Port Owen Marina Dredging Project

Results of dredging of portions of Area 3B and 3A
Dredging Period: 05 January 2026 to 25 March 2026

for
Port Owen Marina Authority

by
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BroadBand Geophysical

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1 Introduction

Port Owen Marina Association (POMA) dredged the remaining portion of Area 3B and a portion of Area 3A from 05 January 2026 to 25 March 2026.

POMA is required to report the estimated volume of dredged material to the Department of Forestry, Fisheries and Environment (DFFE) as a permit requirement. To meet this obligation, BroadBand Geophysical (BBG) was engaged to conduct baseline (pre-dredge) and post-dredge bathymetric surveys. These surveys aimed to estimate the in-situ volume of material removed.

The pre-dredge survey was completed on 28 March 2025, and the post-dredge survey on 16 April 2026. This report presents the findings of these surveys

2 Survey method and equipment.

The survey was conducted with a real-time kinematic (RTK) Global Positioning System (GPS) and a Lowrance sonar system, installed on a 17ft boat.

- The sonar system continuously records the water depth using sonar reflections from mud/sand/rock interface that constitutes marina bottom.
- RTK-Tide correction method. The GPS Rover installed on the boat continuously records the changing elevation of the water surface, and thus of the sonar transducer. This variance in the height of the water surface is mainly due to the tidal variance that occurs during the survey. The GPS Base is placed permanently at a Survey Reference Station and provides corrections to the GPS Rover in real-time. This ensures Centimeter accuracy for the positions and orthometric heights.
- The orthometric height of the marina bottom is calculated by subtracting the water depth from the orthometric height of the sonar transducer.

BBG provided the following equipment:

- 17ft Ocean Runner boat with twin 50HP Honda outboard engines.
- Sonar system: Lowrance Elite FS 7 GPS/Sonar system using a Lowrance 3-in-1 active imaging transducer installed on the boat's transom. The beam-width of the transducer is less than 2m at depths of less than 9m, implying that at bottom depths of 2.5m each depth profile represents the mean depth of an approximately 1m wide strip directly beneath the boat's transom. The measured and interpreted vertical accuracy of the sonar depth measurement has been calibrated in shallow water and is better than 10cm on a hard surface.
- Point-1 GPS interfaced with the Lowrance system. This GPS uses a real-time compass to facilitate accurate and responsive navigation.
- EMLID Reach RS+ RTK GPS Rover and Base system (see Figure 1 for specifications.)

The RTK (Real-Time Kinematic) positioning performance of the RS+ GPS system is better than 2 cm in all three dimensions. All coordinates are referenced to the Survey Reference Station that was established by MJ Geomatics Surveyors INC. on the western pier of the POMA slipway. The coordinates of this station are:

Geographical (WGS84): 18°08’53.829” E 32°47’14.099” S

Orthometric height (w.r.t. SA 2010 Geoid): 1.260m

REACH RS +

Technical specifications

72 channel. Signals tracked	GPS/QZSS: L1C/A, GPS/QZSS: L1C/AGLONASS: L10F, Galileo: E1, BeiDou (COMPASS): B1, SBAS
Positioning Rates	1 Hz, 2 Hz, 5 Hz, 10 Hz, and 14 Hz (GPS only)

POSITIONING PERFORMANCE

Static GNSS surveying

Single Baseline <30 km	
Horizontal	5 mm + 1 ppm RMS
Vertical	10 mm + 2 ppm RMS

Real Time Kinematic surveying

Single Baseline <10 km	
Horizontal	7 mm + 1 ppm RMS
Vertical	14 mm + 2 ppm RMS
RTK TFF	1 to 2 minutes

Post Processed Kinematic surveying

Single Baseline <10 km	
Horizontal	7 mm + 1 ppm RMS
Vertical	14 mm + 2 ppm RMS

Figure 1 - RTK GPS specifications

The survey area was surveyed at a nominal line separation of 10 meters. Data from these lines were then processed to produce 3-dimensional grids and maps of the Marina floor.

Processing software included:

- ReefMaster (Sonar depth mapping)
- Global Mapper,
- Google Earth Pro
- QGIS

3 Results

Figure 2 illustrates the areas outlined by POMA for the purpose of their dredging program:

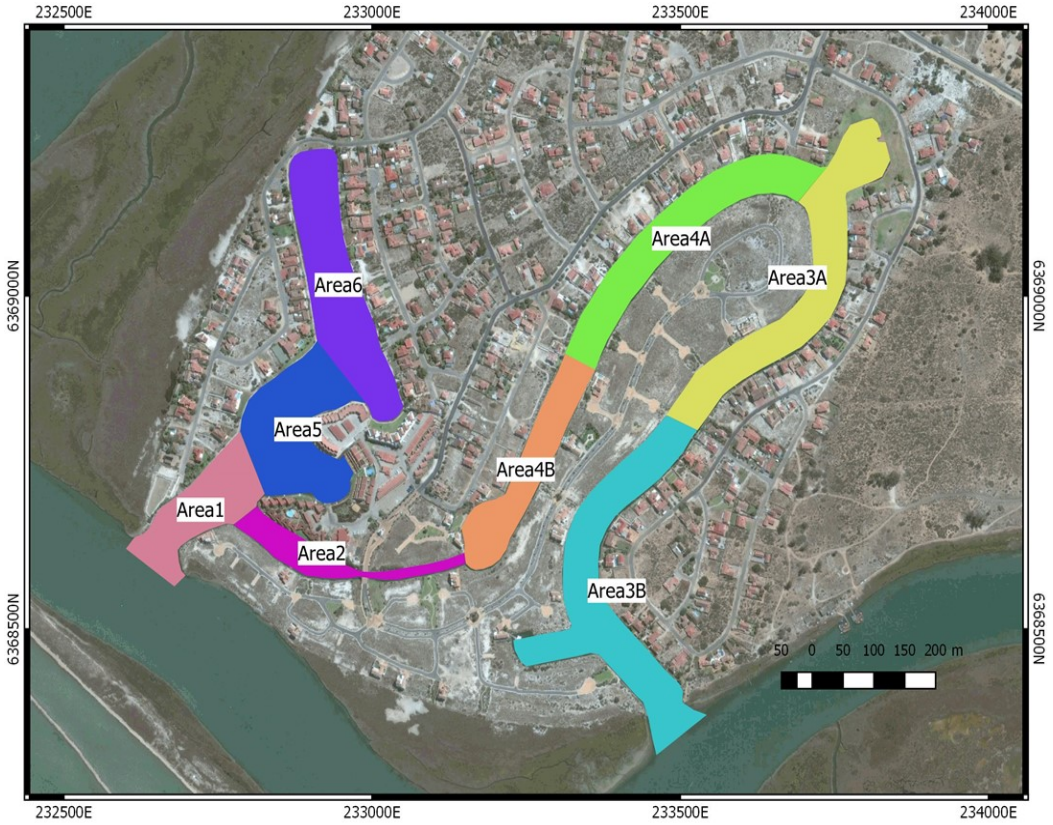

Figure 2 - POMA dredge areas

This survey was done to establish the in-situ volume of material removed from the Marina channel at the eastern river entrance from 05 January 2026 to 25 March 2026. The post-dredge survey tracks are illustrated by Figure 3.

Figure 3 - Post-dredge Survey Tracks

The best possible coverage of the designated area was attempted but in some cases obstacles such as the POMA dredger, buoys, pipes, ropes, shallow water and moored boats prevented access. However, the nominal line-spacing of 10m or better was achieved across most of the area that was dredged.

Figures 4 and 5 illustrate the pre-dredge and post-dredge Marina bottom surfaces respectively. These surfaces depict the orthometric height of the Marina bottom with respect to the South African 2010 geoid. The deepening of the channel, resulting from dredging activities, is clearly depicted in Figure 5.

Figure 6 shows the in-situ thickness of the material that was removed by the dredging.

The estimated <u>in-situ volume</u> of material dredged from 05 January 2026 to 25 March 2026 is <u>3144 cubic meters</u>.

Figure 4 - Pre-dredge Bathymetry (28 March 2025)

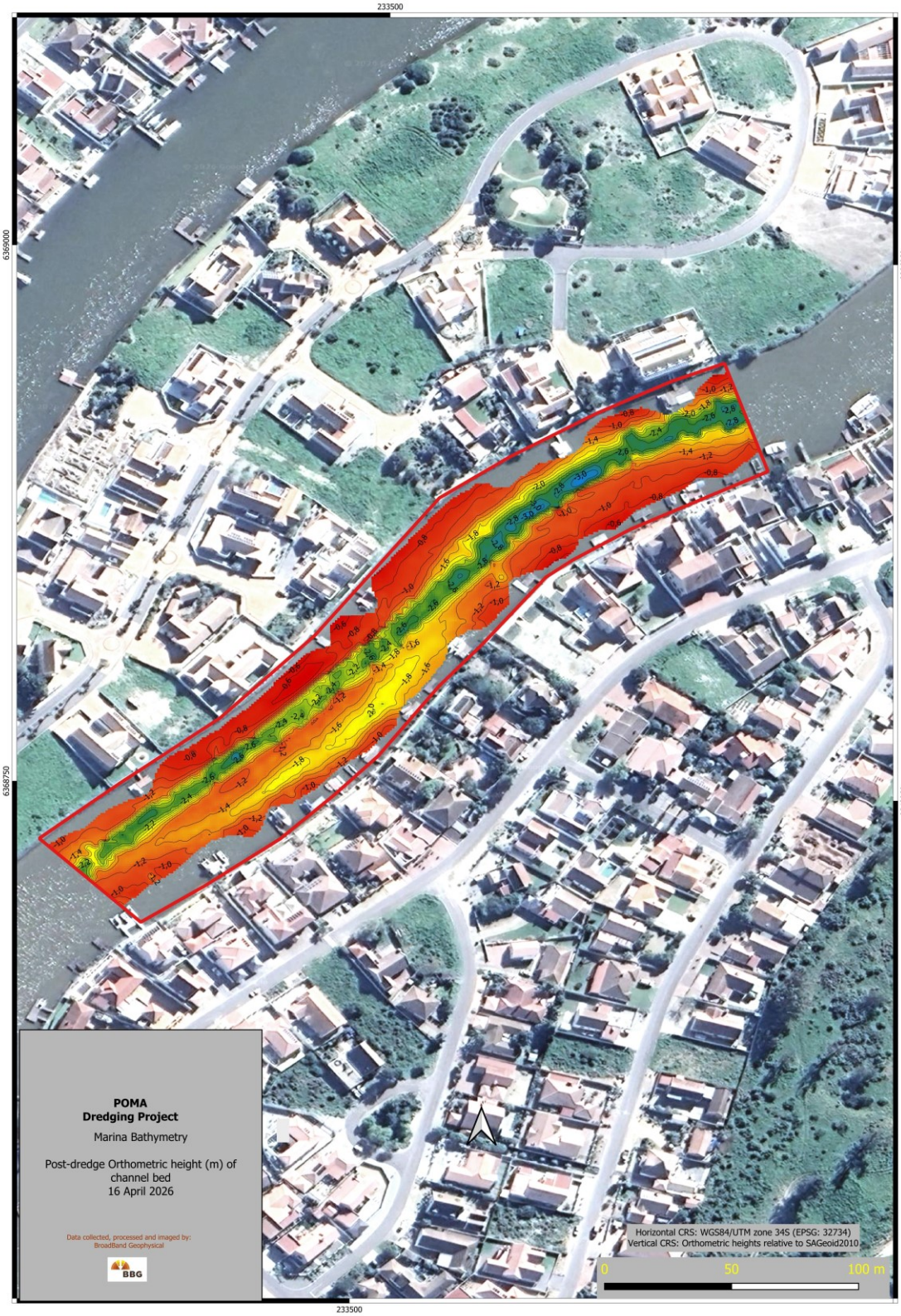

Figure 5 - Post-dredge Bathymetry (16 April 2026)

Figure 6 - Map showing in-situ thickness of material removed