Plenty River Ground Magnetics Report

November 2005

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The Ground magnetics surveys acquired over 16 aeromagnetic targets from within the Plenty River diamond explorations tenements, indicates two general target types. These include:

- Target responses consisting of numerous small sources which model to a depth less than 20m with a magnetic susceptibility of 300 to 500 SI.

- Target responses consistent with a depth extensive larger source which have been modeled to depths between 20m and 70m with magnetic susceptibility ranges of 50 to 1330 SI.

Written by Mike Enright 16/11/05

Introduction

Ground magnetic surveys have been acquired over 16 aeromagnetic targets within the Plenty River tenements. The targets originate from the Eromanga airborne magnetics/radiometrics survey. The tenements (**Plenty River 1** N^{o} 23792 and **Plenty River 2** N^{o} 22872) are located 300km east of Alice Springs in the Northern Territory, which along with the extent of the Eromanga airborne survey is outlined in **Figure 1**.

The ground magnetic acquisition extended from the 5th until the 9th of November 2005. Travel to site and between targets was completed by helicopter. Each aeromagnetic target simultaneously had one loam sample collected. The sample consisted of three composite samples spaced 100m east-west. Sample results are pending.

From the original 18 selected aeromagnetic targets two targets have no work completed due to their location within the restricted access region traversing the Plenty River. The targets with no work completed are PR7 and PR15. The distribution of the targets is displayed in **Figure 2**.

Figure 1: Location map displaying Plenty River Tenements, Alice Springs and extent of the Eromanga aeromagnetic survey. (TMI aeromagnetic image). Coordinates in GDA94 UTM Zone 53S

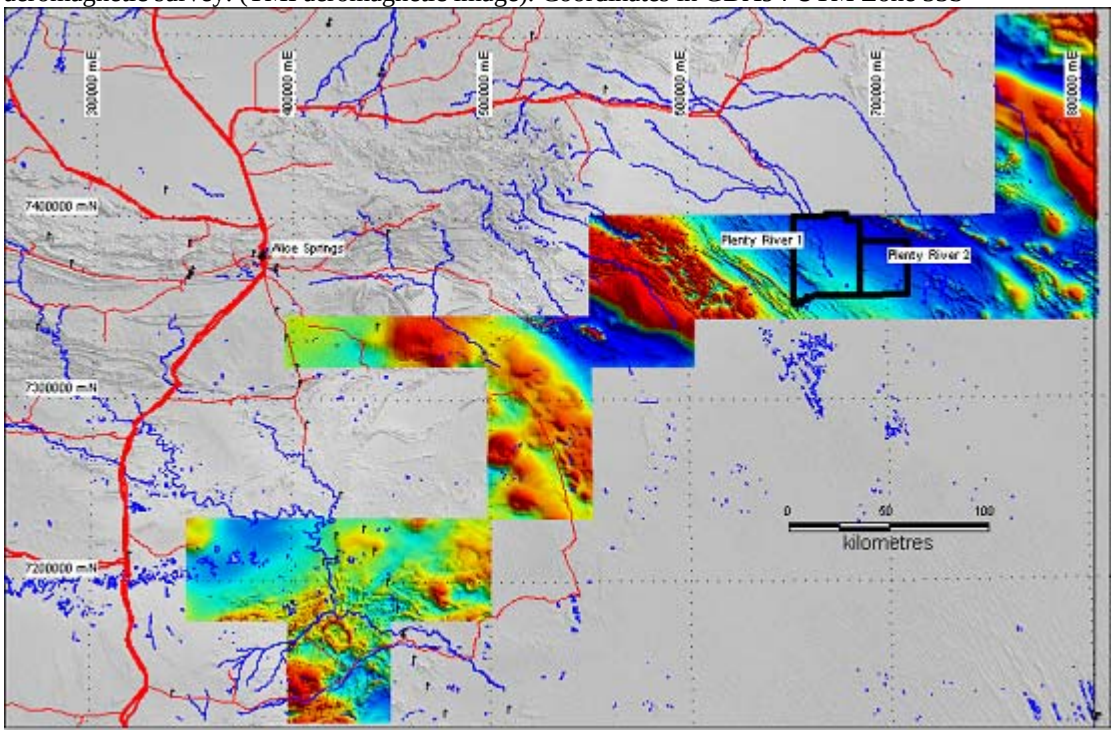
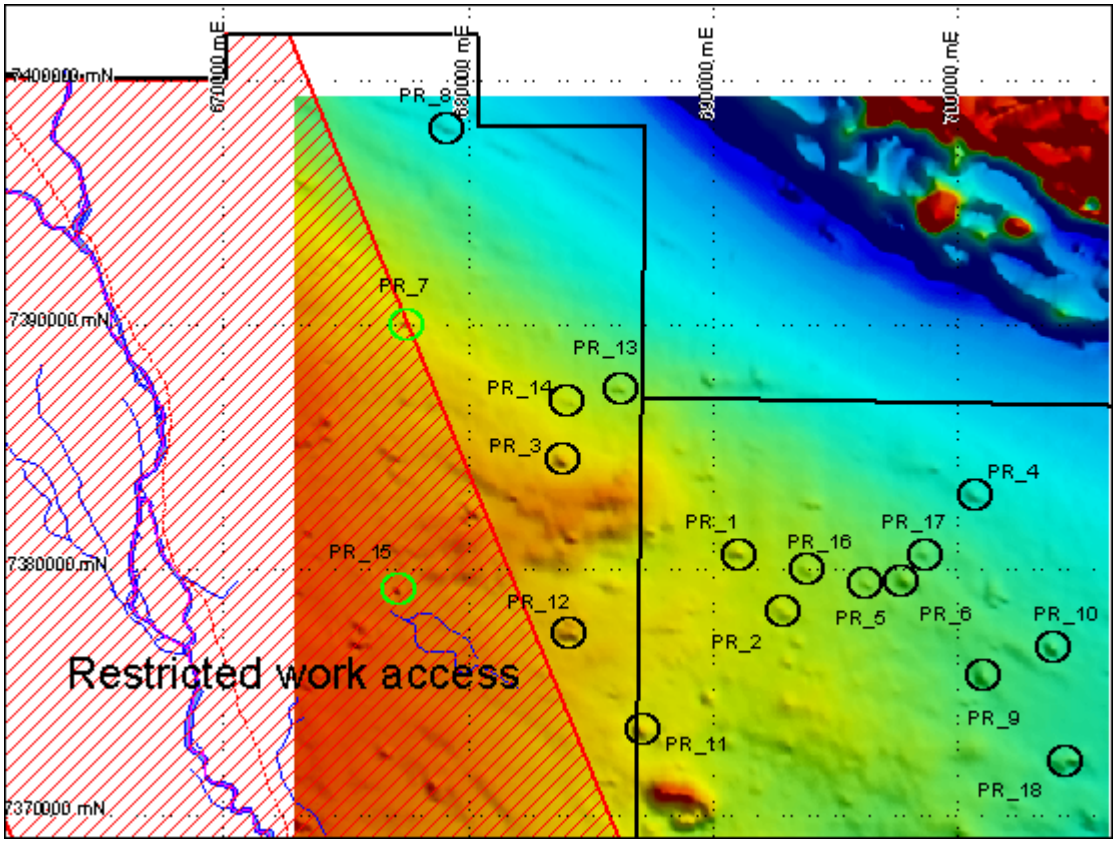


Figure 2: Distribution of the aeromagnetic targets, restricted access area and tenement boundaries overlaid on TMI aeromagnetic image. (Regional trend within aeromagnetic image partially removed). Coordinates in GDA94 UTM Zone 53S



Acquisition/processing parameters

For each target the ground magnetic acquisition has been completed by Mike Enright and consist of 4 or 5 north-south traverses of varying length. Magnetometers acquired continual data at three second intervals resulting in a station spacing of 3 to 4m. The magnetometers were real-time linked to the GPS except for targets PR1, PR12 and PR17. These three targets have been acquired with interpolation between 50m stations.

No base station data has been collected.

The data has been collected in Lat, Long with WGS84 datum. All data has been transformed to Eastings and Northings GDA94, AMG Zone53.

Heading tests undertaken on two targets indicated a one nanoTesla heading affect.

Equipment

Helicopter (AS350BA Super D squirrel)
2 x 858 Geometrics magnetometers, sensor and backpack
1 x GPSmap 76 (real-time link to magnetometer)
1 x Laptop (loaned from IT department)

Difficulties encountered

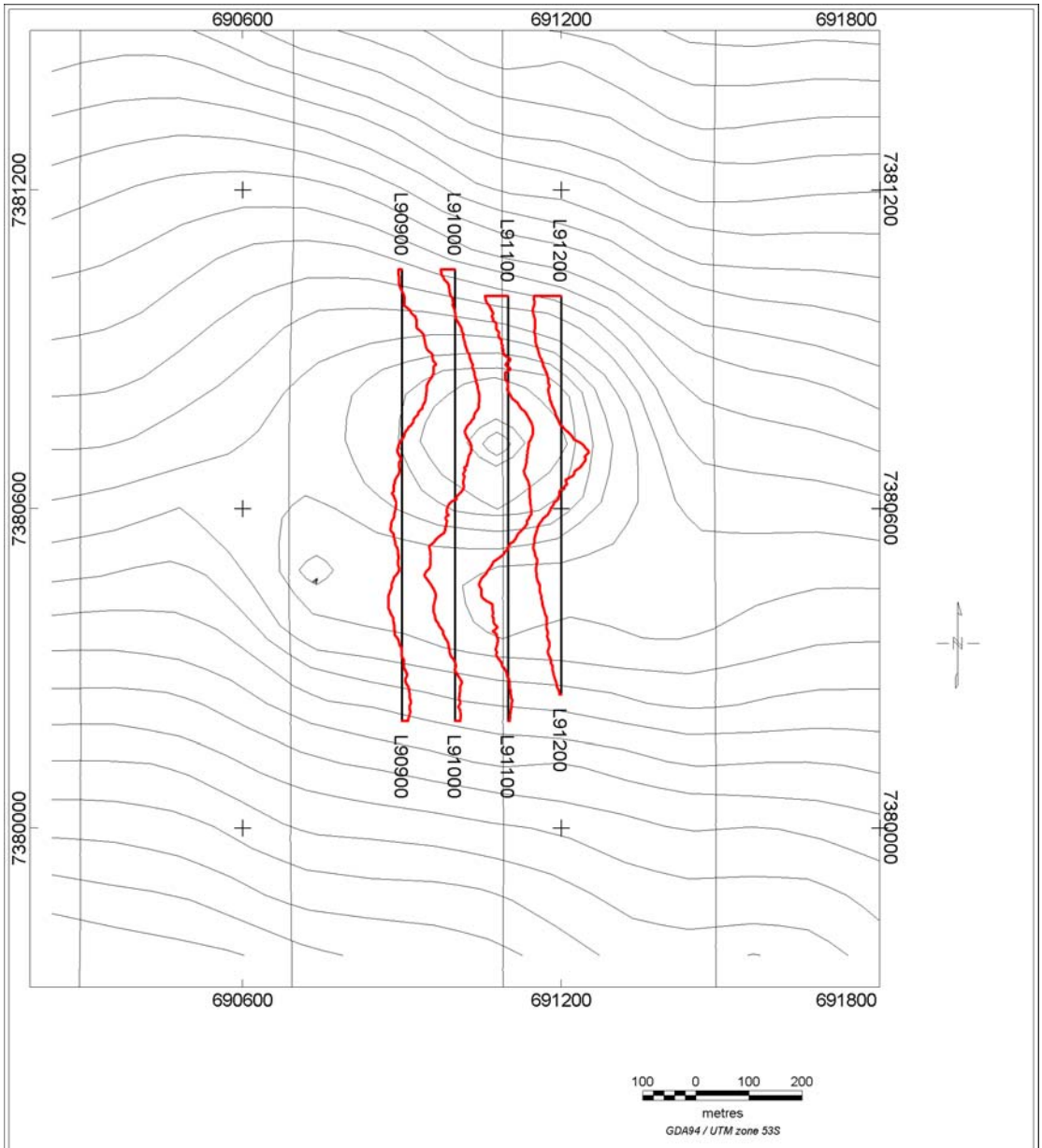
During the acquisition one of the dump cables used in the real-time link to the GPS broke resulting in delays. The cable is the weak link in the system and new purpose built cables that go direct from the GPS to the magnetometer will be made up for future work.

During acquisition one of the 858 magnetometers developed serious memory errors. The data for one target was lost and needed reacquiring and the unit will need to be tested before returning to the field.

Temperatures after midday were largely over 40^{o} and with limited shade the acquisition rate slowed considerably and the number of kilometres walked reduced.

Results

The ground magnetic grids have been displayed as line profiles overlaid on aeromagnetic contours. All data is Total Magnetic Intensity (TMI). The 16 targets completed are displayed individually on the following pages.



Modelling results

Ground magnetic profile L1200:
Depth 40m
Size: 140m by 150m

Airborne magnetic profile
Depth 10m
Size 200m by 200m

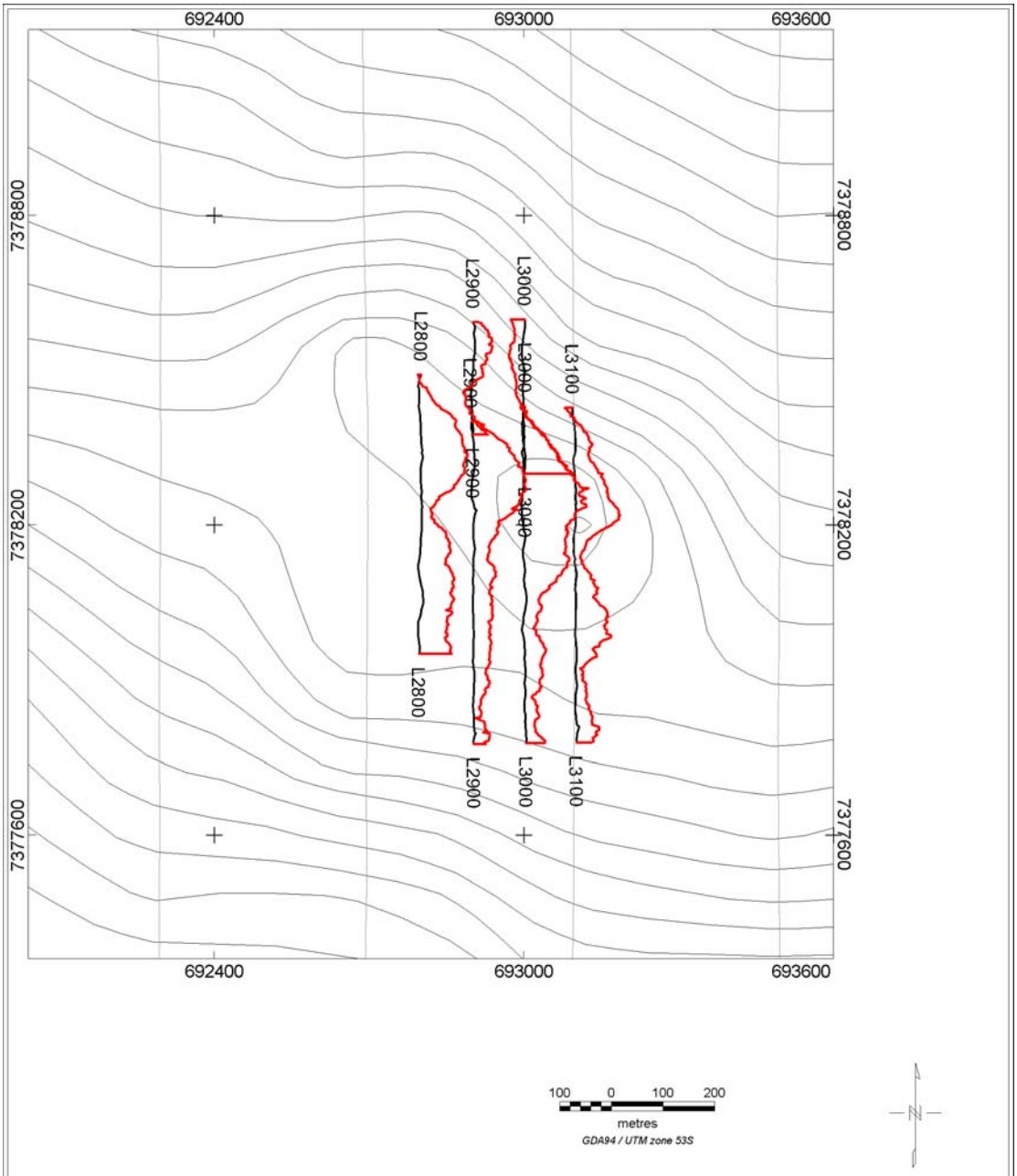
Rio Tinto Exploration JV

Plenty River Target PR1

Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 32nT
Profiles scale 3nT/mm
Profiles base removed: 52725nT
Contours: 1nT

Mike Enright



Modelling results

Ground magnetic profile L3100:
Depth: 35m
Size: 65 x 140m

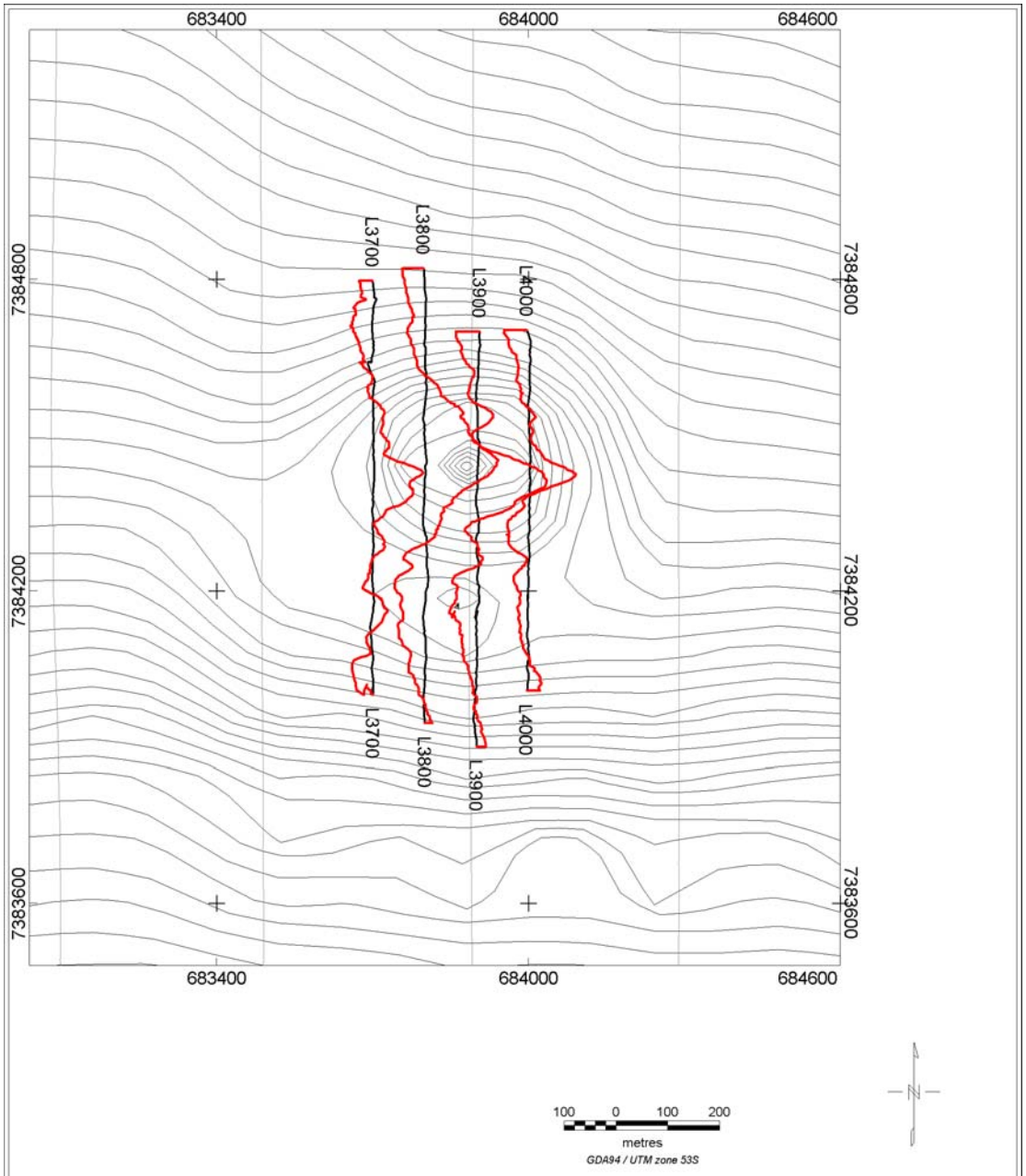
Airborne magnetic profile
Depth 10m
Size 280m by 400m

Rio Tinto Exploration JV

Plenty River Target PR2
Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 31nT
Profiles scale 2nT/mm
Profiles base removed: 52735nT
Aeromagnetic Contours: 1nT

Mike Enright



Modelling results

Ground magnetic profile L3800:
Depth 15m
Size: 45m by 80m

Airborne magnetic profile
Depth 60m
Size 40m by 300m

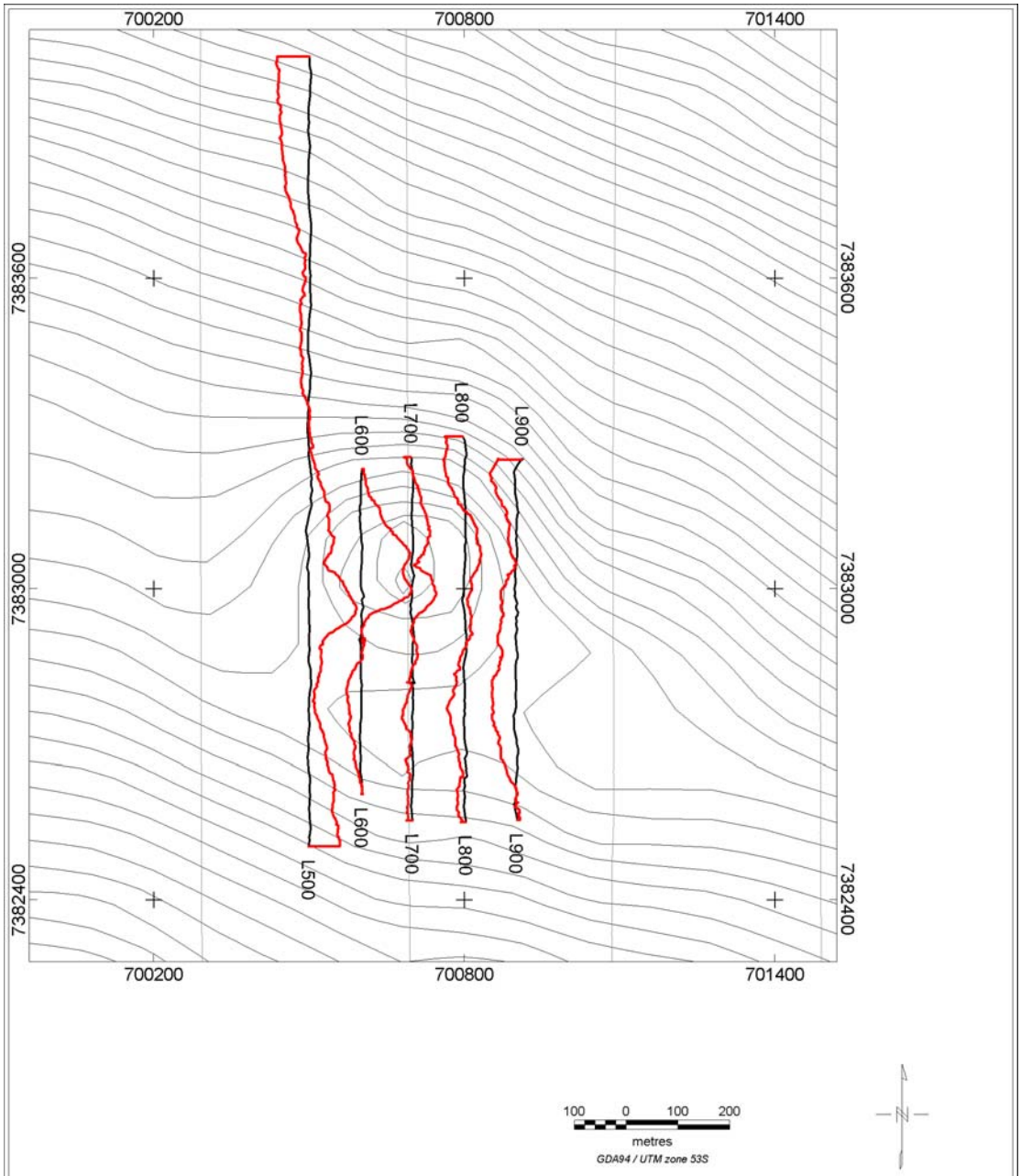
Rio Tinto Exploration JV

Plenty River Target PR3

Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 64nT
Profiles scale 3nT/mm
Profiles base removed: 52715nT
Aeromagnetic Contours: 1nT

Mike Enright



Modelling results

Ground magnetic profile L3800:
Depth 20m
Size: 50m by 80m

Airborne magnetic profile
Depth 30m
Size 180m by 330m

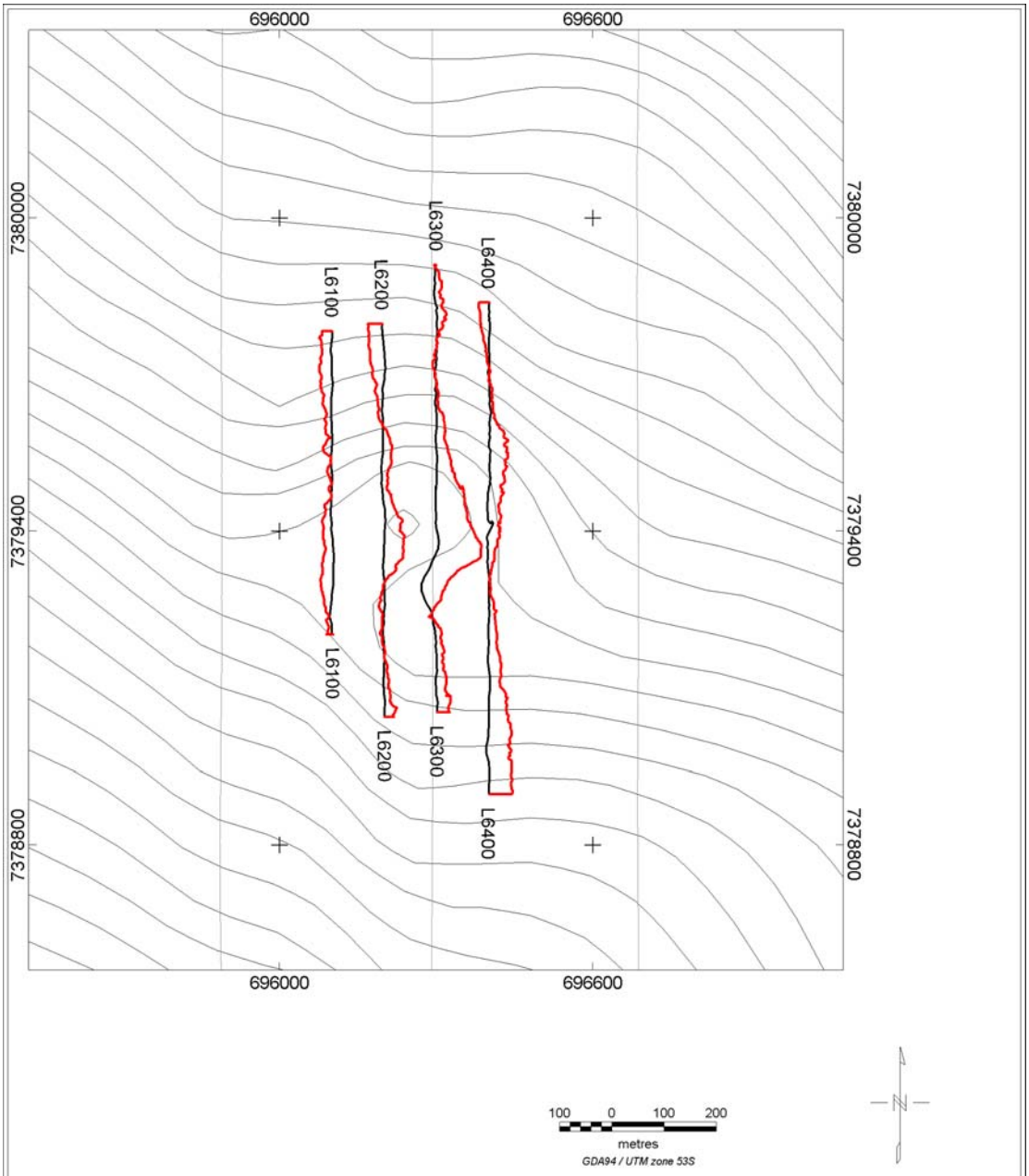
Rio Tinto Exploration JV

Plenty River Target PR4

Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 39nT
Profiles scale 3nT/mm
Profiles base removed: 52600nT
Aeromagnetic Contours: 1nT

Mike Enright



Modelling results

Ground magnetic profile L6300:
Depth 60m
Size: 35m by 60m

Airborne magnetic profile
Depth 60m
Size 80m by 240m

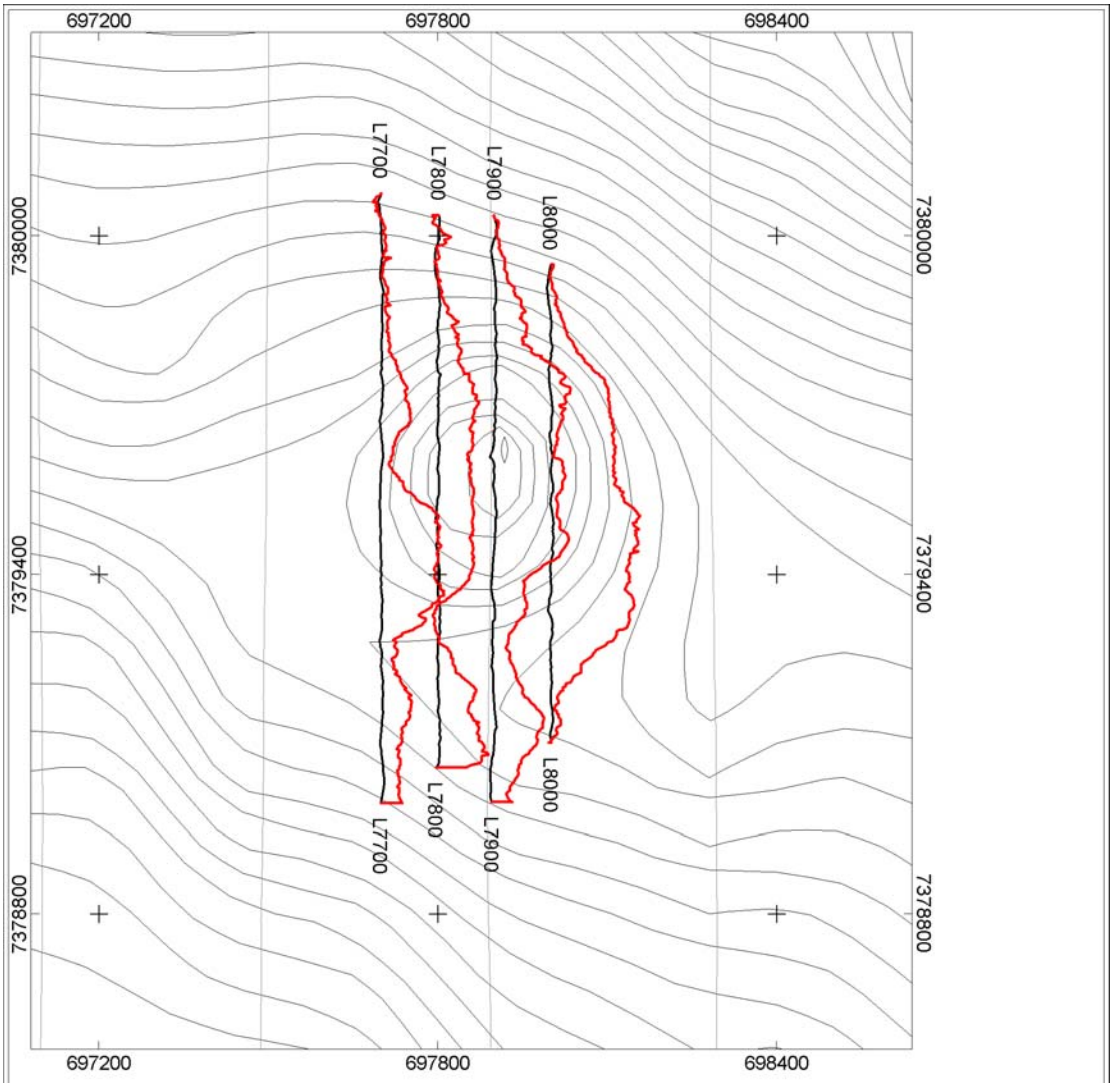
Rio Tinto Exploration JV

Plenty River Target PR5

Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 32nT
Profiles scale 3nT/mm
Profiles base removed: 52710nT
Aeromagnetic Contours: 1nT

Mike Enright



Modelling results

Ground magnetic profile L7700E
Depth: 20m
Size: 230m x 300

Airborne magnetic profile
Depth 110m
Size 220m by 380m

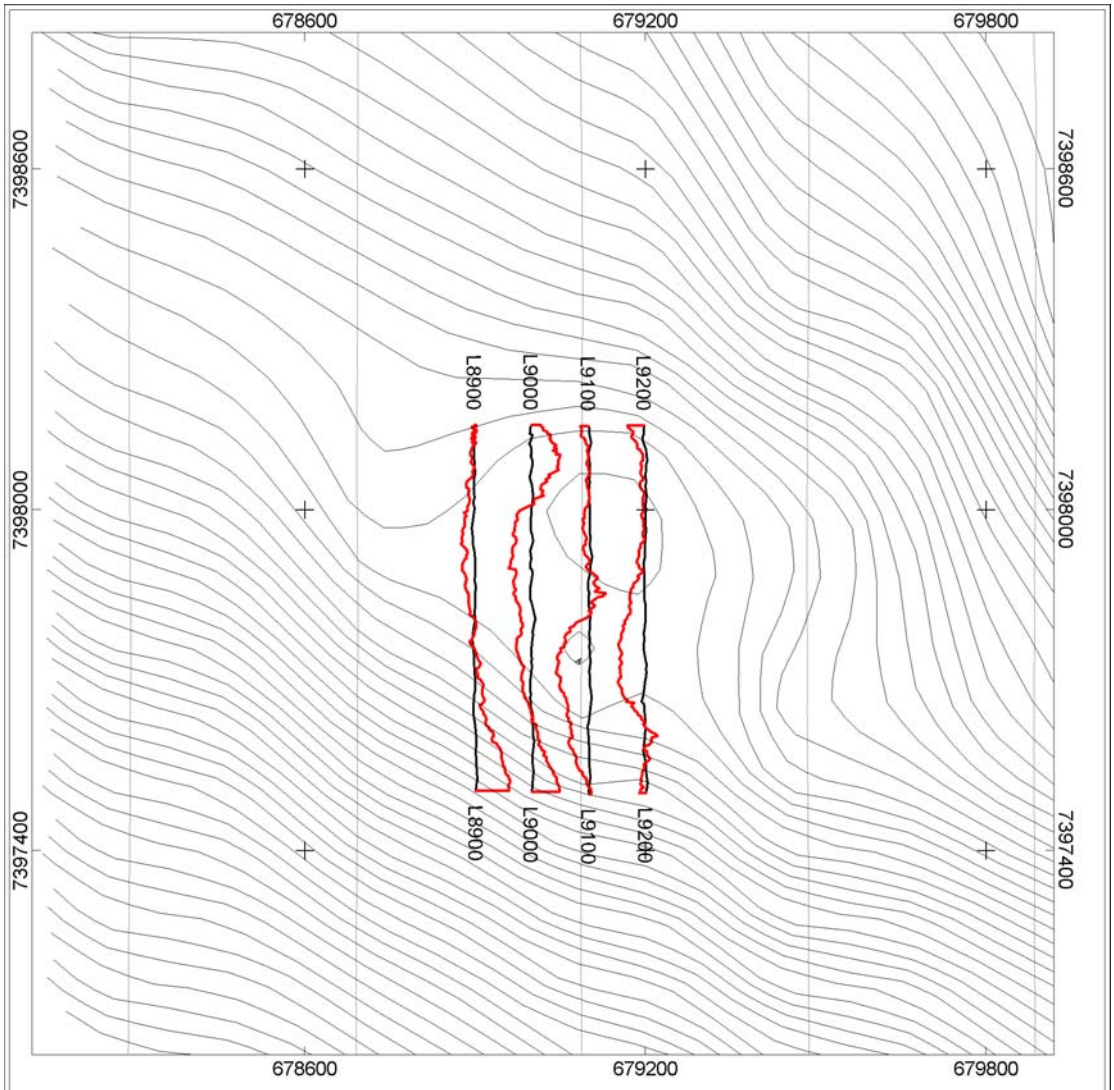
Rio Tinto Exploration JV

Plenty River Target PR6

Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 30nT
Profiles scale 2nT/mm
Profiles base removed: 52700nT
Aeromagnetic Contours: 1nT

Mike Enright



Modelling results

Ground magnetic profile L9100E
Depth: 70m
Size: 50m x 120m

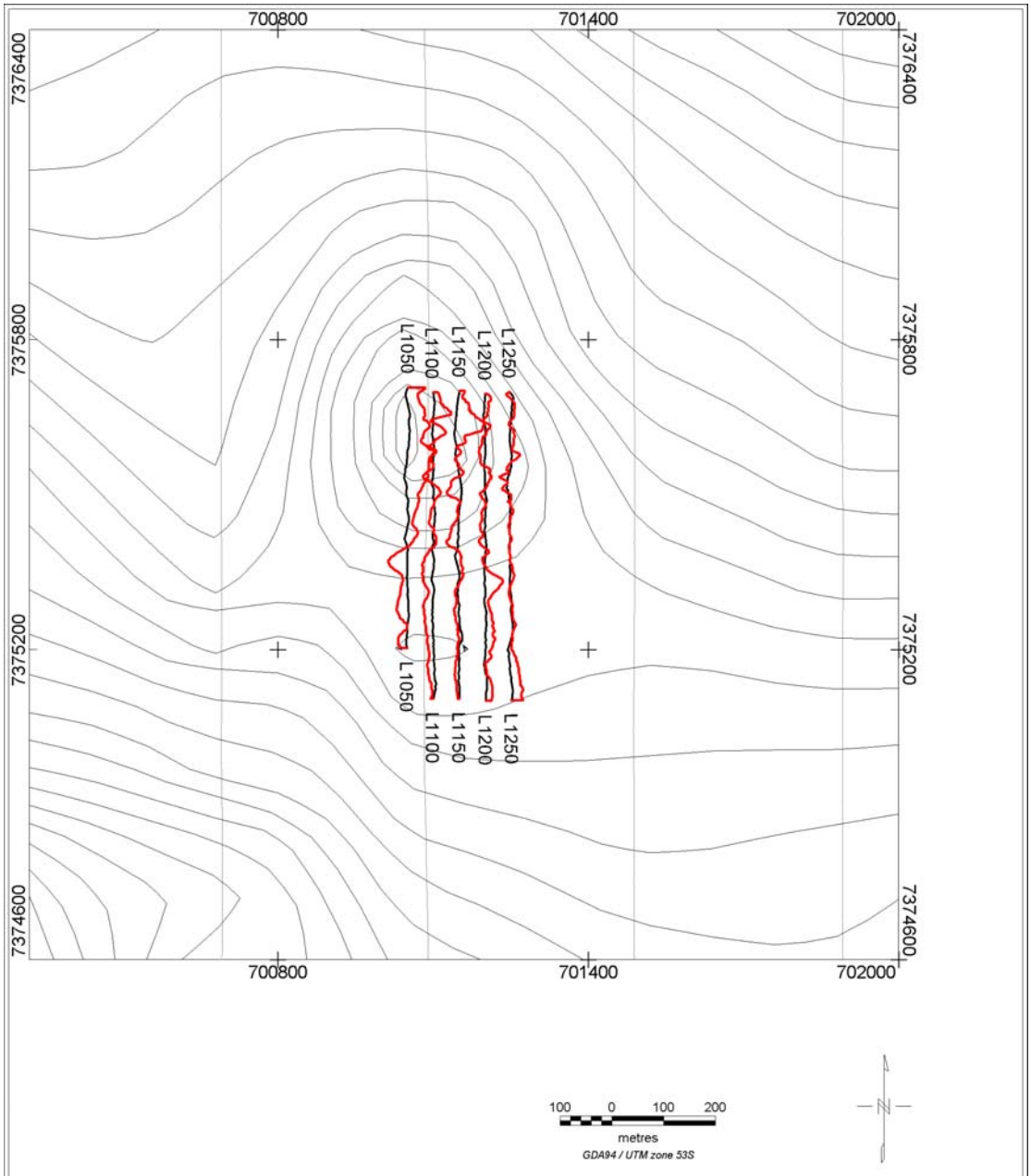
Airborne magnetic profile
Depth 20m
Size 200m by 400m

Rio Tinto Exploration JV

Plenty River Target PR8
Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 18nT
Profiles scale 2nT/mm
Profiles base removed: 52395nT
Aeromagnetic Contours: 1nT

Mike Enright



Modelling results

Ground magnetic profile L1050E
Depth: 20m
Size: numerous small targets
(target could be to the west?)

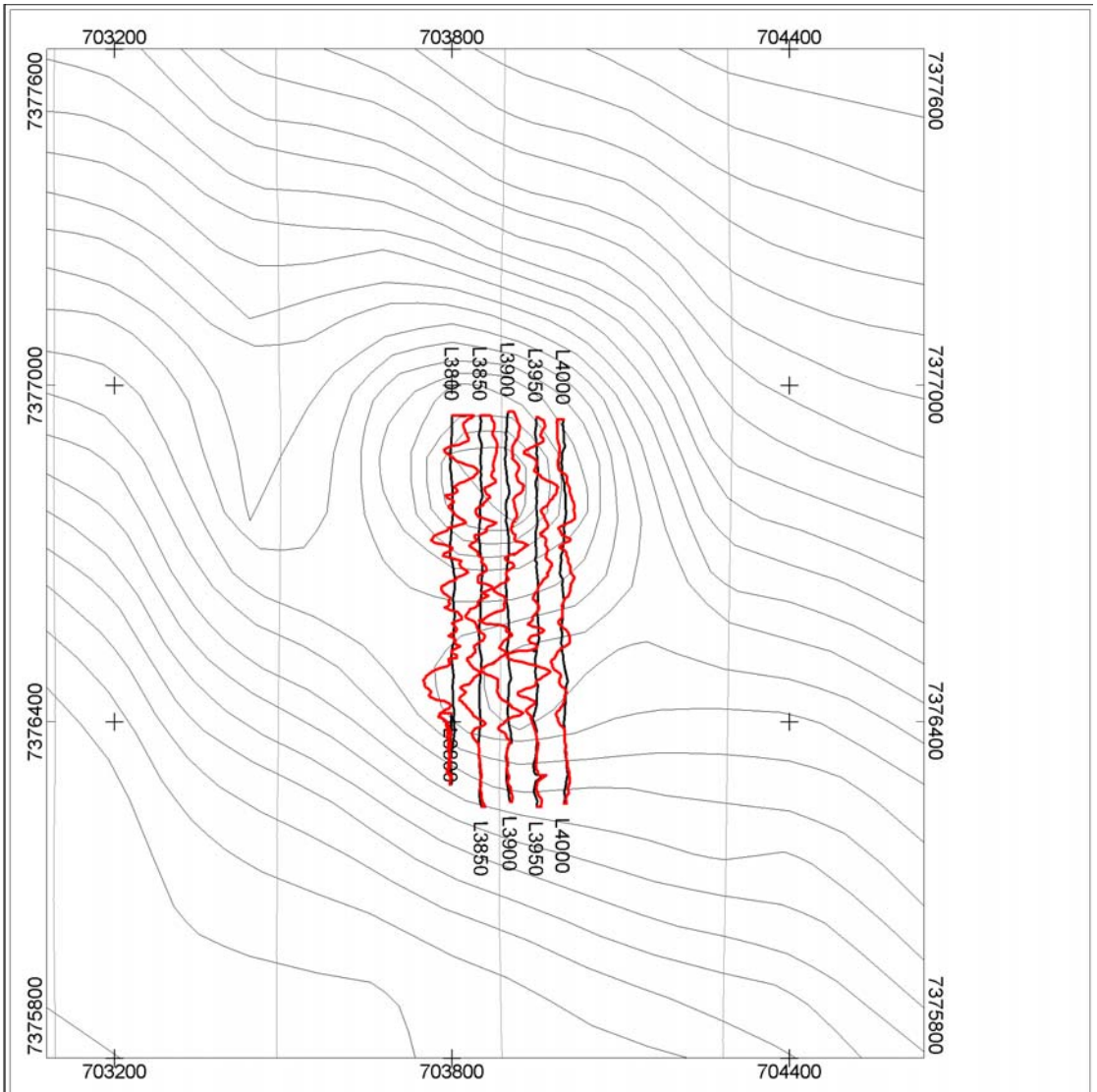
Airborne magnetic profile
Depth 200m
Size 190m by 800m

Rio Tinto Exploration JV

Plenty River Target PR9
Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 48nT
Profiles scale 5nT/mm
Profiles base removed: 52733nT
Aeromagnetic Contours: 1nT

Mike Enright



Modelling results

Ground magnetic profiles L3900E and 4000E
Depth: 10 - 20m
Size: numerous small bodies

Airborne magnetic profile
Depth 50m
Size 50m by 250m

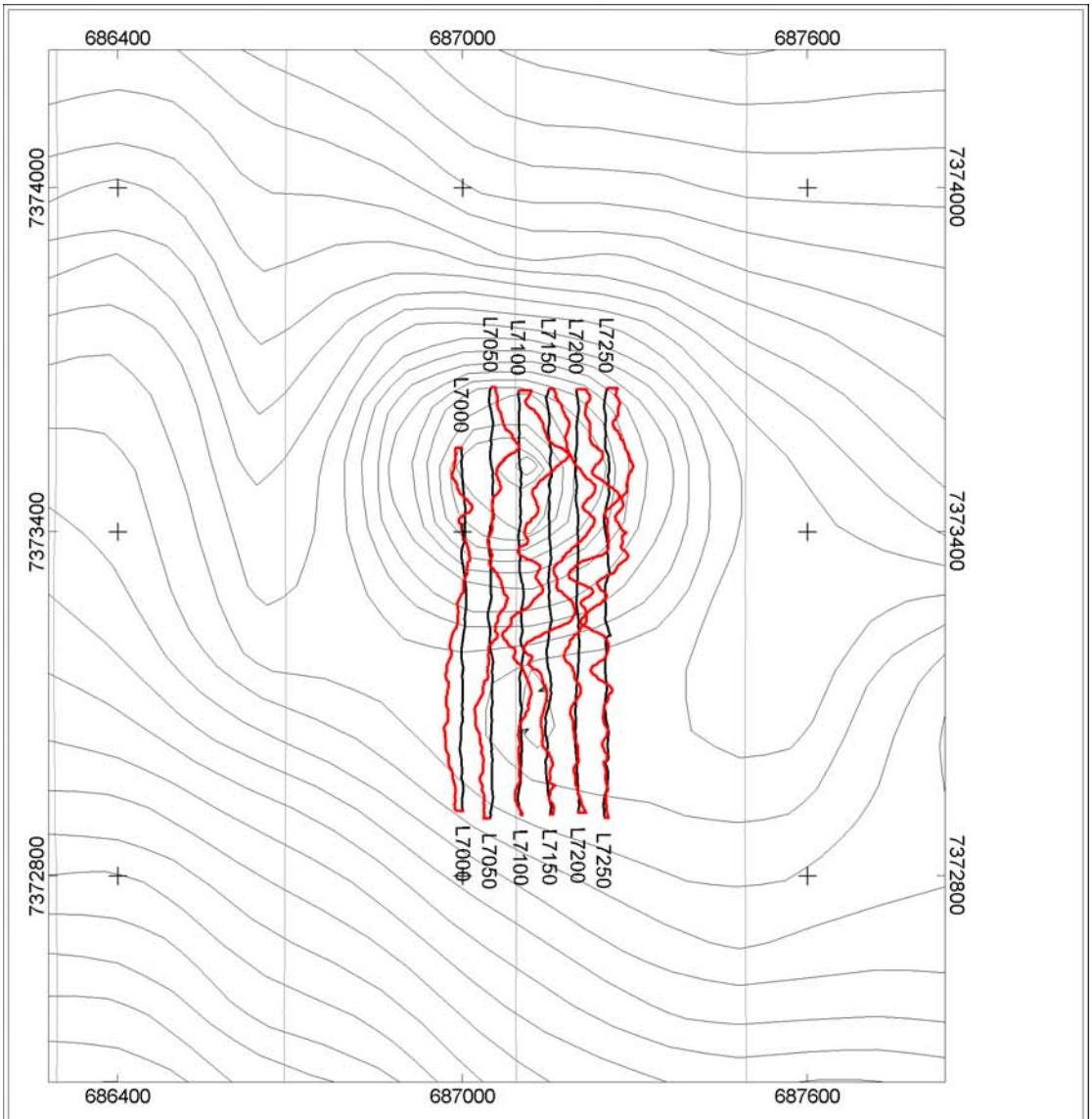
100 0 100 200
metres
GDA94 / UTM zone 53S

Rio Tinto Exploration JV

Plenty River Target PR10
Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 84nT
Profiles scale 8nT/mm
Profiles base removed: 52715nT
Aeromagnetic Contours: 1nT

Mike Enright



Modelling results

Ground magnetic profiles L7000E and 7150E
Depth: 10 - 20m
Size: numerous small bodies

Airborne magnetic profile
Depth 10m
Size 40m by 260m

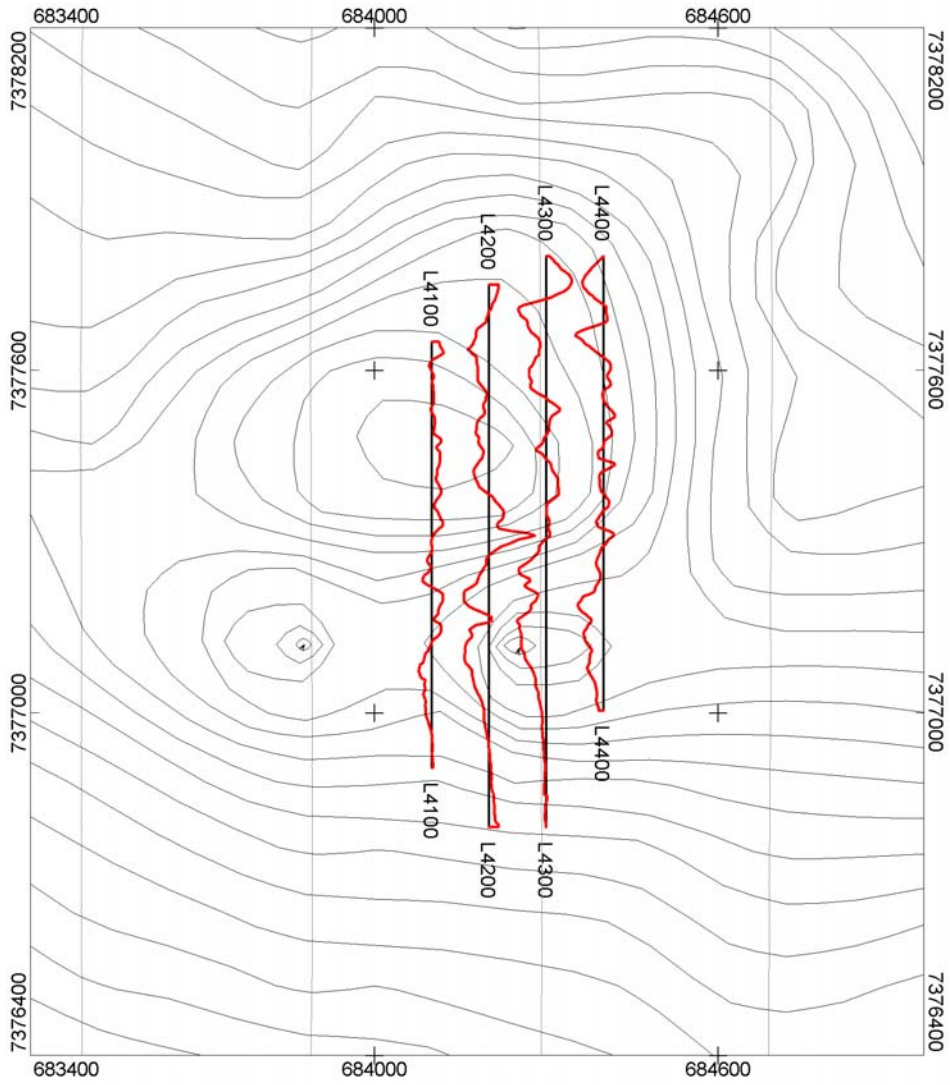
100 0 100 200
metres
GDA94 / UTM zone 53S

Rio Tinto Exploration JV

Plenty River Target PR11
Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 76nT
Profiles scale 6nT/mm
Profiles base removed: 52850nT
Aeromagnetic Contours: 1nT

Mike Enright



Modelling results

Ground magnetic profiles L4100E and 4200E
Depth: 10 - 20m
Size: numerous small bodies

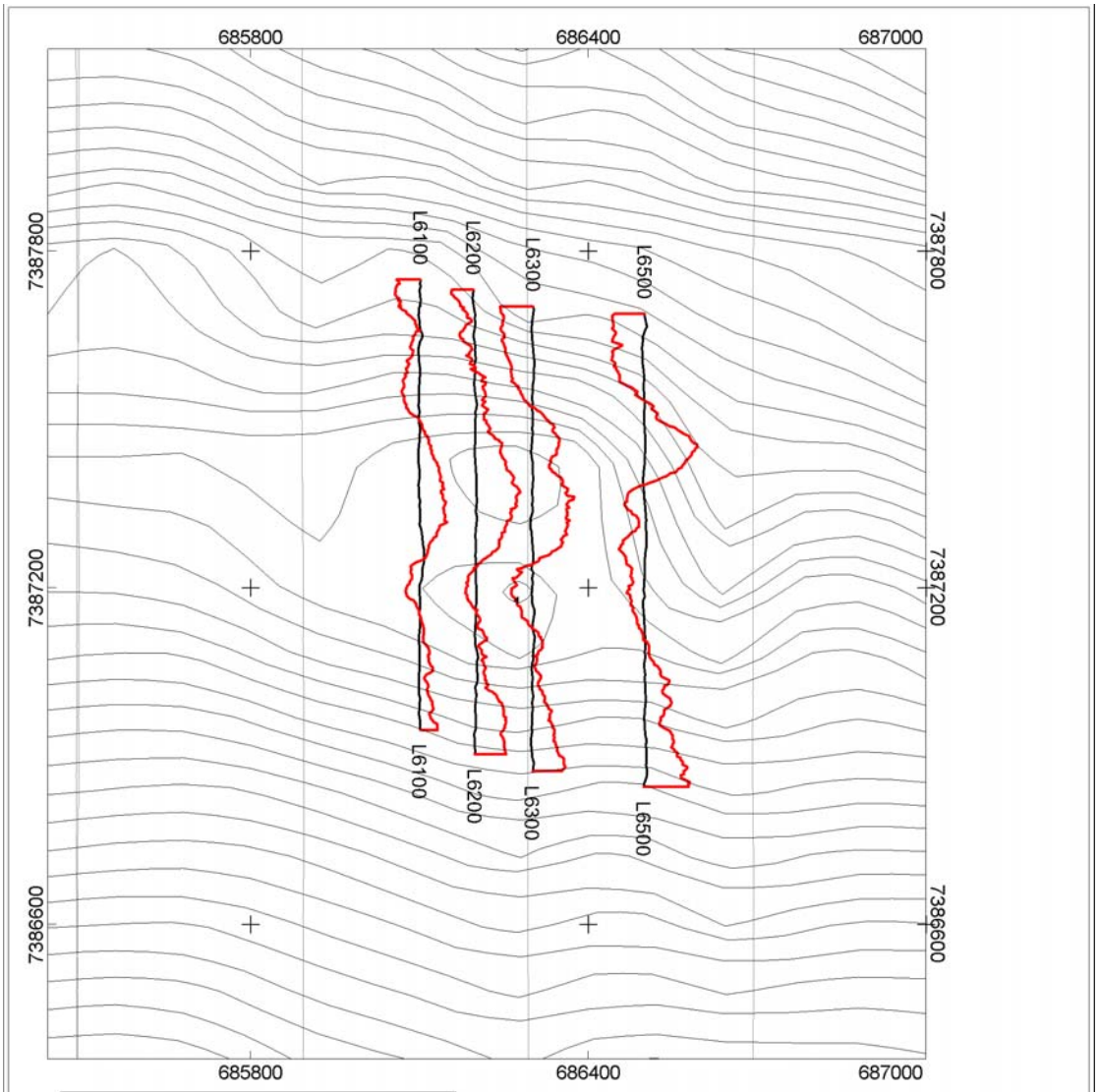
100 0 100 200
metres
GDA94 / UTM zone 53S

Rio Tinto Exploration JV

Plenty River Target PR12
Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 78nT
Profiles scale 8nT/mm
Profiles base removed: 52810nT
Aeromagnetic Contours: 1nT

Mike Enright



Modelling results

Ground magnetic profile L6300E, 6500E
Depth: 30m -40m
Size: 80m by 100m for 6500E profile

Airborne magnetic profile
Depth 10m
Size 300m by 250m

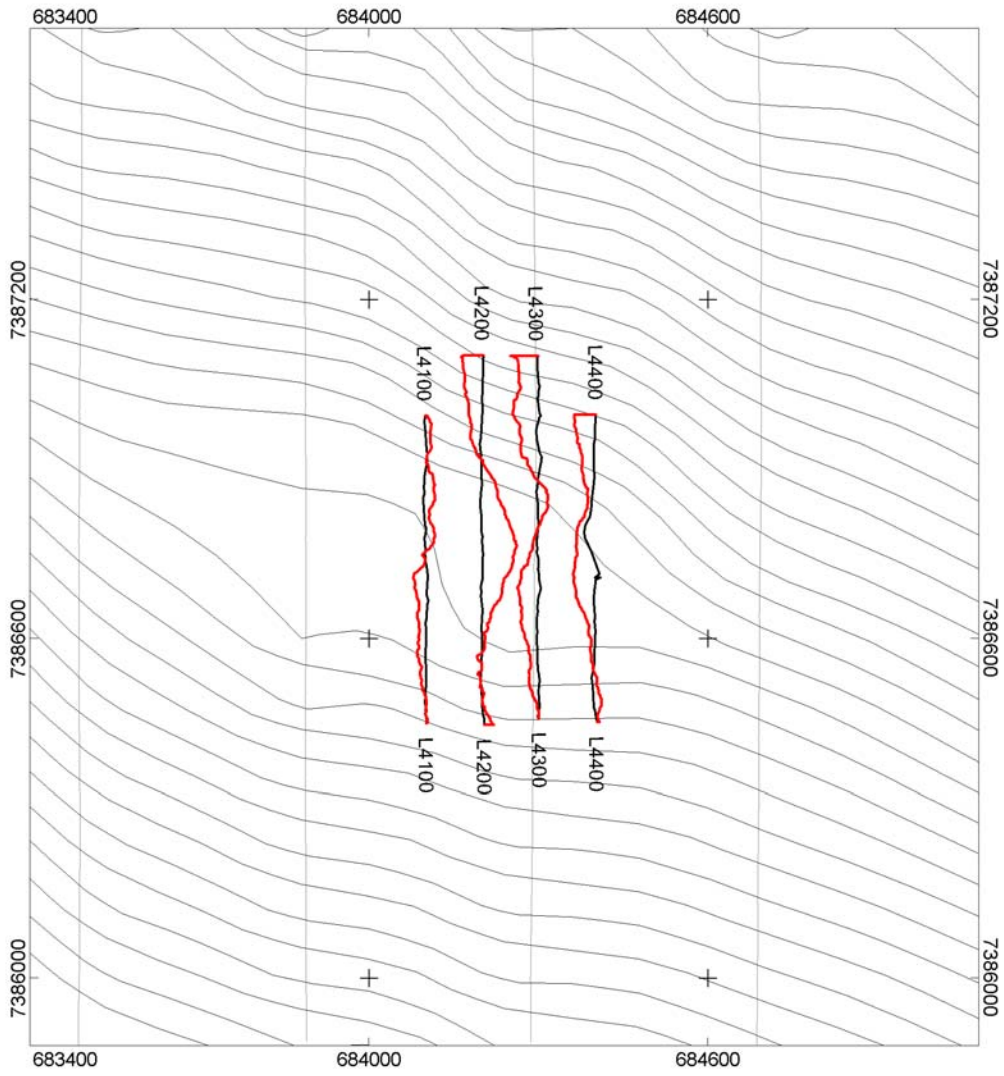
100 0 100 200
metres
GDA94 / UTM zone 53S

Rio Tinto Exploration JV

Plenty River Target PR13
Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 32nT
Profiles scale 2nT/mm
Profiles base removed: 52630nT
Aeromagnetic Contours: 1nT

Mike Enright



Modelling results

Ground magnetic profile L4200E,
Depth: 70m (overlaying signal has shallow source)
Size: 200m by 300m

Airborne magnetic profile
Depth 20m
Size 160m by 80m

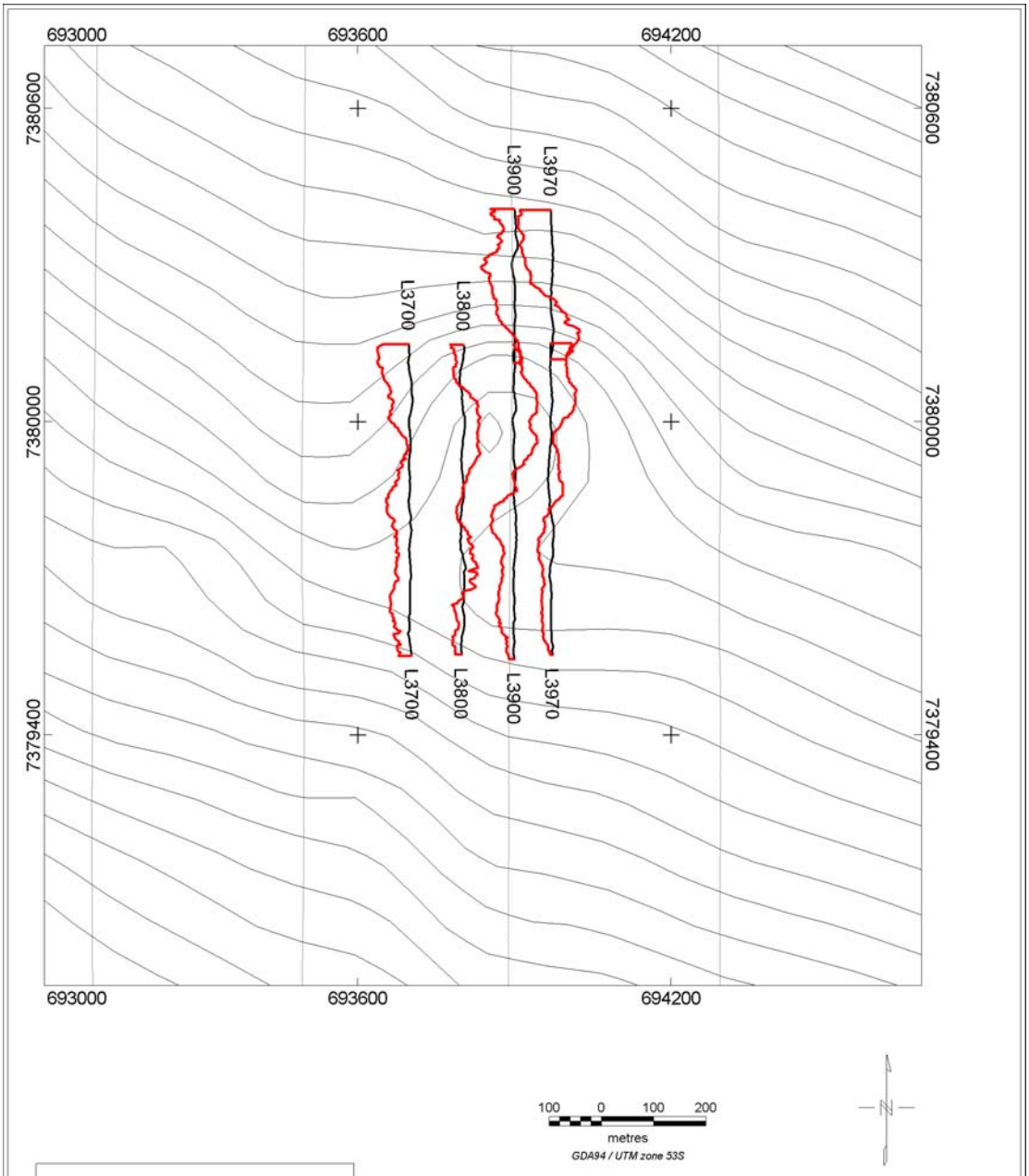
100 0 100 200
metres
GDA94 / UTM zone 53S

Rio Tinto Exploration JV

Plenty River Target PR14
Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 32nT
Profiles scale 3nT/mm
Profiles base removed: 52650nT
Aeromagnetic Contours: 1nT

Mike Enright



Modelling results

Ground magnetic profile L3700E,
Depth: 20m
Size: 110m by 240m

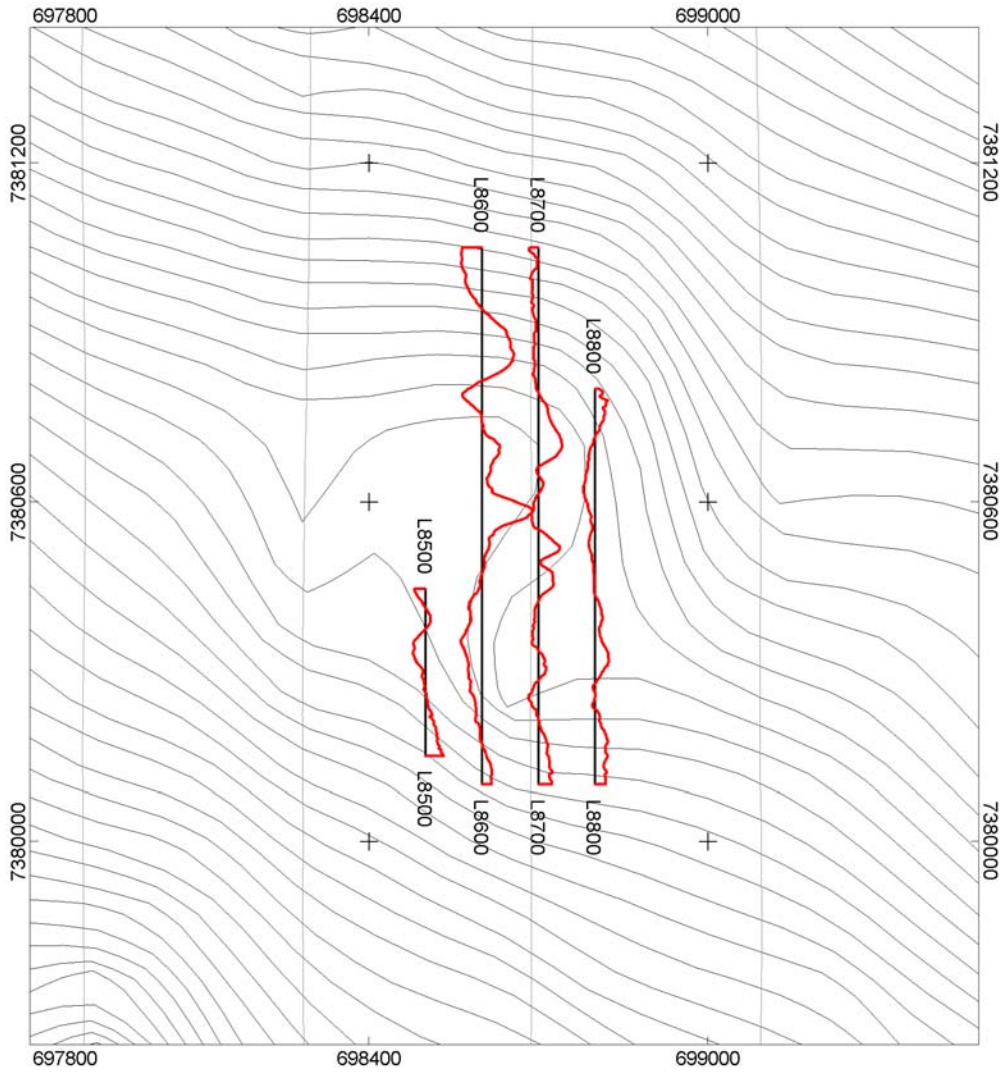
Airborne magnetic profile
Depth 10m
Size 200m by 170m

Rio Tinto Exploration JV

Plenty River Target PR16
Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 18nT
Profiles scale 2nT/mm
Profiles base removed: 52705nT
Aeromagnetic Contours: 1nT

Mike Enright



100 0 100 200

metres

GDA94 / UTM zone 53S

Modelling results

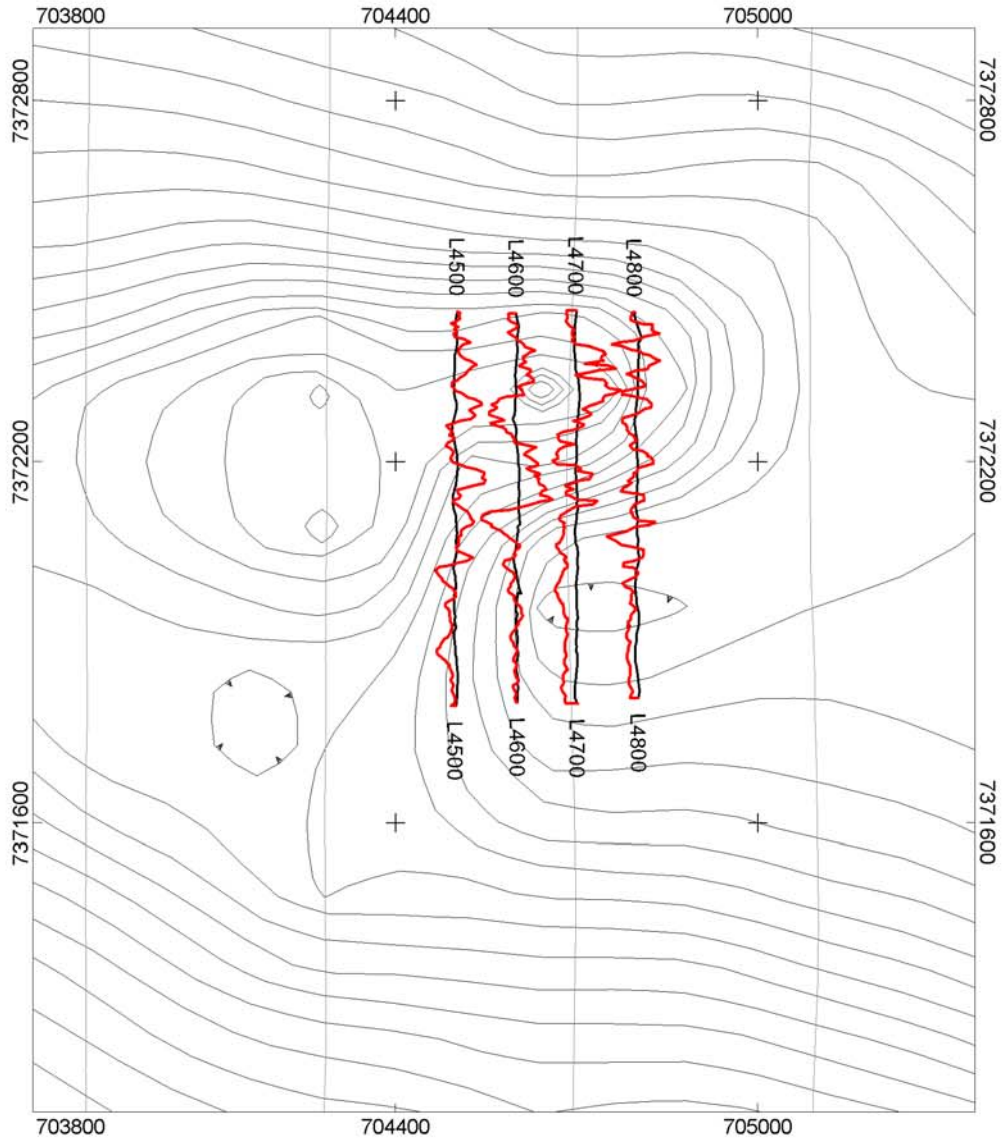
Ground magnetic profile L8500E,
Depth: 20m
Size: 100m by 40m

Rio Tinto Exploration JV

Plenty River Target PR17
Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 40nT
Profiles scale 3nT/mm
Profiles base removed: 52680nT
Aeromagnetic Contours: 1nT

Mike Enright



Modelling results

Ground magnetic profile L4600E,
Depth: 10m
Size: various small bodies

Airborne magnetic profile
Depth 50m
Size 220m by 300m

Rio Tinto Exploration JV

Plenty River Target PR18
Ground magnetic profiles overlaid on Aeromagnetic contours
Total Magnetic Intensity data

Profile Peak to Peak amplitude is 123nT
Profiles scale 10nT/mm
Profiles base removed: 527850nT
Aeromagnetic Contours: 1nT

Mike Enright

Summary Table

Target	Easting	Northing	Depth	Size	Modeled mag. Sus. S.I.
	GDA94 UTM Z35S		ground mag		
PR1	691090	7380577	40m	140m x 150m	214
PR2	693098	7378114	35m	65m x 140m	176
PR3	683888	7384315	15m	45m x 80m	176
PR4	700692	7382900	20m	50m x 80m	138
PR5	696294	7379335	60m	35m x 60m	1332
PR6	697892	7379378	20m	230m x 300m	151
PR8	679087	7397889	70m	50m x 120m	728 - 993
PR9	701087	7375449	20m	various small sources	402
PR10	703886	7376644	10 - 20m	various small sources	364 - 512
PR11	687093	7373341	10 - 20m	various small sources	50 - 400
PR12	684291	7377267	10 - 20m	various small sources	364
PR13	686293	7387287	30 - 40m	200m x 200m	264
PR14	684292	7386729	70m	160m x 80m	201
PR16	693892	7379867	20m	110m x 240m	50
PR17	698688	7380632	20m	100m x 40m	100
PR18	704683	7372216	10m	various small sources	327

All Modeling has been completed with GEOSOFT's MAGMOD with the models constrained to vertical bodies with depth extent. Due to the complex magnetic response from multiple source targets (which GEOSOFT cannot incorporate) the modelling has focussed on calculating depth to source of several individual responses separately and the results averaged. Often complete profiles are not modelled due to the interference from other source responses.

Conclusions

Modeling of the ground magnetic profiles indicates a general trend of depth increase to target in the north, northwest direction.

The shallowest targets to the southeast tend towards the less interesting multiple, small source responses. Positive sample results would be expected for these targets if due to a kimberlite as depth to source is minimal.

The deeper targets are of increased interest due to their increased potential for depth extent.