DIGITAL DATA: DOCUMENTATION

CHRISTCHURCH CITY COUNCIL

CHRISTCHURCH AIRBORNE LASER SCANNING SURVEY

VOLUME 210013703NOB

Summary Data Description

Airborne laser scanning was captured over Christchurch and the adjoining Wiamakariri River between 06th to 9th of July 2003. The data contained within this volume relates to the 2m gridded data files.

CONTENTS	Page Nos.

1.   PROJECT REPORT

Acquisition: Airborne Laser Scanning (ALS) data was acquired from a fixed wing aircraft between 6th to 9th July 2003. Delays in acquiring the data were due to low cloud over the project area.

Ground Support: GPS base station support was provided by the client without incident. The ground check points acquired by the client allowed an assessment of the accuracy of the ALS data.

Data Processing: Reduction of the ALS data proceeded without any significant problems. Laser strikes were classified into ground and non-ground points using a single algorithm across the project area. Manual checking and editing of the data classification against low-resolution intensity imagery created by AAM further improved the quality of the terrain model.

Further Processing: A local geoid model was created covering the C.C.C and Waimakariri River project areas. The geoid separation between the ellipsoidal and local orthometric heights supplied was computed with a resulting N value. The geoid model was then derived using the N value separation and compared to the International geoid model EGM96 as used by the Concord Conversion program. The EGM96 geoid model is a generalised geoid model with minor variations existing with local project areas. Graphics indicated the EGM96 model with a gentle north/south slope. This was expected, as EGM96 is an estimated geoid model with long wavelength corrections. The local geoid is similar, with what appears to be a ridgeline running in a northeast to southwest direction. The outer extents of the geoid model were then extrapolated to cover the project area. The geoid model has been supplied as a dxf file. All data supplied within this volume has been adjusted to the AAMHatch geoid model.
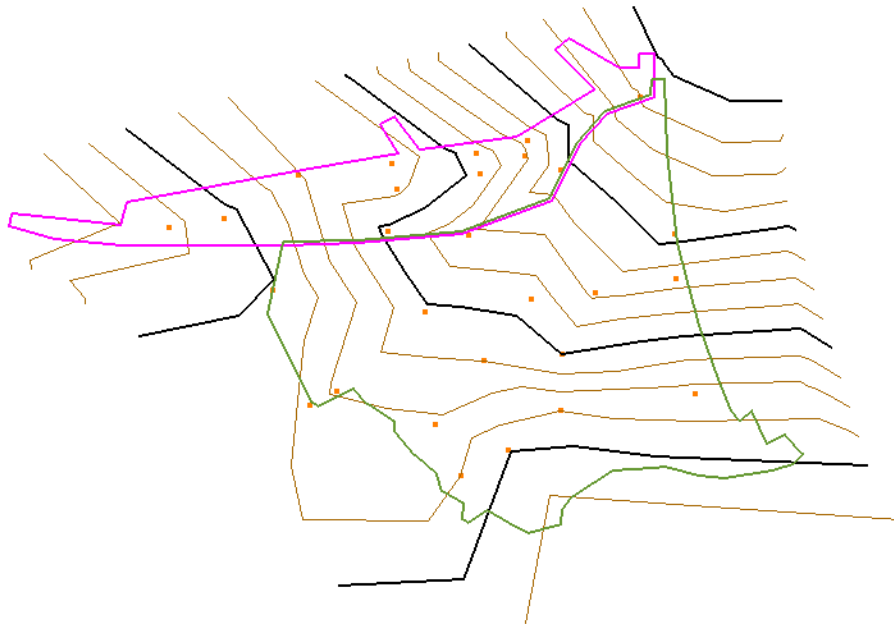

AAM Local Geoid Model
0.05m Contours

A 2m gridded data set was derived from a triangulated surface model using every classified ground laser strike.

A "built layer \ canopy model" was formed from the non-ground strikes by selecting all laser strikes 2m above the ground.

The intensity value attributed each xyz laser point was used to derive a low resolution grey scaled image of the project area. Intensity data was also supplied in digital form being xyzi.

Contours have been derived at 0.5m intervals as Arc GIS 3D line strings. Due to file size limitations and steep terrain the following tiles were derived at 1m intervals. Tiles CCC182 – CCC188, CCC194 – CCC202 and CCC207 – CCC219.

Tiles CCC185, CCC186 and CCC187 have been split into north\south areas.
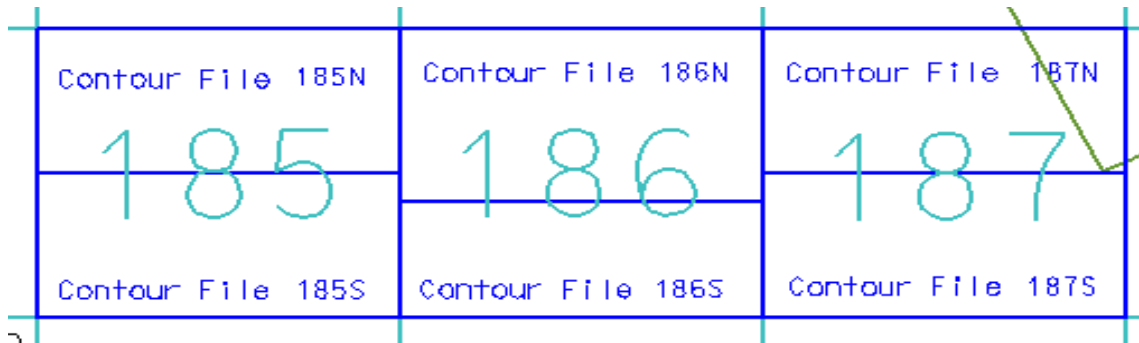
Time stamped flight path files have been provided in digital form for each flight. The time is noted as being GPS time, projection NZMG and the altitude of the aircraft being ellipsoidal heights. The GPS date is Week 1226.

Reliability polygons are supplied in dxf format in areas where the ground definition could be less accurate due to heavy vegetation and low-resolution imagery not providing enough detail during manual editing.

Data Presentation: The data provided on this volume has been supplied in accordance with a specification agreed with the primary client. Subsequent users experiencing difficulties in handling the data should please contact AAMHatch to arrange a more appropriate data presentation

Further Issues:

2.   DATA INSTALLATION

Data format   : Space delimited ASCII, ArcGis
Number & type of media   : One 650MB CD ROM
Media format   : CD-ROM format
Number of files in dataset   : 1854 files and 1 readme.pdf
Data formatted on   : 01.12.2003
Disk volume   : 210013701NOB
AAMHatch Job Managers   : Mr. D. Jonas   07 3891 1033
                                       Mr. B. O'Hagan   07 3891 1033

README FILE
This document (README.PDF) is provided as an Acrobat file in this volume.

To open the file, double click on the PDF file to activate Acrobat Reader Software.
Adobe Acrobat Reader may be downloaded from:
http://www.adobe.com/products/acrobat/readstep2.html

REVISION HISTORY
Volumes previously issued under this project include:

Volume	Date	Data Title	Contents
210013701nob	31.08.01	C.C.C. ALS Survey	All data products
210013702nob	19.12.03	C.C.C. ALS Survey	Additional data north of data supplied in Vol 210013701nob

FILE SIZES AND NAMES

Data is provided in tiles 2km by 2km to the following file naming convention:

eg. CCC012.grd   CCC -   Christchurch City Council
                         .lat -   2m gridded lattice files

A list of the files contained on this volume is provided in Section 7.

SAMPLE LISTING

```
ncols 1000
nrows 1000
xllcenter 2469000.000
yllcenter 5749000.000
cellsize 2.0000
nodata_value -9999
 47.410 47.420 47.560 47.550 47.450 47.520 47.500
 47.370 47.440 47.540 47.550 47.460 47.490 47.450
 47.440 47.510 47.460 47.490 47.470 47.380 47.430
 47.530 47.520 47.530 47.430 47.570 47.350 47.460
 47.420 47.460 47.550 47.560 47.470 47.520 47.480
 47.490 47.580 47.470 47.450 47.520 47.360 47.420
 47.470 47.520 47.500 47.430 47.470 47.450 47.460
 47.460 47.460 47.440 47.420 47.530 47.550 47.450
```

3. ADDITIONAL SERVICES

AAMHatch can perform the following additional services on the data contained on this volume if required:

Change horizontal datum	:	to NZTM or other local grid
Improve data classification	:	by tailoring parameters to suit regional variations
Further classification	:	Assist building identification by further classifying non-ground strikes
Data subset	:	by dividing the data into different tiles or polygons
Data presentation	:	by creating contours, profiles, perspectives, flythroughs, colour-coded height plots etc.
Data gridding	:	to convert the measured spot heights into a regular grids

4. METADATA

DATA CHARACTERISTICS

Characteristic	Description
Format	ArcInfo
Size	204, 088, 850.00 data points (approximate)
Captured terrain model	1.3m average point separation
Supplied terrain model	1.8m estimated point density, separated into ground & non-ground
Data thinning	Points not contributing to the terrain definition within 0.13m removed
Data smoothing	Cartographic dataset smoothed to 0.15m tolerances
Contours	0.5m interval, smoothed to 0.20m tolerances
Laser Intensity	Supplied on all returns
Laser footprint size	0.220m (0.2mrad)
Video	Captured over the project area
Further details	Geoid report methodology, emailed to John Walter on the 09/10/03 File name: geoid_report.pdf

REFERENCE SYSTEMS

	Horizontal	Vertical
Datum	NZGD1949	MSL
Projection	NZMG	N/A
Geoid Model	N/A	
Reference Point	Base Station A 5741299.943 N 2480731.527 E	Base Station A 35.877 RL

SOURCE DATA

	Source	Description	Ref No	Date
Laser scanning	AAM GeoScan	25,000 Hz	810215	6th – 9th July 2003
GPS base data	C.C.C.	Static GPS	810215	6th – 9th July 2003
Base Stn coords	C.C.C.	Unknown	810215	6th – 9th July 2003
Test points	C.C.C.	Unknown	810215	unknown
Geiod Model	C.C.C.	Unknown	810215	unknown

ACCURACY

	Measured Point	Derived Point	Basis of Estimation
Vertical data		0.07	Comparison with 155 test pts
		0.15	Deductive estimate
		0.14	Comparison with 25 pts used in geoid model calculations. This is a measure of system noise across the entire project site based on different flight runs and computed gps trajectories
Horizontal data	< 0.55		System specifications ($^1/_{2000}$ flying height)

ACCURACY NOTES:
- Values shown represent standard error (68% confidence level or 1 sigma), in metres
- "Derived points" are those interpolated from a terrain model.
- "Measured points" are those observed directly.

USE OF DATA
- Council planning and analysis

LIMITATIONS OF DATA
- The definition of the ground under trees and dense vegetation may be less accurate.
- The definition of the ground in steep heavily vegetated areas may be less accurate.

5. CONDITIONS OF SUPPLY

The data in this volume has been commissioned by **CHRISTCHURCH CITY COUNCIL**.

The data in this volume is provided to **CHRISTCHURCH CITY COUNCIL** under a license by which the data is not sold, lent or distributed to any other party; and used only for the project for which provided, subject to the following conditions:

1. This file (README.PDF) is always stored with the unaltered data contained in this volume.

2. The data is not altered in any way without the approval of AAMHatch. The data may be copied from this file to another.

3. The data is not used for purposes beyond that intended.

Any responsibility of AAMHatch is removed if any of these conditions is not observed.

4. AAMHatch maintains an archive copy of the data in this volume together with this README file for at least 7 years after delivery.

Any problems associated with the information in the data files contained in this volume should be reported to:
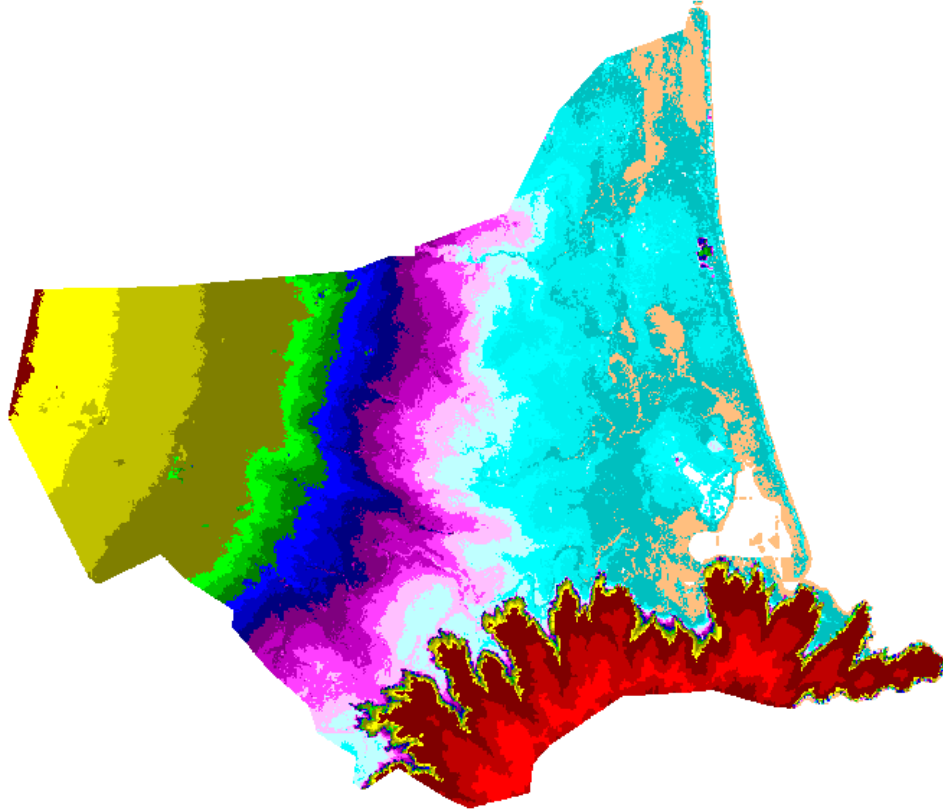
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6. VALIDATION PLOT

Elevation by colours

7.   FILES SUPPLIED

2m Grid

6/02/2004	04:26p	586,857	CCC011.lat
6/02/2004	04:26p	778,804	CCC012.lat
6/02/2004	04:26p	1,564,030	CCC021.lat
6/02/2004	04:26p	6,003,151	CCC022.lat
6/02/2004	04:27p	5,348,686	CCC023.lat
6/02/2004	04:27p	908,104	CCC035.lat
6/02/2004	04:27p	4,119,424	CCC036.lat
6/02/2004	04:28p	6,006,066	CCC037.lat
6/02/2004	04:28p	6,002,234	CCC038.lat
6/02/2004	04:28p	5,583,919	CCC039.lat
6/02/2004	04:28p	521,853	CCC049.lat
6/02/2004	04:29p	1,426,801	CCC050.lat
6/02/2004	04:29p	1,654,224	CCC051.lat
6/02/2004	04:29p	2,835,450	CCC052.lat
6/02/2004	04:29p	4,213,409	CCC053.lat
6/02/2004	04:29p	5,725,929	CCC054.lat
6/02/2004	04:30p	6,559,952	CCC055.lat
6/02/2004	04:30p	6,652,810	CCC056.lat
6/02/2004	04:30p	6,045,168	CCC057.lat
6/02/2004	04:30p	6,004,015	CCC058.lat
6/02/2004	04:30p	6,002,167	CCC059.lat
6/02/2004	04:31p	6,003,175	CCC060.lat
6/02/2004	04:31p	559,142	CCC068.lat
6/02/2004	04:31p	5,771,653	CCC069.lat
6/02/2004	04:31p	6,983,490	CCC070.lat
6/02/2004	04:32p	7,002,107	CCC071.lat
6/02/2004	04:32p	7,002,107	CCC072.lat
6/02/2004	04:32p	7,002,107	CCC073.lat
6/02/2004	04:32p	7,002,107	CCC074.lat
6/02/2004	04:32p	7,002,107	CCC075.lat
6/02/2004	04:32p	7,001,730	CCC076.lat
6/02/2004	04:33p	6,932,099	CCC077.lat
6/02/2004	04:33p	6,608,572	CCC078.lat
6/02/2004	04:33p	6,002,149	CCC079.lat
6/02/2004	04:33p	6,005,045	CCC080.lat
6/02/2004	04:33p	6,072,354	CCC081.lat
6/02/2004	04:33p	890,237	CCC082.lat
6/02/2004	04:34p	2,309,741	CCC090.lat
6/02/2004	04:34p	6,694,902	CCC091.lat
6/02/2004	04:35p	7,002,107	CCC092.lat
6/02/2004	04:35p	7,002,107	CCC093.lat
6/02/2004	04:35p	7,002,107	CCC094.lat
6/02/2004	04:35p	7,002,107	CCC095.lat
6/02/2004	04:35p	7,002,107	CCC096.lat
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6/02/2004	04:36p	6,120,272	CCC099.lat
6/02/2004	04:36p	6,002,127	CCC100.lat

2m Grid

6/02/2004	04:36p	6,002,273	CCC101.lat
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6/02/2004	04:41p	6,105,672	CCC126.lat
6/02/2004	04:41p	6,002,107	CCC127.lat
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6/02/2004	04:41p	6,002,107	CCC129.lat
6/02/2004	04:41p	5,342,550	CCC130.lat
6/02/2004	04:41p	3,820,660	CCC132.lat
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6/02/2004	04:42p	7,002,107	CCC134.lat
6/02/2004	04:42p	7,002,107	CCC135.lat
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6/02/2004	04:43p	6,489,598	CCC139.lat
6/02/2004	04:43p	6,002,107	CCC140.lat
6/02/2004	04:43p	6,002,160	CCC141.lat
6/02/2004	04:43p	6,002,194	CCC142.lat
6/02/2004	04:43p	6,006,873	CCC143.lat
6/02/2004	04:44p	6,004,338	CCC144.lat
6/02/2004	04:44p	848,636	CCC145.lat
6/02/2004	04:44p	61,989	CCC146.lat
6/02/2004	04:44p	6,851,345	CCC147.lat
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6/02/2004	04:45p	6,002,344	CCC155.lat

2m Grid

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6/02/2004	04:46p	6,572,226	CCC163.lat
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6/02/2004	04:47p	6,952,016	CCC166.lat
6/02/2004	04:47p	6,639,226	CCC167.lat
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6/02/2004	04:47p	6,497,313	CCC169.lat
6/02/2004	04:48p	6,659,942	CCC170.lat
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6/02/2004	04:48p	7,170,623	CCC172.lat
6/02/2004	04:48p	6,587,287	CCC173.lat
6/02/2004	04:48p	1,137,891	CCC174.lat
6/02/2004	04:48p	33,176	CCC176.lat
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6/02/2004	04:49p	6,724,436	CCC180.lat
6/02/2004	04:49p	7,336,468	CCC181.lat
6/02/2004	04:49p	7,786,539	CCC182.lat
6/02/2004	04:50p	7,884,400	CCC183.lat
6/02/2004	04:50p	7,502,061	CCC184.lat
6/02/2004	04:50p	7,954,724	CCC185.lat
6/02/2004	04:50p	7,545,998	CCC186.lat
6/02/2004	04:50p	7,180,870	CCC187.lat
6/02/2004	04:51p	3,728,409	CCC188.lat
6/02/2004	04:51p	331,313	CCC191.lat
6/02/2004	04:51p	6,623,393	CCC192.lat
6/02/2004	04:51p	7,088,213	CCC193.lat
6/02/2004	04:51p	7,612,776	CCC194.lat
6/02/2004	04:51p	7,881,297	CCC195.lat
6/02/2004	04:52p	7,749,619	CCC196.lat
6/02/2004	04:52p	3,931,250	CCC197.lat
6/02/2004	04:52p	1,826,388	CCC198.lat
6/02/2004	04:52p	3,344,870	CCC199.lat
6/02/2004	04:52p	3,481,823	CCC200.lat
6/02/2004	04:52p	2,594,891	CCC201.lat
6/02/2004	04:52p	929,508	CCC202.lat
6/02/2004	04:52p	1,850,419	CCC205.lat
6/02/2004	04:53p	5,299,916	CCC206.lat
6/02/2004	04:53p	7,699,328	CCC207.lat
6/02/2004	04:53p	7,889,367	CCC208.lat
6/02/2004	04:53p	700,319	CCC209.lat
6/02/2004	04:53p	375,125	CCC218.lat
6/02/2004	04:53p	273,928	CCC219.lat