



**Bangladesh Inland Water Transport Authority (BIWTA)**  
**Ministry of Shipping**  
**Government of the People's Republic of Bangladesh**



Project: Bangladesh Regional Waterway Transport Project-1  
(BRWTP-1)  
(IDA Credit No.: 5842-BD, Contract # BRWTP-S6)



## Environmental and Social Impact Assessment of proposed new and upgradation of Cargo and Passenger River Terminals

### Final Report

ESIA for Cargo and Passenger River Terminals

Annex

(EC5706-FINAL-ESIA-ANNEX-BRWTP-S6-Ed04)

FEBRUARY 2022

**TYPSA**  
CONSULTING  
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& ARCHITECTS

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Environmental and Social Impact Assessment of proposed new and up-  
gradation of Cargo and Passenger River Terminals. BRWTP-S6  
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT



ANNEX 1. TOR FOR ESIA







## Bangladesh Inland Water Transport Authority (BIWTA)

### BANGLADESH REGIONAL WATERWAY TRANSPORT PROJECT-1

Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Shelters RWTP-S6

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Table 1. ABBREVIATIONS

▪ ARIPA	Acquisition and Requisition of Immovable Property Act of 2017
▪ BCCSAP	Bangladesh Climate Change Strategy and Action Plan
▪ BIWTA	Bangladesh Inland Water Transport Authority
▪ BIWTMAS	Bangladesh Inland Water Transport Master Plan
▪ BNBC	Bangladesh National Building Code
▪ BRWTP	Bangladesh Regional Waterway Transport Project
▪ DFR	Draft Feasibility Report
▪ DGPS	Differential Geographic Positioning System
▪ DoE	Department of Environment
▪ ECC	Environmental Clearance Certificate
▪ ECR	Environment Conservation Rules
▪ EIA	Environmental Impact Assessment
▪ EMP	Environmental Management Plan
▪ EQS	Environmental Quality Standards
▪ ESIA	Environmental and Social Impact Assessment
▪ FGD	Focus Group Discussion
▪ GoB	Government of Bangladesh
▪ IEE	Initial Environmental Examination
▪ IWT	Inland Waterway Transport
▪ MARPOL	International Convention for the Prevention of Pollution from Ships
▪ MoEF	Ministry of Environment and Forest
▪ MoS	Ministry of Shipping
▪ NEMAP	National Environmental Management Action Plan
▪ NEP	National Environment Policy
▪ NIMTP	National Integrated Multimodal Transport Policy
▪ NPV	Net Present Value
▪ RAP	Resettlement Action Plan
▪ RFP	Request for Proposal
▪ SDG	Sustainable Development Goal
▪ SIA	Social Impact Assessment
▪ SPM	Shore Protection Manual
▪ TOR	Terms of Reference
▪ WB	World Bank

## 1. INTRODUCTION

There is a large network of navigation routes along Bangladesh consisting of hundred of rivers. Due to that fact, inland waterways are very important transport link between different parts of the country and also it is an important mean of transporting export-import cargo as well.

Navigability of inland waterways is intensely influenced by river morphology and hydraulics. River systems in Bangladesh exhibits high seasonality over a year i.e. abundant of water during monsoon and scarcity of water during dry season from December to May. Approximately, the total length of navigable waterways during monsoon is about 4,000 km and 2,000-2,500 km is navigable during the low water period (IUCN, 2012).

Over the decades transport demand in Bangladesh has grown faster. However, the shares of different transport modes particularly IWT and railway did not increase in the same proportion. The road sector carried the majority of the increase in passenger traffic, with a share of 73% by 1996. In the freight sector where IWT had been playing a dominant role, its share also eroded from 37% in 1974 to 30% in 1996 and 16% in 2005. A World Bank study on Revival of inland Water Transport conducted in 2006 estimated that 102 million passengers and 30 million metric tons of freight were transported by inland waterways in 2005.

The vision for the inland water transport (which includes coastal waterways) is to develop and operate the system safely and efficiently according with the IWT sector policy and integrated multimodal transport policy (IMTP).

### 1.1 BACKGROUND TO THE PROJECT

Bangladesh Regional Waterway Transport Project – 1 intends to develop and improve facilities used along the corridor. The Government has identified 65 main river navigation routes that are essential to passenger and freight transport within Bangladesh. Of these, 12 have been clearly identified as high priority. The Government of Bangladesh has prioritized the improved development and maintenance of rivers included in the routes along the Dhaka-Chittagong corridor. For this purposes “Bangladesh Regional Waterway Transport Project 1” has been undertaken with the support of World Bank.

The proposed project requires carrying out an Environmental and Social Assessment in accordance with the Environment Conservation Act 1995 (subsequent amendment), the Environment Conservation Rules 1997, and the World Bank Safeguard Policies.

Bangladesh Inland Water Transport Authority (BIWTA) is the Execution Agency and Consulting firms is TYPESA (Spain) with KS (Bangladesh) as a sub-Consultant. The project is Public fund of GOB and Red category according to guideline of DoE.

#### 1.1.1 Project Description

Dhaka - Chittagong corridor (Component 2): Improved Services at Priority Inland Waterway Terminals and Landing Ghats/Stations. This component supports the development of two cargo terminals, four passenger terminals and

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fifteen landing ghats/stations.

Moreover, this project include a resettlement action plan (RAP) for the 6 passenger and cargo terminals, 15 river landings and for the 6 vessel storm shelters.

The cargo terminals include: (i) extension of the existing Pangaon Container Terminal with new general cargo vessel berths and land access infrastructure on the Buriganga river; and, (ii) rehabilitation and modernization of the existing general cargo terminal at Ashuganj including river bank erosion prevention, the replacement of pontoons, gangways and other dilapidated marine structures, the extension of berthing space.

The passenger terminals include: (i) construction of a new passenger terminal at Shashanghat, downstream of the existing terminal at Sadarghat where landside congestion preclude the development of additional berths; (ii) rehabilitation works for the passenger terminal at Narayanganj; (iii) rehabilitation of works for the passenger terminal at Chandpur; and, (iv) extension of the existing passenger terminal at Barisal.

Rehabilitation works or new construction of 15 landing stations or launch ghats under this Project are designed to provide access for rural communities, some of which in the lower Meghna delta have no alternative means of transport.

The proposed locations of the sites for the terminals, landing stations and vessel shelters are showed in the next figure; however, the final locations for the terminals, landings and shelters will be detailed on S3, S4 and S5 Packages.



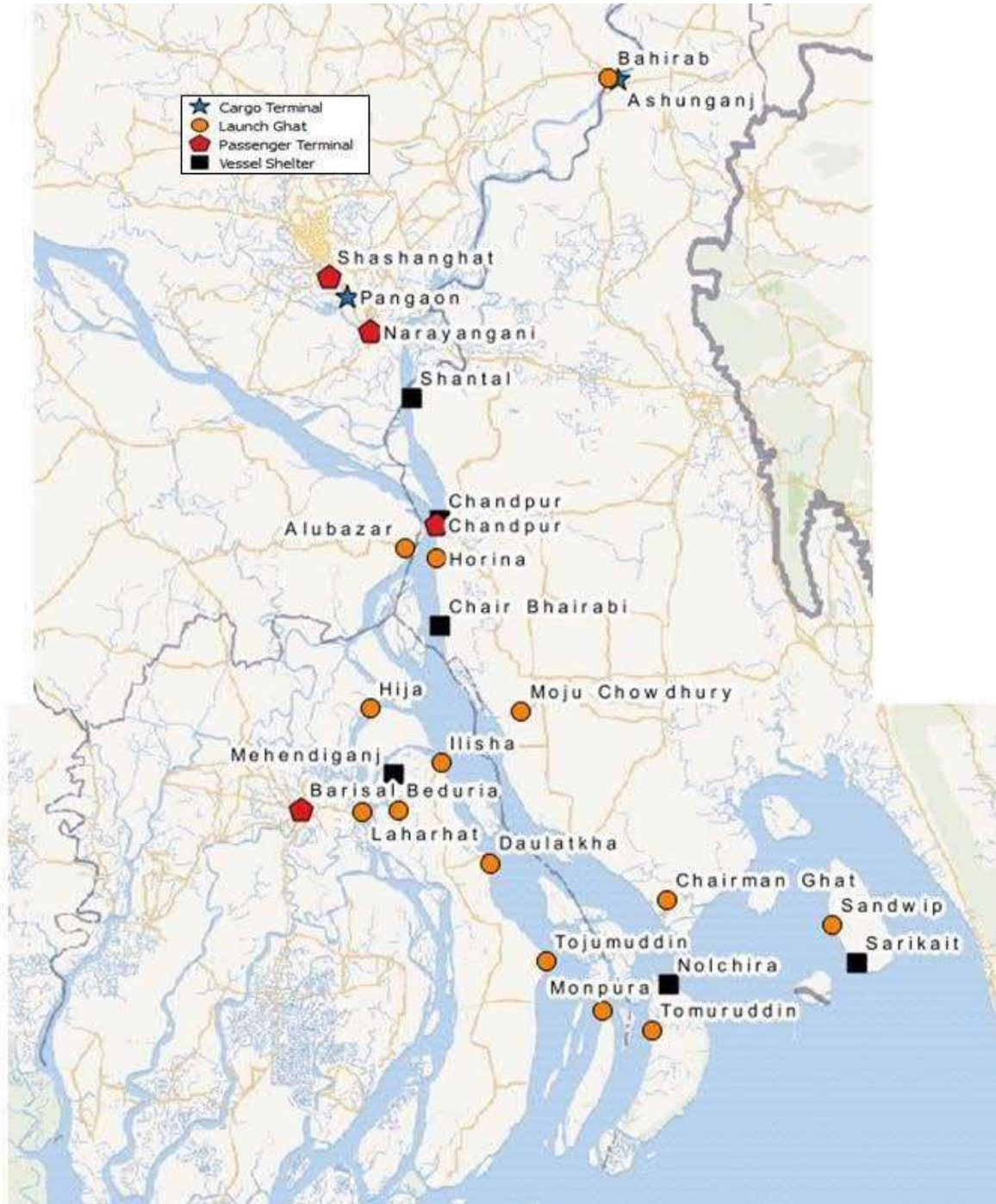


Figure 1. Location Map for S3, S4 and S5 packages

Bellow a description of location map for the terminals, landings and shelters where due to the magnitude of the study area we split the project area into 3 different geographical zones.

a) Zone A: The Upper Meghna Flood Plain

This area comprises the following facilities

- 2 Cargo Terminals
- 2 Passenger Terminals
- 1 Launch Ghat (not included on BRWTP-S6)
- 1 Vessel Shelters

b) Zone B: The Lower Meghna River

This area comprises the following facilities

- 2 Passenger Terminals
- 7 Launch Ghats (not included on BRWTP-S6)
- 3 Vessel Shelters

c) Lower Meghna Estuary, mudflats

This area comprises the following facilities

- 5 Launch Ghats (not included on BRWTP-S6)
- 2 Vessel Shelters

## 1.2 OBJECTIVES

The main objective of the ESIA study is to assess both positive and negative environmental and social impacts due to the project activities; to assess the impacts and recommend appropriate mitigation measures during preconstruction, construction, and operation phases to minimize negative impacts of the project to acceptable levels.

The Environmental and Social Impact Assessment (ESIA) will be used as a decision-making tool to ensure that the project design and implementation of the related construction activities and subsequent activities are environmentally sustainable and socially acceptable.

The present Study will comprise the following:

- Environmental and Social Impact Assessment (ESIA):
  - 1 ESIA for the 4 passenger and 2 cargo river terminals.
  - 1 ESIA for the 15 river landings and for the 6 vessel storm shelters.
- 1 Resettlement action plan (RAP) for the 6 passenger and cargo terminals, 15 river landings and for the 6 vessel storm shelters

The ESIA for the 6 passenger and cargo terminals and ESIA for the 15 river landings and for the 6 vessel storm shelters will be based on site specific assessment of each passenger/cargo terminals, river landings, vessel storm shelters respectively.

## 1.3 ENVIRONMENTAL CLASSIFICATION AND NEED FOR THE EIA

Department of Environment (DoE) under the Ministry of Environment and Forest (MoEF) is the sole entity to issue environmental clearance to any Governmental, Non-Governmental or private Organization intending to develop a project or set up an industry. Environmental Impact Assessments (EIA) should be conducted before projects are undertaken.

All existing and proposed industrial units and projects, that are considered to be low polluting are categorized under "Green" and shall be granted Environmental Clearance. For proposed industrial units and projects falling in the Orange-A, Orange-B and Red Categories, firstly a site clearance certificate and thereafter an environmental clearance certificate will be required.

A detailed description of these four categories of industries has been given in Schedule-1 of ECR'97. Apart from general requirement, for every Red category proposed industrial unit or project, the application must be accompanied with feasibility report, Initial Environmental Examination (IEE), Environmental Impact Assessment (EIA) based on approved terms of reference (ToR) by DoE, Environmental Management Plan (EMP). As per ECR'97, water resources development projects fall under 'Red' category project. Therefore, the project is also categorized as 'Red' which requires IEE, EIA and EMP for environmental clearance from DoE.

The ECR'97 describes the procedures for obtaining Environmental Clearance Certificates (ECC) from the Department of Environment for different types of proposed units or projects. Any person or organization wishing to establish an industrial unit or project must obtain ECC from the Director General. The application for such certificate must be in the prescribed form together with the prescribed fees laid down in Schedule 13, through the deposit of a Treasury Challan in favor of the Director General.

The fees for clearance certificates have been revised in 2010. Rule 8 prescribes the duration of validity of such certificate (three years for green category and one year for other categories) and compulsory requirement for renewal of certificate at least 30 days before expiry of its validity.

As part of the ECC application, a detailed ESIA with EMP satisfactory to the doe will be prepared.

The Department of Environment (DOE) may take up to sixty (60) days to approve the ESIA and thirty (30) more days to issue the environmental clearance, provided everything complies with the requirements. This may be quite a lengthy process if doe uses the full extent of the time limits.

## 1.4 SCOPE OF WORK

The Study will cover all area of influences from the Dhaka - Chittagong corridor. All assessments, survey, investigation, and stakeholder consultations will be mention in the scope of works.

### 1.4.1 Work Program and deliverables

- Inception Report: including results of scoping, outlines for the ESIA and RAP and workplan
- Executive Summary for the ESIA and RAP in both English and Bengali
- Final ESIA Reports including environmental Management Plan (EMP) and Social Management Plan (SMP)
- Disaster Management Plan
- Final RAP

Total Project period will be 10 months. Even note that we have the monsoon period for the months of June, July and August which will extend our Total Project Period in 4 months.

## 1.5 EIA TEAM

The ESIA &RAP team of include the following key experts:

N°	NAME	Position
K-1	Enrique Pinero	Team Leader
K-2	Kushal Roy	Environmental Engineer
K-3	Md. Abdur Rob Mollah	Ecologist
K-4	Kariul Matin	Social Development & Resettlement Specialist
K-5	Md. Asahdula Sadat	Community Engagement Expert I
K-6	Mohsen Ara	Community Engagement Expert II
K-7	Begum Shamsun Nahar	Gender Expert

Table 1. ESIA & RAP team of experts

The following figure resumes the organization of the team to accomplish with the objective of the project

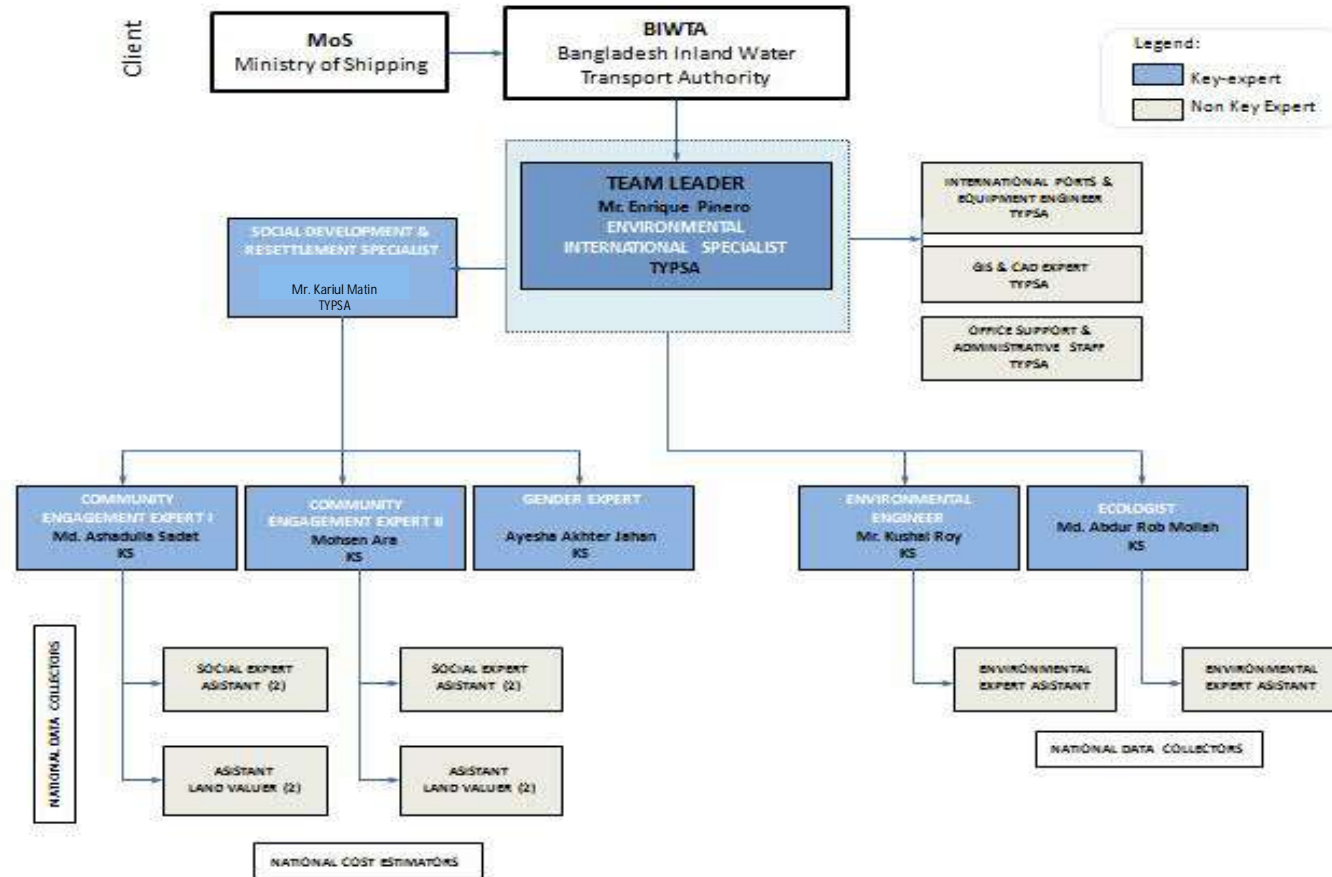


Figure 2. ESIA & RAP Team organization Schedule

## 2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

### 2.1 NATIONAL ENVIRONMENTAL POLICY, 1992

The Bangladesh National Environmental Policy, approved in May 1992, sets out the basic framework for environmental action together with a set of broad sectoral action guidelines. Key elements of the Policy are: Light ecological balance and ensuring sustainable development of the country through protection and conservation of the environment

- Protecting the country from natural disasters
- Identifying and regulating all activities that pollute and destroy the environment
- Ensuring environment-friendly development in all sectors
- Ensuring sustainable and environmentally sound management of the natural resources
- Maintaining active association, as far as possible, with all international initiatives related to environment

The Environmental Policy of 1992, which amongst other policies, seeks to ensure that transport systems, including roads and inland waterways, do not pollute the environment or degrade resources. The Policy states that Environmental Impact Assessments (EIA) should be conducted before projects are undertaken.

#### 2.1.1 National Environment Management Action Plan (NEMAP), 1995

The National Environmental Management Action Plan (NEMAP) is a wide-ranging and multifaceted plan, which builds on and extends the statements, set out in the National Environmental Policy. NEMAP was developed to address issues and management requirements during the period 1995 to 2005, and set out of the framework within which the recommendations of the National Conservation Strategy are to be implemented. NEMAP was developed based on the following broad objectives:

- Identification of key environmental issues affecting Bangladesh
- Identification of actions necessary to halt or reduce the rate of environmental degradation
- Improvement of the natural environment
- Conservation of habitats and bio-diversity
- Promotion of sustainable development
- Improvement of the quality of life of the people

To this end, it has grouped all the relevant necessary actions under four heads: institutional, sectoral, location-specific and long-term issues. The institutional aspects reflect the need of intersectoral cooperation to tackle environmental problems those need new and appropriate institutional mechanisms at national and local levels. The sectoral aspects reflect the way the Ministries and agencies are organized and make it easier to identify the agency to carry out the recommended actions.

The location-specific aspect focuses on particularly acute environmental problems at local levels that need to be addressed on a priority basis. The long-term issues include environmental degradation of such degree that it might become more serious and threatening than they seem to be if their cognizance is not immediately taken.

### 2.1.2 The Environment Conservation Act, 1995 (subsequent amendments in 2000, 2002 and 2003)

The provisions of the Act authorize the Director General (DG) of Department of Environment to undertake any activity he deems fit and necessary to conserve and enhance the quality of environment and to control, prevent and mitigate pollution. The main highlights of the act are:

- Declaration of Ecologically Critical Areas;
- Procurement of the Environmental Clearance Certificate;
- Regulation with respect to vehicles emitting smoke harmful for the environment;
- Regulation of development activities from environmental perspective;
- Promulgation of standards for quality of air, water, noise, and soils for different areas and for different purposes;
- Promulgation of acceptable limits for discharging and emitting waste;
- Formulation of environmental guidelines relating to control and mitigation of environmental pollution, conservation and improvement of environment.

### 2.1.3 Environment Conservation Rules, 1997 (subsequent amendments in 2002 and 2003)

The Environment Conservation Rules, 1997 are the first set of rules promulgated under the Environment Conservation Act, 1995. These Rules provide for, inter alia, the following:

- The national Environmental Quality Standards (EQS) for ambient air, surface water, groundwater, drinking water, industrial effluents, emissions, noise and vehicular exhaust;
- Categorization of industries, development projects and other activities on the basis of actual (for existing industries/development projects/activities) and anticipated (for proposed industries/development projects/activities) pollution load;
- Procedure for obtaining environmental clearance;
- Requirement for undertaking IEE and EIA as well as formulating EMP according to categories of industries/development projects/activities;
- Procedure for damage-claim by persons affected or likely to be affected due to polluting activities or activities causing hindrance to normal civic life.

Depending upon location, size and severity of pollution loads, projects/activities have been classified in ECR, 1997 into four categories: Green, Orange A, Orange B and Red respectively, to nil, minor, medium and severe impacts on important environmental components (IECs). Corresponding categories of passenger terminals, cargo terminals, storm shelters and ghats projects are not directly being mentioned in the ECR 97 but similar project are:

**Orange B** category:

- Item 44. Repairing of metal vessel
- Item 45. Engineering works (up to 10 hundred thousand Taka capital.)
- Item 63. Construction, re-construction and extension of road (feeder road, local road).
- Item 65. Public toilet.

### Red category

- Item 54. Metallic boat manufacturing.
- Item 60. Engineering works: capital above 10 (ten) hundred thousand Taka.
- Item 66. Construction/reconstruction/expansion of flood control embankment, polder, dike, etc.
- Item 67. Construction/reconstruction/expansion of road (regional, national & international).

#### 2.1.4 The EIA Guidelines for Industry, 1997

The EIA Guidelines is a handbook for procedures for preparing the EIAs and for reviewing them for the benefit of the development partners, EIA Consultants, reviewers, and academicians. While preparing these guidelines, the present environmental status as well as the need for rapid economic development of Bangladesh has been kept in view. These considerations have essentially resulted in simpler procedures to be followed for preparing the EIAs and their review.

#### 2.1.5 Integrated Multi-modal Transport Policy (IMTP)

The national IMTP has been in force since 2013 and aims to build a secure, dependable and uninterrupted transport network addressing the relative problems in road, rail and inland waterways including the access to the sea and air ports. It states about adjusting the road vehicular emission standards and enforcing. However, the issues of waterborne vessels are still nonexistent in the policy.

#### 2.1.6 Bangladesh Climate Change Strategy and Action Plan (BCCSAP)

The BCCSAP document came into play in 2009, which was built on six pillars. The fifth pillar focuses on “mitigation and low carbon development”. The objective of this fifth pillar to evolve low carbon development options and implement these within the frame of the country’s economic growth and energy demand. Under this fifth pillar the government has expressed its interest to 5 work plans, of which 3 work plans may contribute to the IWT sector in general:

- Work plan #1: Develop a strategic energy plan and investment portfolio to ensure national energy security and lower greenhouse gas emissions.
- Work plan #2: Seek the transfer of state-of the art technologies developed countries to ensure that we follow a low carbon development path (e.g., ‘clean coal’ and other technologies).
- Work plan #3: Review energy and technology policies and incentives and revise these, where necessary, to promote efficient production, consumption, distribution and use of energy.

## 2.2 POLICY ON SOCIAL SAFEGUARDS

### 2.2.1 Land Acquisition and Resettlement Strategy

Social safeguards policy, particularly the land acquisition and resettlement strategy for the Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Shelters under the Bangladesh Regional Waterway Transport Project-1 will follow the Acquisition and Requisition of Immovable Property Act of 2017 (ARIPA) in Bangladesh and the World Bank policy on Involuntary Resettlement as embedded in the Operational Policy (OP)<sup>2</sup>. The philosophy underlying the safeguard policy is to



avoid and minimize land acquisition and resettlement (LAR) impact, and it is a key strategy for the project. This will be achieved by careful design of the inland water transport (IWT) routes and infrastructure, particularly for construction of physical facilities for passenger/cargo terminals, landing stations and vessel shelters.

### 2.3 INTERNATIONAL TREATIES

Bangladesh is signatory to several International conventions and treaties including MARPOL 73/78 (Prevention of Pollution from Ships), OPRC (Oil Pollution Preparedness Response and Cooperation) or the LC Convention 72 (dumping of ship wastes).

The International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) is subject to enforcement in Bangladesh marine and coastal waters. Therefore, ships in Bangladesh Ports are subject to inspection for the purpose of enforcing MARPOL 73/78. Bangladesh has signed most international treaties, conventions and protocols on environment, pollution control, bio-diversity conservation and climate change, including the Ramsar Convention, the Bonn Convention on migratory birds, the Rio de Janeiro Convention on biodiversity conservation and the Kyoto protocol on climate change.

An overview of the relevant international treaties and conventions is shown in next table .

Table 2. International Treaties, Conventions and Protocol and their relevancy to the proposed project

TREATY OR CONVENTION	BRIEF DESCRIPTION	PROJECT COMPLIANCE
London Convention	The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972, commonly called the "London Convention" or "LC '72" and also abbreviated as Marine Dumping, is an agreement to control pollution of the sea by dumping and to encourage regional agreements supplementary to the Convention.	The Convention is indirectly relevant for the present ESIA as dredging operation is planned not only in the major river routes but also in the delicate coastal ecosystem of the country.
MARPOL Convention	The International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes.	The Convention is in line with the study in question. Most of the Annexes of MARPOL is required to be observed by the project proponent strictly as per EMP recommendation advocating strict observance to this and other relevant Conventions as Bangladesh is a signatory to this Convention.
Ramsar Convention	Protection of wetlands. Broadly applicable for wetlands in and around the project influence area.	The operation may affect wetland habitat. Mitigation measures shall be included in EMP to address potential impacts on wetlands and associated resources as well.
Protocol on Waterfowl Habitat	Amendment of Ramsar Convention to protect specific habitats for waterfowl.	Broadly applicable for wetlands in and around the project influence area. Mitigation measures shall be included in EMP address potential impacts on

TERMS OF REFERENCE FOR ENVIRONMENTAL IMPACT ASSESSMENT

		wetlands and associated ecological resources as well.
CITES Convention (Washington)	Ban and restrictions on international trade in endangered species of wild fauna and flora.	Not directly relevant to the project intervention since the project does not involve in any international trade of endangered species of wild fauna and flora. General restrictions have however been included in the Environmental Code of Practice.
Prevention and Control of Occupational hazards (Geneva)	Protect workers against occupational exposure to carcinogenic substances and agents.	Compliance to this shall be taken care of in the EMP of the ESIA report due to the fact that interventions involve occupational risks to some extent.
Occupational hazards due to air pollution, noise & vibration (Geneva)	Protect workers against occupational hazards in the working environment.	Relevant as there will be pollution due to gaseous emission from dredging equipment, vehicle movement as well as noise. Appropriate mitigation and protective measures shall be included in the EMP.
Occupational safety and health in working Environment (Geneva)	Prevent accidents and injury to health by minimizing hazards in the working environment.	Broadly applicable to the project activities under the project. .
Occupational Health Services (Geneva)	To promote a safe and healthy working environment.	Broadly applicable to the project activities under the project.. Appropriate mitigation and protective measures shall be included in the EMP.
Civil liability on transport of dangerous goods (Geneva)	Safe methods for transport of dangerous goods by road, railway and inland vessels.	Broadly applicable to transportation of substances such as fuels during the project construction phase. Appropriate mitigation measures shall be included in the EMP.
UN framework convention on climate change (Rio de Janeiro)	Regulation of greenhouse gases emissions (GHGs).	The study will take due care of the convention as the intervention area is located within climate vulnerable zone. Appropriate mitigation and protective measures shall be included in the EMP to minimize emissions of GHGs.
Convention on Biological Diversity (Rio de Janeiro)	Conservation of bio-diversity, sustainable use of its components and access to genetic Resources.	The ESIA will be prepared addressing conservation of biological species as these are subject to be affected by the project intervention. Appropriate mitigation and protective measures shall include in the EMP for the conservation of biodiversity.
International Convention on Climate Changes (Kyoto Protocol)	International treaty on climate change and emission of greenhouse gases.	The ESIA will be prepared with due note to the Kyoto Protocol as the project interventions are in the climate vulnerable area. Appropriate mitigation and protective measures shall be included in

	the EMP to minimize emissions of GHGs.
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## 2.4 WORLD BANK SAFEGUARD POLICIES

### 2.4.1 Overview of OPs and Guidelines

The main purposes of the Bank's safeguard policies are to (i) avoid harm to the environment and affected people and provide affected people an opportunity to participate in the development process; (ii) improve project design and performance; and (iii) protect the reputation of the Bank. The current set of safeguard policies cover a broad range of topics from environmental assessment to natural habitats, forests, resettlement, and Indigenous Peoples and others. The policies are the reflection of international conventions and internationally accepted principles of good practice in project preparation and implementation. The following table precisely presents World Bank Safeguard Policies and their applicability to the Project.

OP NUMBER	BRIEF DESCRIPTION	PROJECT COMPLIANCE
OP 4.01 Environmental Assessment	The World Bank requires an Environmental Assessment (EA) for all projects proposed for Bank financing to ensure that these projects are environmentally sound and sustainable. The proposed BIWTA project is classified Category A, because of the scope of the expected impacts from dredging operation, river training, vessel shelter construction and operation, the impacts of land acquisition, and the expected impacts on the natural environment.	Triggered. ESIA shall be prepared considering A Category project as per OP 4.01.
OP 4.04 - Natural Habitats	There are no designated conservation areas or nature reserves in the project area. However, OP 4.04 does apply since the intervention area covers major navigation routes including lower Meghna and part of estuary which consists of natural char lands in the active Meghna floodplain, with typical floodplain habitats and breeding grounds that might be affected by the project.	Triggered. The ESIA report shall be prepared in consideration of all ecological sensitive areas.
OP 4.10 Indigenous People	For purposes of this Policy, the term 'Indigenous Peoples' is used in a generic sense to refer to a distinct, vulnerable, social and cultural group	Not triggered.
OP 4.11 Physical Cultural Resources	The World Bank's general policy regarding cultural properties is to assist in their preservation, and to seek to avoid their elimination.	Triggered. A full baseline will be done to identify the Physical Cultural Resources (PCR) and an EMP and RAP will be formulated to mitigate identified issues.
OP 4.12 - Involuntary Resettlement	The project may require land acquisition for management of dredged material handling as well as construction of vessel shelter.	Triggered. Separate social studies will be carried out and resettlement action plans (RAP) is being prepared.
OP 4.36 Forests	This Policy recognizes the need to reduce deforestation and promote sustainable forest	Triggered. This OP is triggered since the dredging operation will

TERMS OF REFERENCE FOR ENVIRONMENTAL IMPACT ASSESSMENT

OP NUMBER	BRIEF DESCRIPTION	PROJECT COMPLIANCE
	conservation and management in reducing poverty. The Bank believes that forests are very much essential for poverty reduction and sustainable development irrespective of their location in the world.	be over a long period located in different reaches including coastal area having mangrove vegetation and social forestry.
OP 7.50 Projects on International Waterways	Projects on international waterways may affect the relations between the World Bank and its borrowers, and between riparian states.	Triggered. This Policy is triggered since the navigation route include international waterway. However, as Bangladesh is the most downstream country of the Major river system, the proposed project is not expected to adversely change the quality or quantity of water flow to the other riparian countries.
BP 17.50 - Public Disclosure Information of	According to the Bank Policy as well as ToR obligation the EA should be made available to the public by disclosure at public libraries or other places accessible to project affected groups, including a Summary EA in the local language.	The ESIA/EMP, SMP and RAP will be disclosed for Public by BIWTA web site. The EIA Executive Summary will be translated in Bangla.

Table 3. World Bank Safeguard Policies and their applicability to the Project

#### 2.4.2 World Bank EHS Guidelines

GUIDELINES	DESCRIPTION	PROJECT RELEVANCY
Environmental Health and Safety Guidelines	The Environment, Health, and Safety (EHS) Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities or project by existing technology at reasonable costs.	These Guidelines will be applicable to the Project particularly with respect to air emissions, ambient air and noise quality standards, waste water quality, hazardous material and waste management, and occupational and community health and safety management.
Environmental, Health, and Safety Guidelines PORTS, HARBORS, and TERMINALS		Relevant as the project includes provision of improved navigation routes and terminal facilities. EMP section of the ESIA report shall be dedicated to mitigate adverse impact due to the proposed intervention.

Table 4. World Bank Environmental, Health and Safety Guidelines and project compliance

### ▪ Project Policy COMPLIANCE

Following a detail review of the contains of those policies more relevant to the project and a review or their relevance and required compliances

#### ▪ National Environmental Policy, 1992

The National Environment Policy (NEP), sets out the basic framework for environmental action, together with a set of broad sector action guidelines. The Policy provides the broader framework of sustainable development in the country.

The policy addresses 15 sectors in all, in addition to providing directives on the legal framework and institutional arrangements. Transport, water pollution and marine environment are some of the key sectors covered in this policy. The main policy requirements related to the water sector are to ensure environmentally sound utilization of resources, so that developments do not create any significant adverse impacts on the environment; and that all water bodies and water resources are kept free from pollution. The policy also emphasizes on biodiversity conservation and sustainable uses of natural resources.

The policy mentions that, an EIA should be conducted before projects are undertaken.

Relevance and compliances: The Project should ensure that project activities do not degrade the environmental and its biota and needs to undertake EIA Study and address the potential impacts.

#### ▪ Environment Conservation Act, 1995 (Amended in 2000, 2002, 2007 and 2010)

The Bangladesh Environment Conservation Act is the key legislation relating to environment protection in Bangladesh, articulates and expands upon the environmental management and sustainable development goals of the NEP, defining the environmental regulatory regime and DoE's mandate with respect thereto. It provides guidance for conservation of the environment, improvement of environmental standards and control and mitigation of environmental pollution. It includes provisions for the declaration of ECAs (ecologically Critical Areas), restrictions on vehicle emissions, restrictions on the manufacture and sale of articles injurious to the environment, remedial measures (including compensation and/or corrective measures), restrictions on environmental pollution discharges, environmental clearances and formulation of environmental guidelines.

The Act has an overriding effect in that notwithstanding anything contained to the contrary in any other law for the time being in force, the provisions of the Act, and rules and directions issued under the Act shall have effect. . Failure to comply with any part of this Act may result in punishment.

This Act has established the Department of Environment (DoE), to take measures as it considers necessary which includes conducting inquiries, preventing probable accidents, advising the Government, coordinating with other authorities or agencies, and collecting and publishing information about environmental pollution. According to this Act (Section 12), no industrial unit or project shall be established or undertaken without obtaining, in a manner prescribed by the accompanying Rules, and Environmental Clearance Certificate (ECC) from the Director General of DoE.

The amended Act has provision for putting objections for taking legal actions against the polluters or any entity creating nuisance to affected person. The Act also emphasizes on the protection of country's biodiversity that are likely to be affected by any damaging activities.

Relevance and required compliance: According this Act, all projects require to obtain clearances from the DoE prior to project work to begin and need undertake EIA Study, if required, and prepare an EMP for safeguarding the environment. It is the requirement of the Act that environmental soil, air and water qualities are preserved while

undertaking any developmental activities.

- Environment Conservation Rules 1997 (ECR) (amended in 2002 and 2003)

The Environmental Conservation Rules (ECR) promulgated under the Environmental Conservation Act, 1995, specifies the environmental approvals processes for various project types and provides allowable limits for air and water parameters and noises. Based on location, size and severity of pollution loads of the projects/ activities have been classified into four categories: Green, Orange A, Orange B and Red respectively from nil, minor, medium and severe impacts on important components of the environment (IECs).

The project activities are likely to cause changes in the air, water, soil and noise quality affecting the health, biodiversity and the ecosystem integrity. As per Item 67, 63 of the Act the BRWTP-1 falls under the Red category requiring a full length EIA Study and prepare an EMP.

Relevance and required compliance: The BRWTP-1 falls under the DoE's Red Category project and as such the project requires to undertake a complete EIA Study to getting an Environment Clearance Certificate (ECC). The project needs to follow some procedural steps for obtaining IEE, ECC from the DoE. The project also needs to demonstrate that the EMP is in place to keep the air, water and noise parameters within the DoE's standards. It is also required to submit environmental monitoring reports to DoE during implementation of the Project.

- National Biodiversity Strategy and Action Plan (NBSAP) (1995)

Prepared as a commitment under the CBD, the NBSAP proposes a National Biodiversity Policy for Bangladesh based on the principles of the CBD. It forms a national framework for both initiating and executing activities leading to the conservation and sustainable use of biodiversity and establishing mechanisms to ensure equitable sharing of the benefits derived from such activities. It outlines 16 strategies and subsequent actions to be implemented under the proposed biodiversity policy, including a prioritization of those actions. The relevant strategies to the project are: (i) conserve and restore the biodiversity of the country for the well being of the present and future generations, (ii) maintain and improve environmental stability for ecosystems (iii) ensure preservation of the unique biological heritage of the nation for the benefit of the present and future generations, and (iv) guarantee the safe passage and conservation of globally endangered migratory species, especially birds and mammals in the country

Relevance and required compliances: The project construction activities are likely to negatively affect the water quality affecting the aquatic biodiversity. Protection of migratory birds. As per the Action Plan, and preserve t Ecological Critical Area (ECA) Rules, 2016

The ECA Rules, dedicated to the protection of ECA sites, developed under the ECR, 1997, The Rules explain and guide the management mechanism of the ECA sites in the country. Among others, the Rules also define the prohibited activities in the ECA, (Article 18) and provision for requiring permission from DoE for implementing some activities that might cause changes in the the physiographic features of an ECA.

Relevance and required compliances: Two ECA sites, the Burigonga River and the Shitalalykha River, are located within the project boundary of the Zone 1 project sites. The project needs obtaining permission from the DoE for undertaking project activities in the ECA sites.

- National Fisheries Policy, 1998 (amended in 2010)

The National Fisheries Policy aims to develop and increase fish production through optimum utilisation of resources, while preserving the environmental balance and biodiversity. The policy recognizes that fish production has declined due to environmental imbalances, adverse environmental impact and improper implementation of fish culture and management programs. The policy suggests, among others, that biodiversity will be maintained in all natural water bodies and in marine environment and control measures are to be taken against activities that have a negative impact on fisheries resources. National Fisheries Policy focuses on aquaculture and marine fisheries development

and includes the following mandates: (i) maintaining biodiversity in all natural water bodies and in marine environment, (ii) ensuring that chemicals harmful to the environment will not be used in fish shrimp farms; (iii) using environment friendly fish and shrimp culture technology; (iv) expanding fisheries areas and integrating rice, fish and shrimp cultivation; (v) undertaking control measures against activities that have a negative impact on fisheries resources; (v) formulating laws to ban the disposal untreated industrial effluents into the water bodies, if any. The policy also suggest for establishing Fish Sanctuaries for protecting breeding fish population and immature fish.

Relevance and required compliances: This policy is relevant as the project development activities are likely to produce pollutants leading to environmental degradation, affect aquatic biodiversity, including fish, and may also affect the fish migratory routes and fish sanctuary, negatively impacting the fish production. The project needs to devise measures to address the negative effects.

- Protection and Conservation of Fish Act, 1950 (Amended in 1963, 1970, 1982, 1985, 2000, 2010)

The Act aims at protecting the open water fisheries resources through sustainable use of the resource and provides various measures for the protection and conservation of fish including s limiting size of certain fishes at catching, season closure, ban on catching gravid fish and destructive fishing, ban on use of fixed engine and use of poison for fishing, etc. The Act has provision for issuing license to fishers in controlling fishing. The amended Act prohibits collection of fry or post larvae of fish shrimp and prawns of any kind, in any form and in any way, in estuary and coastal waters, blocking water flow that hinders fish diverting or blocking water flow that hinders fish movement/migration. The Act also contains a provision for conservation by empowering the government to declare any fish sanctuary in which fishing and any other detrimental activities can be prohibited.

Relevance and required compliances: The development works under BRWITP-1 in the aquatic habitat are likely to damage fish, pollute aquatic environment affecting production of fish and other aquatic biota, hinder fish migration and affect fish sanctuary. The project will require to take into consideration these issues to minimize the adverse impacts on fisheries.

- Wildlife (Conservation and Security) Act, 2012

Earlier the Act was known as Bangladesh Wildlife (Preservation) Act 1974. The Act mainly focuses on conserving the country's wildlife resources. The Act provides lists of animal (includes fish, amphibians, reptile, birds, mammals, crabs, molluscs, prawns) specifying which animals shall not be killed, trapped, captured and which animals may be killed, captured upon permission from the competent authority. The Act has provision for declaring different categories of Protected Area (PA) and sets out activities restricted activities in the PAs.

Relevance and required compliances: Many animal species, including dolphin, marine turtles, river terrapins, critically endangered migratory birds, otter and many other significant species, are protected under the Act and known to occur within the Project Area and likely to be affected by the project activities. The Project needs to ensure that mitigation measures are designed for safeguarding these species.

- Coastal Zone Policy, 2005

Coastal Zone Policy is a harmonized policy that transcends beyond sectoral perspectives. The policy provides general guidance so that the coastal population can pursue their livelihoods under secured conditions in a sustainable manner without impairing the integrity of the natural environment. The policy framework underscores sustainable management of natural resources like inland fisheries & shrimp, marine fisheries, mangrove and other forests, land, livestock, salt, minerals, sources of renewable like tide, wind and solar energy. It also emphasizes conservation and enhancement of critical ecosystems.

Relevance and required compliance: A major part of the project area comprises the coastal islands and estuaries,

containing mangroves, staging grounds of birds, fish nursing and breeding grounds having massive role in fish recruitment and provides a mosaic of critical habitats. It is to be ensured that the policy issues are taken care of through minimizing the adverse impacts on them

- Forest Act, 1927 (Amended 1990, 2000)

The Act empowers the Government to declare any area of forest as Reserved and by doing that it may take measures for in-situ conservation of biological diversity. According to the Act, the Government may also establish some control over private forests through the Private Forest Ordinance. With the introduction and expansion of Community Forestry, the government is gradually trying to introduce community-oriented co-management.

Any act or omission detrimental to the natural resources of reserve and protected forests is prohibited including clearing forest lands, removing timber, setting fires, felling or otherwise damaging trees, clearing or breaking up any land for cultivation or any other purpose, hunting and the poisoning of water.

The following table presents an outline of the other National legal instruments that will have relevance to the proposed project with respect to the social and environment considerations. The EIA will be prepared in compliance with these national policies.

Table 5. Review of Relevant Laws, Regulations and National Policies

Policies, Laws and Regulations	Description (Policies, Laws and Regulations)	Project Compliance
Environment Court Act, 2000 and subsequent amendments in 2002	GOB has given highest priority to environment pollution and passed 'Environment Court Act, 2000 for completing Environment related legal proceedings effectively	Relevant. The ESIA shall ensure that the project is being implemented with the less amount or 'zero' pollution.
National Water Policy, 1999	The policy aims to provide guidance to the major players in water sector for ensuring optimal development and management of water. The policy emphasizes efficient and equitable management of water resources, proper harnessing and development of surface and ground water, availability of water to all concerned and institutional capacity building for water resource management.	A number of clauses of this policy are applicable to the project as the dredging operation will affect water quality including change in aquatic habitats. The proposed interventions are designed and implemented with due consideration of the relevant clauses of the policy.
National Water Act, 2013	The recently published Water Act 2013 is based on the National Water Policy, and designed for integrated development, management, extraction, distribution, usage, protection and conservation of water resources in Bangladesh.	The Act is considered relevant as the intervention involves improvement of navigability of the major water ways in the country. The ESIA study shall be conducted in consideration of relevant section of the Act.



Policies, Laws and Regulations	Description (Policies, Laws and Regulations)	Project Compliance
The National Environment Management Action Plan (NEMAP, 1995)	NEMAP, 1995 identifies the main national environmental issues, including those related to the water sector. The main water related national concerns include flood damage, riverbank erosion, environmental degradation of water bodies, increased water pollution, shortage of irrigation water and drainage congestion; various specific regional concerns are also identified.	Relevant section of NEMAP is complied with in design and implementation of the project.
Bangladesh Environment Court Act, 2010	Bangladesh Environment Court Act, 2010 has been enacted to resolve the disputes and establishing justice over environmental and social damage raised due to any development activities. This act allows government to take necessary legal action against any parties who creates environmental hazards/ damage to environmentally sensitive areas as well as human society.	According to this act, government can take legal actions if any environmental problem occurs due to project interventions.
The National Land Use Policy (NLUP), enacted in 2001	The National Land Use Policy (NLUP), enacted in 2001, aims at managing land use effectively to support trends in accelerated urbanization, industrialization and diversification of development activities. The NLUP urges that increasing the land area of the country may be not possible through artificial land reclamation process, which is cost-effective only in the long run. Therefore, land use planning should be based on the existing and available land resources. The policy suggests establishing land data banks where, among others, information on accreted riverine and coastal chars will be maintained.	The project intervention is designed adhering to the NLUP so that there is no and/or minimal change.
The National Water Management Plan (NWMP) 2001	The National Water Management Plan (NWMP) 2001, approved by the National Water Resources Council in 2004, envisions to establish an integrated development, management and use of water resources in Bangladesh over a period of 25 years.	The project ESIA study shall be conducted with due consideration of NWMP sub-sector clusters i), iii) and viii).
Inland Water Transport Policy (IWTP), 2009	The objective of the IWTP is to revive inland waterways traffic. This policy for IWT development has direct bearing on overall improvement of BIWT sector including dredging navigation routes, provision of inland port facilities and navigation aids, conducting hydrographic survey, vessel development, etc.	The proposed interventions are in line with the project. Compliance to the policy shall be addressed properly in the EMP Section of the ESIA and proper monitoring arrangement by the project proponent is ensured in the study.
Inland Shipping Ordinance 1976 and Inland Shipping (Amendment) Act 1990	Deals with the administration, registration, competency and pollution control, etc., of inland water transport. Primarily addresses pollution in the coastal and national waters and seaports of Bangladesh. The Act provides control for oil or	The proposed intervention has close relationship with the ordinance and Act. EMP section of the ESIA shall address relevant issues and BIWTA is committed to ensure proper

Policies, Laws and Regulations	Description (Policies, Laws and Regulations)	Project Compliance
	pollutants discharged, spilled or dumped into Bangladesh water from ships, ship transfer to land, land, ports, exploration of the sea bed, pipelines and offshore installations.	compliance to these through proper monitoring arrangement.
Draft Rules for Inland Ship Safety 1994	The proposed Rules control impacts from all inland water transport, ports, ship-related facilities, and ship related activities for the protection of inland water in regard to air emissions, handling and storage of harmful materials, solid and liquid waste discharges, dredging, and disposal of dredged sediments.	The major activities of proposed interventions are in line with the rules and shall be addressed in the EMP.
Bangladesh Labour Act 2006	The Act 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. Provides for safety of work force during construction period.	This act is relevant to the project intervention as there will be involvement of skilled and unskilled labour in operation and management of dredged spoils.
National Land Use Policy, 2001	The Policy aims at managing land use effectively to support trends in accelerated urbanization, industrialization and diversification of development activities;	Compliance to this Act shall be observed through EMP and monitoring during dredging and development activities.
Land Acquisition and Requisition Ordinance 1984	This Ordinance governs acquisition and requisition by the government of immovable property for any public purpose or in the public interest.	The project may require land acquisition and requisition for disposal of dredged materials, development of vessel shelters, etc. RAP will be prepared to deal these aspects.
The Bangladesh National Building Code (BNBC)	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 project will create facilities including construction of vessel shelters. These will involve construction of infrastructures. All civil construction works will be carried out following the BNBC Code.
National Agriculture Policy, 1999	This policy aims to make the nation self-sufficient in food through increasing production of all crops including cereals and ensure a dependable and secure food system for all.	The proposed project is expected to contribute to achieve the objectives of the agriculture policy by avoiding disposal of dredged materials on arable land and creating arable land by raising land level subject to quality of spoil material.
Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009	The Government of Bangladesh has prepared the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 2009.	Relevant as the country particularly the project area is vulnerable to climate change effect. Proposed interventions are designed to address climate induced effect.
The Embankment	Consolidates the laws relating to Embankments and	Disposal of dredged spoil may

TERMS OF REFERENCE FOR ENVIRONMENTAL IMPACT ASSESSMENT

Policies, Laws and Regulations	Description (Policies, Laws and Regulations)	Project Compliance
and Drainage Act, 1952	drainage providing provision for the construction, maintenance, management, removal and control of embankments and water courses for the better drainage of lands and for their protection from floods, erosion or other damage by water.	create drainage obstruction. So, adherence to relevant section of the Act shall be addressed in the ESIA.

## 2.5 EIA APPROVAL FRAMEWORK

Department of Environment (DoE) under the Ministry of Environment and Forest (MoEF) is the sole entity to issue environmental clearance to any Governmental, Non-Governmental or private Organization intending to develop a project or set up an industry. Environmental Impact Assessments (EIA) should be conducted before projects are undertaken.

The Department of Environment (DOE) may take up to sixty (60) days to approve the ESIA and thirty (30) more days to issue the environmental clearance, provided everything complies with the requirements. This may be quite a lengthy process if DOE uses the full extent of the time limits.

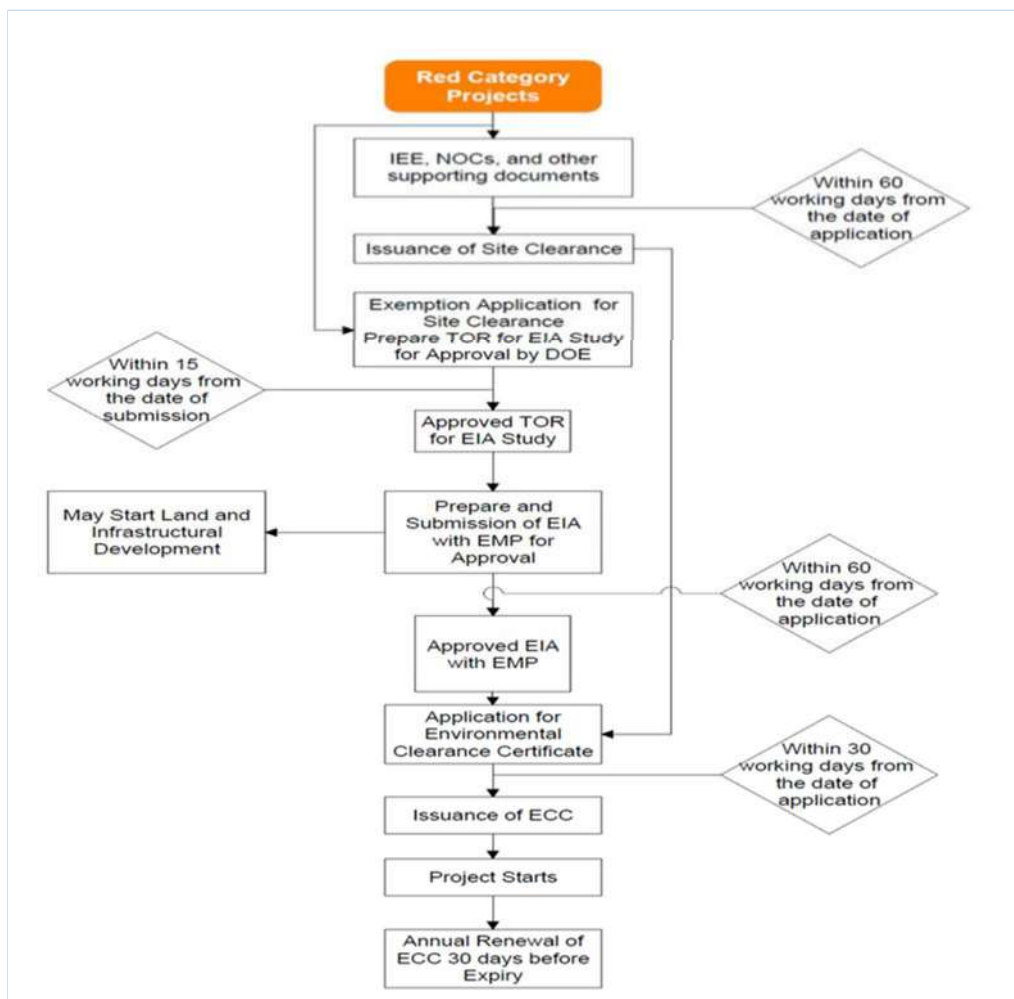


Figure 3. Steps followed by DoE for Red category projects

The Consultant will be responsible in terms of a) approval of the report (ESIA) from WB, PIU and DoE, and b) collection of ECC.

### 2.5.1 Environmental Clearance Procedures

For getting location and environmental clearances, the project proponent of concerned project should apply to the

concerned Divisional Officer of DoE by filling Form-3 as per the rules given in the ECR. They should accompany with the following documents:

- Application through prescribed form-3 under ECR 1997
- Prescribed fee under the schedule of ECR 1997 (Amended in 2002)
- Report on Feasibility of the industrial unit or project
- Initial Environmental Examination (IEE) Report or EIA as per the Terms of Reference Provided by the DoE
- EMP for the proposed project
- No Objection Certificates (NOC) from the Local Authorities.
- Emergency plan relating adverse environmental impact and plan for mitigation of the effect of pollution
- Outline of Relocation and rehabilitation plan
- Other necessary information (based on the type of the project)

The environmental clearance is One-year validity for the Projects which come under the Red Category.

### 3. DESCRIPTION OF THE ENVIRONMENT

The study area of this project is mainly restricted to the Meghna River (upper and lower), its estuary and tributaries-distributaries. The main rivers within the Project boundary beside Meghna are: Buriganga, Dhaleshwari and Sitalakhya. The rivers route starts in Dhaka, the northernmost part of the project boundary, and ends in Sandwip, the southernmost of the project boundary. Besides Sandwip, Daulatkhan, char Tojimuddin etc upazilas also feature the southern boundaries of the project study area. This is the primary demarcation of the project boundary or study boundary. Detail project boundary and study boundaries will be assessed during ESIA preparation. The following descriptions of various aspects of the project are based on the boundary assumed above.

#### 3.1 CLIMATE

##### ■ Temperature

Dhaka experiences a hot, wet and humid tropical climate. Under the Köppen climate classification, Dhaka has a tropical wet and dry climate. The city has a distinct monsoonal season, with an annual average temperature of 25 °C (77 °F) and monthly means varying between 18 °C (64 °F) in January and 29 °C (84 °F) in August.[1] Nearly 80% of the annual average rainfall of 1,854 millimetres (73.0 in) occurs during the monsoon season which lasts from May until the end of September.<sup>1</sup>

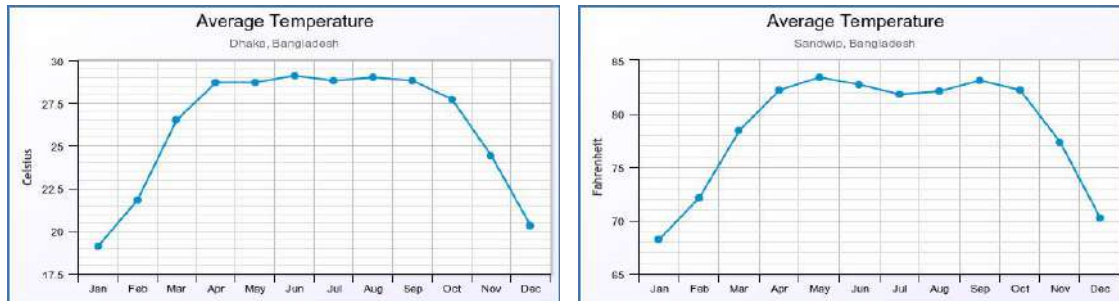


Figure 4. Long term average temperature record for Dhaka (left) and Sandwip (right)

##### ■ Wind

The wind regime in the study area shows seasonal variation between the dry season (November to May) and the monsoon season (June to October). During the dry season the prevailing winds are calm. In the monsoon season the prevailing winds are from South-Southeast direction with an average speed of about 3-7.6 knot in the Meghna estuary based on data analysis of Bangladesh Meteorological Department for the period of 1966 to 2009. The maximum wind speed can be in the range of 32-99 knot.

##### ■ Rainfall

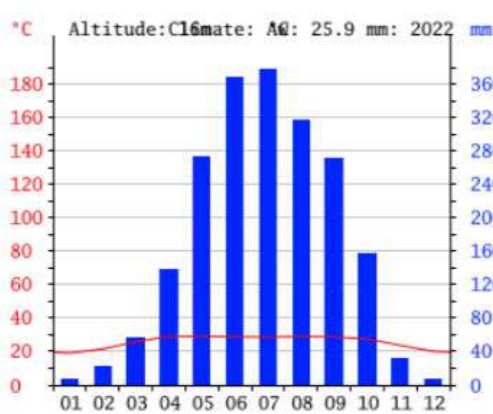
Mean annual rainfall in this region is about 2100mm at Dhaka and 3480mm at Sandwip over a period of 40 years.

<sup>1</sup> "Weatherbase: Historical Weather for Dhaka, Bangladesh". Web: [www.weatherbase.com](http://www.weatherbase.com). Retrieved 2008-12-15.

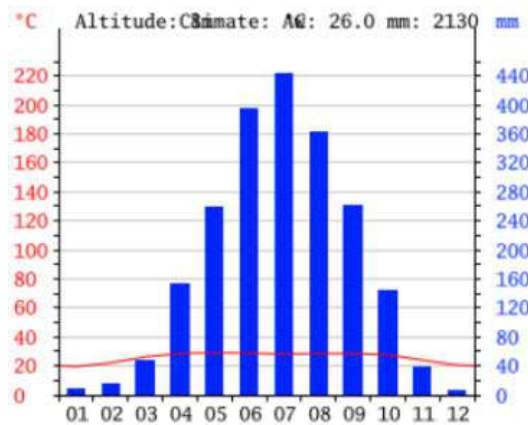
About 75 to 80 percent of annual rainfall occurs during June to September. The maximum monthly rainfall during June to September varies from 450mm to 850mm in the study area.

### 3.1.1 The monsoon Season

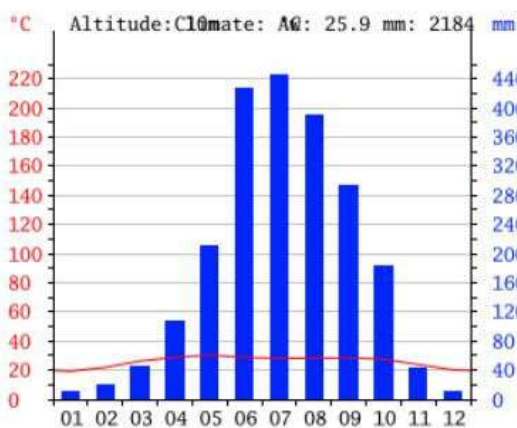
The single most dominant element of the climate of Bangladesh is the rainfall. Because of the country's location in the tropical monsoon region, the amount of rainfall is very high. However, there is a distinct seasonal pattern in the annual cycle of rainfall, which is much more pronounced than the annual cycle of temperature. Monsoon season is clearly defined in the climate diagrams below.



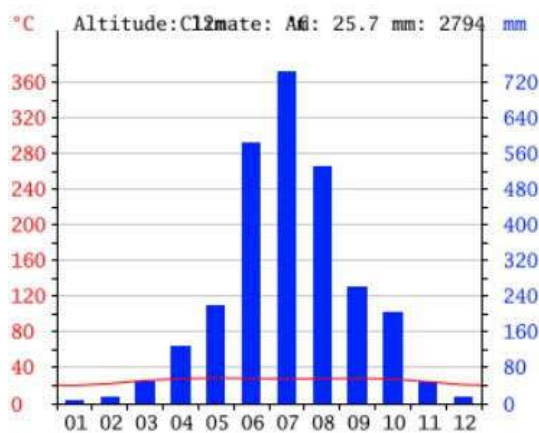
Climate diagram in Dhaka.



Climate diagram in Matlab, Lower Meghna



Climate diagram in Barissal, Lower Meghna and Meghna Estuary



Climate diagram in Chitagong, South east of the country

Figure 5. Climate diagrams. Dhaka, Matlab, Barissal and Chitagong

As the winter season progresses into the pre-monsoon hot season, rainfall increases due to intense surface heat and the influx of moisture from the Bay of Bengal. It is evident that extreme rainfall events occurred during the monsoon. It is accepted based on data available that about 80 percent of Bangladesh's rain falls during the monsoon season

Rainfall increase dramatically during the monsoon season reaching an average amount of 360 to 440 mm in July at the Lower Meghna and the Meghna Estuary region, with more than 700 mm during July at the South East

Bangladesh. High Rainfall season, the monsoon, covers annually: June, July, August and September.

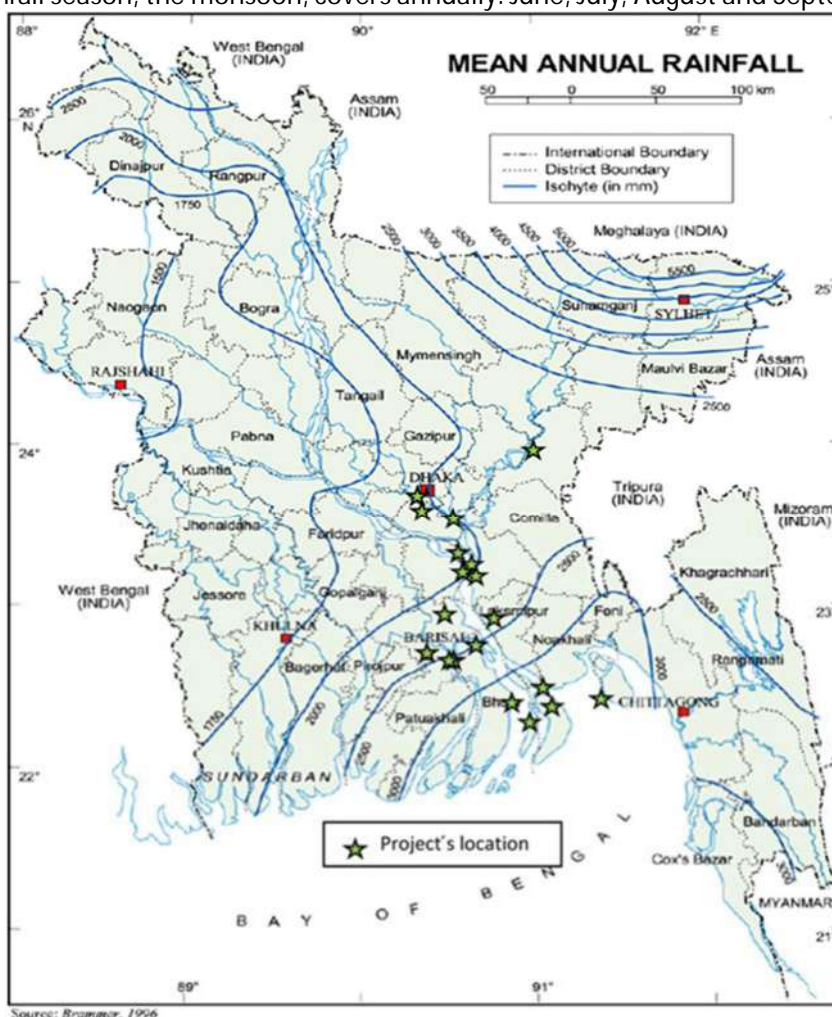


Figure 6. Mean annual rainfall and Location of the Projects

The project areas include the widest and deepest river in the country – the Meghna River that flows into the Bay of Bengal.

- Cyclone

Cyclones pose a threat to inland water transport, lives and property in low-lying coastal regions in Bangladesh. Cyclonic storms, occasionally of severe intensity, can occur in the months of March-May and October-November, accompanied by storm surges, high winds and intense rainfall. While the loss of life during these cyclones is being progressively reduced by means of improved storm warnings and continuing construction of cyclone shelters, the damages to property, livestock, crops and livelihoods continue to take their toll.

Major tropical cyclonic disasters in 1970 and 1991 were estimated to have killed an estimated around 300,000 and 140,000 people respectively. The severe cyclone which occurred in November 1970 was followed by one in May 1985, one in November 1988, one in April 1991 one in May 1997, the severe cyclone SIDR in November, 2007 and lastly the cyclone AILA in May, 2009.

- Flooding phenomena during Monsoon season

Bangladesh has a huge supply of water and sediment through its three major rivers : Brahmaputra, Ganges and Meghna.. The long period of heavy rain caused all 3 rivers to have their peak flow at the same time. Besides from



that most part of country lies on a huge floodplain and delta.

Terrain elevation on the south part of the country is less than 4 meters above sea level.

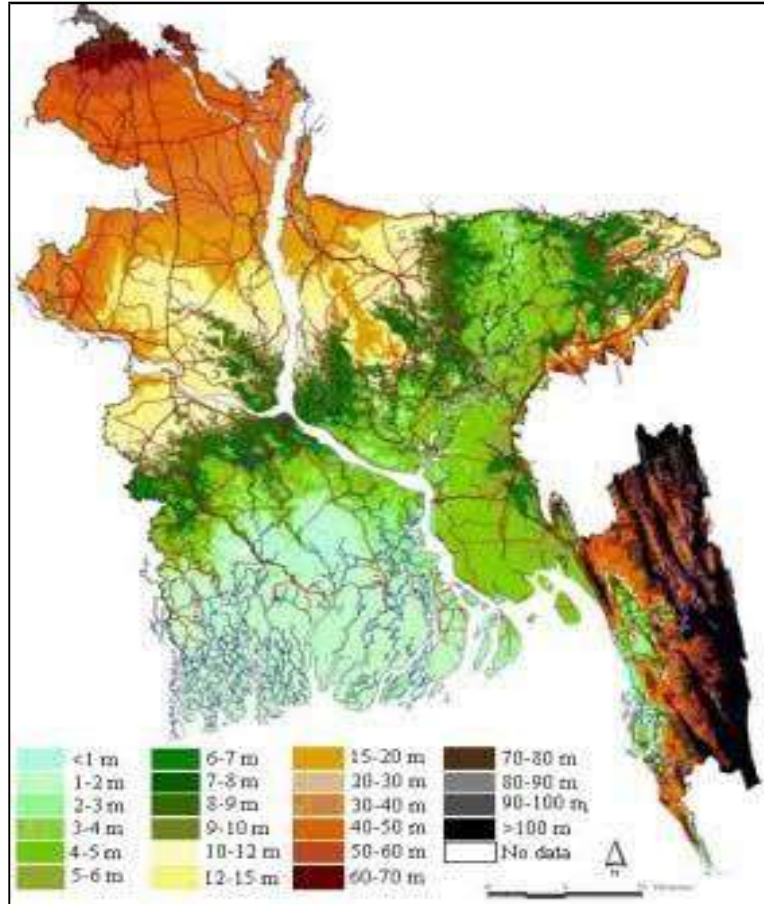


Figure 7. Bangladesh elevation Map. Source: Department of Disaster Management (DDM), Ministry of Disaster Management and Relief, Government of the People's Republic of Bangladesh

As a result, the country suffers flooding phenomena in a big part of it, particularly the low Meghna and the coastal regions. The following map shows flooding areas in the country

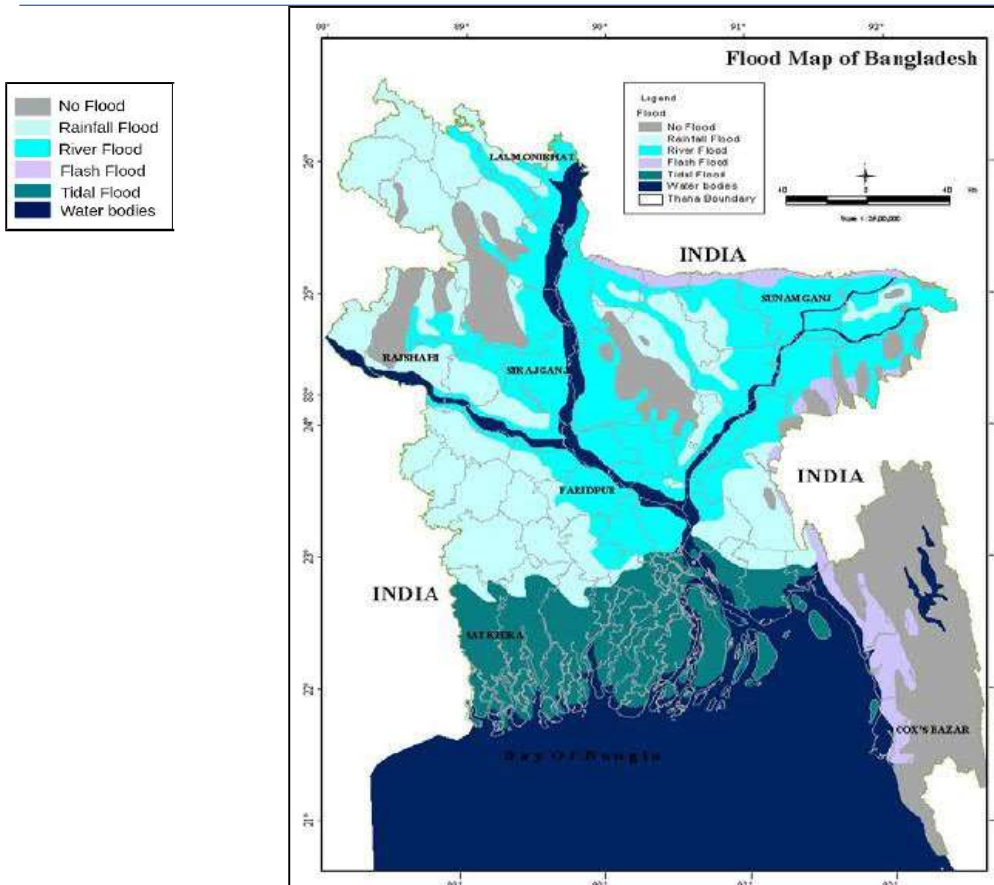


Figure 8 Flood map of Bangladesh ( Source: WARPO )

- The forecast of the 2019 monsoon season

Following a summary from the “South Asia Climate Outlook Forum (SACOF-14)” report. April 2019, Bangladesh Meteorological Department:

- “The outlook suggests that most parts of South Asia are likely to experience normal rainfall during the 2019 southwest monsoon season (June- September). Some northern parts of the region, eastern coastal areas of Peninsular India, Sri Lanka, southern parts of Myanmar, and most parts of Andaman Niobar Islands are likely to experience above normal rainfall. Below-normal rainfall is likely over some areas of southern Pakistan. some areas along the west coast of Peninsular India, northern parts of central India and some areas of northeastern part of the region. Normal rainfall is likely over remaining areas”

### 3.2 HYDROLOGY

As it’s been just clearly detailed Bangladesh is a land of rivers. There are hundreds of rivers in Bangladesh with a large network of navigation routes. Transportation through waterways has always been a natural, environment friendly and relatively cheap mode of transport. Over the decades the navigability during dry season in many rivers of the country has been deteriorating because of morphological processes and for withdrawal of water from the rivers beyond the border and within the country. The navigability has been further aggravated by poor or no maintenance of inland waterways.

Navigability of inland waterways is strongly influenced by river hydrology and morphology. River systems in Bangladesh exhibits high seasonality over a year i.e. abundant of water during monsoon and scarcity of water during

dry season from December to May. Navigability becomes very critical during dry season in many river routes and ferry crossing because of siltation and inadequate water flow.

It is very essential to know the hydrological and morphological characteristics along with biological environment of the river systems under the present study before implementing any navigation improvement measures.

- Water flow

The Lower Meghna River conveys the combined flow of Ganges, Brahmaputra and Upper Meghna rivers. Again the combined flow of Ganges and Brahmaputra is known as the Padma river flow, which meets at Lower Meghna river at Chandpur. The discharge of the Padma and Upper Meghna rivers characterise the water flow of the Lower Meghna river.

Long-term record of discharge is not available at Chandpur since it is not a routine discharge gauging station of BWDB or BIWTA. Hence, discharge characteristics of the Padma river is used to characterise the water flow Lower Meghna river. The monthly mean discharge of the Padma river varies from 5800m<sup>3</sup>/s in the month of February to 72,000m<sup>3</sup>/s in August (Source: BWDB time series discharge data) at Baruria. The average monthly minimum flow in the Padma river is 3700m<sup>3</sup>/s in February and 33400 m<sup>3</sup>/s in August. These statistics is based on the time series data of discharge over a period of 42 years.

- Sediment Transport

The hydrodynamic factors that shape the Lower Meghna Estuary area are; tides, upstream river inflow, sediment transport, estuarine circulation, waves and atmospheric forcing. The resulting temporal and spatial changes in the channel and char systems in the estuary is primarily a consequence of the interaction of these factors acting all over the estuary. Interactions between these factors are complex, and mostly non-linear. Evidence of this interactions is the geomorphologic changes that occur in the estuary with the sediment transport processes.

The average total annual sediment discharge of the Brahmaputra and Ganges is about 1,100 million (BWDB, 2001) tons per year. The sediment discharge of the Upper Meghna river is negligible compared to the discharge of the Brahmaputra and Ganges. It is assumed that the net deposition of sediment in the southern part of Bangladesh is related to the amount of river borne sediment discharge: during periods of high river borne sediment discharge (monsoon), the net gain of land and intertidal areas is higher than during low periods of river borne sediment discharge. The general sedimentology of the Lower Meghna Estuary is the consequence of many conditions. One of the most important condition is the sediment source, which may be the river, the adjacent delta and continental shelf from which sediment is transported by littoral currents and introduced into the estuary by upland flow and tidal action.

Furthermore, within the estuary proper, sediment distribution is extremely variable reflecting the hydrodynamic conditions and the transport processes that are dominant in each portion of it. The circulation patterns, particularly in the lower portions of the Meghna Estuary Area are highly affected by river and tidal dynamics, resulting in characteristic morphological patterns. Flow friction and river flow decrease the tidal effect landwards as the river influence becomes progressively larger.

### 3.2.1 River network

- Meghna river

Meghna River one of the major rivers in Bangladesh, especially famous for its great estuary that discharges the flows of the Ganges-Padma, the Brahmaputra-Jamuna and the Meghna itself.

- Source

The Meghna receives Tippera Surface streams from the east and flows from the enlarged Dhaleshwari from the west. At the confluence, just north of Shatnol, the Meghna is about five kilometres wide. Dhaleshwari comes down in a brown stream and meets the clear blue-green Meghna. For many kilometres the waters do not seem to mix, for half the river water remains brown and the other half blue-green. The boatmen are fond of pointing out

this peculiarity.

Sixteen kilometres from Shatnol, the combined flow of the Ganges and Brahmaputra-Jamuna, known as the padma, meets the Meghna at a 11 km wide confluence in the rainy season near Chandpur. From this point southwards the Meghna is marked as the Lower Meghna, becoming one of the broadest rivers and largest estuaries in the world.

#### ■ Lower Meghna

Lower Meghna is the combined stream of the Padma and the Meghna (Upper Meghna), reinforced by the Dhaleshwari. All the three rivers are large. The Dhaleshwari-Meghna and the Padma are each 5 km wide at the confluence. The Lower Meghna has several small chars (braid-bars) in it, which create two main channels, of which the large eastern one is 5 to 8 km wide. The western channel is about 2 km in width. Near Muladi the 1.5 km wide Safipur river is an offshoot from the right-bank. Further south, the Lower Meghna shifts into three channels: west to east flowing tentulia (Isha) river, the Shahbazpur and the Bamni. The Isha is a 5 to 6.5 km wide channel separating Bhola Island from the Barisal mainland.

West of the mouth of the Isha is the Rabnabad islands. Shahbazpur Channel, 5 to 8 km wide, separates Bhola from Ramgati and Hatiya islands and at its mouth are the Manpura islands. Bamni now is said to be non-existent. previously it used to flow between the islands of Ramgati and Char Lakshmi and the Noakhali mainland and was at times the main outlet for Meghna.

The tides and their bores always affected it considerably, and this channel narrowed or widened in an unpredictable manner. After eroding a considerable part of the mainland in the 1940s, it suddenly shoaled to such an extent, just west of Noakhali town, that in winter there was a land bridge from the mainland to Ramgati Island. To make this a permanent feature, a large earthen cross dam was built. To accelerate the accretion of chars, a second cross dam was built linking Noakhali mainland and Char Jabbar which rapidly built up nearly 260 sq km of land.

#### ■ The estuary

The estuary of the Lower Meghna is usually taken to stretch from the Rabnabad islands to the Kumira coast, a distance of 153 km. The water is, however, saline for half of the year as far north, as a line could be drawn from the middle of Bhola to the north of Sandwip. The estuary of the Lower Meghna may be considered as extending between the Isha (Tentulia) and Shahbazpur rivers which together have a width of about 40 km at the sea-face. The volume of the estuarine discharge is not known, but at Chandpur the mean discharge from June to October is around 2.5 million cusecs.

The mean maximum in this period of the year is about four million cusecs. The winter flow is about one-eighth of it although the river is even then several kilometres wide. The low flow is due to the stream's sluggishness. In maximum flood, the Lower Meghna's flow is no less than five million cusecs. It is also estimated that from May to October its daily load of sediments is nearly four million tons.

The annual load of sediments carried by it is about 1,500 million tons and annual water discharge about 875 million acre-feet (MAF). In comparison, the Congo, La Plata and Yangtse rivers have a total annual flow of 1,022, 636 and 559 MAF respectively. The Lower Meghna, as the major outlet of the combined Ganges, Brahmaputra and Meghna has therefore somewhat less outflow than the Congo, which is second only to the Amazon

#### ■ Buriganga River

The Buriganga river, having a length of only 17km, is one of the most important rivers in Bangladesh. This river is economically very important to Dhaka. Launches and country boats provide connection to other parts of Bangladesh. It provides important services to the residents, including water supply, navigation, recreation, sanitation and flood control.

This vital river however has become extremely polluted and is close to biological death for several reasons. The tremendous increase in population over the last three decades has created enormous environmental problems, including among others the disposal of solid waste, sewage and drainage problems. River depth is decreasing due to siltage deposition, hence affecting the navigation.

Proper dredging of the existing river and removing non degradable matters from the river bed are essential for restoring the river for its multi-purpose services. See Fig. 9 below for Burignaga's path.



Figure 9 Burignaga River

- Shitalakhya River

The river Shitalakhya flows along the eastern side of Dhaka and Narayanganj districts and falls into the river Dhaleswari near Madanganj of Narayanganj. The river is 110 km long and 250 m wide, having 375 hectare water area. The river flows through Gazipur. The Shitalakhya River was once an important center for the industry. Even today, there are centres of artistic weaving on its banks. There also are a number of industrial units on its banks, including thermal power plants. Industrial affluent dumped into the river resulting in high levels of pollution is a cause for concern. There is a river port in Narayanganj, numerous launches move out along the river to different parts of Bangladesh.

- Dhaleswari River

The Dhaleswari River is the main left-bank distributary of the Jamuna/Brahmaputra river and is the main channel of a complex river system. The maximum flow in the river is around 1400 m<sup>3</sup>/s. Off-take morphology of this river from the Brahmaputra/Jamuna comprises a system of watercourses subject to continuous morphological changes thereby influencing the flow entrance as well as location at which it takes place. During the construction period of Jamuna Bridge in 1995, the off-take of Old Dhaleswari became completely closed by construction of closure. However, as an immediate response of the Jamuna, there was a further widening of the already existing small spill channel around 2km downstream of the present Jamuna Bridge location along the left side and got connected to the old course of Old Dhaleswari river.

### 3.2.2 Geomorphic evolution

Deltas and estuaries are generally known as areas of a net deposition of sediments either transported by the river from the upstream or supplied from the sea. The growth of the delta and the accretion of land in the estuaries is a continuous and generally a very gradual natural process interfered by the dynamics of the ever- changing courses

of their channels. A comparison of the 2015 satellite image with the 1779 map of J.Rennell shows a completely changed system of channels and river courses but a more or less stable coastline west of the Tetulia River. East of the Tetulia river, however, a general tendency of seaward growth of the coastline is evident, particularly in the region Bhola Island - Hatia Island, Nijhum Dwip and in the Noakhali district.

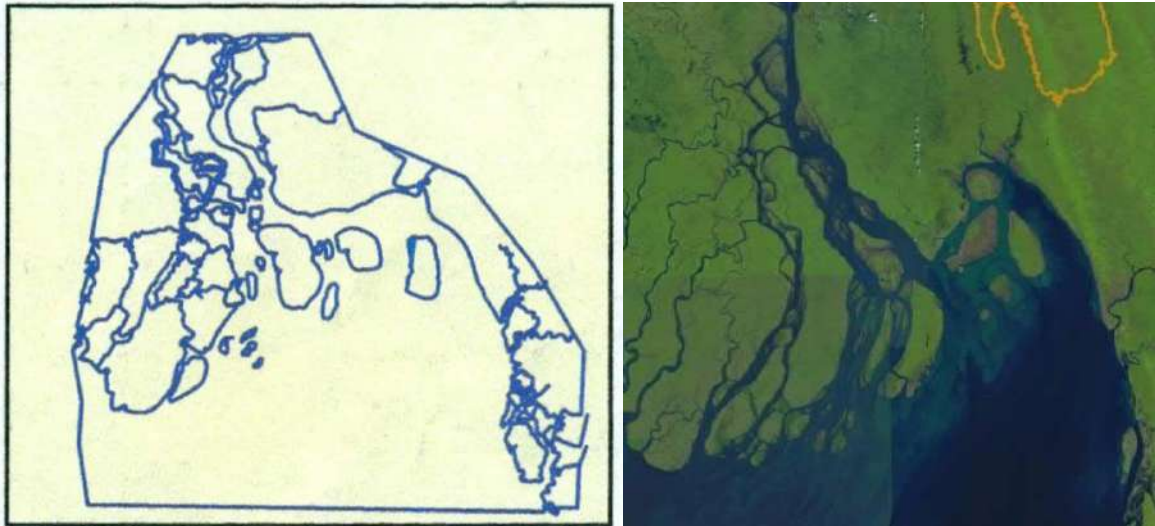


Figure 10 Comparison of Rennell map (left) with satellite image of 2015 (right)

Although the overall process of accretion is dominant, areas of erosion is also visible, particularly on the river banks along the Ramgati under Laxmipur district, northeast shoreline of Bhola Island.

The river Buriganga flows through alluvial silt and clay of medium to dark grey silt to clay. The Dhaleswari River from its meeting point with the Buriganga down to the meeting point with the Meghna River flows through alluvial silt. This formation composed of fine sandy to clayey silt having light to medium-grey colour. The Meghna River until the confluence with the Padma River around Mohonpur (under Matlab North Upazila) flows through the formation of alluvial sand, which is the size from coarse sand to fine silty sand and brownish grey in colour. However, down to it until Chandpur it flows through alluvial silt for its Chandpur side (left bank) and deltaic sand for its Shariatpur side (right bank). The rest of the Meghna River, down from Chandpur, over the part of Shariatpur, entire Mehendiganj and Bhola district flows through estuarine deposits. This kind of deposits show the characteristics of silty clay to clayey silt which has brownish/yellowish appearance. However, on its left bank immediately down to Chandpur a small segment of the riparian area (broadly Haimchar, Faridganj, Raipur) composed of alluvial silt and clay.

### 3.2.3 Biological environment

#### 3.2.3.1 Vegetation

River bank and homestead vegetation is a very important plant community, though a synthetic one. The community includes two types of plant: those cultivated for their economic value, and those that are self-propagating. Plants of the first category can be found all along the river banks and adjacent rivers, and composition within this type is more or less uniform. The composition within the second type is more interesting, in that it reflects the composition of nearby natural communities, including communities and species that have otherwise vanished locally, and contains some strong clues as to local vegetation composition in times past. The dominant homestead trees comprise rain tree *Samanea saman*, Koroi *Albizia procera*, some *A. richardiana*, few *Hizal Barringtonia racemosa*, *koroch Pongamia pinnata*, and *Borun Trewia nudflora*. Other than these were the fruit trees like mango *Mangifera indica*, Custard Apple *Annona reticulata*, Guava *Psidium guajava*, jackfruit

Artocarpus heterophyllus. Among the odd species were Dillenia indica elephant apple; chalta, Alstonia scholaris Indian Blackboard Tree, chatim. The backyards comprised herbs and shrubs of various species and saplings of fruit trees and other naturally grown species providing a refuge for some of the wildlife like monitor lizards, fishing cats, etc.

The plant diversity in some of the off-shore islands and chars in the Lower Meghna estuary include mangrove plants like Acanthus illicifolius, Excoecaria agallocha, Sonneratia apetala, Derris scandens and Tamarix indica. Mangrove plantation started during 1967-68 in newly accreted land in the Meghna estuary. Under the Green Belt Social Forestry Programme (funded by the World Bank), the Noakhali Coastal Forest Division planted both indigenous and exotic species like Phyllanthus emblica, Dalbergia sissoo, Casuarina equisetifolia, Acacia auriculiformis, Azadirachta indica and Acacia mangium, etc., from 1981-82. The characteristic vegetation along the river bank homestead is evergreen in nature. Few plants like Terminalia spp, Albizia spp, Zizyphus mauritiana, Erythrina fusca, Bombax ceiba, Cassia fistula and Crateva magna are deciduous, seasonally changing the landscape colour.

### 3.2.3.2 Wildlife

The Upper Meghna Flood Plain is a dominant freshwater environment inhabited by freshwater plant and animal species. The floodplain comprises a nutrient rich freshwater ecosystem supporting high fish production, and many aquatic species some of which are now endangered. Native waterfowl and migratory birds, freshwater turtles and other reptiles and amphibians depended on this system, and the area was rich in biodiversity. The construction of embankments along some sections of the Upper Meghna, effluents from the industries entirely changed the ecosystem.

The free migration patterns of fish from the floodplain to the Meghna River and vice versa was disrupted, and fish production. Intensive agriculture and reduction in wetland areas have affected the habitat of migratory birds, freshwater turtles. The pressure from the increasing human population on the natural resources has affected the ecosystem. However the water quality is still favourable for many of the aquatic species like the otters, Gangetic dolphins, etc.

- Gangetic Dolphin/Irrawady Dolphin

The Lower Meghna supports both the Ganges Dolphin and Irrawady Dolphin. However their distribution is marked by the salinity depending on seasonal freshwater discharge. The ecological boundary follows salinity and turbidity gradients, and implies that long-term monitoring of dolphin distribution patterns may prove insightful into the impacts of declining freshwater flows on other aquatic biota (Smith et al. 2006).

The Gangetic Dolphin (*Platanista gangetica*) or 'shishu/shushuk' (in Bangla) is found in most of the areas of the Ganges-Brahmaputra-Meghna river system including Nepal, India and Bangladesh. This species is rated as 'Endangered' by the International Union for Conservation of Nature (IUCN) Red List (2010) with the wild populations decreasing drastically within the range countries.

These dolphins share the same ranks as the tigers and great apes that are listed as a species endangered by trade on Appendix I of Convention on International Trade of Endangered Species of Flora & Fauna (CITES). The species is listed as a 'flagship species' by World Wide Fund for Nature (WWF).

- Sea Turtles

The coastal waters and the Bay of Bengal support five species of sea turtles – Olive Ridley turtle (*Lepidochelys olivacea*), Green Turtle (*Chelonia mydas*), Hawksbill Turtle (*Eretmochelys imbricate*), Loggerhead Turtle (*Caretta caretta*) and leatherback (*Dermichelys coraicea*). Among the five species female turtles of three species - Olive Ridley, Green and Hawksbill – have been recorded to nest (Rashid 1997, Rashid & Islam 2006).

Female turtles have often been netted by the fishermen in the Lower Meghna River. Mating has been observed in areas south of the Sandwip Island in the Lower Meghna estuary and in the Bay near the Swatch of No Ground. The males usually stay in off-shore areas for mating with the females and do not come near-shore while the females

use the favourable sandy beaches of the islands and the coastline for nesting.

- Freshwater Turtles

Some of the freshwater turtle species have also been recorded in the Lower Meghna estuary (Figure 5.46). One of the top three critically endangered turtle species – Northern River Terrapin *Batagur baska* forages in the Lower Meghna Estuary and the Sundarban. Bangladesh is the last stronghold for this species as natural population of this species has been extirpated from the other range countries – Myanmar and India. A few other endangered species like Narrow-headed Freshwater Turtle (*Chitra indica*), Asian Giant Turtle (*Pelochelys cantorii*) also share the same habitat.

- Avi fauna

Central Coast of Bangladesh is the cross-road of East Asia -Australasian and Central Asian - Indian Flyways. Central Coast of Bangladesh particularly the NijhumDweep is possibly the best place for the wintering of shore birds in Bangladesh. This site supports more than 200, 000 migratory birds either as their wintering ground or as staging ground during winter quarter. This is mainly because of its pristine habitat and a huge foraging and roosting ground. A total of about 98 species of shorebirds has so far been recorded. Important sites at the central coasts are Nijhum Dweep, Char Bahauddin, Dhal Char, Char Jonak, Char Nogila, Patar Char and Kalkeniy Char. Highest number of birds arrived in the central coasts are belongs to waders (50000) gulls, terns and egrets (80,000) , ducks and geese (50000).

Some of the rare species of birds those who visit the regularly are: Bar-headed Geese, Grey Lag Geese, Eurasian Spoonbill, Black-headed Ibis, Goliath Heron, Asian Dowitcher, Spotted Green Shank, Spotted Red Shank, Spoon-billed Sand Piper and Indian Skimmer. These birds start visiting the site from October and return in the month of April. The early migrants are Common Sandpiper, Wagtail, lesser Sandplover, Brown-headed gull.

### 3.2.3.3 Protected Areas

The project area includes the rivers Buriganga, Dhaleswari, Sitalakhya, Upper Meghna, Lower Meghna, and Meghna Estuary. Additional extensions include Upper Meghna to Ashuganj and from Chandpur to Barisal including Tetulia River. The river stretches from Sadar Ghat located on the banks of the river Buriganga in the south of the metropolitan Dhaka to Chittagong excluding the 35km radius of the Chittagong Port Authority. This aquatic habitat represented by the above-mentioned rivers and estuary consist areas that vary in their characteristics (freshwater, brackish, tidal affected, etc) and are rich in biodiversity and favour the existence of a myriad of species.

The rivers either as a whole or some sections of the rivers are declared as protected under the Bangladesh Environment Conservation Act (BECA) 1995, Fish Conservation Act 1983 (updated 2010).

The rivers surrounding the capital Dhaka including the Buriganga, Turag, Balu and Sitalakhya are declared as Ecologically Critical Areas (ECA) in 2009 under the BECA 1995. Under Article 5 of the Environment Act, so far 17 ECAs have been declared in Bangladesh with the wetlands dominating the list and the Buriganga and Sitalakhya Rivers were declared as ECA in 2009.

Table 6. List of ECAs declared under the Bangladesh Environment Conservation Act 1995

S.No.	Name of the ECA	Year of Declaration	Within Project Area
1.	Sundarban Reserve Forest (10 km periphery on all sides)	1999	-
2.	Cox's Bazaar – Teknaf Peninsula sea beach	1999	-
3.	St. Martin's Island, Cox's Bazaar	1999	-



S.No.	Name of the ECA	Year of Declaration	Within Project Area
4.	Sonadia Island, Cox's Bazaar	1999	-
5.	Hakaluki Haor, Sylhet-Maulavibazaar	1999	-
6.	Tanguar Haor, Sunamganj	1999	-
7.	Marjat Baor, Jenaidah-Jessore	1999	-
8.	Gulshan – Baridhara Lake, Dhaka Metropolitan	2001	-
9.	Buriganga River	2009	✓
10.	Turag River	2009	-
11.	Balu River	2009	-
12.	Sitalakhya River	2009	✓
13.	Jaflong-Dauki River, Sylhet	2015	-

### 3.3 SOCIOCULTURAL ENVIRONMENT

The river routes for this project include Dhaka, and surrounding to Narayanganj, Bhairab Bazaar, Chandpur and Barisal. Dhaka, a megacity, is the capital of Bangladesh. This is the major urban center for business development, urbanization, export-import and industrialization of the country. Narayanganj, Bhairab, Ashuganj, Chandpur and Barisal are the most important and busiest business and river transport routes of the country. Places nearer to the main land in these regions enjoy better privilege in terms of education and medical services, employment opportunity and other advantages. On the other hand, some Char and Islands in the coastal area along the proposed river routes are still facing lack of basic civic amenities i.e. education, health services, electricity, road communication, gas connection, etc.

Dhaka is the largest city in Bangladesh with highest density of populated and has experienced an extremely rapid population growth after the independence, from only 1.6 million in 1974 to about 15.4 million in 2011. Dhaka's density is estimated at 115,000 per square mile or 44,000 per square kilometer, with slum (informal dwelling) densities reported as 4,210 per acre, or 2.7 million per square mile (1 million per square kilometer). Dhaka city being the capital; people from all parts of the country migrate to city in search of employment, education and all other facilities. The city is growing at a rate of 6% every year.

Most of the people near river side depend on their sources of livelihood by river related activities. For example, Sadarghat (in Dhaka); provides for about 300-400 boatmen, who are depending on river related transport. There are also a large number of labours in this ghat. Here the major sources of livelihood are carrying people and goods by boat, day laboring, selling of vegetables and other raw materials, selling clothes, rickshaw or van pulling, whole and retail selling of fruits, etc. There are a huge number of hotels/restaurants in this ghat area. There are a variety of livelihoods in this ghat.

A large number of people are engaged in Naryanganj launch ghat as day labour. Again, vegetables sellers, other raw materials and business men present in Munshigong Sadar launch ghat. There is a big market in Bhairab Bazar launch ghat. There are about 700 business units/shops in this ghat. And a massive number of people, about 10, 000, are crossing one end to another by using this ghat for livelihoods. At Harina ferry ghat, approximately 500 fishermen are leading their lives by catching fishes from the river. There is a large vegetable market in Chandpur Sadar launch ghat with associated businesses.

There are about 1,000 business shops located here. These vegetables are mostly being carried by boat from adjacent Chars. Once again, Ashuganj, Moju Chowdhury Ghat, etc. play a major role in transporting construction materials and receiving imported goods. Each ghat provides for livelihoods for 2,000-3,000 families including 300-600 shops around the ghats and thousands of day laborers working around the area.

For example, the Moju Chowdhury ghat itself has 500-600 shops catering to several needs of the people visiting ghat. Ashuganj ferry ghat has about 1,500-2,000 labourers working each day, along with number of people engaged in transporting goods from neighboring country India. Many vendors (such as vegetables, raw materials, and other things) come to all ghats, jetties, terminals etc. to buy and sell their daily necessities.

Land use pattern adjacent to the river route has different scenarios for rural and urban sites. Terminals are established in urban or semi urban areas that have developed the Ghat areas as commercial centers of the region with shops and markets. These terminals generate sources of livelihoods for thousands of households. On the contrary, the terminals in rural regions with minimal transportation facilities are mostly surrounded by fallow land, cultivable land, ponds, ditches and canals.

For example, Doulotkhan (Bhola), Sandwip, Tojumuddin, Laharhat, etc. have wip, Tojumuddin, Laharhat, etc. have fewer shops and commercial entities compared to other terminals. Almost 65% of the private lands around the Ferry Ghats and Launch Ghats are found to be used for agricultural production. Majority of the titleholders use their land for commercial purposes. Majority of the non-titleholders are using government land for business and other purposes.

It needs to be mentioned that a significant number of women are also working in every ghat and nearer to that area. Many women are working in the restaurants as assistant cook or for cleaning utensils, vegetables/fishes and for blending spices. That means they have to stay in the ghat area for a longer period of time. Many women are around who travel by boat or launch while they have to wait for the transport for a longer period of time. Almost all cases, there is no passenger shade or toilet facilities for women.

More detailed socio-economic and cultural information, including gender issues, will be gathered from the socio-economic baseline survey.

## 4. ESIA APPROACH & METHODOLOGY

### 4.1 DATA ACQUISITION

The objectives of the data acquisition process are to identify significant (i) environmental and social issues early enough to feed them back to the planning team before engineering decisions are made, (ii) environmental components that will be affected during pre-construction, construction, and O/M stages of the Project, and (iii) environmental impacts during various stages of the Project that need to be thoroughly assessed and addressed for mitigation and management.

A data collection framework will be devised to identify the potential Area of Influence for the Project (and thus the appropriate Study Area), to identify potential interactions between the Project and resources/receptors in the Area of Influence and the potential impacts that could result from these interactions. It also helps in developing and selecting alternatives to the proposed action and in identifying the issues to be considered in an ESIA.

#### 4.1.1 Secondary sources

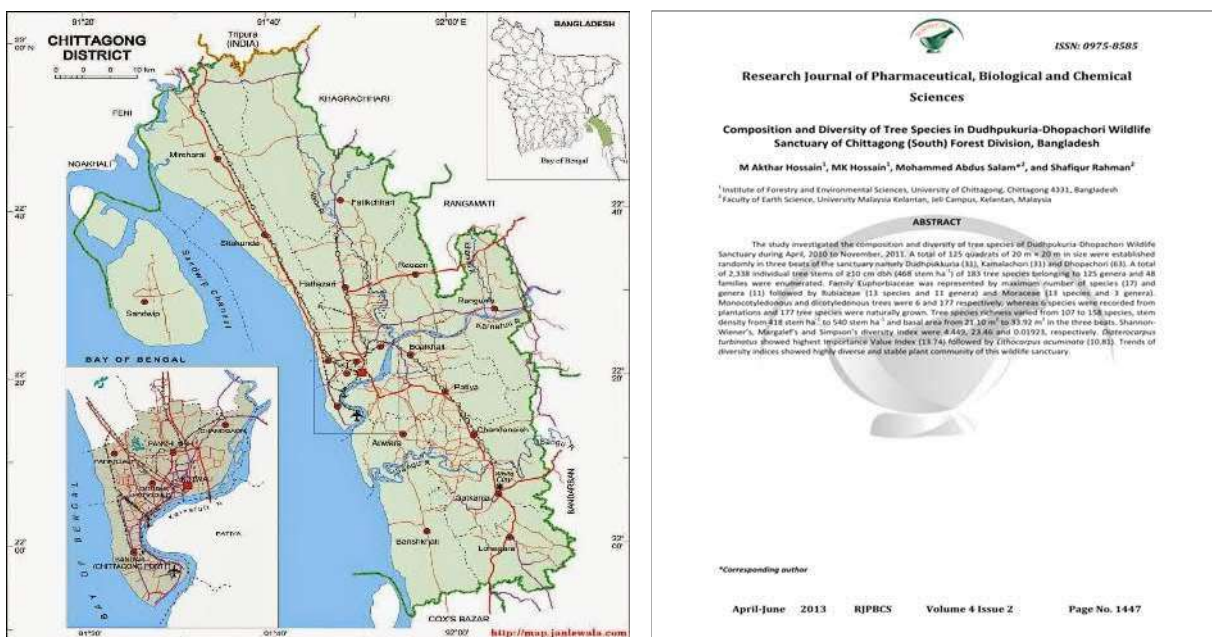


Figure 11. Secondary sources of data

The purpose of the secondary data collection is to provide a review of the relevant physical, ecological and socio-economic information available for the Project area. Sources of secondary data to be used in the study include information gathered from government departments, research institutes, and published literature. Secondary sources will be cited within the document and will be included in the References section.

In the case of secondary data involving geographic information within the Project area, this data will be validated during the environmental surveys

#### 4.1.2 Primary data acquisition: Biophysical

A comprehensive baseline survey will be conducted as part of the ESIA in alignment with the requirements of local permitting authority (i.e. DOE). The impact assessment will rely on these data and it is necessary to ensure sufficient data are collected to enable a robust impact assessment: collection of general baseline information of existing environmental condition in the project influence area and an environmental quality baseline monitoring along the waterway network as an identification of the environmental components that need detailed study. Baseline assessment will be done based on the available information, field visits, sampling and environmental monitoring but not limited to the following for the project Site and Area of influence in the Waterway Network. The Biophysical baseline environment will be divided into four broad categories:

- Physical Environment: Geology, Topology, Geomorphology, Soils, Meteorology and Hydrology
- Environmental Quality: Air, Water, Noise Quality and

Visual: Characterize the existing visual characteristics and identify possible receptors or important viewpoints based on visual sensitivity within the Area of influence.

- Ambient air Quality and Meteorological Data:

Air Quality Assessment Programme will be carried out and will include the particulate Matter PM<sub>2.5</sub> and PM<sub>10</sub>, O<sub>3</sub>, SO<sub>2</sub>, Carbon Monoxide (CO), Nitrogen Oxides. The ambient air quality sampling network will be planned with regard to topography, population, sensitive locations, emission sources, background concentrations, wind pattern during the study period and possible impact zones in the project area. The meteorological data including wind speed, wind direction, relative humidity and air temperature will be compiled based on available nearby information.

- NOISE and Vibration:

Noise measurements will conduct from different sensitive areas same as the locations for Air Quality Monitoring. The noise will measure one-hour duration during the day time and one-hour duration during the night time. Existing sound level will monitor in time weighted average Leq in dBA both at day time and night time at four locations encompassing each of the sample sites will record using a calibrated HTC Sound Level Meter set to A-weighting, slow response and statistical analysis settings. From every location Day and Night Noise has been captured.

- Water Resources:

To characterize the local surface water and ground water and to identify possible freshwater sources that could be impact by the project.

- Surface Water Quality

Surface water quality is of prime concern not only for drinking and irrigation but for maintenance of ecology, aquatic life, other consumption, aesthetic uses and sustainability. Water quality analysis at bridge construction site for the river along the proposed alignment is one of the important tasks for collecting the baseline information. It is in view of the assumption that during construction impact due to heavy machines, construction material, digging and human interference will further increase. All these aspects will have impact on the water quality as well as natural environment along the river. Surface water quality analysis provides status of water in respect of its characteristics suited to drinking, bathing, and irrigation, ecological and aesthetic importance.

Objective of water quality analysis for present study is to provide baseline information for the major river at the project site. Scope of surface water quality will provide baseline information of the physic-chemical characteristics of the river water at project site. Baseline parameters selected for the study are: pH, Temperature, Total Organic Carbon (TOC), Turbidity, Color, Electric conductivity (EC), Chemical Oxygen Demand (COD), Biochemical Oxygen demand (BOD<sub>5</sub>), Ammonia Nitrogen, Nitrites (NO<sub>3</sub>), Total Dissolve Solids (TDS), Total suspended Solids (TSS), Total Phosphorous, Sulphates (SO<sub>4</sub>), oil and grease, Dissolved Oxygen (DO). In addition to the above parameters even the water samples should also be analyzed for the bacterial load (Total coliform/Fecal Coliform) as the incidence of gastric infection is quite high over the entire region. Most of the gastric problems occur due to the bacterial contamination in the surface water.

#### ■ Ground water Quality

The scope of work includes study of ground water quality and using secondary information to know the existing ground water table. The ground water samples will be collected at different locations. The following parameters are to be monitored for assessing the ground water quality. The parameters are pH, Color, Temperature, Turbidity, Total hardness as CaCO<sub>3</sub>, Total coliform/Fecal Coliform, Total Dissolved Solid (TDS), Chlorides, Sulphates, Bicarbonate, Nitrate, Nitrite, Cations (Sodium, potassium, Calcium, Magnesium), heavy metals, As, Fe, Mn, and S. In addition to these parameters biological parameters will be analyzed. Mostly ground water will be used for drinking purpose. The Bacterial population should be identified in the ground water samples. The improper disposal of the solid waste affects the ground water quality.

#### ■ River Sediments Quality

There is environmental purpose for riverbed sediment sampling. The first is to look at the quantity and diversity of invertebrates and benthic organisms living within the sediment. The benthic species present in the sediment sample is an indication of environmental quality of the water body. River water sediments will be collected along the bridge locations and it will be analyzed for the benthic organisms and heavy metals. Any construction or alteration of water course severely impacts the bottom living benthos and planktons. Riverbed sediment quality (Total Organic Matter, Total Phosphate, Nitrate, Ammonia, Sulphate, Al, As, Cd, Hg, Pb, Ca, Zn, Cr, Ni) of the river shall be collected at different locations among all waterway area studied.

#### ■ Soil quality

Soil samples will be collected and will be analyzed for physical, chemical and biological parameters. The samples will be collected from potential on land disposal sites within Project Influence area. The soil in the project area is highly productive and suitable to support different ecosystems in balance. During the dredging period, dredged materials will be stored at some designated places in the project influence area. Hence, there is the chance of the native soil to be disturbed by the dredged material. The different activities may affect the soil quality. The soil will be tested for pH, Electric Conductivity, nitrogen, phosphorus, sulphur, sodium, potassium, calcium, magnesium, manganese, copper. Sample will be tested for baseline setup and Identifying the quality of the soil.

### 4.1.3 Primary data collection: Ecological

Biological Environment: factors related to life such as habitats, aquatic life, fisheries, terrestrial habitats and flora and fauna.

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■ Benthos and Plankton:

Sample both benthos and plankton will collect from the same location of sediment sampling for study to Benthos and plankton fauna.

■ Fish Species

There are several rivers, many beels, water bodies, reservoir are existing in the alignment. The most important routes are the Dhaka-Chittagong main route, the Ghorashal-Demra route, the Demra-Munshiganj route, the Ashuganj-Munshiganj route, the approaching routes to AatHazar via Muladi, via Hijla. Via Illisha, and three ferry routes will get primary importance in survey.

These water bodies play an important role in the fisheries of Bangladesh and give an economic boost for the project area as well as for the nation. In every year large amounts of fish are caught from these habitats. There are many portion of these water bodies are breeding ground of natural fishes. About 267 species of freshwater fish inhabit the water bodies of Bangladesh (Rahman 2005, Mustafa 2013) of which about 200 species are small indigenous fishes (SIS). According to the IUCN Bangladesh (2000) fifty-four (54) species (=20%) are endangered.

The fisheries survey will be conducted to identify the abundant, type and habitat area of different fish species of the river, and fishing gears used around the proposed bridge location. The fish catch and the methods adopted for fishing. Inventory of fish species and their availability like abundance, common, and rare and according to Red data book of IUCN (International Union for Conservation of Nature and Natural Resources)-Bangladesh categorized the threatened status like critical endangered, endangered, vulnerable, data deficient etc.

■ Terrestrial survey

Survey will be undertaken to assess habitat type and quality, species, diversity, rarity, fragmentation, ecological linkage, age and abundance, A one-time rapid survey will be conducted for the following parameters:

- Identify any legally protected areas or internationally recognized areas
- Identify any critical area
- Identify endangered or protected species of endemic floral and faunal species prevailing in the area of influence, considering the IUCN red List and Bangladesh national Lists.
- Identify vegetation cover and current status of mutual habitats or species, including mangrove and other ecologically important habitats; and
- Identify and assess ecological resources

■ Flora survey

The ecological survey is continuing within the project influence areas. Survey will conduct in quadrat method with inventories on flora including terrestrial and aquatic plants. Identification of threatened species and assessment of Biodiversity Conservation Significance of the Project Site.

■ Wildlife survey

Many of the mammalian and reptilian species are cryptic and unlikely to be encountered using standard field sampling methods. As such, experience suggests that interviews with local people are a very useful method for collecting information on local biodiversity. Strongly follow the Red data books on mammals, reptiles, amphibians and birds of IUCN-Bangladesh and categorized the wildlife under endangered, critical endangered, vulnerable, data

deficient etc. During the field survey period, extensive interviews with local people will conduct to collect information on animal and plant presence, including occurrences, behavior, breeding, distribution and seasonal appearance.

■ Avifauna/Birds survey

The survey will conduct for a period of time for resident bird's survey in the project influence area and migratory birds to be conducted at the site by collecting information and interacting with the local population. To be made inventory of resident and as well as migratory birds.

■ Migration of Birds

There are number of migratory birds visiting the project area. A survey to know what type/species of birds visiting the area should be recorded and wetted with an ornithologist.

■ Identification of Critical Species

During the ecological field survey any critical habitat (also why it is critical) and its significance needs to be identified, and protection status recorded. In practice, a checklist of each individual species against the following will be required in order to be able to determine its protection status:

- IUCN's threatened category (Red Data Book-both National and global threatened category);
- Species protected under Bangladesh Wildlife Preservation Act (1974);
- Species included in CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora.
- Species protected under any protocol, conventions and any other agreement;
- Species considered as flagship species, keystone species or other significant species; and
- Endemicity of the species.

■ Assessment of Biodiversity Conservation Significance of the Project Site

This is to make an overall assessment of the proposed survey area to determine its conservation significance. In particular, an assessment is required of whether the area or part of it is essential for the survival of the critical species in the country or within the project area or region. In practical terms, assess the conservation significance at the level of species as well as the level of ecosystem. Extensive expert knowledge will be required during the process. This activity ultimately will help to identify any constraints to the proposed project.

■ Gangetic Dolphins Survey

Ganges river dolphins (*Platanista gangetic*) are threatened in Bangladesh from the effects of dams, large embankment schemes, dredging, fisheries by catch, directed hunting, and water pollution. The South Asian River Dolphin (*Platanista gangetic*) or shushuk in Bangla is listed as an endangered species in IUCN's Red List in 2010. Jamuna River is one of the major habitats for this type of aquatic fauna. The overall aim of the intended survey is to identify their presence, availability and habitat around the project locations. To monitor the presence of this species the survey will be conducted monsoon period for better understanding.

■ Tree inventory and Replacement

As a part of baseline environmental survey, trees will inventory on the alignment and areas if influence for removal of trees in the proposed alignment and the diversity of trees to be identified and recorded. An inventory of trees with local name, girth, dbh, bole height, height, amount of fuel and numbers has been prepared.

#### 4.1.4 Primary data collection: Socio-economic Environment.

- Cultural Heritage

Assess the project site and areas of potential disturbance for cultural heritage, including archaeological sites, historic sites, and living cultural heritage. Identify any critical cultural heritage.

- Secondary data will be collected by respective department in the Area of Influence. In particular:
- Identify communities and households in the Area of Influence and estimate population;
- Assess the health, wellbeing and vulnerability of potentially affected communities;
- Identify local systems of governance, administration, tribal and social set-up and conflict resolution;
- Identify extent of natural resource and ecosystem services and its contribution to the local economy;
- Describe the local economy and dynamics;
- Identify land uses at the Project Site and nearby areas
- Identify possible sensitive receptors;
- Identify possible cultural heritage sites; and
- Identify the presence of any indigenous people in the Area of Influence.



## 5. ALTERNATIVE ASSESSMENT

S3,

S4 and S5 Feasibility Study and Design Services Contracts shall propose and analyzed different alternatives for each one of the Project's component at the stage of Feasibility Study.

Over the set of Project alternatives proposed by S3, S4 and S5 component, S6 Consultant will undertake an Environmental and Social Impact Assessment for each one of the Project component (each location), thus an Alternative Assessment will be carried out.

With the selection of both quantitative and qualitative environmental and social indicators a valued comparison of feasible alternatives to the project location design and operation will be carried out. This Assessment will be based on a multicriteria analysis, in terms of their potential environmental and social impact.

As a result of this exercise, a summary table will be included highlighting the major environmental and social impacts or risks associated with each alternative discussed, as well as mitigation and management measures for each, assigning economic values when feasible.

Important to note that is critical for the Environmental and Social Impact Alternative Assessment that each one of the locations, each one of S3, S4 and S5 component, Feasibility Study stage must be reached, and the corresponding report approved.

## 6. STAKEHOLDER CONSULTATION

A

Public Consultation including identified stakeholders with an assessment of their interest in the project will be developed. A preliminary stakeholder database of key institutional stakeholders and representative community members for preliminary stakeholder consultation will be developed. That approach will result in a Stakeholder Mapping process

The consultation process and its results are to be documented and reflected in the EIA as the views and concerns of stakeholders be made known to decision makers and considered by the Project.

### 6.1 PUBLIC CONSULTATION

For this report, at first the EA (Environmental Assessment) study will conduct in-depth consultation meetings with stakeholders including socio-economic survey at several locations that have been proposed to have project interventions. Individual consultation will conduct with persons of different walks of life including women. A team of experienced professional and support staff will conduct surveys and consultation meetings after being briefed about the project. The orientation session will facilitate by the survey team leader. Techniques of data collection, sampling methods, methods of filling up questionnaire, potential locations of the survey, etc. will discuss in the orientation session using map of the study area. The respondents will select by random sampling method from each of the locations and also by purposive sampling method in some locations.

### 6.2 FOCUS GROUP DISCUSSION

A Focus Group Discussion shall be organized with the participants of the representatives from different Stakeholders around the project location who are directly or indirectly benefited or affected by the project. People with various occupations to be consulted. The discussion program was arranged as a medium of expressing opinions of the local people about the project.

## 7. IDENTIFICATION AND ANALYSIS OF POTENTIAL IMPACTS AND MITIGATION MEASURES

The approach to the assessment of environmental impacts will be based upon the changes in the receiving environment caused by the Project, followed by an assessment of the overall significance of these changes, compared with the baseline condition.

This section will predict and assess the project's likely positive and negative direct and indirect impacts on physical, biological, socioeconomic (including occupational health and safety, community health and safety, vulnerable groups and gender issues, and impacts on livelihoods, and physical cultural resources) environment in the project's area of influence, in quantitative terms as far as possible; identify mitigation measures and any residual negative impacts that cannot be mitigated; explore opportunities for enhancement; identify and estimate the extent and quality of available data, key data gaps, and uncertainties associated with predictions and specifies topics; and examine transboundary, and cumulative impacts as appropriate. Wherever possible, impacts will be quantified via GIS mapping.

TYPASA/KS will prepare two separate ESIA reports (one for terminals and other one covering both landing stations and vessel shelters)

The ESIA's shall be undertaken following a systematic process that predicts and evaluates impacts the Project could have on aspects of the physical, biological, social/socio-economic and cultural environment. Further, it identifies measures that the Project will take to avoid, minimize/reduce, mitigate, offset or compensate for adverse impacts; and to enhance positive impacts where practicable.

### 7.1 IDENTIFICATION OF POTENTIAL IMPACTS ON EXISTING ECOSYSTEM

It is to identify whether the construction of the bridge could potential result in significant:

- lethal or sub lethal effects to biota
- Disturbances to animals (frightening, avoidance, etc.)
- destruction of important vegetation habitat
- reduction/disturbances to natural breeding and recruitment
- permanent degradation of migration and migratory pattern
- disturbance to resting and roosting sites for local area animals
- hindrance of the natural regeneration process in the project corridor
- reduce the aesthetic values of habitat/ecosystem

#### 7.1.1 Change Issues

Bangladesh is one of the worst affected countries of climate change. Table below shows the future predictions for changes in Bangladesh's climate. The prediction for increased precipitation during wet season, sea level rise and increases in SST portend increases in the magnitude and intensity of floods/ increased and high velocity discharge of flood waters, intensified and frequent cyclones, and associated storm surges and likely to cause damages and operational disruption to local infrastructures. All the project sites are located on the river banks and therefore are vulnerable to floods, erosion, cyclones, storm surges, etc, particularly those are located in the estuarine areas, since it is the precise site for interplay of various climate induced events.

The fifth International Panel on Climate Change Assessment Report (AR5-IPCC, 2014) predicts that under a moderate emission scenario the temperature towards the end of the 21st century may increase between 1.5 and 2.0 C. The corresponding sea level rise during this period is likely to be in the ranges of 26–55cm under a low-emissions scenario and 45–82cm for a high-emission scenario. This magnitude of sea level rise implies significant increased risks for South Asia’s coastal infrastructure, particularly if combined with changes in cyclone frequency or intensity, which are likely to become more frequent and severe in the coming years (ARS5-IPCC 2014). An increase of 30C in Sea Surface Temperatures (SST) is likely to increase by 41% the intensity and severity of cyclones.

Year	Temperature change (°C)		Changes in rainfall (%)		Sea level (cm)
	DJF	JJA	DJF	JJA	NAPA
2030	1.1	0.8	- 2	6	14
2050	1.6	1.1	- 5	8	32
2100	2.7	1.9	- 10	12	88

Source: NAPA, 2005

Note: DJF- December-January-February; JJA=June-July-August

Table 7. Predicted Climate Change Scenarios for Bangladesh

Sources: NAPA (2005). Bangladesh Program of Action for Adaptation to Climate Change. Final Report. Bangladesh Agricultural Research Council (BARC), Dhaka. 85 pp and IPCC (Intergovernmental Panel on Climate Change). 2015. Fifth Assessment Report (AR5): Synthesis Report, IPCC, Geneva, Switzerland London.

Bangladesh Government is very responsive to climate change issues. The country has adopted the National Adaptation Program of Action (NAPA; MoEF, 2005) in 2005 and also developed the Bangladesh Climate Change Strategy and Action Plan (BCCSAP; MoEF, 2008) for building a climate resilient development framework through adaptation and mitigation. Adaptation for physical infrastructure is one of the six pillars in the BCCSAP, where it has been strongly emphasized to deal with the likely impacts of climate change. Bangladesh is trying to mainstream the climate change issues in development planning. Therefore, it is a requirement for any development that climate change issue is addressed in project design, planning and implementation.

The Consultant will screen the project/ development activities through a climate change lens and suggest adaptation and mitigation measures, where necessary, for consideration in the design structures of the proposed infrastructures and its operation in order to ensure climate resilient development. In practice, we will perform a risk and vulnerability assessment in relation to different climatic events (e.g. floods, cyclones, storm surges, erosion, sea level rise) under predicted climate scenarios on the different components of infrastructures and assess further needs to adapt to the predicted climate scenarios.

## 7.2 IMPACT ASSESSMENT METHODOLOGY

Impact identification and assessment starts with scoping and continues through the remainder of the IA Process. The principal steps are:

- Impact prediction: to determine what could potentially happen to resources/receptors because of the Project and its associated activities.
- Impact evaluation: to evaluate the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity, value and/or importance of the affected resource/receptor.
- Mitigation and enhancement: to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts.
- Residual impact evaluation: to evaluate the significance of impacts assuming effective implementation of mitigation and enhancement measures.

### 7.2.1 Prediction of Impacts

Prediction of impacts will be carried out with an objective to determine what is likely to happen to the environment because of the Project and its associated activities. From the potentially significant interactions identified in Scoping, the impacts to the various resources/receptors will be elaborated and evaluated.

### 7.2.2 Evaluation of Impacts

Each impact is described in terms of its various relevant characteristics (e.g., type, scale, duration, frequency, extent). The terminology used to describe impact characteristics is shown in next table

CHARACTERISTIC	DEFINITION	DESIGNATIONS
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect)	Direct Indirect Induced
Extent	The "reach" of the impact (e.g., confined to a small area around the Project Footprint, projected for several kilometers, etc.)	Local National Global
Duration	The time period over which a resource/ receptor is affected.	Temporary Short-term Long-term Permanent
Scale	The size of the impact (e.g., the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc.)	[no fixed designations; intended to be a numerical value or a qualitative description of "intensity"]
Frequency	A measure of the constancy or periodicity of the impact.	[no fixed designations; intended to be a numerical value or a qualitative description]

Table 8. Terminology for impact characterization

The definitions for the type designations are given in the following table. Definitions for the other designations are resource/receptor-specific.

TYPE	DEFINITION
Direct	Impacts that result from a direct interaction between the Project and a resource/ receptor
Indirect	Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment
Induced	Impacts that result from other activities (which are not part of the Project) that happen because of the Project.

Table 9. Definition of Impact types

The above characteristics and definitions apply to planned and unplanned events. An additional characteristic that pertains only to unplanned events is likelihood. The likelihood of an unplanned event occurring will be designated using a qualitative scale, as described in the following table.

LIKELIHOOD	DEFINITION
Unlikely	The event is unlikely but may occur at some time during normal operating conditions (probability less than 20%)
Possible	The event is likely to occur at some time during normal operating conditions (probability greater than 20% and less than 50%)
Likely	The event will occur during normal operating conditions (probability greater than 50% and less than 90%)
Certainly	Greater than 90%

Table 10. Definition of likelihoods designation

Once an impact's characteristics is defined, each impact was assigned a 'magnitude'. Magnitude is typically a function of a combination (depending on the resource/receptor in question) of the following impact characteristics:

- Extent
- Duration
- Scale
- Frequency

In case of unplanned events only, magnitude incorporates the 'likelihood' factor discussed above. Magnitude essentially describes the intensity of the change that was predicted to occur in the resource/receptor as a result of the impact. As discussed above, the magnitude designations themselves are universally consistent, but the descriptions for these designations vary on a resource/receptor-by- resource/receptor basis. The universal magnitude designations are:

- Positive
- Negligible
- Small
- Medium
- Large

In the case of a positive impact, no magnitude designation (aside from 'positive') is assigned. It is considered sufficient for the purpose of the IA to indicate that the Project is expected to result in a positive impact, without characterizing the exact degree of positive change likely to occur.

In the case of impacts resulting from unplanned events, the same resource/ receptor-specific approach to concluding a magnitude designation is followed, but the 'likelihood' factor is considered, together with the other impact characteristics, when assigning a magnitude designation. In addition to characterizing the magnitude of impact, the other principal impact evaluation step is the definition of the sensitivity/ vulnerability/ importance of the impacted resource/receptor. There are a range of factors that was considered when defining the sensitivity/ vulnerability/ importance of the resource/receptor, which may be physical, biological, cultural or human. Other factors are also considered when characterizing sensitivity/ vulnerability/importance, such as legal protection, government policy, stakeholder views and economic value. The sensitivity/ vulnerability/importance designations used herein for all resources/receptors are:

- Low
- Medium
- High

### 7.3 ESIA REPORT STRUCTURE

The Environmental and Social Impact Assessment Report will comprise the following details represented in various chapters of the Report.

Chapter-1 Introduction: will emphasize on the project activities and the brief scope and methodology of the EIA Study.

- Suggested contents:
  - Background
  - Needs for Project
  - Location of Study Area and Brief Description of the Project
  - Scope of Environmental Assessment
  - Objectives of the EIA
  - Environmental Classification of Project
  - Methodology of Field Work Surveys
    - Environmental Quality. Materials and Methods
    - Baseline Ecological Survey. Materials and Methods
    - Stakeholder Consultation. Methodology
    - Social Survey
  - EIA Team
  - Limitations
  - References

Chapter-2 would focus on the present environmental legislation applicable for the proposed project and the necessary clearance to be obtained by the executing agencies.

■ Suggested contents:

1. National Policies and Legislations
2. International Policy
3. GoB Env. Clearance and Public Consultation Procedure

Chapter 3, Project description gives an overview of the proposed project.

Suggested contents:

1. Analysis of Alternatives
2. Project Boundaries
3. Project Activities during clearing, construction and operation
4. Project Implementation Schedule
5. Resources and Utilities Demand
6. Map & Survey Information

Chapter 4 will throw light on the existing environmental status and the results obtained during baseline monitoring surveys were also discussed.

Suggested contents:

1. Physical Environmental
2. Biological Environmental
3. Social Environmental

Chapter 5 will list out the likely impacts caused and the suggested mitigation measures due the Construction activity of the proposed project.

Suggested contents:

1. Methodology
2. Environmental Effects and Proposed Mitigation Measures
3. Environmental Benefits and Enhancements

Chapter-6 formulates the environmental management plan with a focus on the implementation of mitigation measures for various stages of the project to curtail the adverse impacts.

Chapter 7- envisages about A detailed monitoring plan will also be worked out for safeguarding the environment. In addition, the frequency for the environmental monitoring activities will also be listed out for the project.

Chapter-8 will give details of the Stakeholder Consultation, Public Consultation and the focus group discussion with the women groups, agricultural labour and the fisher man community was conducted and the feedback received from the local population was included in this section.

Chapter 9 will draw a conclusion from the EIA study and also suggests recommendations.



## 8. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

1. Mitigation: Under mitigation the EMP will:
  - a. Identify and summarize anticipated significant adverse environmental impacts and risks;
  - b. Describe each mitigation measure with technical details, including the type of impact to which it relates and the conditions under which it is required (for instance, continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate; and
  - c. Provide links to any other mitigation plans (for example, for involuntary resettlement) required for the project.
  
2. Monitoring: Under monitoring the EMP will:
  - a. Describes monitoring measures with technical details, including parameters to be measured, methods to be used, sampling locations, frequency of measurements, detection limits and definition of thresholds that will signal the need for corrective actions; and
  - b. Describes monitoring and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures and document the progress and results of mitigation.
  
3. Implementation arrangements: Under the implementation arrangements the EMP will:
  - a. Specify the implementation schedule showing phasing and coordination with overall project implementation;
  - b. Describe institutional or organizational arrangements, namely, who is responsible for carrying out the mitigation and monitoring measures, which may include one or more of the Following additional topics to strengthen environmental management capacity: technical assistance programs, training programs, procurement of equipment and supplies related to environmental management and monitoring, and organizational changes: and
  - c. Estimate capital and recurrent costs and describe sources of funds for implementing the environmental management plan.
  - d. Performance indicator

Here the desired outcomes as measurable events will be described to the extend possible, such as performance indicators, targets, or acceptances criteria that can be tracked over identified time periods.

## 9. INSTITUTIONAL ARRANGEMENT CAPACITY BUILDING AND GRIEVANCE REDRESS MECHANISM

Assessment of Institutional capacity of the implementing agencies will be conducted for effective implementation of environment management and monitoring plan. To identify the responsible institutes for implementation and supervision of the environmental management and monitoring plan (EMMP).

Assess Training needs of these agencies and propose capacity building measures and institutional arrangements to strengthening these agencies along with the cost estimates.

In this section the grievance redress framework (both informal and formal channels) will be described, prepared for the Feasibility Study and Preliminary Design for Construction of Dhaka Subway, setting out the time frame and mechanisms for resolving complaints about environmental performance.

## 10. RISK ASSESSMENT AND EMERGENCY RESPONSE

It is understood that the Project Engineer will consider a hazard risk mitigation plan (such as cyclones, tornadoes, droughts, floods, earthquakes, road accidents, etc.) during the initial planning and design stage. Depending on the timing, the results of this will be summarized in the ESIA and used to inform the Emergency Response Plan which will be coordinated with the surrounding community and resources. The primary objective of the plan is to keep the loss of life, material, machinery/equipment damage, and impacts on the environment to minimum.

The project sites, being located on the river banks, the proposed infrastructures (pontoons, platforms, gangway, terminal buildings, etc) as well as vessels that will utilize the infrastructures are vulnerable to a range of natural and man-made disaster events and have the potentials to disrupt normal functioning of the stations, terminal operations and likely to cause loss of assets, human casualties and environmental degradation of such an severity that requires undertaking special measures. Such disasters may arise from malfunction of the normal operating procedures (technological), disruption of supply chains, accidents, sabotage, social and political unrests, and natural calamities like earthquake, floods, cyclones, storm surges, tornadoes, and pandemics. Both GoB and WB's safeguard policies require to develop Emergency Response Plan/ Disaster Management / Plan to respond to an emergency situation.

### 10.1 EMERGENCY RESPONSE PLAN

The ERP will be developed listing various actions for different disaster cycle, e.g. mitigation, preparedness, response and recovery phases for different type hazards. The development of mitigation measures will be based on the following exercises:

Hazard Identification:

We will consider all ranges of hazards (e.g. fire, cyclones) ranging from ecologic to social having potential risks and the actions will be designed for each individual hazard.

Risk Assessment:

We will identify risks associated with individual hazard, assess the degree, severity of risks and identify and assess the impacts associated with the identified hazards. .

Review of Existing Control of BIWTA: BIWTA has its own ERP for facing the accidents and disasters. We will review the existing ERP and identify the gaps, particularly in relation to new infrastructures.

Development of Mitigation Actions:

Once risks and gaps are known we will identify and define the actions.

The Emergency Response Plan (ERP), among others, will have the actions in the following areas:

- a plan of action for warning and assembling system;
- a plan of action for evacuation of people in case of fire, accidents;
- a plan of action for security and safety services;
- a plan of action for rescue operation and recovery services
- a plan of action for emergency medical services;
- a plan of for strengthening the Emergency Response Cell (ERC) of the BIWTA.

## 11. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

This section will:

1. Describe the process undertaken during project design and preparation for engaging stakeholders, including information disclosure and consultation with affected people and other stakeholders.
2. Summarize the comments and concerns received from affected people and other stakeholders and how these comments have been addressed in project design and mitigation measure with special attention paid to the needs and concerns of vulnerable groups, including women, the poor and indigenous people and
3. Describe the planned information disclosure measure (including the type of information to be disseminated and the method of dissemination) and the process for carrying out consultation with affected people and facilitating their participation during project implementation.

## 12. CONCLUSION AND RECOMMENDATION

This section will provide the conclusions drawn from the assessment and present the recommendations.

13. ENVIRONMENTAL SURVEY -TIME SCHEDULE

Activities/time	2019						2020							
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
ToR submission to DoE for approval	■													
Preparation for environmental survey		■	■											
Air quality Monitoring and analysis				■	■									
Noise level measurement or modeling				■										
Vibration level measurement					■	■								
Surface water quality monitoring and analysis						■	■							
Ground water quality monitoring and analysis						■	■							
Sediment monitoring and analysis						■	■							
Benthos and phytoplankton study							■	■						
Floral diversity (terrestrial and aquatic) survey					■	■								
Wildlife (Amphibians, reptiles, mammals, and birds) survey					■	■								
Fishery survey					■	■								
Dolphin survey					■	■								
Migratory Birds survey					■	■	■							
Soil quality monitoring and analysis							■	■						
Secondary information collection from the project site							■	■	■					
Public consultation			■	■	■									
Information disclosure meeting									■					
Draft EIA report submission to DoE									■					
Final EIA report submission										■				
Presentation of EIA											■			
Obtain Environmental Clearance Certificate (ECC) from DoE												■		

Figure 12. Environmental - Survey Work Schedule



Bangladesh Inland Water Transport Authority (BIWTA)  
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EC5760BRTWP-S6-ToR-submission letter-3

July 27<sup>th</sup> 2019

Ref.: BD-BIWTA-PD-RFI-2

SUBJECT: Consultancy Services of Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats, and Vessel Storm Shelters. Contract Package o. BRWTP-S6

REF.: SUBMISSION OF ESIA TERMS OF REFERENCE (ToR)

Dear Sir,

Kindly find herein 9 hardcopies and 1 softcopy of the draft Terms of Reference for the Environmental and Social Impact Assessment (ESIA) of the Consultancy Services of Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats, and Vessel Storm Shelters. Contract Package o. BRWTP-S6 for their submission to Department of Environment for approval.

79.0

Enrique Pineda  
**Project Team Leader**  
TYPSA



Yours faithfully,









Environmental and Social Impact Assessment of proposed new and up-  
gradation of Cargo and Passenger River Terminals. BRWTP-S6  
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

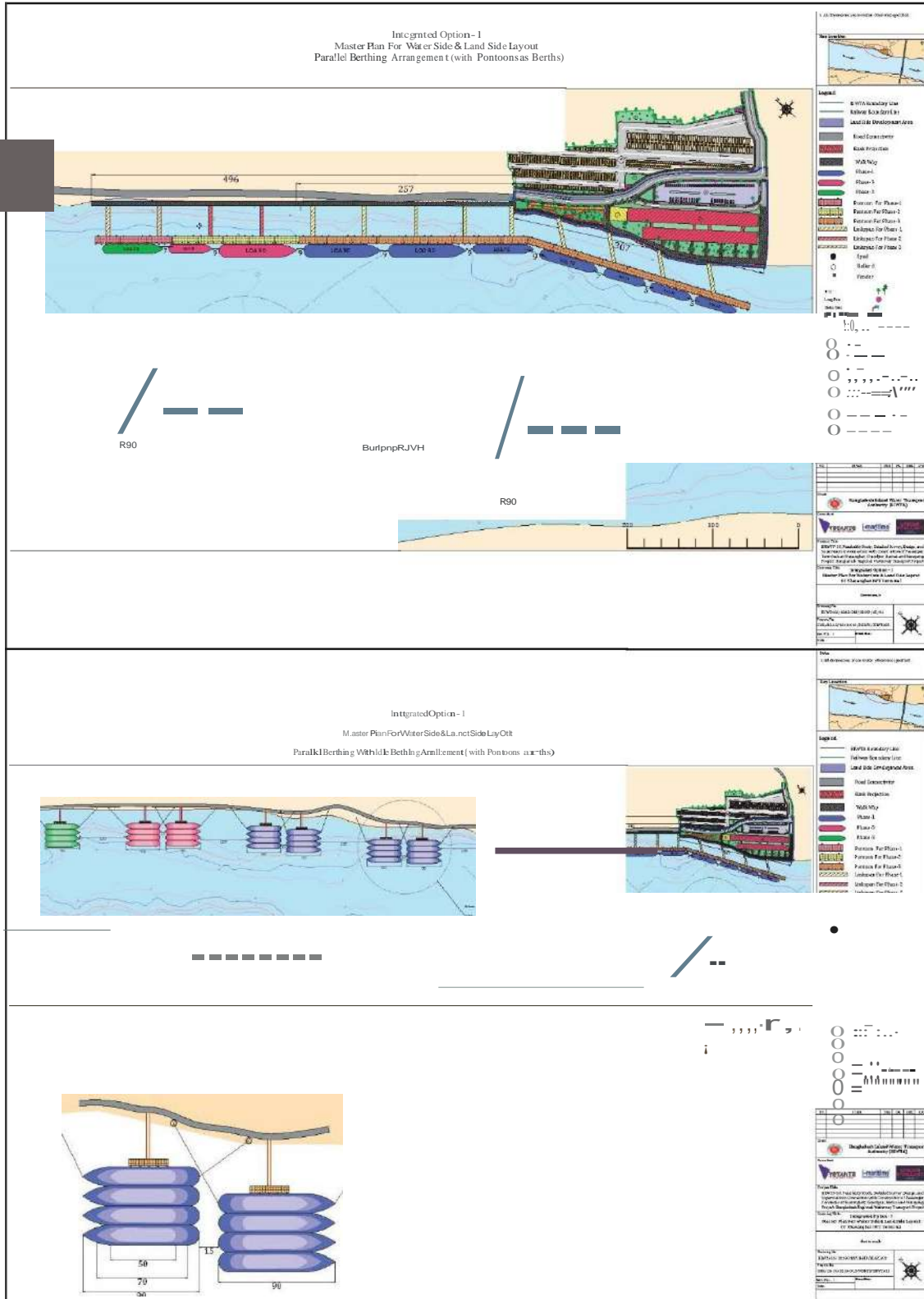


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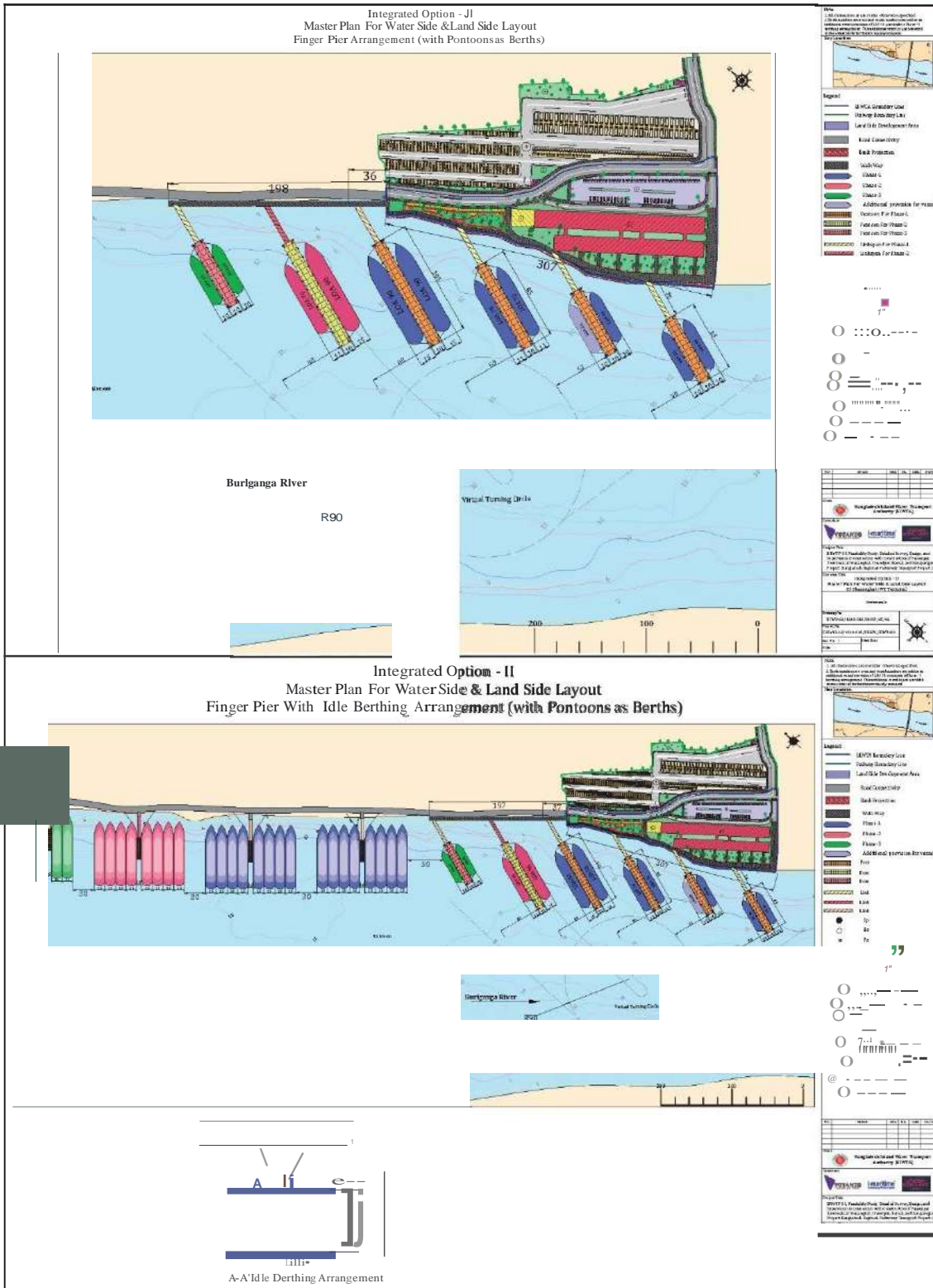
## ANNEX 2. PROJECT OPTIONS AND ALTERNATIVES







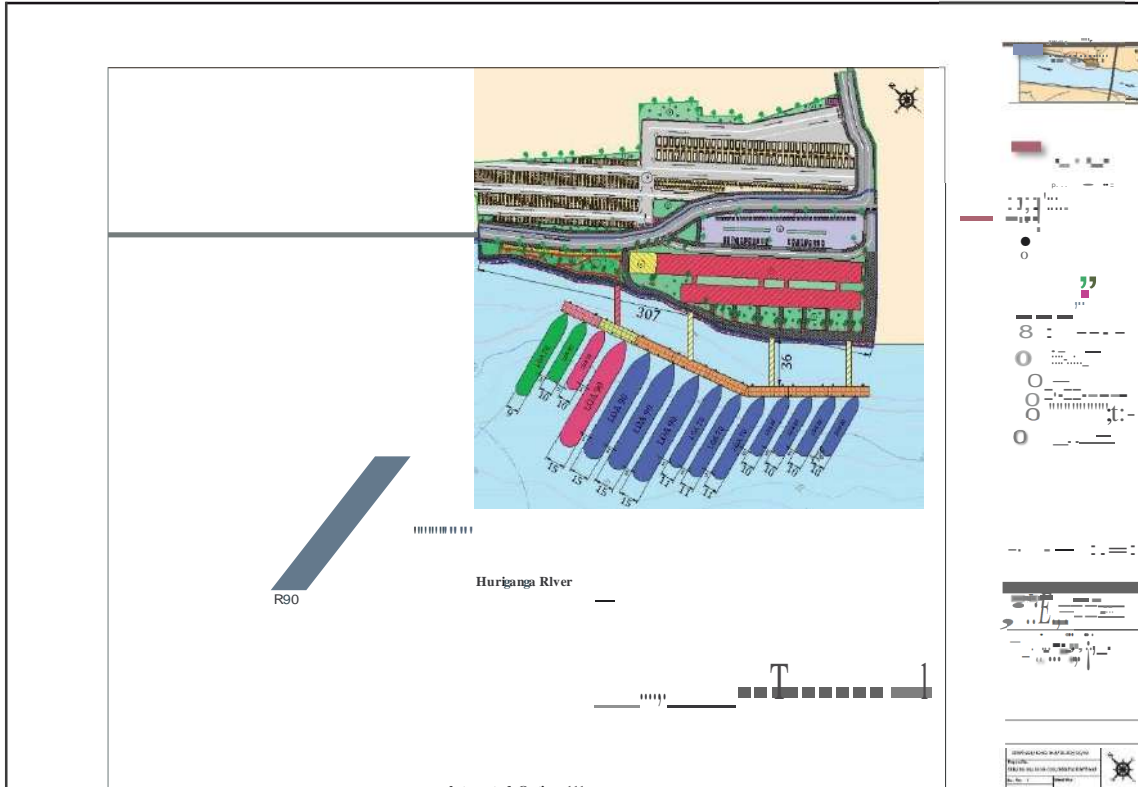
Sashanghat terminal



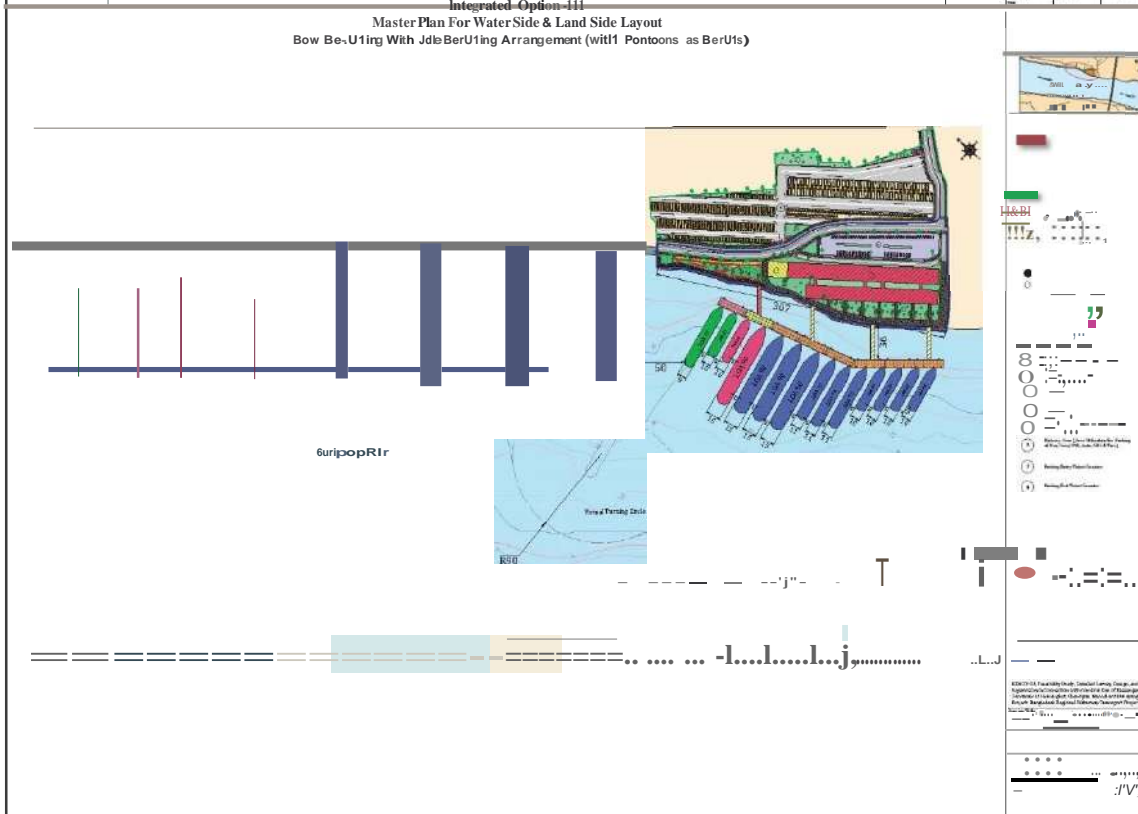
Sashanghat terminal



**Integrated Option-III**  
Master Plan For Water Side & Land Side Layout  
Bow Berthing Arrangement (With Pontoons as Berths)



**Integrated Option-III**  
Master Plan For Water Side & Land Side Layout  
Bow Berthing With JdeBerUing Arrangement (with Pontoons as BerUs)



Sashanghat terminal

### Chandpur terminal

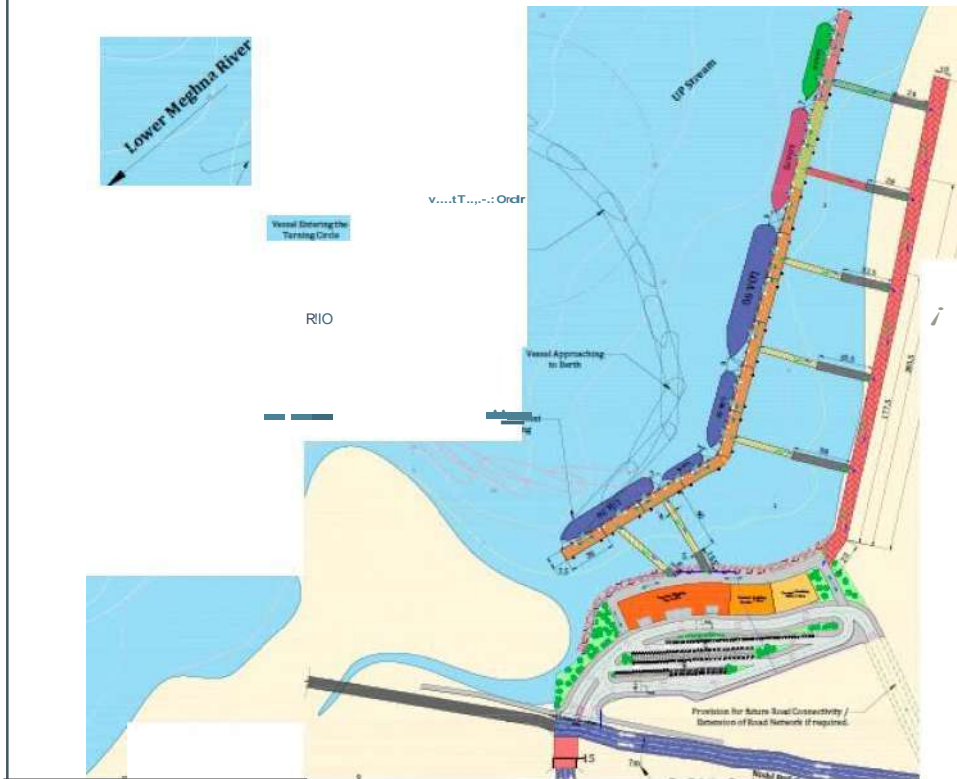


Chandpur Land side Master Plan Option 2

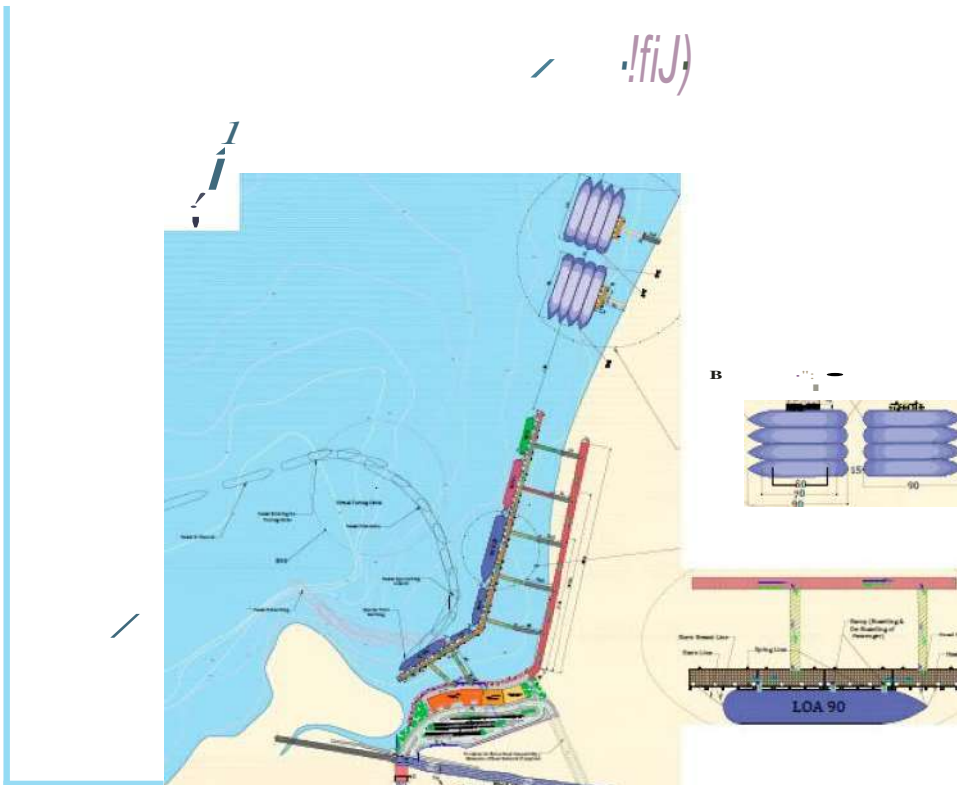




### Option-1 Integrated Master Plan For Parallel Berthing Scenario



Option-1 Integrated Master Plan For Parallel Berthing With Idle Berthing Scenario

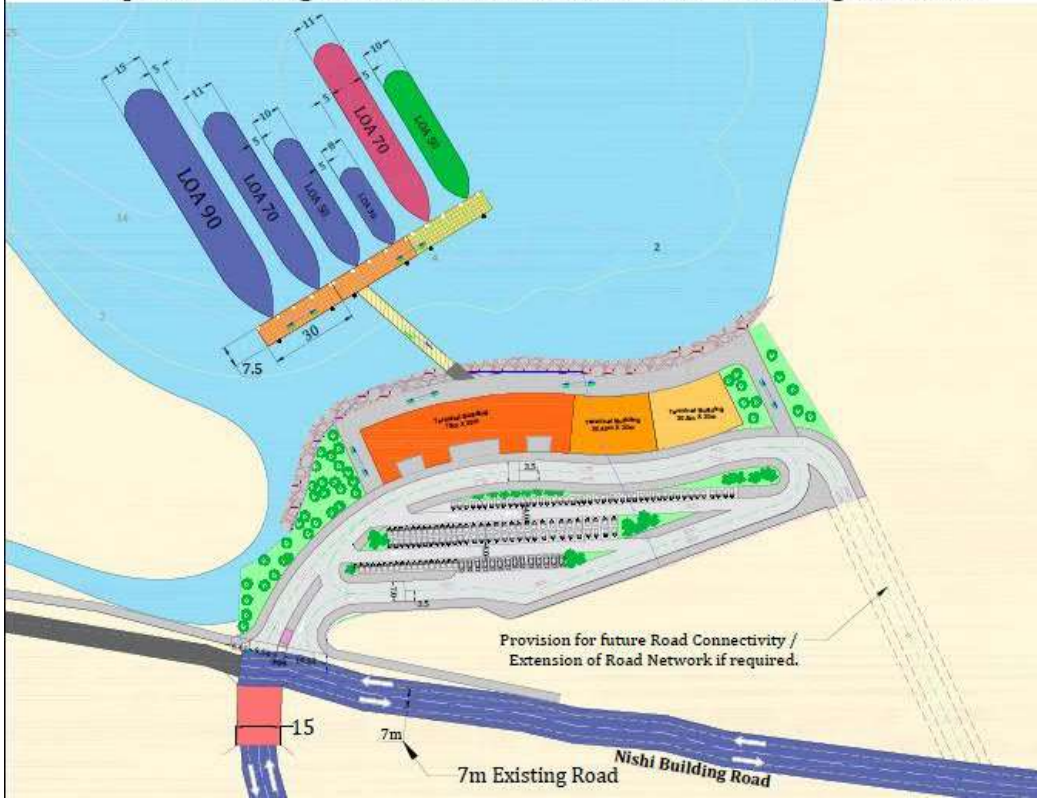


Chandpur terminal

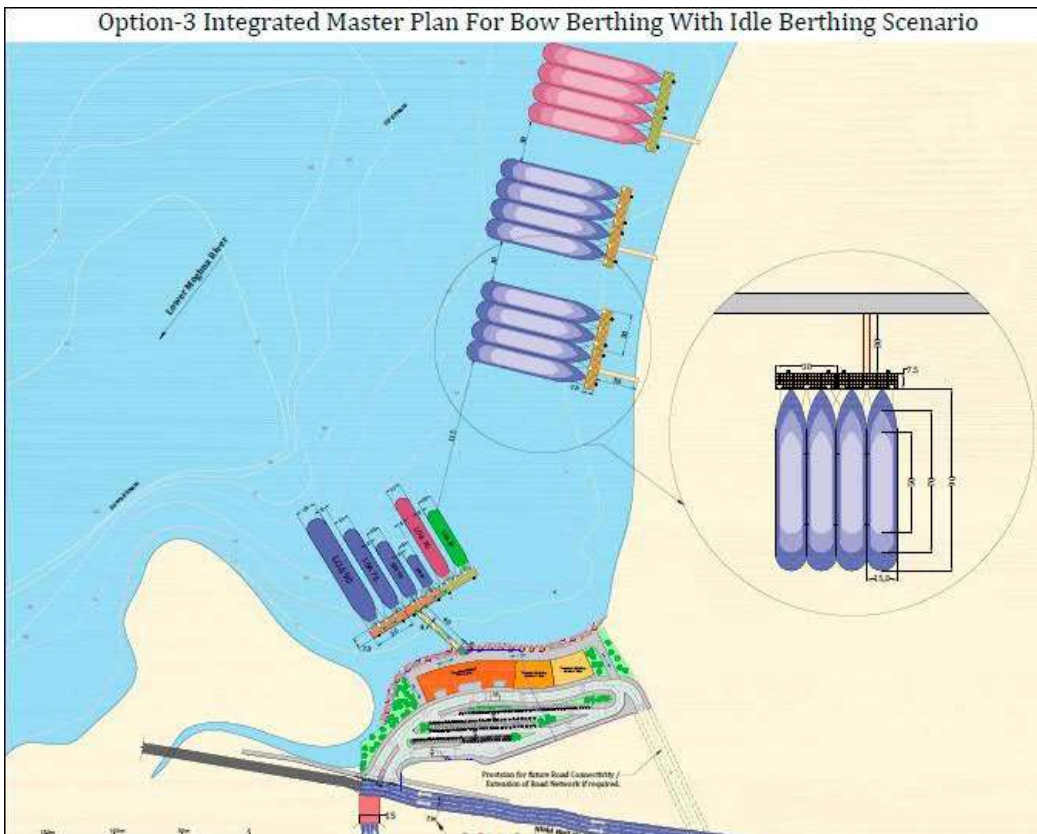




### Option-3 Integrated Master Plan For Bow Berthing Scenario

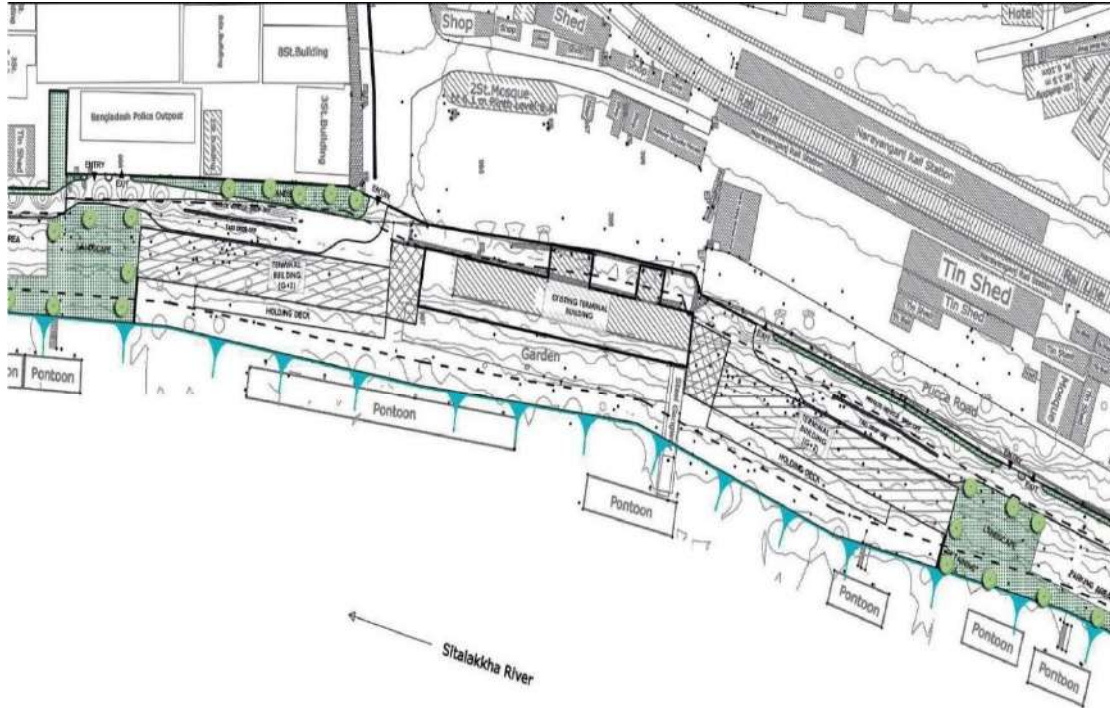


### Option-3 Integrated Master Plan For Bow Berthing With Idle Berthing Scenario

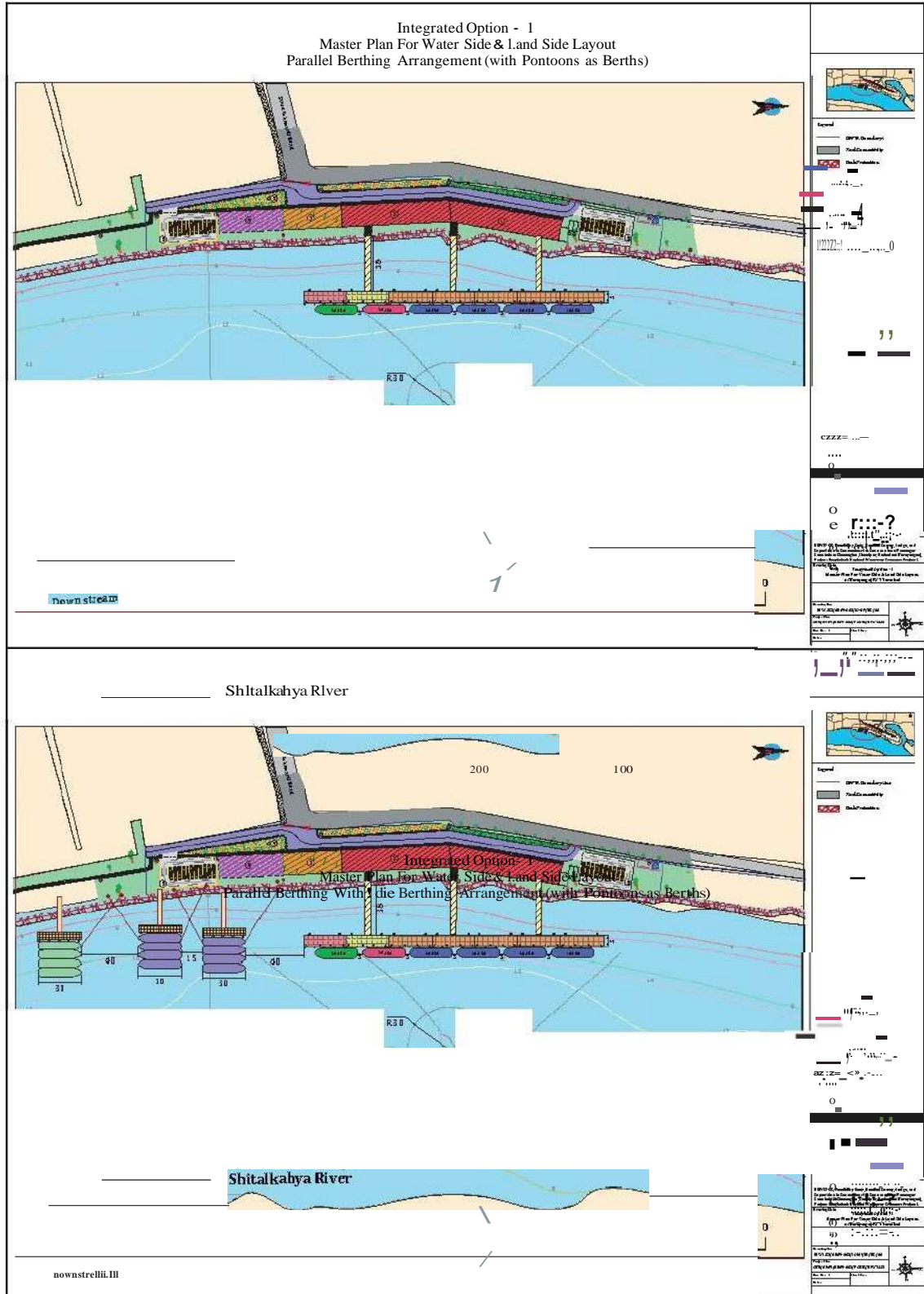


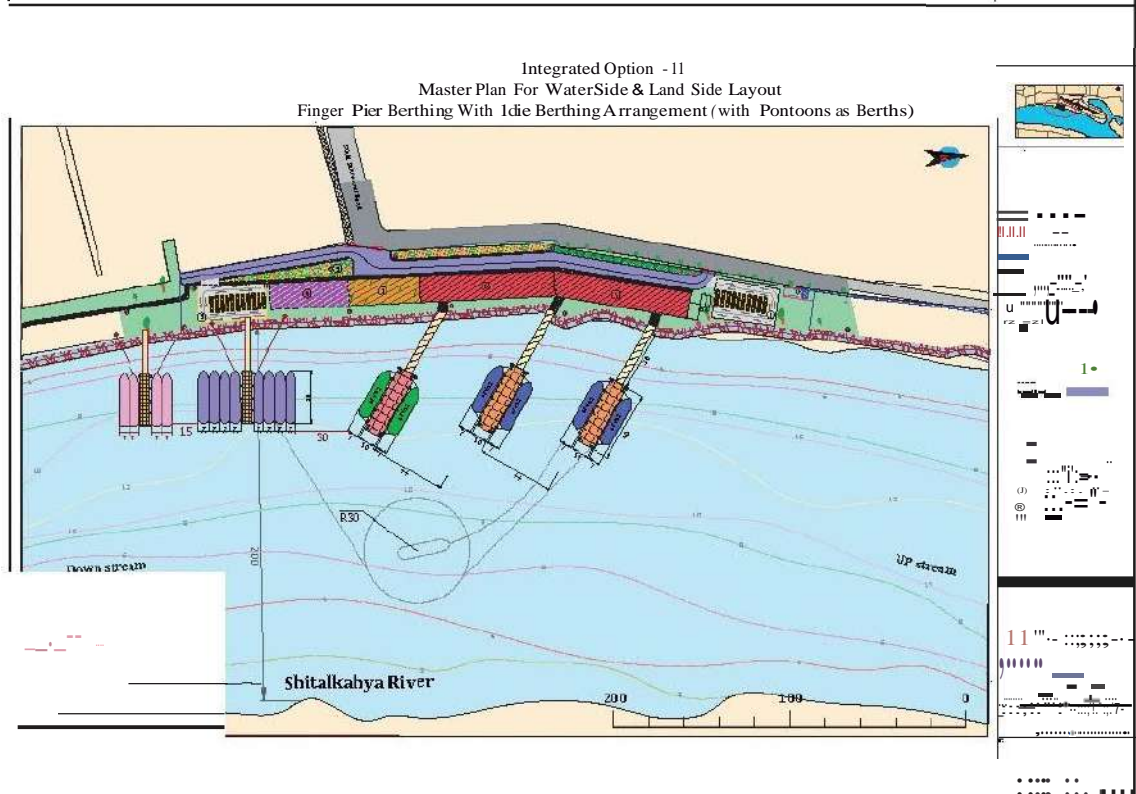
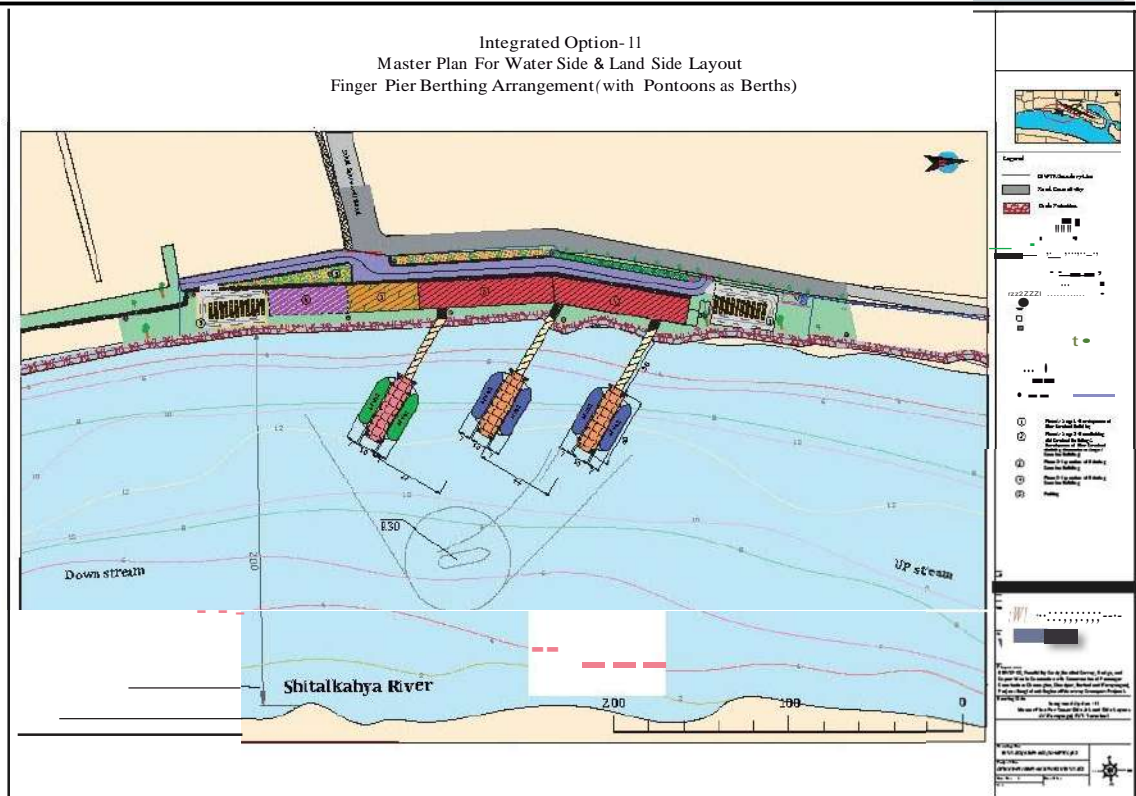
Chandpur terminal

## Narayanganj terminal



Narayanganj Land Side Master Plan - Option-2

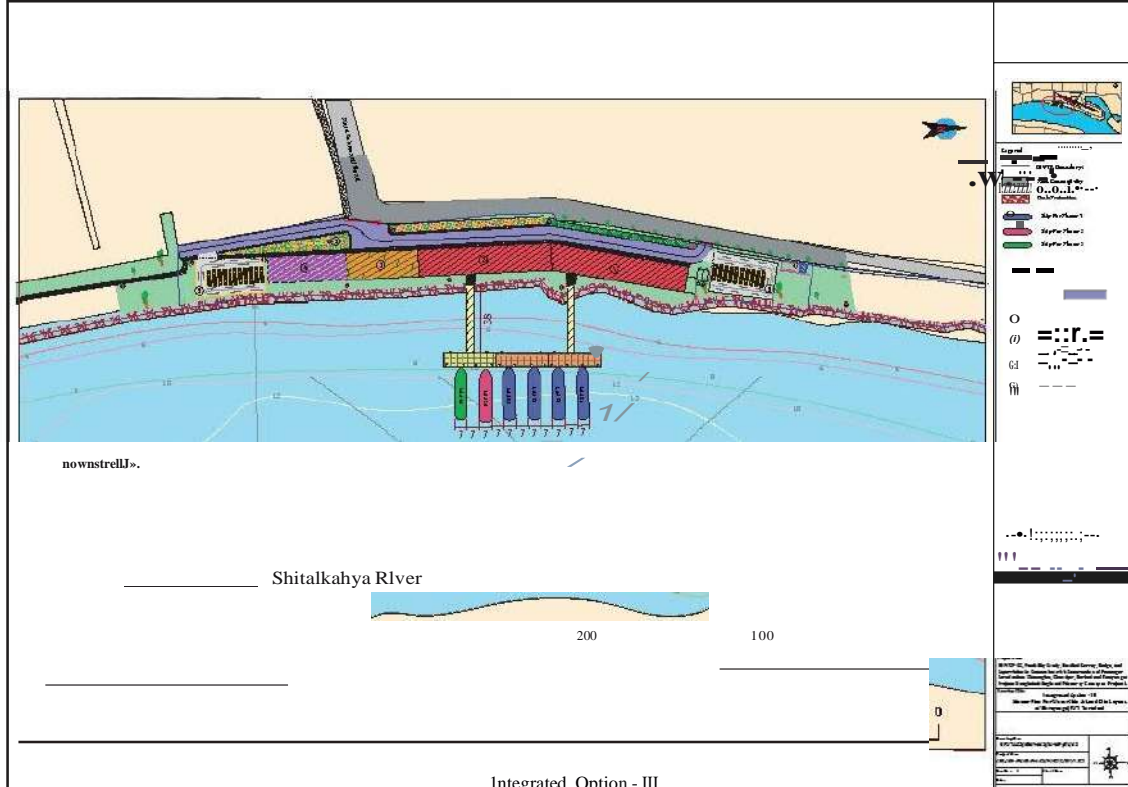




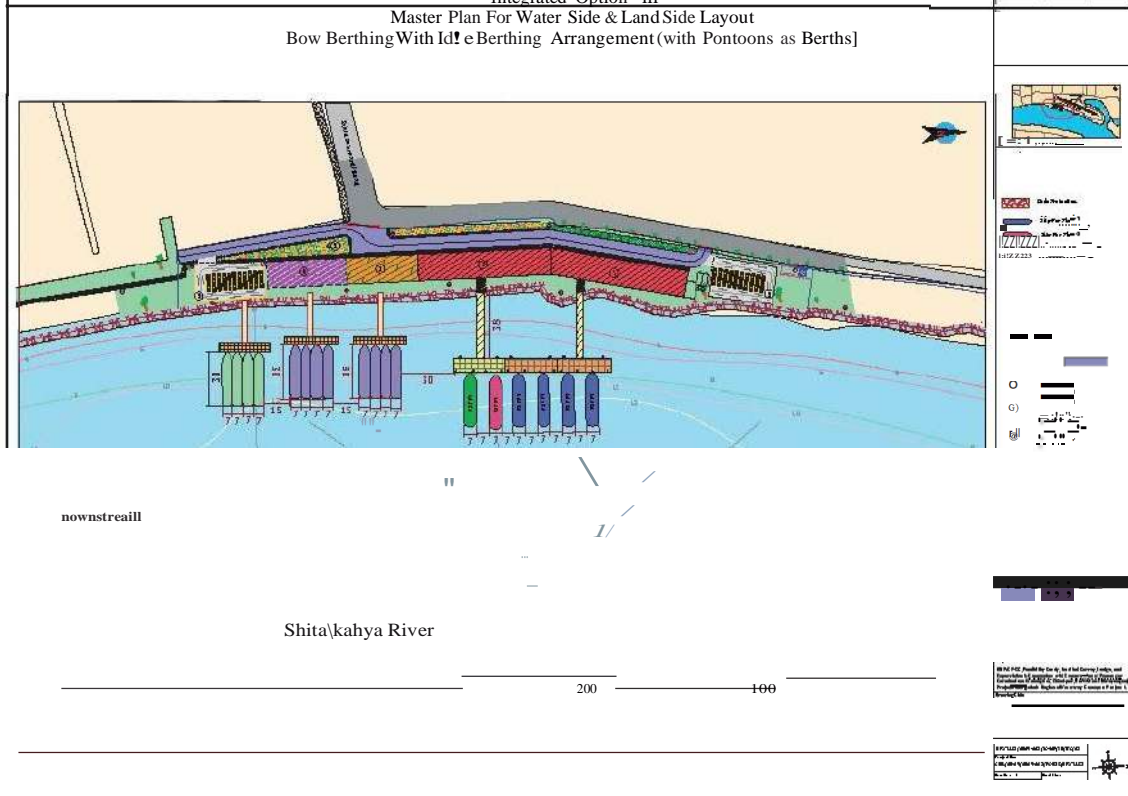
Narayanganj terminal



Integrated Option - III  
Master Plan For Water Side & Land Side Layout  
Bow Berthing Arrangement (with Pontoons as Berths)

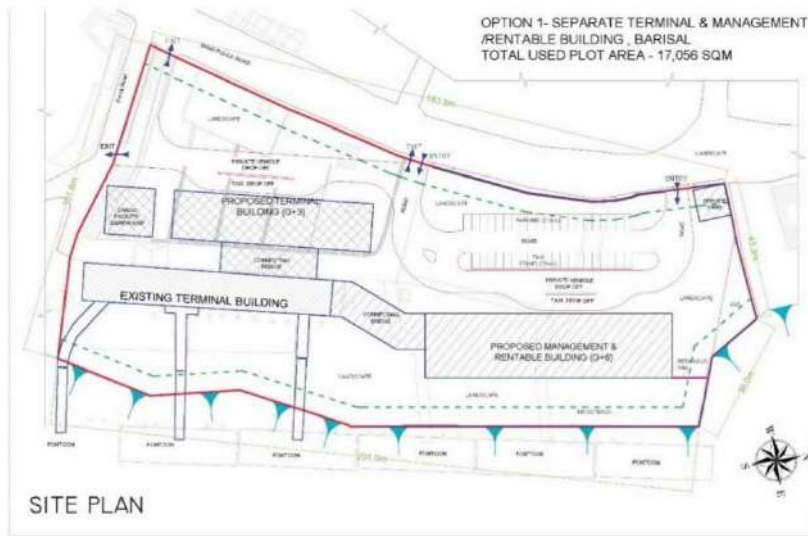


Integrated Option - III  
Master Plan For Water Side & Land Side Layout  
Bow Berthing With Idle Berthing Arrangement (with Pontoons as Berths)

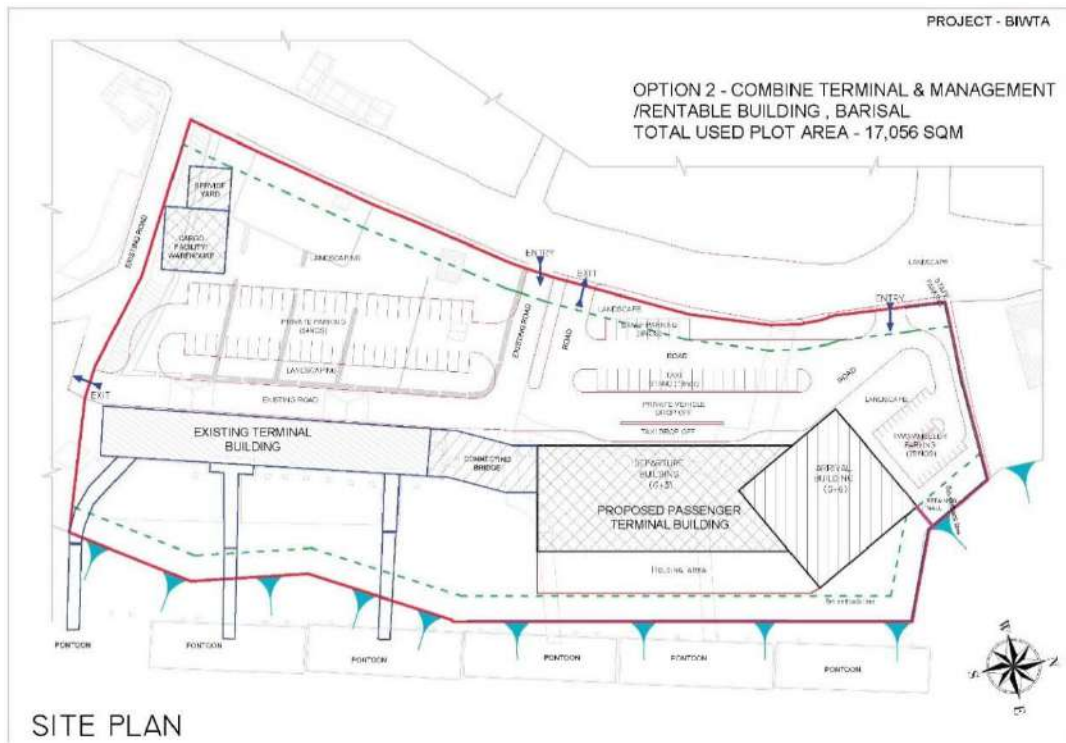


Narayanganj terminal

Barishal Terminal



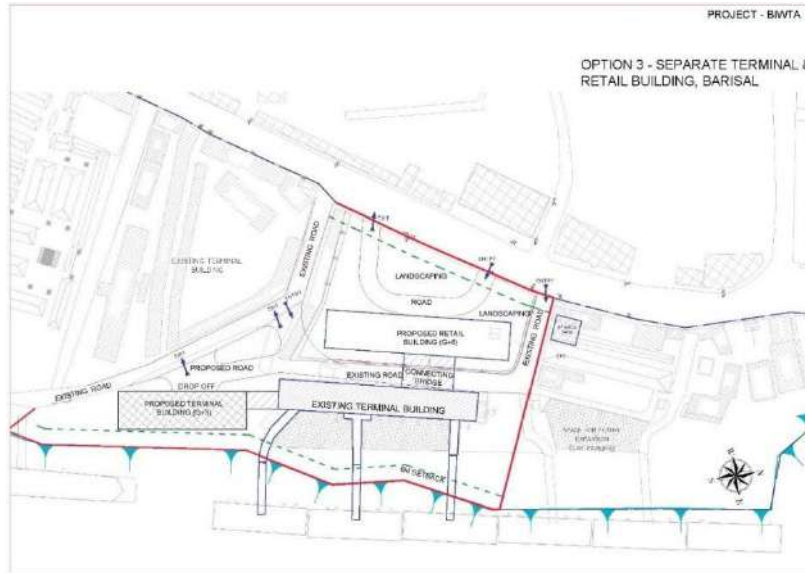
Land Side Master Plan - Option-2a: Separate Passenger Terminal Building & Management/ Rentable Building. Barishal Terminal





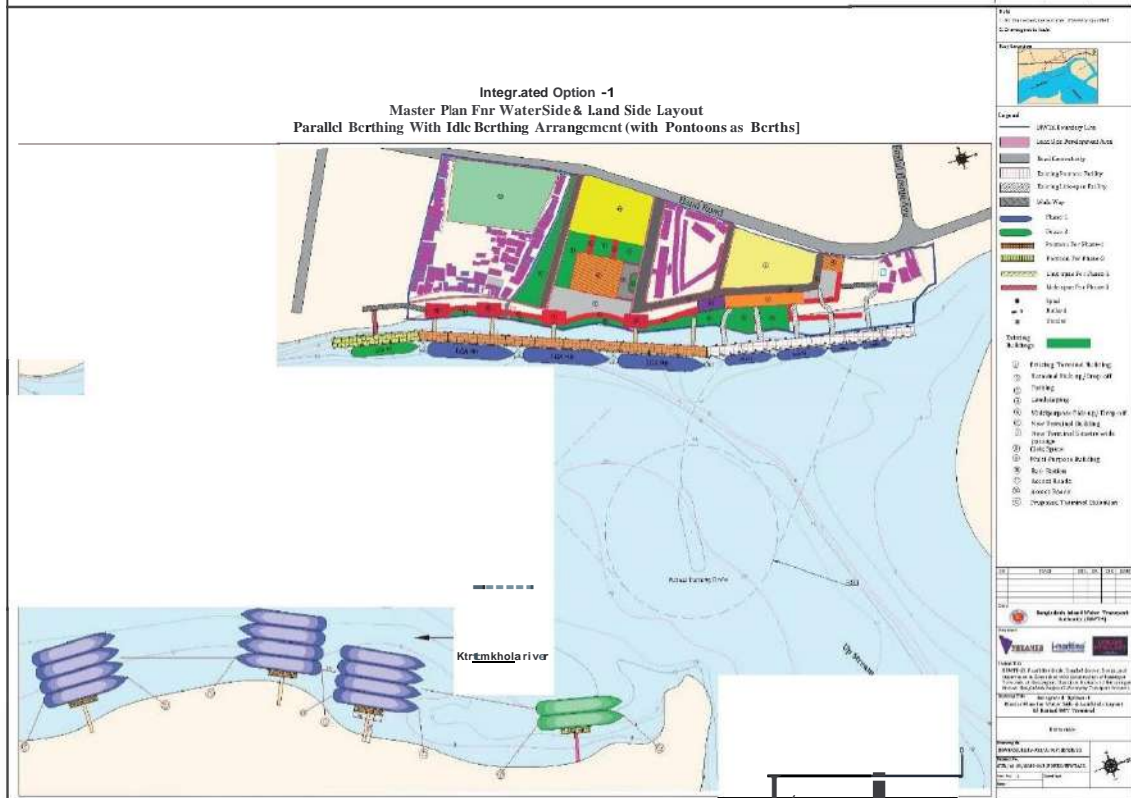
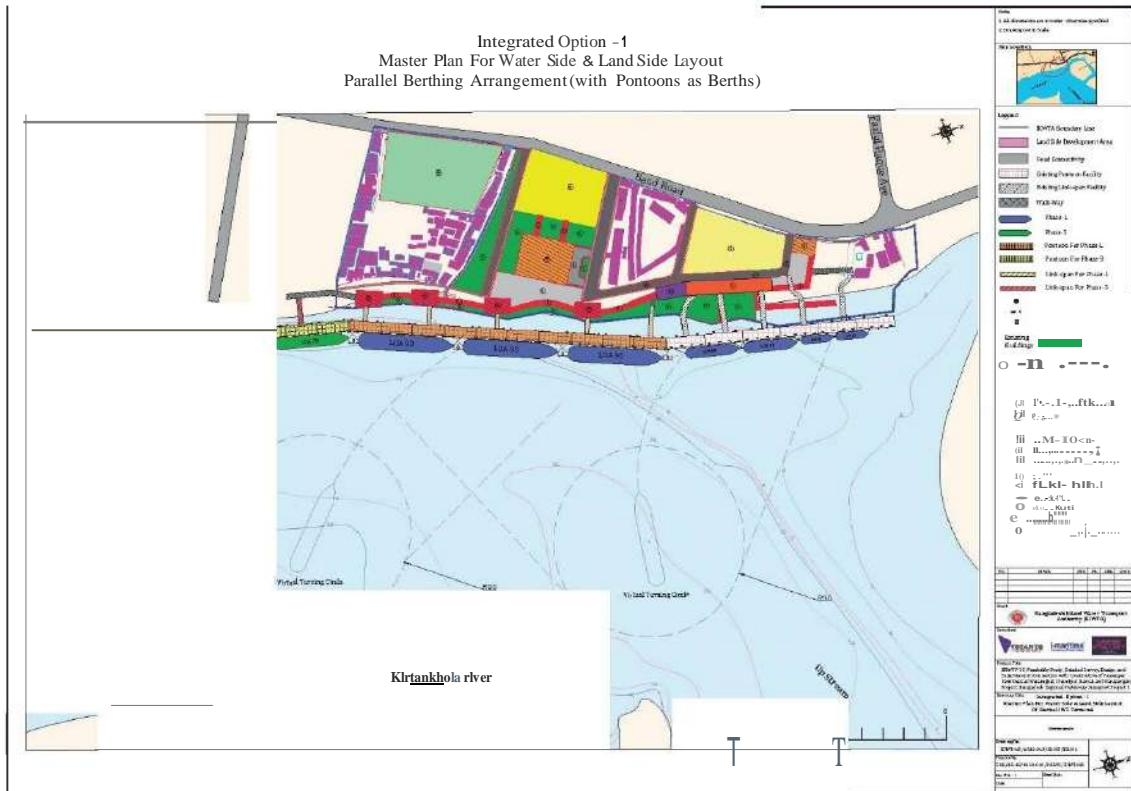


Land Side Master Plan - Option-2b: Combine Passenger Terminal Building & Management/ Rentable Building, Barishal Terminal

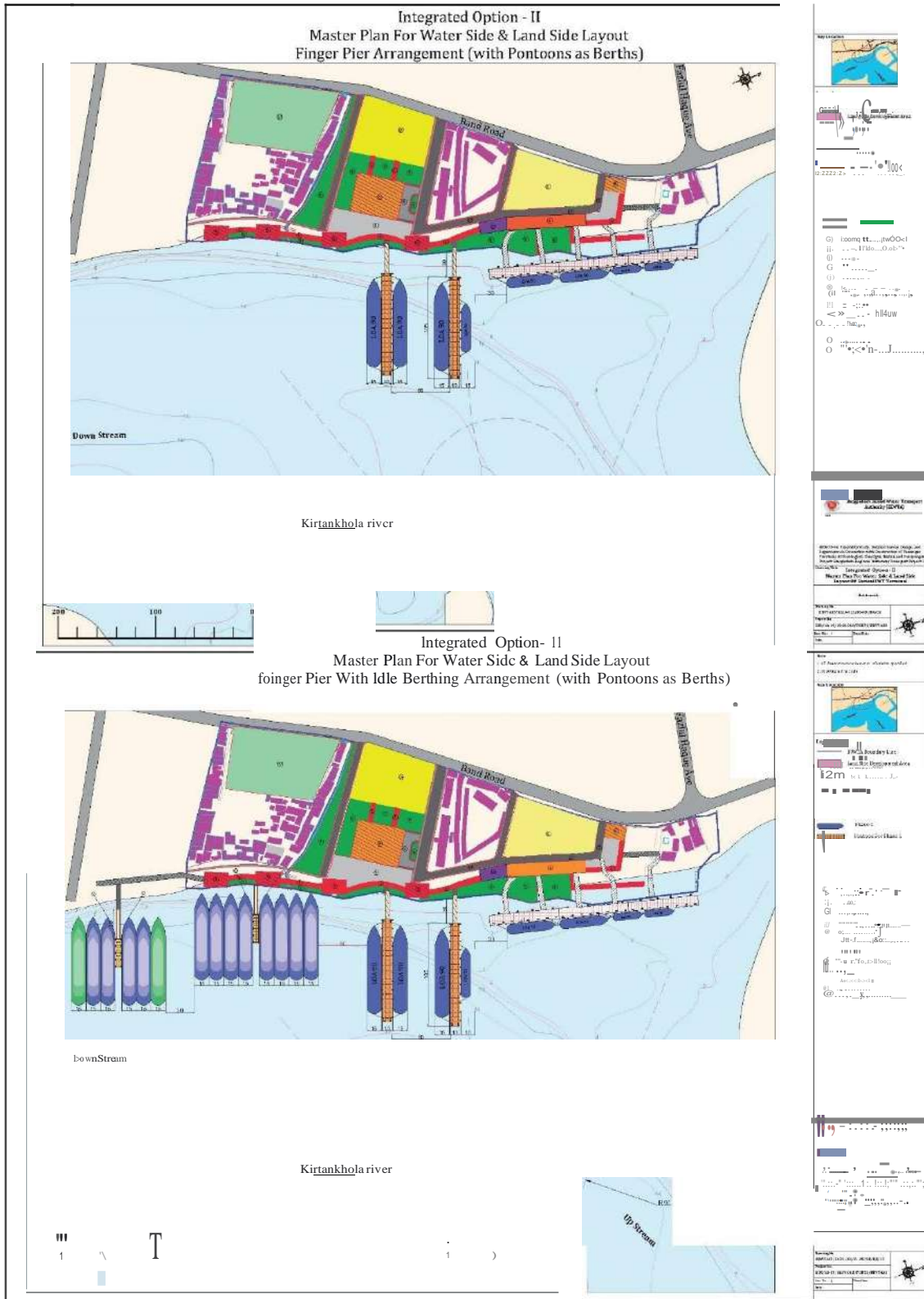


Land Side Master Plan - Option-2c: Separate Passenger Terminal Building & Management/ Rentable Building, Barishal Terminal

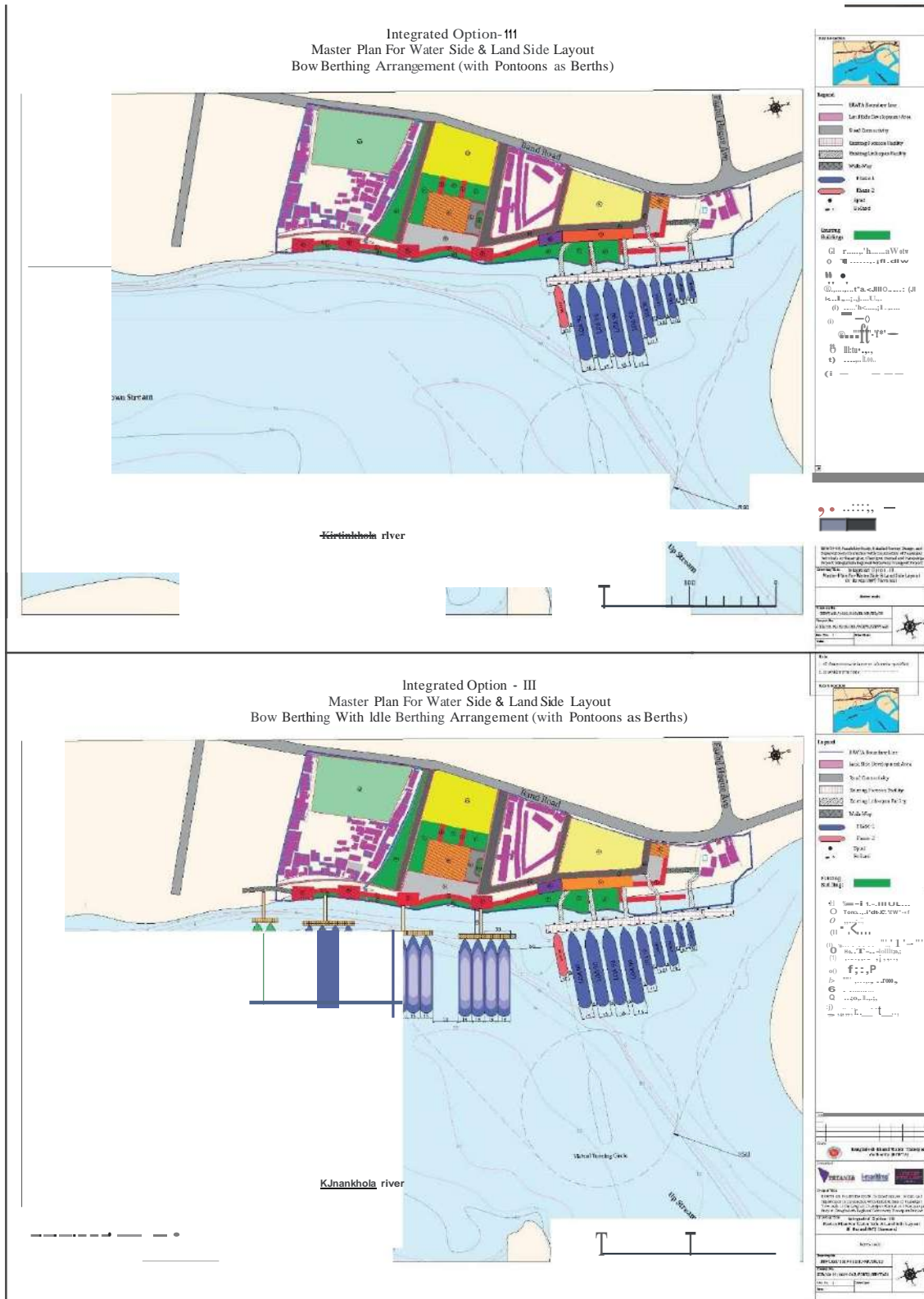
DRAFT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT



Barishal Terminal



Barishal Terminal







Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters. BRWTP-S6

DRAFT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT FOR  
TERMINALS



## ANNEX 3 ENVIRONMENTAL SURVEYS. BASELINE DATA





Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters. BRWTP-S6

DRAFT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT FOR  
TERMINALS



### ANNEX 3.1. ENVIRONMENTAL SCREENING CHECKLISTS





ANNEX 3.1A: SHASHANGHAT SITE

SCREENING CHECKLIST FOR ENVIRONMENTAL ASSESSMENT

1. PURPOSE


The checklist is designed to screen out, in an orderly manner, whether the subproject proposed by BWRTP-1 action may be significant to environment.


This questionnaire is intended to provide information for detailed questionnaire whereby BIWTA can be assured that the determination process has been orderly, comprehensive in nature, yet flexible enough to allow introduction of information to fit a project or action.

2. CHECKLIST

2.1 DESCRIPTION OF THE SUB PROJECT

Please provide a description of the sub project:

Type:	A. New	B. Upgrade	Remarks
	√		New facility
Proposed intervention	a. Launch terminal	b. Cargo Vessel	c. landing station
	√		
Project boundary	 <p>Proposed Shasanghat area is about 2.4 acre of lands</p> <p>North: Scrap Industries and road access                  East: Army camp residence                  South: Buriganga River                  West: Road access</p>		
Access	2 access road (1 west, 2 east)		

	 <p>West Side Road from Sadarghat Golam Azam Road in the North</p>
<p>Current situation</p>	<p>Currently the area in the water side is used as a scrap yard (ship/cargo breaking) Its found that the area is also used as temporary track terminal, Previously it was used as a garbage dumping side</p> <p>There is a land dispute among the Bangladesh Railway, City corporation and BIWTA</p>
<p>Existing facilities</p>	<p>Located 2.5 km downstream of the Sadharghat terminal at Dhaka on the bank of Buriganga River. It is a Greenfield site. There are no existing facilities. It is a proposed extension of Sadarghat terminal.</p>

## 2.2 LOCATION


Please provide the location and coordinates of the subproject:

Site Name:	Shashanghat , ward no 54, Postagola	Upazila:	Dhaka Sadar	Zila: Dhaka
Latitude:	23° 41' 24.55" N	Longitude:	90° 25' 34.72" E	


## 2.3 GENERAL SOIL DESCRIPTION OF THE AREA

Give general description like how of the soil is well drained in the area, what is sloping condition etc.

Soil Description	Description
Soil type	Geologically Dhaka is situated at the southern tip of the Pleistocene terrace, the Madhupur tract. Madhupur Clay of the Pleistocene age and alluvial deposits of recent age cover the two characteristic geological units of the city Dhaka. The Madhupur Clay is the oldest sediment exposed in and around the city area having characteristic topography and drainage.
Soil Texture	The major geomorphic units of the city are: the high land or the Dhaka terrace, the lowlands or floodplains, depressions and abandoned channels. Low lying swamps and marshes located in and around the city are other major topographic features. Madhupur

	Clay of the Pleistocene age, characterized by reddish plastic clay with silt and very fine sand particles. The soil is non-calcareous dark grey in color in and around the project area. Moreover, dark grey floodplain soil can be found adjacent to the area of Turag and Buriganga.
Drainage	
Topography/relief	Flat, urban environment

#### 2.4 GENERAL WATER DESCRIPTION OF THE AREA

Water area Description	Description
Surface Water	<p>Buriganga River water contaminated due to the presence of a big drainage of urban waste water, and also contaminated with oil and different metals for its use as scrap yard.</p> <p>Near the coast abound superficial vegetation.</p> 
Ground Water	Iron and odor, only deep tubewells are usedcheck

## 2.5 CHECKLIST

Screening question	Yes	No	Remarks
1. Are there any environmentally and culturally sensitive areas within the project site and 500 meters from the project boundary? (tick mark if any)	√		
i. Protected areas/forest reserve			
ii. Migratory pathways of animals			
iii. Archaeological sites			
iv. Cultural heritage site			
v. Protected area			
vi. Wetland			
vii. Mangrove			
viii. Buffer zone of protected area	√		Buriganga River (ECA Site)
ix. Bay			
x. Estuarine			
xi. Special area for protecting biodiversity			
2. Are there any plants (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary		√	
3. Are there any animals (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary		√	
B. Potential Socio-Environmental Impacts: Will the Project cause...			
B.1 Pre-construction Phase			
1. Will the project affect land use zoning and planning or conflict with prevalent land use patterns?	√		
2. Will the projects involve significant land disturbance or site clearance?	√		
3. Will the projects land fall within a protected area designated as such by any GOB legislations?		√	
4. Will the projects fall within the restrictive zones		√	
5. If yes to above question, in what category I II III			NA

Screening question	Yes	No	Remarks
6. Will the projects have an impact on archaeological or historical sites, including historic urban/rural areas?		√	
7. Will the projects have an impact on religious monuments, structures and/or cemeteries?	√		The buried place of Hindi Community and they sacrifice their Goddess in the place nearby, there is mosque near by
8. Will the projects involve land expropriation or demolition of existing structures?		√	If land required for extension it may required
9. Will the projects be located in an area intended for urban or industrial development?	√		
10. Dislocation or involuntary resettlement of people?		√	If land required for extension it may required
11. Disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable groups?	√		
1. Will the projects make significant demands on utilities and services?	√		
2. Will the projects require significant levels of accommodation or service amenities to support the workforce during construction (e.g., where contractor will need more than 20 workers)?	√		
3. Will the projects lead to environmental and social disturbance by construction camps?	√		
4. Will the projects require large amounts of raw materials or construction materials?	√		
5. Will the projects generate large amounts of residual wastes or construction material waste?	√		
6. Will the projects result in potential soil or water contamination during construction (e.g., from oil, grease and fuel from equipment yards)?	√		
7. Will the projects lead to the interruption of subsoil and overland drainage patterns?	√		
8. Will the projects lead to an increase in suspended sediments in streams affected by road cut erosion, decline in water quality and increased sedimentation downstream?	√		

Screening question	Yes	No	Remarks
9. Will the projects lead to the destruction of vegetation and soil in the right-of-way, borrow pits, waste dumps, and equipment yards?	√		2/3 trees may require to cut down.
10. Will the projects lead to the creation of stagnant water bodies in borrow pits, quarries, etc?		√	
11. Will the projects increase the levels of harmful air emissions?	√		
12. Will the projects lead to health hazards and interference of plant growth adjacent to roads by dust raised and blown by vehicles?	√		
13. Will the projects increase ambient noise levels during construction?	√		
14. Will the projects involve modification of existing drainage channels (rivers, canals) or surface water bodies (wetlands, marshes)?	√		We observed 4 outfalls in shashanghat area in and around. 2 of them are active other 2 are inactive.
15. Will the projects lead to the destruction or damage of terrestrial or aquatic ecosystems or endangered species directly or by induced development?		√	
16. Will the projects lead to the disruption / destruction of wildlife through interruption of migratory routes, disturbance of wildlife habitats, and noise-related problems?		√	
17. Impacts on the sustainability of associated sanitation and solid waste disposal systems?	√		
18. Accident risks associated with increased vehicular traffic, leading to loss of life?	√		
19. Occupational and community health and safety risks?	√		
20. Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	√		
21. Generation of dust in sensitive areas during construction?	√		
22. Requirements for disposal of fill, excavation, and/or spoil materials?	√		
23. Noise and vibration due to blasting and other civil works?	√		

Screening question	Yes	No	Remarks
24. Long-term impacts on groundwater flows as result of needing to drain the project site prior to construction?		√	
25. Long-term impacts on local hydrology as a result of building hard surfaces in or near the building?		√	
26. Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	√		
27. Social conflicts if workers from other regions or countries are hired?	√		
28. Risks to community safety caused by fire, electric shock, or failure of the building's safety features during operation?	√		
29. Risks to community health and safety caused by management and disposal of waste?	√		
30. Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	√		
<b>B.3 Operations Phase</b>			
1. Is the project likely to lead to unplanned development of infrastructure?		√	
2. Will the projects lead to landslides, slumps, slips and other mass movements in road cuts?		√	
3. Will the Project produce solid wastes during operation or decommissioning?	√		
4. Is the project likely to -			
▪ Decreasing of air quality	√		
▪ Increasing of noise level	√		
▪ Increasing of water run off		√	
▪ Sedimentation	√		



Screening question	Yes	No	Remarks
▪ Shoreline change	√		
▪ Decreasing of surface water quality	√		
▪ Land traffic disruption	√		
▪ Aquatic life disruption (Benthos and necton)	√		
▪ Opening of job and business opportunity	√		
▪ Fishing ground change	√		
▪ Public unrest	√		
5. Are there any other potential adverse impacts?			NA

## 2.6 CLIMATE SCREENING

Climate screening is necessary for project to run smoothly in future. Please use the following scoring matrix to fill up the climate screening table.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Screening Questions		Score
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	1
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	2
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-	0

	meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	1
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design lifetime?	1

END

## ANNEX 3.1B PANGAON SITE

### SCREENING CHECKLIST FOR ENVIRONMENTAL ASSESSMENT

#### 1. PURPOSE


The checklist is designed to screen out, in an orderly manner, whether the subproject proposed by BWRTP-1 action may be significant to environment.

This questionnaire is intended to provide information for detailed questionnaire whereby BIWTA can be assured that the determination process has been orderly, comprehensive in nature, yet flexible enough to allow introduction of information to fit a project or action.

#### 2. CHECKLIST

##### 2.1 DESCRIPTION OF THE SUB PROJECT

Please provide a description of the sub project:

Type:	A. New	B. Upgrade	Remarks
	√		EXTENSION
Proposed intervention	a. Launch terminal	b. Cargo Vessel	c. landing station
	√		
Project boundary			
	<p>North: Industry, muslim graveyard and channel.</p> <p>West: Wetland, road, houses and stores</p> <p>South: Cargo terminal</p> <p>East: River</p>		
Access	Only one narrow road		

Current situation	Open area with houses and stores around. Exist boat activity to cross the river (Passenger temporal station), for that reason there are also auto rickshaws within the area. There is a great wetland used as fishing area and for personal hygiene.  Moreover, exist a gipsy community separated of the rest but inside of BIWTA boundary.
Existing facilities	One narrow road, informal mosque and solar lamp posts

## 2.2 LOCATION

Please provide the location and coordinates of the subproject:

Site Name: Pangaon Upazila: Keraniganj Zila: Dhaka

Latitude: 23°39'30.79"N Longitude: 90°27'14.68"E

## 2.3 GENERAL SOIL DESCRIPTION OF THE AREA

Give general description like how of the soil is well drained in the area, what is sloping condition etc.

Soil Description	Description
Soil type	Grey Floodplain Soils.
Soil Texture	Grey, finely mottled brown, seasonally flooded soils with seasonally acid top-soil and near neutral subsoils.
Drainage	Numerous cross drains to rivers
Topography/relief	Flat, gradually leaned towards the river

## 2.4 GENERAL WATER DESCRIPTION OF THE AREA

Water area Description	Description
Surface Water	Low to moderate river water pollution.  Pond for fishing farm (aquaculture) inside the boundary.
Ground Water	Okay according to the locals

## 2.5 CHECKLIST

Screening question	Yes	No	Remarks
A. Project siting: Is the project area adjacent to or within any of the following areas?			
1. Are there any environmentally and culturally sensitive areas within the project site and 500 meters from the project boundary? (thik mark if any)	√		
i.Protected areas/forest reserve			
ii.Migratory pathways of animals			
iii.Archaeological sites			
iv.Cultural heritage site			
v.Protected area			
vi.Wetland	√		
vii.Mangrove			
viii.Buffer zone of protected area	√		Buriganga river (ECA site)
ix.Bay			
x.Estuarine			
xi.Special area for protecting biodiversity			
xii.Others	√		A graveyard and a small mosque
2. Are there any plants (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary		√	
3. Are there any animals (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary		√	
B. Potential Socio-Environmental Impacts: Will the Project cause...			
B.1 Pre-construction Phase			
1. Will the project affect land use zoning and planning or conflict with prevalent land use patterns?	√		
2. Will the projects involve significant land disturbance or site clearance?	√		
3. Will the projects land fall within a protected area designated as such by any GOB legislations?		√	
4. Will the projects fall within the restrictive zones		√	

Screening question	Yes	No	Remarks
5. If yes to above question, in what category I II III			NA
6. Will the projects have an impact on archaeological or historical sites, including historic urban/rural areas?		√	
7. Will the projects have an impact on religious monuments, structures and/or cemeteries?	√		A mosque and a grave yard
8. Will the projects involve land expropriation or demolition of existing structures?		√	Fish pond and some houses partially
9. Will the projects be located in an area intended for urban or industrial development?	√		
10. Dislocation or involuntary resettlement of people?	√		Some Gypsies living in the proposed site.
11. Disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable groups?	√		Some of the Gypsies livelihood associated in the boat ghat.
<b>B.2 Construction Phase</b>			
1. Will the projects make significant demands on utilities and services?	√		
2. Will the projects require significant levels of accommodation or service amenities to support the workforce during construction (e.g., where contractor will need more than 20 workers)?	√		
3. Will the projects lead to environmental and social disturbance by construction camps?	√		
4. Will the projects require large amounts of raw materials or construction materials?	√		
5. Will the projects generate large amounts of residual wastes or construction material waste?	√		
6. Will the projects result in potential soil or water contamination during construction (e.g., from oil, grease and fuel from equipment yards)?	√		
7. Will the projects lead to the interruption of subsoil and overland drainage patterns?	√		
8. Will the projects lead to an increase in suspended sediments in streams affected by road cut erosion, decline in water quality and increased sedimentation downstream?	√		

Screening question	Yes	No	Remarks
9. Will the projects lead to the destruction of vegetation and soil in the right-of-way, borrow pits, waste dumps, and equipment yards?	√		A no of trees may require to cut down.
10. Will the projects lead to the creation of stagnant water bodies in borrow pits, quarries, etc?	√		
11. Will the projects increase the levels of harmful air emissions?	√		
12. Will the projects lead to health hazards and interference of plant growth adjacent to roads by dust raised and blown by vehicles?	√		
13. Will the projects increase ambient noise levels during construction?	√		
14. Will the projects involve modification of existing drainage channels (rivers, canals) or surface water bodies (wetlands, marshes)?	√		We observed 1 canal is very close to the proposed site and another drainage way foreseen but not actively linked with the river
15. Will the projects lead to the destruction or damage of terrestrial or aquatic ecosystems or endangered species directly or by induced development?		√	
16. Will the projects lead to the disruption / destruction of wildlife through interruption of migratory routes, disturbance of wildlife habitats, and noise-related problems?		√	
17. Impacts on the sustainability of associated sanitation and solid waste disposal systems?	√		
18. Accident risks associated with increased vehicular traffic, leading to loss of life?	√		
19. Occupational and community health and safety risks?	√		
20. Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	√		
21. Generation of dust in sensitive areas during construction?	√		
22. Requirements for disposal of fill, excavation, and/or spoil materials?	√		
23. Noise and vibration due to blasting and other civil works?	√		

Screening question	Yes	No	Remarks
24. Long-term impacts on groundwater flows as result of needing to drain the project site prior to construction?		√	
25. Long-term impacts on local hydrology as a result of building hard surfaces in or near the building?		√	
26. Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	√		
27. Social conflicts if workers from other regions or countries are hired?	√		
28. Risks to community safety caused by fire, electric shock, or failure of the building's safety features during operation?	√		
29. Risks to community health and safety caused by management and disposal of waste?	√		
30. Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	√		
<b>B.3 Operations Phase</b>			
1. Is the project likely to lead to unplanned development of infrastructure?		√	
2. Will the projects lead to landslides, slumps, slips and other mass movements in road cuts?		√	
3. Will the Project produce solid wastes during operation or decommissioning?	√		
4. Is the project likely to -			
▪ Decreasing of air quality	√		
▪ Increasing of noise level	√		
▪ Increasing of water run off		√	
▪ Sedimentation	√		



Screening question	Yes	No	Remarks
▪ Shoreline change	√		
▪ Decreasing of surface water quality	√		
▪ Land traffic disruption	√		
▪ Aquatic life disruption (Benthos and necton)	√		
▪ Opening of job and business opportunity	√		
▪ Fishing ground change	√		
▪ Public unrest	√		
5. Are there any other potential adverse impacts?			NA

## 2.6 CLIMATE SCREENING

Climate screening is necessary for project to run smoothly in future. Please use the following scoring matrix to fill up the climate screening table.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Screening Questions		Score
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	1
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	2
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-	0

	meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	1
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design lifetime?	1

END

## ANNEX 3.1C: NARAYANGANJ SITE

### 1. PURPOSE


The checklist is designed to screen out, in an orderly manner, whether the subproject proposed by BWRTP-1 action may be significant to environment.

This questionnaire is intended to provide information for detailed questionnaire whereby BIWTA can be assured that the determination process has been orderly, comprehensive in nature, yet flexible enough to allow introduction of information to fit a project or action.

### 2. CHECKLIST

#### 2.1 DESCRIPTION OF THE SUB PROJECT

Please provide a description of the sub project:

Type:	A. New	B. Upgrade	Remarks
		√	Narayanganj sub project is also inclusive of up-gradation of Academic and Hostel Building in DEPTC-Narayanganj.
Proposed intervention	a. Launch terminal    b. Cargo Vessel    c. landing station		
	√		
Project boundary	<div style="text-align: center;">  <p style="font-size: small;">Image © 2019 Maxar Technologies © 2019 Google</p> <p style="text-align: right;">Google Earth</p> </div> <p>North: Access (Port road) West: Bus parking, railway station, city South: Launch ghats East: River</p>		
Access	2 access road and 1 passenger road		

	
Current situation	The project site is a very crowded area. Infront of the terminal there is bus stand and railway station. Every early in the morning there sits a informal fish market in the access road to the terminal.
Existing facilities	Platoons, gangway, rcc jetty, administrative building,

## 2.2 LOCATION

Please provide the location and coordinates of the subproject:

Site Name: Narayanganj IWT Terminal Latitude: 23°36'58.86" N	Upazila: Narayanganj Sadar Longitude: 90°30'20.53" E	Zila: Narayanganj
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## 2.3 GENERAL SOIL DESCRIPTION OF THE AREA

Give general description like how of the soil is well drained in the area, what is sloping condition etc.

Soil Description	Description
Soil type	Grey Floodplain Soils.
Soil Texture	Grey, finely mottled brown, seasonally flooded soils with seasonally acid top-soil and near neutral subsoil's.
Drainage	Build environment, drainage accordingly
Topography/relief	Flat

## 2.4 GENERAL WATER DESCRIPTION OF THE AREA

Water area Description	Description
Surface Water	Only one drainage canal and several small drains connecting with the river Water of the river is contaminated with oil (possibly from oil spill)
Ground Water	Okay according to the locals

## 2.5 CHECKLIST

Screening question	Yes	No	Remarks
<b>A. Project siting: Is the project area adjacent to or within any of the following areas?</b>			
1. Are there any environmentally and culturally sensitive areas within the project site and 500 meters from the project boundary? (thick mark if any)	√		
i. Protected areas/forest reserve			
ii. Migratory pathways of animals			
iii. Archaeological sites			
iv. Cultural heritage site			
v. Protected area			
vi. Wetland			
vii. Mangrove			
viii. Buffer zone of protected area	√		Shitalakkhya River (ECA Site)
ix. Bay			
x. Estuarine			
xi. Special area for protecting biodiversity			
2. Are there any plants (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary	√		Few Banyan Trees
3. Are there any animals (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary		√	
<b>B. Potential Socio-Environmental Impacts: Will the Project cause...</b>			

Screening question	Yes	No	Remarks
B.1 Pre-construction Phase			
1. Will the project affect land use zoning and planning or conflict with prevalent land use patterns?		√	
2. Will the projects involve significant land disturbance or site clearance?		√	
3. Will the projects land fall within a protected area designated as such by any GOB legislations?		√	
4. Will the projects fall within the restrictive zones		√	
5. If yes to above question, in what category I II III			NA
6. Will the projects have an impact on archaeological or historical sites, including historic urban/rural areas?		√	
7. Will the projects have an impact on religious monuments, structures and/or cemeteries?		√	
8. Will the projects involve land expropriation or demolition of existing structures?	√		If land required for extension it may required
9. Will the projects be located in an area intended for urban or industrial development?	√		
10. Dislocation or involuntary resettlement of people?	√		Yes, floating hawkers, tea stall, fruits seller, fish seller, restaurants,
11. Disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable groups?		√	
B.2 Construction Phase			
1. Will the projects make significant demands on utilities and services?	√		
2. Will the projects require significant levels of accommodation or service amenities to support the workforce during construction (e.g., where contractor will need more than 20 workers)?	√		
3. Will the projects lead to environmental and social disturbance by construction camps?	√		
4. Will the projects require large amounts of raw materials or construction materials?	√		

Screening question	Yes	No	Remarks
5. Will the projects generate large amounts of residual wastes or construction material waste?	√		
6. Will the projects result in potential soil or water contamination during construction (e.g., from oil, grease and fuel from equipment yards)?	√		
7. Will the projects lead to the interruption of subsoil and overland drainage patterns?	√		
8. Will the projects lead to an increase in suspended sediments in streams affected by road cut erosion, decline in water quality and increased sedimentation downstream?	√		
9. Will the projects lead to the destruction of vegetation and soil in the right-of-way, borrow pits, waste dumps, and equipment yards?	√		For the extension it requires to cut some trees
10. Will the projects lead to the creation of stagnant water bodies in borrow pits, quarries, etc?	√		
11. Will the projects increase the levels of harmful air emissions?	√		
12. Will the projects lead to health hazards and interference of plant growth adjacent to roads by dust raised and blown by vehicles?	√		
13. Will the projects increase ambient noise levels during construction?	√		
14. Will the projects involve modification of existing drainage channels (rivers, canals) or surface water bodies (wetlands, marshes)?	√		We observed 1 big drainage outfalls in the terminal area and several small drains.
15. Will the projects lead to the destruction or damage of terrestrial or aquatic ecosystems or endangered species directly or by induced development?		√	
16. Will the projects lead to the disruption / destruction of wildlife through interruption of migratory routes, disturbance of wildlife habitats, and noise-related problems?		√	
17. Impacts on the sustainability of associated sanitation and solid waste disposal systems?	√		
18. Accident risks associated with increased vehicular traffic, leading to loss of life?	√		
19. Occupational and community health and safety risks?	√		

Screening question	Yes	No	Remarks
20. Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	√		
21. Generation of dust in sensitive areas during construction?	√		
22. Requirements for disposal of fill, excavation, and/or spoil materials?	√		
23. Noise and vibration due to blasting and other civil works?	√		
24. Long-term impacts on groundwater flows as result of needing to drain the project site prior to construction?		√	
25. Long-term impacts on local hydrology as a result of building hard surfaces in or near the building?		√	
26. Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	√		
27. Social conflicts if workers from other regions or countries are hired?	√		
28. Risks to community safety caused by fire, electric shock, or failure of the building's safety features during operation?	√		
29. Risks to community health and safety caused by management and disposal of waste?	√		
30. Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	√		
<b>B.3 Operations Phase</b>			
1. Is the project likely to lead to unplanned development of infrastructure?		√	



Screening question	Yes	No	Remarks
2. Will the projects lead to landslides, slumps, slips and other mass movements in road cuts?		√	
3. Will the Project produce solid wastes during operation or decommissioning?	√		
4. Is the project likely to -			
▪ Decreasing of air quality	√		
▪ Increasing of noise level	√		
▪ Increasing of water run off		√	
▪ Sedimentation	√		
▪ Shoreline change	√		
▪ Decreasing of surface water quality	√		
▪ Land traffic disruption	√		
▪ Aquatic life disruption (Benthos and necton)	√		
▪ Opening of job and business opportunity	√		
▪ Fishing ground change	√		
▪ Public unrest	√		
5. Are there any other potential adverse impacts?			NA

## 2.6 CLIMATE SCREENING

Climate screening is necessary for project to run smoothly in future. Please use the following scoring matrix to fill up the climate screening table.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Screening Questions		Score
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	1
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	1
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	1
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	1
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design lifetime?	1

END

## ANNEX 3.1D: ASHUGANJ SITE

### SCREENING CHECKLIST FOR ENVIRONMENTAL ASSESSMENT

#### 1. PURPOSE


The checklist is designed to screen out, in an orderly manner, whether the subproject proposed by BWRTP-1 action may be significant to environment.


This questionnaire is intended to provide information for detailed questionnaire whereby BIWTA can be assured that the determination process has been orderly, comprehensive in nature, yet flexible enough to allow introduction of information to fit a project or action.

#### 2. CHECKLIST

##### 2.1 DESCRIPTION OF THE SUB PROJECT

Please provide a description of the sub project:

Type:	A. New	B. Upgrade	Remarks
		√	
Proposed intervention	a. Launch terminal	b. Cargo Vessel	c. landing station
		√	
Project boundary			
Access	1 main access road which have 3 sub access towards the water front side		

	 <p>Wast view from zero point</p>	 <p>North view towards river side</p>
Current situation	<p>The existing area is very congested to unload the goods from the cargo and vessels. There is a boat landing station within the area.</p>	
Existing facilities		

## 2.2 LOCATION

Please provide the location and coordinates of the subproject:

Site Name: Ashuganj	Upazila: Ashuganj	Zila: Brahmanbaria
Latitude: 90° 36'30.56"	Longitude: 91° 00'07.95"	

## 2.3 GENERAL SOIL DESCRIPTION OF THE AREA

Give general description like how of the soil is well drained in the area, what is sloping condition etc.

Soil Description	Description
Soil type	Middle Meghna River Floodplain soil
Soil Texture	Soils of the area are grey, loamy on the ridges and grey to dark grey clayey in the basins. Grey sands to loamy sands with compact silty topsoil, occupying areas of old Brahmaputra char. Dominant general type is Non calcareous Grey Floodplain soils. Top soils are strongly acidic and sub soils slightly acidic to slightly alkaline. General fertility level is medium.

Drainage		 <p>We have observed 2 drainage outfalls in the area.</p>
Topography/relief	Flat	

#### 2.4 GENERAL WATER DESCRIPTION OF THE AREA

Water area Description	Description
Surface Water	Only The river water, which seemed clean
Ground Water	Arsenic problem

#### 2.5 CHECKLIST

Screening question	Yes	No	Remarks
1. Are there any environmentally and culturally sensitive areas within the project site and 500 meters from the project boundary? (thik mark if any)		√	
i.Protected areas/forest reserve			
ii.Migratory pathways of animals			
iii.Archaeological sites			
iv.Cultural heritage site			
v.Protected area			
vi.Wetland			

Screening question	Yes	No	Remarks
vii.Mangrove			
viii.Buffer zone of protected area			
ix.Bay			
x.Estuarine			
xi.Special area for protecting biodiversity			
2. Are there any plants (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary	√		Dolphin, Hilsha
3. Are there any animals (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary		√	
<b>B. Potential Socio-Environmental Impacts: Will the Project cause...</b>			
<b>B.1 Pre-construction Phase</b>			
1. Will the project affect land use zoning and planning or conflict with prevalent land use patterns?	√		
2. Will the projects involve significant land disturbance or site clearance?	√		
3. Will the projects land fall within a protected area designated as such by any GOB legislations?		√	
4. Will the projects fall within the restrictive zones		√	
5. If yes to above question, in what category I II III			NA
6. Will the projects have an impact on archaeological or historical sites, including historic urban/rural areas?		√	
7. Will the projects have an impact on religious monuments, structures and/or cemeteries?	√		There is a mosque within the project boundary
8. Will the projects involve land expropriation or demolition of existing structures?	√		There are no. of buildings and tin sheds where business is ongoing and its closely related with the cargo & Vessel landing station.
9. Will the projects be located in an area intended for urban or industrial development?	√		The surrounding area is rapidly growing up with infra-structure

Screening question	Yes	No	Remarks
			development, govt. have also plans to connect the area with 4 lane high way.
10. Dislocation or involuntary resettlement of people?	√		Within the project boundary so many peoples livelihood is depended. As it is a resettlement site of roads and highway peoples were evicted several times as for development works during the bridge construction.
11. Disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable groups?	√		
B.2 Construction Phase			
1. Will the projects make significant demands on utilities and services?	√		
2. Will the projects require significant levels of accommodation or service amenities to support the workforce during construction (e.g., where contractor will need more than 20 workers)?	√		
3. Will the projects lead to environmental and social disturbance by construction camps?	√		
4. Will the projects require large amounts of raw materials or construction materials?	√		
5. Will the projects generate large amounts of residual wastes or construction material waste?	√		
6. Will the projects result in potential soil or water contamination during construction (e.g., from oil, grease and fuel from equipment yards)?	√		
7. Will the projects lead to the interruption of subsoil and overland drainage patterns?	√		
8. Will the projects lead to an increase in suspended sediments in streams affected by road cut erosion, decline in water quality and increased sedimentation downstream?	√		
9. Will the projects lead to the destruction of vegetation and soil in the right-of-way, borrow pits, waste dumps, and equipment yards?	√		3/4 trees may require to cut down.

Screening question	Yes	No	Remarks
10. Will the projects lead to the creation of stagnant water bodies in borrow pits, quarries, etc?		√	
11. Will the projects increase the levels of harmful air emissions?	√		
12. Will the projects lead to health hazards and interference of plant growth adjacent to roads by dust raised and blown by vehicles?	√		
13. Will the projects increase ambient noise levels during construction?	√		
14. Will the projects involve modification of existing drainage channels (rivers, canals) or surface water bodies (wetlands, marshes)?	√		We observed 2 outfalls in the area that may need for modification.
15. Will the projects lead to the destruction or damage of terrestrial or aquatic ecosystems or endangered species directly or by induced development?	√		
16. Will the projects lead to the disruption / destruction of wildlife through interruption of migratory routes, disturbance of wildlife habitats, and noise-related problems?		√	
17. Impacts on the sustainability of associated sanitation and solid waste disposal systems?	√		
18. Accident risks associated with increased vehicular traffic, leading to loss of life?	√		
19. Occupational and community health and safety risks?	√		
20. Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	√		
21. Generation of dust in sensitive areas during construction?	√		
22. Requirements for disposal of fill, excavation, and/or spoil materials?	√		
23. Noise and vibration due to blasting and other civil works?	√		
24. Long-term impacts on groundwater flows as result of needing to drain the project site prior to construction?		√	



Screening question	Yes	No	Remarks
25. Long-term impacts on local hydrology as a result of building hard surfaces in or near the building?		√	
26. Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	√		
27. Social conflicts if workers from other regions or countries are hired?	√		
28. Risks to community safety caused by fire, electric shock, or failure of the building's safety features during operation?	√		
29. Risks to community health and safety caused by management and disposal of waste?	√		
30. Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	√		
<b>B.3 Operations Phase</b>			
1. Is the project likely to lead to unplanned development of infrastructure?		√	
2. Will the projects lead to landslides, slumps, slips and other mass movements in road cuts?		√	
3. Will the Project produce solid wastes during operation or decommissioning?	√		
4. Is the project likely to -			
▪ Decreasing of air quality	√		
▪ Increasing of noise level	√		
▪ Increasing of water run off		√	
▪ Sedimentation	√		
▪ Shoreline change	√		
▪ Decreasing of surface water quality	√		

Screening question	Yes	No	Remarks
▪ Land traffic disruption	√		
▪ Aquatic life disruption (Benthos and nection)	√		
▪ Opening of job and business opportunity	√		
▪ Fishing ground change	√		
▪ Public unrest	√		
5. Are there any other potential adverse impacts?			NA

## 2.6 CLIMATE SCREENING

Climate screening is necessary for project to run smoothly in future. Please use the following scoring matrix to fill up the climate screening table.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Screening Questions		Score
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	1
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	1
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	1

	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	2
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design lifetime?	1

END

## ANNEX 3.1 E : BARISHAL SITE

### SCREENING CHECKLIST FOR ENVIRONMENTAL ASSESSMENT

#### 1. PURPOSE

The checklist is designed to screen out, in an orderly manner, whether the subproject proposed by BWRTP-1 action may be significant to environment.

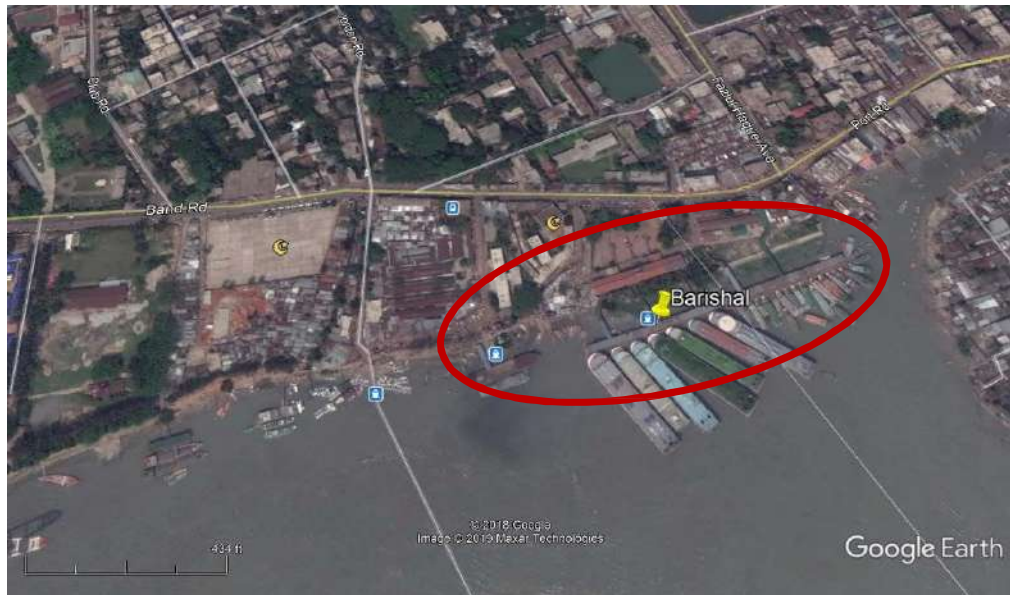
This questionnaire is intended to provide information for detailed questionnaire whereby BIWTA can be assured that the determination process has been orderly, comprehensive in nature, yet flexible enough to allow introduction of information to fit a project or action.

#### 2. CHECKLIST

##### 2.1 DESCRIPTION OF THE SUB PROJECT

Please provide a description of the sub project:

Type:	A. New	B. Upgrade	Remarks
Proposed intervention	a. Launch terminal	b. Cargo Vessel	c. landing station
Project boundary	√	√	The Barisal River port is located on south western region of lower Meghna River. Barisal River Port is on the right bank of Kirtonkhola River (which branches from lower Meghna River).
Access	There is one main road from north to south. There are 4 connecting roads from the main road to go to the terminal.		



Current situation	
Existing facilities	The present port buildings were constructed in 1964. Existing facilities include two-storied terminal building, passenger waiting space, 6 nos. of pontoons, 4 nos. of gangway, cargo shed, transit shed, parking yard and access road. The land area of Barisal is confined between the Steamer Ghat Main road on the West and the river Kirtonkhola on East side.
Current Environmental Condition	<ul style="list-style-type: none"> <li>▪ The solid waste situation of the site was found scattered</li> <li>▪ Vehicular and vessel movement in both terrestrial and water ways creating substantial noise</li> <li>▪ Black smokes from different water vessels have been forming air pollution</li> <li>▪ Oil and grease spillage for water vessels were noticed out in the site</li> <li>▪ Runoff water from around the terminals polluting river water</li> <li>▪ To some extent soil erosion/sediment deposition was found around the terminals that is a risk to the site</li> </ul>

## 2.2 LOCATION


Please provide the location and coordinates of the subproject:

Site Name:	Barishal	Upazila:	Barishal Sadar	Zila:	Barishal
Latitude:	22°41'59.44"N	Longitude:	90°22'31.39"E		

## 2.3 GENERAL SOIL DESCRIPTION OF THE AREA

Give general description like how of the soil is well drained in the area, what is sloping condition etc.

Soil Description	Description
------------------	-------------

Soil type	This region occupies young alluvial land in and adjoining the Meghna estuary. It is almost level with very low ridges and broad depressions. The major soils are grey to olive, deep, calcareous silt loam and silty clay loams and are stratified either throughout or at shallow depth.
Soil Texture	Calcareous Alluvium and Noncalcareous Grey Floodplain soils are the dominant general type. The soils in the south become saline in dry season. Top soils and subsoils of the area are mildly alkaline. General fertility is medium but low in organic matter.
Drainage	
Topography/relief	flat

#### 2.4 GENERAL WATER DESCRIPTION OF THE AREA

Water area Description	Description
Surface Water	Barisal terminal is located on Kirtanakhola River, a distributary of the Lower Meghna River.
Ground Water	It is potable according to the locals

#### 2.5 CHECKLIST

Screening question	Yes	No	Remarks
1. Are there any environmentally and culturally sensitive areas within the project site and 500		√	

Screening question	Yes	No	Remarks
meters from the project boundary? (tick mark if any)			
i.Protected areas/forest reserve			
ii.Migratory pathways of animals			
iii.Archaeological sites			
iv.Cultural heritage site			
v.Protected area			
vi.Wetland			
vii.Mangrove			
viii.Buffer zone of protected area			
ix.Bay			
x.Estuarine			
xi.Special area for protecting biodiversity			
2. Are there any plants (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary	√		Banyan tree , Bokue tree
3. Are there any animals (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary	√		Turtles, 2 types of reptiles
<b>B. Potential Socio-Environmental Impacts: Will the Project cause...</b>			
<b>B.1 Pre-construction Phase</b>			
1. Will the project affect land use zoning and planning or conflict with prevalent land use patterns?	√		
2. Will the projects involve significant land disturbance or site clearance?	√		
3. Will the projects land fall within a protected area designated as such by any GOB legislations?		√	
4. Will the projects fall within the restrictive zones		√	
5. If yes to above question, in what category I II III			NA
6. Will the projects have an impact on archaeological or historical sites, including historic urban/rural areas?		√	
7. Will the projects have an impact on religious monuments, structures and/or cemeteries?	√		there is mosque near by

Screening question	Yes	No	Remarks
8. Will the projects involve land expropriation or demolition of existing structures?	√		If land required for extension it will required
9. Will the projects be located in an area intended for urban or industrial development?	√		
10. Dislocation or involuntary resettlement of people?	√		If land required for extension it will required
11. Disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable groups?	√		
<b>B.2 Construction Phase</b>			
1. Will the projects make significant demands on utilities and services?	√		
2. Will the projects require significant levels of accommodation or service amenities to support the workforce during construction (e.g., where contractor will need more than 20 workers)?	√		
3. Will the projects lead to environmental and social disturbance by construction camps?	√		
4. Will the projects require large amounts of raw materials or construction materials?	√		
5. Will the projects generate large amounts of residual wastes or construction material waste?	√		
6. Will the projects result in potential soil or water contamination during construction (e.g., from oil, grease and fuel from equipment yards)?	√		
7. Will the projects lead to the interruption of subsoil and overland drainage patterns?	√		
8. Will the projects lead to an increase in suspended sediments in streams affected by road cut erosion, decline in water quality and increased sedimentation downstream?	√		
9. Will the projects lead to the destruction of vegetation and soil in the right-of-way, borrow pits, waste dumps, and equipment yards?	√		Some trees may require to cut down.
10. Will the projects lead to the creation of stagnant water bodies in borrow pits, quarries, etc?	√		
11. Will the projects increase the levels of harmful air emissions?	√		



Screening question	Yes	No	Remarks
12. Will the projects lead to health hazards and interference of plant growth adjacent to roads by dust raised and blown by vehicles?	√		
13. Will the projects increase ambient noise levels during construction?	√		
14. Will the projects involve modification of existing drainage channels (rivers, canals) or surface water bodies (wetlands, marshes)?	√		We observed 1 drainage canal and 3 outfalls in and around the existing project boundary
15. Will the projects lead to the destruction or damage of terrestrial or aquatic ecosystems or endangered species directly or by induced development?	√		Very few
16. Will the projects lead to the disruption / destruction of wildlife through interruption of migratory routes, disturbance of wildlife habitats, and noise-related problems?		√	
17. Impacts on the sustainability of associated sanitation and solid waste disposal systems?	√		
18. Accident risks associated with increased vehicular traffic, leading to loss of life?	√		
19. Occupational and community health and safety risks?	√		
20. Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	√		
21. Generation of dust in sensitive areas during construction?	√		
22. Requirements for disposal of fill, excavation, and/or spoil materials?	√		
23. Noise and vibration due to blasting and other civil works?	√		
24. Long-term impacts on groundwater flows as result of needing to drain the project site prior to construction?		√	
25. Long-term impacts on local hydrology as a result of building hard surfaces in or near the building?		√	
26. Large population influx during project construction and operation that causes increased burden on social infrastructure and	√		

Screening question	Yes	No	Remarks
services (such as water supply and sanitation systems)?			
27. Social conflicts if workers from other regions or countries are hired?	√		
28. Risks to community safety caused by fire, electric shock, or failure of the building's safety features during operation?	√		
29. Risks to community health and safety caused by management and disposal of waste?	√		
30. Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	√		

### B.3 Operations Phase

1. Is the project likely to lead to unplanned development of infrastructure?		√	
2. Will the projects lead to landslides, slumps, slips and other mass movements in road cuts?		√	
3. Will the Project produce solid wastes during operation or decommissioning?	√		
4. Is the project likely to -			
▪ Decreasing of air quality	√		
▪ Increasing of noise level	√		
▪ Increasing of water run off		√	May be
▪ Sedimentation	√		
▪ Shoreline change	√		
▪ Decreasing of surface water quality	√		
▪ Land traffic disruption	√		
▪ Aquatic life disruption (Benthos and necton)	√		
▪ Opening of job and business opportunity	√		

Screening question	Yes	No	Remarks
▪ Fishing ground change	√		
▪ Public unrest	√		
5. Are there any other potential adverse impacts?			NA

## 2.6 CLIMATE SCREENING

Climate screening is necessary for project to run smoothly in future. Please use the following scoring matrix to fill up the climate screening table.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Screening Questions		Score
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	1
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	2
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	1
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	2
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design lifetime?	2

END

ANNEX 3.1 F: CHANDPUR SITE

SCREENING CHECKLIST FOR ENVIRONMENTAL ASSESSMENT

1. PURPOSE


The checklist is designed to screen out, in an orderly manner, whether the subproject proposed by BWRTP-1 action may be significant to environment.

This questionnaire is intended to provide information for detailed questionnaire whereby BIWTA can be assured that the determination process has been orderly, comprehensive in nature, yet flexible enough to allow introduction of information to fit a project or action.

2. CHECKLIST

2.1 DESCRIPTION OF THE SUB PROJECT

Please provide a description of the sub project:

Type:	A. New √	B. Upgrade	Remarks
Proposed intervention	a. Launch terminal √	b. Cargo Vessel	c. landing station
Project boundary			

Access	Only 1 access road
Current situation	Chandpur terminal is situated on the confluence of the river Padma and the river Upper Meghna and it has a larger availability of river width. Currently the launch terminal has no building facility. The terminal is situated in the north side towards river. Access road in the the south, canal in the west and open acquired land for terminal extension in the east. In front of terminal there is space for parking area.
Existing facilities & Connectivity	<p>Chandpur is a very old Port, having multi-modal connection with steamer, launch, rail and road transport system. Steamer routes existed from Calcutta (Kolkata) to Narayanganj via Chandpur and vice versa, with railway connections to big cities of Chittagong and Dhaka. Currently there is no proper shelter / waiting sheds / Terminal building for passengers.</p> <p>The existing terminal was established in 1995. Existing facilities include a walkway (167 m<sup>2</sup>), steel jetty – 2 nos, steel spud – 6 nos., pontoon – 4 nos., passenger waiting shed (74 m<sup>2</sup>) and parking yard (8010 m<sup>2</sup>)</p>

## 2.2 LOCATION


Please provide the location and coordinates of the subproject:

Site Name: Chandpur launch Terminal	Upazila: Chandpur Sadar	Zila: Chandpur
Latitude: 23°13'59.61"N	Longitude: 90° 38'54.65"E.	

## 2.3 GENERAL SOIL DESCRIPTION OF THE AREA

Give general description like how of the soil is well drained in the area, what is sloping condition etc.

Soil Description	Description
------------------	-------------

Soil type	Soils of this area are relatively uniform. Silt loams occupy relatively higher areas and silty clay loams the depressions. Non calcareous Dark Grey Floodplain and Calcareous Grey Floodplain soils are major components of general type. Top soils are moderately acidic and sub soils neutral in reaction. General fertility level is medium to high with low to medium organic matter status.
Soil Texture	Grey, finely mottled brown, seasonally flooded soils with seasonally acid top-soil and near neutral subsoils.
Drainage	 <p>Canal linked with river                      Drainage outfall</p>
Topography/relief	This area occupies transitional area between Middle Meghna River Floodplain and the Young Meghna Estuarine Floodplain. The region has slightly irregular relief with little difference in elevation between the ridges and depressions.

#### 2.4 GENERAL WATER DESCRIPTION OF THE AREA

Water area Description	Description
Surface Water	The Lower Meghna River conveys the combined flow of Ganges, Brahmaputra and Upper Meghna rivers. Again the combined flow of Ganges and Brahmaputra is known as the Padma river flow, which meets at Lower Meghna river at Chandpur. The project site is located beside the Meghna River.
Ground Water	Okay according to locals

#### 2.5 CHECKLIST

Screening question	Yes	No	Remarks			
A. Project siting: Is the project area adjacent to or within any of the following areas?						
1. Are there any environmentally and culturally sensitive areas within the project site and 500 meters from the project boundary? (thik mark if any)	√					

Screening question	Yes	No	Remarks
i.Protected areas/forest reserve			
ii.Migratory pathways of animals			
iii.Archaeological sites			
iv.Cultural heritage site			
v.Protected area			
vi.Wetland			
vii.Mangrove			
viii.Buffer zone of protected area			
ix.Bay			
x.Estuarine			
xi.Special area for protecting biodiversity			From Shatnol of Chandpur to Char Alexander of Laxmipur (100km stretch of Lower Meghna) Shatnol Point (90O 37.12'E and 23O 28.19'N); Char Alexander Point (90O 49.30'E and 22O 40.92'N)
2. Are there any plants (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary		√	
3. Are there any animals (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary	√		The lower Meghan river from Chandpur provides habitat for hilsa spawning and breeding. Department of Fisheries (DOF) has earmarked sanctuaries for hilsa in the Lower Meghna and associated rivers.
<b>B. Potential Socio-Environmental Impacts: Will the Project cause...</b>			
<b>B.1 Pre-construction Phase</b>			
1. Will the project affect land use zoning and planning or conflict with prevalent land use patterns?	√		
2. Will the projects involve significant land disturbance or site clearance?		√	
3. Will the projects land fall within a protected area designated as such by any GOB legislations?		√	
4. Will the projects fall within the restrictive zones		√	

Screening question	Yes	No	Remarks
5. If yes to above question, in what category I II III			NA
6. Will the projects have an impact on archaeological or historical sites, including historic urban/rural areas?		√	
7. Will the projects have an impact on religious monuments, structures and/or cemeteries?	√		there is a small mosque within the project boundary
8. Will the projects involve land expropriation or demolition of existing structures?		√	
9. Will the projects be located in an area intended for urban or industrial development?	√		
10. Dislocation or involuntary resettlement of people?	√		The floating business community may requires to dislocation
11. Disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable groups?	√		
<b>B.2 Construction Phase</b>			
1. Will the projects make significant demands on utilities and services?	√		
2. Will the projects require significant levels of accommodation or service amenities to support the workforce during construction (e.g., where contractor will need more than 20 workers)?	√		
3. Will the projects lead to environmental and social disturbance by construction camps?	√		
4. Will the projects require large amounts of raw materials or construction materials?	√		
5. Will the projects generate large amounts of residual wastes or construction material waste?	√		
6. Will the projects result in potential soil or water contamination during construction (e.g., from oil, grease and fuel from equipment yards)?		√	
7. Will the projects lead to the interruption of subsoil and overland drainage patterns?	√		
8. Will the projects lead to an increase in suspended sediments in streams affected by road cut erosion, decline in water quality and increased sedimentation downstream?	√		



Screening question	Yes	No	Remarks
9. Will the projects lead to the destruction of vegetation and soil in the right-of-way, borrow pits, waste dumps, and equipment yards?	√		Few trees may require to cut down.
10. Will the projects lead to the creation of stagnant water bodies in borrow pits, quarries, etc?		√	
11. Will the projects increase the levels of harmful air emissions?	√		
12. Will the projects lead to health hazards and interference of plant growth adjacent to roads by dust raised and blown by vehicles?	√		
13. Will the projects increase ambient noise levels during construction?	√		
14. Will the projects involve modification of existing drainage channels (rivers, canals) or surface water bodies (wetlands, marshes)?	√		We observed 1 canal and a narrow drainage outfall in and around the project boundary.
15. Will the projects lead to the destruction or damage of terrestrial or aquatic ecosystems or endangered species directly or by induced development?	√		Hilsa sanctuaries – especially during months of March and April (key breeding period)
16. Will the projects lead to the disruption / destruction of wildlife through interruption of migratory routes, disturbance of wildlife habitats, and noise-related problems?		√	
17. Impacts on the sustainability of associated sanitation and solid waste disposal systems?	√		
18. Accident risks associated with increased vehicular traffic, leading to loss of life?	√		
19. Occupational and community health and safety risks?	√		
20. Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	√		
21. Generation of dust in sensitive areas during construction?	√		
22. Requirements for disposal of fill, excavation, and/or spoil materials?	√		
23. Noise and vibration due to blasting and other civil works?	√		

Screening question	Yes	No	Remarks
24. Long-term impacts on groundwater flows as result of needing to drain the project site prior to construction?		√	
25. Long-term impacts on local hydrology as a result of building hard surfaces in or near the building?		√	
26. Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	√		
27. Social conflicts if workers from other regions or countries are hired?	√		
28. Risks to community safety caused by fire, electric shock, or failure of the building's safety features during operation?	√		
29. Risks to community health and safety caused by management and disposal of waste?	√		
30. Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	√		
<b>B.3 Operations Phase</b>			
1. Is the project likely to lead to unplanned development of infrastructure?		√	
2. Will the projects lead to landslides, slumps, slips and other mass movements in road cuts?		√	
3. Will the Project produce solid wastes during operation or decommissioning?	√		
4. Is the project likely to -			
▪ Decreasing of air quality	√		
▪ Increasing of noise level	√		
▪ Increasing of water run off		√	
▪ Sedimentation	√		

Screening question	Yes	No	Remarks
▪ Shoreline change	√		
▪ Decreasing of surface water quality	√		
▪ Land traffic disruption	√		
▪ Aquatic life disruption (Benthos and necton)	√		
▪ Opening of job and business opportunity	√		
▪ Fishing ground change	√		
▪ Public unrest	√		
5. Are there any other potential adverse impacts?			NA

## 2.6 CLIMATE SCREENING

Climate screening is necessary for project to run smoothly in future. Please use the following scoring matrix to fill up the climate screening table.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Screening Questions		Score
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	2
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	2
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-	2

	meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	2
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design lifetime?	2

END

ANNEX 3.1G: DECK AND ENGINE PERSONNEL TRAINING CENTER SITE. DEPTC

1.

PURPOSE


The checklist is designed to screen out, in an orderly manner, whether the subproject proposed by BWRTP-1 action may be significant to environment.

This questionnaire is intended to provide information for detailed questionnaire whereby BIWTA can be assured that the determination process has been orderly, comprehensive in nature, yet flexible enough to allow introduction of information to fit a project or action.

2. CHECKLIST

2.1 DESCRIPTION OF THE SUB PROJECT

Please provide a description of the sub project:

Type:	A. New	B. Upgrade	Remarks
Proposed intervention	a. Training Center		up-gradation of Academic and Hostel Building in DEPTC-Narayanganj.
	√		
Project boundary	 <p>North, south and East Urban environment</p> <p>West: River:</p>		

Access	1 access road
Current situation and existing facilities	The project site is a Training Center. This training institute currently has the Admin building, Hostel (for 200 personals) and staff quarters. However, all the buildings are very old (about 40 years) and needs substantial renovation / up-gradation. Total area inside is owned by DEPTC. DEPTC is located 50 meters approx.. from river shoreline

## 2.2 LOCATION

Please provide the location and coordinates of the subproject:

Site Name: DEPTC	Upazila: Narayanganj Sadar	Zila: Narayanganj
Latitude: 23°36'30.56" N	Longitude: 90°30'30.79" E	

## 2.3 GENERAL SOIL DESCRIPTION OF THE AREA

Give general description like how of the soil is well drained in the area, what is sloping condition etc.

Soil Description	Description
Soil type	Grey Floodplain Soils.
Soil Texture	Grey, finely mottled brown,.
Drainage	Build environment, drainage accordingly
Topography/relief	Flat

## 2.4 GENERAL WATER DESCRIPTION OF THE AREA

Water area Description	Description
Surface Water	Small drains connecting with the river
Ground Water	DEPTC has a deep tube well of its own, capable to supply water to the campus. Okay according to the locals

## 2.5 CHECKLIST

Screening question	Yes	No	Remarks
A. Project siting: Is the project area adjacent to or within any of the following areas?			
1. Are there any environmentally and culturally sensitive areas within the project site and 500 meters from the project boundary? (thick mark if any)	√		
i. Protected areas/forest reserve			
ii. Migratory pathways of animals			
iii. Archaeological sites			
iv. Cultural heritage site			
v. Protected area			
vi. Wetland			
vii. Mangrove			
viii. Buffer zone of protected area	√		Shitalakkhya River (ECA Site) at 50 m far from DEPTC boundary
ix. Bay			
x. Estuarine			
xi. Special area for protecting biodiversity			
2. Are there any plants (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary	√		
3. Are there any animals (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary		√	
B. Potential Socio-Environmental Impacts: Will the Project cause...			

Screening question	Yes	No	Remarks
B.1 Pre-construction Phase			
1. Will the project affect land use zoning and planning or conflict with prevalent land use patterns?		√	
2. Will the projects involve significant land disturbance or site clearance?		√	
3. Will the projects land fall within a protected area designated as such by any GOB legislations?		√	
4. Will the projects fall within the restrictive zones		√	
5. If yes to above question, in what category I II III			NA
6. Will the projects have an impact on archaeological or historical sites, including historic urban/rural areas?		√	
7. Will the projects have an impact on religious monuments, structures and/or cemeteries?		√	
8. Will the projects involve land expropriation or demolition of existing structures?		√	If land required for extension it may required
9. Will the projects be located in an area intended for urban or industrial development?		√	
10. Dislocation or involuntary resettlement of people?		√	Yes, floating hawkers, tea stall, fruits seller, fish seller, restaurants,
11. Disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable groups?		√	
B.2 Construction Phase			
1. Will the projects make significant demands on utilities and services?	√		
2. Will the projects require significant levels of accommodation or service amenities to support the workforce during construction (e.g., where contractor will need more than 20 workers)?		√	
3. Will the projects lead to environmental and social disturbance by construction camps?		√	
4. Will the projects require large amounts of raw materials or construction materials?		√	



Screening question	Yes	No	Remarks
5. Will the projects generate large amounts of residual wastes or construction material waste?	√		
6. Will the projects result in potential soil or water contamination during construction (e.g., from oil, grease and fuel from equipment yards)?	√		
7. Will the projects lead to the interruption of subsoil and overland drainage patterns?	√		
8. Will the projects lead to an increase in suspended sediments in streams affected by road cut erosion, decline in water quality and increased sedimentation downstream?		√	
9. Will the projects lead to the destruction of vegetation and soil in the right-of-way, borrow pits, waste dumps, and equipment yards?		√	
10. Will the projects lead to the creation of stagnant water bodies in borrow pits, quarries, etc?		√	
11. Will the projects increase the levels of harmful air emissions?		√	
12. Will the projects lead to health hazards and interference of plant growth adjacent to roads by dust raised and blown by vehicles?		√	
13. Will the projects increase ambient noise levels during construction?	√		
14. Will the projects involve modification of existing drainage channels (rivers, canals) or surface water bodies (wetlands, marshes)?		√	
15. Will the projects lead to the destruction or damage of terrestrial or aquatic ecosystems or endangered species directly or by induced development?		√	
16. Will the projects lead to the disruption / destruction of wildlife through interruption of migratory routes, disturbance of wildlife habitats, and noise-related problems?		√	
17. Impacts on the sustainability of associated sanitation and solid waste disposal systems?		√	
18. Accident risks associated with increased vehicular traffic, leading to loss of life?		√	
19. Occupational and community health and safety risks?	√		

Screening question	Yes	No	Remarks
20. Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?		√	
21. Generation of dust in sensitive areas during construction?	√	√	
22. Requirements for disposal of fill, excavation, and/or spoil materials?		√	
23. Noise and vibration due to blasting and other civil works?	√		
24. Long-term impacts on groundwater flows as result of needing to drain the project site prior to construction?		√	
25. Long-term impacts on local hydrology as a result of building hard surfaces in or near the building?		√	
26. Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	
27. Social conflicts if workers from other regions or countries are hired?		√	
28. Risks to community safety caused by fire, electric shock, or failure of the building's safety features during operation?		√	
29. Risks to community health and safety caused by management and disposal of waste?		√	
30. Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		√	
<b>B.3 Operations Phase</b>			
1. Is the project likely to lead to unplanned development of infrastructure?		√	

Screening question	Yes	No	Remarks
2. Will the projects lead to landslides, slumps, slips and other mass movements in road cuts?		√	
3. Will the Project produce solid wastes during operation or decommissioning?	√		
4. Is the project likely to -			
▪ Decreasing of air quality		√	
▪ Increasing of noise level		√	
▪ Increasing of water run off		√	
▪ Sedimentation		√	
▪ Shoreline change		√	
▪ Decreasing of surface water quality		√	
▪ Land traffic disruption		√	
▪ Aquatic life disruption (Benthos and necton)		√	
▪ Opening of job and business opportunity		√	
▪ Fishing ground change		√	
▪ Public unrest		√	
5. Are there any other potential adverse impacts?			NA

## 2.6 CLIMATE SCREENING

Climate screening is necessary for project to run smoothly in future. Please use the following scoring matrix to fill up the climate screening table.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Screening Questions		Score
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	1
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	1
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	1
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	1
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design lifetime?	1

END



Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals. BRWTP-S6

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT



## ANNEX 3.2. LABORATORY TESTS AND RESULTS



# Environmental Quality Monitoring Report

for

Baseline Data Collection for Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP S6)



January 2020

Prepared for

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# 1 INTRODUCTION

## 1.1 Background

The Government of Bangladesh (the Government) has received a loan from World Bank (WB) for the proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6) under Bangladesh Inland Water Transport Authority (BIWTA), and TYPASA Consulting Engineers & Architects & KS Consultants Ltd. is awarded as Consultant for the Project.

For the purpose of data collection for preparing an Environmental and Social Impact Assessment (baseline ESIA) Report for the proposed project, Development Solutions Consultant Limited (DSCL) has been engaged by KS Consultants Ltd. as a sub-contractor to perform the baseline environmental quality tests for the project. The DSCL was commenced the mobilization of the project team immediately after the award of the consultancy services contract on 21 October 2019. The field work was carried out from 22 October 2019 to 29 October 2019 and 13 January 2020 to 15 January 2020.

## 1.2 Objective of the Report

The main purpose of the report includes,

- ❖ To establish baseline condition of environmental parameters (Air, Water, Riverbed Sediment, Soil and Noise) before starting the construction activities.
- ❖ To make a reference for the future environmental quality test during the construction period.

## 1.3 Scope of Work

The scope of works under the baseline data collection may summarize as,

- The air quality sampling in six locations for eight hours. The parameters monitored were Carbon Monoxide (CO), Oxides of Sulphur (SO<sub>x</sub>), Oxides of Nitrogen (NO<sub>x</sub>), Ozone (O<sub>3</sub>), Particulate Matter (PM<sub>2.5</sub>), Particulate Matter (PM<sub>10</sub>), Humidity, Wind Direction, Wind Speed and Temperature.
- Noise level has measured in six different locations for both day and night times at 1-hour duration.
- Surface water quality is of prime concern not only for drinking and irrigation but for maintenance of ecology, aquatic life, other consumption, aesthetic uses and sustainability. Objective of water quality analysis for present study is to provide baseline information for the surface water bodies present at the project site. Scope of surface water quality will provide baseline information of the physico-chemical characteristics of the surface water body at project site. Baseline parameters selected for the study are: pH, Temperature, Turbidity, Electric Conductivity (EC), Dissolved Oxygen (DO), Salinity, Biochemical Oxygen Demand (BOD), Total Organic Carbon (TOC), Total Dissolves Solids (TDS), Total Suspended Solids (TSS), Sulphate, Iron (Fe) and Oil and grease.
- Riverbed Sediment samples were collected and analyzed for physical, chemical and biological parameters. Total 06 (Six) riverbed sediment samples were collected from the river site. The construction activity may affect the sediment quality. The riverbed

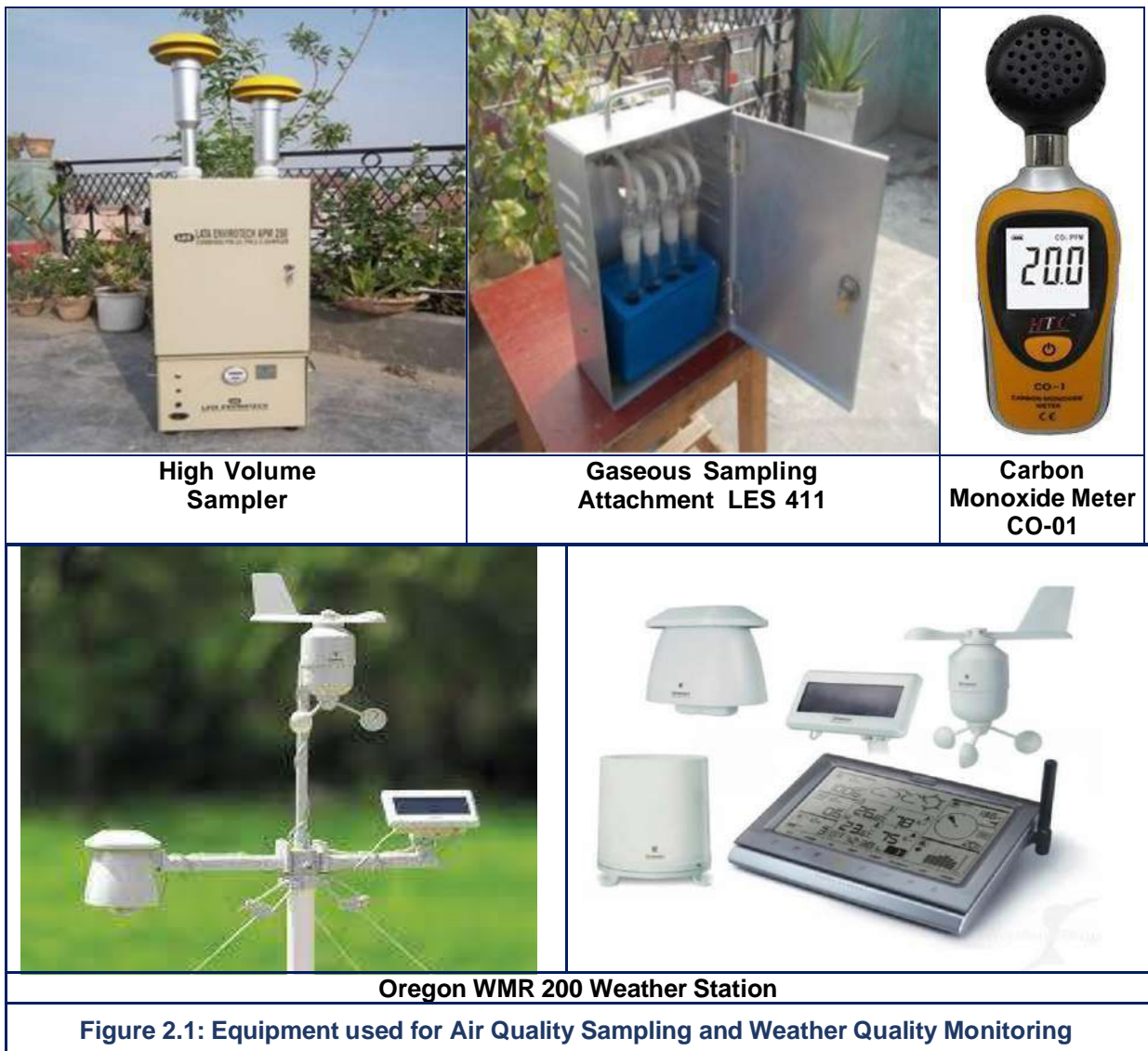
sediment has been tested for Total Organic Carbon (TOC), Total  $\text{PO}_4^{3-}$ , Water soluble Phosphate, Total Arsenic (As), Total Cadmium (Cd), Total Mercury (Hg), Total Lead (Pb), Total Chromium (Cr), Total Zinc (Zn) and Total Nickel (Ni).

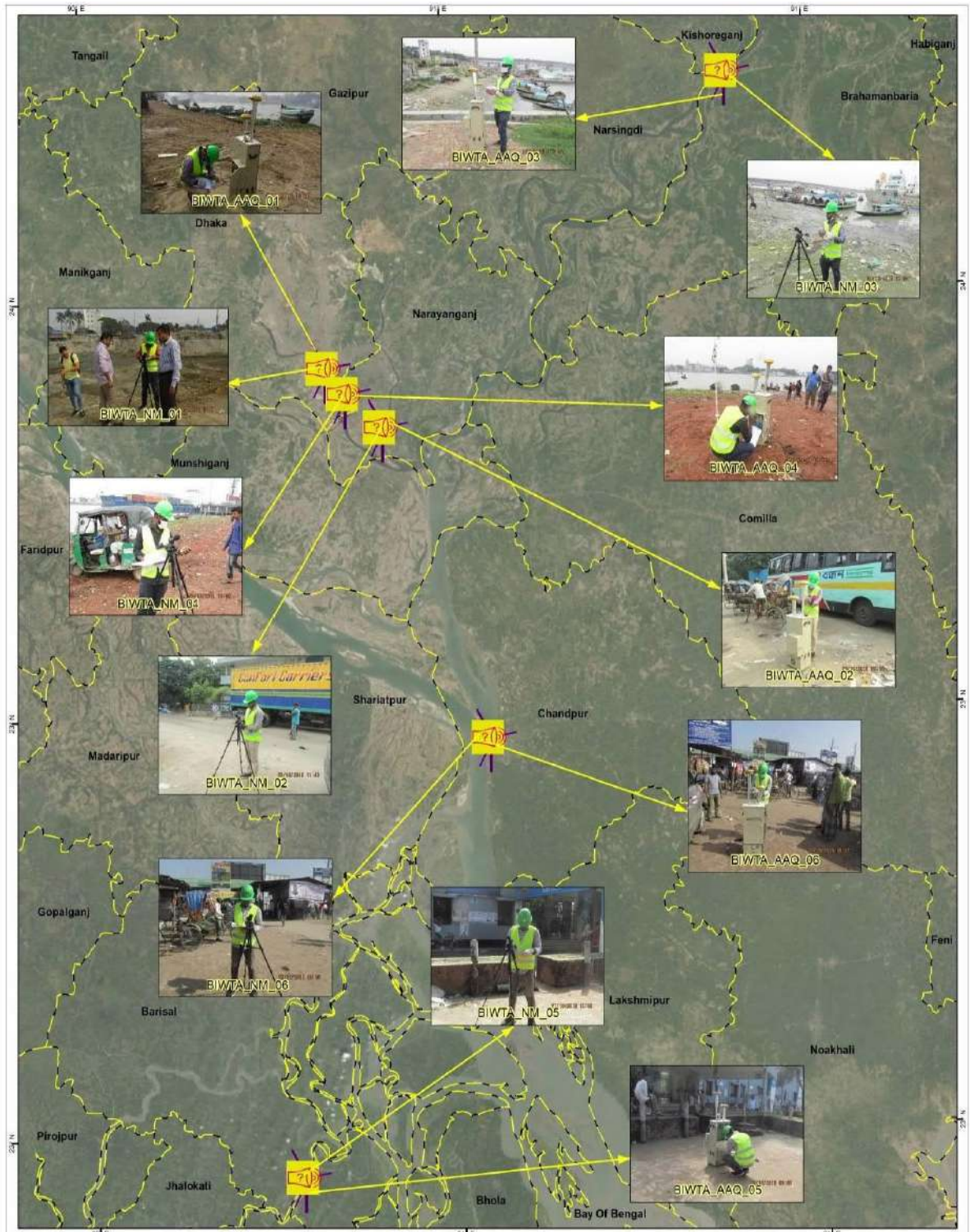
- Soil samples were collected and analyzed for physical, chemical and biological parameters. Total 06 (Six) soil samples were collected along the project site. The construction activity may affect the soil quality. The soil has been tested for pH, Organic Carbon, Phosphate and Bacterial Count.

## 2 METHODOLOGY

### 2.1 Air Quality

The air quality monitoring was carried out at six location on the project locations. The parameters were Carbon Monoxide, Nitrogen Di-oxide, Sulphur Di-oxide, Ozone, PM<sub>10</sub>, PM<sub>2.5</sub>, Temperature, Humidity, Wind Speed and Wind Direction. LATA Envirotech APM 250 with Combined PM<sub>10</sub> Sampler was used for the measurement of particulate matters and for gaseous pollutants LATA Envirotech LES 411 was used for monitoring (Figure 2.1). To monitor carbon monoxide (CO) HTC CO-01 meter was used and value is expressed in ppm. For weather data collection Oregon WMR 200 Professional Weather Center was used (Figure 2.1). The air quality monitoring was performed from 22 October 2019 to 29 October 2019. All the locations of sample collection are showed in a map (Figure 2.2). The weather was partial sunny and partial cloudy during the monitoring period. The duration of air quality monitoring was 08 hours which would be calculated for 24hrs duration as per DoE requirements. Proper Personal Protective Equipment (PPE) including vests and helmets were used during the monitoring period.





Baseline Data Collection for Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-56)

LOCATION OF AIR QUALITY & NOISE MEASUREMENT SAMPLE COLLECTION

Projection:-  
 Grid System: Geographic  
 Height Unit: metre  
 Distance Unit: kilometre  
 Horizontal Datum: WGS 1984

**Legend**

-  Air Quality
-  District Boundary
-  Noise Measurement



UTM Zone: 46 N

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**Figure 2.2: Air Quality and Noise Sample Collection Map**

## 2.2 Noise Measurement

Noise Level Measurement were analyzed at 6 locations same as air quality monitoring locations. The monitoring was performed from 22 October 2019 to 29 October 2019 for both day and night time. Noise measurement at each location was done continuously for 1hour both at day and night time. Sample collection map showing all the sampling location is attached (Figure 2.2). Lightning vests and helmets were used as PPE during the noise measurement period for day time. Noise level was measured using a calibrated HTC Sound Level Meter set to A-weighting, slow response and statistical analysis settings (Figure 2.3).



**Figure 2.3: Sound Level Meter**

## 2.3 Surface Water Quality

Surface Water samples were collected from six (06) project locations from 22 October 2019 to 29 October 2019. To measure Iron (Fe), surface water samples were collected from six (06) project influenced locations from 13 January 2020 to 15 January 2020. The locations of sample collection are showed in the map (Figure 2.6). The parameters measured were pH, Temperature, Turbidity, Electric Conductivity (EC), Dissolved Oxygen (DO), Salinity, Biochemical Oxygen Demand (BOD), Total Organic Carbon (TOC), Total Dissolves Solids (TDS), Total Suspended Solids (TSS), Sulphate, Iron and Oil and grease. The sample was collected and then transferred in 1-liter plastic sampling bottles which was washed by distilled water. The sampling bottles were then kept in an ice cooler. For Oil & Grease testing only, the samples were collected in 500ml amber glass bottles. Vest and helmets were used during the sample collection. EZDO 8200 Multimeter (Figure 2.4) was used to conduct the on-site test of pH, TDS, EC, Temperature and Salinity. Lutron DO-5509 (Figure 2.4) was used to conduct the on-site test of Dissolved Oxygen (DO). The samples were sent to Department of Public Health Engineering (DPHE) and Department of Soil, Water & Environment, Dhaka University (DU) Laboratories for physicochemical parameters testing within 12 hours of being collected.

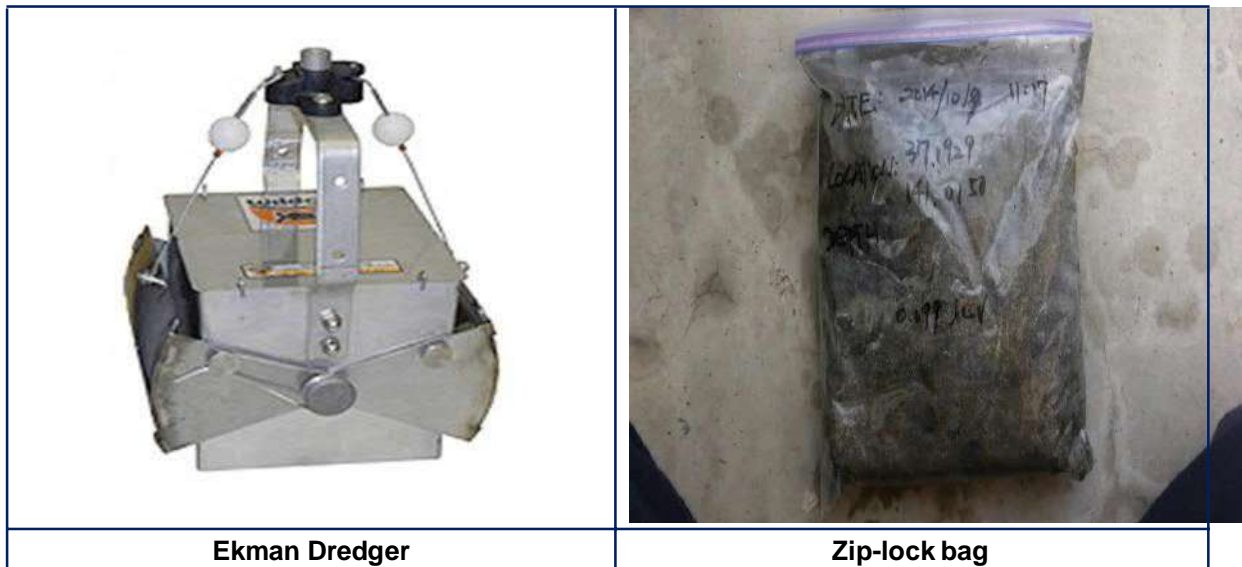


**Figure 2.4: Equipment used for Surface Water Sampling and On-site Testing**

## 2.4 Riverbed Sediment Quality

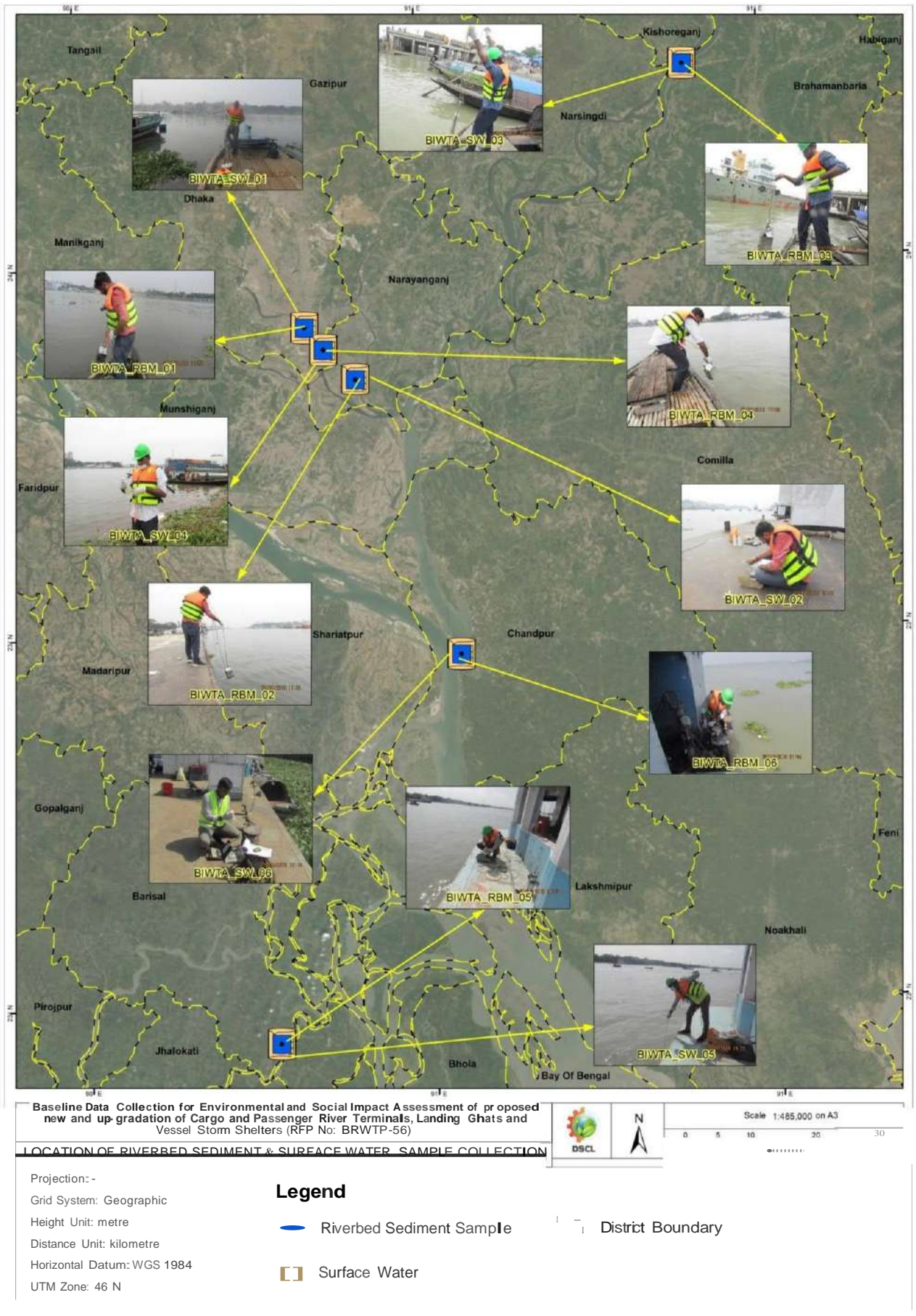
Riverbed Sediment samples were collected from six (06) project locations from 22 October 2019 to 29 October and analyzed for the heavy metals. Any construction or alteration of watercourse severely affects the bottom living benthos and planktons. The samples were collected in a single sampling method by Ekman Dredger (Figure 2.5). The location of sample collection is showed in the map (Figure 2.6). The samples were first placed in zipped lock plastic bags and then transferred to plastic jars. The Parameters are Total Organic Carbon, Total  $\text{PO}_4^{3-}$ , Total As, Total Cd, Total Hg, Total Pb, Total Cr, Total Zn and Total Ni.

The collected sediment samples were tested from Department of Soil, Water & Environment, Dhaka University (DU) Laboratory.



**Figure 2.5: Equipment used for Riverbed Sediment Sampling**





**Figure 2.6: Surface Water and Riverbed Sediment Sample Collection Map**

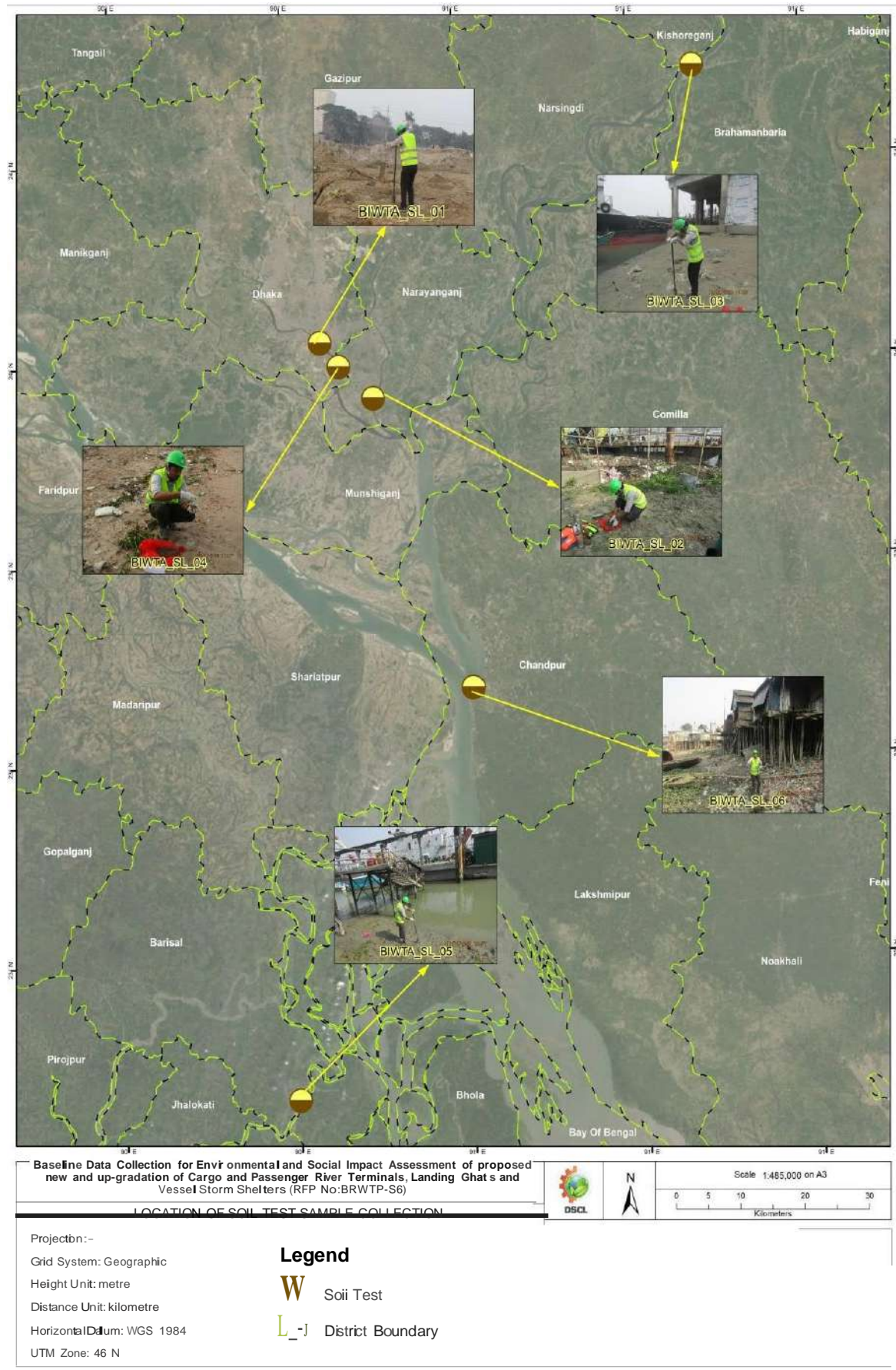
*Proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-56)*

## 2.5 Soil Quality

Soil samples were collected from six (06) project influenced locations from 13 January 2020 to 15 January 2020. The samples were collected in a composite sampling method by Auger boring from 10 inch below the surface level using hand Augur (Figure 2.9). The samples were first placed in zipped lock plastic bags and then transferred to plastic jars. The sample collection map is attached in Figure 2.9. The samples were sent to Dhaka University Laboratory for testing within 72 hours of sample collection. The parameters tested were pH, Organic Carbon, Bacterial Count and Phosphate.



**Figure 2.7: Hand Auger**



**Figure 2.8: Soil Sample Collection Map**

### 3 RESULTS AND DISCUSSIONS

#### 3.1 Air Quality

The air quality monitoring was carried out at six (06) locations for the project sites to verify the current quality of air. The aim was to collect the existing air quality data and to compare the data with the air quality data during future project activities to check if there is any high air pollution level due to the construction activities and to design adequate mitigation measures, as applicable. Dispersal of pollutants depends upon factors like prevailing wind direction and other weather conditions, atmospheric stability, height of the source. The air quality monitoring was performed from 22 October 2019 to 29 October 2019 (see Figure 3.1). Filter and each chemical were measured before testing. Electro-Chemical Sensor device were calibrated before testing some other parameters. Results of the air quality monitored at the project locations have been showed in Table 3.1 and Table 3.2. The details of this result are shown in Appendix A of this report.





**Figure 3.1: Air Quality Monitoring in the Project Locations**

**Table 3.1: Test Results of Ambient Air Quality Monitoring**

Parameter	Unit	BIWTA_AAO_01	BIWTA_AAO_02	BIWTA_AAO_03	BIWTA_AAO_04	BIWTA_AAO_05	BIWTA_AAO_06	Bangladesh Standard	Duration (hours)	Weather Condition	Method of Analysis
		Shashanghat, Dhaka New Terminal near Postagola	Narayanganj Passenger Terminal	Ashuganj Cargo Terminal	Pangaon Cargo Terminal	Barishal Passenger Terminal	Chandpur Passenger Terminal				
		23°41'24.55"N, 90°25'34.72"E	23°36'58.86"N, 90°30'20.53"E	24° 2'32.78"N, 91° 0'1.37"E	23°39'30.79"N, 90°27'14.68"E	22°41'59.44"N, 90°22'31.39"E	23°13'59.61"N, 90°38'54.65"E				
PM <sub>2.5</sub>	µg/m <sup>3</sup>	26.2	27.8	30.3	29.2	29.7	34.5	65	24	Partly Cloudy and Partial Sunny	Gravimetric
PM <sub>10</sub>	µg/m <sup>3</sup>	39.1	52.3	33.7	30.3	37.4	64.2	150	24		Gravimetric
SO <sub>2</sub>	µg/m <sup>3</sup>	1.85	2.12	1.18	1.10	2.17	2.28	365	24		West- Geake
NO <sub>x</sub>	µg/m <sup>3</sup>	8.74	9.02	5.23	5.17	10.14	10.22	100	Annual		Jacob and Hochheiser
O <sub>3</sub> ***	µg/m <sup>3</sup>	12.23	14.67	10.45	11.35	13.39	15.01	235	24		Photometric
CO*	PPM	1	2	1	<1	2	3	9	8		CO Meter

DACL Environmental Laboratory, November 2019

Note: \* CO concentrations and standards are 8-hourly only.

Note \*\*\* O<sub>3</sub> concentrations and standard is for 1 hour

\*\* The Bangladesh National Ambient Air Quality Standards have been taken from the Environmental Conservation Rules, 1997 which was amended on 19th July 2005 vide S.R.O. No. 220-Law/2005.



**Table 3.2: Test Results of Ambient Air Quality Monitoring (Weather Data)**

Sample ID	Location	GPS Location	Humidity (%)	Temperature (°C)	Wind Speed & Wind Direction (knot)
BIWTA_AAQ_01	Shashanghat, Dhaka New Terminal near Postagola	23°41'24.55"N, 90°25'34.72"E	62	33	2.7 knots from Southwest to West
BIWTA_AAQ_02	Narayanganj Passenger Terminal	23°36'58.86"N, 90°30'20.53"E	69	30	3.8 knots from Northeast to East
BIWTA_AAQ_03	Ashuganj Cargo Terminal	24° 2'32.78"N, 91° 0'1.37"E	81	26.4	6.48 knots from Northeast
BIWTA_AAQ_04	Pangaon Cargo Terminal	23°39'30.79"N, 90°27'14.68"E	84	23	7.02 knots from East to West
BIWTA_AAQ_05	Barishal Passenger Terminal	22°41'59.44"N, 90°22'31.39"E	79	27	8.64 knots from Northsouth to East
BIWTA_AAQ_06	Chandpur Passenger Terminal	23°13'59.61"N, 90°38'54.65"E	75	26	1.62 knots from North to East

**Table 3.3: Description of the Surrounding Environment**

Location and Sample ID	Sample Site Description
Shashanghat, Dhaka New Terminal near Postagola (BIWTA_AAQ_01)	<ul style="list-style-type: none"> <li>➤ The weather was sunny</li> <li>➤ Beside the Buriganga River</li> <li>➤ Launch vessels were running</li> <li>➤ Traffic volume was moderate</li> <li>➤ Moderate amount of dust particles was present</li> <li>➤ People movement was low</li> </ul>
Narayanganj Passenger Terminal (BIWTA_AAQ_02)	<ul style="list-style-type: none"> <li>➤ The weather was sunny</li> <li>➤ Beside Shitalakshya River</li> <li>➤ Commercial and busy area</li> <li>➤ Traffic volume was high</li> <li>➤ Higher amount of dust particles was present</li> <li>➤ People movement was high</li> <li>➤ It's a crowded area.</li> </ul>
Ashuganj Cargo Terminal (BIWTA_AAQ_03)	<ul style="list-style-type: none"> <li>➤ The weather was mostly cloudy</li> <li>➤ Lower amount of dust particles was present</li> <li>➤ People movement was moderate</li> <li>➤ Beside the Bhairab Bridge and the Meghna River</li> <li>➤ Traffic volume was moderate</li> </ul>
Pangaon Cargo Terminal (BIWTA_AAQ_04)	<ul style="list-style-type: none"> <li>➤ The weather was cloudy</li> <li>➤ Lower amount of dust particles was present</li> <li>➤ People movement was high</li> <li>➤ Traffic volume moderate</li> <li>➤ Beside the Buriganga River</li> </ul>
Barishal Passenger Terminal (BIWTA_AAQ_05)	<ul style="list-style-type: none"> <li>➤ The weather was sunny</li> <li>➤ Traffic volume was high</li> <li>➤ People movement was high</li> <li>➤ Commercial area (Launch Ghat)</li> <li>➤ Moderate amount of dust particles was present</li> </ul>



Location and Sample ID	Sample Site Description
	<ul style="list-style-type: none"> <li>➤ Beside the Kirtankhola River</li> <li>➤ Crowded Area.</li> </ul>
Chandpur Passenger Terminal (BIWTA_AAQ_06)	<ul style="list-style-type: none"> <li>➤ The weather was sunny</li> <li>➤ Traffic volume was high</li> <li>➤ People movement was high</li> <li>➤ Commercial area (Launch Ghat)</li> <li>➤ Beside the Meghna River</li> </ul>

**PM<sub>10</sub>:** Particle pollution, also called particulate matter or PM, is a mixture of solids and liquid droplets floating in the air. Some particles are released directly from a specific source, while others form in complicated chemical reactions in the atmosphere. PM<sub>10</sub> are 2.5 to 10 micrometers in diameter. Sources include crushing or grinding operations and dust stirred up by vehicles on roads. From the above table of test results, it is seen that, for all the locations, the values were within the national standard.

**PM<sub>2.5</sub>:** PM<sub>2.5</sub> are 2.5 micrometers in diameter or smaller, and can only be seen with an electron microscope. Fine particles are produced from all types of combustion, including motor vehicles, power plants, residential wood burning, forest fires, agricultural burning, and some industrial processes. The test results show that for the locations the values of PM<sub>2.5</sub> was within the national standards.

**SO<sub>x</sub>:** Sulfur oxides (SO<sub>x</sub>) are compounds of sulfur and oxygen molecules. Sulfur dioxide (SO<sub>2</sub>) is the pre-dominant form found in the lower atmosphere. It is a colorless gas that can be detected by taste and smell in the range of 1,000 to 3,000 micrograms per cubic meter (µg/m<sup>3</sup>). From the test results it can be said that, for all the locations, the value was within the national standard.

**NO<sub>x</sub>:** In atmospheric chemistry, NO<sub>x</sub> is a generic term for the nitrogen oxides that are most relevant for air pollution, namely nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>). These gases contribute to the formation of smog and acid rain, as well as tropospheric ozone. The test results above show that, for all the location the values of NO<sub>x</sub> are within the national standard.

**CO:** Carbon monoxide is a gas and is found in air. High levels of carbon monoxide are poisonous to humans and, unfortunately, it cannot be detected by humans as it has no taste or smell and cannot be seen. The main sources of additional carbon monoxide are motor vehicle exhaust and some industrial activities, such as making steel. Tobacco smoke is one of the main indoor sources of carbon monoxide. The above table shows that, for all the sampling locations, CO was within the national standard.

### 3.2 Noise Measurement

Noise Level Measurement were analyzed at 6 (six) locations same as air quality monitoring locations. The monitoring was performed from 22 October 2019 to 29 October 2019 for both day and night time see Figure 3.2). Noise measurement at each location was done continuously for 1 hour both at day and night time. Result of the noise level monitored along with details of the sampling locations have been showed in Table 3.4. The Details result is given in Appendix B of this report.



**Shashangat, Dhaka New Terminal near Postagola on 22-10-19**



**Narayanganj Passenger Terminal on 23-10-19**



**Ashuganj Cargo Terminal on 24-10-19**





**Pangaon Cargo Terminal on 25-10-19**



**Barishal Passenger Terminal (27-10-19)**



**Chandpur Passenger Terminal (29-10-19)**

**Figure 3.2: Noise Level Monitoring in the Project Locations**

**Table 3.4: Test Results of Noise Level Monitoring**

Sample ID	Sample Location	GPS Location	Land Use Category	Time		Noise Level (dBA) (LA <sub>eq</sub> )		Bangladesh Standard (dBA) **	
				Day	Night	Day	Night	Day	Night
BIWTA_NM_01	Shashanghat, Dhaka New Terminal near Postagola	23°41'24.55"N, 90°25'34.72"E	Commercial	10:27	20:09	61.13	52.21	65	55
BIWTA_NM_02	Narayanganj Passenger Terminal	23°36'58.86"N, 90°30'20.53"E	Commercial	11:27	20:50	71.25	67.56	65	55
BIWTA_NM_03	Ashuganj Cargo Terminal	24° 2'32.78"N, 91° 0'1.37"E	Commercial	11:52	20:05	72.35	66.87	65	55
BIWTA_NM_04	Pangaon Cargo Terminal	23°39'30.79"N, 90°27'14.68"E	Commercial	13:58	20:50	70.84	65.63	65	55
BIWTA_NM_05	Barishal Passenger Terminal	22°41'59.44"N, 90°22'31.39"E	Commercial	10:52	21:45	73.14	64.23	65	55
BIWTA_NM_06	Chandpur Passenger Terminal	23°13'59.61"N, 90°38'54.65"E	Commercial	11:58	22:00	76.06	62.47	65	55

Notes:

- Land use category is based on the classification provided in the Noise Pollution Control Rules (2006)
- The sound level standards for commercial area are 65 at day time and 55 at night time.
- Noise Level is the average noise recorded over the duration of the monitoring period

Abbreviation:

NM- Noise Measurement, dB- decibel

DSCL Environmental Laboratory, November 2019

**Table 3.5: Description of the Surrounding Environment**

Sample Location and ID	Sample Site Description
Shashanghat, Dhaka New Terminal near Postagola (BIWTA_NM_01)	<ul style="list-style-type: none"> <li>➤ Ship breaking ahead</li> <li>➤ People movement was moderate</li> <li>➤ Traffic volume was moderate</li> <li>➤ Generator was running.</li> </ul>
Narayanganj Passenger Terminal (BIWTA_NM_02)	<ul style="list-style-type: none"> <li>➤ Traffic volume was high.</li> <li>➤ Beside crowded area.</li> <li>➤ People movement was high.</li> <li>➤ Generator was running.</li> <li>➤ Bus Stand Area.</li> </ul>
Ashuganj Cargo Terminal (BIWTA_NM_03)	<ul style="list-style-type: none"> <li>➤ People movement was high</li> <li>➤ Loading-unloading was going on</li> <li>➤ The place is in commercial zone.</li> <li>➤ Traffic volume was moderate</li> </ul>
Pangaon Cargo Terminal (BIWTA_NM_04)	<ul style="list-style-type: none"> <li>➤ People movement was high</li> <li>➤ Water vessels were running</li> <li>➤ Beside a CNG stand</li> <li>➤ Traffic volume was high</li> </ul>

Sample Location and ID	Sample Site Description
Barishal Passenger Terminal (BIWTA_NM_05)	<ul style="list-style-type: none"> <li>➤ The place is in commercial zone.</li> <li>➤ People movement was high.</li> <li>➤ Traffic volume was high.</li> <li>➤ Generator was running</li> <li>➤ Launch vessels were running.</li> <li>➤ Some people are gossiping near the sampling site.</li> </ul>
Chandpur Passenger Terminal (BIWTA_NM_06)	<ul style="list-style-type: none"> <li>➤ Crowded Area.</li> <li>➤ People movement was high</li> <li>➤ Traffic volume was high</li> <li>➤ Beside a tempo stand.</li> <li>➤ Sudden horn form launches and local transport affects the sampling quality.</li> </ul>

The result shows that time weighted average value of the sound monitored inside the project exceeded the standard set for the Commercial area for all of the sampling locations except for BIWTA\_NM\_01 (Shashanghat, Dhaka New Terminal near Postagola) because of heavy traffic volume and people movement. There were different types of interruptions during the monitoring period which is described in Table 3.5.

### 3.3 Surface Water Quality

Surface Water samples were collected from six (06) project locations from 22 October 2019 to 29 October 2019. EZDO 8200 Multimeter was used to conduct the on-site test of pH, TDS, EC, Salinity and Temperature. For measuring Iron (Fe), water samples were collected from six (06) project influenced locations from 13 January 2020 to 15 January 2020. Lutron DO-5509 was used to conduct the on-site test of Dissolved Oxygen (DO). The samples were sent to Department of Public Health Engineering (DPHE) and Department of Soil, Water and Environment, Dhaka University Laboratories for physicochemical parameters testing within 24 hours of being collected. Before collecting water sample, sampling bottle was washed with distilled water. Only the samples for oil & grease were collected in glass bottles Results of the surface water quality at the project locations have been showed in Table 3.6. The Laboratory test result is given in Appendix C of this report.



**Shashanghat, Dhaka New Terminal near Postagola on 22-10-19**



**Narayanganj Passenger Terminal on 23-10-19**



**Ashuganj Cargo Terminal on 24-10-19**



**Pangaon Cargo Terminal on 25-10-19**



**Barishal Passenger Terminal on 27-10-19**



**Chandpur Passenger Terminal on 29-10-19**

**Figure 3.3: Surface Water Sampling and On-site Testing in Project Locations**

**Table 3.6: Test Result of Surface Water Quality**

Parameters	Unit	Concentration Present						Standards for Inland Surface Water*	Analysis Method
		Shashanghat, Dhaka New Terminal near Postagola	Narayanganj Passenger Terminal	Ashuganj Cargo Terminal	Pangaon Cargo Terminal	Barishal Passenger Terminal	Chandpur Passenger Terminal		
		Buriganga River	Shitalakshya River	Meghna River	Buriganga River	Kirtankhola River	Meghna River		
		BIWTA_SW_01	BIWTA_SW_02	BIWTA_SW_03	BIWTA_SW_04	BIWTA_SW_05	BIWTA_SW_06		
		23°41'24.00"N 90°25'33.74"E	23°37'0.80"N 90°30'22.21"E	24° 2'32.78"N 91° 0'1.37"E	23°39'31.36"N 90°27'13.68"E	22°41'57.26"N 90°22'33.60"E	23°13'59.05"N 90°38'56.94"E		
Temperature*	°C	33.1	32.3	26.4	26.2	29.0	31.4	NYS	Multimeter
pH*	-	9.12	8.87	8.29	8.51	8.94	8.55	6.5-8.5	Multimeter
Salinity*	ppt	0.093	0.133	0.105	0.095	0.133	0.137	NYS	Multimeter
Electrical Conductivity (EC)*	µs/cm	426	466	205	535	329	287	NYS	Multimeter
Dissolved Oxygen (DO)*	mg/L	3.1	3.3	4.8	3.3	4.9	5.2	5 or more	DO Meter
Total Dissolve Solid (TDS)*	mg/L	2077	2666	133	262	2214	189	NYS	Multimeter
Biochemical Oxygen Demand (BOD <sub>5</sub> )	mg/L	3	2	1	2	1	3	6 or less	5 days Incubation
Total Suspended Solids (TSS)	mg/L	12	11	17	10	13	8	NYS	Gravimetric
Turbidity	NTU	2.5	3.1	35.6	2.9	85.5	33.1	NYS	Turbidity Meter
Sulphate	mg/L	38	11	5	35	4	6	NYS	UVS
Oil and Grease	mg/L	Less than 5	Less than 5	Less than 5	Less than 5	Less than 5	Less than 5	NYS	TOC Analyzer
Total Organic Carbon	mg/L	2.258	1.758	1.556	2.217	1.314	1.582	NYS	APHA (5520.B)
Iron (Fe)	mg/L	0.61	0.27	0.48	0.25	0.31	0.25	NYS	AAS

\*Standards for Inland Surface Water is followed Environmental Conservation Rule (ECR) 97

NYS = Not Yet Standardized

Source: DPHE and DU Laboratory Test, November 2019 and January 2020;

\* On-site Test Result



**Table 3.7: Description of the Surrounding Environment**

Sample Location and ID	Sample Site Description
Shashanghat, Dhaka New Terminal near Postagola (Buriganga River) (BIWTA_SW_01)	<ul style="list-style-type: none"> <li>➤ The water is polluted.</li> <li>➤ Some water hyacinth is covering some part of the water.</li> <li>➤ A launch was being dismantled and workers throwing wastes in the water.</li> <li>➤ Loading – unloading was going on.</li> <li>➤ Some boats were moving.</li> </ul>
Narayanganj Passenger Terminal (Shitalakshya River) (BIWTA_SW_02)	<ul style="list-style-type: none"> <li>➤ A large part of the terminal was covered by wastes.</li> <li>➤ A launch crew was bathing using the river water.</li> <li>➤ A large part of the water is covered by water hyacinth.</li> <li>➤ Continuous movement of launch and boats.</li> </ul>
Ashuganj Cargo Terminal (Meghna River) (BIWTA_SW_03)	<ul style="list-style-type: none"> <li>➤ Loading and unloading was going on.</li> <li>➤ Continuous movement of ships and boats.</li> <li>➤ People throw food wastes and also dump generator oil in the water.</li> <li>➤ The water is being polluted.</li> </ul>
Pangaon Cargo Terminal (Buriganga River) (BIWTA_SW_04)	<ul style="list-style-type: none"> <li>➤ Several boats and launches were moving.</li> <li>➤ The water is covered by water hyacinth.</li> <li>➤ People movement was much higher in waterways.</li> </ul>
Barishal Passenger Terminal (Kirtankhola River) (BIWTA_SW_05)	<ul style="list-style-type: none"> <li>➤ Several launches were parked in the terminal.</li> <li>➤ A large part is covered by wastes near the terminal.</li> <li>➤ A small part is covered by water hyacinth.</li> <li>➤ Launch crews use the water for bathing and washing purposes.</li> <li>➤ Several types of wastes have been thrown in the water.</li> </ul>
Chandpur Passenger Terminal (Meghna River) (BIWTA_SW_06)	<ul style="list-style-type: none"> <li>➤ The terminal is surrounded by water hyacinth.</li> <li>➤ People have thrown all types of wastes in the water.</li> <li>➤ The water is used for bathing and washing purposes mainly for launch crews.</li> <li>➤ Several launches were parked in the terminal</li> <li>➤ People movement was high in the terminal area.</li> </ul>

The surface water quality standard is yet not developed in the ECR 1997 except for few parameters. Among the tested parameters the DO and BOD values for most of the tested locations were below the standard value set by ECR 1997.

**Temperature:** Differences in water temperature and density cause stratification. A property that is unique to water versus other substances is that it is most dense at 4 degrees Celsius, or 39 degrees Fahrenheit, and is less dense at either higher or lower temperatures. The standard for inland surface water is undefined. The test result shows that the highest temperature was found to be 33.1°C in BIWTA\_SW\_01 (Shashanghat, Dhaka New Terminal near Postagola, Buriganga River) and lowest temperature was found to be 26.2°C in BIWTA\_SW\_04 (Pangaon Cargo Terminal, Buriganga River).

**pH:** The "desirable" range of pH prescribed by the DOE is between 6.5 and 8.5. This is the range, which provides adequate protection to the life of fresh water fish and bottom dwelling invertebrates. The test result revealed that the amount of pH for all of the sampling location are exceed within the national limit because the water is polluted and people through their waste in the water body. The test result also shows that the highest pH was found to be 9.12

in BIWTA\_SW\_01 (Shashanghat, Dhaka New Terminal near Postagola, Buriganga River) and lowest pH was found to be 8.29 in BIWTA\_SW\_04 (Ashuganj Cargo terminal, Meghna River).

**Electrical Conductivity (EC):** EC stands for electrical conductivity, which measures the potential for a material to conduct electricity. The test result shows that the highest temperature was found to be 535  $\mu\text{s}/\text{cm}$  in BIWTA\_SW\_04 (Pangaon Cargo Terminal, Buriganga River) and lowest temperature was found to be 205  $\mu\text{s}/\text{cm}$  in BIWTA\_SW\_03 (Ashuganj Cargo Terminal, Meghna River).

**Dissolved Oxygen (DO):** Dissolved oxygen is necessary for many forms of life including fish, invertebrates, bacteria and plants. Decrease in DO values below the critical level of 3 mg/L causes death of most fishes and other aerobic aquatic organisms. The test result shows that the highest DO was found to be 5.2 mg/L in BIWTA\_SW\_06 (Chandpur Passenger Terminal, Meghna River) and lowest DO was found to be 3.1 mg/L in BIWTA\_SW\_01 (Shashanghat, Dhaka New Terminal near Postagola, Buriganga River).

**Total Dissolve Solids (TDS):** Dissolved solids refer to any minerals, salts, metals, cations or anions dissolved in water. Total dissolved solids (TDS) comprise inorganic salts (principally calcium, magnesium, potassium, sodium, bicarbonates, chlorides, and sulfates) and some small amounts of organic matter that are dissolved in water. The standard of TDS for inland surface water is undefined. The test results show that, TDS value was highest in BIWTA\_SW\_02 (Narayanganj Passenger Terminal, Shitalakshya River) and it was 2666 mg/L and lowest in BIWTA\_SW\_03 (Ashuganj Cargo Terminal, Meghna River) and it was 189 mg/L.

**Biochemical Oxygen Demand (BOD<sub>5</sub>):** Biochemical Oxygen Demand is supposed to measure the amount of food (or organic carbons) that bacteria can oxidize. The standard for inland surface water for BOD<sub>5</sub> is 6 or less mg/L. BOD concentration was below the national standard limit for all the sampling locations.

**Total Suspended Solids (TSS):** Total suspended solids (TSS) are the dry-weight of particles trapped by a filter. The test result shows that the highest TSS was found to be 17 mg/L in BIWTA\_SW\_03 (Ashuganj Cargo Terminal, Meghna River) and lowest TSS was found to be 8 mg/L in BIWTA\_SW\_06 (Chandpur Passenger Terminal, Meghna River).

**Sulphate:** Sulphate is second to bicarbonate as the major anion in hard water reservoirs. Sulphates ( $\text{SO}_4^{2-}$ ) can be naturally occurring or the result of municipal or industrial discharges. When naturally occurring, they are often the result of the breakdown of leaves that fall into a stream, of water passing through rock or soil containing gypsum and other common minerals, or of atmospheric deposition. The test result shows that the highest Sulphate concentration was found to be 38 mg/L in BIWTA\_SW\_01 (Shashanghat, Dhaka New Terminal near Postagola, Buriganga River) and lowest Sulphate concentration was found to be 4 mg/L in BIWTA\_SW\_05 (Barishal Passenger Terminal, Kirtankhola River).

**Iron:** Natural waters contain variable amounts of iron depending on the geological area and other chemical components of the waterway. Iron in groundwater is normally present in the ferrous or bivalent form [ $\text{Fe}^{++}$ ] which is soluble. It is easily oxidized to ferric iron [ $\text{Fe}^{+++}$ ] or insoluble iron upon exposure to air. The concentration of iron was higher in downstream than Upstream. The test result shows that the highest Iron concentration was found to be 0.61 mg/L in BIWTA\_SW\_01 (Shashanghat, Dhaka New Terminal near Postagola, Buriganga River) and lowest Iron concentration was found to be 0.25mg/L in both BIWTA\_SW\_04

(Pangaon Cargo Terminal, Buriganga River) and BIWTA\_SW\_06 (Chandpur Passenger Terminal, Meghna River).

**Turbidity:** Turbidity is a measure of the degree to which the water loses its transparency due to the presence of suspended particulates. The more total suspended solids in the water, the murkier it seems and the higher the turbidity. Turbidity is considered as a good measure of the quality of water. The test result shows that the highest turbidity was found to be 85.5 NTU in BIWTA\_SW\_05 (Barishal Passenger Terminal, Kirtankhola River) and lowest turbidity was found to be 2.5 NTU in BIWTA\_SW\_01 (Shashanghat, Dhaka New Terminal near Postagola, Buriganga River).

**Total organic carbon (TOC):** Total organic carbon (TOC) is the amount of carbon found in an organic compound and is often used as a non-specific indicator of water quality or cleanliness of pharmaceutical manufacturing equipment. The test result shows that the highest TOC was found to be 2.258 mg/L in BIWTA\_SW\_01 (Shashanghat, Dhaka New Terminal near Postagola, Buriganga River) and lowest turbidity was found to be 1.314 mg/L in BIWTA\_SW\_05 (Barishal Passenger Terminal, Kirtankhola River).

**Oil and Grease:** Oil and grease has the natural tendency to float on the water surface under quiescent conditions, as the density of oil and grease is usually less than one. Not all the oil and grease are in liquid or solid form. Appreciable amounts remain in a finely divided emulsified form. From the test result it is found that, all the samples contain concentration of less than 5 mg/L.

### 3.4 Riverbed Sediment Quality

The quality of the riverbed sediment was identified to characterize the baseline status. The Riverbed sediment samples were collected from around the six (06) project locations from 22 October to 29 October 2019. Test results of sediment analysis are given in Table 3.8.





**Ashuganj Cargo Terminal on 24-10-19**



**Pangaon Cargo Terminal on 25-10-19**



**Barishal Passenger Terminal on 27-10-19**



**Chandpur Passenger Terminal on 29-10-19**

**Figure 3.4: Riverbed Sediment Sampling at Project Locations**

**Table 3.8: Test Result of Riverbed Sediment Quality Analysis**

Parameters	Unit	Concentration Present						Probable Effect Level (PEL)** and USGS and USEPA (2000)***	Analysis Method
		Shashanghat, Dhaka New Terminal near Postagola Buriganga River	Narayanganj Passenger Terminal Shitalakshya River	Ashuganj Cargo Terminal Meghna River	Pangaon Cargo Terminal Buriganga River	Barishal Passenger Terminal Kirtankhola River	Chandpur Passenger Terminal Meghna River		
		BIWTA_RBM_01 23°41'24.00"N 90°25'33.74"E	BIWTA_RBM_02 23°37'0.80"N 90°30'22.21"E	BIWTA_RBM_03 24° 2'32.78"N 91° 0'1.37"E	BIWTA_RBM_04 23°39'31.36"N 90°27'13.68"E	BIWTA_RBM_05 22°41'57.26"N 90°22'33.60"E	BIWTA_RBM_06 23°13'59.05"N 90°38'56.94"E		
Total Organic Carbon	%	0.42	NYS	0.11	0.41	0.52	0.40	NYS	Wet Oxidation
Total Phosphate	mg/kg	1195.65	NYS	649.78	1230.56	1487.78	1243.65	NYS	Aquaregia & Yellow color
Water Soluble Phosphate	mg/kg	21.52	NYS	6.13	22.75	27.59	26.14	NYS	Olsen Method
Total Arsenic	mg/kg	2.497	17	1.850	2.379	2.362	3.158	9	APHA 3114
Total Cadmium	mg/kg	BDL	3.53	BDL	BDL	BDL	BDL	25	Aquaregia & AAS
Total Mercury	(ppb) (µg/kg)	0.35	0.48 6	0.22	0.32	0.26	0.19	0.5	EPA/SW-846/7000A/7040A/7071A
Total Lead	mg/kg	8.87	91.3	5.88	8.82	18.75	9.25	300	Aquaregia & AAS
Total Chromium	mg/kg	12.60	90	21.30	11.66	1.88	1.68	87	Aquaregia & AAS
Total Nickel	mg/kg	23.15	36	8.22	23.45	25.75	29.80	560	Aquaregia & AAS
Total Zinc	mg/kg	47.75	31.5	57.50	46.68	53.75	55.50	8700 ****	Aquaregia & AAS

\*BDL = Below Detection Limit

Source: DU Laboratory Test, November 2019

\*\* Smith, SL; MacDonald, DD; Keenlayside, KA; Ingersoll, CG and Field, J. (1996) A preliminary evaluation of sediment quality assessment values of freshwater ecosystems. J Great Lake Res 22:624-638.

\*\*\*USGS and USEPA (2000) Prediction of sediment toxicity using consensus-based freshwater sediment quality guidelines

\*\*\*\* According to Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems (2000) by MacDonald, Ingersoll and Berger, the PEL for zinc in freshwater sediments is 315 mg/kg dry weight

There is no Bangladesh regulation/standard for sediment. In the absence of local country standards, it is the environment consultant's practice to use published researches that indicate either threshold value or optimum range like US- EPA.

**Total Organic Carbon:** From the test results, the TOC concentration in the project influenced areas ranged from 0.11% to 0.52%. The minimum value was in BIWTA\_RBM\_03 (Ashuganj Cargo Terminal, Meghna River) and maximum value was in BIWTA\_RBM\_05 (Barishal Passenger Terminal, Kirtankhola River).

**Total Phosphate ( $PO_4^{3-}$ ):** From the test results, the total phosphate concentration in the project influenced areas ranged from 649.78 mg/kg to 1487.78 mg/kg. The minimum value was in BIWTA\_RBM\_03 (Ashuganj Cargo Terminal, Meghna River) and maximum value was in BIWTA\_RBM\_05 (Barishal Passenger Terminal, Kirtankhola River).

**Water Soluble Phosphate ( $PO_4^{3-}$ ):** From the test results, the soluble phosphate concentration in the project influenced areas ranged from 6.13 mg/kg to 26.14 mg/kg. The minimum value was in BIWTA\_RBM\_03 (Ashuganj Cargo Terminal, Meghna River) and maximum value was in BIWTA\_RBM\_06 (Chandpur Passenger Terminal, Meghna River).

**Total Arsenic (As):** From the test results, the As concentration in the project influenced areas ranged from 1.743 mg/kg to 3.158 mg/kg. The minimum value was in BIWTA\_RBM\_02 (Narayanganj Passenger Terminal, Shitalakshya River) and BIWTA\_RBM\_06 (Chandpur Passenger Terminal, Meghna River).

**Total Mercury (Hg):** From the test results, Lowest Hg concentration was found to be 0.19  $\mu$ g/kg in BIWTA\_RBM\_05 (Chandpur Passenger Terminal, Meghna River) and highest Hg concentration was found to be 0.35  $\mu$ g/kg in BIWTA\_SW\_01 (Shashanghat, Dhaka New Terminal near Postagola, Buriganga River).

**Total Nickel (Ni):** From the test results, Lowest Ni concentration was found to be 8.22 mg/kg in BIWTA\_RBM\_03 (Ashuganj Cargo Terminal, Meghna River) and highest Ni concentration was 29.80 mg/kg in BIWTA\_RBM\_06 (Chandpur Passenger Terminal, Meghna River).

**Total Zinc (Zn):** From the test results, Lowest Zinc (Zn) concentration was found to be 35.73 mg/kg in BIWTA\_RBM\_02 (Narayanganj Passenger Terminal, Shitalakshya River) and highest Zinc (Zn) concentration was 57.50 mg/kg in BIWTA\_RBM\_03 (Ashuganj Cargo Terminal, Meghna River).

**Total Lead (Pb):** From the test results, Lead (Pb) concentration ranges from 5.88 mg/kg to 18.75 mg/kg. The minimum value was in BIWTA\_RBM\_03 (Ashuganj Cargo Terminal, Meghna River) and maximum value was in BIWTA\_RBM\_05 (Barishal Passenger Terminal, Kirtankhola River).

**Total Cadmium (Cd):** From the test results, all the samples have shown concentration below the detection level.

**Total Chromium (Cr):** From the test results, Chromium concentration ranges from 1.68 mg/kg to 21.30 mg/kg. The minimum value was in BIWTA\_RBM\_06 (Chandpur Passenger

Terminal, Meghna River) and maximum value was in BIWTA\_RBM\_03 (Ashuganj Cargo Terminal, Meghna River).

### 3.5 Soil Quality

The quality of soil was identified to characterize the baseline status. The investigation of chemical releases to soil usually requires collection of composite samples to characterize a large area or volume of near-surface soil in likely contaminated areas. In this context a composite soil sampling technique was followed to measure the contaminant. The Soil samples were collected from around the six (06) project locations from 13 January to 15 January 2020. Test results of soil analysis are given in Table 3.9.



**Shashanghat, Dhaka New Terminal near Postagola on 13-01-20**



**Narayanganj Passenger Terminal on 13-01-20**



**Ashuganj Cargo Terminal on 13-01-20**



**Pangaon Cargo Terminal on 13-01-20**



**Chandpur Passenger Terminal on 14-01-20**



**Barishal Passenger Terminal on 15-01-20**

**Figure 3.5: Soil Sampling at Project Locations**



Table 3.9: Test Result of Soil Quality Analysis

Parameters	Unit	Concentration Present						Optimum Range	Analysis Method
		Shashanghat, Dhaka New Terminal near Postagola	Narayanganj Passenger Terminal	Ashuganj Cargo Terminal	Pangaon Cargo Terminal	Barishal Passenger Terminal	Chandpur Passenger Terminal		
		Buriganga River	Shitalakshya River	Meghna River	Buriganga River	Kirtankhola River	Meghna River		
		BIWTA_SL_01	BIWTA_SL_02	BIWTA_SL_03	BIWTA_SL_04	BIWTA_SL_05	BIWTA_SL_06		
		23° 41' 23.54"N 90° 25' 34.82"E	23° 36' 57.13"N 90° 30' 20.41"E	24° 2' 33.29"N 91° 0' 2.02"E	23° 39' 30.00"N 90° 27' 15.19"E	22° 41' 44.53"N 90° 22' 25.41"E	23° 13' 58.82"N 90° 38' 51.70"E		
pH	-	7.26	5.5 - 7.5**	6.94	7.22	7.10	7.18	5.5 - 7.5**	pH Meter
Organic Carbon	%	1.24	Low fertility (SOC < 1.2%), medium fertility (SOC = 1.2-1.7%) and high fertility (SOC > 1.7%) ***	1.15	1.19	1.21	1.23	Low fertility (SOC < 1.2%), medium fertility (SOC = 1.2-1.7%) and high fertility (SOC > 1.7%) ***	Wet Oxidation
Phosphate	mg/Kg	20.58	30-50****	20.32	23.11	18.78	19.56	30-50****	Olsen
Total Bacterial Count	CFU/gm of Soil	4.9 × 10 <sup>3</sup>	Not Yet Set	4.1 × 10 <sup>4</sup>	5 × 10 <sup>6</sup>	4.3 × 10 <sup>6</sup>	4.5 × 10 <sup>3</sup>	Not Yet Set	Microbial

\*NYS- Not Yet Standardized

Source: DU Laboratory Test, January 2020

\*\*Queensland Department of Environment and Heritage Protection. "Soil pH". [www.qld.gov.au](http://www.qld.gov.au).

\*\*\* Musinguzi, P., Ebanyat, P., Tenywa, J., Basamba, T., Tenywa, M., &amp; Mubiru, D. (2016). Critical Soil Organic Carbon Range For Optimal Crop Response To Mineral Fertiliser Nitrogen On A Ferralsol. Experimental Agriculture, 52(4), 635-653. Doi:10.1017/S0014479715000307

\*\*\*\*Penn State Extension (2002) Agronomy Facts 13 Managing Phosphorus for Crop Production © The Pennsylvania State University 2002



There is no Bangladesh regulation/standard for soil. In the absence of local country standards, it is the environment consultant's practice to use globally recognized published research papers on optimum values or potential pollution values. This techniques has been used in this study.

**pH:** From the test result it is seen that the pH concentration was ranged from 6.94 to 7.34. The higher concentration was found in BIWTA\_SL\_02 (Narayanganj Passenger Terminal, Shitalakshya River) and lower concentration was found in BIWTA\_SL\_03 (Ashuganj Cargo Terminal, Meghna River).

**Organic Carbon:** From the test result it is seen that the Organic Carbon concentration was ranged from 1.15 to 1.32. The higher concentration was found in BIWTA\_SL\_02 (Narayanganj Passenger Terminal, Shitalakshya River) and lower concentration was found in BIWTA\_SL\_03 (Ashuganj Cargo Terminal, Meghna River).

**Phosphate:** From the test result it is seen that the Phosphate concentration was ranged from 18.78 to 25.66. The higher concentration was found in BIWTA\_SL\_02 (Narayanganj Passenger Terminal, Shitalakshya River) and lower concentration was found in BIWTA\_SL\_05 (Barishal Passenger Terminal, Kirtankhola River).

**Total Bacterial Count:** From the test result it is seen that the Total Bacterial Count concentration was ranged from  $4.5 \times 10^3$  to  $6.5 \times 10^6$ . The higher concentration was found in BIWTA\_SL\_02 (Narayanganj Passenger Terminal, Shitalakshya River) and lower concentration was found in BIWTA\_SL\_06 (Chandpur Passenger Terminal, Meghna River).

## 4 CONCLUSION

The main aims of this contract to control and reduce the adverse impact during construction phase. Construction workers and may be affected adversely due to hazardous working environments such as air quality which is declined due to construction vehicle and machineries; noise generated from construction vehicle, water pollution by disposal of construction waste. The management and monitoring team was verified as the environmental impacts were regularly indentified or this project in order to reduce adverse impacts and enhance positive impacts from specific project activities during construction phase. From the environmental assessment it is found that all the air quality parameters for all six (6) sites are within national standard of Bangladesh. Noise level exceeded the standard set for the Commercial area for all of the sampling locations except BIWTA\_NM\_01 (Shashanghat, Dhaka New Terminal near Postagola) both day and night time. From the surface water quality results, it is seen that, most of the parameters are not yet standardized where DO and BOD values for most of the tested locations were below the standard value set by ECR 1997. Since Bangladesh Government Has not adopted Standards for soil and sediment quality yet, various guidelines from literatures were compared with the results and was found that, most results are within the optimum range where severe pollution is not identified.

APPENDIX

Appendix A: Air Quality Test Results



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Name of the Project	Baseline Data Collection for Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP S6)
Description of Sample	Ambient Air Quality
Sampling Location	Shashanghat, Dhaka New Terminal near Postogola (23°41'24.55"N 90°25'34.72"E)
Sample Collector	Collected by DSCL Personnel
Sampling Date	22 October 2019

**Test Result of Ambient Air Quality Analysis**

Parameter	Unit	BIWTA_AAQ_01	Bangladesh Standard	Duration (hours)	Weather Condition	Method of Analysis
		23°41'24.55"N 90°25'34.72"E Shashanghat, Dhaka New Terminal near Postogola				
PM <sub>10</sub>	µg/m <sup>3</sup>	26.2	65	24	Partly Cloudy and Sunny	Gravimetric
PM <sub>2.5</sub>	µg/m <sup>3</sup>	39.1	150	24		Gravimetric
SO <sub>2</sub>	µg/m <sup>3</sup>	1.85	365	24		West- Geake
NO <sub>x</sub>	µg/m <sup>3</sup>	8.74	100	Annual		Jacob and Lochte
O <sub>3</sub>	µg/m <sup>3</sup>	12.23	NYS	24		Photometric
CO	PPM		9	8		COMeter

10. The Bangladesh National Ambient Air Quality Standards have been taken from the Environmental Conservation Rules, 1997 which was amended on 19th July 2005 vide S.R.O. No. 220-17/j2005.   
NYS: Not Yet Standardized

**Test Results of Ambient Air Quality Monitoring (Weather Data)**

Sample ID	Location	GPS Location	Humidity (%)	Temperature (°C)	Wind Speed & Wind Direction (knot)
BIWTA_AAQ_01	Shashanghat, Dhaka New Terminal near Postogola	23°41'24.55"N, 90°25'34.72"E	62	33	2.7 knots from Southwest to West

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**Description of the Surrounding Environment**

Location and Sample ID	Sample Site Description
<p><b>Shashanghat, Dhaka New Terminal near Postagola</b> <b>(BIWTA_AAQ_01)</b></p>	<ul style="list-style-type: none"> <li>➤ The weather was sunny</li> <li>➤ Beside the Buriganga River</li> <li>➤ Launch vessels were running</li> <li>➤ Traffic volume was moderate</li> <li>➤ Moderate amount of dust particles was present</li> <li>➤ People movement was low</li> </ul>

*Saiful Islam Imran*  
 Test Performed By:  
**Saiful Islam Imran**  
 Chemist

*Md. Mashiur Rahman*  
 Checked By:  
**Md. Mashiur Rahman**  
 Jr. Environmental Specialist

*Tonmoy Pandit*  
 Approved By:  
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<b>Name of the Project</b>	Baseline Data Collection for Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals. Landing Ghats and Vessel Storm Shelters (RFP No: BRIVTP 86)
<b>Description of Sample</b>	Ambient Air Quality
<b>Sampling Location</b>	Narayanganj Passenger Terminal (23°36'58.86"N 90°30'20.53"E)
<b>Sample Collector</b>	Collected by DSCL Personnel
<b>Sampling Date</b>	23 October 2019

**Test Result of Ambient Air Quality Analysis**

Parameter	Unit	BIVTA AAQ 02 23°36'58.86"N 90°30'20.53"E Narayanganj Passenger Terminal	Bangladesh Standard	Duration (hours)	Weather Condition	Method of Analysis
PM <sub>2.5</sub>	µg/m <sup>3</sup>		65	24	Partly Cloudy and Sunny	Gravimetric
PM <sub>10</sub>	µg/m <sup>3</sup>					West-Geake Jacob and Hochheiser
SO <sub>2</sub>	µg/m <sup>3</sup>	2.12	365	24		Photometric
NO <sub>x</sub>	µg/m <sup>3</sup>	9.02	100	Annual		
O <sub>3</sub>	µg/m <sup>3</sup>	14.67	NYS	24		
CO	PPM	2	9	8		COMeter

*\*\*The Bangladesh National Ambient Air Quality Standards have been taken from the Environment Conservation Rules, 1997 which was amended on 19th July 2005 vide S.O. No. 220-Law/2005.  
NYS: Not Yet Standardized*

**Test Results of Air Quality Monitoring (Weather Data)**

Sample ID	Location	GPS Location	Humidity (%)	Temperature (°C)	Wind Speed & Wind Direction (knot)
BIVTA_AAQ_02	Narayanganj Passenger Terminal	23°36'58.86"N, 90°30'20.53"E	69	30	3.8 knots from Northeast to East

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Description of the Surrounding Environment

Location and Sample ID	Sample Site Description
Narayanganj Passenger Terminal (BIWTA_AAQ_02)	} The weather was sunny } Beside Shitalakshya River > Commercial and busy area > Traffic volume was high > Higher amount of dust particles was present > People movement was high > It's a crowded area.

Test Performed By:  
SaifulIslam Imran  
Chemist

  
Checked By:  
Md. Mashiur Rahman  
Jr. Environmental  
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Approved By:  
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<b>Name of the Project</b>	Baseline Data Collection for Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP S6)
<b>Description of Sample</b>	Ambient Air Quality
<b>Sampling Location</b>	Ashuganj Cargo Terminal (24° 2'32.78"N; 91° 0'1.37"E)
<b>Sample Collector</b>	Collected by DSCL Personnel
<b>Sampling Date</b>	24 October 2019

#### Test Result of Ambient Air Quality Analysis

Parameter	Unit	BIWTA_AAQ_03	Bangladesh Standard	Duration (hours)	Weather Condition	Method of Analysis
		24° 2'32.78"N 91° 0'1.37"E Ashuganj Cargo Terminal				
PM <sub>2.5</sub>	µg/m <sup>3</sup>	30.3	65	24	Partly Cloudy and Sunny	Gravimetric
PM <sub>10</sub>	µg/m <sup>3</sup>	33.7	150	24		Gravimetric
SO <sub>2</sub>	µg/m <sup>3</sup>	1.18	365	24		West- Geake
NO <sub>x</sub>	µg/m <sup>3</sup>	5.23	100	Annual		Jacob and Hochheiser
O <sub>3</sub>	µg/m <sup>3</sup>	10.45	NYS	24		Photometric
CO*	PPM	1	9	8		CO Meter

Note:

\*\* The Bangladesh National Ambient Air Quality Standards have been taken from the Environmental Conservation Rules, 1997 which was amended on 19th July 2005 vide S.R.O. No. 220-Law/2005.

NYS: Not Yet Standardized

#### Test Results of Air Quality Analysis (Weather Data)

Sample ID	Location	GPS Location	Humidity (%)	Temperature (°C)	Wind Speed & Wind Direction (knot)
BIWTA_AAQ_03	Ashuganj Cargo Terminal	24° 2'32.78"N, 91° 0'1.37"E	81	26.4	6.48 knots from Northeast

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**DSCL**

Multidisciplinary Development Consultants

Name of the Project	Baseline Data Collection for Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals Landing Ghats and Vessel Storm Shelters (RFP No:BRWTP S6)
Description of Sample	Ambient Air Quality
Sampling Location	Pangaon Cargo Terminal (23°39'30.79"N; 90°27'14.68"E)
Sample Collector	Collected by DSCL Personnel
Sampling Date	25 October 2019

Parameter	Unit	Value	Standard	Duration (hours)	Weather Condition	Method of Analysis
PM <sub>10</sub>	g/m <sup>3</sup>	29.2	65	24	Partly Cloudy and Sunny	Gravimetric
PM <sub>2.5</sub>	g/m <sup>3</sup>	30.3	150	24		Gravimetric
SO <sub>2</sub>	g/m <sup>3</sup>	1.10	365	24		West- Geake
NO <sub>x</sub>	g/m <sup>3</sup>	5.17	100	Annual		Jacob and Hochheiser
O <sub>3</sub>	g/m <sup>3</sup>	11.35	NYS	24		Photometric
CO*	PPM	<1	9	8		COMeter

Note:  
 The Bangladesh National Ambient Air Quality Standards have been taken from the Environment Conservation Rules, 1997 which was amended on 19th July 2005 vide SRO.No.220-Liw/2005.  
 NYS: Not Yet Standardized

**Test Results of Air Quality Monitoring (Weather Data)**

Sample ID	Location	GPS Location	Humidity (%)	Temperature (°C)	Wind Speed & Wind Direction (knot)
BIWTA_AAQ_04	Pangaon Cargo Terminal	23°39'30.79"N, 90°27'14.68"E	84	23	7.02 knots from East to West

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**Description of the Surrounding Environment**

Location and Sample ID	Sample Site Oescription
<b>Pangaon Cargo Terminal</b> (BIWTA_AAQ_04)	<ul style="list-style-type: none"><li>) The weather was cloudy</li><li>) Lower amount of dust particles was present</li><li>) People movement was high</li><li>) Traffic volume moderate</li><li>) Beside the Buri an a River</li></ul>

Test Performed By:  
**Saifullslam Imran**  
Chemist

  
Checked By:  
**Md. Mashiur Rahman**  
Jr. Environmental  
Specialist

Approved By:  
**Tonmoy Pandit**  
Deputy Manager



**Development Solutions Consultant Ltd.**

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DSCCL

Multidisciplinary Development Consultants

Name of the Project	Baseline Data Collection for Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals. Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP S6)
Description of Sample	Ambient Air Quality
Sampling Location	Barishal Passenger Terminal (22°41'59.44"N; 90°22'31.39"E)
Sample Collector	Collected by DSCL Personnel
Sampling Date	27 October 2019

**Test Result of Ambient Air Quality Analysis**

Parameter	Unit	BIWTA_AAQ_05 22°41'59.44"N 90°22'31.39"E Barishal Passenger Terminal	Bangladesh Standard	Duration (hours)	Weather Condition	Method of Analysis
PM <sub>2.5</sub>	µg/m <sup>3</sup>	29.7	65	24	Partly Cloudy and Sunny	Gravimetric
PM <sub>10</sub>	µg/m <sup>3</sup>	37.4	150	24		Gravimetric
SO <sub>2</sub>	µg/m <sup>3</sup>	2.17	365	24		West- Geake
NO <sub>x</sub>	µg/m <sup>3</sup>	10.14	100	Annual		Jacob and Hochheiser
O <sub>3</sub>	µg/m <sup>3</sup>	13.39	NYS	24		Photometric
CO*	PPM	2	9	8		COMeter

\* The Bangladesh National Ambient Air Quality Standards have been taken from the Environmental Conservation Rules, 1997 which was amended on 19th July 2005 vide S.O. No 220-La w/2005.  
NYS: Nat Yet St: Indard: ed

**Test Results of Air Quality Monitoring (Weather Data)**

Sample ID	Location	GPS Location	Humidity (%)	Temperature (°C)	Wind Speed & Wind Direction (knot)
BIWTA_AAQ_05	Barishal Passenger Terminal	22°41'59.44"N, 90°22'31.39"E	79	27	8.64 knots from Northsouth to East

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DSCCL\_Mirpur Mirpur Consultants

Description of the Surrounding Environment

Location and Sample ID	Sample Site Description
Barishal Passenger Terminal (BIWTA_AAQ_05)	The weather was sunny Traffic volume was high People movement was high Commercial area (Launch Ghat) Moderate amount of dust particles was present Beside the Kirtorkhola River Crowded Area.

Test Performed By:  
Saifullslam Imran  
Chemist

Checked By:  
Md. Mashiur Rahman  
Jr. Environmental  
Specialist

Approved By:  
Tonmoy Pandit  
Deputy Manager



Development Solutions Consultant Ltd.

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 OOHS Mirpur, Ohaka-1216, Bangladesh. Tel: +8801822758548  
 Email: [dsccl@dscclbd.com](mailto:dsccl@dscclbd.com) Web: [WMy.dscclbd.com](http://WMy.dscclbd.com)



DSCL

Multidisciplinary Development Consultants

Name of the Project	Baseline Data Collection for Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No. BRWfP-S6)
Description of Sample	Ambient Air Quality
Sampling Location	Chandpur Passenger Terminal (23°13'59.61"N 90°38'54.65"E)
Sample Collector	Collected by DSCL Personnel
Sampling Date	29 October 2019

**Test Result of Ambient Air Quality Analysis**

Parameter	Unit	BIWTA_AAQ_06	Bangladesh Standard	Duration (hours)	Weather Condition	Method of Analysis
		23°13'59.61"N 90°38'54.65"E Chandpur Passenger Terminal				
PM <sub>10</sub>	µg/m <sup>3</sup>	34.5	65	24	Partly Cloudy and Sunny	Gravimetric
PM <sub>2.5</sub>	µg/m <sup>3</sup>	64.2	150	24		Gravimetric
SO <sub>2</sub>	µg/m <sup>3</sup>	2.28	365	24		West-Geake
NO <sub>x</sub>	µg/m <sup>3</sup>	10.22	100	Annual		Jacob and Fuchs
O <sub>3</sub>	µg/m <sup>3</sup>	15.01	NYS	24		Photometric
CO	PPM	3	9	8		COMeter

Note:  
 -The Bangladesh National Ambient Air Quality Standards have been taken from the Environmental Conservation Rules, 1997 which was amended on 19th July 2005 vide S.I.W. No. 220 Law/2005.  
 NYS: Not Yet Standardized

**Test Results of Air Quality Monitoring (Weather Data)**

Sample ID	Location	GPS Location	Humidity (%)	Temperature (°C)	Wind Speed & Wind Direction (m/s)
BIWTA_AAQ_06	Chandpur Passenger Terminal	23°13'59.61"N, 90°38'54.65"E	75	26	1.62 knots from North to East

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Description of the Surrounding Environment

Location and Sample ID	Sample Site Description
Chandpur Passenger Terminal (BIWTA_AAQ_06)	)> The weather was sunny > Traffic volume was high > People movement was high > Commercial area (Launch Ghat) > Beside the Meghna River

Test Performed By:  
Saifullslam Imran  
Chemist

Checked By:  
Md.Mashiur Rahman  
Sr. Environmental  
Specialist

Approved By:  
Tonmoy Pandit  
Deputy Manager



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## Appendix 8: Noise Level Measurement Result



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Name of the Project	Baseline Data Collection for Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals. Landing Ghats and Vessel Storm Shelters (RFP No BRWTP S6)
Description of Sample	Noise Level Measurement
Sampling Location	Shashanghat, Dhaka New Terminal near Postagola; Narayanganj Passenger Terminal; Ashuganj Cargo Terminal; Pangaon Cargo Terminal; Barishal Passenger Terminal; Chandpur Passenger Terminal
Sample Collector	Collected by DSCCL Personnel
Sampling Date	22 October 2019-29 October 2019

## Noise Level Analysis

Sample ID	Sample Location	GPS Location	Land Use Category	Time		Noise Level (dBA) (LA <sub>eq</sub> )		Bangladesh Standard (dBA) **	
				Day	Night	Day	Night	Day	Night
BIWTA_NM_01	Shashanghat, Dhaka New Terminal near	23°41'24.55"N, 90°25'34.72"E	Commerdal	10:27	2009	61.13	52.21	65	55
BIWTA_NM_02	Narayanganj Passenger Terminal	23°36'58.86"N, 90°30'20.53"E	Commerdal	11:27	2050	71.25	67.56	65	55
BIWTA_NM_03	Ashuganj Cargo Terminal	24° 2'32.78"N, 91° 0'1.37"E	Commerdal	11:52	2005	72.35	66.87	65	55
BIWTA_NM_04	Pangaon Cargo Terminal	23°39'30.79"N, 90°27'14.68"E	Commerdal	13:58	2050	70.84	65.63	65	55
BIWTA_NM_05	Barishal Passenger Terminal	22°41'59.44"N, 90°22'31.39"E	Commerdal	10:52	21:45	73.14	64.23	65	55
BIWTA_NM_06	Chandpur Passenger Terminal	23°13'59.61"N, 90°38'54.65"E	Commerdal	11:58	2200	76.06	62.47	65	55

Notes:

Land use category is based on the classification provided in the Noise Pollution Control Rules (2006)

The sound level standards for commercial area are 65 at day time and 55 at night time.

Noise Level is the average noise recorded over the duration of the monitoring period

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Description of the Surrounding Environment

Sample Location and ID	Sample Site Description
Shashanghat, Dhaka New Terminal near Postagola (BIWTA_NM_01)	Ship breaking ahead People movement was moderate Traffic volume was moderate Generator was running.
Narayanganj Passenger Terminal (BIWTA_NM_02)	Traffic volume was high. Beside crowded area. People movement was high. Generator was running. Bus Stand Area.
Ashuganj Cargo Terminal (BIWTA_NM_03)	People movement was high Loading-unloading was going on The place is in commercial zone. Traffic volume was moderate
Pangaon Cargo Terminal (BIWTA_NM_04)	People movement was high Water vessels were running Beside a CNG stand Traffic volume was high
Barishal Passenger Terminal (BIWTA_NM_05)	The place is in commercial zone. People movement was high. Traffic volume was high Generator was running Launch vessels were running Some people are gossiping near the sampling site
Chandpur Passenger Terminal (BIWTA_NM_06)	Crowded Area. People movement was high Traffic volume was high Beside a tempo stand Sudden horn from launches and local transport affects the sampling quality

Test Performed By:  
Saifullslam Imran  
Chemist

Checked By:  
Md. Mashiur Rahman  
Jr. Environmental  
Specialist

Approved By:  
Tonmoy Pandit  
Deputy Manager



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Appendix C: Surface Water Quality Test Result



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<b>Name of the Project</b>	Baseline Data Collection for Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP S6)
<b>Description of Sample</b>	Surface Water Quality
<b>Sampling Location</b>	Shashanghat, Dhaka New Terminal near Postagola (Buriganga River); Narayanganj Passenger Terminal (Shitalakshya River); Ashuganj Cargo Terminal (Meghna River); Pangaon Cargo Terminal (Buriganga River); Barishal Passenger Terminal (Kirtankhola River) Chandpur Passenger Terminal (Meghna River).
<b>Sample Collector</b>	Collected by DSCL Personnel
<b>Sampling Date</b>	22 October 2019 – 29 October 2019

Test Result of Surface Water Quality Analysis

Parameters	Unit	Concentration Present						Standards for Inland Surface Water*	Analysis Method
		Shashanghat, Dhaka New Terminal near Postagola	Narayanganj Passenger Terminal	Ashuganj Cargo Terminal	Pangaon Cargo Terminal	Barishal Passenger Terminal	Chandpur Passenger Terminal		
		Buriganga River	Shitalakshya River	Meghna River	Buriganga River	Kirtankhola River	Meghna River		
		BIWTA_SW_01	BIWTA_SW_02	BIWTA_SW_03	BIWTA_SW_04	BIWTA_SW_05	BIWTA_SW_06		
		23°41'24.00"N 90°25'33.74"E	23°37'0.80"N 90°30'22.21"E	24°2'32.78"N 91°0'1.37"E	23°39'31.36"N 90°27'13.66"E	22°41'57.26"N 90°22'33.60"E	23°13'59.05"N 90°38'56.94"E		
Temperature*	°C	33.1	32.3	26.4	26.2	29.0	31.4	NYS	Multimeter
pH*	-	9.12	8.87	8.29	8.51	8.94	8.55	6.5-8.5	Multimeter
Salinity*	ppt	0.093	0.133	0.105	0.095	0.133	0.137	NYS	Multimeter
Electrical Conductivity (EC)*	µs/cm	426	466	205	535	329	287	NYS	Multimeter
Dissolved Oxygen (DO)*	mg/L	3.1	3.3	4.8	3.3	4.9	5.2	5 or more	DO Meter
Total Dissolve Solid (TDS)*	mg/L	2077	2666	133	262	2214	189	NYS	Multimeter

\*Standards for Inland Surface Water is followed Environmental Conservation Rule (ECR) '97 + 01-site Test Result

NYS = No! Yet Standardized

SOJUCI: DPHE and DU LabonJODI Test, November 2019

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**Description of the Surrounding Environment**

Sample Location and ID	Sample Site Description
Shashanghat, Dhaka New Terminal near Postagola (Buriganga River) (BIWTA_SW_01)	<ul style="list-style-type: none"> <li>&gt; The water is polluted.</li> <li>&gt; Some water hyacinth is covering some part of the water.</li> <li>&gt; A launch was being dismantled and workers throwing wastes in the water.</li> <li>&gt; Loading – unloading was going on.</li> <li>&gt; Some boats were moving.</li> </ul>
Narayanganj Passenger Terminal (Shitalakshya River) (BIWTA_SW_02)	<ul style="list-style-type: none"> <li>&gt; A large part of the terminal was covered by wastes.</li> <li>&gt; A launch crew was bathing using the river water.</li> <li>&gt; A large part of the water is covered by water hyacinth.</li> <li>&gt; Continuous movement of launch and boats.</li> </ul>
Ashuganj Cargo Terminal (Meghna River) (BIWTA_SW_03)	<ul style="list-style-type: none"> <li>&gt; Loading and unloading was going on.</li> <li>&gt; Continuous movement of ships and boats.</li> <li>&gt; People throw food wastes and also dump generator oil in the water</li> <li>&gt; The water is being polluted.</li> </ul>
Pangaon Cargo Terminal (Buriganga River) (BIWTA_SW_04)	<ul style="list-style-type: none"> <li>&gt; Several boats and launches were moving.</li> <li>&gt; The water is covered by water hyacinth.</li> <li>&gt; People movement was much higher in waterways.</li> </ul>
Barishal Passenger Terminal (Kirtankhola River) (BIWTA_SW_05)	<ul style="list-style-type: none"> <li>&gt; Several launches were parked in the terminal.</li> <li>&gt; A large part is covered by wastes near the terminal.</li> <li>&gt; A small part is covered by water hyacinth.</li> <li>&gt; Launch crews use the water for bathing and washing purposes.</li> <li>&gt; Several types of wastes have been thrown in the water.</li> </ul>

**Development Solutions Consultant Ud.**

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**DSCCL**

Multidisciplinary Development consultants

Sample Location and ID	Sample Site Description
Chandpur Passenger Terminal (Meghna River) (BIWT A_SW_06)	<ul style="list-style-type: none"> <li>&gt; The terminal is surrounded by water hyadnth.</li> <li>» People have thrown all types of wastes in the water.</li> <li>&gt; The water is used for bathing and washing purposes mainly for launch crews.</li> <li>&gt; Severallaunches were parked in the terminal</li> <li>&gt; People movement was high in the terminal area.</li> </ul>

Test Performed By:  
**Saiful Islam Imran**  
 Chemist

  
Checked By:  
**Md. Mashiur Rahman**  
 Jr. Environmental Specialist

Checked By:  
**Tonmoy Pandit**  
 Deputy Manager




**Development Solutions Consultant Ltd.**

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 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

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Lab Memo: 401/ CC, DPHE, CL, Dhaka.

Date: 07-11-2019

**Physical /Chemical/ Bacteriological Analysis of Water Sample**

Sample ID: CEN2019110051	Sample Receiving date: 24-10-2019
Ref. Memo No: DSCU2019/Nilil & Dated: 24-10-2019	Sample Source: Surface Water
Sent by: Md. Mashur Rahman, Jr. Environmental Specialist, DSCL, Mirpur DOHS, Dhaka-1216.	Dist: Dhaka, Upa:
Care Taker: DSCL (Sample : BWTA_SW_01)	Union: VIII.: Buriganga river, Postogola
Sample Collection date:	Date of Testing: 24/10/2019-07/11/2019

**LABORATORY TEST RESULTS:**

Sl. No.	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Biochemical Oxygen Demand (BOD)	0.2	3	mg/L	5 days Incubation	0.1
2	Sulphate	400	38	mg/L	UVS	1.0
3	Total Suspended Solid (TSS)	10	12	mg/L	Gravimetric Method	
4	Turbidity	10	2.5	NTU	Turbidity Meter	

Comments:

Sample was collected & Supplied by client.

N.B: UVS- UV-Visible Spectrophotometer, LOQ - Limit of Quantitation.

<p><b>Test Performed by:</b></p> <p>1.) Name: Md. Saiful Alam Khosru                  Designation: Sample Analyzer</p> <p style="text-align: right; margin-right: 50px;"><i>Saiful Alam Khosru</i> 07-11-19</p> <p>2.) Name: Taslima Akhter                  Designation: Sample Analyzer</p>	<p><b>Countersigned/Approved by:</b></p> <p>1.) Name: Md. Zahidul Islam Miah                  Designation: Senior Chemist</p> <p>2.) Name: Md. Biplab Hossain                  Designation: Chief Chemist</p> <p style="text-align: right; margin-right: 50px;"><i>Biplab Hossain</i> 07-11-19</p> <p style="text-align: right; font-size: small;">Md. Biplab Hossain                  Senior Chemist                  Department of Public Health Engineering                  Central Laboratory, Mohakhali, Dhaka.</p>
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 Office of the Chief Chemist Department of  
 Public Health Engineering Central Lab, 38-39,  
 Mohakhali C/A, Dhaka-1212  
 Phone: 88-(0)2-9881927, Fax: 88-(0)2-9882003, Email wqmsc\_central\_lab@yahoo.com

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Lab Memo: 401/CC, DPHE, CL, Dhaka.

Date: 07-11-2019

**sical /Chemical/ Bacteriological Analysis of Water Sample**

Sample ID: CEN2019110052	Sample Receiving date: 24-10-2019
Ref. Memo No: DSCU2019/Nil & Dated: 24-10-2019	Sample Source: Surface Water
Sent by: Md. Mashur RMman ,Jr. Environmental Specialist , DSCL, Mirpur DOHS, Dhaka-1216.	Dist: Narayanganj, Upa:
Care Taker: DSCL (Sample : BIWTA_SW_02)	Union: , Viii.: Shitalakshya river
Sample Collection date:	Date of Testing: 24/10/2019-07/11/2019

**LABORATORY TEST RESULTS:**

Sl#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Biochemical Oxygen Demand (BOD)	0.2	2	mg/L	5 days Incubation	0.1
2	Sulphate	400	11	mg/L	UVS	1.0
3	Total Suspended Solid (TSS)	10	11	mg/L	Gravimetric Method	
4	Turbidity	10	3.1	NTU	Turbidity Meter	

Comments:

Sample was collected & Supplied by client.

N.B: UVS- UV-Visible Spectrophotometer, LOQ - Limit of Quantitation.

<p><b>Test Performed by:</b></p> <p>1.) Name: Md. Saiful Alam Khosru                  Designation: Sample Analyzer</p> <p>2.) Name: Taslima Aikhter                  Designation: Sample Analyzer</p>	<p><b>Countersigned/Approved by:</b></p> <p>1.) Name: Md. Zahidul Islam Miah                  Designation: Senior Chemist</p> <p>2.) Name: Md. Biplab Hossain                  Designation: Chief Chemist</p>
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07/11/2019  
**Md. Biplab Hossain**  
 Chief Chemist  
 Department of Public Health Engineering  
 Central Laboratory Mohakhali, Dhaka.





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Lab Memo: 402/ CC, OPHE, CL, Dhaka.

Date: 07-11-2019

**Physical/Chemical/Bacteriological Analysis of Water Sample**

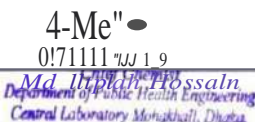
Sample ID: CEN2019110053	Sample Receiving date: 27-10-2019
Ref. Memo No: DSCU2019/Nil & Dated: 27-10-2019	Sample Source: Surface Water
Sent by: Saiful Islam Imran, Jr. Environmental Specialist, DSCL, Mirpur DOHS, Dhaka-1216.	Dist: Brahmanbaria, Upa: Ashuganj
Care Taker: DSCL (Sample : BIWTA_SW_03)	Union: VIII: Meghna river
Sample Collection date:	Date of Testing: 27/10/2019-07/11/2019

**LABORATORY TEST RESULTS:-**

Sl. No.	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	Sulphate	400	5	mg/L	UVS	1.0
3	Total Suspended Solid (TSS)	10	17	mg/L	Gravimetric Method	
4	Turbidity	10	356	NTU	Turbidity Meter	

Comments: Sample was collected & Supplied by client.

N.B: UVS- UV-Visible Spectrophotometer, LOQ = Limit of Quantitation.

<b>Test Performed by:</b>  1.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer <i>O.I - II-I</i>  2.) Name: Taslima Akhter Designation: Sample Analyzer <i>K O.I. - II-IJ</i>	<b>Countersigned/Approved by:</b>  1.) Name: Md. Zahidul Islam Miah Designation: Senior Chemist  2.) Name: Md. Biplob Hossain Designation: Chief Chemist  01711111119 Md. Biplob Hossain Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka.
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 39, Mohakhali C/A, Dhaka-1212  
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Lab Memo: 402/CC, DPHE, CL, Dhaka.

Date: 07.11.2019




**Physical/Chemical/ Bacteriological Analysis of Water Sample**

Sample ID: CEN20191100104	Sample Receiving date: 27-10-2019
Ref. Memo No: OSC/2019/Nil & Dated: 27-10-2019	Sample Source: Surface Water
Sent by: Saiful Islam Imran, Junior Environmental Specialist, DSCL, Mirpur DOHS, Dhaka-1216	Dist: Narayanganj/Upa:
Care Taker: DSCL (Sample: BIWTA_SW_04)	Union; Vill.: Pangaon Cargo Terminal, Buriganga River
Sample Collection date:	Date of Testing: 27/10/2019- 14/11/2019

**LABORATORY TEST RESULTS:**

Sl#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Biological Oxygen Demand (BOD)	0.2	2	mg/L	5 days incubation	0.1
2	Sulphate	400	35	mg/L	UVS	1.0
3	Total Suspended Solid (TSS)	10	10	mg/L	Gravimetric Method	-
4	Turbidity	10	2.9	NTU	Turbidity Meter	-

Comments: Sample was collected & Supplied by client.  
 N.B: UVS: UV-Visible Spectrophotometer, LOQ: Limit of Quantitation.

<p><b>Test Performed by:</b></p> <p>1.) Name: Md. Saiful Alam Khosru                  Designation: Sample Analyzer                    07.11.19</p> <p>2.) Name: Taslima Akhter                    07.11.19                  Designation: Sample Analyzer</p>	<p><b>Countersigned/Approved by:</b></p> <p>1.) Name: Md. Zahidul Islam Miah                  Designation: Senior Chemist</p> <p>2.) Name: Md. Biplob Hossain                    07.11.19                  Designation: Chief Chemist</p> <p align="right"><i>Md. Biplob Hossain</i>                  Chief Chemist                  Department of Public Health Engineering                  Central Laboratory Mohakhali, Dhaka.</p>
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Office of the Chief Chemist  
Department of Public Health Engineering  
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LabMemo: 4451CC, DPHE, CL, Dhaka.

Date: 14-11-2019

**ftrlscai/Chemical/ Bacteriological Analysis of Water Sample**

Sample ID: CEN2019110106	Sample Receiving date: 30-10-2019
Ref. Memo No: DSCLJ201911Nill & Dated: 30-10-2019	Sample Source: Surface Water
Sent by: Saiful Islam Imran, Jr. Environmental Specialist, DSCL, Mirpur DOHS, Dhaka-1216.	Dist: Chandpur, Upa
Care Taker: DSCL (Sample : BWTA_SW_06)	Union, Vill.: Launch Terminal, Meghna river
Sample Collection date:	Date of Testing: 30/10/2019-12/11/2019

**LABORATORY TEST RESULTS:**

Sl. #	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Biochemical Oxygen Demand (BOD)	0.2	3	mg/l	5 days Incubation	0.1
2	Sulphate	400	6	mg/l	UVS	1.0
3	Total Suspended Solid (TSS)	10	8	mg/l	Gravimetric Method	
4	Turbidity	10	33.1	NTU	Turbidity Meter	



Comments: Sample was collected & Supplied by client.  
N.B: UVs- UV-Visible Spectrophotometer, LOQ- Limit of Quantitation.

<p><b>Test Performed by:</b></p> <p>1.) Name: Mahabuba Sabina Motin Designation: Sample Analyzer</p> <p>2.) Name: Md. Saiful Aiam Khosru Designation: Sample Analyzer</p>	<p><b>Countersigned/Approved by:</b></p> <p>1.) Name: Md. Zahidul Islam Miah Designation: Senior Chemist</p> <p>2.) Name: Md. Biplab Hossain Designation: Chief Chemist</p>
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Memo No: 651/ CC, DPHE, CL, Dhaka.

Date: 20-01-2020

Physical/Chemical/Bacteriological Analysis of Water Sample

Sample ID: CEN2020010074 To CEN2020010079 , Total: 6	District: Barisal, Brahmanbaria, Chandpur, Narayanganj
Sent by: Tonmoy Pandt, Deputy Manager, DSCL, Mirpur DOHS, Dhaka-1216.	Sample Source: SW
Ref. Memo No: DSCU2020/NII & Dated: 16-01-2020	Date of Testing: 16/01/2020-19/01/2020
Collection date:	Receiving date: 16-01-2020

LABORATORY TEST RESULTS:

Sample ID	Caretaker Name	Village/ Ward	Union/ Paurashava	Upazila / City Corp.	Arsenic (mg/L) LOQ: , BDS:		Iron (mg/L) LOQ:0.05, BDS:0.1	
					Conc.	Method	Conc.	Method
CEN2020010074	DSCL (Sample : BIWTA SW 01)	Shashongaon (Buriganga River)			-	-	0.61	AAS
CEN2020010075	DSCL (Sample : BIWTA SW 02)	Passenger Terminal			-	-	0.27	AAS
CEN2020010076	DSCL (Sample : BIWTA SW 03)	Cargo Terminal (Buriganga River)		Ashuganj	-	-	0.48	AAS
CEN2020010077	DSCL (Sample : BIWTA SW 04)	Pangaon Cargo Terminal			-	-	0.25	AAS
CEN2020010078	DSCL (Sample : BIWTA SW 05)	Chandpur Cargo Terminal (Meghna)			-	-	0.31	AAS
CEN2020010079	DSCL (Sample : BIWTA SW 06)	Passenger Terminal			-	-	0.25	AAS

Note: Samples were collected & supplied by client.  
N.B: AAS - Atomic Absorption Spectrophotometer, LOQ - limit of Quantitation.

<p>Test Performed by:</p> <p>1.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer <i>Saiful Alam</i> 20.01.2020</p> <p>2.) Name: Taslima Akhter Designation: Sample Analyzer <i>Taslima</i> 20.01.2020</p>	<p>Countersigned/Approved by:</p> <p>1.) Name: Mita Sarker Designation: Senior Chemist</p> <p>2.) Name: Md. Biplab Hossain Designation: Chief Chemist <i>Md. Biplab Hossain</i> 20.01.2020</p>
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Department of Public Health Engineering  
Central Laboratory Mohakhali, Dhaka





Department of Soil, Water and Environment  
University of Dhaka  
Dhaka 1000  
Bangladesh

Date: 14. 11. 2019

## Report of Analysis

Sample supplied by  
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Deputy Manager  
Development Solutions Consultan Ltd.  
House # 734 (5-B), Road # 10, Avenue # 04  
DOHS Mirpur, Dhaka 1216, Bangladesh

Re. Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6)

Sample Title: Surface Water Quality Test for TOC and Oil & Orease

Analytical Results:

Serial No.	Sample Source	Sample ID	Location	Test Parameters (mg/L)	
				Total Organic Carbon (TOC)	Oil and Orease
1	Surface Water	BIWTA_SW_OI	Shashanghat (Buriganga River)	2.258	Less than S

Test Methods:

1. TOC : TOC Analyzer
2. Oil and Orease : APHA (5520.8)

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Report of Analysis

Date: 14.11.2019

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Re. Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6).

Sample Title: Surface Water Quality Test for TOC and Oil & Grease

Analytical Results:

Serial No.	Sample Source	Sample ID	Location	Test Parameters (mg/L)	
				Total Organic Carbon (TOC)	Oil and Grease
01	Surface Water	BIWfA SW 02	Narayanganj (Shitalakshya River)	1.758	Less than 5

Test Methods:

1. TOC : TOC Analyzer
2. Oil & Grease : APHA (5520.B)

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Sample Title: Surface Water Quality Test for TOC and Oil & Grease

Analytical Results:

Serial No.	Sample Source	Sample ID	Location	Test Parameters (mg/L)	
				Total Organic Carbon (TOC)	Oil and Grease
1	Surface Water	BITWA_SW_03	Ashuganj (Meghna River)	1.556	Less than S

Test Methods:

1. TOC : TOC Analyzer
2. Oil and Grease : APHA (5520.8)

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Date: 14.11.2019

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Re. Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-86).

Sample Title: Surface Water Quality Test for TOC and Oil & Grease

Analytical Results:

Serial No.	Sample Source	Sample ID	Location	Test Parameters (mg/L)	
				Total Organic Carbon (TOC)	Oil and Grease
01	Surface Water	BIWIA_SW_04	Pangaon (Buriganga River)	2.217	Less than 5

Test Methods:

1. TOC : TOC Analyzer
2. Oil & Grease : APHA (5520.B)

- 1 -

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Re. Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-86)

Sample Title: Surface Water Quality Test for TOC and Oil & Grease

Analytical Results:

Serial No.	Sample Source	Sample ID	Location	Test Parameters (mg/L)	
				Total Organic Carbon (TOC)	Oil and Grease
1	Surface Water	BITWA_SW_OS	Barishal Launch Terminal (Kirtokhola River)	1.314	Less than 5

Test Methods:

1. TOC : TOC Analyzer
2. Oil and Grease : APHA (5520.8)

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Re. Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6)

Sample Title: Surface Water Quality Test for TOC and Oil & Orease

Analytical Results:

Serial No.	Sample Source	Sample ID	Location	Test Parameters (mg/L)	
				Total Organic Carbon (TOC)	Oil and Orease
1	Surface Water	BITWA_SW_06	Chandpur Launch Terminal (Meghna River)	1.582	Less than 5

Test Methods:

1. TOC : TOC Analyzer
2. Oil and Orease : APHA (5520.8)

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Appendix D: Riverbed Sediment Quality Test Result



Department of Soil, Water and Environment  
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Report of Analysis

Date: 14.11.2019

Sample Supplied by  
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Re. Environmental and Social Impact Assessment of Proposed New Inland Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6).

Sample Title: Riverbed Sediment Quality Test

Analytical Results:

Sample Source	Sample ID	Location	Test Parameters	Units	Results
Riverbed Sediment	BIWTA_RBM_OI	Shashan ghat (Burigan ga River)	Total Organic Carbon	(%)	0.42
			Total P as Phosphate (PO <sub>4</sub> <sup>3-</sup> )	(mg/kg)	1195.65
			Water Soluble Phosphate (PO <sub>4</sub> <sup>3-</sup> )	(mg/kg)	21.52
			Total Mercury (Hg)	(ppb) (µg/kg)	0.35
			Total Arsenic (As)	(mg/kg)	2.497
			Total Zinc (Zn)	(mg/kg)	47.75
			Total Lead (Pb)	(mg/kg)	8.87
			Total Cadmium (Cd)	(mg/kg)	BDL
			Total Chromium (Cr)	(mg/kg)	12.60
Total Nickel (Ni)	(mg/kg)	23.15			

BDL-Below Detectable Limit

Methods Used:

1. Total Organic Carbon: Wet Oxidation Method
2. Soluble Phosphate: Olsen Method
3. Total P as Phosphate: Aquaregia digestion and yellow Color method
4. Mercury: Cold Vapour Atomic Absorption EPA/SW-84617000N7040A/7071A
5. Arsenic: APHA 3114 {Atomic Absorption Spectrometry (HG-AAS)}
6. Pb, Cd, Hg, Cr, Ni and Zn: Aquaregia digestion and AAS Method

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Date: 14.11.2019

Report of Analysis

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Re. Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6)

Sample Title: Riverbed Sediment Quality Test

Analytical Results:

Sample Source	Sample ID	Location	Test Parameters	Units	Results
Riverbed Sediment	BIWfA RBM 02	Narayanganj (Shitalakshya River)	Total Organic Carbon	(%)	0.33
			Total P as Phosphate (P04 <sup>3-</sup> )	(mg/kg)	763.56
			Water Soluble Phosphate (P04 <sup>3-</sup> )	(mg/kg)	11.33
			Total Mercury (Hg)	(ppb) (µg/kg)	0.27
			Total Arsenic (As)	(mg/kg)	1.743
			Total Zinc (Zn)	(mg/kg)	35.73
			Total Lead (Pb)	(mg/kg)	7.70
			Total Cadmium (Cd)	(mg/kg)	BDL
			Total Chromium (Cr)	(mg/kg)	15.31
Total Nickel (Ni)	(mg/kg)	10.51			

\*BDL-Below Detection Limit

Methods Used:

1. Total Organic Carbon: Wet Oxidation Method
2. Soluble Phosphate: Olsen Method
3. Total P as Phosphate: Aquaregia digestion and yellow Color method
4. Mercury: Cold Vapour Atomic Absorption EPNSW-846/7000N7040A/7071A
5. Arsenic: APHA 3114 {Atomic Absorption Spectrometry (HG-AAS)}
6. Pb, Cd, Hg, Cr, Ni and Zn: Aquaregia digestion and AAS Method

*iq*

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Date: 14. 11. 2019

## Report of Analysis

Sample supplied by  
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Re. Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6)

Sample Title: Riverbed Sediment Quality Test

### Analytical Results:

Sample Source	Sample ID	Location	Test Parameters	Units	Results
Riverbed Sediment	BIWTA RBM 03	Ashuganj (Megima River)	Total Organic Carbon	(%)	0.11
			Total P as Phosphate (PO <sub>4</sub> <sup>3-</sup> )	(mg/kg)	649.78
			Water Soluble Phosphate (PO <sub>4</sub> <sup>3-</sup> )	(mg/kg)	6.13
			Total Mercury (Hg)	(mg/kg)	2.31
			Total Arsenic (As)	(mg/kg)	1.850
			Total Zinc (Zn)	(mg/kg)	57.50
			Total Lead (Pb)	(mg/kg)	5.88
			Total Cadmium (Cd)	(mg/kg)	BDL
			Total Chromium (Cr)	(mg/kg)	21.30
			Total Nickel (Ni)	(mg/kg)	8.22

### Methods Used:

- Total Organic Carbon : Wet Oxidation Method
- Soluble Phosphate : Olsen Method
- Total P as Phosphate : Aquaregia digestion and yellow color method
- Arsenic : APHA 3114 { Atomic Absorption Spectrometry (HG-AAS) }
- Pb, Cd, Hg, Cr, Ni and Zn : Aquaregia digestion and AAS Method

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Department of Soil, Water and Environment

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Dhaka 1000

Bangladesh

Date: 14.11.2019

Report of Analysis

Sample Supplied by  
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DOHS Mirpur, Dhaka-1216, Bangladesh

Re. Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6).

Sample Title: Riverbed Sediment Quality Test

Analytical Results:

Sample Source	Sample ID	Location	Test Parameters	Units	Results
Riverbed Sediment	BIWTA RBM 04	Pangaon (Buriganga River)	Total Organic Carbon	(%)	0.41
			Total P as Phosphate (P04 <sup>3-</sup> )	(mg/kg)	1230.56
			Water Soluble Phosphate (P04 <sup>3-</sup> )	(mg/kg)	22.75
			Total Mercury (Hg)	(ppb) (µg/kg)	0.32
			Total Arsenic (As)	(mg/kg)	2.379
			Total Zinc (Zn)	(mg/kg)	46.68
			Total Lead (Pb)	(mg/kg)	8.82
			Total Cadmium (Cd)	(mg/kg)	BDL
			Total Chromium (Cr)	(mg/kg)	11.66
Total Nickel (Ni)	(mg/kg)	23.45			

\*BDL-Below Detection Limit

Methods Used:

1. Total Organic Carbon: Wet Oxidation Method
2. Soluble Phosphate: Olsen Method
3. Total P as Phosphate: Aquaregia digestion and yellow Color method
4. Mercury: Cold Vapour Atomic Absorption EPA/SW-846/7000A/7040A/7071A
5. Arsenic: APHA 3114 {Atomic Absorption Spectrometry (HG-AAS)}
6. Pb, Cd, Hg, Cr, Ni and Zn: Aquaregia digestion and AAS Method

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Department of Soil, Water and Environment

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Bangladesh

Date: 14.11.2019

Report of Analysis

Sample Supplied by  
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DOHS Mirpur, Dhaka-1216, Bangladesh

Re. Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6).

Sample Title: Riverbed Sediment Quality Test

Analytical Results:

Sample Source	Sample ID	Location	Test Parameters	Units	Results
Riverbed Sediment	BIWIA RBM 05	Barisal (Kirtankhola River)	Total Organic Carbon	(%)	0.52
			Total P as Phosphate (P <sub>04</sub> <sup>3-</sup> )	(mg/kg)	1487.78
			Water Soluble Phosphate (P <sub>04</sub> <sup>3-</sup> )	(mg/kg)	27.59
			Total Mercury (Hg)	(ppb) (µg/kg)	0.26
			Total Arsenic (As)	(mg/kg)	2.362
			Total Zinc (Zn)	(mg/kg)	53.75
			Total Lead (Pb)	(mg/kg)	18.75
			Total Cadmium (Cd)	(mg/kg)	BDL
			Total Chromium (Cr)	(mg/kg)	1.88
			Total Nickel (Ni)	(mg/kg)	25.75

\*BDL-Below Detection Limit

Methods Used:

1. Total Organic Carbon: Wet Oxidation Method
2. Soluble Phosphate: Olsen Method
3. Total P as Phosphate: Aquaregia digestion and yellow Color method
4. Mercury: Cold Vapour Atomic Absorption EPA/SW-846/7000A/7040A/7071A
5. Arsenic: APHA 3114 {Atomic Absorption Spectrometry (HG-AAS)}
6. Pb, Cd, Hg, Cr, Ni and Zn: Aquaregia digestion and AAS Method

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Date: 14.11.2019

Rep011of Analysis

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Re. Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6).

Sample Title: Riverbed Sediment Quality Test

Analytical Results:

Sample Source	Sample ID	Location	Test Parameters	Units	Results
Riverbed Sediment	BIWI'A RBM 06	Chandpur (Meghna River)	Total Organic Carbon	(%)	0.40
			Total P as Phosphate (PO <sub>4</sub> <sup>3-</sup> )	(mg/kg)	1243.65
			Water Soluble Phosphate (PO <sub>4</sub> <sup>3-</sup> )	(mg/kg)	26.14
			Total Mercury (Hg)	(ppb) (μg/kg)	0.19
			Total Arsenic (As)	(mg/kg)	3.158
			Total Zinc (Zn)	(mg/kg)	55.50
			Total Lead (Pb)	(mg/kg)	9.25
			Total Cadmium (Cd)	(mg/kg)	BDL
			Total Chromium (Cr)	(mg/kg)	1.68
Total Nickel (Ni)	(mg/kg)	29.80			

BDL-Below Detection Limit

Methods Used:

1. Total Organic Carbon: Wet Oxidation Method
2. Soluble Phosphate: Olsen Method
3. Total P as Phosphate: Aquaregia digestion and yellow Color method
4. Mercury: Cold Vapour Atomic Absorption EPA/SW-846/7000A/7040A/7071A
5. Arsenic: APHA 3114 {Atomic Absorption Spectrometry (HG-AAS)}
6. Pb, Cd, Hg, Cr, Ni and Zn: Aquaregia digestion and AAS Method

**O-1--**

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Professor and Chairman

Or Md. Khalilur Rahman  
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of Soil, Water & Environment

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Appendix E: Soil Quality Test Result



Department of Soil, Water and Environment  
University of Dhaka  
Dhaka 1000  
Bangladesh

Date: 20.01.2020

Report of Analysis

Sample supplied by  
Mr. Tonmoy Pandit  
Deputy Manager  
Development Solutions Consultant Ltd.  
House #, 734 (5-D), Road #, 10, Avenue #, 04  
DOHS Mirpur, Dhaka-1216, Bangladesh

Re: Environmental Assessment of Proposed New Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6)

Sample Title: Soil Quality Test

Analytical Results:

Sample Source	Sample ID	Location	Test Parameters	Units	Results
Soil Sample	DIWTA SL 01	Shashanghat, Dhaka New Terminal near Postaaola	Total Organic Carbon	%	1.24
			Soluble Phosphate (PO <sub>4</sub> <sup>2-</sup> )	mg/Kg	20.58
			pH	-	7.26
			Total Bacterial Count	cfu/gm of soil	4.9 × 10 <sup>3</sup>

Methods Used:

- Total Organic Carbon : Wet Oxidation Method
- Soluble Phosphate : Olsen method
- pH : pH meter
- Total Bacterial Count : microbial method (Nutrient Agar; Pour Plate)

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Date: 20.01.2020

## Report of Analysis

Sample supplied by  
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Development Solutions Consultant Ltd.  
House # 734 (5-B), Road # 10, Avenue # 04  
DOHS Mirpur, Dhaka 1216, Bangladesh

Re. Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals. Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6)

Sample Title: Soil Quality Test

### Analytical Results:

Sample Source	Sample ID	Location	Test Parameters	Units	Results
Soil Sample	BIWTA SL 02	N arayanganj Passenger Terminal	Total Organic Carbon	(%)	1.32
			Soluble Phosphate (PO <sub>4</sub> <sup>3-</sup> )	(mg/kg)	25.66
			pH	-	7.34
			Total Bacteria Count	cfu/gm of soil	6.5 × 10 <sup>6</sup>

### Methods Used:

1. Total Organic Carbon : Wet Oxidation Method
2. Soluble Phosphate : Olsen Method
3. pH : pH meter
4. Total Bacteria Count : Microbial method (Nutrient Agar; Pour Plate)

স্বাক্ষর

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Department of Soil, Water and Environment

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Date: 20.01.2020

## Report of Analysis

Sample supplied by  
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House # 734 (5-B), Road # 10, Avenue # 04  
DOHS Mirpur, Dhaka-1216, Bangladesh

Re: Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6)

Sample Title: Soil Quality Test

### Analytical Results:

Sample Source	Sample ID	Location	Test Parameters	Units	Results
Soil Sample	BIWTA SL 03	Ashuganj Cargo Terminal	Total Organic Carbon	(%)	1.15
			Soluble Phosphate ( $PO_4^{2-}$ )	mg/Kg	20.32
			pH	-	6.94
			Total Bacteria Count	cfu/gm of soil	$4.1 \times 10^4$

### Methods Used:

1. Total Organic Carbon : Wet Oxidation Method
2. Soluble Phosphate : Olsen Method
3. pH : pH Meter
4. Total Bacteria Count : Microbial method (Nutrient Agar; Pour Plate)

J. 2 P

(Dr. Md. Khalit Raliman)  
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Department of Soil, Water and Environment  
University of Dhaka  
Dhaka 1000  
Bangladesh

Date: 20.01.2020

## Report of Analysis

Sample supplied by  
Mr. Tonmoy Pandit  
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House #734 (5-B), Road # 10, Avenue #04  
DOHS Mirpur, Dhaka-1216, Bangladesh

Re: Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6)

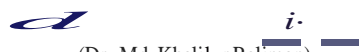
Sample Title: Soil Quality Test

### Analytical Results:

Sample Source	Sample ID	Location	Test Parameters	Units	Results
Soil Sample	BIWTA SL 04	Pangaon Cargo Terminal	Total Organic Carbon	(%)	1.19
			Soluble Phosphate ( $PO_4^{2-}$ )	mg/Kg	23.11
			pH	-	7.22
			Total Bacteria Count	cfu/gm of soil	$5 \times 10^6$

### Methods Used:

- Total Organic Carbon : Wet Oxidation Method
- Soluble Phosphate : Olsen Method
- pH : pH Meter
- Total Bacteria Count : Microbial method (Nutrient Agar; Pour Plate)

  
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Professor and Chairman

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Department of Soil, Water and Environment  
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Dhaka 1000  
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Date: 20.01.2020

### Report of Analysis

Sample supplied by  
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DOHS Mirpur, Dhaka-1216, Bangladesh

Re: Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-S6)

Sample Title: Soil Quality Test

#### Analytical Results:

Sample Source	Sample ID	Location	Test Parameters	Units	Results
Soil Sample	BIWTA SL 05	Batishal Passenger Terminal	Total Organic Carbon	(%)	1.21
			Soluble Phosphate ( $PO_4^{2-}$ )	mg/Kg	18.78
			pH	-	7.10
			Total Bacteria Count	cfu/gm of soil	$4.3 \times 10^6$

#### Methods Used:

1. Total Organic Carbon : Wet Oxidation Method
2. Soluble Phosphate : Olsen Method
3. pH : pH Meter
4. Total Bacteria Count : Microbial method (Nutrient Agar; Pour Plate)

(Dr. Md. Khalilur Rahman)  
Professor and Chairman

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Date: 20.01.2020

## Report of Analysis

Sample supplied by  
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House # 734 (5-B), Road # 10, Avenue # 04  
DOHS Mirpur, Dhaka-1216, Bangladesh

Re: Environmental and Social Impact Assessment of Proposed New and Up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters (RFP No: BRWTP-86)

Sample Title: Soil Quality Test

### Analytical Results:

Sample Source	Sample ID	Location	Test Parameters	Units	Results
Soil Sample	BIWTA SL 06	Chandpur Passenger Terminal	Total Organic Carbon	(%)	1.23
			Soluble Phosphate ( $PO_4^{2-}$ )	mg/Kg	19.56
			pH	-	7.18
			Total Bacteria Count	cfu/gm of soil	$4.5 \times 10^3$

### Methods Used:

1. Total Organic Carbon : Wet Oxidation Method
2. Soluble Phosphate : Olsen Method
3. pH : pH Meter
4. Total Bacteria Count : Microbial method (Nutrient Agar; Pour Plate)

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### ANNEX 3.3 FISH LIST





Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters. BRWTP-S6

DRAFT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT FOR TERMINALS



Sl. No.	Scientific name	English name	Locale name	SG	NG	BS	CP	PG	AG	IUCN Threatened Category	
										National	Global
1	<i>Ailia coila</i>	Gangetic Ailia	Kajuli	FC	LC	--		LC	FC	LC	LC
2	<i>Amblypharyngodon mola</i>	Mola carplet	Mola	FC	FC	FC		FC	FC		
3	<i>Anabus testudinius</i>	Climbing Perch	Koi	LC	LC	LC		LC	LC		
4	<i>Anguilla bengalensis</i>	Indian longfin Eel	Bamosh			--			R	VU	NT
5	<i>Aplocheilus panchax</i>	Blue panchax	Kanpona, Choukkani			FC			LC		
6	<i>Apocryptes bato.</i>	Goby	Chewa Bele, Chiring			LC					
7	<i>Bagarius bagarius</i>	Devil Catfish	Baghair			R		R	R	EN	NT
8	<i>Botia derio</i>		Bourani	lc	LC	--		LC	LC	EN	LC
9	<i>Brachygobius nusus</i>	Blamblebee goby	Nuna baila			LC					
10	<i>Catla catla</i>	Catla	Katal, Catla	LC	LC	LC		LC	LC		
11	<i>Chaca chaca</i>	Squarehead Catfish	Chaka, Chaka Veka.			--			LC	EN	LC
12	<i>Chanda baculis</i>	Indian glassy fish	Kata chnada	FC	FC	FC		FC	FC		
13	<i>Chanda nama</i>	Elongate Glass-perchlet	Nama Chanda	R	R	LC		R	LC	VU	LC
14	<i>Channa gachua</i>	Dwarf Snakehead	Telo taki				LC			LC	LC
15	<i>Channa marulius</i>	Giant Snakehead	Gajar, Gajal		R	---		R	R	EN	LC
16	<i>Channa orientalis</i>	Walking Snakehead	Gachua, Raga, Cheng			---			R	VU	LC
17	<i>Channa punctatus</i>	Spotted Snakehead	Taki	FC	FC	FC		FC	FC	--	



Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters. BRWTP-S6

DRAFT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT FOR TERMINALS



Sl. No.	Scientific name	English name	Locale name	SG	NG	BS	CP	PG	AG	IUCN Threatened Category	
										National	Global
18	Channa striatus	Snakehead Murrel	Shol	LC	LC	LC		LC	LC		
19	Chitala chitala	Humped Featherback	Chital		LC	LC		R	LC	EN	LC
20	Cirhinus reba	Reba	Bhagna, Raik, Tatkini, Bata.			--			LC	VU	LC
21	Cirrhinus cirrhosus	Mrigal Carp	Mirka, Mrigal	LC	LC	LC		LC	LC		
22	Clarias batrachus	Walking catfish	Magur, Jagur	LC	LC	LC		LC	LC		
23	Clupisoma garua	Garua Bacha	Ghaura	LC	LC	FC		LC	LC	EN	NT
24	Colisa fasciata	Giant Gourami	Khailsha, Khoila			--			FC		
25	Colisa lalia	Red Gourami	Lal Khailsha, Baicha		LC	--			LC		
26	Corica soborna	Ganges river-sprat	Kachki	FC	FC	LC		FC	VC		
27	Ctenops nobilis	Indian gourami	Modhumala			--		R			
28	Cyprinus carpio	Common Carp	Carpu, Carphu		R	----		OC	OC		
29	Dasyatis sp.	Short snout stingray	Housh pata/ Saplapata	--	--	--	LC			--	--
30	Esomus danricus	Flying barb	Darkina	LC	FC	LC		LC	C		
31	Eutropichthys vacha	Vacha	Bacha	R	R	FC		R	FC	LC	LC
32	Glassogobius giuris	Bar-eyed Goby	Bele, Bailla.			FC		LC	FC		
33	Gudusia chapra	Indian river shad	Chapila			--		FC	C	VU	LC
34	Hemibagrus menoda	Menoda catfish	Gang tenra			--			LC		
35	Heteropneustes fossilis	Stinging catfish	Shing	FC		FC		C	FC		



Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters. BRWTP-S6

DRAFT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT FOR TERMINALS



Sl. No.	Scientific name	English name	Locale name	SG	NG	BS	CP	PG	AG	IUCN Threatened Category	
										National	Global
36	Hyporhamphus limbatus	Congaturi Halfbeak	Ek Thuita		LC	--			LC		
37	Labeo calbasu	Black Rohu	Kalibaus	LC	LC	LC		LC	LC	LC	LC
38	Labeo gonius	Kuria Labeo	Gonia, Ghannia				FC			NT	LC
39	Labeo rohita	Rohu Carp	Rui, Rohit.	LC	LC	LC		LC	FC		
40	Lates calcarifer	Sea Perch	Koral, Bhetki.			FC					
41	Lepidocephalichthys guntea	Guntea Loach	Gutum, Puiya	LC	LC	--		LC	FC		
42	Macrognathus aculeatus	Spotted spiny Eel	Tara Baim			LC		R	LC	NT	
43	Macrognathus pancalus	Striped spiny Eel	Guchi Baim	LC	FC	-		LC	C		
44	Mastacembelus armatus	Tire-track spiny Eel	Baim			LC			LC	EN	
45	Microphis cuncalus	Crocodile Tooth Pipefish	Kumirer Khil	--	---	--	LC			VU	LC
46	Monopterus cuchia	Freshwater mud eel	Kuicha	LC	LC	--		R	LC	VU	VU
47	Mystus cavasius	Gangetic Mystus	Gulsha tengra			LC			LC	NT	LC
48	Mystus tengara	Stripped Dwarf Catfish	Bajari Tengra, Guitta Tengra	FC	FC	FC		FC	C		
49	Mystus vittatus	Stripped River Catfish	Tengra	LC		LC		LC	FC		
50	Nandus nandus	Mud Perch	Meni, Bheda		LC	--			LC	NT	LC
51	Notopterus notopterus	Grey Featherback	Foli		LC	FC			FC	VU	LC
52	Odontamblyopus rubicundus	Rubicundus Eelgoby	Lal Chewa			LC					
53	Ompok pabda	Pabdah catfish	Madhu Pabda			--		R	LC	EN	NT
54	Oreochromis niloticus	Nile Tilapia	Nilotica	LC	LC	LC		R	OC		





Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Storm Shelters. BRWTP-S6

DRAFT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT FOR TERMINALS



Sl. No.	Scientific name	English name	Locale name	SG	NG	BS	CP	PG	AG	IUCN Threatened Category	
										National	Global
55	<i>Oryzas melastigma</i>	Estuarine ricefish	Kanpona			FC					
56	<i>Osteobrama cotio</i>	Cotio	Dhela		LC	LC		LC	LC	NT	LC
57	<i>Otolithoides pama</i>	Pama crocker	Poa			FC					
58	<i>Polynemus paradiseus</i>	Paradise thraedfin	Topse			C					
59	<i>Pseudambassis ranga</i>	Indian Glassy Fish	Ranga chanda, Chanda	FC	FC	FC		FC	C	LC	LC
60	<i>Pseudeutropius atherinoides</i>	Indian Potasi	Batasi	FC	C	--		FC	VC		
61	<i>Pungasius pangasius</i>	Pungas	Pangas			LC				CR	LC
62	<i>Puntius chola</i>	Chala Barb	Chalapunti	LC		--			LC		..
63	<i>Puntius conchonius</i>	Red barb	Kanchan punti		LC	LC		FC	FC		..
64	<i>Systemus sarana</i>	Olive barb	Sar Punti			--			LC	NT	..
65	<i>Puntius sophore</i>	Spotfin Swamp barb	Jat Punti	C	C	FC		C	VC		..
66	<i>Pethia ticto</i>	Two-spot Barb	Tit Punti	R	LC	LC		R	LC	VU	LC
67	<i>Rasbora daniconius</i>	Slender rasbora	Darkina			--		LC	LC		
68	<i>Rhinomugil corsula</i>	Corsula Mullet	Khalla, Bata.		R	FC		LC	LC		
69	<i>Rita rita</i>	Rita	Rita			FC		R	FC	EN	LC
70	<i>Salmostoma bacaila</i>	Large Razorbelly Minnow	Narkalichela		R	LC			LC		
71	<i>Silonia silondia</i>	Silondia Vacha	Shilong			LC				LC	LC
72	<i>Somileptes gongota</i>	Gongoata loach	Ghar puiya	LC	LC	--		LC			



Sl. No.	Scientific name	English name	Locale name	SG	NG	BS	CP	PG	AG	IUCN Threatened Category	
										National	Global
73	Sperata aor	Long - whiskered Catfish	Talla Ayre	LC	LC	FC		LC	LC	VU	LC
74	Sperata seenghala	Giant River-catfish	Guijja Ayre	R	LC	FC		LC	FC	VU	LC
75	Tenualosa ilisha	River shad	Ilish			FC			LC		
76	Tetradon cutcutia	Common Pufferfish	Tepa, Potka.	R	LFCC	LC		R	LC		
77	Wallago attu	Freshwater Shark	Boal	LC	LC	FC		LC	FC	VU	NT
78	Xenentodon canila	Needle fish	Kaikya, Kakila	LC	R	FC		LC	FC		

Note: Site Code: SG= Shashanghat; NG= Narayangonj; BS= Barishal; CP= Chandpur; PG= Pangaon; AG= Ashugonj

Local status code: VC = Very common; C = Common; FC = Fairly common; LC = Less common; R= Rare; OC= Occasional

Threatened code: CR = Critically Endangered; EN = Endangered; VU = Vulnerable; NE = Near threatened; LC = Least concern





Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals. BRWTP-S6

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT



#### ANNEX 3.4 MOLLUSCS AND CRABS LIST





Sl. NO	Name of species	Common name	English	Local name	Family	SG	NG	BS	CP	PG	AG
<b>MOLLUSCS</b>											
1	<i>Pila globosa</i>	Common Apple-snail		Bara Shamuk	Pilidae	--	--	--		LC	LC
2	<i>Bellamya bengalensis</i>	Banded pond/river snail		Guli Shamuk	Viviparidae	--	LC			FC	FC
3	<i>Indoplanorbis exustus</i>	Ram's Horn snail		Chapta Shamuk	Planorbidae	LC	LC	FC		FC	C
4	<i>Gyraulus convexusculus</i>	Horn Snail		Choto Pachano Shamuk	Planorbidae	LC	FC	FC		LC	C
5	<i>Lamellidens marginalis</i>	Freshwater mussels		Jhinuk				LC			LC
<b>CRUSTACEA- PRAWNS/ SHRIMP</b>											
1	<i>Macrobrachium rosenbergii</i>	Jiant freshwater prawn		Gholda Chingri	Palaeminidae	R		FC		LC	C
2	<i>Macrobrachium malcolmsonii</i>	Moonsoon River Prawn			Palaeminidae			LC		--	FC
3	<i>Macrobrachium dayanus</i>	Kalna River prawn		Dimoala Icha, Dimua Icha	Palaeminidae			FC		LC	LC
4	<i>Linder stylifera</i>					LC				FC	C
5	<i>Caridina gracilirostris</i>	Needle nose caridin		Gusa chingri	Atyidae	LC				FC	VC



CRUSTACEA- CRABS										
1	Sartoriana spinigera	Sartorina Crab	Chimta Kakra	Potamidae	R	LC	LC		FC	R
2	Lebothelphusa woodmasoni			Potamidae	LC	LC	FC		LC	LC

Note:

Site Code: SG= Shashanghat; NG= Narayangonj; BS= Barishal; CP= Chandpur; PG= Pangaon; AG= Ashugonj

Local status code: VC = Very common; C = Common; FC = Fairly common; LC = Less common; R= Rare; OC= Occasional



Environmental and Social Impact Assessment of proposed new and up-  
gradation of Cargo and Passenger River Terminals. BRWTP-S6  
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT



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ANNEX 3.5 PLANKTON LIST





Zooplankton density (Indiv./l water) by species and by site

Group Name	Species Name	Site name					
		Shashan ghat	Narayanganj	Barishal	Chandpur	Pangaon	Ashuganj
<b>Protozoa</b>							
	Centropyxis sp.		0.45				0.444
	Diffugia sp.				0.222		
	Volvox sp.					7.11	
	Sub-Total	0	0.45	0	0.222	7.11	0.444
<b>Rotifera</b>							
	Brachionus angularis	1.33					0.444
	Brachionus falcatus	0.89				0.444	0.444
	Brachionus quadridentatus	0.89					
	Filinia longiseta	0.89			0.222		
	Keratella tropica	0.44					
	Rotaria neptunia		0.45				
	Unidentified	0.44	0.45				
	Sub-total	4.88	0.9	0	0.222	0.444	0.889
<b>Nauplii</b>							
	Nauplius	0.44			0.222	1.333	
	Metanauplius	0.44	0.45			0.444	
	Sub-total	0.88	0.45	0	0.222	1.778	0
<b>Copepoda</b>							
	Cyclops sp.					1.778	
	Cyclops nanus	0.44	8		0.889		2.222
	Mesocyclops sp.	1.33					0.444



	Diaptomus sp.		0.45	2			
Sub-total		1.77	8.45	2	0.889	1.778	2.667
Cladocera							
	Bosmina coregoni	2.22	0.45	2	0.667	0.444	0.444
	Diaphanosoma brachyurum		1	2	0.222		1.778
Sub-total		2.22	1.45	4	0.889	0.444	2.222
Ostracoda							
	Heterocypris sp.	0.89				0.45	
Sub-Total		0.89				0.444	
TOTAL		10.67	12	6.222	2.667	12	6.222

Species composition and abundance (indiv./l water) recorded from S3 and S4 project sites

S3 Sites:

Groups	Number of species and abundance ( indiv./l water)							
	Shashanghat		Narayangonj		Barishal		Chandpur	
	No.	Abundance	No.	Abundance	No.	Abundance	No.	Abundance
Protozoa	0	0	1	0.45	0	0	1	0.25
Rotifera	6	4.88	2	0.90	0	0	1	0.25
Nauplii	2	0.88	1	0.45	0	0	1	0.25
Copepoda	2	177	2	8.45	1	2	1	1.0
Cladocera	1	2.22	2	1.45	2	4	2	1.0
Ostracoda	1	0.89	0	0	0	0	0	0
Total	12	10.64	8	11.7	3	6.0	6	2.75



S4 Sites:

Number of species and abundance ( indiv./l water)				
Zooplankton Groups	Pangaon		Ashuganj	
	No.	Abundance	No.	Abundance
Protozoa	1	7.11	1	0.45
Rotifera	1	0.45	2	0.89
Nauplii	2	1.78	0	0
Copepoda	1	1.78	2	3.67
Cladocera	1	0.45	2	2.25
Ostracoda	1	0/45	0	0
<b>Total</b>	<b>7</b>	<b>12.02</b>	<b>7</b>	<b>6.25</b>





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ANNEX 3.6 TERRESTRIAL FLORA LIST





SL.NO	Local/Bengali Name	Scientific name	Family	English Name	Habit	Plant Type	Habitat	SG	NG	BS	CP	PG	AG
1.	Akashmoni	Acacia auriculiformis	Mimosaceae	Ear-pod Wattle	D	T	T			√		√	
2.	Mangium	Acacia mangium	Mimosaceae	Forest mangrove	D	T	T					√	
3.	Muktajhuri	Acalypha indica	Euphorbiaceae	Chenille Plant	D	H	T					√	
4.	Upatlangra /apong	Achyranthes aspera	Amaranthaceae	Prickly Chaff-flower	D	H	T	√		√		√	√
5.	Bel	Aegle marmelos	Rutaceae	Wood Apple	D	T	T	√		√	√		
6.	Fulkuri/sagola	Ageratum conyzoides	Asteraceae	Billy Goat Weed	D	H	T			√		√	√
7.	Shirish	Albizia lebeck	Mimosaceae	Siris Tree,	D	T	T			√			
8.	Koroi /loha siris	Albizia procera	Mimosaceae	White Siris	D	T	T		√	√	√		√
9.	Mankachu	Alocasia macrorrhizos	Araceae	Giant taro	M	S	T				√		
10.	Helencha	Alternanthera philoxeroides	Amaranthaceae	Alligator Weed	D	H	A		√	√		√	
11.	Sachi shak	Alternanthera sessilis	Amaranthaceae	Sessile Joyweed	D	H	A,T			√		√	
12.	Kata notey	Amaranthus spinosus	Amaranthaceae	Spiny Amaranth	D	H	T			√		√	√
13.	Notey shak	Amaranthus viridis	Amaranthaceae	Green Amaranth,	D	H	T					√	
14.	Anaros	Ananas sativus	Bromeliaceae	Pine Aple	D	S	T		√				
15.	Ata/nona	Anona reticulate	Annonaceae	Bullock's Heart	D	T	T		√	√	√	√	√
16.	Kadam	Anthocephalus chinensis	Rubiaceae	Burflower-tree	D	T	T			√	√		
17.	Royna/Pitraj	Aphanamixis polystachya	Meliaceae	Amoora	D	T	T		√			√	
18.	Krismas tree/	Araucaria cookii	Arauciaciaceae	Coki pine	D	T	T		√				
19.	Gua / supari	Areca catechu	Arecaceae	Betel Nut Tree	M	T	T			√	√		
20.	Sialkanta	Argemone mexicana	Papaveraceae	Yellow Mexican Poppy	D	H	T					√	
21.	Chambul	Artocarpus chama	Moraceae	Monkey Jack	D	T	T	√					
22.	Kanthal	Artocarpus heterophyllus	Moraceae	Jackfruit	D	T	T	√		√	√	√	√
23.	Moricha	Asclepias curassavica	Asclepiadaceae	Blood flower	D	S	T		√				
24.	Kamranga	Averrhoa carambola	Averrhoaceae	Star Fruit, Carambola	D	T	T		√		√		
25.	Carpet gash/ dhaka ghach	Axonopus compressus	Poaceae	Blanket Grass	M	H	T		√			√	√
26.	Neem	Azadirachta indica	Meliaceae	Indian Lilac, Neem Tree.	D	T	T	√		√	√	√	√
27.	Makla bash	Bambusa nutans	Poaceae	Makhal Bamboo	M	S	T				√		√
28.	Puishak	Basella alba	Basellaceae	Indian Spinach	D	S	T		√				
29.	Bauhinia	Bauhinia tomentosa	Caesalpiniaceae	Wild Champak	D	S	T					√	
30.	Shial murtha	Blumea lacera	Asteraceae	Not known	D	H	T					√	
31.	Shimul/tula	Bombax ceiba	Bombacaceae	Red Silk Cotton Tree	D	T	T	√		√			
32.	Radha chura	Caesalpinia pulcherrima	Caesalpinioideae	Peacock Flower	D	T	T		√	√			
33.	Arol/arhar dal	Cajanus cajan	Fabaceae	Pigeon Pea	D	S	T		√				
34.	Kolaboti	Canna indica	Cannaceae	Indian Shot	M	H	T		√				
35.	Papaya	Carica papaya	Caricaceae	Papaya	D	S	T	√	√	√	√	√	
36.	Koromcha	Carissa carandas	Apocynaceae	Christ's Thorn	D	S	T		√				





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SL.NO	Local/Bengali Name	Scientific name	Family	English Name	Habit	Plant Type	Habitat	SG	NG	BS	CP	PG	AG
37.	Kolkeshunda	Senna tora	Caesalpiniaceae	Sickle Senna	D	S	T			√		√	
38.	Nayantara	Catharanthus rosea	Apocynaceae	Madagascar Periwinkle	D	S	T	√	√	√			
39.	Thankuni	Centella asiatica	Apiaceae	Indian Pennywort	D	H	T					√	
40.	Hasnahena	Cestrum nocturnum	Solanaceae	Night Jasmin	D	S	T			√			√
41.	Palm tree	Chrysalidocarpus lutescens	Arecaceae	Yellow Areca Palm	M	T	T	√	√	√			
42.	Premkata/Chorkata	Chrysopogon aciculatus	Poaceae	Love Grass	D	H	T					√	
43.	Lebu	Citrus limon	Rutaceae	Lemon	D	S	T	√	√	√	√	√	
44.	Jambura	Citrus maxima	Rutaceae	Shaddck	D	S	T			√	√	√	
45.	Bhat	Clerodendrum viscosum	Verbenaceae	Hill Glory Bower	D	S	T					√	
46.	Telakucha	Coccinea grandis	Cucurbitaceae	Ivy Guard	D	C	T			√		√	√
47.	Narikel	Cocos nucifera	Arecaceae	Coconut Palm	M	T	T	√	√	√	√	√	√
48.	Pata bahar	Codiaeum variegatum	Euphorbiaceae	Golden Ring Croton	D	S	T		√	√			
49.	Kochu	Colocasia esculenta	Araceae	Taro	M	H	A,T			√		√	
50.	Kansira	Commelina benghalensis	Commelinaceae	Blue Commelina	M	H	T		√	√		√	
51.	Monanoyona	Commelina diffusa	Commelinaceae	Climbing Dayflower	M	H	A,T			√		√	
52.	Taal	Corypha umbraculifera	Arecaceae	Talipot Palm	M	T	T					√	
53.	Croton	Croton bonplandianus	Euphorbiaceae	Bonplant's Croton	D	S	T		√			√	
54.	Fern/Dekhi shak	Ctenitis subglandulosa	Athyriaceae	Cirate Fern	Pte	Pte	T					√	√
55.	Kanainala	Cyanotis cristata	Commelinaceae	Not Known	M	H	A,T			√		√	
56.	Cycas	Cycas circinalis	Cycadeacea	Sago palm	M	S	T			√			
57.	Durba ghas	Cynodon dactylon	Poaceae	Bermuda Grass	M	H	T	√	√	√	√	√	√
58.	Behua	Cyperus difformis	Cyperaceae	Small Flower Umbrella Plant	M	H	A,T					√	
59.	Dhutora	Datura metel	Solanaceae	Thorn Apple	D	S	T					√	
60.	Krishnochura	Delonix regia	Caesalpiniaceae	Flame Tree	D	T	T		√	√	√		√
61.	Bicha gass/ aungoli gass	Digitaria sanguinalis	Poaceae	Large Crabgrass	M	H	T		√	√		√	√
62.	Chupri alu	Dioscorea alata	Dioscoreaceae	White yam	D	C	T						√
63.	Bon alu	Dioscorea pentaphylla.	Dioscoreaceae	Fiji yam, Kawan yam.	D	C	T			√		√	
64.	Duranta	Duranta repens	Verbenaceae	Golden Dewdrop	D	S	T		√	√		√	
65.	Keshoraj	Eclipta alba	Asteraceae	False Daisy	D	H	T					√	
66.	Kachuripana	Eichhornia crassipes	Pontederiaceae	Water Hyacinth	M	H	A	√	√		√	√	
67.	Jalpai	Elaeocarpus robustus	Elaeocarpaceae	Indian Olive	D	T	T	√					√
68.	Chapra	Eleusine indica	Poaceae	Indian Goosegrass	M	H	T					√	
69.	Dudnol	Eragrostis cilianensis	Poaceae	Stink grass	M	H	A,T					√	
70.	Eucalyptus/ bangach	Eucalyptus camaldulensis	Myrtaceae	River Red Gum	D	T	T				√		√
71.	Assamlata	Eupatorium odoratum	Asteraceae		D	C	T		√			√	



SL.NO	Local/Bengali Name	Scientific name	Family	English Name	Habit	Plant Type	Habit at	SG	N G	BS	CP	PG	AG
72.	Boro Dadhia	Euphorbia hirta	Euphorbiaceae	Australian Asthma	D	H	T					√	
73.	Bot	Ficus benghalensis	Moraceae	Banyan Tree	D	T	T	√	√	√		√	√
74.	Aswath/Pakur	Ficus benjamina	Moraceae	Yellow Fig	D	T	T	√	√	√		√	√
75.	Kak dumur	Ficus hispida	Moraceae	Opposite-leaved Fig	D	T	T			√			√
76.	Jogga dumur	Ficus racemosa	Moraceae	Fig Tree, Craddock	D	T	T					√	
77.	Matichech	Fimbristylis dichotoma	Cyperaceae	Tall Fringe-rush	M	H	A		√			√	
78.	Ban Karpash	Fioria vitifolia	Malvaceae	Tropical fanleaf	D	H	T						√
79.	Gandharaj	Gardenia augusta	Rubiaceae	Cape Jasmine	D	S	T		√	√			
80.	Jiga/jika/hengela	Garuga pinnata	Burseraceae	Grey Downy Balsam	D	T	T	√					
81.	Khetpapa	Hedyotis corymbosa	Rubiaceae	Flat-top mille grains	D	H	T					√	
82.	Hatisur	Heliotropium indicum	Boraginaceae	Indian Heliotrope	D	S	T					√	
83.	Jangli Dherosh	Hibiscus ficulneus	Malvaceae	white wild musk mallow	D	S	T		√				
84.	Joba	Hibiscus rosa-sinensis	Malvaceae	China rose	D	S	T		√	√			
85.	Chukur	Hibiscus sabdarifa var. sabdarifa	Malvaceae	Roselle	D	S	T			√			
86.	Chan/ oulu	Imperata cylindrica	Poaceae	Bedding grass	M	H	T			√		√	
87.	Kolmishak	Ipomoea aquatica	Convolvulaceae	Swamp Cabbage	D	H	A,T	√		√		√	
88.	Dholkolmi	Ipomoea fistulosa	Convolvulaceae	Bush morning-glory	D	S	A,T	√				√	
89.	Rangan	Ixora coccinea	Rubiaceae	Flame of the Wood	D	S	T		√	√			
90.	Beli	Jasminum sambac	Oleaceae	Arabian Jasmin	D	S	T			√			
91.	Keshardam	Jussiaea repens	Onagraceae	Creeping water primrose	D	H	A					√	
92.	Bish jaron	Justicia gendarussa	Acanthaceae	Gendarussa	D	S	T		√				
93.	Lombu Mehogoni	Khaya anthotheca	Meliaceae	Red mahogany	D	T	T					√	
94.	Lau/kadu/panilau	Lageneria siceraria	Cucurbitaceae	Bottle Gourd	D	C	T					√	
95.	Mehedi	Lawsonia inermis	Lythraceae	Henna/ Egyptian privet	D	S	T		√				
96.	Khudepana	Lemna minor	Lemnoideae	Duckweed	D	H	A					√	
97.	Ipil-Ipil	Leucaena leucocephala	Fabaceae	Ipil-Ipil	D	T	T		√				
98.	Lichu	Litchi chinensis	Sapindaceae	Litchi	D	T	T						√
99.	Am	Mangifera indica	Anacardiaceae	Mango	D	T	T	√	√	√	√	√	√
100.	Shosni sak	Marsilea quadrifoliata	Marsileaceae	Water clover	Pte	Pte	A,T					√	
101.	Champa ful	Michelia champaca	Magnoliaceae	Champak	D	T	T		√				
102.	Lazzaboti	Mimosa pudica	Mimosaceae	Sensitive Plant	D	H	T	√				√	
103.	Bakul	Mimosop elengi	Sapotaceae	Bullet Wood	D	T	T	√	√	√			
104.	Sajna	Moringa oleifera	Moringaceae	Drumstick Tree /Moringa	D	T	T		√		√	√	√
105.	Kamini	Murraya paniculata	Rutaceae	Cosmatic Bark	D	S	T			√			
106.	Kola	Musa sapientum	Musaceae	Banana Plant	M	H	T		√			√	



SL.NO	Local/Bengali Name	Scientific name	Family	English Name	Habit	Plant Type	Habitat	SG	NG	BS	CP	PG	AG
107.	Mosenda	Mussaenda erythrophylla	Rubiaceae	Ashanti blood	D	S	T			√			
108.	Korobi	Nerium indicum	Apocynaceae	Oleander	D	S	T			√			
109.	Bon tamak	Nicotiana plumbaginifolia	Solanaceae	Tex-Mex Tobacco	D	H	T			√		√	
110.	Bon tulsi	Ocimum americanum	Labiatae	Lemon basil	D	S	T			√		√	
111.	Tulsi	Ocimum sanctum	Labiatae	Holy basil	D	S	T			√			
112.	Basket gash	Oplisma burmanii	Poaceae	Burmann's basketgrass	M	H	T			√		√	
113.	Jhora Dhan /Bunodhan	Oryza rufipogon	Poaceae	Brownbeard rice	M	H	A,T					√	√
114.	Amrul shak	Oxalis corniculata	Oxalidaceae	Indian Sorrel	D	H	A,T					√	
115.	Chelagash	Parapholis strigosa	Poaceae	Slender Barb Grass	M	H	A,T					√	√
116.	Bera-chita	Pedilanthus tithymaloides	Euphorbiaceae	Jew's Slipper	D	S	T		√				
117.	Luchi Pata	Peperomia pellucida	Piperaceae	Peperomia	D	H	T			√			
118.	Bishkatali	Persicaria orientalis	Polygonaceae	Prince's Feather	D	H	A,T			√		√	√
119.	Sitki	Phyllanthus reticulatus	Euphorbiaceae	Reticulated Leaf flaver	D	S	A,T		√			√	
120.	Orboroi/orbori	Phyllanthus acidus	Euphorbiaceae	Star Gooseberry	D	T	T						√
121.	Boro hazardana	Phyllanthus urinaria	Euphorbiaceae	Chamber Bitter	D	H	T		√			√	
122.	Topapana	Pistia stratiotes	Araceae	Water Lettuce	M	H	A					√	
123.	Debdaro	Polyalthia longifolia	Annonaceae	Mast Tree	D	T	T			√			√
124.	Piyara	Psidium guajava	Myrtaceae	Guava	D	S	T		√	√	√		√
125.	Dalim	Punica granatum	Punicaceae	Pomegranate	D	S	T		√				
126.	Madhobilota	Quisqualis indica	Combretaceae	Rangoon Creeper	D	C	T			√			
127.	Panthapad	Ravenala madagascariensis	Araceae	Panthapad	M	S	T		√				
128.	Venna/varenda	Ricinus communis	Euphorbiaceae	Castor	D	S	T		√			√	
129.	Binna ghas	Saccharum munja	Poaceae	Munja Grass	M	H	T			√		√	√
130.	Raintree	Samanea saman	Mimosaceae	Rain Tree	D	T	T	√		√		√	
131.	Choto kolkesunda	Senna sophera	Caesalpiniaceae	Pepper-leaved Senna	D	S	T					√	
132.	Berela	Sida cordifolia	Malvaceae	Flannel Weed	D	H	T					√	√
133.	Kureta	Sida acuta	Malvaceae	Broom Weed	D	S	T					√	√
134.	Kumarilota	Smilax macrophylla	Liliaceae	Kumarika	D	S	T		√				
135.	Tit begun /Foska begun	Solanum indicum	Solanaceae	Glossy Nightshade	D	H	T					√	√
136.	Kontikori	Solanum torvum	Solanaceae	Wild Eggplant, Turkey Berry,	D	S	T					√	√
137.	Jirakataful	Spilanthes calva	Asteraceae	Toothache plant	D	H	T		√			√	
138.	Amra	Spondias pinnata	Anacardiaceae	Hog Plum	D	T	T	√		√	√		
139.	Jal durba	Sporobolus tremulus	Poaceae	Poverty Grass	D	H	A					√	
140.	Mehogoni	Swietenia mahagoni	Meliaceae	Small-leaved Mahogany	D	T	T	√	√	√	√	√	√
141.	Kalojam	Syzygium cuminii	Myrtaceae	Black Berry	D	T	T	√	√	√			
142.	Tagar ful	Tabernaemontana divaricata	Apocynaceae	Wax flower	D	S	T		√				



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SL.NO	Local/Bengali Name	Scientific name	Family	English Name	Habit	Plant Type	Habitat	SG	NG	BS	CP	PG	AG
143.	Shegun	Tectona grandis	Verbenaceae	The Teak Tree	D	T	T				√		
144.	Arjun	Terminalia arjuna	Combretaceae	The Arjuna Myrobalam	D	T	T		√				
145.	Kath Badam	Terminalia catappa	Combretaceae	The Indian Almond	D	T	T		√				
146.	Thuja	Thuja occidentalis	Cupressaceae	Thuja	M	S	T		√	√			
147.	Meraghota	Trewia nudiflora	Euphorbiaceae	False White Teak	D	T	T					√	
148.	Tonaki	Tridax procumbens	Asteraceae	Coat Button	D	H	A,T					√	
149.	Baro Sim	Vicia faba	Fabaceae	Broad bean	D	C	T		√				
150.	Ghagra	Xanthium indicum	Asteraceae	Rough Cochlebur	D	S	T					√	
151.	Boroi	Zizyphus mauritiana	Rhamnaceae	Indian Plum	D	T	T		√	√	√	√	√

Site code: SG=Sashanghat; NG=Narayangonj; BS= Barishal; CP=Chandpur

Plant habit code: D=Dicotyledon; M= Monocotyledon; An=Angiosperm

Plant type: T= Tree; H= Herbs; S= Shrubs; Pt= Pteridophyte

Habitat code: T= Terrestrial; A= Aquatic





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ANNEX 3 7. WILDLIFE LIST





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SL No	Common English Name	Scientific Name	Common Bangla Name	SG	NG	BS	CP	PG	AG	habitat	Protection status (National)	Threatened Status	
												National	Global
<b>AMPHIBIA</b>													
1	Asian Common Toad	Duttaphrynus melanostictus	Kuno Bang	FC	FC	LC		C	C	Terrestrial	-----	LC	LC
2	Skipper Frog	Euphlyctis cyanophlyctis	Kotkoti Bang	LC	LC	LC		FC	LC	Aquatic	Schedule-1 Appendix-II	LC	LC
3	Indian Bullfrog	Hoplobatrachus tigerinus	Kola Bang	LC	LC	R		LC	LC	Aquatic	Schedule-1 Appendix-II	LC	LC
4	Cricket frog	Ferjavana	Sorsori bang		R			FC		Aquatic			
<b>REPTILIA</b>													
1	Wall lizard	Hemidactylus flaviviridis	Goda Tiktiki	VC	VC	C		C	VC	Terrestrial	Schedule-2	LC	NE
2	Tokay Gecko	Gekko gekko	Tokkhak	R	LC	-		LC	LC	Terrestrial	Schedule-2	LC	NE
3	Oriental Garden Lizard	Calotes versicolor	Roktochosa		LC	LC		LC	LC	Terrestrial	Schedule-2	LC	NE
4	Common Skink	Eutropis carinata	Anjon	R	R	LC		LC	LC	Terrestrial	Schedule-2	LC	LC
5	Bengal Monitor	Varanus bengalensis	Kalo Gui Shap		R	FC		LC	R	Terrestrial	Schedule-2 Appendix-I	NT	LC
	Yellow Monitor	Varanus flavescens	Holde Gui Sap			LC		R		Terrestria			
6	Indian Softshek Turtle	Nilssomia gangetica	Khalua kachhim			LC		R	LC	Aquatic	Schedule-1 Appendix-II	EN	VU





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SL No	Common English Name	Scientific Name	Common Bangla Name	SG	NG	BS	CP	PG	AG	habitat	Protection status (National)	Threatened Status	
												National	Global
7	Indian Roofed Turtle	Pangshura tecta	Kori Kaitta					R	LC	Aquatic	Schedule-1 Appendix-I	LC	LC
8	Spotted flpshell turtle	Lissemys punctata	Dhur kasim		R	LC		LC	LC	Aquatic	Schedule-1 Appendix-I	LC	LC
9	Common Whip Snake	Ahaetulla nasuta	Sutanali Shap	R				FC	LC	Terrestrial	Schedule-1	LC	NE
11	Striped Keelback	Amphiesma Stolatum	Dagi Dhora Shap		LC			FC	LC	Aquatic	Schedule-1	LC	NE
12	Checkered Keelback	Xenochrophis Piscator	Dhora Shap	LC	FC	LC		LC			Schedule-1 Appendix-III	LC	NE
13	Spectacled Cobra	Naja naja	Khoia Gokhra					R		Terrestrial	Schedule-2 Appendix-II	NT	NEI
14	Common Smooth Water Snake	Enhydris enhydris	Paina Shap	R	LC	LC		LC	R	Aquatic	Schedule-1	LC	LC
<b>AVES</b>													
1	Common Myna	Acridotheres tristis	Bhat Shalik	LC	LC	FC		FC	LC	Terrestrial	Schedule-2	LC	LC
2	Crimson Sunbird	Aethopyga siparaja	Shindury Moutushi	LC	LC	LC		LC	LC	Terrestrial	Schedule-1	LC	LC
3	Common Kingfisher	Alcedo atthis	Pati Maachranga	R	LC	LC		LC	LC	Terrestrial	Schedule-2	LC	LC
4	House Swift	Apus nipalensis	Ghor Batashi	LC				FC	FC	Terrestrial	Schedule-1	LC	LC
5	Indian Pond Heron	Ardeola grayii	Kani Bok	R	R	LC		LC	R	Terrestrial	Schedule-1	LC	LC



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SL No	Common English Name	Scientific Name	Common Bangla Name	SG	NG	BS	CP	PG	AG	habitat	Protection status (National)	Threatened Status	
												National	Global
6	Spotted Owlet	Athene brama	Khuruley Pecha	R		R		LC	LC	Terrestrial	Schedule-1 Appendix-II	LC	LC
7	Cattle Egret	Bubulcus ibis	Go-bok		R			LC		Terrestrial	Schedule-2	LC	LC
8	Oriental Magpie Robin	Copsychus saularis	Doel			R		R		Terrestrial	Schedule-2	LC	LC
9	Jungle Crow	Corvus levaillantii	Dar Kak	R	LC	FC		LC	LC	Terrestrial	-----	LC	LC
10	House Crow	Corvus splendens	Pati Kak	C	C	C		C	VC	Terrestrial	-----	LC	LC
11	Black Drongo	Dicrurus macrocercus	Kala Fingey	LC	LC			FC	LC	Terrestrial	Schedule-2	LC	LC
12	Black-rumped Flameback	Dinopium benghalense	Kaththokra	LC		OC		R		Terrestrial	Schedule-2	LC	LC
13	Little Egret	Egretta garzetta	Choto Boga	LC		R		LC	R	Terrestrial	Schedule-2	LC	LC
14	Asian koel	Eudynamis 19scolopaceus	Kala Kokil	OC	LC	R		R	LC	Terrestrial	Schedule-2	LC	LC
15	Brahminy Kite	Haliastur indus	Shonkho Chil	LC	LC	FC		LC	LC	Terrestria	Schedule-2	LC	LC
17	Green Bee-eater	Merops orientalis	Shobuj Shuichora	FC	FC	LC		FC		Terrestria	Schedule-2	LC	LC
17	Black Kite	Milvus migrans	Bhubon Chil		LC	FC		LC		Terrestria	Schedule-2	LC	LC
18	Common Tailorbird	Orthotomus sutorius	Pati Tuntuni	LC	FC	FC		FC		Terrestria	Schedule-2	LC	LC
19	House Sparrow	Passer domesticus	Chorui	VC	VC	VC		VC		Terrestria	Schedule-2	LC	LC



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SL No	Common English Name	Scientific Name	Common Bangla Name	SG	NG	BS	CP	PG	AG	habitat	Protection status (National)	Threatened Status	
												National	Global
21	Lineated Barbet	Psilopogon lineatus	Dagi Boshonto	LC	R	LC		FC		Terrestria	Schedule-1	LC	LC
22	Rose-ringed Parakeet	Psittacula krameri	Shobuj Tia	OC	R	LC		R		Terrestrial	Schedule-2	LC	LC
23	Red-vented Bulbul	Pycnonotus cafer	Bulbul	LC	FC	FC		FC	LC	Terrestrial	Schedule-2	LC	LC
24	Spotted Dove	Spilopelia chinensis	Tila Ghughu	LC	R	R		FC	LC	Terrestrial	Schedule-1	LC	LC
25	Asian Pied Starling	Sturnus contra	Gobrey Shalik	C	C	VC		VC	C	Terrestrial	Schedule-2	LC	LC
26	Little Cormorant	Microcarbo niger	Choto Pankouri	OC		--		R		Terrestrial	Schedule-2	LC	LC
27	Pigeon	Columba livia	Jalali kobutor	C	LC	FC		FC	FC	Terrestrial		LC	LC
28	Common snipe	Gillanago gillanago	Pati chaga	R	LC	FC		LC	LC	Aquatic		LC	LC
29	River tern	Sterna aurantia	Panchil		LC	FC		LC	FC	Aquatic			
<b>MAMMALS</b>													
2	Large Bandicoot Rat	Bandicota indica	Dhari Indur	LC	R	R		LC	LC	Terrestrial	Schedule-3	LC	LC
3	House Mouse	Mus musculus	Nengti Indur	C	C	FC		C	C	Terrestrial	Schedule-3	LC	LC
4	Common House Rat	Rattus rattus	Indur	C	C	C		C	VC	Terrestrial	Schedule-3	LC	LC
5	House shrew	Suncus murinus	Chika	C	FC	FC		FC	C	Terrestrial	-----	LC	LC



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SL No	Common English Name	Scientific Name	Common Bangla Name	SG	NG	BS	CP	PG	AG	habitat	Protection status (National)	Threatened Status	
												National	Global
6	Greater Short-nosed Fruit Bat	Cynopterus sphinx	Kola Badur	OC	R	FC		LC	LC	Terrestrial	Schedule-1	LC	LC
7	Indian Pipistrelle	Pipistrellus coromandra	Chamchika	LC	R	C		R	R	Terrestrial	Schedule-1	LC	LC
8	Golden Jackal	Canis aureus	Shial			--		R		Terrestrial	Schedule-1 Apendix-III	LC	LC
9	Common Mongoose	Herpestes edwardsii	Boro Beji	LC	FC	LC		FC	FC	Terrestrial	Schedule-1 Apendix-III	LC	LC
10	Gangetic dolphin	Platinista gangetica	Shushuk	OC	R	---		LC	LC	Terrestrial	Schedule-1 Apendix-I	EN	

Note:

Site code: SG= Shashanghat; NG= Narayangonj; BS= Barishal; CP= Chandpur; PG= Pangaon; AG= Ashuganj

Habitat Code: AQ = Aquatic; Tr =Terrestrial

Threatened Category: LC-Least Concern, NE-Not Evaluated, NT-Near Threatened, VU-Vulnerable, EN-Endangered, CR-Critically Endangered, DD-Data Deficient

Local status: VC=Very common; C = Common; FC= Fairly common; LC= Less common; R=Rare; R-OC= Rare and occasional





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### ANNEX 3.8 ZOOPLAKTON ANALYSIS



**Department of Zoology  
University of Dhaka**

Dhaka 1000, Bangladesh  
PABX: 880-2-9661900-73, Extn: 7580, 7581  
Fax : 880-2-9667222 (Office of the Vice-  
Email: zoology@du.ac.bd

Web : www.du.ac.bd, www.univdhaka.edu **Report on of Benthic Fauna Analysis**

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Sampling procedure : Unknown No of  
Number of Samples : 6  
Sample received on : 8 November 2019  
Sample analysed by : 25 November 2019  
Locations : River, Coastal river  
Client : KS Consultants

No.	Sample ID	Name and number of individual per species/group	No. indiv/m2 area	Comments (if any)
1	Pangaon 22.10.2019	Nais (Oiigochaeta)-7 Paranais (Oiigochaeta)- 4 Indoplanorbis (Gastropoda)-1 Planorbis (Gastropoda)-2	622	Sorted,preserved in formalin
2	Narayanganj 23.10.2019	Nais (Oiigochaeta)-5 Paranais (Oiigochaeta)- 4 Dicranota larvae (Diptera)- 7 Corbicula (Bivalvia)- 4	889	Sorted,preserved in formalin
3	Ashuganj 24.10.2019	Enchytraeus (Oiigochaeta)- 21 Brotia (Gastropoda)-2 Bellamyia (Gastropoda)- 2 Dicranota larva (Diptera)- 3 Unidentified small Gastropod- 1	1289	Sorted, preserved in formalin
4	Barisal 27.10.2019	Unidentified decomposed body parts-1	44	Presence of debris and putrified
5	Chandpur 28.10.2019	Tubifex (Oiigochaeta)- 4 Nephtys (Polychaeta)-6 Corenoneura larvae (Diptera)- 1 Juvenile shrimp (Decapoda)-1	533	Sorted,preserved in formalin
6	Shashan Ghat Undated	Nais (Oiigochaeta)-2 Dero (Oiigochaeta)- 1 Cirratulidae (Polychaeta)- 23 Bellamyia (Gastropoda)-1 Tanypus larva(Diptera)- 2 Unidentified pupa (Insecta)-1	1333	Sorted, preserved in formalin

Professor

ড. এম নিয়ামুল নাসের  
অধ্যাপক, প্রাণিবিদ্যা বিভাগ  
ঢাকা বিশ্ববিদ্যালয়



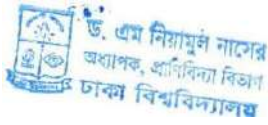


**Benthic Fauna Analysis:** The benthic sediment macrofauna were received in vials containing 10% formalin solution in our lab at the Department of Zoology. The samples were observed under stereo and compound microscope for identification and enumeration. The samples were identified up to species as far possible or to groups. The abundance of sediment fauna is expressed as no.indiv.  $1m^2$  surface area.

**Comments:** Highest number of benthic macro-benthic fauna were obtained from samples of Shashanghat, Narayanganj and Ashuganj sites, dominated by Nais, Paranae oligochaetes and Ceratullid polychaetes indicative of organic pollution. The poor abundance of benthic macrofauna in Barishal site may be an artifact of poor preservation or local sediment characteristics.



Prof. M. Niamul Naser  
Professor





Department of Zoology

University of Dhaka

Report on otzoo plankton Analysis

Sampling procedure : Unknown  
No of Number of Samples : 6

Sample received on : 8 November 2019  
Sample analysed by : 25 November 2019  
Locations : River, Coastal river  
Client : KS Consultants

Groups	Species Name	Site name / Dy:Si (N" / .P ...)					
		Shashan ghat	Narayanganj	Barishal	Chandpur	Paígaon	Ashugatj
<b>Protozoa</b>							
	<i>Centropyxis sp.</i>		0.45				0.444
	<i>Diffugia sp.</i>				0.22		
	<i>Volvox sp.</i>					7.11	
	Sub-Total	0	0.45	0	0.22	7.11	0.444
<b>Rotifera</b>							
	<i>Brachionus angularis</i>	1.33					0.444
	<i>Brachionus falcatus</i>	0.89				0.444	0.444
	<i>Brachionus quadridentatus</i>	0.89					
	<i>Filinia longiseta</i>	0.89			0.22		
	<i>Keratella tropica</i>	0.44					
	<i>Rotaria neptunio</i>		0.45				
	Unidentified	0.44	0.45				
	Sub-total	4.88	0.9	0	0.22	0.44	0.88
<b>Naupli i</b>							
	Nauplius	0.44			0.22	1.33	
	Metanauplius	0.44	0.45			0.44	
	Sub-total	0.88	0.45	0	0.22	1.77	0
<b>Copepoda</b>							
	<i>Cyclops sp.</i>					1.77	
	<i>Cyclops nanus</i>	0.44	8		0.88		2.22
	<i>Mesocyclops sp.</i>	1.33					0.44
	<i>Diaptomus sp.</i>		0.45	2			
	Sub-total	1.77	8.45	2	0.88	1.77	2.66
<b>Cladocera</b>							
	<i>Bosmina coregoni</i>	2.22	0.45	2	0.66	0.44	0.44
	<i>Diaphanosoma brachyurum</i>		1	2	0.22		1.77
	Sub-total	2.22	1.45	4	0.88	0.44	2.22
<b>Ostracoda</b>							
	<i>Heterocypris sp.</i>	0.89				0.45	
	Sub-total	0.89				0.44	
	TOTAL (Piankton/L)	10.67	12	6.22	2.66	12	6.22

M. N1amul Naser, PhD-----Signature  
Professor

Date: 25 November 2019





**Methods for Zooplankton Analysis:** Samples for zooplankton studies were collected using plankton net of 69 um mesh size. A total of 30 litres of water was passed through the net. The filtered samples (approx. 30 ml) were then transferred to plastic bottles containing 5% formalin. As with benthic sampling, water for zooplankton study were also taken from three locations within the site boundary to make a composite sample. Both zooplankton and benthic organisms were brought to the Department of Zoology, University of Dhaka for subsequent laboratory analysis. Plankton were observed under compound microscope (10x magnification). Zooplankton were identified up to species/genera and enumerated to obtain density by species and are expressed as no. of individuals/L water.

**Comments:** Presence of higher number of rotifers in samples from Sghashanghat indicate the organic load in water. The poor number of zooplankton observed in samples from Barishal could be due to regular tidal flushing of water.



M. Niamul Naser, PhD

Address

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ANNEX 4 LAND AND SOCIAL SURVEY

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ANNEX 4.1. STAKEHOLDER CONSULTATION







Affected people and other stakeholders associated with the project planning and implementation will be identified and consulted throughout the project preparation and implementation period. Both primary and secondary stakeholders will be consulted and their opinion will be sought and considered during project planning and implementation process. Local, regional and national level stakeholder consultation meetings/workshops will be held at different stages of the project execution. ESIA

Consultant has started holding consultation meetings during preparatory stage at the terminals, landing stations and vessels storm shelters.

The consultations are conducted to ensure that adequate and timely information is made available to the affected people and communities. Enough opportunities should be provided to them to express their opinions and participation in influencing the upcoming project decisions and processes. The main objective of the public consultation is to ensure timely, effective, and multi-directional communications between the project and the affected people and communities. Therefore, that people can get the benefits of the project.

#### A. IDENTIFICATION OF STAKEHOLDERS

Stakeholders are being identified during preparatory stage of the project through field reconnaissance, personal contact, document review and analysis of stakeholders involved in the project planning and implementation process.

##### i. Primary Stakeholders

Primary stakeholders include affected people, passengers, terminal users and project authority. Primary stakeholders are consulted at various stages of the project planning stage. They will also be consulted during implementation stage. Their opinions are sought through individual interview, intensive consultation meetings and group discussion and suggestions are incorporated in project planning process.

##### ii. Secondary Stakeholders

Secondary stakeholders include local government institutions, Deputy Commissioners, contractors, suppliers and sub-contractors. Secondary stakeholders will be associated with the project during implementation stage.

#### B. CATEGORIZATION OF STAKEHOLDERS

For the purposes of effective and tailored engagement, stakeholders of the proposed project(s) can be divided into the following core categories:

Affected People/entities: Persons, groups and other entities within the proposed sites for passenger/cargo terminals, landing stations and vessels storm shelters that are directly or indirectly influenced (actually or potentially) by the project and/or have been identified as most susceptible to change associated with the project, and who need to be closely engaged in identifying impacts and their significance, as well as in decision-making on mitigation and management measures;



Other Interested Parties: Individuals/groups/entities that may not experience direct impact from the Project but who consider or perceive their interests as being affected by the project and/or who could affect the project and the process of its implementation in some way; and

Vulnerable Groups: Persons who may be disproportionately impacted or further disadvantaged by the project(s) as compared with any other groups due to their vulnerable status<sup>1</sup>, and that may require special engagement efforts to ensure their equal representation in the consultation and decision-making process associated with the project.

Engagement with all identified stakeholders will help ensure the greatest possible contribution from the stakeholders toward the successful implementation of the project and will enable the project to draw on their pre-existing expertise, networks and agendas.

It will also facilitate both the community's and institutional endorsement of the project by various parties. Access to the local knowledge and experience also becomes possible through the active involvement of stakeholders.

### C. STAKEHOLDER CONSULTATION

Stakeholders consultation meetings have been held at the proposed six terminals (Sashanghat, Pangaon, Narayanganj, Ashuganj, Barishal and Chandpur) with the potential affected people, vessel owners, laborers, BIWTA local officials and passengers. Meetings were held in easy accessible places with prior notice to the people. ESIA Social Development & Resettlement Specialist and Ecologist facilitated the meetings.

BIWTA senior officials including Environmental Specialist, Social Specialist and Executive Engineer attended in some of the meetings. Project information including interventions, potential impacts and mitigation measures, role of the project authority, affected people and other stakeholders were discussed in the meetings.

A total of 393 people including 373 male and 20 female were present in the 06 meetings. They took active part in the discussion and gave opinion for betterment of the project.

The table underneath presents date, location, category and number of participants in all six meetings.

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<sup>1</sup> Vulnerable status may stem from an individual's or group's race, national, ethnic or social origin, color, gender, language, religion, political or other opinion, property, age, culture, literacy, sickness, physical or mental disability, poverty or economic disadvantage, and dependence on unique natural resources.

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### List of Consultation meetings

Date	Location	Category of participants	Number of participants	
			Male	Female
22/10/2019	Sashanghat	Businessmen, Ward Councillor, Teacher, Service holder, BIWTA officials, Student, Wage Labour	52	08
22/10/2019	Pangaon	Businessmen, UP Member, Teacher, BIWTA officials, Boatman, Wage Labour	53	04
23/10/2019	Narayanganj	Businessmen, Cargo/ Launch owner, BIWTA local officials, Boatman, DEPTC instructor and trainees, Student, Wage Labour.	63	00
24/10/2019	Ashuganj	Businessmen, Doctor, Cargo owner, BIWTA local officials, Boatman, Truck owner, Wage Labour.	60	00
27/10/2019	Barishal	Businessmen, Councilor, Service holders, BIWTA local officials, Wage Labour, Boatman.	78	06
29/10/2019	Chandpur	Mayor, Councilor, Auto-Rickshaw Driver, Businessmen, Service holders, BIWTA local officials, Wage Labour, Boatman, Student, Labour leader, Rickshaw puller, Expatriate.	67	02
Total	06		373	20

#### i. Major Issues Discussed in the Meetings

In the consultation meetings potential affected people and other stakeholders took active part in the discussion. The ESIA consultants and BIWTA officials disseminated project information including potential environmental and social impacts and necessary mitigation measures. Among other following major issues were discussed in the meetings-

- Project background and importance
- Land acquisition requirements for each of the terminal locations
- Potential impacts on the passengers, local people and terminal users during construction phase of the project
- Process of land acquisition as per Acquisition and Requisition of Immovable Property Act, 2017 (ARIPA 2017)
- Compensation payment mechanism by DC office as per ARIPA 2017



- Process of assessing replacement cost for land and other affected properties as per World Banks Environmental and Social Framework (ESF) and good practices of other development projects
- Compensation and resettlement benefits for the structures and business on the GOB land
- Other entitlements for the potential affected people (businessmen, wage laborers, vulnerable people)
- Potential impacts on environment and ecology due to the project and necessary mitigation measures to be taken
- Benefits of the project after successful implementation
- Gender issues including gender-based violence
- Gender related facilities for the women, elderly and disabled people in the terminals and vessels
  - a. Separate toilet for male and female
  - b. Toilet with facilities for physically challenged people
  - c. Enough lighting and visible location for female toilet considering security and safety
  - d. Water supply and useable condition must be ensured by proper maintenance
  - e. Breast feeding corner
  - f. Separate prayer space with required facilities
- Discrimination of wages for male and female laborers/workers
- Grievance Redress Mechanism for affected people and construction workers
- Relocation requirement of the potential displaced businessmen

## ii. People's Concerns and Responses

During consultation meetings all level stakeholders were briefed about the project interventions, components, potential impacts and mitigation measures. Different issues were discussed in different locations.

People raised various pertinent issues relating to land acquisition, compensation and resettlement benefits, relocation and livelihood restoration and employment opportunity during construction and operation phase, equal facilities for male and female in the terminals and vessels.

ESIA consultants responded to all questions and therefore, affected people and other stakeholders by location were well aware of the project. Issues raised by the participants by location and responses of the consultants are furnished below-



Consultation meeting at Sashanghat

Location	Issues raised by the people	Responses of the consultants
<p>Sashanghat (This location is on the BIWTA, Dhaka South City Corporation and Bangladesh Railway land)</p>	<ul style="list-style-type: none"> <li>■ Compensation for the structures and business demolished by BIWTA couple of weeks ago</li> <li>■ Search alternative location for the terminal since Sashanghat is closed to the residential area, Bangladesh Army camp and Postogola Bridge</li> <li>■ People took land lease from Bangladesh Railway for business. Whether they will be paid compensation for their losses</li> <li>■ Need access to the river from cremation ground for sacrificing Gods (Murti) of Hindu Community and ashes of burnt dead body</li> <li>■ Women and disabled would have all facilities in the improved terminals and vessels</li> <li>■ Adequate compensation and benefits for the affected people is to be paid</li> <li>■ Second largest ship breaking yard is located at Sashanghat where thousands of people are involved. How their livelihood will be restored</li> <li>■ Access road to the Shahanghat is very narrow. How the access to the improved Terminal will be developed</li> </ul>	<ul style="list-style-type: none"> <li>■ Structures were demolished to clear river bank as per decision of the government. So, compensation for those structures and business will not be paid under this project.</li> <li>■ This site has been selected based on feasibility study. Issue will be conveyed to the BIWTA. They can further review feasibility report.</li> <li>■ Compensation will be paid for lost assets and business irrespective of title to the land</li> <li>■ Project will keep access to the river for the Hindu Community for sacrificing Gods (Murti) and ashes</li> <li>■ Project will provide required facilities to women and disabled in the terminals and vessels</li> <li>■ Adequate compensation will be paid for lost assets</li> <li>■ This project will take care of the people will be affected by this project by losing assets and livelihood.</li> <li>■ GOB is planning to implement Subway project connecting the Sashanghat. Other access roads will also be developed to facilitate the improved terminal.</li> </ul>
		





Consultation meetings at Pangaon

Location	Issues raised by the people	Responses of the consultants
<p>Pangaon (Located on BIWTA land but private acquisition will require)</p>	<ul style="list-style-type: none"> <li>▪ Avoid private land acquisition if possible. In case of urgency please acquire plain land and avoid residential area.</li> <li>▪ Pay adequate compensation for land, if acquired</li> <li>▪ Plan the terminal facilities including construction of a good mosque</li> <li>▪ People go to Pagla (business hub) by crossing the river for their daily needs. Construct a separate pontoon and stair for the river crossing people</li> <li>▪ Pontoon with passenger shed for the river crossing boat would be constructed in safe distance from the cargo terminals</li> </ul>  <p style="font-size: small;">consultation meeting at pangaon, date: 22~10~2019</p>	<ul style="list-style-type: none"> <li>▪ Project will try to avoid private land acquisition and displacement.</li> <li>▪ In case of urgency to acquire, compensation will be paid at replacement cost.</li> <li>▪ A new mosque will be constructed within the territory of the terminal by the project</li> <li>▪ River crossing boat operation will be uninterrupted. Stair and other facilities will be provided as per policy of the project.</li> <li>▪ This issue will be discussed with the BIWTA Management. Hopefully a pontoon and passenger shed will be for the passenger will be constructed.</li> </ul>  <p style="font-size: small;">consultation meeting at pangaon, date: 22~10~2019</p>





### Consultation meetings at Narayanganj

Location of consultation meetings	Issues raised by the people	Responses of the consultants
<p>Narayanganj (The proposed terminal will be on BIWTA land)</p>	<ul style="list-style-type: none"> <li>▪ Avoid private land acquisition</li> <li>▪ Displaced shops would be paid compensation</li> <li>▪ A space for relocation of the shop keepers within the terminal or outside the terminal</li> <li>▪ Drainage system would be uninterrupted</li> <li>▪ River crossing boats along with separate pontoon and stairs would be in safe distance</li> <li>▪ Employment opportunity of the affected people in the project construction and operation phase</li> <li>▪ Primary treatment facilities for the terminal users would be available with at least 10 beds</li> <li>▪ Necessary facilities for the women and disabled passenger including separate toilet, prayer hall, breast feeding corner, etc. in the terminal and vessels</li> </ul>	<ul style="list-style-type: none"> <li>▪ Private land will not be acquired to improve Narayanganj Passenger terminal</li> <li>▪ Affected shop owners will be paid compensation following the World Bank Environmental and Social Framework (ESF)</li> <li>▪ This issue will be discussed with the PIU of BRWTP-1 to consider relocation of the shops to facilitate businessmen and passenger</li> <li>▪ Drainage system will be developed to avoid water logging</li> <li>▪ This will be in the design to keep the pontoon and stair for the river coring boats and passenger in sage distance.</li> <li>▪ Local people particularly affected vulnerable people will be preferentially employed in the civil construction</li> <li>▪ A developed medical facility including Doctor and medicine will be in the terminal</li> <li>▪ Women and disabled will have special facilities including ramp, breast feeding corner, separate toilet, prayer hall, sufficient lighting in the corner space of vessels and terminals.</li> </ul>
	 <p style="font-size: small; text-align: center;">consultation meeting at narayanganj date 23-10-2019</p>	





Consultation meetings at Ashuganj

Location of consultation meetings	Issues raised by the people	Responses of the consultants
Ashuganj	<ul style="list-style-type: none"> <li>▪ Instead of the existing terminal choose free space, preferably RHD land (28 Acre free land) nearer to the Petro Bangla in the down stair, to avoid mass displacement of shops huge compensation</li> <li>▪ Resettlement of the shops will be required since it is a resettlement site of the Bhairab Bridge Project provided by RHD</li> <li>▪ Need access to the river since business here is fully dependent on the river</li> <li>▪ Around 50 river-crossing boats are operated here where about 300 families are dependent on it. Needs separate space along with pontoon and stair for easy access to the boat</li> </ul>	<ul style="list-style-type: none"> <li>▪ The project has prioritized improvement of existing terminal in the first phase and new terminal in the second phase at the downstream at any suitable location. If RHD land is available, BIWTA will try to get through inter-ministerial transfer rather to acquire mass private land.</li> <li>▪ BIWTA will consider the issue and further discuss with the affected people regarding relocation and livelihood restoration.</li> <li>▪ The project (BRWTP) will require river side for terminal and other installations. Nevertheless, necessity of access to the river by the local businessmen will be taken into account</li> <li>▪ If the boat ghat requires displacement due to the project interventions, necessary facilities will be provided including stair.</li> </ul>
 <p>consultation meeting at ashuganj, date:24~10~2019</p>		 <p>consultation meeting at ashuganj, date:24~10~2019</p>







Consultation meetings at Barishal

Location of consultation meetings	Issues raised by the people	Responses of the consultants
<p>Barishal (Total land is owned by BIWTA)</p>	<ul style="list-style-type: none"> <li>▪ Avoid private land acquisition</li> <li>▪ There are about 500 shops at the vegetable market and City Market in BIWTA land those require relocation in suitable place.</li> <li>▪ Want relocation even instead of compensation for structure and business</li> <li>▪ Discuss with Honorable Minister and Mayor before finalization of design and relocation plan</li> <li>▪ Separate location for the river crossing boat and speed boat with independent pontoon and stair</li> </ul>	<ul style="list-style-type: none"> <li>▪ Private land will not be acquired for development of terminal</li> <li>▪ The project authority will be briefed about the requirement. Relocation plan will be adopted in consultation with affected people.</li> <li>▪ Compensation will be paid for the lost assets as per GOB laws and World Bank policy. Relocation issue is quite different and will be mitigated separately.</li> <li>▪ The Hon'ble Minister and Mayor of Barishal City Corporation are well known about the project. They will obviously be consulted before finalization of the design and relocation plan</li> <li>▪ Project will provide separate pontoon and stair for the river coring boats and passenger in sage distance.</li> </ul>
		



Consultation meetings at Chandpur

Location of consultation meetings	Issues raised by the people	Responses of the consultants
<p>Chandpur (land is owned by BIWTA and Bangladesh Railway. Private land acquisition may be required)</p>	<ul style="list-style-type: none"> <li>▪ Avoid private land acquisition</li> <li>▪ Compensation for the structure and business on GOB land</li> <li>▪ People living on the Bangladesh Railway land want to have compensation and relocation</li> <li>▪ Environmental issues are to be carefully taken care of</li> <li>▪ Approach road will need to be developed along with terminal to enjoy better facility. Suggested to construct approach road from terminal to Bus stand alongside the river</li> </ul>	<ul style="list-style-type: none"> <li>▪ Private land acquisition may be required for improvement of the terminals. If it is, then replacement cost for land will be paid.</li> <li>▪ Compensation and resettlement benefits for the structures on the GOB land will be paid following World Bank policies and good practices of other projects</li> <li>▪ Compensation will be paid for lost assets irrespective of title to the land. Relocation issues will be discussion with the project authority</li> <li>▪ Environmental Management Plan will be prepared and compliance issues will be strictly monitored</li> <li>▪ Project will consider necessity of approach road for including alignment route and make decision accordingly</li> </ul>
		

iii. Gender Issues discussed during Stakeholder Consultation Meeting

Begum Shamsun Nahar, Gender Expert, KS Consultants, attended the Stakeholder Consultation Meetings. At first, she welcomed the participants. Then she asked them regarding women’s need while they travel by in land water transport and boats. She said that while traveling by river transport, women have some needs which are not available at this moment. If there are some facilities those are not adequate.

Women are facing security problems due to gender-based violence. During the construction of new terminal most of those problems could be solved if we give attention to those issues. To reduce the gender-based violence gender specific facilities have to be built with acceptable design. She stated that national and international policies support gender equality and



Bangladesh government declared “National Women Development Policy 2011” towards women empowerment. Bangladesh government also ratified the “Convention on Elimination of All Forms of Discrimination against Women (CEDAW)” as well as following “Sustainable Development Goals (SDGs)”.

Then she addressed gender issues including gender-based violence (GBV) more specifically and detailed gender specific facilities. She has given emphasis on gender related facilities for the women in general, pregnant women, breast feeding mother, elderly and disabled people who will be in the waiting place or working in the terminals and vessels shelter:

- Separate toilets for male and female passengers as well as laborers
- Separate toilets with facilities for physically challenged people
- Enough lighting and visible location for female toilet considering security and safety
- Water supply and useable condition must be ensured by proper maintenance
- Space for Breast feeding mother and pregnant women
- Separate prayer space for female with required facilities
- No discrimination of wages for male and female laborers/workers for similar work
- Grievance Redress Mechanism for affected people and construction workers including women who are affected for this work

#### D. MAJOR FINDINGS OF THE CONSULTATION MEETINGS

During consultation meetings the ESIA consultant found out some important social issues that need to be addressed for better implementation of the project. Participants of the meetings from various cross sections raised these issues and sought mitigation measures for their interest. Site specific findings are as under-

##### i. Sashanghat

Required land for improvement of Sashanghat Passenger terminal is owned by BIWTA, Dhaka South City Corporation and Bangladesh Railway. To provide maximum facility to the passengers this site has been selected within around 2km from Sadarghat terminal. But there are some issues that raised by the people those need to be considered.

- Bangladesh Railway had leased out land to the businessmen for running their business. Ship braking and scrap business are being done.
- An ancient Mazar is located within or very close to the boundary of the proposed site (Demarcation is not done).
- The Cremation Ground of Hindu community is very close to the site and they want access to the river for sacrificing their Gods (Murti) and ashes of the burnt dead body.
- It is also very nearer to the residential area, Army Camp and two schools (Riverview School and College and Faridabad High School)
- Access road to this location is narrow
- People urged to change the location to downstream after Postogola Bridge

##### ii. Pangaon

Pangaon Cargo terminal requires some private land acquisition since BIWTA land is found insufficient. Local people urged to avoid private land acquisition since they gave their most of



the land for container terminal close to proposed Pangaon terminal. If land acquisition is unavoidable, they requested to acquire plain land which is now being used as fish pond and avoid their residence. Thousands of people cross the river by boat at this point to go to Pagla for their daily needs. There is no passenger shed for the river-crossing people. They want a shed and stair in the safe zone for their uninterrupted river crossing.

### iii. Narayanganj

The existing terminal is located on the BIWTA land. Private land acquisition will not be required for improvement of the terminal. There are shops in the terminal area those will require displacement. The terminal is close to Bus stand and railway station and therefore remarkable number of passengers use this terminal. Thousands of people cross the river by small boat to go other side of the city. The boat ghat is very close to the vessel terminal that causes accident, injuries and even death. Relocation of the shops within or outside the new terminal building and construction of the separate river-crossing boat ghat with necessary facilities are urged by the people.

### iv. Ashuganj

The existing cargo terminal is located at the upstream of the river and close to the resettlement site of the commercial enterprises provided by Roads and Highways Department during Bhairab Bridge Construction.

According to the discussion with the potential affected people and other stakeholders the following issues have been found important to consider-

- If the terminal is expanded /improved here and required more land then further relocation of these shops will be required. After physical demarcation of the site, actual number of affected shops will be identified.
- Private land acquisition may be required for the improvement of existing site.
- There is no free space at the existing site and land is used commercially. More than 300 shops are in within or close to the proposed site.
- Price of land at this location is so high (around 10 Million BDT per decimal).
- People are agreed to give their space for the project if they are relocated with all civic amenities including internal road, access to the river and main road, truck stand for about 400 trucks, etc.
- Relocation of the shops will require private land acquisition in the same vicinity
- Ships will need to cross two bridges (Rail and Road Bridge) to come to the existing site which may cause incident as like as Third Buriganga Bridge incident.
- Considering the high value of land, relocation requirement of business in new site, compensation payment, dismantling of established developed area, etc. they suggested the following issues which may be considered for further review and decision.
- Select alternative site at the downstream (around one km from the existing site) nearer to Petro Bangla where about 28 acres of RHD land is available.
- That large piece of land has around 500 feet river front and completely free from encumbrances.



- Acquisition of additional 5-6 acres of private land at the river side will make it more than 33 acres for installation of all required facilities of the modern terminal and give very suitable shape with around 1,000 feet river front
- A four-lane road is under construction with an access to this area.
- The location is in between Silo and Petro Bangla and close to proposed ICT site.
- Land value in this area is approximately BDT 1.20 million per decimal which is much lower than that of existing site.
- RHD land can be taken through inter-ministerial transfer.

Considering the scenario people urged to select this land for new terminal for development of new site rather to do further development in the already developed area. This will require minimum project implementation cost and avoid displacement of huge numbers of shops.

#### v. Barishal

This site is on the BIWTA land and further private land acquisition is not required. Three major issues are to be taken care of during planning of the project design. (i) A vegetable market called Kheya Ghat Market contains around 180 small shops (ii) A big garments market called City Market containing more than 300 shops is located on around 2.15 acres land of BIWTA. These are semi pucca (tin shed with brick wall) structure with sufficient space in between rows of the shops. (iii) A wholesale vegetable market is operated in the morning (until 10 am) at the river side (in between City market and River) where there are around 75 whole sale depot from where retailers of nearby districts purchase vegetables.

Relocation of these three business spots will be necessary for proper implementation of the project. Potentially affected businessmen urged for relocation even instead of compensation for their lost assets. Mayor of Barishal City Corporation is well aware of the issue and people suggested to consult him for proper relocation planning.

#### vi. Chandpur

This site is located on BIWTA and Bangladesh Railway (BR) land. Development of the terminal will require private land acquisition and use of BR land. Some shops and houses along with one River Police camp will need to be displaced. Access road to the terminal is very narrow, therefore people urged to construct a new approach road connecting terminal and bus stand.

### E. STAKEHOLDER ENGAGEMENT PLAN

Stakeholder's engagement and communication is an important tool for ensuring transparency, accountability and effectiveness of development projects. Various levels of stakeholders will be engaged at different stages of the project planning and implementation.

The purpose of the Stakeholder Engagement Plan is to detail how Stakeholder Engagement will be practiced throughout the course of the project and which methods will be used as part of the process; as well as to outline the responsible parties in the implementation of Stakeholder Engagement activities. Timely and two-way information sharing, and communication can help to mobilize and maintain stakeholder support for the project and advance the overall project goals.

Affected people, influential personalities and local government representatives are the main stakeholders who will be consulted throughout the project planning and implementation stage.



They are engaged in the project through various committees including grievance redress committee and physical relocation assistance committee.

#### i. Stakeholder Engagement During Preparatory Stage

Stakeholders are engaged in the project planning process through consultation and disclosure meetings at the community level.

All of the project information including background, objective, design, land acquisition requirement, project interventions, timeline, executing agency and their responsibility, role of the affected people and other stakeholders, compensation assessment and payment procedures, relocation requirements, etc. are disseminated to the community level stakeholder at the initial stage of the project planning to make them aware of the project.

The affected people will be individually consulted during conducting census & socioeconomic survey and inventory of losses survey. They will again be consulted in focus group discussion to ensure their participation in the project planning particularly in social, land acquisition, resettlement and environmental issues.

#### ii. Stakeholder Engagement During Implementation Stage

Stakeholders will be engaged in the project implementation activities through various committees including grievance redress committee (GRC) and physical relocation assistance committee (PRAC).

Affected people, local government representatives, teacher, influential personalities, etc. will be directly involved in the project through the committees. People will produce grievances on any social and environmental issues to the GRC where local government representative will play role to resolve the grievance as a member of the GRC. Stakeholders from the local people as nominated by the Mayor of Municipality or Chairman of Union Parishad will play vital role as a member of PRAC in case of physical relocation of the displaced people. Apart from this, people will take part in the valuation process of affected properties.

The property assessment and valuation committee (PAVC) will consult five categories of people such as potential seller, potential buyer, religious leader, teacher and deed writer to ascertain current market price of the affected land.

The local government representative will also be involved in compensation payment process to recognize the entitled person as citizen of his /her Union/Municipality. Such involvement will be required during payment of cash compensation under law (CCL) by DC offices and additional compensation/resettlement benefit by the BIWTA. Local people can also put comments/observation/complaints on the quality of civil work as responsible member of the society.



Environmental and Social Impact Assessment of proposed new and up-  
gradation of Cargo and Passenger River Terminals. BRWTP-S6  
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT



ANNEX 4.2.. SOCIAL SCREENING, CENSUS AND SOCIOECONOMIC SURVEY





BANGLADESH REGIONAL WATERWAY TRANSPORT PROJECT-1(BRWTP-1), BIWTA

Socio-Economic Survey (SES) Form

Census Form No.			
SES Form No.			

1. Sub-Project/Location Name : .....

Code :		
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2. Name of the Respondent (as NID): .....

6. Father/Husband's Name of Respondent: .....

7. Mother's Name of Respondent: .....

3. Sex of Respondent: 1= Male, 2 = Female, 3 = Common (Transgender)

4. Name of the Household Head (as NID): .....

5. Sex of Household Head: 1= Male, 2 = Female, 3 = Common (Transgender)

8. National ID of Household Head: .....

9. Phone No. of the Respondent: .....

10. Address:

A. Village.....B. Ward No.: .....

C. Union/ Municipality.....D. Upazila..... E. District.....

11. Ethnicity & Religion

A. Ethnicity: 1. Bengali 2. Adibashi/Indigenous

B. Religion: 1. Muslim 2. Hinduism 3. Christian 4. Buddhist 5. Others (Specify)

**Type of Family: 1. Nuclear 2. Joint 3. Extended**



7. Work : 1=yes, 2=No

8-9.Occupation: 1. Service (Private/Government/NGO), 2. Business, 3 Day Labor, 4. Fisherman/ Fish culture, 5.Boatman, 6.Driver, 7.Carpenter, 8.Mason, 9 Electrician/mechanics, 10.Housewife, 11.Unemployed, 12.Student, 13. Old 14 Others, 15. Professional, 16. Retired

10. Reasons for not working: 1=No work, 2=unemployment for seasonality, 3= Family responsibility, 4=Old, 5=disability, 6= Student

12. Disability: 0= without disability or chronic illness, 1=disabled (including the following disabilities: physical, deaf, dumb and blind),

2= chronic illness, (an illness that the household member has had for at least the last three months) , 3=Both, 4= mental disorder

13: HOUSEHOLD LAND OWNERSHIP

Sl. No.	QUESTION	RESPONSE	NOTES	Men/Women's ownership status (Only men, only women, both)
1.	How much homestead land does your Household own?		If no land write 0. Otherwise, write size of the land in decimals.	
2.	How much cultivable land does your Household own?			
3.	How much water bodies does your Household have?			
4.	How much Khas Land does your Household have?			
5.	How much GOB Land does your Household have? (Mention Agency)			

Code: Men=1, Women=2, Both Men & Women=3

14: HOUSING, WATER, SANITATION & ELECTRICITY ACCESS AND STRUCTURE PATTERN

	QUESTION	RESPON	CODES
1.	What is the length of your house ?( in feet)		
2..	What is the width of your house? ( in feet)		
3.	Who owns the house you live in?		1=own, 2=rent, 3=father 4= Mother 4=father-in-law, 5. Mother in law 6. Son 7. daughter 5=Live rent free with family member, 6 = Live rent free with non-family member, 7=Own house on khas land, 8=Someone else's land, 10=other (specify)
4.	What is the main construction material of your wall?		1 = Grass/ straw/ jute stick/ kashia/ khar/ leaves/ plastic, 2 = Bamboo, 3 = Mud, 4 = Tiles, 5 = Tin/Cl Sheets, 6 = Cement/brick, 7 = Other (specify)
5.	What is the main construction material of your roof?		
6..	What is the main construction material of your floor?		
7	Overall Type of residential structure		1= Pucca 2= Semipucca 3 = Tin-Made 4=. Katcha
8.	What is your Household's main source of drinking water?		1 = Pipe/supply, 2 = Hand tube well, 3=Shallow TW, 4 = Deep TW, 5 = Open well, 6= Spring water 7 = Pond/river/canal, 8 = Rain harvesting, purchased water, 9= Bottled water, 10= Other (specify)
9.	If Household uses a tube well as its main drinking source: who owns this tube well?		1 = tube well owned by this Household, 2 = shared ownership, 3 = tube well owned by others, 4 = not applicable, 5= other (specify), 6=Govt.
10	What is your Household's main source of domestic water?		1 = Pipe/supply, 2 = Hand tube well, 3=Shallow TW, 4 = Deep TW, 5 = Open well, 6= Spring water 7 = Pond/river/canal, 8 = Rain harvesting, purchased water, 9= Bottled water, 10= Other (specify)
11.	What type of electricity supply or connection do you have?		0 = no electricity, 1 = connected to main line, 2 = connection from another house, 3 = connected to generator, 4 = solar power, 5=other (specify)
12	Do you have own latrine?		1=Yes, 2=No
13.	Where do the Household Members usually defecate?		0 = open spaces, 1 = hanging latrine, 2 = pit latrine, 3 = ring/slab latrine, 4 = concrete/ complete sanitary latrine, 5 = other (specify)

14.	What does the Household generally cook with?		1 = dung, 2 = wood/jute stick/straw/grass/paddy husk/leaf, 3 = charcoal, 4 = coal, 5 = pit, , 6 = kerosene, 7 = pipe or bottled gas, 8 = electric cooker/heater, 9 = Others (specify)
15	Total area of commercial structure		(...sft)
16	Type of commercial structure		1= Pucca 2= Semipucca 3 = Tin-made 4=. Katcha

15. HOUSEHOLD ASSETS

Sl. No.	Asset Type	Quantity (No.)	Asset Worth in Taka
1	Table		
2	Chair		
3	Almirah/Weredrob		
4	Radio		
5	Bicycle		
6	Television		
7	L.P.G connection/ Gas cylinder		
8	Computer		
9	Refrigerator		
10	Washing machine		
11	Motor cycle/Scooter/Auto rickshaw		
12	Car		
13	Rickshaw/Van		
14	Power tiller		
15	Boat/trawler		
16	Phone/mobile		
17	Solar panels		
18	Cow/bullock		
19	Poultry		
20	Buffalo		
21	Goat		
22	Sheep		
23	Duck		
24	Pig		
25	Others (Specify)		

16. Average monthly income of the Household (Tk.): .....

17. Monthly Income of the Household by Sector

Sl	Activity	No. of Earning Member	Monthly Income (Taka)
1	Agriculture		
2	Service		
3	Business		
4	Labor		
5	Cattle sale		
6	Duck, hen sale		
7	Fruit of garden/orchard		
8	Share Market		
9	FDR/Sonchay Pattra/Bank		
10	Cash Saving in House		
11	Fishery (fish/shrimp farming)		
12	Professional practices		
13	Foreign remittance		
14	Other		
	Total		

18. Average Monthly Expenditure of the Household (Tk.): .....

19. Consumption Pattern

Kindly indicate the consumption/expenditure on different items in the previous month by sector.

Sl. No.	Head of Expenditure	Monthly Expenditure (Tk.)
1	Food	
2	Transportation	
3	Communication	
4	Clothing	
5	Health	
6	Education	
7	House rent	
8	Loan Refund	
9	Social functions	
10	Agriculture inputs (such as seeds, hiring of farmhands)	
11	Consumption of fuel for Household	
12	Fuel/ Electric Bill	
13	Others Specify	
	Total (1-13)	

20. Transportation and Mobility

20.1. Is your house directly connected to a road?

1. Yes 2. No

1.1 If Yes, to which road?

1. Village Road 2. Union Road 3. Upazial Road 5. Zila road 4. National Highway

1.2 How is the condition of the connecting road?

1. Good 2. Average 3. Poor 4. Very Poor

20.1 What types of transportation do you usually use for local travelling?

1. Bus, 2. Train, 3. Rickshaw/Van 4. Launch/Boat 5. Tempo 6. Car, 7. Bicycle 8. Motor cycle 9. CNG/Three wheeler, 10. others (please specify)

20.2. Distance of work place/ business center

1. How far away of your work place (service or business center)?

Sl. No.	Nature of work	Within 1 km	1-3 km away	3-5 km away	More than 5 km away
1	Service/ Job place				
2	Business centre				



2. How do you go there? (Put round mark in appropriate means of transport)

1. Bus 2. Launch/Boat 3. CNG/Tempo 4. Rickshaw/Van 5. On foot 6. Train (7) Car (8) Other (Specify .....

20.3. What types of transportation do you usually use for long travelling?

1. Bus 2. Train 3. Car 4. Micro bus 5. Launch 6. Motor cycle 7. CNG 8. Truck 9. Other (Specify.....)

1. Do you travel regularly?

- a. Yes b. No

If yes then, how frequently you use transport?

- Daily  
Weekly  
Bi monthly  
Monthly

2. For what purpose you use transport?

1. Business  
2. Employment  
3. Visit relative house  
4. Recreation

3. If the Terminal/Landing Station/Vessels Storm Shelter is constructed, then what will be the potentials impacts on your life and livelihood (multiple response)

1. Reduced time  
2. Reduced hassles  
3. Reduced harassment  
4. Reduced traffic Jam  
5. Reduce transport cost  
6. Availing public services easily  
7. Increased investment  
8. Increased employment  
9. Increased income  
10. Increased access to market  
11. Sell of produced equitable  
12. Increased mobility, including women  
13. Increased access to education  
14. Reduce Environmental Hazard  
15. Other

4. Educational Institutions

4.1 How far the educational institutions are?

Sl. #	Name of Institution	Within 1 km	1-3 km	3-5 km	More than 5 km
0	1	2	3	4	5
1	University				
2	College				
3	Secondary School				
4	Primary School				
5	Non-formal primary school				
6	Moktob (Basic Islamic school)				

4.2. How do your son go there? (Put v in the box)

1. Bus      2. Launch/Boat      3. CNG/Tempo      4. Rickshaw/Van      5. On foot 6. Train

4.3. How do your daughter go there? (Put v in the box)

2. Bus      2. Launch/Boat      3. CNG/Tempo      4. Rickshaw/Van      5. On foot 6. Train

21. Livelihood

1. Is there any scope profitable work in this area? (multiple)

1. Agriculture 2. Motor mechanics 3. Livestock 4. Rickshaw /van5. Fisheries 6. Horticulture 7. Small business 8. Poultry rearing 9. Others (Please mention)

2. What are the Major income generating work for women? (multiple)

1. Agriculture 2. Motor mechanics 3. Livestock 4. Rickshaw /van5. Fisheries 6. Horticulture 7. Small business 8. Poultry rearing 9. Others (Please mention)

3. What are the Major income generating work for men? (multiple)

1. Agriculture 2. Motor mechanics 3. Livestock 4. Rickshaw /van5. Fisheries 6. Horticulture 7. Small business 8. Poultry rearing 9. Others (Please mention)

4. Economic Activity of Households

What are the economic activities of the Household? (Please tick all that apply).

Sl. No.	Type of Activities	Main	Allied/secondary
1	Agriculture		
2	Share cropping		
3	Working for other farmers		
4	Agriculture day labor		
5	Non-agriculture day labor		
6	Rickshaw/van puller		
7	Motor driver		
8	Mason		
9	Carpenter		
10	Mechanics/electrician		
11	Fishing		
12	Teacher		
13	Business/shop keeping		
14	Service for Government and NGO		
15	Foreign Remittent		
16	Allied activities (dairy, poultry, sheep rearing, etc.)		
17	Trade and business		
18	Handicrafts/sewing		
19	Others		

## 22. Gender Issues

### 1. Women's Participation in Social Activities

- Were you consulted in collective decisions process of your area? Did you participate?

Yes, always= 1, Yes, sometimes =2 , No never=3

- Do you participate in collective decision making process of your area?

Yes, always= 1, Yes, sometimes =2 , No never=3

- Does your decision receive importance?

Yes, always= 1, Yes, sometimes =2 , No never=3

- Do you get social and legal justice easily?

Yes, always= 1, Yes, sometimes with conditions=2 , No never=3

- Women's participation in family decision making process

Yes, always= 1, Yes, sometimes =2 , No never=3

### 2. Women's participation in household decision making process

- Food, cloth and household items related expenditure: Yes, always= 1, Yes, sometimes =2 , No never=3

- Education related expenditure particularly for daughters: Yes, always= 1, Yes, sometimes =2 , No never=3

- Wedding of children related expenditure: Yes, always= 1, Yes, sometimes =2 , No never=3

- Importance to consent of the bride during wedding: Yes, always= 1, Yes, sometimes =2 , No never=3

- Important buy and sale: Yes, always= 1, Yes, sometimes =2 , No never=3

- Receive treatment in the hospital: Yes, always= 1, Yes, sometimes =2 , No never=3

- Going to the bazar for shopping: Yes, always= 1, Yes, sometimes =2 , No never=3

- Going to relatives/parents house for holidays: Yes, always= 1, Yes, sometimes =2 , No never=3

- Contraceptive related: Yes, always= 1, Yes, sometimes =2 , No never=3

- Social decision making: Yes, always= 1, Yes, sometimes =2 , No never=3

- Right to vote: Yes, always= 1, Yes, sometimes =2 , No never=3

- Participation in the election: Yes, always= 1, Yes, sometimes =2 , No never=3

3. Gender Based Violence

Any type of gender based violence you noticed in last one year in your area? (Multiple Answer)

1. Sexual Violence 2. Physical Assault 3. Eve Teasing 4. Acid attack 5. Child abuse 6. Others  
(Specify.....)

23. HEALTH ISSUES

23.1 HIV AIDES

A. Are you aware of HIV AIDES? Yes= 1, No =2

B. Do you know how does it spread? Yes= 1, No =2

<b>C</b>		<b>Awareness on STIs/STDs/HIV/AIDS</b>			
<b>1</b>	<b>Have you ever heard about any STIs/STDs?</b>	1	Yes	2	No
<b>2</b>	<b>Have you ever heard about HIV/AIDS?</b>	1	Yes	2	No
<b>D</b>		<b>Yes</b>		<b>No</b>	
<b>1</b>	<b>What are the sources of your hearing about STI/STDs/HIV/AIDS? (Multiple choice question)</b>				
1	Media (Radio/Television/Newspaper)	1		2	
2	Friends	1		2	
3	NGO	1		2	
4	Medical professionals	1		2	
5	Traditional healers (like Kabiraj)	1		2	
6	Educational institutions	1		2	
7	Other (specify)	1		2	

<b>D.1</b>	<b>Do you know about any organization that deals with STI/HIV/AIDS in your locality?</b>	1	Yes	2	No
<b>D.2</b>	<b>What is the name of that organization?</b>				
<b>D.3</b>	<b>Do you know how the STI/ HIV/AIDS spread out and can be prevented? (Give your opinion)</b>	<b>Yes</b>	<b>No</b>	<b>Don't know</b>	
1	Unprotected sex with an STI infected person can cause STIs/STDs	1	2	3	
2	Having sex with commercial sex workers increase the likelihood of getting infected with an STI	1	2	3	
3	Having sex with multiple partners is one of causes of STIs/STDs.	1	2	3	
4	Are STDs (Gonorrhea, Syphilis, etc.) preventable	1	2	3	
5	Use of condom during sexual intercourse can reduce the likelihood of getting infected with STIs	1	2	3	

23.2 If the Terminal/Landing stations are developed/Vessels Storm Shelters are constructed, then do you think the HIV/AIDS or STD will be increased? 1= Yes 2=No

If Yes then why?

1. Influx of outsiders
  2. Influx of foreigner
  3. Opportunity of local people to engage with outsider
  4. others
24. Human Trafficking

<b>A</b>	<b>Have you ever heard about human trafficking?</b>	1	Yes	2	No
<b>B</b>	<b>What are the sources of your hearing about human trafficking (Multiple choice question)</b>	Yes		No	
1	Media (Radio/Television/Newspaper)	1		2	
2	Friends	1		2	
3	NGO	1		2	
4	Medical professionals	1		2	
5	Traditional healers (like Kabiraj)	1		2	
6	Educational institutions	1		2	
7	Other (specify)	1		2	
<b>C</b>	<b>What is your opinion about the following issues?</b>	<b>Yes</b>	<b>No</b>	<b>Don't know</b>	
1	Human trafficking occurs only from one country to another	1	2	96	
2	A person is trafficked when one is transported to another place with deception of job, location or employer	1	2	3	
3	No trafficked person can be sexually abused at the destination	1	2	3	
4	Human trafficking occurs when a person receives loans from traffickers before going to another place and then is compelled to work for repaying loans	1	2	3	
5	A child can not be the target for human trafficking	1	2	3	
6	Human traffickers are always unknown to a targeted person for trafficking	1	2	3	
7	An woman can be the target for human trafficking	1	2	3	
8	No trafficked person can experience threatened or forced labor/services at the destination	1	2	3	
9	A trafficked person may experience isolation, confinement or surveillance by the traffickers/employer at the destination	1	2	3	
10	Human traffickers usually promise for a better future to a targeted person for trafficking	1	2	3	
11	Human trafficking is recruitment or transferring of persons from one country to another for the purpose of slavery or practices similar to slavery	1	2	3	
12	Men cannot be the target for human trafficking	1	2	3	
13	A person can be trafficked by means of abduction for the purpose of exploitation	1	2	3	

14	Human trafficking does not occur when a man marries a woman, takes her to another place and sells her to someone else	1	2	3
15	Every illegal transportation of human being is human trafficking	1	2	3
16	Human trafficking occurs when a person is taken from one place to another through deception or force for the purpose of removal of organ	1	2	3
<b>D</b>	<b>Do you foresee an increased risk of human trafficking if the Terminal/Landing Station/Vessels Storm Shelters construction would take place? (During Construction)</b>	1	Yes	2 No
<b>E</b>	<b>Do you foresee an increased risk of human trafficking after Terminal/Landing Station/Vessels Storm Shelters are developed?</b>	1	Yes	2 No
<b>F</b>	<b>Do you know about any organization that deals with human trafficking in your locality?</b>	1	Yes	2 No
<b>G</b>	<b>What is the name of the organization?</b>			

24.1 Do you know about any incidence of human trafficking in this area?

1. Yes
2. No

24.2 What would be the preventive measures to stop trafficking?

1. Awareness raising
2. Sensitizing local elites
3. Community consultations
4. Sensitizing Local government
5. Stop marriage without knowing the bridegroom side properly.
6. Others

25. Drug Abuse

25.1 Do you know about any incidence of Drug selling of taking in this area?

1. Yes
2. No

25.2 If yes,

- i. What type of drugs are taken by the people?
- ii. What category of people mostly take the drug? (Multiple answer) (a) Youth male (b) Youth female (c) Transport workers (d)business men (e) others (specify)
- iii. Is the drug openly available in the area? Yes=1 No=2
- iv. In your opinion what is the main reason behind taking the drug? (a) Frustration(b) Bad company (c) Dismissal from love (d) Excess money in hand (e) Other (specify).....(f) Don't know

25.3 What would be the preventive measures to stop Drug abuse?

- i. Awareness raising of the family members

- ii. Upholding family bondage
- iii. Sensitizing local elites
- iv. Adequate apply of law
- v. Proper rehabilitation of the drug users
- vi. Community consultations
- vii. Teaching effect of Drug Abuse as a curriculum of the education institution
- viii. Others (Specify).....
- ix. Don't know

26. Labor Influx

26.1 Do you think that labor influx in the terminal/landing stations create social crisis such as

(a) social conflict (b) conflict in local power structure (c) deteriorate law and order situation (d) increase gender based violence (f) increase drug abuse (g) other (specify.....)

27. Indebtedness

- i. Do you or your household member have bank account? 1=yes, 2=No
- ii. Whether you or your family member are the member of any association or cooperative? 1=Yes, 2=No
- iii. Do you have any loan? 1. Yes 2. No
- iv. If yes, please indicate your borrowings in the current year. (Tk.)

Sl. No.	Source	Status of loan recovery	
		Still Due	
1	Bank		
2	NGO		
3	Relative/Friend		
4	Private money lender		
5	Other		

v. Causes of loan received -1=Consumption, 2=IGA, 3=Treatment, 4=marriage, 5=Repayment of other loan, 6=House construction , 7=others

vi. If there is still due than what are the reasons behind?

(1) Long term loan (2) Due to poverty (3) Business loss (4) No permanent income source (5) marriage (6) house construction (7) Household consumption 8) Foreign migration 9) No earning member 10) Others

28. Coverage under Government/Other Development Schemes

- i. Did you derive any benefit from any project or scheme? 1. Yes 2. No
- ii. If 'Yes', kindly give us the following details about the assistance given

Source	Name of Scheme	Type of help: 1. Loan; 2. Training; skill development 3. Employment, 4. Grant; 5. Health care; 6. Others
Government		
NGO		
Funding agency		
Other		

Name of the data collector \_\_\_\_\_

Date



**Affected Wage Labor Listing Form**

[This sheet will be attached to the main questionnaire]

Main Survey Form No.....

01. Name of the owner of the Business institution  02. Gender  [1] Male  [2] Female

03. Name of Institution  04. Type of Business

3.1 List of the labors

Sl. No.	Name	Name of father/husband	National ID No.	Age	M=1 F=2	Educational qualification
1						
2						
3						
4						
5						
6						

3.2 Address (according to 3.1)

Sl. No.	Village	Union	Thana/ Upazilla	District
1				
2				
3				
4				
5				
6				

3.3 Details about service information (according to 3.1)

Sl. No.	Designation	1=monthly; 2=weekly; 3=per day	Salary/wage	Days of involvement with this
1				
2				
3				
4				
5				
6				

Representative of the institution: .....Designation:.....

Signature.....Date .....Mobile no.....

Name & signature of the interviewer .....Date.....

**Vendor Survey Form**

**01. General**

- i. Sub-project/Location Name: .....
- ii. Questionnaire No.: .....
- iii. Name of Likely Affected Household Head: .....
- iii. Father's Name: .....
- iv. National ID: .....
- v. Phone No: .....
- vi. Ward: .....                      vii. City Corp:.....

**02. Detailed about own Business**

2.1	Name of business Institution:	
2.2	Trade license no. (if any):	
2.3	Type of business	
2.4	Total capital (Taka):	
2.5	Monthly income (Taka):	
2.6	Monthly Expenditure (Taka):	
2.7	Number of labor (If any):	
2.8	What should be the period/ time limitation for structure displacement notice:	
2.9	The deadline of structure displacement:	

**BANGLADESH REGIONAL WATERWAY TRANSPORT PROJECT-1(BRWTP), BIWTA**

**Details about the Tenant Household (Commercial/Residential) affected within Project site**

[This sheet will be attached to the main questionnaire]

01.	Name of the owner of Structure					02.	Sex	1	2
		HH Number:.....					Male		Female
03.	Description of the commercial structure:								
3.1	Type of structure	Pucca	Semi Pucca	Tin	Katcha	Thatched			
		total	total	total	total	total			
3.2	Size :								

**Relevant information about the affected tenant**

Mobile No. of Tenant

National ID No. of Tenant

04. Name of the affected tenant:

05. Age

06. Sex  1  2  
Male Female

07. Number of household member :  Male: .....Female: .....Total.....

**08. Address:**

Village/ Road No. : Present:  Permanent:

Union /Ward : Present:  Permanent:

Thana/Upazilla : Present:  Permanent:

District : Present:  Permanent:

09. Type of Tenant: Residential=1 / Business=2

10. In case of business, Type of business.....

11. Capital Investment (BDT):.....

12. Monthly Income(BDT):.....

13. Monthly rent(BDT):.....

14. Secondary occupation.....

Comment:

Name & signature of the affected people.....Date .....

Name & signature of the interviewer .....Date.....

HH/Are no:  
Form no:

**BANGLADESH REGIONAL WATER TRANSPORT PROJECT-1(BRWTP),BIWTA  
Property Valuation Survey (PVS)  
Conducted by TYPISA & KS Consultant Ltd**

Name of Location/Subproject: -----

1. Name of Respondent

Name \_\_\_\_\_  
Name of Father /Husband \_\_\_\_\_, Occupation \_\_\_\_\_

Village: \_\_\_\_\_ P.S/Thana \_\_\_\_\_

2. Have you purchased land during last one year?

Yes      No

If answer is yes:

a. Date \_\_\_\_\_

b. Location of land (Mouza, plot no.) and Category \_\_\_\_\_

c. Amount of Land (Decimal) \_\_\_\_\_

d. Purchase value of land (Except stamp and other expenditure) \_\_\_\_\_

3. Have you sold any land during last one year?

If answer is yes:

a. Date \_\_\_\_\_

b. Location of land (Mouza, plot no.) and Category \_\_\_\_\_

c. Amount of land (Decimal) \_\_\_\_\_

d. Sale value of land (Except stamp and other expenditure) \_\_\_\_\_

4. What are the market price of different category of land mentioned bellow according to your knowledge ?

SL no	Description of categories	Location of land (Mouza)	Current market price (Perdecimal)	Comments
1.	Homestead			
2.	Vita/ High land			
3.	Single crop			
4.	Double Crop			
5.	Multi Crop			
6.	Orchard			
7.	Pond (Under Cultivated)			
8.	Pond (Non Cultivated)			
9.	Fallow Land			
10.	Road			
11.	Nayanjuli			
12.	Others (Please mention)			
13.				
14.				
15.				
16.				

Name & Signature of Respondent: -----

BANGLADESH REGIONAL WATER TRANSPORT PROJECT-1(BRWTP), BIWTA  
Property Valuation Survey (PVS)

Conducted by TYP SA & KS Consultant Ltd

Tree valuation survey

What are the present market prices of the following trees according to your knowledge

SL no	Name of tree	Market Price of tree (as per age)				Comments
		Big	Medium	Small	Sapling	
1	Fruit Tree					
2	Timber Tree					
3	Firewood					
4	Medicinal plants					
5	Bamboos					
6	Fruit & Timber Tree					
7	Others					
8	Total number of trees					
9						

\*Big= Height 16+ wide 30-40+Inches  
 Small\*=Height 6-10 Wide 10-20 Inches

\*Mediam=Height11-15 Wide 20-30  
 Sapling\*= Height1-5 Wide 01-10 Inches

Name & Signature of Respondent:-----

**BANGLADESH REGIONAL WATER TRANSPORT PROJECT-1(BRWTP), BIWTA  
Property Valuation Survey (PVS)**

Conducted by TYP SA & KS Consultant Ltd

Structure Replacement Value Survey

SL	Particular of Structure			Measurement	of	Replacement Value (BDT)	Comments
	Roof	Fence	Floor	Structure	Code*		
				Quantity			
1	Pucca	Pucca	Pucca				
2	Pucca	Pucca	Pucca				
3	Tin	Pucca	Pucca				
4	Tin	Pucca	Pucca				
5	Tin	Tin	Pucca				
6	Tin	Tin	Pucca				
7	Tin	Soil	Katcha				
8	Tin	Straw	Katcha				
9	Straw	Straw	Katcha				
10	Straw	Soil	Katcha				
11							
12							
13	Latrine (Katcha)						
14	Latrine (Slab)						
15	Latrine (Pucca)						
16	Tubewell						
17	Draw Well						
18	Well						
19	Drain						
20	Fencing by Straw						
21	Fencing by Tin						
22	Boundary Wall (Brick)						

\* Infrastructure One Code: 1. S.f.t, 2. R.f.t, 3.C.f.t, 4.Number.

Name & Signature of Respondent:-----

**BANGLADESH REGIONAL WATER TRANSPORT PROJECT-1(BRWTP), BIWTA  
Property Valuation Survey (PVS)**

Conducted by TYP SA & KS Consultant Ltd

Crops valuation survey

SL.	Name of Crop	Total production as per Bigha (Mon)	Current market price of production ( per Mon )	Total market price of production ( Per Bigha )
1	Bona Aush (Hybrid )			
2	Bona Aush(Deshi)			
3	Ropa (Hybrid)			
4	Ropa Aush(Deshi)			
5	Bona Amon(Hybrid )			
6	Bona Amon(Deshi)			
7	Ropa Amon(Hybrid )			
8	Ropa Amon(Deshi)			
9	Brow (Hybrid )			
10	Brow (Deshi) (Deshi)			
11	Jute			
12	Wheat			
13	Corn			
14	Mustard			
15	Sesame			
16	Red Gram			
17	Grass Pea/Khesari			
18	Chikpea			
19	Mung			
20	Chili			
21	Orion			
22	Gorlic			
23	Roundish Potato			
24	Sugoncone			
25	BetelLeft			
26	Eggplant/Brinjal			
27	Lady's finger			
28	Others			

Name & Signature of Respondent:-----

Name and Signature of interviewer: \_\_\_\_\_

\_\_\_\_\_  
Name and Signature of Field coordinator

Date of data collection : \_\_\_\_\_

Location : \_\_\_\_\_



BANGLADESH REGIONAL WATERWAY TRANSPORT PROJECT-1(BRWTP), BIWTA  
Census & Socio-economic Survey (CSS) and Inventory of Losses (IOL)

Location Code:


Form No.:

Conducted by : TYP SA & KS Consultant Ltd

I. General

1. Name of Location /sub-project : \_\_\_\_\_
2. Name of Household Head (HHH):.....
3. Father's Name:.....
4. National ID of HHH: .....
5. Mobile Phone No. of the HH: .....
6. Present Address:
  - A. Village: .....B. Ward No/Unit no : .....
  - C. Union: .....D. Upazila : .....
  - E. Municipality/City corporation: ----- F. Street Address: -----
  - G. District:.....
7. Ethnicity & Religion
  - A. Ethnicity: 1. Bengali 2. Adibashi/Indigenous
  - B. Religion: 1. Muslim 2. Hinduism 3. Christian 4. Buddhist 5. Others
8. Type of Family: 1. Nuclear (Parent + unmarried children), 2. Joint (all other type)
9. Types of impacts/loss by the project implementation
  - 1) Land
  - 2) Structure
  - 3) Labor and livelihood
  - 4) tree
  - 5) CPR
  - 6) Tenants
  - 7) House rent
  - 8) Others

6. Details of Family Members of affected PDP (start with HHH) (please fill appropriate code)

Sl. No.	Name of family member	Relation with Household Head Code	Age(in year)	Sex (Code)	Marital Status (Code)	Education Qualification (Code)	Do you work Yes/No	If no, reasons for not working (Code)	Main Occupation (Code)	Ownership of affected property (Yes/No)	Annual Income (BDT)	Annual expenditure (BDT)	Physical Condition (Code)
0	1	2	3	4	5	6	7	8	9	10	11	12	13

Codes:

- 2. Relation with HH Head: 1=head, 2=spouse, 3=child, 4=grandchild, 5=sibling, 6=parent, 7=parent-in-law, 8=son/daughter-in-law, 9=Uncle/Aunt
- 4. Sex: 1=Male, 2=Female, 3=Transgender
- 5. Marital Status: 1=Married, 2=Unmarried, 3=Widow/Widower, 4= Separated, 5=Divorced.
- 6. Education: 1.Illiterate, 2.Can sign only, 3. Can read and write, 4. Primary, 5.Below SSC, 6.SSC, 7. HSC 8. Graduate, 8. Masters and Above
- 7. Work: 1=yes, 2=No
- 8. Occupation: 1. Service (Private/Government/NGO), 2. Business, 3 Farmer/Agriculture related Day Labour 4. Labor, 5. Fisherman/ Fish culture, 6.Boatman, 7.Driver, 8.Carpenter, 8.Mason, 9. Electrician/mechanics, 10.Housewife, 12.Student, 13. Medical Practitioner 14. Lawyer
- 9. .Physical Condition: 1=Perfect, 2=Partially Disable, 3= Fully Disable

**II. Details of Affected Land**

1. Do you have any land under this project? 1=Yes, 2= No

Sl. No	Category of land	Total area of land of the HHs (Decimal)	Ownership status (Code)	Affected area of land (Decimal)						Years of using land
				Own land		Land own by other		Govt. Land (Khash/Others)		
				Total	Affected	Total	Affected	Total	Affected	
0	1	2	3	4	5	6	7	8	9	10
1	Homestead									
2	Vita /highland									
3	Agriculture									
4	Orchard									
5	bamboo bush									
6	Pond									
7	Water body									
8	Commercial land									
9	Fallow									
10	Graveyard									
11	Others									

Ownership Code: By inherited=1 By purchase=2 Leased in =3 Grant/donation=4, Government =5

**III. Details of Structures (For all affected people)**

Is there any structure on the affected land? 1. Yes 2. No

SL. No	Category of Structure (Code)	Description of Structure			Str. Code No.	Total Affected Area Size				Use of the Structure (Code)	Operated by (Owner=1 Tenant =2)	Percentage of affected structure (Code)
		Roof	Wall	Floor		Str. Unit Code	Length	Width	Height/ Depth			
1												
2	Cowshe d											
3	Firewo od store											
4	Busines s											
5	Residen ce											
6	Busines											

	S												
7													
8													

Code:

\*Category of Structure code: Residence-1, Shop-2, Residence cum Shop=3 Kitchen-4, SanitaryToilet-5, Slab Toilet-6, Katcha Toilet =7, Deep tube well-8, Hand Tube well-9, Water pump-10, RCC Pillar -11, Bakery Burner-12, Mobile tower-13, Boundary Wall (5") -14, Boundary wall (10") -15, Grill-16, drain-17, Gate-18, Gas line-19, Brick build stair in pond-20, Culvert-21, water tank-22, store room-23, cow shed-24, Veranda-25, Bath Room-26, Boundary Wall (Tin)=27, Septic Tank=28, Bill Board= 29,

Structure description Code No: :Pucca/Pucca/Pucca=1, Tin/Pucca/Pucca=2, Tin/Tin/Pucca or Katcha=3, Tin/wood or straw/Katcha=4, Straw/straw/katcha=5, Polythin/Open/ katcha=6, Tube well=7, Toilet, (Sanitary) =8, Toilet (Slab) =9, Toilet (Kutch) =10, Boundary wall 10 inch=11, Bounday wall 5 inch=12, Bounday Wall Tin made =13, Others.....

Str. Unit Code: Sft=1, Rft=2, Number= 3 & Cft=4

Use of the Structure: 1. Residential 2. Commercial 3.Residential & commercial.4. Kitchen 5. Firewood Store 6.Cowshed 7.Toilet, 8.Office/Political Party Office 9. Water supply, 10.Boundary Wall 11. Others

Percentage of affected structure Code 1= Less than 25% , 2=25% 3= 50% 4= 75% 5=100%

2. HH Ownership status.....

1= Legal Titleholder 2= Tenant 3= Lease holder 4= Encroacher 5= Squatter 6. Uthuli

If not legal owner, mention:

Name of the Owner:.....

Father's Name: .....

3. Use of structure by Own=1, Rented out =2, Both=3

1.If rented out

Details of the Tenants: (Go to Tenants' questionnaire)

**IV Information about Tree**

1. Number of trees within the affected area:

Category of tree (Code)	Private Land				Govt. Land				Yearly Income from fruit selling (BDT)	
	Large No.	Medium No	Small No.	Sapling No.	Large No.	Medium No	Small No.	Sapling No.	Private	Govt.
Timber										
Timber & fruit										
Fruit bearing										
Firewood										
Medicinal										
Bamboo bush										

Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals, Landing Ghats and Vessel Shelters, BRWTP-S6

Category of tree (Code)	Private Land				Govt. Land				Yearly Income from fruit selling (BDT)	
	Large No.	Medium No	Small No.	Sapling No.	Large No.	Medium No	Small No.	Sapling No.	Private	Govt.
Cane Bush										
Banana										
Papaya										
Others										

Timber: High timber value and used for furniture fixture such as, Rain Tree/Koroi, Mehgini, Shegun

Fruits and Timber: High value of Timber and fruits as well, such as Mango, Jackfruit, Litchi, Coconut, Dates, Palm tree, etc.

Fruit bearing: High value of fruits but very less value of timber such as Guava, Lemon, Sofeda/Shorifa, Dalim, etc.

**V. Information on affected Business (Details about Business)**

SL. No	SL. No of structure	Name of Business operator	Father's Name	Business operated by (Code)	Present address	Nature of business (Code)	TIN/trade license (Code)	Capital	Annual Income	No. of wage labor	Advance	Ownership Own-1 Rent-2
0	1	2	3	4	5	6	7	8	9	10	11	12
1	4											
2	6											

Business operation Code: 1= Only Male, 2= Male and Female, 3= Only female

Nature of business Code: 1=Small, 2= Medium, 3= Large

TIN/trade license Code: Have TIN Number=1, Have Trade License=2, Have both =3, Have none=4

**V. Employee affected in Business**

SL #	Name of employee	Name of Father	Designation	Type of work (1.skill 2.unskill)	Type of employment (1.permanent 2.Temporary)	Monthly salary	Date of joined in this business
1.							
2.							
3.							
4.							

**VI. Households Loan and saving**

Source of loan (if any)	Amount (BDT)	Saving (if any)	Amount (BDT)	Remark
Bank				
NGO				
Relatives				
Friends				
Others				
Total		Total		

## VII. Use of Common property resources (CPR)

SL no#	Type of common property resources	Availability (Yes/No)	Distance (km)
1.	Mosque		
2.	Temple		
3.	Church		
4.	Graveyard		
5	Community Centre		
6	Play Ground / Park		
7	Others (Mention)		

### 2. Civic Amenities Available

#### 2.1. Source of Drinking Water

1. Piped-water supply
2. HTW
3. Shallow TW
4. Deep TW
5. Well
6. River/canal/pond
7. Rain harvesting
8. Bottled water
9. Others

#### 2.2. Type of Toilet

1. Sanitary
2. Slab Latrine (Water sealed)
3. Katcha
4. No toile

#### 2.3. Fuel for cooking

1. Electricity
2. Wood
3. Gas
4. Diesel/Kerosene
5. Solar

#### 2.4. Sources of lighting

1. Electricity
2. Diesel/Kerosene
3. Solar
4. Generator
5. IPS
6. Others

**VIII. Resettlement & Rehabilitation**

1. Average total monthly income of the affected family (Tk.): .....
2. Average total monthly expenditure of the affected family (Tk.): .....
3. Resettlement/ Relocation Option Preferred: (expectation of HHs who will lose residential land with structure)
  1. Self-Relocation through purchasing new land    2. Relocation on residual land
  3. Project Assisted Resettlement
4. Compensation Option for Anyone Loosing Land: (expectation of HHs who will lose land only)
  1. Land for land lost        2. Cash for Land lost
5. Compensation Options for Anyone Loosing Structure :(expectation of HHs who will lose the structures only)
  1. House for house lost    2. Shop for shop lost        3. Cash for House    4. Cash for shop
6. Income Restoration Assistance (the most preferred option) (Multiple)
  1. Employment opportunities in construction work
  2. Assistance/loan from other ongoing development scheme
  3. Assistance/loan arranged through this project
  4. Vocational training
  5. Others (specify .....
7. How would you like to spend the compensation money? (Multiple)
  1. To buy land        2. To shift a house        3. To build a house
  4. To get training for taking a new occupation    5. To get a job    6. To invest in business
  7. To market produce        8. To invest for self-employment
  9. To adjust a loan        10. Other (Please specify)

1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>

\* Planning according to preference

8. What are the available sources/opportunities for employment in your locality?
  1. Agriculture
  2. Motor mechanics
  3. Livestock
  4. Auto Rickshaw Pulling
  5. Rickshaw /van pulling
  6. Fisheries
  7. Horticulture
  8. Small business
  9. Poultry rearing
  10. CNG Auto Driving
  11. Transport Working
  12. Others (Please mention)

1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>

9.



Do you think that you or your family members need training to develop skills for taking up a new occupation?

Yes=1, No=2

If the answer is yes, please specify the name(s) or type(s) of training essential for you or your family members:

1. Agriculture
2. Motor mechanics
3. Livestock
4. Technical training
5. Fisheries
6. Horticulture
7. Small business
8. Poultry rearing
9. Tailoring
10. Driving
11. Other (Please mention

10) Photograph of Respondent with structure

11) GPS Location

Name of Investigation :

Name of Supervisor :

-----  
Signature of Investigator with date



Environmental and Social Impact Assessment of proposed new and up-  
gradation of Cargo and Passenger River Terminals. BRWTP-S6  
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT



ANNEX 5. STEPS OF LAND ACQUISITION AS PER ARIPA 2017





#### Section-4. Publication of preliminary notice of acquisition of immovable property:

- (1) Whenever it appears to the Deputy Commissioner that any property in any locality is needed or is likely to be needed for any public purpose or in the public interest, he shall cause a notice to be published at convenient places on or near the property in the prescribed form and manner stating that the property is proposed to be acquired.
- (2) In case of acquisition of immovable property for any non-governmental person or organization, whatever be the amount of the immovable property, sanction of the government must be taken before the initiation of acquisition proceeding.
- (3) The Deputy Commissioner, under sub-section (1)-
  - (a) before the publication of notice, in the prescribed manner and form, shall record the real nature, condition and infrastructures built therein, crops and trees of the proposed immovable property in video or still picture or any other technology and thereafter prepare a report accordingly; and
  - (b) after the publication of notice, in the prescribed manner and form, shall prepare a joint-list of Requiring persons or organizations and persons interested.
- (4) If the nature of land is changed in reality from its recent record of rights, the Deputy Commissioner, at the time of preparation of the joint list, shall decide about the change of the nature of the land.
- (5) The Deputy Commissioner shall mention in the joint list, in the prescribed manner, if any house or infrastructure is built or is being built in the proposed immovable property for acquisition, in contravention of public purpose for illegal gain.
- (6) The joint list prepared under sub-section 3(b) shall be affixed in the notice board of the local land office and in the convenient place of the project.
- (7) The Deputy Commissioner shall not record the change of the nature of land in the joint list, if after the initiation of proceeding under sub-section 3(a), the nature of the land is changed by building houses or infrastructures in bad motive.
- (8) If any person is aggrieved by the decision of the Deputy Commissioner under sub-section 7, he may file an appeal to the Commissioner within the next 7 working days.
- (9) The Commissioner, in the prescribed manner, shall hear the appeal under sub-section 8 and shall provide with the decision within next 15 working days and in case of a nationally important project, shall provide with the decision within the next 10 working days.
- (10) The decision of the Commissioner under sub-section 9 shall be deemed to be final.
- (11) If there is any disposal of appeal under sub-section 9 or no appeal is preferred within the prescribed period in sub-section 8, within the next 24 hours, the concerned persons shall in his own cost remove the houses or infrastructures from the proposed immovable property, otherwise the Deputy Commissioner shall take steps to evict those in accordance with the existing provisions of law.
- (12) The Deputy Commissioner may, after choosing the place for nationally important project, by order, impose control over the sale of plots and building of infrastructures thereon.



(13) Generally religious places, graves or crematoriums can be taken into acquisition; Provided that, if it essential in public purpose or public interest, by relocating and rebuilding, in the own money of the Requiring persons or organizations, it may be taken into acquisition.

Explanation: The term „purpose in contravention of public interest“ in this section means the purpose for obstructing in the implementation of the project, creating hindrance or doing anything that retards the implementation of a project or doing something to get monetary benefit by compensation.

#### Section-5. Objections against acquisition:

(1) Any person concerned may file an objection against the acquisition proceeding to the Deputy Commissioner within 15 working days.

(2) The Deputy Commissioner shall, speedily hear the objection filed under sub-section 1 in the presence of the appellant or an agent, after hearing all such objections and after making such further inquiry, if any, as he thinks necessary, prepare a report within thirty working days, and in case of a nationally important project within 15 working days, following the expiry of the period specified under sub-section (1) containing his opinion on the objections.

(3) The Deputy Commissioner-

(a) if the property exceeds 50 [fifty] standard bighas (or 16.5 acre) of land, submit the record of the proceedings held by him, together with his opinion, for the decision of the Ministry of Land; and

(b) if the property does not exceed 50 [fifty] standard bighas (or 16.5 acre) of land, submit the record of the proceedings held by him, together with his opinion, for the decision of the Commissioner:

Provided that if no objection is raised within the period specified in sub-section (1), the Deputy Commissioner shall, instead of submitting the records of the proceedings to the Divisional Commissioner, make a decision within ten days of the expiry of the aforesaid period, or within such further period but not exceeding thirty days, as the Divisional Commissioner permits on the request of the Deputy Commissioner in writing] and in case of a national important project within 15 days, about the acquisition of the property and such decision of the Deputy Commissioner shall be final

#### Section-6. Final decision regarding acquisition:

(1) Under section 5(3), after considering the report of the Deputy Commissioner, as the case may be-

(a) The government shall, not exceeding 60 days after the submission of the report, and

(b) within 15 days of the submission of the report of the Commissioner or recording the report of delay within not exceeding 30 days-shall take final decision.

(2) When the Government, the Divisional Commissioner or the Deputy Commissioner, as the case may be, makes a decision for acquisition of the property under sub-section (1) of this section or section 5(3), as the case may be, such decision shall be conclusive evidence that the property is needed for a public purpose or in the public interest.

#### Section 7. Notice to persons interested:



(1) When the Government, the Divisional Commissioner or the Deputy Commissioner, as the case may be, has made a decision for acquisition of any property under section 5 or the proviso to section 6, as the case may be, the Deputy Commissioner shall cause public notice to be given in the prescribed manner at convenient places on or near such property stating that the Deputy Commissioner, has decided to acquire the property and intends to take possession thereof.

(2) Such notice shall state the particulars of the property to be acquired and taken possession of, and shall require all persons interested in the property to appear personally or by agent before the Deputy Commissioner at a time, fifteen days after the date of publication of the notice or in case of a nationally important project after 7 days, and such notice shall also contain the time and place to be present and state the nature of their respective interests in the property and the amount and particulars of their claims to compensation for such interests.

(3) The Deputy Commissioner shall also serve notice to the same effect in the prescribed form on the occupier, if any, of such property and on all persons known or believed to be interested therein.

(4) The Deputy Commissioner may also, by notice, require any such person to make or deliver to him at a time, not being earlier than fifteen days after the date of service of the notice, and place mentioned therein a statement containing, so far as may be practicable, the name of every other person possessing any interest in the property or any part thereof as co-sharer, mortgagee or otherwise, and of the nature of such interest and profits, if any, received or receivable on account thereof.

(5) Every person required to make or deliver a statement under this section shall be deemed to be legally bound to do so within the meaning of sections 175 and 176 of the Penal Code (XLV of 1860).

#### Section-8. Award of compensation by Deputy Commissioner:

(1) On the date so fixed, or on any other date to which the enquiry has been adjourned, the Deputy Commissioner shall proceed to enquire into the statement, if any, which any person has made pursuant to a notice given under section 7 and into the value of the property at the date of the publication of the notice under section 4, and into the respective interests of the persons claiming the compensation and shall make an award of

- (a) the compensation which, in his opinion, shall be allowed for the property; and
- (b) the apportionment of the said compensation among all the persons known or believed to be interested in the property, of whom, or of whose claims, he has information from the latest record of the proposed mouza for acquisition.

(2) The award made by the Deputy Commissioner shall, except as hereinafter provided, be final.

(3) The Deputy Commissioner shall, within seven days from the date of making award of compensation-

- (a) give notice of his award to the person interested;
- (b) send the estimate of the award of compensation to the Requiring persons or organizations.

(4) The Requiring persons or organization shall pay the estimated amount within 120 working days after receiving the estimation under sub-section 3 to the Deputy Commissioner.



(5) within 30 working days of the publication of notice under section 7 or in case of a national important project 15 working days, as the case may be, the preparation of the estimated amount of the award of compensation shall be complete.

Section-9. Matters to be considered in determining compensation:

(1) In determining the amount of compensation to be awarded for any property to be acquired under this Part, the Deputy Commissioner shall take into consideration-

(a) the market value of the property at the date of publication of the notice under section 4: Provided that in determining such market value, the Deputy Commissioner shall take into account the average value, to be calculated in the prescribed manner, of the properties of similar description and with similar advantages in the vicinity during the twelve months preceding the date of publication of the notice under section 4;

(b) the damage that may be sustained by the person interested, by reason of the taking of any standing crops or trees which may be on the property at the time of the making of the joint list;

(c) the damage that may be sustained by the person interested by reason of severing such property from his other property;

(d) the damage that may be sustained by the person interested by reason of the acquisition injuriously affecting his other properties, movable or immovable, in any other manner, or his earnings; and

(e) if in consequence of the acquisition of the property, the person interested is likely to be compelled to change his residence or place of business, the reasonable expenses, if any, incidental to such change.

(2) While the government is acquiring land, it shall provide the persons interested with compensation of 200 per centum of the market price as defined in sub-section 1(a): Provided that if the government acquires the land for any non-government person then the amount of compensation shall be 300 per centum.

(3) In cases of injuries made under sub-section 1(b), (c), (d) and (e), additional 100 per centum compensation shall be provided.

(4) Notwithstanding any compensation provided under this section, necessary steps may be taken to rehabilitate evicted persons due to acquisition in the prescribed form.

Section-10. Matters not to be considered in determining compensation:

In determining the amount of compensation to be awarded for any property to be acquired under this Part, the Deputy Commissioner shall not take into consideration-

(a) the degree of urgency which has led to the acquisition;

(b) any disinclination of the person interested to part with the property to be acquired;

(c) any damage that may be sustained by him which, if caused by a private person, would not render such person liable to a suit;

(d) any damage which is likely to be caused to the property to be acquired, after the date of service of notice under section 7, by or in consequence of the use to which it will be put;



(e) any increase to the value of the property to be acquired likely to accrue from the use to which it will be put after the publication of notice under section 7; or (f) any alteration or improvement in, or disposal of, the property to be acquired, made or effected without the sanction of the Deputy Commissioner after the date of publication of the notice under section 4.

#### Section-11. Payment of compensation:

(1) On making of an award under section 8, before taking possession of the property, after the submission of the estimated amount of compensation by the Requiring persons, the Deputy Commissioner shall pay the aforesaid compensation within not exceeding 60 days from the date of deposit by the Requiring persons under sub-section 2.

(2) If the persons entitled to compensation do not consent to receive it, or if there be no person competent to receive the compensation, or if there be any dispute as to the title to receive the compensation or as to the apportionment of it, the Deputy Commissioner shall keep the amount of the compensation in a deposit account in the Public Account of the Republic which shall be deemed payment for the purpose of taking over possession of the property without any prejudice to the claim of the parties to be determined by the Arbitrator: Provided that any person admitted to be interested may receive such payment under protest as to the sufficiency of the amount: Provided further that no person who has received the amount otherwise than under protest shall be entitled to make any application under section 30.

(3) The Deputy Commissioner shall, realizing the compensation from the recipient, who may have received the whole or any part of the compensation awarded under this Part, take measures to give to pay the same to the person lawfully entitled thereto.

#### Section-12. Payment of compensation to Bargadar (Sharecroppers):

Notwithstanding anything contained in this Act, when the property acquired under this Part contains standing crops cultivated by bargadar, such portion of the compensation as may be determined by the Deputy Commissioner for the crops shall be paid to the bargadar.

Explanation. In this section "bargadar" means a person who under the system generally known as adhi, barga or bhag cultivates the land of another person on condition of delivering a share of produce of such land to that person.

#### Section-13. Acquisition and possession:

(1) When the compensation mentioned in the award has been paid or is deemed to have been paid in pursuance of section 11, the property shall stand acquired and vest absolutely in the Government free from all encumbrances, and the Deputy Commissioner shall thereupon take possession of the property.

(2) Immediately after the acquisition of the property under sub-section (1), a declaration by the Deputy Commissioner in the prescribed form to that effect shall be published in the official Gazette

#### Section-15. Acquisition of part of a house or buildings:





1) an acquisition cannot be made if the owner desires that the whole of such house, manufactory or building should be so acquired: Provided that the owner may, at any time, before the Deputy Commissioner has made his award under section 8, by notice in writing withdraw or modify his expressed desire that the whole of such house, manufactory or building should be so acquired.

(2) If any question arises as to whether any property proposed to be taken under this Part does or does not form part of a house, manufactory or building within the meaning of this section, the decision of the Deputy Commissioner shall be final.



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ANNEX 6. CHANCE FIND PROCEDURES





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## Chance Find Procedures

(Ref: The World Bank Operational Manual, 1999 OP4.11)

Works could impact sites of social, sacred, religious, or heritage value. "Chance find" procedures would apply when those sites are identified during the design phase or during the actual construction period and the related activity will not be eligible for financing under the project.

(1) Cultural property includes monuments, structures, works of art, or sites of significant points of view, and are defined as sites and structures having archaeological, historical, architectural, or religious significance, and natural sites with cultural values. This includes cemeteries, graveyards and graves.

(2) The list of negative subproject attributes which would make a subproject ineligible for support includes any activity that would adversely impact cultural property.

(3) In the event of finding of properties of cultural value during construction, the following procedures for identification, protection from theft, and treatment of discovered artifacts should be followed and included in standard bidding document.

- (a) Stop the construction activities in the area of the chance find;
- (b) Delineate the discovered site or area;
- (c) Secure the site to prevent any damage or loss of removable objects.
- (d) Notify the supervisory Engineer who in turn will notify the responsible local authorities;
- (e) Responsible local authorities and the relevant Ministry would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures.
- (f) Decisions on how to handle the finding shall be taken by the responsible authorities and the relevant Ministry. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance), conservation, restoration and salvage.
- (g) Implementation of the authority decision concerning the management of the finding shall be communicated in writing by the relevant Ministry.
- (h) Construction work could resume only after permission is given from the responsible local authorities and the relevant Ministry concerning safeguard of the heritage.

(4) These procedures must be referred to as standard provisions in construction contracts. During project supervision, the Site Engineer shall monitor the above regulations relating to the treatment of any chance find encountered.

(5) Relevant findings will be recorded in World Bank Supervision Reports and Implementation Completion Reports will assess the overall effectiveness of the project's cultural property mitigation, management, and activities, as appropriate.





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ANNEX 7. TERMS OF REFERENCE BIWTA'S PIU ENVIRONMENTAL STAFF





## Terms of Reference for PIU Environmental Staff

### Objective

Two environmental consultants, one environmental expert and one Environmental Officer, will be hired under the Project Implementation Unit (PIU) to support the Project Director (PD) in implementing the Environmental Management Plans of the Project in close co-ordination with the CSC consultants and the World Bank.

### Activities

The key activities to be carried out by the Environmental Specialist are:

- Finalizing the terms of references and request for proposals for various environmental consulting firms or NGOs to be hired for implementation of the EMP
- Undertake environmental screening, assessment and management of any activities with environmental implications (including preparatory studies for future projects),
- Oversee the pre-construction baseline monitoring of air, noise, water, soil and sediment quality to be carried out by the construction supervision consultant
- Ensure integration of the EA and resulting EMP into the project redesign and implementation plans (contract documents);
- Ensure compliance of the mitigation measures by the Contractors;
- Liaison with the DOE on environmental and other regulatory matters; including renewal of environmental clearance documents as and when required
- Develop training program on environmental aspects for the key stakeholders (BIWTA, contractors, public representatives and local government institutions/ NGOs;
- Maintaining project-specific Database for Environmental Management
- Compiles monthly, quarterly and annual reports to update ongoing environmental processes and address current issues. Provide recommendations for implementation of corrective actions and suggest program improvements.

The key activities to be carried out by the Environmental Officer are:

- Review the contractor's Implementation Plan for the environmental and social mitigation measures, as per the EMP;
- Liaison with the contractors and CSC on the implementation of the EMP;
- Carry out site inspections, check and undertake periodic environmental monitoring and initiate necessary follow-up actions;
- Undertaking environmental monitoring and reporting to the Project Director and follow-up activities;
- Assist the PD to arrange for the Environmental Auditing and follow up action on the Audit recommendation.
- Document the good practices in the project on incorporation and integration of environmental issues into engineering design; Report to the PD on the environmental aspects pertaining to the project;
- Assist in the preparation of periodic reports for dissemination to the PIU, and World Bank.

### key skills

The Environmental Specialist should have 10 years of experience and the Environmental Officer should have 5 years of experience in planning, implementation and monitoring of environmental management for large infrastructure projects. Both the consultants should have master's in environmental engineering or environmental sciences.

### Estimated Man months

The consultants will be hired for a period of 48 months (4 years).







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ANNEX 8. TERMS OF REFERENCE FOR ENVIRONMENTAL STAFF OF THE MONITORING AND  
EVALUATION M&E CONSULTANT





## Terms of Reference for Environmental Staff of Monitoring and Evaluation Consultants

### Objective

The Project will be supported by a specialized an External Monitoring and Evaluation (M&E) firm that will be responsible for monitoring and evaluation of implementation progress of all project works and activities and its impacts as well the implementation of the EMP. The M&E reports will evaluate the success in project implementation in terms of meeting the project's objectives, and assess its economic impacts. The M&E activities will provide continuous feedback to the PIU on the project's performance, and on mitigation of negative impact under various components, so that corrective actions can be undertaken in a timely manner if necessary.

### Activities

The key activities to be carried out by the M&E Consultants are:

- To develop specific monitoring indicators, checklists, and questionnaires to undertake external monitoring (a preliminary list of monitoring indicators has been given in the ESMP) in consultation with BIWTA and WB.
- To review and verify the implementation progress of various EMP elements, particularly, mitigation plan, compliance and effects monitoring, environmental trainings, documentation, and grievance redress mechanism.
- To review and verify the functioning of the key entities – E&S Cell, DSC, CSC, and contractors for environmental management.
- Identify the strengths and weaknesses of the design of EMP and its implementation, and also the entities tasked to undertake various tasks detailed in the EMP.
- Evaluate and assess the adequacy of the mitigation measures proposed in the Mitigation Plan in addressing the potentially negative impacts of the project activities and propose changes as appropriate.
- Review results of internal monitoring (compliance and effects monitoring) and verify its effectiveness through community consultations, spot checks, and field observations.
- Review the process and outcome of environmental trainings conducted by different project entities in line with the training program given in the EMP.
- Review the process and outcome of the documentation and reporting being carried out by various project entities in line with the EMP requirements.
- Identify, quantify, and qualify the types of EMP-related conflicts and grievances reported and resolved and the consultation and participation procedures. Provide recommendations to strengthen the grievance management and redress system.
- Recommend and describe any additional measures to strengthen capacity of implementing entities to ensure full and effective implementation of required mitigation and management measures.
- Describe any lessons learned that might be useful for environmental assessment and management of future projects.

### Key skills

The consultants should have minimum 10 years of experience in carrying out similar assignments.

### Estimated Man months

The consultants will be hired for a period of 24 months (2 years).





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ANNEX 9. ENVIRONMENTAL CONSERVATION RULES- ECR'97 STANDARDS



## SCHEDULE-2

### Standards for Air [See Rule 12]

Density in microgram per cusec meter

SI. No.	Categories of Area	Suspended Particulate Matters SPM	Sulphur-dioxide	Carbon Monoxide	Oxides Nitrogen
a.	Industrial and mixed	500	120	5000	100
b.	Commercial and mixed	400	100	5000	100
c.	Residential and rural	200	80	2000	80
d.	Sensitive	100	30	1000	30

Notes:

- (1) At national level, sensitive area includes monuments, health center, hospital, an;h ::ological sil<, t:ducational inslilution, and gov ::mmt:nl designated areas (if any).
- (2) Industrial units located in areas not designated as industrial areas shall not discharge pollutants which may contribute to exceeding the standard for air surrounding the areas specified at SI. nos. e and d above.
- (3) Suspended Particulate Matter means airborne particles of a diameter of 10 micron or less.



**SCHEDULE-3**

**Standards for Water**  
[See Rule 12]

(A) Standards for inland surface water

Best Practice based classification	Para meter			
	pH	BOD mg/l	DO mg/l	Total Coliform number/100
a. Source of drinking water for supply only after disinfecting:	6.5-8.5	2 or less	6 or above	50 or less
b. Water usable for recreational activity :	6.5 -8.5	3 or less	5 of more	200 or less
c. Source of drinking water for supply after conventional treatment :	6.5-8.5	6 of less	6 or more	5000 or less
d. Water usable by fisheries:	6.5-8.5	6 of less	5 or more	
e. Water usable by various process and cooling industries :	6.5 -8.5	10 or less	5 or more	5000 or less
f. Water usable for ini.gation:	6.5 -8.5	10 or less	5 or more	1000 or less

Notes:

1. In water used for pisciculture, maximum limit of presence of ammonia as Nitrogen is 1.2 mg/l.
2. Electrical conductivity for irrigation water – 2250  $\mu$ tmhoms/cm (at a temperature of 25°C); Sodium less than 26%; boron less than 0.2%.

(B) Standards for drinking water

SI. No.	Para meter	Unit	Standards
1	2	3	4
1.	Aluminum	mg/l	0.2
2.	Ammonia (NH <sub>3</sub> )		0.5
3.	Arsenic		0.05
4.	Balium		0.01
5.	Benzene		0.01

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	2	3	4
6.	BOD <sub>5</sub> 20°C		0.2
7.	Boron		1.0
8.	Cadmium		0.005
9.	Calcium		75
10.	Chloride		150 – 600*
11.	Chlorinated alkanes		
	carbontetrachloride		0.01
	1.1 dichloroethylene		0.001
	1.2 dichloroethylene		0.03
	tetrachloroethylene		0.03
	trichloroethylene		0.09
12.	Chlorinated phenols		
	- pentachlorophenol	mg/l	0.03
	- 2.4.6 trichlorophenol		0.03
13.	Chlorine (residual)		0.2
14.	Chloroform		0.09
15.	Chromium (hexavalent)		0.05
16.	Chromium (total)		0.05
17.	COD		4
18.	Coliform (fecal)	n/100 mi	0
19.	Colifmm (total)	n/100 mi	0
20.	Color	Hazen unit	15
21.	Copper	mg/l	
22.	Cyanide		0.1
23.	Detergents		0.2
24.	DO		6
25.	Fluoride		
26.	Hardness (as CaCO <sub>3</sub> )		200 – 500
27.	Iron		0.3 – 1.0
28.	Kjeldhl Nitrogen (total)		
29.	Lead		0.05

	2	3	4
30. Magnesium			30 – 35
31. Manganese			0.1
32. Mercury			0.001
33. Nickel			0.1
34. Nitrate			10
35. Nitrite			<1
36. Odor			Odorless
37. Oil and grease			0.01
38. pH			6.5 – 8.5
39. Phenolic compounds			0.002
40. Phosphate			6
41. Phosphorus			0
42. Potassium			12
43. Radioactive materials (gross alpha activity)		Bq/l	0.01
44. Radioactive materials (gross beta activity)		Bq/l	0.1
45. Selenium		mg/l	0.01
46. Silver			0.02
47. Sodium			200
48. Suspended particulate matters			10
49. Sufide			0
50. Sulfate			400
51. Total dissolved solids			1000
52. Temperature		°C	20-30
53. Tin		mg/l	2
54. Turbidity		JIU	10
55. Zinc		mg/l	5

#### SCHEDULE-4

Standards for Sound  
[See Rule 12]

Sl. No.	Category of areas	Standards determined at dBa unit	
		Day	Night
a.	Silent zone	45	35
b.	Residential area	50	40
c.	Mixed area (mainly residential area, and also simultaneously used for commercial and industrial purposes)	60	50
d.	Commercial area	70	60
e.	Industrial area	75	70

Notes:

1. The time from 6 a.m. to 9 p.m. is counted as daytime.
2. The time from 9 p.m. to 6 a.m. is counted as night time.
3. Area up to a radius of 100 meters around hospitals or educational institutions or special institutions/ establishments identified to be identified by the Government is designated as Silent Zones where use of horns of vehicles or other audio signals, and loudspeakers are prohibited.

### SCHEDULE-S

Standards for Sound originating from Motor Vehicles or Mechanized Vessels  
[ See Rule 12]

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

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

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

### SCHEDULE-6

Standards for Emission from Motor Vehicles  
[ See Rule 12 ]

Parameter	Unit	Standard Limit
Black Smoke	Hartridge Smoke Unit (HSU)	65
Carbon Monoxide	gm/k.m. percent area	24 04
Hydrocarbon	gm/k.m. ppm	02 180
Oxides of Nitrogen	gm/k.m. ppm	02 600

\* As measured at two thirds of maximum rotating speed.

### SCHEDULE-7

Standards for Emission from Mechanized Vessels  
[ See Rule 12 ]

Parameter	Unit	Standard Limit
Black Smoke*	Hartridge Smoke Unit (HSU)	65

\* As measured at two thirds of maximum rotating speed.

### SCHEDULE-S

Standards for Odor  
[ See Rule 12 ]

Parameter	Unit	Standard Limit
Acetaldehyde	ppm	0.5 – 5
Ammonia		1 – 5
Hydrogen Sulfide		0.02- 0.2
Methyl Disulfide		0.009 – 0.1
Methyl Sulfide		0.01 – 0.2
Styrene		0.4-2.0
Trim ethylamine		0.005 – 0.07

Notes:

- (1) Following regulatory limit shall be generally applicable to emission/exhaust outlet pipe of above 5 meter height:  
$$Q = 0.108 \times H_e^2 \times C_m$$

Where Q = Gas Emission rate Nm<sup>3</sup>/hour  
H<sub>e</sub> = Height of exhaust outlet pipe (m)  
C<sub>m</sub> = Above mentioned limit (ppm)
- (2) In cases where a special parameter has been mentioned, the lower limit shall be applicable for warning purposes, and the higher limit shall be applicable for prosecution purpose or punitive measure.

### SCHEDULE-9

#### Standards for Sewage Discharge [See Rule 12]

Parameter	Unit	Standard Limit
BOD	miligram/l	40
Nitrate		250
Phosphate		35
Suspended Solids (SS)		100
Temperature	Degree Centigrade	30
Coliform	number per 100 ml	1000

Notes:

- (1) This limit shall be applicable to discharges into surface and inland waters bodies.
- (2) Sewage shall be chlorinated before final discharge.

### SCHEDULE-10

#### Standards for Waste From Industrial Units or Projects Waste [ See Rule 13 ]

SI. No.	Parameter	Unit	Places for determination of standards		
			Inland Surface Water	Public Sewerage system connected to treatment at second stage	Irrigated Land
1	2	3	4	5	6
	Ammonical Nitrogen (as elementary N)	mg/l	50	75	75
2	Ammonia (as free ammonia)		5	5	15
3	Arsenic (as)		0.2	0.05	0.2
4	BOD <sub>5</sub> at 20°C		50	250	100
5	Boron		2	2	2



E.C.R.- Schedule-10

1	2	3	4	5	6
6	Cadmium (as CD)		0.50	0.05	0.05
7	Chloride		600	600	600
8	Chromium (as total Cr)		0.5	1.0	1.0
9	COD		200	400	400
10	Chromium (as hexavalent Cr)		0.1	1.0	1.0
11	Copper (as Cu)		0.5	3.0	3.0
12	Dissolved Oxygen (DO)		4.5-8	4.5-8	4.5-8
13	Electro-conductivity (EC)	micro mho/cm	1200	1200	1200
14	Total Dissolved Solids		2,100	2,100	2,100
15	Fluotide (as F)		2	15	10
16	Sulfide (as S)			2	2
17	Iran (as Fe)		2	2	2
18	Total Kjeldahl Nitrogen (as N)		100	100	100
19	Lead (as Pb)		0.1	1.0	0.1
20	Manganese (as Mn)		5	5	5
21	Mercury (as Hg)		0.01	0.01	0.01
22	Nickel (as Ni)		1.0	2.0	1.0
23	Nitrate (as elementary N)	mg/l	10.0	Not yet Fixed	10
24	Oil and Grease		10	20	10
25	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> OH)		1.0	5	
26	Dissolved Phosphorus (as P)		8	8	15
27	Radioactive substance	To be specified by Bangladesh Atomic Energy Commission			
28	pH		6-9	6-9	6-9
29	Seleniuro (as Se)	mgil	0.05	0.05	0.05
30	Zinc (as Zn)	Degree	5	10	10

পরিবেশ আইন সংকলন

1	2	3	4	5	6
31	Total Dissolved Solids		2,100	2,100	2,100
32	Temperature	Centig rade	40	40	40- Summer
			45	45	45- Winter
33	Suspended Solids (SS)	mg/l	150	500	200
34	Cyanide (as Cn)		0.1	2.0	0.2

Notes:

- (1) These standards shall be applicable to all industries or projects other than those specified under the heading "Standards for sector-wise industrial effluent or emission."
- (2) Compliance with these standards shall be ensured from the moment an industrial unit starts trial production, and in other cases, from the moment a project starts operation.
- (3) These standards shall be inviolable even in case of any sample collected instantly at any point of time. These standards may be enforced in a more stringent manner if considered necessary in view of the environmental conditions of a particular situation.
- (4) Inland Surface Water means drains/ponds/tanks/water bodies/ditches, canals, rivers, springs and estuaries.
- (5) Public sewerage system means treatment facilities of the first and second stage and also the combined and complete treatment facilities.
- (6) Irrigable land means such land area which is sufficiently irrigated by waste water taking into consideration the quantity and quality of such water for cultivation of selected crops on that land.
- (7) Inland Surface Water Standards shall apply to any discharge to a public sewerage system or to land if the discharge does not meet the requirements of the definitions in notes 5 and 6 above.

## SCHEDULE –11

Standards for Gaseous Emission from Industries or Projects  
[See Rule 13]

Sl.No.	Parameters	Standard present in a unit of mg/Nm <sup>3</sup>
1	2	3
1.	Particulate	
(a)	Power plant with capacity of 200 Megawatt or above.	150
(b)	Power plant with capacity less than 200 Megawatt.	350
2.	Chlorine	150
3.	Hydrochloric acid vapor and mist	350
4.	Total Fluoride F	25
5.	Sulfuric acid mist	50
6.	Lead particulate	10
7.	Mercury particulate	0.2
8.	Sulfur dioxide	kg/ton acid
(a)	Sulfuric acid production (DCDA* process)	4
(b)	Sulfuric acid production (SCSA* process)	10

(\* DCDA: Double Conversion, Double Absorption;

SCSA: Single Conversion, Single Absorption.)

Lowest height of stack for dispersion of sulfuric acid (in meter).

(a)	Coal based power plant	
(1)	500 Megawatt or above	275
(2)	200 to 500 Megawatt	220
(3)	Less than 200 Megawatt	$14(Q)^{0.3}$
(b)	Boiler	
(1)	Steam per hour up to 15 tons	11
(2)	Steam per hour more than 15 tons	$14(Q)^{0.3}$

[Q = Emission of Sulfur dioxide (kg/hour)].

1	2	3
9.	Oxides of Nitrogen	
(a)	Nitric acid production	3 kg/ton acid
(b)	Gas Fuel based Power Plant	50 ppm
(1)	500 Megawatt or above	50 ppm
(2)	200 to 500 Megawatt	40 ppm
(3)	Below 200 Megawatt	30 ppm
(e)	Metallurgical oven	200 ppm
10.	Kiln soot and dust	mg/Nm <sup>3</sup>
(a)	Blast Furnace	500
(b)	Brick Kiln	1000
(c)	Coke oven	500
(d)	Lime Kiln	250





Environmental and Social Impact Assessment of proposed new and up-gradation of Cargo and Passenger River Terminals. BRWTP-S6

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT



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## ANNEX 10. MINUTES OF STAKEHOLDERS CONSULTATION MEETINGS



## ANNEX-10: MINUTES OF THE STAKEHOLDER CONSULTATION MEETINGS

Public Consultation Meeting  
Bangladesh Regional Water Transport Project -1  
Bangladesh Inland Water Transport Authority

**Name of the subproject** : **Ashuganj Cargo Terminal**  
**Place of Meeting** : Ashugani Fery ghat, Premise of BIWTA  
**Date** : 24<sup>th</sup>October, 2019  
**Time** : 10.00 pm to 12.00 pm  
**Upazila** : Ashuganj  
**District** : Brahmanbaria

### List of Participants:

Local official of BIWTA		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	Md. Zahidul Islam	S.T.M of BIWTA
S-6 Consultants		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	1.Kh.Kharul Matin	Social Development & Resettlement Specialist, Package BRWTP-S6, TYP SA
2.	2. Mario Rios Garcia	Chemical Engineer, Package BRWTP-S6, TYP SA
4.	A.R.Molia	Ecologist, Package BRWTP-S6, KS Consultants
5.	5.Md.Ashadulla Sadat	Community Engagement Expert, Package BRWTP-S6, KS Consultants
6.	6. Mohsen Ara	Community Engagement Expert, Package BRWTP-S6, KS Consultants
Occupation wise Participants' numbers:		
<b>SL</b>	<b>Occupation</b>	<b>Participants' numbers</b>
1.	Local office of BIWTA	01
2.	Consultants	06
3.	Business	15



4.	Truck Malic association	02
5.	Shopkeeper	06
6.	Service	01
7.	Boat man	10
8.	Boat owner association	03
9.	Doctor	01
10	Truck driver	05
11	Others	10
<b>Total Participants 60 ( Male 60 &amp; Female 00)</b>		

### **Inaugural session :**

The consultation meeting was started by recitation from the holy Quran. The meeting was presided over Md.Jalal Uddin, President of Bangladesh Fertilizer Association. The meeting was organized by TYP SA and KS Consultant Ltd. on Behalf of BRWTP-1

At first, Kh.Kharul Matin, Social Development & Resettlement Specialist BRWTP-1 introduced each of PIU Members of BRWTP-1 Project, BIWTA and all Consultants.

### **Business session :**

At the beginning of the business session, **Mr. Abdur Rob Mollah**, Ecologist (Consultants) BRWTP-1, discussed on ecology and environmental issues in the project area likely to be affected by the project implementation. The ecological impact resulting from the project may include degradation to both terrestrial and aquatic environmental conditions impacting fish, invertebrates, birds, frogs, turtle, lizards, and mammals. He mentioned that particular concern, however, relates to dolphin and threatened turtle. He also mentioned that we are thinking how these impacts can be avoided or mitigated. The project will also monitor the impacts during the construction phase to track whether there is any adverse impacting of the project. He then requested the participants to give suggestions on how the adverse impacts can be avoided. During construction stage and operation & maintenance period.

**Kh. Kharul Matin**, Social Development & Resettlement Specialist (**TYP SA**) BRWTP-1, explained the potential social impacts and land acquisition and resettlement process including payment of compensation and resettlement benefits, relocation options, etc. He discussed the following issues-

- (i) Land acquisition requirements for each of the project location.
- (ii) Potential impacts on the passengers, local people and terminal users during construction phase of the project
- (iii) Process of land acquisition as per Acquisition and Requisition of Immovable Property Act, 2017 (ARIPA 2017)
- (iv) Compensation payment mechanism by Deputy Commissioner (DC) office as per ARIPA 2017
- (v) Process of assessing replacement cost for land and other affected properties as per World Banks Environmental and Social Framework (ESF) and good practices of other development projects
- (vi) Compensation and resettlement benefits for the structures and business on the GOB land
- (vii) Other entitlements for the potential affected people (businessmen, wage laborers, vulnerable people)
- (viii) Relocation requirement of the potential displaced businessmen
- (ix) Cut-off date for the non-titled persons is the date of commencement of census survey which is 25<sup>th</sup> October 2019.

He also discussed gender regarding issues including Gender based violence (GBV) and gender related facilities for the women, elderly and disabled people in the terminals and vessels shelter. He has given emphasis on gender facilities for the women in general,

pregnant women, breast feeding mother, elderly and disabled people who will be in the waiting place or working in the terminals and vessels:

- i. Separate toilet for male and female
- ii. Toilet with facilities for physically challenged people
- iii. Enough lighting and visible location for female toilet considering security and safety
- iv. Water supply and useable condition must be ensured by proper maintenance
- v. Breast feeding corner
- vi. Separate prayer space for female with required facilities
- vii. No discrimination of wages for male and female laborers/workers for similar work

**Question and answer session :**

This session was moderated by Kh. Khairul Matin. He requested to all participants to take part on *Question and Answer* session.

Issues raised by	Issues raised	Response by consultants
Md. Abul Kalam General Secretary, Meghna somobye samiti 01725 -140405	He point out that, More than 50 river crossing boat are operating to carry out goods and passenger every day, and about 300 families are fully dependent. For their livelihood. His opinion that, to build a new cargo terminal to left side from existence boat ghat.	The project has prioritized improvement of existing terminal in the first phase and new terminal in the second phase at the downstream at any suitable location. If the boat ghat is require displacement due to the project interventions, necessary facilities will be provided including stair.
Saju Mia, Advisor, Mazi somobye somiti 01989-139872	He said the same words like as Md. Abul Kalam.	As above
Md. Dalim Mia, Businessman 01738605282	He said that those who will be lost their business or structure to paid compensation for them.	Affected shop owners will be got compensation following the World Bank Environmental and Social Framework (ESF)
Dr. Abdulla Al Mahamud, Joint Secretary, Fare Ghat transport cooperative association, 01792-185582	He said that more than 600 businessman are doing their business in Ferighat area. Here land value is very high (per decimal about 1.5 crore taka) .He suggested that all business/shop would	If RHD land is available, BIWTA will try to get through inter-ministerial transfer rather to acquire mass private land.

	be relocated to RHD land (28 Acre free land) nearer to the Petro Bangla in the downstream.	
Md.Jakir Hossain, Member, Rehabilitation Market Committee  01714-061662	He recalled all business/shop are relocated here during construction of Bhairab Bridge. We do not agree to go there and there for the name of development.	BIWTA will consider the issue and further discuss with the affected people regarding relocation and livelihood restoration

Apart from, Thowhidul Islam Nasir, President, Truck Owner Association, Md. Mohiuddin, Business (seed), Md. Nurul Haque, General Secretary, Truck Owner Association, Md. Mozzammel Haque, Business also discussed the meeting.

**Some photographs of consultation meeting at Aushganj Cargo Terminal**





Consultation meeting at Aushganj Cargo Terminal

Concluding Remark :  
 Md.Jalal Uddin, President of Bangladesh Fertilizer Association, Chairperson of the meeting thanked the participants and the members of consultants to make the meeting a great success. He is expecting that all opinion of the participants will be considered during the project implementation.

**Attendance Sheet**  
 Bangladesh Regional Water Transport project -1  
 Bangladesh Inland Water Transport Authority  
**Public Consultation Meeting on**  
**Environment, Gender, Social and Resettlement issues**

Name of Subproject: Asugonj Cargo Terminal  
 Place: Asugonj Feri Ghat  
 Date: 24.10.2019  
 Time: 10.00-12.00  
 Upzilla: Ashugonj  
 District: Brahmanbaria

**Attendance Sheet of Public Consultation held in Ashugani Ferighat**

SL #	Name of participant	Profession of the Stakeholder	Cell phone no:
1	Md.Jalal Uddin	President of Bangladesh Fertilizer Business Association (BFA)	01711523875
2	Md.Ibrahim Molla	President, Fare Ghat Transport Cooperative Association, Ahsuganj	01711154191

3	Dr.Abdulla Al Mahamud	Joint Secretary, Fare Ghat Transport Cooperative Association, Ahsusganj	01792185582
4	Haji saidul Rahman	Member secretary of Rehabilitation Market committee	01711944469
5	Md.Jakir Hossain	Member, Rehabilitation Market committee	01714061662
6	Mosarof Hossain	Businessman (Ferighat)	01711077944
7	Md.Romel Munshi	General Secretary	01716859221
8	Thowhidul Islam Nasir	President, Truck Owner Association	01717324875
9	Haji Rofikul Islam	Businessman and Ex-Secretary of Rehabilitation Market committee	01716171913
10	Md.Bidhon Mia Mintu	President of Sromic union, Truck	01716426325
11	Saju Mia	Advisor of Mazi somobye somiti	01989139872
12	Md.Abul Kalam	General secretary, Meghna somobye samiti	01725140405
13	Abu Sayed Mia	Vice president, Truck Owner Association	01711118502
14	Md. Kodor Ali	President, Meghna somobye samiti	01784437434
15	Md. Mohiuddin	Businessman( Seed )	01716926816
16	Md.Abdul Hasim	RAC	01711585792
17	Md. Kawsar Ali	Imam , Masjid Ferighat	01926107635
18	Md. Hanif Sarker	Secretary, Truck Owner Association	01757817268
19	Md. Nurul Haque	General truck sromic	01753612639
20	Md. Sahadat Mia	Grocery	
21	Md. Alamgir	Boat Driver	
22	Md.Ismail Hossain	Boat Driver	01868473432
23	M.Al Amin Shaeb	Muazzam , Ferighat Masjid	01746359362
24	Md. Alomgir Sorder	Contractor	017257785
25	Abul Azam	Boat Driver	

26	Abdul Awoal	Boat Driver	01720471673
27	Md.Dalim Mia	Businessman	01738605282
28	Kamal Mia	Boat Driver	
29	Saju Mia	Boat man	
30	Robi Mia	Boat Driver	
31	Md. Golap Mia	Boat Driver	
32	Saimon Mia	Labour	01798503715
33	Md. Badal Sorker	Businessman	01718906522
34	Md.Shohel	Businessman	01711462269
35	Sayed Mia	Boat Driver	
36	Abdur salam	Businessman	01716376753
37	Masud Mia	Businessman	01711368260
38	Bulbul Ahamed	Service	01799556885
39	Haji momammed Satter	Businessman	01711077998
40	Md. Sentu Mia	Businessman	01743745905
41	Moazzam Ahmed	Businessman	01711870281
42	Jakir Hossain	Car Driver	01745929431
43	Edris Mia	Hotel Businessman	
44	Md. Musa Mia	Businessman	01907421174
45	Md .Almas Mia	Tea seller	01679428297
46	Md Abdu Mai	Truck Driver	01717106937
47	Md. Kawser Ali	Businessman	01768529183
48	Md. Korban Ali	Truck Driver	01772011291
49	MD. Sazzat Hossain	Truck Driver	01718744077
50	Md. Ripon	Truck Driver	01736573360
51	Md. Moazzamel Haque	Businessman	01748984652

52	Md. Sayed Mia	Businessman	01736163561
53	Md. Zahidul Islam	S.T.M,BIWTA	01716223974
54	Kowshik Ahmed	Jr Evn Expert	01748549063
55	Maio Rios Garcea	Chemical Eng. TYP SA	
56	Abdul Rob Mollah	KS Consultant	01711680704
57	Kh. Khairul Matin	Social Development Specialist ,TYP SA	01741127736
58	Md Rubel Ahmed	Businessman	01711518632
59	Md Shohel	Boat Driver	01713502704
60	Md Asadulla Sadat	Community Management Expert	01716045152
61	Mohsen Ara	Community Management Expert	01715287204



Public Consultation Meeting  
Bangladesh Regional Water Transport Project -1  
Bangladesh Inland Water Transport Authority

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**Name of the subproject** : **Ashuganj Cargo Terminal**  
**Place of Meeting** : Ashugani Ferighat, Premise of BIWTA  
**Date** : 12 February 2020  
**Time** : 10.30 am to 12.30 pm  
**Upzilla:** : Ashuganj  
**District:** : Brahmanbaria

**List of Participants:**

PIU Member of BRWTP-1 Project, BIWTA		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	Md. Monjurual Haque	DPD , BIWTA
2	Md. Khairal Alam	River Ports Specialist BRWTP, BIWTA
3	Md. Nazrul Islam Sarker	Social Expert BRWTA -1
Local official of BIWTA		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	Md. Main Uddin	B.S. BIWTA
2.	Md.Md. Shamim Ahmed	Traffic Supervisor BIWTA
3.	Sumon Chamdra Sarker	BIWTA
4.	Md. Najmul Alam	BIWTA
S-6 Consultants		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	Kh.Kharul Matin	Social Development & Resettlement Specialist, Package BRWTP-S6, TYP SA
2.	Mario Rios Garcia	Chemical Engineer, Package BRWTP-S6, TYP SA
3.	A.R.Molia	Ecologist, Package BRWTP-S6, KS Consultants

4.	Mohsen Ara	Community Engagement Expert,Package S6 BRWTP KS Consultants
5.	Ratan KumarShaha	Asst: Sociologist
6.	Md. Ahasan Habib	Asst: Sociologist
7.	Md. Mizanur Rahman	Asst: Sociologist
Occupation wise Participants' numbers:		
<b>SL</b>	<b>Occupation</b>	<b>Participants' numbers</b>
1.	PIU BIWTA	03
2.	Local office of BIWTA	04
3.	Consultants	04
4.	Asst: Sociologist	03
5.	Business	32
6.	Truck Malic association	06
7.	Service	02
8.	Boat man	03
9.	Boat owner association	13
10.	Doctor	01
11.	Truck driver	02
12.	Others	10
<b>Total Participants 83 ( Male 83 &amp; Female 00)</b>		

**Inaugural session :**

The consultation meeting was started by recitation from the holy Quran. The meeting was presided over Md.Ibrahim Molla, President of Bangladesh Fare Ghat Transport Cooperation Association. The meeting was organized by TYPASA and KS Consultant Ltd. on Behalf of BRWTP-1

At first, Kh.Kharul Matin Social Development & Resettlement Specialist BRWTP-1 introduced each of PIU Members of BRWTP-1 Project, BIWTA and all Consultants.

### **Business session :**

At the beginning of the business session, **Mr. Abdur Rob Mollah**, Ecologist (Consultants) BRWTP-1, discussed on ecology and environmental issues in the project area likely to be affected by the project implementation. The ecological impact resulting from the project may include degradation to both terrestrial and aquatic environmental conditions impacting fish, invertebrates, birds, frogs, turtle, lizards, and mammals. He mentioned that particular concern, however, relates to dolphin and threatened turtle. He also mentioned that we are thinking how these impacts can be avoided or mitigated. The project will also monitor the impacts during the construction phase to track whether there is any adverse impacting of the project. He then requested the participants to give suggestions on how the adverse impacts can be avoided. During construction stage and operation & maintenance period.

**Kh.Kharul Matin**, Social Development & Resettlement Specialist BRWTP-1, explained the potential social impacts and land acquisition and resettlement process of payment of compensation and resettlement benefits. He discussed the following issues-

- (x) Land acquisition requirements for each of the project location.
- (xi) Potential impacts on the passengers, local people and terminal users during construction phase of the project
- (xii) Process of land acquisition as per Acquisition and Requisition of Immovable Property Act, 2017 (ARIPA 2017)
- (xiii) Compensation payment mechanism by Deputy Commissioner (DC) office as per ARIPA 2017
- (xiv) Process of assessing replacement cost for land and other affected properties as per World Banks Environmental and Social Framework (ESF) and good practices of other development projects
- (xv) Compensation and resettlement benefits for the structures and business on the GOB land
- (xvi) Other entitlements for the potential affected people (businessmen, wage laborers, vulnerable people)
- (xvii) Relocation requirement of the potential displaced businessmen

He also discussed gender regarding issues including Gender based violence (GBV) and gender related facilities for the women, elderly and disabled people in the terminals and vessels shelter. He has given emphasis on gender facilities for the women in general, pregnant women, breast feeding mother, elderly and disabled people who will be in the waiting place or working in the terminals and vessels:

- i. Separate toilet for male and female
- ii. Toilet with facilities for physically challenged people
- iii. Enough lighting and visible location for female toilet considering security and safety
- iv. Water supply and useable condition must be ensured by proper maintenance
- v. Breast feeding corner
- vi. Separate prayer space for female with required facilities
- vii. No discrimination of wages for male and female laborers/workers for similar work

**Question and answer session :**

This session was moderated by Kh. Khairul Matin. He requested to all participants to take part on *Question and Answer* session.

Issues raised by	Issues raised	Response by consultants
Md.Abul Kalam General Secretary, Meghna somobye samiti 01725 -140405	He point out that, More than 50 river crossing boat are operating to carry out goods and passenger every day, and about 300 families are fully dependent. For their livelihood. His opinion that, to build a new cargo terminal to left side from existence boat ghat.	The project has prioritized improvement of existing terminal in the first phase and new terminal in the second phase at the downstream at any suitable location. If the boat ghat is require displacement due to the project interventions, necessary facilities will be provided including stair.
Saju Mia, Advisor, Mazi somobye somiti 01989-139872	He said the same words like as Md.Abul Kalam.	-----
Md.Dalim Businessman Mia, 01738605282	He said that those who will be lost their business or structure to paid compensation for them.	Affected shop owners will be got compensation following the World Bank Environmental and Social Framework (ESF)
Dr.Abdulla Al Mahamud, Joint Secretary, Fare Ghat transport cooperative association, 01792-185582	He said that more than 600 businessman are doing their business in Ferighat area. Here land value is very high (per decimal about 1.5 crore taka) .He suggested that all business/shop would be relocated to RHD land (28 Acre free land) nearer to the Petro Bangla in the downstream.	If RHD land is available, BIWTA will try to get through inter-ministerial transfer rather to acquire mass private land.
Md.Jakir Hossain, Member, Rehabilitation	He recalled all business/shop are	BIWTA will consider the issue and further discuss

Market Committee 01714-061662	relocated here during construction of Bhairab Bridge. We do not agree to go there and there for the name of development.	with the affected people regarding relocation and livelihood restoration
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Apart from, Thowhidul Islam Nasir, President, Truck Owner Association Md. Mohiuddin, Business (seed), Md. Nurul Haque, General Secretary, Truck Owner Association, Md. Mozzammel Haque, Business also discussed the meeting.

**Some photographs of consultation meeting at Aushganj Cargo Terminal**



Consultation meeting at Aushganj Cargo Terminal

Concluding Remark :

Md. Jalal Uddin, President of Bangladesh Fertilizer Association, Chairperson of the meeting thanked the participants and the members of consultants to make the meeting a great success. He is expecting that all opinion of the participants will be considered during the project implementation.

**Attendance Sheet**  
 Bangladesh Regional Water Transport project -1  
 Bangladesh Inland Water Transport Authority  
**Public Consultation Meeting on**  
**Environment, Gender, Social and Resettlement issues**

Name of Sub-project: Asugonj Cargo Terminal  
 Place : Ashuganj Feri Ghat  
 Date : 12.02.2020  
 Time : 10.30-12.30  
 Upzilla : Ashuganj  
 District : Brahmanbaria

**Attendance Sheet of Public Consultation held in Ashuganj Ferighat**

SL #	Name of participant	Profession/ Stakeholder	Cell phone no:
1	Md.Ibrahim Molla	President,Fare Ghat Transport Cooperative Association, Ahsuganj	01711154191
2	Hazi Md. Mizanur Rahman	Vice President Market Committee	01711-647785
3	Md. Nazrul Islam Bakul	General Secretary BFA	01711-330375
4	Ikbal Shikder	Businessman	01720-04137
5	Md.Alamgir Kha	Businessman	01730-908939
6	Hazi Mozibur Sharker	CEO Director	01711-647211
7	Md.Jakir Hossain	Member, Rehabilitation Market committee	01714061662
8	Md.Romel Munshi	General Secretary	01716859221
9	Md. Kodor Ali	President, Meghna somobye samiti	01784437434
10	Haji saidul Rahman	Member secretary of Rehabilitation Market committee	01711944469

11	Shahjahan Miya	Assistant Presiden, Meghna somobye samiti	01712-836299
12	M.K.Manik	Businessman	01714-28665
13	Md. Abul Kalam	General Secretary Megna Somobye Samiti	01725-140405
14	Md. Abdul Hasim	RAC	01711-585792
15	Md. Md. Alomgir Sharker	Labour Sorder	01725-147785
16	Md. Safiqur Rahman	Businessman	01712-204332
17	Mohiuddin	Businessman	01716-926816
18	Md. Deen Islam Sikder	Farmer	01749-129579
19	Md. Shapan	Businessman	01704-924311
20	Saju Mia	Advisor of Mazi somobye somiti	01989139872
21	Md. Zahirul Haque	Businessman	01711-666511
22	Md. Abu Bakr Siddique Rubel	Businessman	01711-518632
23	Hazi Md. Tajul Islam	Businessman	01711-956217
24	Bashir Miya	Meghna somobye samiti, Cashier	01720-350516
25	Muslim	Meghna somobye samiti, Member	01728-209016



26	Md. Kaiser	Imam	01926-107635
27	Md. Janu Miya	Meghna somobye samiti	-----
28	Hazi Md. Anichur Rahman	Businessman	01711-114474
29	Md. Kamal Uddin	Businessman	01711-373671
30	Moazzem Ahmed	Businessman	01711-870281
31	Md. Badal Sarker	Businessman	01718-906522
32	Md. Badal Miya	Meghna somobye samiti, Member	01715-318180
33	Dr.Abdulla Al Mahamud	Joint Secretary, Fare Ghat Transport Cooperative Association, Ahsusganj	01792185582
34	Md. Jalal Uddin	President Of Bangladesh Fertilizer Business Association (BFA)	01711-523875
35	Md. Sohel	Meghna somobye samiti, Member	01713-502708
36	Md. Bajlu Miya	Meghna somobye samiti, Member	01733-964493
37	Md. Mostafa Miya	Businessman	01740-544822
38	Md. Alamgir	Meghna somobye samiti, Member	-----

39	Md. Iman Miya	President, Truck Driver Association	01716-426325
40	Kamal	BIWTA Lease Holder	01733-878766
41	Md. Mobin Sarovar	Businessman	01713-612390
42	Md. Noorul Haque Sarker	General Secretary, Truck Driver Association	01753-612639
43	Md. Jalal Miya	Driver	01710-327030
44	Moti Miya	Meghna somobye samiti, Member	01307-603075
45	Md. Dalim Miya	Businessman	01708-605282
46	Md. Babul Miya	Businessman	01914-701264
47	Asaduzzaman Khandaker	Businessman	01737-751972
48	Md. Azizur Rahman	Businessman	01715-318319
49	Md. Kuddus Miya	Businessman	01748-989760
50	Md. Abul Hashem	Meghna somobye samiti, Member	-----
51	Md. Jamshed Hossain	Driver	01744-545636
52	Md. Roquan	Boat Driver	01787-018473

53	Abdul Auyal	Boat Driver	01720-471673
54	Md. Kalam Sikder	Businessman ( ship)	01749-931310
55	Md. Rahim Uddin	Businessman (Fertilizer)	01760-538879
56	Mostafa Miya	Businessman	01713-807834
57	Zahidul Islam	Businessman	01915-963939
58	Paresh Chandra Saha	Businessman	-----
59	Md. Badal Miya	Businessman	01712-214078
60	Chadir Miya	Boat Driver	01736-772219
61	Md. Rajiv Sikder	Businessman	01703-968705
62	Md. Yasin	Service	01716-611121
63	Ataur Rahman Kabir	Businessman	01711-223136
64	Najibul	Businessman	01317-989186
65	Abu Bakr Siddique	Labor chief	01732-347978
66	Kamal Uddin	Businessman	01733-997388

67	Tapas Sarker	Businessman	01913-416730
68	Md. Shafiqul Islam	Businessman	01919-781383
69	Md. Nasir Miya	Businessman	01711-184180

Bangladesh Regional Water Transport project -1  
Bangladesh Inland Water Transport Authority  
**Public Consultation Meeting on  
Environment, Gender, Social and Resettlement issues**

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Name of Subproject: Asugonj Cargo Terminal

Place : Asugonj Feri Ghat

Date : 12.02.2020

Time : 10.30-12.30

Upazila : Ashugonj

District : Brahmanbaria

**PIU Member of BRWTP -1 Project, BIWTA:**

SL #	Name of participant	Profession/ Stakeholder	Cell phone no:
01	Md. Monjurul Haque	DPD , BIWTA	01722-179479
02	Md. Khairul Alam	River Ports Specialist BRWTP, BIWTA	01711-388042

03	Md. Nazrul Islam Sarker	Social Expert BRWTP-1	01719-542270
04	Md. Shamim Ahmed	Traffic Supervisor BIWTA	01747-653292
05	Md. Main Uddin	B.S. BIWTA	01783-845699
06	Sumon Chamdra Sarker	BIWTA	01722-171965
07	Md. Najmul Alam	BIWTA	01816-097069
<b>S-6 Consultants Of BRWTP-1</b>			
01	Maio Rios Garcea	Chemical Eng. TYP SA	
02	A.R. Mollah	Ecologist	01711-680704
03	Kh. Khairul Matin	Social Development Specialist ,TYP SA	01741127736
04	Mohsen Ara	Community Engagement Expert	01715287204
05	Ratan Kumar Shaha	Asst: Sociologist	01725-789779
06	Md. Ahasan Habib	Asst: Sociologist	01721-474053
07	Md. Mizanur Rahman	Asst: Sociologist	01683-301740

(C)

Stakeholders Consultation Meeting  
Bangladesh Regional Water Transport Project -1  
Bangladesh Inland Water Transport Authority

Name of Subproject: Barisal Passenger Terminal

Place : Barisal Terminal Bhabon

Date : 27.10.2019

Time : 10.00-12.00

Upazila : Barisal

District : Barisal

**List of Participants:**

PIU Member of BRWTP-1 Project, BIWTA		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	Md. Shahidul Islam	Assistant Director of BTWTA
2.	Md. Mamun Ur Rashid	Executive Engineer, Barisal Division of BTWTA
3.	MamunurRashid Chowdhury	Convener of BTWTA
S-6 Consultants		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	1.Kh.Kharul Matin	Social Development & Resettlement Specialist, Package BRWTP-S6, TYP SA
2.	2. Mario Rios Garcia	Chemical Engineer, Package BRWTP-S6, TYP SA
3.	3. Begum Shamsun Nahar	Gender Expert, Package BRWTP-S6, KS Consultants
4.	4. Kushal Roy	Environmental Engineer,Package, BRWTP- S6,KS Consultants
5.	5.Md.Ashadulla Sadat	Community Engagement Expert, Package BRWTP-S6, KS Consultants
6.	6. Mohsen Ara	Community Engagement Expert, Package BRWTP-S6, KS Consultants
Occupation wise Participants' numbers:		
<b>SL</b>	<b>Occupation</b>	<b>Participants' numbers</b>
1.	Local of BIWTA	03

2.	Consultants	06
3.	Business	17
4.	Fruit seller	02
5.	Shopkeeper	16
6.	Councilor	01
7.	Service	03
8.	Business (chicken)	07
9.	Business (vegetable)	12
10	Labour	04
11	Boatman	01
12	Others	12
<b>Total Participants 84( Male 80 &amp; Female 04)</b>		

#### **Inaugural session :**

The consultation meeting was started by recitation from the holy Quran. The meeting was presided over A.T.M. Shahidullah, councilor, ward no 10, Barisal city corporation. The meeting was organized by TYP SA and KS Consultant Ltd.

At first, Kh.Kharul Matin, Social Development & Resettlement Specialist introduced each of PIU Member of BRWTP-1 Project, BIWTA and all Consultants.

Then **Md. Mamun ur Rashid, Executive Engineer**, Barisal Division of BIWTA discussed objectives of the project and its components. He said that BRWTP-1 project is one of the most priority project of the government. There is no need land accusation for the project. About 200 shops of City market, about 100 business of Vegetable market, about 100 shops of fruit seller and more than 100 small business would be affected during implementation of the project. **Md. Shahidul Islam, assistant Director of BTWTA** was present the meeting.

#### **Business session :**

At the beginning of the discussion **Mr Kushal Roy** Environmental Engineer (Consultants) BRWTP-1, discussed on ecology and environmental issues in the project area likely to be affected by the project implementation. The ecological impact resulting from the project may include degradation to both terrestrial and aquatic environmental conditions impacting fish, invertebrates, birds, frogs, turtle, lizards, and mammals. He mentioned

that particular concern, however, relates to dolphin and threatened turtle. He also mentioned that we are thinking how these impacts can be avoided or mitigated. The project will also monitor the impacts during the construction phase to track whether there is any adverse impacting of the project. He then requested the participants to give suggestions on how the adverse impacts can be avoided. During construction stage and operation & maintenance period.

**Begum Shamsun Nahar**, Gender Expert, BRWTP-1 discussed some government rules and regulations on gender issues such as National Women Development Policy 2011, the Convention on Elimination of All Forms of Discrimination Against Women (CEDAW) which was ratified by the Government of Bangladesh (GOB) in 1984 etc. Then she addressed gender issues including gender based violence (GBV) and gender related facilities for the women, elderly and disabled people in the terminals and vessels shelter. She has given emphasis on gender facilities for the women in general, pregnant women, breast feeding mother, elderly and disabled people who will be in the waiting place or working in the terminals and vessels shelter:

- a) Separate toilet for male and female
- b) Toilet with facilities for physically challenged people
- c) Enough lighting and visible location for female toilet considering security and safety
- d) Water supply and useable condition must be ensured by proper maintenance
- e) Breast feeding corner
- f) Separate prayer space for female with required facilities
- g) No discrimination of employment and wages for male and female laborers/workers for similar work

**Kh.Kharul Matin**, Social Development & Resettlement Specialist BRWTP-1, explained the potential social impacts and land acquisition and resettlement process of payment of compensation and resettlement benefits. He discussed the following issues-

- (xviii) Land acquisition requirements for each of the project location.
- (xix) Potential impacts on the passengers, local people and terminal users during construction phase of the project
- (xx) Process of land acquisition as per Acquisition and Requisition of Immovable Property Act, 2017 (ARIPA 2017)
- (xxi) Compensation payment mechanism by Deputy Commissioner (DC) office as per ARIPA 2017
- (xxii) Process of assessing replacement cost for land and other affected properties as per World Banks Environmental and Social Framework (ESF) and good practices of other development projects
- (xxiii) Compensation and resettlement benefits for the structures and business on the GOB land
- (xxiv) Other entitlements for the potential affected people (businessmen, wage laborers, vulnerable people)
- (xxv) Relocation requirement of the potential displaced businessmen

#### **Question and answer session:**

This session was moderated by Kh. Khairul Matin. He requested to all participants to



take part on *Question and Answer* session.

Issues raised by	Issues raised	Response by consultants
Bachchu Bapari, Chicken Business, 017374084027	He wanted relocation even instead of compensation for structure and business	Compensation will be paid for the lost assets as per GOB laws and World Bank policy. Relocation issue is quite different and will be mitigated separately
Abul Malek, Businessman (Vegetable) and Md. Kamal Munsii, Businessman (Vegetable) 01922-022522	He said that there are about 500 shops at the vegetable market and City Market in BIWTA land those require relocation in suitable place	The project authority will be briefed about the requirement. Relocation plan will be adopted in consultation with affected people
A.T.M. Shahidullah, Councilor, 10 no Ward ,BCC 01711456693 And Primal Chandra Dash, General Secretary. Sromic League , Barishal Town 01724-851252	Both of they said that to discuss with Honorable Minister and Mayor before finalization of design and relocation plan	The Hon'ble Minister and Mayor of Barisal City Corporation are well known about the project. They will obviously be consulted before finalization of the design and relocation plan
A.T.M. Shahidullah, Councilor, 10 no Ward ,BCC 01711456693,	He called on separate location for the river crossing boat and speed boat with independent pontoon and stair	Project will provide separate pontoon and stair for the river coring boats and passenger in sage distance.

Apart from, Asia Khatun, Shopkeeper, Shohel Hawlader(Vegetable Business), Kawser member (Vegetable Business) and Mrs saleha Khatun also discussed the aforementioned issues.

**Some Photographs of Consultation meeting at Barisal Passenger Terminal**



Concluding Remark :

A.T.M. Shahidullah, councilor, 10 no ward, Barisal city corporation, Chairperson of the meeting thanked the participants and the members of consultants to make the meeting a great success. He is expecting that all opinions of the participants will be considered during the project planning and implementation

#### **Attendance**

Bangladesh Regional Water Transport project -1

Bangladesh Inland Water Transport Authority

**Public Consultation Meeting on**

**Environment, Gender, Social and Resettlement issues**

**Name of Subproject: Barisal Passenger Terminal**

Place : Barisal Terminal Bhabon

Date : 27.10.2019

Time : 10.00-12.00

Upazila : Barisal

District : Barisal

**Attendance Sheet of Public Consultation held in Barisal Terminal Bhabon**

<b>SL #</b>	<b>Name of participant</b>	<b>Profession/ Stakeholder</b>	<b>Cell phone no:</b>
1	A.T.M. Shahidullah	Councilor,10 no Ward, BCC	01711456693
2	Md. Mamun Ur Rashid	Exen, Barisal Division of BTWTA	01778553374
3	Mamunur Rashid Chowdhury	Convener of BTWTA	01718136126
4	Primal Chandra Dash	General Secretary. Sromic League ,Barisal Town	01724851252
5	Md. Shahidul Islam	Assistant Director of BTWTA	01777806551
6	Mrs. Laki Begum	Shopkeeper	
7	Md.Mizanur Rahman	Shopkeeper	01722378577
8	Lima	Shopkeeper	
9	Md. Summon	Chicken Business (Arhoth)	01712617650
10	Md. Tutul	Businessman	01911145138
11	Kabir Ahmed	Service	01716138973
12	Shanjib Lal Hela	Service	01714599317
13	Animas Vaidya	Service	01926839284
14	Md.Chunnu Bapari	Businessman	01923523855
15	Md. Habib Shikder	Businessman(Fish)	01759532581
16	Md. Babul Molla	Businessman( Meat)	01911967709
17	Md. Selim Munsu	Businessman (Vegetable)	01929270850
18	Md. Kamal Munsu	Businessman(Vegetable)	01922022522
19	Md. Zatin Ali	Shopkeeper	01738955095
20	Md. Shohel	Vegetable Vendor	01704609642
21	Md. Ataher Hosen	Shopkeeper	01720226030
22	Md. Ismail	Vegetable Vendor	01761994349

23	Moslam Munsu	Vegetable Vendor	01706580170
24	Md. Shabuj Hossen	Tea Seller	01710941207
25	Md. Abul Hossen	Business (Meat)	01929732492
26	Md. Babul Fakir	Businessman (Vegetable)	01929940706
27	Md. Shoel Rana	Businessman( Vegetable)	01984493448
28	Md. Rajjak	Businessman (Vegetable)	0177149288
29	Md. Al Amin	Fruit seller	01704956851
30	Md. Ohedul	Tea Seller	01724216093
31	Md. Liakat Hossain	Shopkeeper	01724456489
32	Md. Kalam	Vegetable Vendor	017928434245
33	Md. Rana	Businessman( Meat)	01760771049
34	Md. Abdul Aziz	Businessman	01712702275
35	Md. Mutaleb	Chicken Businessman	0172649405
36	Md. Babul	Shopkeeper	-
37	Shukh Ranjan	Businessman	-
38	Nnrul Islam	Businessman	01741411125
39	Md. Lal Mia	Businessman (Vegetable)	0191749068
40	Abdul Haq	Businessman(Vegetable)	01761101259
41	Abu Bakkar Howlader	Fruit Seller	01984496079
42	Mrs. Saleha Khatun	Shopkeeper	-
43	Md. Milon hallowder	Businessman (Vegetable)	01721431857
44	Krishna Dash	Betel leaf Business	01751652598
45	Md. Hannan	Tea seller	-
46	Kamal	Vegetable Vendor	-
47	Md. Litton	Tea seller	01732133795
48	Md. Zakir	Businessman	01929960726
49	Md. Shaddam Shah	Businessman	01811560701

50	Md. Shied Hossain	Businessman	01721690069
51	Md. Showhag	Businessman	01721354189
52	Rashid	Businessman	01765347570
53	Nurul	Businessman	01987254260
54	Ripon B'aparai	Chicken Businessman	01745396165
55	Md. Bachchu Hallawer	Chicken Businessman	01682948375
56	Md. Salim Faraji	Businessman	01919467072
57	Md. Harun	Businessman(Vegetable)	01923148958
58	Dr. Pronob Kumar Mozumder	Asst. Environmentalist	01751775662
59	Begum Shamsun Nahar	Gender Expert of KSCL	017151018981
60	Kushal Roy	Environmental assistant KSCL	01783264521
61	Kh. Khairul Matin	Social Development & Resettlement Specialist, TYP SA	01741127736
62	Maio Rios Garcea	Chemical Engineer , TYP SA	
63	Jahangir Bepari	Businessman	01721540804
64	Shukur Mazy	Boat Driver	
65	Bachchu Bapari	Shop (Hen)	017374084027
66	Musharraf	Day-Labor	
67	Asia Khatun	Shopkeeper	
68	Md. Shoel Rana	Shopkeeper	01718114412
69	Md. Raiaj Boparai	Shopkeeper	01758903642
70	Md. Eddies	Businessman	
71	Bilal	Shopkeeper	01749718544
72	Jakir	Businessman	
73	Abur Sowbhan	Chicken Businessman	
74	Hridoy	Shopkeeper	
75	Md. Hanif	Businessman	

76	Abul Malek	Businessman (Vegetable)	
77	Ibrahim	Day Labor	
78	Arif	Day Labor	
79	Shedam	Businessman	
80	Al- Amin	Day Labor	
81	Salam	Businessman	01867588865
82	Abdul Mannan	Businessman	01754997706
83	Md. Ashadulla Sadat	CEE, KSCL	01716045152
84	Mohsen Ara	CEE, KSCL	01715287204

**(D)**  
Public Consultation Meeting  
Bangladesh Regional Water Transport Project -1  
Bangladesh Inland Water Transport Authority

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Name of Subproject: Chandpur Passenger Terminal  
Place : Chandpur Launch ghat  
Date : 29.10.2019  
Time : 10.00 to 12.00  
Upazila : Chandpur  
District : Chandpur

**List of Participants:**

PIU Member of BRWTP-1 Project, BIWTA		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	Md. Monzurul Haque	PIU & PEC-Member, BRWTP-1 project and DD, Env & Social Cell, BIWTA
2.	Md. Mizanur Rahman	Environmental Expert, PIU Member of BRWTP-1 Project, BIWTA
S-6 Consultants		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	Kh.Kharul Matin	Social Development & Resettlement Specialist, BRWTP-1, TYPASA
2.	Md.Ashadulla Sadat	Community Engagement Expert,BRWTP-1, KS Consultants
3.	Mohsen Ara	Community Engagement Expert,BRWTP-1,KS Consultants
Occupation wise Participants' numbers:		
<b>SL</b>	<b>Occupation</b>	<b>Participants' numbers</b>
1.	Gest	02
2.	PIU, BIWTA	02
3.	Consultants	03
4.	Business	09

5.	Fruit seller	02
6.	Shopkeeper	16
7.	Councilor	01
8.	Service	06
9.	Boat man and Fisher	04
10.	Councilor	02
11.	Student	01
12.	CNG Driver	07
13.	Day Labour	04
14.	House wife/Female	02
15.	Journalist	02
16.	Others	27
<b>Total Participants 71( Male 69 &amp; Female 02)</b>		

**Inaugural session :**

The consultation meeting was started by recitation from the holy Quran. The meeting was presided over Alhaj Nasir Uddin Ahmed, Mayor, Chadpur Pourashava. The meeting was organized by TYPSA and KS Consultant Ltd. on Behalf of BRWTP-1

At first, Kh.Kharul Matin, Social Development & Resettlement Specialist, BRWTP-1 introduced of PIU Member of BRWTP-1 Project, BIWTA and all Consultants.

**Then Alhaj Nasir Uddin Ahmed, Mayor** of Chandpur Pourashava, said that Bangladesh Government has approved Bangladesh Delta Plan 2100 (BDP2100) on September 04, 2018 with the aspiration of achieving 'safe, climate resilient and prosperous Delta' by 2100. He referred a consultant of Netherlands that 'Meghna River is not a river it is a great sea'. He mentioned that any development project intervention was some impacts on social, environmental and livelihoods etc. There is no significant impacts on social, ecosystem and environmental during project implementation. There would be only minor impact on some commercial structures. He is pledged to BIWTA to give any kind of support during project implementation.

Then **Md. Mizanur Rahman**, Environmental Expert, PIU Member of BRWTP-1 Project, BIWTA discussed objectives of the project and its components. He also discussed environmental rules and regulations of the Government of Bangladesh (GOB). He mentioned some environmental rules such as (i) *The Environment Conservation Act*



(ECA) of 1995 (ii) National Environmental Management Plan, 1995 and (iii). Environmental Pollution Control Ordinance, 1977; World Bank Environmental Social standards (ESS). Md. Md. Monzurul Haque PIU & PEC-Member, BRWTP-1 project and Deputy Director (Environment & Social Cell) of BIWTA discussed his speech in a nutshell.

**Alhaj Abu Naim Dulal Patuari**, General Secretary of Bangladesh Awami League, Chandpur. He decorated to the meeting as a chief guest and said that, this project was long cherish dream of Chandpur city dwellers. He also explained why Chandpur Terminal is important for Chandpur dwellers and said that with the help of all people, we want to make a modern and aesthetic town for city dwellers.

#### **Business session :**

**Kh.Kharul Matin**, Social Development & Resettlement Specialist BRWTP-1, explained the potential social impacts and land acquisition and resettlement process of payment of compensation and resettlement benefits. He discussed the following issues-

- (xxvi) Land acquisition requirements for each of the project location.
- (xxvii) Potential impacts on the passengers, local people and terminal users during construction phase of the project
- (xxviii) Process of land acquisition as per Acquisition and Requisition of Immovable Property Act, 2017 (ARIPA 2017)
- (xxix) Compensation payment mechanism by Deputy Commissioner (DC) office as per ARIPA 2017
- (xxx) Process of assessing replacement cost for land and other affected properties as per World Bank's Environmental and Social Framework (ESF) and good practices of other development projects
- (xxxii) Compensation and resettlement benefits for the structures and business on the GOB land
- (xxxii) Other entitlements for the potential affected people (businessmen, wage laborers, vulnerable people)
- (xxxiii) Relocation requirement of the potential displaced businessmen

Side by side, He also discussed gender regarding facilities for the women in general, pregnant women, breast feeding mother, elderly and disabled people who will be in the waiting place or working in the terminals and vessels shelter.

- i) Separate toilet for male and female
- ii) Toilet with facilities for physically challenged people
- iii) Enough lighting and visible location for female toilet considering security and safety
- iv) Water supply and useable condition must be ensured by proper maintenance
- v) Breast feeding corner
- vi) Separate prayer space for female with required facilities
- vii) No discrimination of wages for male and female laborers/workers for similar work

## Question and answer session :

This session was moderated by Kh. Khairul Matin. He requested to all participants to take part on *Question and Answer* session.

Issues raised by	Issues raised	Response by consultants
Md. Sah Alam (Bepari), Councilor, 7 no ward, Chandpur Pourashava 01915070728	He said that Try to Avoid private land acquisition and Compensation for the structure and business on GOB land	Private land acquisition may be required for improvement of the terminals. If it is, then replacement cost for land will be paid
Md. Anowar Hawlader, Business, 01819823815	He said that People are living on the Bangladesh Railway land. He wanted compensation for them.	Compensation and resettlement benefits for the structures on the GOB land will be paid following World Bank policies and good practices of other projects.
Mis.Farida Ilias, Councilor,(Reserved) 7,8.9 017120201190	She said that passengers and terminal users are throwing garbage in to the river resulting contamination water. She requested to BIWTA authorities all of garbage produced by passenger will be kept in fixed place in the terminal. She pledged Conservancy department of Pourashava will be carried these garbage.	Environmental Management Plan will be prepared and compliance issues will be strictly monitored
Md. Selim Reza, Secretary, (BAL)7 no ward & President, Policing committee: 01712408006	He wanted those who will be lost their business and commercial structures, they will get compensation.	Compensation will be paid for lost assets irrespective of title to the land. Relocation issues will be discussion with the project authority
Alhaj Abu Naim Dulal Patuari, General Secretary, Bangladesh Awami League, Chandpur District. 01711989317	He said that approach road will need to be developed along with terminal to enjoy better facility. He suggested to construct approach road from terminal to Bus stand alongside the river	Project will consider necessity of approach road for including alignment route and make decision accordingly

Some Photographs of Consultation meeting at Chadnpur Cargo Terminal



Concluding Remark :  
**Alhaj Nasir Uddin Ahmed**, Mayor, Chadpur Pourashava ,Chairperson of the meeting thanked the participants and the members of consultants to make the meeting a great success. He is expecting that all opinions of the participants will be considered during the project planning and implementation.

**Attendance Sheet**  
 Bangladesh Regional Water Transport project -1  
 Bangladesh Inland Water Transport Authority  
**Public Consultation Meeting on**  
**Environment, Gender, Social and Resettlement issues**

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Name of Subproject: Chandpur Passenger Terminal

Place: Chandpur Launch ghat

Date: 29.10.2019

Time: 10.00 to 12.00

Upazila: Chandpur

District: Chandpur

**Attendance Sheet of Public Consultation held in Chandpur Passenger Terminal**

SL	Name of participant	Profession/Stakeholder	phone no:
1	Alhaj Nasir Uddin Ahmed	Mayor Chandpur Pourashava	01711989317
2	Alhaj Aubu Naim Dulal Patuari	General Secretary, Bangladesh Awami League, Chandpur District.	01711989317
3	Mis.Farida Ilias	Councilor,(Reserved) 7,8,9	017120201190
4	Md.Mahbubur Rahman	President ,Sromic League	01861955478
5	Md. Shah Alam (Bepari)	Councilor, 7 no ward, Chandpur Pourashava	01915070728
6	Md. Selim Reza	Secretary, (BAL)7 no ward & President, Policing committee	01712408006
7	Md.Nazrul Islam	Secretary, Jubo league	01716900270
8	Md. Sahalam Mia	Bangladesh Awami League, Chandpur	01977884988
9	Md. Shah Jalal	Bangladesh Awami League,Chandpur 7 No.Ward	01720443303
10	Md.Mohi Uddin	CNG Diver	01874536357
11	Md.Kader	Ferry driver	-
12	Md. Rofoj Uddin	Business	
13	Md.Yusuf Ali	-	
14	Md.Sekendar	C.N.G Driver	01729794322
15	Md.Towhidur Rahman Joni	Service	01816183404

16	Md.Rejaul Islam	Business	01817600679
17	Md. Mokbul Bepari	Business	01711734182
18	Md. Abdul Hannan	Business	01817641499
19	Md. Abul Kalam Azad	service	01715013568
20	Md. Mizanur Rahman Bhuiyen	Secretary,District Sromic League	01926007544
21	Md.Shafikul Islam	Business	01817003488
22	Md.Hiron Sarkar	Laborer	
23	Md.Delowar Hosen Dorji	Business	01777588777
24	Md.Jwel Patoari	Service	01954670590
25	Md.Anowar Hawlader	Business	01819823815
26	Md.Mamun	Service	01721682253
27	Md.Jahangir	Business	01866529298
28	Md.Sultan Ahmed	Former President ,The R S League	01713615052
29	Md.Samim Sarkar	Service	01816310826
30	Md.Hosen Alli	Business	01403839573
31	Md.Musha	Business	01906510695
32	Md.Rafiqul Islam	Journalist	01825512045
33	Md.Sumon	Probashi	01642754944
34	Md.Giash Uddin Khan	Business and politician	01673749912
35	Md.Ismail Hossen	Service	01824705602
36	Md.Sha –Alam	A R T	01818435178
37	Md.Shajalal	Business	01752910630
38	Md.Mofijur	-	0182764408
39	Abdul Kalam Nishi	Sromic League Noubander	01715276440
40	Md.Shohag Hosen	C.N.G Driver	01857083677
41	Md.Ridoy	Service	01874858767
42	Md.Jahid	Student	01682667653

43	Md.Kalam Dewan	Fish Business	01811116449
44	Md.Ibrahim Mintu	-	01839680849
45	Doctor Mostak	Doctor/Pharmacy	01741289154
46	Md.Soleman Gazi	Labor	0172266858
47	Mohammad Alli	Rickshaw puller	
48	Md.Badsha Sekendar	Fish Business	01863136030
49	Md.Saddam Hosen	Lawyer	01681629504
54	Md.Giash Uddin	Fish Business	01714652512
55	Md.Ibrahim Hawlader	Rickshaw puller	018135421109
56	Md.Jashim Uddin	C.N.G Driver	01825519639
57	Md.Abdul Rashid	Labor	01859004402
58	Md.Belal Bepari	Shopkeeper	01814847072
59	Md.Mizanur Rahman	Environmental Expert , BIWTA	01713129275
60	Md.Manik	C.N.G Driver	01625668792
61	Md.Alomgir Hosen	Day Labor	01875132222
62	Md.Shohan	C.N.G Driver	01937624846
63	Md.Saiful Islam Liton	Business	01782674829
64	Md.Munjurul Haque	Deputy Director ,PIU ,BIWTA	01722179479
65	Md.Saidul Islam	C.N.G Driver	01767667391
66	Md.Sumon Sheak	Business	01715612798
67	Biplob Chandra Pal	Business	01878989579
68	Kowshik Ahmed	Jnr Environmental Expert, Ks Consultant	01748549063
69	Kh. Khairul Matin	Social Development & Resettlement Specialist , TYPASA	01741127736
70	Md. Ashadulla Sadat	Community Engagement Expert, KSCL	01716045152
71	Mohsen Ara	Community Engagement Expert, KSCL	01715287204

**(E)**  
Public Consultation Meeting  
Bangladesh Regional Water Transport Project -1  
Bangladesh Inland Water Transport Authority

Name of the subproject : Narayanganj Passenger Terminal  
Place of Meeting : BIWTA Conference Room, Narayanganj Terminal  
Date : 23th October, 2019  
Time : 10.00 AM to 12.00 PM  
Upzila : Narayanganj  
District : Narayanganj

**List of Participants:**

PIU Member of BRWTP-1 Project, BIWTA		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	Ehtesamul Parvez	Assistant Director(Port) ,Narayanganj Passenger Terminal of BIWTA
2.	Dr.Md.Zakirul Hasan Faruk	Medical officer, Narayanganj Passenger Terminal of BIWTA
S-6 Consultants		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	Kh.Kharul Matin	Social Development &Resettlement Specialist, Package BRWTP-1, TYP SA
2.	Mario Rios Garcia	Chemical Engineer, Package BRWTP-1,TYP SA
3.	A.R.Molia	Ecologist, Package BRWTP-1 KS Consultants
4.	Md.Ashadulla Sadat	Community Engagement Expert,BRWTP-1, KS Consultants
5.	Mohsen Ara	Community Engagement Expert, Package BRWTP-1, KS Consultants
Occupation wise Participants' numbers:		
<b>SL</b>	<b>Occupation</b>	<b>Participants' numbers</b>
1.	Local of BIWTA	02
2.	Consultants	05
3.	Business	08

4.	Fruit seller	21
5.	Shopkeeper	11
6.	Doctor	01
7.	Service	02
8.	DEPTC	03
10	Labour	03
11	Others	16
Total Participants 72( Male 72& Female 00)		

#### **Inaugural session :**

The consultation meeting was started by recitation from the holy Quran. The meeting was presided over Md. Siddiqur Rahman, President, CBA of BIWTA, The meeting was organized by TYPISA and KS Consultant Ltd. on Behalf of BRWTP-1

At first, Kh.Kharul Matin, Social Development & Resettlement Specialist, Package BRWTP-1 introduced each of PIU Members of BRWTP-1 Project, BIWTA and all Consultants.

Then Ehtesamul Parvez Assistant Director (Port),Narayanganj Passenger Terminal ,BIWTA. He discussed on environmental rules & regulation of Bangladesh Government as well as World Bank`s Environmental Social standards (ESS).He explained the attitude of Bangladesh Government (GoB) about passenger, Cargo terminal & Vessels shelter. He said that Narayanganj is only one multimodal port of Bangladesh. He also explained why Primary treatment facilities for the terminal user`s.

#### **Business session :**

At the beginning of the business session, **Mr. Abdur Rob Mollah**, Ecologist (Consultants) BRWTP-1, discussed on ecology and environmental issues in the project area likely to be affected by the project implementation. The ecological impact resulting from the project may include degradation to both terrestrial and aquatic environmental conditions impacting fish, invertebrates, birds, frogs, turtle, lizards, and mammals. He mentioned that particular concern, however, relates to dolphin and threatened turtle. He also mentioned that we are thinking how these impacts can be avoided or mitigated. The project will also monitor the impacts during the construction phase to track whether there is any adverse impacting of the project. He then requested the participants to give suggestions on how the adverse impacts can be avoided. During construction stage and operation & maintenance period.

**Kh.Kharul Matin**, Social Development & Resettlement Specialist BRWTP-1, explained the potential social impacts and land acquisition and resettlement process of payment of



compensation and resettlement benefits. He discussed the following issues-

- (xxxiv) Land acquisition requirements for each of the project location.
- (xxxv) Potential impacts on the passengers, local people and terminal users during construction phase of the project
- (xxxvi) Process of land acquisition as per Acquisition and Requisition of Immovable Property Act, 2017 (ARIPA 2017)
- (xxxvii) Compensation payment mechanism by Deputy Commissioner (DC) office as per ARIPA 2017
- (xxxviii) Process of assessing replacement cost for land and other affected properties as per World Banks Environmental and Social Framework (ESF) and good practices of other development projects
- (xxxix) Compensation and resettlement benefits for the structures and business on the GOB land
- (xl) Other entitlements for the potential affected people (businessmen, wage laborers, vulnerable people)
- (xli) Relocation requirement of the potential displaced businessmen

He also discussed gender regarding issues –

- h) Separate toilet for male and female
- i) Toilet with facilities for physically challenged people
- j) Enough lighting and visible location for female toilet considering security and safety
- k) Water supply and useable condition must be ensured by proper maintenance
- l) Breast feeding corner
- m) Separate prayer space for female with required facilities
- n) No discrimination of employment and wages for male and female laborers/workers for similar work

**Question and answer session :**

This session was moderated by Kh. Khairul Matin. He requested to all participants to take part on *Question and Answer* session.

Issues raised by	Issues raised	Response by consultants
Md Abul Kalam, Fruit seller  01673398088	He point out that displaced shops would be paid compensation	Affected shop owners will be paid compensation following the World Bank Environmental and Social Framework (ESF)
Md. Shahin,shopkeeper  01728763446	He said the same words like as Md.Adul Kalam, Fruit seller	Affected shop owners will be paid compensation following the World Bank Environmental and Social

		Framework (ESF)
<p>Md Shobuj Shikder Bangladesh Shipping Sromic Federation.</p> <p>0171612590</p>	<p>He highly thanked to the Government of Bangladesh (GoB) for adopting to improve terminal facilities. He point out the following issues -</p> <p>i. River crossing boats along with separate pontoon and stairs would be in safe distance</p> <p>ii. Plan the terminal Necessary facilities for the women and disabled passenger including separate toilet, prayer hall, breast feeding corner, etc. in the terminal and vessels</p>	<p>i. This will be in the design to keep the pontoon and stair for the river crossing boats and passenger in safe distance</p> <p>ii. Women and disabled will have special facilities including ramp, breast feeding corner, separate toilet, prayer hall, sufficient lighting in the corner space of vessels and terminals.</p>
<p>Md. Bodiuzzaman Badal, President, Launch owner association,</p>	<p>He point out the following issues-</p> <p>i. Avoid private land acquisition</p> <p>ii. River crossing boats along with separate pontoon and stairs would be in safe distance</p> <p>iii. A space for relocation of the shop keepers within the terminal or outside the terminal</p> <p>iv. Drainage system would be uninterrupted</p> <p>v. Employment opportunity of the affected people in the project construction and operation phase</p>	<p>(i) Private land will not be acquired to improve Narayanganj Passenger terminal</p> <p>(ii) This will be in the design to keep the pontoon and stair for the river coring boats and passenger in safe distance.</p> <p>(iii) This issue will be discussed with the PIU of BRWTP-1 to consider relocation of the shops to facilitate businessmen and passenger</p> <p>(iv) Drainage system will be developed to avoid water logging</p> <p>(v) Local people particularly affected vulnerable people will be</p>

		preferentially employed in the civil construction
Dr. Md.Zakirul Hasan Faruk, Medical officer, Medical officer, Narayanganj Passenger Terminal ,BIWTA 01712-541596	He point out that Primary treatment facilities for the terminal users would be available with at least 10 beds	A developed medical facility including Doctor and medicine will be in the terminal

**Some Photographs of Consultation meeting at Narayangang Passenger Terminal**



**Concluding Remark :**

Md. Siddiqur Rahman, President, CBA of BIWTA, Chairperson of the meeting thanked the participants and the members of consultants to make the meeting a great success. He is expecting that all opinion of the participants will be considered during the project planning and implementation.

**Attendance Sheet**  
 Bangladesh Regional Water Transport project -1  
 Bangladesh Inland Water Transport Authority  
**Public Consultation Meeting on**  
**Environment, Gender, Social and Resettlement issues**

**Name of Subproject: Narayanganj Passenger Terminal**

Place : Conference Room, BIWTA

Date : 23.10.2019

Time : 10.00-12.00

Upazila : Narayanganj

District : Narayanganj

**Attendance Sheet of Public Consultation held in Conference Room, BIWTA**

SL #	Name of participant	Profession/ Stakeholder	Cell phone no:
1	Md. Bodiuzzaman Badal	BIW(PC)A	01705511111
2	Md.Rajib	Businessman	01963353840
3	Shohag	Businessman	01745315808
4	Abdul Gofran	BIWTA	01915806063
5	Md. Jahangir Alam	BIWTA	01716813115
6	Md Mamun Hossain	BIWTA	01716592877
7	Ehtesamul Parvez	Assistant Director(Port )BIWTA	01971343747
8	Md. Siddiqur Rahman	Chairman , CBA (BIWTA)	01819450013
9	Kh. Khairul Matin	Social Development Specialist, TYPSA	01741127736
10	Mario Rios Garcia	Chemical Engineer, TYSPA	
11	Md. Lutfur Rahman Miah	Senior INS & Admin	01916983224
12	Abbas	Shopkeeper	
13	Md Sabuj Shikder	Bangladesh Shipping Sromic Federation	0171612590
14	Alamgir Miah	PCA,BIWTA	01817512510
15	DR Md. Zakirul Hasan	Medical Officer, BIWTA	01712541596

	Faruk		
16	Munshi Abdulla	Medical Centre	01613863708
17	Md. Alauddin	Accountant	01714933887
18	MD Roni Foraji	DEPTC,Narayongongj	01838600427
19	Rakib pathan	DEPTC, Narayongongj	01838600427
20	MD Shakil Miha	DEPTC, Narayongongj	01630373120
21	Md. Shahin	Shopkeeper	1728763446
22	MD Saiful Islam	Noaw P CHA	01712707496
23	Md. fazrul Haque	Shopkeeper	0181493240
24	Md.Sentu	Shopkeeper	
25	Shipon Sorddar	Shopkeeper	01858522323
26	Md Jakir Hossain	Shopkeeper	01877644964
27	Md. Jakir	Fruit seller	01988566869
28	Md Jalal Ahmed	Fruit seller	01672996941
29	Md. Khorshad Alom	Confectionery	0171353764
30	Md. Shalim	Businessman	01912448662
31	Md. Kazi Murad	Shopkeeper, Vegetable	01868803227
32	Kshisno Saha	Fruit seller	01701485259
33	Md Sahajalal Mona	Fruit seller	01738109440
34	Monir Hossain	Floating Business (Betel leaf, cigarettes etc.)	01814402513
35	Md Badal Khan	Floating Business (Betel leaf, cigarettes etc.)	01715348734
36	Md. Mohammadulla	Fruit seller	01871576413
37	Md Ruhul Amin	Fruit seller	01833791398
38	Dilip Babu	Businessman	
39	Shahazan Bapari	Fruit seller	01942823058
40	Moznu Mia	Fruit seller	01980960854

41	Md Abul Kalam	Fruit seller	01673398088
42	Md Shiraj	Fruit seller	01850215612
43	MD Moslam	Businessman	01924879016
44	Md Manik Mia	Service	01888521391
45	Md Bajlur Rhaman	Shopkeeper	01842012274
44	Md Kabir Hossain	Businessman	01981369398
47	MD Anower	Tea seller	18222511017
48	Abdul Rohim Dorbes	Fruit seller	0140468785
49	MD Jalil	Tea seller	01727009993
50	Kali Podo Saha	Fruit seller	01716867658
51	Md Khalak Gazi	Fruit seller	01671085410
52	Md Jakir Uddin	Fruit seller	01638262592
53	Abdus Samad	Day labor	
54	Md Mohamudullah	Businessman(Sand)	01629365741
55	Dulal Mia	Tea seller	1751680177
56	Rofiq	Fruit seller	01401521200
57	Md.Ziaur Rhaman	Fruit seller	01679775611
58	Md. Lal Mai	Businessman( Vegetable seller )	
59	Md. Nanu	Fruit seller	01817632765
60	Gones Gosh	Shopkeeper	
61	Masum	Grocery	
62	Rofiq	Businessman( Cosmetic)	01922039979
63	Jalal	Business(Telecom)	01773448448
64	Ramiz Uddin	Floating Business (Betel leaf, cigarettes etc.)	01988858668
65	Abu Akkas Zihad	Shopkeeper	01818116033
66	Liton Mia	Fruit seller	-

67	Dayal Bhai	Fruit seller	-
68	Maiyen uddin	Business	-
69	Zaved Ali	Day Labor	-
70	Sharif Sunon	Journalist, Alokit Bangladesh	01919079017
71	Md.Ashadulla Sadat	Community Engagement Expert	01716-045152
72	Mohsen Ara	Community Engagement Expert	01715287204

(F)

Stakeholders Consultation Meeting  
Bangladesh Regional Water Transport Project -1  
Bangladesh Inland Water Transport Authority

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**Name of Subproject: Pangaon Cargo Terminal**

Place : Pangaon Boat ghat  
Date : 22.10.2019  
Time : 03.00 - 05.00 pm  
Upazila : South Keranigonj  
District : Dhaka

**List of Participants:**

<b>PIU Member of BRWTP-1 Project, BIWTA</b>		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	Md. Muniruzzaman	Executive Engineer, PIU Member of BRWTP-1 Project, BIWTA
2.	Md. Mizanur Rahman	Environmental Expert, PIU Member of BRWTP-1 Project, BIWTA
3.	Md. Nazrul Islam Sarker	Social Expert, PIU Member of BRWTP-1 Project, BIWTA
<b>S-6 Consultants of BRWTP-1</b>		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	Kh.Kharul Matin	Social Development &Resettlement Specialist, BRWTP-1, TYPASA
2.	Mario Rios Garcia	Chemical Engineer, BRWTP-1, TYPASA
3.	A.R.Molia	Ecologist, BRWTP-1, KS Consultants
4.	Begum Shamsun Nahar	Gender Expert,BRWTP-1 KS Consultants
5.	Kushal Roy	Environmental Engineer BRWTP-1 KS Consultants
6.	Md.Ashadulla Sadat	Community Engagement Expert, BRWTP-1 KS Consultants
7.	Mohsen Ara	Community Engagement Expert, BRWTP-1, KS



		Consultants
<b>Occupation-wise Participants' Numbers:</b>		
<b>SL</b>	<b>Occupation</b>	<b>Participants' numbers</b>
1.	PIU, BIWTA	03
2.	Consultants	07
3.	Business	10
4.	CNG Driver	05
5.	House wife /Female	02
6.	Councilor	01
7.	Service	04
8.	Retard	03
9.	Unemployment	03
10	Teacher	02
11	Boatman	02
12	Others	16
<b>Total Participants: 58 (Male 56 &amp; Female 02)</b>		

**Inaugural session:**

The public consultation meeting was started by recitation from the Holy Quran. The meeting was presided over Md. **Kamal Hussain**, member, Kunda Union Parishad. The meeting was organized by TYP SA and KS Consultant Ltd. on behalf of BRWTP-1 of BIWTA.

At first, **Kh. Khairul Matin**, Social Development & Resettlement Specialist of BRWTP-1, introduced each of PIU Members of BRWTP-1 Project, BIWTA and all Consultants.

Then **Md. Mizanur Rahman**, Environmental Expert, PIU Member of BRWTP-1 Project, BIWTA discussed objectives of the project and its components. He also discussed environmental rules and regulations of the Government of Bangladesh (GOB). He mentioned some environmental rules such as (i) *The Environment Conservation Act (ECA) of 1995* (ii) National Environmental Management Plan, 1995 and (iii). Environmental Pollution Control Ordinance, 1977; World Bank Environmental Social standards (ESS) .Md. Muniruzzaman Executive Engineer, PIU of BRWTP-1 Project, BIWTA Discussed his speech in a nutshell.

## **Business session:**

At the beginning of the business session, **Mr. Abdur Rob Mollah**, Ecologist (Consultants) BRWTP-1, discussed on ecology and environmental issues in the project area likely to be affected by the project implementation. The ecological impact resulting from the project may include degradation to both terrestrial and aquatic environmental conditions impacting fish, invertebrates, birds, frogs, turtle, lizards, and mammals. He mentioned that particular concern, however, relates to dolphin and threatened turtle. He also mentioned that we are thinking how these impacts can be avoided or mitigated. The project will also monitor the impacts during the construction phase to track whether there is any adverse impacting of the project. He then requested the participants to give suggestions on how the adverse impacts can be avoided. During construction stage and operation & maintenance period.

**Begum Shamsun Nahar**, Gender Expert, BRWTP-1 discussed some government rules and regulations on gender issues such as National Women Development Policy 2011, the Convention on Elimination of All Forms of Discrimination Against Women (CEDAW) which was ratified by the Government of Bangladesh (GOB) in 1984 etc. Then she addressed gender issues including gender based violence (GBV) and gender related facilities for the women, elderly and disabled people in the terminals and vessels shelter. She has given emphasis on gender facilities for the women in general, pregnant women, breast feeding mother, elderly and disabled people who will be in the waiting place or working in the terminals and vessels shelter:

- o) Separate toilet for male and female
- p) Toilet with facilities for physically challenged people
- q) Enough lighting and visible location for female toilet considering security and safety
- r) Water supply and useable condition must be ensured by proper maintenance
- s) Breast feeding corner
- t) Separate prayer space for female with required facilities
- u) No discrimination of employment and wages for male and female laborers/workers for similar work

**Kh.Kharul Matin**, Social Development & Resettlement Specialist BRWTP-1, explained the potential social impacts and land acquisition and resettlement process of payment of compensation and resettlement benefits. He discussed the following issues-

- (xlii) Land acquisition requirements for each of the project location.
- (xliii) Potential impacts on the passengers, local people and terminal users during construction phase of the project
- (xliv) Process of land acquisition as per Acquisition and Requisition of Immovable Property Act, 2017 (ARIPA 2017)
- (xlv) Compensation payment mechanism by Deputy Commissioner (DC) office as per ARIPA 2017
- (xlvi) Process of assessing replacement cost for land and other affected properties as per World Banks Environmental and Social Framework (ESF) and good practices of other development projects
- (xlvii) Compensation and resettlement benefits for the structures and business on the GOB land

- (xlviii) Other entitlements for the potential affected people (businessmen, wage laborers, vulnerable people)
- (xlix) Relocation requirement of the potential displaced businessmen

**Question and Answer Session:**

This session was moderated by Kh. Khairul Matin. He requested to all participants to take part on *Question and Answer* session.

<b><i>Issues raised by</i></b>	<b><i>Issues raised</i></b>	<b><i>Consultants' response</i></b>
Kazi Kamrul Hasan (CNF)  i. 01911950513	He said that large quantity land of kazi families has been acquired for construction ICT (Inland Container Terminal).  i. He point out avoid private land acquisition if possible. In case of urgency acquire plain land and avoid residential area as well as the pond/fish cultivation land.	i. Project will try to avoid private land acquisition and displacement ii. In case of urgency to acquire, compensation will be paid at replacement cost
Alhaj Kazi Motahar Hussain, Retried teacher  01916227377	He point out the following issues  i. Plan the terminal facilities including construction of a good mosque ii. People go to Pagla (business hub) by crossing the river for their daily needs. Construct a separate pontoon and stair for the river crossing people iii. Pontoon with passenger shed for the river crossing boat would be constructed in safe distance from the cargo terminals iv. Keep separate place for CNG and Auto-rikshaw and dumping place for garbage as well as need deep drainage system for remission of rainwater from inter area during monsoon	i. A new mosque will be constructed within the territory of the terminal by the project ii. River crossing boat operation will be uninterrupted. Stair and other facilities will be provided as per policy of the project. iii. This issue will be discussed with the BIWTA Management. Hopefully a pontoon and passenger shed will be constructed for the river-crossing passenger. iv. This issue will be discussed with the BIWTA Management.

## Some Photographs of Consultation meeting at Pangaon Cargo Terminal



### Concluding Remark:

**Md. Kamal Hussain**, Chairperson of the meeting thanked the participants and the members of BIWTA and consultants to make the meeting a great success. He is expecting that all opinions of the participants will be considered during the project planning and implementation.

## Attendance Sheet

Bangladesh Regional Water Transport project -1  
Bangladesh Inland Water Transport Authority  
**Public Consultation Meeting on  
Environment, Gender, Social and Resettlement issues**

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**Name of Subproject: Pangaon Cargo Terminal**

Place : Pangaon Boat ghat  
Date : 22.10.2019  
Time : 03.00 - 05.00 pm  
Upazila : South Keranigonj  
District : Dhaka

**Attendance Sheet of Public Consultation held Pangaon Boat ghat**

<b>SL #</b>	<b>Name of participant</b>	<b>Profession/ Stakeholder</b>	<b>Cell phone no:</b>
1	Md. Kamal Hossain	Member, 4 no Ward, North Pangaon	1967344180
2	Abdur Rahim	Retried (Teacher)	1715498860
3	Mst. Salma Begum	Housewife,	
4	Dr.Waziulla Chowdhury	Medical doctor	1716433071
5	Md. Kazi Aaiyub	Service	1672796949
6	Alhaj Kazi Motahar Hussain	Retried Teacher	1916227377
7	Md Abul Kashem	Terminal Officer, CPA	1846319329
8	Kazi Kamrul Hasan	CNF	1911950513
9	Kazi Yusuf	Retired, Teacher	1914507125
10	Kazi Alauddin	Unemployed	1816165622
11	Sheikh Shahabuddin	Service, Mama-Vagna enterprise	1759957872
12	Akro Dev	CNG Driver	1921435092
13	Ripon Miah	Business	1943434022
14	Jainal Kha	Business	1735623681
15	Kazi Akram Hussain	Business, Rice (Arot)	1865734483

16	Kazi Shariful Islam	Business	1554318716
17	Md. Shah Alam	Troller Driver	1846736767
18	Kazi Rubel	Business(Sand)	1916267734
19	Md. Rakib	CNG Driver	1955214989
20	Md. Tanvir Ahmed	CNG Driver	1926893299
21	Md.Solaiman	CNG Driver	1888677795
22	Md. Bahadur	Truck Driver	1890349836
23	Md. Nur Islam	Service ,Garments	
24	Md. Sohel	Day Labor	1812902399
25	Md. Siddique Miah	Business	1937647010
26	Binod Chandra Das	Unemployed	1919804227
27	Abdur Rashid	Unemployed	
28	Md .Motaher	Day Labor	
29		Shopkeeper	
30	Md .Anwar Hussain	-----	1797170286
31	Md. Muniruzzaman	Executive Engineer ,PIU,BIWTA	1711909250
32	Md. Mizanur Rahman	Environmental Expert,BRWTP-1	1713129275
33	Md. Nazrul Islam Sarkar	Social Expert,BIWTP-1	01719542270
34	Md. Altaf Hussain	Teacher	185006083
35	Mosharraf Hussain	Business	1720050655
36	Sharmin	Housewife	
37	Md. Shah Alam	Small Business	
38	Md. Jamshed Hussain	Service	1744545636
39	Ali Ahmed	Business	1706080242
40	Jalal Uddin	Troller Driver	
41	Md. Abul Hossain	Auto Driver	1887107143

42	Md. Dulu Bepari	Business( Brick and sand)	1986793702
43	Md. Shahidul Islam	Mason	1770038152
44	Md. Ruhul Amin Faraji	----	1717177114
45	Johirul Islam	Day Labor	1788753933
46	Chiru Bepari	Mason	1770038152
47	Md. Osman Ali	Business(Oil)	
48	Khokon Das	Business(Brick )	
49	Mustafa Kamal	Retired	1600225419
50	Md. Nur Hossain	Engine Maker	1913663290
51	Abdur Rob Mollah	Ecologist Expert	1711680704
52	Begum Shamsun Nahar	Gender Expert	
53	Koushik Ahmed	Junior Environment Expert, KS consultants	1748549063
54	Kh Khairul Matin	Social Development & Resettlement. Specialist, TYPASA	1741127736
55	Kushal Roy	Environmental Specialist, KSCL	1783264521
56	Mario Rios Garcia	Chemical Engineer, TYPASA	1319787385
57	Md. Ashadullah Sadat	Community Engagement Expert, KSCL	1716045152
58	Ms. Mohsen Ara	Community Engagement Expert, KSCL	01715287204

Stakeholders Consultation Meeting  
Bangladesh Regional Water Transport Project -1  
Bangladesh Inland Water Transport Authority

**Name of Subproject: Shashan ghat Passenger Terminal**

Place : Balur Ghat (Shanshan ghat)

Date : 22.10.2019

Time : 10.00-12.00

Upazila : Shampur, Dhaka

District: Dhaka

**List of Participants:**

PIU Member of BRWTP-1 Project, BIWTA		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	Md. Muniruzzaman	Executive Engineer, PIU Member of BRWTP-1 Project, BIWTA
2.	Md. Mizanur Rahman	Environmental Expert, PIU Member of BRWTP-1 Project, BIWTA
3.	Md. Nazrul Islam Sarker	Social Expert, PIU Member of BRWTP-1 Project, BIWTA
S-6 Consultants		
<b>SL</b>	<b>Name</b>	<b>Designation</b>
1.	Kh.Kharul Matin	Social Development &Resettlement Specialist, BRWTP-1, TYPSA
2.	Mario Rios Garcia	Chemical Engineer, BRWTP-1, TYPSA
3.	A.R.Molia	Ecologist, BRWTP-1, KS Consultants
4.	Begum Shamsun Nahar	Gender Expert,BRWTP-1 KS Consultants
5.	Kushal Roy	Environmental Engineer BRWTP-1 KS Consultants
6.	Md.Ashadulla Sadat	Community Engagement Expert, BRWTP-1 KS Consultants
7.	Mohsen Ara	Community Engagement Expert, BRWTP-1, KS Consultants
Occupation wise Participants' numbers:		
<b>SL</b>	<b>Occupation</b>	<b>Participants' numbers</b>
1.	PIU, BIWTA	03



2.	Consultants	07
3.	Business	12
4.	Teacher	16
5.	Day labour	05
6.	Councilor	01
8.	Service	04
9.	Others	12
Total Participants 66( Male 53 & Female 07)		

### **Inaugural session :**

The consultation meeting was started by recitation from the holy Quran. The meeting was presided by Md.Nasir Ahmed Bhuyaon, Councilor, 47 No Ward of DSCC. The meeting was organized by TYP SA and KS Consultant Ltd. on Behalf of BRWTP-1.

At first, Kh.Kharul Matin, Social Development & Resettlement Specialist, Package BRWTP-1 introduced to each of PIU Members of BRWTP-1 Project, BIWTA and all Consultants.

Then **Md. Mizanur Rahman**, Environmental Expert, PIU Member of BRWTP-1 Project, BIWTA discussed objectives of the project and its components. He also discussed environmental rules and regulations of the Government of Bangladesh (GOB). He mentioned some environmental rules such as (i) *The Environment Conservation Act (ECA) of 1995* (ii) National Environmental Management Plan, 1995 and (iii). Environmental Pollution Control Ordinance, 1977; World Bank Environmental Social standards (ESS) .Md. Muniruzzaman Executive Engineer, PIU of BRWTP-1 Project, BIWTA Discussed his speech in a nutshell

### **Business session :**

At the beginning of the business session, **Mr. Abdur Rob Mollah**, Ecologist (Consultants) BRWTP-1, discussed on ecology and environmental issues in the project area likely to be affected by the project implementation. The ecological impact resulting from the project may include degradation to both terrestrial and aquatic environmental conditions impacting fish, invertebrates, birds, frogs, turtle, lizards, and mammals. He mentioned that particular concern, however, relates to dolphin and threatened turtle. He also mentioned that we are thinking how these impacts can be avoided or mitigated. The project will also monitor the impacts during the construction phase to track whether there is any adverse impacting of the project. He then requested the participants to give suggestions on how the adverse impacts can be avoided. During construction stage and operation & maintenance period.

**Begum Shamsun Nahar**, Gender Expert, BRWTP-1 discussed some government rules and regulations on gender issues such as National Women Development Policy 2011,

the Convention on Elimination of All Forms of Discrimination Against Women (CEDAW) which was ratified by the Government of Bangladesh (GOB) in 1984 etc. Then she addressed gender issues including gender based violence (GBV) and gender related facilities for the women, elderly and disabled people in the terminals and vessels shelter. She has given emphasis on gender facilities for the women in general, pregnant women, breast feeding mother, elderly and disabled people who will be in the waiting place or working in the terminals and vessels shelter:

- v) Separate toilet for male and female
- w) Toilet with facilities for physically challenged people
- x) Enough lighting and visible location for female toilet considering security and safety
- y) Water supply and useable condition must be ensured by proper maintenance
- z) Breast feeding corner
- aa) Separate prayer space for female with required facilities
- bb) No discrimination of employment and wages for male and female laborers/workers for similar work

**Kh.Kharul Matin**, Social Development & Resettlement Specialist BRWTP-1, explained the potential social impacts and land acquisition and resettlement process of payment of compensation and resettlement benefits. He discussed the following issues-

- (I) Land acquisition requirements for each of the project location.
- (ii) Potential impacts on the passengers, local people and terminal users during construction phase of the project
- (iii) Process of land acquisition as per Acquisition and Requisition of Immovable Property Act, 2017 (ARIPA 2017)
- (liii) Compensation payment mechanism by Deputy Commissioner (DC) office as per ARIPA 2017
- (liv) Process of assessing replacement cost for land and other affected properties as per World Banks Environmental and Social Framework (ESF) and good practices of other development projects
- (lv) Compensation and resettlement benefits for the structures and business on the GOB land
- (lvi) Other entitlements for the potential affected people (businessmen, wage laborers, vulnerable people)
- (lvii) Relocation requirement of the potential displaced businessmen

**Question and answer session :**

This session was moderated by Kh. Kharul Matin, Social Development & Resettlement Specialist, requested to all participant to take part on Question and answer session.

Issues raised by	Issues raised	Response by consultants
Md.Sheikh Fazlul Rahman Bokul, President, of Bangladesh Steel Rolling Mill Association.	He requested to search alternative location for the terminal since Shashanghat is closed to the residential area,	This site has been selected based on feasibility study. Issue will be conveyed to the BIWTA. They can further review feasibility report

01711560810	Bangladesh Army camp and Postogola Bridge	
Md. Main uddin Chisti General Secretary , Awami League , 47 no Ward of DSCC	He said that people took land lease from Bangladesh Railway for business. Whether they will be paid compensation for their losses	Compensation will be paid for lost assets and business irrespective of title to the land
Jenat Rehana Teacher ,Foridabad High School 01627575423	She requested to compensation for the structures and business demolished by BIWTA couple of weeks ago	Structures were demolished to clear river bank as per decision of the government. So, compensation for those structures and business will not be paid under this project.
Sri Polash Chokraborti, Service , 01797167316	He said that why need access to the river from cremation ground for sacrificing Gods ( <b>Murti</b> ) of Hindu Community and ashes of burnt dead body	Project will keep access to the river for the Hindu Community for sacrificing Gods ( <b>Murti</b> ) and ashes
Yasmin Akter, Teacher. River View International School 01981665679	She requested to plan for Women and disabled would have all facilities in the improved terminals and vessels shelter.	Project will provide required facilities to women and disabled in the terminals and vessels
S.M. Zahangir Alam Bangladesh Furniture shop owner Association, Dhaka south city 01735140900	Adequate compensation and benefits for the affected people is to be paid	Adequate compensation will be paid for lost assets
Md. Moazzam Hoasin, Senior Teacher ,Foridabad High School, 01715842668	Second largest ship breaking yard is located at Shashanghat where thousands of people are involved. How their livelihood will be restored	This project will take care of the people will be affected by this project by losing assets and livelihood.
	Access road to the Shahanghat is very narrow. How the access to the improved Terminal	GOB is planning to implement Subway project connecting the Shashanghat. Other access roads will also be developed to facilitate the improved terminal

**Some Photographs of Consultation meeting at Shashan Ghat Passenger Terminal**



consultation meeting at shashanghat ,22~10~2019



consultation meeting at shashanghat ,date22~10~2019



consultation meeting at shashanghat,22~10~2019

**Concluding Remark :**

Md.Nasir Ahmed Bhuyaon, Councilor, 47 No Ward of DSCC and Chairperson of the meeting thanked the participants and the members of consultants to make the meeting a great success. He is expecting that all opinion of the participants will be considered during the project planning and implementation

**Attendance Sheet**  
 Bangladesh Inland Water Transport Authority  
**Public Consultation Meeting on**  
**Environment, Gender, Social and Resettlement issues**

**Name of Subproject: Shahan ghat Passenger Terminal**

Place: Balur Ghat (Shanshan Ghat)

Date: 22.10.2019

Time: 10.00-12.00

Upazila: Shampur, Dhaka

District: South District

**Attendance Sheet of Public Consultation held in Balur Ghat (Shanshan Ghat)**

SL #	Name of participant	Profession/Stakeholder	Cell phone no:
1	Md. Nasir Ahmed Bhuyaon	Councilor,47 No Ward of DSCC	01711561438
2	Md. Main uddin Chisti	General Secretary , Awami League , 47 no Ward DSCC	01748763520
3	Md.Sheikh Fazlul Rahman Bokul	President, Bangladesh Steel Rolling Mill Association.	01711560810
4	Easmin Akter	Teacher ,River View International School	01981665679
5	Yasmin Akter	Teacher ,River View International School	01678832532
6	Begum Nurun Naher Chowdhury	Principal , River View International School	01678832505
7	Md. Jasim Uddin	Imam & Khotib , Asoke Hasul (Sm) Masjid	01716319165
8	Jotis Chandro Pal	29 no Lal Mohan ,goder lane	01716172982
9	S M Zahangir Alam	Bangladesh Furniture shop owner Association, Dhaka south city	01735140900
10	Endrojit sen Chowdohry	Businessman	0182302530
11	Sheikh Laki Pervin	Teacher ,Foridabad High School	01552411811
12	Jenat Rehana	Teacher ,Foridabad High School	01627575423
13	Jasmin Hossain	Asst. Teacher ,Foridabad High School	01911566999

14	Soyed Juel	Teacher ,Foridabad High School	01721138192
15	Md. Nurul Amin	Teacher ,Foridabad High School	01729100256
16	Md. Jahidul Islam	Principle ,Foridabad High School	01717663320
17	Ummey Raihana	Senior Teacher ,River View International School	01688676611
18	Jhanara Dey	Senior Teacher , River View International School	01682183394
19	Kaniz Fatema Nipa	Asst. Teacher ,River View International School	01718518956
20	M. Mir Mahbubur Rahman	Vice – Principal, River View International School	01715157428
21	MD Jasim Uddin	Businessman	01717295544
22	Sri Polash Chokraborti	Service	01797167316
23	Md.Mizanur Rahman	joint convener, Awami League , 47 no Ward DSCC	01720103484
24	Rana Chowdohry	Businessman	01711028897
25	Milon Lal Dom	Service	01617647408
26	Mohammad Asif Iqbal	Senior Teacher , River View International School	01818984144
27	Md. Asraful Islam	Senior Teacher , River View International School	01710833587
28	Md.Moizanur Rhaman	Senior Teacher , River View International School	01919824320
29	Anil Chandra Roy	Senior Teacher ,Foridabad High School	01819181687
30	Md. Moazzam Hoaasin	Senior Teacher ,Foridabad High School	01715842668
31	Md. Delwar Hossain	Businessman(Ship)	01821503575
32	Md Shihab	Businessman( Iron and chement)	01711345001
33	Md. Siddik	Leader, Labour	01712912616
34	Md. Eman Hossain	Businessman (Iron)	01712039517
35	Khondoker Nazrul	Businessman(Cloths)	01712104246

	Islam		
36	Alomgir	General Secretary , Laborer Union (Van)	01915568132
37	Md. Motin	Asst. General Secretary , Laborer Union (Van)	0192611843
38	Md. Rana	Van Driver	01722946515
39	Md. Ayub	Laborer	01793245901
40	M. Tara Mia	Laborer	01918499932
41	Md. Hafijur Rhaman	Businessman	01718581710
42	Shohel Das	Service	01865158597
43	Abdul Khalak	Businessman	01675720170
44	Md. Badal Hossain	Businessman	01743111540
45	Jahangir Hossain	Businessman	01678115755
46	Alal Uddin	Day laborer	01968298285
47	Raj kumar Mozunder	Private Service	01683151266
48	Woasim	Service	01922336999
49	Md. Anower Hossain	Day laborer	01716027443
50	Md. Salim	Day laborer	
51	Md.Aslam	Businessman	01713043231
52	Md Nazrul Islam Sarker	social Expert ,BIWTP -1 ,BIWTA	01719542270
53	Md. Moniruzzaman	Executive Eng. BIWTP -1 ,BIWTA	01711909250
54	Md. Abdul Rob Molla	Consultant, KSCL	01711680704
55	Md. Mizanur Rhaman	Environmental Expert, BIWTA	01713129275
56	Md. Mohiuddin Khan	Assistant Director , Dhaka Port	01715158253
57	Kowshik Ahmed	Jr Env Expert ,KSCL	01748549063
58	Kh. Khairul Mmatin	Social Development Specialist, TYPISA	01741127736
59	Begum Shamsur Nahar	Gender Expert, KSCL	01715101981
60	Mohsen Ara	CEE , KSCL	01715287204







Environmental and Social Impact Assessment of proposed new and up-  
gradation of Cargo and Passenger River Terminals. BRWTP-S6  
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT



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**ANNEX 11 CONSULTATION WORKSHOP ON S6 CONSULTANCY**

## **Annex 11**

**Consultation Workshop on Resettlement Action Plan (RAP) and  
Environmental & Social Impact Assessment (ESIA) of proposed Cargo  
and Passenger River Terminals under Bangladesh Regional Waterway  
Transport Project 1 (BRWTP-1)**

## **Consultation Workshop on Resettlement Action Plan (RAP) and Environmental & Social Impact Assessment (ESIA) of proposed Cargo and Passenger River Terminals under Bangladesh Regional Waterway Transport Project 1 (BRWTP-1)**

### **General**

A Consultation Workshop on Resettlement Action Plan (RAP) and Environmental & Social Impact Assessment (ESIA) of proposed Cargo and Passenger River Terminals under Bangladesh Regional Waterway Transport Project 1 (BRWTP-1) was celebrated on January 27th at BIWTA Conference Room (BIWTA Bhaban), 141-143 Motijheel C/A, Dhaka-1000.

**Commodore Golam Sadeq** (G) NGP, ndc, nsc, psc, BN, Chairman, BIWTA gave his kind consent to grace the occasion as Chief Guest and **Dr. AKM Matiur Rahman**, Member Engineering, BIWTA chaired the event.

The workshop counted with both the physical and virtual assistance of officials and member engineers from BIWTA, Ministry of Shipping, Bangladesh Department of Environment, Distinguished representatives from the World Bank, Government agencies, District & Upazila Administration, Stakeholders, Project Affected Persons (PAPs) including representatives from the Local Government also participated in the Consultation Workshop virtually.

A copy of the invitation card and the attendance list is attached to this Annex

### **Workshop presentations**

A first speech by Mr. Rajesh Rohatgi, Task Team Leader, World Bank, Dhaka was followed by the speech by the Chief Guest: Commodore Golam Sadeq (G) NGP, ndc, nsc, psc, BN.

After the welcome speech by **Mahmud Hasan Salim, Project Director (Director, BIWTA)**, The Consultants (TYPASA KS) proceeded with the presentation of the BRWTP-1 Project, Introduction, Methodology and Objective

The two main documents of the S6 Consultancy were presented by a ppt presentation to the assistants

#### a) The Resettlement Action Plan

It was explained how the project triggers the World Bank's OP 4.12 on Involuntary Resettlement which required that the economic, social, and environmental risks are mitigated, and livelihoods of the displaced persons were restored.

The unavoidable impacts related to land acquisition and economic displacement were identified through census and socio-economic survey from October 2019 to February 2020 at six terminals under S3 & S4 packages. Consultation meetings at all six sites have been held and disseminated project information, rolled out of the project and the affected people, compensation payment procedure, cut-off date, etc.

A comprehensive resettlement action has been prepared for the affected people to compensate them following the ARIPA 2017 and WB OP 4.12.

The main components presented were:

- Impacts identified by the project
- Eligibility Criteria and Policy
- Resettlement and Relocation options
- Grievance Redress Mechanism (GRM)
- Implementation Arrangement .
- Cost Estimate and Budget .

b) ESIA process, Main Results and Conclusions

The Environmental and Social Impact Assessment (ESIA) was presented as a decision-making tool to ensure that the project design and implementation of the related construction activities and subsequent activities are environmentally sustainable and socially acceptable

The main components presented were:

- Environmental and Social primary data collection
- Site specific identification and evaluation of impacts
- Site specific mitigation measures
- Site specific environmental and social management and monitoring plans during construction and operation
- Public participation and consultation

**Discussion**

After a Tea Break/ Refreshment and Open Discussions: Questions & Answers started.

In general, the participants appreciated the high level of both documents and the great work carried out in these years for their realization and the achievement of the objectives set. Likewise, they recognized the quality of the presentations and the level and large quantity of the exposed information.

As part of the discussion process, some questions and doubts arose from the participants, mainly on the ESIA's methodology and results obtained, to which the consultants responded exhaustively, leaving no question unanswered adequately.

Attached below is a table with the main issues raised during the debate and the responses issued by the consultants

Table 1: Responses to comments made on the workshop on ESIA

Sl. No	Comments from the audience	Responses to comments	
1	World Bank has developed a new Environmental Management Framework (?) and the ESIA Report should be aligned to that.	The project work was completed and ESIA prepared before the new EMF came into force. We followed the World Banks's Relevant Clauses of ECoP. The new Framework mainly relates to 3 <sup>rd</sup> party monitoring. Therefore, we think this should not be applicable to the present case. The WB has no any observation on this.	
2	Environmental sampling was limited to six locations in six terminal construction sites, it should cover the entire project sites, for example in the lower Meghna	As per Revised Contract, the ESIA Study was limited to 6 Passenger and Cargo Terminals, and therefore sampling was confined only to those terminal areas. Adequate number of replications of sampling were ensured at each site. It may be mentioned that in the revised contract the sites (15 launch ghats) located in the lower Meghna and its tributaries were dropped.	
3	How the weightage of different impact types used in the Empirical formula was determined, while assessing the impact significance and reference should be cited on the formula used.	It was mainly determined based on the <b>Leopold Matrix</b> method, a worldwide accepted methodology to determine the importance and the magnitude of the impacts. The Leopold matrix (LM) was developed in 1971 and provides a system for the analysis and numerical weighting of probable impacts. The Leopold matrix provides a simple way to summarize and rank environmental impacts, and to focus on those that are considered to be greatest. As far as possible, the assignment of magnitude is based on factual information (Sign /Nature, Type Intensity, Extent/Location, Timing, Reversibility, Recoverability and Duration/ Persistence). All these aspects are cited in the ESIA 5.2.1 Potential Impact Characterization; features and criteria	
4	How the scoping for the identification the receptors and impact parameters were undertaken	It was done by holding brainstorming session among the consultant team, which considered outcomes of reconnaissance field visits, project actions, consultants' experiences with similar projects in the country and published literature. <ul style="list-style-type: none"> <li>• For receptors , the ESIA report focuses on Valued Environmental Components or VECs that could be most affected by the Project and those that are a concern to governments, community members and stakeholders.</li> <li>• For impact parameters, a logical and systematic formal method is used for impact identification, this is the matrix. A matrix is used therefore, as a grid able to identify the interaction between environmental characteristics which are displayed along one axis, and project activities, which are displayed along the other axis.</li> </ul>	

Sl. No	Comments from the audience	Responses to comments	
5	<p>Management of , run-off water, solid and liquid wastes management actions are not included in the EMP, particularly for the operation phase</p>	<p>It is very much in the EMP, for both operation and construction phases of the project. The consultant team had regular interactions with the design engineers of S3 and S4 Components. Appropriate facilities for waste (both liquid and solid), run-off water, storm water, etc. have been considered in the design parameters of Terminal constructions.</p> <p>It may be mentioned that the EMP and monitoring plan for Physical Environment were not presented on the workshop, but the aspects are very much in the ESIA Report/ ESMP and Monitoring Plan of each site.</p> <p>An emergency response plan has been prepared, which also include the accidental spill management aspect</p>	
6	<p>Operational period EMP and monitoring plan should include threatened fishes as it is a concern to our fisheries</p> <p>-</p>	<p>Addressed in the ESMP and Monitoring Plans of each individual Terminal .</p> <p>However, we don't think that there will be appreciable magnitude of impact on threatened fish during the operation phase of the project. In fact, a wide range of factors (non-project) poses threats to fishes and fisheries of the area of influences of the concerned rivers, and likely to affect the fish abundance and diversity.</p> <p>EMP suggests for awareness campaign on the conservation of threatened fish and monitoring important threatened fishes available within project influence areas.</p>	

It should be noted that, because of the Workshop debate, no additional information or substantial modification of the reports has been necessary for which both the RAP and the ESIA reports presented can be considered as Finals.

Finally, after the final Round up and Concluding Speech by Chairperson, Dr. AKM Matiur Rahman, the workshop was finalized.

## Photographic Report





**Invitation Card**



Ministry of Shipping

Dear Sir/Madam,

We are pleased to warmly invite you to the Consultation Workshop on Resettlement Action Plan (RAP) and Environmental & Social Impact Assessment (ESIA) of proposed new/up-gradation of Pangaon & Ashuganj Cargo Terminals and Shasanghat (Dhaka), Narayanganj, Chandpur & Barishal Passenger River Terminals to be held on January 27, 2022 at BIWTA Conference Room (level-6 in the BIWTA Bhaban), 141-143 Motijheel C/A, Dhaka-1000.

**Commodore Golam Sadeq** (G) NGP, ndc, nsc, psc, BN, Chairman, BIWTA has given his kind consent to grace the occasion as Chief Guest and **Dr. AKM Matiur Rahman**, Member Engineering, BIWTA shall chair the event.

Distinguished representatives from the World Bank, Government agencies, District & Upazila administration, Stakeholders, Project Affected Persons (PAPs) including representatives from the Local Government will participate in the Consultation Workshop virtually.

Respected participants from BIWTA (HQ), Consultants from TYPASA, Spain and KS Consultants Limited, Bangladesh will participate and present in the Consultation Workshop.

Detailed schedules are as bellow:

Date : January 27, 2022  
Time : 10.00am (Dhaka Time)  
**Zoom ID : 811 2160 6703**  
**Passcode : brwtp1234**



**Mahmud Hasan Salim**  
Project Director  
(Director, BIWTA)

**Bangladesh Inland Water Transport Authority (BIWTA)**



**Invitation for the Consultation Workshop on Resettlement Action Plan (RAP) and Environmental & Social Impact Assessment (ESIA) of proposed Cargo and Passenger River Terminals under Bangladesh Regional Waterway Transport Project 1 (BRWTP-1)**

**Schedule (27 January 2022)**

- 09:45-10:00 Registration and connecting to the participants through virtual/online platform
- 10:00-10:05 Welcome Speech by Mahmud Hasan Salim, Project Director (Director, BIWTA), BRWTP-1 Project
- 10:05-10:15 1. Introduction, Methodology and Objective**
- 10:15-11:35 2. RAP and ESIA Presentation**
- The Resettlement Action Plan
- The ESIA process, Main Results and Conclusions
- 11:35-11:45 Tea Break/ Refreshment
- 11:45-12:35 3. Open Discussions: Questions & Answers**
- 12:35-12:40 Speech by Mr. Rajesh Rohatgi, Task Team Leader, World Bank, Dhaka
- 12:40-12:50 Speech by the Chief Guest:** Commodore Golam Sadeq (G) NGP, ndc, nsc, psc, BN, Chairman, BIWTA
- 12:50-13:00 Round up & Concluding Speech by Chairperson, Dr. AKM Matiur Rahman, Member Engineering, BIWTA


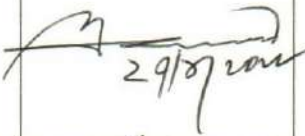
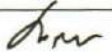

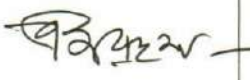

**Attendance List**

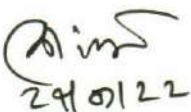
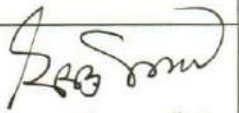
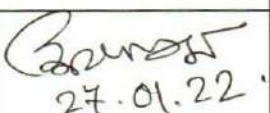
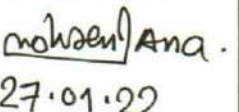
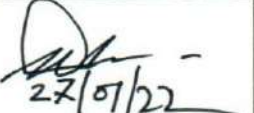

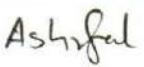
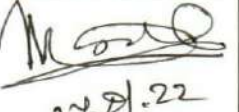

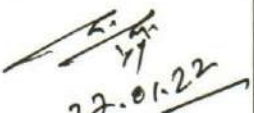
**Bangladesh Inland Water Transport Authority (BIWTA)**  
**Bangladesh Regional Waterway Transport Project 1 (BRWTP-1)**

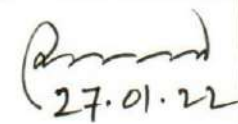

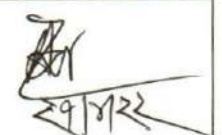
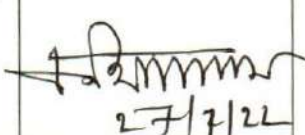
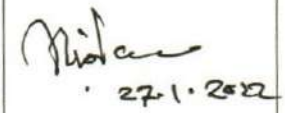

**Subject :** Consultation Workshop on Resettlement Action Plan (RAP) and Environmental & Social Impact Assessment (ESIA)

**Venue :** BIWTA Conference Room (BIWTA Bhaban), 141-143 Motijheel C/A, Dhaka-1000  
**Date :** 27 January 2022  
**Time :** 10:00 - 13:00

Attendance sheet of the participants

Sl #	Name, Organization & Position	Contact Details	Signature
	Name: Dr. AKM Mahir Rahman Organization: BIWTA Position: Member Engineering	Cell: 01552300468 E-mail: mahir1968@yahoo.com	
	Name: Md. Delwar Hossain Organization: BIWTA Position: Member (PSO)	Cell: 01715663687 E-mail: delwar5716@yahoo.com	 29/01/2022
	Name: Md. Modidul Islam Organization: BIWTA Position: Chief Ggr.	Cell: 01711264706 E-mail: modidulbiwta@gmail.com	
	Name: Md. Muniruzzaman Organization: BIWTA & BRWTP-1 Position: executive Engineer	Cell: 01711-909250 E-mail: e.nayan@yahoo.com	
	Name: Md. Mijanur Rahman Organization: BIWTA Position: Superintending Engineer	Cell: 01917713554 E-mail: mijanurmb@gmail.com	
	Name: Salma Absar Organization: BIWTA Position: DD, PIU	Cell: 01720307474 E-mail: salmaabsar1977@gmail.com	
	Name: A.S.M. Masrurul Arefin Organization: BIWTA Position: Executive Engr, Dredging Dept.	Cell: 01819943678 E-mail: asm.arefin@gmail.com	Arefin

Name: Md. Jhahirul Islam Organization: BIWTA Position: XEN	Cell: 01670884975 E-mail: johirbiwta@gmail.com	 27/01/22
Name: MD. Rasidul Alam Organization: BIWTA Position:	Cell: 01716-405790 E-mail:	 27.1.22
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Position:		
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Position:		
Name:	Cell:	
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Position:		