19. TYRED FLATS (EL 2370)

19.1 Introduction

Tyred Flats is situated 35 kilometres north-west of The Granites and within the south-eastern corner of EL 2370. Previously the area attracted exploration interest because of the correlation of twin magnetic anomalies, a favourable configuration of lineaments and a Bulk Leach Extractable Gold/base of hole geochemical anomaly from shallow vacuum drilling. Elevated gold/arsenic values in rock chip samples were also encountered at surface.

19.2 Work Undertaken

In line with a change in current geochemical sampling techniques, the Tyred Flats grid area was lag sampled at surface to allow a direct comparison with other geochemical data. 38 samples were collected from points 200 metres apart wherever suitable material was available. A magnetometer was also used to locate the postiion of the western magnetic anomaly in relation to a Tertiary palaeo-drainage channel.

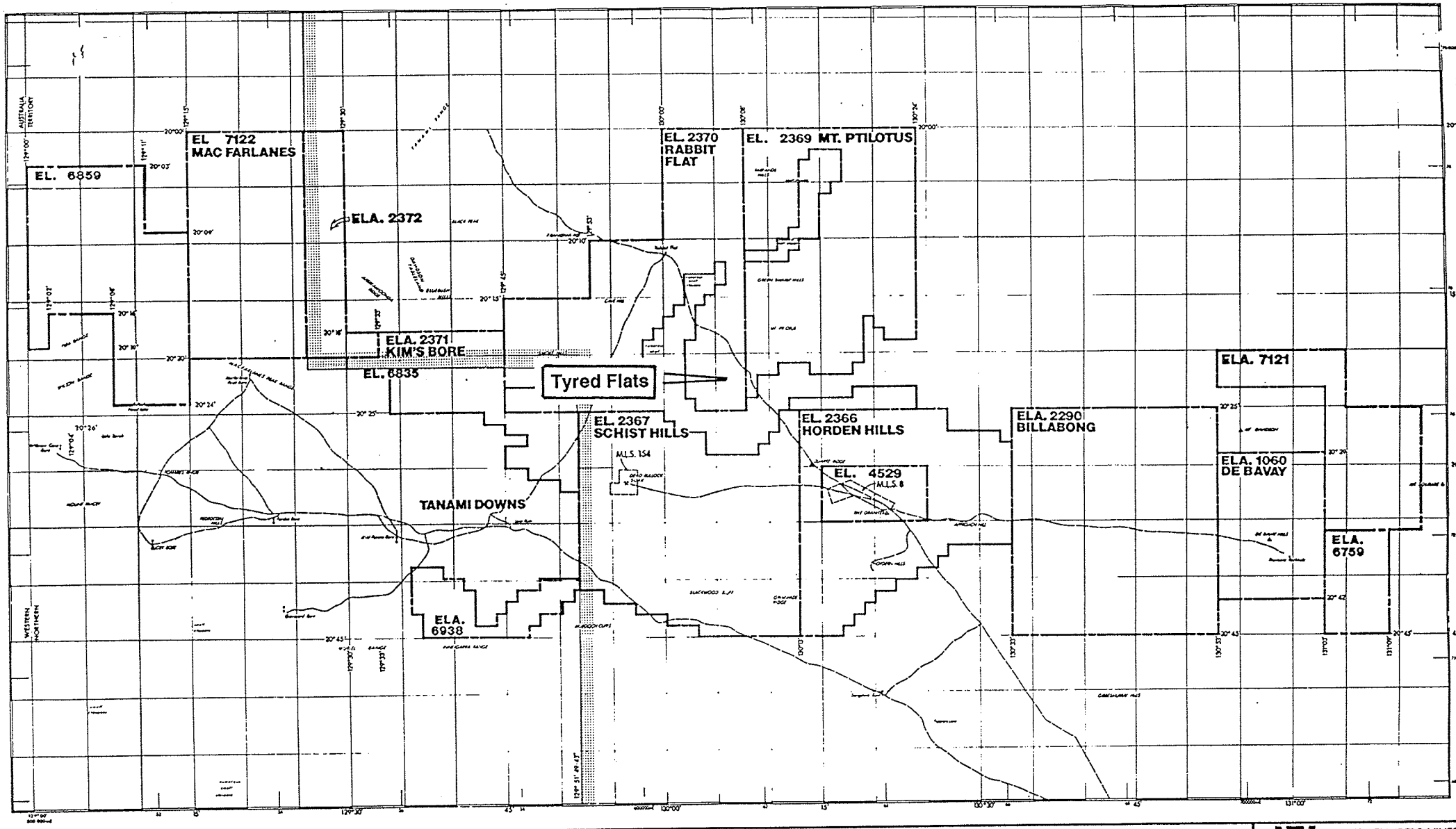
19.3 Results

None of the lag samples yielded anomalous gold (≥ 3ppb Au). Arsenic, though locally elevated (maximum 118ppb), is not considered anomalous. Variation in other elements is interpreted to reflect differences in bedrock type.

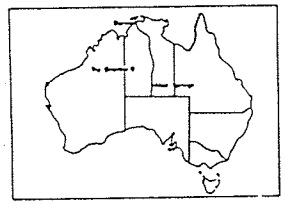
Whereas the exact margin of the drainage system is somewhat ill defined, the ground magnetic survey confirmed the western anomaly is centred approximately 600 metres west of the eastern edge of the palaeo drainage channel. Consequently it is (almost) certain that the magnetic source rocks will be covered by at least tens of metres of unconsolidated, water bearing sediments, and therefore beyond the reach of a RAB rig (A magnetic model of this anomaly yielded a depth to top of 52 metres). Any further testing will require a drilling rig capable of penetrating these sediments.

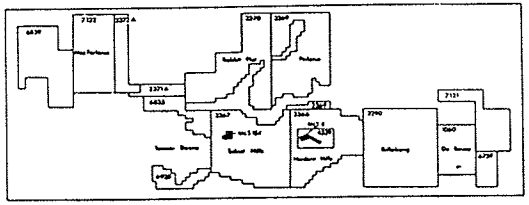
19.4 Plans

Drawing No	Title	Scale
60 121	Geochemical sampling I15	1:25000
1200 913	Tyred Flats - Fact Geology and Geochem Sampling Sheet 1	1:5000
1600 914	Tyred Flats - Fact Geology and Geochem Sampling Sheet 2	1:5000



LOCATION MAP





LEGEND

NORTH FLINDERS MINES LIMITED

Tanami Reconnaissance : Northern Territory

EL LAYOUT

1:250000

KILOMETRES

DATA BY

DRAWN MARCH '89

AMENDED

Drg. No. 20-

Approximate eastern edge of Tertiary drainage system.

"Western magnetic anomaly"

"Eastern magnetic anomaly"

9,600E

10,000E

10,400E

14,000E

7750000N

7748000N

7746000N

7744000N

N

Scale 1:25000

TYRED FLATS.

Magnetic contours and grid base plan.

20. CHALLENGER (EL 2370)

20.1 Introduction

The Challenger-Rabbit Flat Belt is a zone of high amplitude linear magnetic anomalies extending in a broad arc northwards from Rabbit Flat through the Challenger grid area to the northern boundary of EL 2370. This belt extends to the south-west through Redeye into the Cave Hills area. The presence of a mirror image of stratigraphy on the western side of the Frankenia Dome extending from the Black Hills southwards through Tanami and Redback Rise into the Black Peak area, has been taken as evidence for diapiric intrusion of the Frankenia Granite.

Regional vacuum sampling in 1989 highlighted four anomalous areas, Challenger One, and Anomalies 11 to 13.

Challenger One consists of units ascribed to the Davidson Beds. Rock chip sampling and subsequent costeaning produced Au values up to 0.28ppm Au in CRC, and 8m at 0.11ppm Au in costeans. Detailed RAB drilling highlighted a zone of 1000m x 100m of + 10ppb Au. This was not considered sufficient to warrant further work at that time.

Anomalies 11 and 12 were based upon anomalous (>4ppb) Au in laterites, and in Base of Hole (BOH) samples (>4ppb Au). Follow up work failed to repeat the anomalous levels in the laterite, however the base of hole values were repeated. Anomalous Base of Hole (BOH) Au values come from laterite developed over Tanami Volcanics at Anomaly 11. Anomaly 12 anomalous Base of Hole (BOH) Au values are now known to have reflected high Au backgrounds within metabasalts and minor metasediments belonging to the Tanami Complex.

Anomaly 13 was based upon elevated As in laterites. Follow up work, although confirming these values, failed to define a distinct zone. No further work has been done on Anomaly 13 this year.

20.2 Work Undertaken

Anomaly 11

Objectives for the reporting period were to undertake closer spaced vacuum drilling within the anomalous zone and conduct preliminary electromagnetic and ground magnetic surveys prior to RAB drilling.

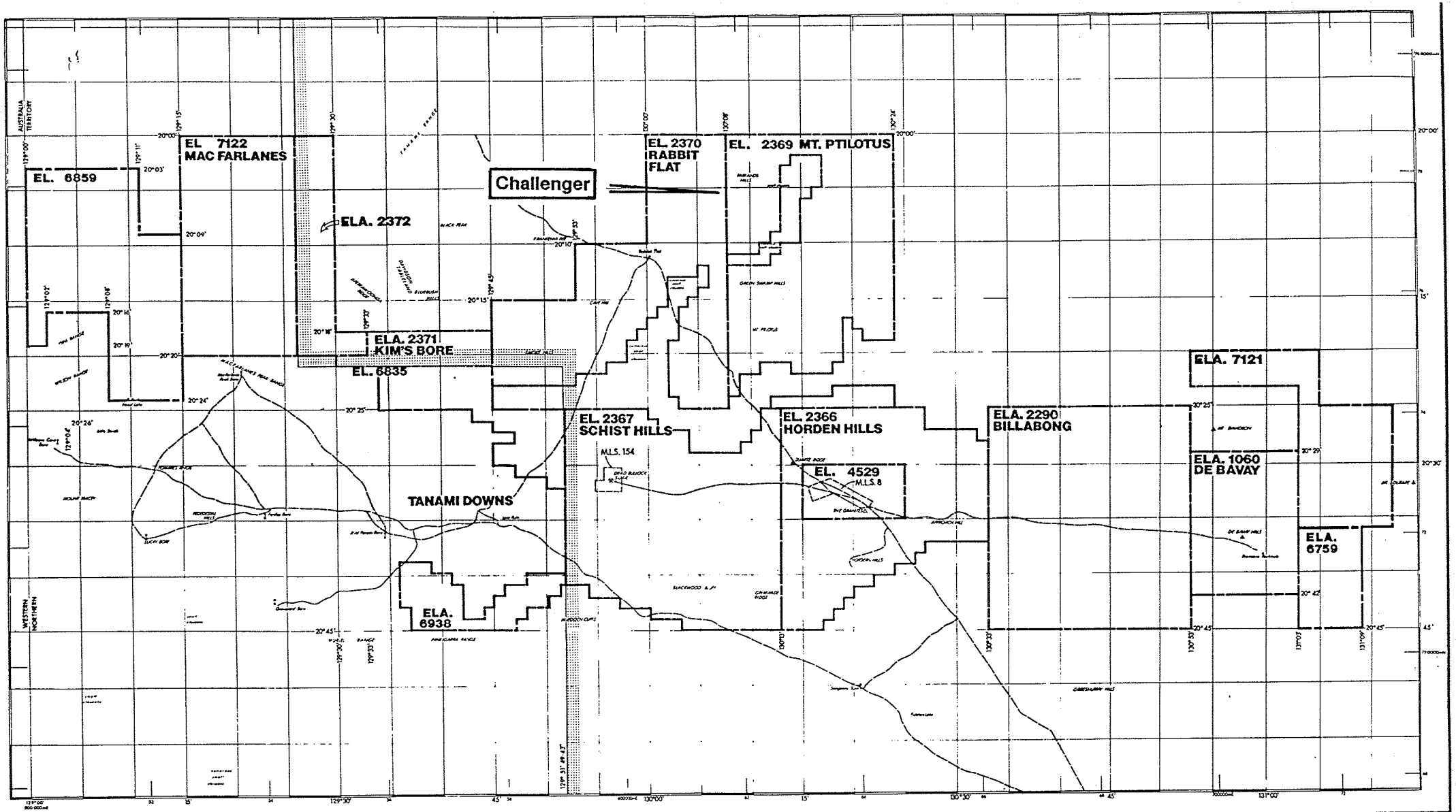
A 250m x 250m vacuum drilling program was designed to infill the anomalous Au zone with wider spaced 500m x 250m drilling within the extension of the zone to the west. As the anomaly is dominated by mafic rocks, all samples were dispatched for analysis for Au, As, Cu, Pb and Zn. All drillholes and rock chip sites were accurately located using the Global Positioning System (GPS).

6.45 kilometres of ground magnetic survey were carried out on three north-south traverses along vacuum drill lines.

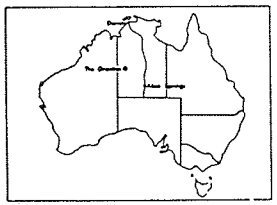
Details of the work carried out are presented below -

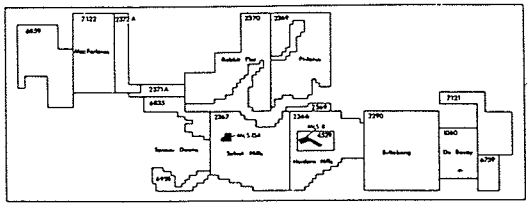
STATISTICS OF WORK COMPLETED				
	Samples	Metres	Holes	Traverses
Vacuum Drilling	59	386.5m	54	-
Bulk Cyanide Leach	54	-	-	-
Ground Magnetics	-	~6.5km	-	3
Electro Magnetics	-	-	-	-

Later in the year a single north-south traverse was RAB drilled along 616160E. 7 holes were drilled for 261 metres and 88 samples. Vertical holes were spaced at 50 metre intervals between 7771200N and 7771500N.



LOCATION MAP





LEGEND

Road
Fence
Airfield
Mine
Windsock
Building
Control Point, Major
" " Minor
" " Astronomical
Spot Elevation (metres)
" " Approximate
Sand Ridges
Relief Shading
Waterhole
Dry Lake
Stream, Intermittent
E.L.A. Boundary
M.L. Boundary
Aboriginal Land Boundary

NORTH FLINDERS MINES LIMITED

Tanami Reconnaissance : Northern Territory.

EL LAYOUT

1:250 000

KILOMETRES

DATA BY			AMENDED	A	12-90 CG
DRAWN	MARCH '89			B	8-90 CG
				C	4-91 CG

Drg. No. 20-1

Anomaly 12

The objective of the 1991 program was to follow up exploration of a geochemically anomalous zone outlined during 1990 with closer spaced vacuum drilling.

Five (5) 500m spaced traverses running north-south with drill holes spaced at 250m intervals were drilled in the anomalous zone. As the anomaly is dominated by mafic rocks, all samples were analysed for Au, As , Cu, Pb and Zn.

All drillholes and rock chip sites were accurately located using the Global Positioning System (GPS).

Details of the work carried out are presented below -

STATISTICS OF WORK COMPLETED				
	Samples	Metres	Holes	Traverses
Vacuum Drilling	60	457.7m	57	5
Bulk Cyanide Leach	3	-	-	-
Rock Chip Samples	4	-	-	-

The nature of the bedrock was not amenable to BCL sampling. In most cases fresh bedrock was intersected, not weathered bedrock so the base of hole sample was sufficient. Deeply weathered zones of Antrim Plateau Volcanics consisted of clays after mafics, again not amenable to the BCL technique.

Results from the 1990 program indicated BCL assays of bedrock are of the same order as standard base of hole assays. Also BCL samples taken within Au anomalous clays after mafics failed to detect mineralisation due to the clays retarding the leaching process.

Challenger Grid

Four angled open holes were percussion drilled on the Challenger Grid (Challenger One) to test below anomalous surface goechemistry.

Regional Exploration

Regional exploration of the remaining Challenger area was advanced by marking out an arcuate array of traverses which were mapped, rock chip and lag sampled, tested with a Max-Min EM survey and RAB drilled over the most prospective zones (see map in this section of the report). Traverses were numbered C1 to C6.

Rock chip and lag (-5mm to +2mm fraction) samples were collected wherever suitable material was present. RAB drilling was confined to traverses C1, 2, 3 and 5. Lag samples were analysed for Pb, Bi, Mo, Sb, Sn, U, W, As, Fe, Se, Ag, Co, Cu, Zn and Au. RAB samples were assayed for gold and arsenic.

The EM survey has been completed; however, data processing/analysis has yet to be finalised and the results are therefore not presented with this report.

Details of regional exploration are summerised below -

	Holes	Samples	Metres
RAB Drilling *	186	1040	3123
Rock Chip Sampling	-	4	-
Lag Sampling	-	115	-

* inclusive of 4 drillholes on Challenger Grid (Challenger One).

20.3 Results

The Regional Geology of the Northern Part of EL 2370

Activities during 1991 have demonstrated that basalts of the Antrim Plateau Volcanics (Cambrian) cover much of the area interpreted from geophysical data to be underlain by the basal stratigraphy of the Tanami Group (Blake, Davidson and Tanami facies). RAB drilling has penetrated up to 34 metres of Antrim Plateau basalt, and thicknesses in excess of 20 metres appear to be common. The Cambrian basalts are flat lying, non-magnetic and are easily recognised texturally in RAB samples, even though commonly deeply weathered. They are both undeformed an unmetamorphosed. By comparison the basalts of the Tanami Volcanics comprise foliated amphibolite facies metabasalts and metadolerites. The presently known distribution of the Antrim Plateau volcanics is shown in by the map attached to this section. It is probably not coincidental that the eastern limit of the Antrim Plateau basalt corresponds with the trend of existing topographic highs; the latter probably existed in the Cambrian and influenced flow directions.

In the northern part of the Challenger area (line C5) Gardiner Sandstone has also been found to overlie inferred Tanami Group rocks in areas of no outcrop. In the eastern part of line C5 Gardiner Sandstone has been intersected beneath both Cainozoic sediments and Antrim Plateau basalts. This area has yielded the only significant multi-point lag gold geochemical anomaly in the Challenger area; the source of the anomaly is presently unknown.

Rocks from the lower Tanami Group (Blake and Tanami facies) comprise interbedded basalts, basaltic tuffs and epiclastic rocks, and fine grained dominantly pelitic clastic rocks passing eastwards up sequence into variably graphitic mudstones (now graphitic and pelitic schists), cherts, ferruginous schists and banded iron formations (Davidson facies). A single RAB hole drilled near the eastern end of line C3 (at 10,000E) intersected Madigan facies mudstone and greywacke, supporting earlier geophysical interpretations.

At variance with those interpretations however, granite, rather than greywacke/mudstone was intersected at the eastern end of line C2. This is not entirely unexpected as granites are known to the south and east of this area, and EM and magnetic responses are similar for both rock types.

In the Anomaly 11 area RAB drilling encountered thick, water bearing Cainozoic sediments in the south. To the north a sequence of strongly magnetic metabasalts and interbedded schistose metasediments is present : these rocks are interpreted to be mixed Blake/Tanami facies.

There is a possibility that a basaltic sequence equivalent to the Tanami Mine basalts may also be present at Challenger. It is suggested that these may be represented by local lateritised rises that form part of Anomalies 11, 12 and 13. These Basalts unconformably overlie greenschist to amphibolite facies metasediments, and metabasalts belonging to the Tanami Complex. The Tanami Complex is also overlain by Antrim Plateau Volcanics. In contrast to the Tanami Mine basalts, no laterite form development is known over the Antrim Plateau Volcanics at Challenger-Rabbit Flat. There is no known occurence of Antrim Plateau Volcanics overlying Tanami Mine Basalt. Presumably, lateritised Tanami Mine Basalts form Pre Cambrian topographic highs. In addition mixed Davidson and Blake Beds are known at Challenger and from RAB Traverses C2. The majority of the western portion of the belt is overlain by 20-40m thickness of Antrim Plateau Volcanics.

Anomaly II

A substantial BLEG gold anomalous zone was encountered in the south-east of this zone. It was detected on four infill vacuum drilled lines which indicated a strike of at least 1.5 kilometres. A peak BLEG value of 69.4ppb Au was recorded, with another six results above 5ppb Au. Later magnetic and EM surveys also located coincident anomalies.

A single north-south RAB drill traverse through the middle of Anomaly II indicated that the target was highly magnetic metabasalt.

To the north of the traverse metabasalts lay beneath Tanami Mine Basalts while the southern portions consisted of drainage sediments and indurated silts. Bedrock was not reached due to excessive water and depths.

Assays from the seven RAB drillholes were disappointing. As the depth of cover is excessive no further work has been undertaken.

Anomaly 12

Results from Anomaly 12 phase three drilling revealed single point (per line) gold anomalies. A 3 kilometre northeast trending zone is defined which mirrors Tanami Complex stratigraphy (Davidson Beds, Tanami Volcanics, Blake Beds) interpreted from aeromagnetics.

The lack of anomalous results from phase two drilling in the north and west of the Anomaly 12 is attributed to cover of Tanami Mine basalt. These rocks, though generally highly lateritised, have been found outcropping in two areas. In contrast, the gold anomalous basalts (Tanami Volcanics) are quite distinctive, comprising massive and amygdaloidal basalts, probably flows, and laminated, cross bedded epiclastics and tuffs; more massive units are commonly metamorphosed to amphibolites. It is possible that the anomalous gold results from Anomaly 12 are simply reflecting higher background values in the Tanami Volcanics. Interbedded quartz rich clastic sediments, though rarely seen, comprise quartz ± sericite schists comparable to (and ascribed to) Blake Beds facies. EM profiles indicate that some of the sediments are highly conductive, so graphite schists (? Davidson Beds facies) may also be present.

The high amplitude linear magnetic trends correspond with interbedded basalts/basaltic tuffs and sediments of mixed Blake Beds/Tanami Volcanics/Davidson Beds passing eastwards into non-magnetic Madigan Beds. Basalts of the Antrim Plateau Volcanics are much more extensive than previously recognised, and cover much of the area of both Anomaly 11 and Anomaly 12. These basalts probably also blanket much of the Tanami complex to the north of the Anomaly 12 area and are also widespread over the Frankenia Granite. They are relatively thin, do not generate significant magnetic anomalies and outcrop only rarely. The Antrim Plasteau Basalts are easily discriminated from Tanami Complex basalts (Tanami Volcanics) on textural and mineralogical grounds. Geochemically, both in fresh and lateritised material, the two appear distinguishable. The Antrim Plateau basalts are, however, not known to contain any significant gold or generate gold anomalies.

It may be possible to undertake future exploration in areas of thin (<10m) cover of Antrim Plateau basalt. Results to date indicate that both magnetics and EM remain effective but further assessment is required.

Challenger Grid

The four angled open hole percussion holes drileld on the Challenger Grid to test below anomalous surface geochemistry failed to achieve sample assays greater than 0.1g Au/t. Ferruginous pelitic schists, cherts and minor BIF were intersected.

Regional Exploration - Vacuum Drilling

The regional vacuum program highlighted three areas of the belt worthy of follow up. Anomalies 11 and 12 were highlighted by their anomalous Au and Cu in laterites and anomalous BOH Au.

Subsequent phases of work failed to reproduce the anomalous Au values in the laterite, however the anomalous Cu values were verified. The anomalous BOH Au values were repeated, however As was never anomalous, only at the level of detection.

Recent reinterpretation of the belt shows the anomalous laterite values were from Tanami Mine Basalts. The anomalous BOH Au within Anomaly 12 was due to a high background within metabasalts and metasediments of the Tanami Complex. The elevated BOH Au and BCL Au values from Anomaly 11 have been interpreted to be due to elevated values within Tanami Volcanics, possibly reflecting mineralisation.

Challenger Shear Zone

This zone, appearing as a corridor of magnetic depletion, runs north-south and controls the axis of anomalism at Challenger. The structure flexes/bends to the south of Challenger and heads south-east through Anomaly 11. Geochemically this structure is anomalous at Challenger and possibly explains Anomaly 11. Favourable stratigraphy cutting this structure may act as a trap for gold.

Regional Exploration - Lag and Rock Chip Sampling

Lag (-5mm, + 2mm) and rock chip samples were taken along the regional EM profiles whenever suitable material was present. Rockchip results were not anomalous. Anomalous lag results were received from the eastern end of line C5. A 300m wide zone was outlined, (10300E-10600E) samples were anomalous in Au (up to 52ppb), U(up to 8.4ppm), W (up to 23ppm), Mo (up to 11.5ppm) and Co (up to 40ppm).

Regional Exploration - RAB Drilling

Traverse C1

Traverse C1 consisted of Antrim Plateau Volcanics overlying metabasalts of the Tanami Complex with deep cover over granite in the east.

The base of the Antrim Plateau Basalt is flat lying and the interface consists of quartz gravels with paleosoils and abundant water. A sharp increase in depth to Tanami Complex is noted to the west of the traverse. This represents a pre-Cambrian fault scarp.

One hole was purposely extended in order to indicate background levels of gold in the amphibolitic Tanami Complex. This information indicated background for Au is 5-10ppb.

Traverse C2

Traverse C2 follows a similar trend to C1. Deep 30-46m+ cover of Antrim Plateau volcanics overlying metabasalts to the west, rapidly shallowing to suboutcropping metabasalts becoming dominated by magnetic-sericite slates to the east. Granite was intersected further to the east. A laterite cap of Tanami Mine Basalt overlying Tanami complex metabasalts is located in the centre of this traverse.

No anomalous assay results were received.

Traverse C3

This traverse passes through the Challenger grid. Three holes were sited to the west to test the thickness of the Antrim Plateau Volcanics with one hole to the east to determine wheather bedrock was greywacke or granite.

Antrim Plateau was shown to be +22m thick, however bedrock was not intersected. The easternmost hole intersected greywacke.

No anomalous assay results were received.

Traverse C4

Not drilled.

Traverse C5

Traverse 5 consists of deep 20-30m Antrim Plateau volcanics overlying/Blake Beds with a progressive shallowing of cover basalts overlying quartz lithic sandstone of the Gardiner sequence. To the east Gardiner outcrops east of 11350E.

Between 10500E-11000E elevated Au values occur in both the Antrim Plateau Volcanics and the Gardiner sequence. Maximum values in the Antrim Plateau are 300ppb Au, while maximum values in the Gardiner sequence are 190ppb Au. These values are by no means isolated, the cover rocks are anomalous for the length of the drillholes.

Traverse C6

Not drilled.

20.4 Plans

Drawing No	Title	Scale
1000 1253	Challenger BLEG & CRC Sampling Sheet 2	1:5000
1000 1254	Challenger BLEG & CRC Samplin Sheet 3	1:5000
1000 1255	Challenger BLEG & CRC Sampling Sheet 4	1:5000
1000 1256	Challenger BLEG & CRC Sampling Sheet 5	1:5000
1000 1258	Challenger Bot. Hole of Geochem. & Geol. Sheet 2	1:5000
1000 1259	Challenger Bot. Hole of Geochem. & Geol. Sheet 3	1:5000
1000 1260	Challenger Bot. Hole of Geochem. & Geol. Sheet 4	1:5000
1000 1261	Challenger Bot. Hole of Geochem. & Geol. Sheet 5	1:5000
1000 1319-1322	RAB drilling: assay results and Geology Traverse C1	1:500
1000 1323-1326	RAB drilling: assay result and Geology Traverse C2	1:500
1000 583,1330,	RAB drilling: assay result and Geology Traverse C3	1:500
1000 1329, 1332-1333	RAB drilling: assay result and Geology Traverse C5	1:500
2200-1328	RAB drilling: assay results and Geology Traverse A11 Section 616160E	1:500
1000-1331	RAB drilling: Geology and assay cross sections under costeans 11025N, 1135ON	1:500

E.L. 2370

E.L. 2369

Anomaly 13

C6 EM/mag line

C5 EM/mag line RAB

C3 EM/mag line RAB

Challenger grid

C4 EM/mag line

Anomaly 12

C2 EM/mag line RAB

C1 EM/mag line RAB

Anomaly 11

RAB

EM/mag line

EM/mag line

EM/mag line

Tanami

Rabbit Flat

Track

Track

Tanami Downs

Granites

N

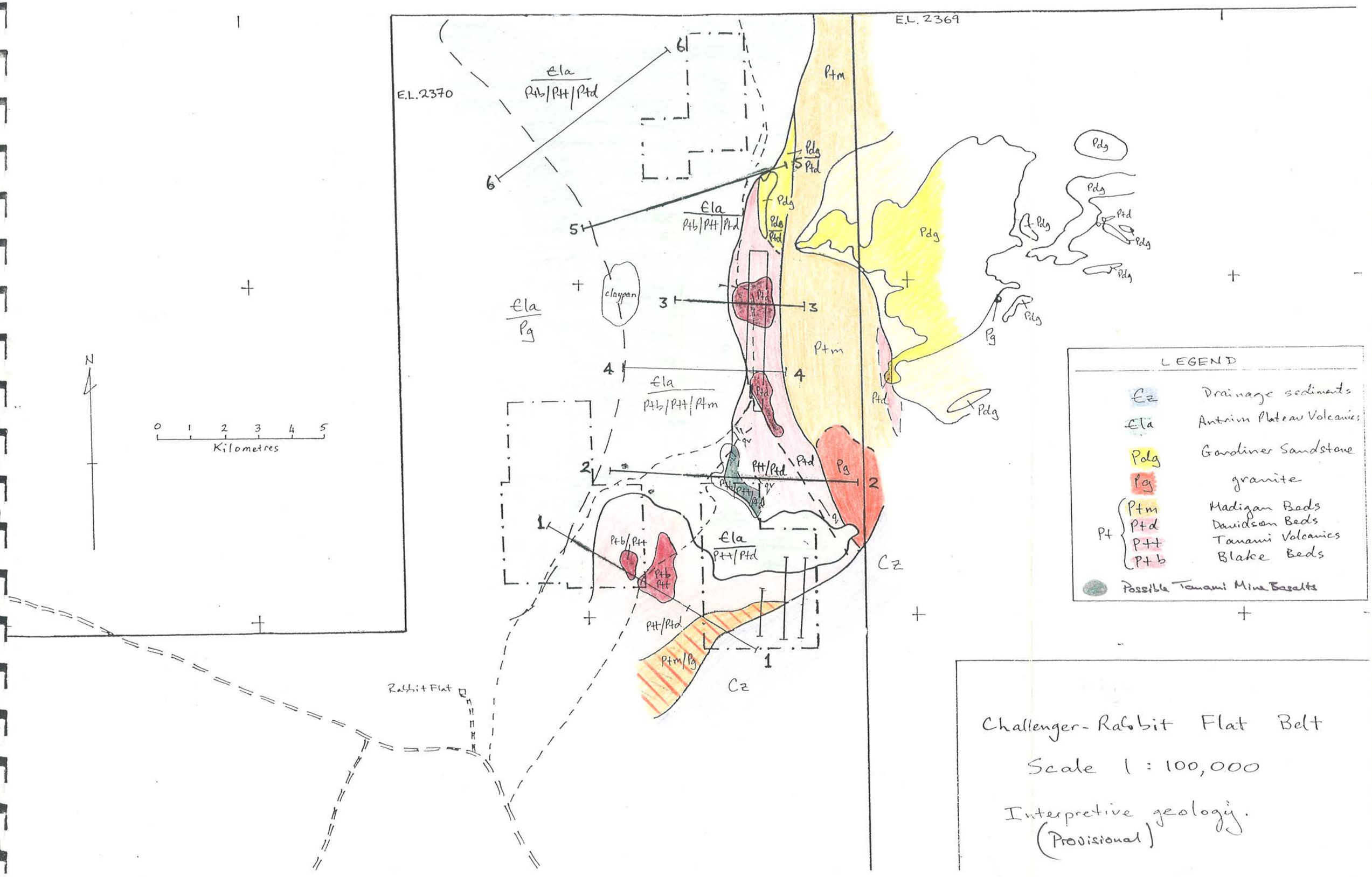
0 1 2 3 4 5

Kilometres

Challenger - Rabbit Flat Belt

Scale 1 : 100,000

Summary plan



Challenger - Rabbit Flat Belt

Scale 1 : 100,000

Interpretive geology.
(Provisional)

E.L. 2370

E.L. 2369

N

0 1 2 3 4 5
Kilometres

Magnetic interpretation.

Magnetic unit

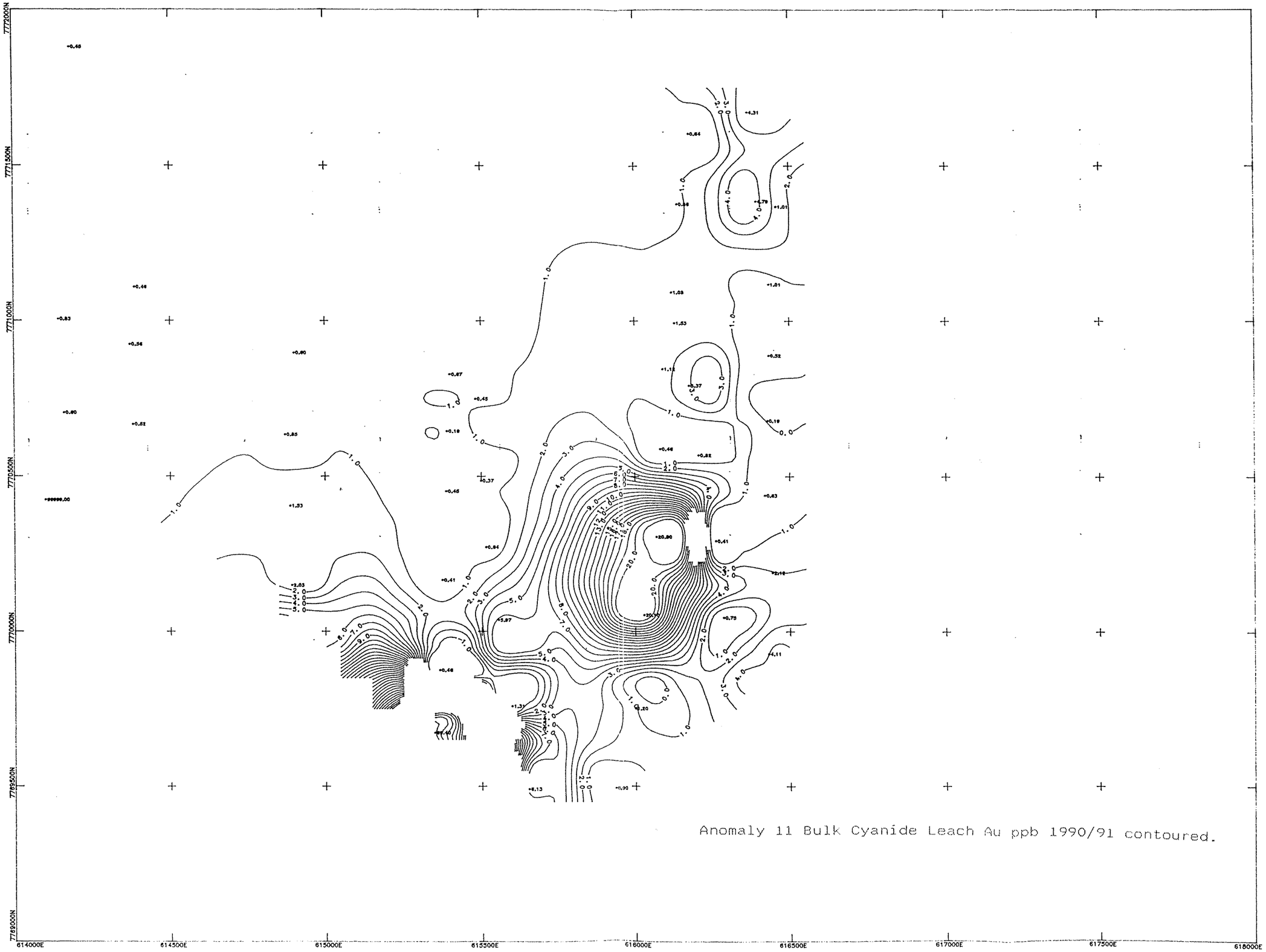
Fault

Rabbit Flat

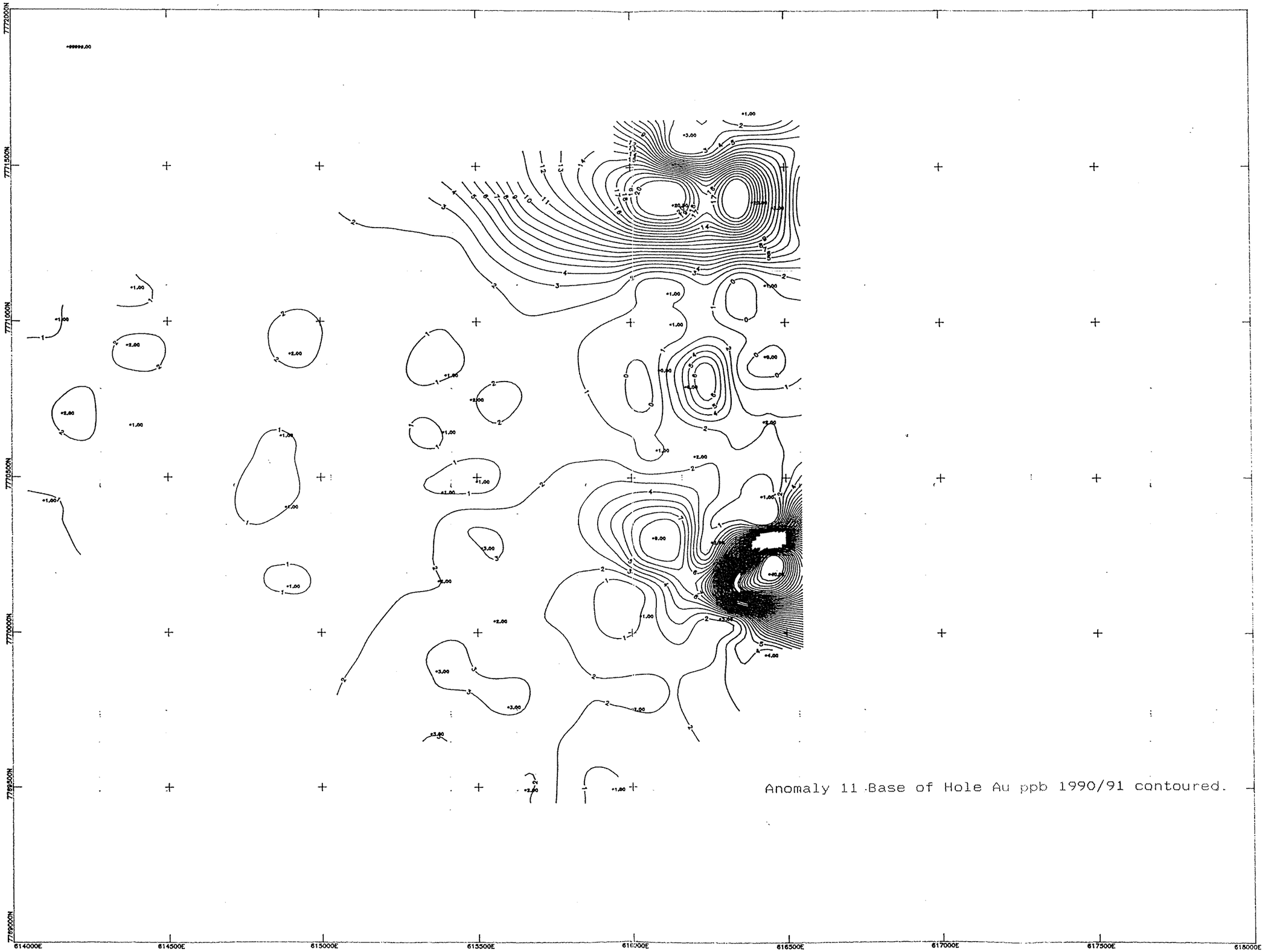
Challenger - Rabbit Flat Belt

Scale 1 : 100,000

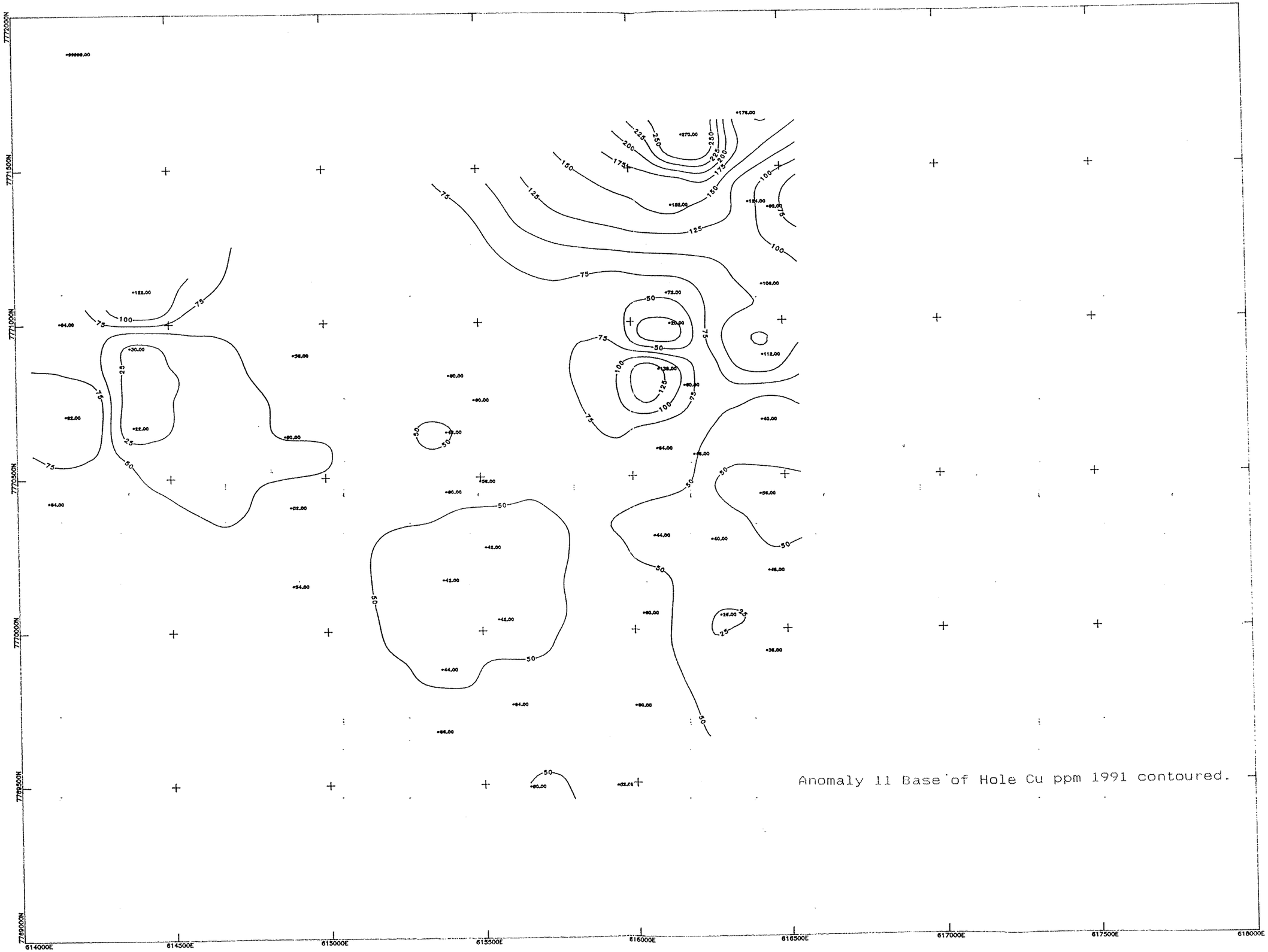
Major magnetic units - interpretation by H. Rutter, 1990.



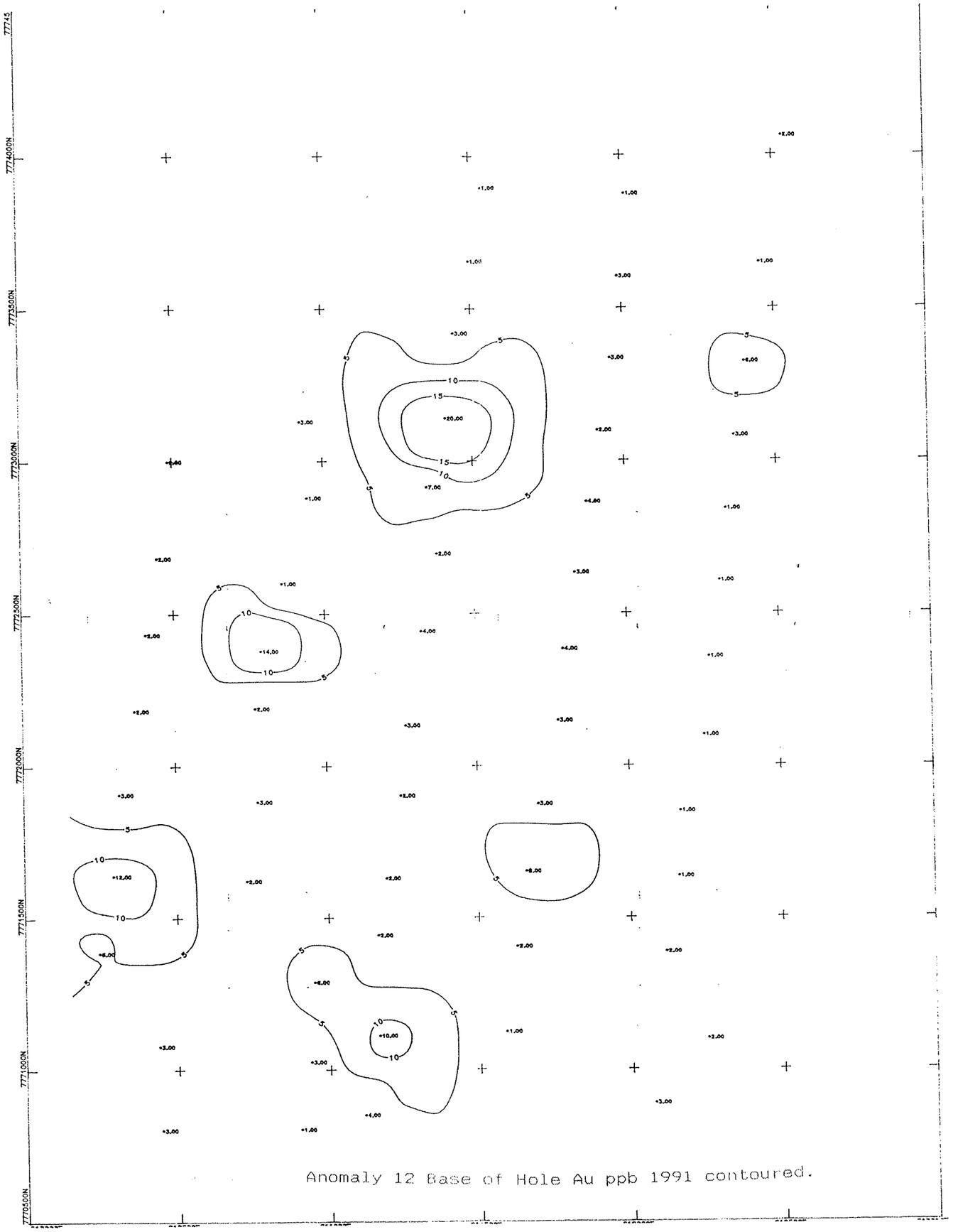
Anomaly 11 Bulk Cyanide Leach Au ppb 1990/91 contoured.



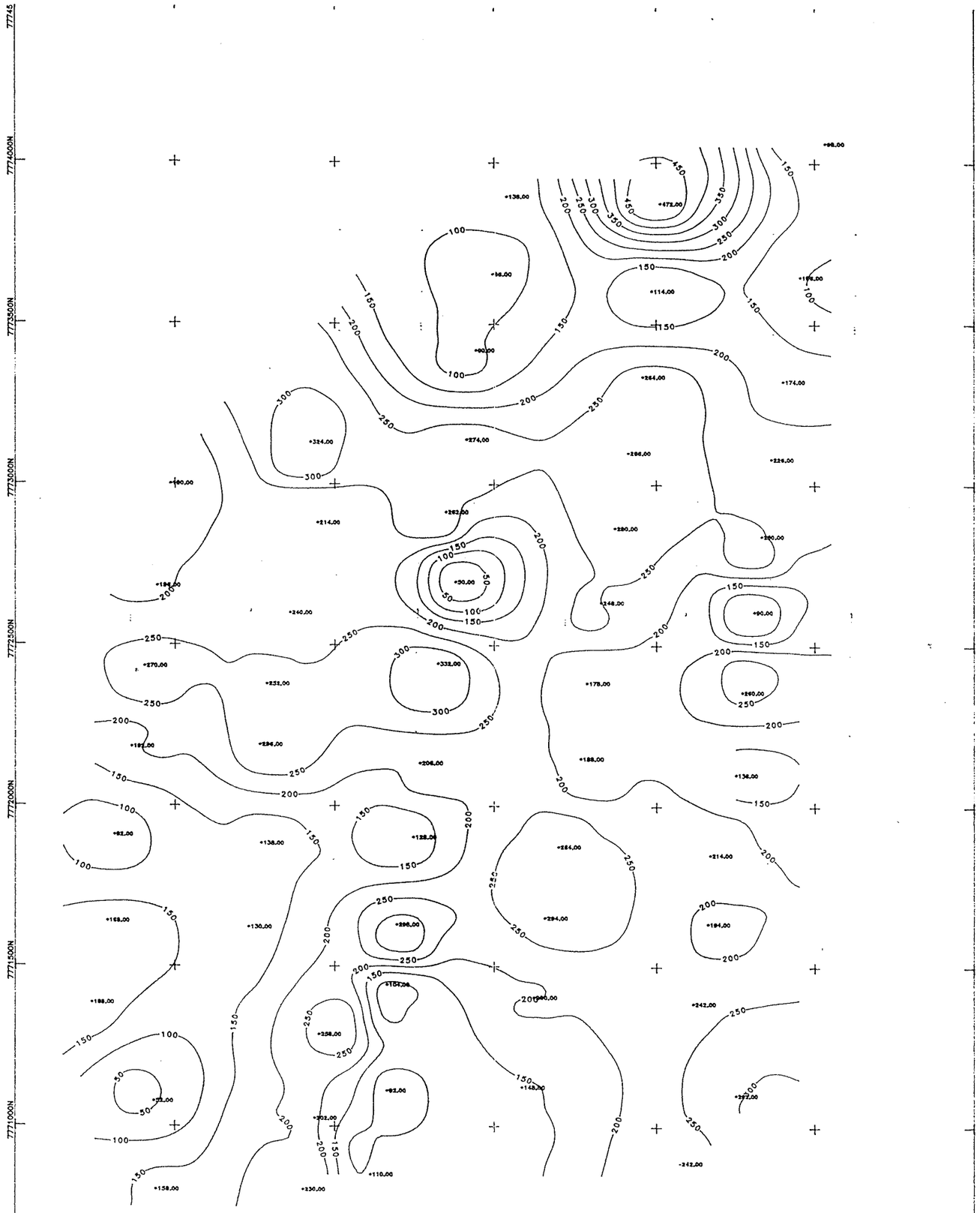
Anomaly 11 Base of Hole Au ppb 1990/91 contoured.



Anomaly 11 Base of Hole Cu ppm 1991 contoured.



Anomaly 12 Base of Hole Au ppb 1991 contoured.



Anomaly 12 Base of Hole Cu ppm 1991 contoured.