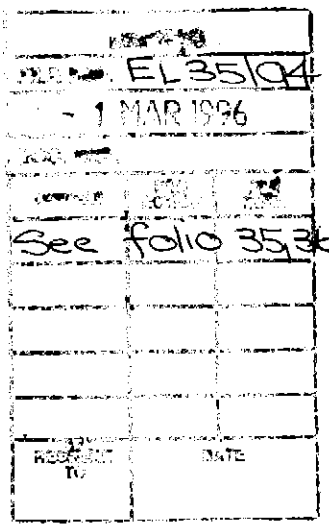
ANNUAL REPORT
1995

EL 35/94 SAVAGE RIVER
EL 36/94 MT. BERTHA
NORTHWEST TASMANIA



by *K.J. RIDGE*

ALLSTATE EXPLORATION N.L.

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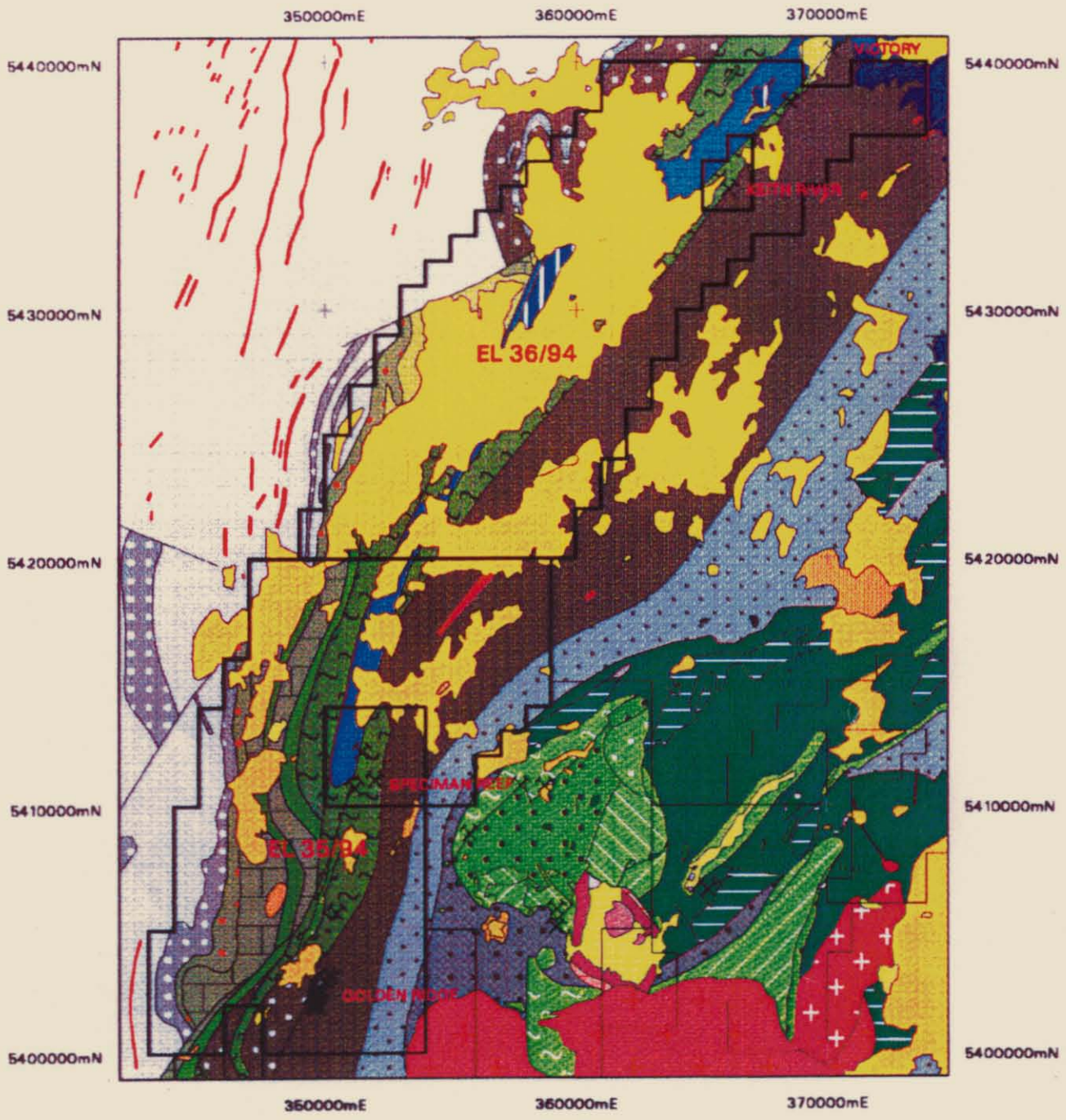

ALLSTATE EXPLORATIONS
ARTHUR LINEAMENT
GEOLOGY

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Date 12/12/95

Drawn by: JRB

Geology from Tasmanian Geological Survey -
1:250000 GEOLOGY OF NORTHWEST TASMANIA.

For geological legend refer to Tasmanian Geological Survey -
1:250000 GEOLOGY OF NORTHWEST TASMANIA.

Fig 2

5 cm

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1) INTRODUCTION :

This report details exploration activity completed on EL 35/94 Savage River and EL 36/94 Mt. Bertha northwest Tasmania during 1995. Following evaluation of this work, recommendations for future work programmes are made.

1.1 Tenement Details :

These two Licences cover a contiguous area of 406 square kilometres centred on the Arthur Lineament from an area surrounding the Savage River Mine and extending northeast to the Arthur River.

Both Exploration Licences were granted to Allstate Exploration N.L. on 17 February, 1994 for a term of 10 years.

Annual expenditure commitments are as follows :

EL 35/94	Savage River	175 sq km	$35,000
EL 36/94	Mt. Bertha	231 sq km	$46,000

1.2 Access :

These Licences support a thick, wet eucalyptus mixed forest with generally thick understorey including horizontal scrub, particularly in the deep gullies and on steep slopes. Button grass is developed on the northern margin of EL 36/94 (Mt. Bertha).

During initial inspection in 1995 access along the Savage River Pipeline road was found to be excellent. However, access from this track and the poorly maintained logging tracks in the north is possible on foot with difficulty.

Access is further complicated by high rainfall of approximately 2500mm which falls, for the most part from May to October.

Elevations range from 700m (Mt. Bertha) to about 120m along deeply incised rivers. Rapid changes in elevation are evident around creeks where changes of 200 m over 500m horizontally are not uncommon.

2) GEOLOGY :

Proterozoic rocks of northwest Tasmania are cut by a tectonic feature referred to as the Arthur Lineament which contains an assemblage of metasediments and amphibolite called the Arthur Metamorphic Complex. The Arthur Mobile Belt covers both the Arthur Lineament and relatively unmetamorphosed rocks on either side. The geology of the Arthur Mobile Belt has been described by Turner (1990) and Turner et al (1992).

Western Sedimentary Association :

West of the Arthur Lineament, most of the Rocky Cape region is underlain by formations of mature quartzarenite and of siltstone, mudstone and minor dolomite. These rocktypes indicate deposition in tectonically stable, shallow marine shelf and deeper environments.

Ahrberg Succession :

Near Corinna an east facing succession of quartzose sandstone and quartzose conglomerate is overlain by mudstone, dolomite and tholeiitic metavolcanics. The base of the succession transgresses across rock boundaries in the western sedimentary association.

Arthur Metamorphic Complex :

Although the Arthur Lineament has not been studied in detail in the area between Savage River to the south and Arthur River to the north, the main lithological association in the south is also extensively developed in the Arthur River district to the north.

The dominant lithological association comprises; pelite and carbonate - rich schist, with lesser amphibolite and minor quartzose schist and carbonate. Greenschist facies assemblages of quartz, white mica, chlorite, albite, carbonate and rare biotite comprise the schist, while the amphibolite comprises; actinolitic amphibole, albite, epidote, chlorite, carbonate, quartz and magnetite. The amphibolite is generally tholeiitic in composition, mainly extrusive with possible intrusive units.

Eastern Sedimentary Association :

The eastern parts of the Rocky Cape region is underlain by mainly quartzose greywacke and pelite in a turbiditic sequence. This sequence is thought to continue under the relatively flat lying cover rocks which correlate with the Oonah Formation of western Tasmania. The Oonah Formation comprises sandstones and pelite and contains carbonate and alkali basalts in the upper parts. The Oonah Formation is metamorphosed to low greenschist facies in the eastern part of the Arthur Metamorphic Complex.

Metamorphism and Deformation :

High pressure, prograde metamorphic assemblages are locally preserved in the Arthur Lineament where glaucophane/crossite in blueschist facies metabasite has compositional parameters consistent with crystallisation at about 700 MPa.

Prograde assemblages in the Arthur Lineament are strongly retrogressed to actinolitic assemblages.

3) MINERALISATION STYLES :

Known mineralisation styles associated with the Arthur Lineament include large magnetite deposits such as Savage River. In the north, there is the Keith River sulphide horizon; magnesite at Main Creek, Savage River, Lyons River and Arthur River. Vein or reef gold has been worked at Specimen Reef and Golden Ridges. There are a number of alluvial gold prospects generally small and often downstream from ironstones. Small base metal prospects such as the Victory copper mine also occur in the area.

The Arthur Lineament is a significant mineralised zone but as yet not fully explored. Much of the mineralisation in the Lineament is associated with iron formations comprising ironstone - carbonate - basic volcanics. The association of gold occurrences, both bedrock and alluvial with ironstones needs further investigation. In this investigation, the carbonate facies of this association should not be overlooked in gold search programmes.

It is recognised that coarse gold occurrences are not likely to have been missed by historical prospecting. However, effort should be focused on the search for low grade fine gold targets in close association with the ironstone - carbonate - basic volcanic suite.

Recently, the Arthur Lineament has been favourably compared to the Japanese Sambagawa Metamorphic Belt. (Turner et al 1993) and Geopeko 1991 - 1993).

From this, stratiform (Cu - Zn (Au) deposits of the Besshi type is a valid exploration target in the Arthur Lineament.

The reasons for this are as follows :

Both the Arthur Lineament and the Sambagawa Belt are narrow linear belts containing high pressure metamorphic assemblages.

Compositional parameters of blue amphiboles from each terrain are similar.

In each terrain, the protolith succession comprises thick continentally derived, clastic sediments with rift-related basaltic volcanics.

Mineralisation at the Alpine locality in the Bowry Formation of the Arthur Lineament comprises pyrite - chalcopyrite minor sphalerite, magnetite and haematite. Thus, this mineralisation is similar in composition as well as setting to the Besshi style deposits of the Sambagawa Belt (Turner et al 1992).

Although the delineation of the likely parameters of gold-base metal targets associated with the Arthur Lineament are to date, not well defined the following "pieces of information" should not be overlooked.

Montgomery, (1894) noted the abundance of chalcedony in many of the gold placers around Corinna, suggesting a possible replacement origin in some of the Precambrian limestones, which are locally silicified.

The Savage River and Rocky River magnetite deposits were first prospected for gold, and grades of up to 55 g/t Au were reported at Savage River (Twelvetrees, 1903).

More recently, limited gold assaying at Savage River Mines has returned values in the range 0.02 g/t to 0.04 g/t Au. (M.McKeown pers comm 1995).

Gold is recorded at the Victory Mine associated with high grade copper mineralisation (McNeil 1961).

Other mineralisation noted by Nye (1971) near the Old Victory Mine consists of pyrite - chalcopyrite in a carbonated amphibolite carrying quartz - carbonate - pyrite - chalcopyrite veins.

CRAE under EL 1/79 in follow-up of gold stream sediment anomalies, sampled carbonate horizons in the Rapid River area carrying high background levels of gold and platinoid metals ($\leqslant$ 0.4 g/t Au, $\leqslant$0.015 g/t Pt, $\leqslant$0.020 g/t Pd).

4) REVIEW OF PREVIOUS WORK

As a starting point for exploration of EL's 35/94 and 36/94, a data review of open file information held by the Tasmanian Geological Survey was undertaken. From this, reports containing significant information to these tow Licences have been summarised as follows.

CR 56-124 :

Early review work by J.H. Rattigan, Rio Aust Expl Pty Ltd made a passing reference to copper mineralisation at the Victory Mine associated with dolomite.

The original reference to the Victory Mine is contained in "Geological Reconnaissance of the Arthur River Area" by R.D. McNeil,(1961).

Where a small lode of copper mineralisation is recorded to be associated with a contact between dolomite and schist. The copper ore comprises malachite and chalcopyrite with dolomite gangue. High grade copper mineralisation 22.4% is accompanied by silver 8 ozs 3 dwts 8 grs and gold 10 dwts 4 grs.

CR 72-868 :

"Progress reports on exploration on S.P.L. 56, Arthur River District, north-western Tasmanian" by P.B. Nye 1971, Mineral Holdings Aust. Pty. Ltd.

An aeromagnetic anomaly 1.5 miles downstream from the Old Victory Mine was associated with a carbonated amphibolite carrying quartz - carbonate - pyrite - chalcopyrite veins associated with an irregular magnetite body plus some disseminated pyrite chalcopyrite (100 - 900 ppm Cu).

CR 70-632 :

"Progress reports on Exploration on S.P.L. 56 Arthur River District north-western Tasmania" by P.B. Nye and T.D. Hughes, 1970 Mineral Holdings Aust. Pty. Ltd.

Report 2 :

This report discusses the New Victory Mine and the Adjacent magnesite - dolomite body and concludes the size of the copper body was very small.

CR 71-839 :

"Final Report on the Keith River Prospect EL 43/70" by T.M. Porter.

Concluded after two diamond drill holes that the gossan represents lenticular stratiform pyrite occurrence associated with anomalous copper and zinc, less than 1500 ppm in each case. The core was not assayed in detail for gold and returned less than 0.04 ozs/ton Au (1.24 g/t Au) over 100 feet composites.

CR 83-2036, CR 84-2214, CR 85-2334 :

These reports detail work undertaken by CRAE and Mineral Holdings Aust Pty Ltd on EL 43/70 Arthur River.

The focus of this work was the magnesite potential of the Keith - Arthur River area.

In this work it was suggested that the Keith River gossan was a correlative of the Savage River pyrite - magnetite deposits.

CR 85-2334, CR 85-2335, CR 85-2336, CR 87-2643 :

EL 1/77 Rocky Cape

This EL was initially taken up by CRAE to establish the tin potential of the area. On joint venturing the ground with Geopeko in 1979, the target was extended to include shale hosted lead - zinc mineralisation in the Rocky Cape rocks.

CR 83-2030, CR 84-2103, CR 85-2341, CR 86- 2533 :

EL 1/79 CRAE Rapid River

These reports outline the exploration programme undertaken by CRAE and Geopeko in the period 1979 to 1987. Commodities sought included gold, platinum, shale hosted base metals and Mittershill type tungsten as well as extensions to the Lyons River magnesite trend.

Exploration work included, airborne magnetic and radiometric surveys, ground follow-up, limited geological mapping and stream sediment sampling.

Follow-up gold anomalies in the north of the EL indicated that gold is associated with carbonate horizons. Sampling of magnesite and dolomite horizons returned high background levels of gold and platinoid metals ($\leqslant$ 0.4 g/t Au, $\leq$ 0.015 g/t Pt, $\leqslant$0.020 g/t Pd).

EL 2/73 held by Esso Australia 1973

Esso covered EL 2/73 with an airborne INPUT EM Survey which outlined 63 anomalies of which 36 were not explained due to access problems. The licence was relinquished in 1974.

CR 80-1442 :

"Report on Field Investigations of the Hall Creek - Specimen Creek Area" by M.D. Edyvean.

Stream sediment sampling using -80 mesh detected a Pb - Zn anomaly on McPhee Creek (218, 345 ppm Zn, 784, 409 ppm Pb). Specimen reef was located and described as a quartz reef while a dump carrying lead - zinc mineralisation was found in the McPhee Creek - Davis Creek area.

EL 40/89, EL 41/89, EL 42/89, EL 43/89, EL 44/89,
EL 45/89, EL 46/89, EL 1/90, EL 21/90, EL 39/90
held by Geopeko.

CR 92-3328, CR 92-3329, CR 92-3330, CR 92-3331,
CR 92-3332, CR 92-3333, CR 91-3212, CR 91-3212A
CR 91-3213, CR 91-3215, CR 91-3215A, CR 91-3216,
CR 91-3216A, CR 91-3218, CR 91-3219, CR 91-3220,
CR 91-3220A, CR 93-3408, CR 93-3409, CR 93-3529
This block of contiguous E.L.s comprised The Arthur River Project explored by Geopeko in the early 1990's.

Targets sought included stratiform Pb, Zn, Ag, deposits of the Mt. Isa - McArthur River type and stratiform Cu - Zn (Au) deposits of the Besshi Type.

The exploration programme undertaken by Geopeko comprised :

Compilation of previous stream sediment data a geophysical review (aeromagnetics and gravity) and water geochemistry, but the tenements were progressively relinquished possibly due to budgetary constraints.

CR 88-2854, CR 88-2865, EL 24/87 Rapid River

These two reports summarise exploration undertaken by Pasadena Projects Pty Ltd, Betoota Pty Ltd and Echelon Pty Ltd in 1987 and 1988.

Work comprised :
Compilation of interpretative geology together with limited fieldwork.

CR 88-2887 :

Annual Report EL 57/83 Mt. Donaldson by H.D. Nolan.

Notes on the Brookside Prospect. Au, Cu and As anomalism on the contact between the Corinna Dolomite and Mudstone 5 kilometres east of Corinna. This was previously considered to be associated with Tertiary gravels but, this report proposes a bedrock source.

CR 90-3146 :

Relinquishment Report for 12 months to June 1990, EL 18/89, Frog Hill by P.D. Ellis (1990) Placer Exploration Ltd.

The EL was explored for Carlin style gold mineralisation. Although BCL and minus 20 mesh BCL sampling detected a gold anomaly in Twisting Creek, conventional drainage samples failed to confirm the anomaly.

5) AEROMAGNETIC INTERPRETATION :

In conjunction with an exploration data review, consultant geophysicist Dr. J.R. Bishop was commissioned to undertake a preliminary aeromagnetic interpretation of the aeromagnetic survey flown in 1993 by Geo Instruments.

A report on this work is included as Appendix 1.

This emphasis of this first pass interpretation was shears and zones of intersecting linears as well as individual magnetic anomalies detected by the aeromagnetic survey.

6) TASMANIAN GEOLOGICAL SURVEY - DATA COMPILATION :

In recent years The Tasmanian Department of Mines has embarked on a specially funded research programme on the Arthur Mobile Belt. To date, Departmental mapping of the Corinna 1:50,000 geological sheet has been published while thee Trowutta 1:50,000 geological sheet is due to be published in 1996.

Currently, The Tasmanian Geological Survey has available a geological compilation of the area including the Allstate tenements in digital form. This compilation has been derived from unpublished geological mapping and interpretation of the helicopter-borne magnetic and radiometric data gathered in the survey commissioned by the Survey in 1993.

7) FIELD INSPECTION - ALLSTATE TENEMENTS :

Late in 1995 the Allstate tenements were field inspected to aid planning of future exploration programmes.

During this work, access along the Savage River Pipeline road was found to be excellent. Thick bush and forest together with rugged terrain severely restricts access over most of the two tenements; apart from the development of button grass on the northern margin of EL 36/94 (Mt. Bertha).

A photographic record of terrain and access in included as Appendix II.

8) CONCLUSIONS AND RECOMMENDATIONS :

From study of open file material held by The Tasmanian Geological Survey, it is evident that past exploration of the Allstate exploration Licences 35/94 and 36/94 has been "patchy" at best, with tenements being dropped prior to completion of systematic exploration programmes.

Admittedly, access is often at best, difficult and hence geological data gathered to date has been gathered in "scattered locations" with emphasis on the far north and the far south of the tenement block. However, with the availability of more detailed aeromagnetic data, a geological synthesis should now, be more precise.

To this end future exploration programmes of the two Allstate Licences should include the following :

The aeromagnetic data gathered by The Tasmanian Geological Survey in 1993 should be re-interpreted in detail with these aims in mind:

** The extent of Tertiary basalts should be carefully mapped and where possible, thickness should be determined.

** This could be achieved by the combination of airphoto interpretation, aeromagnetic interpretation and compiling the surface extent of the basalt onto 1:25,000 scale topographic sheets to give some indication of the vertical variation of the base of the basalt.

** More detailed evaluation of the location of shears and faults should be undertaken using the aeromagnetic data and possibly airphoto interpretation.

** Mapping of magnetic lithologies using the aeromagnetics should be carried out. These would include magnetic schists and phyllites together with mafic volcanics (amphibolites) and iron formations.

** Following the gaining of as much information from remote sensing techniques, ground follow-up can be initiated on structural/lithological targets, especially where they are not covered by significant thicknesses of Tertiary basalt. This ground work is acknowledged as being slow and laborious, but should include stream sediment sampling/geological mapping of stream courses together with ridge and spur sampling, where considered appropriate.

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10) **APPENDICES :**

APPENDIX I

Report on an Aeromagnetic Survey over the Arthur Lineament, N.W. Tasmania.

for

Allstate Explorations

by

Dr J.R. Bishop

Introduction

Allstate Explorations have pegged two exploration licences over a belt of regionally metamorphosed and deformed Proterozoic rocks in northwest Tasmania. The belt, referred to as the Arthur Lineament, consists mostly of quartz mica schists, chloritic schists, phyllites, dolomites and amphibolites. A considerable proportion of the area is overlain by Tertiary basalt. Most of these units, including the basalt, are magnetic.

The area contains the Savage River iron ore mine and has a number of magnesite deposits with economic potential. There are also a number of occurrences of chalcopyrite (with pyrite and magnetite), of which the best known are the Keith River gossan and the old Victory mine. However, Allstate's primary target is for gold. Apart from alluvial gold workings in the cross-cutting rivers (including a 7.5 kg nugget taken from the Rocky River), there are also occurrences of auriferous quartz veins; e.g., Specimen Reef and Golden Ridge (Burrett and Martin, 1989). However the area is extremely difficult to access and has been little explored, the last attempt apparently being in 1982-3 by CRAE.

Shears and zones of intersecting linears, as well as individual magnetic highs (or lows), are commonly favourable sites for mineralisation and this report presents a set of interpreted linears from a recent aeromagnetic survey over the area.

Survey Details

A helicopter-borne aeromagnetic/radiomagnetic survey covering most of the Arthur Lineament was flown by Geo Instruments for the Tasmanian Geological Survey in 1993. The flight lines were east-west and spaced 200m apart. The survey did not cover the southernmost section of the licence and to complete the coverage, some data from an earlier, broader spaced, fixed-wing survey has been used.

Contours of the total magnetic field and various enhanced images have been produced (using ERMapper) at a scale of 1:50,000 and these were used for the interpretation. For this report, the linears have been reduced to 1:250,000 scale and overlain onto the total magnetic intensity (TMI) and geology (Figures 1 and 2 respectively). The program 'Infoview' was used to produce the images which can be reproduced at any scale and with any combination of data (geology, geochemistry, etc).

Previous Work

In 1982, Austirex flew an aeromagnetic/radiometric survey for CRAE using a 250m line spacing. Flis (1982) noted that the magnetic units included Arthur Lineament metamorphics, amphibolites, dolerite dykes, some sedimentary units and Tertiary basalt. CRAE's evaluation of the area also included anomalies from an Input (i.e., airborne EM) survey which had been previously carried out for Esso Minerals but not adequately followed up. Twenty anomalies were identified, most of which were found to be due to Tertiary basalt and others were ascribed to dolerite dykes or amphibolites. The causes of ~5 were not established, however in conjunction with the (rather limited) stream sediment sampling, none were considered to be worthy of further investigation and the leases were relinquished.

CRAE's exploration emphasis appears to have been on discrete magnetic anomalies in areas of relatively quiet background on either side of the Lineament (where presumably the target was for a magnetite-bearing, sediment-hosted base metal deposit). There appears to have been little attention paid to structurally controlled gold deposits within the more magnetic schists and phyllites. CRAE's interpretation included a plan of lineaments interpreted from air photos and landsat images and these have been included on the overlays to Figures 1 and 2. It is interesting to note that there is little correlation with the aeromagnetic interpretation. Also included in the figures are the areas chosen by CRAE for follow up. (To assist in their magnetic modelling, CRAE made a few measurements of the magnetic remanence of the Tertiary basalts. They were found to have a strong remanence (Q ~5), but this paralleled the present day field: Flis and Clementson (1983). Bishop (1986) quotes a magnetic susceptibility range of 0.0001 to 0.02 cgs for the basalts, with Q between 1 & 71. Much of the basalt has a reversed magnetism.)

Bishop (1986) produced an interpretation of a regional aeromagnetic survey (500m line spacing) carried out over northwest Tasmania by AGSO. Modelling suggested that the bulk of the response over the Arthur Lineament could be due to a large (6 to 7 km wide) deeply buried body, but that a much shallower source was required for the main high amplitude anomaly. A prominant response at the northern end of the lineament was drilled by BHP and found to be due to amphibolite (Anon., 1984).

Preliminary results from a recent seismic survey by AGSO, suggest the presence of a number of east dipping faults at depth beneath the Arthur Lineament. As possible pathways for mineralised fluids, the integration of these faults with the magnetic interpretation should be done when the data becomes available.

Interpretation

Although only the Keith River and Victory deposits appear to be associated with magnetic features (in this case a very prominant fault, sub-parallel to the main magnetic trend), the most appropriate gold deposit model for the Arthur Lineament is probably a shear-related, iron oxide - hosted relationship. Thus, a qualitative interpretation of the Geological Survey's aeromagnetic survey over the Arthur Lineament has identified two types of magnetic features: those apparently paralleling the stratigraphy and those cross-cutting it. These have been put onto 1:250,000 scale transparencies which have been presented as overlays for the TMI (Figure 1) and geology (Figure 2).

In this 'first-pass' interpretation, no attempt has been made to identify individual anomalies for quantitative analysis, although this should be done if given some encouragement to study a particular area in detail. Similarly no attempt has been made here to use the magnetics to help map the Lineament's lithologies, although with the appropriate processing this could be done for several units. It should be particularly useful for helping determine the extent of the Tertiary basalt.

Conclusions

The Arthur Lineament is a major tectonic zone, with some known mineral occurrences including gold and copper. However, rugged topography, numerous cross-cutting creeks and rivers and thick vegetation have all combined to make the area difficult to explore. The last serious effort was in the early 1980s and that program appears to have been biased towards a copper(?) deposit in the dolomitic sediments, rather than gold in the iron-rich rocks. Also, only a small proportion of the prospective streams appear to have been sampled.

The recent aeromagnetic survey has assisted the geological mapping of the region although the effects of the Tertiary basalt are widespread and significant. The interpretation of the magnetics carried out for this report was essentially a preliminary undertaking which concentrated on identifying linears which could be related to magnetic stratigraphy and faulting. More detailed work could be done after specific areas have been identified for follow up. This would include modelling to establish depth, size and attitude of the magnetic source rocks as well as better recognition of more subtle sub-parallel faults, splays, etc.

JRB
Dec., 1995

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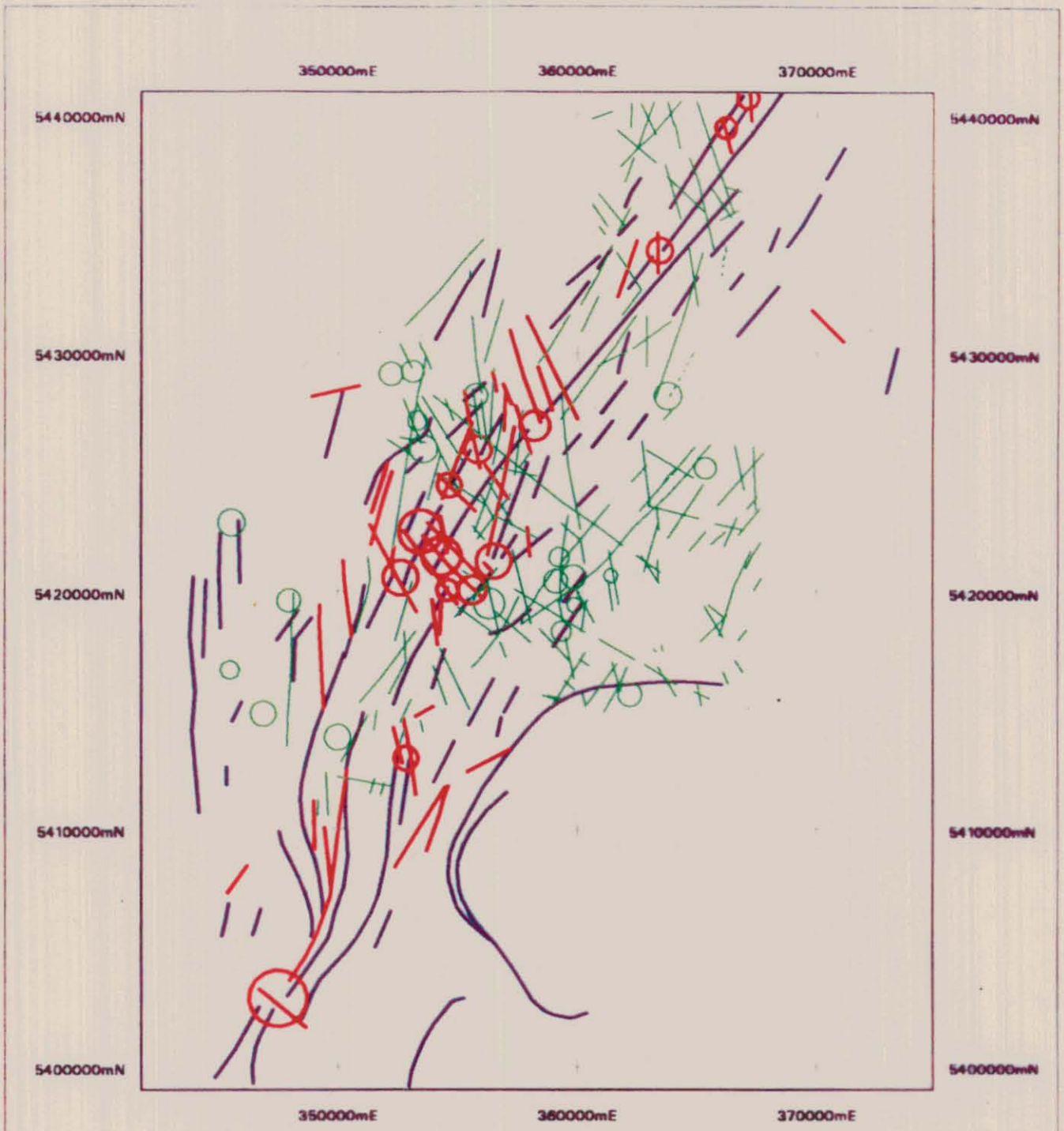

ALLSTATE EXPLORATIONS
ARTHUR LINEAMENT
AEROMAGNETIC INTERPRETATION

'Parallel' magnetic lineament.

'Cross cutting' magnetic lineament.

Areas recommended for follow up.

CRAE air photo interpreted lineaments (1983).

CRAE areas recommended for follow up (1983).

Scale - 1 : 250000

Date 12/12/95

Drawn by: JRB

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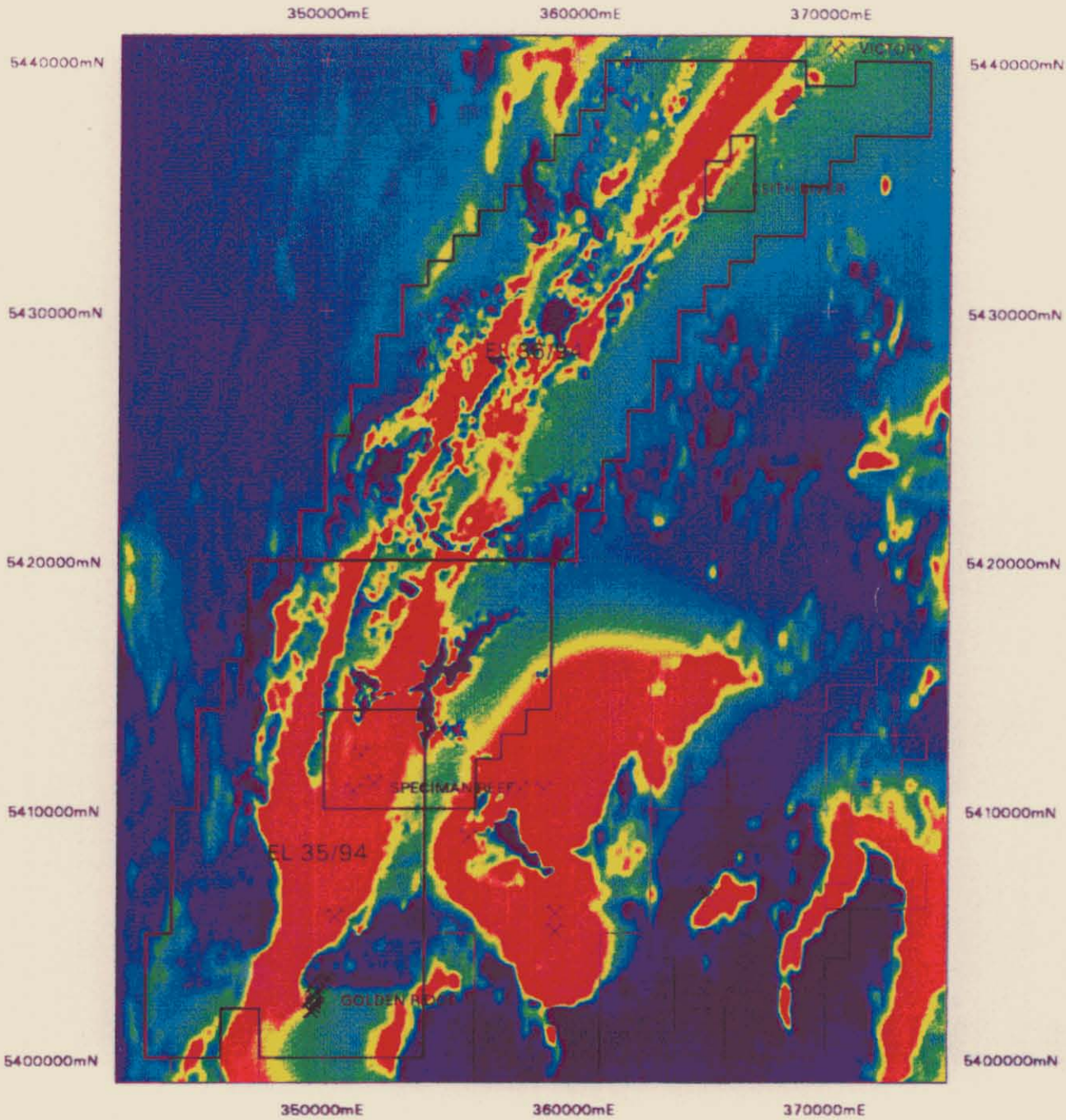

ALLSTATE EXPLORATIONS
ARTHUR LINEAMENT
AEROMAGNETIC IMAGE

Scale - 1 : 250000

Date 12/12/95

Drawn by: JRB

Fig 1

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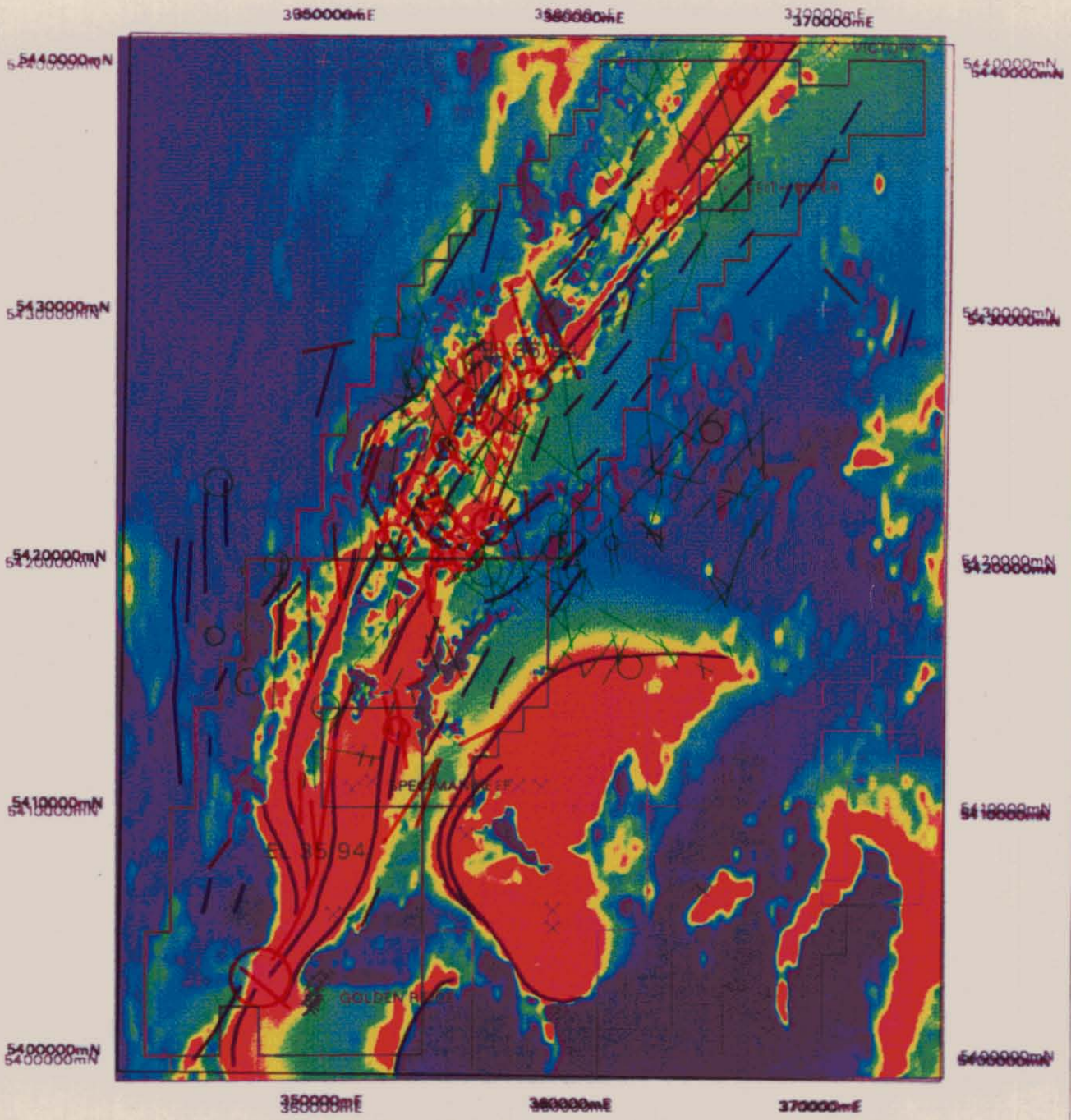

ALLSTATE EXPLORATIONS

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Fig 1

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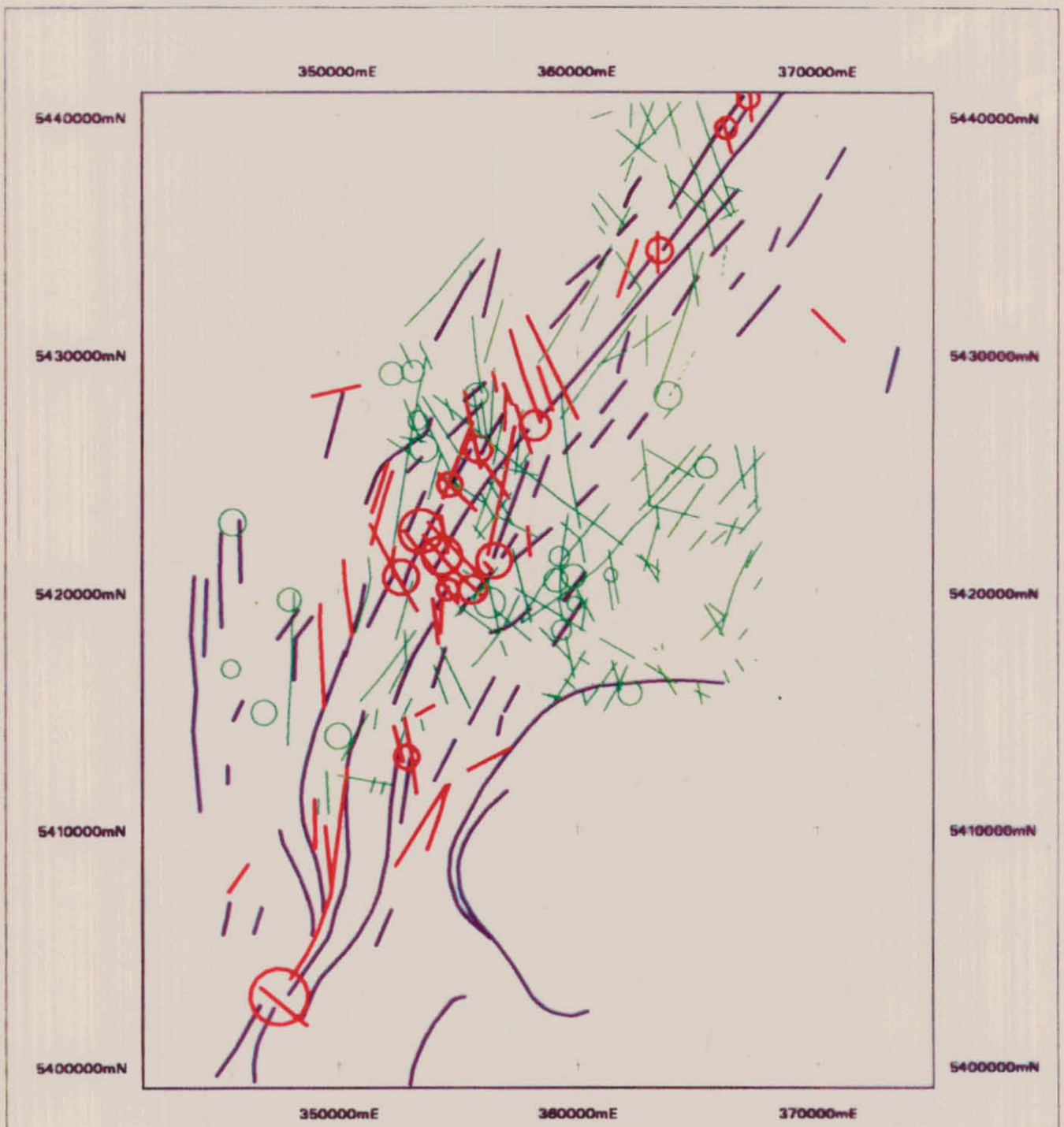

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Date 12/12/95

Drawn by: JRB

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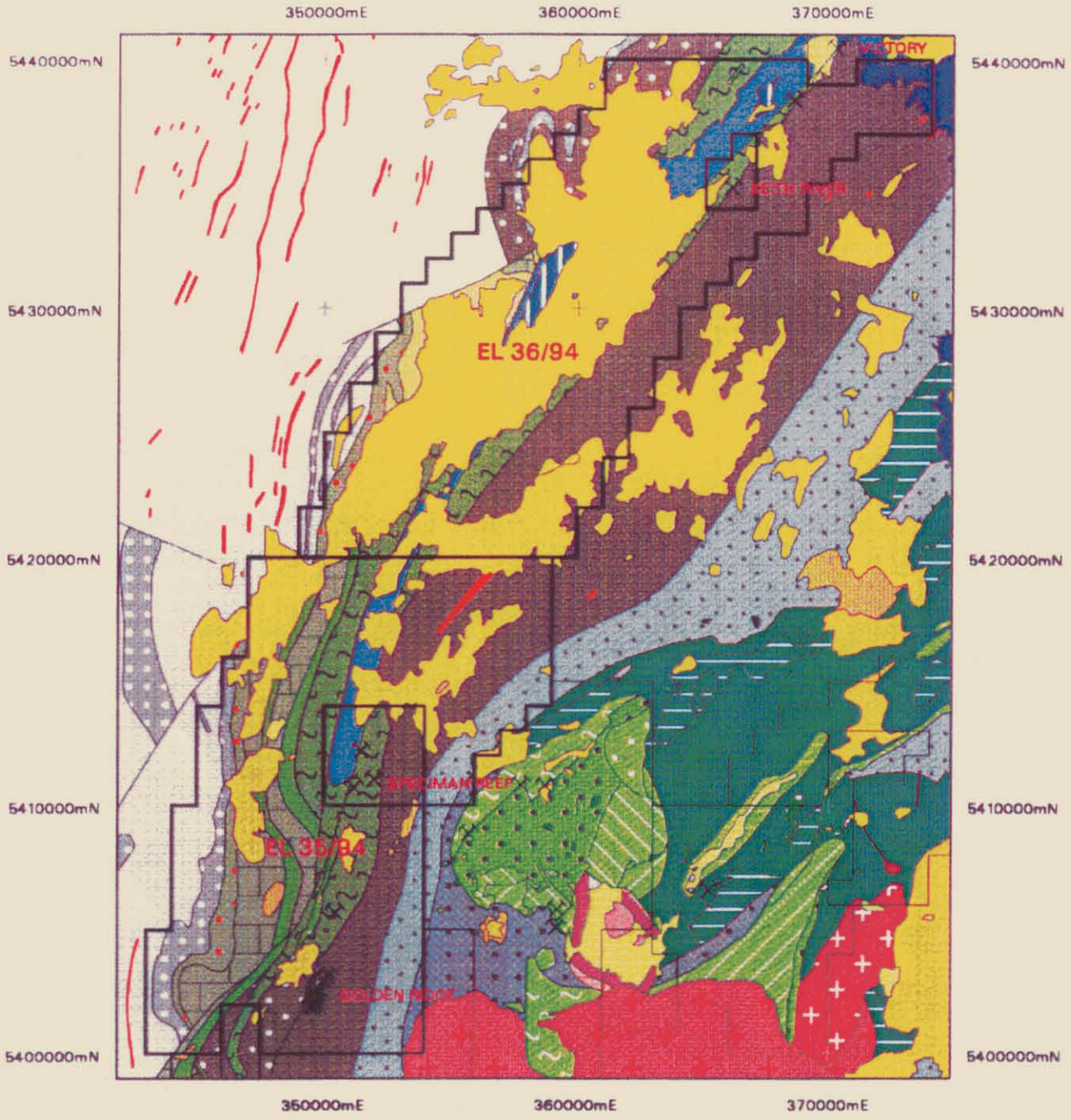

ALLSTATE EXPLORATIONS
ARTHUR LINEAMENT
GEOLOGY

Scale - 1 : 250000

Date 12/12/95

Drawn by: JRB

Geology from Tasmanian Geological Survey -
1:250000 GEOLOGY OF NORTHWEST TASMANIA.

For geological legend refer to Tasmanian Geological Survey -
1:250000 GEOLOGY OF NORTHWEST TASMANIA.

Fig 2

5 cm

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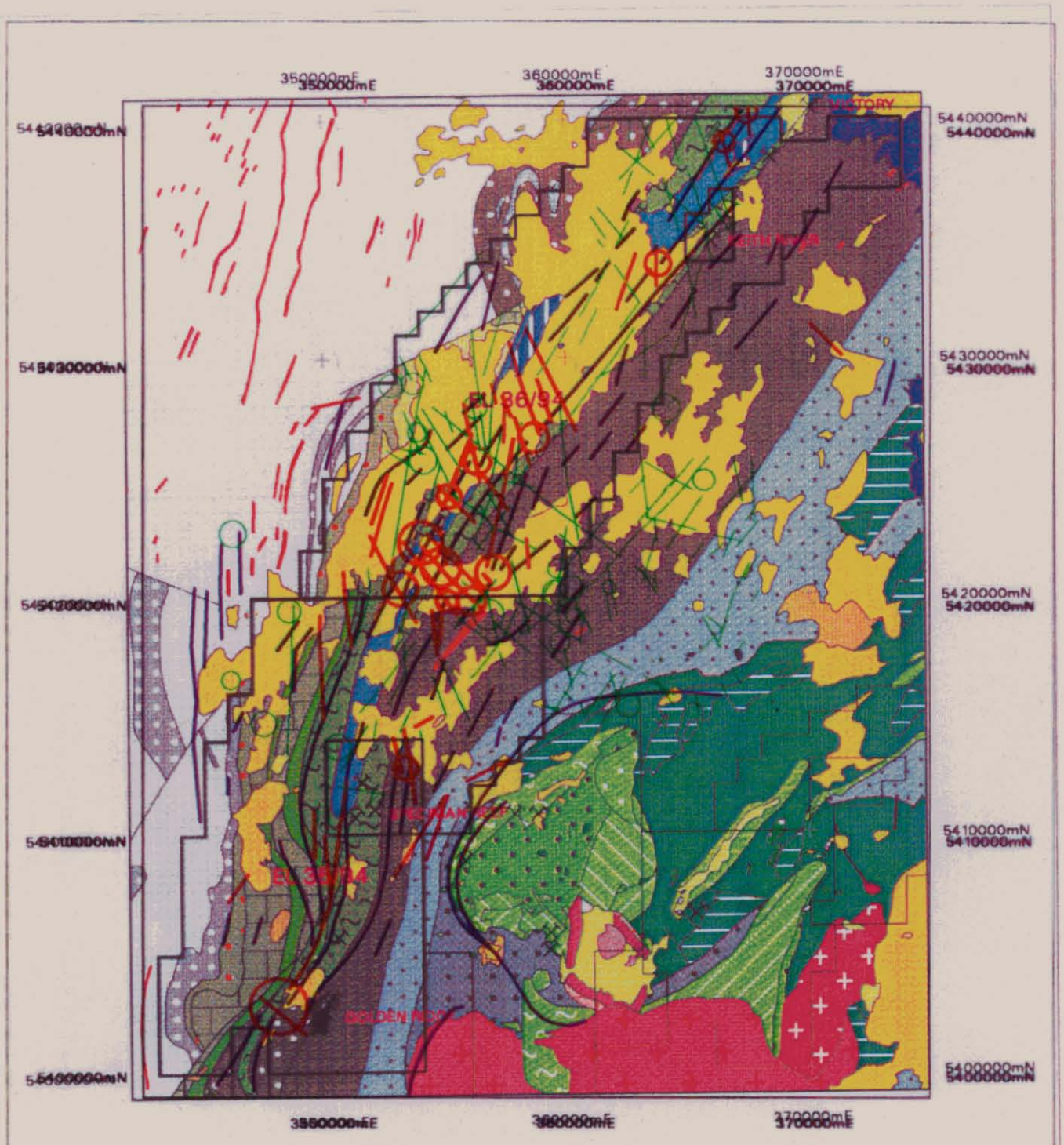


ALLIED STATE EXPLORATIONS
ARTHUR LINEAMENT
AEROMAGNETIC INTERPRETATION
GEOLOGY

'Parallel' magnetic lineament.

'Cross cutting' magnetic lineament.

CRAE areas recommended for follow up.

Geology from Tasmanian Geological Survey -
1:250000 GEOLOGY OF NORTHWEST TASMANIA.

For geological legend refer to Tasmanian Geological Survey -
1:250000 GEOLOGY OF NORTHWEST TASMANIA.

Scale - 1 : 250000

Date 12/12/95

Drawn by: JRB

Fig 2

5 cm

721028

APPENDIX II

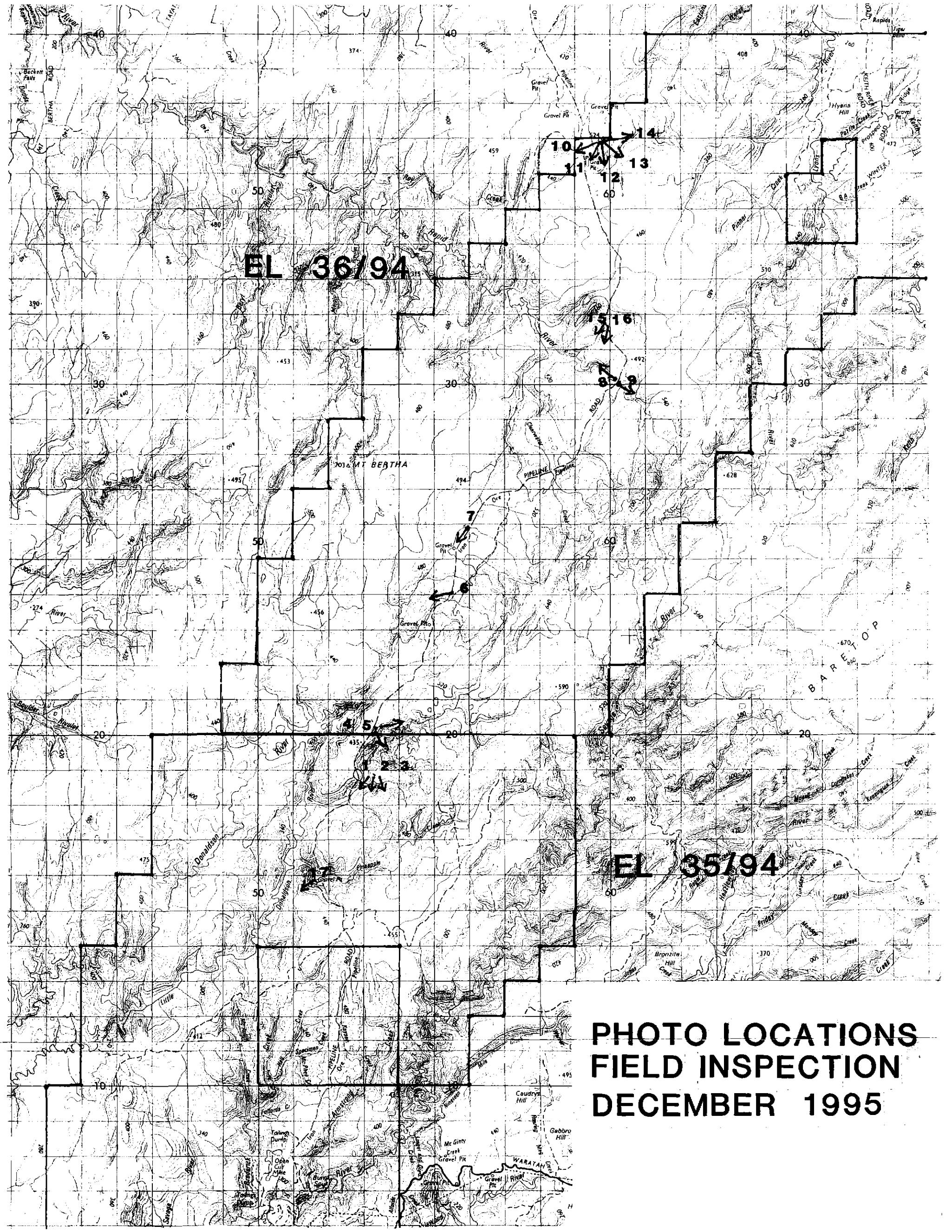


PHOTO LOCATIONS
FIELD INSPECTION
DECEMBER 1995

721031

721032

PHOTO 1

PHOTO 2

721033

PHOTO 3

PHOTO 4

721034

PHOTO 5

PHOTO 6

721035

PHOTO 7

PHOTO 8

PHOTO 9

SOUTHWEST PHOTOS 10 11 WEST

SOUTHEAST

SOUTH

PHOTOS 12 13

EAST

PHOTO 14

721040

PHOTO 15

PHOTO 16

721041

PHOTO 17

TASMANIA
DEVELOPMENT
AND RESOURCES

TASMANIAN GEOLOGICAL SURVEY

GEOLOGY OF NORTHWEST TASMANIA

SCALE 1:250000

5 cm

0 5 10 15 20 25

Kilometres

Grid: Australian Map Grid, Zone 55.

CAINOZOIC

HOLOCENE — Qh — Sand, gravel, and mud of alluvial, lacustrine and littoral origin (Qh).

Qt — Talus (Qt).

PLEISTOCENE — Q — Qp — Qpg — Qps — Qpl — Glacial, periglacial and fluvioglacial sediments including till and interglacial deposits (Qp); some glacial deposits (Qpg), coastal sand and gravel (Qps), and limestone (Qpl) indicated.

Erosional surface

MESOZOIC

TERTIARY — Tm — Ts — Tb — Dominantly non-marine sequences of sand, gravel, silt and clay (Ts); marine sequences of limestone (Tm); basalt and related igneous and pyroclastic rocks (Tb).

Erosional surface.

TRIASSIC — R — Fluviolacustrine sequences of sandstone, siltstone and mudstone (R).

PERMIAN-LATE CARBONIFEROUS — Pu — Upper glaciomarine sequences of pebbly mudstone, pebbly sandstone and limestone (Pu).

P — Pc — Freshwater and paralic sandstone and mudstone with some coal measures (Pc).

Pl — Lower glaciomarine sequences of mudstone, pebbly mudstone, pebbly sandstone, minor limestone and Tasmanite oil shale (Pl).

Pt — Basal tillite (Pt).

UPPER PARMEENER SUPERGROUP / LOWER PARMEENER SUPERGROUP

Erosional surface

LATE MIDDLE DEVONIAN

EARLY DEVONIAN-SILURIAN

ORDOVICIAN

LATE CAMBRIAN

MIDDLE CAMBRIAN

EARLY CAMBRIAN

PALAEOZOIC

SMITHTON - ROCKY CAPE REGION

Cm — Middle to Late Cambrian marine conglomerate, lithicwacke and siltstone. (€m).

Structural conformity

PROTEROZOIC

NEOPROTEROZOIC — Ps — Psd — Psv — Psb — Psa — Psc — Shallow marine dolomite and minor limestone (Psd: Smithton Dolomite).

Turbiditic volcaniclastic – mafic volcanic rocks and minor diamictite (Psv) with some tholeiitic basalt indicated (Psb).

Shallow marine dolomite, chert, shale and diamictite (Psa); basal siliceous conglomerate and sandstone (Psc). (Ps: Togari Group, Ahrberg Group and correlates).

Angular unconformity.

Pr — Prs — Prp — Successions of mudstone, siltstone and minor carbonate (Prp) and orthoquartzite (Prs). (Pr: Rocky Cape Group).

ARTHUR METAMORPHIC COMPLEX

(in part metamorphic equivalents of Pr, Po and Ps).

Pgc — Pma — Chloritic schist, with minor phyllite, dolomite and magnesite (Pac); amphibolite (Pma).

Pqs — Quartz mica schist, quartzite, phyllite and rare dolomite (Pqt) (Keith Schist and correlates).

Ppa — Phyllite with minor pelitic schist, foliated quartzite and dolomite, and rare conglomerate (Pap).

Strike and dip of bedding: right way up; overturned; facing unknown; vertical with facing unknown; horizontal.

Strike and dip of cleavage: dipping; vertical.

Strike and dip of granulation cleavage: dipping; vertical.

Strike and dip of schistosity or metamorphic foliation: dipping; vertical.

Direction and plunge of hinge line of minor fold: unspecified age; folding cleavage or schistosity.

Strike and dip of igneous mineral foliation: dipping; vertical; trend of foliation trace on horizontal surface.

Geological boundary.

Fault.

Wrench fault with relative displacement indicated.

Concealed fault.

Axial trace of major antiform.

Axial trace of major synform.

Axial trace of overturned major antiform.

Axial surface of overturned major synform.

Terrestrial cavern-filling deposits (Dc: Eugenana Beds).

Angular unconformity attributed to major polyphase orogeny.

SDb — Devonian siltstone-shale sequences (SDb) (Bell Shale and correlates).

SDf — Shallow marine quartz sandstone (SDf) (Florence quartzite and correlates).

SDs — Siltstone, shale and minor quartz sandstone (SDs) (Correlates of Austral, Knel and Amber Formations).

SDc — Shallow marine quartz sandstone (SDc) (Crotty Quartzite and correlates).

SD: Eldon Group and correlates).

Dominantly shallow marine limestone with minor siltstone and sandstone. (Ol: Gordon Group).

COum — Late Cambrian to Early Ordovician marine to non-marine quartzose conglomerate-sandstone-siltstone sequences (€O). Internal unconformities in some areas. Includes Denison Group, Owen 'Group', Upper Dundas Group.

COut — Early Ordovician sandstone and calcareous siltstone (€Out) (Florentine Valley Formation and correlates).

COum — Late Cambrian to Early Ordovician quartz sandstone (€Oum) (including Moina Sandstone and correlates).

COu — Upper sandstone sequences with trace fossils (€Ou) and minor basalt (€Ob).

COb — Marine sandstone-siltstone-conglomerate sequences, including turbidite fan deposits, commonly with Late Cambrian fossils. Includes upper Dundas Group and correlates, Newton Creek Sandstone and correlates (€On).

Angular unconformity in some areas, apparent conformity in others.

WURAWINA SUPERGROUP

DUNDAS - DIAL RANGE - FOSSEY MOUNTAINS REGION

Cd — Cdm — Cdv — Cdvt — Cdvo — Cds — Dominantly Middle Cambrian sedimentary and volcanic sequences (€d). Dominantly felsic to intermediate volcanic rocks(€dv) – includes Mt Read Volcanics (in part). Upper, dominantly volcaniclastic sequence of Tyndall Group shown (€dvt). Units of dominantly andesitic volcanic rocks shown (€dvo).

Dominantly felsic volcanosedimentary sequences of sandstone, siltstone, conglomerate, volcaniclastic breccia and minor lava (€dsv) – includes Mt Read Volcanics (in part). Undifferentiated sedimentary sequences (€ds).

Cs — Ct — Cb — Layered peridotite, serpentinite and associated rocks (€s); tonalite and associated rocks (€t); low-Ti tholeiitic and boninitic lavas (€b). Structurally emplaced.

Cc — Sequences of turbiditic mafic volcaniclastics, red mudstone and chert. Some basalts (€wb) and chert (€wc) indicated. (€w: 'Cleveland-Waratah association' and correlates).

Pdv — Pds — Turbiditic volcaniclastic-mafic volcanic rocks (Pdv); some tholeiitic basalt indicated (Pvb). (Crimson Creek Formation and correlates).

Shallow-water quartz sandstone and siltstone with carbonate and chert beds (Pds) (Success Creek Group and correlates).

Angular unconformity.

Pq — Ppa — Quartzwacke turbidite successions (Pq), with some basalt (Pob); quartzwacke of high-grade metamorphic provenance (Paq) (Burnie and Oonah Formations and correlates).

TYENNAN AND SIMILAR REGIONS

Ct — Ctb — Ctp — Dominantly greenschist facies rocks of pelitic sequences (Ptp), quartzite sequences (Pts).

(Pt: undifferentiated pelitic and quartzite sequences).

IGNEOUS ROCKS

TERTIARY — Tb — Basalt and related igneous and pyroclastic rocks (Tb).

JURASSIC — Jd — Dolerite and related igneous rocks (Jd).

Dd — Dolerite dykes (Dd).

LOWER CARBONIFEROUS -DEVONIAN — Dgaf — Dominantly alkali-feldspar granite (Dgaf).

Dga — Dgaa — Dominantly adamellite/granite and associated dykes (Dgaa).

Dg — Dgn — Dominantly granodiorite/adamellite (Dgn).

Dgr — Dominantly granodiorite (Dgr).

ORDOVICIAN — COb — Basalt (COb).

COd — Dolerite (COd).

COav — Dominantly andesitic volcanic rocks (€dva).

COv — Felsic-intermediate volcanic rocks (€dv).

€qf — Quartz-feldspar porphyry (€qf).

€gr — Granitic rocks (€gr).

€d — Dolerite (€d).

€g — Gabbroic rocks (€g).

CAMBRIAN — €bo — Boninitic lavas (€bo).

€b — €bt — Low-Ti tholeiitic lavas (€bt).

€t — Tonalite and associated rocks (€t).

€s — €sd — €sp — Layered peridotite, serpentinite and associated rocks (€s); dominantly serpentinised layered dunite and harzburgite (€sd); dominantly layered pyroxenite and dunite (€sp).

€wb — Basalt (€wb) ('Cleveland-Waratah association').

Psb — Psv — Tholeiitic basalt (Psb: Smithton-Rocky Cape), (Pvb: Crimson Creek Formation).

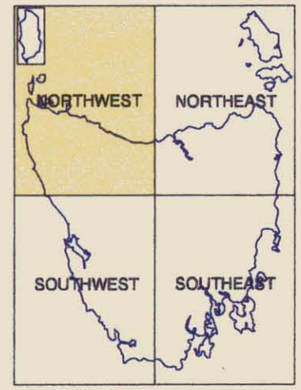
Pob — Basalt (Pob) (Burnie/Oonah Formations and correlates).

Pd — Felsic and mafic dykes (Pd).

PROTEROZOIC — Pg — Granitic rocks (Pg).

Pma — Amphibolite (Pma).

LOCATION DIAGRAM



The geological data for this map were compiled by J.Pemberton B.Sc.(Hons) M.Sc., C.R.Calver B.Sc.(Hons), K.D.Corbett B.Sc. (Hons)Ph.D., J.L.Everard B.Sc.(Hons), B.A.Goscombe B.Sc.(Hons)Ph.D., D.B.Seymour B.Sc.(Hons)Ph.D., from Tasmanian Geological Survey Geological Atlas 1:63,360 and 1:50,000 series maps and other sources.

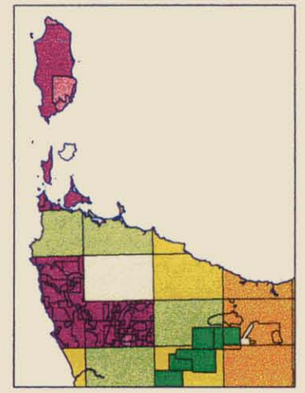
Digital base information from Land Information Bureau, Department of Environment and Land Management.

Map produced April 1995 by Data Management Group using G.I.S. software.

Data correct as at 27 April 1995

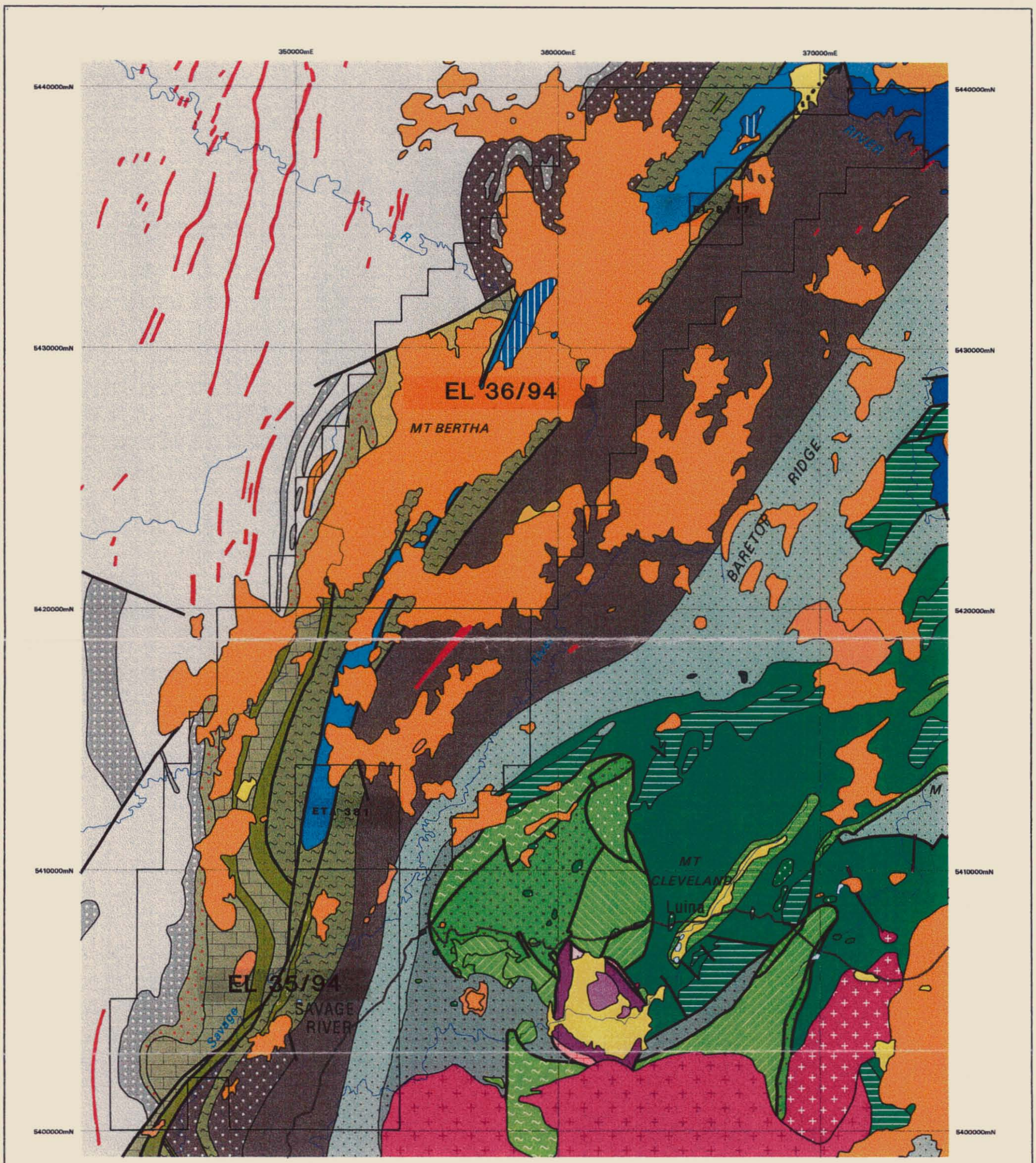
Reference this map as:
CALVER, C.R.; CORBETT, K.D.; EVERARD, J.L.; GOSCOMBE, B.A.; PEMBERTON, J.; SEYMOUR, D.B.; (comp.). 1995. Geological Atlas 1:250,000 digital series. Geology of Northwest Tasmania. Tasmanian Geological Survey.

RELIABILITY DIAGRAM



- Published systematic Geological Survey mapping (1:25000 scale).
- Published systematic Geological Survey mapping (1:50000 scale).
- Unpublished compilation Geological Survey mapping (1:10000 - 1:50000 scale).
- Published systematic Geological Survey mapping (1:63360 scale) after 1965.
- Published systematic Geological Survey mapping (1:63360 scale) before 1965.
- Mapping (1:63360 or more detailed scale) from various non-Geological Survey sources.
- Reconnaissance scale mapping, and/or interpretation based on air photo and/or geophysical data, from various sources.

SOURCES
Source information for this map is available as an additional sheet.



GEOLOGY - SAVAGE RIVER AREA

PLAN 1

For legend refer Tasmanian Geological Survey - 1:250000 Geology of NorthWest Tasmania