

TECHNICAL SPECIFICATIONS

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DREDGING PARTICULAR TECHNICAL SPECIFICATIONS

Project Name:

CONSTRUCTION OF THE MARINE WORKS FOR THE UPGRADE OF BREAKWATER (NEW DOLOSSES) PROJECT AT PORT OF RICHARDS BAY

Transnet Project Number:

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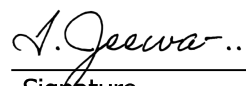
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RICHARDS BAY BREAKWATER UPGRADE AND REPAIRS

Dredging Particular Technical Specifications

FEL 4

S2072-01-TS-CS-Rbay Spec dredge-003-R0

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1. SCOPE

1.1 General

This specification covers the requirements for the dredging works required as part of the Richards Bay Breakwater upgrades.

2. INTERPRETATIONS

2.1 Supporting specifications

The specifications listed in this section must be read in conjunction with this specification.

- Hydrographic Surveys Generic Technical Specification
- 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.

4. MATERIALS, PLANT AND WORKMANSHIP

4.1 Dredging

4.1.1 Nature of material to be dredged

The *Contractor* in planning its dredging works takes note that there is a possibility of encountering unknown objects or obstructions below ground level or seabed level.

4.1.2 Classification of materials for dredging purposes

Materials

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Material will be identified and classified in accordance with Table 6 of BS 6349 - Part 5 modified as set out below. The applicable classification of material includes the following:

| | |
|-------|------------------------|
| 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 |

4.2 Classes of Material to be dredged

The *Contractor* is referred to the Site Information of the contract document as pertinent information is contained within the documentation.

The *Contractor* must dredge all materials with a particle size of ≤ 20 mm until refusal or until achieving the lines and levels shown on the drawings. Materials with larger particle sizes do not need to be dredged. The *Employer's* reason for limiting the particle size of dredge material is so that the *Contractor* can carry out dredging with a DOP pump, or equivalent Equipment.

5. EXECUTION

5.1 Dredging

Dredging of this sandy material must be carried out to the lines and levels shown on the drawings. Existing breakwater material, including rocks and dolosse (or pieces thereof), must not be dredged.

The toe trench must be 9 m in width, at a depth of -13.9 m CD or refusal by submersible dredge pump. The toe must be placed within the trench, and must be 2 units wide. Dredging must be limited to a radius not exceeding 80 m from the centre of the crane. Dredging should allow for encountering rocks or concrete within the dredge area. This will simply entail dredging around such isolated objects until a continuous toe line is visible at -13.9m CD. In the unlikely event that the actual toe level is above -13.9m CD dredging below the actual toe level will result in displacement of toe rocks. When a level close to -13.9m is reached regular multi-beam surveys are to be conducted. If any there is any sign of rock displacement, dredging is to be stopped

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and the Project Manager should be informed. A decision will then be made to terminate dredging at the current level. Dredging must be terminated if the levels shown on the drawings are not achieved due to refusal within the 80 m radius.

The *Contractor*, when devising his methods and considering the risks, takes cognisance of:

- Dredging slope instability risks that can be induced by aggressive dredging and steep temporary slopes;
- The potential variances in dredge slopes, which will not be consistent and typically range between 1:3 (V:H) and 1:5 (V:H), depending on the properties of the in-situ material; and
- Sediment movement from the breakwater core into the trench following initial dredging, or from slope instabilities on the seaward side of the dredged slopes. It is expected that slope instability can be avoided when slopes are dredged to 1:5 (V:H). Dredging steep slopes in an attempt to increase dredge production could lead to slope instability.

Surveys of the dredged trenches must be carried out immediately prior to placement of concrete armour units to ensure that levels have not been altered by siltation or slumping of slopes. Accreted material must be removed, and the dredged trenches must be re-surveyed as required. Where accretion of material occurs, the *Contractor* dredges, excavates and maintains the trenches to the tolerances given in Clause 6 of this specification and, if necessary, corrects incorrect profiles.

5.1.1 Precautions

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 and required by legislation. 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 risk of encountering man-made debris and potential snagging of the submersible dredge pump.

5.1.2 Method statements

Dredging operations must not commence without the *Contractor* having submitted a method statement to the *Supervisor* for acceptance. The method statement for each operation must include a comprehensive safety and environmental risk assessment.

5.1.3 Dredging works records

The *Contractor* must submit a daily diary to the *Supervisor*, the minimum contents of which must include the following:

- Date and time
- Equipment type and name
- Description of the dredging/excavation area
- Daily production and material type

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- Details of working time, downtime and standby time during each shift
- Coordinates of the vessel in time-track plots
- Working area of the last 24hrs in comparison to the dredging plan

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

5.1.4 Disposal of dredged material

All dredged and excavated material must be disposed of (TGC to confirm disposal area)

5.2 Surveys

Detailed surveys must be carried out over the areas to be dredged. The following surveys are required as a minimum:

- Multibeam survey of the dredge area and adjacent slopes (in-survey)
- Multibeam survey of the dredge disposal areas (in- and out-survey)
- Progress multibeam surveys of areas dredged more than 2 m in the vertical direction since the previous multibeam survey of the area
- Multibeam survey of toe trench prior to placement of units in the trench

5.2.1 Hydrographic surveys

All hydrographic surveys must be carried out to the requirements as specified in Hydrographic Surveys Generic Technical Specification.

The general survey requirements apply:

In-surveys: A multi-beam survey of the area that needs to be dredged and the disposal areas, including a 30 m offset along the seaward perimeter, must be carried out, no earlier than two weeks before commencement of the dredging of that particular area. This is in order to allow sufficient time for checking, verification and acceptance by the *Supervisor*. Surveys must be repeated if a storm with a significant wave height larger than 2.2 m occurs after the in-survey and before dredging commences.

Other surveys: A multi-beam survey of the area that has been dredged and of the areas where material has been disposed of, including a 30 m offset along the seaward perimeter, must be carried out, directly after the dredging operation. The *Supervisor's* acceptance must be obtained before any rock or armour units are placed. If any additional dredging is required, then the *Contractor* must carry out additional surveys to confirm that dredge levels and dredge disposal areas are in accordance with the specifications. Surveys must be repeated if a storm with a significant wave height larger than 2.2 m occurs after dredging and:

- Before rock is placed on the south breakwater slopes; or
- Before Antifer units are placed in the south breakwater toe trench.

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6. TOLERANCES

6.1 Dredging

For final acceptance, the following tolerances apply to dredged and excavated areas.

Table 6-1: Tolerances for dredging.

| Area | Levels (m) | | Lines (m) | |
|------------------|------------|----------|-------------|------------|
| | + (up) | - (down) | + (outside) | - (inside) |
| South breakwater | 0.0 | -0.2 | 1.0 | -0.0 |

Any areas that don't meet the tolerances stated above must be re-dredged by the *Contractor* and re-surveyed to prove compliance with the required tolerances.

7. TESTING

7.1 Dredging

7.1.1 Turbidity (*on hold*)

Monitoring of sediment levels in the water column must commence at least one month prior to dredging activities. Continuous real-time monitoring of suspended sediment levels in the water column during dredging operations must be implemented for the duration of the dredging 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.

The following guideline levels will be applied: (TGC to define)

All tests must be performed by an accredited laboratory and submitted to the *Supervisor* for acceptance. Guideline levels and corrective actions are described in the *Environmental Management Plan (EMP)*.

Prior to the commencement of testing, the *Contractor* must describe how it intends to retrieve the required samples and how testing will be performed and submit the proposed methodology to the *Supervisor* for acceptance.