

Reference: DML2014

Rev 1.0, 07 August 2020

Report of Survey – Hatea River Post Dredge Survey, July 2020

1. Survey Location

The location for this survey was the main channel of the Hatea River from the Whangarei Town Basin (northern extent) to adjacent the Portland channel approach (southern extent). The survey location is depicted on New Zealand Chart NZ 5215 Whangarei harbour.

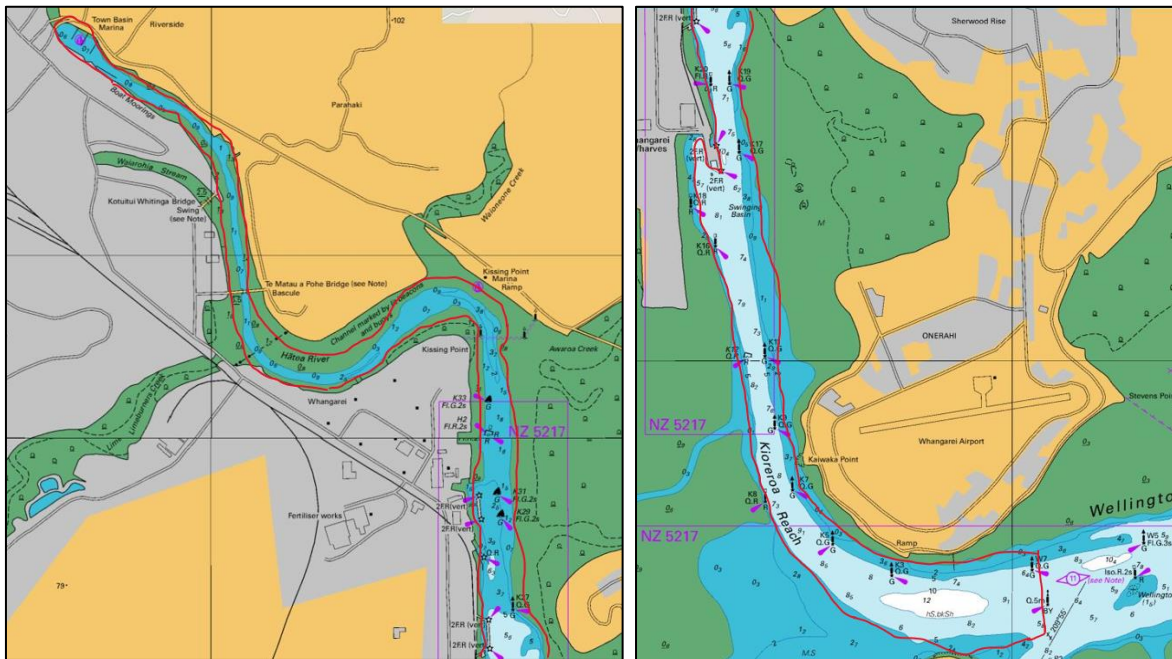


Figure 1: Hatea River Survey Extents - 29 July 2020

2. Survey Date

This survey was conducted over three days 27 -29 July 2020

3. Survey Requirement

The survey was undertaken for post dredge analysis and safety of Navigation purposes for The Northland Regional Council. The survey was undertaken with the objective of providing high quality bathymetry for the marked channel and adjacent banks.

4. Weather & Sea Conditions

The survey was completed in calm seas and light winds. The survey was completed across several tidal cycles, thus the sound velocity of the channel varied greatly between incoming and outgoing tides and required careful

management. The survey was completed in blocks (5-10min sounding lines) with new sound velocity profiles taken at regular (1-3hr) intervals and when moving to a new block.

5. Survey Vessel and Equipment

Vessel

This survey was undertaken using DML's 5.6m inshore survey vessel *Pelican*. The vessel is an 1850 Stabicraft and is operated under the Maritime New Zealand MOSS safety management system. The onboard survey system comprised a multibeam echo sounder (MBES), POSMV inertial motion sensor and positioning system, a hand deployable sound velocity probe, and a rugged laptop for data acquisition, navigation and providing real-time quality assurance.



Figure 2: Pelican

Sonar

The survey was completed using a R2 Sonic 2022, Multibeam Echosounder (MBES) operated at 400kHz frequency and a max 130° swath opening angle.

Type:	R2 Sonic 2022
Max swath width:	120-130°
Frequency:	400 kHz
Beam Width:	1° x 1°
Sonar resolution:	+/- 1cm

Positioning and Orientation System

Positioning and orientation for the survey system was supplied by an Applanix POS MV Wavemaster receiving RTK GNSS corrections via UHF radio from a South G1+ GNSS base station occupying LINZ BM A2Q5. Position check shots were taken on LINZ BM's A2Q7, A2Q9, and EYKE with all check shots agreeing with published LINZ geodetic database coordinates to < 0.03m.

6. Horizontal Datum

Positions are in terms of the New Zealand Geodetic Datum 2000 (NZGD2000), MT EDEN 2000 Circuit (EDENTM2000).



7. Vertical Datum and Reduction Method

Depths are referenced to Whangarei Chart Datum which is defined as 5.182m below RNZN Brass Plaque DD99/23 (LINZ Code: A2Q9). Soundings were reduced to datum in real time within the acquisition software by RTK GNSS elevations.

The MBES data was gridded as an average 1m x1m bin size. This dataset is included with the digital deliverables. The 1m grid was then clashed at a 12m x 10m bin size shoal bias sounding selection for presentation on the sounding sheets.

8. Software

The following software was used to produce the deliverables.

Acquisition:	QPS QINSy v9.1.2
Data Processing:	QPS Qimera v2.2.3
Data Quality Control and Rendering:	Trimble Terramodel v10.61

9. Total Propagated Uncertainty

The A-Posteriori Total Vertical Uncertainties (TVU) have been computed at 95% confidence assuming a standard deviation scale factor of 1.96 (1D) or 2.45 (2D), corresponding to the assumption of a Normal distribution of errors. The TVU is assessed as +/-0.12m for 10m depths.

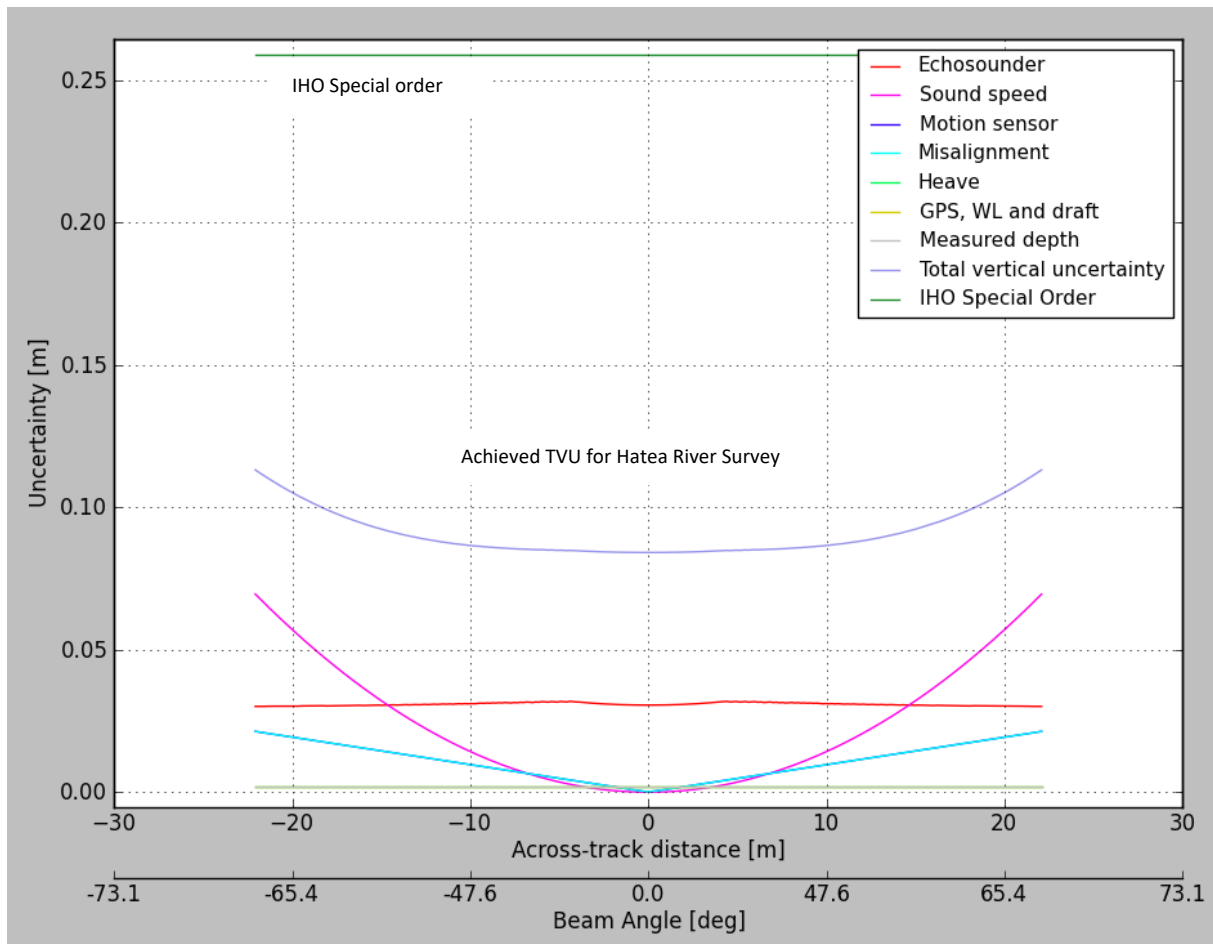
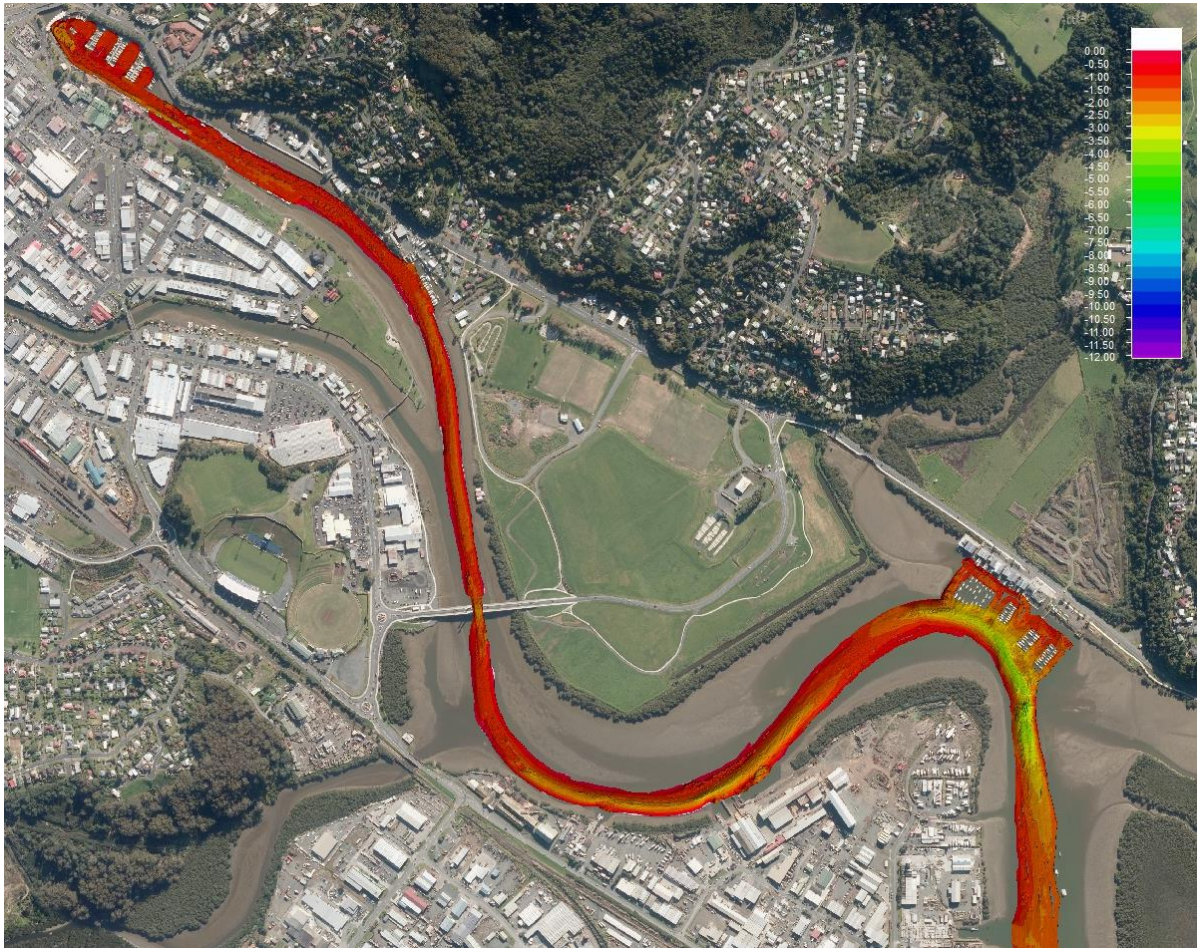
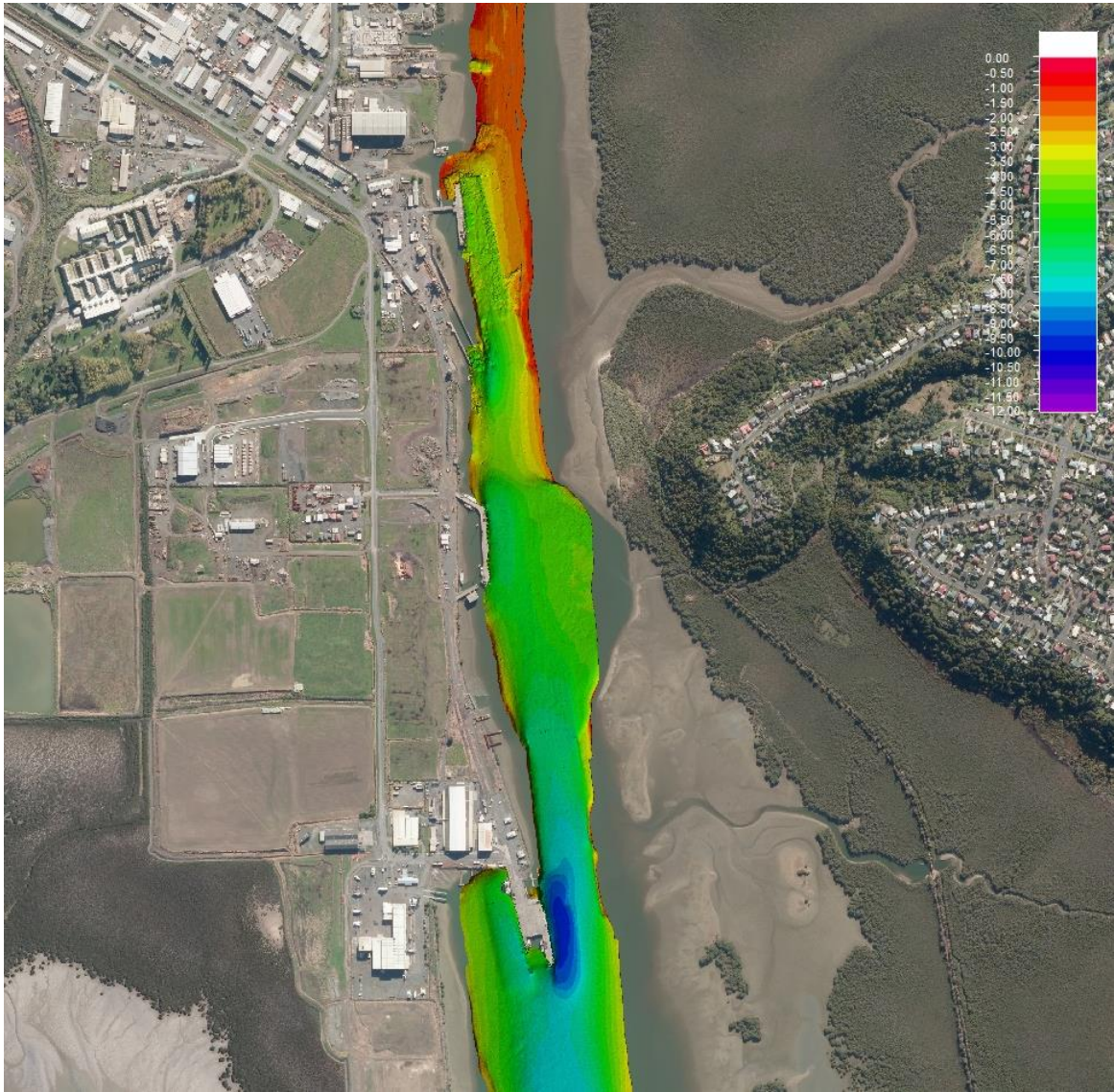


Figure 3: A-Posteriori TVU for Hatea River Survey

10. Survey Coverage and Comments

A 95% sea floor search has been achieved. Full coverage was completed where possible with some MBES striping completed in a few wide/shallow sections of the river. The figures below depict the colour banded MBES coverage for The Hatea river. More detailed images of the bathymetry have been included with the digital deliverables.





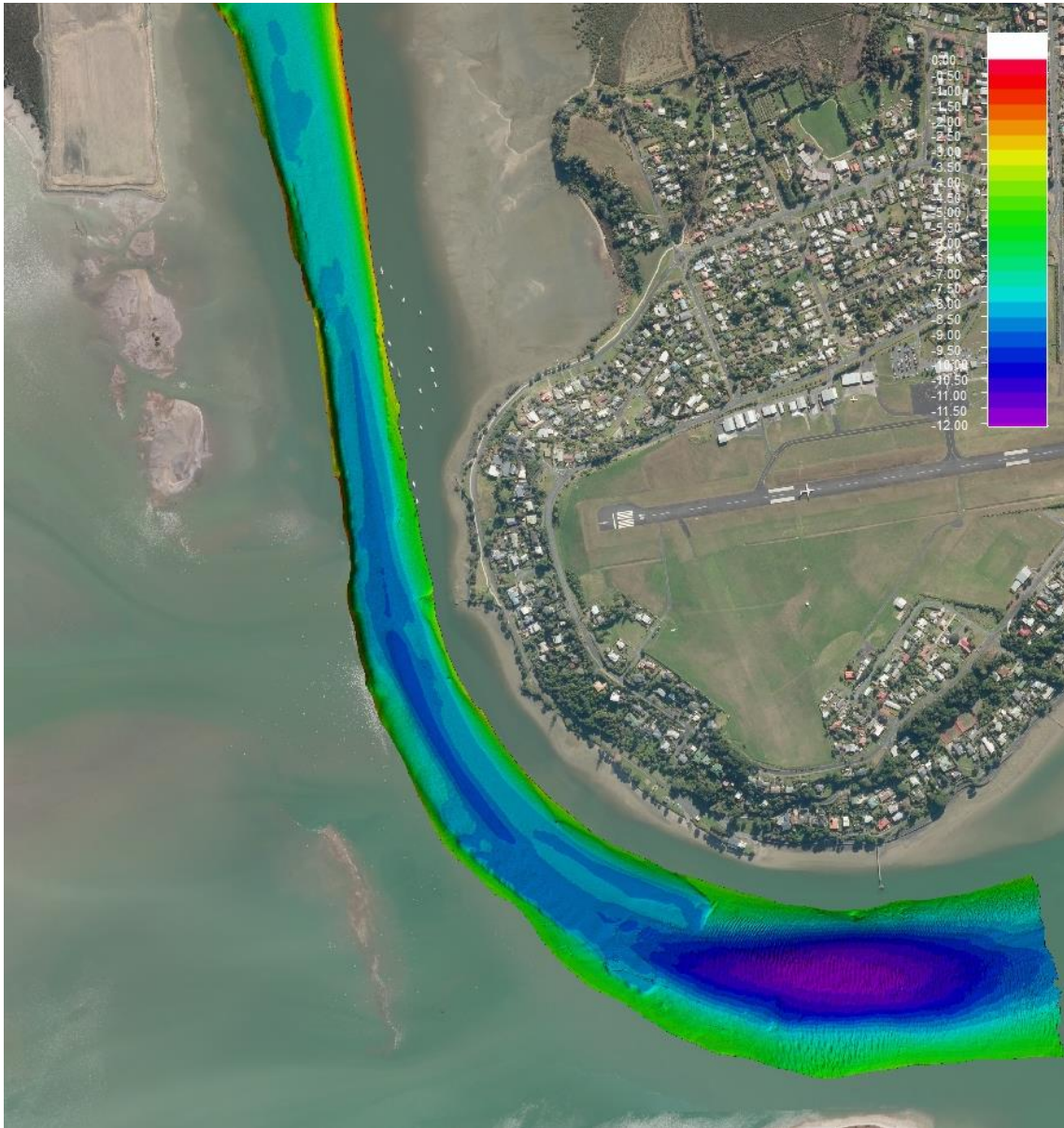


Figure 4: MBES Coverage

- The H1 Stbd buoy was in the process of being moved at the time of survey so has been excluded from the list of navigation aids included as part of the digital deliverables accompanying this report.
- A large tree was detected in the MBES dataset **70m NW of K27 beacon at location 35° 44.9425' S, 174°20.97583'E**. The shoal depth sounded on the tree was 1.82m below chart datum. The figures below show the locality, plan and profile views of the log.

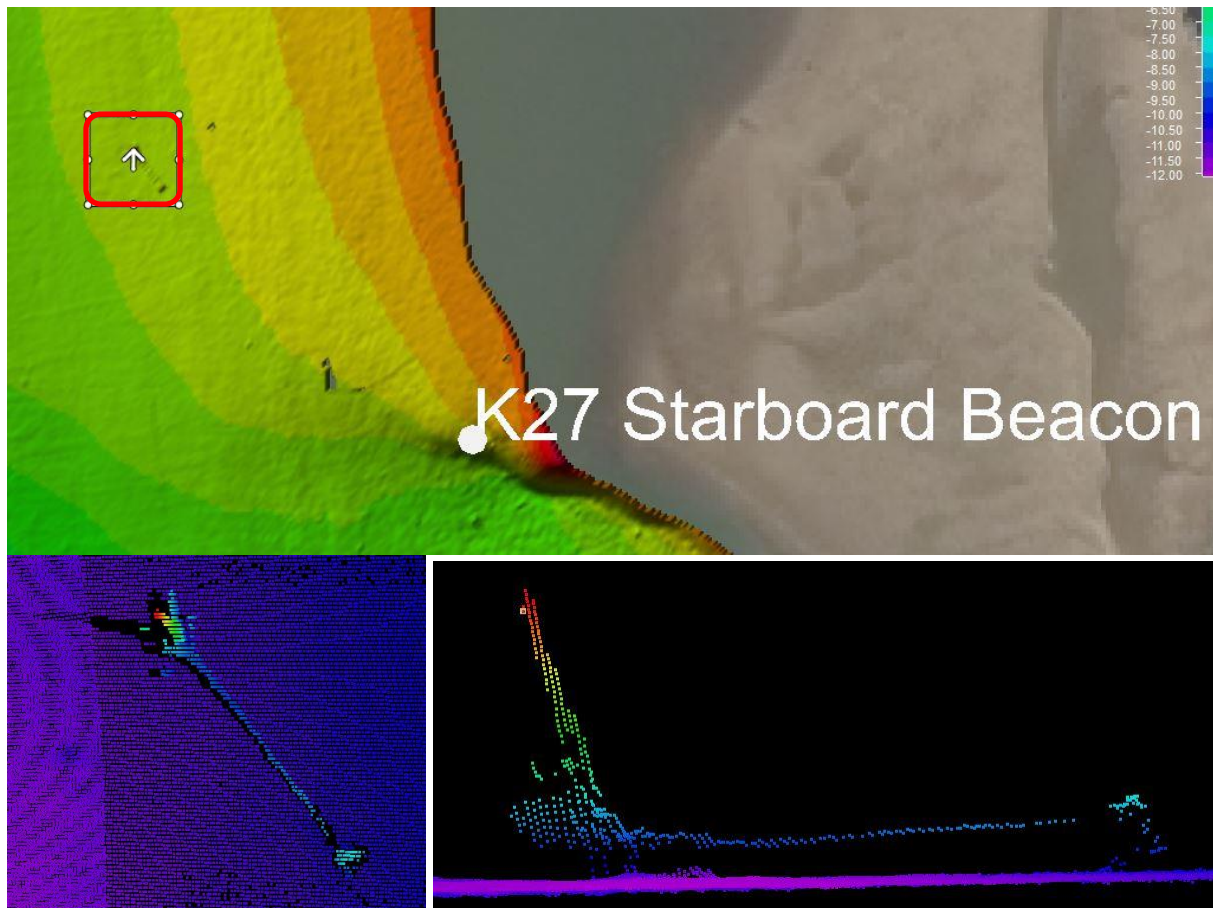


Figure 5: Large log NW of K27 beacon

11. Supplied Deliverables

The following digital data has been supplied, accompanying this report:

Data Format	Data Type	File Name
XYZ	Clashed XYZ Shoal bias Soundings from PDF Sheets	DML2014_NRC_2020_HATEA_12x10m_Clashed_Shoal_Bias_Soundings_EDEN2000_CD.txt
XYZ	1m x 1m average gridded MBES XYZ soundings	DML2014_NRC_2020_Hatea_1.0m_avg_EDEN2000_CD.xyz
DWG	DWG CAD file of clashed soundings and contours	DML2014_NRC_2020_HATEA_DWG_EDEN2000.dwg
PDF	7 x 1:2000 Standard Sheets	DML20_14_NRC_STD-X.pdf
PDF	Report of Survey	DML2014_ROS_Rev_1.0
XLSX	Excel list of position fixes on Navaid's	DML2014_2020 Hatea_Navaids.xlsx
JPG	Folder of dataset images	N/A

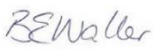



12. Retention of Data

DML will retain copies of the project deliverables, including source data files, on its servers for a period of 12 months from completion of the project. The data will then be archived to a digital medium and retained for 7 years. After the initial 12-month period client requests to access and supply project data will incur a fee.

DML wishes to thank Northland Regional Council for the opportunity to undertake this project and looks forward to working with NRC again in the future.

For Discovery Marine Ltd

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