

SURVEY AREA CENTRAL HIGHLANDS:

SURVEY REPORT:

The survey crew based themselves at Bronte Park Village being central access to the survey areas and convenience of access to high ground for RTK GPS control.

The cabin was self contained and provided convenience for meal preparation and work space. Food was brought from Hobart originally and some extras supplied from Ouse as no food supplies were available in the local area. Local meals at the dining room were taken on some occasions when arriving back late from a long survey day.

Gravity control was carried to Bronte Park from Hobart airport after re-establishing a station from Mount Pleasant to Hobart. Additional controls were made in fringe areas for the survey and tied to previous control stations, see listings and photos

A local all weather gravity base was established in the back porch of Cabin 3 Bronte Park to cater for changes in weather. This base was occupied for all survey readings in addition to the external Bronte base control located by a fence just south of the village on the Marlborough Highway.

GPS survey controls were acquired via internet from the State data base and initially GPS base ST1084 at Bronte Park was used. Later new controls were occupied or created as needed in more remote locations further north. Data base listed survey controls were not numerous or easily accessible in the survey area and Solo established additional bases of convenience when the RTK radio repeater could no longer be useful in areas of steep terrain.

General road access in the area was good, and surveying nearby to a highway required caution and use of safety clothing and warning lights on survey vehicle.

All access from the roads and tracks in this area was locked with the exception of tracks to authorised lake fishing spots. This was a result of deer shooting in the highlands that commenced on 13th March and ended the 17th of June. The locks restrict poachers accessing these properties however they are still frequent in these areas and safety is of concern when working in timbered areas. Property owners would also refuse access when additional shooters were culling, fearing some incident may occur outside of their control.

Gunns Limited and Forestry Tasmania were the principal controllers of logging tracks in this area with the addition of some more private logging firms on private lands where additional keys were required. Master keys opened all non private lands and were of convenience to the survey.

Locating private owners and acquiring keys was an additional chore to be arranged at the convenience of the land owner if they were agreeable to the land entry without any signed paperwork.

The survey was planned to four areas by the consultant and progress was made in this direction. Areas of dense timber reduced data acquisition by limiting satellite visibility

and these were not acquired due to extra delays required. Fallen timber on logging tracks prevented some additional access as these were too large to clear from the track.



Locked boom and cable gates were the other restriction, and were also on private logging tracks.



These were a problem when on Forrest tracks then continuing onto private land with additional locks preventing continued access.

A break in this survey to the west coast area during the good weather lost the momentum to gain access to some difficult areas requiring data infill. On return deer culling was in progress and it was not possible to get into some of these areas late in the season.

Outstanding infill Areas above Lake Echo:

An area requiring infill is the "Top Marsh", owners unknown, area above Serpentine Road, a Gunn's logging track. No easy access into this area is available and it is too large to walk. Southern access may be possible before and near to eastern boom gate on Serpentine logging road, and via small track with obstructions to prevent access.

The east side of the Ouse River valley on "Macclesfield" property needs some careful access to cleared areas.

Part of "Lake Echo" property on east side of Macclesfield also has access to this east side area by walking access only across steep gullies.

"The Spring" also has access to this area on the eastern side of the river.

"The Ripple" property on Lake Highway access after deer season.

"Half Moon Marsh" private land south of Bellevue Tier.

Final Data:

Final data was supplied to consultant Dr. David Leaman of Leaman Geophysics and Bob Richardson at Department of Primary Industries and Resources Tasmania.

Data records on disc.

DATA ACQUISITION:

Control Data:

- All raw GPS survey controls are acquired in GDA94 datum (WGS84) and transformed in real time to survey grid references to AMG66 Zone 55 using the Tasmanian AGD66 transformation and geoid files.
- All map presentation is AMG66 zone 55 datum.
- All time references for gravity are EST, or UTM plus 10 hours after May 5th.
- All height references are AHD

RTK GPS Base stations:

- See base locations

Gravity Base station:

- See base location.

GPS Surveys:

- A map shows extent of the proposed survey area in the central highlands.
- Main roads, minor roads, forest logging tracks, and private property tracks were accessed at 500m intervals for data records.
- Topography in the area ranged from 600m to 1100m and required accessing numerous suitable high areas for the radio GPS link.
- The base RTK GPS was set to automatic on three day cycles between battery changes to give more time to the survey.
- Additional RTK coverage was gained by a mobile radio repeater link.
- Some overhanging dense foliage areas on roads were levelled by optical level due to poor satellite coverage.
- The survey crew were equipped with reflective clothing and a vehicle with flashing beacons for advance traffic warning of survey crew when on roads and tracks.
- No incidents or accidents occurred during this survey period.

Optical Levelling :

- Used when GPS levels were not available due to dense cover and poor satellite availability.
- Levelled from nearest valid RTK GPS elevation
- GPS horizontal positioning still accurate for station location.
- GPS positioning at each gravity station was recorded in the GPS memory in GDA94 datum as raw data in addition to real time display in AMG66 zone55.
- This data was then transformed again to the required datum and transferred to a memory card for computer access.
- Format was Station ID, Easting, Northing, Elevation, and satellite elevation position error to 0.05m
- Elevations not available by RTK GPS were calculated from optical level data using standard back site fore sight method from known to unknown height and transferred to the GPS digital record.

Gravity Survey:

- Gravity stations occupied were located by RTK GPS in real time in the appropriate datum at approximately 500m station intervals along all accessed tracks unless interrupted by lack of satellite access.
- All field stations were given a unique six figure ID commencing with 100000
- The first two digits identified RTK GPS base station.
- This was reduced to a four digit number by request, the last survey number being 1901 for government data base records.
- Readings were taken in loops from a single control station at Bronte Park, the loop duration dependent on access and terrain elevation.



- All meter readings were observed at ground level along roads and tracks.
- Additional delays occurred when some periods of seismic activity predominated.
- The extended period of fine weather this year was exceptional and aided survey progress.

GPS Data Processing:

- Each survey station was given a unique six digit ID.
- RTK GPS positioning at each gravity station was recorded in the GPS memory in GDA94 datum as raw data in addition to the real time transformed display in AMG66 zone55.
- Final AHD elevations were derived by using a standard ellipsoid to geoid file produced for the local area from Auslig tables.
- This transformed survey data was then downloaded to a memory card for computer access.
- Format was Station ID, Easting, Northing, Elevation, and satellite elevation position error to 0.05m
- No additional post processing was required when using this data set format.

Optical levelling Processing:

- Elevations calculated from nearest valid RTK GPS tie station used.
- Elevations not available by RTK GPS were then calculated from optical level data using standard back site fore sight method from known GPS to unknown height
- These calculated elevation values were entered into the GPS data file.

Gravity Data Processing:

- All gravity stations were given a unique six digit ID
- Gravity data was recorded in loops from a control station, the field measurement being a relative gravity measurement referenced to the base station control.
- Bronte house base and an additional tie to Bronte base station each day was used for data control. Regional tie points were used for drift checks.
- Gravity data was recorded at each station in instrument divisions.
- The time of measurement was recorded in EST daylight saving until April 12th and EST from May 5th to end of survey.
- All tidal corrections referenced UTM plus 10 hours.
- A Solo program combined the common GPS point ID to the gravity station point ID as these were stored in two separate instruments.
- This data set was then processed to produce a tidal corrected data set of instrument readings to check repeatability of stations before further processing.
- Longmans' formulae was used for the calculation of tidal changes at the local time and location.

An example of a combined data set before processing is as follows:

CLIENT: Great Southland Minerals

AREA: Bronte Park Tasmania

GRID: Brontie Park

BASE # 01;GRAVITY:9802094.100;EAST=xxxxxx ;NORTH=xxxxxxx : Bronte house

BASE # 02;GRAVITY:9802095.600;EAST=xxxxxx ;NORTH=xxxxxxx : Bronte Base

BASE # 08;GRAVITY:9804370.200;EAST=xxxxxx ;NORTH=xxxxxxx : Hobart Obs

BASE # 09;GRAVITY:9804483.500;EAST=xxxxxx ;NORTH=xxxxxxx : Hobart AP CPk

LAST BASE

LOOP:47;METER:556;DATE:030407;OPERATOR:B.RAU

LINE L

LINE L

000000.00 000000001. 3725.68 723 000.00 93 -.084 01 3725.60	\Bronte house base station
***** ** ***** ** 3725.68 724 *** ** 93 -.086 100001 3725.59	
***** ** ***** ** 3725.68 800 *** ** 93 -.086 100001 3725.59	
457742.78 5334623.73 3725.84 807 676.00 93 -.086 100032 3725.75	\ a check base, Bronte
487544.01 5359066.92 3609.41 950 1168.28 93 -.054 191270 3609.36	\field stations
487412.88 5359814.51 3607.36 957 1174.94 93 -.047 191271 3607.31	
487255.13 5360475.73 3610.15 1004 1157.50 93 -.047 191272 3610.10	
487246.92 5361264.51 3610.41 1015 1154.21 93 -.040 191273 3610.37	
486972.57 5361812.25 3605.96 1021 1177.79 93 -.040 191274 3605.92	
486624.66 5362398.19 3603.11 1028 1183.74 93 -.032 191275 3603.08	
486307.79 5362997.80 3608.38 1046 1150.31 93 -.025 191276 3608.35	

Format:

east, north, meter value, time, elevation, julian date, tidal correction, station ID, tidal corrected meter value.
Note no GPS location for Bronte house inside base.

- This final data set was processed to produce the following example result.
- This includes instrument drift at base, daily drift, latitude and Bouguer calculation.
- The Observed 65 value is a drift corrected tie to a base station with a recorded AGSO Isogal65 value.
- The final calculations are derived by the standard AGSO Isogal65 formulae.

pegID	AMGEst	AMG-Nth	Latitude	Longitude	Elvn	Observed	Theoretical	D2.20	D2.30	D2.40	D2.50	D2.67
100001	0.00	0.00	0.000000	0.000000	0.00	980209.40	978049.00	2160.40	2160.40	2160.40	2160.40	2160.40
100001	0.00	0.00	0.000000	0.000000	0.00	980209.40	978049.00	2160.40	2160.40	2160.40	2160.40	2160.40
100032	457742.78	5334623.73	-42.139217	146.488642	676.00	980209.56	980371.62	-15.77	-18.60	-21.44	-24.27	-29.09
191270	487544.01	5359066.92	-41.920108	146.849786	1168.28	980091.58	980351.95	-7.56	-12.45	-17.35	-22.25	-30.57
191271	487412.88	5359814.51	-41.913373	146.848220	1174.94	980089.51	980351.35	-7.59	-12.51	-17.44	-22.36	-30.73
191272	487255.13	5360475.73	-41.907415	146.846332	1157.50	980092.33	980350.82	-8.00	-12.85	-17.70	-22.56	-30.80
191273	487246.92	5361264.51	-41.900310	146.846250	1154.21	980092.61	980350.18	-7.80	-12.64	-17.48	-22.31	-30.54
191274	486972.57	5361812.25	-41.895373	146.842955	1177.79	980088.10	980349.74	-6.77	-11.70	-16.64	-21.58	-29.97
191275	486624.66	5362398.19	-41.890089	146.838774	1183.74	980085.22	980349.26	-7.88	-12.85	-17.81	-22.77	-31.20
191276	486307.79	5362997.80	-41.884683	146.834969	1150.31	980090.56	980348.78	-9.29	-14.11	-18.93	-23.75	-31.95

- Only a single Bouguer density of 2.67 gms/cc was required to be calculated and terrain corrections for this survey are by consultant Dr. David Leahman.
- Final consultant format is then

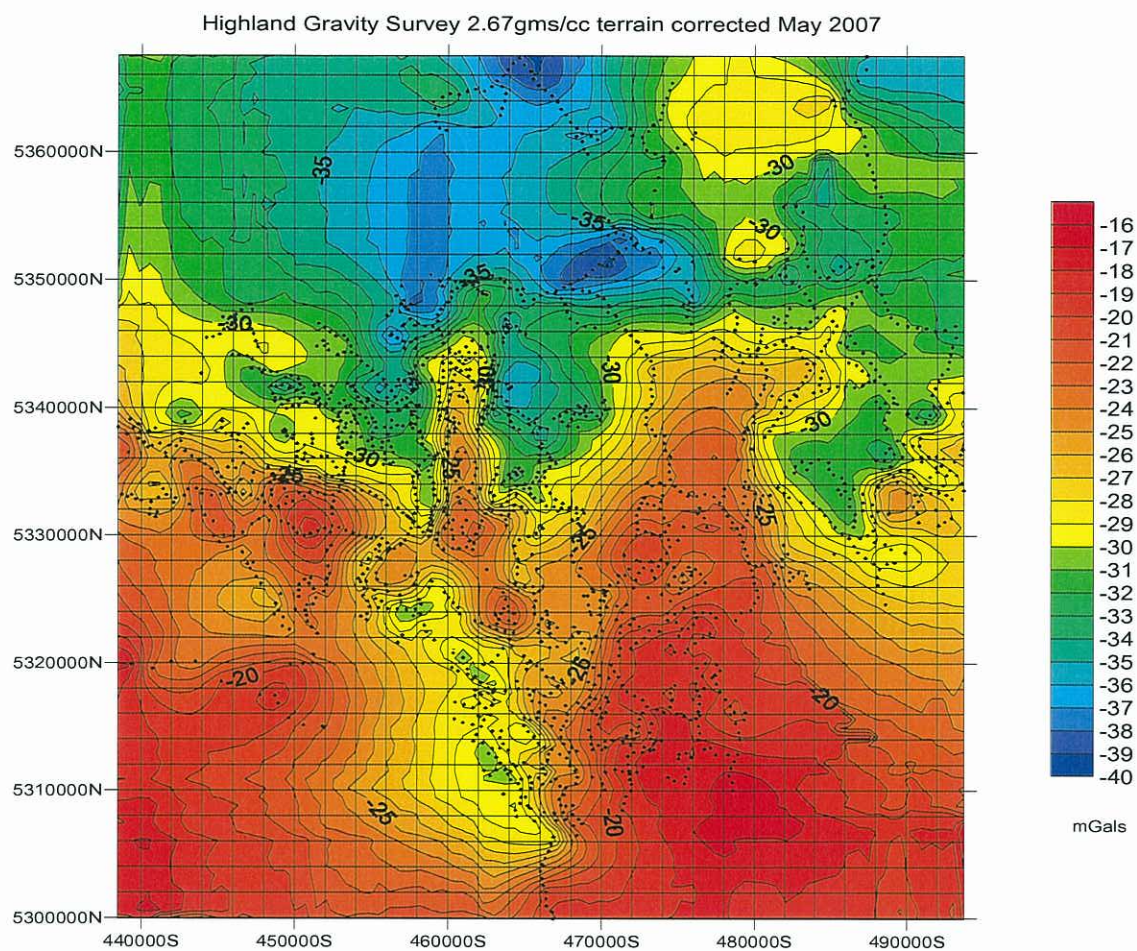
pegID	AMGEst	AMG-Nth	Elvn	D2.67	Tcn	2.67Tcn
1270	487544.01	5359066.92	1168.28	-30.57	0.35	-30.22
1271	487412.88	5359814.51	1174.94	-30.73	0.36	-30.37
1272	487255.13	5360475.73	1157.50	-30.80	0.37	-30.43
1273	487246.92	5361264.51	1154.21	-30.54	0.34	-30.20
1274	486972.57	5361812.25	1177.79	-29.97	0.38	-29.59
1275	486624.66	5362398.19	1183.74	-31.20	0.43	-30.77
1276	486307.79	5362997.80	1150.31	-31.95	0.65	-31.30

- Final archive data format for government files is then

CLIENT: Great Southland Minerals
 AREA: Bronte Park Tasmania
 AMG66 ZONE=55
 Meter: Lacoste G556 CALIB.FACTOR Interval= 1.01367
 Observed values are drift corrected in Isogal65 mGals
 Operator: Solo Geophysics April 2007

pegID	AMGEst	AMG-Nth	Elvn	Observed	TCn
1270	487544.01	5359066.92	1168.28	980091.58	0.35
1271	487412.88	5359814.51	1174.94	980089.51	0.36
1272	487255.13	5360475.73	1157.50	980092.33	0.37
1273	487246.92	5361264.51	1154.21	980092.61	0.34
1274	486972.57	5361812.25	1177.79	980088.10	0.38
1275	486624.66	5362398.19	1183.74	980085.22	0.43
1276	486307.79	5362997.80	1150.31	980090.56	0.65

Gravity contour map, coordinates AMG66 Zone55



Regional Gravity Ties February 2007:

CLIENT: Great Southland Minerals

AREA: Hobart

GRID: Highland Bases

BASE # 01;GRAVITY:9802093.800;EAST=xxxxxx ;NORTH=xxxxxxx :Bronte house
 BASE # 02;GRAVITY:9802095.200;EAST=457742 ;NORTH=5334623 :Bronte
 BASE # 08;GRAVITY:9804369.700;EAST=535927;NORTH=5260737 :radio telescope
 BASE # 09;GRAVITY:9804483.100;EAST=541258;NORTH=5256804 :airport car park
 LAST BASE
 LOOP:01;METER:556;DATE:070207;OPERATOR:B.RAU
 LINE Line
 LINE L
 000000.00 0000000009. 3961.46 1152 000.00 40 -.015 09 3961.44
 541258.00 5256804.00 3961.46 1152 ***,** 40 -.015 900001 3961.44 980448.31 airport c/pk
 514752.00 5297743.00 3866.49 1321 ***,** 40 -.014 900003 3866.48 980352.03 Melton Mobray
 500531.00 5307366.00 3827.27 1352 ***,** 40 -.013 900004 3827.26 980312.28 Bothwell
 494750.00 5320911.00 3784.16 1416 ***,** 40 -.011 900005 3784.15 980268.55 Waddamana T/O
 491236.00 5338613.00 3691.66 1443 ***,** 40 -.010 900006 3691.65 980174.78 Stepps T/O
 485143.94 5346832.79 3668.49 1503 918.88 40 -.009 900007 3668.48 980151.29 Open area
 492842.35 5344155.67 3648.30 1526 945.36 40 -.009 900008 3648.29 980130.83 Gate Flintstone
 473136.82 5352174.04 3629.65 1557 1056.34 40 -.011 900009 3629.64 980111.92 Great Lakes Hotel
 472625.89 5361169.62 3628.43 1618 1053.72 40 -.012 900010 3628.42 980110.69 Liawanie
 457742.78 5334623.73 3725.94 1724 676.00 40 -.022 900011 3725.92 980209.52 Bronte
 457592.57 5331275.16 3730.07 1736 674.23 40 -.022 900012 3730.05 980213.71 ST7614 RM3
 455248.00 5316734.00 3800.87 1806 ***,** 40 -.028 900013 3800.84 980285.49 Tungatina Mem
 459655.00 5308224.00 3833.40 1828 ***,** 40 -.035 900014 3833.36 980318.45 Wayatinah Assem
 471957.00 5301222.00 3845.04 1850 ***,** 40 -.038 900015 3845.00 980330.25 Strickland T/O
 475968.00 5296295.00 3878.59 1905 ***,** 40 -.042 900016 3878.55 980364.26 Ouse hydrant
 500531.00 5307366.00 3827.34 1945 ***,** 40 -.054 900004 3827.29 980312.30 Bothwell
 514752.00 5297743.00 3866.57 2007 ***,** 40 -.057 900003 3866.51 980352.06 Melton Mobray
 541258.00 5256804.00 3961.52 2118 ***,** 40 -.071 900001 3961.45 980448.31 airport car park
 999999.99 0000000009. 3961.52 2119 000.00 40 -.071 09 3961.45

Elevations are from Leica RTK surveyed stations, others are Garmin GPS no RTK



Hobart airport:



Melton Mobray:

Bothwell:

Waddamana T/Off



Stepps:



Poatina T/Off



Gate: Flintstone



Great Lakes Hotel:



Liawanie: Lake Augusta T/Off



Bronte Park



Bronte Park Hwy T/Off ST7614



Tungatina Memorial:



Wayatinah Assembly Point:



Strickland T/Off



Ouse:

