A LOGISTICS REPORT FOR A GRAVITY AND MAGNETICS SURVEY CONDUCTED AT THE ANTRIMS JV BIRRINDUDU, NT FOR BHP BILLITON

FUGRO GROUND GEOPHYSICS PROJECT NUMBER G2052

August, 2002
Fugro Ground Geophysics Pty. Ltd.
65 Brockway Road
Floreat 6014
Perth Australia

CONTENTS

FIGURES

APPENDICES

1. INTRODUCTION

1.1 GENERAL

Between Thursday 4th July and Tuesday 22nd July 2002, Fugro Ground Geophysics Pty Ltd conducted a Gravity and Magnetics survey for BHP Billiton, near Birrindudu Station in the Northern Territory.

The survey was conducted on ten (10) individual locations, with a gravity crosshair done over eight of the locations, and magnetics on all locations. A total of 444 gravity stations were observed, together with 88.1km of magnetics traverses.

1.2 EQUIPMENT AND PERSONNEL

A Garmin GPS2+ handheld GPS was used to navigate to each point for the gravity acquisition and to flag the line positions for the magnetics traverses. A geodetic-grade GPS (Ashtech Z-12) was used to record all pseudo range and phase information simultaneously with the acquisition of the gravity data. The On The Fly (OTF) processing of this GPS data generated positional information used in the gravity processing. Gravity data was acquired using a LaCoste & Romberg Model G gravimeter, with magnetics data acquired using a Geometrics G-856 proton precession magnetometer. While repeatable, the magnetics data exhibited high gradients and rapid station to station changes as could be expected over basalts.

Fugro Ground Geophysics supplied a complete camp and food for the crew, together with all geophysical equipment and a Toyota 4x4 vehicle. BHPB supplied fuel and water from Birrindudu Station.

The following Fugro Ground Geophysics personnel acquired and processed the gravity/GPS data:

GRAVITY/MAGNETICS PERSONNEL

PERSONNEL	POSITION
Doug Hall	Crew Chief
Morris Wallace	Geophysical Technician

The following equipment was supplied on site by FUGRO GROUND GEOPHYSICS for magnetics, gravity and GPS data acquisition and processing.

Num	HARDWARE
1	Lacoste and Romberg Model G gravity meter.
3	Ashtech Z-12 geodetic grade-GPS receivers.
4	Geometrics G-856 Proton Magnetometers
1	Garmin GPS 2+ navigation GPS
1	Pentium II laptop computer for GPS processing
1	HP 320 Deskjet Printer
1	Four wheel drive vehicles
1	Inmarsat Satellite telephone
	Safety equipment - survival/first aid kits, EPIRB
	Tripods, Wild Optical level, compasses etc.
	SOFTWARE
	GRAVI Gravity Processing software
	Ashtech PNAV GPS processing software
	Geometrics MAGMAP 2000 for magnetics processing

2. SURVEY PROCEDURE AND SPECIFICATIONS

2.1 DATA ACQUISITION

The gravity/GPS survey consisted of a total of 444 stations which were acquired at a 40m spacing in a crosshair over the centre of each target. Line length varied between 1000 and 1200m. The GPS data was processed with OTF to calculate elevation and position to sub-decimetre accuracy. Repeat readings were taken at the cross over of each line.

Magnetics data was acquired at a 10m station spacing on lines 200m apart. A base magnetometer was established at the camp to provide diurnal corrections.

The following table summarises the specifications for this survey.

PARAMETERS	**All Grids - Gravity**	Magnetics
Line Spacing	Crosshair	200m
Station Spacing	40 m	10m
Line Direction	E-W, N-S	N-S
Number of Stations	444	
Number of Lines	16	
Number of Repeats	12	
Navigation	Garmin GPS2+	
Surveying	OTF	
Loops	101-108	

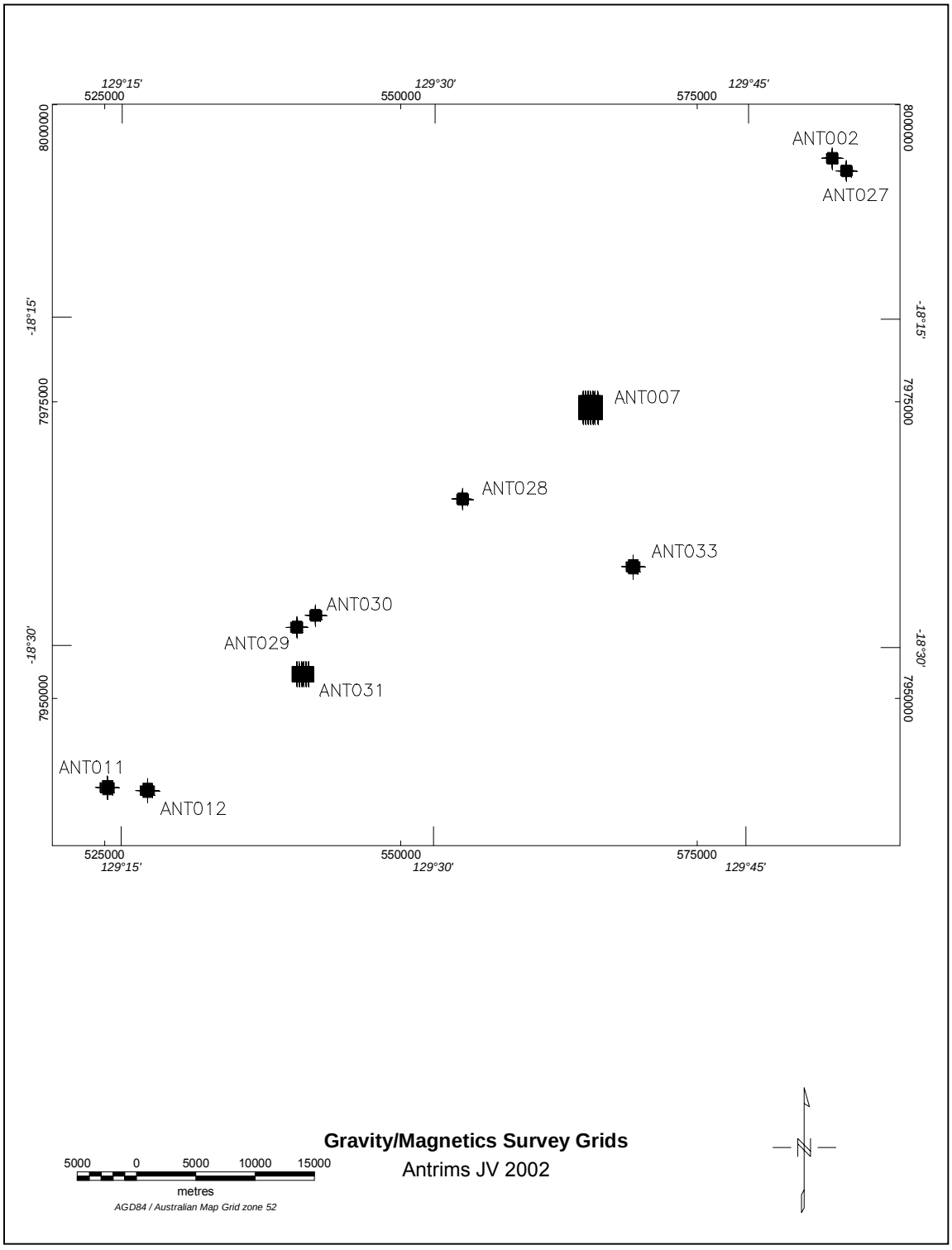


Figure 1. Antrims JV survey area.

2.2 NAVIGATION

Cross country station to station navigation was accomplished using a stand alone Garmin GPS2+ GPS receiver. This GPS unit was mounted on the dashboard of the vehicle and connected to a roll cage mounted external antenna. After entering the desired waypoint, it displayed the vehicle's track and bearing and range to the destination in real time.

2.3 BASE STATION ESTABLISHMENT

There are two reasons for the establishment of gravity base stations: Datum control and drift control.

2.3.1 Datum Control

The gravity meter measures only the relative changes in gravity and not the absolute value of gravity. Giving each station an absolute value of gravity is not critical if the survey is small and independent from all other past and planned surveys. Surveys forming part of an on-going exploration program and/or covering large areas need to be tied into a base with a known absolute gravity value to allow merging of different survey data sets and for correct application of latitude corrections (latitude correction is a non-linear function of latitude, so relative corrections should only be applied to small survey areas).

To facilitate datum control, the Bureau of Mineral Resources (now Geoscience Australia or GA) has established a national gravity base station network consisting of 200 equidistant bases throughout Australia. Of these, 60 bases were subsequently tied directly to at least one of the five absolute gravity measurement sites in Australia that were measured in 1979. These measurement sites are compatible with the International Gravity Standardisation Net 1971 (IGSN71) and referred to as Isogal84 values. It is important that the 1967 International Gravity Formula is used in reducing observations on the IGSN71 datum (the 1930 formula only applies to observations on the Potsdam datum).

One permanent gravity base was established roughly in the centre of the project area, along the road into Birrindudu Station, which served as a starting and ending point for the gravity loops. The gravity base, called DUDU, was tied to a GA base in Halls Creek located at the airport (6491.0129). For DUDU a observed gravity value of 978438.43 milligals was registered. The location of DUDU is shown in Figure 2 on the following pages together with gravity loop details for the ties.

64910129
Loop 0001 lp Time 6.2hrs Drift -0.02 VALUE: 978447.30
Parent Base Out 64910129 Value: 978447.30 Time: 11.10
Parent Base In CAMP Value: 978439.35 Time: 17.28

Loop 0002 lp Time 8.2hrs Drift 0.01 VALUE: 978447.29
Parent Base Out CAMP Value: 978439.35 Time: 6.23
Parent Base In CAMP Value: 978439.35 Time: 14.40

Loop 0002 lp Time 8.2hrs Drift 0.01 VALUE: 978447.30
Parent Base Out CAMP Value: 978439.35 Time: 6.23
Parent Base In CAMP Value: 978439.35 Time: 14.40

CAMP
Loop 0001 lp Time 6.2hrs Drift -0.02 VALUE: 978439.34
Parent Base Out 64910129 Value: 978447.30 Time: 11.10
Parent Base In CAMP Value: 978439.35 Time: 17.28

DUDU
Loop 0003 lp Time 8.3hrs Drift 0.00 VALUE: 978438.42
Parent Base Out CAMP Value: 978439.35 Time: 8.49
Parent Base In DUDU Value: 978439.35 Time: 17.20

Loop 0004 lp Time 4.2hrs Drift 0.04 VALUE: 978438.43
Parent Base Out CAMP Value: 978439.35 Time: 7.07
Parent Base In CAMP Value: 978439.35 Time: 11.31

Loop 0005 lp Time 11.1hrs Drift 0.00 VALUE: 978438.44
Parent Base Out CAMP Value: 978439.35 Time: 6.51
Parent Base In CAMP Value: 978439.35 Time: 18.04

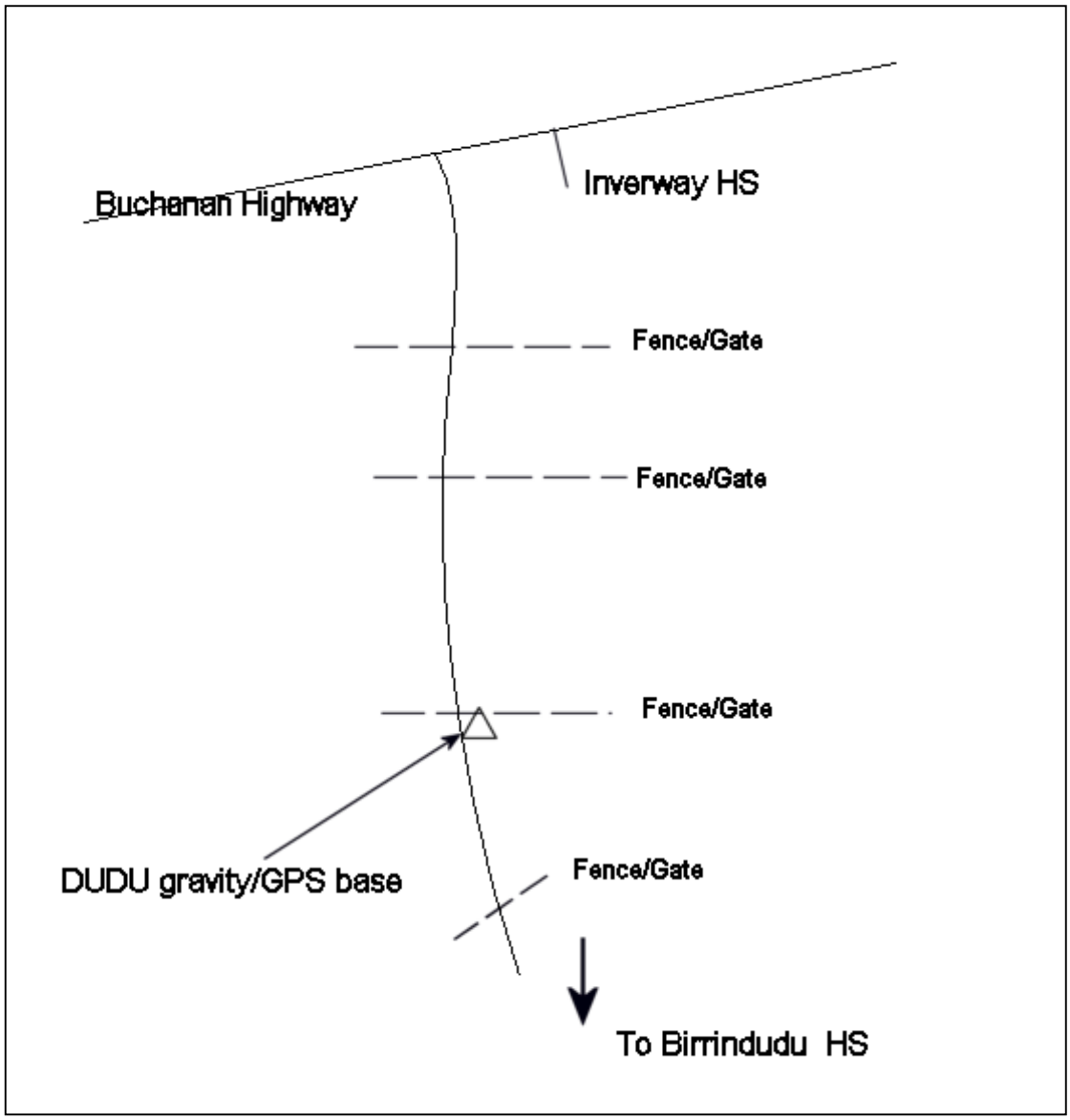


Figure 2. GPS and gravity base DUDU. (schematic only)

2.3.2 Drift Control

Drift has two components, a cyclic component due to the time varying gravitational effects of the sun and moon, and an approximately linear component due to instrumental drift. The tidal effects are removed using Longman's algorithm which calculates the tidal correction to a resolution of 0.01 mgals. As the remaining drift is predominantly linear, gravity loop times can be extended to cover the full day.

This offers a number of advantages :

- Most loops are directly tied to primary bases reducing accumulated errors generated from tying secondary bases to other secondary bases.

- Removes the need to set up a series of temporary bases along the survey line.

- Instrument drift rate is often less than reading error, even for long duration loops.

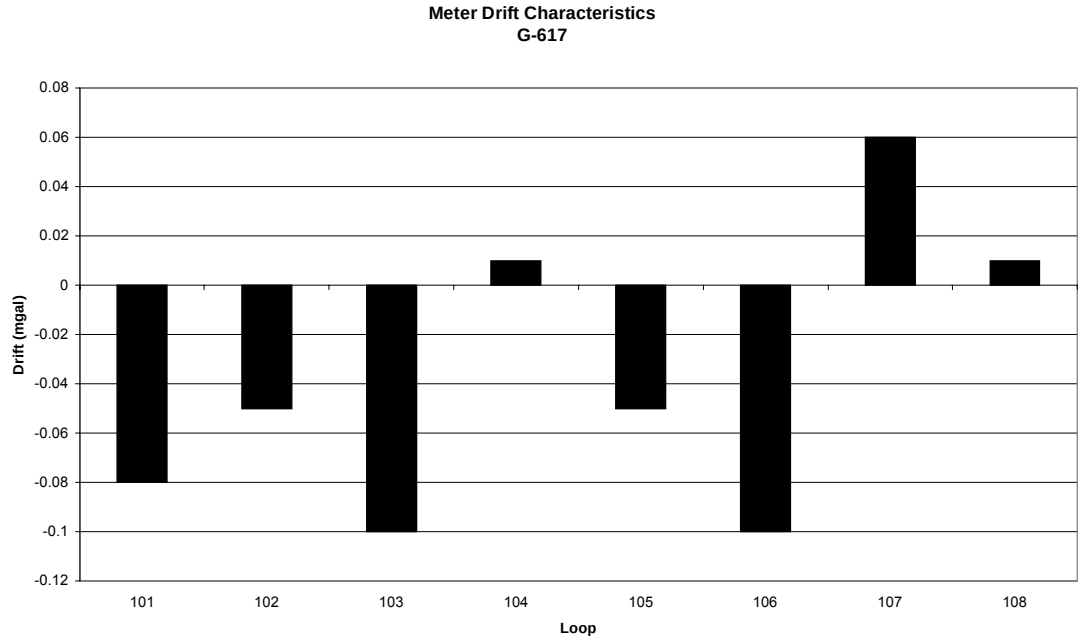


Figure 3. Instrument drift for meter G617

The gravity meter, being a mechanical instrument consisting of beams, weights and springs, suffers from drift due to minute stretching of the spring mechanism. This drift can be removed provided each survey loop starts and ends at the same gravity station or at two different stations each of known value of gravity. For this survey, gravity loops are tied into the gravity base station DUDU. Drift values for G-617 are shown above.

2.4 GRAVITY REPEATS

An operational procedure that includes 5% repeats provides both quality control and confirmation of the linearity of the mechanical drift. The repeats are used as secondary bases to isolate and reduce the amount of field data recovery in the instances where excessive tares have occurred. On this survey, the layout of the gravity lines and grids made this repeat level impractical to achieve. Repeats were observed at the line crossovers and generally at the start and end of the grid with the GPS base station located beside the first station.

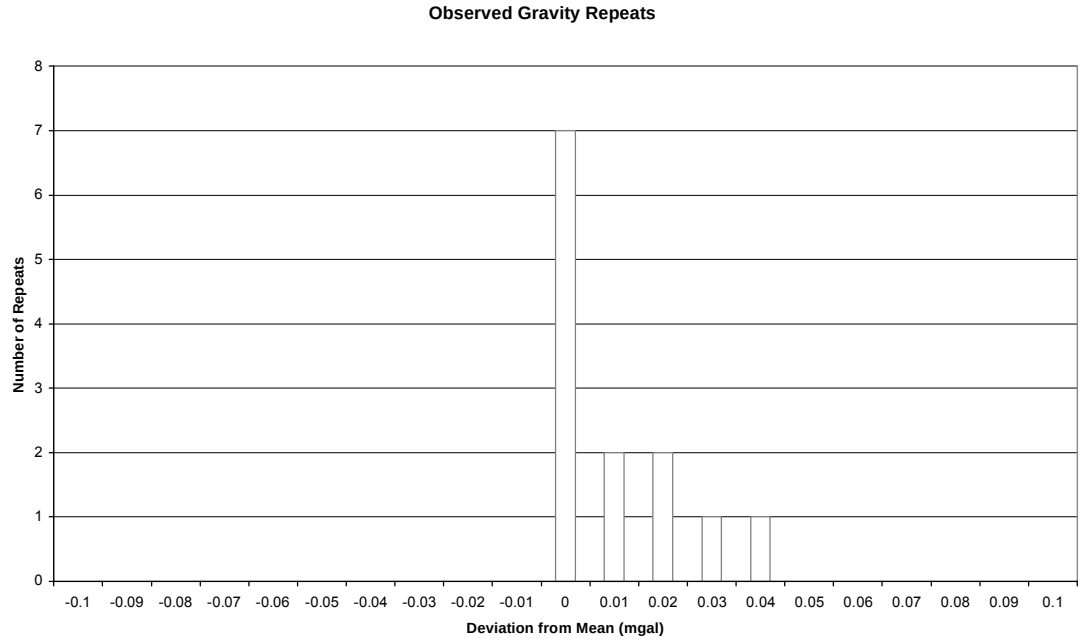


Figure 4. Statistical distribution of gravity repeats

For this survey a total of 13 stations were reoccupied for drift control. Figure 6 demonstrates the distribution of the repeats.

2.5 GPS SURVEYING

Unlike most other geophysical methods, observed gravity requires accurate survey information before the technique can usefully be used in sub-surface mapping. The gravity response to elevation and position can far exceed sub-surface anomaly amplitudes. The effects are approximately 0.20 mgals per meter of elevation and 0.5 mgals per kilometre of north-south position. Therefore real-time GPS (±20 metres) is totally inadequate while real-time differential GPS (±5 metres) would produce ±1 mgal errors. There are three GPS methods that can provide adequate quality survey data for gravity reductions. These are:

METHOD	DESCRIPTION	ELEV ERROR	GRAV ERROR
Rapid Static	Relies on the mobile receiver remaining stationary for 5 to 30 minutes depending on the distance between the base and mobile receivers. Very accurate but slow.	±2cm	<.01 mgals
Real Time Kinematic (RTK)	Tracks satellites continuously and relies on a radio telemetry link with the GPS base station. Observations at the base are transmitted to the rover receiver together with the position of the base receiver, allowing it to calculate the vector from base to rover and apply it to the base station position. Observation times at each station is only a few seconds. Maintenance of the radio link is the limiting factor with RTK surveys generally limiting them to smaller grids.	±5cm	±.01 mgals
On The Fly Ambiguity resolution (OTF)	Tracks satellites continuously and stores information for post processing. Observation time at each station is only a few seconds. Able to recover from interruption of the satellite signals with no loss of accuracy through advanced ambiguity resolution algorithms which eliminate the need for a static initialisation or antenna swap.	±5cm	±.01 mgals

All methods require a base GPS receiver to be located at a station with known elevation and horizontal coordinates. This base receiver allows post processing of the data to remove ionospheric effects and accurately calculate the vector from the base to the rover receiver using carrier phase processing. The most appropriate method is generally a compromise between cost and accuracy, though the accuracy should be kept in-line with other sources of gravity noise (eg geological noise, terrain correction errors, meter reading resolution)

Fugro Ground Geophysics surveyed all gravity stations with GPS utilising Ashtech Z-12 geodetic receivers. Data processing was performed using PNAV, Ashtech's On The Fly (OTF) ambiguity resolution software.

2.5.1 Control Point Establishment

Because of the scattered locations of the survey grids, a central base (DUDU) was established, with a temporary base on each survey grid tied to the DUDU base. provided location and elevation for the GPS base stations. The location of DUDU is shown as a schematic in the appendices to this report together with a photograph of the base. The quality of the GPS data is partially dependent on a well selected location for the GPS base receiver. Some of the criteria used for selecting a base station site include:

-Restrict the maximum base receiver to mobile receiver distance (baseline) to 20 km

-Minimise daily access time for installation/de-installation

-Minimal obstruction to satellite signals (trees, hills, culture)

-Avoid areas with potential multi-path reflections (metal culture, saline water etc).

The base station DUDU was positioned using Auslig's AUSPOS long baseline processing service. While a number of benchmarks and trig stations were shown in the area, none were able to be located. Refer to the appendices for a picture of the DUDU base and a location schematic.

2.5.2 On The Fly (OTF) GPS

The OTF kinematic method of processing data is done using Ashtech's proprietary PNAV^{TM} baseline processing algorithm. PNAV is a Kalman-filter based real-time baseline processing engine which processes the time-tag matched double difference pseudo range and carrier phase measurements to generate optimal position and velocity solutions. Its ambiguity search algorithm fixes the carrier phase integer cycle ambiguities on-the-fly and enables PNAV to generate centimetre level epoch by epoch solutions. One of its major advantages over the other kinematic techniques is the elimination of initialisation requirements. This means that if the receiver loses lock completely because of trees, the crew does not have to stop and reinitialise the receiver. The PNAV software automatically recomputes the integer ambiguities even while the roving receiver is moving.

Repeats fell into a similar situation to the gravity repeats due to the programme layout. A total of 5 elevation repeats were observed with the largest error being 5cm.

2.5.3 GPS Window

The GPS window was good during the period of the survey, although some periods in the middle of the day had only 6-7 satellites available at an elevation mask of 10 degrees, as can be seen on the Geometric Dilution Of Precision (GDOP) graph below. This was only a problem on grids with substantial tree cover where some stations required a longer observation time after breaks in satellite lock. Figures 13 and 14 graph the Geometric Dilution Of Precision (GDOP) and number of satellites in view typical for a day in July 2002

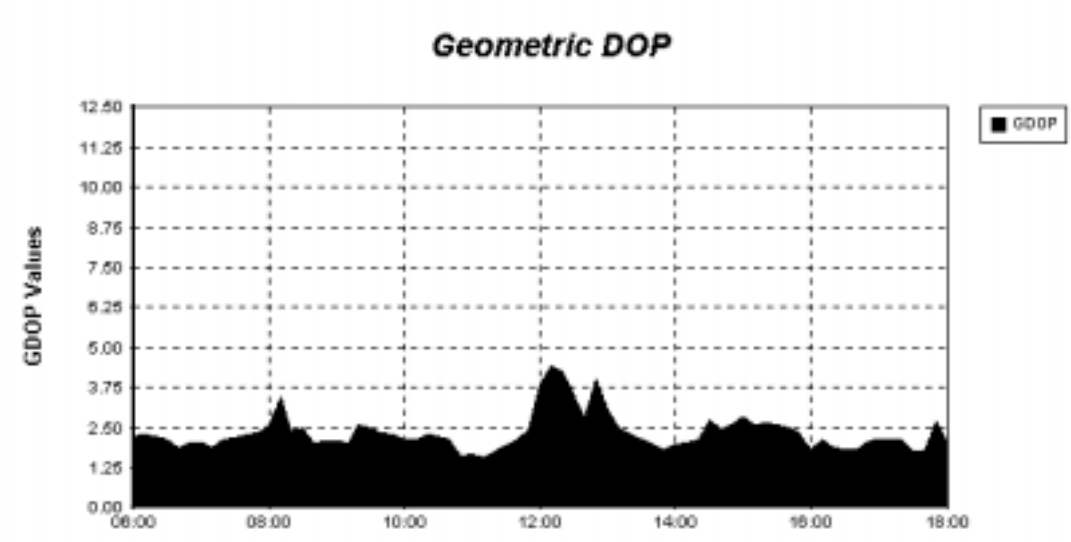


Figure 5. GDOP at a mask angle of 10^{o} (July 2002)

GDOP is a measure of the quality of the solution based on satellite geometry and is the single most important factor effecting data quality. An absolute minimum of four satellites are required to solve for the receiver's position in 3-D space (ie. there are four unknowns to solve: X,Y,Z and receiver synchro-timing errors). GDOP can be considered as being inversely proportional to the volume of the hexahedron formed between the receiver and the four satellites (ie small volume $\Rightarrow$ high GDOP $\Rightarrow$ poor solution). GDOP is good when it is less then 3, acceptable when it lies between 3 and 5 and unacceptable if it exceeds 5.

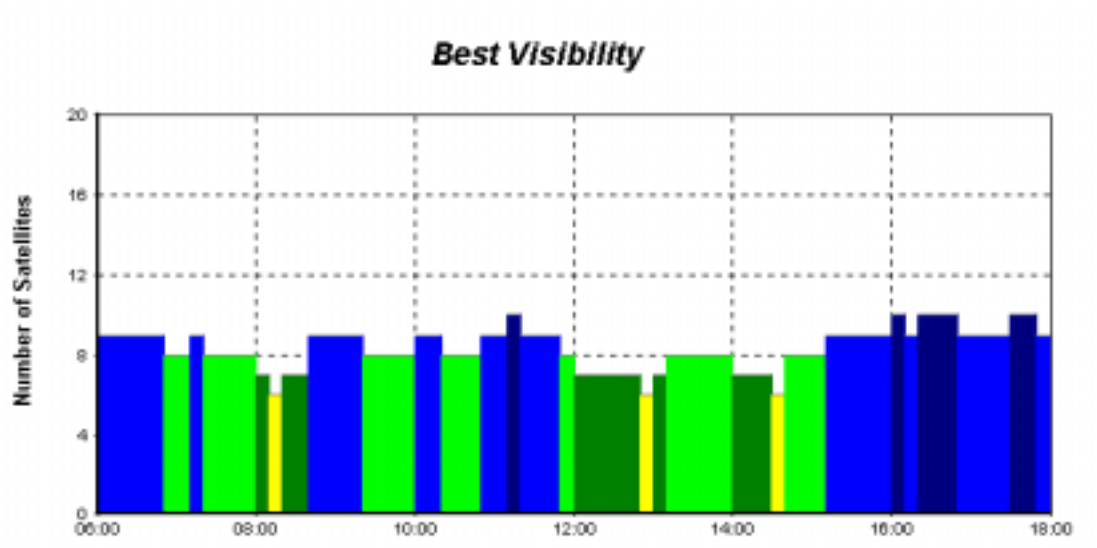


Figure 6. Satellites in view above 10^{o} for survey area during July 2002

3. DATA PROCESSING

3.1 OBSERVED GRAVITY

The following corrections are applied to the raw gravity data to obtain observed gravity (g_o):

Instrument correction: to correct for the scaling factor between machine units and milligals, as listed in the manufacturer's calibration tables (see Appendix A).

Tidal correction: To correct for the differential gravitational effects of the moon and sun. Longman's polynomial approximation of tidal effect is applied to the base-out, base-in readings before the loop drift rate is calculated and is also applied to each station within the loop. The Longman's formulae are published in the Journal of Geophysical Research, Vol 64, No 12.

Mechanic drift: removed with the assumption that the drift between base-out and base-in is linear. This is a valid assumption when the non-linear components (tidal) have been removed before the drift rate is calculated and the meter has not suffered significant tares during the course of the loop.

The following equation summarises theses corrections to obtain observed gravity:

$$g_o = g_{stn} + C_{tide} - C_{drift} - g_{base\text{-}out} + g_{0(base)}$$

where:

g_o= observed gravity in milligals

g_{stn}= raw gravity reading at each station

C_{tide}= tidal effect (in milligals)

$g_{0(base)}$ absolute value of gravity at the base

$C_{drift} = (g_{base\text{-}out} - g_{base\text{-}in})/(t_{base\text{-}out} - t_{base\text{-}in}) \times t_{stn}$

$g_{base\text{-}out}$, $g_{base\text{-}in}$ are base readings at start and end of loops

$t_{base\text{-}out}$, $t_{base\text{-}in}$ are base times at start and end of loops

3.2 BOUGUER GRAVITY

Bouguer gravity is calculated using equation:

$$G_b = G_o - G_t + C_{fa} - C_b + C_t$$

where

G_o=	observed gravity described above
G_t=	theoretical gravity calculated from the station's latitude.
C_{fa}=	free air correction
C_b=2πGρh	bouguer correction, G=universal gravity constant, ρ=density
C_t=	terrain correction

Latitude Correction - To correct observed gravity for the effects of the differential centrifugal acceleration due to the reduction in angular velocity at the surface of the earth with latitude (this acceleration is at its maximum at the equator where the observed gravity will be at its minimum). This correction is solely a function of latitude (φ) obtained from survey co-ordinates.

For this survey the 1967 gravity formula is used to calculate the theoretical gravity g_t.

$$g_t = -978031.80 \times (1 + 0.0053024 \times \sin^2(\varphi) - 0.0000059 \times \sin^2(2\varphi))$$

Free Air Correction - To correct for the fact that gravity decreases (as the square of the distance) from the elevation datum. This correction is a function of station elevation above the datum and is approximately 0.3085958 mgals/metre.

Bouguer Correction - Corrects for the gravitational attraction of the rock between the station and elevation datum. This correction is dependent on elevation and the rock density and is approximately $2\pi G\rho h = 0.041896325\rho$ mgal/meter. For this survey, densities of 2.2, 2.4 and 2.67 gms/cc were used for the Bouguer corrections.

Terrain Correction - Corrects for the effects of surrounding topographic features which deviates from the infinite slab that is implicit in the bouguer correction. Quite small hills close to the reading site can have significant effects on gravity. Major features can have effects in excess of 20 km from the reading site. No terrain corrections were required for the grids covered during this survey.

3.3 GPS

3.3.1 Static Differential GPS

The temporary GPS bases established at each grid within the survey area were processed using Ashtech's 'Prism' software for the static ties.

3.3.2 On The Fly (OTF) GPS

Ashtech "PNAV" software was used in processing all GPS loops acquired on this survey. PNAV uses a recursive Kalman filter parameter estimation technique that resolves ambiguities while the roving receiver is in motion. PNAV initially uses the linear combination of the L1 and L2 frequencies (called widelane), which gives an 86cm carrier wave. The widelane carrier wave, being 86cm long is easier to solve ambiguities for than the L1 or L2 (<19cm) carrier waves individually. Once the widelane ambiguity is solved, L1 and L2 ambiguities are easily computed. The OTF method gives results comparable to normal kinematic methods, while eliminating the need to carry out static initialisation's or antenna swaps after breaks in the satellite data.

3.4 SPHEROID TRANSFORMATION

GPS uses the World Geodetic System 1984 (WGS84) spheroid for both its broadcast and precise ephemerides. The WGS84 (World Geodetic System) is a geocentric reference system which attempts a best fit of the whole earth using the latest information. The Australian National Spheroid (ANS) is a non geocentric local spheroid and is the basis for the Australian co-ordinate set (AGD66 & 84) and its UTM projection. An accurate 7 parameter shift is available to convert between WGS84 and AGD84, however because coordinates were required in the older AGD66 values, a block shift (supplied by AUSLIG) must then be applied to the AGD84 values. This shift was 4.48m East and -3.3m North from AGD84 values. It should be noted that conversion to AGD66 can generate an error in position of up to 3m, as the AUSLIG values are simply a mean value for each 1:250,000 map sheet. This is a result of the non homogenous nature of the AGD66 projection.

All GPS data are processed on the WGS84 datum, and must then be converted to AGD, to reflect the shift between the datum origins. Fugro Ground Geophysics used the following datum transformation values.

Defining parameters for the ANS Spheroid:

Semi-Major Axis (a) 6378160m	Inverse Flattening ($^1/_f$) 298.25
Transformation Parameters From WGS84 to AGD84	(From Higgins, 1987)
Shifts	Rotations (seconds)
Tx 116m	Rx 0.23
Ty 50.47m	Ry 0.39
Tz -141.69m	Rz 0.344
Scale change K 0 ppm	

The data is also presented as UTM co-ordinates (Zone 52) using Redfearn's (1948) formulae to convert geographic co-ordinates to easting and northing values.

3.5 SPHEROID-GEOID SEPARATION

The Australian Height Datum (AHD) is a national vertical datum based on mean sea level measured at 30 locations around the Australian coastline. The geoid is an equipotential surface which best approximates mean sea level over the whole earth. AHD, true local mean sea level and geoid surfaces invariably do not coincide and certainly differ from the WGS84 and AGD84 spheroid surfaces.

Fugro Ground Geophysics processes all heights to the WGS84 spheroid which differs by up to 50 meters from the AHD height. This height difference is referred to as spheroid separation or n-value. The calculation of the height difference between the WGS84 spheroid and the non-uniform Australian Height Datum depends on the GPS method, area and accuracy. The possible methods include:

1 Global Geo-potential Model (eg OSU91) which utilises a satellite orbit perturbation, terrestrial gravity and satellite altimetry to produce a high degree expansion model of the geoid. This method provides absolute accuracies of 2 metres and relative errors at the decimetre level. Given that relative errors of over 20ppm (20mm/km) can occur when exclusively using a geo-potential model this method should only be applied in areas where there no better geoid model.

2 In Australia, AUSLIG (Australian Surveying & Land Information Group - Dept. of Administrative Services) maintains a data base of n values over a regular 2 minute grid calculated from a combination of the Global model (EGM96) and Geoscience Australia's gravity database. This method can provide relative accuracy of 2-3 parts per million. Fugro Ground Geophysics uses a bi-cubic interpolation routine provided by AUSLIG to calculate n-values for each control point from this regular grid of calculated values. The interpolation errors are less than 10 cm when compared with rigorously calculated n values.

3 For surveys requiring high accuracy in areas with good gravity coverage, the n-values may be rigorously calculated using a combination of Global model EGM96 and GA gravity data for each station. This method will therefore have no interpolation errors.

For this survey method 2 has been applied to the WGS84 co-ordinates to give AHD heights.

3.6 OFFICE REPROCESSING

As a standard procedure, all data is routinely checked throughout the survey, and undergoes a final checking process via a complete reprocessing sequence subsequent to the completion of the survey.

The following data integrity checks were made:

All data entry of raw gravity are checked against field books
WGS84 to AGD66 to AMG conversions checked
Spheroid to geoid separation checked for both control and each gravity station
GPS and Gravity Base station ties are checked and reprocessed
Re-process OTF data where necessary

The final data accompanying this report has been shifted to reflect the accurate position of the DUDU base station which was computed after completion of the survey.

4. ERROR ANALYSIS

The total probable error in the final Bouguer Gravity data, e_{bg}, is calculated using: (from Appendix D)

$$e_{bg}^2 = e_g^2 + e_{gt}^2 + (c * e_h)^2$$

where

e_g is the error in the observed gravity

e_{gt} is the error in the theoretical gravity value used

e_h is the error in the elevation value

$c=(0.3086-2\pi\rho G)$

where $G=6.67 \times 10^{-8}$ (dyne cm^2)/g Universal Gravity Constant

$\rho=2.67$ g/cc

c=0.1967 mgal/metre

From preceding sections

e_g = 0.019 x 0.707 = 0.013 mgals

e_h = 0.05 x 0.707 = 0.035 metres

e_{gt} = 0.00081 sin(2 x latitude) mgals/metre x northing error
= 0.0001 mgal

It follows that the probable Bouguer error for the survey

$$e_{bg}^2 = 0.013^2 + 0.0001^2 + (0.035 \times 0.1967)^2$$

e_{bg} = 0.014 mgals

5. DATA PRODUCTS

5.1 FIELD DATA PRODUCTS

The following data presentation products were presented to BHP Billiton.

-Field data via email.

5.2 FINAL DATA PRODUCTS

The following data presentation products were presented to BHP Billiton.

-Logistics Report

-Final data on CD-ROM.

5.2.1 FINAL DATA FORMAT

The final data is supplied to BHP in a standard Geosoft ASCII format including a header line detailing column assignments. This disk is located at the rear of the report.

APPENDIX A

GRAVITY METER CALIBRATION TABLE

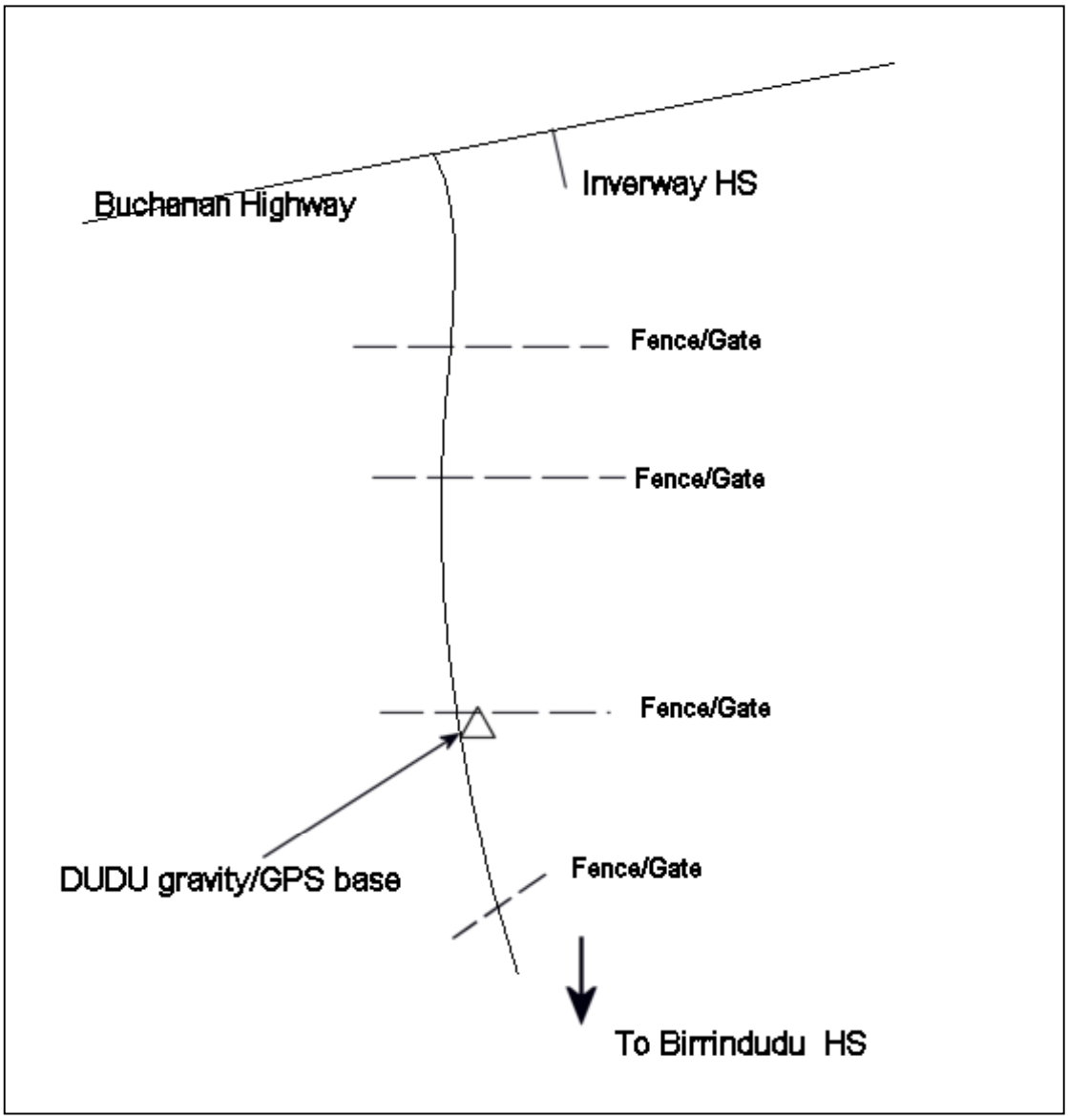
MILLIGAL VALUES FOR LACOSTE & ROMBERG MODEL G GRAVITY METER # G-617

COUNTER READING	VALUE IN MILLIGALS	FACTOR FOR INTERVAL
2000	2032.28	1.01678
2100	2133.95	1.01686
2200	2235.64	1.01696
2300	2337.34	1.01706
2400	2439.04	1.01717
2500	2540.76	1.01729

APPENDIX B

GPS CONTROL DESCRIPTIONS

DUDU	GDA94
Latitude (ϕ)	18°09'10".1701 S
Longitude (λ)	129°30'49".3905 E
MGA East (Zone 52)	554,337.252
MGA North (Zone 52)	7,992,830.462
Spheroidal Height	433.529
Geoid Separation (n)	30.881
AHD Elevation (Auspos Derived)	402.648
Observed Gravity (Isogal84 milligals)	978438.43


Buchanan Highway
Inverway HS
Fence/Gate
Fence/Gate
Fence/Gate
DUDU gravity/GPS base
Fence/Gate
To Birrindudu HS

APPENDIX C

GRAVITY LOOP STATISTICS

GRAVITY LOOP STATISTICS

Loop	Date	Stations	Drift	G #	G Fact	Base Out	Base In
101	20020707	54	-0.08	617	1.01678	DUDU	DUDU
102	20020708	54	-0.05	617	1.01678	DUDU	DUDU
103	20020711	64	-0.1	617	1.01678	DUDU	DUDU
104	20020716	52	0.01	617	1.01678	DUDU	DUDU
105	20020717	53	-0.05	617	1.01678	DUDU	DUDU
106	20020719	63	-0.1	617	1.01678	DUDU	DUDU
107	20020720	64	0.06	617	1.01678	DUDU	DUDU
108	20020721	53	0.01	617	1.01678	DUDU	DUDU

APPENDIX D

STATISTICAL ANALYSIS AND ERROR CALCULATION

STATISTICAL ANALYSIS AND ERROR CALCULATION

Assuming all of the factors contributing to the final Bouguer gravity are mutually independent, then the expected error in the final Bouguer gravity is the square root of the sum of the squares of the error in each factor, ie

$$E_{BG}^2 = E_{OBS}^2 + E_{gv}^2 + (C \times E_h^2) + E_{gT}^2$$

This assumption is not absolutely valid, since a small amount of cross-correlation does exist (for instance, an error in the vertical will affect the terrain correction if measured elevations rather than grid elevations are used to calculate the terrain correction). These cross-correlations will, however, be generally small, so the above error calculation will yield results that are very close to the true values.

In order to quantitatively measure the so-called expected error, it is necessary to define the confidence limit. This gives some meaning to the term expected error (or, put more positively, expected accuracy) by making the following statement possible:

X percent of the measured values will be accurate to within ±Y

For our purposes, we have defined the confidence limit to be 1 sigma, or roughly 67%, hence, we are after the error range (ie ±0.3 mgal) that will allow us to confidently state that 67% of the data satisfies this criterion. We could have chosen a 2 sigma limit, in which our expected error would have been larger, since our confidence limit would be about 95%. Similarly, we could have gone for a 50% confidence limit, which would have resulted in a smaller expected error. By choosing the 1 sigma limit, we are conforming to a fairly widely accepted industry standard.

The solution of the error equation for the final Bouguer gravity reduces to collecting enough data to determine the 1 sigma confidence limit of each of the factors in the equation. This is done by repeating enough samples to derive a statistically significant error limit. For simplicity, we will look at the probable error in observed gravity. The calculation of the probable errors in the other factors is analogous.

To derive the probable error in the observed gravity, stations are revisited and the gravity reading is taken again. Each reading at a station is compared with the mean of all readings taken at that station. For example, a station with three readings would yield three deviations from the mean value. It is believed that this method yields a much better statistical analysis of the data. Once all the deviations for a survey have been calculated, they are plotted on a histogram. The repeat differences will fit a normal distribution curve with a mean (zero in theory, very close to zero in practice) and a standard deviation (sigma). Statistically, 67% of the repeat differences will fall within ±1 sigma of the mean.

According to our definition:

$$E_{RPT\ DIFF} = \pm \text{ sigma}$$

In other words, the expected repeatability of an observed gravity reading is ± sigma.

It is very important to realise that expected repeatability is not the expected accuracy of an individual reading. The expected repeatability and expected accuracy of the individual reading are only the same if the repeat reading has an expected error of zero. This follows logically from our definition of expected error, as the square root of the sum of the squares of the expected error of each independent factor (see the formula for expected error of final Bouguer gravity). There may be

other small cross-correlations (ie the observer may look up the previous reading to speed up the repeat reading), but, for our purposes, we assume they are totally independent.

Thus

$$E_{RPT.DIFF}^2 = E_{RPT\ RDG}^2 + E_{FIRST\ RDG}^2$$

But we assume:

$$E_{RPT\ RDG} = E_{FIRST\ RDG}$$

(This assumption is a good one: you expect to be able to read a gravimeter on the same spot with the same precision at different times).

Therefore:

$$E_{RPT\ RDG}^2 = 2 \times E_{FIRST\ RDG}^2$$

or

$$E_{FIRST\ RDG} = 0.707 \times Sigma$$

The expected error of an individual observed gravity value is equal to 0.707 times the expected repeatability.

The above calculation for observed gravity is carried through for each factor in the final Bouguer value and the end result is a 67% confidence limit of final Bouguer gravity which we have defined as expected accuracy.

APPENDIX E

PRODUCTION REPORTS

PRODUCTION REPORT FOR G2052

DATE	COMMENTS	PROD
2/7/02	mobilisation	
3/7/02	Collect equipment and mobilise to field. Vehicle accident 27km from town (BHPB personnel driving). To Kununurra in evening to collect replacement	mobilisation
4/7/02	Mobilised to camp arriving 1730hrs	standby
5/7/02	Setup camp. Acquisition in afternoon on ANT029	stby/prod
6/7/02	Magnetics ANT029 and ANT030	production
7/7/02	Magnetics and Gravity ANT030	production
8/7/02	Gravity ANT029, Magnetics ANT031	production
9/7/02	Magnetics ANT031, ANT033	production
10/7/02	Gravity tie to Halls Creek, purchase fuel, tyres, supplies	standby
11/7/02	Gravity ANT033	production
12/7/02	Magnetics ANT028, scout access ANT007	production
13/7/02	Magnetics ANT007	production
14/7/02	Magnetics ANT027 - very poor access	production
15/7/02	Magnetics ANT002 - poor access	production
16/7/02	Gravity ANT027 - very poor access	production
17/7/02	Gravity ANT002 - poor access	production
18/7/02	Magnetics ANT012	production
19/7/02	Gravity and Magnetics ANT011	production
20/7/02	Gravity and Magnetics ANT012	production
21/7/02	Gravity ANT028	production
22/7/02	Gravity Base tie to Halls Creek. Completion of BHPB programme	.5 Standby

APPENDIX F

DATA LISTING

Line 111
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD 08-01-2002

\Line	Station	North metres	East metres	Latitude dec deg	Longitude dec deg	Elev metres	Ter Cor mgals	G obs. mgals	Free Air mgals	Bouguer Gravity (mgals) 2.20g/cc	2.40g/cc	2.67g/cc
111	1	7943103	525198	-18.60275	129.23885	379.58	0.0000	978462.92	22.63	-12.36	-15.54	-19.84
111	2	7943061	525194	-18.60312	129.23881	379.79	0.0000	978462.82	22.58	-12.43	-15.61	-19.91
111	3	7943023	525194	-18.60347	129.23881	379.95	0.0000	978462.73	22.51	-12.51	-15.69	-19.99
111	4	7942980	525197	-18.60386	129.23884	380.07	0.0000	978462.74	22.54	-12.49	-15.68	-19.98
111	5	7942939	525204	-18.60423	129.23891	380.21	0.0000	978462.64	22.46	-12.58	-15.77	-20.07
111	6	7942900	525205	-18.60458	129.23892	380.43	0.0000	978462.57	22.44	-12.63	-15.82	-20.12
111	7	7942859	525199	-18.60496	129.23886	380.86	0.0000	978462.46	22.45	-12.66	-15.85	-20.16
111	8	7942818	525199	-18.60532	129.23886	381.17	0.0000	978462.38	22.44	-12.69	-15.89	-20.20
111	9	7942779	525199	-18.60568	129.23886	381.46	0.0000	978462.30	22.43	-12.73	-15.93	-20.24
111	10	7942739	525202	-18.60604	129.23889	381.84	0.0000	978462.10	22.32	-12.87	-16.07	-20.39
111	11	7942700	525201	-18.60639	129.23888	382.29	0.0000	978461.99	22.34	-12.90	-16.10	-20.43
111	12	7942658	525192	-18.60677	129.23880	382.74	0.0000	978461.79	22.25	-13.03	-16.23	-20.56
111	13	7942620	525199	-18.60711	129.23886	383.27	0.0000	978461.67	22.27	-13.05	-16.26	-20.60
111	14	7942578	525200	-18.60749	129.23888	383.88	0.0000	978461.54	22.32	-13.06	-16.28	-20.62
111	15	7942539	525202	-18.60784	129.23889	384.64	0.0000	978461.34	22.33	-13.12	-16.35	-20.70
111	16	7942501	525204	-18.60818	129.23892	385.61	0.0000	978461.06	22.34	-13.21	-16.44	-20.80
111	17	7942456	525201	-18.60859	129.23889	387.04	0.0000	978460.72	22.41	-13.27	-16.51	-20.89
111	18	7942416	525201	-18.60895	129.23888	388.10	0.0000	978460.37	22.37	-13.40	-16.65	-21.04
111	19	7942375	525200	-18.60933	129.23887	388.95	0.0000	978460.14	22.38	-13.47	-16.73	-21.13
111	20	7942333	525201	-18.60970	129.23889	389.25	0.0000	978459.98	22.30	-13.58	-16.84	-21.25
111	21	7942298	525203	-18.61003	129.23891	389.70	0.0000	978459.79	22.22	-13.70	-16.96	-21.37
111	22	7942257	525202	-18.61040	129.23890	389.98	0.0000	978459.71	22.21	-13.74	-17.01	-21.42
111	23	7942218	525201	-18.61074	129.23889	390.22	0.0000	978459.68	22.23	-13.74	-17.01	-21.42
111	24	7942178	525201	-18.61111	129.23889	390.44	0.0000	978459.68	22.28	-13.71	-16.98	-21.40
111	25	7942137	525202	-18.61148	129.23890	390.56	0.0000	978459.65	22.26	-13.73	-17.01	-21.42
111	26	7942097	525203	-18.61184	129.23891	390.63	0.0000	978459.61	22.24	-13.77	-17.04	-21.46
111	27	7942057	525202	-18.61220	129.23890	390.73	0.0000	978459.69	22.32	-13.70	-16.97	-21.39
111	28	7942018	525202	-18.61255	129.23890	390.88	0.0000	978459.78	22.44	-13.59	-16.87	-21.29
111	29	7941978	525199	-18.61292	129.23887	390.98	0.0000	978459.88	22.55	-13.49	-16.77	-21.19
111	30	7941937	525201	-18.61328	129.23889	391.14	0.0000	978459.89	22.59	-13.46	-16.74	-21.17
111	31	7941899	525211	-18.61362	129.23899	391.24	0.0000	978459.94	22.65	-13.41	-16.69	-21.12

Line 112
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD 08-01-2002

\Line	Station	North metres	East metres	Latitude dec deg	Longitude dec deg	Elev metres	Ter Cor mgals	G obs. mgals	Free Air mgals	Bouguer Gravity (mgals) 2.20g/cc	2.40g/cc	2.67g/cc
112	1	7942499	524598	-18.60822	129.23317	385.83	0.0000	978461.02	22.35	-13.21	-16.44	-20.81
112	2	7942501	524639	-18.60819	129.23356	385.74	0.0000	978461.09	22.40	-13.15	-16.39	-20.75
112	3	7942500	524679	-18.60820	129.23394	385.57	0.0000	978461.12	22.38	-13.16	-16.39	-20.75
112	4	7942502	524719	-18.60819	129.23432	385.36	0.0000	978461.17	22.36	-13.15	-16.38	-20.74
112	5	7942500	524758	-18.60820	129.23468	385.27	0.0000	978461.18	22.35	-13.16	-16.39	-20.75
112	6	7942502	524799	-18.60818	129.23508	385.18	0.0000	978461.21	22.35	-13.15	-16.38	-20.74
112	7	7942499	524837	-18.60821	129.23544	385.15	0.0000	978461.29	22.42	-13.08	-16.31	-20.66
112	8	7942497	524879	-18.60823	129.23583	385.14	0.0000	978461.24	22.37	-13.13	-16.36	-20.72
112	9	7942497	524919	-18.60823	129.23621	385.08	0.0000	978461.28	22.39	-13.10	-16.33	-20.69
112	10	7942500	524958	-18.60820	129.23658	385.01	0.0000	978461.26	22.35	-13.14	-16.36	-20.72
112	11	7942501	524997	-18.60819	129.23695	385.01	0.0000	978461.28	22.36	-13.13	-16.35	-20.71
112	12	7942499	525036	-18.60821	129.23732	384.97	0.0000	978461.30	22.37	-13.12	-16.34	-20.70
112	13	7942499	525076	-18.60821	129.23770	384.98	0.0000	978461.25	22.32	-13.16	-16.39	-20.74
112	14	7942503	525116	-18.60817	129.23808	385.10	0.0000	978461.20	22.31	-13.19	-16.41	-20.77
112	15	7942499	525158	-18.60821	129.23847	385.50	0.0000	978461.08	22.32	-13.21	-16.44	-20.80
112	16	7942501	525204	-18.60818	129.23892	385.61	0.0000	978461.03	22.30	-13.24	-16.47	-20.83
112	17	7942498	525240	-18.60822	129.23925	385.87	0.0000	978461.00	22.35	-13.22	-16.45	-20.82
112	18	7942496	525282	-18.60823	129.23965	386.03	0.0000	978461.07	22.47	-13.11	-16.35	-20.72
112	19	7942502	525320	-18.60817	129.24001	385.80	0.0000	978461.18	22.51	-13.05	-16.28	-20.65
112	20	7942503	525360	-18.60817	129.24039	385.73	0.0000	978461.27	22.58	-12.97	-16.21	-20.57
112	21	7942503	525399	-18.60817	129.24076	385.48	0.0000	978461.38	22.61	-12.92	-16.15	-20.51
112	22	7942503	525442	-18.60817	129.24117	385.18	0.0000	978461.37	22.51	-12.99	-16.22	-20.58
112	23	7942503	525481	-18.60817	129.24154	384.82	0.0000	978461.51	22.53	-12.94	-16.16	-20.51
112	24	7942508	525523	-18.60812	129.24193	384.42	0.0000	978461.64	22.54	-12.89	-16.11	-20.46
112	25	7942505	525560	-18.60815	129.24229	384.18	0.0000	978461.86	22.69	-12.72	-15.94	-20.28
112	26	7942506	525601	-18.60814	129.24268	383.93	0.0000	978461.98	22.74	-12.65	-15.87	-20.21
112	27	7942497	525641	-18.60822	129.24305	383.79	0.0000	978462.04	22.75	-12.62	-15.84	-20.18
112	28	7942502	525681	-18.60817	129.24344	383.40	0.0000	978462.15	22.74	-12.60	-15.82	-20.15
112	29	7942506	525721	-18.60813	129.24382	383.06	0.0000	978462.16	22.64	-12.66	-15.87	-20.21
112	30	7942504	525760	-18.60815	129.24418	382.86	0.0000	978462.31	22.73	-12.56	-15.76	-20.09
112	31	7942504	525801	-18.60815	129.24457	382.60	0.0000	978462.36	22.70	-12.56	-15.77	-20.09

Line 121
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD 08-01-2002

\Line	Station	North metres	East metres	Latitude dec deg	Longitude dec deg	Elev metres	Ter Cor mgals	G obs. mgals	Free Air mgals	Bouguer Gravity (mgals) 2.20g/cc	2.40g/cc	2.67g/cc
121	1	7942848	528601	-18.60501	129.27111	370.90	0.0000	978466.39	23.30	-10.89	-14.00	-18.19
121	2	7942809	528601	-18.60536	129.27111	371.02	0.0000	978466.25	23.17	-11.02	-14.13	-18.33
121	3	7942769	528596	-18.60572	129.27106	371.12	0.0000	978466.18	23.11	-11.09	-14.20	-18.40
121	4	7942727	528596	-18.60610	129.27106	371.27	0.0000	978466.11	23.07	-11.16	-14.27	-18.47
121	5	7942687	528600	-18.60646	129.27110	371.36	0.0000	978466.01	22.98	-11.25	-14.36	-18.56
121	6	7942647	528606	-18.60683	129.27116	371.48	0.0000	978465.89	22.87	-11.37	-14.48	-18.68
121	7	7942606	528601	-18.60719	129.27112	371.59	0.0000	978465.78	22.78	-11.47	-14.59	-18.79
121	8	7942567	528596	-18.60755	129.27106	371.71	0.0000	978465.71	22.73	-11.53	-14.65	-18.85
121	9	7942528	528595	-18.60790	129.27106	371.82	0.0000	978465.63	22.66	-11.61	-14.72	-18.93
121	10	7942487	528599	-18.60827	129.27109	371.96	0.0000	978465.60	22.65	-11.63	-14.75	-18.95
121	11	7942448	528606	-18.60863	129.27116	372.08	0.0000	978465.53	22.60	-11.70	-14.81	-19.02
121	12	7942406	528591	-18.60900	129.27102	372.24	0.0000	978465.45	22.56	-11.75	-14.87	-19.08

```
     121      13 7942366  528601 -18.60937 129.27111  372.38  0.0000 978465.41   22.54  -11.79  -14.91  -19.12
     121      14 7942325  528610 -18.60973 129.27120  372.53  0.0000 978465.37   22.52  -11.82  -14.94  -19.15
     121      15 7942282  528605 -18.61012 129.27116  372.69  0.0000 978465.34   22.52  -11.84  -14.96  -19.17
     121      16 7942247  528605 -18.61044 129.27115  372.82  0.0000 978465.31   22.51  -11.86  -14.98  -19.20
     121      17 7942205  528609 -18.61082 129.27120  373.00  0.0000 978465.31   22.55  -11.83  -14.96  -19.17
     121      18 7942167  528597 -18.61116 129.27108  373.09  0.0000 978465.30   22.55  -11.84  -14.97  -19.19
     121      19 7942125  528593 -18.61154 129.27104  373.26  0.0000 978465.25   22.53  -11.88  -15.01  -19.23
     121      20 7942087  528605 -18.61189 129.27116  373.40  0.0000 978465.22   22.52  -11.90  -15.03  -19.25
     121      21 7942047  528602 -18.61225 129.27113  373.55  0.0000 978465.22   22.54  -11.89  -15.02  -19.24
     121      22 7942005  528600 -18.61263 129.27111  373.40  0.0000 978465.22   22.49  -11.93  -15.06  -19.28
     121      23 7941966  528602 -18.61298 129.27113  373.57  0.0000 978465.21   22.51  -11.93  -15.06  -19.28
     121      24 7941924  528602 -18.61335 129.27113  373.78  0.0000 978465.20   22.54  -11.91  -15.05  -19.27
     121      25 7941886  528598 -18.61370 129.27109  374.17  0.0000 978465.18   22.62  -11.87  -15.00  -19.24
     121      26 7941845  528605 -18.61407 129.27116  374.27  0.0000 978465.16   22.61  -11.89  -15.03  -19.26
     121      27 7941805  528606 -18.61443 129.27117  374.39  0.0000 978465.13   22.60  -11.91  -15.04  -19.28
     121      28 7941767  528597 -18.61478 129.27109  374.47  0.0000 978465.10   22.58  -11.94  -15.08  -19.31
     121      29 7941726  528603 -18.61515 129.27114  374.58  0.0000 978465.05   22.54  -11.99  -15.13  -19.36
     121      30 7941686  528608 -18.61551 129.27119  374.75  0.0000 978465.02   22.54  -12.00  -15.14  -19.38
     121      31 7941646  528597 -18.61587 129.27109  374.91  0.0000 978465.04   22.59  -11.97  -15.11  -19.35
Line 122
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD    08-01-2002
\=============================================================================================================
\Line   Station North    East   Latitude  Longitude   Elev   Ter Cor  G obs.  Free Air  Bouguer Gravity (mgals)
\               metres   metres  dec deg   dec deg    metres   mgals   mgals    mgals  2.20g/cc 2.40g/cc 2.67g/cc
\=============================================================================================================
     122       1 7942254  529207 -18.61037 129.27686  373.16  0.0000 978466.01   23.32  -11.07  -14.20  -18.42
     122       2 7942242  529157 -18.61047 129.27639  373.09  0.0000 978465.85   23.14  -11.25  -14.38  -18.60
     122       3 7942246  529117 -18.61044 129.27600  372.99  0.0000 978465.83   23.09  -11.29  -14.42  -18.64
     122       4 7942252  529080 -18.61039 129.27566  372.89  0.0000 978465.77   23.00  -11.37  -14.50  -18.72
     122       5 7942245  529040 -18.61045 129.27528  372.88  0.0000 978465.75   22.97  -11.40  -14.53  -18.74
     122       6 7942248  529000 -18.61043 129.27490  372.85  0.0000 978465.77   22.98  -11.39  -14.51  -18.73
     122       7 7942246  528959 -18.61045 129.27451  372.78  0.0000 978465.71   22.90  -11.46  -14.58  -18.80
     122       8 7942246  528919 -18.61045 129.27413  372.78  0.0000 978465.66   22.85  -11.51  -14.63  -18.85
     122       9 7942241  528880 -18.61049 129.27376  372.76  0.0000 978465.58   22.76  -11.60  -14.72  -18.94
     122      10 7942241  528839 -18.61050 129.27337  372.79  0.0000 978465.48   22.67  -11.69  -14.81  -19.03
     122      11 7942249  528800 -18.61042 129.27301  372.76  0.0000 978465.45   22.64  -11.72  -14.85  -19.06
     122      12 7942246  528759 -18.61045 129.27261  372.76  0.0000 978465.42   22.60  -11.76  -14.88  -19.10
     122      13 7942247  528719 -18.61043 129.27224  372.79  0.0000 978465.40   22.59  -11.77  -14.89  -19.11
     122      14 7942248  528679 -18.61042 129.27186  372.80  0.0000 978465.35   22.54  -11.82  -14.94  -19.16
     122      15 7942250  528638 -18.61041 129.27147  372.81  0.0000 978465.34   22.54  -11.82  -14.94  -19.16
     122      16 7942249  528604 -18.61042 129.27115  372.80  0.0000 978465.32   22.52  -11.84  -14.97  -19.18
     122      17 7942246  528560 -18.61045 129.27073  372.81  0.0000 978465.21   22.41  -11.96  -15.08  -19.30
     122      18 7942247  528518 -18.61044 129.27033  372.82  0.0000 978465.15   22.35  -12.02  -15.14  -19.36
     122      19 7942251  528479 -18.61041 129.26997  372.77  0.0000 978465.17   22.36  -12.00  -15.12  -19.34
     122      20 7942248  528441 -18.61043 129.26960  372.77  0.0000 978465.12   22.31  -12.05  -15.17  -19.39
     122      21 7942248  528401 -18.61043 129.26922  372.76  0.0000 978465.14   22.32  -12.03  -15.16  -19.37
     122      22 7942252  528361 -18.61040 129.26884  372.77  0.0000 978465.10   22.29  -12.07  -15.20  -19.41
     122      23 7942250  528320 -18.61041 129.26846  372.75  0.0000 978465.10   22.28  -12.08  -15.20  -19.42
     122      24 7942246  528280 -18.61045 129.26807  372.81  0.0000 978465.04   22.24  -12.12  -15.24  -19.46
     122      25 7942252  528241 -18.61040 129.26771  372.82  0.0000 978465.08   22.29  -12.08  -15.20  -19.42
     122      26 7942255  528201 -18.61037 129.26733  372.87  0.0000 978465.03   22.25  -12.12  -15.24  -19.46
     122      27 7942255  528161 -18.61038 129.26695  372.94  0.0000 978465.10   22.34  -12.03  -15.16  -19.37
     122      28 7942251  528121 -18.61041 129.26657  373.12  0.0000 978465.08   22.38  -12.02  -15.14  -19.36
     122      29 7942248  528080 -18.61044 129.26618  373.20  0.0000 978465.06   22.38  -12.02  -15.15  -19.37
     122      30 7942247  528040 -18.61044 129.26580  373.36  0.0000 978465.04   22.41  -12.01  -15.14  -19.36
     122      31 7942254  528002 -18.61039 129.26544  373.49  0.0000 978464.98   22.39  -12.04  -15.17  -19.39
Line 21
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD    08-01-2002
\=============================================================================================================
\Line   Station North    East   Latitude  Longitude   Elev   Ter Cor  G obs.  Free Air  Bouguer Gravity (mgals)
\               metres   metres  dec deg   dec deg    metres   mgals   mgals    mgals  2.20g/cc 2.40g/cc 2.67g/cc
\=============================================================================================================
      21       1 7995499  585901 -18.12761 129.81200  437.70  0.0000 978430.93   34.20   -6.14   -9.81  -14.76
      21       2 7995494  585941 -18.12766 129.81237  437.80  0.0000 978430.91   34.21   -6.15   -9.82  -14.77
      21       3 7995505  585981 -18.12756 129.81275  437.98  0.0000 978430.83   34.18   -6.19   -9.86  -14.81
      21       4 7995503  586019 -18.12758 129.81312  438.84  0.0000 978430.75   34.38   -6.07   -9.75  -14.71
      21       5 7995499  586059 -18.12761 129.81349  438.23  0.0000 978430.82   34.26   -6.14   -9.81  -14.77
      21       6 7995500  586099 -18.12760 129.81387  438.14  0.0000 978430.92   34.33   -6.05   -9.73  -14.68
      21       7 7995498  586137 -18.12762 129.81423  437.93  0.0000 978430.99   34.33   -6.03   -9.70  -14.65
      21       8 7995497  586179 -18.12763 129.81463  438.84  0.0000 978431.08   34.71   -5.74   -9.42  -14.38
      21       9 7995503  586220 -18.12756 129.81502  438.55  0.0000 978431.16   34.69   -5.73   -9.41  -14.37
      21      10 7995506  586259 -18.12754 129.81538  438.36  0.0000 978431.24   34.71   -5.69   -9.36  -14.32
      21      11 7995504  586299 -18.12756 129.81576  437.10  0.0000 978431.34   34.42   -5.86   -9.53  -14.47
      21      12 7995500  586338 -18.12759 129.81613  436.78  0.0000 978431.42   34.40   -5.85   -9.51  -14.46
      21      13 7995499  586379 -18.12760 129.81652  436.17  0.0000 978431.57   34.37   -5.83   -9.49  -14.42
      21      14 7995502  586419 -18.12757 129.81689  437.41  0.0000 978431.77   34.95   -5.36   -9.03  -13.98
      21      15 7995504  586458 -18.12755 129.81727  435.59  0.0000 978431.94   34.57   -5.58   -9.23  -14.16
      21      16 7995498  586499 -18.12760 129.81765  434.70  0.0000 978432.14   34.48   -5.58   -9.23  -14.14
      21      17 7995497  586539 -18.12761 129.81803  433.61  0.0000 978432.37   34.38   -5.59   -9.22  -14.13
      21      18 7995497  586581 -18.12761 129.81842  433.65  0.0000 978432.51   34.53   -5.44   -9.07  -13.98
      21      19 7995498  586619 -18.12759 129.81879  433.28  0.0000 978432.73   34.63   -5.30   -8.93  -13.83
      21      20 7995500  586659 -18.12757 129.81916  433.43  0.0000 978432.74   34.69   -5.26   -8.89  -13.79
      21      21 7995516  586699 -18.12743 129.81955  433.16  0.0000 978432.73   34.60   -5.32   -8.95  -13.85
      21      22 7995512  586740 -18.12747 129.81993  432.64  0.0000 978432.94   34.66   -5.22   -8.85  -13.74
      21      23 7995501  586781 -18.12757 129.82032  431.79  0.0000 978433.34   34.79   -5.01   -8.63  -13.52
      21      24 7995496  586818 -18.12760 129.82066  429.23  0.0000 978433.62   34.27   -5.29   -8.89  -13.74
      21      25 7995497  586857 -18.12760 129.82104  428.84  0.0000 978433.88   34.42   -5.11   -8.70  -13.55
      21      26 7995507  586899 -18.12750 129.82143  427.71  0.0000 978434.30   34.49   -4.93   -8.52  -13.35
```

Line 22
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD 08-01-2002

\Line	Station	North metres	East metres	Latitude dec deg	Longitude dec deg	Elev metres	Ter Cor mgals	G obs. mgals	Free Air mgals	Bouguer Gravity (mgals) 2.20g/cc	2.40g/cc	2.67g/cc
22	1	7996000	586401	-18.12307	129.81671	439.22	0.0000	978431.92	35.90	-4.58	-8.26	-13.23
22	2	7995962	586399	-18.12341	129.81669	439.92	0.0000	978431.83	36.01	-4.54	-8.23	-13.20
22	3	7995922	586398	-18.12377	129.81668	439.10	0.0000	978431.86	35.77	-4.70	-8.38	-13.35
22	4	7995879	586397	-18.12416	129.81667	439.19	0.0000	978431.76	35.68	-4.81	-8.49	-13.45
22	5	7995839	586397	-18.12453	129.81667	438.84	0.0000	978431.61	35.40	-5.05	-8.73	-13.69
22	6	7995803	586402	-18.12485	129.81672	438.59	0.0000	978431.60	35.29	-5.13	-8.81	-13.77
22	7	7995762	586392	-18.12522	129.81663	438.51	0.0000	978431.48	35.13	-5.29	-8.96	-13.92
22	8	7995724	586403	-18.12557	129.81673	438.26	0.0000	978431.57	35.12	-5.28	-8.95	-13.91
22	9	7995682	586399	-18.12595	129.81670	438.06	0.0000	978431.59	35.06	-5.32	-8.99	-13.94
22	10	7995642	586401	-18.12631	129.81672	437.79	0.0000	978431.65	35.02	-5.33	-9.00	-13.95
22	11	7995597	586402	-18.12671	129.81673	436.85	0.0000	978431.58	34.64	-5.63	-9.29	-14.23
22	12	7995561	586395	-18.12704	129.81666	436.13	0.0000	978431.61	34.42	-5.78	-9.43	-14.36
22	13	7995521	586388	-18.12740	129.81660	435.81	0.0000	978431.65	34.35	-5.82	-9.47	-14.40
22	14	7995480	586399	-18.12777	129.81671	435.27	0.0000	978431.70	34.21	-5.91	-9.56	-14.48
22	15	7995440	586406	-18.12813	129.81678	434.88	0.0000	978431.73	34.10	-5.98	-9.63	-14.55
22	16	7995400	586404	-18.12849	129.81676	434.39	0.0000	978431.76	33.96	-6.08	-9.72	-14.63
22	17	7995359	586396	-18.12887	129.81668	434.02	0.0000	978431.82	33.88	-6.12	-9.76	-14.67
22	18	7995319	586402	-18.12922	129.81675	433.46	0.0000	978431.79	33.66	-6.29	-9.92	-14.82
22	19	7995282	586396	-18.12956	129.81668	433.14	0.0000	978431.92	33.68	-6.24	-9.87	-14.77
22	20	7995239	586403	-18.12995	129.81676	433.62	0.0000	978432.17	34.06	-5.91	-9.55	-14.45
22	21	7995197	586399	-18.13033	129.81672	433.05	0.0000	978432.16	33.85	-6.06	-9.69	-14.59
22	22	7995156	586398	-18.13069	129.81671	432.52	0.0000	978432.30	33.81	-6.06	-9.69	-14.58
22	23	7995117	586402	-18.13105	129.81675	431.90	0.0000	978432.40	33.70	-6.11	-9.73	-14.62
22	24	7995076	586404	-18.13142	129.81678	431.32	0.0000	978432.37	33.47	-6.28	-9.90	-14.78
22	25	7995037	586395	-18.13178	129.81669	431.16	0.0000	978432.23	33.26	-6.48	-10.09	-14.97
22	26	7994993	586397	-18.13217	129.81671	430.72	0.0000	978432.21	33.08	-6.62	-10.23	-15.10

Line 271
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD 08-01-2002

\Line	Station	North metres	East metres	Latitude dec deg	Longitude dec deg	Elev metres	Ter Cor mgals	G obs. mgals	Free Air mgals	Bouguer Gravity (mgals) 2.20g/cc	2.40g/cc	2.67g/cc
271	1	7994452	587111	-18.13703	129.82349	415.11	0.0000	978436.24	32.04	-6.22	-9.70	-14.40
271	2	7994448	587138	-18.13707	129.82374	415.23	0.0000	978436.26	32.09	-6.18	-9.66	-14.36
271	3	7994444	587180	-18.13710	129.82413	415.66	0.0000	978436.19	32.15	-6.16	-9.64	-14.34
271	4	7994452	587219	-18.13703	129.82450	415.80	0.0000	978436.25	32.26	-6.06	-9.55	-14.25
271	5	7994444	587260	-18.13709	129.82488	415.80	0.0000	978436.29	32.29	-6.03	-9.52	-14.22
271	6	7994447	587300	-18.13707	129.82526	415.91	0.0000	978436.36	32.40	-5.94	-9.42	-14.13
271	7	7994449	587338	-18.13705	129.82563	416.03	0.0000	978436.41	32.49	-5.86	-9.34	-14.05
271	8	7994446	587378	-18.13708	129.82600	416.57	0.0000	978436.30	32.54	-5.85	-9.34	-14.06
271	9	7994448	587418	-18.13705	129.82638	417.19	0.0000	978436.13	32.56	-5.89	-9.39	-14.10
271	10	7994449	587458	-18.13705	129.82676	417.31	0.0000	978436.17	32.64	-5.82	-9.32	-14.04
271	11	7994449	587499	-18.13704	129.82715	417.60	0.0000	978436.27	32.84	-5.66	-9.15	-13.88
271	12	7994452	587538	-18.13702	129.82752	417.74	0.0000	978436.33	32.94	-5.56	-9.06	-13.79
271	13	7994456	587578	-18.13698	129.82790	417.60	0.0000	978436.25	32.82	-5.67	-9.17	-13.89
271	14	7994443	587618	-18.13710	129.82828	417.97	0.0000	978436.22	32.89	-5.63	-9.14	-13.87
271	15	7994445	587658	-18.13707	129.82865	419.05	0.0000	978436.06	33.07	-5.55	-9.06	-13.80
271	16	7994454	587698	-18.13699	129.82903	419.73	0.0000	978435.84	33.07	-5.62	-9.14	-13.89
271	17	7994450	587739	-18.13703	129.82941	420.12	0.0000	978435.79	33.14	-5.59	-9.11	-13.86
271	18	7994450	587779	-18.13702	129.82979	420.65	0.0000	978435.85	33.35	-5.42	-8.94	-13.70
271	19	7994448	587819	-18.13704	129.83017	420.99	0.0000	978436.07	33.68	-5.12	-8.65	-13.41
271	20	7994456	587859	-18.13696	129.83055	421.39	0.0000	978436.30	34.04	-4.81	-8.34	-13.10
271	21	7994458	587903	-18.13695	129.83097	421.87	0.0000	978436.41	34.30	-4.59	-8.12	-12.89
271	22	7994449	587939	-18.13702	129.83131	422.13	0.0000	978436.48	34.45	-4.46	-8.00	-12.77
271	23	7994454	587981	-18.13698	129.83170	422.48	0.0000	978436.51	34.58	-4.36	-7.90	-12.68
271	24	7994454	588020	-18.13697	129.83208	422.80	0.0000	978436.48	34.65	-4.32	-7.86	-12.65
271	25	7994450	588057	-18.13701	129.83243	423.17	0.0000	978436.50	34.78	-4.22	-7.77	-12.55
271	26	7994449	588100	-18.13702	129.83283	423.60	0.0000	978436.48	34.90	-4.15	-7.69	-12.49

Line 272
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD 08-01-2002

\Line	Station	North metres	East metres	Latitude dec deg	Longitude dec deg	Elev metres	Ter Cor mgals	G obs. mgals	Free Air mgals	Bouguer Gravity (mgals) 2.20g/cc	2.40g/cc	2.67g/cc
272	1	7993952	587602	-18.14153	129.82815	421.70	0.0000	978435.21	32.80	-6.07	-9.61	-14.38
272	2	7993994	587599	-18.14115	129.82811	421.69	0.0000	978435.28	32.89	-5.98	-9.51	-14.28
272	3	7994034	587590	-18.14079	129.82803	422.60	0.0000	978435.20	33.11	-5.84	-9.38	-14.16
272	4	7994074	587596	-18.14043	129.82809	423.08	0.0000	978435.06	33.14	-5.86	-9.40	-14.19
272	5	7994116	587594	-18.14005	129.82806	423.14	0.0000	978435.06	33.17	-5.83	-9.38	-14.16
272	6	7994164	587599	-18.13961	129.82811	422.89	0.0000	978435.33	33.39	-5.59	-9.13	-13.91
272	7	7994195	587603	-18.13934	129.82814	422.28	0.0000	978435.52	33.40	-5.52	-9.06	-13.83
272	8	7994232	587594	-18.13900	129.82806	420.20	0.0000	978435.98	33.24	-5.49	-9.01	-13.77
272	9	7994273	587594	-18.13863	129.82805	419.37	0.0000	978436.13	33.16	-5.50	-9.01	-13.76
272	10	7994313	587595	-18.13827	129.82807	418.86	0.0000	978436.23	33.11	-5.49	-9.00	-13.74
272	11	7994352	587594	-18.13792	129.82805	418.65	0.0000	978436.19	33.03	-5.56	-9.07	-13.80
272	12	7994392	587598	-18.13756	129.82809	418.45	0.0000	978436.22	33.02	-5.55	-9.06	-13.79
272	13	7994431	587595	-18.13720	129.82806	418.40	0.0000	978436.31	33.12	-5.45	-8.95	-13.69
272	14	7994469	587591	-18.13686	129.82802	418.46	0.0000	978436.29	33.12	-5.45	-8.95	-13.69
272	15	7994506	587593	-18.13653	129.82803	418.83	0.0000	978436.25	33.22	-5.39	-8.90	-13.63
272	16	7994547	587596	-18.13615	129.82806	419.14	0.0000	978436.21	33.30	-5.34	-8.85	-13.59
272	17	7994586	587594	-18.13580	129.82804	419.31	0.0000	978436.32	33.48	-5.17	-8.68	-13.42
272	18	7994625	587589	-18.13545	129.82799	419.70	0.0000	978436.38	33.67	-5.01	-8.53	-13.28
272	19	7994667	587586	-18.13507	129.82796	420.25	0.0000	978436.36	33.84	-4.89	-8.41	-13.17
272	20	7994704	587595	-18.13473	129.82805	421.08	0.0000	978436.33	34.09	-4.72	-8.25	-13.01

```
     272      21 7994745  587593 -18.13437 129.82803  421.69  0.0000 978436.24   34.21   -4.66   -8.19  -12.96
     272      22 7994787  587587 -18.13399 129.82797  422.17  0.0000 978436.16   34.30   -4.61   -8.15  -12.93
     272      23 7994826  587597 -18.13363 129.82806  422.84  0.0000 978436.07   34.43   -4.54   -8.08  -12.87
     272      24 7994865  587593 -18.13328 129.82801  423.33  0.0000 978436.04   34.57   -4.45   -8.00  -12.79
     272      25 7994905  587595 -18.13292 129.82803  423.62  0.0000 978435.99   34.63   -4.42   -7.97  -12.76
Line 281
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD    08-01-2002
\=============================================================================================================
\Line   Station North    East   Latitude  Longitude   Elev   Ter Cor  G obs.  Free Air  Bouguer Gravity (mgals)
\               metres   metres  dec deg   dec deg    metres   mgals   mgals    mgals  2.20g/cc 2.40g/cc 2.67g/cc
\=============================================================================================================
     281       1 7966305  555207 -18.39248 129.52266  380.39  0.0000 978456.49   27.86   -7.20  -10.39  -14.69
     281       2 7966337  555205 -18.39219 129.52264  380.95  0.0000 978456.34   27.90   -7.21  -10.41  -14.72
     281       3 7966381  555202 -18.39179 129.52261  381.62  0.0000 978456.01   27.79   -7.38  -10.58  -14.90
     281       4 7966420  555197 -18.39144 129.52256  382.21  0.0000 978455.70   27.69   -7.54  -10.74  -15.07
     281       5 7966459  555199 -18.39109 129.52258  382.72  0.0000 978455.50   27.66   -7.61  -10.82  -15.15
     281       6 7966495  555198 -18.39076 129.52257  383.24  0.0000 978455.38   27.72   -7.61  -10.82  -15.15
     281       7 7966541  555204 -18.39035 129.52262  383.96  0.0000 978455.23   27.82   -7.57  -10.79  -15.13
     281       8 7966581  555197 -18.38998 129.52256  384.48  0.0000 978455.15   27.92   -7.52  -10.74  -15.09
     281       9 7966619  555200 -18.38964 129.52258  384.86  0.0000 978454.94   27.84   -7.63  -10.86  -15.21
     281      10 7966658  555201 -18.38928 129.52259  385.44  0.0000 978454.80   27.90   -7.63  -10.86  -15.22
     281      11 7966698  555199 -18.38892 129.52257  385.93  0.0000 978454.62   27.89   -7.68  -10.91  -15.28
     281      12 7966738  555198 -18.38857 129.52256  386.29  0.0000 978454.52   27.92   -7.68  -10.92  -15.29
     281      13 7966784  555204 -18.38814 129.52262  386.56  0.0000 978454.49   28.00   -7.63  -10.87  -15.24
     281      14 7966818  555199 -18.38784 129.52257  386.81  0.0000 978454.41   28.01   -7.64  -10.88  -15.26
     281      16 7966906  555176 -18.38704 129.52235  387.63  0.0000 978454.19   28.08   -7.65  -10.89  -15.28
     281      17 7966939  555195 -18.38675 129.52252  387.95  0.0000 978454.04   28.05   -7.70  -10.96  -15.34
     281      18 7966980  555206 -18.38637 129.52263  388.38  0.0000 978453.95   28.11   -7.68  -10.94  -15.33
     281      19 7967019  555197 -18.38603 129.52254  388.89  0.0000 978453.82   28.16   -7.69  -10.95  -15.34
     281      20 7967059  555188 -18.38566 129.52246  389.42  0.0000 978453.66   28.19   -7.71  -10.97  -15.37
     281      21 7967100  555195 -18.38529 129.52253  389.75  0.0000 978453.55   28.20   -7.73  -10.99  -15.40
     281      22 7967138  555199 -18.38494 129.52256  390.22  0.0000 978453.49   28.30   -7.67  -10.94  -15.35
     281      23 7967178  555196 -18.38459 129.52253  390.68  0.0000 978453.39   28.36   -7.65  -10.93  -15.35
     281      24 7967218  555197 -18.38422 129.52254  391.14  0.0000 978453.25   28.39   -7.67  -10.94  -15.37
     281      25 7967260  555200 -18.38385 129.52257  391.70  0.0000 978453.20   28.53   -7.58  -10.86  -15.29
     281      26 7967297  555199 -18.38351 129.52256  392.27  0.0000 978453.13   28.65   -7.51  -10.79  -15.23
Line 282
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD    08-01-2002
\=============================================================================================================
\Line   Station North    East   Latitude  Longitude   Elev   Ter Cor  G obs.  Free Air  Bouguer Gravity (mgals)
\               metres   metres  dec deg   dec deg    metres   mgals   mgals    mgals  2.20g/cc 2.40g/cc 2.67g/cc
\=============================================================================================================
     282       1 7966796  555699 -18.38803 129.52730  381.66  0.0000 978456.04   28.05   -7.13  -10.33  -14.65
     282       2 7966798  555658 -18.38801 129.52692  382.29  0.0000 978455.92   28.12   -7.12  -10.32  -14.65
     282       3 7966793  555619 -18.38805 129.52655  382.76  0.0000 978455.81   28.15   -7.13  -10.34  -14.67
     282       4 7966795  555580 -18.38804 129.52617  383.37  0.0000 978455.63   28.16   -7.17  -10.39  -14.72
     282       5 7966797  555540 -18.38802 129.52579  383.80  0.0000 978455.46   28.12   -7.25  -10.47  -14.81
     282       6 7966800  555501 -18.38800 129.52543  384.09  0.0000 978455.23   27.98   -7.42  -10.64  -14.99
     282       7 7966793  555460 -18.38806 129.52504  384.38  0.0000 978455.05   27.89   -7.54  -10.76  -15.11
     282       8 7966797  555415 -18.38803 129.52461  384.87  0.0000 978454.87   27.86   -7.62  -10.84  -15.19
     282       9 7966799  555378 -18.38801 129.52426  385.21  0.0000 978454.74   27.84   -7.66  -10.89  -15.25
     282      10 7966792  555337 -18.38807 129.52388  385.53  0.0000 978454.60   27.79   -7.74  -10.97  -15.33
     282      11 7966792  555298 -18.38808 129.52350  385.96  0.0000 978454.53   27.85   -7.72  -10.96  -15.32
     282      12 7966790  555258 -18.38810 129.52312  386.36  0.0000 978454.47   27.91   -7.70  -10.94  -15.31
     282      13 7966789  555215 -18.38810 129.52272  386.57  0.0000 978454.53   28.04   -7.59  -10.83  -15.21
     282      14 7966786  555176 -18.38813 129.52235  386.59  0.0000 978454.43   27.95   -7.69  -10.92  -15.30
     282      15 7966792  555133 -18.38808 129.52194  386.67  0.0000 978454.29   27.83   -7.81  -11.05  -15.42
     282      16 7966800  555097 -18.38801 129.52160  386.69  0.0000 978454.11   27.67   -7.98  -11.22  -15.59
     282      17 7966799  555056 -18.38802 129.52122  386.63  0.0000 978454.07   27.60   -8.03  -11.27  -15.65
     282      18 7966793  555009 -18.38807 129.52077  386.58  0.0000 978454.16   27.68   -7.96  -11.20  -15.57
     282      19 7966809  554975 -18.38793 129.52045  386.69  0.0000 978454.10   27.65   -7.99  -11.23  -15.60
     282      20 7966801  554934 -18.38800 129.52006  386.61  0.0000 978454.28   27.81   -7.83  -11.07  -15.44
     282      21 7966807  554896 -18.38795 129.51970  386.71  0.0000 978454.15   27.72   -7.93  -11.17  -15.54
     282      22 7966801  554858 -18.38801 129.51934  386.56  0.0000 978454.23   27.75   -7.88  -11.12  -15.50
     282      23 7966791  554815 -18.38810 129.51893  386.42  0.0000 978454.28   27.75   -7.87  -11.11  -15.48
     282      24 7966801  554777 -18.38800 129.51857  386.39  0.0000 978454.18   27.64   -7.98  -11.21  -15.58
     282      25 7966794  554737 -18.38807 129.51819  386.09  0.0000 978454.28   27.64   -7.94  -11.18  -15.55
     282      26 7966802  554697 -18.38800 129.51781  386.05  0.0000 978454.31   27.66   -7.92  -11.16  -15.52
Line 291
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD    08-01-2002
\=============================================================================================================
\Line   Station North    East   Latitude  Longitude   Elev   Ter Cor  G obs.  Free Air  Bouguer Gravity (mgals)
\               metres   metres  dec deg   dec deg    metres   mgals   mgals    mgals  2.20g/cc 2.40g/cc 2.67g/cc
\=============================================================================================================
     291       1 7955506  541201 -18.49040 129.39028  369.57  0.0000 978455.34   18.07  -15.99  -19.09  -23.27
     291       2 7955539  541204 -18.49010 129.39031  369.43  0.0000 978455.30   18.00  -16.05  -19.14  -23.32
     291       3 7955580  541207 -18.48972 129.39034  369.32  0.0000 978455.34   18.03  -16.01  -19.10  -23.28
     291       4 7955621  541211 -18.48936 129.39038  369.15  0.0000 978455.28   17.94  -16.08  -19.18  -23.35
     291       5 7955662  541214 -18.48899 129.39040  368.99  0.0000 978455.26   17.88  -16.13  -19.22  -23.39
     291       6 7955700  541216 -18.48864 129.39042  368.82  0.0000 978455.20   17.79  -16.21  -19.30  -23.47
     291       7 7955740  541216 -18.48828 129.39042  368.68  0.0000 978455.08   17.65  -16.33  -19.42  -23.59
     291       8 7955781  541217 -18.48791 129.39043  368.51  0.0000 978455.08   17.61  -16.35  -19.44  -23.61
     291       9 7955820  541217 -18.48755 129.39043  368.38  0.0000 978455.03   17.54  -16.41  -19.50  -23.67
     291      10 7955861  541219 -18.48719 129.39045  368.25  0.0000 978455.00   17.49  -16.45  -19.54  -23.70
     291      11 7955901  541220 -18.48682 129.39046  368.06  0.0000 978455.00   17.45  -16.47  -19.56  -23.72
     291      12 7955941  541223 -18.48646 129.39048  367.91  0.0000 978454.83   17.26  -16.65  -19.73  -23.89
     291      13 7955983  541227 -18.48608 129.39052  367.68  0.0000 978454.68   17.06  -16.83  -19.91  -24.07
     291      14 7956021  541230 -18.48574 129.39055  367.49  0.0000 978454.61   16.95  -16.92  -20.00  -24.16
     291      15 7956061  541233 -18.48538 129.39057  367.31  0.0000 978454.83   17.13  -16.73  -19.80  -23.96
     291      16 7956100  541234 -18.48503 129.39058  367.19  0.0000 978454.86   17.14  -16.70  -19.78  -23.93
     291      17 7956139  541238 -18.48467 129.39062  367.20  0.0000 978454.84   17.15  -16.70  -19.78  -23.93
     291      18 7956180  541236 -18.48430 129.39060  367.26  0.0000 978454.86   17.20  -16.65  -19.72  -23.88
```

```
     291      19 7956222  541239 -18.48393 129.39062  367.11  0.0000 978454.84   17.16  -16.68  -19.75  -23.91
     291      20 7956260  541240 -18.48358 129.39063  366.62  0.0000 978454.88   17.07  -16.72  -19.80  -23.94
     291      21 7956300  541247 -18.48322 129.39070  366.29  0.0000 978454.90   17.01  -16.76  -19.83  -23.97
     291      22 7956350  541253 -18.48276 129.39076  365.89  0.0000 978454.93   16.94  -16.79  -19.85  -23.99
     291      23 7956386  541239 -18.48244 129.39063  365.61  0.0000 978454.96   16.90  -16.80  -19.86  -24.00
     291      24 7956420  541231 -18.48213 129.39055  365.48  0.0000 978454.91   16.83  -16.86  -19.92  -24.06
     291      25 7956460  541211 -18.48177 129.39036  365.32  0.0000 978454.86   16.74  -16.93  -19.99  -24.12
     291      26 7956501  541201 -18.48140 129.39026  365.42  0.0000 978454.72   16.65  -17.03  -20.09  -24.22
Line 292
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD    08-01-2002
\=============================================================================================================
\Line   Station North    East   Latitude  Longitude   Elev   Ter Cor  G obs.  Free Air  Bouguer Gravity (mgals)
\               metres   metres  dec deg   dec deg    metres   mgals   mgals    mgals  2.20g/cc 2.40g/cc 2.67g/cc
\=============================================================================================================
     292       1 7956002  540699 -18.48592 129.38552  366.40  0.0000 978455.00   16.99  -16.78  -19.85  -23.99
     292       2 7956002  540736 -18.48592 129.38587  366.37  0.0000 978455.03   17.01  -16.76  -19.83  -23.97
     292       3 7956002  540776 -18.48592 129.38625  366.36  0.0000 978455.13   17.11  -16.66  -19.73  -23.87
     292       4 7956001  540816 -18.48593 129.38663  366.42  0.0000 978455.17   17.17  -16.60  -19.68  -23.82
     292       5 7956000  540857 -18.48594 129.38702  366.43  0.0000 978455.23   17.23  -16.54  -19.61  -23.76
     292       6 7955999  540897 -18.48595 129.38739  366.48  0.0000 978455.14   17.15  -16.63  -19.70  -23.84
     292       7 7955998  540939 -18.48595 129.38779  366.57  0.0000 978455.19   17.23  -16.56  -19.63  -23.77
     292       8 7955998  540979 -18.48595 129.38817  366.75  0.0000 978455.14   17.24  -16.57  -19.64  -23.79
     292       9 7955997  541019 -18.48596 129.38855  366.87  0.0000 978455.03   17.17  -16.65  -19.72  -23.87
     292      10 7955996  541059 -18.48597 129.38893  366.96  0.0000 978455.07   17.24  -16.59  -19.66  -23.81
     292      11 7955995  541100 -18.48598 129.38932  367.13  0.0000 978454.94   17.15  -16.68  -19.76  -23.91
     292      12 7955995  541142 -18.48597 129.38971  367.27  0.0000 978454.48   16.74  -17.11  -20.19  -24.35
     292      13 7955993  541180 -18.48600 129.39007  367.46  0.0000 978454.36   16.67  -17.20  -20.28  -24.43
     292      14 7955988  541220 -18.48604 129.39045  367.63  0.0000 978454.61   16.97  -16.91  -19.99  -24.15
     292      15 7955986  541260 -18.48606 129.39083  367.85  0.0000 978454.84   17.27  -16.63  -19.71  -23.88
     292      16 7955983  541300 -18.48608 129.39121  368.21  0.0000 978454.97   17.51  -16.42  -19.51  -23.67
     292      17 7955979  541339 -18.48612 129.39158  368.60  0.0000 978454.97   17.63  -16.34  -19.43  -23.60
     292      18 7955976  541381 -18.48614 129.39198  369.17  0.0000 978454.84   17.67  -16.35  -19.45  -23.62
     292      19 7955986  541422 -18.48606 129.39236  368.89  0.0000 978454.89   17.64  -16.36  -19.45  -23.62
     292      20 7955979  541463 -18.48612 129.39275  368.65  0.0000 978454.93   17.60  -16.38  -19.47  -23.64
     292      21 7955982  541490 -18.48609 129.39301  368.42  0.0000 978455.00   17.61  -16.35  -19.43  -23.60
     292      22 7955982  541538 -18.48609 129.39346  368.06  0.0000 978455.03   17.53  -16.39  -19.48  -23.64
     292      23 7955993  541580 -18.48599 129.39386  367.70  0.0000 978455.11   17.51  -16.39  -19.47  -23.63
     292      24 7955998  541620 -18.48594 129.39425  367.42  0.0000 978455.23   17.54  -16.32  -19.40  -23.56
     292      25 7956004  541658 -18.48589 129.39461  367.17  0.0000 978455.25   17.49  -16.36  -19.43  -23.59
     292      26 7956008  541698 -18.48585 129.39498  366.96  0.0000 978455.28   17.45  -16.37  -19.45  -23.60
Line 301
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD    08-01-2002
\=============================================================================================================
\Line   Station North    East   Latitude  Longitude   Elev   Ter Cor  G obs.  Free Air  Bouguer Gravity (mgals)
\               metres   metres  dec deg   dec deg    metres   mgals   mgals    mgals  2.20g/cc 2.40g/cc 2.67g/cc
\=============================================================================================================
     301       1 7956502  542789 -18.48136 129.40530  366.17  0.0000 978454.52   16.69  -17.06  -20.13  -24.27
     301       2 7956537  542789 -18.48105 129.40530  366.10  0.0000 978454.52   16.68  -17.06  -20.13  -24.27
     301       3 7956576  542788 -18.48070 129.40529  366.05  0.0000 978454.49   16.66  -17.08  -20.15  -24.29
     301       4 7956618  542787 -18.48032 129.40528  365.93  0.0000 978454.46   16.61  -17.12  -20.19  -24.33
     301       5 7956659  542789 -18.47994 129.40530  365.86  0.0000 978454.49   16.64  -17.08  -20.15  -24.29
     301       6 7956698  542798 -18.47959 129.40539  365.87  0.0000 978454.47   16.64  -17.08  -20.15  -24.29
     301       7 7956738  542799 -18.47923 129.40539  365.79  0.0000 978454.44   16.60  -17.11  -20.18  -24.32
     301       8 7956778  542798 -18.47887 129.40539  365.69  0.0000 978454.36   16.52  -17.19  -20.25  -24.39
     301       9 7956819  542796 -18.47850 129.40536  365.71  0.0000 978454.23   16.41  -17.29  -20.36  -24.50
     301      10 7956859  542801 -18.47814 129.40541  365.63  0.0000 978454.07   16.25  -17.45  -20.52  -24.65
     301      11 7956898  542802 -18.47778 129.40542  365.67  0.0000 978453.83   16.04  -17.66  -20.72  -24.86
     301      12 7956938  542805 -18.47742 129.40545  365.61  0.0000 978453.62   15.83  -17.87  -20.93  -25.07
     301      13 7956978  542792 -18.47706 129.40532  365.53  0.0000 978453.58   15.78  -17.91  -20.97  -25.10
     301      14 7957019  542791 -18.47669 129.40531  365.54  0.0000 978453.63   15.86  -17.83  -20.90  -25.03
     301      15 7957058  542802 -18.47633 129.40541  365.53  0.0000 978453.70   15.95  -17.75  -20.81  -24.94
     301      16 7957099  542799 -18.47597 129.40538  365.52  0.0000 978453.75   16.01  -17.68  -20.74  -24.88
     301      17 7957139  542799 -18.47560 129.40539  365.51  0.0000 978453.73   16.01  -17.68  -20.74  -24.88
     301      18 7957180  542803 -18.47523 129.40542  365.50  0.0000 978453.78   16.08  -17.61  -20.68  -24.81
     301      19 7957218  542802 -18.47489 129.40541  365.50  0.0000 978453.75   16.06  -17.63  -20.69  -24.82
     301      20 7957257  542797 -18.47454 129.40537  365.48  0.0000 978453.66   15.98  -17.70  -20.77  -24.90
     301      21 7957299  542800 -18.47416 129.40539  365.47  0.0000 978453.57   15.91  -17.78  -20.84  -24.97
     301      22 7957339  542800 -18.47380 129.40539  365.54  0.0000 978453.48   15.87  -17.82  -20.89  -25.02
     301      23 7957380  542798 -18.47343 129.40537  365.55  0.0000 978453.43   15.84  -17.85  -20.91  -25.05
     301      24 7957420  542799 -18.47307 129.40538  365.52  0.0000 978453.42   15.84  -17.85  -20.91  -25.05
     301      25 7957461  542802 -18.47270 129.40541  365.46  0.0000 978453.37   15.79  -17.89  -20.95  -25.09
     301      26 7957500  542798 -18.47234 129.40537  365.51  0.0000 978453.30   15.76  -17.93  -21.00  -25.13
Line 302
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD    08-01-2002
\=============================================================================================================
\Line   Station North    East   Latitude  Longitude   Elev   Ter Cor  G obs.  Free Air  Bouguer Gravity (mgals)
\               metres   metres  dec deg   dec deg    metres   mgals   mgals    mgals  2.20g/cc 2.40g/cc 2.67g/cc
\=============================================================================================================
     302       1 7956992  542296 -18.47694 129.40063  365.36  0.0000 978454.00   16.16  -17.52  -20.58  -24.71
     302       2 7956997  542335 -18.47690 129.40100  365.33  0.0000 978453.98   16.13  -17.54  -20.61  -24.74
     302       3 7956999  542376 -18.47687 129.40139  365.39  0.0000 978453.93   16.10  -17.58  -20.64  -24.77
     302       4 7956999  542416 -18.47688 129.40176  365.48  0.0000 978454.01   16.21  -17.48  -20.54  -24.68
     302       5 7957002  542457 -18.47686 129.40215  365.40  0.0000 978453.95   16.12  -17.56  -20.62  -24.75
     302       6 7957001  542497 -18.47686 129.40252  365.45  0.0000 978453.93   16.12  -17.56  -20.63  -24.76
     302       7 7957000  542535 -18.47687 129.40289  365.38  0.0000 978453.92   16.09  -17.59  -20.65  -24.78
     302       8 7957002  542576 -18.47685 129.40328  365.49  0.0000 978453.86   16.06  -17.62  -20.69  -24.82
     302       9 7957001  542613 -18.47685 129.40363  365.48  0.0000 978453.65   15.85  -17.84  -20.90  -25.03
     302      10 7956997  542655 -18.47689 129.40403  365.50  0.0000 978453.64   15.84  -17.84  -20.91  -25.04
     302      11 7956993  542695 -18.47693 129.40440  365.53  0.0000 978453.61   15.82  -17.87  -20.93  -25.07
     302      12 7956998  542736 -18.47688 129.40479  365.54  0.0000 978453.61   15.83  -17.86  -20.93  -25.06
     302      13 7957000  542776 -18.47686 129.40517  365.57  0.0000 978453.53   15.76  -17.94  -21.00  -25.13
     302      14 7957000  542816 -18.47686 129.40555  365.56  0.0000 978453.58   15.81  -17.88  -20.95  -25.08
```

```
     302      15 7956998  542858 -18.47688 129.40594  365.63  0.0000 978453.64   15.88  -17.82  -20.88  -25.02
     302      16 7956997  542896 -18.47688 129.40631  365.63  0.0000 978453.77   16.02  -17.68  -20.75  -24.88
     302      17 7956997  542935 -18.47688 129.40667  365.65  0.0000 978453.90   16.16  -17.55  -20.61  -24.75
     302      18 7956996  542976 -18.47689 129.40706  365.69  0.0000 978454.04   16.30  -17.40  -20.47  -24.60
     302      19 7956995  543016 -18.47690 129.40745  365.70  0.0000 978454.13   16.40  -17.31  -20.37  -24.51
     302      20 7956993  543056 -18.47692 129.40782  365.74  0.0000 978454.18   16.46  -17.25  -20.31  -24.45
     302      21 7956990  543096 -18.47694 129.40820  365.79  0.0000 978454.22   16.51  -17.21  -20.27  -24.41
     302      22 7956990  543135 -18.47695 129.40858  365.78  0.0000 978454.21   16.50  -17.22  -20.28  -24.42
     302      23 7956991  543176 -18.47694 129.40896  365.80  0.0000 978454.28   16.58  -17.14  -20.21  -24.34
     302      24 7956989  543215 -18.47696 129.40933  365.85  0.0000 978454.29   16.60  -17.12  -20.18  -24.32
     302      25 7956989  543255 -18.47696 129.40971  365.90  0.0000 978454.38   16.70  -17.02  -20.09  -24.23
     302      26 7956998  543303 -18.47687 129.41016  365.86  0.0000 978454.45   16.77  -16.95  -20.02  -24.16
Line 331
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD    08-01-2002
\=============================================================================================================
\Line   Station North    East   Latitude  Longitude   Elev   Ter Cor  G obs.  Free Air  Bouguer Gravity (mgals)
\               metres   metres  dec deg   dec deg    metres   mgals   mgals    mgals  2.20g/cc 2.40g/cc 2.67g/cc
\=============================================================================================================
     331       1 7960497  569604 -18.44454 129.65916  368.51  0.0000 978464.51   29.39   -4.57   -7.66  -11.83
     331       2 7960537  569603 -18.44418 129.65915  368.59  0.0000 978464.49   29.42   -4.55   -7.64  -11.81
     331       3 7960577  569602 -18.44382 129.65913  368.67  0.0000 978464.50   29.48   -4.51   -7.59  -11.77
     331       4 7960617  569602 -18.44346 129.65912  368.70  0.0000 978464.48   29.49   -4.50   -7.59  -11.76
     331       5 7960657  569600 -18.44309 129.65911  368.86  0.0000 978464.45   29.53   -4.47   -7.56  -11.74
     331       6 7960697  569599 -18.44274 129.65910  369.10  0.0000 978464.42   29.59   -4.43   -7.52  -11.70
     331       7 7960737  569602 -18.44237 129.65912  369.40  0.0000 978464.37   29.65   -4.40   -7.49  -11.67
     331       8 7960776  569602 -18.44202 129.65912  369.65  0.0000 978464.30   29.68   -4.39   -7.49  -11.67
     331       9 7960817  569601 -18.44165 129.65911  369.98  0.0000 978464.16   29.66   -4.44   -7.54  -11.73
     331      10 7960858  569599 -18.44128 129.65909  370.36  0.0000 978464.00   29.63   -4.50   -7.61  -11.80
     331      11 7960897  569601 -18.44093 129.65911  370.76  0.0000 978463.84   29.61   -4.56   -7.67  -11.86
     331      12 7960937  569600 -18.44057 129.65910  371.07  0.0000 978463.72   29.61   -4.59   -7.70  -11.90
     331      13 7960977  569602 -18.44021 129.65912  371.33  0.0000 978463.56   29.56   -4.67   -7.78  -11.98
     331      14 7961017  569600 -18.43985 129.65910  371.56  0.0000 978463.42   29.50   -4.74   -7.86  -12.06
     331      15 7961057  569601 -18.43948 129.65910  371.77  0.0000 978463.45   29.62   -4.65   -7.76  -11.97
     331      16 7961097  569604 -18.43912 129.65913  372.04  0.0000 978463.37   29.64   -4.65   -7.77  -11.97
     331      17 7961139  569599 -18.43874 129.65908  372.32  0.0000 978463.26   29.64   -4.68   -7.80  -12.01
     331      18 7961179  569601 -18.43838 129.65910  372.67  0.0000 978463.17   29.68   -4.67   -7.80  -12.01
     331      19 7961218  569599 -18.43803 129.65908  372.99  0.0000 978463.03   29.65   -4.73   -7.85  -12.07
     331      20 7961259  569599 -18.43766 129.65908  373.25  0.0000 978462.98   29.70   -4.70   -7.83  -12.05
     331      21 7961298  569600 -18.43730 129.65908  373.55  0.0000 978462.88   29.71   -4.72   -7.85  -12.08
     331      22 7961336  569601 -18.43696 129.65910  373.86  0.0000 978462.81   29.75   -4.70   -7.84  -12.07
     331      23 7961378  569601 -18.43658 129.65909  374.19  0.0000 978462.73   29.81   -4.68   -7.82  -12.05
     331      24 7961419  569600 -18.43621 129.65909  374.54  0.0000 978462.59   29.79   -4.73   -7.87  -12.11
     331      25 7961458  569602 -18.43586 129.65910  374.86  0.0000 978462.58   29.90   -4.65   -7.79  -12.03
     331      26 7961498  569601 -18.43549 129.65908  375.29  0.0000 978462.52   29.99   -4.60   -7.74  -11.99
     331      27 7961537  569601 -18.43515 129.65909  375.59  0.0000 978462.48   30.06   -4.56   -7.70  -11.95
     331      28 7961578  569601 -18.43477 129.65909  375.94  0.0000 978462.49   30.20   -4.45   -7.60  -11.85
     331      29 7961622  569600 -18.43438 129.65907  376.40  0.0000 978462.48   30.35   -4.34   -7.49  -11.75
     331      30 7961659  569599 -18.43404 129.65906  376.71  0.0000 978462.45   30.44   -4.29   -7.44  -11.70
     331      31 7961700  569601 -18.43367 129.65908  377.17  0.0000 978462.41   30.56   -4.21   -7.37  -11.63
Line 332
\Bouguer Gravity Data collected and processed by Fugro Ground Geophysics PTY LTD    08-01-2002
\=============================================================================================================
\Line   Station North    East   Latitude  Longitude   Elev   Ter Cor  G obs.  Free Air  Bouguer Gravity (mgals)
\               metres   metres  dec deg   dec deg    metres   mgals   mgals    mgals  2.20g/cc 2.40g/cc 2.67g/cc
\=============================================================================================================
     332       1 7961104  569006 -18.43908 129.65347  370.21  0.0000 978464.70   30.41   -3.71   -6.81  -11.00
     332       2 7961104  569037 -18.43907 129.65376  370.34  0.0000 978464.61   30.36   -3.78   -6.88  -11.07
     332       3 7961104  569078 -18.43908 129.65415  370.52  0.0000 978464.60   30.40   -3.75   -6.85  -11.04
     332       4 7961101  569119 -18.43910 129.65454  370.64  0.0000 978464.55   30.39   -3.77   -6.88  -11.07
     332       5 7961103  569157 -18.43908 129.65490  370.83  0.0000 978464.54   30.44   -3.74   -6.85  -11.05
     332       6 7961105  569197 -18.43907 129.65527  371.04  0.0000 978464.47   30.43   -3.77   -6.88  -11.08
     332       7 7961103  569236 -18.43908 129.65565  371.19  0.0000 978464.27   30.28   -3.93   -7.04  -11.24
     332       8 7961102  569277 -18.43909 129.65603  371.35  0.0000 978464.25   30.31   -3.92   -7.03  -11.23
     332       9 7961102  569316 -18.43909 129.65640  371.49  0.0000 978464.23   30.33   -3.91   -7.02  -11.22
     332      10 7961103  569358 -18.43908 129.65680  371.60  0.0000 978464.18   30.31   -3.94   -7.05  -11.25
     332      11 7961101  569398 -18.43909 129.65718  371.70  0.0000 978464.07   30.23   -4.03   -7.14  -11.35
     332      12 7961101  569437 -18.43909 129.65755  371.81  0.0000 978463.97   30.17   -4.10   -7.21  -11.42
     332      13 7961101  569477 -18.43909 129.65792  371.87  0.0000 978463.80   30.02   -4.26   -7.37  -11.58
     332      14 7961100  569517 -18.43910 129.65830  371.92  0.0000 978463.63   29.87   -4.41   -7.53  -11.74
     332      15 7961098  569557 -18.43911 129.65869  371.95  0.0000 978463.44   29.68   -4.60   -7.72  -11.92
     332      16 7961097  569603 -18.43912 129.65912  372.02  0.0000 978463.40   29.66   -4.63   -7.74  -11.95
     332      17 7961098  569638 -18.43911 129.65945  372.07  0.0000 978463.44   29.72   -4.58   -7.69  -11.90
     332      18 7961101  569678 -18.43908 129.65983  372.17  0.0000 978463.41   29.72   -4.59   -7.70  -11.91
     332      19 7961099  569719 -18.43910 129.66022  372.22  0.0000 978463.34   29.67   -4.64   -7.76  -11.97
     332      20 7961099  569757 -18.43910 129.66058  372.26  0.0000 978463.36   29.70   -4.61   -7.73  -11.94
     332      21 7961099  569797 -18.43910 129.66096  372.34  0.0000 978463.41   29.78   -4.54   -7.66  -11.87
     332      22 7961099  569838 -18.43910 129.66135  372.43  0.0000 978463.44   29.83   -4.49   -7.61  -11.83
     332      23 7961098  569876 -18.43910 129.66171  372.64  0.0000 978463.54   30.00   -4.35   -7.47  -11.69
     332      24 7961097  569917 -18.43911 129.66209  372.78  0.0000 978463.66   30.16   -4.20   -7.32  -11.54
     332      25 7961096  569958 -18.43912 129.66249  372.94  0.0000 978463.73   30.28   -4.09   -7.22  -11.44
     332      26 7961098  569999 -18.43910 129.66287  373.17  0.0000 978463.81   30.43   -3.96   -7.09  -11.31
     332      27 7961096  570037 -18.43912 129.66323  373.28  0.0000 978463.91   30.57   -3.84   -6.97  -11.19
     332      28 7961095  570078 -18.43913 129.66361  373.45  0.0000 978463.86   30.56   -3.86   -6.99  -11.21
     332      29 7961097  570117 -18.43910 129.66399  373.70  0.0000 978463.83   30.61   -3.83   -6.96  -11.19
     332      30 7961095  570156 -18.43912 129.66436  373.75  0.0000 978463.85   30.64   -3.80   -6.94  -11.16
     332      31 7961097  570198 -18.43910 129.66476  373.89  0.0000 978463.84   30.68   -3.78   -6.92  -11.15
```