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542001

THE SHELL COMPANY OF AUSTRALIA LIMITED

METALS DIVISION

E.L. 49/80 - MARRAWAH

Relinquishment Report & Annual Report

for Period to June, 1983

Author: W.D. Smyth

Date : 8-7-83

Report No: 08.1264

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542002

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542004

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D/PW 44/030	Linnanes Road South Aeromagnetic Anomaly - VLF Profiles
D/PW 44/040	Linnanes Road South Aeromagnetic Anomaly - IP Section
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542005

APPENDICES

SUMMARY

The Shell Company of Australia Limited was granted Exploration Licence 49/80 in April, 1981. Work in the area has concentrated on the potential for tin mineralization either of stockwork/greisen style or replacement sulphide style.

Reconnaissance geological, ground geophysical and geochemical work located no prospective areas. An aeromagnetic/radiometric survey in the east of the area covered a zone of Cambrian Dolomite.

A total of 14 anomalies from the airborne survey have been ground checked. Most are due to basalt hills or Cambrian volcanics. One line of IP has been done over three of the unexplained anomalies. No anomaly worth further investigation was located.

The area was relinquished in April, 1983.

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1.0 INTRODUCTION

The Shell Company of Australia Limited was granted Exploration Licence 49/80, Marrawah on the 29th April, 1981.

This report covers all investigations undertaken in the licence area from June, 1982 till the relinquishment date, 30-4-83. It should be read in conjunction with the previous report E.L. 49/80 - Marrawah, "Progress Report on Exploration During the Period April, 1981 to June, 1982" (08.1261). Reference will be made to anomalies previously investigated.

2.0 LOCATION & ACCESS

The E.L. is located at the western edge of the Burnie 1:250,000 geological map and the Welcome 1:100,000 topographic map. Access is via Highway 2 to Redpa and Marrawah. (Fig. 1).

3.0 PREVIOUS INVESTIGATIONS

Refer to "Progress Report ......" 3.0.

4.0 EXPLORATION TARGETS & METHODS

The only target is Sn mineralization either as a stockwork type or replacement type. Note all ground magnetic readings taken with a proton precession magnetometer with 2.5m sensor height. Soil samples taken at C horizon.

5.0 REGIONAL GEOLOGY

Refer to "Progress Report ......" 5.0. (Refer Plan D/PW 44/003).

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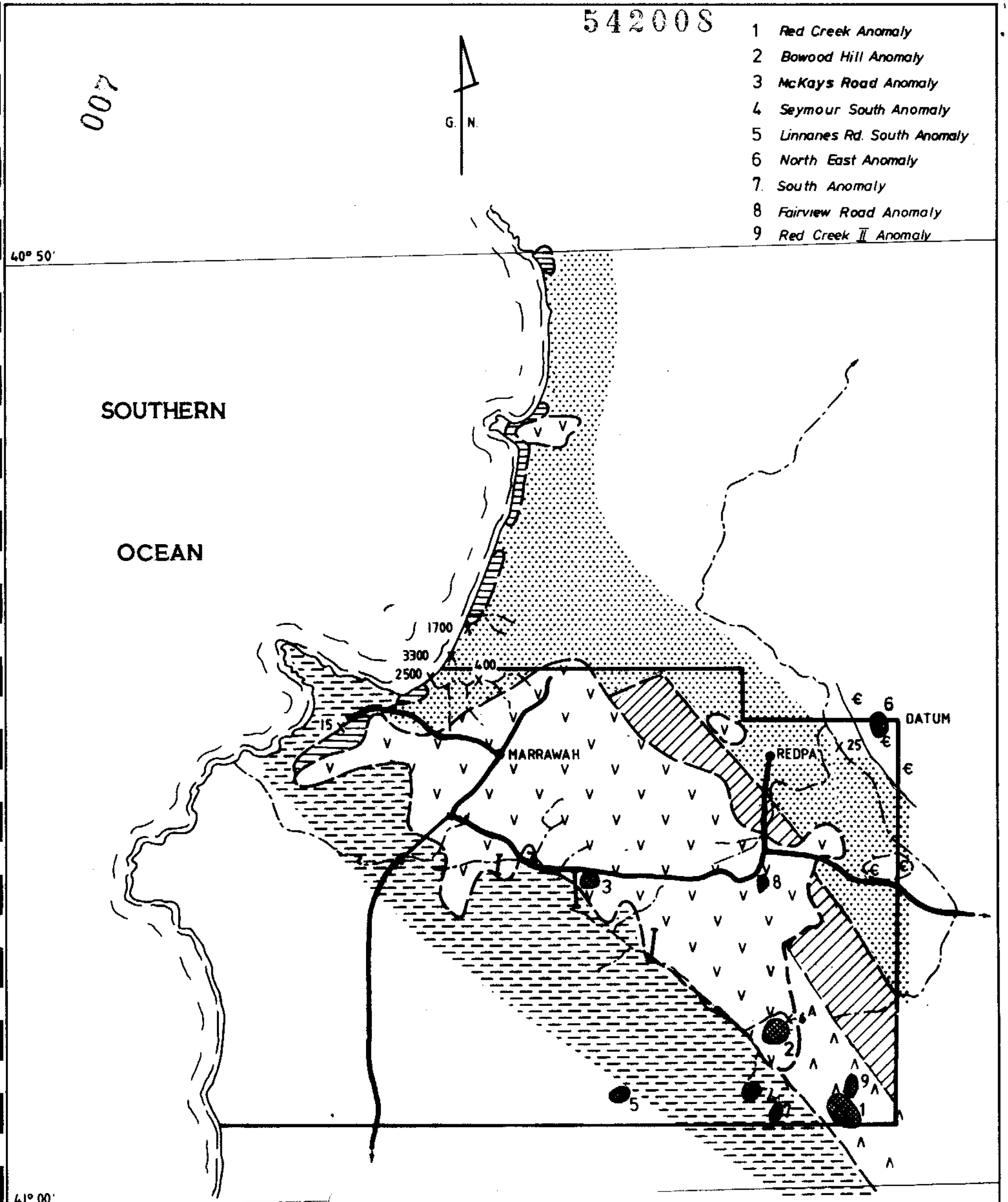

LEGEND

- Holocene sand
- Tertiary basalt
- Tertiary marine Limestone
- Cambrian sediments
- Underlain by p€ Dolomite
- Pre Cambrian metamorphics
- Volcanics - Cambrian/Precambrian?
- Aeromagnetic Anomalies
- Road traverses
- x 1700ppm Sn instream sediment or beach sand.

The Shell Company of Australia Limited METALS DIVISION	
E.L. 49/80 MARRAWAH GEOLOGY	
Scale . 1:100,000	
FIG. No. 1	REPORT No.
ENCL. No.	DRG. No D/PW44/001
DATE 21-2-83	AUTHOR M.B.
DRAWN O H	OFFICE DEVONPORT

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6.0 INVESTIGATIONS COMPLETED

6.1 Regional

Various traverses were made in an attempt to locate mineralized areas by using general geological mapping, ground magnetic and VLF - EM traverses and soil and stream sediment sampling. (Refer to "Progress Report..." 6.1). No anomalous zones were located by this method.

An aeromagnetic/radiometric survey was flown over the eastern portion of the licence. Several aeromagnetic anomalies were picked out for closer work. (Refer to "Progress Report ..." 6.2). Measurements on remnance of several basalt samples give koenigsberger ratios of approx. 10 (Appendix 1). (Refer Plan D/PW 44/002).

6.2 McKay's Road Aeromagnetic Anomaly

This anomaly was thought to be due to a basalt hill. Refer to "Progress Report ..." 6.2.1.

6.3 Bowood Hill Aeromagnetic Anomaly

This anomaly was thought to be due to a basalt hill. Refer to "Progress Report ..." 6.2.2.

6.4 Red Creek Aeromagnetic Anomaly

This anomaly was thought to be due to a gabbro dyke. Refer to "Progress Report ..." 6.2.3.

6.5 North East Aeromagnetic Anomaly

This anomaly was thought to be due to magnetic Cambrian(?) volcanics. Refer to "Progress Report ..." 6.2.4.

6.6 Linnanes Road South Aeromagnetic Anomaly

This is a broad 100nT aeromagnetic anomaly located in the southwest of the survey area. A small grid was pegged over the anomaly.

6.6.1 Geology

Very little outcrop is available, however the grid appears to be entirely within Precambrian quartzites. An outcrop of pyritic black shale was located approximately 500m to the south.

6.6.2 Geophysics

A ground magnetic survey located an east-west trending anomaly of 400 nT. Magnetic susceptibilities in the area are all very low, of the order of 20 x 10^{-5} SI units. Modelling the ground magnetics indicates a thin (10m) steeply dipping body of high susceptibilities (10,000 x 10^{-5} SI units). No magnetic material of this susceptibility was observed anywhere on the grid. (Refer Plan D/PW 44/011).

A VLF-EM survey failed to locate any conductors. (Refer Section D/PW 44/30). One line of IP was done. The response appears to be Precambrian black shales. (Appendix 2) (Refer Plan D/PW 44/040).

6.6.3 Geochemistry

Results from soil sampling are uniformly low for all elements. One ferruginous sample from a dam wall had no anomalous geochemistry, nor was it derived from basalt (Ni 14 ppm). (Refer Plans D/PW 44/024, 025, 026).

6.6.4 Recommendations

No further work is recommended.

6.7 South Seymour Aeromagnetic Anomaly

This is an intense 80 nT aeromagnetic anomaly surrounded to the east, west and south by magnetic lows. It is located in a swampy area in the south of the main basalt trend. A cross grid was cut and pegged over the anomaly.

6.7.1 Geology

The centre of the anomaly is located in a swamp which is surrounded to the east, west and south by Precambrian quartzites. To the north is Mt. Seymour, a basalt hill. Soil samples indicate the northern part of the grid is underlain by basalt soils. (Refer Plan D/PW 44/034).

6.7.2 Geophysics

The ground magnetic survey located a small circular 1500 nT anomaly. Because of lack of outcrop no magnetic susceptibilities were taken. Modelling indicates a thin shallow body dipping to the east striking 20° W of N. A very high susceptibility of 9000×10^{-5} SI units is assumed. (Refer Plan D/PW 44/010).

The VLF-EM survey located a conductor at the contact between the quartzite and swamp on the east-west line. (Refer Sections D/PW 44/30). One line of IP was done on the east-west line. No significant anomaly was located (Refer App. 2). (Refer Plan D/PW 44/039).

6.7.3 Geochemistry

The soil sampling indicates the presence of basalt soils, but no anomalous values are recorded. (Refer Plans D/PW 44/021, 022, 023).

6.7.4 Recommendations

No further work is recommended for this anomaly. Its shape and magnetic response suggest a basalt feeder pipe.

6.8 South Anomaly

This is an intense 900 nT aeromagnetic anomaly located on the southern boundary of the licence. A cross grid was cut and pegged over the anomaly.

6.8.1 Geology

The centre of the anomaly is located in a depression in the Precambrian quartzites. Soil samples suggest the central part of the anomaly is underlain by basalt.

6.8.2 Geophysics

The ground magnetic survey located a small bullseye anomaly of approximately 3000 nT of 150m diameter. No outcrop was available for susceptibility measurements. (Refer Plan D/PW 44/033).

One line of IP was done on an east-west line. A shallow resistivity anomaly was observed, which may be explained by the swampy ground conditions. (Refer Plan D/PW 44/038).

6.8.3 Geochemistry

Soil geochemical results appear to indicate a basalt source with Ni values of greater than 100 ppm and Cu and Zn values in the order of 40 ppm and 60 ppm respectively. (Refer Plan D/PW 44/037).

6.8.4 Recommendations

No further work is recommended for this anomaly. Its geographic location, shape and magnetic response suggest a basalt feeder pipe.

6.9 Red Creek II Aeromagnetic Anomaly

This is an elongate 20 nT aeromagnetic anomaly parallel with and slightly north-east of the main Red Creek Anomaly. Topolite and compass traverses were made across the anomaly.

6.9.1 Geology

Float rock samples submitted for petrology were reported as basic volcanics similar to Crimson Creek Formation. (Refer Appendix 3).

6.9.2 Geophysics

An elongate anomaly of approximately 1000 nT was located by ground magnetics. (Refer Plan D/PW 44/035).

6.9.3 Geochemistry

Results from soil sampling show no anomalous zones. The values are similar to those from the North East Anomaly. (Refer Plan D/PW 44/036).

Rock chip samples show similar values of Cu, Zn, Ni as the soil samples. (Refer Plan D/PW 44/014).

6.9.4 Recommendations

No further work is recommended for this anomaly. It would appear to be an en echelon continuation of the gabbro dyke of the Red Creek Anomaly.

6.10 Fairview Road Aeromagnetic Anomaly

This is a 15 nT aeromagnetic anomaly associated with a hill near the junction of Fairview Road and Highway 2. Topolite traverses were made along two roads across the anomaly.

6.10.1 Geology

The area is basalt covered and forms part of a basalt hill.

6.10.2 Geophysics

The ground magnetic traverses located a 400 nT anomaly adjacent to the road. (Refer Plan D/PW 44/041).

6.10.3 Recommendations

No further work is recommended. The anomaly is thought to be due to the basalt hill.

6.11 North-eastern Radiometric/Aeromagnetic Anomalies

A series of NW striking radiometric anomalies with associated low order magnetic anomalies are located in the east of the licence, crossing Highway 2. These were located and are shown to be due to Cambrian volcanics/sediments. This locates a good eastern margin to the possible extent of the dolomite horizon. (Refer Plan D/PW 44/003).

7.0 CONCLUSIONS & RECOMMENDATIONS

Grids have been established on six aeromagnetic anomalies. Single line traverses have been completed over four anomalies and a geophysical ground check has been completed over four other minor anomalies. The other five low order anomalies are located within the main basalt zone.

No encouragement has come from the investigation so far and no further work is warranted.

APPENDIX 1

016

542017

CSIRO

Division of Mineral Physics
Delhi Road, North Ryde, NSW, Australia

A Division of the Institute of Energy and Earth Resources

PO Box 136, North Ryde, NSW, Australia 2113
Telephone (02) 887 8666
Telex AA25817

DAC/khh

14th December, 1982

Mr J. Lawton
SHELL CO. OF AUSTRALIA LTD
Metals Division
P.O. Box 860
DEVONPORT. Tasmania. 7310

Dear Mr Lawton,

Please find enclosed results of our magnetic property measurements on your rock samples 21079 - 21082. The NRM direction of sample 21080 is (46°, -63°) which is sub-parallel to the Earth's field. Directions from the other two oriented samples are highly oblique to the present field and to its reverse, that is, they are not close to the directions expected from Tertiary rocks in this area. This suggests they may have been struck by lightning and this hypothesis is confirmed by alternating field (AF) cleaning of some specimens from these samples. After AF treatment the directions clean up to normal polarity Tertiary directions, similar to 21081 and the samples from a previous batch.

This implies that these rocks can be assumed without gross error to be magnetised by induction, with a large effective susceptibility. The representative NRM of the bulk rock which has not been affected by lightning is $\sim$ 2,000 microgauss (200 gammas) for 21080 - 21082, corresponding to an effective susceptibility of $32{,}00 \times 10^{-6}$. This is far higher than the measured susceptibilities because of the relatively intense remanence.

In sample 21079 the spurious component of remanence is opposed to the original remanence and they largely cancel out, producing the anomalously low Q value. This sample is quite strongly magnetic and would be expected to have an NRM intensity of $\sim$ 50,000 microgauss (5,000 gammas) assuming a Koenigsberger ratio of $\sim$ 18, as for 21081. This corresponds to an effective susceptibility of $\sim 79{,}000 \times 10^{-6} = 0.08$.

I hope these results are of help.

Yours sincerely,

Dave Clark

David Clark

Encl.

MAGNETIC PROPERTIES OF TASMANIAN BASALT SAMPLES

Sample	k	J	Q	J*
21079	4,300	(6,300)	(2.3)	48,800
21080	320	2,560	13	3,570
21081	110	1,180	18	1,180
21082	170	(5,000)	(47)	1,930

k = cgs (emu) susceptibility x 10^6

J = measured NRM intensity in microgauss (10 microgauss = 1 gamma)

Q = Koenigsberger ratio = J/kH, where H = 0.63 oesteds

J* = inferred NRM intensity assuming Q = 18

Note: Values in parentheses are believed to be lightning affected.

APPENDIX 2

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542020

Marrawah - Geophysical Results to Date (2/83)

1. Summary

All high priority aeromag features at Marrawah have been ground checked and satisfactorily explained. On the basis of the magnetic and IP results to date, no drill target is readily apparent.

2. Magnetics

A total of 19 anomalies were picked from the aeromag survey. The top 7 anomalies (Red Creek, South Seymour, Southern Anomaly, NE Anomaly, Linnanes Rd., Boxwood Hill and McKay's Rd.) have been ground checked in detail, and the ground magnetic results are described in earlier memos.

Given the high remanent magnetization of the basalt in the area, Boxwood Hill and McKay's Rd. can be ascribed to basaltic sources. Red Creek is due to a basic dyke, while the NE Anomaly is probably formational and of little interest. Linnanes Rd., the Southern Anomaly and South Seymour were not adequately explained by the initial ground mag and modelling, so they have each been covered with a line of IP.

Anomalies 8 to 11 and 19 have been written off as formational, and of little interest, given the target being sought. Anomalies 12 to 18 have low priority for follow-up, as they can probably be explained by basalt. However, a ground check is still recommended, to confirm the existence of basalt topography, or separate flows.

3. IP Results

South Anomaly (ON) - A resistivity anomaly was observed about 50E, but with no chargeability response. The source looks to be shallow, flat-lying and depth-limited, and the anomaly can probably be explained by the swamp in the area; and is of no further interest.

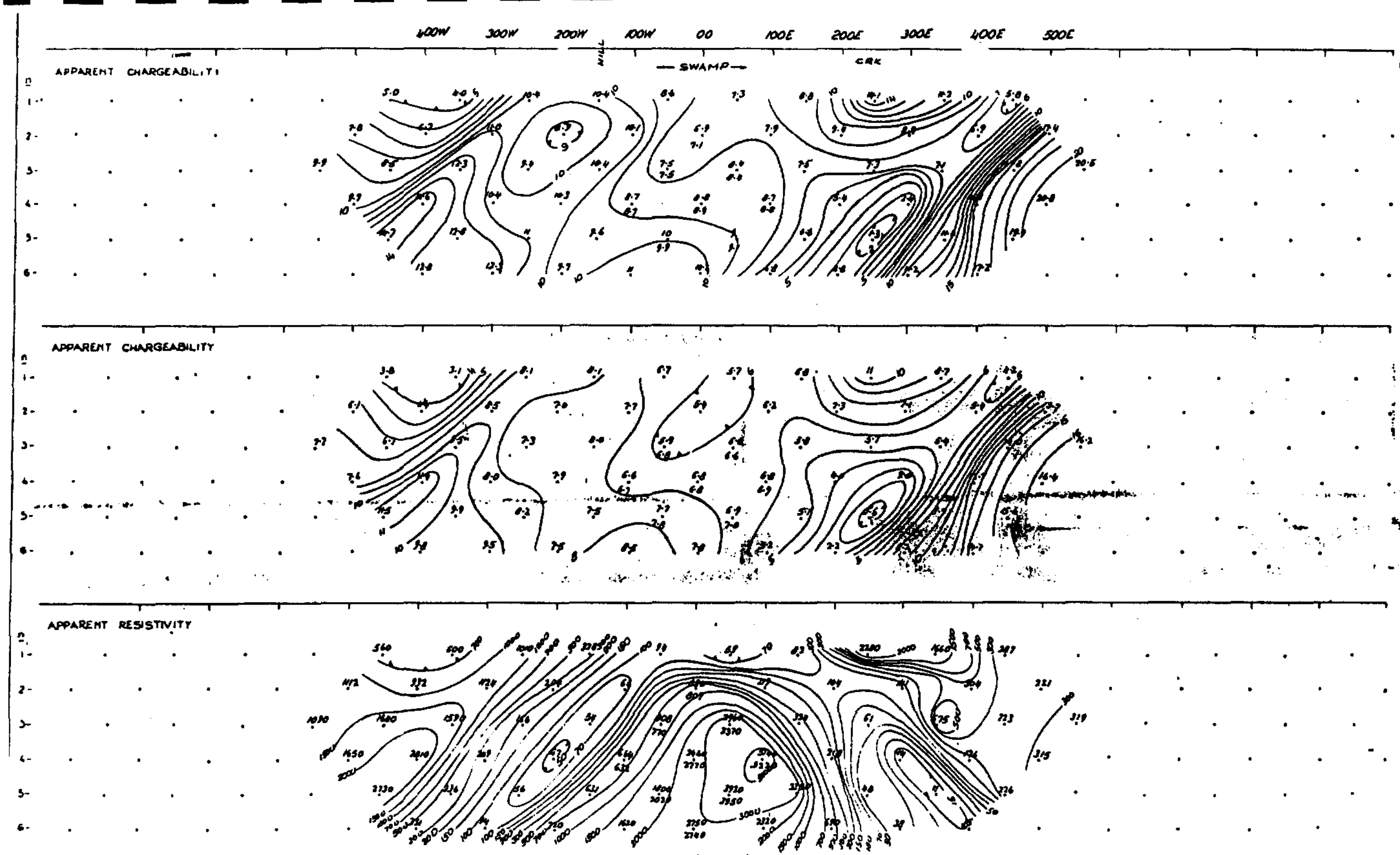
A chargeability anomaly was detected to the east of 500E, possibly associated with lower resistivities. This anomaly does not appear to be related to the magnetic feature, and hence is of no further interest. (Geology of the area is unknown).

The aeromag feature could well be due to a basic dyke.

South Seymour (ON) - A broad resistivity low was observed from 100W-200E. Again, the source is shallow, flat-lying and depth-limited, with no chargeability response, so the anomaly is probably due to the swamp and hence of no further interest.

Linnanes Rd - Resistivities throughout the section are low (decreasing towards the north) and show no discrete anomaly. The chargeabilities are high, with an indistinct, low-order anomaly at 0-200S (but not associated with any resistivity low). The geology may be Precambrian and the response certainly looks like that of p€ black shales seen elsewhere, therefore, the area is of no further interest (especially as there is no distinct target associated with the mag anomaly.

021

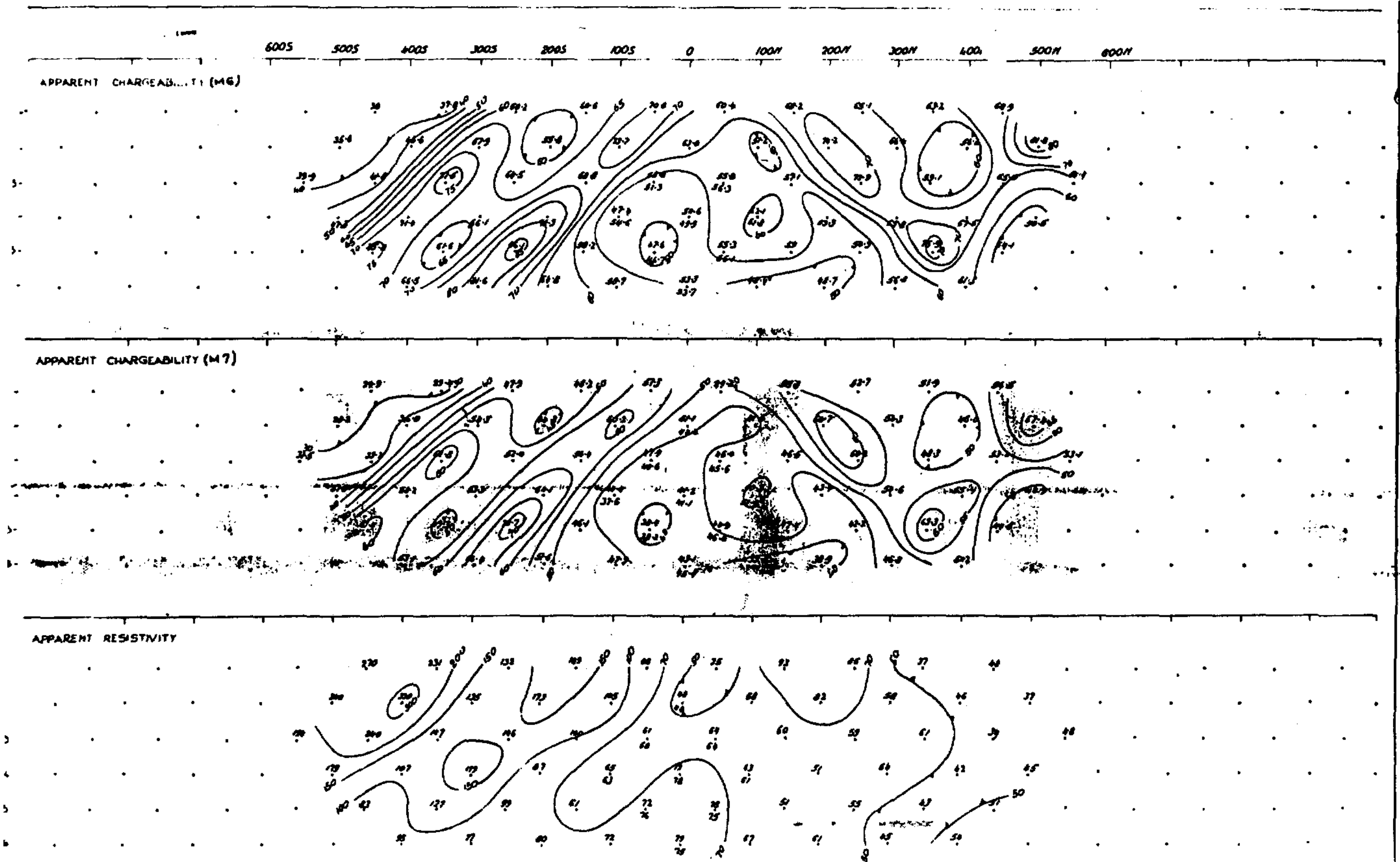


Contractor SCINTREX (TAS-103)
Date 6-1-83
Timing
Transmitter
Receiver
Integration time
Array Dipole - dipole
Dipole length : 100m

METALS DIVISION

IP / RESISTIVITY SURVEY
MACANAH
SOUTH ANOMALY
00 N

542022

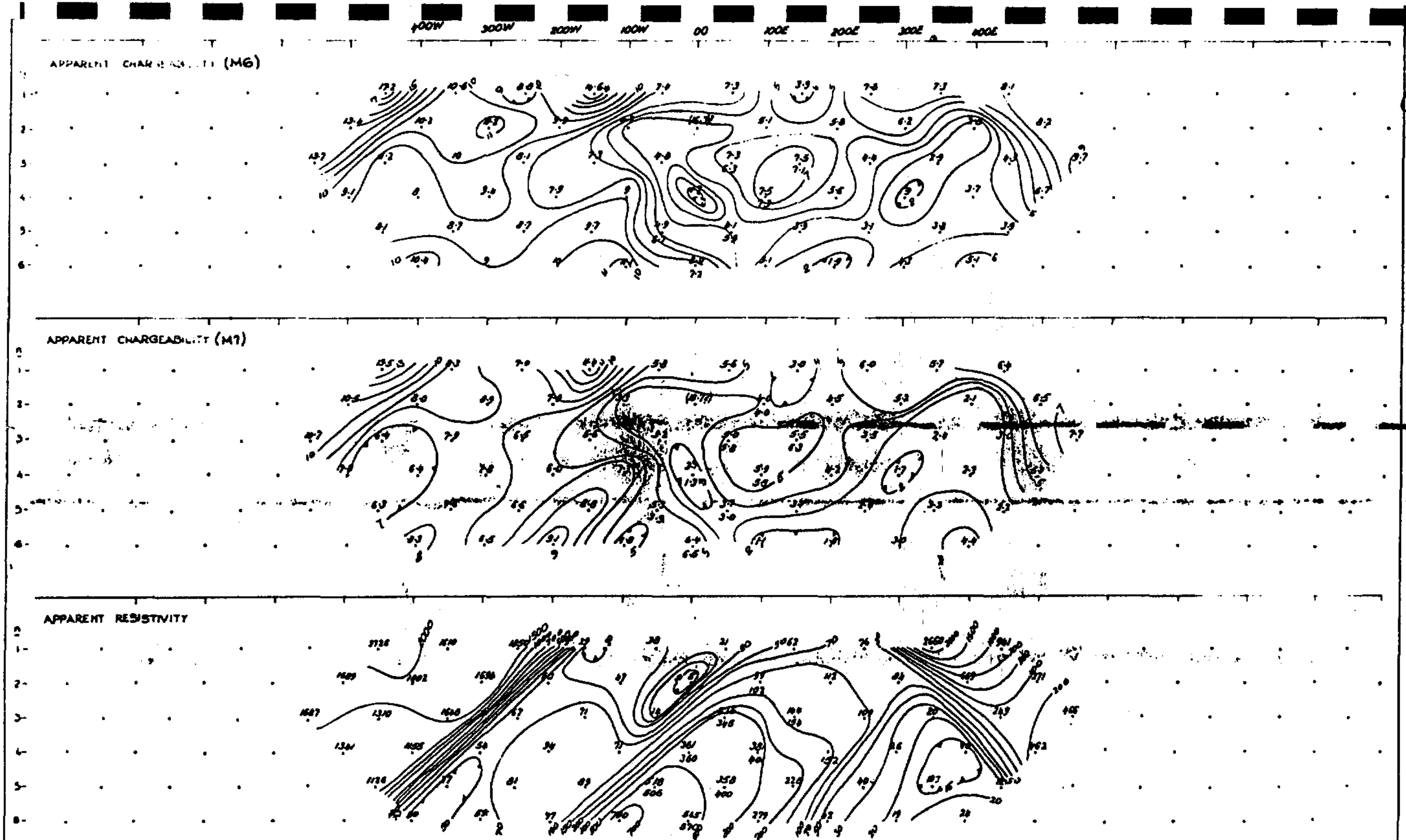


Contractor SCINTREX (Job Nº TAS-103)
Date 18/19 DEC '82
Timing 2 sec
Transmitter
Receiver
Integration time
Array Dipole - dipole

The Shell Company of Australia Limited
METALS DIVISION

IP / RESISTIVITY SURVEY
MARRAWA
LINNANES ROAD

54 2023



023

Contractor SCINTREX (TAS-103)
Date 8-JAN-81
Timing 2 sec
Transmitter
Receiver
Integration time
Array Dipole-dipole
Dipole length 100m

The Shell Company of Australia Limited
METALS DIVISION
IP / RESISTIVITY SURVEY
MACAWAH
SEYMORE SOUTH
00 N

542024

AIRBORNE ANOMALY LIST

AREA : MARRAWAH

SURVEY : AEROMAG

ANOMALY NO.	NAME	DESCRIPTION	LOCATION		WORK PROGRAMME		INTERPRETED CAUSE
			LINE FIDUCIAL	AMG CO-ORDS.	COMPLETED	RECOMMENDED	
1	McKay's Rd.	450nT + small radiometric	190.775	307800E 5464800N	Mag		Basalt Hill
2	Boxwood Hill	300nT + broad radiometric	330.999	311700E 54601300N	Mag Rock property		Basalt Hill
3	Red Creek	200nT	380.1163	313000E 5460000N	Mag		Weathered gabbro
4	Seymour South	80nT	360.1144	311500E 5460500N	Mag IP		Swamp ?
5	Linnanes rd.	Broad 100nT and radiometric	360.1135	309000E 5460500N	Mag IP		Pre Cambrian
6	North East	60nT broad	80.5760	313600E 5468000N	Mag		C volcanics
7	South	900nT	380.1166	312200E 5460000N	Mag IP		Basic dyke/ swamp
8	Fairview Rd.	15nT + radiometric	70.495	310400E 5468000N	Mag		Basalt Hill over dolomite

ANOMALY NO.	NAME	DESCRIPTION	LOCATION		WORK PROGRAMME		INTERPRETED CAUSE
			LINE FIDUCIAL	AMG CO-ORDS.	COMPLETED	RECOMMENDED	
9	Red Creek 2	20nT + radiometrics	130.376	312200E 5466500N	Mag		Dyke in C volcanics
10		30nT + radiometrics	170.644	313100E 5465500N	Mag		€ volcanics
11		50nT broad + strong radiometrics	200.806	313500E 5464700N	Mag		€ volcanics

542026

Memorandum 026

542027

Date 20th October, 1982

From G. Oakes (BXN)

To B. Smythe (BXH)

AEROMAG. ANOMALIES : MOINA & MARRAWAH

BOXWOOD HILL (MARRAWAH)

Figure 2 shows a model which gives a reasonable fit to the magnetics: a shallow body at 330 W, of limited depth extent and clipping shallowly W. The modelled susceptibility is fairly high (20000×10^{-6} cgs.), but the geometry of the body and location on a topographic feature would fit a basalt source.

Again, the first thing to do is to check remanence, preferably in a sample from 330W - 350W; a Q of the order of 10 is required to explain the anomaly (which fits basalt on the Housetop E.L.'s, but don't know about Marrawah). If remanence is not significant, try a line of max-min (150m coil sepn., after extending line 200m to west).

FORM 32/6000

027

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McKAYS RD. (MARRAWAH)

The anomaly is not particularly exciting and not worth trying to model at this stage (as there is interference between 2 anomalies. with aliasing by the aeromag. forming a single anomaly of them). Apparently there are 2 bodies of similar parameters to the body at Boxwood Hill, which suggests a basalt cause here also. I suggest a remanence sample be taken here also.

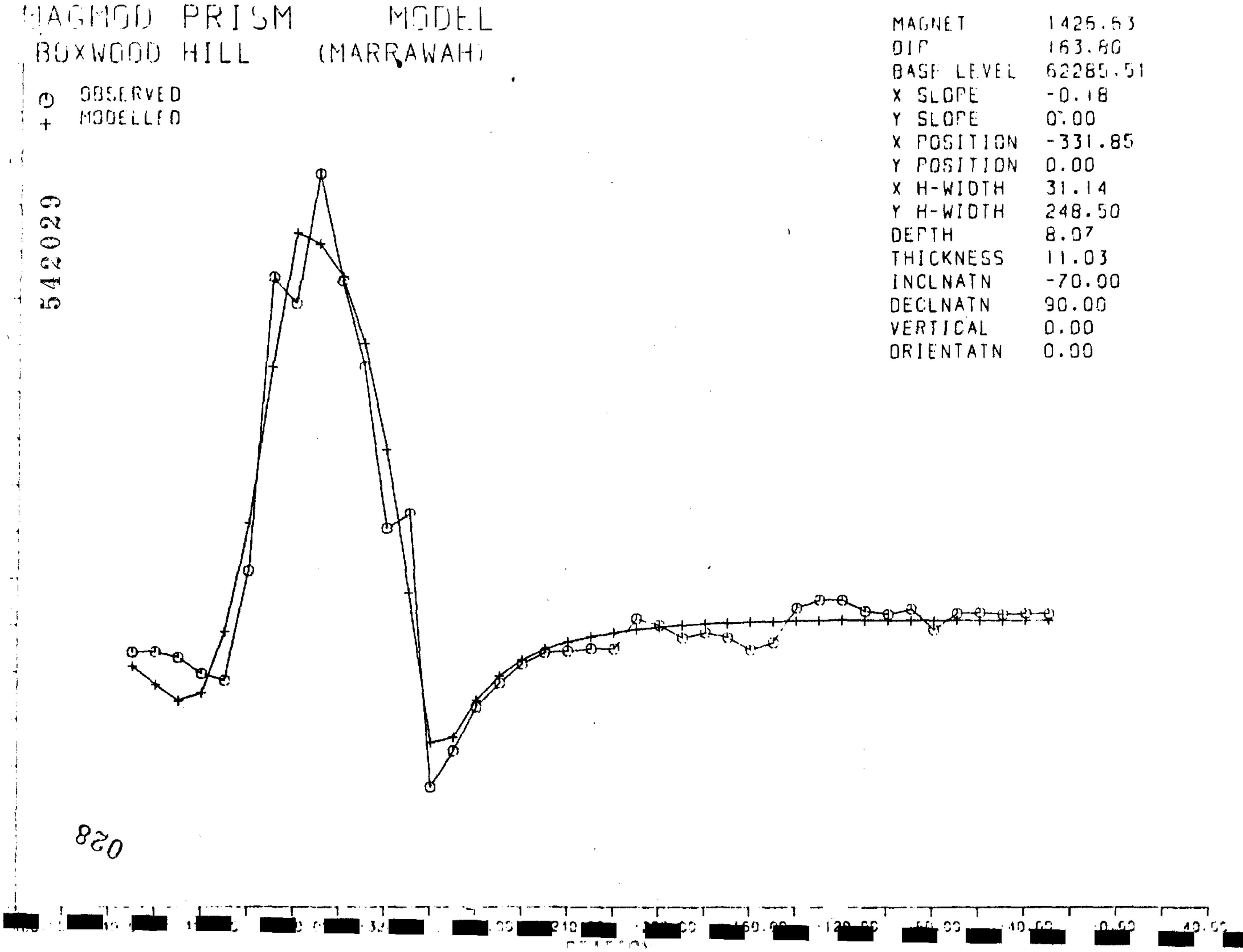

MAGMOD PRISM MODEL
BOXWOOD HILL (MARRAWAH)
OBSERVED
MODELLED
MAGNET 1425.63
DIP 163.60
BASE LEVEL 62285.51
X SLOPE -0.18
Y SLOPE 0.00
X POSITION -331.85
Y POSITION 0.00
X H-WIDTH 31.14
Y H-WIDTH 248.50
DEPTH 8.07
THICKNESS 11.03
INCLNATN -70.00
DECLNATN 90.00
VERTICAL 0.00
ORIENTATN 0.00
542029
028

Fig. 2

029

MEMO

542030

DATE 25/6/82

FROM DMN/Devonport (G. Oakes)

TO DMH/Devonport (W. Smyth)

Re: MARRAWAH AEROMAGNETIC ANOMALIES

I have prepared some models for the following anomalies from Marrawah.

Red Creek (Figs. 1 & 2)

Two models are included. The causative body appears to be narrow (of the order of 30 metres), steeply dipping and shallow. It strikes west of north (with a strike length of the order of 400m?). The modelled susceptibility is of the order of $10,000 \times 10^{-6}$ cgs units, which would seem reasonable for a basic dyke. (What are the measured susceptibilities?). 300×10^{-5} cgs

South Seymour (Fig. 3)

The best model of the several I tried is included. The model is very dependent on the strike of the body (which has not been well defined by the two cross-lines done) a strike of 20° W of N has been used here.

The model dips shallowly to the east, and is fairly thin and shallow. This would be a reasonable shape for a basalt flow, however the modelled susceptibility (9000×10^{-6} cgs) is rather high - a check on susceptibility and remanence is recommended. If there is basalt with high remanence (or susceptibility) in the area, then the anomaly is explained. No outcropping basalt, but appears from soil geochem that basalt soil at NE end of line

NE Anomaly (Fig. 4)

The airborne anomaly was broad, small and formational and given low priority. The ground anomaly here is only of the order of 200 nT and fairly noisy, so it is hardly worthwhile doing detailed modelling, but one model is included. The anomaly strikes west of north.

The modelled body is fairly broad (of the order of 60 metres) and deep (90 metres) and dips steeply west. However, I do not think that this depth or dip is very well constrained by the data available - the body could well be shallower (in which case the susceptibility will be lower) and have a different dip. The modelled susceptibility is 4000×10^{-6} cgs

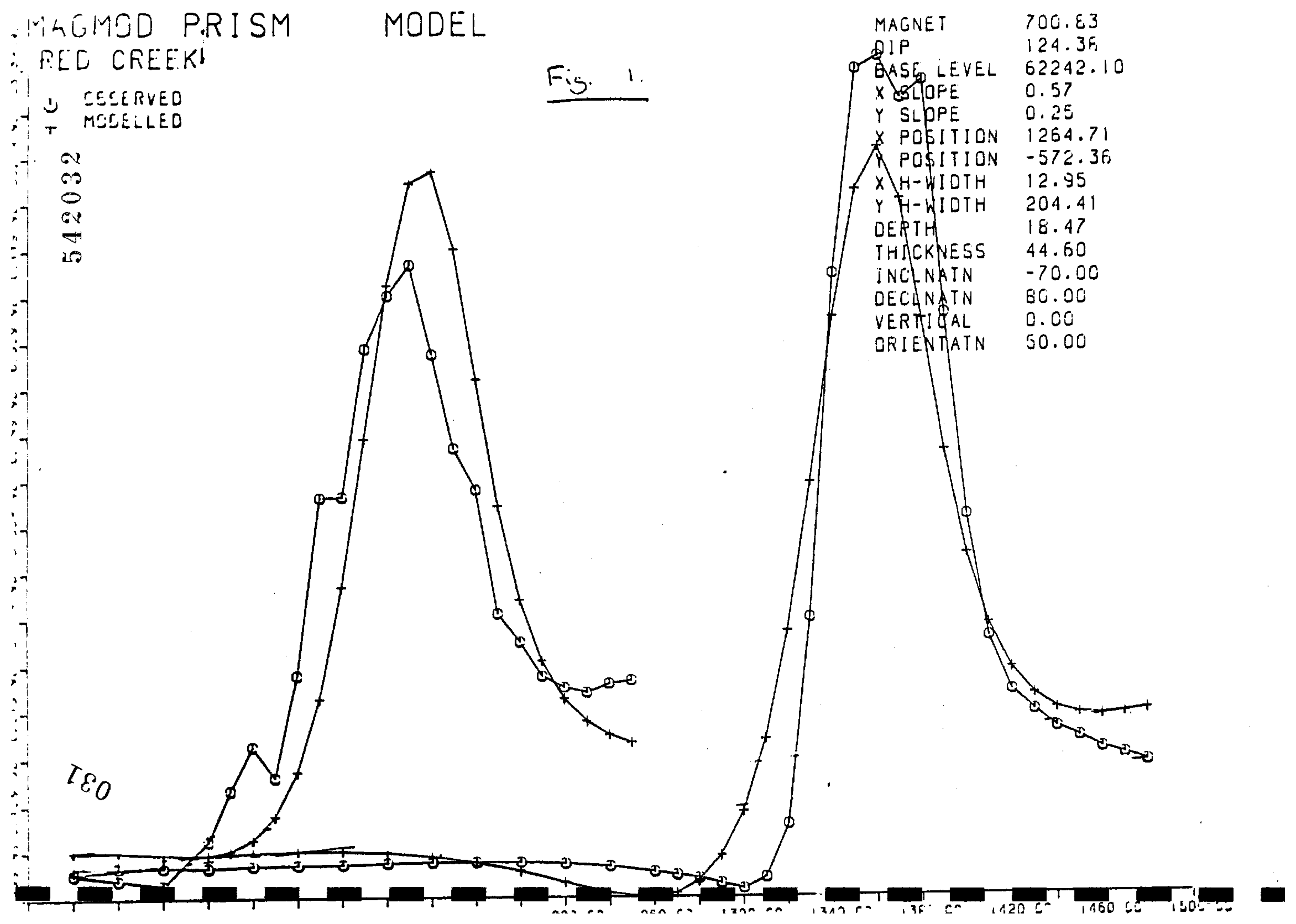
FORM 32/6000

(or less if the body is shallower - which seems reasonable from the noise in the profile). This would be reasonable for volcanics or basalt. Unless the geochem or geology is particularly good, I don't see much point doing more work here.

Linannes Road (Figs. 5-8)

Models for the three north-south lines are included. The body strikes south of east and dips steeply to the south (although the dip looks more shallow on line 200 W - it may be worth extending this line another 100m S to check this). The model is fairly shallow (20-30m). Two models for 100E show that a 10m thick body of susceptibility = 10,000 x 10^{-6} cgs or a 60m thick body of susceptibility = 2000 x 10^{-6} cgs could fit the anomaly equally well. The situation would be similar on the other lines.

A thin, steeply dipping body of high susceptibility does not look like basalt, although a thicker body of basalt (more basalt valleys? or a basalt hill?) could be the explanation. A line of max-min (and gravity?) would be worthwhile to resolve this. No basalt.


MAGMOD PRISM MODEL
RED CREEK
Fig. 1.
OBSERVED
MODELLED
MAGNET 700.83
DIP 124.36
BASE LEVEL 62242.10
X SLOPE 0.57
Y SLOPE 0.25
X POSITION 1264.71
Y POSITION -572.36
X H-WIDTH 12.95
Y H-WIDTH 204.41
DEPTH 18.47
THICKNESS 44.60
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DECLNATN 80.00
VERTICAL 0.00
ORIENTATN 50.00

542033

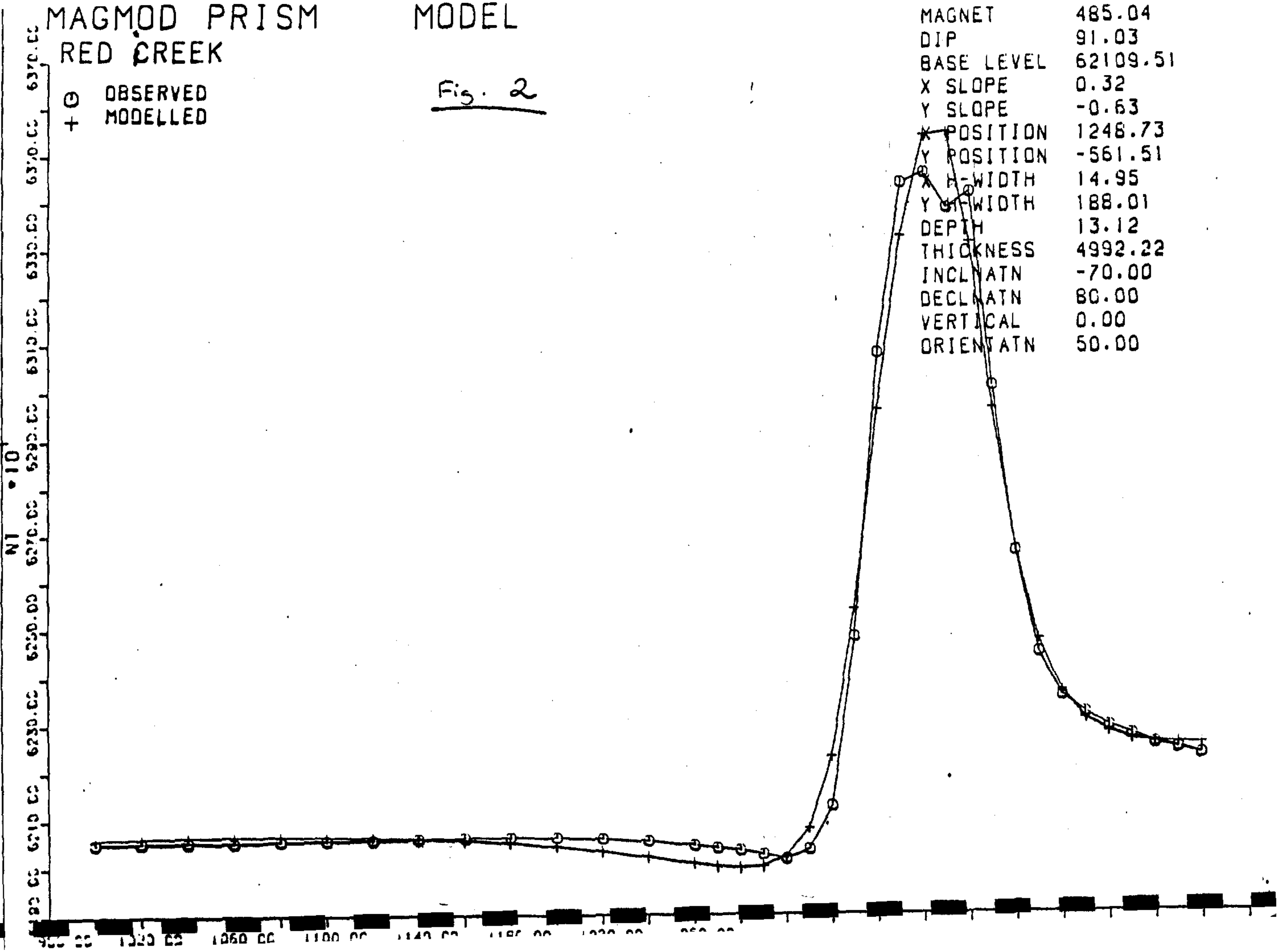
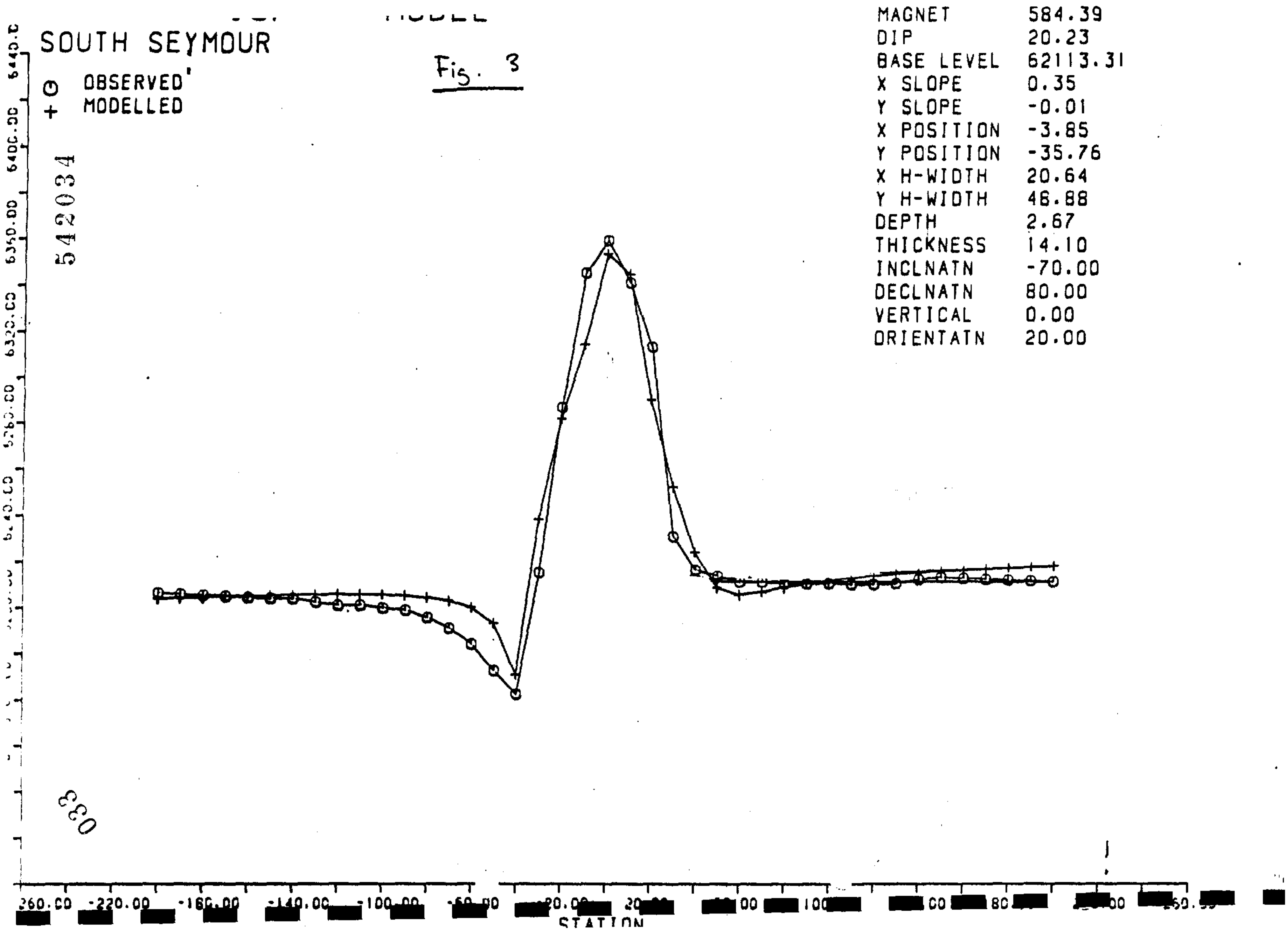
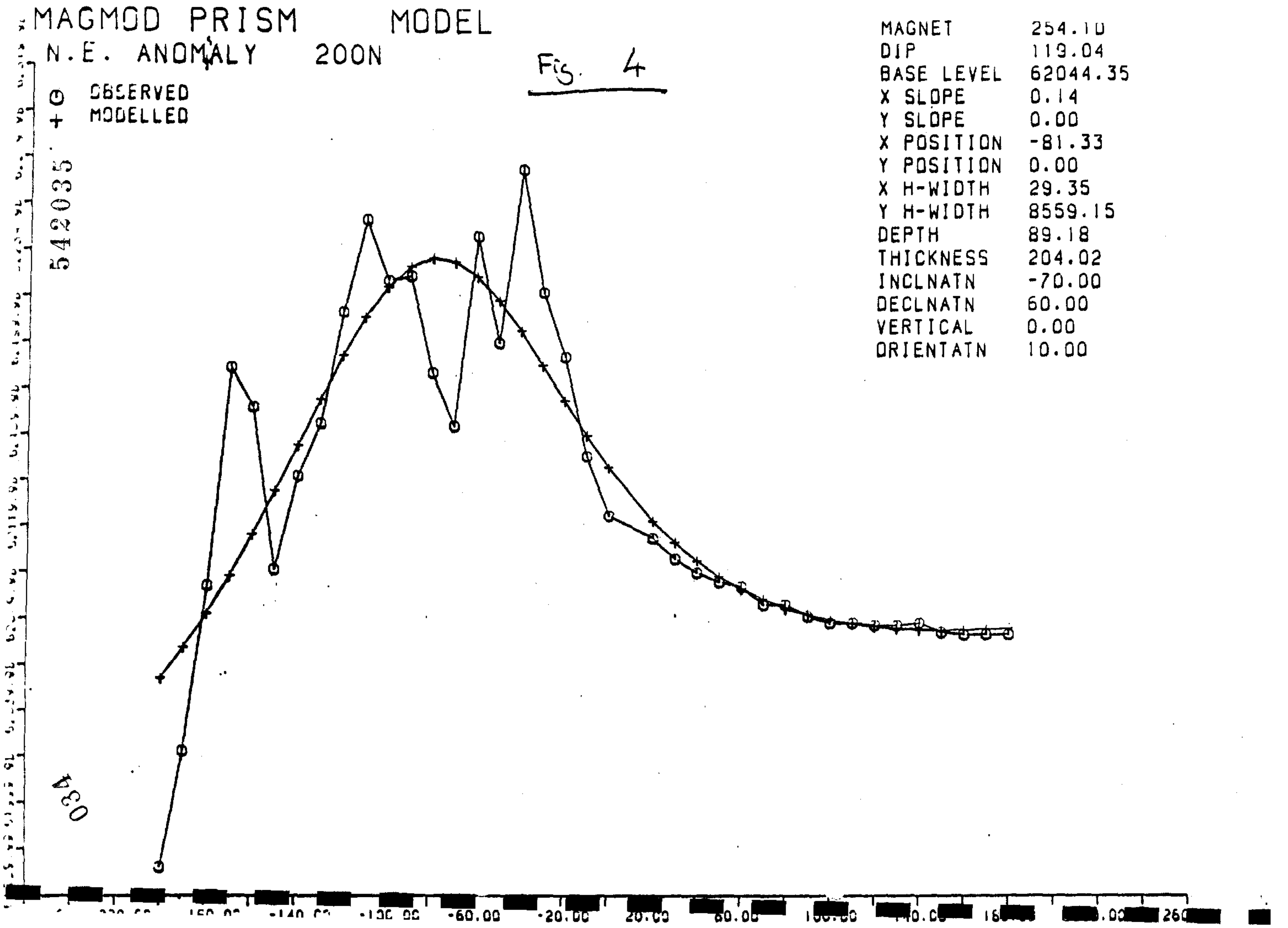


Fig. 2

032


SOUTH SEYMOUR
Fig. 3
OBSERVED'
MODELLED
542034
MAGNET 584.39
DIP 20.23
BASE LEVEL 62113.31
X SLOPE 0.35
Y SLOPE -0.01
X POSITION -3.85
Y POSITION -35.76
X H-WIDTH 20.64
Y H-WIDTH 46.88
DEPTH 2.67
THICKNESS 14.10
INCLNATN -70.00
DECLNATN 80.00
VERTICAL 0.00
ORIENTATN 20.00
[redacted]
STATION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N.E. ANOMALY 200N
OBSERVED
MODELLED
542035
MAGNET 254.10
DIP 119.04
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Y SLOPE 0.00
X POSITION -81.33
Y POSITION 0.00
X H-WIDTH 29.35
Y H-WIDTH 8559.15
DEPTH 89.18
THICKNESS 204.02
INCLNATN -70.00
DECLNATN 60.00
VERTICAL 0.00
ORIENTATN 10.00
-60.00
-20.00
20.00
60.00

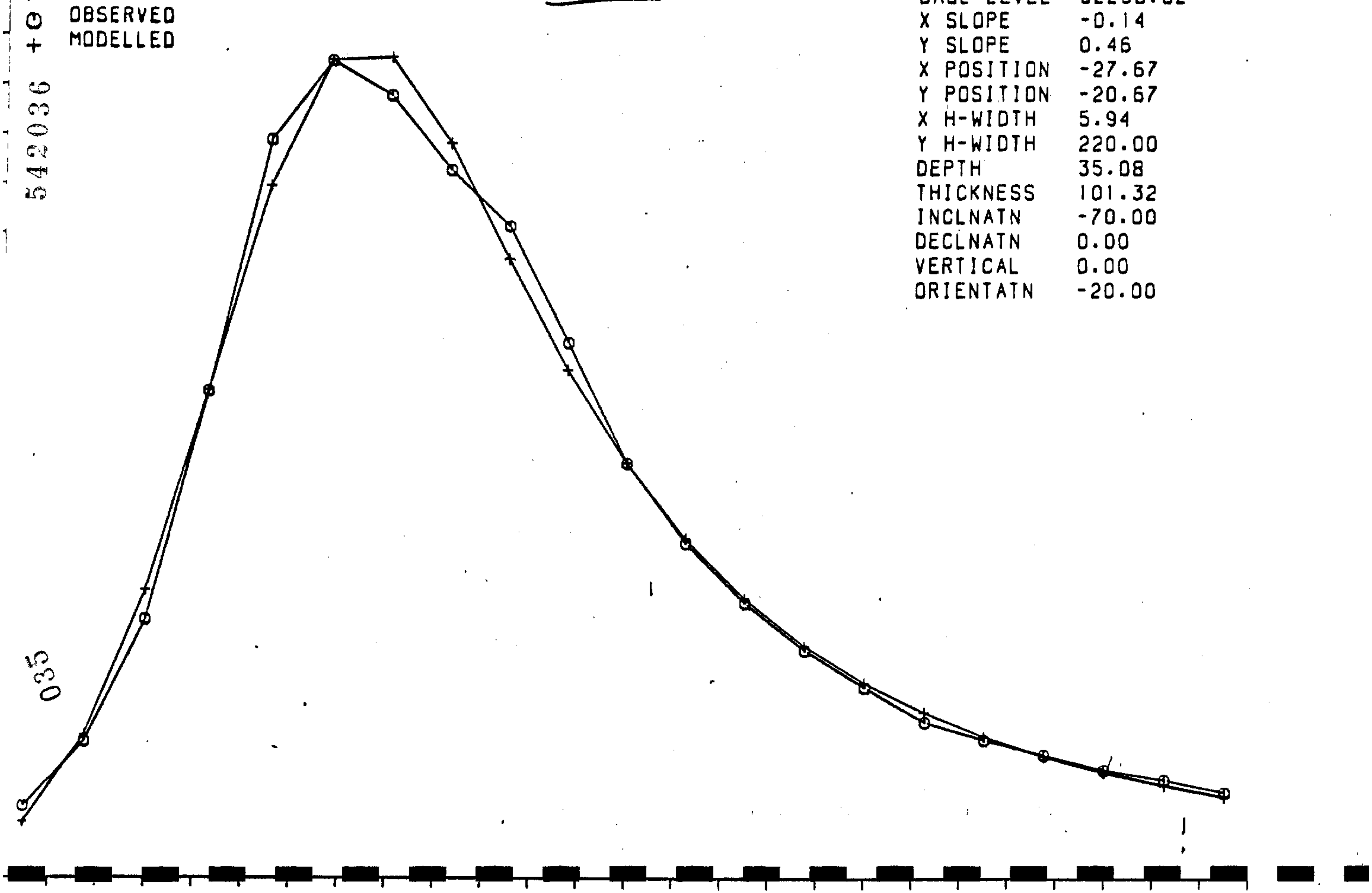
Fig. 4

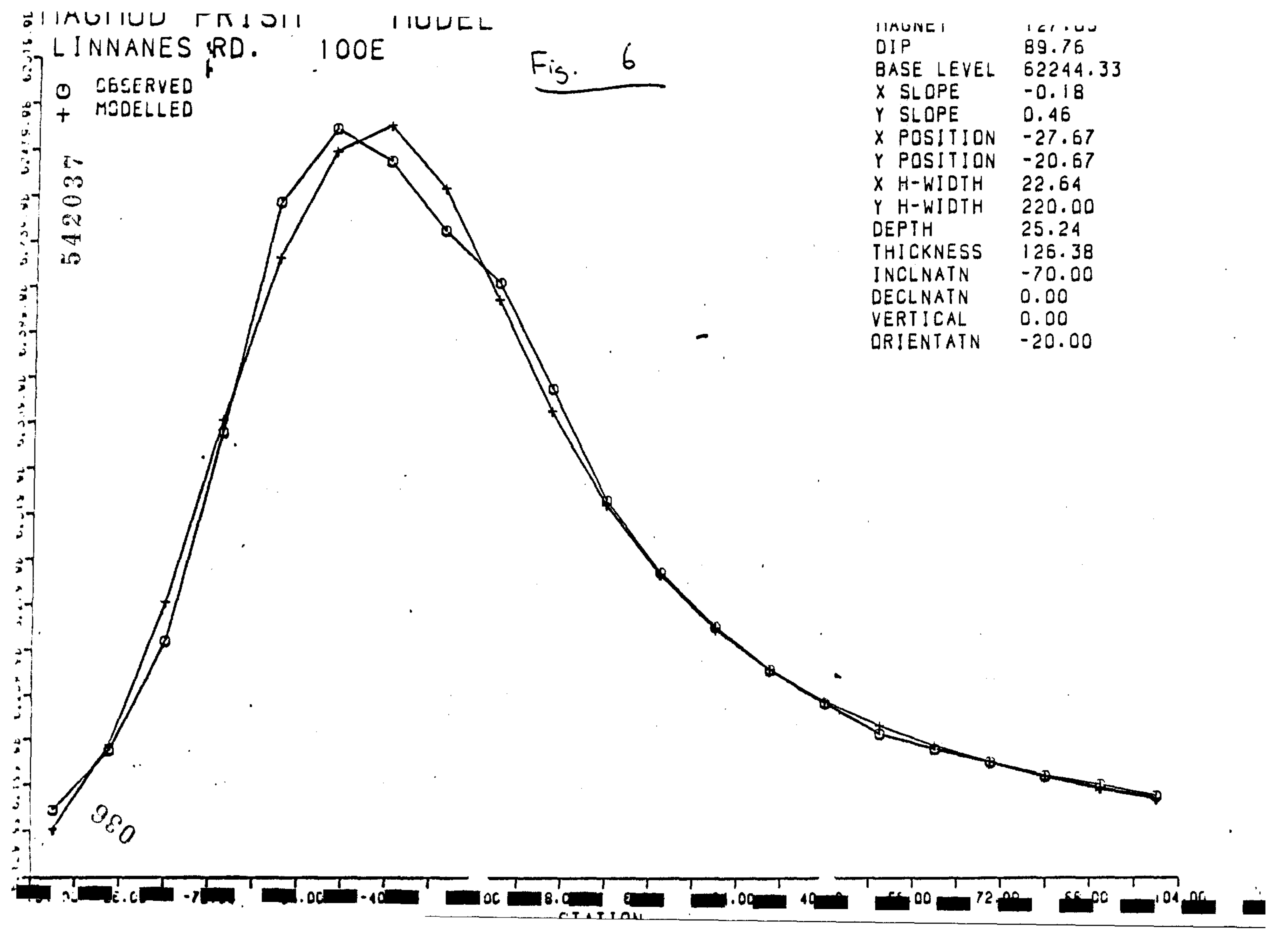
MAGMOD PRISM MODEL

LINNANES RD. 100E

Fig. 6

MAGNET	627.21
DIP	91.12
BASE LEVEL	62238.82
X SLOPE	-0.14
Y SLOPE	0.46
X POSITION	-27.67
Y POSITION	-20.67
X H-WIDTH	5.94
Y H-WIDTH	220.00
DEPTH	35.08
THICKNESS	101.32
INCLNATN	-70.00
DECLNATN	0.00
VERTICAL	0.00
ORIENTATN	-20.00





MAGMOD PRISM MODEL
LINNANES RD. 100E
O OBSERVED
+ MODELLED
542037
036
MAGNET 127.05
DIP 89.76
BASE LEVEL 62244.33
X SLOPE -0.18
Y SLOPE 0.46
X POSITION -27.67
Y POSITION -20.67
X H-WIDTH 22.64
Y H-WIDTH 220.00
DEPTH 25.24
THICKNESS 126.38
INCLNATN -70.00
DECLNATN 0.00
VERTICAL 0.00
ORIENTATN -20.00
STATION

Fig. 6

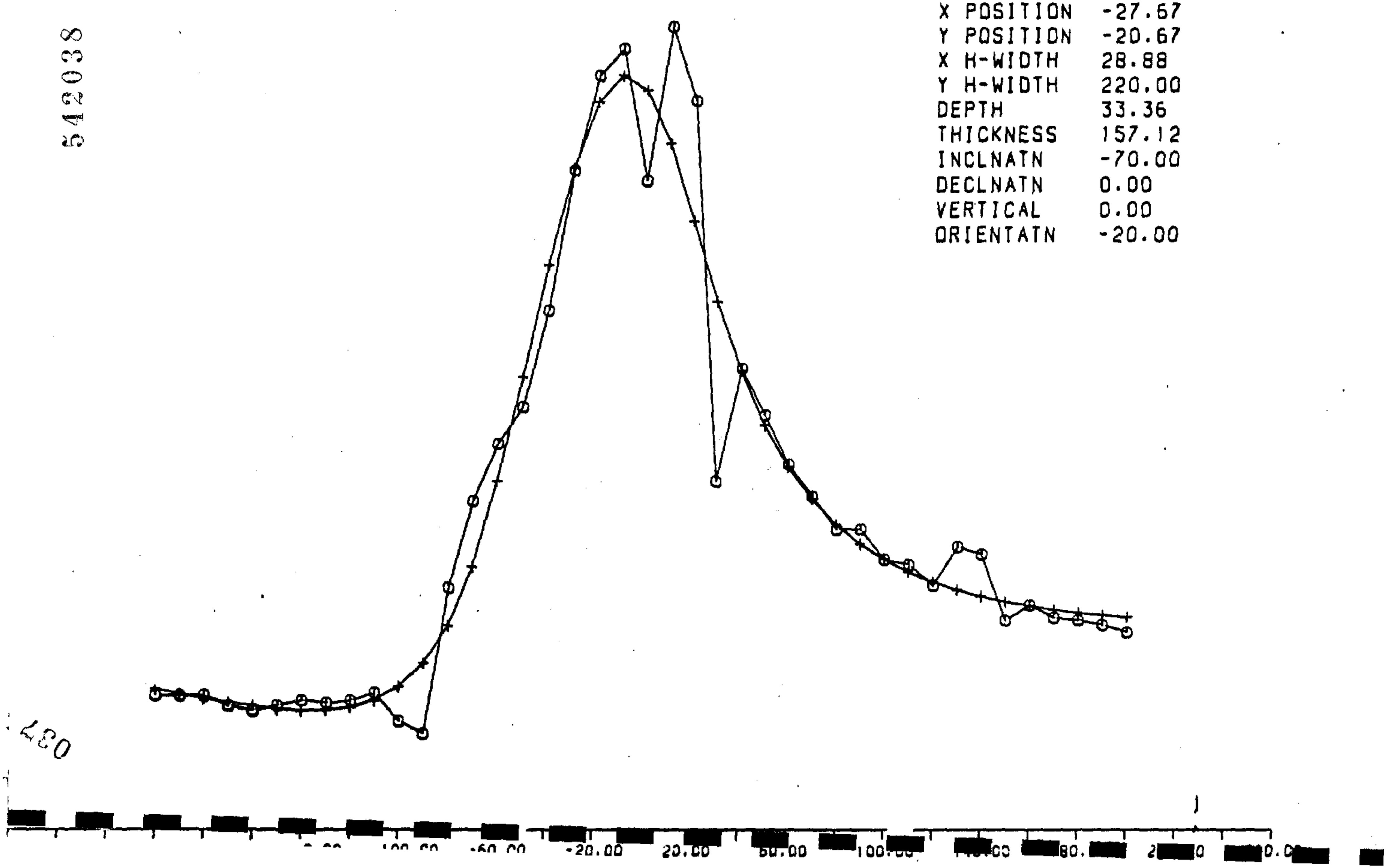
MAGMOD PRISM MODEL
LINNANES RD. OE

Fig. 7

⊙ OBSERVED
\+ MODELLED

542038

MAGNET	99.82
DIP	106.32
BASE LEVEL	62173.42
X SLOPE	-0.01
Y SLOPE	0.46
X POSITION	-27.67
Y POSITION	-20.67
X H-WIDTH	28.88
Y H-WIDTH	220.00
DEPTH	33.36
THICKNESS	157.12
INCLNATN	-70.00
DECLNATN	0.00
VERTICAL	0.00
ORIENTATN	-20.00



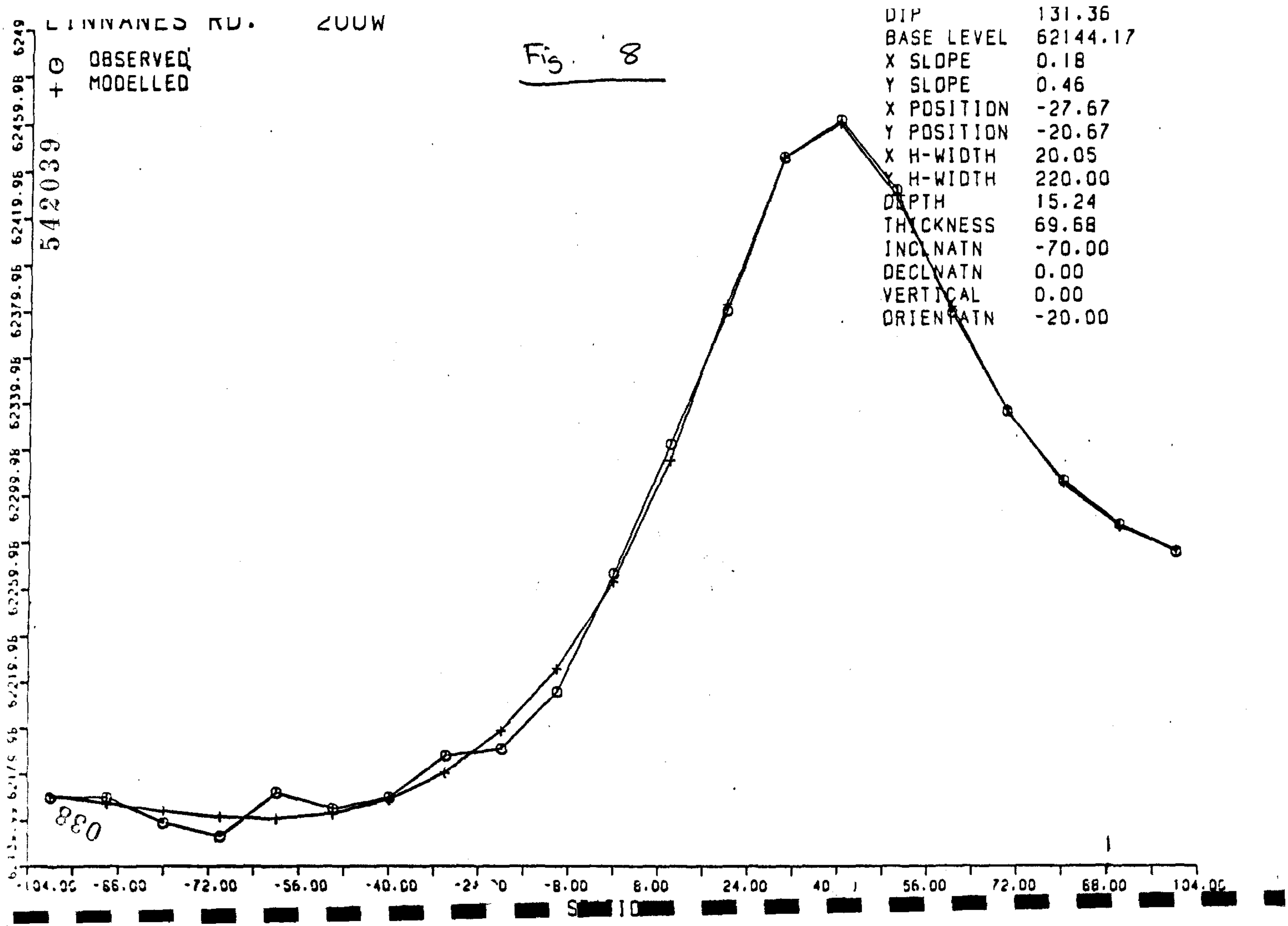

LINNANES RD. 200W
O OBSERVED
+ MODELLED
542039
DIP 131.36
BASE LEVEL 62144.17
X SLOPE 0.18
Y SLOPE 0.46
X POSITION -27.67
Y POSITION -20.67
X H-WIDTH 20.05
Y H-WIDTH 220.00
DEPTH 15.24
THICKNESS 69.68
INCLNATN -70.00
DECLNATN 0.00
VERTICAL 0.00
ORIENTATN -20.00
62459.98
62419.98
62379.98
62339.98
62299.98
62259.98
62219.98
-104.00
-88.00
-72.00
-56.00
-40.00
-8.00
8.00
24.00
56.00
72.00
88.00
104.00
S[redacted]ID
038

Fig 8

039

APPENDIX 3

542041

040

Central Mineralogical Services

CMS

39 Beulah Road
Norwood, S.A. 5067
Telephone 42 5659

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

17th January, 1983

REPORT CMS 82/12/34

YOUR REFERENCE:	Sample Despatch No. 4310/PW44/WDS/164
DATE RECEIVED:	24th December, 1982
SAMPLE NOS.:	21083, 21085, 21087
SUBMITTED BY:	W.D. Smyth
WORK REQUESTED:	Petrology

HWFander.

H.W. Fander, M. Sc.

041

REPORT CMS 82/12/34

Three samples were received for petrological examination; two samples were decomposed and very friable, requiring impregnation before sectioning. The rocks are individually described below.

21083 (T.S. 44942)
This is believed to be a basic tuff, and textures and structures suggest that it is a "snowball" tuff, the spheroidal structures being acquired by a process of snowballing/accretion.

The rock consists of crudely concentrically arranged small splinters of altered glass, feldspar, ferromagnesian minerals (including ?olivine), scoriaceous fragments and occasional quartz. Although all the components (except quartz) are altered, they must have comprised vitric, lithic and crystal fragments. There are pronounced concentric fractures, reflecting the mode of formation of the rock.

The inferred mineral assemblage indicates a basic volcanic source; the quartz particles are xenolithic.

21085 (T.S. 44943)
This is an altered tuff of intermediate to basic (andesitic-basaltic) composition; it was probably subaqueously deposited and could be mildly reworked. The rock may be correlatable with tuffaceous members of the Crimson Creek formation.

The rock is well-sized and -sorted, homogeneous, with bedding-orientation of the framework grains which are of elongate or tabular shape. The framework grains consist mainly of patches of chloritic minerals (believed to be pseudomorphous after ferromagnesian minerals and basic glass), limonitic grains, argillised feldspars, and abundant oxide opaques including leucoxene and hematite; angular quartz grains are interspersed. The cement is mainly ferruginous and argillaceous.

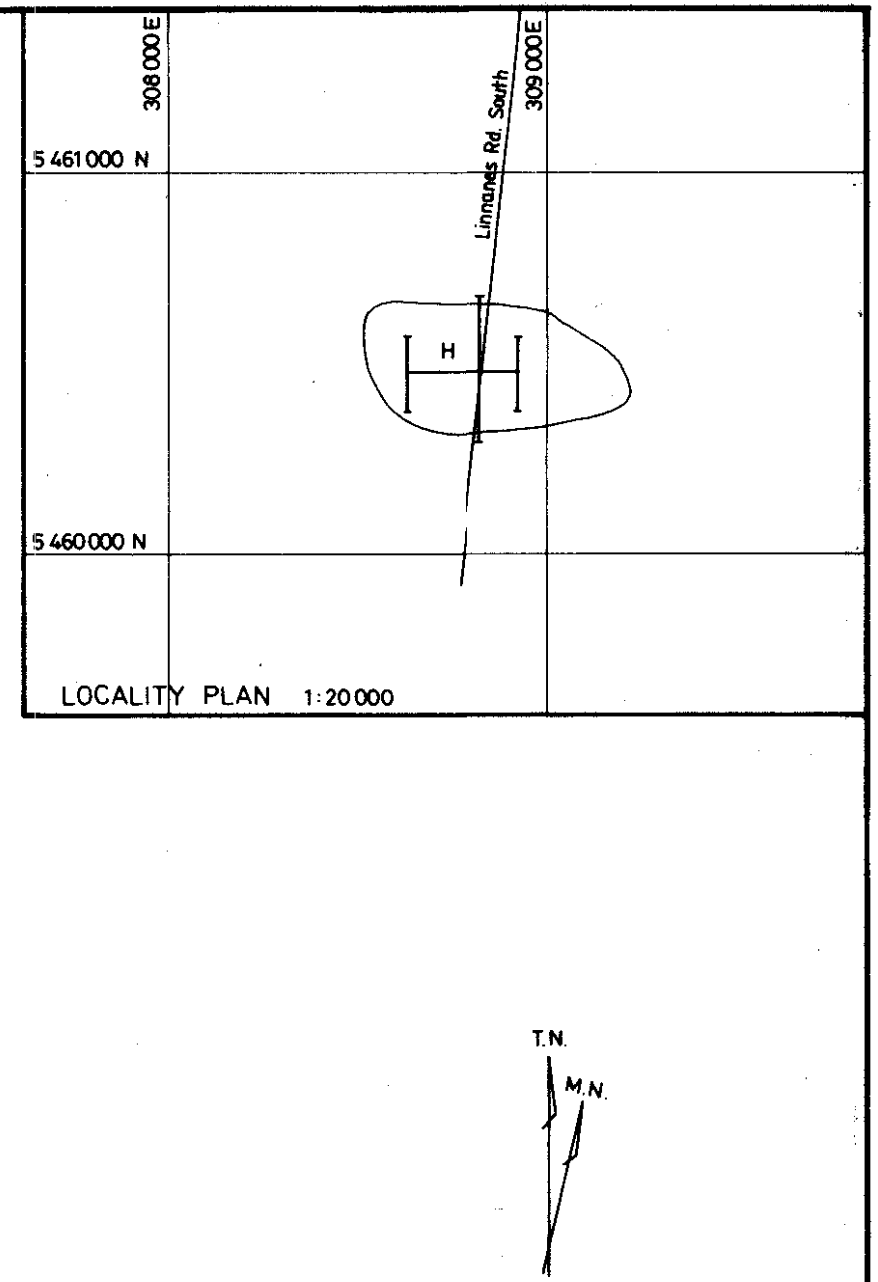
21087 (T.S. 44944)
This is an altered porphyritic basalt, brecciated and veined by serpentinous minerals; it is olivine-bearing and may be Tertiary.

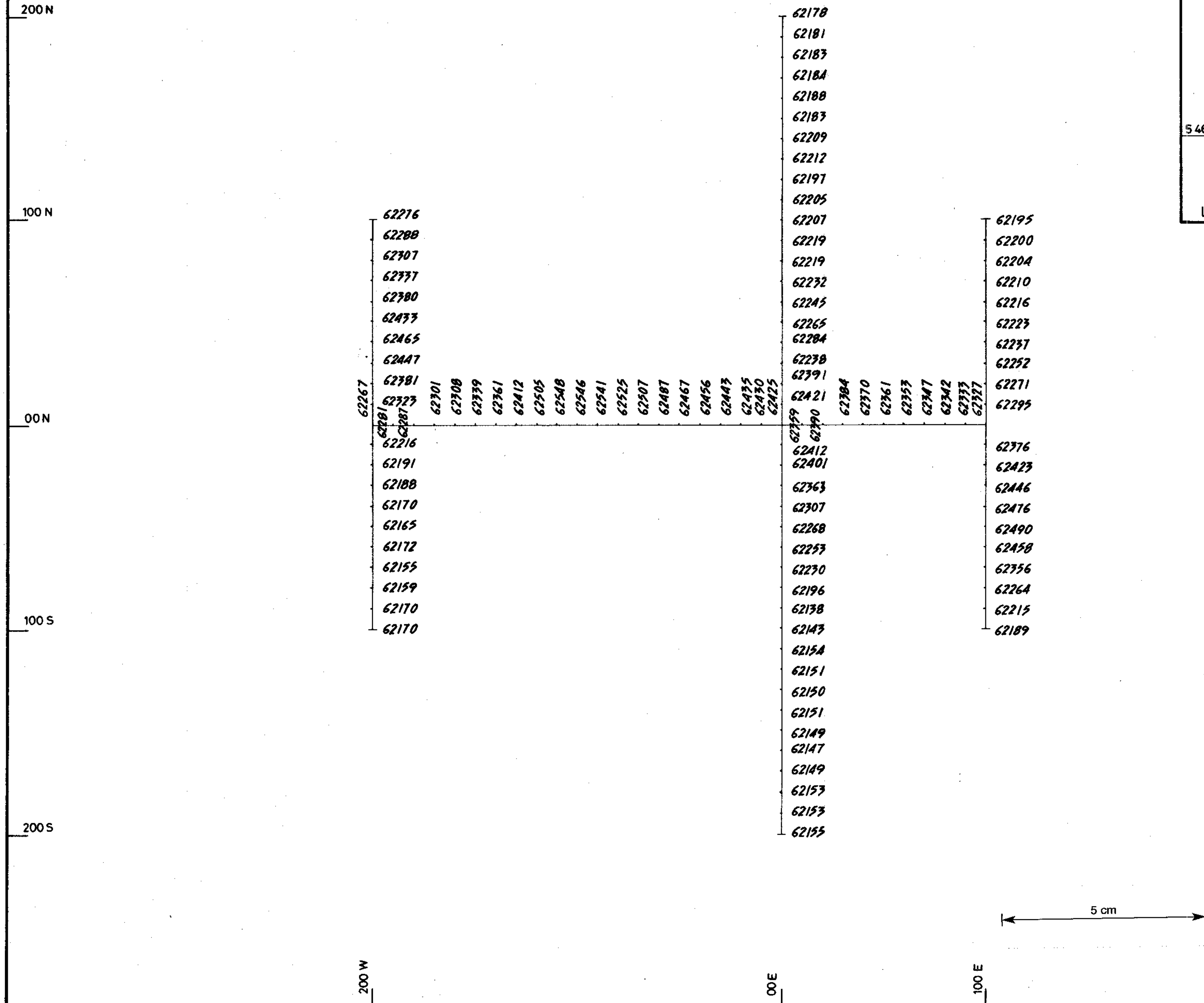
The rock consists of serpentinised olivine and pyroxene phenocrysts set in a mass of random, argillised plagioclase laths, interstitial glass, and microcrystalline altered pyroxene. Flow features are absent and suggest that the rock could be a minor intrusive or from the interior of a flow; amygdales are also absent. Some textures suggest that brecciation may have occurred, at least in part, before complete consolidation; this strengthens support for, but does not prove, an extrusive occurrence.

There may be a genetic relationship between 21083 and 21087.

H.W. Fander, M. Sc.


83-2009
The Shell Company of Australia Limited
METALS DIVISION
E.L. 49/80 MARRAWAH
GEOLOGY
542043
SCALE 1: 20 000
DATE 22-2-83
AUTHOR W.D. SMYTH
DRAWN H.L SMYTH
OFFICE DEVONPORT
REP.No.
DRG.No. D/PW44/003
FIG.No.
042
5 cm
Kilometres
N
LEGEND
Alluvials/basalt talus
Recent sands
Holocene sands
Tertiary Marine Limestone
Tertiary basalt
Cambrian sediments/volcanics
Cambrian ? Gabbro
Precambrian dolomite - Smithton dolomite
Precambrian quartzites/mudstones
Aeromagnetic linears
Air photo linears
Swamp
Bedding
Quarry
MAGNETIC ANOMALIES
1 Mc Kay's Rd.
2 Bowood Hill
3 Red Creek
4 South Seymour
5 Linnane's Rd
6 North East
7 South
8 Fairview Rd.
9 Red Creek II
RADIOMETRIC ANOMALY
300 000 E
302 000 E
304 000 E
306 000 E
308 000 E
310 000 E
312 000 E
5 470 000 N
5 468 000 N
5 466 000 N
5 464 000 N
5 462 000 N
Southern Ocean
Green Point Road
West Point Road
MARRAWAH
REDPA
Comeback Road
BASS HIGHWAY
Arthur River Road
Wells Road
Fairview Road
To Smithton
Possible fault zone
pE dol
Tm





Proton precession magnetometer
Sensor height 2.5M

542044 043

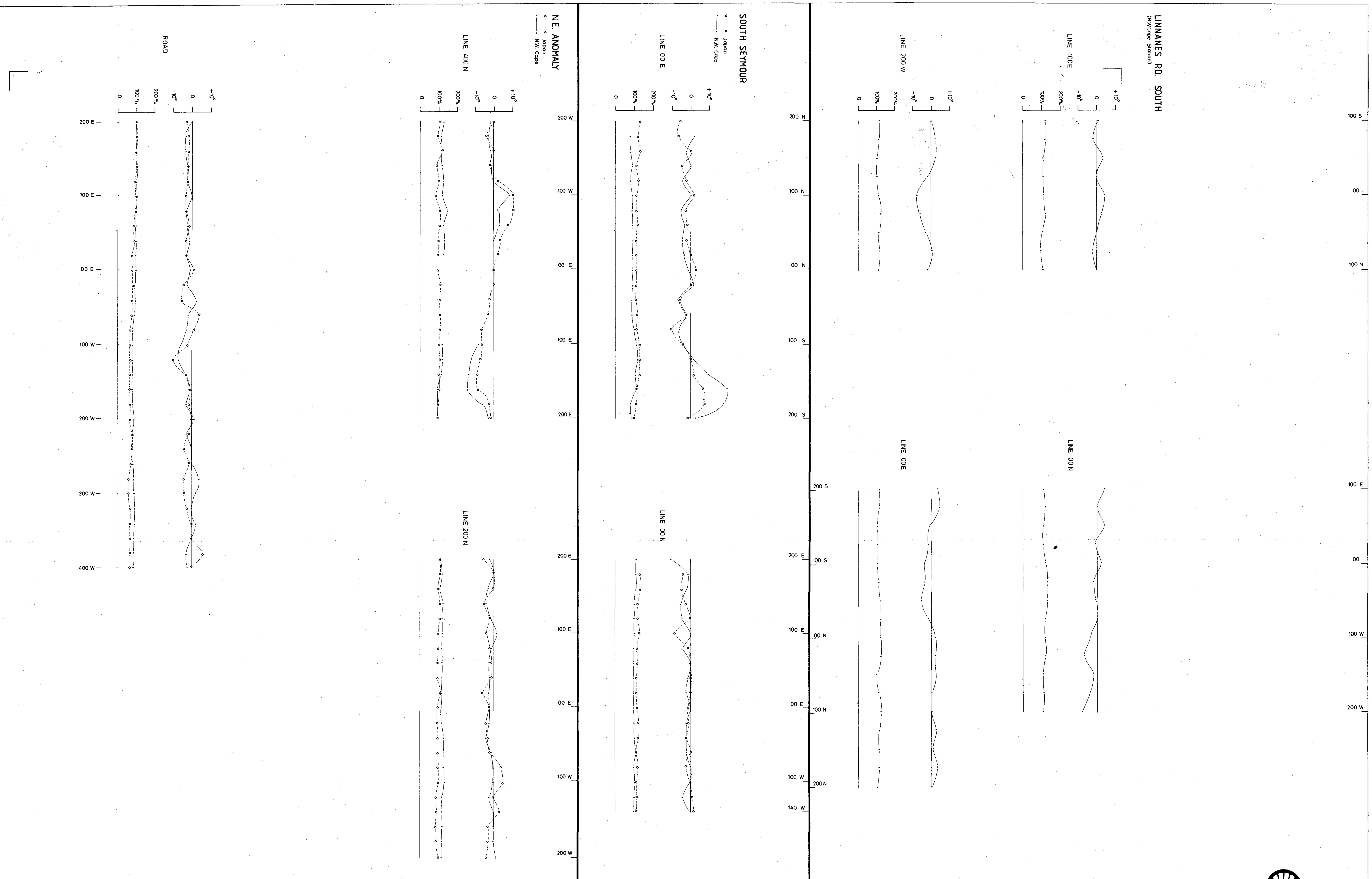
0 50 100M

The Shell Company of Australia Limited
METALS DIVISION

E.L. 49 / 8 MARRAWAH
LINNANES RD. SOUTH
AEROMAGNETIC ANOMALY
GROUND MAGNETICS

83-2009

SCALE	1: 2000	DATE	10-5-82
AUTHOR	W.D. SMYTH	DRAWN	H.L.H.
OFFICE	DEVONPORT	REP.No.	
DRG.No.	D/PW-4/011	FIG.No.	



542045

044

0 100 200M

The Shell Company of Australia Limited
METALS DIVISION

E.L. 49/80 MARRAWAH
V.L.F. PROFILES

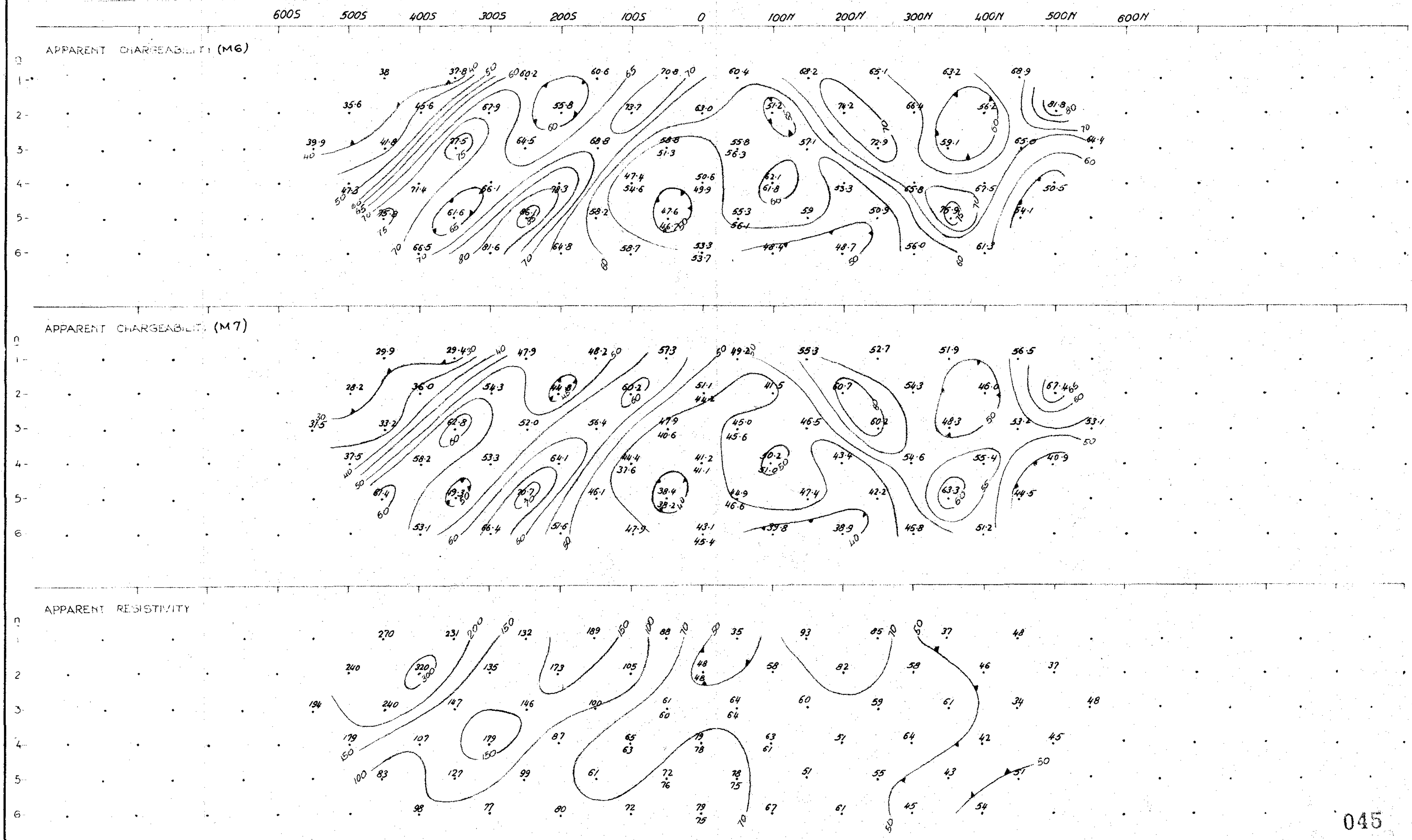
SCALE	1: 2500	DATE	24-8-82
AUTHOR	W.D. SMYTH	DRAWN	H.L.S.
OFFICE	DEVONPORT	REP. No.	
ENCL. No		DRG No	D/PW44/030

5 cm

83-2009

AIRBORNE GEOPHYSICS
(EM MAG etc)

GEOLOGY
& TOPOGRAPHY



Contractor SCINTREX (Job Nº TAS-103)
Date 18/19 DEC '82
Timing 2 sec
Transmitter
Receiver
Integration time
Array Dipole-dipole
Dipole length 100m

045

542046

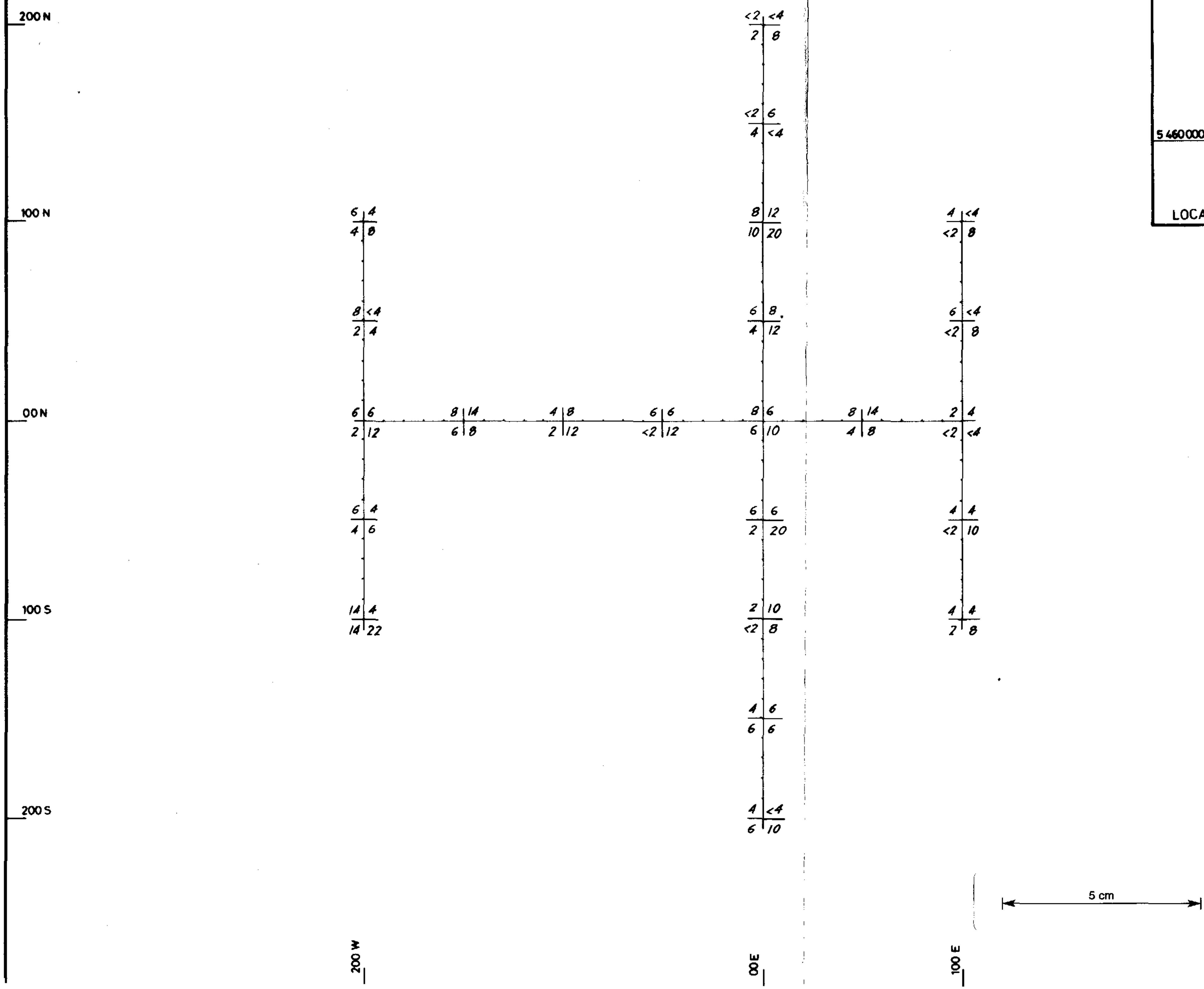
5 cm

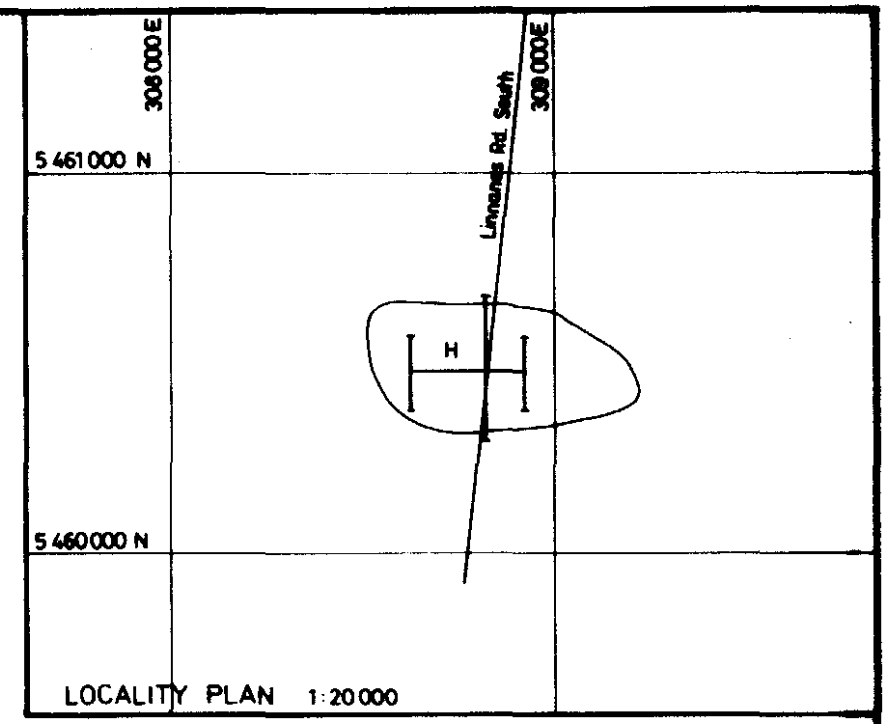
The Shell Company of Australia Limited
METALS DIVISION

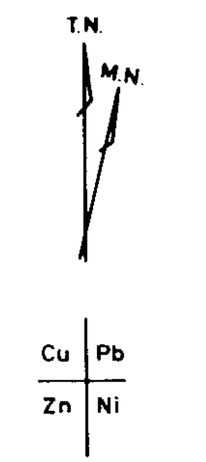
IP / RESISTIVITY SURVEY
E.L. 49/80 MARRAWAH
LINNANES ROAD

DWG No D/PW44/040

83-2009







Analyses in ppm.
Comlabs AAS1

542047

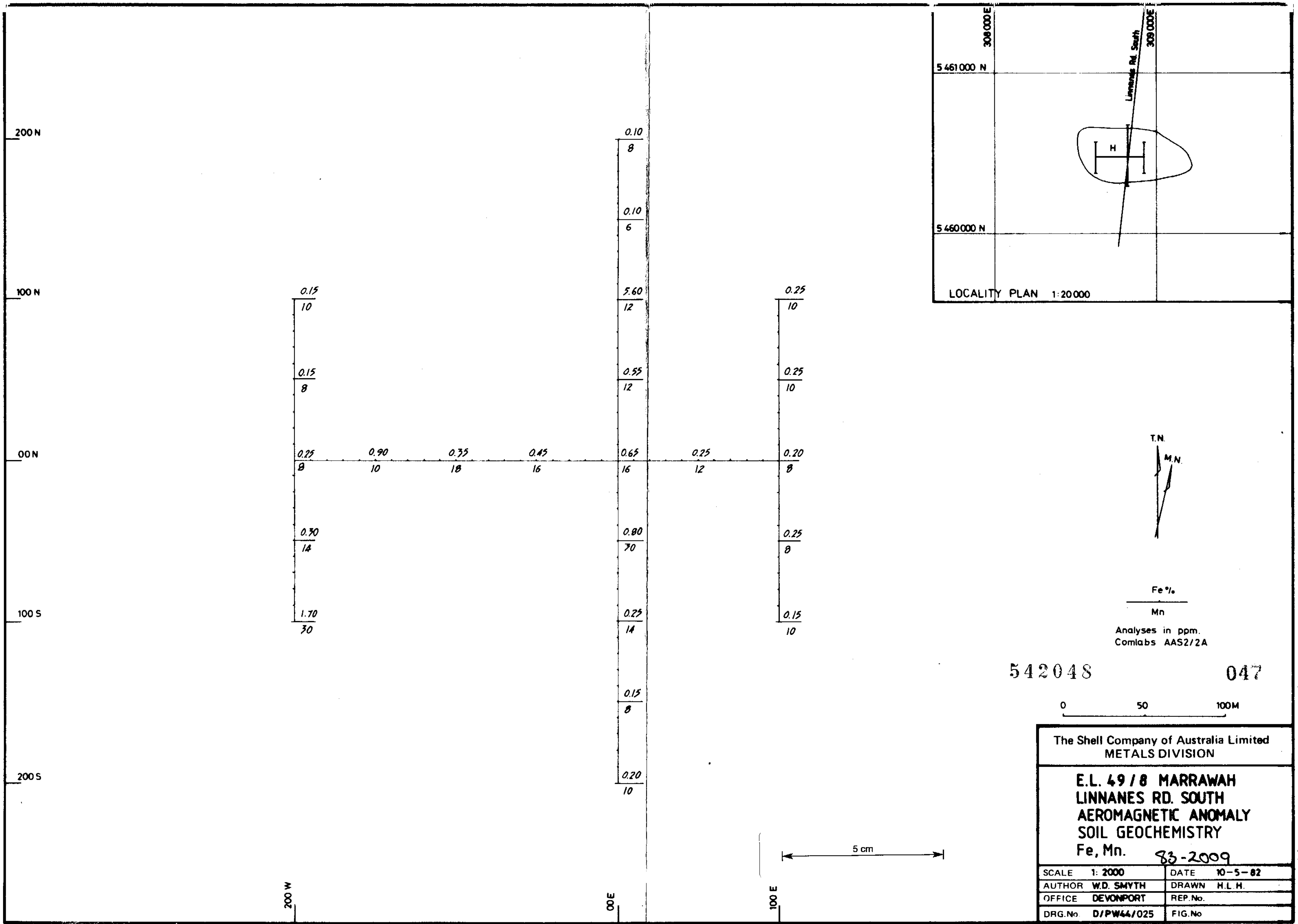
046

0 50 100M

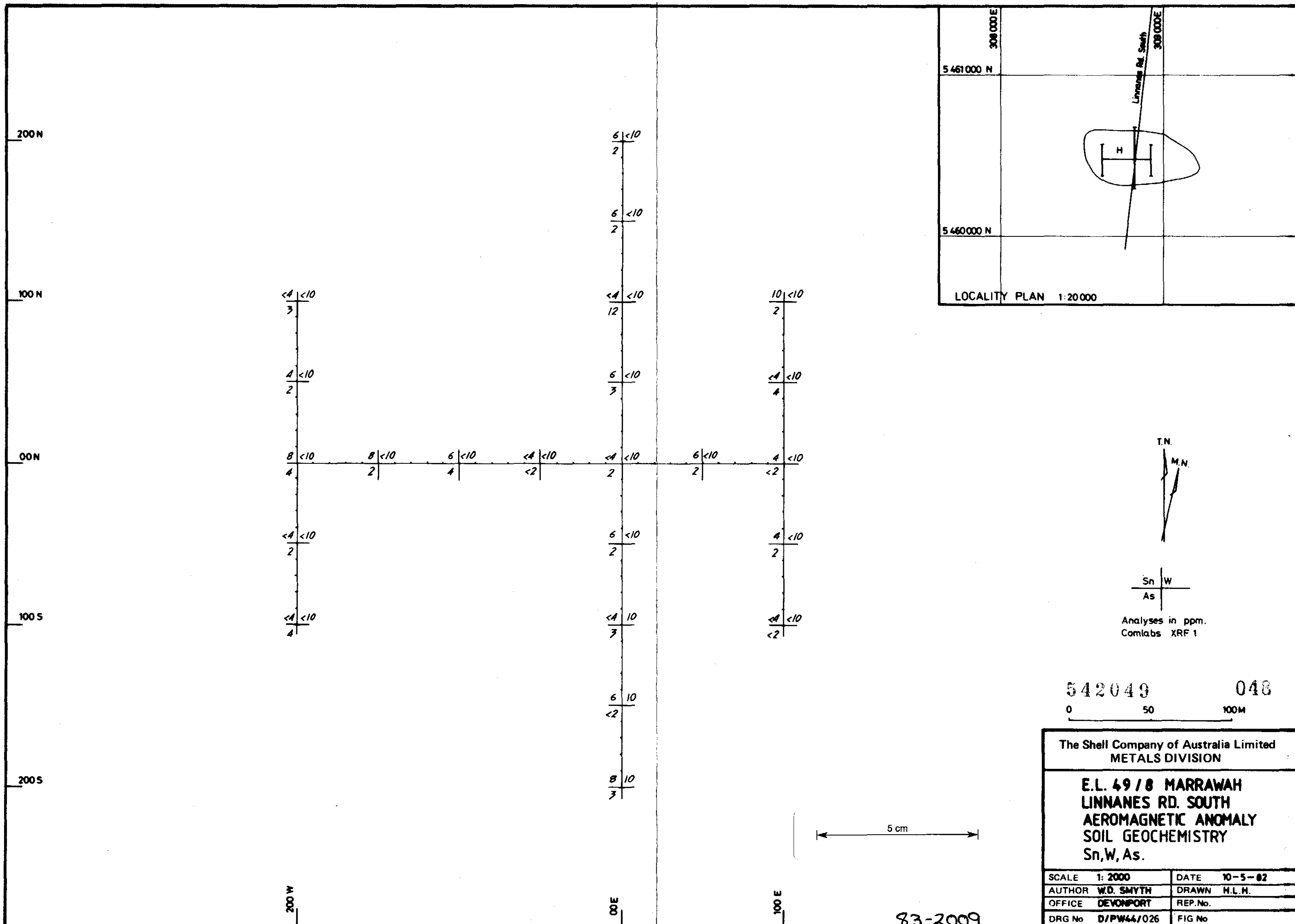
The Shell Company of Australia Limited
METALS DIVISION

E.L. 49 / 8 MARRAWAH
LINNANES RD. SOUTH
AEROMAGNETIC ANOMALY
SOIL GEOCHEMISTRY
Cu, Pb, Zn, Ni. 83-2009

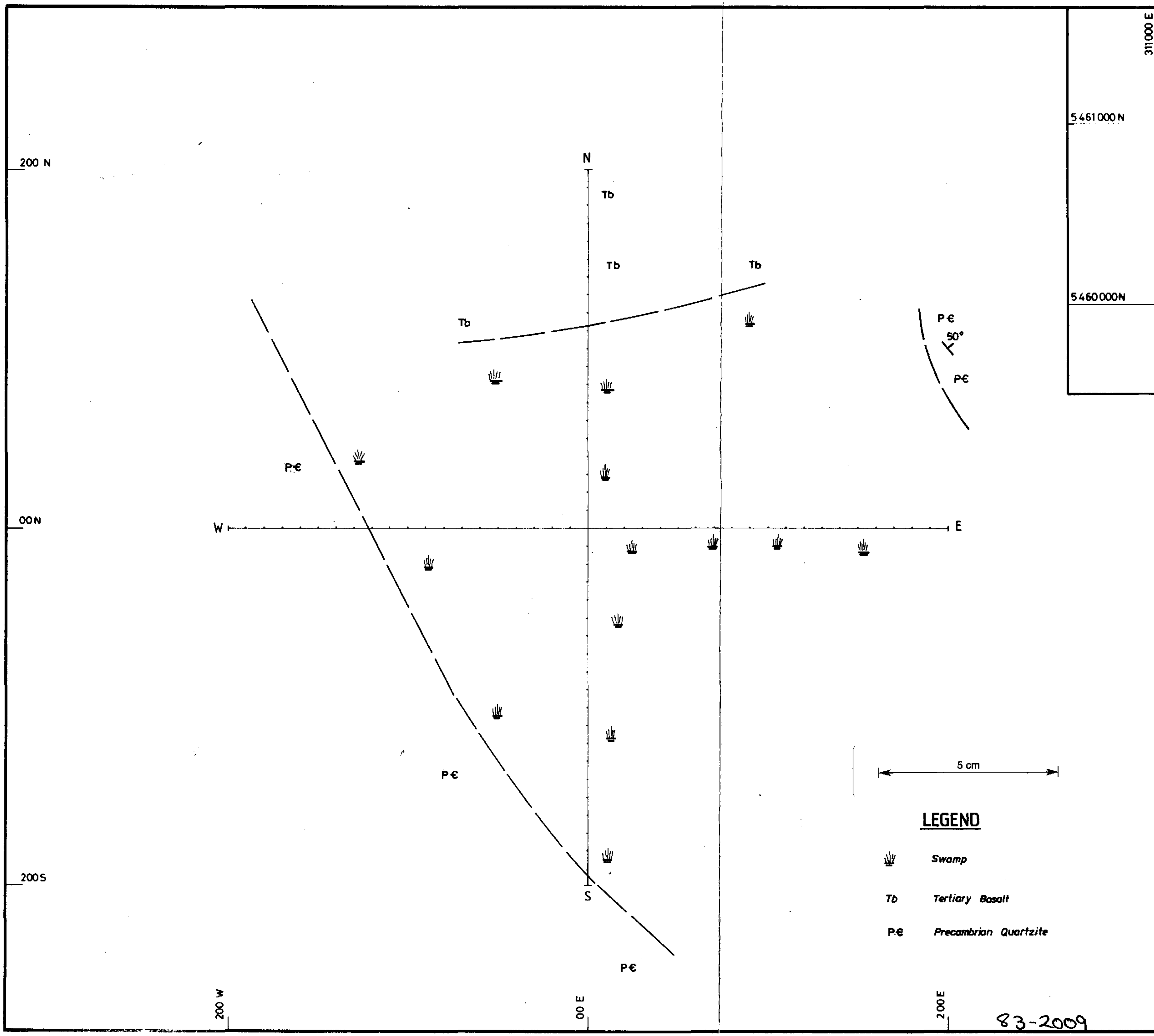
SCALE	1: 2000	DATE	10-5-82
AUTHOR	W.D. SMYTH	DRAWN	H.L H.
OFFICE	DEVONPORT	REP.No.	
DRG.No.	D/PW44/024	FIG.No	



5 461 000 N
5 460 000 N
308 000 E
309 000 E
Linnanes Rd. South
H
LOCALITY PLAN 1:20 000
200 N
100 N
00 N
100 S
200 S
200 W
00 E
100 E
0.10 / 8
0.10 / 6
5.60 / 12
0.55 / 12
0.65 / 16
0.80 / 70
0.25 / 14
0.15 / 8
0.20 / 10
0.15 / 10
0.15 / 8
0.25 / 8
0.90 / 10
0.35 / 18
0.45 / 16
0.70 / 14
1.70 / 30
0.25 / 12
0.25 / 10
0.25 / 10
0.20 / 8
0.25 / 8
0.15 / 10
T.N.
M.N.
Fe %
Mn
Analyses in ppm.
Comlabs AAS2/2A
542048
047
0
50
100M
5 cm
The Shell Company of Australia Limited
METALS DIVISION
E.L. 49/8 MARRAWAH
LINNANES RD. SOUTH
AEROMAGNETIC ANOMALY
SOIL GEOCHEMISTRY
Fe, Mn.
83-2009
SCALE 1: 2000
DATE 10-5-82
AUTHOR W.D. SMYTH
DRAWN H.L.H.
OFFICE DEVONPORT
REP. No.
DRG. No D/PW44/025
FIG. No



308 000E
309 000E
5 461 000 N
5 460 000 N
Linnanes Rd. South
H
LOCALITY PLAN 1:20 000
200 N
100 N
00 N
100 S
200 S
200 W
00E
100 E
T.N.
M.N.
Sn | W
As
Analyses in ppm.
Comlabs XRF 1
542049 048
0 50 100M
5 cm
83-2009
The Shell Company of Australia Limited
METALS DIVISION
E.L. 49 / 8 MARRAWAH
LINNANES RD. SOUTH
AEROMAGNETIC ANOMALY
SOIL GEOCHEMISTRY
Sn, W, As.
SCALE 1: 2000
DATE 10-5-82
AUTHOR W.D. SMYTH
DRAWN H.L.H.
OFFICE DEVONPORT
REP. No.
DRG No D/PW44/026
FIG No



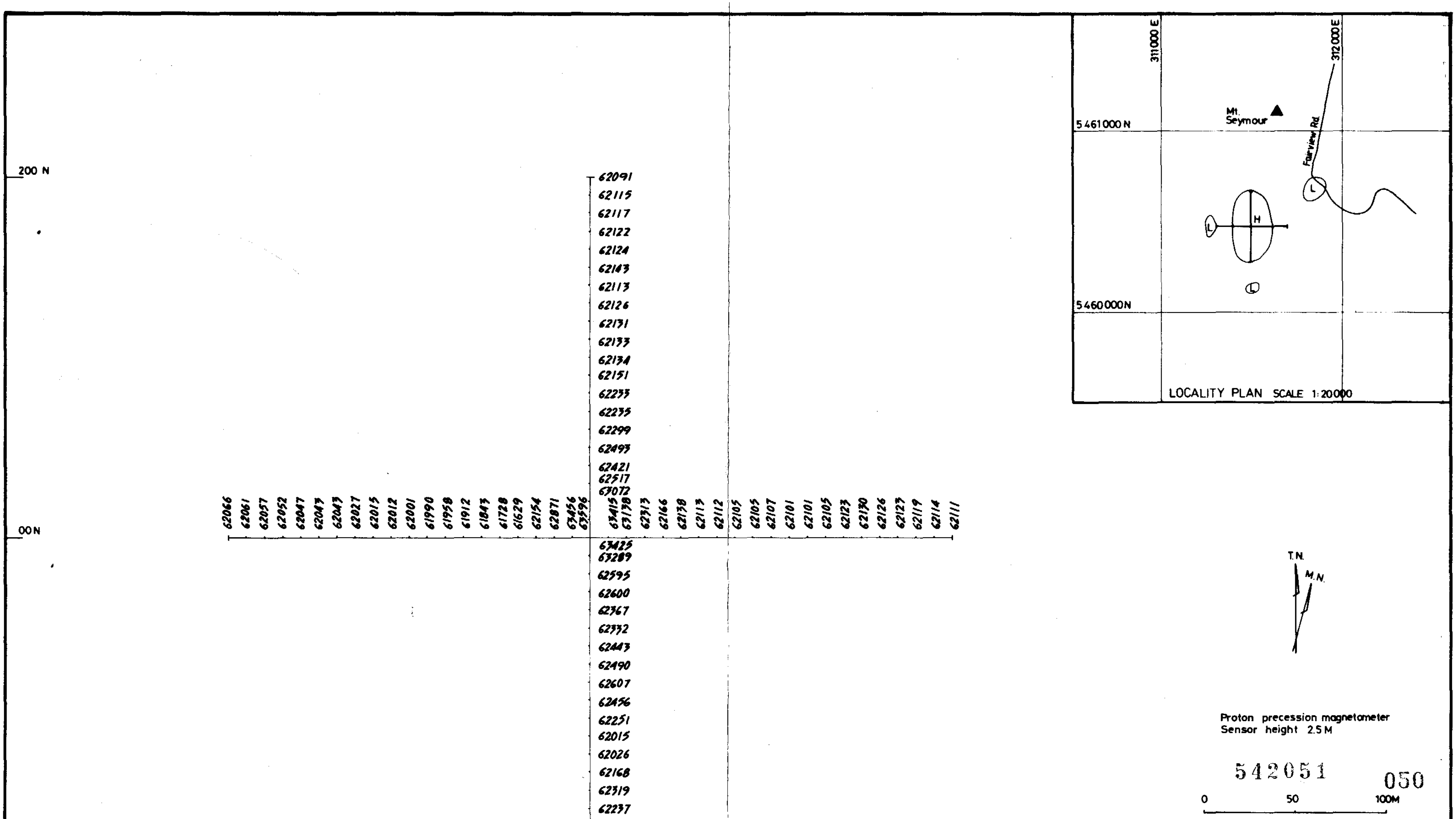
542050 049

The Shell Company of Australia Limited
METALS DIVISION

E.L. 49/80 MARRAWAH
SOUTH SEYMOUR
AEROMAGNETIC ANOMALY
GEOLOGY

SCALE	1:2000	DATE	30-11-82
AUTHOR	W.D. SMYTH	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP. No.	
DRG. No.	D/PW44/034	FIG. No.	

83-2009

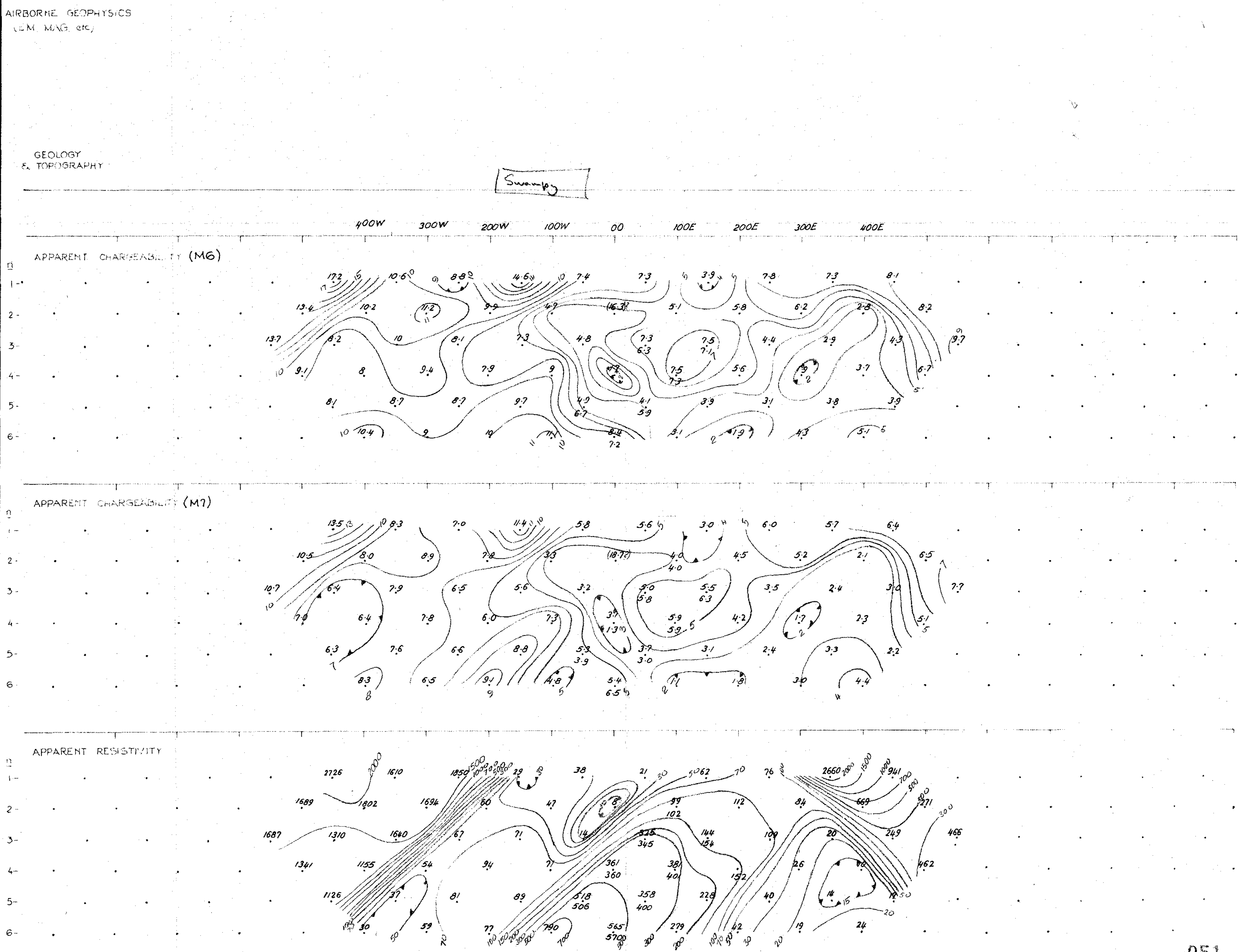


The Shell Company of Australia Limited
METALS DIVISION

E.L. 49/80 MARRAWAH
SOUTH SEYMOUR
AEROMAGNETIC ANOMALY
GROUND MAGNETICS

83-2009

SCALE	1:2000	DATE	10-5-82
AUTHOR	W.D. SMYTH	DRAWN	H.L.H.
OFFICE	DEVONPORT	REP.No.	
DRG No	D/PW44/010	FIG No	



Contractor SCINTREX (TAS-103)
Date 8-JAN-82
Timing 2 sec
Transmitter
Receiver
Integration time
Array Dipole-dipole
Dipole length 100m

542052

5 cm

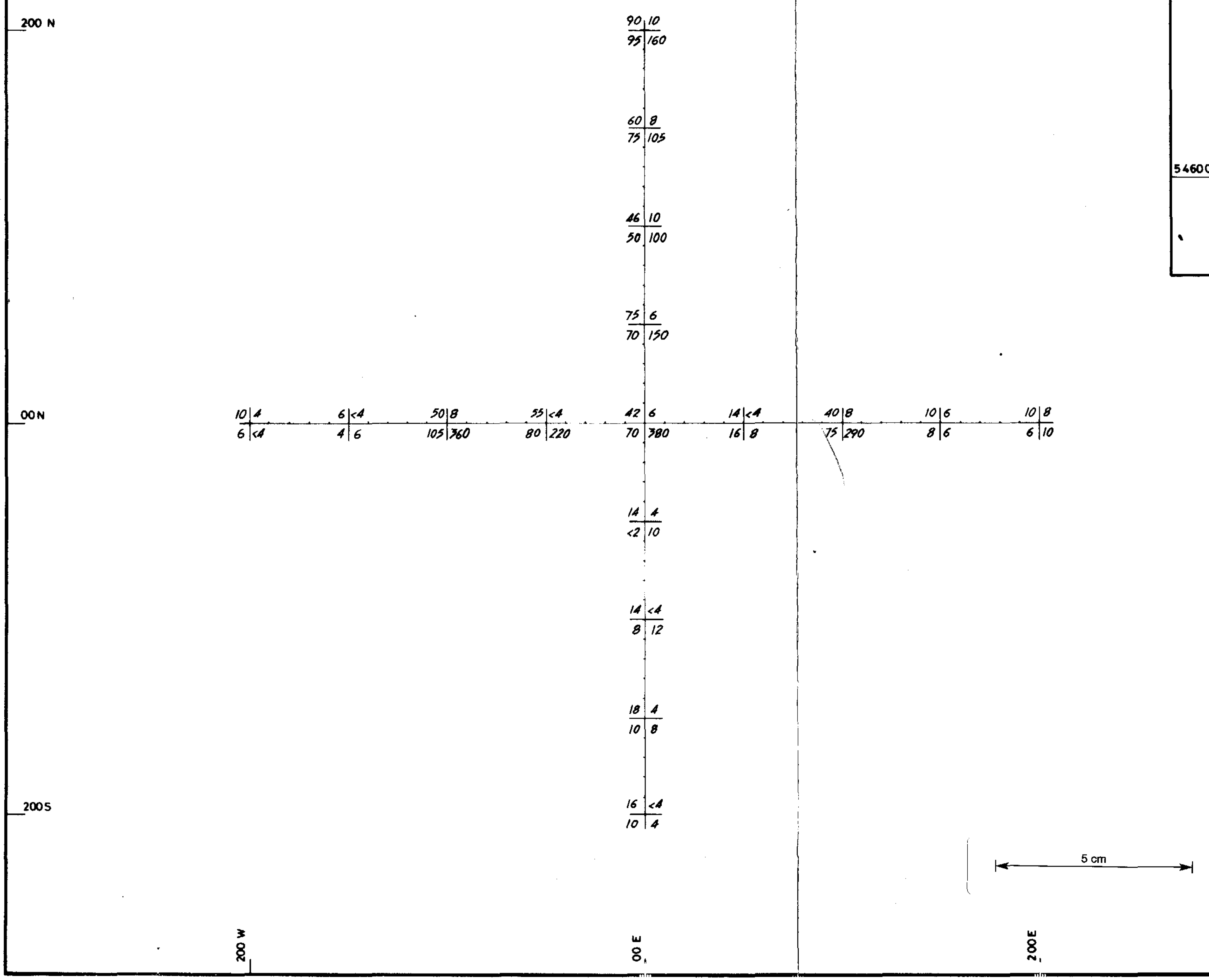
051

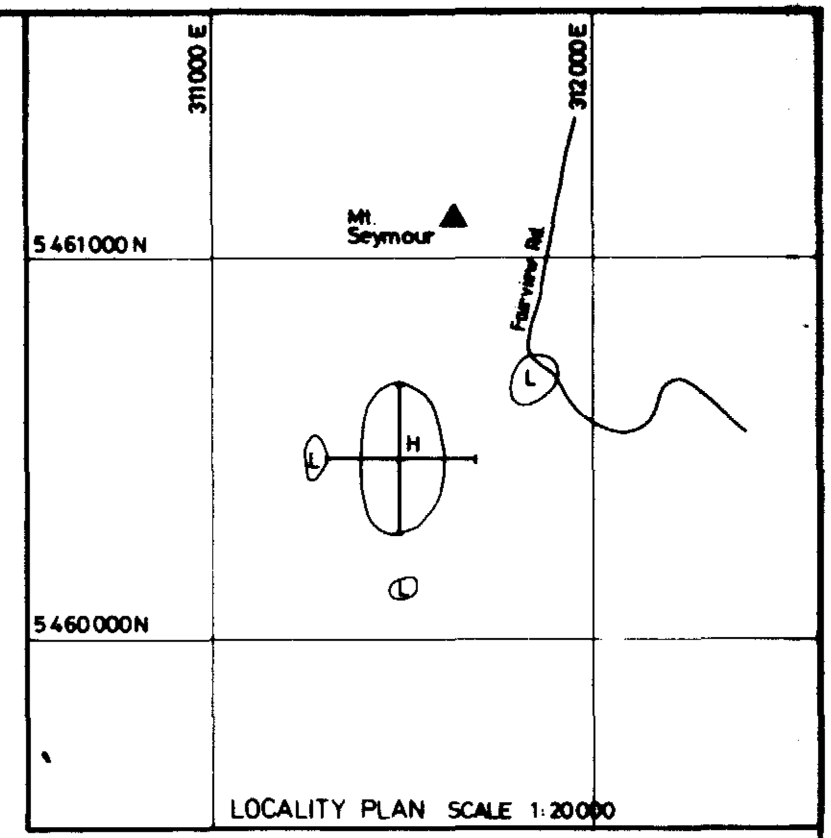
The Shell Company of Australia Limited
METALS DIVISION

IP/RESISTIVITY SURVEY
E.L. 49/80 MARRAWAH
SEYMORE SOUTH
00 N

	DWG No D/PW44/039

83-2009





T.N.
M.N.

Cu	Pb
Zn	Ni

Analyses in ppm.
Comlabs AAS 1

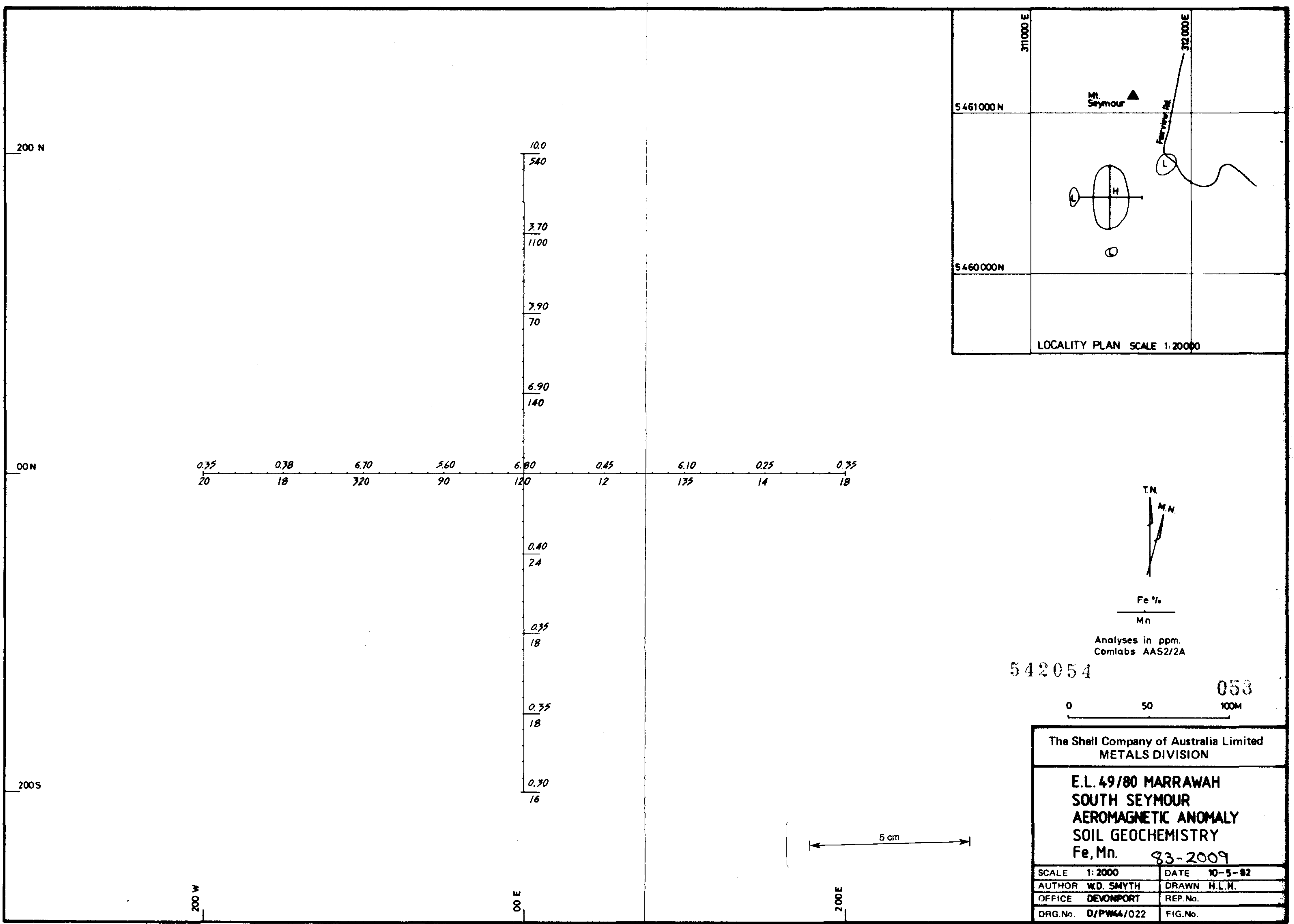
542053 052

0 50 100M

The Shell Company of Australia Limited
METALS DIVISION

E.L. 49/80 MARRAWAH
SOUTH SEYMOUR
AEROMAGNETIC ANOMALY
SOIL GEOCHEMISTRY
Cu, Pb, Zn, Ni. 83-2009

SCALE	1:2000	DATE	10-5-82
AUTHOR	W.D. SMYTH	DRAWN	H.L.H.
OFFICE	DEVONPORT	REP. No.	
DRG No	D/PW44/021	FIG No	



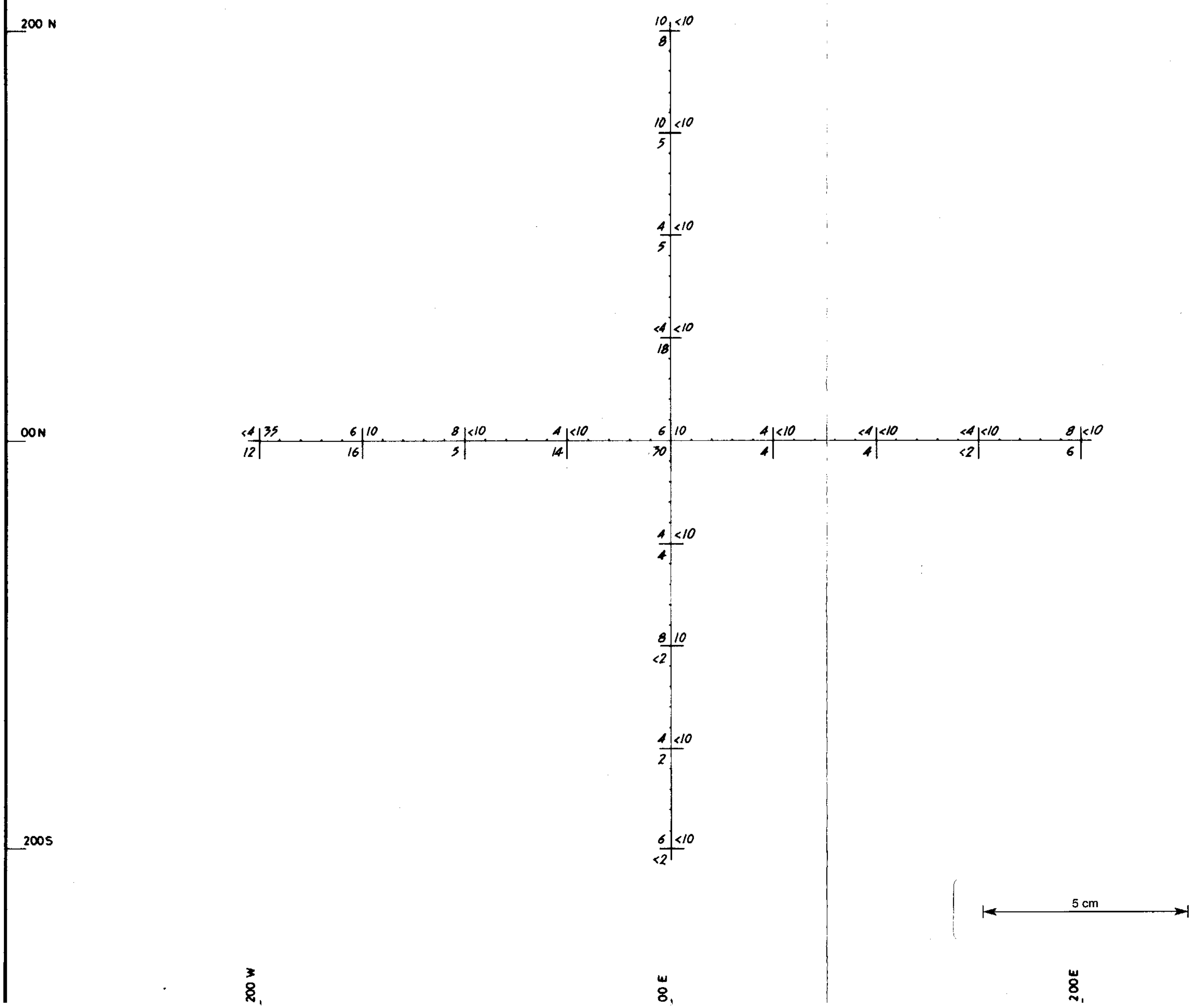
542054

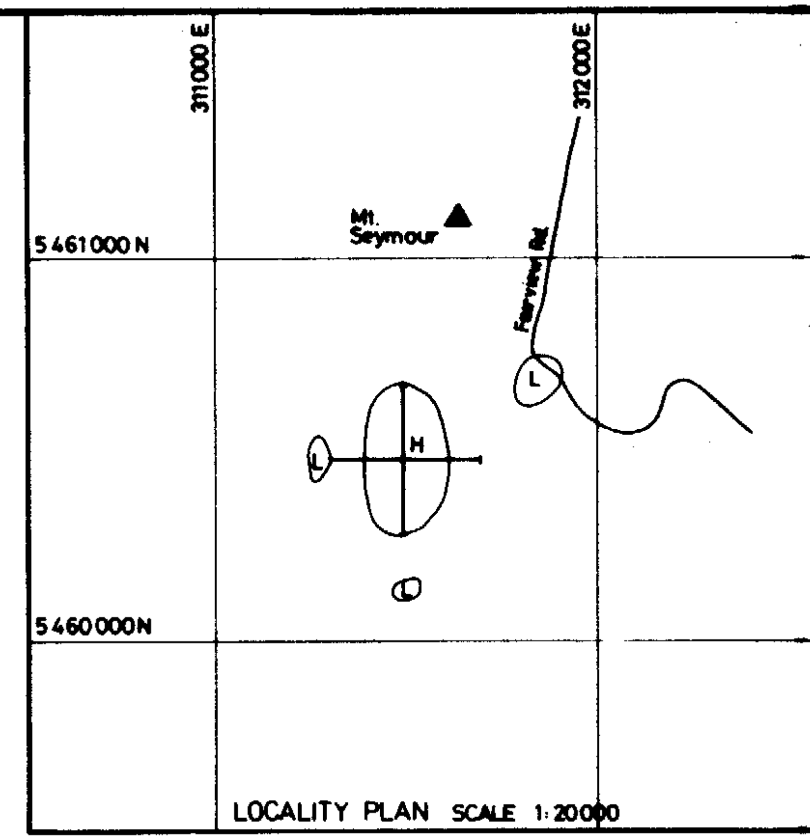
053

The Shell Company of Australia Limited
METALS DIVISION

E.L. 49/80 MARRAWAH
SOUTH SEYMOUR
AEROMAGNETIC ANOMALY
SOIL GEOCHEMISTRY
Fe, Mn.
83-2009

SCALE 1:2000	DATE 10-5-82
AUTHOR W.D. SMYTH	DRAWN H.L.H.
OFFICE DEVONPORT	REP.No.
DRG.No. D/PW44/022	FIG.No.





T.N.
M.N.

Sn	W
As	

Analyses in ppm.
Comlabs XRF1

542055

054

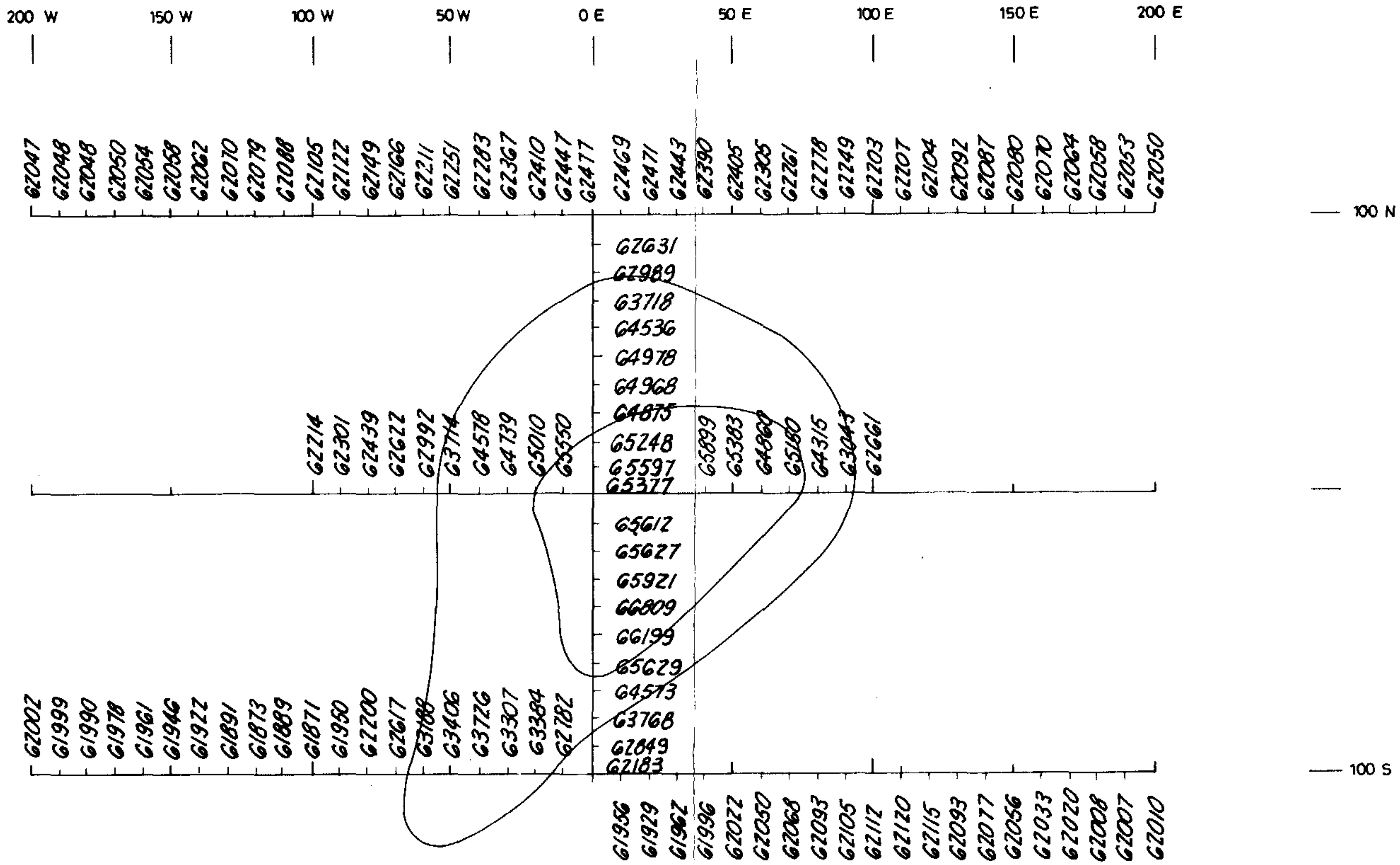
0 50 100M

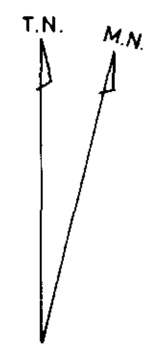
The Shell Company of Australia Limited
METALS DIVISION

E.L. 49/80 MARRAWAH
SOUTH SEYMOUR
AEROMAGNETIC ANOMALY
SOIL GEOCHEMISTRY
Sn, W, As.

83-2009

SCALE	1:2000	DATE	10-5-82
AUTHOR	W.D. SMYTH	DRAWN	H.L.H.
OFFICE	DEVONPORT	REP.No.	
DRG No	D/PW44/023	FIG No	

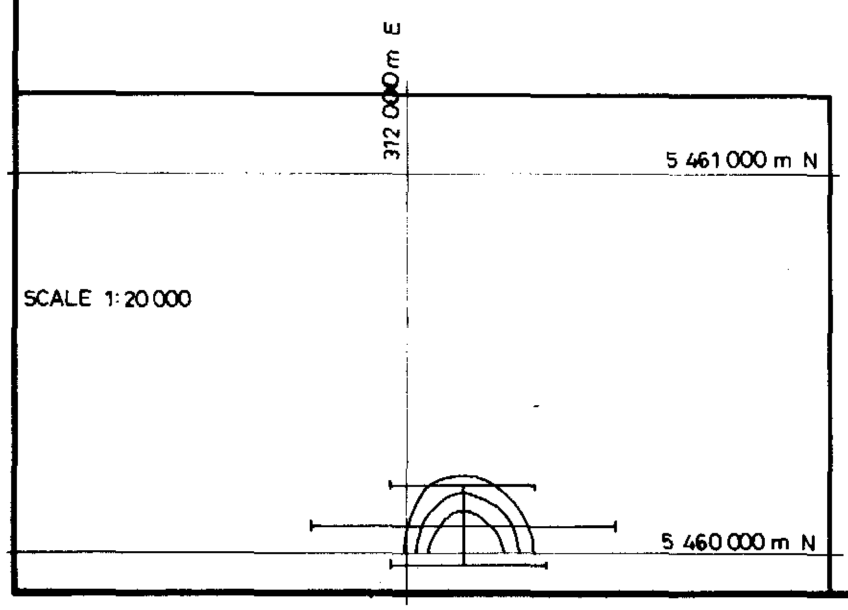




542056

055

0 50 100 M



5 cm

The Shell Company of Australia Limited
METALS DIVISION

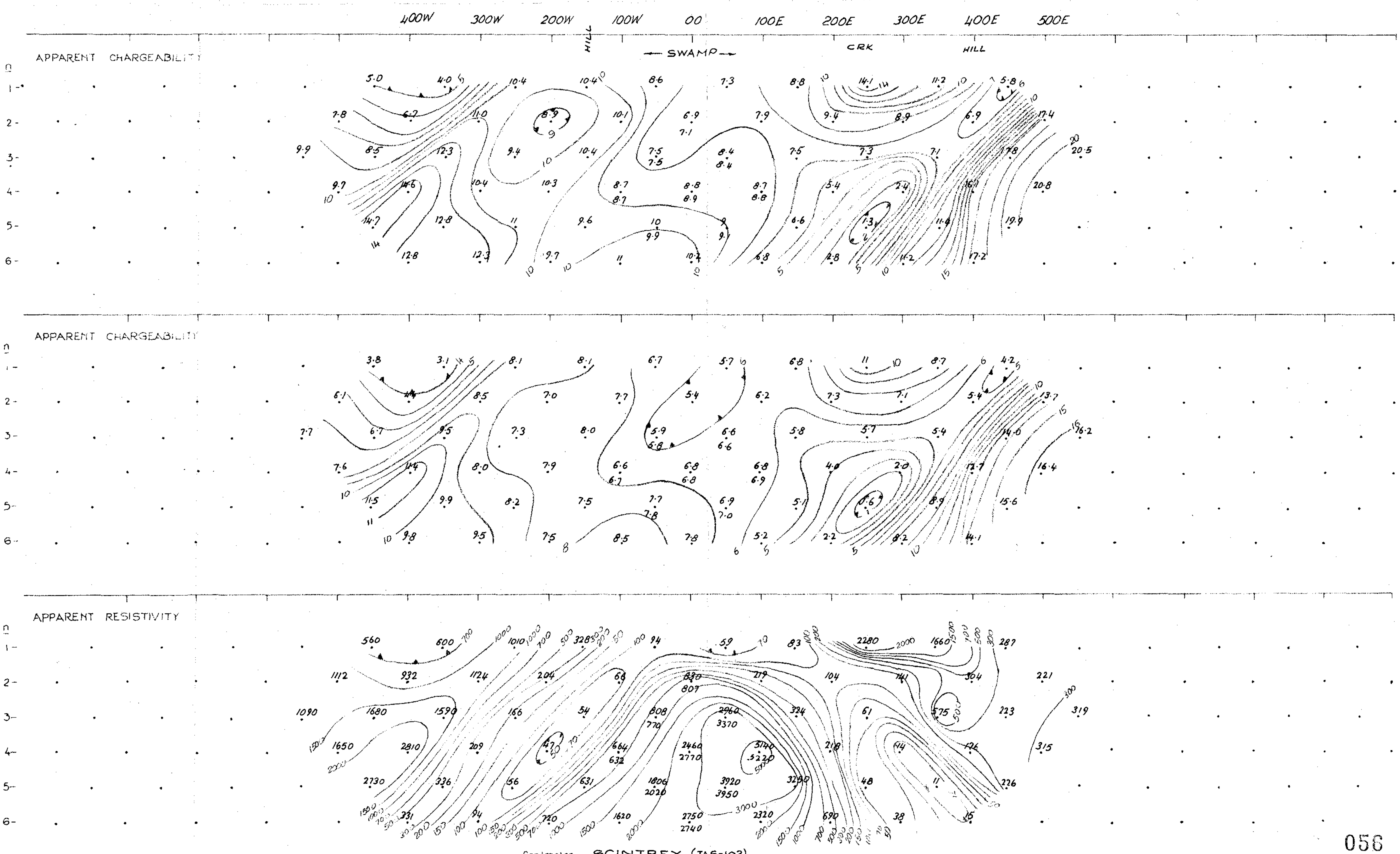
MARRAWAH E.L. 49/80
SOUTH AEROMAGNETIC ANOMALY
GROUND MAGNETICS
TOTAL FIELD
C.I. 83-2009

SCALE	1: 2000	DATE	21 - 2 - 83
AUTHOR	W. D. SMYTH	DRAWN	J.L.L.
OFFICE	DEVONPORT	REP. No.	
DRG. No.	D/PW44/033	FIG. No.	

56

AIRBORNE GEOPHYSICS
(EM MAG. etc)

GEOLOGY
& TOPOGRAPHY



Contractor SCINTREX (TAS-103)

Date 6-1-83

Timing

Transmitter

Receiver

Integration time

Array Dipole-dipole

Dipole length 100m

056

542057

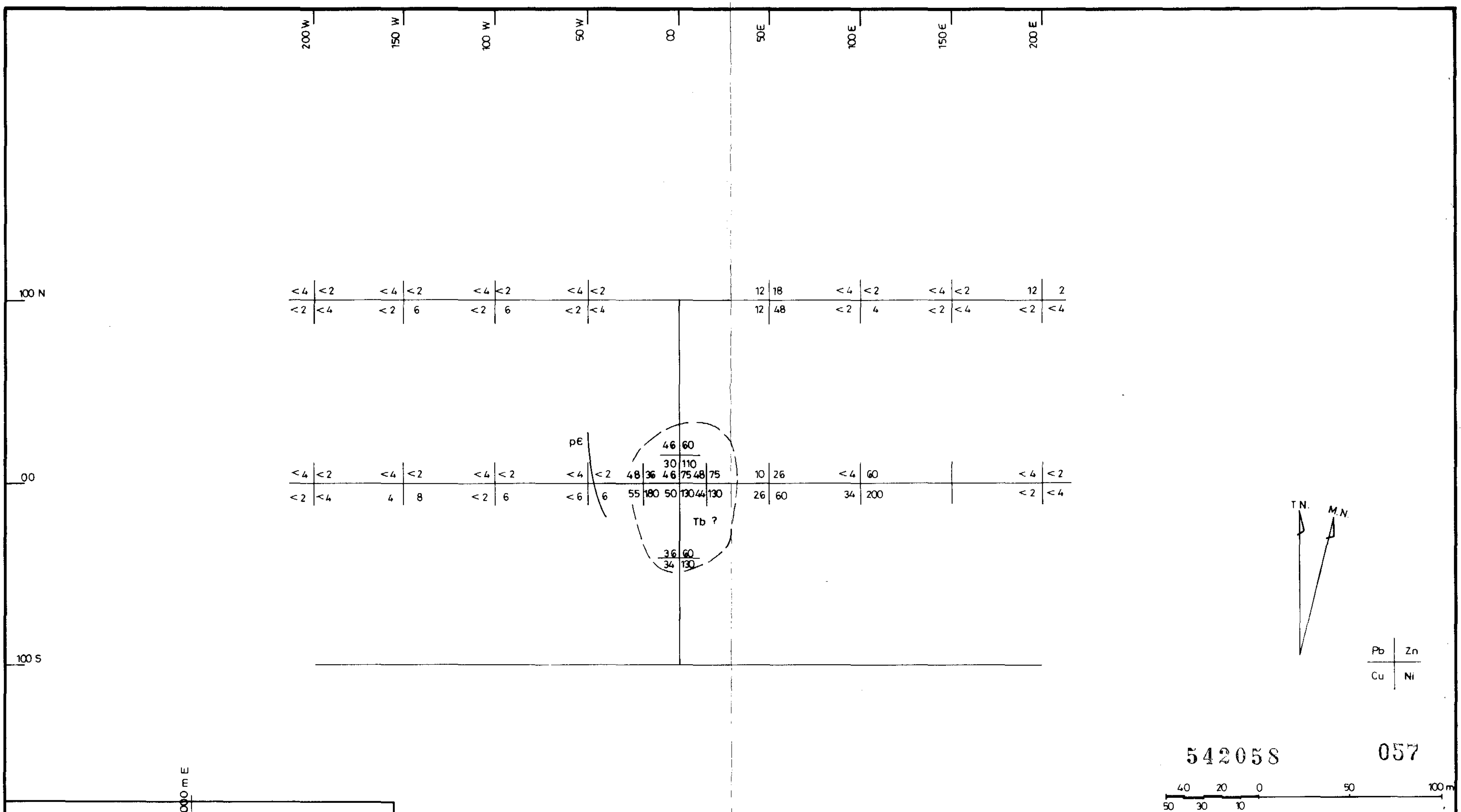
5 cm

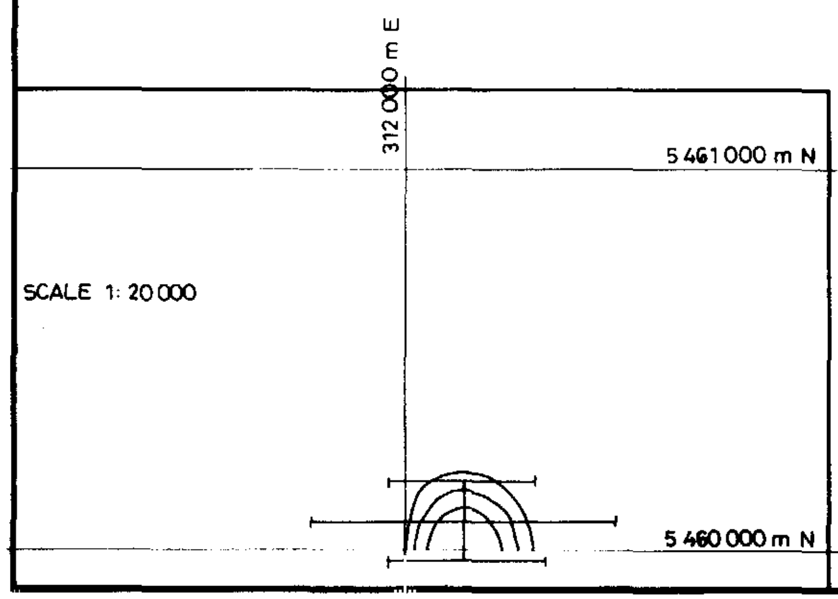
The Shell Company of Australia Limited
METALS DIVISION

IP / RESISTIVITY SURVEY
EL. 49/80 MARRAWAH
SOUTH ANOMALY
00 N

DWG No D/PW 44/038

83-2009





542058 057

5 cm

The Shell Company of Australia Limited
METALS DIVISION

E.L. 49/80 MARRAWAH
SOUTH ANOMALY
GEOCHEMISTRY
Pb, Zn, Cu, Ni.

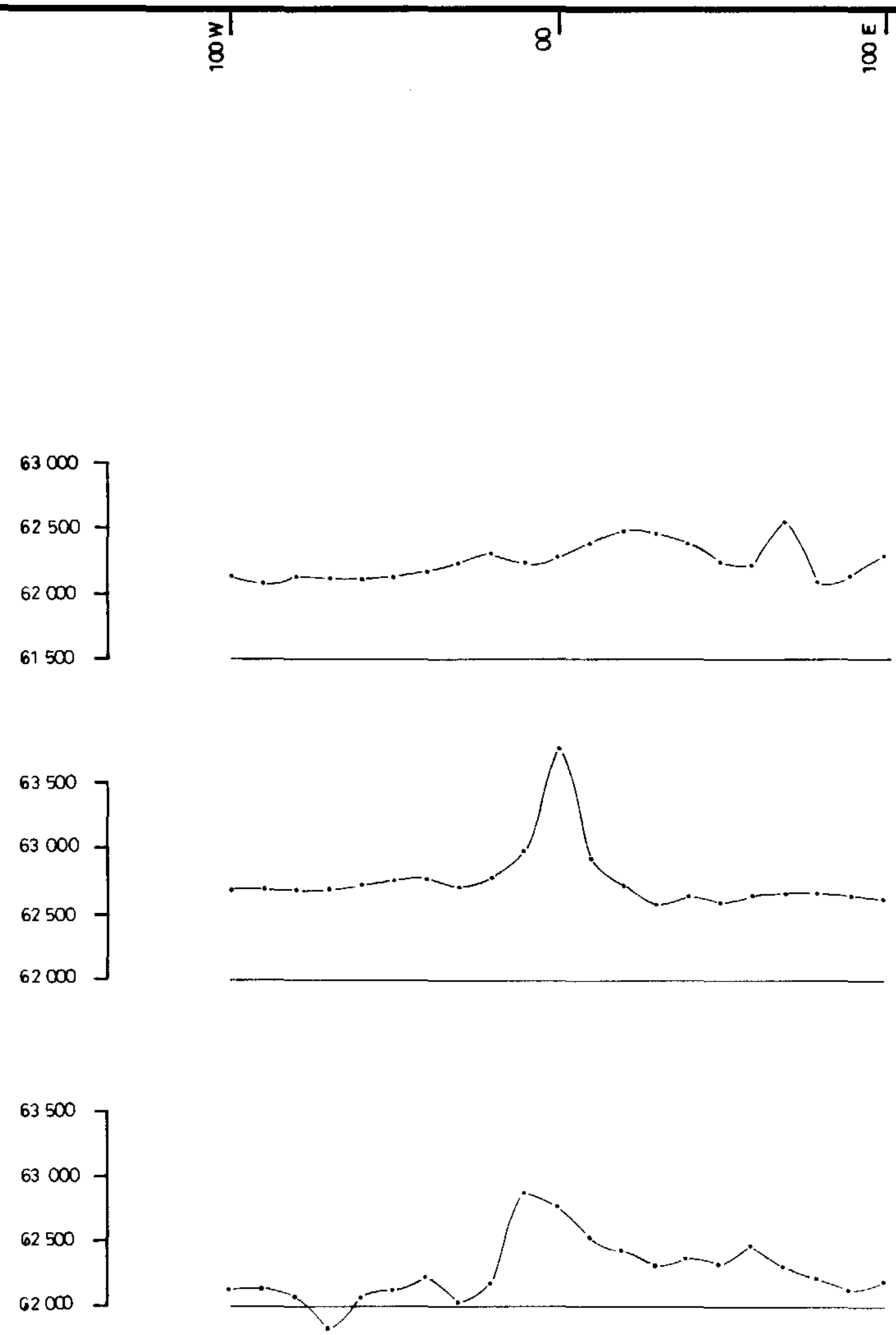
83-2009

SCALE 1: 2000	DATE 3 - 3 - 83
AUTHOR W.D.S.	DRAWN J.L.L.
OFFICE DEVONPORT	REP. No.
DRG No D/PW 44/037	FIG. No.

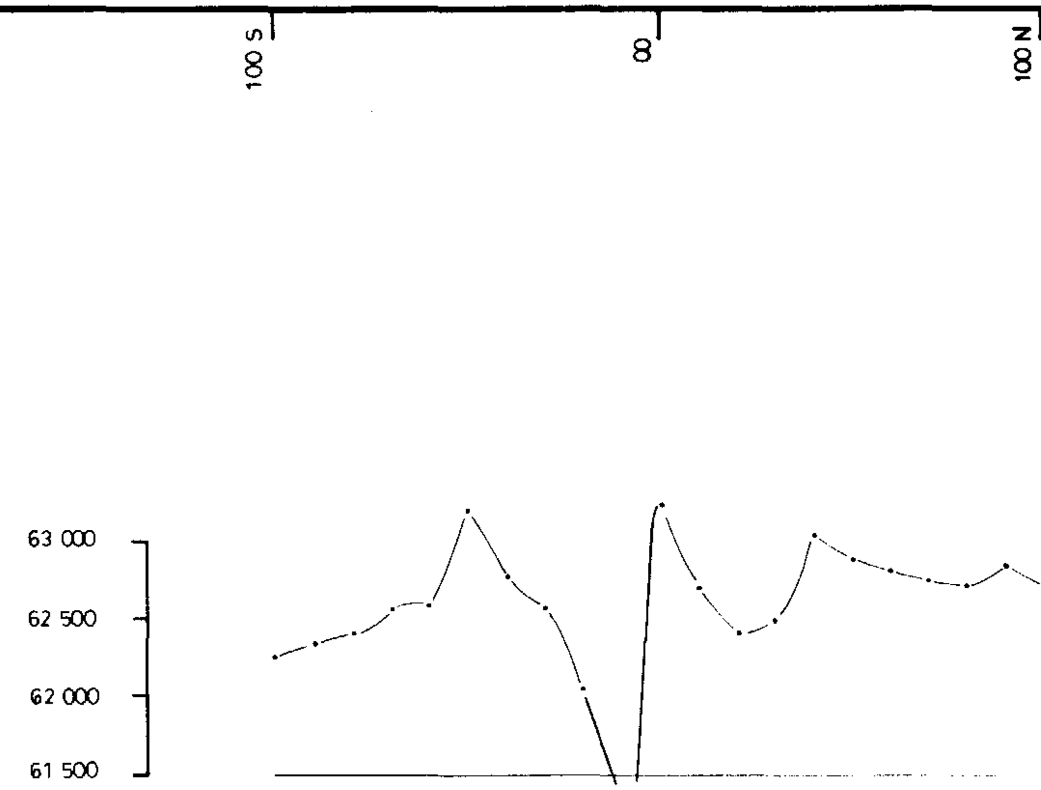
LINE 100 S

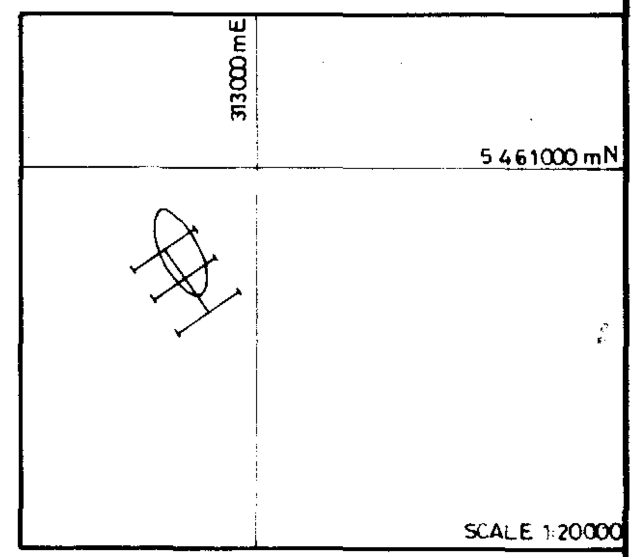
LINE 00

LINE 100 N



LINE 00 E





542059

5 cm

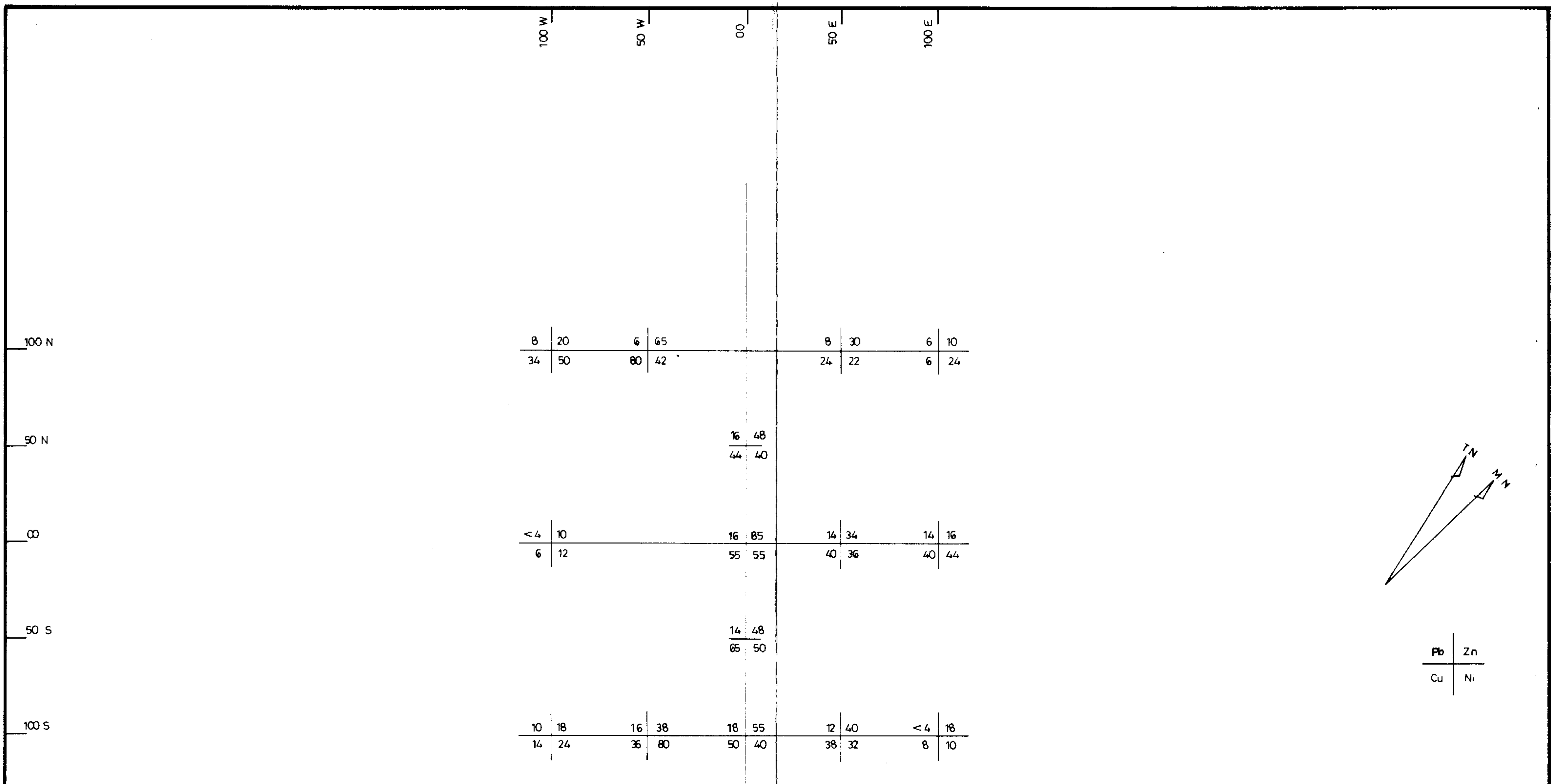
058

83-2009

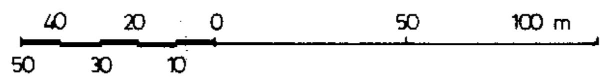
The Shell Company of Australia Limited
METALS DIVISION

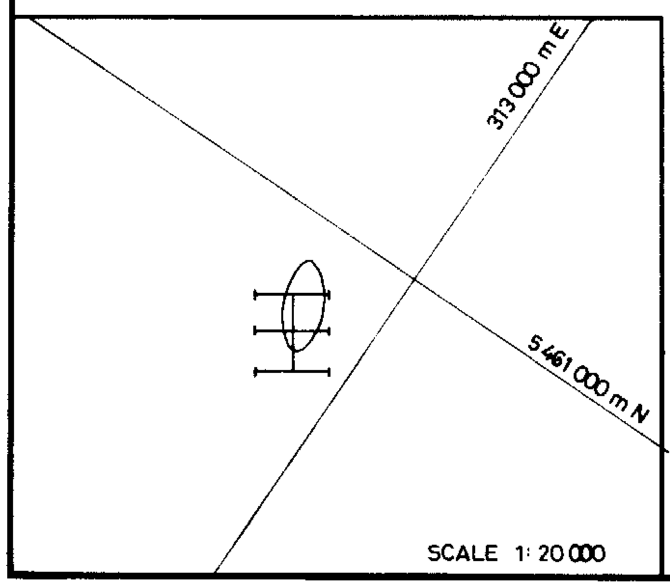
E.L. 49/80 MARRAWAH
RED CREEK II
MAGNETIC PROFILES

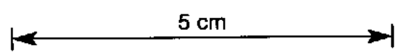
SCALE 1: 2000	DATE 1 - 3 - 83
AUTHOR W. D. S.	DRAWN J. L. L.
OFFICE DEVONPORT	REP. No.
DRG. No. D/PW 44/035	FIG. No.



542060 059





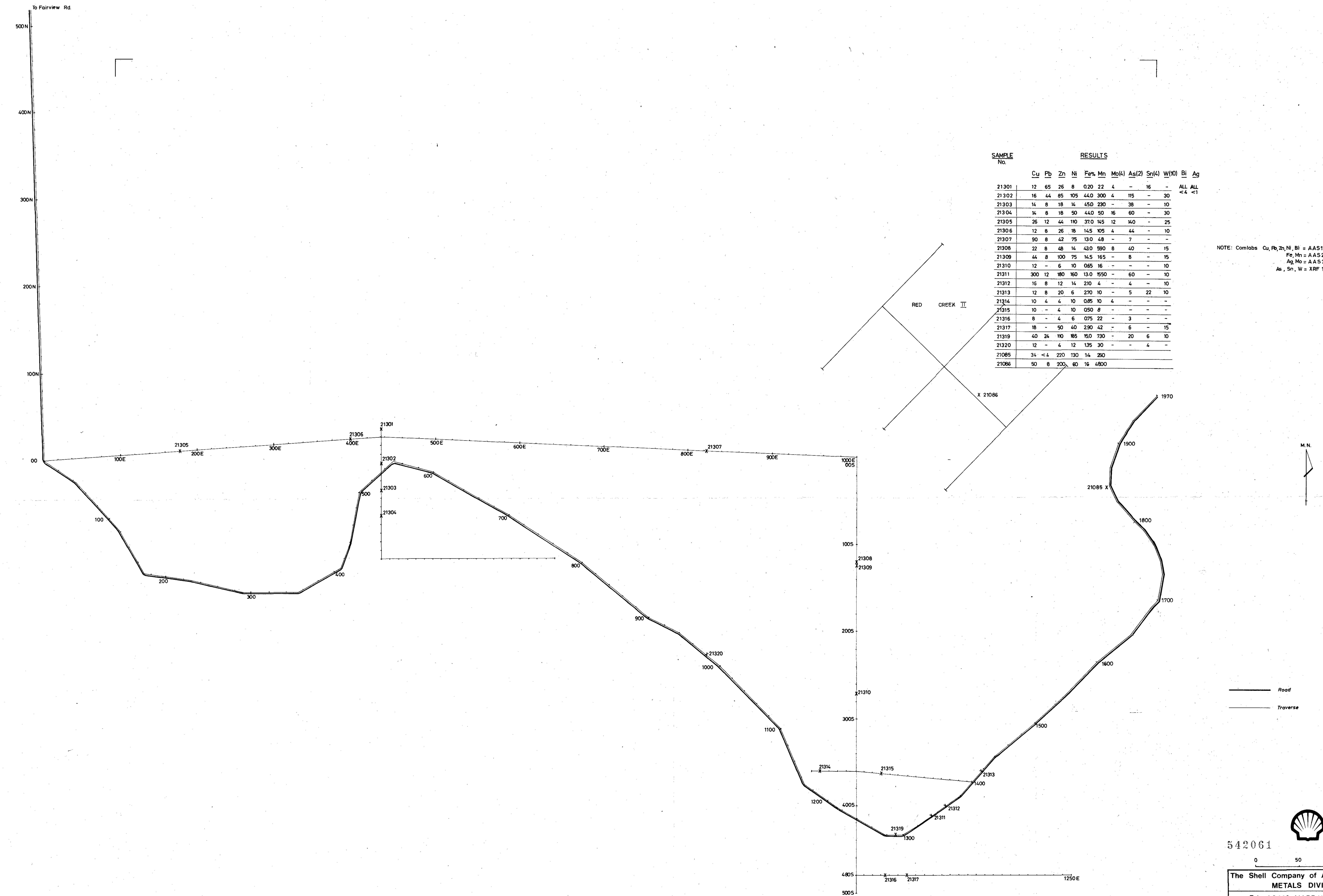


The Shell Company of Australia Limited
METALS DIVISION

E.L. 49/80 MARRAWAH
RED CREEK II
GEOCHEMISTRY
Pb, Zn, Cu, Ni.

SCALE 1: 2000	DATE 3-3-83
AUTHOR W.D.S	DRAWN J.L.L.
OFFICE DEVONPORT	REP.No.
DRG.No. D/PW44/036	FIG.No.

83-2009



SAMPLE No.	Cu	Pb	Zn	Ni	Fe%	Mn	Mo(4)	As(2)	Sn(4)	W(10)	Bi	Ag
21301	12	65	26	8	0.20	22	4	–	16	–	ALL <4	ALL <1
21302	16	44	85	105	44.0	300	4	115	–	30		
21303	14	8	18	14	45.0	230	–	38	–	10		
21304	14	8	18	50	44.0	50	16	60	–	30		
21305	26	12	44	110	37.0	145	12	140	–	25		
21306	12	8	26	18	14.5	105	4	44	–	10		
21307	90	8	42	75	13.0	48	–	7	–	–		
21308	22	8	48	14	43.0	590	8	40	–	15		
21309	44	8	100	75	14.5	165	–	8	–	15		
21310	12	–	6	10	0.65	16	–	–	–	10		
21311	300	12	180	160	13.0	1550	–	60	–	10		
21312	16	8	12	14	2.10	4	–	4	–	10		
21313	12	8	20	6	2.70	10	–	5	22	10		
21314	10	4	4	10	0.85	10	4	–	–	–		
21315	10	–	4	10	0.50	8	–	–	–	–		
21316	8	–	4	6	0.75	22	–	3	–	–		
21317	18	–	50	40	2.90	42	–	6	–	15		
21319	40	24	110	185	15.0	730	–	20	6	10		
21320	12	–	4	12	1.35	30	–	–	4	–		
21085	34	<4	220	130	14	250						
21086	50	8	200	60	16	4800						

NOTE: Comlabs Cu, Pb, Zn, Ni, Bi = AAS1
Fe, Mn = AAS2/2A
Ag, Mo = AAS3
As, Sn, W = XRF 1

542061 060

0 50 100M

The Shell Company of Australia Limited
METALS DIVISION

E.L. 49/80 MARRAWAH
AEROMAGNETIC ANOMALY
RED CREEK ANOMALY
ROCK CHIP SAMPLING

Scale 1: 2000

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/PW44/014
DATE 1-3-83	AUTHOR W.D. SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT

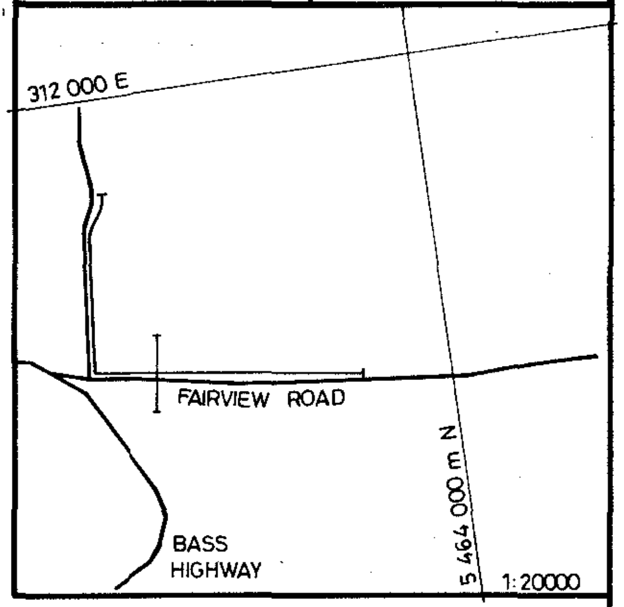
83-2009

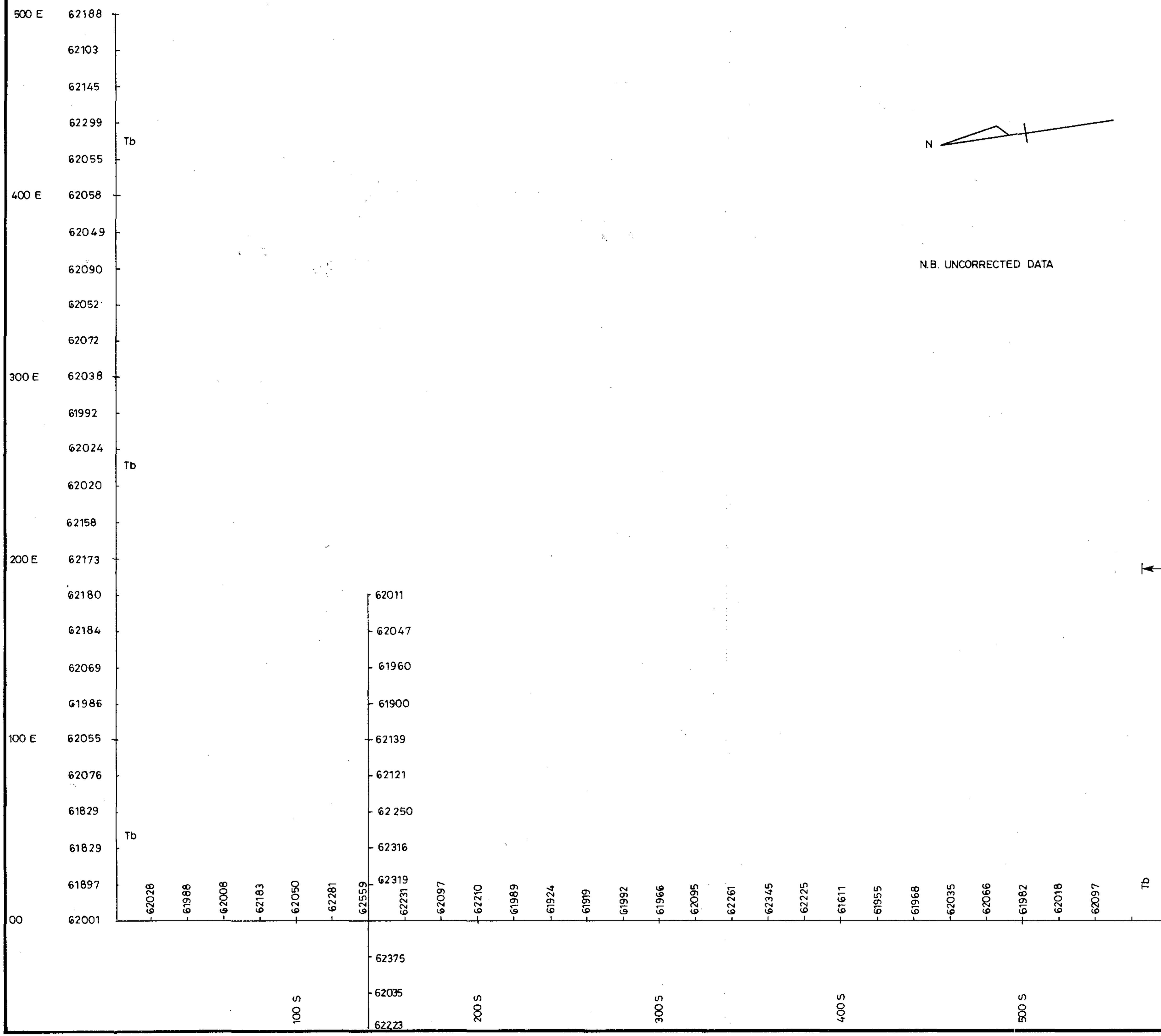
The Shell Company of Australia Limited
METALS DIVISION

E.L. 49/80 MARRAWAH FAIRVIEW ROAD AEROMAGNETIC ANOMALY GROUND MAGNETICS

83-2009

SCALE 1: 2000	DATE 8-7-83
AUTHOR W.D.S.	DRAWN J.L.L.
OFFICE DEVONPORT	REP.No.
DRG.No. D/PW44/041	FIG.No.

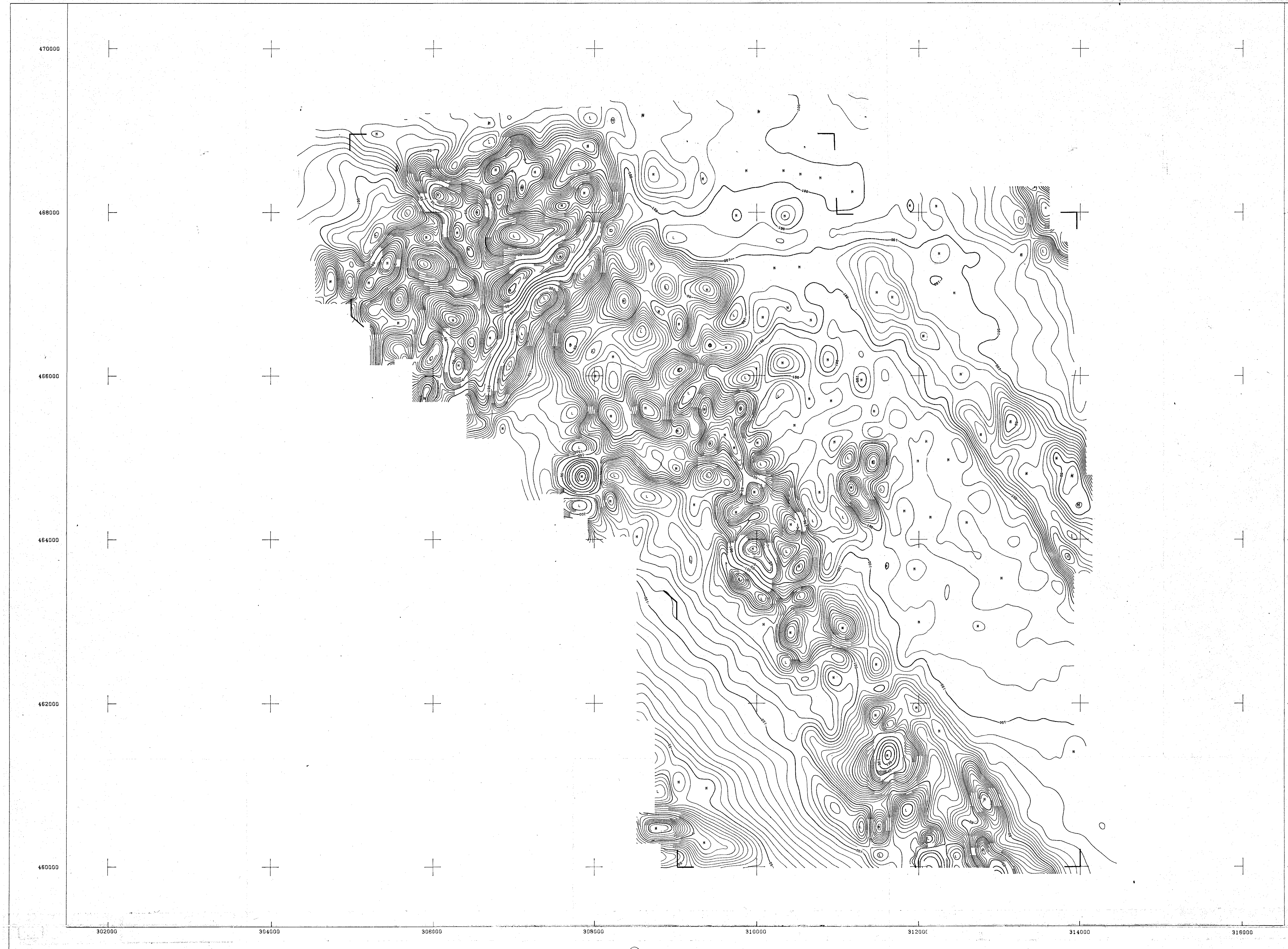




061

542062

The Shell Company of Australia Limited
METALS DIVISION
E.L. 49/80 MARRAWAH
SAMPLE LOCATIONS
83-2009
SCALE 1: 20 000
DATE 22 - 2 - 83
AUTHOR W.D. SMYTH
DRAWN H.L. SMYTH
OFFICE DEVONPORT
REP. No.
DRG. No. D/PW44/002
FIG. No.
542063
3167
5 cm
Kilometres
( ) Magnetic susceptibility x 10^-5 S.I. Units on basalt.
X Rock chip sample.
(s.s.) Stream sediment sample.
Auger sample
Mag. & V.L.F. traverses
X R.M. Remnant Magnetism sample
N
Approx. position Abertoyle Exp. P.L. sample line.
300 000 E
302 000 E
304 000 E
306 000 E
308 000 E
310 000 E
312 000 E
5 470 000 N
5 468 000 N
5 466 000 N
5 464 000 N
5 462 000 N
MARRAWAH
REDPA
Southern Ocean
Green Point Road
West Point Road
Comeback Road
BASS HIGHWAY
Doctors Creek
Arthur River Road
Arthur
Wells Road
McKays Road
Linnanes Road
Fairview Road
Kings Road
Welcome River
To Smithton
5317
5318
5319
5315
5316
5314 (s.s.)
21007
21064
21065
21066
21067
21068
21005
21006
21004
5321 (s.s.)
21061
21062
21063
21016
5324 (s.s.)
21053
21054
21055
21056
21057
21058
21059
21060
21049
21050
21051
21052
(600)
(800)
21082 R.M.
(800)
5322(s.s.)
21021
21001(s.s.)
21020
21022
21003(s.s.)
21008
21009
21023
21024
(100)
(400)
21080 R.M.
21081 R.M.
(60)
21014
(250)
21083
21084
21087
21028
21027
21025
21026
21011
21010
21012
21013
21029
21030
21031
21032
21033
21034
21035
21036
21019
21018
21017
21045
21046
21047
21048
5323 (s.s.)
21041
21042
21043
21044
21037
21038
21039
21040
21079 R.M.
21002(s.s.)
21086
21085
21089
21088



Airborne Geophysical Survey and Compilation by GEOEX PTY LTD

for 542064

THE SHELL COMPANY OF AUSTRALIA LIMITED

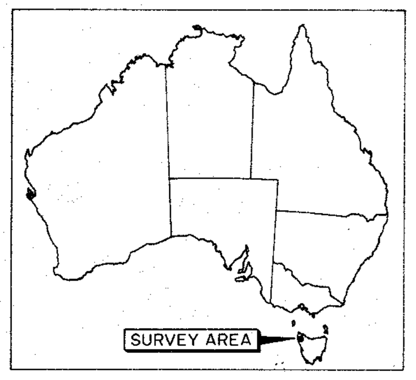
MARRAWAH AREA TASMANIA

CONTOURS OF RESIDUAL TOTAL MAGNETIC INTENSITY

SCALE 1:20000

0 400 800 1200 1600 2000 METRES

5 cm



SURVEY LOCATION

The Shell Company of Australia Limited METALS DIVISION	
E.L. 49/80 MARRAWAH	
83-2009	
SCALE	DATE
AUTHOR	DRAWN
OFFICE DEVONPORT	REP.No.
DRG.No. D/PW44/031	FIG.No.

3168

The data presented is the residual magnetic intensity, after subtracting the International Geomagnetic Reference Field from the observed Total Magnetic Intensity
The data was corrected for diurnal drift using a base station monitor at SMITHTON Airfield, Latitude 40.837 S
Longitude145.083 E
Altitude 9 Metres
The sensor height was 3 metres.
The adopted value for this location was 62190 nT
Final detailed levelling of the data was performed using tie-line crossover analysis.
A simple 3 point filter was applied to the data, which was then gridded and contoured using a 75m by 75m mesh cell.

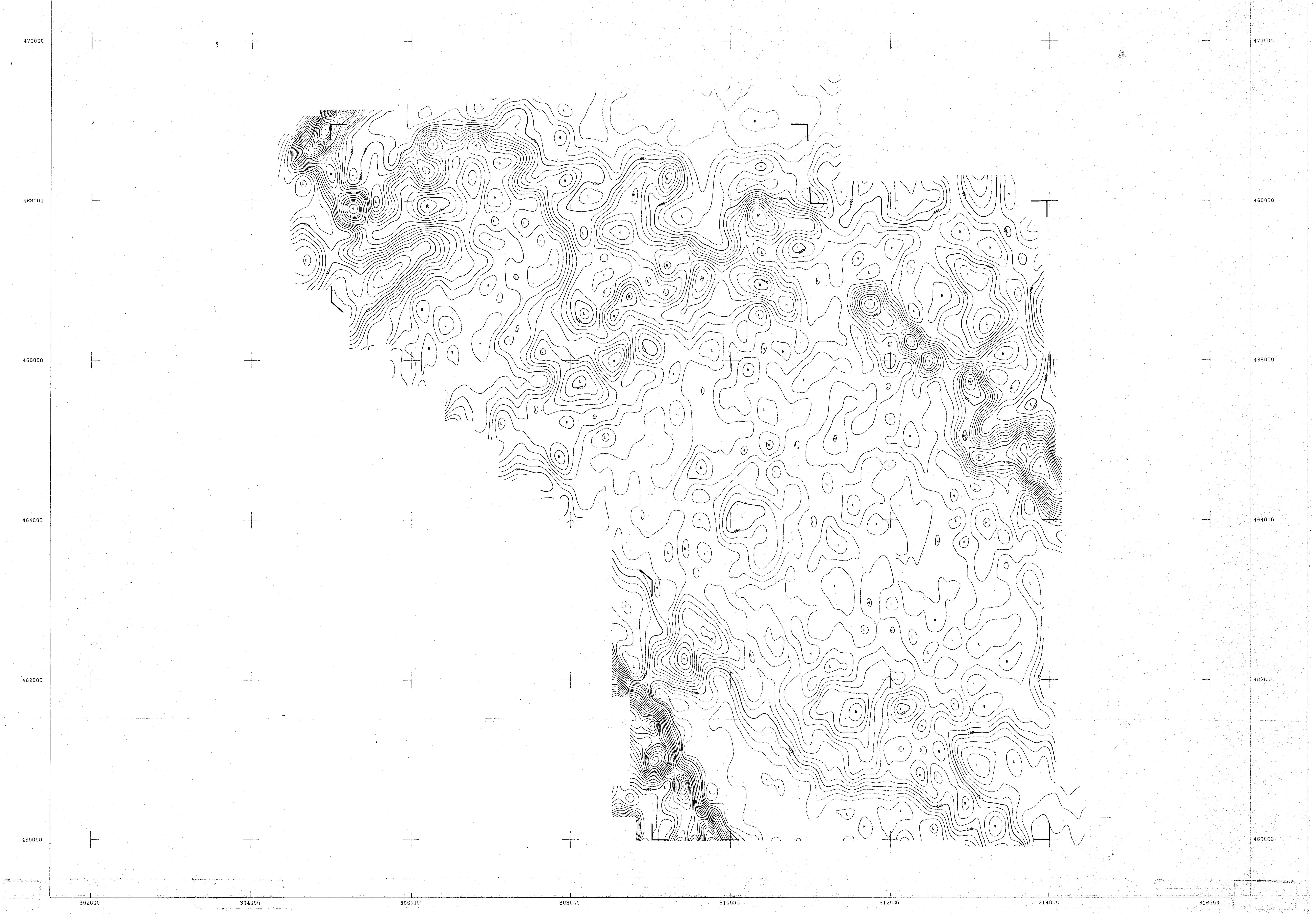
SURVEY BOUNDARY

CONTOUR INTERVAL 5 nTesla

PROJECT NUMBER 82738 SURVEYED FEBRUARY 1982

EQUIPMENT SPECIFICATIONS
Cessna A185E Aircraft
SONOTEK IGSS1 SYSTEM
0.1 nT MAGNETOMETER
256 CHANNEL SPECTROMETER
24 Litre NaI(Tl) DETECTOR
KING KRA10 RADAR ALTIMETER
16mm Ground Tracking Camera
Industry Standard 9 track
32 RPmm Magnetic Tape
8 Channel Analogue Recorder
3 Channel Analogue Recorder
for Magnetometer

The nominal flight line separation was 250 metres, and the nominal tie-line bearing was 0 degrees.
The observed mean sample interval in the flight direction was 28 metres, achieved with a nominal aircraft speed of 90 Knots, and a reading interval of 0.6 seconds. The mean sensor height was 70 metres, using a towed bird configuration. The magnetometer accuracy is 1.0 nT, and the resolution 1.0 nT.



Airborne Geophysical Survey and Compilation by GEOEX PTY LTD

for

THE SHELL COMPANY OF AUSTRALIA LIMITED

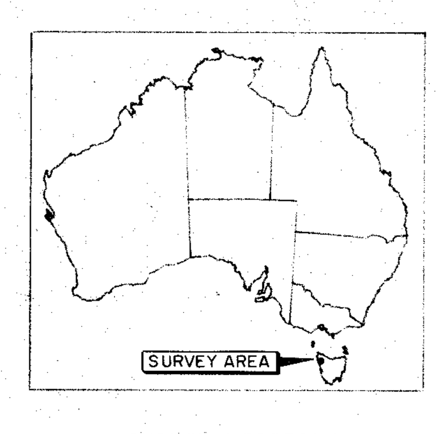
MARRAWAH AREA TASMANIA

CONTOURS OF TOTAL RADIOMETRIC INTENSITY

SCALE 1:20000

5 cm

0 400 800 1200 1600 2000 METRES



SURVEY LOCATION

542065

The Shell Company of Australia Limited METALS DIVISION	
E.L. 46/80 MARRAWAH 83-2009	
SCALE	DATE
AUTHOR	DRAWN
OFFICE DEVONPORT	REP.No.
DRG.No. D/PW44/032	FIG.No.

3169

SURVEY BOUNDARY

CONTOUR INTERVAL 20cps.

PROJECT NUMBER 82738 SURVEYED FEBRUARY 1982

EQUIPMENT SPECIFICATIONS
Cessna A185E Aircraft
SONOTEK IGSS1 SYSTEM
0.1 nT MAGNETOMETER
256 CHANNEL SPECTROMETER
24 Litre NaI(Tl) DETECTOR
KING KRA10 RADAR ALTIMETER
16mm Ground Tracking Camera
Industry Standard 9 track
32 RPmm Magnetic Tape
8 Channel Analogue Recorder
3 Channel Analogue Recorder
for Magnetometer

The nominal flight line separation was 250 metres , and the nominal tie-line bearing was 0 degrees.
The observed mean sample interval in the flight direction was 28 metres , achieved with a nominal aircraft speed of 90 Knots , and a reading interval of 0.6 seconds. The mean sensor height was 70 metres , using a towed bird configuration. The magnetometer accuracy is 1.0 nT , and the resolution 1.0 nT.