

**Request for Proposal Document**

**Volume VIII: DREDGING WORK**

**ENGINEERING, PROCUREMENT AND CONSTRUCTION  
OF  
MODERNISATION AND UPGRADATION OF  
COCHIN FISHERIES HARBOUR AT THOPPUMPADY,  
KOCHI, KERALA**

COCHIN PORT TRUST,  
WILLINGDON ISLAND,  
KOCHI, KERALA – 682003

APRIL 2022

## **DREDGING WORKS**

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## I. TECHNICAL SPECIFICATIONS (for Dredging Works)

### 1.0 PROJECT AND SITE INFORMATION

#### 1.1 Location

Cochin Fisheries Harbour(CFH) is located on the western side of the Mattancherry channel and it is adjacent to CSL's (Cochin Shipyard Limited) ISRF (International Ship Repair Facility) dry dock. The proposed dredging area A-B-C-D-E-F-G-A is shown in the Figure 1 below

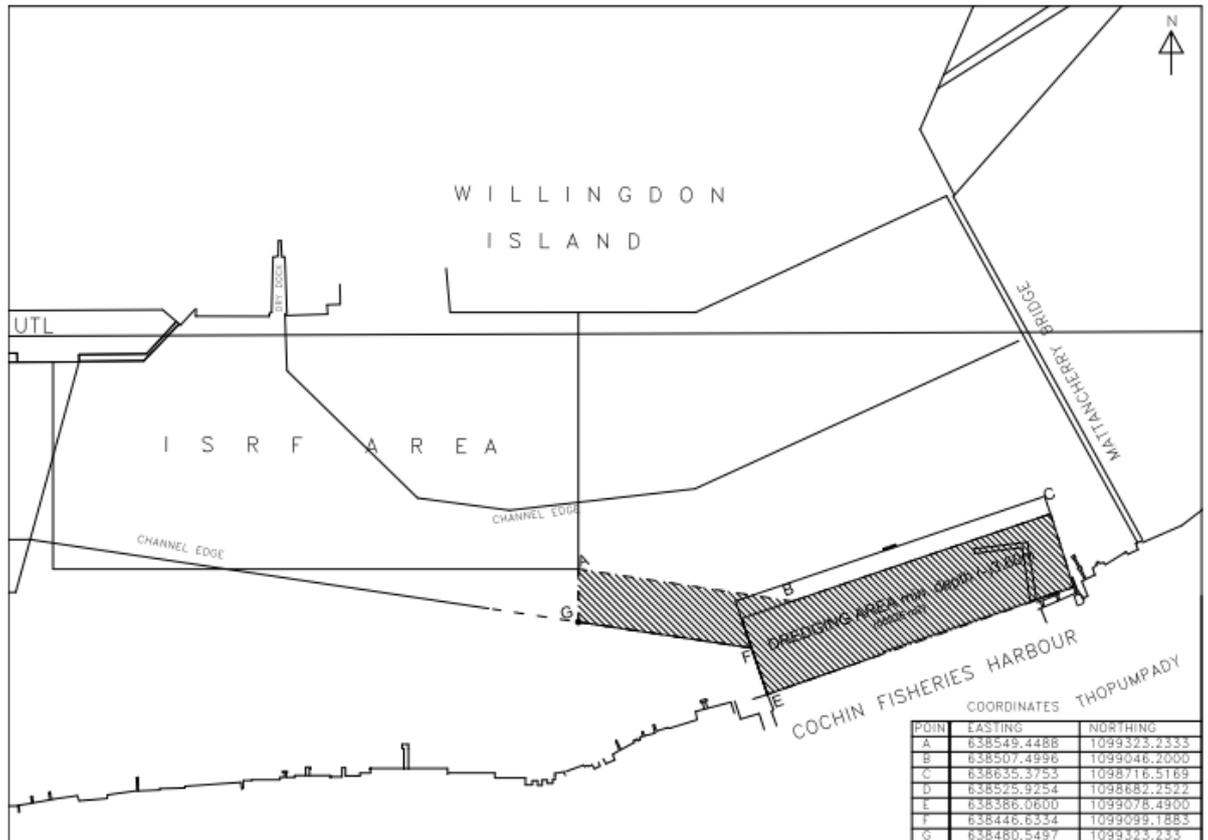


Figure 1 Location of Dredging area

### 2.0 PROJECT BACKGROUND

The present Approach Channel comprises of an Outer Channel, Entrance Channel, LNG basin, ICTT Basin and two Inner Channels; the Ernakulum Channel and Mattancherry Channel. Outer channel is about 13.0 km long and maintained for a varying width of 286/260m and depth of 15.90m from the Harbour entrance towards channel mouth. Mattancherry channel is about 2.60km from channel mouth and the depth of not less than 7m (approx.) is available in the channel upto CSL's ISRF dry dock.

The Cochin Fisheries Harbour is one of the major fisheries harbours in the country and it has designed capacity for berthing and landing of about 507 fishing vessels. The frontage of the berth has been silted up and the depth available is about (-) 1.50m. It is proposed to dredge the entire wharf frontage for a length of about 400m and width of 100m and portion of approach channel from the ISRF berth to the fishing harbour area for obtaining a depth of (-) 3.60m with respect to Port's Chart Datum. The location of the proposed site is as shown at Figure 1.

### **3.0 SITE INFORMATION**

#### **3.1 General**

- 3.1.1 The whole coastal area is characterized by formation of the coastal land forms, which are made up of sand bars and barriers, sandy flats, mud flats and bars. The coastal plain is occupied by quaternary and recent sediments consisting essentially of sands, sandy clays, clays and carbonaceous clays.
- 3.1.2 The near shore area outside the Cochin Gut is relatively shallow reaching a water depth of 5 m at a distance of about 2 km from the shore and gradually deepening to 10 m at a distance of about 6 km outside the Gut. The sea bottom is mainly soft mud up to several meters deep in the near shore waters of Cochin.
- 3.1.3 The siltation in the Cochin Harbour area mainly takes place due to the deposition of the sediments from sea, which are stirred up during the wave action and brought inside the lagoon during the flood tide, whereas the siltation in the outer channel is mainly due to the phenomena of littoral drift.
- 3.1.4 The site for the proposed works is in the Cochin Fisheries Harbour, which is located on the western side of Mattancherry Channel at Thoppumpady. The fisheries harbour area is adjacent to ISRF project area of CSL. The site is accessible by road and through water.

#### **3.2 Analysis Report on Side Scan Sonar Studies**

No Side Scan studies have been conducted. The bidder may be permitted to conduct detailed studies if the Bidder wish to do so at bidder's cost with prior permission of the Employer.

#### **3.3 Bathymetry and Seabed Features**

- 3.3.1 The seabed slopes gently in the offshore region and is about 1 in 500 to 600. The coast experiences the littoral drift as anywhere else but there is a phenomenon of formation of the mud banks. The mud banks are not stationary and have a tendency to move in the coastal region.
- 3.3.2 Bar formation at the entry of the port is a natural phenomenon and it takes place during the southwest monsoon season. Hence, annual dredging is to be resorted to in order to keep the necessary depths and widths in the navigational channel. Littoral drift takes place during both the SW & NE monsoons as a result of which the channel experiences siltation. This effect gets compounded when material from the mud banks find its way to the entrance channel during the flood tides.
- 3.3.3 The indicative quantity off dredging is about 90000m<sup>3</sup> and the Hydrographic Survey chart, DRG. No. HS/D/135/2021 dated 16/10/2021 is given below.

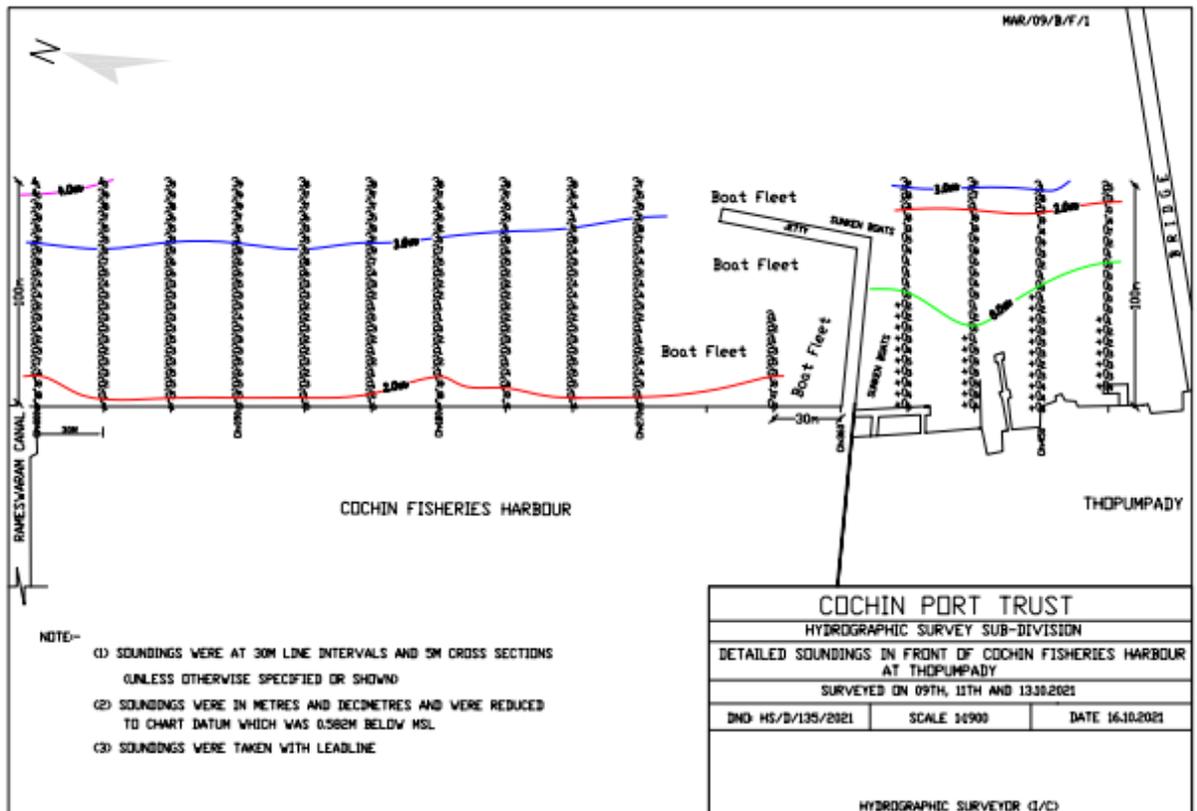


Figure 2 : DRG. No. HS/D/135/2021 dated 16/10/2021

3.3.4 Bidder, if he so desires is free to conduct Hydrographic Survey at his own cost with prior permission of the Employer.

### 3.4 Meteorological Data

#### 3.4.1 Wind

3.4.1.1 The wind speed and wind direction is determined by the season and by the daily temperature differences between land and sea. The predominant wind direction during the SW monsoon period ie, from June to September, is west to South-West and the effect of land breeze is not dominant during this period.

3.4.1.2 During the non-monsoon periods, the predominant wind direction is from North-East during the morning and West during the evening, which shows influence of land breeze.

3.4.1.3 The maximum wind speed observed was of the order of 112 kmph from WSW direction.

3.4.1.4 The details of wind data is shown in Table -1 below.

Month	Observed Wind		% time speed exceeded 20 KMPH	Predominant Direction
	Maximum Velocity			
	KMPH	Direction		
January	58	SSE	10	W
February	53	N	20	W
March	80	SSW	26	W
April	88	SSW	23	W
May	112	WSW	23	W
June	86	WNW	13	W
July	93	SW	13	NW
August	93	NNW	16	NW
September	77	WNW	15	NW
October	67	NNW	6	W
November	69	WNW	5	W
December	64	SSE	3	W

Table -1 : Wind Data

### 3.4.2 Cyclonic Storms and Depressions

Cochin lies beyond the cyclone belt and therefore the risk of cyclone is negligible.

### 3.4.3 Air Temperature

Temperature at Cochin varies from about 23° to 32.5° C. There are not much distinct seasonal variations in the temperature, which is more or less uniform throughout the year. However, highest temperatures tend to occur in the months of March to May. The low temperature occurs during December and January.

### 3.4.4 Relative Humidity

The humidity is high throughout the year. From June to September, during monsoon, the humidity ranges from 95 to 100%. From October to January it comes down to 50 to 70%. During summer months of February to May average humidity is about 60%.

### 3.4.5 Rainfall

The maximum rainfall usually occurs during the SW monsoon period ie, from June to September. The annual rainfall in the region varies between 2500 to 3500 mm.

### 3.4.6 Visibility

The visibility in the dredging area is excellent, except for few days during monsoon.

## 3.5 Oceanographic Information

### 3.5.1 Waves

#### 3.5.1.1 Deep-water Waves

The wave climate is governed by the South West monsoon when wave action can be strong with prevailing wave direction from North-West to South-West. Deep water (15m depth) wave observation in the past indicate the significant wave heights of 4m, 2m and 1m at water depths of 10m, 5m and 2m respectively, the predominant wave direction being West.

3.5.1.2 Wave action inside the harbour is insignificant because of narrow entrance between Vypeen Gut and Fort Cochin and the configuration of the land. Generally calm conditions prevail in the harbour basin throughout the year except during the times of extreme wind action.

3.5.1.3 Wave Rose diagram (Period and Height) near Cochin Port is presented in Figure – 2 below.

### 3.5.2 Tides

Cochin experiences semi diurnal tides. The tidal levels as per Naval Hydrographic Chart No. 2004.

Highest High Water Level	:	+1.20
Mean High Water Spring (MHWS)	:	+0.92m
Mean Low Water Spring (MLWS)	:	+0.80m
Mean Sea Level (MSL)	:	+0.582m
Mean High Water Neap (MHWN)	:	+0.60m
Mean Low Water Neap (MLWN)	:	+0.30m
Lowest Low Water Level	:	+0.20m

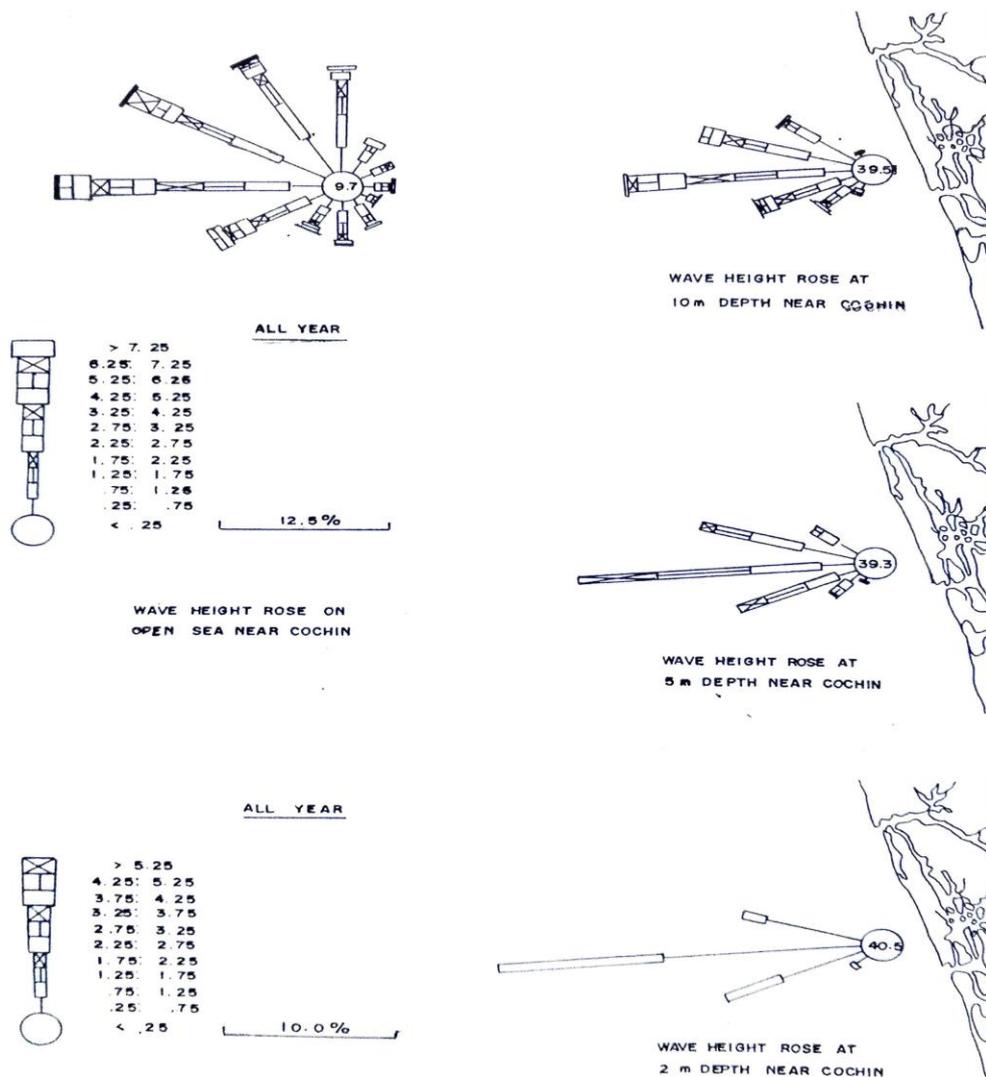


Figure – 2 Wave Rose Diagram

### 3.5.3 Currents

- 3.5.3.1 The currents along the coast of Cochin consists of tide, wave and wind induced components.
- 3.5.3.2 The tidal flow inside harbour basin, towards south bifurcates and flows around Willingdon Island giving rise to maximum current velocities both in Ernakulum and Mattancherry channels but their magnitude is different at different locations inside harbour. In the shallow natural channels on the northern side, velocities are low. While velocities during dry season follow a definite pattern, monsoon brings in large amount of fresh water and this gives rise to highly stratified conditions in the navigation channels. The distinct saline wedge which intrudes into channel was shown to exhibit sharp reversal of velocities. As can be expected, peak velocities occur at the Cochin Gut. As per observations, the maximum current velocities at the Cochin Gut during the non-monsoon periods are of the order of 3 knots, which could increase to as high as 5.5 knots during the monsoon periods. Inside the harbour the current velocities are low, of the order of 0.5 knots only, with directions varying at different locations. Maximum flood velocities during monsoon were observed at the bottom due to density currents.

## **4.0 SCHEDULING OF WORK**

### **4.1 General**

Before commencement of dredging, the dredging plan will be prepared by the Contractor in consultation with the Deputy Conservator and Chief Engineer of the Port and the dredging will be carried out as per this plan. It will be the sole responsibility of the contractor to plan the dredging programme so as to attain the widths and depths in the berth basin / channel as required in the scope of work. However, during the course of dredging due to requirement of shipping or for any other reasons if it is so required by the Dy. Conservator/Chief Engineer, the Contractor shall undertake dredging in any other area than previously planned, in the berth frontage as instructed and no claim of any sort shall be made for deviating from the original dredging plan.

### **4.2 Chart Datum**

Port's Chart Datum is 0.582 m below Indian Mean Sea Level with reference to the tide gauge established for the purpose.

### **4.3 Tolerance**

#### ***Vertical Tolerance***

No reduction in specified area and depth is permissible. However, Positive tolerance (increase in specified area & depth) is allowed subject to limitations specified in Clause 2.4[*Maximum Permissible Dredged Depth*] of Special Conditions of Contract.

#### ***Horizontal Tolerance***

Horizontal tolerances for dredging in the Port Basin shall be (-) 0 mm and (+) 2500 mm, where (-) indicates a deviation of the toe of the dredged slope (towards the basin) from the location specified in the contract drawings and (+) indicates a deviation of the toe of the dredged slope (away from the basin) from the location specified in the contract drawings

### **4.4 Method of Measurement**

The method of measurement for Dredging is detailed separately in Clause No 2.30 [*Bills and Payments Schedules*], of the Special Condition of Contract of this bid document.

## **5.0 DISPOSAL TOLERANCES**

5.1 The Contractor shall ensure that no dredged soil is dumped outside the limits of lesser depth specified in the dumping grounds or the dumping area specified.

5.2 In case of dumping of dredged material by the Contractor at unauthorised places and times, such quantities so dumped and as assessed by the Engineer shall be removed by the Contractor at his cost and the same shall be dumped in the designated dumping ground. In addition, penal recovery shall be made based on the hopper volume of material unauthorizedly dumped, the rate applicable being 50% of the quoted Rate.

5.3 The Contractor shall mark the limits of the area(s) indicated with suitable buoys and shall carry out the dumping as per the instruction of the Engineer.

## **6.0 SURVEYING**

### **6.1 General**

6.1.1 Information to enable the Contractor to accurately define the boundaries of the dredging and dumping areas are supplied on the Drawings. It shall be the Contractor's responsibility

to erect and maintain any visual or other marks at site required to accurately control the dredging and dumping operations.

- 6.1.2 The Contractor shall provide all labour, qualified hydrographic surveyor, materials, plant and equipment including sea worthy launch, position fixing equipments, etc. and arrange setting out works, taking of soundings, preparation of sounding charts, monitoring progress of surveying the areas of dredging for which the Employer's representative shall be available at any time.
- 6.1.3 Each survey shall be undertaken by a surveyor suitably experienced in hydrographic survey work engaged by the Contractor, whose "curriculum vitae" is acceptable to the Engineer in Charge.
- 6.1.4 Field measurement and collection of data shall be executed to a degree of accuracy in horizontal and vertical directions and processed to scale and to the full satisfaction of the Employer. Employer's Representative shall be present during any surveys or any connected activities on site.
- 6.1.5 It shall be the responsibility of the Contractor to obtain all licences, permits and permissions for the use of marine radios, walkie-talkies, radio positioning systems, satellite phones for the placing of onshore, offshore and underwater beacons and marker buoys, and for giving the proper statutory notices for all maritime operators. The costs of such licences, permits and notices are to be borne by the Contractor, and shall be deemed to be covered in the rate quoted in the bid.
- 6.1.6 The Contractor shall be notified by the Dy. Conservator / Engineer in advance of commencing any survey work.
- 6.1.7 In the case of surveys, the Dy. Conservator shall be the final authority.

## **6.2 SURVEY LAUNCH, ECHO SOUNDER AND DIFFERENTIAL GLOBAL POSITIONING SYSTEM (DGPS)**

### **6.2.1 Survey Launch**

The survey launch employed for the work shall comply with the following requirements:

The Contractor shall provide, maintain and operate with a skilled and efficient crew to the satisfaction of the Deputy Conservator, an all weather sea worthy survey launch suitable for surveying and site investigation work including handling gear during the currency of the contract. The launch shall have the following requirements:

- (i) Shall be of steel/FRP hull construction with a draught of around one metre.
- (ii) It should have maximum speed of 10 knots with excellent control and Manoeuvrability at low speeds (1 to 2knots)
- (iii) It should have ample space to accommodate the survey and soil investigation equipment and shall provide day accommodation for three men of the Employer's staff, besides the normal crew and Contractor's own surveyors.
- (iv) The launch shall be fitted with VHF facilities and provide radio communications between all survey personnel.
- (v) Minimum deck space of 3.0m x 5.0m, equipped with safety gear as per Indian Mercantile Act shall be available.

- (vi) The launch shall have adequate power back up for continuous operation of the equipment.

## **6.2.2 Echo Sounder**

6.2.2.1 Each hydrographic survey shall be carried out using DUAL FREQUENCY ECHO SOUNDER and HULL MOUNTED Transducer (the digitizer of an echo sounder “Thresholds” or “Sensitivity” determine part) Resonant Frequency 33/210KHz in dual frequency mode. Echo sounder shall be capable of taking sounding with accuracy within one percent (1%) of the depth in conjunction with position fixing using Real Time Differential GPS. Echo Sounder equipment shall be capable of logging data compactable with computers apart from the facility of producing echo chart. The Contractor shall provide, install and operate, the following survey equipment to the satisfaction of Dy. Conservator of the Port;

- (i) Transducer resonant frequency 33/210 KHz and Dual frequency echo sounder Operation in dual frequency mode capable of printing of depth (both high and low frequency) echo chart.
- (ii) Dual frequency echo sounder systems capable of store data in HYPACK software survey program as EC2 Records. These records contain the Device Number, the Time tag, and the High and Low frequency depths.

6.2.2.2 It shall not be permitted for any reason to use Echo Sounder for the post dredging survey at lower operational frequency than that has been used for the pre dredging survey. **The sounding chart shall be prepared based on cell average depth available from the sounding and also based on the Hypack software program originally designed for Cartographic selection.**

6.2.2.3 At the start of the each hydrographic survey, the DGPS is to be calibrated to the specified accuracy. To this effect, the Contractor shall establish a fixed point (or fixed points) with known co-ordinates such that the survey board can easily be positioned with the transducer of the echo sounder always in the same position relative to the calibration point.

## **6.2.3 Differential Global Positioning System (DGPS)**

At the start of the each hydrographic survey, the DGPS will be calibrated to the specified accuracy.

### **6.2.3.1 Composition of DGPS**

The system shall consists of mobile station and Reference Station, receivers (one for each dredger and one for each survey launch), the requisite number of shore stations, interfaces, track plotters, data storage facilities and sufficient spares.

### **6.2.3.2 Installation and Testing**

The system shall be installed, tested and set to work for continuous operation during all dredging and survey operations. The system shall be fully operational, a minimum of 7 days before surveying operations commence including field calibration by using known/ established Port Survey stations.

Once operational, the system shall remain in continuous operation until the last Post dredging survey is completed and the last post dredging survey drawings have been signed jointly by the Contractor and the Deputy Conservator's Representatives

#### **6.2.3.3 Failure of DGPS**

In case the DGPS fails or considered to be inaccurate by the Dy. Conservator's representative, he may permit the use of an approved temporary back up system or may order that the affected works or part be carried out after the system is repaired to the required accuracy. No extension of time for completion shall be granted by the Engineer to the Contractor on account of such discontinuity in the works.

DGPS should have one hundred percent in built back up stand by equipment to cater for the failure of any individual components.

DGPS shall at all the times maintain a repeatable accuracy, for any point within the work site of plus or minus 1.0m in the horizontal plane.

#### **6.2.3.4 Giving Notice of any Irregularities**

The contractor shall inform the Deputy Conservator's Representative forthwith, of any breakdown irregularities or otherwise, affecting the positioning of his vessels or other equipment.

### **6.3 Existing Survey Station / Control Points**

6.3.1 Established survey station/ control points, exist in the area on land will be used for the survey. The Contractor will be permitted to use these established survey marks for triangulation surveys, Leveling surveys or for checking purpose under the following conditions:.

- (i) That no station is damaged.
- (ii) That any mark, flag or equipment required by the Contractor shall be placed adjacent to be directly above (if possible) the permanent mark in a position approved by the Hydrographic Surveyor.

6.3.2 The Contractor shall be responsible for establishing the true position and level of any mark, flag or equipment placed by him in relation to the permanent mark.

### **6.4 Setting out Works**

6.4.1 The setting out of boundaries and alignments of the basin under the contract shall be executed by the Contractor. All the surveys and connected activities shall be executed in the presence of Employer's Representative.

6.4.2 Setting out works shall be done by the Contractor on such dates as to permit timely commencement of the work. The Contractor shall be provided with detailed drawing sufficiently in advance by the Deputy Conservator for the setting out works.

6.4.3 The Contractor shall be responsible for the accuracy of the setting out.

## **7.0 HYDROGRAPHIC SURVEY**

7.1 Hydrographic Surveys shall be performed by using 200-210 & 33 KHz Echo-Sounder and DGPS both with an accuracy which ensures that the requirements of the contract are

achieved. Echo chart record printing of both high and low frequency depths on same face of chart paper at a time in dual frequency mode.

- 7.2 The interfacing of the GPS and Echo sounder will be done by 'HYPACK-MAX' or equivalent standard software acceptable to Deputy Conservator/Engineer.
- 7.3 The survey vessel guided by the 'HYPACK-MAX' or equivalent standard software acceptable to the Deputy Conservator/Engineer will be taken along the sounding line and depth shall be continuously recorded by the help of Echo sounder. The depths recorded and their position will be continuously interfaced and stored in the memory of computer software for post processing and computation of volumes / dredging quantities.
- 7.4 These surveys shall only be carried out if weather and sea conditions, condition of equipment and methods of execution and interpretation are, in the opinion of the Deputy Conservator, satisfactory for this purpose.
- 7.5 The position, whether determined by the electronic or optical methods, should be regularly checked by reference to onshore transit marks at some point along the survey line.

**7.6 Calibration of Echo Sounder**

Echo Sounder shall be checked and calibrated at least daily before and after use, by means of a bar or plates suspended at known distances below the water surface as per the procedure requirements of calibration. Checking shall be performed at the actual location of the survey and in the presence of the Contractor's and Port's Representative. Adjustments to recordings/readings taken shall be made accordingly. Records of bar or plate checks shall be retained at the start and end of the Echo Sounder record for the day of survey. The Echo Sounder shall maintain a repeatable accuracy of better than 10 cms.

- 7.6.1 A calibration procedure (Path Test) shall be integrated with sub systems prior to actual survey.

**7.7 Accuracy of Surveys**

- 7.7.1 The Accuracy of Surveys in the horizontal plane, related to the relevant triangulations stations for the projects shall be within 3.0m

The accuracy of surveys in the vertical plane includes:

- (i) The echo sounder, used shall maintain a repeatable accuracy of better than 10cm for measurement of distance between seabed and survey vessel waterline.
  - (ii) The registration of water levels by means of temporary tide gauges shall be within 5cm. The water level plane between the tide gauges and the survey location can be assumed horizontal.
- 7.7.2 The Employer's Representative may resolve to check echo soundings by means of other methods to measure water depths, such as sounding poles or lead lines. The Employer's Representatives may also order calibration checks of the equipment as and when considered necessary. The Contractor shall provide all manpower, boats and equipment that may be reasonably required for this verification, at no extra cost.

**7.8 Sounding Survey Requirements**

- 7.8.1 Sounding shall be taken to the nearest decimetre and reduced to the Port's Chart Datum, which is 0.582 m below Indian Mean Sea Level.
- 7.8.2 The Echo Sounder Transducer shall be located as close as practicable to the centre line of the survey vessel.
- 7.8.3 The chart (paper) speed and the associated speed of the survey vessel during a sounding traverse shall be calibrated to ensure that 100m of bottom traverse are represented by at least 75mm of echo trace. Sensitivity (gain) controls shall be adjusted to the maximum level so that it produces a clear bottom echo trace.
- 7.8.4 The hydrographic survey software shall have capability to pickup minimum three soundings in a second in the sounding traverse and to produce the continuous record of the bed profile.
- 7.8.5 All values of the gain setting and adjustments thereto shall be noted on the echo chart for each traverse.
- 7.8.6 The automated hydrographic survey software system shall store the recorded depths in digitized format for subsequent automatic computer plotting. In this event fully annotated analogue (hard copy) records shall be maintained and furnished.
- 7.8.7 Prior approval of the Employer shall be obtained for the method of data acquisition and associated processing techniques and computations, proposed by the Contractor.

**7.9 Sounding Lines, Grid Lines and Grid Points**

- 7.9.1 Sounding lines are lines along which the soundings are taken.
- 7.9.2 Grid lines are lines perpendicular to the sounding lines.
- 7.9.3 Grid points are the points of intersection of sounding lines and grid lines, where soundings are to be taken for preparing the sounding charts.
- 7.9.4 The location of the sounding lines shall be fixed such that they are at an interval not more than 10m measured along the longitudinal directions of the basin. Grid lines shall be not more than 5 m apart. A grid line shall be established along the design toe of each side slope and also near the wharf/jetty frontage. Thus, the grid points on the cross section shall be at, close to but not exceeding 10m interval. The Employer may at their discretion carry out survey much closer interval to ascertain any leftover pinnacles.
- 7.9.5 An echo trace shall be obtained along each of the sounding lines.
- 7.9.6 The horizontal position of soundings shall be obtained at intervals not exceeding 10m along a sounding line, and these locations shall be marked on the echo trace chart as fix marks. Fix marks shall be obtained where a sounding line crosses the toe and the top of dredged side slope, where practical. Intermediate soundings representing the shallowest depth in a length of not more than 10m shall be obtained by interpolation between fix marks.
- 7.9.7 The horizontal accuracy of each position fix shall be:
  - + 3.0 m along the sounding line
  - + 3.0 m perpendicular to the sounding line

7.9.8 Surveying along any sounding line, which deviates by more than the specified tolerances above shall be repeated to the extent necessary to ensure that all fixes along the sounding line remain within, specified tolerances. The repeated segment of the sounding line shall overlap that segment of the previous sounding line, which complies with the specified tolerances, by a minimum of 10m.

7.9.9 Where sounding areas about a previously surveyed section, of the works, the sounding lines shall overlap the previously surveyed area by a minimum of 10m.

#### 7.10 **Verification Lines**

7.10.1 In the pre- and post-dredging surveys, 10 percent of all sounding lines are to be known as verification lines. Verification lines shall be representative of the whole of the area and of the entire duration of the sounding sessions. Verification lines are to be sounded twice, immediately following one another and preferably in opposite directions.

7.10.2 When the difference in vertical position at any common point along the two sea bed profiles resulting from each verification line exceeds +100 mm, then the soundings subsequent to the last successful verification shall be deemed unacceptable as pre- and post-dredging soundings. In such a case, the lower value of the two soundings shall be considered acceptable and accordingly corrections will be made to all soundings in the entire representative areas of the verification line. If the Contractor desires he can arrange another joint resurvey of the concerned area at his own cost.

7.10.3 The Employer's Representative may resort to check echo sounding by means of other methods to measure water depths, such as sounding poles or lead lines. The Contractor shall cooperate in this respect and supply any manpower and boats that may be reasonably required for this verification.

#### 7.11 **Digital Recording and Plotting**

7.11.1 Interpretation of echo rolls, reduction of sounded depths for tidal heights obtained from tide gauges, Corrections for squat and wave motions (to be made using appropriate observed data and /or compensating devices) shall be done to the satisfaction of the Hydrographic Surveyor. Each fix on the echo rolls shall be annotated on the track plot chart of the survey vessel, and interpreted data shall be plotted.

7.11.2 The design profile shall also be clearly marked on the echo sounding trace as well as on the hydrographic survey software. The design profile shall be the specified minimum bed level of the relevant section of works under survey.

#### 7.12 **Drawings/ Sounding Charts**

7.12.1 After each survey session, the Contractor's representatives shall immediately prepare **separate high frequency sounding chart and low frequency sounding chart drawings (with cell average readings)** on which the results of the survey shall be recorded, to a scale of 1:2500 or as directed by the Dy. Conservator. **Separate sounding charts for High frequency 210 KHz and above soundings for Navigation and payment purpose and Low frequency 33 Khz soundings for silt and sedimentation studies shall be furnished to the Port.**

- 7.12.2 Furthermore, the charts shall incorporate all reference points and markers together with the location and nature of obstructions, structures and facilities. Particular items of interest shall also be indicated on the charts.
- 7.12.3 After verifying the results plotted on each drawing, Deputy Conservator's representatives, Contractor's representative shall put date and signature on each agreed drawing and submit these to the Chief Engineer for his approval and these shall form the basis for processing the payment.
- 7.12.4 A sounding chart, which does not contain soundings of at least 95% of the total number of theoretical grid points as above, shall not be accepted. It is to be specifically noted that the remaining 5% grid points where readings are missing shall not be accumulated in one area. They shall be in a scattered manner. The allowance of 5% given shall not be construed that dredging can be avoided in 5% of the area to be dredged.
- 7.12.5 10 hard copies and 3 soft copies of every sounding chart (**final product in HYPLOT as per the "Sounding color settings"**) shall be submitted to Employer at no extra cost.

## **8.0 FIELD BOOKS**

All Field books (in specified formats and countersigned by the authorities who entered the measurements/readings/parameters, etc.), calculations, maps, original records of survey tracks, run plots, input output parameters, keypad entries, tide, etc. of all survey activities shall be kept in the office of the Hydrographic Surveyor and shall be available for the Employer's Representative to scrutiny and checking for the duration of the contract.

## **9.0 PRE-DREDGING SURVEYS**

- 9.1 For determination of the bed level, before commencing dredging operations, a joint survey of the bed is to be undertaken by the Contractor and the representative of the Employer. The services of an external survey agency may also be inducted by the Employer for the Pre-dredge surveys along with the representatives of the Employer and the Contractor.
- 9.2 All the dredging drawings shall be constructed on EVEREST or WGS84 in Universal Traverse Mercator (UTM) **projection or three parameter datum transformations work over a Local area.**
- 9.3 On completion of the survey, the Contractor shall prepare within 24 hours, survey charts and cross section showing the full results of the survey. On completion and agreement of the contents of the drawings, the Contractor, Deputy Conservator's representatives and Representative of external agency if any engaged by the Employer for witnessing and certifying the survey, shall sign the drawings, which shall form the basis for all the further measurement of the works undertaken in the course of the Contract.

## **10.0 INTERIM SURVEYS**

- 10.1 Interim joint surveys shall be carried out by the Contractor and the Deputy Conservator's representative, during the period of dredging works at fortnightly intervals. Soundings shall be taken under the same configuration and settings as used for pre-dredging surveys..
- 10.2 If it is not possible to take the soundings in the basin / very near to the berths using a **Dual Frequency echo-sounder of 33KHz / 210 KHz, arrangements shall be made to take soundings in this area using sounding chain having lead weight varying from 2.5Kg to 10.0 Kg** as the case may be, depending on depth, with standard dimensions and to submit

the charts by the Contractor, without any extra Cost to the department at the time of its completion. However, such soundings will be taken only for verification purpose and not for computing quantities for payment purpose

#### **11.0 SLOPE SURVEY**

On completion of the development of the Basin, soundings of side slopes shall be taken at intervals not exceeding 30m longitudinally and not exceeding 5m on the cross section commencing from the edge of the channel (toe of slope) towards the bank for 100m or such smaller distance as decided by the Engineer.

#### **12.0 DUMPING AREA SURVEY**

Prior to commencing and on completion of the work, the Contractor shall carry out survey of the dumping area.

#### **13.0 POST-DREDGING SURVEY**

13.1 The post dredging survey equipment shall have the same configuration as used for Pre dredging survey.

13.2 On completion of all required dredging Works, a post dredging final hydrographic survey will be conducted jointly by the Contractor and the representative of the Employer on the same basis as specified for pre- dredging survey. The services of an external survey agency may also be inducted by the Employer for Post dredging surveys along with the representatives of the Employer and the Contractor.

13.3 On completion of the survey, the Contractor shall prepare, survey charts and cross sections showing the full results of the survey. All the data/raw data, fair charts/plotting sheets, survey report, positioning data, tidal data, echo-traces, computation worksheets, and analysed charts (both hard and soft copies) shall be submitted to the Employer.

13.4 On completion and agreement on the contents of the drawings and if the Deputy Conservator's Representatives had satisfied that the Works have been executed according to the Contract, the Contractor, Deputy Conservator's Representatives and Representative of external agency if any engaged by the Employer for witnessing and certifying the survey shall sign the drawings, which then acquire the status of "Post dredging Survey".

#### **14.0 ADDITIONAL SURVEYS**

Additional surveys, upon instructions of the Engineer shall comprise of survey of areas where shoaling is expected or where artificial obstructions are suspected. Contractor shall carry out these surveys in presence of Deputy Conservator's representatives without any extra Cost to the Contract.

#### **15.0 SERVICES OF EXTERNAL AGENCY FOR SURVEY**

The services of the external survey agency, if found required, will be inducted by the Employer for the pre, interim and post dredge surveys along with the representative of the Employer and the Contractor. The cost of engaging external survey agency shall be fully borne by the Employer. The decision on survey and survey associated issues by the third party/external survey certification agency, if engaged by the Employer, will be binding on Employer and Contractor.

## **16.0 COST OF SURVEY**

The cost of providing all survey equipment, consumables, spares etc. and carrying out all surveys including any additional surveys, setting out etc. and preparation of record drawings for the purpose of the execution of the Contract, are deemed to be included in the amount quoted in Schedule of Quantities. No additional payment will be payable to the Contractor in this regard.

## **17.0 PLANT AND EQUIPMENT**

The Contractor shall arrange, mobilize and provide, all dredgers and other Plant, equipment and accessories for the execution of the dredging work, for carrying out survey and all connected works and demobilize the same on completion of the Work. No separate mobilisation and demobilisation charges will be paid to the Contractor for the Plant and equipment deployed by him for the satisfactory completion of the Work detailed in the Contract Work. The unit rate quoted for the Work will squarely and totally include all the charges to be paid to the Contractor by the Employer. *The Contractor shall not change the type, number, size and make of dredgers indicated in the contract without written approval of the Engineer.* If any dredger/craft goes out of order, the Contractor should arrange for replacement of the same with an equivalent capacity suitable dredger/craft. This shall not relieve Contractor from obligations under other clauses of Contract. No additional cost and time will be allowed.

## **18.0 NAVIGATION**

### **18.1 General**

Certain area within the proposed dredging area will be in use and it shall be kept free from the equipment related to the dredging operations till specifically authorized by the Engineer.

### **18.2 Channel Buoys and Navigational Lights**

The Employer shall, endeavour to provide and maintain all channel buoys and navigational lights. However, in case of any failure, dredger/craft is expected to navigate and dredge on its Electronic position fixing system and radar. No claim from the Contractor shall be entertained by the Employer for failures to provide and maintain channel buoys and navigational lights etc., nor shall the Contractor be entitled to any such compensation.

### **18.3 Minimum Interference with Navigation**

The number of ship movement in the channel is more than 200 per month. Throughout the Contract Period, the Contractor shall ensure that the Work is carried out without causing any obstruction to or interference with the normal traffic in the harbour. The Contractor's craft and personnel shall, at all times, adhere to the established rules of the Employer and comply with any direction in respect of navigation in the harbour that may be issued from time to time by the Employer. The Contractor shall also conform in every way, to the Employer's requirements in respect of marking, lighting and watching any structure, craft or equipment deployed in the execution of Contract. It is the sole responsibility of the Contractor to maintain the channel free for navigation during the entire period of Contract irrespective of the time/period in the year during which the dredging operations have to be carried out. Contractor shall provide all navigational equipment like Gyro-compass, Radar,

Echo-sounder, VHF. etc. in good working condition. Also, refer Clause 2.14 [*Traffic*] of Special Conditions of Contract.

#### **18.4 Navigation Requirement**

18.4.1 Dredging shall be organised so that dredger(s) and other Plant are so positioned as to allow the normal passage of vessels to the satisfaction of the Harbour Master of the Employer.

18.4.2 Navigation signals, lights and warning markers shall be provided and maintained by the Contractor on his floating plant, floating pipelines, anchors and any other equipment placed by the Contractor to the satisfaction of the Harbour Master of the Employer. Floating pipeline, if any, shall be controlled to ensure that it causes least obstruction to the movement of vessels.

18.4.3 The Contractor shall prior to the establishment of Plant on site notify the Harbour Master and the Engineer of his proposed programme and methods. The Contractor shall be responsible for providing the Harbour Master and Engineer with details of any changes to the programme and methods approved by the Engineer.

#### **19.0 OIL SPILLAGE**

Oil spill response equipment shall be provided on the Site in sufficient quantity to cope with the maximum fuel load of the dredging equipment and associated Plant.

#### **20.0 DIVING**

Should any diving work be carried out during the Contract, this shall be in accordance with the rules and regulations of the Cochin Port Trust and Statutory Authorities. The Cost of this diving works will be borne by the Contractor.

## **II. SPECIAL CONDITIONS OF CONTRACT (for Dredging Works)**

### **1.0 GENERAL**

- 1.1** Special Conditions shall be read in conjunction with the General Conditions of Contract, Specifications, Drawings and any other document forming part of this Contract wherever the context so requires.
- 1.2** Notwithstanding the Sub-division of the documents into these separate section and volume every part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into the Contract so far as it may be practicable to do so.
- 1.3** Where any portion of the General Conditions of Contract is repugnant to or at variance with any provision of the Special Conditions, the provisions of the Special Conditions shall be deemed to over-ride the provisions of the General Conditions of Contract and shall to the extent of such repugnancy of variations, prevail.
- 1.4** Where it is mentioned in the Specifications that the Contractor shall perform certain Work or provide certain facilities, it is understood that the Contractor shall do so at his own Cost.
- 1.5** The materials, design and workmanship shall satisfy the relevant Indian Standard, the Specification and conditioned herein referred to. Where the Specifications stipulate requirement in addition to those contained in the Standard codes and Specifications, these additional requirements shall also be satisfied.

### **2.0 THE WORK**

#### **2.1 Scope of Work**

The scope of work involves dredging the basin in front of the berth for about 410m length and 100m width at Cochin Fisheries Harbour and approach channel as shown in drawing by deploying appropriate / suitable type of dredgers like Cutter suction Dredger/ Bucket Dredger/ Grab Dredger/ Backhoe Dredger or any other suitable dredger for direct loading to hopper/ barge and disposing of dredged material at designated dumping ground in outer sea at a distance of about 20 km away from the dredging site. The work also involves removal of sunken boat / vessel in the southern side of the existing finger jetty

The work to be executed in front of Fisheries Harbour, wherein there will be continuous berthing of fishing boats. It is expected that there will be every chance of getting encounter of materials like wire ropes, gunny bags, fishing nets, rubber tyres, cane baskets and all sort of discarded materials. Bidders should take note of encountering of all such materials during dredging while submitting the bid and the quote shall include removal of all such materials while carrying out the dredging.

#### **2.2 Nature of Work**

The works under the contract comprise of dredging, conveying and disposing the dredged material at specified dumping areas as detailed in Clause 2.8 [*Disposal of Dredged Material*], by deploying suitable Dredger(s) of adequate capacity, and

arranging survey works as stipulated and other related works as detailed elsewhere in the bid document.

**2.2.1 Period of Dredging.**

2.2.1.1 The period of dredging work shall be for 3 months and the work shall be completed at any time during the contract period of the entire project

**2.3 Area to be Dredged and Depth to be Achieved**

2.3.1 The berth basin in front of Cochin Fisheries Harbour and approach channel is to be dredged for a depth of (-)3.60m w.r.to CD as marked in the drawing at Figure No.1.

2.3.2 The availability of specified depth on completion of work shall be evidenced by the soundings taken on that date.

**2.4 Maximum Permissible Dredged Depths**

The maximum permissible dredged depth in the basin shall be **3.90m** below Chart Datum. No payment will be made for over dredging beyond this depth.

**2.5 Side Slopes**

The work involves Dredging the basin in front of Fisheries Harbour for providing depth of (-)3.60m CD. The Dredging shall also cover the adjacent areas for achieving side slopes within the specified limits. The dredging work shall be considered as completed only if the side slopes of the area achieved beyond the line of specified minimum width / dimensions are not steeper than 1:6 ( 1 Vertical to 6 Horizontal)

The soundings of the side slopes shall be taken for a width of 100m or such smaller distance as decided by the Engineer, for sides of the basin, beyond the boundary line of the area of the basin, in which the specified depth is to be achieved. The soundings of side slopes are to be taken at a longitudinal interval not exceeding 30m and on the cross section the intervals shall be not more than 5m. Soundings of the side slopes shall be taken on completion of the work.

**2.6 Dredger(s) to be Deployed**

2.6.1 Dredger(s) deployed for the Work should have adequate capacity to achieve the required depth in the basin as specified under clause 2.3 above.

2.6.2 The Contractor shall mobilize adequate number of dredgers of appropriate type and capacity for executing the work and achieving the specified depth.

2.6.3 Deployment of Water Injection Dredger for carrying out the Work is not allowed.

2.6.4 In case of breakdown of dredger(s)/ dredging equipment(s), alternate dredger(s)/ dredging equipment(s) has/have to be mobilized, without affecting the programme of Work and without any additional expenditure to the Port. The Contractor shall mobilize the alternate dredger(s) immediately, in case of breakdown without waiting for an instruction from department so as to comply with above requirement.

**2.7 Dredging Programme**

2.7.1 Before commencement of dredging, the dredging programme will be prepared by the Contractor in consultation with the Engineer of the Port, matching with the Dredger

deployment schedule submitted by the Contractor. It shall be ensured that the actual dredger deployment generally adhere to the Dredger deployment schedule contemplated at the time of the bid. However, the performance of the dredging shall be continuously monitored and in case the expected progress of Work is not achieved, the capacity of the dredgers shall be increased as directed by the Engineer, at no extra Cost. Notwithstanding the above, it will be the sole responsibility of the Contractor to plan the dredging programme, so as to achieve the depth in the basin/ channel as specified at 2.3 above.

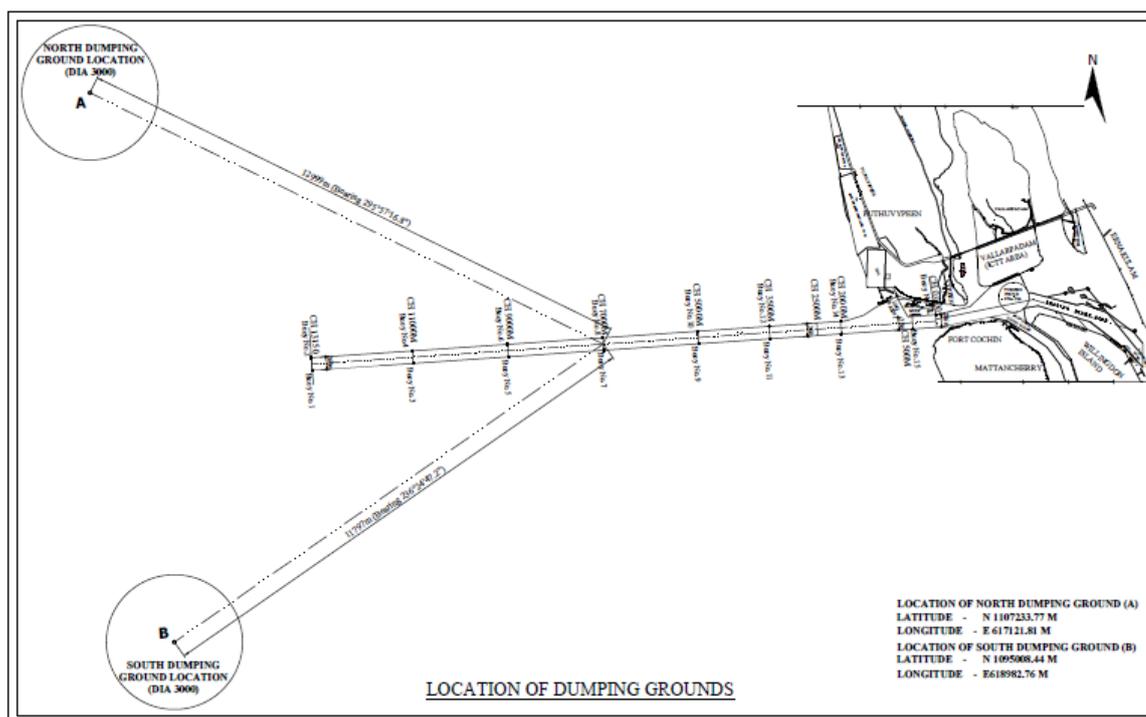
2.7.2 During the progress of dredging, due to requirement of shipping or for any other reasons, if it is so required by the Dy. Conservator/ Engineer, the Contractor shall undertake dredging in any other area than programmed earlier, in the basin as instructed and no claim of any sort shall be made for deviating from the original dredging programme

2.7.3 No claim shall also be entertained by the Port on account of delay due to shipping movements, due to restriction by Indian Navy on account of firing exercise or for similar reasons.

### **2.8 Disposal of Dredged Material.**

2.8.1 The dredged material shall be conveyed and disposed off in the specified dumping area as detailed hereunder.

2.8.2 The dredged material shall be conveyed and disposed off in the specified dumping area. Two dumping areas are one on south and the other on the north of approach channel is shown in Figure -3 below. These dumping areas are approximately 12.999 km located at  $295^{\circ} 57' 16.8''$  and 11.797 km located at  $236^{\circ} 24' 47.2''$  from No.7 and No.8 buoys respectively. The dredged material may be dumped predominantly at the south dumping area and north dumping area may be used only when there are hindrances for accessing the southern dumping area. The material shall be dumped only beyond the distances specified above and where water depth is 20 m or more, spreading evenly over an area having a diameter of 3 km, in such a way that the depth shall not be less than 19 m at any time.



**Figure -3 Proposed location for Dredge Spoil Disposal**

2.8.3 Open dumping of dredged material from the Cutter Suction Dredger/ other dredgers into the channels are not permitted and it has to be conveyed and disposed off at the specified dumping area through barges. However, a proposal of the bidder to have specialized arrangement for avoiding of spreading of material into the channel, in such cases, Employer may permit the dumping at their discretion on satisfaction of the proposal thereof.

2.8.4 In case of dumping of dredged material by the Contractor at unauthorised places and times, such quantities so dumped and as assessed by the Engineer shall be removed by the Contractor at his cost and the same shall be dumped in the designated dumping ground. In addition, penal recovery shall be made based on the quantity assessed by

**2.9 Mobilisation and Demobilisation.**

No separate mobilisation or demobilisation charges shall be payable for the deployment of dredgers and the cost of mobilisation and demobilisation charges of the dredgers deployed shall be included in the unit rate quoted for the Works.

**2.10 Water, Fuel and Other Consumables for Dredger/Craft.**

2.10.1 As there is scarcity of water, the Port will not be in a position to supply water to the dredgers / other crafts always. In such cases, the Contractor will have to make his own arrangements at his Cost. The rates for supply of fresh water by the Port will be as per the Scale of Rates applicable from time to time.

2.10.2 Fuel, oils and other consumables required for the dredger(s) and other crafts shall be arranged by the Contractor at his own Cost.

**2.11 Berthing Facilities for Maintenance**

For maintenance, repairs, bunkering etc. of Contractor's dredgers including floating crafts, the Employer will provide suitable berthing facilities subject to availability if required by the contractor and the charges towards providing berthing facilities will be to the account of the Contractor and shall be recovered from the Contractor's running account bills, as per the prevailing Cochin Port's Scale of Rates as amended from time to time.

### **2.12 Vessel Related Charges**

All vessel related charges including pilotage, tug, berth hire charges for dredgers and other crafts will be to the account of the Contractor and recovered from his running account bill as per the prevailing Cochin Port's Scale of Rates as amended from time to time.

### **2.13 Transit Ships**

The Contractor shall submit to the Employer the proposal for positioning and or mooring his Equipment and crafts during the contract period and shall finalise the programme of dredging in consultation with the Chief Engineer. The programme of dredging thus finalized shall be binding on the Contractor.

### **2.14 Traffic**

2.14.1 Cochin Port is an operational Port and it is to use the navigational channel for the vessels movement. When the dredging is undertaken in the basin, there will be normal vessel movement in the adjacent channel. Hence, care shall be taken to carryout the work without any hindrance to the above vessel movement during the progress of work. No claim towards any delay on this account shall be entertained by the Port.

2.14.2 The Contractor shall at all times observe and comply with all Laws including regulations that are relating to the navigation manoeuvring, and anchorage of his floating craft being used throughout the Works and shall get their craft within the Port limits or at the Work Site. The Contractor shall comply with the instructions given by the Employer in this regard. The Contractor shall carry out his Works strictly in such a manner, which would not obstruct or endanger the normal use of the channels, anchor areas, wharves and approaches thereto. The priority of navigation within Port limits will be always at discretion of the Employer. The Employer shall not be responsible for any inconvenience, losses or delays to the Contractor arising due to the priority not being given to their floating craft for moving about within Port limits as per decision of the Employer.

### **2.15 Maintenance / Special Repairs**

No compensation will be paid to the Contractor by the Employer for the time utilized for routine maintenance and special repairs due to break down etc. of the dredgers and other crafts.

### **2.16 Loss or Damages to Port's Crafts/ Personnel.**

The Contractor shall be responsible for any collision/damage to craft/Plant/equipment such as fenders, cranes, mooring buoys etc. of the Employer / Employer's Licensor and for any injury/accident to any of the Employer's Personnel deployed directly or

indirectly for the Work and Contractor shall keep the Employer indemnified against all such damages and injuries/accidents. This is applicable for the personnel during the course of his duty from the time of boarding the boat provided by the Contractors for transit to the dredger(s) and till the time of disembarkation from the boat. If the Contractor fails to indemnify the Employer for any losses, the same shall be adjusted from any money or monies due to the Contractor under the terms of this Agreement.

### **2.17 Working Time**

The Contractor is free to Work throughout Day and night and even on holidays and the working beyond the normal working hours and during holidays shall be informed to the Engineer.

### **2.18 Departmental Supervision**

The expense towards Employer's supervision shall be borne by the Employer. Essential facilities like boarding and accommodation etc. on board the dredger and boat transport for Pilot shall be provided by the Contractor at his Cost. Port officers like Asst. Engineer/ Asst.Exe. Engineer/ Exe. Engineer/ Superintending Engineer/ Dy. Chief Engineer, Chief Engineer, Deputy Conservator, etc., may make occasional visit on board the dredger as desired by them. The Employer may also send on board Employer's Engineer(s)/Surveyor(s) for witnessing the dredging and dumping by the dredgers. Essential facilities like boarding, accommodation etc. to the staff of Employer shall be provided by the Contractor at no extra Cost for the above personnel of the Employer

Third Party Certification Agency, if any required, shall be engaged for monitoring/supervision of the dredging work and for conducting surveys, by the Employer.

### **2.19 Transportation Facilities**

The Contractor shall provide a **boat** of 8 persons capacity with license for operating through port waters, at his own cost, exclusively for the departmental staff for supervision works, throughout the contract period. The supply shall commence not later than 15 days from the date of commencement of dredging. The boat shall be available round the clock on all days including Sundays and holidays. The boat and its operators shall have valid registration and insurance. All consumables and stores for the safe working of the boat and its operators as necessary should be provided by the contractor and nothing will be given by the Port for the running of the boat under this contract. The Contractor shall be solely responsible for the consequences arising out of any loss or damage/accident etc. caused to the boat on duty. If the Contractor fails to provide boat as above, the department will hire the same, the actual cost of which will be deducted from the Contractor's bills or an amount of Rs.10,000/- per day or part thereof shall be deducted from the Contractor's running bills.

### **2.20 Dredge Area clear of Natural/Artificial Under Water Obstructions.**

2.20.1 To the best of the knowledge of the Employer, there are no major artificial or uncharted obstructions existing in the form of sunken wrecks of ships or Plants in the area to be dredged. However, if any obstructions like sunken buoys, barges or

pontoons, small anchors, steel plates, angles, boulders, concrete pieces upto a size of 3m x 2m /2 tonnes are encountered these shall be removed by the Contractor at his own risk and no claim whatsoever on this account will be entertained by the Employer. The Contractor is not entitled to an extension of time or an adjustment of contract price for such obstructions to be removed or can be removed by the dredging equipment. The Employer's decision in this regard shall be final and binding on the Contractor.

2.20.2 During the dredging operation, any damage occurring to the Contractor's dredger, equipment and floating crafts due to artificial uncharted obstructions shall be covered and compensated through the Marine Insurance Policy and P & I cover only. However, the amount deductible service shall be reimbursed by the Employer.

### **2.21 Clearance of the Site on Completion**

On completion of the Work, the Contractor shall clear away and remove from Port, the dredger, other Plants, materials etc. and Temporary Works of every kind. The Contractor shall also forthwith dispatch, raise and remove any Plant (floating or otherwise) belonging to him or to any person employed by him which might have sunk in the course of the Work or otherwise deal with the same as directed by the Engineer and until the same is raised and removed, the Contractor shall set on such buoys and display at night such lights, for the safe navigation as may be required by the Port Trust. In the event of the Contractor not carrying out the obligation imposed upon him by this Clause, the Engineer shall raise and remove the same (without prejudice to the right of the Employer to hold the contractor liable) and the Contractor shall pay to the Employer all costs incurred in connection therewith or the same shall be adjusted from any money (ies) due to the Contractor under the terms of this Agreement. The fact that the sunken vessel/craft or plant is insured or has been declared a total loss, shall not absolve the Contractor from his obligation under this Clause, to raise or remove the same.

### **2.22 Contractor's Office and Personnel**

2.22.1 The Contractor shall provide and maintain a suitable office at Kochi to which the Employer or its representatives may send communications and instructions. Contractor has to appoint a single person as the Contractor's Representative and shall give him all authority necessary to act on the Contractor's behalf under the Contract and for liaising with the Employer. He shall receive, on behalf of the Contractors, directions, instructions or other notices from the Employer. The Employer shall be at liberty to object and require the Contractor to remove forthwith from the Works any person including Dredger Commander, Engineer or Dredge Master provided by the Contractor who, in the opinion of the Employer misconducts himself, or is incompetent or negligent in the proper performance of his duties or whose presence on board the dredger is otherwise considered by the Employer to be undesirable or impedes the progress of the Work and such person shall not be again allowed upon the Works without the consent of the Employer. Any person so removed shall be replaced with suitable person as soon as possible.

2.22.2 The Contractor's representative shall always be available at site. In case of temporary charge as per clause 4.3 of General Conditions of Contract (Contractor's Representative), this shall not be for more than 5 days continuously and such charge shall not be for more than a total of 14 days in a month.

2.22.3 The Contractor shall appoint an experienced Project Manager with minimum qualification as Graduate in Civil Engineering with 10 years experience/Dredge Master with 10 years experience, for monitoring and reporting on the day-to-day activities to the Engineer in charge.

2.22.4 If the Project Manager is not available at site for more than 3 days continuously or if he is not available for a total of 10 days in a month, an amount of Rupees One lakh per month will be deducted for such absence from the Running Account Bills/payment due to the contractor.

### **2.23 Accident or Injury to Contractor's Workmen**

The Employer shall not be liable for, or in respect of, any damages or compensation payable at Law in respect or in consequence of any accident or injury to any workmen or other person in the employment of the Contractor or any Sub-contractor save and except an accident or injury resulting from any default of the Employer, his agents or servants and the Contractor shall indemnify and keep the Employer indemnified against all such damages and compensation and against all claims, demands, proceedings, Costs, charges and expenses whatsoever in respect thereof or in relation thereto.

### **2.24 Insurance against Accident to Workmen**

The Contractor shall insure against such liability and shall continue such insurance during the whole of the time that any persons are employed by him on the Works. Provided that, in respect of any persons employed by any Sub-contractor, the Contractor's obligations to insure as aforesaid under this Sub-clause shall be satisfied if the Sub-contractor shall have insured against the liability in respect of such persons in such manner that the Employer is indemnified under the policy, but the Contractor shall require such Sub-Contractor to produce before the Employer, such policy of insurance and the receipt for the payment of current premium.

### **2.25 Compliance with Statutes, Regulations etc.**

The Contractor shall conform in all respects with the provisions of any such Statute, Ordinance or Law as aforesaid and the Regulations or Bye-laws of any local or other duly constituted authority which may be applicable to the Work or to any Temporary Work and with such rules and regulations of public bodies and Companies as aforesaid and shall keep the Employer indemnified against all penalties and liability of every kind for breach of any such Statute, Ordinance or Law, Regulation or Bye-laws.

All statutory liabilities towards Contractor's staff including but not limited to Contract Labour (Regulation and Abolition Act) 1970, Interstate Migrant Workmen Act 1979, Employees Provident Fund and Miscellaneous provisions Act 1952, The Minimum wages Act 1948, The payment of Wages Act, 1936, The Employees Compensation

Act, 1923, Industrial Disputes Act 1947, Employees State Insurance, Workmen Compensation Act-1923, and their amendments etc shall be the prime responsibility of the Contractor.

## **2.26 Return of Labour**

The Contractor shall deliver to the Employer or at the office of Employer a return in detail in such form and at such intervals as may be prescribed showing the staff on board the dredger and the names with age of the other staff from time-to-time employed by the Contractor ashore for the purpose of issuing dock entry permit.

## **2.27 Dredging Licence, Customs Clearance etc.**

The Contractor should obtain necessary licences from the DG Shipping. However, it is not necessary to obtain license from DG Shipping for cutter suction dredger which are pontoon mounted / transported on Trailer / non-propelled.

The Employer shall not be responsible to the Contractor where clearance is required by the customs for bringing the dredger and other Plants and materials and other things required. However, any documentary assistance to obtain such clearance will be rendered without any financial commitment.

## **2.28 Official Secrets**

2.28.1 The Contract involves an obligation of secrecy and the Contractor, his agents, servants or Sub-contractor or their agents or servants shall observe and comply with the requirements of the Indian Official Secrets Act 1923, and the rules there under or any statutory modifications or re-enactments thereof. Any breach of this clause shall constitute a breach of the Contract.

2.28.2 The Contractor shall not disclose to anybody the details of Drawings and sounding charts prepared by him and of the Work on which it is engaged without the approval of the Employer. No photographs of the Port area shall be taken or permitted by the Contractor to be taken by any of his employees without the approval of the competent authority and no such photographs shall be published, or otherwise circulated without the approval of the Employer.

## **2.29 Daily Dredging Report (DDR)**

2.29.1 Dredging is to be undertaken in accordance with the Drawings and as directed.

2.29.2 The Contractor shall supply to the Engineer, DDR signed jointly by the representatives of the Employer and the Contractor in duplicate along with a soft copy MS Excel format.

2.29.3 DDRs shall contain:

- (i) track record of the dredger viz. position, time and the track and the location from where the dredger/barges took various loads.
- (ii) Time of dumping and depth of water at dumping area.

2.29.4 The Contractor shall submit the DDR to the representative of the Engineer on the next Day in his office.

### **2.30 Handing over of the area**

2.30.1 On the date of expiry of the Contract Period, the Contractor shall hand over to Employer the dredged area with the specified depth of (-) 3.60m CD.

### **2.31 Insurance**

The Contractor shall insure dredger and other supporting crafts / equipment deployed for the Work against normal marine risks. The dredger should also have Protection and Indemnity (P&I) or such cover, which shall include salvage of said dredger in case she is sunk within the Port limits and is required to be salvaged by the Employer. The Contractor should indemnify the Port of all losses, which may occur due to blockage of channel caused by damage to or sinking or due to any such happening to the dredger and other vessels deployed by the Contractor. He shall also indemnify the Employer for any claims against the Port or its officers arising out of any accident, failure or negligence on his part. The Employer shall not be liable for or in respect of any demand or compensation payable under Law or orders of court in respect of or in consequence of any accident, death or injury due to the above and the Contractor shall indemnify and keep the Employer indemnified against all such damages and compensation and against all claims, damages, proceedings, Costs, charges and expenses whatsoever in respect thereof and in relation thereto. Should the Employer have to pay any money in respect of such claims or demands as aforesaid, the amount so paid and the Cost incurred by the Employer shall be paid by the Contractor and the Contractor shall not be at liberty to dispute or question the right of the Employer to make such payments notwithstanding, the same may have been paid without the consent of the Contractor.

### **2.32 Care of Works**

From the commencement to the completion of the Work, the Contractor shall take full responsibility for the care of dredger, its staff and his other employees in connection with the Work thereof and in case any damage, loss or injury shall happen to the Works or any part thereof or to any Temporary Work from any cause whatsoever, he shall at his own Cost repair and make good the same so that the Work shall be completed in good order and in conformity in every respect with requirement of the Contract. In the event of any such damage, loss or injury happening from any of the excepted risks, the Contractor shall if and to the extent required by the Engineer, make good the same as aforesaid and it will be to the account of the EMPLOYER.

### **2.33 Sample Collection from Dredgers.**

Samples of the mixture in the hopper if required by the Engineer are to be collected and handed over in suitable plastic containers by the Contractor at his Cost for the purpose of testing. Sample shall be collected in the presence of Engineer's representative. If the Contractor fails to collect samples and hand over, a lump sum amount will be recovered from the Contractor and the same amount will be decided by the Engineer. The decision of Engineer in this regard shall be final and binding.

**2.34 Duties of the Engineer/ Deputy Conservator (DC)'s Representative**

The Engineer DC's Representative is a person appointed by the Engineer/DC. The Representative is responsible to the Engineer / DC and shall carryout such duties and exercise such authority as may be delegated to the Representative by the Engineer / DC.

**2.35 Engineer / Deputy Conservator (DC)'s Authority to Delegate**

The Engineer/ DC may from time to time delegate to the Representative any of the duties and authorities vested in the Engineer/ DC and he may at any time revoke such delegation. Any such delegation or revocation shall be in writing. Any communication given by the Representative to the Contractor in accordance with such delegation shall have the same effect provided that:

- (a) any failure of the Representative to disapprove any Work, materials or Plant shall not prejudice the authority of the Engineer/ DC to disapprove such Work, materials or Plant and to give instructions for the rectification thereof;
- (b) if the Contractor questions any communication of the Representative, he may refer the matter to the Engineer/ DC who shall confirm, reverse or vary the contents of such communication

**2.36 Deployment of Staff by the Engineer / Deputy Conservator (DC)**

The Engineer / Deputy Conservator shall deploy any number of persons in carrying out duties. Such persons have the authority to carry out their duties, acceptance of materials, verifications of Drawings, checking the surveys, quantities of dredging, checking the locations of disposals of dredged material, plant or workmanship as being in accordance with the Contract, and any instructions given by any of them to the Contractor for those purposes shall be deemed to have been given by the Engineer /DC's Representative on behalf of the Engineer/ DC.

**3.0 THE SITE**

**3.1 General Site Information.**

Refer Clause No.3.0 [*SITE INFORMATION*] of Technical Specification

**4.0 SURVEYS AND LEVELS TO BE AGREED**

**4.1** Before the Works of any part thereof begun, the Contractor's Representative and the Employer's Representative shall together survey and take levels of the Site of the Works both above and below water level / Chart Datum level, and agree all particulars on which the measurements of the Works are to be based. Such particulars shall be plotted by the Contractor and after agreement, the Drawings shall be signed by the Contractor/ Contractor's Representative, Deputy Conservator's Representatives and Representative of external agency, if any.

**4.2** All the survey charts shall also be plotted by the Contractor and after Agreement, the Drawings shall be signed by the Contractor/ Contractor's Representative, Deputy Conservator's Representatives and Representative of external agency, if any.

4.3 Failing such surveys and agreements being prepared and/or signed by the Contractor, the surveys and sounding charts of the Employer shall be final and binding on the Contractor.

4.4 The Contractor shall be entirely responsible for the horizontal and vertical alignment, the levels and correctness of every part of the Work and shall rectify any errors or imperfection therein. Such rectification shall be carried out by the Contractor, at his own Cost.

#### **5.0 SETTING OUT THE WORKS**

5.1 The Employer shall furnish the relevant existing grid points with bench Mark with reference to Cochin Port Chart Datum. It shall be Contractor's responsibility to set out the necessary central points on land and to set out alignment. The Contractor shall have in his employee's efficient survey team for this purpose and the accuracy of such setting out Works shall be Contractor's sole responsibility.

5.2 Before beginning the Work, the Contractor shall work out the control points on ground which are pre requisite for carrying out hydrographic surveys, accurately, with suitable markers as approved by the Deputy Conservator's Representative. All these points and markings shall be checked and accepted by the Contractor's Representative before starting the Work.

5.3 The Contractor shall also provide necessary equipment, labour and other facilities for proper checking of triangulation / bench mark stations and inspection of the points during the survey and dredging operations at no Cost to the Employer.

5.4 The Contractor shall give the Employer not less than 24 hours notice in writing of his intention to set out or give levels for any part of the Works so that arrangements may be made for checking the Work.

5.5 Work shall be suspended for such times as necessary for checking lines and levels on any part of the Works.

5.6 The Contractor shall at his own expense provide all assistance, which the Employer may require for checking the setting out.

#### **6.0 ORDER OF WORKS**

The order in which the Works are to be carried out shall be to the approval of the Engineer and shall be such as to suit the detailed method of dredging adopted by the Contractor as well as the CPM schedule and shall be carried out without affecting the Port operation.

#### **7.0 CO-ORDINATION AND INSPECTION OF WORKS**

The Co-ordination and inspection of the day-to-day Work under the Contract shall be the responsibility of the Engineer. The written instructions regarding any particular Work will be normally passed by the Engineer. A Work/Site order book will be maintained by the Contractor for each sector in which aforesaid written instructions will be entered. These will be signed by the Contractor or his authorized representative by way of acknowledgment within 12 hours. A copy such instruction shall be forwarded to the Engineer time to time.

**8.0 WORK IN MONSOON**

The execution of the Work entails working in the monsoon period. The Contractor must maintain sufficient equipment, Plant and labour force as may be required for the Work and execute the dredging & render assistance for surveying according to the prescribed schedule. It is preferred that all barges shall be self propelled and capable of carrying out the work safely during monsoon. Allowing dump barges will be conditional at the discretion of the Dy. Conservator of the Port. No claims of what so ever shall be acceptable in case of denial of permission for any dump barges. All the crafts engaged for the work shall be sea worthy and shall have appropriate Licenses and facilities as statutorily required for the respective craft. No special rate will be considered for carrying out the work in monsoon.

**9.0 CONTRACTOR'S WORKING AREA**

**9.1** The area as available with the Employer shall be allowed to the Contractor as Work Area.

**9.2** The Contractor shall submit to the Engineer for his approval, Drawings and proposals for any Temporary Works such as, storage yard, office, store, false work and temporary platforms, workshop, etc. which he intend to construct for the execution of the Contract and no such Work shall be constructed before obtaining the written approval of the Engineer.

**9.3** The Contractor shall obtain permission for any Temporary Work and would ensure that during execution of Works, the statutory requirements of the concerned authorities such as Cochin Port Trust/ Cochin Corporation/Indian Navy/ Local Police, etc. would be complied with.

**9.4** Not less than one month before the date when the Contractor intends to start erecting any part of the Temporary Works and staging required for carrying out the Works he shall furnish to the Engineer complete Drawings of that part of the Temporary Works and staging. The Contractor shall at the same time, if so required by the Engineer, furnish design calculations in respect of such Temporary Works. The Contractor shall also furnish to the Engineer Drawings showing the method proposed for the erection of the various parts of the Work.

**9.5** The furnishing to the Engineer any design for any Temporary Works and staging shall not relieve the Contractor of any liability or obligation under the Contract in respect of such Temporary Works and staging. All Temporary Works shall remain the property of the Contractor.

**10.0 OPERATIONS OF THE EMPLOYER AND OTHERS**

**10.1** The ordinary business and Works of the Employer and others as carried out on and in the vicinity of the Site will be continued during the dredging and surveying, completion of the Works and the execution of the Contract shall be conducted in such a way as to avoid interference with traffic of every kind by land and by water and with any other Works in progress in the vicinity.

**10.2** The Contractor's attention is drawn to the fact that other Contractors employed by the Employer and other entity authorized by the Employer may be working in the vicinity.

**10.3** The Contractor shall where so directed by the Engineer be required to Work to other Contractor's Drawings where so ever Drawings for Work not included in this Contract are related to particular details of the Works.

**10.4** The Contractor shall from time to time as the Engineer may direct, provide attendance on the other Contractors and carry out minor Works in connection with such Contracts. The Cost of provision of such attendance and Work as may be so required will be mutually agreed before commencement of attendance/Work.

#### **11.0 PORT AUTHORITY RULES**

**11.1** The Contractor shall observe the conservancy rules relating to the Harbour and shall always take such necessary additional steps to keep the harbour waters free of noxious or unhygienic matters coming from his works as are required by the Employer. Under no circumstances shall inflammable material be allowed to spill to the Harbour area.

**11.2** The Contractor shall always observe and comply with the working rules and regulations of the Port Trust in force or as issued from time to time.

#### **12.0 EXISTING SERVICES.**

**12.1** Drains, pipes, cables, overhead wires and similar services encountered in the course of the Work shall be guarded from injury by the Contractor at his own Cost so that may continue in full and uninterrupted use to the satisfaction of the owners thereof or otherwise occupy any part of the Site in a manner likely to hinder the operation of such services.

**12.2** Should any damage be done by the Contractor to any mains pipes, cables or lines (whether above or below ground). Whether or not & shown on the Drawings the Contractor must make good or bear the Cost of making good the same without delay to the satisfaction of the Engineer and of the owners.

#### **13.0 ENTRY ON PRIVATE OR OTHER PROPERTY**

The Contractor shall not enter upon or commence any Work in or upon, across or through any land, building or place being private property until authorised in writing by the Engineer or other competent authority to do so.

#### **14.0 NOTICE OF OPERATIONS**

No important operations shall be commenced nor shall Work outside the usual working hours be carried out without the consent of the Engineer in writing or without full and complete notice also in writing being given to him.

#### **15.0 SECURITY AND SAFETY**

**15.1** The Contractor shall comply with all regulations imposed by the Customs and Cochin Port Security Authorities in respect of the passage of Plant, Equipment, Vehicles, materials and personnel through Customs and Port barriers.

- 15.2** The Contractor shall take all possible precaution to prevent out breaks of fire on the Site and in all offices, stores, camps and other places and things connected therewith and especially with respect to the safe storage of petroleum products, explosives and all other dangerous hazardous goods. He shall comply with all rules, regulations and orders of any Statutory Authority and of the Engineer at no extra Cost to the Employer.
- 15.3** The Contractor shall obtain from the Employer details of any restricted areas in or around the Site and shall have prominently and clearly displayed for the information of his staff and work people notices defining any such restricted areas. Such notices shall be provided at his own expenses.
- 15.4** The Contractor will be required to take entry passes to the restricted area of Cochin Port for all personnel, labourers and vehicle. No claim whatsoever on this account will be entertained.

**16.0 RETURNS AND DRAWINGS**

All reports, statement, returns, diagrams, photographs or Drawings, etc. which the contractor is required to submit to the Engineer are unless otherwise directed, to be furnished in the triplicate.

**17.0 POSSESSION PRIOR TO COMPLETION**

The Engineer shall have the right to take possession of or use any completed or partially completed Work or part of the Work. Such possession or use shall not deem to be acceptance of any Work completion in accordance with the Contract Agreement. If such, prior possession or use by the Engineer delays the progress of Work, on equitable adjustment in the time of completion will be made and the Contract Agreement shall be deemed to be modified accordingly.