MS2002
St Helier Harbour Survey

Operational Report
July 2020

Project	Client	Location
St Helier Harbour Survey	Ports of Jersey	St Helier, Jersey

Report status	Produced by	Checked by
Final	Philip Le Neveu	Donford Nicholas

Maritime House,
St Helier, Jersey, JE1 1HB
Tel: +44 (0)1534 447747
Email: marineservices@ports.je
Website: www.marineservices.je

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Introduction:

Ports of Jersey Marine Services completed a routine survey of St Helier harbour in July 2020. The survey included coverage of the Small Roads approaching the harbour, the Tanker Berth, the East and West Berths, the Main Harbour, La Collette Yacht Basin, St Helier Marina and Elizabeth Marina. The following reports gives a brief overview of the findings.

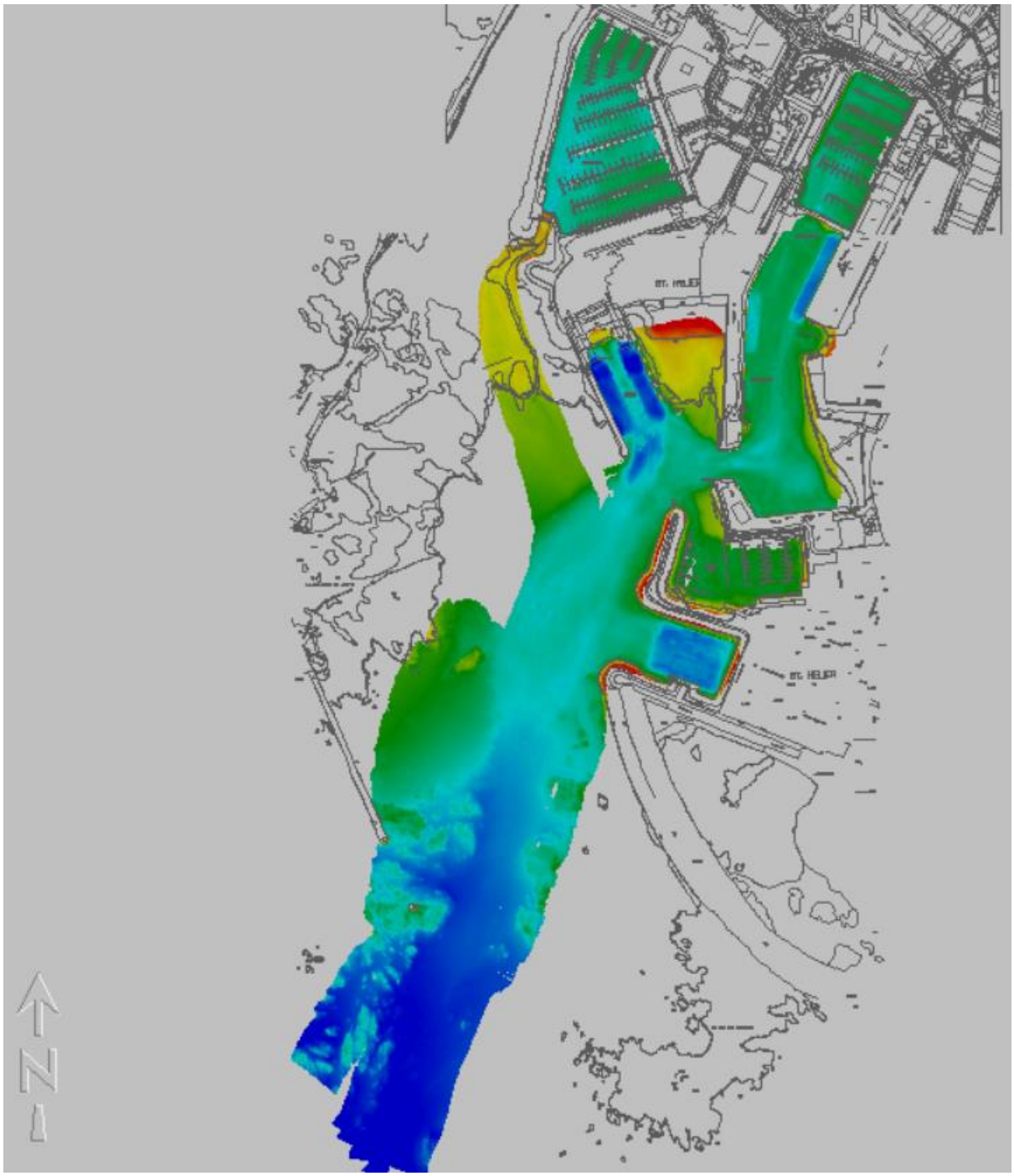

Figure 1 Showing an overview of the survey coverage

Methodology

Vessel and equipment

Ports of Jersey Marine Services mobilised the vessel Rival with an R2Sonic Multibeam Echosounder, along with an SBG Navsight inertial navigation system. The SBG GNSS system was supplemented by a real time kinematic (RTK) correction. The RTK correction was calculated by a base station established at the Southern end of the Albert Pier. The correction service was transmitted to the vessel via a UHF link. The system was able to provide sub 5cm accuracy in X, Y and Z planes of reference. All the systems onboard Rival were interfaced into the Hypack acquisition system. Ocean conditions were monitored with Valeport sound velocity sensor installed at the transducer head and periodic sound velocity casts were taken using a Valeport Swift SVP.

Figure 2 Archive photo of the vessel Rival mobilised with Survey equipment

Table 1 List of survey equipment

Equipment	System
Multibeam Echosounder.	R2Sonic 2024 – UHR Capable, 170 – 700KHz
Primary GNSS	Apogee Navsight Dual Antenna system
RTK Correction Base station GNSS	Hemisphere R330 using Atlas Link L-Band H10 Offshore
UHF Radio Link	Satel EASy UHF Radio modems
Motion Reference Unit	Apogee-U Navsight
Ocean monitoring	Valeport SVS Valeport Swift SVP
Acquisition Software	Hypack

Calibration

Following the mobilisation of the vessel a patch test was conducted over the Diamond rock in St Aubins bay. A vertical clarification was also completed in St Helier over the St Helier marina sill to verify the systems heights accuracy. The results of the patch test are shown in Table 2.

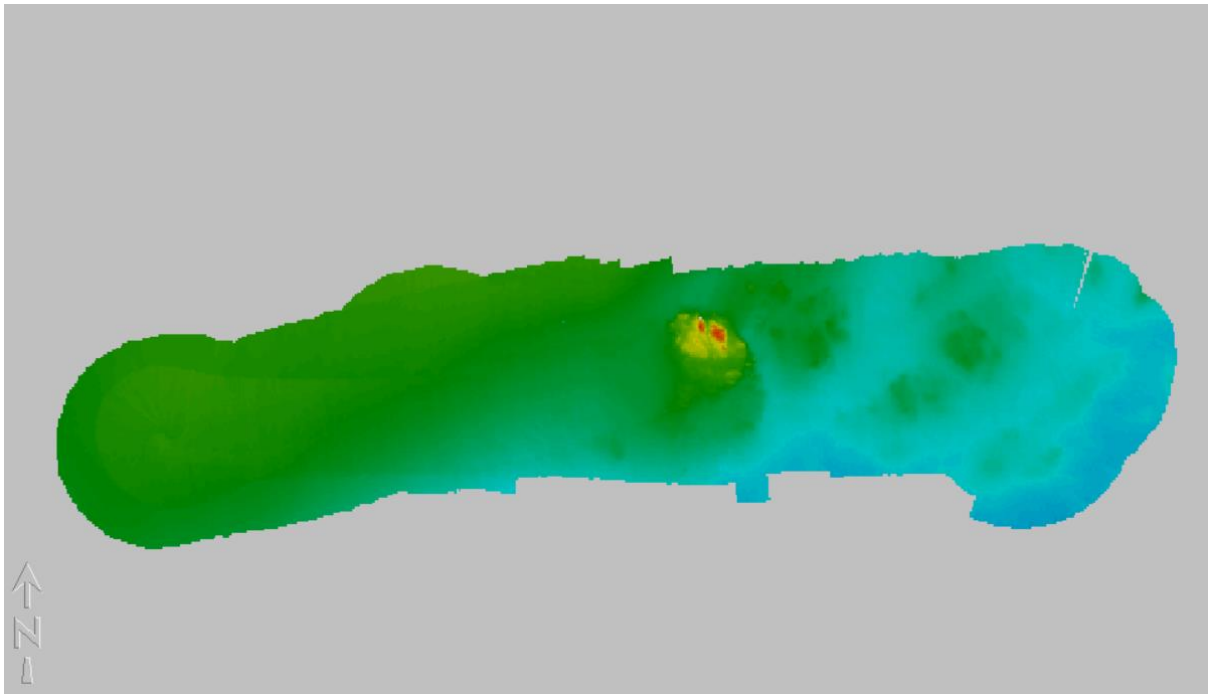

Figure 3 Patch test bathymetry over Diamond Rock

Table 2 Patch test results

Rotation	Correction
Roll	-0.40°
Pitch	0.10°
Heading	0.50°

Geodetic Parameters

Tables 3 and 4 outline the projects geodetic parameters.

Table 3 WGS84 definition

Ellipsoid	
Ellipsoid	World Geodetic System (WGS-84)
Semi Major Axis	6378137.000 metres
Inverse Flattening (1/f)	298.257223563

Table 4 UTM Project definition

Projection	
Projection	Universal Transverse Mercator (UTM 30N)
Central Meridian	003° West
Reference Latitude	0° North
Scale Factor	0.9996
False Easting	500000 metres
False Northing	0 metres

Vertical reduction

Vertical control onboard the Rival was provided by an Apogee-U Navsight SBG system combined with RTK GNSS correction received via the UHF link from the base station. The Apogee-U Inertial Navigation System (INS) provided real time Heave corrections onboard. Sounding depths were reduced to Chart Datum (CD) - Lowest Astronomical Tide (LAT) using the Vertical Offshore Reference Frame (VORF) model.

Acquisition

The survey data was acquired over several high tides throughout July to provide optimum conditions. Prior to each survey a series of dynamic manoeuvres were completed to align the SBG INS system. Prior to beginning operations, a sound velocity cast was completed. Casts were then completed periodically throughout the survey, whenever the surveyor deemed it necessary.

Data Processing

Post processing of the data was undertaken using HYPACK. Initially each line was QC'd to identify any possible errors due to increased; speed, heave, motion or sound velocity errors. Following this the tidal data from the survey period was smoothed to remove any erroneous points. Data cleaning was completed using a combination of automatic filters and manual cleaning.

Data for St Helier Marina and the Elizabeth Marina were manually shifted to reflect the Pond height of each Marina. The pond heights for each marina are shown in table 5.

Table 2 Marina Pond heights

Marina Pond Hights above Admiralty Chart Datum (ACD)	
St Helier Marina	5.0m
Elizabeth Marina	5.6m

Results

Figures 4 to 15 show detailed images of the survey results. The colour scale and North orientation has been varied between images to best display the data.

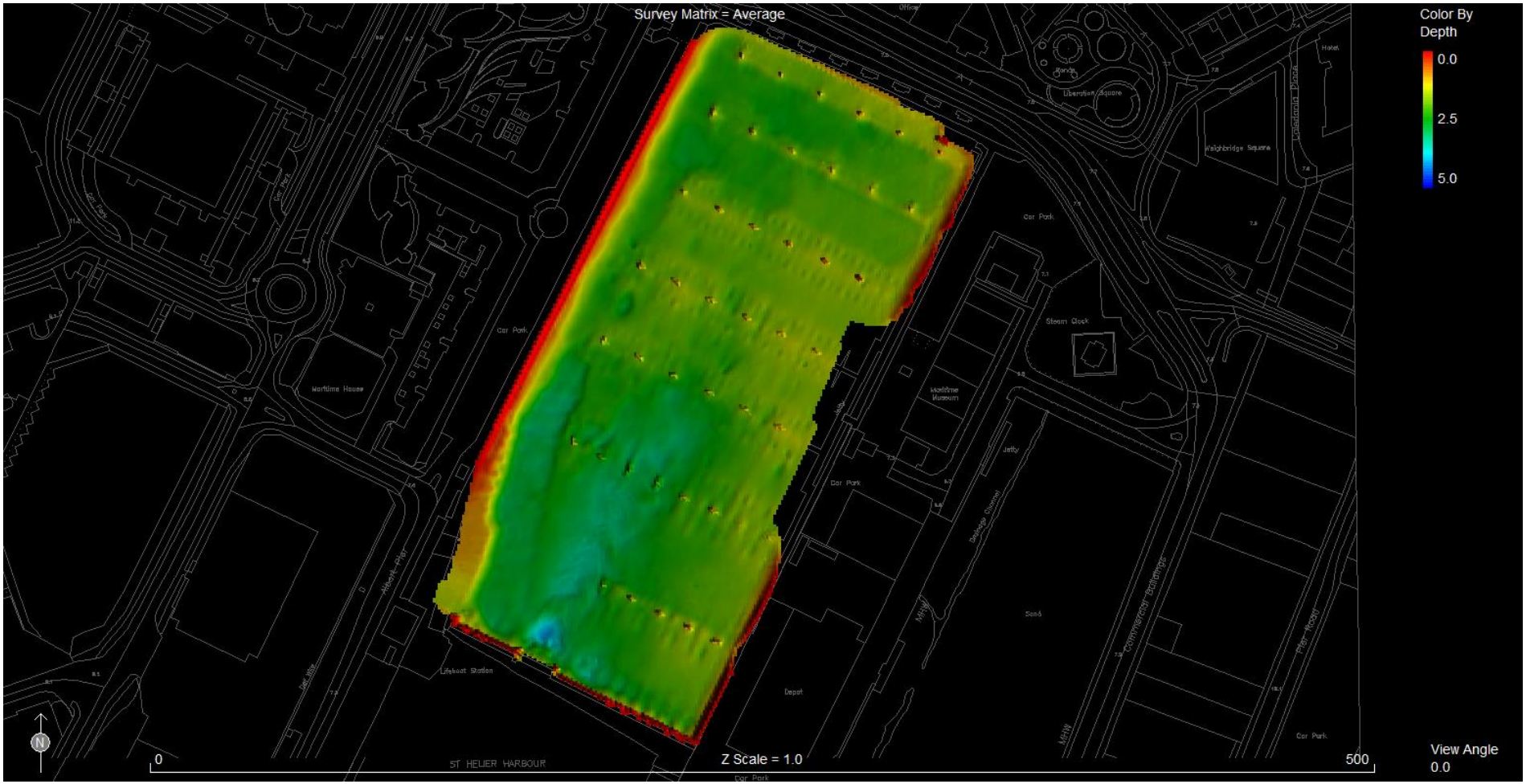

Figure 4 St Helier Marina. All depths have been adjusted to reflect Pond Depth

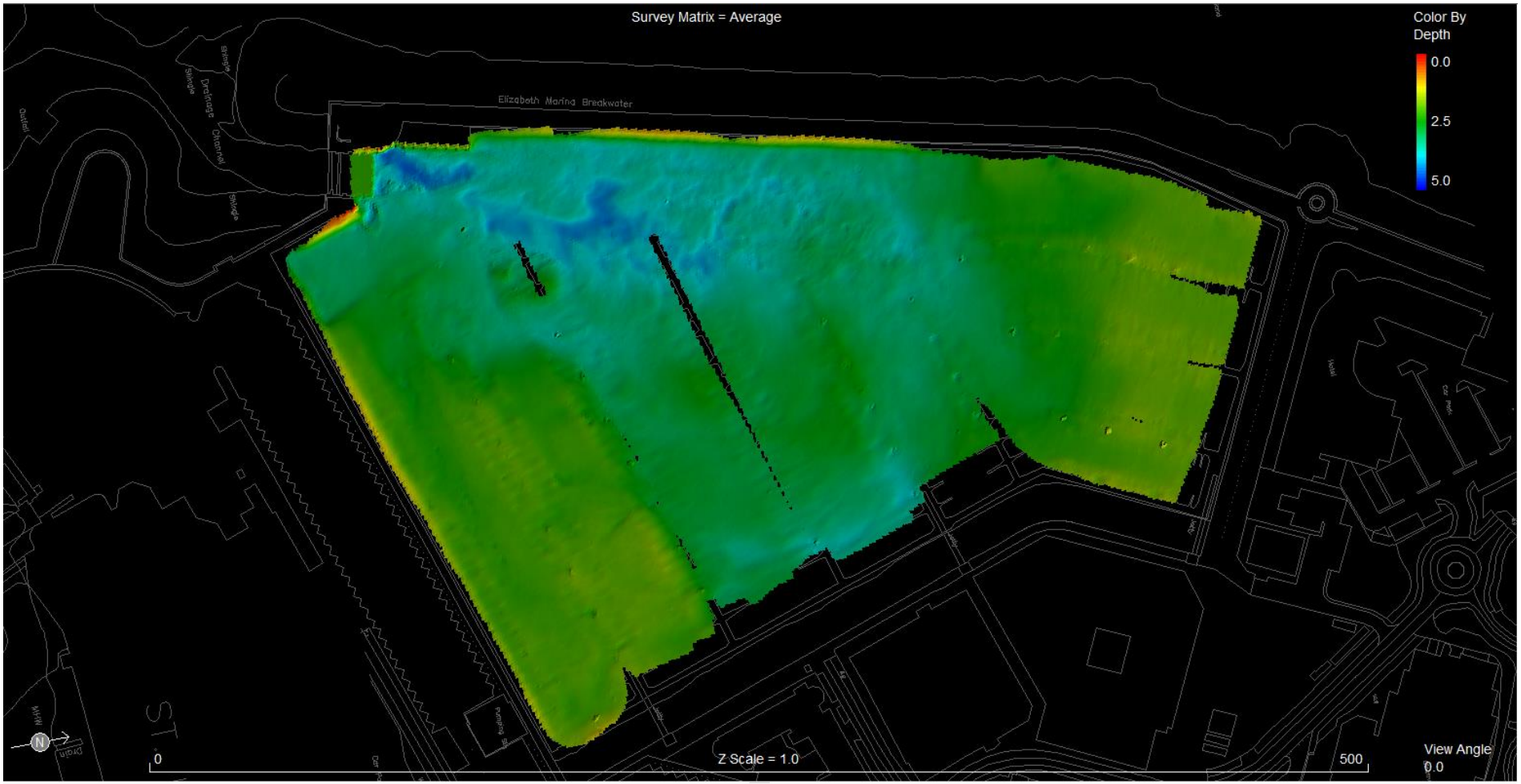

Figure 5 Elizabeth Marina. All depths have been adjusted to reflect Pond Depth

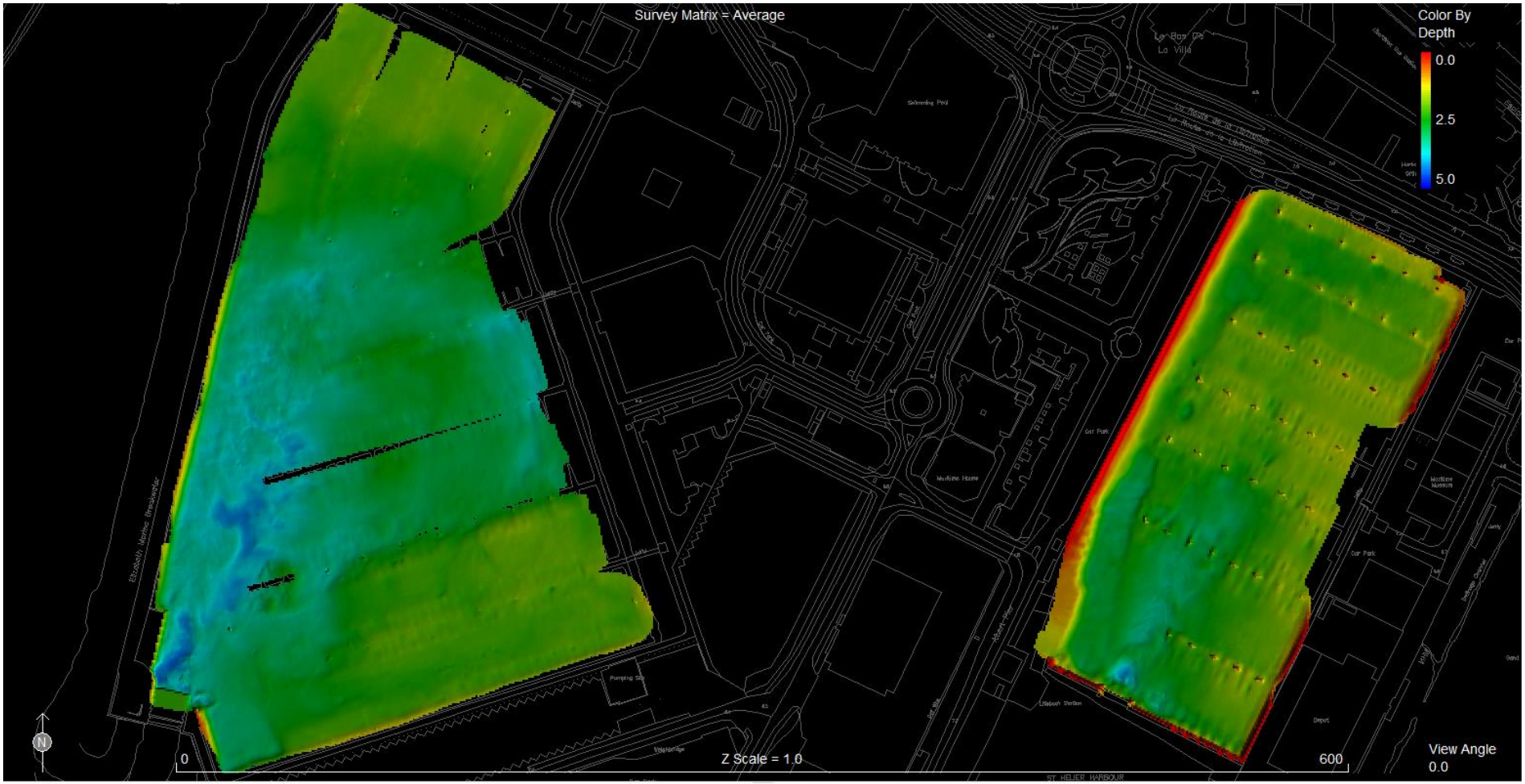

Figure 6 Elizabeth marina on the left and St Helier Marina on the right. All depths have been adjusted to reflect Pond Depth

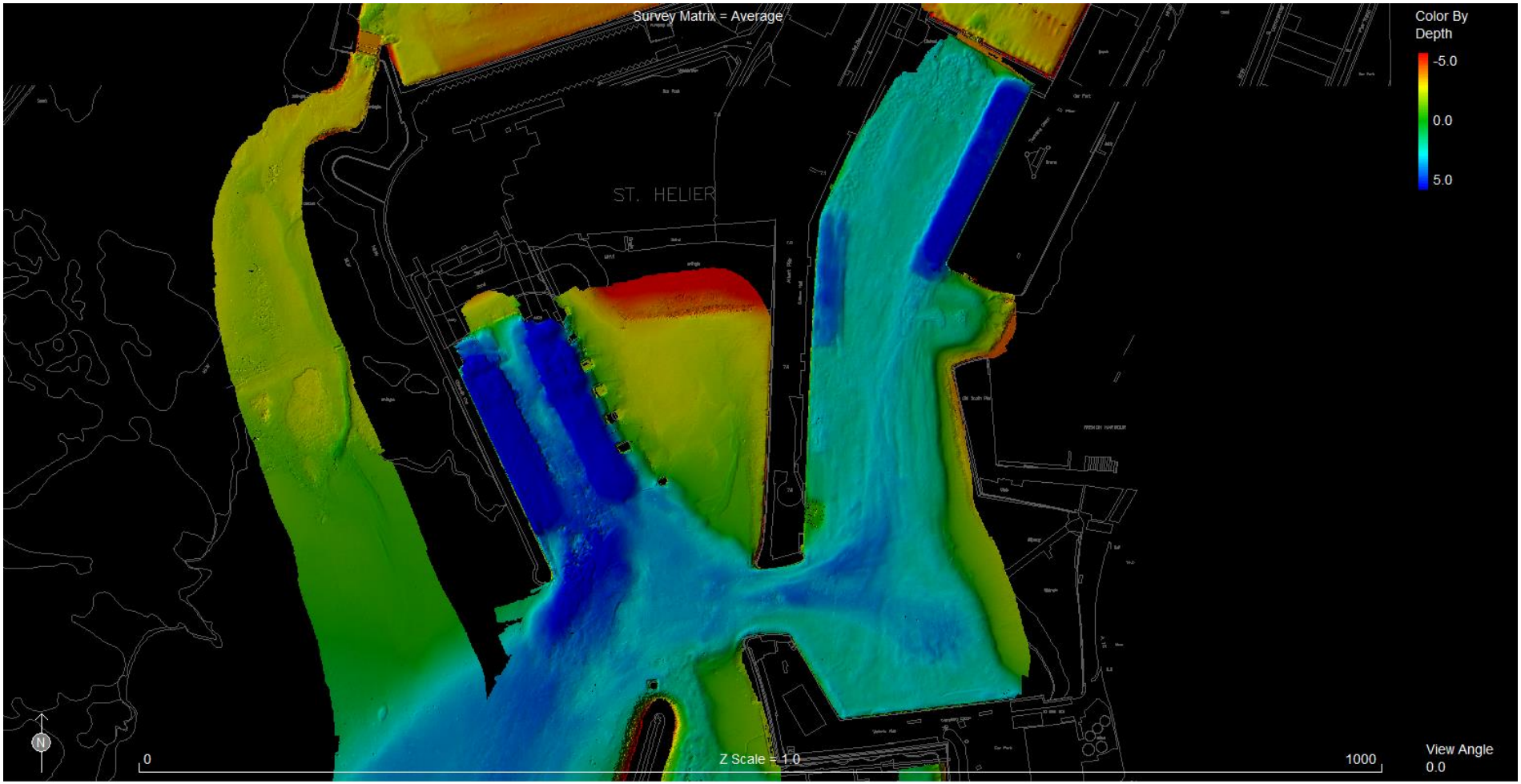

Figure 7 St Helier Main Harbour, East and West Berths and the approach to Elizabeth marina

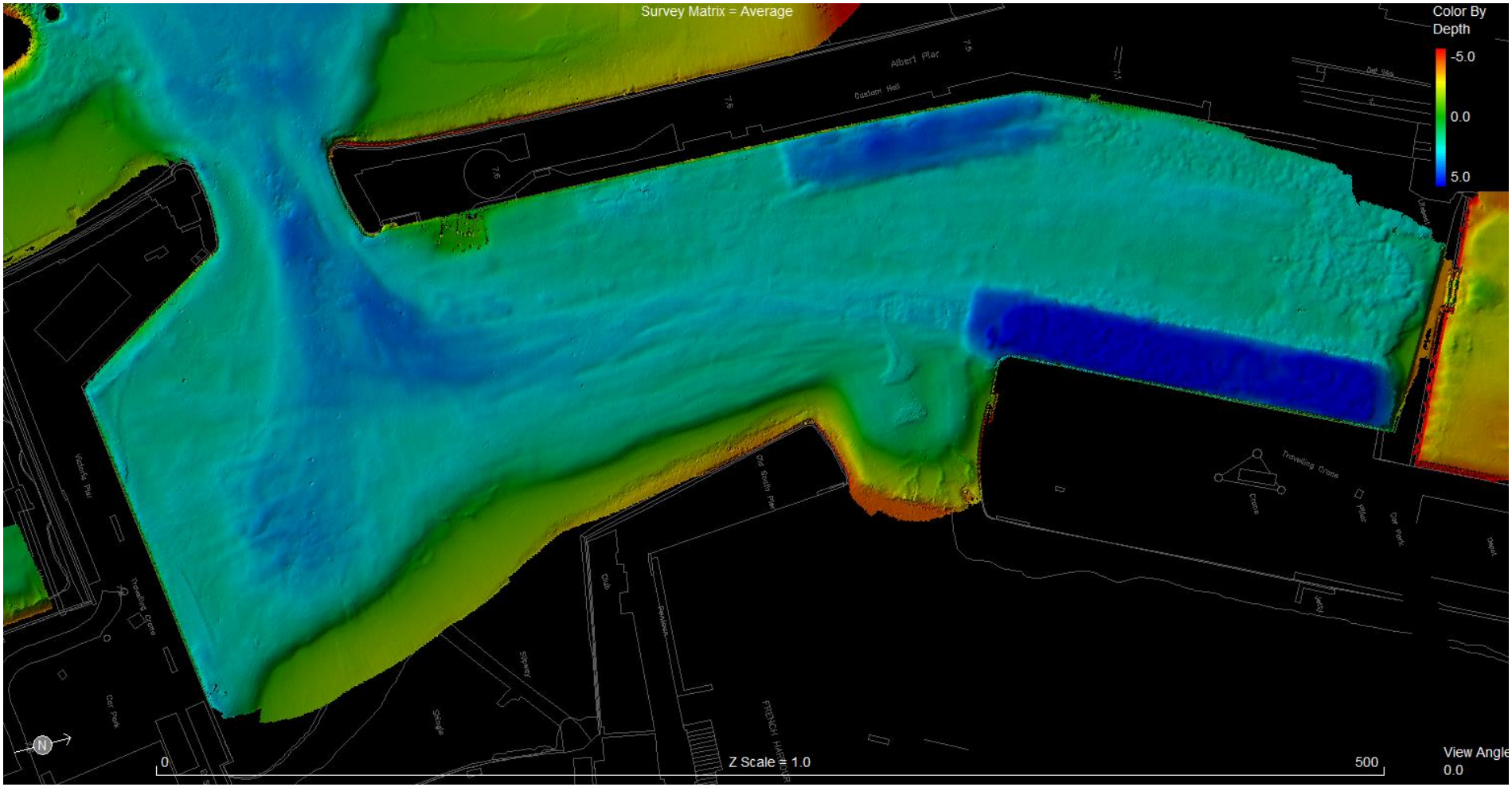

Figure 8 St Helier Main Harbour

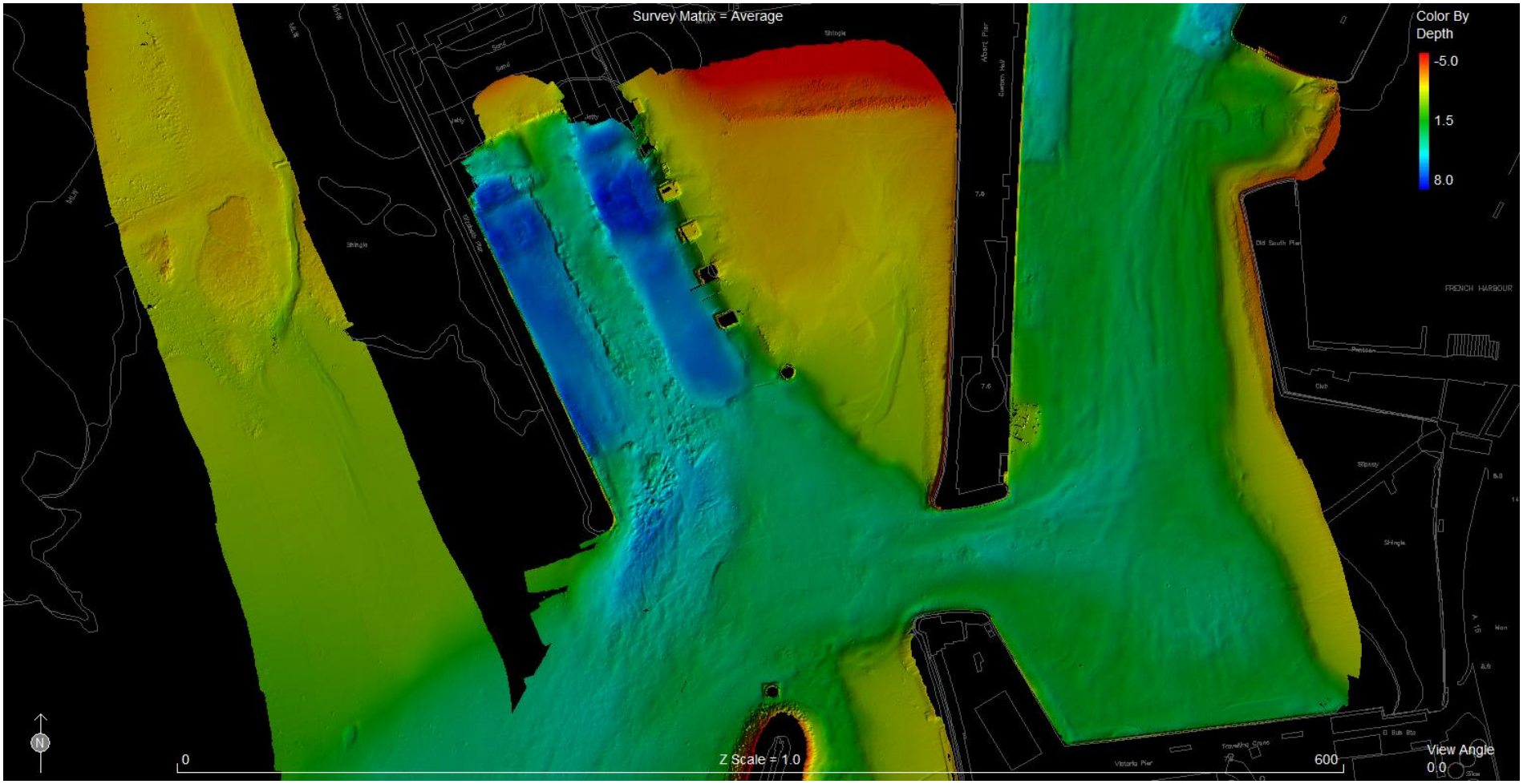

Figure 9 The East and West Berths

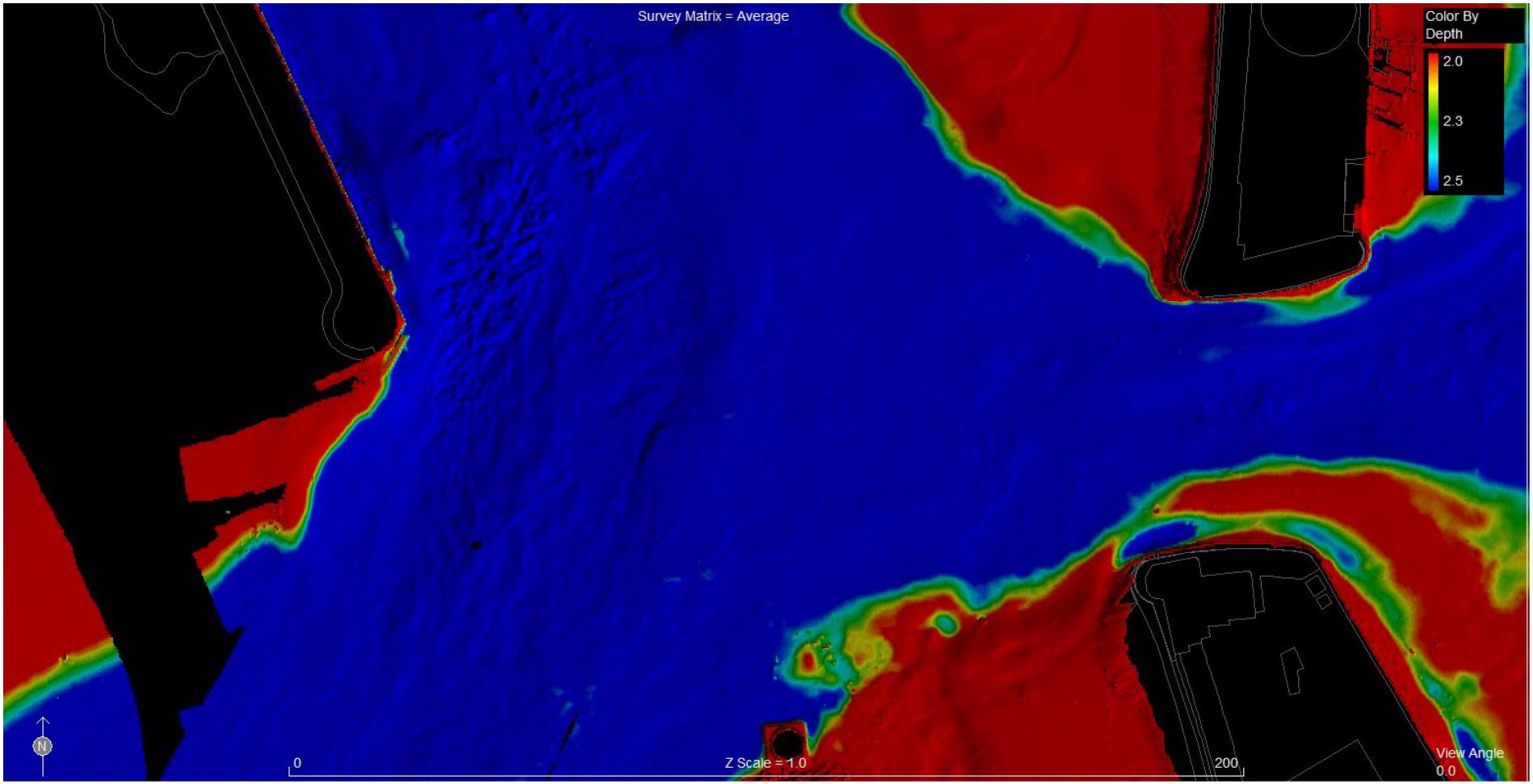

Figure 10 Small roads South of the East and West Berths, compressed colour scale to show depth maintained to at least 2.5m.

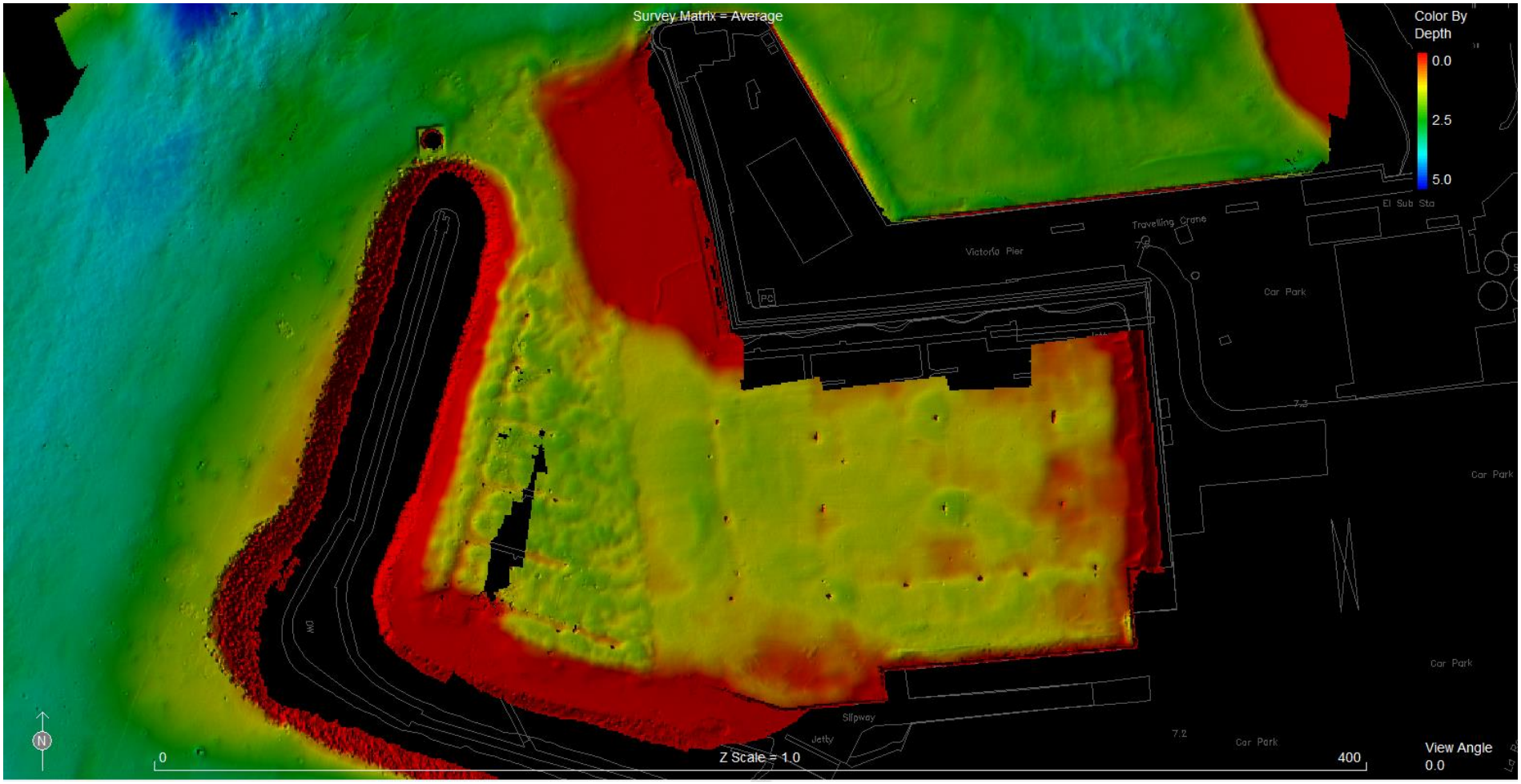

Figure 11 La Collette Yacht Basin

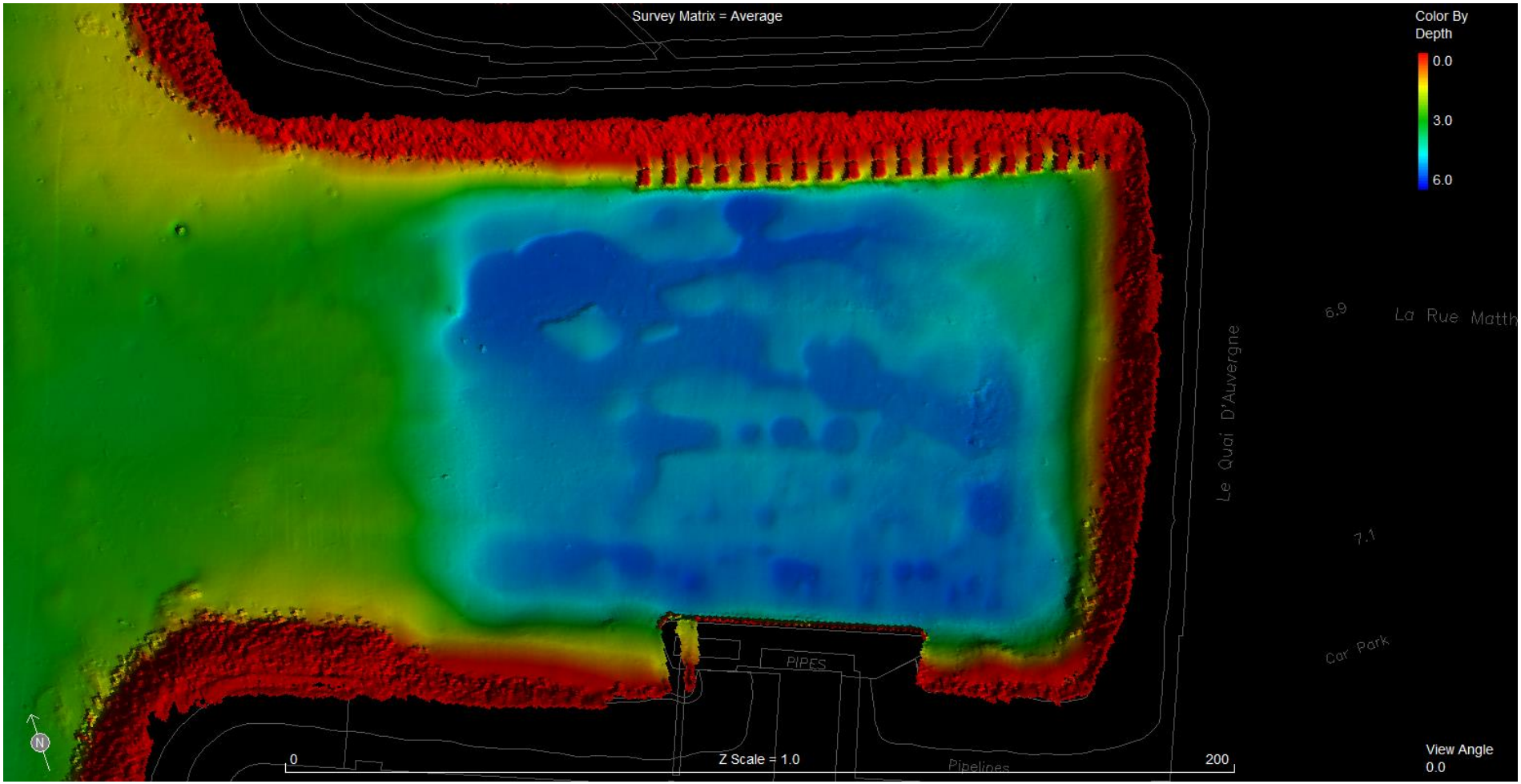

Figure 12 The Tanker Berth

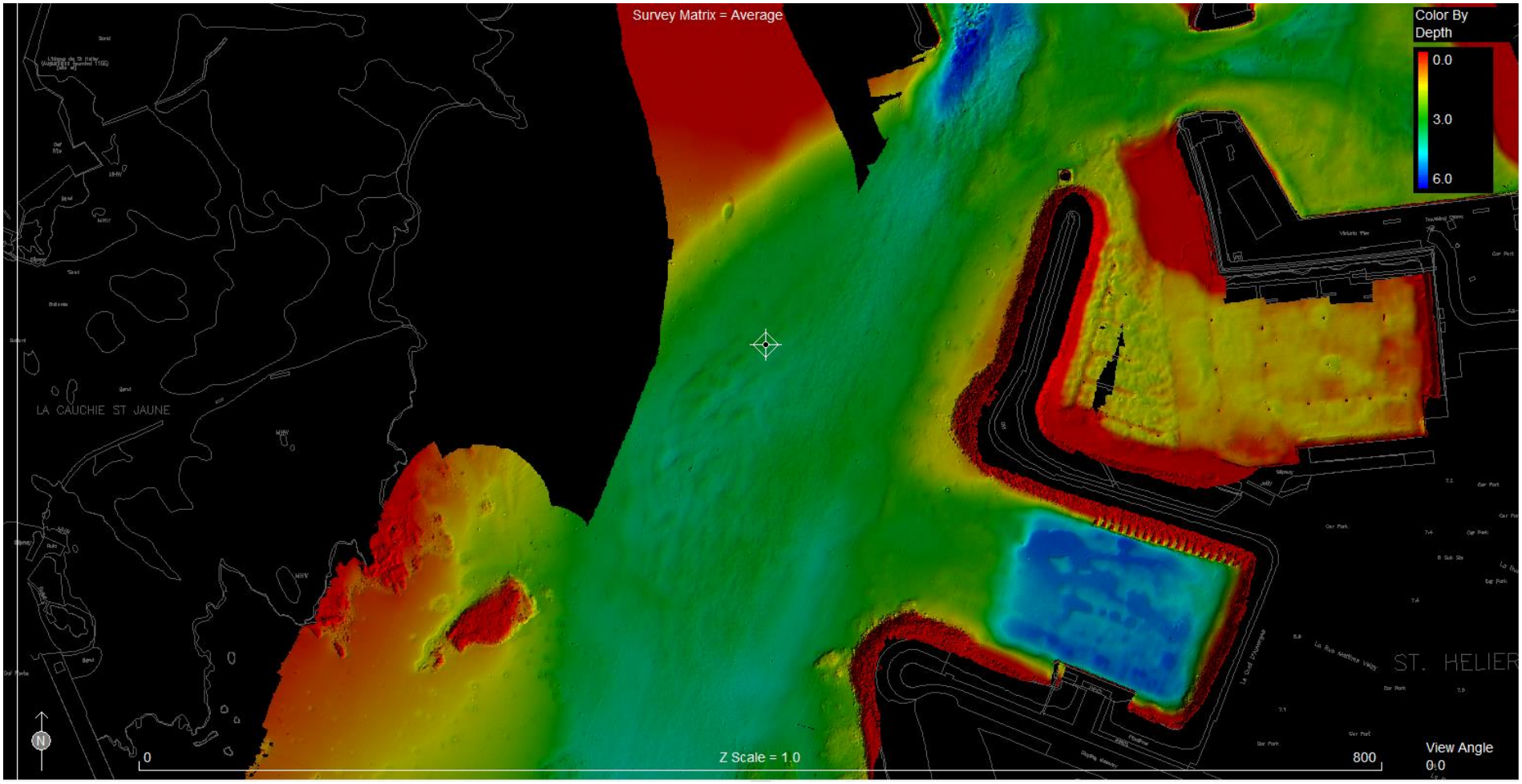

Figure 13 The North of the Small Roads, the Tanker berth and La Collette Yacht Basin

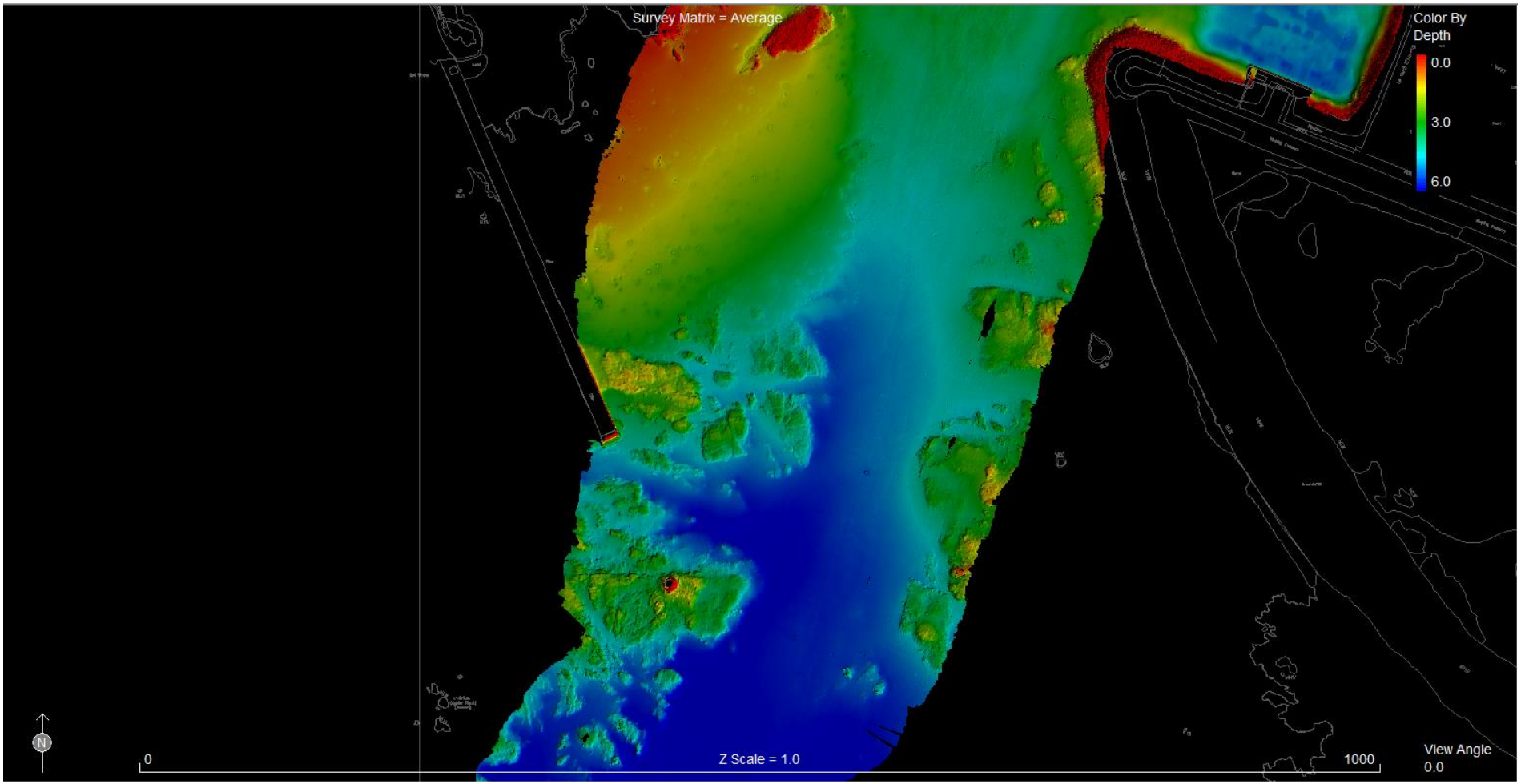

Figure 14 The South of the Small Roads

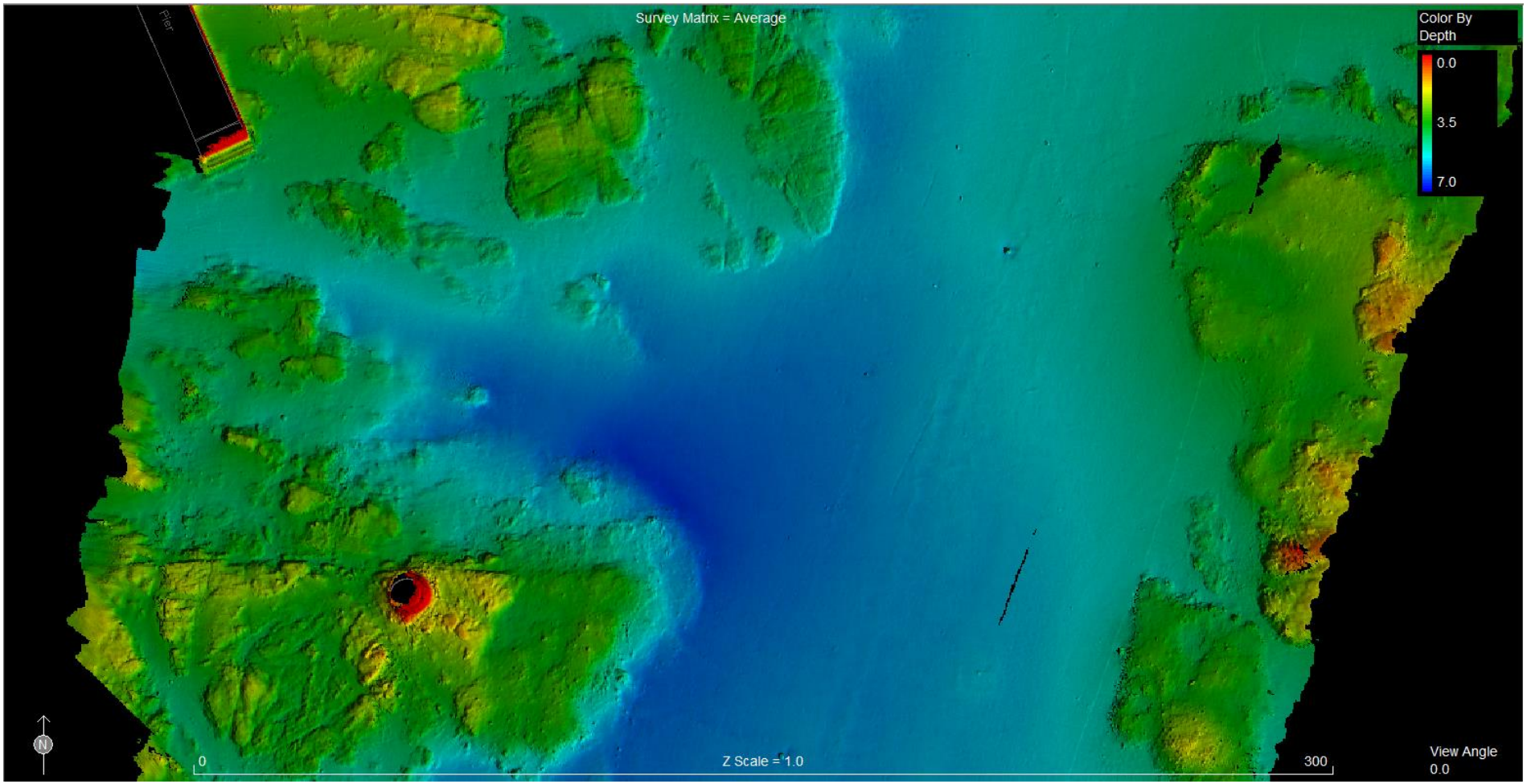

Figure 15 The Small Roads showing the Southern end of Elizabeth Breakwater and the Platte Beacon

Charts:

Table 3 shows a list of all the charts and related details that have been produced using the data acquired during the July 2020 Survey campaign.

Table 3 List of charts

Chart number	Location	Description	Scale
1	St Helier Overview	Bathymetry	1 to 1250
2	St Helier Marina	Bathymetry	1 to 1000
3	St Helier Marina	Bathymetry and Soundings	1 to 1000
4	Main Harbour	Bathymetry	1 to 1000
5	Main Harbour	Bathymetry and Soundings	1 to 1000
6	Elizabeth Marina	Bathymetry	1 to 1000
7	Elizabeth Marina	Bathymetry and Soundings	1 to 1000
8	La Collette Yacht Basin	Bathymetry	1 to 500
9	La Collette Yacht Basin	Bathymetry and Soundings	1 to 500
10	East and West Berth	Bathymetry	1 to 500
11	East and West Berth	Bathymetry and Soundings	1 to 500
12	Tanker Berth	Bathymetry	1 to 500
13	Tanker Berth	Bathymetry and Soundings	1 to 500
14	Small Roads	Bathymetry	1 to 1250
15	Small Roads	Bathymetry and Soundings	1 to 1000