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96-3869

CRA EXPLORATION PTY. LIMITED  
ACN 000 057 125

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FICHE No.011335-39

EL 54/94  
See folio 34

First Annual Report  
For The Period Ending 23 January 1996  
EL 54/94 St Valentines Peak, Tasmania

**OPEN FILE**

Author: SA Menpes  
S Maher

Date: December 1995

Licence Holder: CRA Exploration Pty. Limited

Submitted to: Chief Geologist, Vic/Tas

Copies to: Mineral Resources Tasmania  
CRAE - Vic/Tas District  
CRAE - ETIG

Submitted by: *Address (for SA Menpes)  
S Maher*

Accepted by: *J. Conway*

96-3869

FIRST ANNUAL REPORT TO 23 JANUARY  
1996 EL 54/94 ST VALANTINES PEAK  
- CRA MENPES S.A., MAHER S

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CRAE Report No. 21979

### Abstract

Significant Pb-Zn mineralisation, interpreted to be Irish-style, occurs within the Ordovician Gordon Group carbonates at Oceana and Grieves near Zeehan. Other areas of preserved Gordon Group carbonate are also considered prospective for Irish-style Pb-Zn mineralisation. Hence CRAE acquired EL 54/94 to explore mapped Gordon Group carbonates east of St Valentines Peak.

A detailed literature review was carried out during the first permit year of EL 54/94, St Valentines Peak. The review has highlighted the following:

- Past exploration methods applied to the licence area (predominantly stream sediment sampling and helimagnetic surveys targeting Kara style W mineralisation) are not suitable for detecting Irish-style Pb-Zn mineralisation. The carbonates tend to form valleys with variable cover masking stream sediment signatures, and the target mineralisation style is generally non-magnetic.
- The untested Old Park Road Pb-Zn in soil anomaly may represent a subcropping, possibly partially remobilised, Irish-style Pb-Zn deposit, or extensive sulphide skarn mineralisation

Recommended exploration for permit year 2 includes:

- Infill soil sampling over the Old Park Road grid and possibly follow-up drill testing to determine mineralisation style, and potential size and grade
- Reconnaissance gridding, mapping, rockchip sampling and soil/wacker bedrock sampling over the mapped Gordon Group sequence (extending across the unfaulted eastern contact of the Gordon and Denison groups) to test prospective horizons at the base and middle of the sequence.

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## Plans

Plan No.	Title	Scale
Tv 1058	St Valentines Peak EL 54/94 Location Plan	1:100,000
Tv 985	St Valentines Peak EL 54/94 Pb ppm -80# Stream Sediment	1:25,000
Tv 986	St Valentines Peak EL 54/94 Zn ppm -80# Stream Sediment	1:25,000
Tv 987	St Valentines Peak EL 54/94 Cu ppm -80# Stream Sediment	1:25,000
To 1736	McIntyre Mines (Aust.) P/L Ridgley Area Aeromagnetic Total Intensity Contours EL 17/68 78-1279	1:10,000
To 229	Guildford Stream Sediment Analyses 20/4041	1:20,000
To 230	Guildford Stream Sediment & Panned Concentrate Analyses 20/4041	1:20,000
To 231	Guildford Stream Sediment Analyses 20/4042	1:20,000
To 232	Guildford Stream & Spring Water sample location 20/3842	1:20,000
To 237	Guildford Stream sediment analyses 20/3941	1:20,000
To 240	Guildford Stream mag & panned concentrate analyses 20/3941	1:20,000
To 241	Guildford Stream sediment analysis 20/3942	1:20,000
To 242	Guildford Stream mag & panned concentrate analyses 20/3942	1:20,000
To 884	EL 1/76 Guildford Grid and Anomaly Locations	1:50,000
To 954	EL 4/77 Highclere Old Park Road Geology (Fact)	1:2,000
To 1737	EL 4/77 Highclere Old Park Road Soil Geochemistry Pb Zn Ag Shell Tcr84-2105	
To 1738	EL 4/77 Highclere Old Park Road Soil Geochemistry Co Bi Cd Shell Tcr84-2105	

To 1739	EL 4/77 Highclere Old Park Road Soil Geochemistry As Ni Cu Shell Tcr84-2105	
To 1740	EL 4/77 Highclere Old Park Road Soil Geochemistry Sn W Mo Shell Tcr84-2105	
To 914	EL 4/77 Highclere Geology	1:50,000
To 1628	EL 4/77 Highclere Tas. Buckby Prospect Cross Section at 100S	1:1,250

### Appendices

Appendix 1	Previous Exploration - EL 54/94 St Valentines Peak
Appendix 2	Incomplete Compilation of Drillhole Information

## 1. Conclusion and Recommendation

The following conclusions have been drawn from the literature review carried out during permit year 1:

- The Irish-style Grieves and Oceana Pb-Zn deposits in the Zeehan area occur at the contact of the Gordon and Denison groups and in the middle of the Gordon Group sequence (beneath an impermeable, argillaceous unit) respectively. Hence the equivalent horizons are considered prospective in the St Valentines Peak licence area.
- Past exploration methods applied to the licence area (predominantly stream sediment sampling and helimagnetic surveys targeting Kara style W mineralisation) are not suitable for detecting Irish-style Pb-Zn mineralisation. The carbonates tend to form valleys with variable cover masking stream sediment signatures, and the target mineralisation style is generally non-magnetic.
- The untested Old Park Road Pb-Zn in soil anomaly may represent a subcropping, possibly partially remobilised, Irish-style Pb-Zn deposit, or extensive sulphide skarn mineralisation.

The following work should be carried out during permit year 2:

- Infill soil sampling over the Old Park Road grid and possibly follow-up drill testing to determine mineralisation style, and potential size and grade
- Reconnaissance gridding, mapping, rockchip sampling and soil/wacker bedrock sampling over the mapped Gordon Group sequence (extending across the unfaulted eastern contact of the Gordon and Denison groups) to test prospective horizons.

## 2. Introduction

St Valentines Peak EL 54/94 was granted to CRA Exploration Pty. Limited (CRAE) on 24th February, 1995. The EL covers 38 sq km and is located 30 km south of Burnie on the north-west coast of Tasmania. (Plan Tv 1058).

CRAE acquired the licence area to explore for economic, Irish-style Pb-Zn mineralisation in the Ordovician Gordon Group carbonates. CRAE's preceding exploration of the Gordon Group carbonates in the Zeehan area has resulted in several very encouraging Pb-Zn intersections. Hence CRAE has expanded exploration efforts to other areas of poorly explored Gordon Group carbonates with potential to host economic Irish-style Pb-Zn mineralisation. The St Valentines Peak licence area satisfies these criteria. Secondary targets are W-Sn-F-Cu-Pb-Zn skarn/carbonate replacement mineralisation (cf. Kara Mine, Moina deposit, former Bischoff Mine, former Cleveland Mine, former King Island Scheelite Mine, Renison Mine, and Queen Hill deposit).

This report details all exploration activities conducted within EL 54/94 St Valentines Peak by CRAE during the first permit year ending 23 January 1996.

### 3. Review of Previous Work

Significant exploration carried out prior to the current licence is briefly summarised below. See Appendix 1 for a detailed summary of previous exploration.

#### *1958-? Rio Tinto Australian Exploration Pty. Limited*

- regional airborne magnetic survey

#### *1965-? Pickands Mather & Co. International*

- reconnaissance stream sediment geochemistry survey

#### *1968-85 Tasminex N.L., Australia and New Zealand Exploration Company, McIntyre Mines (Aust) Pty. Ltd.*

- airborne magnetic and radiometric survey
- stream sediment geochemistry (W only) survey
- geological mapping
- auger sampling of Sutton's Skarn - analysed for W only
- helimagnetic survey
- resampling Sutton's Skarn

#### *1976-84 Comalco-Billiton*

- stream sediment geochemistry survey covering pre-Tertiary rocks
- stream sediment anomaly follow-up
- helimagnetic survey covering pre-Tertiary rocks
- heliborne magnetic and radiometric survey over area not covered by the early survey
- regional gravity survey

### 4. Exploration Completed in the 12 Month Period Ending 23 January 1996

#### 4.1 Literature Review

A comprehensive literature review was carried out prior to the commencement of field exploration.

##### 4.1.1 Geology (modified from Seymour, 1989)

The Ordovician Gordon Group sequence is very poorly exposed within EL 54/94 St Valentines Peak, and is consequently not well understood. The two main lithologies recognised are a siliceous hornfels and a magnetite skarn. The latter hosts significant scheelite mineralisation (plus minor Fe, Ag) outside the licence area.

The Gordon Group forms a north trending syncline within EL 54/94. The western contact of the Gordon Group is faulted against Denison Group sediments whilst the eastern contact appears conformable with the underlying Denison Group Moina Sandstone correlate. The southern contact is an interpreted normal fault against a Devonian Bell Shale correlate. The Devonian Husetop granite crops out in the north and north west of the licence area, and Tertiary basalt and greybilly overlie Gordon Group stratigraphy in the north and south of the licence area.

Open pit mining of scheelite in skarn units has been in progress since 1977 at Kara No. 1 and Bobs Bonanza within Consolidation Lease 105M/77 (immediately adjacent to EL 54/94). Tasminex N.L. developed the deposits which have been operated by Tasmania Mines Ltd since 1985-86. To June 1988, a total of 1.03 Mt of ore had been mined for 2454 t of W03 concentrate which also contained 1-1.5% Mo. The average recovery grade of W03 is 0.24% which is substantially lower than the in-ground ore grade of about 0.8% cited by Tasminex N.L. Additional reserves remain at Kara No. 1, Kara North, locality "L5", Eastern Ridge, and elsewhere.

Magnetite in skarn at Kara No. 1 is concentrated during scheelite extraction and stockpiled. Reserves of magnetite are present in other scheelite bearing skarns and in magnetite rich skarns which are poor in scheelite. Kara No. 2 contains magnetite with possible reserves of 0.2 Mt @ 45% Fe.

At Kara No. 1, skarn units are developed in a transitional unit between siliceous Denison Group sediments and the Gordon Group carbonates preserved as a pendant in the roof zone of the Husetop granite. The Scheelite ore has a draped blanket geometry 15-20 m above the granite. The ore is underlain by a poorly mineralised quartz-epidote zone and Denison Group sediments are preserved against the granite. Skarn minerals include garnet, diopside, magnetite, amphibole and vesuvianite forming mainly magnetite rich or grossular-anhydrite rich lithologies. Scheelite is widespread, but ore grades occur within magnetite-amphibole skarn or in adjacent garnet skarn. Much of the W03 in the upper part of the deposit occurs in hydrous minerals and is not recovered during processing.

Small alluvial Sn workings are scattered over the area. Sn bearing greisen veins are known in aplitic intrusions into the Husetop granite.

#### 4.1.2 Conclusions

- Past exploration within EL 54/94 has been reconnaissance only, predominantly involving stream sediment sampling programmes and helimagnetic surveys.
- Past exploration targeted Kara style W mineralisation. Typically:
  - ⇒ samples were analysed for W only
  - ⇒ geochemical anomalies without coincident magnetic anomalies were not followed up
  - ⇒ weak magnetic anomalies were not followed-up

Consequently, other styles of mineralisation may have been overlooked.

- Multi-element stream sediment geochemistry acquired by Comalco and Pickands Mathers is sparse. However anomaly plots of stream sediment data (Plans Tv 985-87) highlight the "Old Park Road" area centred on 401000mE, 5422000mN. Billiton established a grid (unlocated) in the area and identified a 500 x 500m Pb-Zn in soil anomaly at >200 ppm. The prospect was abandoned without drill testing
- Prospectivity for carbonate hosted Pb-Zn mineralisation within EL 54/94 is fair given:
  - ⇒ carbonate hosted Pb-Zn mineralisation occurs within the Gordon Group at Grieves and Oceana. These deposits occur at the contact of the Gordon and Denison groups, and in the middle of the carbonate sequence beneath an impermeable, argillaceous unit respectively
  - ⇒ no systematic bedrock sampling of carbonate has been undertaken
  - ⇒ stream sediment data indicate areas of untested carbonate with elevated Pb-Zn values
  - ⇒ the poor exposure of the target sequence leaves scope for significant undetected near surface mineralisation
- Prospectivity for sulphide skarn mineralisation within EL 54/94 is good. The untested Old Park Road Pb-Zn in soil anomaly corresponds to a weak ground magnetic anomaly sourced by local pyrrhotite replacement. The soil anomaly may represent sulphide skarn mineralisation.
- Mo values of ore concentrate from the Kara mine are very high (1.5%) and perhaps undervalued by current mine operators. The Red Mountain porphyry Mo deposit has reserves of 187 Mt @ 0.167% MoS<sub>2</sub>, using a 0.1% MoS<sub>2</sub> cut-off. The Logtung deposit is a large tonnage (162 Mt), low grade (0.13% W03 and 0.052% MoS<sub>2</sub>) porphyry style W-Mo deposit hosted by interbedded calcareous shale and graphitic quartzite and skarn.

#### 4.2 Field Exploration

The Old Park Road prospect is considered worthy of immediate follow-up exploration. Although prospect plans (with local co-ordinates only) are included in relevant open file reports, the Old Park Road grid is absent from former licence plans showing prospect grids. Hence it is believed that Billiton may have been exploring off their licence.

1:25,000 scale colour air photos of the licence area have been purchased in an effort to locate the Old Park Road grid by identifying tracks/creeks mapped on the prospect plans. Ground checks of potential areas, stream sediment sampling, rock chip sampling and reconnaissance soil sampling is currently underway.

## 5. Discussion of Results

The Gordon Group carbonates in the St Valentines Peak licence area are considered prospective for Ordovician Irish-style Pb-Zn mineralisation and Devonian skarn mineralisation.

The untested Old Park Road Pb-Zn in soil anomaly is an existing target that should be further investigated. The Old Park Road grid will be located and further work (infill soil sampling, possibly drilling) carried out to determine the mineralisation style, and potential size and grade.

Reconnaissance grid lines should be established over the mapped Gordon Group sequence, extending across the unfaulted eastern contact of the Gordon and Denison groups. Mapping, rockchip sampling and soil/wacker bedrock sampling should be carried out to test the potentially mineralised Gordon and Denison group contact, and carbonates beneath a possible argillaceous "scal" near the middle of the sequence.

## 6. Rehabilitation

The following procedures are being implemented to reduce environmental impact and enhance rehabilitation:

- Soil augers and field boots are cleaned prior to entering the area to prevent the introduction of weeds or the vegetation fungus *Phytophthora cinnamomi*
- Reconnaissance soil geochemical traverses are being surveyed using tape and compass and do not involve track cutting
- Soil auger holes are backfilled

## 7. Expenditure

Expenditure during current term:      \$15715

**Total Expenditure \$15715**

## 8. References

- Anon., 1966 Interim report for the northwest Tasmanian exploration project for a period ending April 1966. EL 12/65. Pickands Mather & Co. International. TCR 66-439
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- McDonald, I.R., 1986. First and final report on EL 3/85 St. Valentines Peak. EZ. TCR 862541.
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- Smyth, W.D. and Hungerford, N., 1984 EL1/76 - Guildford. Report on exploration for the period 1st January, 1980 to 31st December, 1983. The Shell Company of Australia. TCR842105
- Weste, G., 1978 EL1/76 Guildford and southern part of EL 4/77 Highclere. Report on all investigations to September, 1978. Commonwealth Aluminium Corporation Limited. TCR781307
- Weste, G., 1979 EL1/76 Guildford and southern part of EL 4/77 Highclere. Report on all exploration from October, 1978 to December, 1979. Commonwealth Aluminium Corporation Limited. TCR79-1409
- Wright, R.G. and Oakes, G., 1984 EL 4/77 - Highclere. Final report on exploration during the period September, 1982-May, 1984. The Shell Company of Australia. TCR84-2276

**9. Location**

Burnie	SK55-3	1:250,000
Inglis	8015	1:100,000
Parrawe	3842	1:25,000
Loyetea	4042	1:25,000
Guildford	3841	1:25,000
Loongana	4041	1:25,000

**10. Keywords**

Tasmania, Base Metals, Ordovician, Carbonate Hosted, Hornfels, Calc Silicate, Review, Soil Sampling, Rockchip Sampling.

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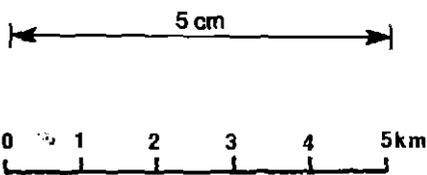
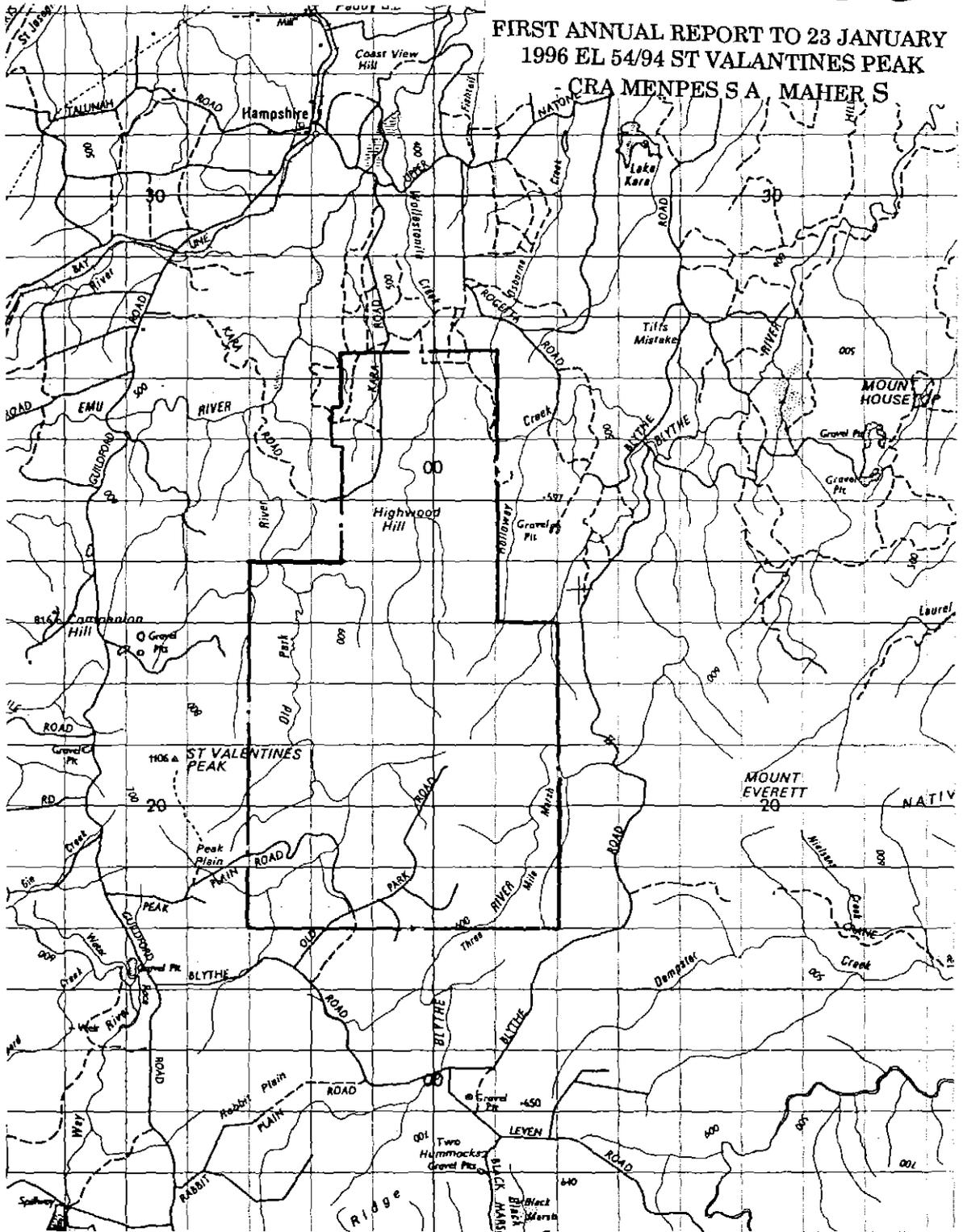
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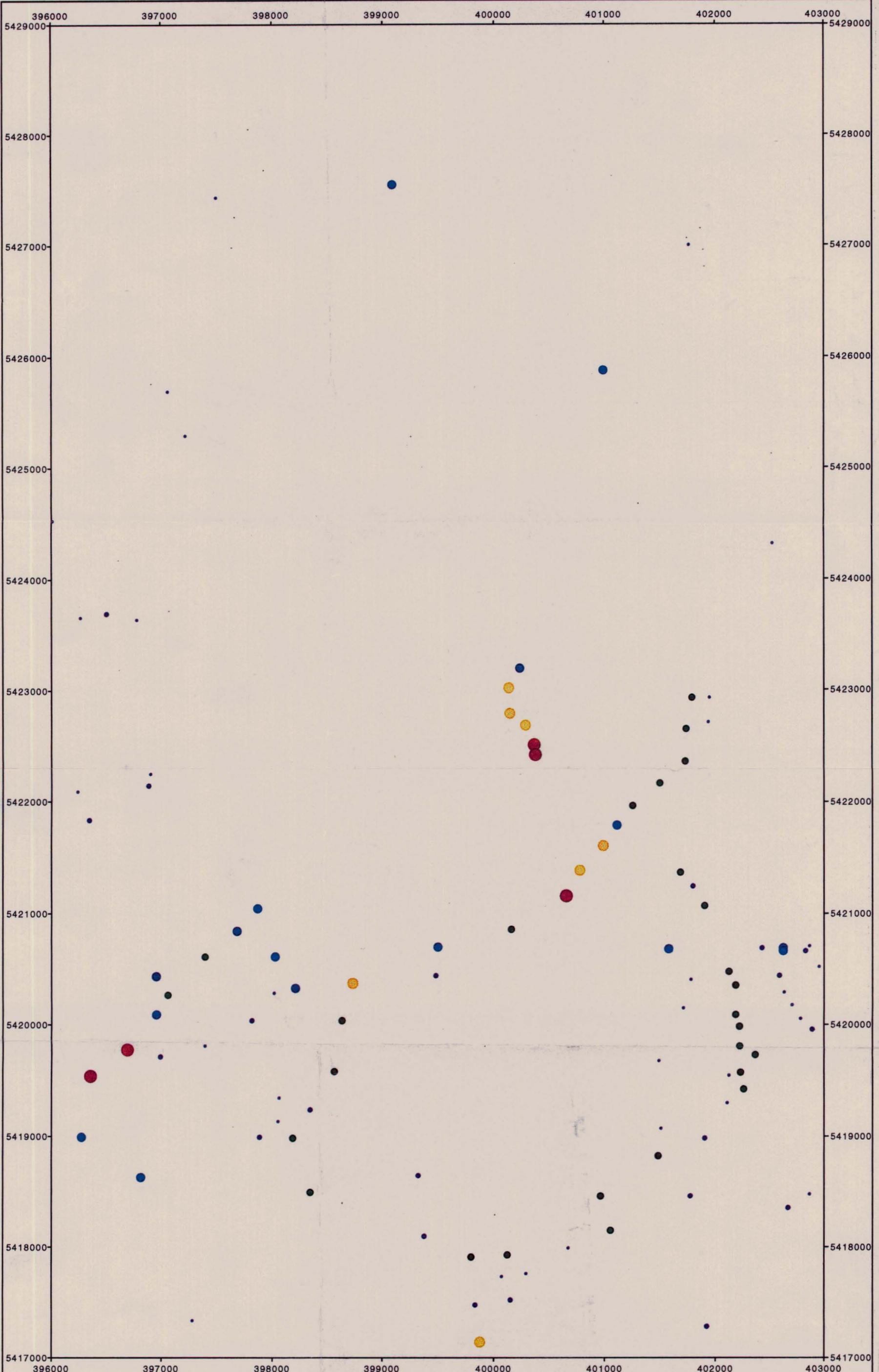
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1996 EL 54/94 ST VALENTINES PEAK  
- CRA MENPES S A MAHER S

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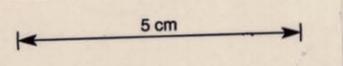


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Author: S.Menpes	Reference: SK55-3
Drawn: A.Jelen	File Name:
Date: May 1996	Report No: 21979
Scale: 1:100 000	Plan No: Tv 1058



705014

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- 48-100
- 100-200
- +200

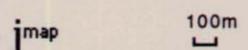


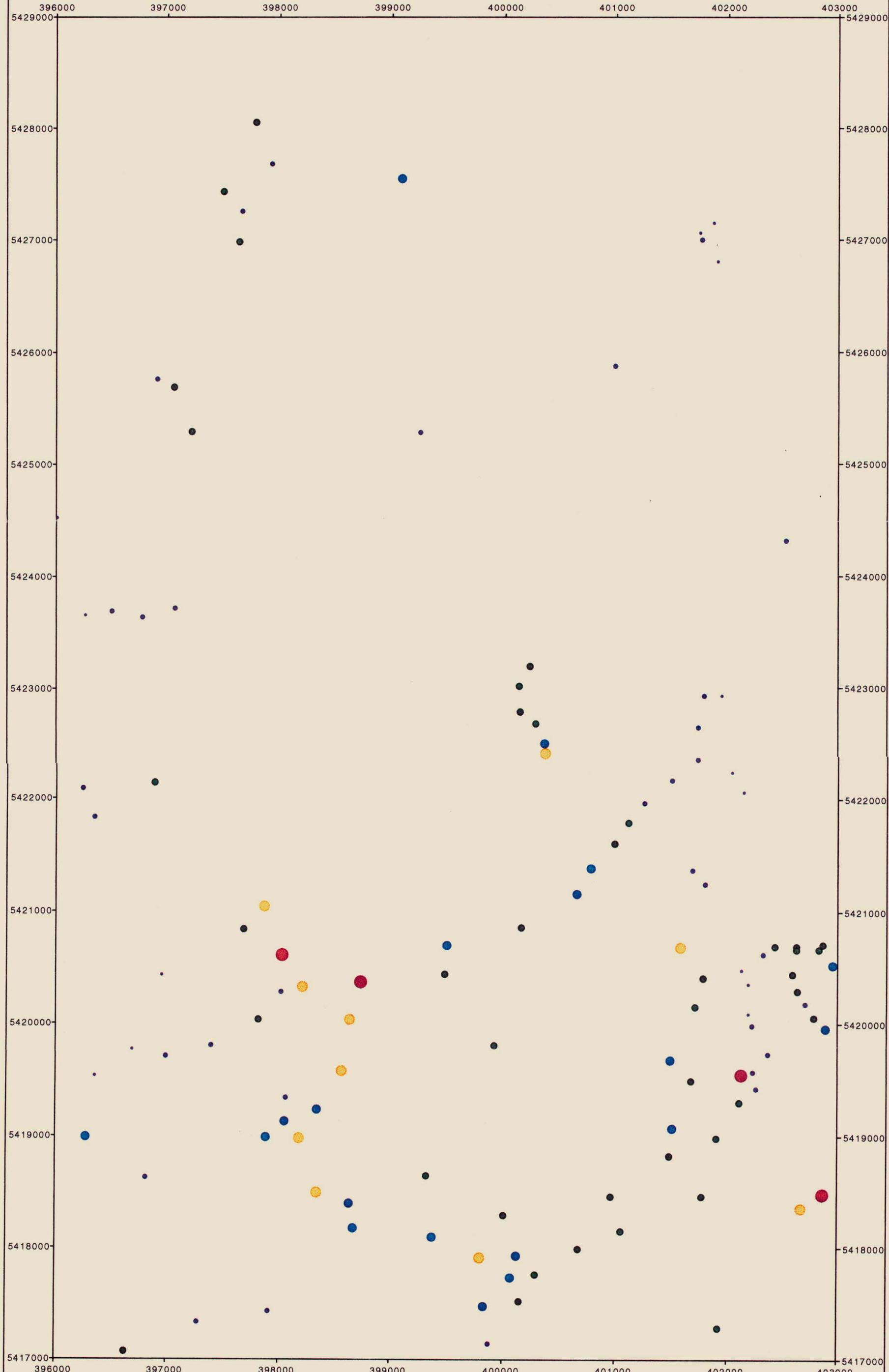
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1996 EL 54/94 ST VALANTINES PEAK  
- CRA MENPES S.A. MAHER S

CRA EXPLORATION PTY. LIMITED		
ST VALENTINES PEAK EL54/94		
Pb ppm -80# Stream Sed.		
Geol: S.Maher	Scale: 1:25000	Report: 21979
Drawn:	Date: 9/20/95	Plan: Tv 985

Pickands Mather & Comalco





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 • 20-50      • 50-100      • 100-150      • 150-200      • +200

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Pickands Mather & Comalco

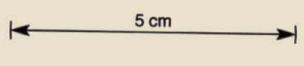
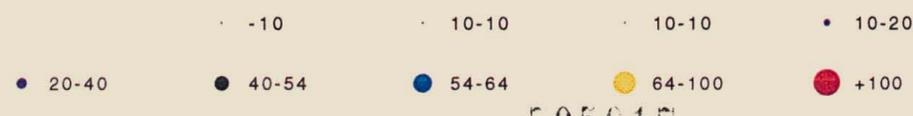
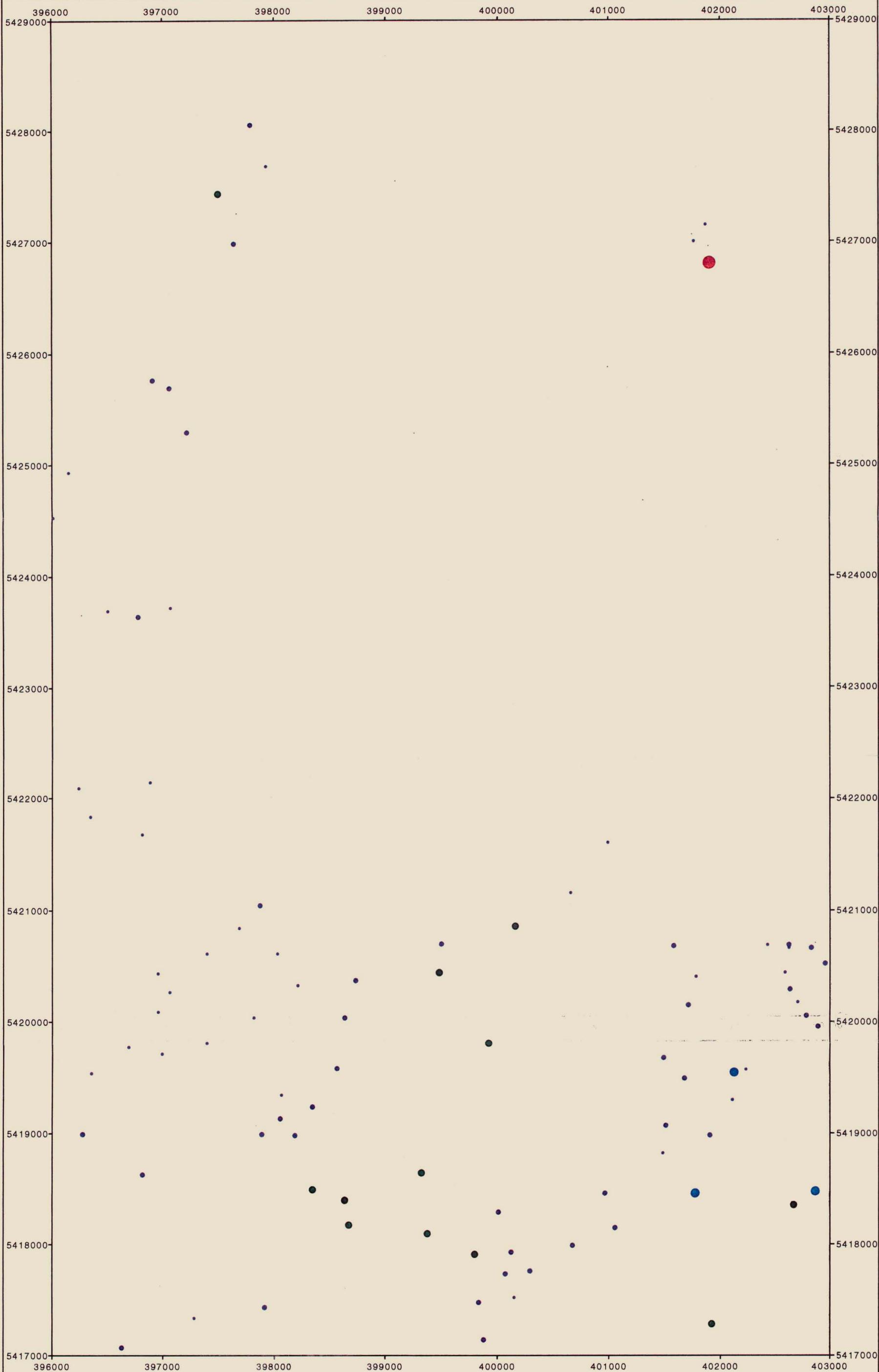
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# 96-3869

FIRST ANNUAL REPORT TO 23 JANUARY  
 1996 EL 54/94 ST VALANTINES PEAK  
 - CRA MENPES S A . MAHER S

705015

CRA EXPLORATION PTY. LIMITED		
ST VALANTINES PEAK EL54/94		
Zn ppm -80# Stream Sed.		
Geol: S.Maher	Scale: 1:25000	Report: 21979
Drawn:	Date: 9/20/95	Plan: Tv 986



705017  
**96-3869**

FIRST ANNUAL REPORT TO 23 JANUARY  
 1996 EL 54/94 ST VALANTINES PEAK  
 - CRA MENPES S A , MAHER S

CRA EXPLORATION PTY. LIMITED		
ST VALENTINES PEAK EL54/94		
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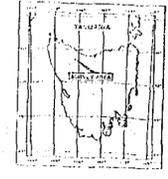
Pickands Mather & Comalco  
 jmap 100m

395 000 m E

400 000 m E

401 000 m E

LOCATION



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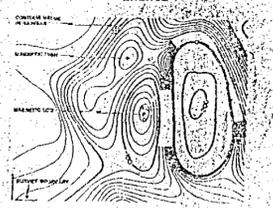
SURVEY SPECIFICATIONS

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CLIENT	CRA MENPES S.A. MAHER S
DATE	23 JANUARY 1996
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PROJECTION	UTM
COORDINATE SYSTEM	WGS 84
UNIT	METERS
VERTICAL DATUM	EGM 96
MAP SHEET	705016
PROJECT NO.	96-3869

SHEET INDEX



REFERENCE



CONTOUR INTERVAL: 10 METERS

Scale 1:25,000



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5427 000 m N

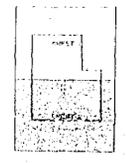
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 RIDGLEY AREA - TAS  
 AEROMAGNETIC  
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 SCALE 1:25,000  
 SHEET 705016

2126

# 96-3869

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1996 EL 54/94 ST VALANTINES PEAK  
CRA MENPES S.A. MAHER S

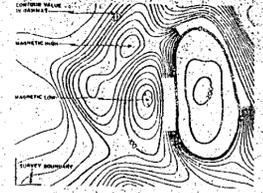
SHEET INDEX



SURVEY SPECIFICATIONS

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CLIENT	CRA MENPES S.A. MAHER S
DATE	23 JANUARY 1996
SCALE	1:25,000
CONTOUR INTERVAL	10 METERS
PROJECTION	UTM
COORDINATE SYSTEM	WGS 84
UNIT	METERS
VERTICAL DATUM	EGM 96
MAP SHEET	705016
PROJECT NO.	96-3869

REFERENCE



CONTOUR INTERVAL: 10 METERS



705016

5 cm

2127

GEODESIC SURVEYING PTY LTD  
1996 EL 54/94 ST VALANTINES PEAK  
RIDGLEY AREA - TAS  
AEROMAGNETIC  
TOTAL INTENSITY CONTOURS  
SCALE 1:25,000  
SHEET 705016

THE DATA HAS BEEN CHECKED FOR ERRORS. HOWEVER, THE USER SHOULD BE AWARE THAT THE DATA IS SUBJECT TO THE ACCURACY OF THE ORIGINAL DATA AND THE ACCURACY OF THE SURVEYING AND MAPPING PROCESS.

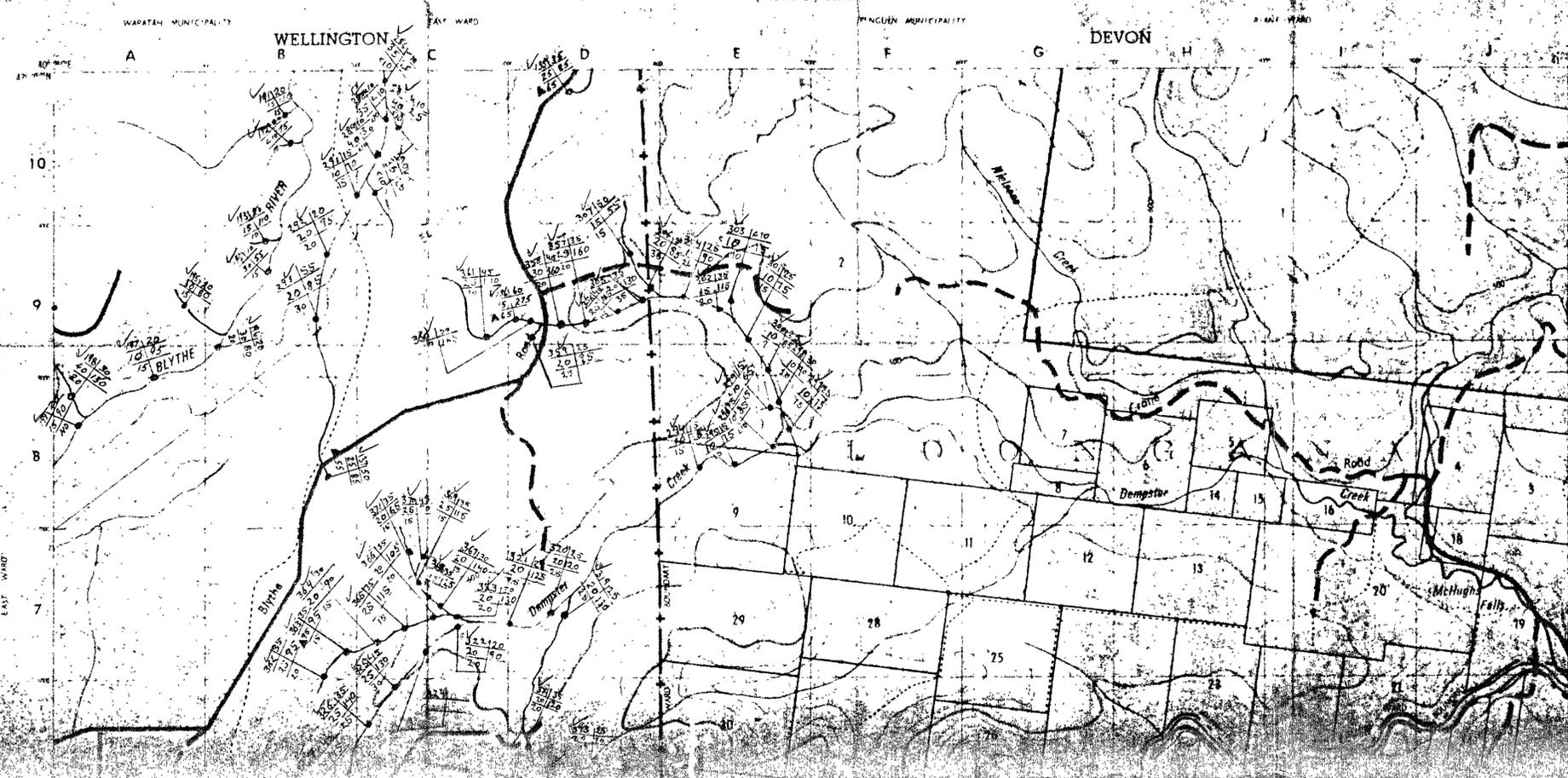
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 SHEET 705016

Plan No. 96-3869  
Report No.

Index numbers shown on this map when used in conjunction with the sheet number provides a unique reference to any lot. (e.g. 20/20/4845). Details of various G = granted lot, P.G = purchase grant, P = purchase lot, L.O = leasehold order, C.I = certificate issued, S.S = soldier settlement lease, R.A = residence area, L = lease, T.I = temporary license, C.L = crown land, G.P.P = granted under Real Property Act. Copies of this plan may be obtained from the Lands Dept. or Box 444 G.P.O. Hobart.

CADASTRAL REFERENCE SHEET 20/4041

Index	Survey Plan	Lot	Area	Name / Purpose	Tenure	Index	Survey Plan	Lot	Area	Name / Purpose	Tenure
1	120/17	29	136.65a	State Forest Cont. 29.12.26	C.L.						
2	120/17	29	136.65a	vacant	P.C.						
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55	120/17	29	136.65a	vacant	P.C.						
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57	120/17	29	136.65a	vacant	P.C.						
58	120/17	29	136.65a	vacant	P.C.						
59	120/17	29	136.65a	vacant	P.C.						
60	120/17	29	136.65a	vacant	P.C.						
61	120/17	29	136.65a	vacant	P.C.						
62	120/17	29	136.65a	vacant	P.C.						
63	120/17	29	136.65a	vacant	P.C.						
64	120/17	29	136.65a	vacant	P.C.						
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PRODUCTION: 1977  
 PHOTOGRAPHY: 1977  
 HORIZONTAL DATUM: Australian National Datum 1970  
 VERTICAL DATUM: Mean Sea Level  
 COMPILER: 1:20,000 Topographic Series and Land Register Chart

SCALE 1:20,000  
 (1:20,000 = 1 cm = 200 m)

CONTOUR INTERVAL: 20 METERS

BOUNDARY LEGEND

ROAD CLASSIFICATIONS

Principal road and highway  
 Secondary road  
 Minor road  
 Unimproved road  
 Reserved road

INDEX TO ADJOINING SHEETS

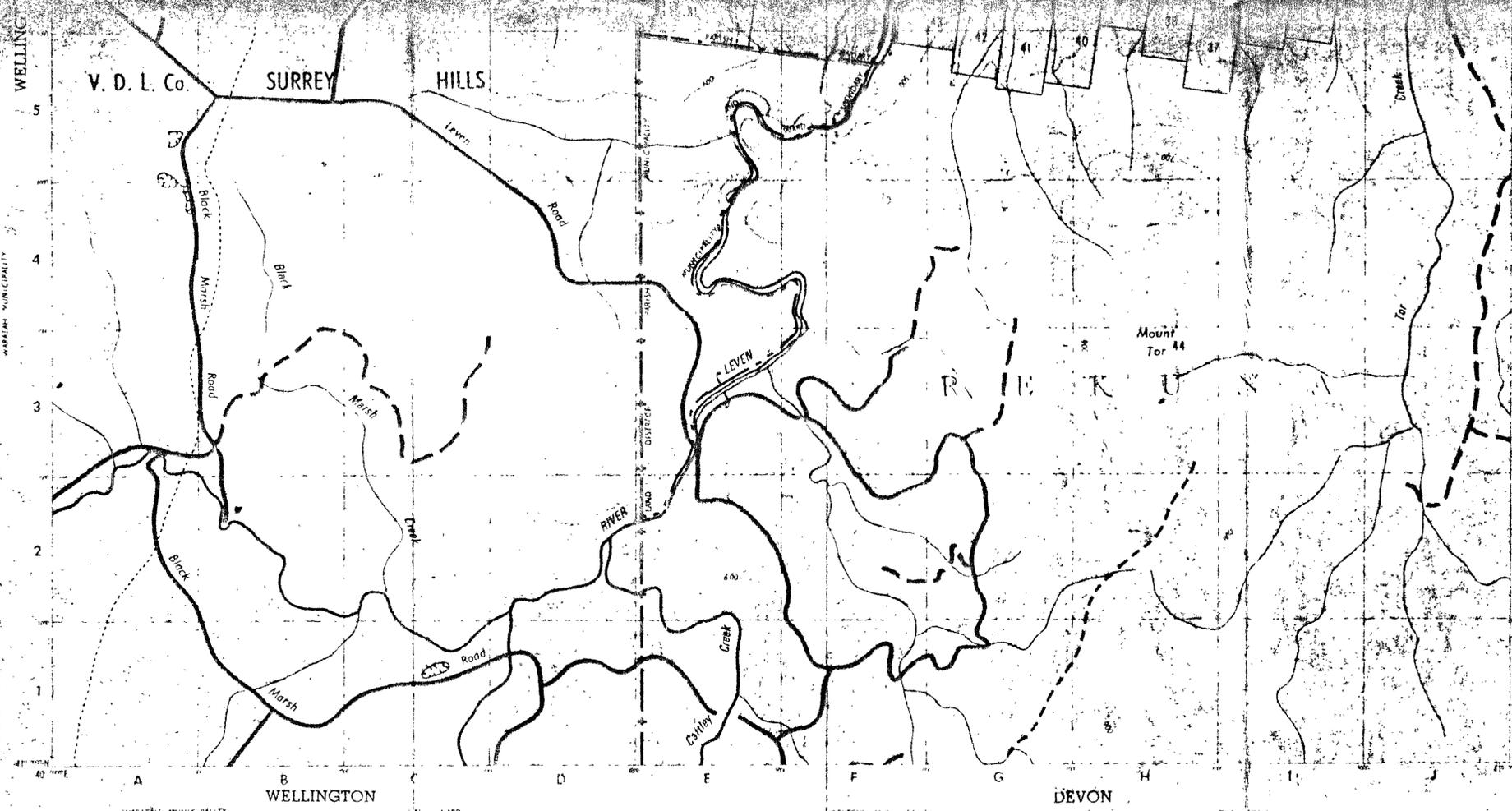
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3941	4041	4141
3940	4040	4140

LOCATION DIAGRAM

705018  
**96-3869**  
 FIRST ANNUAL REPORT TO 23 JANUARY  
 1996 EL 54/94 ST VALANTINES PEAK  
 CRA MENPES S.A., MAHER S

Plan No. To 220  
 Report No. 21979

COMALCO LIMITED		
E.L. 76 TASMANIA		
GUILDFORD		
STREAM SEDIMENT ANALYSES		
Date	1977-78	Scale 1:20000
Drawn	1977-78	Drawn No. TAS-78-182A



20/4041

1. This map is a preliminary edition prepared by the Survey Department on behalf of the State of Tasmania. It is not to be used as a legal document. The map is a Crown Copyright and may not be reproduced without written authority from the Survey Department.

2. This map is a preliminary edition prepared by the Survey Department on behalf of the State of Tasmania. It is not to be used as a legal document. The map is a Crown Copyright and may not be reproduced without written authority from the Survey Department.

BOUNDARY LEGEND

ROAD CLASSIFICATIONS

Principal road and highway  
 Secondary road  
 Minor road  
 Unimproved road  
 Reserved road

INDEX TO ADJOINING SHEETS

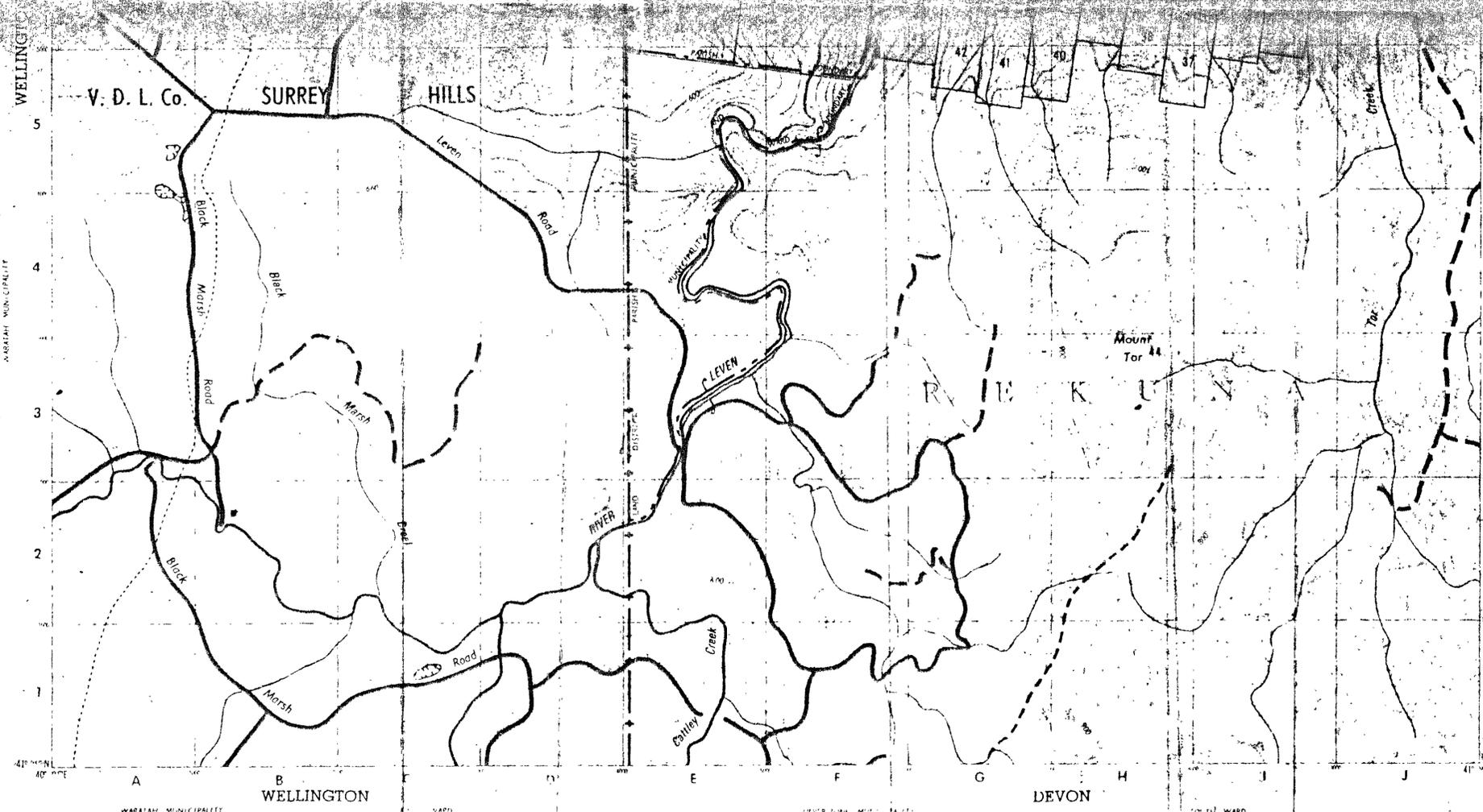
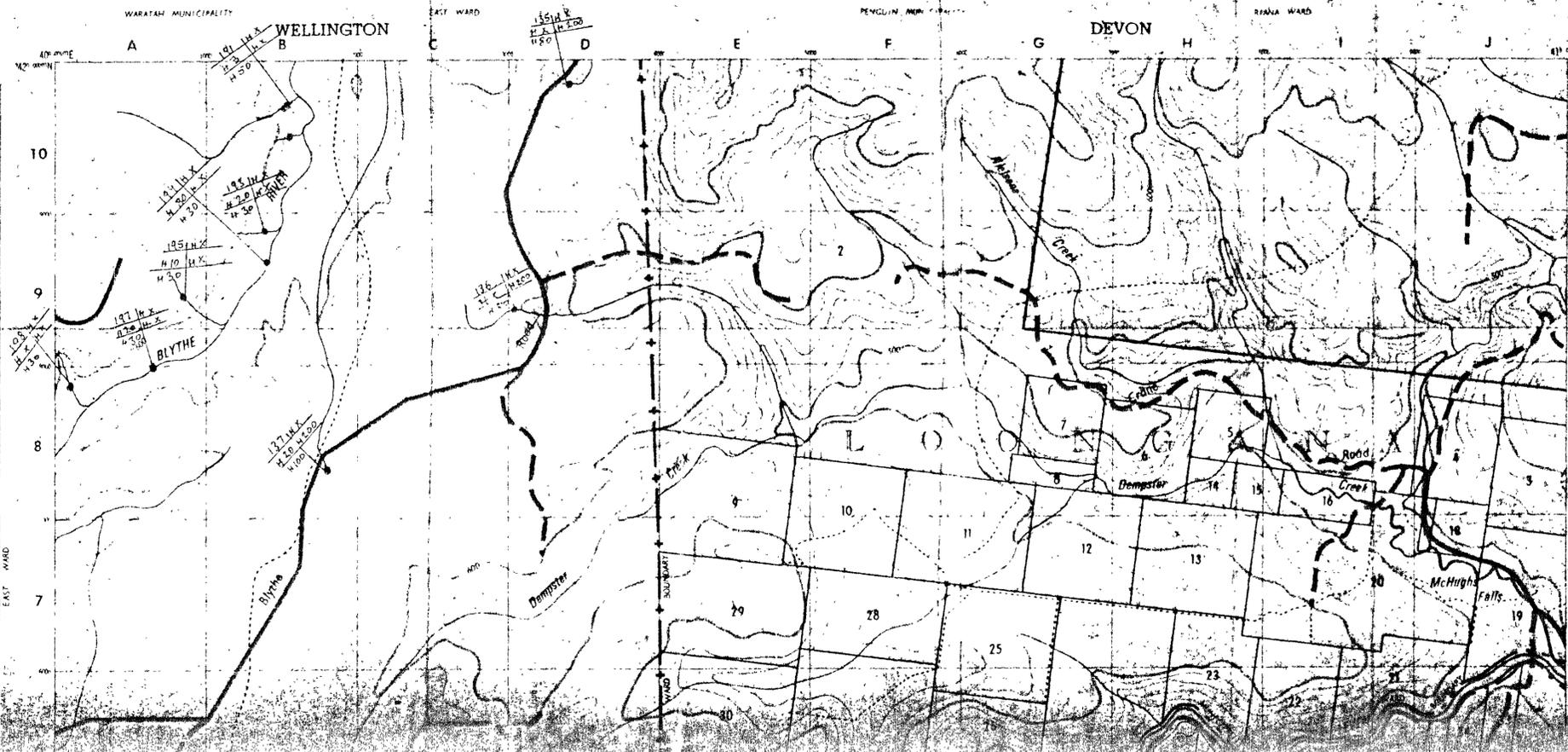
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3940	4040	4140

LOCATION DIAGRAM

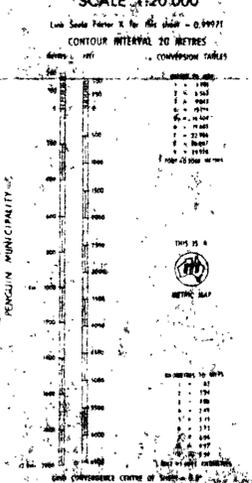
Index numbers shown on this tenure map when used in conjunction with the sheet number provides a unique reference to any lot (e.g. 28/20/404). Details of Tenure: G = granted lot, P.G. = purchase grant, P. = purchase lot, L.O. = lease in order, C.I. = certificate issued, S.S. = soldier settlement, S.S.I. = soldier settlement lease, R.A. = residence area, L. = lease for T.I. = temporary licence, C.L. = crown land, G.R.P. = granted under Real Property Act. Copies of this plan may be obtained from the Lands Dept or Box 444, G.P.O. Hobart.

CADASTRAL REFERENCE SHEET 20/4041

Index No.	Survey Plan	Lot	Area	Name / Purpose	Tenure
1	110		37.64ha	State Forest Co. 28.12.77	A.L.
2	79	120717	29.84ha	Parant	C.L.
3	18	120717	48.45ha	Albrighton, Pty. Ltd.	P.C.
4	88	158717	24.36ha	Statham, S.	P.C.
5	88	15872	40.42ha	Burke, T.M.	P.C.
6	17	13172	32.31ha	Fenton, A.K.D.	P.C.
7	17	13172	12.22ha	Fenton, A.K.D.	P.C.
8	17	13172	79.13ha	Wicks, J.B. Pty. Ltd.	P.C.
9	17	13172	58.28ha	Wicks, J.B. Pty. Ltd.	P.C.
10	17	13172	38.05ha	Wicks, J.B. Pty. Ltd.	P.C.
11	17	13172	60.87ha	Wicks, J.B. Pty. Ltd.	P.C.
12	17	13172	53.29ha	Wicks, J.B. Pty. Ltd.	P.C.
13	17	13172	10.12ha	Wicks, J.B. Pty. Ltd.	P.C.
14	17	13172	20.27ha	Wicks, J.B. Pty. Ltd.	P.C.
15	17	13172	2.02ha	Wicks, J.B. Pty. Ltd.	P.C.
16	17	13172		Wicks, J.B. Pty. Ltd.	P.C.
17	17	13172		Wicks, J.B. Pty. Ltd.	P.C.
18	17	13172		Wicks, J.B. Pty. Ltd.	P.C.
19	17	13172		Wicks, J.B. Pty. Ltd.	P.C.
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32	17	13172		Wicks, J.B. Pty. Ltd.	P.C.
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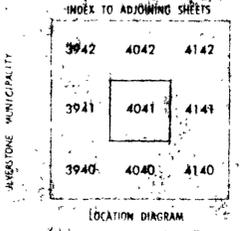


PRODUCTION: Land Use 1975  
PROJECTION: Transverse Mercator  
HORIZONTAL DATUM: Australian Geodetic Datum 1966  
VERTICAL DATUM: Mean Sea Level  
CORRECTION: Based on 1950 000 Topographic Series and 1968 Photogrammetry



BOUNDARY LEGEND  
Land District  
Municipality  
Parish  
Ward  
Town  
Tenure  
Lease  
Cattle Pasture  
Survey  
Miscellaneous

ROAD CLASSIFICATIONS  
Principal road and highway  
Secondary road  
Minor road  
Vehicular track  
Reserved road



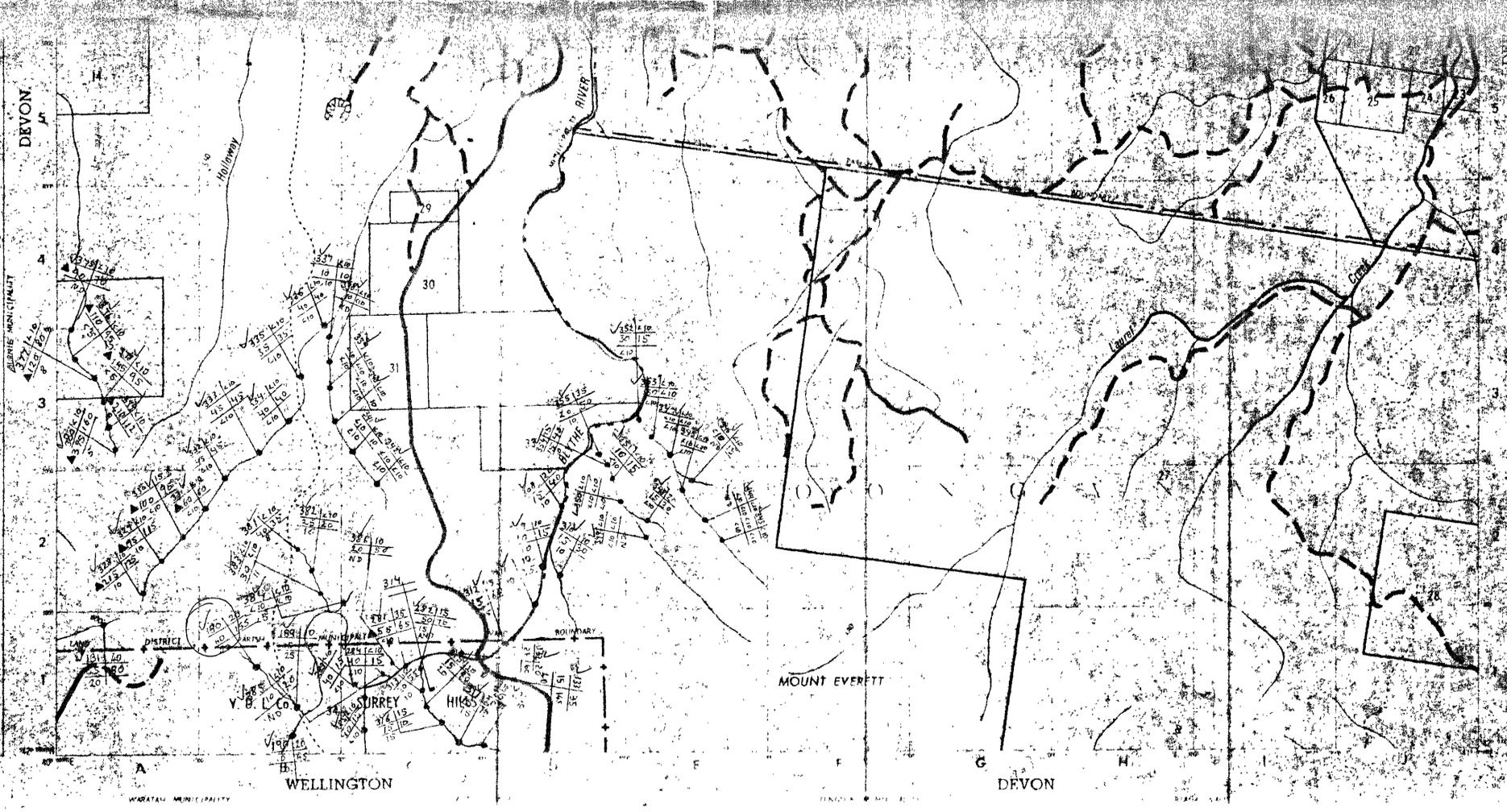
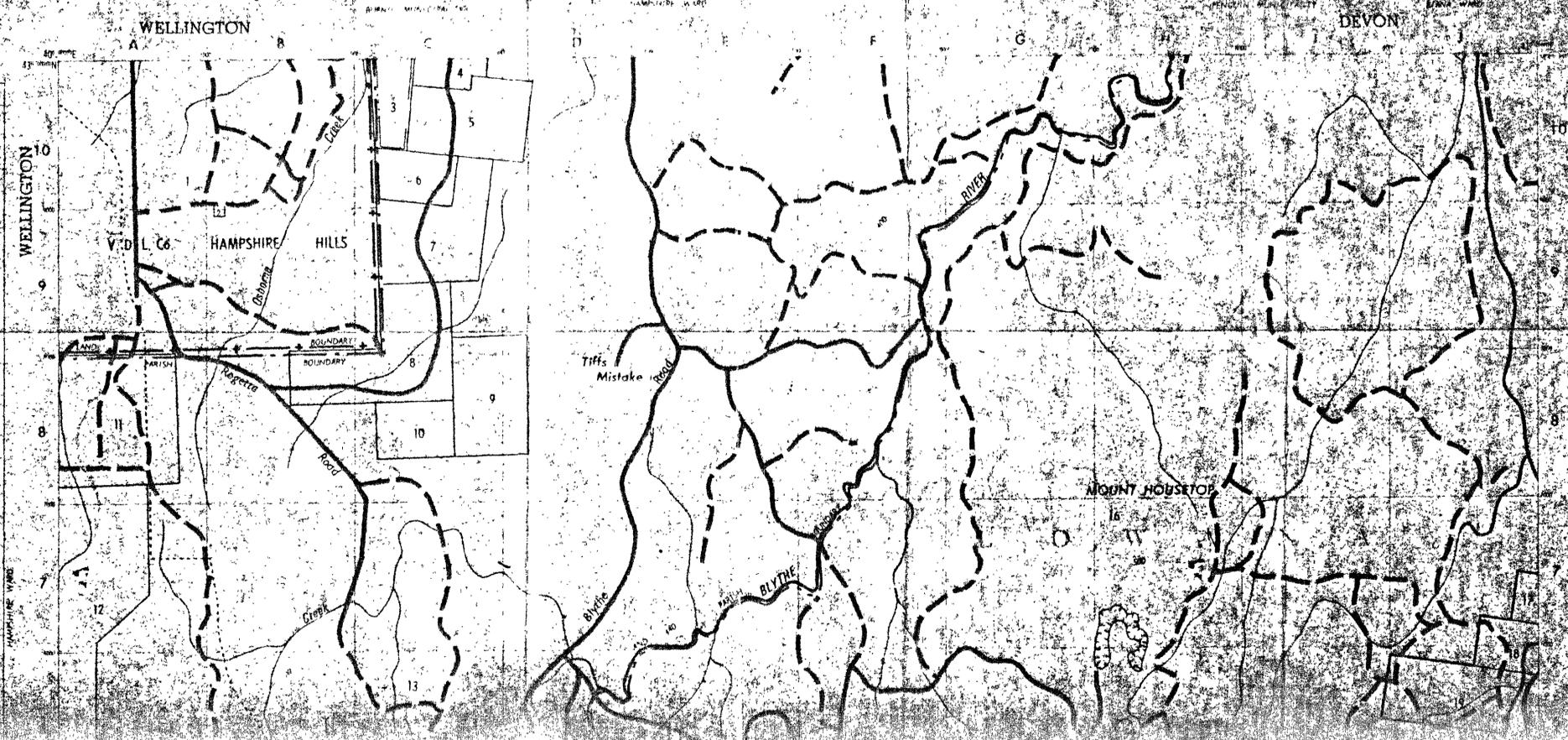
705019  
**96-3869**  
FIRST ANNUAL REPORT TO 23 JANUARY  
1996 EL 5494 ST VALANTINES PEAK  
- CRA MENPES S.A. MAHER S

Plan No. To 230  
Report No. 21979

COMALCO LIMITED	
E.L. 176 TASMANIA	
GUILDFORD	
STREAM MAGNETIC & PANNED	
CONCENTRATE ANALYSES	
Date	1977-78
Scale	1:20000
Drg No	TAS-78-182B

Number shown on the plan... (Legal notice regarding land titles and survey information)

CADASTRAL REFERENCE SHEET 20/1042. Table with columns: Index, Date, Plan, Area, Name, Tenure, and Remarks. Lists various land parcels and their details.



SCALE 1:20,000. Contour interval 10 metres. (Scale and contour information)

PLAN CLASSIFICATION. (Classification and legend information for the map)

96-3869

FIRST ANNUAL REPORT TO 23 JANUARY 1996 EL 54/94 ST VALANTINES PEAK CRA MENPES SA MAHR S

COMALCO LIMITED  
E.L. 54/94 TASMANIA  
GUILDFORD  
STREAM SEDIMENT ANALYSES

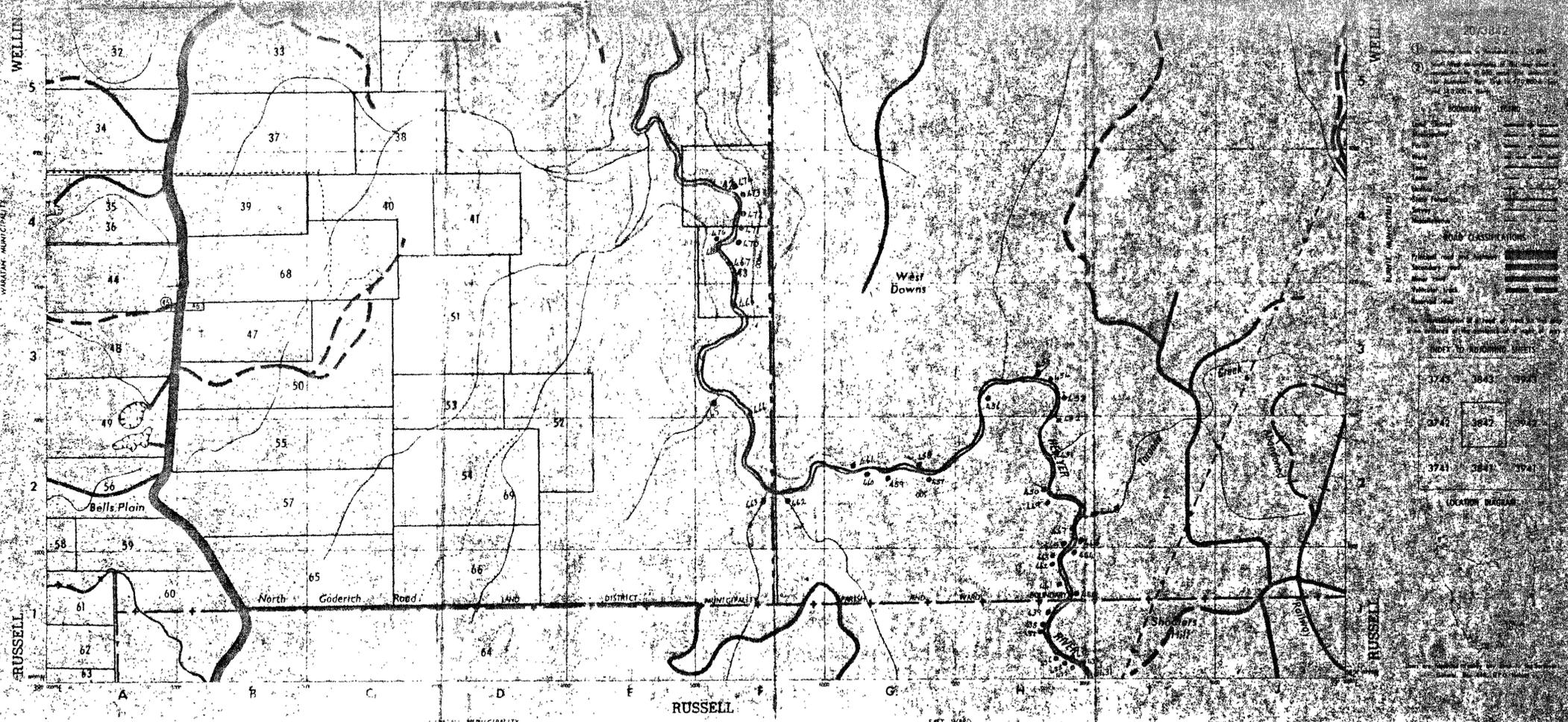
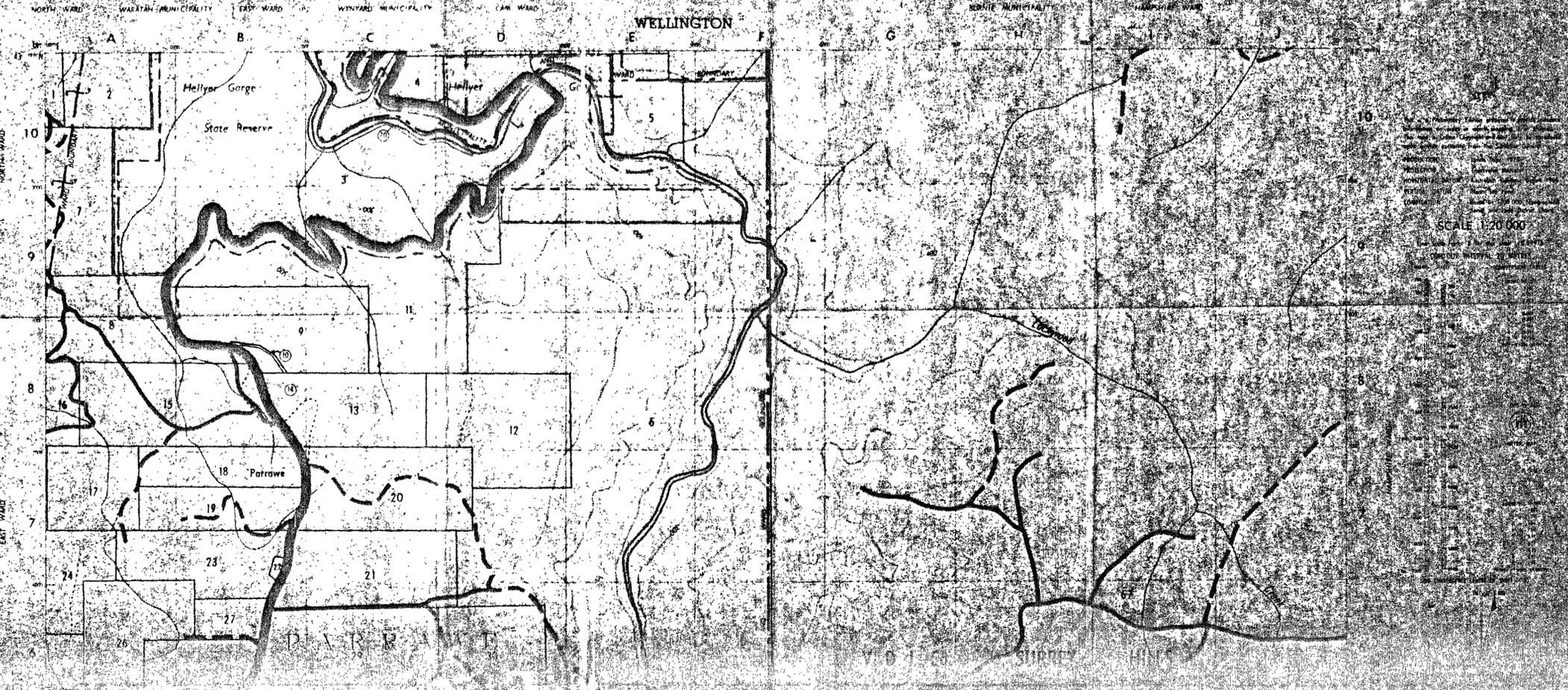
Plan No. To 231  
Report No. 21976

Date: 1977-78 Scale: 1:20,000 Org. No. AS-78-183A

Index numbers shown on this map when used in conjunction with the sheet number provide a unique reference to any lot. For example, 20/34/100. Details of the map are given in the 'Notes' section. For a full list of the 'Notes' section, see the 'Notes' section of the 'Notes' section. For a full list of the 'Notes' section, see the 'Notes' section of the 'Notes' section.

CADASTRAL REFERENCE SHEET 20/3842

Lot No.	Survey Plan	Lot Area	Name of Proprietor	Tenant	Notes
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# 96-3869

FIRST ANNUAL REPORT TO 23 JANUARY  
1996 EL 64/94 ST VALANTINES PEAK  
CRA MENPES S A MAHER S

5 cm

GOMA CO. LIMITED

EL 176 TASMANIA

GUILDFORD

STREAM & SPRING WATER

SAMPLE LOCATIONS

Date: 1977-78 Scale: 1:20000 Org No: TAS-93-185

SCALE 1:20 000  
The scale of this map is 1:20 000. The horizontal scale is true at sea level. The vertical scale is true at mean sea level. The map is based on the datum of 1958 AD. The map is based on the datum of 1958 AD. The map is based on the datum of 1958 AD.

KEY TO SYMBOLS  
The symbols on this map are as follows:  
1. Contour lines  
2. Spot heights  
3. Bench marks  
4. Water courses  
5. Rivers  
6. Lakes  
7. Swamps  
8. Forests  
9. Cultivated land  
10. Pasture  
11. Bare land  
12. Buildings  
13. Roads  
14. Fences  
15. Boundaries  
16. Survey points  
17. Old boundaries  
18. Old survey points  
19. Old roads  
20. Old fences  
21. Old boundaries  
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23. Old roads  
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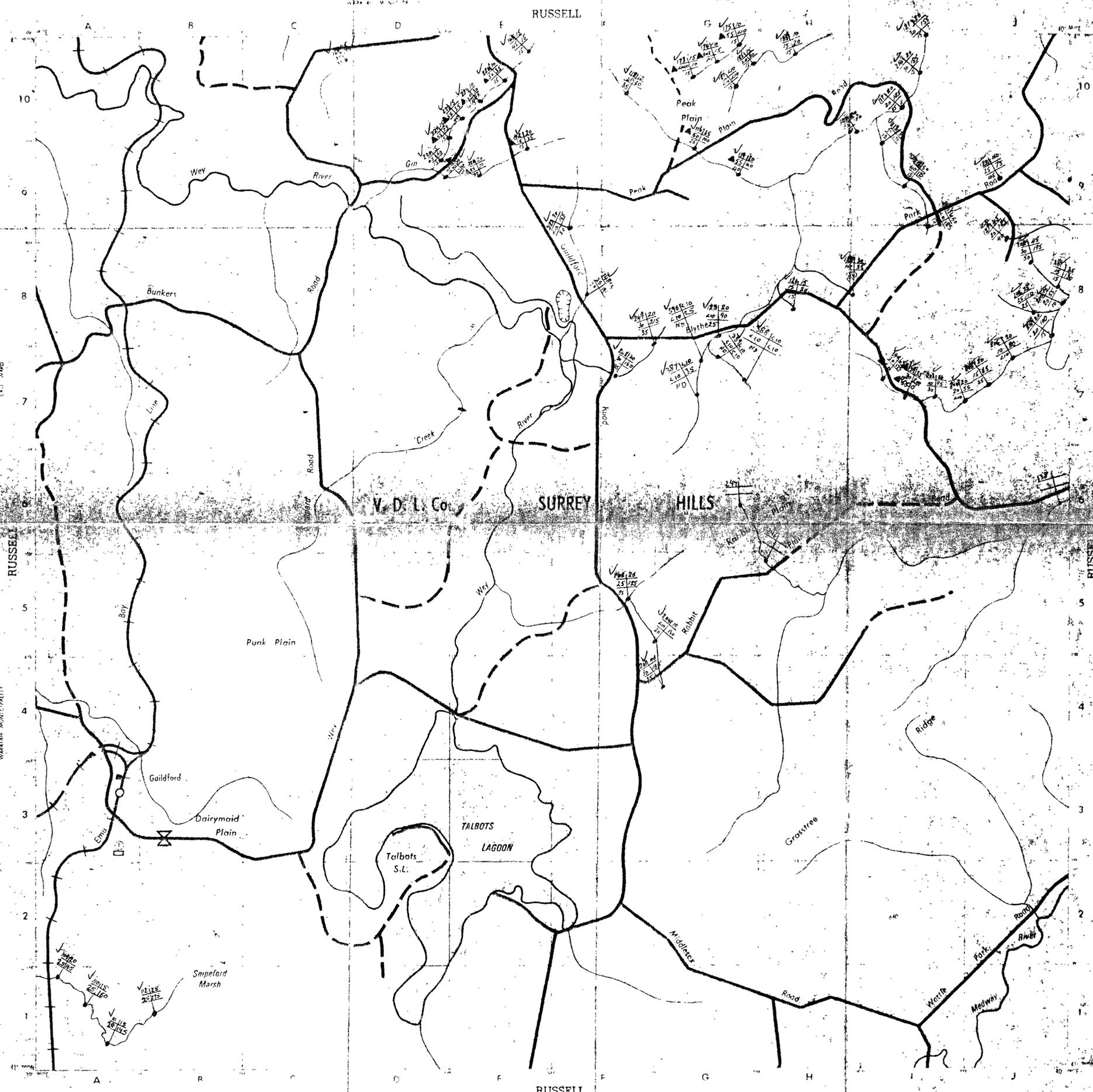
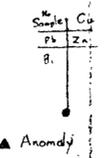
INDEX TO ADJOINING SHEETS  
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1. 20/34  
2. 20/35  
3. 20/36  
4. 20/37  
5. 20/38  
6. 20/39  
7. 20/40  
8. 20/41  
9. 20/42  
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53. 20/86  
54. 20/87  
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62. 20/95  
63. 20/96  
64. 20/97  
65. 20/98  
66. 20/99  
67. 20/100

LOCATION MAP  
The location map is as follows:  
1. Wellington  
2. Russell  
3. Hobart  
4. Launceston  
5. Burnie  
6. Devonport  
7. Ulverston  
8. Queenstown  
9. Smithton  
10. Wynyard  
11. Wynyard West  
12. Wynyard East  
13. Wynyard North  
14. Wynyard South  
15. Wynyard West North  
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387. Wynyard East South South South South North North

Index Numbers shown on this map when used in conjunction with the sheet number provides a unique reference to any lot (e.g. 28/20/4842). Details of Tenure: G = granted lot, P.G. = purchase grant, P. = purchase for, L.O. = location order, C.L. = certificate issued, S.S. = soldier settlement, S.S.T. = soldier settlement lease, R.A. = residence area, L. = lease for, T.L. = temporary licence, C.L. = crown land, G.R.P. = granted under Real Property Act. Copies of this plan may be obtained from the Land Dept or Box 44a, G.P.O. Hobart.

CADASTRAL REFERENCE SHEET 20/3941

Index	Lot No.	Survey Plan	Lot	Area	Name - Purpose	Tenure	Index	Survey Plan	Lot	Name - Purpose	Tenure
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10	10	10



1:20 000  
SCALE 1:20 000  
Vertical Interval 20 METERS  
Contour Interval 20 METERS  
CONTOUR INTERVAL 20 METERS  
CONTOUR INTERVAL 20 METERS

20/3941  
1. Proposed State Highway 117/118 RD  
2. Water Ways are indicated as per the Waterways Act 1956 and the Waterways (Amendment) Act 1964. The Waterways Act 1956 and the Waterways (Amendment) Act 1964 apply to the 1:20 000 Scale Map.  
BOUNDARY (FORM)  
Land District  
Municipality  
Parish  
Ward  
Town  
Zone  
Water  
State Forest  
Screen  
Mudflats  
ROAD CLASSIFICATIONS  
Proposed road and highway  
Standard road  
Main road  
Collector Road  
Reserve Road  
The representation of a road or track on this map is the evidence of the existence of a road or track.  
INDEX TO ADJOINING SHEETS  
3842 3942 4042  
3841 3941 4041  
3840 3940 4040  
LOCATION DIAGRAM  
There are special titles on the map to be referred to in the Survey General By-Laws G.P.O. Hobart.

705022  
**96-3869**  
FIRST ANNUAL REPORT TO 23 JANUARY  
1996 EL 54/94 ST VALANTINES PEAK  
CRA MENPES S.A. MAHER S

Plan No. To 237  
Report No. 21975

5cm

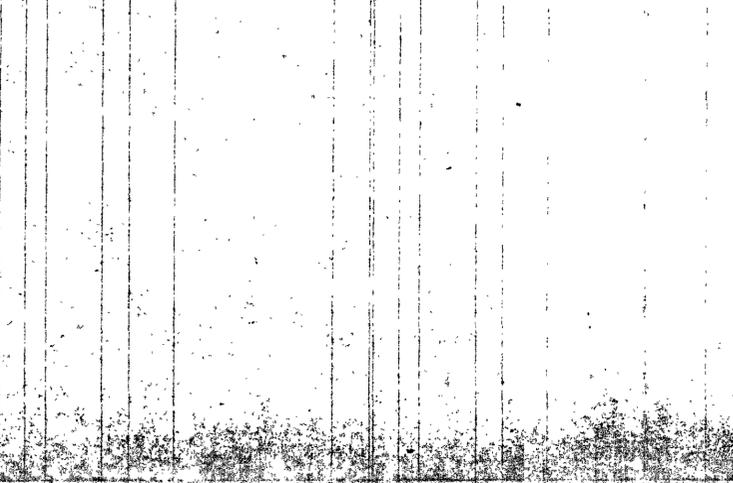
COMALCO LIMITED	
E.L. 11/76 - TASMANIA	
GUILDFORD	
STREAM SEDIMENT ANALYSES	
DATE: 1977-78	SCALE: 1:20,000 DRG NO. TAS 78-180A



Index numbers shown on this feature map when used in conjunction with the sheet number provides a unique reference to any lot. To obtain details of Tenure, G = granted lot, P = purchase or grant, R = purchase for 1.0, a location of lot, C1 = Certificate of Title, S = solid settlement, S.S. = solid settlement, R.A. = residence area, L = lease for 1, P = temporary licence, C.L. = Crown land, G.P.P. = granted under Real Property Act. Copies of this plan may be obtained from the Land Department, Box 444, G.P.O. Hobart.

CADASTRAL REFERENCE SHEET 20/3942

Lot No.	Survey Plan	Lot Area	Name	Purpose	Temp.	Lot No.	Survey Plan	Lot Area	Name	Purpose	Temp.
1	100/1	100.00	...	...	...	1	100/1	100.00	...	...	...
2	100/2	100.00	...	...	...	2	100/2	100.00	...	...	...
3	100/3	100.00	...	...	...	3	100/3	100.00	...	...	...
4	100/4	100.00	...	...	...	4	100/4	100.00	...	...	...
5	100/5	100.00	...	...	...	5	100/5	100.00	...	...	...
6	100/6	100.00	...	...	...	6	100/6	100.00	...	...	...
7	100/7	100.00	...	...	...	7	100/7	100.00	...	...	...
8	100/8	100.00	...	...	...	8	100/8	100.00	...	...	...
9	100/9	100.00	...	...	...	9	100/9	100.00	...	...	...
10	100/10	100.00	...	...	...	10	100/10	100.00	...	...	...
11	100/11	100.00	...	...	...	11	100/11	100.00	...	...	...
12	100/12	100.00	...	...	...	12	100/12	100.00	...	...	...
13	100/13	100.00	...	...	...	13	100/13	100.00	...	...	...
14	100/14	100.00	...	...	...	14	100/14	100.00	...	...	...
15	100/15	100.00	...	...	...	15	100/15	100.00	...	...	...
16	100/16	100.00	...	...	...	16	100/16	100.00	...	...	...
17	100/17	100.00	...	...	...	17	100/17	100.00	...	...	...
18	100/18	100.00	...	...	...	18	100/18	100.00	...	...	...
19	100/19	100.00	...	...	...	19	100/19	100.00	...	...	...
20	100/20	100.00	...	...	...	20	100/20	100.00	...	...	...
21	100/21	100.00	...	...	...	21	100/21	100.00	...	...	...
22	100/22	100.00	...	...	...	22	100/22	100.00	...	...	...
23	100/23	100.00	...	...	...	23	100/23	100.00	...	...	...
24	100/24	100.00	...	...	...	24	100/24	100.00	...	...	...
25	100/25	100.00	...	...	...	25	100/25	100.00	...	...	...
26	100/26	100.00	...	...	...	26	100/26	100.00	...	...	...
27	100/27	100.00	...	...	...	27	100/27	100.00	...	...	...
28	100/28	100.00	...	...	...	28	100/28	100.00	...	...	...
29	100/29	100.00	...	...	...	29	100/29	100.00	...	...	...
30	100/30	100.00	...	...	...	30	100/30	100.00	...	...	...



705024

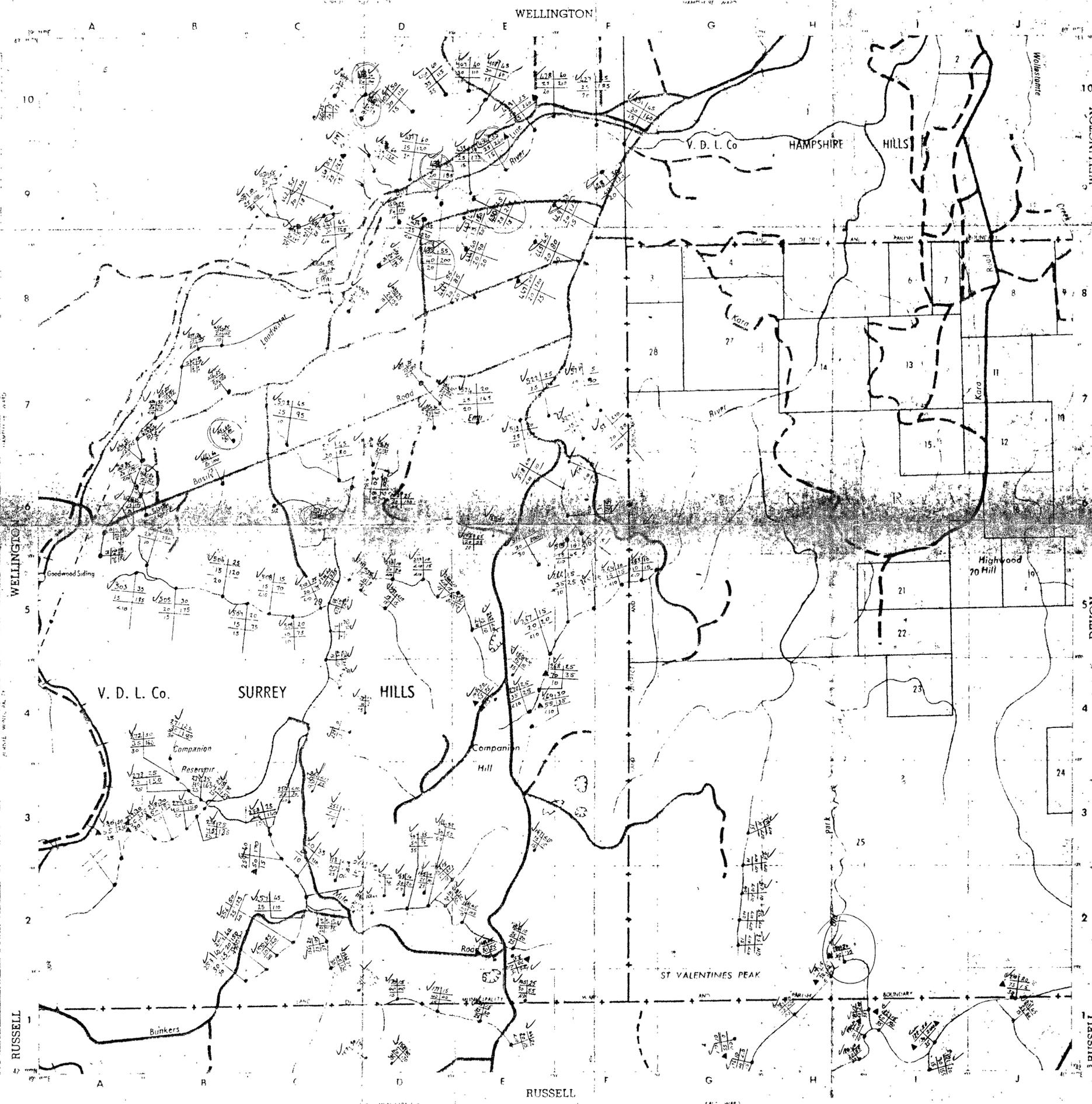
# 96-3869

FIRST ANNUAL REPORT TO 23 JANUARY  
1996 EL 54/94 ST VALENTINES PEAK  
CRA MENPES S.A. MAHER S

Plan No. To 241  
Report No. 21979

5cm

COMALCO LIMITED			
E.L. 1/76 TASMANIA			
GUILDFORD			
STREAM SEDIMENT ANALYSES			
Date:	1977-78	Scale:	1:20000
Org No:	TAS-78-181A		



This is a Preliminary Edition prepared by the Land Department in accordance with the provisions of the Land Act 1971. The map is a reproduction of the original map and may differ from the original map in some details. The map is a reproduction of the original map and may differ from the original map in some details.

PROJECTION: Transverse Mercator  
HORIZONTAL DATUM: Australian Geodetic Datum 1966  
VERTICAL DATUM: Mean Sea Level  
SCALE: 1:20 000  
CONTOUR INTERVAL: 20 METRES

20/3942

1 Fractional scale in thousands 1:20 000  
2 South West corner of the map sheet is represented by 10 000 metres grid co-ordinates of the Australian Map Grid (42 090 000 North and 150 000 000 East)

**BOUNDARY LEGEND**

Land District  
Municipality  
Parish  
Road  
Lease  
Tenure  
State Forest  
Survey  
Miscellaneous

**ROAD CLASSIFICATIONS**

Principal road and highway  
Secondary road  
Main road  
Vehicle track  
Reserved road

The representation of a road or track on this map is evidence of the existence of a right of way.

**INDEX TO ADJOINING SHEETS**

3843	3943	4043
3842	3942	4042
3841	3941	4041

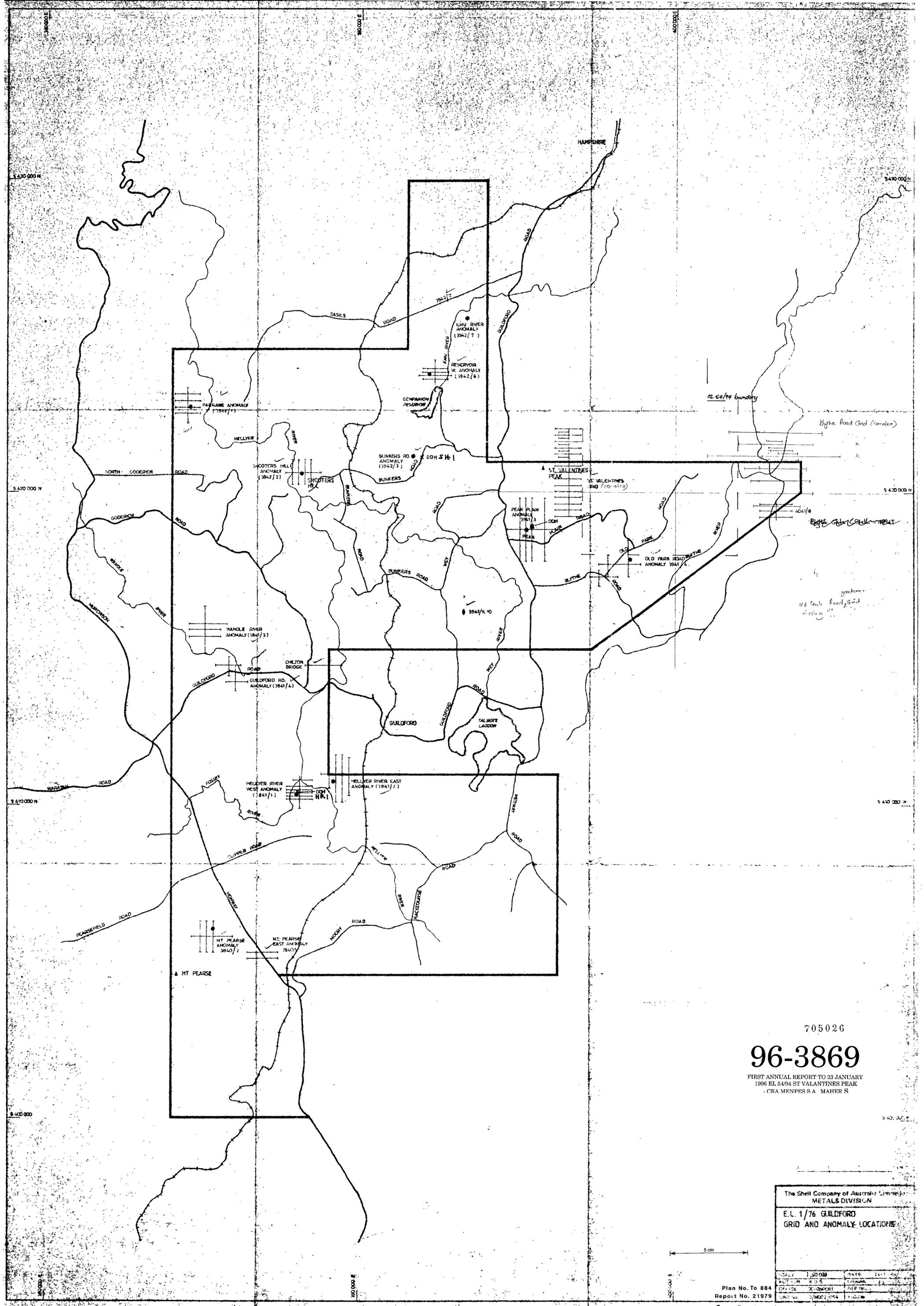
**LOCATION DIAGRAM**

This map is a reproduction of the original map and may differ from the original map in some details.

WELLINGTON  
HAMPshire HILLS  
SURREY HILLS  
V. D. L. Co.  
Companion Hill  
St Valentines Peak  
Highwood 70 Hill  
Kara River  
Bunkers  
Goodwood Siding

WELLINGTON  
DEVON  
RUSSELL





705026

# 96-3869

FIRST ANNUAL REPORT TO 23 JANUARY  
1996 EL 5494 ST VALENTINES PEAK  
- CRA MENPES S A MAHER S

The Shell Company of Australia Limited  
METALS DIVISION  
E.L. 1/76 GUILDFORD  
GRID AND ANOMALY LOCATIONS

5 cm

DATE	1/30/96	BY	...
AUTHOR	...	...	...
OFFICE	...	...	...
DATE	...	...	...

705027

# 96-3869

FIRST ANNUAL REPORT TO 23 JANUARY  
1996 EL 54/94 ST VALANTINES PEAK  
CRA MENPES S.A. MAHER S

**LEGEND**

**Quaternary**

- Alluvium
- Fill

**Permian-Carboniferous**

- Sandstone, siltstone, shale

**Devono-Silurian**

- ool shale
- Flintstone sandstone
- Magnetite rich siltstone

**Ordovician**

- Limestone
- Sandstone
- Conglomerate

**Cambrian**

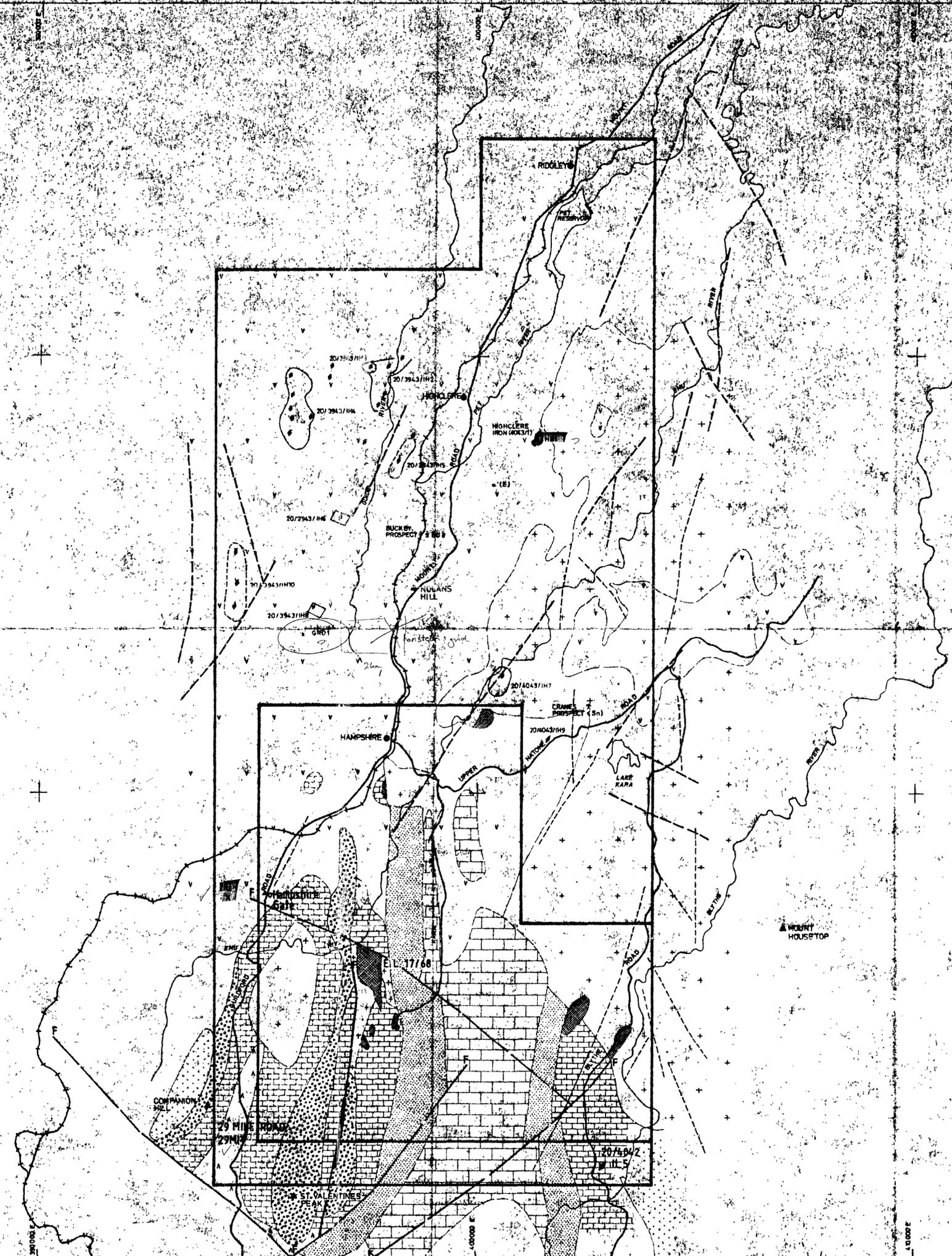
- Limestone/mudstone
- Acid/intermediate volcanic and sediment

**Igneous Rocks**

- Tertiary basalt
- Devonian granite - Hartzberg granite

**KEY**

- Highway
- Road
- River
- Emu Bay Railway
- Electrical sounding location
- Geological boundary
- Landfill interpretation (Markings)
- INPUT ANOMALY



5 cm

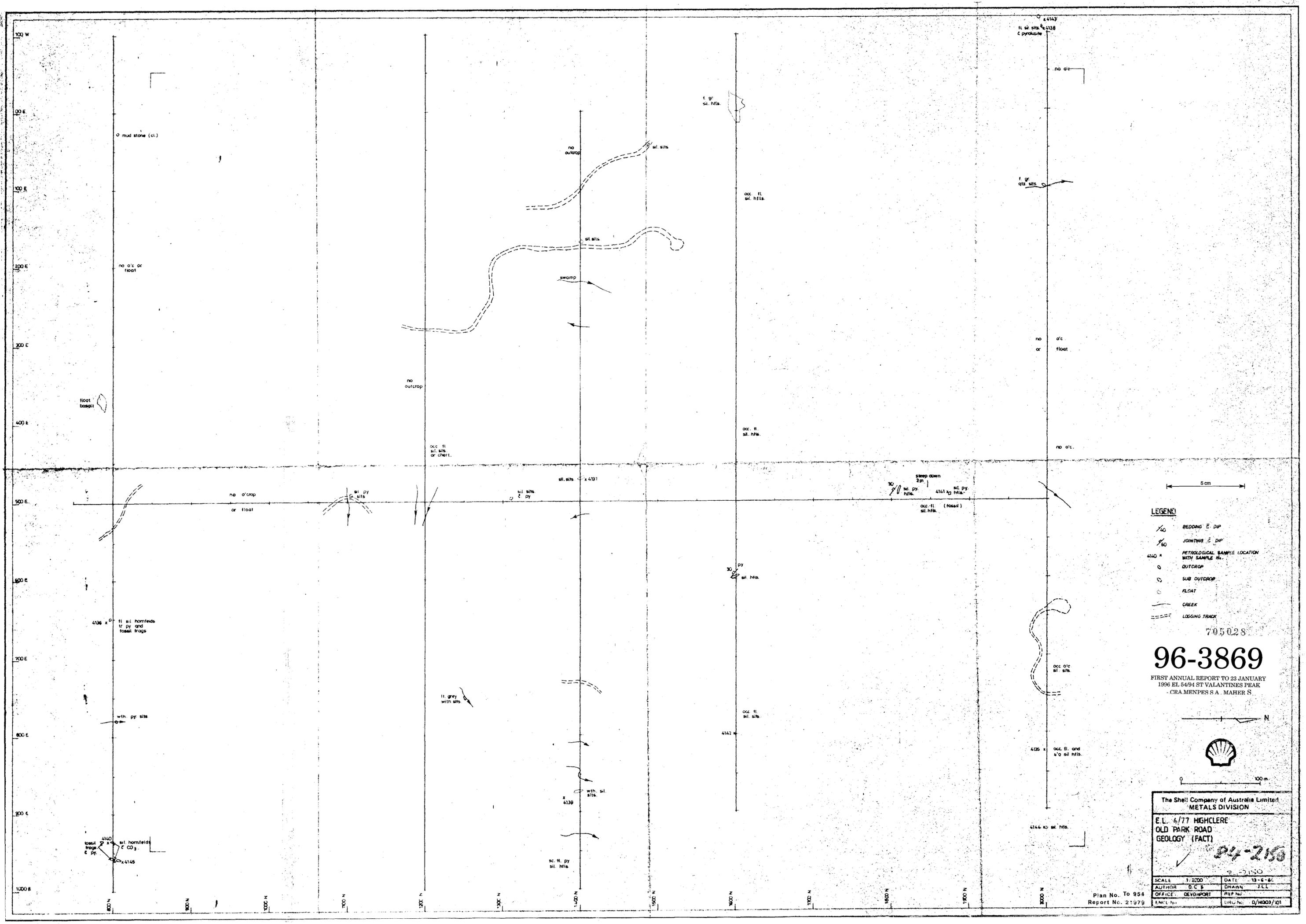


The Shell Company of Australia Limited  
METALS DIVISION

**EL 54/94 MONCLERE  
GEOLOGY**

FIG. No.	REPORT No.
ENCL. No.	DRG. No.
DATE	AUTHOR
DRAWN	OFFICE

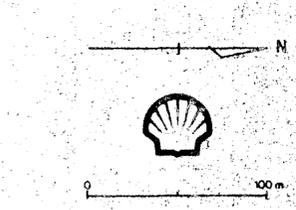
PEER No. To 918  
Report No. 21998



**LEGEND**

- BEDDING  $\angle$  DIP
- JOINTS  $\angle$  DIP
- PETROLOGICAL SAMPLE LOCATION WITH SAMPLE No.
- OUTCROP
- SUB OUTCROP
- FLOAT
- CREEK
- LOGGING TRACK

705028  
**96-3869**  
 FIRST ANNUAL REPORT TO 23 JANUARY  
 1996 EL 54/94 ST VALANTINES PEAK  
 - CRAMENPES S.A. MAHER S.

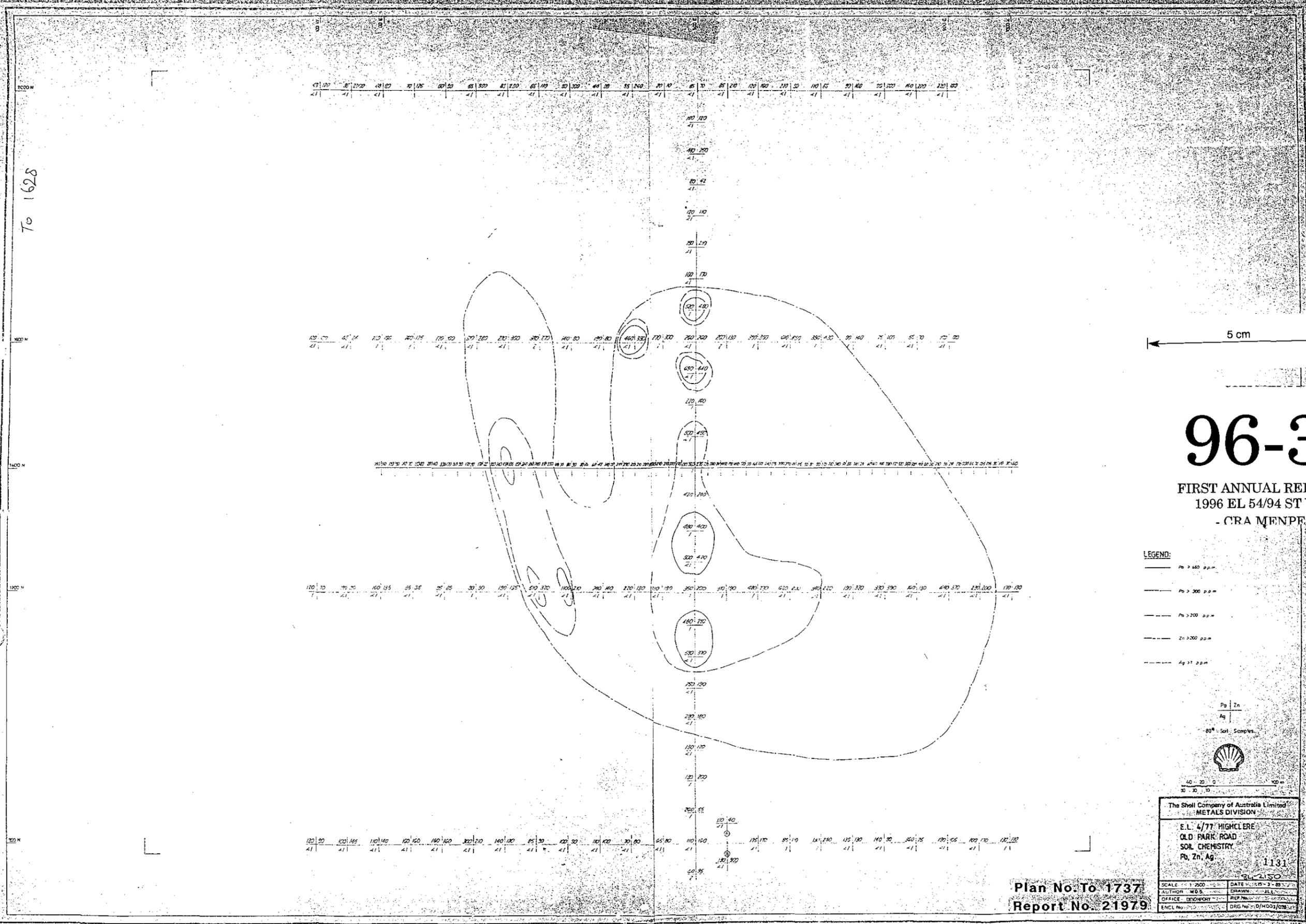


The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE OLD PARK ROAD GEOLOGY (FACT)	
24-2150	
SCALE 1:2000	DATE 13-6-82
AUTHOR D.C.B.	DRAWN J.L.L.
OFFICE DEVONPORT	REP No.
ENCL No.	DRG No. D/4003/01

Plan No. To 954  
 Report No. 21979

To 1628

705029

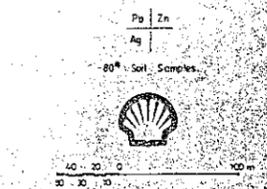


5 cm

# 96-3869

FIRST ANNUAL REPORT TO 23 JANUARY  
1996 EL 54/94 ST VALANTINES PEAK  
- CRA MENPES SA MAHER S

- LEGEND:
- Pb > 450 ppm
  - Pb > 300 ppm
  - Pb > 200 ppm
  - Zn > 200 ppm
  - Ag > 1 ppm



The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE OLD PARK ROAD SOIL CHEMISTRY Pb, Zn, Ag	
SCALE 1:200	DATE 15-1-88
AUTHOR W.S.	DRAWN J.L.
OFFICE CRONPORT	REP No. 21979
ENCL No. 2	DRG No. D/M001/028

Plan No. To 1737  
Report No. 21979

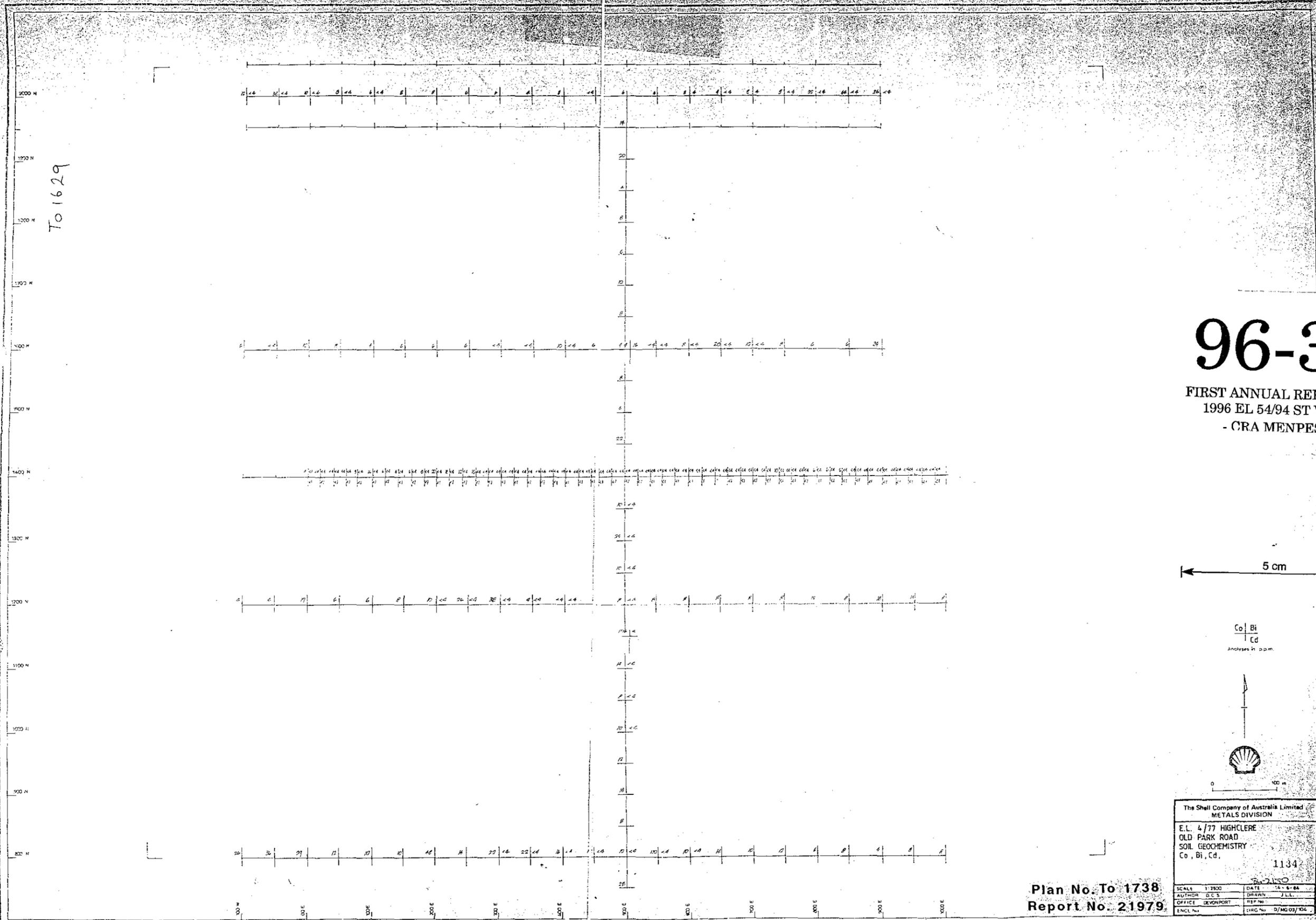
To ~~1628~~ 1737

To 1629

705030

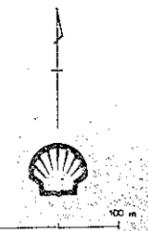
# 96-3869

FIRST ANNUAL REPORT TO 23 JANUARY  
1996 EL 54/94 ST VALANTINES PEAK  
- CRA MENPES SA MAHER S



5 cm

Co | Bi  
Cd  
Analyses in p.p.m.



The Shell Company of Australia Limited METALS DIVISION	
E.L. 4/77 HIGHCLERE OLD PARK ROAD SOIL GEOCHEMISTRY Co, Bi, Cd.	
1134	
SCALE 1:2500	DATE 12-8-84
AUTHOR G.C.S.	DRAWN J.L.L.
OFFICE DEVONPORT	REP No.
ENCL No.	CHG No. D/MG 03/84

Plan No. To 1738  
Report No. 21979

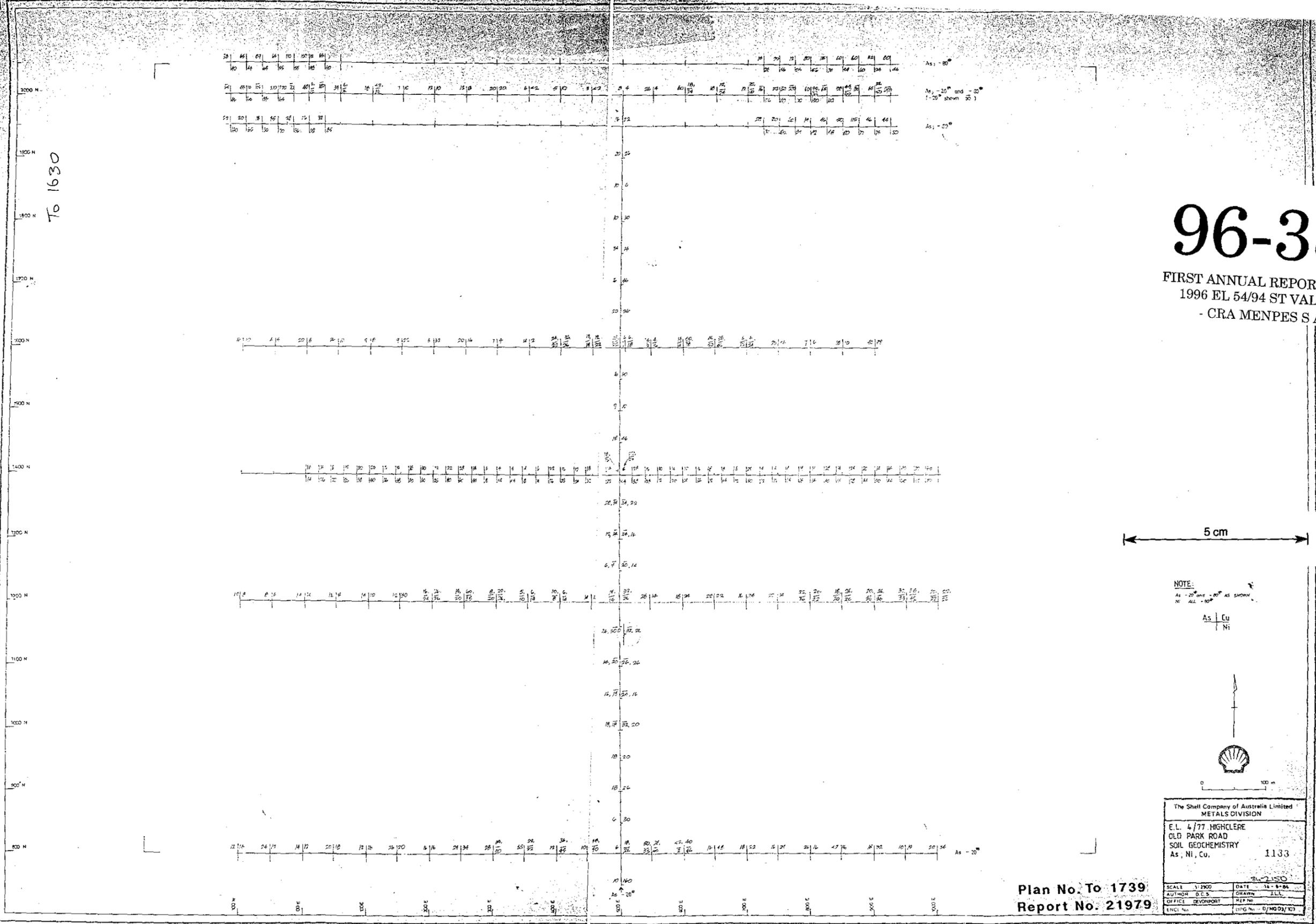
To 1738

705031

# 96-3869

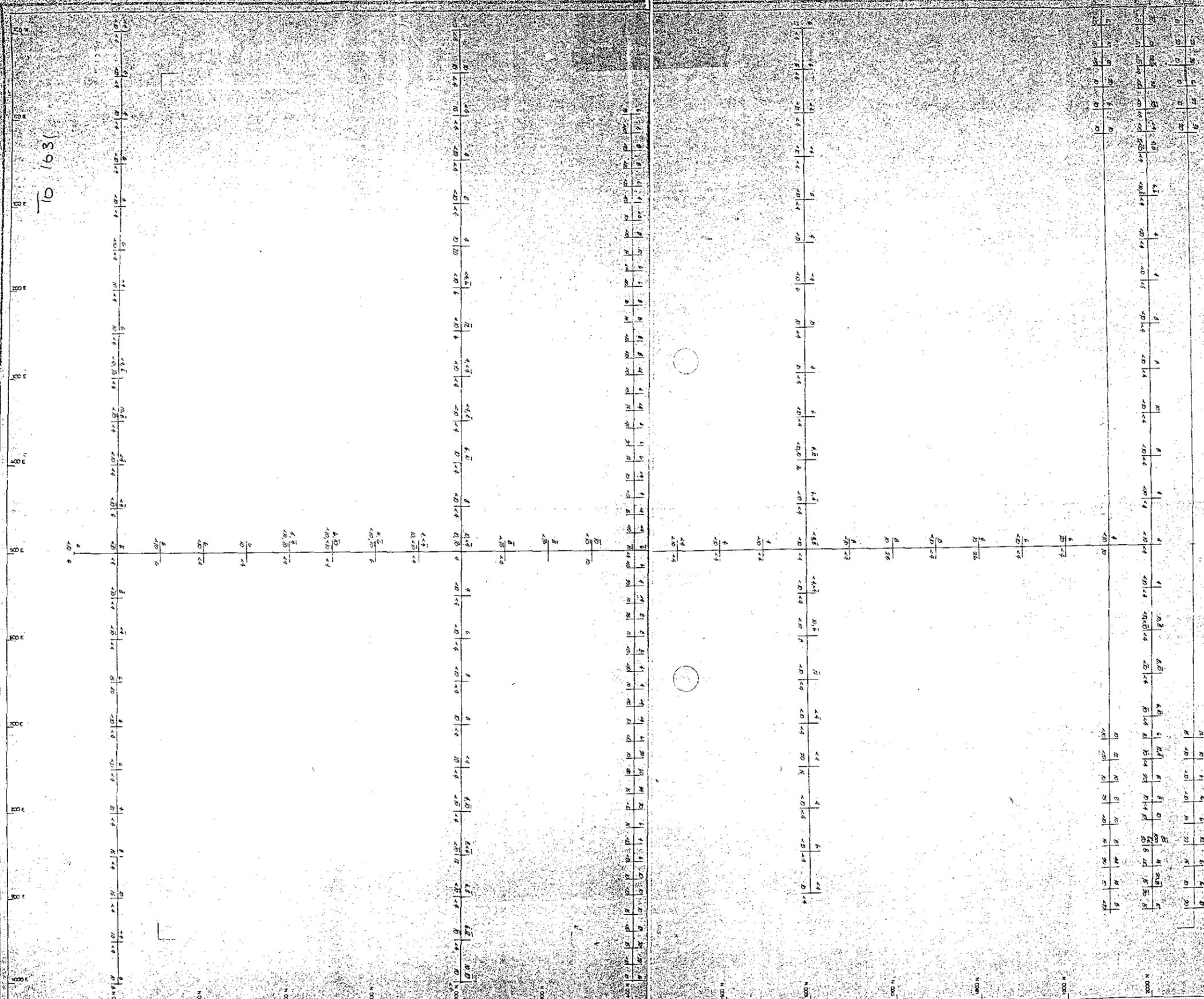
FIRST ANNUAL REPORT TO 23 JANUARY  
1996 EL 54/94 ST VALANTINES PEAK  
- CRA MENPES S A, MAHER S

To 1630



Plan No. To 1739  
Report No. 21979

To 1739



# 96-3869

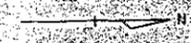
FIRST ANNUAL REPORT TO 23 JANUARY  
1996 EL 54/94 ST VALANTINES PEAK  
- CRA MENPES S A, MAHER S

705032

5 cm

Plan No. To 1740  
Report No. 21979

NOTE  
- 20° shown in  
otherwise - 0°  
Sn  
W - Mo



The Shell Company of Australia Limited  
METALS DIVISION  
E.L. 4/77 PECHLERE  
OLD PARK ROAD  
SOIL GEOCHEMISTRY  
Sn, W, Mo

1132

SCALE 1:1000 DATE 11-8-99  
AUTHOR B.C.S. DRAWN J.L.L.  
OFFICE IN CHARGE REP. NO. 21979  
INCL. NO. 21979/258 DRG. NO. 10/258/258

To 1740

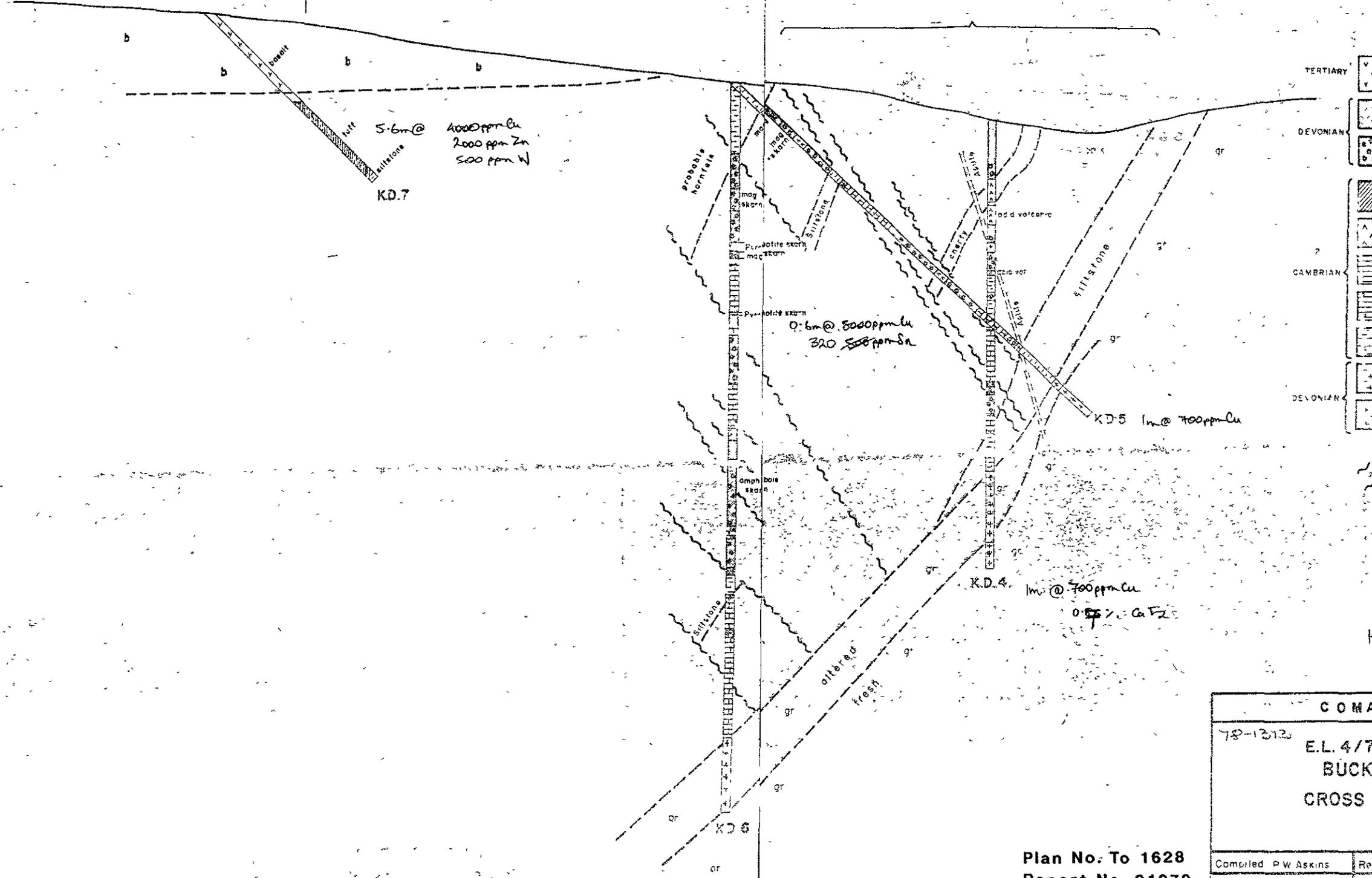
To 1628

# 96-3869

FIRST ANNUAL REPORT TO 23 JANUARY  
1996 EL 54/94 ST VALANTINES PEAK  
- CRA MENPES S A, MAHER S

1900 W 1850 W 1800 W 1750 W 1700 W 1650 W 1600 W 1550 W 1500 W 1450 W

Sequence of dolomitic limestone, dolomitic limestone conglomerate, silty dolomites, all variously metasomatized



- TERTIARY Basalt (b)
- DEVONIAN Skarn of various types after dolomitic limestone, silty dolomites
- DEVONIAN Skarn of various types after dolomitic limestone conglomerate
- Lithic tuff
- Cherts, acid volcanics
- CAMBRIAN Dolomitic limestone, silty dolomites
- Dolomitic limestone conglomerate
- Siltstone (or hornfels)
- DEVONIAN Aplite
- DEVONIAN Hausstop granite (gr)
- Faults or fractures

705033

5 cm

COMALCO LIMITED

78-1312 E.L. 4/77 HIGHCLERE TASMANIA  
BUCKBY PROSPECT  
CROSS SECTION AT 100S 2558

Compiled P.W. Askins	Revised	Drawn M. Attwell
Date April, 1979	Scale 1:250 vert & horiz	Dwg No TAS-78--30

Plan No. To 1628  
Report No. 21979

705034

**Appendix 1**

**Previous Exploration - EL 54/94 St Valentines Peak**

**Rio Tinto Australian Exploration Pty. Limited**      **SPL 311**      **1958-?**

SPL 311, held by Rio Tinto Australian Exploration Pty. Limited, includes most of the area covered by EL 54/94 (McCarthy, 1958). An airborne magnetic survey was flown over the licence. Survey line spacing and ground clearance were 800m and 160m respectively. Atkinson (1958) inspected the Hampshire and Highclere magnetic Fe deposits to the north of the area covered by EL 54/94. No additional work was undertaken in this area.

**Pickands Mather & Co. International**      **EL 12/65**      **1965-?**

EL 12/65, held by Pickands Mather & Co. International, includes the area covered by EL 54/94 (Anon., 1966). This area was covered by a reconnaissance stream sediment sampling programme with a sample density of one sample per 4 sq ml (13 samples). Samples were taken from "active" stream beds, dried, and -80 mesh fractions were analysed for Cu Pb Zn Ni by AAS (perchloric acid digest) and Cu Mo As Sn by calorimetric techniques (located samples are included in CRAE's competitor stream sediment database). No additional work within this area was reported by Pickands Mather.

**Comstaff Proprietary Limited**      **EL 19/68**      **1968-?**

The area covered by former EL 19/68, which was granted to Comstaff Proprietary Limited in December 1968, is west of the area covered by EL 54/94. EL 19/68 was taken out over predominantly Cambrian stratigraphy to explore for VHMS mineralisation (cf. Hellyer Deposit). Comstaff completed a regional stream sediment geochemistry sampling programme covering the licence area. Stream sediment anomalies were followed up with geological mapping and grid soil sampling. Results from sampling downgraded the anomalies and no further work was undertaken.

**Tasminex N.L, Australia and New Zealand Exploration Company (ANZEC) and Tasminex N.L**      **EL 17/68**      **1968-1974**

**McIntyre Mines (Aust) Pty. Ltd**      **EL 17/68, CL 105M/77**      **1977-1985**  
**and Tasminex N.L**

**Tasminex N.L**      **EL 17/68, CL 105M/77**      **1985-1987**

The area covered by former EL 17/68, granted to Tasminex N.L. in 1968, includes the area covered by EL 54/94. Tasminex and the Mines Department undertook ground magnetic surveys which located magnetite bearing skarn lenses including Kara. Skarns were initially drilled by the Mines Department and Tasminex to evaluate the Fe potential. Records of work undertaken in the first three years of tenure were not found.

EL 17/68 (and 44/71 - subsequently amalgamated with 17/68) was held under a joint venture agreement between Australia and New Zealand Exploration Company (ANZEC) and Tasminex N.L. between October 1971 and May 1974. Work undertaken by ANZEC was designed to locate and prove W deposits and included regional geological mapping, airborne and ground magnetic surveys, and geochemical sampling surveys.

Airborne magnetic and radiometric data was collected over a 5x25 km area (450 m spaced flight lines) including most of the area covered by EL 54/94. 806 geochemical samples (mostly panned stream sediment) were collected during regional work and assayed for W by XRF. 157 of these samples, from streams draining Cambrian volcanic-sedimentary terrains (outside the area covered by EL 54/94), were additionally analysed for Sn Cu Pb Zn Au. This data is not captured on the CRAE competitor database.

Stream sediment data indicated a 500 m long magnetite-bearing skarn (L2 - Sutton's Skarn) centred at 401700mE, 5427400mN within the area covered by EL 54/92. Sutton's Skarn is developed in poorly exposed transitional Denison-Gordon Group sequences at the western margin of the Housetop Granite. The skarn was concluded to be barren of W following power auger sampling (54 samples, 6 m average depth) which returned a best assay of 670 ppm W (?only assayed for W).

Stream sediment data and geological mapping indicated several other prospective areas outside the area covered by EL 54/94. These areas were investigated by trenching, power auger drilling, and diamond drilling - and included the Kara W and magnetite deposits.

EL 17/68 and Consolidation Lease 105M/77 (which covers the Kara skarns), were subsequently held under an option agreement between McIntyre Mines (Aust) Pty. Ltd. and Tasmincx N.L. between 1977-85.

Work undertaken during this period focussed on proving the Kara W resources, and locating additional W reserves. This involved collecting detailed helimagnetic data, and follow-up of helimagnetic and ANZEC stream sediment anomalies within the area covered by EL 54/94.

Contoured magnetic data from the helimagnetic survey (150 m spaced E-W flight lines and 70m terrain clearance) is shown on Plan To 1736. Interpretation of helimagnetic data was not reported.

Sutton's Skarn was selectively resembled for geochemical analysis. Results of this sampling were not reported.

Following the purchase of McIntyre Mines interests in EL 17/68 and CL105M/77 by Tasminex in 1985, Tasminex commissioned an evaluation of exploration undertaken by Tasminex, ANZEC, and McIntyre Mines during the history of the licence (McArthur, 1985). David Simpson (contract geologist) concluded most exploration (including drilling) targeted scheelite bearing magnetite skarn, and potential for other mineralisation styles/commodities is unknown.

No reports on exploration within EL 17/68 or CL 105M/77 were found after 1985. EL 17/68 was due to expire in 1987.

#### **Northern Prospecting**

**EL 1/75**

**1975-?**

Former EL 1/75 was held by Northern Prospecting in 1975 (Gould, 1975), and does not include the area covered by EL 54/94. Three vertical stratigraphic diamond holes (GF I-3) were drilled to determine Tertiary basalt thickness prior to committing to a substantial sub-basalt exploration programme. Holes ended at 152.0 m, 88.5 m and 90.0 m respectively in Tertiary basalt. Sub-basalt exploration was not considered to be viable given the thickness of Tertiary basalt cover, and EL 1/75 was relinquished.

#### **Comalco,**

**EL 1/76, 4/77**

**1976-1980**

#### **Comalco and Billiton**

**EL 1/76, 4/77**

**1980-1984**

Former EL's 1/76 and 4/77 were held by Comalco between 1976-80 and 1977-80 respectively, and under the Housetop JV agreement between Comalco and Billiton between 1980-84. EL 54/94 covers 10 sq km of former EL 1/76. EL 54/94 covers a five sq km area in the south of former EL 4/77. From 1977-80 exploration undertaken in this area was included in exploration reports for EL 1/76.

Comalco and Billiton targeted W-Sn-F-Cu skarn/carbonate replacement mineralisation (cf. Kara Mine, Moina Deposit, former Bischoff Mine, former Cleveland Mine, former King Island Scheelite Mine, and Renison Mine). Devonian, Ordovician, Cambrian, and Precambrian carbonate stratigraphy was considered to offer the best potential for these styles of mineralisation. Tertiary basalt covers large areas within the area covered by ELs 1/76 and 4/77.

*Stream Sediment Survey:*

Between 1976 and 1978, Comalco undertook an extensive stream sediment sampling survey covering areas of exposed and thinly covered pre-Tertiary rocks within EL's 1/76 and 4/77 (Weste, 1978; Weste, 1979; Askin, 1982). EL's were covered with a sample density of >2 per sq km. -80# stream sediment, panned concentrate, magnetic fraction, and water samples were collected from most sites. -80# samples were analysed for Cu Pb Zn Bi by AAS (10 ppm detection limit for all elements). Water samples were analysed for F by specific ion electrode. Panned concentrate and magnetic fraction samples were analysed by Cu Pb Bi Pb Zn W by emission spectroscopy. Panned concentrate samples were additionally inspected for scheelite and zircon under short-wave UV light. Verified located assay results for -80# samples are included in CRAE's competitor stream sediment database. Samples collected within the area covered by EL 54/94 are additionally shown on Plans To 229-232, 237, 240-242.

Geostatistical analysis of -80# stream sediment data by Comalco indicated Pb to be an excellent pathfinder to mineralisation (Cu to a lesser degree). High Zn values typically indicate Tertiary basalt detritus. Anomalous and high values for Pb and Cu are shown in Table 1.

Element	Pb ppm	Cu
Anomaly threshold	48	64
High threshold	27	54

Table 1 Anomalous and high Pb and Cu values for -80# stream sediment samples.

Anomalies that were followed up within or close to the area covered by EL 54/94 are summarised below:

*Blythe Road/Blythe River area:*

Anomalous Pb Zn Bi in PC/MF/-80# and F in water samples (plus one scheelite grain in PC) highlighted the Blythe Road/Blythe River area. The Blythe Road/Blythe River area is centred on 402500mE, 5420500mN and lies at the eastern boundary of EL 54/94.

*Old Park Road area:*

Anomalous Pb in -80# (plus significant scheelite in PC) highlighted the Old Park Road area. The Old Park Road area is centred on 401000mE, 5422000mN and lies within the area covered by EL 54/94. Creeks drain very poorly outcropping Gordon Group sequences. One of the anomalous creeks is coincident with a probable fault.

A N-S striking quartzite-metasiltstone-hornfels ridge (?Denison Group) separates the Blythe River/Blythe Road and Old Park Road areas. Tertiary basalt-greybilly covers most of the Blythe River/Blythe Road area east of the ridge. Anomalies were thought to be related to the interpreted underlying Gordon Group limestone. The Old Park Road stratigraphy west of the ridge (either Gordon or Eldon Group) is poorly exposed. The main scheelite grain anomalies in this area occur in a creek following an intensely fractured (faulted) siltstone-shale horizon. A decision not to undertake additional work in this area was made because carbonate rocks did not crop out. This decision may have been premature given very poor bedrock exposure.

Billiton (Simpson, 1984) re-investigated the Old Park Road area. Work undertaken included geological mapping, soil sampling, a ground magnetic survey, and a Sirotem survey. The Old Park Road grid is unlocated except for local coordinates, and is different from the grid shown on Plan To 884 established by Billiton to follow-up the Old Park Road helimagnetic anomaly.

Despite very poor exposure, geological mapping identified a sequence of siliceous siltstone and quartzose carbonates dipping shallowly to the SW in the north-central part of the grid (Plan To 954). Simpson suggested the sequence was metamorphosed Gordon Group

carbonates and not Bell Shale as inferred by Billiton and Comalco. -80# B-horizon soil samples were collected at 25 and 50 m intervals along grid lines and assayed for Sn W As by XRF1, and Cu Pb Zn Co Ni Cd Bi Ag Mo by AAS. Soil geochemistry data indicated a 500x500 m Pb-Zn anomaly (>200 ppm). Data is shown on Plans To 1737-40. Ground magnetic data was collected along gridlines and identified several small, low order highs that may be related to pyrrhotite replacing carbonate as observed in a rock chip sample. No significant anomalies were interpreted in helimagnetic data over the soil geochemistry anomaly. A Sirotem survey was undertaken on line 1200N profiling the soil geochemistry anomaly and indicated an anomaly centred at 750E. This corresponds to an area of no outcrop with "clay pug indicating intense weathering". No source for the anomaly was determined.

Despite a recommendation to follow-up the Pb-Zn soil anomaly (cf. Queen Hill deposit) by Simpson, no additional work was undertaken because Pb-Zn values were considered not sufficiently elevated.

*SE St. Valentines Peak area:*

A 1.5 x 3 km area centred at 397000mE, 5420000mN (SE St. Valentines Peak) returned anomalous Pb (-Zn) in stream sediment samples. This area includes Gordon Group, Denison Group and Eldon Group sequences and lies within EL 54/94. Anomalies are unrelated to a magnetite skarn identified in helimagnetic data east of St. Valentines Peak by Comalco. A ferruginous quartz vein in sandstone collected within the SE St. Valentines Peak area assayed 5000 ppm Pb, 300 ppm Cu and 30 ppm Ag. This and other veins are typically associated with intrusion of Devonian granites and may be responsible for the Pb stream sediment anomalies.

*NW St. Valentines Peak area:*

Anomalies (Comalco and Comstaff) to the north and NW of St. Valentines Peak (NW St. Valentines Peak) were concluded to be sourced by quartz-tourmaline (-feldspar) dykes and veins. These rocks have elevated Sn-Pb-W values (cf. Mt. Bischoff) but were not considered to represent significant mineralisation. These anomalies are outside the area covered by EL 54/94.

*Gin Creek area:*

Low order Pb anomalies in the Gin Creek area, centred at 399450mE, 5419000mN (outside EL 54/94), were concluded to be sourced from limonite-quartz veins in sericite-chlorite altered quartz porphyries exposed on Bunker's Road (cf. VHMS). These rocks have up to 1.65% Pb as cerussite and 6.5 ppm Ag. This area is largely covered by alluvium and Tertiary basalt.

*Heliborne Magnetic Survey:*

Comalco commissioned a heliborne magnetic survey over areas within EL 1/76 and south EL 4/77 not covered by Tertiary basalt (Weste, 1979). 520 line km of data were collected at 200m line spacings with a 120m ground clearance. Follow-up within or close to the area covered by EL 54/94 was undertaken on the St Valentines and Blythe Road anomalies:

*St Valentines anomaly:*

The St. Valentines Grid (Plan To 884) was established over a N-S trending magnetic high (the St. Valentines anomaly) along strike from the Kara Scheelite Mine and just outside the western boundary of EL 54/94. The anomaly corresponds to vertically dipping, east facing Denison Group sandstone-shale-hornfels underlain by conglomerate and bounded in the east by a faulted conglomerate inlier.

Ground magnetic, time domain, gradient array IP, and soil geochemistry data were acquired. One diamond hole (SV1) was drilled to test a local 65780 nT ground magnetic high within the St. Valentines anomaly. SV1 intersected unmineralised skarn between 68.3 and 75.3m. A detailed description of SV1 is included in Appendix 2 and collar information is included in the CRAE drill hole database. No further work was undertaken on the St. Valentines anomaly because of the small size (consistent with the magnetic interpretation) and unmineralised character (consistent with stream sediment data) of the intersected skarn.

*Blythe Road anomaly:*

The Blythe Road grid (Plan To 884) covers several small, weak, isolated helimagnetic anomalies (Blythe Road anomaly) in an area of Tertiary basalt cover just outside the eastern boundary of EL 54/94. Magnetite skarn bodies are known at the Gordon Group carbonate-Housetop Granite contact two km north of the Blythe Road anomaly.

Ground magnetic, time domain-gradient array IP, and -80# C-horizon soil geochemistry data were collected over the Blythe Road grid. Selected chargeability anomalies were followed-up with pole-dipole surveys. Three pairs of vertical electrical soundings (Schlumberger array) were undertaken in the vicinity of anomalies to determine thickness of Tertiary basalt. This work indicated a number of IP anomalies in the east of the Blythe Road grid. Sources were interpreted to be shallow and to underlie, or occur within Tertiary basalt. Anomalies were thought to indicate sulphide bearing skarn in Gordon Group limestone. One RC-Percussion hole was drilled on the Blythe Road Grid and intersected Tertiary basalt to 75 m EOH. Detailed information on this hole was not reported.

*Heliborne Magnetic and Radiometric Survey:*

A feasibility study of sub-basalt exploration was reported in Weste (1979).

In 1980, Billiton commissioned a heliborne magnetic and radiometric survey covering a large area (Oakes, 1983), including areas in EL's 1/76 and 4/77 not covered by the Comalco survey (Weste, 1979). The survey was undertaken to detect near surface magnetite and pyrrhotite skarns particularly in untested stratigraphy beneath Tertiary basalts. Modelling indicated magnetic signatures of skarns would be larger than signatures due to variations in basalt thickness for basalt thicknesses less than 100 m. Data was collected along E-W orientated flight lines spaced at 250 m intervals, with an 80 m ground clearance.

Follow-up of anomalies involved soil sampling, IP survey, ground magnetic survey, drilling, Max-Min and VLF EM, and Sirotem and AMT soundings (Plan To 884 & To 914). No work was undertaken in the area covered by EL 54/94. This work concluded most anomalies were sourced by Tertiary basalt -hill/valley/plug/weathering (Smyth & Hungerford, 1984; Wright & Oakes, 1984; Lawton, 1982).

Anomalies with sources not attributed to Tertiary basalt are described below:

*St. Valentines Anomaly:*

The St. Valentines anomaly corresponds to the magnetite skarn intersected in SV1 by Comalco.

*Highclere Anomaly:*

The Highclere anomaly corresponds to the Highclere magnetite skarn. Details of follow-up drilling of the Highclere anomaly/skarn are included in Appendix 2 and collar information is included in CRAE's drill hole database.

*29 Mile Road Anomaly:*

The 29 Mile Road anomaly corresponds to quartz-feldspar (-tourmaline-pyrite) dykes with weakly elevated Sn values which intrude Cambrian stratigraphy. Geological mapping, soil sampling, IP, RC-Per percussion drilling, and ground magnetic surveys were undertaken to follow-up the 29 Mile Road helimagnetic anomaly. Details of drilling are included in Appendix II and collar information included in the CRAE Drilling Database.

Details of other follow-up drilling are included in Appendix 2 and collar information is included in CRAE's drill hole database.

Interpretation of radiometric data (Oakes, 1983) indicated the Cranes prospect, NE of the area covered by EL 54/94 (Plan To 914), covers a zone of late stage alteration or multiple intrusive phases within the Housetop granite. Limited follow-up (Wright & Oaks, 1984) located several widely dispersed Sn bearing alteration zones, with Sn values in rock chips up to 1150 ppm. This work downgraded the potential for Sn bearing greisen.

Magnetite bearing skarn is known at the Highclere magnetite skarn and within the Buckby and Kingsclere prospects north of the area covered by EL 54/94. Skarns are thought to be hosted by a N-NE trending carbonate horizon of uncertain stratigraphic affinity mostly overlain by Tertiary basalt (Askin, 1978). Drilling undertaken by Comalco and Billiton in this area is summarised in Appendix 2.

#### *Airborne INPUT Survey:*

In 1982 Billiton commissioned an airborne INPUT survey covering an 8 x 8 km area including the Tertiary basalt covered Highclere-Buckby Carbonate Trend (outside the area covered by EL 54/94). 216 km of data were collected along N-W trending, 300 m spaced flight lines, with a mean terrain clearance of 120 m. The aim of the survey was to identify coincident conductive-magnetic anomalies which may represent sulphide skarn bodies covered by thin basalt.

The location of INPUT anomalies is shown on Plan To 914. Geological mapping, ground magnetics, max-min EM, and dipole-dipole IP surveys were undertaken over ten anomalies to discriminate between anomalies with lithological and sulphide skarn sources (Wright & Oaks, 1984). Follow-up concluded most anomalies were related to conductive clay layers within or at the base of Tertiary basalt cover. INPUT anomaly 4043/IH3 corresponds to the Highclere magnetite skarn and anomaly 3943/IH5 corresponds to outcropping carbonaceous shales.

#### *Regional Gravity Survey:*

Billiton undertook a regional gravity survey with 2 km station spacing over a large area including ELs 1/76 and 4/77 (Oakes, 1983). One vertical stratigraphic diamond hole (HG1), was drilled to test a gravity low which was thought to represent granite apophyses in carbonate (Wright & Oaks, 1984). This gravity low lies along the Highclere-Buckby Carbonate Trend, and is north of the area covered by EL 54/94. Additionally HG1 was designed to test Tertiary basalt thickness, determine the underlying stratigraphy, and test the source of a strong magnetic linear coincident with the Highclere-Buckby carbonate trend. HG1 intersected unmineralised skarns from 212m, and is overlain by 202.5m of Tertiary basalt. No further work was considered given the thickness of Tertiary basalt cover. A detailed description of HG1 is included in Appendix 2 and collar information included in the CRAE's drill hole database.

**EZ**

**EL 3/85**

**1985-1986**

Former EL 3/85 was held by EZ between 1985-86, and covered 5 sq km of the area covered by EL 54/94 (McDonald, 1986). EZ targeted skarn mineralisation associated with the Housetop Granite and VHMS mineralisation within Mount Reid Volcanics. Work undertaken by EZ involved a review of past exploration. EZ concluded that the area covered by EL 56/64 had been explored thoroughly by Comalco and Billiton and no further work was undertaken.

**Appendix 2**

**Incomplete Compilation of Drillhole Information**

**Comalco:***St. Valentines (helimagnetic) Anomaly:*

Hole: SV1  
 Type: Diamond  
 Collar: 396545mE, 5421600mN  
 Azimuth: 270 AMG  
 Inclination: -50

Stratigraphy: Sandstone, siltstone and hornfels to 65.3m. Mixed epidote-garnet, calc-silicate, magnetite-garnet-pyrite skarn between 68.3 and 75.3 m. A fault probably separates the skarn sequence from underlying siltstone-sandstone (hornfels) and conglomerate to 113 m EOH.

Analyses: Half-core between 49.0-71.0 m was analysed for Sn W by XRF and several other elements by qualitative spectrographic analysis. Best intersection was 1 m @ 8 ppm Sn and 35 ppm W from 70.0 m.

**Billiton***Highclere (helimagnetic) Anomaly/Skarn:*

Hole: H1  
 Type: Percussion  
 Collar: 401400mE, 5438200mN

Target: Evaluate the W potential of the Highclere skarn and coincident soil W-Sn, magnetic, gravity, and chargeability anomalies (Lawson, 1982).

Stratigraphy: Hematite-magnetite skarn between 0-44 m, pyroxene skarn between 44-48 m, and granite between 48-102 m

Analyses: Best assays from 2 m sample intervals were 360 ppm Sn, 380 ppm W, 0.92% F, 340 ppm Cu, 120 ppm Pb, and 300 ppm Zn. No further work was undertaken on the Highclere skarn in light of the disappointing assays.

*29 Mile Road (helimagnetic) Anomaly:*

Hole: 29MI  
 Type: Percussion  
 Collar: 394650mE 5422270mN

Target: High chargeability-low resistivity anomaly coincident with a 800 nT magnetic high

Stratigraphy: Feldspar crystal lithic tuff to 8 m, and contact metamorphosed, fine grained volcanoclastics (with high magnetic susceptibility and up to 5% disseminated pyrite) between 8-70 m EOH. Observed magnetite and pyrite are probably responsible for the magnetic/chargeability anomalies

Analyses: Cuttings were sampled at 2 m intervals and analysed for Sn W by XRF, Ni Cu Pb Zn Mo by AAS, and Au. Best assays for 2 m intervals were 46 ppm Sn, 50 ppm W, and 400 ppm Zn.

*"Other" Helimagnetic Anomalies sourced by Tertiary Basalt:*

Hole: GRD1  
 Type: Percussion  
 Collar: 396000mE 5433800mN

Target: 2000 nT Guide River helimagnetic anomaly

Stratigraphy: Tertiary basalt to 118 m, and pyritic-carbonaceous sandstone-siltstone (?basalt) between 118-200 m. The magnetic susceptibility of Tertiary basalt/greybilly intersected in GRD1 was sufficient to account for the Guide River anomaly and no further work was undertaken

Analyses: Best assays from 2 m sample intervals were 12 ppm Sn, 25 ppm W, and 310 ppm Zn.

Hole: PP1  
 Type: Diamond (vertical)  
 Collar: Unlocated

Target: Coincident magnetic and IP anomalies generated by follow-up work on the Peak Plain helimagnetic anomaly.

Stratigraphy: Tertiary basalt/greybilly to 71.2 m, black siltstone with <5% disseminated pyrite between 71.2-79.5 m, calcareous siltstone with <5% disseminated pyrite between 79.5-106.0 m, and unmetamorphosed/metasomatized limestone between 106.0-113.3 m EOH. Semi-massive pyrite was intersected between 106.1-106.3 m

Analyses: Selected core from this hole was submitted for geochemical analysis. Best assays were 520 ppm Pb, 155 ppm Zn, 125 ppm Ni, and 3 ppm Ag from the semi-massive pyrite zone.

Hole: HRW1  
 Type: Diamond (vertical)  
 Collar: 388100mE 5410300mN

Target: Hellyer River West helimagnetic anomaly and coincident 0.5 mgal gravity anomaly.

Stratigraphy: Tertiary basalts to 197.6 m EOH.

Hole: SH1  
 Type: Diamond (vertical)  
 Collar: 392000mE 5421100mN

Stratigraphy: Tertiary basalts to 202.5 m EOH.

*Highclere-Buckby Carbonate Trend Gravity Anomaly:*

Hole: HG1  
 Type: Diamond  
 Collar: 3 94400mE 5427500mN

Stratigraphy: Tertiary basalt to 202.5 m, weathered metasomatized shale-carbonate with magnetite skarns (212-232 m and 242-248 m) between 202.5-258.3 m EOH.

Analyses: Non Tertiary basalt core was analysed for Cu Pb Zn by AAS and Sn W by XRF. Best assay was 125 ppm Sn, 70 ppm W, and 310 ppm Zn from a magnetite-pyroxene skarn interval.

## Comalco and Billiton

### *Highclere-Buckby Carbonate Trend:*

Holes: DDH1 to DDH4  
Type: Diamond

The Highclere magnetite skarn consists of magnetite rich skarn with W and Sn values up to 5000 and 200 ppm respectively. The skarn was percussion drilled for scheelite by ANZEC, and diamond drilled (DDH1-4) for Fe by the Mines Department (Askin, 1978). Drilling defined a small skarn pendant overlying granite with variable, but overall low W values. Geological mapping, magnetic, IP, and gravity survey data covering the area north of detailed drilling indicated only very small isolated magnetite skarn/calc silicate rock pendants occur north of the Highclere magnetite skarn (Askin, 1978). Selective re-assay of Mines Department drill core for Sn W Bi Be Ge Cu Pb Zn Cd Ag Au by semi-quantitative spectrographic returned a best assay of 13m @ 5000 ppm W (Askin, 1978).

### *Kingsclere Grid:*

Holes: KD1-KD3  
Type: Diamond

Three holes were drilled by Comalco on the Kingsclere Grid which covered an airmag anomaly (Askin, 1978). Two vertical diamond holes (KD1 and KD2) targeted a large magnetic anomaly. KD1 intersected Tertiary basalt to 84 m, and unmineralised granite between 84-95 m EOH. KD2 was collared 500 m north of KD1 and intersected Tertiary basalt to 126 m EOH. Drilling confirmed Tertiary basalt was responsible for the magnetic anomaly. There is no record of core being assayed.

A third diamond hole - KD3, targeted a coincident magnetic-chargeability anomaly. KD3 intersected Tertiary basalt/greybilly to 38 m, and sandstone-siltstone-hornfels intruded by Tertiary basalt and granite dykes between 38-123 m EOH. Best assays from selective assay of core were 2000 ppm Mo (0.4 m) and 500 ppm Zn (1.6 m). The magnetic anomaly is probably related to Tertiary basalt dykes, and the chargeability anomaly related to pyritic hornfels.

### *Buckby:*

Hole: KD4 to KD7  
Type: Diamond

Four diamond holes were drilled by Comalco in the Buckby prospect area which covers a calc-silicate "window" in Tertiary basalt (Askin, 1978). Gossanous altered dolomite and skarn with elevated Sn and Cu crop-out in this area (cf. Cleveland). Drilling targeted calc-silicate rocks with elevated Sn-Cu-F (plus low order magnetic high), and was designed to identify the source of anomalies and determine structure. Diamond holes KD4 to KD7 indicated a 120 m thick sequence of pyrrhotite bearing dolomitic limestone, dolomitic limestone-conglomerate-chert, all variously metasomatised to pyrrhotite-diopside-phlogopite skarns (Plan To 1628). Minor acid volcanics occur within the sequence, and the sequence is overlain by siltstone-hornfels plus acid volcanoclastics. The sequence is underlain by unmineralised altered granite. Selected intervals were analysed for Sn W Bi Be Ag Mo Cu As Y Zn by semi-quantitative spectrographic (plus XRF checks). Best Sn assay from routine core analysis was 0.6 m @ 320 ppm (XRF).

Hole: DB8  
Type: Diamond  
Collar: 399000mE 5435900mN  
Azimuth: 83 ?AMG  
Inclination: -60

- Target: Coincident chargeability-magnetic-soil Cu-Sn-F anomalies south of the Buckby prospect.
- Stratigraphy: Tertiary basalt to 15.0 m, diopside-phlogopite-pyrrhotite skarn between 15.0-93.8 m, pyrrhotite bearing dolomite-conglomerate-chert between 93.8-180.62, dolomite-conglomerate-serpentinite between 180.6-226.0 m, metasomatised dolomite-chert-conglomerate between 226.0-249.8 m, diopside-phlogopite-magnetite skarn between 249.8-253.9 m, and (porphyritic) granite between 253.9-272.2 m EOH.
- Analyses: Best assays were 210 ppm Sn (2.8 m), 380 ppm W (2.4 m), 485 ppm Cu (1.65 m), 360 ppm Zn (1.7 m), 4.62% CaF<sub>2</sub> (6.1 m), 170 ppm Mo (3.6 m), 11 ppm Ag (1.0 m), and 2300 ppm Ni (4.0 m). Further work was not considered in light of the low Sn and W values.