

# **TENDER DOCUMENT**

**No. IWAI/PL/2010/1**

## **Techno-Economic Feasibility Study for achieving 3.0 m LAD for navigation in Allahabad-Ghazipur stretch of River Ganga, the National Waterway-1**

**Inland Waterways Authority of India  
(Ministry of Shipping)  
A-13, Sector-1, Noida-201 301(U.P.)**

To,

**Sub: Techno-economic Study for achieving 3.0 m LAD for navigation in Allahabad-Ghazipur stretch of River Ganga, the National Waterway-1**

Ref: Your letter no.

Sir,

Please find enclosed herewith the Tender Document on the above mentioned subject as requested vide above cited reference.

The pre-bid meeting will be held at 1500 hrs on 20<sup>th</sup> May, 2010 at IWAI, H.O, Noida.

The sealed tenders in two cover system (one for technical bid and other for price bid) are to be received in the office of Chief Engineer latest by 1500 Hrs. on 10<sup>th</sup> June, 2010. The technical bids would be opened at 1600 hrs on the same day. The tender shall be submitted in the form and manner as stipulated in this document.

Yours faithfully,

Chief Engineer

Encl.- As stated above.

## LIST OF CONTENTS

| <b>Sl. No.</b> | <b>Description</b>                             | <b>Page No.</b> |
|----------------|------------------------------------------------|-----------------|
| 1              | Notice Inviting Tender                         | 4               |
| 2.             | Background                                     | 5               |
| 3.             | Terms of References                            | 12              |
| 4.             | Submission of Reports                          | 13              |
| 5.             | Information to be Supplied to the Consultant   | 14              |
| 6.             | Clarifications and/or Interpretation of Report | 15              |
| 7              | Ownership of Documents and Copy Right          | 15              |
| 8.             | Remuneration/Payment Schedule                  | 15              |
| 9              | General Conditions of Contract                 | 16              |
| 10.            | Termination of Contract                        | 18              |
| 11             | Force Majeure                                  | 18              |
| 12             | Arbitration                                    | 19              |
| 13             | Earnest Money Deposit                          | 19              |
| 14.            | Security Deposit                               | 19              |
| 15             | Liquidate Damages                              | 20              |
| 16             | Submission of Tender                           | 20              |
| 17             | Evaluation of bids                             | 22              |
| 18.            | Formats                                        | 24              |

## **NOTICE INVITING TENDER**

No.IWAI/PL/2010/1

Sealed tenders in two-cover system are invited from reputed Consultancy organizations/ for undertaking the following study :

| Description of Study                                                                                                                                                    | EMD          | Period of study |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|
| Techno-Economic Feasibility Study for achieving 3.0 m Least Available Depth (LAD) for navigation in Allahabad-Ghazipur stretch of River Ganga, the National Waterway-1. | Rs 5.0 lakhs | 12 months       |

### **TERMS AND CONDITIONS**

1. Only those firms who had undertaken minimum two studies related to construction of dams/ barrages or development of navigation on alluvial rivers of India or elsewhere shall be eligible for quoting this work (Proof of the same needs to be produced along with the request for tender document).
2. Tender document can be had from the office of Chief Engineer, IWAI, A-13. Sector-1, Noida, U.P- 201 301 on payment of Rs 2000/- in the form of DD drawn in favour of "IWAI Fund" payable at Noida/ New Delhi during office hours from 10<sup>th</sup> May, 2010 to 25<sup>th</sup> May, 2010. Tender document can also be downloaded from IWAI website [www.iwai.nic.in](http://www.iwai.nic.in) . Those who choose to use the downloaded tender document may submit the cost of tender document in the form of DD along with Technical Bid.
3. Pre-bid meeting will be held at 1500 hrs on 20<sup>th</sup> May, 2010 at IWAI, H.O, Noida.
4. The closing date for receipt of sealed tender shall be at 1500 hrs on 10<sup>th</sup> June, 2010. Technical bids will be opened at 1600 hrs on the same day.
5. IWAI reserves the right to reject or accept any tender in full or part thereof without assigning any reason.
6. Other terms and conditions are as per tender document.

Chief Engineer

## **2. BACKGROUND**

### **2.1 General**

**2.1.1** Inland Water Transport (IWT) is a fuel efficient, environment friendly and cost effective mode of transport having potential to supplement the over burdened rail and congested roads, especially for bulk cargo like coal, cement, steel, food grains, fertilizers, POL, over dimensional cargo etc. For this however, it is necessary that basic IWT infrastructure is developed on waterways to a threshold level at which private sector starts using it as a viable mode of transport.

**2.1.2** Nearly 40 percent of India's population lives in the States of West Bengal, Bihar, Jharkhand and Uttar Pradesh. These are also the States having most 'growth potential' and are largely perceived to be the potential 'drivers of growth' in the unfolding 'Indian Growth Story' in the 21<sup>st</sup> century. It will be an understatement to say that rail and road corridors in these states are choked and their limitation to carry additional cargo, especially bulk cargo, transportation of which is critical for any economic activity, is one of the most important impediments in growth of this region.

**2.1.3** Ganga-Bhagirathi-Hooghly river system from Allahabad to Haldia (1620 km) was declared as first National Waterway in 1986 and IWAI is developing it with IWT infrastructure. It is essentially an alluvial river, being normally monsoon fed between July and September and glacial fed thereafter. The Ganga accommodates several tributaries like the Gomti, Ghagra, Gandak and Kosi from the left bank and Tons, Jamuna and Sone from the right bank

**2.1.4** The role of Ganga in the transportation of men and material has been very important in past- up to early twentieth century. Due to various reasons however, commercial navigation on the upper reaches of Ganga however, was reduced to a trickle by the middle of 20<sup>th</sup> century and at present except in the lower reaches of Haldia—Kolkata stretch very little cargo is transported by the waterway upstream of Farakka except by country boats. The intensive utilization of the river for non-transportation related ends such as irrigation and power generation, combined with lack of adequate river development/ training and protection works over a prolonged period of time, and of course, the development of railway and road network along the Ganga corridor effectively contributed to reducing the navigational importance of the river.

**2.1.5** With the rapid growth in the Indian economy in the years after independence, the land transportation modes (rail and road) in the Ganga corridor steadily started getting saturated. With rapid economic growth since nineties, the requirement of transportation of bulk goods increased in geometric proportion due to which the rail and road modes have reached capacity limits thereby causing congestion, delays and pollution.

## **2.2 IWT potential of Allahabad- Varanasi- Ghazipur stretch**

**2.2.1** Allahabad- Varanasi- Ghazipur stretch of NW-1 has enormous potential for transportation of cargo by IWT mode if a commercially viable IWT operation becomes possible since it shall provide hassle free port- hinterland connectivity for this highly populated, land locked region having enormous potential of development in the coming years.

**2.2.2** There are several cement plants in UP and Madhya Pradesh which are not very far from Ganga (cement plants exist at Chunar, Jagdishpur in UP and Rewa and Satna in MP). These plants dispatch all their finished cement through railways and have to keep stocks for long periods due to shortage of rakes. Upcoming thermal power plants at Bara, Karachhana and Meza shall require imported coal of about 3 to 10 million tonne every year. This entire coal can be transported by IWT mode. Raw edible oil of Jhunjhunwala group has already been transported to Varanasi many times through IWT mode. Finished edible oil has also been transported by M/s Adani upto Ghazipur and Allahabad. Fertilizer is an important input for agriculture. Being predominantly agricultural states, UP and Bihar have huge consumption of Fertilizers and Fertilizer Corporation of India has its warehouses in several places in both the States. Pakur in Jharkhand/West Bengal and Sahibganj in Bihar have quarries of very good quality stone chips. These stone chips are regularly transported to Patna by IWT mode since last six years. These can also be transported up to Allahabad since demand of this essential construction material obviously exists in Allahabad-Ghazipur sector as well. Being two most populous states of the country, food grains are transported in UP and Bihar in large quantities both for consumption and in transit to other states. Food Corporation of India has their warehouses in every big and small towns of UP, Bihar, West Bengal etc. With many river terminals having been constructed by IWAI, the possibility of regular transportation of food grains on NW-1 by IWT mode including up to Allahabad cannot be ruled out. Govt of UP purchases several lakhs of Jute bales from West Bengal each year. Many times these Jute bales have been transported by IWT mode. With development of Allahabad-Ghazipur stretch for round the year operation, these jute bales can be regularly transported by IWT mode.

**2.2.2** Allahabad and Varanasi are the places which attract maximum tourists in north India (except probably Agra). Both these places are very important religious and historical places. With successful operation of river cruise vessel of Pandaw Cruise up to Buxar and Ghazipur, the potential of such cruise services right up to Allahabad and operation of regular cruise services between Allahabad and Varanasi/ Ghazipur cannot be overstated.

**2.2.3** To summarize, the Allahabad-Varanasi- Ghazipur stretch of NW-1 has definite potential of utilizing IWT for various cargo as well as cruise shipping if the waterway with adequate LAD for

commercially viable operations of IWT vessels round the year and terminals with effective loading/unloading facilities are developed.

### **2.3 Fairway, the most important IWT infrastructure**

**2.3.1** There are three basic infrastructural requirements for making a waterway suitable for shipping and navigation. These are (i) navigable channel with adequate depth and width to enable navigation by reasonable size of cargo and passenger vessels, (ii) navigational aids for safe and smooth navigation during day and night, and (iii) terminals to provide facility for berthing of vessels, loading and unloading of cargo/passengers and connectivity with road and rail.

**2.3.2** Though all the three are critical and absence of any one of these will make the waterway unsuitable for navigation, the first and foremost requirement for developing any waterway for shipping is navigation is providing and maintaining assured navigational channel (also called the fairway) with width of at least 45 m and maximum possible least available depth (LAD) for navigation. Only this makes an IWT operator confident about the waterway and enables him to plan an optimum size of vessel and its technology for profitable commercial operations.

**2.3.3** Bigger the size of the IWT vessel, better shall be its economic viability and operators shall be finding the option of investing in vessels less risky. Considering the hydro-morphological characteristics, IWAI had initially been targeting to providing assured fairway of 2m depth and 45 m width in NW-1 and it has been successful in providing this in Haldia- Ghazipur/ Varanasi stretch (1383 km out of total length of 1620 km). But the operators generally do not find this LAD very attractive and hence are not very keen in investing in IWT vessels due to which the cargo transportation in these waterways has not really picked up, particularly in upper reaches of NW-1. Therefore IWAI has now targeted to increase LAD to 3m in Haldia- Farakka stretch and 2.5 m in Farakka- Patna stretch.

**2.3.4** Based on the experience of Inland Water Transport (IWT) system in India, it can be said that LAD of 2.0 m is bare minimum for enabling commercially viable operation. With this depth Self Propelled Vessel (SPV) of 600 to 1000 ton capacity or pusher barge-tug unit of 1500 t (two barges of 750 t each) can safely ply and if 24 hr. navigational aids are provided and both side cargo is available it can provide commercially viable operation. However, it is a touch & go situation and risks are high. With these size of barges and tugs the power to load ratio can not be more than 1:1.5 (since on one way the vessels have to necessarily go against the current) which limits the advantage of the waterway regarding fuel efficiency. Then if the operation does not get cargo on both sides or the vessels do not operate with good turn-around time due to any reason (e.g. non availability of night navigational aids, inefficient loading / unloading facility, high waiting time for getting cargo on either end, breakdown of vessel etc.), then the operator is surely not going to earn profits from his operation. It is an account of these factors that the IWT operators are not keen to operate their vessels upstream of Kolkata on NW-1

despite that assured LAD of 2.0 m is being maintained by IWAI upto Patna round the year. On the other hand, if LAD is 2.5 m or 3.0 m then the operation definitely becomes viable since then Self Propelled Vessels (SPV) of 1500 to 2000 tonne capacity or barge- tug unit of 6000 t (four 1500 T barges plus one tug) to even 9000 T (six barges of 1500 T each + one tug) can safely ply in the waterway, which shall surely make IWT operation far cheaper than road and rail.

## **2.4 Methods of developing fairway**

**2.4.1** Navigable depth in a waterway with the required LAD can be developed and maintained in a number of ways out of which the techniques such as open river navigation, large dams with reservoirs, canalization of river by river training works and series of locks with small dams/ barrages are most common in the countries where developed IWT system exists.

**2.4.2** Open river navigation techniques (bandalling, dredging etc) are the most economical in terms of capital investment but they can provide assured LAD only to the extent, which the natural characteristics of the river can easily support. With these techniques IWAI had been trying to provide and maintain LAD of 2 m in Allahabad- Varanasi- Ghazipur stretch for the last 23 years but had not been very successful. This stretch was also studied very critically by the experts of Netherlands from 1987 to 1990 under a Pilot Project and they inferred that with open river navigation techniques, LAD of 1.5 m can at best be achieved in this stretch. Therefore, it must be clearly recognized that these methods of bandalling and dredging can not provide LAD of 3 m or so in Allahabad- Ghazipur stretch at all.

**2.4.3** Constructing large dams with reservoirs in upper hilly reaches of the river for big storage of water to be released during summer months is very costly, has huge gestation periods, raise several environmental issues and practically are seldom conceptualized for navigation being the main benefit.

**2.4.4** Permanent river training works such as spurs, groynes, dykes etc for the stabilization and rectification of the river to improve navigability can be achieved only gradually over a long period of time, starting with the semi permanent structures and gradual implementation of permanent measures. Such works also become expensive and difficult in rivers where  $Q_{Max}/Q_{Min}$  ratio is high, and flood plains are very wide with braiding, meandering and shifting of channels as well as river course itself which reduces the confidence levels of success of these highly capital extensive structures.

**2.4.5** The lock and dams/ barrages approach is also highly capital intensive but it is sure to succeed since locations of barrages for maintaining assured targeted depth all round the year can be easily decided based on the bed levels/ slope and high and low water level of the river.

**2.4.6** For providing an assured waterway with LAD of say 3 m adopting one of these methods would be an inescapable requirement for sustainable development of the navigation. A combination of lock and dams/ barrages with some river training works to contain the river between two barrages perhaps

appears to be the best option, for Allahabad- Varanasi- Ghazipur sector of NW-1. However being very capital intensive works it is necessary that a proper Techno- Economic feasibility study for this approach is taken up at the first instance.

## **2.5 Hydro-morphological features of NW-1**

**2.5.1** Ganga river- the National Waterway-1, is a typical alluvial river with characteristics of braiding, meandering and large water level fluctuation (both horizontal and vertical) between summer and monsoon months. Moreover, the discharge in such rivers keeps on increasing as the river flows towards the sea since tributaries keep on joining it one after another. On river Ganga also therefore, on account of these factors and most importantly, far lower discharge in the upper reaches, provision of a navigational channel with least available depth (LAD) of even 2 m during non-monsoon months becomes progressively difficult as we go upstream since in these months (November/ December to May/ June), several shallow areas (called shoals) come up. Allahabad- Varanasi- Ghazipur being the upper most stretch of NW-1, it is most difficult to maintain LAD of even 2 m during November/ December to May/ June, especially by adopting open river navigation techniques of increasing depth for navigation.

**2.5.2** As far as NW-1 is concerned, the stretch between Haldia and Tribeni (196 km) is tidal and LAD of more than 3 m is maintained naturally therein. The stretches upstream of Tribeni however are not affected by tides but due to controlled discharge from Farakka barrage, LAD of 2.5 m is not difficult to maintain between Tribeni and Farakka. Up stream of Farakka also the discharge is not too low and the Farakka barrage itself has backwater effect due to which between Farakka and Patna, LAD of even 2.5 m is not very difficult to be maintained with the bandalling and dredging. Between Patna and Ghazipur also LAD of 2 m is not difficult with the help of Dredging and bandalling. But maintenance of 2 m LAD in Allahabad- Varanasi stretch (237 km) is most difficult proposition.

**2.5.3** While Patna- Farakka sector has very wide flood plains of even 5 km at some places, the flood plains of Allahabad – Varanasi- Ghazipur sector are far smaller as the river in this reach is more restricted with firm banks on both sides. The flood plains do not extend beyond 2- 2.5 km at any place. Due to these factors there are many stretches where deep pools of water exist even during non monsoon months.

**2.5.6** From the study of discharge data of river Ganga for the period 1979 to 2003-04 it is seen that the discharge at Allahabad obviously is lowest every year and it increases as we go down the river. Therefore discharge at Mirzapur is more than Allahabad and the discharge at Varanasi is more than that of Mirzapur. It is also seen that there is huge variation between minimum ( $Q_{\min}$ ) and maximum discharge ( $Q_{\max}$ ) in a year (the ratio between  $Q_{\max}$  and  $Q_{\min}$  varying from 100 times to sometimes even 400 times).

**2.5.7** The typical monsoon characteristics are also reflected by the range of maximum and minimum water levels at different places. Near the sea this difference obviously is minimum and it increases as we go up the river. At Farakka the typical difference between lowest and highest water levels is only 2.5 m while at Patna it increases to 9 to 10 m and at Allahabad it goes up to as much as 16.5 m.

**2.5.9** Current velocities between Allahabad and Farakka may vary between 0.10 m/s and 4.0 m/s. The feeder canal is designed for a non-silting and non-scouring velocity of 1.2 m/s. In the Bhagirathi the maximum velocity may be 1.7 m/s. In the tidal reaches of Hooghly the maximum spring tide velocity may be as high as 3.5 m/s in flood and ebb.

**2.5.10** The river system is alluvial. The bed and banks are of the same material. The bank layers consist of layers of sands of varying grades inter-spread with stratum of clay. The D50 varies mostly from 0.2 m to 0.3 mm in the reaches upstream of Farakka.

## **2.6 Range of availability of depth naturally**

This is the most important aspect of Allahabad- Varanasi- Ghazipur stretch of NW-1. It is the combination of discharge and other hydro- morphological factors (e.g. bed slope, confluences, sediments load etc) is responsible for formation of long shoals which are difficult to remove by bandalling and dredging. This is evident from the study of thalweg charts of Allahabad- Ghazipur region for the months of November/December (when floods have receded) and May/June (when monsoon is about to come). This period of November/ December to May/ June of course is the worst period from the point of view of navigability as the discharge is the lowest in this period. However even in this period also about 70 % of the river has more than 3 m depth naturally. IWAI has longitudinal thalweg survey data for the past 20 years.

## **2.7 USA's experience and possibility of lock and dam approach in Allahabad- Ghazipur stretch**

**2.7.1** Waterways of USA where till 1920s or so a 6 feet draft channel was being maintained on Mississippi river system (Mississippi, Missouri, Ohio, Illinois, Tennessee river etc.) but the river navigation was steadily declining because the operators were not finding it viable compared to road and railways which were developed quite a bit by 1920s. [It may please be noted that all these rivers are typical alluvial rivers with characteristics of braiding, meandering, large water level fluctuation and thus these are very well comparable with Ganga river]. Then Govt. of USA adopted and implemented a project of 9 feet channel on all these rivers and they went for dams and lock system to provide assured channel to enable navigation by 9 feet plus draft for round the year operations. This approach not only made the operation of bigger barges possible but also made the construction of terminal and loading / unloading by mechanized facilities very simple and economical. It also enabled the operators to adopt barge + tug flotilla approach and now even on upper stretches of these rivers, their one flotilla typically

consists of 15 barges of 1500 t capacity + 1 tug. Thus each of their flotillas carries 22,500 tonne cargo. The tug typically has large power of 4500 to 5000 – which means that they operate on power to load ratio of 4 to 5. Many bulk cargo (particularly coal, POL and food grains) move on these waterways in huge quantities totaling to more than 500 million tones. Many of these have origin – destination distance of 2000 km and more, saving enormous quantity of diesel had these quantities were being transported by road.

**2.7.2** Though construction of dams and locks is highly capital intensive, in the end they provide so many benefits that the huge investment does become well justified. In addition to the economy of scale of IWT operations, there are other benefits of dams & locks approach in terms of reduction in floods, production of hydroelectric power, increased availability of water for irrigation and drinking water, forestation, protection of species and secondary and tertiary economic activities in the hinterland due to very active and profitable operations all along by barge companies, terminal operators, construction and maintenance industry etc.

**2.7.3** Therefore, based on the data of fortnightly surveys over past twenty years, satellite imageries, discharge of waters slopes etc it is prima facie felt that it may be techno-economical to construct dams and barrages in this stretch to provide assured navigable depth of more than 3 m even during lowest water level periods between Allahabad and Ghazipur. Apart from providing benefits for navigation this approach will also provide water for Irrigation, drinking etc and also charge the ground water table regularly. However further detailing including mathematical and physical modeling (if required) etc shall have to be carried out before arriving at conceptual designs and cost estimation etc. Moreover such important structures shall have to be constructed after all the stake holders namely State Govt of UP, Ministry of Water Resources, Ministry of Environment & Forests, Planning Commission, Ganga Flood Control Board, Ganga River Basin Authority and other agencies related to Ganga river in Uttar Pradesh and Central Government have been consulted since their views shall have to be taken into account before finalizing the plans. Hence this proposal of carrying out Techno- Economic feasibility study.

### **3. TERMS OF REFERENCE**

1. Study/analyze the available hydro-morphological data (secondary data) with IWAI for Allahabad-Ghazipur stretch of River Ganga as listed in clause 5 of the tender document.
2. List out, collect and study/ analyze the additional data required to be collected (secondary data) from other agencies like Ministry of Water Resources (MoWR), Central Water Commission (CWC), Ganga Water Development Authority (GWDA), Ganga Flood Control Commission (GFCC), Uttar Pradesh State Irrigation/ flood control Deptt etc. Close interaction with these agencies/ Deptt is required for fulfillment of this study.
3. Collect and analyse all other primary data required for completion of the study through reconnaissance survey.
4. Study the change of course of river and conditions of the banks in the stretch based on satellite images (secondary data) for the past 20 years and identify the critical locations/ sub-stretches.
5. Confirm the locations identified at 4 above after conducting physical inspection of river banks and river stretch.
6. Analyze the stage-discharge curve from the CWC stations at Allahabad, Mirzapur, Varanasi and Ghazipur for the past 20 years to arrive at the minimum depth available at least 330 days in a year, naturally.
7. Identify the critical locations/ sub-stretches where depth constrains are observed for 3m Least Available Depth (LAD).
8. Critically examine various options/ measures to improve the depth to at least 3 m for 330 days in a year (open river navigation, river training works, series of locks with small dams/ barrages, and/ or any other methods) and suggest the most suitable method for development.
9. Identify the type and location of the structures, if any, proposed to be constructed to achieve the targeted LAD of 3 m.
10. Confirm the locations identified at 9 above based on a mathematical modeling using suitable software like MIKE 21.
11. Suggest suitable mechanism for ensuring uninterrupted movement of vessels like locks/ ship lift etc to be provided in the structures.
12. In the event of construction of barrage(s)/ dam(s) the effects and extent of submergence and its impact on environment. Nature and impact on agricultural activity, habitation, other socio-economic activity in the region etc, if any, also to be elaborated.

13. Give preliminary design and cost estimates of all the structures/ developmental works proposed.
14. Suggest the most economical vessel size (SPVs and barge + tug flotilla combinations). Give a rate analysis for crossing the lock-cum-barrage to be charged from IWT vessel operators.
15. Give financial and economic analysis (FIRR & EIRR) of the project including SWOT analysis.
16. To suggest suitable method of implementation of the project including phasing, time frame and sources of funds for implementation of the project.
17. To suggest suitable monitoring mechanism ( a high level committee consisting of various stake holders or so) for implementation of the project
18. To submit the project report incorporating all the above aspects.
19. Conduct a stake holder meeting at Allahabad and/or Varanasi/ Noida, give a presentation of the project report and seek the views of all the stake holders on the project proposal. Incorporate the views of the stake holders and make suitable modification/ improvement of the proposal and submit a final report.

#### **4. SUBMISSION OF REPORTS**

(A) Consultant shall submit the reports as follows:-

- (i) The inception report (2 copies) shall be submitted within 1 month of award of work which should contain the views of the Consultant on the approach of preparation of project report, data to be collected, activities proposed (month-wise), tentative chapters/ content of the report etc.
- (ii) Two copies of report on secondary and primary data collection within 3 months time (1<sup>st</sup> report of data collection)
- (iii) Two copies of report on secondary and primary data collection including mathematical modeling after 6 months time (2<sup>nd</sup> report of data collection)
- (iv) First Draft report (3 copies) to be submitted covering all activities as per ToR within 9 months
- (v) After incorporating the comments of IWAI and the inputs received from stake holders meeting submit revised Draft final project report within 11<sup>th</sup> month.
- (vi) Submission of Final report (30 copies) incorporating final comments of IWAI latest by completion of 12<sup>th</sup> month.

**Note:** The time limits given above shall be reckoned from date of signing of agreement at Noida.

- (B) If at any stage mentioned above, the Consultant apprehends delay in the submission of any stage reports, they shall at least a month in advance seek on sufficient grounds suitable extension, which would be without any additional financial implications to the IWAI. If the delay is caused beyond the extended period, if any, the IWAI shall have the right to terminate the contract and be entitled to employ and pay other agencies/consultants (new) to carry out the work at the risk and cost of original consultant and all expenses consequent thereon or incidental thereto shall be recoverable from the original consultants by the IWAI or may be deducted by the IWAI from any dues or which may become due to the original consultants.
- (C) In case of unsatisfactory progress/services by consultant, IWAI will inform the consultant in writing. If the consultancy service continues to be unsatisfactory, the contract may be terminated by IWAI before the completion of work and the balance work will be got done by IWAI at the risk and cost of the consultant.

## **5 INFORMATION TO BE SUPPLIED TO THE CONSULTANTS**

- a. IWAI will supply the following data/ material based on its availability
1. Satellite images (digital and/ or analogue copies, as per availability) for the past 10 years
  2. Thalweg survey data for the stretch for the past 10 years (digital/ analogue form as per availability)
  3. Detailed survey data (bank to bank bathymetric data, if available) at shoal locations for the past 10 years (digital/ analogue form as per availability)
  4. Shoal analysis for the stretch for the last 10 years ,as available
  5. One set of River Navigational Chart for the stretch
  6. Water level data/ Discharge data of Allahabad, Mirzapur, Varanasi and Ghazipur sites, which shall be kept confidential by the consultant.
  7. One copy of River Atlas for NW-1
  8. Pilot project report of development of River Ganga in Patna-Allahabad stretch by M/s Frederic Harris B.V, Netherlands (1990 report)
- b. IWAI shall give reasonable assistance to the consultant for carrying out their duties under agreement. Information shall be supplied to the consultant considered by IWAI to be pertinent free of charge. If any necessary and pertinent information, which is to be supplied to the consultant by IWAI, is not furnished in time, the consultant shall use their best judgement based on their experience and make their own assessment for

the purpose of completion of reports. The consultant shall get such assumption approved by IWAI and such approval shall be given by IWAI within ten days of receipt of such request.

- c. Consultant shall warrant that information already furnished as well as to be furnished shall be treated as secret and shall be used by the consultant only for the propose for which such information was intended and shall not disclose it to any other party without the prior approval of IWAI.
- d. Original data should be returned to IWAI on completion of study.

## **6. CLARIFICATION AND / OR INTERPRETATION OF REPORT.**

After submission of the final report by the consultant, to the satisfaction of IWAI if clarifications are required or doubt arises as to the interpretation of any thing included in the reports, consultants shall, on receipt of written request from IWAI, furnish such clarification to the satisfaction of IWAI within 30 days without any extra charge, even after completion of study.

## **7. OWNERSHIP OF DOCUMENT AND COPYRIGHT**

The report on submission by the consultant shall be the property of IWAI. It shall not be used in part or full, copied or published in any manner without obtaining prior permission of IWAI.

## **8 REMUNERATION / PAYMENT SCHEDULE**

- (a) The consultant shall receive a sum of Rs.... Lakhs as fees (the amount approved by Competent Authority), for all services and expenses required for completion of Techno-economic feasibility study for achieving 3.0 m LAD in Allahabad-Ghazipur stretch of NW-1 for navigation as per ToRs mentioned under Clause -3 of this Tender. This fee will be firm and final and will cover the entire scope of work and terms of reference.
- (b) The fees referred at (a) shall become due in the following installments.( % of contract value)
  - 1) 20% as mobilization advance (simple interest bearing @10% per annum) against submission of a non-revocable Bank Guarantee valid for 12 months or till release of 5<sup>th</sup> stage payment, (submission of first draft report), whichever is later. If no mobilization advance is taken, then the 5<sup>th</sup> stage payment will be equal to 40% (20% +20%) of the contract value.
  - 2) 5 % on submission of Inception report
  - 3) 10 % on submission 1<sup>st</sup> Report on data collection

- 4) 15 % on submission of 2<sup>nd</sup> Report on data collection and mathematical modeling of barrages
- 5) 20% on submission of first draft report
- 6) 20% on submission of final draft Report incorporating the comments / inputs after the stake holders meeting and its acceptance
- 7) 10% on submission of required number of copies of final report.

Payment of the installments shall be effected within thirty days of becoming due and shall be made by cheque payable to the account of consultant.

## **9 GENERAL CONDITIONS OF CONTRACT**

The consultant shall carry out the consultancy services in accordance with accepted bid and tender conditions mentioned hereunder.

- i) Consultants are advised to visit the site sufficiently in advance of date fixed for the receipt of tender. The consultant shall be deemed to have full knowledge of the site, situations, local conditions etc. prevailing irrespective of whether they inspect or not.
- ii) The successful consultant will have to execute an agreement with IWAI on Rs.100/- stamp paper (non-judicial). Format of agreement is placed at Annexure-IV. The conditions of the agreement shall be binding on the consultant.
- iii) The acceptance of tender shall rest with the IWAI. The IWAI reserves the right to reject any or all tenders received without assigning any reasons whatsoever.
- iv) The right to award, split up work and to reject the offer without assigning any reason is reserved with the Authority.
- v) Any breach of condition of contract shall be brought to the notice of the consultant and given an opportunity to explain the fact, but the IWAI has right to withdraw in full or part of the work of the consultant. In such event, payment shall be made in proportion to the extent of service rendered by the consultant till such time.
- vi) The consultant shall insure all their personnel working on this project and keep IWAI indemnified of all liabilities, loss, etc.
- vii) The Chairman, IWAI shall nominate an Engineer-in-Charge who will be the Coordinating officer on behalf of IWAI for the day to day working of the project.
- viii) The consultant will submit to the Authority a bill in triplicate on completion of each stage of consultancy service giving the details of fees, charges, service rendered etc. for payment by the Authority.
- ix) The rate quoted shall include all taxes, duties, etc. such as sales tax, octroi, duties, toll etc but excluding the service tax, which is 10.36% at present. The service tax will be

paid over and above the stage payment(s) as per Govt of India rules, as applicable from time to time.

- x) The rate quoted by the consultant will remain valid till the consultancy work is fully completed.
- xi) Suitable extension of consultancy period may be granted by IWAI only for reasons eligible for consideration. The consultant shall make request for the same in writing in advance indicating the reasons and period of extension desired.
- xii) The consultant shall not change nature and level of technical experts as well as other staff indicated in the proposal.
- xiii) The Consultant shall remain fully and squarely responsible for the correctness and accuracy of all the data, analysis, designs, drawings, quantities, specifications and documents etc., basically prepared by them.
- xiv) The consultant shall observe all care in accordance with recognized sound engineering standards for carrying out the service required under this contract. They shall use for this purpose the highest scientific and most modern means and apply all speedy and economical methods for mapping as well as the use of electronic computer, software etc in designing the various structures required for the project.
- xv) The consultant shall undertake to supply upon the Authority's request, additional copies (not exceeding 5 nos.) of the drawings, reports, etc, at free of cost.
- xvi) The consultant shall not without the prior written approval of the Authority, concede, transfer or sublet the right and obligation under this contract or any part thereof to the third parties otherwise the Authority shall have right to terminate this contract without assigning any reasons except for notifying the consultant of such termination in writing. The consultant in such case shall have no right to claim for compensation for any harm due to this termination. However, the consultant shall still remain responsible in case of the Authority approves to his conceding, transferring or subletting to the third parties fully, individually and jointly with the parties to whom the work has been conceded, transferred or sublet.
- xvii) The consultant shall provide all the necessary help to the Engineer-in-charge or his representative to cross check the works during and after the work till the completion of Project.
- xviii) The consultant shall make their own arrangements for the transport, accommodation, TA/DA of their personnel assigned to this project for their site work, visiting IWAI

offices/ other offices as may be required in connection with this consultancy work, attending discussions/ meeting/ presentations etc with concerned authorities.

- xix) Consultancy fees quoted for the work would deem to have included all the incidental cost including cost of all the drawings, designs, reports, schemes, documents etc. which would be required to be prepared by the consultant during the course of the assignment.
- xx) In the event of consultant's firm closing its business, IWAI shall have the right to employ any other agency to complete the work at the risk and cost of the Consultant. The payment shall be made to Consultant up to the stage of service then completed. In this regard, decision of Chairman, IWAI shall be final and binding on the consultant.

## **10 TERMINATION OF CONTRACT**

IWAI have the right to terminate the contract by giving 30 days written notice. In the event of termination for no fault of consultant, the IWAI shall reimburse all the expenses incurred by the consultant including that for winding up the project. If the contract is terminated due to the fault of the consultant or in case of termination of the agreement by the consultant, the consultant shall pay to IWAI the excess amount that may have to be incurred by IWAI for getting the scope of work completed by some other Agency.

## **11 FORCE MAJ URE**

Any delays in or failure of performance by a party to this Agreement shall not constitute default here under or give rise to any claims for damages against said party, if any, to the extent caused by matters beyond the control of said party like acts of God, strikes, lock outs or other concerted acts of workmen, fires, floods, explosions, blockades, embargoes, riots, war (Declared or undeclared), rebellion, sabotage, extra-ordinary severe weather, civil commotion and criminal acts of third persons.

If the work is delayed by force Majeure, then upon the happening of such delay the consultant shall within 14 days of the happening of such event given notice in writing to IWAI requesting for extension of time indicating the period for which extension is desired. IWAI may also give a fair and reasonable extension of time for completion of the work at their discretion but no monetary allowance shall be made to the consultant for any such delay and the consultant may not; make any claim for damages by reason of any such delays. If any of the above

circumstances continue for more than 3 months in that event IWAI will have the right to terminate this contract without any notice to the consultant.

## **12 ARBITRATION**

In the event of any dispute or difference covering, relating to or arising out of this Agreement, the parties shall do their utmost to settle it in a fair and amicable manner in a spirit of mutual cooperation and any dispute or difference not to settled within thirty days, shall be referred to the sole arbitration of a person so nominated by the Chairman, IWAI. Such arbitrator shall have the right to extend the period of arbitration proceedings with the consent of the parties. The venue of the arbitration shall be NOIDA. In view of the arbitration proceedings, the work under the AGREEMENT should not be suspended.

## **13 EARNEST MONEY DEPOSIT**

Consultant shall submit EMD amounting Rs.5,00,000/- (Rupees Five lakhs only) in the form of Demand Draft drawn on any Nationalized Bank in favour of “IWAI Fund” payable at New Delhi / Noida. The EMD shall be submitted along with Technical bid as mentioned in clause 16.1. EMD of all unsuccessful tenderers shall be returned after award of work to the successful bidder on request by the tenderers. No interest shall be paid on any account against EMD.

The EMD may be forfeited:-

- a. If a bidder withdraws his bid during the validity period of bid as specified under clause 16.4
- b. In the case of a successful bidder, if the bidder fails:-
  - To sign the contract in accordance to clause 9(ii)
  - To furnish security deposit in accordance with clause 15

## **14 SECURITY DEPOSIT**

A security deposit (SD) of 10% of the contract value shall be submitted by the consultant awarded with the work in the form of Demand Draft/ Bank Guarantee (BG) drawn from any Nationalized bank in favour of ‘IWAI FUND’ payable at New Delhi / Noida immediately after the issuing of work order and not later than the period specified in the work order. The EMD of the successful consultant will form part of the S.D. The EMDs for the other bidders will be refunded on request after finalization and issuance of work order to the successful tenderer. If the S.D is submitted in the form of BG, it should be valid for the entire period of study including extension period, if any. The S.D will be released on request by the consultant only on

successful completion of study in all respect and production of a “No Demand Certificate” issued by the Engineer-in-Charge within a period of 30 days after release of final payment.

## **15 LIQUIDATED DAMAGES**

- (i) If consultant fail to complete the whole of the works within the period specified under the agreement, the consultant shall pay to the owner as fixed and agreed liquidated damages, and not as penalty, a sum @ 0.1% of the agreed fees for each calendar day of delay.
- (ii) The aggregate maximum of liquidated damage payable to the owner under this clause shall be subject to a maximum of 10% of the total agreed fees

## **16 SUBMISSION OF TENDER**

The consultants are required to submit their tender in two parts in separate sealed envelopes as given below:

### **16.1 Part A-Technical bid**

The consultant shall submit the technical bid keeping in view the scope of work listed in the TOR and indicate the consultant’s approach for completing the work in time giving the details such as work programme, deployment of technical personnel and staff with their qualification, status etc. to be used for the consultancy work. The technical proposal would cover, inter-alia , the following.

- a. EMD as specified in Clause -13.
- b. Background of the organization with respect to similar experience and brief description of projects recently undertaken (for the past 5 years) in the relevant field including scope of work and nature of consultancy services offered. The details of work carried out may be furnished in Annexure – II & III. Copies of completion certificate in case of completed studies and copies of work order/ agreement in case of ongoing studies shall be submitted as proof of work experience.
  - c. Details of organizational set up of the consultant
  - d. A short write up on methodology to be adopted for the present project and proposed approach and programme to carry out this assignment. (Submit with the help of Bar chart).
  - e. Details of the organizational set up for carrying out the subject study and the individual expertise.

- f. A list of associates with complete CV's who would be associated with the present assignment with their specific scope of work. This should be supported by letter from their associates.
- g. The original tender document, duly signed in every page by authorized signatory of the consultant shall be returned along with Technical bid. If downloaded tender document is used from the website, a written undertaking indicating that the tenderer has not made any addition/ deletion/change to any of the tender clauses and it is exactly as per the document available in IWAI's website.
- viii) Copy of the annual Report or Audited balance sheets, for the last 3 years
- ix) Solvency certificate from the Bank for an amount not less than Rs 25 lakhs.
- x) Copy of PAN card
- xi) Any other details which consultant may feel relevant to carryout the present assignment.

**It may please be noted that the technical proposal shall not contain any reference to the consultancy fee.**

#### **16.2 Part B- Financial Bid**

- (i) This will contain consultancy fee to be charged for completing the work. The total fee shall be quoted as a lump-sum amount. However, consultant shall also enclose therewith, the detailed break up of consultancy fees for important subheads e.g. cost towards manhours, TA/DA, hydrographic surveys, mathematical modeling, preparation of reports etc.
- (ii) While working out consultancy fees, following points should be noted:
  - (a) The consultants will have to make their own arrangements for the transport/ accommodation/ TA/DA of their personnel assigned to this project for their site works, visiting IWAI offices and other places for meetings, presentations and discussions.
  - (b) Consultancy fees quoted would deem to have included all the incidental cost including cost of all the drawings, documents, reports etc. which would be required to be prepared by the consultants during the course of the assignment.

### **16.3 Submission**

- (a) The technical and financial bids complete in all respects should be submitted by 1500 hours on 10<sup>th</sup> June, 2010 in the office of the Chief Engineer, Inland Waterways Authority of India, A-13, Sector-1, Noida-201301(U.P)
- (b) Technical and financial bids should be sealed in separate envelopes duly super scribed. These two envelopes should be put in one cover which shall be super scribed with “Tender for taking up of Techno-economic feasibility study for achieving at least 3.0 m LAD in Allahabad-Ghazipur stretch of River Ganga, National Waterway-1 for navigation”.

### **16.4 Validity of offer**

The offer shall be valid for at least 180 days from the date of opening of technical bids.

## **17 EVALUTION OF BIDS**

- a. The firms past experience will be considered based on the following. For the past 5 years period, the Consultant should have undertaken
- i) Three similar completed studies costing not less than the amount equal to Rs 24 lakhs OR
  - ii) Two similar completed studies costing not less than the amount equal to Rs 30 lakhs, OR
  - iii) One similar completed study costing not less than the amount equal to Rs 50 lakhs.

Similar study means preparation of Detailed Project Report or Techno-economic feasibility study for construction of Dams or Barrages/ Navigational study for waterways in alluvial rivers , Ports and Harbour or Transportation related projects ( in that order of merits) .

- b. The firm should have a solvency of minimum Rs 25 lakhs.
- c. The evaluation committee appointed by the client will carry out its technical evaluation applying the evaluation criteria and point system specified and each responsive proposal will be attributed a technical score.
- d. Any effort by the consultant to influence the client in the client’s proposal evaluation or contract award decisions may result in the rejection of the consultant’s proposal.
- e. The IWAI shall notify in writing the consultants that they passed the minimum technical score and indicate the date and time for opening the financial bids.
- f. On opening the financial proposals in the presence of the consultants who choose to attend bid opening, the IWAI will announce the name of the consultants, their technical

scores and the amounts of their financial proposals. The IWAI will keep a register of representatives attending the meeting. There will not be any carry over of weightage on technical evaluation to the financial bid opening stage. Only L-1 will be the deciding criteria.

- g. The evaluation committee will determine whether the financial proposals are complete (i.e., whether they have quoted all items of the corresponding technical proposals, if not, the committee will cost them and add its cost to the initial price) for the evaluation of financial bids.

The points given to evaluation criteria would generally be as follows:

| <u>Sl. No.</u> | <u>Description</u>                                     | <u>Points</u> |
|----------------|--------------------------------------------------------|---------------|
| 1.             | The consultants relevant experience for the assignment | 40            |
| 2.             | The quality of methodology proposed                    | 10            |
| 3.             | The qualifications of the key staff proposed           | 30            |
| 4.             | Added advantage in experience in IWT field             | 10            |
| 5.             | Past work done in the locality of work                 | 10            |
| <b>TOTAL</b>   |                                                        | <b>100</b>    |

The points given to evaluation sub-criteria for qualification of key staff proposed are:

| <u>Description</u>                | <u>Points</u> |            |
|-----------------------------------|---------------|------------|
| General qualification             | 30            |            |
| Adequacy for study                | 50            |            |
| Experience in IWT related study   | 15            |            |
| Experience and language in region | 05            |            |
| <b>TOTAL</b>                      |               | <b>100</b> |

The technical proposal should score at least 80 points out of 100 only will be considered for financial evaluation.

**DETAILS OF WORKS/ STUDIES CARRIED OUT FOR IWAI**

| Name of the Work | Contract Value | Schedule of Completion Actual date of Completion | Extension, if any |
|------------------|----------------|--------------------------------------------------|-------------------|
|                  |                |                                                  |                   |

Note: Copies of completion certificate to be submitted in case of completed studies and copies of work order/ agreement to be submitted in case of ongoing studies to substantiate the experience.

DETAILS OF SIMILAR WORKS/ STUDIES CARRIED OUT FOR  
OTHER ORGANISATIONS

| Name of the Work | Contract Value | Schedule of Completion Actual date of Completion | Extension, if any |
|------------------|----------------|--------------------------------------------------|-------------------|
|                  |                |                                                  |                   |

Note: Copies of completion certificate to be submitted in case of completed studies and copies of work order/ agreement to be submitted in case of ongoing studies to substantiate the experience.

**AGREEMENT BETWEEN INLAND WATERWAYS AUTHORITY OF INDIA AND (NAME OF SUCCESSFUL TENDERER)**

This agreement made on this \_\_\_\_\_ day of \_\_\_\_\_ Two Thousand Ten between the Inland Waterways Authority of India, A-13, Sector-1, Noida – 201301. Uttar Pradesh (hereinafter called the “IWAI” which expression shall unless excluded by or repugnant to the context, be deemed to include their successors in office) on the one part and (hereinafter called the “Consultant” which expression shall unless excluded by or repugnant to the context be deemed to include their heirs, executors, administrators, representatives and assigns or successors in Office) on the other part.

WHEREAS IWAI is desirous of commissioning the services of a Consultant to assume total responsibility with regard to preparation of a Techno-economic Feasibility Report for achieving minimum 3.0 m Least Available Depth (LAD) for navigation in Allahabad-Ghazipur stretch of River Ganga, the National Waterway-1.

WHEREAS the CONSULTANT has agreed to provide consultancy services for undertaking the work on terms and conditions hereinafter set forth.

**1. DUTIES AND OBLIGATIONS OF CONSULTANT:**

- i) Consultant shall prepare and submit the reports to IWAI on terms and in the manner and within the time set forth hereunder.
- ii) For this purpose, the consultant will depute personnel with adequate qualifications and experience as may be agreed upon between the two parties.
- iii) Consultant shall exercise all reasonable skill, care and diligence in the discharge of the duties agreed to be performed by them.

**2. SCOPE AND CONTENT OF STUDY:**

- i) The scope and content of feasibility study shall be as set for as per the Tender Document No. IWAI/PL-/2010/1 submitted by consultant with their offer to the Chief Engineer, IWAI forms an integral part of this agreement.
- ii) The units used shall be in metric system.

- iii) The report shall include all necessary drawings and sketches along with guide maps to illustrate and simplify its content.

### **3. DURATION OF STUDY & TIME OF SUBMISSION.**

The duration of completion of this study is 12 months from the date of signing of agreement at Noida. The reports shall be submitted as per Clause 4 of the tender document.

### **4. REMUNERATION:**

The Consultant shall receive, as fees for all services and expanses required for carrying out the Study and submission of reports, a sum of Rs...../- (Rupees.....). This fees is firm and final and covers the entire scope of work.

### **5. SUBMISSION OF PROGRESS REPORTS:**

- i) The consultant shall submit monthly progress reports to IWAI conveying accurate description of the services already performed and all other information and graphs showing the existing status and progress of the consultant's service during the fortnight with detailed information about personnel used in carrying out this work. The consultant may also include any other information which consultant deems necessary to point out to IWAI.
- ii) Quarterly appraisal reports about the progress of consultancy services shall be submitted to IWAI.
- iii) All the required number of reports mentioned in Clause 8 of the tender document shall be submitted as per schedule.
- iv) In case of unsatisfactory progress/ services by the Consultant, IWAI will inform the Consultant in writing. If the consultancy services continues to be unsatisfactory, the contract may be terminated by IWAI before the completion of the work and the balance work will be got done by IWAI at the risk and cost of the Consultant.
- v) In addition to the Tender No.IWAI/PL/2010/1 for this work, the correspondences exchanged between IWAI and the Consultant up to the stage of signing of this agreement shall be deemed to form and be read construed as a part of this agreement.

In WITNESS WHERE OF the parties hereto have caused this contract to be executed in accordance with their respective laws the day and year first above written.

Signed sealed and delivered by the said .....  
(for the Authority)

in the presence of .....

Seal of the Authority

Signed. sealed and delivered by the said .....  
(for the Consultant)

in the presence of .....

Seal of the Consultant