METADATA REPORT
Prepared for Queenstown Lakes District Council

Upper Clutha 2022 - LiDAR and Imagery

Project	Upper Clutha 2022 - LiDAR and Imagery
Client	Queenstown Lakes District Council
Contact	Tim White

Summary of data	Landpro completed data capture including LiDAR and imagery of the requested area on **12/1/2023.** The data has been processed into a variety of digital map and data products. The supplied dataset includes the following items: Acquisition of topographic LiDAR and co-captured imagery across three areas of interest in the Upper Clutha area: Wanaka, Hawea and Luggate. • RGBN ortho rectified imagery Tiff format at 10 cm GSD • RGB encoded point cloud classified to ground, above ground, vegetation, water, and building classes in LAS format • Contours at 1 m major and 0.25 m minor intervals, in DWG and SHP formats • Detailed metadata report

Data acquisition	The image below outlines the area surveyed. Data was captured using the following systems: • Leica RCD30 • Leica ALS60

Reference systems	Projection: NZTM NZGD2000
	Vertical Datum: NZVD16
	Reference Station: GSLW

GSLW: Mark details

MARK IDENTIFICATION

Code:	**GSLW**	Country:	**New Zealand**
Name:	**Lake Wanaka Lakeside**	Land District:	**Otago**
Alternatives:		Topo50 sheet:	**CB12**
		NZTM:	**5043809.594**
			1293877.950

NZGD 2000 COORDINATES

Latitude:	**44° 41' 37.34128" S**	Order:	**3**	Previous coordinates
Longitude:	**169° 08' 11.46984" E**	Authorised:	**17-May-2022**	
Ellipsoidal height (m):	**303.126**	Reference:	**2022.05.10 - GS CORS upgrade to order 3**	

Circuit	Northing (m)	Easting (m)	Scale Factor	Convergence	
Lindis Peak Circuit 2000	**804535.559**	**373764.561**	**1.0000085**	**-0° 13' 58"**	Previous coordinates

ORTHOMETRIC HEIGHTS

Height datum	Height (m)	Order	Calculation Date	Reference	
New Zealand Vertical Datum 2016	**295.18**	**3V**	**17-May-2022**	**2022.05.10 - GS CORS upgrade to order 3**	Previous heights

MARK DETAILS

Last maintained:	**05-Aug-2024**
Maintenance level:	
Mark condition:	**Reliably Placed**
Description:	**N/A**
Mark type:	**Forced Centering**
Beacon type:	**Unknown**
Protection type:	**Not specified**

| Data processing	## LiDAR point processing
	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 GSLW 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 and image exterior orientations prior to LAS and ortho creation.
	Image data was processed using Leica Frame Pro and any radiometric adjustment applied as required. LiDAR data was generated via Leica Cloud Pro.
	## 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. A manual classification was then used to edit points where gross classification errors occurred in the automatic classification process. Overage is defined as 1 degree scan angle on each edge of each strip, to be excluded from use.
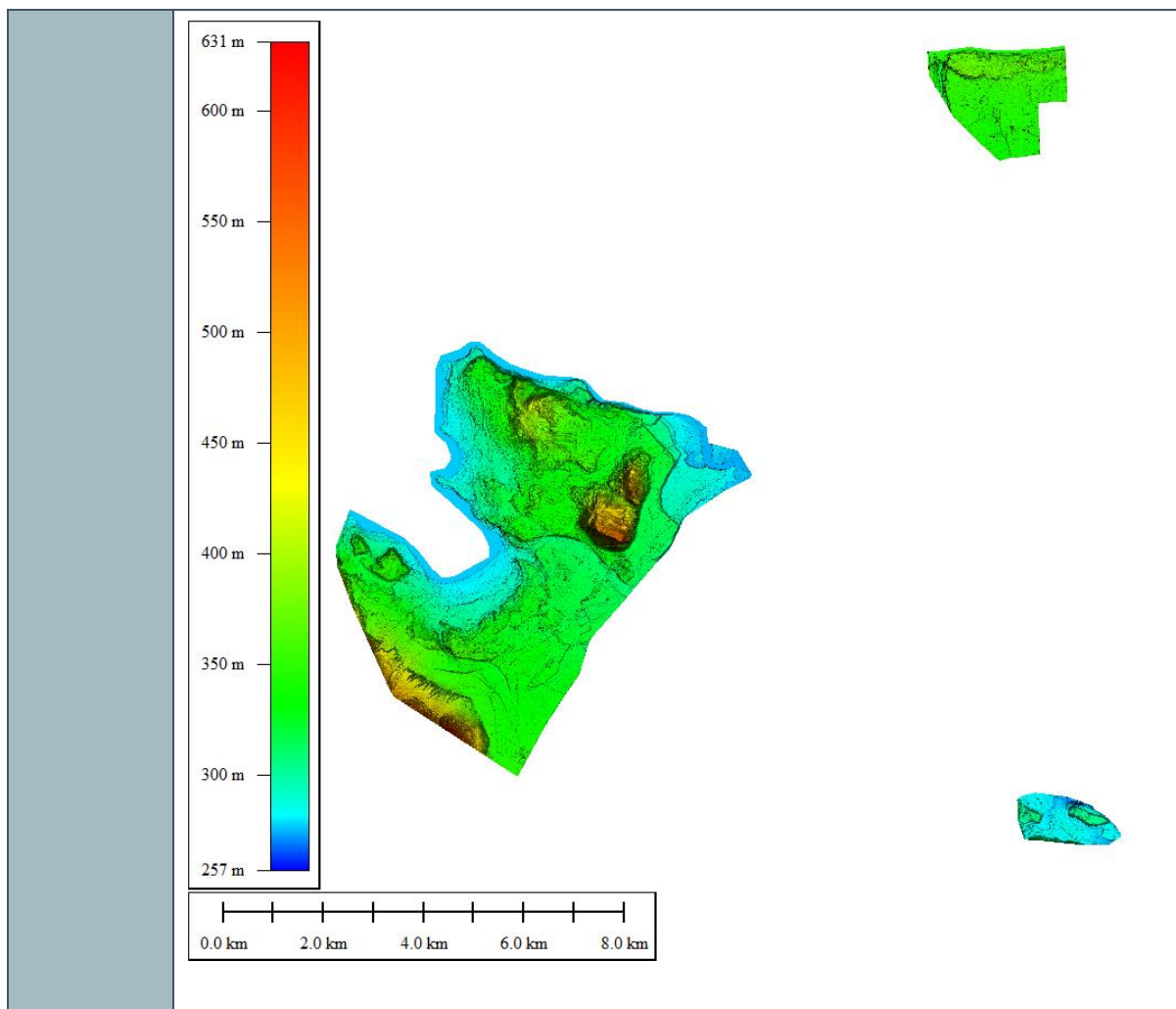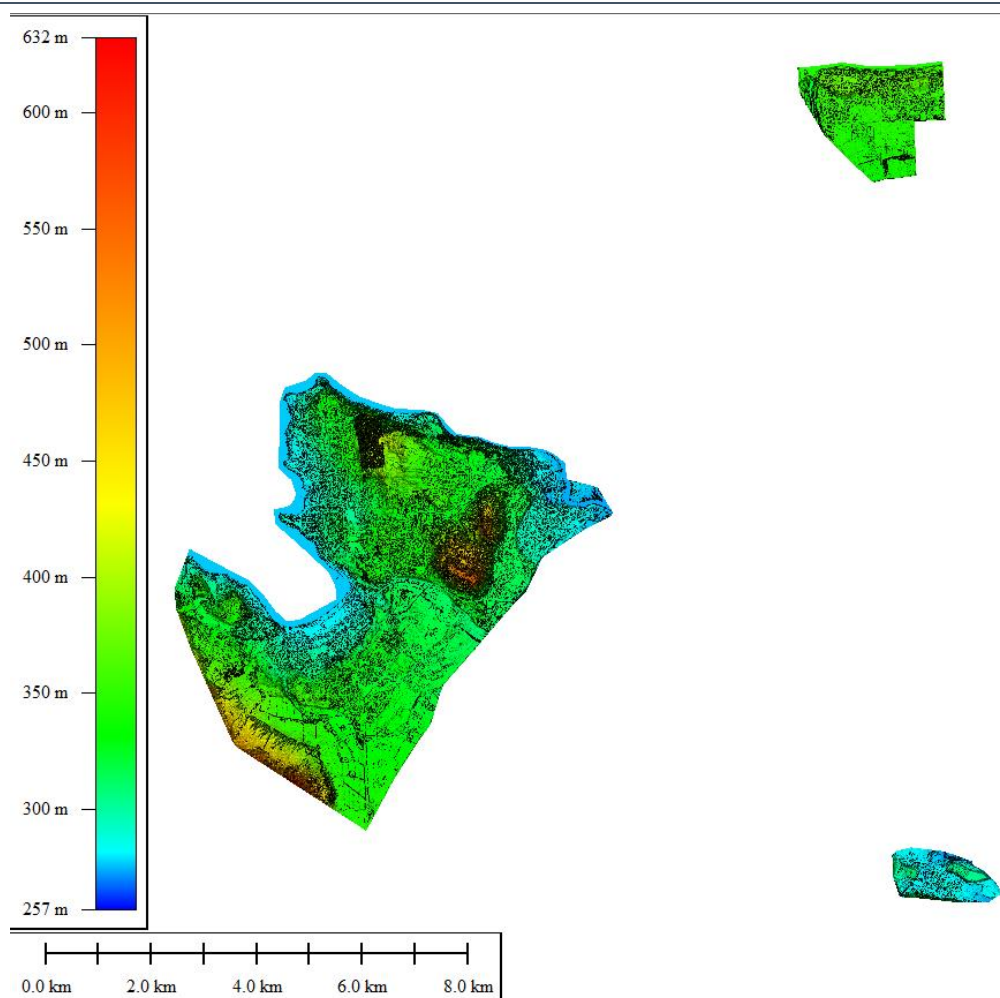
Vertical accuracy

| Average dz	+0.006
Minimum dz	-0.036
Maximum dz	+0.097
Average magnitude	0.021
Root mean square	0.030
Std deviation	0.031

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.

Orthophoto rectification procedure

The imagery was developed into tiffs using Leica Frame Pro. The exterior orientation was obtained by using IPAS CO+, which uses the trajectory and event file to determine an accurate orientation of every image.

The imagery was then run using Pix4D. Keypoints were computed on the images and matches were then determined. From these matches, Automatic Aerial Triangulation (AAT) was run. This results in the creation of an Orthomosaic based on orthorectification.

0 m   250 m   500 m   750 m   1000 m

0 m   125 m   250 m   375 m   500 m
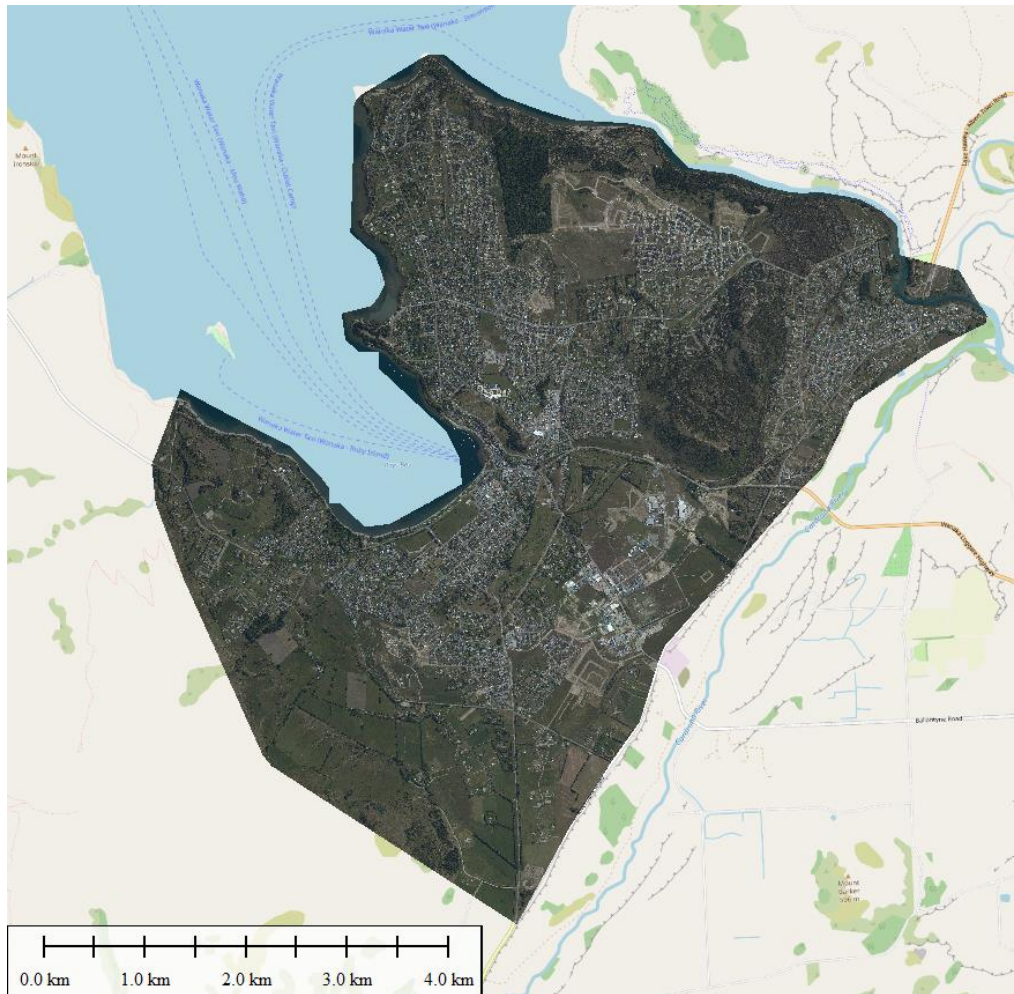
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Date of metadata creation	26 January 2023