

Terms of Reference

BRWTP-S7: Design and Development of System to prepare and disseminate Hydrographic Information Electronically

The Project at a Glance

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| Title of the Project | Bangladesh Regional Waterway Transport Project1 (BRWTP-1) |
| Implementing Organization | Bangladesh Inland Water Transport Authority (BIWTA), Ministry of Shipping (MoS) |
| Package Name of Consultancy Services | Design and Development of System to prepare and disseminate Hydrographic Information Electronically |
| Package Number | BRWTP-S7 |
| Market Approach | Open-International |
| Procurement Method | Selection under a Fixed Budget (FBS) |
| Type of Contract | Lump-Sum |
| Assignment Duration | Thirty (30) months |
| Location of Assignment | Within project area |
| Funding Source(s) | IDA (Credit No. 5842-BD) |
| Contracting Entity | Project Director, BRWTP-I Project, BIWTA |

1. Introduction

- 1.1. Bangladesh lies predominately within the Bengal basin, the world's largest delta formed by the Ganges, Brahmaputra (Jamuna) and Meghna (GBM) river system and its tributaries and distributaries. It has over 700 rivers, streams and canals with a total length of about 24,000 kilometres (km). Approximately 6,000 km are navigable during the monsoon (wet) period for different size vessels, shrinking to about 4,000 km in the dry periods.
- 1.2. Inland Water Transport (IWT) carries over 50 percent of all Bangladesh's cargo traffic and one quarter of all passenger traffic. There are over 22,300 registered vessels engaged in this trade. In addition, there are approximately 750,000 unregistered country boats of a great variety of shape and size. These play a vital role in the transport of goods and people, especially on the smaller rivers.
- 1.3. The IWT sector is dominated by the private sector, which has invested heavily in shipping. It is represented by various associations, including: the Coastal Ship Owners' Association, the Cargo Vessel Owners' Association, the Tanker Owners' Association and the Launch (Passenger) Vessel Owners' Association.
- 1.4. Despite its size, IWT faces regulatory and safety challenges. Though Bangladesh is a signatory to all of the main international maritime conventions and does have rules governing the construction and operation of both sea-going and inland (non-convention) ships, many of these are dated. There is also a lack of mechanisms and capacity to ensure that the rules made to reduce the risk of accidents are consistently enforced. While it does have substantial salvage capacity, it often does not have mechanisms to respond to distress situations before an accident happens.

- 1.5. Though some casualties are caused by weather, structural, mechanical or equipment failure, most shipping casualties in Bangladesh result from commercial pressure, a major factor in all sub-standard operations. This generally leads to overloading (especially in respect to passenger vessels operating in peak holiday periods), which is a major cause of capsizing and loss.
- 1.6. A lack of information and guidance to mariners also impacts negatively on shipping safety. While Bangladesh does provide some meteorological warnings and prevents vessels from departing its ports (including the inland ports) during adverse weather conditions, there is very little information available to mariners when on a voyage. Bangladesh does not publish sailing directions and despite producing navigation charts for the major rivers, these are not disseminated to mariners and most vessels operate without the same or any positioning fixing equipment of any kind. Moreover, very few vessels are provided with radar allowing them to navigate during reduced visibility conditions, including rain and fog – which is common at night during the period of the SW monsoon and in the early morning in the months of November to February. During such periods, most (but not all) vessels will anchor or proceed at very slow speeds to avoid risk of collision, though not all emit sound or other alert signals. Use of radiotelephony, especially VHF, is also very limited and most vessels do not maintain a listening watch on general or distress frequencies. No use is made of digital selective calling for sending pre-defined digital messages, nor, outside the main sea ports, are there dedicated facilities for receiving or responding to distress messaging.
- 1.7. Despite this, the quality of seamanship is actually quite good and there is a high degree of local knowledge of route and other conditions. Nearly all vessels obey rules for the prevention of collisions at sea and with the exception of some of the smaller country boats, all vessels are equipped with navigation lights. Nearly every vessel is also equipped with fog horns and powerful searchlights - typically mounted on the bow, used to detect other vessels, riverbanks and other key hazards to navigation (such as bridges and other structures). Some aids to navigation are provided on the major routes, mainly buoys marking the lateral limits of navigation channels and positioned at key points on the rivers. Where provided, these generally comply with International Association of Lighthouse Authorities (IALA) recommendations for navigation in region 'A' and some display lights for recognition during darkness. Provision of aids to navigation is however complicated by the changing nature of the rivers and none comply with standards of availability required for safe navigation purposes.
- 1.8. The development and control of Inland Water Transport is the responsibility of the Bangladesh Inland Water Transport Authority (BIWTA), under the Ministry of Shipping (MoS). Its functions include but are not limited to:
- Providing aids to navigation;
 - Disseminating navigational and meteorological information including publication of river charts;
 - Providing pilotage and hydrographic survey services;
 - Carrying out removal of wrecks and obstruction in inland navigable waterways;
 - Conducting traffic surveys to establish passenger and cargo requirements on the main rivers, feeders and creek routes;
 - Developing rural water transport by progressing of schemes for modernizing and mechanizing country craft;
 - Ensuring co-ordination of Inland Water Transport with other forms of transport, with major sea ports, and with trade and agricultural interests for the optimum utilization of the available transport capacity;

- Conducting research in matters relating to Inland Water Transport;
- Arranging programs of technical training for Inland Water Transport personnel
- Maintaining liaison with the shipyard and ship repair industry to meet the requirements of the Inland Water Transport fleet;

In addition, it performs a regulatory function, including but not limited to the inspection of inland vessels to ensure compliance with shipping ordinances and regulations.

2. Objective of Consulting Service

- 2.1. The main objective of this consultancy service is to assist BIWTA to provide both systems and services that can be used on board vessels to aid river navigation and therefore compliance with the principals of SOLAS Chapter V, Regulation 19 (Ship borne navigation equipment and systems).

This shall include:

- A. The development of a River Information Service (RIS) including all necessary RIS architecture— whereby a RIS is defined as a formal concept for harmonized information services to support traffic and transport management in inland navigation;
- B. The development of a system to produce and distribute inland Electronic Nautical Charts (but not data collection which is being provided by BIWTA).

- 2.2. All parts of the study are expected to run concurrently and the Consultant is expected to deliver each in a harmonized and logical manner. The Consultant shall be responsible for evolving an appropriate methodology based on the tasks as elaborated in the scope of works that is acceptable to BIWTA. The Consultant shall furthermore undertake all fieldwork and ensure all data and information gathered is quality assured and corrected wherever appropriate. Any qualitative assessments must be backed up by case studies and relevant industry examples.

3. Scope of Work

The tenure of the contract shall be **30 (thirty) months**.

3.1. Part A. Development of a River Information Service (RIS)

- 3.1.1. The RIS system shall be designed:

- a) in accordance with the guidelines and recommendations for River Information Services established and kept current by a Working Group of PIANC (Edition 3.0, 2011 as elaborated by the Permanent Working Group 125 of the World Association for Waterborne Transport Infrastructure PIANC); and
- b) taking into account the type and coverage of any internet, mobile telephone or other communication service available in Bangladesh and/or used by BIWTA.

- 3.1.2. The Consultants shall study, examine, investigate, evaluate, make recommendations and provide cost estimates for:

- a) Providing and equipping all existing river stations with the necessary facilities to collect, monitor and transmit real time data on river conditions (including but not limited to river height, current and wave conditions, wind and other meteorological conditions);
- b) Method of processing and disseminating such data for use by river users in the form of River Notices and River Warnings on but not necessarily limited to:

- River Levels (including flood and tidal levels);
 - Air Clearance Drafts at all bridge and other crossings;
 - River current and/or tidal stream conditions; and
 - Advise on navigation restrictions, debris, and closures
- c) Making available such notices and warnings to Mariners through step by step development of available technical systems, including internet based systems, mobile data communication, VHF radio, GNSS, Inland ECDIS and other vessel tracking and tracing systems such as AIS;
- d) All organizational and action policies needed within the BIWTA for RIS implementation.

3.2. Part B. Development of a System to Distribute and Use Inland Electronic Nautical Charts

3.2.1. The Consultant shall, mindful of the structure of the IWT Fleet, study, examine, investigate, evaluate, make recommendations and provide cost estimates for the production and distribution and use of inland Electronic Nautical Charts for nationwide Classified IWN routes.

3.2.2. In conducting this part of the assignment, the Consultant shall:

- a) Study, evaluate and take into consideration International Hydrographic Organization (IHO) Standards in respect to the publication and dissemination of Electronic Nautical Charts, including but not limited to the following Hydrographic Organization Standards:
- S-57 - Transfer Standard for Digital Hydrographic Data (including the Product Specification for Electronic Navigational Chart (ENC);
 - S-52 - Chart Content and Display Aspects of ECDIS;
 - S-61 - Product Specification for Raster Navigational Chart (RNC);
 - S-65 - ENCs: Production, Maintenance and Distribution Guidance;
 - S-11 Part A - Guidance for the Preparation and Maintenance of International (INT) Chart and ENC Schemes.
- b) Study, evaluate and take into consideration the use of Electronic Nautical Charts for inland navigation in other parts of the world;
- c) Study, evaluate and take into consideration technologies available to receive and display ENCs.
- d) Make recommendations and provide costs estimates for the publication and dissemination of ENCs to Mariners through using both Electronic Chart Display and Information Systems (ECDIS);
- e) Make recommendations and provide costs estimates for provision of different types of Electronic Chart Display and Information Systems (ECDIS) for different types and sizes of inland navigation vessels. This shall include ECDIS systems that supports both navigation and information modes.
- f) Make recommendations and provide costs estimates for alternative means of displaying electronic charts through handheld devices provided with GPS receivers (including when operated offline – i.e. without internet connectivity);
- g) Make recommendations for organizational and action policies needed within BIWTA

for ENC implementation; and

- h) Prepare Bid Documents for procurement of related Goods packages including but not limited to software and hardware items for ENCs.

4. Deliverables

The outputs of the Consulting Services will be:

- a) **An Inception Report**, which has to be submitted 6 weeks after the commencement of the assignment. This Report shall summarize the Consultants' initial findings and will present a first assessment of available data. The Inception Report shall also contain:
- i. Details regarding the methodology to be applied by the Consultant during the execution of the project; and
 - ii. An outline of activities expected to be completed until the date of the presentation of subsequent reports;
- b) **Draft Report** with RIS data in connection with all classified IWN purposes (including draft Bid Documents for procurement of related Goods packages), which has to be submitted 32 weeks after commencing the assignment.
- c) **Final Report** (including Bid Documents for procurement of related Goods packages), which has to be submitted 40 weeks after the commencement of the assignment or two weeks after receiving comments on the Final Draft Reports whichever comes earlier.

5. Payment Schedule

| Deliverable/Output | Timeline | Payment |
|--|--|---------|
| Advance Payment | Upon signing of Contract | 10% |
| Inception Report | 4 weeks after Contract signing | 10% |
| Draft Report with RIS data in connection with all classified IWN purposes (including draft Bidding Documents for procurement of related Goods packages) followed by World bank's comments/observations Presentation Workshop to acquire necessary feedback/ suggestions. | 32 weeks after Contract signing | 40% |
| Final Report (including Bid Documents for procurement of related Goods packages) | 36 - 40 weeks after Contract signing or two weeks after submission of Comments by the Employer | 10% |
| Providing technical supports to procurement of related goods items | Throughout the procurement process | 10% |
| Capacity building/on-the-job training of BIWTA's counterpart operating staffs | After installation, commissioning and trial run of the System up to the end of Contract tenure | 20% |

Note: Payments against deliverables shall only be made upon approval of the deliverables by the Client subsequent to consent of the World Bank Task Team.

6. Consultant Qualifications

The consulting services shall be carried out by a Consulting Firm with experience in: the Inland Water Transport; vessel operations; transport planning and technical innovation.. The Employer estimates a minimum mandatory staffing Input as follows; however the Consultant may propose additional experts as well.

6.1. Key Staff Inputs

| Key Professionals | Inputs Required (months) (intermittent and spread over the whole contract period) |
|--|--|
| 1. Team Leader | 12.0 |
| 2. RIS Expert | 10.0 |
| 3. ENC & ECDIS Expert cum Deputy Team Leader | 20.0 |
| 4. IWT Expert | 10.0 |
| 5. IT Expert | 6.0 |
| Total Key Professional Inputs | 58.0 |

Note:

- a) *List of key professionals and person months is the minimum mandatory requirement. However, the Consultant is responsible to review the required services and shall propose own requirements for additional key professionals/person months if deemed necessary and support staff (e.g., Surveyor(s), enumerators, CAD operator, Office Manager-cum-Accountant, Driver (s), etc.) required to accomplish the proposed services in a satisfactory manner.*
- b) *Financial proposal should include all the direct and indirect costs necessary to execute the services and reporting as well as any public consultation. The Consultant shall provide all facilities and equipment to enable progress of the consultancy works to be completed. This shall include all logistic requirements for their professionals including support staff, office accommodation, equipment and supplies, vehicles, consumables and communications equipment. The Consultant will incorporate these costs in the financial proposal.*
- c) *The number of experts for different positions shall match with the Consultant's Technical Proposal.*

6.2. Qualifications and Responsibilities of Key Personnel

The preferred broad qualifications and responsibilities of the Key Personnel are given below:

6.2.1. Team Leader

Education: Post Graduate Degree with science discipline or similar. However, for Captains of merchant ships education background will be reluctant.

Experience: 20 years of general experience with a minimum of 10 years' experience in shipping and at least 2 years of experience as Team Leader or other senior position in the shipping sector preferably in an assignment of similar nature and complexity. Excellent analytical and written skills. Computer literacy and skills to work with geographic information system software.

Captains of merchant ships shall be preferred.

6.2.2. RIS Expert

Education: At least Bachelor degree in natural sciences, particularly hydrology, hydrogeology, hydrochemistry, hydro-ecology or other adjacent fields.

Experience: Minimum 5 years of professional experience in the field of water resources management, surface water assessment and monitoring. Practical experience in planning and conducting studies on the assessment of the status of surface water, specifically hydromorphological parameters. Good knowledge of the requirements of national water monitoring system, experience of working with national monitoring entities; experience in the Ganges, Brahmaputra and Meghna river basins will be an advantage. Ability to work with a large data sets. Computer literacy and skills to work with geographic information system software.

6.2.3. ENC & ECDIS Expert

Education: At least Bachelor degree in a relevant subject, such as earth sciences, geographic information science, geographic information technologies, geographical information systems (GIS), geography and geology, geomatics and geoinformatics, land surveying mapping and geospatial data science. However, for Captains of merchant ships education background will be reluctant.

Experience: At least 5 years' experience in ENC map-making, editing (including ATNs, IWN infrastructures etc.) using latest software and 10 years' experience in the field of ENC & ECDIS matters (scientific, technological and artistic). She/he will be responsible for: researching, collecting, storing, retrieving, evaluating and manipulating data, designing maps, updating maps and checking the accuracy of maps accordingly. Also must possess sound knowledge on GIS and Google Earth software.

Captains of merchant ships with expertise in preparing, updating, editing ENC shall be preferred.

6.2.4. IWT Expert

Education & Experience: Should have a Bachelor degree in science discipline, e.g., Engineering, Geography or equivalent from reputed academic institution(s) with an extensive and varied experience of at least 10 years in handling large scale passenger and freight inland water Transport and Port projects.

Should have experience in Bathymetric Charts and knowledge in software use. Knowledge on GIS and Google Earth software shall be an added advantage.

6.2.5. IT Expert

Education & Experience: Should have a Bachelor degree in ICT, CSE, EEE or equivalent advance science discipline from reputed university with an extensive and varied experience of at least 3 years in ICT related activities. Experience in GIS & Google Earth.

7. Consultant's Obligations:

The Consultant shall be responsible for undertaking all fieldworks and ensuring all data gathered is quality assured and corrected wherever appropriate. The Consultant shall keep a record of all information collected and present this in a manner which allows statistical comparisons to be made. Qualitative assessments must be backed up by case studies and relevant industry examples. The Consultant shall be fully responsible to conduct necessary survey, investigations and establish office(s) within close vicinity of the Employer's office, mobilize the required key professionals and supporting staff including necessary transport, communication, coordination, reporting, and conducting workshops to fulfill the objectives and deliverables mentioned in this TOR. Consultant's financial proposal shall include all the costs to complete this task. While performing the services, the Consultant shall exercise all reasonable skill, care and diligence in the performance of the study and shall carry out all responsibilities to recognized professional standards. The Consultant shall act as a faithful advisor to BIWTA and shall supply all expertise, knowledge, advice and skills required to carry-out and complete the assignment expeditiously in accordance with the conditions of engagement.

8. Employer's Obligations

BIWTA shall provide the Consultant free of charge, with the following:

- a) **Available** reports, formats, drawings, survey data, hydrological and bathymetric data/ maps or studies made in the past;
- b) Letters of Introduction of Consultant and objective of the assignment to all relevant Government Departments or Institutions for necessary coordination and collection of information.