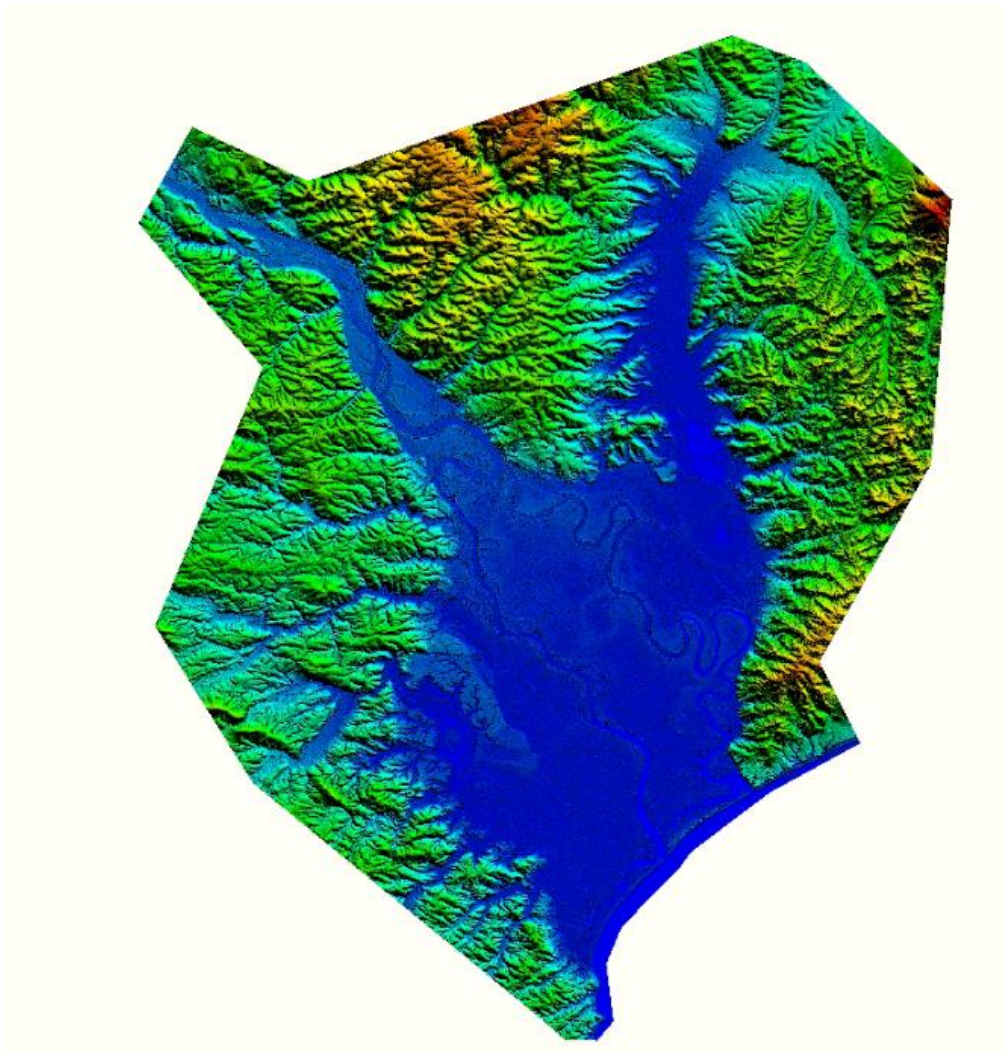**LANDPRO**
Make the most of your land

LINZ

Clutha Delta

LiDAR Project Survey Report

Contents

Project Detail, Overview, Equipment and Datums

Project Detail

Survey Project: Clutha Delta.

Date of Survey: 16 & 18 January 2020.

Client: LINZ.

Project Overview

The topographical survey was undertaken by Landpro Ltd to produce a digital terrain model (DTM) of the project area.

The topographical survey was carried out using an aircraft mounted LiDAR system that scanned the ground below with a 131 kHz laser frequency rate, resulting in a dense DTM of the ground surface and objects above the ground.

Equipment Used

LiDAR Scanner: Leica ALS60

Camera: Leica RCD30

Datums Used

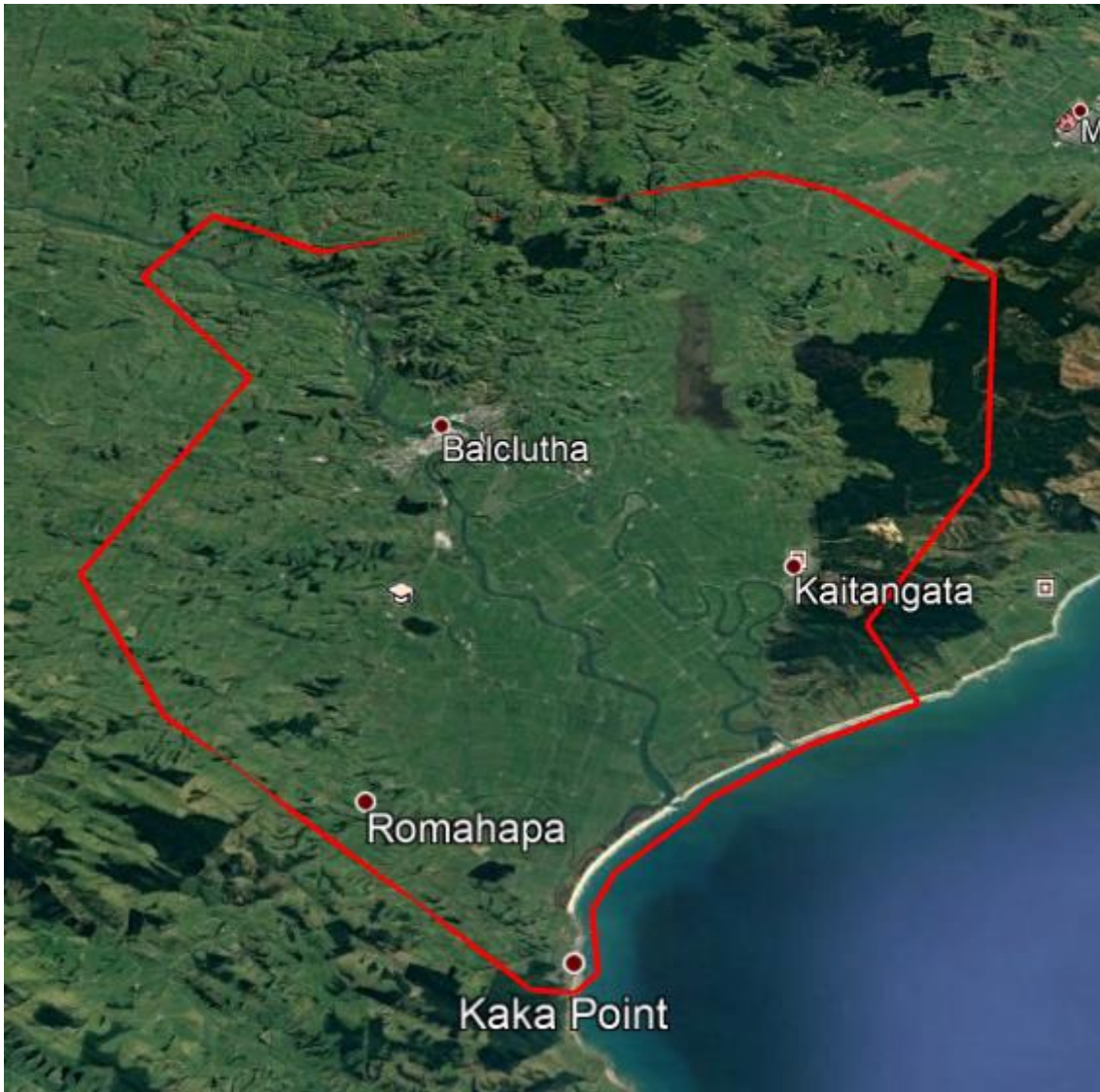**Horizontal Datum:**   NZTM2000

Vertical Datum: NZVD16

LiDAR Specifications

Flying height AGL	Scan Angle	Scan Frequency Hz	Pulse Rate kHz	Swath Overlap	Points per m²
1749	13	51	131	28.7	2.03

Point Cloud Classification

Classification	Point Class
1	Default
2	Ground
3	Low Veg
4	Med Veg
5	High Veg
6	Building
9	Water
10	Bridge

Project Extent

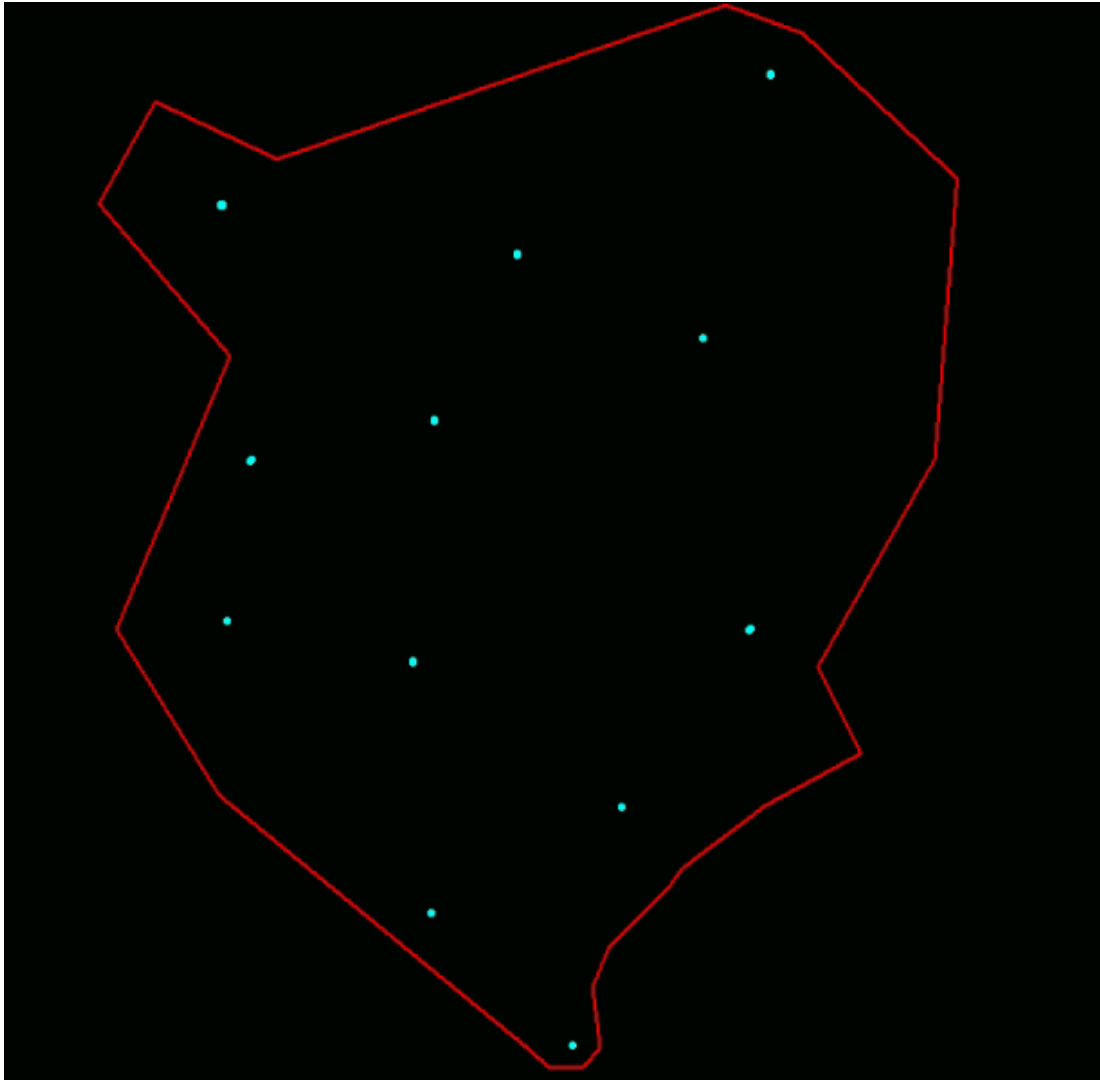Locality Map

LiDAR Coverage

Flights on the 16 January 2020 - Orange and Green

Flights on the 18 January 2020 – Red

Blue – AOI

Check Points

Ground control points were placed and surveyed by Landpro Ltd. and their coordinate values were used for the vertical and horizontal check points on the aerial LiDAR survey (189 Points).

LiDAR Point Processing, Calibration, Editing and Transformations

LiDAR Point Processing

Data processing has been in accordance with our standard policies and procedures surrounding acceptable tolerances, therefore ensuring optimal accuracies of deliverables.

GNSS/IMU data is processed utilising Dunedin Base Station and precise ephemeris data.

The GNSS and IMU are processed in a tightly coupled loop to give an optimum trajectory. This data is then applied to the LiDAR and Image exterior orientations for prior to LAS and ortho creation.
Image data is created using Leica Framepro and any radiometric adjustment applied as required. LiDAR data is generated via CloudPro.

LiDAR Calibration

Overlapping LiDAR points from adjacent aircraft trajectories were used to check the LiDAR calibration for heading, roll, pitch and scale.

These values were then used to make small flight-specific adjustments to the LiDAR data.

LiDAR Point Editing

A "1st run" automatic classification was carried out on the raw LiDAR points using *TerraSolid's TerraScan* software to separate the LiDAR points into ground hits and non-ground hits. This results in a greater than 90% correct classification. After this, a manual classification was done over the required area to edit the points with gross classification errors that may have occurred in the automatic classification process.

Checkpoints and Accuracies

Vertical Accuracy

The check points have been compared with the LiDAR ground surface and used as a vertical check on the data.
The results are as follows:

Average Dz	0.000
Minimum Dz	-0.059
Maximum Dz	0.067
Average magnitude	0.022
Root mean square	0.026
Std deviation	0.026

Horizontal Accuracy

The positional accuracy of the LiDAR data has been checked by plotting the Landpro Ltd. check points and displaying the LiDAR by intensity. The LiDAR was in position.
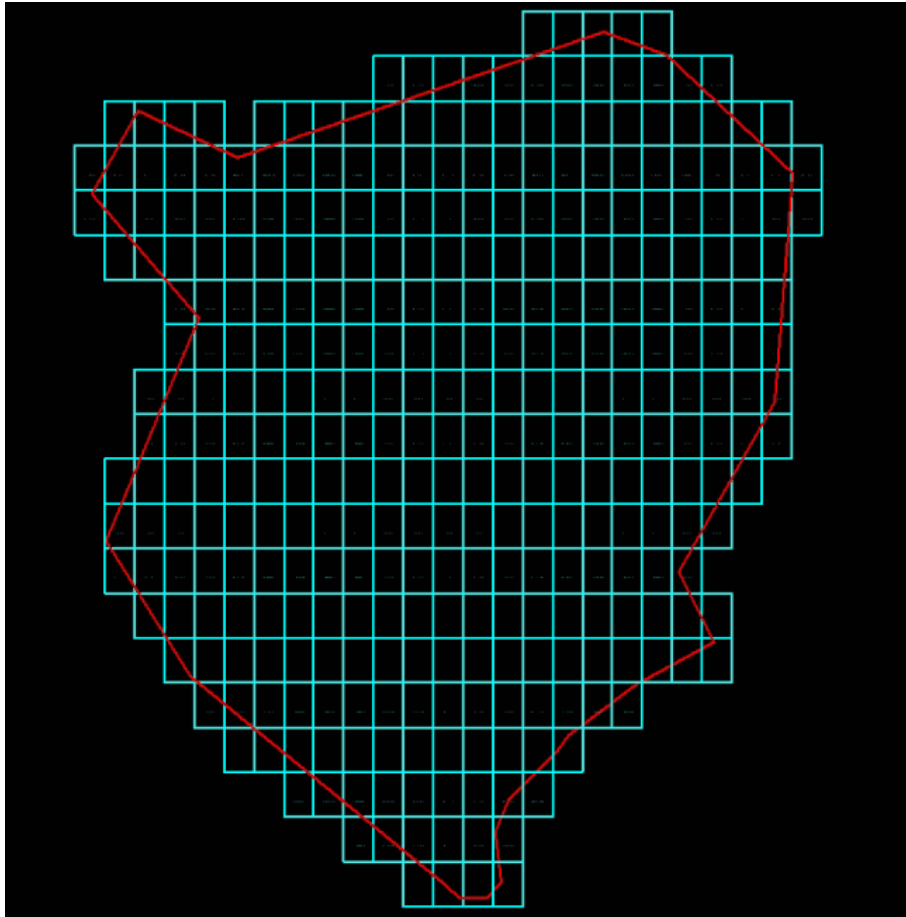
Deliverables

1m Gridded DEM
1m Gridded DSM
LiDAR Points in LAS 1.4
Metadata Report
LINZ 1:1000 Grid

Project Block Index

<u>Queries</u>

In case of any queries please do not hesitate to contact:

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