No.

THE SOCIALIST REPUBLIC OF VIETNAM
MINISTRY OF TRANSPORT
PROJECT MANAGEMENT UNIT 85

CAI MEP – THI VAI INTERNATIONAL PORT CONSTRUCTION PROJECT
L/A No. VN XII-2

BID DOCUMENTS

FOR

CONTRACT PACKAGE 3

NAVIGATION CHANNEL DREDGING WORKS

VOLUME II

TECHNICAL SPECIFICATIONS

February 2006

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

CAI - MEP THI VAI INTERNATIONAL PORT CONSTRUCTION PROJECT

PACKAGE 3 CONTRACT
NAVIGATION CHANNEL DREDGING WORKS

TECHNICAL SPECIFICATIONS

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DIVISION 1 : DESCRIPTION OF THE WORKS

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1.1 GENERAL

The Works under this Package 3 Contract comprise the Channel Navigation Dredging for the operation of Cai Mep – Thi Vai International Terminals.

The detailed scope of works are described in the Specifications, Drawings and Bills of Quantities but the major components of the Works comprise the following:

1.2 SCOPE OF WORK

1.2.1 Scope of Works

1) Capital Dredging

a) The new navigation channel with a total stretch length of 35.3km and which start from the offshore of Buoy "0" in the Vung Tau near-shore waters upto the upstream part of Cai Mep Terminal will involve some 8.3 million cu.m. of capital dredging outlay.

b) Dredging operation will be concentrated on two (2) shoals. One is at the sandy bar in the marine part of the channel fronting the Vung Tau Peninsula, and the other is the silty and sandy shoal at the mouth of the Thi Vai / Cai Mep river in Ganh Rai Bay.

c) The disposal area of dredge spoil is about 10 km away from the shoreline of the Cape of Vung Tau. Considering the type of materials to be dredged and the far disposal area, trailing suction hopper dredge appears to be the most appropriate type of dredge equipment.

d) The Bidder, however, is advised that the dredge equipment was identified for purposes of the engineering study and the Engineer nor the Employer shall assume no responsibility as to the type of dredge equipment, the capacity and the number of equipment the Bidder proposes to employ to complete the dredging works in accordance with the Package 3 Contract, should he be awarded the Contract. Particulars of the Dredging Works are summarized hereunder.

1.2.2 Scope of Dredging

Channel / Basin	Capital Dredging (Thousand m^3)
Thi Vai Terminal Channel	1,240
S-shaped Bend Channel	50
Thi Vai River Approach Channel (Corner Section)	6,760
Vung Tau Approach Channel (Bend Section)	520
Vung Tau Approach Channel (Outer Section)	520
Total	9,090

1.2.3 Light Buoys

As part of the measures for safety of navigation, all the existing light buoys shall be replaced by the installation of new light buoys by the Contractor along the sea section navigation channel and the river section navigation channel. The new light buoys totaling 43 sets shall be relocated and realigned as shown on the Drawings.

1.2.4 Chart Datum

The Chart Datum Line (CDL) at Vung Tau in relation to the National Datum at Hon Dau (NDL) can be derived as follows:

CDL = NDL -2.887m

1.3 UNITS AND ABBREVIATIONS

1.3.1 Units

The following units have been used throughout these Specifications.

m	-	meter
m^2	-	square meter
m^3	-	cubic meter
cm	-	centimeter
cm^2	-	square centimeter

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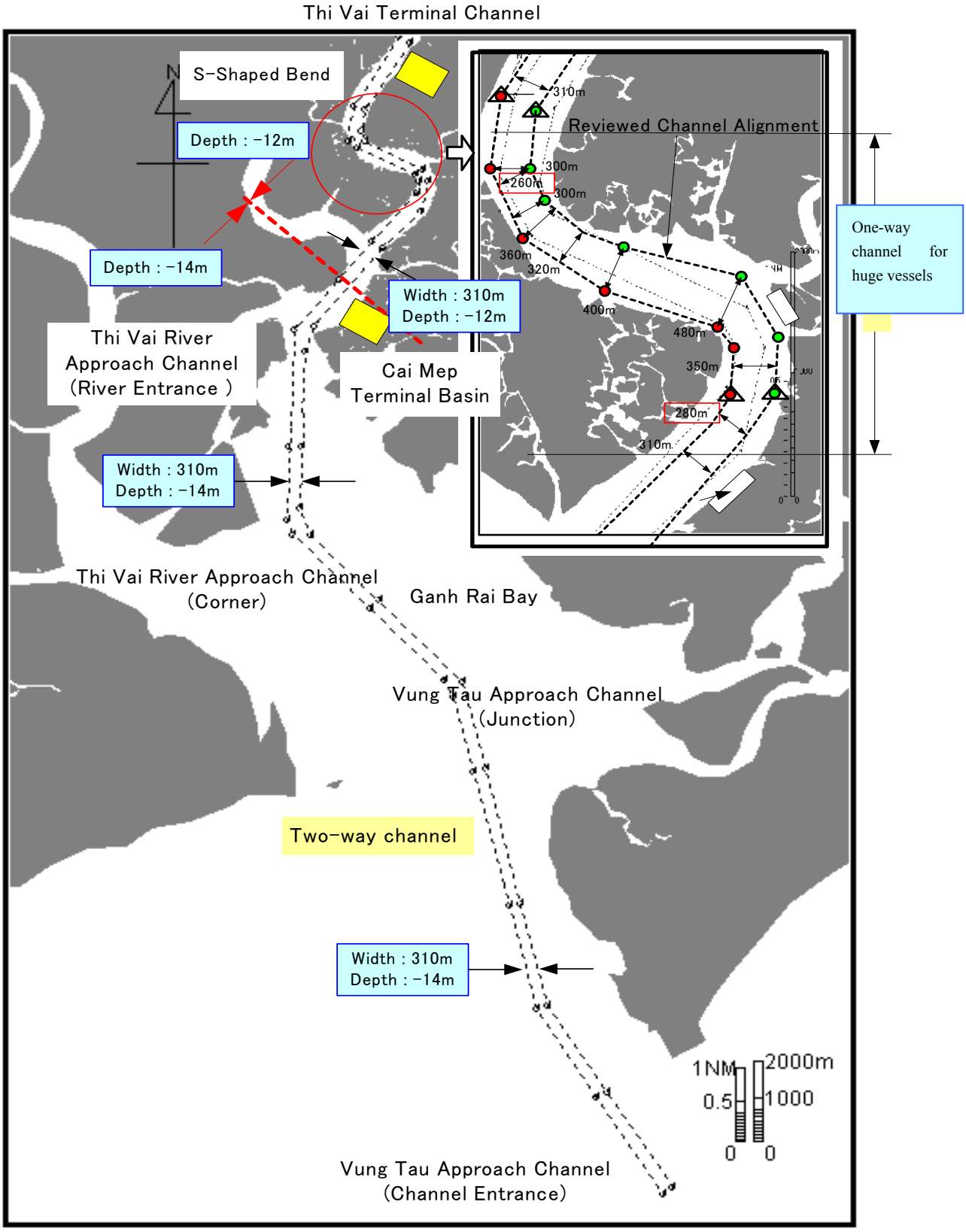
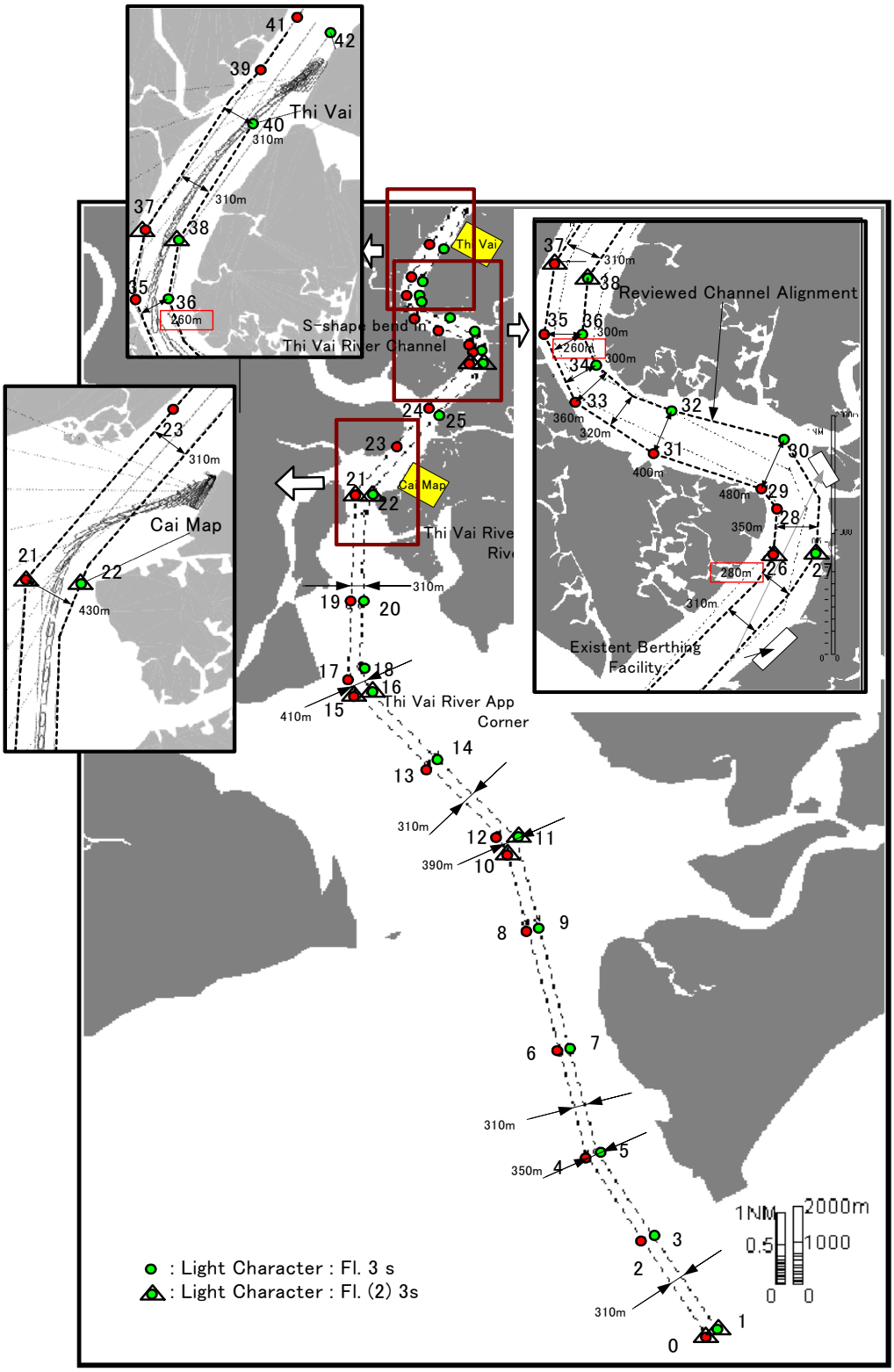
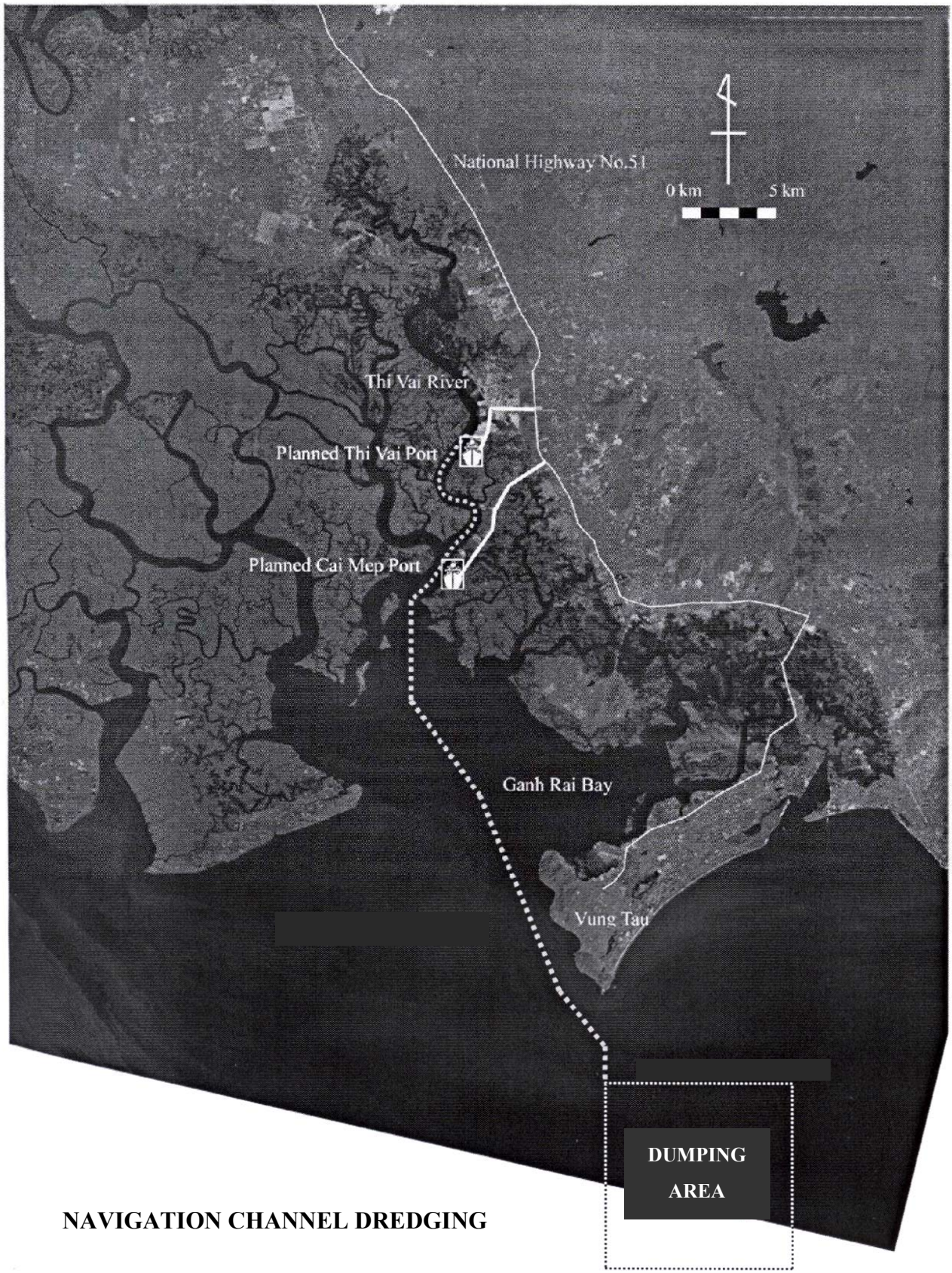


NAVIGATION CHANNEL DREDGING PLAN



LIGHT BUOY LOCATIONS



NAVIGATION CHANNEL DREDGING

DIVISION 2 : DESCRIPTION OF THE SITE

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2.1 NATURAL CONDITIONS

2.1.1 Location

The general extent scope of dredging works is shown in the plans attached in the General Information of these Bid Documents.

2.1.2 Topography

The site which is located in the eastern edge of the Mekong Delta is in an area covered mostly by low flat land with vast paddy fields and mangrove swamps. The site condition is biologically and geologically diverse. A major portion of the soil properties in the area is sediment deposits carried by the Thi Vai River. The subsoil condition along the river and its banks including the foreshore areas are soft.

2.1.3 Meteorological Condition

The area is humid which is typical in all tropical Southeast Asian countries. The climate is governed by the occurrence of the monsoon season. Dry season occurs from November to April during the northeast monsoon season and wet season occurs from May to October during the southwest monsoon season.

Five tropical depressions in the south 11° North, was recorded in the past 26 years, i.e., 1954 to 1980. Based on record from the Ho Chi Minh Meteorological Station, four winds exceeding the 20 m/sec velocity were recorded over the past 60 years.

2.1.4 Hydrographic Condition

The Thi Vai River is a confluence of three rivers, i.e., Thi Vai, Go Gia and Cai Mep. The Thi Vai – Cai Mep Rivers are flowing to the South-North direction in parallel with National Highway No.51. The deepest area is about 60m which is at the confluence of the Thi Vai – Go Gia – Cai Mep Rivers. The average width is 500 to 600 meters, but in some places could reach up to 1,000 meters. The tide is semi-diurnal and amplitude during spring tide which can reach 4.0 meters above CDL.

The representative tidal level at Vung Tau based on the studies conducted by JICA feasibility study is tabulated hereunder:

Tide Levels	Level (m) at CDL Datum
HHWL	+ 4.43
HWL	+ 3.97
MSL	+ 2.67
LWL	+ 0.58
CDL	+ 0.00
LLWL	- 0.47

During the feasibility studies, JICA carried out current speed measurements in June and December 2001 at certain locations in Ganh Rai Bay. The results are shown in the tabulation hereunder:

Tide	Flood Tide						Ebb Tide					
Point	Layers											
	Bottom		Middle		Surface		Bottom		Middle		Surface	
	V (m/s)	Dir. (°)	V (m/s)	Dir. (°)	V (m/s)	Dir. (°)	V (m/s)	Dir. (°)	V (m/s)	Dir. (°)	V (m/s)	Dir. (°)
V1	1.08	007	1.08	35	1.22	354	1.37	173	1.74	169	1.77	160
V2	0.89	307	1.17	314	1.30	318	0.95	128	1.16	126	1.32	127
V3	0.81	335	0.94	338	1.22	338	0.73	165	0.96	160	1.07	155
V4	0.78	025	0.78	017	0.83	020	0.65	017	0.60	195	1.03	185
V5	0.55	354	0.61	355	0.64	358	0.47	160	0.69	157	0.79	163
V6	0.65	257	0.74	258	0.77	264	0.84	245	1.11	259	1.22	260
V7	0.68	295	1.02	296	1.40	134	0.92	116	1.35	109	1.62	120

2.1.5 Geological Condition

The mandatory stretch of channel to be dredged is approximately 42 km long from Thi Vai Site to the proposed dumping area. Boreholes were conducted in 4 locations namely, RB, SA, SB, and SC as shown in the Figure attached at the back of this Division. Boring was also conducted in SD area as shown also in the Figure attached at the back of this Division. On the basis of the field investigations and laboratory testing, 8 geotechnical stratifications were made for illustrating the sub-soil conditions along the Channel. The results of the sub-soil investigation may be summarized as follows:

a) RB and SA areas consist of very soft to soft elastic SILT and clayey SAND except at RB10 area wherein a layer of loose to medium dense silty SAND was discovered. Soil

becomes more consistent at locations RB9 and RB11. Stiff sub-soil materials with N-value of about 11 were found at elevation of about –15 m CDL.

b) SB and SC areas: The stratum consists of two layers with the upper layer consisting of thin layer of loose poorly graded SAND. The lower layer is soft elastic SILT/lean CLAY.

c) SD area: Two points were investigated in this area. SD1 area consists of very soft to soft clayey SAND while SD2 area consists of very soft to soft elastic SILT.

d) Sub-bottom profiling survey was carried out to map the seabed and sub-seabed geology along part of the proposed channel near Vung Tau. The area is about 10 km long by 1 km wide as shown in the Figure attached at the back of this Division. Based on the result of the survey, firm/stiff sediments exist at a depth of more than CDL -40 m in the southern portion of the survey area. The rock profile was finally recorded on one of the cross lines close to the inshore area where the depth is about CDL -35 m. For purposes of the engineering studies, the sub-soil stratum along the Channel to be dredged consists of sandy/silty deposits. It is unlikely that rock formation or layers of stiff N values will be encountered.

2.2 ACCESS TO DATA

Data on natural conditions made available by the Employer should be deemed to include data listed elsewhere in the Contract are open for inspection at the office:

DIRECTOR GENERAL
Project Management Unit 85
184 Nguyen Sy Sach Street, Vinh City,
The Socialist Republic of Vietnam
Tel: 84-38-83-1270
Fax: 84-38-84-1253
E-mail: bqlda85@vnn.vn

The data, however, was made by the Employer for purposes of conducting the engineering studies and it may not be representative of all the conditions existing throughout the Site.

The Contractor is deemed to have taken any or all risks, contingencies or all other possible circumstances which may exist beyond the information provided which could affect his Bid.

2.3 EXTENT OF THE SITE

The Site comprises the areas shown in Volume IV – Bid Drawings.

2.4 ACCESS TO THE SITE

2.4.1 General Access

The site is accessible by land and water. The Contractor is required to provide its adequate watchmen at the specified gates to control the access at the Project Site and

shall submit details of all matters relating to security for the approval of the Engineer prior to the commencement of the Works on Site at no additional cost to the Project.

2.5 POSSESSION OF THE SITE

The Contractor shall be given possession of the Site, or of any parts thereof, as and when required for the purpose of the Contract.

2.6 USAGE OF THE SITE

2.6.1 General

a) Except where otherwise shown on the Drawings, the Contractor is required to make his own arrangements to obtain the area necessary for his workshops, storage, offices, accommodation and the like, and for the offices and relative facilities to be provided for the Engineer at the location designated by the Engineer or as shown on the Drawings.

b) The Contractor shall not use any portion of the Site for any purpose not connected with the Works unless the prior written permission of the Engineer have been obtained.

2.6.2 Public and Access Road

a) The Contractor shall ensure that his vehicles, boats and the vehicles/ boats of his employees brought to the Site for the purpose of or in connection with the Contract are not parked on or adjacent to any public roads/ shoreline or on any right of way, except with the prior express permission of the owner, of any private property.

b) The Contractor shall maintain access for the inspection, operation and maintenance of any plant, equipment, facilities or works belonging to the Employer which lie within the Site or elsewhere and which are affected by the Contractor's operations.

2.6.3 Vessel Traffic

Tabulated hereunder is the statistics on vessel traffic along the navigation channel

Vessel	2000	2001	2002	2003	2004
Ingress/ Egress	9 units/day	10 units/day	11 units/day	10 units/day	11 units/day
Average DWT	20.000	20.000	20.000	20.000	20.000

In pursuing the dredging works and disposal of dredged spoils, the Contractor shall create the least possible obstruction and inconvenience to the traffic such as those listed above and he shall work on such length of amount of work, which he shall be able to manage well without unnecessarily obstructing the traffic.

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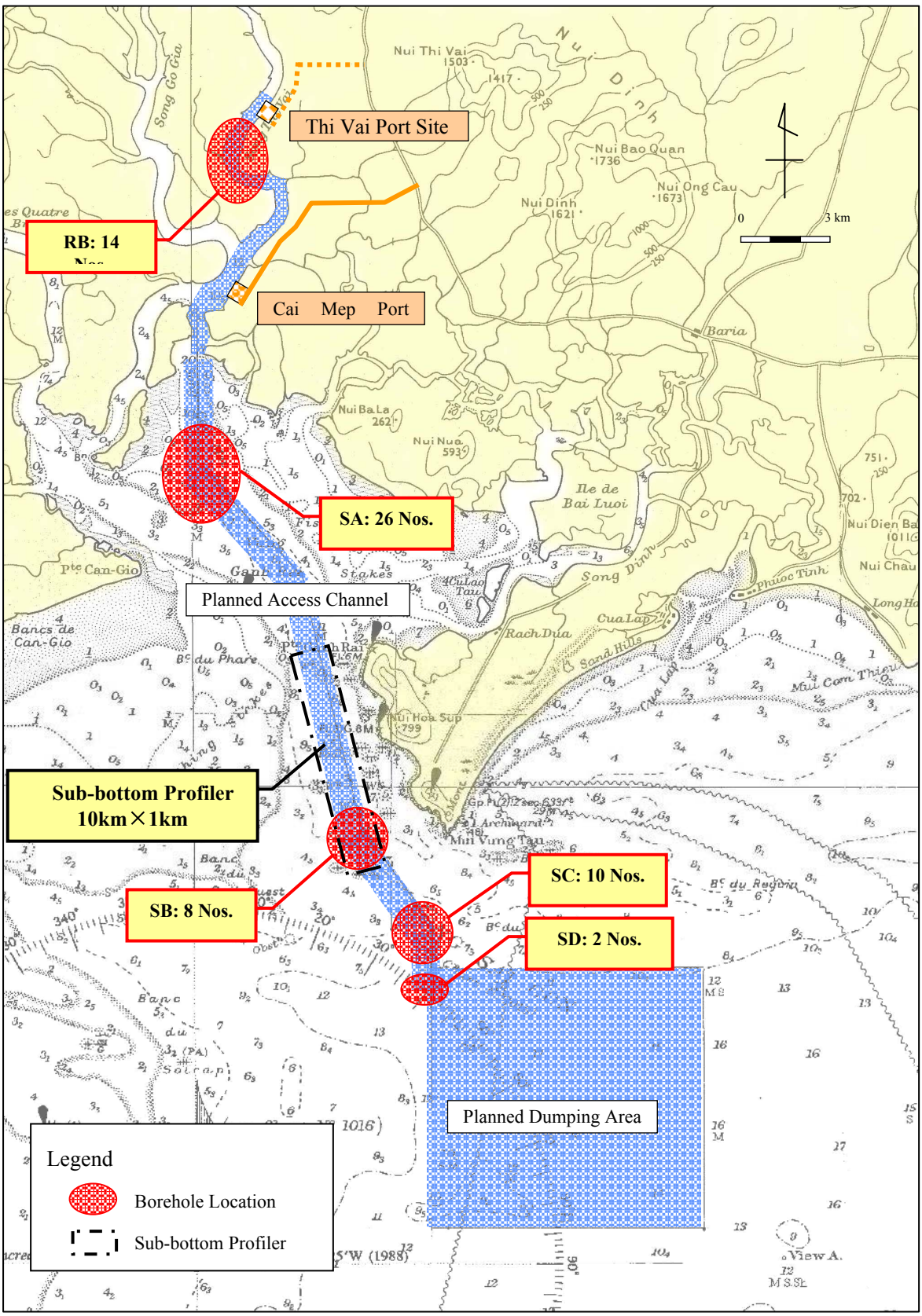

Location of Sub-Soil Investigations

DIVISION 3 : CONSTRUCTION PROGRAMME AND PROGRESS

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3.1 PROGRAMME OF WORKS

3.1.1 General

a) In amplification of Clause 14.1 of the Conditions of Contract, the initial programme and all subsequent programmes shall be in such a form that the critical elements of construction can be readily identified. The applications of computer techniques is considered essential and the Contractor must allow for providing approved software and equipment along with suitably experienced staff to operate the software and the equipment.

b) The programmes shall be based on the application of established programming procedures, such as Bar Chart or Critical Path Method (CPM) showing sequences, dependencies, durations and dates for execution of all major items following the sub-divisions in the Bills of Quantities and be sufficiently flexible to allow the Contractor and Engineer to appreciate the general progress of the Dredging Works and sufficiently detailed to monitor day to day progress.

c) All programmes shall show the expected cash flow both monthly and cummulatively. The values shall reflect the expected amount of the Engineer's payment certificates including advances and repayments for constructional plant, retention and payment of retention and the like but excluding the initial advance payment and the repayment thereof.

3.1.2 Contents of the Programme

In addition to showing the starting times and duration of dredging activities, the programme shall show, amongst other things:

a) the dates by which the Contractor requires instructions from the Engineer to carry out work described in the Contract;

b) the dates by which drawings are to be submitted to the Engineer for approval, and the dates by which such approvals are required; The shop drawings shall be submitted together with the corresponding computer disc (CD-R);

c) the dates by which drawings are to be submitted to statutory and other authorities for approval, and the dates by which such approvals are required;

d) the dates by which requests for approval of the Works shall be submitted, and the dates by which such approvals are required;

e) the dates by which requests for approval of Sub-Contractors shall be submitted, and the dates by which such approvals are required;

f) the quantities and productivities used to calculate the duration of all activities;

g) computer-generated resource histograms showing the daily and cumulative requirements for the various categories of staff, artisans, labor and equipment necessary to complete the Works in accordance with the programme;

h) in the case of a sequential requirement for possession of Site, the areas involved, the dates upon which possession will be required and the expected duration of such possession;

i) those activities whose progress is likely to affect the activities of other Contractors; and

3.1.3 Submission of Requirements

The Contractor shall submit for approval four copies of the programme, or any revision thereof, together with four copies of all supporting documentation and one (1) electronic copy.

3.2 PROGRESS OF WORKS

3.2.1 Monitoring of Progress

Progress against these programmes will be monitored by the Engineer and to this purpose the following shall be done:

1) Contractor's Monthly Report

The Contractor shall submit a monthly report showing,

a) actual progress as against anticipated progress;

b) information required by the Contractor from the Engineer;

c) equipment on Site at the end of the month;

d) any other information required by the Engineer or Engineer's Representative.

One week before the Monthly Progress Meeting, the Contractor shall submit three copies of the Programme together with three copies of the supporting documentation, duly updated to reflect the progress to date.

2) Weekly Meetings

The Engineer will call regular weekly meetings to examine actual progress as against the approved programme. Senior site management of the Contractor shall attend these meetings to discuss and agree, if necessary, the actual progress, delays to the Works and means of overcoming these delays and any other problem(s) arising from the dredging Works. The Contractor shall submit, at these meetings, a summary of the

work he proposes to carry out during the following week. Included in this report shall be the anticipated progress of dredging Works.

3) Other Meetings

Other progress/programme meetings will be called as necessary to examine and discuss particular parts of the Works or other matters.

3.2.2 Method Statement

The Contractor shall, when required by the Engineer give detailed statements of how he intends to proceed with the dredging Works. If the progress of the Works becomes unsatisfactory, the Engineer may require the Contractor to amend the method statements to show the change in resources required to complete the Works within the Contract period, and, if found satisfactory, the Contractor shall immediately put the methods into effect at no extra cost to the Employer, if, in the opinion of the Engineer, the delays are to the Contractor's account.

3.2.3 Record Drawings

Monthly progress shall be marked on a set of dredging drawings kept specifically for this purpose. Other important dates and the like will also be recorded on these drawings. The drawings will be kept in the office of the Engineer and will be marked up by his staff. The Contractor will agree with the recorded drawings monthly or if he does not agree will inform the Engineer, in writing, within 14 days of examining the drawings. If the dispute is not resolved on Site, the matter will be submitted to the Engineer whose decision will be final without prejudice to the Contractor's rights under the Contract. The drawings may be used for interim measurement in accordance with Clause 56.1 of the Conditions of Contract.

3.2.4 Progress Photographs

The Contractor shall supply to the Engineer technically perfect color photographs of the Works taken in such a manner and at such a time or times as the Engineer shall direct. The photographs shall be in a digital format minimum of 5.0 mega pixels. Clarity and depth of focus are the principal objectives. The Contractor shall provide a CD disk and six prints of each objective. The CD disk and two sets of prints shall be compiled in a good-quality photograph album suitable for record purposes, and the remaining four sets of the prints shall be stored in photo wallets. The Engineer shall then determine which, if any, of the photographs are to be reproduced at larger sizes and in what numbers, and shall advise the Contractor accordingly. The copyright of all photographs is retained by the Employer. All photographs shall be clearly identified giving the Project Name, the number of the photograph, the date taken and the view depicted.

3.3 AS-BUILT DRAWINGS AND FINAL DREDGING WORK REPORT

a) The Contractor shall progressively prepare As-Built Drawings covering the whole of the Works and a final dredging report. As-Built Drawings shall be based on the Construction Drawings.

b) Amendments and changes to the Construction Drawings shall be recorded on a set of Construction Drawings kept specifically for this purpose. The Contractor, on completion, will produce from them a final, complete set of As-Built Drawings depicting accurately the location, dimensions and nature of the completed Works.

c) The following are to be provided:

(1) Full size (A1) paper print 5 sets

(2) Reduced size (A3) paper prints from above 5 sets

(3) Electronic Copy 2 sets

d) The Contractor shall prepare As-Built Drawings progressively throughout the Works.

e) Payment for any item in the Bill of Quantities in excess of 90% of the value of that item prior to deduction of retention monies will not be made until the Contractor has provided approved As-Built Drawings associated directly or indirectly with the item. All approved As-Built Drawings shall be submitted together with the corresponding computer disc (CD-R).

f) Draft copies of c) (1) above (5 sets) shall be submitted for approval to the Engineer within 28 days of the Contractor submitting an interim payment certificate claiming 90% of any item or for all or any part of the Works. Within a further 28 days, the Engineer shall return the Drawings, either approved or with a statement as to what is required before approval can be given. On incorporation of the Engineers' statement which must be done within a further 28 days, the Contractor shall provide the prints and copies as stated in items c) (1) to c) (3) herein above.

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DIVISION 4 : CONTRACTOR'S SITE ESTABLISHMENT

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4.1 OFFICES, YARDS, WORKSHOPS, ETC

4.1.1 Contractor's Responsibility

a) The Contractor is entirely responsible for the provision, erection, maintenance and removal on completion of the whole of the Works his offices, yards, workshops, stores, housing, labour camp, services and the like.

b) Where provision has been made for the Contractor to establish all or any part of his offices, yards, workshops and accommodation on Site, the locations and areas shall be subject to Engineer's approval.

c) Where the Contractor intends to use the assigned areas, he shall submit to the Engineer for approval detailed plans of his intended site establishment, including arrangements for access, drainage, sewerage and the containment of pollutants.

d) Should any area on the Site allocated to the Contractor for his use be insufficient for his purposes, it shall be the responsibility of the Contractor to provide such additional area at his own cost.

4.1.2 Security

a) The Contractor is responsible for the security of his offices, yards, workshops, storage areas, work areas and the like, and shall provide whatever walls, fencing, gates, guards and access-control measures as are necessary to provide such security.

b) Where the construction of the Works requires internal walls or fencing, the Contractor shall provide temporary security fencing or walls of a standard acceptable to the Engineer.

c) Where there are other Contractors on Site, the Contractor shall ensure that all security arrangements are properly coordinated. The Contractor shall comply in all respects with regard to the security of the port, including the provision of identity cards for all vehicles and persons engaged on or about the construction of the Works or the supervision thereof.

4.1.3 Reinstatement of Site

On completion of the Works, the Contractor shall:

a) remove from Site all his equipment, workshops, stores, offices, accommodation, and the buildings, except those required to discharge his obligations during the Defects Liability Period;

b) demolish and dispose of all foundations, ramps, inspection pits and the like;

c) seal off service connections;

d) clear the Site of all debris and waste material of any kind;

e) plough the area previously occupied by his site establishment, at right angles to the slope of the ground, and grade it to minimize the risk of erosion; and

f) scarify designated access roads to a depth of 200 mm, and generally return the ground to a condition acceptable to the Engineer.

Once the Contractor's obligations with regard to the Defects Liability Period have been discharged, the remaining site establishment shall be removed forthwith and the area reinstated as described above.

4.2 TEMPORARY SERVICES

4.2.1 Electrical Power for Construction and Commissioning

a) Further to the requirements of the Conditions of Contract, the Contractor shall provide all power requirements for the execution of the Works including commissioning on and in vicinity of the Site, in his store yards, workshops and like areas from power generation units provided by the Contractor.

b) The Contractor shall provide adequate power generation capacity, including standby generator plant, necessary to maintain continuity and quality of the Works and ensure continuous uninterrupted supply to offices to the Engineer and their personnel.

c) The supply of electricity by the Contractor shall include all fuel, servicing, maintenance and repairs to ensure compliance of the Works with the requirements of the Contract and power supply as indicated above.

d) The Contractor is responsible for liaising with all relevant authorities, with regard to the supply of electricity, and removing, clearing away and making good all temporary connections on completion of the Works to the satisfaction of the relevant authority.

4.2.2 Water for Construction and Commissioning

1) Water Supply

a) The Contractor shall provide a continuous supply of clean and potable water required for the offices. He may, make arrangements for water to be supplied in whole or in part from any national or local water supply organization or from the Employer.

b) Water to be supplied for domestic purposes shall not constitute a health hazard, shall not stain, mark or discolor clothing regularly washed in such water, and shall be subject to frequent testing to ensure that this remains so. The Contractor shall arrange

for weekly testing of both the water at source and the water at the point of use and at such locations and times as the Engineer shall advise. The tests shall determine the presence of parasites, the level of pathogens, the type and concentration of dissolved solids, and the presence of any other contaminants. The test results shall be returned directly to the Engineer and shall be accompanied by a certificate from the testing laboratory which includes a narrative assessment of the quality of the water and its suitability for domestic purposes.

c) The Contractor is responsible for liaising with all relevant authorities, with regard to the supply of water, and removing, clearing away and making good to all temporary connections on completion of the Works to the satisfaction of the relevant authority and the Engineer.

2) Potable Water Supply

a) Potable water is water which is safe and suitable for drinking without receiving any further form of treatment.

b) Contractor shall provide bottled potable water as specified elsewhere for drinking purposes.

4.2.3 Other Utility

All gas, lubricant and fuel oil required for the dredging works shall be provided by the Contractor.

4.3 TEMPORARY ACCESS ROADS

4.3.1 Provision

a) The Contractor shall provide all temporary access roads and haul roads required for the dredging Works, notwithstanding that only a portion of such roads may be separately identified in these documents. The Contractor may not use the finished pavement of roads which are part of the Permanent Works for the purpose of access or as haul roads except with the approval of the Engineer, whose approval will be withheld if the roads are likely to suffer any significant deterioration by being so used. Under no circumstances will vehicles with single-axle loadings of greater than 8000 kg be allowed to use such roads or any part thereof.

b) The Contractor is to submit to the Engineer, for approval, details of his proposed access and haul roads system including:

(1) the construction of all proposed roads;

(2) the location and geometry of all proposed roads;

(3) details of drainage;

(4) measures for dust control;

(5) traffic-control measures at intersections with public roads;

(6) measures for cleaning vehicles before entering public roads; and

4.3.2 Removal

Immediately a road if no longer required, the area affected by the subject road, including all side drains, cut-off drains, miter drains and culvert outfalls shall be rehabilitated. This will be achieved by the filling in of any drainage channels, the grading of the area to match existing contours, the ploughing and disc harrowing of the compacted roadway in a direction at right angles to the fall of the road, the creation of grass-seeded erosion berms where appropriate, and the replacement of topsoil. Particular care is to be extended to the prevention of erosion, and the avoidance of silt deposition in natural waterways.

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DIVISION 5 : EQUIPMENT

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5.1 MOBILIZATION

5.1.1 Scope of Work

This Section includes mobilization, demobilization, assembly and disassembly of dredge and related equipment including incidentals necessary to complete the work as well as the clean-up of the premises of the site.

5.1.2 Mobilization

a) The Contractor shall mobilize and put into work all personnel, plant and equipment required to undertake the Works.

b) Mobilization shall include the obtaining and transportation to the Site of equipment and personnel and all necessary items for the execution and completion of the Works. It shall include a sufficient supply of spare parts of the dredge equipment. Breakdowns of dredge equipment are to be repaired on the Site by the most expeditious method possible at no cost to the Employer.

c) In the event of repairs beyond the ability of personnel or tools at site to effect repairs in a reasonable time, such that the dredge equipment has to be removed from the site, then a replacement of equipment of a similar capacity shall be provided by the Contractor at no additional mobilization cost to the Employer nor extension of completion of Works.

d) Mobilization shall also include installation/construction of communication facilities, electricity and water supply lines and fixtures, temporary roads, sanitary and security facilities, buildings for the field office, etc.

5.2 EQUIPMENT TYPE AND CAPACITY

The minimum equipments/plant to be mobilized to the Site are the following:

Equipment	Minimum Required
1) Trailing suction hopper dredge (3000 cu.m. capacity) equipped with GPS system, survey equipment and plotters.	2

Equipment	Minimum Required
2) Tugboat 1,000Hp	2
3) Service Boat with crane 800 Hp	1
4) Barges 800 ton cap.	2

The above equipment however was determined for purposes of the study and design and the Contractor shall be solely responsible for the adequacy of equipment to pursue and complete the dredging works in accordance with the Contract.

5.3 DEMOBILIZATION

Demobilization shall include the removal of all debris and materials and disposing them into disposal areas approved by the Engineer, removal of all equipment, temporary building structures, utilities, markers and etc., provided that the Employer has not taken the option to retain all or part of any marker, building or utilities without added cost to the Project.

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DIVISION 6 : SITE SURVEYS

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6.1 SITE SURVEYS

6.1.1 General

It is required that for a "Before Construction" Record, the Contractor shall carry out topographic survey where required and hydrographic survey including center line survey, profile leveling, cross section survey, at the various locations shown on the Drawings to cover the extent of the Works and prepare drawings of the Site for examination by the Engineer. If satisfied as to the accuracy of the survey and the drawings, the Engineer and the Contractor shall sign the drawings which shall constitute a "Before Construction" Record.

6.1.2 Survey Areas

a) The types of surveys required for the different areas, where the works shall be executed shall be proposed by the Contractor for the Engineer's approval.

b) It shall be noted that survey using DGPS shall be carried out, as and when required, during the execution of the survey works mentioned herein.

c) Any discrepancy between the "before construction" drawings and the Bid Drawings shall be pointed out by the Contractor to the Engineer. The Engineer shall give instructions as to the resolution of such discrepancies.

d) The instructions and modifications referred to in this Division shall not constitute an order to vary the Works.

6.1.3 Base Survey

The Contractor shall study, confirm and be familiar with results of the previous survey data on the survey points provided by the Engineer. If there are any errors or discrepancies in such data, the Contractor shall inform the details to the Engineer for decision. Any survey conducted by the Contractor without informing the Engineer of any such errors shall be at the Contractor's risk.

The Contractor shall establish base lines as control points and levels for all Survey Works.

When removal of the existing benchmark(s) becomes necessary in conjunction with the execution of the Works, the Contractor shall re-establish such benchmark(s) at the location (s) as directed by the Engineer without any additional costs to the Employer.

6.1.4 Setting out of the Survey Works

a) The Contractor shall provide the Engineer with any information required enabling him to check the setting out of the Works, including explanation of any marks established by the Contractor for the setting out.

b) The Contractor shall be solely responsible for its accuracy. The Contractor shall provide, fix and maintain all stakes, marks or the like for the accurate setting out of the Works. The Contractor shall arrange all necessary precautions to prevent them from removal or disturbance.

The Contractor shall prepare, install and maintain temporary survey base points for significant base lines for the dredging Works, including the Dredging limits.

6.1.5 Method of Survey Works

The Contractor shall submit to the Engineer his proposals for the method of carrying out the survey works, in accordance with accepted standard and code of practice. No work shall commence until the Engineer has approved the proposals in writing. In conducting the surveys, the Contractor shall give particular emphasis to the following:

1) Coordinate System

The locations of all notable and principal points shall be referred to in the Employer coordinate system, whose origin is shown on the Drawings.

2) Survey Using DGPS

All measurements shall be conducted using DGPS.

3) Automatic Tidal Gauge

Shall be installed in 3 locations as shown in the attached Figure at the expense of the Contractor. The Contractor shall be responsible for the maintenance and protection of the tidal gauges. The exact locations of the tidal gauges shall be decided by the Engineer at the Site prior to commencement of the survey works. During survey works, the Contractor shall provide at its own expense the necessary personnel to secure the tidal records in connection with the survey works.

4) Depth Survey

Depth survey shall be conducted by an approved type of echo sounder in accordance with the method of survey proposed by the Contractor and accepted by the Engineer.

5) Cross Section Leveling

Cross section leveling shall be carried out perpendicular to the direction of the established centerline of any survey area and at specified intervals along the centerline.

Along the perpendicular direction to the centerline, levels shall be picked up at intervals of 20 m and at every changing point of the dredging work and any natural feature shall be reflected on the prepared drawings.

6) Compiling and Mapping

The field data shall be compiled and processed in the manner described herein below.

The field note books duly signed by the field supervisor shall contain the following items:

a) Names and locations of permanent benchmarks used as reference points for the linkage and principal points.

b) Name and type of instrument used.

c) Location map and description of any new benchmarks shall be supplemented to the submitted drawings.

d) All field sketches and calculation results.

e) The coordinates and elevations of all the critical points, encountered or established during the execution of the survey works, including the starting and ending points of the survey areas.

The work results shall be processed and plotted on A1 size drawings using the following scales:

(1) Profile : Scale Ver 1:50, Hor 1: 1000

(2) Cross Sections : Scale Ver 1:50, Hor 1: 1000

(3) Others as directed by the Engineer

7) Topographic Survey

a) Topographic Survey of the whole Site where required shall be conducted before commencement of earthwork including excavation. The Contractor shall verify the topographic maps provided in the Drawings. When necessary or so instructed by the Engineer, supplemental topographic survey shall be undertaken.

b) Topographic survey shall be carried out by means of DGPS and leveling. Topographic maps shall be prepared by CAD software and provided to the Engineer.

8) Hydrographic Survey

a) The Contractor shall carry out hydrographic survey of the area where dredging, will be carried out, by means approved by the Engineer and shall prepare hydrographic charts in 1:1000 and 2,000 scales. The maps shall show elevation of the seabed and salient features of the area within an accuracy of 1/1,000 and shall have contour lines of 50 cm vertical interval.

b) All stations shall be established by DGPS.

c) The sounding shall be carried out by an echo sounder of approved manufacturer, 30Hz and 210Hz, capable of sounding the depth within an accuracy of 10 cm. The record paper shall be of dry type.

d) The sounding shall be made by the Contractor under the supervision of the Engineer along the established lines of sounding prior to the commencement of dredging at 20 meters intervals unless otherwise directed by the Engineer. Sounding shall, as far as practicable, be performed when the sea condition is calm.

9) Submission of Work Results

Within two weeks after survey started, three blue print copies of each drawing shall be submitted to the Engineer for review. Submission of the final drawings containing five print copies and one CD copy shall be submitted after the Engineer has reviewed the Drawings.

Five copies of the field notes bound neatly shall be submitted including the original.

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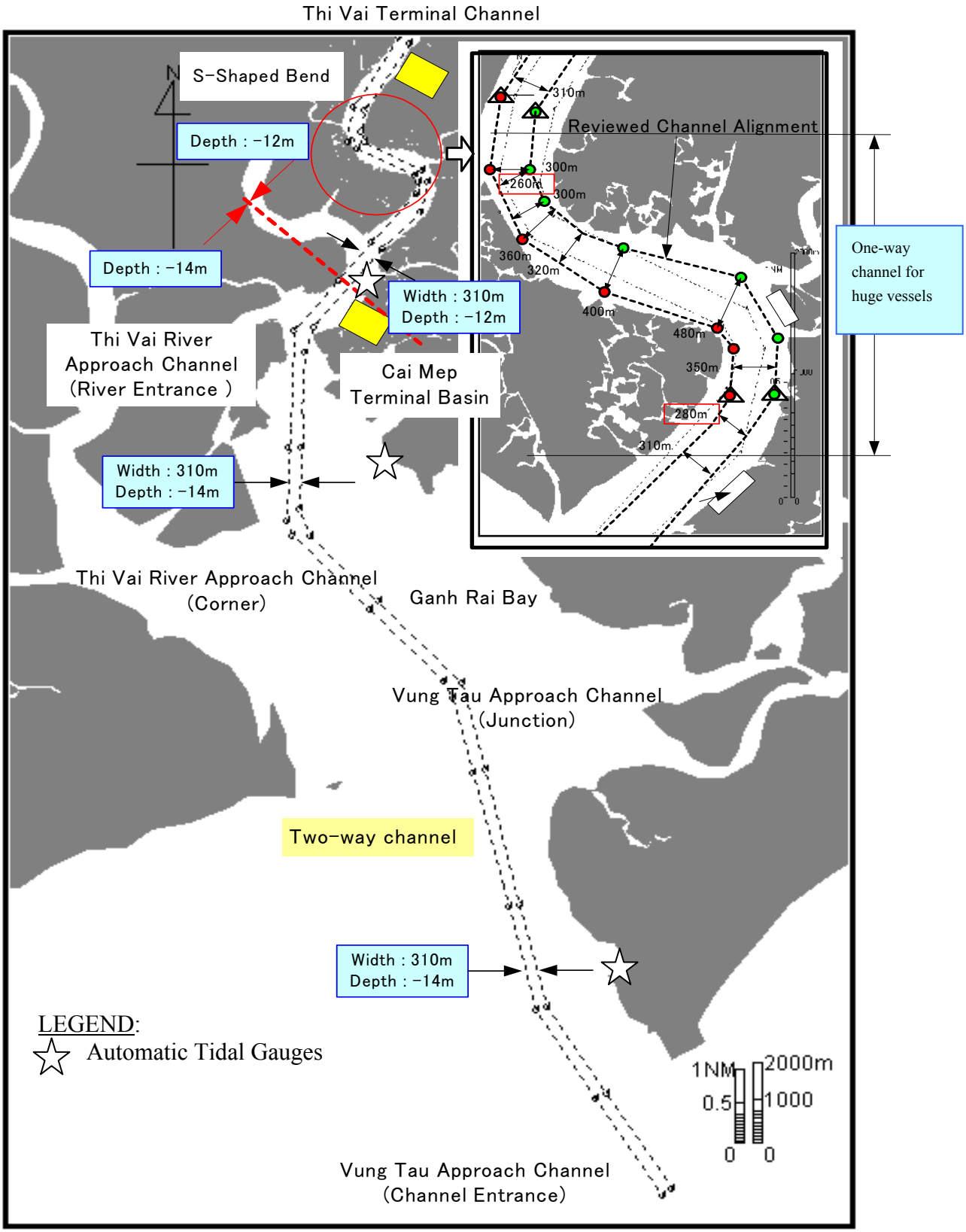

APPROXIMATE LOCATION OF AUTOMATIC TIDAL GAUGES

DIVISION 7 : SETTING OUT INFORMATION

SUB CONTENTS **Page**

7.1 SETTING OUT INFORMATION

As soon as possible after the Award of the Contract, the Contractor shall formulate proposals for his control of setting out the Works.

The Contractor is entirely responsible for accurately setting out and constructing the Works in accordance with the Drawings. The Engineer shall indicate, in writing, which bench marks shall be used for this purpose.

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DIVISION 8 : CHANNEL DREDGING WORK

SUB CONTENTS **Page**

8.1 GENERAL

Volume I, Volume II - Divisions 1 to 7 and Volume III contain provisions and requirements essential to these Specifications and shall apply to this Division whether or not referred to herein.

8.1.1 Scope of Work

The Work consists of the excavation of the seabed in mandatory dredging areas along the channel to the limits as shown on the Drawings or as may be directed by the Engineer.

8.1.2 Construction Program

Pursuant to Part 1, Division 6 of these Specifications, prior to commencement of the Work, the Contractor shall submit to the Engineer for approval his Construction Program and method of executing the Work. In preparing the methodology, focus shall be given on the manner and sequence of dredging the channel and disposing of dredge spoil without unnecessarily obstructing traffic along the Channel and the disposal areas.

8.1.3 Survey and Setting Out

a) Prior to start of the Work, the Contractor shall survey and set out the mandatory areas to be dredged using 30 Hz and 210 Hz echo sounder equipments and DGPS pursuant to Division 6 of these Specifications for the Engineer's review and approval.

b) Survey results shall become the basis for measurement and payment.

8.1.4 Safety of Work

a) Pursuant to Sub-Clause 19.1 of Volume I of the Contract:

(1) As safety precaution, the area to be dredged shall be marked with buoys which shall light at night to identify the limits of dredging operation and to preclude vessel/ship intrusion into the area.

(2) The Contractor shall maintain traffic along the Channel as part of the Dredging Works at all times to avoid obstruction to traffic.

(3) The Contractor shall submit to the Engineer, before commencing the Dredging Work, his detailed sequence and method of dredging the Channel, provision for traffic maintenance, traffic control measures and access ways for the use of the public and for his own use covering the whole period of the Contract.

(4) In executing the dredging operation, the Contractor shall create the least possible obstruction and inconvenience to the public and he shall work on such length of amount of work, which he shall be able to manage well.

(5) During the progress of the Work, the Contractor may propose any other alternatives/modifications to his proposals for traffic maintenance control.

(6) The Contractor shall be deemed to have satisfied himself as to the nature and location of the Work, general and local conditions particularly those pertaining to traffic and the sub-soils condition along the channel.

(7) The Contractor shall comply with all local and national safety regulations particularly on navigation and operation of Contractor's vessels and floating equipment.

8.2 EQUIPMENT REQUIRED

8.2.1 Operating Condition

a) The Contractor shall, at all times during the progress of the works, provide, operate and maintain in proper working condition all floating and other equipment of adequate capacities and amounts required for the expeditious and proper execution and completion of the works and the arrangements shall be such that the Contractor's Equipment which have become unserviceable due to wear, damage or any other cause shall be made good or replaced immediately so that no delay in the works shall occur.

b) The equipment shall include, but not be limited to, dredgers, hoppers, barges, tugs, launches, boats, buoys, moorings, surveying and sounding instruments, tools, implements and tackles. The Contractor without the written approval of the Engineer shall not demobilize the Contractor's Equipment.

8.2.2 Contractor's Responsibility for his Equipment

a) The Contractor shall be solely responsible for the suitability, safety and security of all Contractor's Equipment and shall take all precautions to ensure that the same is fully secured and maintained in safe condition as long as may be necessary to protect it against risks of damage by wind or wave action or other causes.

b) Approval by the Engineer of the Contractor's Equipment shall not relieve the Contractor from any of his responsibilities for the sufficiency of the same or from any of his other responsibilities and obligations under the Contract.

c) If any of the Equipment provided by the Contractor is found to be unfit for the execution of the Works, the Contractor shall provide replacement Equipment which is appropriate and necessary for the works when directed by the Engineer, and all extra costs shall be borne by the Contractor and he shall make allowance in his Bid rates or prices accordingly.

d) No extension of time for completing the Works will be allowed by reason of the provision of such replacement Equipment.

8.3 EXECUTION

a) Dredging shall be conducted by trailing suction hopper dredge or any approved dredge equipment to the limits as shown on the Drawings. For trimming work, mounted grab on barge may be used or any other approved equipment.

b) Dredging shall commence from upstream going downstream.

c) Separate payment will not be made for dredging outside the limits as shown on the Drawings.

c) Dredged spoils shall be disposed into the offing at a location as shown on the Drawings or as may be directed or approved by the Engineer. The top elevation of the disposed spoil shall be at least 20 meters below CDL.

8.4 OBSTRUCTIONS

a) The Contractor is responsible and shall be paid for clearing the following items:

(1) Wire ropes and wire rope nest;

(2) Sunken or buried vessels

The above items shall be disposed at a place approved by the Engineer.

8.5 OWNERSHIP OF MATERIALS DREDGED AND THINGS REMOVED FROM THE DREDGING

8.5.1 Materials Removed from the Seabed

a) Everything dredged from the site of the Works or removed from the seabed at the site of the Works shall remain the property of the Employer, but shall remain in the custody of the Contractor until it is discharged or dumped at the approved dumping site or otherwise placed as directed by the Engineer.

b) The Contractor shall notify the Engineer forthwith whenever anything unusual or of value is lifted out of the water and shall keep the same separately from the dredged material pending instructions from the Engineer.

8.6 POLLUTION CONTROL MEASURES

8.6.1 Adverse Environmental Concerns

a) The Contractor shall provide the necessary pollution control measures should the following adverse environmental concerns be encountered:

(1) When the silt content (fine materials passing #200 sieve) being disposed into the offing reaches 2,000 PPM;

(2) When the dispersion of silt content in the vicinity of the disposal areas averages 1,000 PPM over any six consecutive hour measurement; and

(3) When the dispersion of silt content reaches a maximum of 500 PPM within a radius of 250 meters from the point of disposal of dredged spoils into the dumping areas.

(4) The Contractor shall undertake the necessary measurements to determine the occurrence of any of the foregoing adverse environmental consequences and should any of the above be encountered, anti-pollution control measures including the provision of net to contain the dispersion shall be provided by the Contractor at his cost as part of and incidental to the dredging activities.

8.7 TOLERANCE

a) Over-dredging to the limits as shown on the Drawings shall be permitted but without additional cost.

b) Under-dredging below the limits as shown on the Drawings shall not be permitted.

8.8 TAKING OVER CERTIFICATE

The Engineer shall issue the Taking Over Certificate when the whole of the dredging work along the Navigation Channel has been completed in accordance with the Contract.

8.9 MAINTENANCE

Pursuant to Volume I, Clause 49.5, for sections of the Dredging Works for which a Taking-Over Certificate has been issued, maintenance dredging will not be required.

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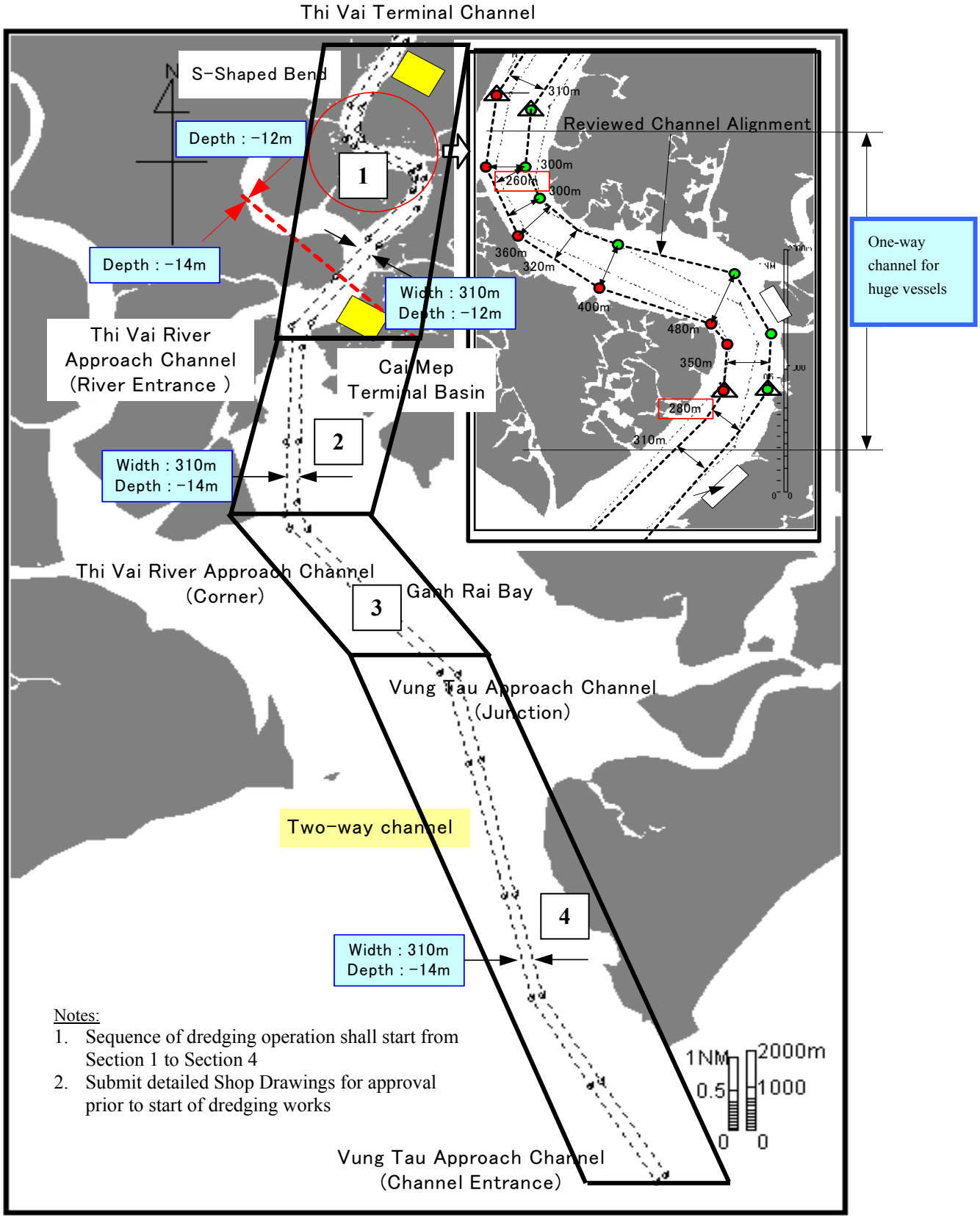

Notes:

1. Sequence of dredging operation shall start from Section 1 to Section 4
2. Submit detailed Shop Drawings for approval prior to start of dredging works

NAVIGATION CHANNEL DREDGING WORKS

DIVISION 9: LIGHT BUOYS

SUB CONTENTS **Page**

9.1 GENERAL

General Requirements contain provisions and requirements essential to these Specifications and shall apply to this Division, whether or not referred to herein.

9.2 SCOPE OF WORKS

9.2.1 Additional (New) Light Buoys

The Work included in this Sub-Clause of this Division is the fabrication, supply, installation of additional new light buoys as shown on the Drawings, testing and commissioning of the light buoys complete in all respect and in accordance with these Specifications.

9.2.2 Existing Light Buoys

Prior to start of fabrication of the additional new light buoys, the Engineer shall issue to the Contractor an inventory from the Employer which of the existing light buoys will be retained, relocated and/or repaired by the Employer. Based on the information issued by the Engineer, the Contractor shall confer with the Engineer on the number of supply and installation of new light buoys in accordance with these Specifications and the Engineer's directive.

9.3 SUBMITTAL

Prior to fabrication of the light bouys, the Contractor shall submit brochures, catalogs and shop drawings pursuant to applicable requirements of Division 3 of these Specifications.

The buoy shall be compartmentalized to ensure the safety of the facility at all times. The Shop Drawings that the Contractor shall submit as part of the Submittals shall include the details of the compartment for the Engineer's review and approval prior to fabrication.

Method and schedule of installation shall be submitted in advance to the Engineer for approval.

9.4 STANDARD

Buoyage system shall be in accordance with the International Association of Lighthouse Authorities (IALA) Maritime Buoyage System A.

9.5 COORDINATION

The Contractor shall be responsible for coordinating the Work with Vietnam Maritime Safety Agency (V.M.S) as to the pertinent regulations to be followed.

9.6 EXECUTION

9.6.1 Installation of New Light Buoys (See Drawing PAC3-NC-NVA-001)

a) From Buoy "PM0" to Buoy "PM22": Focal Plane Height approx. 4.0 m Skirt type steel buoy, with LED Marine Lantern

b) From Buoy "PM23" to Buoy "PM42": Focal Plane height approx. 3.8 m Skirt type steel buoy, with LED Marine Lantern

9.6.2 Existing Buoys in the Vicinity of Vung Tau Channel: 35 units

The Employer will determine which of these buoys will be repaired, removed, relocated or scrapped. This Work will be undertaken by the Employer.

a) Location No.1

No.	Buoy Designation	Latitude	Longitude
1.	P0	10-18.1N	107-04.2E
2.	P1	10-18.8N	107-03.8E
3.	P2	10-22.5N	107-02.7E
4.	P3	10-20.3N	107-03.6E
5.	P5	10-24.2N	107-02.4E

b) Location No.2: Thi Vai River Approach Channel, Cai Mep Terminal Channel, S-shaped Bend Channel and Thi Vai Terminal Channel.

No.	Buoy Designation	Latitude	Longitude
1.	P2	10-25.0N	107-01.3E
2.	P4	10-25.8N	107-00.8E
3.	P6	10-26.5N	107-00.2E
4.	P1	10-26.6N	107-00.3E
5.	P8	10-27.3N	106-59.7E
6.	P3	10-27.4N	106-59.8E
7.	P10	10-28.4N	106-59.6E
8.	P5	10-28.3N	106-59.8E

No.	Buoy Designation	Latitude	Longitude
9.	P7A	10-29.3N	106-59.9E
10.	P12	10-29.8N	106-59.7E
11.	P14A	10-30.3N	106-59.6E
12.	P7	10-30.1N	107-00.0E
13.	P14	10-31.0N	107-00.4E
14.	P9A	10-30.7N	107-00.7E
15.	P16	10-31.6N	107-00.9E
16.	P9	10-31.5N	107-01.1E
17.	P18	10-32.1N	107-01.5E
18.	PLG	10-32.2N	107-01.7E
19.	P20	10-32.6N	107-01.5E
20.	P11	10-32.7N	107-01.7E
21.	P22A	10-32.8N	107-00.7E
22.	P13	10-33.0N	107-00.9E
23.	P15	10-33.6N	107-00.7E
24.	P22B	10-33.4N	107-00.5E
25.	P22	10-33.9N	107-00.7E
26.	P17	10-33.8N	107-00.8E
27.	P24A	10-34.3N	107-01.0E
28.	P19A	10-34.2N	107-01.1E
29.	P24	10-34.7N	107-01.4E
30.	P19	10-34.7N	107-01.5E

9.7 PARTICULARS OF NEW LIGHT BUOYS

9.7.1 Location: PM0 to PM22

a) Buoy Size (See Drawing PAC3-NC-NVA-002)

(1) Height overall : Approx. 6.1 m

(2) Focal plane height : Approx. 4.0 m

(3) Outside diameter of float : Approx. 2.4 m

b) Buoy Body

(1) Material : Steel, Thickness of main body shall be 7mm min.

(2) Cathodic protection : Aluminum Alloy Anode Plate (For 5 years operation)

(3) Body color / Top mark : Red/Can Port side buoys for inbound vessels

: Green/Conical Starboard side buoys for inbound vessels

(4) Mooring Facilities : See Drawing AC3-NC-NVA-003

(5) Main chain : 1 piece – Diameter, approx. 32mm, JIS Grade 2 or approved equal. Length

depending on depth of water (see Drawing).

(6) Shackle, eyebolt etc : Suitable to minimize chafe

(7) Sinker : 1piece, 6 tons or more concrete sinker

c) Lighting Equipment

(1)	Lantern	: Light Emitting Diode (LED)		
(2)	Lens color	: Red	Port side buoys for inbound vessels	
		: Green	Starboard side buoys for inbound vessels	
(3)	Light character	: Fl (2) 3sec.	PM0, PM1 PM10, PM11 PM15, PM16 PM21, PM22	
		: Fl 3 sec	PM2, PM3 PM4, PM5 PM6, PM7 PM8, PM9 PM12 PM13, PM14 PM17, PM18 PM19, PM20	
(4)	Luminous range	: More than 4.0 miles		
(5)	Flasher	: Microprocessor Type		
(6)	Sun switch	: Photo electric cell system		
(7)	Power source	: Solar cell module		
(8)	Charging controller	: Over charge, over current and reverse current protection type		
(9)	Battery	: Capacity for at least 15 days working without charge		

d) Painting

(1) Interior of buoy body

Under Coat : One layer of epoxy zinc rich primer of more than 15μthickness and one layer of epoxy resin primer of more than 15μthickness.

Final Coat : One layer of epoxy resin of more than 15μ thickness.

(2) Exterior

(a) Above Water Line

Under Coat : One layer of epoxy zinc rich primer of more than 15 μ thickness and two layers of epoxy resin primer of more than 30 μ thickness.

Final Coat : Two layers of epoxy resin of more than 30 μ thickness.

(b) Under Water Line

Under Coat : One layer of epoxy zinc rich primer of more than 15 μ thicknesses.

Final Coat : Three layers of epoxy resin of more than 90 μ thickness.

(3) Test: After completion, thickness of the paint applied shall be measured at random by a calibrated digital micrometer to be provided by the Contractor. Thickness which is found to be non-complying shall be repaired by the Contractor at his own cost.

e) Radar Reflector **:** 1 piece, Anti-corrosive aluminum

9.7.2 Location: PM23 to PM42

a) Buoy Size (See Drawing PAC3-NC-NVA-002)

(1) Height overall : Approx. 5.8 m

(2) Focal plane height : Approx. 3.8 m

(3) Outside diameter of float : Approx. 2.1 m

b) Buoy Body

(1) Material : Steel, Thickness of main body shall be 7mm min.

(2) Cathodic protection : Aluminum Alloy Anode Plate (For 5 years operation)

(3) Body color / Top mark

: Red / Can Port side buoys for inbound vessels PM0

: Green / Conical Starboard side buoys for inbound vessels

c) Mooring Equipment (See Drawing PAC3-NC-NVA-003)

(1) Main chain : 1 piece

Diameter is approx. 32mm and JIS Grade 2 or equivalent

Length is dependent on depth where buoy is installed (See drawing)

(2) Shackle, eyebolt etc. : Suitable to minimize chafe

(3) Sinker : 1piece

Concrete sinker, 6 ton or more.

d) Lighting Equipment

(1)	Lantern	: Light Emitting Diode (LED)		
(2)	Lens color	: Red	Port side buoys for inbound vessels	
		: Green	Starboard side buoys for inbound vessels	
(3)	Light character	: Fl (2) 3sec.	PM26, PM27	
			PM37, PM38	
		: Fl 3 sec	PM24, PM25	
			PM28,	
			PM29, PM30	
			PM31, PM32	
			PM33, PM34	
			PM35, PM36	
			PM17, PM18	
			PM39, PM40	
(4)	Luminous range	: More than 4.0 miles		
(5)	Flasher	: Microprocessor Type		
(6)	Sun switch	: Photo electric cell system		
(7)	Power source	: Solar cell module		
(8)	Charging controller	: Over charge, over current and reverse current protection type		
(9)	Battery	: Enough battery capacity for at least 15 days working without charge		

e) Painting

(1) Interior of buoy body

Under Coat	:	One layer of epoxy zinc rich primer of more than 15μthickness and one layer of epoxy resin primer of more than 15μthickness.
Final Coat	:	One layer of epoxy resin of more than 15μthickness.

(2) Exterior

i) Above Water Line

Under Coat	:	One layer of epoxy zinc rich primer of more than 15 μ thickness and two layers of epoxy resin primer of more than 30 μ thickness.

Final Coat : Two layers of epoxy resin of more than 30 μthicknesses.

ii) Under Water Line

Under Coat : One layer of epoxy zinc rich primer of more than 15 μ thicknesses.

Final Coat : Three layers of epoxy resin of more than 90 μ thicknesses.

(3) Test: After completion, thickness of the paint applied shall be measured at random by a calibrated digital micrometer to be provided by the Contractor. Thickness which is found to be non-complying shall be repaired by the Contractor at his own cost.

f) Radar Reflector **:** 1 piece, Anti-corrosive aluminum

9.8 SPARE PARTS

Listed hereunder are the spare parts to be provided for the navigation aids. Contractor shall secure approval of the Engineer prior to delivery.

a) Lighting Equipment : 4 pcs

9.9 INSTALLATION

a) Location: As shown on the Drawing PAC3-NC-NVA-001.

b) Buoys shall be installed using GPS. Sinkers shall be placed within an accuracy of ±2.0 meters from the positions as shown on the Drawings.

c) All the installation works shall be undertaken without hindrance to the existing navigational system and traffic.

9.10 SURVEY AND TEST

After installation of navigation aids, the actual locations of Buoys shall again be surveyed and the intensity of luminous range tested. When tests have been completed and adjustments / corrections made, the Contractor shall submit for approval a duly signed Test Certificate with a corresponding request for acceptance of the facilities.

9.11 WARRANTY

The Light Buoys shall be guaranteed against any defects attributable to faulty design, manufacture and performance under normal operating conditions. The guarantee shall be for one (1) year from the date of issuance of the Taking-Over Certificate.

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