

# Open File Envelope

## No. 10,120

**EL 2976**

**MERNA MORA**

**FIRST ANNUAL / FINAL REPORT TO LICENCE EXPIRY  
FOR THE PERIOD 25/6/2002 TO 24/6/2003**

Submitted by  
Mara Pty Ltd  
2003

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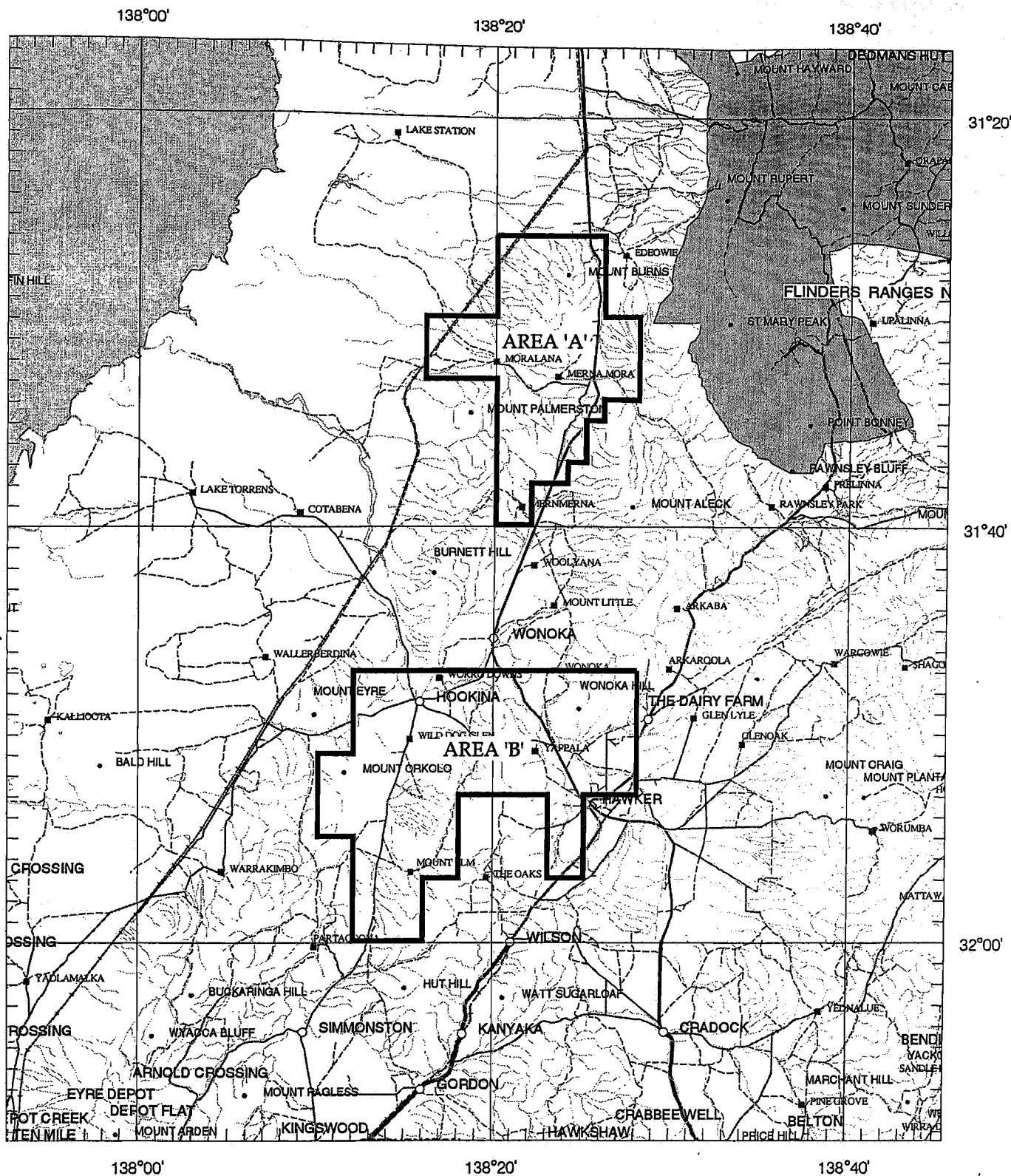
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**PRIMARY INDUSTRIES  
AND RESOURCES SA**

# SCHEDULE A



APPLICANT : MARA PTY LTD, INCA RESOURCES PTY LTD, LEBRUN A F G, ALLENDER J F

FILE REF : 211/01 TYPE : MINERAL ONLY AREA : 701 km<sup>2</sup> (approx.)

1:250000 MAPSHEETS : PARACHILNA

LOCALITY : WARRAKIMBO AREA - Approximately 100 km northeast of Port Augusta

DATE GRANTED : 25 June 2002

DATE EXPIRED : 24 June 2003

EL No : 2976

**EXPLORATION LICENCE EL 2976**

**ANNUAL TECHICAL REPORT PE 24/06/2003**

**Submitted on behalf of Mara Pty Ltd**

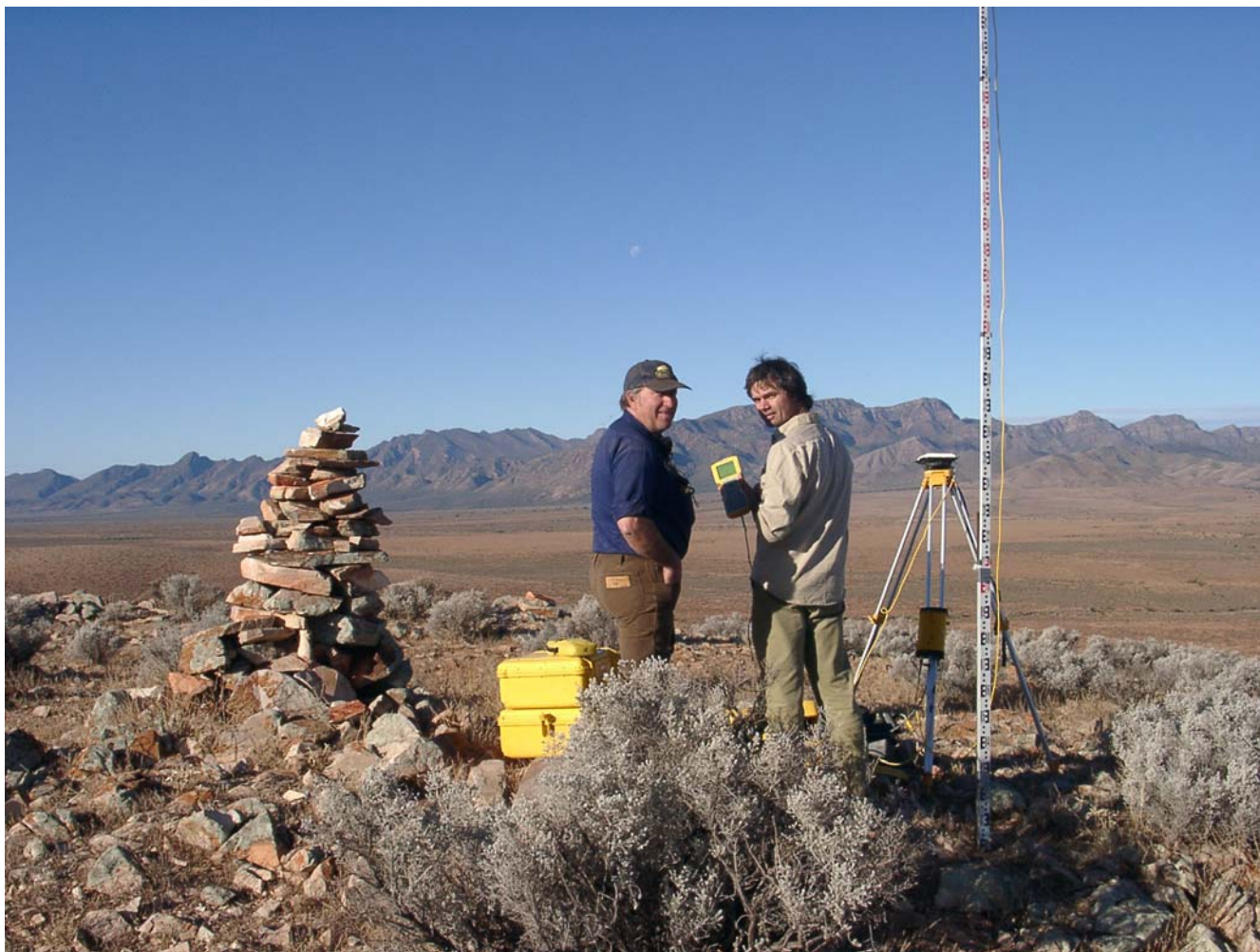
**Now Torrens Resources**

**By**

**JF Allender**

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# Merna Mora - EL 2976



*Merna Moras Area - Exploration Licence 2976*

## Operations Report

September 2002

|  |                            |
|--|----------------------------|
|  | <b>Author</b> Mara Pty Ltd |
|--|----------------------------|

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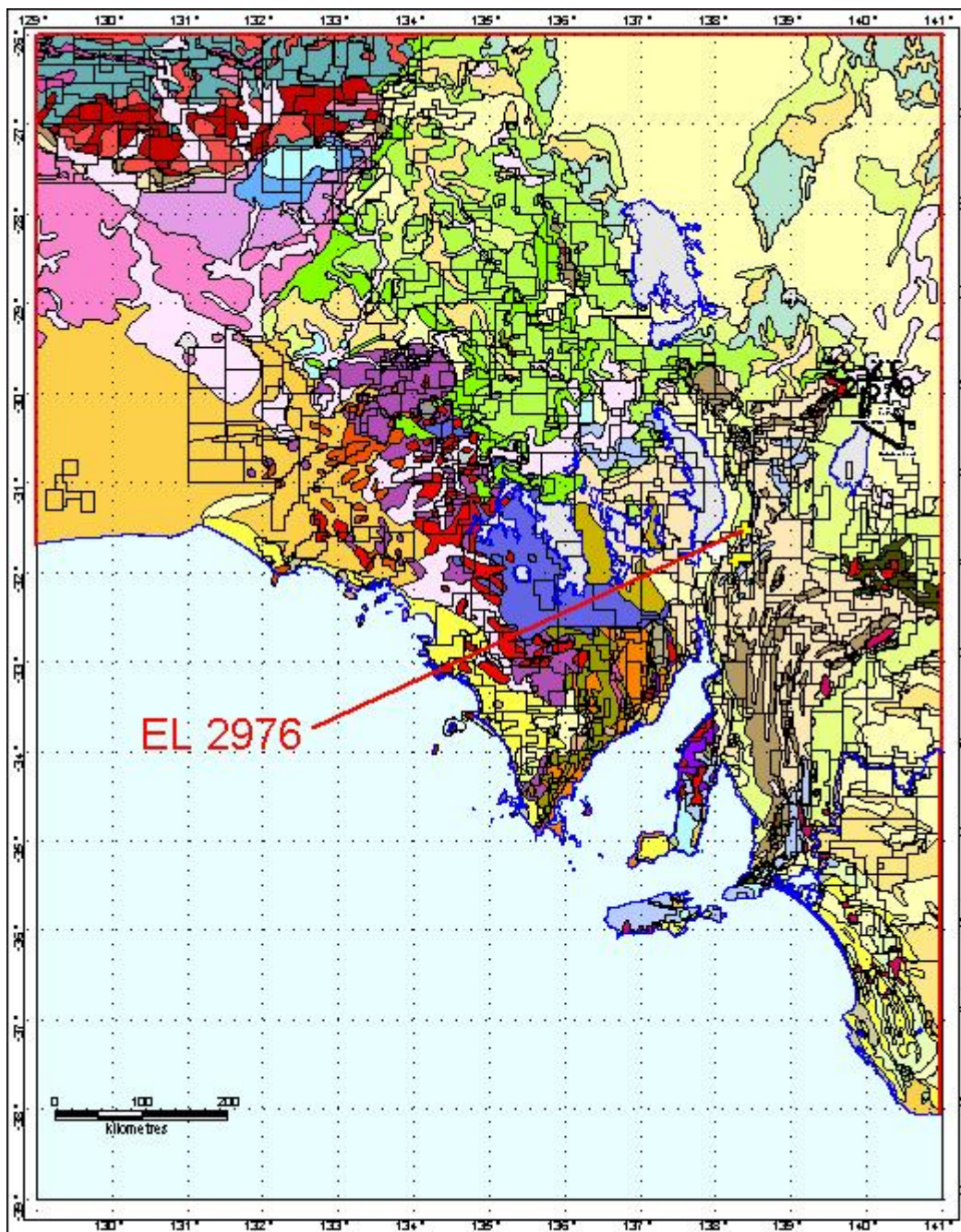
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Bouguer Gravity contours

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*Location plan EL 2860 - lake Torrens*

## **INTRODUCTION**

This report describes the recent ground gravity survey undertaken by Allender Exploration Pty Ltd on behalf of Mara Pty Ltd in EL 2976.

The work was concentrated on geophysical acquisition over a gravity anomalous area within the central portion of EL 2860 resulting from earlier regional surveys included in the PIRSA data base. The

gravity acquisition field work was undertaken on 22-23 May 2002.

## **LOCATION AND ACCESS**

EL 2860 lies 80 kilometres northwest of the town of Hawker. Access is by road via the Hawker-Parachilna Road then west via unsealed roads and station tracks largely on Moralana and Merna Mora pastoral stations.

---

## TENURE

Exploration licence 2976 was granted on the 26 June 2002. The term of the tenement expires on 24 June 2003.

## GEOLOGY

The geology of the tenement is reasonably well known at least in terms of outcrop. The area is used as a training area for mapping by students from the University of South Australia. The reason for the regional gravity extrema is not known. A number of copper shows with shallow workings and shafts exist throughout the permit area. Geochemical survey work was in progress by Desertstone in the area when that company withdrew from exploration.



*Reading meter*



*Copper Workings.*

## PREVIOUS EXPLORATION

Previous exploration in the region has been sporadic and limited. A detailed close-spaced airborne magnetics survey was undertaken by AGSO. A detailed review of the geological work undertaken is under way. This work will incorporate the efforts made by students in their university mapping projects.

## EXPLORATION BY THE CURRENT LICENCE HOLDERS

The licence holder reviewed the available geophysical data.

Data were obtained from PIRSA's Initiative surveys. The magnetic data were reprocessed and reduced to the pole. The data over several discrete magnetic anomalies were not modelled as the terrain effects have yet to be incorporated.

A broad regional and brief geophysical program over EL 2976 was undertaken along existing roads and tracks. A Landsat ETM 7 scene provided a base for the geophysical acquisition program.

The ground gravity survey work was undertaken in May 2002. The survey locations were derived using Real Time Kinematic equipment. La Coste-Romberg gravity meter model G No 212 was used to record field gravity readings. Data were field reduced and preliminary contour maps were field produced in order to verify morphological internal consistency and to design infill program.

Mara undertook this regional gravity survey with the objective to define areas within the licence that could provide suitable geophysically based drilling targets.

The current program was planned to verify the existence of a broad regional gravity maximum and to determine if the area presents additional geophysical targets.

---



*Reading the La Coste Romberg gravity meter .*

The picture shows the key elements of the real time kinematic GPS (RTK). The base station antenna is mounted on the tripod with the UHF antenna up above, on top the staff. The yellow box on the tripod is the UHF transmitter link to the mobile, in this case the vehicle. The electronic coordinating unit is, on the ground, out of sight.

The mobile has a similar configuration. Note the GPS antenna on the bonnet. The spring-mounted antenna on the bull bar is the UHF link for the RTK GPS from the mobile to the base station. The transmitter and coordinator units for the mobile are in the vehicle.

The white GPS antenna on the bull bar is the separate navigation system GPS antenna. The bonnet mounted UHF antenna is the local communication radio.

The unit has a data logger and controller that is show below.



*RTK GPS base station showing UHF link to mobile  
Base station coordinating unit and power supply  
and Wence holding the controller. A similar setup  
is in the vehicle.*

The controller is shared between the base and the mobile and travels with the operator.

The system is really good. There is no post-processing; all positional results including elevations are displayed in real time and provide a repeatable accurate reading, relative to a known point of 12mm vertical, over a horizontal range of 10 kms. Horizontal resolution is infinitesimal.



*RTK GPS base station showing GPS receiver*

tracks and routes can also be used. Data were downloaded every couple of days into a PC and logged manually as well. The gravity data can also be logged with this device.

The real time output is superb and readily allows a check on system integrity. Gone are the days of post-processing GPS location data.



*LaCoste Romberg meter*



*RTK GPS data logger and controller*

The controller has a very well designed one-handed operating mode with an alphanumeric keyboard for data entry and to control the whole system either by direct plug-in or by UHF radio. The device logs a large number of parameters including of not only the X,Y,Z values but also RMS errors, satellite parameter data, time and so on. It is also capable of making program, actual and navigation maps. Waypoints,



*Gravity base station with control brought in from Hawker*



*Merna Mora looking east toward Wilpena Pound*



*Moralana Shearing shed*

The following software packages were involved in the office data reduction:

Petrosys  
Intrepid  
Potent  
Model Vision  
ERMapper  
Mapinfo  
PFE32  
Manifold

## RESULTS

The results were very good and showed little noise. The navigation system and in combination with the La Coste Romberg meter worked well and resulted in an error free data set. The results have been incorporated with the regional State data

base and the results presented as Bouguer gravity grid images and contours.

## CONCLUSIONS

The results of the geophysical survey verify that the area is characterised by a large Bouguer gravity anomaly. The effects of a rapidly varying topography on the Bouguer gravity calculations have not been considered

## RECOMENDATIONS

The results need to have terrain corrections applied. This should be done prior to a further detailed gravity survey being undertaken. It is recommended that a regional grid be emplaced over the entire permit making use of existing roads and tracks wherever possible.

## REFERENCES

Drexel, J.F., Preiss, W.V. and Parker, A.J. 1993. The Geology of South Australia. Vol 1, The Precambrian. South Australia

Preiss, W.V. (Compiler), 1987. The Adelaide Geosyncline—Late Proterozoic stratigraphy, sedimentation, palaeontology and tectonics. Bull. Geol. Surv. S. Aust., 53.

Open File Reports - Envelope 0904 PIRSA. This folder contains reports from Desertstone NL. Exploration activities

Mara Pty Ltd. Lake Torrens EL 2860. Operations report February 2002.

\*\*\*\*\*  
\*\*\*\*\*

Intrepid Gravity v3.6  
(release) cut 158 (static)  
Start processing - 14/ 4/2002  
16:57: 9

\*\*\*\*\*  
\*\*\*\*\*

Gravity AGSO Field Data Checking  
Report  
-----  
-----

Starting from AGSO field and  
checking loops, GPS etc.  
.. If you want to produce  
profiles, use LINE\_POSITION  
keyword  
.. and start each GPS record with  
an additional line number entry  
-----

Survey 8888: Merna

1: Position Data  
Full 3-D projection / datum  
conversion requested from  
MGA54/WGS84 to GEODETIC/AGD66  
1.1: Position Set 1

Coordinate Reference Frame  
- UNKNOWN  
Ellipsoid  
- WGS  
Horizontal Datum  
- WGS84  
Vertical Datum  
- AHD  
Coordinate Projection  
- MGA54  
Position Accuracy  
- 0.000001  
Elevation Accuracy  
- 0.020  
Data Bounds  
Number of Stations  
- 76  
Longitudes/latitudes  
transformed to horizontal  
datum  
- AGD66  
Longitude (Maximum, Minimum)  
- 138.427420 ( 2037.000),  
138.341895 ( 2066.000)  
Latitude (Maximum, Minimum)  
- -31.437674 ( 2034.000), -  
31.618800 ( 2012.000)  
Elevation (Maximum, Minimum)  
- 261.432 ( 2029.000),  
142.648000 ( 2033.000)

1.2: Position Set 2  
Coordinate Reference Frame  
- UNKNOWN  
Ellipsoid  
- WGS  
Horizontal Datum  
- WGS84  
Vertical Datum  
- AHD  
Coordinate Projection  
- MGA54  
Position Accuracy  
- 0.000001  
Elevation Accuracy  
- 0.020  
Data Bounds  
Number of Stations  
- 1  
Longitudes/latitudes  
transformed to horizontal  
datum  
- AGD66  
Longitude (Maximum, Minimum)  
- 138.084360 ( 1001.000),  
138.084360 ( 1001.000)  
Latitude (Maximum, Minimum)  
- -31.757825 ( 1001.000), -  
31.757825 ( 1001.000)  
Elevation (Maximum, Minimum)  
- 199.084 ( 1001.000),  
199.084000 ( 1001.000)

1.3: Total Number of Stations  
- 77

2: Control Gravity Data  
2.1: Station List  
Station Obs Gravity  
Precision Datum  
Theoretical Comments  
1001 9793869.8160  
0.1000 IGSN71 9794638.5787  
Nase Station at Moralan Gate

2.2: Primary Control Gravity  
Station - 1001

3: Gravity Meter Calibration Loop  
Data  
No Gravity Meter Calibration Data

4: Gravity Observation Loop Data  
4.1: Gravity Meter Loop Set 1  
Gravimeter -  
LCR\_G(LCR): Meter - G212,  
Adjustment to Manufacturers Scale  
Factor 1.057500  
Gravimeter Reader - Jim  
Allender  
Number of Loops - 3  
Loop Number Readings  
BaseIn BaseOut Start  
End  
1 100.010 24  
1001 1001 23/ 5/2002 8:44  
23/ 5/2002 10:49

```

      2      101.010      25
1001      1001      23/ 5/2002 10:49
23/ 5/2002 13:13
      3      102.010      28
1001      1001      23/ 5/2002 14: 0
23/ 5/2002 17:21

```

#### 5: Node List

```

  X - node in loop
  D - node in loop used for
drift control
  F - fixed node in loop
5.1: Gravity Meter Loop Set 1
validation test
  Relaxed view of what constitutes
a loop node.
Look for station numbers that are
repeated
A node is defined as a station
that appears in more than one
loop.
Default all first and last
stations in a loop to a node.
Also add all fixed stations
Number of Unique Nodes = 1

```

| Loop | 1 | 2 | 3 |
|------|---|---|---|
| Node |   |   |   |
| 1001 | D | D | D |

6: Global Nodes - Nodes common to more than one Gravimeter  
Warning - NO GLOBAL NODES FOUND  
You have only one loop/one gravity meter  
No global adjustment will be attempted

#### 7: Internal Loop repeat stations

7.1: Gravity Meter Loop Set 1

| Loop    | Station | No. |
|---------|---------|-----|
| Repeats |         |     |

```

1
2
3

```

Total Number of Repeats 0

#### 8: Data Structure Check

8.1: Data Structure Check for Gravity Meter Loop Set 1

| Loop | FirstAndLast | TimeOrder | Tares | Position | Nodes |
|------|--------------|-----------|-------|----------|-------|
| 1    | ok           |           |       |          | ok    |

\*\* possible tare(s) in data

```

      Station1 Station2
Difference
      1001      1002
23.840
      1002      2001      -
21.510
      ok      ok      ok
      2      ok      ok      ok
      3      ok      ok      ok
      ok      ok      ok
SaveLoopDB
Loop DB output in GEODETIC proj,
AGD66 datum
*** 77 stations output in newly
created intrepid gravity loop
database
                        data stored in ->
Survey8888_LoopDB
Gravity output DB created
Survey8888_ControlDB, in
GEODETIC proj, AGD66 datum
*** 1 stations output in newly
created gravity database
                        data stored in Intrepid
format -> Survey8888_ControlDB

```

```

*****
*****
End processing - 14/ 4/2002
16:57:13, Log =
J:/skeleton/Grav_survey/Intrepid/
Merna_Mora_processing.rpt

```

```

*****
*****

```

```

*****
*****
Intrepid Gravity v3.6
(release) cut 158 (static)
Start processing - 14/ 4/2002
16:57:46

```

```

*****
*****

```

Gravity AGSO Field Data Checking Report

```

-----
-----

```

Starting from AGSO field and checking loops, GPS etc.  
.. If you want to produce profiles, use LINE\_POSITION keyword  
.. and start each GPS record with an additional line number entry

```

-----
-----

```

Survey 8888: Merna

|                               |                                 |
|-------------------------------|---------------------------------|
| 1: Position Data              | Elevation (Maximum, Minimum)    |
| Full 3-D projection / datum   | - 199.084 ( 1001.000),          |
| conversion requested from     | 199.084000 ( 1001.000)          |
| MGA54/WGS84 to GEODETIC/GDA94 |                                 |
| 1.1: Position Set 1           | 1.3: Total Number of Stations   |
| Coordinate Reference Frame    | - 77                            |
| - UNKNOWN                     | 1a.GPS check Print of positions |
| Ellipsoid                     | 1:                              |
| - WGS                         | Station Latitude Longitude      |
| Horizontal Datum              | Height                          |
| - WGS84                       | 1001 -31.55130 138.38866        |
| Vertical Datum                | 199.084                         |
| - AHD                         | 1002 -31.53049 138.39598        |
| Coordinate Projection         | 208.464                         |
| - MGA54                       | 2001 -31.55316 138.39935        |
| Position Accuracy             | 216.919                         |
| - 0.000001                    | 2002 -31.55288 138.40970        |
| Elevation Accuracy            | 230.049                         |
| - 0.020                       | 2003 -31.55632 138.41911        |
| Data Bounds                   | 245.732                         |
| Number of Stations            | 2004 -31.55708 138.42831        |
| - 76                          | 238.592                         |
| Longitudes/latitudes          | 2005 -31.56591 138.42749        |
| transformed to horizontal     | 237.936                         |
| datum                         | 2006 -31.57347 138.42265        |
| - GDA94                       | 236.378                         |
| Longitude (Maximum, Minimum)  | 2007 -31.58188 138.41800        |
| - 138.428772 ( 2037.000),     | 235.832                         |
| 138.343249 ( 2066.000)        | 2008 -31.59002 138.41376        |
| Latitude (Maximum, Minimum)   | 250.436                         |
| - -31.436235 ( 2034.000), -   | 2009 -31.59696 138.40629        |
| 31.617363 ( 2012.000)         | 242.040                         |
| Elevation (Maximum, Minimum)  | 2010 -31.60408 138.40109        |
| - 261.432 ( 2029.000),        | 251.508                         |
| 142.648000 ( 2033.000)        | 2011 -31.61308 138.39697        |
|                               | 249.613                         |
| 1.2: Position Set 2           | 2012 -31.61736 138.39165        |
| Coordinate Reference Frame    | 247.923                         |
| - UNKNOWN                     | 2013 -31.60969 138.39336        |
| Ellipsoid                     | 241.043                         |
| - WGS                         | 2014 -31.60267 138.39579        |
| Horizontal Datum              | 232.585                         |
| - WGS84                       | 2015 -31.59692 138.39807        |
| Vertical Datum                | 233.489                         |
| - AHD                         | 2016 -31.59473 138.39871        |
| Coordinate Projection         | 225.963                         |
| - MGA54                       | 2017 -31.58724 138.40197        |
| Position Accuracy             | 215.883                         |
| - 0.000001                    | 2018 -31.57770 138.40900        |
| Elevation Accuracy            | 207.495                         |
| - 0.020                       | 2019 -31.57075 138.41285        |
| Data Bounds                   | 223.632                         |
| Number of Stations            | 2020 -31.56264 138.41259        |
| - 1                           | 230.404                         |
| Longitudes/latitudes          | 2021 -31.55729 138.41764        |
| transformed to horizontal     | 199.068                         |
| datum                         | 1001 -31.55130 138.38866        |
| - GDA94                       | 203.354                         |
| Longitude (Maximum, Minimum)  | 2022 -31.54457 138.39250        |
| - 138.085719 ( 1001.000),     | 200.113                         |
| 138.085719 ( 1001.000)        | 2023 -31.53909 138.39973        |
| Latitude (Maximum, Minimum)   | 210.735                         |
| - -31.756391 ( 1001.000), -   | 2024 -31.53692 138.39435        |
| 31.756391 ( 1001.000)         | 206.490                         |

|         |           |           |
|---------|-----------|-----------|
| 2025    | -31.53442 | 138.40754 |
| 209.834 |           |           |
| 2026    | -31.52590 | 138.41311 |
| 207.442 |           |           |
| 2027    | -31.51773 | 138.41444 |
| 201.372 |           |           |
| 2028    | -31.51190 | 138.42134 |
| 220.958 |           |           |
| 2029    | -31.50489 | 138.41533 |
| 261.432 |           |           |
| 2030    | -31.51015 | 138.40211 |
| 256.319 |           |           |
| 2031    | -31.50481 | 138.40263 |
| 230.512 |           |           |
| 2032    | -31.50906 | 138.40912 |
| 210.793 |           |           |
| 2033    | -31.51046 | 138.41718 |
| 142.648 |           |           |
| 2034    | -31.43623 | 138.42173 |
| 151.917 |           |           |
| 2035    | -31.44589 | 138.42415 |
| 157.352 |           |           |
| 2036    | -31.45448 | 138.42860 |
| 190.170 |           |           |
| 2037    | -31.49680 | 138.42877 |
| 199.530 |           |           |
| 2038    | -31.50767 | 138.42848 |
| 214.371 |           |           |
| 2039    | -31.52513 | 138.42663 |
| 221.327 |           |           |
| 2040    | -31.53454 | 138.42553 |
| 226.173 |           |           |
| 2041    | -31.54318 | 138.42453 |
| 216.620 |           |           |
| 1657    | -31.54848 | 138.42010 |
| 205.653 |           |           |
| 2042    | -31.54656 | 138.40956 |
| 200.203 |           |           |
| 2043    | -31.54684 | 138.40062 |
| 199.067 |           |           |
| 1001    | -31.55130 | 138.38866 |
| 199.038 |           |           |
| 1001    | -31.55130 | 138.38865 |
| 194.913 |           |           |
| 2044    | -31.55519 | 138.37990 |
| 184.860 |           |           |
| 2045    | -31.55878 | 138.37046 |
| 166.792 |           |           |
| 2046    | -31.55456 | 138.36266 |
| 195.158 |           |           |
| 2047    | -31.54192 | 138.37939 |
| 180.214 |           |           |
| 2048    | -31.54141 | 138.36940 |
| 180.487 |           |           |
| 2049    | -31.53468 | 138.36064 |
| 162.458 |           |           |
| 2050    | -31.53440 | 138.35016 |
| 158.278 |           |           |
| 2051    | -31.52873 | 138.35458 |
| 187.409 |           |           |
| 2052    | -31.52475 | 138.36326 |
| 177.632 |           |           |
| 2053    | -31.52255 | 138.36996 |
| 181.751 |           |           |

|         |           |           |
|---------|-----------|-----------|
| 2054    | -31.51653 | 138.37374 |
| 206.944 |           |           |
| 2055    | -31.50890 | 138.37548 |
| 157.406 |           |           |
| 2056    | -31.53778 | 138.34919 |
| 161.070 |           |           |
| 2057    | -31.54702 | 138.35458 |
| 204.688 |           |           |
| 2058    | -31.56651 | 138.36232 |
| 193.699 |           |           |
| 2059    | -31.57309 | 138.35747 |
| 174.763 |           |           |
| 2060    | -31.57702 | 138.35014 |
| 183.882 |           |           |
| 2061    | -31.58464 | 138.35081 |
| 175.040 |           |           |
| 2062    | -31.59071 | 138.34789 |
| 182.210 |           |           |
| 2063    | -31.59923 | 138.34568 |
| 197.449 |           |           |
| 2064    | -31.57860 | 138.34370 |
| 170.448 |           |           |
| 2065    | -31.56980 | 138.34338 |
| 178.475 |           |           |
| 2066    | -31.56300 | 138.34325 |
| 159.277 |           |           |
| 2067    | -31.55315 | 138.34402 |
| 162.690 |           |           |
| 2068    | -31.54557 | 138.34867 |
| 153.723 |           |           |
| 2069    | -31.53710 | 138.34398 |
| 199.071 |           |           |
| 1001    | -31.55130 | 138.38864 |
| 199.071 |           |           |

## 2: Control Gravity Data

### 2.1: Station List

| Station                       | Obs Gravity  | Precision    | Datum | Theoretical | Comments |
|-------------------------------|--------------|--------------|-------|-------------|----------|
| 1001                          | 9793869.8160 |              |       |             |          |
| 0.1000                        | IGSN71       | 9794637.4194 |       |             |          |
| Nase Station at Moralana Gate |              |              |       |             |          |

### 2.2: Primary Control Gravity Station - 1001

## 3: Gravity Meter Calibration Loop Data

No Gravity Meter Calibration Data

## 4: Gravity Observation Loop Data

### 4.1: Gravity Meter Loop Set 1

Gravimeter -  
 LCR\_G(LCR): Meter - G212,  
 Adjustment to Manufacturers Scale  
 Factor 1.057500

Gravimeter Reader - Jim  
 Allender

|                 |          |
|-----------------|----------|
| Number of Loops | - 3      |
| Loop Number     | Readings |

| BaseIn | BaseOut | Start |
|--------|---------|-------|
| End    |         |       |

|                  |         |                 |
|------------------|---------|-----------------|
| 1                | 100.010 | 24              |
| 1001             | 1001    | 23/ 5/2002 8:44 |
| 23/ 5/2002 10:49 |         |                 |

```

      2      101.010      25
1001      1001      23/ 5/2002 10:49
23/ 5/2002 13:13
      3      102.010      28
1001      1001      23/ 5/2002 14: 0
23/ 5/2002 17:21

```

#### 5: Node List

```

X - node in loop
D - node in loop used for
drift control
F - fixed node in loop
5.1: Gravity Meter Loop Set 1
validation test
Relaxed view of what constitutes
a loop node.
Look for station numbers that are
repeated
A node is defined as a station
that appears in more than one
loop.
Default all first and last
stations in a loop to a node.
Also add all fixed stations
Number of Unique Nodes = 1

```

| Loop | 1 | 2 | 3 |
|------|---|---|---|
| Node |   |   |   |
| 1001 | D | D | D |

6: Global Nodes - Nodes common to more than one Gravimeter  
Warning - NO GLOBAL NODES FOUND  
You have only one loop/one gravity meter  
No global adjustment will be attempted

#### 7: Internal Loop repeat stations

7.1: Gravity Meter Loop Set 1

| Loop    | Station | No. |
|---------|---------|-----|
| Repeats |         |     |

```

1
2
3

```

Total Number of Repeats 0

#### 8: Data Structure Check

8.1: Data Structure Check for Gravity Meter Loop Set 1

| Loop  | FirstAndLast | TimeOrder |
|-------|--------------|-----------|
| Tares | Position     | Nodes     |

```

1      ok      ok
** possible tare(s) in data

```

| Station1 | Station2 | Difference |
|----------|----------|------------|
| 1001     | 1002     | 23.840     |
| 1002     | 2001     | 21.510     |
| ok       | ok       | ok         |
| 2        | ok       | ok         |
| ok       | ok       | ok         |
| 3        | ok       | ok         |
| ok       | ok       | ok         |

SaveLoopDB  
Loop DB output in GEODETIC proj, GDA94 datum  
\*\*\* 77 stations output in newly created intrepid gravity loop database  
data stored in -> Survey8888\_LoopDB  
Gravity output DB created  
Survey8888\_ControlDB, in GEODETIC proj, GDA94 datum  
\*\*\* 1 stations output in newly created gravity database  
data stored in Intrepid format -> Survey8888\_ControlDB

```

*****
*****
End processing - 14/ 4/2002
16:57:50, Log =
J:/skeleton/Grav_survey/Intrepid/
Merna_Mora_processing.rpt

```

```

*****
*****

```

```

*****
*****
Intrepid Gravity v3.6
(release) cut 158 (static)
Start processing - 14/ 4/2002
16:58: 3

```

```

*****
*****

```

#### Gravity Processing Report

Starting from Loop Data Base and doing All adjustments

#### 5: Node List

```

X - node in loop
D - node in loop used for
drift control
F - fixed node in loop
5.1: Gravity Meter Loop Set 1
validation test
Relaxed view of what constitutes
a loop node.

```

Look for station numbers that are repeated

A node is defined as a station that appears in more than one loop.

Default all first and last stations in a loop to a node.

Also add all fixed stations

Number of Unique Nodes = 1

| Loop | 1 | 2 | 3 |
|------|---|---|---|
| Node |   |   |   |
| 1001 | D | D | D |

6: Global Nodes - Nodes common to more than one Gravimeter

Warning - NO GLOBAL NODES FOUND

You have only one loop/one gravity meter

No global adjustment will be attempted

7: Internal Loop repeat stations

7.1: Gravity Meter Loop Set 1

| Loop    | Station | No. |
|---------|---------|-----|
| Repeats |         |     |

1  
2  
3

Total Number of Repeats 0

8: Data Structure Check

8.1: Data Structure Check for Gravity Meter Loop Set 1

| Loop  | FirstAndLast | TimeOrder |
|-------|--------------|-----------|
| Tares | Position     | Nodes     |

|   |    |    |
|---|----|----|
| 1 | ok | ok |
|---|----|----|

\*\* possible tare(s) in data

| Station1 | Station2 |
|----------|----------|
|----------|----------|

Difference

|        |      |   |
|--------|------|---|
| 1001   | 1002 |   |
| 23.840 |      |   |
| 1002   | 2001 | - |

21.510

|    |    |    |
|----|----|----|
| ok | ok | ok |
|----|----|----|

|   |    |    |
|---|----|----|
| 2 | ok | ok |
|---|----|----|

|    |    |    |
|----|----|----|
| ok | ok | ok |
|----|----|----|

|   |    |    |
|---|----|----|
| 3 | ok | ok |
|---|----|----|

|    |    |    |
|----|----|----|
| ok | ok | ok |
|----|----|----|

9: MeterCorrections

MeterCorrections for set number

1

10: EarthTide

EarthTide correction for set number 1

| Loop      | Station  | Longitude | GMT |
|-----------|----------|-----------|-----|
| Latitude  | Elev.    | Time      |     |
| EarthTide | Adjusted |           |     |

(millgals)

|          |           |           |          |
|----------|-----------|-----------|----------|
| 1        | 1001      | 138.38866 | -        |
| 31.55130 | 199.1     | 8.737500  | -        |
| 0.762500 | 0.060     | 3029.4869 |          |
| 1        | 1002      | 138.39598 | -        |
| 31.53049 | 208.5     | 8.746944  | -        |
| 0.753056 | 0.061     | 3004.2632 |          |
| 1        | 2001      | 138.39935 | -        |
| 31.55316 | 216.9     | 8.848056  | -        |
| 0.651944 | 0.062     | 3027.0236 |          |
| 1        | 2002      | 138.40970 | -        |
| 31.55288 | 230.0     | 8.988611  | -        |
| 0.511389 | 0.065     | 3025.3647 |          |
| 1        | 2003      | 138.41911 | -        |
| 31.55632 | 245.7     | 9.049167  | -        |
| 0.450833 | 0.066     | 3021.5566 |          |
| 1        | 2004      | 138.42831 | -        |
| 31.55708 | 238.6     | 9.117222  | -        |
| 0.382778 | 0.066     | 3019.3990 |          |
| 1        | 2005      | 138.42749 | -        |
| 31.56591 | 237.9     | 9.181667  | -        |
| 0.318333 | 0.067     | 3022.3306 |          |
| 1        | 2006      | 138.42265 | -        |
| 31.57347 | 236.4     | 9.243056  | -        |
| 0.256944 | 0.068     | 3023.6431 |          |
| 1        | 2007      | 138.41800 | -        |
| 31.58188 | 235.8     | 9.308889  | -        |
| 0.191111 | 0.068     | 3024.5007 |          |
| 1        | 2008      | 138.41376 | -        |
| 31.59002 | 250.4     | 9.375000  | -        |
| 0.125000 | 0.069     | 3023.4114 |          |
| 1        | 2009      | 138.40629 | -        |
| 31.59696 | 242.0     | 9.455833  | -        |
| 0.044167 | 0.069     | 3020.8409 |          |
| 1        | 2010      | 138.40109 | -        |
| 31.60408 | 251.5     | 9.523056  | 0.023056 |
| 0.070    | 3022.6504 |           |          |
| 1        | 2011      | 138.39697 | -        |
| 31.61308 | 249.6     | 9.581944  | 0.081944 |
| 0.070    | 3020.6192 |           |          |
| 1        | 2012      | 138.39165 | -        |
| 31.61736 | 247.9     | 9.652500  | 0.152500 |
| 0.070    | 3022.0159 |           |          |
| 1        | 2013      | 138.39336 | -        |
| 31.60969 | 241.0     | 9.755556  | 0.255556 |
| 0.070    | 3023.2117 |           |          |
| 1        | 2014      | 138.39579 | -        |
| 31.60267 | 232.6     | 9.891944  | 0.391944 |
| 0.070    | 3024.7985 |           |          |
| 1        | 2015      | 138.39807 | -        |
| 31.59692 | 233.5     | 10.050278 |          |
| 0.550278 | 0.069     | 3026.4484 |          |
| 1        | 2016      | 138.39871 | -        |
| 31.59473 | 226.0     | 10.172778 |          |
| 0.672778 | 0.068     | 3026.1406 |          |



```

3      2054  138.37374  -
31.51653 206.9 15.458889
5.958889 -0.096  3025.7540
3      2055  138.37548  -
31.50890 157.4 15.541389
6.041389 -0.097  3018.9501
3      2056  138.34919  -
31.53778 161.1 15.847222
6.347222 -0.098  3037.4016
3      2057  138.35458  -
31.54702 204.7 15.953333
6.453333 -0.098  3038.2271
3      2058  138.36232  -
31.56651 193.7 16.070000
6.570000 -0.097  3032.2285
3      2059  138.35747  -
31.57309 174.8 16.162500
6.662500 -0.096  3035.1283
3      2060  138.35014  -
31.57702 183.9 16.247222
6.747222 -0.095  3040.5781
3      2061  138.35081  -
31.58464 175.0 16.331944
6.831944 -0.094  3039.8279
3      2062  138.34789  -
31.59071 182.2 16.393333
6.893333 -0.093  3042.2305
3      2063  138.34568  -
31.59923 197.4 16.479444
6.979444 -0.092  3040.9940
3      2064  138.34370  -
31.57860 170.4 16.714444
7.214444 -0.087  3036.7347
3      2065  138.34338  -
31.56980 178.5 16.791111
7.291111 -0.086  3040.8101
3      2066  138.34325  -
31.56300 159.3 16.874444
7.374444 -0.083  3037.9449
3      2067  138.34402  -
31.55315 162.7 16.965556
7.465556 -0.081  3040.1059
3      2068  138.34867  -
31.54557 153.7 17.091944
7.591944 -0.077  3038.0465
3      2069  138.34398  -
31.53710 199.1 17.163889
7.663889 -0.075  3038.1335
3      1001  138.38866  -
31.55130 199.1 17.355556
7.855556 -0.068  3029.2422

```

## 11: Gravity Drift Corrections

### 11.1 Gravity Meter Drift Correction for set number 1 Least Squares Polynomial Fitting - multi-loop

\*\*\*\*\*Readings at same time  
suspected for LoopSeq 2, Loop  
101.010, Station 1001.00 Time  
0.08730 - please check

seemingly different readings  
have exactly the same time stamp  
- review the preparation of the  
loops

Rejecting Too small an Interval  
(Time Segment) for Base Stations  
Skipping time segment as too  
small (less than 0.480 of hour)

Base = 1001, Obs.Drift = -  
4166666.625000, Time interval =  
0.000000 (hrs)

Initial Goodness of fit for drift  
curve polynomial of order 2 is =  
0.686294 (ChiSqr)  
Probability that observed ChiSqr  
for a correct model be less than  
this is = 0.046992

Rejecting Outlier Intervals(Time  
Segments) for Base  
Note, the gradient drift  
polynomial uses X = MidTime, Y =  
Obs.Drift

The Calc. Drift is the Least  
Squares Estimated drift

| Base<br>Calc | StartTime<br>MidTime | interval<br>Obs.Drift |
|--------------|----------------------|-----------------------|
| Calc.Drift   | (hrs)                | (hrs)                 |
|              | (hrs from start)     | (per hr)              |
|              | (per hr)             | status                |
| 1001         | 0.0000               | 2.0953                |
| 1.0476       | 0.13530              |                       |
| 0.12833      |                      |                       |
| 1001         | 2.0953               | 2.3933                |
| 3.2919       | 0.02945              |                       |
| 0.01222      |                      |                       |
| 1001         | 4.4886               | 0.7903                |
| 4.8837       | -0.12055             | -                     |
| 0.07013      |                      |                       |
| 1001         | 5.2789               | 3.3392                |
| 6.9485       | -0.15074             | -                     |
| 0.17696      |                      |                       |

Final Goodness of fit for drift  
curve polynomial of order 2 is =  
0.686294 (ChiSqr)  
Probability that observed ChiSqr  
for a correct model be less than  
this is = 0.046992

Final polynomial coeff for time  
=4.380868, time\*\*2 = -29.800558

A long term drift correction is  
found by integrating the final  
polynomial drift curve  
Integrated Correction Polynomial  
coeff for time = 0.000000, time\*\*2  
= 4.380868, time\*\*3 = -14.900279

Correction Polynomial base value  
(estimated long term drift  
correction) = 0.162840

|          |          |
|----------|----------|
| 102.010  | 2866.620 |
| 3029.666 |          |
| 102.010  | 2866.150 |
| 3029.753 |          |

## 11.2 Final Drift Control Adjustments Long term non-linear

Drift Control Data for LoopSeq  
1, Loop 100.010

| Station       | Drift              |
|---------------|--------------------|
| Rate(mgal/hr) | Time Extent        |
| Time_1        | Time_2 Total Drift |
| (mgal)        |                    |
| 1001          | 0.0070             |
| 2.0953        | 8.7375 10.8328     |
| 0.0146        |                    |

Drift Control Data for LoopSeq  
2, Loop 101.010

| Station       | Drift              |
|---------------|--------------------|
| Rate(mgal/hr) | Time Extent        |
| Time_1        | Time_2 Total Drift |
| (mgal)        |                    |
| 1001          | 0.0172             |
| 2.3933        | 10.8328 13.2261    |
| 0.0412        |                    |

Drift Control Data for LoopSeq  
3, Loop 102.010

| Station       | Drift              |
|---------------|--------------------|
| Rate(mgal/hr) | Time Extent        |
| Time_1        | Time_2 Total Drift |
| (mgal)        |                    |
| 1001          | 0.0262             |
| 3.3392        | 14.0164 17.3556    |
| 0.0876        |                    |

## 11.3 Estimating Loop Precision for set number 1 after drift

Number of repeat stations  
candidates for Precision Estimate  
= 0

## 11.4 Print node values for set number 1 after drift corrections

| Node =      | 1001             |
|-------------|------------------|
| Loop        | Original Reading |
| Drifted Val |                  |
| 100.010     | 2866.260         |
| 3029.650    |                  |
| 100.010     | 2866.530         |
| 3029.664    |                  |
| 101.010     | 2866.530         |
| 3029.664    |                  |
| 101.010     | 2866.680         |
| 3029.706    |                  |

## 12: Node Connections Analysis & Levelling

### 12.0a CreateNodeListFromLoops for set number 1

Relaxed view of what constitutes  
a loop node.

Look for station numbers that are  
repeated

A node is defined as a station  
that appears in more than one  
loop.

Default all first and last  
stations in a loop to a node.

Also add all fixed stations  
Number of Unique Nodes = 1

### 12.0b Strict view of what constitutes a loop node.

Look for station numbers that are  
repeated, and arrange in time  
order

A node is defined as a station  
that appears in more than one  
loop.

First and last stations in a loop  
are not used if not repeated.

Neither are fixed stations  
Node , Observed\_Grav.

|      |          |
|------|----------|
| 1001 | 3029.650 |
| 1001 | 3029.664 |
| 1001 | 3029.664 |
| 1001 | 3029.706 |
| 1001 | 3029.666 |
| 1001 | 3029.753 |

Number of Time-ordered Nodes  
(includes all repeats) = 6

### 12.1 NodeConnectionLevelling for set number 1

Loop connection search  
commenced (Nodes in time order)

### 12.2 LoopAdjust for set number 1

Loop adjustment search  
- control parameters

Stop if Max Loop Change  
less than : 0.010

Stop after Max Loop  
Iterations : 20

|                                 |          |      |          |
|---------------------------------|----------|------|----------|
| Issue warning if                | 1        | 2016 | 3026.095 |
| misclosure exceed: 20.0         | 3026.119 |      |          |
|                                 | 1        | 2017 | 3025.415 |
| Iteration 1 forward             | 3025.438 |      |          |
| Average misclosure change       | 1        | 2018 | 3027.436 |
| 0.000000                        | 3027.458 |      |          |
| New average                     | 1        | 2019 | 3028.190 |
| 3029.683788                     | 3028.211 |      |          |
| Running Sum of all changes      | 1        | 2020 | 3023.469 |
| 0.000000                        | 3023.490 |      |          |
| Absolute Sum of all changes     | 1        | 2021 | 3020.986 |
| 0.000000                        | 3021.006 |      |          |
| Max improvement at              | 1        | 1001 | 3029.664 |
| 1001 of 0.000000                | 3029.684 |      |          |
| 12.3 Update Loopset Node        | 2        | 1001 | 3029.664 |
| Observations                    | 3029.684 |      |          |
| Report mean & estimate          | 2        | 2022 | 3026.890 |
| loopset node precision          | 3026.907 |      |          |
| Node Count Mean Value           | 2        | 2023 | 3025.931 |
| Standard Deviation              | 3025.947 |      |          |
| 1001 6 3029.684                 | 2        | 2024 | 3023.053 |
| 0.039                           | 3023.067 |      |          |
|                                 | 2        | 2025 | 3024.777 |
|                                 | 3024.788 |      |          |
| Loop Adjusted values for strict | 2        | 2026 | 3024.071 |
| view of nodes taking time into  | 3024.080 |      |          |
| account                         | 2        | 2027 | 3023.356 |
|                                 | 3023.364 |      |          |
| Loop Node Old Diff              | 2        | 2028 | 3023.689 |
| New Adjustment                  | 3023.696 |      |          |
| 1 1001 3029.650                 | 2        | 2029 | 3018.911 |
| 3029.684                        | 3018.917 |      |          |
| 1 1002 3004.424                 | 2        | 2030 | 3007.307 |
| 3004.458                        | 3007.310 |      |          |
| 1 2001 3027.167                 | 2        | 2031 | 3008.138 |
| 3027.200                        | 3008.139 |      |          |
| 1 2002 3025.483                 | 2        | 2032 | 3016.427 |
| 3025.516                        | 3016.427 |      |          |
| 1 2003 3021.665                 | 2        | 2033 | 3021.713 |
| 3021.697                        | 3021.712 |      |          |
| 1 2004 3019.496                 | 2        | 2034 | 3031.900 |
| 3019.528                        | 3031.894 |      |          |
| 1 2005 3022.417                 | 2        | 2035 | 3031.897 |
| 3022.448                        | 3031.889 |      |          |
| 1 2006 3023.720                 | 2        | 2036 | 3030.562 |
| 3023.751                        | 3030.553 |      |          |
| 1 2007 3024.568                 | 2        | 2037 | 3024.261 |
| 3024.598                        | 3024.250 |      |          |
| 1 2008 3023.468                 | 2        | 2038 | 3022.599 |
| 3023.498                        | 3022.586 |      |          |
| 1 2009 3020.886                 | 2        | 2039 | 3020.926 |
| 3020.915                        | 3020.911 |      |          |
| 1 2010 3022.686                 | 2        | 2040 | 3020.628 |
| 3022.714                        | 3020.613 |      |          |
| 1 2011 3020.646                 | 2        | 2041 | 3020.839 |
| 3020.675                        | 3020.823 |      |          |
| 1 2012 3022.033                 | 2        | 1657 | 3024.404 |
| 3022.061                        | 3024.387 |      |          |
| 1 2013 3023.215                 | 2        | 2042 | 3027.430 |
| 3023.242                        | 3027.411 |      |          |
| 1 2014 3024.785                 | 2        | 2043 | 3027.663 |
| 3024.811                        | 3027.643 |      |          |
| 1 2015 3026.416                 | 2        | 1001 | 3029.706 |
| 3026.441                        | 3029.684 |      |          |

|          |      |          |
|----------|------|----------|
| 3        | 1001 | 3029.666 |
| 3029.684 |      |          |
| 3        | 2044 | 3032.738 |
| 3032.754 |      |          |
| 3        | 2045 | 3035.705 |
| 3035.720 |      |          |
| 3        | 2046 | 3038.151 |
| 3038.161 |      |          |
| 3        | 2047 | 3029.823 |
| 3029.818 |      |          |
| 3        | 2048 | 3029.836 |
| 3029.828 |      |          |
| 3        | 2049 | 3031.274 |
| 3031.265 |      |          |
| 3        | 2050 | 3035.578 |
| 3035.567 |      |          |
| 3        | 2051 | 3035.209 |
| 3035.195 |      |          |
| 3        | 2052 | 3027.359 |
| 3027.343 |      |          |
| 3        | 2053 | 3028.270 |
| 3028.253 |      |          |
| 3        | 2054 | 3025.859 |
| 3025.839 |      |          |
| 3        | 2055 | 3019.069 |
| 3019.047 |      |          |
| 3        | 2056 | 3037.574 |
| 3037.544 |      |          |
| 3        | 2057 | 3038.420 |
| 3038.387 |      |          |
| 3        | 2058 | 3032.444 |
| 3032.408 |      |          |
| 3        | 2059 | 3035.362 |
| 3035.324 |      |          |
| 3        | 2060 | 3040.829 |
| 3040.789 |      |          |
| 3        | 2061 | 3040.096 |
| 3040.054 |      |          |
| 3        | 2062 | 3042.512 |
| 3042.468 |      |          |
| 3        | 2063 | 3041.294 |
| 3041.248 |      |          |
| 3        | 2064 | 3037.088 |
| 3037.035 |      |          |
| 3        | 2065 | 3041.181 |
| 3041.126 |      |          |
| 3        | 2066 | 3038.335 |
| 3038.278 |      |          |
| 3        | 2067 | 3040.518 |
| 3040.459 |      |          |
| 3        | 2068 | 3038.490 |
| 3038.427 |      |          |
| 3        | 2069 | 3038.595 |
| 3038.531 |      |          |
| 3        | 1001 | 3029.753 |
| 3029.684 |      |          |

12.4 Estimating Loop Precision  
for set number 1 after loop  
adjustment

Number of repeat stations  
candidates for Precision Estimate  
= 0

Loop Precision used: 0.000000  
(StdDev of differences of  
repeats)

13: GlobalAdjustment

No Global Adjustment attempted

14: Applying Meter Scale factor  
to all loop data

15: Calculating adjustments to  
global nodes

Doing tie in to control  
value at fixed stations  
Primary Fixed Node adjustment to  
GMLS 1

|                              |      |             |  |
|------------------------------|------|-------------|--|
| Fixed Node (type) Adjustment |      |             |  |
| + Meter * Units = Required   |      |             |  |
| 1001                         | 2    | 9761830.910 |  |
| 3029.684                     | 10.0 | 9793869.816 |  |

Mean  
9761830.909939

15.1: Global Nodes/Ties...  
averaging for a final estimate

N.B. Loopset nodes  
that are not global, already done

Station Observation Running\_Ave  
(Loopset, loop, reading)

|             |             |    |    |     |
|-------------|-------------|----|----|-----|
| 1001        | 9793869.816 |    |    |     |
| 1001        | 9793869.816 |    |    |     |
| 9793869.816 | (           | 0, | 0, | 23) |
| 1001        | 9793869.816 |    |    |     |
| 9793869.816 | (           | 0, | 1, | 0)  |
| 1001        | 9793869.816 |    |    |     |
| 9793869.816 | (           | 0, | 1, | 24) |
| 1001        | 9793869.816 |    |    |     |
| 9793869.816 | (           | 0, | 2, | 0)  |
| 1001        | 9793869.816 |    |    |     |
| 9793869.816 | (           | 0, | 2, | 27) |

## Average 9793869.8160 Loop\_SD  
0.03884933 Global\_SD 0.00000000  
6

16: Final Values

Simple Bouguer Anomaly  
land Density : 2.670  
Datum : IGSN71

|             |           |           |
|-------------|-----------|-----------|
| Station     | Latitude  | Longitude |
| Observed    | StdDev    | No.       |
| Vert_Offset | Free Air  | Bouguer   |
| 1001        | -31.55130 | 138.38866 |
| 9793869.816 | 0.0000    | 6         |
| 199.084     | 0.00      | 12.3281   |
| -210.4469   |           |           |
| 1002        | -31.53049 | 138.39598 |
| 9793603.057 |           | 1         |

|             |           |           |
|-------------|-----------|-----------|
| 208.464     | 0.00      | -208.7308 |
| -442.0020   |           |           |
| 2001        | -31.55316 | 138.39935 |
| 9793843.549 |           | 1         |
| 216.919     | 0.00      | 39.5938   |
| -203.1386   |           |           |
| 2002        | -31.55288 | 138.40970 |
| 9793825.738 |           | 1         |
| 230.049     | 0.00      | 62.5307   |
| -194.8941   |           |           |
| 2003        | -31.55632 | 138.41911 |
| 9793785.355 |           | 1         |
| 245.732     | 0.00      | 67.7693   |
| -207.2048   |           |           |
| 2004        | -31.55708 | 138.42831 |
| 9793762.416 |           | 1         |
| 238.592     | 0.00      | 22.1857   |
| -244.7988   |           |           |
| 2005        | -31.56591 | 138.42749 |
| 9793793.302 |           | 1         |
| 237.936     | 0.00      | 43.9323   |
| -222.3181   |           |           |
| 2006        | -31.57347 | 138.42265 |
| 9793807.076 |           | 1         |
| 236.378     | 0.00      | 46.8071   |
| -217.6999   |           |           |
| 2007        | -31.58188 | 138.41800 |
| 9793816.032 |           | 1         |
| 235.832     | 0.00      | 47.2955   |
| -216.6005   |           |           |
| 2008        | -31.59002 | 138.41376 |
| 9793804.402 |           | 1         |
| 250.436     | 0.00      | 74.1723   |
| -206.0656   |           |           |
| 2009        | -31.59696 | 138.40629 |
| 9793777.086 |           | 1         |
| 242.040     | 0.00      | 15.3493   |
| -255.4934   |           |           |
| 2010        | -31.60408 | 138.40109 |
| 9793796.115 |           | 1         |
| 251.508     | 0.00      | 57.8557   |
| -223.5817   |           |           |
| 2011        | -31.61308 | 138.39697 |
| 9793774.543 |           | 1         |
| 249.613     | 0.00      | 23.1772   |
| -256.1397   |           |           |
| 2012        | -31.61736 | 138.39165 |
| 9793789.207 |           | 1         |
| 247.923     | 0.00      | 29.1728   |
| -248.2530   |           |           |
| 2013        | -31.60969 | 138.39336 |
| 9793801.699 |           | 1         |
| 241.043     | 0.00      | 26.6241   |
| -243.1030   |           |           |
| 2014        | -31.60267 | 138.39579 |
| 9793818.288 |           | 1         |
| 232.585     | 0.00      | 22.7694   |
| -237.4932   |           |           |
| 2015        | -31.59692 | 138.39807 |
| 9793835.525 |           | 1         |
| 233.489     | 0.00      | 47.4362   |
| -213.8380   |           |           |
| 2016        | -31.59473 | 138.39871 |
| 9793832.117 |           | 1         |

|             |           |           |
|-------------|-----------|-----------|
| 225.963     | 0.00      | 22.5663   |
| -230.2863   |           |           |
| 2017        | -31.58724 | 138.40197 |
| 9793824.918 |           | 1         |
| 215.883     | 0.00      | -9.6965   |
| -251.2696   |           |           |
| 2018        | -31.57770 | 138.40900 |
| 9793846.282 |           | 1         |
| 207.495     | 0.00      | -6.5271   |
| -238.7140   |           |           |
| 2019        | -31.57075 | 138.41285 |
| 9793854.243 |           | 1         |
| 223.632     | 0.00      | 56.8346   |
| -193.4096   |           |           |
| 2020        | -31.56264 | 138.41259 |
| 9793804.316 |           | 1         |
| 230.404     | 0.00      | 34.3347   |
| -223.4874   |           |           |
| 2021        | -31.55729 | 138.41764 |
| 9793778.051 |           | 1         |
| 199.068     | 0.00      | -84.3162  |
| -307.0733   |           |           |
| 2022        | -31.54457 | 138.39250 |
| 9793840.452 |           | 1         |
| 200.113     | 0.00      | -8.4424   |
| -232.3688   |           |           |
| 2023        | -31.53909 | 138.39973 |
| 9793830.296 |           | 1         |
| 210.735     | 0.00      | 18.5912   |
| -217.2212   |           |           |
| 2024        | -31.53692 | 138.39435 |
| 9793799.841 |           | 1         |
| 206.490     | 0.00      | -23.2163  |
| -254.2786   |           |           |
| 2025        | -31.53442 | 138.40754 |
| 9793818.041 |           | 1         |
| 209.834     | 0.00      | 7.3186    |
| -227.4857   |           |           |
| 2026        | -31.52590 | 138.41311 |
| 9793810.559 |           | 1         |
| 207.442     | 0.00      | -0.6842   |
| -232.8118   |           |           |
| 2027        | -31.51773 | 138.41444 |
| 9793802.986 |           | 1         |
| 201.372     | 0.00      | -20.4058  |
| -245.7410   |           |           |
| 2028        | -31.51190 | 138.42134 |
| 9793806.491 |           | 1         |
| 220.958     | 0.00      | 48.2250   |
| -199.0270   |           |           |
| 2029        | -31.50489 | 138.41533 |
| 9793755.953 |           | 1         |
| 261.432     | 0.00      | 128.2238  |
| -164.3186   |           |           |
| 2030        | -31.51015 | 138.40211 |
| 9793633.214 |           | 1         |
| 256.319     | 0.00      | -14.5212  |
| -301.3421   |           |           |
| 2031        | -31.50481 | 138.40263 |
| 9793641.985 |           | 1         |
| 230.512     | 0.00      | -81.0850  |
| -339.0279   |           |           |
| 2032        | -31.50906 | 138.40912 |
| 9793729.621 |           | 1         |

|             |           |           |
|-------------|-----------|-----------|
| 210.793     | 0.00      | -57.7196  |
| -293.5969   |           |           |
| 2033        | -31.51046 | 138.41718 |
| 9793785.510 |           | 1         |
| 142.648     | 0.00      | -213.2574 |
| -372.8805   |           |           |
| 2034        | -31.43623 | 138.42173 |
| 9793893.191 |           | 1         |
| 151.917     | 0.00      | -17.2574  |
| -187.2525   |           |           |
| 2035        | -31.44589 | 138.42415 |
| 9793893.140 |           | 1         |
| 157.352     | 0.00      | -8.2960   |
| -184.3729   |           |           |
| 2036        | -31.45448 | 138.42860 |
| 9793879.008 |           | 1         |
| 190.170     | 0.00      | 71.9382   |
| -140.8621   |           |           |
| 2037        | -31.49680 | 138.42877 |
| 9793812.349 |           | 1         |
| 199.530     | 0.00      | 0.1204    |
| -223.1537   |           |           |
| 2038        | -31.50767 | 138.42848 |
| 9793794.757 |           | 1         |
| 214.371     | 0.00      | 19.5726   |
| -220.3085   |           |           |
| 2039        | -31.52513 | 138.42663 |
| 9793777.045 |           | 1         |
| 221.327     | 0.00      | 9.2684    |
| -238.3965   |           |           |
| 2040        | -31.53454 | 138.42553 |
| 9793773.890 |           | 1         |
| 226.173     | 0.00      | 13.4881   |
| -239.5994   |           |           |
| 2041        | -31.54318 | 138.42453 |
| 9793776.112 |           | 1         |
| 216.620     | 0.00      | -20.7233  |
| -263.1210   |           |           |
| 1657        | -31.54848 | 138.42010 |
| 9793813.799 |           | 1         |
| 205.653     | 0.00      | -21.1522  |
| -251.2779   |           |           |
| 2042        | -31.54656 | 138.40956 |
| 9793845.779 |           | 1         |
| 200.203     | 0.00      | -4.4394   |
| -228.4666   |           |           |
| 2043        | -31.54684 | 138.40062 |
| 9793848.230 |           | 1         |
| 199.067     | 0.00      | -5.7221   |
| -228.4780   |           |           |
| 2044        | -31.55519 | 138.37990 |
| 9793902.287 |           | 1         |
| 184.860     | 0.00      | -2.2303   |
| -209.0887   |           |           |
| 2045        | -31.55878 | 138.37046 |
| 9793933.645 |           | 1         |
| 166.792     | 0.00      | -29.5239  |
| -216.1642   |           |           |
| 2046        | -31.55456 | 138.36266 |
| 9793959.460 |           | 1         |
| 195.158     | 0.00      | 87.2250   |
| -131.1568   |           |           |
| 2047        | -31.54192 | 138.37939 |
| 9793871.237 |           | 1         |

|             |           |           |
|-------------|-----------|-----------|
| 180.214     | 0.00      | -36.9324  |
| -238.5919   |           |           |
| 2048        | -31.54141 | 138.36940 |
| 9793871.342 |           | 1         |
| 180.487     | 0.00      | -35.5740  |
| -237.5389   |           |           |
| 2049        | -31.53468 | 138.36064 |
| 9793886.533 |           | 1         |
| 162.458     | 0.00      | -70.5950  |
| -252.3855   |           |           |
| 2050        | -31.53440 | 138.35016 |
| 9793932.028 |           | 1         |
| 158.278     | 0.00      | -37.7780  |
| -214.8911   |           |           |
| 2051        | -31.52873 | 138.35458 |
| 9793928.098 |           | 1         |
| 187.409     | 0.00      | 52.7596   |
| -156.9511   |           |           |
| 2052        | -31.52475 | 138.36326 |
| 9793845.063 |           | 1         |
| 177.632     | 0.00      | -57.2463  |
| -256.0165   |           |           |
| 2053        | -31.52255 | 138.36996 |
| 9793854.682 |           | 1         |
| 181.751     | 0.00      | -33.1460  |
| -236.5254   |           |           |
| 2054        | -31.51653 | 138.37374 |
| 9793829.156 |           | 1         |
| 206.944     | 0.00      | 23.9236   |
| -207.6467   |           |           |
| 2055        | -31.50890 | 138.37548 |
| 9793757.328 |           | 1         |
| 157.406     | 0.00      | -194.6383 |
| -370.7756   |           |           |
| 2056        | -31.53778 | 138.34919 |
| 9793952.941 |           | 1         |
| 161.070     | 0.00      | -10.9669  |
| -191.2043   |           |           |
| 2057        | -31.54702 | 138.35458 |
| 9793961.853 |           | 1         |
| 204.688     | 0.00      | 125.0996  |
| -103.9463   |           |           |
| 2058        | -31.56651 | 138.36232 |
| 9793898.625 |           | 1         |
| 193.699     | 0.00      | 12.2568   |
| -204.4924   |           |           |
| 2059        | -31.57309 | 138.35747 |
| 9793929.459 |           | 1         |
| 174.763     | 0.00      | -20.6404  |
| -216.2002   |           |           |
| 2060        | -31.57702 | 138.35014 |
| 9793987.250 |           | 1         |
| 183.882     | 0.00      | 62.1240   |
| -143.6399   |           |           |
| 2061        | -31.58464 | 138.35081 |
| 9793979.479 |           | 1         |
| 175.040     | 0.00      | 20.9235   |
| -174.9463   |           |           |
| 2062        | -31.59071 | 138.34789 |
| 9794005.008 |           | 1         |
| 182.210     | 0.00      | 63.6835   |
| -140.2095   |           |           |
| 2063        | -31.59923 | 138.34568 |
| 9793992.104 |           | 1         |

|             |           |           |
|-------------|-----------|-----------|
| 197.449     | 0.00      | 90.9365   |
| -130.0089   |           |           |
| 2064        | -31.57860 | 138.34370 |
| 9793947.554 |           | 1         |
| 170.448     | 0.00      | -20.3011  |
| -211.0324   |           |           |
| 2065        | -31.56980 | 138.34338 |
| 9793990.818 |           | 1         |
| 178.475     | 0.00      | 54.8254   |
| -144.8881   |           |           |
| 2066        | -31.56300 | 138.34325 |
| 9793960.704 |           | 1         |
| 159.277     | 0.00      | -29.0538  |
| -207.2848   |           |           |
| 2067        | -31.55315 | 138.34402 |
| 9793983.763 |           | 1         |
| 162.690     | 0.00      | 12.4734   |
| -169.5767   |           |           |
| 2068        | -31.54557 | 138.34867 |
| 9793962.279 |           | 1         |
| 153.723     | 0.00      | -30.5798  |
| -202.5958   |           |           |
| 2069        | -31.53710 | 138.34398 |
| 9793963.371 |           | 1         |
| 199.071     | 0.00      | 117.2784  |
| -105.4820   |           |           |

| Average                   | Observed |
|---------------------------|----------|
| Free Air                  | Bouguer  |
| Indicative_Survey_StdDev. |          |

9793845.715

5.244 -222.860  
0.000000

Gravity output DB created  
Survey8888, in GEODETIC proj,  
GDA94 datum

\*\*\* 72 stations output in newly  
created gravity database  
data stored in Intrepid  
format -> Survey8888

\*\*\*\*\*  
\*\*\*\*\*

End processing - 14/ 4/2002  
16:58: 9, Log =  
J:/skeleton/Grav\_survey/Intrepid/  
Merna\_Mora\_processing.rpt

\*\*\*\*\*  
\*\*\*\*\*

|          |           |           |             |   |         |      |
|----------|-----------|-----------|-------------|---|---------|------|
| 2061     | -31.58464 | 138.35081 | 9793979.479 | 1 | 175.040 | 0.00 |
| 20.9235  | -174.9463 |           |             |   |         |      |
| 2062     | -31.59071 | 138.34789 | 9794005.008 | 1 | 182.210 | 0.00 |
| 63.6835  | -140.2095 |           |             |   |         |      |
| 2063     | -31.59923 | 138.34568 | 9793992.104 | 1 | 197.449 | 0.00 |
| 90.9365  | -130.0089 |           |             |   |         |      |
| 2064     | -31.57860 | 138.34370 | 9793947.554 | 1 | 170.448 | 0.00 |
| -20.3011 | -211.0324 |           |             |   |         |      |
| 2065     | -31.56980 | 138.34338 | 9793990.818 | 1 | 178.475 | 0.00 |
| 54.8254  | -144.8881 |           |             |   |         |      |
| 2066     | -31.56300 | 138.34325 | 9793960.704 | 1 | 159.277 | 0.00 |
| -29.0538 | -207.2848 |           |             |   |         |      |
| 2067     | -31.55315 | 138.34402 | 9793983.763 | 1 | 162.690 | 0.00 |
| 12.4734  | -169.5767 |           |             |   |         |      |
| 2068     | -31.54557 | 138.34867 | 9793962.279 | 1 | 153.723 | 0.00 |
| -30.5798 | -202.5958 |           |             |   |         |      |
| 2069     | -31.53710 | 138.34398 | 9793963.371 | 1 | 199.071 | 0.00 |
| 117.2784 | -105.4820 |           |             |   |         |      |

| Average                   | Observed    | Free Air | Bouguer  |         |
|---------------------------|-------------|----------|----------|---------|
| Indicative_Survey_StdDev. | 9793845.715 | 5.244    | -222.860 | 0.00000 |

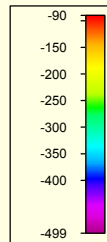
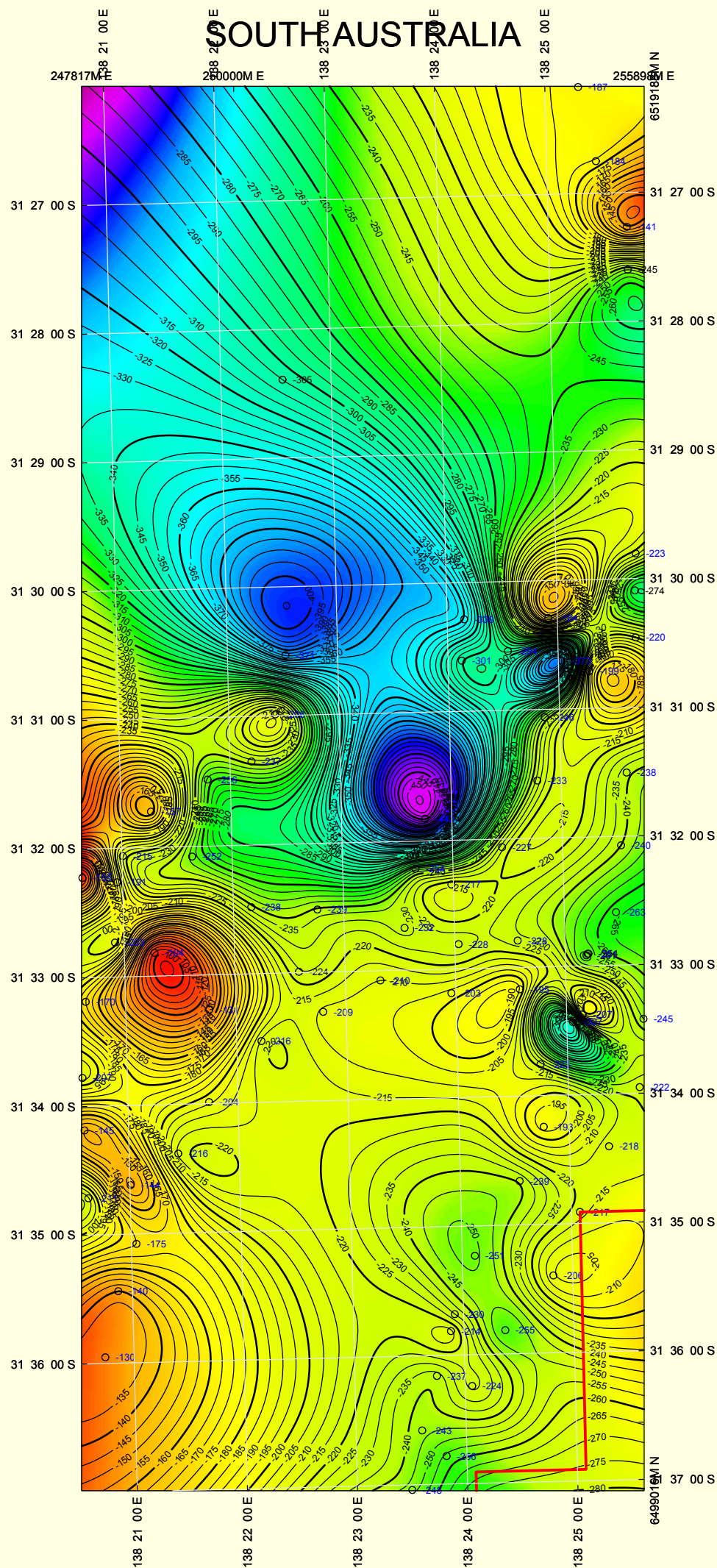
Gravity output DB created Survey8888, in GEODETIC proj, GDA94 datum

\*\*\* 72 stations output in newly created gravity database  
data stored in Intrepid format -> Survey8888

\*\*\*\*\*

End processing - 14/ 4/2002 16:58: 9, Log =  
J:/skeleton/Grav\_survey/Intrepid/Merna\_Mora\_processing.rpt  
\*\*\*\*\*

# SOUTH AUSTRALIA



N  
↑  
TRUE NORTH IS SHOWN  
FOR THE CENTRE OF THE MAP

1:50000  
0 1 2  
KILOMETRES

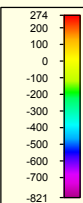
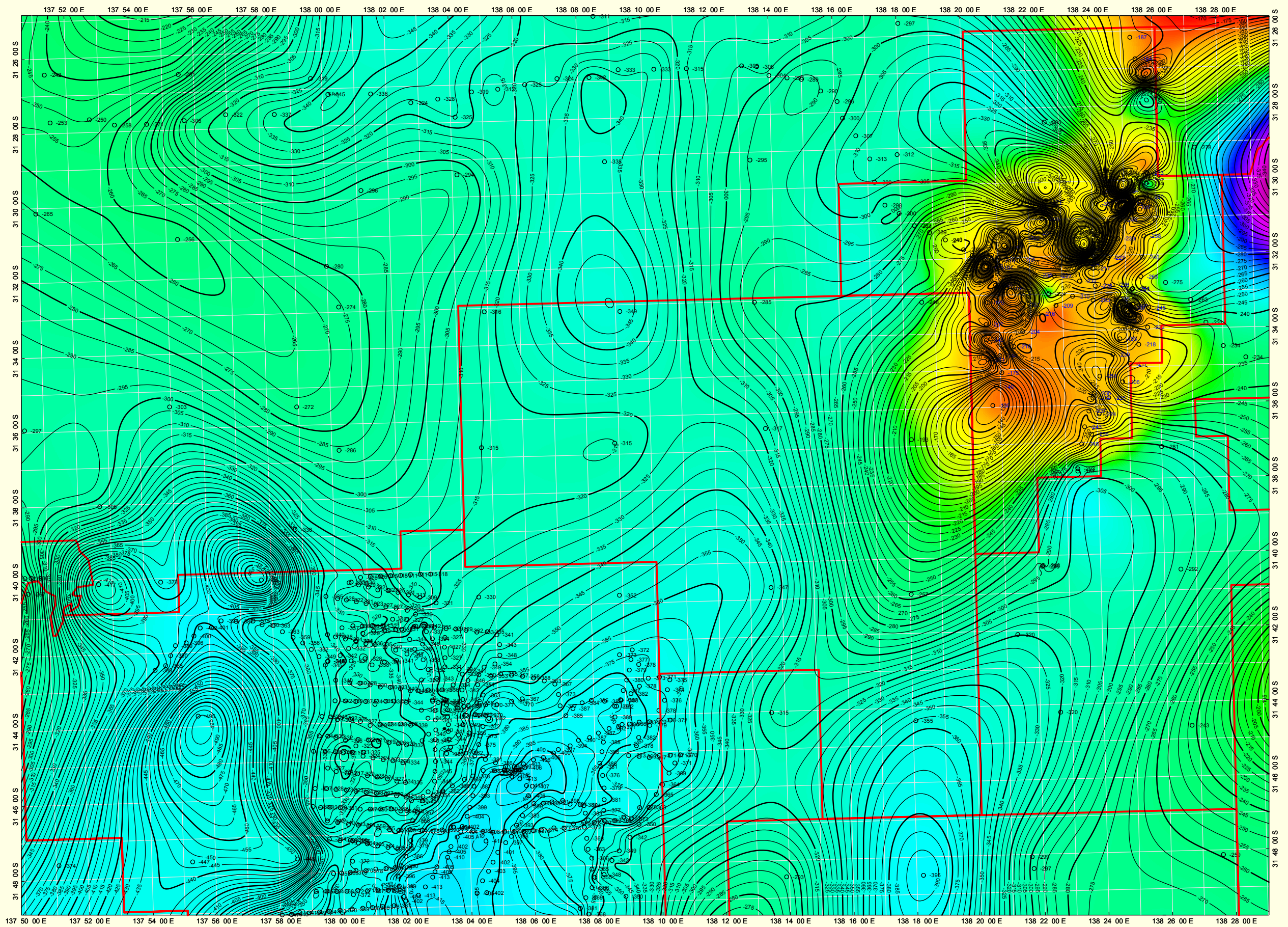
UNIVERSAL TRANSVERSE MERCATOR PROJECTION  
WGS 1984 SPHEROID  
CENTRAL MERIDIAN 141 00 00 E  
Mapsheet datum: "GDA94"

**ALLENDER**  
EXPLORATION

Bouguer Gravity  
Contour Interval = 2 gravity unit (~1foot)

|               |                 |
|---------------|-----------------|
| Map: 1:50,000 | Scale: 1:50,000 |
| Map: 1:50,000 | Scale: 1:50,000 |
| Map: 1:50,000 | Scale: 1:50,000 |
| Map: 1:50,000 | Scale: 1:50,000 |
| Map: 1:50,000 | Scale: 1:50,000 |

Mara Torrens - Merna Mora



N  
TRUE NORTH IS SHOWN  
FOR THE CENTRE OF THE MAP



1:100000  
UNIVERSAL TRANSVERSE MERCATOR PROJECTION  
WGS 1984 SPHEROID  
CENTRAL MERIDIAN 141 00 00 E  
Mapsheet datum: "GDA94"

**ALLENDER EXPLORATION**

Bouguer Gravity  
Contour Interval = 2 gravity unit (~1foot)

|            |           |
|------------|-----------|
| Map Scale  | 1:100,000 |
| Map Datum  | GDA94     |
| Projection | UTM       |
| Zone       | 50S       |
| Ellipsoid  | WGS 84    |
| Units      | Meters    |