



WINNIE GRAVITY SURVEY
ATP Eromanga Basin, QLD – Australia
ATP940

Operational Report

Volume 1 of 1

Prepared for

DRILLSEARCH ENERGY LIMITED

By

WesternGeco
Integrated EM Center of Excellence
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1 INTRODUCTION

Under contract from DRILLSEARCH ENERGY LTD and SCHLUMBERGER AUSTRALIA PTY LTD, WesternGeco’s Integrated EM Center of Excellence carried out a gravity survey in the ATP940 permit area, on a 3D seismic survey area of about 1000 km² (Fig.1).

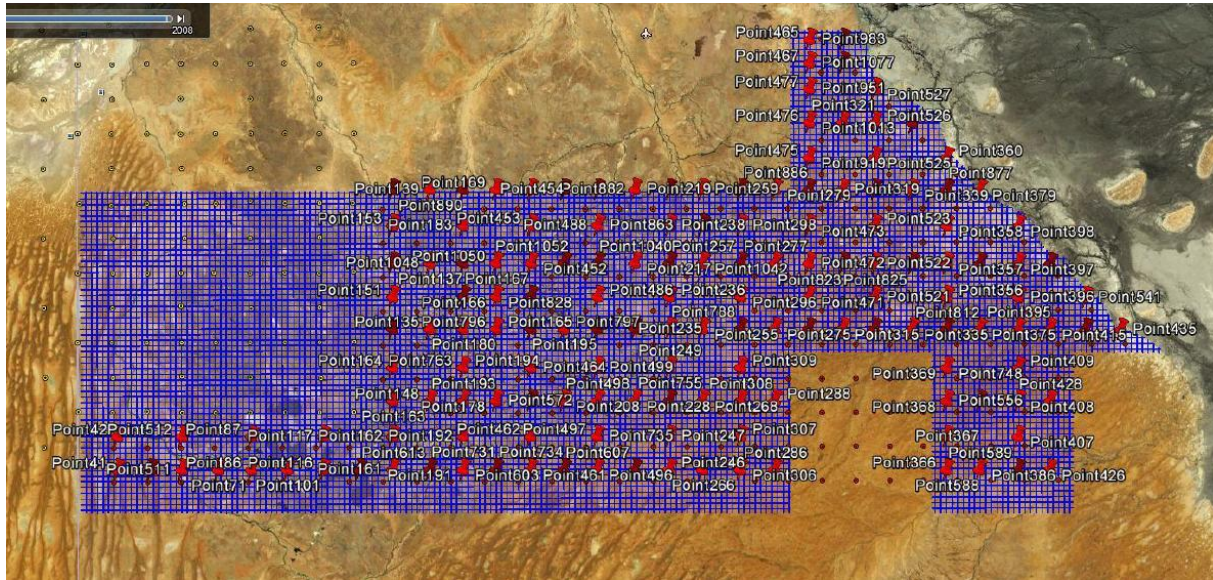


Figure 1: Gravity station preplot on the 3D seismic grid

Gravity and dGPS surveying data were acquired by #2 crews based at the seismic crew (WesternGeco Crew 1160) camp.

All data processing QC was performed on site, at the office base camp.

| | |
|-----------------------|--|
| Project name: | 27101_Drillsearch Energy Ltd Gravity survey |
| Survey areas: | Eromanga Basin, QLD – Australia |
| Survey Period: | November 26 th to December 4 th , 2012 |
| Survey Type: | Gravity |
| Client: | Drillsearch Energy Limited |
| Report Type: | Survey logistics, methodology description, survey parameters, data QC and processing of NON-seismic method |

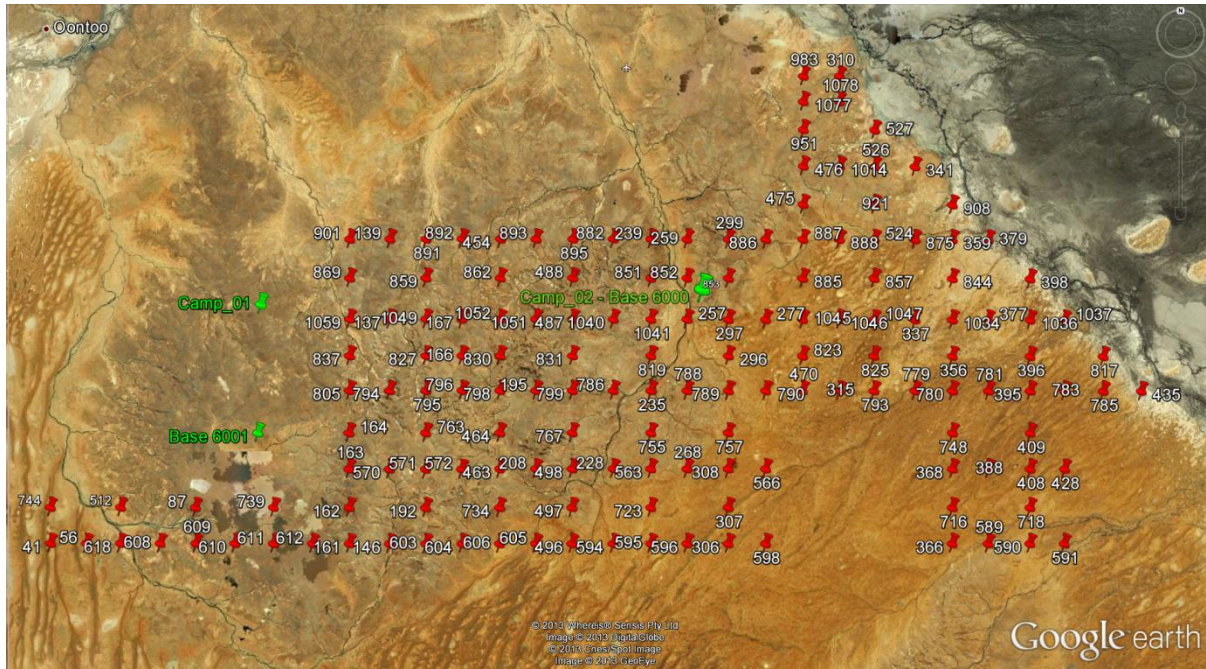


Figure 2: Gravity stations grid and local gravity and surveying base locations

2 GENERAL SURVEY DETAILS

2.1 LOCATION

| | |
|--|---------------------------------|
| General Location: | Eromanga basin – QLD, Australia |
| Base camp (for personnel accommodation, project management, data processing, instrument maintenance, and battery charging): | Base camp 2 – Ballera (Fig.2) |

2.2 COORDINATES SYSTEM

| | | |
|----------------------------|---------------------|--|
| Coordinates system: | Group Key: | Australian MGA Coordinate System |
| | Coordinates Sys Key | MGA Zone 54 |
| | Unit Key: | Meters |
| | Unit Factor: | 1 |
| | Projection: | Transverse Mercator |
| | False Easting: | 500 000 |
| | False Northing: | 1 000 000 |
| | Latitude Origin: | 00°00'00.000m N |
| | Central meridian: | 141°00'00.000m N |
| | Scale factor | 0.9996 |
| | Datum: | GDA94 – Australia |
| | Ellipsoid: | GRS 1980 |
| | Datum: | WGS84 |
| | Spheroid: | WGS84 |
| Elevation | Orthometric: | dGPS survey DEM, in meters relative to mean sea level |
| | Geoid Model: | AUSGE0ID09_QLD-S_5716905_01 |

2.3 SURVEY GRID

| | |
|---------------------------------|---------------------------------|
| Gravity station spacing: | 156 stations on 3D seismic grid |
|---------------------------------|---------------------------------|

3 HSE SUMMARY

3.1 SAFETY INDUCTION

| | |
|---|---|
| Schlumberger- WesternGeco QHSE System | |
| | As requested by the Schlumberger QHSE System, all personnel were subject to: <ul style="list-style-type: none"> - Specific health screening to certify their "Fitness to Work" - specific trainings, which included First Aid, Vehicle passenger, Electrical Safety, Fire Prevention and Combat, Food Handling, Hazardous Substances Handling, Use of Personal Protective Equipment, Ergonomics and Load Handling, Schlumberger Injury Prevention Training. |
| | All drivers were SLB approved, after carrying out the approved defensive driving training (SMARRRT Drive Certificate+ Commentary Driving, which has been done at the location to emphasize on specific project terrain) |

3.2 SAFETY STATISTICS

| Industry Recognized (SLB) -- Occupational Injuries & Illnesses | Number |
|--|--------|
| Fatalities (fatalities in fatal incidents) | 0 |
| LWDC - Lost Work Days Cases | 0 |
| LD - Lost Days | 0 |
| RWDC - Restricted Work Day Cases | 0 |
| RD - Restricted Days | 0 |
| TDL - Total Days Lost (LD + RD) | 0 |
| MC - Medical Treatment Cases | 0 |
| FAC - First Aid Cases | 0 |
| Life Loss | |
| Life Loss - Total | 0 |
| General HSE Events | |
| Catastrophic | 0 |
| Major | 0 |
| Serious | 0 |
| Light | 0 |
| Near Accidents | 0 |
| Hazardous Situations | 0 |
| Regulatory Recordable Incidents | 0 |
| Automotive | |

| | |
|---|-----|
| Total AA's - Automotive Accidents (CMS) | 0 |
| Supporting Data | |
| Vehicles (Light and Heavy Vehicles) | 2 |
| Vehicles with Working Monitors | 2 |
| Headcount - Total (Employees + Contractors) | 4 |
| Man Hours - Total | 500 |

All the access and survey trips were carried out in accordance with the Project Journey Management Plan, addressing location specific risks; the field crews had daily pre-determined journey plans.

The seismic crew Journey Manager was in charge of ensuring that established practices were followed, and the crew location monitored continuously. Daily plans and access routes were discussed each morning at the toolbox meetings.

During the project, working schedule was 7/7 , 5 weeks on and 2 weeks off rotation.

During the whole survey no relevant HSE incident have been reported. The main incidents (light) were related to vehicles driving (flat tires) related to bad driving conditions.

4 SURVEY SPECIFICATIONS

4.1 OPERATIONS

| | |
|--|---|
| Survey Dates | November 26 th to December 4 th , 2012 |
| Survey Production Days | 9 |
| Mobilization/Demobilization Days | November 22 nd , 2012 December 5 th , 2012 |
| Surveyed stations: (coordinates list in Appendix A) | 156 Gravity |
| Gravity stations per day: | From 4 to 36 (average 19) |
| Number of crews for AMT/MT production: | 2 crews. |
| Mode of access to sites: | 4WD on gravel roads and seismic line tracks |
| Stations Surveying: | Trimble dGPS base and rover units |
| Contact between crews and base: | VHS radio and Sat Phones |

4.2 PERSONNEL

| | |
|--|--|
| Party Chief, Data processor QC, Gravity Operator | Aldo Ambrogio |
| Gravity /Surveying Operators | Jesse Lewis Paul Fitzpatrick James Steel |

4.3 GRAVITY ACQUISITION PARAMETERS

| | |
|---|------------------------|
| Data acquisition: | Gravity stations |
| Equipment: | Scintrex CG-5 Autograv |
| Earth Tide Corrected residual Gravity maximum drift | 0.1 mGal |
| Drift and tide corrected Observed Gravity repeatability | 0.1 mGal |
| Stations repeat rate | 3% |

4.4 GRAVITY AND SURVEYING RTK GPS DATA ACQUISITION

| | |
|---------------------|--|
| Applied Technique : | Gravity stations along seismic lines Differential GPS, Fast Static. |
| Equipment: | # 2 Scintrex CG-5 Autograv # 3 Trimble R7 GNSS GPS receiver # 3 Trimble Zephyr Model 2 antenna |

Surface gravity was observed on a 4 by 2 km grid (Fig.2). Minor positioning shift were made to keep the final station position on the seismic tracks in order to accomplish the local Cultural Heritage recommendations. Fast static gps technique was used to obtain the site coordinates.

Standard field operations were based on # 2 independent survey teams both with # 2 operators in order to acquire gravity and dGPS data. Each team leader was using handheld GPS units in order to navigate to the point and assist final finding of the stations.

Data acquisition started on November 26th and ended on December 4th, with no interruptions (Fig.3).

| Gravity survey | | | | | Statistics | | | Statistics | | | |
|----------------|--------------------|-------------------------|--------------------|-------------------------|---|--------------------|---------------------------|----------------------------|------------------------|---------------------------|---------------------------|
| Date | Team 1 | | Team 2 | | Comments | Daily New Stations | Monthly Stations Observed | Prospect Stations Observed | Daily Station repeated | Monthly Stations repeated | Prospect Station repeated |
| | Daily New Stations | Daily repeated stations | Daily New Stations | Daily repeated stations | | | | | | | |
| 26-Nov-12 | 4 | 1 | 8 | | | 12 | 12 | 12 | 1 | 1 | 1 |
| 27-Nov-12 | | | 4 | 1 | Team 1 transfer GPS reference base from Camp1 to Camp 2 | 4 | 16 | 16 | 1 | 2 | 2 |
| 28-Nov-12 | 8 | 2 | 3 | 1 | Team 2 transfer Gravity value from AFGN station in Innamincka to Camp 2 | 11 | 27 | 27 | 3 | 5 | 5 |
| 29-Nov-12 | 17 | 4 | 19 | 1 | | 36 | 63 | 63 | 5 | 10 | 10 |
| 30-Nov-12 | 17 | 1 | 11 | 1 | Team 2 network bases tie (6000-6001) | 28 | 91 | 91 | 2 | 12 | 12 |
| 1-Dec-12 | 21 | 2 | 4 | 1 | Team 2 network bases tie (base 6001 to AFGN station in Innamincka) | 25 | 25 | 116 | 3 | 3 | 15 |
| 2-Dec-12 | 18 | 3 | 13 | 3 | | 31 | 56 | 147 | 6 | 9 | 21 |
| 3-Dec-12 | 9 | 10 | | | # 8 stations repeated for GPS surveying check | 9 | 65 | 156 | 10 | 19 | 31 |
| 4-Dec-12 | | 6 | | | # 6 stations repeated for GPS surveying check | 0 | 65 | 156 | 6 | 25 | 37 |

Figure 3: Survey history

Total of 156 gravity stations were measured 9 working days with an average of 19 stations per day. A local gravity Base Network was established on the area and tied with the closest AFGN Station located in the village of Innamincka, SA.

During every production day, gravity reading “loops” were tied to a gravity base of the Base Network. Loop closure readings on the base were performed four times a day. Furthermore gravity readings were performed at the beginning and at the end of every acquisition day on a base established at camp location. None of the acquired loops showed abnormal gravity meter drift or closure values higher than 0.1 mGal.

4.5 SURVEYING

As mentioned, each field team was equipped with dGPS receiver in order to acquire gravity station coordinates using FastStatic survey mode.

4.5.1 SURVEY CONTROL AND PARAMETERS

Two control base dGPS stations (6000 and 6001) were available within the survey area from the seismic surveying. The stations were located at Base Camp 1 and Base Camp 2 respectively and were part of the gravity base network. The coordinate's reference used during the survey was UTM-WGS84, converted, in a post processing step, to the geodetic following parameters:

| | | |
|--------------------------------|-----------------------------|-----------------------------------|
| Geographic Coordinates: | | |
| | Datum: | GDA94_01Sept2012 |
| | Type: | Bursa |
| | Ellipsoid: | GRS1980 |
| | Major semi-axis: | 6378137.000m |
| | First eccentricity squared: | 0.006694379990 |
| | Flattering: | 298.25722101 |
| Metric Coordinates: | | |
| | Projection: | Australian MGA Coordinates System |
| | Zone: | MGA Zone 54 |
| | Unit Key: | Meters |
| | Unit Factor: | 1 |
| | Projection: | TM |
| | False Easting: | 500000 |
| | False Northing | 1000000 |
| | Latitude origin: | 000 00 00.000 N |
| | Central Meridian: | 141 00 00.000 N |
| | Scale Factor at Origin: | 0.9996 |
| Elevation | Height Adjustment: | AUSGEOID09_QLD-S_5716905_01.grd |

4.5.2 FAST STATIC SURVEYING

The Fast Static survey was performed using Trimble R7 (dual frequency geodetic receiver – GNSS enabled) with Trimble Survey Controller 2 (TSC2). In the survey controllers TSC2, criteria for rejection of data were set up to ensure that the final position achieved the requested accuracy. The system would record the values automatically, as soon as the specified parameters were satisfied. The parameters were a minimum of 5 satellites, mask angle 15° above horizon and acquisition duration (depending from the minimum number of satellite).

4.5.3 PROCESSING RESULTS AND QUALITY CONTROL

The survey software used for Fast Static mode was TBC (Trimble Business Center) version 1.5. The data acquired in the field were checked against the technical GPS criteria. Once the data quality was satisfactory the data were incorporated into the survey database. In the database, additional analyses were run to determine the displacement against the pre-planned coordinates, as well as any missing station. If the quality or differences from the pre-plot were out of acceptable range, field re-observations would be done.

4.6 GRAVITY METER TESTS

Before production, instrument checks were performed

- Overnight drift test to check the internal meter drift
- Short Base Line Test to check readings repeatability

4.6.1 Overnight Drift Test

The change of the length of the gravimeter spring – approximately a linear stretching over time – produces an apparent change in the gravity measurements over the time, predictable when linear. This aspect of the gravimeter performance QC is checked through a so-called “Drift test” usually performed overnight. The Scintrex CG-5M meters provide an internal software compensation of this drift, based on a user-provided estimate on the drift rate obtained by the drift-test (mGal/day). Examples of drift tests for the meters used during the survey follows (Figure 5).

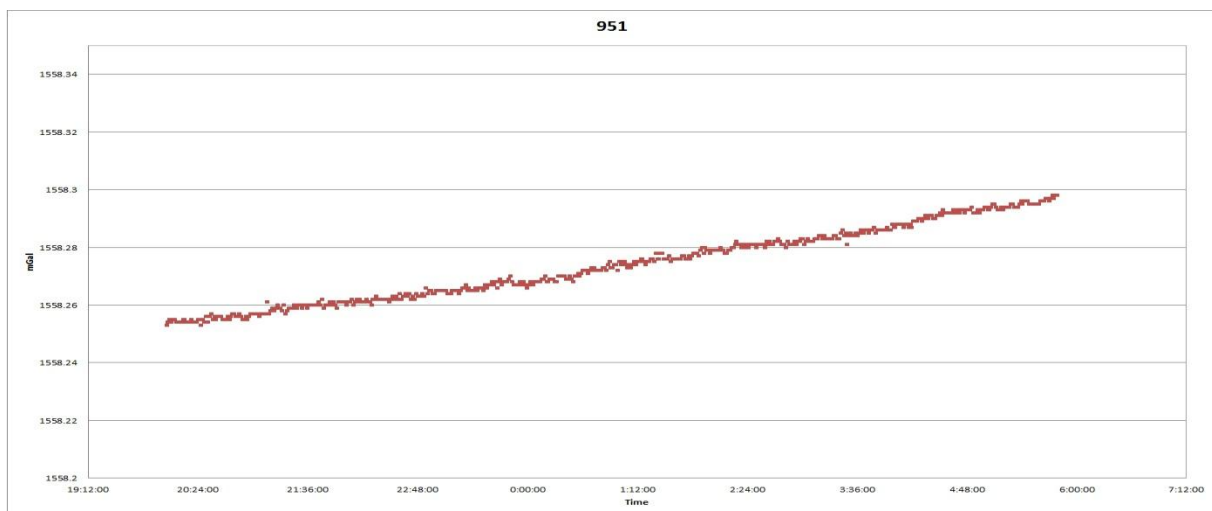


Figure 4. Drift test for gravimeter Scintrex CG5 40951

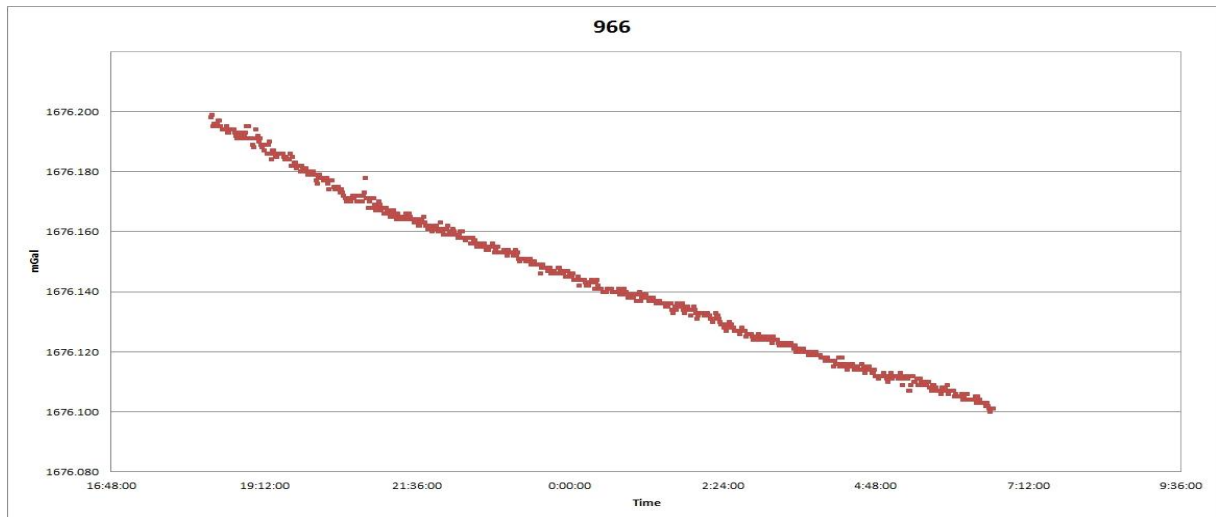


Figure 5. Drift test for gravimeter Scintrex CG5 40966

4.6.2 Short and Long Baseline Test

The test are carried to check data repeatability and stability. The short baseline test is usually carried out at the camp. Gravity meter stability is tested over a two stations at 30-50 m distance. Five measurements are recorded at every site (Figure 6 - 7).

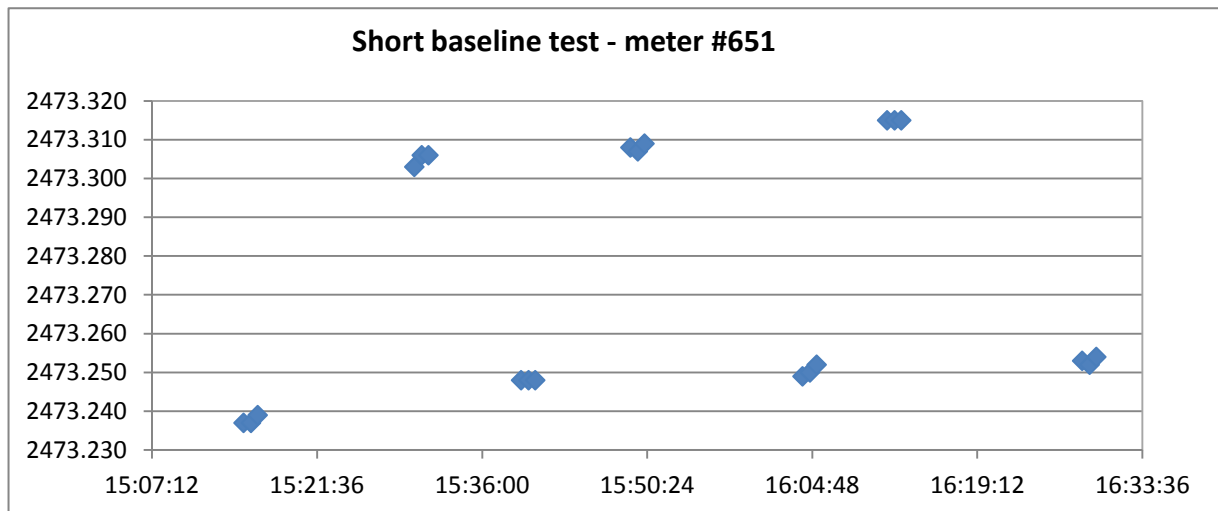


Figure 6. Short baseline test for Scintrex CG5 40951

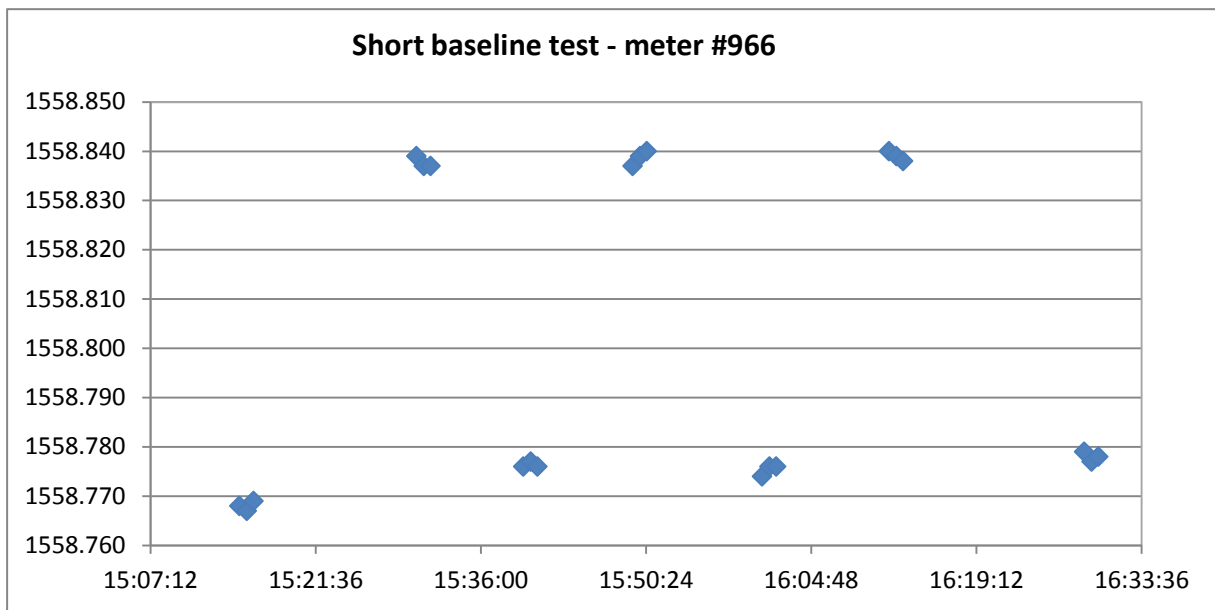


Figure 7. Short baseline test for Scintrex CG5 40966

The long baseline test (Figure 8 - 9) is usually carried on two bases of the network with different purposes: to check data repeatability, meter calibration and base network computation.

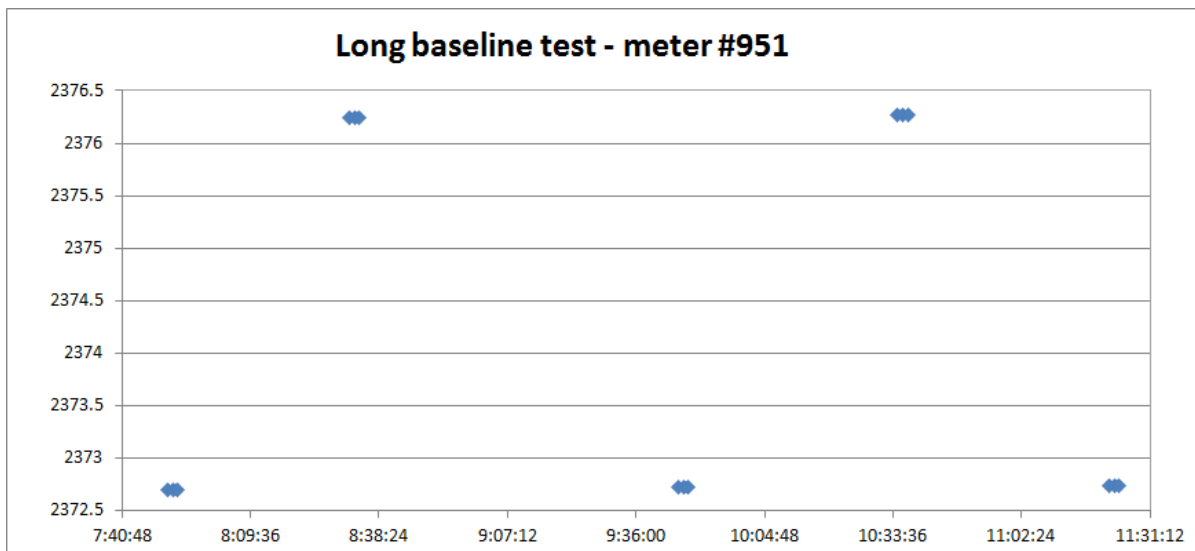


Figure 8. Long baseline test for Scintrex CG5 40951

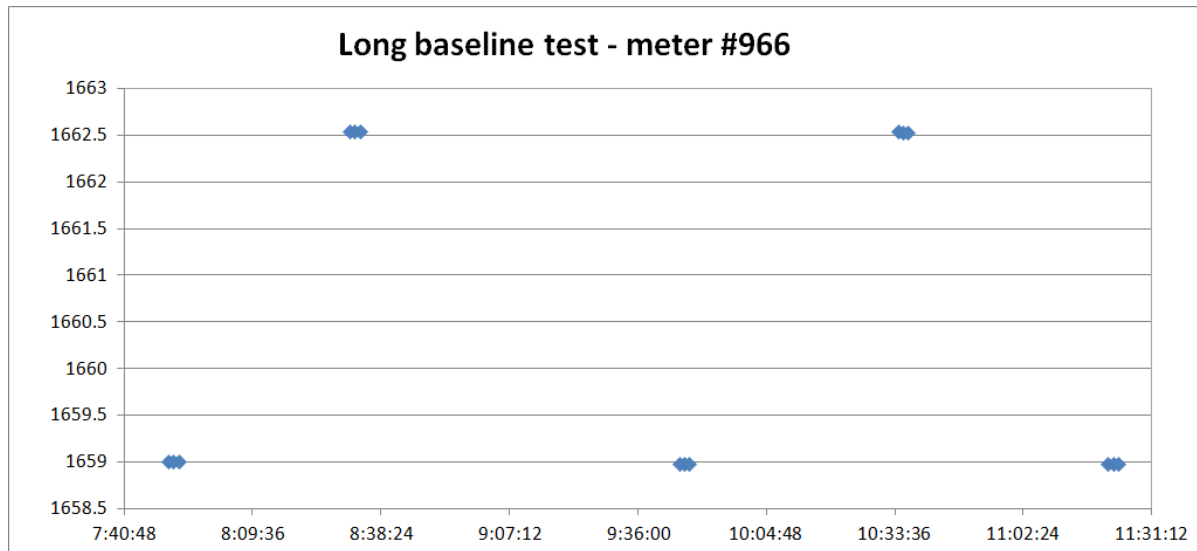


Figure 9. Long baseline test for Scintrex CG540966

4.7 GRAVITY QUALITY CONTROL

| | | |
|----------------------|------------------------------|--|
| During-survey | Layout parameters | Scintrex data digitally stored, # 3 repeated reading at each station, tilt checked Drift daily checked through repeated reading performed at the base station |
| Post-survey | Field office control measure | Data transfer/download daily on survey database, loop closure check, data conversion to Obs Gravity, Mistie check , Outliers / instrumental tares Check. Correlation check with topography |

Number of Gravity re-surveyed stations: **21/156 (13.5%)**
 Standard deviation in measured gravity: **0.03**
 Average difference: **0.005**

The following graphic shows statistic of repeated station mistie (**Figure 10**):

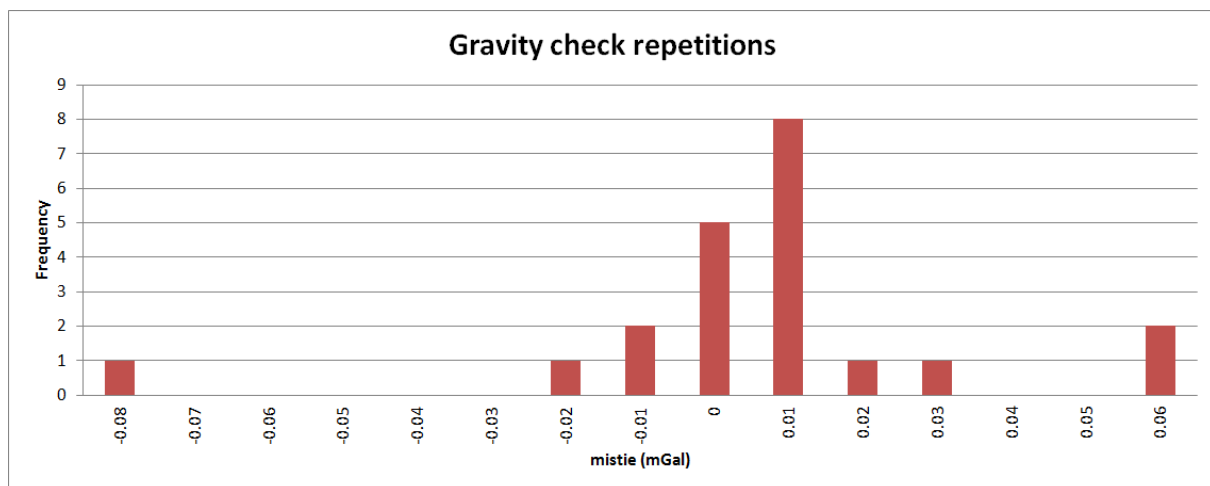


Figure 10. Statistic of repeated stations

4.8 GRAVITY BASE NETWORK

The local gravity Base Network includes #3 base-stations tied with #3 double runs (A-B-A-B-A) ties on one triangle for error compensation (**Figure 11**).

Proprietary ElevNet software was then used to compute the final adjustment and obtain a well-compensated base network, using all the individual ties. Absolute Gravity value was transferred to the area using the AFGN 1962113036 Bourke&Wills monument located in the small village of Innamincka (**Figure 12 to 15**). Final values of all network bases as long with handheld GPS determined base station coordinates are listed in Table 3.

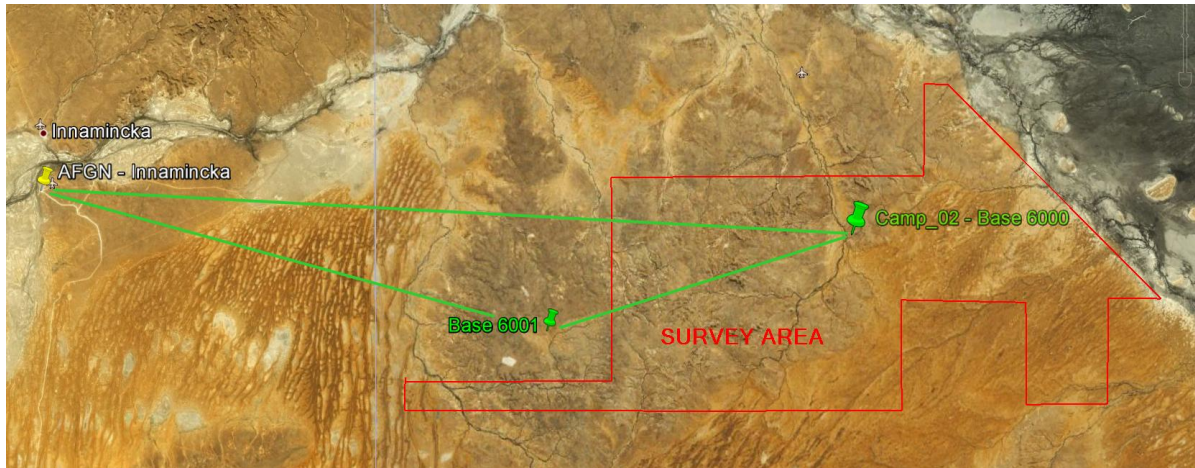


Figure 11. Local gravity base network layout

| Base Stations | Latitude [° ' "] | Longitude [° ' "] | Elevation [m] | Absolute Gravity value [mGa] |
|------------------------|------------------|-------------------|---------------|------------------------------|
| 5000 (AFNG Innamincka) | -17 32 42.0051 | 133 32 04.9002 | 53 | 979102.632 |
| 6000 (Camp 2) | 27°46'43.38"S | 141°22'19.70"E | 98 | 979125.911 |
| 6001 | 27°50'42.73"S | 141° 8'1.47"E | 132 | 979111.882 |

Table 1. Gravity Base Network – station coordinates (the red one is the gravity absolute reference).



Figure 12: AFGN Innamincka station 1962113036 location on satellite image

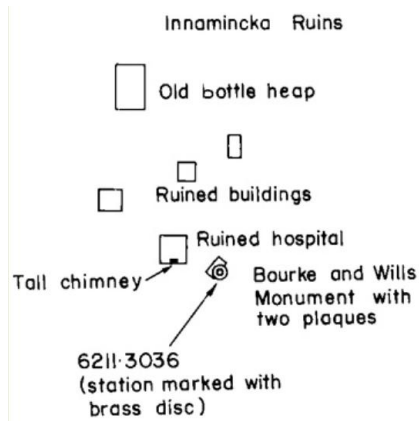


Figure 13: Innamincka station 1962113036 location on AFGN web site station monography (<http://www.ga.gov.au/afng>)

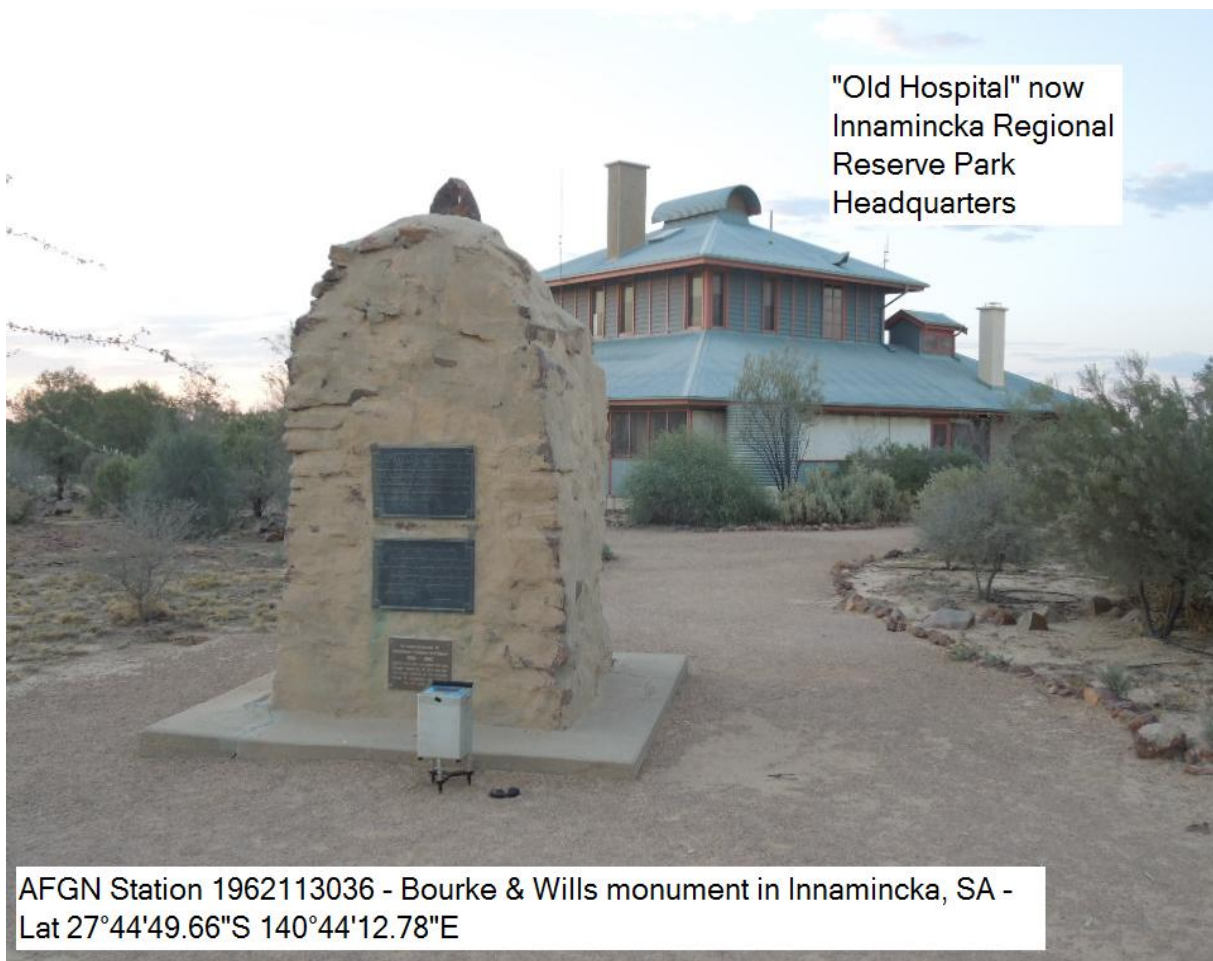


Figure 14: AFGN Innamincka station 1962113036 location



Figure 15: AFGN Innamincka station 1962113036 location

The absolute reference station is located in front of the monument (Fig.26) not far from the former hospital building now hosting the Innamincka Regional Reserve Park Headquarters (Fig.27).



Figure 16: Gravity meter on base station at Base Camp 2 (6000)



Figure 17: Gravity meter on base station 6001

4.9 GRAVIMETER INTER CALIBRATION

Just before the project start, a calibration line, internal to the well-compensated base network, was measured in order to intercalibrate the two meters used during the survey. The calibration factors derived from these calibrations, listed below, were used within WinGLink software utility to normalize the Obs gravity values.

| Double Run (Gravity base 9000 to 9001) | | | | | | Scintrex 966 | | | |
|--|------|--------|----------|--------------|----------|---------------|------------|-------|--|
| Base | Stn | Date | Time | Date-Time | G meter | G Diff | drift rate | Delta | |
| 9000 | 9001 | 21-Aug | 10:14:53 | 21-Aug 10:14 | 1542.277 | -7.954 | 0.00473 | | |
| 9000 | 9001 | 21-Aug | 11:43:06 | 21-Aug 11:43 | 1542.281 | -7.954 | 0.0009 | | |
| 9000 | 9001 | 25-Aug | 11:26:57 | 25-Aug 11:26 | 1547.339 | -7.954 | -0.00152 | | |
| 9000 | 9001 | 25-Aug | 12:53:13 | 25-Aug 12:53 | 1547.345 | -7.944 | -0.00441 | 0.010 | |
| 9000 to 9001 average | | | | | | -7.952 | | | |
| Stdev | | | | | | 0.005 | | | |

| Double Run (Gravity base 9028 to 9029) | | | | | | Scintrex 951 | | | |
|--|------|--------|----------|--------------|----------|--------------|------------|-------|--|
| Base | Stn | Date | Time | Date-Time | G meter | G Diff | drift rate | Delta | |
| 9028 | 9029 | 20-Oct | 8:31:17 | 20-Oct 08:31 | 2376.254 | 3.541 | 0.01241 | | |
| 9028 | 9029 | 20-Oct | 10:34:10 | 20-Oct 10:34 | 2376.276 | 3.542 | 0.0087 | 0.001 | |
| 9028 to 9029 average | | | | | | 3.542 | | | |
| Stdev | | | | | | 0.001 | | | |

Table 2. Spreadsheets showing calibration reading for all the meters

| Cal Correction | |
|----------------|------------|
| 966= | 1.0030540 |
| 951= | 1.0007059 |
| G_Ref(5000)= | 979102.632 |

Table 3. Refined calibration factors table

4.10 GRAVITY DATA ACQUISITION FORMAT

Scintrex CG-5 gravity data were recorded digitally and dumped to PC daily. Recorded data included: line and station ID, gravity reading, standard deviation, X,Y tilts (arc sec), inner temperature deviation (mK), internal calculated earth tide correction, reading duration (30s x 4Hz sampling rate), % of rejected readings, time, and date (see **Figure 18**:).

The meter calculates the Earth Tide correction at each reading, based on the date and time of the reading at a user-defined (survey-centre) location. The meter also applies a user-entered linear drift correction – the drift rate is obtained via an overnight drift test.

```

/ CG-5 SURVEY
/ Survey name: 26401
/ Instrument S/N: 40364
/ Client: Hess
/ Operator: SR
/ Date: 2012/ 9/ 5
/ Time: 06:26:06
/ LONG: 133.3000000 E
/ LAT: 16.5000000 S
/ ZONE: 53
/ GMT DIFF.: -9.5

/ CG-5 SETUP PARAMETERS
/ Gref: 0.000
/ Gcall: 7745.155
/ Tiltxs: 601.226
/ Tiltys: 622.524
/ Tiltxo: -44.070
/ Tiltyo: 5.661
/ Tempco: -0.134
/ Drift: 0.677
/ DriftTime Start: 06:26:08
/ DriftDate Start: 2012/09/05

/ CG-5 OPTIONS
/ Tide Correction: YES
/ Cont. Tilt: NO
/ Auto Rejection: YES
/ Terrain Corr.: NO
/ Seismic Filter: YES
/ Raw Data: NO
Line 122.00000
/-----LINE-----STATION-----ALT-----GRAV-----SD-----TILTX-----TILTY-----TIDE-----DUR-REJ-----TIME-----DEC.TIME+DATE--TERRAIN--DATE
122.0000000 9016.0000000 0.0000 3015.235 0.028 -6.7 -3.0 -1.25 -0.033 60 0 06:47:27 41125.28250 0.0000 2012/09/05
122.0000000 9016.0000000 0.0000 3015.241 0.040 -6.5 -3.6 -1.26 -0.034 60 0 06:48:42 41125.28337 0.0000 2012/09/05
122.0000000 9016.0000000 0.0000 3015.243 0.040 -6.0 -4.2 -1.26 -0.034 60 0 06:49:48 41125.28413 0.0000 2012/09/05
122.0000000 9017.0000000 0.0000 3004.768 0.039 -1.6 0.2 -1.26 -0.050 30 0 07:23:13 41125.30730 0.0000 2012/09/05
122.0000000 9017.0000000 0.0000 3004.777 0.028 -1.6 0.8 -1.25 -0.050 30 0 07:23:57 41125.30781 0.0000 2012/09/05
122.0000000 9017.0000000 0.0000 3004.781 0.039 -1.3 0.8 -1.25 -0.050 30 0 07:24:32 41125.30821 0.0000 2012/09/05
122.0000000 18321.0000000 0.0000 3002.469 0.028 -2.4 -0.4 -1.22 -0.060 30 0 08:00:21 41125.33304 0.0000 2012/09/05
122.0000000 18321.0000000 0.0000 3002.475 0.040 -1.3 -0.5 -1.21 -0.060 30 0 08:01:05 41125.33355 0.0000 2012/09/05
122.0000000 18321.0000000 0.0000 3002.481 0.049 0.3 -1.5 -1.20 -0.060 30 0 08:01:40 41125.33396 0.0000 2012/09/05
122.0000000 18337.0000000 0.0000 3002.382 0.018 1.8 -0.8 -1.19 -0.060 30 0 08:04:49 41125.33614 0.0000 2012/09/05
122.0000000 18337.0000000 0.0000 3002.388 0.049 2.3 -0.1 -1.18 -0.060 30 0 08:05:33 41125.33665 0.0000 2012/09/05
122.0000000 18337.0000000 0.0000 3002.391 0.025 2.8 0.0 -1.17 -0.061 30 0 08:06:08 41125.33705 0.0000 2012/09/05
122.0000000 18353.0000000 0.0000 3002.388 0.049 -7.0 -0.3 -1.17 -0.061 30 0 08:09:13 41125.33919 0.0000 2012/09/05
122.0000000 18353.0000000 0.0000 3002.394 0.051 -7.7 0.3 -1.17 -0.061 30 0 08:09:57 41125.33970 0.0000 2012/09/05
122.0000000 18353.0000000 0.0000 3002.398 0.035 -8.4 1.2 -1.16 -0.061 30 0 08:10:32 41125.34010 0.0000 2012/09/05

```

Figure 18: Example of a Scintrex CG-5 data file

4.11 GRAVITY DATA PROCESSING

Importing all the gravity data into WinGLink software utility, the readings at each station were corrected for residual (linear) meter drift through the repeated base station readings. Meter drift was normally below 0.1 mGal. Loops showing bigger fluctuation drift were re-observed.

The combined gravitational effect of the Sun and Moon at the Earth's surface was computed by the "WinGLink" utility, using the I.M.Longman,1959 formula. The tidal gravity correction was thus applied to the L&R gravity meters readings. Scintrex CG-5 gravimeter automatically includes tidal correction computation based on stored meter position coordinates.

Observed gravity data (Gobs) files were exported from each day's runs and imported to the WinGLink project database (Fig.19) along with the stations coordinates from dGPS survey (Fig.20).

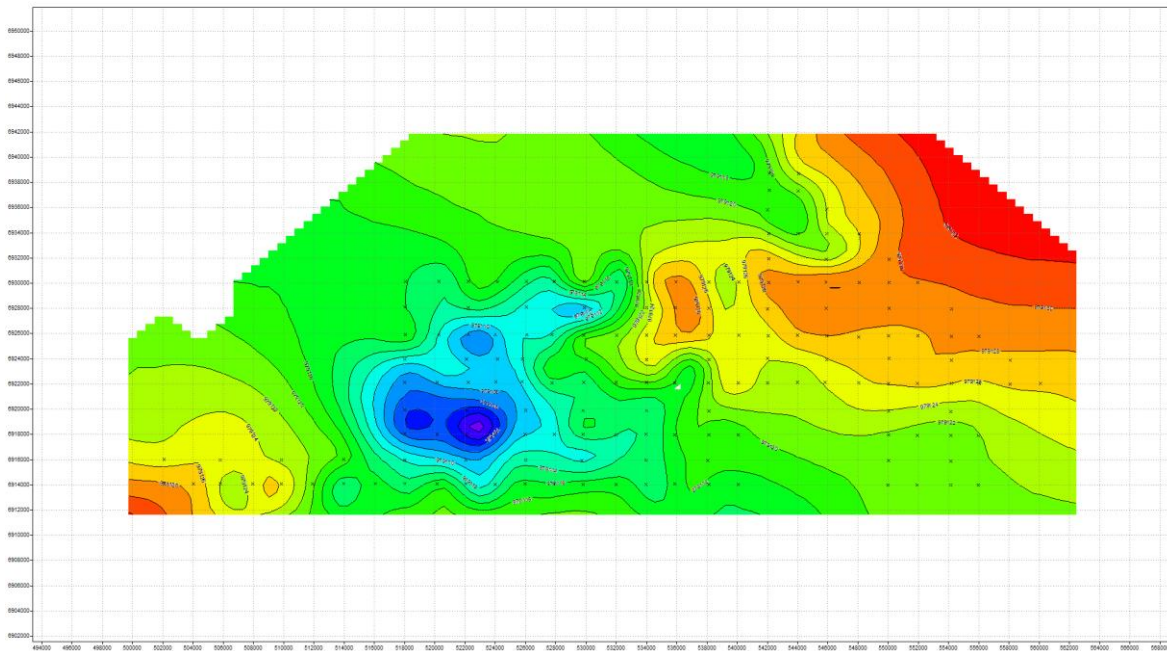


Figure 19: Observed gravity map

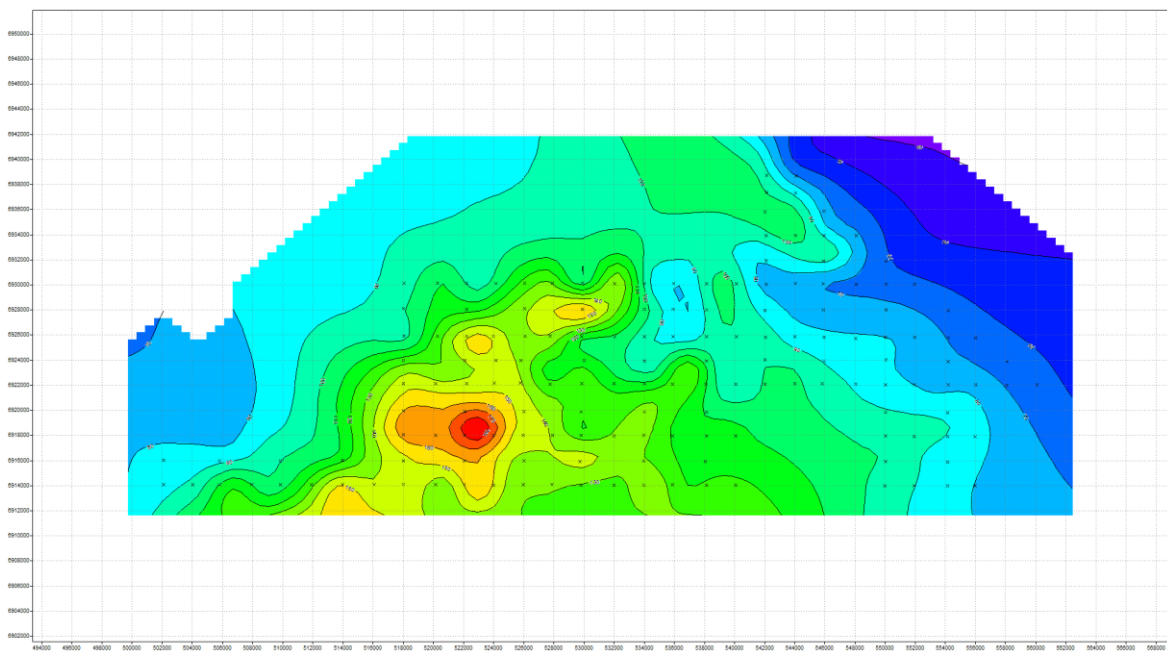


Figure 20: Elevation map

4.12 GRAVITY REDUCTIONS

Observed gravity values were reduced to Bouguer anomalies using standard procedures using WinGLink processing software. Terrain, Free Air and Bouguer Corrections were computed. Theoretical gravity was calculated from the 1980 International Gravity Formula. Additional

refinements include the curvature correction to the simple Bouguer anomaly to account for earth sphericity (Bullard B correction).

4.12.1 FREE-AIR ANOMALY

The free-air anomaly (Figure 21) was computed by calculating the theoretical gravity field at the position of the gravity station, then subtracting the theoretical field from the observed gravity. The theoretical gravity field is a function of latitude and elevation.

The free-air anomaly is calculated using the following formula:

$$\Delta g_{FA} = g_{obs} - g_T + 0.3086 H$$

Where:

g_{obs} is the observed gravity

g_T is the normal gravity on the ellipsoid at that latitude and computed using the 1980 International Gravity Formula

H is the height of the meter above the geoid

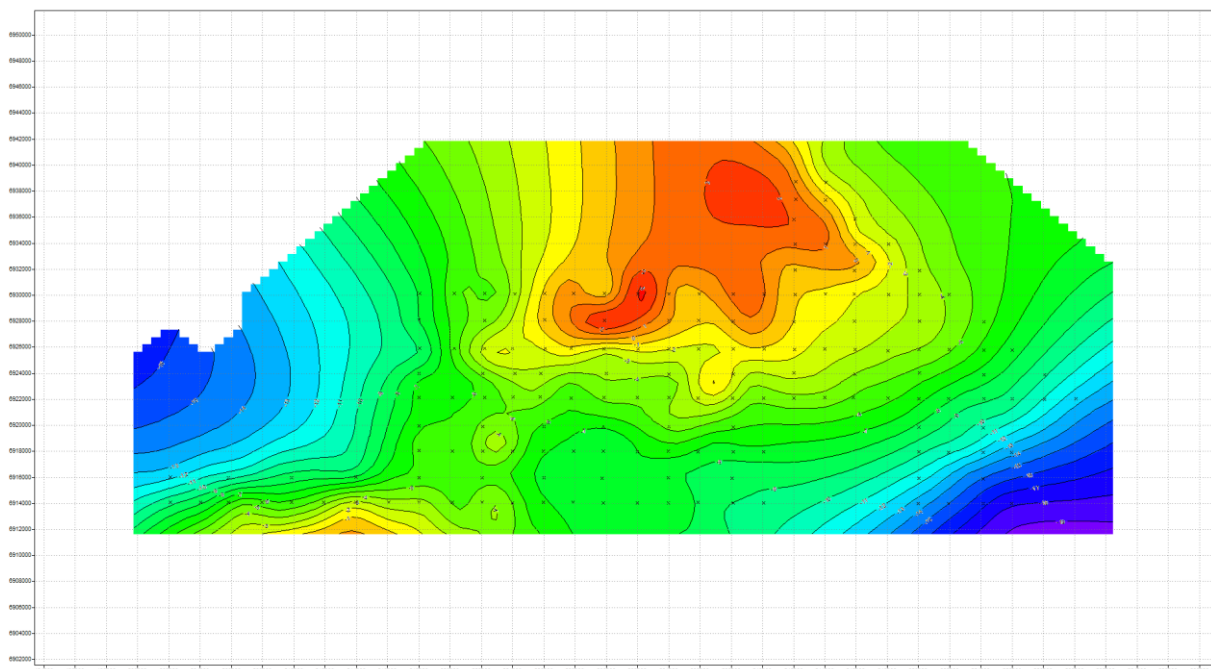


Figure 21: Free air anomaly map. Contour line interval s 2.0 mGal.

4.12.2 TERRAIN CORRECTION

The Terrain Correction (Figure 22) was computed using:

- 2m grid project DEM (from 0 to 100 m radius)
- SRTM 100m DEM (from 100m to 10,000 m radius)
- SRTM 500m DEM (from 10,000m to 167,000 m radius of the Hayford-Bowie Zone).

The WinGlink software compute TC using a nominal density of 1 g/cc (Figure 21). This TC value is then multiplied by the Bouguer density applied in the calculation of the Complete Bouguer anomaly.

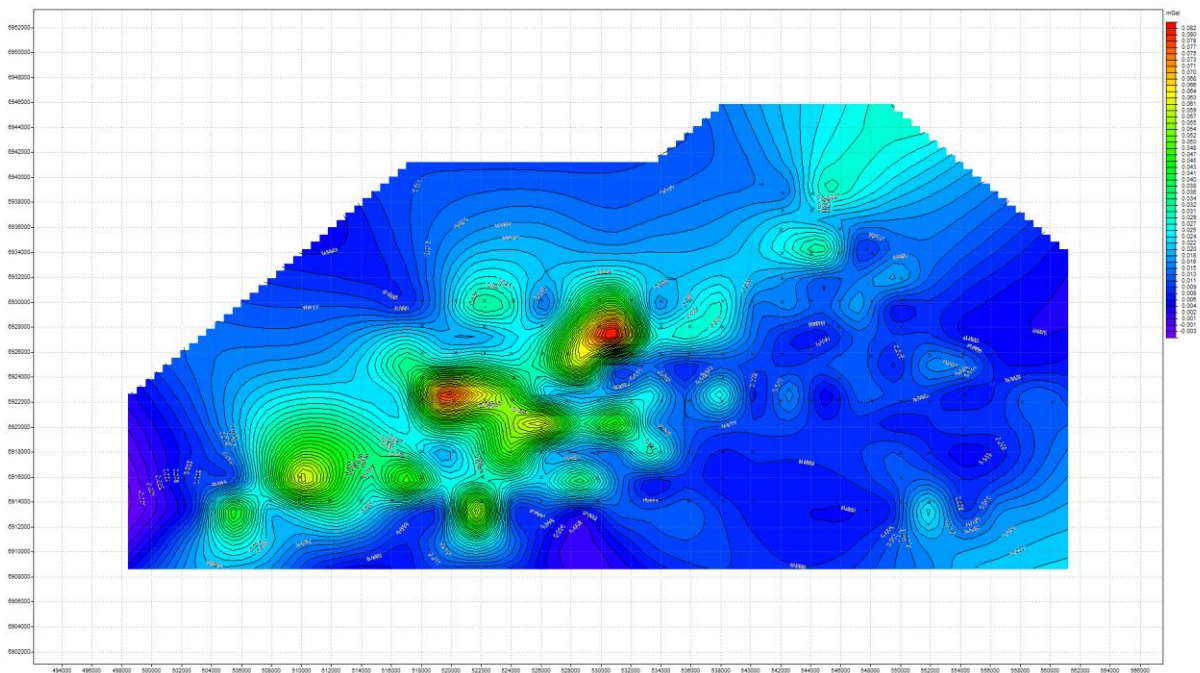


Figure 22: Terrain Correction (1.0 mGal) map

4.12.3 BOUGUER ANOMALY

The classical Bouguer reduction is a three-step procedure (Swick, 1942, LaFehr, 1991):

- apply the Simple Bouguer slab formula (Bullard A)
- add a curvature correction (Bullard B)
- apply a terrain correction for departures of the actual Earth's surface from an idealized spherical surface (Bullard C)

The first two are functions of elevation and topographic density only, while the third is, in addition, a function of surrounding topography.

The infinite slab term is given by $2\pi G\rho h$ (G being the Newton's gravitational constant) and is almost always larger than the terrain correction and is always larger than the curvature correction.

The curvature correction is calculated by computing the gravitational effect of a spherical cap with a linear radius of 166.7 km (outer radius Hayford-Bowie system). The spherical cap produces a lesser effect than the infinite slab because of the "truncation" of that part of the slab above the earth and extending to infinity, but it produces a greater effect than the slab because of sub slab earth resulting from curvature. The physical significance of the correction lies in the combination of these two differences, which are each a function of elevation (LaFehr, 1991). Simple Bouguer anomaly map is showed in **Figure 23**.

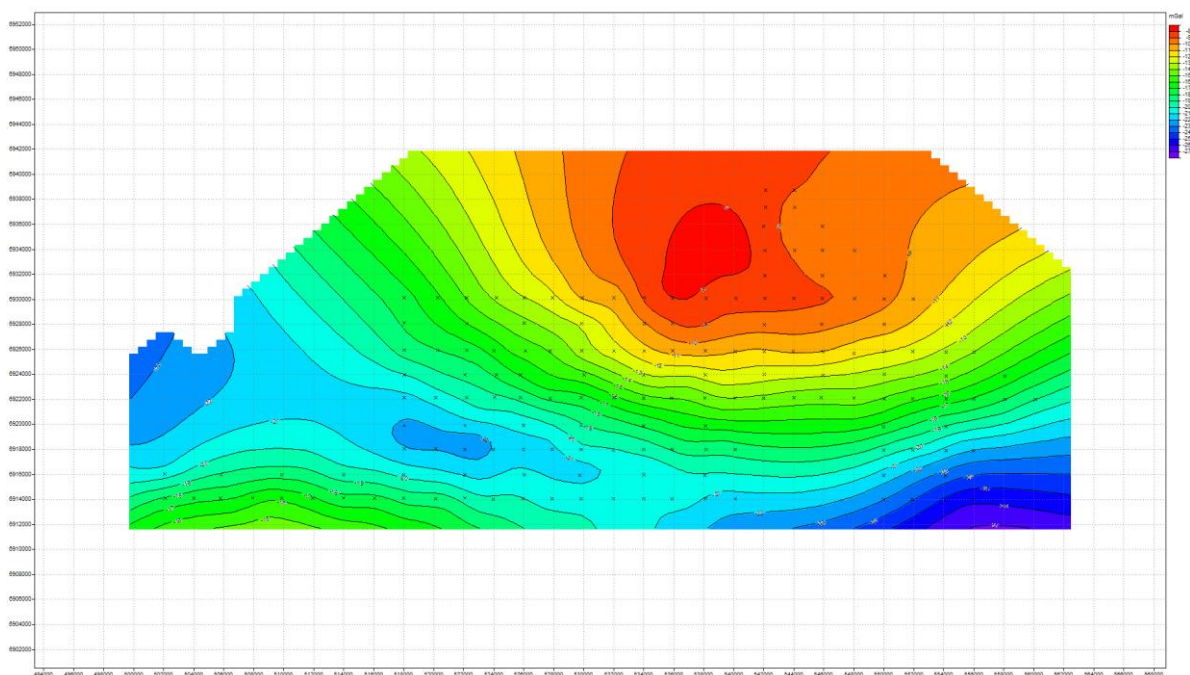


Figure 23: Simple Bouguer anomaly map (density = 2.4 g/cc; Bullard B applied). Contour line interval is 2.0 mGal.

The computed TC is added to the Simple Bouguer (**Figure 23**) anomaly to provide the so-called Complete Bouguer Anomaly .

Because the Bouguer Correction BC may be written:

$$BC = g_{\text{slab}} + g_{\text{cc}} + g_{\text{TC}}$$

Where: $g_{\text{slab}} = 0.0418\rho H$, g_{cc} = curvature correction, and g_{TC} = the terrain correction.

The Bouguer anomaly Δg_{BA} is then given by

$$\Delta g_{\text{BA}} = \Delta g_{\text{FA}} - (g_{\text{slab}} + g_{\text{cc}} + g_{\text{tc}}).$$

In order to define a theoretical average reduction density value for the whole area, a "Nettleton method" test has been performed using different gravity values, along Source Line 1468. A density of 2.4 g/cc shown the minimum correlation with topography. This value was then applied to compute Complete Bouguer anomaly (Figure 24) .

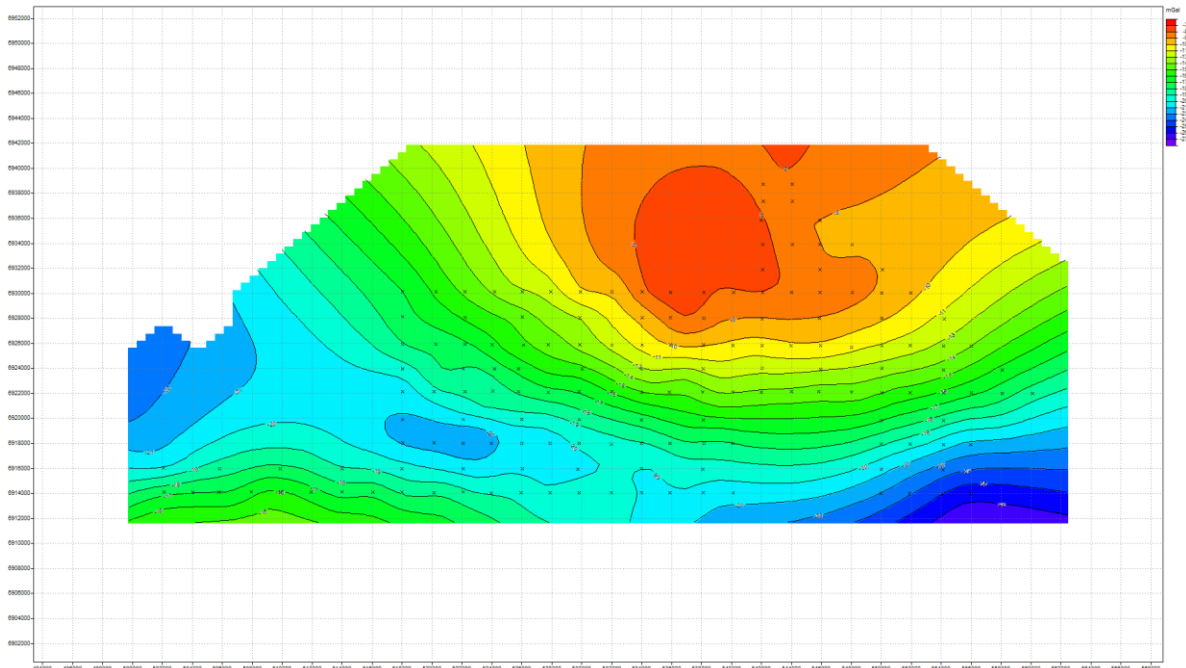


Figure 24: Complete Bouguer anomaly map (density = 2.4 g/cc; Bullard B applied; OTC max distance 167 km). Contour line interval is 2.0 mGal.

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| | | |
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APPENDIX A - GRAVITY STATIONS DATA

Drillsearch ATP940
 Name: Complete Bouguer (density = 2.4 g/cc)
 Units: mGal

| ID | x(m) | y(m) | z(m) | Longitude | Latitude | GObs | TGrav | FreeAir | Bgcorr | TC | BGANom |
|-----|------------|------------|---------|-----------|-----------|------------|------------|---------|--------|----------|---------|
| 41 | 502095.672 | 6914103.17 | 86.199 | 141.02129 | -27.89794 | 979128.186 | 979164.147 | 26.607 | 8.67 | 0.030243 | -17.367 |
| 56 | 504014.767 | 6914099.22 | 92.524 | 141.04079 | -27.89797 | 979127.384 | 979164.15 | 28.56 | 9.306 | 0.020664 | -17.095 |
| 87 | 509858.403 | 6916002.1 | 100.284 | 141.10016 | -27.88076 | 979123.422 | 979162.865 | 30.955 | 10.087 | 0.147679 | -17.894 |
| 137 | 520264.08 | 6925926.05 | 126.66 | 141.2057 | -27.79106 | 979111.63 | 979156.177 | 39.097 | 12.74 | 0.060528 | -17.737 |
| 139 | 520262.719 | 6930138.8 | 109.634 | 141.20562 | -27.75303 | 979114.248 | 979153.345 | 33.841 | 11.027 | 0.052326 | -15.656 |
| 146 | 520149.531 | 6914084.18 | 134.842 | 141.20474 | -27.89796 | 979117.367 | 979164.149 | 41.622 | 13.563 | 0.042538 | -18.336 |
| 161 | 518002.012 | 6914086.66 | 148.687 | 141.18292 | -27.89797 | 979114.615 | 979164.15 | 45.875 | 14.949 | 0.044966 | -18.277 |
| 162 | 518004.844 | 6915994.06 | 147.413 | 141.18292 | -27.88075 | 979111.716 | 979162.864 | 45.503 | 14.827 | 0.106345 | -19.929 |
| 163 | 518012.42 | 6918040.6 | 165.035 | 141.18297 | -27.86227 | 979104.973 | 979161.485 | 50.942 | 16.6 | 0.063596 | -21.595 |
| 164 | 518019.931 | 6919937.36 | 159.361 | 141.18301 | -27.84515 | 979104.739 | 979160.208 | 49.191 | 16.029 | 0.069842 | -21.558 |
| 166 | 524167.593 | 6923992.41 | 144.977 | 141.24537 | -27.80845 | 979109.356 | 979157.472 | 44.751 | 14.582 | 0.073274 | -17.573 |
| 167 | 524004.676 | 6925899.9 | 162.624 | 141.24367 | -27.79123 | 979105.206 | 979156.19 | 50.198 | 16.357 | 0.067415 | -16.631 |
| 192 | 522072.937 | 6915989.04 | 160.849 | 141.22425 | -27.88073 | 979107.954 | 979162.863 | 49.65 | 16.179 | 0.066179 | -20.931 |
| 195 | 527743.387 | 6922112.79 | 118.897 | 141.28171 | -27.82535 | 979116.211 | 979158.732 | 36.7 | 11.959 | 0.045235 | -17.274 |
| 208 | 527898.934 | 6918010.39 | 138.886 | 141.28339 | -27.86238 | 979111.259 | 979161.493 | 42.87 | 13.97 | 0.041184 | -20.818 |
| 228 | 531978.464 | 6917971.3 | 131.003 | 141.32483 | -27.86264 | 979114.05 | 979161.513 | 40.437 | 13.177 | 0.030748 | -19.649 |
| 235 | 534005.582 | 6922122.75 | 101.948 | 141.3453 | -27.82511 | 979122.127 | 979158.714 | 31.469 | 10.254 | 0.055888 | -14.639 |
| 239 | 534026.833 | 6930111.86 | 90.599 | 141.34529 | -27.75299 | 979125.603 | 979153.343 | 27.966 | 9.113 | 0.037434 | -8.386 |
| 257 | 535920.773 | 6925873.56 | 85.41 | 141.36463 | -27.7912 | 979127.565 | 979156.187 | 26.364 | 8.591 | 0.029826 | -10.315 |
| 259 | 535937.234 | 6930106.94 | 81.032 | 141.36467 | -27.75299 | 979128.332 | 979153.342 | 25.013 | 8.151 | 0.053182 | -7.575 |
| 268 | 535867.375 | 6917983.04 | 116.669 | 141.36433 | -27.86243 | 979118.233 | 979161.497 | 36.013 | 11.735 | 0.027032 | -18.518 |
| 277 | 540103.352 | 6925863 | 100.774 | 141.40709 | -27.79118 | 979124.087 | 979156.186 | 31.106 | 10.136 | 0.027576 | -10.6 |
| 296 | 538132.674 | 6923944.78 | 93.425 | 141.38715 | -27.80855 | 979125.653 | 979157.48 | 28.838 | 9.397 | 0.029685 | -11.905 |
| 297 | 538121.605 | 6925866.44 | 92.279 | 141.38697 | -27.79121 | 979126.248 | 979156.188 | 28.484 | 9.282 | 0.037979 | -10.296 |
| 299 | 538145.267 | 6930081.56 | 112.234 | 141.38708 | -27.75315 | 979121.277 | 979153.355 | 34.644 | 11.289 | 0.064686 | -8.311 |
| 306 | 538131.974 | 6914050.74 | 122.206 | 141.38746 | -27.89787 | 979117.363 | 979164.142 | 37.722 | 12.292 | 0.020063 | -20.844 |
| 307 | 538078.879 | 6915949.28 | 115.11 | 141.38686 | -27.88073 | 979118.602 | 979162.863 | 35.531 | 11.578 | 0.015323 | -19.79 |
| 308 | 538143.762 | 6917991.22 | 120.8 | 141.38745 | -27.8623 | 979117.405 | 979161.487 | 37.288 | 12.151 | 0.017524 | -18.437 |
| 310 | 544067.532 | 6938704.78 | 68.555 | 141.44686 | -27.67513 | 979124.226 | 979147.554 | 21.161 | 6.896 | 0.062025 | -8.414 |

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|-----|------------|------------|---------|-----------|-----------|------------|------------|--------|--------|----------|---------|
| 315 | 544013.113 | 6922125.37 | 102.128 | 141.44692 | -27.8248 | 979122.833 | 979158.691 | 31.524 | 10.272 | 0.013104 | -13.931 |
| 337 | 548033.726 | 6925709.74 | 81.413 | 141.4876 | -27.7923 | 979127.527 | 979156.269 | 25.13 | 8.189 | 0.027586 | -11.168 |
| 341 | 548072.515 | 6933917.85 | 70.837 | 141.48766 | -27.7182 | 979126.231 | 979150.755 | 21.866 | 7.125 | 0.019985 | -9.31 |
| 356 | 550044.752 | 6924008.33 | 80.858 | 141.50808 | -27.80759 | 979127.052 | 979157.408 | 24.959 | 8.133 | 0.023594 | -13.066 |
| 359 | 550058.171 | 6930055.26 | 66.069 | 141.50796 | -27.753 | 979129.817 | 979153.343 | 20.394 | 6.645 | 0.018166 | -9.385 |
| 366 | 549979.741 | 6914000.4 | 93.868 | 141.50784 | -27.89793 | 979121.815 | 979164.147 | 28.975 | 9.442 | 0.025025 | -22.344 |
| 368 | 550008.651 | 6917944.94 | 99.244 | 141.50797 | -27.86232 | 979121.292 | 979161.489 | 30.634 | 9.982 | 0.026443 | -19.138 |
| 377 | 551948.481 | 6925815.79 | 74.01 | 141.52733 | -27.7912 | 979128.271 | 979156.187 | 22.845 | 7.444 | 0.035035 | -12.015 |
| 379 | 551969.744 | 6930043.6 | 62.096 | 141.52736 | -27.75303 | 979129.824 | 979153.346 | 19.167 | 6.246 | 0.021477 | -10.109 |
| 388 | 551920.141 | 6917937.88 | 92.947 | 141.52739 | -27.86232 | 979121.834 | 979161.488 | 28.69 | 9.349 | 0.019406 | -19.832 |
| 395 | 554170.096 | 6922044.06 | 79.012 | 141.55005 | -27.82516 | 979125.594 | 979158.718 | 24.389 | 7.947 | 0.013324 | -16.085 |
| 396 | 554175.452 | 6923883.82 | 71.959 | 141.55002 | -27.80855 | 979127.808 | 979157.48 | 22.212 | 7.238 | 0.043919 | -14.264 |
| 398 | 554194.063 | 6927981.07 | 65.112 | 141.55003 | -27.77156 | 979129.054 | 979154.725 | 20.098 | 6.549 | 0.012156 | -11.745 |
| 408 | 554143.953 | 6917925.55 | 90.655 | 141.54997 | -27.86234 | 979121.333 | 979161.49 | 27.983 | 9.118 | 0.011153 | -20.889 |
| 409 | 554152.393 | 6919825.93 | 84.725 | 141.54997 | -27.84518 | 979123.493 | 979160.211 | 26.152 | 8.522 | 0.021746 | -18.53 |
| 428 | 555979.273 | 6917917.38 | 83.718 | 141.56862 | -27.86234 | 979121.906 | 979161.49 | 25.842 | 8.421 | 0.014147 | -21.721 |
| 435 | 560103.491 | 6922021.42 | 63.754 | 141.6103 | -27.82511 | 979126.37 | 979158.714 | 19.679 | 6.413 | 0.02841 | -18.659 |
| 454 | 526044.801 | 6930130.47 | 120.307 | 141.26429 | -27.753 | 979115.192 | 979153.343 | 37.136 | 12.101 | 0.034005 | -12.701 |
| 463 | 525985.864 | 6918019.89 | 143.772 | 141.26396 | -27.86233 | 979110.141 | 979161.49 | 44.379 | 14.461 | 0.055334 | -20.966 |
| 464 | 526000.214 | 6919920.75 | 146.196 | 141.26406 | -27.84517 | 979109.09 | 979160.21 | 45.127 | 14.705 | 0.146726 | -19.611 |
| 470 | 542014.415 | 6922111.34 | 101.965 | 141.42662 | -27.82499 | 979123.149 | 979158.705 | 31.474 | 10.256 | 0.036442 | -13.858 |
| 475 | 542085.682 | 6931921.6 | 80.962 | 141.427 | -27.73643 | 979126.872 | 979152.11 | 24.991 | 8.143 | 0.04104 | -7.844 |
| 476 | 542098.804 | 6933923.1 | 101.408 | 141.42706 | -27.71836 | 979121.027 | 979150.767 | 31.302 | 10.2 | 0.059432 | -8.057 |
| 487 | 529865.615 | 6925893.79 | 111.337 | 141.30317 | -27.79117 | 979119.361 | 979156.185 | 34.367 | 11.199 | 0.058416 | -13.335 |
| 488 | 529876.998 | 6928065.69 | 158.371 | 141.30323 | -27.77156 | 979108.79 | 979154.725 | 48.885 | 15.93 | 0.197405 | -12.489 |
| 496 | 529803.653 | 6914056.87 | 129.232 | 141.30284 | -27.89803 | 979116.72 | 979164.154 | 39.89 | 12.999 | 0.03133 | -19.985 |
| 497 | 529739.008 | 6915932.31 | 143.658 | 141.30213 | -27.8811 | 979111.507 | 979162.89 | 44.343 | 14.45 | 0.074013 | -20.532 |
| 498 | 529824.229 | 6918013.23 | 122.913 | 141.30295 | -27.86231 | 979115.493 | 979161.488 | 37.94 | 12.363 | 0.04518 | -20.153 |
| 512 | 505813.695 | 6915956.68 | 87.103 | 141.05906 | -27.8812 | 979125.726 | 979162.897 | 26.886 | 8.761 | 0.030844 | -18.687 |
| 524 | 545899.404 | 6930077.44 | 70.452 | 141.46576 | -27.75295 | 979129.699 | 979153.34 | 21.747 | 7.086 | 0.036479 | -8.488 |
| 526 | 545920.993 | 6933932.25 | 94.161 | 141.46584 | -27.71815 | 979121.414 | 979150.751 | 29.065 | 9.471 | 0.086626 | -9.314 |
| 527 | 545926.933 | 6935865.17 | 65.779 | 141.46582 | -27.7007 | 979126.293 | 979149.454 | 20.304 | 6.616 | 0.060937 | -9.096 |
| 563 | 533993.245 | 6918003.36 | 131.863 | 141.34529 | -27.8623 | 979114.273 | 979161.487 | 40.703 | 13.263 | 0.067034 | -19.296 |
| 566 | 540097.096 | 6917986 | 107.488 | 141.40729 | -27.86229 | 979120.529 | 979161.486 | 33.179 | 10.812 | 0.019854 | -18.082 |

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|-----|------------|------------|---------|-----------|-----------|------------|------------|--------|--------|----------|---------|
| 570 | 520150.343 | 6918032.82 | 163.497 | 141.20468 | -27.86231 | 979105.159 | 979161.488 | 50.467 | 16.445 | 0.048709 | -21.85 |
| 571 | 522081.732 | 6918026.51 | 180.565 | 141.2243 | -27.86234 | 979101.071 | 979161.49 | 55.736 | 18.162 | 0.077111 | -22.515 |
| 572 | 523991.761 | 6918020.04 | 185.38 | 141.2437 | -27.86237 | 979100.745 | 979161.492 | 57.222 | 18.646 | 0.117363 | -21.538 |
| 589 | 551903.397 | 6913998.43 | 91.8 | 141.52739 | -27.89788 | 979120.771 | 979164.143 | 28.336 | 9.234 | 0.054233 | -23.742 |
| 590 | 554129.76 | 6913981.97 | 84.56 | 141.55001 | -27.89794 | 979121.363 | 979164.147 | 26.101 | 8.505 | 0.019671 | -24.709 |
| 591 | 555960.049 | 6913986.83 | 79.774 | 141.56861 | -27.89782 | 979121.669 | 979164.138 | 24.624 | 8.024 | 0.032106 | -25.43 |
| 594 | 531992.368 | 6914055.7 | 127.304 | 141.32508 | -27.89799 | 979117.081 | 979164.151 | 39.295 | 12.805 | 0.029214 | -20.042 |
| 595 | 533981.906 | 6914052.24 | 135.873 | 141.34529 | -27.89797 | 979114.954 | 979164.15 | 41.94 | 13.667 | 0.025808 | -20.404 |
| 596 | 535875.208 | 6914064.27 | 124.269 | 141.36453 | -27.89781 | 979117.462 | 979164.138 | 38.359 | 12.499 | 0.028574 | -20.366 |
| 598 | 540097.002 | 6914038.67 | 124.077 | 141.40743 | -27.89792 | 979116.835 | 979164.146 | 38.299 | 12.48 | 0.015941 | -20.884 |
| 603 | 522067.559 | 6914085.3 | 165.803 | 141.22423 | -27.89792 | 979109.573 | 979164.146 | 51.179 | 16.677 | 0.12939 | -19.175 |
| 604 | 523988.131 | 6914027.13 | 143.096 | 141.24375 | -27.89841 | 979114.688 | 979164.183 | 44.17 | 14.393 | 0.032504 | -19.201 |
| 605 | 527877.712 | 6914062.87 | 131.757 | 141.28327 | -27.89801 | 979116.191 | 979164.153 | 40.67 | 13.253 | 0.025601 | -20.162 |
| 606 | 525967.26 | 6914066.57 | 131.359 | 141.26385 | -27.89802 | 979116.689 | 979164.153 | 40.547 | 13.213 | 0.034799 | -19.636 |
| 608 | 507943.81 | 6914100.94 | 106.925 | 141.08072 | -27.89794 | 979125.366 | 979164.147 | 33.005 | 10.755 | 0.056201 | -16.087 |
| 609 | 509847.9 | 6914108.29 | 103.14 | 141.10006 | -27.89786 | 979126.303 | 979164.141 | 31.837 | 10.374 | 0.075536 | -15.768 |
| 610 | 511914.546 | 6914099.96 | 124.521 | 141.12106 | -27.89792 | 979121.223 | 979164.146 | 38.436 | 12.525 | 0.088094 | -16.512 |
| 611 | 513979.582 | 6914097.37 | 150.421 | 141.14205 | -27.89792 | 979114.962 | 979164.146 | 46.431 | 15.13 | 0.06598 | -17.428 |
| 612 | 516054.949 | 6914092.6 | 141.589 | 141.16314 | -27.89794 | 979116.78 | 979164.147 | 43.705 | 14.242 | 0.049262 | -17.351 |
| 618 | 505797 | 6914105.19 | 112.918 | 141.0589 | -27.89791 | 979123.302 | 979164.145 | 34.855 | 11.358 | 0.092553 | -17.064 |
| 716 | 550003.144 | 6915908.42 | 99.463 | 141.508 | -27.88071 | 979120.568 | 979162.861 | 30.702 | 10.004 | 0.028414 | -21.13 |
| 718 | 554138.51 | 6915896.42 | 83.862 | 141.55001 | -27.88066 | 979121.901 | 979162.857 | 25.886 | 8.435 | 0.01838 | -23.018 |
| 723 | 533982.663 | 6915961.85 | 130.816 | 141.34524 | -27.88073 | 979114.675 | 979162.863 | 40.379 | 13.158 | 0.018248 | -20.412 |
| 734 | 526026.059 | 6915987.33 | 137.076 | 141.26441 | -27.88068 | 979113.354 | 979162.859 | 42.312 | 13.788 | 0.054557 | -20.491 |
| 739 | 513990.089 | 6916005.38 | 116.153 | 141.14213 | -27.8807 | 979119.016 | 979162.86 | 35.853 | 11.683 | 0.079306 | -19.172 |
| 744 | 502071.598 | 6916006.38 | 82.978 | 141.02105 | -27.88076 | 979125.039 | 979162.865 | 25.613 | 8.346 | 0.018069 | -20.32 |
| 748 | 550013.768 | 6919842.79 | 92.047 | 141.50794 | -27.84519 | 979123.55 | 979160.211 | 28.413 | 9.258 | 0.016635 | -17.061 |
| 755 | 533997.659 | 6919895.41 | 133.116 | 141.34528 | -27.84522 | 979114.484 | 979160.213 | 41.089 | 13.389 | 0.038859 | -17.447 |
| 757 | 538139.559 | 6919860.56 | 111.744 | 141.38735 | -27.84542 | 979120.107 | 979160.228 | 34.492 | 11.24 | 0.024439 | -16.277 |
| 763 | 522095.709 | 6919901.59 | 167.476 | 141.22441 | -27.84541 | 979103.788 | 979160.228 | 51.695 | 16.845 | 0.090057 | -20.654 |
| 767 | 529828.201 | 6919918.15 | 126.268 | 141.30294 | -27.84511 | 979114.62 | 979160.205 | 38.976 | 12.701 | 0.10429 | -18.783 |
| 779 | 548030.122 | 6922076.2 | 88.409 | 141.48771 | -27.8251 | 979125.703 | 979158.713 | 27.29 | 8.893 | 0.028573 | -14.131 |
| 780 | 550023.629 | 6922064.53 | 83.565 | 141.50795 | -27.82514 | 979126.231 | 979158.716 | 25.794 | 8.405 | 0.023981 | -14.659 |
| 781 | 551940.416 | 6922063.62 | 80.177 | 141.52741 | -27.82507 | 979126.169 | 979158.711 | 24.749 | 8.065 | 0.020502 | -15.366 |

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|-----|------------|------------|---------|-----------|-----------|------------|------------|--------|--------|----------|---------|
| 783 | 556002.426 | 6922041.41 | 76.638 | 141.56866 | -27.82511 | 979125.612 | 979158.714 | 23.656 | 7.709 | 0.018384 | -16.75 |
| 785 | 558075.641 | 6922017.04 | 69.288 | 141.58971 | -27.82524 | 979126.272 | 979158.724 | 21.387 | 6.969 | 0.029512 | -17.544 |
| 786 | 532007.395 | 6922124.99 | 113.404 | 141.32501 | -27.82514 | 979118.845 | 979158.716 | 35.005 | 11.407 | 0.071217 | -15.729 |
| 788 | 535863.715 | 6922111.21 | 124.836 | 141.36417 | -27.82517 | 979117.616 | 979158.718 | 38.534 | 12.557 | 0.031423 | -14.632 |
| 789 | 538093.326 | 6922115.03 | 99.276 | 141.38681 | -27.82507 | 979123.829 | 979158.711 | 30.644 | 9.986 | 0.061691 | -13.711 |
| 790 | 540090.771 | 6922110.26 | 109.897 | 141.40709 | -27.82506 | 979121.215 | 979158.71 | 33.922 | 11.054 | 0.018819 | -14.123 |
| 793 | 545834.825 | 6922127.32 | 97.219 | 141.46541 | -27.82472 | 979123.601 | 979158.685 | 30.009 | 9.779 | 0.016576 | -14.256 |
| 794 | 520148.165 | 6922154.42 | 139.206 | 141.20459 | -27.82511 | 979109.121 | 979158.714 | 42.969 | 14.002 | 0.191619 | -19.364 |
| 795 | 522206.086 | 6922135.46 | 153.465 | 141.22549 | -27.82525 | 979106.636 | 979158.724 | 47.371 | 15.436 | 0.148781 | -19.587 |
| 796 | 524049.416 | 6922178.06 | 136.474 | 141.2442 | -27.82483 | 979111.153 | 979158.693 | 42.126 | 13.727 | 0.123186 | -18.278 |
| 798 | 525791.382 | 6922171.19 | 139.058 | 141.26189 | -27.82486 | 979111.275 | 979158.695 | 42.924 | 13.987 | 0.06184 | -17.792 |
| 799 | 529843.836 | 6922130.63 | 115.133 | 141.30304 | -27.82514 | 979117.571 | 979158.716 | 35.539 | 11.581 | 0.039018 | -16.726 |
| 805 | 518022.688 | 6922155.59 | 154.279 | 141.18301 | -27.82513 | 979105.193 | 979158.715 | 47.622 | 15.518 | 0.083454 | -20.936 |
| 817 | 558082.473 | 6923864.43 | 65.083 | 141.58969 | -27.80856 | 979127.491 | 979157.481 | 20.089 | 6.546 | 0.020109 | -16.191 |
| 819 | 534010.907 | 6923957.53 | 97.758 | 141.3453 | -27.80855 | 979123.972 | 979157.48 | 30.175 | 9.833 | 0.029194 | -12.658 |
| 823 | 542028.458 | 6924017.32 | 97.815 | 141.4267 | -27.80778 | 979124.434 | 979157.422 | 30.193 | 9.839 | 0.022079 | -12.192 |
| 825 | 545938.333 | 6923928.76 | 87.391 | 141.4664 | -27.80845 | 979126.345 | 979157.472 | 26.975 | 8.79 | 0.021831 | -12.385 |
| 827 | 522096.255 | 6923987.87 | 137.845 | 141.22434 | -27.80853 | 979109.99 | 979157.478 | 42.549 | 13.865 | 0.077255 | -18.193 |
| 830 | 525794.257 | 6923961.45 | 141.014 | 141.26188 | -27.8087 | 979110.839 | 979157.491 | 43.527 | 14.184 | 0.061165 | -16.792 |
| 831 | 530015.29 | 6923966.14 | 128.625 | 141.30474 | -27.80857 | 979114.945 | 979157.481 | 39.703 | 12.938 | 0.066518 | -15.303 |
| 837 | 518027.513 | 6923989.81 | 122.64 | 141.18303 | -27.80857 | 979111.752 | 979157.481 | 37.856 | 12.336 | 0.102953 | -19.712 |
| 844 | 550046.689 | 6928000.22 | 72.919 | 141.50793 | -27.77155 | 979128.936 | 979154.724 | 22.508 | 7.334 | 0.022055 | -10.224 |
| 851 | 534026.3 | 6928061.37 | 101.732 | 141.34534 | -27.7715 | 979123.361 | 979154.72 | 31.402 | 10.233 | 0.06 | -9.94 |
| 852 | 535928.707 | 6928049.07 | 82.187 | 141.36465 | -27.77156 | 979128.477 | 979154.725 | 25.369 | 8.267 | 0.069534 | -8.507 |
| 853 | 538143.954 | 6928006.26 | 96.293 | 141.38713 | -27.77189 | 979125.467 | 979154.749 | 29.723 | 9.686 | 0.058669 | -8.743 |
| 855 | 542031.403 | 6927985.15 | 86.589 | 141.42659 | -27.77196 | 979127.029 | 979154.755 | 26.728 | 8.709 | 0.024698 | -9.279 |
| 857 | 545884.435 | 6928010.44 | 75.9 | 141.46569 | -27.77161 | 979129.101 | 979154.728 | 23.428 | 7.634 | 0.02158 | -9.286 |
| 859 | 522215.211 | 6928066.44 | 115.279 | 141.22547 | -27.7717 | 979114.611 | 979154.735 | 35.584 | 11.595 | 0.048512 | -15.714 |
| 862 | 526050.705 | 6928116.68 | 137.627 | 141.26439 | -27.77118 | 979111.635 | 979154.697 | 42.482 | 13.843 | 0.063887 | -14.145 |
| 869 | 518029.117 | 6928091.89 | 99.267 | 141.18298 | -27.77154 | 979116.086 | 979154.723 | 30.641 | 9.985 | 0.043205 | -17.428 |
| 875 | 548062.639 | 6930065.82 | 68.383 | 141.48772 | -27.75298 | 979129.69 | 979153.342 | 21.108 | 6.878 | 0.037343 | -8.902 |
| 882 | 532026.651 | 6930119.99 | 138.36 | 141.32499 | -27.75297 | 979113.824 | 979153.341 | 42.708 | 13.917 | 0.148783 | -10.125 |
| 886 | 540123.312 | 6930099.73 | 88.728 | 141.40715 | -27.75293 | 979126.394 | 979153.338 | 27.388 | 8.925 | 0.037091 | -7.965 |
| 887 | 542092.439 | 6930062.48 | 77 | 141.42713 | -27.75321 | 979128.676 | 979153.359 | 23.768 | 7.745 | 0.038762 | -8.158 |

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|------|------------|------------|---------|-----------|-----------|------------|------------|--------|--------|----------|---------|
| 888 | 544021.05 | 6930078.92 | 74.862 | 141.4467 | -27.753 | 979128.959 | 979153.343 | 23.108 | 7.53 | 0.026711 | -8.333 |
| 891 | 522216.033 | 6930139.03 | 96.493 | 141.22544 | -27.75299 | 979118.232 | 979153.343 | 29.785 | 9.706 | 0.078879 | -14.572 |
| 892 | 524169.273 | 6930116.62 | 107.657 | 141.24526 | -27.75316 | 979116.975 | 979153.355 | 33.231 | 10.829 | 0.066862 | -13.361 |
| 893 | 527919.388 | 6930125.65 | 130.396 | 141.28331 | -27.75301 | 979113.754 | 979153.344 | 40.25 | 13.116 | 0.084131 | -12.022 |
| 895 | 529887.722 | 6930123.18 | 105.096 | 141.30329 | -27.75299 | 979120.419 | 979153.342 | 32.44 | 10.571 | 0.08549 | -10.539 |
| 901 | 518042.289 | 6930143.94 | 95.23 | 141.18309 | -27.75301 | 979116.058 | 979153.344 | 29.395 | 9.579 | 0.023679 | -17.008 |
| 908 | 550064.528 | 6931892.64 | 62.332 | 141.50795 | -27.73641 | 979129.283 | 979152.109 | 19.24 | 6.27 | 0.043285 | -9.337 |
| 921 | 545900.793 | 6931914.01 | 94.704 | 141.46571 | -27.73637 | 979122.92 | 979152.106 | 29.233 | 9.526 | 0.030145 | -8.956 |
| 951 | 542003.028 | 6935824.2 | 100.583 | 141.42602 | -27.7012 | 979120.223 | 979149.491 | 31.047 | 10.117 | 0.067861 | -7.52 |
| 983 | 542141.141 | 6938710.71 | 93.47 | 141.42732 | -27.67514 | 979119.48 | 979147.555 | 28.852 | 9.402 | 0.036611 | -8.231 |
| 1014 | 544041.89 | 6933926.67 | 105.043 | 141.44677 | -27.71826 | 979119.548 | 979150.76 | 32.424 | 10.566 | 0.054833 | -8.812 |
| 1034 | 550034.308 | 6925817.84 | 82.794 | 141.5079 | -27.79125 | 979126.866 | 979156.191 | 25.556 | 8.328 | 0.016897 | -11.595 |
| 1036 | 554183.07 | 6925799.81 | 69.746 | 141.55001 | -27.79126 | 979128.372 | 979156.191 | 21.529 | 7.015 | 0.017318 | -12.825 |
| 1037 | 556017.885 | 6925794.79 | 64.728 | 141.56864 | -27.79123 | 979128.653 | 979156.189 | 19.98 | 6.511 | 0.016772 | -13.643 |
| 1040 | 532020.704 | 6925890.61 | 108.088 | 141.32504 | -27.79115 | 979121.137 | 979156.183 | 33.364 | 10.872 | 0.033069 | -12.202 |
| 1041 | 534016.021 | 6925873.78 | 92.791 | 141.3453 | -27.79125 | 979125.454 | 979156.191 | 28.642 | 9.333 | 0.04063 | -11.02 |
| 1045 | 542044.316 | 6925844.6 | 95.742 | 141.42679 | -27.79129 | 979124.996 | 979156.194 | 29.553 | 9.63 | 0.024026 | -10.817 |
| 1046 | 543992.021 | 6925859.28 | 85.056 | 141.44656 | -27.79109 | 979127.484 | 979156.179 | 26.255 | 8.555 | 0.030305 | -10.511 |
| 1047 | 545951.926 | 6925815.69 | 81.964 | 141.46646 | -27.79142 | 979128.024 | 979156.203 | 25.3 | 8.244 | 0.02375 | -10.538 |
| 1049 | 522215.947 | 6925935.34 | 138.535 | 141.22552 | -27.79094 | 979109.897 | 979156.168 | 42.762 | 13.934 | 0.08707 | -16.774 |
| 1051 | 527757.93 | 6925909.22 | 137.993 | 141.28177 | -27.79107 | 979112.366 | 979156.178 | 42.595 | 13.88 | 0.151651 | -14.239 |
| 1052 | 526101.55 | 6925911.94 | 134.377 | 141.26496 | -27.79108 | 979112.596 | 979156.178 | 41.479 | 13.516 | 0.091067 | -14.92 |
| 1059 | 518034.177 | 6925924.41 | 97.14 | 141.18307 | -27.7911 | 979117.215 | 979156.18 | 29.985 | 9.771 | 0.056605 | -18.159 |
| 1077 | 542136.774 | 6937358.55 | 100.547 | 141.42733 | -27.68734 | 979118.906 | 979148.461 | 31.036 | 10.113 | 0.034461 | -8.283 |
| 1078 | 544058.359 | 6937347.94 | 87.935 | 141.44681 | -27.68738 | 979120.755 | 979148.464 | 27.143 | 8.845 | 0.03709 | -8.967 |

APPENDIX B – GRAVITY EQUIPMENT SPECS

B.1 GRAVITY EQUIPMENT TECHNICAL SPECIFICATIONS

Survey Gravity Meters

| | |
|---|-----|
| 6 × Scintrex AutoGrav CG-5M (s/n) | 951 |
| | 966 |

Scintrex CG-5M Specifications

| | |
|--|--|
| Sensor element..... | fused quartz elastic spring |
| Nulling | electrostatic restoring |
| Resolution | 0.001mGal |
| Typical repeatability | $\sigma < 0.010\text{mGal}$ |
| Operating Range..... | minimum, 8000mGal |
| Residual long-term drift | $< 0.020\text{mGal/day}$ |
| Levels | electronic tilt sensors |
| Tilt correction range..... | ± 200 arc sec |
| Data recording..... | flash technology, up to 200000 readings |
| Operating Temperature..... | -40°C to $+45^{\circ}\text{C}$ |
| Operating Temperature (high temperature version) | -40°C to $+55^{\circ}\text{C}$ |
| Dimensions | $33 \times 21 \times 20$ |
| Weight (including battery)..... | 8.9kg |
| Power consumption..... | 4.5 Watts at 25°C |

APPENDIX C - DIGITAL DATA

All the project raw and processed data files are archived at I EM CoE office in Milan, on DVD and magnetic tape.

GRAVITY DATA

| | |
|--------------------------------------|---|
| Instrument raw files | *.txt (Scintrex meter) |
| Scanned operation field-books | *.pdf (L&R and Scintrex meters) |
| Base network | Base Ties .xlsx |
| Base network data ties | :\Base_ties_GR (all ties raw data) |
| Absolute reference data | :\INGS_reference |
| | |
| Loop data | OBServedGR.xlsx (Meter and tide corrected Observed Gravity) |
| Processed Data | CompleteBouguer.txt <i>Observed, Theoretical, Free Air and Terrain Correction, Simple and Complete Bouguer Anomaly. Final metric coordinates</i> |

Report Deliverables

Acrobat pdf file of this report

Final Bouguer spreadsheet file (ATP_Complete_Boug_24gcc.xlsx).
