

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

“Digital Entrepreneurship and Innovation Eco-system Development Project”

Bangladesh Hi-Tech Park Authority

Information and Communication Technology Division

Ministry of Post, Telecommunication and Information Technology

Office of the Project Director

Level-9, ICT Tower, Agargaon, Sher-e-Bangla Nagar. Dhaka-1207, Bangladesh.



ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) REPORT

OF

***VISION-2041 SMART TOWER
SOFTWARE TECHNOLOGY PARK***



Submitted by

DCON DESIGN STUDIO-KAMAL COGENT ENERGY PVT. LTD. JV

Flat# 4-B, 2/4, Block# A, Mohammadpur Housing Estate, Mirpur Road, Dhaka, Tel: 02-58154775-6

Table of Contents

1.....	1
1. Introduction	2
1.1 Sub-project Background	2
1.2 Objective of ESIA	4
1.3 Scope of ESIA.....	4
1.4 Approach & Methodology	6
2 Sub-project Description.....	8
2.1 Sub-project overview	8
2.2 Sub-project location and Area of Influence	9
2.3 Functional and Technical aspects of Vision 2041 Smart Tower	11
2.4 Green Building elements:	12
2.5 Implementation Schedule and Costing.....	12
2.6 Sub-project activities	12
2.6.1 Pre-construction phase.....	13
2.6.2 Construction Phase	13
Table 2.1: List of equipment use	14
2.7 Features of the sub-project	15
2.7.1 Architectural and engineering features	15
2.7.2 Firefighting facilities	16
2.7.3 Educational Facilities	16
2.7.4 Nearby facilities	16
2.8 Utilities.....	17
2.8.1 Water Supply and sewage	17
2.8.2 Solid waste disposal.....	18
2.8.3 Electric connection.....	18
2.8.4 Telephone connection	18
2.8.5 Transport Coordination	18
2.8.6 Gas connection.....	18
3 Legal and Policy Framework.....	20
3.1 Introduction	20
3.2 Relevant World Bank’s Environmental & Social Framework	20
3.3 World Bank Groups’ EHSs, IFC, 2007	27
3.4 Relevant GoB rules, regulations, policies, legislations, guidelines	27
3.5 Applicable International Treaties Signed by the GoB and their Relevance to the Sub-project³⁴	

3.6	Environmental Institutional Framework.....	36
3.7	Implications of Policies and Environmental Clearance Procedure	36
4	Environmental & Social Baseline.....	39
4.1	Introduction	39
4.2	Data Source	39
4.2.1	Data on physical and biological environment	39
4.2.2	Socio-economic Data	39
4.3	Existing social settings	40
4.4	Physical Environment	40
4.4.1	Topography and physiography.....	42
4.4.2	Seismicity	43
4.4.3	Climate	44
4.4.4	Hydrogeology.....	48
4.4.6	Noise Level	55
4.4.7	Traffic Condition	56
4.5	Biological Environment.....	57
4.5.1	Bio-Ecological Zone	57
4.5.2	Biodiversity of Flora	57
4.5.3	Protected Areas and Endangered Species & Red Book Species	57
4.6	Socio-economic Environment.....	57
4.6.1	Demography and ethnicity	59
4.6.2	Settlement, housing and business	59
4.6.3	Solid Waste Management	59
4.6.4	Health Care Facilities	60
4.6.5	Physical and Cultural Heritage	60
4.6.6	Social and Cultural Resources	60
5	Analysis of alternative	63
5.1	Site Selection.....	63
5.2	Without Sub-project Scenario	63
5.3	With sub-project Scenario	63
5.4	Technological Alternatives	64
6	Anticipated Significant Impact & Analysis	66
6.1	Introduction	66
6.2	Impact Identification	66
6.2.1	Anticipated Impacts During Pre-Construction (Design and Preparation) Phase	66
6.2.2	Anticipated Impacts During Construction Phase	66

6.2.3	Impacts Related to land & assets	71
6.3	Anticipated Impacts During Operation Phase	72
7	Public and stakeholder consultation.....	77
7.1	Purpose of Public and Stakeholder Consultation	77
7.2	Past Consultation and Participation during Feasibility Study	78
7.3	Approach and Methodology for Consultation.....	85
7.4	Stakeholder Identification.....	86
7.5	Stakeholder Consultation	87
7.6	Summary of Consultations	88
7.7	Future Consultation and Disclosure	94
7.8	Grievance Mechanism	94
7.8.1	Grievance Mechanism Structure/Architecture.....	94
7.8.2	STP Level Grievance Redress Mechanism during Operation Stage.....	95
7.8.3	PMU (BHTPA) Level Grievance Redress Mechanism	95
7.8.4	GRM contact information – BHTPA.....	96
8	Institutional capacity assessment and Implementation arrangement.....	99
8.1	Institutional Framework.....	99
8.2	Institutional responsibilities.....	99
8.2.1	ICT Division (ICTD).....	100
8.2.2	Bangladesh Hi-Tech Park Authority (BHTPA).....	100
8.2.3	Individual Consultants	100
8.2.4	Environment and Social Experts.....	100
8.2.5	Sub-project Implementation Unit (PIU)	101
8.2.6	Construction and Supervision Consultant (CSC)	101
8.2.7	Contractors.....	102
8.2.8	Assessment of Capacity of BHTPA.....	102
8.2.9	Action Plan for capacity building.....	102
9	Environmental and Social Management Plan (ESMP)	105
9.1	Introduction	105
9.2	Objective	105
9.3	Options for Impact Mitigation/Protection/Compensation Measures.....	105
9.3.1	Avoidance/Prevention:.....	105
9.3.2	Modification:.....	106
9.3.3	Control/Mitigation:.....	108
9.3.4	Protection/Insulation:	108
9.3.5	Enhancement:	108

9.4	Impact Mitigation Measures	109
9.4.1	Pre-Construction and Construction Phases	109
9.5	Monitoring Indicators	120
9.6	Environmental and Social Monitoring Plans.....	120
9.7	Labor Management Procedure during Construction.....	125
9.7.1	Objectives:	125
9.7.2	Location of Construction Camp and its facilities:	125
9.7.3	Attendance & Working hours.....	126
9.7.4	Activities prohibited at site	127
9.7.5	Guidelines for night time working at the site.....	127
9.7.6	Record keeping & Maintenance	127
9.7.7	Auditing & Inspection	127
9.7.8	Grievance Redress Mechanism	127
9.7.9	Issues with GBV/SH/SEA, child and Forced labor	127
9.7.10	Security System.....	127
9.7.11	Closure of the Construction Site and Construction Labor Camps	128
9.8	Emergency and Disaster Preparedness and Response Plan	128
9.8.1	Emergency Response Plan.....	128
9.9	Guidelines for environmental and social conditions in contract documents	131
9.10	Implementation cost and Responsibility	133
10	Conclusion and Recommendation	137
10.1	Conclusions	137
10.2	Recommendations.....	137
10.3	Limitations of the study.....	138
10.4	Disclosure of Environmental and Social Safeguards Instruments.....	138
ANEEXURE 1	140
Feature of the sub-project	140
Architectural and engineering features	140
ANNEX 2: WASTE MANAGEMENT PLAN	152
ANNEX 3: OCCUPATIONAL HEALTH AND SAFETY GUIDANCE.....	158	
ANNEX 4: EMERGENCY PREPAREDNESS AND RESPONSE PLAN	164	
ANNEX 5: DISASTER MANAGEMENT PLAN	167	
ANNEX6: STANDARD OPERATING PROCEDURES.....	170	
ANNEX7: SAMPLE 'GRIEVANCE FORM' AND GRIEVANCE MECHANISM OF PRIDE SUB-PROJECT		

ANNEX 8: RESULTS OBTAINED FROM THE MEASUREMENT OF O₃EL, AND LAB TESTS OF AIR AND WATER QUALITY PARAMETER.....	172
ANNEX 9: TRAFFIC COUNTING RESULTS.....	182
ANNEX10: SIGNATURE SHEET OF STAKEHOLDER CONSULTATION	198
ANNEX 11: Grievance Mechanism	204
Grievance Mechanism Structure/Architecture	204
STP Level Grievance Redress Mechanism during Operation Stage.....	205
PMU (BHTPA) Level Grievance Redress Mechanism	205
Grievance Mechanism Intake Channels.....	206
Grievance Registry, Referral, Resolution and Appeals Process	207
GRM Monitoring and Reporting.....	207
GRM contact information – BHTPA.....	207

List of Table

Table 2.1: List of equipment use	14
Table 2.2: List of nearby emergency facilities	17
Table 3.1: World Bank policies and relevance	20
Table 3.2:EHSGs, IFC, 2007	27
Table 3.3: National Policy/Act/Rules and their relevance	27
Table 3.4: Relevant International Treaties, Conventions and Protocols Signed and Accessed to by Bangladesh.	34
Table 3.5: Process obtaining ECC from DoE	37
Table 4.1: Monthly Average Sunshine hours in Dhaka	48
Table 4.2: Surface water quality	49
Table 4.3: Groundwater Quality	52
Table 4.4: Air quality nearby sub-project locations	55
Table 4.5: Noise level data collection	56
Table 6.1: Impact analysis chart	74
Table 7.1: Findings from Consultations during Beginning Phase to the ESIA	80
Table 7.2: Finding from consultation on draft ESIA	83
Table 7.3: Schedule and Participation of Current Consultation Meetings	88
Table 7.4: Stakeholder consultation and KII with summery	91
Table 8.1: Capacity Development Initiative Chart (Proposed)	103
Table 9.1: Impacts during Pre-Construction, Construction and Operation Phases , Related Mitigation Measures and Responsible Authority	110
Table 9.2: Environmental and Social Monitoring Plan, frequency of monitoring and responsible authority	121
Table 9.3: Emergency Response Plan	131
Table 9.4: ESMP Implementation Costing (Contractor’s part)	134

List of Figure

Figure 1.1: Process flow of ESIA Study	5
Figure 2.1: Sub-project Location Map	8
Figure 2.2: Proposed Location for Smart Tower	9
Figure 2.3: Inside of the sub-project location	9
Figure 2.4: 1 km influence area map	9
Figure 2.5: Locational Map in Scale	10
Figure 2.6: Consideration of natural sunlight during design of sub-project	11
Figure 2.7: Exterior view of STP2 (Day time)	16
Figure 4.1: Zoning of Karwan bazar	41
Figure 4.2: Housing type surrounding the sub-project	42
Figure 4.3: Land use map	43
Figure 4.4: Seismic Zone Map of Bangladesh	44
Figure 4.5: Seismic vulnerability map of Dhaka	44
Figure 4.6: Average High and Low temperature in Dhaka (1987-2022)	45
Figure 4.7: Yearly average Rainfall & Rainy days of Dhaka	46
Figure 4.8: Monthly average rainfall of Dhaka	46
Figure 4.09: Yearly average cloud and humidity of Dhaka	46
Figure 4.10: Yearly average Wind Speed (2010-2022)	47
Figure 4.11: Wind Direction of Dhaka	47
Figure 4.12: Average monthly hours of Sunshine in Dhaka, Bangladesh	48
Figure 4.13: Surface water collection from Hatirjheel lake	49
Figure 4.14: Surface water collection from a drain in front of Vision 2041 smart tower	49
Figure 4.15: Groundwater data collection from basement of STP1	52
Figure 4.16: Groundwater sample collection from WASA	52
Figure 4.17: Live air quality of Dhaka (accessed on 14.07.22)	54
Figure 4.18: Air quality sample collection points	54
Figure 4.19 :Air quality and noise level data collection near Vision 2041 smart tower(Kawranbazar Road 1)	56
Figure 4.20: Air quality & noise level data collection in Kawranbazar	56
Figure 4.21: Solid waste in the sub-project area	60
Figure 6.1: STP Sizing	69
Figure 7.1: Group Discussion with pepe potti people	79
Figure 7.2: KII with Locals	79
Figure 7.3: Discussion with STP 1 people	79
Figure 7.4: Discussion with existing IT businessmen of STP 1	79
Figure 7.5: Consultation with sub-project affected people	79
Figure 7.6: Sub-project consultation	79
Figure 7.7: Stakeholder consultation in STP 1	89
Figure 7.8: Stakeholder consultation with mixed group of stakeholders	89
Figure 7.9: Stakeholder consultation with wholesaler group	90
Figure 7.10: Consultation with local people of kawranbazar	90
Figure 7.11: Stakeholder consultation with labor and businessmen of Kawranbazar	90

Figure 7.12: KII with officials of IT park	90
Figure 7.13: KII with MD of a company in STP 1	90
Figure 7.14: GRM Flow Chart	96
Figure 8.1: Proposed institutional framework for ESMP implementation	99
Figure 9.1: Process Flow Diagramme of Biocleaner STP	107
Figure 9.2: Biocleaner STP Layout	107

Annexures: Tables and Figures

Table 1 (1): Floor Plan	141
Table 2 (1): Waste Management Objectives	152
Table 6 (1): Standard Operating Procedures	170
Table 7 (1): Sample Grievance Form	170
Table 9 (1): Traffic Counting Results	182

Figures:

Figure 1(1): Basement Floor Plan 1	142
Figure 1(2): Basement Floor Plan 2	143
Figure 1(3): Basement Floor Plan 3	143
Figure 1(4): Basement Floor Plan 4	144
Figure 1(5): Ground Floor Plan	144
Figure 1(6): First Floor Plan	145
Figure 1(7): 2 nd Floor Plan	146
Figure 1(8): 3rd Floor Plan	146
Figure 1(9): 4th Floor Plan	147
Figure 1(10): 5th Floor Plan	147
Figure 1(11): 6th Floor Plan	148
Figure 1(12): 7th Floor Plan	148
Figure 1(13): 8 th Floor Plan	149
Figure 1(14): Roof Floor Plan	149
Figure 1(15): Space Calculation of Different Floor	150
Figure 1(16): Master Plan of Total Area	151

Figure 1(17): Exterior view of Vision 2041 Smart Tower (Day time)	151
Figure 2(1): The Waste Hierarchy	152
Figure 2(2): General Lay out garbage room	155
Figure 3(1): Risk Assessment Steps	159
Figure 11(1): Grievance Mechanism Structure	205
Figure 11(2): GRM flow chart	209

Abbreviations and Acronyms

AP	Affected Persons
AR	Analytical Reagent
BBS	Bangladesh Bureau of Statistics
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BMD	Bangladesh Meteorological Department
BNBC	Bangladesh National Building Code
BOD	Biochemical Oxygen Demand
BWDB	Bangladesh Water Development Board
CBD	Convention on Biological Diversity
CGS	Centimeter, Gram, Second
CRM	Certified Reference Material
CSC	Construction Supervision Consultant
COD	Chemical Oxygen Demand
DEPC	Department of Environmental Pollution Control
DG	Director General
DMT	Disaster Management Team
DoE	Department of Environment
DoM	Department of Meteorology
DNCC	Dhaka North City Corporation
DPHE	Directorate of Public Health Engineering
EA	Environmental Assessment
ECA	Environmental Conservation Act
ECC	Environmental Clearance Certificate
ECR	Environment Conservation Rules
EHS	Environmental Health and Safety
EHSGs	Environmental Health and Safety Guidelines
EPA	Environmental Protection Agency
ESIAs	Environmental and Social Impact Assessments
ESMP	Environmental and Social Management Plan

EQS	Environmental Quality Standards
ERDMP	Emergency Response Disaster Management Plan
ESIA	Environment and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	Environment and Social Standard
FGD	Focus Group Discussion
FIs	Financial Intermediaries
FPIC	Free, Prior and Informed Consent
FS	Feasibility study
GHG	Green House Gas
GBV	Gender Based Violence
GIIP	Good International Industry Practice
GIS	Geographic Information Systems
GoB	Government of Bangladesh
GPS	Global Positioning System
GPM	Gallons Per Minute
GRM	Grievance Redress Mechanism
HHs	Households
ICT	Information and Communication Technology
ICTPs	International Conventions, Treaties and Protocols
IECs	Important Environmental Components
IEE	Initial Environmental Examination
ILO	International Labor Organization
IPM	Integrated Pest Management
IUCN	International Union for Conservation of Nature
KII	Key Informant Interview
KLD	Kilo Liter Per Day
LMP	Labor Management Plan
LPCD	Liter Per Capita Per Day
MEA's	Multilateral Environmental Agreements
MoEFCC	Ministry of Environment, Forest and Climate Change
NCS	National Conservation Strategy
NEMAP	National Environmental Management Action Plan
NEQS	National Environmental Quality Standards
NOC	No Objection Certificate
O ₃	Ozone
OMS	Operation Management System
PAP	Project Affected People
PCU	Passenger Car Unit
PMU	Sub-project Management Unit
PPE	Personal Protective Equipment
PSCP	Pollutant Spill Contingency Plan

RA	Risk Assessment
RAP	Resettlement Action Plan
SC	Supply Chain
SEISs	Significant Environmental and Social Impacts
SRDI	Soil Resources Development Institute
SSC	Site Safety Certification
STP	Software Technology Park
SWM	Solid Waste Management
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
WHO	World Health Organization
WMP	Waste Management Plan

Executive Summary

The government of Bangladesh has declared "Vision 2021," with the goal of transforming Bangladesh into a middle-income country through the use of information and communication technology (ICT). The government has taken a number of initiatives to meet the goals. The Bangladesh Hi-Tech Park Authority (BHTPA) was established to foster digital entrepreneurship and private investment in the IT and IT-enabled services (ITeS) industries, as well as employment development. The World Bank approved USD 500.00 million for the Government of The People's Republic of Bangladesh in a project titled 'Private Investment and Digital Entrepreneurship (PRIDE)' to be implemented during August 2023 to December 2025. Among the components of the PRIDE project, the fourth component is—strengthening the digital entrepreneurship and innovation ecosystem—aims at strengthening the foundation of the digital entrepreneurship and innovation ecosystem in the country. BHTPA currently operates the Vision 2021 Tower STP-1 in an old building at Kawran Bazar that rents out 72,000 ft² of workspace to IT and ITeS firms. The building needs upgrading and improved maintenance of some items. BHTPA has also decided to construct a new building to host approximately 100 small and medium-sized firms with 2,000 professionals plus another 100-200 micro entrepreneurs. The proposed 9-storey building with 4 basements (Vision 2041 Smart Tower) site is on the land owned by Bangladesh Hi-Tech Park Authority at Kawran Bazar in Dhaka North City Corporation.

To construct a Climate Resilient, Eco-friendly and Green Vision 2041 Smart Tower (Software Technology Park) beside existing Vision 2021 Tower STP-1 at Kawran Bazar, Dhaka, some of the important issues have been considered. To address the climate resilient issues, the Vision 2041 Smart Tower will incorporate the following components of the green building concept: Energy efficiency, Water efficiency, Environment friendly and environmentally preferable building materials and specifications, Reduction of pollutants, Indoor air quality, Sustainable development & designed in such a way that it will allow maximum sunlight and natural airflow so that rooms and common spaces will use natural light with a cool environment.

This updated ESIA has been updated following the relevant policies and legislation of GOB and WB ESF standards. To prepare this report major national policies and legislation were analyzed and discussed. For example, National Environment Policy 2018, Environment Conservation Act 1995, Environment Conservation Rules 2023 which are the main legal framework of environment for developing a project or industry in the country. These legal tools describe project categories based on site risk, impact and area. They describe environmental clearance procedures and measures taken against non-compliance of polluters. The WB ESF has also been reviewed as the Bank's ESF sets out the WB's commitment to sustainable development, through a bank policy and a set of environmental and social standards that are designed to support the project, which sets out the mandatory requirements that apply to the bank.

Apart from the mentioned policies, laws and regulations, some other relevant laws and policies have been discussed for upgradation in this report. Moreover, since Bangladesh is a ratifying or signatory country to adhere to some important treaties, protocols and conventions, they are also briefly discussed.

To assess the extent of water pollution at the site, three representative samples were collected randomly. First sample was collected from the nearby water body Hatirjheel, second sample was collected from the drain beside the sub-project location and the third sample was collected from a drain beside the vegetable market of Kawran Bazar (nearby water body) for chemical analysis to determine concentration of pH, Turbidity, DO, BOD₅, COD, TSS, TDS, Total Coliform and Fecal

Coliform. The test result shows that BOD₅, COD concentrations, TSS and Turbidity for two locations are high. Whereas, in another location (Hatirjheel lake) BOD₅ is slightly higher, COD and DO are within standard, TSS and Turbidity is higher. Besides, these each location is contaminated with Coliform bacteria since the Total Coliform and Fecal Coliform counts are found high as compared to the Bangladesh standard. TDS value is well below the acceptable value of Bangladesh standards.

Groundwater samples were collected from three points around the sub-project area. Sample's locations were adjacent to STP-1, city corporation market area and DWASA Bhaban. The physical and chemical parameters (pH, turbidity, alkalinity, iron, lead, manganese) are found satisfactory and within DOE standards and the arsenic concentration is also within the acceptable limit. No trace of Total coliform and Fecal Coliform.

Ambient air samples were measured from three points within the boundary of the sub-project site for 8 hours during peak time of the day using Combo sampler. The GPS points of three sites are 23.749898N, 90.393310E; 23.753945N, 90.393103E and 23.753951N, 90.393103E. Monitoring data shows that the PM₁₀, PM_{2.5}, NO_x, SO₂, and CO values are within DoE standards.

Noise levels were measured at three different locations comprising commercial area and mixed area. The GPS points of three sites are 23.749898N, 90.393310E; 23.753945N, 90.393103E and 23.753951N, 90.392289E. Day time noise levels slightly exceeded the allowable limits because the roads are always busy with movement of different types of vehicles. On the other hand, at night-time heavy-duty vehicles are added on road together with intercity bus services.

Possible impacts anticipated during construction phase of the Vision 2041 Smart Tower Sub-Project are: Air pollution caused by exhaust of various construction vehicles and various moving and stationary equipment, and dust from construction activities; construction of multistoried basement and pile foundation may cause risk to nearby structures; large volume of excavated soil because of piling operation, noise caused by machines and equipment and various other construction activities; contamination of drainage channels by construction activities; potential contamination of surface water sources, groundwater resources and hampering of business activities.

Operation phase of the sub-project is likely to cause the following impacts if appropriate measures are not taken: Traffic congestion because of vehicle movement; Air pollution and noise hazard from all the incoming vehicles; potential pollution of surface water and groundwater from runoff and other contamination and drainage congestion due to unmanaged solid waste and construction waste. If there is no proper sewage system then it will be a problem for tenants and environment.

Different stakeholder consultations were conducted to gather input and feedback from various parties who seemed to be affected by the project. The consultations aimed to understand the concerns, interests, and expectations of stakeholders and incorporate them into the ESIA process. Key stakeholders involved in the consultation process included local elected representatives, community leaders, business owners, government agencies, IT/ITEs industry representatives, business owner associations leaders and poor and vulnerable groups who lives nearby and work in Karwanbazar. The consultations were conducted through public meetings, workshops, Key Informant Interview (KII), Focus Group Discussion (FGD) and one-on-one interviews.

The ESMP in this report addresses the issues related to the temporary disruption of the utility services, stock piling of construction materials, large volume of excavated soil because of piling operation, disruption of traffic flow, air and water pollution management, dust suppression, noise and vibration management that would occur during the construction activities, solid waste and wastewater management during both the construction and operational phases, workers' health

and safety, GBV, SEA, SH, Labour camp management, and disaster and emergency response management.

The responsibility of the ESMP implementation as well as its supervising authority have been defined. A tentative ESMP implementation costing has also been incorporated into the ESIA report. These costing amounts are also kept in the BOQ of bidding documents. Compliance monitoring shall be conducted for the workers (Wage, increment, working hours, incidents of GBV, SEA and SH etc.), noise, water and air pollution, solid waste and wastewater management, OHS etc., during the construction and the operation phases. Monitoring standards as well as the monitoring frequencies shall be followed by the respective contractor and implementation agency. Specific reporting mechanism described in the report.

Possible important mitigation measures outlines in the report are: Storage of oil and chemical materials in an appropriate storage site to prevent permeation into the ground, prohibit illegal dumping of solid waste, measures should be taken so that no dusts come from the nearby moving vehicles, water spraying to control dust as per necessary, use tarpaulins to cover soils, sand and other loose material when transported by trucks, use of high noise generating equipment shall be avoided. Remove all construction and demolition wastes on a daily basis, measures should be taken to shift the excess excavated soils immediately to designated areas, no construction waste materials like earth, stone, polythene, paper, wood and concrete are kept in the sub-project area that may block the flow of water of existing drains, clean the construction side drain regularly, all vehicles delivering fine materials to the site and carrying waste debris for disposal shall be covered to avoid spillage of materials, the contractor may follow the traffic management plan which is annexed to the ESIA, shore protection shall be implemented prior to excavation of earthworks so that nearby structures are safe and secure during pilling.

The contractor shall immediately take the necessary remedial action on any complaint/grievance received by himself and forward the details of the grievance along with the action taken to the PMU within 72 hours of receipt of such complaint/grievance. Produce and implement a site health and safety (H&S) plan approved by PMU which include measures as: (i) excluding the public from worksites; (ii) ensuring all workers are provided with and required to use personal protective equipment at the working hours; (iii) providing (H&S) training for construction site personnel; (iv) documenting procedures to be followed for all site activities; and (v) maintaining accident reports and records. Arrangement for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances. Maintain necessary living accommodation and ancillary facilities in functional and hygienic manner in work camps. Ensure (i) uncontaminated water for drinking, cooking and washing, (ii) clean eating areas where workers are not exposed to hazardous or noxious substances; (iii) providing fire extinguisher at construction site and (iv) sanitation facilities are available at all times.

Depending on the scope, design and location of the sub-project and construction of a 09-storey new building may pose considerable risk to the sub-project site. As such sub-projects may fall under "yellow" category as per ECR, 2023, IEE, EIA and EMP are required to be conducted to obtain environmental clearance. For obtaining environmental clearance a fixed amount of fee is required to be deposited by treasury challan as per schedule 7 of ECR, 2023. Initially IEE report has already been prepared and submitted to DoE for obtaining site clearance along with proposed TOR of EMP. But the DOE said in its decision as a sub-project, a 9-storey office building will be reconstructed on the site, it will not fall under the high-rise building. Therefore, the DOE disposed of the matter saying, "if it does not fall under the category of high rise, no environmental clearance is required as per the relevant rules". Therefore, this will fall under the medium risk sub-project as the DoE's

decision on not requiring environmental clearance. However, as per WB's ES risk classification, the sub-project will fall under substantial risk that requires ESIA and ESMP.

After finalization of all necessary design and other related matters, this ESIA is updated. The Environmental and Social Impact Assessment (ESIA) of the sub-project took into account the detailed engineering design for the construction of the proposed building and identified the expected environmental and social impacts due to various activities during the pre-construction, construction and operational phases of the sub-project.

In order to mitigate potential negative impacts and enhance measures for positive impacts, an outline of the ESMP is provided to mitigate/enhance the impacts, which are expected to occur during the pre-construction, construction and operation phases of the sub-project. The report also includes an ESMP monitoring plan that includes the standards and frequency of monitoring.

CHAPTER: 1

Introduction

1. Introduction

1.1 Sub-project Background

Information Technology (IT) allows for quick and easy access to information, which is critical for a country's development. Large IT companies are springing up all over the world, and countries are expanding and promoting their IT sectors by establishing IT platforms. Asian countries are also participating in the surge by creating favorable conditions that attract global IT corporations to invest in their respective countries. Existing tech giants such as Microsoft, Apple, Samsung and others are showing great interest in investing in Asian countries due to low labor benefits. Bangladesh, with its vast underutilized labor supply can likewise gain from such initiatives if a well-developed foreign investment platform with a nationwide IT infrastructure and skilled labor force is established.

The government of Bangladesh has declared "Vision 2021," with the goal of transforming Bangladesh into a middle-income country through the use of information and communication technology (ICT) and the creation of a conducive business environment for high-tech enterprises. Recently, the ICT sector has been described as the "thrust sector" in Bangladesh's economy. The government has taken a number of initiatives to meet the goal.

The Bangladesh Hi-Tech Park Authority (BHTPA) was established to foster digital entrepreneurship and private investment in the IT and IT-enabled services (ITeS) industries, as well as employment development. BHTPA is in charge of establishing and expanding Hi-Tech Parks (HTPs) and Software Technology Parks (STPs) across the country, as well as of managing, operating, and developing those.

Over the years, significant progress has been made in the IT sector towards the formation of "Digital Bangladesh", and more efforts are on the way. To fully capitalize on the prospects presented by global IT expansion, Bangladesh should devote significant resources to further expanding the IT sector in order to attract foreign investors in a competitive market with other technologically advanced/well-invested Asian countries. At present, IT sector has been gaining enormous interest in Bangladesh. There are over 100 software firms, 35 data entry centers, tens of thousands of formal and informal IT training centers, and a plethora of computer stores. As part of this, the government is taking steps such as creating a hi-tech park or an IT park and encouraging the private investors to create their own IT park. In recent years, the information and communication technology (ICT) business has grown significantly in size and strength across the globe. Bangladesh isn't an exception to this phenomenon. Though ICT industry is young in Bangladesh, it is now the fastest expanding sector. This industry has so many potentials for the growth of sustainable economics in the country.

Bangladesh has designated ICT as a "push sector" because it has the ability to facilitate successful reforms, job creation, industrial expansion, and high spillover effects to other sectors, as well as improve governance and inclusivity. The current World Bank Country Assistance Strategy for Bangladesh recognizes the importance of information and communication technology in advancing Bangladesh's economic, competitiveness, and governance goals. Ranking as one of the largest industries in the world, the ICT market is forecasted to reach a size of 5.5 trillion dollars in 2022, and almost six trillion by 2023 (<https://www.statista.com/statistics/263801/global-market-share-held-by-selected-countries-in-the-ict-market/>).

The World Bank Board has approved USD 500.00 million for Government of The People's Republic of Bangladesh in a project titled 'Private Investment and Digital Entrepreneurship (PRIDE)' to be implemented during January, 2021 to December, 2025. The execution of the project is vested upon two Sub-project Implementing Entities (PIEs)—Bangladesh Economic Zones Authority (BEZA) and Bangladesh Hi-Tech Park Authority (BHTPA). Economic Relations Division (ERD) has been given the

responsibilities to play coordinating role to ensure smooth operation of the sub-project. Among others, Central Coordination Unit (CCU) of ERD will act as the single point delivery mechanism of progress reports, results framework reports and other fiduciary requirements to World Bank, as well as monitoring fund flows and utilization, DLIs verification and project activity monitoring for quality control support.

The project PRIDE is built upon the foundation laid by Private Sector Development Support project (PSDSP) that will strengthen capacity to start delivering by BEZA and BHTPA on their mandates and help generate positive outcomes. The Project Development Objectives (PDOs) of PRIDE are to promote private investment, job creation and environmental sustainability in participating economic zones and software technology parks in Bangladesh.

There are four components to the proposed Bangladesh Private Investment and Digital Entrepreneurship (PRIDE) project:

1. Component 1: Creating an Enabling Environment for Private Investment and Job Creation
 - a) **Sub-component 1.1:** Promoting good governance and administrative efficiency
 - b) **Sub-component 1.2:** Promoting public private participation
2. Component 2: Supporting phased development of the BSMSN Green Industrial City
 - a) **Sub-component 2.1:** Developing environmentally sustainable and resilience infrastructure
 - b) **Sub-component 2.2:** Last mile infrastructure to implement the Master Plan for BSMSN
3. Component 3: Creating a dynamic private market for serviced industrial land
4. Component 4: Strengthening the digital entrepreneurship and innovation ecosystem
 - a) **Sub-component 4.1:** Establishing Digital Entrepreneurship Hub in Dhaka
 - b) **Sub-component 4.2:** Digital Entrepreneurship and Innovation Support Program

Of these the first three will be implemented by Bangladesh Economic Zones Authority (BEZA), and the fourth component will be implemented by BHTPA. The fourth component—**strengthening the digital entrepreneurship and innovation ecosystem**—aims at strengthening the foundation of the digital entrepreneurship and innovation ecosystem in the country. The specific goals are: (a) for STPs and leading universities to evolve into entrepreneurship hubs, (b) to improve the market entry and growth rates of digital startups and small and medium-sized enterprises in the digital economy, and (c) to create a gender-inclusive culture for digital entrepreneurship. The fourth component of the PRIDE Sub-project has two subcomponents: **Sub-Component 4.1. Establishing Digital Entrepreneurship Hub** in Dhaka that aims to establish Dhaka as a relevant digital entrepreneurship hub in South Asia and **Sub-Component 4.2. Digital Entrepreneurship and Innovation Support Program**, which will design and implement a digital entrepreneurship and innovation support program to attract more youth and professionals to become digital entrepreneurs; provide start-up and scale-up facilities and services for entrepreneurs in STPs to increase the number of firms that are investment ready; and establish a number of university innovation hubs (UIH) in technological universities across the country. Out of which 07 (seven) UIHs have already been selected and civil work is in full swing in three UIHs.

The Sub-Component 4.1. will help establish Dhaka as a relevant digital entrepreneurship hub in South Asia. It will do so by facilitating network effects and developing Bangladesh's first significant cluster of IT and ITeS firms. BHTPA currently operates the Vision 2021 Tower STP-1 in an old but ideally located government building those rents out 72,000 ft² of workspace to IT and ITeS firms. The building needs upgrading and improved maintenance of common spaces. BHTPA has decided to construct 100,000-125,000 ft² of workspace for Vision 2041 Smart Tower() to create a proper cluster of up to 200,000 ft² of micro, small and some medium-sized enterprises that serve the digital economy. The sub-component would finance works, goods and technical assistance to: (a) upgrade and expand Vision 2021 Tower STP-1 by adding 100,000-125,000 ft² of workspace through public and private

investment; and (b) assess the feasibility and develop models for private participation for the expansion and management, and then promote private tenants to the site. This STP will host approximately 100 small and medium-sized farms with 2,000 professionals plus another 100-200 micro entrepreneurs.

The proposed 9-storied building plus 4 basements site is on the land owned by Bangladesh Hi-Tech Park Authority, ICT Division under Ministry of Posts, Telecommunication and Information Technology. The report presents the findings of the Environmental and Social Impact Assessment (ESIA) of the Establishment of Vision 2041 Smart Tower Software Technology Park. This ESIA has been updated based on the World Bank's ESF standards, and related national laws and regulations and any other relevant international environmental and social laws and regulations. The ESIA includes an ESMP, which describes the mitigation measures, monitoring plan, capacity building, responsibilities and reporting system and budget.

1.2 Objective of ESIA

The objectives of the ESIA are:

- I. To identify and assess environmental and social risks and impacts of the sub-project (construction of the Vision 2041 Smart Tower) in accordance with the WBs ESSs and pertinent GoB laws and policies and to be considered during the planning, design, and implementation stage of the sub-project (pre-construction, construction, and operation phases of the sub-project);
- II. To create a hierarchy of mitigation measures for the sub-project's environmental and social risks, including: a) anticipating and avoiding risks and impacts; b) minimizing or reducing risks and impacts to acceptable levels, if avoidance is not possible; c) mitigating risks and impacts; and d) compensating for or offsetting significant residual impacts, where technically and financially practical;
- III. To assist in identifying distinct consequences on the underprivileged or vulnerable group of people and, where appropriate, propose different steps to alleviate such impacts;
- IV. To determine the implication and significance of social institutions, systems, laws, and regulations in the evaluation, creation, and execution of sub-projects, where necessary; to spot any gaps;
- V. Recommend specific measures to avoid or mitigate adverse environmental and social impacts and to enhance positive impacts.
- VI. Prepare implementable Environmental and Social Management Plan (ESMP) for managing the environmental and social impacts and risks and;
- VII. Recommend suitable institutional mechanisms to monitor and supervise effective implementation of ESMP.

1.3 Scope of ESIA

The scope of this ESIA study has been made in accordance with the requirements of the rules and regulations of the Government of Bangladesh and the World Bank's ESF standards.

An ESIA report was prepared during the sub-project planning phase. After completing the detailed drawings and designs, this current version has been updated to include all required elements and obligations of the ESIA.

ESIA process involves identification of the key impacts on natural and social environment and evaluation of the significant impacts along with recommendation of measures as well as listing of

unresolved environmental issues. The ESIA includes collection of baseline information, identification of important environmental and social components through scoping session, setting up of spatial and temporal boundaries for assessing impacts, impact assessment and evaluation and suggestion of mitigation measures and providing an environmental and social management plan. The processes followed in the ESIA study is presented in the following Figure 1.1.

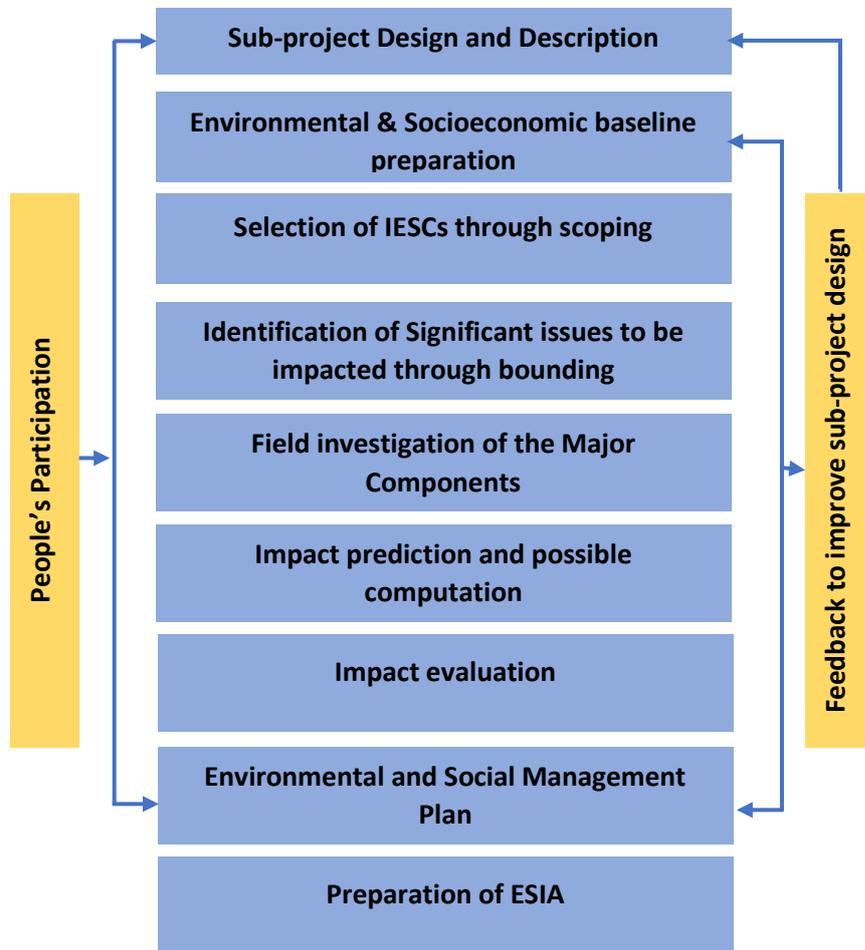


Figure 0.1: Process flow of ESIA Study

The scope of the ESIA are as follows:

- I. Assessment of the current physical, biological, and socioeconomic conditions in and around the sub-project area
- II. A review of the legislative, regulatory and policy guidelines and considerations relevant to the sub-project;
- III. Identification of alternatives to the sub-project, if any, in terms of environmental and social perspectives;
- IV. Evaluate the potential impacts of the sub-project on the surrounding natural and human environment
- V. Stakeholders consultation in order to identify any environmental and social issues that have been overlooked as well as to incorporate their perceptions into the sub-project
- VI. Updating of environmental and social management plans.

1.4 Approach & Methodology

For this ESIA study, both of the qualitative and quantitative method have been followed simultaneously. For risk analysis and ESIA, Matrix method has been followed. Within this matrix, the identified Environmental and Social impacts are estimated using weighted average method based on the marking allocated for each impact. The task of updating this ESIA report consisted of the following sequential steps:

- I. Identification of all activities including their final design to be carried out under the sub-project;
- II. Finding and screening the environmental factors pertinent to the planned activities through a scoping procedure;
- III. Field visit to gather social and environmental baseline data;
- IV. Development of a Stakeholder Engagement Plan (SEP) and interaction with stakeholders involved in and affected by the sub-project;
- V. Evaluation of potential risk and impacts on pertinent environmental and societal factors;
- VI. Recommending mitigation actions in accordance with the mitigation hierarchy to address potential negative impacts;
- VII. Prepare an Environmental and Social Management Plan (ESMP);
- VIII. Other plans and process identification and preparation of plans for smooth construction and operation of the IT park.

The field visits to the sub-project sites helped to identify the environmental and social parameters/components (relevant to the sub-project actions) which are likely to be affected. The field visit also included participatory approach, which involved discussions with local people in order to identify the perceptions and priorities of the stakeholders in and around the study area. Apart from the local people, information was obtained from the local businessmen, social elites and elected local representatives. Key Informant Interviews (KIIs) with concerned government officials were also carried out. Information was also derived from secondary sources such as different reports, journals, satellite imagery analysis, etc. The team also collected some primary data of air, surface water, ground water, noise in and around the sub-project area. These data have been analyzed and discussed in Chapter 4. A stakeholder consultation meeting on the key findings of the ESIA and ESMP was held on 5 July 2022 near the sub-project site. The recommendations of the stakeholders have been included in this ESIA report (Chapter 7). Other than these Stakeholder consultations recommendations, some more consultations were held during the preparation of ESMF report. All consultations summary and recommendations have been described sequentially in this report.

CHAPTER 2

Sub-project Description

2 Sub-project Description

2.1 Sub-project overview

The proposed site for the establishment of 09 Storied Software Technology Park is located at Plot No. 49/A, 49/B, 49/C Kawran Bazar (figure: 2.1), Dhaka, in a Commercial Area. The sub-project area is a 0.47-acre plot adjacent to the south of the STP-1 (Software Technology Park – 1). Other than commercial activities this area is dominated by office, institutions and market buildings. The proposed site is located to the East of the Airport-Gulistan Highway about 7 kilometers from the center (zero point) of Dhaka City and about 12 km from the Dhaka International Airport.

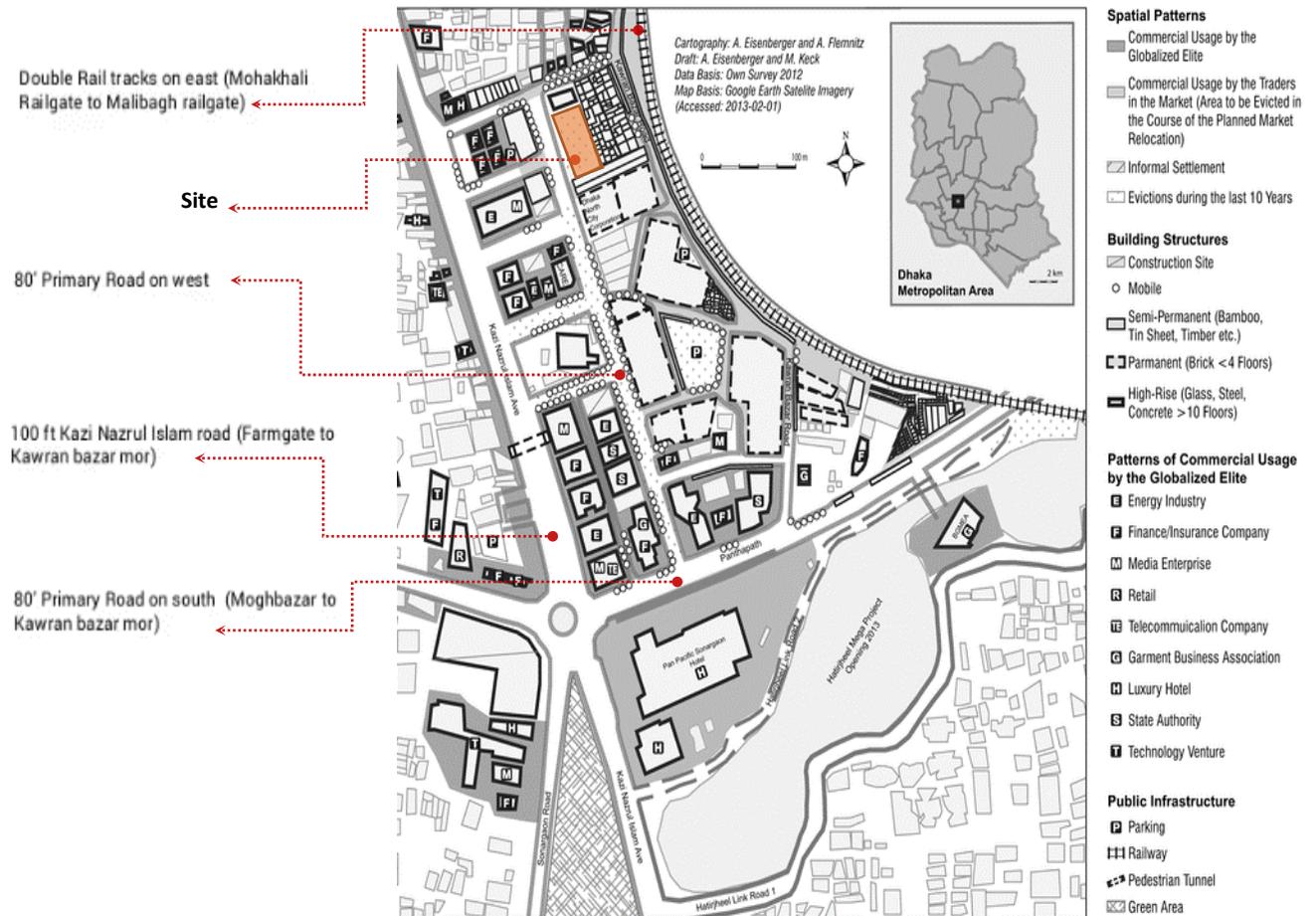


Figure 2.1: Sub-project Location Map

Following figure 2.2 and 2.3 shows the existing condition of the proposed sub-project site. The Vision 2041 Smart Tower will be a center for software development, Research and Innovation, Hardware and Networking, Data Centre, Call center, IT Training Institute and all IT related Business development activities.



Figure 2.2: Proposed Location for Vision 2041 ST



Figure 2.3: Inside of the sub-project location

2.2 Sub-project location and Area of Influence

The area within 1 km radius of the sub-project site may be directly or indirectly impacted by the sub-project activities, which has been considered as the area of influence (figure 2.4) for this sub-project. To the west there is a 100 feet wide road named Kawran Bazar road.

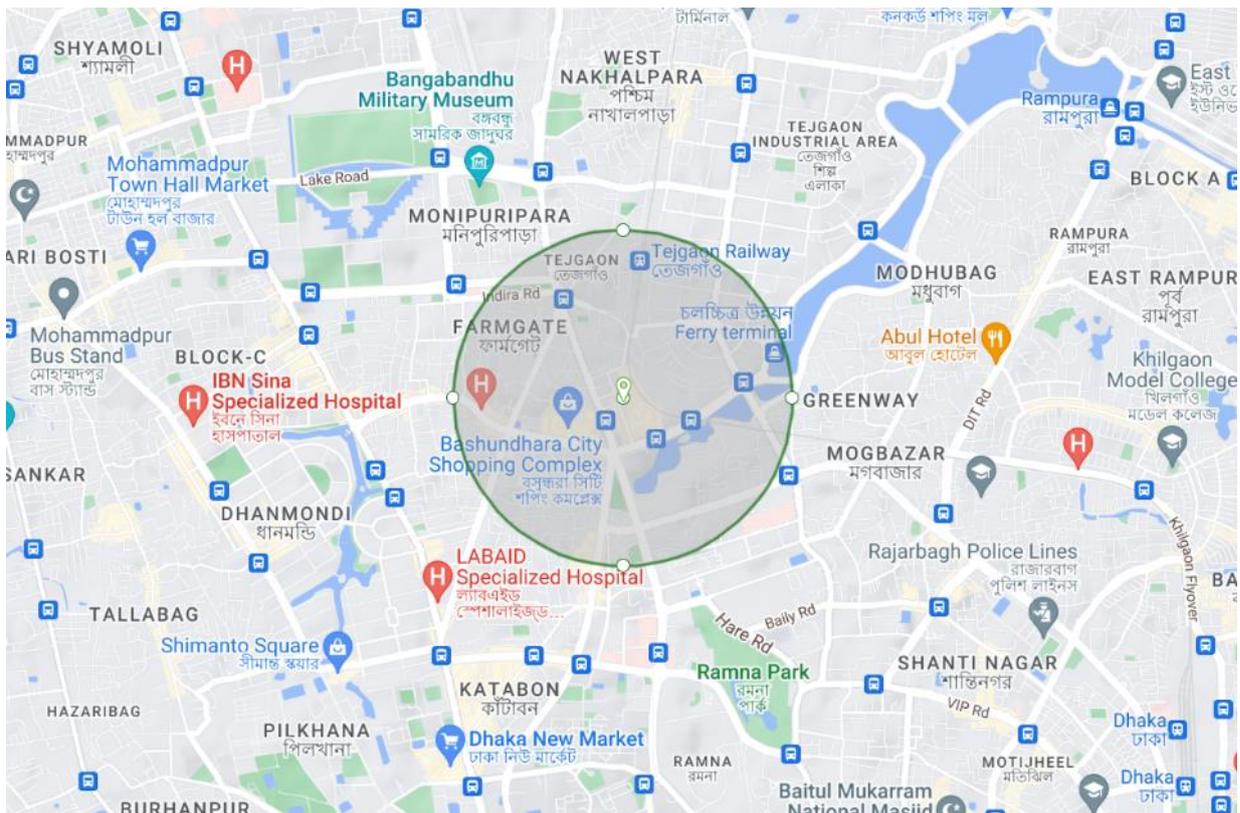


Figure 2.4: 1 km influence area map

This is key road in this area that crisscrosses the commercial zone from south to north. During the day, the road is used for parking of adjacent government and nongovernment office cars, pickups, and buses in two to three lines, sometime narrowing the road to half of its capacity. Commuters are often able to use only one fourth of each thoroughfare in that area. Moreover, most of the day the road is blocked by a heap of wastes generated by the wholesale market. During night, this road becomes the key unloading space for trucks as well as a business space for the retailers. Often this

road and roads adjacent to it have back-to-back traffic until late night as trucks pour in from various parts of the country for delivering goods.

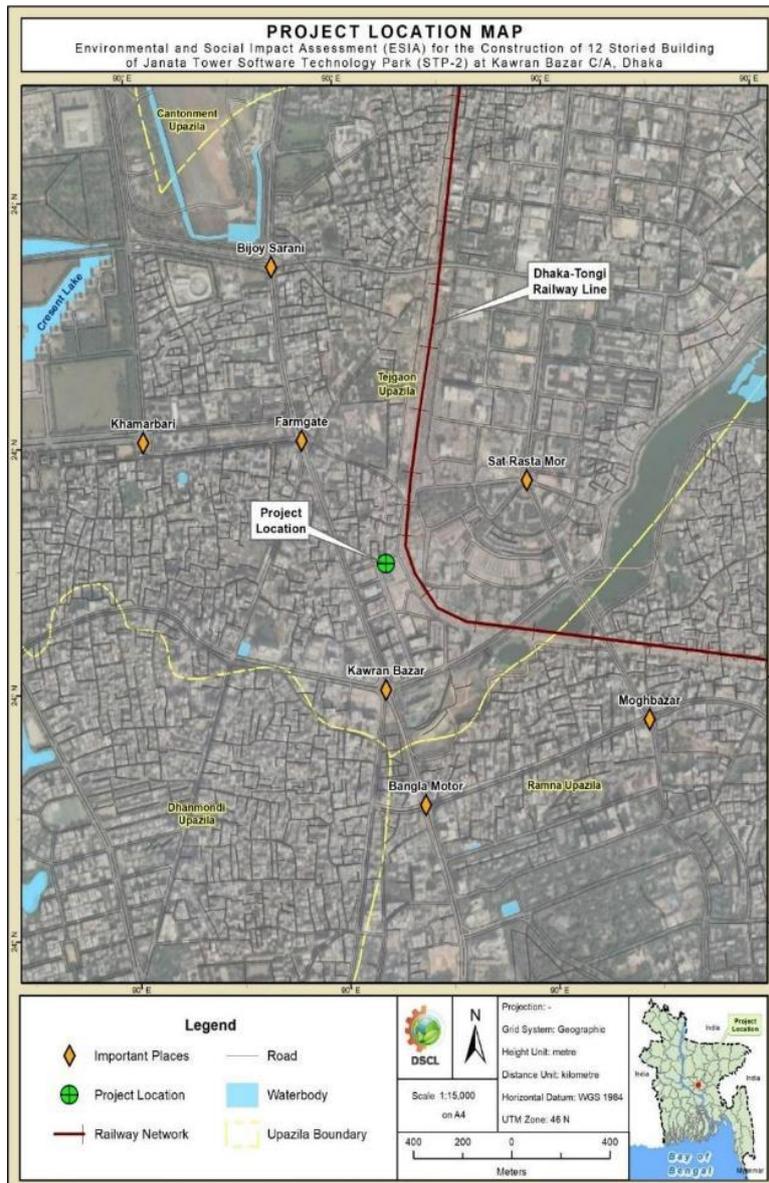


Figure 2.5: Locational Map in Scale

In the north of the sub-project area is the Vision 21 STP-1 tower and a 60 feet wide road that connects Kawran Bazar with Farmgate and Tejgaon (Fig. 2.5). During the day the road is used for parking of pickup vans, and at night it is used for transporting goods to the market. Adjoining to the east side of the sub-project area boundary is a market named Hasina market. The market is mainly comprised of approximately one hundred two-storied tin shed shops which are allotted from the Rajdhani Unnayan Karttripakkha (RAJUK). This market caters to the daily grocery needs of all the people in Kawran Bazar, and has bathhouses, restaurants, barber shops, spice shops, cell phone and flexiload shops, tea and betel leaf shops etc. There are approximately ten bathhouses and ten restaurants in this market. Moreover, around 60-70 of these shops rent out their top floor rooms to the migrant labors who work at Kawran Bazar. Each room is usually shared by 4-5 labors. Therefore, approximately 250-300 labors live temporarily in these markets. Finally, adjacent to the south boundary of the sub-project area is another tin shed temporary market that is known as Pepe potti.

This market has approximately 32 shops that are divided in two rows. These are used mainly to store and sell vegetables.

The sub-project's footprint plot currently belongs to the Bangladesh Hi-Tech Park Authority under Information and Communication Technology (ICT) division. There are two one-storied abandoned buildings inside the plot, along with one two-roomed tin shed shack. The caretaker of the plot, an employee of the Ministry of Housing and Public Works, lives inside the tin shed shack. Since he is a government employee after handing over the land by RAJUK the caretaker has been shifted from the plot and accommodated in another place by the Ministry of Housing and Public Works.

2.3 Functional and Technical aspects of Vision 2041 Smart Tower

The proposed software technology park will provide the required infrastructural support for tech businessman, entrepreneur and IT innovators. The following functionalities are prioritized during the development of Vision 2041 Smart Tower. Compared to other renowned software technology park Vision 2041 Smart Tower will have all modern facilities.

- I. Software R & D
- II. Foreign investors zone
- III. Data and communication center
- IV. Software exhibition hall & sharing zone
- V. Conference facilities
- VI. Meeting room
- VII. Startup and R & D
- VIII. IT labs
- IX. Training facilities etc.

The setup of doors and windows for Vision 2041 Smart Tower are designed in such a way that it will allow maximum sunlight and natural airflow so that rooms and common spaces will have natural light with a cool environment. Based on the design objectives and the strategies, a series of studies are experimented with to understand how these elements can relate most suitably. The proposed site is stretched on the north-south direction so the initial rectangle block gains more heat from the west side. Under this circumstance, the first design decision was to reduce the west surface by changing the initial shape, which was a U-shaped surface and creating a self-shading form as shown in the figure 2.6. The extensions of the form are designed for casting the maximum amount of shadows on the west façade. The orientation of the form ensures generous air flow with the indoor spaces getting adequate amounts of natural light within the working space.

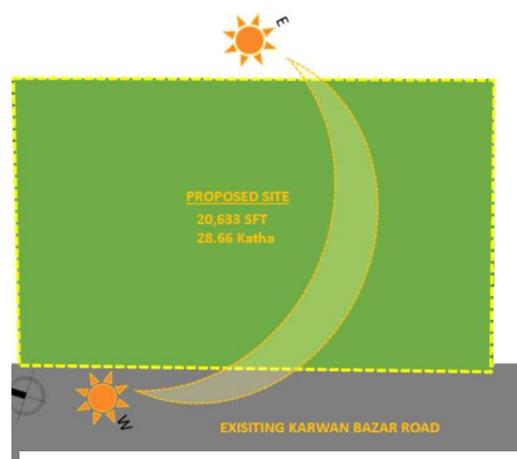


Figure 2.6: Consideration of natural sunlight during design of sub-project

In technical design, every detail has been considered which includes but not limited to desk type, sitting arrangement, brainstorming area, branding for promoting business, wall color for comfortable work, laptop working area, plant in room for natural feelings etc.

2.4 Green Building elements:

A green building incorporates environmental considerations into every stage of building construction and focuses on the design, construction, operation, and maintenance phases. Green buildings typically incorporate higher air quality, abundant natural light, access to views, and noise control which benefits building occupants, making the buildings better places to work or live. The major considerations taken into account are the lot design and development efficiency, energy and water efficiency, resource efficiency, indoor environmental quality, and the building's overall impact on the environment. **Energy efficient building envelop, rapidly renewable materials and use of certified wood will help to reduce the carbon footprint.** Energy efficiency is one of the most important factors in almost all green building programs. Careful window selection, building envelope air sealing, duct sealing, proper placement of air and vapor barriers, and use of clean energy-powered heating/cooling systems contribute toward an energy-efficient building. The use of renewable energy, such as solar, wind, or biomass energy, to meet energy requirements can significantly reduce the carbon footprints of such buildings. Green buildings lay stress on water conservation by implementing more efficient water delivery and recycling system, both of which are integral features of a property that is eco-friendly. Minimization of water use is another characteristic feature of a green building that helps in reducing the detrimental effects of water use and its effects on local ecologies.

According to the EPA, following are the 7 components of the green building concept:

1. Energy efficiency and renewable energy
2. Water efficiency
3. Environmentally-friendly and environmentally preferable building materials and specifications
4. Toxicity reduction
5. Indoor air quality
6. Sustainable development & smart growth
7. Waste reduction

Bangladesh Hi-Tech Park authority's Vision 2041 Smart Tower is eligible under the LEED (version 4.0) program governed directly by the USGBC. The rating scales is under four categories: -

- Certified Level – 40 to 49 points
- Silver Level – 50 to 59 points
- Gold Level – 60 to 79 points
- Platinum Level – 80 to 110 points

2.5 Implementation Schedule and Costing

The implementation period of the sub-project is expected to start from August 2023 and ends by December 2025. Proper construction sub-project management is required in order to ensure the timely completion of the sub-project.

2.6 Sub-project activities

Different types of sub-project activities will be carried out during different phase of the sub-project. The major phases are a) pre-construction phase, b) construction phase, and c) operational phase. Major sub-project activities to take place during the pre-construction and construction phases can, broadly be categorized as:

- Finalization of the design and drawing of the VISION 2041 SMART TOWER.
- Finalization of engineering design
- Mobilization
- Procurement of necessary materials and equipment

- Construction of the VISION 2041 SMART TOWER
- Implementing and monitoring of Occupational Health and Safety and other ESF standards
- Construction material carrying vehicle movement management to minimize congestion
- Solid waste and construction waste management

As per the requirement of carrying out the ESIA study, the anticipated impacts during pre-construction and construction phases of the sub-project on the environmental baselines within and surrounding the sub-project areas have been considered, identified and evaluated. Since the pre-construction activities, for the sub-project are not expected to have any impact on the environmental baselines, the activities to take place during the sub-project construction phase have been considered. Typical impacts during this phase include deterioration of air quality, deterioration of noise quality, vibration due to various earth-works and construction works, traffic congestion, drainage congestion, impacts related to waste management, health and safety issues, etc. However, for better understanding phase wise major activities are listed below:

2.6.1 Pre-construction phase

The planning and pre-construction phase of the sub-project involves the following activities. Since the sub-project is planned to be implemented in phases, some of these activities will be in parallel to earlier phases of construction.

- Updating of Environmental and Social Impact Assessment (ESIA) and the submission of the report.
- Clearing the sub-project site
- Topographic survey of the proposed construction area
- Geotechnical and sub-soil investigation
- Air, water, noise quality survey, and analysis
- Meteorological data analysis
- Present condition of solid waste management and drainage system
- Social study
- Finalization of all design and drawings
- Working drawing preparation
- Coordination with all related authorities
- Tender processing and other related works.

2.6.2 Construction Phase

Activities during the construction phase of the sub-project are as follows:

- Site Development
- Clearing of 27 trees and demolition of the existing shed for preparing the site
- Construction of temporary labour and staff shed
- Excavation for laying foundation
- Shore protection with pilling and steel bracing
- Construction of Utilities including electric connection, water supply and gas supply.
- Construction of multiple basements and related pilling works and RCC casting
- Protection of surrounding buildings during construction of basements
- Construction of super structure (ground floor to 8th floor)
- Construction of 75 MLD Sewage Treatment plant (STP)
- Construction of Rain Water Harvesting facilities
- Construction of rooftop Gym and Restaurant

All sorts of safety measures should be carried out at the construction sites, since one minor mistake can cause severe damage to lives and properties. So, to be safe while working at construction sites it is very necessary to adopt all the preventive measures that can avoid accidents at construction sites.

2.6.2.1 *Related plants and equipment to be used during construction phase*

Various kinds of plants and equipment are to be deployed in the sub-project area during construction works. These include bull dozers, hydraulic excavators, vibrating rollers, vibratory compactors, concrete batching plants, asphalt concrete plant, crawler crane, tower crane, flat-bed trailer, dump truck, etc (Table 2.1).

Table 2.1: List of equipment use

Items of Equipment	Quantity	Use
Dump Truck	4	10-Wheeler
Wheeled Loader	1	3 cum
Excavator	2	1 cum
Vibratory Roller	1	10 Ton
Road Roller	1	10 Ton
Motor Grader	1	120 HP
Construction equipment (different types)	LS	Concrete mixing, concrete lifting, tiles cutting, utility fixing, welding machine etc.
Vibrator for concrete	4	Concrete compressing
Piling machine	2	For construction of pile
Tower cranes	1	For lifting construction materials

Apart from the machineries listed in the above table, there are several other ancillary tools and equipment will be used in the sub-project during the construction period.

2.6.3 **Operational Phase after construction**

Activities during operation of the sub-project are as follows:

- Sewage collection and treatment
- Solid and kitchen waste management
- E-waste management
- Storm water drainage
- Community health and safety management
- Fire detection and Fire Fighting
- Networking
- Maintenance of Elevators and Escalators
- Maintenance of greeneries
- Electrical distribution and lighting
- Maintenance of Plumbing and sanitary system.
- Access Control and Surveillance System
- Parking Management
-

Vision 2041 Smart Tower should have its own Operations and Maintenance department fully staffed with skilled personnel for the smooth functioning of the sub-project. These personnel will be hired during sub-project implementation for optimal handover of responsibilities.

2.7 Features of the sub-project

The design considered adequate provision for parking facilities, fire extinguisher and emergency escapes. There is also provision for flower beds on the ground floor for planting flowers and shrubs for beautification purposes. Besides the ground floor beautification plan, a rooftop garden can also be proposed to enhance the environmental quality of the building. There might be a particular space for plantation along the cornices. It will increase the beauty and also maintain eco-friendly features of the building. The site is free from flood and water logging. There are provisions for drainage system to effectively drain out rainwater from the site and discharge to the main drainage system of the City Corporation. Fire separation distance would be maintained from consideration of fire safety between the adjacent buildings and any other building on the site. This building will have all modern and environmentally friendly facilities.

2.7.1 Architectural and engineering features

The "Vision-2041 Smart Tower (software technology park) " is designed as a 9-storied building, to serve as a smart building for an IT innovation hub for the ICT sector in Bangladesh. This building has offices with the necessary space and facilities such as an underground water reservoir, lift, escalator, ramp facility, stairs, generator room, substation, fire extinguisher, and toilet blocks with provision for both males and females, water supply, parking facilities, sewage treatment plant etc. Multiple facilities like start-up floors, cafeterias, gaming areas, kitchens, gymnasiums, prayer rooms, and outdoor green spaces have been considered to make a healthier environment for the employees. The design considered adequate provision for parking facilities, fire extinguishers, and emergency escapes. The floor-wise distribution of various features is given in Annex 1. The proposed sub-project is designed as a permanent building of column beam structure having a 09- storied foundation and the total built-up area of the sub-project is approximately 171,000 square feet. There are 3 basements and one semi-basement in this building. The semi-basement includes Maintenance Office, ANSAR Barack, prayer spaces for both males and females with ablution spaces, toilets, generator room, STP control & filter room, 05 no's Car and 27 no's cycle Parking zone, etc. The cycle parking zone has a separate shower zone for the riders so they can come and freshen up there.

However, the other basements consist of Car, and motorcycle Parking, Driver waiting room, Water reservoirs, a Pump Room, and Rain Water Harvesting Filter facilities. The 1st basement has 40 no's car parking and 19 no's motorcycle Parking, the 2nd & 3rd basement each have 36 and 38 no's car parking respectively and 15 no's motorcycles Parking each. According to the Dhaka Imarat-Nirman-Bidhimala-2008, for any kind of commercial sub-project (Occupancy Type F), the minimum Parking Requirement is 1 car parking for every 200 Sqm area. So, the required number of parking for is 50 nos. The Total number of car parking that is provided in this building is 119 of which 79 numbers is for office use and 40 no's are for visitors, while there are facilities for 47 no's motorcycle and 27 no's cycle parking. Details floor plans are given in Annex 1.

The ground floor consists of 940 Sqm space where the utility core area is 212 sqm, and has lifts, stairs, lift lobby, and toilets. The lobby space has the Information and Reception desk, a lounge, and the Mujib corner with 232 Sqm. There are 2 Office spaces of 137 sqm which can accommodate up to 40 people at a time, a Café that can accommodate 60 people at times, and a Day Care center of 68 Sqm with a feeding room facility that can accommodate 15 children at a time. In general, the designated area for children's activities should contain a minimum of forty-two square feet of usable floor space per child.. There is a security room, Sub Station, and a BNS Room with a fire control space on the

ground floor level. The front part of the site has raised gardens and universal access for disabled people. The exterior view of the Vision 2041 Smart Tower is presented below in fig 2.7:



Figure 2.7: Exterior view of Vision 2041 Smart Tower (Day time)

2.7.2 Firefighting facilities

In order to ensure safety at the workplace, Vision 2041 Smart Towers shall have its own firefighting system following the BNBC 2020. Firefighting aids including fire hydrants close to the various sections of the power generation area and Portable Fire Extinguishers of various types and sizes need to be installed at conveniently reachable locations. The firefighting facilities will be adequate and related people will be trained on those facilities. Other than fire alarm, smoke detectors, and common fire extinguishers, Vision 2041 Smart Tower should keep enough modern firefighting facilities such as sprinkler (basement and ground floor), fire extinguisher dry chemical powder type, twin flashing light, fire rated door completed with panic bar with modern fully automated central monitoring and control station (IBMS) for safety purpose in stock as this building will be situated one of the most densely populated area.

2.7.3 Educational Facilities

The VISION 2041 SMART TOWER will have education and training zone where IT related training and education will be provided. Training on software development, IT business entrepreneurship, coding etc. will be provided.

2.7.4 Nearby facilities

Though Vision 2041 Smart Tower will have its own security and firefighting facilities within its premise, a list of nearby security, medical facilities and police facilities have been prepared during the ESIA process. The nearby emergency facilities are described in Table 2.2:

Table 2.2: List of nearby emergency facilities

Sl. No.	Name of facilities	Distance	Comment
1	Firefighting facilities	Within 3 km	Tejgaon station
2	Medical facilities	Within 2 km	Samarita Hospitals Ltd., Square Hospitals Ltd., Bangabandhu Sheikh Mujib Medical University Hospital, Green Life Medical College Hospital, etc.
3	Police station	Within 1 km	Farmgate police box is the nearest one which is approximately 0.67 KM from the location, Tejgaon police station is around approx. 0.82 km away. Assistant commissioners' office is around 0.87 KM away and Bangla motor police box is around 0.92 KM away

2.8 Utilities

To meet the requirement of urban life adequate utility services will be provided in the sub-projects area through DPDC, DWASA, BTTB, Titas gas etc. Besides, during the sub-project implementation period, the construction works would require some of these facilities. Related Government agencies will be contacted for this purpose and necessary applications will be made. At the initial stage of the sub-project implementation, it may not be feasible to supply gas through pipeline. DPDC will be contacted for electric supply.

2.8.1 Water Supply and sewage

Considering total occupancy of 2000 persons, domestic water demand is estimated to be 23,778 gallons per day. Considering fire demand along with the domestic demand, a 27,500 ft³ of underground reservoir for the building has been proposed. The water supply and sewerage facilities will be provided by DWASA (Dhaka Water and Sewerage Authority). The sub-project proponent shall establish the plumbing system of the entire building, whereas DWASA shall ensure the supply of potable water to the building as well as collecting and managing the effluent that shall be discharged through the outlet of the sewage treatment plant installed within the building. Apart from water supply and sewerage facilities from DWASA, a rainwater harvesting facility will also be installed in the building. The calculation of sewage facility and rain water has been shown in the ESMP part.

2.8.1.1 Groundwater extraction

The sub-project proponent shall take all possible measures to ensure groundwater sources for the building from the DWASA sub-project. Since the underground water is a national resource, permission from Dhaka WASA is necessary for its withdrawal. Proper permission will be taken from DWASA following due procedures.

2.8.1.2 Introduction of Rainwater Harvesting

This sub-project incorporates Rain water harvesting System (RWHS) into its design, which offer an opportunity to offset freshwater use. The roof area or the catchment area for collecting the rainwater from the building is 11,100 ft². With a rainfall intensity of 100 mm/hour (as per BNBC 2020), total volume of rainfall per hour would be 103,159 liters. The total Rain Water will be collected from roof top to Collection Tank or rain water filtration pit through inlet rain water pipe of building. The collected water in collection tank/primary rain water tank having capacity of 12000 gallons. This water will be passed through a filtration unit and then pumped to a secondary rainwater tank having capacity of 50,256 gallons. Finally, water from this secondary tank shall be lifted to the overhead tank

for the purpose of using in toilet flushing and gardening. This will reduce the extra pressure on groundwater extraction. A provision for groundwater recharge may also be proposed in the design so that the excess rainwater need not to be discharged into the drainage system.

2.8.1.3 Stormwater drainage

At present, the stormwater drainage system within or outside the sub-project area is connected to the city corporation's drainage network. This network is connected with the nearby waterbody for the discharge of the surface runoff. Recently there are no water logging in and around this area but during rainy season overflow of drains might cause problems.

2.8.2 Solid waste disposal

Per capita daily solid waste generation rate under the context of Bangladesh is 0.56 kg as mentioned in the 8th Five Year Plan of Bangladesh. Approximately 560 kg of solid waste will be generated when the full sub-project comes into the implementation stage. Waste will be collected in 3 separate bins of different color on each floor. Then the waste of each floor will be kept at the designated place of DNCC from where they will finally dispose of the waste. Dhaka North City Corporation (DNCC) will be responsible for disposing of the waste on a daily basis.

2.8.3 Electric connection

Electrical connection is required for the site and permission will be taken for complete connection from Dhaka Power Distribution Company Ltd. (DPDC). There will be a 2 MVA dedicated substation inside the building on the ground floor.

2.8.4 Telephone connection

Telephone connections will be required for the Vision 2041 tower. For telephone line connections, application shall be made to Bangladesh Telegraph & Telephone Board (BTTB) authority. The reception area has been selected for placing the Telephone Switchboard. Proper safety and security measures will be taken during the establishment of the telephone line connection. Intercom facility is also considered through optical fiber connectivity. Which will be installed in the server room of the Smart Tower.

2.8.5 Transport Coordination

This sub-project may not have much impact on the traffic movement during the operational phase but during the construction activities, some problems may arise during the transportation of construction materials at the sub-project site. It may therefore be helpful to consult with the transport department of Dhaka North City Corporation and DMP Tejgaon Traffic Circle to prepare an effective traffic management plan. A Traffic Management Plan is suggested in Annex .

2.8.6 Gas connection

Gas supply for the building may be made through cylinders since piped gas supply may no longer be allowed in Dhaka City for commercial and residential purposes.

CHAPTER 3

Legal and Policy Framework

3 Legal and Policy Framework

3.1 Introduction

The ESMF guides the implementing agency in designing and implementation of environmentally sustainable sub-project interventions. It is anticipated that proposed PRIDE interventions at the STPs will have some minor environmental and social impacts. The Environmental and Social Standards (ESSs) of the Bank as well as the national and international conventions, treaties and protocols provide specific guidelines to minimize and/or mitigate Environmental and Social impacts resulting from development interventions. This chapter provides a brief summary of relevant ESSs and national and international conventions, treaties and protocols.

Regulatory requirements toward protection and conservation of environment and various environmental resources and also toward protection of social environment from adverse impact of sub-projects and activities associated with them have been enunciated by the Government of Bangladesh’s laws and guidelines. Such requirements are also explicit in the World Bank guidelines and standards, these requirements are summarized as under.

3.2 Relevant World Bank’s Environmental & Social Framework

The Bank classifies all sub-projects into one of four categories: High Risk, Substantial Risk, Moderate Risk and Low Risk. In determining the appropriate risk classification, the Bank considers relevant issues, such as the type, location, sensitivity, and scale of the sub-project; the nature and magnitude of the potential environmental and social risks and impacts; and the capacity and commitment of the Borrower to manage the environmental and social risks and impacts in a manner consistent with the Environmental and Social Standards (ESSs). Other areas of risk may also be relevant to the delivery of environmental and social mitigation measures and outcomes, depending on the specific sub-project and the context in which it is being developed. The following section discusses the relevance of ESF Policy, each of the ten standards (ESS1 to 10) and associated Directive; their requirements are tabulated in Table 3.1.

Table 3.1: World Bank policies and relevance

World Bank ESS Policy, Standards, Directive	Objectives	Requirements	Relevance & Extent of Relevance to the Sub-project
World Bank Environment and Social Policy for Investment Sub-project Financing	It sets out the mandatory requirements of the Bank in relation to the sub-projects it supports through Investment Sub-project Financing.	The types of E&S risk and impacts that should be considered in the environmental and social assessment. The use and strengthening of the Borrower’s environmental and social framework for the assessment, development and the types of E&S risk and	Applicable to this sub-project

World Bank ESS Policy, Standards, Directive	Objectives	Requirements	Relevance & Extent of Relevance to the Sub-project
ESS-1 Assessment and Management of Environmental and Social Risks and Impacts	Identify, assess, evaluate, and manage environment and social risks and impacts in a manner consistent with the ESF. Adopt differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable, and they are not disadvantaged in sharing development benefits and opportunities	impacts that should be considered in the environmental and social assessment. The use and strengthening of the Borrower’s environmental and social framework for the assessment, development and implementation of World Bank financed sub-projects where appropriate.	This component includes construction of a multi-story building within the vicinity of market place with potential environmental and social risks and impacts.
ESS-2 Labor-and-Working Conditions	<ul style="list-style-type: none"> • Promote safety and health at work. Promote the fair treatment, nondiscrimination, and equal opportunity of sub-project workers. • Protect sub-project workers, with particular emphasis on vulnerable workers. • Prevent the use of all forms of forced labor and child labor. • Support the principles of freedom of association and collective bargaining of sub-project workers in a manner consistent with national law. • Provide sub-project workers with accessible means to raise workplace concerns. 	<ul style="list-style-type: none"> • Requirements for the Borrower to prepare and adopt labor management procedures. • Provisions on the treatment of direct, contracted, community, and primary supply workers, and government civil servants. • Requirements on terms and conditions of work, nondiscrimination and equal opportunity and workers organizations. Provisions on child labor and forced labor. • Requirements on occupational health and safety, in keeping with the World Bank Group’s Environmental, Health, and Safety Guidelines (EHSB). 	This standard is relevant to this sub-project. Sub-project will be hiring following types of workers: <ul style="list-style-type: none"> i) Direct workers will include the sub-project managers and supervisors, who are employees of BHTPA ii) All the work force deployed by the Contractors and the Sub-project Management Consultant (for all packages) under the BHTPA will be deemed to be contracted workers. The Contractor(s) might further engage multiple subcontractors; ii) Migrant labors may be employed by the contractor. iii) Codes of conduct, Human and Occupational Resource Management Procedure (HORMP) (equivalent to the Labor Management Plan) and OHS (Occupational Health and Safety) measures for all components has been prepared and disclosed which was covered issues with all types of workers. The salient points have been addressed in the

World Bank ESS Policy, Standards, Directive	Objectives	Requirements	Relevance & Extent of Relevance to the Sub-project
			<p>ESMF and HORMP and appropriate requirements will be incorporated in Management of Contractors documents. A separate workers GRM has been developed as per the requirement of ESS2. The sub-project will also provide training on waste management practices and OHS related practices to the PIU's officials, personnels and labors.</p>
<p>ESS-3 Resource-Efficiency-and-Pollution-Prevention-and-Management</p>	<p>Promote the sustainable use of resources, including energy, water, and raw materials. Avoid or minimize adverse impacts on human health and the environment caused by pollution from sub-project activities. Avoid or minimize sub-project-related emissions of short and long-lived climate pollutants. Avoid or minimize generation of hazardous and non-hazardous waste. Minimize and manage the risks and impacts associated with pesticide use. Requires technically and financially feasible measures to improve efficient consumption of energy, water, and raw materials, and introduces specific requirements for water efficiency where a sub-project has high water demand.</p>	<p>Requires an estimate of gross greenhouse gas emissions resulting from sub-project (unless minor), where technically and financially feasible. Requirements on management of wastes, chemical and hazardous materials, and contains provisions to address historical pollution. ESS3 refers to national law and Good International Industry Practice, in the first instance the World Bank Groups' EHSs.</p>	<p>With respect to Resource Efficiency, the sub-project preparation and the ESIA process will identify feasible measures for efficient (a) energy use; (b) water usage and management to minimize water usage during construction, conservation measures to offset total construction water demand and maintain balance for demand of water resources; and (c) Raw materials will be used by exploring use of local materials, recycled aggregates, use of innovative technology so as to minimize sub-project's footprints on limited natural resources.</p> <p>The sub-project would also need to address the management of solid and liquid waste, biodegradable and non-biodegradable waste generated during the construction and operation phases.</p>

World Bank ESS Policy, Standards, Directive	Objectives	Requirements	Relevance & Extent of Relevance to the Sub-project
<p>ESS-4 Community Health-and Safety</p>	<ul style="list-style-type: none"> ● Anticipate or avoid adverse impacts on the health and safety of sub-project-affected communities during sub-project life-cycle from routine and non-routine circumstances. ● Promote quality, safety, and climate change considerations in infrastructure design and construction, including dams. ● Avoid or minimize community exposure to sub-project-related traffic and road safety risks, diseases and hazardous materials. ● Have in place effective measures to address emergency events. ● Ensure that safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the sub-project-affected communities. 	<ul style="list-style-type: none"> ● Requirements on infrastructure, considering safety and climate change, and applying the concept of universal access, where technically and financially feasible. ● Requirements on traffic and road safety, including road safety assessments and monitoring. ● Addresses risks arising from impacts on provisioning and regulating ecosystem service. ● Measures to avoid or minimize the risk of water-related, communicable, and noncommunicable diseases. ● Requirements to assess risks associated with security personnel, and review and report unlawful and abusive acts to relevant authorities. 	<p>In the sub-project there is likely to be</p> <ul style="list-style-type: none"> i) earth excavation, use of vibratory equipment, construction debris handling and disposal etc. during construction; ii) high likelihood of direct exposure to increased construction related traffic and equipment especially at road sections. There are no sensitive receptors such as schools, religious place, health center/hospitals in the vicinity of the sub-project area; iii) moderate dust levels from earthworks, moderate noise and emission level from traffic congestion and idling of vehicles; moderate risk of Gender based Violence (GBV), Sexual Harassment (SH), social disturbance, and communicable diseases due to the low-level influx of migrant workers.

World Bank ESS Policy, Standards, Directive	Objectives	Requirements	Relevance & Extent of Relevance to the Sub-project
<p>ESS-5 Land-Acquisition-Restrictions-on-Land-Use-and-Involuntary Resettlement</p>	<p>Avoid or minimize involuntary resettlement by exploring sub-project design alternatives. Avoid forced eviction. Mitigate unavoidable adverse impacts from land acquisition or restrictions on land use by providing compensation at replacement cost and assisting displaced persons in their efforts to improve, or at least restore, livelihoods and living standards to pre-displacement levels or to levels prevailing prior to the beginning of sub-project implementation, whichever is higher. Improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure. Conceive and execute resettlement activities as sustainable development programs.</p>	<p>Applies to permanent or temporary physical and economic displacement resulting from different types of land acquisition and restrictions on access. Does not apply to voluntary market transactions, except where these affects third parties. Provides criteria for “voluntary” land donations, sale of community land, and parties obtaining income from illegal rentals. Prohibits forced eviction (removal against the will of affected people, without legal and other protection including all applicable procedures and principles in ESS5). Requires that acquisition of land and assets happens only after payment of compensation and resettlement has occurred. Requires community engagement and consultation, disclosure of information and a grievance mechanism.</p>	<p>Land acquisition will not be required for the sub-project. There are only 27 trees and two one storied tin shed structures belonging to the Government which need to be removed before construction activities.</p>
<p>ESS-6 Biodiversity Conservation</p>	<p>Protect and conserve biodiversity and habitats. Apply the mitigation hierarchy and the precautionary approach in the design and implementation of sub-projects that could have an impact on biodiversity. To promote the sustainable management of living natural resources.</p>	<p>Requirements for sub-projects affecting areas that are legally protected designated for protection or regionally/internationally recognized to be of high biodiversity value. Requirements on sustainable management of living natural resources, including primary production and harvesting, distinguishing between small-scale and commercial activities. Requirements relating to primary suppliers, where a sub-project is purchasing natural resource commodities, including food, timber and fiber.</p>	<p>Site preparation activities for building construction will involve removal of felling of 27 trees. There is no rich biodiversity point in and around the site. So, there will be no biodiversity disturbance due to construction activities and operation phases of the sub-project.</p>

World Bank ESS Policy, Standards, Directive	Objectives	Requirements	Relevance & Extent of Relevance to the Sub-project
ESS-7 Indigenous- Peoples	Ensure that the development process fosters full respect for affected parties' human rights, dignity, aspirations, identity, culture, and natural resource-based livelihoods. Promote sustainable development benefits and opportunities in a manner that is accessible, culturally appropriate and inclusive. Improve sub-project design and promote local support by establishing and maintaining an ongoing relationship based on meaningful consultation with affected parties. Obtain the Free, Prior, and Informed Consent (FPIC) of affected parties in three circumstances. Recognize, respect and preserve the culture, knowledge, and practices of Indigenous Peoples, and to provide them with an opportunity to adapt to changing conditions in a manner and in a timeframe acceptable to them.	Applies when the Indigenous Peoples are present or have a collective attachment to the land, whether they are affected positively or negatively and regardless of economic, political or social vulnerability. The option to use different terminologies for groups that meet the criteria set out in the Standard. The use of national screening processes, providing these meet World Bank criteria and requirements. Coverage of forest dwellers, hunter gatherers, and pastoralists and other nomadic groups. Requirements for meaningful consultation tailored to affected parties and a grievance mechanism. Requirements for a process of free, prior and informed consent in three circumstances.	Not relevant to this sub-project as there is no indigenous community in and around the sub-sub-project site.
ESS-8 Cultural- Heritage	Protect cultural heritage from the adverse impacts of sub-project activities and support its preservation. Address cultural heritage as an integral aspect of sustainable development. Promote meaningful consultation with stakeholders regarding cultural heritage. Promote the equitable sharing of benefits from the use of cultural heritage.	Requires a chance finds procedure to be established. Recognition of the need to ensure peoples' continued access to culturally important sites, as well as the need for confidentiality when revealing information about cultural heritage assets that would compromise or jeopardize their safety or integrity. Requirement for fair and equitable sharing of benefits from commercial use of cultural resources. Provisions of archaeological sites and material built heritage, natural features with cultural	The location of the sub-project does not have any ancient monuments and/or archaeological site(s), protected area of local importance. Not applicable for this sub-project. But, if any objects of archaeological interest is discovered on the site during excavation works, shall be the property of the government and shall be dealt with as per the provisions of the relevant legislation.

World Bank ESS Policy, Standards, Directive	Objectives	Requirements	Relevance & Extent of Relevance to the Sub-project
		significance, and moveable cultural heritage.	
ESS-9 Financial Intermediaries	<p>Sets out how Financial Intermediaries (FI) will assess and manage environmental and social risks and impacts associated with the sub-projects it finances.</p> <p>Promote good environmental and social management practices in the sub-projects the FI finance. Promote good environmental and sound human resources management within the FI.</p>	<p>Financial Intermediaries (FIs) to have an Environmental and Social Management System (ESMS) - a system for identifying, assessing, managing, and monitoring the environmental and social risks and impacts of FI sub-projects on an ongoing basis. FI to develop a categorization system for all sub-project; with special provisions for sub-project categorized as high or substantial risk. FI borrowers to conduct stakeholder engagement in a manner proportionate to the risks and impacts of the FI sub-project.</p>	<p>Not relevant as there is no financial intermediary involved.</p>
ESS-10 Stakeholder Engagement and Information Disclosure	<p>Establish a systematic approach to stakeholder engagement that helps Borrowers identify stakeholders and maintain a constructive relationship with them. Assess stakeholder interest and support for the sub-project and enable stakeholders' views to be taken into account in sub-project design. Promote and provide means for effective and inclusive engagement with sub-project-affected parties throughout the sub-project life-cycle. Ensure that appropriate sub-project information is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner.</p>	<p>Requires stakeholder engagement throughout the sub-project life cycle, and preparation and implementation of a Stakeholder Engagement Plan (SEP). Requires early identification of stakeholders, both sub-project-affected parties and other interested parties, and clarification on how effective engagement takes place. Stakeholder engagement to be conducted in a manner proportionate to the nature, scale, risks and impacts of the sub-project, and appropriate to stakeholders' interests. Specifies what is required for information disclosure and to achieve meaningful consultation.</p>	<p>Relevant as the sub-project will involve a wide variety of stakeholders during its cycle</p>

3.3 World Bank Groups' EHSs, IFC, 2007

Table 3.2: EHSs, IFC, 2007

World Bank ESS Policy, Standards, Directive	Objectives	Requirements	Relevance & Extent of Relevance to the Sub-project
General EHS Guidelines, April, 2007, IFC	The General EHS Guidelines contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors	Requirements on environmental, health, and safety issues during construction of the building.	Applicable for this Sub-project
EHS Guidelines for Construction Materials Extraction, April, 2007, IFC	The EHS Guidelines contain the performance levels and measures that are considered to construction materials extraction activities such as aggregates, limestone, slates, sand, gravel, clay, gypsum, feldspar, silica sands, and quartzite	Requirements on the resource management of construction materials extraction activities such as aggregates, limestone, slates, sand, gravel, clay, gypsum, feldspar, silica sands, and quartzite	Applicable for this Sub-project

3.4 Relevant GoB rules, regulations, policies, legislations, guidelines

The implementation of various components of proposed 'VISION 2041 SMART TOWER Sub-project' will be governed by Government of Bangladesh (GoB) Environmental Acts, Rules, Policies, and Regulations. All relevant national policies, strategies, plans, acts, rules and regulations laid out by the Government of Bangladesh pertaining to the environment and social aspects are briefly discussed in Table 3.3:

Table 3.3: National Policy/Act/Rules and their relevance

Sl.No.	Policies/Act/Rules	Key provisions and purpose	Applicability to Sub-project
1.	Constitution of Bangladesh	Article 18A of the constitution refers to one of the fundamental principles of the state policy regarding protection and improvement of the environment and biodiversity: it states that the State shall endeavor to protect and improve the environment and to preserve and safeguard the natural resources, bio-diversity, wetlands, forests and wildlife for the present and future citizens.	A Constitution is a supreme law of a country. No one is above the law, and everyone under the authority of the constitution is obligated equally to obey the law.

2.	Solid Waste Management Rules 2021	The Solid Waste Management Rules 2021 were published on December 23, 2021, under the Bangladesh Environmental Protection Act, 1995. The Rules define the responsibilities of businesses involved in solid waste management and impose collection, recycling, and disposal obligations according to Extended Producer Responsibility (EPR) on manufacturers of non-biodegradable products such as glass, plastic, and bottles. The Rules also include provisions for the treatment of solid waste such as composting and energy recovery.	VISION 2041 SMART TOWER will be in category of waste generator, for which the policy states that the generators shall dispose of waste in accordance with the regulations of authorities including local government. Also the waste generator is not allowed to dump, store, or burn waste outdoors.
3.	National Environmental Policy, 2018	The vision of the newly approved Bangladesh National Environmental Policy, 2018 is “Ensuring sustainable development by protecting the environment, controlling pollution, conserving biodiversity and tackling the adverse effects of climate change. “The policy sets out the basic framework for environmental action together with a set of broad sectoral action guidelines with some specific objectives. This policy has been adopted with the aim of reflecting the principles mentioned in the constitution in the national policies and bringing the environment into the mainstream of development.	At various stages of sub-project development, specific action plans will be adopted based on the principles of air pollution control, water resource management, energy efficiency, waste management, sewage management, public health and ecosystem management, etc.
4.	Bangladesh Environmental Conservation Act (BECA), 1995 (amended in 2000, 2002 and 2010)	This is the main legislative framework document relating to environmental protection in Bangladesh. This umbrella act includes laws for conservation of the environment, declaration of ecologically critical area, restrictions regarding vehicles emitting smoke injurious to the environment, remedial measures for injury to the ecosystem, improvement of environmental standards, control and mitigation of environmental pollution etc. According to this act, if any part or the environment is	Bangladesh Hi-Tech Park Authority (BHTPA) shall take environmental clearance from DoE in due course. Application has already been made to DoE with relevant documents for the environmental site clearance from BHTPA.

		<p>polluted/damaged by operations, the Director General can request or force the operator to make rectifying arrangements, Operators must inform the Director General of any pollution incident or 'near miss', In the case of an accidental (pollution) event, the Director General may take control an operation and the respective operator is bound to help. The operator is responsible for costs incurred (and possibly compensation), According to this act (Section 12), no industrial unit or sub-project shall be established or undertaken without obtaining, in a manner prescribed by the accompanying Rules, an Environmental Clearance Certificate (ECC) from the Director General of DoE.</p>	
4.	Environmental Conservation Rules (ECR), 2023	<p>The Government of Bangladesh has promulgated the Environment Conservation Rules, 2023 to exercise the powers conferred under the Environment Protection Act, 1995 and which are already being implemented across the country. The Rule 5 classifies industrial units and sub-projects into four categories depending on environmental impact and location for the purpose of issuance of ECC. These categories are: Green, Yellow, Orange, and Red. The ECR'2023 describes the procedures for obtaining Environmental Clearance Certificates (ECC) from the Department of Environment for different types of proposed units or sub-projects.</p>	<p>Depending on the scope, design and location of the sub- sub-project and the construction of a 09 storey new building is likely to create substantial risks at the sub-project site. As such sub-project may fall under “Yellow” category which require to conduct both IEE, ESIA, and ESMP. ESMP should require to approve by the DoE. To obtain environmental clearance specific amount of fee have to be deposited by treasury challan according to the schedule 7 of rules. The IEE report has already been prepared and submitted to DoE for obtaining site clearance with proposed TOR of ESMP.</p> <p>Apart from the sub-project, as a 9-storey office building it will not fall under the high rise building. If it does not fall under high rise category,</p>

			then environmental clearance is not required as per respective policy.
5.	Bangladesh Environment Court Act, 2010	The government of Bangladesh has passed the Environment Court ACT, 2010 for the trial of offences relating to environmental pollution replacing the Environment Court Act, 2000.	According to this act, government can take legal actions if any environmental problem or irregularities occurs due to sub-project interventions.
6.	Bangladesh National Building Code, 2020	The BNBC clearly sets out the constructional responsibilities according to which the relevant authority of a particular construction site shall adopt some precautionary measures to ensure the safety of the workmen. The Code also clarifies the issue of safety of workmen during construction.	As there will be construction of a new 09 storied building adjacent to markets and commercial places there must follow the codes of BNBC so that no accident or incidence occur during pre-construction, construction and operation phases. In addition, there have substation, generator, warehouse, Sewage Treatment plant, Rainwater Harvesting System etc.
7.	Forest Act 1927 (Amended 2000)	The act empowers the government to regulate the felling, extraction, and transport of forest produce in the country.	Inside the sub-project, there are 27 trees and will need to be cut to clear the site for construction purposes.
8.	Forest Product Transit Rule 2011	If it is necessary to remove or transport forest products from such government owned land which is not under the control of the forest department, approval has to be obtained by applying to the forest department in a prescribed form.	BHTPA or contractor may have to apply to the local forest department if any trees need to be cut on the premises of the sub-projects.
9.	Biodiversity Act, 2017	It provides for the creation of the National Committee and the Biodiversity Management and Surveillance Committees at local levels (i.e. Districts, Upazilas, City Corporations, Municipalities, and Unions). In general, all these committees are mandated to: assist the Government in implementing the National Biodiversity Strategy and Action Plan (NBSAP) and to visit the biodiversity enriched areas in their respective territories; and,	There are no rich biodiversity sites in and around the sub-project site. Therefore, the sub-project activities will not create any problem of biodiversity.

		monitor the progress of implementation of the NBSAP.	
10.	Bangladesh Labor Act, 2006 and the related Labor Rules	It provides the guidance of employer's extent of responsibility and workmen's extent of right to get compensation in case of injury by accident while working. Section 150. Employer's Liability for Compensation: (1) If personal injury is caused to a worker by accident arising out of and in the course of his employment, his employer shall be liable to pay compensation in accordance with the provisions of this chapter. (2) The employer shall not be liable to pay compensation- (a) in respect of any injury which does not result in the total or partial disablement of the worker for a period exceeding three days; (b) in respect of any injury, not resulting in death, caused by an accident which indirectly attributable to - (i) the worker having been at the time thereof under the influence of drink or drugs, or (ii) the willful disobedience of the worker to an order expressly given, or to a rule expressly framed, for the purpose of securing the safety of worker, or (iii) the willful removal or disregard by the worker of any safety guard or other device which he knew to have been provided for the purpose of securing the safety or worker.	The policy with the relevant acts and rules is applicable to the sub-project activities which involves construction of a nine storied new building.
11.	The Noise Pollution Control Rules, 2006	The Noise Pollution Control Rules have been established in order to manage noise generating activities which have the potential to impact the health and wellbeing of workers and the surrounding communities.	Yes, many activities during sub-projects life cycle will be performed and may have the possibility of generating noise pollution.
12.	Road Transport Act, 2018	The new Road Transport Act 2018 finally came into effect at the start of November. After the long-standing Motor Vehicle Ordinance of 1983, the new act introduces a myriad of updated laws and adds	Yes, heavy vehicles will be used in the sub-project, drivers and machinery operators will be deployed. A traffic management plan will be developed to ensure

		new definitions for what constitutes an offence, with most of the fines and punishments receiving major bumps.	that vehicular traffic is not disrupted due to construction of the sub-project.
13.	The Water Supply and Sanitation Act (1996)	Regulates the management and control of water supply and sanitation in urban areas.	This sub-project will include construction of water supply and sanitation facilities. This sub-project shall manage the wastewater in a sustainable manner so that no environmental pollution occurs.
14.	The Ground Water Management Ordinance (1985)	Describes the management of ground water resources and licensing of tube wells	Yes, construction sites of the sub-project may require deep tube wells for meeting up water use. Proper measures will be taken to draw up the ground water after taking permission from the concerned authority, DWASA.
15.	Hazardous Waste (E-Waste) Management Rules 2021.	On June 10, 2021, Department of Environment (DOE) promulgated the Hazardous Waste (e-waste) Management Rules, 2021 under the Bangladesh Environmental Protection Act, 1995. The E-waste rule covers the products listed in the Schedule (home appliances, monitoring and control equipment, lab equipment, automatic machines, IT and communication equipment), and establishes obligations for manufacturers, assemblers, collectors, sellers, and consumers of the products. The rule also sets provisions to limit the use of the 10 substances covered by the EU RoHS Directive.	During sub-project life-cycle many IT and Electronic equipment will be used, which need to be managed according to the procedure described in the rules.
16.	City Corporation Act 2000	Provide primary and public health services, sanitation, water supply, vector and infectious disease control, etc. to ensure public awareness and safety of the residents.	The sub-project must integrate community health and hygiene of the tenants and workers during the construction stage and take forward appropriate issues to the operational stage.
17.	Water Supply and Sewerage Authority Act, 1996	The Act specifies WASA's responsibility to develop and manage water supply and sewerage	Construct drainage system as per DWASA Act will be taken.

		systems for the public health and environmental conservation.	
18.	The Energy Policy (1996)	Provides for utilization of energy for sustainable economic growth, supply to different zones of the country, development of the indigenous energy source and environmentally sound sustainable energy development programs. Highlights the importance of ESIA's for any new energy development sub-project.	As the sub-projects will have to construct a green and resilient building, therefore, energy efficient building is a pre-requisite. To construct a energy efficient building all possible measures should be taken to conserve energy and mitigate the energy loss and reduce the GHG emissions.
19.	The Building Construction Act (1952)	Ensures prevention of haphazard construction of building and excavation of tanks, which are likely to interfere with future the planning of certain areas in country. The acts have follow-up amendments.	Building Construction Act and RAJUK's (City improvement authority) condition will be followed during construction and operation phases.
20.	Ozone Depleting Substances Rules (2004)	Addresses issues related to Green House Gas (GHG) emission by phasing out the use of Ozone depleting substances and ultimately banning use of Ozone depleting substances.	Use alternate material for CFC so that no GHG emission occurs during construction and operation phases.
21.	Right to Information Act, 2009	The Act makes provisions for ensuring free flow of information and people's right to information. The freedom of thought, conscience and speech is recognized in Bangladesh Constitution as a fundamental right and the right to information is an alienable part of it. The right to information act ensures that transparency and accountability in all public, autonomous and statutory organizations and in private organizations run on government or foreign funding shall increase, corruption shall decrease and good governance shall be established.	Yes, provision for public information disclosure will be ensured in all phases of the sub-project development life cycle. This ESIA report will also be disclosed in due time.

3.5 Applicable International Treaties Signed by the GoB and their Relevance to the Sub-project

Bangladesh has signed most international treaties, conventions and protocols on environment, pollution control, bio-diversity conservation and climate change. An overview of the relevant international treaties signed by GoB is shown in Table 3.5.

Table 3.4: Relevant International Treaties, Conventions and Protocols Signed and Accessed to by Bangladesh.

Treaty	Year	Brief Description/Relevance to	Relevant Department
United Nations Framework Convention on Climate Change	1992	GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system	DoE
Kyoto Protocol to the United Nations Framework Convention on Climate Change	1997	The protocol sets binding obligations on industrialized countries to reduce emissions of GHG.	MoEFCC
Paris Agreement (under UNFCC) (Paris)	2015	Global temperature rises this century well below 2 degrees Celsius above pre-industrial levels.	MoEFCC
Stockholm Convention on Persistent Organic Pollutants	2001	To protect human health and the environment through measures to reduce or eliminate emissions and discharges of persistent organic pollutants (POPs).	DoE
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade.	1998	To promote shared responsibilities in relation to importation of hazardous chemicals through Prior Informed Consent (PIC) Procedure.	
Vienna Convention for the Protection of the Ozone Layer	1985	To protect human health and the environment against adverse effects resulting from modifications of the ozone layer	DoE
Montreal Protocol on Substances that Deplete the Ozone Layer	1987	To protect the ozone layer by phasing out the production of numerous substances believed to be responsible for ozone depletion.	DoE
		sub-project	
Prevention and Control of Occupational hazards	1974	Protect workers against occupational exposure to carcinogenic substances and	MoH

Treaty	Year	Brief Description/Relevance to	Relevant Department
		agents. Broadly applicable to the construction and O&M activities under the sub-project. Appropriate mitigation and protective measures will be included in the ESMP.	
Occupational hazards due to air pollution, noise & vibration (Geneva)	1977	Protect workers against occupational hazards in the working environment. Broadly applicable to the construction and O&M activities under the sub-project. Appropriate mitigation and protective measures will be included in the ESMP.	MoH
Occupational safety and health in working environment (Geneva)	1981	Prevent accidents and injury to health by minimizing hazards in the working environment. Broadly applicable to the construction and O&M activities under the sub-project. Appropriate mitigation and protective measures will be included in the ESMP.	MoH
Occupational Health services	1985	To promote a safe and healthy working environment, broadly applicable to the construction and O&M activities under the sub-project appropriate mitigation and protective measures will be included in the ESMP.	MoH
		sub-project	
Civil liability on transport of dangerous goods (Geneva)	1989	Safe methods for transport of dangerous goods by road, railway and inland vessels. Broadly applicable to transportation of substances such as fuels during the sub-project construction phase. Appropriate mitigation measures will be included in the ESMP.	MoC
Safety in use of chemicals during work	1990	Occupational safety of use of chemicals in the work place. Broadly applicable to the construction and O&M activities under the sub-project. Appropriate mitigation and protective measures will be included in the ESMP.	DoE
Convention on oil pollution	1990	Legal framework and preparedness for control of oil pollution. Broadly applicable to the construction and O&M activities under the sub-project. Appropriate mitigation and protective measures will be included in the ESMP.	DoE/MoS

3.6 Environmental Institutional Framework

In Bangladesh, the Ministry of Environment, Forest and Climate Change (MoEFCC) is the apex body with the mandate for handling environmental issues in the country. Realizing the ever-increasing importance of environmental issues, the MoEFCC was established in 1989 Under the MoEFCC, there are several agencies which undertake specific tasks within the framework of the MoEFCC's mandate. They are:

- Department of Environment (DoE)
- Forest Department (FD)

Department of Environment (DoE): Established in 1989 under the jurisdiction of the MoEF, the Department of Environment (DoE) is the executing agency for planning and implementing environmental issues including, but not limited to, the following activities:

- Reviewing environmental impact assessments and issuing environmental clearance Where appropriate;
- Implementing environmental monitoring programs and enforcement measures;
- Developing and maintaining environmental data bases, and
- Coordinating international events with the MoEF (e.g., representing Bangladesh in the meetings of various multi-lateral environmental agreements, international seminars, workshops, etc.).

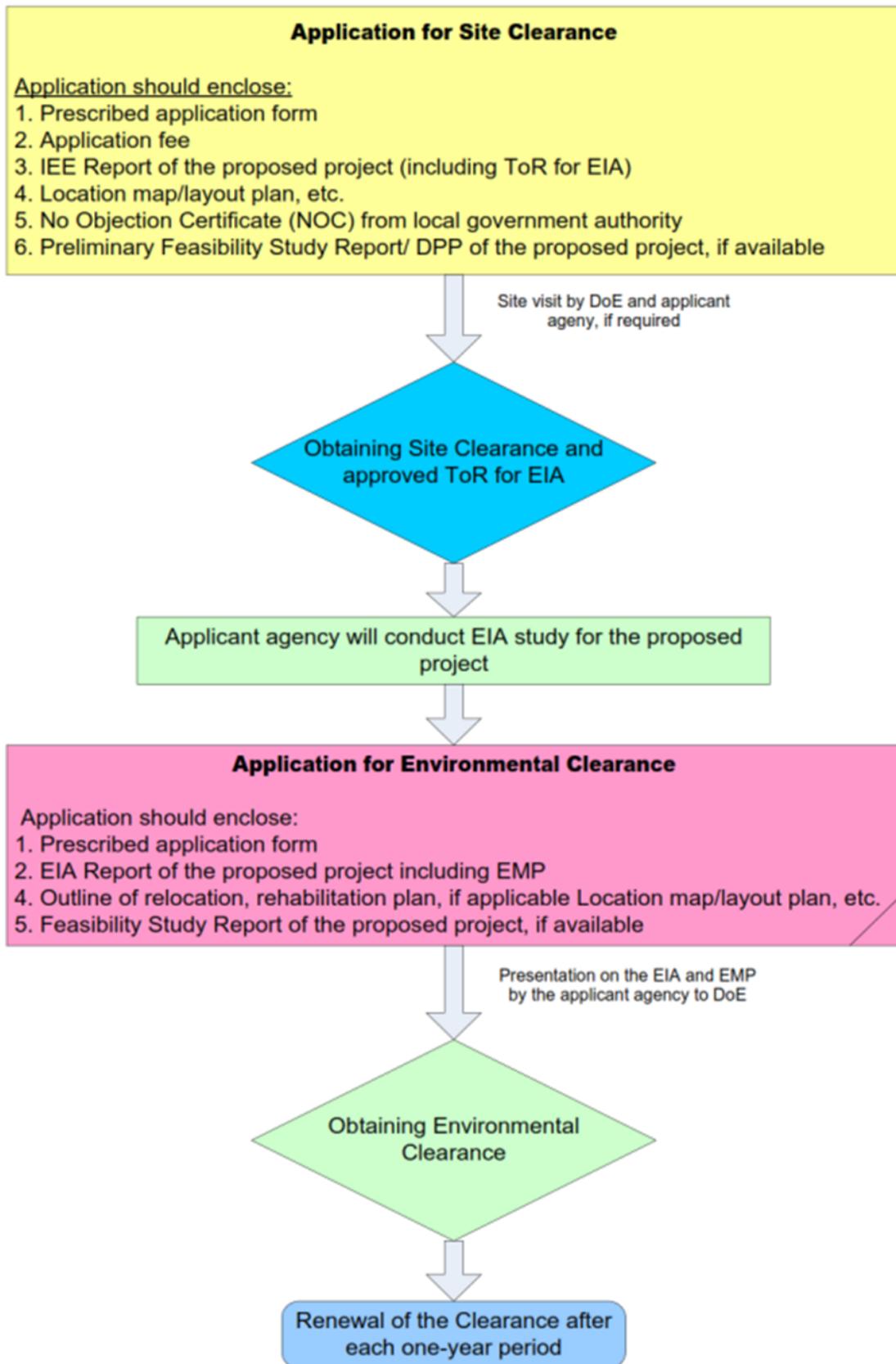
Forest Department (FD): The Forest Department (FD), under the Ministry of Environment and Forest, is responsible for the protection and management of the Reserve Forests, National Parks, and Sanctuaries in the country. The department's manpower extends down to Union levels in areas where reserve forests exist. Officers of the FD are responsible for protection of wildlife in these forest areas.

3.7 Implications of Policies and Environmental Clearance Procedure

Legislative basis for EIA in Bangladesh are the Environmental Conservation Act 1995 (and subsequent amendments) and the Environmental Conservation Rules 2023. Department of Environment (DOE), under the Ministry of Environment, Forest and Climate Change (MOEFCC), is the regulatory body responsible for enforcing the rules. According to the ECR 2023, construction/reconstruction/expansion of alternative high-rise building is classified as a "Orange B" will require initial environmental examination with EMP and DOE clearance. It is the responsibility of the proponent to conduct an IEE and EIA of the development proposal. The responsibility to review EIAs for the purpose of issuing Environmental Clearance Certificate (ECC) rests on DOE. **Based on the reviewing relevant policies, regulations and rules, DoE takes decision of environmental clearances which is differ from sub-project to sub-project.**

Steps to be followed for obtaining Environmental Clearance Certificate (ECC) (under Orange-B category) from DoE are outlined in Table 3.5 as under.

Table 3.5: Process obtaining ECC from DoE



CHAPTER 4

Environmental & Social Baseline

4 Environmental & Social Baseline

4.1 Introduction

As part of the ESIA of the construction of the proposed high-rise building of the Vision 2041 Smart Tower, an environmental and social baseline survey was carried out at and around the sub-project locations. The specific objectives of the baseline study were:

- To gather and present information on the existing physical environment, biological-ecological environment and socio-economic environment;
- To identify the significant environmental and social aspects that are likely to be affected by the proposed sub-projects activities.

The purpose of this section is to review and assess the environmental baseline condition of the physical, biological and socio-economic environment of the proposed VISION 2041 SMART TOWER Sub-project. The environment has been broadly considered into four major groups as below:

- ii) Physical Environment
- iii) Ecological Environment
- iv) Socio-economic environment

Relevant information on physical environment, climate, topography, drainage, geology, soil characteristics, hydrology and water resources, air quality, noise level, soil & sediment quality, water quality, etc. have been described in this chapter. Moreover, baseline information on ecology and socio-economic environment has also been described.

During updating the ESIA study, Baseline data for the study area were collected using the following methods:

- Previous studies and literature review
- Site Reconnaissance and Field Visits
- Organizational Visit
- Desktop Research
- Stakeholder and Public Consultations
- Field Studies and Data Collection
- Laboratory Analyses
- Preparation of Maps

4.2 Data Source

4.2.1 Data on physical and biological environment

As part of the baseline survey air and water samples were collected from the study area and sent them for laboratory analysis. Ambient noise level was measured at different locations of the study area. Secondary data from various sources such as BBS, DoE, Department of Meteorology (DOM), Soil Resources Development Institute (SRDI), and Bangladesh Water Development Board (BWDB) have also been used. Sample collection locations are given in figure 4.14 to 4.17, Sample collection map is given in 4.19 and sample collection location is also given with test results in table 4.2 and 4.3.

4.2.2 Socio-economic Data

The influence area of 1 km is considered for the study to analyze the local developments at the macro level and is represented with the secondary and primary data, and Stakeholder consultations. A socio-economic profile for the sub-project area was prepared based on the information collected from secondary and primary data sources. Collection of secondary data was done through searching

and reviewing censuses, government reports, journals, newspapers and from different sources like Bangladesh Bureau of Statistics, Bangladesh Demographic and Health Survey, Bangladesh Institute of Development Studies etc. The secondary information helped to understand macro level socio-economic profile of the population by gender, ethnicity, vulnerability, poverty, working population and available infrastructure facilities for services in the sub-project influence area. The data was also used in identifying relevant stakeholders and to develop instruments for primary data collection.

4.3 Existing social settings

The proposed site for the building is located at the West side of Kawran Bazar, which is one of the largest wholesale markets in Dhaka City. Overall, it is the distribution center for more than one-quarter (27.3%) of all the vegetables, fish, and fruits consumed in Dhaka, and represents the most important market in Bangladesh — with an estimated daily transaction volume of Bangladeshi taka 5 crore (USD 590,260). The market covers an area of 13.5 hectares. There are around two thousand shops, of which the fresh food market has about 300 shops.

The market provides jobs for approximately 20,000 people. Of them, around 2000 are wholesalers/retailers or arottdars (depot holders). In addition, approximately 10,000 laborers work every night to unload commodities from the trucks and carry and load them in pickups and vans. They primarily work collectively under the leadership of sardars or leaders and retailers. Approximately, 20000 small store owners come to the market every night from all over the city to buy goods from the retailers. Adjacent to the east side of the sub-project boundary is a market named Hasina market. This market tends to serve the daily needs of all the people in Kawran Bazar, and has bathhouses, restaurants, barber shops, spice shops, cell phone and flexi Load shops, tea and betel leaf. Approximately 250-300 laborers live temporarily in these markets.

Around 50 to 100-ton solid waste generates daily in the vegetable market area which are collected by the DNCC truck every day morning and dumped into Matuail and/or Aminbazar landfill site. A portion of these vegetable wastes are collected by the composting company situated in Bhulta, Narayangonj. There is a covered drain in front (west side) of the sub-project site which is not in operation and is fully clogged by the solid waste generated from the vegetable market. There are two more drains available, one is in the east side boundary of the sub-project and another is the main sewer that is in operation. During the night time, mainly after 1 am this road becomes the key unloading space for trucks as well as a business space for the retailers.

4.4 Physical Environment

The proposed site of the sub-project is currently belonging to the Bangladesh Hi-Tech Park Authority under the ICT Division of the Ministry of Posts, Telecommunication and Information Technology. The plot is presently vacant and fenced by a brick boundary wall. There are two one-storied abandoned buildings inside the plot, along with one two-roomed tin shed shack. The caretaker of the plot, an employee of the Ministry of Housing and Public Works, lives inside the tin shed shack. Since he is a government employee. After handing over the land by RAJUK, the caretaker has been shifted from the plot and accommodated in another place by the Ministry of Housing and Public Works.

Physical infrastructure

It is one of the largest wholesale marketplace in Dhaka city. As of 2002, the market had 1255 stores, out of which 55 were owned by the Dhaka City Corporation. In 2002, the wholesale market has a daily revenue of 50 million Bangladeshi taka. Kawran Bazaar has emerged as an important business district of Dhaka. The main offices of Prothom Alo, the Daily Star, The Independent, and several other newspapers are located here. Also, the office and studio of television channels Ekushey Television,

NTV, ATN Bangla, ATN News, Bangla Vision and ABC Radio are located at Kawran Bazar. Samsung Electronics has an R&D center at Kawran Bazaar. Kawran Bazaar also has the headquarters for the Trading Corporation of Bangladesh, along with Export Promotion Bureau, Bangladesh (EPB). Though Karwan bazar is a commercial space and no such appropriate zoning, an initiative has taken to map the different area there. Figure 4.1 shows the zoning of karwan bazar.



Figure 4.1: Zoning of Karwan bazar¹

At present it is the distribution center for more than one quarter (27.3%) of all vegetables fish and fruits consumed in Dhaka. There are few important roads surrounding the sub-project area, which are 100 ft Kazi Nazrul Islam Road (Shahabag to Farmgate), 80 ft. Panthapath road (kalabagan to Karwanbazar), 80 ft. road in front of sub-project site.

Various commercial establishments are located around the sub-project boundary i.e. north, west, south and east. Most of these establishments are multi-storied buildings. Present land use is mainly urban in the center, however other land uses as well including commercial units and increasing numbers of high-rise buildings for commercial establishment and SME industries.

¹ https://www.slideshare.net/tonmoybarua585/existing-situation-of-kawran-bazar?next_slideshow=125304327



Figure 4.2: Housing type surrounding the sub-project (Source: <https://www.slideshare.net/tonmoybarua585/existing-situation-of-kawran-bazar>).

Most of the house surrounding the sub-project is low-rise semi pucca or tin shed building. However, the overall structure types are governed by Highrise buildings.

4.4.1 Topography and physiography

Dhaka city is situated in the southern half of the Madhupur Tract and Floodplain area with southern river system. Regional elevation of the area gradually declines towards Buriganga River on the south and the mean elevation 32 m above the mean sea level. Two characteristic geological units cover the city and surroundings, including Madhupur Clay of the Pleistocene age and alluvial deposits of recent age. The Madhupur Clay is the oldest sediment exposed in and around the city area having characteristic topography and drainage. The major geomorphic units of the city are: the high land or the Dhaka terrace, the low lands or floodplains and depressions and abandoned channels. Low lying swamps and marshes located in and around the city are other major topographic features. The height of the land gradually increases from the east to the west. The land feature of the sub-project area bears no uneven elevation. Once, the area was covered with green vegetation. Now, due to rapid growth of population and industrialization, land has been converted to urban use. Due to its physiography, historically this place has developed as business center. However, different parts of this place have different types of use.



Figure 4.3: Land use map (Source: <https://www.slideshare.net/tonmoybarua585/existing-situation-of-kawran-bazar>)

4.4.2 Seismicity

Bangladesh is situated in one of the most tectonically active regions in the world, where three major plates meet (the Indian Plate, the Tibet Sub-Plate, and the Burmese Sub-Plate). The sub-project area is located over the Indian Plate, which is moving north. However due to the location of relevant plates, fault lines and hinge zones, Bangladesh itself is divided into four seismic zones, based on the ranges of the seismic coefficient. As per the seismic zone map, sub-project area falls in the Zone II of **BNBC 2020** comprising the south-central part of Bangladesh. It means the sub-project area is prone to moderate seismic intensity. There is no evidence of major earthquakes in the sub-project area in recent past.



Figure 4.4: Seismic Zone Map of Bangladesh*

*Source: https://www.researchgate.net/figure/Seismic-Zoning-map-of-Bangladesh-BNBC-2015_fig3_340875288

** https://emi-megacities.org/wp-content/uploads/2015/01/HVRA-Guidebook_FINAL.pdf

4.4.3 Climate

The climate of Bangladesh is heavily influenced by Asiatic monsoon, which results in three distinct seasons:

- (a) Pre-monsoon hot season (from March to May);
- (b) Monsoon season (from June to September); and
- (c) Cool dry winter season (from October to February).

Although less than half of Bangladesh lies within the tropics, the presence of the Himalaya Mountain range has created a tropical macroclimate across most part of our country. Bangladesh can be divided into seven climatic zones. The proposed sub-project area is located in the south-central zone.

4.4.3.1 Temperature

Long-term average monthly temperature data (1987-2022) has been collected from Dhaka weather station of Bangladesh Meteorological Department. On April 25, 2021, the highest temperature recorded in Dhaka was 39.5°C. The lowest average recorded temperature was found in the month of

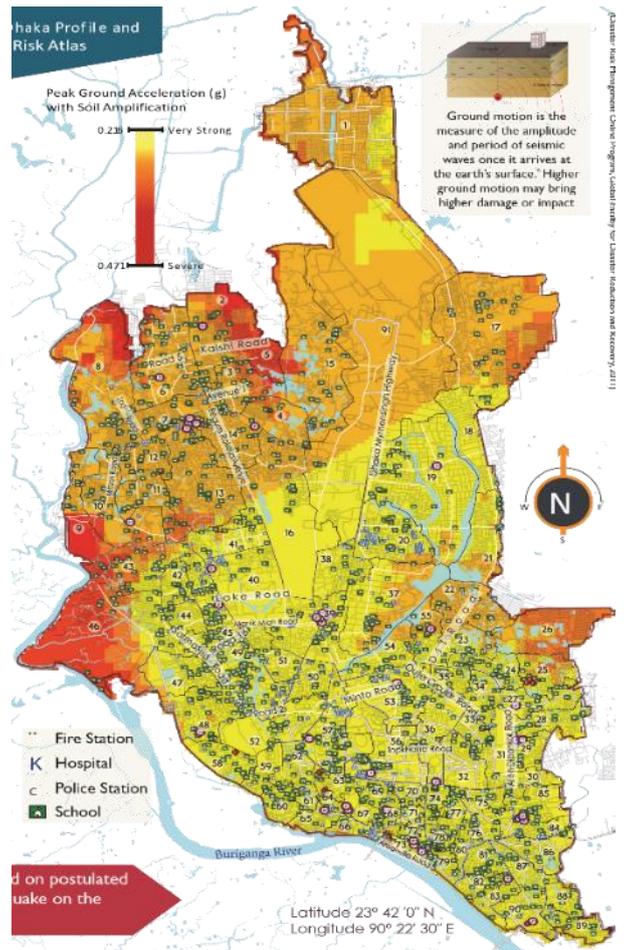


Figure 4.5: Seismic vulnerability map of Dhaka**

January which was 18.42°C. Both of the average monthly temperature graphs show that this area faces high temperature from April to September and lowest temperature during winter remains from December to February in the year (Figure 4.7).

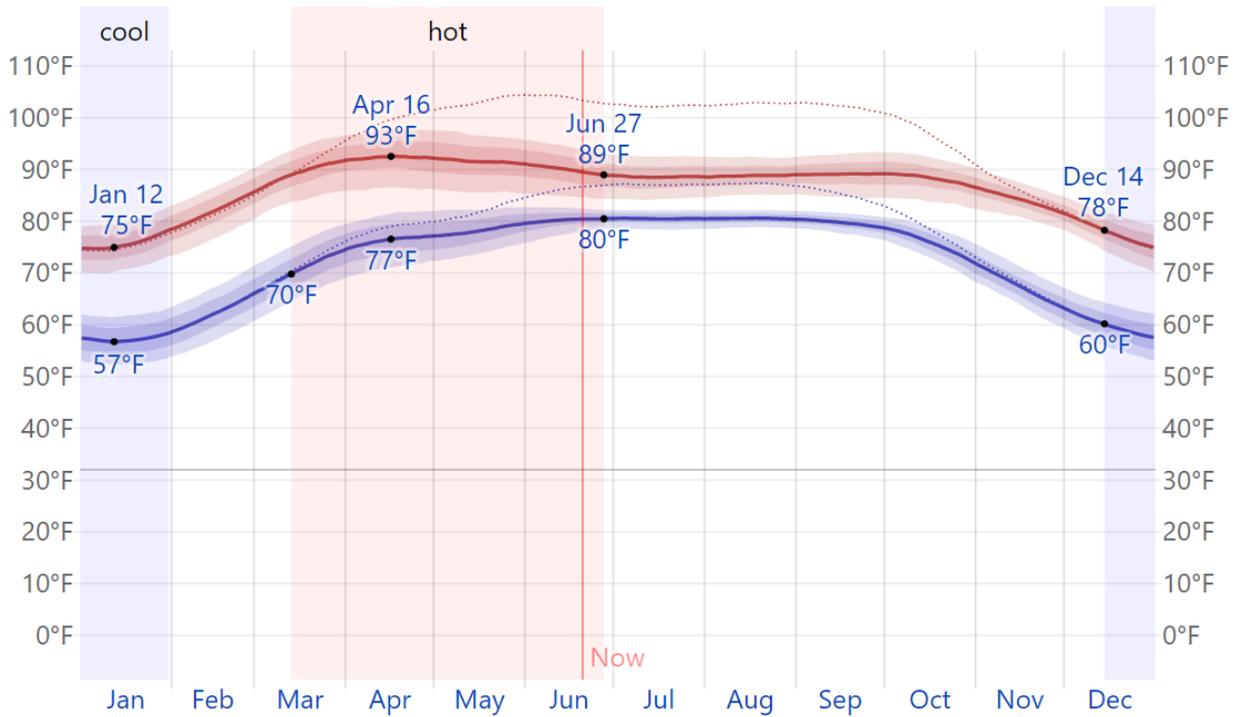


Figure 4.6 Average High and Low temperature in Dhaka (1987-2022)

Source: <https://weatherspark.com/y/111858/Average-Weather-in-Dhaka-Bangladesh-Year-Round#Sections-Precipitation>

4.4.3.2 Rainfall

The average annual rainfall of Dhaka City is around 1890 mm. The rainfall data collected from the aforementioned station represents that maximum rainfall occurs during June to September and the lowest rainfall occurs in November to February during the winter season. Statistical data of 1987 to 2022 shows that Dhaka experience more than 300 mm rainfall during monsoon. In the month of December and January of winter season around 10 mm rainfall occurred in this area (Figure 4.7 and Figure 4.8).

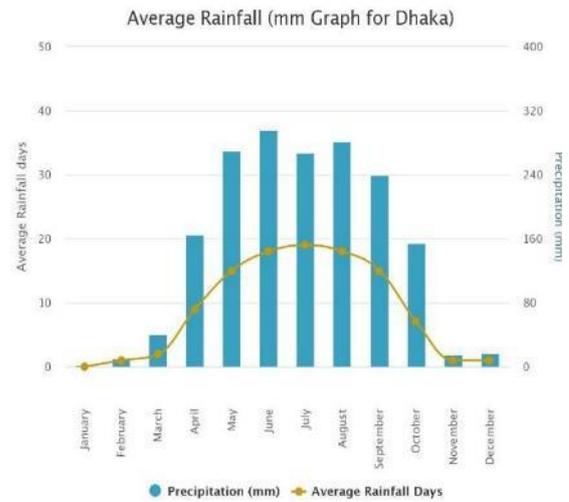
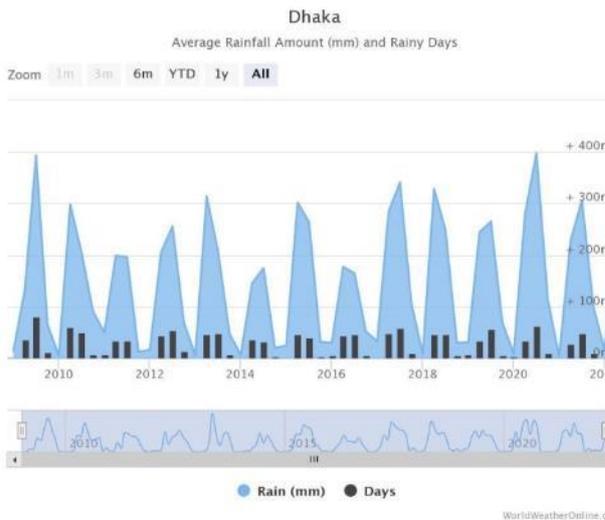


Figure 4.7: Yearly average Rainfall & Rainy days of Dhaka

Figure 4.8: Monthly average rainfall of Dhaka

Source: <https://www.worldweatheronline.com/dhaka-weather-averages/bd.aspx>

4.4.3.3 Humidity

Generally, humidity of Bangladesh is high throughout the year. The western part of Bangladesh has the least humidity (57%) during the month of March and April. The least humid months in the eastern areas are January, February and March and the humidity was 58.50%. Elsewhere in the country, the relative humidity during June, July and August is 80%. However, average relative humidity for the whole year ranges from 70.50 to 78.10%. Monthly and annual average humidity data has been obtained from the Climate Division of Bangladesh Meteorological Department, GOB. Humidity remains high in summer and comparatively low in winter season. The statistical data of humidity from 1987 to 2022 indicates that humidity in the Dhaka Station area maximum in June to September in the year which is ranges from 80% to 82%. On the other hand, humidity falls around 60% in February, March and April during the winter season (Figure 4.10).

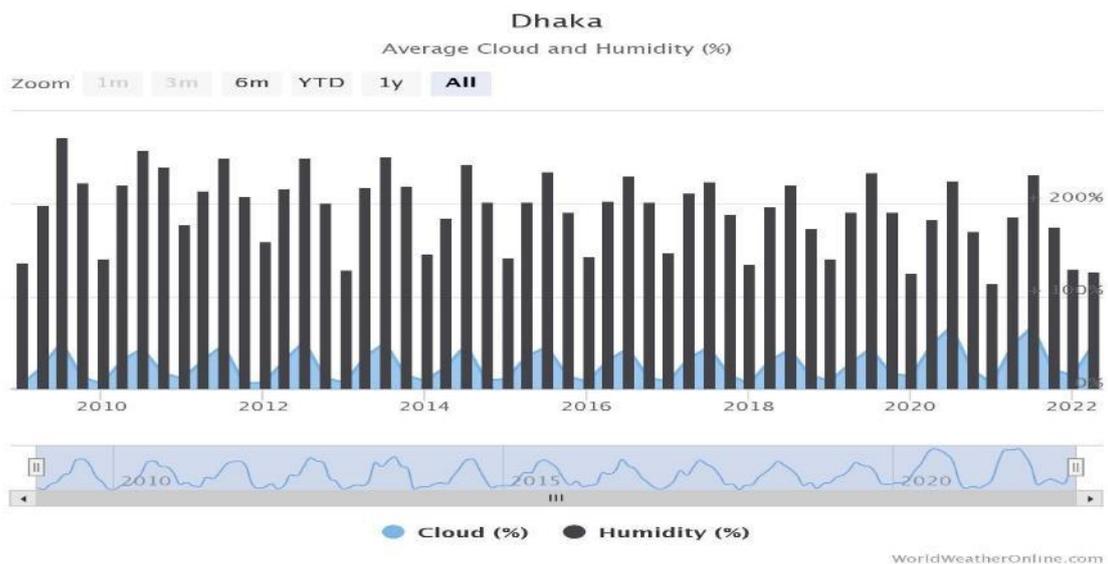


Figure 4.9: Yearly average cloud and humidity of Dhaka (Source: <https://weatherspark.com/y/111858/Average-Weather-in-Dhaka-Bangladesh-Year-Round#Sections-Humidity>)

4.4.3.4 Wind direction and Speed

The statistical wind speed data (Fig. 4.11) shows that average maximum of wind speed value was 3.28 knots in April. The minimum wind speed value was 2.01 knots in the month of December in the area of Dhaka station. In the sub-project areas the predominant wind flows from the northwest (Fig. 4.11).

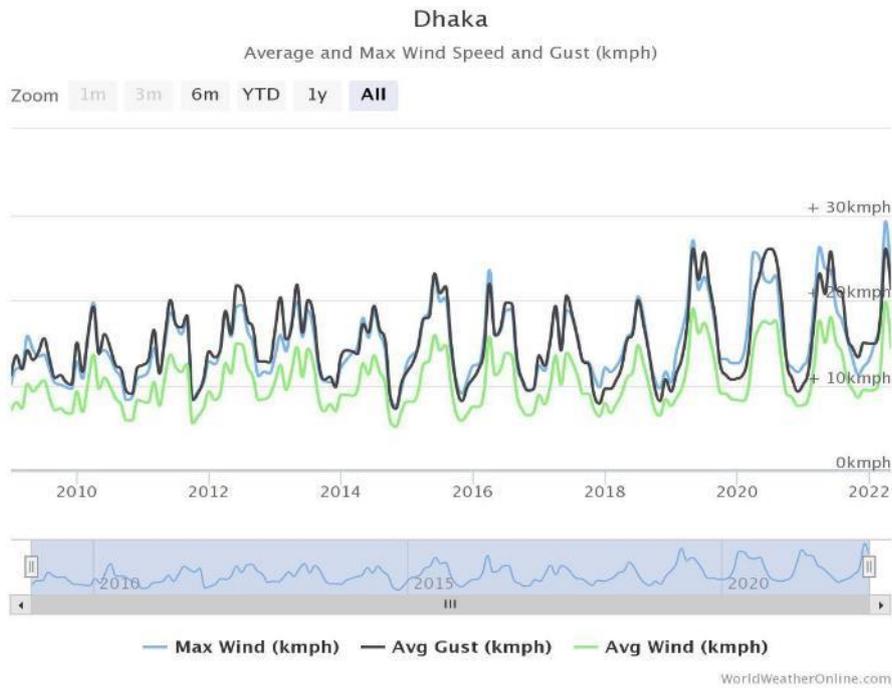


Figure 4.10: Yearly average Wind Speed (2010-2022) (Source: <https://weatherspark.com/y/111858/Average-Weather-in-Dhaka-Bangladesh-Year-Round#Sections-Wind>)

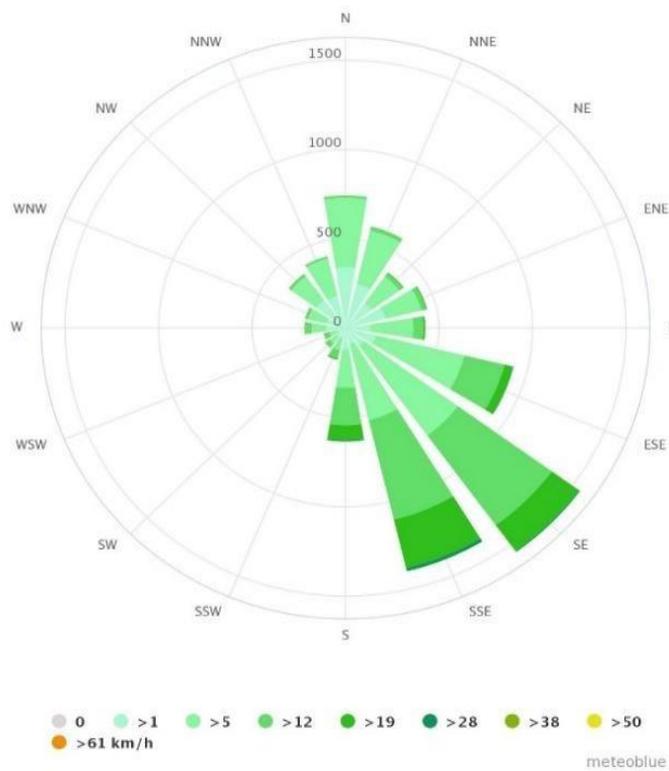


Figure 4.11: Wind Direction of Dhaka (Source: <https://weatherspark.com/y/111858/Average-Weather-in-Dhaka-Bangladesh-Year-Round#Sections-Wind>)

4.4.3.5 Sunshine hours

The sun in Bangladesh regularly shines in the dry season, while in the monsoon season, from June to September, the situation differs. Here are the average daily sunshine hours in Dhaka (Table 4 and Figure 13). On average, January is the sunniest and August has the lowest amount of sunshine.

Table 4.1: Monthly Average Sunshine hours in Dhaka

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sunshine Hour	9	8	7	6	5	3.9	3.4	4	5.6	7	8	7.9

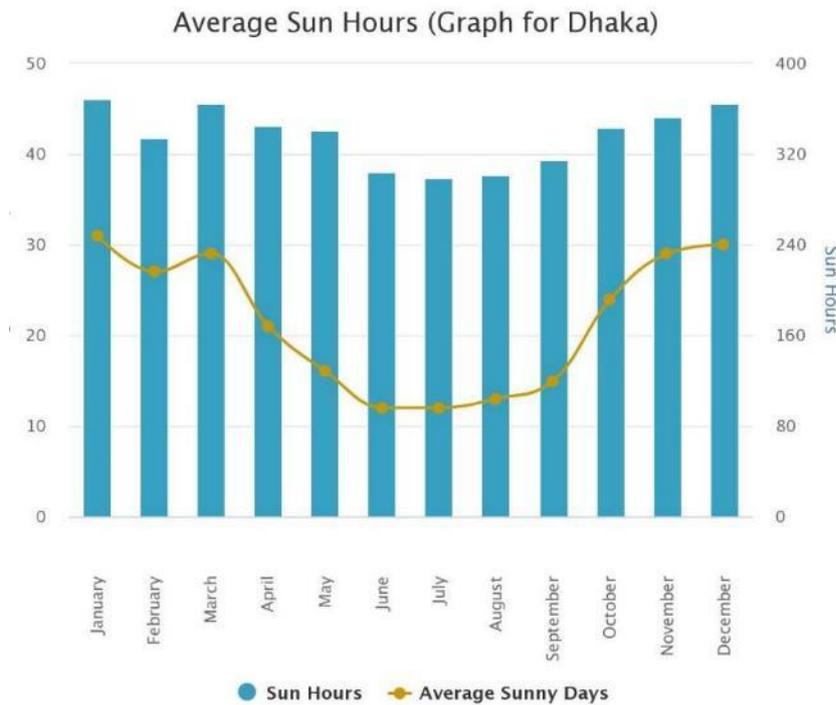


Figure 4.12: Average monthly hours of Sunshine in Dhaka, Bangladesh (Source: <https://weatherspark.com/y/111858/Average-Weather-in-Dhaka-Bangladesh-Year-Round#Sections-Sun>)

4.4.4 Hydrogeology

Stratigraphically, Dhaka is characterized by a Pleo-Pleistocene sequence of fluvio-deltaic deposits of a few hundred meters thickness composed of gravels, sands, silts and clays forming the DupiTila Formation and the Madhupur Clay Formation. The Madhupur Clay Formation, composed of characteristically red plastic clay to silty-clay and silt, forms an aquitard above fine to coarse-grained micaceous, quartzo-feldspathic sands of the DupiTila Formation, and is itself unconformably overlain by the Holocene Alluvium. The Pliocene multi-layered DupiTila Formation forms the main aquifer, effectively confined by the semi-pervious Madhupur Clay. The aquifer underlying Dhaka can locally be separated into three units, viz., the Upper DupiTila Aquifer (UDTA) (1), Upper DupiTila Aquifer (2) and the Lower DupiTila Aquifer (LDTA) (3) (DWASA & IWM, 2008), with hydraulic connection between the units facilitated by discontinuity of the intervening aquitard layers.

4.4.4.1 Surface water

The sources of surface water around the sub-project area are the local water body. The surface water plays a vital role for the habitats of aquatic animals, especially fish. In order to obtain the information on the surface water quality, samples were collected from the nearby waterbody Hatirjheel, drain in

front of sub-project side (STP-1) and drain beside the vegetables market of the **sub-project area** during updating of the ESIA report. Surface water sample collection locations are given in figure 4.13 to 4.15, sample collection map is given in figure 4.19 and sample collection location is also given with test results in table 4.2.

Dhaka City is enclosed by the Turag- Buriganga River in the west and the Balu-Sitalakhya River in the east, both of which drain into the Meghna in the south, along with the Dhaleswari, old Brahmaputra and other rivers outside the city limits. The Ministry of Environment, Forest and Climate Change estimates that 80% of the sewage produced by the entire population in Dhaka and surrounding areas enters into the rivers untreated, and most of the 7,000 industries discharge their effluents to drainage ditches and rivers without treatment (Dhaka Environment Programme, 2005). It is not surprising that the ecology of the rivers has deteriorated under such pressure, and declining fish catches (26,476 tons in 1983 to 84 to 6,095 tons in 1996 to 97 in North Central Region) are just one indicator of the malaise.



Figure 4.13: Surface water collection from Hatirjheel lake



Figure 4.14: Surface water collection from a drain in front of Vision 2041 Tower site

In order to assess the extent of surface water pollution, three representative samples were collected randomly (figure 4.13 and figure 4.14) on 17 August 2022 for chemical analysis of different parameters. The first sample was collected in front of STP-1 near the site, second sample was collected from the drain beside the Kawran bazar vegetables market and the third sample was collected from the nearby water body, Hatirjheel. The surface runoff that occurs after a rainfall event is collected through the drains and then discharged into the nearby waterbody, thereby polluting the waterbody. Laboratory tests were performed on these samples to determine concentration of pH, Turbidity, DO, BOD₅, COD, TSS, TDS, Total Coliform and Fecal Coliform. Sampling location and test results are presented in Table 4.2

Table 4.2: Surface water quality

	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method
SWQ1					
Location: In front of STP 1 near the site					
1	Biochemical Oxygen	0.2	50	mg/L	5 days Incubation

	Demand (BOD)				
2	Chemical Oxygen Demand (COD)	4.0	220	mg/L	CRM
3	Coliform (Fecal)	0	200	Nil 00 ml	MFM
4	Coliform (Total)	0	448	N/l 00 ml	MFM
5	Dissolved Oxygen (DO)	6.0	1.46	mg/L	Multimeter
6	pH	6.5-8.5	6.5		pH Meter
7	Total Dissolved Solid (TDS)	1000	345	mg/L	Multimeter
8	Total Suspended Solid (TSS)	10	20	mg/L	Gravimetric Method
9	Turbidity	10	70	NTU	Turbidity Meter
SWQ2					
Location: City Market Kawran Bazar					
1	Biochemical Oxygen Demand (BOD)	0.2	9	mg/L	5 days Incubation
2	Chemical Oxygen Demand (COD)	4.0	36	mg/L	CRM
3	Coliform (Fecal)	0	112		MFM
4	Coliform (Total)	0	248	Nil /ml	MFM
5	Dissolved Oxygen (DO)	6.0	3.20	mg/L	Multimeter
6	pH	6.5-8.5	6.8		pH Meter
7	Total Dissolved Solid (TDS)	1000	240	mg/L	Multimeter
8	Total Suspended Solid (TSS)	10	8	mg/L	Gravimetric Method
9	Turbidity	10	40	NTU	Turbidity Meter
SWQ3					
Location: Nearby waterbody (Hatirjheel)					
	Biochemical Oxygen	0.2	1	mg/L	5 days Incubation

	Demand (BOD)				
	Chemical Oxygen Demand (COD)	4.0	4	mg/L	CRM
	Coliform (Faecal)	0	390	Nil /ml	MFM
	Coliform (Total)	0	788	Nil /ml	MFM
5	Dissolved Oxygen (DO)	6.0	6.50	mg/L	Multimeter
	pH	6.5-8.5	6.7		pH Meter
	Total Dissolved Solid (TDS)	1000	260	mg/L	Multimeter
	Total Suspended Solid (TSS)	10	17	mg/L	Gravimetric Method
	Turbidity	10	90	NTU	Turbidity Meter

Testing laboratory: DPHE central lab (main report attached in Annex 8)

The test result shows that BOD₅ , COD, TSS and Turbidity for two locations are higher though DO is low. Whereas, in Hatirjheel lake location BOD₅ is slightly higher, COD and DO are within standard, TSS and Turbidity is higher. Besides, these each location is contaminated with Coliform bacteria since the Total Cauliform and Fecal Cauliform counts are found high as compared to Bangladesh standards.

The lower DO value in two sampling sites other than Hatirjheel lake indicates that the aquatic ecosystem is unhealthy. The two locations are not actually wetlands for any aquatic life. These unhealthy conditions will not disrupt the life cycle of any aquatic activity. But if this water goes to the nearby lake, it can affect the lake water. So, care should be taken so that during the construction, polluted and unsanitary water does not mix with the lake water.

Although the Hatirjheel site is within the DO standard, samples were taken during the monsoon season when there is heavy rainfall. As a result, the sample is standardized due to the dilution effect. But if there is no dilution effect during the dry season, the results may be different. Hatirjheel lake has around 10 to 12 unauthorized wastewaters opening from nearby drainage where municipal and commercial wastewater are regularly mixing with that lake. However, periodically during rainy season and high flow time control gate near Karwan bazar opened and high amount of municipal and industrial wastewater passes through this lake. This wastewater may make the lake ecosystem unhealthy.

4.4.4.2 Groundwater

Water supply for drinking and other domestic purposes for the occupants of the sub-project area will be supplied by DWASA, which mainly depends on groundwater source. Due to rapid decline in recharge area over the local ground water basins and excessive withdrawal rate, piezometric level is falling in many parts of the country. The current depth of available ground water is 15 meters in Dhaka City. Due to the increasing demand of potable water, DWASA is working on extracting water from rivers such as Sitalakhya and Buriganga rivers. The groundwater resources at the sub-project

area are found in three separate aquifers. An upper aquifer: a surface layer consisting mainly of clay and silt, characterized by high porosity but low permeability; composite aquifer: an intermediate layer of mainly fine sand and clay characterized by high porosity and moderate permeability (possibility of providing water with hand pumps); and main aquifer: a deeper layer, containing mainly fine to coarse sand. The main aquifer is characterized by high porosity and moderate to high permeability and is separated from the composite aquifer by a clay layer.

Groundwater samples were collected from the tap water point from three locations around sub-project area. Sampling locations are, STP 1, City corporation market, Kawran bazar and WASA Bhaban (figure two locations 4.15-4.16). Water is suitable for human consumption because the physical and chemical parameters (Alkalinity, Arsenic, Chlorine, Coliform, Iron, Lead, Manganese, pH, Salinity and Turbidity) are found satisfactory and within DOE standards.



Figure 4.15: Groundwater data collection from basement of STP1



Figure 4.16: Groundwater sample collection from WASA

Table 4.3: Groundwater Quality

	Water parameters	quality	Bangladesh Standard	Concentration resent	Unit	Analysis Method
GWQ1						
Location: STP 1						
1	Alkalinity			20	mg/L	Titrimetric
2	Arsenic (As)		0.05	0.001	mg/L	AAS
3	Chlorine (Residual)		0.2	0.13	mg/L	UVS
4	Coliform (Fecal)			0	Nil / FCU	ME-M
5	Coliform (Total)			0	TCU	MFM
6	Iron (Fe)		0.3-1	0.10	mg/L	AAS
7	Lead (Pb)		0.05	0.004	mg/L	AAS
8	Manganese (Mn)		0.1	0.03	mg/L	AAS
9	pH		6.5-8.5	6.9		pH Meter
10	Salinity			0.21	%	Multimeter
11	Turbidity		10	2	NTIJ	Turbidity Meter

	Water parameters	quality	Bangladesh Standard	Concentration resented	Unit	Analysis Method
GWQ2						
Location: City market Kawran bazar						
1	Alkalinity			15	mg/L	Titrimetric
2	Arsenic (As)		0.05	0.001	mg/L	AAS
3	Chlorine (Residual)		0.2	0.1 1	mg/L	UVS
4	Coliform (Fecal)		0	0	Nil / FCU	MFM
5	Coliform (Total)				N/ TCU	MFM
6	Iron (Fe)		0.3-1	0.09	mg/L	AAS
7	Lead (Pb)		0.05	0.001	mg/L	AAS
8	Manganese (Mn)		0.1	0.03	mg/L	AAS
9	pH		6.5-8.5	7.1		pH Meter
10	Salinity			0.08	%	Multimeter
11	Turbidity		10	1	NTU	Turbidity Meter
GWQ3						
Location: WASA Bhaban						
1	Alkalinity			20	mg/L	Titrimetric
2	Arsenic (As)		0.05	0.001	mg/L	AAS
3	Chlorine (Residual)		0.2	0.10	mg/L	UVS
4	Coliform (Fecal)		0		Nil / FCU	MFM
5	Coliform (Total)				Nil / TCU	MFM
6	Iron (Fe)		0.3-1	0.08	mg/L	AAS
7	Lead (Pb)		0.05	0.001	mg/L	AAS
8	Manganese (Mn)		0.1	0.03	mg/L	AAS
9	pH		6.5-8.5	7.1		pH Meter
10	Salinity			0.08	%	Multimeter
11	Turbidity		10	1.1	NTU	Turbidity Meter

Testing Laboratory: DPHE Central lab (Detailed report added in Annex)

Vision 2041 Smart Tower authority/Contractor shall take measures to supply water to the Smart Tower from DWASA. This water can be treated to make it safe for drinking purposes by individual tenants/firms/operators as required.

4.4.5 Air Quality

While there are no major air polluting industries surrounding the sub-project area, there are few infrastructures such as garments factory, various type of raw fruits and vegetable markets etc., which might be source of air pollution. However, ammonia pollution, to some extent is expected from the rotten fruits and vegetables. Another major source of air pollution in this area is the transport sector. Huge number of traffic commute through this area and causes air pollution. In Bangladesh the Air Quality Index (AQI) is based on 5 criteria pollutants, which are Particulate Matters (PM10 and PM2.5), NO₂, CO, SO₂ and Ozone (O₃). The Department of Environment (DoE) has also set national ambient

air quality standards for these pollutants. These standards aim to protect against adverse human health impacts.

4.4.5.1 Air Quality Data from Secondary Source

Based on a live air pollutant monitoring system, an Air quality map was extracted for Dhaka city on August 14, 2022 as follows (Figure 4.17). The air quality seems moderate during that day.



Figure 4.17: Live air quality of Dhaka (accessed on 14.07.22)(Source: <https://www.iqair.com/bangladesh/dhaka>)

4.4.5.2 Air quality measurement at the sub-project site

Ambient air samples were measured from three points within the boundary of the sub-project site for 8 hours during peak time of the day using Combo sampler. The GPS points of three sites are 23.749898N, 90.393310E; 23.753945n, 90.393103E and 23.753951N, 90.393103E. Monitoring data shows that the PM₁₀, PM_{2.5} NO_x, SO₂, and CO values are within DoE standards. The PM₁₀ are within the allowable limit but standing close to the threshold value compared to WB standard indicating that any additional load can impact the quality negatively. On the other hand, the PM_{2.5} is also very close to WB standard. Air quality sample collection map is shown in figure 4.18 and the test results have been presented in Table 4.4.

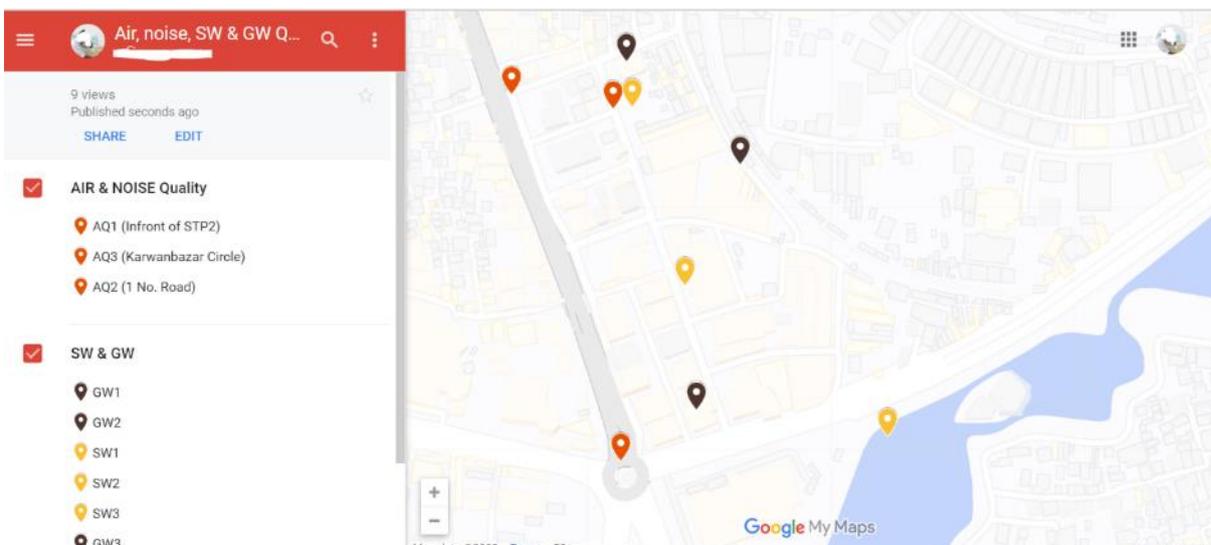


Figure 4.18: Air quality sample collection points

Table 4.4: Air quality nearby sub-project locations

Sample ID	Ambient Air Pollutants' Conc. in $\mu\text{g}/\text{m}^3$							CO (ppm)	CO ₂ (ppm)
	PM ₁₀	PM _{2.5}	NO ₂	SO ₂	O ₃	TSP	Pb		
AQ-1	56.69	15.1	62.05	209.07	24.25	84.14	0.18	1.81	428.8
AQ-2	34.25	17.8	22.96	93.19	18.81	63.42	0.1	0.72	413.3
AQ-3	36.9	22.05	32.11	101.83	12.47	65.62	0.13	0.66	457.1
Bangladesh Standards as per ECR, 1997 amended on 2005 (Schedule-2)*	150	65	100 Annual	365	157	200	-	9	-
WB Standard**	50	25	200 1 Hour	20	100	230	-	9	-

Note: Regular checkup and calibration of the equipment's to avoid any error.

*ECR, 1997 = Environmental Conservation Rules, 1997.

**WB = World Bank, IFC = International Finance Cooperation.

Legend: PM_{2.5}- Particulate Matter of a diameter of 2.5 micron or less, PM₁₀- Particulate Matter of a diameter of 10 micron or less, NO₂- Nitrogen Di-Oxide, SO₂- Sulphur Di-Oxide, CO- Carbon Monoxide, TSP- Total Suspended Particles, Pb- Lead, CO- Carbon Monoxide, CO₂- Carbon Di-Oxide.

4.4.6 Noise Level

Level of noise in Dhaka city and the surrounding areas has now become a major concern for the people, since it has exceeded the tolerance level. According to a survey by a researcher at several locations of Dhaka city, most of the traffic points and many of the industrial, residential, commercial, silent and mixed areas are suffering noises exceeding the standard limits of Bangladesh. The noise situation surrounding the sub-project area is quite unhealthy and hazardous to the human health, especially for elderly people and children. Moreover, the traffic personnel, rickshaw/van pullers, open vehicle drivers, road side workers, small scale businessmen etc. are exposed to long-term noise pollution which might cause severe mental and physical health problems. Noise level was measured at the same place where air samples were collected during July 2022. Measured noise levels are provided in table 4.5 below. Model SL- 4033 SD (Manufacturer-Lutron, Taiwan), a precision sound level meter was used to collect noise data. These data were taken during Day time (6 am to 9 pm) and stored in SD Card during monitoring. The noise meter was used for one hour duration, and Leq (t) was calculated. Leq (60 min) was used as the monitoring parameter for the period between 0600-2100 hours (peak hours) on normal weekdays. The measurements were carried out according to the equivalent method of USEPA approved methods.



Figure 4.19: Air quality and noise level data collection near VISION 2041 SMART TOWER (Kawranbazar Road 1)



Figure 4.20: Air quality & noise level data collection in Kawranbazar

Noise levels were measured at three different locations comprising commercial zone and mixed area and compared with the acceptable values of those according to zone-specific Bangladesh standards. Noise levels were slightly exceeded the allowable limits because the roads are always busy with movement of different types of vehicles.

Table 4.5: Noise level data collection

SI No	Sample ID	Sampling Location	Conc. Present (dB)			BD Standard	Category
			Leq	L _{max}	L _{min}		
1	NL-1	Kawran Bazar Circle GPS: 23.749898 N, 90.393310 E	76.31	83.70	64.80	70	Commercial Area
2	NL-2	Vision 2021 IT Park GPS: 23.753945 N, 90.393103 E	65.34	77.70	49.60	60	Mixed Area
3	NL-3	In front of La Vinci Hotel (Near Titas Bhaban) GPS: 23.753951 N, 90.392289 E	66.41	77.0	53.90	70	Commercial Area

4.4.7 Traffic Condition

Most of the time, the adjacent road to the sub-project site has back-to-back traffic until late night as trucks and covered vans pour in from different parts of the country for delivering vegetable, fishes, grocery items etc. During the night time, mainly after 1 AM, this road becomes the key unloading space for trucks as well as a business space for the retailers. The problem is compounded by the very large population who visit the market and the office area, which creates a large volume of pedestrian traffic, and the vast array of public and private transport vehicles including rickshaw, van, auto rickshaw coming together in the area during the office time. A detailed traffic survey was conducted to understand the traffic condition and to prepare traffic management planning which will be required during the construction time (Annex 09). The summary of the analysis and some recommendations are discussed below.

From the detailed traffic survey, it's found that the overall PCU count is not so high compared to other similar roads in Dhaka city. However, the characteristic of this road is a little bit different from other roads. Several government offices and private organizations run their businesses in this area. Besides, this area is one of the largest business centers in Dhaka, where most of the vehicles carrying vegetables and other wholesale items enter the area after 11 PM at night. As a result, the entire area remains busy during both day and night time. Even though the night time vehicle movement is low but the road is not free. On the other hand, at day time most of the private vehicles, non-motorized vehicles and some waste collection trucks enter this area and leave by 2-3 PM in the afternoon. Moreover, the parking facilities are scarce in that area, as a result most of the vehicle, especially, private vehicle are parked near the building and occupy around 60-70% of the road width. Based on the traffic survey and forecasting, the following conclusions can be drawn:

- a) Proper movement planning for the construction materials carrying vehicles is required during the construction time (a map is prepared in this regard based on traffic analysis as shown in the fig. 4.40)
- b) During Operation phase, around 20% vehicle could be increased and traffic congestions situation could be worsened. To mitigate that, traffic flow and parking management would be required in the vicinity of the office area.
- c) The PCU counts at 8.00 am and 4.00 pm are low compared to 9:00 am and 5:00 pm. The office timing at the proposed Vision 2041 Smart Tower may be adjusted accordingly.
- d) Traffic congestion situation at Karwanbazar may be improved as soon as the metro rail starts its operation (from Uttara to Motijheel). The situation will be further improved if the markets are shifted to a centralized high-rise building as planned by the city corporation.
- e) The city corporation authority might implement some road management strategies to handle unauthorized roadside parking, which is responsible for most of the traffic jam.

4.5 Biological Environment

4.5.1 Bio-Ecological Zone

There are 12 Bio-Ecological Zone in Bangladesh.² According to IUCN, the proposed area for Vision 2041 Smart TowerSTP2 is not under any specific zone and there will not be any impact for the zones classified by IUCN.

4.5.2 Biodiversity of Flora

A total 27 trees have been recorded at the proposed Vision 2041 Smart Tower sub-project site. There are twenty-four mahogany (*Swietenia macrophylla*) and three peepal (*Ficus religiosa*) in the premises of the proposed site.

4.5.3 Protected Areas and Endangered Species & Red Book Species

There are no areas in or around the sub-project site designated and protected for nature conservation, and no rare or endangered and red book species are available here.

4.6 Socio-economic Environment

Kawran Bazar is a business district and one of the most important commercial hubs located at the center of Dhaka city. It is also the largest food wholesale marketplaces in the city. It therefore, is a bustling area round the clock, where the commercial activities in the high-rise office buildings and shopping malls and rush hour traffic during the day is replaced by the hubbubs of street vendors and market stalls and trucks, pushcarts, and vans carrying fish, rice, and vegetables at night. Kawran Bazar

² Bio-Ecological Zone of Bangladesh, IUCN the world conservation union, 2002

and the surrounding business area have a combined area of approximately one square kilometer and are part of the ward 26 (old ward number 39) of Dhaka North City Corporation. On the East it is bounded by city's only rail line, in the South by Panthapath-Tejgaon link road, and in the North by Kawran Bazar road. A major street of the city—Kazi Nazrul Islam Avenue—runs through west of Kawran Bazar. Overall, it is the distribution center for more than one-quarter (27.3 per-cent) of all the vegetables, fish, and fruits consumed in Dhaka, and represents the most important market in Bangladesh — with an estimated daily transaction volume of Bangladeshi taka 5 crore³. The market covers an area of 13.5 hectares, which comprises of four large permanent brick-built markets: Kawran Bazar kitchen market, city corporation market-1, city corporation market-2, and Kawran Bazar small fresh food storage market; and smaller tin shed markets like Kawran Bazar chicken market, fish market, pepe potti, and Hasina market. The market has separate blocks for wholesale trade in fish, vegetables, fruits, and rice. There is also a permanent shade for rows of shops that sell grocery items and toiletries. Overall, there are around two thousand shops in these four markets, of which the fresh food market has 300 shops. Moreover, there are other markets and shops throughout the area like restaurants and cigarette shops that are dependent on these markets.

The market has created jobs for approximately 20,000 people. Among them, approximately 2000 are wholesalers/retailers or arotdars, who are one of the key stakeholders of the market and have invested large sums of money in the market. These arotdars usually pay large sums of money to the city corporation or political actors in return for the possession of a certain amount of space, which they use for selling their commodities as well as for storage. They also give large amount of loan or dadon to the traders or beparis, who act as the middlemen between farmers and retailers, and brings the commodities like fresh vegetables, fishes, and fruits from all over the country. These traders are tied with retailers because of the loans, and most of the time, one retailer works with two or more traders. In any given night, approximately 5000 traders bring goods to the market using 2000 trucks⁴. With one driver and one helper per truck, at least 4000 transport workers come to the Bazar every night. In addition, approximately 10000 laborers work every night to unload commodities from the trucks and carry and load them in pickups and vans. They primarily work collectively under the leadership of sardars or leaders and retailers. Throughout the night, trucks and pickups brings vegetables, fish, rice and other commodities from around the country. The small traders from around the city flock to the Bazar mainly from 4-7am. Approximately 20000 small store owners come to the market every night from all over the city to buy goods from the retailers.

The construction of the building of Software Park will cause disruption in some day-to-day activities of the Bazar and it may have long term impact. There is a boundary wall around the proposed land where this high-rise building will be constructed. On the west side of the road, there are wholesale shops (Vegetables and fruits), where business activities run during night and the retailers start unloading products from trucks and sell them from 11.00 PM to sunrise. Adjacent to the proposed building location, there is Pepe market in the south and Hasina market at the east. Their activities will be affected during and after the construction if proper measures are not taken to minimize disturbance. Traffic on adjacent roads will also be affected if proper measures are not taken. As a

³ Markus Keck, *Navigating Real Markets: The Economic Resilience of Food Whol ESIA le Traders in Dhaka* (Stuttgart: Franz Steiner Verlag, 2015). 3

Eisenberger and Keck, "The Blight in the Center: Dhaka's Kawran Bazar in the Context of Modern Space Production."

⁴ Ratib Riyan, "Markets Needed to be Demolished Even After Spending 300 Crore," Kaler Kantho, 2018, <https://www.kalerkantho.com/print-edition/dhaka-360/2018/07/18/659166>.

result, the movement of transport vehicles will be disrupted. Construction of a high-rise building in the vicinity of the wholesale market may cause some inconvenience for the Kawran Bazaar community. For example, due to the commercial nature of the area along with heavy traffic and narrow streets, sub-project activities during construction could lead to traffic congestion. Construction activities and loading and unloading of construction materials may lead to a significant traffic disruption. This may also expose the community to risks of fire, accidents, and falling objects. Moreover, poorly designed temporary camps and sanitation facilities may pose a health threat and nuisance to the workers and local populace. Besides, during the construction phase, the risk of Gender Based Violence (GBV) and Sexual abuse and harassment (SAH) for women and girls working in Kawran Bazaar may happen. However, as the sub-project site is relatively small and there are no communities residing inside the sub-project site, the risk is expected to be low if proper measures are taken.

4.6.1 Demography and ethnicity

According to the 2011 census, Kawran Bazar has 561 households and with a population of 6513. Of them, 2742 is floating population, which is 92% of the total homeless population⁵. However, these homeless people engage as laborers at the wholesale market. According to the 2011 census, the sex ratio is 150:100, i.e., 150 males per 100 females and the average household size is 5. The primary qualitative data shows that most of these households were in the Kawran Bazaar railway slum. In addition, approximately 350-400 laborers live temporarily in the markets of Kawran Bazaar. According to the secondary data, all people living and/conducting business in Kawran Bazar area are Bangali. No one belonging to ethnic minority groups people were found.

Occupation Pattern within the community of the sub-project area is quite diversified and dynamic. Business is one of the main occupations of the people of the area and 9.57 percent of people are engaged in it. About 12 percent people are engaged in government / non-government services, whereas housewives claim the largest share, which is 25.33% of the total occupations. Employments in industries as skilled Mechanic/Artisan or unskilled workers comprise 2.9 percent. About 25.40 percent are students while unemployed constitute 4.02 percent. A substantial number comprising 10.66 percent are infants.

4.6.2 Settlement, housing and business

The Hasina Market, which is adjacent to the sub-project site, is mainly comprised of approximately one hundred two storied tin shed shops which are allotted from the Rajdhani Unnayan Kartripakkha (RAJUK). Adjacent to the south boundary of the sub-project area is another tin shed temporary market that is known as Pepe potti. This market has approximately 32 shops that are divided in two rows. While they are used mainly to store and sell vegetables, some laborers use them to sleep during the day. Inside the sub-project site, there are three abandoned pucca houses with two rooms each.

4.6.3 Solid Waste Management

From the wholesale market, a large amount of vegetable and food waste is generated, which are mainly dumped on the road side in front of the proposed Vision 2041 Smart Tower. This waste creates an unsightly, make nuisance and health hazard to the commuters and pedestrians. During the night time mainly after 1 AM, this road becomes the key unloading space for trucks as well as a business space for the retailers. From the early morning vegetable sellers started to dump their waste. Around 50-100-ton solid waste generated daily in the vegetable market area of KawranBazar. These solid wastes are collected by the DNCC truck every day morning and dump into Matuail and /or Aminbazar

⁵ Bangladesh Bureau of Statistics BBS, "Bangladesh Population and Housing Census 2011," 2011.

landfill site. Some of the portions of these vegetable wastes are collected by a composting company situated in Bhulta, Narayangonj. This arrangement will continue during the construction and operation phases of the building.



Figure 4.21: Solid waste in the sub-project area

4.6.4 Health Care Facilities

Citizens of Dhaka suffer many of the diseases associated with poor sanitation, including dysentery, diarrhea, whooping cough, gastro-enteritis, tuberculosis, Chikungunya and dengue fever. There are a variety of medical facilities, both public and private sector, covering general health care and specialized services (including cardiac and cholera hospitals, and eye hospitals) in Dhaka city. There are 16 public hospitals with more than 5,000 beds, and although patients are required to pay for the service, charges are significantly less than in the private sector, and some services are provided free to the poor.

4.6.5 Physical and Cultural Heritage

There are no sites of physical and cultural heritage in the sub- sub-project footprint and influence area.

4.6.6 Social and Cultural Resources

Kawran Bazar was established in the late 18th century and emerged as an important business district of Dhaka in the late 19th century. It was connected with Buriganga and Balu River through Hatirjheel, and the railway that runs through it was established in the 1880s⁶. It was shifted to its current position along the rail line in the second half of the 20th century. The Bazar was designated as a commercial area during the 80s, ensuing the construction of numerous high-rise buildings in the area adjacent to the current market. At present, the main offices of many major media organizations like the Daily Prothom Alo, the Daily Star, The Independent, Ekushey tv, NTV, and ATN are located in Kawran Bazar area. The offices of many government organizations, autonomous bodies, and large

⁶ Alexandra Eisenberger and Markus Keck, "The Blight in the Center: Dhaka's Kawran Bazar in the Context of Modern Space Production," *ASIEN* 134 (February 1, 2015): 95–120.

companies are located in the adjacent areas of the market. A five-star hotel and a big shopping mall is situated near the Bazar.

There are no Small Ethnic Group people identified in the vicinity of the sub-project area. Vulnerable groups are people or households whose social, political, and economic status put them at higher risk of forgotten or violated rights. Due to their vulnerable position in society, they need special protection as compared to the majority. For this sub-project, the vulnerable groups are identified as slum dwellers, floating population, and sex workers. Based on the current status of the sub-project, the construction of the building is not likely to impact the vulnerable groups adversely. However, due to increased commercial/economic activity some of them may benefit.

CHAPTER 5

Analysis of Alternative

5 Analysis of alternative

5.1 Site Selection

The establishment of the Vision 2041 Smart Tower is in a center place and heart of Dhaka city. Suitable land of size 0.47 acres is available adjacent to the existing Tower STP-1, where the proposed building would be an added advantage for establishing the proposed tower. The ownership of the proposed site belongs to the Bangladesh Hi-Tech Park authority under the ICT Division, Ministry of Posts, Telecommunication and Information Technology. Dhaka city is the perfect place to invite and meet foreign clients. Moreover, the location of Vision 2041 Smart Tower is very close to five-star hotels, Hotel Sonargaon and Hotel Intercontinental. The number of daily involvement of people as well as the number of activities within the existing STP-1 indicates that there is a need and justification for more such establishment within Dhaka city. Having all the infrastructural facilities like road, rail and air communication as well as the utility connections i.e., water supply, sewerage system, telephone and natural gas, the sub-project site is a prime and center place of Dhaka city for developing IT/ITES hub in Bangladesh. Moreover, as this is an expansion of the adjacent existing building, there is no logical need to look into alternative sites.

5.2 Without Sub-project Scenario

“No sub-project” scenario considers the situation of not developing any further sub-project. As a result, there will be no new investment for the IT sector and no provision of digitalization of Bangladesh for the further development. From the socio-economic point of view, the ‘no sub-project’ scenario is not acceptable since this will negatively impact the potential for socio-economic development as well as the advancement of the country. The ‘no sub-project’ option is the least preferred from the socio-economic perspective due to the following factors:

- The socio-economic status of Bangladesh is in general and the youth in particular would remain unchanged.
- No employment opportunities will be created for the youth who would have worked otherwise in the software firms and the startup businesses.
- Foreign and local investors will be discouraged
- Development of infrastructural facilities (roads, fiber cables, and associated infrastructure) will not be undertaken.

So, it is concluded that the ‘No build’ alternative is not acceptable, and the potential socio-economic benefits of implementation of such sub-project far outweigh the adverse impacts, all of which can be controlled and minimized to an allowable level. As per anecdotal evidence gathered during field visit, most owners and workers in the software firms in the Vision 2021 Tower STP-1 and retailers, shop-owners, traders, and laborers are accustomed to large construction sub-projects, aware of the risks and benefits of such sub-projects, and prepared to face temporary inconveniences caused by construction if the sub-project is implemented in a timely manner.

5.3 With sub-project Scenario

The sub-project is designed to have strong and tangible socioeconomic benefit for the whole country. Firstly, when completed, the proposed sub-project will attract substantial private and foreign investment compared to the ‘no sub-project’ scenario. Secondly, the sub-project will create substantial amounts of job in local and foreign firms in the software and the IT sector. Thirdly, the sub-project will provide valuable experiences for the promising software engineers, startup businesses and IT sector of Bangladesh regarding public private partnership, it will help to learn new lessons, which will be helpful for other government entities. Fourthly, the sub-project will generate new and innovative practices to improve social and environmental outcomes, which will not only

reduce negative externalities but also develop good governance practices. The sub-project will also have some positive socioeconomic impact for the people working in Kawran Bazar. Especially the businessman and the shop owners at the market will benefit from increased business during and after the construction period. The sub-project will also create employment opportunities for construction workers during the construction phase of the sub-project. The sub-project site is in a commercial zone, and next to an established software park equipped with all necessary facilities. No cultural heritages in the vicinity of the site. And no alternative locations are required since there will be no land acquisition and no squatters have been found that will be adversely affected the Sub-project activities. Also, no ethnic minority groups present in the Sub-project areas and cultural heritage will not be negatively affected by the Sub-project. The proposed sub-project will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. The sub-project also plans to include the green building concept which will also consider the rooftop gardening, gardening in the cornices of the building. The most important benefit of green building is that which it offers to the environment. It positively influences the climate and overall ecosystem by reducing water use and energy sources that pollute the environment, such as GHG and carbon dioxide discharged into the atmosphere. Green building not only decreases water wastage, but also preserves natural resources, defends biodiversity and enhances air and water quality. Green building also reduces the carbon footprint by producing less waste and decreasing the volume of toxic gases set free into the air. In this way, the pace of climate change is slowed down, and a positive contribution to saving our environment is made. Besides it requires lower maintenance costs as they are built from sustainable components which in turn adds value to the property.

5.4 Technological Alternatives

Use of Green technology in this sub-project is undoubtedly a better and smarter option. Green technology makes buildings more energy-efficient and sustainable. Thus, have a lower carbon footprint and a reduced impact on the environment. Green building concept plays an important role for the construction of new building in its every phase of development. Every aspect of the structure, including siting, design, construction materials, and the systems used to run and maintain operations are chosen to be as sustainable and energy-efficient as possible, e.g., use of solar power, biodegradable materials, green insulation, sustainable resource sourcing, Cool roofs, block etc. The present footprint is the preferred site considering not just environmental and social aspects, but also financial, economic and engineering requirements.

CHAPTER 6

**Anticipated Significant
Impact & Analysis**

6 Anticipated Significant Impact & Analysis

6.1 Introduction

This chapter intends to identify and predict the likely environmental and social impacts in the sub-project area as well as its surrounding area of influence due to various sub-project activities. These impacts have been evaluated to understand their nature (direct, indirect or cumulative), spatial extent (limited or widespread), duration (long term or short term), and probability of occurrence. Finally, these parameters have been combined in order to categorize the consequences of these impact using a qualitative scale. The following sections explain the relevant potential impacts during different phases of the sub-project activities (i.e., pre-construction, construction and operation) on the surrounding environment as well as on the society. These impacts on the natural environment (physical and ecological resources) and social environment (economic development and social and cultural resources) will be either adverse or beneficial. These impacts may be direct, indirect and cumulative impacts as follows:

- Direct Impacts - i.e., direct impacts include the impact of construction expenditures in the local economy.
- Indirect Impacts - i.e., those resulting from activities to be carried out by the Sub-project, but not directly attributable to it.
- Cumulative Impacts - i.e., impacts in conjunction with other activities. The cumulative or additive effect could be large impacts on environment.

Major activities of the sub-project during the different phases can be summarized as follows:

- **Pre-construction Phase:**
 - a) Finalization of the design and drawing of Vision 2041 Smart Tower including facilities;
 - b) Finalization and categorization of services planned to provide;
- **Construction Phase:** Construction of the Vision 2041 Smart Tower (e.g., main building, services and facilities, etc.);
- **Operational Phase:** Commissioning of the Vision 2041 Smart Tower and subsequent activities.

6.2 Impact Identification

6.2.1 Anticipated Impacts During Pre-Construction (Design and Preparation) Phase

Since no land acquisition and resettlement is required, there will be no negative impacts during pre-construction part. However, demolition of some temporary structure will be required. This demolition waste has to be disposed of properly. Besides, there is some accumulated waste at the sub-project site, which was observed during the field visit. Waste shouldn't be openly dumped at the site since it may pollute the surrounding environment (Details described in Impact Analysis Chart (Table 6.1).

6.2.2 Anticipated Impacts During Construction Phase

Impacts anticipated during construction phase of the Vision 2041 Smart Tower Sub-project are as follows:

- Air pollution due to exhaust from various vehicles and various moving and stationary equipment engaged in construction work and dust from construction activities;

- Construction of multistoried basement and pile foundation may cause risk to nearby structures.
- Excavations of soil for the basement, may risk to workers and adjacent building
- Noise caused by machines and equipment and various other construction activities;
- Contamination of water courses and drainage channels by construction materials.;
- Potential contamination of surface water sources and groundwater resources
- Cut down the of trees within the sub-project area.
- Hampering business activities of the nearby markets and movable shopping facilities

The mitigation and management of these impacts will largely be the responsibility of the contractors and are covered in detail in the Environmental and Social Management Plan in [Table 9.1](#).

The baseline ecological survey reveals that no wildlife was found in the sub-project area. Sub-project activities (civil works) are likely to cause no ecological impact on the floral and faunal resources.

6.2.2.1 Physio-chemical Impacts

Major physio-chemical parameters considered for assessment of environmental impacts due to sub-project activities include:

- Noise pollution
- Air pollution
- Vibration
- Possible drainage congestion
- Generation and disposal of solid wastes, and
- Water pollution due to improper sanitation for the laborers

Noise and Vibration: Noise, air pollution and vibration are of significant consideration, particularly the construction work during night time. Noise pollution and vibration may result from movement of vehicles carrying materials and equipment to and from sub-project sites, piling, operation of machines and equipment (e.g., concrete mixing machines, aggregate crushers, generators, etc.), and other various activities related to construction (e.g., demolition of existing structures).

The principal source of noise during construction of sub-project would be from operation of equipment, piling, machinery and vehicles. Earth moving machineries e.g., excavators, graders and vibratory rollers has potential to generate high noise levels. These machineries produce noise levels of more than 70 dB (A). This can cause disturbance to the settlement, adjacent to the carriageway or within 500 m from the worksite. The noise generated during the construction would cause inconvenience to the population, especially adjacent to the sub-project site. During the operation period, noise might be generated from the use of generators. The mitigation and management of these impacts will largely be the responsibility of the contractors and are covered in detail in the Environmental and Social Management Plan ([Table 9.1](#)).

Air pollution: Localized and temporary air pollution may generate from earthworks (excavation and filling) during site preparation, movement of vehicles and demolition activities. However, such air pollution is likely to be localized (affecting immediate surroundings of the sub-project sites). Such construction-related air pollution is of particular concern at locations where residences or offices are at close proximity to the site.

The baseline results of all air quality parameters (PM₁₀, PM_{2.5}, SO_x, NO_x and CO, O₃) are within acceptable limit as compared to the national standards (Table 4.4). This can be attributed to overall good pavement condition, less volume of traffic, and absence of polluting sources in the sub-project area. Construction activities can give rise to dust emissions under particular circumstances if not effectively managed. Movement of vehicles for transporting construction materials, operation of concrete batching plant could also result in significant emissions of dust. The level and distribution of dust emissions will vary according to the duration and location of activity, weather conditions, and the effectiveness of suppression measures.

Gaseous emission during construction will be from the construction machinery, equipment and trucks used for material transportation. The operation of vehicles and equipment will result in emissions of carbon monoxide, sulphur dioxide, and oxides of nitrogen. The greatest impact on air quality due to emissions from vehicles and plant will be in the areas immediately adjacent to site access. Generally, additional vehicle movements generated during the construction phase will have the potential to influence local air quality in the vicinity of the sub-project site and pollutant concentration is likely to reduce with increase distance from the sub-project location. The mitigation and management of these impacts will largely be the responsibility of the contractors and are covered in detail in the Environmental and Social Management Plan (Table 9.1).

Drainage Congestion: Drainage congestion may result from obstruction to natural flow of drainage water during construction activities. Such congestion will last for a very short time, though it can create nuisance.

Generation and Disposal of Wastes: Improper or inappropriate facilities at the labor sheds may lead to problems related to solid waste management, which may arise during construction phase of the Sub-project. During the peak construction period, a considerable number of workers will be involved. Apart from the construction activities, the workers will be involved in their daily household activities, which shall trigger the generation of municipal solid waste both hazardous and non-hazardous. Improper or inadequate storage and disposal facilities shall pollute the surrounding environment.

Non-hazardous wastes may include excavated waste, building materials, municipal waste and wastewater. Hazardous wastes are mostly petroleum for construction machinery and generators. Although toxic waste may include used oil, empty drums or replaced machinery parts, concrete chemicals such as admixture etc. The handling, storage and disposal of waste on and off-site may pose a number of potential risks to human health and the environment. Faulty management and storage may lead to potential air, soil, and water contamination that may directly or indirectly affect human health. Uncontrolled waste disposal and inadequate waste management during building construction can lead to environmental pollution with organic and inorganic wastes generated by sub-project activities. Discharge of untreated wastewater can lead to soil and water contamination and may pose adverse impact on human health (Table).

Water Pollution and STP installation:

The wastewater and effluents that will be generated within the building premises shall be collected by internal drainage pipeline and then stored in a reservoir of the Sewage Treatment Plant (STP). The type of Sewage Treatment Plant (STP) proposed for the Vision 2041 Smart Toweris BioCleaner having capacity of 75 KLD. It has been designed for serving 2000 people considering wastewater generation rate of 45 liters per capita per day. The tank capacity is estimated as 6550 CFT. Within the tank, human excreta as well as the wastewater will be collected from the Toilet to STP Collection Tank. The size of the STP is shown in the following figure 6.1. The treated wastewater will

then be pumped to the overhead water tank and be used for toilet flushing and gardening purposes. There is a provision for Grey water/Black water recycling. The wastewater and effluents that will be generated within the building premises shall be collected by an internal drainage pipeline and then stored in a reservoir of the Sewage Treatment Plant (STP).

75 KLD STP

TOTAL AREA: 17200 x 2660 x 3600 mm

SL. NO	TAG. NO	DESCRIPTION	SIZE	QTY
01	B S	BAR SCREEN	1000 x 1000 x 500 SWD	1
02	O G T	OIL & GREASE TRAP	1000 x 1561 x 1500 SWD	1
03		ANAEROBIC TANK	5600 x 2761 x 4000 SWD	1
04		AEROBIC TANK	5800 x 2761 x 3900 SWD	1
05	FFT	FILTER FEED TANK	2000 x 2761 x 3900 SWD	1
06	TWT	TREATED WATER TANK	2840 x 2761 x 4000 SWD	1

Figure 6.1: STP sizing

Sanitation Facilities: Lack of proper sanitation facilities for the sub-project personnel, including the labor/construction workers may result in an unhealthy environment (including water pollution) within and around the sub-project sites.

6.2.2.2 Socio-economic Impacts

Major parameters considered for assessment of socio-economic impacts of sub-project activities include:

- Temporary dislocation/displacement
- Traffic congestion (in front of the sub-project site)
- Safety (Occupational Health and Safety- OHS and Community Health and Safety -CHS both), and
- Employment

Temporary Dislocation/Displacement: Some hawkers or morning time vegetable businessman need to move away for some hours temporarily during construction activities due to safety issues and other considerations (e.g., privacy/noise pollution/air pollution/vibration/vehicle movement).

As with any other construction sub-project, following are the key labor risks that have been identified:

- Employment practice by the contractors may not be compliant with either labor law or ESS 2. For example, not providing written documents of assignments, wages, not proportionate with tasks performed, excess workload without provision of adequate rests and leisure, lack of hygiene facilities, discrimination towards women, etc.
- Assignment of child and forced labor and use of unscrupulous labor practice.
- Conducting hazardous work, such as working at heights or in confined spaces, use of heavy machinery, deep excavations for the construction of 4 basements or use of hazardous materials etc.
- Lack of Occupational Health and Safety (OHS) practice and procedures.
- Community health and safety issues, especially shifting the economic power balance, rise of communicable diseases
- Generation of solid, liquid and fecal wastes, especially around labor camps and toilet areas.

- Rise of incidence of Gender-Based Violence (GBV) emanating from the labors.

Construction of a 9-storey building plus 4 basements shall involve a range of activities that might possibly be unsafe to workers and the local community if proper measures or precautions are not taken. The construction activities include piling, excavation of soils, fabrication of MS rod, erection of heavy construction material etc. Loading and unloading operation of the construction material may cause injury if not handled properly. Further, there is potential for slips and fall of construction material, liquid spills and uncontrolled use of electrical cords and ropes on the ground which results in injuries and time loss during construction. Also, the workers will be at risk while working at the deep excavation, e.g., the collapse of the sides; materials falling on workers in the excavation; and falls of people and/or equipment into the excavation etc. Considering the intensity of work, sub-project location and types of activities that expected to be done for the proposed facilities, it is obvious that this sub-project may carry high risk on the occupational health and safety without appropriate mitigation measures.

Depending on the circumstances and potential hazards present, different types of PPE may be required. Selection of such PPEs shall be made by supervisor based on the preliminary Job Hazard Analysis. Following are the most common PPEs that are used in the construction sites:

- Helmet
- Boot
- Apron
- Protective gloves
- Hearing protection
- Full face shields when cutting, grinding, or chipping
- Chemical splash goggles
- Respiratory protection
- Fall protection equipment when working above 6 feet
- Specific protective clothing such as welding leathers when welding or Flame-Retardant clothing when necessary
- COVID-19 protective gears

Possible mitigation measures for the risks and impacts mentioned above are recommended in the ESMP section (Table). Mitigation measures are also recommended in specific sections of the bidding documents.

Traffic Congestion: Temporary increase in vehicle movement due to carrying construction material and equipment may lead to traffic congestion. Traffic congestion may be aggravated if materials (e.g., construction materials) are stored on the street and equipment/machines/vehicles (e.g., mixing machines) are kept/parked on the street during both of the day and night time.

There is a 40 feet wide road in front of the proposed site which is connected to the 100 feet wide DNCC road. This 40-feet road will act as haul road for transporting the construction materials, which may result in blocking the roads if the vehicles commute during the day time. This obstruction may cause nuisance and economic loss to the local road users. In addition, the volume of traffic will be increased, which may increase the possibility of accident.

6.2.2.3 Labour Influx

The sub-project area is located in a commercial zone inside the center of the city. Though the number of construction workers during the entire construction period might be limited to between 50 to 60 only, the sub-project's impact on the health and safety of the workers has to be considered carefully.

Moreover, the contractor will be obligated to reduce the labor influx by tapping into the local workforce for unskilled labor.

6.2.2.4 Fire, Accidents, and Falling Objects

During the construction period, the community and the construction workers may become exposed to additional risks of fire, accidents, and falling objects. Moreover, they will also face health hazards such as minor or major injuries due to lack of general safety requirements and precautions applicable for such sites, malfunctioning equipment, careless use of equipment and vehicles, etc. Poorly designed temporary camp and sanitation facilities may pose a health threat and nuisance to the workers and local populace. There might be fire hazard during the operation phase of the sub-project. Fire might be triggered from electric short circuit or from other sources. Pedestrians can be injured from the falling objects at or beside the construction site.

Possible mitigation measures for the risks and impacts mentioned above are recommended in the ESMP section (Table 9.1).

6.2.2.5 Social disturbance and Gender-Based Violence due to labor influx

During the construction phase, the risk of Gender Based Violence for women and girls working in KawranBazar may also increase. However, as the sub-project site is relatively small and there are no communities residing in the vicinity of the sub-project site, the risk is estimated to be low. Moreover, the scale of the labor influx will be low during the construction period and the absorptive capacity of the KawranBazar community is very high as the community is mostly made up of migrant workers and retailers, traders, and shop owners that regularly deal with such workers. As the migrant worker community of KawranBazar is made up of migrants from all areas of Bangladesh, there will be little cultural difference between the contracted and local workers. However, competition between local and non-local workers for local resources may create social disturbance.

6.2.3 Impacts Related to land & assets

The sub-project with its current design involves no involuntary resettlement and requires no land acquisition. There are no squatters living in the sub-project site. The floating retailers (vendors), who usually sit beside the boundary wall of the sub-project site, may have to use the boundary walls of the adjacent buildings / shops and may also share the spots used by other vendors.

6.2.4 Impacts related to excavated soil for basement

For the construction of a 9storey building plus four basements it is estimated to excavate 765,000 cft of soil This large volume of soil may pose threat to the workers and to the nearby building if not properly handled and mitigation measures are not taken.

The excavation subcontractor will be recruited under the main construction contractor then excavation will start. There will be a contract between the main contractor and sub-contractor/s for the excavation. The soil will be disposed of as per the agreement between the main contractor and sub-contractor /s. The options for subcontractor/s to dispose excavated soil are:

- a. Excavated soil should not be disposed any lake or water body
- b. Excavated soil should not be disposed on road, near any road or any area (lake side, Markets, or communal places) which will hamper communication of local people
- c. Excavated soil should not be disposed in any location within Dhaka city which is not designated places of (DNCC / DSCC)
- d. Before disposal of excavated soil, sub-contractor /s should take approval from relevant city corporation if disposes within Dhaka city and
- e. Excavated soil should not be kept near site for a long time.

Some important mitigation measures are also suggested in the ESMP section on removal of excavated soil.

6.2.5 Water requirement

Amount of water will be required during construction period

- a. Amount water used during pile work = $84,000 \times 2 = 1,68,000$ litre/day
Total 60 day- $60 \times 1,68,000 = 1,0080,000$ litre/day
- b. Average 80,000 litre/day
Total 840 days – $80,000 \times 840 = 6,72,00,000$ litres
- c. Human consumption (labour and others) – $200 \text{ persons} \times 30 \times 900 = 54,0000$ litre

Total amount of water used during construction period (a+b+c) = $10,080,000 + 6,72,00,000 + 54,000 = 8,26,80,000$ litres. This volume of water will be taken from the DWASA through pipeline.

6.2.6 Impact on Ecology and Biodiversity

Flora: In the sub-project area, there are twenty-seven trees that have to be cut-off during construction phase. The Vision 2041 Smart Tower would not emit any toxic gas or dust during operation so the impact on floral species around the sub-project area is insignificant.

Fauna: The Vision 2041 Smart Tower will not emit thermal discharge to water body. Besides, the daily wastewater generated in the building will be collected and treated by the in-house sewage treatment plant and then be discharged into the sewer network provided by the DWASA and some of the treated water will be used for toilet flushing and gardening purpose. In this regard, the impact on the aquatic fauna in the area is insignificant.

Safety: Occupational Health and Safety (OHS) and Community Health and Safety (CHS)

Construction activities of the proposed Smart Tower shall involve safety risks to both the sub-project personnel including construction workers and officers as well as regular users of the roads and streets over and alongside where the construction activities will take place. Safety risks comprise sudden fall of heavy construction materials, sudden fall of pre-fabricated structure during and after placement on the main structure, etc., could cause serious or fatal injury to passersby and construction workers. Serious accidents may also occur due to sudden fall of construction workers from the height of the under-construction building. Regular safety measures, special construction methodology, etc., would have to be followed to ensure safety during construction. Contractors must provide an occupational health and safety plan which must be approved by the BHTPA. OHS issues have been properly included in the ESMP part (Table 9.1) and bidding documents.

Employment: Construction of the proposed Smart Tower will generate employment opportunities for skilled manpower (e.g., engineers) and unskilled workforce (i.e., labor). This, in turn, would induce beneficial impacts on some other parameters including commercial activities in the sub- sub-project area.

6.3 Anticipated Impacts During Operation Phase

Primary objectives of the proposed Vision 2041 Smart Tower Sub-project are to enhance IT capacity and reduce the dependency on other countries. In particular, the proposed STP will (a) enhance digitalization capacity; (b) lower the cost of IT product and software; (c) improve employment of youth and provide them support to start-up business related to IT;

Operation phase of the sub-project is likely to cause the following impacts:

- Traffic congestion because of vehicle movement;

- Air pollution and noise hazard from all the incoming vehicles;
- Potential pollution of water from surface runoff;
- Potential pollution of groundwater from runoff and other contamination; etc.
- Drainage congestion due to unmanaged solid waste and construction waste

The following table 6.1 lists the likelihood of occurrence and the magnitude of impacts on different environmental resources that might occur during various phases of the sub-project.

Table 6.1: Impact analysis chart

Sub-project Phase	Sl. No.	Action affecting Environmental and Social Resources and Values	SEIs without mitigation measures							Comments/Observation
			Temporal Aspects	Spatial Aspects	Reversibility	Likelihood	Magnitude	Sensitivity	Significance	
Pre-Construction Phase	1.	Loss of land displacement from homestead land	Long term	Local	IR	UL	Nil	Low	Negligible/No	No loss of land displacement from homesteads land;
	2.	Damage nearby operation	Long term	Local	R	UL	Nil	Low	Negligible	No impact anticipated
	3.	Disruption to drainage pattern	Long term	Local	R	UL	Nil	Low	Negligible	No impact
	4.	Change in landscape	Long term	Local	IR	C	Nil	Low	Negligible	It will happen but its impact will be positive
Construction Phase	5.	Run off erosion	Short term	Local	R	L	Low	Low	Negligible	No impact
	6.	Noise/vibration hazard	Short term	Local	R	L	Moderate	Moderate	Moderate	Impacts are expected during the piling and excavation, vehicle movement etc.
	7.	Traffic congestion	Short term	Local	R	L	Low	Low	Negligible	Very low and short-term impact anticipated from construction vehicles
	8.	Damage to nearby operation	Short term	Local	R	L	Moderate	Moderate	Moderate	Excavation and piling activities may damage the existing utilities. Construction of multiple underground may pose risk to nearby buildings
	9.	Disruption to drainage pattern	Short term	Local	R	L	Low	Moderate	Negligible	No impact anticipated
	10.	Worker accident	Short term	Local	R	L	Moderate	Moderate	Moderate	Accident during work in height and electrical works

	11.	Air pollution	Short term	Local	R	L	Moderate	Moderate	Moderate	Impact during excavation
	12.	Waste disposal (Solid and Liquid)	Short term	Local	R	M	Moderate	Moderate	Moderate	During construction phase generated solid and liquid waste may dispose nearby in unmanaged way
Operational Phase	13.	Pollution from liquid discharge beyond boundary	Long term	Local	R	C	High	High	Substantial	If the Sewage Treatment Plant does not work properly
	14.	Groundwater pollution	Long term	Local	IR	UL	Moderate	Moderate	Negligible/No	Based on plan and design there is no possibilities of groundwater pollution
	15.	Air pollution	Long term	Local	R	L	Moderate	Moderate	Moderate	Dust from cleaning, vehicle moving to and from the building, and from generator
	16.	Waste disposal (Solid and Liquid)	Long term	Local	IR	M	Moderate	Moderate	Moderate	Everyday solid and liquid waste will be generated. Unmanaged waste could pose risk to environment
	17.	Noise/vibration hazard	Long term	Local	R	L	low	Low	Negligible	No impact anticipated
	18.	Traffic congestion	Long term	Local	R	L	Moderate	Moderate	Moderate	vehicle moving to and from the building

UL= Unlikely, L= Likely, IR= Irreversible, C= Certain

CHAPTER 7

Public and Stakeholder Consultation

7 Public and stakeholder consultation

7.1 Purpose of Public and Stakeholder Consultation

Stakeholder consultation aims to involve all primary and secondary stakeholders in the sub-project's decision-making process so that their concerns can be addressed, the sub-project may have improved design, and the legitimacy of the sub-project can be attained. If the stakeholder consultation could be conducted in a participatory and objective manner, it is highly likely that the sub-project would be sustainable. Public consultation and participation can be envisaged as a continuous process where, public understanding of the processes and mechanisms can be promoted, which in turn helps in investigating the developmental problems and needs. The stakeholder consultation, which is an integral part of environmental and social assessment process throughout the sub-project preparation stage minimizes the risks and unwanted hurdles against the sub-project implementation as well as bridges the gap between the community and the sub-project formulators. Such an initiative leads to successful and timely completion of the sub-project and makes the sub-project acceptable to the people.

Therefore, keeping in mind the above objective, public consultations were conducted with the people of different section of the society like local businessmen, knowledgeable persons, community leaders, ward councilors, and other stakeholders to know the expectations, complaints and comments about the sub-project in-depth. Moreover, potential vulnerable people were also consulted with the aim to make people aware and minimize adverse impacts of the sub-project. Community input on socioeconomic and environmental issues in terms of knowledge and values can greatly enhance the quality of decision-making. Stakeholder consultation was therefore conducted in the sub-project area not only to satisfy the legal requirements of the ESIA process in Bangladesh but also to improve and enhance the social and environmental design of the sub-project.

The following have been the operational framework for the stakeholder consultations:

-
- Disclosure in local language with understandable content during public consultation.
- Community engagement is free of external manipulation, interference or coercion, and intimidation, and conducted on the basis of timely, relevant, understandable and accessible information.
- A grievance redress mechanism (GRM) to receive and facilitate resolution of the affected communities' concerns and grievances about the borrower's environmental performance.
- Formal public consultation.

Public and stakeholder consultation helps to define a program for stakeholder engagement as well as public information disclosure and consultation, throughout the entire sub-project cycle. Such consultation outlines the ways the sub-project team will communicate with the stakeholders and includes a mechanism by which people can raise concerns, provide feedback, or make complaints about the sub-project and any activities related to the sub-project. Toward realizing ESF requirements for the sub-project, public consultations were conducted as a part of the environmental and social assessment procedure and were aimed at achieving the following objectives:

- to make the stakeholders aware of the Sub-project;
- to ensure that the public was provided with opportunities to participate in the decision-making process and to influence decisions that would affect them;
- to identify the widest range of potential environmental and social issues about the sub-project as early as possible and in some cases, have those resolved;

- to ensure that government departments were notified and consulted early in the process; and
- to ensure a broad range of perspectives for consideration in any decision pertaining to the environmental assessment process of the sub-project.

7.2 Past Consultation and Participation during Feasibility Study

As a part of a previous initiative of ESIA, some stakeholder consultation has been done. Separate individual interviews were held with disadvantaged and vulnerable members of the community to disseminate information about the sub-project and to understand their views about the sub-project. Such a technique helped solicit views and opinions at the individual level. It enabled stakeholders to speak freely and confidentially about controversial and sensitive issues and allowed researchers to build personal relations with stakeholders. The purpose is to understand the social concerns of the directly or indirectly impacted persons. A team comprising social development professionals carried out these consultations. A total of 30 key informant interviews were also done to understand the harms that the sub-project may bring to the Kawran Bazar community, potential benefits of the sub-project, existing ways of grievance redress etc. Of these 30 interviews, 13 were conducted with officials working in the Vision 2021 Tower STP-1. Nine more interviews were conducted with retailers from different markets (3 retailers from the Pepe Potti, 2 retailers from the 100 feet road, 1 from the Hasina market, and 3 from other adjacent markets). In addition, researchers also interviewed 2 traders, 2 laborers, 1 Ansar member, 2 local dwellers, and 1 magistrate.

Stakeholder consultations at the beginning phase of the ESIA preparation were held with surrounding community members during November 2019. The key findings of the consultations are described in the socio-economic study and in the below Table 7.1. Another consultation with the sub-project affected persons was conducted on 30th January 2020 after the preparation of the draft ESIA. During the consultation, the outcome of the assessment of the ESIA was shared with the participants and important opinions of the participants on the draft ESIA were received. The details of the consultation are given in Table 7.1 below.



Figure 7.1: Group Discussion with pepe potti people



Figure 7.2: KII with Locals



Figure 7.3: Discussion with STP 1 people



Figure 7.4: Discussion with existing IT businessmen of STP 1



Figure 7.5: Sub-project consultation with PAF



Figure 7.6: Sub-project consultation with PAF

Table 7.1: Findings from Consultations during Beginning Phase to the ESIA

SI	Key issues raised	Participant/s type	Response
1	How do they know about this sub-project? (Sub-project start-up period, Land acquisition information; how they knew about the sub-project etc.)	All persons in that work in the existing Vision 2021 Tower STP-1 building	Nearly all the participants said, they have only heard a new building will be constructed near the existing building. Some added that the new building will be a 12 th storied one. But from when the construction will start, what facilities will be there, who shall be using the building they do not know anything about these.
2	What are the causes of conflict among the wholesalers/ retailers, businessmen, godown or warehouse owners, labors etc.	Business owner in Vision 2021 Tower STP-1	<ul style="list-style-type: none"> ▪ The people around this area are doing business only. They know how to do business with others without having any quarrel or conflict. ▪ They try to maintain such an environment where everybody has freedom for doing business and they are concerned only with earning. ▪ As example, a business owner cannot give less wages to labor, he has to maintain the rule of the bazar. ▪ Sometimes conflicts among the political groups take place regarding taking control of tender or extortion.
3	Who lives and works near the sub-project site and how the sub-project will affect their health and safety	Worker's, day labors and local people	<ul style="list-style-type: none"> ▪ The workers of the market do not live here. They are from different places, and mainly from Mymensingh, Chandpur, Barisal, Noakhali. They do not live here in Kawran Bazar. They come from nearby areas like Tejturi bazar, Tejkuni para, Tejgaon, etc. Even some of them come from Tongi, and Gazipur too. So, the noise during the construction of the building here will not affect them. ▪ He added, as Kawran bazar is a busy area, and the characteristic is known to all so if any noise or chaos takes place it would not hamper any.
		Employee of a Software firm at Vision 2021 Tower STP-1	<ul style="list-style-type: none"> ▪ Noise and air pollution will take place during the construction work of the building. But as dwellers of Dhaka city, we have and are experiencing circumstances of another development sub-project such as metro rail, so we will be able to cope with it too. ▪ She added, she has to travel every day to join office from Sanir Akhra (which is quite a distant place from Kawran bazar) during the installation of 'Mayor Hanif Flyover' she had to suffer every day from immense traffic jams and dusty environment but now when the job is done all are benefitted from it.

SI	Key issues raised	Participant/s type	Response
		Employee of a Software firm at Vision 2021 Tower STP-1	<ul style="list-style-type: none"> ▪ Newspapers published reports saying the air condition of Kawran Bazar is most polluted. When this building construction work starts it would add more to the pollution level. But as there many development works are going on in the city, we (dwellers) are already habituated with such an environment. So, it would bring no new hamper to us. ▪ Hence, she requested the sub-project authority to be careful during the construction period to take steps to repair the window glasses into soundproof so the noise during construction work does less hamper, because a calm environment is needed while working on IT farms.
		Employee of a Software firm at Vision 2021 Tower STP-1	<ul style="list-style-type: none"> ▪ I have seen in Thailand; they work without any noise and air pollution.
		Employee of a Software firm at Vision 2021 Tower STP-1	<ul style="list-style-type: none"> ▪ Sound pollution hampers our work to an intense degree. ▪ Already this bazar area affects our work severely, but it is better to have a construction work nearby than having a market place.
		DNCC Official	To minimize the air and sound pollution level he referred to the 'Basundhara Convention Smart City Mela', a fair where they are having an exhibition of various technologies of construction work. He adds, nowadays most countries of the world are using modern technologies in construction work to hamper the environment. As we are doing a smart job
		Employee of a Software firm at Vision 2021 Tower STP-1	<ul style="list-style-type: none"> ▪ Constructing this building so we also need to act smart. ▪ Safety codes should be maintained during the construction period.
		Senior Executive of a Software firm at Vision 2021 Tower STP-1	
4	identify the stakeholders: people who will be affected and see how the sub-project will benefit them and harm them; and who have some kind of interest in the sub-project and see what interests they have in the sub-project	Participants (Employee, senior executive and owner) from the software park	<ul style="list-style-type: none"> ▪ IT sector is growing in Bangladesh, so if the building expands it would bring benefit to the IT sector and entrepreneurs related to it. ▪ Now, the garment sector is largest where foreign investors invest because of the availability of cheap labor. But recently Africa is also offering cheaper labor, so investments are moving towards Africa which is a threat for Bangladeshi industries and thus for the economy. On the contrary IT is growing larger so it is good for the sector. ▪ During space distribution, entrepreneurs that have been using the floors should get priority.
		Senior Executive of a Software firm at Vision 2021 Tower STP-1	The construction of the building should be more sophisticated so that clients, especially foreign investors get attracted.

SI	Key issues raised	Participant/s type	Response
		Employee of a Software firm at Vision 2021 Tower STP-1	<ul style="list-style-type: none"> ▪ With extension of the building other facilities like enough parking space, wide road, clean road should things like these must be there in the plan. ▪ Because of the narrow entry roads, we get stuck for long time getting out or in in the office which highly time consuming. ▪ Because the roads mostly remain wet motorcycle accidents are a common scenario here. We do not invite our clients here because of safety risks, rather we take them to our Uttara office. ▪ The building should be with such technology that offers sound proof working environment which is needed for its persons. ▪ The construction work would not be harmful in any perspective (jam, accident risks etc.) for the students of nearby area's institutions as they will be in their respective institutes by 9.00 am.
		Senior Executive of a Software firm at Vision 2021 Tower STP-1	The organization is planning to recruit a number of 300 staff in the next month. But it is not possible to accommodate that large number here for which it is looking for another office space, so if we get another office space in the next building beside it would be very easy and productive for it to maintain the offices smoothly.
		Employee of a Software firm at Vision 2021 Tower STP-1	Hope that there would be no such cases getting harassed or being teased by any labor who will be working in the sub-project or other personnel.
		Businessman, Kawran Bazar	<ul style="list-style-type: none"> ▪ No possibility for anyone to lose anything because the location is an abandoned area and owned by the government. ▪ Although there is a market by the side of the proposed area by the permission of the city corporation, it has no chance to get harmed or displaced. ▪ There are a number of warehouses on the other side of the road but they are unauthorized. ▪ None has anything to do with material piling here

Table 7.2: Finding from consultation on draft ESIA

SI	Key issues raised	Participant/s type	Response
1	BHTPA authority shared information regarding STP2 and the findings of the draft ESIA and planned mitigation measures	<ul style="list-style-type: none"> ▪ BHTPA representative ▪ Social Development Specialist and team ▪ Environmental Specialist and team ▪ Employees of organizations having office in the existing Vision 2021 Tower STP-1 ▪ Owners / Higher authorities having office in the existing Vision 2021 Tower STP-1 	<p>Shared information was like:</p> <ul style="list-style-type: none"> ▪ The new building would provide working scope for nearly 5000 people. ▪ There would be facility and mentoring for the ‘startup’ businesses. ▪ The construction will take place at night. ▪ Instructions in the ESIA for labor issues will be followed. ▪ Construction work should be environment friendly that is mentioned in the report. ▪ Another participant suggested talking to other business entities surrounding the site, business farms in the existing Vision 2021 STP and other government offices regarding having a plan on when to run construction work, when to carry goods on the site etc. so that all the stakeholders know about the development work and they also manage their working times accordingly and get prepared mentally about the work.
2	Time of construction work and carrying construction goods to site	<ul style="list-style-type: none"> ▪ BHTPA representative ▪ Social Development Specialist and team ▪ Environmental Specialist and team ▪ Employees of organizations having office in the existing Vision 2021 Tower STP-1 ▪ Owners/ Higher authorities having office in the existing Vision 2021 Tower STP-1 	<ul style="list-style-type: none"> ▪ Participants said carrying construction materials at night will be good. Construction work should be done during day time, but inside a boundary of the proposed location of new building. ▪ Construction materials would not be carried to the location daily, rather once or twice in a week. And they would carry them when the market is closed. ▪ One participant suggested carrying the construction goods during weekends such as Friday and/ or Saturday when offices, academic institutes are off.
3	What measures should be taken regarding dust and other pollution/ wastes during construction period?	<ul style="list-style-type: none"> ▪ BHTPA representative ▪ Social Development Specialist and team ▪ Environmental Specialist and team ▪ Employees of organizations having office in the existing Vision 2021 Tower STP-1 ▪ Owners/ Higher authorities having office in the existing Vision 2021 Tower STP-1 	<ul style="list-style-type: none"> ▪ The environmental specialist assured that mitigation measures are mentioned in the report for the contractors during construction period on minimizing environment pollution. ▪ Brick, sand, cement etc. will be kept inside the construction boundary covering by tarpaulin. ▪ The BHTPA authority added, that it will be high priority to minimize disturbance during construction. ▪ During the generator using time they will be covered with canopy to reduce sound and keep it in a minimal noise. ▪ Regularly spraying water on the construction will also be followed to minimize the level of dust in the air. ▪ Participants were ensured that an indicative waste management budget is already kept in the ESIA report.

SI	Key issues raised	Participant/s type	Response
4	Effects on businessman of adjacent market	<ul style="list-style-type: none"> ▪ BHTPA representative ▪ Social Development Specialist and team ▪ Environmental Specialist and team ▪ Employees of organizations having office in the existing Vision 2021 Tower STP-1 ▪ Owners/ Higher authorities having office in the existing Vision 2021 Tower STP-1 ▪ Market Management Committee 	One of the representatives of BHTPA suggested the contractor along with representative from BHTPA should have a meeting with 'Dhaka North City Corporation' before starting the construction work on this issue, if there comes any probability affecting those businesses.
5	Labor influx	<ul style="list-style-type: none"> ▪ BHTPA representative ▪ Social Development Specialist and team ▪ Environmental Specialist and team ▪ Employees of organizations having office in the existing Vision 2021 Tower STP-1 ▪ Owners/ Higher authorities having office in the existing Vision 2021 Tower STP-1 	One participant expressed that for the big construction work coming of a large number of people as laborer is a must. We all have to manage with it. Of course, they (laborers) may have some difficulties regarding their food, living etc. The recruiter should have a good management system for them.
6	Traffic management	<ul style="list-style-type: none"> ▪ BHTPA representative ▪ Social Development Specialist and team ▪ Environmental Specialist and team ▪ Employees of organizations having office in the existing Vision 2021 Tower STP-1 ▪ Owners/ Higher authorities having office in the existing Vision 2021 Tower STP-1 	Participants agreed on the problem in traffic management. Thus, they think it would be wise for the authority to talk with stakeholders and develop a plan as well as share the plan with stakeholders like; the numbers of vehicle that will be carrying goods, when they would enter the area, and how much they would take to unload construction materials/ goods/ equipment etc.

SI	Key issues raised	Participant/s type	Response
7	Security/ safety during construction	<ul style="list-style-type: none"> ▪ BHTPA representative ▪ Social Development Specialist and team ▪ Environmental Specialist and team ▪ Employees of organizations having office in the existing Vision 2021 Tower STP-1 ▪ Owners/ Higher authorities having office in the existing Vision 2021 Tower STP-1 	One participant raised an issue regarding harassment by the laborers during the construction period. She said, it is the responsibility of the authority to ensure good labor rules or management, so no labor attempts any such behavior. She also added, many female employees finish their office at 10.00 pm and get out of the Vision 2021 Tower STP 1 for their home, so she expects that at least no such bad incident take place from any person related to this sub-project or construction work. Other participants agreed with her.
8	Design of the new STP	<ul style="list-style-type: none"> ▪ BHTPA representative ▪ Social Development Specialist and team ▪ Environmental Specialist and team ▪ Employees of organizations having office in the existing Vision 2021 Tower STP-1 ▪ Owners/ Higher authorities having office in the existing Vision 2021 Tower STP-1 	Regarding the design of the new STP participants wish to have mentioned facilities or technologies: <ul style="list-style-type: none"> ▪ Green environment ▪ Stronger electricity supply than before. One said, “We do not want our computers out of electricity even for a 5 second break”. ▪ Cargo lift is must in the new building. Because in the starting hour there comes a huge load of people and all have to wait quite a time to get in to the lift and thus they get late for their office. ▪ A good fire exit system which is not there now. ▪ To use sound proof technology in the design of new building so no sound from the nearby rail line comes into their ear and create disturbance in their work. Because there are a good number of IT or software farms and call support centers and they all need a quiet and calm working environment. ▪ A well-planned parking system, because now in the existing building there is none and they have to face trouble coming with their own cars and it becomes embarrassing when they invite their local and foreign clients to their office. ▪ To improve the sewerage system.
9	Relocation of the Vendors	<ul style="list-style-type: none"> ▪ BHTPA representative ▪ Social Development Specialist and team ▪ Local vendors representative 	Regarding the use of side walls at night to store and sell commodities. <ul style="list-style-type: none"> - During construction the vendors have to use other spaces / walls of nearby buildings. - They may also share the spaces used by other vendors.

7.3 Approach and Methodology for Consultation

The following key processes were followed during conducting the information disclosure and stakeholder consultation:

- Mapping and identification of key stakeholders both primary (direct sub-project influence) and secondary (indirect sub-project influence) stakeholders;
- Undertaking expert consultation, interviews and public consultation meeting with the respective stakeholders

- Assessing the influence and impact on these stakeholders' groups due to the sub-project activities at various stages;
- Summarizing the key findings and observations from the consultation
- Keep provision or proposing of necessary actions / changes & modification based on consultation;
- Preparing a future stakeholder engagement strategy plan for a more detailed assessment at a microscopic level at various sub-project life-cycle phases and their implications on the stakeholders.

7.4 Stakeholder Identification

Sub-project stakeholders are 'people who have a role in the Sub-project or could be affected by the Sub-project or its Proponent's actions, objectives, and policies, or who are interested in the Sub-project'. Stakeholders vary in terms of degree of interest, influence, and control they have over the Sub-project or the proponent. Sub-project stakeholders can be grouped into primary stakeholders who are "...individuals, groups or local communities that may be affected by the Sub-project, positively or negatively, and directly or indirectly"... especially... "those who are directly affected, including those who are disadvantaged or vulnerable" and secondary stakeholders, who are "...broader stakeholders who may be able to influence the outcome of the Sub-project because of their knowledge about the affected communities or political influence over them". In the present study, all the stakeholders have been primarily categorized into two categories as follows:

- Primary Stakeholders (people, groups, institutions that either have a direct influence or impact on the sub-project or by the sub-project).
- Secondary Stakeholders (people, groups, institutions that have an indirect influence or impact on the sub-project or by the sub-project).

Throughout the sub-project development, cooperation and negotiation with the stakeholders often require the identification of persons who act as legitimate representatives of their respective stakeholder group. Such individuals have been entrusted by their fellow groups members with advocating the groups' interests in the process of engagement with the Sub-project. Community representatives may provide helpful insight into the local settings and act as the main source for sub-project-related information. Besides, such representatives act as primary communication/liaison links between the Sub-project and targeted communities and their established networks. The legitimacy of such representatives may stem both from their official elected status and their informal and widely supported standing within the community that allows them to act as the focal points of contact in the Sub-project's interaction with its stakeholders. Examples of legitimate stakeholder representatives include and are not limited to:

- elected officials of regional, local, and village councils and self-governance bodies;
- leaders of informal or traditional community institutions such as village headpersons or chiefs of the communes;
- non-elected leaders that have wide recognition within their community, such as chairpersons of local initiative groups, committees, local cooperatives etc.;
- leaders of community-based organizations, local NGOs and women's groups;
- the elders and veterans within the affected community;
- religious leaders, including those representing traditional faiths;
- teachers and other respected persons in the local communities, etc.

The legitimacy of the community representatives can be verified by talking informally to a random sample of community members and heeding their views on who can be representing their interests in the most effective way.

In addition to legitimacy, the influence and priority of the stakeholders are required to be categorized. Both the influence as well as the priority are primarily rated as:

- High Influence/Priority: This implies a high degree of influence of the stakeholder on the sub-project in terms of participation and decision making or high priority for the sub-project proponent to engage that stakeholder.
- Moderate Influence/Priority: This implies a moderate level of influence and participation of the stakeholder in the sub-project as well as a priority level for the sub-project proponent to engage the stakeholder who is neither highly critical nor insignificant in terms of influence.
- Low Influence/Priority: This implies a low degree of influence of the stakeholder on the sub-project in terms of participation and decision making or low priority for the sub-project proponent to engage that stakeholder.

A list of stakeholders is given below identified based on criteria discussed above:

Sl. No.	Name of Stakeholders/ Type	No. of Stakeholders	Type of Engagement
1.	Software technology park 1 executives, officers, entrepreneurs	5-10	FGD & KII
2.	Bazar committee lead/head (from existing 13 Bazar committee of Karwanbazar)	13-15	FGD & KII
3.	Local small businessmen/ shopkeepers, hawkers, day labors, floating people	10-15 (each group and total two groups)	FGD
4.	City corporation officials, WASA officials, and officials from nearby large govt. and non-gov. officials	5-7	FGD
5.	Local waste management entrepreneur, sanitation worker, drivers from waste transport, cleaner, etc.	5-7	FGD/ KII
6.	Councilor of Karwanbazar city corporation, Zonal executive officer	2	KII

7.5 Stakeholder Consultation

Consultations were undertaken with the primary stakeholders including beneficiaries, poor and vulnerable groups, and people who may potentially be impacted adversely by the sub-project as well as with secondary stakeholders including local community-based organizations (CBOs) and community representatives as well as government departments.

Focus group discussions were conducted with a cross-section of retailers and laborers working in the nearby community (Pepe potti and Hasina market). The objective of these discussions was to attain a thorough understanding of sub-project issues and concerns from a broad group of stakeholders, including those people who may be affected by loss of livelihoods. The consultations focused mainly on the inclusiveness in participation of community members, perceptions and concerns about the positive and negative Environmental and Social impacts of the sub-project, including impacts on livelihoods and sustainability of the sub-project.

For the disadvantaged and vulnerable members of the community, separate individual interviews were held in order to disseminate information about the sub-project and to understand their views about the sub-project. In this way, views and opinions at the individual level could be asked and discussed with. It enabled stakeholders to speak spontaneously and confidentially about any controversial and sensitive issues and allowed the ESIA team to build personal relations with stakeholders. The purpose is to understand the environmental and social concerns of the directly or indirectly impacted persons. A team comprising social development professionals led by a sociologist carried out these consultations. A total of 5 FGDs and 12 KIIs were conducted to understand the harms that the sub-project may bring to the Kawran Bazar community, potential benefits of the sub-project, existing ways of grievance redress etc. These KIIs were conducted among the STP 1 official, local leaders of the different market committees, local businessmen, city corporation officials, and WASA officials.

7.6 Summary of Consultations

An ESIA report was prepared and related stakeholder consultation was done during sub-project preparation. That report was reviewed and cleared by the WB, which is now updated based on the finalized detailed design.

Stakeholder consultations at the beginning phase of the ESIA preparation were held with surrounding community members on Nov. 2019 and Jan.2020 (figure 7.1 and 7.2). The key findings of the consultations are presented in Tables 7.3 below. Other consultations were conducted with the sub-project affected persons on 5th July 2022 and from 18th July to 25th July, 2022. During the consultation, the outcome of the assessment of the ESIA was shared with the participants and important opinions of the participants on the draft ESIA were received. The details of the consultation are given in the Table 7.3 and 7.4 below. List of participants in Appendix-9.

Table 7.3: Schedule and Participation of Current Consultation Meetings

Sl	Key issues raised	Response
Basic Information: Date & Time: 05th July, 2022 (10.30 am) Location: Vision 2021 Tower STP-1 (Hall Room) Attendee: Local Business owners, service holders, business workers, local elites, Bangladesh Hi-Tech Park Authority (BHTPA) authority, other government agencies personnel (20 participants)		
1	What type of building should it be?	<ul style="list-style-type: none"> ▪ Considering the global climate change issues, it should be Green Building and the waste management should be efficient ▪ Action taken: The building designed in green design concept
2	What type of conference room and other amenities should it have?	<ul style="list-style-type: none"> ▪ Big conference room with modern equipment is needed ▪ There shouldn't be any column inside the room ▪ There should be a restaurant and recreational zone inside the building ▪ Any modern IT park within Asia may be visited to get better ideas about required facilities for an IT park <p>Action Taken: All the comments are addressed during the building design and all above mentioned facilities are accommodated in the building</p>

Sl	Key issues raised	Response
3	3D display, Car Parking, Swimming Pool, AC, Night situation	<ul style="list-style-type: none"> 3D display is needed outside the building, but the viewers of that display would be mostly people from the kacha bazar area It needs enough car parking facility with proper security Swimming pool is also required because most of the IT park in Asia have swimming pool Central AC is required with proper design After 8pm at night due to heavy traffic at the bazar a proper route is needed for the entry of the cars or other vehicles of the IT park Action taken: Except swimming pool, all other requirements are incorporated in the design of the IT park building. For traffic congestion reduction, special traffic support will be proposed in the ESIA report
4	Fire safety, kacha bazar, rainy season	<ul style="list-style-type: none"> Needs to have proper fire safety system and emergency exit Kacha Bazar is situated right in front of the building which can be unpleasant for the foreign client In rainy reason roads and surroundings get muddy due to the bazar Action Taken: All the comments are addressed during the building design
5	Temporary hawkers	<ul style="list-style-type: none"> Bazar committee leaders ensured that they would resolve the issue if there any space disturbance for the temporary hawkers



Figure 7.7: Stakeholder consultation in STP 1



Figure 7.8: Stakeholder consultation with mixed group of stakeholders



Figure 7.9: Stakeholder consultation with wholesaler group



Figure 7.10: Consultation with local people of kawranbazar



Figure 7.11: Stakeholder consultation with labor and businessmen of Kawranbazar



Figure 7.12: KII with officials of IT park



Figure 7.13: KII with MD of a company in STP 1

Table 7.4: Stakeholder consultation and KII with summery

SL	Date & Time	Interviewee /Stakeholder	Summary of consultations
1	18.07.22	Stakeholder Consultation-2 with Govt. Officials, STP officials, Bazar committee members, environmental specialstand social specialist	<p>The participants made the following comments:</p> <ul style="list-style-type: none"> ▪ To minimize the air and sound pollution level, one participant suggested using modern technologies in construction work, like most developed countries of the world is doing, so that the environment may less hampered. In this regard, he referred to the ‘Bashundhara Convention Smart City Mela’, a fair where there is exhibition of various technologies of construction work. ▪ Safety codes should be followed, and safety practice should be maintained during the construction period. ▪ IT sector is growing in Bangladesh, so if the building expands it would bring benefit to the IT sector as well as to the entrepreneurs related to it. ▪ During space allocation, entrepreneurs who have been using the STP 1 should get priority. ▪ Regularly spraying water on the construction should be followed to minimize the level of dust in the air. ▪ During construction period, incidents like harassment by the labors may occur. A female participant said that, it is the responsibility of the authority to ensure good labor rule or management so that no such incidents occur. She also added that many female employees finish their office as late as 10.00 pm. She expects that at least no such bad incident will take place from any person related to this sub-project or construction work. Other participants agreed with her ▪ Action taken or Proposed: Based on the consultation, in the ESIA report GBV, SH, SEA, provision of labor rules, water spraying etc. has been incorporated.
2	24/07/22, 1.00 pm	Stakeholder Consultation-3 with retailers, wholesale dealers, labors	<p>The participants raised the following issues:</p> <ul style="list-style-type: none"> ▪ The roads adjacent to the building shall suffer from severe traffic congestion ▪ Transportation of vegetables, groceries etc. will be affected ▪ Construction noise will be annoying for the community people ▪ Keeping construction materials on the roadside shall impede the traffic movement ▪ Due to construction works air will be polluted, which in turn shall affect the health of people ▪ The construction work would not be harmful in any perspective (jam, accident risks etc.) ▪ Action taken or Proposed: Based on the comments, traffic study was done and alternative traffic routes and times are proposed for the construction vehicles so that traffic congestions could be avoided.
3	24/07/22, 4.30 pm	Stakeholder Consultation-4	<p>The participants made the following comments:</p> <ul style="list-style-type: none"> ▪ They should be facilitated with job opportunities

SL	Date & Time	Interviewee /Stakeholder	Summary of consultations
		with retailers, wholesale dealers, labors)	<ul style="list-style-type: none"> ▪ Trainings can be provided as per the necessity of community people ▪ Brick, sand, cement etc. should be kept inside the construction boundary covered by tarpaulin. ▪ A well-planned parking system should be devised ▪ Roads will be congested while construction continues <p>Action taken or Proposed: Labor job opportunity or relevant job opportunity may open for locals. This ESIA report proposes keeping all the construction materials within the sub-project's premise. A well planned parking system has been designed.</p>
4	24/07/22 2.30 pm- 4.00 pm	<p>KII-1 with FIFO TECH-Manager, Finance Admin</p> <p>KII-2 with FIFO TECH-Assistant Manager, Operations</p> <p>KII-3 with Pridesys IT Limited-CEO</p> <p>KII-4 with Pridesys IT Limited Manager, Operations</p>	<p>Officials of different companies within the STP 1 premise shared the following views:</p> <ul style="list-style-type: none"> ▪ Fire safety should be ensured ▪ Fire trainings should be provided ▪ A canteen for food is required which will be managed centrally ▪ Uninterrupted electricity is highly required ▪ Internet services should be arranged centrally ▪ The construction of the building should be modern and sophisticated so that clients, especially foreign clients get attracted. ▪ parking space, wide road, clean road and road safety should be there in the plan. ▪ One participant requested that the sub-project authority should take necessary steps in replacing the normal window glasses into soundproof glasses so the noise during construction work does less hamper, since a calm environment is needed while working in IT farms. ▪ Due to the narrow entry roads, the people get stuck for long time getting out or in in the office which is total wastage of time ▪ There is no cooking facility in the STP 1 building. This should be considered in the VISION 2041 SMART TOWER ▪ Commodities like lift and other facilities are very poor in the STP 1 building due to lack of proper management and manpower. It should be taken care of for the Vision 2041 Smart Tower building ▪ Many organizations, in order to expand their businesses, are required to recruit more staff on a regular basis. But it is not possible to accommodate that large number here because of the limitation of spaces in the STP 1 building. These organizations are looking for more office spaces and expecting to have a new office space in the Vision 2041 Smart Tower . In that case, it would be very easy and productive for them to run their businesses smoothly. ▪ There should be a central recreational facility within the Vision 2041 Smart Tower.

SL	Date & Time	Interviewee /Stakeholder	Summary of consultations
			<ul style="list-style-type: none"> ▪ Drainage systems must be improved. ▪ There should be a dedicated smoking zone. ▪ Green building facility should be introduced. <p>Action taken or proposed: All of the building design related suggestions are considered and accommodated in the design. However, the decision regarding the expansion of existing offices of STP1 to Vision 2041 Smart Tower shall be made by the authority, which may be decided during the space allocation time.</p>
3	25/07/22; 5.30 pm	KII-5 with Karwan Bazar Committee Secretary) KII-6 with Karwan Bazar Committee- member	<ul style="list-style-type: none"> ▪ One participant requested to allow Bazar community people to use toilets at ground floor as there aren't enough toilets for them in the markets. They are willing to pay for such services. ▪ One participant urged that they should be granted to use pure drinking water. ▪ In emergency or in any fire incident community people may use water from the water supply of the building. ▪ As there will be a big hub for job seekers so community people should get employment opportunity. ▪ No possibility for anyone to lose anything because the location is an abandoned area and owned by the government. ▪ One participant suggested carrying the construction goods during weekends such as Friday and/ or Saturday when offices, academic institutes are closed. ▪ One participant expressed that a large number of laborers shall work in this sub-project, who might face difficulties in managing their living, food etc. They may help these laborers to overcome such difficulties. The recruiter should also have a good management system for them. ▪ Action taken or Proposed: Most of the suggestions were delivered to the authorities; construction goods related suggestions are considered and discussed in the ESIA report. Labour issues were addressed in the LMP.

7.7 Future Consultation and Disclosure

The public consultation and disclosure program will remain a continuous process throughout the proposed Vision 2041 Smart Tower implementation and shall include the following steps:

- **Consultation during detailed design:** Focus-group discussions with the affected persons and other stakeholders (including women 's groups, NGOs and CBOs) to listen to their views and concerns; and Structured consultation meetings with the institutional stakeholders (government bodies and NGOs) to discuss and approve key aspects of the sub-project.
- **Consultation during Construction:** Public meetings with affected communities to discuss and plan work programmes and allow issues to be raised and addressed once construction has started; Smaller-scale meetings to discuss and plan construction work with individual communities to reduce disturbance and other impacts, and provide a mechanism through which stakeholders can participate in sub-project monitoring and evaluation;
- **Sub-project Disclosure:** A communications strategy is of vital importance in terms of accommodating traffic during road closure. Local market owners will be continuously consulted regarding the location of construction camp, access and hauling routes, and other likely disturbances during construction. The road closure, together with the proposed detours, will be communicated via advertising, pamphlets, radio broadcasts, road signage, etc.

Public information campaigns via newspaper, radio, and TV will explain the sub-project details to a wider population. Public disclosure meetings at key sub-project stages will inform the public about the progress and future plans of the sub-project.

For the benefit of the community, the summary of the ESIA will be translated into the local language and made available at: (i) STP1 office; (ii) Local Authority- office; and (iii) PMU.

It will be ensured that hard copies of the ESIA are kept at places which are conveniently accessible to citizens, to disclose the document and at the same time create wider public awareness. Electronic versions of the ESIA will be on the official websites of the BHTPA. Copies of the ESIA will be kept in the PMU office and will be distributed to any person willing to consult and seek information and relevant data pertaining to Vision 2041 Smart Tower from the ESIA.

7.8 Grievance Mechanism

7.8.1 Grievance Mechanism Structure/Architecture

A grievance mechanism (Details described in Annex 12) is a procedure that provides a clear and transparent framework for responding to concerns and grievances of sub-project-affected parties related to the environmental and social performance of the task in a timely manner. Considering the overall need for the sub-project period, BHTPA proposes to establish a GRM to address complaints and grievances starting from sub-project construction and implementation level. Based on consensus, the procedure will help to resolve issues/conflicts amicably and quickly. The GRM works within existing environmental and social management frameworks, providing an additional opportunity to resolve grievances at the local, sub-project, STP/IT/ITeS level operations and at the BHTPA level.

The objective of the sub-project implementation level GRM is to bring the GRM closer to PAPs/ workers of the sub-project in its implementation stage. All effort shall be made to resolve issues at the first instance.

The sub-project Implementation level GRM shall have the following Grievance Redress Committee (GRC) members:

- Deputy Project Director, DEIEDP-BHTPA (Convenor)
- An elected member of the DNCC North Zone 5/Ward Commissioner, Ward No. 26
- A member of the Bazar Committee/Workers Welfare Committee at Karwan Bazar
- A Member of the PAPs/workers of the sub-project
- Local NGO working on Labor and Gender related Issue
- Environmental Specialist of the sub-project
- Social Specialist of the sub-project (Member Secretary)

The sub-project Implementation level GRC shall resolve or reach a decision within **fifteen (15) days** from the date the complaint is received. The chairperson of the GRC shall communicate the committee's decision to the aggrieved PAPs in writing and maintain a record of all decisions related to each case.

7.8.2 STP Level Grievance Redress Mechanism during Operation Stage

The objective of STP level GRM is to oversee the GRM of the STP at the operation stage and assist the Industries/Entrepreneurs in addressing the grievances immediately upon receipt of a complaint. When a grievance could not be effectively addressed and mitigated at the Industry/Entrepreneur level, it would be forwarded to the BHTPA level for necessary action.

The STP level GRM shall have the following Grievance Redress Committee (GRC) members:

- Director Administration of the Industry/STP/ - Convener
- Representative of the staff or workers of the Industry/STP/ including a female staff/worker
- Elected Representative of the Local Government Institution
- Local NGO working on Labor and Gender related Issue
- HR Manager Administration of IT/ITeS/STP - Member Secretary

7.8.3 PMU (BHTPA) Level Grievance Redress Mechanism

A committee of persons, experienced in the subject area, shall be constituted at the PMU (BHTPA) level to handle complaints that have not been addressed or resolved at the Sub-project implementation and operational level. The BHTPA level GRC shall be comprised of the following members:

Sl. No.	Name/Designation	Organization	Position in GRC
1.	Director (Admin & Finance)	BHTPA	Convener
2.	Sub-project Director, DEIEDP	BHTPA	Member
3.	Deputy Director Planning & DPD/AD, DEIEDP	BHTPA	Member
4.	Environmental Specialist	DEIEDP, BHTPA	Member
5.	Social Specialist	DEIEDP, BHTPA	Member
6.	Representative from STP-1		Member
7.	Assistant Director, DEIEDP	DEIEDP, BHTPA	Member Secretary

The BHTPA level Grievance redress committee shall do everything possible to hear and determine the issues within **15 (fifteen) days** from the date the case has been transferred to it from the Sub-project / IT/ITeS GRC. The GRCs will record the details of the complaints, the reasons that led to the

acceptance or rejection of the particular cases, and the decision agreed with the complainants. BHTPA will keep records of all resolved and unresolved complaints and grievances and make them available for review as and when asked for by the World Bank and other interested persons/entities.

The chairperson of the GRC shall communicate the outcome to the aggrieved PAP(s)/staff in writing. The GRC shall maintain a record of all outcomes related to each case.

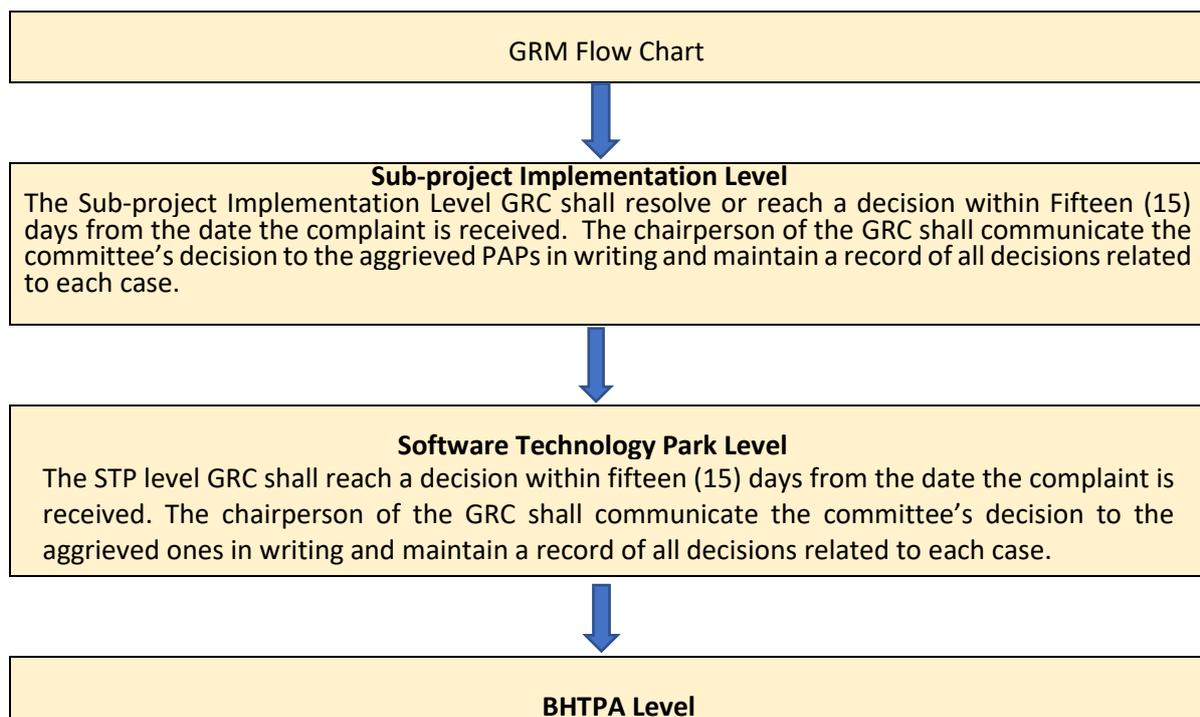
Information about the GRM will be publicized as part of the initial disclosure consultations. Information about the GRM will also be posted online on the BHTPA website (<http://www.bhtpa.gov.bd>).

An example of a grievance registration form and Typical grievance resolution process of PRIDE project is given Annex 7: Sample ‘grievance form’ and grievance mechanism of pride sub-project.

7.8.4 GRM contact information – BHTPA

Information on the sub-project and future stakeholder engagement programs will be available on the sub-project’s website and will be posted on information boards in the sub-project office. Information can also be obtained from BHTPA offices. The point of contact regarding the stakeholder engagement program at BHTPA is given below:

Description	Contact details
Company:	Bangladesh High-Tech Park Authority
To:	Sub-project Director
Address:	Bangladesh Hi-Tech Park Authority, ICT Tower (9th Floor), E-14/X, Agargaon, Dhaka-1207
E-mail:	pd.deiedp@bhtpa.gov.bd
Website:	www.bhtpa.gov.bd
Telephone:	Phone: +88-02- 55006889, Mobile: 01849462230



The BHTPA level Grievance redress committee shall do everything possible to hear and determine the issues within 30 (thirty) days from the date the case has been transferred to it from the Sub-project level and STP's level GRC. To ensure impartiality and transparency, hearings on complaints will remain open to the public. The GRCs will record the details of the complaints, the reasons that led to acceptance or rejection of the particular cases, and the decision agreed with the complainants. BHTPA will keep records of all resolved and unresolved complaints and grievances and make them available for review as and when asked for by the World Bank and other interested persons/entities.

The chairperson of the GRC shall communicate the outcome to the aggrieved PAP(s)/staffs in writing. The GRC shall maintain a record of all outcomes related to each case. Should measures taken by the BHTPA fail to satisfy the complainant, the aggrieved party is free to take his/her grievance to the court, and the court's decision will be final.

Figure:7.14 GRM Flow Chart

CHAPTER 8

**Institutional Capacity
Assessment and
Implementation Arrangement**

8 Institutional capacity assessment and Implementation arrangement

8.1 Institutional Framework

Environmental management of the sub-project requires a multidisciplinary approach with consolidated and coordinated efforts from a number of agencies. Various institutions will be involved during implementation of the Sub-project. While contractor is responsible for implementation of ESMP during construction works, Construction Supervision Consultant (CSC) is primarily responsible for supervision of monitoring of the implementation of the ESMP and also reporting the progress to BHTPA. Information and Communication Technology Division is the Executing Agency (EA). The BHTPA will be involved in the implementation and management of the works for which they are responsible by establishing a Sub-project Management Unit (PMU). The Key organizations and people involved in environmental management of the sub-project are as presented in Figure 9.1.

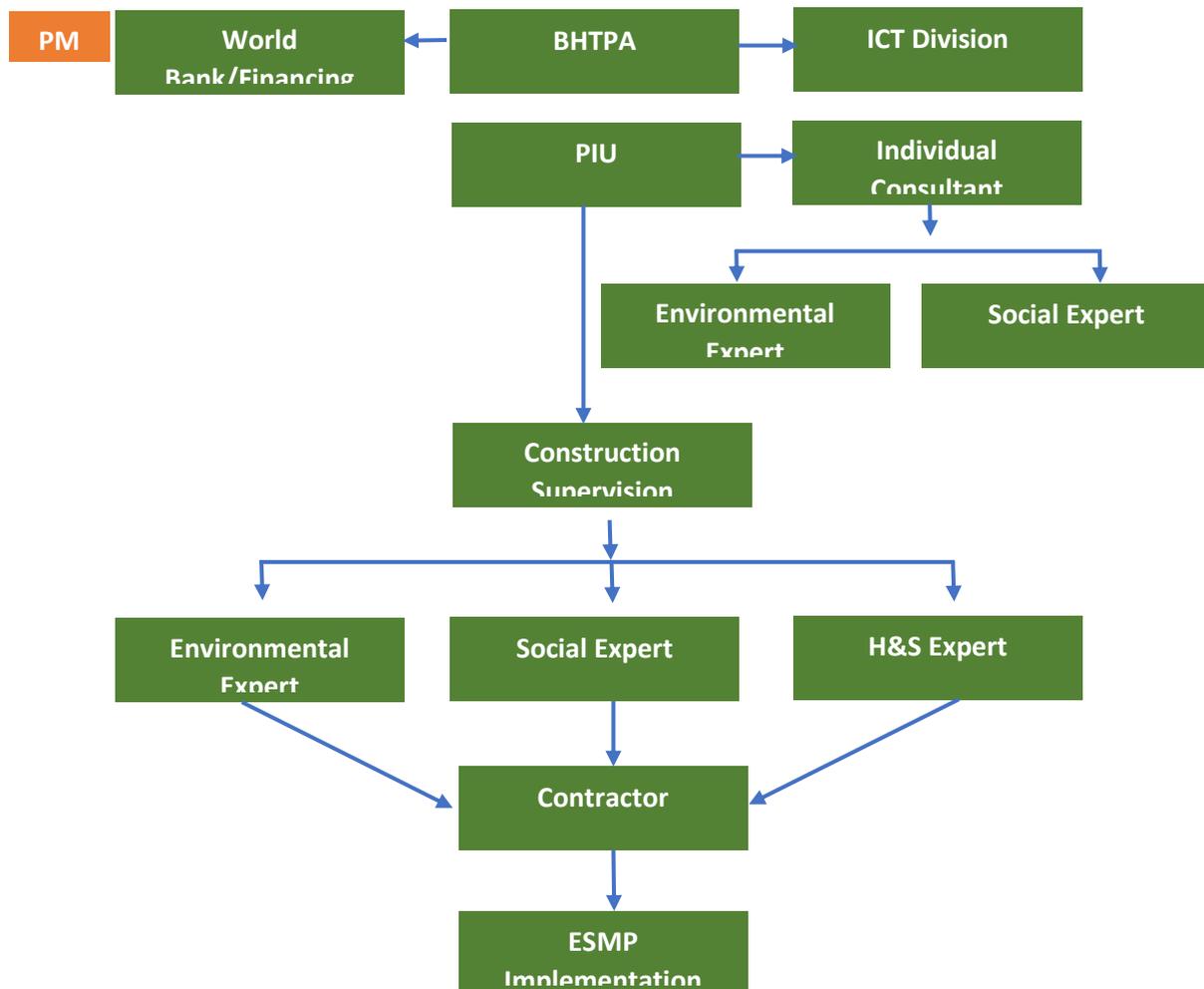


Figure 8.1: Proposed institutional framework for ESMP implementation

8.2 Institutional responsibilities

A number of institutions will be involved during construction and operation phase of the Sub-project in order to achieve environmental compliance goal set by ESMP. A proposed institutional framework for ESMP implementation has been shown in Figure 8.1. These institutions will carry out following distinct but interrelated responsibilities. Contactor shall be responsible for coordination among different authorities and for any coordination PMU will provide all possible support. Quarterly

coordination meeting will be arranged with the relevant authorities. The proposed institutional framework will be followed in order to implement the ESMP. Environmental and Social consultants shall monitor the implementation of ESMP of contractor.

8.2.1 ICT Division (ICTD)

ICTD as the Executing Agency of the Sub-project will have the overall responsibility of ensuring that the ESF requirements of the sub-project are fulfilled through the BHTPA. The main responsibilities of the ICTD are to:

- Ensure that the sub-project, regardless of financing source, complies with the provisions of the ESMP and World Bank ESF Policies
- Ensure that sub-project implementation complies with government environmental policies and regulations;
- Ensure that sub-project environmental management is implemented and reported to the Steering Committee and the financing agency as required.

8.2.2 Bangladesh Hi-Tech Park Authority (BHTPA)

BHTPA Committee with representatives from related ministries and government agencies' coverage will be established at the time of implementation of this sub-project. This committee will facilitate the coordination of various agencies under the ministries in the environmental management and monitoring process.

8.2.3 Individual Consultants

An individual consultant team functioning under the BHTPA will be directly responsible for contract administration and day-to-day sub-project supervision including environmental management. The team may consist of a health and safety expert as well as an environmental and social expert. The engineers of the PMU will advise the BHTPA on ESMP implementation and monitor the work of the contractors in the field. The Engineers will also help the PMUs prepare quarterly progress reports to be submitted to the BHTPA, who will submit semi-annual reports to the WB for review. The engineers will, inter alia, be responsible for the following:

- Facilitate environment specialists to ensure proper implementation of ESMP provisions;
- Undertake regular monitoring of the contractor's environmental performance supported by Environmental and Social specialist, as scheduled in the ESMP;
- Conduct periodical environmental audits supported by Environmental and Social Specialist;
- Prior to construction, review and approve ESMPs/method statements prepared by the sub-project company;
- Supervise the site environmental management system of the contractors with support from Environmental and Social specialist, and provide corrective instructions;
- Monitor the implementation of the ESMP and review the environmental management and monitoring reports prepared by the Contractor;
- Review and report on ESMP implementation by the Contractor.

Overall, the consultant will be responsible for ensuring proper and timely implementation of all the tasks specified in the ESMP with the support of Environmental and Social Expert.

8.2.4 Environment and Social Experts

Environmental and social experts will work together. They will guide PMU staff in developing mechanisms for effective sub-project supervision throughout the sub-project construction and even in the operation phase. They will also assist CSC (Construction and Supervision Consultant) and

contractors in conducting subsequent monitoring and reporting and in undertaking corrective options and establishing and implementing an environmental management system.

8.2.5 Sub-project Implementation Unit (PIU)

The Sub-project Implementation Unit will be established under the BHTPA and will employ an individual consultant on environment and an individual consultant on social.

The consultants will be responsible for overseeing the monitoring activities conducted by the CSC on its behalf. It will also be responsible for overseeing the activities of the contractor through PMU. Consultants will provide the quarterly and annual ESMP monitoring report to the PIU which will be circulated to related authorities including the WB and PMU. The final report will be approved by PIU and sent back to the contractor with recommendations (if any) for continuing, improving and following instructions. The main activities of the consultants are:

- Planning and implementation of ESMP
- Ensuring that environmental and social protection and mitigation measures in the ESMP are incorporated in the Construction Environmental and Social Management Plan (CESMP);
- Ensuring that the CSC commits and retains dedicated staff as environment and safety managers to oversee CESMP implementation
- Supervision and monitoring of the progress of activities of the consultants and contractors for implementation of different components of ESMP
- Guide PMU, CSC and contractors in conducting subsequent monitoring and reporting and in undertaking corrective options
- Responsible for modifications or correction of the ESMP when there were adaptation/changes during implementation.
- Ensure submission of periodical environmental management and monitoring reports to the BHTPA and World Bank;
- Submit semi-annual monitoring reports on ESMP implementation for BHTPA and World Bank;
- Ensure establishment and implementation of an environmental and social management system;
- Implementation of environmental monitoring measures (such as environmental quality monitoring, tree plantation, landscaping, and wildlife monitoring) during the O/M stage of the sub-project.
- Promote improved environmental and social performance through the effective use of management systems;
- External communications with other government, semi-government, and non-government organizations, universities, and research institutes in the country on matters of mutual interest related to environmental and social management.

8.2.6 Construction and Supervision Consultant (CSC)

The CSC functioning under the BHTPA will be directly responsible for contract administration and day-to-day sub-project supervision, including environmental management. The CSC will consist of 1 environmental expert and 1 social development expert. The CSC will advise the BHTPA and the PMU on ESMP implementation and monitor the work of the contractors in the field. The consultants will also help the PMU prepare quarterly progress reports to be submitted to the BHTPA, who will submit semi-annual reports to the WB for review. Overall, CSC is responsible for ensuring proper and timely implementation of all the tasks specified in the ESMP.

8.2.7 Contractors

The contractor will be primarily responsible for preparing and implementing the CESMP. Each contractor will be recommended to have one Environmental Specialist and one Occupational, Health and Safety (OHS) Specialist, who will be working in close coordination with the environmental staff of CSC and PMU. The main functions of the contractor for environmental management and monitoring are to:

- Preparation of contract, prepare the CESMP and other method statements and management plans according to the requirements of ESMP ;
- Recruit qualified environmental and safety officers (ESO) to ensure compliance with environmental statutory and contractual obligations and proper implementation of CESMP;
- Provide sufficient funding and human resources for proper implementation of CESMP;
- Prepare monthly reports on environmental management and monitoring for review and verification by the CSC; Prepare and implement an Environmental Management system according to the requirement specified in ESIA.

8.2.8 Assessment of Capacity of BHTPA

A careful assessment of BHTPA has been made which shows that there is no defined institutional setup to supervise the Environmental and Social activities under the sub-project. There is no dedicated social and environmental cell or unit in BHTPA for monitoring and managing social, environmental, and health and safety risks for the development sub-projects, except for an individual environmental and a social consultant at the PMU. An environmental, social and communication cell is therefore, recommended under the PD of BHTPA during the sub-project period. This cell will work independently to monitor and supervise the ESMP for the sub-project. The PMC will work under the PMU. The PMC will need to have qualified Environmental and Social specialists who will review the reports from the Design and Supervision Consultants and the Contractors on the implementation of the ESMP. The Design and Supervision Consultant will work to monitor the implementation of the ESMP by the contractor and report to the PMU.

8.2.9 Action Plan for capacity building

During the sub-project period, the Environmental and Social Consultants will have to be deployed at the PMU level. After ending the sub-project fund, the positions will have to be in permanent status under BHTPA. Training shall be imparted, on a regular interval, to the BHTPA officials and staff on Environmental and Social issues. The ESMP document will be used as training material for the capacity building of BHTPA officials and staff, and the Environmental & Social Specialist will act as facilitators for the capacity-building sessions. If the consultants, ES & SS, do not feel confident in their subjects, the ESIA consultants will initiate training for the BHTPA officials as a TOT course on Environmental and Social issues. Later on, the BHTPA officials and consultants will train the contractors on Environmental and Social compliance.

On-the-job training is essential for the capacity building of Contractors' people (supervisors and labor supervisors of contractors). BHTPA with the support of third-party resources as needed (independent experts, NGOs, etc. will design and implement training for targeted groups involved in the sub-project to improve their awareness of risks and mitigate the impacts of the sub-project.

Table 8.1: Capacity development initiative chart (proposed)

Training to be provided	Targeted Groups and Timeframe	Timeline of Trainings
Environmental and Social Framework: Training on ESF and the 10 ESSs including preparation of ESMP	Personnel directly related to sub-project at BHTPA head office and field office (if available)	Before sub-project effectiveness for 3 days
Occupational Health and Safety Module: Personal protective equipment Workplace risk management Prevention of accidents at work sites Health and safety rules Solid and liquid waste management Hazardous waste management e.g. fueling of vehicles Preparedness and response to emergencies Awareness campaign on HIV/AIDS	<i>Local Officials of BHTPA, PMC, Locally active NGOs, Contractors</i>	Before sub-project effectiveness and during construction period 4 sessions with each comprising 2 days
Labor and Working Conditions: Terms and conditions of employment according to national working laws and regulations Contractor and sub-contractor codes of conduct Worker's organizations Child labor and minimum age employment rules	<i>Local officials of BHTPA, Contractors Health Safety Officer, Labor Sardars (Leaders)</i>	Before sub-project effectiveness 4 sessions with each comprising 2 days (can be merged with the OHS module)
Grievance Redress Mechanism Module, design and production of a training module addressing the following aspects: <ul style="list-style-type: none"> ● Registration and processing procedure ● Grievance redress procedure ● Documenting and processing grievances ● Use of the procedure by different stakeholders 	Local Governments, Civil Society, Local NGOs working with host population and, Contractors	Before sub-project effectiveness and thereafter once every six months Each session for 1 day
Construction Waste Management: <ul style="list-style-type: none"> ● Information about the risks, along with health and safety advice ● Basic knowledge about handling procedures and risk management ● Using protective and safety equipment ● Information about the waste sorting process Safe procedures for managing waste in dumps ● Hazardous waste management ● Refueling procedure ● Management of oil Spillage 	EHS, Contractors and workers	Before sub-project effectiveness and thereafter every three months Each session for 1 day
GBV Risk Module <ul style="list-style-type: none"> ● Raising awareness and measures to prevent and mitigate GBV risks ● The topics, activities and targeted groups will be developed in the GBV Action Plan including GBV-specific GRM 	BHTPA Local officials, Contractors Health Safety Officer, Labor Sardars (Leaders), Local NGOs	Before sub-project effectiveness and thereafter every six months Each session for 2 days

CHAPTER 9

Environmental and Social Management Plan

9 Environmental and Social Management Plan (ESMP)

9.1 Introduction

The Environmental and Social Management Plan, under the context of a sub-project, is primarily concerned with the implementation of necessary measures that would minimize or offset adverse impacts and would enhance beneficial impacts where possible. In order to achieve the full benefits of an ESMP, the mitigation and benefit enhancement measures identified in the ESIA have to be fully implemented. Feasible and economically viable measures should be planned within an ESMP which can reduce to a reasonable level and/or exclude possible essential negative consequences of environmental impact. The measures and strategies described in this Chapter correspond to environmental impacts during the pre-construction, construction and operation and maintenance stages due to the implementation of various activities of Sub-project and associated development. The methodology for developing of ESMP consists of the following steps:

- Deriving mitigation/protection measures for identified impacts for each of the Sub-project activities and environmental component
- Recommend mitigation, compensation and enhancement measures for each identified impacts and risks
- Developing a mechanism for monitoring the proposed mitigation measures
- Estimating budget requirements for implementation of mitigation and monitoring measures, and Identifying responsibilities of various agencies involved in the Sub-project for implementation and monitoring of mitigation measures.

9.2 Objective

This chapter will summarize the impacts of various sub-project activities during different phase of construction and the corresponding mitigation measures. It will also identify the responsible authority and person who shall monitor the effectiveness of the mitigation measures. Besides, this chapter will also discuss the method of emergency response during the occurrence of any hazardous event. The main objectives of this ESMP are:

- Listing of suggested mitigation measures and control technologies, safeguards against all risks and impacts as per ESF of World Bank;
- Providing institutional mechanism with well-defined roles and responsibilities for ensuring the measures against all the anticipated impacts;
- Providing sub-project monitoring program for effective implementation of the mitigation measures and ensuring efficacy of the environmental management and risk control systems

9.3 Options for Impact Mitigation/Protection/Compensation Measures

A wide range of mitigation measures may be available in order to address different environmental impacts that arise due to different activities during various stages of sub-project implementation. The most effective combination of all of these mitigation/protection/compensation strategies, in terms of their applicability and cost-effectiveness, is analyzed and then incorporated into this ESMP.

9.3.1 Avoidance/Prevention:

The way to ensure the greatest degree of protection for an environmental feature is to avoid impacting the feature. Avoidance/prevention means essentially keeping away from environmentally sensitive areas by locating (sitting) or reducing the size of the sub-project activity. Because of a number of competing interests that must be considered during the design, it is not possible to avoid all impacts. Some examples are as follows:

- Change in design and keeping provision of free space for trees and green areas and avoid cutting old trees.
- Avoiding high carbon emission materials, exported materials and try to use local materials.
- Change in plumbing design so that greywater may be recycled instead disposing of it.

9.3.2 Modification:

In some cases, modification of sub-project activity or its implementation under special conditions (e.g., timing of activities) will greatly reduce or control the adverse impacts. For example, modification of piling techniques will reduce the noise and vibration impacts in and around the sub-project area.

9.3.2.1 Modification of Sewage Treatment Plant (STP):

Primarily it was decided to install a MBBR based STP in the Smart Tower. But after detailed discussions and visiting some of the STP sites eventually the decision was made to install a Bio-cleaner technology based STP instead of MBBR. The decision was made because of some advantageous factors in case of Bio-cleaner technology. As for example, this technology requires smaller footprint or land use, low maintenance cost, low power cost, no odor, no sludge handling, no chemical usage, flexibility of relocation, environmentally independent, etc.

9.3.2.1.1 Toilet wastewater disposal

The wastewater and effluents that will be generated within the building premises shall be collected by internal drainage pipeline and then stored to a reservoir of the Sewage Treatment Plant (STP). The type of Sewage Treatment Plant (STP) proposed for the Software Technology Park is Moving *Bio-cleaner* having capacity of 75 KLD. It has been designed for serving 2000 people considering wastewater generation rate of 45 liters per capita per day. The tank capacity is estimated as 6550 CFT. Within the tank, human excreta as well as the wastewater will be collected from the Toilet to STP Collection Tank. The process flow diagram is shown in the following figure 9.1. The treated wastewater will then be pumped to the overhead water tank and be used for toilet flushing, gardening etc. purposes.

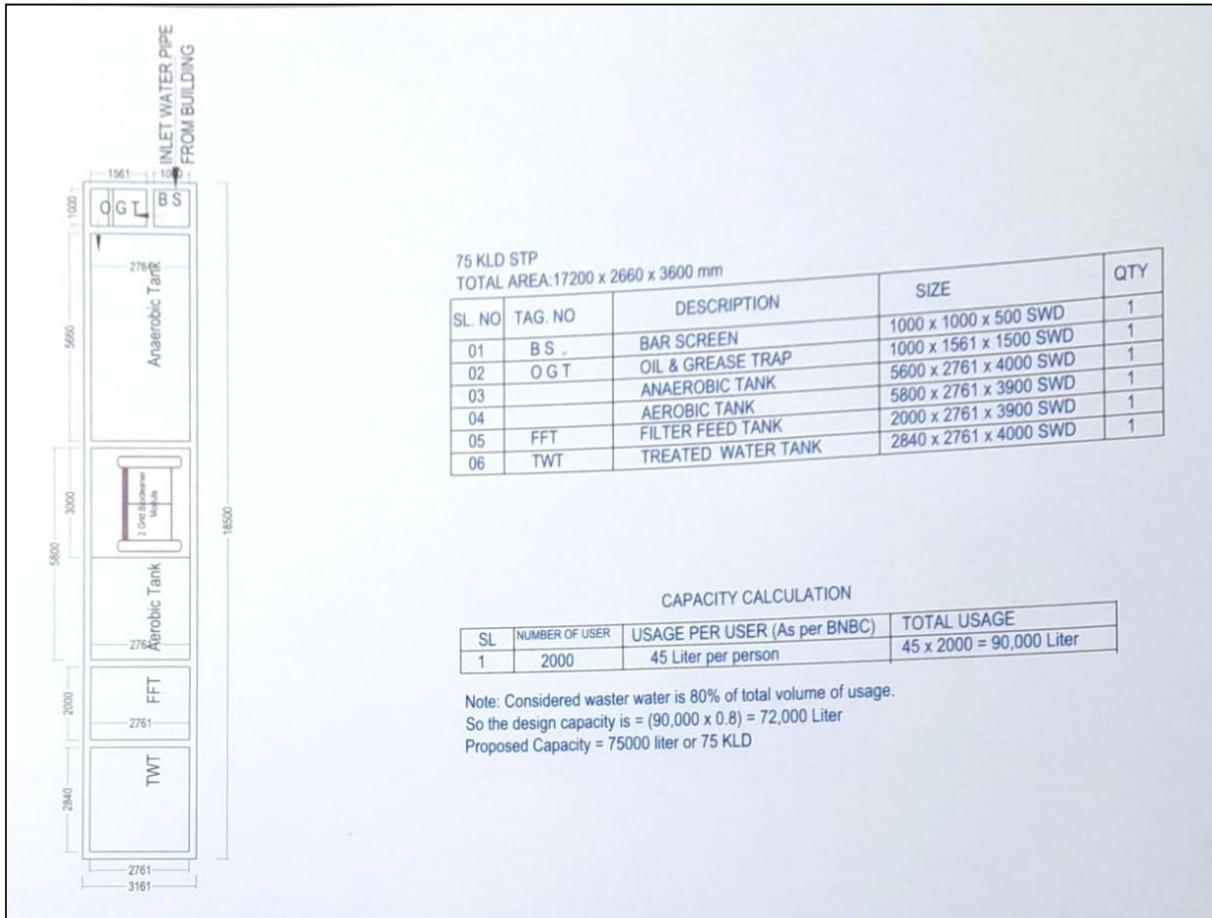


Figure 9.1: Process flow diagramme of Biocleaner Technology STP

Biocleaner Layout According to the Site Requirements

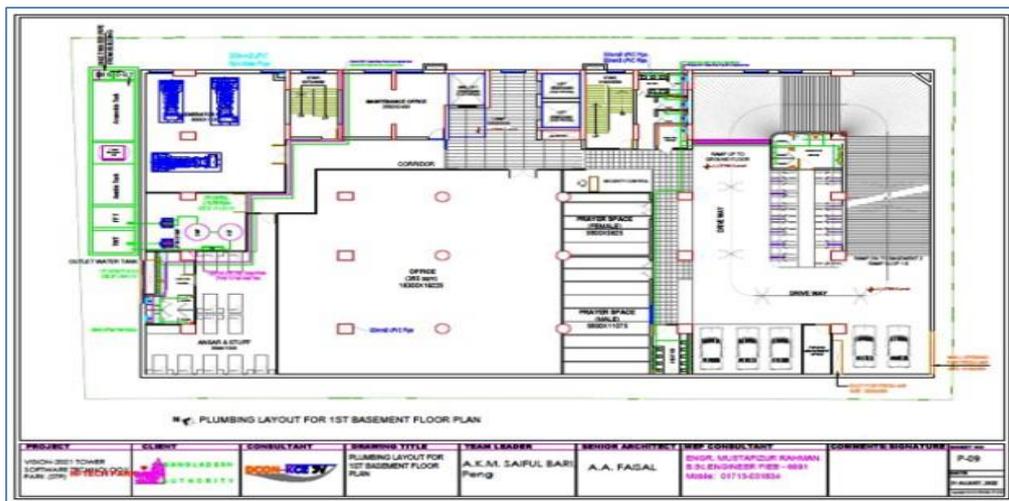


Figure 9.2: Biocleaner STP Layout

9.3.3 Control/Mitigation:

It is not possible or even practical to avoid all impacts. Following proper control/mitigation measures will reduce (i.e., control) the extent of the impact on the environment. The best construction practices may also help in reducing the extent of the impact, e.g.,

- The intensity of the noise impact on a noise sensitive area (nearby) will be lessened by using low noise/vibration generating equipment or incorporating noise dampeners.
- Management of products, fuels, waste and excess materials during construction will minimize waste generation and associated impacts and will also minimize impacts associated with material handling and storage.

9.3.4 Protection/Insulation:

Protection/insulation of receptors from impacts will reduce the impacts that remain after control measures have been used. The extent of these measures will be proportional to the environmental significance of the feature to be affected and the ability to reasonably mitigate the impacts. For example, use of noise walls/barriers as insulation could be among the measures to mitigate noise impacts.

9.3.5 Enhancement:

Enhancement measures refer to the provision of features that could comprise improvement over previous environmental conditions. For this sub-project, for example, this could be done by promoting ecological conservation, providing training and opportunities for the affected community, reducing waterlogging through the introduction of a rainwater harvesting system etc.

9.3.5.1 Introduction of Rainwater Harvesting

This project incorporates Rainwater harvesting System (RWHS) into its design, which offer an opportunity to offset freshwater use. The roof area or the catchment area for collecting the rainwater from the building is 11,100 ft². With a rainfall intensity of 100 mm/hour (as per BNBC 2020), total volume of rainfall per hour would be 103,159 liters. The total Rainwater will be collected from roof top to Collection Tank or rainwater filtration pit through inlet rain water pipe of building. The collected water in collection tank/primary rainwater tank having capacity of 12000 gallons. This water will be passed through a filtration unit and then pumped to a secondary rainwater tank with a capacity of 50,256 gallons. Finally, water from this secondary tank shall be lifted to the overhead tank for the purpose of using in toilet flushing and gardening. This will reduce the extra pressure on groundwater extraction. A provision for groundwater recharge may also be proposed in the design so that the excess rainwater need not to be discharged into the drainage system.

9.3.5.2 Rain Water calculation

Typically, a conventional site's rainwater management technique is to address runoff as a byproduct to be disposed of by piping and conveying it as quickly as possible into centralized, large facilities at the base of drainage areas. The total Rain Water is collected from the rooftop to Collection Tank in this building. From the Collection Tank, it goes to the Pump and Filter and then to the Harvesting Tank. From the Harvesting Tank, the collected water goes to the Overhead Water Tank and the users can use that water for Toilet Flushing.

Rain Water calculation:

1. Roof Area 11,100 SFT. (1031.59 SQM) (as BNBC 2020, Part VIII, Chapter-7, Rain Water Management, Table 8.7.4)
2. Total Rain Water Volume: Total Roof Area X One Hour Rainfall. Total Rain Water Volume: 1031.59 SQM X 100 MM

3. Total Rain Water: 103.159 m³/hr.
4. Total Rain Water: 103,159 Liter/hr.
5. Total Rain Water: 27,254 Gal/hr.
6. Rain Water Tank Size: 6550 CFT.

9.4 Impact Mitigation Measures

9.4.1 Pre-Construction and Construction Phases

Table 9.1 indicates the mitigation measures with respect to specific adverse impacts. The entity responsible for the implementation of these measures as well as the supervising authorities are outlined in this table. A baseline ecological survey reveals that the floral species existing in the sub-project site are planted. Environmental impacts on some of the physio-chemical parameters due to the sub-project activities include exceedance of noise levels, vibration, air pollution, possible drainage congestion and generation and disposal of wastes. This Table also discusses the measures aimed at minimizing the magnitude of these anticipated adverse impacts as well as enhancing the beneficial impacts. An effective post-sub-project monitoring program needs to be established in order to evaluate the extent of anticipated environmental impacts as well as to assess the effectiveness of the suggested mitigation measures.

Table 9.1: Impacts during Pre-Construction, Construction and Operation Phases of Vision 2041 Smart TowerSTP2, Related Mitigation Measures and Responsible Authority

Sl. No.	Issues & Impacts	Mitigation Measures	Responsible for	
			Implementation	Supervision
1.0 Pre-construction Phase				
1.1	Obtaining SSC/NOCs Failure to obtain necessary consents, permits, NOC's can result in design revisions and/or stoppage of the Works.	<ul style="list-style-type: none"> The proposed building will be constructed on BHTPA's own land. Necessary consents, permits, clearance, etc. has already been taken from related authority as mentioned earlier in the related sections in this report 	PMU	BHTPA
1.2	Updating of ESMP based on detail information Specific impacts are identified as per design and recommended construction methods.	<ul style="list-style-type: none"> Based on detailed approved design, ESIA and ESMP have been updated Based on this updated ESMP, Contractors will develop Contractor's ESMP (C-ESMP) 	PMU	BHTPA
1.3	Incorporation of cost of ESMP in the Bidding Document.	<ul style="list-style-type: none"> BoQ and other details are updated in associated sections of ESIA 	PMU	BHTPA
1.4	Existing Utilities Disruption of services (short term).	<ul style="list-style-type: none"> Existing infrastructure (such as water distribution pipes, electric poles, etc.) shall be removed before construction starts at the sub-project site Require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. Prior permission shall be obtained from the respective local authority for use of water and the utility services for construction. Care must be taken to ensure that local water users are not affected by the use of water for construction purposes. 	CSC/ Contractors	PIU
1.4	Construction Camps, & Stock Yards	<ul style="list-style-type: none"> The location must be determined before awarding the construction contracts. Avoid nearby sensitive receptors, educational institutes and any important commercial place 	PMU	BHTPA

Sl. No.	Issues & Impacts	Mitigation Measures	Responsible for	
			Implementation	Supervision
	Disruption to traffic flow and sensitive receptors			
1.5	ESMP Implementation Training Contractor representative/workers, PMU officials	<ul style="list-style-type: none"> • Training will be required to undergo ESMP implementation including waste management, Standard operating procedures (SOP) for construction works; health and safety (H&S), hazard management, core labor laws, applicable environmental laws, etc. 	CSC/PMU/ Contractor	BHTPA
1.6	Eviction of illegal structures Loss of business/ temporary problem	<ul style="list-style-type: none"> • There is no illegal structure within the sub-project site. However, there is one temporary shed, which is abandoned and need to be dismantled before the commencement of the construction work. • Proper safety measures will be taken during the demolition period. Since the existing structures are very small, this will not have any negative impact to the adjacent community. 	PMU	BHTPA
2.0 Construction Phase				
2.1	Soil Quality <ul style="list-style-type: none"> • Leakages of oil and chemical materials from construction activity • Inappropriate disposal of waste • Exhaust dust from vehicles 	<ul style="list-style-type: none"> • Storage of oil and chemical materials in an appropriate storage site and method to prevent permeation into the ground. • Prohibit illegal dumping of solid waste • Measures should be taken so that no dust comes from the nearby moving vehicles. 	Contractor	CSC/PMU
2.2	Air quality Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of	<ul style="list-style-type: none"> • Water spraying to control dust as per necessary; • Use tarpaulins to cover soil, sand and other loose material when transported by trucks. • Arrangements to control dust through provision of windscreens, water sprinklers. • Periodic air quality monitoring shall be conducted by the contractor 	Contractor	CSC/PMU

Sl. No.	Issues & Impacts	Mitigation Measures	Responsible for	
			Implementation	Supervision
	vehicle-related pollutants (such as carbon monoxide, Sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.			
2.3	<p>Noise & Vibration</p> <p>Temporary increase in noise level and vibrations may be caused by excavation equipment, movement of equipment, construction materials and construction activity. However, the proposed sub-project will be at busy commercial area and impact is short term, site-specific and within a relatively small area.</p>	<ul style="list-style-type: none"> • Involve the community in planning the work schedule so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times. • Plan activities in consultation with local people so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. • Use of high noise generating equipment shall be avoided. • Horns should not be used unless it is necessary to warn other road users of the vehicle's approach; • Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, • All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent type generators. • Monitor noise levels. Maintain maximum sound levels not exceeding 85 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s. 	Contractor	CSC/PMU

Sl. No.	Issues & Impacts	Mitigation Measures	Responsible for	
			Implementation	Supervision
		<ul style="list-style-type: none"> • If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection. • Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly. • Noise will be tested by contractor and overseen by the Supervising Engineer 		
2.4	<p>Sourcing of Construction material Construction would require large quantity of various types of construction material source of which need to be investigated.</p>	<ul style="list-style-type: none"> • Borrower will adopt measures specified in the EHSGs and other GIIP to support efficient use of raw materials, to the extent technically and financially feasible. 	PMU/Contractor	CSC/PMU
2.5	<p>Waste management and Aesthetics The construction activities will produce excess excavated earth (spoils), excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. The impacts are negative but short term, site-specific within a</p>	<ul style="list-style-type: none"> • Follow the waste management plan <u>Annex 2: Waste management plan</u> • Remove all construction and demolition wastes on a daily basis. • Coordinate with DNCC/RAJUK authority for beneficial uses of excess excavated soils or immediately dispose to designated areas. Avoid stockpiling of any excess spoils. • Suitably dispose of collected materials from construction site, unutilized materials and debris either through filling up of pits/wasteland or at pre-designated disposal locations. • No construction waste materials like earth, stone, polythene, paper, wood and concrete are kept in the sub-project area that may block the flow of water of existing drains. • Clean the construction side drain regularly. • All vehicles delivering fine materials to the site and carrying waste debris for disposal shall be covered to avoid spillage of materials. • All existing roads used by vehicles of the contractor, shall be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. • Lighting on construction sites at night. 	Contractor	CSC/PMU

Sl. No.	Issues & Impacts	Mitigation Measures	Responsible for	
			Implementation	Supervision
	relatively small area and reversible by mitigation measures.	<ul style="list-style-type: none"> In areas where the visual environment is particularly important or privacy concerns for surrounding buildings exist, the site may require screening. This could be in the form of shade cloth, temporary walls, or other suitable materials prior to the beginning of construction. This is to be determined by the Supervising Engineer The site must be kept clean to minimize the visual impact of the site. 		
2.6	<p>Biodiversity</p> <p>Activities being located in the built-up area of Dhaka. There are no protected areas in or around sub-project site, and no known areas of ecological interest. There are 27 trees at the site that need to be removed before construction begins.</p>	<ul style="list-style-type: none"> No trees, shrubs, or groundcover may be removed, or vegetation stripped without the prior permission of the environment specialist of appropriate authority Compensatory plantation for trees lost will be confirmed by the rooftop plantation and balcony gardening since there is no space at the site for plantation. Other than rooftop plantation, surrounding open area need to be planted by different types of plants. The sub-project site consists of 27 plants, which will be cut down during the construction period. This report proposes that two plants should be planted instead of each plant. 	Contractor	CSC/PMU
2.7	<p>Traffic Congestion</p> <p>Hauling of construction materials and operation of equipment on-site can cause traffic and pedestrian movement problems. The impacts are negative but short-term, site specific within a relatively small area and reversible by mitigation measures.</p>	<ul style="list-style-type: none"> During the public consultation meeting, the Kawran Bazar community leader ensured that they would help the contractors to manage the traffic flow of the vehicle carrying the construction material so that any unnecessary congestion can be avoided. A traffic management plan has been provided in this ESIA. The contractor may follow this one or may prepare a new one based on the existing situation and in consultation with the bazar committee leaders. Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of the delivery sites. Maintain safe passage for vehicles and pedestrians throughout the construction period. Schedule truck deliveries of construction materials during periods of low traffic volume after consultation with the Kawran bazar authority. Erect and maintain barricades, including signs, markings, flags and flagmen informing diversions and alternative routes when required. 	Contractor	CSC/PMU

Sl. No.	Issues & Impacts	Mitigation Measures	Responsible for	
			Implementation	Supervision
		<ul style="list-style-type: none"> • Notify affected sensitive receptors by providing sign boards informing nature and duration of construction activities and contact numbers for concerns/complaints. • Provide walkways and metal sheets where required to maintain access across for people and vehicles. • Consult businesses and institutions regarding operating hours and factoring this in work schedules. Ensure there is provision of alternate access to businesses and institutions during construction activities 		
2.8	<p>Socio-economic status Sub-project will be located in BHTPA own land and there is no requirement for land acquisition or any resettlements. Manpower will be required during the construction stage. This can result in the appointment of contractual workers and increase in local revenue. Thus, potential impact is positive and long-term.</p> <p>The sub-project will not specifically increase the risk of GBV as the sub-project location is already in an area with thousands of men and</p>	<ul style="list-style-type: none"> • Employ at least 50% of labor force from communities in the vicinity of the site. This will have the added benefit of avoiding social problems that sometimes occur when workers are imported into host communities and avoiding environmental and social problems from workers housed in poorly serviced camp accommodation. • Secure construction materials from the local market. • Ensure the engagement of women employees as per policy. • The Labor Management Plan and the Code of Conduct provided by the contractor should include clauses regarding the non-tolerance of GBV and SEA. Any cases of GBV and SEA will be referred to the appropriate authority following the GBV Action Plan prepared for the sub-project. 	Contractor	CSC/PMU

Sl. No.	Issues & Impacts	Mitigation Measures	Responsible for	
			Implementation	Supervision
	women interacting in the market and business offices			
2.9	<p>Community health and safety and threat to surrounding structures during pilling</p> <p>Construction works may impede the access to residence and offices in some cases. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures. Poor safety signage and lack of barriers at work site and trenches will create hazard to pedestrians and children.</p>	<ul style="list-style-type: none"> • Provide safety signage at construction sites, which should be visible to the public • Provide safety barriers near any trenches, and cover trenches with planks during non-working hours. • Contractor’s activities and movement of staff will be restricted to designated construction areas. • Consult with Kawran bazar authority/DNCC regarding the designated areas for stockpiling soils, gravel, bricks and other construction materials. • Shore protection shall be implemented prior to excavation of earthworks so that nearby structures are safe and secure during pilling. • A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: (i) no alcohol/drugs on site; (ii) prevent excessive noise; (iii) construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives; (iv) no fires permitted on site except if needed for the construction works; (v) trespassing on private/commercial properties adjoining the site is forbidden; (vi) other than pre-approved security staff, no workers shall be permitted to live on the construction site; and (vii) no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do. • Interested and affected parties need to be made aware of the existence of the complaints book and the methods of communication available to them. The contractor must address queries and complaints by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to the environmental & social specialist’s attention immediately; and (iv) taking remedial action as per specialist’s instruction. • The contractor shall immediately take the necessary remedial action on any complaint/grievance received by himself and forward the details of the grievance along with the action taken to the PMU within 72 hours of receipt of such complaint/grievance. 	Contractor	CSC/PMU

Sl. No.	Issues & Impacts	Mitigation Measures	Responsible for	
			Implementation	Supervision
2.10	<p>Workers' health and safety</p> <p>There are invariably safety risks that may occur during different sorts of construction works such as excavation, shoring, piling, carrying of mixture materials, Shuttering, steel/wood work and earthmoving etc. Workers need to be cautious of the occupational hazards which can arise from working in height and excavation works. Potential impacts are negative and major but reversible by mitigation measures.</p>	<ul style="list-style-type: none"> • Comply with requirements of Government of Bangladesh Labor Law of 2006 & rules 2015 and WB EHSG on workers H&S. • Ensure that all site personnel have a basic level of environmental awareness training. If necessary, the environmental/social specialist shall be called at the sites to further explain aspects of environmental or social behavior that are unclear. • Produce and implement a site health and safety (H&S) plan approved by PMU which include measures as: (i) excluding the public from worksites; (ii) ensuring all workers are provided with and required to use personal protective equipment at the working hours; (iii) providing (H&S) training for construction site personnel; (iv) documenting procedures to be followed for all site activities; and (v) maintaining accident reports and records. • Arrangement for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances • Ensure transferring persons with serious injuries to nearby hospitals. • Maintain necessary living accommodation and ancillary facilities in functional and hygienic manner in work camps. Ensure (i) uncontaminated water for drinking, cooking and washing, (ii) clean eating areas where workers are not exposed to hazardous or noxious substances; (iii) providing fire extinguisher at construction site and (iv) sanitation facilities are available at all times. • Provide medical insurance coverage for workers; • Provide H&S orientation training to all workers to ensure that they are apprised of the basic site rules of work at the site, PPE, and preventing injuring to fellow workers; • Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; • Disallow worker exposure to noise levels greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively. 	Contractor	CSC/PMU
2.11	<p>Post-construction clean-up</p>	<ul style="list-style-type: none"> • Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; • All disrupted utilities restored • All affected structures rehabilitated/ compensated 	Contractor	CSC/PMU

Sl. No.	Issues & Impacts	Mitigation Measures	Responsible for	
			Implementation	Supervision
	Damage due to debris, spoils, excess construction materials	<ul style="list-style-type: none"> The construction camp is to be checked for spills of substances such as used container/water bottles, paint, etc. and these shall be cleaned up. Request PMU to report in writing that worksites and camps have been vacated and restored to pre- sub-project conditions before acceptance of work. 		
2.12	<p>Gender Based Violence: During the construction phase gender-based violence may happen and male labor/manager or related person could sexually harass/abuse/exploit female labor. Low payment may allocate for female which is also gender based discrimination</p>	<ul style="list-style-type: none"> Proper monitoring and reporting mechanisms should be established. A safe calling system will be established to report any sexual exploitation or harassment. Similar payment for both male and female will be ensured by authority and monitored by the respective team. Strict GRM system must be operational so that any victim can make complain to the specific authority 	Contractor and Individual private authority	PMU
3.0 Operation Phase				
3.1	<p>Air Quality</p> <ul style="list-style-type: none"> Exhaust gas from vehicles and generators. Dust from building cleaning 	<ul style="list-style-type: none"> Use of rainwater for regular spraying around market premises for dust suppression. Provisions of BHTPA budget for operation & maintenance; Periodic monitoring; Follow the Standard Operating Procedures (SOPs) for building maintenance and management in Annex 6: Standard operating procedures for building maintenance 	BHTPA	BHTPA
3.2	<p>Noise Level</p> <ul style="list-style-type: none"> Noise caused by vehicles around area. Noise from generator 	<ul style="list-style-type: none"> Use of canopy for generator and place the generator in a confined room. Provisions of BHTPA budget for operation & maintenance; Periodic monitoring; Follow the Standard Operating Procedures (SOPs) for building maintenance and management in Annex 6: Standard operating procedures for building maintenance. 	BHTPA	BHTPA
3.3	Biodiversity	<ul style="list-style-type: none"> Watering the planted trees regularly; 	BHTPA	BHTPA

Sl. No.	Issues & Impacts	Mitigation Measures	Responsible for	
			Implementation	Supervision
		<ul style="list-style-type: none"> • Fencing the trees if required; 		
3.4	Waste Management <ul style="list-style-type: none"> • Create nuisance from food wastes. • Solid and liquid wastes from the operation of the building. 	<ul style="list-style-type: none"> • Provision of Sewage Treatment Plan (STP) is already proposed. • Incorporate Waste reduction principle, source segregation of different kinds of waste and ensure proper disposal according to solid waste management rule 2021 • Provisions of BHTPA budget for operation & maintenance; • Periodic monitoring of the effluent from the STP; • Follow the Standard Operating Procedures (SOPs) for building maintenance and management in annex 6: Standard operating procedures for building maintenance 	BHTPA	BHTPA
3.5	Health & Safety	<ul style="list-style-type: none"> • Adequate provision of firefighting equipment; • Checking and replacing the old equipment regularly; • Conduct fire drills with the building users regularly. • Display earthquake safety tips at different places inside the building • Display emergency exit point with appropriate directional sign so that the tenants can leave the building in case of any emergency situation 	BHTPA	BHTPA

9.5 Monitoring Indicators

The physical, biological and social components which are of particular significance to the proposed sub-project are listed below:

- Air quality
- Surface & Groundwater quality
- Noise Level
- Solid & Hazardous Waste Management
- Drinking Water Quality
- Sanitation and Hygiene at Construction Labor Camps and Construction Site
- Gender Based Violence (GBV)
- Grievance Redress Mechanism (GRM)

These indicators will be evaluated periodically based on the monitoring results, baseline conditions, predicted impacts and mitigation measures.

9.6 Environmental and Social Monitoring Plans

Environmental and social monitoring is an essential tool for the proper management of environmental and social parameters that would be affected by the sub-project activities. The purpose of the monitoring activities is to ensure that the objectives of the sub-project could be achieved and the targeted population or society could enjoy the desired benefits. To ensure the effective implementation of the mitigation measures, it is essential that an effective monitoring program is designed and carried out throughout the stipulated period of time. Compliance monitoring will be conducted in accordance with the environmental and social mitigation measures and monitoring plan provided in Table 9.2.

The objective of environmental and social monitoring during the construction and operation phases is to assess the effectiveness of the mitigation measures and the protection of the ambient environment by comparing the quality of the monitored data with the baseline condition collected during the study period. The main objectives of the pre-construction, construction and operation phase monitoring plans is:

- To ensure that the recommendations in the approved ESIA report are adhered to by the various institutions
- To ensure that the environmental and social mitigation and their enhancement actions are well understood and communicated to all involved stakeholders.
- Recommend mitigation measures for any unexpected impact or where the impact level exceeds that anticipated in the ESIA;
- Ensure compliance with legal and community obligations including safety on construction sites;
- Appraise the adequacy of the ESIA with respect to the sub-project's predicted long-term impacts on the physical, biological and socio-economic environment;
- Evaluate the effectiveness of the mitigation measures proposed in the ESMP and recommend improvements, if and when necessary;

Table 9.2: Environmental and Social monitoring Plan, Frequency of Monitoring and Responsible Authority

Sub-project Stage/ Affected Component	Environmental / social Issue	Parameters to be Monitored	Location	Measurements	Standards/ Guidelines	Frequency	Responsible Agency	
							Implemented by	Supervised by
Pre-construction & Construction Phase								
Existing Utilities	Disruption of services (short term).	Proper coordination with related utility authority	Sub-project site	Coordination with utility authority	Local govt.	Monthly or when needed	Supervision Engineer / contractor	PMU
Women Worker/ Vulnerable/ Disadvantaged	GBV	Wage, increment, working hour, incidents of GBV, SH etc.	Camp site and work site	Consultation with female labor	World Bank and GoB	Monthly	GBV expert / contractor	PMU
Community or labor	Social conflict and labor unrest	GRM	At sub-project office	Complaint box and discussion with labor	World Bank and GoB	Weekly	Supervision Engineer and SS	PMU
Ambient Air Quality	Dust generation	Dust	Sub-project activity areas and construction workers camp	Visual inspection of all active work areas	Government of Bangladesh (GoB) and international standard	Daily	Contractor	PMU
	Ambient Air Pollutant	SPM, PM _{2.5} , PM ₁₀ , CO, SO ₂ , NO _x	2 samples at Sub-project site	24-hour	Air quality standard by DOE, Bangladesh	Quarterly	Contractor by Engaging Environmental Firm	Consultant
Noise	Increase in ambient noise levels	Noise levels in dB day and dB night	2 locations in case of high noise generation location at the sub-project site	24-hour	Noise Pollution Control Rules (2006)	Quarterly	Contractor by Engaging Environmental Firm	Consultant

Sub-project Stage/ Affected Component	Environmental / social Issue	Parameters to be Monitored	Location	Measurements	Standards/ Guidelines	Frequency	Responsible Agency	
							Implemented by	Supervised by
Water Quality	Contamination of surface water	Dissolved Oxygen, Turbidity, pH, DO, Total dissolved solids, oil & grease, BOD ₅ , COD, NH ₃	Two samples from nearby drains	Monitoring	Surface water quality standard as per ECR 1997	Quarterly	Contractor by Engaging Environmental Firm	Consultant
	Contamination of Groundwater quality	pH, Alkalinity, Cl, Fe, As, Salinity, Pb, etc.	2 Locations Sub-project site and Closest borehole of the sub-project site	Monitoring	Drinking water quality standard as per ECR 1997	Quarterly		
Waste	Liquid waste, Solid Waste	<ul style="list-style-type: none"> • Safe disposal of waste • Spilling of liquid waste • Waste storage and disposal • Safe disposal of sludge generated from STP process 	Sub-project Site	Inspection following waste disposal standard through expert	Monitoring	Weekly	Contractor	
Child and forced labor	Child exploitation, violence, abuse	<ul style="list-style-type: none"> • Monitor NID card to check age of labor • Check details of suspected child labor. • Regular consultation with labor supplier about that 	Sub-project site and consultation place	Monitoring	Child labor related regulations National Laws	Monthly	Contractor	PMU
Traffic management	Air and sound pollution, Traffic congestions	<ul style="list-style-type: none"> • Vehicle movement (construction vehicles and construction related vehicles) 	Sub-project adjacent road Sub-project	Daily trafficking, signals implementations, use alternative routes, dividers,	Dhaka North City Corporations & Bangladesh City Traffic rules	Daily	Contractor	Consultant

Sub-project Stage/ Affected Component	Environmental / social Issue	Parameters to be Monitored	Location	Measurements	Standards/ Guidelines	Frequency	Responsible Agency	
							Implemented by	Supervised by
				signage, barriers, signals and community police				
Occupational Health and Safety	Workers Health & Safety	<ul style="list-style-type: none"> ● Regular checking of safety equipment ● Checking the accommodation ● Check safe water supply, hygienic toilet at camp, construction of drain at campsite; ● Check toilets are close to construction site; ● First Aid Box with required tools and medicines; ● The heavy construction material to handled and stored safely putting due care on public safety; ● Heavy construction materials at construction site to be stored and handled safely; and ● Check of personal protective equipment 	Labor Shed	Visual inspection	Monitoring	Daily	Contractor	PMU
Operational Phase								
Female Worker, disadvantaged and	GBV	GBV, Sexual harassment, exploitation Wage, increment, working hour etc.	Sub-project site	Consultation with female employee	World Bank and GoB	Quarterly and as required	BHTPA	BPHTA

Sub-project Stage/ Affected Component	Environmental / social Issue	Parameters to be Monitored	Location	Measurements	Standards/ Guidelines	Frequency	Responsible Agency	
							Implemented by	Supervised by
vulnerable people								
Noise	Increase in ambient noise levels	Noise levels in dB day, dB night and hourly Leq	3 locations Sub-project site at high noise generation location and adjacent sensitive receptor	24-hour	Noise Pollution Control Rules (2006)	1/year	Building Management System	BPHTA
Water Quality	Contamination of surface water	Dissolved Oxygen, Turbidity, pH, DO, Total dissolved solids, oil & grease, BOD ₅ , COD, NH ₃ , Tc, Fc	1 sample from the nearby drain and one 1 sample from the nearby waterbody	Monitoring	Surface water quality standard as per Schedule 3 of ECR 1997	1/year	O&M Unit by Engaging Environmental Firm	BPHTA
	Contamination of Groundwater quality	pH, Alkalinity, Cl ⁻ , Fe, As, TSS, Pb etc.	1 Location Sub-project site	Monitoring	Drinking water quality standard as per ECR 1997	1/year	O&M Unit by Engaging Environmental Firm	

9.7 Labor Management Procedure during Construction

Labor is one of the important components of a construction sub-project. In many sub-projects, laborers are being ignored and get very low facilities, where and poor sanitation and health issues are very common. Many labors become disable or even die due to lack of proper safety arrangements at the construction site. Labors also suffer from lack of basic services within their shed.

9.7.1 Objectives:

The main objective of labor management plan is to provide them safe working environment and safe accommodation to ensure their physical and mental health and ensure the continuation of work. However, the specific objectives are:

- Ensuring safe and dignified workplace for labor
- Ensure compliance with the national labor laws as well as IFC & ESF (ESS2) standards

9.7.2 Location of Construction Camp and its facilities:

Labor camp will be constructed within the area of construction site as there is no other area of labor camp construction nearby. During the construction stage of the sub-project, the construction contractor will construct and maintain necessary (temporary) living accommodation, rest area and ancillary facilities for labors. Facilities required are listed and elaborated below.

- Site barricading
- Clean Water Facility
- Clean kitchen area with provision of clean fuel like LPG
- Clean Living Facilities for Workers
- Sanitation Facilities separate for men and women workers
- Waste Management Facilities
- Rest area for workers at construction site
- Adequate Illumination & ventilation
- Health Care Facilities
- Fire-fighting Facility
- Emergency Response Area
- Separate toilet facilities for men and women

9.7.2.1 Safe Water Supply

Access to an adequate and convenient supply of free potable water is a necessity for workers. The domestic water supply shall be made available by the contractor.

- The supplied water should be potable Safe drinking water shall be provided;
- The direct usage of water from bore well should not be allowed and water shall be adequately treated; and
- The contractor should regularly monitor the quality of drinking water available. In case of noncompliance with the Drinking Water Specifications, additional treatment shall be provided, or alternative sources of water supply shall be arranged;

9.7.2.2 Clean Living Facility for the Workers

Workers should be provided with proper bedding facility. Single beds should be provided to each worker. Double deck bedding should be avoided. Adequate fire-fighting facilities should be provided. Facilities for storage of personal belongings for workers should be provided in the form of locker, shelf or cupboard. A separate storage area for the tools, boots, PPEs should be provided. Proper ventilation through mechanical systems and lighting systems should be ensured in construction camps.

9.7.2.3 Sanitation Facilities

Construction camps shall be provided with sanitary latrines and urinals. Toilets provided should have running water availability all the time. Bathing, washing & cleaning areas shall be provided at the site for construction labor. Washing and bathing places shall be kept in clean and drained condition. Adequate number of bathing and toilet facility should be provided at site and should not less than 1 unit per 15 persons with provision of separate facilities for men and women. Toilets and bathing facilities should be inside or very close to the camps. Workers shall be hired especially for cleaning the toilets and bathing area. Septic tanks and soak pits shall be provided at the site for disposal of the generated sewage. The toilets should be cleaned on a daily basis. These tanks should be evacuated through authorized vendors if filled and at the time of closure. Pest management should be carried out at the camps if the area is infected by any pests. Adequate lighting should be ensured in the camp area especially during night time.

9.7.2.4 Waste Management Facilities

Generated waste should be segregated at the site by providing different color bins for recyclable and non-recyclable waste. Recyclable waste shall be sold to authorized vendors and nonrecyclable shall be handed over to the responsible authority for waste management. Waste management for the construction site shall be as per waste management plan proposed in ESMP. Waste management area should be cleaned on a regular basis to avoid germination of flies, mosquitoes, rodents and other pests.

9.7.2.5 Rest Area for Workers at Site

A rest area shall be provided at the site for construction workers where they can rest after lunch time so that they do not have to lay down at site anywhere. The height of shelter shall not less than 3m from floor level to lowest part of the roof. Sheds shall be kept clean and the space shall be provided on the basis of at least 1.0 Sq. m per head.

9.7.2.6 Adequate Illumination & Ventilation

Construction worker camps shall be provided with electric connection and be adequately illuminated. Labor camps shall be adequately ventilated. Fans shall be provided for ventilation purpose.

9.7.2.7 Health Care Facilities

First aid box and personnel trained in first aid (certified first-aider) shall be available at labor camp and site all the time (24X7). Equipment in first-aid box shall be maintained as per the national labor's law. Tie-ups should be made with a nearby hospital to handle emergency, if any. The contact numbers of ambulances, doctors and nearby hospitals shall be displayed at convenient places at the sub-project site and labor shed. Workers shall be made aware of the causes, symptoms and prevention from HIV/AIDS through awareness programs.

9.7.2.8 Fire-Fighting Facility

Fire-fighting facilities such as sand filled buckets and portable fire-extinguishers shall be provided at labor camps and at the sub-project site. Fire extinguishers shall be provided as per BNBC norms. Personnel trained in handling firefighting equipment should be available at the site. Fire evacuation plans should be displayed at the site and should be communicated to all the workers and other staff at camp site.

9.7.3 Attendance & Working hours

Supervisor of the camp should perform the following work on daily basis

- Taking the attendance of the employee at the camp twice in a day (morning and evening) and should maintain the record.

- Work hours of the workers should be maintained in accordance with the labor law
- All workers should be provided with ID card and entry to the site should be through ID card only and should be ensured by security guard.

9.7.4 Activities prohibited at site

Activities which should be strictly prohibited at site shall include:

- Open burning of wood, garbage and any other material at the site for cooking or any other purpose
- Adoption of any unfair means or getting indulgence in any criminal activity;
- Noncompliance of the safety guidelines
- Harm to animal (wild or domestic or bird) shall be prohibited by any construction worker at the site and nearby areas;
- No-smoking inside the site and labour shed.

9.7.5 Guidelines for night time working at the site.

Activities that generate noise shall not be carried out at the site after 10:00 PM. Night working protocol should be developed and followed properly. Sites should maintain minimum illumination level. Any accidents if occurs at site during night time working shall be immediately reported and recorded. Penalty shall be imposed on the contractor for the accident. Analysis shall be carried out to find the reason for such accidents for future learning.

9.7.6 Record keeping & Maintenance

Record of entry/exit of the people in the construction site and labor camp area shall be maintained in register at gate. Record of material coming in and going out from site also shall be maintained.

9.7.7 Auditing & Inspection

Conditions of labor camp and site shall be inspected, and audit report shall be submitted to BHTPA authority on monthly basis.

9.7.8 Grievance Redress Mechanism

A complaint register and a complaint box should be provided at the site so that any agreed person from local community can register their complaint, if any issue occurs due to the camp, workers and other facilities. The system shall be communicated to local communities through consultations. Open house meetings should be conducted with workers on a monthly basis to identify their problems and issues if any related to health, hygiene, safety, comfort and other issues.

9.7.9 Issues with GBV/SH/SEA, child and Forced labor

As there will be many labor including females, there is possibilities of sexual and gender-based violence, Sexual exploitation and abuse, child and forced labor. Regular monitoring and implementation of grievance mechanisms should be addressed properly. The sub-project will also ensure to monitor for not to engaging child labor in the site. At the time of onboarding of labor, orientation and awareness training on GBV, SH, SEA should be given.

9.7.10 Security System

Site should be barricaded and should be guarded by sufficient security guards. Security guards should allow only authorized personnel to the campsite. Guards should be available 24/7. Guard should allow entry of workers to the site only be seeing the ID cards. Guard should report if any unusual or unfair practice happening at site and nearby area. Guards should be trained to handle emergency situations

like firefighting and should be responsible to contact the emergency personnel in case of any emergency.

9.7.11 Closure of the Construction Site and Construction Labor Camps

After the construction is over, the labor camps shall be restored back to the original site conditions. Following measures are required to be taken during the closure:

- Septic tanks/soak pits should be dismantled;
- Any temporary/permanent structure constructed shall be dismantled;
- Construction/demolition waste, hazardous waste and municipal waste at site and labor camp site shall be disposed of as per waste management plan in ESMP;
- The site shall be cleaned properly.

9.8 Emergency and Disaster Preparedness and Response Plan

An Emergency and Disaster Response Plan is required according to occupational health safety standards for an organization. Information on escape route, marking, assembly point, storage of relevant tools and equipment etc. shall be displayed at convenient locations of every job site. It is a detail step-by-step procedure to follow in emergency such as fire, earthquake, chemical spill or a major accident. An emergency response plan also includes information such as whom to notify, who should do what, and location of emergency stock. The Emergency Response Plan includes any measures that should be in place at all facilities to combat any manmade or natural disaster.

9.8.1 Emergency Response Plan

Emergency cases are incidents that cause the activities to cease and also cause serious damage on environment, occupational health and assets. The following needs to be detailed in the procedure:

- Emergency Response Team (Title, Responsibilities and key features)
- Emergency Response Plans, Emergency Drills, Internal Trainings (The drill scenarios should be conducted for different emergency cases)
- Maintenance and Control of Emergency Response Equipment (Fire Emergency Equipment, Pollution Prevention Materials, First Aid Cabinet, Personal Protective Equipment, Warning and Guiding Signs etc.)

Having taken all the preventative measures, a Disaster Management Team (DMT) should be established which would be responsible for preparing a specific Disaster Management Plan for the sub-project. The team should meet at regular intervals to update the Disaster Management Plan based on any accident data and any changes to support agencies. The team should also undertake trial runs to be fully prepared and to improve upon the communication links, response time and other critical factors.

9.8.1.1 Identification of Emergencies

According to Alcorn State University (Revised Fall 2021) emergencies can be classified into three broad categories as described below:

- **Level 1 Emergency** is a MINOR EMERGENCY, which can be controlled entirely by personnel and facilities, located within the immediate vicinity of the accident/incident site. LEVEL-1 Emergencies are those which cause minor property or equipment damage that is non-disruptive to operations and do not pose a safety risk to personnel or property outside of the boundaries of the existing site.
- **Level 2 Emergency** is a SERIOUS EMERGENCY, which is disruptive but not extensive and forces a portion of the site to be temporarily suspended or shut down. Events or conditions

which describe LEVEL 2 Emergencies are accidents/incidents that endanger the safety of personnel or the public outside of the boundaries of site, or have the potential to endanger the safety of personnel or the public outside of the boundaries of site, and would require the notification of external support services.

- **Level 3 Emergency** is a DISASTER EMERGENCY that forces the indefinite shut down of operations or a part of operations. Safe operating control has been lost, causing or having to cause; serious injuries or fatalities among employees, contractors or the public; extensive damage to BHTPA property or equipment; or serious harm to the environment.

9.8.1.2 Declaration of Emergencies

It is the responsibility of the emergency site commander to take situational decision to declare the emergency.

9.8.1.3 Emergency Equipment

Preparation of any emergency response involving nearby communities and settlements will include training and awareness, alarms, procedures for evacuation, firefighting, emergency communication systems, first aid, etc.

9.8.1.4 Infrastructure for Execution of Emergency Plan:

Fire Fighting Facilities: The STP building will have adequate firefighting aids including fire hydrants close to the various sections of the power generation area and portable Fire Extinguishers of various types and sizes need to be installed at conveniently reachable locations.

Disaster signaling Siren: Siren to be used for raising the alarm and also for ALL CLEAR signals should be installed within the STP building premises.

First Aid Boxes should be provided at specific locations including at the assembly point for administering preliminary treatment. Some employees will be trained for first aid use.

9.8.1.5 Evacuation Procedure

This section outlines the procedure for the management of emergencies and evacuation plans during the operations stage. The main objective of the Emergency Response Plan (ERP) is to ensure that activities are carried out to the following priorities:

- Safeguard lives;
- Protect the environment;
- Respond to emergencies using an effective communication network and organized procedures;
- Protect the institution's or Third-Party's assets
- Maintain the institution's image/reputation
- Resume normal activities

Personnel involved in dealing with emergencies shall follow these priorities while making decisions and developing strategies. For the Vision 2041 Smart Tower, "Emergency Exit"

Contractor's employees should also be instructed of the Emergency Procedures before commencing work on this site. They will report to the emergency assembly point on this site. Personnel Manager will guide them in case a major decision like evacuation from the site is taken. During highly catastrophic conditions, all employees need to be evacuated. Local administration is to be properly informed and interacted with. These will be pursued upon verification of or environmental acceptability.

9.8.1.6 Coordination with External Agencies

The following external agencies may be required to contact in order to tackle the emergency.

- Medical or hospital
- Police department
- Fire department
- Ambulance Services etc.

9.8.1.7 Response Procedures

Emergency Response Procedures will identify who does what and when in the event of an emergency. Responsibility for who is in charge and their coordination of emergency actions shall be identified. The following are important events that require emergency response procedures:

- Fire
- Accidents and Medical emergency
- Spills, leaks and other releases of hazardous substances
- Natural disasters (e.g., Earthquakes, floods, tornadoes, etc.)

9.8.1.8 Reporting and Documentation

Major disasters are often preceded by a string of minor incidents which are ignored, neglected or not fully understood. Therefore, a routine system should be enforced to ensure that all accidents are investigated and reported to the STP building supervisors in a specified format such as the following:

- Description of incident or episode; Immediate cause;
- Background on the factors that might have made the incident possible;
- What form of energy release or toxic substance was involved?
- What was done to prevent an accident (who responded and how)
- What effect did it produce on the immediate and surrounding environment?
- What repercussions did the incident have (loss of life damage to equipment and buildings)
- Cost estimates of damage done and repairs needed
- Recommendations for future preventive actions

Registers of all incidents should be kept and should be analyzed regularly (at least monthly) to identify trends or patterns in incident occurrence in particular cases this may prevent significant chronic incidents or single-event events that are the result of an accumulation of either physically hazardous materials or substances, or operational complacency. Table 9.3 list down responses/actions for different emergency situation, principal responding authority and corresponding evacuation plan.

Table 9.3: Emergency Response Plan

Emergency Event	Probability	Response/Action	Principal Response Agencies	Other Coordinating Agencies	Evacuation Plan
Traffic Accident	High	<ul style="list-style-type: none"> • Short-term closure of effected portions of road • Towing of damaged vehicles • Informing nearby Hospitals / Clinics 	Police	<ul style="list-style-type: none"> • Fire Service • Health Department • BHTPA 	In the case of accidents and other road emergencies, the affected lane will be temporarily shutdown and vehicles will be directed through unaffected lanes. In the event of a major traffic accident, lane/lanes on affected side will be closed and a lane on the opposite side of the road will temporarily be used for vehicle evacuation.
Fire Event	Medium	<ul style="list-style-type: none"> • Closure of the daily activities of the building • The in-house Emergency Response Team shall respond at the first place 	• Fire Service	<ul style="list-style-type: none"> • Fire Service • BHTPA • Health Department 	Occupants shall leave the building through the emergency exit located at the North-East side i.e., the back side of the building.
Earthquake and other natural disasters	Medium	<ul style="list-style-type: none"> • Take position to the designated places during earthquake • After first wave try to go out of the building and wait in free spaces if there any possibilities for second wave 	<ul style="list-style-type: none"> • Fire service • DNCC 	<ul style="list-style-type: none"> • DNCC • BHTPA • Health Department • Bangladesh Police 	Occupants shall leave the building through emergency exit located at the North-East side i.e., the back side of the building.
Spills/Leak of Hazardous Materials in Land and Water	Low	<ul style="list-style-type: none"> • Containment of leak/spill • Evaluation of risk and danger to surrounding communities • Alerting and evacuation of surrounding populations (if required) • Clean-up once emergency has been Mitigated. 	Fire Service	<ul style="list-style-type: none"> • BHTPA • BPC • Petro Bangla 	In the case of a major toxic chemical spill/leak, proper cleaning measures should be taken as early as possible. The Bangladesh police would lead an evacuation of the surrounding settlement communities if necessary
Terrorist Event/Threats	Low	<ul style="list-style-type: none"> • Increased security and police presence • Security check points • Closure of the foot overbridged and approach roads • Evacuation from all levels • Appropriate police action 	<ul style="list-style-type: none"> • RAB • Bangladesh Police 	<ul style="list-style-type: none"> • Police • BHTPA 	In case of any terrorist event nearest police station should take proper measure.

9.9 Guidelines for environmental and social conditions in contract documents

In preparing the specification for ES requirements, the WB ESF, ESMF, ESIA, ESMP, EHS guidelines, OHS/CHS management process, GIIP and relevant national laws have been consulted and followed. The ES requirements have been prepared in a manner that does not conflict with the relevant General

Conditions of Contract and Particular Conditions of Contract. Moreover, ES specifications have been included in the bidding documents based on ESMP and other ES documents.

In addition to the guidelines, specifications and recommendations in the relevant reports, frameworks and standards mentioned above, the following environmental and social (ES) issues are also requirements for the conditions of contract.

The environmental and social management during the pre-construction and construction phases should primarily be focused on addressing the possible negative impacts arising from:

- Demolition of existing establishments
- Excavation of soil for basement work
- Air pollution
- Traffic/ communication problems
- Noise pollution
- Drainage congestion
- Water and soil pollution
- Destruction of aquatic habitat and reduction of fisheries, aquatic fauna

Environmental and social standards guidelines are to be included in the General items of Schedule of Works and comprise the following points:

- Insurances for Contractor's equipment, insurances for injury to persons and damage to properties and other insurances.
- Quality assurance and control plan
- Environmental & social management plan
- Traffic management plan
- Health and safety plan
- GBV Action plan
- Labor management plan

A detailed write-up on the above issues is generally included in the employer's requirement, which is a part of the bidding document. Along with other condition, the following conditions should be included in the employer's requirement with the contract document for the contractors, where the contractors shall:

- design the works to minimize adverse environmental impacts;
- meet all the obligations under the prevailing environmental regulations and the environmental management plan;
- The Contractor shall always operate and maintain the Works in accordance with the approved Environmental Social Management Plan and approved Contractor's Documents including:
 - the operating and maintenance manuals
 - the Emergency Response Plan
 - Traffic Management Plan
 - the water quality testing plan
 - the air quality testing plan
 - noise standard testing plan
 - the health and safety manual
 - GBV plan
 - providing training on OHS and waste management plan

The Contractor shall undertake all monitoring, sampling and testing plans in accordance with the procedures set out in the ESIA and ESMP reports.

Under the general requirement for Operation Management in the Bid Document the following requirements are mandatory:

- maintain the site in tidy condition and take measures to control potential environmental and social nuisance, including but not limited to, odors, litter, pests, insects, rodents and birds, etc.
- Maintain a safe and secure environment including GBV, SEA, SH protection.

Under the general requirement for the Performance during the Operation Service Period in the Bid Document the following requirements are mandatory:

- The Contractor shall at all times operate and maintain the Works in accordance with the approved Environmental Social Management Plan and approved Contractor's Documents including:
 - i. the operating and maintenance manuals
 - ii. the Emergency Response Plan which includes managing emergencies in the event of chemical spills; contamination of the water source; pollution of the environment
 - iii. the water quality testing plan
 - iv. traffic management plan
 - v. disposal plan of solid waste and liquid waste
 - v. the health and safety manual
 - vi. the quality assurance manual

Under the general requirement for Water Quality, Air Quality and Sound Quality Testing Plan in the Bid Document the following requirements are mandatory:

- The Contractor shall develop a water quality testing plan, air quality testing plan and noise standard testing plan in accordance with the monitoring plan set out in the updated ESIA, including methods, schedules and frequency of sampling and analysis

Under the general requirement for the overall description of the Operation Service in the Bid Document the following requirements are mandatory:

- The Contractor shall treat wastewater including sewage effluent to meet specified standards and safely discharge the treated wastewater to the environment (or specified discharge point).

9.10 Implementation cost and Responsibility

Primary objective of environmental monitoring is to record environmental impacts arising out of sub-project activities and to ensure implementation of the earlier identified mitigation measures in order to reduce or ameliorate or bring down the intensity and extent of the adverse impacts. Most of the mitigation measures require the contractors/sub-project authority to adopt good site practice, such that the compliance issues are adequately addressed. Mitigation measures are the responsibilities of BHTPA, whereas the contractor participate as part of their management in this regard. The cost estimation for Environmental and Social Mitigation Measures and Monitoring is given in the following table 9.4. The total mitigation and monitoring cost for the sub-project is calculated as BDT 1625000.00 excluding the remuneration of Contractor's Environment, Health and Safety Officer. The total duration of the engagement of the expert will be decided as per the requirement of the sub-project after getting approval from the PMU. Additionally, the PMU will engage one Environmental Specialist

and one Social Specialist during the sub-project construction period. The estimated budget for the Environmental & Social Management is estimated as BDT approximately 1.6 million.

Table 9.4. ESMP Implementation Costing (The contractor’s part)

No.	Mitigation and Monitoring items	Unit	Cost per unit	Total unit	Total cost
1.0	Pre –construction period				
1.1	Obtaining of SCC/NOCs	Included in sub-project preparation cost			0
1.2	Updating of ESMP	Included in sub-project preparation cost			0
1.3	Existing utilities	Included in engineering cost			0
1.4	Construction of labour shed	1 lump-sum			BDT 500,000
1.5	Accommodation facilities in labour shed (toilet: both for male and female, water supply with hand washing soap etc. and proper sewerage network system, drinking water supply, cooking arrangement, setting of waste bins and sufficient ventilation facility etc.				
2.0	Construction Period				
2.1	ESMP implementation and capacity building Training 1	No.	Tk. 100,000	1	BDT 100,000
2.2	Air Quality Test (05 parameters)	No.	Tk. 1000	2 (1000X2X5)	BDT 10,000
2.3	Noise (at least 03 places) 03 times	No.	Tk. 400	3 400X3X3	BDT 2,400
2.4	Surface water test (at least 03 places) 02 times (05 parameters)	No.	Tk. 1000	2 1000X3X2X5	BDT 30,000
2.5	Ground water test (at least 02 places) 02 times (04 parameters)	No.	Tk. 1000	2 1000X2X2X4	BDT 16,000
2.6	Water spray for dust suppression	Month	24	3000	BDT 72,000
2.7	Waste Management	Month	24	2,000	BDT 48,000
2.8	Community health and safety Training 1	Lump-sum	1	50,000	BDT 50,000
2.9	Occupational Health and Safety Training including GRM, GBV, SEA 2	Lump-sum	2	40,000	BDT 80,000
2.10	Communicable disease awareness and prevention (COVID 19 protocol) training	Lump-sum	1	50,000	BDT 50,000
2.11	Personal Health and Safety and COVID-19 kits	Lump-sum			BDT 200,000

	(Provision of adapted Personal Protective Equipment (PPE) i.e., Boots, Helmets, Hand gloves, Face mask, Ear plugs, visible jacket, eye protector etc.). Sufficient No. of safety kits should be kept for the visitors				
2.12	First Aid Facilities (Provide First Aid Boxes and Emergency Medical kits including sanitizer and any other COVID-19 kits (following COVID-19 protocol).	Lump-sum			BDT 50,000
2.13	Placing of barrier and precautionary signal/signboard/banner/alert sign/Information about GRM contact point etc.	Lump-sum			BDT. 50,000
2.14	Post construction clean-up	Lump-sum			BDT 50,000
3.0	Other expenses during construction period				
3.1	Gardening on roof top and other places	Lump-sum			BDT 200,000
3.2	Monthly environmental monitoring report by the contractor	No.	5,000	24	BDT 120000
4.0	Operation period				
4.1	Air quality test	BHTPA O&M Budget			-
4.2	Water quality test	BHTPA O&M Budget			-
4.3	Noise Level	BHTPA O&M Budget			-
4.4	Waste Management	BHTPA O&M Budget			-
4.5	Grand Total:				BDT1,592,400 Approx. BDT 1,600,000

CHAPTER 10
Conclusion
and Recommendation

10 Conclusion and Recommendation

10.1 Conclusions

Environmental and Social Impact Assessment (ESIA) of the Sub-project has been taken into consideration of the detailed engineering design for the construction of the proposed building including four basements and has identified the significant Environmental and Social impacts anticipated due the various activities to take place during the pre-construction, construction and operational stages of the sub-project.

Baseline assessments of ambient air, surface water, ground water and noise levels have been carried out at various locations around the sub-project area and the results are discussed in specific chapters.

Impacts anticipated during the three stages, viz., pre-construction, construction and operational stages of Vision 2041 Smart Tower are as under:

Pre-Construction Impacts: Demolition of some temporary structure will be required. This demolition waste and other accumulated waste at the sub-project site needs to be disposed of properly. Mitigation measures mentioned in the ESMP shall be followed by the contractor to reduce or stop the possible impacts.

Construction impacts: Impacts resulting from construction activities including site clearance, piling, excavations, earthworks, civil works, and vehicular movement etc. may create air and noise pollution, contaminate surface water and groundwater, and create drainage congestion. Mitigation measures mentioned in the ESMP shall be followed by the contractor to reduce or stop the possible impacts.

O&M impacts: Impacts associated with the operation and maintenance activities of the proposed Vision 2041 Smart Towers such as pedestrians along the road, vehicular exhaust emissions, surface and ground water pollution and drainage congestions etc. may arise if not handled everything properly.

Based on the above observations, this report formulates plan for Environmental and Social management and monitoring along with cost estimates for implementation during the various stages. This report also discusses the Emergency and Disaster Response Plan that might be required during the construction as well as operational phase of the sub-project.

10.2 Recommendations

Implementation of appropriate environmental and social management plans and possible mitigation measures at various stages will reduce the negative impacts of Vision 2041 Smart Towers to an acceptable level. To ensure that mitigation measures are implemented and negative impacts are avoided, the ESMP consultation and any other plans and strategies related to ES should be included in the sub-project contract documents. The Bill-of-Quantity (BoQ) should also have a separate line item on environmental and social management.

BHTP authority and PMU with their explicit positive approach towards environmental and social management and safety standard will provide necessary resources along with adequately trained technical personnel and requisite.

They can undertake following initiatives themselves and through contractors:

- They shall regularly monitor the activities of the contractors/sub-contractors to ensure that the work is being carried out in accordance with the relevant documents and BOQ policies and guidelines with special attention to safety and security.

- A detailed traffic management plan is proposed in the traffic survey section to manage traffic during construction. However, the contractor should also prepare a separate traffic management plan in consultation with key stakeholders such as the police and Kawran Bazar business community leaders. However, in respect of vehicular movement during operation period after construction work, new traffic plan may be adopted.
- Proper management of solid waste should be done as suggested in the bidding document based on ESMP and other ES documents.
- Performance of Sewage Treatment Plant (STP) should be monitored regularly. The maintenance of STP requires an experienced technical person. After carrying out the plant test, the STP should be regularly tested by the contractor up to the period recommended in the BOQ. A checklist should be prepared for the routine monitoring of STP. After the expiry of the contract period, BHTPA will appoint an operator who will monitor/supervise the STP activities on regular basis.
- The plumbing system of Rainwater Harvesting Unit as well as the quality of the harvested water should be monitored regularly.
- Fire exits should be kept free, and the passage should be wide enough for the smooth movement of a large number of people. Regular monitoring will be done along with periodic fire drilling.
- During construction phase, labor shed, and labor management will be done as per ESMP. Occupational Health and Safety awareness training should be ensued for the workers.
- Proper management of CESMP and Environmental mitigation plan will be done on a regular basis.
- During the incorporation of electrical and plumbing system proper safety measures will be ensured so that no accident happens.
- Above all, the contractor must follow the instructions prescribed in Chapter VII of the Bidding Documents prepared based on the ESMP and other ES documents.

10.3 Limitations of the study

- Environmental baseline data are collected during a specific season, so the seasonal variations are not included in this study.
- Some data are collected from online sources which are older more than five years, so there are possibilities of some changes in the related environmental baseline in recent years.
- No numeric analysis is done for this study so there is no quantification of carbon emission and related impacts.

10.4 Disclosure of Environmental and Social Safeguards Instruments

Bangladesh Hi-Tech Park Authority (BHTPA) and PMU will disclose this updated Environmental and Social Impact Assessment (ESIA) by making copies available at its head office and in relevant offices where the Sub-project is situated. The copies shall also be made available to the relevant stakeholders. A soft copy of this document needs to be available on the DEIEDP and BHTPA website.

ANNEXES

ANEEXURE 1

Feature of the sub-project

The sub-project area is a 0.47-acre plot adjacent to the south of the Vision 2021 Tower STP-1 at Kawran Bazar. This Bazar is famous for its wholesale kitchen market. The surroundings of the sub-project area is dominated by commercial activities, office, institutional and market buildings. The proposed site is located at the East side of the Airport-Gulistan Highway; about 7 kilometers from the center (zero point) of Dhaka City and about 12 km from the Dhaka International Airport. The design considered adequate provision for parking facilities, fire extinguisher and emergency escapes. There is also provision for flower beds on the ground floor for planting flowers and shrubs for beautification purposes. Besides the ground floor beautification plan, a rooftop garden can also be proposed to enhance the environmental quality of the building. There might be a particular space for plantation along the cornices. It will increase the beauty and also maintain eco-friendly features of the building. The site is free from flood and water logging. There are provisions for drainage system to effectively drain out rain water from the site and discharge to the main drainage system of the City Corporation. Fire separation distance would be maintained from consideration of fire safety between the adjacent buildings and any other building on the site. Different floor of this building will be given to different IT related companies who have capability and interest to contribute to the nation's economy through IT sector as per Vision 2021 of Bangladesh government and those who wish to see Bangladesh as a digital Bangladesh. This building will have all modern and environmentally friendly facilities.

Architectural and engineering features

The "Vision-2041 Smart Tower (software technology park) " is designed as a 9-storied building, to serve as a smart building for an IT innovation hub for the ICT sector in Bangladesh. The Government aims to supervise the entire hub through one office building and hence a smart building is to be constructed which will promote sustainability and sustainable development and facilitate the efficient management of resources to maximize profits and user satisfaction. This building has offices with the necessary space and facilities such as an underground water reservoir, lift, escalator, ramp facility, stairs, generator room, substation, fire extinguisher, and toilet blocks with provision for both males and females, water supply, parking facilities, sewage treatment plant etc. Multiple facilities like start-up floors, cafeterias, gaming areas, kitchens, gymnasiums, prayer rooms, and outdoor green spaces have been considered to make a healthier environment for the employees. The floor-wise distribution of various features is given below. The proposed sub-project is designed as a permanent building of column beam structure having a 09- storied foundation and the total built-up area of the sub-project is approximately 171,000 square feet. There are 3 basements and one semi-basement in this building. The semi-basement includes Maintenance Office, ANSAR Barack, prayer spaces for both males and females with ablution spaces, toilets, generator room, STP control & filter room, Car and cycle Parking

zone, etc. The cycle parking zone has a separate shower zone for the riders so they can come and freshen up there.

Table 1(1): Floor plan

Sl. No.	Floor No.	Features
1.	Basement 1	<ul style="list-style-type: none"> ▪ Office ▪ Prayer Space ▪ Lift, Stair, Lobby, Toilet ▪ Ansar & Staff ▪ Generator Room ▪ STP Control Room ▪ Maintenance Office ▪ Parking Area
2.	Basement 2	<ul style="list-style-type: none"> ▪ Stair ▪ Parking ▪ Store ▪ Rain Water Filter ▪ Driver's Waiting
3.	Basement 3	<ul style="list-style-type: none"> ▪ Stair ▪ Parking ▪ Maintenance Office ▪ Driver's Waiting Room ▪ Underground Water Reservoir
4.	Basement 4	<ul style="list-style-type: none"> ▪ Stair ▪ Parking ▪ Maintenance Office ▪ Pump Room ▪ Underground Water Reservoir
5.	Ground Floor	<ul style="list-style-type: none"> ▪ Office ▪ Café ▪ Day Care ▪ E. Lobby, Reception & Lounge ▪ Lift, Stair, Lobby, Toilet ▪ Sub-Station ▪ Security & Fire Control ▪ Ramp
6.	1st Floor Podium	<ul style="list-style-type: none"> ▪ Office ▪ Lift, Stair, Lobby, Toilet ▪ Ante Store & Corridor
7.	2nd Floor Podium	<ul style="list-style-type: none"> ▪ BHTPA Office ▪ Lift, Stair, Lobby, Toilet ▪ Double Height Space
8.	3rd Floor	<ul style="list-style-type: none"> ▪ Start-up and R&D ▪ Open Terrace ▪ Lift, Stair, Lobby, Toilet

Sl. No.	Floor No.	Features
9.	4 th to 8 th Floor	<ul style="list-style-type: none"> Office Lift, Stair, Lobby, Toilet
10.	Roof Floor (9 th Floor)	<ul style="list-style-type: none"> Restaurant Lift, Stair, Lobby, Toilet Open Gym Garden

However, the other basements consist of Car, and motorcycle Parking, Driver waiting room, Water reservoirs, a Pump Room, and Rain Water Harvesting Filter facilities. The 1st basement has 40 no's car parking and 19 no's motorcycle Parking, the 2nd & 3rd basement each have 36 and 38 no's car parking respectively and 15 no's motorcycles Parking each. According to the Dhaka Imarat-Nirman-Bidhimala-2008, for any kind of commercial sub-project (Occupancy Type F), the minimum Parking Requirement is 1 car parking for every 200 Sqm area. So, the required number of parking for the proposed tower is 50 nos. The Total number of car parking that is provided in this building is 119 of which 79 nos is for office use and 40 nos are for visitors, while there are facilities for 47 no's motorcycle and 27 no's cycle parking. Details floor plans are given below:

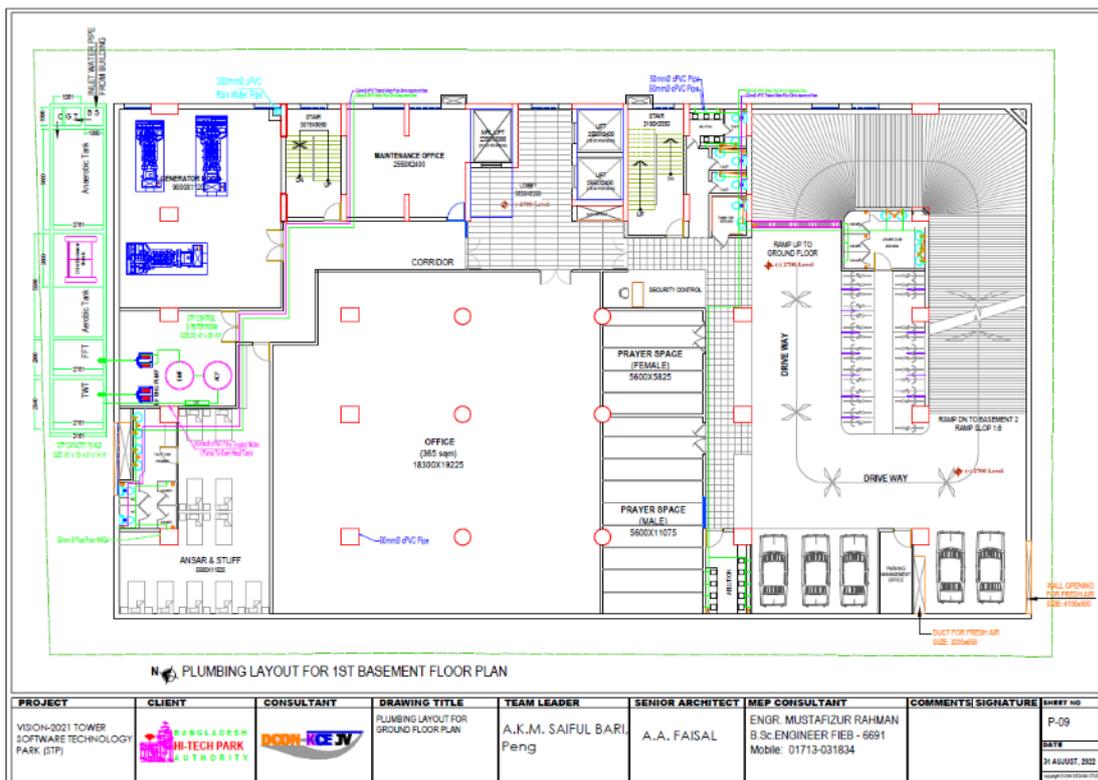
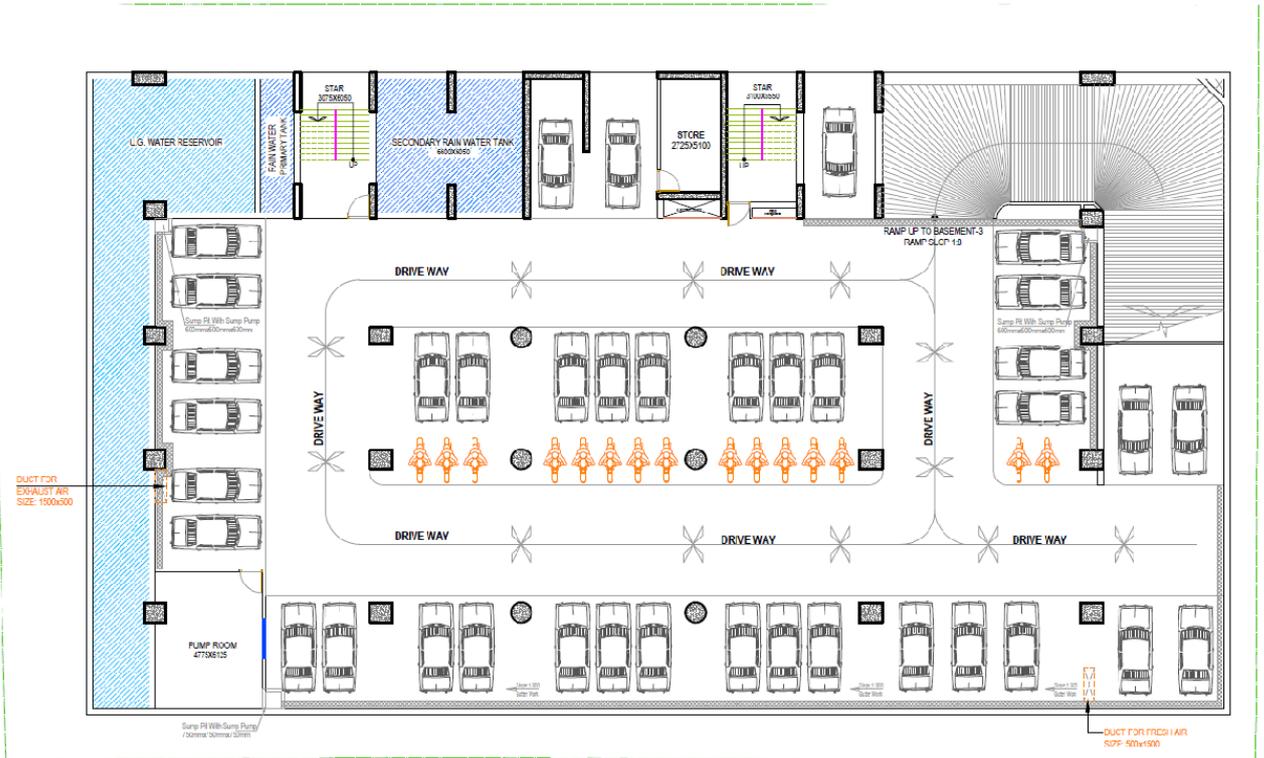


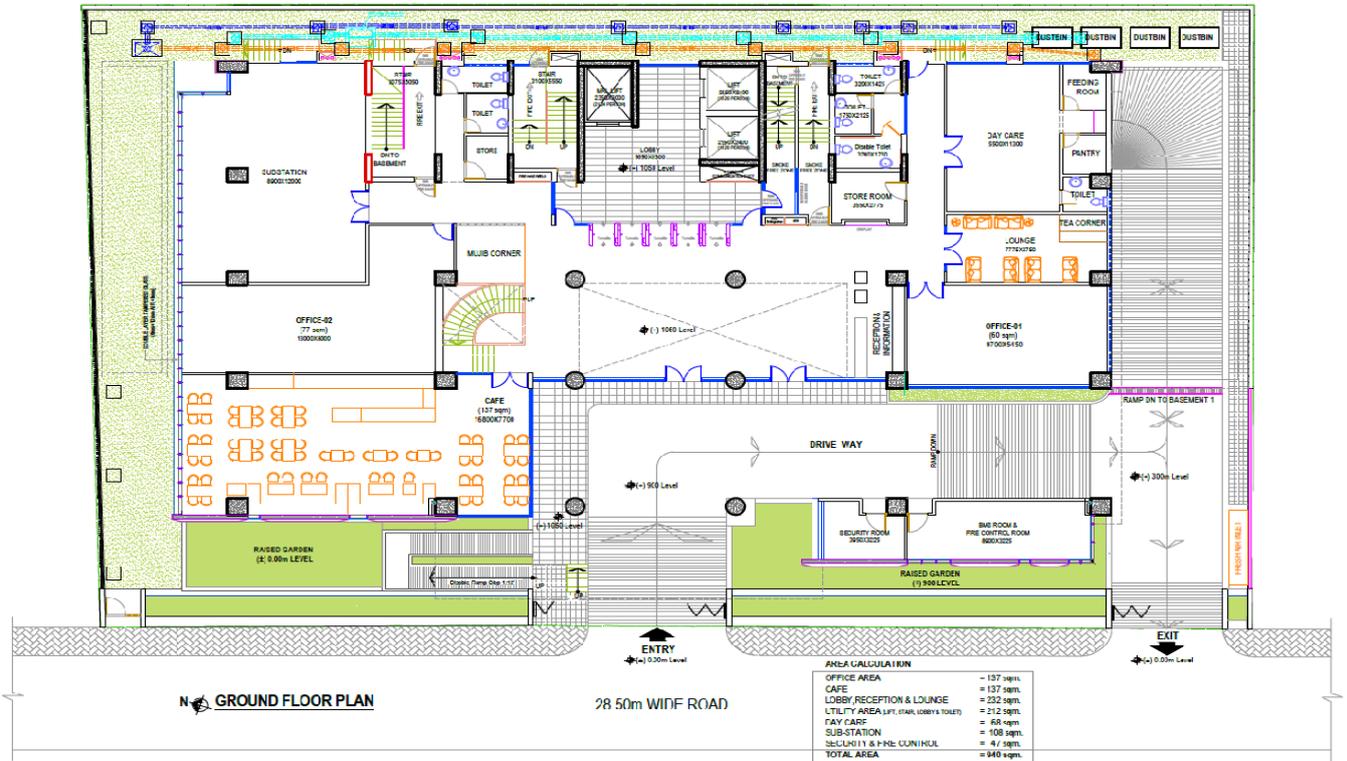
Figure 1(1): Basement floor Plan 1



BASEMENT FLOOR PLAN-04

Parking Calculation	
CAR	= 38 nos.
MOTOR BIKE	= 15 nos.

Figure 1(4): Basement floor plan 4



GROUND FLOOR PLAN

AREA CALCULATION	
OFFICE AREA	= 137 sqm.
CAFE	= 137 sqm.
LOBBY, RECEPTION & LOUNGE	= 232 sqm.
UTILITY AREA (LIFT, STAIR, LOBBY & TOILET)	= 212 sqm.
DAY CARE	= 68 sqm.
SUB-STATION	= 108 sqm.
SECULARITY & PPH: CUNIHUL	= 41 sqm.
TOTAL AREA	= 940 sqm.

Figure 1(5): Ground Floor Plan

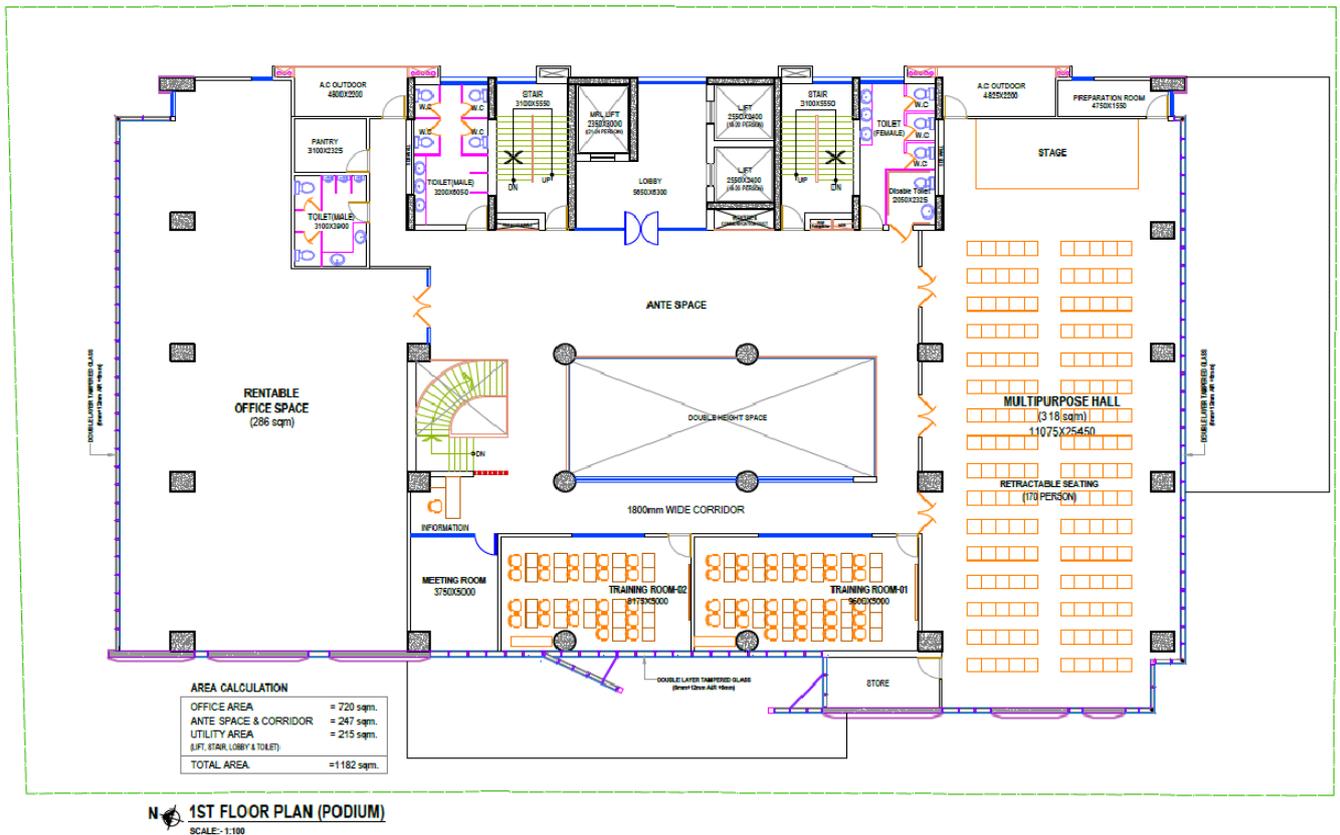


Figure 1(6): First Floor Plan

The ground floor consists of 940 Sqm space where the utility core area is 212 sqm, and has lifts, stairs, lift lobby, and toilets. The lobby space has the Information and Reception desk, a lounge, and the Mujib corner with 232 Sqm. There are 2 Office spaces of 137 sqm which can accommodate up to 40 people at a time, a Café that can accommodate 60 people at times, and a Day Care center of 68 Sqm with a feeding room facility that can accommodate 15 children at a time. In general, the designated area for children’s activities should contain a minimum of forty-two square feet of usable floor space per child. There is a security room, Sub Station, and a BNS Room with a fire control space on the ground floor level. The front part of the site has raised gardens and universal access for disabled people.

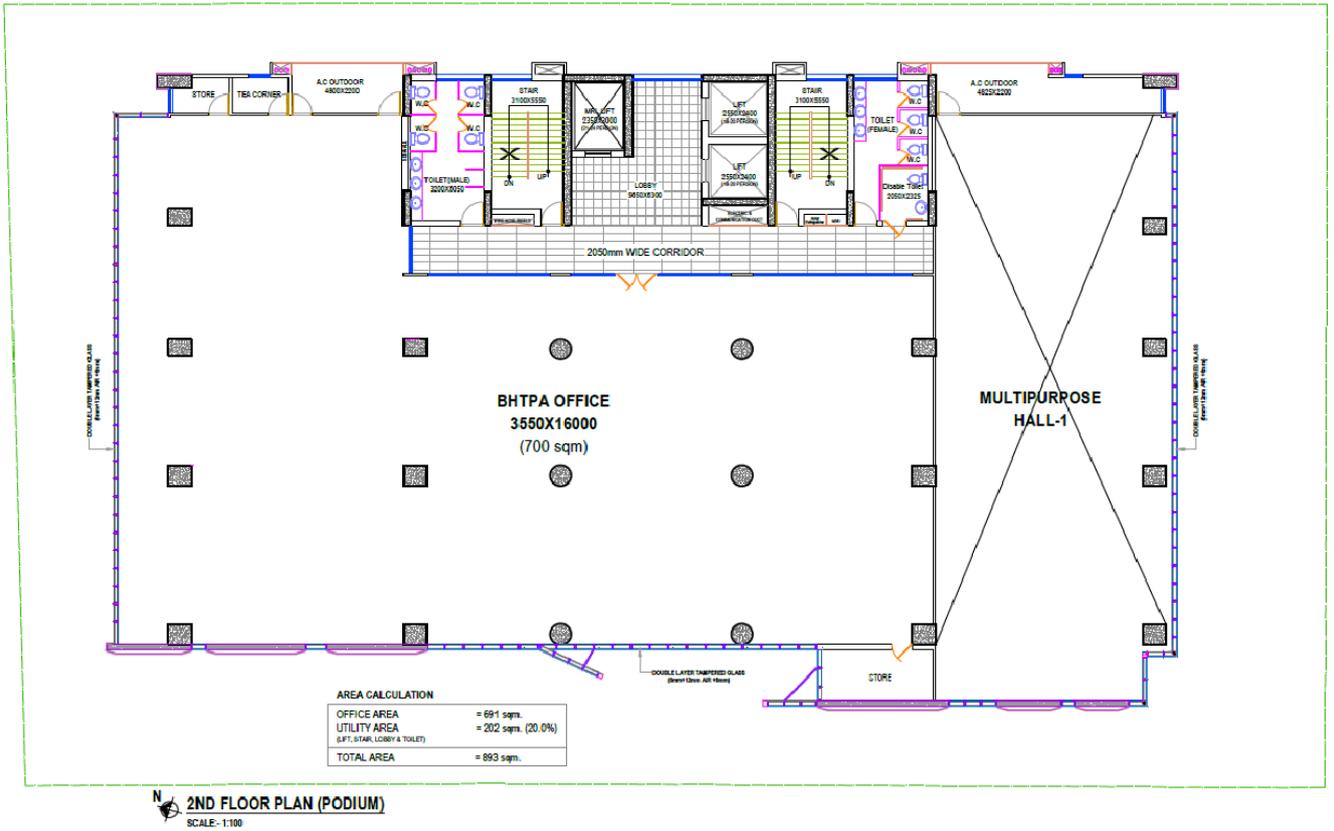


Figure 1(7): 2nd Floor Plan

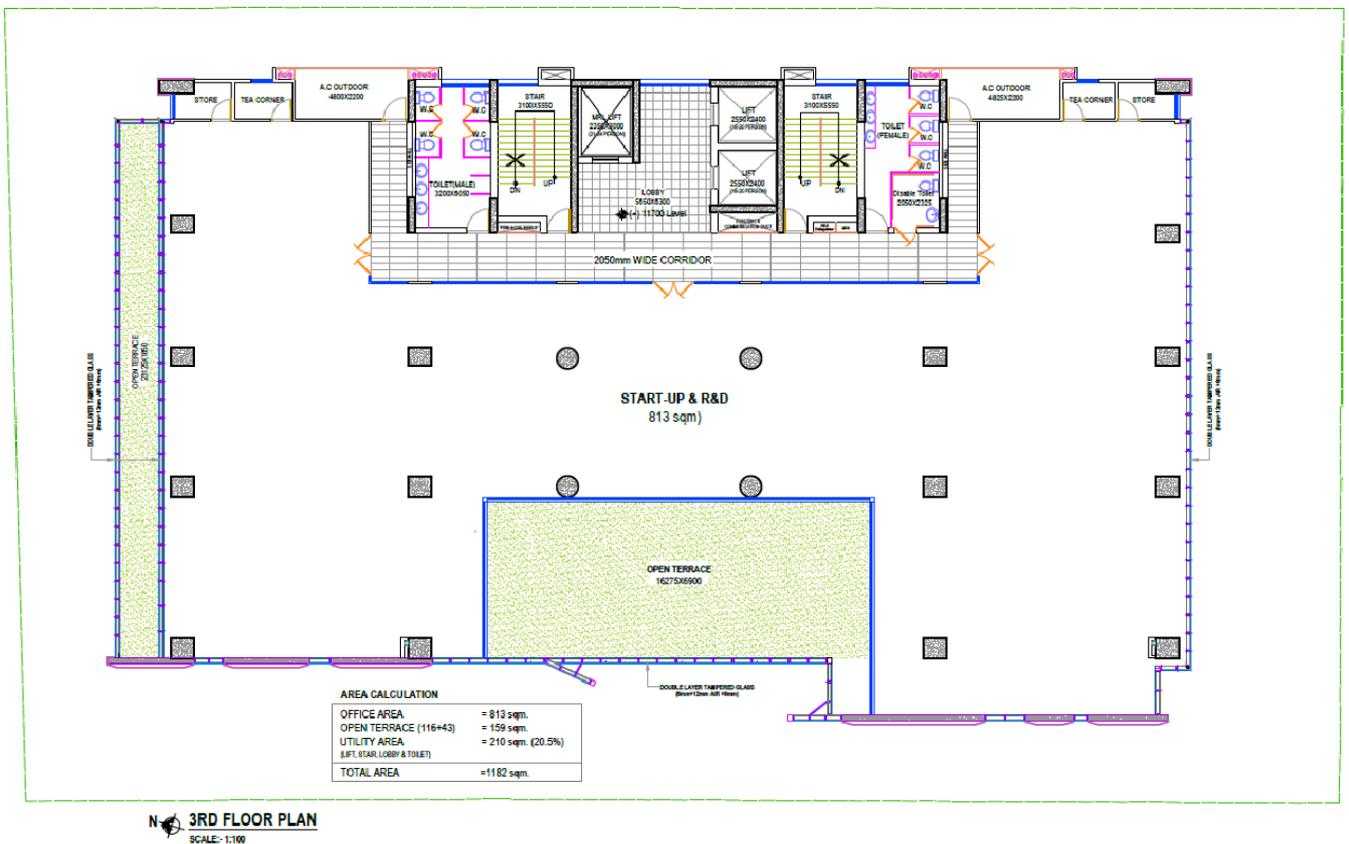
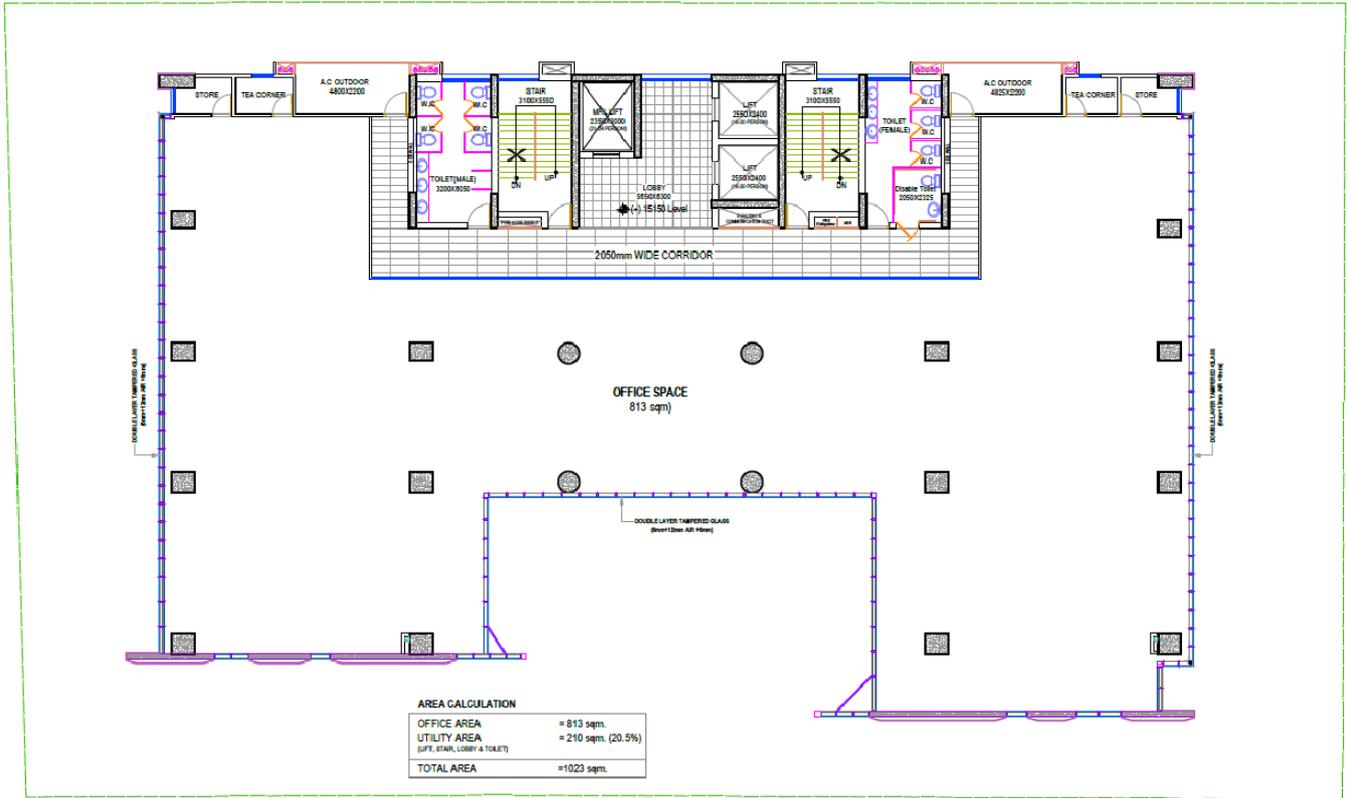
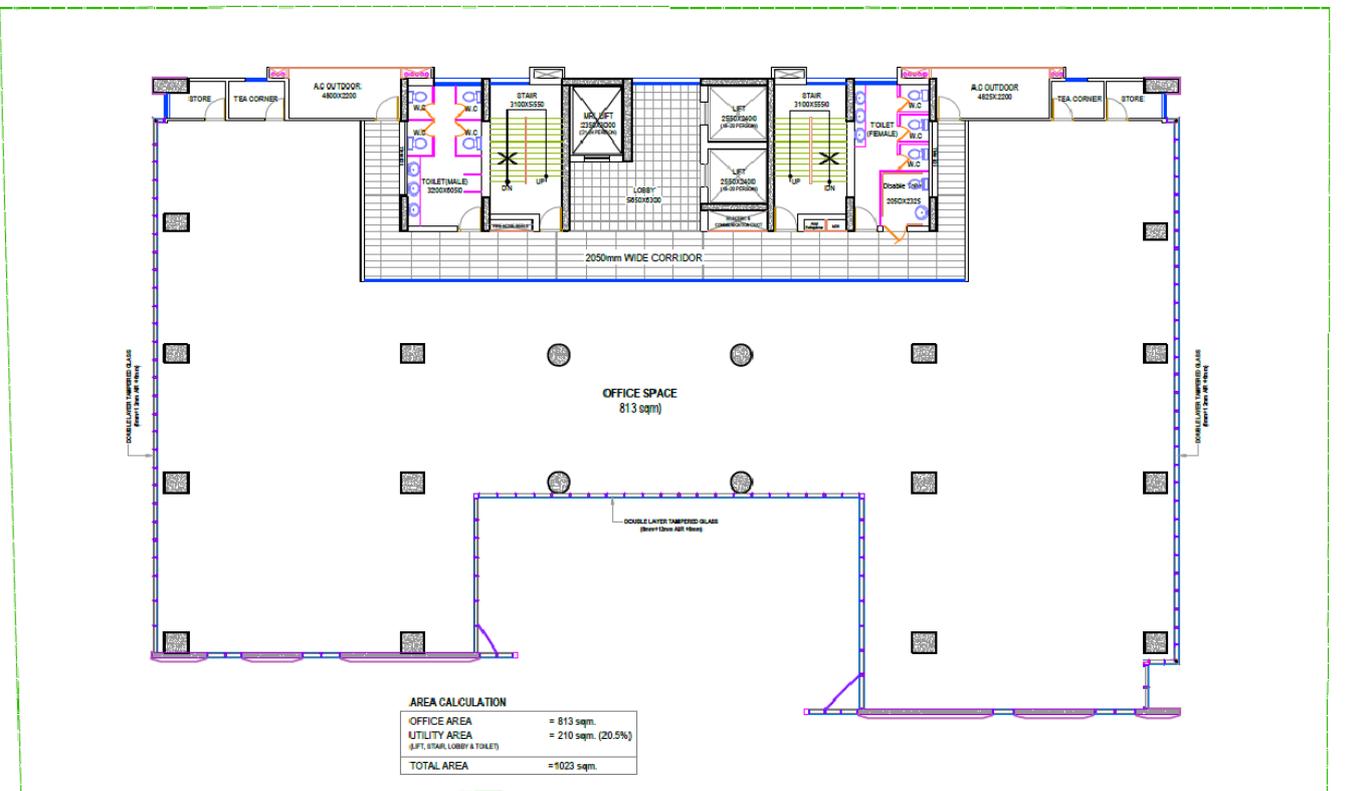


Figure 1(8): 3rd floor Plan



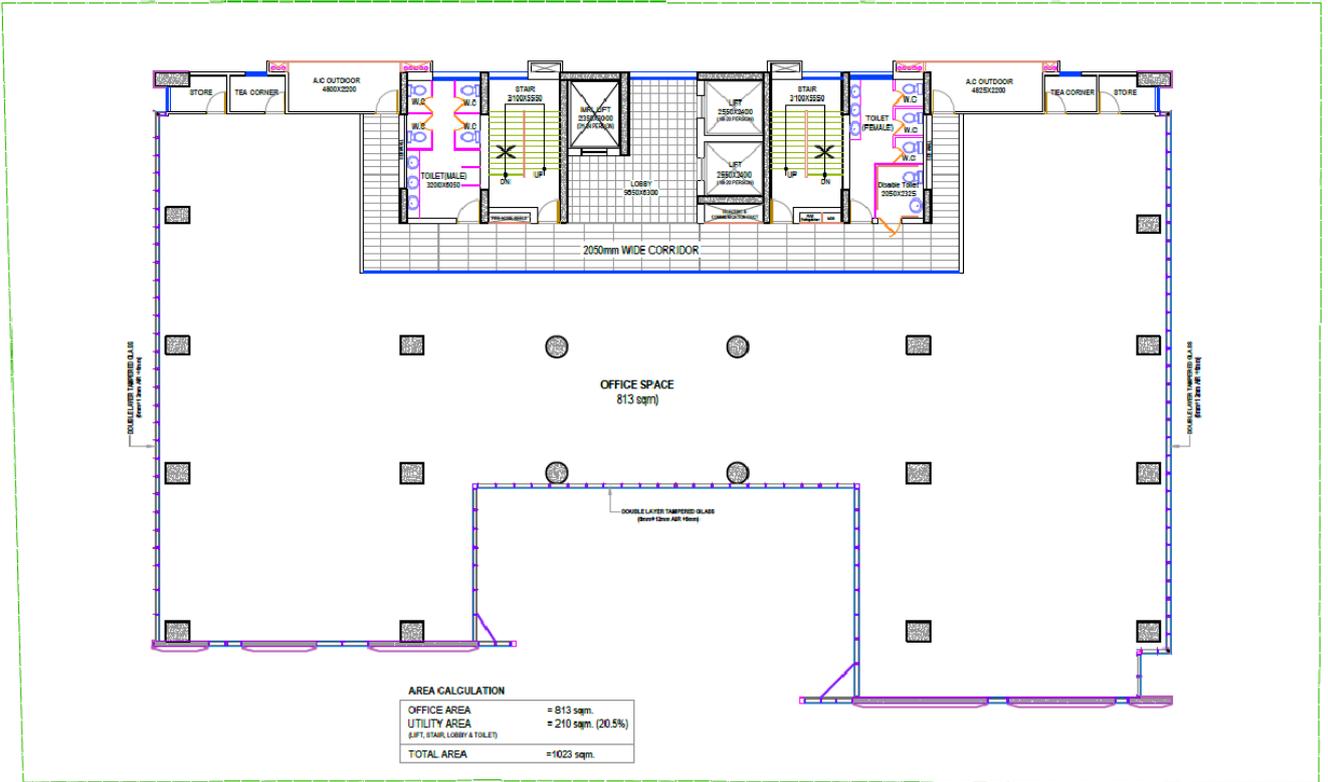
4TH FLOOR PLAN
SCALE: 1:100

Figure 1(9): Forth floor Plan



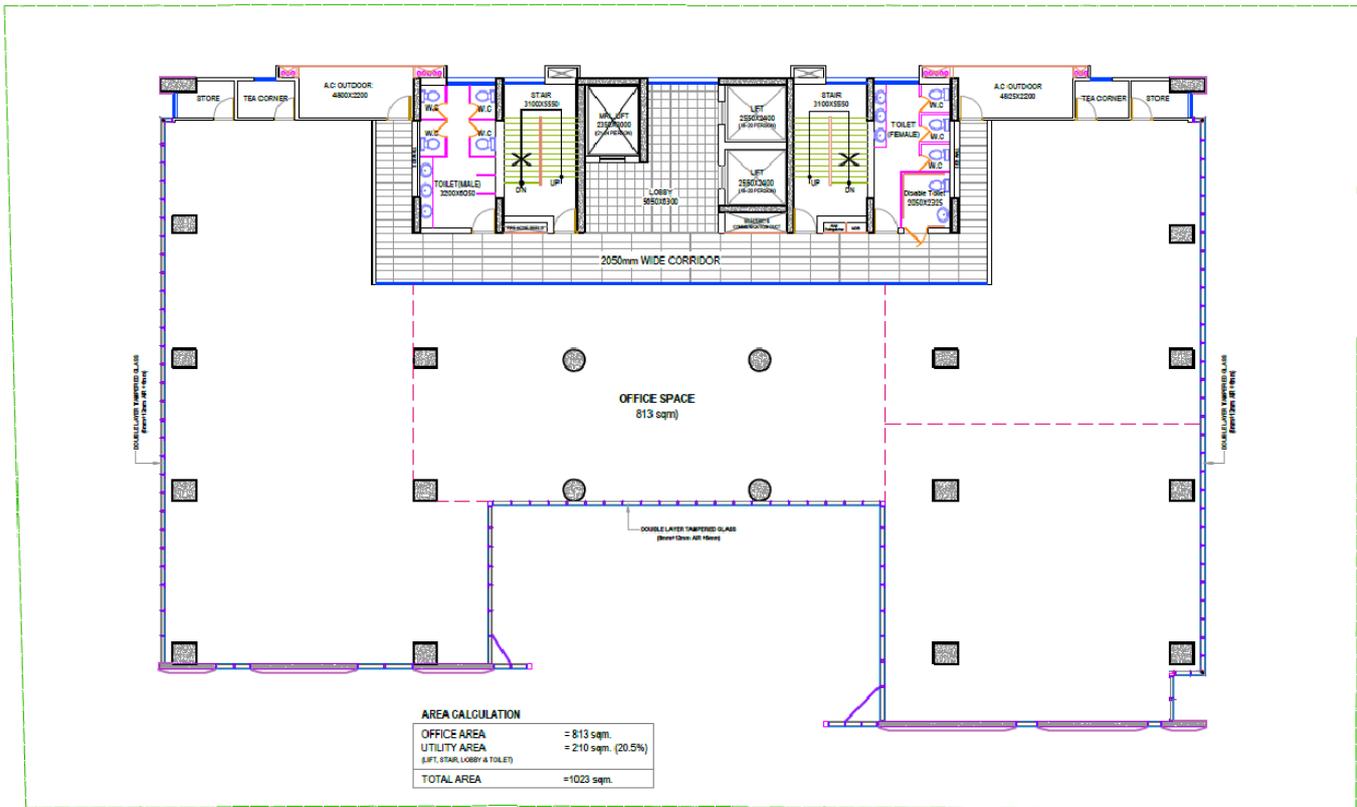
5TH FLOOR PLAN
SCALE: 1:100

Figure 1(10): 5th floor Plan



6TH FLOOR PLAN
SCALE: 1:100

Figure 1(11): 6th floor plan



7TH FLOOR PLAN
SCALE: 1:100

Figure 1(12): 7th Floor Plan

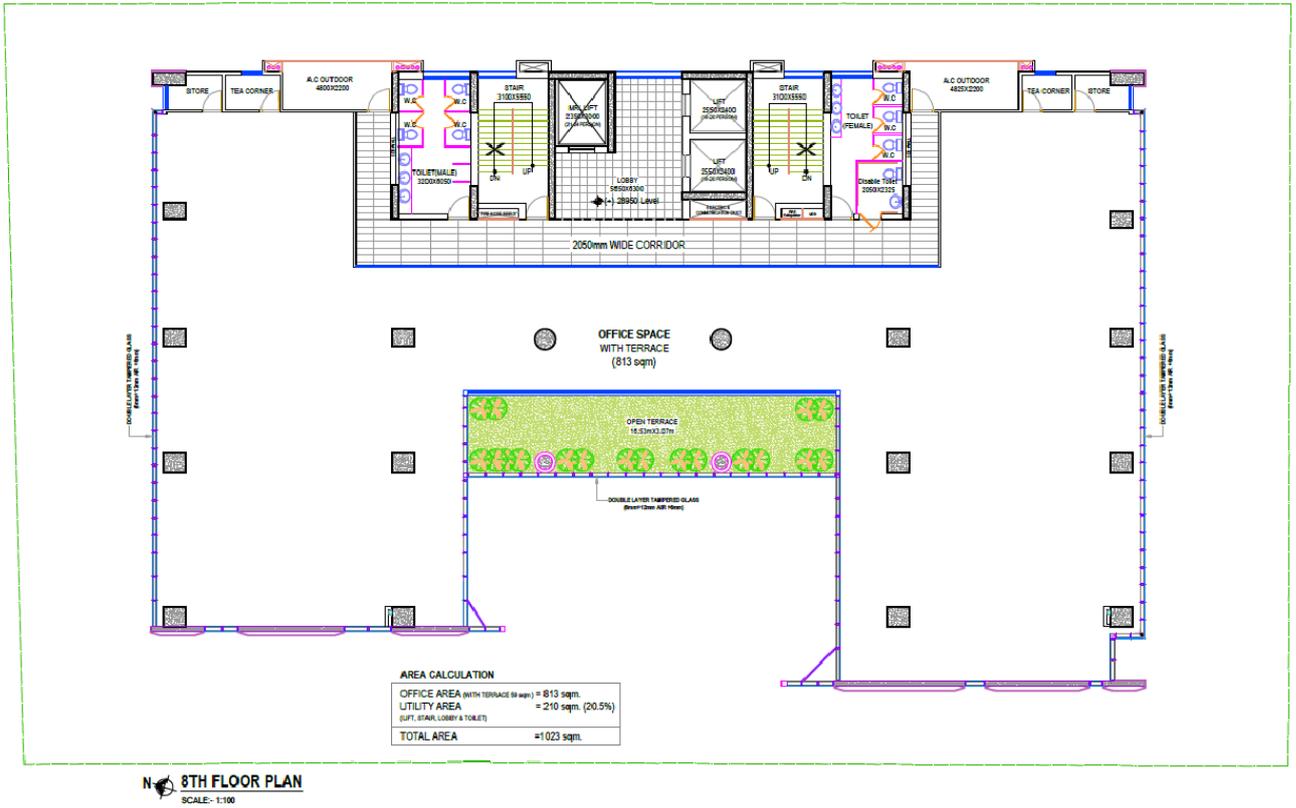


Figure 1(13): Rooftop plan (with Sitting arrangement)

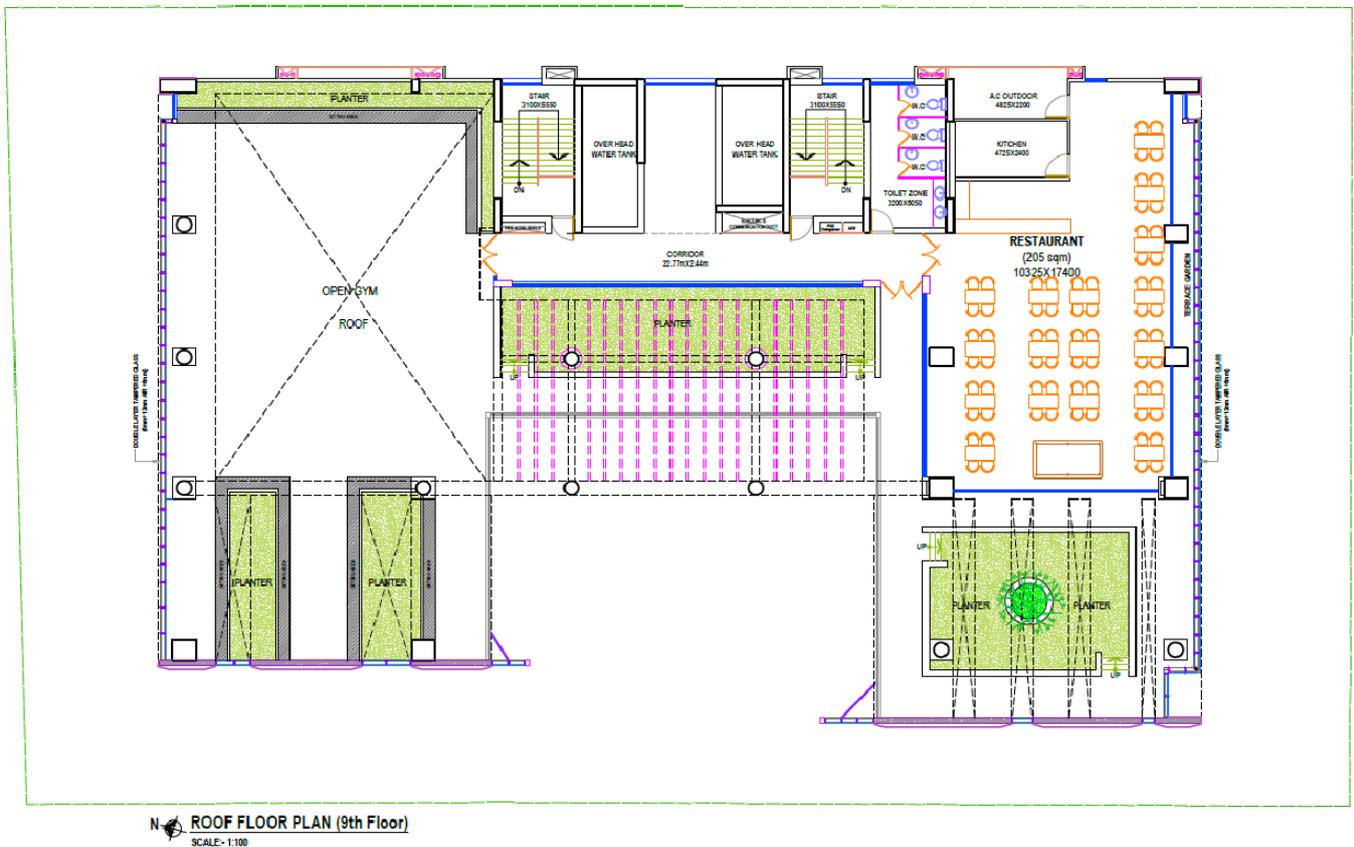


Figure 1(14): Rooftop plan 9th floor (Structural)

PROJECT VISION-2021 TOWER SOFTWARE TECHNOLOGY PARK (STP-02) 10 STORED (WITH 04 BASEMENT) COMMERCIAL BUILDING	CLIENT  BANGLADESH HI-TECH PARK AUTHORITY	CONSULTANT  DCON-KCE JV	TEAM LEADER A.K.M. SAIFUL BARI, Peng	SENIOR ARCHITECT A.A. FAISAL	MECHANICAL ENGINEER RISHABH KASLIWAL	ELECTRICAL ENGINEER MUSTAFIZUR RAHMAN	SHEET NO. A-15-A DATE 24 AUGUST, 2022 <small>REGISTRATION NO. 18110</small>
--	--	--	--	--	--	---	---

AEA CALCULATION		
Type	DESCRIPTION	AREA(SQM)
GROUND FLOOR	OFFICE AREA	137.00
	CAFE	137.00
	DAY CARE	68.00
	E. LOBBY, RECEPTION & LOUNGE	232.00
	UTILITY AREA (LIFT, STAIR, LOBBY, TOILET)	212.00
	SUB-STATION	108.00
	SECURITY & FIRE CONTROL	47.00
	RAMP	410.00
	SUB TOTAL	1,351.00
BASEMENT-01	OFFICE AREA	355.00
	PRAYER SPACE	145.00
	UTILITY AREA (LIFT, STAIR, LOBBY, TOILET)	232.00
	ANSAR & STUFF	110.00
	GENERATOR ROOM	108.00
	STP CONTROL ROOM	38.00
	MAINTANANCE OFFICE	43.00
	PARKING AREA	450.00
	SUB TOTAL	1,481.00
BASEMENT - 02	STAIR	48.00
	PARKING AREA	1,311.00
	STORE	58.00
	RAIN WATER FILTER	35.00
	DRIVER'S WAITING	29.00
	SUB TOTAL	1,481.00
BASEMENT - 03	STAIR	48.00
	PARKING AREA	1,178.00
	MAINTANANCE OFFICE	58.00
	DRIVER'S WAITING	29.00
	U. G. W RESERVOIR	168.00
SUB TOTAL	1,481.00	
BASEMENT - 04	STAIR	48.00
	PARKING AREA	1,173.00
	MAINTANANCE OFFICE	58.00
	PUMP ROOM	34.00
	U. G. W RESERVOIR	168.00
SUB TOTAL	1,481.00	
1ST FLOOR (PODIUM)	OFFICE AREA	720.00
	UTILITY AREA (LIFT, STAIR, LOBBY, TOILET)	215.00
	ANTE SPACE & CORRIDOR	247.00
	SUB TOTAL	1,182.00
2ND FLOOR (PODIUM)	BHTPA OFFICE	700.00
	UTILITY AREA (LIFT, STAIR, LOBBY, TOILET)	202.00
	DOUBLE HEIGHT SPACE	280.00
	SUB TOTAL	1,182.00
3RD FLOOR	START-UP & R&D	813.00
	OPEN TERRACE	159.00
	UTILITY AREA (LIFT, STAIR, LOBBY, TOILET)	210.00
	SUB TOTAL	1,182.00
4TH TO 8TH FLOOR	OFFICE AREA	813.00
	UTILITY AREA (LIFT, STAIR, LOBBY, TOILET)	210.00
	SUB TOTAL	1,023.00
9TH FLOOR (ROOF)	RESTAURANT	205.00
	UTILITY AREA (STAIR, LOBBY, TOILET)	175.00
	ROOF (OPEN ZYM, GARDEN)	643.00
SUB TOTAL	1,023.00	
TOTAL AREA		16,959.00

Figure 1(15): Space calculation of different floors

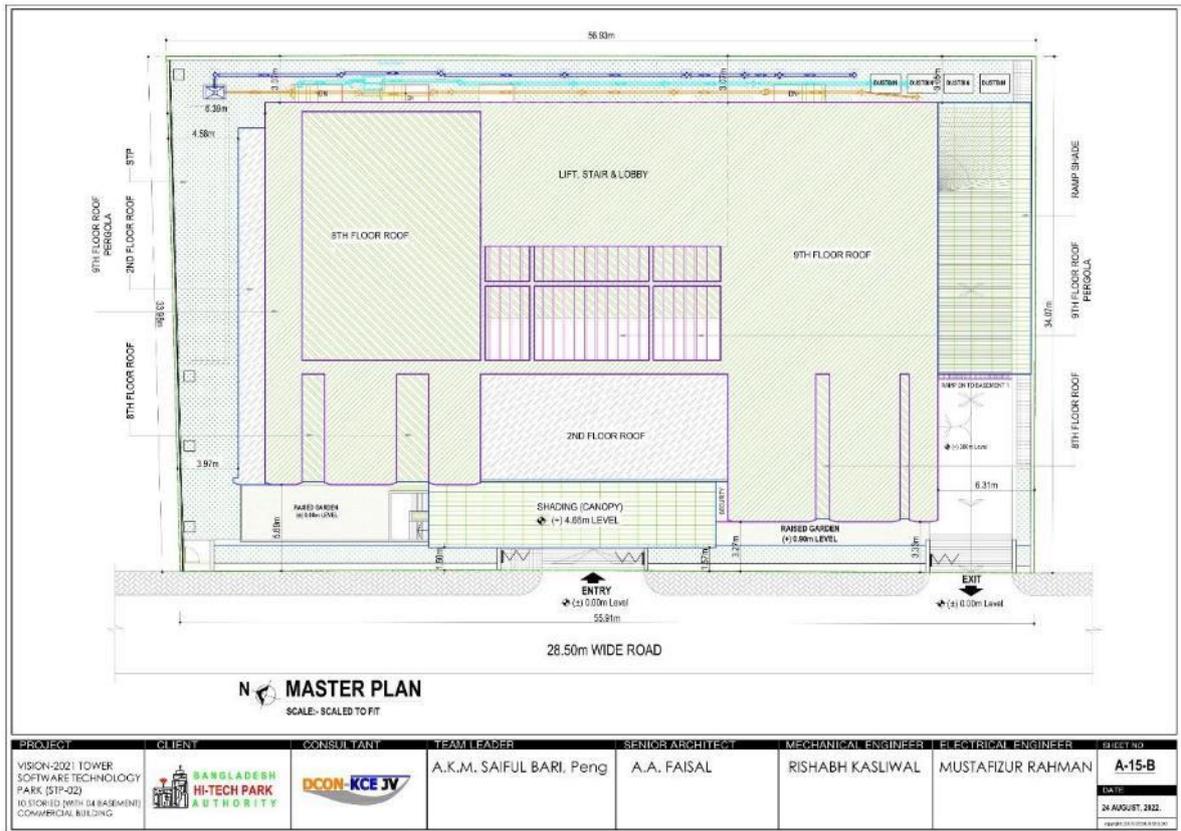


Figure 1(16): Master Plan of total area



Figure 1(17): Exterior view of Vision 2041 Smart Tower(Day time)

ANNEX 2: WASTE MANAGEMENT PLAN

General:

Throughout the sub-project, the emphasis will follow the principles of waste minimization to reduce the potential for waste impacts on the local and non-local environment. These principles are illustrated in Figure 1.

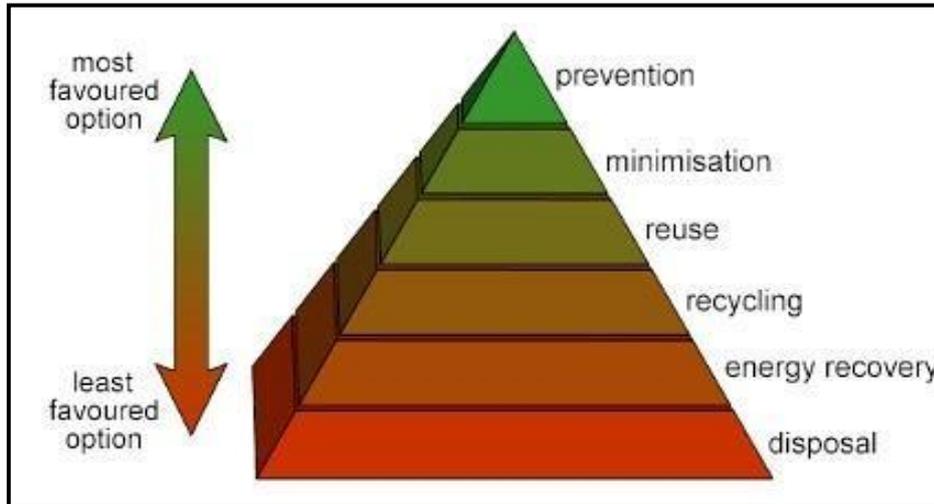


Figure 2(1): The Waste Hierarchy

(Source: Wikipedia: http://en.wikipedia.org/wiki/Waste_hierarchy)

The waste minimization hierarchy will be implemented in this sub-project in a manner consistent in Table1(1)

Table 1(1): Waste Management Objectives for the Vision 2041 Smart Tower Facilities

Principle	Application in this Sub-project
Prevent	Products and services to be employed for this sub-project will be assessed for their potential to generate waste. Those with a lower potential will be favored.
Minimize	If a product or service that produces more waste than is desirable must be used for particular reasons, than the use of that product or service will be minimized.
Reuse	No sub-project materials with the potential to be reused will be disposed of after only single use.
Recycle	Where facilities are available, all recyclable domestic and industrial waste generated by this sub-project will be recycled.
Recover	Creation of facilities for energy recovery from waste products including that for waste gas now being flared has to be encouraged. All other items that may be reused for energy or other purposes will be employed wherever possible.
Dispose	As a final resort, waste will be disposed of. All waste disposed of will be done responsibly in approved landfills / due treatment and disposal sinks/sumps. This will be ensured by DNCC.

Objectives:

The Contractor will promote waste minimization by waste avoidance, reduction, reuse and recycling to the extent practical. Waste minimization is generally accomplished through the "3Rs" - reduce, reuse and recycle.

The Contractor will produce a Waste Management Plan (WMP) dealing with the waste generated by sub-project activities. This WMP will specify provisions for disposal, re-use or recycling of solid and hazardous waste.

Scope:

The Contractor will be responsible for the development of a waste management plan to ensure that all wastes (hazardous, non-hazardous and wastewater) are all disposed of in an environmentally sound manner.

The WMP includes actions to be taken by the Contractor's / Subcontractor's sub-project personnel for the management and safe disposal of waste materials generated by them during construction. Specifically, the WMP will:

- list the different waste categories likely to be generated during the construction period;
- define their segregation methods;
- provide information on local waste transportation and disposal regulations and permit requirements;
- define responsibilities for waste management handling including safe disposal;
- comply with the Contractor's environmental requirements, policies and procedures and with environmental laws, rules, regulations applicable in Bangladesh regarding waste management.

The Contractor shall at all times maintain his camp and construction sites in clean and tidy conditions and shall provide appropriate and adequate facilities for temporary dumping of all types of wastes before their proper disposal.

Equipment, surplus material, and rubbish shall be removed, and the site is left in a clean condition to the satisfaction of the Employer's representative after completion of construction activities. The Contractor shall be responsible for safe transportation and disposal of all types of wastes generated by his activities in such a way that no environmental pollution or hazard to health is caused to workers or local people. In case the Contractor employs a third party to dispose of any wastes, the Contractor even in such cases is considered to be responsible himself under this clause until the wastes leave the site under his control. He remains legally bound to exercise due diligence to ascertain that the proposed transport and disposal mechanism do not cause pollution or public health hazards.

The Contractor shall not allow waste oil, lubricant or other petroleum derivatives to be used as dust suppressants and shall take all reasonable precautions to prevent accidental spillage of petroleum products, contact of such materials with soil or watercourse through discharge, run-off, and seepage. Where practicable, garbage and solid wastes generated in the sub-project area will be converted into compost. Where this is not possible, they will be buried in designed landfill areas. Good construction practices and site management shall be adopted to avoid affecting soil and groundwater, and pollution of water bodies from accidental spills from fuels and lubricants, etc.

Waste Types and Quantities Generated:

Where practicable, garbage, kitchen waste and solid wastes generated in the sub-project area will be converted into compost. Where this is not possible, they will be buried in designed landfill areas.

The type of waste are as follows:

- Paper waste, packaging material, carton
- Garbage, rubbish
- Kitchen waste mainly organic
- Solid waste, E-waste, Liquid waste (Sewage)

Construction Phase:

The waste will generate from construction activities like site clearing, leveling, etc. Other categories of waste will be produced daily and comprise of the following:

- Scrap metal;
- Soil waste;
- Food waste from kitchen premises of labor camps;
- Construction debris; and
- Sewage from temporary toilets;

The construction and decommissioning phases will require the use of hazardous materials such as diesel or petrol to cater the fuel equipment and vehicles and maintain equipment. The following hazardous wastes will also be produced from construction activities.

- Oily rags;
- Used oil and oil filters - from generators or vehicle maintenance; and
- Scrap and packaging material

Operation Phase:

Ineffective waste management for commercial premises can lead to environmental pollution, offensive odors, litter, attraction of vermin and occupational safety and hygiene problems. Effective waste management reduces costs through the reuse of resources and minimization of fees associated with removal, transportation and disposal of waste, and improves environmental outcomes. Effective waste management is achieved through the implementation of a WMP for the operational life of the Sub-project.

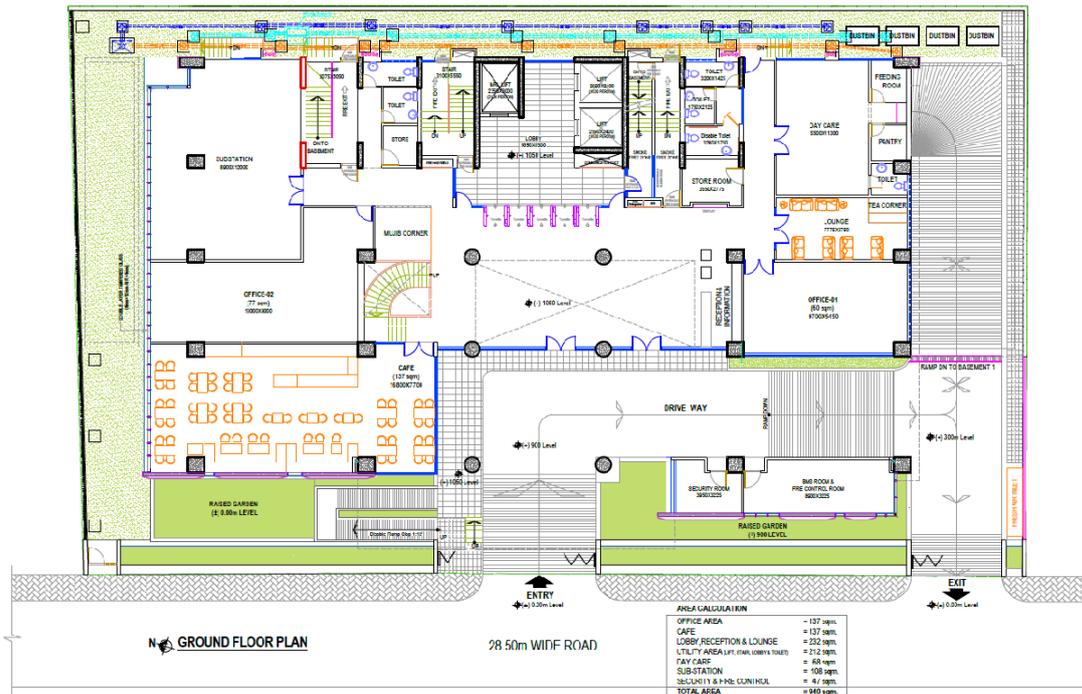


Figure 2 (2): General Layout of Garbage Room

- The garbage storage room will be in the ground floor in the south-east corner of the site (refer to Figure 1 above).
- The garbage room will include provision for at least 13 x 240 litre bins, amounting to around 3,120L for both recycling and general waste storage purpose.
- Waste collection will occur via the loading dock adjacent to the garbage room and will be by private waste removal contractor.
- Frequency of waste collection will be as determined necessary by waste contractor.

Identified Waste Streams:

The operational phase of the Sub-project will likely generate the following waste streams given the intended use/activities to be undertaken:

- plastic stretch wrapping and general plastic;
- cardboard and paper;
- printer cartridges and toners;
- general landfill waste;
- maintenance waste (e.g. cleaning chemicals); and
- e-waste and potentially hazardous wastes e.g. batteries, smoke detectors, fluorescent etc.
- Food waste

Recycling, Reuse and Disposal:

It is anticipated that the Stage 1 development can adopt the simple waste management processes consisting of the following:

- Under desk bins and paper recycling bins are provided in office administration areas and scrap paper collection and recycling.
- Secure paper destruction recycling bins are also provided within the office areas.
- Printer cartridges and toners will be collected in allocated bins for appropriate contractor disposal.

Food and Liquid Wastes

- Any food wastes will be stored in designated bins within the waste storage location. Any food wastes generated will be disposed of by a suitably qualified contractor to an appropriately licensed disposal facility.
- A suitably qualified contractor will dispose of any liquid wastes generated by tenants to an appropriately licensed disposal facility.
- No liquid wastes or wash down waters should be disposed of via the stormwater drainage system. Wastewater storage tanks (including stormwater collection tanks) should be carefully monitored to ensure overflow does not occur.

The waste storage areas will include a dedicated and enclosed centralized waste and recycling storage area. The construction of this waste rooms and equipment will comply with BNBC (Bangladesh National Building Code) requirements and WB ESSs standards.

Proposals for Waste minimization and Management:

- ❖ All commercial premises must have a dedicated waste and recycling storage room or area, which has adequate storage space to meet the needs of the land use activity
- ❖ All waste and recycling storage rooms and areas must be designed and constructed in accordance with the requirements
- ❖ The waste and recycling storage room or area must provide separate containers for the separation of recyclable materials from general waste. Standard and consistent signage on how to use the waste management facilities should be clearly displayed
- ❖ Space must be provided in each occupancy for the temporary storage of garbage and recyclables generated in that area.
- ❖ Hazardous and special waste is to be stored in accordance with relevant occupational, health, safety and environmental protection legislation and WB's ESSs.
- ❖ In multi-story developments, consideration must be given to the convenient transportation of waste and recycling from the various floors to the central storage area. Such transportation system may include a passenger or goods lifts, or a garbage chute system.
- ❖ Separate space must be allocated for the storage of liquid waste etc. The liquid waste storage areas must be undercover and bound to prevent the escape of spills or leaks.
- ❖ Space is to be provided for compactors and for any other equipment necessary to manage the waste and recycling likely to be generated on the premises. Sufficient space is also required for storage of the waste (such as cardboard boxes) prior to processing.
- ❖ Adequate access must be provided for the users, waste collection staff and collection vehicles. Where collection vehicles are required to drive into a property to collect waste and recycling:
 - The site must be designed to allow collection vehicles to enter and exit the property in a forward direction with minimal need for reversing and to be operated with adequate clearances; and
 - The driveway and any basement space needed are to be suitable for collection vehicles in terms of pavement strength, spatial design, access width, and height clearances

Liquid Wastes Storage

All maintenance and cleaning chemicals, oils and fuels including associated wastes should be stored separately in an appropriately bounded, well-ventilated area with a drain grease trap and allow sufficient space for handling and storage.

Waste Collection Methods:

Contractor Waste Collection

A contractor will be employed to collect and appropriately dispose of the majority of wastes generated by the proposal. Written evidence of a valid and current contract with a licensed waste collector is to be held at the premises.

Contracts with waste collection contractors will incorporate provisions for the collection, recycling and appropriate disposal of the potentially contaminated and hazardous waste types. Liquid wastes will only be collected by licensed waste contractors and authorized government departments. The private contractor's fleet will determine size of refuse collection trucks; and collection frequency determined by the amount of waste generated.

Waste Bin Types

The amount and type of bins used by the Sub-project will depend on the Waste Management System chosen for the Sub-project. All waste and recycling must be stored in respective bins or skips, with lids closed to reduce littering, stormwater pollution, odor and vermin communicated to cleaners and housekeeping staff (and form part of any contractual conditions) to outline the cleaner's waste minimization responsibilities.

Additional Waste Minimization Strategies:

It is recommended that waste storage areas are provided within the Vision 2041 Smart Tower at each level and that waste is to be removed on a daily basis to the main garbage room located at the ground floor level.

ANNEX 3: OCCUPATIONAL HEALTH AND SAFETY GUIDANCE

Purpose and Scope

The Environment and Social Management Plan (ESMP) is the overall framework which shall be implemented in order to avoid or minimize Environmental and Social impacts during the construction works of Vision 2041 Smart Tower, Dhaka, Bangladesh. The ESMP presents the framework for implementing the management and monitoring requirements for the sub-project.

Definitions

The Vision 2041 Smart Tower sub-project itself along with its associated facilities or minimize impacts on the environment wherever practicable. Vision 2041 Smart Tower would ensure implementation of mitigation measures to reduce negative Environmental and Social impacts on Health, Environment, and Safety, and would ensure the protection of health and safety of not only its operating personnel but also for that of the developer and its 3rd party service contractors as well as members of the neighboring public. A well-designed Operation Management System (OMS) inbuilt in the organizational set-up of Vision 2041 Smart Tower has provided a consistent delivery mechanism to address potential adverse impacts, to enhance sub-project benefits and to introduce standards of good practice to be adopted for sub-project activities.

Roles and Responsibilities

The Contractor/Subcontractor shall abide by the rules of regulation of the occupational health and safety as stipulated in the Labor Act - 2006 and BNBC codes of Bangladesh. The Contractor shall also abide by the clauses of health and safety in the clauses of the General Conditions of Contract and the subsequent Special Conditions of Contract of the bidding documents.

Creating and Maintaining a Safe and Healthy Work Environment

The PMU shall comply concerning the site and the construction works that are contemplated:

- cause a preliminary hazard identification to be performed by a competent person before commencing any physical construction activity;
- evaluate the risks associated with such work constituting a hazard to the health and safety of such employees and the steps that need to be taken; and
- As far as is practicable, prevent the exposure of such employees to the hazards concerned or, where prevention is not reasonably practicable, and minimize such exposure.
- The client shall ensure that:
- all practicable steps are taken to prevent the uncontrolled collapse of any new or existing structure or any part thereof, which may become unstable or is in a temporary state of weakness or instability due to the carrying out of construction work; and
- no structure or part of a structure is loaded in a manner which would render it unsafe.
- The client shall carry out regular inspections and audits to ensure that the works are being performed by the requirements of this specification.

Risk Assessment (RA)

In the process of the risk assessment, technical evaluation of facilities, construction, and operations are conducted to identify hazards and risks, establish qualitative/quantitative risk levels, and provide recommendations for cost-effective engineering and administrative controls to reduce risk and loss. The focus is primarily on the application of engineering techniques during the administrative building and facility design phase on recognized codes, standards practices, and operational and administrative controls needed to reduce materials hazards and risk. All required codes, standards and practices should apply to the design and construction of new facilities. A review must be

conducted when expansion or change occurs to an existing facility, equipment, construction technology, operating procedure or software program, which could result in exceeding the current design limits and/or increasing the risks associated with the building construction system in the area beyond acceptable levels. Hazards and risks are identified and evaluated through the following steps: A team of experienced operating and safety personnel will be involved in determining potential risks

- Identify major hazard scenarios
- Analyze their consequences (severity)
- Determine the probability of occurrence (likelihood)

The overall approach of risk assessment is summarized below in Figure 1 & 2.

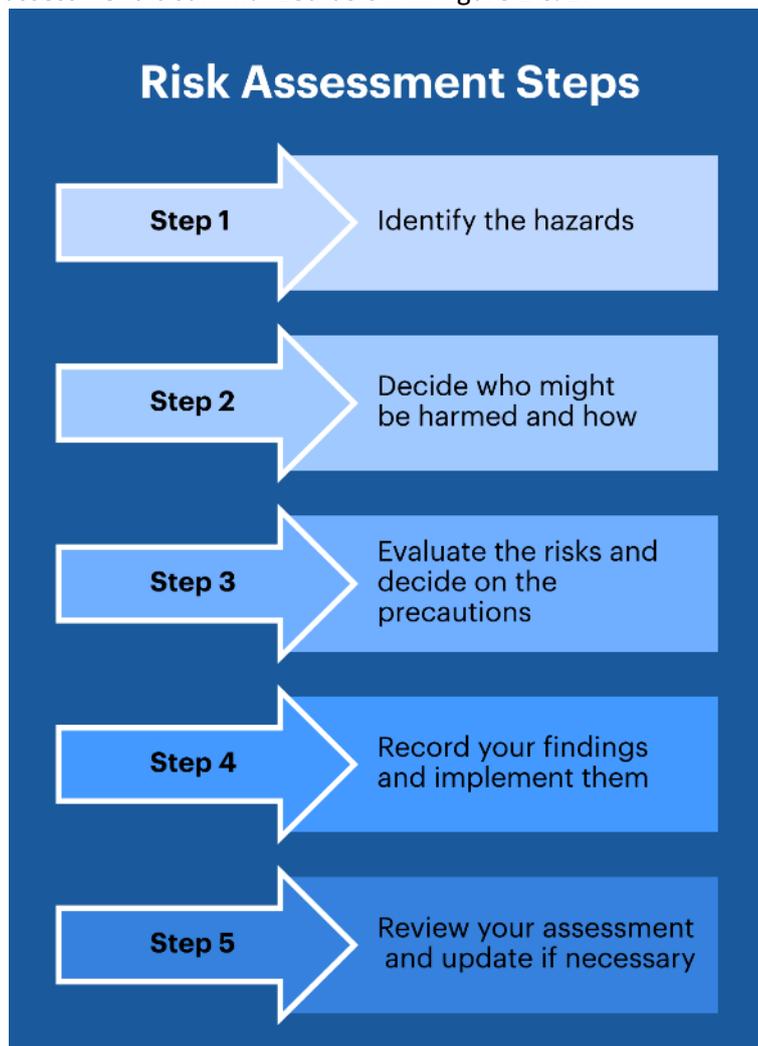
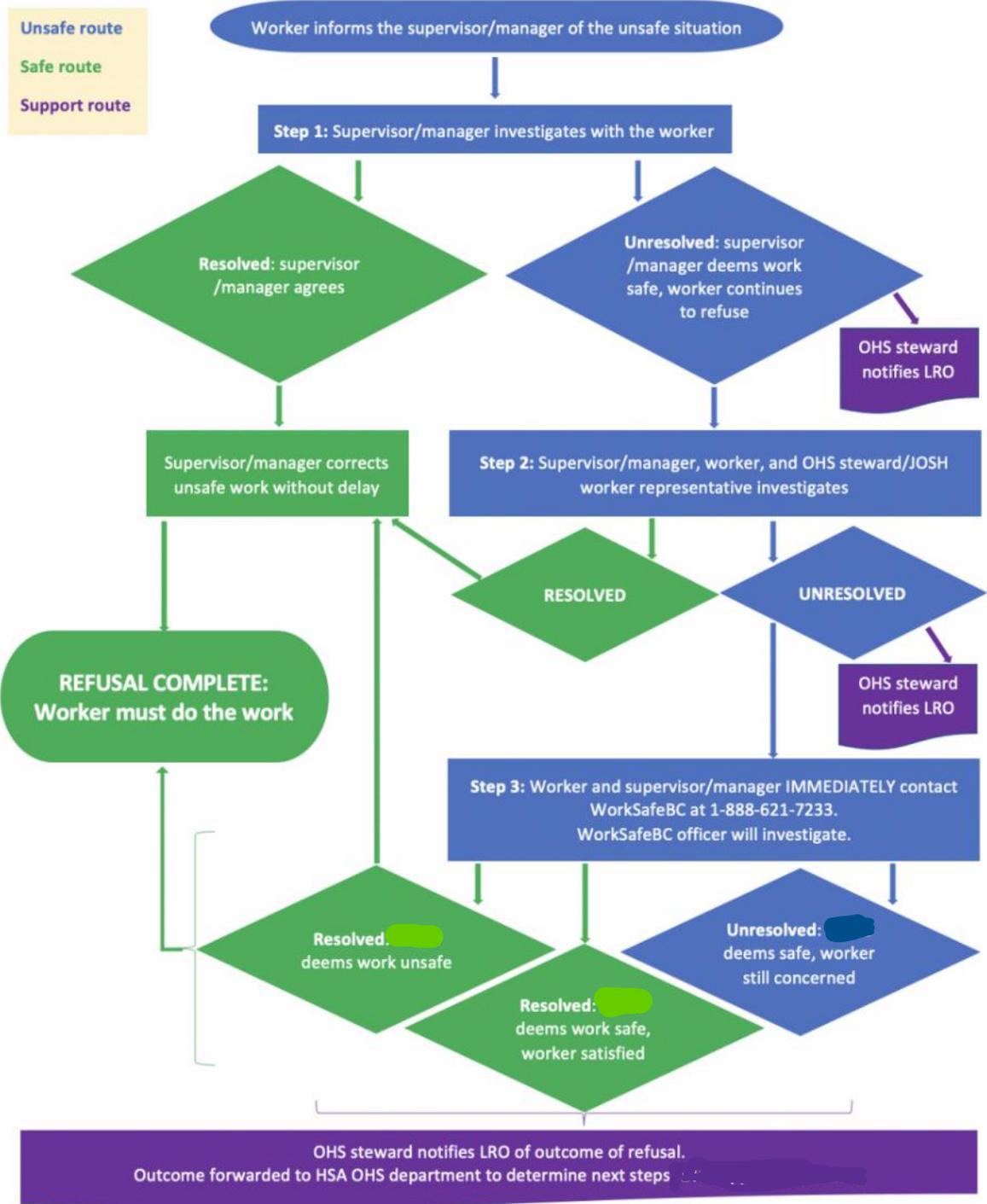


Figure 3(1): Risk assessment (RA) steps

What to do if you have reasonable cause to believe that performing a work process or operating equipment creates an OHS hazard for you or someone else:



Training

A basic occupational health and safety training program and specialty courses should be provided, as needed, to ensure that workers are oriented to the specific hazards of individual work assignments. Training should generally be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards.

Initial safety training is required to inform the employees about the risk of the sub-project. The orientation shall include the following:

- Specific job hazards
- Safety precautions
- Job responsibilities
- Regulatory requirements
- Company policy
- Worker's right to be informed about and to refuse unsafe work

Reporting Accidental Events Immediate reporting to the OMS is essential to take actions against accidents. So, a standard easy reporting procedure should be followed as per Vision 2041 Smart Tower's rule.

Reporting Procedure (Vision 2041 Smart Tower)

Routine monitoring on the environmental performance of the sub-project will be reported by the sub-project authority of Vision 2041 Smart Tower, and a copy of the report will be made available to the funding agencies.

Reporting Procedure (HES)

Routine monitoring on the environmental performance of the sub-project will be reported by the Health Environment and Safety Department, and a copy of the same will be made available to the DoE.

Documentation and Record Keeping

The Risk Assessment (RA) study reveals that occurs heavy rainfall within the premises of the proposed sub-project site for the most probable scenarios. In addition, the overall safety record of after rain needs to be recognized while movement problem has been reported in a recent year. This reported record of casualty due to waterlogging keep in mind for strictly follow the safe procedure before the sub-project is commissioned and operations can commence.

Communication and Information Dissemination

The Risk Assessment (RA) aims to provide a systematic analysis of the major risks that may arise as a result of the operation of the proposed sub-project. The RA process outlines rational evaluations of the identified risks based on their significance and provides the outline for appropriate preventive and risk mitigation measures. The output from the risk assessment will contribute towards strengthening of the Emergency Response Disaster Management Plan (ERDMP) to prevent damage to personnel, infrastructure, and receptors near the sub-project. As in practice, the following issues stand out to be of significance for taking into consideration in averting any risk and hazard during different phases of construction and operation of the sub-project.

- Identify potential risk scenarios that may arise due to rain water drainage problem.
- Review existing information and historical databases to arrive at the possible likelihood of such risk scenarios;

The employment of Geographic Information Systems (GIS) methods allows one to visualize the risk levels and to assign them to specific geographical areas. Furthermore, GIS facilitates the interpretation of data and the final results. The accumulated risk layers lead to interesting, sometimes surprising results because several minor events accumulated at the same geographical site might result in significant total risk.

As part of the mutual aid scheme, Vision 2041 Smart Tower will explore the possibility of sharing of information and resources with RAJUK in case of serious crisis. However, the decision of seeking external assistance will be taken by the duty manager on the advice of ERT.

Safe Work Practices

There are always Hazards everywhere in any workplace. But to work safely, hazards needed to be identified and mitigated properly. Safety is an integral part of Vision 2041 Smart Tower construction and operation. By fulfilling safety responsibilities, employees will share the benefits of a safe workplace. To determine compliance with safety and hazard issues while performing a task, the following will be followed:

- Employees are to be provided with safety equipment and safe working environment.
- Employees are to draw up and ensure the implementation of safe systems and procedures for work which poses an acute risk.
- Employees are to be provided with adequate personal protective and safety equipment (PPE).
- Arrange safety training for concerned employees on safe work procedures and refresher training;
- Employees entrusted by these tasks participate in the development of safe work procedures;
- Employees are involved in the maintenance of safe work procedures;
- Review records to ensure that employees receive training on hazardous work procedures, codes and practices; and
- Where practical, observe employees performing critical tasks to ensure that they follow the operating procedures and general safety.

Accidents and near-miss incidents shall be investigated to determine what caused the problem and what action is required to prevent a recurrence. The purpose of impact mitigation and countermeasures are to avoid creating negative impacts wherever possible, to minimize impacts where they may be unavoidable and to generate opportunities for improvements or positive impacts where appropriate.

It should be assessed to determine what personal protective and safety equipment is needed and the equipment must be available. A maintenance schedule must be developed for PPE and employees must be trained in fitting, care, maintenance, and use of same.

General Working Conditions

To ensure healthy and safe working conditions, several steps should be taken as follows:

Housekeeping

- Work areas should be maintained in a neat and orderly condition;
- Scrap material, such as rags, bolts, and wedges should not be allowed to accumulate in the site area;
- Spills of oil, grease, paint and other slippery substances should be cleaned up immediately;
- Walkways should be kept clear of tripping hazards at all times;
- All personal protective equipment required for a procedure or production area must be properly fitted and worn;
- Maintain free access to all safety equipment including firefighting equipment, electrical panels, and boxes, etc.;
- Scaffolding and ladders; etc. must be secured;
- Proper barricades, safety rings, and safety wires should be used for openings, manholes, etc. Barricades must be properly lighted for visibility;
- Operating equipment, tools or machinery without proper guards and/or signaling devices is prohibited;
- Observe all warning signs in the yard; and
- Before leaving the job, always check the area for any sparks or smoldering materials.

Ventilation

- Adequate Local Ventilation (with filtration/mitigation arrangements where required) is to be arranged in connection with all types of works involving injurious or irritating gases/smoke/fumes, which may occur or may form while the work is going on; and
- Ventilation is to start up before work commences; a check is to be made by the EHS Manager;

First Aid

- All work areas must be provided with adequate first aid facilities with a trained first aider/doctor during working hours; and
- The contractor must provide or ensure that there is the provision of adequate and appropriate facilities for enabling first aid to be rendered to their employees if they are injured or become ill at work.

ANNEX 4: EMERGENCY PREPAREDNESS AND RESPONSE PLAN

An “*Emergency Preparedness and Response Procedure*” will be developed for emergency cases that consist of incidents such as accidents, explosions, fires, gas leakages, hazardous chemical and liquid waste spills, disease outbreaks and earthquake that occur unexpectedly due to equipment/infrastructure failures, employee errors, natural disasters (flooding, landslides, earthquakes, storms), sabotage and similar. Emergency cases are incidents that cause the activities to cease and also cause serious damages on environment, occupational health and assets. The following needs to be detailed in the procedure:

- Emergency Response Team (Title, Responsibilities and key features)
- Emergency Response Plans, Emergency Drills, Internal Trainings (The drill scenarios should be conducted for different emergency cases)
- Maintenance and Control of Emergency Response Equipment (Fire Emergency Equipment, Pollution Prevention Materials, First Aid Cabinet, Personal Protective Equipment, Warning and Guiding Signs etc.)
- Measures to be taken in case of Emergencies/Natural Disasters (Communication in case of Emergency, Liquid Chemicals/Hazardous Liquid Wastes Spills, Gas Leakage (O₂, Natural Gas, etc.) and Explosion, Flash/Fire, Earthquakes)

Having taken all the preventative measures, a Disaster Management Team (DMT) should be established which would be responsible for preparing a specific Disaster Management Plan for the sub-project. The team should meet at regular intervals to update the Disaster Management Plan based on accident data and any changes to support agencies. The team should also undertake trial runs to be fully prepared and to improve upon the communication links response time and other critical factors.

Identification of Emergencies

There are broadly 3 Categories to identify the emergencies which are likely to happen as narrated below:

- Level 1 Emergency is a MINOR EMERGENCY, which can be controlled entirely by personnel and facilities, located within the immediate vicinity of the accident/incident site. LEVEL-1 Emergencies are those which cause minor property or equipment damage that is non-disruptive to operations and do not pose a safety risk to personnel or property outside of the boundaries of Company property.
- Level 2 Emergency is a SERIOUS EMERGENCY, which is disruptive but not extensive and forces a portion of the Company operates to be temporarily suspended or shut down. Events or conditions which describe LEVEL 2 Emergencies are accidents/incidents that endanger the safety of personnel or the public outside of the boundaries of Company property, or have the potential to endanger the safety of personnel or the public outside of the boundaries of Company property, and would require the notification of external support services.
- Level 3 Emergency is a DISASTER EMERGENCY that forces the indefinite shut clown of Company operations or a sector of Company operations. Safe operating control has been lost, causing or having to cause; serious injuries or fatalities among employees, contractors or the public; extensive damage to company property or equipment; or serious harm to the environment.

Declaration of Emergencies

It is the responsibility of the emergency site commander to take situational decision to declare the emergency. This guideline is in addition to the Emergency Procedure Manual.

Emergency Equipment

Preparation of any OERP involving nearby communities and settlements will include training and awareness, alarms, procedures for evacuation, firefighting, emergency communication systems, first aid, etc. Procedures are to be established for a large emergency with district and state authorities, coast guard, etc. One Tugboat shall be fitted with anti-pollution equipment.

Infrastructure for Execution of Emergency Plan:

- a) *Fire Fighting Facilities:* The STP building will have adequate firefighting aids including fire hydrants close to the various sections of the power generation area and Portable Fire Extinguishers of various types and sizes need to be installed at conveniently reachable locations.
- b) *Disaster signaling Siren:* Siren to be used for raising the alarm and also for ALL CLEAR signal should be installed within the STP building premises.
- c) *First Aid Boxes* should be provided at specific locations including at the Assembly point for administering preliminary treatment. Some employees will be trained for first aid use.
- d) *Emergency Control Centre* should be at a central as well as the safe location in the STP building premises wherefrom the Site Controller could direct the movements of Personnel and Equipment during an Emergency.
- e) *Contents of Emergency Control Centre* should be as under:
 - External telephone line and a list of relevant telephone numbers to contact at times of emergency.
 - Internal telephone and telephone list of Emergency Assembly Points.
 - List of Emergency Control Team, who must be called showing addresses and telephone numbers.
 - Emergency Controller's Red & White Helmet.
 - A list of all persons (by title) responsible for groups of employees.
 - Logs and Emergency Controller's checklist.
 - Emergency lighting.
 - Copy of the emergency plan.
 - List of persons trained in First Aid & Fire Fighting.
 - List of safety cabinets and their contents & locations.
 - Battery operated torches.
 - Detailed site plan.
 - First aid equipment including stretchers (in surgery).

Coordination with External Agencies

The following external agencies may require to tackle the emergency.

1. Medical or hospital
2. Police department
3. Army

Emergency Response Team

As with the emergency preparedness plan Bangladesh law does not yet require Emergency Response Plans at the implementation of STP facilities. However, like all other Industries and installations facilities must have adequate measures against accidents or incidents to meet the emergency. The purpose of having an Emergency Response Plan (ERP) is to:

- Assist personnel in determining the appropriate response to emergencies.
- Provide personnel with established procedures and guidelines.
- Notify the appropriate Company Emergency Response Team personnel and regulatory/ Govt.

- agencies.
- Manage public and media relations.
- Notify the next-to-kin of accident victims.
- Minimize the effects that disruptive events can have on company operations by reducing recovery times and costs.
- Respond to immediate requirements to safeguard the subtending environment and community.

Response Procedures

Emergency Response Procedures will identify who does what and when in the event of an emergency. Responsibility for who is in charge and their coordination of emergency actions shall be identified. The following are important events that require emergency response procedures:

- Fire
- Accidents and Medical emergency
- Spills, leaks and other releases of hazardous substances
- Natural disasters (e.g., Earthquakes, floods, tornadoes, etc.)

Reporting and Documentation

Major disasters are often preceded by a string of minor incidents which are ignored, neglected or not fully understood. Therefore, a routine system should be enforced to ensure that all accidents are investigated and reported to the STP building supervisors in a specified format such as the following:

- Description of incident or episode;
- Immediate cause;
- Background on the factors that might have made the incident possible; • What form of energy release or toxic substance was involved?
- What was done to prevent an accident (who responded and how)
- What effect did it produce on the immediate and surrounding environment?
- What repercussions did the incident have (loss of life damage to equipment and buildings) and,
- Cost estimates of damage done and repairs needed.

Registers of all incidents should be kept and should be analyzed regularly (at least monthly) to identify trends or patterns in incident occurrence in particular cases this may prevent significant chronic incidents or single-event events that are the result of an accumulation of either physically hazardous materials or substances, or operational complacency.

ANNEX 5: DISASTER MANAGEMENT PLAN

Objectives

On-site Emergency Plan is required to meet the emergency condition during a disastrous event in the sub-project. Its objectives are to:

- Rescue and treat casualties
- Safeguard other people & Installations
- Minimize damage
- Control initially and restore ultimately to a normal situation
- Arrange rehabilitation of the affected people

Definitions

Accident - an unintended incident which results in injury to persons and/or damages to property, the environment, third party or which leads to production loss.

Contractors - persons working for external companies (or employed by an employment agency) that are under contract to carry out work for the sub-project.

Emergency - a serious, unexpected and often dangerous situation which poses an immediate threat to personals, processes, assets, environment, and communities and requiring immediate action.

Incident - a sudden accident or near miss.

Medical Treatment Case - injury at work (other than a lost-time injury and restricted work case) requiring treatment by a doctor, or nurse in consultation with a doctor, before the injured person's resumes normal work.

Natural Disasters - are types of disasters that cause material and physical damages and human losses. These include drought, water rise, earthquake, flood, storms, epidemics, and others.

Anthropogenic Disasters - disasters causing material and physical damage and destruction and human losses. These include explosions, plane crash, fire accidents due to human negligence and other human induced disasters.

Roles and Responsibilities

Potential impacts could originate from the developer/contractor's activities. Therefore, Vision 2041 Smart Tower shall ensure that Contractors take due responsibility to mitigate these negative impacts. Particularly Vision 2041 Smart Tower will ensure that the Contractor:

- Takes reasonable steps to protect the environment and avoid damage and nuisance arising from their activities and operations.
- Complies with statutes and regulations concerning the execution of work.
- Familiarizes with legislation and regulations relating to environmental protection that is relevant to their activities.
- Refers to national environmental quality guidelines.
- Be responsible for the costs of cleaning up any environmental pollution resulting from their activities, if methods for doing so are available and effective.
- Maintains sites under their control in a clean and tidy condition and shall provide appropriate and adequate facilities for the temporary storage of wastes before disposal.

- Shall not allow used oil or other petroleum wastes to be used as dust suppressants and reasonable precautions shall be taken to control and prevent accidental blow off of gas and/or spillage of petroleum products or discharge into atmosphere or watercourses.
- Be responsible for the provision of adequate sanitary facilities for the construction workforce (including those employed under sub-contracts) at construction and campsites. Vehicles operated by the Contractor (including sub-contractors) shall be maintained according to the original manufacturer's specifications and manuals with particular regard to the control of noise and/or smoke emissions.
- Takes reasonable measures to minimize dust-blow arising from sites under their control by regular watering of soil stockpiles, bare soil, haul roads, non-surfaced traffic areas and sources of fugitive dust, when conditions require dust suppression.
- Be responsible for paying compensation upon the appropriate monetary evaluation applicable to the local market if any damage is incurred to agricultural land or surrounding homesteads outside of the requisitioned land.
- Precautionary signboards/ danger signals/ propitiatory billboards shall be placed in appropriate places to notify people about the possible dangers particularly in the eve of nondestructive testing inspections involving radiations.
- No pollution materials will be discharged to surface water without treatment
- Removes equipment, surplus material, rubbish, and temporary works and leave the sites in a clean condition to the satisfaction of the company's representatives after completion of construction activities.

Emergency Procedure

Designated persons will carry out the actions detailed in the Individual STP building Emergency Procedure. Their presence at the Emergency Assembly Point should be verified and ascertained through roll-calls. Personnel not at their normal workplace must also move to the emergency assembly point and await necessary safety instructions.

Contractor's employees should also be instructed of the Emergency Procedures before commencing work on this site. They will report to the emergency assembly point on this site. Personnel Manager will guide them in case a major decision like evacuation from the factory is taken.

Evacuation Procedure

This section outlines the procedure for the management of emergencies and evacuation plans during the operations phase. The main objective of the Emergency Response Plan (ERP) is to ensure that activities are carried out to the following priorities:

- Safeguard lives;
- Protect the environment;
- Respond to emergencies using an effective communication network and organized procedures;
- Protect the company or Third-Party assets
- Maintain the company image/reputation
- Resume normal activities

Personnel involved in dealing with emergencies shall follow these priorities while making decisions and developing strategies.

Contractor's employees should also be instructed of the Emergency Procedures before commencing work on this site. They will report to the emergency assembly point on this site. Personnel Manager will guide them in case a major decision like evacuation from the factory is taken. High Disaster Catastrophic condition. All employees need to be evacuated. Local administration is to be properly informed and interacted with. These will be pursued upon verification of or environmental acceptability.

Verification and Monitoring

Verification of the emergency and based on prepare the monitoring plan.

Training

Before the commencement of any construction activity, all personnel shall be provided with chemical management training to ensure the safe and proper handling of hazardous chemicals and to reduce the potential for accidents.

Training is an integral part of a preventive strategy. Environmental and disaster management training will be required to ensure proper implementation of effective environmental management and monitoring plan; and disaster management plan. However, training could be organized by ESMU involving relevant staff. As a trainer, competent Consultant can be outsourced. Important training under the spectrum of ESMU needs to include:

- Training on firefighting;
- Mock drills by the firefighting cells/ groups (twice a year)
- Training on environmental regulations and standards;
- Staff training on environmental monitoring;
- Training on environmental health and safety measure

ANNEX6: STANDARD OPERATING PROCEDURES

These procedures are simple steps that must be included in everyday work activities and are a joint responsibility of everyone in the work place conducting maintenance on buildings.

Table 1: SOPs to be Considered

Do	Do not
Remove trash and debris around building and grounds daily or as needed.	DO NOT let trash and waste accumulate in or around the building.
Place temporary inlet protection at stormwater inlets to catch contaminants and wash water from maintenance activities.	DO NOT transfer, pour, or dispose of maintenance materials outdoors in parking lots, near or in storm drains, drainage ditches, on the ground, or any other location where they can runoff into the storm drainage system.
Have spill cleanup materials available and ready to go during painting activities or any activity that has chemicals standing by for use.	DO NOT let maintenance wash water, chemicals, paint, or any other maintenance residue enter the storm drain system.
Clean up paint or other spills promptly, with DRY methods if possible.	DO NOT handle containers alone if awkward or require over-exertion on your part. Get help and spread the weight load.
Supervision and maintenance of STP on a regular basis.	DO NOT let unattended for a long time without maintenance and operation of STP.
Keep maintenance equipment clean; do not allow a buildup of wastes.	
Maintain a record of contractor work and if any spills/problems occurred.	

ANNEX7: SAMPLE 'GRIEVANCE FORM' AND GRIEVANCE MECHANISM OF PRIDE SUB-PROJECT

Grievance Form: Bangladesh High-Tech Park Authority			
Grievance reference number (to be completed by Sub-project):			
Contact details (may be submitted anonymously)	Name (s):		
	Address:		
	Telephone:		
	Email:		
How would you prefer to be contacted (check one)	By mail/post: <input type="checkbox"/>	By phone: <input type="checkbox"/>	By email <input type="checkbox"/>
Preferred language	<input type="checkbox"/> Bangla <input type="checkbox"/> English		
Provide details of your grievance. Please describe the problem, who it happened to, when and where it happened, how many times, etc. Describe in as much detail as possible.			

What is your suggested resolution for the grievance, if you have one? Is there something you would like BHTPA or another party/person to do to solve the problem?			
How have you submitted this form to the sub-project?	Website <input type="checkbox"/>	Email <input type="checkbox"/>	By hand <input type="checkbox"/>
	In person <input type="checkbox"/>	By telephone <input type="checkbox"/>	Other (specify) <input type="checkbox"/>
Who filled out this form (if not the person named above)?	Name and contact details:		
Signature			
Name of BHTPA official assigned responsibility			
Resolved or referred to GRC1?	<input type="checkbox"/> Resolved	<input type="checkbox"/> Referred	If referred, date:
Resolved referred to GRC2?	<input type="checkbox"/> Resolved	<input type="checkbox"/> Referred	If referred, date:
Completion			
Final resolution (briefly describe)			
	Short description	Accepted? (Y/N)	Acknowledgement signature
1 st proposed solution			
2 nd proposed solution			
3 rd proposed solution			

**ANNEX 8: RESULTS OBTAINED FROM THE MEASUREMENT OF O₃EL, AND LAB TESTS
OF AIR AND WATER QUALITY PARAMETER**



GEM Consultants Limited

House: 57/A, Road: 4/A, Dhanmondi, Dhaka, Bangladesh

Memo No: GEM/AAQ/0404/07-22

Test Results of Ambient Air Quality Analysis

Project Name : Software Technology Park 2 (STP 2), Kawran Bazar, Dhaka
Description of Sample : Ambient Air Quality
Sampling Location : **AQ-1:** Kawran Bazar Circle (23.749898 N, 90.393310 E)
AQ-2: Vision 2021 IT Park (23.753945 N, 90.393103 E)
AQ-3: In front of La Vinci Hotel (Near Titas Bhaban)
(23.753951 N, 90.392289 E)

Sampling Date : 17th July 2022
Date of Analysis : 17-23 July 2022
Reporting Date : 24th July 2022
Environmental Cond. : Temperature: 36.6 °C; Relative Humidity: 60%; Weather
Condition: Cloudy

Description of Analysis:

Sample ID	Ambient Air Pollutants' Conc. in µg/m ³							CO (ppm)	CO ₂ (ppm)
	PM ₁₀	PM _{2.5}	NO ₂	SO ₂	O ₃	TSP	Pb		
AQ-1	56.69	15.1	62.05	209.07	24.25	84.14	0.18	1.81	428.8
AQ-2	34.25	17.8	22.96	93.19	18.81	63.42	0.1	0.72	413.3
AQ-3	36.9	22.05	32.11	101.83	12.47	65.62	0.13	0.66	457.1
Bangladesh Standards as per ECR, 1997 amended on 2005 (Schedule-2)*	150	65	100 Annual	365	157	200	-	9	-
WB Standard**	50	25	200 1 Hour	20	100	230	-	9	-

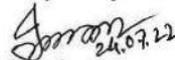
Note: Regular checkup and calibration of the equipment's to avoid any error.

*ECR, 1997 = Environmental Conservation Rules, 1997.

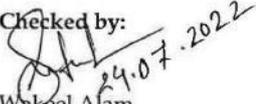
**WB = World Bank, IFC = International Finance Cooperation.

Legend: PM_{2.5}- Particulate Matter of a diameter of 2.5 micron or less, PM₁₀- Particulate Matter of a diameter of 10 micron or less, NO₂- Nitrogen Di-Oxide, SO₂- Sulphur Di-Oxide, CO- Carbon Monoxide, TSP- Total Suspended Particles, Pb- Lead, CO₂- Carbon Di-Oxide.

Analysed by:


Mostafa Al Imran
Environmental Specialist
GEM Consultants Limited

Checked by:


Wakeel Alam
Assistant Director
GEM Consultants Limited



GEM Consultants Limited

House: 57/A, Road: 4/A, Dhanmondi, Dhaka, Bangladesh

Memo No: GEM/NL/0403/07-22

Test Results of Noise Level Analysis

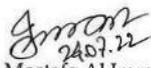
Project Name : Software Technology Park 2 (STP 2), Kawran Bazar, Dhaka
Description of Sample : Sample was collected from the project area
Sample Collection Date : 17th July 2022
Date of Analysis : 17-23th July 2022
Reporting Date : 24th July 2022

Test Results:

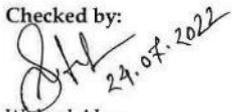
SI No	Sample ID	Sampling Location	Conc. Present (dB)			BD Standard (Day time)	Category
			Leq	L _{max}	L _{min}		
1	NL-1	Kawran Bazar Circle GPS: 23.749898 N, 90.393310 E	76.31	83.70	64.80	70	Commercial Area
2	NL-2	Vision 2021 IT Park GPS: 23.753945 N, 90.393103 E	65.34	77.70	49.60	60	Mixed Area
3	NL-3	In front of La Vinci Hotel (Near Titas Bhaban) GPS: 23.753951 N, 90.392289 E	66.41	77.0	53.90	70	Commercial Area

*BD Standard= Bangladesh Standard (ECR, 1997 = Environmental Conservation Rules, 1997).

Analysed by:


24.07.22
Mostafa Al Imran
Environmental Specialist
GEM Consultants Limited

Checked by:


24.07.2022
Wakeel Alam
Assistant Director
GEM Consultants Limited

ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 Certified Company
ENGINEERING CONSULTANTS, ENVIRONMENTAL MONITORING
Cell: +8801712293231, Email: info@gem.com.bd

	Government of the People's Republic of Bangladesh Office of the Chief Chemist Department of Public Health Engineering Central Lab, 38-39, Mohakhali C/A, Dhaka-1212 Phone: 88-02-9881927, Fax: 88-02-9882003, Email: wqmsc_central_lab@yahoo.com	
---	--	---

Lab Memo: 73/ CC, DPHE, CL, Dhaka

Date: 02-08-2022

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2022070280	Sample Receiving date: 17-07-2022
Ref. Memo No: 01.003.0455 & Dated: 17-07-2022	Sample Source: Surface Water
Sent by: Engr. S. M. Tarikuzzaman, Director, Edifice Consultancy Ltd., Dhaka.	Dist: Dhaka, Upa:
Care Taker: Edifice Consultancy Ltd. (Sample ID : SW1)	Union:, Vill.: Software Technology Park STP-1
Sample Collection date:	Date of Testing: 17/07/2022-31/07/2022

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Biochemical Oxygen Demand (BOD)	0.2	50	mg/L	5 days Incubation	0.1
2	Chemical Oxygen Demand (COD)	4.0	220	mg/L	CRM	-
3	Coliform (Faecal)	0	200	N/100ml	MFM	-
4	Coliform (Total)	0	448	N/100ml	MFM	-
5	Dissolved Oxygen (DO)	6.0	1.46	mg/L	Multimeter	-
6	pH	6.5-8.5	6.5	-	pH Meter	-
7	Total Dissolved Solid (TDS)	1000	345	mg/L	Multimeter	-
8	Total Suspended Solid (TSS)	10	20	mg/L	Gravimetric Method	-
9	Turbidity	10	70	NTU	Turbidity Meter	-

Comments: Sample was collected & supplied by client.

N.B: MFM- Membrane Filtration Method, CRM-Closed Reflex Methods, LOQ- Limit of Quantitation.

<p>Test Performed by:</p> <p>1.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer</p> <p>2.) Name: Taslima Akhter Designation: Sample Analyzer</p>	<p>Countersigned/Approved by:</p> <p>1.) Name: Mita Sarker Designation: Senior Chemist</p> <p>2.) Name: Md. Biplab Hossain Designation: Chief Chemist</p>
<p>Signature</p> <p><i>(Signature)</i> 02.08.2022</p> <p><i>(Signature)</i> 02.08.2022</p>	<p>Signature</p> <p><i>(Signature)</i> 02.08.2022</p> <p>Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka</p>

	Government of the People's Republic of Bangladesh Office of the Chief Chemist Department of Public Health Engineering Central Lab, 38-39, Mohakhali C/A, Dhaka-1212 Phone: 88-02-9881927, Fax: 88-02-9882003, Email: wqmsc_central_lab@yahoo.com	
---	--	---

Lab Memo: 73/ CC, DPHE, CL, Dhaka

Date: 02-08-2022

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2022070281	Sample Receiving date: 17-07-2022
Ref. Memo No: 01.003.0455 & Dated: 17-07-2022	Sample Source: Surface Water
Sent by: Engr. S. M. Tarikuzzaman, Director, Edifice Consultancy Ltd., Dhaka.	Dist: Dhaka, Upa:
Care Taker: Edifice Consultancy Ltd. (Sample ID : SW2)	Union:, Vill.: City Corp. Market, Karwan Bazar
Sample Collection date:	Date of Testing: 17/07/2022-31/07/2022

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Biochemical Oxygen Demand (BOD)	0.2	9	mg/L	5 days Incubation	0.1
2	Chemical Oxygen Demand (COD)	4.0	36	mg/L	CRM	-
3	Coliform (Faecal)	0	112	N/100ml	MFM	-
4	Coliform (Total)	0	248	N/100ml	MFM	-
5	Dissolved Oxygen (DO)	6.0	3.20	mg/L	Multimeter	-
6	pH	6.5-8.5	6.8	-	pH Meter	-
7	Total Dissolved Solid (TDS)	1000	240	mg/L	Multimeter	-
8	Total Suspended Solid (TSS)	10	8	mg/L	Gravimetric Method	-
9	Turbidity	10	40	NTU	Turbidity Meter	-

Comments: Sample was collected & supplied by client.

N.B: MFM- Membrane Filtration Method, CRM-Closed Reflex Methods, LOQ- Limit of Quantitation.

<p>Test Performed by:</p> <p>1.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer <i>Signature</i> 02.08.2022</p> <p>2.) Name: Taslima Akhter Designation: Sample Analyzer <i>Signature</i> 02.08.2022</p>	<p>Countersigned/Approved by:</p> <p>1.) Name: Mita Sarker Designation: Senior Chemist <i>Signature</i></p> <p>2.) Name: Md. Biplab Hossain Designation: Chief Chemist <i>Signature</i> 02.08.2022 Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka</p>
--	---

	Government of the People's Republic of Bangladesh Office of the Chief Chemist Department of Public Health Engineering Central Lab, 38-39, Mohakhali C/A, Dhaka-1212 Phone: 88-02-9881927, Fax: 88-02-9882003, Email: wqmsc_central_lab@yahoo.com	
---	--	---

Lab Memo: 73/ CC, DPHE, CL, Dhaka

Date: 02-08-2022

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2022070282	Sample Receiving date: 17-07-2022
Ref. Memo No: 01.003.0455 & Dated: 17-07-2022	Sample Source: Surface Water
Sent by: Engr. S. M. Tarikuzzaman, Director, Edifice Consultancy Ltd., Dhaka.	Dist: Dhaka, Upa:
Care Taker: Edifice Consultancy Ltd. (Sample ID : SW3)	Union:, Vill.: Hatirheel, Karwan Bazar area
Sample Collection date:	Date of Testing: 17/07/2022-31/07/2022

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Biochemical Oxygen Demand (BOD)	0.2	1	mg/L	5 days Incubation	0.1
2	Chemical Oxygen Demand (COD)	4.0	4	mg/L	CRM	-
3	Coliform (Faecal)	0	390	N/100ml	MFM	-
4	Coliform (Total)	0	788	N/100ml	MFM	-
5	Dissolved Oxygen (DO)	6.0	6.50	mg/L	Multimeter	-
6	pH	6.5-8.5	6.7	-	pH Meter	-
7	Total Dissolved Solid (TDS)	1000	260	mg/L	Multimeter	-
8	Total Suspended Solid (TSS)	10	17	mg/L	Gravimetric Method	-
9	Turbidity	10	90	NTU	Turbidity Meter	-

Comments: Sample was collected & supplied by client.

N.B: MFM- Membrane Filtration Method, CRM-Closed Reflex Methods, LOQ- Limit of Quantitation.

<p>Test Performed by:</p> <p>1.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer</p> <p>2.) Name: Taslima Akhter Designation: Sample Analyzer</p>	<p style="text-align: center;"><u>Signature</u></p> <p style="text-align: center;"><i>Alam</i> 02.08.2022</p> <p style="text-align: center;"><i>Taslima</i> 02.08.2022</p>	<p>Countersigned/Approved by:</p> <p>1.) Name: Mita Sarker Designation: Senior Chemist</p> <p>2.) Name: Md. Biplab Hossain Designation: Chief Chemist</p>	<p style="text-align: center;"><u>Signature</u></p> <p style="text-align: center;"><i>Mita Sarker</i> 02.08.2022</p> <p style="text-align: center;">Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka</p>
--	--	--	---

	Government of the People's Republic of Bangladesh Office of the Chief Chemist Department of Public Health Engineering Central Lab, 38-39, Mohakhali C/A, Dhaka-1212 Phone: 88-02-9881927, Fax: 88-02-9882003, Email: wqmsc_central_lab@yahoo.com	
---	--	---

Lab Memo: 73/ CC, DPHE, CL, Dhaka

Date: 02-08-2022

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2022070283	Sample Receiving date: 17-07-2022
Ref. Memo No: 01.003.0455 & Dated: 17-07-2022	Sample Source: Ground Water
Sent by: Engr. S. M. Tarikuzzaman ,Director , Edifice Consultancy Ltd., Dhaka.	Dist: Dhaka, Upa:
Care Taker: Edifice Consultancy Ltd. (Sample ID : GW1)	Union:, Vill.: Software Technology Park STP-1
Sample Collection date:	Date of Testing: 17/07/2022-31/07/2022

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Alkalinity	-	20	mg/L	Titrimetic	-
2	Arsenic (As)	0.05	0.001	mg/L	AAS	0.001
3	Chlorine (Residual)	0.2	0.13	mg/L	UVS	0.001
4	Coliform (Faecal)	0	0	N/100ml	MFM	-
5	Coliform (Total)	0	0	N/100ml	MFM	-
6	Iron (Fe)	0.3-1	0.10	mg/L	AAS	0.05
7	Lead (Pb)	0.05	0.004	mg/L	AAS	0.001
8	Manganese (Mn)	0.1	0.03	mg/L	AAS	0.03
9	pH	6.5-8.5	6.9	-	pH Meter	-
10	Salinity	-	0.21	‰	Multimeter	-
11	Turbidity	10	2	NTU	Turbidity Meter	-

Comments: Sample was collected & supplied by client.

N.B: MFM- Membrane Filtration Method, CRM-Closed Reflex Methods, LOQ- Limit of Quantitation.

<p><u>Test Performed by:</u></p> <p style="text-align: right;">Signature</p> <p>1.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer <i>Saiful Alam</i> 02.08.2022</p> <p>2.) Name: Taslima Akhter Designation: Sample Analyzer <i>Taslima Akhter</i> 02.08.2022</p>	<p><u>Countersigned/Approved by:</u></p> <p style="text-align: right;">Signature</p> <p>1.) Name: Mita Sarker Designation: Senior Chemist <i>Mita Sarker</i> 02.08.2022</p> <p>2.) Name: Md. Biplab Hossain Designation: Chief Chemist <i>Md. Biplab Hossain</i> 02.08.2022 Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka</p>
---	--



Government of the People's Republic of Bangladesh
Office of the Chief Chemist
Department of Public Health Engineering
Central Lab, 38-39, Mohakhali C/A, Dhaka-1212
Phone: 88-02-9881927, Fax: 88-02-9882003, Email: wqmsc.central_lab@yahoo.com



Lab Memo: 73/ CC, DPHE, CL, Dhaka

Date: 02-08-2022

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2022070284	Sample Receiving date: 17-07-2022
Ref. Memo No: 01.003.0455 & Dated: 17-07-2022	Sample Source: Ground Water
Sent by: Engr. S. M. Tarikuzzaman, Director, Edifice Consultancy Ltd., Dhaka.	Dist: Dhaka, Upa:
Care Taker: Edifice Consultancy Ltd. (Sample ID : GW2)	Union:, Vill.: City Corp. Market, Karwan Bazar
Sample Collection date:	Date of Testing: 17/07/2022-31/07/2022

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Alkalinity	-	15	mg/L	Titrimetic	-
2	Arsenic (As)	0.05	0.001	mg/L	AAS	0.001
3	Chlorine (Residual)	0.2	0.11	mg/L	UVS	0.001
4	Coliform (Faecal)	0	0	N/100ml	MFM	-
5	Coliform (Total)	0	0	N/100ml	MFM	-
6	Iron (Fe)	0.3-1	0.09	mg/L	AAS	0.05
7	Lead (Pb)	0.05	0.001	mg/L	AAS	0.001
8	Manganese (Mn)	0.1	0.03	mg/L	AAS	0.03
9	pH	6.5-8.5	7.1	-	pH Meter	-
10	Salinity	-	0.08	‰	Multimeter	-
11	Turbidity	10	1	NTU	Turbidity Meter	-

Comments: Sample was collected & supplied by client.

N.B: AAS- Atomic Absorption Spectrophotometer, UVS- UV-Visible Spectrophotometer, MFM- Membrane Filtration Method, LOQ- Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	 02.08.2022	1.) Name: Mita Sarker Designation: Senior Chemist	 02/08/2022
2.) Name: Taslima Akhter Designation: Sample Analyzer	 02.08.2022	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	 02/08/2022 Md. Biplab Hossain Chief Chemist

Department of Public Health Engineering
Central Laboratory Mohakhali, Dhaka

	Government of the People's Republic of Bangladesh Office of the Chief Chemist Department of Public Health Engineering Central Lab, 38-39, Mohakhali C/A, Dhaka-1212 Phone: 88-02-9881927, Fax: 88-02-9882003, Email: wqmsc_central_lab@yahoo.com	
---	--	---

Lab Memo: 73/ CC, DPHE, CL, Dhaka

Date: 02-08-2022

Physical /Chemical/ Bacteriological Analysis of Water Sample

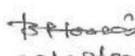
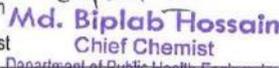
Sample ID: CEN2022070285	Sample Receiving date: 17-07-2022
Ref. Memo No: 01.003.0455 & Dated: 17-07-2022	Sample Source: Ground Water
Sent by: Engr. S. M. Tarikuzzaman, Director, Edifice Consultancy Ltd., Dhaka.	Dist: Dhaka, Upa:
Care Taker: Edifice Consultancy Ltd. (Sample ID : GW3)	Union:, Vill.: WASA Bhaban, Karwan Bazar
Sample Collection date:	Date of Testing: 17/07/2022-31/07/2022

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Alkalinity	-	20	mg/L	Titrimetic	-
2	Arsenic (As)	0.05	0.001	mg/L	AAS	0.001
3	Chlorine (Residual)	0.2	0.10	mg/L	UVS	0.001
4	Coliform (Faecal)	0	0	N/100ml	MFM	-
5	Coliform (Total)	0	0	N/100ml	MFM	-
6	Iron (Fe)	0.3-1	0.08	mg/L	AAS	0.05
7	Lead (Pb)	0.05	0.001	mg/L	AAS	0.001
8	Manganese (Mn)	0.1	0.03	mg/L	AAS	0.03
9	pH	6.5-8.5	7.1	-	pH Meter	-
10	Salinity	-	0.08	‰	Multimeter	-
11	Turbidity	10	1.1	NTU	Turbidity Meter	-

Comments: Sample was collected & supplied by client.

N.B: AAS- Atomic Absorption Spectrophotometer, UVS- UV-Visible Spectrophotometer, MFM- Membrane Filtration Method, LOQ- Limit of Quantitation.

Test Performed by: 1.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer  02.08.2022 2.) Name: Taslima Akhter Designation: Sample Analyzer  02.08.2022	Countersigned/Approved by: 1.) Name: Mita Sarker Designation: Senior Chemist  02.08.2022 2.) Name: Md. Biplab Hossain Designation: Chief Chemist  Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka
---	---

ANNEX 9: TRAFFIC COUNTING RESULTS

Intersection No.: 01
 Direction: (From- Petro Banqla To- STP)

Location: Petro Center

Name of Road: Kacha Bazar Road

Date: 17-07-2022

Time:		Hour	MOTORIZED VEHICLE						NON-MOTORIZED VEHICLE			Total Traffic Per Hour		
			1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNG	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Covered Van	8. Auto Rickshaw	9. Rickshaw		10. Bicycle	11. Animal/ Push Cart
8:30 AM	8:45 AM	1:00 hr	16	17	0	11	35	0	7	0	31	7	18	871
8:45 AM	9:00 AM		58	25	0	29	53	0	6	0	45	21	14	
9:00 AM	9:15 AM		65	14	0	30	82	0	8	0	38	8	12	
9:15 AM	9:30 AM		67	13	0	29	50	0	11	1	60	4	6	
Traffic Per Hour			206	69	0	99	200	0	32	1	174	40	50	
9:30 AM	9:45 AM	2:00 hr	57	7	0	35	72	0	11	0	52	12	11	869
9:45 AM	10:00 AM		62	10	0	42	88	0	2	2	52	8	16	
10:00 AM	10:15 AM		33	6	0	23	49	0	3	1	49	8	9	
10:15 AM	10:30 AM		38	3	0	26	42	0	11	0	35	7	7	
Traffic Per Hour			190	26	0	126	231	0	27	3	188	35	43	
10:30 AM	10:45 AM	3:00 hr	47	6	0	22	38	0	9	0	39	3	12	640
10:45 AM	11:00 AM		31	12	0	29	37	0	0	0	39	3	8	
11:00 AM	11:15 AM		28	3	0	12	35	0	5	0	30	4	5	
11:15 AM	11:30 AM		42	5	0	33	42	0	6	0	42	7	6	
Traffic Per Hour			148	26	0	96	152	0	20	0	150	17	31	
11:30 AM	11:45 AM	4:00 hr	25	10	0	16	32	0	7	0	32	1	2	457
11:45 AM	12:00 PM		30	5	0	17	31	0	4	0	39	3	5	
12:00 PM	12:15 PM		26	9	0	15	28	0	5	0	23	8	1	
12:15 PM	12:30 PM		20	12	0	12	16	0	8	0	15	0	2	
Traffic Per Hour			101	36	0	60	105	0	24	0	109	12	10	
12:30 PM	12:45 PM	5:00 hr	22	10	0	15	18	0	3	0	23	2	2	459
12:45 PM	1:00 PM		40	3	0	25	25	0	5	0	17	1	1	
1:00 PM	1:15 PM		33	7	0	14	50	0	2	0	21	8	5	
1:15 PM	1:30 PM		30	6	0	16	27	0	6	0	18	0	4	
Traffic Per Hour			125	26	0	70	120	0	16	0	79	11	12	
1:30 PM	1:45 PM	6:00 hr	28	3	0	37	33	0	6	0	33	6	7	618
1:45 PM	2:00 PM		42	17	0	32	52	0	13	0	37	3	12	
2:00 PM	2:15 PM		22	3	0	22	33	0	3	0	24	0	6	
2:15 PM	2:30 PM		28	2	0	35	39	0	9	0	28	0	2	
Traffic Per Hour			121	25	0	126	157	0	31	0	122	9	27	
2:30 PM	2:45 PM	7:00 hr	20	2	0	23	35	0	1	0	31	3	3	492
2:45 PM	3:00 PM		32	5	0	22	36	0	6	0	21	6	3	
3:00 PM	3:15 PM		25	8	0	14	30	0	4	0	21	3	7	
3:15 PM	3:30 PM		22	9	0	21	49	0	4	0	21	2	3	
Traffic Per Hour			99	24	0	80	150	0	15	0	94	14	16	
3:30 PM	3:45 PM	8:00 hr	42	6	0	29	83	0	6	0	23	21	11	559
3:45 PM	4:00 PM		21	7	0	26	45	0	2	0	25	9	7	
4:00 PM	4:15 PM		23	11	0	19	37	0	5	0	22	14	3	
4:15 PM	4:30 PM		13	8	0	6	32	0	1	0	13	2	7	
Traffic Per Hour			99	32	0	80	177	0	14	0	83	46	28	
Total Traffic in 8 Hours=												4965		

Intersection No.: 01
 Direction: (From- STP To- Petro Bangla)

Location: Petro Center

Name of Road: Kacha Bazar Road

Date: 17-07-2022

Time:		Hour	MOTORIZED VEHICLE							NON-MOTORIZED VEHICLE			Total Traffic Per Hour	
			1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNG	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Covered Van	8. Auto Rickshaw	9. Rickshaw	10. Bicycle		11. Animal/ Push Cart
8:30 AM	8:45 AM	1:00 hr	10	5	3	25	9	0	2	0	33	3	10	458
8:45 AM	9:00 AM		10	4	1	32	26	0	4	0	26	4	17	
9:00 AM	9:15 AM		11	3	0	24	22	0	3	0	33	8	6	
9:15 AM	9:30 AM		12	4	0	27	19	1	3	0	42	5	9	
			43	16	4	108	78	1	12	0	134	20	42	
9:30 AM	9:45 AM	2:00 hr	5	8	1	29	14	0	2	0	35	5	6	445
9:45 AM	10:00 AM		13	5	0	25	26	0	3	0	33	4	9	
10:00 AM	10:15 AM		14	4	0	21	25	0	4	0	24	6	2	
10:15 AM	10:30 AM		8	9	0	34	25	0	4	1	29	10	3	
			40	26	1	109	92	0	13	1	121	25	20	
10:30 AM	10:45 AM	3:00 hr	13	5	0	22	18	2	5	0	37	5	8	463
10:45 AM	11:00 AM		9	8	0	23	22	0	5	0	26	5	4	
11:00 AM	11:15 AM		15	8	0	20	31	0	5	0	28	4	6	
11:15 AM	11:30 AM		8	5	0	27	40	0	6	0	31	4	9	
			45	24	0	92	112	2	21	0	122	18	27	
11:30 AM	11:45 AM	4:00 hr	18	5	0	27	34	0	9	0	28	9	3	482
11:45 AM	12:00 PM		18	8	0	34	24	0	1	0	34	7	2	
12:00 PM	12:15 PM		11	8	0	30	35	0	0	0	20	5	2	
12:15 PM	12:30 PM		14	6	0	25	22	0	3	0	20	3	3	
			59	23	0	116	115	0	13	0	102	24	10	
12:30 PM	12:45 PM	5:00 hr	20	5	0	31	25	0	3	0	19	7	3	464
12:45 PM	1:00 PM		15	3	0	26	36	0	1	0	18	5	4	
1:00 PM	1:15 PM		23	8	0	25	39	0	5	0	20	5	2	
1:15 PM	1:30 PM		21	13	0	30	27	0	3	0	14	5	1	
			79	29	0	112	129	0	12	0	71	22	10	
1:30 PM	1:45 PM	6:00 hr	23	9	0	34	43	1	12	0	30	6	2	568
1:45 PM	2:00 PM		37	11	0	32	36	0	7	0	17	3	4	
2:00 PM	2:15 PM		28	17	0	25	23	0	9	0	28	2	3	
2:15 PM	2:30 PM		17	7	0	30	32	0	11	0	22	1	6	
			105	44	0	121	134	1	39	0	97	12	15	
2:30 PM	2:45 PM	7:00 hr	16	13	0	36	30	1	14	0	23	7	4	540
2:45 PM	3:00 PM		24	11	0	31	36	0	7	0	22	7	5	
3:00 PM	3:15 PM		12	4	0	28	37	0	3	0	16	5	6	
3:15 PM	3:30 PM		19	6	1	34	35	0	5	0	26	5	7	
			71	34	1	131	140	1	29	0	87	24	22	
3:30 PM	3:45 PM	8:00 hr	20	10	0	16	31	1	1	0	20	2	2	490
3:45 PM	4:00 PM		12	6	0	30	30	0	4	0	20	4	3	
4:00 PM	4:15 PM		9	8	0	34	25	0	4	0	32	8	6	
4:15 PM	4:30 PM		16	10	0	39	41	0	11	0	30	3	2	
			57	34	0	119	127	1	20	0	102	17	13	
												Total Traffic in 8 Hours=	3893	

Intersection No.: 02

Location: In front of City Corporation

Name of Road: Kacha Bazar Road

Date: 17-07-2022

Direction: (From- Petro Banla To- STP)

Time:		Hour	MOTORIZED VEHICLE						NON-MOTORIZED VEHICLE			Total Traffic Per Hour		
			1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNG	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Covered Van	8. Auto Rickshaw	9. Rickshaw		10. Bicycle	11. Animal/ Push Cart
8:30 AM	8:45 AM	1:00 hr	20	11	0	15	40	0	9	1	37	7	19	671
8:45 AM	9:00 AM		22	5	0	10	28	1	2	0	19	5	7	
9:00 AM	9:15 AM		42	11	0	17	71	0	6	0	49	9	14	
9:15 AM	9:30 AM		47	7	0	25	42	0	5	1	50	7	10	
Traffic Per Hour			131	34	0	67	181	1	22	2	156	29	50	
9:30 AM	9:45 AM	2:00 hr	30	4	0	11	58	0	9	0	45	12	8	722
9:45 AM	10:00 AM		38	10	0	17	60	0	5	1	50	12	12	
10:00 AM	10:15 AM		31	4	0	22	44	0	5	1	43	17	17	
10:15 AM	10:30 AM		33	1	0	20	37	0	6	0	47	7	5	
Traffic Per Hour			132	19	0	70	199	0	25	2	186	48	42	
10:30 AM	10:45 AM	3:00 hr	33	6	0	16	28	0	9	0	59	11	14	668
10:45 AM	11:00 AM		25	10	0	18	42	0	6	25	63	9	7	
11:00 AM	11:15 AM		28	4	0	13	42	0	8	0	51	8	6	
11:15 AM	11:30 AM		35	1	0	15	31	0	6	0	27	6	6	
Traffic Per Hour			121	21	0	62	143	0	29	25	200	34	33	
11:30 AM	11:45 AM	4:00 hr	30	8	0	28	56	0	12	0	60	7	4	644
11:45 AM	12:00 PM		30	5	0	20	30	0	6	0	49	10	9	
12:00 PM	12:15 PM		30	3	0	12	33	0	6	0	36	4	1	
12:15 PM	12:30 PM		31	10	0	21	37	0	7	1	37	9	2	
Traffic Per Hour			121	26	0	81	156	0	31	1	182	30	16	
12:30 PM	12:45 PM	5:00 hr	35	5	0	15	31	0	7	0	32	10	5	546
12:45 PM	1:00 PM		38	1	0	19	35	0	9	0	28	3	3	
1:00 PM	1:15 PM		34	4	0	17	40	0	6	0	23	7	4	
1:15 PM	1:30 PM		34	9	0	13	42	0	6	0	25	0	6	
Traffic Per Hour			141	19	0	64	149	0	28	0	108	20	18	
1:30 PM	1:45 PM	6:00 hr	12	6	0	20	65	1	13	0	58	12	8	754
1:45 PM	2:00 PM		41	18	0	22	53	0	8	0	52	13	4	
2:00 PM	2:15 PM		38	9	0	27	51	1	8	0	40	0	6	
2:15 PM	2:30 PM		40	12	0	14	38	0	11	0	47	2	4	
Traffic Per Hour			131	45	0	83	207	2	40	0	197	27	22	
2:30 PM	2:45 PM	7:00 hr	28	3	0	16	34	0	7	20	38	8	9	574
2:45 PM	3:00 PM		34	3	0	22	30	0	10	13	38	7	4	
3:00 PM	3:15 PM		20	5	0	15	35	0	5	4	29	6	8	
3:15 PM	3:30 PM		24	5	0	17	36	0	4	0	22	8	7	
Traffic Per Hour			106	16	0	70	135	0	26	37	127	29	28	
3:30 PM	3:45 PM	8:00 hr	30	8	0	12	45	0	5	0	33	6	7	597
3:45 PM	4:00 PM		28	5	0	26	28	0	3	0	26	6	5	
4:00 PM	4:15 PM		28	6	0	24	47	0	5	0	40	2	5	
4:15 PM	4:30 PM		33	9	0	17	56	0	4	0	42	5	3	
Traffic Per Hour			117	28	0	79	176	0	17	0	141	19	20	
Total Traffic in 8 Hours=												5176		

Intersection No.: 02

Location: Bapex

Name of Road: Kacha Bazar Road

Date: 17-07-2022

Direction: (From- STP To- Petro Bangla)

Time:		Hour	MOTORIZED VEHICLE						NON-MOTORIZED VEHICLE				Total Traffic Per Hour	
			1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNG	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Covered Van	8. Auto Rickshaw	9. Rickshaw	10. Bicycle		11. Animal/ Push Cart
8:30 AM	8:45 AM	1:00 hr	2	1	0	12	12	0	0	0	23	2	11	455
8:45 AM	9:00 AM		8	11	3	18	26	0	2	0	30	3	19	
9:00 AM	9:15 AM		14	11	0	15	40	0	4	0	35	11	12	
9:15 AM	9:30 AM		10	3	1	23	35	1	0	0	42	8	7	
Traffic Per Hour			34	26	4	68	113	1	6	0	130	24	49	
9:30 AM	9:45 AM	2:00 hr	6	11	2	17	26	0	4	0	34	3	11	463
9:45 AM	10:00 AM		9	3	0	15	24	0	1	0	37	4	5	
10:00 AM	10:15 AM		13	9	0	27	29	0	4	0	40	8	8	
10:15 AM	10:30 AM		6	7	0	26	19	0	2	0	45	5	3	
Traffic Per Hour			34	30	2	65	98	0	11	0	156	20	27	
10:30 AM	10:45 AM	3:00 hr	16	5	0	22	19	0	8	0	55	2	9	454
10:45 AM	11:00 AM		13	7	0	30	31	0	12	0	37	1	2	
11:00 AM	11:15 AM		5	7	0	9	17	0	4	0	45	2	5	
11:15 AM	11:30 AM		9	7	0	14	27	0	5	0	23	6	0	
Traffic Per Hour			43	26	0	75	94	0	29	0	160	11	16	
11:30 AM	11:45 AM	4:00 hr	14	4	0	32	47	0	5	0	35	11	4	446
11:45 AM	12:00 PM		9	7	0	20	21	0	3	0	27	4	8	
12:00 PM	12:15 PM		8	6	0	18	35	0	7	0	23	7	3	
12:15 PM	12:30 PM		9	4	0	19	15	0	9	0	27	1	4	
Traffic Per Hour			40	21	0	89	118	0	24	0	112	23	19	
12:30 PM	12:45 PM	5:00 hr	9	2	0	8	22	0	1	0	20	7	2	343
12:45 PM	1:00 PM		16	3	0	17	18	0	6	0	24	1	1	
1:00 PM	1:15 PM		21	3	0	18	28	0	8	0	26	2	3	
1:15 PM	1:30 PM		14	6	0	13	18	0	3	0	17	1	5	
Traffic Per Hour			60	14	0	56	86	0	18	0	87	11	11	
1:30 PM	1:45 PM	6:00 hr	18	8	0	8	18	0	4	0	18	2	5	273
1:45 PM	2:00 PM		17	5	0	14	12	0	2	0	16	1	4	
2:00 PM	2:15 PM		8	3	0	13	17	0	0	0	12	7	1	
2:15 PM	2:30 PM		8	3	0	8	12	0	2	0	20	5	2	
Traffic Per Hour			51	19	0	43	59	0	8	0	66	15	12	
2:30 PM	2:45 PM	7:00 hr	18	7	0	23	37	1	9	0	39	8	8	423
2:45 PM	3:00 PM		12	3	0	16	22	0	2	0	18	5	4	
3:00 PM	3:15 PM		11	4	1	22	34	0	8	0	31	7	5	
3:15 PM	3:30 PM		7	5	0	16	17	0	1	0	18	2	6	
Traffic Per Hour			48	19	1	77	110	1	18	0	106	22	21	
3:30 PM	3:45 PM	8:00 hr	15	10	0	17	25	0	1	0	29	3	2	363
3:45 PM	4:00 PM		11	7	0	18	23	0	5	0	27	3	1	
4:00 PM	4:15 PM		8	8	0	23	24	0	4	0	24	4	5	
4:15 PM	4:30 PM		11	5	0	9	22	0	2	0	27	9	1	
Traffic Per Hour			45	30	0	67	94	0	12	0	107	19	9	
												Total Traffic in 8 Hours=	3240	

Intersection No.: 03
Direction: (From- Petro Banla To- STP)

Location: City Corporation

Name of Road: Kacha Bazar Road

Date: 17-07-2022

Time:		Hour	MOTORIZED VEHICLE							NON-MOTORIZED VEHICLE			Total Traffic Per Hour	
			1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNG	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Covered Van	8. Auto Rickshaw	9. Rickshaw	10. Bicycle		11. Animal/ Push Cart
8:30 AM	8:45 AM	1:00 hr	1	4	0	2	5	0	3	7	14	2	13	313
8:45 AM	9:00 AM		7	3	0	2	13	1	1	9	20	4	10	
9:00 AM	9:15 AM		6	5	0	8	20	1	1	12	23	3	8	
9:15 AM	9:30 AM		11	3	0	15	21	0	3	8	31	7	6	
Traffic Per Hour			25	15	0	27	59	2	8	36	68	16	37	
9:30 AM	9:45 AM	2:00 hr	18	5	0	9	28	0	4	13	21	6	10	415
9:45 AM	10:00 AM		17	5	0	8	29	0	2	15	30	2	8	
10:00 AM	10:15 AM		15	1	0	17	16	0	2	12	28	4	7	
10:15 AM	10:30 AM		13	2	0	11	18	0	3	12	22	0	2	
Traffic Per Hour			63	13	0	45	91	0	11	52	101	12	27	
10:30 AM	10:45 AM	3:00 hr	7	2	0	11	15	0	1	9	25	2	5	351
10:45 AM	11:00 AM		10	1	0	13	17	0	3	15	3	2	5	
11:00 AM	11:15 AM		12	2	0	30	28	0	2	15	20	2	11	
11:15 AM	11:30 AM		8	0	0	10	17	0	4	23	13	3	5	
Traffic Per Hour			37	5	0	64	77	0	10	62	61	9	26	
11:30 AM	11:45 AM	4:00 hr	7	1	0	12	16	0	3	7	12	1	3	433
11:45 AM	12:00 PM		10	3	0	9	11	1	3	14	11	1	4	
12:00 PM	12:15 PM		12	2	0	26	30	0	5	28	13	6	21	
12:15 PM	12:30 PM		18	5	0	27	30	0	0	43	32	4	2	
Traffic Per Hour			47	11	0	74	87	1	11	92	68	12	30	
12:30 PM	12:45 PM	5:00 hr	7	5	0	14	12	0	2	5	26	11	3	475
12:45 PM	1:00 PM		18	4	0	11	15	1	5	13	16	3	5	
1:00 PM	1:15 PM		6	4	0	22	37	0	2	27	38	4	4	
1:15 PM	1:30 PM		7	3	0	27	47	0	4	26	33	2	8	
Traffic Per Hour			38	16	0	74	111	1	13	71	113	20	20	
1:30 PM	1:45 PM	6:00 hr	10	3	0	22	31	0	3	26	37	7	4	520
1:45 PM	2:00 PM		12	2	0	15	22	1	2	22	12	3	7	
2:00 PM	2:15 PM		15	5	0	22	30	2	5	28	23	7	15	
2:15 PM	2:30 PM		23	2	0	13	25	1	7	38	0	7	11	
Traffic Per Hour			60	12	0	72	108	4	17	114	72	24	37	
2:30 PM	2:45 PM	7:00 hr	4	2	0	13	7	0	1	21	13	5	13	210
2:45 PM	3:00 PM		5	3	0	9	4	0	0	7	13	2	3	
3:00 PM	3:15 PM		4	0	0	10	7	0	0	5	4	2	8	
3:15 PM	3:30 PM		3	2	0	4	9	0	0	14	3	8	2	
Traffic Per Hour			16	7	0	36	27	0	1	47	33	17	26	
3:30 PM	3:45 PM	8:00 hr	8	3	0	14	21	0	3	23	19	5	6	366
3:45 PM	4:00 PM		8	2	0	17	22	0	5	22	20	3	8	
4:00 PM	4:15 PM		15	4	0	19	32	0	7	13	13	0	3	
4:15 PM	4:30 PM		14	2	0	8	17	0	3	19	5	5	2	
Traffic Per Hour			43	11	0	58	92	0	18	77	57	13	19	
Total Traffic in 8 Hours=												3105		

Intersection No.: 03
 Direction: (From- STP To- Petro Bangla)

Location: City Corporation

Name of Road: Kacha Bazar Road

Date: 17-07-2022

Time:		Hour	MOTORIZED VEHICLE							NON-MOTORIZED VEHICLE			Total Traffic Per Hour	
			1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNG	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Covered Van	8. Auto Rickshaw	9. Rickshaw	10. Bicycle		11. Animal/ Push Cart
8:30 AM	8:45 AM	1:00 hr	4	5	0	13	17	0	0	6	12	1	7	358
8:45 AM	9:00 AM		5	8	0	3	17	0	0	10	21	2	8	
9:00 AM	9:15 AM		14	3	0	4	34	0	1	7	23	2	12	
9:15 AM	9:30 AM		8	5	0	23	32	1	2	11	25	3	10	
Traffic Per Hour			31	21	0	43	100	1	3	34	81	8	37	
9:30 AM	9:45 AM	2:00 hr	16	6	1	13	39	2	3	12	19	3	7	445
9:45 AM	10:00 AM		16	2	0	16	27	0	2	15	25	3	6	
10:00 AM	10:15 AM		17	0	0	20	27	0	2	15	20	3	12	
10:15 AM	10:30 AM		11	4	0	16	22	0	2	17	13	3	2	
Traffic Per Hour			62	12	1	69	115	2	9	59	77	12	27	
10:30 AM	10:45 AM	3:00 hr	14	1	0	22	10	1	4	13	20	2	2	363
10:45 AM	11:00 AM		11	1	0	12	34	0	4	15	15	0	7	
11:00 AM	11:15 AM		13	4	0	18	28	0	3	20	25	0	16	
11:15 AM	11:30 AM		10	1	0	20	30	1	3	5	5	0	0	
Traffic Per Hour			48	7	0	72	100	2	14	53	65	2	25	
11:30 AM	11:45 AM	4:00 hr	11	4	0	29	36	2	2	11	21	8	8	717
11:45 AM	12:00 PM		11	10	0	26	37	1	7	22	25	11	6	
12:00 PM	12:15 PM		17	8	0	20	54	0	13	30	32	7	10	
12:15 PM	12:30 PM		14	7	0	37	69	4	7	40	47	5	12	
Traffic Per Hour			53	29	0	112	196	7	29	103	125	29	34	
12:30 PM	12:45 PM	5:00 hr	21	4	0	31	55	0	6	40	30	4	8	913
12:45 PM	1:00 PM		18	9	0	43	76	0	8	36	43	8	14	
1:00 PM	1:15 PM		14	5	0	49	55	1	10	40	57	4	7	
1:15 PM	1:30 PM		6	3	0	55	36	2	8	42	48	8	9	
Traffic Per Hour			59	21	0	178	222	3	32	158	178	24	38	
1:30 PM	1:45 PM	6:00 hr	12	8	0	58	53	0	5	48	50	12	4	948
1:45 PM	2:00 PM		13	4	0	51	64	1	3	54	43	6	5	
2:00 PM	2:15 PM		8	7	0	43	75	0	12	52	51	8	10	
2:15 PM	2:30 PM		11	13	0	52	38	0	4	59	0	4	7	
Traffic Per Hour			44	32	0	204	230	1	24	213	144	30	26	
2:30 PM	2:45 PM	7:00 hr	9	6	0	44	37	0	12	57	59	7	4	849
2:45 PM	3:00 PM		16	4	0	53	31	0	6	51	33	10	8	
3:00 PM	3:15 PM		14	7	0	46	64	0	4	55	33	4	6	
3:15 PM	3:30 PM		8	10	0	27	39	0	2	32	43	5	3	
Traffic Per Hour			47	27	0	170	171	0	24	195	168	26	21	
3:30 PM	3:45 PM	8:00 hr	7	4	0	31	54	0	3	60	70	8	6	840
3:45 PM	4:00 PM		4	2	0	43	33	0	2	82	48	3	5	
4:00 PM	4:15 PM		9	5	0	37	44	0	0	51	48	7	9	
4:15 PM	4:30 PM		6	3	0	29	37	0	0	55	43	5	7	
Traffic Per Hour			26	14	0	140	168	0	5	228	209	23	27	
Total Traffic in 8 Hours=												5459		

Intersection No.: 04
 Direction: (From- Petro Bangla To- STP)

Location: STP

Name of Road: Kacha Bazar Road

Date: 17-07-2022

Time:	Hour	MOTORIZED VEHICLE							NON-MOTORIZED VEHICLE			Total Traffic Per Hour	
		1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNG	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Covered Van	8. Auto Rickshaw	9. Rickshaw	10. Bicycle		11. Animal/ Push Cart
8:30 AM	8:45 AM	0	3	0	1	2	0	2	3	6	1	10	209
8:45 AM	9:00 AM	1	3	0	0	7	0	0	8	12	4	14	
9:00 AM	9:15 AM	2	4	0	7	0	1	0	16	18	2	16	
9:15 AM	9:30 AM	8	1	0	3	0	0	1	18	17	1	17	
Traffic Per Hour		11	11	0	11	9	1	3	45	53	8	57	
9:30 AM	9:45 AM	0	2	0	2	9	0	2	16	18	3	12	327
9:45 AM	10:00 AM	4	0	0	11	8	0	1	19	25	5	10	
10:00 AM	10:15 AM	11	1	0	5	14	0	4	21	20	3	13	
10:15 AM	10:30 AM	10	0	0	7	9	0	2	20	25	3	12	
Traffic Per Hour		25	3	0	25	40	0	9	76	66	14	47	
10:30 AM	10:45 AM	9	0	0	7	10	0	1	22	29	5	7	369
10:45 AM	11:00 AM	7	0	0	2	10	0	2	26	24	2	9	
11:00 AM	11:15 AM	9	0	0	8	19	0	0	33	28	6	10	
11:15 AM	11:30 AM	12	0	0	6	13	0	2	19	23	6	3	
Traffic Per Hour		37	0	0	23	52	0	5	100	104	19	29	
11:30 AM	11:45 AM	9	0	0	6	11	0	0	26	27	3	7	341
11:45 AM	12:00 PM	9	0	0	8	14	0	1	28	13	6	6	
12:00 PM	12:15 PM	7	0	0	5	12	0	2	20	20	7	6	
12:15 PM	12:30 PM	14	0	0	5	9	0	2	19	23	5	11	
Traffic Per Hour		39	0	0	24	46	0	5	93	83	21	30	
12:30 PM	12:45 PM	16	0	0	5	12	0	2	13	28	14	5	328
12:45 PM	1:00 PM	13	1	0	4	18	0	3	13	23	10	4	
1:00 PM	1:15 PM	10	2	0	8	19	0	0	8	12	7	2	
1:15 PM	1:30 PM	9	1	0	9	17	0	2	17	14	6	1	
Traffic Per Hour		48	4	0	26	66	0	7	51	77	37	12	
1:30 PM	1:45 PM	4	0	0	6	13	0	0	22	19	4	6	277
1:45 PM	2:00 PM	7	0	0	4	9	0	0	26	22	2	5	
2:00 PM	2:15 PM	11	0	0	7	12	0	0	19	22	1	2	
2:15 PM	2:30 PM	7	1	0	4	7	0	0	12	18	2	3	
Traffic Per Hour		29	1	0	21	41	0	0	79	81	9	16	
2:30 PM	2:45 PM	5	1	0	1	8	0	0	3	13	2	1	228
2:45 PM	3:00 PM	14	0	0	7	15	0	1	11	15	4	3	
3:00 PM	3:15 PM	7	2	0	1	12	0	1	6	14	5	3	
3:15 PM	3:30 PM	7	0	0	2	15	0	2	25	15	5	2	
Traffic Per Hour		33	3	0	11	50	0	4	45	57	16	9	
3:30 PM	3:45 PM	4	0	0	2	13	0	0	10	12	2	1	189
3:45 PM	4:00 PM	6	0	0	4	7	0	0	10	13	3	3	
4:00 PM	4:15 PM	5	0	0	2	7	0	1	8	13	1	1	
4:15 PM	4:30 PM	7	0	0	3	14	0	0	15	17	3	2	
Traffic Per Hour		22	0	0	11	41	0	1	43	55	9	7	
Total Traffic in 8 Hours=												2268	

Intersection No.: 04
 Direction: (From- STP To- Petro Banla)

Location: STP

Name of Road: Kacha Bazar Road

Date: 17-07-2022

Time:		Hour	MOTORIZED VEHICLE							NON-MOTORIZED VEHICLE			Total Traffic Per Hour	
			1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNG	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Covered Van	8. Auto Rickshaw	9. Rickshaw	10. Bicycle		11. Animal/ Push Cart
8:30 AM	8:45 AM	1:00 hr	0	2	0	4	15	0	0	6	15	5	10	294
8:45 AM	9:00 AM		1	1	0	1	12	0	0	5	7	4	12	
9:00 AM	9:15 AM		6	1	0	5	22	1	1	12	25	4	20	
9:15 AM	9:30 AM		9	2	0	14	18	2	1	19	14	2	14	
Traffic Per Hour			16	6	0	24	67	3	2	44	61	15	56	
9:30 AM	9:45 AM	2:00 hr	12	4	1	10	31	1	4	18	24	2	10	543
9:45 AM	10:00 AM		10	3	0	15	41	0	3	24	40	5	11	
10:00 AM	10:15 AM		17	4	0	12	26	0	2	23	23	7	14	
10:15 AM	10:30 AM		14	5	0	25	40	0	6	11	33	4	8	
Traffic Per Hour			53	16	1	62	138	1	15	76	120	18	43	
10:30 AM	10:45 AM	3:00 hr	10	7	0	20	32	1	3	25	37	5	14	663
10:45 AM	11:00 AM		17	6	0	37	36	0	6	26	21	3	12	
11:00 AM	11:15 AM		12	3	0	15	43	0	4	34	40	7	17	
11:15 AM	11:30 AM		17	5	0	20	42	1	7	25	37	10	4	
Traffic Per Hour			56	21	0	92	153	2	22	110	135	25	47	
11:30 AM	11:45 AM	4:00 hr	13	7	0	32	47	0	2	25	34	7	12	655
11:45 AM	12:00 PM		8	2	0	17	34	0	3	21	29	7	12	
12:00 PM	12:15 PM		15	7	0	40	52	1	2	19	32	8	11	
12:15 PM	12:30 PM		11	4	0	29	52	1	5	15	24	6	9	
Traffic Per Hour			47	20	0	118	185	2	12	80	119	28	44	
12:30 PM	12:45 PM	5:00 hr	25	3	0	24	36	0	6	24	25	8	4	610
12:45 PM	1:00 PM		20	5	0	31	30	0	4	19	24	3	8	
1:00 PM	1:15 PM		13	7	0	21	39	0	4	18	22	8	6	
1:15 PM	1:30 PM		11	6	0	23	43	1	5	37	24	16	9	
Traffic Per Hour			69	21	0	99	148	1	19	96	95	36	27	
1:30 PM	1:45 PM	6:00 hr	6	4	0	16	28	0	5	25	13	10	4	404
1:45 PM	2:00 PM		8	6	0	13	33	0	3	22	12	7	8	
2:00 PM	2:15 PM		4	2	0	9	25	0	6	18	18	8	4	
2:15 PM	2:30 PM		3	4	0	13	14	0	2	26	22	3	2	
Traffic Per Hour			21	16	0	51	100	0	16	91	65	28	16	
2:30 PM	2:45 PM	7:00 hr	13	2	0	2	12	0	2	6	14	3	2	331
2:45 PM	3:00 PM		18	3	0	19	35	0	2	13	14	6	4	
3:00 PM	3:15 PM		12	3	0	9	23	0	1	17	19	6	1	
3:15 PM	3:30 PM		3	2	0	10	16	0	1	17	12	7	2	
Traffic Per Hour			46	10	0	40	86	0	6	53	59	22	9	
3:30 PM	3:45 PM	8:00 hr	8	2	0	7	18	0	3	26	22	5	3	322
3:45 PM	4:00 PM		6	0	0	11	13	0	3	10	27	3	5	
4:00 PM	4:15 PM		5	1	0	8	16	0	4	6	18	2	7	
4:15 PM	4:30 PM		9	3	0	7	15	0	3	13	23	6	4	
Traffic Per Hour			28	6	0	33	62	0	13	55	90	16	19	
Total Traffic in 8 Hours=												3822		

Intersection No.: 01

Location: Petro Center

Name of Road: Kache Bazar Road

Date: 17-07-2022

Direction: (From- Petro Bangla To- STP)

Time:		Hour	MOTORIZED VEHICLE							NON-MOTORIZED VEHICLE			Total Traffic Per Hour	
			1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNV	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Covered Van	8. Auto Rickshaw	9. Rickshaw	10. Bicycle		11. Animal/ Push Cart
10:00 PM	10:15 PM	1:00 hr	6	4	0	6	17	3	5	0	30	6	29	359
10:15 PM	10:30 PM		5	0	0	3	16	3	2	0	10	0	30	
10:30 PM	10:45 PM		3	0	0	3	14	2	8	1	37	2	30	
10:45 PM	11:00 PM		5	0	0	5	7	3	6	0	17	2	39	
Traffic Per Hour			19	4	0	17	54	11	21	1	94	10	128	
11:00 PM	11:15 PM	2:00 hr	1	0	0	0	9	0	7	0	21	2	40	361
11:15 PM	11:30 PM		4	0	0	2	7	3	7	2	22	0	36	
11:30 PM	11:45 PM		6	0	0	6	19	7	15	6	29	0	44	
11:45 PM	12:00 AM		1	0	0	2	6	1	0	17	11	0	28	
Traffic Per Hour			12	0	0	10	41	11	29	25	83	2	148	
12:00 AM	12:15 AM	3:00 hr	0	0	0	3	4	1	6	5	15	1	27	274
12:15 AM	12:30 AM		1	0	0	4	5	8	8	13	5	1	42	
12:30 AM	12:45 AM		0	0	0	3	4	2	2	11	12	0	20	
12:45 AM	1:00 AM		0	0	0	7	6	3	4	16	8	0	27	
Traffic Per Hour			1	0	0	17	19	14	20	45	40	2	116	
1:00 AM	1:15 AM	4:00 hr	0	0	0	5	1	5	8	15	4	0	31	227
1:15 AM	1:30 AM		1	0	0	5	1	8	8	18	4	0	42	
1:30 AM	1:45 AM		1	0	0	2	1	1	1	9	0	0	21	
1:45 AM	2:00 AM		1	0	0	0	2	0	0	10	0	0	22	
Traffic Per Hour			3	0	0	12	5	14	17	52	8	0	116	
2:00 AM	2:15 AM	5:00 hr	0	0	0	3	0	2	8	12	0	0	20	163
2:15 AM	2:30 AM		0	0	0	1	0	0	8	11	0	0	14	
2:30 AM	2:45 AM		0	0	0	2	0	3	4	7	0	0	17	
2:45 AM	3:00 AM		0	0	0	3	0	1	11	12	5	0	19	
Traffic Per Hour			0	0	0	9	0	6	31	42	5	0	70	
3:00 AM	3:15 AM	6:00 hr	0	0	0	3	0	2	8	17	3	1	16	109
3:15 AM	3:30 AM		0	1	0	6	0	2	5	8	2	0	13	
3:30 AM	3:45 AM		1	0	0	2	0	2	3	0	2	0	4	
3:45 AM	4:00 AM		0	0	0	2	0	1	1	0	2	0	4	
Traffic Per Hour			1	1	0	13	0	7	17	23	9	1	37	
4:00 AM	4:15 AM	7:00 hr	0	0	0	6	1	0	2	5	0	0	5	223
4:15 AM	4:30 AM		0	0	0	7	0	0	7	12	6	0	13	
4:30 AM	4:45 AM		1	0	0	16	2	0	8	10	17	0	24	
4:45 AM	5:00 AM		1	1	0	17	2	0	10	3	19	0	28	
Traffic Per Hour			2	1	0	46	5	0	27	30	42	0	70	
5:00 AM	5:15 AM	8:00 hr	0	0	0	9	0	0	3	2	14	0	4	173
5:15 AM	5:30 AM		1	1	0	13	2	0	2	8	14	0	5	
5:30 AM	5:45 AM		1	1	0	8	0	0	2	3	12	1	6	
5:45 AM	6:00 AM		0	2	0	13	1	1	9	2	25	2	8	
Traffic Per Hour			2	4	0	43	3	1	16	13	65	3	23	
6:00 AM	6:15 AM	9:00 hr	1	0	0	18	9	0	15	7	45	3	41	437
6:15 AM	6:30 AM		1	1	0	7	5	2	9	1	36	1	14	
6:30 AM	6:45 AM		5	5	0	21	8	0	14	12	50	1	27	
6:45 AM	7:00 AM		2	6	0	15	7	0	7	3	30	0	8	
Traffic Per Hour			9	12	0	61	29	2	45	23	181	5	90	
7:00 AM	7:15 AM	10:00 hr	3	2	0	9	4	0	6	1	35	1	9	336
7:15 AM	7:30 AM		4	0	0	4	2	0	7	1	45	2	11	
7:30 AM	7:45 AM		7	1	0	11	4	0	3	5	29	1	24	
7:45 AM	8:00 AM		12	7	0	10	12	0	3	1	38	0	24	
Traffic Per Hour			26	10	0	34	22	0	19	8	145	4	68	

Total Traffic in 10 Hours =

2662

Intersection No.: 01

Location: Petro Center

Name of Road: Kacha Bazar Road

Date: 17-07-2022

Direction: (From- STP To- Petro Bangla)

Time:		Hour	MOTORIZED VEHICLE						NON-MOTORIZED VEHICLE				Total Traffic Per Hour	
			1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNG	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Covered Van	8. Auto Rickshaw	9. Rickshaw	10. Bicycle		11. Animal/ Push Cart
10:00 PM	10:15 PM	1:00 hr	3	3	0	10	22	1	0	3	20	4	13	312
10:15 PM	10:30 PM		4	2	0	5	10	0	2	13	13	3	8	
10:30 PM	10:45 PM		2	2	0	2	17	1	6	15	21	5	30	
10:45 PM	11:00 PM		3	0	0	2	6	1	4	17	17	3	19	
Traffic Per Hour			12	7	0	19	55	3	12	48	71	15	70	
11:00 PM	11:15 PM	2:00 hr	2	1	0	2	14	1	2	22	9	1	24	237
11:15 PM	11:30 PM		0	1	0	4	5	2	2	24	7	1	17	
11:30 PM	11:45 PM		1	0	0	5	3	2	6	22	9	0	13	
11:45 PM	12:00 AM		1	0	0	4	2	1	3	12	4	0	8	
Traffic Per Hour			4	2	0	15	24	6	13	60	29	2	62	
12:00 AM	12:15 AM	3:00 hr	1	0	0	1	3	1	2	10	5	0	10	140
12:15 AM	12:30 AM		0	0	0	2	0	1	4	17	2	0	5	
12:30 AM	12:45 AM		0	0	0	6	4	2	5	17	6	0	4	
12:45 AM	1:00 AM		0	0	0	4	1	4	2	10	2	0	9	
Traffic Per Hour			1	0	0	13	8	8	13	54	15	0	28	
1:00 AM	1:15 AM	4:00 hr	0	0	0	3	5	3	3	13	2	0	10	140
1:15 AM	1:30 AM		0	0	0	3	2	1	5	12	1	0	11	
1:30 AM	1:45 AM		0	0	0	4	1	0	3	15	2	0	11	
1:45 AM	2:00 AM		0	0	0	0	0	1	5	11	1	0	12	
Traffic Per Hour			0	0	0	10	8	5	16	51	6	0	44	
2:00 AM	2:15 AM	5:00 hr	0	0	0	1	1	1	7	3	0	0	9	106
2:15 AM	2:30 AM		1	0	0	3	0	0	6	2	3	0	12	
2:30 AM	2:45 AM		0	0	0	2	0	3	10	4	0	0	11	
2:45 AM	3:00 AM		0	0	0	3	1	2	7	1	1	0	12	
Traffic Per Hour			1	0	0	9	2	6	30	10	4	0	44	
3:00 AM	3:15 AM	6:00 hr	0	0	0	3	0	1	5	10	4	0	12	87
3:15 AM	3:30 AM		1	0	0	1	0	2	5	6	1	0	9	
3:30 AM	3:45 AM		1	0	0	2	0	1	2	0	1	0	4	
3:45 AM	4:00 AM		0	1	0	2	0	1	1	3	2	1	5	
Traffic Per Hour			2	1	0	8	0	5	13	19	8	1	30	
4:00 AM	4:15 AM	7:00 hr	0	1	0	3	1	0	5	5	2	0	5	118
4:15 AM	4:30 AM		0	0	0	4	0	1	8	3	1	0	12	
4:30 AM	4:45 AM		0	0	0	1	0	0	7	3	5	0	13	
4:45 AM	5:00 AM		0	0	0	5	0	1	10	2	9	0	11	
Traffic Per Hour			0	1	0	13	1	2	30	13	17	0	41	
5:00 AM	5:15 AM	8:00 hr	2	2	0	7	2	0	5	1	12	1	9	174
5:15 AM	5:30 AM		0	1	0	9	2	0	2	5	14	2	6	
5:30 AM	5:45 AM		2	2	0	8	1	0	7	2	11	2	7	
5:45 AM	6:00 AM		0	1	0	14	0	0	10	3	16	1	5	
Traffic Per Hour			4	6	0	38	5	0	24	11	53	6	27	
6:00 AM	6:15 AM	9:00 hr	3	8	0	18	2	0	9	4	28	3	7	302
6:15 AM	6:30 AM		3	4	0	12	5	0	6	1	23	1	17	
6:30 AM	6:45 AM		5	10	0	15	2	0	7	4	35	1	6	
6:45 AM	7:00 AM		1	3	0	10	4	0	4	0	34	1	6	
Traffic Per Hour			12	25	0	55	13	0	26	9	120	6	36	
7:00 AM	7:15 AM	10:00 hr	7	3	0	6	3	0	6	0	31	2	10	318
7:15 AM	7:30 AM		2	9	0	3	2	0	7	0	32	0	10	
7:30 AM	7:45 AM		9	9	0	7	1	1	7	0	25	0	15	
7:45 AM	8:00 AM		13	12	0	15	4	0	14	0	28	2	18	
Traffic Per Hour			31	38	0	31	10	1	34	0	116	4	53	

Total Traffic in 10 Hours = 1934

Intersection No.: 02

Location: In front of City Corporation

Name of Road: Kecha Bazar Road

Date: 17-07-2022

Direction: (From- Petro Bangla To- STP)

Time:		Hour	MOTORIZED VEHICLE								NON-MOTORIZED VEHICLE			Total Traffic Per Hour
			1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNV	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Covered Van	8. Auto Rickshaw	9. Rickshaw	10. Bicycle	11. Animal/ Push Cart	
10:00 PM	10:15 PM	1:00 hr	34	5	0	15	26	0	8	3	20	11	6	505
10:15 PM	10:30 PM		25	2	0	17	29	1	7	7	27	7	5	
10:30 PM	10:45 PM		27	4	0	16	30	2	5	5	25	5	4	
10:45 PM	11:00 PM		32	7	0	14	28	1	9	9	19	3	7	
Traffic Per Hour			118	18	0	62	111	4	29	24	91	26	22	
11:00 PM	11:15 PM	2:00 hr	29	4	0	15	19	0	5	7	15	5	12	400
11:15 PM	11:30 PM		24	5	0	11	15	2	7	8	17	7	7	
11:30 PM	11:45 PM		17	9	0	12	14	1	8	11	14	7	9	
11:45 PM	12:00 AM		17	2	0	8	12	2	7	8	12	3	11	
Traffic Per Hour			87	20	0	47	60	5	27	35	58	22	39	
12:00 AM	12:15 AM	3:00 hr	11	1	0	6	11	1	8	10	10	2	11	225
12:15 AM	12:30 AM		5	2	0	5	5	0	3	10	12	1	7	
12:30 AM	12:45 AM		4	3	0	6	7	2	5	9	7	1	13	
12:45 AM	1:00 AM		2	1	0	7	3	3	7	12	8	1	3	
Traffic Per Hour			22	7	0	24	26	6	23	41	37	5	34	
1:00 AM	1:15 AM	4:00 hr	1	0	0	3	2	0	5	9	1	0	9	133
1:15 AM	1:30 AM		1	2	0	2	1	2	6	8	2	1	8	
1:30 AM	1:45 AM		0	0	0	1	2	5	8	12	1	0	10	
1:45 AM	2:00 AM		0	0	0	1	0	3	2	13	1	0	11	
Traffic Per Hour			2	2	0	7	5	10	21	42	5	1	38	
2:00 AM	2:15 AM	5:00 hr	0	0	0	1	1	3	7	12	2	0	9	120
2:15 AM	2:30 AM		0	0	0	1	0	3	7	7	3	0	6	
2:30 AM	2:45 AM		0	0	0	2	1	5	5	8	2	1	8	
2:45 AM	3:00 AM		0	0	0	1	0	1	1	15	1	0	7	
Traffic Per Hour			0	0	0	5	2	12	20	42	8	1	30	
3:00 AM	3:15 AM	6:00 hr	0	0	0	1	0	2	5	31	2	0	10	141
3:15 AM	3:30 AM		1	0	0	3	0	0	8	20	3	0	11	
3:30 AM	3:45 AM		1	0	0	4	1	0	2	16	1	0	0	
3:45 AM	4:00 AM		0	0	0	4	0	0	2	8	0	0	5	
Traffic Per Hour			2	0	0	12	1	2	17	75	6	0	26	
4:00 AM	4:15 AM	7:00 hr	0	0	0	3	0	0	4	11	3	0	8	139
4:15 AM	4:30 AM		0	1	0	2	1	2	5	15	1	0	6	
4:30 AM	4:45 AM		0	0	0	2	1	0	7	17	2	0	5	
4:45 AM	5:00 AM		0	0	0	1	0	0	8	25	2	0	7	
Traffic Per Hour			0	1	0	8	2	2	24	68	8	0	26	
5:00 AM	5:15 AM	8:00 hr	0	2	0	13	3	0	4	23	12	1	11	361
5:15 AM	5:30 AM		0	2	0	19	1	0	14	27	14	1	8	
5:30 AM	5:45 AM		1	3	0	15	0	0	13	20	11	1	23	
5:45 AM	6:00 AM		0	4	0	20	3	1	16	10	19	1	45	
Traffic Per Hour			1	11	0	67	7	1	47	80	58	4	87	
6:00 AM	6:15 AM	9:00 hr	11	5	0	11	9	0	7	8	14	3	9	418
6:15 AM	6:30 AM		8	6	0	15	14	0	11	11	28	2	12	
6:30 AM	6:45 AM		10	9	0	10	11	0	6	7	22	5	10	
6:45 AM	7:00 AM		19	11	0	21	25	0	12	9	33	4	10	
Traffic Per Hour			48	31	0	57	59	0	36	35	95	14	41	
7:00 AM	7:15 AM	10:00 hr	18	7	0	14	19	0	10	0	21	5	15	583
7:15 AM	7:30 AM		15	5	0	11	26	0	12	1	19	5	19	
7:30 AM	7:45 AM		27	12	0	15	40	0	4	0	35	8	16	
7:45 AM	8:00 AM		40	14	0	23	57	0	7	0	29	9	10	
Traffic Per Hour			100	38	0	63	142	0	33	1	104	27	60	
Total Traffic in 10 Hours =												3008		

Intersection No.: 02

Location: Bapex

Name of Road: Kacha Bazar Road

Date: 17-07-2022

Direction: (From- STP To- Petro Bangla)

Time:		Hour	MOTORIZED VEHICLE							NON-MOTORIZED VEHICLE			Total Traffic Per Hour	
			1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNG	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Covered Van	8. Auto Rickshaw	9. Rickshaw	10. Bicycle		11. Animal/ Push Cart
10:00 PM	10:15 PM	1:00 hr	9	2	0	8	22	0	1	0	20	7	1	301
10:15 PM	10:30 PM		21	4	0	17	19	0	8	0	23	1	4	
10:30 PM	10:45 PM		14	3	0	18	28	1	4	0	17	2	3	
10:45 PM	11:00 PM		11	6	0	13	18	0	3	0	19	1	4	
Traffic Per Hour			55	15	0	56	86	1	16	0	79	11	12	
11:00 PM	11:15 PM	2:00 hr	17	8	0	8	18	0	4	0	20	2	5	310
11:15 PM	11:30 PM		18	3	0	14	12	1	3	3	16	1	4	
11:30 PM	11:45 PM		9	3	0	13	17	2	6	0	23	7	5	
11:45 PM	12:00 AM		8	3	0	8	12	2	2	1	20	5	7	
Traffic Per Hour			52	17	0	43	59	5	15	4	79	15	21	
12:00 AM	12:15 AM	3:00 hr	5	1	0	5	9	1	4	7	3	1	5	143
12:15 AM	12:30 AM		2	2	0	7	5	2	3	8	4	0	8	
12:30 AM	12:45 AM		3	0	0	6	6	1	5	5	2	0	9	
12:45 AM	1:00 AM		1	0	0	4	1	4	7	13	1	0	1	
Traffic Per Hour			11	3	0	22	21	8	19	33	10	1	21	
1:00 AM	1:15 AM	4:00 hr	0	1	0	3	1	2	3	6	1	0	10	102
1:15 AM	1:30 AM		1	0	0	5	2	4	2	4	2	0	4	
1:30 AM	1:45 AM		0	0	0	6	0	1	4	3	1	0	11	
1:45 AM	2:00 AM		0	0	0	3	0	2	9	1	1	0	9	
Traffic Per Hour			1	1	0	17	3	9	18	14	5	0	34	
2:00 AM	2:15 AM	5:00 hr	0	0	0	3	4	5	5	9	1	0	8	77
2:15 AM	2:30 AM		0	0	0	2	0	3	2	4	0	0	4	
2:30 AM	2:45 AM		0	0	0	2	0	2	2	3	0	0	5	
2:45 AM	3:00 AM		0	0	0	1	0	1	3	4	1	0	3	
Traffic Per Hour			0	0	0	8	4	11	12	20	2	0	20	
3:00 AM	3:15 AM	6:00 hr	0	0	0	1	0	1	3	16	1	0	5	112
3:15 AM	3:30 AM		0	0	0	3	0	2	5	9	1	0	7	
3:30 AM	3:45 AM		0	0	0	2	0	1	2	19	0	0	8	
3:45 AM	4:00 AM		0	0	0	2	0	0	2	17	2	0	3	
Traffic Per Hour			0	0	0	8	0	4	12	61	4	0	23	
4:00 AM	4:15 AM	7:00 hr	0	0	0	9	0	1	5	28	0	0	7	172
4:15 AM	4:30 AM		0	0	0	4	1	0	4	15	2	0	8	
4:30 AM	4:45 AM		0	0	0	9	1	0	4	23	4	0	6	
4:45 AM	5:00 AM		0	2	0	9	2	1	8	14	3	0	2	
Traffic Per Hour			0	2	0	31	4	2	21	80	9	0	23	
5:00 AM	5:15 AM	8:00 hr	1	1	0	5	1	1	4	23	13	1	7	222
5:15 AM	5:30 AM		0	0	0	7	1	0	14	22	11	0	8	
5:30 AM	5:45 AM		0	0	0	5	0	2	13	15	10	0	9	
5:45 AM	6:00 AM		0	0	0	6	1	0	16	10	9	1	5	
Traffic Per Hour			1	1	0	23	3	3	47	70	43	2	29	
6:00 AM	6:15 AM	9:00 hr	1	1	0	9	4	1	3	12	9	1	10	193
6:15 AM	6:30 AM		2	0	0	2	7	0	3	7	11	3	11	
6:30 AM	6:45 AM		3	0	0	8	8	0	2	9	15	4	4	
6:45 AM	7:00 AM		1	5	0	4	10	0	5	3	12	1	8	
Traffic Per Hour			7	6	0	23	29	1	13	31	47	9	33	
7:00 AM	7:15 AM	10:00 hr	2	1	0	10	11	0	1	3	21	6	9	314
7:15 AM	7:30 AM		6	6	0	13	13	0	2	2	20	9	5	
7:30 AM	7:45 AM		12	10	0	18	12	0	2	0	11	11	6	
7:45 AM	8:00 AM		9	4	0	12	19	0	0	1	30	8	9	
Traffic Per Hour			29	21	0	53	55	0	5	6	82	34	29	
Total Traffic in 10 Hours =												1988		

Intersection No.: 03

Location: City Corporation

Name of Road: Kacha Bazar Road

Date: 17-07-2022

Direction: (From- Petro Bangla To- STP)

Time:		Hour	MOTORIZED VEHICLE								NON-MOTORIZED VEHICLE			Total Traffic Per Hour
			1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNG	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Coverd Van	8. Auto Rickshaw	9. Rickshaw	10. Bicycle	11. Animal Push Cart	
10:00 PM	10:15 PM	1:00 hr	5	2	0	9	11	0	2	11	22	1	11	338
10:15 PM	10:30 PM		4	1	0	11	19	0	3	19	19	1	12	
10:30 PM	10:45 PM		7	2	0	12	22	0	2	14	17	4	14	
10:45 PM	11:00 PM		9	0	0	10	10	0	5	22	13	3	7	
Traffic Per Hour			25	5	0	42	62	0	12	66	71	9	44	
11:00 PM	11:15 PM	2:00 hr	4	2	0	11	12	0	3	12	12	5	4	254
11:15 PM	11:30 PM		5	3	0	8	9	0	2	19	14	5	7	
11:30 PM	11:45 PM		8	0	0	9	12	0	1	12	6	8	12	
11:45 PM	12:00 AM		4	2	0	4	7	0	1	9	8	3	11	
Traffic Per Hour			21	7	0	32	40	0	7	52	40	21	34	
12:00 AM	12:15 AM	3:00 hr	1	0	0	3	1	1	1	5	4	1	14	121
12:15 AM	12:30 AM		1	2	0	2	1	0	1	4	3	2	12	
12:30 AM	12:45 AM		0	1	0	5	2	0	2	3	5	3	11	
12:45 AM	1:00 AM		1	1	0	4	4	1	3	2	3	2	9	
Traffic Per Hour			3	4	0	14	8	2	7	14	15	8	48	
1:00 AM	1:15 AM	4:00 hr	0	0	0	5	2	0	2	1	2	0	7	50
1:15 AM	1:30 AM		1	0	0	1	0	0	1	1	1	0	5	
1:30 AM	1:45 AM		0	0	0	0	0	0	0	0	0	0	9	
1:45 AM	2:00 AM		0	0	0	1	0	0	0	2	0	0	9	
Traffic Per Hour			1	0	0	7	2	0	3	4	3	0	30	
2:00 AM	2:15 AM	5:00 hr	0	0	0	0	0	0	0	1	3	0	12	51
2:15 AM	2:30 AM		0	0	0	0	0	0	2	0	0	0	5	
2:30 AM	2:45 AM		0	0	0	0	0	0	0	0	0	0	5	
2:45 AM	3:00 AM		0	0	0	0	0	0	0	1	8	0	14	
Traffic Per Hour			0	0	0	0	0	0	2	2	11	0	36	
3:00 AM	3:15 AM	6:00 hr	0	0	0	0	0	0	0	4	1	0	12	58
3:15 AM	3:30 AM		0	0	0	0	0	0	6	1	0	0	3	
3:30 AM	3:45 AM		0	0	0	0	0	0	1	8	0	0	3	
3:45 AM	4:00 AM		0	0	0	0	0	0	1	9	0	0	7	
Traffic Per Hour			0	0	0	0	0	0	2	27	2	0	25	
4:00 AM	4:15 AM	7:00 hr	0	0	0	1	0	0	1	8	3	0	10	76
4:15 AM	4:30 AM		0	0	0	0	0	0	4	0	0	0	5	
4:30 AM	4:45 AM		0	0	0	2	0	0	0	2	3	0	15	
4:45 AM	5:00 AM		0	0	0	1	0	0	0	4	7	0	10	
Traffic Per Hour			0	0	0	4	0	0	1	18	13	0	40	
5:00 AM	5:15 AM	8:00 hr	0	0	0	1	2	0	2	5	12	0	11	115
5:15 AM	5:30 AM		0	0	0	1	1	0	1	3	9	1	9	
5:30 AM	5:45 AM		0	0	0	0	2	1	0	2	17	1	6	
5:45 AM	6:00 AM		0	0	0	1	1	0	0	1	17	0	9	
Traffic Per Hour			0	0	0	2	6	1	3	11	55	2	35	
6:00 AM	6:15 AM	9:00 hr	0	0	0	0	0	0	2	1	18	0	3	119
6:15 AM	6:30 AM		0	0	0	0	0	0	0	1	13	0	4	
6:30 AM	6:45 AM		0	0	0	0	0	0	0	3	29	0	4	
6:45 AM	7:00 AM		0	0	0	1	1	0	1	7	17	0	14	
Traffic Per Hour			0	0	0	1	1	0	3	12	77	0	25	
7:00 AM	7:15 AM	10:00 hr	3	5	0	11	12	0	2	2	19	3	11	294
7:15 AM	7:30 AM		9	3	0	5	4	0	1	3	22	2	6	
7:30 AM	7:45 AM		11	7	0	9	9	0	3	1	25	1	7	
7:45 AM	8:00 AM		14	9	0	12	17	0	3	1	29	4	9	
Traffic Per Hour			37	24	0	37	42	0	9	7	95	10	33	
Total Traffic in 10 Hours=													1472	

Intersection No.: 03

Location: Qly Corporation

Name of Road: Kacha Bazar Road

Date: 17-07-2022

Direction: (From- STP To- Petro Bangla)

Time:	Hour	MOTORIZED VEHICLE							NON-MOTORIZED VEHICLE			Total Traffic Per Hour	
		1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNG	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Covered Van	8. Auto Rickshaw	9. Rickshaw	10. Bicycle		11. Animal Push Cart
10:00 PM	10:15 PM	3	3	0	12	11	0	0	7	14	2	8	275
10:15 PM	10:30 PM	6	2	0	11	21	0	3	5	15	3	2	
10:30 PM	10:45 PM	11	6	0	9	17	0	1	12	19	3	3	
10:45 PM	11:00 PM	6	2	0	14	14	1	2	3	14	1	9	
Traffic Per Hour		26	13	0	46	63	1	6	27	62	9	22	
11:00 PM	11:15 PM	5	2	0	10	10	0	1	6	12	1	7	201
11:15 PM	11:30 PM	4	2	0	9	9	1	2	7	8	2	4	
11:30 PM	11:45 PM	5	4	0	8	8	0	1	10	11	1	4	
11:45 PM	12:00 AM	2	1	0	10	6	1	2	4	12	1	8	
Traffic Per Hour		16	9	0	37	33	2	6	26	44	5	23	
12:00 AM	12:15 AM	1	0	0	3	1	1	1	4	9	1	7	88
12:15 AM	12:30 AM	0	0	0	5	2	0	2	3	11	0	9	
12:30 AM	12:45 AM	0	1	0	2	1	2	0	6	5	0	13	
12:45 AM	1:00 AM	0	0	0	1	0	0	2	0	2	0	3	
Traffic Per Hour		1	1	0	11	4	3	5	13	27	1	32	
1:00 AM	1:15 AM	1	2	0	2	1	0	3	5	5	0	11	103
1:15 AM	1:30 AM	0	0	0	1	1	1	2	6	9	0	12	
1:30 AM	1:45 AM	1	0	0	0	0	2	1	1	4	0	8	
1:45 AM	2:00 AM	0	0	0	1	1	0	1	4	6	0	10	
Traffic Per Hour		2	2	0	4	3	3	7	16	24	0	42	
2:00 AM	2:15 AM	0	0	0	1	1	1	2	3	4	1	12	112
2:15 AM	2:30 AM	1	1	0	3	1	0	1	4	2	0	16	
2:30 AM	2:45 AM	1	0	0	1	2	0	2	2	7	0	11	
2:45 AM	3:00 AM	0	0	0	0	0	1	2	5	8	0	16	
Traffic Per Hour		2	1	0	5	4	2	7	14	21	1	55	
3:00 AM	3:15 AM	0	0	0	1	0	0	2	2	5	0	18	101
3:15 AM	3:30 AM	0	0	0	0	0	0	0	1	1	0	13	
3:30 AM	3:45 AM	0	0	0	1	0	0	3	2	9	1	19	
3:45 AM	4:00 AM	0	0	0	0	0	0	2	5	3	0	15	
Traffic Per Hour		0	0	0	2	0	0	7	10	17	1	64	
4:00 AM	4:15 AM	0	0	0	1	0	0	2	1	4	0	11	80
4:15 AM	4:30 AM	0	0	0	1	0	0	2	3	3	1	14	
4:30 AM	4:45 AM	0	0	0	0	0	0	2	2	2	0	9	
4:45 AM	5:00 AM	0	0	0	1	0	0	1	6	6	0	8	
Traffic Per Hour		0	0	0	3	0	0	7	12	15	1	42	
5:00 AM	5:15 AM	0	0	0	1	0	0	0	8	4	0	9	81
5:15 AM	5:30 AM	0	0	0	2	0	0	0	5	10	0	10	
5:30 AM	5:45 AM	0	0	0	0	0	0	0	2	7	0	2	
5:45 AM	6:00 AM	0	0	0	1	1	0	0	0	13	1	5	
Traffic Per Hour		0	0	0	4	1	0	0	15	34	1	26	
6:00 AM	6:15 AM	0	0	0	1	1	0	2	4	11	0	5	108
6:15 AM	6:30 AM	0	0	0	2	2	0	0	5	6	0	11	
6:30 AM	6:45 AM	0	0	0	1	1	0	0	7	7	2	9	
6:45 AM	7:00 AM	0	0	0	2	1	0	1	1	12	1	13	
Traffic Per Hour		0	0	0	6	5	0	3	17	36	3	38	
7:00 AM	7:15 AM	0	0	0	0	0	0	3	3	13	1	9	166
7:15 AM	7:30 AM	0	0	0	3	1	0	0	7	14	1	12	
7:30 AM	7:45 AM	0	0	0	1	6	0	0	9	15	1	18	
7:45 AM	8:00 AM	0	0	0	3	4	0	0	0	24	4	14	
Traffic Per Hour		0	0	0	7	11	0	3	19	66	7	63	
Total Traffic in 10 Hours =											1325		

Intersection No.: 04

Location: STP

Name of Road: Kacha Bazar Road

Date: 17-07-2022

Direction: (From- Petro Bangla To- STP)

Time:		Hour	MOTORIZED VEHICLE							NON-MOTORIZED VEHICLE			Total Traffic Per Hour	
			1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CRG	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Covered Van	8. Auto Rickshaw	9. Rickshaw	10. Bicycle		11. Animal/ Push Cart
10:00 PM	10:15 PM	1:00 hr	0	0	0	2	0	1	0	5	8	0	7	170
10:15 PM	10:30 PM		2	1	0	2	6	1	2	7	12	3	13	
10:30 PM	10:45 PM		1	0	0	0	4	0	2	6	16	2	20	
10:45 PM	11:00 PM		0	0	0	1	1	0	1	5	14	1	23	
Traffic Per Hour			3	1	0	6	11	2	5	23	50	8	63	
11:00 PM	11:15 PM	2:00 hr	0	0	1	1	0	1	3	2	4	0	35	106
11:15 PM	11:30 PM		0	0	0	0	1	0	1	0	0	0	8	
11:30 PM	11:45 PM		0	0	0	0	0	0	2	7	4	0	12	
11:45 PM	12:00 AM		0	0	0	1	1	0	3	6	5	0	8	
Traffic Per Hour			0	0	1	2	2	1	9	15	13	0	63	
12:00 AM	12:15 AM	3:00 hr	0	0	0	0	0	0	2	1	1	0	20	50
12:15 AM	12:30 AM		0	0	0	0	0	0	2	0	1	0	5	
12:30 AM	12:45 AM		0	0	0	1	0	0	0	0	0	0	8	
12:45 AM	1:00 AM		0	0	0	2	0	0	3	0	0	0	4	
Traffic Per Hour			0	0	0	3	0	0	7	1	2	0	37	
1:00 AM	1:15 AM	4:00 hr	0	0	0	0	0	0	0	0	2	0	13	56
1:15 AM	1:30 AM		0	0	0	1	0	0	0	0	0	0	13	
1:30 AM	1:45 AM		0	0	0	0	0	0	0	0	0	0	7	
1:45 AM	2:00 AM		0	0	0	0	0	0	0	0	0	0	20	
Traffic Per Hour			0	0	0	1	0	0	0	2	0	53		
2:00 AM	2:15 AM	5:00 hr	0	0	0	0	0	0	0	2	0	0	8	46
2:15 AM	2:30 AM		0	0	0	2	0	1	1	1	1	0	9	
2:30 AM	2:45 AM		0	0	0	0	0	0	2	2	0	0	6	
2:45 AM	3:00 AM		0	0	0	2	0	1	0	1	0	0	7	
Traffic Per Hour			0	0	0	4	0	2	1	6	3	0	30	
3:00 AM	3:15 AM	6:00 hr	0	0	0	0	0	0	0	1	0	0	5	41
3:15 AM	3:30 AM		0	0	0	0	0	0	3	1	0	0	8	
3:30 AM	3:45 AM		0	0	0	1	0	0	0	1	1	0	7	
3:45 AM	4:00 AM		0	0	0	0	0	0	1	4	1	0	7	
Traffic Per Hour			0	0	0	1	0	0	1	9	3	0	27	
4:00 AM	4:15 AM	7:00 hr	0	0	0	0	0	0	0	3	2	0	5	50
4:15 AM	4:30 AM		0	0	0	0	2	0	0	2	3	0	4	
4:30 AM	4:45 AM		0	0	0	0	0	0	2	3	4	0	3	
4:45 AM	5:00 AM		0	0	0	1	1	0	1	4	2	0	8	
Traffic Per Hour			0	0	0	1	3	0	3	12	11	0	20	
5:00 AM	5:15 AM	8:00 hr	0	0	0	0	0	0	0	3	3	0	8	44
5:15 AM	5:30 AM		0	0	0	0	0	0	3	2	0	0	3	
5:30 AM	5:45 AM		0	0	0	0	0	0	1	1	2	0	4	
5:45 AM	6:00 AM		0	0	0	0	1	0	1	3	4	0	7	
Traffic Per Hour			0	0	0	0	1	0	2	10	11	0	20	
6:00 AM	6:15 AM	9:00 hr	0	0	0	2	2	0	2	1	9	0	4	112
6:15 AM	6:30 AM		1	2	0	1	1	0	2	5	8	1	9	
6:30 AM	6:45 AM		2	0	0	5	1	0	1	1	11	2	8	
6:45 AM	7:00 AM		0	3	0	7	1	0	1	1	9	1	8	
Traffic Per Hour			3	5	0	15	6	0	6	8	37	4	29	
7:00 AM	7:15 AM	10:00 hr	0	0	0	0	0	0	1	2	5	0	2	120
7:15 AM	7:30 AM		3	0	0	1	0	0	1	2	20	2	8	
7:30 AM	7:45 AM		1	0	0	1	1	0	1	1	21	0	12	
7:45 AM	8:00 AM		2	0	0	1	1	0	1	0	22	0	8	
Traffic Per Hour			6	0	0	3	2	0	4	5	68	2	80	
Total Traffic in 10 Hours =											795			

Intersection No.: 04
 Direction: (From- STP To- Palto Bangla)

Location: STP

Name of Road: Kacha Bazar Road

Date: 17-07-2022

Time:	Hour	MOTORIZED VEHICLE							NON-MOTORIZED VEHICLE				Total Traffic Per Hour
		1. Car / Jeep	2. Microbus / Mini Bus	3. Large Bus	4. CNV	5. Motor Cycle	6. Heavy Truck	7. Medium or Small Truck/ Coward Van	8. Auto Rickshaw	9. Rickshaw	10. Bicycle	11. Animal/ Push Cart	
10:00 PM	10:15 PM	0	0	0	0	0	0	0	5	5	1	3	124
10:15 PM	10:30 PM	3	0	0	2	9	0	0	13	5	2	11	
10:30 PM	10:45 PM	0	0	0	0	7	0	2	7	8	1	15	
10:45 PM	11:00 PM	0	0	0	0	3	0	0	3	1	0	18	
Traffic Per Hour		3	0	0	2	19	0	2	28	19	4	47	
11:00 PM	11:15 PM	0	0	0	0	0	1	2	4	4	1	21	108
11:15 PM	11:30 PM	0	0	0	0	2	0	2	1	2	0	11	
11:30 PM	11:45 PM	0	0	0	0	3	0	3	6	4	0	13	
11:45 PM	12:00 AM	0	0	0	1	2	1	2	8	0	0	14	
Traffic Per Hour		0	0	0	1	7	2	9	19	10	1	59	
12:00 AM	12:15 AM	0	0	0	0	0	0	1	1	0	0	8	32
12:15 AM	12:30 AM	0	0	0	0	0	0	1	2	0	0	4	
12:30 AM	12:45 AM	0	0	0	0	0	0	1	3	1	0	6	
12:45 AM	1:00 AM	0	0	0	0	1	0	0	0	0	0	3	
Traffic Per Hour		0	0	0	0	1	0	3	6	1	0	21	
1:00 AM	1:15 AM	0	0	0	0	0	0	0	0	0	2	6	13
1:15 AM	1:30 AM	0	0	0	0	0	0	0	0	0	0	2	
1:30 AM	1:45 AM	0	0	0	0	0	0	0	0	0	0	2	
1:45 AM	2:00 AM	0	0	0	0	0	0	0	0	0	0	1	
Traffic Per Hour		0	0	0	0	0	0	0	0	0	2	11	
2:00 AM	2:15 AM	0	0	0	0	0	0	0	0	0	0	3	16
2:15 AM	2:30 AM	0	0	0	0	0	0	0	1	0	0	8	
2:30 AM	2:45 AM	0	0	0	0	0	0	0	0	1	0	0	
2:45 AM	3:00 AM	0	0	0	0	0	0	0	0	0	0	3	
Traffic Per Hour		0	0	0	0	0	0	0	1	1	0	14	
3:00 AM	3:15 AM	0	0	0	0	0	0	0	0	0	0	5	24
3:15 AM	3:30 AM	0	0	0	0	0	0	0	1	0	0	7	
3:30 AM	3:45 AM	0	0	0	0	0	0	0	0	1	0	4	
3:45 AM	4:00 AM	0	0	0	0	0	0	0	2	1	0	3	
Traffic Per Hour		0	0	0	0	0	0	0	3	2	0	19	
4:00 AM	4:15 AM	0	0	0	0	0	0	0	3	0	0	5	37
4:15 AM	4:30 AM	0	0	0	0	0	0	0	1	1	0	6	
4:30 AM	4:45 AM	0	0	0	0	0	0	1	1	0	0	3	
4:45 AM	5:00 AM	0	0	0	0	0	0	0	3	1	0	5	
Traffic Per Hour		0	0	0	0	0	0	1	14	3	0	19	
5:00 AM	5:15 AM	1	0	0	0	1	0	0	2	1	0	6	45
5:15 AM	5:30 AM	0	0	0	1	2	0	0	3	2	0	4	
5:30 AM	5:45 AM	1	0	0	1	1	1	4	1	0	0	3	
5:45 AM	6:00 AM	0	0	0	2	1	0	2	2	1	0	2	
Traffic Per Hour		2	0	0	4	5	1	6	8	4	0	15	
6:00 AM	6:15 AM	2	2	0	2	2	0	3	0	2	0	3	115
6:15 AM	6:30 AM	1	3	0	4	5	0	0	1	7	1	10	
6:30 AM	6:45 AM	3	1	0	2	8	1	0	2	5	0	3	
6:45 AM	7:00 AM	4	1	0	9	11	0	0	2	12	0	3	
Traffic Per Hour		10	7	0	17	26	1	3	5	26	1	19	
7:00 AM	7:15 AM	1	1	0	2	15	0	0	3	11	3	8	254
7:15 AM	7:30 AM	2	1	0	1	12	0	2	8	12	6	11	
7:30 AM	7:45 AM	4	2	0	5	22	0	1	6	19	3	13	
7:45 AM	8:00 AM	5	3	0	14	18	0	1	5	14	7	12	
Traffic Per Hour		12	7	0	22	67	0	4	23	56	19	44	
Total Traffic in 10 Hours =											788		

ANNEX10: SIGNATURE SHEET OF STAKEHOLDER CONSULTATION

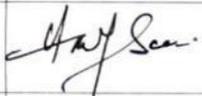
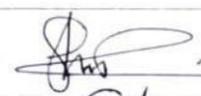
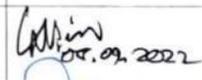
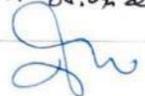
Digital Entrepreneurship and Innovation Ecosystem Development Project

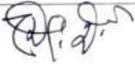
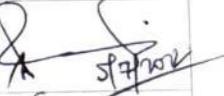
Stakeholder Consultation

Venue: Vision 2021 STP-1, Conference Room, Kawran Bazar, Dhaka

List of Participants

Date: 05.07.2022

Sl. No.	Name	Designation	Organization	Mobile no.	Email	Signature
01	Mohammad Asif Shakriar	Manager, HR Admin	Millennium Information Solution Ltd.	01707814141	asif@mis162.com	
02	Md. Mamun Rakid	Human Resource Analyst	Millennium Information Solution Ltd.	01671048296	rakid@mis162.com	
03	Md. Shahadat Hossain	Managing Director	Guide platform Limited	01558959032	growupshan@gmail.com	
04	মু. মাহবুবুল হক			05950889006		MD. ETK
05	M Naser Uddin	Assistant Director	DAFP, 6 Kawranbazar	01960400616	naser.hanlader@gmail.com	 M. N. Uddin 05.07.2022
06	Md. Nurul Islam	Director of Superintending Engineer	Dhaka WASA	01777252818	m.nurul@gnm.com	
07	Tanvir Hossain Khan	Director, BASIS	BASIS	01675110479	tanvir@basis.org.bd	

Sl. No.	Name	Designation	Organization	Mobile no.	Email	Signature
08	MONUWAR Sobal	CEO	Pridesys IT	01726135748	monuwar@pridesys.com	
09	Haji Saiful Hakeem Khan	President Kawtarban	Kawtarban Bank Group	01715329053 0195975329053		SAIFUL HAKEEM KHAN
10	MD. HABIB ULLAH TUHIN	Managing Director	NICEPOWER IT SOLUTION Ltd.	01711666776		
11	Mohammad Yasin	CEO	NRBExpress Ltd	01764529462	yasin.nrbexpress@gmail.com	
12	Tasnim Islam	Finance Executive	Virgo Contact Center Services Ltd	01717206197	tasnim.islam@virgoecl.com	
13	Nishat Tasnem	HR Executive	Virgo Contact Center Services Ltd.	01701884726	nishat.tasnem@virgoecl.com	
14	Md. Mahmud-Uf Solan	IT Manager	Pan Pacific Services Dhaka	0171595024	mislam@panpacific.com	
15	ABU ANAS FAISAL	Architect DCON	DCON-KCEJ	01711614551	faisal2395@gmail.com	
16	Dr. Afzal Ahmed	Env. Specialist DCON		01747219478	afzal.ahmed2008@gmail.com	
17	Masud Kabir	Sup. Engineer	BHTPA	01842008908	masud.se2020@gmail.com	

Sl. No.	Name	Designation	Organization	Mobile no.	Email	Signature
18	md Rasheduzzaman Ruhel	A. Accountant	DEON	0176608828	rashedmubelgc@gmail.com	
19	Naimul Alam Mazumder	JSEE	DEIEDP, BHTPA	01913604045	naimulalam91@gmail.com	
20	Md. Khairul Alam	Junior Engineer	Edifice Consultancy Ltd.	01704330028	khairulalam.se@gmail.com	Md. Khairul Alam
21	AL-ISHMAM	Project Coordinator	DEON-KEE JV	01791228700	ishmam-records@gmail.com	
22	Srikanta Kumar B	Director	Ezee tech- nology Ltd.	01713606912	Srikanta@eeze tech.com	
23	MD. JAHIR UDDIN MAHAMUD	Head of operation	NRB BAZAAR LD	0161700378	jahir@nrb bazaar.com	
24	Palash Dey	Sr. Executive Business Develp.	NRB EXPRESS	01888007771	info@nrbbexpress.com	
25	Md. Mozibyn Rahman Howhader	Manager, Training & Coordinating	MARS solutions 8771-806004 Ltd.	01711-806004	mazibyn@mars.com.bd	
26	MD: Omar Farooq	PRE: K.K. A: B. S.		01711422639	Extensiveword1168@gmail.com	

Sl. No.	Name	Designation	Organization	Mobile no.	Email	Signature
27	Wasim Uddin	Supervisor	JTSTP-1 Vision 2021-7	01922-036226	wasimuddin406@gmail.com	Wasim
28	Palash Khan	Business Head	Digital Food	01716530308		Palash
29	Dozmul	Business Head	Digiear	01611703095	dozmul@digiear.com	Dozmul
30	Harun-Or-Rashid	IOT Engineer	systemch Digital Limited	01757409157	harun@systemchdigital.com	Harun
31	Moshiqum Nabid	IOT Engineer	systemch Digital	01521331607	moshiqum.hamam@gmail.com	Moshiqum
32	MD. Wahidur Rahman	Dean Engineer	D Con Design	01827780808		Wahid
33	Hamida Akter Mita		Councillor	01971405810		Mita
34	Towhid Hossain	MD	FIFO Tech	0192711100		Towhid
35	Nazmul Islam	Social Specialist	DEIEDP BHTPA	01711-816552		Nazmul
36	MD. Shezan	P.S		01752700633		Shezan
37	Goutom Kumar Biswas	Social Welfare Officer	DNCC	01911-055748		Goutom

Stakeholder Consultation of Software Technology Park 2

Time: 1.00 pm

Date: 24th July, 2022

Venue: Karwan Bazar

Group: stakeholder dealer & labour

ক্রমিক নং	নাম	পিতার নাম	ঠিকানা	মোবাইল নং	স্বাক্ষর
১	শ্রী. দালাল হোসেন	ফকির আলী হোসেন	শায়খার বাড়ি	০১৭১৫১৪৭৪৪১	
২	সামসুল	শ্রী. শ্রী. হুসেন	✓	০১৭২২১৩৫৩৭১	
৬	শ্রী. হাদিদুল হুসেন	ফকির আলী হোসেন	✓	০১৭১৫২৬১০৭৪	
৪	শ্রী. আব্দুল	সদুল আলী	✓		
৫	শ্রী. হাদিদুল হুসেন	ফকির আলী হোসেন	✓	০১৭১৫১৪৫৫৩	
৬	শ্রী. মনির হোসেন	হামিদ উদ্দিন	✓	০১৭৯৬৬৪৬৫৬১	
৭	শ্রী. হাদিদুল	শ্রী. শ্রী. মজিদ	✓	০১৭১৩৬৫৭১৭০	
৮	শ্রী. হাদিদুল হুসেন	শ্রী. শ্রী. হাদিদুল	✓	০১৬৪৫৭২৫৪৯৬	
১০	শ্রী. মনির হুসেন	শ্রী. হাদিদুল	✓		
১১	শ্রী. মনির হুসেন	শ্রী. হাদিদুল হুসেন	✓	০১৭১০০০৫১৪৭৫	
১২	শ্রী. মনির হুসেন	শ্রী. হাদিদুল হুসেন	✓		

ANNEX 11: Grievance Mechanism

Grievance Mechanism Structure/Architecture

A grievance mechanism is a procedure that provides a clear and transparent framework for responding to concerns and grievances of sub-project-affected parties related to the environmental and social performance of the task in a timely manner. For this purpose, the implementing agency will propose and implement a grievance mechanism to receive and facilitate resolution of such concerns and grievances. This typically takes the form of an internal procedure for complaints, followed by consideration and management response and feedback. Grievances in the sub-project may range from effects on society and the local community due to construction-related activities or negative effects on the livelihood of the sub-project-affected people. Considering the overall need for the total sub-project period, BHTPA intends to establish a GRM to address complaints and grievances starting from Sub-project Implementation Level as there are not likely to be reckonable adverse effects on the community. Based on consensus, the procedure will help to resolve issues/conflicts amicably and quickly, saving the aggrieved persons from resorting to expensive, time-consuming legal actions. The mechanism will, however, not bar an aggrieved person to go to the courts of law. The purpose of the GRM is to record and address any complaints that may arise during the life cycle of the sub-project period effectively and efficiently. The GRM is designed to address concerns and complaints promptly and transparently with no impact (cost, discrimination) on any reports made by sub-project-affected people (PAPs) and the complainants. The GRM works within existing environmental and social management frameworks, providing an additional opportunity to resolve grievances at the local, sub-project, STP/IT/ITeS level operations and at the BHTPA level. Necessary signposting/billboards would be placed at the central places of the sites where people gather for sharing detailed information about the GRCs at every level. The structure of the Grievance Mechanism chain is as follows:

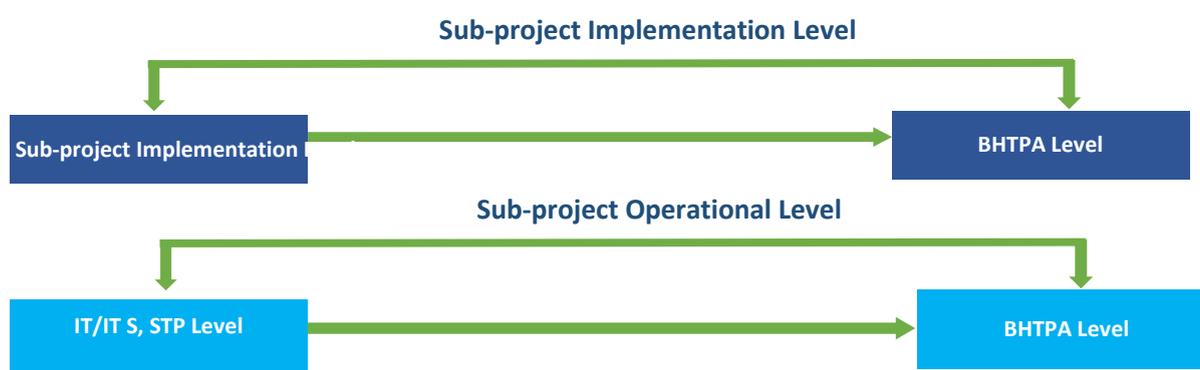


Figure:11.1 Grievance Mechanism structure

The objective of the sub-project implementation level GRM is to bring the GRM closer to PAPs/ workers of the sub-project in its implementation stage. All effort shall be made to resolve issues at the first instance. The Social Specialist at the sub-project level shall carry out the following as regard to redressing grievances:

- Hear the grievances of the PAPs/staffs and workers, and provide an early and mutually satisfactory solution to those;
- If not solved at the initial level then immediately bring to the notice of the pSub-project unit ;
- Inform the aggrieved parties about the progress of actions of their grievances and decisions of the Sub-project unit level.

The sub-project Implementation level GRM shall have the following Grievance Redress Committee (GRC) members:

- Deputy Sub-project Director, DEIEDP-BHTPA (Convenor)
- An elected member of the DNCC North Zone 5/Ward Commissioner, Ward No. 26

- A member of the Bazar Committee/Workers Welfare Committee at Karwan Bazar
- A Member of the PAPs/workers of the sub-project
- Local NGO working on Labor and Gender related Issue
- Environmental Specialist of the sub-project
- Social Specialist of the sub-project (Member Secretary)

The sub-project Implementation level GRC shall resolve or reach a decision within **fifteen (15) days** from the date the complaint is received. The chairperson of the GRC shall communicate the committee's decision to the aggrieved PAPs in writing and maintain a record of all decisions related to each case.

STP Level Grievance Redress Mechanism during Operation Stage

The objective of STP level GRM is to oversee the GRM of the STP at the operation stage and assist the Industries/Entrepreneurs in addressing the grievances immediately upon receipt of a complaint. When a grievance could not be effectively addressed and mitigated at the Industry/Entrepreneur level, it would be forwarded to the BHTPA level for necessary action. All efforts shall be made to resolve issues at the earliest. An appropriate representation of the industry along with the HR Manager at the operational level.

The STP level GRM shall have the following Grievance Redress Committee (GRC) members:

- Director Administration of the Industry/STP/ - Convener
- Representative of the staff or workers of the Industry/STP/ including a female staff/worker
- Elected Representative of the Local Government Institution
- Local NGO working on Labor and Gender related Issue
- HR Manager Administration of IT/ITeS/STP - Member Secretary

PMU (BHTPA) Level Grievance Redress Mechanism

A committee of persons, experienced in the subject area, shall be constituted at the PMU (BHTPA) level to handle complaints that have not been addressed or resolved at the Sub-project implementation and operational level. The BHTPA level GRC shall be comprised of the following members:

Sl. No.	Name/Designation	Organization	Position in GRC
1.	Director (Admin & Finance)	BHTPA	Convener
2.	Sub-project Director, DEIEDP	BHTPA	Member
3.	Deputy Director Planning & DPD/AD, DEIEDP	BHTPA	Member
4.	Environmental Specialist	DEIEDP, BHTPA	Member
5.	Social Specialist	DEIEDP, BHTPA	Member
6.	Representative from STP-1		Member
7.	Assistant Director, DEIEDP	DEIEDP, BHTPA	Member Secretary

The BHTPA level Grievance redress committee shall do everything possible to hear and determine the issues within **15 (fifteen) days** from the date the case has been transferred to it from the Sub-project / IT/ITeS GRC. To ensure impartiality and transparency, hearings on complaints will remain open to the public. The GRCs will record the details of the complaints, the reasons that led to the acceptance or rejection of the particular cases, and the decision agreed with the complainants. BHTPA will keep records of all resolved and unresolved complaints and grievances and make them available for review as and when asked for by the World Bank and other interested persons/entities.

The chairperson of the GRC shall communicate the outcome to the aggrieved PAP(s)/staff in writing. The GRC shall maintain a record of all outcomes related to each case. Should measures taken by the BHTPA fail to satisfy the complainant, the aggrieved party is free to take his/her grievance to the court, and the court's decision will be final.

Grievance Mechanism Intake Channels

Information about the GRM will be publicized as part of the initial disclosure consultations. Brochures will be distributed during consultations and public meetings, and posters will be displayed in public places such as in government offices, sub-project offices, community centers, etc. Information about the GRM will also be posted online on the BHTPA website (<http://www.bhtpa.gov.bd>). The overall process for the GRM will include six steps and described below. This builds on the way grievances are typically managed.

- **Step 1 Uptake:** Different pSub-project stakeholders will be able to provide feedback and report complaints through several channels: in person at offices and at sub-project sites, and by mail, telephone, and email.
- **Step 2 Sorting and processing:** Complaints and feedback will be compiled by the Environmental and Social Development Officer and recorded in a register.
- **Step 3 Acknowledgement and follow-up:** Within fifteen (15) days of the date of a complaint is submitted; the responsible person will communicate with the complainant and provide information on the likely course of action and the anticipated timeframe for resolution of the complaint.
- **Step 4 Verification, investigation and action:** This step involves gathering information about the grievance to determine the facts surrounding the issue and verifying the complaint's validity, and then developing a proposed resolution, which could include changes of decisions concerning eligibility for compensation, additional compensation or assistance, changes in the program itself, other actions, or no actions. Depending on the nature of the complaint, the process can include site visits, document reviews, a meeting with the complainant (if known and willing to engage), and meetings with others (both those associated with the sub-project and outside) who may have knowledge or can otherwise help resolve the issue. It is expected that many or most grievances would be resolved at this stage. All activities taken during this and the other steps will be fully documented, and any resolution logged in the register. It is expected that redress to a complaint can be made within 15 days from the receipt of the complaint.
- **Step 5 Monitoring and evaluation:** Monitoring refers to the process of tracking grievances and assessing the progress that has been toward resolution. The Environmental and Social Specialist will be responsible for consolidating, monitoring, and reporting on complaints, enquiries and other feedback that have been received, resolved, or pending. This will be accomplished by maintaining the grievance register and records of all steps taken to resolve grievances or otherwise respond to feedback and questions.
- **Step 6 Providing Feedback:** This step involves informing those to submit complaints, feedback, and questions about how issues were resolved, or providing answers to questions. Whenever possible, complainants should be informed of the proposed resolution in person. If the complainant is not satisfied with the resolution, he or she will be informed of further options, which would include pursuing remedies through the World Bank, as described below, or through avenues afforded by the Bangladesh legal system. On a regular basis, the PMU will report to the BHTPA and the World Bank on grievances.

Grievance Registry, Referral, Resolution and Appeals Process

The GRC at the sub-project site level will establish a simple computerized system to record the complaints; information on the complainants with names of the enterprises they are employed in; acceptance/rejection of the complaints by GRC and the reasons thereof. If the decision made at this level is not acceptable to the aggrieved person, GRC will refer to the sub-project PMU level. At the operation level of STP, if they too fail to solve the problem, it would be referred to the BHTPA Headquarters with details of the complaint and minutes of the hearings. BHTPA will review the case and send its decision within fifteen days from the receipt of the complaint or earlier. However, if an aggrieved person is dissatisfied with the GRM, he/she may lodge complain following the law of the land. An example of a grievance registration form and Typical grievance resolution process of PRIDE sub-project is given at ANNEX 6: SAMPLE 'GRIEVANCE FORM' AND GRIEVANCE MECHANISM OF PRIDE SUB-PROJECT.

Any GBV related complaints will be handled in a survivor-centric manner in line with the World Bank guidelines provided in the WB good practice note on gender-based violence⁷. GBV-related complaints will be dealt with strict confidentiality, based on the wishes of the GBV-survivor. Any GBV-survivor will be referred to an NGO assigned for the sub-project by the Borrower to manage and respond to GBV cases. This NGO will support GBV survivors in accessing service providers and guiding them through options of lodging a complaint. For further details, please refer to the GBV action plan at

<https://www.worldbank.org/en/news/press-release/2017/11/08/new-action-plan-addresses-gender-based-violence-in-world-bank-operations>

GRM Monitoring and Reporting

Day-to-day implementation of the GRM and reporting to the World Bank will be the responsibility of the Project Director of DEIEDP under PRIDE sub-project. To ensure management oversight of grievance handling, the Internal team will be responsible for monitoring the overall process, including verification that agreed resolutions are actually implemented.

GRM contact information – BHTPA

Information on the sub-project and future stakeholder engagement programs will be available on the sub-project's website and will be posted on information boards in the sub-project office. Information can also be obtained from BHTPA offices. The point of contact regarding the stakeholder engagement program at BHTPA is given below:

Description	Contact details
Company:	Bangladesh High-Tech Park Authority
To:	Sub-project Director
Address:	Bangladesh Hi-Tech Park Authority, ICT Tower (9th Floor), E-14/X, Agargaon, Dhaka-1207
E-mail:	pd.deiedp@bhtpa.gov.bd
Website:	www.bhtpa.gov.bd
Telephone:	Phone: +88-02- 55006889, Mobile: 01849462230

⁷ The World Bank (2018): Good Practice Note Addressing Gender Based Violence in Investment Sub-project Financing involving Major Civil Works. <http://documents.worldbank.org/curated/en/399881538336159607/Environment-and-Social-Framework-ESF-Good-Practice-Note-on-Gender-based-Violence-English.pdf>

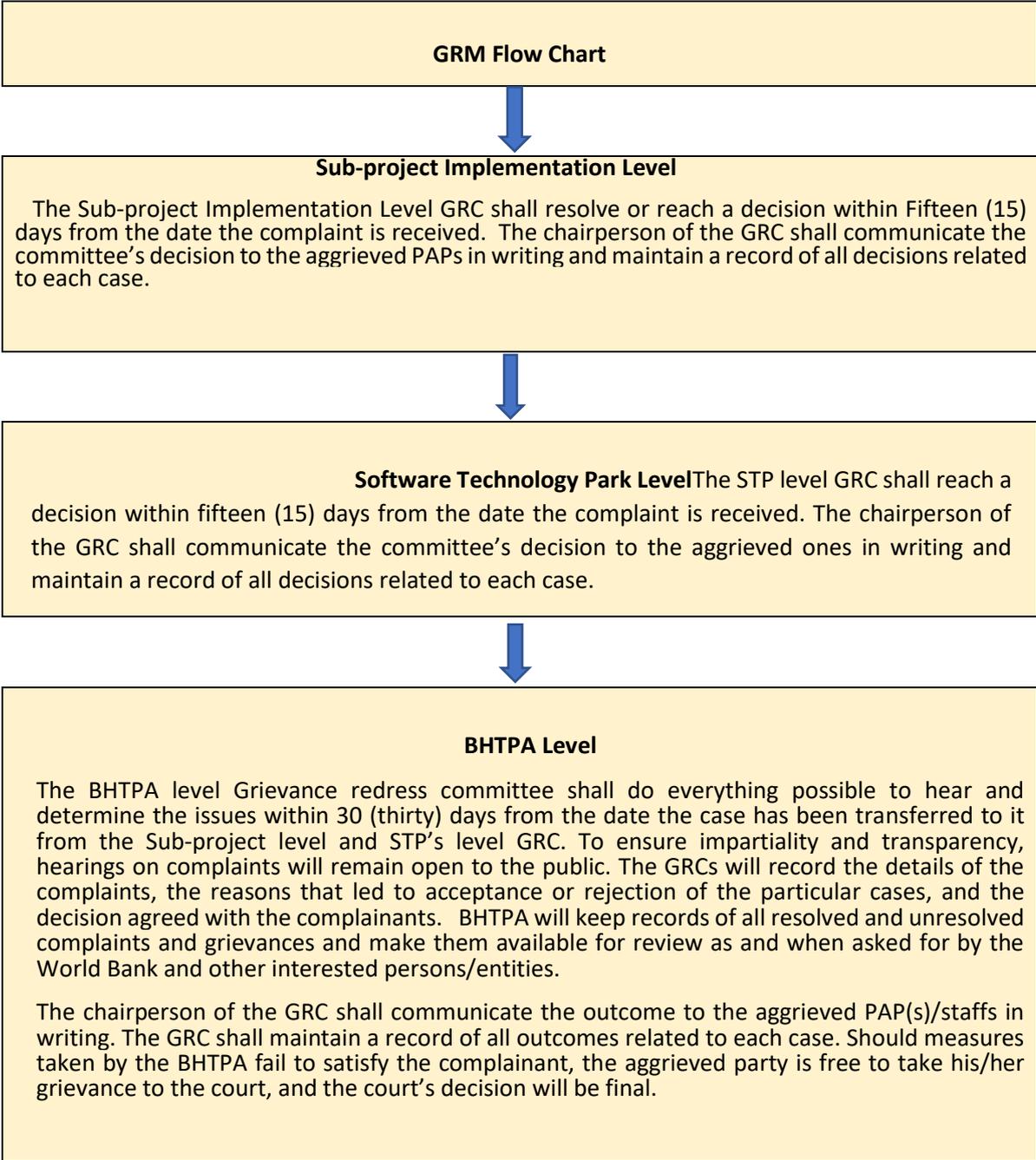


Figure:11.2 GRM Flow Chart

