

GHD

Airborne Geophysical Survey Operations Report

Rogetta



**Thomson Aviation Job
F14097**



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PART 1 - SPECIFICATIONS FOR AIRBORNE GEOPHYSICAL SURVEY

1.1 SURVEY DETAILS

Start Date	10/12/2014
End Date	13/12/2014
Time Base - Magnetics	20 Hz
Time Base - Radiometrics	2 Hz
Base Mag Locations	Wynyard
Ground Cals Locations	Wynyard
Test Line Locations	Wynyard
Block 1	F14097_Rogetta
Total Processed Line Kilometers	870.0



1.2 LOCATION MAP

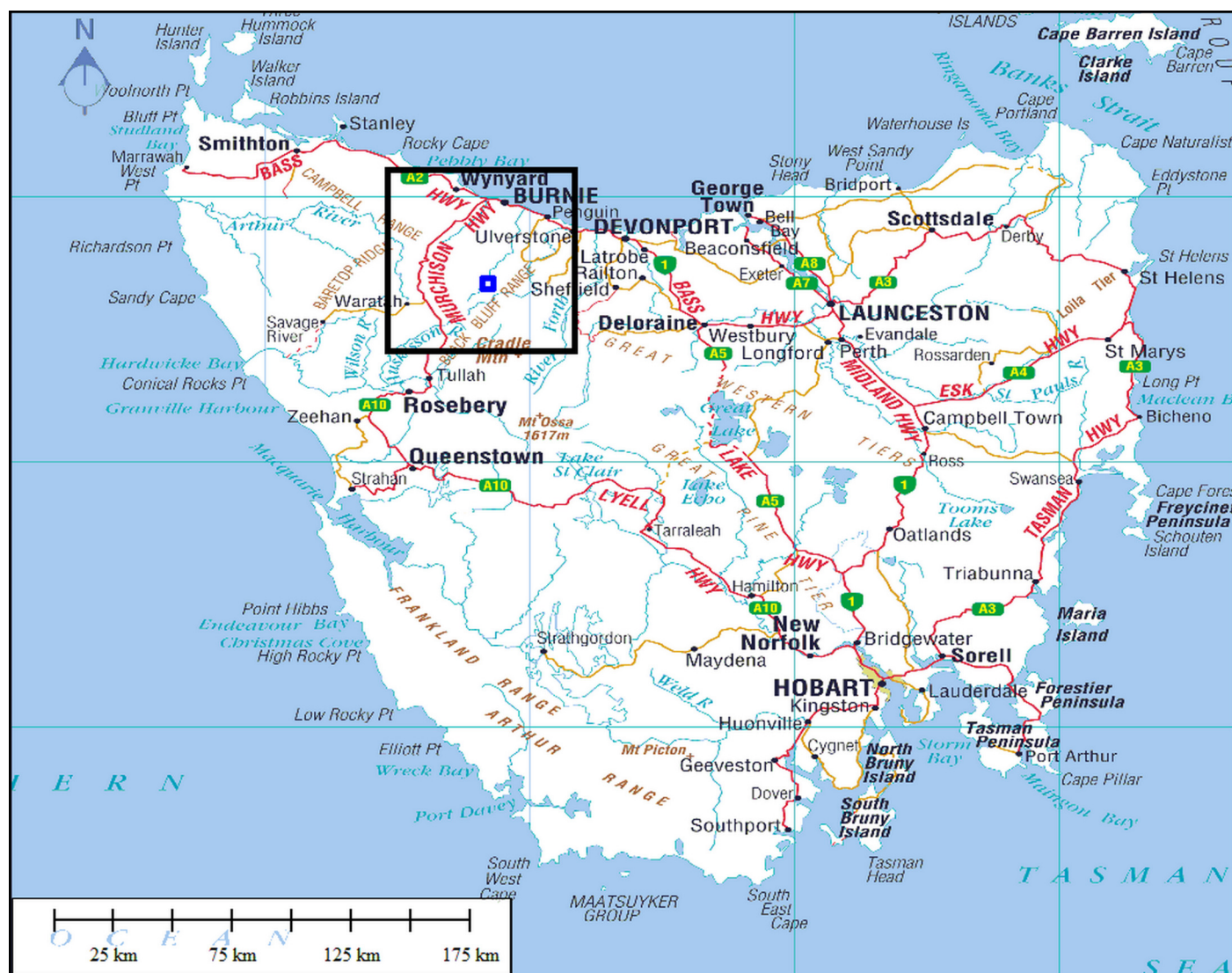


Figure 1 Rogetta



1.3 SURVEY SPECIFICATIONS

F14097_Rogetta	
Traverse line direction	90
Traverse line spacing	25 m
Tie line direction	180
Tie line spacing	250 m
Block Traverse Kilometers	763
Block Tie Kilometers	80
Block Total Kilometers	843

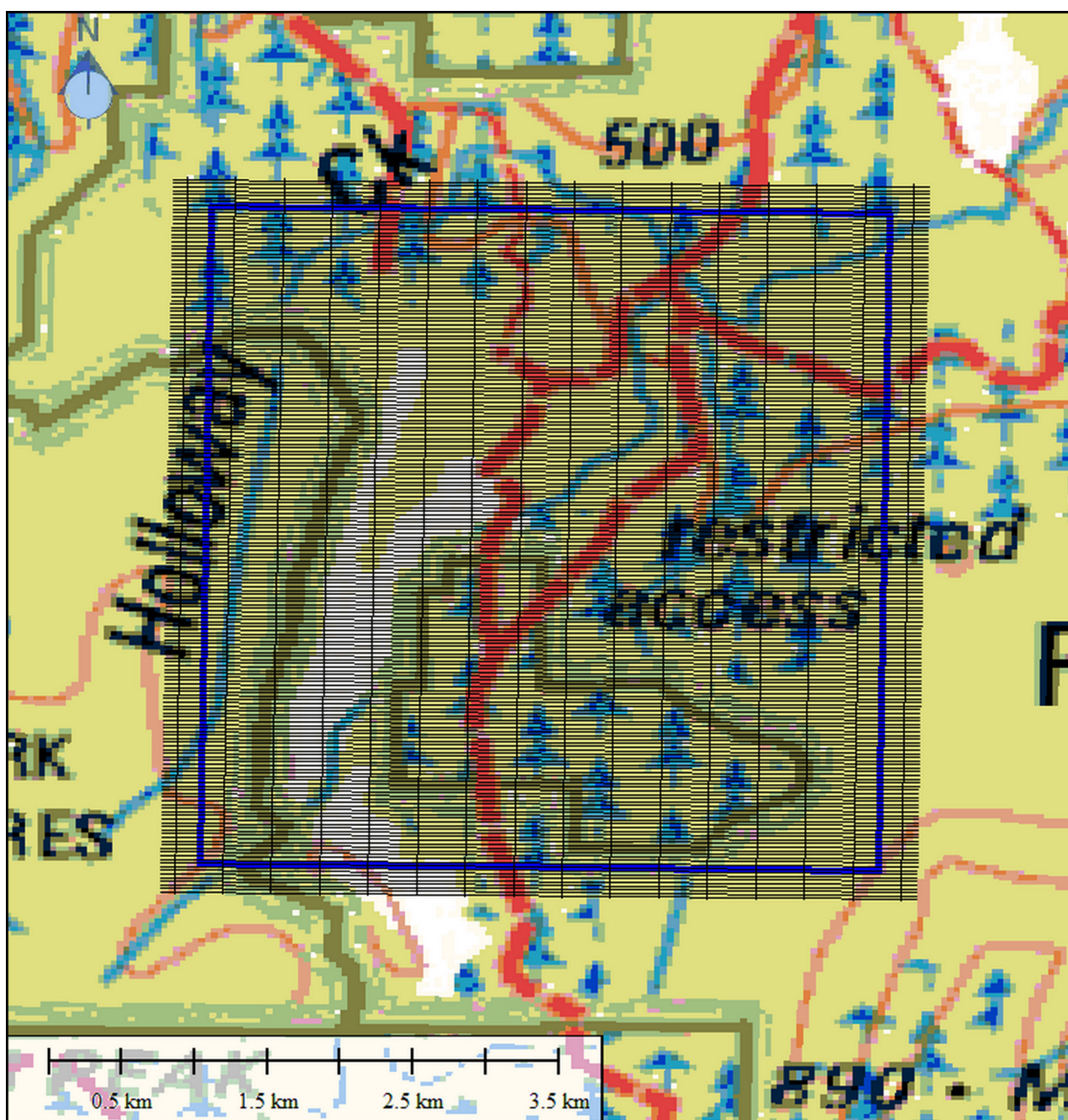


Figure 2 F14097_Rogetta

1.4 CALIBRATION RANGE

The radiometric systems for each aircraft were calibrated using the Geoscience Australia calibration range in Carnamah WA to determine the ground concentration coefficients for the radiometric systems.

Cosmic stacks were flown over water to determine the aircraft and cosmic coefficients.

Height attenuation coefficients were determined from IAEA recommended attenuation coefficients.

1.5 IN FIELD CALIBRATION

a) Spectrometer

The gamma ray spectrometer response was verified by exposing the system to thorium test samples for a time sufficient to accumulate 10,000 counts.

Frequency Before the first flight and after the last flight of each day when survey operations were conducted.

All background corrected counts fell within +/- 3% of the mean over the survey period.

Results of thorium test sample measurements can be found in Appendix B and Appendix C.

b) Test Line

Test lines are flown at the specified survey height to verify magnetometer, spectrometer and barometric altimeter baselines.

Length 10km
Direction Bi-Directional
Frequency Before the first flight and after the last flight of each day when survey operations were conducted.

The test line thorium counts fell within +/- 7% of the mean over the survey period.

Results of test line thorium counts can be found in Appendix B and Appendix C

c) Compensation Flight

The compensation flight was carried out to determine what manoeuvring effects the aircraft will have while collecting magnetic data. These effects are removed during data processing to produce true magnetic data.

Frequency Before the commencement of the survey project and after each scheduled maintenance operation.



1.6 IN FIELD VERIFICATION AND PROCESSING

Thomson Aviation conducts stringent real time data validity checks.

The following products were generated on site from the ChrisDBF database program and Thomson Aviation proprietary software:

- Flight path plots, to demonstrate quality of navigation
- Magnetic stacked profiles, to demonstrate character of magnetic data
- Statistical summary of line data
- Magnetometer base station plots
- Progressive image presentation of magnetic and topographic data
- Daily plots of aircraft parking locations to verify GPS position

1.7 NAVIGATION AND POSITIONING

Navigation was provided using a mobile Novatel OEMV-1 VBS receiver. This equipment provides flight guidance to the pilot as well as flight path information which was recorded for subsequent processing.

Differential GPS data was obtained in real time using static GPS data obtained from the Omnistar wide area GPS service.

Position relative to the survey line was displayed to the pilot by an accurate and effective system proprietary to Thomson Aviation.

Under normal circumstances differential GPS is expected to yield positional accuracies in the order of 5 meters RMS or better.



PART 2 - AIRCRAFT

The aircraft used for survey operations combine good manoeuvrability with a magnetically clean base to provide maximum magnetic sensor performance.

2.1 VH-THS

Aircraft Information	
Engine	Piston
Fuel	AVGAS
Fuel Burn	65 litres per hour
Typical Survey Speed	130 knots
Stall Speed	60 knots



Figure 3 Example Aircraft: Cessna C210

PART 3 - SURVEY INSTRUMENTATION

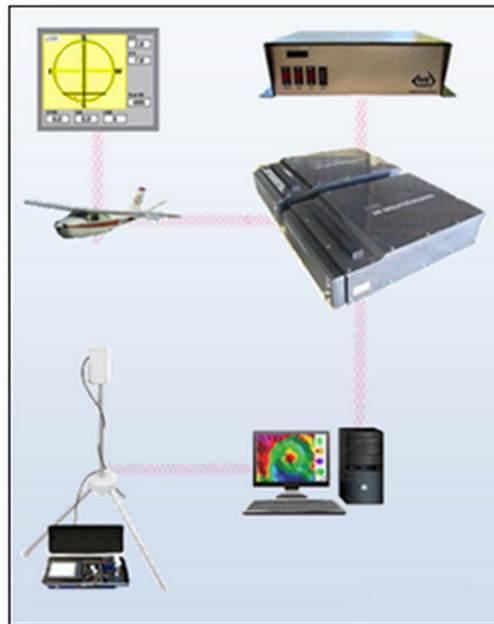


Figure 4 System Outline

3.1 MAGNETOMETER

The Geometrics G822A Magnetometer is a highly sensitive unit incorporating an optically pumped sensor. The constant harmonic frequency from the sensor is proportional to the surrounding scalar magnetic field. This frequency is resolved by the Counter / Processor which provides the magnetic field to a nominal accuracy of 0.01nT with a data capture rate of 20 times per second both in analog and digital formats.

The sensor and pre-amp are mounted in a stinger assembly which may be attached to the front or rear of the survey aircraft.



Figure 5 G822A Magnetometer and Typical Stinger Mounts

3.2 RADAR ALTIMETER

Type: King KR 495B Radar Altimeter



Figure 6 Radar Altimeter

This unit is a high resolution, short pulse ratio altitude system designed for automatic continuous operation over a wide variations of terrain and weather conditions, target reflectivity, and aircraft altitude. It provides an accurate terrain clearance indication ranging from 0 to 650m (0 to 2,000ft).

3.3 BAROMETRIC ALTIMETER

Type: Setra 276 Pressure Transducer



Figure 7 Pressure transducer

This type of pressure transducer over a range of 600 to 1100 mB and has infinite resolution (limited only by system noise). The sensor is referenced to the height given by the GPS.

3.4 DATA ACQUISITION SYSTEM

Type: GeOZ-DAS Digital Data Acquisition System



Figure 8 Zdas System

The GeOZ system manages the data acquisition and saves the data to removable Flash Cards.

It provides guidance and real time error diagnostics for the pilot.

Acquired data is transferred to a field computer on completion of the flight for both verification and archiving prior to being shipped to the processing centre.



3.5 NAVIGATION EQUIPMENT

Type: Novatel OEMV-1VBS GPS Receiver



Figure 9 GPS Receiver

This equipment is a 12 channel parallel tracking receiver capable of providing sub-meter resolution at 5Hz and is integrated with the GeOZ-DAS acquisition unit.

3.6 GAMMA RAY SPECTROMETER SYSTEM

Type: Radiations Solutions Inc. RS 400 Spectrometer

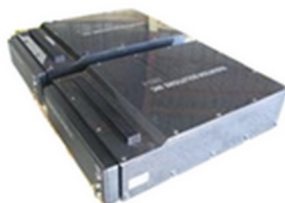


Figure 10 RS 400 Systems

These units deliver high-resolution spectral information from 0.33 MeV to 3.0 MeV including the five primary regions of interest; Total Count, Potassium, Uranium, Thorium and Cosmic.

The Gamma Ray Spectrometer is interfaced to a NaI (TI) crystal detector pack with a total volume of 33 liters (2048 cubic inches). These detector packs embody the latest techniques whereby the elimination of dead time in the counting process yields up to 30% more counts over other commercial systems.

Superior calibration facilities included the visual real time monitoring of full spectrum data and in flight monitoring of gain drift relative to the selected isotope window maintain long-term data quality.

Enhancement of the spectrometer data is achieved by noise reduction techniques (NASVD or MNF), followed by dead time correction, energy calibration, cosmic/aircraft background correction and atmospheric radon removal all applied to the 256 channel data. Spectral stripping, height correction and conversion to radio-element concentrations are then applied prior to gridding and micro-levelling.

The gamma ray spectrometer response was verified by exposing the system to thorium test samples for a time sufficient to accumulate 10,000 counts.



3.7 BASE STATION MAGNETOMETER

Two units are used in tandem for diurnal monitoring. These units run continuously during the survey periods and record the data in digital format.

Base station magnetometer instruments record data to a sensitivity of 0.1 nT every 6 seconds.

During data acquisition, if the non-linear diurnal variation was greater than 5 nT in 5 minutes, or the deviation from a straight line chord of length 10 minutes exceeded 10 nT, the line was reflowed.



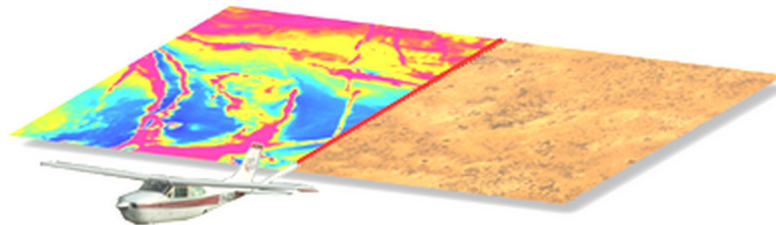
Figure 11 Setting up base station magnetometer



Figure 12 Magnetometer and Data Console

PART 4 - CONTACT INFORMATION

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PART 5 - APPENDICES

APPENDIX A

DAILY REPORTS



Daily Log								
Date	Flt Num	Block(s)	Operator(s)	Aircraft	SBY	MNT	SUS	Comments
10/12/2014		F14097_Rogetta		VH-THS				Ferry from Griffith to Wynyard
10/12/2014	2	F14097_Rogetta	C Dixon	VH-THS				
10/12/2014	1	F14097_Rogetta	C Dixon	VH-THS				Compbox carried out
11/12/2014	3	F14097_Rogetta	C Dixon	VH-THS				
11/12/2014	4	F14097_Rogetta	C Dixon	VH-THS				Aircraft parked in our spot had to park else where.



APPENDIX B

CALIBRATION AND TEST LINE VARIATION TABLES



Av Normalized Th: 341.9 Min TH: 335.4 Max TH: 345.2 Standard Deviation: 4.4

Ground Cals - VH-THS - Wynyard																				
		Position			Hand Sample				Background				Normalized				Th Cal Results		TH Chg	Diff
Date	Flt	East	North	GPS Ht	TC	Pot	Ura	Tho	TC	Pot	Ura	Tho	TC	Pot	Ura	Tho	ThPeak	% FWHM	+/- 3%	5 max
10/12/2014	2	392751.03	5461157.95	20.3	5985.2	281.0	143.1	367.8	946.9	126.6	25.4	24.7	5038.3	154.4	117.7	343.1	217.41	4.45	0.4	0.0
10/12/2014	1	392752.45	5461158.38	18.8	5911.2	277.6	145.7	363.1	1009.5	127.9	28.2	27.7	4901.7	149.7	117.5	335.4	217.55	4.60	-1.9	1.5
11/12/2014	3	392750.66	5461157.48	19.8	5999.6	278.2	146.4	370.9	967.2	127.2	26.7	25.7	5032.4	151.0	119.7	345.2	217.50	4.43	1.0	0.6
11/12/2014	4	392729.28	5461158.26	18.6	6060.0	289.9	147.6	371.1	1013.3	137.0	27.1	27.2	5046.7	152.9	120.5	343.9	217.76	4.42	0.6	21.8



Av Normalized Th: 70.4 Min TH: 69.4 Max TH: 71.4 Standard Deviation: 1.4

Test Lines - VH-THS - Wynyard															
		801					802				Normalized				TH Chg
Date	Flt	TC	Pot	Ura	Tho	Flt	TC	Pot	Ura	Tho	TC	Pot	Ura	Tho	+/- 7%
10/12/2014	2	1570.6	108.2	51.3	68.3	2	1646.7	118.8	52.5	70.6	-76.1	-10.6	-1.2	69.4	-1.4
11/12/2014	3	1594.1	114.7	51.5	67.9	4	1687.2	120.1	54.9	74.8	-93.1	-5.4	-3.4	71.4	1.4



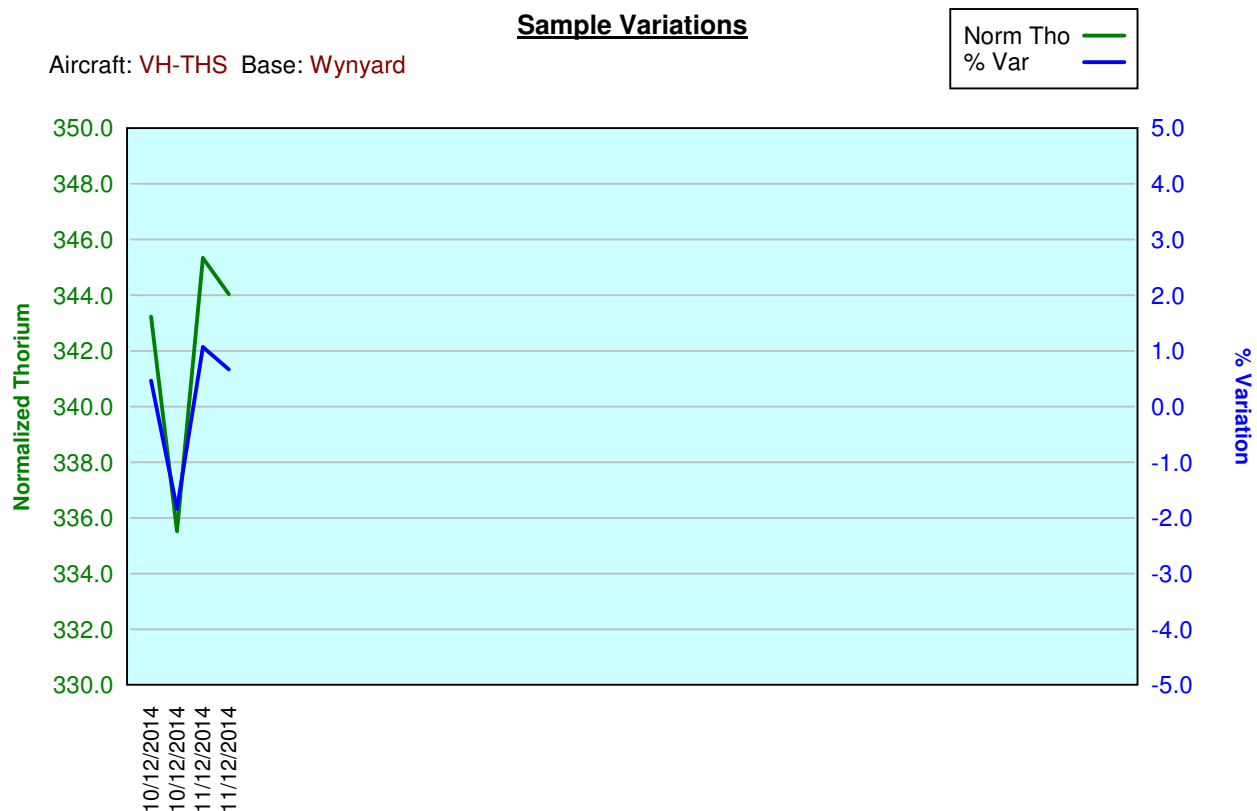
APPENDIX C

CALIBRATION AND TEST LINE VARIATION CHARTS



Sample Variations

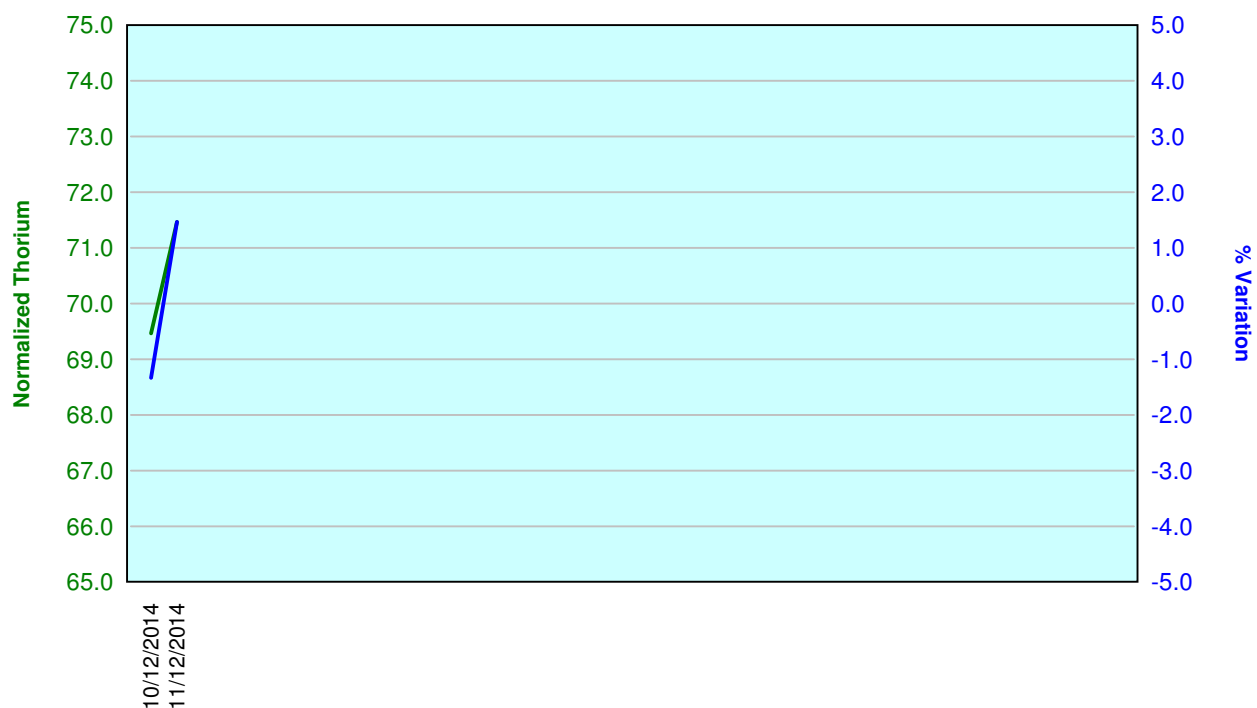
Aircraft: **VH-THS** Base: **Wynyard**



Test Line Variations

Aircraft: VH-THS Base: Wynyard

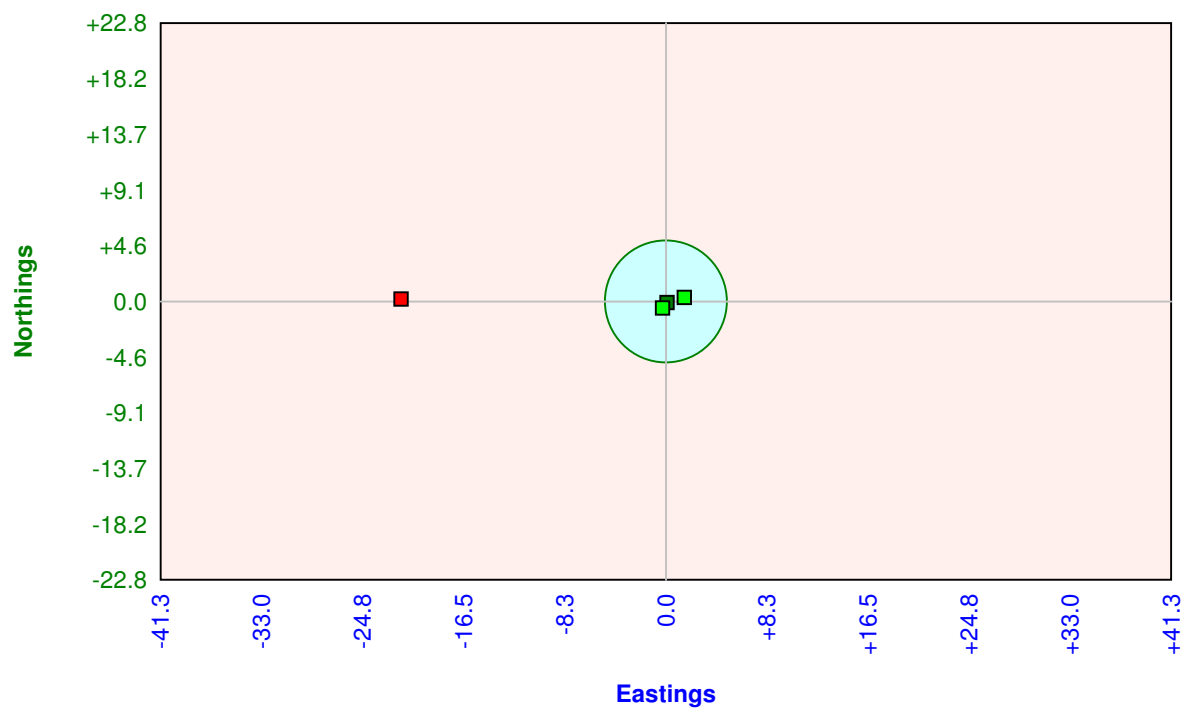
Norm Tho —
% Var —



Hand Sample Calibration Positions

Aircraft: VH-THS Base: Wynyard

Normal ■
Error (>5) ■



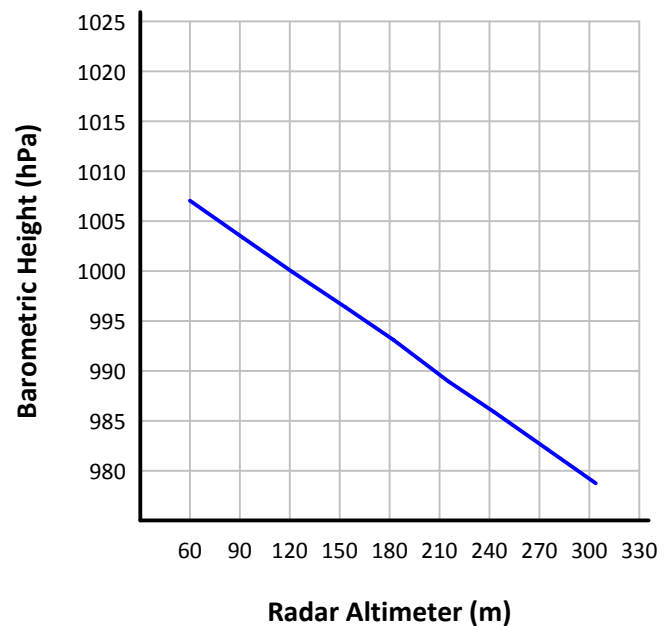
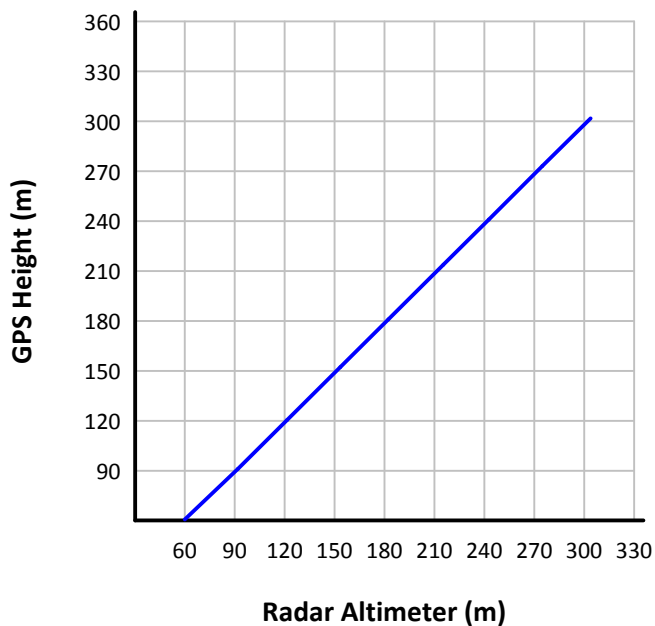
APPENDIX D

RADAR ALTIMETER AND BAROMETRIC ALTIMETER CHECKS



VH-THS

Radar Altimeter (m)	Barometric Height (hPa)	GPS Height (m)
59.97	1007.06	60.63
91.81	1003.35	91.07
121.25	999.92	120.34
153.42	996.38	152.20
182.39	993.11	181.01
215.43	988.95	213.94
242.73	985.88	240.89
274.88	982.13	273.03
303.85	978.73	301.80



Calibration flights for VH-THS were flown on 19/12/2013



APPENDIX E

BOUNDARY COORDINATES



F14097_Rogetta, Datum: GDA 94, Zone: 55

Eastings	Northings
401150.03	5426674.98
404649.99	5426675.05
404650.04	5422175.00
401150.01	5422175.06



APPENDIX F

LINE SPECIFICATIONS



F14097_Rogetta

Line	Type	Easting	Northing	Easting	Northing	Direc	Length	Tv	Cumul	Ti	Cumul
100010	Trav	400960.30	5421990.00	404850.54	5421990.00	90.0	3.9		3.9		0.0
100020	Trav	400960.30	5422015.00	404850.54	5422015.00	90.0	3.9		7.8		0.0
100030	Trav	400960.30	5422040.00	404850.54	5422040.00	90.0	3.9		11.7		0.0
100040	Trav	400960.30	5422065.00	404850.54	5422065.00	90.0	3.9		15.6		0.0
100050	Trav	400960.30	5422090.00	404850.54	5422090.00	90.0	3.9		19.5		0.0
100060	Trav	400960.30	5422115.00	404850.54	5422115.00	90.0	3.9		23.3		0.0
100070	Trav	400960.30	5422140.00	404850.54	5422140.00	90.0	3.9		27.2		0.0
100080	Trav	400960.30	5422165.00	404850.54	5422165.00	90.0	3.9		31.1		0.0
100090	Trav	400960.30	5422190.00	404850.54	5422190.00	90.0	3.9		35.0		0.0
100100	Trav	400960.30	5422215.00	404850.54	5422215.00	90.0	3.9		38.9		0.0
100110	Trav	400960.30	5422240.00	404850.54	5422240.00	90.0	3.9		42.8		0.0
100120	Trav	400960.30	5422265.00	404850.54	5422265.00	90.0	3.9		46.7		0.0
100130	Trav	400960.30	5422290.00	404850.54	5422290.00	90.0	3.9		50.6		0.0
100140	Trav	400960.30	5422315.00	404850.54	5422315.00	90.0	3.9		54.5		0.0
100150	Trav	400960.30	5422340.00	404850.54	5422340.00	90.0	3.9		58.4		0.0
100160	Trav	400960.30	5422365.00	404850.54	5422365.00	90.0	3.9		62.2		0.0
100170	Trav	400960.30	5422390.00	404850.54	5422390.00	90.0	3.9		66.1		0.0
100180	Trav	400960.30	5422415.00	404850.54	5422415.00	90.0	3.9		70.0		0.0
100190	Trav	400960.30	5422440.00	404850.54	5422440.00	90.0	3.9		73.9		0.0
100200	Trav	400960.30	5422465.00	404850.54	5422465.00	90.0	3.9		77.8		0.0
100210	Trav	400960.30	5422490.00	404850.54	5422490.00	90.0	3.9		81.7		0.0
100220	Trav	400960.30	5422515.00	404850.54	5422515.00	90.0	3.9		85.6		0.0
100230	Trav	400960.30	5422540.00	404850.54	5422540.00	90.0	3.9		89.5		0.0
100240	Trav	400960.30	5422565.00	404850.54	5422565.00	90.0	3.9		93.4		0.0
100250	Trav	400960.30	5422590.00	404850.54	5422590.00	90.0	3.9		97.3		0.0
100260	Trav	400960.30	5422615.00	404850.54	5422615.00	90.0	3.9		101.1		0.0
100270	Trav	400960.30	5422640.00	404850.53	5422640.00	90.0	3.9		105.0		0.0
100280	Trav	400960.30	5422665.00	404850.53	5422665.00	90.0	3.9		108.9		0.0
100290	Trav	400960.30	5422690.00	404850.53	5422690.00	90.0	3.9		112.8		0.0
100300	Trav	400960.30	5422715.00	404850.53	5422715.00	90.0	3.9		116.7		0.0
100310	Trav	400960.30	5422740.00	404850.53	5422740.00	90.0	3.9		120.6		0.0
100320	Trav	400960.30	5422765.00	404850.53	5422765.00	90.0	3.9		124.5		0.0
100330	Trav	400960.30	5422790.00	404850.53	5422790.00	90.0	3.9		128.4		0.0
100340	Trav	400960.30	5422815.00	404850.53	5422815.00	90.0	3.9		132.3		0.0
100350	Trav	400960.30	5422840.00	404850.53	5422840.00	90.0	3.9		136.2		0.0
100360	Trav	400960.30	5422865.00	404850.53	5422865.00	90.0	3.9		140.0		0.0
100370	Trav	400960.30	5422890.00	404850.53	5422890.00	90.0	3.9		143.9		0.0
100380	Trav	400960.30	5422915.00	404850.53	5422915.00	90.0	3.9		147.8		0.0
100390	Trav	400960.30	5422940.00	404850.53	5422940.00	90.0	3.9		151.7		0.0
100400	Trav	400960.30	5422965.00	404850.53	5422965.00	90.0	3.9		155.6		0.0
100410	Trav	400960.30	5422990.00	404850.53	5422990.00	90.0	3.9		159.5		0.0
100420	Trav	400960.30	5423015.00	404850.53	5423015.00	90.0	3.9		163.4		0.0
100430	Trav	400960.30	5423040.00	404850.53	5423040.00	90.0	3.9		167.3		0.0
100440	Trav	400960.30	5423065.00	404850.53	5423065.00	90.0	3.9		171.2		0.0
100450	Trav	400960.30	5423090.00	404850.53	5423090.00	90.0	3.9		175.1		0.0
100460	Trav	400960.30	5423115.00	404850.53	5423115.00	90.0	3.9		179.0		0.0
100470	Trav	400960.30	5423140.00	404850.53	5423140.00	90.0	3.9		182.8		0.0
100480	Trav	400960.30	5423165.00	404850.53	5423165.00	90.0	3.9		186.7		0.0
100490	Trav	400960.30	5423190.00	404850.53	5423190.00	90.0	3.9		190.6		0.0
100500	Trav	400960.30	5423215.00	404850.53	5423215.00	90.0	3.9		194.5		0.0
100510	Trav	400960.30	5423240.00	404850.53	5423240.00	90.0	3.9		198.4		0.0
100520	Trav	400960.30	5423265.00	404850.53	5423265.00	90.0	3.9		202.3		0.0
100530	Trav	400960.30	5423290.00	404850.53	5423290.00	90.0	3.9		206.2		0.0
100540	Trav	400960.30	5423315.00	404850.53	5423315.00	90.0	3.9		210.1		0.0
100550	Trav	400960.30	5423340.00	404850.53	5423340.00	90.0	3.9		214.0		0.0
100560	Trav	400960.30	5423365.00	404850.53	5423365.00	90.0	3.9		217.9		0.0
100570	Trav	400960.30	5423390.00	404850.53	5423390.00	90.0	3.9		221.7		0.0
100580	Trav	400960.30	5423415.00	404850.53	5423415.00	90.0	3.9		225.6		0.0
100590	Trav	400960.30	5423440.00	404850.53	5423440.00	90.0	3.9		229.5		0.0
100600	Trav	400960.30	5423465.00	404850.53	5423465.00	90.0	3.9		233.4		0.0
100610	Trav	400960.30	5423490.00	404850.53	5423490.00	90.0	3.9		237.3		0.0
100620	Trav	400960.30	5423515.00	404850.53	5423515.00	90.0	3.9		241.2		0.0
100630	Trav	400960.30	5423540.00	404850.52	5423540.00	90.0	3.9		245.1		0.0
100640	Trav	400960.30	5423565.00	404850.52	5423565.00	90.0	3.9		249.0		0.0
100650	Trav	400960.30	5423590.00	404850.52	5423590.00	90.0	3.9		252.9		0.0



F14097_Rogetta (Cont)

Line	Type	Easting	Northing	Easting	Northing	Direc	Length	Tv	Cumul	Ti	Cumul
100660	Trav	400960.30	5423615.00	404850.52	5423615.00	90.0	3.9	256.8			0.0
100670	Trav	400960.30	5423640.00	404850.52	5423640.00	90.0	3.9	260.6			0.0
100680	Trav	400960.31	5423665.00	404850.52	5423665.00	90.0	3.9	264.5			0.0
100690	Trav	400960.31	5423690.00	404850.52	5423690.00	90.0	3.9	268.4			0.0
100700	Trav	400960.31	5423715.00	404850.52	5423715.00	90.0	3.9	272.3			0.0
100710	Trav	400960.31	5423740.00	404850.52	5423740.00	90.0	3.9	276.2			0.0
100720	Trav	400960.31	5423765.00	404850.52	5423765.00	90.0	3.9	280.1			0.0
100730	Trav	400960.31	5423790.00	404850.52	5423790.00	90.0	3.9	284.0			0.0
100740	Trav	400960.31	5423815.00	404850.52	5423815.00	90.0	3.9	287.9			0.0
100750	Trav	400960.31	5423840.00	404850.52	5423840.00	90.0	3.9	291.8			0.0
100760	Trav	400960.31	5423865.00	404850.52	5423865.00	90.0	3.9	295.7			0.0
100770	Trav	400960.31	5423890.00	404850.52	5423890.00	90.0	3.9	299.5			0.0
100780	Trav	400960.31	5423915.00	404850.52	5423915.00	90.0	3.9	303.4			0.0
100790	Trav	400960.31	5423940.00	404850.52	5423940.00	90.0	3.9	307.3			0.0
100800	Trav	400960.31	5423965.00	404850.52	5423965.00	90.0	3.9	311.2			0.0
100810	Trav	400960.31	5423990.00	404850.52	5423990.00	90.0	3.9	315.1			0.0
100820	Trav	400960.31	5424015.00	404850.52	5424015.00	90.0	3.9	319.0			0.0
100830	Trav	400960.31	5424040.00	404850.52	5424040.00	90.0	3.9	322.9			0.0
100840	Trav	400960.31	5424065.00	404850.52	5424065.00	90.0	3.9	326.8			0.0
100850	Trav	400960.31	5424090.00	404850.52	5424090.00	90.0	3.9	330.7			0.0
100860	Trav	400960.31	5424115.00	404850.52	5424115.00	90.0	3.9	334.6			0.0
100870	Trav	400960.31	5424140.00	404850.52	5424140.00	90.0	3.9	338.4			0.0
100880	Trav	400960.31	5424165.00	404850.52	5424165.00	90.0	3.9	342.3			0.0
100890	Trav	400960.31	5424190.00	404850.52	5424190.00	90.0	3.9	346.2			0.0
100900	Trav	400960.31	5424215.00	404850.52	5424215.00	90.0	3.9	350.1			0.0
100910	Trav	400960.31	5424240.00	404850.52	5424240.00	90.0	3.9	354.0			0.0
100920	Trav	400960.31	5424265.00	404850.52	5424265.00	90.0	3.9	357.9			0.0
100930	Trav	400960.31	5424290.00	404850.52	5424290.00	90.0	3.9	361.8			0.0
100940	Trav	400960.31	5424315.00	404850.52	5424315.00	90.0	3.9	365.7			0.0
100950	Trav	400960.31	5424340.00	404850.52	5424340.00	90.0	3.9	369.6			0.0
100960	Trav	400960.31	5424365.00	404850.52	5424365.00	90.0	3.9	373.5			0.0
100970	Trav	400960.31	5424390.00	404850.52	5424390.00	90.0	3.9	377.4			0.0
100980	Trav	400960.31	5424415.00	404850.52	5424415.00	90.0	3.9	381.2			0.0
100990	Trav	400960.31	5424440.00	404850.51	5424440.00	90.0	3.9	385.1			0.0
101000	Trav	400960.31	5424465.00	404850.51	5424465.00	90.0	3.9	389.0			0.0
101010	Trav	400960.31	5424490.00	404850.51	5424490.00	90.0	3.9	392.9			0.0
101020	Trav	400960.31	5424515.00	404850.51	5424515.00	90.0	3.9	396.8			0.0
101030	Trav	400960.31	5424540.00	404850.51	5424540.00	90.0	3.9	400.7			0.0
101040	Trav	400960.31	5424565.00	404850.51	5424565.00	90.0	3.9	404.6			0.0
101050	Trav	400960.31	5424590.00	404850.51	5424590.00	90.0	3.9	408.5			0.0
101060	Trav	400960.31	5424615.00	404850.51	5424615.00	90.0	3.9	412.4			0.0
101070	Trav	400960.31	5424640.00	404850.51	5424640.00	90.0	3.9	416.3			0.0
101080	Trav	400960.31	5424665.00	404850.51	5424665.00	90.0	3.9	420.1			0.0
101090	Trav	400960.31	5424690.00	404850.51	5424690.00	90.0	3.9	424.0			0.0
101100	Trav	400960.31	5424715.00	404850.51	5424715.00	90.0	3.9	427.9			0.0
101110	Trav	400960.31	5424740.00	404850.51	5424740.00	90.0	3.9	431.8			0.0
101120	Trav	400960.31	5424765.00	404850.51	5424765.00	90.0	3.9	435.7			0.0
101130	Trav	400960.31	5424790.00	404850.51	5424790.00	90.0	3.9	439.6			0.0
101140	Trav	400960.31	5424815.00	404850.51	5424815.00	90.0	3.9	443.5			0.0
101150	Trav	400960.31	5424840.00	404850.51	5424840.00	90.0	3.9	447.4			0.0
101160	Trav	400960.31	5424865.00	404850.51	5424865.00	90.0	3.9	451.3			0.0
101170	Trav	400960.31	5424890.00	404850.51	5424890.00	90.0	3.9	455.2			0.0
101180	Trav	400960.31	5424915.00	404850.51	5424915.00	90.0	3.9	459.0			0.0
101190	Trav	400960.31	5424940.00	404850.51	5424940.00	90.0	3.9	462.9			0.0
101200	Trav	400960.31	5424965.00	404850.51	5424965.00	90.0	3.9	466.8			0.0
101210	Trav	400960.31	5424990.00	404850.51	5424990.00	90.0	3.9	470.7			0.0
101220	Trav	400960.31	5425015.00	404850.51	5425015.00	90.0	3.9	474.6			0.0
101230	Trav	400960.31	5425040.00	404850.51	5425040.00	90.0	3.9	478.5			0.0
101240	Trav	400960.31	5425065.00	404850.51	5425065.00	90.0	3.9	482.4			0.0
101250	Trav	400960.31	5425090.00	404850.51	5425090.00	90.0	3.9	486.3			0.0
101260	Trav	400960.31	5425115.00	404850.51	5425115.00	90.0	3.9	490.2			0.0
101270	Trav	400960.31	5425140.00	404850.51	5425140.00	90.0	3.9	494.1			0.0
101280	Trav	400960.31	5425165.00	404850.51	5425165.00	90.0	3.9	497.9			0.0
101290	Trav	400960.31	5425190.00	404850.51	5425190.00	90.0	3.9	501.8			0.0
101300	Trav	400960.31	5425215.00	404850.51	5425215.00	90.0	3.9	505.7			0.0



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Line	Type	Easting	Northing	Easting	Northing	Direc	Length	Tv	Cumul	Ti	Cumul
101310	Trav	400960.31	5425240.00	404850.51	5425240.00	90.0	3.9		509.6		0.0
101320	Trav	400960.31	5425265.00	404850.51	5425265.00	90.0	3.9		513.5		0.0
101330	Trav	400960.31	5425290.00	404850.51	5425290.00	90.0	3.9		517.4		0.0
101340	Trav	400960.31	5425315.00	404850.51	5425315.00	90.0	3.9		521.3		0.0
101350	Trav	400960.31	5425340.00	404850.50	5425340.00	90.0	3.9		525.2		0.0
101360	Trav	400960.31	5425365.00	404850.50	5425365.00	90.0	3.9		529.1		0.0
101370	Trav	400960.31	5425390.00	404850.50	5425390.00	90.0	3.9		533.0		0.0
101380	Trav	400960.31	5425415.00	404850.50	5425415.00	90.0	3.9		536.9		0.0
101390	Trav	400960.31	5425440.00	404850.50	5425440.00	90.0	3.9		540.7		0.0
101400	Trav	400960.31	5425465.00	404850.50	5425465.00	90.0	3.9		544.6		0.0
101410	Trav	400960.31	5425490.00	404850.50	5425490.00	90.0	3.9		548.5		0.0
101420	Trav	400960.31	5425515.00	404850.50	5425515.00	90.0	3.9		552.4		0.0
101430	Trav	400960.31	5425540.00	404850.50	5425540.00	90.0	3.9		556.3		0.0
101440	Trav	400960.31	5425565.00	404850.50	5425565.00	90.0	3.9		560.2		0.0
101450	Trav	400960.31	5425590.00	404850.50	5425590.00	90.0	3.9		564.1		0.0
101460	Trav	400960.31	5425615.00	404850.50	5425615.00	90.0	3.9		568.0		0.0
101470	Trav	400960.31	5425640.00	404850.50	5425640.00	90.0	3.9		571.9		0.0
101480	Trav	400960.31	5425665.00	404850.50	5425665.00	90.0	3.9		575.8		0.0
101490	Trav	400960.31	5425690.00	404850.50	5425690.00	90.0	3.9		579.6		0.0
101500	Trav	400960.31	5425715.00	404850.50	5425715.00	90.0	3.9		583.5		0.0
101510	Trav	400960.31	5425740.00	404850.50	5425740.00	90.0	3.9		587.4		0.0
101520	Trav	400960.31	5425765.00	404850.50	5425765.00	90.0	3.9		591.3		0.0
101530	Trav	400960.31	5425790.00	404850.50	5425790.00	90.0	3.9		595.2		0.0
101540	Trav	400960.31	5425815.00	404850.50	5425815.00	90.0	3.9		599.1		0.0
101550	Trav	400960.31	5425840.00	404850.50	5425840.00	90.0	3.9		603.0		0.0
101560	Trav	400960.31	5425865.00	404850.50	5425865.00	90.0	3.9		606.9		0.0
101570	Trav	400960.31	5425890.00	404850.50	5425890.00	90.0	3.9		610.8		0.0
101580	Trav	400960.32	5425915.00	404850.50	5425915.00	90.0	3.9		614.7		0.0
101590	Trav	400960.32	5425940.00	404850.50	5425940.00	90.0	3.9		618.5		0.0
101600	Trav	400960.32	5425965.00	404850.50	5425965.00	90.0	3.9		622.4		0.0
101610	Trav	400960.32	5425990.00	404850.50	5425990.00	90.0	3.9		626.3		0.0
101620	Trav	400960.32	5426015.00	404850.50	5426015.00	90.0	3.9		630.2		0.0
101630	Trav	400960.32	5426040.00	404850.50	5426040.00	90.0	3.9		634.1		0.0
101640	Trav	400960.32	5426065.00	404850.50	5426065.00	90.0	3.9		638.0		0.0
101650	Trav	400960.32	5426090.00	404850.50	5426090.00	90.0	3.9		641.9		0.0
101660	Trav	400960.32	5426115.00	404850.50	5426115.00	90.0	3.9		645.8		0.0
101670	Trav	400960.32	5426140.00	404850.50	5426140.00	90.0	3.9		649.7		0.0
101680	Trav	400960.32	5426165.00	404850.50	5426165.00	90.0	3.9		653.6		0.0
101690	Trav	400960.32	5426190.00	404850.50	5426190.00	90.0	3.9		657.4		0.0
101700	Trav	400960.32	5426215.00	404850.50	5426215.00	90.0	3.9		661.3		0.0
101710	Trav	400960.32	5426240.00	404850.49	5426240.00	90.0	3.9		665.2		0.0
101720	Trav	400960.32	5426265.00	404850.49	5426265.00	90.0	3.9		669.1		0.0
101730	Trav	400960.32	5426290.00	404850.49	5426290.00	90.0	3.9		673.0		0.0
101740	Trav	400960.32	5426315.00	404850.49	5426315.00	90.0	3.9		676.9		0.0
101750	Trav	400960.32	5426340.00	404850.49	5426340.00	90.0	3.9		680.8		0.0
101760	Trav	400960.32	5426365.00	404850.49	5426365.00	90.0	3.9		684.7		0.0
101770	Trav	400960.32	5426390.00	404850.49	5426390.00	90.0	3.9		688.6		0.0
101780	Trav	400960.32	5426415.00	404850.49	5426415.00	90.0	3.9		692.5		0.0
101790	Trav	400960.32	5426440.00	404850.49	5426440.00	90.0	3.9		696.3		0.0
101800	Trav	400960.32	5426465.00	404850.49	5426465.00	90.0	3.9		700.2		0.0
101810	Trav	400960.32	5426490.00	404850.49	5426490.00	90.0	3.9		704.1		0.0
101820	Trav	400960.32	5426515.00	404850.49	5426515.00	90.0	3.9		708.0		0.0
101830	Trav	400960.32	5426540.00	404850.49	5426540.00	90.0	3.9		711.9		0.0
101840	Trav	400960.32	5426565.00	404850.49	5426565.00	90.0	3.9		715.8		0.0
101850	Trav	400960.32	5426590.00	404850.49	5426590.00	90.0	3.9		719.7		0.0
101860	Trav	400960.32	5426615.00	404850.49	5426615.00	90.0	3.9		723.6		0.0
101870	Trav	400960.32	5426640.00	404850.49	5426640.00	90.0	3.9		727.5		0.0
101880	Trav	400960.32	5426665.00	404850.49	5426665.00	90.0	3.9		731.4		0.0
101890	Trav	400960.32	5426690.00	404850.49	5426690.00	90.0	3.9		735.2		0.0
101900	Trav	400960.32	5426715.00	404850.49	5426715.00	90.0	3.9		739.1		0.0
101910	Trav	400960.32	5426740.00	404850.49	5426740.00	90.0	3.9		743.0		0.0
101920	Trav	400960.32	5426765.00	404850.49	5426765.00	90.0	3.9		746.9		0.0
101930	Trav	400960.32	5426790.00	404850.49	5426790.00	90.0	3.9		750.8		0.0
101940	Trav	400960.32	5426815.00	404850.49	5426815.00	90.0	3.9		754.7		0.0
101950	Trav	400960.32	5426840.00	404850.49	5426840.00	90.0	3.9		758.6		0.0



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Line	Type	Easting	Northing	Easting	Northing	Direc	Length	Tv	Cumul	Ti	Cumul
101960	Trav	400960.32	5426865.00	404850.49	5426865.00	90.0	3.9	762.5		0.0	
190010	Tie	401003.00	5426915.00	401003.00	5421940.00	180.0	5.0	762.5		5.0	
190020	Tie	401273.00	5426915.00	401273.00	5421940.00	180.0	5.0	762.5		9.9	
190030	Tie	401543.00	5426915.00	401538.00	5421940.00	180.1	5.0	762.5		14.9	
190040	Tie	401813.00	5426915.00	401813.00	5421940.00	180.0	5.0	762.5		19.9	
190050	Tie	402063.00	5426915.00	402063.00	5421940.00	180.0	5.0	762.5		24.9	
190060	Tie	402313.00	5426915.00	402313.00	5421940.00	180.0	5.0	762.5		29.9	
190070	Tie	402563.00	5426915.00	402563.00	5421940.00	180.0	5.0	762.5		34.8	
190080	Tie	402813.00	5426915.00	402813.00	5421940.00	180.0	5.0	762.5		39.8	
190090	Tie	403063.00	5426915.00	403063.00	5421940.00	180.0	5.0	762.5		44.8	
190100	Tie	403313.00	5426915.00	403313.00	5421940.00	180.0	5.0	762.5		49.8	
190110	Tie	403563.00	5426915.00	403563.00	5421940.00	180.0	5.0	762.5		54.7	
190120	Tie	403813.00	5426915.00	403813.00	5421940.00	180.0	5.0	762.5		59.7	
190130	Tie	404063.00	5426915.00	404063.00	5421940.00	180.0	5.0	762.5		64.7	
190140	Tie	404313.00	5426915.00	404313.00	5421940.00	180.0	5.0	762.5		69.7	
190150	Tie	404563.00	5426915.00	404563.00	5421940.00	180.0	5.0	762.5		74.6	
190160	Tie	404813.00	5426915.00	404813.00	5421940.00	180.0	5.0	762.5		79.6	



