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THE METALS DIVISION OF THE SHELL COMPANY OF AUSTRALIA LTD.

E.L. 7/74 - MOINA

Report on Area Relinquished on 18/7/84

Author : R.G. Wright

Report No : 08.2269

Date : 6/8/84

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- APPENDIX 4 : Drill Log Sheets for drill holes PDH WV 1  
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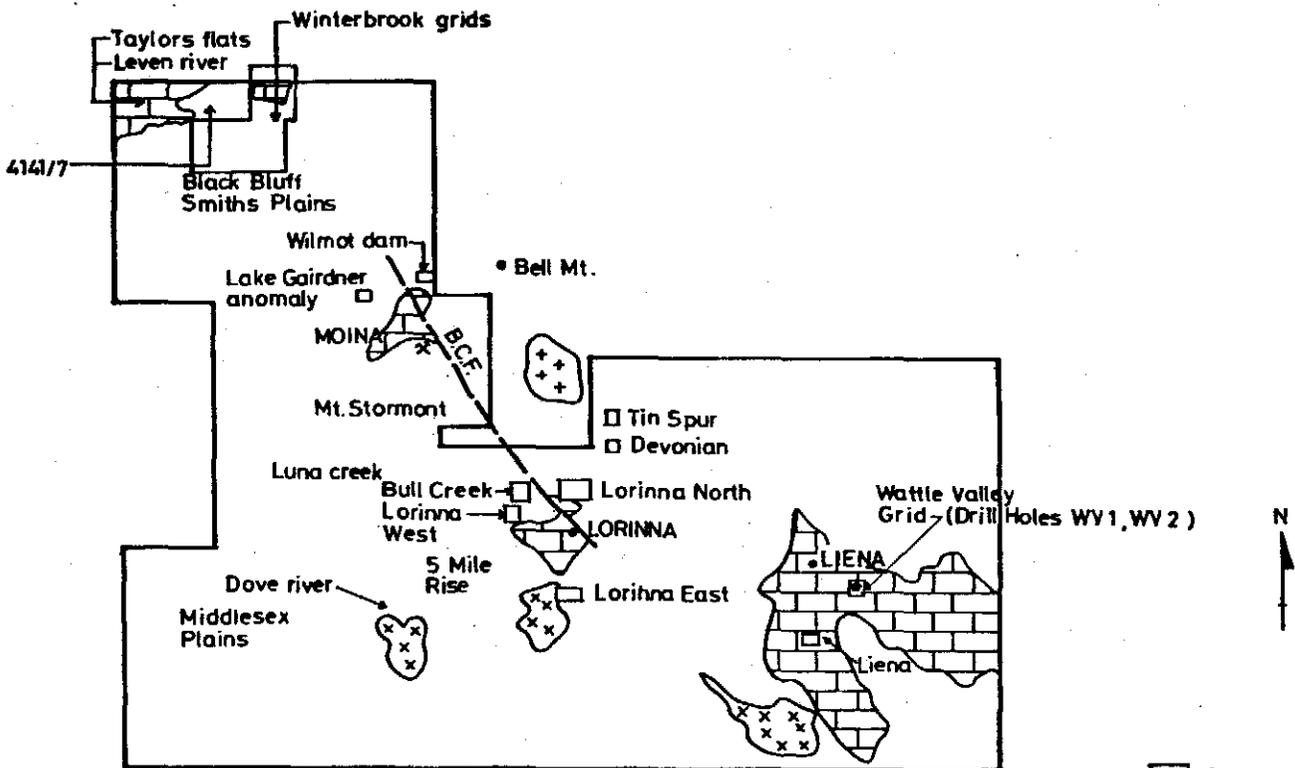
SUMMARY

An area of poorly exposed Gordon Limestone around Liena has been investigated with aeromagnetic-radiometric surveys and regional stream and rock chip sampling.

Two prominent magnetic anomalies and one Pb, Zn soil anomaly have been examined with disappointing results.

No further worthwhile targets remain within the relinquished area.

DEVONPORT



-  Dolcoath granite
-  Dove granite
-  Gordon limestone

10K

The Shell Company of Australia Limited  
METALS DIVISION

### E.L.7/74 MOINA

Scale 1:250,000

FIG. No. 1	REPORT No.
ENCL. No.	DRG. No D/MZ01/113
DATE 6 7 81	AUTHOR W D S

5 cm

## 1.0 INTRODUCTION

The Shell - Comalco Joint Venture relinquished title to a 60 sq km section of Exploration Licence 7/74 - Moina on the 18th July, 1984.

A definition of the relinquished area is as follows:

"Commencing at a northwest angle of the area whose grid co-ordinates are 433 000m E 5 400 000m N thence grid East to 435 000m E grid North to 5 401 000m N again grid East to 437 000m E again grid North to 5 405 000m N again grid East to 440 000m E grid south to 5 396 000m N grid West to 438 000m E again grid South to 5 393 000m N again grid West to 433 000m E aforesaid thence again grid north to the point of commencement".

This report covers the investigation of this area carried out by Shell between January, 1980 - June, 1984.

## 2.0 LOCATION & ACCESS

The Liena area is situated about 15 km due west of Mole Creek. (Refer Fig. 1). Access is generally very good via several main roads and numerous well kept HEC and forestry tracks.

## 3.0 EXPLORATION TARGETS

The main targets sought were replacement Sn, W skarn deposits with high level Pb, Zn leakage haloes and Mississippi Valley style Zn, Pb mineralization.

## 4.0 REGIONAL GEOLOGY

The relinquished area covers the western end of a major EW trending syncline consisting of a conformable sequence of Ordovician Moina Sandstone, Gordon Limestone and Silurian Eldon sandstones. (Refer plan D/MZ 01/208).

009

The syncline lies just north of the Precambrian Cradle Mountain Block. On its southern edge the Precambrian schists and quartzites have been intruded by the Cambrian Dove Granite.

#### 5.0 INVESTIGATIONS COMPLETED

Initial work in the area consisted of follow-up over two prominent aeromagnetic anomalies located by a regional aeromagnetic-radiometric survey in March, 1980.

The survey was flown over the entire licence by Geometrics with NS flight lines at 250m spacings and a terrain clearance of 100m.

Maps of Residual Magnetic Contours and Total Count Contours were produced at 1:20 000 scale to overlay standard cadastral base sheets. (Refer plans MZ 01/1054 and 1055). Regional geology for Cadastral Sheet 4339 is shown on Plan D/MZ 01/208.

The Liena South (4339/1) and Liena (4339/2) aeromagnetic anomalies were selected by Dr. G. Dickson, consultant geophysicist, for follow-up.

Both anomalies were gridded and then surveyed with ground magnetics, soil sampling, magnetic susceptibility measurements and geological mapping.

Ground magnetic surveys were done with a Proton Precession magnetometer with a 2.5m sensor height. Soil samples were taken with an auger at the maximum depth possible (C horizon) and sieved to -80#. Stream sediment surveys are -80# fractions unless otherwise specified.

5.1 Liena South (4339/1) Aeromagnetic Anomaly

The anomaly is located approximately 5.5 km south of Liena on the east side of the Mersey River.

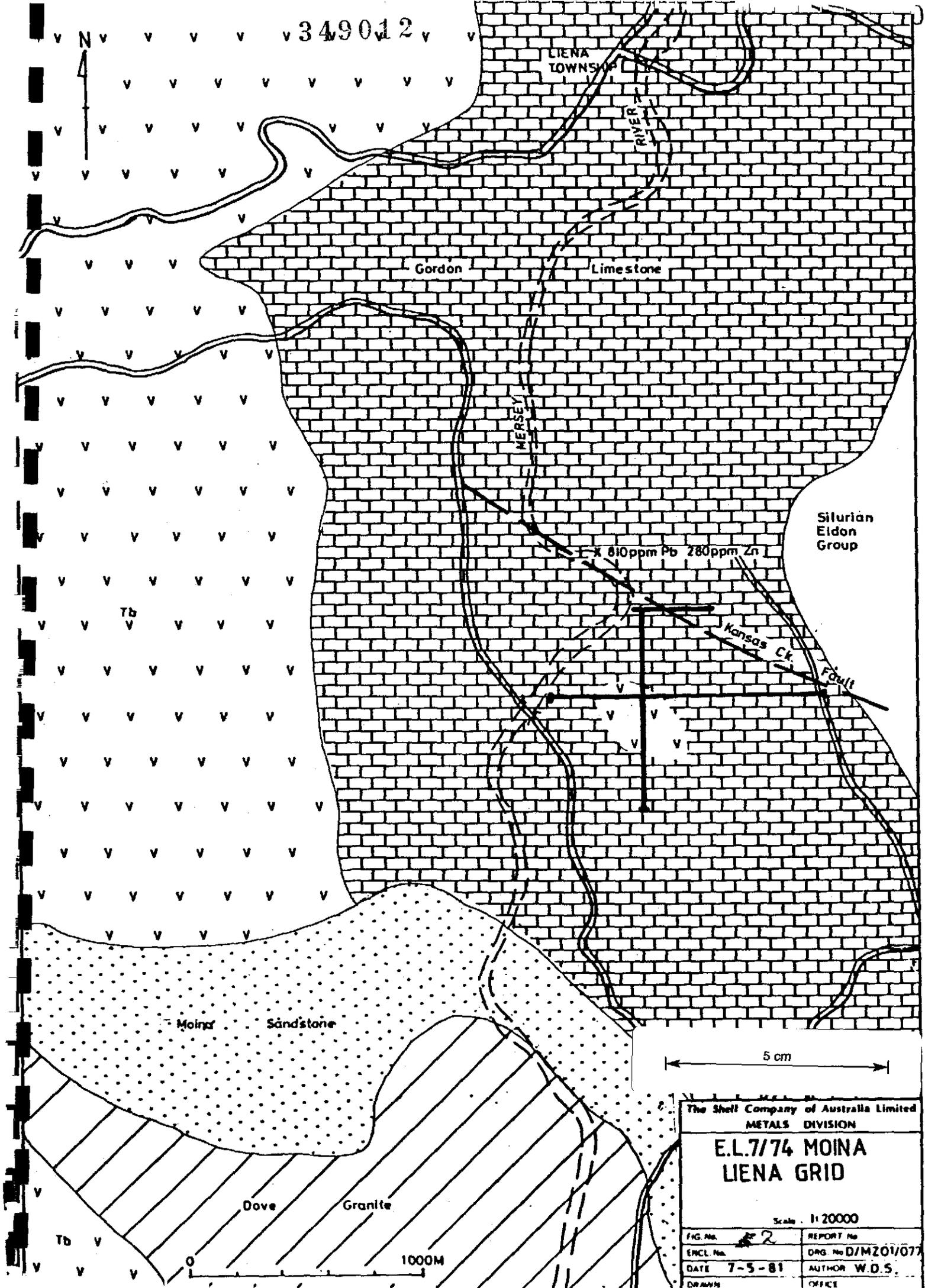
One east-west line (1120m long) and two north-south lines (600m, 1000m) were cut over the anomaly. (Refer plans D/MZ 01/208 and D/MZ 01/147).

The geology of the area consists of Cambrian Dove Granite intruding into Precambrian quartzites and overlain by Moina sandstone.

Ground magnetic traverses along the grid lines indicate two roughly circular 1500 nT anomalies, both approximately 300m in diameter. The western anomaly is located over hematite-magnetite bearing, weakly greisenized granite and the eastern anomaly is situated over hornfelsed, partly granitized and brecciated, hematitic quartzite. The source of the anomalies appears to be disseminated magnetite within a granite pendant. Hematitic breccias occur within the contact metamorphosed quartzites. Magnetic susceptibility readings of around  $3000 \times 10^{-5}$  SI units are recorded. (Refer to plans D/MZ 01/125 and 126). Susceptibility readings on weathered granite exposed in road cuttings indicated susceptibilities up to  $8000 \times 10^{-6}$  cgs units. These were generally associated with magnetite veining. Background readings of  $200 - 400 \times 10^{-6}$  cgs units are common in the granite.

A suite of 36 magnetite-bearing granite and breccia samples were collected and analysed by Amdel of Sn, W (XRF), Au (C3/3), U (J3/1) and Ba, Be, Ce, Co, Cr, La, Mn, Mo, Nb, Ni, Sc, Sr, Ta, Th, Ti, U, W, Y, Yb, Zn (Spec. 1) and Ag, As, Bi, Cd, Cu, Ca, Ce, In, Pb, Sb, Sn, Zn (Spec. 2). Details are included in Appendix 1.

v 349012 v



LIENA TOWNSHIP

Gordon

Limestone

Silurian Eldon Group

X 810ppm Pb 280ppm Zn

Kansas Ck. Fault

Moira Sandstone

Dove Granite

5 cm

1000M

The Shell Company of Australia Limited	
METALS DIVISION	
E.L.7174 MOINA	
LIENA GRID	
Scale 1:20000	
FIG. No. 2	REPORT No.
ENCL. No.	DRG. No D/MZ01/077
DATE 7-5-81	AUTHOR W.D.S.
DRAWN	OFFICE

Results of soil sampling over the grid (Cu, Pb, Zn, Bi, Ag, Mo - AAS; Sn, W, U - XRF, Comlabs) indicated one slightly anomalous result at 1600E/2460N of 75 ppm Pb, 65 ppm Zn. (Refer to plan D/MZ 01/121 & 122).

Stream sediment sampling in the immediately adjacent area (Au, Cu, Pb, Zn, Bi, Ag, Mo - AAS; Sn, W, U - XRF, Comlabs) did not give anomalous results (Refer to plans D/MZ 01/108, 123, 124, 127 & 128).

Due to the weak geochemical response from rock and soil sampling over this anomaly no further investigation is warranted.

## 5.2 Liena (4339/2) Aeromagnetic Anomaly

This sharp-peaked anomaly is located approximately 2.8 km south of Liena on the east side of the Mersey River. (Refer Fig. 2 and Plan D/MZ 01/104).

Two grid lines at right angles, one north-south (880m) and one east-west (1200m) were cut over the anomaly. An additional east-west line was cut as a followup line on anomalous Pb soil samples.

The aeromagnetic anomaly is centred over a basalt covered hill surrounded by lower relief Gordon Limestone. Thin section description of the basalts (Refer Appendix 2) indicates they are breccias possibly formed by drag flow along the chilled contact zones of shallow intrusive porphyritic olivine basalts. It is thought that the basalt in this area is an intrusive feeder to the extensive basalt flows to the west.

Ground magnetic traverses along the two main grid lines indicated an approximately circular anomaly, of 2500 nT with a diameter of approximately 200m centred on 1400mE/

013

2000mN. Magnetic susceptibilities in the basalts are of the order of 200 - 2000 x 10<sup>-6</sup> cgs units. (Refer plans D/MZ 01/085 & 086.

A VLF-EM survey was done over both lines without indicating any easily recognizable conductors.

Soil sampling over the original grid (Cu, Pb, Zn, Bi, Ni, Co, Cr, Fe, Mn, Ag, Mo - AAS; Sn, W - XRF, Comlabs) gave one anomalous Pb result. The grid was extended and three minor anomalous Pb results were indicated. One extremely anomalous Pb Zn soil sample result (810 ppm Pb, 280 ppm Zn) was recorded from a traverse along the base of the limestone cliff on the east side of the Mersey River west of the grid. (Refer plans D/MZ 01/088 & 090).

The grid was later found to be partly over the Croesus Cave State Reserve so no further exploration was possible in the area.

### 5.3 Wattle Valley Lead Zinc Prospect

The area of Gordon Limestone around Liena had never previously been explored for skarn mineralization except by aeromagnetics.

As anomalous Pb, Zn values had been located in soil and rock sampling at the Liena anomaly, it was decided to carry out further regional stream sediment and road track soil sampling to try to locate other zones of basemetal interest.

A stream sediment survey was carried out using available streams. Two anomalous values were located in a stream approximately one kilometer south of Liena township. Soil sampling from "C" horizon was done at 100m spacings along tracks in this area. No anomalous zone was located in the soil sampling. (Refer plans D/MZ 01/123 & 124).

014

As the streams covered only a small percentage of the area, a soil sampling survey was done along further tracks at 200m - 300m spacings. One extremely anomalous Pb, Zn value was located (4100 ppm Pb, 2050 ppm Zn). Followup sampling at 50m spacings confirmed this anomaly and a grid was established in the area and called the Wattle Valley Grid.

Results from the regional soil sampling are shown plotted on Figures 3, 4, 5, 6 & 7.

Geology - The Wattle Valley grid is underlain by Gordon Limestone. (Refer plan D/MZ 01/228). To the north, Moina Sandstone outcrops and to the south Silurian Eldon Sandstone. The Moina Sandstone, Gordon Limestone, Eldon Sandstone sequence is a conformable sequence from Ordovician to early Devonian. The Gordon Limestone in this area is reported to be upto 1000m thick. The grid is on the northern side of an east-west trending, open syncline with a half width of 3 km. Several northwest trending faults are mapped in the region and one, apparent on air photos, cuts through the gridded area. No evidence for this fault is apparent on the ground.

The limestone exposed on the grid is generally poorly bedded, with some bedding showing east west strike and a dip to the south. A cleavage developed throughout the sequence, trends east west and is generally vertical. Petrographic descriptions (Appendix 3) show the limestones to be syngenetic pyritic, variably carbonaceous limestones with fabrics ranging from massive-laminated to intraformationally brecciated. Dolomitisation is variably developed, predates incipient regional metamorphic recrystallization, and also predates localised calcite veining and vug filling. No base metal sulphides were detected in the surface samples.

Recent elluvium, derived from Eldon Sandstone covers the south and south-east part of the grid.

Geochemistry - Soil samples on the grid were taken at what was hoped to be just above bedrock. This was found not to be the case in some samples which were later recognized to be Eldon Sandstone elluvium.

The highest soil sample value of 1900 ppm Pb, 3800 ppm Zn, 4000 ppm Mn and 37 ppm Cd is recorded at OON/50W. The 100 ppm Pb contour (background approximately 25 ppm) outlines a zone 500m long 100m wide trending WNW from 100E 100N to 400W 150N. The 1000 ppm Pb contour outlines a zone of 100m long 50m wide along OON line from 00E to 100W. The grid was put in at 45° to true north which may skew the results. The anomalous zone may infact be trending parallel to bedding (approximately E-W).

Rock chip sampling on the rocks adjacent to the geochemical anomaly gave values up to 115 ppm Pb, 290 ppm Zn, 380 ppm Mn. (Refer plan D/MZ 01/253, 265, 221 & 222).

Geophysics - A Max-Min EM survey was carried out on lines 200W and 00E (Refer Figs. 8 & 9). A conductor was detected on line 00E at OON coincident with the geochemical anomaly. Another possible conductor is located on line 200W at 300S although the line needs to be extended to cover the full extent of the anomaly.

A dipole-dipole IP survey (100m spacing, n = 4) was done along line 00E. This located a zone of very high conductivity and low resistivity near OON. The source for this anomaly is thought to be quite shallow. (Refer plan D/MZ 01/240).

Gravity has been surveyed along lines 200E, 100E and 00E. A 0.7 mgal anomaly was detected on line 00E around 50m N.

016

On line 100E a 0.35 mgal anomaly was detected at 100N which probably represents an extension of the anomaly at 00E, 50N. Other possible anomalies were located at 100E, 300S and 200E, 300S. These however, have not been covered in sufficient detail to give an interpretation. (Refer plan D/MZ 01/264).

An SP survey was done along lines 200W, 00E and 200E. A good SP anomaly (150 - 200m V) was recorded at 00E, 25N and another possible anomaly at 200W, 275S. Readings along 200E indicate that that part of the survey was not carried out correctly. (Refer plan D/MZ 01/266).

Ground magnetics and VLF surveys were run across the grid but provide no extra information of value. (Refer plans D/MZ 01/211 & 214).

Evaluation of the geophysical results indicated a target zone at about 20m depth below 50N on line 00E.

The zone was considered to be about 10m wide and to extend to only 100m down dip.

The anomaly possibly extends from 100E (geochem., gravity anomaly) to 200W (geochem., SP, Max-Min anomaly) giving a strike length of 300m.

Percussion/Diamond Drilling - One vertical percussion drillhole, WV 1, was collared at 00m E 50m N and a vertical percussion-diamond drill hole, WV 2 located at 400m W 170m S. (Refer plans D/MZ 01/240 & 307).

Samples from the percussion drillhole WV 1 gave anomalous base metal values throughout the length of the hole. The highest value was 2m at 270 ppm Pb, 1400 ppm Zn, 8 ppm Cd, 165 ppm Mn in fine grained limestone.

017

Results from WV 2 were also elevated over most of the hole with a highest value of 195 ppm Pb, 940 ppm Zn, 6 ppm Cd, 410 ppm Mn over 1.55m. (Refer Appendix 4 - Drillhole Logs).

Petrographic descriptions confirm the presence of sparse sphalerite, possibly syngenetic, in chalcedonic layers. The host rock is a carbonaceous limewackestone/mudstone showing preconsolidated folding and recrystallization. It is partly dolomitized. (Refer Appendix 3 - Petrographic Reports).

The main, coincident geochemical/geophysical targets have been drill tested. the high background Pb, Zn values in the limestone within the area appears to explain the soil geochemical anomalies. The carbonaceous nature of the limestone possibly accounts for the electrical geophysical anomalies and the karstic limestone may explain variations in the gravity field.

No other significant targets are present and no further work is recommended for this anomaly.

#### 6.0 CONCLUSIONS & RECOMMENDATIONS

Three main anomalies have been followed up with discouraging results.

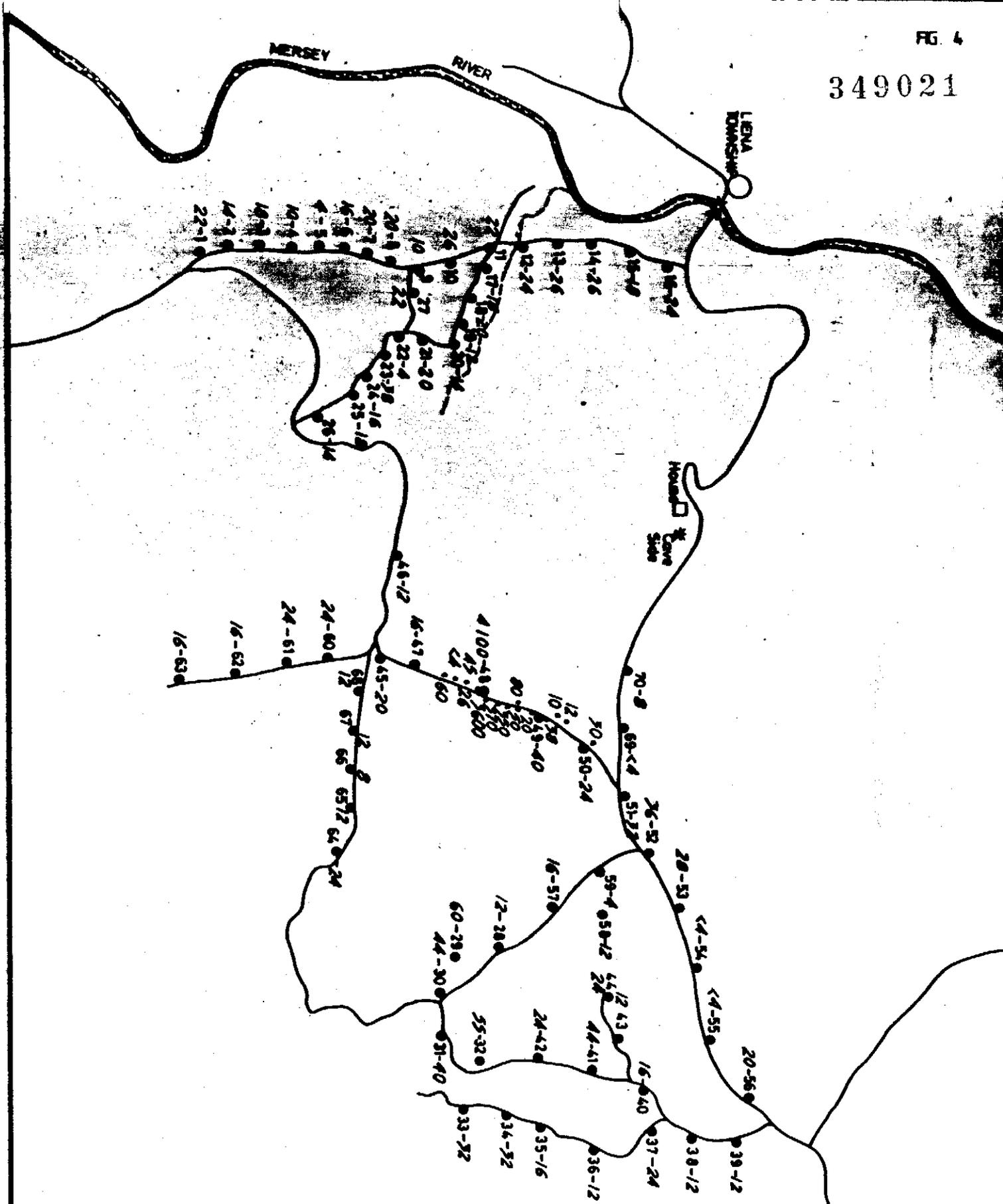
No further work is considered justified and the area has been relinquished from E.L. 7/74.

REFERENCES

- SMYTH, W.D., 1981. Exploration Licence 7/74 - Moina. Progress Report on Exploration during the period 1/1/80 - 31/7/81. Unpubl. Shell Rep. 08.1062.
- SMYTH, W.D., 1982. Exploration Licence 7/74 - Moina. Progress Report on Exploration during the period 31/7/81 - 30/6/82. Unpubl. Shell Rep. 08.1066.
- SMYTH, W.D., 1983. Exploration Licence 7/74 - Moina. Progress Report on Exploration during the period 1/7/82 - 30/6/83. Unpubl. Shell Rep. 08.2064.



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48 = Sample No.  
 24 = Assay value

OVERLAY PHOTO ENLARGEMENT  
 MERSEY MEANDER RUN 1  
 T 756.13

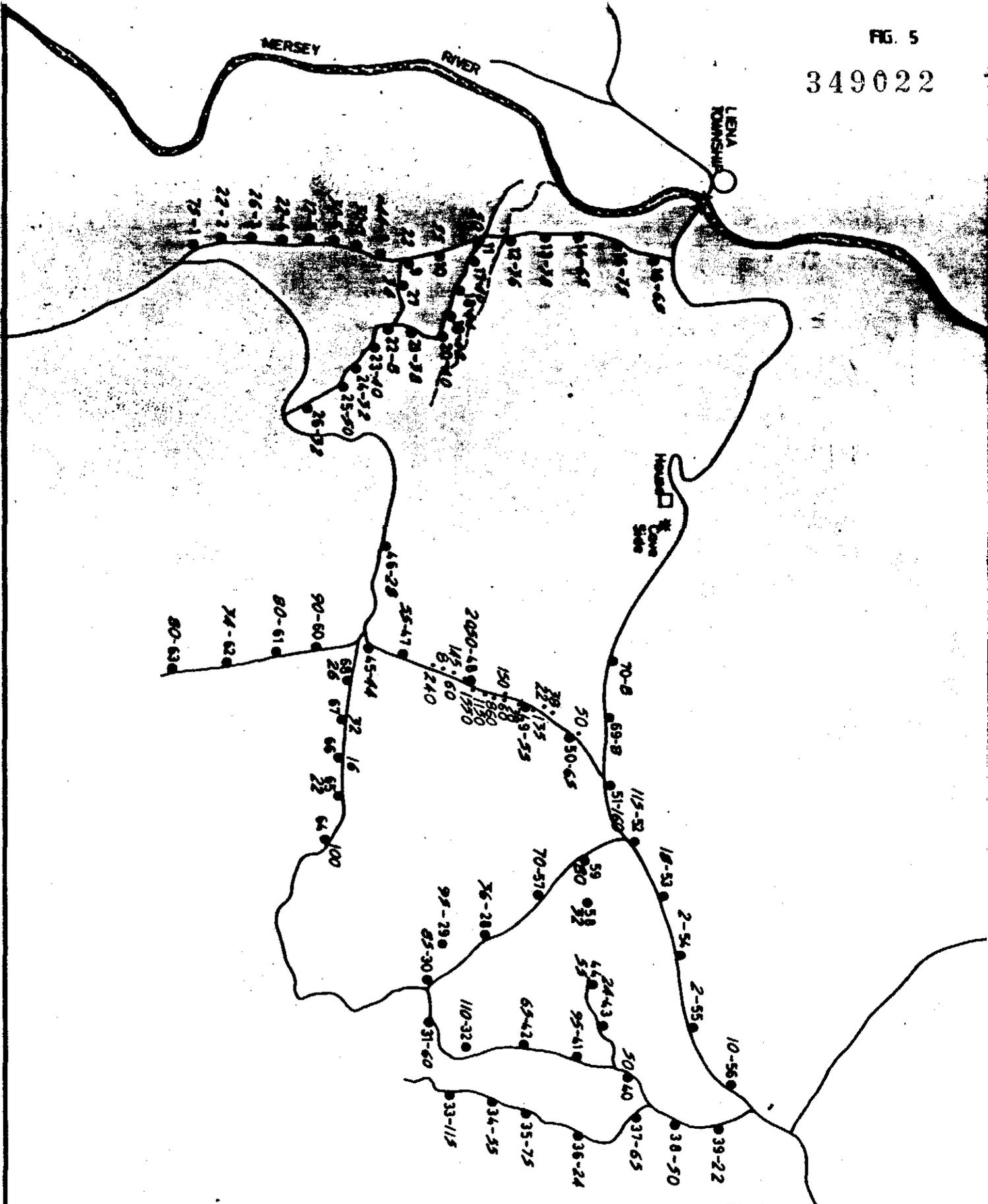
NOTE: All numbers  
 have prefix LI. for  
 Liena

The Shell Company of Australia Limited  
 METALS DIVISION

**E.L.7774 MOINA**  
 LIENA AREA  
 REGIONAL SOIL SAMPLING

**Pb**

SCALE	DATE 17-9-81
AUTHOR W.D.S.	DRAWN H.L.M.
OFFICE DEVONPORT	
DRG.No. D/M2017157	



48 = Sample No.  
 24 = Assay value

OVERLAY PHOTO ENLARGEMENT  
 MERSEY MEANDER RUN 1  
 T 756.13

NOTE: All numbers  
 have prefix LI. for  
 Liena.

The Shell Company of Australia Limited METALS DIVISION	
<b>E.L.7/74 MOINA</b>	
LIENA AREA REGIONAL SOIL SAMPLING	
<b>Zn</b>	
SCALE	DATE 17-9-81
AUTHOR W.D.S.	DRAWN H.L.H.
OFFICE DEVONPORT	
DRG.No. D/M201/165	

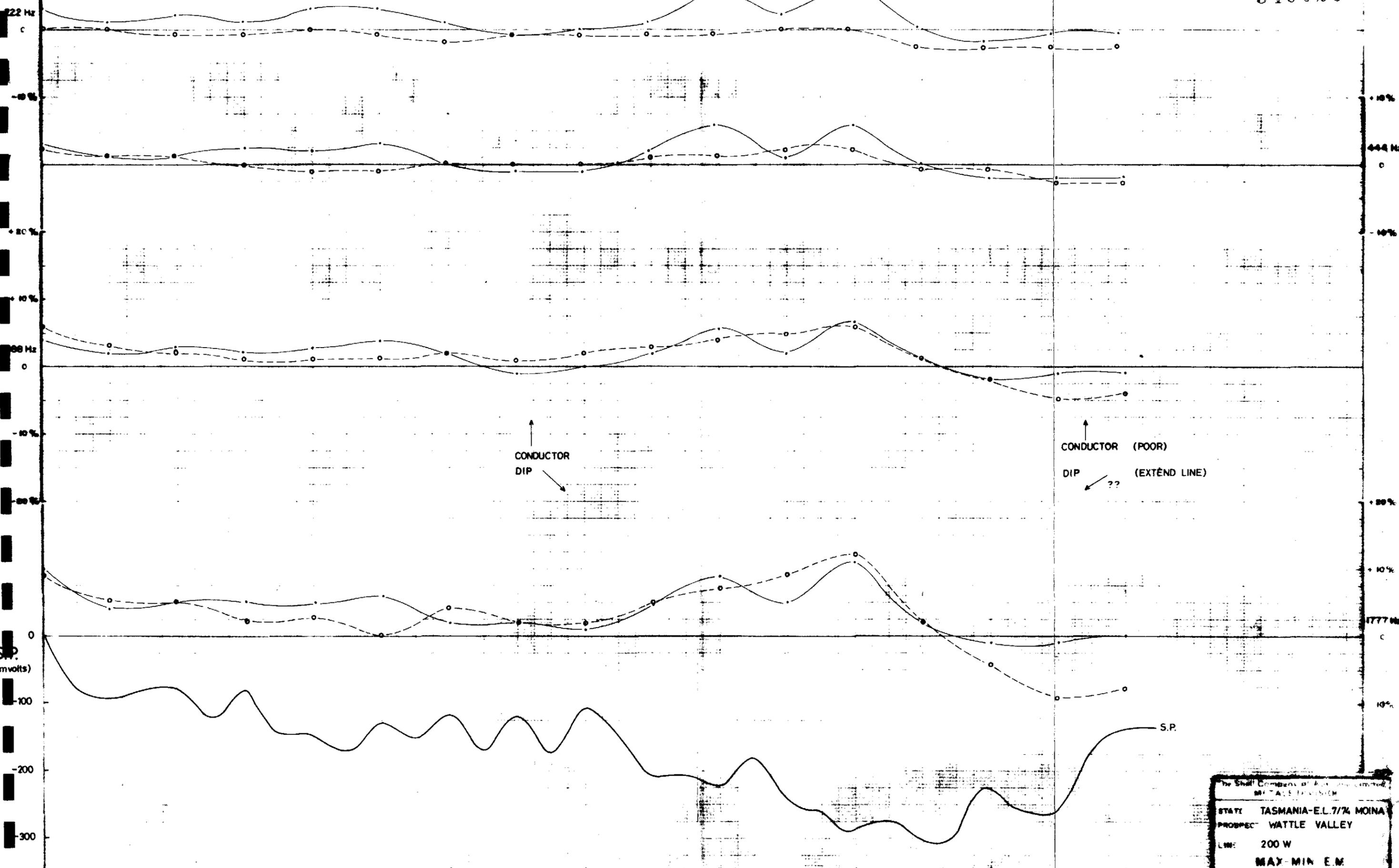




022

300N 200N 100N 00 100S 200S 300S 400S

349025



CONDUCTOR  
DIP

CONDUCTOR (POOR)  
DIP (EXTEND LINE)  
??

S.P.  
(mvolts)

-300

-200

-100

0

+100

+200

+300

+400

+500

+600

+700

+800

+900

+1000

+1100

+1200

+1300

5 cm

100 metres

Con Separation = 200M

— In Phase  
- - - Out of Phase

The Shell Company of Australia Limited	
METALS DIVISION	
STATE	TASMANIA-E.L. 7/74 MOINA
PROSPECT	WATTLE VALLEY
LINE	200 W
MAX-MIN E.M.	
SCALE	1:2500
DATE	6-8-82
BY	N.H.
CHKD	H.L.S.
APP	ANC
REF	DA/201/257
REV	B

300N

200N

100N

00

100S

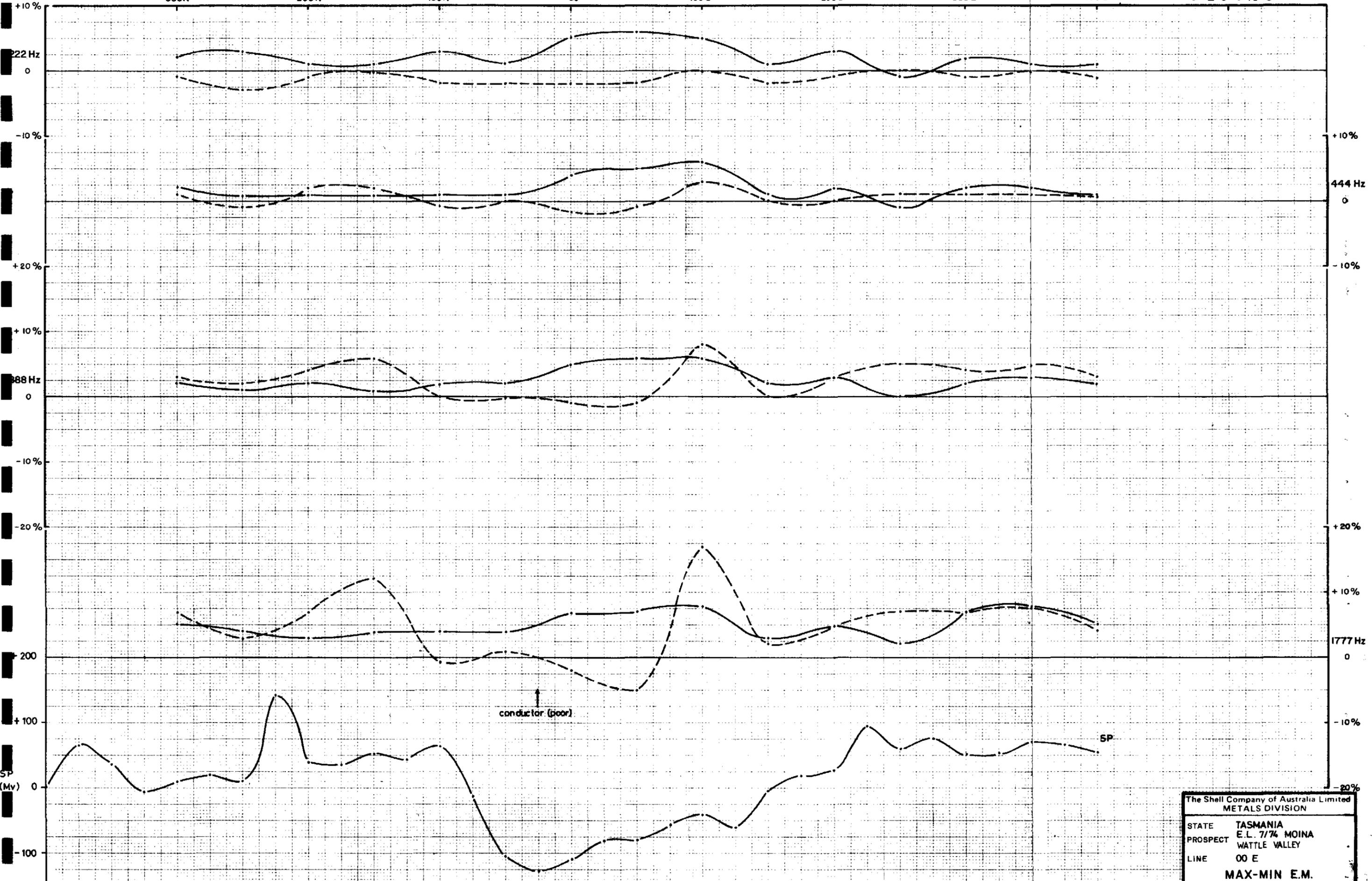
200S

300S

400S

349026

025



5 cm

100 metres

Coil Separation = 200 M

—•—•— In Phase  
 - - - - - Out of Phase

The Shell Company of Australia Limited METALS DIVISION	
STATE	TASMANIA
PROSPECT	E.L. 7/74 MOINA
	WATTLE VALLEY
LINE	00 E
<b>MAX-MIN E.M.</b>	
SCALE 1:2500	DATE 7-9-62
AUTHOR N.H.	DRAWN H.L.S.
OFFICE Devonport	REP. No.
DRG. No. DMZ01262	FIG. No. 9

## APPENDIX 1

LIENA SOUTH AEROMAGNETIC ANOMALY (4339/1)

Results from Reconnaissance Rock Sampling  
across the Anomaly Area by I.J. Buchhorn,  
Exploration Geologist. July, 1980.

027

349028

LIENA SOUTH AEROMAGNETIC ANOMALY 4339/1RECONNAISSANCE ROCK SAMPLING OF AREA

by

I.J. BUCHHORN

<u>Sample No.</u>	<u>Location</u>	<u>Description</u>
1001	100S on N-S Traverse	Med g Qtz, feld, biotite $\pm$ hornblende "Granite"
1002	250S	Mod weathered "Granite" with irregular mm thick veins & veinlets of magnetite.
1003	280S	F to med g, slightly weathered magnetite- bearing granite.
1004	280S	F g leucocratic ?phase of granite. ?porphyry dyke?
1005	300S	Slightly - mod weathered granite - strongly magnetic.
1006	360S	Mod magnetic, slightly weathered, rel. leucocratic "Granite".
1007	380S	Mod magnetic, slightly weathered, biotite-hornblende "Granite" with minor epidote.
1008	380S	Mod magnetic, mod weathered, biotite-hornblende "Granite".
1009	381S	Slight weathered, sl - mod magnetic biotite - hornblende "Granite".
1010	390S	Weakly magnetic, strongly weathered biotite "granite" with cavity fill quartz.
1011	390S	Weakly-mod magnetic, mod-str weathered "granite" with hornblende biotite? & minor mm thick quartz veining.
1012	391S	Mod weathered, mod-str magnetic biotite "granite" with very minor epidote, hornblende.
1013	392S	Sl-mod weathered, non-magnetic granite with epidote-rich band & minor relict magnetite?
1014	400S	Mod-str magnetic, sl weathered hornblende-rich "granite".
1015	450S	Mod weathered, sol-mod magnetic biotite-hornblende "granite".
1016	550S	F gr banded, biotite $\pm$ hematitic quartzite (non- magnetic).
1017	+550S	F gr sl weathered, very mafic ?"granite" with 50% mafic minerals (biotite hornblende) f gr magnetite and trace pyrite. (?Hybrid contact rock)
1018	50W on E-W Traverse	F gr vaguely bedded, mod weathered quartzite containing 10% haematite. (Cherty rock).

028

349029

<u>Sample No</u>	<u>Location</u>	<u>Description</u>
1019	50W on E-W Traverse	F gr relatively massive quartzite with 1cm thick haematite veins. Also minor haematite as veinlets & disseminations & minor epidote also.
1020	50W	Mod weathered, strongly brecciated quartzite with specular haematite in veins, veinlets & fractures.
1021	100W	V f gr, sl-mod weathered, vaguely banded quartzite with >20% f g haematite - biotite.
1022	150W	Str weathered, specular haematite-quartz-iron oxide rock (>75% iron oxides).
1023	160W	Mod weathered, v strongly brecciated specular haematite bearing quartzite/chert.
1024	200W	V f gr sl-mod weathered, finely banded, biotite-?haematite-muscovite quartzite.
1025	200W	Mod weathered, v str brecciated haematite-rich (some specular) "quartzite" with minor feldspar.
1026	300W	Sl weathered, quartz veined, midly brecciated, v f g biotite-muscovite-?haematite quartzite.
1027	500W	Mod weathered, sl-mod magnetic biotite-hornblende "granite" with minor epidote.
1028	550W	Sl-mod weathered non-magnetic, rel massive qtz feldspar rock with >40% haematite & minor biotite. Appears midly brecciated.
1029	End of W Traverse close to road.	Sl weathered, weakly-mod magnetic "granite"-hornblende rich with v minor epidote.
1030	2000N 1000E on grid	Massive black haematite-quartz rock (>80% iron oxides) with v minor relict pyrite.
1031	East Contact of granite	Grey, pyritic Moina Sandstone.
1032	East Contact of granite	Grey pyritic Moina Sandstone.
1033	" "	Grey, pyritic Moina Sandstone.
1034	" "	Grey-white, friable feldspathic f g-pebbly Moina Sandstone - possibly with weak hydrothermal alteration
1035	" "	Grey-white friable Moina Sandstone.
1036	" "	Grey-white friable Moina Sandstone.
1037-1049		Miscellaneous rock samples from regional reconnaissance over other localities not on E.L. 7/74.

023



The Australian Mineral Development Laboratories

Flemington Street, Frewville, South Australia 5063  
Phone Adelaide 79 1662  
Telex AA 82520

Please address all correspondence to  
P.O. Box 114 Eastwood SA 5063  
In reply quote:

349030 *LIENA 577*

3/114/0 - AC 1097/81

7 October 1980

# amdel

## NATA CERTIFICATE

### PART REPORT 1

The Shell Company of Australia Limited,  
Metals Division,  
P.O. Box 860,  
DEVONPORT TAS. 7301

### REPORT AC 1097/81

YOUR REFERENCE: Sample Despatch No. SDL/MZ01/004  
IDENTIFICATION: As listed  
DATE RECEIVED: 27 August 1980

Enquiries quoting AC 1097/81 to the Manager please.

D.K. Rowley  
Manager  
Analytical Chemistry Division

*J.B. Bourditch*

for Norton Jackson  
Managing Director

cc Mr. P.J. Verwoerd,  
Shell Metals,  
P.O. Box 872K,  
Melbourne Vic. 3001

ij

13/10/80 MZ01/847

*reported in 10/80  
MR*

*JB.*

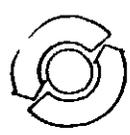
*IB 9B  
RW  
WS*

Pilot Plant: Osman Place  
Thebarton S.A.  
Telephone 43 8053  
Branch Laboratory: Perth



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030



349031

# amdel

Analysis code C3/3

Report AC 1097/81

Page 1

NATA Certificate

Results in ppm

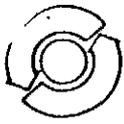
Sample	Au
1016	0.01
1017	0.01
1018	0.09
1019	<0.01
1020	<0.01
1021	<0.01
1022	0.42
1023	<0.01
1024	<0.01
1025	<0.01
1026	<0.01
1027	<0.01
1028	<0.01
1029	<0.01
1030	<0.01
1031	0.01
1032	<0.01
1033	<0.01
1034	<0.01
1035	<0.01
1036	<0.01
1037	<0.01
1038	<0.01
1039	<0.01
1040	<0.01
1041	0.02
1042	0.01
1043	0.04
1044	0.04
1045	0.02
1046	0.02
1047	0.01
1048	0.02
1049	<0.01

reported October MR  
49

spec hem - qtz - lim  
7759 Fe oxide

Detn limit (0.01)

031



349032

# amdel

Analysis code J3/1

Report AC 1097/81

Page 2

NATA Certificate

Results in ppm

Sample	U
1001	3.7
1002	3.5
1003	2.1
1004	4.6
1005	3.5
1006	2.9
1007	2.4
1008	3.1
1009	4.2
1010	3.6
1011	<u>15.</u>
1012	2.8
1013	3.5
1014	4.8
1015	2.7
1016	2.6
1017	7.3
1018	1.9
1019	2.2
1020	1.5
1021	3.2
1022	2.4
1023	1.8
1024	4.0
1025	1.4
1026	2.8
1027	3.6
1028	3.8
1029	3.8
1030	2.2
1031	4.5
1032	1.6
1033	1.1
1034	2.3
1035	1.6
1036	2.2
1037	1.1
1038	1.3
1039	2.0
1040	1.0

*weak - most many hbl gr*

Detn limit (0.1)

032



349033

# amdel

Analysis code J3/1

Report AC 1097/81

Page 3

NATA Certificate

Results in ppm

Sample	U
1041	0.6
1042	2.3
1043	7.8
1044	2.0
1045	3.3
1046	3.4
1047	3.2
1048	3.1
1049	5.1
Detn limit	(0.1)

033



The Australian Mineral Development Laboratories

Flemington Street, Frewville, South Australia 5063  
Phone Adelaide 79 1662  
Telex AA 82520

Please address all correspondence to  
P.O. Box 114 Eastwood SA 5063  
In reply quote:

349034 LIENA STH

# amdel

3/114/0 - AC 1097/81

17th October, 1980.

## NATA CERTIFICATE

### PART REPORT 2

The Shell Company of Australia Limited,  
Metals Division,  
P.O. Box 860,  
DEVONPORT. TAS. 7301

### REPORT AC 1097/81

YOUR REFERENCE: Sample Despatch No. SDL/MZ01/004

IDENTIFICATION: As listed

DATE RECEIVED: 27th August, 1980

Enquiries quoting AC 1097/81 to the Manager please.

D.K. Rowley  
Manager  
Analytical Chemistry Division

*A.B. Bowditch*  
for Norton Jackson  
Managing Director

cc Mr. P.J. Verwoerd,  
Shell Metals,  
P.O. Box 872K,  
Melbourne. Vic. 3001

glj

2

22/10/80

Action	Date	Initials

Pilot Plant: Osman Place  
Thebarton S.A.  
Telephone 43 8053  
Branch Laboratory: Perth



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Analysis code B1/1

Report AC 1097/81

Page 1

NATA Certificate

Order M201/004

Results in ppm

Sample	Sn	W
1001	<4	10
1002	34	10
1003	6	<10
1004	<4	<10
1005	10	<10
1006	<4	<10
1007	<4	10
1008	12	<10
1009	<4	<10
1010	4	10
1011	8	45
1012	8	10
1013	4	15
1014	<4	<10
1015	<4	<10
1016	<4	<10
1017	22	<10
1018	8	20
1019	18	45
1020	44	40
1021	<4	15
1022	150	55
1023	170	55
1024	6	<10
1025	110	40
1026	8	<10
1027	<4	15
1028	26	45
1029	10	<10
1030	240	<10
1031	<4	<10
1032	8	<10
1033	10	<10
1034	4	<10
1035	<4	<10
1036	<4	<10
1037	<4	<10
1038	<4	<10
1039	4	10
1040	4	<10

MAGNETIC GRANITE 7 16 ppm U

HAEMATITE VEIN IN QUARTZITE

BRECCIATED QUARTZITE

SPECULAR HAEMATITE 2 0.42 ppm Au

SPECULAR HAEMATITE

BRECCIATED HAEMATITE QUARTZITE

QUARTZ FINGERPRINT ROCKS

MASSIVE HAEMATITE QUARTZ

Detn limit (4) (10)

035



amdel

349036

Analysis code B1/1

Report AC 1097/81

Page 2

NATA Certificate

Order M201/004

Results in ppm

Sample	Sn	W
1041	<4	10
1042	<4	15
1043	130	20
1044	<4	25
1045	4	20
1046	6	20
1047	<4	10
1048	<4	<10
1049	<4	<10
Detn limit	(4)	(10)

SILICEOUS ANTHOCE

036



The Australian  
Mineral Development  
Laboratories

Remington Street, Frewville,  
South Australia 5063  
Phone Adelaide 79 1662  
Telex AA 82520

Please address all  
correspondence to  
P.O. Box 114 Eastwood  
SA 5063  
In reply quote:

349037 LIENA STA

# amdel

3/114/0 - AC 1097/81

## NATA CERTIFICATE

21 November 1980

### REPORT COMPLETE

The Shell Co of Aust Limited  
Metals Division  
PO Box 860  
DEVONPORT TAS 7301

### REPORT AC 1097/81

YOUR REFERENCE:	Sample Despatch No SDL/MZ01/004
IDENTIFICATION:	As listed
DATE RECEIVED:	27 August 1980

D.K. Rowley  
Manager  
Analytical Chemistry Division

*S.H. Bowditch*

cc Mr P J Verwoerd  
Shell Metals  
PO Box 872K  
MELBOURNE VIC 3001

for Norton Jackson  
Managing Director

dam

Pilot Plant: Osman Place  
Thebarton S.A.  
Telephone 43 8053  
Branch Laboratory: Perth



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\* A1A2

Results in pp. unless otherwise stated. Detection limits in brackets

SAMPLE NO.		1001	02	03	04	05	06	1007	SAMPLE NO.		1001	02	03	04	05	06	1007			
*	A1	Ba (200)	800	2000	1000	800	600	600	600	*	A2	In (10)	X	X	X	X	X	X		
		Re (1)	1	1	X	2	X	X	1			Pb (1)	10	5	5	15	30	5	10	
		Ce (300)	X	X	X	X	X	X	X			Sb (30)	X	X	X	X	X	X	X	
		Co (5)	10	20	30	X	60	20	20			Sn (1)	X	8	2	X	X	X	X	
		Cr (20)	60	60	40	40	40	40	40			Zn (20)	X	X	X	X	X	X	X	
		La (50)	250	100	50	50	50	100	100											
		Mn (10)	250	200	200	80	250	200	200		A3	Au (3)								
		Mo (3)	X	X	X	X	X	X	X				P (100)							
		Nb (20)	X	X	X	X	X	X	X				Te (20)							
		Ni (5)	50	100	40	8	50	40	40				Tl (1)							
		Sc (3)	10	40	10	X	15	15	20											
		Sr (50)	250	100	150	300	300	200	200			A4	Li (1)							
		Ta (100)	X	X	X	X	X	X	X				Na (50)							
		Th (100)	X	X	X	X	X	X	X		A5	Cs (30)								
		Ti (100)	6000	8000	8000	600	10000	10000	10000				K (5)							
		V (10)	100	250	150	X	200	200	200				Rb (10)							
		W (50)	X	X	X	X	X	X	X											
		Y (10)	60	30	30	60	30	50	50											
	Yb (1)	6	4	4	10	3	6	6												
	Zr (10)	100	100	150	80	150	150	200	A8	B (3)										
*	A2	Ag (0.1)	X	X	X	X	X	X		X	A9	Al (100)								
		As (50)	X	X	X	X	X	X	X	Ca (100)										
		Bi (1)	X	X	X	X	X	X	X	Fe (100)										
		Cd (3)	X	X	X	X	X	X	X	Mg (100)										
		Cu (1)	20	5	60	3	80	20	10	Si (100)										
		Ga (1)	15	20	15	15	10	15	15											
		Ge (1)	X	X	X	X	X	X	X											

349038

037

Results are semi-quantitative. Elements apparently present in concentrations of economic interest should be redetermined

SAMPLE NO.		1008	09	10	11	12	13	1014	SAMPLE NO.		1008	09	10	11	12	13	1014	
*	A1 Ba (200)	800	600	200	2000	600	600	600	A2*	In (10)	X	X	X	X	X	X	X	
	Be (1)	X	1	X	X	X	X	X	Pb (1)	25	50	10	30	10	30	10		
	Ce (300)	X	X	X	X	X	X	X	Sb (30)	X	X	X	X	X	X	X		
	Co (5)	30	20	40	15	15	25	20	Sn (1)	2	2	4	3	1	X	1		
	Cr (20)	60	40	40	40	40	60	40	Zn (20)	X	X	X	X	X	X	X		
	La (50)	100	100	X	100	50	50	100										
	Mn (10)	200	250	250	80	200	150	250	A3	Au (3)								
	Mo (3)	X	X	X	25	X	X	X	P (100)									
	Nb (20)	X	X	X	X	X	X	X	Te (20)									
	Ni (5)	60	40	40	50	20	60	40	Tl (1)									
	Sc (3)	20	10	8	6	10	25	25										
	Sr (50)	100	200	X	100	150	150	250	A4	Li (1)								
	Ta (100)	X	X	X	X	X	X	X	Na (50)									
	Th (100)	X	X	X	X	X	X	X										
	Ti (100)	10000	8000	4000	4000	6000	6000	6000	A5	Cs (30)								
	V (10)	250	150	200	100	150	250	200	K (5)									
	W (50)	X	X	X	X	X	X	X	Rb (10)									
	Y (10)	50	50	20	40	40	30	50										
Yb (1)	4	6	2	6	4	2	6											
Zr (10)	150	150	80	150	100	150	200											
*	A2 Ag (0.1)	0.2	0.8	0.2	0.1	0.2	X	X	A8	B (3)								
	As (50)	X	X	X	X	X	X	X	A9	Al (100)								
	Bi (1)	X	X	X	X	X	X	X	Ca (100)									
	Cd (3)	X	X	X	X	X	X	X	Fe (100)									
	Cu (1)	5	3	10	3	1	40	3	Mg (100)									
	Ga (1)	25	25	25	15	20	20	20	Si (100)									
	Ge (1)	X	X	X	X	X	X	X										

Results are semi-quantitative. Elements apparently present in concentrations of economic interest should be redetermined  
 Y = Not detected at limit quoted

038

349039

\*A1A2

Results in ppm unless otherwise stated. Detection limits in brackets

SAMPLE NO.		1015	16	17	18	19	20	1021	SAMPLE NO.		1015	16	17	18	19	20	1021				
*	A1	Ba (200)	1000	1000	2000	600	1000	1000	600	*	A2	In (10)	X	X	X	X	X	X			
		Be (1)	X	1	X	1	X	X	2			Pb (1)	10	10	5	2	5	10	5		
		Ce (300)	X	X	300	X	X	X	X			Sb (30)	X	X	X	X	X	X	X		
		Co (5)	30	15	30	X	15	5	10			Sn (1)	1	X	8	3	5	20	X		
		Cr (20)	60	60	60	60	60	40	60			Zn (20)	X	X	X	X	X	X	X		
		La (50)	100	150	300	100	50	50	150												
		Mn (10)	200	100	100	20	40	60	200		A3	Au (3)									
		Mb (3)	X	X	25	X	20	3	X				P (100)								
		Nb (20)	X	X	X	20	X	X	X				Te (20)								
		Ni (5)	40	80	80	50	50	30	80				Tl (1)								
		Sc (3)	25	15	20	10	8	6	8												
		Sr (50)	100	X	100	X	X	X	X			A4	Li (1)								
		Ta (100)	X	X	X	X	X	X	X				Na (50)								
		Th (100)	X	X	X	X	X	X	X												
		Ti (100)	8000	8000	4000	6000	4000	4000	8000		A5		Cs (30)								
		V (10)	250	150	200	100	80	80	80					K (5)							
		W (50)	X	X	X	X	X	X	X					Rb (10)							
		Y (10)	60	60	50	50	50	60	50												
	Yb (1)	6	8	10	6	6	8	8													
	Zr (10)	200	150	150	100	80	150	150													
*	A2	Ag (0.1)	0.2	X	0.1	0.1	0.1	X	X	A8	B (3)										
		As (50)	X	X	X	X	X	X	X		A9	Al (100)									
		Bi (1)	X	X	X	X	X	1	X				Ca (100)								
		Cd (3)	X	X	X	X	X	X	X				Fe (100)								
		Cu (1)	200	10	5	3	1	10	20				Mg (100)								
		Ga (1)	25	25	20	25	20	25	20				Si (100)								
		Ge (1)	X	X	X	X	X	X	X			X									

349040

039

Results are semi-quantitative. Elements apparently present in concentrations of economic interest should be redetermined

\*A1A2

Results in ppm unless otherwise stated. Detection limits in brackets

SAMPLE NO.		1022	23	24	25	26	27	1028	SAMPLE NO.		1022	23	24	25	26	27	1028	
*	A1 Ba (200)	200	800	600	200	400	800	800	*	A2 In (10)	X	X	X	X	X	X	X	
	Be (1)	X	X	1	X	1	X	X		Pb (1)	15	5	10	5	X	15	15	
	Ce (300)	X	X	X	X	X	X	X		Sb (30)	X	X	X	X	X	X	X	
	Co (5)	30	X	20	X	5	15	5		Sn (1)	150	150	X	60	1	X	10	
	Cr (20)	40	40	60	40	40	40	40		Zn (20)	X	X	X	X	X	X	X	
	La (50)	X	X	100	X	100	100	50										
	Mn (10)	80	60	250	30	100	250	80		A3 Au (3)								
	Mo (3)	20	10	X	3	X	X	X		P (100)								
	Nb (20)	X	X	X	X	X	X	X		Te (20)								
	Ni (5)	20	50	80	80	60	60	40		Tl (1)								
	Sc (3)	3	6	8	15	10	15	8										
	Sr (50)	X	X	X	50	X	250	50		A4 Li (1)								
	Ta (100)	X	X	X	X	X	X	X		Na (50)								
	Th (100)	X	X	X	X	X	X	X										
	Ti (100)	3000	4000	8000	3000	6000	8000	6000		A5 Cs (30)								
	V (10)	60	80	60	100	100	150	80		K (5)								
	W (50)	X	X	X	X	X	X	X		Rb (10)								
	Y (10)	60	500	50	60	60	40	60										
Yb (1)	10	50	6	10	8	6	10											
Zr (10)	150	200	150	80	80	100	100											
*	A2 Ag (0.1)	X	X	X	X	0.1	0.2	0.1	A8 B (3)									
	As (50)	X	X	X	X	X	X	X	A9 Al (100)									
	Bi (1)	X	X	X	X	X	X	X	Ca (100)									
	Cd (3)	X	X	X	X	X	X	X	Fe (100)									
	Cu (1)	10	3	5	3	10	15	60	Mg (100)									
	Ga (1)	20	25	20	40	15	20	25	Si (100)									
	Ge (1)	X	X	X	X	X	X	X										

349041

040

... concentrations of economic interest should be redetermined

\* A1A2

Results in ppm unless otherwise stated. Detection limits in brackets

\*

SAMPLE NO.	1029	30	31	32	33	34	1035	SAMPLE NO.	1029	30	31	32	33	34	1035
A1	Ba (200)	200	X	X	X	X	X	A2	In (10)	X	X	X	X	X	X
	Be (1)	X	1	X	X	X	X	*	Pb (1)	15	10	5	10	50	5
	Ce (300)	X	X	X	X	X	X		Sb (30)	X	X	X	X	X	X
	Co (5)	10	5	X	X	X	X		Sn (1)	X	150	X	X	X	X
	Cr (20)	40	40	40	40	40	20		Zn (20)	X	X	X	X	X	X
	La (50)	X	X	X	X	X	X								
	Mn (10)	150	20	20	20	40	X	A3	Au (3)						
	Mo (3)	X	60	X	X	X	X		P (100)						
	Nb (20)	X	X	X	X	X	X		Te (20)						
	Ni (5)	15	150	X	10	X	X		Tl (1)						
	Sc (3)	10	40	X	X	X	X								
	Sr (50)	100	50	X	X	X	X	A4	Li (1)						
	Ta (100)	X	X	X	X	X	X		Na (50)						
	Th (100)	X	X	X	X	X	X								
	Ti (100)	6000	4000	1000	1500	2000	400	A5	Cs (30)						
	V (10)	200	250	30	40	40	20		K (5)						
	W (50)	X	X	X	X	X	X		Rb (10)						
	Y (10)	40	20	10	10	10	X								
	Yb (1)	2	2	1	1	1	X								
	Zr (10)	100	150	80	80	60	40								
								A8	B (3)						
*	A2	Ag (0.1)	0.1	0.1	0.2	0.1	0.2	X	0.1						
		As (50)	X	X	X	X	X	X	X	A9	Al (100)				
		Bi (1)	X	X	X	X	X	X	X		Ca (100)				
		Cd (3)	X	X	X	X	X	X	X		Fe (100)				
		Cu (1)	5	5	5	5	5	3	3		Mg (100)				
		Ga (1)	25	60	X	6	6	X	X		Si (100)				
		Ge (1)	X	X	X	X	X	X	X						

349042

041

Results are semi-quantitative. Elements apparently present in concentrations of economic interest should be redetermined

\* A1A2

Results in ppm unless otherwise stated. Detection limits in brackets

SAMPLE NO.		1036	37	38	39	40	41	1042	SAMPLE NO.		1036	37	38	39	40	41	1042		
*	A1	Ba (200)	X	X	X	200	X	X	X	*	A2	In (10)	X	X	X	X	X	X	
		Be (1)	X	X	X	1	X	X	X			Pb (1)	2	100	80	150	20	30	20
		Ce (300)	X	X	X	X	X	X	X			Sb (30)	X	X	X	X	X	X	X
		Co (5)	X	5	20	5	30	40	5			Sn (1)	X	X	X	X	X	X	X
		Cr (20)	X	80	80	80	X	300	100			Zn (20)	X	80	X	60	40	20	X
		La (50)	X	X	50	50	X	X	X										
		Mn (10)	X	30	30	80	10000	100	80		A3	Au (3)							
		Mb (3)	X	X	X	X	X	X	X			P (100)							
		Nb (20)	X	X	X	X	X	X	X			Te (20)							
		Ni (5)	X	10	40	50	80	250	80			Tl (1)							
		Sc (3)	X	X	3	8	X	X	3										
		Sr (50)	X	X	X	X	50	X	X		A4	Li (1)							
		Ta (100)	X	X	X	X	X	X	X			Na (50)							
		Th (100)	X	X	X	X	X	X	X										
		Ti (100)	600	1500	2500	6000	400	1000	1000		A5	Cs (30)							
		V (10)	X	40	60	100	40	60	100			K (5)							
		W (50)	X	X	X	X	X	X	X			Rb (10)							
		Y (10)	X	10	40	50	10	10	20										
		Yb (1)	X	1	2	6	1	1	3										
	Zr (10)	60	100	80	100	60	40	100											
*	A2	Ag (0.1)	0.1	0.2	0.2	0.1	X	X	0.3	A8	B (3)								
		As (50)	X	X	X	X	X	X	X	A9	Al (100)								
		Bi (1)	X	X	X	X	X	X	X		Ca (100)								
		Cd (3)	X	X	X	X	X	X	X		Fe (100)								
		Cu (1)	3	5	10	10	3	15	5		Mg (100)								
		Ga (1)	X	8	10	20	X	8	6		Si (100)								
		Ge (1)	X	X	X	X	X	X	X										

349043

042

Elements apparently present in concentrations of economic interest should be redetermined

\* A1A2 Results in ppm-unless otherwise stated. Detection limits in brackets

SAMPLE NO.		1043	44	45	46	47	48	1049	SAMPLE NO.		1043	44	45	46	47	48	1049	
* A1	Ba (200)	400	200	600	1500	800	800	400	* A2	In (10)	X	X	X	X	X	X	X	
	Be (1)	2	X					X		Pb (1)	200	10000	800	300	500	3000	150	
	Ce (300)	X	X	X	X	X	X	X		Sb (30)	X	X	X	X	X	X	X	
	Co (5)	10	5	20	25	20	X	X		Sn (1)	80	X	X	1	X	X	X	
	Cr (20)	60	40	40	40	60	40	40		Zn (20)	60	6000	40	X	X	X	X	
	La (50)	200	X	100	200	100	100	X										
	Mn (10)	250	100	150	80	80	250	40		A3	Au (3)							
	Mo (3)	10	X	3	X	X	3	3			P (100)							
	Nb (20)	20	X	20	20	X	X	X			Te (20)							
	Ni (5)	80	60	60	60	200	15	X		Tl (1)								
	Sc (3)	8	X	8	20	8	8	6		A4	Li (1)							
	Sr (50)	X	X	X	X	X	X	X			Na (50)							
	Ta (100)	X	X	X	X	X	X	X		A5	Cs (30)							
	Th (100)	X	X	X	X	X	X	X			K (5)							
	Ti (100)	6000	2000	8000	10000	6000	4000	2000			Rb (10)							
	V (10)	100	60	100	150	100	100	100										
	W (50)	X	X	X	X	X	X	X										
	Y (10)	60	30	50	80	60	40	20										
Yb (1)	8	3	8	8	6	6	3											
Zr (10)	100	80	100	150	100	100	40											
* A2	Ag (0.1)	0.3		0.6	0.1	0.1	0.4	0.1	A8	B (3)								
	As (50)	X	X	X	X	X	X	X		A9	Al (100)							
	Bi (1)	X	X	X	X	X	X	X			Ca (100)							
	Cd (3)	X	20	X	X	X	X	X			Fe (100)							
	Cu (1)	25	40	40	15	10	10	30			Mg (100)							
	Ga (1)	25	10	30	30	30	25	8			Si (100)							
	Ge (1)	X	X	X	X	X	X	X										

349014

043

Results are semi-quantitative. Elements apparently present in concentrations of economic interest should be redetermined.

044

349045

APPENDIX 2

Rock Samples from the Liena Aeromagnetic Anomaly

(4339/2)

Mineralogical Report Shell 23/80

by

Dr. A.W.G. Whittle

## A. W. G. WHITTLE &amp; ASSOCIATES

CONSULTING MINERALOGISTS

ALICK W. G. WHITTLE, M.Sc., Ph.D.

P.O. BOX 102

STANSBURY, S.A. 5082

PHONE (088) 52 4281

MINERALOGICAL REPORTSHELL 23/80Samples 5201 - 5206, Tasmania.R.G. Wright,  
25.9.80 : letter.DISTRIBUTION

Copy 1	Mr R.G. Wright Supervising Geologist Shell Metals P.O. Box 860	DEVONPORT 7310.
Copy 2	Mr J. Langenberg Exploration Manager Shell Metals G.P.O. Box 872K	MELBOURNE 3001.

046

349047 7201 - 848

25th September, 1980.

Dr. A.W.G. Whittle,  
P.O. Box 102,  
STANSBURY. S.A. 5582.

P.O. Box 860,  
DEVONPORT. Tas. 7310.

Dear Alick,

Re: Llena Magnetic Anomaly, Northern Tasmania.

I have sent a suite of 5 rock samples from the above ground magnetic anomaly to Ian Pontifex for the preparation of thin and polished sections.

The samples appear to be olivine basalts (5201, 5205 and 5206) associated with unusual mafic breccias (5202 and 5204).

We have outlined a sharp-peaked ground magnetic feature in the vicinity of these samples and wish to explain the anomaly.

Magnetic susceptibilities measured on these and other specimens are much lower than we would expect to cause the observed magnetics.

We suspect we may be dealing with a pipe-like feeder structure to now eroded Tertiary basalts. Surrounding host rocks are Ordovician limestones.

Please identify the samples and comment on the following:

1. Are the breccias of volcanic origin and do they contain significant oxidized magnetite?
2. Are textures in the basalts indicative of shallow intrusive material or extrusive flows?
3. Do the basalts contain significant oxidized magnetite?
4. Do these rocks have any kimberlite affinities?

I hope things are still going well for you over in Stansbury. I would appreciate a small quantity of consistently sunny South Australian weather if you have any to spare.

Regards,

R.G. WRIGHT  
Supervising Geologist

*Large magnetic anomaly*Samples 5201 - 5206, Tasmania.

The report was prepared from observations on the thin and polished sections of rocks which were submitted by Mr R.G. Wright.

The breccias were possibly formed by flow drag along the chilled contact zones of shallow intrusive porphyritic olivine basalts, with country rock. This postulation is based upon the abundance of devitrified vitric basalt (or tachylite) within the breccias.

The magnetic susceptibilities in the three porphyritic basalt samples is due to the presence of slightly martitised titanomagnetite amongst the principal accessory ilmenite.

The basalts are highly unsaturated; but of low potash content since they contain no mica. There is therefore, no affinity with kimberlite.

\* \* \* \*

5201      Flow-structured olivine basalt.

The basalt has a simple composition; and it is a very undersaturated species. The principal components are roughly parallel-oriented labradorite; and olivine, which exists as small phenocrysts, and as finer interstitial material amongst the plagioclase.

Pyroxenes are not present. About 7% evenly dispersed ilmenite, several % titano-magnetite, and traces of fine pyrite are complexed with the fine grained interstitial olivine. The titanomagnetite induces the magnetic susceptibility.

A small proportion of the olivine is either serpen-  
tinised, or altered to iddingsite.

5202      Decomposed basaltic volcanic breccia.

The assemblage of non-size-classified fragmentary  
material includes a major proportion of completely decomposed  
basic volcanic rock, some 7% highly angular quartz, minor  
calcite, olivine and pyroxene. There are no opaque mineral  
components.

The fragments of volcanic material appear to have  
been from both tachylite and vesicular basalts; some of which  
had flow structure. Sparse olivine and pyroxene are preserved  
in some fragments; but most fragments now consist of limonite-  
stained microcrystalline montmorillonite and serpentinous  
minerals. In the fragments the pseudomorphs of olivine are  
clearly visible.

The fragmentary quartz is irregularly dispersed as  
single individuals. The quartz was either vein material, or  
was present as vesicle fillings in the volcanics.

5204      Devitrified vitric breccia.

This assemblage of volcanic fragments is less altered  
than is the case with 5202. The fragments are highly angular;  
and they range in size from 01. - 4.0 mm.

All of the fragments are from devitrified vitric basalt; probably tachylite which formed at the contacts of the basalt with the country rock. Rapid chilling occurred; a few small vesicles were formed; and most fragments contain minute 0.1 mm crystals of olivine, sparse fine pyrite and pyroxene. Calcite or quartz is present in some of the vesicles.

There are in the fragments, no opaque mineral components, other than sparse fine pyrite.

5205      Serpentinised porphyritic olivine basalt.

This basalt has much the same composition as 5201; but there are slight differences. It is more distinctly porphyritic, since it contains a few olivines and plagioclase of several mm size, as well as occasional clusters of pyroxenes.

The main components are plagioclase and olivine. The finest olivine coexists with 7% ilmenite, 1 - 2% weakly martitised titano-magnetite, 0.2% pyrite and a trace of fine chalcopyrite. These minerals, together with 5% brown isotropic silicate glass, constitute the mesostasis amongst the randomly-oriented plagioclase and coarser olivine grains.

More extensive serpentinisation was incident in this rock. In addition, despite the presence of larger phenocrysts than in 5201, this basalt underwent a late stage of rapid chilling. This was the cause of the formation of silicate glass in the fine grained mesostasis.

A small magnetic susceptibility can be expected because of the content of titano-magnetite.

5206      Porphyritic olivine basalt.

The general similarity with 5201 and 5205 is apparent from the thin section. In this rock, proportions of both the labradorite and olivine are phenocrysts of 1 - 3 mm size.

The bulk of the smaller labradorite crystals, and the very fine olivine, constitute with 7% ilmenite, 2 - 3% titanomagnetite, and minor fine sulphides, the groundmass of the basalt. There are sparse orthopyroxene crystals.

Incipient alteration of the olivine to either serpentine or to iddingsite, is evident from the section.

*A.W.G. Whittle*

A.W.G. WHITTLE

24th October 1980.

APPENDIX 3

Petrological Report CMS 82/5/16

Wattle Valley Grid - Surface Rock Samples

Petrological Report CMS 82/12/26

Two core Samples from Drillhole WV 2

052

**Central Mineralogical Services**

---



39 Beulah Road  
Norwood, S.A. 5067  
Telephone 42 3659

Mr. W.D. Smyth  
Exploration Geologist  
The Shell Co. of Aust. Ltd.  
Metals Division  
P.O. Box 860  
DEVONPORT / TAS. 7310

28th May, 1982

REPORT CMS 82/5/16

YOUR REFERENCE:	Sample Despatch No. 4129/MZ01/WDS/134	
DATE RECEIVED:	11th May, 1982	
SAMPLE NOS.:	5688 - 5691	<u>WATTLE VALLEY GARD</u>
SUBMITTED BY:	W.D. Smyth	<u>SURFACE ROCK</u>
WORK REQUESTED:	Petrology	<u>SAMPLES</u>

  
H.W. Fander, M. Sc.

REPORT CMS 82/5/16

Four rock samples from the Gordon Limestone were submitted for petrological examination. Since the four rocks are essentially similar, brief tabulated descriptions were prepared. These incorporate data from carbonate-staining tests and microscopic (stereobinocular, petrological) examination of representative thin-sections and offcuts, and include interpretative comments.

All four rocks can be classified as incipiently syngenetic-pyritic limestones. Fabrics range from massive-laminated to intraformationally brecciated. Dolomitisation is variably developed, predates incipient regional metamorphic recrystallization, and also predates localised calcite veining and vug-filling. These limestones are variably carbonaceous and more or less typical of the Gordon Limestone. There are no indications of base metal mineralisation.

D. Cowan, B. Sc.

Sample	Classification - Composition	Fabric	Accessories	Central Mineralogical Services Comments
38 .S. 130)	<u>Dolomitic Limestone Breccia</u> . Clasts, interspersed bands of microcrystalline to semi-porcellanous, weakly carbonaceous limestone with extensively dolomitised sparry calcite cement, minor stylolites.	Soft-pebble conglomerate-like with mildly corrosive cement. Minor late calcite veins. Mildly stressed.	Traces authigenic quartz (in matrix). Minor traces ultrafine "syngenetic" pyrite.	Intraformationally brecciated, fine laminated, carbonaceous, weakly fossiliferous limestone; partly dolomitised, subsequently weakly calcite-veined.
89	<u>Dolomitic Limestone "Breccia"</u> . Microcrystalline to semi-porcellanous, weakly carbonaceous limestone with irregular veins, impregnations of fine sparry dolomite with thin selvages of calcite.	Micro laminated limestone with pyg-matic dolomite veins, incipiently sheared.	Traces quartz (silty, detrital), minor traces ultrafine "syngenetic" pyrite.	Extensively diagenetically dolomite veined/partially dolomitised, micro-laminated, carbonaceous, weakly pyritic limestone sim. 5688, but relatively massive.
90	<u>Impure Limestone</u> . Microcrystalline to semi-porcellanous calcite, weakly pervasively carbonaceous. Minor (<5-10 %) silt-sized detrital quartz. Minor localised dolomitisation.	Massive to weakly laminated, mildly slumped, with incipient discordant slaty cleavage.	Minor traces ultrafine pyrite.	Relatively massive, relatively weakly laminated impure microcrystalline limestone. Very incipiently dolomitised in comparison to 5688, 5689.
91 .S. 133)	<u>Limestone</u> . Microcrystalline to semi-porcellanous calcite with pervasive fine-scale semi-lustre-mottled calcite cavity fillings.	Banded to micro-laminated, massive to silty fine sandy clastic ("calcarenitic"). Stressed.	Traces recrystallized "syngenetic" pyrite; minor traces carbonaceous matter.	Unusually vuggy limestone. General features suggestive of algal bioconstruction, but lacks the intricate banding of stromatolitic types. Undolomitised.
	SAMPLE GRID LOCATION			
	5688 00N 600 W			
	5689 00N 90 W			
	5690 20N 120 W			
	5691 30N 150 W			

055

349056

# Central Mineralogical Services



39 Beulah Road  
Norwood, S.A. 5067  
Telephone 425659

Mr. W.D. Smyth  
Exploration Geologist  
The Shell Co. of Aust. Ltd.  
Metals Division  
P.O. Box 860  
DEVONPORT / TAS. 7310

7th January, 1983

## REPORT CMS 82/12/26

YOUR REFERENCE:	Sample Despatch No. 4309/MZ01/WDS/163
DATE RECEIVED:	17th December, 1982
SAMPLE NOS.:	920, 921
SUBMITTED BY:	W.D. Smyth
WORK REQUESTED:	Petrology

*H. W. Fander*

H.W. Fander, M. Sc.

056

349057

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 7th January, 1983

## SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

Job No. CMS 82/12/26 Date Received: 17.12.1982Reference Sample Despatch No. 4309/MZ01/WDS/163Sample No. 920Nature of Sample: D.D. CoreDESCRIPTION SECTION No. 44892

## a. Hand Specimen:

## b. Microscopic:

920 (T.S. 44892) Calcite stain test positive.

This is a carbonaceous limestone with minor sphalerite, possibly of syngenetic origin; the rock is quite strongly folded and partly recrystallized, which may have occurred before lithification.

The rock consists partly of massive crystalline calcite with embedded chalcedonic annular (or atoll-shaped) bodies of organic origin, possibly corals. This passes into a calcitic mud with embedded dolomite rhombs and carbonaceous matter, and the contact between the two is marked by a chalcedony layer and fibrous calcite, with thin carbonaceous films. The calcitic mud is finely bedded. The two rock types are intermingled in places, due to pre-consolidation movement and brecciation.

Sphalerite occurs as pale crystals in chalcedonic layers in the massive calcite; it is fractured and is believed to pre-date the pre-lithification movements, thus suggesting a syngenetic origin. A Mississippi-Valley style of mineralisation may be involved.

H.W. Fander, M. Sc.

## IDENTIFICATION

920 WJ 54.5m

Carbonaceous Limestone  
with Sphalerite

349058

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 7th January, 1983

## SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

Job No. CMS 82/12/26 Date Received: 17.12.1982Reference Sample Despatch No. 4309/MZ01/WDS/163Sample No. 921Nature of Sample: D.D. CoreDESCRIPTION SECTION No. 44893

a. Hand Specimen:

b. Microscopic:

921 (T.S. 44893) Calcite stain test positive.

This is a carbonaceous, dolomitic limestone which shows pre-consolidation folding; it resembles 920 in many features, but is not mineralised, and the massive calcite (with fossils) is absent.

Part of the rock consists of very fine calcite mud with silt-sized clastic quartz grains; this is finely bedded or laminated. It makes a sharp contact with a calcareous dolostone composed of small dolomite rhombs in a carbonaceous, calcitic fine cement. At the contact, there is a thin zone of rock laced with numerous carbonaceous veinlets, and a selvedge of fibrous calcite. The contact itself clearly represents a fold, and is repeated in a layer of carbonaceous material and streaks of calcitic mud embedded in the dolostone. The textural and structural relationships of the two rock types indicate that folding occurred prior to lithification. No fossils were detected.

H.W. Fander, M. Sc.

## IDENTIFICATION

921 UV2 75.5A

Carbonaceous  
Dolomitic Limestone

APPENDIX 4

Drill Log Sheets for PDH WV 1 & PDH/DDH WV 2

# DRILL LOG SHEET

349060

PROJECT: MOINA

Hole No: WV 1

COLLAR CO-ORDINATES: 00E 50N

LOCATION CODE: MZ 01

COLLAR R.L.: .....

LOCATION: WATTLE VALLEY GRID	DATE STARTED	22-11-82	HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE
	DATE FINISHED	22-11-82	NON CORE	O	O	50m		NO OF TRAYS
MAP/PHOTO REFERENCE: 00E 50N	TOTAL DEPTH	50m						SAMPLE STORAGE
HOLE SURVEY DATA			LOGGED BY	D. SIMPSON	CORE			ASSAY LAB.
INSTRUMENT:			CONTRACTOR	OVERLAND DRILLING CO.				ASSAY REPORTS
DEPTH	INSTRUMENT		ACID ETCH		REMARKS	RIG	SCOUT	
	INCL.	AZ.	INCL.	AZ.				
COLLAR	90°	-						
						DRILL CREW	CASING	MIN. & PET. LAB.
							CASING LEFT	MIN. & PET. REPORTS

GRAPHIC/LETTER SYMBOL LOGGING KEY

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

STRUCTURE / ALTERATION CODE

- B BEDDING
- J JOINTING
- C CLEAVAGE
- F FOLIATION
- sh SHEARING
- q QUARTZ VEINS
- O OXIDATION

DRILLING SUMMARY: From 0-4m probably contaminated (high Ni, Co) however high Pb, Zn values occur throughout the section.







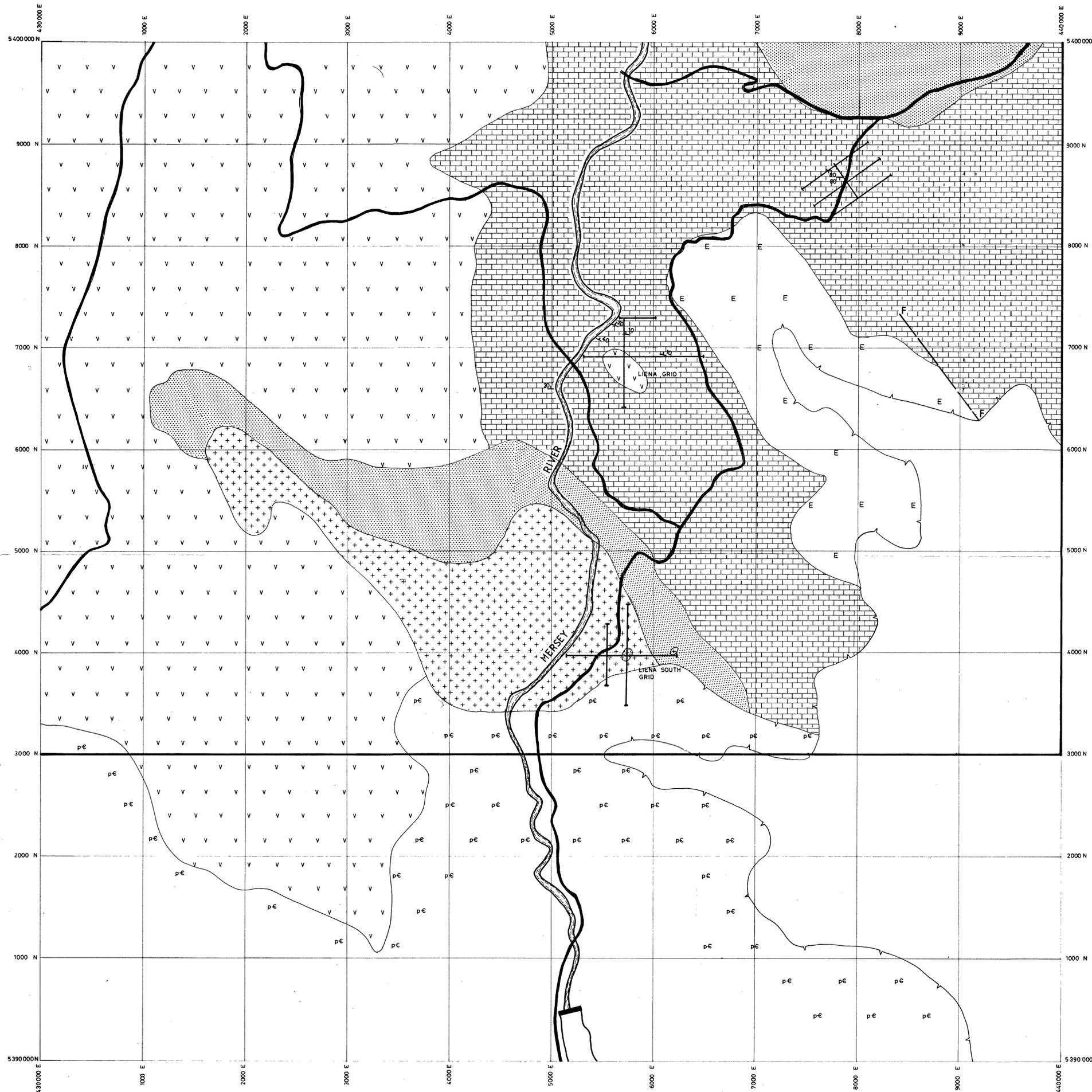
349064

MICROFILMED

FORM	A.O.	G.	E.O.	REG.
				Registrar
D. D.	11 SEP 1984			E & IL
	DEPT. OF MINES			
No.	9332/84			

<u>Plan No.</u>	<u>Title</u>	<u>Scale</u>
D/MZ 01/208 ✓	Cadastral Sheet 4339 - Geology	1:20 000
D/MZ 01/1054 ✓	Moina-Housetop Tasmania - Residual Magnetic Contours - Sheet 20/4339	1:20 000
D/MZ 01/1055 ✓	Moina-Housetop Tasmania - Residual Magnetic Contours - Sheet 20/4339	1:20 000
D/MZ 01/147 ✓	Liena South 4339/1 - Geology	1:2 500
D/MZ 01/125 ✓	Liena South Line 2000N - Magnetic Profile	1:2 500
D/MZ 01/126 ✓	Liena South Lines 1400E & 1600E - Magnetic Profiles	1:2 500
D/MZ 01/121 ✓	Liena South Soil Sampling Cu, Pb, Zn & Bi	1:2 500
D/MZ 01/122 ✓	Liena South Soil Sampling Sn, W	1:2 500
D/MZ 01/108 ✓	Liena Area Stream Sediment & Rock Chip Sampling	1:20 000
D/MZ 01/123 ✓	Liena Area Stream Sediment Sample Assay Results Cu, Pb, Zn, Ba	1:20 000
D/MZ 01/124 ✓	Liena Area Stream Sediment Sample Assay Results Sn, W	1:20 000
D/MZ 01/127 ✓	Liena Area Rock Chip Assay Results Cu, Pb, Zn, Ba	1:20 000
D/MZ 01/128 ✓	Liena Area Rock Chip Assay Results Sn, W	1:20 000
D/MZ 01/104 ✓	Liena Anomaly (4339/2) - Geology	1:2 500
D/MZ 01/085 ✓	Liena Anomaly (4339/2) - Line 2000N - Geology VLF & Magnetics	1:2 500
D/MZ 01/086 ✓	Liena Anomaly 4339/2 - Line 1400E - Geology VLF & Magnetics	1:2 500
D/MZ 01/088 ✓	Liena Anomaly 4339/2 - Soil & Rock Chip Sampling Sn, W	1:2 500
D/MZ 01/090 ✓	Liena Anomaly 4339/2 - Soil & Rock Chip Sampling Cu, Pb, Zn, Ba	1:2 500
D/MZ 01/228 ✓	Wattle Valley Grid - Geology	1:2 500
D/MZ 01/253 ✓	Wattle Valley Grid - Soil Geochemistry Cu, Pb, Zn, Ni & Mn	1:2 500
D/MZ 01/265 ✓	Wattle Valley - Lead Geochem. Contours	1:2 500

<u>Plan No.</u>	<u>Title</u>	<u>Scale</u>
D/MZ 01/221	Wattle Valley Grid - Soil Geochemistry - Cd	1:2 500
D/MZ 01/222	Wattle Valley Grid - Soil Geochemistry - % Fe	1:2 500
D/MZ 01/240	Wattle Valley Grid - Line 00mE - Profiles	1:2 500
D/MZ 01/264	Wattle Valley Gravity	1:2 500
D/MZ 01/266	Wattle Valley SP	1:2 500
D/MZ 01/211	Wattle Valley Grid - Ground Magnetics	1:2 500
D/MZ 01/214	Wattle Valley Grid - V.L.F.	1:2 500
D/MZ 01/307	Wattle Valley Grid - Line 400mW - Profiles	1:2 500



**LEGEND**

- Tertiary basalt
- Gordon Limestone
- Maira Sandstone
- Pre Cambrian volcanics
- Eldon formation
- Granite



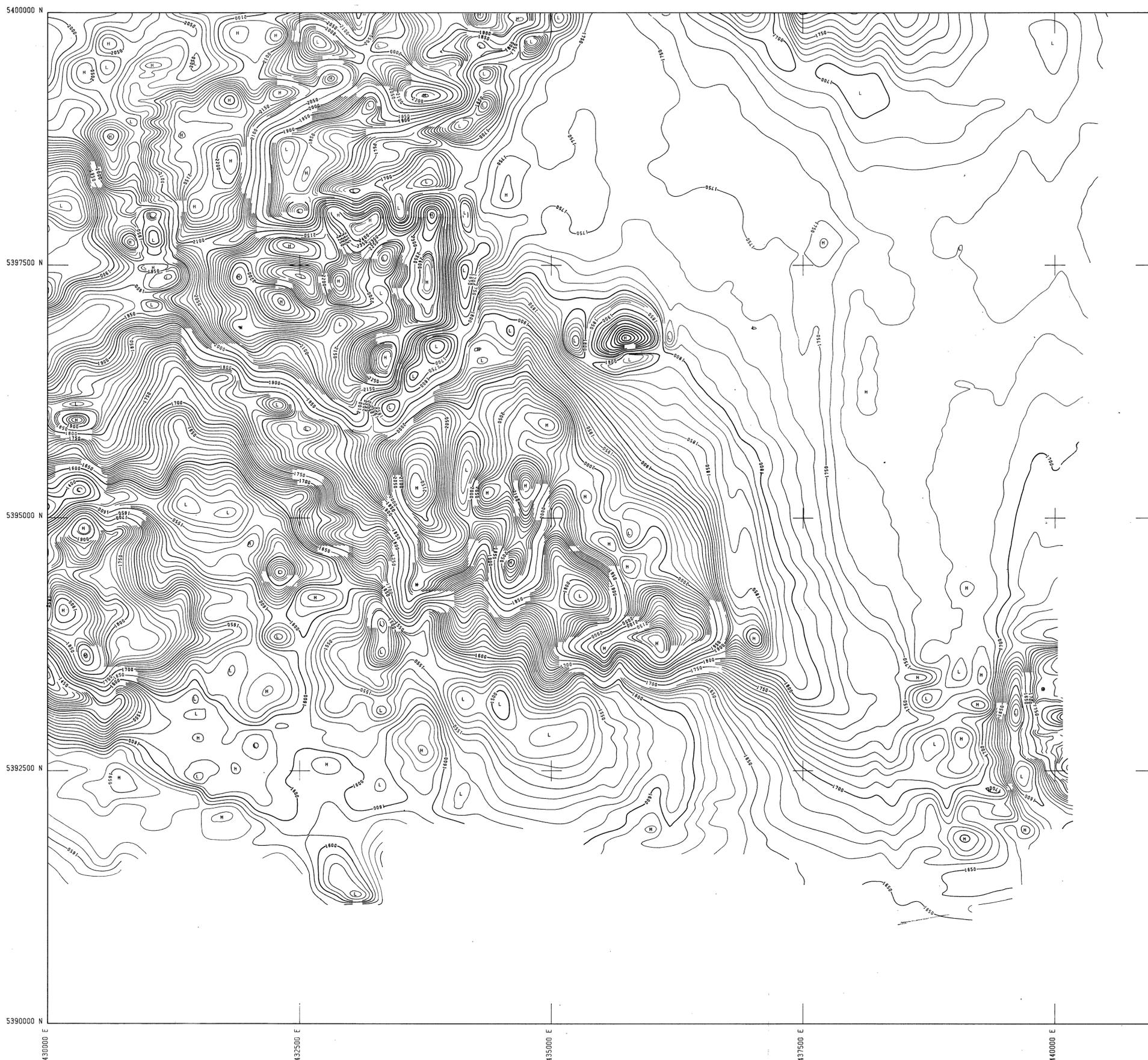
349066



5 cm

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA CADASTRAL SHEET 4339 GEOLOGY	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/M201/208
DATE 24-11-81	AUTHOR W.D SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT

84-2211  
Scale 1:20 000 916

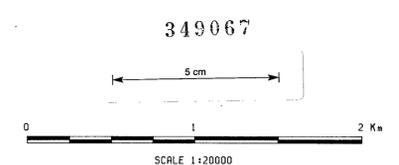


**AIRBORNE SURVEY SPECIFICATIONS**

MAGNETOMETER : G-803 PROTON PRECESSION RECORDING TO 1.0 nT  
 SPECTROMETER : EXPLORANUM DCRS, VOLUME 1024 cu in  
 DATA RECORDING : ALL DIGITAL TO MAGNETIC TAPE, ANALOGUE ON ACM-6  
 DATA RECORDING INTERVAL : 1.0 SEC., APPROX 36M LINEAR SAMPLING  
 AT MEAN GROUND SPEED OF 60 KNOTS  
 FLIGHT PATH RECORD : HULCHER 35mm TRACKING CAMERA  
 DETECTOR TERRAIN CLEARANCE : SPECTROMETER IN AIRCRAFT AT 100 metres MTC  
 MAGNETOMETER SENSOR IN TOWED BIRD  
 CABLE LENGTH 30 metres  
 NOMINAL FLIGHT LINE SPACING : 250m N-S and E-W, TIES 2.5km  
 FLIGHT LINE RECOVERY : VISUALLY TO ENLARGED AC9 PHOTOGRAPHY AT 1:20000  
 AND 1:30000

**PROCESSING SPECIFICATIONS**

IGRF : REMOVED, DATUM 2000 NT ADDED  
 RADIOMETRIC CORRECTIONS : COMPTON  
 BACKGROUND  
 ALTITUDE  
 GRID MESH : 50m by 50m  
 CONTOUR INTERVAL : 10 nT  
 HORIZONTAL SCALE 1 : 20000  
 SHEET 4339  
 GRID NOTATION REFERS TO AUSTRALIAN MAP GRID



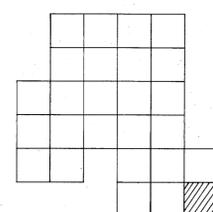
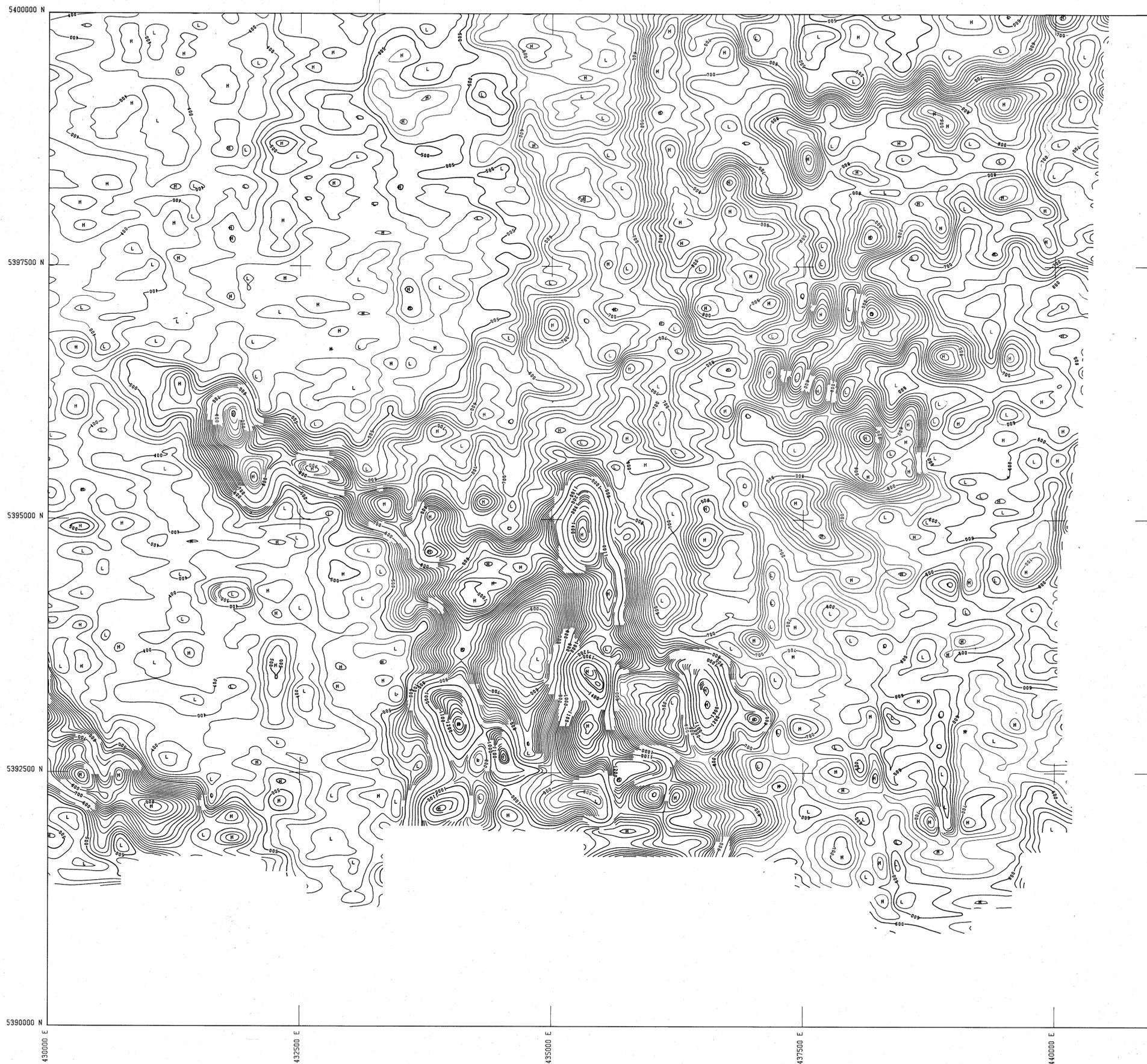
349067

FLOWN BY GEOMETRICS INT CORP  
 JOB NO : 9221, FLOWN : MARCH - APRIL 1980  
 COMPILED BY ENGINEERING COMPUTER SERVICES PTY LTD

**SHELL MINERALS (AUST)**

**MOINA - HOusetop TASMANIA**  
**RESIDUAL MAGNETIC CONTOURS 917**  
**SHEET 20/4339**

PROJ. NO. MZ 01 / 1054 DATE: 21-OCT-80



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER : G-803 PROTON PRECESSION RECORDING TO 1.0 nT  
 SPECTROMETER : EXPLORANIUM DCRS, VOLUME 1024 cu in  
 DATA RECORDING : ALL DIGITAL TO MAGNETIC TAPE, ANALOGUE ON ACM-6  
 DATA RECORDING INTERVAL : 1.0 SEC., APPROX 36M LINEAR SAMPLING  
 AT MEAN GROUND SPEED OF 60 KNOTS  
 FLIGHT PATH RECORD : HULCHER 35mm TRACKING CAMERA  
 DETECTOR TERRAIN CLEARANCE : SPECTROMETER IN AIRCRAFT AT 100 metres MTC  
 MAGNETOMETER SENSOR IN TOWED BIRD  
 CABLE LENGTH 30 metres  
 NOMINAL FLIGHT LINE SPACING : 250m N-S and E-W, TIES 2.5km  
 FLIGHT LINE RECOVERY : VISUALLY TO ENLARGED RC9 PHOTOGRAPHY AT 1:20000  
 AND 1:30000

PROCESSING SPECIFICATIONS

IGRF : REMOVED, DATUM 2000 NT ADDED  
 RADIO-METRIC CORRECTIONS : COMPTON  
 BACKGROUND  
 ALTITUDE  
 GRID MESH : 50m by 50m  
 CONTOUR INTERVAL : 20 c.p.s.  
 HORIZONTAL SCALE 1 : 20000  
 SHEET 20/4339  
 GRID NOTATION REFERS TO AUSTRALIAN MAP GRID

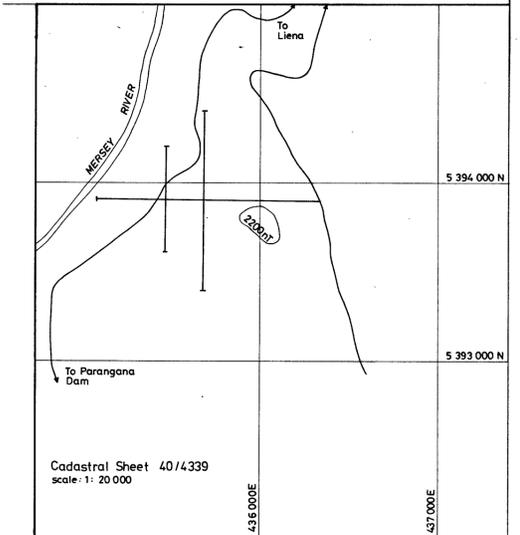
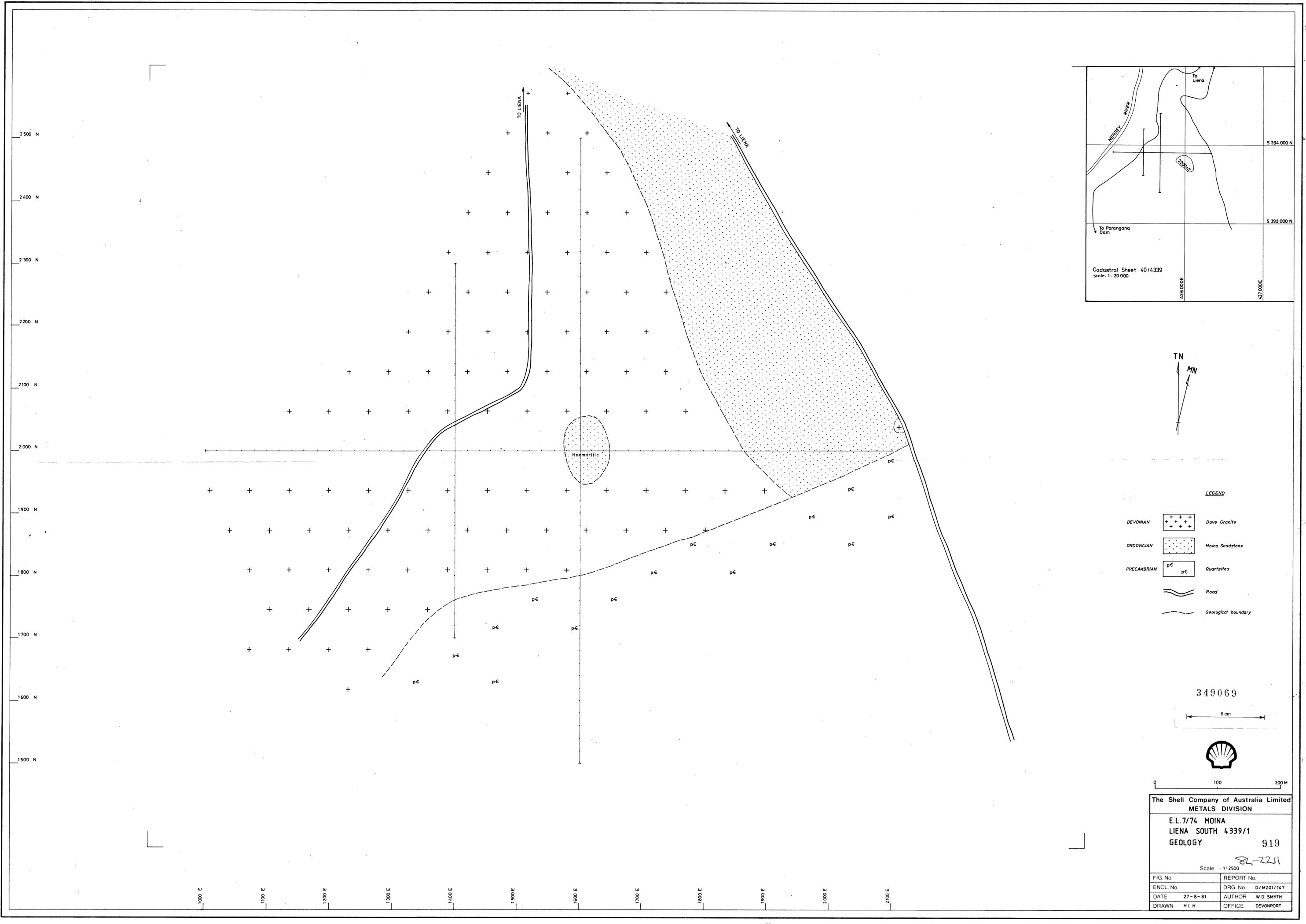


SCALE 1:20000

349068

FLOWN BY GEOMETRICS INT CORP  
 JOB NO : 9221, FLOWN : MARCH - APRIL 1980  
 COMPILED BY ENGINEERING COMPUTER SERVICES PTY LTD

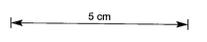
SHELL MINERALS (AUST)	
MOINA - HOUSETOP TASMANIA	918
TOTAL COUNT CONTOURS	
SHEET 20/4339	84-2211
PROJ NO. MZ01/1055	DATE: 24-JAN-81



**LEGEND**

DEVONIAN		Dove Granite
ORDOVICIAN		Maina Sandstone
PRECAMBRIAN		Quartzites
		Road
		Geological boundary

349069



0 100 200 M

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA LIENA SOUTH 4339/1 GEOLOGY 919	
Scale 1: 2500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/147
DATE 27-8-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT

LINE 2000 N

63 500 nT

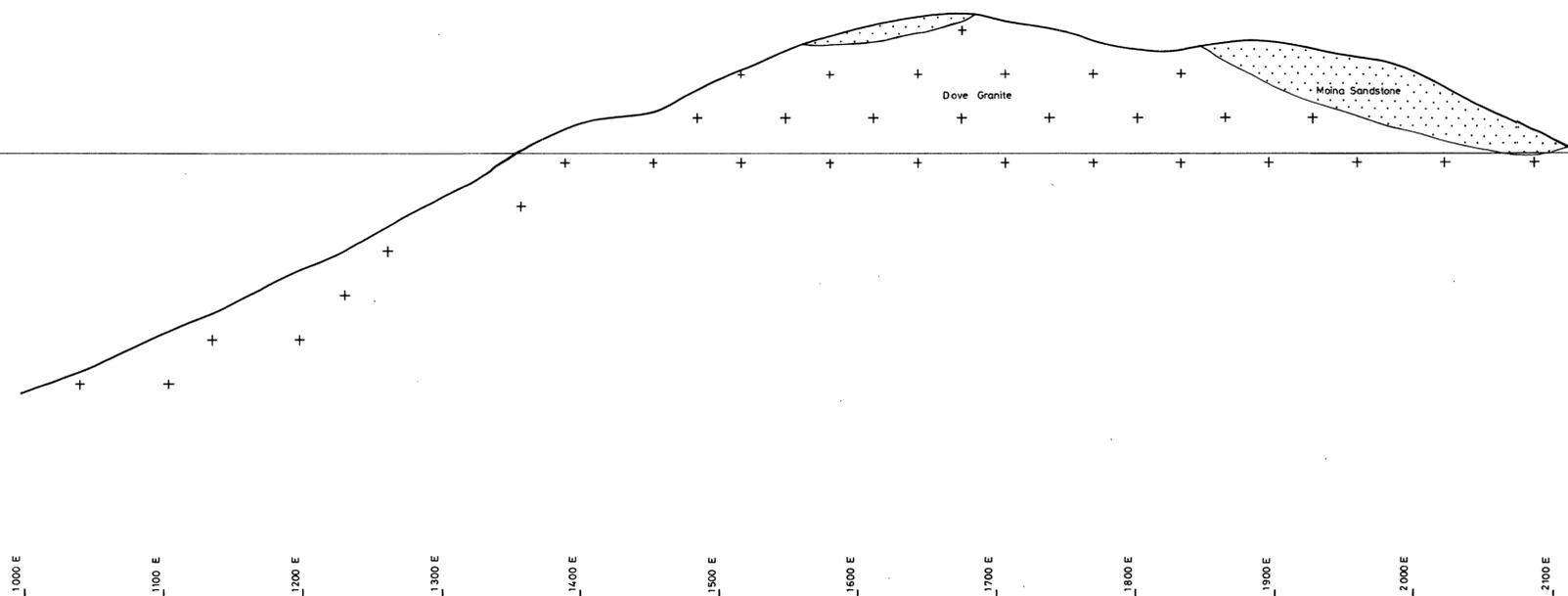
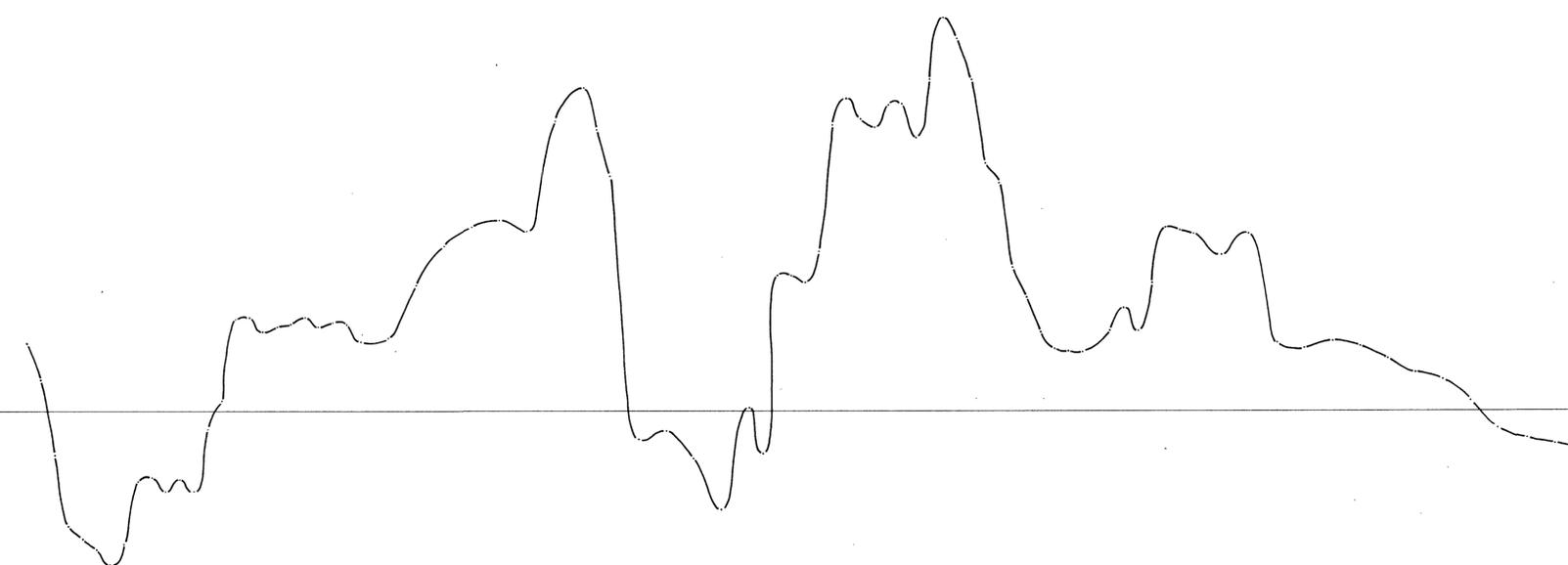
63 000 nT

62 500 nT

62 000 nT

61 500 nT

LINE 2000 N



349070



0 100 200 M

The Shell Company of Australia Limited  
METALS DIVISION

E.L. 7/74 MOINA  
LIENA SOUTH  
LINE 2000 N  
MAGNETIC PROFILE 920

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/125
DATE 10-8-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT

Scale: 1cm = 100 nT VERTICAL  
1:2500 HORIZONTAL



LINE 1600 E

LINE 1600 E

LINE 1400 E

LINE 1400 E

2500 N  
2400 N  
2300 N  
2200 N  
2100 N  
2000 N  
1900 N  
1800 N  
1700 N  
1600 N  
1500 N

61500 nT

62000 nT

62500 nT

63000 nT

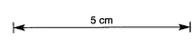
61500 nT

62000 nT

62500 nT

63000 nT

349071



0 100 200 M

The Shell Company of Australia Limited  
METALS DIVISION

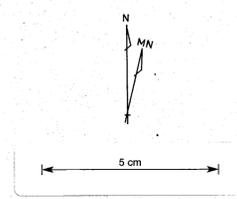
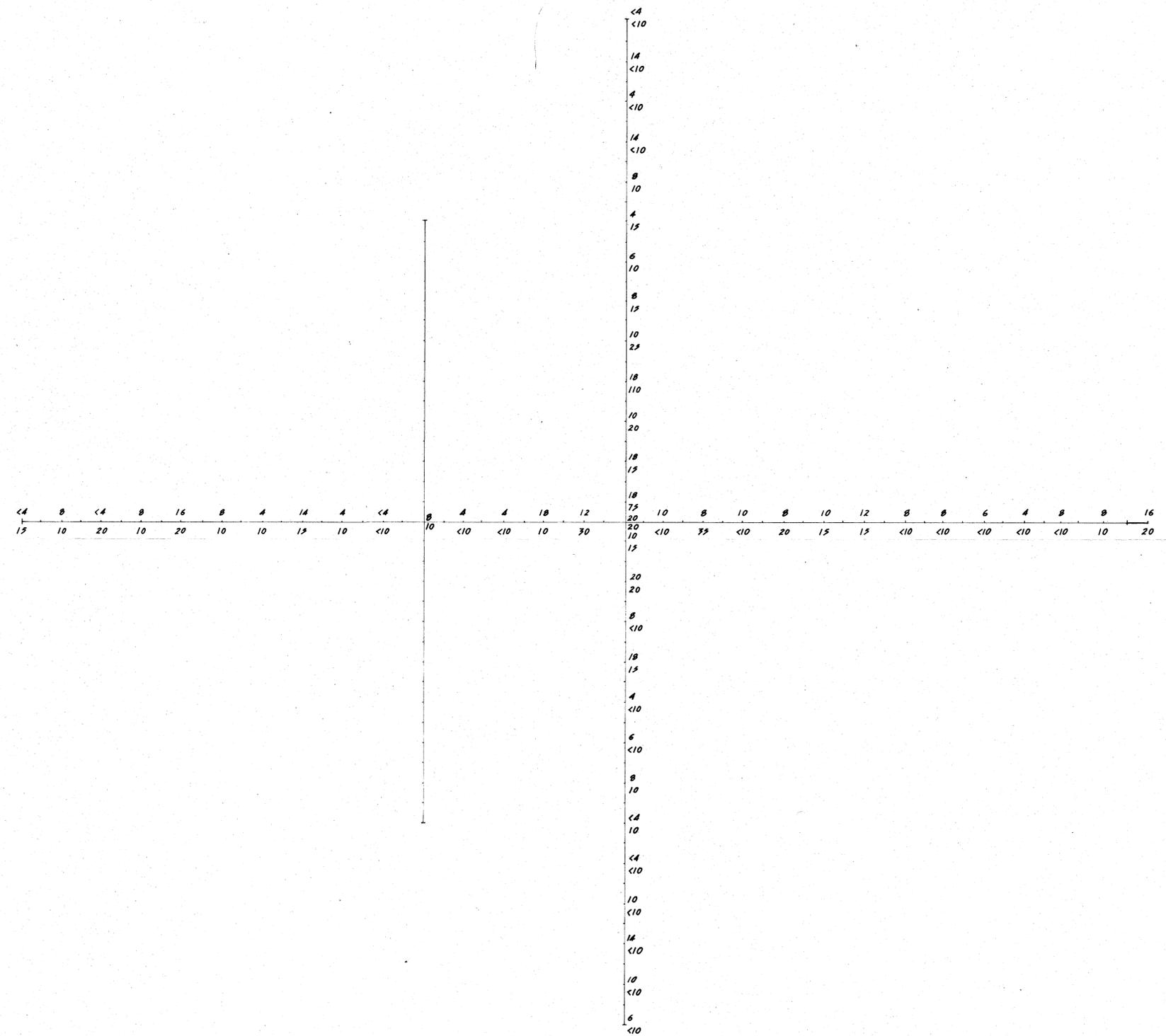
E.L. 7/74 MOINA  
LIENA SOUTH 921  
LINES 1400 + 1600 E  
MAGNETIC PROFILES

84-2211 Scale 1cm = 100 nT VERTICAL  
1:2500 HORIZONTAL

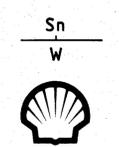
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/126
DATE 10-8-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT



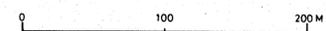
2500 N  
2400 N  
2300 N  
2200 N  
2100 N  
2000 N  
1900 N  
1800 N  
1700 N  
1600 N  
1500 N



NOTE: Analyses in ppm.



349073



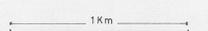
The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA LIENA SOUTH SOIL SAMPLING Sn, W.	
FIG. No. SL-2211	REPORT No. 923
ENCL. No.	DRG. No. D/M201/122
DATE 4-8-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT



Sample No's	Results			
	Cu	Pb	Zn	Mn
5651	4	12	14	105
5652	4	4	2	16
5653	2	28	40	95
5654	<2	16	85	80
5655	2	8	16	44
5656	2	12	20	80
5657	4	10	14	120
5658	4	10	20	85
5660	6	6	12	90
5661	6	4	12	90
5662	8	6	16	65
5663	8	<4	6	175
5664	14	<4	14	70
5665	6	<4	10	90
5666	6	6	20	65
5667	6	6	40	95
5670	8	4	44	100
5671	8	<4	16	75
5672	6	6	10	210
5673	4	4	12	95
5674	4	<4	8	65
5675	6	<4	14	105
5676	4	6	10	110
5677	4	4	8	95
5678	2	<4	8	110
5679	4	4	26	165
5680	4	<4	8	65
5681	4	<4	8	60
5682	6	4	14	145
5683	4	<4	8	80
5684	4	4	12	90
5685	4	4	10	115
5692	12	12	12	160
5693	12	16	8	110
5694	10	22	10	90



SS entered into database  
Survey No 334



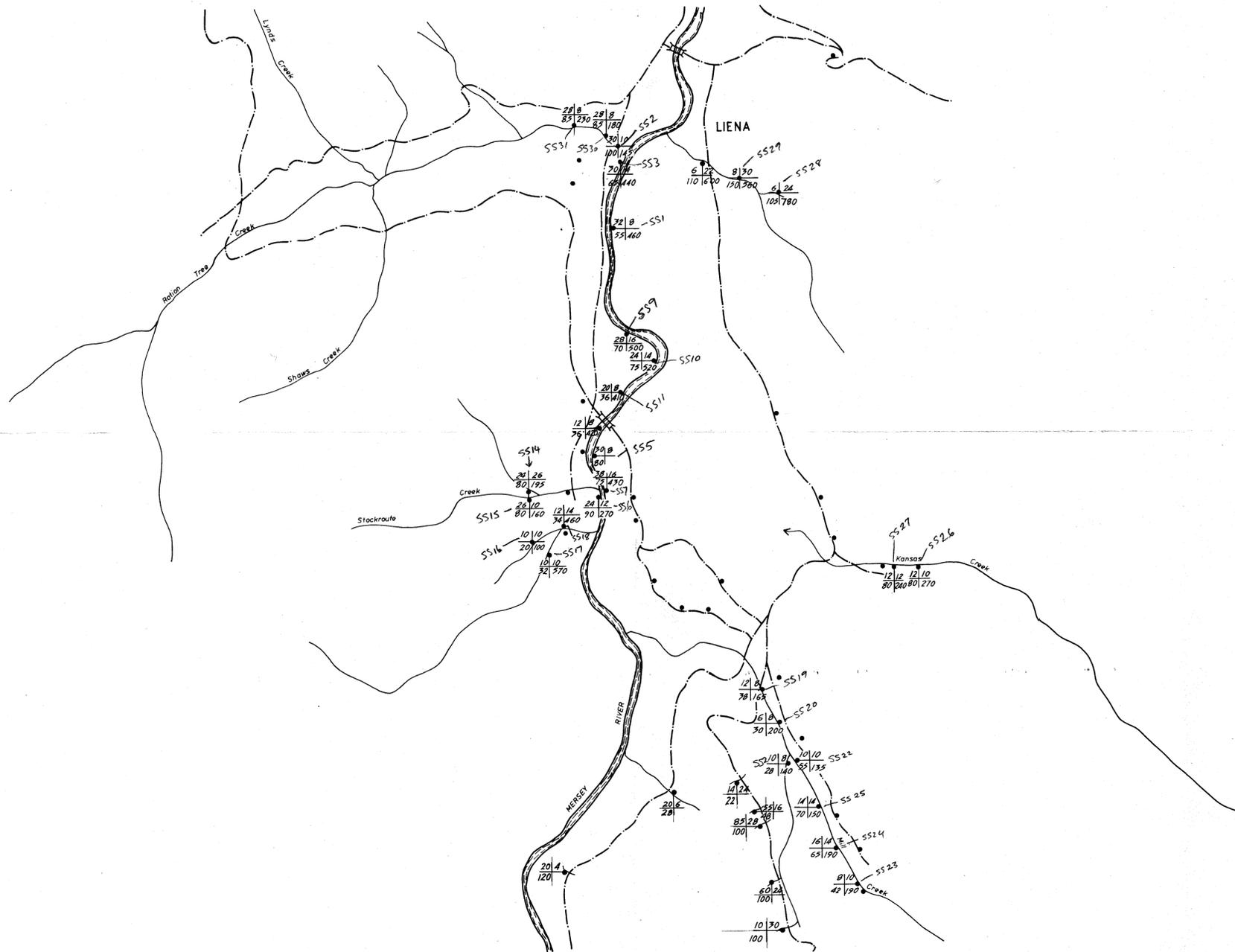
349074

The Shell Company of Australia Limited  
METALS DIVISION

E.L. 7/74 MOINA  
LIENA AREA  
Stream sediment & rock  
chip sampling.

FIG. No. 84-2211 Scale 1:20 000 REPORT No. 926

ENCL. No.	DRG. No. D/MZ01/108 B
DATE 22-6-81	AUTHOR W.D. SMYTH.
DRAWN	OFFICE DEVONPORT



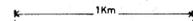
Cu Pb  
Zn Ba



**LEGEND**

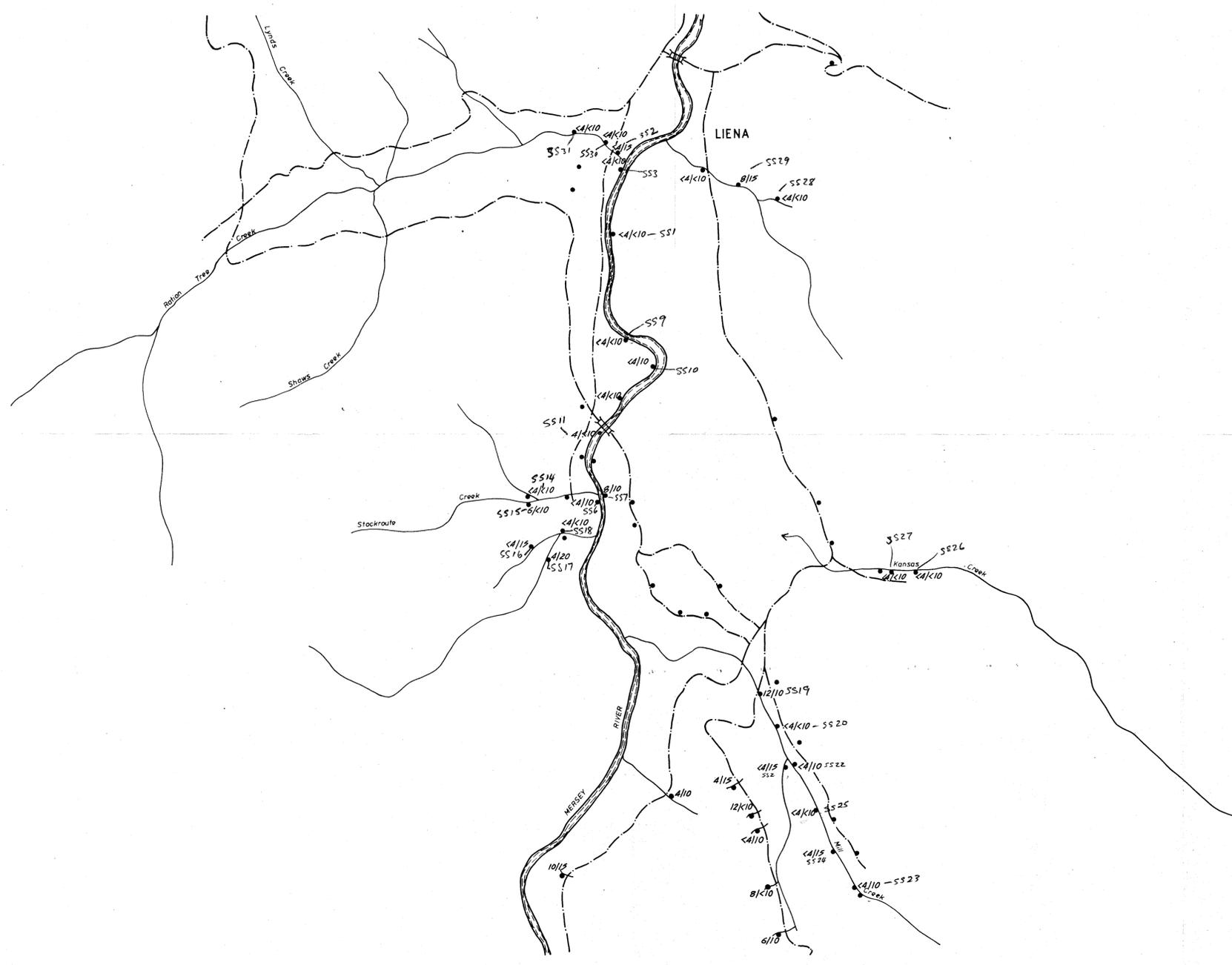
- CREEK
- RIVER
- ROADS

NOTE: Analyses in ppm.  
-80 #



*SS Entered into database  
Survey No 334*

The Shell Company of Australia Limited METALS DIVISION	
E.L. 774 MOINA LIENA AREA Stream sediment sample assay results - Cu, Pb, Zn, Ba.	
FIG No. 84-2211	Scale 1:20000
ENCL No.	DRG No. D/M201/123
DATE 5-8-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT



Sn/W

**LEGEND**

-  CREEK
-  RIVER
-  ROADS

NOTE Analyses in ppm.  
-80 #

*SS Entered into database  
Survey No 334*

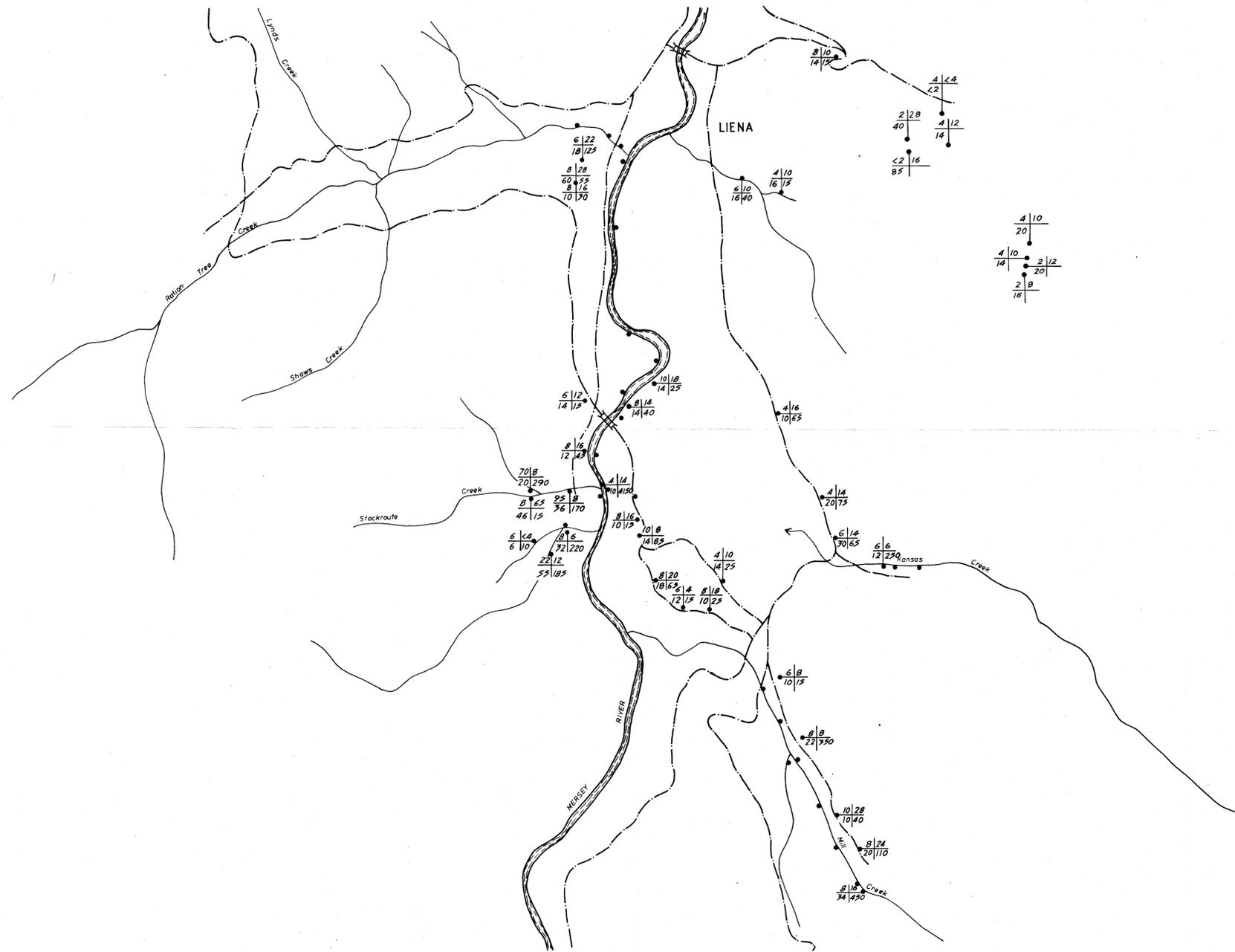


1km

349076

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA LIENA AREA Stream sediment sample assay results - Sn,W.	
FIG. No. 84-2211	Scale 1:20000
ENCL. No.	REPORT No. 925
DATE 6-8-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT

5 cm



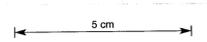
Cu Pb  
Zn Ba



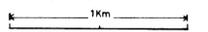
**LEGEND**

-  CREEK
-  RIVER
-  ROADS

NOTE: Analyses in ppm.

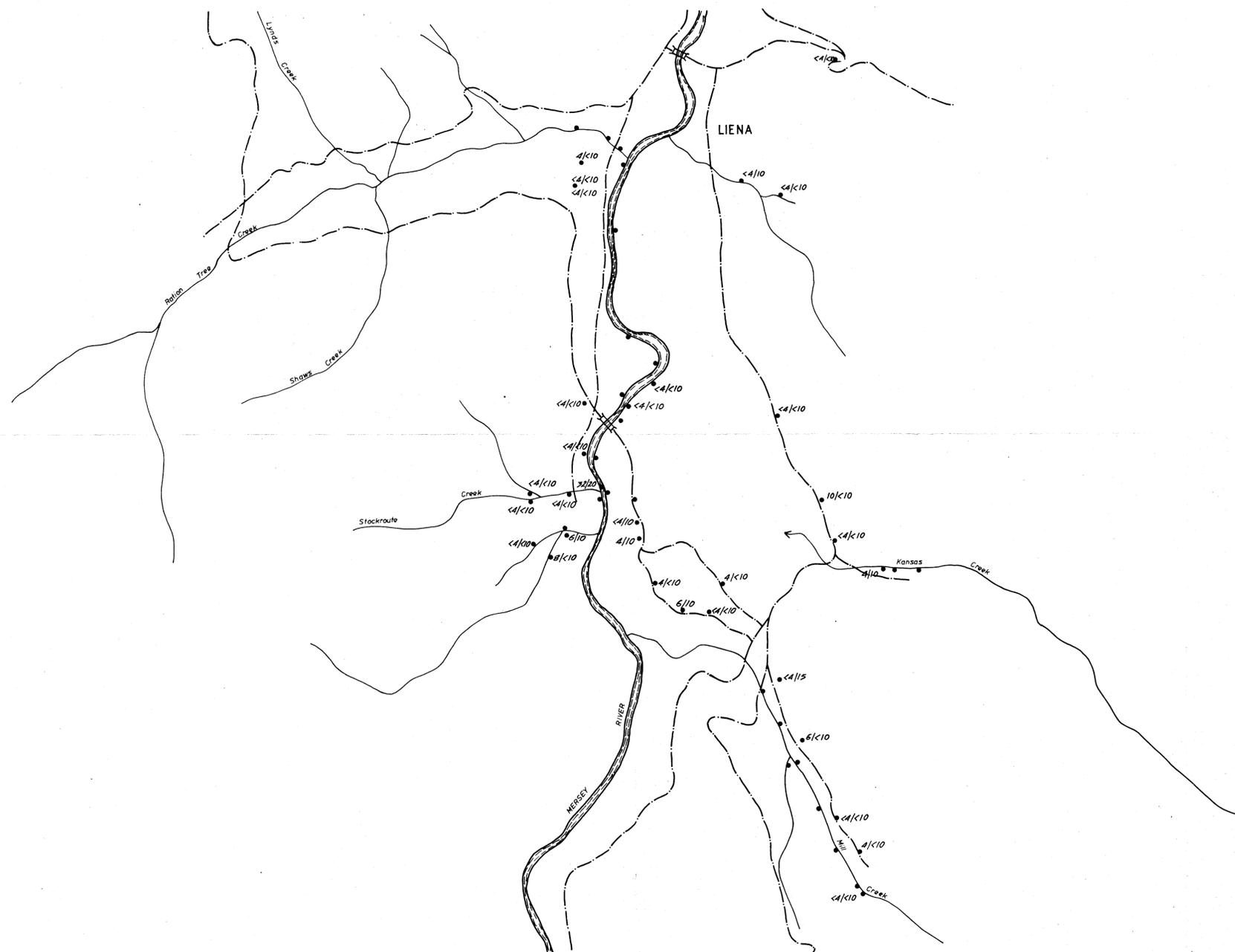


349077



RC 19  
22 | 4  
8 | 20  
RC 32  
22 | 65  
14 | 55

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7174 MOINA LIENA AREA Rock chip assay results - Cu, Pb, Zn, Ba.	
FIG No. 84-2211	Scale: 1:20000
ENCL. No.	REPORT No. 927
DATE 11-8-81	DRG. No. D/MZ01/127
DRAWN H.L.H.	AUTHOR W.D. SMYTH
	OFFICE DEVONPORT



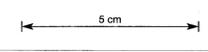
Sn/W



**LEGEND**

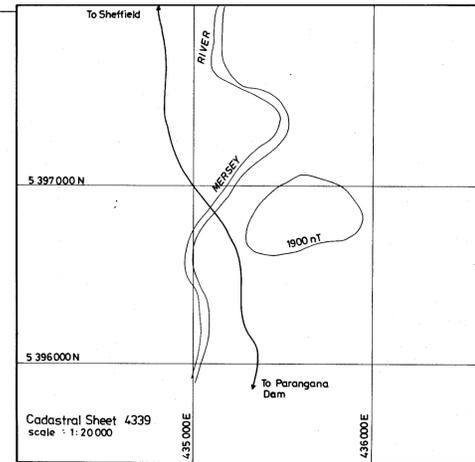
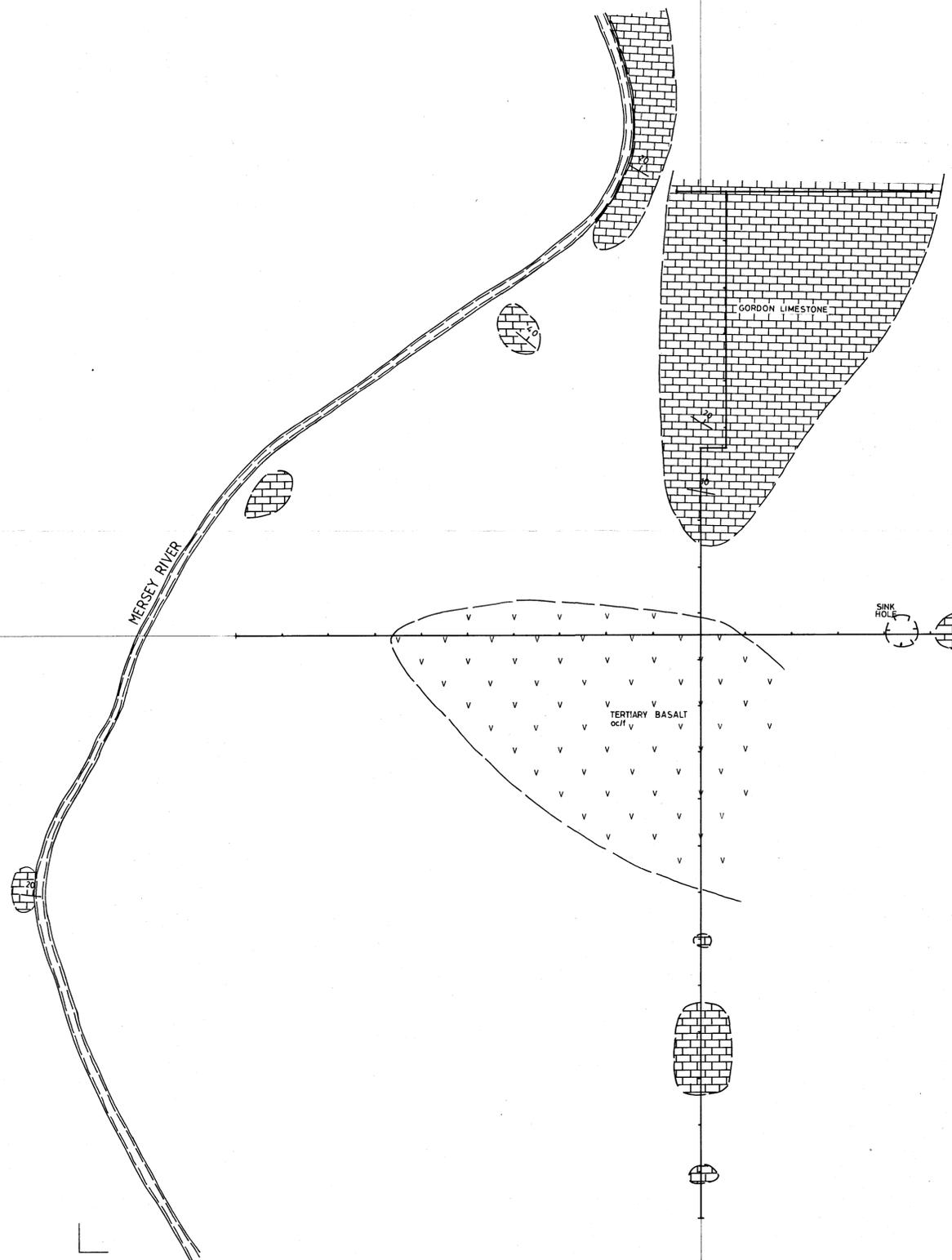
-  CREEK
-  RIVER
-  ROADS

349078



RC 19  
22/15  
RC 32  
4/k10

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA LIENA AREA Rock chip assay results - Sn, W.	
FIG No. 84-2211	REPORT No. 928
ENCL No.	DRG. No. D/M201/128
DATE 11-8-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT



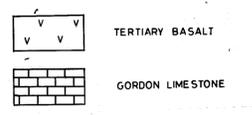
2380 N

2000 N

1500 N

349079

LEGEND



5 cm



oc/f = outcrop float



0 100 200M

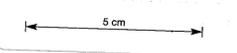
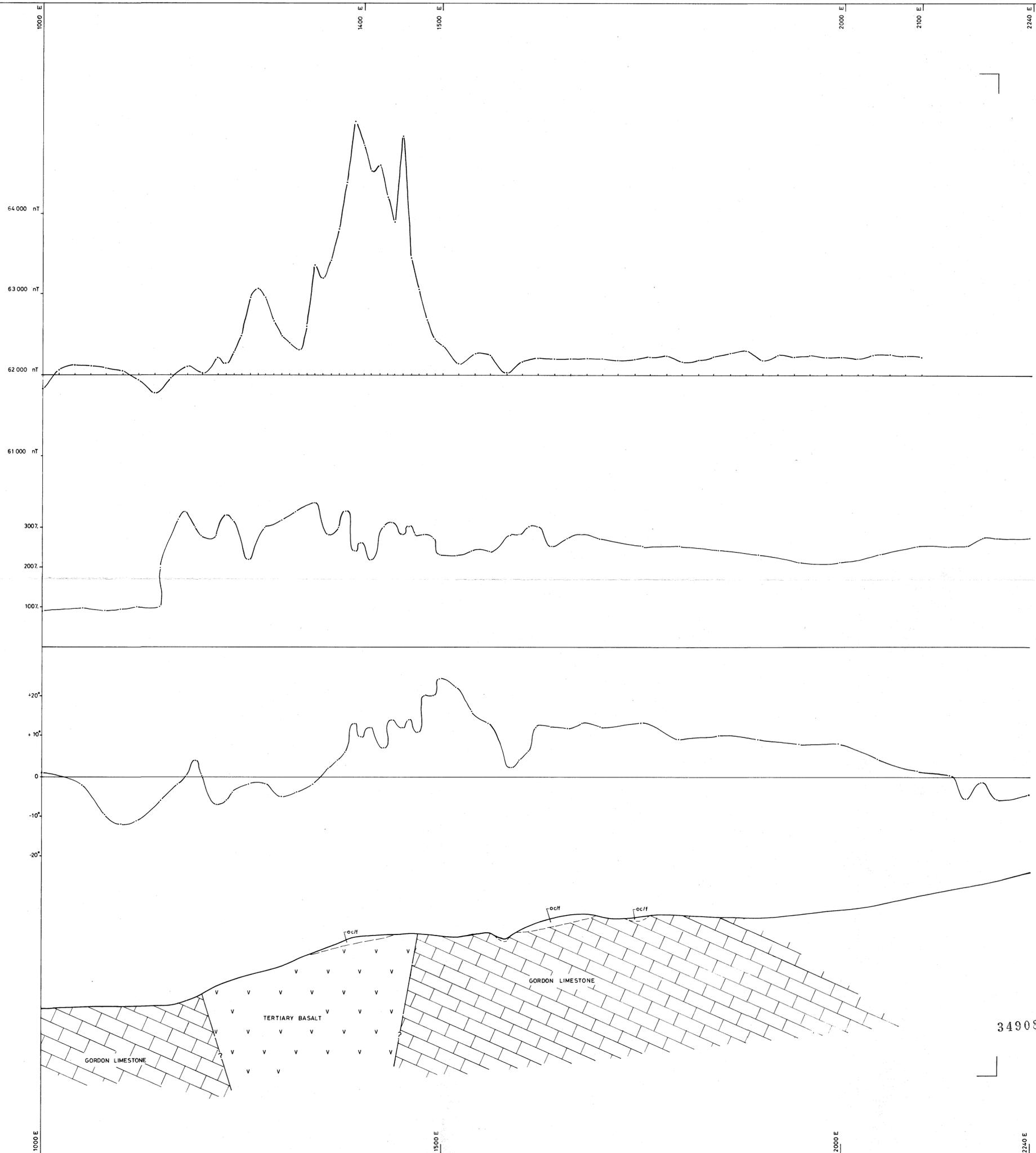
The Shell Company of Australia Limited  
METALS DIVISION

MOINA E.L. 7/74  
LIENA ANOMALY (4339/2)  
GEOLOGY

8L-2211 Scale 1:2500 929

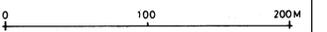
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/M201/104
DATE 5-6-81	AUTHOR W.D. SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT.

V.L.F.



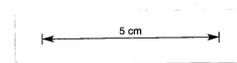
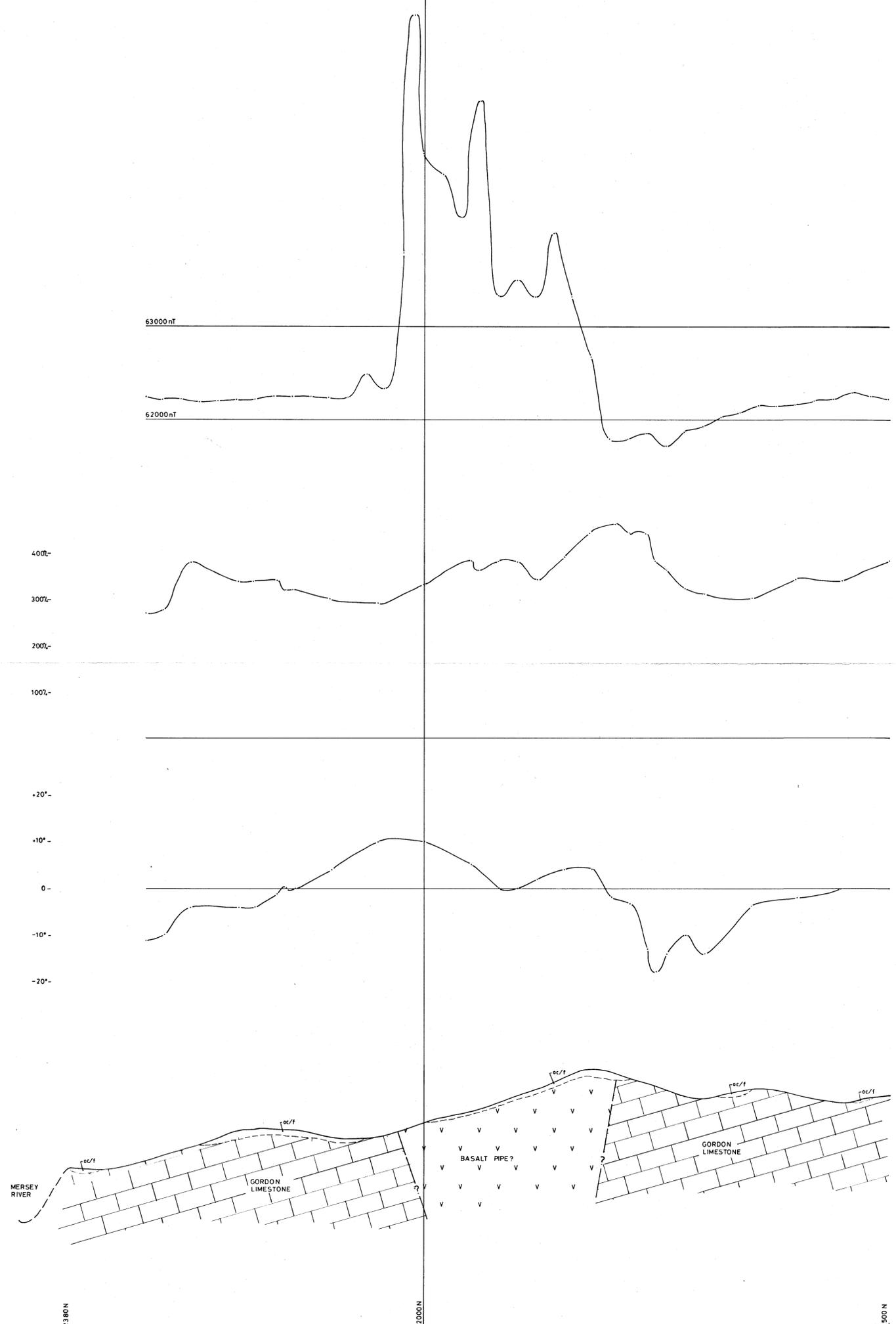
25nT = 1cm vert

ocf = outcrop float



349080

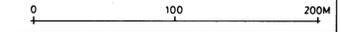
The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA LIENA ANOMALY 4339/2 LINE 2000N GEOLOGY, V.L.F., MAGNETICS.	
FIG. No. 84-2211	Scale 1:2500
ENCL. No.	REPORT No. 930
DATE 19-5-81	DRG. No. D/MZ01/085
DRAWN H.L.H.	AUTHOR W.D. SMYTH
	OFFICE DEVONPORT



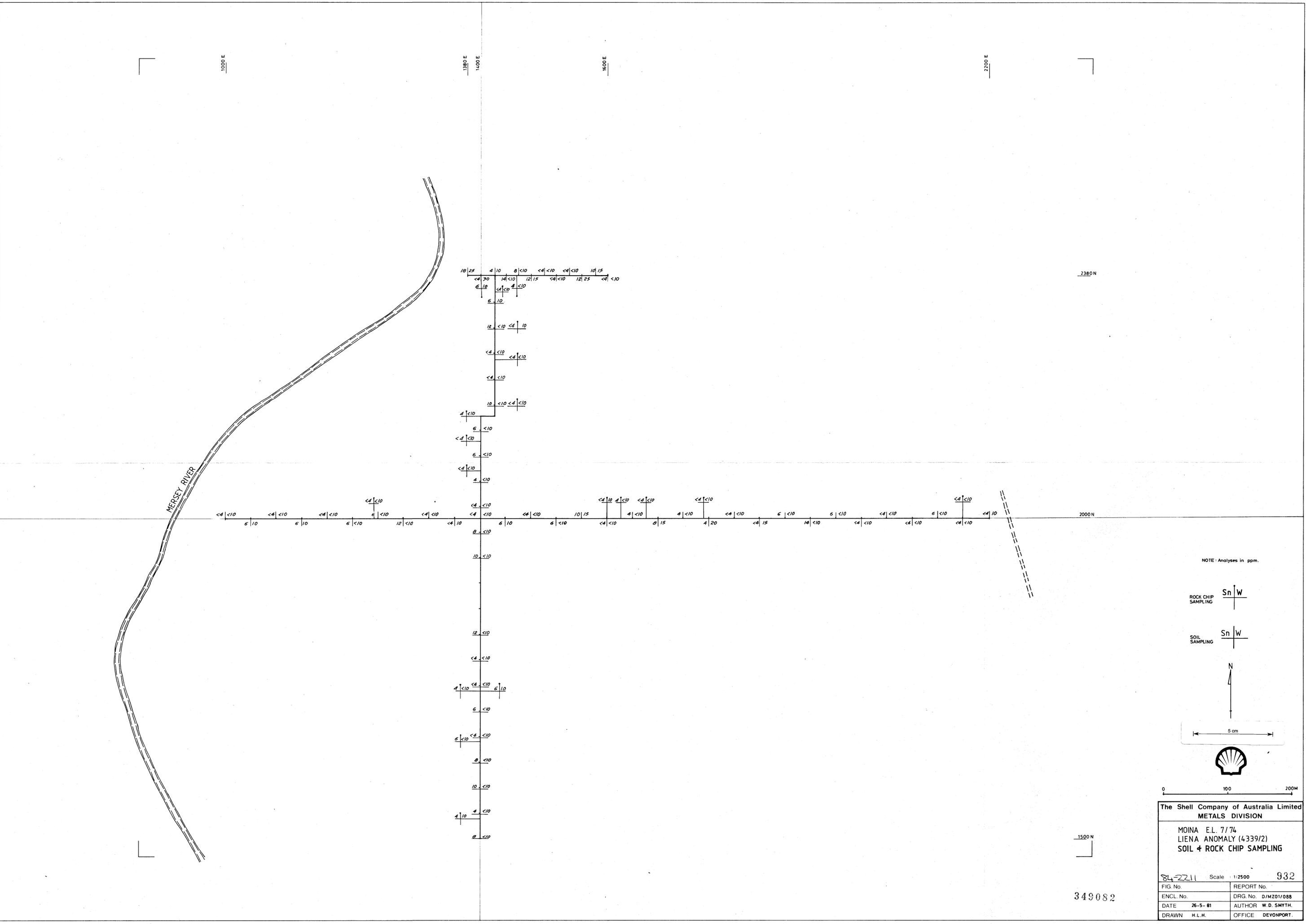
oc/f = outcrop float



349081



The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA LIENA ANOMALY 4339/2 LINE 1400 E GEOLOGY, V.L.F., MAGNETICS.	
84-2211	Scale 1:2500
FIG. No.	REPORT No. 931
ENCL. No.	DRG. No. DMZ01/086
DATE 20-5-81	AUTHOR W.D. SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT



MERSEY RIVER

18	25	4	10	8	<10	<4	<10	<4	<10	10	15
<4	<10	14	<10	12	15	<4	<10	12	25	<4	<10
6	10	<4	<10	<4	<10						
6	10										
12	<10	<4	10								
<4	<10	<4	<10								
<4	<10										
10	<10	<4	<10								
<4	<10										
6	<10										
<4	<10										
6	<10										
<4	<10										
6	<10										
<4	<10										
6	<10										
12	<10										
<4	<10										
4	<10	<4	<10	6	10						
6	<10										
6	<10	<4	<10								
6	<10										
10	<10										
4	10										
6	<10										
6	<10										
10	<10										
4	10										
6	<10										

NOTE: Analyses in ppm.

ROCK CHIP SAMPLING Sn W

SOIL SAMPLING Sn W



5 cm



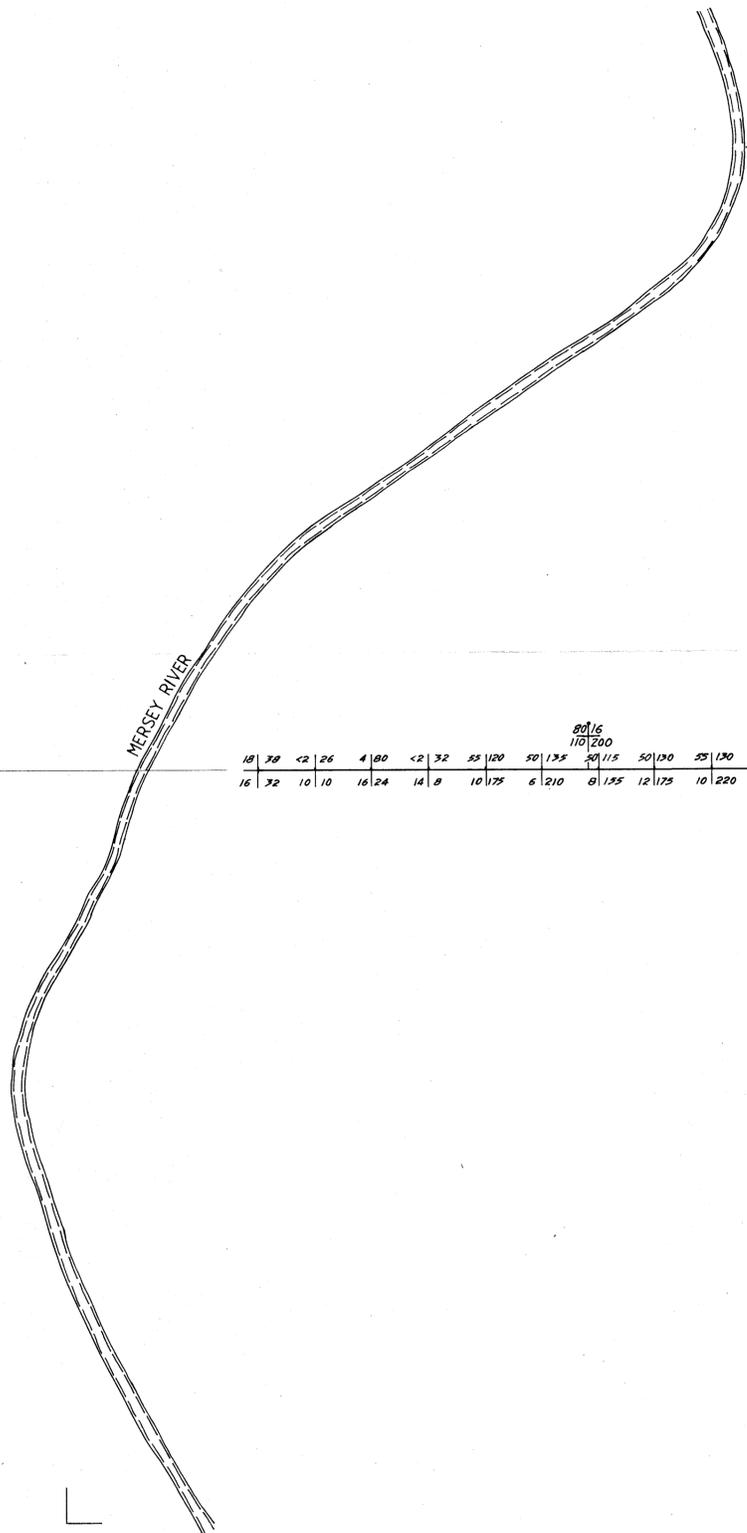
0 100 200M

The Shell Company of Australia Limited  
METALS DIVISION

MOINA E.L. 7/74  
LIENA ANOMALY (4339/2)  
SOIL & ROCK CHIP SAMPLING

84-2211	Scale 1:2500	932
FIG. No.	REPORT No.	
ENCL. No.	DRG. No. D/MZ01/088	
DATE 26-5-81	AUTHOR W.D. SMYTH.	
DRAWN H.L.H.	OFFICE DEVONPORT.	

349082



18	130	18	120	16	170	8	50	16	48	12	50		
28	44	24	32	24	20	12	20	16	20	28	32	20	32
18	250	24	240	12	90	10	165	18	90	4	16		
32	48	85	36	70	32	12	28	28	28	<	4	8	
6	32	4	14	6	14								
60	25	22	25	22	25								
<	2	3	4										
18	8												
<	2	65	4	14									
44	22	18	12										
8	60												
34	26	6	12										
		14	30										
16	20												
44	40												
12	100	4	10										
46	26	16	10										
4	12												
12	120												
12	145												
4	10	50	40										
10	10												
18	110												
50	46												
4	12												
150	10												
18	160												
18	170												
55	150												
4	230												
270													
55	120												
4	220												
50	120												
<	4	170											
14	36												
8	22												
<	2	22											
<	4	6											
65	120												
<	4	220											
38	120												
6	135	10	170	60	14								
52	125	70	160										
20	70												
22	48												
8	65												
10	18	22	34										
14	175												
22	105												
32	60												
<	2	18											
4	10												
<	2	44											
6	10	8	16										
24	20												
18	65												
14	30												

ROCK CHIP SAMPLES

Cu	Pb
Zn	Ba

NOTE: Analyses in ppm.

SOIL SAMPLES

Cu	Zn
Pb	Ni



5 cm



0 100 200M

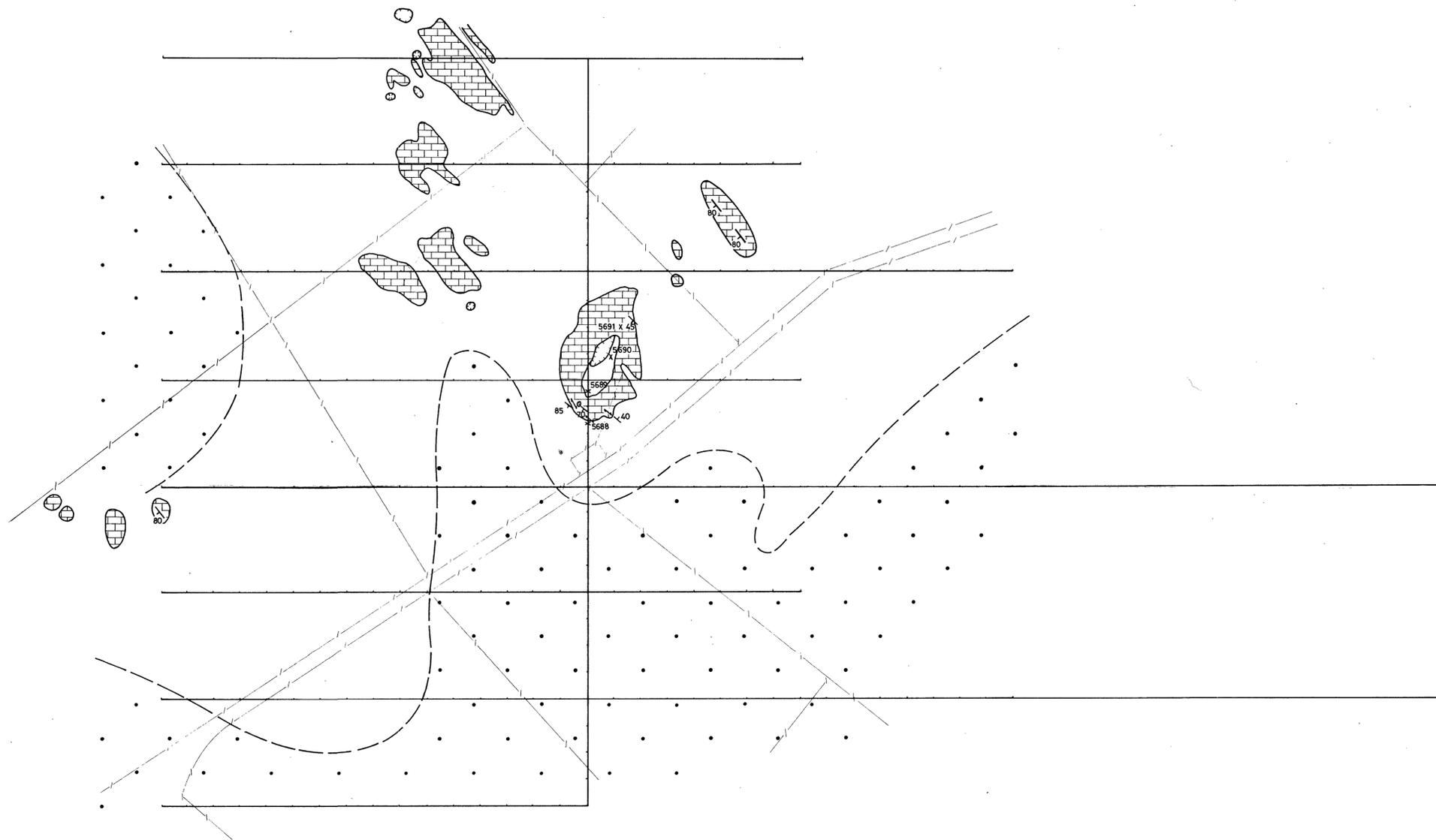
The Shell Company of Australia Limited  
METALS DIVISION

MOINA E.L. 7/74  
LIENA ANOMALY (4339/2)  
SOIL & ROCK CHIP SAMPLING

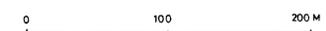
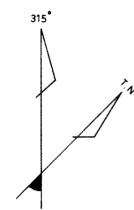
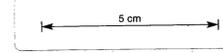
84-2211 Scale: 1:2500 933

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/M201/090
DATE 28-5-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT.

349083



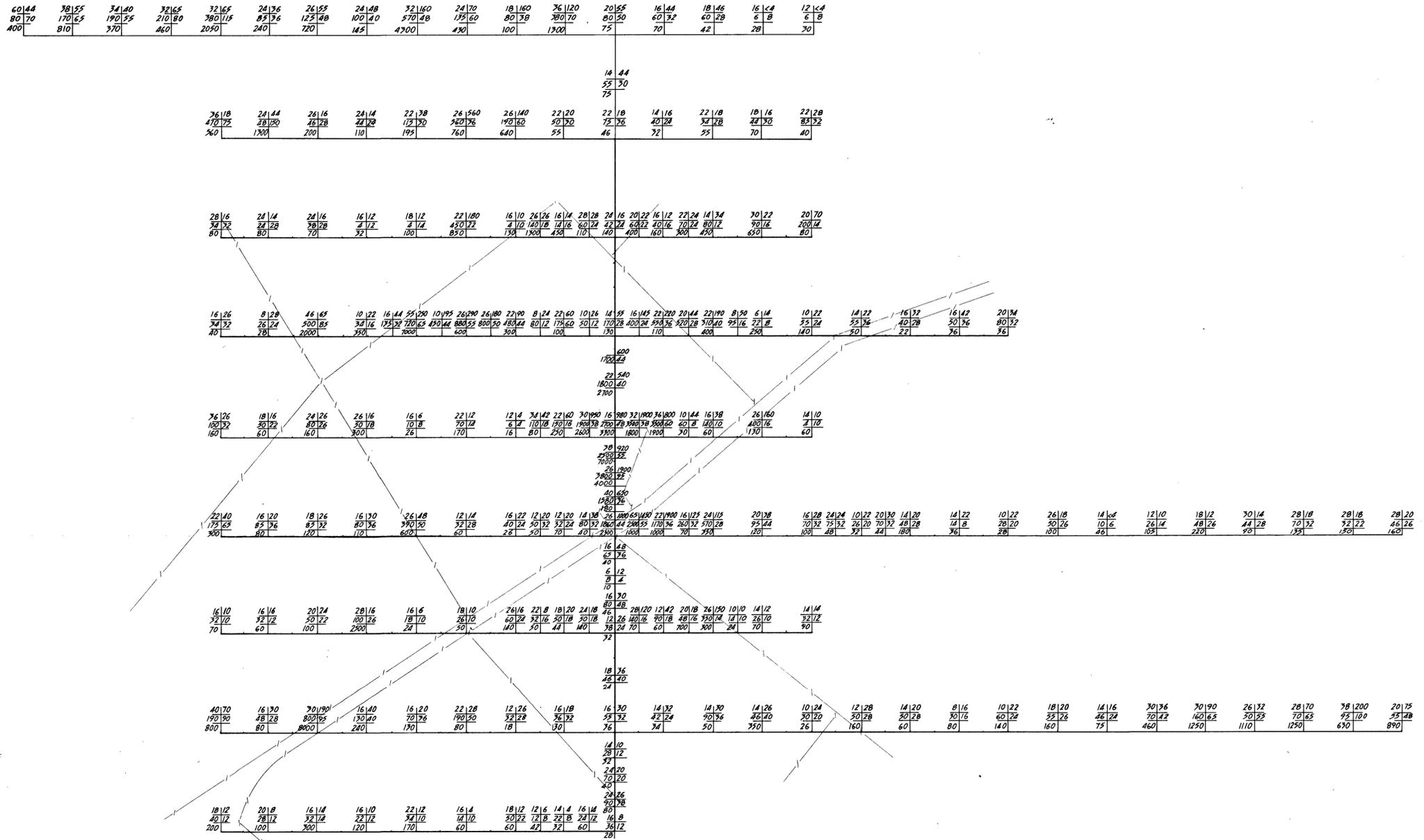
- Transported overburden / Eldon Sandstone rubble.
- Gordon Limestone
- Sinkhole



349084

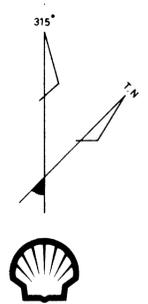
The Shell Company of Australia Limited METALS DIVISION			
E.L. 7/74 MOINA WATTLE VALLEY GRID GEOLOGY			
84-2211		Scale	1:2500
FIG. No.	REPORT No.		
ENCL. No.	DRG. No. D/MZ01/228		
DATE	4-12-81	AUTHOR	W.D. SMYTH
DRAWN	H. L. H.	OFFICE	DEVONPORT

934



Cu	Pb
Zn	Ni
Mn	

  
 Comlabs - Analyses in ppm.  
 Cu, Pb, Zn, Ni = AAS1  
 Mn = AAS2/2A



0 100 200 M

349085

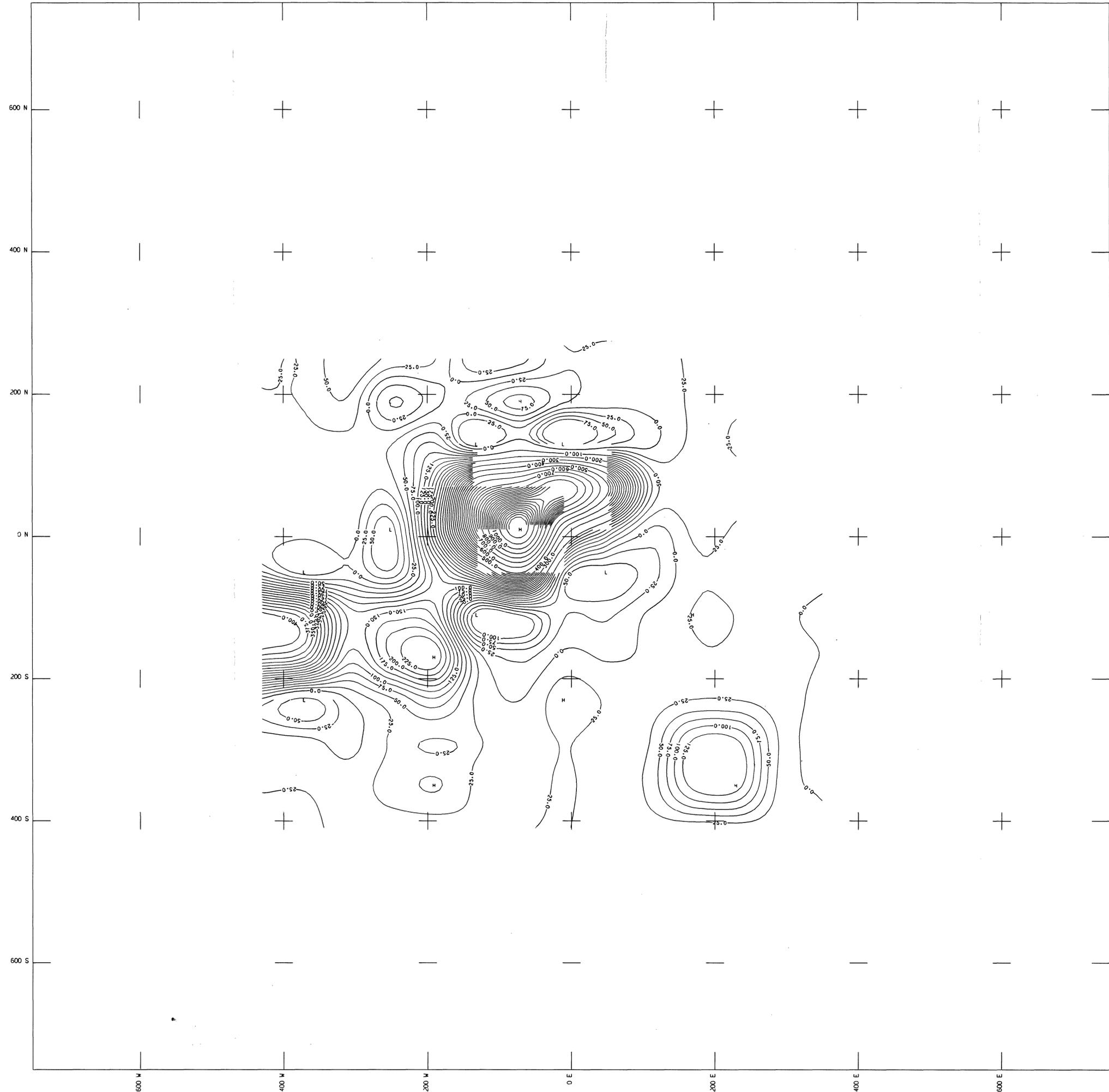
5 cm

The Shell Company of Australia Limited  
METALS DIVISION

**E.L. 7/74 MOINA**  
WATTLE VALLEY GRID  
SOIL GEOCHEMISTRY  
Cu, Pb, Zn, Ni, Mn

FIG No. 84-2211 Scale 1:2500 REPORT No. 935

ENCL. No.	DRG. No. D/MZ01/253
DATE 4-12-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT



5 cm



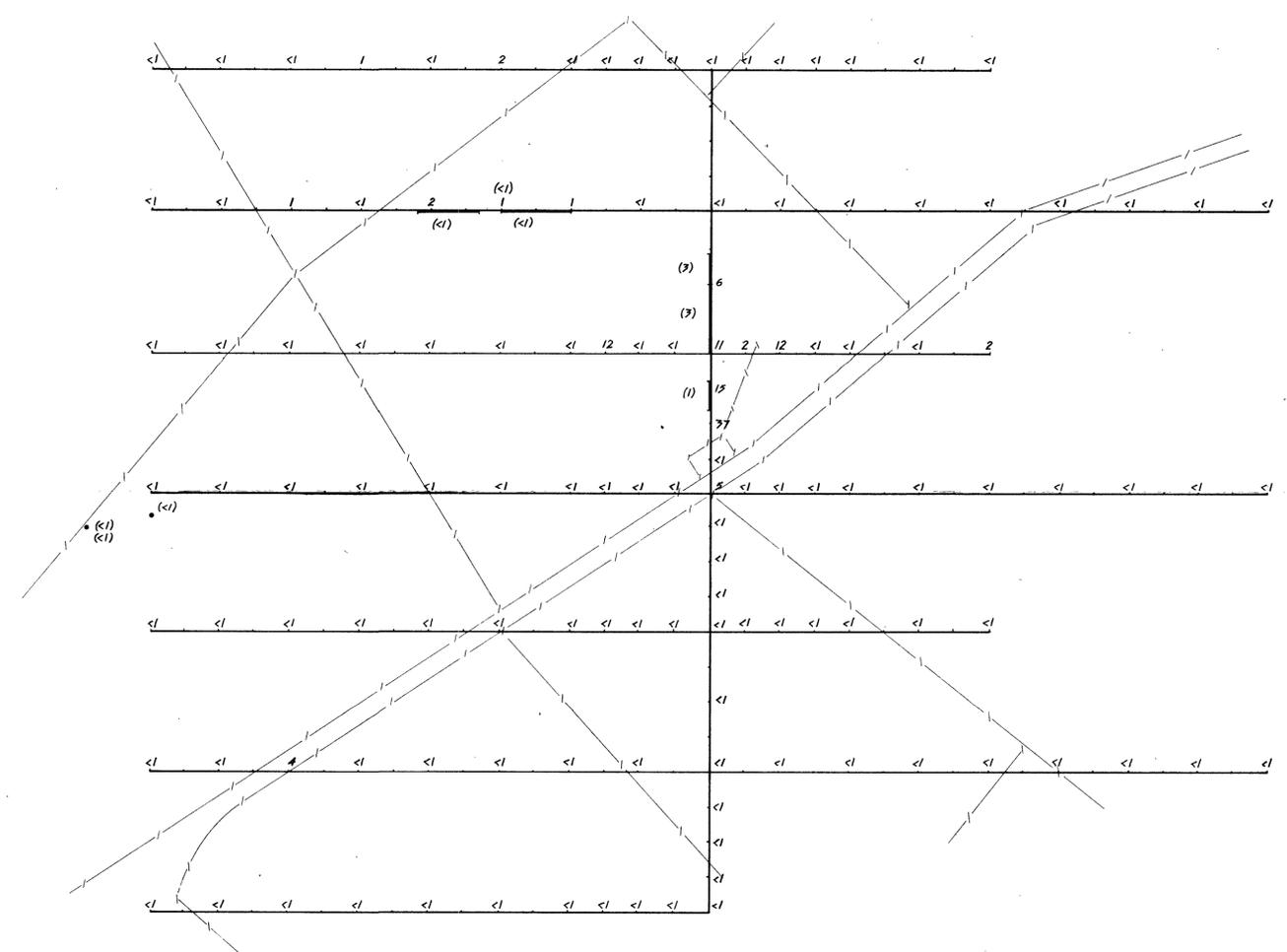
349086

SHELL COMPANY OF AUSTRALIA  
METALS DIVISION  
WATTLE VALLEY  
PB GEOCHEM

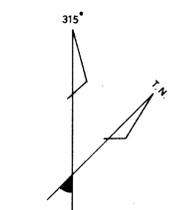
936

SCALE: 1 : 2500.	
FIG. NO:	REPT. NO:
ENCL. NO:	DRG. NO: D/M201/265
DATE:	AUTHOR:
DRAWN:	OFFICE:

400 S 200 S 00 N 200 N 400 N



AAS1 COMLABS  
 Analyses in ppm.  
 ( ) Rock chip samples.



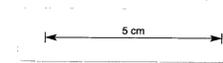
349087  
 0 100 200 M

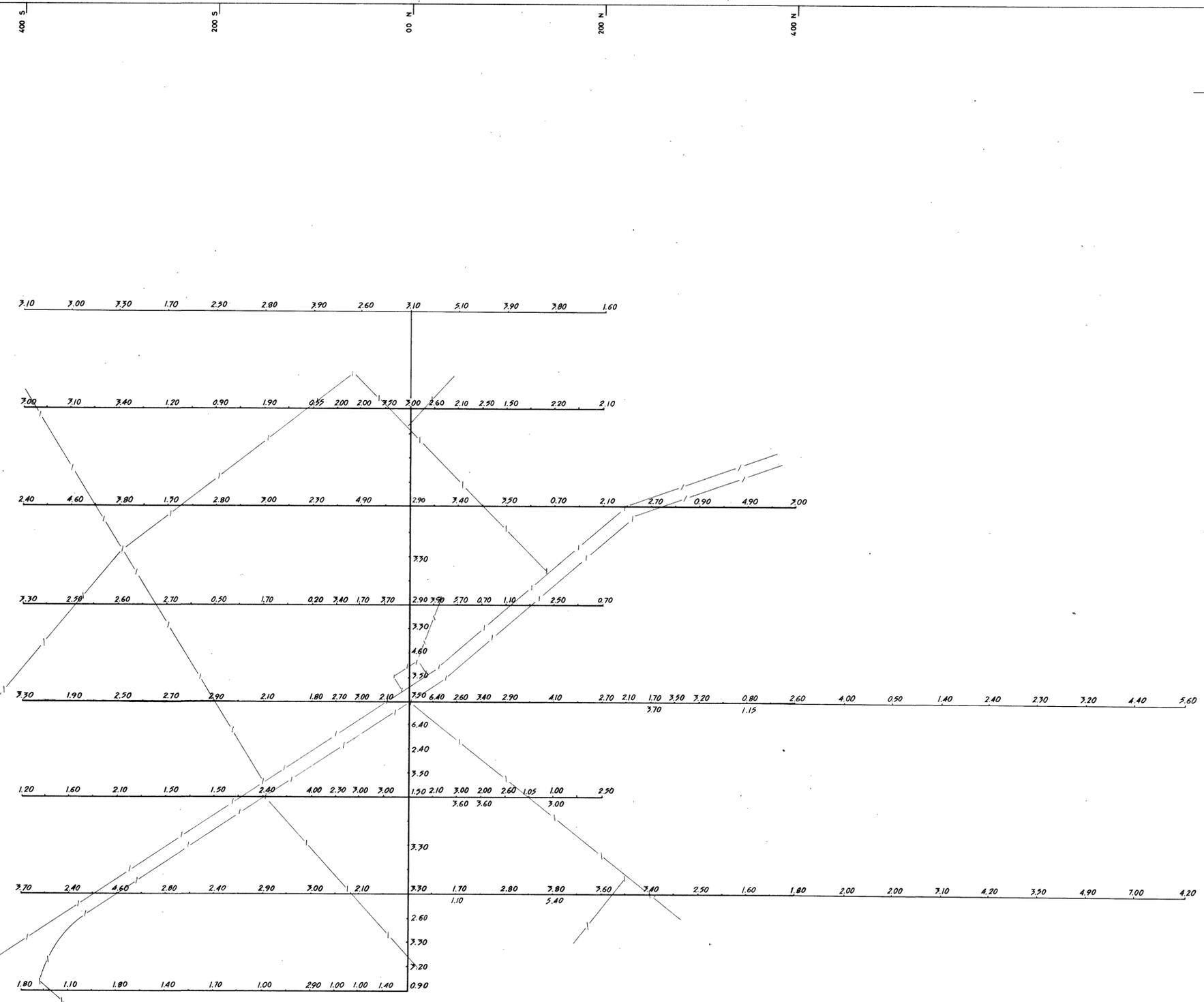
The Shell Company of Australia Limited  
 METALS DIVISION

E.L. 7/74 MOINA  
 WATTLE VALLEY GRID  
 SOIL GEOCHEMISTRY - Cd

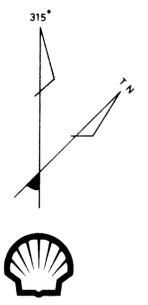
FIG. No. 24-2211 Scale 1:2500 REPORT No. 937

ENCL. No.	DRG. No. D/MZ01/221
DATE 4-12-81	AUTHOR W.D. SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT





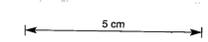
AAS 2/2A COMLABS  
Analyses in ppm.

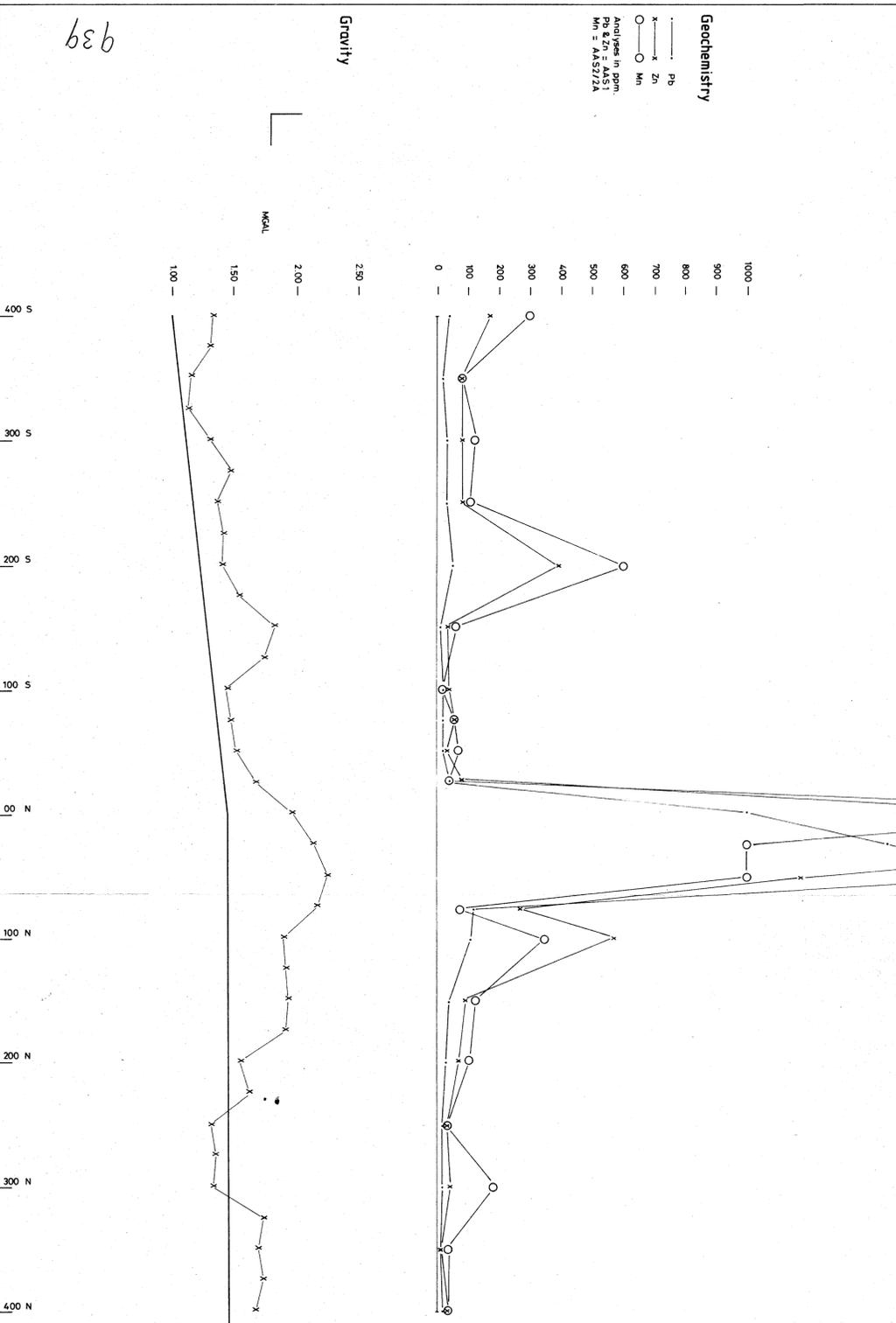
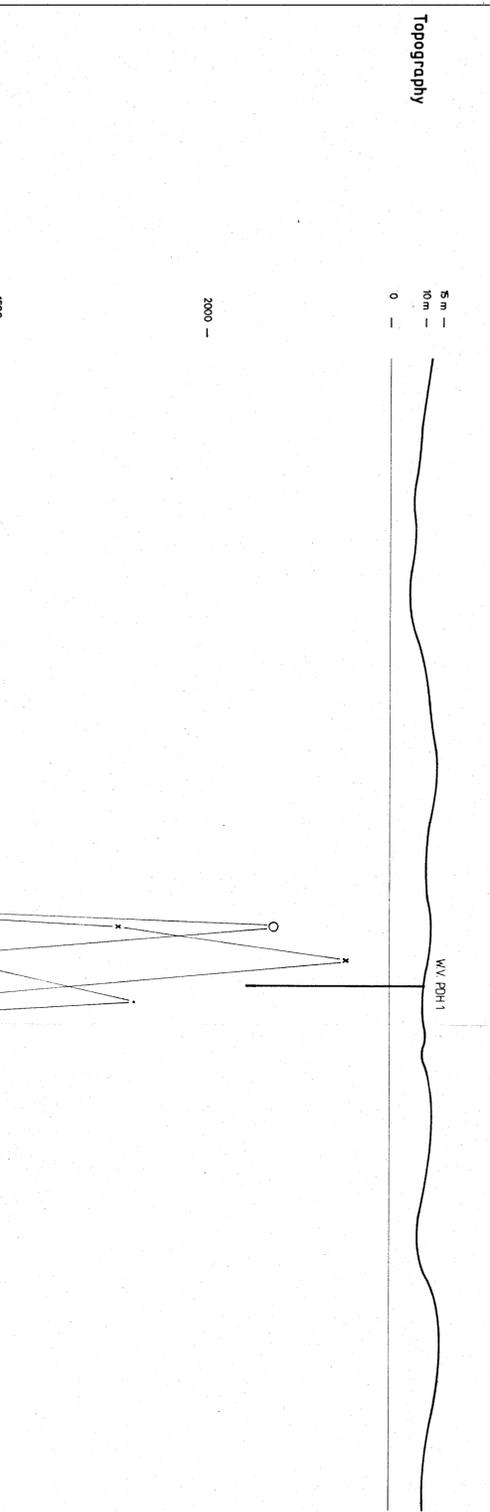
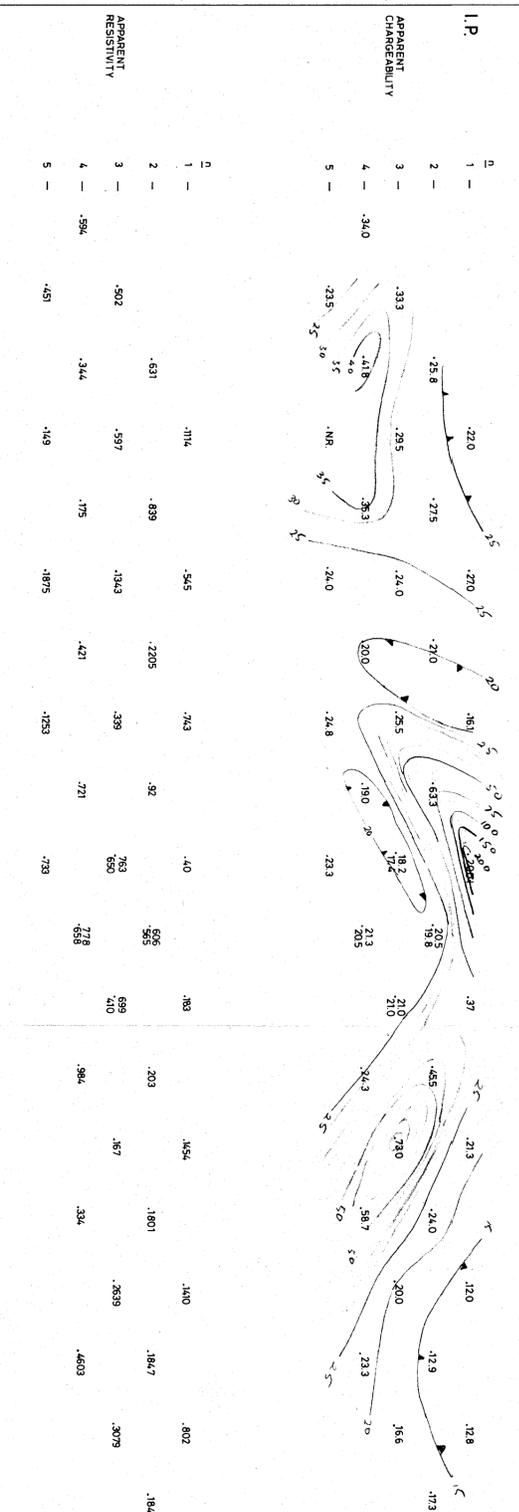
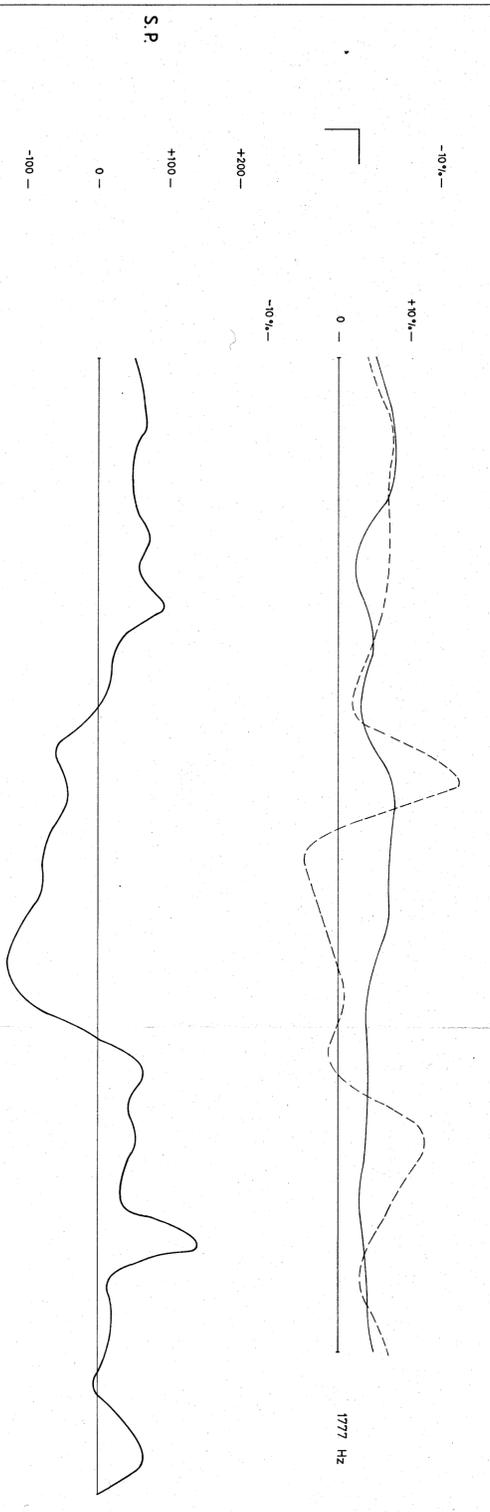
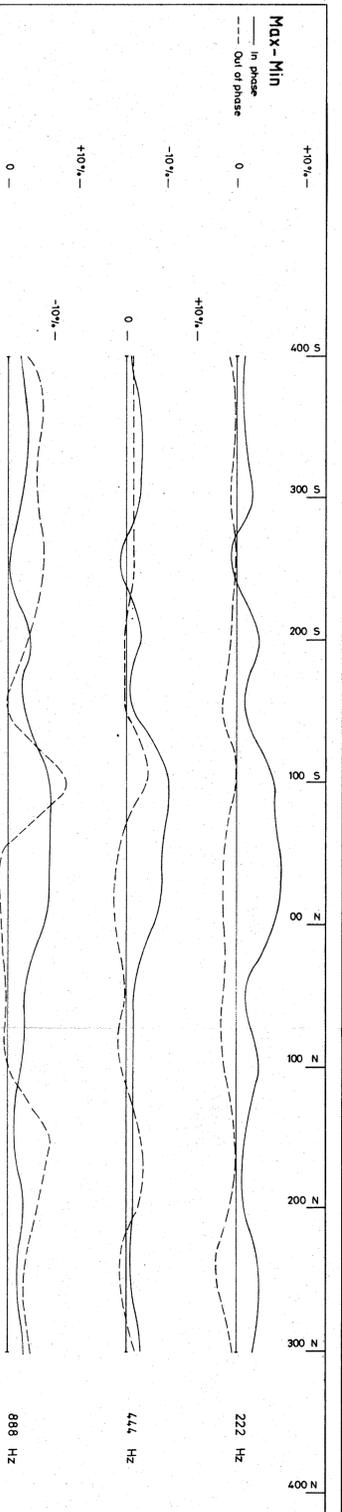


0 100 200 M

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA WATTLE VALLEY GRID SOIL GEOCHEMISTRY - %Fe	
FIG No. 34-2211	Scale 1:2500
ENCL. No.	REPORT No. 938
DATE 4-12-81	DRG. No. D/MZ01/222
DRAWN H.L.H.	AUTHOR W.D. SMYTH
	OFFICE DEVONPORT

349088





  
 The Shell Company of Australia Limited  
 METALS DIVISION  
 E.L. 7/74 MOINA  
 WATTLE VALLEY GRID  
 LINE 00m E  
 PROFILES

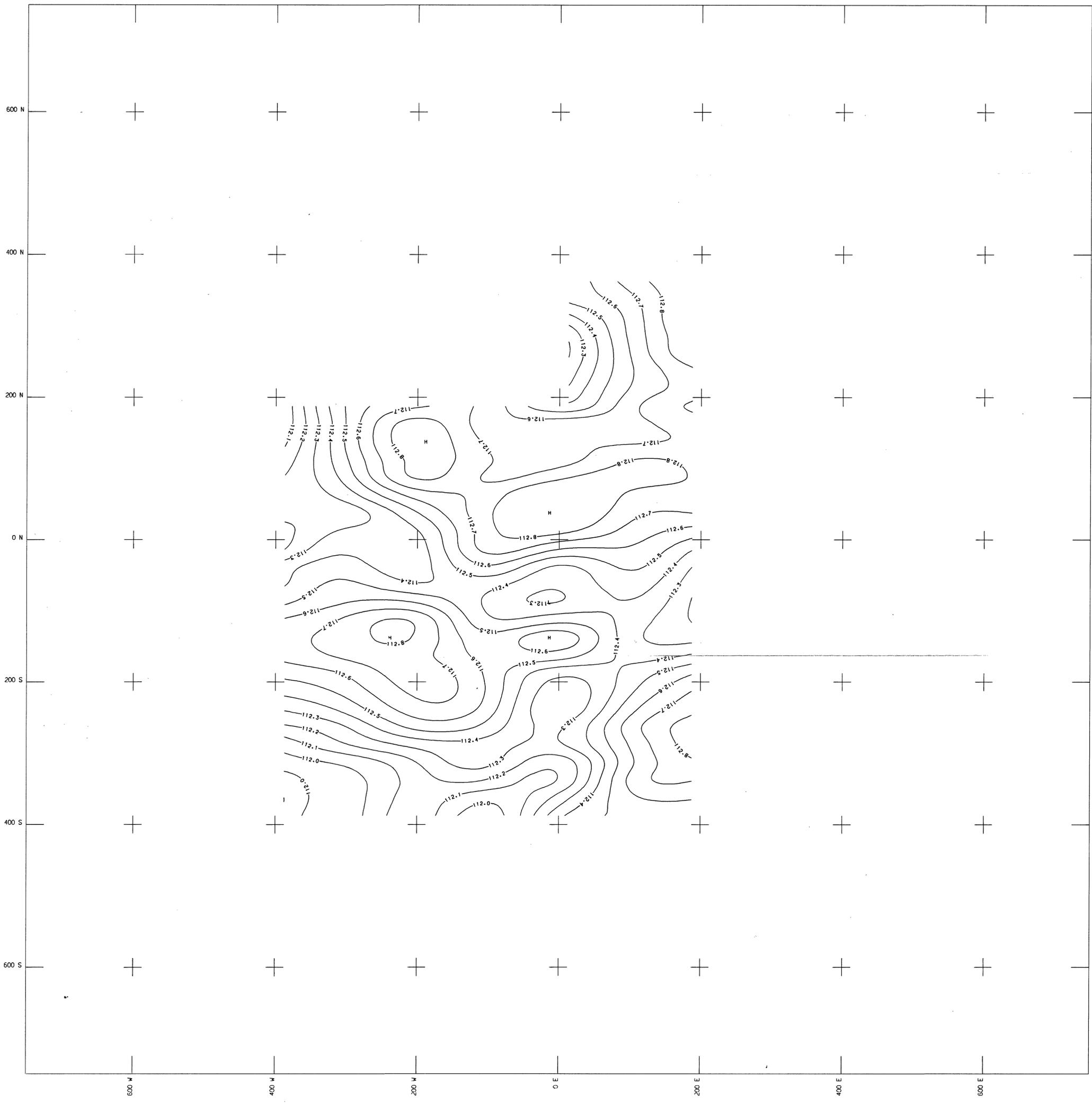
FIG. No. 349089 Scale 1:2500  
 REPORT No. 939  
 ENCL. No. DRG. No. D/M201/240  
 DATE 2-3-83 AUTHOR W.D. SMYTH  
 DRAWN H.L.H. OFFICE DEVONPORT

W.V. PDM 1

Co	Ni	Pb	Zn
20	30	5.0	1300
12	32	4.6	1350
4.4	8	1.0	1.60
4.4	16	2.0	1.60
4.4	30	1.0	7.60
4.4	90	1.0	5.40
4.4	90	1.0	5.00
4.4	14	1.2	8.00
4.4	14	1.40	4.80
4.4	16	1.10	3.80
4.4	16	2.00	10.50
4.4	14	2.10	10.50
4.4	14	1.60	7.70
4.4	14	2.10	7.80
4.4	14	2.40	2.70
4.4	12	1.90	3.20
4.4	10	1.50	3.60
4.4	12	1.00	3.60
4.4	12	1.10	4.40
4.4	12	1.2	5.40
4.4	16	1.80	4.70
4.4	16	1.45	4.20

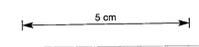
SCALE 1:500

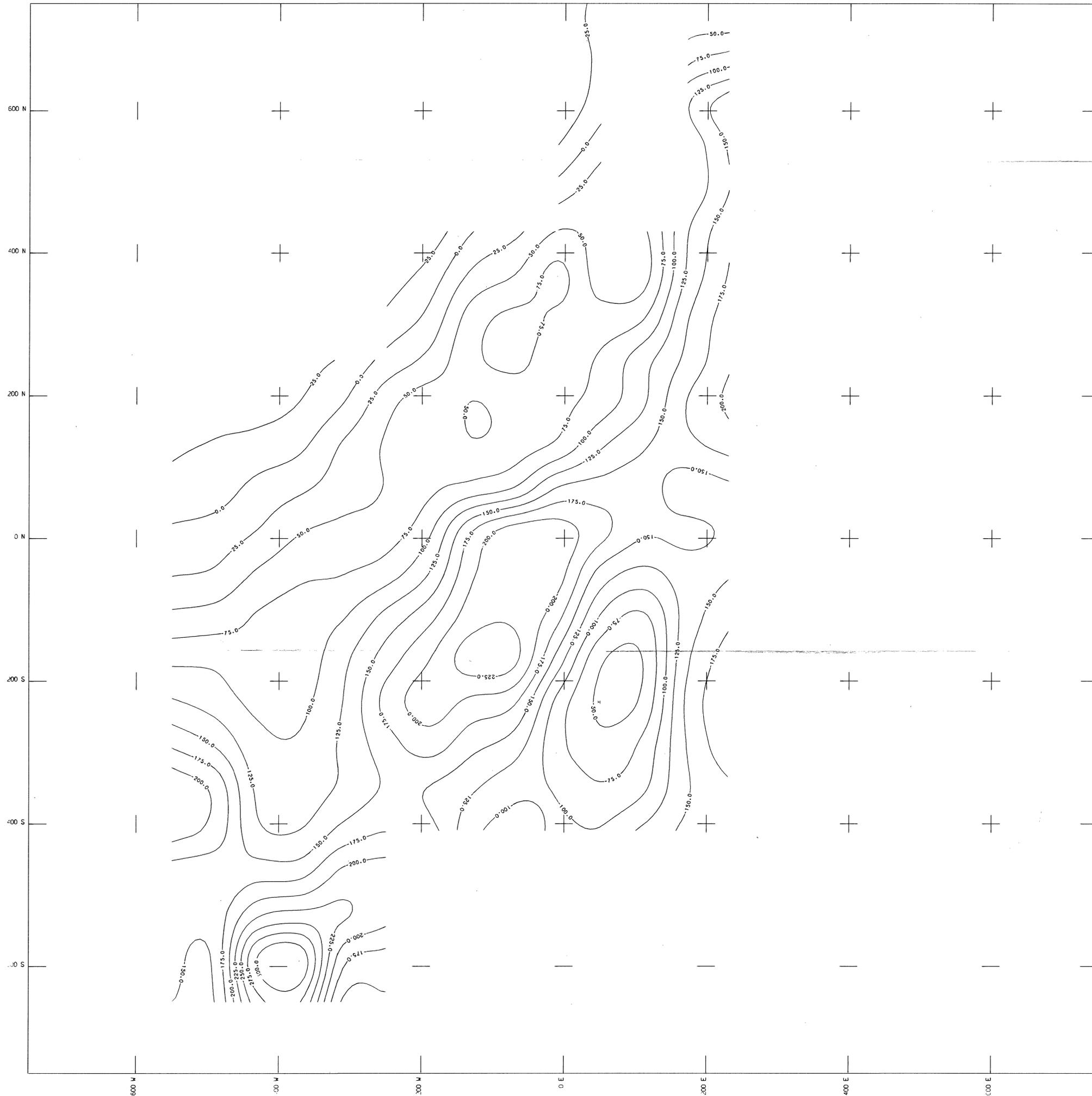
939



349090

SHELL COMPANY OF AUSTRALIA METALS DIVISION	
WATTLE VALLEY GRAVITY	
TERRAIN CORRECTED BOUGUER DENS = 2.7	
940	
SCALE: 1 : 2500.	
FIG. NO:	REPT. NO:
ENCL. NO:	DRG. NO: D/M201/264
DATE:	AUTHOR:
DRAWN:	OFFICE:





349091

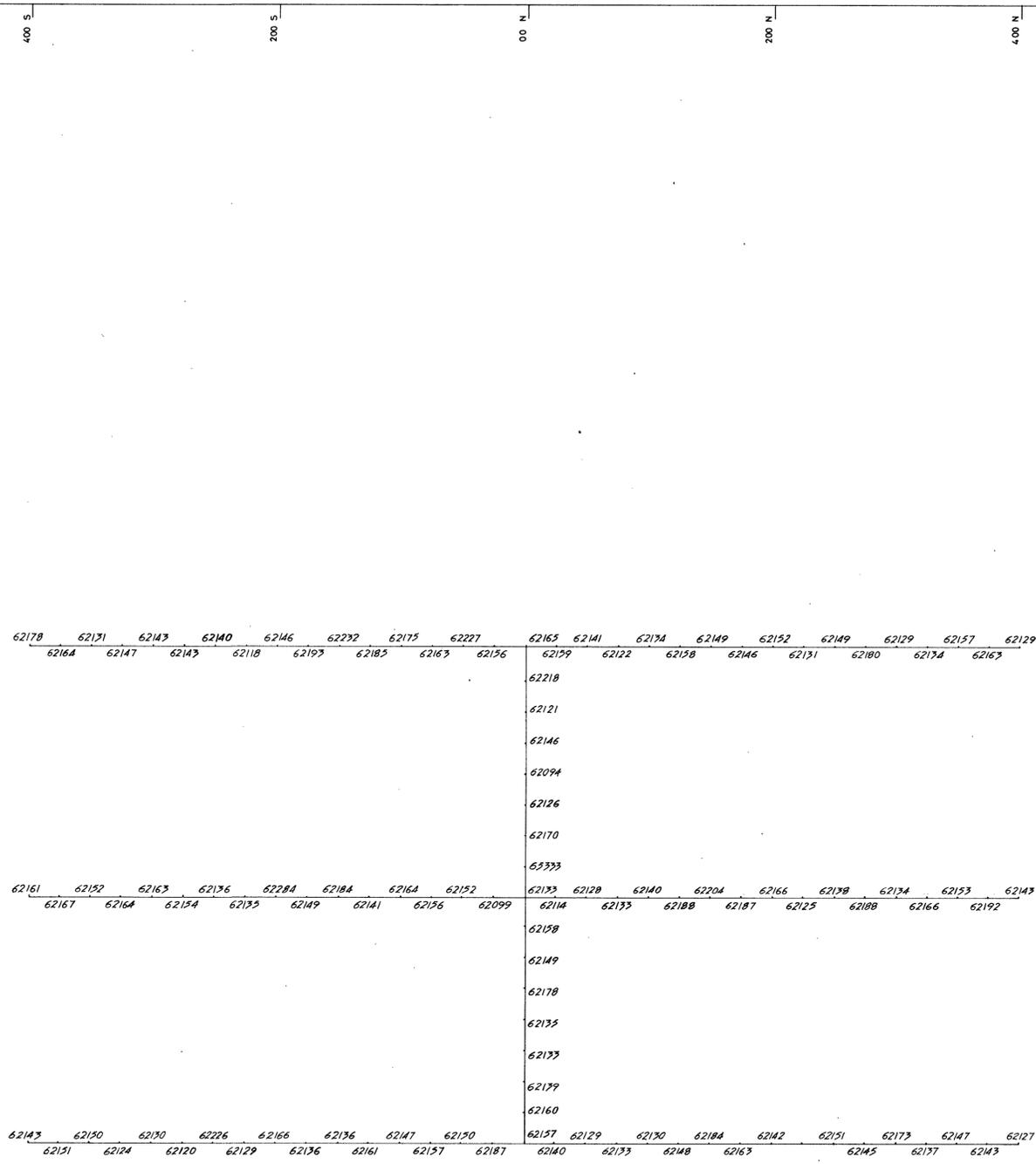
SHELL COMPANY OF AUSTRALIA  
METALS DIVISION  
WATTLE VALLEY  
SP

C.I. = 25 MV.

81-2211 SCALE: 1 : 2500. 941

FIG. NO:	REPT. NO:
ENCL. NO:	DRG. NO: D/M201/266
DATE:	AUTHOR:
DRAWN:	OFFICE:

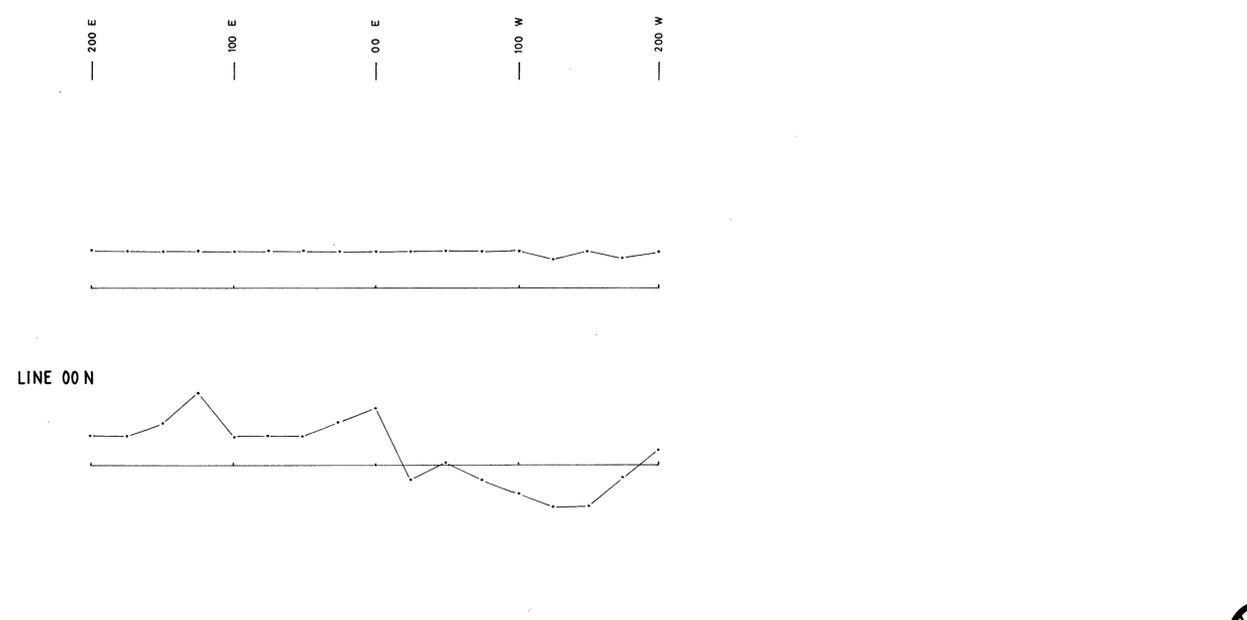
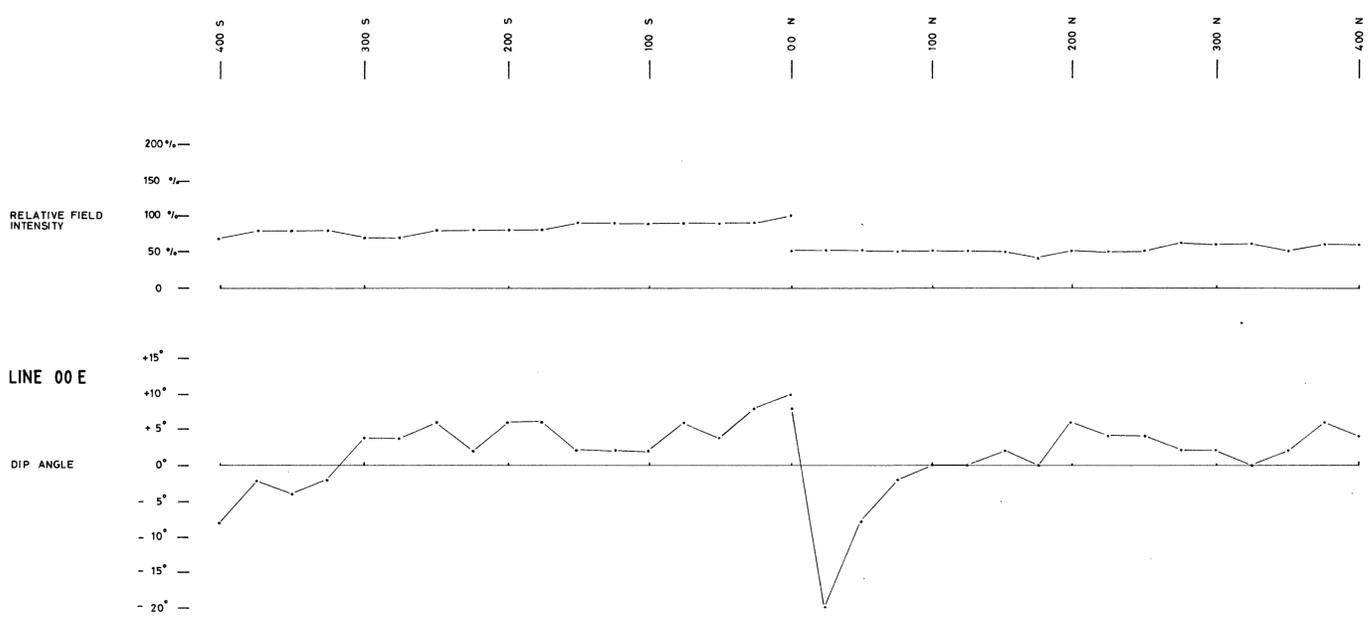
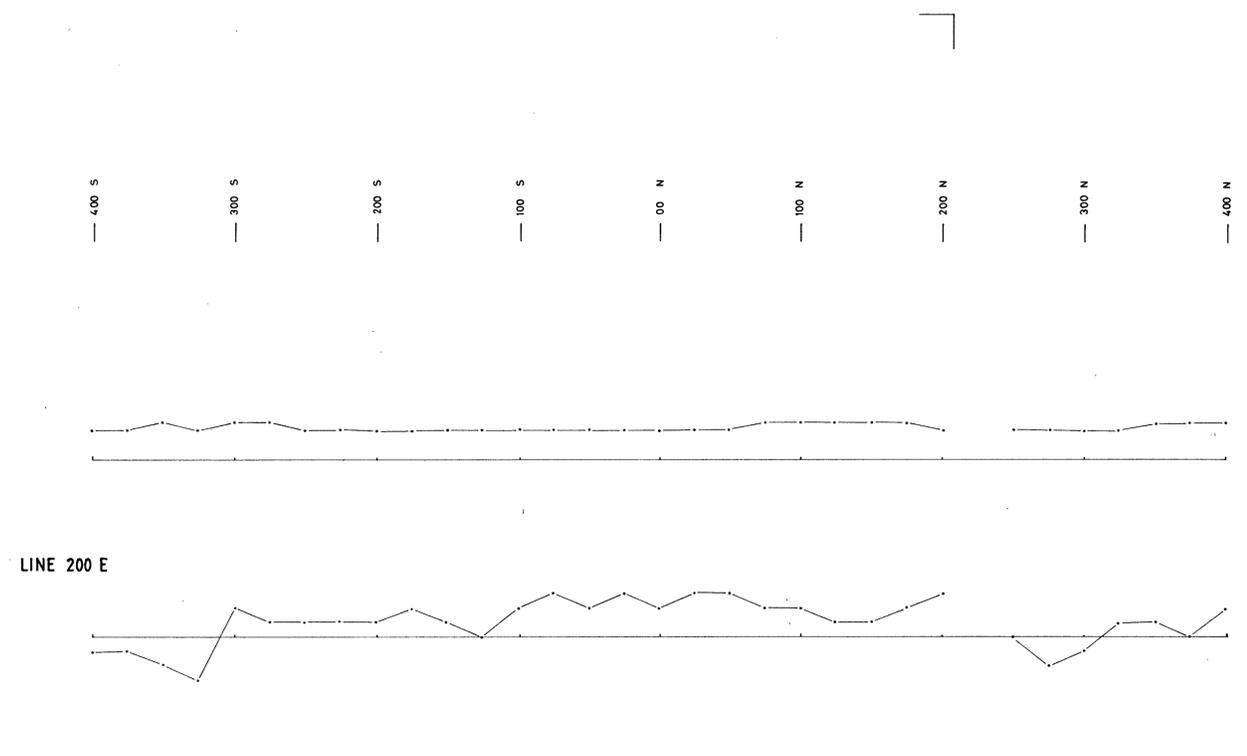
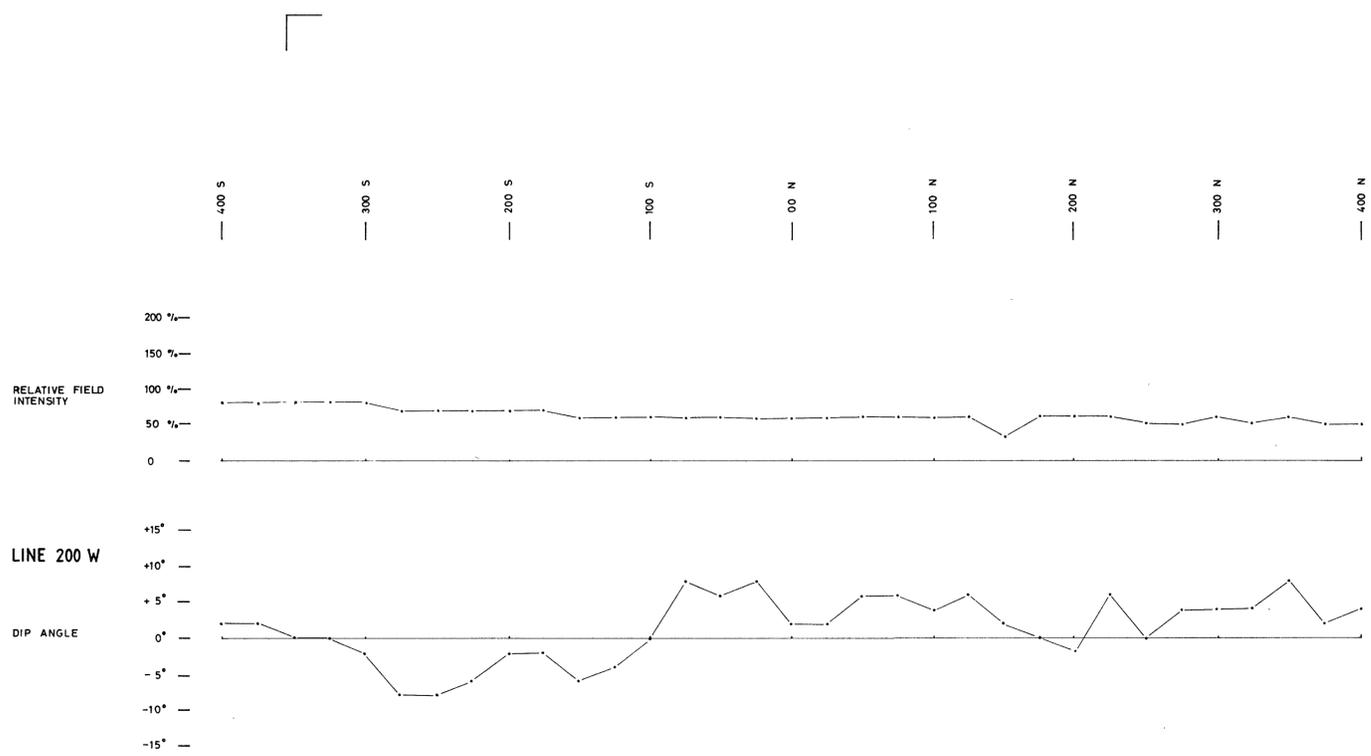




349092

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7174 MOINA WATTLE VALLEY GRID GROUND MAGNETICS	
942	
FIG. No. SL-2211	Scale 1:2500
ENCL. No.	DRG. No. D/M201/211
DATE 4-12-81	AUTHOR W.D. SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT





0 100 200 M



The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA WATTLE VALLEY GRID V.L.F.	
943	
FIG. No. 349093	Scale 1:2500
ENCL. No.	REPORT No. DRG. No. D/M201/214
DATE 8-12-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT

349093

5 cm

400 S 300 S 200 S 100 S 00

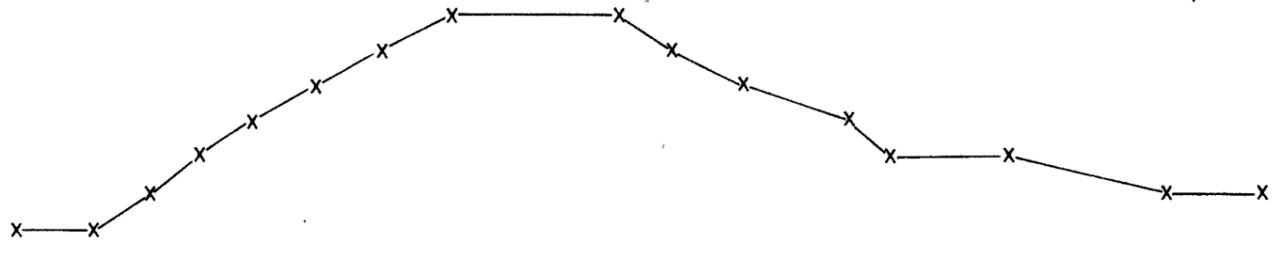
349094

The Shell Company of Australia Limited  
 METALS DIVISION  
 E.L. 7/74 MOINA  
 WATTLE VALLEY GRID  
 LINE 400 m W  
 PROFILES 6 944  
 84-2211

SCALE	1:2500	DATE	12-9-83
AUTHOR	W.D.S.	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP.No.	
DRG.No.	D/MZ01/307	FIG.No.	

**GRAVITY**  
 TERRAIN CORRECTED  
 BOUGUER DENS.  
 = 2.70

— 112.6  
 — 112.5  
 — 112.4  
 — 112.3  
 — 112.2  
 — 112.1  
 — 112.0 Mgal

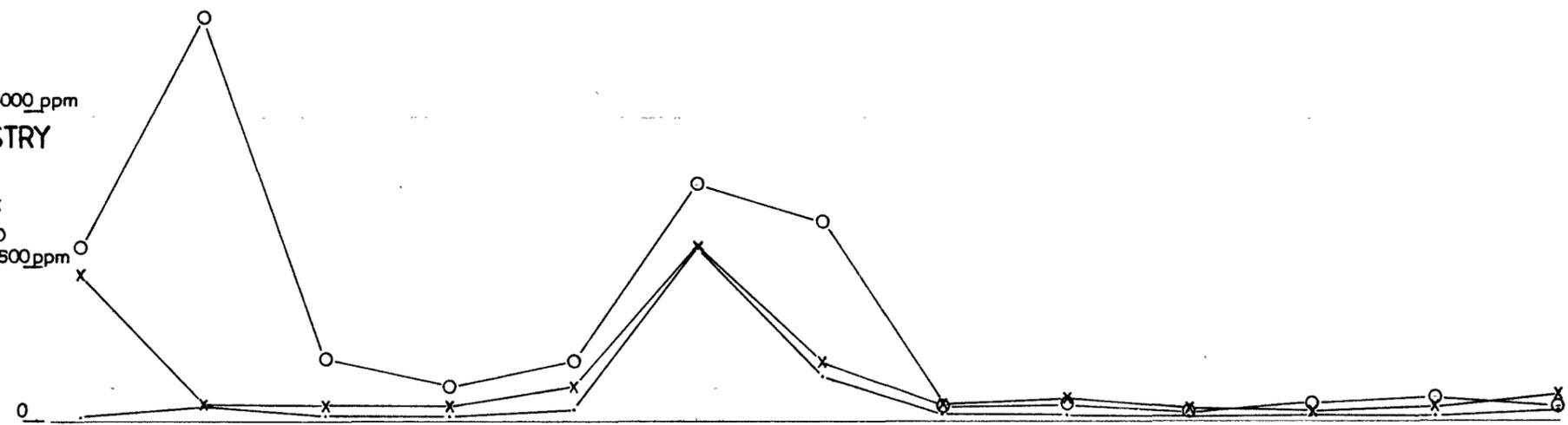


5 cm

**GEOCHEMISTRY**

1500 ppm  
 1000 ppm  
 500 ppm  
 0

Pb ———  
 Zn X—X  
 Mn O—O



PDH WV2

hab

Cu	Ni	Pb	Zn	Cu	Pb	Ni	Zn
6	16	32	42	8	14	34	46
6	10	30	50	6	10	34	60
8	12	34	55	8	16	36	65
6	12	32	65	8	16	24	48
8	16	50	140	6	14	44	120
6	12	34	95	6	16	55	260
6	20	80	460	6	18	75	360
8	18	80	360	6	14	42	120
6	16	65	190	8	10	20	65
12	18	50	210	8	10	14	50
10	8	16	80	8	10	14	50
6	6	38	200	6	12	44	190
6	12	42	200	4	8	36	180
8	10	42	260	6	8	42	200
6	10	195	940	4	8	14	360
4	8	70	420	4	8	65	570
6	10	32	110	6	10	16	26
6	10	12	28	10	8	80	600
6	6	70	250	6	4	16	70
6	8	12	38				