

Government of the People's Republic of Bangladesh
Ministry of Water Resources



Bangladesh Water Development Board

Project Name: Loan 4305-Flood Reconstruction Emergency Assistance Project

Indicative Terms of Reference

for

Consultancy Services regarding “Feasibility Study for Integrated Water
Resources Management of Khowai and Adjacent River System”

May, 2025

1. Background

Historically important district Habiganj is flourished with a number of rivers like: Kushiara, Khowai, Korangi, Sutang, Bijna, Ratna, Shutki, Jhingri, Bhera-mohona, Borak etc. Among all these rivers, Khowai river is one of the most important rivers in Habiganj district. Originating from Atharamura hill at Tripura, this river flows through the side of Khowai city of Tripura and enters into Bangladesh at Balla under Chunarughat Upazilla of Habiganj District. The total length of this trans-boundary river is about 156 km of which 90 km. is inside Bangladesh. The main reason of flash flood of this river is excess rainfall in Khowai basin. The total area of Khowai basin is about 1492 sq. km. of which 92% is located (1378 sq. km.) in Tripura, India. So the flood condition of Khowai river entirely depends on the rainfall of Khowai basin of Tripura. As bottom slop of the river is too steep (approx. 300cm./ km.) and flows through the middle of two hill, the flood water of Khowai river enters into Bangladesh very quickly. This Khowai river with high velocity flows through the heart of the city Habiganj and finally falls at river Meghna uniting with the river Dhaleshwari. About 80% of crop area of Habiganj district is directly or indirectly dependent on Khowai river. Previously, the Khowai River System project was taken to protect Habiganj district. It is one of the Flood Control Drainage and Irrigation Projects (FCDI) of Bangladesh Water Development Board. Khowai River Project located in Habiganj district, provides flood protection to an area of 25,790 ha. The Khowai River System Project started in 1960-61 and was completed in 1992-93. A 40 km long flood embankment has been constructed from Habiganj to Chunarughat along the right bank of the Khowai and a 47 km submergible embankment up to Rajabazar has been built on the left bank. The need for development of the project has arisen as the project has not been repaired for a long time after its implementation.

Recently, this area has been affected by heavy flooding in June and August 2024. This flood severely impacted several upazilas of Khowai Basin. More than 120 km of flood embankment/protective works of Habiganj district were severely damaged and needed to be rehabilitated. Unplanned development and encroachment to the flood plain has resulted disruption in connectivity between river and flood plain and may contribute to flood intensification. Floods and waterlogging occur during the monsoon season and farmers and fishermen are suffering due to lack of water during the dry season. A technical committee has been formed to assess the damage to the Bank, Embankment, and other structures of the Khowai River in Habiganj district due to the flood occurred in August 2024 in c/w "Flood Reconstruction Emergency Assistance Project (FREAP)". According to the recommendations of the committee, 0.55 km bank protective works, 25.00 km embankment rehabilitation works and 45 km dredging are required. The committee recommends that, a detail feasibility studies should be conducted, and any additional works should be carried out subject to the recommendations of the feasibility study.

In this context, BWDB intends to conduct a feasibility study for integrated water resources management of Khowai River System and adjacent rivers at Habiganj District under Flood Reconstruction Emergency Assistance Project. The package number is BWDB/Habiganj/S-1. It will be financed by the Asian Development Bank (ADB).

2. Study area

The study area comprises of the total Khowai river basin including the tributaries, distributaries, approximately 64 km Karangi river, 81 km Sutang river, 32 km Kasti river, Old khowai, 18 Km mora kasti river and approximately 70 km of connecting khals and canals (Jalabarir kha, Eralia khal, Longla khal, Boiragi khal, Vuichara Khal, Ichalia khal,, Ekdala khal, Gharvanger khal, Jhalobarir khal, Shingar khal, Sharaswati khal, Ruiaar khal and Chandalpur khal). The course of this Khowai river flows through Chunarughat, Habiganj Sadar, Bahubal, Baniachung, Lakhai and Ashtagram of Habiganj district. A location map is shown in Figure-1.

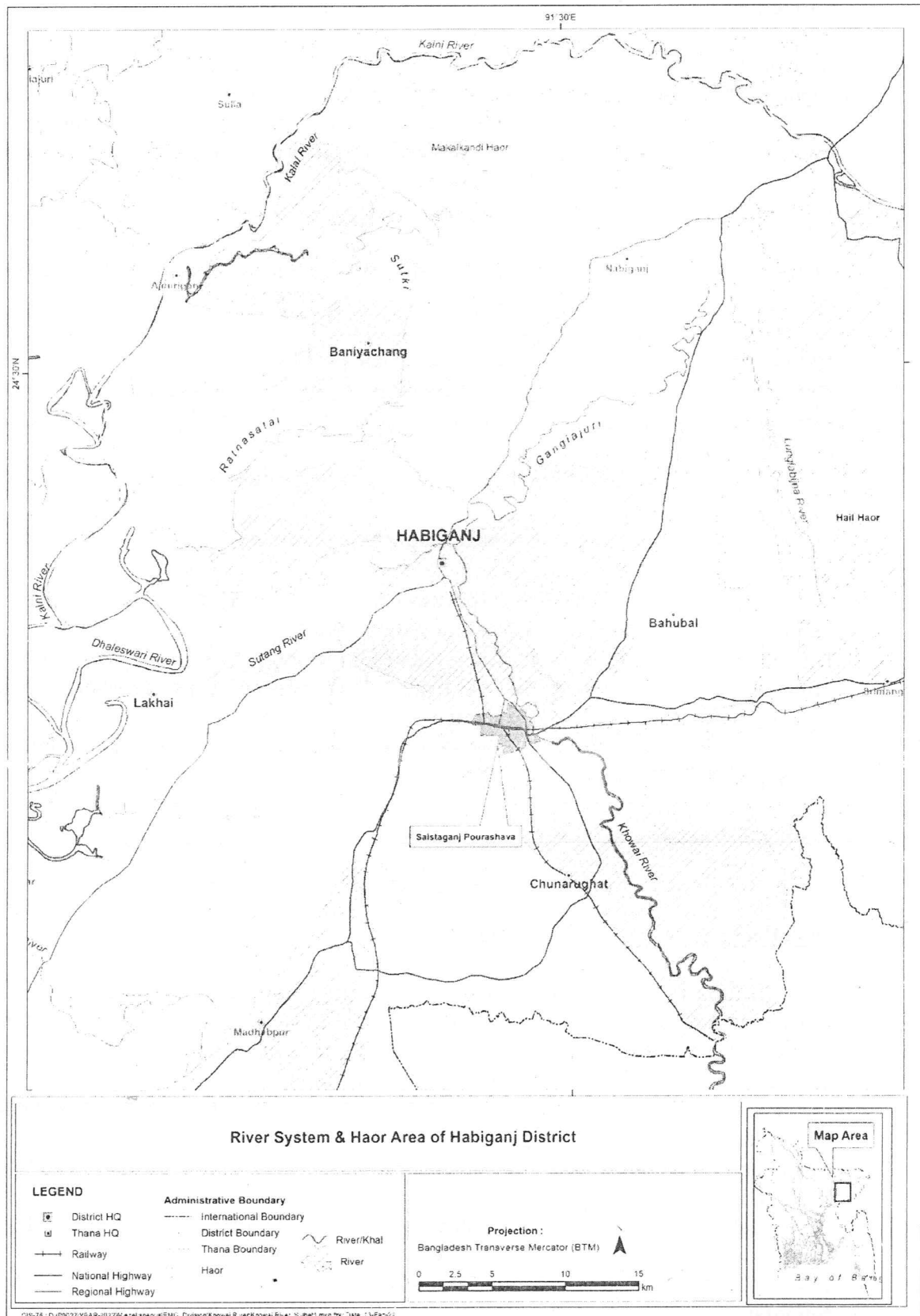


Fig 1: Index Map of Khowai River in Habiganj district

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3. Objectives

The overall objective of the study is to carry out a detailed feasibility study for comprehensive development of Khowai river basin (including adjacent rivers, Khals, canals etc) focusing on integrated flood, water and river system management, drainage improvement and irrigation development for the improvement of socio-economic and overall environmental condition by considering climate change aspects.

The specific objectives of the study but not limited to the following are:

- Identify the causes of flash flood and erosion problems in the Khowai and adjacent rivers and suggest sustainable and economically viable measures;
- Assess the problems associated with flood control infrastructure and timely drainage across Khowai and adjacent rivers and solutions to the problems.
- Assess the minimum requirement of dredging along Khowai and adjacent rivers including connecting khals/canals to ensure smooth drainage of flash flood, safe navigation and its impact on aquatic ecosystem.
- Assess the scope of irrigation facilities from the project area and recommendations for availing those facilities.
- Detailed Environmental and Social Impact Assessment (ESIA) in the study area in a comprehensive way;
- Assessment of the project with respect to Environmental Sustainability, Climate Resilience and Disaster Risk and find the ways for reducing/mitigating negative impacts;
- Device potential options for re-fixing the design level of the embankment and repairing the affected embankment along the two banks of Khowai and adjacent rivers considering sea level rise and climate change scenario.
- Recommendations for overall management to ensure the long-term rehabilitation of Khowai and adjacent rivers

4. Scope of Works

The activities and scope of work for the assignments are as follows (but not limited to):

A. Data collection, survey and investigation

- i) Identification of the problems in the study area with emphasis on drainage, flood, bank erosion, navigation, siltation/sedimentation and similar issues on river management;
- ii) Review relevant past studies for the project area, transboundary catchments, flash flood characteristics with help of available hydrologic data;
- iii) Review relevant environmental Rules, Acts, Policies and Regulations for compliance by key stakeholders;
- iv) Secondary data collection, statistical analysis & field information collection; satellite images, identify data gaps and planning for primary data collection;
- v) Historical analysis of rainfall/water level data of different hydrological stations to determine probable flood levels at different locations of project area;
- vi) Primary data collection in and around the study area regarding hydro-morphology, topography, sediment inflow, size, erosion-deposition phenomena and water availability for irrigation;
- vii) Bathymetry/cross-section survey of the Khowai and adjacent rivers and topographic survey along the envisaged link/ by-pass channel between the Khowai and Karangi river;
- viii) Preparation of thalweg of Khowai and adjacent rivers to observe available hump or any undesired depression in the longitudinal course of the river;

- ix) Surveying the existing embankment to observe the overall condition to know the stability against seepage, wave action and current and recommendations for rehabilitation for the existing affected sections of embankment;
- x) Collection of mouza maps;
- xi) Demarcation of original river and present position of the river on Mouza Map;
- xii) Collection of damage data of the recent flood of 2024 in the Khowai and adjacent rivers.

B. Hydraulic Modelling

- i) Collection of water level, discharge and sediment concentration at some notable locations so that 1-D and 2-D mathematical model can be calibrated and validated appropriately;
- ii) Development of 1-D, 2-D hydro-dynamic model for study of flood and drainage management in the Khowai river system including Sutang, Korangi, Kasti, Mora Kasti, Old Khowai incorporating the haor/river/canal system and different water management infrastructures that has direct relevance to management of Khowai river;
- iii) Setting up 2-D mathematical model of the project area to predict the morphological change of the river and to justify the viability and find out the design criteria of sediment trap and link/ by-pass channel considering climate change scenario;
- iv) Determine dredging requirement of Khowai and adjacent rivers for drainage improvement and also for increasing water storage capacity through options simulation with the developed model;
- v) Investigating the reasons behind being more susceptible to erosion and meandering nature of the river system.

C. Planning studies and design

- i) Preparation of base map of the study area and also project map;
- ii) Establishment of baseline scenario, regarding river hydraulics and morphology, environmental & socio-economic in the study area concerned;
- iii) Review of the existing flooding and drainage situations during monsoon;
- iv) Assess the flood scenario of year 2024 and preparation of suggestive measures against this type of extreme events;
- v) Video & Photograph of Pre-project conditions of the project area, especially the problematic areas as well as the locations of proposed interventions;
- vi) Assess hydraulic design parameters (water level, discharge, Seal Level, scouring depth, etc.) of the proposed interventions.
- vii) Preparation of detailed development plan based on survey data, uses of different stakeholders, environmental considerations;
- viii) Assessment of suitability and sustainability of different types of existing interventions/ structures and impact of the proposed interventions on the surroundings areas including the existing project(s) in and around the study area;
- ix) Study the need for new embankment/ bank revetment at erosion prone area on both banks of the Khowai and adjacent rivers;
- x) Assessment of land acquisition plan (LAP) for establishing/ restoration of link channel and assessment of effectiveness of different options and selection of the best-suited linkage/ restoration of river improvement options;
- xi) Preparation of Resettlement action plan (RAP) and associate cost off relocation;
- xii) Identification and evaluation of proposed items (dredging, flood walls, and bank protection etc.) of works in the existing DPP and provide necessary suggestions for updating, if there is any;

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- xiii) Design of proposed interventions (location, dimension and invert level) for flood control, drainage and water storage capacity improvement, design of protective works/ bank revetment considering climate change scenario;
- xiv) Design of dredging which includes fixing the dredging alignment, designing dredging depth and width and calculating the dredged volume of soil;
- xv) Detail dredged material management plan ensuring beneficiary use of the dredged material and following The Draft Dredging and Dredged Material Management Policies 2020;
- xvi) Explore the development of land for settlement and recreational area using dredged material;
- xvii) Proposal of tree plantation along the embankments for long term sustainability;
- xviii) Devising scope (if any), size, type and orientation of necessary structures to avail irrigation facilities in the command area;
- xix) Incorporating the Delta Appraisal Framework (DAF) to align with the goals of BDP 2100 and principles of Adaptive Delta Management (ADM)

D. Environmental and Social Impact Assessment

- i) Collection and review of existing data, maps, information and past relevant studies from the secondary sources;
- ii) Carry out environmental survey works including measurement of environmental quality parameters in the study area, fish market survey etc.;
- iii) Carry out socio-environmental survey through appropriate tools & process (such as Focus Group Discussions (FGD), Key Informant Interview (KII), consultation meetings etc.) to establish important environmental and social issues and to identify important environmental and social components;
- iv) Collection of all the proposed interventions recommended by the consultant employed to conduct technical study at the same study area;
- v) Selection of important environmental and social components presently being impacted and of course likely to be addressed by the proposed interventions;
- vi) A detailed ToR should be prepared for DoE approval; it should be included in Inception report. The ToR would specially focus on the adverse impacts of high magnitude. Attention should also be given to cumulative and residual impacts.
- vii) Preparation of Environmental Impact Assessment (EIA) report following approved format of DoE, and presentation of EIA report at the DoE in getting requisite clearance certificate thereof.
- viii) Preparation of Strategic Environmental Assessment (SEA) in study area;
- ix) Assessment of land acquisition for establishing/restoration of rivers and preparing LAP & RAP;
- x) Development of Environmental Management Plan (EMP) which should include (i) Mitigation plan, (ii) Enhancement plan, (iii) Compensation plan and (iv) Monitoring Plan.
- xi) Establishment of physical, biological and social baseline conditions
- xii) Selection of Valued Environmental Component (VEC)
- xiii) Environmental and social impact assessment and planning of mitigation measures
- xiv) Formulation of Environmental Management Plan & Environmental monitoring program
- xv) Preparation of study report compiling technical, social, environmental and economic aspects.
- xvi) Assessment of environmental, disasters and climate change impacts or risk from the projects;
- xvii) Planning the counter measures to reduce/mitigate these negative impacts;
- xviii) Determination of costs for reducing/mitigating the negative impacts;

- xix) Finding alternative ways of the project deliverables without incurring these environmental costs;
- xx) Selecting contingency plan for emergency disaster management;
- xxi) Determination of the rehabilitation period after, remaining risks and adequate risk reduction measures;
- xxii) Using the DAF tool to assess potential environmental and socio- economic impacts under present and future climate change and socio-economic uncertainties including demographic changes.

E. Economic and Financial Analysis

- i) Cost estimate of improvement measures;
- ii) Yearly breakdown of cost for DPP;
- iii) Economic and financial analysis;
- iv) Estimation of BCR, EIRR, FIRR, NPV of each planning option based on the with and without project situation.

F. Workshop & Reports

- i) Conduct Stakeholder consultation, workshop and other types of mass discussion session for communicating with local stakeholders and disseminating the study outputs.
- ii) Preparation of Inception Report, Interim, Draft Final and Final feasibility study report according planning commission format compiling the technical, social, environmental and economic aspects;
- iii) Preparation of ESIA Report.

5.0 Expected outputs & Outcome

- Baseline hydrological and morphological conditions of the Khowai and adjacent rivers in Habiganj district with emphasis on flood, drainage and river bank erosion.
- A comprehensive development plan for flood protection, drainage improvement and erosion protection in the Khowai and adjacent rivers in Habiganj district.
- River dredging plan for drainage improvement;
- Erosion, flood control and drainage improvement plan with proposed maintenance program;
- Type, location, alignment and design of proposed/remodeled structures considering climate change scenario;
- Dredging location and alignment, dredged material management plan, capital and maintenance dredging volume and Dredged Material Management Plan;
- Environmental and Social baseline condition of the project and ESIA of proposed interventions;
- Anticipated post project Environmental and Social condition of the area.
- Impact of proposed interventions to the environment.
- Assessment report with respect to Environmental Sustainability, Climate Resilience and Disaster Risk and ways for reducing/mitigating negative impacts;
- Environmental Management Plan (EMP), which should include:
 - ❖ Mitigation Plan;
 - ❖ Enhancement Plan;
 - ❖ Compensation Plan;
 - ❖ Environmental Monitoring Plan

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- EIA report incorporating the findings of the EIA study including an Environmental Management Plan (EMP) and an Environmental Monitoring Plan considering pre-construction, construction and post construction phases.
- Environmental Clearance Certificate From Department of Environment (DoE).
- Strategic Environmental Assessment (SEA) report incorporating overall impacts on environment and address them properly along with economic and social aspects at the phase of decision making.
- Economic analysis of the integrated development plan.
- Detail design and cost estimate of the proposed interventions.
- Workshop and Dissemination of the study findings.
- Feasibility Study report of the overall development plan (Prescribed Feasibility study report format of Planning Commission by following the indicators of DAF as well as the requirement of the Development Partners i.e. ADB, World Bank etc).
- Any other, as deemed to be necessary, in compliance with the Scope of Works

Outcome:

Comprehensive water resources management plan of Khowai and adjacent rivers which will lead to increase in food security, decrease in water related disasters, and overall socio-economic development in Khowai river basin area.

6.0 Duration of the Assignment

The assignment of the consultancy services is expected to commence in November 2025 and the services are required about 8 months.

Sl.	Report	Deadline
1	Inception Report, 20 copies	At the end of 1st month
2	Interim Report, 20 copies	At the end of 4th month
3	Draft Final Report, 20 copies (Along with detailed design vetted from concerned BWDB Design office and ESIA report) (Along with detailed design vetted from concerned BWDB Design office and ESIA report)	At the end of 7th month
	Detailed guideline of climate-resilient infrastructures design and other deliverables would be submitted after prior approval from the concerned Design offices of BWDB	
4	Final Report 30 copies	2 Weeks before the end of the study period.

N.B. Hard and Soft copies (along with CD/DVD and portable hard drive) of all the reports, presentations, data, cross-sections, long profile, documents, kml file, shape file, model setup etc. have to be submitted and must be handed over to BWDB. Data and reports will be copyright property of BWDB. No part of this report may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods without the prior written permission of BWDB.

The Project Director, BWDB, Sylhet would be representing BWDB and receiving all the deliverables mentioned above. Review meetings with participation of concerned Planning, Design and Field level officials of BWDB would be held on Inception, Interim and Draft Final Reports. The office of the Project Director would communicate with other line departments and all concerned for consultation, sharing of ideas and to discuss the findings as well as disputes also.

7.0 Deliverables

The contract of this assignment will be output based on a lumpsum contract for which the following deliverables will be ensured:

- (i) Inception Report
- (ii) Interim Report
- (iii) Draft Final Report
- (iv) Final Report

8.0 Payment Schedule

The payment schedule of the assignment is as follows (each payment shall be made after successful submission of the report and duly accepted by the Client):

Sl. No.	Deliverables/Report	% of payment
(i)	Inception Report-1 Month	20% of total contract
(ii)	Interim Report 4 Month	20% of total contract
(iii)	Draft Final Report 7 Month	30% of total contract
(iv)	Final Report	30% of total contract

9.0 Study Management, Key Personnel, Qualifications and Task Assignment

The study shall be carried out within a period of **8 (Eight) months** from the signing of the contract with the consultant i.e. from the date of commencement. It is estimated that to carry out the study consultant may require 68 man-months comprising a team of 19 professionals (including Key professionals and non-key professionals). The composition of the team and their man-months is given below.

Sl. No	Professionals	No. of professionals	Month	Man-month
1	2	3	4	5
Key Professionals				
1	Team leader/Water Resources Planning Specialist	1	7	7

Sl. No	Professionals	No. of professionals	Month	Man-month
2	Deputy Team Leader/Senior Design Engineer	1	6	6
3	Flood and Drainage Modelling Specialist	1	4	4
4	Hydrological & Hydrodynamic Modeller	1	4	4
5	Morphologist cum Sediment Management Specialist	1	4	4
6	Land Acquisition cum Resettlement Specialist	1	4	4
7	Geotechnical Expert	1	2	2
8	Climate Change and Disaster Management Specialist	1	2	2
9	Environmental Specialist	1	4	4
10	Economist	1	3	3
11	Sociologist	1	3	3
12	Agronomist	1	2	2
13	Fisheries Expert	1	3	3
Non-key Professionals				
14	GIS Specialist	1	4	4
15	Survey Specialist	1	4	4
16	Junior Engineer	4	3	12
Total		19		68.0

Key Personnel Qualifications and Task Assignment

SL No.	Disciplines	Qualification and tasks
Key Professionals		
1	Team Leader/ Water Resources Planning Specialist	He/she should have MSc. degree in Civil/Water Resources Engineering with 20 years or more professional experiences including 15 years' experience in projects involving river morphology and hydraulics, water resources project. Minimum 5 years experiences as Team Leader/project leader to lead and manage a team for flood control, drainage and irrigation projects. Experience in working with international organizations/international agencies, or with MDBs (ADB, World Bank, JICA etc.) is required. His/ her major responsibilities shall include but not necessarily be limited to the following: • Review of past studies on dredging and sediment management; • Formulate strategy and action plan for the study; • Guide and supervise the project activities; • Comparison of alternative plans for dredging; • Comparison of alternative plans for silt management ; • Maintain liaison with BWDB and related agencies;

SL No.	Disciplines	Qualification and tasks
		• Coordinate all the components of the study; • Preparation of different reports as per requirement of the study; • Preparation of Final Report containing all the requirements for the study.
2	Deputy Team Leader/ Senior Design Engineer	He/she should have MSc. degree in Civil/Water Resources Engineering with 15 years or more professional experiences including 12 years' experience in projects involving water resources management, planning and design of hydraulic structures. Experience in working with international organizations/international agencies, or with MDBs (ADB, World Bank, JICA etc.) is required. His/her major responsibilities shall include but not necessarily be limited to the following: • Plan for alternative interventions (structural/non-structural); • Design of recommended interventions; • Preparation of cost estimates of the interventions on the basis of recent actual schedule of rates; • Preparation of different reports as required for the proposed study; • Lead the study team in absence of Team Leader; • Maintain liaison with BWDB and other related agencies; • Assist the Team Leader in preparing Final Report containing all the requirement of BWDB for the feasibility study.
3	Flood and Drainage Modelling Specialist	He/she should have Bachelor degree in Civil Engineering/Water Resources Engineering with 12 years or more professional experiences including 10 years' experience in projects involving Flood, Drainage management and numerical modelling. Experience in working with international organizations/international agencies, or with MDBs (ADB, World Bank, JICA etc.) is preferable. His/ her major responsibilities shall include but not necessarily be limited to the following: • Rainfall-runoff analysis and development of River drainage model; • Hydrological analysis and establishment of design flood event; • Development of drainage model for different scenarios to find out design parameters for the interventions; • Assess effectiveness of different interventions for drainage improvement of Khowai River system using numerical model; • Development of hydrological characteristics of river system using historical data and hydrodynamic model results; • Development of several options for flood control and drainage improvement.
4	Hydrological & Hydrodynamic Modeller	He/she should have Bachelor degree in Civil Engineering/Water Resources Engineering with 12 years or more professional experiences including 10 years' experience in projects involving

SL No.	Disciplines	Qualification and tasks
		river hydraulics, numerical modelling. Previous experience in similar environment will be preferred. Experience in working with international organizations/international agencies, or with MDBs (ADB, World Bank, JICA etc.) is preferable. His/her major responsibilities shall include but not necessarily be limited to the following: • Establish the baseline hydrological and hydrodynamic condition of the study area; • Set-up, calibration and verification of 1D, 2D hydrological and hydrodynamic model; • Interpret model results in accordance with the requirement ; • Devise the design parameters for different proposed protection works and infrastructure; • Rainfall Analysis and reserve the rain water for different uses; • Assess the hydraulic condition and water availability in the project area; • Participation in meetings with BWDB as and when required; • Contribution to reports.
5	Morphologist cum Sediment Management Specialist	He/she should have Bachelor degree in Civil Engineering/Water Resources Engineering with 12 years or more professional experiences including 10 years' experience in river morphology, hydraulics and water resources engineering with experience in sediment analysis and sediment modelling. Experience in working with international organizations/international agencies, or with MDBs (ADB, World Bank, JICA etc.) is preferable. His/her major responsibilities shall include but not necessarily be limited to the following: • Identify the present morphological process of the whole Khowai river system; • Establish baseline morphological behaviour based on model result and available data; • Formulation of sediment sampling strategy; • Analysis and interpretation of the sediment data; • Assess the scouring, river bank erosion (and sedimentation rate in the river; • Supervise the laboratory analysis of collected data; • Analysis of the overall sedimentation process in the main drainage channel; • Carry-out sediment modelling to predicate the sedimentation rate; • Contribute in preparing the reports and preparation of workshop materials; • Quantify the amount of capital and maintenance dredging • Prepare Dredged Material Management Plan.

SL No.	Disciplines	Qualification and tasks
6	Land Acquisition cum Resettlement Specialist	He/she should have Master's degree in Social Welfare/Sociology with 12 years or more professional experiences including 10 years' experience in land acquisition and resettlement in water sector including irrigation project. Advanced academic/professional qualifications will be preferred. Experience in working with international organizations/international agencies, or with MDBs (ADB, World Bank, JICA etc.) is preferable. His/her major responsibilities shall include but not necessarily be limited to the following: • Demarcation of the existing acquired land/disputed land (if any) on CS/RS map under this project; • Analysing and interpreting the data on CS/RS map; • Formulate a Land Acquisition Plan (LAP) and Resettlement Action Plan (RAP) and associated cost of relocation for project components along with Sociologist; • Attending meeting as and where required; • Maintain liaison with required other agencies; • Assisting team leader in co-ordinating the study.
7	Geotechnical Expert	He/she should have Bachelor degree in Civil Engineering/ Geotechnical Engineering/Masters in Geology with 12 years or more professional experiences including 10 years' experience in projects involving geotechnical investigation. Experience in working with international organizations/international agencies, or with MDBs (ADB, World Bank, JICA etc.) is preferable. His/her major responsibilities shall include but not necessarily be limited to the following: • Assess need based Geo-technical information; • Data collection, Quality control, analysis and compilation; • Identify the locations of sub soil investigation for proposed infrastructures; • Soil-boring & other geological Survey; • Analysis of bore-log data; • Establishment of soil condition; • Stability analysis of the soil; • Guide and assist in assessing the effectiveness of different filter materials of protective works; • Contribute in report writing; and • Guide and assist the team member of the study team.
8	Climate Change and Disaster Management Specialist	He/she should have Master's Degree in Disaster Management/ Water Resources Engineering/ or relevant natural sciences. with 10 years professional experience including 8 year specific experience in the field of climate change and disaster management. Advanced academic/professional qualifications will be preferred. Experience in working with international organizations/international agencies, or with MDBs (ADB, World Bank, JICA etc.) is preferable.

SL No.	Disciplines	Qualification and tasks
		His/her major responsibilities shall include but not necessarily be limited to the following: • Identify the environmental, disaster and climate change impacts or risks from the project; • Assessment of disaster resilience of the project which should include contingency plan for emergency disaster management, business continuity plan, time of recovery and reporting of residual risk; • Co-ordinate relevant activities and assist the Team leader; • Attend meeting as and when required; • Assist in preparation of DIA, SEA and EIA part of Final Report as per the format of feasibility study; • Assisting team leader in co-ordinating the study.
9	Environmental Specialist	He/she should have Bachelor's Degree in Civil/Water Resources Engineering/ Masters' degree in Geography/Masters' in Environmental Study with 12 years of professional experience including 10 years' on EIA in water sector project. Candidate should have formal training in carrying out EIA. Advanced academic/professional qualifications will be preferred. Experience in working with international organizations/international agencies, or with MDBs (ADB, World Bank, JICA etc.) is preferable. His/her major responsibilities shall include but not necessarily be limited to: • Prepare an inventory of present environmental situation and carry out Environmental Impact Assessment (EIA); • Review the existing environmental policies and guidelines; • Preparation of Environmental data collection plan; • Describe breeding/ spawning behaviours and migratory patterns of aquatic and terrestrial fauna. • Identification of aquatic and terrestrial habitat types. • Inventory of aquatic and terrestrial wildlife. • Carryout environmental survey; • Establishment of environmental baseline condition of the study area; • Assessment the impact of project interventions on the environment; • Review contributions to regular environmental reports; • Guide and monitor the implementation of the environmental management plan, including establishment of a monitoring and reporting system; • Prepare environmental assessment for the follow-on project including documentation required by the DoE and ADB/World bank;

SL No.	Disciplines	Qualification and tasks
		• Co-ordinate relevant activities and assist the Team leader; • Attend meeting as and when required;
10	Economist	He/she should have Masters degree in economics with 10 years of professional experience including 08 years of working experience involving economic appraisal of agriculture sector project, natural resources management, physical and monetary valuation of possible environmental impacts. Experience in working with international organizations/international agencies, or with MDBs (ADB, World Bank, JICA etc.) is preferable. His/her major responsibilities shall include but not necessarily be limited to the following : • Collect, compute analyze and evaluate the socio-economic data of the project; • Assessment of cost that are related to economic benefits; • Identify all costs and benefit based on engineering, agronomic, social analysis including with and without project scenario; • Perform the economic and financial analysis of the proposed intervention in order to assess the economic and financial feasibility; • Any and all other works necessary for proper study.
11	Sociologist	He/she should have Masters in Sociology/Statistics/Social welfare with 10 years of professional experience including 08 years of working experience in sociological activities & field survey, i.e interaction with the stakeholders, holding Focus Group Discussion (FGD), Target Group Discussion (TGD) and work-shops/seminars at field level to find out the desired goal of the study and to disseminate the results of the study. Experience in working with international organizations/international agencies, or with MDBs (ADB, World Bank, JICA etc.) is preferable. His/her major responsibilities shall include but not necessarily be limited to the following: • Responsible for covering the socio-economic aspects of the baseline study and selection of important social components (IECs) which are likely to be impacted by the specified project; • Design and plan needs assessment and PRA surveys of communities in the project area; • Study and field data collection for identification of disadvantaged group/ affected people; • Identification of future probable social negative impacts and social imbalance in project area; • To assist the study team in preparation of maps for workshops and reports etc.








SL No.	Disciplines	Qualification and tasks
12	Agronomist	He/she should have Masters degree in Agriculture/Crop Science, with 10 years of professional experience including 08 years of working experience in field survey, evaluation of agricultural benefits of a project between pre-& post project condition by introducing improved agricultural practices. His/her major responsibilities shall include but not necessarily be limited to the following: • Analysis of the existing conditions of the agricultural practices and production; • Suggest for improved agricultural method with respect to time, land, cropping pattern, cropping inputs & agricultural practices • Evaluate the agricultural benefits after post project condition. • To assist the study team in holding seminars, workshops; • To assist the study team in Preparation of maps for workshops and reports etc. and development of database software.
13	Fisheries Expert	He/she Should have Master's degree in Fisheries /Zoology with 10 years of professional experience including 08 years of working experience in Blue Economy, spawning ground, brood fish characteristics and all relevant parameters influencing sawing in rivers. Experience in working with international organizations/international agencies, or with MDBs (ADB, World Bank, JICA etc.) is preferable. His/her major responsibilities shall include but not necessary be limited to the following: • Compile and analyze necessary information related to fish culture, spawning of fish such as spawning time, river condition, weather condition, water quality, habitat of mother fish etc concerning the river in the Study area. • Assess vulnerabilities of proposed interventions on Fisheries Resources and suggest remedies, mitigation program and any other step to be taken up for conservation of fisheries resources in the Project Area. • Propose scope to future development of Fisheries resources • Assist the Team Leader.
Non-Key Professionals		
14	GIS Specialist	He/she Should have B.Sc. degree in Civil Engineering Water Resources Engineering/ Urban and Rural Planning/ Hydrology/ Masters in Geography with 08 years of professional experience including 05 years of working experience in producing GIS coverage, contour map, Digital Elevation Model. His/her major responsibilities shall include but not necessarily be limited to the

SL No.	Disciplines	Qualification and tasks
		following: • Preparation of Arc View based contour maps of project area, difference maps of bed topography; • Preparation of study/basin area maps with all the relevant features; • Preparation of project map showing existing and proposed infrastructures; • Preparation of maps for workshops and reports; • Assist the study team in report writing.
15	Survey Specialist	He/she should have Bachelor Degree in Civil Engineering/Water Resources Engineering with 08 years of professional experience including 05 years of working experience in hydrographic, topographic and hydrometric survey and knowledge on using DGPS, ADCP, hydro-pro, Arc-view for processing surveyed data. His/her major responsibilities shall include but not necessarily be limited to the following: • Field survey for topography, bathymetry, tide, current, sediment, salinity and wave data; • Preparing detailed specification for all field survey activities; • Supervise the survey activities; • Ensure the quality of the survey; • Guide in processing and analyzing the data.
16	Junior Engineer	He/she should have Bachelor degree in Civil/ Water Resources Engineering with 05 years of professional experience including 03 years of working experience in projects involving of analysis of data on bathymetry, sediment, flow velocity and model set up. To assist the mathematical modelling team in processing data compatible for model update. His/her major responsibilities shall include but not necessarily be limited to the following: • To assist survey specialist in processing field acquisitioned data; • Responsible for the collection of field data and data from different organizations as well as primary data collection. • Provide necessary support with data for other analysis required by the study team. • Process entire data collected and assess environmental & social impact. • To assist EIA Key team members in conducting focus group discussions, Public Consultations for collecting; primary data on social condition, cultural values, etc.

SL No.	Disciplines	Qualification and tasks
		- To assist expatriate team in carrying out questionnaire survey on sample household for establishing baseline agro-socio-environmental condition. - Assist the Team for preparation of reports.

10.0 Duties and Responsibilities

10.1 BWDB's Responsibilities

The Consultants shall work under the supervision of the Project Director of FREAP. Overall co-ordination will be done by the Superintending Engineer (Civil), Directorate of Planning-1, BWDB. Survey and data collection will be done by the consultant in close consultation with the concerned offices of BWDB.

Superintending Engineer (Civil), Directorate of Planning-1, will ensure that the objective of the study as detail in the ToR would be achieved within schedule time and will direct the planning process as well as work programme and supervise the study and monitor progress according to the objectives set in ToR. Moreover, he will arrange regular meetings between the consultants and BWDB professionals to discuss technical and project management issues. Any unresolved issues either technical or otherwise shall be taken up with BWDB's senior officials (Chief Engineer (Civil) Planning, Chief Engineer, Design; Chief Engineer, Hydrology; Superintending Engineer, Directorate of Planning-1 etc.) or other GoB agencies as required.

BWDB shall provide or make available of the following data, services and facilities to the consultants, as per existing rules of BWDB:

- (a) Available all kinds of relevant data and records;
- (b) Available previous study reports;
- (c) Any other services, available with BWDB, to help the consultants to carry out the data collection program as per ToR.

10.2 Consultant's Responsibilities

The consultants shall carry out the services as detailed in "Scope of Works" and "Tasks of Consultants" in the best interest of the Government with reasonable care, skill and diligence with sound engineering, administrative and financial practices. The Consultants shall be responsible to the client (BWDB) for discharge of responsibilities.

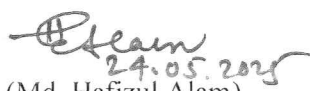
The consultant shall-

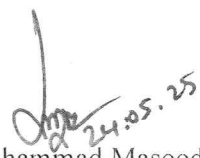
- Make available all the primary data to BWDB or other agencies concerned as and when required on written permission from the Client (BWDB);

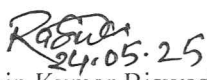
- Make necessary arrangements for field investigation, data collection as needed for performance of the assigned task and evaluation thereby;
- Provide all support for the effective delivery of the services as stipulated in the objectives, scope of works and expected outputs written in the ToR;
- Organise workshop programme to disseminate or monitoring study results to the BWDB officials and stakeholders of the project area;

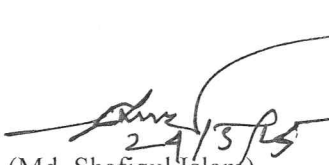
The consultant should design and propose work plan and staffing schedule, considering smooth and timely completion of the study that will ensure quality outputs in line with approved ToR. Work Plan can be altered/ modified if necessary for the interest of the Study.

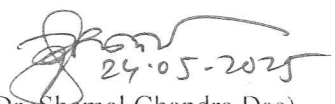

24.05.24
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&
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24/5/25
(Md. Shafiqul Islam)
Addl. Chief Engineer (in Charge)
North Eastern Zone
BWDB, Sylhet
&
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24.05.2025
(Dr. Shamal Chandra Das)
Addl. Chief Engineer (Civil)
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BWDB, Dhaka
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Approved.


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ID No. 670705001
Director General (Addl. Ch.)
BWDB, Dhaka.