

ANNEXURE C2

PARTICULAR SPECIFICATIONS

Marine Excavations

TABLE OF CONTENTS

	PAGE NO.
1. SCOPE	2
2. INTERPRETATIONS	2
3. CONTRACTOR'S EQUIPMENT.....	2
4. MATERIALS, PLANT AND WORKMANSHIP	3
5. EXECUTION	5
6. TOLERANCES.....	9
7. Testing	10

C2 MARINE EXCAVATION

1. SCOPE

This specification covers the requirements for the marine excavation works required as part of the Island View Seawalls upgrades. The works shall include but not limited to the following:

- Removal of obstructions and debris.
- Excavation for the placement of revetment toe.
- Excavation to form the design slopes as shown in the drawings.
- Disposal of excavated material.
- All necessary surveys and testing.

2. INTERPRETATIONS

2.1 Supporting specifications

The specifications listed in this section shall, inter alia, be read in conjunction with this specification.

- Generic Specification E3: Hydrographic Surveys
- IHO Standards for Hydrographic Surveys, Special Publication No. 44, 5th Edition, February 2008.

3. CONTRACTOR'S EQUIPMENT

3.1 General

The Contractor submits a full description of the equipment planned for Providing the Works.

The Contractor obeys all vessel speed and navigational requirements within the Port. All Port protocols are observed by the Contractor including the hiring of Harbour Pilots and/or the application for exemptions as required. Where the use of divers is required,

the Contractor ensures that the latest requirements, restrictions, and regulations in this regard are complied with.

The Contractor ensures that all temporary lighting structures are designed to not interfere with navigation in the Port. The Contractor's proposed working lights are submitted to the Supervisor for acceptance prior to installation.

4. MATERIALS, PLANT AND WORKMANSHIP

4.1 Marine Excavation

4.1.1 Nature of material to be excavated

The Contractor in planning its excavation works takes note that there is a possibility of encountering unknown objects or obstructions below ground level or seabed level. The Contractor notifies the Project Manager immediately if obstructions in the dredge area are identified and removes the objects and obstructions.

4.1.2 Classification of materials for excavation purposes

Material

Material will be identified and classified in accordance with Table 6 of BS 6349 - Part 5 modified as set out below.

The classification of material shall include the following:

Boulders	Larger than 200 mm
Cobbles	60 mm - 200 mm
Gravels	Coarse 20 mm - 60 mm
	Medium 6 mm – 20 mm
	Fine 2 mm - 6 mm

Sands	Coarse 0.6mm - 2 mm
	Medium 0.2 mm – 0.6 mm
	Fine 0.06 mm – 0.2 mm
Silts	0.002 mm – 0.06 mm
Clays	Below 0.002 mm

Clays will be classified in accordance with their undrained shear strength as follows:

Very soft	< 20 kPa
Soft	20 to 40 kPa
Firm	40 to 75 kPa
Stiff	75 to 150 kPa
Hard	> 150 kPa

Rock

Weak to moderately weak rock will be classified according to its Unconfined Compressive Strength (UCS) as follows:

Weak rock	UCS < 5 MPa
Moderately weak rock	5 to 12.5 MPa

Moderately strong to strong rock will be classified according to its Unconfined Compressive Strength (UCS) as follows:

Moderately strong rock	12.5 to 50 MPa
Strong rock	UCS > 50 MPa

4.2 Classes of Material to be Excavated

The Contractor is referred to "Part C4: Site Information" of the contract document as pertinent geotechnical information is contained within the documentation.

The Contractor makes his own assessment of the ground conditions to be excavated when devising his method and selecting his Equipment.

5. EXECUTION

5.1 Excavation

The excavation works, including excavated slopes and embankments, are excavated to the lines and levels shown on the drawings.

The slopes around the perimeter of excavated areas are excavated to a slope of 1:3 (V:H).

Between Berths 1 and 5, there are sections of scour protection that slope down from the sheet pile wall. These areas are excavated with a slope to accommodate the required levels of the sloping scour protection, as shown on the drawings.

The Contractor dredges, excavates and maintains the specified profiles within the tolerances given in Clause 6 of this specification and if necessary corrects incorrect profiles.

5.1.1 Precautions

The Contractor provides sufficient risk allowance in its programme, for weather related downtime and disruptions due to adjacent berthing operations.

The Contractor complies with the instructions of Port Control regarding shipping and navigation safety. No disruption of port shipping due to encroachment of the Contractor's Equipment in designated shipping areas is permitted.

The Contractor complies with the environmental requirements included in the Works Information. The Contractor takes cognisance of the requirements for the monitoring

and mitigation of dredge plumes and turbidity levels. The Contractor therefore takes all necessary precaution in its planning and during the execution of the Works to achieve these requirements.

The Contractor further notes that there is a high risk of encountering manmade debris, including but not limited to concrete pieces and vessel debris. Calcarenite (UCS > 20 kPa) may also be present within the dredge volumes in particular between Berths 7 to 10 (Bunker).

5.1.2 Method statements

Excavation operations shall not commence without the Contractor having submitted to the Project Manager, and having obtained the Project Manager's acceptance of, a method statement. The method statement for each operation must include a comprehensive safety risk assessment.

5.1.3 Removal of Calcarenite

The provisional site data indicates that there is a possibility of encountering moderately strong Calcarenite within the dredge and excavation volumes between Berths 7 and 10 (Bunker). The Contractor includes for the removal of moderately strong Calcarenite as part of its normal excavation and excavation operations and without the need for drilling and blasting and shall select its equipment accordingly. Should the Contractor encounter material other than sands and clays, the Contractor notifies the Project Manager immediately, and will be required to carry out the necessary testing to verify the strength of the material.

5.1.5 Excavation works records

The Contractor shall submit a daily diary to the Project Manager, the minimum contents of which shall include the following:

- Date and time
- Equipment type and name
- Designation of the excavation/excavated area
- Daily production and material type
- Working area of the last 24hrs in comparison to the excavation plan

The Contractor will be ordered to stop all excavation activities if the frequency of submission of daily diaries is not being adhered to.

The Contractor shall provide the Project Manager/Supervisor with unlimited access to all excavation and/or dumping vessels as well as the right to witness all excavation operations, including the right to make photographic and video recordings.

5.1.6 Disposal of excavated material

All excavated material shall be disposed of on site in the designated area, as shown on the drawings (Drawing No. S2063-DR-GA-101 REV A). Finished levels of disposed material shall not be above -13 m CDP. Any other foreign objects excavated shall be disposed of at a Environmentally approved site by local authorities.

The Contractor shall keep daily records and submit a weekly report to the Project Manager, outlining how the objectives in the weekly report are being met. The Contractor will be ordered to stop disposing of material if the deposition plan is not being adhered to.

5.2 Surveys

Before commencement of any excavation, detailed surveys must be carried out over the entire marine portion of the Section. The following surveys are required as a minimum:

- Multibeam survey of the excavated area and adjacent slopes
- Multibeam survey of the excavation disposal areas

An in-survey of the entire marine portion of the Site shall be carried out before commencement of any excavation.

5.2.1 Hydrographic surveys

All hydrographic surveys shall be carried out to the requirements as specified in "Annexure E3: Hydrographic Surveys".

The general survey requirements apply:

In-Survey: A multi-beam survey of the area that needs to be excavated and the disposal areas, including a 30m offset along the seaward perimeter, shall be carried out, no longer than two weeks before commencement of the excavation of that particular area. This is in order to allow sufficient time for checking, verification and approval by the Project Manager.

Interim surveys: A multi-beam survey of the area that has been excavated and of the areas where material has been disposed of, including a 30m offset along the seaward perimeter, shall be carried out, directly after the excavation operation. This is to be accepted by the Project Manager before any filter or scour rock may be placed. If any additional excavation is required, then the Contractor shall carry out an addition out-survey to confirm that dredge levels and dredge disposal areas are in accordance with the specifications.

6. TOLERANCES

6.1 Excavation

For final acceptance, the following tolerances will be applied to excavated areas.

Table 6-1: Tolerances for excavation.

Area	Levels (m)		Lines (m)	
	+ (up)	- (down)	+ (outside)	- (inside)
Berth Pocket and Navigation Area	0.0	-0.5	0.0	1.2
Dredge Slopes	0.0	-0.5	0.0	1.2

Any areas that are outside the tolerances stated above shall be re-excavated by the Contractor and re-surveyed at the Contractor's expense. The excavation works will be accepted by the Project Manager as complete on receipt of survey data showing compliance with the required tolerances. Material excavated below the specified level and profiles will not be paid for. Any accumulation of material in the dredge area or anywhere else in the existing basin shall be corrected by the Contractor at his expense.

7. Testing

7.1 Excavation

7.1.1 Turbidity

Monitoring of sediment levels in the water column must commence at least one month prior to excavation activities. Continuous real-time monitoring of suspended sediment levels in the water column during excavation operations must be implemented for the duration of the excavation works to ensure that acceptable thresholds are not exceeded.

Sediments must be measured at 0.5 m intervals in the water column. This requires deploying instrumentation capable of monitoring sediment concentrations in the water column at a designated position and making this information available in real time to the person responsible for managing dredge activities.

All tests are to be performed by an accredited laboratory for the acceptance of the Project Manager. Guideline levels and corrective actions are described in the Environmental Monitoring Plan (EMP).

Prior to the commencement of testing, the Contractor shall describe the manner in which it intends to retrieve the required samples and how testing will be performed. Testing may not commence without prior written acceptance from the Project Manager.