LANDPRO

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METADATA REPORT

Prepared for Environment Canterbury Regional Council

Selwyn District LiDAR

Project	Selwyn District LiDAR
Client	Environment Canterbury Regional Council
Contact	Angus Loader

Summary of data	Landpro conducted capture flights of LiDAR data of the requested areas between 24TH March 2023 to 4TH May 2023 The data has been processed into a variety of digital map and data products. The supplied dataset includes the following items: Acquisition of LiDAR data of the Selwyn district priority areas 1 and 2 • LiDAR point cloud classified to full LINZ spesifications in LAS and LAZ format • 1 m DEM in RASTER (GeoTiff) and ASCII formats • 1 m DSM in RASTER (GeoTiff) and ASCII formats • Hydro breaklines in SHP format • Detailed metadata report

Data acquisition	Figure 1 below outlines the area surveyed.

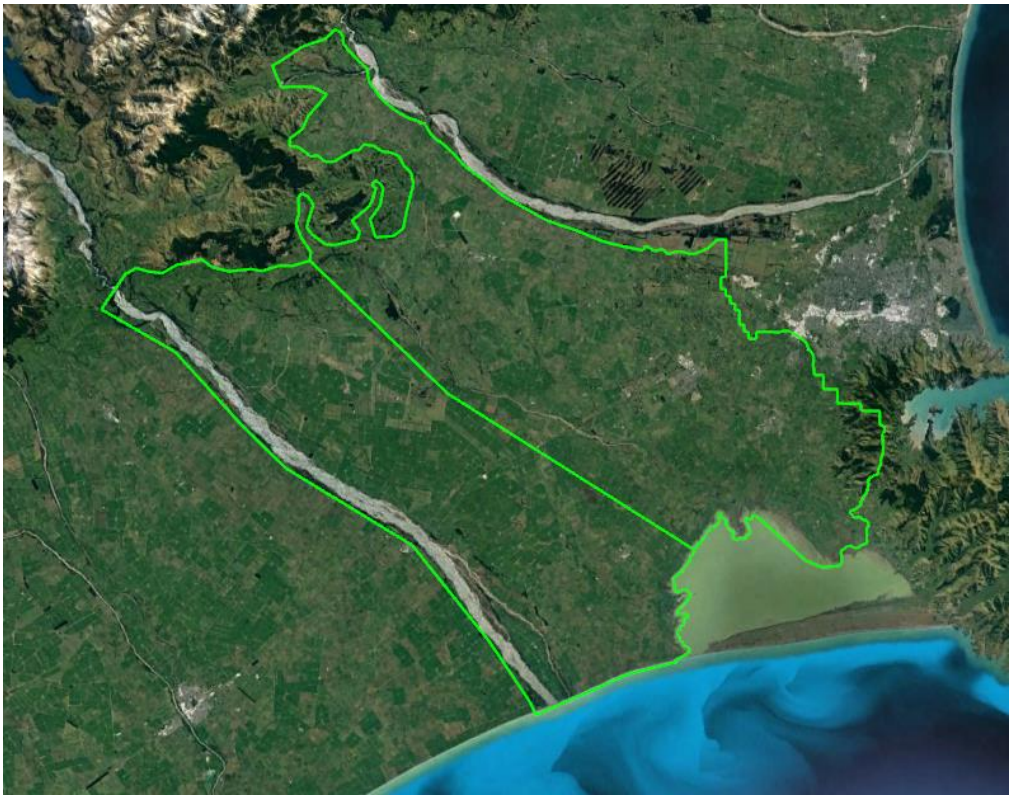

Figure 1. Area of interest surveyed as part of the Selwyn District LiDAR project captured for Environment Canterbury Regional Council.

Data was captured using the following systems:

- Leica ALS60
- Riegl VQ-880-GII

Reference systems	**Projection:** NZTM NZGD2000 **Vertical Datum:** NZVD16 **Reference Stations:** YALD, GSAB and METH

YALD: Mark details

MARK IDENTIFICATION

Code:	**YALD**	Country:	**New Zealand**
Name:	**Yaldhurst**	Land District:	**Canterbury**
Alternatives:		Topo50 sheet:	**BX23**
		NZTM:	**5184552.842 1558046.346**
		Scale factor	**0.9996216**
		Convergence	**-0° 21' 26"**

NZGD 2000 COORDINATES

Latitude:	**43° 29' 26.77524" S**	Order:	**2**	Previous coordinates
Longitude:	**172° 28' 52.08861" E**	Authorised:	**21-Dec-2018**	
Ellipsoidal height (m):	**64.624**	Reference:	**CORS Update (Constrained to PositioNZ stations DefMod v20180701 ITRF2008@2018-01-01)**	

Circuit	Northing (m)	Easting (m)	Scale Factor	Convergence	
Mount Pleasant Circuit 2000	**811057.048**	**380116.776**	**1.0000049**	**-0° 10' 09"**	Previous coordinates

ORTHOMETRIC HEIGHTS

Height datum	Height (m)	Order	Calculation Date	Reference	Previous heights
New Zealand Vertical Datum 2016	**52.4870**	**1V**	**25-Feb-2020**	**2020CORS NZVD2016 Point Load**	

MARK DETAILS

Last maintained:	**24-Feb-2022**
Maintenance level:	
Mark condition:	**Reliably Placed**
Description:	**Continuously operating GNSS station or CORS site. Mark is unable to be physically occupied. Horizontal reference point is the centre of 5/8ö thread. The vertical reference is the flat surface at top of monument. There is a 0.035m difference between the GNSS antenna reference point (ARP) and the vertical reference point (antenna height). For more information see https://www.geonet.org.nz/data/network/sensor/search**
Mark type:	**Other**
Beacon type:	**Deep Drilled Braced Monument**
Protection type:	**Post & rail enclosure**

METH: Mark details

MARK IDENTIFICATION

Code:	**METH**	Country:	**New Zealand**
Name:	**Methven**	Land District:	**Canterbury**
Alternatives:	**50251M001**	Topo50 sheet:	**BX20**
		NZTM:	**5172526.860 1484994.522**
		Scale factor	**0.9997627**
		Convergence	**-0° 58' 57"**

NZGD 2000 COORDINATES

Latitude:	**43° 35' 28.87714" S**	Order:	**0**	Previous coordinates
Longitude:	**171° 34' 31.09042" E**	Authorised:	**25-Oct-2018**	
Ellipsoidal height (m):	**452.649**	Reference:	**PositioNZ Update (DefMod v20171201 ITRF2008@2018-01-01)**	

Circuit	Northing (m)	Easting (m)	Scale Factor	Convergence	
Gawler Circuit 2000	**817449.684**	**417341.845**	**1.0000037**	**+0° 08' 53"**	Previous coordinates
Mount Pleasant Circuit 2000	**799266.706**	**306999.288**	**1.0001063**	**-0° 47' 39"**	Previous coordinates

ORTHOMETRIC HEIGHTS

Height datum	Height (m)	Order	Calculation Date	Reference
New Zealand Vertical Datum 2016	**439.7690**	**1V**	**25-Feb-2020**	**2020CORS NZVD2016 Point Load**

MARK DETAILS

Last maintained:	**25-Nov-2020**
Maintenance level:	
Mark condition:	**Reliably Placed**
Description:	**Continuously operating GNSS station or CORS site. Mark is unable to be physically occupied. Horizontal reference point is the centre of 5/8ö thread. The vertical reference is the flat surface at top of monument. There is a 0.002m difference between the GNSS antenna reference point (ARP) and the vertical reference point (antenna height). For more information see http://www.linz.govt.nz/positionz**
Mark type:	**Other**
Beacon type:	**Deep Drilled Braced Monument**
Protection type:	**Post & rail enclosure**

GSAB: Mark details

MARK IDENTIFICATION

Code: **GSAB**
Name: **Ashburton Hassal**
Alternatives:

Country: **New Zealand**
Land District: **Canterbury**
Topo50 sheet: **BY21**
NZTM: **5135615.279 1496578.900**
Scale factor **0.9997316**
Convergence **-0° 53' 38"**

NZGD 2000 COORDINATES

Latitude: **43° 55' 31.14152" S**
Longitude: **171° 42' 41.98644" E**
Ellipsoidal height (m): **110.428**

Order: **3**
Authorised: **17-May-2022**
Reference: **2022.05.10 - GS CORS upgrade to order 3**

Previous coordinates

Circuit	Northing (m)	Easting (m)	Scale Factor	Convergence	
Gawler Circuit 2000	**780306.432**	**428196.290**	**1.0000098**	**+0° 14' 37"**	Previous coordinates

ORTHOMETRIC HEIGHTS

Height datum	Height (m)	Order	Calculation Date	Reference	Previous heights
New Zealand Vertical Datum 2016	**99.94**	**3V**	**17-May-2022**	**2022.05.10 - GS CORS upgrade to order 3**	

MARK DETAILS

Last maintained: **08-Dec-2022**
Maintenance level:
Mark condition: **Reliably Placed**
Description: **N/A**
Mark type: **Forced Centering**
Beacon type: **Not Beaconed**
Protection type: **No protection**

Data processing	<u>LiDAR point processing</u> Data processing has been in accordance with our standard policies and procedures surrounding acceptable tolerances, therefore ensuring optimal accuracy of deliverables. GNSS/IMU data was processed using the YALD, GSAB and METH Base Station and precise ephemeris data. The GNSS and IMU were processed in a tightly coupled loop to give an optimum trajectory. This data was then applied to the LiDAR during las creation LiDAR data was generated via Leica Cloud Pro and Riegl RiProcess <u>LiDAR calibration</u> 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. <u>LiDAR point editing</u> 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. A manual classification was then used to edit points where gross classification errors occurred in the automatic classification process. The DEM for the area of interest is presented in Figure 2.

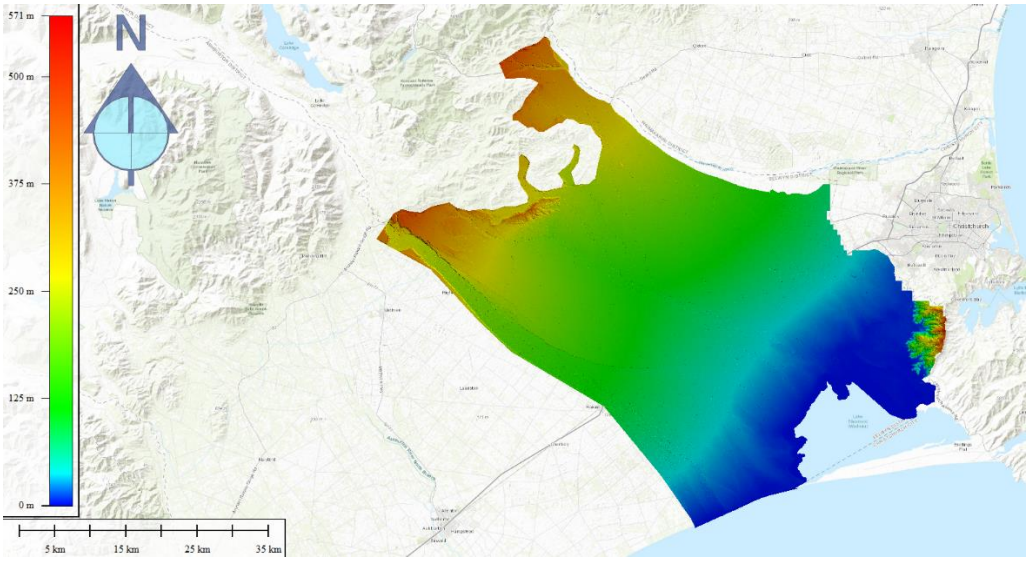

Figure 2. DEM for the Selwyn District LiDAR area of interest.

DEM/DSM creation

1m Digital Elevation Model was generated by making use of the ground class and synthetically generated hydro-flattening points. Elevation values were calculated per cell based on a TIN model (Triangulated irregular network)
1m Digital Surface Model was generated by making use of first returns after noise has been removed from the dataset and synthetically generated hydro-flattening points. Elevation values were calculated per cell based on the highest feature at each grid raster square cell.

The Terrasolid software package in combination with Bentley's Microstation was used for the generation of the DEM/DSM.

Vertical accuracy

Average dz	-0.004
Minimum dz	-0.098
Maximum dz	+0.098
Average magnitude	0.034
Root mean square	0.042
Std deviation	0.042

Horizontal accuracy

The positional accuracy of the LiDAR data was checked by plotting Landpro Ltd. check

	points and displaying the LiDAR by intensity. The LiDAR was in position.

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Date of metadata creation	30 November 2023