Atlas Geophysics Report Number R2014061

West Amadeus Gravity Survey

Geoscience Australia

Attention: Mr Phill Wynne

Report completed by:

Richard Allpike & Leon Mathews

T 08 6278 2898
F 08 6278 1595
PO BOX 1049
MORLEY WA 6943
AUSTRALIA

info@atlasgeo.com.au

ABN 68 123 110 243

5 January 2015

/

TABLE OF CONTENTS

1.0 Company Overview

Atlas Geophysics Pty Ltd is an Australian company based in Morley, Western Australia, whose mission is to provide the highest quality geophysical resource data to the mining, petroleum and exploration industry in a safe and timely manner. Through experience, innovation and excellence, the company will exceed its client's expectations and will continually develop its technologies and methodologies to maintain its reputation for being the best in the business.

The company specialises in the acquisition, processing and interpretation of potential field datasets, with particular emphasis on gravity. The director of the company, Leon Mathews B.Sc. Hons (Geophysics), has over 16 years of experience in the field of gravity and brings to the company, a young, vibrant and motivated approach to project management. Strategically, through development and research, the company aims to expand into other geophysical acquisition markets that encompass methods such as electrical, electromagnetic, induced polarisation and reflection seismic. The company also has interests in developing an airborne platform capable of acquiring high quality magnetic and radiometric data so it can offer its clients a complete airborne and ground geophysical solution.

Atlas Geophysics Pty Ltd is committed to the values and principles of Health, Safety and Environment. To this end, the company aims to prevent injuries and occupational illness to its employees and minimise any adverse environmental impact its activities may have.

2.0 Project Brief

Atlas Geophysics project P2014061 required the acquisition and processing of **8,107** new regional gravity stations on behalf of Geoscience Australia (GA), funded by the Northern Territory Geological Survey (NTGS). The gravity survey, referred to as the "West Amadeus Gravity Survey" was assigned GA project number 201481.

The survey covered a large area in the south western corner of the Northern Territory, bound by the Western Australian and South Australian borders. The survey was carried out from logistics bases at Kintore and a remote camp located midway between Uluru and Docker River.

Atlas Geophysics Pty Ltd completed the acquisition of the dataset using helicopter-borne gravity methods with two helicopter crews.

The survey commenced on 28th June 2014 with survey cessation on 11th August 2014.

2.1 Location, Access and Terrain

The gravity survey spanned a large area within the Amadeus Basin (Figure 1). Approximately 44,000 kilometres square were covered, with all or parts of the following 1:250,000 map sheets surveyed:

- Mount Rennie
- Bloods Range
- Petermann Ranges
- Mount Liebig
- Lake Amadeus
- Uluru/Ayers Rock

Surveying of the northern section of the grid was conducted out of the remote settlement of Kintore (*Wa̲lungurru* by the local Pintupi people) which is located approximately 530km west of Alice Springs. The southern section of the survey was conducted from a camp which was set up 90km east of Docker River (*Kaltukatjara* by the local Anangu people), 110km west of Uluṟu and 2.3km south of the Docker River Road on the track to the outstation of Ngamgurr.

As most of the survey covered aboriginal lands, access was quite poor, with only the Docker River Road, Gary Junction Road and Kiwirrkurra Road available for helicopter refueling. Thankfully, all roads were in reasonable condition, with only minor rutting in parts. As a result of the poor access, some long ferry times were required to get out to the furthest extents of the grid.

Terrain encountered was predominantly open dune country, typical of the south-western parts of the Northern Territory. Dunes ranged from 5m to 10m in height and most were covered with light, low lying vegetation. South of Lake Neale in the centre of the survey, the country opened up a little and dune spacing was generally larger. The ranges in the south allowed for some spectacular flying, but some stations here were offset for safety reasons.

2.2 Survey Configuration

Gravity acquisition was conducted using a square grid configuration with station spacings of 500m, 1000m, 2000m, and 4000m.

A number of stations were offset from their planned station location where helicopter landing was deemed risky e.g. salt lakes, heavily wooded areas and steep terrain. No stations were omitted from the survey aside from those lying within sensitive heritage areas.

Appendix A contains a station location plot of the acquired gravity stations.

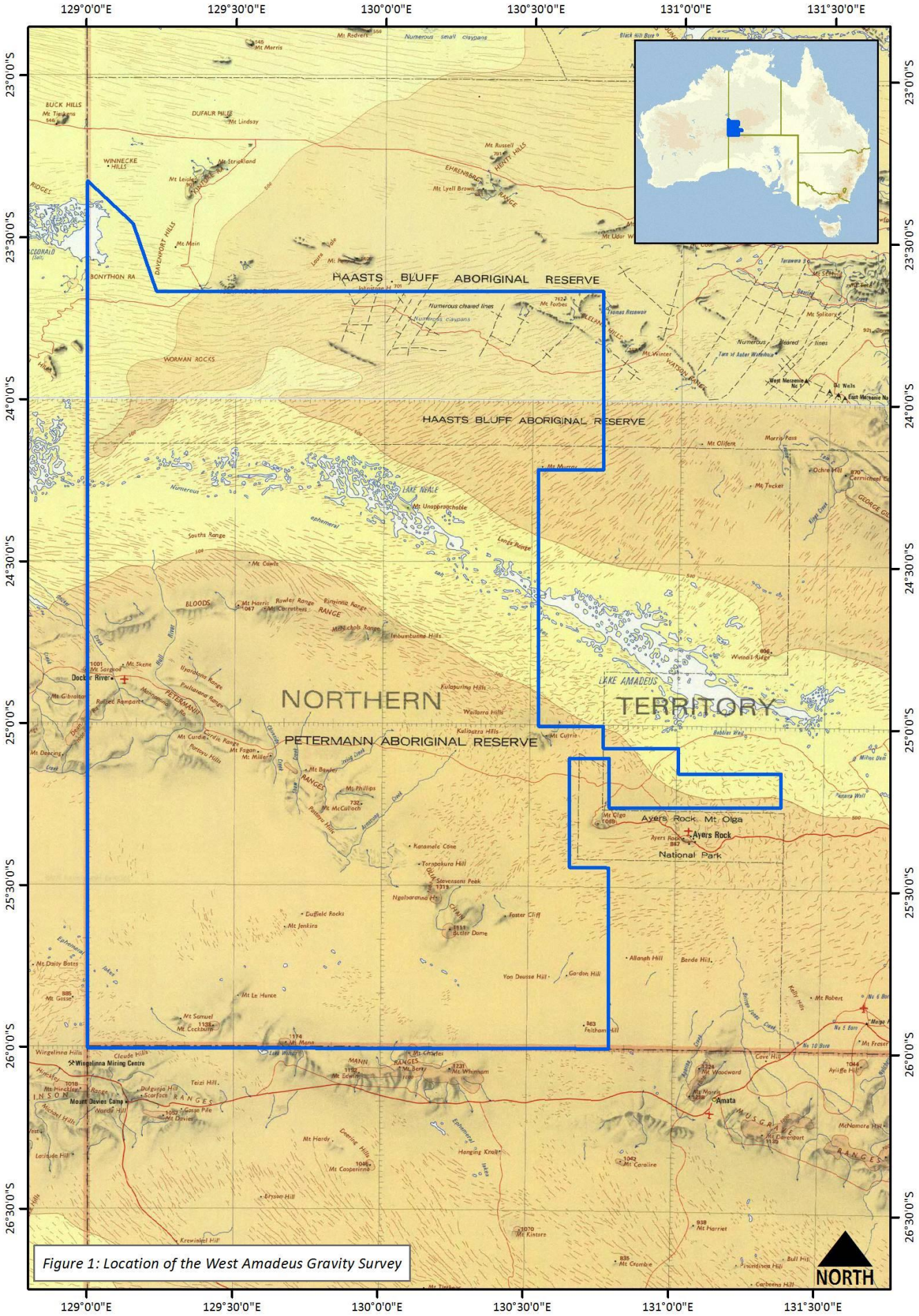


Figure 1: Location of the West Amadeus Gravity Survey

3.0 Personnel and Subcontractors

Atlas Geophysics Pty Ltd engages only fit, motivated and safe working professionals to conduct its gravity operations. Acquisition staff members are from a range of backgrounds, usually from the geoscience or geotechnical fields, and all are trained in senior first aid, bush survival, and advanced four wheel driving. Overseeing the acquisition and processing is the company's team of geophysicists and data processors – a team with a combined total of over 20 years of experience in the acquisition, processing and quality control of gravity data.

3.1 Project Supervision

Supervising the project from Perth Operations was director Leon Mathews. Leon has been involved in the acquisition, processing and interpretation of potential field data for over 15 years and has directly overseen the acquisition and processing of over 1,000,000 gravity stations.

Leon was responsible for project supervision, as well as for conducting the processing and quality control of the gravity data on a daily basis.

All final data processing, QC, reporting and delivery was performed by Leon Mathews.

3.2 Acquisition/Other Personnel

Other personnel participating in field acquisition of the gravity data on this project were:

David Hanson	*Supervising Geophysical Technician*
Justin Fenwick	Geophysical Technician
Marc Camenzind	Geophysical Technician
Brian Maguire	Geophysical Technician
Barry Thompson	Pilot
Rene Theirry	Pilot
Alex Reid-Terry	Pilot
Sebastian Parker	Pilot
Darius Howard	Pilot
Ryan Jackett	Pilot

3.3 Subcontractors

Adelaide based helicopter operations company, Great Ocean Road Helicopters Pty Ltd, were chosen to supply the helicopters, pilots and engineering support for the duration of this project.

4.0 Equipment and Instrumentation

4.1 GPS/GNSS Receiver Equipment

Leading edge dual-frequency GPS technologies from Leica Geosystems such as the GPS1200 have been utilised on the project to allow for post-processed kinematic (PPK) centimetre level accuracy 3D positions. System specifications for the receivers utilised can be found in the attached brochures (Figures 2-4). The GPS1200 system is equipped with future proof GNSS technology which is capable of tracking all available GNSS signals including the currently available GLONASS. These new generation receivers, in conjunction with full GNSS tracking and processing, offer a new level of unmatched solution accuracy and reliability, especially when compared to existing conventional L1, L2 GPS technologies.

The use of Glonass technology in addition to GPS provides very significant advantages:

- Increased satellite signal observations
- Markedly increased spatial distribution of visible satellites
- Reduced Horizontal and Vertical Dilution of Precision (DOP) factors
- Improved post-processed-kinematic (PPK) performance
- Decreased occupation times means faster acquisition

Twelve Leica GPS1200 geodetic grade receivers were utilised to conduct the survey. Two receivers were used as post-processed kinematic (PPK) rovers in each helicopter, with the other receivers used as base stations for logging static data on multiple control stations.

On the helicopter, the GPS/GNSS antennas were mounted on the tail-boom of the aircraft and a fixed aluminium bracket at the front of the aircraft, with the receivers mounted on a custom mount inside the cabin.

Navigation between gravity stations was facilitated by a Garmin 296 GPS receiver operating in autonomous mode.

4.2 Gravity Instrumentation

Complementing the company's GNSS/GPS technologies is the latest in gravity instrumentation from Scintrex Ltd, the Scintrex CG-5 (Figure 5). The CG-5 digital automated gravity meter offers all of the features of the low noise industry standard CG-3M micro-gravity unit, but is smaller and lighter. It also offers improved noise rejection. By constantly monitoring tilt sensors electronically, the CG-5 automatically compensates for errors in gravity meter tilt. Due to a low mass and the excellent elastic properties of fused quartz, tares are virtually eliminated.

The CG-5 can be transported over very rough terrain, on quad bikes, foot, vehicle or helicopter without taring or drifting. In terms of repeatability, the CG-5 outperforms all existing gravity meter technologies, with a factory quoted repeatability of better than 0.005 mGal.

Table 1 below lists the gravity meters used on the project.

Gravity Meter Type	Gravity Meter Code	Gravity Meter Serial Number
Scintrex CG-5	A2	40241
Scintrex CG-5	A6	40382

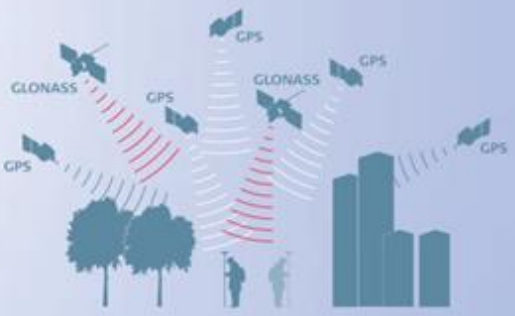
Table 1: Gravity meters used on the project

4.3 Other Equipment

The company utilised the following additional equipment to fully support the operations:

- Two HP Laptop computers for data download and processing
- Seven Iridium satellite phones for long distance communications and scheduled calls
- Personal Protective Equipment for all personnel
- Batteries, battery chargers, solar cells, UPS System
- Survey consumables
- Tools, engineering and maintenance equipment for vehicle servicing
- First aid and survival kits
- Tyres and recovery equipment
- Satellite tracking and communication devices.

Leica GPS1200
Fast, accurate, rugged and reliable



SmartTrack+

GNSS technology
GPS1200's SmartTrack+ measurement engine now utilizes two global navigation satellite systems increasing the number of tracked satellites. The new SmartTrack+ measurement engine tracks all available GNSS signals (L2C and GLONASS). More satellites means higher productivity, accuracy and reliability. SmartTrack+ acquires satellites within seconds, is ideal in urban canyons and obstructed areas where other receivers often fail. GPS1200 with SmartTrack+ is designed to support the future signals GPS L5 and Galileo.

SmartCheck+
Continuously checking provides the highest possible reliability. A unique, built-in integrity monitoring system checks all results immediately. SmartCheck+ now processes GPS and GLONASS measurements simultaneously for centimeter-accuracy, 20 Hz RTK at 30 km and more. Initialize within seconds and survey in obstructed areas with a GX1230/ATX1230 (GPS only) sensor or increase productivity with a GX1230 GG/ATX1230 GG (GPS and GLONASS).

GLONASS
For many years the GLONASS system was not reliable enough in terms of satellite availability and system performance. With recent launches and commitment from the Russian government, reliability and availability are significantly improved. Under normal conditions there are 2 to 5 additional satellites compared to a GPS only constellation – and even more satellites will be available over the next two years. Now is the time to invest in hybrid GNSS technology.

"The GLONASS system should be created before 2008, as it was originally planned ... We have the possibility. Let us see what can be done in 2006 – 2007"

(Russian President Vladimir Putin December 26th 2005).

Exceptionally rugged
Don't worry about how your crews handle GPS1200. It's built to MIL specs to withstand the roughest use. With its strong, precision-machined magnesium housing, GPS1200 stands up to drops and falls and the jolts and vibrations of machines.

Immune to bad weather
Designed for temperatures from –40° C to +65° C (storage +80° C), GPS1200 shrugs off arctic cold and blistering heat. Fully waterproof – withstands immersion to 1 m – sand and dustproof, it operates perfectly in any conditions from tropical rainfall to desert sandstorms. GPS1200 just keeps on working.

High contrast touch screen
The high quality 1/4 VGA (11 lines by 32 characters) with optional colour option (RX1250) touch screen guarantees perfect clarity and contrast. Whether in fading light or bright sunshine, you can always read the display perfectly. Operate using the touch screen or the QWERTY keyboard, which-ever you prefer.

With or without controller
Connect the controller to the receiver when you need to input information and make full use of the on-board functions and programs.

RTK/DGPS communication
Radio modems, GSM, GPRS and CDMA modules fit in waterproof housings attached to the receiver. Attach either one or two devices for RTK/DGPS reference and rover applications.

With *Bluetooth*® Wireless-Technology built in to the RX1250 controller complete cable free operation and connectivity to compatible wireless products is available.

Figure 2: Leica GPS1200 product brochure

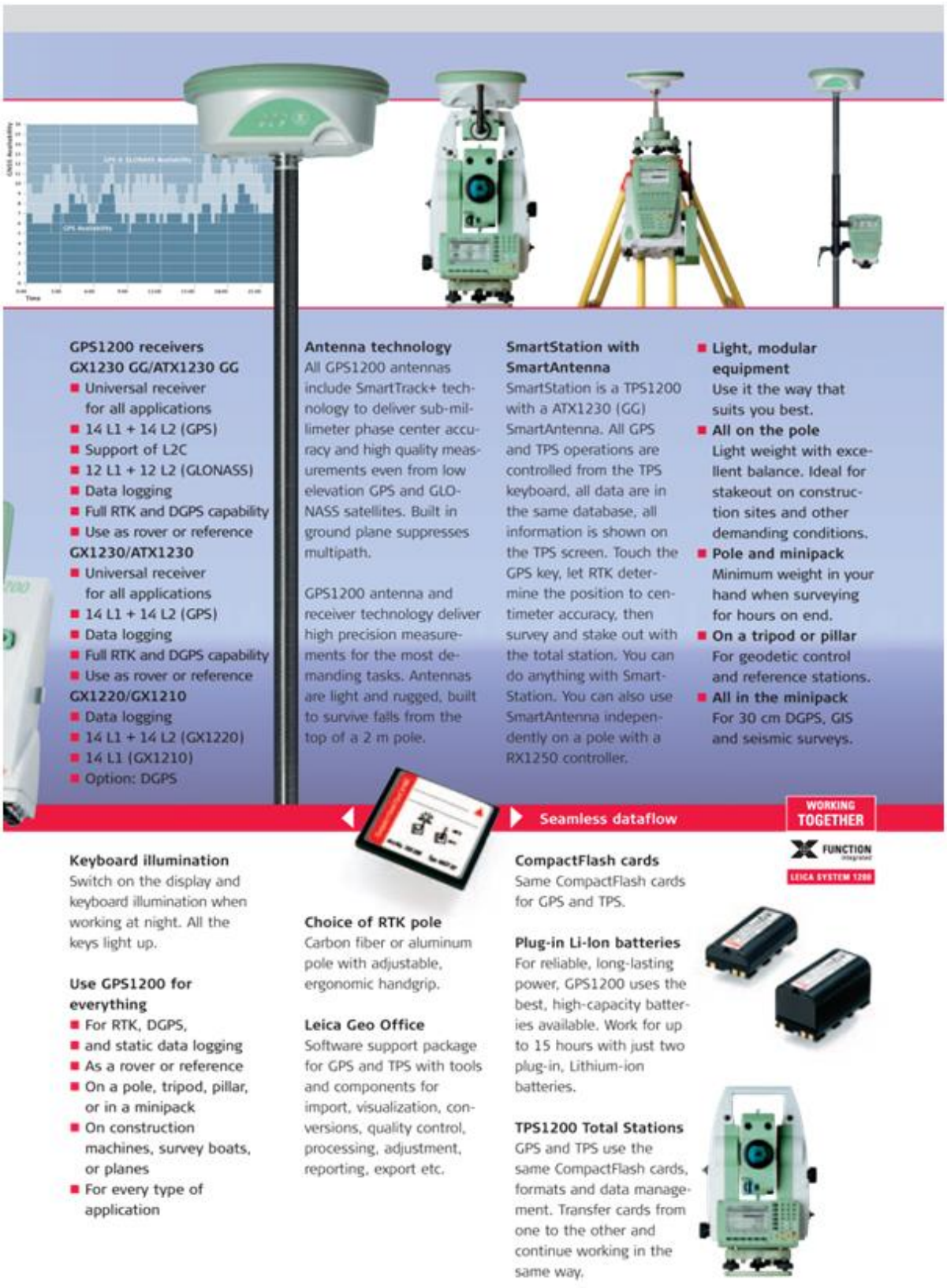


Figure 3: Leica GPS1200 product brochure

Leica GPS1200
Technical specifications and system features

GPS1200 receivers	GX1230 receiver	GX1220 receiver	GX1210 receiver	ATX1230 SmartAntenna / RX1250
GPS technology	SmartTrack	SmartTrack	SmartTrack	SmartTrack
Type	Dual frequency	Dual frequency	Single frequency	Dual frequency
Channels	12 L1 + 12 L2 / WAAS / EGNOS	12 L1 + 12 L2 / WAAS / EGNOS	12 L1 / WAAS / EGNOS	12 L1 + 12 L2 / WAAS / EGNOS
RTK	Yes, SmartCheck	No	No	Yes, SmartCheck
DGPS + WAAS / EGNOS	Yes	Optional	Optional	Yes
Status indicators	3 LED indicators: for power, tracking, memory.			
Ports	1 power port, 3 serial ports, 1 controller port, 1 antenna port.			1 power/controller port, Bluetooth port
Supply voltage, Consumption	Nominal 12 VDC. 5.2 W receiver + controller + antenna			ATX1230: 2.4 W, RX1250 1.1 W
Event input and PPS	Optional:	Optional:	Optional:	
	1 PPS output port	1 PPS output port	1 PPS output port	
	2 event input ports	2 event input ports	2 event input ports	
Standard antenna Built in groundplane	SmartTrack AX1202 Built in groundplane	SmartTrack AX1202 Built in groundplane	SmartTrack AX1201 Built in goundplane	SmartTrack ATX1230 Built in goundplane

The following apply to all receivers except where stated.

Power supply	Two LI-ion 3.8Ah/7.2V plug into receiver. One LI-ion 1.9Ah/7.2V plugs into ATX1230 and RX1250.
Plug-in LI-ion batteries Same for GPS and TPS	Power receiver + controller + SmartTrack antenna for about 15 hours (for data logging).
	Power receiver + controller + SmartTrack antenna + low power radio modem or phone for about 10 hours (for RTK/DGPS). Power SmartAntenna + RX1250 controller for about 5 hours (for RTK/DGPS)
External power	External power input 10.5 V to 28 V.
Weights	Receiver 1.20 kg. Controller 0.48 kg (RX1210) and 0.75 kg (RX1250). SmartTrack antenna 0.44 kg. SmartAntenna 1.12 kg. Plug-in LI-ion battery 0.09 kg (1.9Ah) and 0.19 kg (1.9Ah).
	Carbon fiber pole with SmartTrack antenna and RX1210 controller: 1.80 kg.
	All on pole: carbon fiber pole with SmartAntenna, RX1250 controller and plug-in batteries: 2.84 kg.

Temperature	Operation:	Receiver	-40°C to +65°C
ISO9022	Antennas		-40°C to +70°C
MIL-STD-810F	Controllers		-30°C to +65°C
	Storage:	Receiver	-40°C to +80°C
	Antennas		-55°C to +85°C
	Controllers		-40°C to +80°C
Humidity	Receiver, antennas and controllers		
ISO9022, MIL-STD-810F	Up to 100% humidity.		
Protection against water, dust and sand	Receiver, antennas and controllers: Waterpoof to 1m temporary submersion.		
IP67, MIL-STD-810F	Dust tight		
Shock/drop onto hard surface	Receiver: withstands 1m drop onto hard surface. Antennas: withstand 1.5m drop onto hard surface.		
Topple over on pole	Receiver, antennas and controllers: withstand fall if pole topples over.		
Vibrations	Receiver, antennas and controllers:		
ISO9022	withstand vibrations on large construction		
MIL-STD-810F	machines. No loss of lock.		

Figure 4: Leica GPS1200 technical specifications

SPECIFICATIONS

Sensor Type
Fused Quartz using electrostatic nulling

Reading Resolution
1 microGal

Standard Field Repeatability
< 5 microGal

Operating Range
8,000 mGal without resetting

Residual Long-Term Drift (static)
Less than 0.02 mGal/day

Range of Automatic Tilt Compensation
± 200 arc sec

Tares
Typically less than 5 microGals for shocks up to 20 G.

Automated Corrections
Tide, Instrument Tilt, Temperature, Noisy Sample, Seismic Noise Filter.

Dimensions
31 cm (H) x 22 cm x 21 cm
12 in (H) x 8.5 in x 8 in

Weight (including batteries)
8 kg, (17.5 lbs.)

Battery Capacity
2 x 6Ah (10.8V) rechargeable Litium-Ion Smart Batteries. Full day operation in normal survey conditions with two fully charged batteries.

Power Consumption
4.5 Watts at 25°C

Standard Operating Temperature Range
-40°C to +45°C

Ambient Temperature Coefficient
0.2 microGal/°C (typical)

Pressure Coefficient
0.15 microGal/kPa (typical)

Magnetic Field Coefficient
1 microGal/Gauss (typical)

Memory
Flash Technology (data security)
Standard 12 MBytes

Digital Data Output
RS-232 C and USB interface
Is optimized for Win XP™

Analog Data Output
Strip-Chart Recorder

Display Screen
¼ VGA 320 x 240 pixels

Keypad
27 key alpha/numeric

Standard System
- CG-5 Console
- Tripod base
- 2 rechargeable batteries
- Battery Charger, 110/240 V
- External Power 110/240 V
- RS-232 and USB Cables
- Carrying Bag
- Data dump and utilities software
- Operating Manual (CD)
- Transit Case

GPS
Enables GPS station referencing from an external 12 channel smart GPS antenna being connected via the RS-232 port. Standard GPS accuracy: <15m DGPS (WAAS) < 3m. Client has the option to use other higher accuracy GPS receivers outputting NMEA data string through the serial port.

OPTIONS

High Temperature Option
For use in climates that may exceed the normal operating temperate of 45°C. Allows operating temperatures of up to 55°C. This option is intended to be used in climates above freezing and needs to be ordered at the time of purchase.

Battery Belt
Suggested for cold weather operation.

COMPLETE GRAVITY SOLUTIONS

Special Applications
Please contact LRS Scintrex or your local representative.

Training Programs
LRS Scintrex can provide training programs at our office in Canada or at your location.

Application Software
LRS Scintrex can provide software packages to support your data processing, interpretation and mapping needs.

An ISO 9001:2000 registered company

* All specifications are subject to change without notice.

SCINTREX
A DIVISION OF LRS

CANADA
Scintrex
222 Snidercroft Road
Concord, Ontario, Canada L4K 2K1
Telephone: +1 905 669 2280
Fax: +1 905 669 6403
e-mail: scintrex@scintrexltd.com
Website: www.scintrexltd.com

MICRO g LACOSTE
A DIVISION OF LRS

USA
Micro-g LaCoste
1401 Horizon Avenue
Lafayette, CO 80026
Telephone: +1 303 828 3499
Fax: +1 303 828 3288
e-mail: info@microglacoste.com
website: www.microglacoste.com

Figure 5: Scintrex CG-5 specifications

5.0 Vehicle and Helicopter Transportation

5.1 Helicopters

Two Robinson R44 helicopters were supplied to the project (Photo 1). The helicopters were serviced in accordance with CASA specifications with 100 hourly services carried out in Uluru and Alice Springs.

Both helicopters were equipped with an EPIRB device, comprehensive first aid and survival kits. Communications were via VHF radio and Iridium satellite phone. Helicopter movements were also tracked using a satellite tracking system.

Aviation fuel and oils were supplied ex Alice Springs.

5.2 Support Vehicles

Facilitating refuelling operations were two 4WD Toyota Landcruiser utilities and an Isuzu FTS750 truck. A Toyota 4WD Landcruiser utility was used for crew and pilot transport, helicopter refuels and crew changeovers. The vehicles were fitted with the following equipment:

- Iridium satellite phone
- Garmin navigation grade GPS receiver with moving map display
- Spare navigation grade GPS receiver with batteries
- First aid and survival kit
- Two spare tyres
- Recovery equipment for tyre repair
- Recovery equipment including winch for bogging, stranding.
- Comprehensive tool-kit
- 10L of drinking water
- Satellite tracking device

All vehicles used on the project were supplied, serviced and maintained by Atlas Geophysics. The field crew carried out daily pre-start checks on all vehicles and these have been documented in Atlas Geophysics pre-start log books.

6.0 Camping / Accommodation

The crew were accommodated and messed in an Atlas Geophysics supplied caravan based at Kintore Airport and then at a remote camp between Uluru and Docker River. At the cessation of the project, all camp refuse was removed from site and the site left as it was found.

Photo 1: View towards ranges south of Kintore

7.0 Communications, Internet and Scheduled Calls

The primary method of communication for the field crews was via Iridium satellite phones. The helicopter crews made scheduled calls to the field operations base at hourly intervals. In addition to scheduled calls, the position of the helicopters was reported to the operations base at 10 minute intervals using satellite tracking technology.

Internet connections for client contact and data server access were established using a Telstra Turbo Gateway NextG internet modem and a Broadband Global Area Network (BGAN) satellite internet network system for remote locations.

8.0 Survey Methodology

All gravity data were acquired using Atlas Geophysics Pty Ltd helicopter-borne techniques. These techniques, which involve concurrent GPS and gravity acquisition, allow for rapid acquisition of very high quality data.

8.1 Gravity and GPS Control Establishment

One primary GPS and gravity control station was established during this survey (Table 2).

At this primary control station a permanent monument was erected to mark and witness the station. The monument consisted of a 40cm star picket driven into the ground with about 10cm protruding alongside a small square concrete slab set level in concrete. The star picket marked the position of the GPS control station and the concrete slab marked the position of the gravity control station. A steel star picket of 1.5m length was placed within 0.5m of each control point and carried an Atlas Geophysics Pty Ltd witness plaque numbered with a unique station number (Figure 6).

Control Station ID	Lat / Long / Ht (GDA94, GRS80)	Observed Gravity (AAGD07 µm/s^2)
201406100001 (GA 20148100001) *West Amadeus South Base*	-25 05 16.7115 129 58 11.8971 605.288	9787625.02

Table 2: Gravity and GPS control stations used to control the survey

The details of this primary control station has been recorded on an Atlas Geophysics Pty Ltd control station summary sheet. This sheet includes the geodetic coordinates, observed gravity value, station description, locality sketch, locality map and a digital photo of the station. The sheet is contained in Appendix B.

Figure 6: Atlas Geophysics Pty Ltd survey witness plaque

8.1.1 GPS Control

Primary GPS control was established for all control stations and this allowed all position and height information obtained from the gravity survey to be tied to the Geocentric Datum of Australia (GDA94), the Geodetic Reference System 1980 (GRS80) and Australian Height Datum (AHD).

Secondary GPS control was used to restrict kinematic baseline length. 11 separate remote, control stations were established in the field and all were marked with a 40cm steel rod driven into the ground with about 1cm protruding (not identified). In the field, whilst the survey was underway, temporary coordinates for these stations were established using static base-line processing to the primary control station over a minimum ten hour period.

Upon final processing, coordinates for all primary and secondary control stations were obtained using the 5 second static GPS data logged at each station whilst the gravity survey was underway. The static data has been submitted to Geoscience Australia's AUSPOS processing system to produce first-order geodetic coordinates accurate to better than 10mm for the x, y and z observables. Multiple days of static GPS data have been submitted to ensure accuracy and reliability of the solution.

Initial surveying was conducted using adopted control station coordinates since the AUSPOS system requires approximately two weeks before a Final Ephemeris Solution can be delivered. The adopted coordinates were derived from an autonomous GPS measurement at the primary control station giving an accuracy of better than 0.5m for x, y coordinates and better than 15m for the z coordinate. Once the final ephemeris solution for the control station coordinates was delivered by AUSPOS, all control and field GPS measurements had the necessary DC shift applied to give accurate, absolute positions for east, north and elevation. A listing of final coordinates for all control stations are contained in Appendix C.

8.1.2 Gravity Control

Gravity control was pre-existing at the Kintore base but had to be established at the remote southern camp. Once tied to the Australian Fundamental Gravity Network (AFGN), the gravity control stations allowed all field gravity observations to be tied to the Australian Absolute Gravity Datum 2007 (AAGD07).

An accurate observed or absolute gravity value for control station 201406100001 was established via an "ABABA" tie with a project gravity meter to a nearby AFGN station. Table 3 summarises the control ties conducted and Appendix D contains the control tie data. Expected accuracy of the tie surveys would be better than 0.1 µm/s^2 (or 0.01 mGal).

Control Station ID	AFGN station tied to	Date of tie
GRVGPS0112 *(Existing Kintore Base)*	2006600037 Kintore Workers Cottage and 2006600038'Kintore A/S"	22/06/2010 23/06/2010
201406100001 *(West Amadeus South Base)*	1991911213 'Yulara Airport Terminal'	26/07/2014

Table 3: Primary gravity and GPS control stations used to control the survey

8.2 GPS Data Acquisition, Processing and Quality Control

GPS/GNSS data were collected in static mode at each of the control stations and in kinematic mode with the helicopters using geodetic grade Leica GPS1200 receivers. Rigorous post-processing of the recorded kinematic data allowed for excellent GPS/GNSS ambiguity resolution and 3-D solution coordinate qualities better than 5cm for each of the gravity station locations. Atlas Geophysics QC procedures have ensured the final GPS/GNSS data have met and exceeded contract specifications.

8.2.1 GPS/GNSS Acquisition

Each GSL was positioned using navigation grade Garmin receivers fitted to custom mounts inside the cockpit of the helicopter. Accuracy of the positioning system was better than 5m and where practicable, the helicopter crew landed as close to the programmed station location as possible. Where it was too dangerous to land, stations were moved from the programmed coordinate.

For the kinematic helicopter operations, the GPS/GNSS sensors were mounted on a fixed aluminium bracket at the front of the aircraft (primary) and on the tail boom of the aircraft (secondary backup, with phase data logged by the receivers inside the cockpit. Data were logged at five second epochs onto Compact Flashcards (CF) for later downloading and processing. Static data were also concurrently logged at the primary and secondary GPS control stations to allow for later kinematic processing.

8.2.2 GPS/GNSS Processing

The acquired raw GPS/GNSS data were processed nightly using Novatel Waypoint Grafnav v8.50 post-processing software (Figure 7). GrafNav is a fully-featured kinematic and static GPS/GNSS post-processing package that uses Waypoint's robust GPS/GNSS processing carrier phase kinematic (CPK) filter engine. The software is capable of processing raw kinematic GPS/GNSS data from most GPS/GNSS receivers and allows the user to process the roving data from as many as eight separate control stations to achieve accuracies at the centimetre level. The software can automatically switch from static to kinematic processing and has a fixed static solution for static initialisation of short or medium baselines that are below 30km. Kinematic Ambiguity Resolution (KAR) allows the session to start in kinematic mode and can help fix otherwise unrecoverable cycle slips. Ionospheric processing and modelling is also included with the software and can help improve accuracy, especially over long baselines. Advantages of the Waypoint processing engine over other packages include:

Fast Processing – The Grafnav engine is one of the fastest on the market. For a single base station, a 2.40 Mhz PIII CPU can expect to process GPS data at 670 epochs/second. This means that a 4-hour 2 Hz data set will process one direction in 22 seconds. For two bases, processing takes 250 epochs/second or about 1 minute for the same 4-hour data set. For 4 bases, these times are 50 epochs/second or about 5 minutes.

Reliable OTF Processing – Waypoint's on-the-fly KAR algorithm has had years of development and testing. Various implementations and numerous options are available to control this powerful feature.

Multi-Base (MB) processing – With Version 8.50, GrafNav now supports true multiple control station processing where all of the baselines are incorporated into one sophisticated Kalman filter. This can spatially de-correlate some of the error sources while also allowing integer ambiguity determination using the closest base station. Satellite drop-outs at one base will also be compensated by the others. The two biggest advantages are improved overall accuracies and much less operator effort required to process and QC such data.

Accurate Static Processing – Three modes of static processing are implemented in the main processing kernel.

Dual Frequency Support – Full dual frequency GPS processing comes with the software. For ambiguity resolution, this entails wide/narrow lane solutions for KAR, fixed static and quick static. The GrafNav kernel implements two ionospheric processing modes including the iono-free and relative models. The relative model is especially useful for airborne applications where initialisation is near the base station, and this method is much less susceptible to L2 phase cycle slips.

Forward and Reverse – Processing can be performed in both the forward and reverse directions. GrafNav also has the ability to combine these two solutions to obtain a globally optimum one.

GPS + GLONASS – The GrafNav kernel has the ability to also process GPS+GLONASS data. This is especially advantageous for applications in forested areas, where the additional satellite coverage can improve accuracies.

Velocity Determination – Since the GrafNav kernel includes the L1 doppler measurement in its Kalman filter, velocity determination is very accurate. In addition to this, a considerable amount of code has been added specifically for the detection and removal of Doppler errors.

High Dynamics – The GrafNav kernel can handle extremely high dynamics from missiles, rockets, dropped ordinances, and fast flying aircraft.

Long Baseline - Because precise ephemeris and dual frequency processing is supported, long baselines accuracies can be as good as 0.1 PPM.

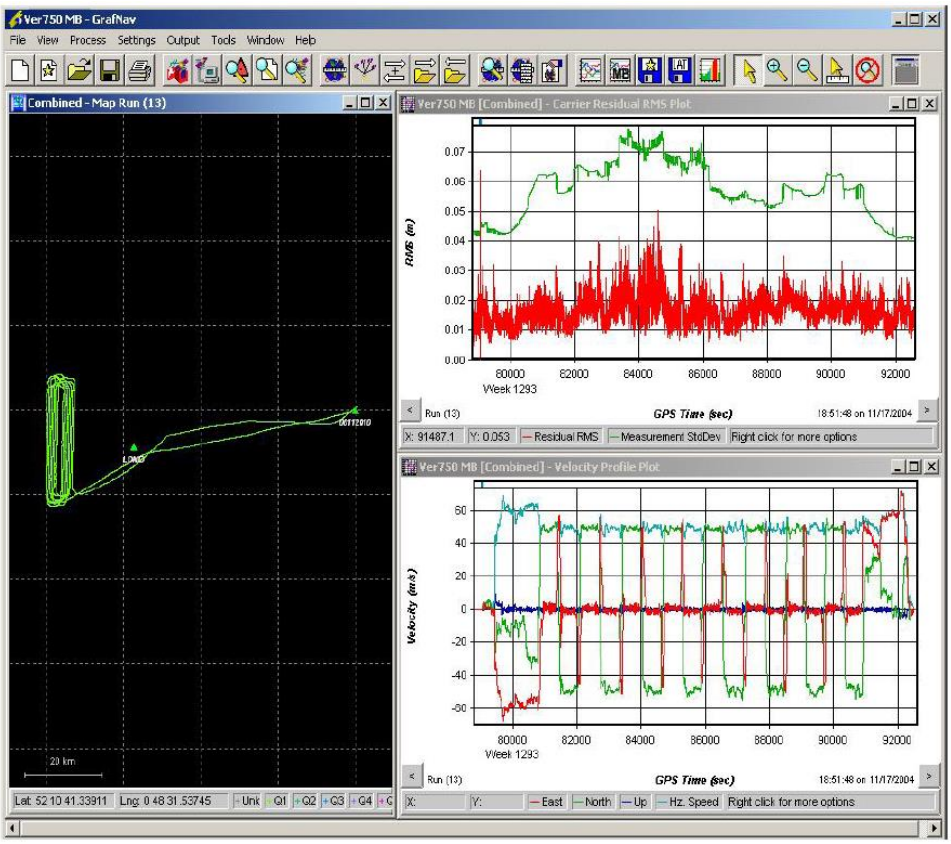


Figure 7: Waypoint Grafnav Processing Software

Once each epoch was processed to give a solution for the WGS84 position and elevation at ground level (i.e. corrected for sensor height), conversion between GPS/GNSS derived WGS84/GDA94 coordinates to Map Grid of Australia (MGA) coordinates was conducted within Waypoint. For most practical applications, where a horizontal accuracy of only a metre or greater is required, GDA94 coordinates can be considered the same as WGS84. MGA94 coordinates were obtained by projecting the GPS-derived WGS84 coordinates using a Universal Transverse Mercator (UTM) projection with zone 52. For more information about WGS84, GDA94 and MGA94 coordinates, the reader is asked to visit the Geoscience Australia website http://www.ga.gov.au/earth-monitoring/geodesy/

Elevations above the Australian Height Datum (AHD) were modelled using Waypoint 8.50 software and the latest geoid model for Australia, AUSGEOID09. Information about the geoid and the modelling process used to extract separations (N values) can be found at http://www.ga.gov.au/geodesy/ausgeoid/. To obtain AHD elevation, the modelled N value is subtracted from the GPS derived WGS84/GRS80 ellipsoidal height (Figure 8).

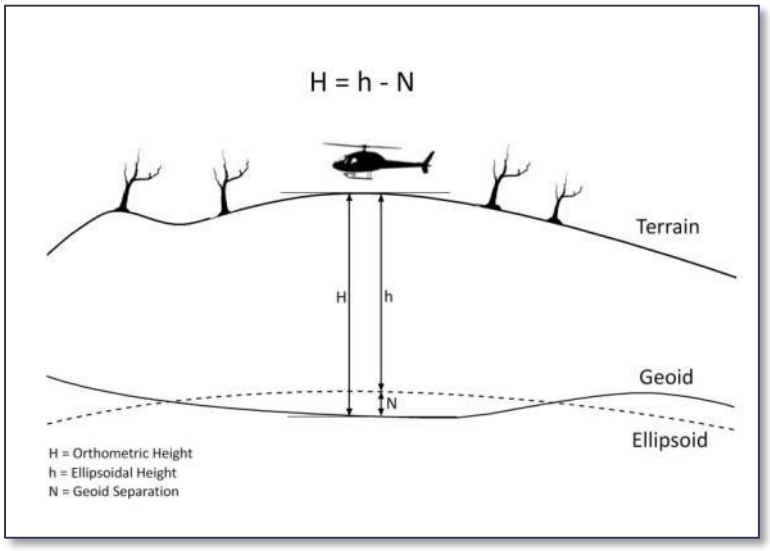


Figure 8: Geoid-Ellipsoid Separation

8.2.3 GPS/GNSS Quality Control

Rigorous quality control procedures were applied to the acquired GPS/GNSS data on a daily basis using Waypoint Grafnav's built in QC tools. Some of the tools used on this project include:

Combined Separation Plot: This plot shows the difference between the forward and reverse solutions (Figure 9). A perfect solution would have a separation of zero as this indicated the carrier phase ambiguities have been determined to be exactly the same value in both directions. A separation of better than 0.1m on a helicopter survey would indicate that the data is of high quality.

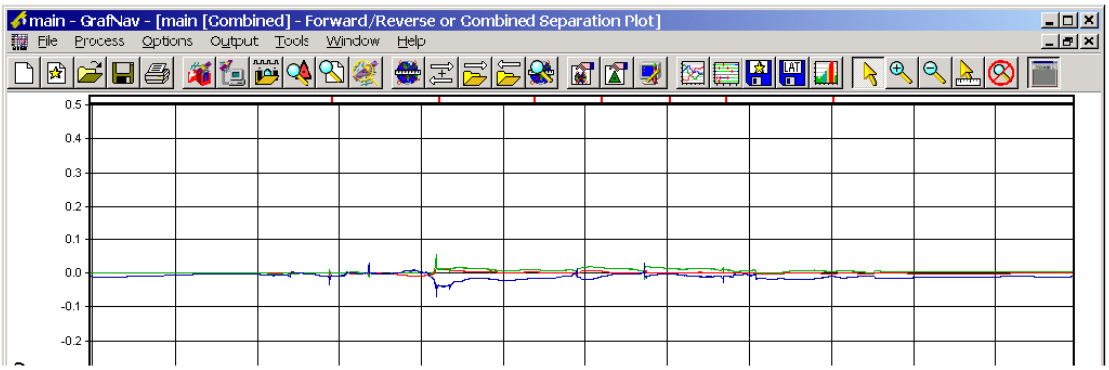


Figure 9: Combined Separation Plot

Float or Fixed Ambiguity Status Plot: This plot shows if the final solution is float or fixed (Figure 10). Fixed integer ambiguities generally have better accuracies (usually < 10cm

accuracy). Ideally the plot should show fixed as this indicated an integer ambiguity fix on both forward and reverse directions.

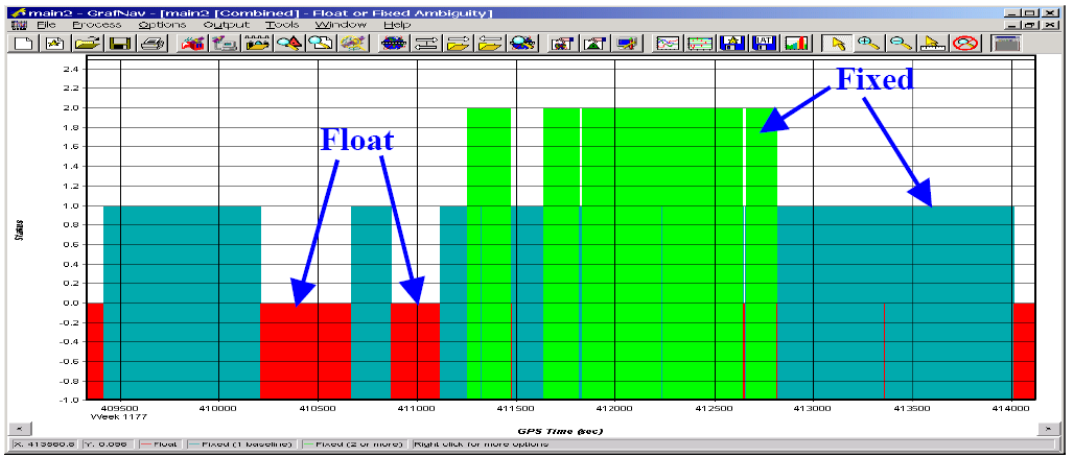


Figure 10: Float or Fixed Ambiguity Status Plot

Quality Factor Plot: This plot shows the quality of the final solution (Figure 11). There are five different quality factors plotted and these factors are also output in the Atlas Geophysics Pty Ltd GPS data file.

Quality 1 – Fixed Integer (Green)
Quality 2 – Stable Float (Aqua)
Quality 3 – Converging Float (Blue)
Quality 4 – DGPS or worse (Red)
Quality 5 – Single Point (Yellow)

Increasing quality factors indicate a worse solution. This is not a perfect indication, but it can be useful to isolate problems.

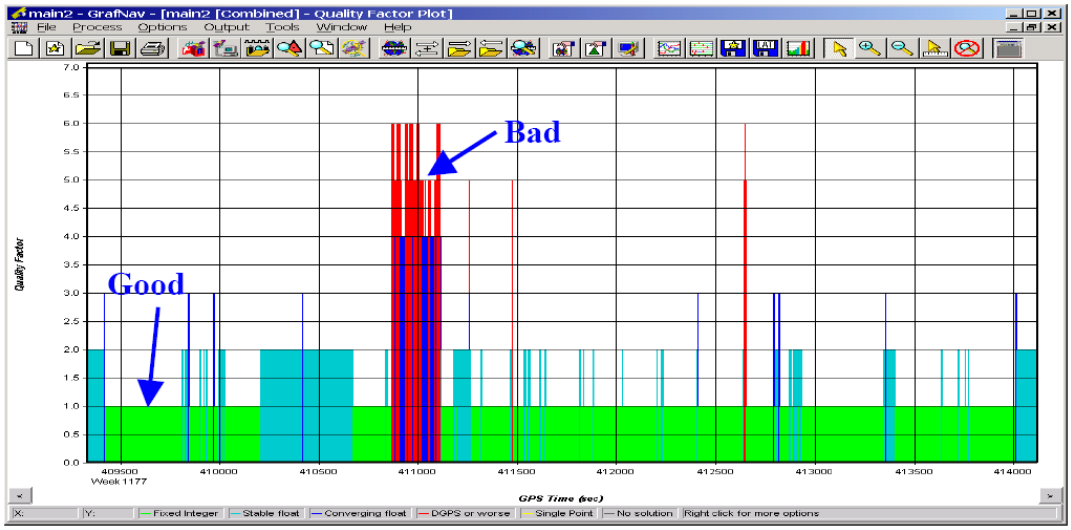


Figure 11: Quality factor plot

Complementing Waypoint GrafNav QC tools is the company's own in-house GPS quality control software. A module built into AGRIS (Atlas Geophysics Reduction and Information Software) allows the user to import the Waypoint output files and examine quality factors such as station repeatability between multiple control stations, coordinate velocity, dilution

of precision, coordinate quality factor and standard error for each gravity station location. The procedure is carried out before merging the positional data with gravity data for final reduction to Bouguer Anomaly. Comprehensive statistics, repeatability analysis and histogram plotting are also performed.

QC procedures were applied to the GPS/GNSS data on a daily basis and any gravity stations not conforming to contract specifications were repeated by the company at no cost to the client.

8.3 Gravity Data Acquisition, Processing and Quality Control

Gravity data were gained using the company's rapid acquisition, high accuracy helicopter-borne techniques. The company's own in-house reduction and QC software was used to reduce the data on a daily basis to ensure quality and integrity. Final delivered data met and exceeded contract specifications.

8.3.1 Calibration of the Gravity Meter

The gravity meters used for survey on this project were calibrated pre and post survey on the Guildford Cemetery – Helena Valley Primary School calibration range (2010990117-2010990217) in Western Australia. The calibration process has validated the gravity meter's scale factor to ensure reduction of the survey data produces correct Observed Gravities from measured dial reading values. Table 4 summarises the results of the calibration ties and lists the resultant scale factor for the survey gravity meter. Appendix E contains the reduced data used to create the summary.

PRE SURVEY CALIBRATION RUN 27/06/14 and 25/06/2014				
Meter Code	Meter SN	Calc 2010990217 AAGD07 (µm/s^2)	Diff (µm/s^2)	Scale
A2	40241	9794483.79	-0.06	0.999283
A6	40382	9794483.82	-0.03	1.000000

POST SURVEY CALIBRATION RUN 18/12/2014 and 20/01/2015				
Meter Code	Meter SN	Calc 2010990217 AAGD07 (µm/s^2)	Diff (µm/s^2)	Scale
A2	40241	9794483.80	-0.05	0.999283
A6	40382	9794483.91	0.05	1.000000

Table 4: Gravity meter scale factors

Weekly tilt-tests and cycles were conducted to ensure the meter's drift and tilt correction factors were valid. Gravity meter drift rates were monitored on a day to day basis using AGRIS software.

8.3.2 Acquisition of the Gravity Data

Gravity data were acquired concurrently with GPS/GNSS data using Scintrex CG-5 gravity meters. Data were acquired in a single shift of ten hours duration, with each shift consisting

of a single loop controlled by observations at the gravity control stations. Each loop contained a minimum of two repeated readings so that an interlocking network of closed loops was formed. A total of **10.47%** repeats were acquired for quality control purposes. Repeat readings were evenly distributed on a time-basis throughout each of the gravity loops.

The gravity acquisition crew consisted of a single gravity operator and pilot per helicopter. The pilot was responsible for safely navigating to each station, and once at the station, the operator disembarked from the helicopter and acquired the gravity data. The observation point was always situated in front of the aircraft, in the pilot's view. Under no circumstances were readings taken outside of the pilot's view as this can jeopardise the safety of the operator. As the helicopter always landed on flat ground, the error due to the gravity observation not being coincident with the GPS/GNSS observation is minimal. A small latitude based error of less than 0.05 $\mu m/s^2$ would apply, but this is not seen to be appreciable on a regional gravity survey, so is not corrected for.

At each station, the gravity operator took a minimum of two gravity readings of 20 second duration so that any seismic or wind noise could be detected. Control station readings were set to 60 second duration. Before taking the reading, the operator ensured that the instrument tilt-reading was restricted to less than 5 arc-seconds and after the reading, not higher than 20 arc-seconds. Tilt-testing prior to project commencement showed that the gravity meters performed well even at extreme tilts (better than 0.05 $\mu m/s^2$ at +150/-150 arc-seconds).

If two separate readings did not agree to better than 0.20 $\mu m/s^2$ (0.10 $\mu m/s^2$ for control station readings), then the operator continued taking readings until the tolerance between consecutive readings was achieved. At the conclusion of the gravity reading, the final data display on the gravity meter was analysed to ensure the instrument was performing to specification and that the station observation provided data conforming to the project specifications. The operator also checked that the temperature, standard deviation and rejection values were within required tolerance before recording the reading. At each station, the operator recorded the gravity data digitally in the gravity meter as well as in an Atlas Geophysics Pty Ltd field book so that instrument drift and reading repeatability could be analysed easily whilst in the field. Data recorded at each GSL was assigned a unique station code and station number.

Repeat stations were marked with a biodegradable flagging tape for subsequent reoccupation. When reoccupying stations, the pilot positioned the helicopter as close to the original landing spot as possible (usually better than 0.5m). A very small percentage of the repeat stations were positioned greater than 0.5m from the original location due to soft ground and/or windy conditions, but always on flat ground at the same level as the original observation. All repeat gravity observations were taken in exactly the same location, even if the helicopter landed slightly offset from the original position.

8.3.3 Processing of the Gravity Data

The acquired gravity data were processed using the company's in-house gravity pre-processing and reduction software, AGRIS. This software allows for full data pre-processing, reduction to Bouguer Anomaly, repeatability and statistical analysis, as well as full quality control of the output dataset.

The software is capable of downloading Scintrex CG-3/CG-5 and Lacoste Romberg gravity data. Once downloaded, the gravity data is analysed for consistency and preliminary QC is performed on the data to check that observations meet specification for standard deviation, reading rejection, temperature and tilt values. Once the data is verified, the software averages the multiple readings and performs a merge with the GPS data (which it has also previously verified) and performs a linear drift correction and earth tide correction. Calculation of Free Air and Bouguer Anomalies is then performed using the contract specified formulae.

The following corrections were applied to the dataset to produce Bouguer Anomaly values for each of the gravity stations. All formulae produce values in µm/s^2.

Instrument scale factor: This correction is used to correct a gravity reading (in dial units) to a relative gravity unit value based on the meter calibration.

$$r_c = 10 \cdot (r \cdot S(r))$$

where,

r_c corrected reading in µm/s^2
r gravity meter reading in dial units
$S(r)$ scale factor (dial units/mGal)

Earth Tide Correction: The earth is subject to variations in gravity due to the gravitational attraction of the Sun and the Moon. These background variations can be corrected for using a predictive formula which utilises the gravity observation position and time of observation. The Scintrex CG5 gravity meter automatically calculates ETC but uses only an approximate position for the gravity observation so is not entirely accurate. For this reason, the Scintrex ETC is subtracted from the reading and a new correction calculated within AGRIS software. The full formula is listed in Appendix G.

$$r_t = r_c + g_{tide}$$

where,

r_t tide corrected reading in µm/s^2
r_c scale factor corrected reading in µm/s^2
g_{tide} Earth Tide Correction (ETC) in µm/s^2

Instrument Drift Correction: Since all gravity meters are mechanical they are all prone to instrument drift. Drift can be caused by mechanical stresses and strains in the spring mechanism as the meter is moved, knocked, reset, subjected to temperature extremes, subjected to vibration, unclamped etc. The most common cause of instrument drift is due to extension of the sensor spring with changes in temperature (obeying Hooke's law). To calculate and correct for daily instrument drift, the difference between the gravity control station readings (closure error) is used to assume the drift and a linear correction is applied.

$$ID = \frac{r_{cs2} - r_{cs1}}{t_{cs2} - t_{cs1}}$$

where,

ID	Instrument Drift in µm/s^2 /hour
r_{cs2}	control station 2nd reading in µm/s^2
r_{cs1}	control station 1st reading in µm/s^2
t_{cs2}	control station 2 time
t_{cs1}	control station 1 time

Observed Gravity: The preceding corrections are applied to the raw gravity reading to calculate the earth's absolute gravitational attraction at each gravity station. The corrections produced Observed Gravities on the AAGD07 datum.

$$G_o = g_{cs1} + (r_t - r_{cs1}) - (t - t_{cs1}) \cdot ID$$

where,

G_o	Observed Gravity in µm/s^2
g_{cs1}	control station 1 known observed gravity in µm/s^2
r_t	tide corrected reading in µm/s^2
r_{cs1}	control station 1 reading in µm/s^2
t	reading time
t_{cs1}	control station 1 time
ID	instrument drift in µm/s^2/hour

Normal Gravity: The normal (or theoretical) gravity value at each gravity station is calculated based on the assumption that the Earth is a homogeneous ellipsoid. The closed form of the 1980 International Gravity Formula is used to approximate the theoretical gravity at each station location and essentially produce a latitude correction. Gravity values vary with latitude as the earth is not a perfect sphere and the polar radius is much smaller than the equatorial radius. The effect of centrifugal acceleration is also different at the poles versus the equator.

$$G_n = 9780326.7715((1 + 0.001931851353(sin^2 l)/(SQRT(1 - 0.0066943800229(sin^2 l)))$$

where,

G_n	Theoretical Gravity in gravity units
l	GDA94 latitude at the gravity station in decimal degrees

Atmospheric Correction: The gravity effect of the atmosphere above the ellipsoid can be calculated with an atmospheric model and is subtracted from the normal gravity.

$$AC = 8.74 - 0.00099 \cdot h + 0.0000000356 \cdot h^2$$

where,

AC	Atmospheric Correction in gravity units
h	elevation above the GRS80 ellipsoid in metres

Free Air Correction: Since the gravity field varies inversely with the square of distance, it is necessary to correct for elevation changes from the reference ellipsoid (GRS80). Gravitational attraction decreases as the elevation above the reference ellipsoid increases.

$$FAC = -(3.087691 - 0.004398\, sin^2 l) \cdot h + 7.2125 \cdot 10^{-7} \cdot h^2$$

where,

FAC Free Air Correction in gravity units

l GDA94 latitude at the gravity station in decimal degrees

h elevation above the GRS80 ellipsoid in metres

Bouguer Correction: If a gravity observation is made above the reference ellipsoid, the effect of rock material between the observation and the ellipsoid must be taken into account. The mass of rock makes a positive contribution to the gravity value. The correction is calculated using the closed form equation for the gravity effect of a spherical cap of radius 166.7km, based on a spherical Earth with a mean radius of 6,371.0087714km, height relative the ellipsoid and a rock density of 2.67 t/m^3.

$$BC = 2\pi G\rho((1+\mu)\cdot h - \lambda R)$$

where,

BC Bouguer Correction in gravity units

G gravitational constant = $6.67428\cdot10^{-11}$m^{3}kg^{-1}s^{-2}

ρ rock density (2.67 t/m^3)

h elevation above the GRS80 ellipsoid in metres

R $(R_o + h)$ the radius of the earth at the station

R_o mean radius of the earth = 6,371.0087714 km (on the GRS80 ellipsoid)

μ & λ are dimensionless coefficients defined by:

$$\mu = ((1/3)\cdot\eta^2 - \eta)\cdot$$

where,

η h/R

$$\lambda = (1/3)\{(d + f\delta + \delta^2)[(f-\delta)^2 + k]^{\frac{1}{2}} + p + m\cdot ln(n/(f - \delta + [(f-\delta)^2 + k]^{\frac{1}{2}})\}$$

where,

d $3\cdot cos^2\alpha - 2$

f $cos\alpha$

k $sin^2\alpha$

p $-6\cdot cos^2\alpha\cdot\sin(\alpha/2) + 4\cdot sin^3(\alpha/2)$

δ (R_o/R)

m $-3\cdot k\cdot f$

n $2\cdot[sin(\alpha/2) - sin^2(\alpha/2)]$

α S/R_o with S = Bullard B Surface radius = 166.735 km

Terrain Correction: The terrain correction accounts for variations in gravity values caused by variations in topography near the observation point. The correction accounts for the attraction of material above the assumed spherical cap and for the over-correction made by the Bouguer correction when in valleys. The terrain correction is positive regardless of whether the local topography consists of a mountain or a valley. Section 8.3.4 contains a more in-depth discussion of the terrain correction process.

Free Air Anomaly: The free air anomaly is the difference between the observed gravity and normal gravity that has been computed for latitude and corrected for the elevation of the gravity station above or below the reference ellipsoid:

$$FAA = G_o - (G_n - AC) - FAC$$

where,

FAA Free Air Anomaly in gravity units
G_o Observed Gravity in gravity units
G_n Normal Gravity in gravity units
AC Atmospheric Correction in gravity units
FAC Free Air Correction in gravity units

Bouguer Anomaly: The Bouguer anomaly is computed from the free air anomaly above by removing the attraction of the spherical cap calculated by the Bouguer correction.

$$BA = FAA - BC$$

where,

BA Bouguer Anomaly in gravity units
FAA Free Air Anomaly in gravity units
BC Bouguer Correction in gravity units

Complete Bouguer Anomaly: This is obtained by adding the terrain correction to the Bouguer anomaly. The Complete Bouguer Anomaly is the most interpretable value derived from a gravity survey as changes in the anomaly can be directly attributed to lateral density contrasts within the geology below the observation point.

$$CBA = BA + TC$$

where,

CBA Complete Bouguer Anomaly in gravity units
BA Bouguer Anomaly in gravity units
TC Terrain Correction in gravity units

8.3.4 Terrain Corrections

Terrain corrections, which account for the variation in gravity due to topography proximal to the gravity station, were computed using a digital elevation model (DEM) and RASTERTC software from Geopotential. RASTERTC software permits the user to input a DEM in the form of a binary grid file, and gravity data in an ASCII file. From this information, the software is capable of calculating extremely accurate terrain corrections. For more detailed information regarding the software and algorithm, the reader is asked to visit the Geopotential website http://geopotential.com/docs/RasterTC/RasterTC.shtml

Elevation data were sourced from the 1 second SRTM Level 2 Derived Smoothed Digital Elevation Model (DEM-S) Version 1.0 which has an equivalent cell size of 30m. Data were extracted to provide a 30km buffer from the extents of the gravity survey.

A comparison against GPS heights recorded during the gravity survey revealed that the DEM data were sufficiently accurate to be used in regional terrain corrections. The average difference between GPS height and DEM heights was 3.39 m and the standard deviation of the differences was 2.11 m.

When executing the terrain correction, the following inputs were used with RASTERTC:

R_{MIN} = 30 m
R_{MED} = 250 m
R_{MAX} = 30000 m
Angle = 6 degrees

R_{MIN} was selected to enable correction for topography near to the gravity station and coincided with the grid cell size of the SRTM DEM. R_{MAX} was selected to allow for outer zone correction of severe topography at large distances from the gravity station. R_{MED} was chosen so that the DEM would be sampled at an interval close to the grid cell size of the DEM when using the 6 degree integration angle.

The terrain correction software provides indicators for terrain correction quality and accuracy as part of its output (included on the data DVD as Appendix J). The output variables QFINNER and QFOUTER specify the quality factor for each correction made. If these factors have a value of 0, then the user can assume that the terrain correction proceeded successfully. If non-zero values are reported, then the value of the QF factor will provide an indication as to possible problems or inadequacies in the correction.

For the inner zone correction, an indicator of how well the terrain in the immediate vicinity of a gravity station is represented by the available elevation samples is obtained by examining the spatial distribution of the elevation samples. In the radial interval R_{MIN} to R_{MED}, RASTERTC counts the number of samples falling within the 8 octants surrounding the station. If any of these octants are missing elevation samples, that fact is noted, and the tabulated quality factor simply notes how many of octants are missing samples (see Table 5).

For the outer zone correction, a result of 0 means that the correction proceeded successfully. If a portion of the outer-zone terrain is missing from the DEM supplied, the value of QF-Outer will reflect the percent of terrain that was available (rounded to the nearest percent). For example, if QF-Outer is 91, the implication is that 9% of the terrain in

the outer zones was missing for some reason, and that the terrain correction calculated for that particular station is too small by some amount.

QF-Inner	Explanation of Error Code
0	Inner-zone terrain calculation OK
1	No elevation samples occur in 1 octant surrounding the gravity station
2	No elevation samples occur in 2 octants surrounding the gravity station
3	No elevation samples occur in 3 octants surrounding the gravity station
4	No elevation samples occur in 4 octants surrounding the gravity station
5	No elevation samples occur in 5 octants surrounding the gravity station
6	No elevation samples occur in 6 octants surrounding the gravity station
7	No elevation samples occur in 7 octants surrounding the gravity station
22	Duplicate elevation nodes encountered while calculating terrain gradients
23	All elevation nodes collinear or triangulation structure corrupted

Table 5: Terrain Correction Error Codes

8.3.5 Quality Control of the Processed Gravity data

Following reduction of the data to Bouguer Anomaly, repeatability and QC procedures were applied to both the positional and gravity observations using AGRIS software. AGRIS checks the following as part of its QC processing:

- Easting Observation Repeatability and Histogram
- Northing Observation Repeatability and Histogram
- Elevation Observation Repeatability and Histogram
- Gravity Observation Repeatability and Histogram
- Gravity SD, Tilt XY, Temperature, Rejection, Reading Variance
- Gravity meter drift / closure
- Gravity meter loop time, drift per hour
- GPS Dilution of Precision, Coordinate Quality Factor, Standard Error
- Variation of surveyed station location from programmed location

QC procedures were applied to the gravity data on a daily basis and any gravity stations not conforming to contract specifications were repeated by the company at no cost to the client.

8.3.6 Additional Processing, Gridding and Plotting

Complementing the QC procedures is additional daily gridding, imaging and plotting of the elevation and gravity data. Once processed to Bouguer Anomaly and assessed for QC, data are imported into Geosoft Oasis Montaj or ChrisDBF software for gridding at 1/5th the station spacing to produce ERMapper compatible grid files. Resultant grids are contoured, filtered and interpreted using ERMapper and ArcMap software to check that data is smoothly varying and that no spurious anomalies are present. A first vertical, tilt angle and horizontal derivative filter are routinely applied to the data as these filters allow for excellent noise recognition. Once identified, any spurious stations can be field checked by the helicopter crew the following day and repeated if required. During the course of the survey one anomalous station was field checked and found to be valid.

Plotting of the acquired stations on a daily basis allowed for identification of any missed stations which were then gained the following day.

9.0 Results

With two helicopter crews running simultaneously, production was excellent despite the often long ferries and remoteness of the survey area. Surveying out in the open desert was straight forward, with the only challenges for the pilots being the occasional set of steep ranges or stand of trees.

A total of **8,107** new gravity stations were gained during the survey.

Final data have been delivered to a technically excellent standard and are presented both digitally and hardcopy as Appendices to this report.

9.1 Survey Timing and Production Rates

Two crews began gravity data acquisition on 5th July 2014 and remained on site until survey cessation on 11th August 2014. The only downtime experienced was due to logistical base moves, remote GPS base establishment, tyre issues with vehicles and some minor helicopter maintenance. On the whole, production was consistent with an approximate total average of 250 stations per day.

A full production report can be found on the data DVD (Appendix J).

9.2 Data Formats

Final point located data for the project have been delivered in ASEG-GDF2 compliant format. Appendix I contains a listing of the definition and description files accompanying the final data.

Raw GPS-GNSS and gravity data in their respective native formats have been included on the data DVD as Appendix J. Table 6 overleaf summarises the deliverables.

Final Delivered Data	Format	Data DVD	Hardcopy
Gravity Database	Point located data ASEG-GDF2	•	
Raw Positional Data	AGRIS format, comma delimited	•	
Raw Gravity Data	Scintrex CG5 format	•	
Raw GPS-GNSS Data	Waypoint GPB Binary	•	
Gravity Control Data	Microsoft Excel Format	•	•
Calibration Data	Microsoft Excel Format	•	•
Repeat Data	Microsoft Excel Format	•	•
Terrain Corrections	RASTERTC output file	•	
Final Grids	ERMapper Grids .ers	•	
Final Images	Geotiff Images	•	•
Acquisition Report	PDF .pdf	•	•

Table 6: Final Deliverables

9.3 Data Repeatability: All Observations

The repeatability of both the gravity and GPS data was excellent. In total, **849** gravity and GPS repeat stations were collected and analysed. As a percentage, this equates to **10.47%** of the total number of new gravity stations acquired. Repeat stations were acquired so that an even distribution between gravity loops was established and that all loops were interlocked.

Descriptive statistics pertaining to the repeatability are contained in Table 7 and Appendix F contains a tabulation of the actual repeat data for the entire survey.

The standard deviation of the gravity repeat deviations was **0.37 µm/s²** and the standard deviation of the GPS derived elevation repeat deviations was **0.070m**. These statistics confirm that the data has met and exceeded contract specifications.

	Elevation Repeat (mGRS80)	Gravity Repeat (µm/s²)
Mean	-0.004	0.04
Standard Error	0.002	0.01
Median	-0.003	0.03
Mode	-0.012	0.00
Standard Deviation	0.070	0.37
Sample Variance	0.005	0.14
Kurtosis	0.441	0.27
Skewness	-0.051	-0.05
Range	0.411	2.22
Minimum	-0.204	-1.05
Maximum	0.207	1.17
Sum	-3.715	32.45
Count	849	849

Table 7: Repeat Statistics

9.3.1 Repeatability Histograms

Histograms showing the distribution of repeat differences for both the GPS and gravity observations are shown in Figures 12 and 13.

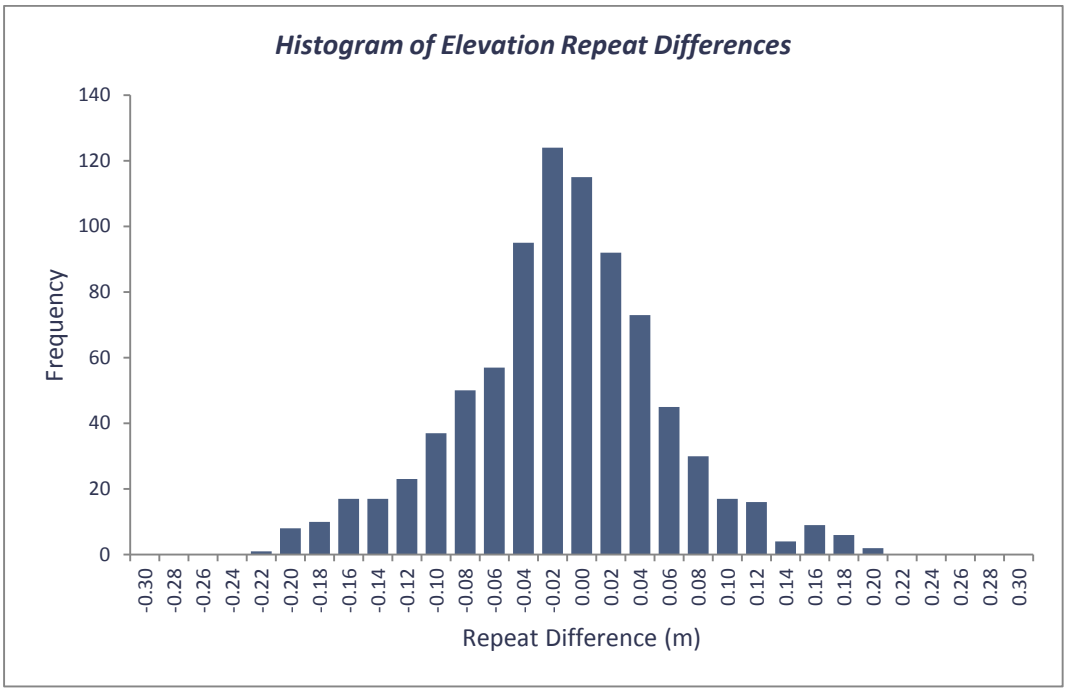


Figure 12: Histogram of GPS Repeat Differences

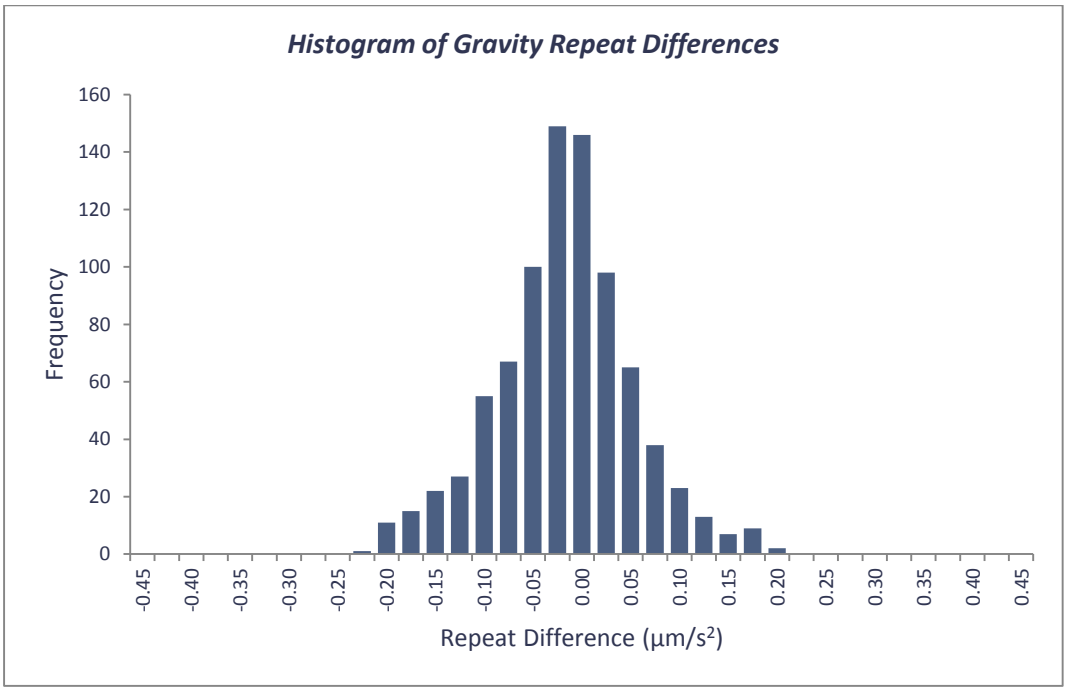


Figure 13: Histogram of Gravity Repeat Differences

9.4 Data Repeatability: Multiple Control Station Observations Only

The repeatability of gravity and GPS observations made with respect to multiple control stations was also analysed separately to the main database.

Descriptive statistics pertaining to the repeatability are contained in Table 8 and Appendix G contains a tabulation of the actual repeat data controlled from multiple control stations.

The standard deviation of the gravity repeat deviations was **0.27µm/s²** and the standard deviation of the GPS derived elevation repeat deviations was **0.084m**. These statistics confirm that the data has met and exceeded contract specifications for data controlled from multiple control stations.

	Elevation Repeat (mGRS80)	Gravity Repeat (µm/s²)
Mean	-0.010	-0.24
Standard Error	0.007	0.07
Median	-0.012	-0.13
Mode	-0.032	-0.08
Standard Deviation	0.084	0.27
Sample Variance	0.007	0.07
Kurtosis	-0.008	1.65
Skewness	-0.115	-1.50
Range	0.400	0.96
Minimum	-0.204	-0.89
Maximum	0.196	0.07
Sum	-1.371	-3.61
Count	143	15

Table 8: Repeat Statistics

9.4.1 Multiple Control Station Repeatability Histograms

Histograms showing the distribution of repeat differences for both the GPS and gravity observations from multiple control stations are shown in Figures 14 and 15.

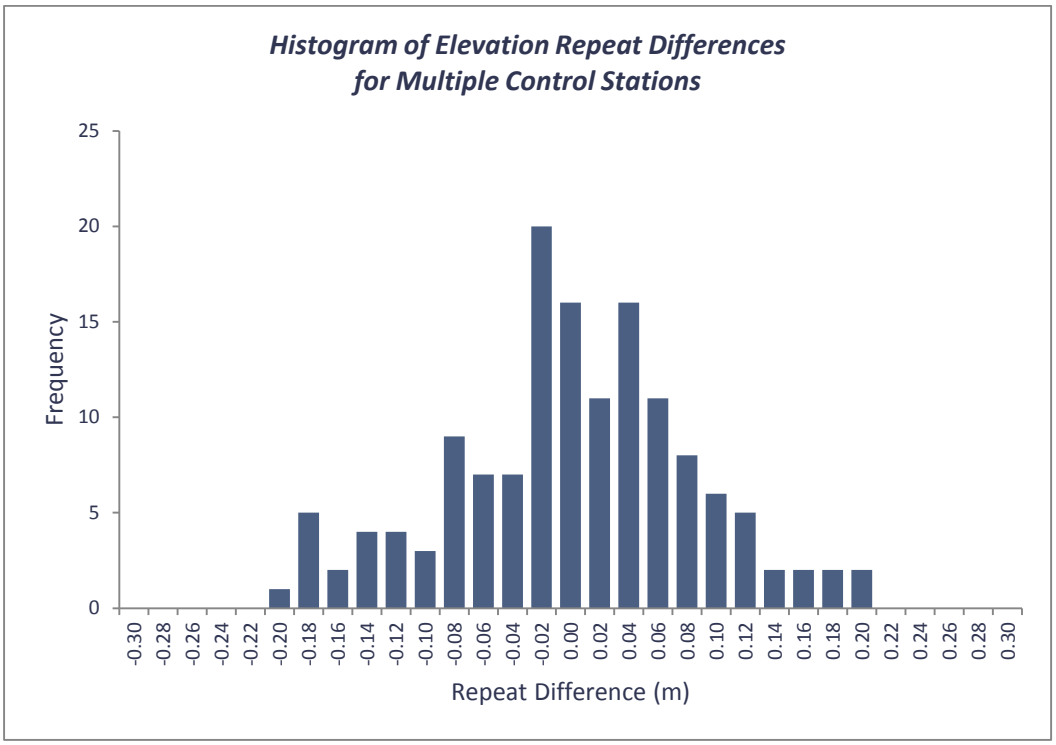


Figure 14: Histogram of GPS Repeat Differences

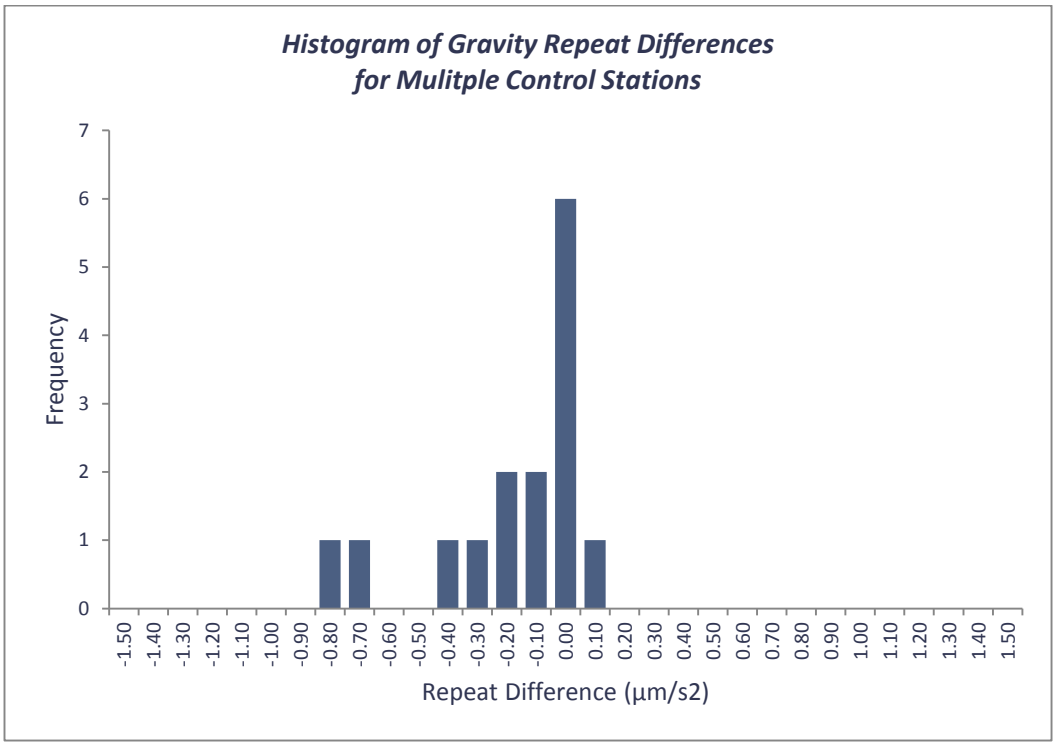


Figure 15: Histogram of Gravity Repeat Differences

9.5 Grids, Images and Plots

Final reduced data have been gridded using ChrisDBF software and a minimum curvature algorithm with multiple loops. All grids are provided in ERMapper compatible .ers format and are in units of $\mu m/s^2$ and m (GRS80).

Grids for GPS Derived Elevation (GRS80), Complete Spherical Cap Bouguer Anomaly (CSCBA267) and 1st vertical derivative of Complete Bouguer Anomaly (CBA267VD) were produced for this particular project. The grid cell size for all grids is 500m.

The grids produced have been imaged using Geosoft Oasis Montaj mapping and processing software. Five plots of these images have been included with this report to assist in data interpretation (Appendix A). The plots have been included digitally on the data DVD in Arcmap GIS compatible TIFF format.

Station Location Plot: The first plot displays the acquired gravity station locations overlayed on a 1:1 million topographic map of the area and surrounds. As evident on the plot, some stations have been moved off the original programmed co-ordinates due to terrain and safety considerations.

GPS Derived Elevation: This plot displays a pseudocoloured grid of the digital elevation data obtained from the gravity survey (GRS80). A histogram equalisation colour stretch has been applied when pseudocolouring and a sunshade from the north-east has been applied.

Complete Bouguer Anomaly 2.67 Contours: This plot displays a pseudocoloured grid of Complete Bouguer Anomaly calculated with a rock density of 2.67 t/m^3. A histogram equalisation stretch has been applied when pseudocolouring. Overlying the image data are contours created at an appropriate interval.

Complete Bouguer Anomaly 2.67 Sunshade: This plot displays a pseudocoloured grid of Complete Bouguer Anomaly calculated with a rock density of 2.67 t/m^3. A histogram equalisation stretch has been applied when pseudocolouring and a sunshade from the north-east has been applied.

Vertical Derivative Image: This plot displays a pseudocoloured grid of the first vertical derivative of Complete Bouguer Anomaly calculated with a rock density of 2.67 t/m^3. A histogram equalisation stretch has been applied when pseudocolouring and sunshading from the north-east has been applied. This image represents the rate of change of the Complete Bouguer Anomaly and is useful for detecting lineaments and body edges, especially where there are large regional gradients present.

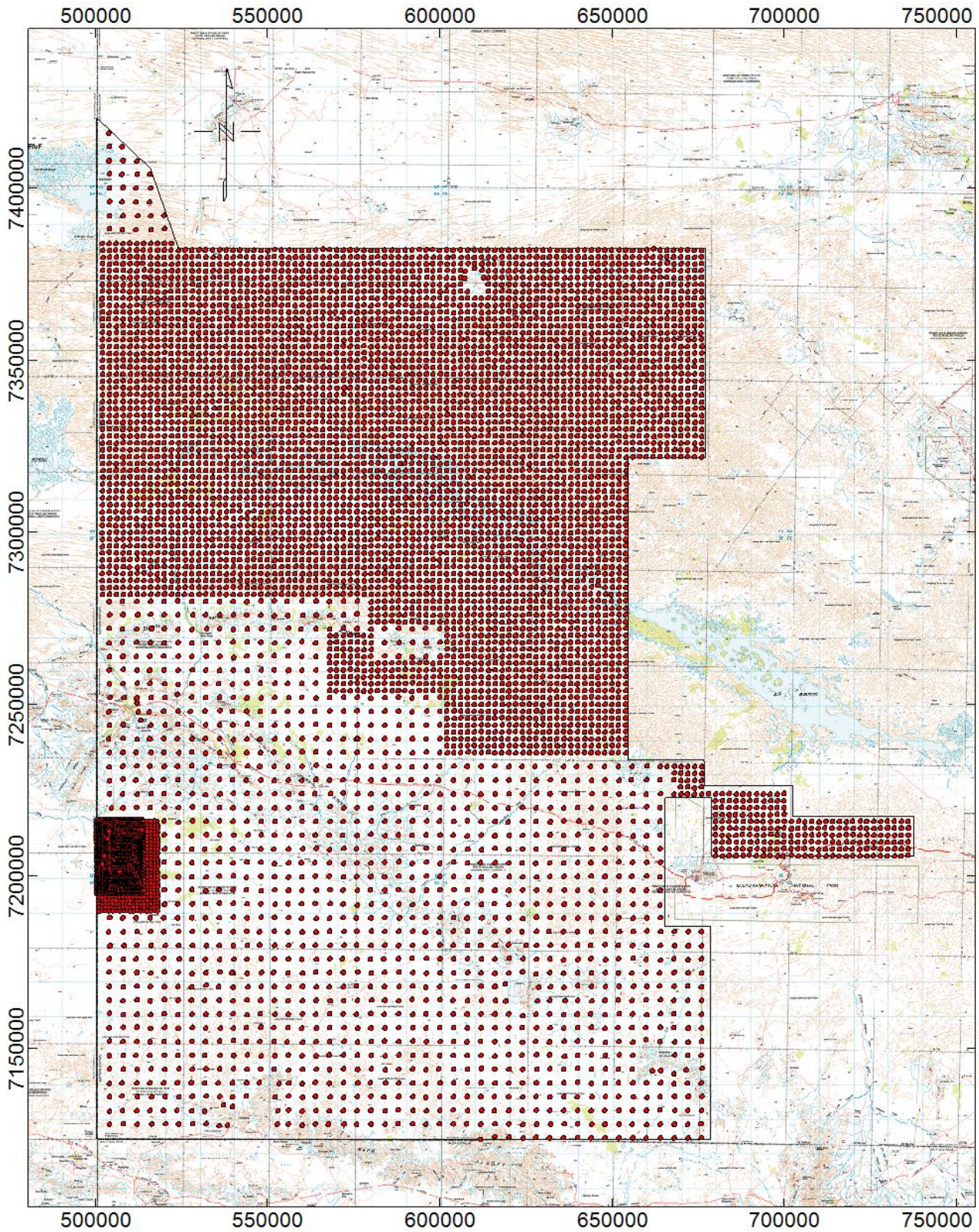
10.0 Conclusion

Atlas Geophysics Pty Ltd is confident that it has delivered high quality data to its client, to a high standard and in the safest way possible.

The company was pleased to be involved in the acquisition and processing of the gravity data collected on this project and look forward to working with Geoscience Australia again in the future.

Leon Mathews
Director

APPENDIX A
Plots and Images



Scale 1:1700000

25000 0 25000

(meters)

GDA94 / MGA zone 52

GEOSCIENCE AUSTRALIA

P2014061 GA WEST AMADEUS GRAVITY SURVEY

Plot of Gained Gravity Stations

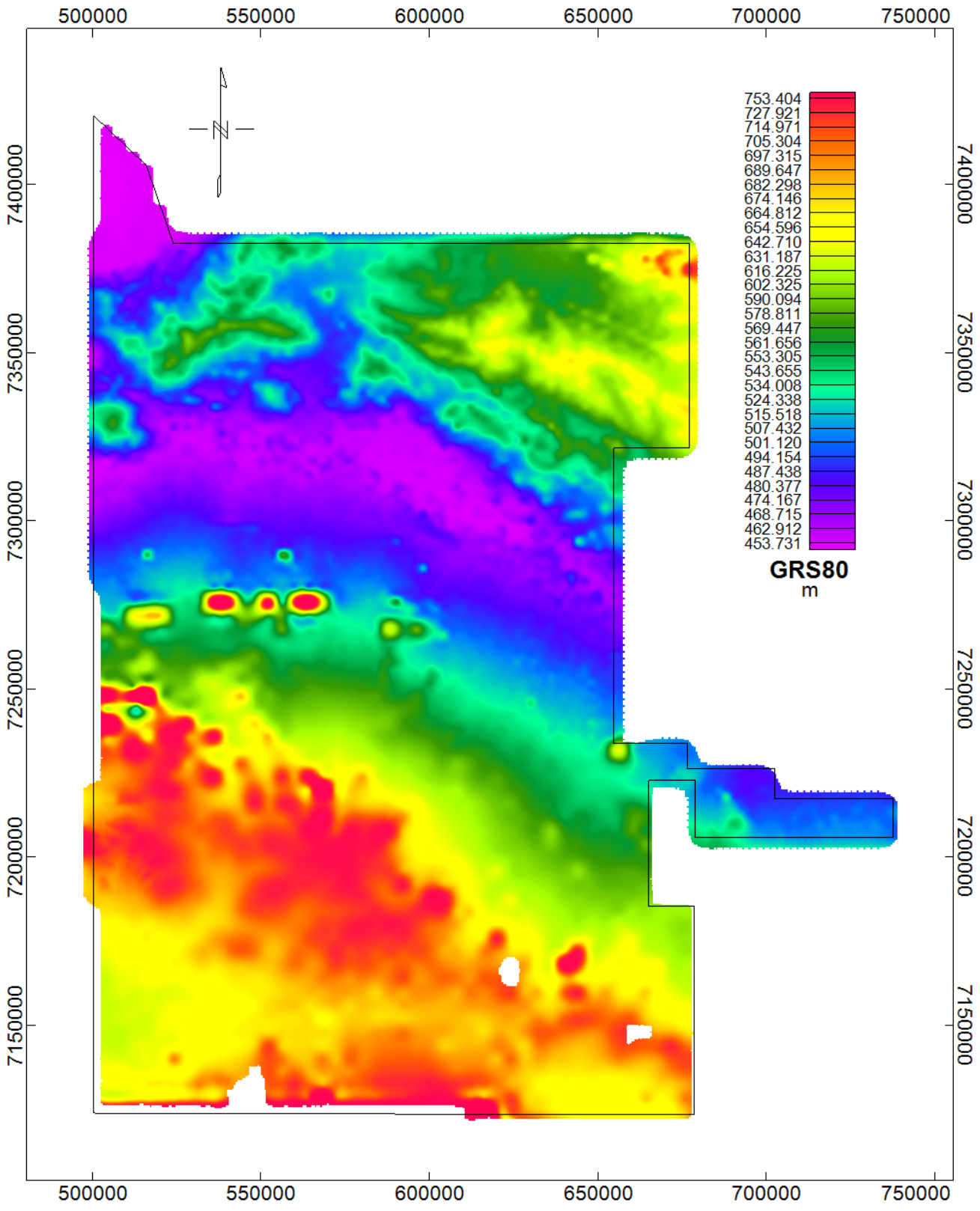
500m, 1km, 2km and 4km square grid configurations

ATLAS GEOPHYSICS PTY LTD

FINAL DATA RELEASE

www.atlasgeo.com.au

drawn by : RNA



Scale 1:1700000

25000 0 25000

(meters)

GDA94 / MGA zone 52

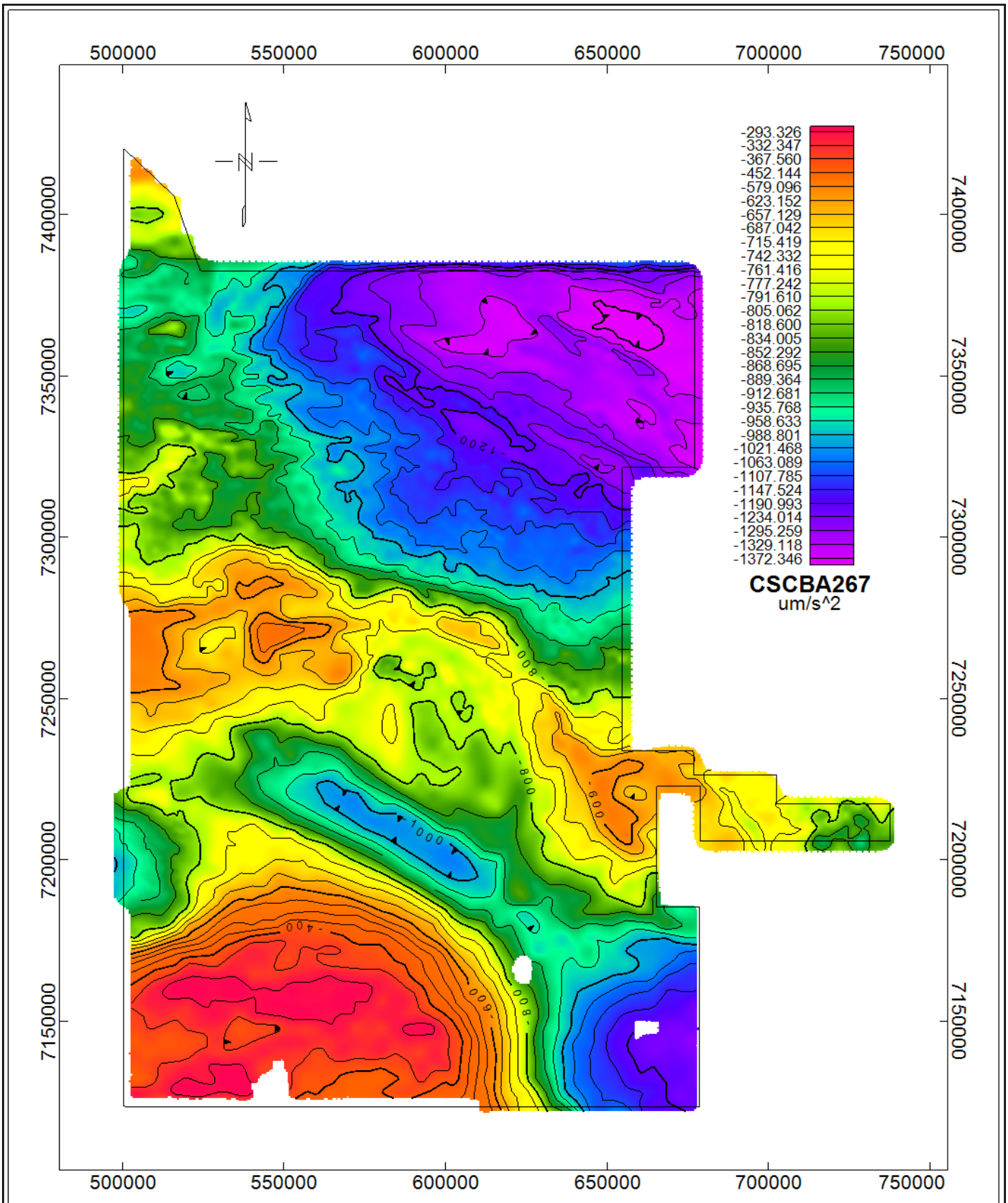
GEOSCIENCE AUSTRALIA

P2014061 GA WEST AMADEUS GRAVITY SURVEY

Pseudocoloured Image of GPS Derived Elevation
Shade = None , Contours =None, Histo =Equalised

ATLAS GEOPHYSICS PTY LTD
FINAL DATA RELEASE
www.atlasgeo.com.au

drawn by : RNA



GEOSCIENCE AUSTRALIA

P2014061 GA WEST AMADEUS GRAVITY SURVEY

Pseudocoloured Image of Complete SC Bouguer Anomaly t/m^3
Shade = None, Contours =50 um/s^2, Histo = Equalised

ATLAS GEOPHYSICS PTY LTD
FINAL DATA RELEASE
www.atlasgeo.com.au

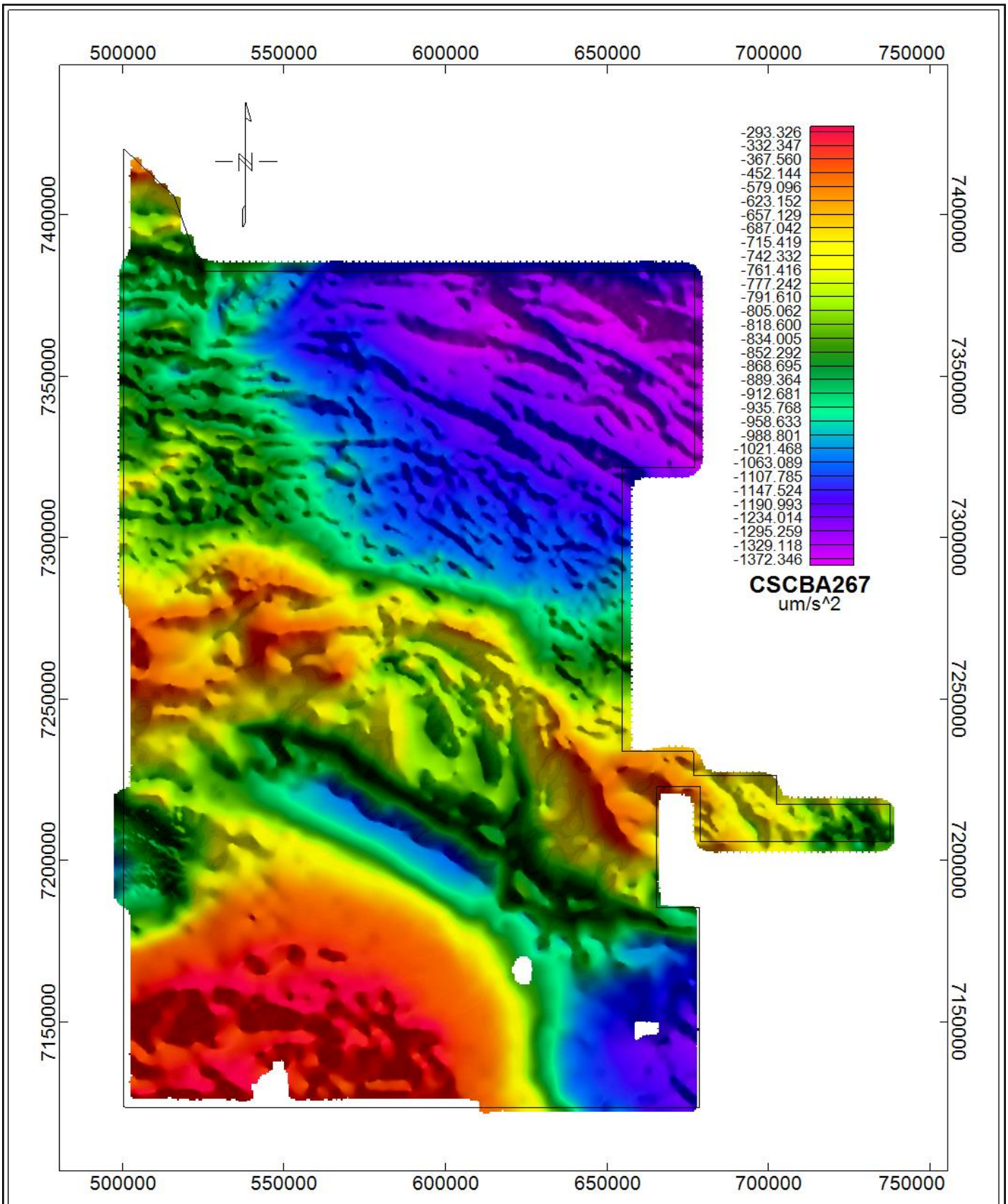
drawn by : RNA

Scale 1:1700000

25000 0 25000

(meters)

GDA94 / MGA zone 52



Scale 1:1700000

25000 0 25000

(meters)

GDA94 / MGA zone 52

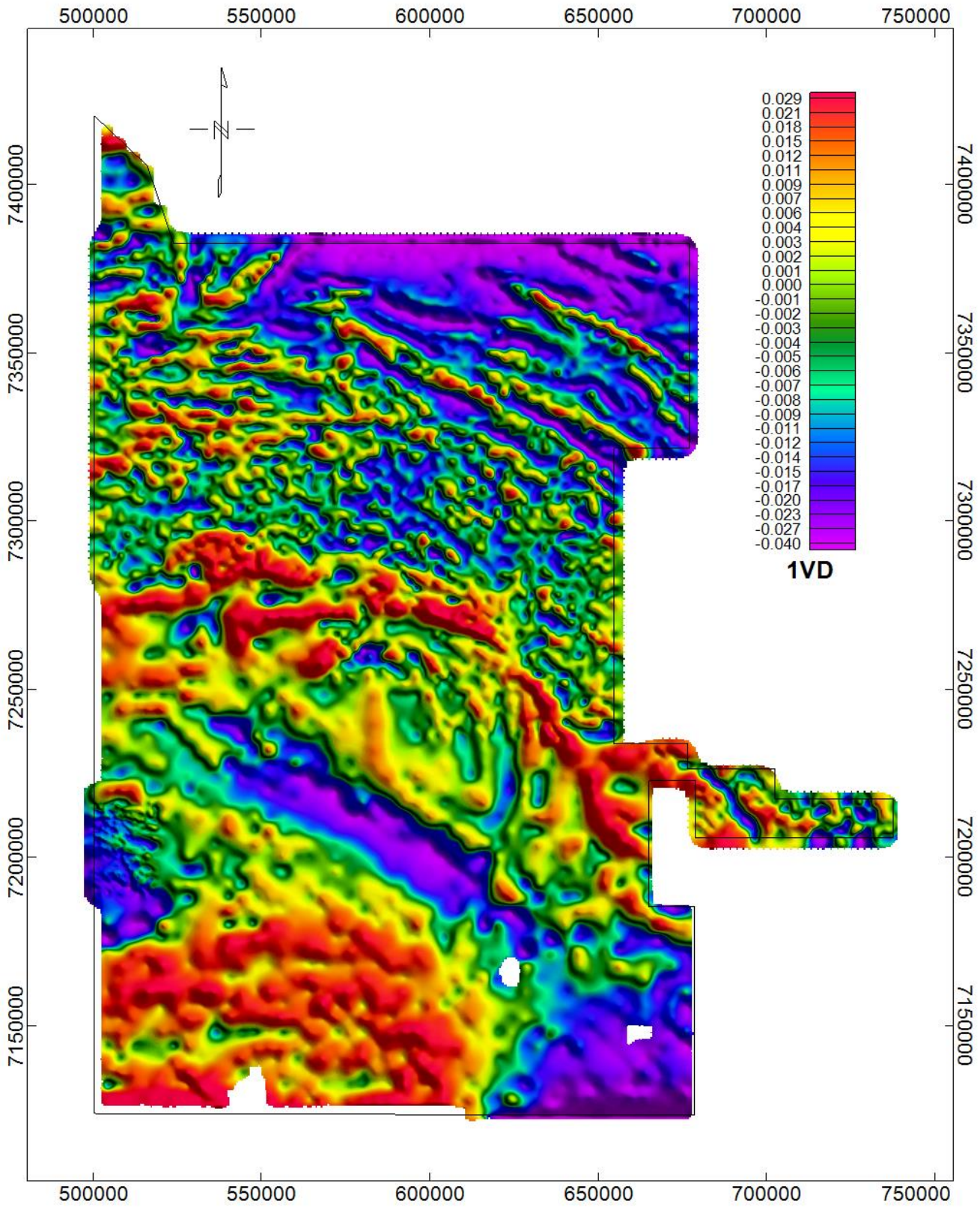
GEOSCIENCE AUSTRALIA

P2014061 GA WEST AMADEUS GRAVITY SURVEY

Pseudocoloured Image of Complete SC Bouguer Anomaly t/m^3
Shade = NE, Contours =None, Histo = Equalised

ATLAS GEOPHYSICS PTY LTD
FINAL DATA RELEASE
www.atlasgeo.com.au

drawn by : RNA



Scale 1:1700000

25000 0 25000

(meters)

GDA94 / MGA zone 52

GEOSCIENCE AUSTRALIA

P2014061 GA WEST AMADEUS GRAVITY SURVEY

Pseudocoloured Image of 1VD of Complete SC Bouguer Anomaly t/m^3
Shade = NE, Contours = None, Histo = Equalised

ATLAS GEOPHYSICS PTY LTD
FINAL DATA RELEASE
www.atlasgeo.com.au

drawn by : RNA

APPENDIX B
Control Station Descriptions

201406100001 (GA 20148100001) – WEST AMADEUS SOUTH CAMP

GDA94/GRS80		MGA Z52		AMG Z52	
Latitude	-25 5 16.7115	***Easting***	597,812.738	***Easting***	597,679.074
Longitude	129 58 11.8971	***Northing***	7,224,959.723	***Northing***	7,224,793.963
Ellipsoidal Height	605.288	***Orthometric Height***	601.792	***Orthometric Height***	601.792

OBSERVED GRAVITY

AAGD07 µm/s²	9787625.02

Occupation Method/Location Details

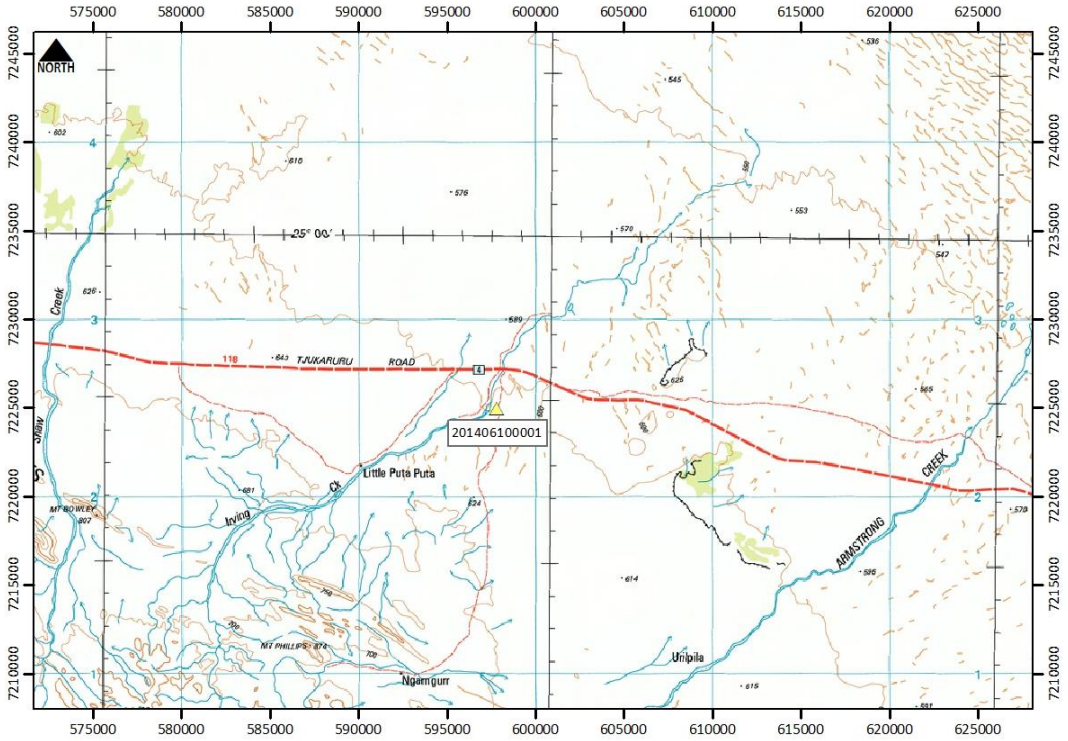
The GPS control point consists of a dumpy steel star picket driven into the ground to a height of 10cm above ground level. The gravity control point consists of a small concrete slab (30cm square) concreted into the ground, opposite the GPS control point. The control station is witnessed by an Atlas Geophysics survey plaque attached to a 1.5 metre steel picket placed within 0.5m of both control points.

Gravity Control was established by Atlas Geophysics via ABA loops with one of the project gravity meters to AFGN station 1991911213 'Yulara Airport Terminal'. Expected accuracy would be better than 0.1 µm/s^2.

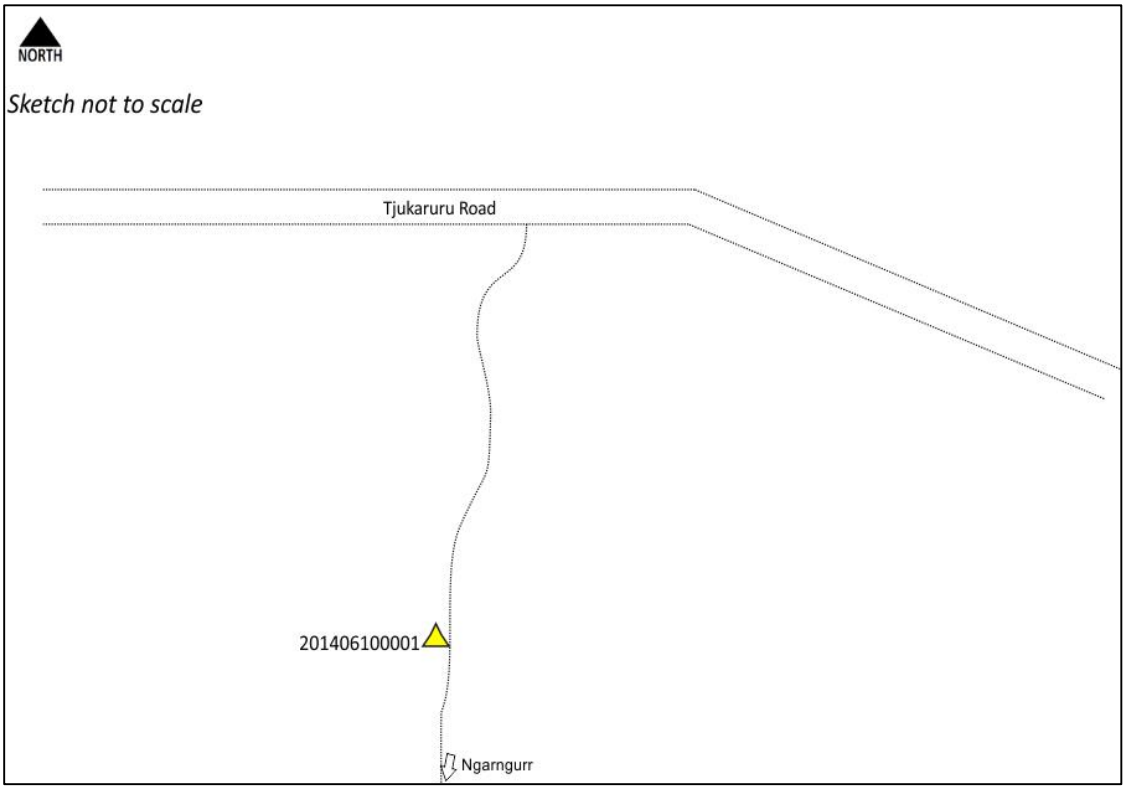
GPS Control was established using AUSPOS. Three separate +10 hour sessions were submitted to Geoscience Australia's online processing system, AUSPOS. Returned coordinates were accurate to better than 0.01m.

This station can be reached by travelling west on the Lasseter Hwy from Uluru until the turn off to the Tjukaruru (Docker River) Road is reached. Then once on the Tjukaruru Road, head west for 83km and a track to Ngarngurr will appear on the left side of the road. Follow this track for 2.3km and the control station will be on the right side, 50m from the track.

Photograph of Control Station 201406100001



Location of Control Station 201406100001



Locality Sketch of Control Station 201406100001

APPENDIX C
GPS Control Information

201305300001
1311 -29 41 10.48251 121 01 28.77739 404.978 425.762 GDA94
1311 -29 41 10.48255 121 01 28.77739 404.975 425.759 GDA94
1311 -29 41 10.48256 121 01 28.77742 404.982 425.766 GDA94

GDA94AVE
-29 41 10.4825
121 1 28.7774

-29.68624514
121.02466039

GRS80HT
404.978

AHDHT
425.762

N
-20.784

MGA52
-272889.081
6689230.508

AMG52
-273020.418
6689064.666

201406100100
1407 -23 59 53.64631 129 16 33.24079 542.263 537.785 GDA94
1407 -23 59 53.64630 129 16 33.24078 542.265 537.787 GDA94
1407 -23 59 53.64627 129 16 33.24078 542.269 537.791 GDA94

GDA94AVE
-23 59 53.6463
129 16 33.2408

-23.99823508
129.27590022

GRS80HT
542.266

AHDHT
537.788

N
4.478

MGA52
528062.564
7345941.383

AMG52
527928.987
7345775.537

201406100101
1407 -23 59 45.68585 129 53 15.80895 529.816 525.612 GDA94
1407 -23 59 45.68592 129 53 15.80899 529.827 525.623 GDA94
1407 -23 59 45.68586 129 53 15.80907 529.823 525.619 GDA94

GDA94AVE
-23 59 45.6859
129 53 15.8090

-23.99602386
129.88772472

GRS80HT
529.822

AHDHT
525.618

N
4.204

MGA52
590296.644
7345929.186

AMG52
590163.028
7345763.325

201406100102
1407 -23 59 34.43630 130 28 23.00426 624.712 620.135 GDA94
1407 -23 59 34.43629 130 28 23.00426 624.715 620.138 GDA94
1407 -23 59 34.43627 130 28 23.00423 624.715 620.138 GDA94

GDA94AVE
-23 59 34.4363
130 28 23.0043

-23.99289897
130.47305675

GRS80HT
624.714

AHDHT
620.137

N
4.577

MGA52
649845.531
7345776.273

AMG52
649711.876
7345610.385

201406100103
3615 -24 35 42.18984 129 21 22.47505 512.625 508.748 GDA94
3165 -24 35 42.18989 129 21 22.47514 512.627 508.750 GDA94
3165 -24 35 42.18987 129 21 22.47508 512.626 508.749 GDA94

GDA94AVE
-24 35 42.1899
129 21 22.4751

-24.59505275
129.35624308

GRS80HT
512.626

AHDHT
508.749

N
3.877

MGA52
536065.465
7279843.605

AMG52
535931.874
7279677.806

201406100104
1407 -24 38 36.63389 130 08 46.99010 486.155 482.603 GDA94
1407 -24 38 36.63391 130 08 46.99009 486.150 482.598 GDA94
1407 -24 38 36.63392 130 08 46.99010 486.146 482.594 GDA94

GDA94AVE
-24 38 36.6339
130 8 46.9901

-24.64350942
130.14638614

GRS80HT
486.150

AHDHT
482.598

N
3.552

MGA52
616018.124
7274041.001

AMG52
615884.461
7273875.186

201406100105
3599 -25 10 16.17654 129 21 26.81221 681.844 678.356 GDA94
3599 -25 10 16.17655 129 21 26.81221 681.848 678.360 GDA94
3599 -25 10 16.17654 129 21 26.81221 681.844 678.356 GDA94

GDA94AVE
-25 10 16.1765
129 21 26.8122

-25.17116014
129.35744783

GRS80HT
681.845

AHDHT
678.357

N
3.488

MGA52
536019.978
7216051.927

AMG52
535886.379
7215886.190

201406100106
1408 -25 09 53.50430 130 23 36.11911 552.307 548.778 GDA94
1408 -25 09 53.50431 130 23 36.11907 552.310 548.781 GDA94
1408 -25 09 53.50429 130 23 36.11909 552.312 548.783 GDA94

GDA94AVE
-25 9 53.5043
130 23 36.1191

-25.16486231
130.39336642

GRS80HT
552.310

AHDHT
548.781

N
3.529

MGA52
640424.902
7216070.922

AMG52
640291.189
7215905.154

201406100107
1408 -25 11 47.45802 131 00 17.14665 499.035 495.737 GDA94
1408 -25 11 47.45806 131 00 17.14660 499.036 495.738 GDA94
1408 -25 11 47.45807 131 00 17.14660 499.041 495.743 GDA94

GDA94AVE
-25 11 47.4581
131 0 17.1466

-25.19651614
131.00476294

GRS80HT
499.037

AHDHT
495.739

N
3.298

MGA52
702003.551
7211787.083

AMG52
701869.766
7211621.284

201406100108
1408 -25 38 32.46360 129 23 53.74297 667.379 663.120 GDA94
1408 -25 38 32.46361 129 23 53.74292 667.380 663.121 GDA94
1408 -25 38 32.46361 129 23 53.74296 667.382 663.123 GDA94

GDA94AVE
-25 38 32.4636
129 23 53.7430

-25.64235100
129.39826194

GRS80HT
667.380

AHDHT
663.121

N
4.259

MGA52
539977.241
7163862.423

AMG52
539843.632
7163696.748

201406100109
1408 -25 38 18.04104 129 57 24.33301 693.685 689.569 GDA94
1408 -25 38 18.04106 129 57 24.33306 693.688 689.572 GDA94
1408 -25 38 18.04106 129 57 24.33303 693.688 689.572 GDA94

GDA94AVE
-25 38 18.0411
129 57 24.3330

-25.63834475
129.95675917

GRS80HT
693.687

AHDHT
689.571

N
4.116

MGA52
596044.313
7164019.200

AMG52
595910.632
7163853.512

201406100110
1408 -25 40 17.58455 130 23 38.43122 711.977 709.286 GDA94
1408 -25 40 17.58452 130 23 38.43121 711.975 709.284 GDA94
1408 -25 40 17.58457 130 23 38.43129 711.978 709.287 GDA94

GDA94AVE
-25 40 17.5845
130 23 38.4312

-25.67155125
130.39400867

GRS80HT
711.977

AHDHT
709.286

N
2.691

MGA52
639903.475
7159951.568

AMG52
639769.735
7159785.870

APPENDIX D
Gravity Control Processing and Information

201406100001 GRAVITY CONTROL TIE

1 = 201406100001 WEST AMADEUS SOUTH CAMP
1213 = 1991911213 YULARA AIRPORT TERMINAL
Ties carrier out by vehicle

METER A6

station	gda94_longitude_dd	gda94_latitude_dd	date_ddmmyyyy	time_hhmmss	dialrdng_mgal	etc_mgal	aagd07_mgal	metersn
1	129.969971	-25.087975	25/07/2014	12:48:59	2934.758	0.035	980000.000	40382
1	129.969971	-25.087975	25/07/2014	12:50:05	2934.760	0.035	980000.002	40382
1213	130.976200	-25.190700	25/07/2014	15:05:33	2973.187	-0.033	980038.364	40382
1213	130.976200	-25.190700	25/07/2014	15:06:39	2973.187	-0.034	980038.364	40382
1	129.969971	-25.087975	25/07/2014	16:56:07	2934.861	-0.076	979999.998	40382
1	129.969971	-25.087975	25/07/2014	16:57:13	2934.863	-0.077	980000.000	40382
1	129.969971	-25.087975	25/07/2014	16:57:13	2934.863	-0.077	980000.000	40382
1213	130.976200	-25.190700	25/07/2014	18:50:29	2973.209	-0.054	980038.380	40382
1213	130.976200	-25.190700	25/07/2014	18:51:35	2973.207	-0.054	980038.379	40382
1	129.969971	-25.087975	25/07/2014	22:33:48	2934.629	0.121	980000.000	40382
1	129.969971	-25.087975	25/07/2014	22:34:54	2934.628	0.122	980000.000	40382

AVG 1213	980038.372	
DIFF 1_1213	38.372	
KNOWN 1213	978800.874	
CALC 1	978762.502	mGal AAGD07
	9787625.02	**µm/s² AAGD07**

APPENDIX E
Gravity Meter Calibration Data

P2014061_GA_WEST_AMADEUS_BASIN_GRAVITY

PRE SURVEY CALIBRATION DATA

1 = 2010990117 CS1 Guildford Cemetery 9793899.63 µm/s^2 AAGD07

2 = 2010990217 CS2 Helena Valley Primary School **9794483.85 µm/s^2 AAGD07**

STATION	MGAE	MGAN	DATE	TIME	OBSGAAD07_µm/s2	DRIFT_µm/s2	SERIAL
A2 METER							
1	420754.17	6464380.51	27/06/2014	10:17:19	9793899.63	0.24	40241
1	420754.17	6464380.51	27/06/2014	10:18:25	9793899.65	0.24	40241
2	417649.82	6460586.82	27/06/2014	10:46:05	9794483.77	0.24	40241
2	417649.82	6460586.82	27/06/2014	10:47:11	9794483.79	0.24	40241
1	420754.17	6464380.51	27/06/2014	11:11:15	9793899.61	0.24	40241
1	420754.17	6464380.51	27/06/2014	11:12:21	9793899.63	0.24	40241
1	420754.17	6464380.51	27/06/2014	11:12:21	9793899.63	0.19	40241
2	417649.82	6460586.82	27/06/2014	11:39:49	9794483.77	0.19	40241
2	417649.82	6460586.82	27/06/2014	11:40:55	9794483.72	0.19	40241
1	420754.17	6464380.51	27/06/2014	12:05:35	9793899.62	0.19	40241
1	420754.17	6464380.51	27/06/2014	12:06:41	9793899.63	0.19	40241
1	420754.17	6464380.51	27/06/2014	12:06:41	9793899.63	0.34	40241
2	417649.82	6460586.82	27/06/2014	12:33:08	9794483.80	0.34	40241
2	417649.82	6460586.82	27/06/2014	12:34:14	9794483.89	0.34	40241
1	420754.17	6464380.51	27/06/2014	13:00:18	9793899.60	0.34	40241
1	420754.17	6464380.51	27/06/2014	13:01:24	9793899.63	0.34	40241
				AVG2	**9794483.79**		
A6 METER							
1	420754.17	6464380.51	25/06/2014	10:14:32	9793899.63	0.14	40382
1	420754.17	6464380.51	25/06/2014	10:15:38	9793899.62	0.14	40382
2	417649.82	6460586.82	25/06/2014	10:57:26	9794483.84	0.14	40382
2	417649.82	6460586.82	25/06/2014	10:58:32	9794483.79	0.14	40382
1	420754.17	6464380.51	25/06/2014	11:31:39	9793899.62	0.14	40382
1	420754.17	6464380.51	25/06/2014	11:32:45	9793899.63	0.14	40382
1	420754.17	6464380.51	25/06/2014	11:32:45	9793899.63	0.04	40382
2	417649.82	6460586.82	25/06/2014	12:05:46	9794483.81	0.04	40382
2	417649.82	6460586.82	25/06/2014	12:06:52	9794483.84	0.04	40382
1	420754.17	6464380.51	25/06/2014	12:37:35	9793899.67	0.04	40382
1	420754.17	6464380.51	25/06/2014	12:38:41	9793899.63	0.04	40382
				AVG2	**9794483.82**		

P2014061_GA_WEST_AMADEUS_BASIN_GRAVITY

POST SURVEY CALIBRATION DATA

1 = 2010990117 CS1 Guildford Cemetery 9793899.63 µm/s^2 AAGD07

2 = 2010990217 CS2 Helena Valley Primary School **9794483.85 µm/s^2 AAGD07**

STATION	MGAE	MGAN	DATE	TIME	OBSGAAD07_µm/s2	DRIFT_µm/s2	SERIAL
A2 METER							
1	420754.17	6464380.51	18/12/2014	14:36:04	9793899.63	0.06	40241
1	420754.17	6464380.51	18/12/2014	14:37:10	9793899.64	0.06	40241
2	417649.82	6460586.82	18/12/2014	15:00:46	9794483.71	0.06	40241
2	417649.82	6460586.82	18/12/2014	15:01:52	9794483.72	0.06	40241
1	420754.17	6464380.51	18/12/2014	15:23:29	9793899.63	0.06	40241
1	420754.17	6464380.51	18/12/2014	15:23:29	9793899.63	-0.04	40241
2	417649.82	6460586.82	18/12/2014	15:48:12	9794483.88	-0.04	40241
2	417649.82	6460586.82	18/12/2014	15:49:18	9794483.90	-0.04	40241
1	420754.17	6464380.51	18/12/2014	16:11:20	9793899.62	-0.04	40241
1	420754.17	6464380.51	18/12/2014	16:12:26	9793899.63	-0.04	40241
				AVG2	**9794483.80**		
A6 METER							
1	420754.17	6464380.51	20/01/2015	11:07:36	9793899.63	-0.02	40382
1	420754.17	6464380.51	20/01/2015	11:08:42	9793899.60	-0.02	40382
2	417649.82	6460586.82	20/01/2015	11:36:43	9794483.91	-0.02	40382
2	417649.82	6460586.82	20/01/2015	11:37:49	9794483.90	-0.02	40382
1	420754.17	6464380.51	20/01/2015	12:06:26	9793899.64	-0.02	40382
1	420754.17	6464380.51	20/01/2015	12:07:32	9793899.63	-0.02	40382
1	420754.17	6464380.51	20/01/2015	12:07:32	9793899.63	-0.03	40382
2	417649.82	6460586.82	20/01/2015	12:35:13	9794483.89	-0.03	40382
2	417649.82	6460586.82	20/01/2015	12:36:19	9794483.91	-0.03	40382
1	420754.17	6464380.51	20/01/2015	13:04:34	9793899.58	-0.03	40382
1	420754.17	6464380.51	20/01/2015	13:05:40	9793899.63	-0.03	40382
1	420754.17	6464380.51	20/01/2015	13:05:40	9793899.63	0.00	40382
2	417649.82	6460586.82	20/01/2015	13:36:04	9794483.91	0.00	40382
2	417649.82	6460586.82	20/01/2015	13:37:10	9794483.91	0.00	40382
1	420754.17	6464380.51	20/01/2015	14:08:02	9793899.58	0.00	40382
1	420754.17	6464380.51	20/01/2015	14:09:08	9793899.63	0.00	40382
				AVG2	**9794483.91**		

APPENDIX F
Repeat Listing: All Observations

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148105772	592120.4	7235917.7	0.110	0.05	01082014	072838	40382
20148103498	587841.3	7219941.4	-0.012	-0.07	01082014	072934	40241
20148106365	588148.0	7243977.9	-0.028	-0.46	01082014	073444	40382
20148103497	571968.8	7216014.0	-0.075	0.00	01082014	074004	40241
20148106370	589996.5	7256030.0	-0.051	-0.16	01082014	074150	40382
20148106269	588026.1	7263954.4	0.061	-0.22	01082014	074720	40382
20148103496	560013.8	7215998.4	-0.087	-0.02	01082014	074812	40241
20148103495	548121.7	7215983.5	-0.123	0.00	01082014	075704	40241
20148106275	586069.2	7279967.7	0.000	-0.07	01082014	080142	40382
20148102581	536032.0	7216057.6	-0.002	0.03	01082014	080440	40241
20148106276	585987.6	7282180.9	0.031	-0.23	01082014	080516	40382
20148103320	531996.1	7219976.3	0.037	0.24	01082014	081448	40241
20148103321	524040.0	7220053.7	0.026	0.12	01082014	082058	40241
20148103322	515913.2	7219993.8	-0.016	0.02	01082014	083416	40241
20148103323	507991.4	7219868.4	-0.084	-0.01	01082014	084010	40241
20148106342	585943.4	7298031.6	0.078	0.40	01082014	085100	40382
20148106341	585943.3	7300022.8	-0.020	0.18	01082014	085426	40382
20148106292	587948.4	7303945.9	0.055	-0.33	01082014	090856	40382
20148106293	590082.8	7304092.7	0.074	-0.10	01082014	091256	40382
20148106322	622102.9	7301974.6	0.072	-0.26	01082014	103402	40382
20148106321	624076.8	7302014.4	0.050	-0.50	01082014	103734	40382
20148103694	503009.1	7202507.4	-0.013	0.03	01082014	120840	40241
20148103691	502977.2	7203000.1	0.002	-0.03	01082014	121126	40241
20148103671	502974.2	7211950.6	0.009	-0.19	01082014	125955	40241
20148103668	503013.4	7212544.4	0.059	0.05	01082014	130314	40241
20148103518	504919.7	7215532.8	-0.005	0.17	01082014	133542	40241
20148103519	505018.1	7216010.1	0.010	0.22	01082014	133824	40241
20148103516	505509.3	7215921.1	0.022	0.23	01082014	134136	40241
20148103517	505478.7	7215444.8	-0.025	0.07	01082014	134420	40241
20148103321	524039.9	7220053.4	-0.034	0.20	01082014	135422	40241
20148106261	621908.6	7248069.9	-0.025	-0.22	01082014	141822	40382
20148106052	624014.4	7247925.8	-0.078	-0.52	01082014	142200	40382
20148103474	515978.4	7197091.0	-0.007	0.13	01082014	152314	40241
20148103473	515895.3	7196022.6	-0.027	0.07	01082014	152538	40241
20148106249	621894.5	7265966.6	0.013	-0.12	01082014	174124	40382
20148106251	622019.4	7264058.5	-0.175	-0.41	01082014	174532	40382
20148103495	548121.2	7215983.2	0.164	-0.09	01082014	174712	40241
20148103496	560013.0	7215998.3	-0.029	0.01	01082014	175330	40241
20148103497	571969.1	7216013.2	0.093	0.24	01082014	180006	40241
20148103498	587841.3	7219940.3	-0.024	0.28	01082014	180946	40241
20148105808	616004.7	7243949.8	-0.019	-0.47	01082014	181138	40382
20148105630	608225.6	7236213.2	-0.002	0.07	01082014	181730	40382
20148103315	579951.5	7223932.1	0.005	0.10	02082014	072924	40241
20148103317	559966.2	7220096.6	0.066	0.63	02082014	074013	40241
20148103319	539918.6	7219906.4	-0.023	-0.02	02082014	074930	40241
20148103321	524039.7	7220053.4	0.024	0.15	02082014	075712	40241
20148103669	503537.5	7212486.6	-0.037	0.11	02082014	082312	40241

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148106531	620103.8	7274081.4	-0.017	-0.13	02082014	082442	40382
20148103670	503490.5	7211964.8	0.045	0.00	02082014	082552	40241
20148106530	619923.0	7276113.8	0.013	0.44	02082014	082814	40382
20148106523	620053.2	7286089.7	0.171	0.31	02082014	084513	40382
20148106522	619979.8	7287805.3	-0.040	0.37	02082014	084826	40382
20148103692	503494.9	7203006.1	0.010	-0.50	02082014	090254	40241
20148103693	503507.2	7202464.3	0.078	-0.29	02082014	090616	40241
20148106544	617992.0	7247951.4	0.012	0.17	02082014	102432	40382
20148106250	615895.0	7266016.0	-0.067	-0.11	02082014	105948	40382
20148105566	615938.6	7268135.5	0.042	-0.55	02082014	110334	40382
20148105568	615995.9	7270049.8	-0.038	-0.10	02082014	111036	40382
20148105509	616024.4	7274049.2	0.031	0.08	02082014	112052	40382
20148105567	613991.7	7269938.9	-0.073	0.26	02082014	130108	40382
20148105565	614054.2	7267891.2	0.132	-0.25	02082014	130506	40382
20148106543	613963.2	7244013.8	0.002	-0.17	02082014	134106	40382
20148105504	612055.4	7244078.0	0.033	0.31	02082014	142916	40382
20148105509	616024.0	7274048.1	0.016	-1.05	02082014	151718	40382
20148106418	607933.7	7297995.5	-0.125	0.24	02082014	161342	40382
20148106419	607985.1	7300059.1	-0.017	0.48	02082014	161702	40382
20148106416	606057.3	7300118.1	-0.100	-0.06	02082014	162020	40382
20148106417	606010.7	7298005.2	0.023	0.32	02082014	162342	40382
20148106695	596000.0	7251960.2	-0.093	-0.16	03082014	073344	40382
20148103316	572120.6	7219888.1	-0.145	-0.29	03082014	073626	40241
20148106694	595975.7	7254024.2	-0.036	-0.19	03082014	074252	40382
20148103318	547877.2	7219875.2	-0.107	-0.19	03082014	074756	40241
20148103319	539916.0	7219911.5	-0.077	-0.44	03082014	075346	40241
20148103828	528184.0	7216136.4	0.001	-0.38	03082014	080122	40241
20148106688	596068.4	7267976.2	0.204	-0.68	03082014	080508	40382
20148106652	609985.5	7279938.4	0.049	-0.27	03082014	144854	40382
20148106653	609968.8	7281912.3	0.097	-0.81	03082014	145536	40382
20148108030	512448.6	7210972.2	-0.055	0.03	03082014	150004	40241
20148108031	512501.6	7210492.6	-0.058	0.13	03082014	150204	40241
20148106742	595959.7	7290042.3	0.044	0.17	03082014	154322	40382
20148106743	596034.9	7288112.7	0.016	-0.36	03082014	154706	40382
20148106802	599924.1	7290139.8	0.003	-0.07	03082014	160240	40382
20148106755	600191.6	7275915.2	0.024	0.06	03082014	165250	40382
20148106756	600063.4	7273999.7	0.088	-0.54	03082014	165638	40382
20148108165	512004.6	7200484.7	-0.015	-0.04	03082014	173410	40241
20148108164	511947.8	7200948.2	-0.063	0.04	03082014	173558	40241
20148106767	600020.0	7248001.5	0.054	0.26	03082014	175808	40382
20148106768	600043.9	7240050.6	0.011	-0.40	03082014	180714	40382
20148103498	587841.3	7219940.9	-0.029	-0.15	03082014	182908	40241
20148108239	571788.1	7211962.9	-0.084	0.27	04082014	073424	40241
20148108238	551761.2	7207930.8	-0.084	0.15	04082014	074358	40241
20148105509	616023.9	7274048.4	-0.025	-0.11	04082014	075126	40382
20148108237	531679.6	7207858.8	0.051	0.06	04082014	075458	40241
20148106848	608032.0	7280042.1	0.023	1.07	04082014	083618	40382

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148106855	604058.4	7283865.6	0.017	0.65	04082014	091152	40382
20148106846	604011.3	7280005.4	-0.032	0.03	04082014	092608	40382
20148106845	603957.7	7277934.4	0.017	0.78	04082014	093024	40382
20148108258	507475.5	7201494.2	-0.070	-0.05	04082014	095130	40241
20148108257	507496.8	7201970.1	0.057	0.07	04082014	095352	40241
20148108256	508006.7	7201993.3	0.011	0.05	04082014	095620	40241
20148108255	508005.1	7201512.2	0.012	-0.01	04082014	095930	40241
20148106828	601970.5	7262094.6	-0.163	0.07	04082014	102938	40382
20148108243	511530.0	7203040.9	0.020	0.07	04082014	103746	40241
20148108236	512002.2	7203046.0	0.010	0.17	04082014	104012	40241
20148106829	602032.2	7259977.2	-0.065	0.01	04082014	104304	40382
20148108241	512015.0	7203522.5	-0.017	0.01	04082014	105452	40241
20148108242	511478.6	7203489.4	-0.024	-0.04	04082014	105746	40241
20148106835	601963.9	7252029.8	-0.015	-0.63	04082014	105806	40382
20148106836	602110.0	7250023.1	0.036	-0.24	04082014	110130	40382
20148106837	601992.7	7248113.0	0.072	-0.84	04082014	110456	40382
20148108256	508007.0	7201993.5	0.019	-0.11	04082014	113848	40241
20148108255	508005.3	7201512.1	0.002	-0.01	04082014	114110	40241
20148108258	507475.9	7201494.3	-0.045	-0.02	04082014	114408	40241
20148108257	507497.0	7201969.9	-0.046	-0.13	04082014	114636	40241
20148103518	504919.4	7215533.3	0.062	-0.12	04082014	140429	40241
20148103519	505018.7	7216010.3	0.018	-0.18	04082014	140736	40241
20148105508	611989.6	7260059.8	0.011	-0.06	04082014	140850	40382
20148103516	505509.1	7215921.5	0.055	-0.15	04082014	141010	40241
20148103517	505478.8	7215445.0	0.078	-0.07	04082014	141226	40241
20148105509	616019.1	7274054.6	-0.018	0.36	04082014	143420	40382
20148108030	512448.8	7210972.8	0.002	0.11	04082014	151220	40241
20148108029	512995.5	7210999.5	-0.002	0.29	04082014	151440	40241
20148108032	513022.8	7210495.4	0.055	0.21	04082014	151730	40241
20148108031	512501.5	7210492.6	0.053	0.06	04082014	151952	40241
20148108241	512014.9	7203521.4	0.050	-0.13	04082014	154944	40241
20148108236	512002.0	7203045.8	0.034	-0.08	04082014	155204	40241
20148108243	511530.1	7203040.4	-0.015	-0.14	04082014	155422	40241
20148108242	511478.3	7203490.2	0.012	0.02	04082014	155710	40241
20148103828	528184.2	7216136.0	0.132	-0.17	04082014	173756	40241
20148103495	548121.3	7215983.5	-0.051	0.11	04082014	174754	40241
20148103496	560013.2	7215998.0	0.027	-0.16	04082014	175604	40241
20148103497	571969.2	7216012.8	0.008	0.07	04082014	180428	40241
20148103498	587841.2	7219941.2	0.037	-0.07	04082014	181326	40241
20148102899	516145.8	7387993.2	-0.025	-0.31	05072014	150440	40241
20148103101	520024.5	7388286.2	-0.018	-0.01	05072014	150854	40241
20148103316	572120.7	7219883.3	0.053	0.15	05082014	072748	40241
20148106934	599999.0	7191974.9	0.045	0.01	05082014	073156	40382
20148103317	559966.2	7220096.3	-0.010	0.15	05082014	073442	40241
20148103318	547877.1	7219875.0	-0.033	0.04	05082014	074116	40241
20148106935	596047.1	7164039.5	0.107	0.17	05082014	074518	40382
20148103319	539918.5	7219906.9	0.048	0.03	05082014	074614	40241

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148103320	531996.2	7219976.9	-0.081	-0.82	05082014	075154	40241
20148103321	524039.6	7220053.8	-0.022	-0.27	05082014	075722	40241
20148103322	515912.5	7219994.1	0.000	-0.06	05082014	080452	40241
20148103323	507990.5	7219867.6	0.050	0.03	05082014	081218	40241
20148106939	607901.5	7159983.2	-0.006	0.00	05082014	081244	40382
20148103516	505509.0	7215920.9	-0.014	0.13	05082014	081700	40241
20148106940	611902.3	7160039.6	0.066	0.25	05082014	081708	40382
20148103519	505017.8	7216010.6	0.035	-0.02	05082014	081938	40241
20148103518	504920.2	7215532.9	0.001	0.02	05082014	082240	40241
20148103517	505478.2	7215444.9	-0.046	0.10	05082014	082522	40241
20148106946	639909.9	7159965.5	0.014	-0.75	05082014	085008	40382
20148108331	505041.2	7205970.0	0.000	0.27	05082014	092202	40241
20148108328	504959.3	7205516.3	-0.068	0.06	05082014	092404	40241
20148108329	505458.0	7205515.3	-0.141	-0.05	05082014	100602	40241
20148108330	505524.0	7206028.3	0.069	0.26	05082014	110218	40241
20148108409	510986.3	7207428.4	-0.020	-0.36	05082014	122120	40241
20148108408	511527.7	7207543.5	-0.044	-0.91	05082014	122326	40241
20148108411	511472.7	7207992.6	0.043	-0.32	05082014	122934	40241
20148108410	511017.8	7208005.6	-0.099	-0.91	05082014	123242	40241
20148106933	604063.1	7200009.6	0.102	0.73	05082014	131950	40382
20148106934	599998.6	7191975.5	-0.112	0.11	05082014	142400	40382
20148106935	596046.6	7164040.0	0.000	-0.27	05082014	145122	40382
20148103321	524039.2	7220053.7	0.023	-0.33	05082014	145304	40241
20148102579	539974.0	7268170.1	-0.025	-0.75	05082014	160700	40241
20148102580	536058.6	7279863.1	-0.126	-0.14	05082014	165422	40241
20148107045	603862.5	7132125.9	0.016	0.73	05082014	171206	40382
20148107044	600030.9	7132033.4	-0.005	-0.39	05082014	171544	40382
20148106958	608000.2	7155984.9	0.014	-0.05	05082014	174616	40382
20148106939	607902.1	7159983.2	0.002	0.37	05082014	175132	40382
20148106934	599998.4	7191975.1	0.016	-0.05	05082014	181158	40382
20148101753	505810.2	7382034.0	0.070	0.48	06072014	075524	40241
20148104047	665926.3	7324056.1	0.017	-0.40	06072014	114201	40382
20148104046	668128.2	7324081.2	-0.031	-0.36	06072014	114524	40382
20148104035	674112.0	7331931.1	0.074	-0.21	06072014	123133	40382
20148104034	673926.9	7334068.7	0.029	-0.77	06072014	123708	40382
20148104027	674078.3	7343918.0	-0.092	-0.87	06072014	131323	40382
20148104026	673966.9	7346054.1	0.005	0.35	06072014	131649	40382
20148101003	509779.0	7381993.6	0.000	-0.34	06072014	152816	40241
20148101732	505959.0	7340005.3	-0.065	-0.13	06072014	163534	40241
20148101731	505812.6	7338009.6	0.024	0.33	06072014	163828	40241
20148102535	511948.4	7382058.4	-0.157	0.12	06072014	175224	40241
20148102536	512038.4	7383943.1	0.163	-0.45	06072014	175648	40241
20148103498	587842.1	7219940.4	0.055	-0.49	06082014	072510	40241
20148103497	571968.7	7216013.1	0.006	-0.12	06082014	073310	40241
20148103496	560013.6	7215998.1	-0.036	0.28	06082014	073934	40241
20148107027	612007.3	7195969.5	-0.021	0.95	06082014	074104	40382
20148103495	548121.4	7215983.3	-0.019	0.14	06082014	074650	40241

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148102581	536031.5	7216057.7	-0.093	0.13	06082014	075300	40241
20148103828	528183.5	7216136.1	-0.085	0.30	06082014	082016	40241
20148108022	515957.6	7214997.4	-0.010	-0.15	06082014	082900	40241
20148108634	511507.6	7215045.9	0.011	0.15	06082014	084404	40241
20148108631	510959.5	7214989.9	-0.048	0.19	06082014	084606	40241
20148108632	511006.8	7214488.7	0.004	0.26	06082014	090812	40241
20148108633	511559.0	7214476.2	-0.028	0.02	06082014	091208	40241
20148108606	505961.0	7212457.9	-0.005	0.72	06082014	100400	40241
20148108605	506498.9	7212499.8	-0.008	0.71	06082014	100602	40241
20148108604	506489.4	7212053.6	-0.013	0.63	06082014	100758	40241
20148108603	506050.4	7211983.6	-0.025	0.76	06082014	101004	40241
20148107084	636127.8	7191933.4	-0.053	0.23	06082014	123646	40382
20148107083	636161.6	7196032.3	-0.052	0.18	06082014	124102	40382
20148107027	612007.2	7195969.7	0.006	-0.52	06082014	131004	40382
20148107076	612127.9	7191907.1	-0.015	0.21	06082014	131700	40382
20148108604	506489.6	7212053.5	-0.012	0.87	06082014	132442	40241
20148108603	506050.6	7211983.4	0.007	0.71	06082014	132936	40241
20148107075	608391.2	7199984.6	0.001	-0.02	06082014	133026	40382
20148108606	505960.9	7212457.8	-0.029	0.70	06082014	133350	40241
20148108605	506499.3	7212499.7	-0.024	0.72	06082014	133550	40241
20148107074	599937.7	7208173.7	0.146	0.48	06082014	133740	40382
20148107072	599758.9	7183798.7	0.045	0.59	06082014	143538	40382
20148106939	607901.9	7159982.8	0.031	0.83	06082014	150058	40382
20148103321	524039.2	7220053.4	-0.053	-0.16	06082014	151118	40241
20148107068	595927.4	7143845.8	0.039	0.85	06082014	152114	40382
20148107069	599652.0	7144022.0	0.074	0.76	06082014	152502	40382
20148102581	536031.8	7216058.5	-0.017	-0.40	06082014	155354	40241
20148108854	536031.9	7183991.5	0.178	0.13	06082014	174836	40241
20148101725	505986.9	7325841.1	-0.110	-0.09	07072014	094812	40241
20148101724	505874.1	7324058.5	-0.181	0.05	07072014	095302	40241
20148104132	602176.7	7376147.3	-0.098	-0.28	07072014	135412	40382
20148102897	515874.2	7381999.9	0.024	0.79	07072014	144246	40241
20148101133	514002.7	7350089.7	-0.002	-0.37	07072014	154442	40241
20148104221	599897.1	7339983.0	-0.078	-0.22	07072014	155840	40382
20148104226	599919.4	7341930.3	-0.107	-0.06	07072014	160434	40382
20148101153	515983.0	7349990.0	-0.019	-0.11	07072014	161834	40241
20148104231	600079.6	7351976.8	0.112	0.04	07072014	162626	40382
20148101144	517998.6	7365969.4	-0.007	0.18	07072014	165352	40241
20148101145	515971.7	7365970.1	-0.027	-0.05	07072014	165640	40241
20148101134	516021.8	7377911.5	-0.150	-0.05	07072014	171612	40241
20148101137	518017.5	7379924.6	-0.079	0.53	07072014	171952	40241
20148101136	518045.9	7381980.9	0.059	0.52	07072014	172332	40241
20148108884	588138.3	7207996.0	-0.133	-0.09	07082014	073752	40241
20148106933	604062.7	7200009.5	-0.056	0.21	07082014	074814	40382
20148108883	564168.8	7196054.3	-0.150	-0.01	07082014	075218	40241
20148107153	607891.6	7192091.1	0.030	0.48	07082014	080022	40382
20148108882	547640.2	7183922.7	-0.049	-0.48	07082014	080140	40241

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148106939	607902.3	7159982.9	-0.013	-0.75	07082014	084212	40382
20148106958	608000.5	7155984.6	-0.025	-0.22	07082014	084624	40382
20148107070	607856.7	7151889.3	0.004	0.43	07082014	085042	40382
20148106967	639990.8	7147975.1	0.017	0.28	07082014	095528	40382
20148106966	639986.4	7152147.3	-0.096	-0.50	07082014	100152	40382
20148106946	639910.2	7159965.5	-0.003	0.03	07082014	101652	40382
20148107116	644021.9	7143936.6	-0.085	-0.02	07082014	104140	40382
20148107117	648115.1	7144021.8	-0.040	-0.01	07082014	104526	40382
20148107130	664077.9	7160138.8	-0.031	0.23	07082014	114116	40382
20148107131	664051.3	7164165.1	-0.005	-0.03	07082014	114502	40382
20148107145	640087.5	7187938.8	-0.018	-0.24	07082014	122954	40382
20148107146	635975.6	7187914.8	0.035	-0.18	07082014	123324	40382
20148108886	540062.9	7152359.4	0.062	-0.05	07082014	123434	40241
20148108950	540125.8	7147952.5	-0.105	0.02	07082014	124132	40241
20148107076	612127.7	7191906.9	0.024	-0.05	07082014	125840	40382
20148107075	608390.8	7199984.0	0.012	0.10	07082014	130414	40382
20148108950	540126.0	7147952.3	0.066	-0.05	07082014	134328	40241
20148108886	540063.5	7152359.1	0.023	-0.13	07082014	134712	40241
20148108885	539978.0	7163869.3	0.129	0.04	07082014	135938	40241
20148108882	547640.0	7183922.8	0.006	-0.31	07082014	141506	40241
20148107028	600099.5	7212019.9	-0.038	-0.51	07082014	142118	40382
20148107073	600019.4	7203796.5	-0.064	0.16	07082014	142818	40382
20148103495	548121.7	7215983.0	0.006	-0.21	07082014	143308	40241
20148107153	607891.2	7192090.9	-0.021	0.41	07082014	143644	40382
20148107212	611807.8	7184038.5	-0.044	0.83	07082014	144242	40382
20148103628	536080.8	7228224.2	-0.051	-0.05	07082014	150948	40241
20148103828	528183.5	7216136.7	-0.098	-0.17	07082014	152750	40241
20148103828	528183.9	7216136.4	-0.050	0.09	07082014	163120	40241
20148108881	543906.1	7184033.9	-0.068	0.01	07082014	165846	40241
20148108882	547640.0	7183922.8	-0.006	0.03	07082014	170256	40241
20148108974	548093.7	7195853.4	-0.077	-0.19	07082014	172156	40241
20148108237	531679.2	7207859.3	-0.075	-0.01	07082014	174456	40241
20148104176	673951.0	7368051.4	0.126	0.37	08072014	082318	40241
20148104175	673772.4	7366023.0	0.025	0.32	08072014	082836	40241
20148104175	673772.4	7366023.0	0.101	0.35	08072014	091028	40241
20148104176	673951.0	7368051.6	0.120	0.43	08072014	091332	40241
20148104266	670021.8	7373862.0	-0.042	0.49	08072014	101148	40241
20148104265	670007.4	7371983.0	0.007	1.09	08072014	101542	40241
20148104258	670031.6	7361872.5	0.128	0.45	08072014	110452	40241
20148104257	669983.7	7360025.2	0.069	0.18	08072014	110816	40241
20148104164	668013.8	7354166.8	0.045	-0.07	08072014	113412	40241
20148104163	667929.0	7351964.9	0.046	0.29	08072014	114026	40241
20148104093	670031.1	7340000.5	0.041	0.80	08072014	121714	40241
20148104092	669931.4	7337933.0	0.017	0.25	08072014	122056	40241
20148101198	522014.7	7349957.0	0.003	0.71	08072014	131744	40382
20148101197	521943.9	7351933.0	0.090	-0.03	08072014	132202	40382
20148104308	665942.4	7335938.4	-0.141	0.01	08072014	132518	40241

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148104307	666049.7	7338026.8	-0.050	0.53	08072014	132836	40241
20148101192	522029.5	7362026.3	0.090	-0.38	08072014	133808	40382
20148101191	521926.8	7364012.8	0.111	-0.31	08072014	134150	40382
20148101184	522019.6	7373979.2	0.111	-0.66	08072014	135834	40382
20148104299	665941.4	7345999.8	-0.092	-0.56	08072014	140132	40241
20148101183	522070.9	7376011.6	0.128	-0.79	08072014	140338	40382
20148104298	666075.4	7347997.2	0.022	-0.07	08072014	141644	40241
20148104292	666027.9	7357936.2	-0.031	0.54	08072014	145733	40241
20148104291	665950.0	7360016.5	-0.091	0.34	08072014	150822	40241
20148104284	665981.7	7365914.2	-0.055	0.09	08072014	152234	40241
20148104283	665885.6	7368005.5	-0.026	0.21	08072014	153326	40241
20148101278	526095.8	7380003.8	-0.179	-0.06	08072014	174308	40382
20148101277	527996.6	7380044.7	0.024	0.63	08072014	174756	40382
20148101276	529938.4	7380125.1	-0.076	-0.25	08072014	175204	40382
20148101275	530097.9	7382066.4	-0.014	0.21	08072014	175914	40382
20148101274	527967.2	7381963.2	-0.002	-0.21	08072014	180500	40382
20148103319	539918.6	7219907.3	0.038	0.17	08082014	074928	40241
20148102581	536032.0	7216057.7	0.088	0.05	08082014	075812	40241
20148103320	531996.4	7219976.6	0.007	0.36	08082014	082956	40241
20148103430	528086.3	7224057.0	0.070	0.52	08082014	091332	40241
20148106935	596046.4	7164039.4	-0.074	0.27	08082014	111410	40382
20148107032	591896.7	7164223.7	0.098	0.17	08082014	111954	40382
20148109024	527980.8	7227960.8	-0.076	0.15	08082014	115908	40241
20148109023	527972.3	7232173.1	0.038	0.19	08082014	120316	40241
20148109020	532041.8	7231690.5	0.055	0.29	08082014	120710	40241
20148109021	531999.9	7235766.5	-0.052	0.10	08082014	121400	40241
20148109022	527990.6	7236123.3	-0.119	0.17	08082014	121732	40241
20148107367	564032.8	7131931.1	-0.008	0.21	08082014	123320	40382
20148107366	563889.7	7136106.8	-0.022	0.09	08082014	123814	40382
20148107359	564192.6	7155912.0	-0.058	0.21	08082014	125852	40382
20148107358	563923.2	7159947.3	-0.003	0.20	08082014	130236	40382
20148107352	564166.6	7175926.0	0.036	0.13	08082014	131638	40382
20148107351	563850.8	7180039.3	0.001	0.30	08082014	132034	40382
20148107343	579961.9	7187929.6	-0.039	0.43	08082014	134450	40382
20148107342	588294.7	7187925.4	-0.050	0.18	08082014	135302	40382
20148103628	536080.2	7228224.5	0.013	0.27	08082014	135922	40241
20148108974	548094.7	7195853.2	-0.007	0.32	08082014	143334	40241
20148108882	547639.8	7183923.0	-0.006	0.42	08082014	143956	40241
20148107391	588014.3	7156081.8	0.042	-0.18	08082014	155146	40382
20148107392	584075.8	7155946.1	-0.003	-0.10	08082014	155518	40382
20148107285	616129.5	7163961.7	0.023	0.18	08082014	173952	40382
20148108885	539978.2	7163869.2	-0.032	0.12	08082014	174242	40241
20148108882	547639.6	7183922.9	0.075	0.13	08082014	175346	40241
20148106946	639910.3	7159965.5	0.034	0.36	08082014	175828	40382
20148103496	560013.4	7215998.4	0.009	0.11	08082014	180840	40241
20148103497	571969.0	7216013.5	0.061	0.10	08082014	181654	40241
20148103498	587841.8	7219940.8	-0.075	0.28	08082014	182848	40241

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148104192	661822.1	7379967.3	-0.204	0.12	09072014	082812	40382
20148104191	664030.5	7380011.3	0.010	-0.25	09072014	083750	40382
20148104357	661938.2	7371988.0	-0.164	-0.45	09072014	085930	40382
20148104356	661955.6	7370111.7	-0.196	-0.09	09072014	090456	40382
20148101256	521916.2	7344026.4	-0.124	0.71	09072014	094536	40241
20148101255	521966.0	7342057.5	0.003	0.12	09072014	094938	40241
20148104343	662013.6	7356149.7	0.083	0.67	09072014	095258	40382
20148104342	662005.0	7353994.3	0.034	1.17	09072014	095836	40382
20148104330	661975.0	7344067.9	-0.185	0.14	09072014	103128	40382
20148104329	662172.8	7341978.2	-0.157	-0.08	09072014	103534	40382
20148104064	661878.2	7330100.8	0.089	-0.05	09072014	110440	40382
20148104063	660006.1	7330135.9	0.122	0.00	09072014	110822	40382
20148104389	660030.8	7336023.1	0.083	0.80	09072014	112004	40382
20148104388	660016.9	7337879.6	0.011	-0.48	09072014	112352	40382
20148104383	659985.7	7347899.0	0.061	0.59	09072014	114538	40382
20148104382	659979.4	7349936.9	0.006	0.46	09072014	114926	40382
20148104377	660037.2	7360065.1	-0.136	-0.54	09072014	121738	40382
20148104376	659977.9	7361871.4	-0.141	0.00	09072014	123142	40382
20148104372	660045.9	7365924.4	-0.162	-0.03	09072014	123918	40382
20148104371	660092.4	7367964.0	0.165	-0.18	09072014	125148	40382
20148101324	545978.1	7313966.4	0.016	-0.23	09072014	133756	40241
20148101323	544081.3	7313977.0	-0.002	-0.22	09072014	134518	40241
20148101315	534033.4	7315977.7	0.025	-0.08	09072014	140702	40241
20148194141	601891.4	7357916.1	-0.033	-0.27	09072014	142012	40382
20148101279	525939.0	7378021.7	-0.085	0.22	09072014	152620	40241
20148101286	526052.2	7364117.2	0.040	0.16	09072014	153804	40241
20148101370	523970.6	7338003.5	-0.146	-0.17	09072014	164408	40241
20148101307	522012.6	7337962.3	-0.006	-0.16	09072014	164812	40241
20148101384	525994.6	7344182.8	-0.014	0.33	09072014	172820	40241
20148101377	525985.3	7353906.9	-0.077	-0.10	09072014	173402	40241
20148101281	525980.1	7373991.4	0.000	0.76	09072014	174623	40241
20148101273	526051.7	7382076.4	-0.001	0.55	09072014	175140	40241
20148101275	530098.2	7382066.3	0.035	0.55	09072014	175634	40241
20148107425	595990.9	7212070.5	-0.006	-0.05	09082014	073034	40382
20148108884	588137.9	7207996.2	0.061	-0.16	09082014	073122	40241
20148108883	564168.3	7196054.8	0.061	-0.30	09082014	074300	40241
20148107029	592081.2	7188071.0	0.055	-0.80	09082014	075824	40382
20148107031	592159.3	7172011.3	0.040	-0.02	09082014	085010	40382
20148107032	591896.6	7164222.8	-0.018	0.59	09082014	085856	40382
20148106935	596046.2	7164040.0	-0.016	-0.03	09082014	090312	40382
20148108972	539953.9	7167801.9	0.086	0.08	09082014	090844	40241
20148108885	539977.7	7163868.8	-0.031	0.13	09082014	091302	40241
20148108971	539915.9	7160074.0	-0.135	0.36	09082014	091716	40241
20148107030	592039.0	7179996.4	0.027	0.94	09082014	094704	40382
20148108886	540063.3	7152359.4	-0.064	-0.09	09082014	095208	40241
20148107029	592081.2	7188071.3	0.012	0.21	09082014	095538	40382
20148108970	540024.9	7155881.5	-0.122	0.18	09082014	095616	40241

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148108882	547639.2	7183922.5	-0.083	0.15	09082014	105706	40241
20148109140	556066.7	7195939.3	-0.021	0.76	09082014	111532	40241
20148103495	548121.3	7215983.2	0.022	0.26	09082014	120800	40241
20148109207	624118.9	7236039.9	0.022	0.11	09082014	152558	40241
20148109206	622018.3	7235909.1	-0.007	-0.02	09082014	153322	40241
20148109200	614095.8	7236100.6	-0.031	0.22	09082014	154426	40241
20148107535	701994.9	7211786.9	-0.012	0.37	09082014	161508	40382
20148107534	660009.1	7228116.6	-0.076	-0.16	09082014	173714	40382
20148107533	647951.5	7228018.7	-0.040	0.18	09082014	174326	40382
20148109258	660051.2	7220219.3	0.001	0.06	09082014	174816	40241
20148109257	659917.3	7223842.6	-0.017	0.10	09082014	175332	40241
20148107531	616184.7	7228011.7	-0.014	0.06	09082014	180450	40382
20148101374	528083.9	7357934.1	0.050	0.18	10072014	080734	40241
20148101379	527908.6	7351966.4	0.024	0.40	10072014	081656	40241
20148101380	528063.9	7350125.6	0.008	0.43	10072014	082114	40241
20148101369	531983.9	7326071.0	-0.028	0.46	10072014	085252	40241
20148101368	532069.7	7324044.3	-0.047	0.20	10072014	085830	40241
20148101363	535979.3	7315902.7	-0.162	0.29	10072014	092320	40241
20148104409	658091.2	7368133.3	-0.131	-0.33	10072014	093846	40382
20148101323	544081.6	7313976.9	-0.011	0.14	10072014	094102	40241
20148104408	658039.8	7366059.1	-0.071	0.93	10072014	094316	40382
20148101324	545968.5	7313958.8	-0.010	0.18	10072014	094442	40241
20148104406	657942.1	7362127.7	-0.034	0.50	10072014	094944	40382
20148104405	657956.7	7359959.2	-0.094	0.13	10072014	095304	40382
20148104402	658006.6	7356001.2	-0.044	-0.54	10072014	100110	40382
20148101358	556070.0	7314018.7	-0.077	0.24	10072014	100224	40241
20148104401	658132.1	7353968.2	-0.099	0.63	10072014	100434	40382
20148101357	563965.4	7314041.1	-0.087	0.06	10072014	101510	40241
20148104503	649873.0	7375999.8	-0.018	0.37	10072014	122428	40382
20148104502	648045.6	7376024.8	-0.066	0.28	10072014	122818	40382
20148104132	602176.7	7376147.4	-0.008	0.16	10072014	140610	40382
20148104138	606233.6	7368038.6	-0.151	0.06	10072014	144110	40382
20148104139	605879.3	7365901.4	-0.133	-0.62	10072014	144454	40382
20148194145	606167.0	7356087.6	-0.049	0.56	10072014	150032	40382
20148104147	605988.8	7353817.5	-0.027	0.60	10072014	150438	40382
20148104154	606055.3	7346036.1	-0.097	0.83	10072014	151720	40382
20148104474	602165.7	7334185.9	-0.056	-0.42	10072014	154702	40382
20148181493	530024.9	7341970.1	0.099	-0.21	10072014	160146	40241
20148104430	602082.6	7323947.0	-0.002	-0.17	10072014	161350	40382
20148181492	529894.0	7334058.0	0.146	0.07	10072014	161642	40241
20148104431	602110.4	7321996.2	-0.012	-0.30	10072014	162204	40382
20148104468	609784.4	7315986.4	0.180	-0.28	10072014	164356	40382
20148104467	611895.0	7315936.1	0.114	0.67	10072014	164826	40382
20148181508	520067.0	7330087.0	-0.026	-0.38	10072014	170220	40241
20148181507	522059.7	7330031.8	0.024	0.23	10072014	170604	40241
20148106931	612060.3	7228016.8	0.049	0.63	10082014	072530	40382
20148107603	640426.2	7216080.3	0.020	-0.17	10082014	074602	40382

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148109312	644136.3	7207922.7	0.014	-0.09	10082014	101134	40241
20148109311	643883.6	7203988.5	-0.059	0.06	10082014	101534	40241
20148109318	643996.9	7215882.1	-0.094	-0.08	10082014	103036	40241
20148109285	620165.7	7211881.5	0.104	0.82	10082014	113534	40241
20148107675	733865.9	7209961.6	-0.015	0.00	10082014	114636	40382
20148107674	733981.4	7211964.1	0.048	-0.50	10082014	115108	40382
20148109284	619849.6	7215826.1	0.023	0.15	10082014	115500	40241
20148109283	616051.9	7215967.3	0.097	-0.13	10082014	115846	40241
20148107666	727935.4	7214028.7	0.047	0.58	10082014	122340	40382
20148107665	726048.3	7213951.6	0.059	0.57	10082014	124734	40382
20148109014	575941.6	7219942.3	0.186	-0.24	10082014	125338	40241
20148103315	579951.2	7223931.7	0.000	-0.28	10082014	130214	40241
20148103314	587930.3	7223938.0	-0.039	-0.39	10082014	131012	40241
20148107659	718008.0	7214021.9	0.007	0.06	10082014	132509	40382
20148107708	720023.1	7209957.5	0.032	-0.31	10082014	142246	40382
20148107709	720016.0	7212168.6	0.055	0.15	10082014	142548	40382
20148107659	718007.4	7214022.0	0.027	-0.22	10082014	142902	40382
20148109015	556024.7	7219941.2	-0.114	-0.37	10082014	142910	40241
20148107660	718034.1	7215856.9	-0.028	0.04	10082014	143138	40382
20148103219	555846.6	7244044.4	-0.024	-0.46	10082014	162104	40241
20148109357	568293.8	7224104.9	-0.091	-0.26	10082014	165412	40241
20148109356	571961.1	7224283.9	0.076	-0.22	10082014	165812	40241
20148107534	660008.2	7228117.0	0.089	-0.37	10082014	171238	40382
20148107533	647951.1	7228018.5	-0.012	-0.04	10082014	172116	40382
20148107532	632058.3	7228044.5	-0.149	0.14	10082014	173543	40382
20148107531	616184.2	7228011.4	-0.041	0.01	10082014	175200	40382
20148106931	612059.9	7228015.2	-0.035	0.33	10082014	175612	40382
20148101400	531880.7	7382008.8	0.109	0.00	11072014	071840	40241
20148104574	615875.2	7378028.5	-0.030	0.33	11072014	073008	40382
20148104573	618173.4	7378091.2	0.016	0.47	11072014	073340	40382
20148181494	532016.6	7369936.7	-0.022	0.52	11072014	074102	40241
20148181495	532087.9	7361956.7	-0.137	-0.27	11072014	080324	40241
20148181496	532016.1	7354076.9	0.069	0.54	11072014	082826	40241
20148104000	528051.1	7345932.6	0.020	0.21	11072014	085200	40241
20148104544	654146.6	7360294.3	-0.141	0.13	11072014	090948	40382
20148104543	653965.1	7358022.4	0.087	0.49	11072014	091344	40382
20148104528	654090.2	7332053.0	0.018	0.43	11072014	095120	40382
20148104527	654012.7	7329947.2	-0.036	0.12	11072014	095538	40382
20148101468	572039.8	7317868.9	-0.096	0.17	11072014	103244	40241
20148101467	574107.6	7318037.3	-0.172	0.49	11072014	103700	40241
20148101459	590078.4	7318009.1	-0.108	0.14	11072014	111422	40241
20148101458	591935.7	7318051.6	0.059	-0.55	11072014	111834	40241
20148104020	649851.5	7345762.6	0.114	0.20	11072014	113428	40382
20148104651	651981.8	7369937.9	-0.064	-0.22	11072014	122352	40382
20148104650	652150.4	7372045.3	0.018	0.02	11072014	122808	40382
20148101592	598016.5	7347945.9	0.005	0.26	11072014	144310	40241
20148101591	597993.0	7345983.2	-0.126	0.94	11072014	144618	40241

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148194145	606167.2	7356087.2	0.017	-0.13	11072014	150312	40382
20148104147	605988.8	7353817.5	-0.019	-0.67	11072014	150824	40382
20148101582	597988.4	7328042.6	0.008	0.04	11072014	151906	40241
20148101581	597927.4	7325922.3	0.010	0.16	11072014	152208	40241
20148104596	605865.6	7340051.0	-0.028	-0.28	11072014	154304	40382
20148104597	606008.3	7337795.6	-0.129	-0.23	11072014	154913	40382
20148101646	589961.3	7327977.8	-0.073	0.51	11072014	163800	40241
20148104738	609919.7	7362106.9	-0.037	-0.37	11072014	174314	40382
20148101613	593986.9	7361980.7	0.138	-0.33	11072014	174656	40241
20148101612	594005.0	7364001.3	-0.011	-0.57	11072014	174946	40241
20148107342	588294.7	7187925.1	0.032	0.43	11082014	103017	40382
20148107343	579962.1	7187929.4	0.000	0.02	11082014	103758	40382
20148107031	592159.2	7172010.9	-0.006	0.29	11082014	105720	40382
20148106935	596046.1	7164040.2	-0.005	0.29	11082014	110426	40382
20148109180	551957.7	7164023.5	0.045	-0.40	11082014	111650	40241
20148108885	539978.2	7163869.3	-0.059	-0.13	11082014	112934	40241
20148107269	612210.0	7187939.1	0.046	-0.61	11082014	115756	40382
20148107083	636161.3	7196032.3	0.017	0.06	11082014	121006	40382
20148107603	640431.3	7216077.5	-0.013	0.34	11082014	125034	40241
20148107646	698072.6	7215995.7	0.054	-0.29	11082014	130358	40382
20148107535	701994.8	7211786.8	-0.005	0.25	11082014	133912	40382
20148101531	534087.2	7368023.2	-0.187	-0.36	12072014	074556	40241
20148101532	534077.2	7365868.4	-0.029	-0.05	12072014	074956	40241
20148101537	533994.8	7357917.2	-0.096	-0.14	12072014	081842	40241
20148104702	650021.9	7354026.9	0.041	0.13	12072014	084520	40382
20148181497	532018.7	7343994.7	-0.071	-0.67	12072014	084718	40241
20148104701	649976.9	7352101.8	-0.017	-0.26	12072014	084902	40382
20148104020	649852.3	7345762.6	-0.020	0.05	12072014	090140	40382
20148101523	531929.8	7331987.8	-0.030	0.08	12072014	090900	40241
20148104685	649963.1	7323865.9	-0.010	-0.25	12072014	095158	40382
20148104684	649845.3	7321994.7	-0.142	-0.27	12072014	095630	40382
20148101695	534109.7	7344053.6	-0.005	0.27	12072014	111432	40241
20148101689	535945.6	7357920.9	0.046	0.65	12072014	115911	40241
20148101537	533994.7	7357917.6	0.019	-0.04	12072014	120310	40241
20148101536	533908.5	7360002.0	-0.010	-0.17	12072014	120714	40241
20148104457	628032.0	7316162.6	0.096	0.08	12072014	121646	40382
20148101532	534077.0	7365868.6	-0.047	0.04	12072014	121720	40241
20148101685	536075.3	7366019.3	0.116	0.38	12072014	122024	40241
20148104458	625972.6	7315974.8	0.053	0.03	12072014	122032	40382
20148104132	602173.4	7376144.4	0.177	-0.11	12072014	132428	40382
20148104733	607998.6	7369878.5	-0.001	0.53	12072014	135036	40382
20148181750	538045.5	7372072.6	-0.070	-0.33	12072014	140608	40241
20148181747	537955.3	7369996.4	0.006	-0.15	12072014	141024	40241
20148104153	612108.2	7346058.3	-0.024	-0.41	12072014	142920	40382
20148181742	538042.8	7358166.4	-0.197	-0.19	12072014	143822	40241
20148104766	611950.7	7337932.5	0.051	-0.21	12072014	144052	40382
20148104765	612050.1	7336074.8	0.001	0.08	12072014	144426	40382

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148101737	538223.9	7352037.5	0.104	0.00	12072014	145602	40241
20148101736	538101.1	7350065.3	0.064	0.13	12072014	150054	40241
20148104604	603980.0	7328012.6	-0.154	0.06	12072014	151436	40382
20148101723	535947.0	7334149.3	0.057	0.02	12072014	153732	40241
20148101722	536079.7	7332055.7	0.011	0.01	12072014	154148	40241
20148104900	619899.2	7320056.4	-0.001	-0.33	12072014	163652	40382
20148104899	618039.6	7320159.5	0.085	-0.09	12072014	164002	40382
20148101787	541984.4	7331925.7	0.004	0.33	13072014	091630	40241
20148101785	541918.3	7330084.7	-0.062	-0.19	13072014	091946	40241
20148101653	588040.3	7328043.5	0.013	-0.48	13072014	112050	40241
20148101654	590016.9	7329999.0	0.164	0.15	13072014	112602	40241
20148101661	592043.0	7338048.4	-0.108	0.03	13072014	120112	40241
20148101662	592075.9	7340130.0	0.082	-0.06	13072014	121024	40241
20148101670	592103.7	7351994.5	0.116	0.41	13072014	123506	40241
20148101671	591978.5	7353940.8	-0.178	0.36	13072014	123808	40241
20148101822	544072.5	7381917.5	0.050	-0.29	14072014	073456	40241
20148101821	543815.6	7380029.7	-0.007	-0.10	14072014	073832	40241
20148101831	545934.9	7363991.1	-0.190	0.99	14072014	081252	40241
20148101830	544071.6	7364044.5	-0.092	0.44	14072014	081608	40241
20148101841	543955.0	7344082.9	-0.032	0.86	14072014	084654	40241
20148101855	550189.6	7321993.5	0.102	0.43	14072014	093858	40241
20148104971	622027.3	7330104.4	-0.085	0.40	14072014	103310	40382
20148104970	622011.7	7331992.3	0.019	0.06	14072014	103908	40382
20148101862	560037.8	7321901.9	-0.012	0.41	14072014	110850	40241
20148104963	618168.1	7340020.1	-0.009	0.41	14072014	111204	40382
20148104962	617938.6	7342016.4	0.048	0.44	14072014	111648	40382
20148104957	618148.5	7347938.3	-0.073	0.23	14072014	112818	40382
20148104956	617977.8	7350096.7	0.064	0.09	14072014	113308	40382
20148104732	612281.1	7376240.8	0.035	0.02	14072014	123638	40382
20148104731	614092.6	7375986.8	0.033	0.47	14072014	124006	40382
20148104930	614031.8	7372085.9	0.097	0.72	14072014	124440	40382
20148104995	620031.2	7356100.4	-0.113	-0.75	14072014	133538	40382
20148104994	620084.7	7354071.8	-0.106	0.07	14072014	134016	40382
20148104988	621945.9	7339984.3	-0.012	-1.00	14072014	140038	40382
20148104987	622073.1	7337971.1	-0.012	-0.47	14072014	140358	40382
20148104980	623960.2	7326034.0	-0.107	-0.84	14072014	142352	40382
20148104979	624123.2	7324006.4	0.017	0.10	14072014	142820	40382
20148104838	635916.1	7317915.6	-0.028	-0.53	14072014	145926	40382
20148104837	638100.5	7318142.1	-0.018	-0.08	14072014	150322	40382
20148104831	646055.8	7317906.0	0.015	0.52	14072014	151622	40382
20148104830	648027.6	7317930.6	0.021	0.57	14072014	152032	40382
20148105023	626013.9	7319822.4	0.023	-0.19	14072014	155634	40382
20148105022	626183.7	7322066.5	0.027	0.41	14072014	155958	40382
20148104798	647964.5	7341938.1	0.023	0.63	14072014	170930	40382
20148104797	647801.3	7343980.3	0.133	0.54	14072014	171322	40382
20148104791	648145.0	7357980.4	0.014	0.01	14072014	173546	40382
20148104790	647985.5	7360057.9	0.046	-0.47	14072014	174220	40382

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148104980	623971.2	7326033.9	0.193	0.38	15072014	084412	40382
20148104979	624123.3	7324006.4	0.099	-0.58	15072014	084730	40382
20148101974	546164.5	7329868.8	-0.039	-0.61	15072014	090116	40241
20148105099	643933.6	7326036.0	-0.050	0.11	15072014	094046	40382
20148105098	641930.4	7325954.0	-0.071	-0.06	15072014	094510	40382
20148105106	634077.0	7325948.2	-0.018	-0.02	15072014	103118	40382
20148105107	633974.5	7327899.3	0.008	-0.73	15072014	103430	40382
20148101878	586000.3	7328172.4	-0.090	0.00	15072014	110731	40241
20148101887	588049.0	7335993.1	-0.090	0.24	15072014	112620	40241
20148105124	638135.7	7329967.4	0.021	0.15	15072014	114818	40382
20148105125	638028.5	7332026.1	-0.003	0.04	15072014	115222	40382
20148101935	587972.1	7358147.9	-0.083	-0.10	15072014	122900	40241
20148101936	588112.6	7360003.1	-0.031	-0.23	15072014	124104	40241
20148101937	588004.4	7370062.9	-0.024	-0.30	15072014	130810	40241
20148101938	587876.6	7371994.6	-0.031	0.07	15072014	131318	40241
20148105153	628003.0	7341961.7	0.060	0.89	15072014	144326	40382
20148105147	632096.6	7333923.4	0.068	-0.14	15072014	150706	40382
20148105146	633971.5	7333961.5	0.040	0.76	15072014	151126	40382
20148102059	583867.3	7339966.6	-0.059	-0.23	15072014	155724	40241
20148102058	583955.0	7337938.9	0.207	-0.02	15072014	160142	40241
20148105174	635988.2	7338103.0	0.083	-0.01	15072014	160832	40382
20148105173	633886.1	7337972.6	-0.003	-0.52	15072014	161204	40382
20148102042	571993.2	7327985.9	0.050	-0.22	15072014	163446	40241
20148102041	569894.1	7327910.9	0.033	-0.31	15072014	163856	40241
20148105190	636013.7	7342003.5	0.012	-0.15	15072014	171908	40382
20148105189	633921.6	7341924.4	-0.105	0.43	15072014	172316	40382
20148104019	590292.6	7345910.0	-0.002	0.11	16072014	075240	40241
20148104785	648077.3	7366039.8	0.153	0.28	16072014	085648	40382
20148104786	648008.7	7363915.2	-0.070	0.66	16072014	090312	40382
20148104790	647985.7	7360057.8	-0.052	0.25	16072014	091222	40382
20148104791	648145.0	7357980.9	-0.038	0.10	16072014	091604	40382
20148102042	571993.2	7327985.9	0.018	-0.05	16072014	093056	40241
20148102041	569894.2	7327911.2	0.032	0.12	16072014	093414	40241
20148104020	649852.1	7345762.5	-0.106	0.04	16072014	094116	40382
20148102110	557947.5	7327994.0	-0.038	-0.13	16072014	100112	40241
20148105199	643958.9	7343954.2	-0.038	0.15	16072014	100158	40382
20148102111	556032.0	7328024.0	0.032	0.50	16072014	100416	40241
20148105200	641994.6	7343935.6	-0.002	-0.01	16072014	100544	40382
20148104157	641955.3	7346019.3	0.058	0.80	16072014	103554	40382
20148102131	577945.2	7344074.4	-0.003	0.13	16072014	131310	40241
20148102132	578081.6	7341837.7	-0.016	0.10	16072014	131636	40241
20148102133	580092.7	7341923.5	0.049	0.11	16072014	131946	40241
20148102130	579986.6	7343912.6	-0.066	-0.14	16072014	132318	40241
20148101937	588005.0	7370062.8	0.012	0.21	16072014	141210	40241
20148101916	590058.7	7370001.4	-0.018	-0.18	16072014	141600	40241
20148104132	602175.8	7376147.5	-0.075	0.57	16072014	142422	40241
20148101938	587876.7	7371994.7	-0.007	-0.33	16072014	145842	40241

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148105311	633910.5	7351824.4	-0.054	0.54	16072014	152006	40382
20148105312	634066.1	7354029.3	-0.035	-0.20	16072014	152322	40382
20148102130	579986.3	7343912.3	0.035	-0.25	16072014	154850	40241
20148102131	577945.2	7344074.5	0.059	0.00	16072014	155140	40241
20148105336	633954.3	7362024.4	-0.056	-0.11	16072014	164738	40382
20148105337	633966.4	7364017.0	0.003	0.74	16072014	165206	40382
20148105212	628093.3	7367895.3	0.132	-0.98	16072014	173356	40382
20148105211	625976.3	7367916.0	-0.013	-0.20	16072014	174240	40382
20148102131	577945.1	7344074.5	-0.008	0.12	17072014	092936	40241
20148102130	579986.7	7343912.4	0.021	0.91	17072014	093304	40241
20148101928	588064.2	7345920.4	-0.044	0.57	17072014	093852	40241
20148104019	590292.6	7345910.0	-0.075	0.48	17072014	102146	40241
20148102133	580092.9	7341923.7	-0.081	0.12	17072014	103236	40241
20148102132	578081.9	7341837.9	-0.013	0.25	17072014	103610	40241
20148104000	528051.4	7345932.8	0.034	-0.20	17072014	105014	40382
20148102214	569912.8	7343892.8	0.078	-0.09	17072014	113612	40241
20148102217	572013.6	7344107.9	0.092	0.26	17072014	113930	40241
20148102216	572191.4	7342011.0	0.149	0.14	17072014	114248	40241
20148102215	570112.0	7341857.3	0.065	0.09	17072014	114556	40241
20148105378	552058.0	7354010.0	-0.019	-0.34	17072014	120156	40382
20148105377	551998.7	7355923.5	-0.034	0.35	17072014	121250	40382
20148105367	551917.1	7374076.8	-0.059	0.58	17072014	124108	40382
20148105364	551986.0	7375988.8	0.028	-0.12	17072014	124428	40382
20148102297	573900.5	7364001.0	0.163	-0.07	17072014	131806	40241
20148105365	554071.8	7375981.7	0.036	-0.51	17072014	140022	40382
20148105366	553851.5	7373956.8	-0.018	0.35	17072014	140440	40382
20148102298	571908.1	7363935.3	0.026	0.01	17072014	143910	40241
20148102301	572006.6	7362160.6	0.179	0.06	17072014	144228	40241
20148102300	570153.8	7361989.2	0.196	-0.42	17072014	161902	40241
20148102299	569596.1	7363974.9	0.103	-0.25	17072014	162340	40241
20148105386	555913.6	7350067.4	0.043	0.14	17072014	162402	40382
20148105387	554101.4	7349900.6	-0.006	0.81	17072014	163430	40382
20148105408	555940.3	7366030.3	-0.012	0.27	17072014	170916	40382
20148105407	555903.3	7368110.1	0.074	-0.94	17072014	171320	40382
20148105449	557958.1	7377990.7	0.024	0.00	18072014	091054	40241
20148105449	557958.2	7377990.7	-0.019	0.09	18072014	111456	40241
20148105450	558077.6	7379985.2	0.049	0.47	18072014	111918	40241
20148101374	528083.9	7357934.7	-0.023	-0.13	18072014	123456	40241
20148101375	527980.5	7355982.6	0.025	-0.32	18072014	123816	40241
20148101542	530176.4	7347982.0	-0.122	-0.90	18072014	125318	40241
20148101541	532132.1	7347952.0	-0.129	-0.29	18072014	125746	40241
20148101544	531999.0	7346015.8	-0.111	-0.47	18072014	130134	40241
20148104000	528051.8	7345932.6	-0.013	-0.01	18072014	130824	40241
20148101928	588064.0	7345920.2	0.037	-0.89	18072014	141952	40241
20148104019	590292.5	7345909.9	0.039	-0.51	18072014	142336	40241
20148104020	649852.2	7345762.3	0.040	-0.12	18072014	155628	40241
20148104677	654049.1	7312060.9	-0.153	-0.18	23072014	104452	40382

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148104678	652014.5	7311919.0	-0.027	0.07	23072014	104844	40382
20148105512	651988.6	7274015.9	0.079	0.42	23072014	115531	40382
20148105513	653964.2	7274004.9	0.097	0.03	23072014	115914	40382
20148105560	654037.0	7252005.2	0.044	-0.26	23072014	142006	40382
20148105588	648084.8	7273918.3	-0.167	0.00	23072014	155934	40382
20148105587	647927.8	7271916.9	0.017	0.05	23072014	160404	40382
20148105503	612019.7	7237992.2	-0.062	-0.10	23072014	182126	40382
20148105500	612059.9	7236045.7	-0.057	0.74	23072014	182538	40382
20148105505	611972.3	7247933.0	0.023	0.09	24072014	075152	40382
20148105508	611992.1	7260056.1	0.079	0.36	24072014	075946	40382
20148105509	616024.8	7274049.4	0.017	0.03	24072014	080820	40382
20148105510	627876.8	7274056.8	-0.040	-0.06	24072014	081900	40382
20148105511	639937.2	7274125.8	0.038	0.11	24072014	082634	40382
20148105541	652063.9	7292082.9	-0.062	0.59	24072014	085102	40382
20148105540	652023.4	7294016.1	0.007	0.27	24072014	085504	40382
20148102580	536058.3	7279863.6	0.085	0.39	24072014	125406	40241
20148182232	510015.5	7311990.7	0.111	-0.32	24072014	143626	40241
20148102593	504072.4	7282009.1	-0.101	-0.20	24072014	164244	40241
20148102592	506026.6	7281972.6	0.084	-0.16	24072014	164536	40241
20148102580	536058.5	7279863.4	-0.030	-0.49	24072014	172458	40241
20148102583	564055.5	7251829.9	0.005	0.25	24072014	174300	40241
20148102578	568017.6	7251963.9	-0.023	0.08	24072014	174748	40241
20148102582	584207.1	7235954.5	-0.103	0.12	24072014	180202	40241
20148102587	516039.4	7282020.9	-0.156	-0.79	25072014	073956	40241
20148102588	514075.3	7282000.6	-0.117	-0.45	25072014	074518	40241
20148102667	512178.0	7289858.6	-0.185	0.00	25072014	083853	40241
20148102668	512110.4	7292104.2	-0.057	0.07	25072014	084350	40241
20148101098	529949.8	7312093.0	0.035	-0.76	25072014	100113	40241
20148101099	531920.0	7312095.8	-0.027	-0.46	25072014	101140	40241
20148102734	543969.0	7256115.2	-0.022	-0.49	25072014	141908	40241
20148102733	544113.8	7271924.1	0.031	0.29	25072014	142812	40241
20148102583	564057.1	7251830.1	-0.027	-0.07	25072014	175948	40241
20148105630	608220.5	7236211.3	-0.061	-0.03	26072014	072653	40382
20148102582	584207.2	7235954.0	0.074	-0.16	26072014	072900	40241
20148105631	608080.9	7238032.3	-0.015	0.23	26072014	073012	40382
20148105502	609966.3	7238045.0	-0.015	0.58	26072014	073346	40382
20148105503	612014.2	7237994.1	0.039	0.30	26072014	073655	40382
20148105504	612050.3	7244081.8	0.052	0.32	26072014	074144	40382
20148105505	611968.6	7247937.4	-0.027	0.27	26072014	074610	40382
20148105506	611995.3	7252006.9	0.104	0.35	26072014	075026	40382
20148105507	612004.6	7256129.2	0.061	0.56	26072014	075442	40382
20148105508	611987.4	7260059.3	-0.108	0.00	26072014	075900	40382
20148105509	616019.4	7274050.4	-0.075	0.34	26072014	082416	40382
20148105510	627878.7	7274061.8	0.066	0.22	26072014	083738	40382
20148105511	639938.7	7274130.8	-0.089	0.26	26072014	085048	40382
20148105587	647922.3	7271916.0	-0.037	0.28	26072014	090200	40382
20148105588	648079.4	7273919.1	0.011	0.29	26072014	090512	40382

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148101340	576070.5	7312033.1	0.068	-0.26	26072014	092536	40241
20148101339	574093.2	7312031.3	-0.003	-0.07	26072014	092858	40241
20148104447	620091.2	7311935.3	-0.118	-0.25	26072014	104750	40382
20148104446	618156.4	7312036.6	-0.078	-0.06	26072014	105116	40382
20148102577	572050.0	7244142.9	0.010	0.49	26072014	105132	40241
20148102848	572064.7	7252075.3	0.121	0.42	26072014	112228	40241
20148104439	603906.5	7311932.8	-0.074	-0.08	26072014	112640	40382
20148104438	602155.0	7312021.5	-0.064	-0.89	26072014	113006	40382
20148102838	572038.7	7275958.3	-0.048	0.37	26072014	115602	40241
20148101346	588055.4	7311982.5	-0.034	-0.13	26072014	120806	40382
20148101345	585981.3	7311977.9	0.041	-0.05	26072014	121220	40382
20148101331	558072.4	7312004.2	-0.056	-0.09	26072014	131058	40241
20148101330	555910.7	7312050.3	-0.181	-0.08	26072014	131412	40241
20148102736	544178.3	7232074.7	-0.004	0.34	26072014	143004	40241
20148102735	544084.6	7244272.1	-0.068	-0.60	26072014	145606	40241
20148102733	544113.6	7271924.0	0.055	-0.20	26072014	151656	40241
20148102578	568017.7	7251963.8	-0.137	-0.08	26072014	171736	40241
20148102848	572064.4	7252075.4	-0.140	-0.75	26072014	172120	40241
20148102575	587939.6	7235955.1	0.035	-0.02	26072014	173416	40241
20148102583	564055.6	7251830.1	0.034	-0.77	27072014	073340	40241
20148102905	551966.1	7280098.3	-0.003	-0.06	27072014	081922	40241
20148102732	543965.3	7279841.1	0.016	-1.00	27072014	082536	40241
20148102731	544047.6	7281993.9	-0.118	-0.94	27072014	083022	40241
20148102719	544216.9	7305732.7	0.005	-1.00	27072014	091846	40241
20148102718	544093.3	7307928.0	-0.035	-0.49	27072014	092224	40241
20148102669	514107.7	7292007.2	-0.047	-0.18	27072014	104734	40241
20148102670	513888.2	7290056.2	-0.071	-0.50	27072014	105038	40241
20148103036	524013.6	7255778.3	0.011	-0.39	27072014	140640	40241
20148103035	523999.7	7264015.6	-0.006	-0.36	27072014	141410	40241
20148103034	523973.4	7271785.6	0.050	0.48	27072014	142142	40241
20148103033	523868.6	7280068.2	-0.047	0.17	27072014	142934	40241
20148103057	535986.5	7302044.6	0.037	-0.06	27072014	153104	40241
20148103058	535993.9	7299976.6	-0.051	0.07	27072014	153356	40241
20148102901	548044.7	7268059.5	0.053	-0.84	27072014	173230	40241
20148102576	579953.6	7243974.3	0.086	0.10	27072014	175306	40241
20148102582	584207.0	7235955.3	-0.025	0.03	27072014	180236	40241
20148102935	570090.9	7281927.8	-0.083	0.31	28072014	075630	40241
20148102934	569954.3	7288088.7	-0.079	-0.52	28072014	080424	40241
20148102933	569942.2	7289869.8	-0.037	0.64	28072014	080712	40241
20148105501	610061.7	7235980.2	0.121	0.25	28072014	084206	40382
20148105773	614006.9	7240006.3	0.022	-0.43	28072014	084658	40382
20148105809	616036.9	7242030.0	-0.069	-0.08	28072014	085100	40382
20148105662	648034.6	7264145.7	0.002	-0.24	28072014	095408	40382
20148102912	552025.3	7291894.2	0.085	-0.13	28072014	103300	40241
20148102911	551886.7	7289972.8	-0.002	0.42	28072014	103600	40241
20148105974	639969.3	7306009.0	-0.080	0.23	28072014	120250	40382
20148105973	642097.9	7305874.1	-0.004	0.52	28072014	120658	40382

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148102936	567917.3	7279876.4	-0.170	-0.33	28072014	123452	40241
20148102937	567993.0	7271827.5	-0.021	-0.51	28072014	124244	40241
20148102938	567922.6	7263928.8	0.182	-0.40	28072014	130348	40241
20148105939	631957.1	7245929.8	0.007	0.05	28072014	131226	40382
20148105892	629923.6	7245878.5	-0.003	0.12	28072014	131602	40382
20148102578	568017.5	7251963.7	0.120	-0.10	28072014	133210	40241
20148105892	629924.0	7245878.6	-0.017	0.21	28072014	142456	40382
20148105939	631958.1	7245931.3	0.016	0.06	28072014	142854	40382
20148102904	543906.6	7264052.3	0.055	-0.02	28072014	144054	40241
20148105814	646111.7	7246004.5	-0.006	-0.01	28072014	145318	40382
20148105826	644052.3	7265872.8	0.019	-0.17	28072014	154130	40382
20148105511	639937.3	7274124.7	0.045	-0.03	28072014	160034	40382
20148103229	534039.1	7288018.0	-0.098	-0.11	28072014	160254	40241
20148103228	535999.0	7287990.4	-0.030	0.15	28072014	160640	40241
20148102580	536058.3	7279863.1	0.020	0.21	28072014	172220	40241
20148102733	544114.1	7271924.6	0.002	-0.51	28072014	174644	40241
20148103103	556061.4	7259890.2	-0.014	-0.35	28072014	175550	40241
20148105808	616005.0	7243949.5	0.093	0.09	29072014	073758	40382
20148192902	548132.3	7251862.8	-0.053	-0.17	29072014	080218	40241
20148102734	543969.0	7256115.5	0.005	0.62	29072014	081352	40241
20148192903	543976.0	7251813.3	0.044	0.03	29072014	081836	40241
20148105669	634086.1	7274125.9	0.009	0.15	29072014	085308	40382
20148103036	524014.0	7255778.4	0.022	0.67	29072014	094924	40241
20148102734	543968.9	7256115.7	0.028	0.31	29072014	100700	40241
20148103103	556061.2	7259890.2	0.021	0.42	29072014	102922	40241
20148103266	547871.2	7256130.0	-0.036	0.11	29072014	104238	40241
20148105670	636074.6	7274206.7	-0.007	-0.34	29072014	110028	40382
20148105669	634086.1	7274125.8	-0.004	-0.08	29072014	110422	40382
20148106062	633979.2	7266009.5	0.009	0.02	29072014	112634	40382
20148106061	634022.7	7263851.0	0.019	-0.18	29072014	112956	40382
20148105663	640057.2	7257990.7	0.032	0.18	29072014	114642	40382
20148105770	580063.1	7247907.3	-0.057	0.75	30072014	074748	40382
20148105769	579961.3	7251794.8	-0.136	0.18	30072014	075216	40382
20148102581	536031.9	7216057.7	-0.032	-0.02	30072014	081456	40241
20148105723	589910.0	7307988.2	-0.012	0.75	30072014	094924	40382
20148105722	592018.6	7308010.6	-0.119	0.40	30072014	095244	40382
20148105712	607831.9	7308245.6	-0.001	0.47	30072014	102220	40382
20148105711	609970.6	7307867.5	-0.065	0.23	30072014	102602	40382
20148105700	627813.6	7307946.4	0.026	0.60	30072014	105558	40382
20148105699	630091.7	7308046.1	0.086	0.58	30072014	105920	40382
20148106062	633984.8	7266007.7	-0.091	0.24	30072014	130652	40382
20148106061	634021.8	7263845.3	-0.054	0.22	30072014	131000	40382
20148103326	501001.4	7216505.7	-0.055	-0.17	30072014	133558	40241
20148103322	515913.1	7219993.6	-0.039	-0.25	30072014	134738	40241
20148103321	524039.8	7220053.1	0.046	-0.24	30072014	143826	40241
20148105663	640059.6	7257995.7	-0.056	0.43	30072014	145106	40382
20148106053	634012.1	7248036.1	0.074	0.50	30072014	153300	40382

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148103461	514921.6	7191012.8	0.096	-0.11	30072014	160848	40241
20148103460	515916.4	7191014.8	0.030	0.05	30072014	161216	40241
20148105510	627879.3	7274061.9	0.075	0.22	30072014	164938	40382
20148105509	616019.1	7274050.9	0.067	0.59	30072014	172558	40382
20148103320	531995.8	7219976.2	0.040	-0.40	30072014	172712	40241
20148106250	615890.4	7266019.3	0.046	0.14	30072014	173337	40382
20148103318	547877.3	7219874.8	0.125	-0.18	30072014	173450	40241
20148106226	629863.5	7249880.5	-0.068	-0.25	30072014	181026	40382
20148103315	579951.2	7223932.0	0.024	0.20	31072014	072702	40382
20148103316	572120.7	7219883.0	0.037	0.17	31072014	073240	40382
20148103317	559966.3	7220096.3	0.045	-0.52	31072014	073956	40382
20148103318	547877.2	7219875.0	0.022	0.44	31072014	074658	40382
20148103319	539918.5	7219906.9	0.041	0.33	31072014	075216	40382
20148102581	536032.0	7216057.9	-0.018	0.40	31072014	075658	40382
20148105772	592119.1	7235923.0	-0.039	-0.08	31072014	075838	40241
20148103320	531996.2	7219976.7	-0.025	0.50	31072014	080352	40382
20148103321	524039.6	7220053.4	0.039	0.96	31072014	081028	40382
20148103322	515912.8	7219993.6	0.039	0.27	31072014	081758	40382
20148106136	581944.9	7293988.5	-0.034	-0.40	31072014	093032	40241
20148103325	501435.6	7216347.2	0.025	0.35	31072014	093342	40382
20148106137	582017.6	7296065.0	0.056	-0.12	31072014	093410	40241
20148103326	501001.2	7216506.0	0.049	0.27	31072014	093610	40382
20148103417	501546.9	7210546.5	0.181	0.57	31072014	100834	40382
20148103418	501022.9	7210573.2	0.063	-0.79	31072014	101104	40382
20148103415	501039.5	7210005.5	0.079	0.10	31072014	101352	40382
20148103416	501492.1	7209991.7	-0.026	0.05	31072014	101626	40382
20148103398	501473.5	7202019.6	0.063	-0.27	31072014	105802	40382
20148103399	500936.9	7202020.7	-0.013	0.20	31072014	110040	40382
20148103396	501027.1	7201602.1	0.012	-0.58	31072014	110256	40382
20148103397	501565.8	7201477.8	0.014	-0.17	31072014	110536	40382
20148106309	618195.3	7304228.0	-0.006	-0.63	31072014	114936	40241
20148106308	616111.3	7303945.3	-0.044	-0.48	31072014	115256	40241
20148103397	501566.1	7201478.0	0.033	-0.09	31072014	121946	40382
20148103398	501473.3	7202019.8	-0.005	-0.02	31072014	122252	40382
20148106293	590077.0	7304093.7	0.006	-0.12	31072014	123136	40241
20148106292	587951.4	7303945.9	-0.055	-0.04	31072014	123521	40241
20148103416	501492.1	7209992.0	0.138	-0.37	31072014	130856	40382
20148103417	501547.0	7210546.5	0.003	-0.51	31072014	131130	40382
20148106276	585983.2	7282185.6	-0.034	0.89	31072014	132452	40241
20148106275	586069.2	7279966.1	-0.007	0.34	31072014	132822	40241
20148106269	588035.0	7263955.6	-0.034	0.68	31072014	135500	40241
20148103519	505018.0	7216010.3	-0.026	-0.25	31072014	140028	40382
20148103518	504919.8	7215533.0	-0.017	-0.33	31072014	140322	40382
20148103517	505478.5	7215444.5	-0.037	-0.37	31072014	140600	40382
20148103516	505509.1	7215920.9	-0.025	-0.35	31072014	140842	40382
20148105772	592119.1	7235922.9	-0.058	-0.02	31072014	142746	40241
20148103321	524039.8	7220052.9	-0.027	-0.53	31072014	145738	40382

STATION	MGAEAST	MGANORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN
20148106365	588144.0	7243973.4	0.052	0.36	31072014	150524	40241
20148106375	592124.8	7268021.3	0.020	0.01	31072014	171836	40241
20148106370	589993.9	7256028.0	0.072	0.12	31072014	173816	40241

APPENDIX G
Repeat Listing: Multiple Control Station Observations

STATION	MGA94EAST	MGA94NORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN	GRVBASE	GPSBASE
20148101098	529949.125	7312092.778			07072014	110400	40241	GRVGPS0112	20148100100
20148101098	529949.762	7312092.989	0.035	-0.76	25072014	100113	40241	20148100001	20148100103
20148101099	531919.809	7312095.575			07072014	111328	40241	GRVGPS0112	20148100100
20148101099	531920.029	7312095.813	-0.027	-0.46	25072014	101140	40241	20148100001	20148100103
20148101330	555910.278	7312051.161			09072014	113844	40241	GRVGPS0112	20148100100
20148101330	555910.655	7312050.324	-0.181	-0.08	26072014	131412	40241	20148100001	20148100103
20148101331	558072.444	7312004.534			09072014	114528	40241	GRVGPS0112	20148100100
20148101331	558072.360	7312004.209	-0.056	-0.09	26072014	131058	40241	20148100001	20148100103
20148101339	574092.999	7312031.575			09072014	121240	40241	GRVGPS0112	20148100100
20148101339	574093.160	7312031.348	-0.003	-0.07	26072014	092858	40241	20148100001	20148100103
20148101340	576070.834	7312033.299			09072014	121714	40241	GRVGPS0112	20148100100
20148101340	576070.487	7312033.069	0.068	-0.26	26072014	092536	40241	20148100001	20148100103
20148101345	585978.930	7311971.569			09072014	123438	40241	GRVGPS0112	20148100100
20148101345	585981.348	7311977.915	0.041	-0.05	26072014	121220	40382	20148100001	20148100104
20148101346	588055.481	7311982.593			09072014	123940	40241	GRVGPS0112	20148100100
20148101346	588055.418	7311982.543	-0.034	-0.13	26072014	120806	40382	20148100001	20148100104
20148101400	531880.595	7382008.176			09072014	180014	40241	GRVGPS0112	20148100100
20148101400	531880.674	7382008.813	0.109		11072014	071840	40241	GRVGPS0112	GRVGPS0112
20148101467	574107.537	7318037.115			10072014	122744	40241	GRVGPS0112	20148100100
20148101467	574107.550	7318037.329	-0.172		11072014	103700	40241	GRVGPS0112	20148100102
20148101468	572039.468	7317869.626			10072014	123230	40241	GRVGPS0112	20148100100
20148101468	572039.828	7317868.896	-0.096		11072014	103244	40241	GRVGPS0112	20148100102
20148101531	534086.865	7368022.920			11072014	074804	40241	GRVGPS0112	GRVGPS0112
20148101531	534087.180	7368023.185	-0.187		12072014	074556	40241	GRVGPS0112	20148100100
20148101536	533908.631	7360002.554			11072014	081204	40241	GRVGPS0112	GRVGPS0112
20148101536	533908.454	7360002.024	-0.010		12072014	120714	40241	GRVGPS0112	20148100100
20148101541	532132.277	7347952.418			11072014	083852	40241	GRVGPS0112	GRVGPS0112
20148101541	532132.066	7347952.017	-0.129		18072014	125746	40241	GRVGPS0112	20148100100

STATION	MGA94EAST	MGA94NORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN	GRVBASE	GPSBASE
20148101542	530176.513	7347982.167			11072014	084306	40241	GRVGPS0112	GRVGPS0112
20148101542	530176.402	7347982.008	-0.122		18072014	125318	40241	GRVGPS0112	20148100100
20148101544	531998.503	7346015.528			11072014	090635	40241	GRVGPS0112	GRVGPS0112
20148101544	531999.007	7346015.755	-0.111		18072014	130134	40241	GRVGPS0112	20148100100
20148101653	588040.452	7328043.149			11072014	163314	40241	GRVGPS0112	20148100102
20148101653	588040.252	7328043.481	0.013		13072014	112050	40241	GRVGPS0112	20148100100
20148101753	505810.284	7382033.842			05072014	173346	40241	GRVGPS0112	20148100100
20148101753	505810.207	7382034.036	0.070		06072014	075524	40241	GRVGPS0112	GRVGPS0112
20148101821	543815.673	7380029.413			12072014	175752	40241	GRVGPS0112	20148100100
20148101821	543815.590	7380029.668	-0.007		14072014	073832	40241	GRVGPS0112	GRVGPS0112
20148101822	544072.372	7381917.291			12072014	180300	40241	GRVGPS0112	20148100100
20148101822	544072.498	7381917.504	0.050		14072014	073456	40241	GRVGPS0112	GRVGPS0112
20148101830	544071.186	7364044.716			13072014	081108	40241	GRVGPS0112	20148100100
20148101830	544071.550	7364044.506	-0.092		14072014	081608	40241	GRVGPS0112	GRVGPS0112
20148101831	545934.306	7363990.529			13072014	081516	40241	GRVGPS0112	20148100100
20148101831	545934.875	7363991.058	-0.190		14072014	081252	40241	GRVGPS0112	GRVGPS0112
20148101841	543954.575	7344082.334			13072014	084916	40241	GRVGPS0112	20148100100
20148101841	543954.994	7344082.869	-0.032		14072014	084654	40241	GRVGPS0112	GRVGPS0112
20148101855	550189.783	7321993.544			13072014	094350	40241	GRVGPS0112	20148100100
20148101855	550189.566	7321993.494	0.102		14072014	093858	40241	GRVGPS0112	20148100102
20148101862	560038.070	7321901.407			13072014	101026	40241	GRVGPS0112	20148100100
20148101862	560037.848	7321901.937	-0.012		14072014	110850	40241	GRVGPS0112	20148100102
20148101878	585999.768	7328172.315			13072014	111650	40241	GRVGPS0112	20148100100
20148101878	586000.321	7328172.421	-0.090		15072014	110731	40241	GRVGPS0112	20148100102
20148101887	588049.171	7335993.246			13072014	115134	40241	GRVGPS0112	20148100100
20148101887	588049.001	7335993.136	-0.090		15072014	112620	40241	GRVGPS0112	20148100102
20148101935	587972.088	7358148.018			13072014	162748	40241	GRVGPS0112	20148100100

STATION	MGA94EAST	MGA94NORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN	GRVBASE	GPSBASE
20148101935	587972.134	7358147.943	-0.083		15072014	122900	40241	GRVGPS0112	20148100102
20148101936	588112.674	7360003.097			13072014	163316	40241	GRVGPS0112	20148100100
20148101936	588112.648	7360003.066	-0.031		15072014	124104	40241	GRVGPS0112	20148100102
20148102214	569912.564	7343893.172			16072014	125600	40241	GRVGPS0112	20148100102
20148102214	569912.771	7343892.755	0.078		17072014	113612	40241	GRVGPS0112	20148100100
20148102215	570111.864	7341857.522			16072014	130018	40241	GRVGPS0112	20148100102
20148102215	570112.032	7341857.255	0.065		17072014	114556	40241	GRVGPS0112	20148100100
20148102216	572191.060	7342011.505			16072014	130418	40241	GRVGPS0112	20148100102
20148102216	572191.385	7342011.007	0.149		17072014	114248	40241	GRVGPS0112	20148100100
20148102217	572012.797	7344107.815			16072014	130832	40241	GRVGPS0112	20148100102
20148102217	572013.599	7344107.890	0.092		17072014	113930	40241	GRVGPS0112	20148100100
20148102297	573900.486	7364001.215			17072014	083510	40241	GRVGPS0112	GRVGPS0112
20148102297	573900.535	7364000.958	0.163		17072014	131806	40241	GRVGPS0112	20148100100
20148102298	571907.982	7363935.022			17072014	083842	40241	GRVGPS0112	GRVGPS0112
20148102298	571908.056	7363935.334	0.026		17072014	143910	40241	GRVGPS0112	20148100100
20148102299	569595.842	7363974.229			17072014	084329	40241	GRVGPS0112	GRVGPS0112
20148102299	569596.103	7363974.889	0.103		17072014	162340	40241	GRVGPS0112	20148100100
20148102300	570154.078	7361989.482			17072014	084638	40241	GRVGPS0112	GRVGPS0112
20148102300	570153.836	7361989.203	0.196		17072014	161902	40241	GRVGPS0112	20148100100
20148102301	572006.753	7362161.353			17072014	085010	40241	GRVGPS0112	GRVGPS0112
20148102301	572006.604	7362160.606	0.179		17072014	144228	40241	GRVGPS0112	20148100100
20148102575	587939.764	7235954.750			23072014	082904	40241	20148100001	20148100001
20148102575	587939.625	7235955.081	0.035		26072014	173416	40241	20148100001	20148100103
20148102579	539973.851	7268170.214			23072014	102410	40241	20148100001	20148100001
20148102579	539974.034	7268170.075	-0.025		05082014	160700	40241	20148100001	20148100105
20148102580	536058.616	7279863.698			23072014	111156	40241	20148100001	20148100001
20148102580	536058.349	7279863.616	0.085		24072014	125406	40241	20148100001	20148100103
20148102580	536058.461	7279863.432	-0.030		24072014	172458	40241	20148100001	20148100103

STATION	MGA94EAST	MGA94NORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN	GRVBASE	GPSBASE
20148102580	536058.281	7279863.082	0.020		28072014	172220	40241	20148100001	20148100103
20148102580	536058.590	7279863.061	-0.126		05082014	165422	40241	20148100001	20148100105
20148102581	536032.049	7216057.628			23072014	123802	40241	20148100001	20148100001
20148102581	536031.871	7216057.735	-0.032		30072014	081456	40241	20148100001	20148100105
20148102581	536032.044	7216057.902	-0.018		31072014	075658	40382	20148100001	20148100105
20148102581	536031.972	7216057.619	-0.002		01082014	080440	40241	20148100001	20148100105
20148102581	536031.510	7216057.689	-0.093		06082014	075300	40241	20148100001	20148100001
20148102581	536031.772	7216058.477	-0.017		06082014	155354	40241	20148100001	20148100105
20148102581	536031.951	7216057.715	0.088		08082014	075812	40241	20148100001	20148100108
20148102587	516039.275	7282020.936			24072014	131416	40241	20148100001	20148100103
20148102587	516039.433	7282020.927	-0.156		25072014	073956	40241	20148100001	20148100001
20148102848	572064.983	7252075.210			26072014	104404	40241	20148100001	20148100001
20148102848	572064.670	7252075.281	0.121		26072014	112228	40241	20148100001	20148100001
20148102848	572064.426	7252075.351	-0.140		26072014	172120	40241	20148100001	20148100103
20148103219	555846.586	7244044.550			28072014	142808	40241	20148100001	20148100105
20148103219	555846.551	7244044.412	-0.024		10082014	162104	40241	20148100001	20148100001
20148103322	515912.879	7219993.883			30072014	083516	40241	20148100001	20148100105
20148103322	515913.128	7219993.639	-0.039		30072014	134738	40241	20148100001	20148100105
20148103322	515912.847	7219993.633	0.039		31072014	081758	40382	20148100001	20148100105
20148103322	515913.190	7219993.818	-0.016		01082014	083416	40241	20148100001	20148100105
20148103322	515912.451	7219994.085	0.000		05082014	080452	40241	20148100001	20148100001
20148103496	560013.505	7215998.162			30072014	174700	40241	20148100001	20148100105
20148103496	560013.773	7215998.418	-0.087		01082014	074812	40241	20148100001	20148100105
20148103496	560012.999	7215998.283	-0.029		01082014	175330	40241	20148100001	20148100105
20148103496	560013.158	7215998.025	0.027		04082014	175604	40241	20148100001	20148100105
20148103496	560013.611	7215998.128	-0.036		06082014	073934	40241	20148100001	20148100001
20148103496	560013.384	7215998.370	0.009		08082014	180840	40241	20148100001	20148100108
20148103497	571968.955	7216013.312			30072014	175506	40241	20148100001	20148100105
20148103497	571968.842	7216013.970	-0.075		01082014	074004	40241	20148100001	20148100001
20148103497	571969.074	7216013.241	0.093		01082014	180006	40241	20148100001	20148100105
20148103497	571969.167	7216012.839	0.008		04082014	180428	40241	20148100001	20148100105
20148103497	571968.706	7216013.138	0.006		06082014	073310	40241	20148100001	20148100001
20148103497	571968.978	7216013.480	0.061		08082014	181654	40241	20148100001	20148100108

STATION	MGA94EAST	MGA94NORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN	GRVBASE	GPSBASE
20148103498	587841.311	7219940.951			30072014	180414	40241	20148100001	20148100001
20148103498	587841.310	7219941.437	-0.012		01082014	072934	40241	20148100001	20148100001
20148103498	587841.261	7219940.348	-0.024		01082014	180946	40241	20148100001	20148100001
20148103498	587841.318	7219940.853	-0.029		03082014	182908	40241	20148100001	20148100001
20148103498	587841.177	7219941.188	0.037		04082014	181326	40241	20148100001	20148100001
20148103498	587842.143	7219940.394	0.055		06082014	072510	40241	20148100001	20148100001
20148103498	587841.842	7219940.751	-0.075		08082014	182848	40241	20148100001	20148100108
20148104000	528051.413	7345932.433			05072014	122742	40382	GRVGPS0112	GRVGPS0112
20148104000	528051.053	7345932.603	0.020		11072014	085200	40241	GRVGPS0112	GRVGPS0112
20148104000	528051.383	7345932.814	0.034		17072014	105014	40382	GRVGPS0112	GRVGPS0112
20148104000	528051.786	7345932.614	-0.013		18072014	130824	40241	GRVGPS0112	20148100100
20148104092	669931.382	7337932.948			06072014	125616	40382	GRVGPS0112	20148100102
20148104092	669931.382	7337933.037	0.017		08072014	122056	40241	GRVGPS0112	GRVGPS0112
20148104093	670031.047	7340000.582			06072014	125956	40382	GRVGPS0112	20148100102
20148104093	670031.059	7340000.469	0.041		08072014	121714	40241	GRVGPS0112	GRVGPS0112
20148104157	641955.775	7346019.335			07072014	094620	40382	GRVGPS0112	20148100102
20148104157	641955.300	7346019.317	0.058		16072014	103554	40382	GRVGPS0112	GRVGPS0112
20148104163	667929.239	7351965.265			07072014	103934	40382	GRVGPS0112	20148100102
20148104163	667929.003	7351964.851	0.046		08072014	114026	40241	GRVGPS0112	GRVGPS0112
20148104164	668013.817	7354166.602			07072014	104400	40382	GRVGPS0112	20148100102
20148104164	668013.837	7354166.827	0.045		08072014	113412	40241	GRVGPS0112	GRVGPS0112
20148104191	664030.800	7380011.479			07072014	123954	40382	GRVGPS0112	20148100102
20148104191	664030.541	7380011.300	0.010		09072014	083750	40382	GRVGPS0112	GRVGPS0112
20148104192	661822.282	7379967.264			07072014	124440	40382	GRVGPS0112	20148100102
20148104192	661822.071	7379967.291	-0.204		09072014	082812	40382	GRVGPS0112	GRVGPS0112
20148104329	662172.813	7341978.135			08072014	134732	40241	GRVGPS0112	GRVGPS0112
20148104329	662172.831	7341978.227	-0.157		09072014	103534	40382	GRVGPS0112	20148100102
20148104330	661975.563	7344067.634			08072014	135151	40241	GRVGPS0112	GRVGPS0112
20148104330	661975.015	7344067.908	-0.185		09072014	103128	40382	GRVGPS0112	20148100102
20148104342	662005.285	7353994.277			08072014	144156	40241	GRVGPS0112	GRVGPS0112

STATION	MGA94EAST	MGA94NORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s^2	DATE_DDMMYY	TIME_HHMMSS	METERSN	GRVBASE	GPSBASE
20148104342	662005.010	7353994.286	0.034		09072014	095836	40382	GRVGPS0112	20148100102
20148104343	662013.500	7356150.182			08072014	144714	40241	GRVGPS0112	GRVGPS0112
20148104343	662013.552	7356149.660	0.083		09072014	095258	40382	GRVGPS0112	20148100102
20148104356	661956.132	7370111.802			08072014	154338	40241	GRVGPS0112	GRVGPS0112
20148104356	661955.622	7370111.674	-0.196		09072014	090456	40382	GRVGPS0112	20148100102
20148104357	661938.579	7371988.041			08072014	154640	40241	GRVGPS0112	GRVGPS0112
20148104357	661938.160	7371987.984	-0.164		09072014	085930	40382	GRVGPS0112	20148100102
20148104438	602154.890	7312021.547			09072014	152006	40382	GRVGPS0112	20148100102
20148104438	602155.036	7312021.545	-0.064	-0.89	26072014	113006	40382	20148100001	20148100104
20148104439	603906.513	7311933.122			09072014	152314	40382	GRVGPS0112	20148100102
20148104439	603906.500	7311932.834	-0.074	-0.08	26072014	112640	40382	20148100001	20148100104
20148104446	618156.634	7312036.434			09072014	154338	40382	GRVGPS0112	20148100102
20148104446	618156.424	7312036.560	-0.078	-0.06	26072014	105116	40382	20148100001	20148100104
20148104447	620091.452	7311935.177			09072014	154654	40382	GRVGPS0112	20148100102
20148104447	620091.196	7311935.290	-0.118	-0.25	26072014	104750	40382	20148100001	20148100104
20148104677	654053.111	7312064.711			11072014	102706	40382	GRVGPS0112	20148100102
20148104677	654049.129	7312060.866	-0.153	-0.18	23072014	104452	40382	20148100001	20148100104
20148104678	652020.418	7311918.787			11072014	103152	40382	GRVGPS0112	20148100102
20148104678	652014.549	7311918.989	-0.027	0.07	23072014	104844	40382	20148100001	20148100104
20148104785	648077.410	7366039.813			12072014	080850	40382	GRVGPS0112	20148100102
20148104785	648077.268	7366039.803	0.153		16072014	085648	40382	GRVGPS0112	GRVGPS0112
20148104786	648008.527	7363915.018			12072014	081420	40382	GRVGPS0112	20148100102
20148104786	648008.679	7363915.159	-0.070		16072014	090312	40382	GRVGPS0112	GRVGPS0112
20148104790	647985.778	7360057.868			12072014	082942	40382	GRVGPS0112	20148100102
20148104790	647985.488	7360057.884	0.046		14072014	174220	40382	GRVGPS0112	20148100102
20148104790	647985.689	7360057.837	-0.052		16072014	091222	40382	GRVGPS0112	GRVGPS0112
20148104791	648144.887	7357980.454			12072014	083430	40382	GRVGPS0112	20148100102
20148104791	648145.005	7357980.370	0.014		14072014	173546	40382	GRVGPS0112	20148100102

STATION	MGA94EAST	MGA94NORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_µm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN	GRVBASE	GPSBASE
20148104791	648145.008	7357980.865	-0.038		16072014	091604	40382	GRVGPS0112	GRVGPS0112
20148104979	624123.503	7324006.370			14072014	101258	40382	GRVGPS0112	20148100102
20148104979	624123.202	7324006.380	0.017		14072014	142820	40382	GRVGPS0112	20148100102
20148104979	624123.310	7324006.387	0.099		15072014	084730	40382	GRVGPS0112	GRVGPS0112
20148104980	623960.136	7326033.602			14072014	101804	40382	GRVGPS0112	20148100102
20148104980	623960.217	7326034.028	-0.107		14072014	142352	40382	GRVGPS0112	20148100102
20148104980	623971.223	7326033.929	0.193		15072014	084412	40382	GRVGPS0112	GRVGPS0112
20148105364	551985.688	7375988.825			17072014	081954	40382	GRVGPS0112	GRVGPS0112
20148105364	551986.046	7375988.849	0.028		17072014	124428	40382	GRVGPS0112	20148100100
20148105365	554071.872	7375981.935			17072014	082438	40382	GRVGPS0112	GRVGPS0112
20148105365	554071.763	7375981.724	0.036		17072014	140022	40382	GRVGPS0112	20148100100
20148105366	553851.542	7373956.928			17072014	082836	40382	GRVGPS0112	GRVGPS0112
20148105366	553851.532	7373956.771	-0.018		17072014	140440	40382	GRVGPS0112	20148100100
20148105367	551917.020	7374076.899			17072014	083302	40382	GRVGPS0112	GRVGPS0112
20148105367	551917.051	7374076.787	-0.059		17072014	124108	40382	GRVGPS0112	20148100100
20148105377	551998.636	7355923.330			17072014	090630	40382	GRVGPS0112	GRVGPS0112
20148105377	551998.731	7355923.531	-0.034		17072014	121250	40382	GRVGPS0112	20148100100
20148105378	552057.794	7354009.959			17072014	091548	40382	GRVGPS0112	GRVGPS0112
20148105378	552057.971	7354010.001	-0.019		17072014	120156	40382	GRVGPS0112	20148100100
20148105506	611999.134	7252002.816			23072014	081204	40382	20148100001	20148100001
20148105506	611995.322	7252006.855	0.104		26072014	075026	40382	20148100001	20148100104
20148105507	612008.916	7256125.219			23072014	081714	40382	20148100001	20148100001
20148105507	612004.553	7256129.179	0.061		26072014	075442	40382	20148100001	20148100104
20148106370	589993.950	7256028.153			31072014	152434	40241	20148100001	20148100104
20148106370	589993.876	7256028.034	0.072		31072014	173816	40241	20148100001	20148100104
20148106370	589996.491	7256029.993	-0.051		01082014	074150	40382	20148100001	20148100001
20148106946	639910.073	7159965.855			04082014	173100	40382	20148100001	20148100109
20148106946	639909.935	7159965.476	0.014		05082014	085008	40382	20148100001	20148100110
20148106946	639910.194	7159965.453	-0.003		07082014	101652	40382	20148100001	20148100110

STATION	MGA94EAST	MGA94NORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_μm/s²	DATE_DDMMYY	TIME_HHMMSS	METERSN	GRVBASE	GPSBASE
20148106946	639910.344	7159965.459	0.034		08082014	175828	40382	20148100001	20148100001
20148107031	592158.836	7172011.685			05082014	144034	40382	20148100001	20148100109
20148107031	592159.275	7172011.280	0.040		09082014	085010	40382	20148100001	20148100109
20148107031	592159.195	7172010.934	-0.006		11082014	105720	40382	20148100001	20148100001
20148107076	612127.748	7191907.220			06082014	074818	40382	20148100001	20148100109
20148107076	612127.852	7191907.074	-0.015		06082014	131700	40382	20148100001	20148100109
20148107076	612127.655	7191906.915	0.024		07082014	125840	40382	20148100001	20148100001
20148107083	636161.329	7196032.244			06082014	081722	40382	20148100001	20148100110
20148107083	636161.646	7196032.319	-0.052		06082014	124102	40382	20148100001	20148100110
20148107083	636161.343	7196032.286	0.017		11082014	121006	40382	20148100001	20148100001
20148107153	607891.279	7192091.774			06082014	132206	40382	20148100001	20148100109
20148107153	607891.552	7192091.087	0.030		07082014	080022	40382	20148100001	20148100109
20148107153	607891.192	7192090.946	-0.021		07082014	143644	40382	20148100001	20148100001
20148107269	612210.068	7187938.952			07082014	125400	40382	20148100001	20148100109
20148107269	612210.025	7187939.065	0.046		11082014	115756	40382	20148100001	20148100001
20148107285	616129.359	7163962.340			07082014	150428	40382	20148100001	20148100109
20148107285	616129.464	7163961.676	0.023		08082014	173952	40382	20148100001	20148100108
20148107533	647951.565	7228018.684			09082014	134312	40382	20148100001	20148100001
20148107533	647951.471	7228018.673	-0.040		09082014	174326	40382	20148100001	20148100001
20148107533	647951.113	7228018.513	-0.012		10082014	172116	40382	20148100001	20148100107
20148108238	551761.034	7207930.425			03082014	180742	40241	20148100001	20148100105
20148108238	551761.215	7207930.792	-0.084		04082014	074358	40241	20148100001	20148100001
20148108239	571787.614	7211962.652			03082014	182026	40241	20148100001	20148100105
20148108239	571788.125	7211962.918	-0.084		04082014	073424	40241	20148100001	20148100001
20148108881	543906.232	7184033.790			06082014	175702	40241	20148100001	20148100105
20148108881	543906.094	7184033.941	-0.068		07082014	165846	40241	20148100001	20148100108
20148108885	539978.002	7163869.234			07082014	083646	40241	20148100001	20148100105
20148108885	539978.034	7163869.331	0.129		07082014	135938	40241	20148100001	20148100108
20148108885	539978.168	7163869.198	-0.032		08082014	174242	40241	20148100001	20148100108
20148108885	539977.683	7163868.760	-0.031		09082014	091302	40241	20148100001	20148100108

STATION	MGA94EAST	MGA94NORTH	REPEAT_ERROR ELEVATION_M	REPEAT_ERROR GRAVITY_$\mu m/s^2$	DATE_DDMMYY	TIME_HHMMSS	METERSN	GRVBASE	GPSBASE
20148108885	539978.215	7163869.289	-0.059		11082014	112934	40241	20148100001	20148100001
20148109180	551958.067	7164023.487			09082014	102658	40241	20148100001	20148100108
20148109180	551957.746	7164023.459	0.045		11082014	111650	40241	20148100001	20148100001
20148181494	532016.131	7369937.110			10072014	153342	40241	GRVGPS0112	20148100100
20148181494	532016.627	7369936.731	-0.022		11072014	074102	40241	GRVGPS0112	GRVGPS0112
20148181495	532087.946	7361956.454			10072014	154028	40241	GRVGPS0112	20148100100
20148181495	532087.946	7361956.745	-0.137		11072014	080324	40241	GRVGPS0112	GRVGPS0112
20148181496	532016.039	7354077.513			10072014	154650	40241	GRVGPS0112	20148100100
20148181496	532016.134	7354076.888	0.069		11072014	082826	40241	GRVGPS0112	GRVGPS0112
20148182232	510019.585	7311991.604			06072014	104408	40241	GRVGPS0112	20148100100
20148182232	510015.543	7311990.725	0.111	-0.32	24072014	143626	40241	20148100001	20148100103

APPENDIX H
Longman's Earth Tide Correction Formula

```
input dLat (latitude)
input dLon (longitude)
input dDate (date)
*Date broken down into year, month and date
input dTime (time)

array pClndr[12]={0,31,59,90,120,151,181,212,243,273,304,334}
lYr=year
lMo=month
lDa=day

ny=(lYr-1900)
days=(dTime/24.0+lDa-1+pClndr[lMo-1])
lLeap=(ny/4)
if(lLeap/2=ny and lMo<3)then lLeap=lLeap-1
lDay=(ny*365+lLeap+lDa+pClndr[lMo-1])
dcent = (ny*365.0+lLeap+days+0.5)/36525)
dhrs = (ny*365.0+lLeap+days+0.5)*24.0)
ds = (dcent*8399.709299+4.720023434+(dcent*dcent)*4.40696e-5)
dp=(dcent*71.01800936+5.835124713-(dcent*dcent)*1.80545e-4-dcent*2.1817e-
7*(dcent*dcent)
dh=(dcent*628.3319509+4.88162792+(dcent*dcent)*5.27962e-6)
doln=(4.523588564-dcent*33.757153303+(dcent*dcent)*3.6749e-5)
dps=(dcent*0.030005264l6+4.908229461+(dcent*dcent)*7.902463e-6)
des=(0.01675104-dcent*4.18e-5-(dcent*dcent)*1.26e-7)
dsoln=(sin(doln))
dci=(0.91369-cos(doln)*0.03569)
dsi=(sqrt(1.0-(dci*dci))
dsn=(dsoln*0.08968/dsi)
dcn=(sqrt(1.0-(dsn*dsn))
dtit=(dsoln*0.39798/(dsi*cos(doln)*dcn+1.0dsoln*0.91739*dsn))
det=(atan(dtit)*2.0)
if (det<0.0)then det=det+6.2831852)

dolm1=(ds-doln+det+sin(ds-dp)*0.10979944)
dolm=(dolm1+sin((ds-dp)*2.0)*0.003767474+sin(ds-
dh*2.0+dp)*0.0154002+sin((ds-dh)*2.0)*0.00769395)
dha=((dTime*15.0-180)*0.017453292519 9+dLon/57.295779513)
dchi=(dha+dh-atan(dsn/dcn))
dal=(dLat/57.295779513)
dct=(sin(dal)*dsi*sin(dolm)+cos(dal)*((dci+1.0)*cos(dolm-dchi)+(1.0-
dci)*cos(dolm+dchi))/2.0)
dda=(cos(ds-dp)*0.14325+2.60144+cos((ds-dp)*2.0)*0.0078644+cos(ds-
dh*2.0+dp)*0.0200918+cos((ds-dh)*2.0)*0.0146006)
dr=(6.378388/sqrt((1.0-((cos(dal)*cos(dal))*0.00676902+1.0)
r_1=(dda)
r_2=(dct)
r_3=(dr)
r_4=(dda)
r_5=(dda*dda)
r_6=(dct)
dgm=(dr80.49049*dda*(r_1*r_1)*((r_2*r_2)*3.0-1.0)+(r_3*r_3)*7.4e-
4*(r_5*r_5)*dct*((r_6*r_6)*5.0-3.0))
dols=(dh+des*2.0*sin(dh-dps))
dchis=(dha+dh)
dds=((des*cos(dh-dps)+1.0)*0.668881/(1.0-(des*des)))
dcf=(sin(dal)*0.39798*sin(dols)+cos(dal)*(cos(dols-
```

APPENDIX I
Data Formats and Metadata

```
DEFN   ST=RECD,RT=COMM;RT:A4;COMMENTS:A76
DEFN 1 ST=RECD,RT=;PROJECT:F7.0:NULL=-9999.,UNIT=None,NAME=PROJECT
DEFN 2 ST=RECD,RT=;STATION:F12.0:NULL=-999999999.,UNIT=None,NAME=STATION
DEFN 3 ST=RECD,RT=;LATITUDE:F11.6:NULL=-99.999999,UNIT=Decimal Degrees,NAME=LATITUDE
DEFN 4 ST=RECD,RT=;LONGITUDE:F12.6:NULL=-999.999999,UNIT=Decimal Degrees,NAME=LONGITUDE
DEFN 5 ST=RECD,RT=;EASTING:F9.1:NULL=-99999.9,UNIT=metres,NAME=EASTING
DEFN 6 ST=RECD,RT=;NORTHING:F10.1:NULL=-999999.9,UNIT=metres,NAME=NORTHING
DEFN 7 ST=RECD,RT=;ELLIPSHTGRS80:F9.3:NULL=-999.999,UNIT=metres,NAME=ELLIPSHTGRS80
DEFN 8 ST=RECD,RT=;NAG09:F9.3:NULL=-999.999,UNIT=metres,NAME=NAG09
DEFN 9 ST=RECD,RT=;GRNDELEVATION:F9.3:NULL=-999.999,UNIT=metres,NAME=GRNDELEVATION
DEFN 10 ST=RECD,RT=;OBSGAAGD07:F12.2:NULL=-9999999.99,UNIT=µm/s^2,NAME=OBSGAAGD07
DEFN 11 ST=RECD,RT=;HTGM:F9.3:NULL=-999.999,UNIT=metres,NAME=HTGM
DEFN 12 ST=RECD,RT=;TCINNER:F7.2:NULL=-99.99,UNIT=µm/s^2,NAME=TCINNER
DEFN 13 ST=RECD,RT=;TCQFINNER:I4:NULL=-99,UNIT=None,NAME=TCQFINNER
DEFN 14 ST=RECD,RT=;TCOUTER:F7.2:NULL=-99.99,UNIT=µm/s^2,NAME=TCOUTER
DEFN 15 ST=RECD,RT=;TCQFOUTER:I4:NULL=-99,UNIT=None,NAME=TCQFOUTER
DEFN 16 ST=RECD,RT=;TCTOTAL:F7.2:NULL=-99.99,UNIT=µm/s^2,NAME=TCTOTAL
DEFN 17 ST=RECD,RT=;EFAA:F10.2:NULL=-99999.99,UNIT=µm/s^2,NAME=EFAA
DEFN 18 ST=RECD,RT=;SCBA267:F10.2:NULL=-99999.99,UNIT=µm/s^2,NAME=SCBA267
DEFN 29 ST=RECD,RT=;CSCBA267:F10.2:NULL=-99999.99,UNIT=µm/s^2,NAME=CSCBA267
DEFN 20 ST=RECD,RT=;HORIZDIST:F9.2:NULL=-9999.99,UNIT=metres,NAME=HORIZDIST
DEFN 21 ST=RECD,RT=;GRVBASE:F13.0:NULL=-9999999999.,UNIT=None,NAME=GRVBASE
DEFN 22 ST=RECD,RT=;GPSBASE:F13.0:NULL=-9999999999.,UNIT=None,NAME=GPSBASE
DEFN 23 ST=RECD,RT=;TIME:A9:,UNIT=None,NAME=TIME
DEFN 24 ST=RECD,RT=;DATE:A9:,UNIT=None,NAME=DATE
DEFN 25 ST=RECD,RT=;MGAZONE:F4.0:NULL=-9.,UNIT=None,NAME=MGAZONE
DEFN 26 ST=RECD,RT=;GMTYPESN:A30:,UNIT=None,NAME=GMTYPESN
DEFN 27 ST=RECD,RT=;STATIONDESC:F20.0:NULL=-99.,UNIT=None,NAME=STATIONDESC;END DEFN
DEFN 29 ST=RECD,RT=;COMMENTS:F20.0:NULL=-99.,NAME=COMMENTS;END DEFN
DEFN 1 ST=RECD,RT=PROJ; RT:A4
DEFN 2 ST=RECD,RT=PROJ; PROJNAME:A30: COMMENT=GDA94 / MGA zone 52
DEFN 3 ST=RECD,RT=PROJ; ELLPSNAM:A30: COMMENT=GRS 1980
DEFN 4 ST=RECD,RT=PROJ; MAJ_AXIS: D12.1: UNIT=m, COMMENT=6378137.000000
DEFN 5 ST=RECD,RT=PROJ; ECCENT: D12.9: COMMENT=298.257222
DEFN 6 ST=RECD,RT=PROJ; PRIMEMER: F10.1: UNIT=deg, COMMENT=0.000000
DEFN 7 ST=RECD,RT=PROJ; PROJMETH: A30: COMMENT=Transverse Mercator
DEFN 8 ST=RECD,RT=PROJ; PARAM1: D14.0: COMMENT=      0.000000
DEFN 9 ST=RECD,RT=PROJ; PARAM2: D14.0: COMMENT=    129.000000
DEFN 10 ST=RECD,RT=PROJ; PARAM3: D14.0: COMMENT=      0.999600
DEFN 11 ST=RECD,RT=PROJ; PARAM4: D14.0: COMMENT= 500000.000000
DEFN 12 ST=RECD,RT=PROJ; PARAM5: D14.0: COMMENT=10000000.00000
DEFN 13 ST=RECD,RT=PROJ; PARAM6: D14.0:
DEFN 14 ST=RECD,RT=PROJ; PARAM7: D14.0:
DEFN 15 ST=RECD,RT=PROJ; END DEFN
```

COMM ATLAS GEOPHYSICS PTY LTD ASEG-GDF2 FORMAT FILE
COMM WWW.ATLASGEO.COM.AU
COMM INFO@ATLASGEO.COM.AU
COMM
COMM ATLAS PROJECT NUMBER P2014061
COMM GA PROJECT NUMBER 201481
COMM CLIENT GA
COMM PROJECT AREA WEST AMADEUS BASIN GRAVITY SURVEY
COMM START DATE 05072014
COMM END DATE 28072014
COMM PROCESSED BY LR MATHEWS
COMM
COMM VESSEL HELICOPTER ROBINSON R44
COMM OPERATORS GEOSCIENCE AUSTRALIA / GA
COMM OBSERVERS DH,JF,BM,MC
COMM
COMM MIN SPACING 500m
COMM MAX SPACING 4000m
COMM LAYOUT CELL CENTRE
COMM
COMM GRAVITY STATIONS 8107
COMM
COMM GEODETIC DATUM GDA94
COMM PROJECTION MGA52
COMM HORIZ ACCURACY 0.05 m
COMM
COMM VERTICAL DATUM GRS80
COMM VERTICAL ACCURACY 0.09 m
COMM
COMM GRAVITY DATUM AAGD07
COMM GRAVITY ACCURACY 0.40 µm/s^2
COMM
COMM GRAVITY INSTRUMENT SCINTREX CG5
COMM GRAVITY SN 40241,40382
COMM GPS INSTRUMENT LEICA GPS1200
COMM GPS METHOD PPK
COMM
COMM GPS BASE 20148100001, 20148100100-20148100112
COMM GRV BASE 20148100001, 20148100112
COMM CTRL TIE STATION 1991911213
COMM
COMM PROCESSING
COMM DRIFT CORRECTION
COMM ETC CORRECTION LONGMAN
COMM NORMAL GRAVITY 9780326.7715*((1+0.001931851353*(SIN(B3*(PI()/180)))^2)/(SQRT(1-0.0066943800229*(SIN(B3*(PI()/180)))^2)))
COMM ATMOSPHERIC CORRECTION 8.74-0.00099*F3+0.0000000356*F3^2
COMM FREE AIR CORRECTION -(3.087691-0.004398*SIN(LAT)^2)*ELLIPSHT+0.00000072125*ELLIPSHT^2
COMM SCAP BOUGUER CORRECTION 2*PI*Gp((1+µ)*ELLIPSHT-LAMBDA*R) for p=2.67 t/m^3
COMM TERRAIN CORRECTION METHOD RASTERTC
COMM
COMM SOFTWARE AGRIS(IN HOUSE), WAYPOINT850, CHRISDBF, ERMAPPER, RASTERTC
COMM
COMM
COMM DETAILED COLUMN DESCRIPTIONS

COMM COLUMN NAME	COLUMN DESCRIPTION	UNITS
COMM		
COMM PROJECT	GA PROJECT NUMBER	NONE
COMM STATION	GA STATION NUMBER	NONE
COMM LATITUDE	COORDINATE LATITUDE GDA94	DECIMAL DEGREES
COMM LONGITUDE	COORDINATE LONGITUDE GDA94	DECIMAL DEGREES
COMM EASTING	COORDINATE EASTING MGA/GDA94	M
COMM NORTHING	COORDINATE NORTHING MGA/GDA94	M
COMM ELLIPSHTGRS80	COORDINATE ELEVATION ELLIPSOIDAL GRS80	M
COMM NAG09	GEOID ELLIPSOID SEPARATION AUSGEOID09	M
COMM GRNDELEVATION	GROUND LEVEL ELEVATION	M
COMM OBSGAAGD07GU	OBSERVED GRAVITY AAGD07	µm/s^2
COMM HTGM	STATION HEIGHT OF GRAVITY METER	M
COMM TCINNER267	INNER ZONE TERRAIN CORRECTION 2.67 t/m^3	µm/s^2
COMM TCQFINNER	QUALITY FACTOR OF INNER ZONE TERRAIN CORRECTION	NONE
COMM TCOUTER267	OUTER ZONE TERRAIN CORRECTION 2.67 t/m^3	µm/s^2
COMM TCQFOUTER	QUALITY FACTOR OF OUTER ZONE TERRAIN CORRECTION	NONE
COMM TCTOTAL267	TOTAL TERRAIN CORRECTION 2.67 t/m^3	µm/s^2
COMM EFAA	ELLIPSOIDAL FREE AIR ANOMALY	µm/s^2
COMM SCBA267	SPHERICAL CAP BOUGUER ANOMALY 2.67 t/m^3	µm/s^2
COMM CSCBA267	COMPLETE SPHERICAL CAP BOUGUER ANOMALY 2.67 t/m^3	µm/s^2
COMM HORIZDIST	HORIZONTAL DISTANCE FROM PROGRAMMED STATION	M
COMM GRVBASE	GRAVITY BASE STATION REFERENCED TO	NONE
COMM GPSBASE	GPS BASE STATION REFERENCED TO	NONE
COMM TIME	TIME OF GRAVITY OBSERVATION	NONE
COMM DATE	DATE OF GRAVITY OBSERVATION	NONE
COMM MGAZONE	MGA ZONE NUMBER	NONE
COMM GMTYPESN	GRAVITY METER TYPE SERIAL	NONE
COMM STATIONDESC	STATION DESC	NONE
COMM COMMENTS	COMMENTS	NONE