

SURVEY REPORT – Naval Point

MBES SURVEY March 2020



Prepared by
Peter Hunter
PRIMEPORT TIMARU

Client: Christchurch City Council

INTRODUCTION

Acting on instruction of, Kristine Bouw CCC, Hunter Hydrographic Services (PrimePort Timaru) mobilised to Lyttelton to undertake a Multibeam Echo Sounder survey of the Marina and approaches at Naval Point.

The information gathered to be used by CCC for planning purposes..

The equipment chosen for this survey being Heron Construction Ltd's purpose built hydrographic survey vessel White Pointer. White Pointer is fully equipped with a state of the art Multi Beam Echo Sounder (MBES)

This Survey Report details the equipment and methods used, as well as checks conducted to ensure that the system is working properly, and the results are accurate.

Scope of Works

The survey was to generally cover the dredged channel areas described in email from the CCC of 04/02/2020.

The contractor is to produce an appropriate scaled drawing and an ASCII of the area surveyed along with this light survey report.

Dates of Survey(s)

Having assessed weather and sea conditions I mobilized to Lyttelton from Timaru on Tuesday the 10th of March, arriving on site at the harbour at approx. 1400hrs. The majority of data acquisition was completed by 1800hrs and I then returned to Timaru for reduction arriving in Timaru at 2100hrs. A second visit to the site to supplement the dataset took place on Tuesday the 17th of .March.

Personnel

The personnel engaged were:

Peter Hunter – Surveyor– Hunter Hydrographic Services, PrimePort Timaru Limited

Matt Pedler – Technical Support and Helmsman – Heron Construction Limited

Equipment

Survey suite included

- Trimble R9 with precise base, deployed as RTK GNSS base at Z Berth Lyttelton Harbour
- Motion/Positioning: Applanix Pos MV.
- Multibeam Sounder: Reson SeaBat T50.
- Sound Velocity Probe: Reson SVP15.
- Software: Reson PDS2000. Terramodel
- 8.5m Survey vessel "White Pointer"

SURVEY CONTROL

Technical Information (see also Metadata attached)

Vertical Control

All vertical measurements were reduced to Lyttelton Harbour Chart Datum (CD). This was achieved by calibration at LPC's tide board near B Jetty and the use of RTK GNSS base. Zero of the tide board set at CD and CD is determined as 4.478m below B.M. UD 40 (LINZ code B40V), a stainless steel pin set in a concrete block adjacent to the main pier of the overbridge to the main wharves. BM CQGA is located part way along the north side of Holmes Wharf. (ref. LINZ)

Notes: No geoid model/EGM was used for this site.

Horizontal Control

Horizontal Datum is in terms of: Mount Pleasant 2000
Scale Factor: 1.00000
False Easting: 400,000 mE
False Northing: 800,000 mN

Calibration/Audits/Checks on Site Control

The system is supplied set up, with all lever and offsets established and tested. The calibration checks consisted of two checks of RL (Attached), a sound velocity profile, downloaded directly into PDS2000, and a calibration check (Patch Test) for Heave Pitch and Roll of the IMU, computed in and applied in PDS2000.

Horizontal Confidence is established using real time (during survey) data against known features.

SURVEYING

Site Conditions

Site Conditions – The sea conditions were generally slight to moderate with southerly winds up to 20knts, this along with mooring lines, many moored vessels and the closeness of piles restricted coverage of site as seen on plots.

SQUAT / SWELL / TIDE

The RTK reduced levelling techniques incorporating IMU output used eliminates the need to allow independently for Squat, Swell and Tide.

VERTICAL DATUM

This survey was reduced to local chart datum as listed above. LINZ supply the relationship of Chart Datum to tide levels for Lyttelton at this link.

<https://www.linz.govt.nz/sea/tides/tide-predictions/standard-port-tidal-levels>

GEODESY

Data is provided reduced to Chart Datum on Mt Pleasant 2000 circuit.

COVERAGE

The area requiring surveys was covered with only a few data holidays. In all 151,154,398 individual spot depths were reduced in to 6,469,799 0.2m x 0.2m cells which averages at 584 hits/m²,

SURFACE COMPARISON

NA

VOLUME CHANGES

NA

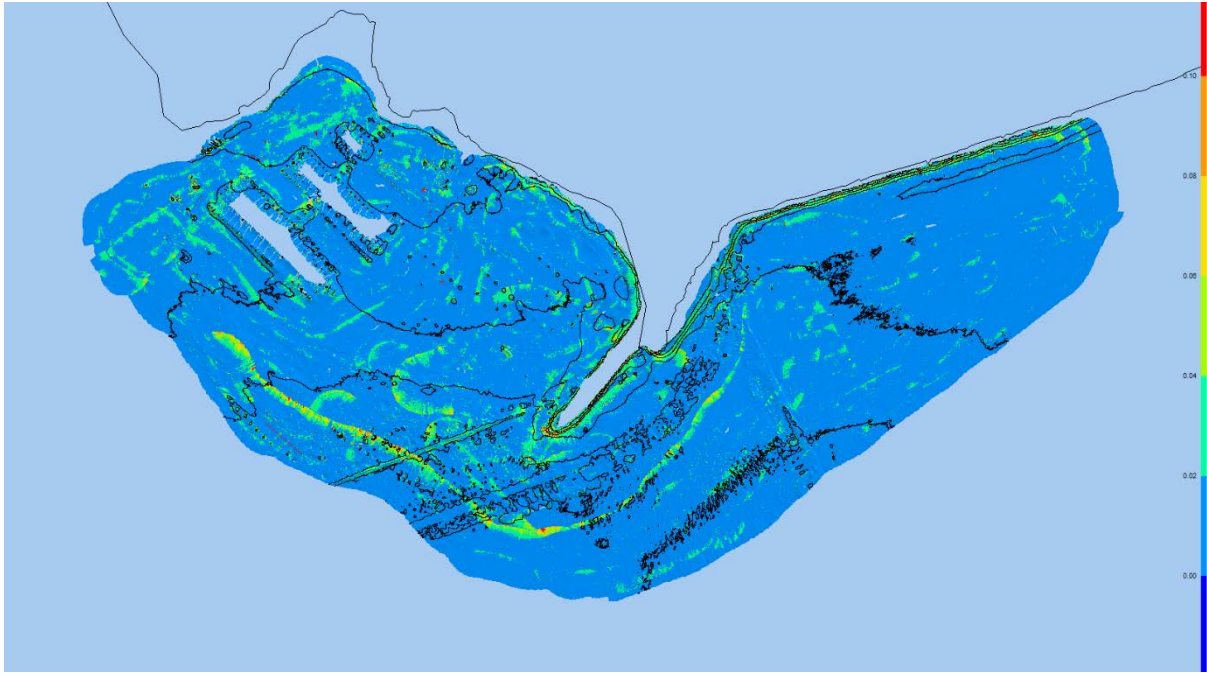
SURVEY STATEMENT/DECLARATION

The survey was carried out with results to my satisfaction. Confidence levels for this work are better than 0.2m horizontal and 0.05m vertical.

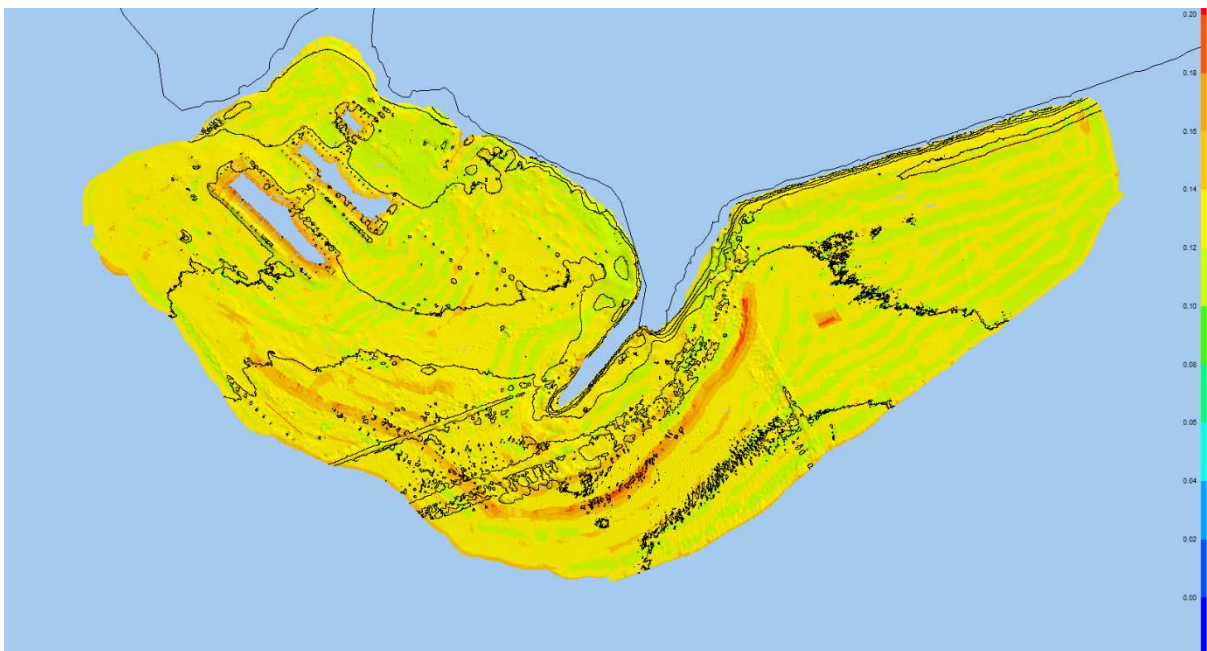
A handwritten signature in black ink, appearing to read 'Peter Hunter', written in a cursive style.

Peter Hunter
Hunter Hydrographic Services
PrimePort Timaru Limited

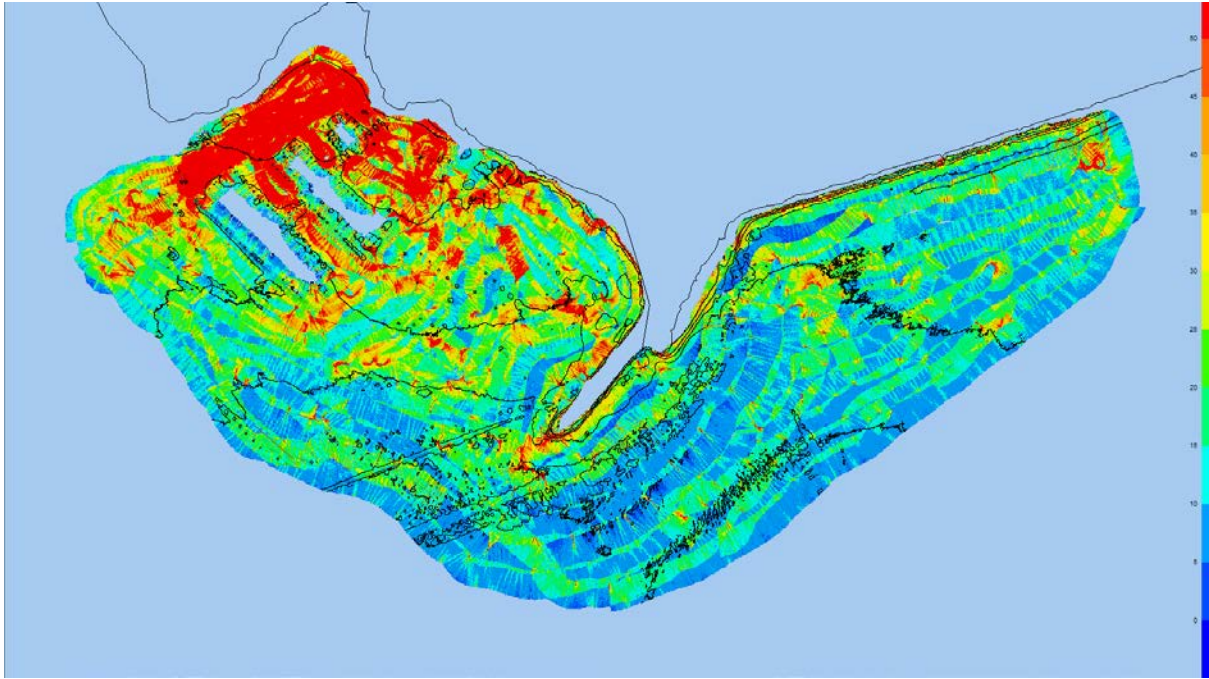
Survey	Lyttelton - Naval Point Marina
Date	10th March & 17th March 2020
Vessel	"White Pointer"
Horizontal Datum	Mount Pleasant GD2000
Vertical Datum	LPC Harbour Datum
Vertical Reference	Zero of LPC tide board inner end of tug jetty
Geoid	none (WGS84 Ellipsoid)*
Positioning	GNSS RTK/IMU
POSMV	
Type	Applanix 320
Config.	POS/IMU
Echo Sounder	
Type	SeaBat T50 RESON 7k
Frequency	400Khz
Beam distribution	equi-distance
Beam count	up to 512
Ping rate	28 - 35 hz
Swathe	typically 120 deg or less
Filters	
Detection Quality	Prim. Quality 3
Statistics	5*5 Strictness 7
IHO	IHO Special Order
Custom Error (Window Vert. max.)	not used
Flying objects	Size 4 Bord 8
Swath reject threshold	70%
Logging Guidance Reduction	
Make	Teledyne PDS2000
Patch Test	
Patch Test	Yes - Outside of Entrance SW corner of Channel
System Roll pitch and Yaw adjusted	Yes
SVP	
Model	SPV-15T (Fixed surface) and SPV-70(Tethered)
Sampling	Each day of survey and applied directly.
Weather	Light to Moderate Southerlies
Reduced Data	
Confidence level	0.05m
TVU	0.06 m to 0.10mm (Typically)
THU	0.20m (range typically 0.08 m to 0.14m)
Total system RL (Bar) check	Performed at physical gauge Error less than 0.03m
Std. Dev. (flat surface)	Typically less than 0.03m over full swathe
Hit Rate	Typically 15 to 50pts/0.04m ² in the marina (say 600pts/m ²)
Coverage	100% plus - nil in some areas.
True Heave	Aquired, not implemented other than for patch test
Survey Speed	2 to 6 Knots
Surveyor	Peter Hunter (HHS)



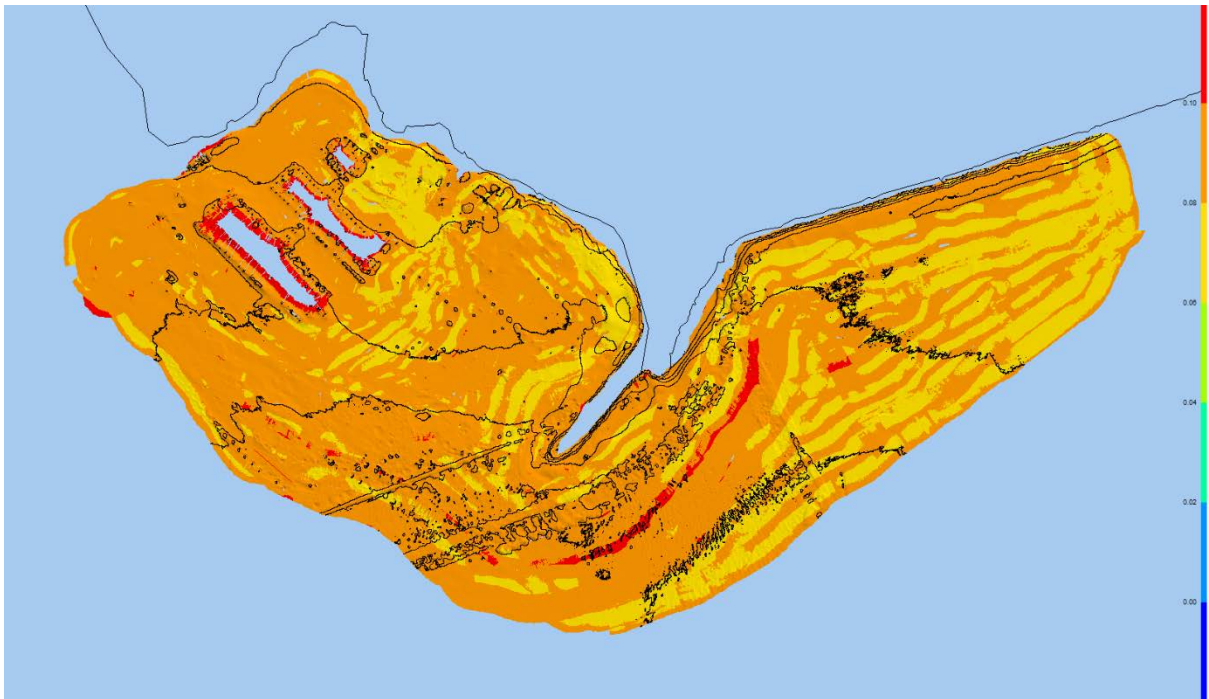
Standard Deviation Plot – Scale shown in metres, 0.02m resolution.



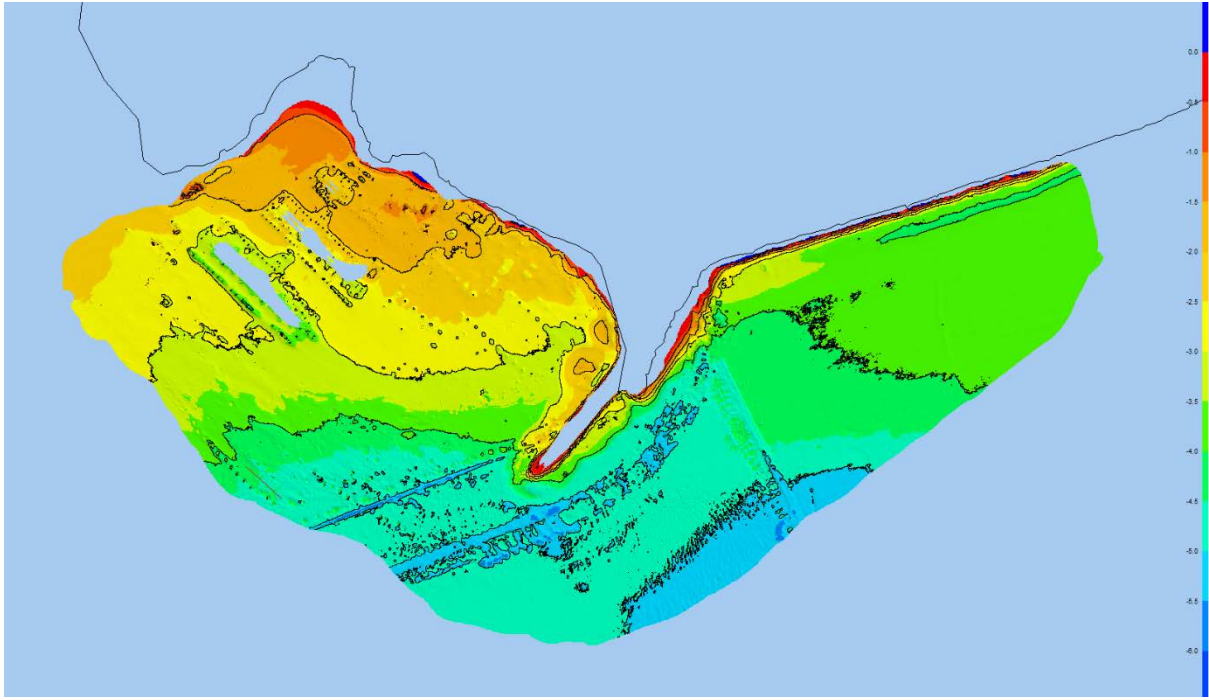
THU Plot – Scale shown in metres, 0.02m resolution.



Coverage Plot – Scale shown in hits per 0.2mx0.2m cell, 5 hit resolution.



TVU Plot – Scale shown in metres, 0.02m resolution.



Reduced Survey Plot – Scale shown in metres 0.5m resolution.