22. IVY WEST (EL 4529)

22.1 Introduction

The Ivy west anomaly lies immediately west of the Ivy exploration camp, partly within ML S8 and with the remainder in EL 4529.

Much of the area has a surficial cover of transported material, and outcrop is therefore limited. However, outcropping Madigan Beds, minor subcropping Davidson Beds and sandstone float have been located.

Previous work in the area has been restricted to reconnaissance auger drilling within the area of ML S8.

The area was covered in 1990 by the reconnaissance vacuum drilling programme, which produced both anomalous silver and gold assays in the BLEG samples. Consequently a phase of follow-up drilling has been carried out during this report period.

22.2 Work Undertaken

January - June Activity

To confirm the existence of the silver (and gold) anomaly and more closely define the anomalous zone a program of follow-up vacuum drilling on a 450 x 500 metre grid was initiated. A BLEG sample and a base of hole sample were collected from each hole where possible, with base of hole samples assayed for silver as well as gold and arsenic. The drilling was complemented by rockchip sampling.

53 vacuum holes were drilled for 451.5 metres with 52 BLEG and 48 base of hole samples being collected. 47 rock chip samples were taken.

July - December Activity

A subsequent program comprising a ground magnetics survey, gravity survey and RAB drilling was undertaken later in 1991 to determine or confirm:

(a) the extent of the Davidson Beds at Ivy West
(b) the existence of an interpreted rift structure.

Preparatory to drilling 8.4 line kilometres of ground magnetics was undertaken to facilitate target - definition. In addition, two gravity traverses were carried out to provide further evidence of the rift feature interpreted from the magnetics.

To assist with tracing the Davidson Beds, this investigation was to group the lithological units according to metamorphic facies i.e. all drillholes depths were to enable identification of the bedrock. In lieu of the single-collection multiple/sample-type method (viz BCL and BOH samples), an alternative of multiple down hole sampling (in this case with RAB) was selected, with analysis to include gold, silver and arsenic content. Traverse lines were generally spaced at 500 metre intervals, and mostly perpendicular to the rift/gold anomalous zone.

Work undertaken in this second program for 1991 is summarised below.

TRAVERSE	GEOPHYSICS (LINE KM) MAGNETICS, GRAVITY (25m int.)	(100m int.)	DRILLHOLES NOS. (50-200m int.)	METERAGE	PURPOSE
67500E	1.7	-	10	298	Davidson Beds - silver anomaly
68500E	1.2	-	10	319	?Davidson Beds
69400E	2.5	-	17	374	Alluvium & ?Davidson Beds
1700M	1.5	-	13	343	Define inferred Structu
2000N	-	3.5	10	247	?Davidson Beds/quartz stock work source for g anomalous zone
2600N	1.5	-	5	110	
5000N	-	2.8	-	-	
TOTAL	8.4	6.3	65	1682	

22.3 Results

January - June Activity

Geochemistry

Although duplication of the original reconnaissance drillholes failed to repeat many of the anomalous BLEG assays, the infill drilling confirmed the existence of anomalous levels of silver (≥ 80ppb) and gold (≥ 0.9ppb) in the Ivy West area. Since the majority of the BLEG samples from both the reconnaissance and the follow-up drilling were taken in transported material, a patchy distribution of silver and gold within this surficial cover could explain the failure to repeat many of the original anomalous assays. One which was repeated, however, showed high copper values as well as silver:

Reconnaissance	BLEG 282088	1250ppb Ag	1.07ppm Cu
Follow-Up (IWV 1)	BLEG 284414	386ppb Ag	2.96ppm Cu

These two samples were collected from holes adjacent to Davidson Beds sup-outcrop. No other significant Cu assays were obtained in either the first or second phase of drilling.

Base of hole gold assays were quite encouraging, with nine anomalous or elevated (≥ 4ppb) assays lying within a well defined zone.

Base of hole silver assays were disappointing, with the highest being 1.5ppm (IWV 32). Most others were at or below the detection limit (0.5ppm).

The highest arsenic assay was 30ppm (IWV 32, 49), with most others at or below detection limit (10ppm).

This follow-up program, although validating the geochemical anomalism, failed, in most instances, to duplicate the sites of the earlier anomalies. The situation has been attributed to the limitations of sampling essentially unenriched alluvium. In both campaigns, most samples were collected from the transported cover and not from insitu bedrock.

Assay results from the rock chip sampling were generally low with peak values of 200ppm arsenic and 7ppb gold being recorded. Lithologies encountered were predominantly turbidite sequences of the Madigan Beds, showing varying degrees of lateritisation, associated iron enrichment and occasional to common quartz veining.

July - December Activity

Geochemistry

With respect to the BCL sample assays, a comparison of the original reconnaissance results with the infill followup (shown in table below) failed both to duplicate many of the anomalous results or provide an increment in anomalism at a prospective area which is juxtaposed to The Granites gold mine.

The observations from the study at the Mt. Pleasant mine (Lawrance, 1988), concerning the geochemical dispersion of gold silver and arsenic in transported overburden, is regarded as relevant. The conclusion was that there is a preference for the concentration of all elements into the surface horizon, of the alluvium. Within this horizon lateral dispersion is confined (and diluted) with respect to gold or leach depleted with respect to silver. There is no clay horizon (basal or otherwise) to inhibit geochemical dispersion. The anomalous near surface results recorded from the auger traverse would support such conclusions. The poor repeatability of these elements is a result of hydromorphic remobilisation which achieves only patchy distribution in alluvium.

ANOMALOUS BCL RESULTS: Comparing Juxtaposed Follow-up with Reconnaissance Samples

LOCATION (AMG) Easting	Northing	EXPLORATION PHASE	DRILLHOLE/ BCL	ASSAY (ppb) Au	Ag
631280	7727010	Recce	282209	1.02	144
631185	7726955	First Follow up	IWV 43	0.11	1.5
631375	7727980	Recce	LSV 763	0.64	653
631275	7727895	Follow up	IWV 41	0.27	39
631420	7728980	Recce	282088	0.76	1250
631475	7729015	Follow up (Duplicate)	IVW 01	0.82	836
631515	7729905	Recce	LSV 753	0.87	154
631545	7729995	Follow up	IVW 03	0.90	3.5
633125	7727160	Recce	LSV 759	1.21	1820
633100	7726985	Follow up	IWV 30	0.21	29
633270	7728170	Recce	282201	1.37	1770
633170	7727980	Follow up	IWV 32	0.60	31
633295	7729185	Recce	LSV 758	1.19	90.8
633250	7728990	Follow up	IWV 34	1.85	31
		Recce	282099	0.81	204
633325	7729900	Follow up	IWV 36	0.27	57

As the second table indicates, the anomalous gold and arsenic results from the vacuum derived BOH and RAB samples were comparable but consistently low. Considering the density of coverage in the prospective zones is down to two hundred metres, there is little encouraging evidence that a further follow-up sequence of sampling would direct the search to a mineralised host.

To understand gold anomalism, low detection analysis was completed of unmineralised footwall schists and metabasalts at Quorn in MLS8. The results demonstrated that in a mineralised field the elevated geochemical envelope is extensive with the threshold of anomalism higher. The conclusion is that the threshold levels that define mineralisation are the only values to be considered as anomalous, which in this case is 50ppb.

Similarly at Ivy West, the elevated gold values only emphasize a geological feature, the western margin of a magnetic rift zone, and do not indicate mineralisation. With the Quorn investigation, core from three diamond drillholes located within one hundred and fifty metres of the subeconomic Main Host Unit revealed that only 10% of the samples had a gold content less than the nominal anomalism threshold of 6ppb. Such a result demonstrates elevated gold in the system. Significantly, 65% of the drill-intersections had assay values greater than 50ppb, defining the effect of proximity to mineralisation.

Interestingly, elevated gold and, to a lesser degree, arsenic values appear to correlate to the Madigan Beds and be absent from the narrow pelitic Davidson units. The extensive rock chip sampling of the western sector also confirms this observation. Arsenic anomalism, at two separate occurrences, peaked at 50 to 200ppm, but otherwise remained at a background level at or below the detection limit of 10ppm. There was no arsenic association with the elevated gold values.

It is suggested that there is an association with the bedding parallel possibly sulphide bearing quartz-veins and elevated gold-silver values, but indications are that any gold enrichment would be uneconomic.

ANOMALOUS BOH RESULTS Comparing Juxtaposed Follow up with Orientation Samples

LOCATION (AMG) Easting	Northing	EXPLORATION STAGE	DRILLHOLE/ SAMPLE	ASSAY Au (ppb)	GEOLOGY
		Regolith	72671	6(2020)	Overburden
633815	7727395	Orientation	GRB 694	7	Overburden
		Regolith	72669	7	Overburden
633890	7727310	Orientation	GRB 689	6	Overburden
633135	7727510	Follow up	IWV 31	4	Overburden
633110	7727530	Orientation	GRB 7809	18	Overburden
		Regolith	72646	2	Overburden
632920	7727480	Orientation	GRB 711	9	Overburden
633170	7727980	Follow up	IWV 32	8	Madigan Beds
633160	7728160	Orientation	GRB 717	10	Madigan Beds
		Regolith	72736	6	Overburden
632625	7728645	Orientation	GRB 727	7	Overburden
632395	7728570	Follow up	IWV 17	6	?Madigan Beds
632600	7728740	Orientation	GRB 726	6	?Madigan Beds

Geology

The prospect occupies an alluvium covered topographic low between the higher relief mineralised Granites chert sequences (Davidson Beds) of the Granites district to the east, and the quartz veined ferruginised, capped rises of the metaturbidites (Madigan Beds) to the west. Granite intrusives define the southern limit of this prospect, and probably intrude as small stocks with narrow aureoles.

Magnetically, the area is revealed as a diffuse irregular pattern of low amplitude horizons between distinctly linear magnetic highs to the east (600 plus nT) and to the west (80-120nT). The western magnetic linear extends south westerly apparently terminating at the prospective anomaly 2 area. Bedrock intersections confirms that there is an association between the chemical units of the Davidson Beds and the moderate magnetic horizons measuring 30-50nT amplitude.

It is inferred that magnetic high axes coincide with magnetic mafics or are a product of enhancement with granite contacts. Lithologically, the prospect is dominated by sandstone-shale facies characteristic of a turbidite association. The metamorphic grade of these rock units is low with a maximum range of up to the biotite zone. The turbidites are presumed to represent the Madigan Beds. As mentioned earlier, bedrock gold anomalism appears to be associated with the Madigan units.

The other main unit, the Davidson Beds, is composed of intercalated siltstones, chert and SHIM layers, which because of the porphyroblasts of garnet, andalusite and cummingtonite, is determined as upper greenschist to amphibolite facies. In the prospect area, the SHIM horizons that have been identified in the north west are discontinuosu extremely narrow amphibole poor units. It is concluded that these otherwise favoured host units are not the significant chemical traps required for sustained gold deposition.

The marker horizon is the Davidson Beds which can be traced as broad folds with an interpreted anticlinal nose in the north west, near the original silver anomaly. The extended southern limb of the Davidson unit is fault disrupted but apparently not substantially displaced. The southern limb strikes beneath the 1987 regolith sampled 2.02ppm gold result. Uncharacteristically, the Davidson Beds in this portion of the prospect are not gold anomalous.

Another unusual feature of the Davidson Beds in this area is that no graphitic schists have been detected. This situation may reflect a depositional variation with, locally, the chemical dominance of the sediments being replaced by an clastic enriched component. A more favoured suggestion is that a detachment zone exists along or adjacent to the contact of the Davidson Beds and the Madigan Beds. This structure would not dramatically disrupt the stratigraphy of the infrastructure, but could result with the incompetent units, such as the graphitic schists, to be "pinched out". Both models have petrological evidence.

West of the Granites magnetic anomaly at the Ivy-Quorn prospect, a series of faults have been interpreted which may constitute a one kilometre wide rift zone. This north-northwest trending structure dominates the geology of the Ivy West prospect. The importance of the feature is further enhanced with the coincidence of bedrock sourced elevated gold values along a zone coincident with the western margin of the interpreted fault. However, the gravity and magnetic data does not provide convincing evidence for a rift feature (Rutter 1991), and the measurable changes can represent boundaries of different rock types.

It has been suggested that the magnetic data indicated alluvial magnetite. This is regarded as doubtful. The reason for declining such a conclusion is that the magnetic feature is located on the eastern bank of the palaeo-channel with only a shallow (5-7 metres) depth of alluvium. Also drilling has failed to recognise a magnetite enriched lense in the vicinity. An alternative interpretation is that a narrow magnetic (amphibole rich) horizon within the Davidson Beds is responsible and the unit diminishes with depth resultant of perhaps a facies change.

The closer interval bedrock drilling along the western margin of the magnetic interpreted fault has confirmed a zone of elevated gold values. The juxtaposition of the bedrock gold anomalism with a substantial structure is conceptually attractive but merely fortuitous. More importantly for gold concentration is:

(1) the width of the iron formation providing the opportunity of structural dilation to enable significant venation;
(2) The degree of competency contrast and strain incompatibility to localise the dilatant zones, which is usually reflected in the lithological package; and
(3) the calibre of the iron formation to possess suitable chemical traps.

To reiterate, at this locality, despite the indications of similar deformation and metamorphism, as recorded at the mineralised occurrences elsewhere, these Davidson beds have a higher clastic (silty) component and a paucity of iron rich chemical sediments of any width or continuity.

22.4 Plans

Drawing No	Title	Scale
I-2001	MLS8 - Ivy West RAB X-Section 1700N	1:500
I-2002	MLS8 - Ivy West RAB X-Section 2000N	1:500
I-2003	MLS8 - Ivy West RAB X-Section 2600N	1:500
I-2004	MLS8 - Ivy West RAB X-Section 67500Eand 65800E	1:500
I-2005	MLS8 - Ivy West RAB X-Section 69400E	1:500
40-1003	Geochemical Anomaly Follow Up J17. Hole Location and Bottom of Hole Geology	1:25,000
40-1014	Geochemical Anomaly Follow Up J17. Bottom of Hole Geochemistry and Composite Rock Chip Sampling	1:25,000
40-1025	Geochemical Anomaly Follow Up J17. BLEG/Laterite Geochemistry	1:25,000
40-1090	Reconnaissance Vacuum Drilling Bottom of Hole Geochemistry Gold/Arsenic Sheet 4	1:100,000
60-1102	Reconnaissance Vacuum Drilling Bottom of Hole Geology Sheet 4	1:100,000
50-103	Regional Map J17 Geophysical Interpretation	1:25,000
60-30	Fact Geology	1:25,000

IVY WEST

Location Plan
Fact Geology

Scale 1 : 25000

N.B 12/91

EL 4529

RAB Drill Traverse

scattered outcrops of meta-quartz greywacke (with strong E-W cleavage) extensively invaded by The Granites granite

IVY

EXPLORATION CAMP

WEST

PORTAL

PLANT

TWIN HILLS CAMP

MLS8

Lat Scree

Metapelite

Layered gabbro?

Mafic

Granodiorite

Tr 3

Greyw

Lat greyw

all Qtz Greyw.

Sericitic G+(qV)

scattered low outcrops of lat. G

probable layering trends in bedrock defined by quartz scree trails

Magnetic interpreted faults (? graben)

? B.I.

hBSc Ch

CScCh

hSc

aSc

BSc

Sc

f.g.G

f.g. G

? G

? Pg

Pg

N 7730000

32'30" 728

726

724

35'00"

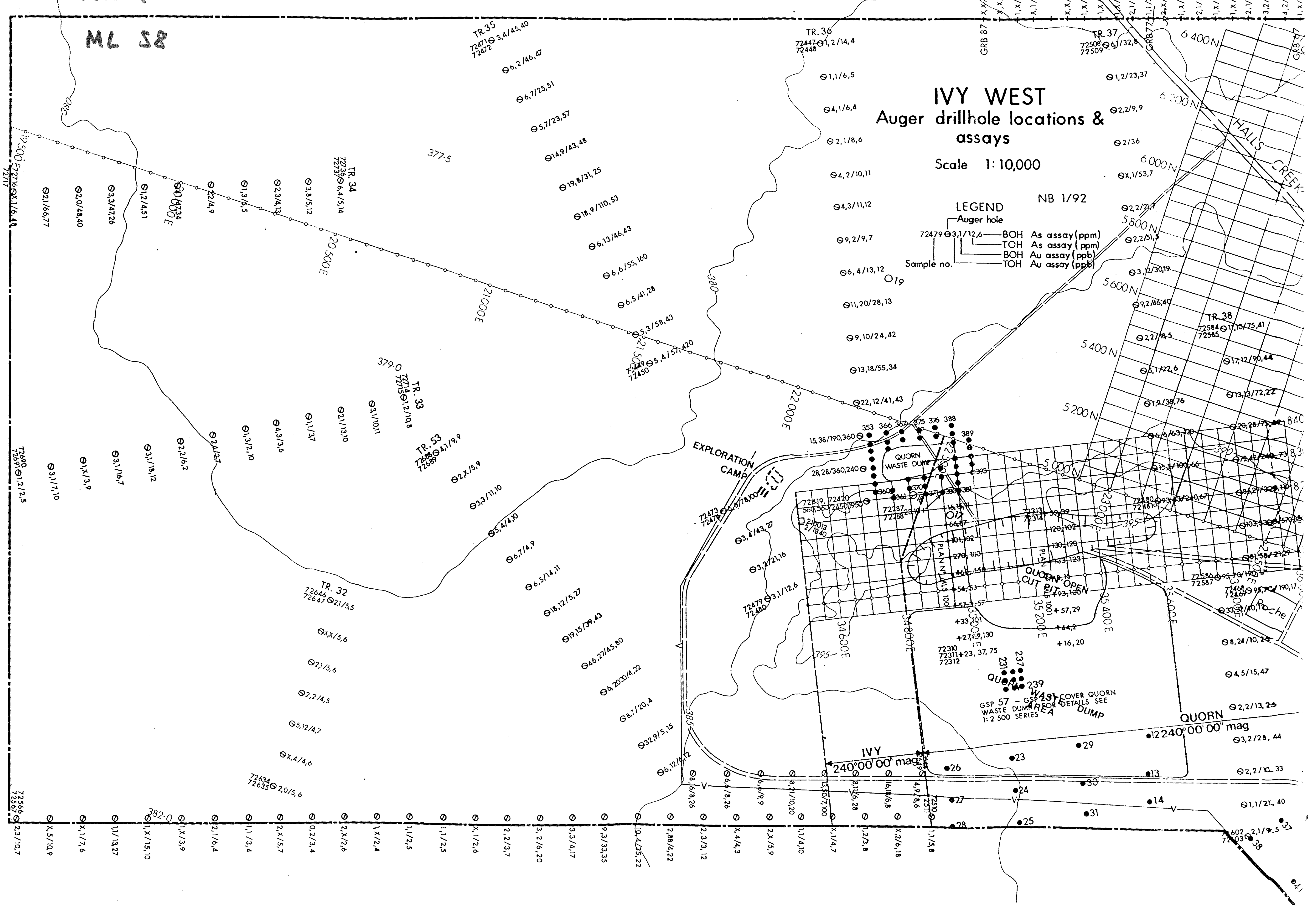
632

634

636

638

EL 4529


ML 58
IVY WEST
Auger drillhole locations & assays
Scale 1:10,000
NB 1/92
LEGEND
Auger hole
72479 ⊖ 3,1/12,6
BOH As assay (ppm)
TOH As assay (ppm)
BOH Au assay (ppb)
TOH Au assay (ppb)
Sample no.
TR. 32
TR. 33
TR. 34
TR. 35
TR. 36
TR. 37
TR. 38
TR. 53
EXPLORATION CAMP
QUORN WASTE DUMP
QUORN OPEN CUT PIT
HALLS CREEK
IVY
240°00'00" mag
QUORN
240°00'00" mag
GSP 57 – GSP 62 COVER QUORN WASTE DUMP. FOR DETAILS SEE 1:2 500 SERIES
6400N
6200N
6000N
5800N
5600N
5400N
5200N
5000N
20 500E
21 000E
21 500E
22 000E
34 600E
34 800E
35 200E
35 400E

EL 4529

ML S8

Dolerite dyke

BRIC

Volc comple

Pgm

Pgm

Atc

7730N

Anomalous sample sites
from first follow up survey

MAGNETIC SCHIST hosting the
Bullakitchie Mine and other gold prospects

Original
silver anomaly

Davidson Beds

West Shoe

Vee (u/g)

Shoe

Quorn

Ivy

E Bull

u/g

mafic

7728N

Granite

Area 2

FAULT

mafic
INTRUSIVE ?

T. H. ? HOST UNIT

INTRUSIVE

Atc

ZONE

K40

ML S8

7726N

Area 1

BOUNDARY

K40

K40

K40

Pg

Pg

632E

634E

636E

638E

640E

REVISIONS:

SCALE 1:25000

DATA BY	H. RUTTER		1987
DRAWN	CARTOGRAPHICS		DEC '91
CHECKED			
APPROVED			
AMENDED	A	JAN.'92	C.G.

NORTH FLINDERS MINES LIMITED

THE GRANITES: NORTHERN TERRITORY

WEST GRANITES

Magnetic Interpretation

PREPARED by CARTO GRAPHICS

THE GRANITES MINE AREA

Residual Magnetic Contours

Scale 1 : 25 000

1986

IVY

WEST

Location of Gravity and Magnetic Surveys

— Magnetic

– – – Gravity

7730 N

32 30 S
7728 N

7726 N

632 E

634 E

636 E

638 E

IVY WEST

First Followup

Anomalous geochemistry

Contours of B.O.H. Au assays

Scale 1:10000

EL 4529

ML 58

7729N

7728N

7727N

631E

632E

633E

634E

o1·00

o0·00

o18·00 (0·7,112)

o5·00

o0·00

o1·00

o1·00 (0·8,836)
BCL 282088
(0·7,1250)

o(0·7,75)

oSNR

oLSV 758
(11·9,90·8)

o2·00
(1·9,31)

o1·00

o2·00

●6·00
(0·6,62)

o9·00

o2·00

o1·00

oBCL
(1·3,1770)

o2·00

oLSV763
(0·6,653)

o1·00
(0·3,39)

o1·00

o1·00

o4·00
(0·6,53)

●8·00

o0·00

o1·00

o1·00

o1·00
(0·6,69)

o4·00
(0·6,57)

o1·00
(0·3,64)

oLSV 759
(1·2,1820)

oSNR

o1·00

o0·00

o1·00 (1·0,144)
o(0·1,2)

o0·00
(0·6,164)

o2·00

Exploration Camp

LEGEND

Source of anomalous results only

- ● Bedrock
- o Alluvium

BCL Assays (Au>1·9, Ag>50ppb)

LSV759 (1·2,1825) Reconnaissance

(0·6, 57) First followup

IVY WEST

Depth of surficial cover contours with anomalous results from alluvium (Au ppb)

Scale 1:10000

N.B. 12/91

ML S8

EL 4529

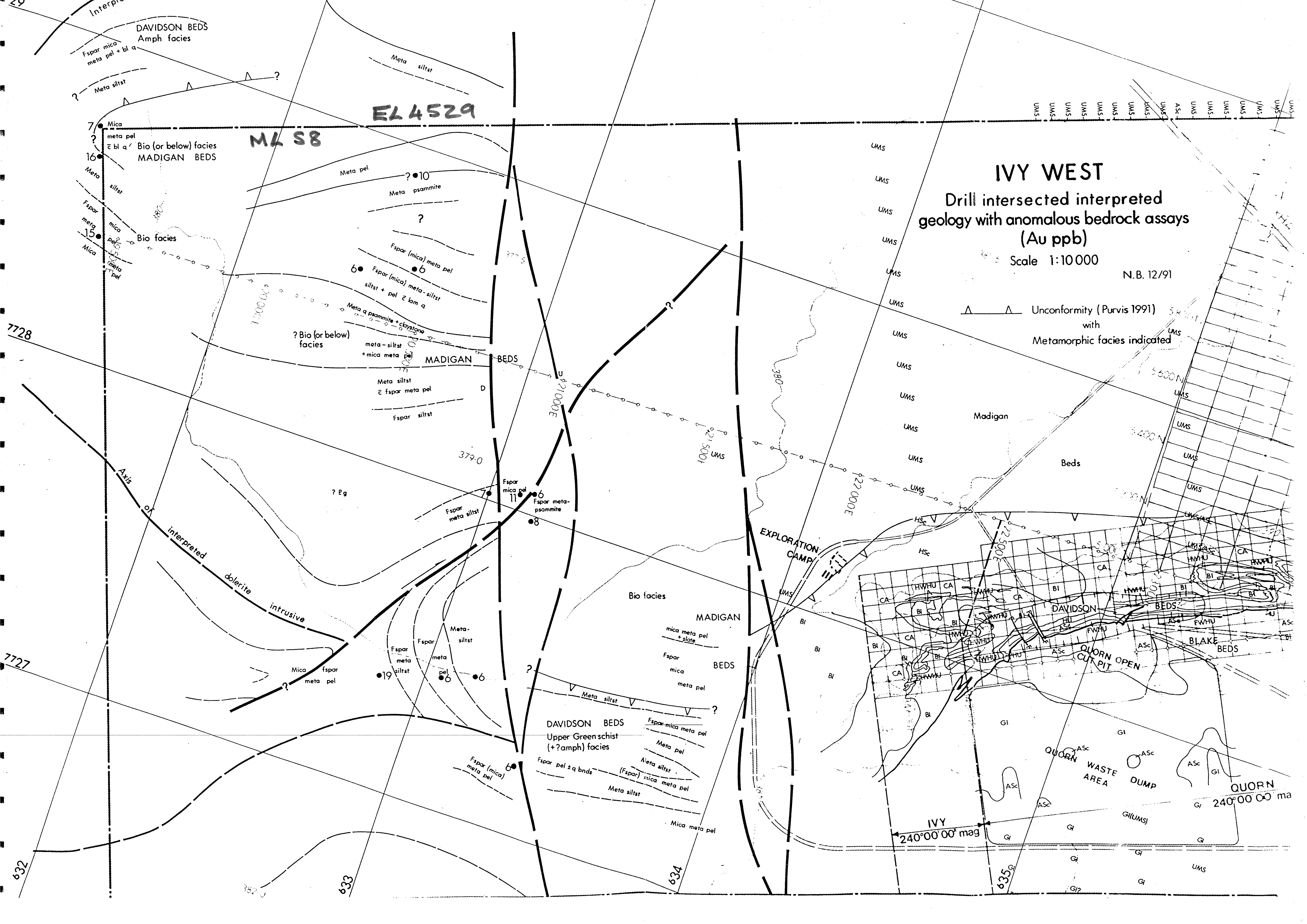
EXPLORATION CAMP

QUORN OPEN CUT PIT

QUORN WASTE DUMP AREA

IVY 240°00'00" mag

QUORN 240°00'00" mag



IVY WEST
Drill intersected interpreted geology with anomalous bedrock assays (Au ppb)
Scale 1:10 000
N.B. 12/91
Unconformity (Purvis 1991) with Metamorphic facies indicated
EL 4529
ML 58
DAVIDSON BEDS
Amph facies
MADIGAN BEDS
Bio facies
Axis of interpreted dolerite intrusive
EXPLORATION CAMP
Madigan Beds
Bio facies
DAVIDSON BEDS
Upper Green schist (+?amph) facies
QUORN OPEN CUT PIT
QUORN WASTE DUMP AREA
BLAKE BEDS
IVY 240°00'00" mag
QUORN 240°00'00" mag
7728
7727
632
633
634
635