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TASMANIA GOLD PROJECT

MOLE CREEK AREA

E.L. 13/74

FINAL REPORT

by

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APRIL 1975

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SUMMARY

In order to evaluate the possible occurrence of Carlin-type gold mineralization in an Ordovician limestone intruded by Devonian granitic rocks in north-central Tasmania, a programme of rock and soil sampling was undertaken. The area was chosen on the basis of published 1:63360-scale geologic mapping. The area chosen for this evaluation comprised the closest available limestone terraine to known intrusives within the district, and an exploration licence was obtained over this terraine. The closest known granitic intrusives are about 15 kilometres west of the western boundary of this exploration licence. The exploration licence is centred on the town of Mole Creek (pop. 800), which is served by road and rail. Access is generally good, except in areas of high relief.

Of the 317 square kilometres comprising this prospect, an estimated 200 square kilometres is underlain by limestone. Surficial cover consists of an admixture of residual soil, floodplain alluvials, and glacial till. Areas of low topographic relief are utilised for cropping and pasture. Virgin forest occupies the areas of higher topographic relief. Outcrop is most abundant within the high-relief areas.

Regional geochemical sample traverses (400 x 100 metres) were followed by increasingly detailed grids (100 x 20; 10 x 50; 10 x 40; 10 x 10 metres) as anomalous areas were outlined. Although soil

comprised the principal sampling medium, stream sediments and rock samples were also collected; the latter to establish a correlation between bedrock metal values and the metal values obtained in bedrock-derived materials.

Initial analyses were for gold, arsenic, copper, lead and zinc. After obtaining uniformly negative results for gold, arsenic and copper, and numerous anomalous results for lead and zinc, the program was reoriented to an evaluation of the lead-zinc potential of the area.

The follow-up of lead and zinc soil anomalies led to the delineation of one anomalous zone (Mayberry area) and a number of isolated spot-anomalies. Detailed examination of the Mayberry anomalous zone revealed that the anomalous lead and zinc values were originating in zones of brecciation within the otherwise massive dark grey finely-crystalline limestone. The calcite-healed brecciated zones appear to contain varying amounts of lead and zinc ions. No visual evidence of metal concentration was seen, and it was concluded that the lead and zinc content of the calcite-healed breccia zones is a reflection of metal ion precipitation within a locally suitable Eh-pH environment. The source of the lead and zinc is probably the same as the source of calcite, namely limestone taken into solution within the zones of brecciation. As such, no economic concentrations of metal are expected, and it is recommended that the evaluation of the metal potential of this area be terminated.

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## I INTRODUCTION

1. Purpose of Report. The purpose of this report is to outline reasons for entering the Mole Creek area of Tasmania to explore for gold, to outline the procedure taken to evaluate the area, to present the results of this evaluation, which changed in emphasis from gold search to lead-zinc exploration; and to draw conclusions and make recommendations based on this investigation.
  
2. Location. The exploration licence area is situated in north-central Tasmania. The main town within the boundaries of the exploration licence is Mole Creek (population 800), a centre for dairy, beef and sheep farming. A local limestone quarry and lime burning kiln, tourist caves, and an apiary are other sources of income to the town. Nearby state forests are a source of timber for the woodpulp industry. Chudleigh is another smaller town and farming centre. Caveside and Mayberry are farming localities only.
  
3. Access. Access to Mole Creek from the main cities of Tasmania is by sealed road through Deloraine which is situated on the main highway between Devonport and Launceston. These latter two cities are serviced by regular domestic airline services to and from Melbourne and ferry services to and from the mainland. Mole Creek is also on the main railway network throughout Tasmania.

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The area under investigation is accessible<sup>a</sup> by sealed roads, graded road, farm tracks and timber cutters tracks. Access by road is possible throughout the year but many of the timber tracks are blocked during winter due to washouts and fallen trees. Most of the limestone area can be driven to within a short distance by four wheel drive vehicles and the rest of the distance covered on foot. Access on foot varies from very easy in the grazing areas to very difficult in the rain forest areas.

4. Climate. The Mole Creek area has a cold to mild winter and a mild to warm summer. The average annual rainfall at Mole Creek is 45 inches and at Caveside 40 inches. Rainfall varies between places a short distance apart due to the high relief of the surrounding mountain ranges. Rain falls throughout the year but is concentrated during the winter months. Snowfall during winter and cold periods at other times of the year are confined to the Western Tiers and Gog Range.
5. Vegetation. Vegetation varies with altitude, rainfall and amount of sunlight received. The latter two factors are in turn affected by the topography. Types of vegetation are variable and affect access by foot. The types include areas cleared for farming (very good); myrtle-sassafras

forest (poor to fair); open eucalypt forest with sparse undergrowth (good); thinned-out eucalypt forest with secondary undergrowth (poor); and sassafras-tree fern rain forest (poor). Rock types affect vegetation only by their affect on the topography.

6. Physiography. Within the exploration licence area there are four main physiographic units<sup>2</sup>.

- (i) The plateau area.
- (ii) The dolerite escarpment.
- (iii) The fold mountain system.
- (iv) The Mole Creek lowlands.

(i) The plateau area. The south western corner of the tenement area takes in part of the 1300 metre-high plateau area known as the Western Tiers. The plateau is capped by a thick dolerite sill, resistant to erosion, and underlain by relatively softer Permo-Triassic sediments.

(ii) The dolerite escarpment. Near-vertical cliffs up to 150 metres high mark the edge of the

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<sup>2</sup> Jennings, 1963

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plateau in the dolerite section. Benched slopes strewn with talus underlie the dolerite cliffs and sweep down to the lowlands. The origin of the scarp is not clear as no boundary faults have been found. The process of retreat is clearly effected by major landslips, ice wedging and rock wedging aided by a series of close-spaced contraction joints and several sets of tectonic joints.

(iii) The fold mountain system. The northern part of the tenement area is occupied by a belt of strongly folded Lower Palaeozoic rocks. The Ordovician quartzite and conglomerate are more resistant to erosion than the underlying Cambrian greywacke and conglomerate so that where Cambrian rocks are exposed a scarp similar to that of the plateau is formed. These rocks are folded parallel to their length and crossed by north-west trending cross folds to form the Gog Range.

(iv) The Mole Creek Lowlands. A broad relatively flat valley lying between the foot of the Western Tiers and the Gog Range is a manifestation of the Gordon Limestone. Westward the valley forks, separated by Standard Hill which is the crest of

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an anticline exposing older quartzitic rocks more resistant than the limestone. In the southern branch between Mayberry and Caveside, limestone outcrop is frequent and the relief of the limestone here is high. North-west of Mole Creek and north of Standard Hill the valley is flatter with small isolated conical limestone hills, surrounded by soil covered flats with sporadic limestone outcrop. East and south-east of Mole Creek the valley flattens appreciably becoming broad and covered with alluvium. Outcrop is sporadic to absent and where present it usually occurs in scattered outliers of limestone, basalt, dolerite and younger sediments. The limestone areas present good examples of karst topography with numerous sinkholes and caverns. Most of the streams flow either partially or entirely underground. East of Mole Creek more mature limestone terrain is represented by erosion to base level and above ground drainage.

Several erosion surfaces (namely those typified by limestone, dolerite and basalt) are present within the tenement area. Differential erosion, not faulting, appears fundamental in producing

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the present topography. Many glacial features such as ice scoured platforms, roches moutonnees, moraines, and rock basin lakes occur on the plateau where an ice cap centred on the plateau during Pleistocene times moved radially outward spilling over the edges.

Drainage. The present drainage pattern has been developed since the extrusion of the tertiary basalts. The main drainage channel is the Mersey River. All of the area is drained to the north by the Mersey and its tributaries. A notable feature is the relatively straight course it follows to the north from its source at Lake Towallan across the general trend of the folds. The Mersey is fed by the underground and above ground streams draining the lowlands.

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II TENEMENT STATUS

An exploration tenement covering 317 square kilometres was applied for by U. S. Steel International, Inc. on 11th June, 1974, and title was granted as Exploration Licence 13/74 by the Tasmanian Department of Mines on 24th September, 1974. The six-month tenure was extended to expire on 25th September, 1975. The Exploration Licence covers all metallic minerals.

### III GEOLOGY

#### 1. Regional Geology<sup>2</sup>

The basement rocks in the region of central north Tasmania comprise a thick sequence of complexly-deformed Precambrian quartzites and schists. Intricacies of structure, lack of fossils and similarity of lithological type render the detailed stratigraphy of these rocks uncertain. They are overlain unconformably by an unknown thickness of greywacke and volcanic rocks of probable Cambrian age. The Cambrian system is in turn overlain unconformably by more than 1500 metres of folded Ordovician and Silurian quartzite, conglomerate, and limestone. All rocks up to this level are folded and have been affected by granite intrusions of probable Devonian age. These Lower Palaeozoic rocks are followed unconformably by about 600 metres of flat lying Permian and Triassic sediments which have been intruded by Jurassic dolerite in the form of thick sills. There is no record of any deposition between Triassic and Tertiary when widespread extrusions of basaltic lavas occurred. Locally these lavas are underlain by, and inter-bedded with, terrestrial clay and sand. The lava fields are widely distributed

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<sup>2</sup> Jennings, 1963

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but can be related generally to a pre-basalt drainage system. Superficial Pleistocene deposits of glacial and periglacial origin occur widely on and around the central plateau and in the valleys of the Forth and Mersey Rivers and their tributaries. Recent scree and talus deposits obscure much of the geology around the Central Plateau and the lower slopes of the Gog Range.

2. Stratigraphic Table<sup>2</sup>

<u>PERIOD</u>	<u>ROCK UNIT</u>
QUATERNARY	RECENT River alluvium Scree & talus
	PLEISTOCENE Glacial deposits
TERTIARY	Basalt Terrestrial sand & clay
JURASSIC	Dolerite intrusions
TRIASSIC	≡ Cluan Formation? Ross Sandstone
PERMIAN	Cygnets Measures

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<sup>2</sup> Jennings, 1963

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Ferntree Group  
 Woodbridge Glacials  
 Liffey Sandstone and  
 shale  
 Kansas Creek Beds

-----UNCONFORMITY-----

DEVONIAN

Dolcoath, Dove & Lone  
 Pine Granites

SILURIAN

Eldon Group (≡ Crotty  
 Sandstone?)

ORDOVICIAN

Gordon Limestone

Magog Group Moina  
 Sandstone

Roland  
 Conglomerate

-----UNCONFORMITY-----

CAMBRIAN

Keratophyre

Gog Range Greywacke

Bull Creek Formation

Lorinna Greywacke

-----UNCONFORMITY-----

PRECAMBRIAN

Dove Group

Fisher Group

Howell Group

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As this report is devoted to work done in the Gordon Limestone only, the Gordon Limestone is the only rock unit described in detail.

3. Gordon Limestone

The Gordon Limestone<sup>1</sup> occupies a large part of the low lying area around Mole Creek and Chudleigh, and also extends westwards to Liena and Lorinna (see Map 3, sheets 1 & 2). Around Chudleigh the limestone is largely obscured by superficial Quarternary deposits but west of Mole Creek the relief of the limestone is higher and outcrops extensively. The limestone displays typical karst topography with well-developed underground drainage, numerous sink holes and caverns. Well-decorated caverns are visited by tourists while others are only open to cave-neers. The limestone is presently being exploited as a joint venture between Mole Creek Limestone Pty. Ltd., who operate a quarry near the townsite, and David Mitchell Estate, who burn the lime on site. At Moina mineralization of the limestone and underlying Moina Sandstone has occurred

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<sup>1</sup> Jennings, 1957

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and some mining carried out in the past<sup>3</sup>. Tin, tungsten and bismuth mineralization around the Dolcoath granite complex was extracated from the Shepherd and Murphy mines at Moina, which is outside of the exploration licence area. The limestone is estimated to exceed 1000 meters in thickness in the Mole Creek area. Folding of the limestone has occurred which has affected the overlying Silurian but not the overlying Permian. The effects on the structure are seen in the axial plane schistosity which is strongly developed in some localities, and weak to absent in others. Gash veins of white sparry calcite, sometimes containing minor quartz incrustations, are common throughout. Brecciation of the limestone and accompanying fracture filling with calcite occurs, particularly in the Mayberry area. The rock when pure is hard, compact, very finely crystalline, with a conchoidal fracture. The colour varies from medium grey to black but is usually very dark grey. Patches and thin layers of pink argillaceous limestone, patches of grey silty limestone, stylolites and fossils are other common features. The fossils are not ubiquitous, but collections of bryozoans, solitary corals, brachiopods, gastropods and pelecypods were found locally. Occasionally

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<sup>3</sup> Jennings, 1970

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the limestone is thinly bedded but is more commonly massive with irregular parting surfaces which make accurate dip and strike measurements difficult.

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IV PREVIOUS WORK

Other than for limestone quarrying, no records of previous mineral exploration or exploitation are known for the tenement area.

Excepting for a number of shallow prospecting pits in the Den Plain area, there is no evidence of previous base metal exploration within this tenement. It seems probable that the abovementioned pits may have been sunk on copper shows in the Eldon Sandstone, the copper having been leached from the overlying basalt.

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V GEOLOGICAL WORK

Geological work was very limited as published maps of the area covered by the exploration licence were available at a scale of 1:63360 (Map 3, Sheets 1 & 2). The limestone boundaries were mapped concurrently with the Phase I soil sampling program in greater detail than is presented on the published maps. Contacts between rock units other than the Gordon Limestone were not examined. Other geological field work involved rock chip sampling and taking some structural readings and detailed mapping of the costeans described under Phase IV Geochemistry.

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VI GEOCHEMISTRY

The most intensive exploration work carried out on the Mole Creek prospect was the geochemical soil and rock sampling of the limestone areas. This sampling program commenced in November, 1974 and terminated at the end of March, 1975. A geochemical field technician was employed to carry out the soil sampling and present the data in the form of a base map with sample locations and limestone boundaries marked thereon. The sampling program was carried out in four phases, each more detailed than the former, as anomalous areas were defined. The writer made periodic visits to Mole Creek to review the data in the field and plan the next stage of the program.

Analyses were made for gold, arsenic, lead and zinc by atomic absorption spectrophotometry. Soil samples were sieved and the minus 80 mesh fraction analysed. Rock samples were prepared by crushing and pulverizing. The purpose of the program was to detect Carlin-Cortez type fine gold in the limestone. When the search for fine gold and associated arsenic proved fruitless but some anomalous zones of lead-zinc were delineated, the project was reoriented to become a lead-zinc search.

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#### Phase I Sampling Program

The Phase I geochemistry program was a combined soil rock and stream sediment sampling program covering all the outcropping limestone within the confines of the exploration licence area. This program was carried out between November, 1974 and February, 1975. A total of 1295 soil and rock samples and 44 stream sediment samples were taken.

Soil samples were taken approximately every 100 meters on traverses 400 metres apart. The sample was taken from the B-horizon, usually an orange-brown clayey soil, at a depth of 10 to 20 centimetres. A composite rock sample was taken from an outcrop where the B-horizon was lacking, where a soil sample would not have been representative of the limestone, where the outcrop was of special interest, or to compare the geochemistry of the soil with that of the rock from which it was derived. Stream sediments were taken wherever a good sample from an above-ground stream could be obtained. Sample locations were plotted on 1:17000-scale air photos and the limestone outcrop boundaries were drawn in concurrently. The information was then transferred onto an air photo mosaic at 1:14600-scale. This mosaic was used as the base map. Map 4, Sheets 1 & 2 show the sample locations and analytical results from the Phase I program.

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Of the gold analyses only one, a soil sample, registered slightly above a level of detection of 20 parts per billion. A small percentage of soil and rock analyses were above the level of detection of 5 parts per million for arsenic. On the basis of these negative results, no analyses beyond Phase I were made for gold and associated arsenic.

Anomalous zinc values were obtained from the soil analyses. The zinc anomalies were either solitary or grouped together. No rock or stream sediment zinc values were anomalous. The initial program was interrupted to re-examine three areas in the vicinity of Mole Creek townsite, called for convenience the "Limestone Quarry", "Den Plain" and "Mersey Hill" areas. Soil values were not high but being the best to date, "Limestone Quarry" and "Den Plain" were resampled at closer intervals and the three areas inspected for a possible source of zinc. It is perhaps significant that they line up parallel to the regional strike of the fold axes and foliation. Continuation of the Phase I program showed a larger anomalous area, defined by the 100 ppm zinc contour, measuring approximately 800 by 3600 metres. This area near Mayberry proved by far the most interesting because of its size, remoteness from civilization, abundant limestone outcrop and high zinc and corresponding high lead values. All following work, apart from the completion of the Phase I regional coverage, was concentrated on an evaluation of this area.

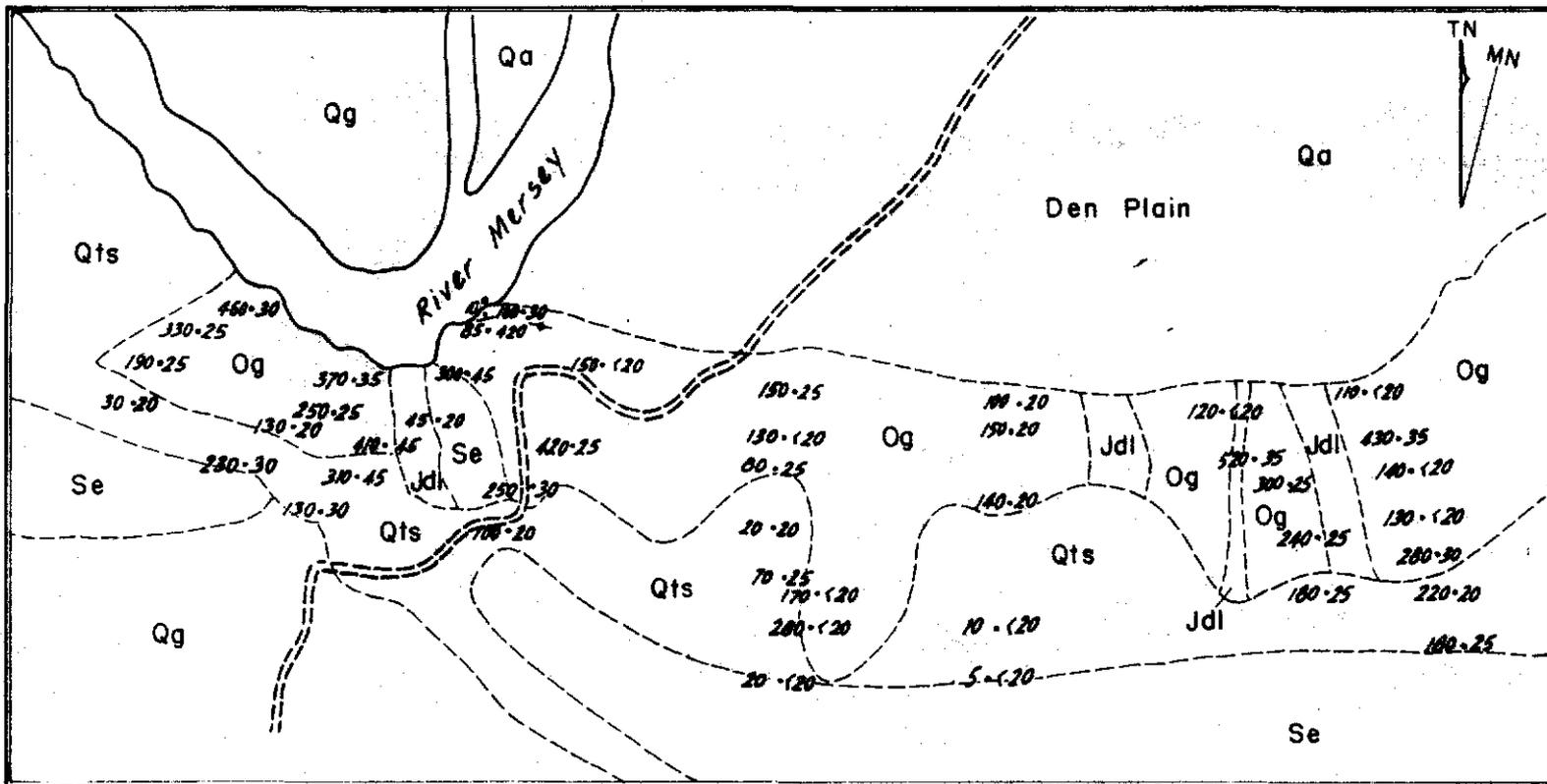
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Phase II Geochemistry1. Den Plain, Limestone Quarry, Mersey Hill

(i) Den Plain. This area comprises one side of a ridge sloping steeply down to the River Mersey and the Den Plain. The ridge is capped by Silurian sandstones from which scree and colluvium gravitate down over the underlying Ordovician limestone. Several dolerite dikes of Jurassic age intrude the limestone. Forty-five soil samples were taken over an area of 200 by 900 metres, at 25 metres spacings on traverses 50 to 100 metres apart.

Figure 1, (page 20) shows a plan of the soil geochemistry for lead and zinc. The analytical results served only to define the anomalous areas more accurately. No evidence of alteration or mineralization in the rocks was found. The limestone is generally dark grey, with pink argillaceous bands, vertical axial-plane cleavage weakly developed, and irregular but well-defined bedding planes. Some of the rocks had vugs lined with limonite but when analysed were found to contain only slightly above background values of lead and zinc. One sample described by petrographic analysis as a recrystallized oolitic and fossiliferous limestone breccia (see

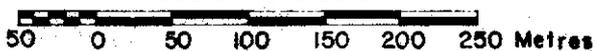


**FIG. 1 PHASE II GEOCHEMISTRY IN THE DEN PLAIN AREA**

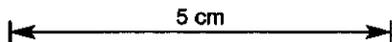
**LEGEND:**

Qa	Recent alluvium
Qg	Till, Talus & residual soil
Qts	Talus (siliceous sedimentary origin)
Se	Eldon Group (Silurian)
Og	Gordon Limestone (Ordovician)

Scale :- 1:5 000



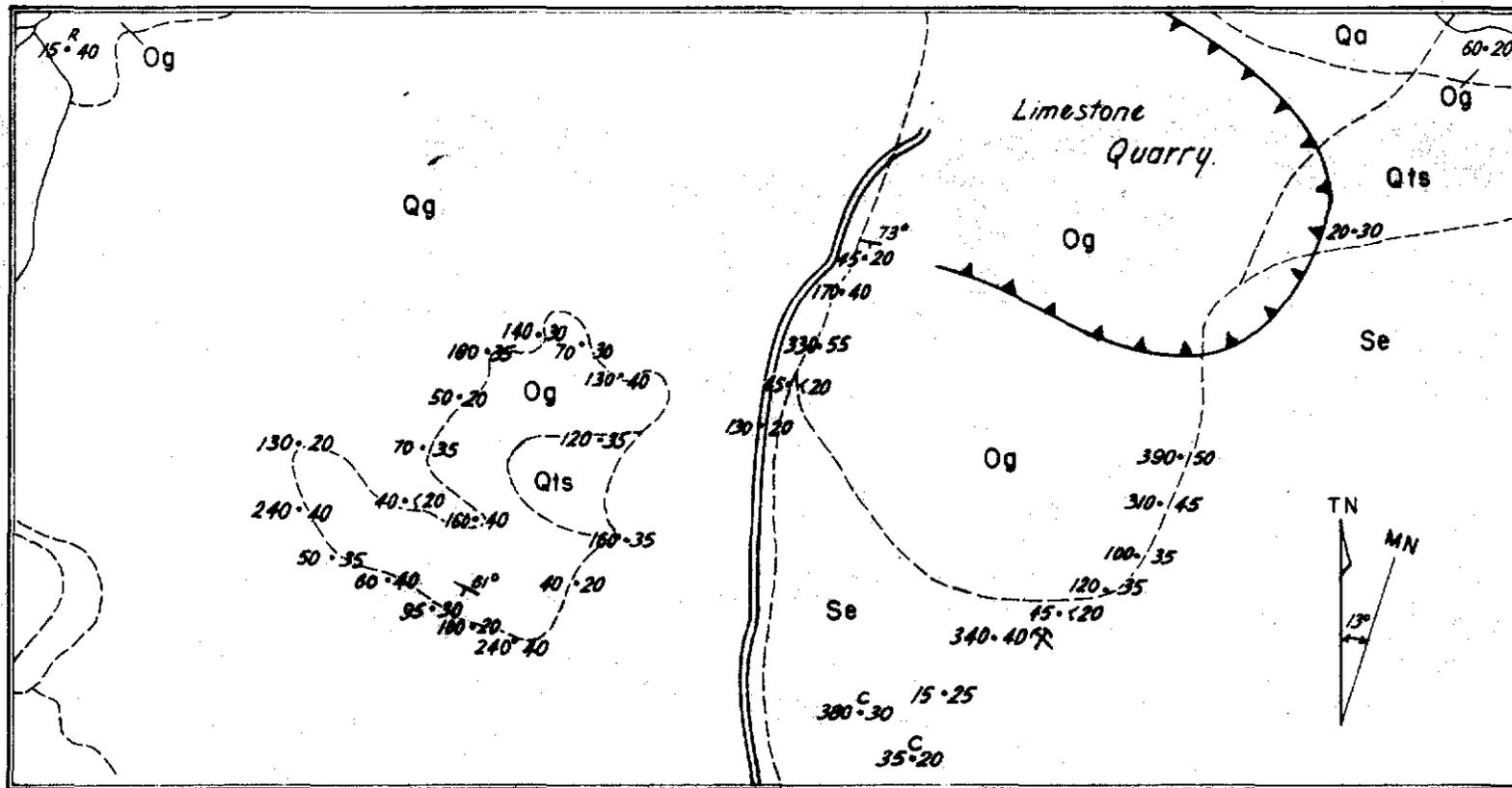
- Approx. geological boundary
- Direction & dip of strata
- Strike of vertical foliation
- Vehicle track
- Geochemical sample location



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petrographic report, Sample No. A 356 R) on analysis was shown to contain 100 ppm Pb, 55 ppm Zn and 5 ppm Cd.

(ii) Limestone Quarry. This area, adjacent to a limestone quarry operated by Mole creek Limestone Pty. Ltd., was resampled after several values of 100 to 400 ppm zinc were obtained (see Figure 2 - page 22). To the east of the road is the western end of the ridge described in the Den Plain area. Higher zinc values appear to originate from the Silurian sandstones (Se).



**FIG. 2 PHASE II GEOCHEMISTRY IN THE LIMESTONE QUARRY AREA**

**LEGEND:**

Qa	Recent alluvium
Qg	Till, Talus & residual soil
Qts	Talus (siliceous sedimentary origin)
Se	Eldon Group (Silurian)
Og	Gordon Limestone (Ordovician)

Scale :- 1:5 000  
 50 0 50 100 150 200 250 Metres

- Approx. geological boundary
- Direction & dip of strata
- Unsealed road
- Stream
- Costean, Mine shaft
- Geochemical sample location

5 cm

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Two small costeans and a 3-metre prospect pit were found in this area. A sandstone sample from the pit contained 45 ppm Zn and 20 ppm Pb. The reason for the digging of the pit is not known as there is no sign of mineralization in the rocks or in the analyses. An isolated hill of outcropping limestone west of the road was sampled about its perimeter but no anomalous zinc or lead values were obtained.

(iii) Mersey Hill. This area consists of limestone intruded by Jurassic dolerite and overlain by Tertiary basalt. Isolated outcrops of well bedded limestone stand out amongst a thick cover of soil strewn with boulders of dolerite and basalt. Some above-background zinc values were obtained in the soil here and the area was inspected. Some small gash veins of massive white calcite were found, but no more samples taken.

## 2. Mayberry

The main part of the anomalous area near Mayberry was the object of a thorough geochemical investigation. Limestone hills with deep valleys and underground drainage describe all but a small part where a narrow flat bottomed valley leads westward from the centre of the area. The hills and valleys are covered with dense myrtle-sassafras rain forest with eucalypt forest in the more open ground. The central valley has been cleared at one time and grown over again,

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but the remainder has only had a few large trees removed. Access by vehicle can be made only to within the general area along farm and timber tracks; the remainder of the distance must be made on foot.

A soil resampling program was executed on a 25 by 100 metre grid to cover the +100 ppm zinc-in-soil area. Soil samples were taken in the same manner as for Phase I. Plan 1 is an idealized plan of the sample locations (with corrections made for the relative positions of some of the traverse lines) showing the analytical results for lead and zinc. These results show anomalous zones for zinc and coincident zones for lead;

(i) A discontinuous zone between stations F 369 and F 225 with peak lead-zinc values at F 295 and F 284 following the brecciated axis of a syncline.

(ii) A zone extending from stations F 300 to F 378 following a limestone ridge, continuing down the central valley, then forking at F 378 and continuing towards F 132 in one direction and F 126 in the other.

Further soil sampling (Phase III) was carried out on a 10 x 40 and 10 x 50 metre grid to further evaluate these zones.

Phase III Geochemistry

Detailed soil sampling was carried out over anomalous zones in the Mayberry area defined in the Phase II program. Soil samples were taken in the same manner as for Phases I and II.

(i) Plan 2, Sheet 1 is an idealized plan of detailed soil sampling carried out over part of an anomalous zone extending from F 369 and F 225. This zone runs parallel with a ridge of limestone which has been brecciated, foliated and fractured then healed with calcite. The ridge crest appears to be the axis of a tilted south-east plunging syncline. The nose of the syncline appears to lie between stations F 327 and F 369 where the ridge abruptly turns to the north-east for a short distance. The ridge and flanks were sampled. The parameters of the syncline based on two bedding plane readings are as follows: axial plane strike  $132^{\circ}$ , dip  $76^{\circ}$  north-east; fold axis plunge  $10^{\circ}$  south-east.

(ii) Plan 2, Sheet 2 contains plans of detailed geochemistry carried out over three lead-zinc highs in the anomalous zone extending from stations F 300 to F 132.

The area shown in Figure 1 centred on stations F 335 and F 384 covers the length of a narrow limestone ridge, coincident with the base line and similar in nature to the

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synclinal ridge described in the preceding paragraph, but its structural relationship is not known. Analytical results define the anomaly more clearly but the source of the zinc is not certain.

The area shown in Figure 2 centred on station F 132 is located on a low hill of outcropping limestone. This exercise was carried out to relocate a 1500 ppm zinc anomaly picked up in the Phase I program but not in Phase II. It was successful in locating a lead-zinc anomaly registering 5400 ppm Pb and 1900 ppm Zn. This is the highest lead reading and second highest zinc reading obtained in the project and as the results were not available until the field program was terminated no investigation of its source has been made.

The area in Figure 3 centred on station F 378 is located on the floor of the central valley. The location and analytical results of samples taken at the surface on a 10 x 40-metre grid are illustrated in figure 3a. Figure 3b shows a plan of auger sample locations and depths of samples taken on a 10 x 10-metre grid centred on station F 378 to gain an idea of the dispersion of lead-zinc ions in the soil. The samples were taken from an orange-brown clay considerably manganese stained.

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Phase IV Geochemistry

Phase IV was a combined bedrock and auger soil sampling program designed to determine the source of the lead and zinc in the soil in the vicinity of the synclinal ridge. Two costeans were dug across strike and composite rock samples taken over every metre. Where the depth of soil exceeded one metre soil auger samples were taken. Depth of erosion was variable across strike and in some places both rock and soil samples have been taken within the same metre.

The limestone is dark grey, very fine grained and compact, breaking with a conchoidal fracture, with or without thin bands of pink marl or patches of grey silty limestone. Foliation parallel to the axial plane varies between strong and weak. The pure limestone often displays in situ spheroidal weathering, probably controlled by a system of axial plane cleavage and fractures at right angles to the fold axis. Bedding plans are present as infrequent irregular surfaces where they are not obscured by other foliation. Calcite veins, occasionally with minor quartz, are common throughout, either parallel to the foliation or discordant and highly irregular, and varying in thickness from a millimetre to a metre. Several brecciated zones consisting

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of angular fragments of massive limestone in a matrix of coarse white calcite were located. In some places white calcite is dominant, with slabs and slivers of the limestone aligned parallel to the foliation plane.

Plan 3, Sheets 1 & 2 carry information derived from costeans in the vicinities of sample locations F 295 and F 284 respectively. Two rock sample anomalies appear, one in zinc with a maximum at C16 and one in lead at C29. The rock containing the higher lead was a greenish and brownish medium grained recrystallized limestone breccia, possibly dolomitic, which when analysed on its own registered 280 ppm Pb, 75 ppm Zn, and 5 ppm Cd (see petrographic report, Appendix I, sample C29R). The higher zinc value occurs in a wide brecciated zone consisting of a major component of massive coarse white calcite with remnants of the grey limestone. It appears that the higher lead and zinc is introduced with only some of the secondary calcite whereas a slight increase accompanies the remainder. Comparing the rock values with the soil values indicates a slight to two-fold increase in soil, and, in some cases, a loss of lead content in the soil. A considerable enrichment, up to twelve-fold, of zinc in the soil occurs, however. The high rock value for zinc at C16 is obviously the source of the high soil value for zinc at C20 which is down slope from C16. This enrichment of lead-zinc in the soil is also obvious when comparing the rock analysis at C58 with the soil analyses between C56 and C60.

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VII CONCLUSIONS & RECOMMENDATIONS

The attempt to locate Carlin-type gold mineralization in the Gordon Limestone was abandoned after obtaining negative results from the geochemical soil and rock sampling program.

The numerous lead and zinc soil anomalies were subjected to detailed examination. Only the Mayberry area exhibited discrete anomalous zones, as opposed to sporadic groupings of lead-zinc high values.

The results obtained from close-spaced geochemical soil and rock-chip sampling within the Mayberry area have demonstrated that the anomalous lead-zinc values are associated with the brecciated zones within the limestone. The lead-zinc values within this brecciated material are sporadic. Although outcrop is extensive, no visual signs of metal concentration were seen.

It is concluded that the anomalous lead-zinc values obtained during this investigation reflect base metal fixation in fracture zones within the Gordon Limestone. The source of the metal ions was probably the limestone itself, the ions being leached from the fractured host rock at some depth, and precipitated within the calcite-healed fracture zones at localities where suitable Eh-pH conditions prevailed.

- 30 -

No evidence of hydrothermal activity was found in the area, and no alteration zones were seen.

It is concluded that the base and precious metal prospectivity of this area has been shown to be negative, inasmuch as no evidence of economic-grade metal concentrations was located during the course of the extensive geochemical survey conducted over the area.

On the basis of the foregoing statement, it is recommended that no further work be done on this tenement, and that the title thereto be relinquished.

VIII BIBLIOGRAPHY

1. Jennings, I.B., 1957, Mole Creek, Chudleigh, and Liens in Limestones in Tasmania. Mineral Resources Geological Survey of Tasmania, No. 10.
  2. Jennings, I.B., 1963, Geological Survey Explanatory Report, Middlesex, Tasmania Department of Mines, K/55-6-45.
  3. Jennings, I.B., 1970, Middlesex Mineral District, Geology of Australian Ore Deposits, pp. 512-514, (Ed. J. McAndrew), 8th Comm. Min. & Metal Congr., Australasian Inst. Min. Met.
- 

APPENDIX

Petrographic reports.

038

# Jan R. Pontifex & Associates

532039

MINERALOGY — PETROLOGY  
GEOLOGY  
SECTION PREPARATION

50 MARY STREET, UNLEY  
SOUTH AUST. 5061  
TEL. 272 2856. A.H. 31 3816

## MINERALOGICAL REPORT NO. 1720

March 16, 1975

TO: Mr. A.J. Cummings,  
U.S. Steel International (New York) In  
Suite 6 Chandler House,  
424-426 Nepean Highway,  
Frankston, Victoria 3199

YOUR REFERENCE: Your memo dated 10/4/75

MATERIAL: Rock samples

IDENTIFICATION: A 356R  
C 29R

WORK REQUESTED: Petrographic examination,  
analysis for Pb, Zn, Cd, report  
summary by telex

SAMPLES & SECTIONS: Returned to you by post



IAN R. PONTIFEX & ASSOCIATES

039

A 356R: recrystallised, probably oolitic  
and slightly micro-fossiliferous  
limestone breccia; accessory  
limonite and chalcedony

The chemical analysis for this sample (and  
for C 29R) were undertaken by A.C.S.Laboratories; and  
reported as follows in ppm:

Pb 100, Zn 55, Cd 5

In thin section the rock is seen to consist  
of a clouded aggregate of microcrystalline limestone  
of homogeneous composition.

Texturally the rock is rather heterogeneous,  
consisting of a loosely packed aggregate of angular to  
rounded fragments to 5 mm across. More abundant,  
finer, (0.5 mm) closely packed, commonly elongated  
oolitic bodies, and microcrystalline carbonate form  
a general matrix to these coarser fragments.

Minor probable recrystallised microfossils  
of unknown species are randomly scattered. Minor veins  
and patches of clear, remobilised calcite occur at  
random. Accessory limonite staining and diffuse patches  
of chalcedony are the only other minerals present.

040

C 29R: recrystallised (?dolomitic)  
limestone breccia

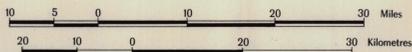
Geochem (ppm): Pb 280, Zn 75, Cd 5

Rather independent angular fragments of clear carbonate (calcite), to 7 mm across (10-12%) are randomly disposed through a fairly homogeneous microcrystalline granoblastic mosaic of carbonate. The mosaic carbonate is weakly clouded and optical properties suggest that it is dolomite limestone (although this cannot be confirmed by optical means alone).

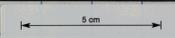
With the exception of iron oxide staining and minute iron oxide grains surrounding some fragments, carbonate is the only mineral phase present.

# GEOLOGICAL MAP OF TASMANIA

SCALE 1:506,880



Drawn on Transverse Mercator Projection. Origin of co-ordinates 400,000 yards West and 1,800,000 yards South of True Origin of Zone 7 of the International Grid.



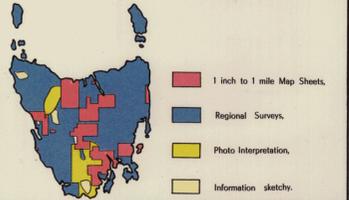
CREEK AREA  
Boundary of E.L.13/74  
317 S. Km.



### GEOLOGICAL REFERENCE

- QUATERNARY
  - TERTIARY Marine
  - TERTIARY Non-marine
  - TRIASSIC
  - PERMIAN
  - DEVONIAN AND SILURIAN
  - ORDOVICIAN
  - CAMBRIAN
  - PRECAMBRIAN Unmetamorphosed
  - PRECAMBRIAN Metamorphosed
  - PRECAMBRIAN Undifferentiated
  - TERTIARY Basalt
  - JURASSIC Syenite
  - JURASSIC Dolerite
  - DEVONIAN Granite
  - CAMBRIAN Ultrabasics
  - CAMBRIAN Granite
- IGNEOUS

### RELIABILITY DIAGRAM



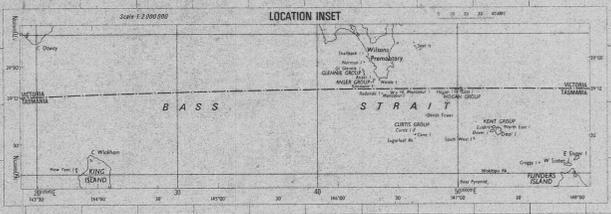
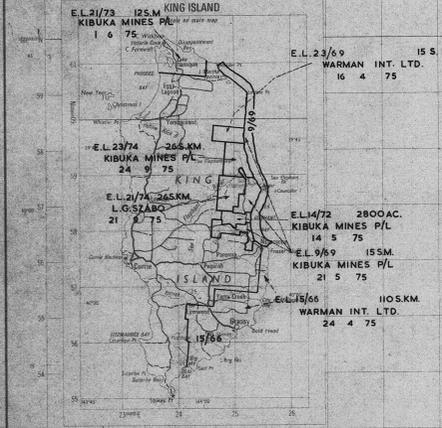
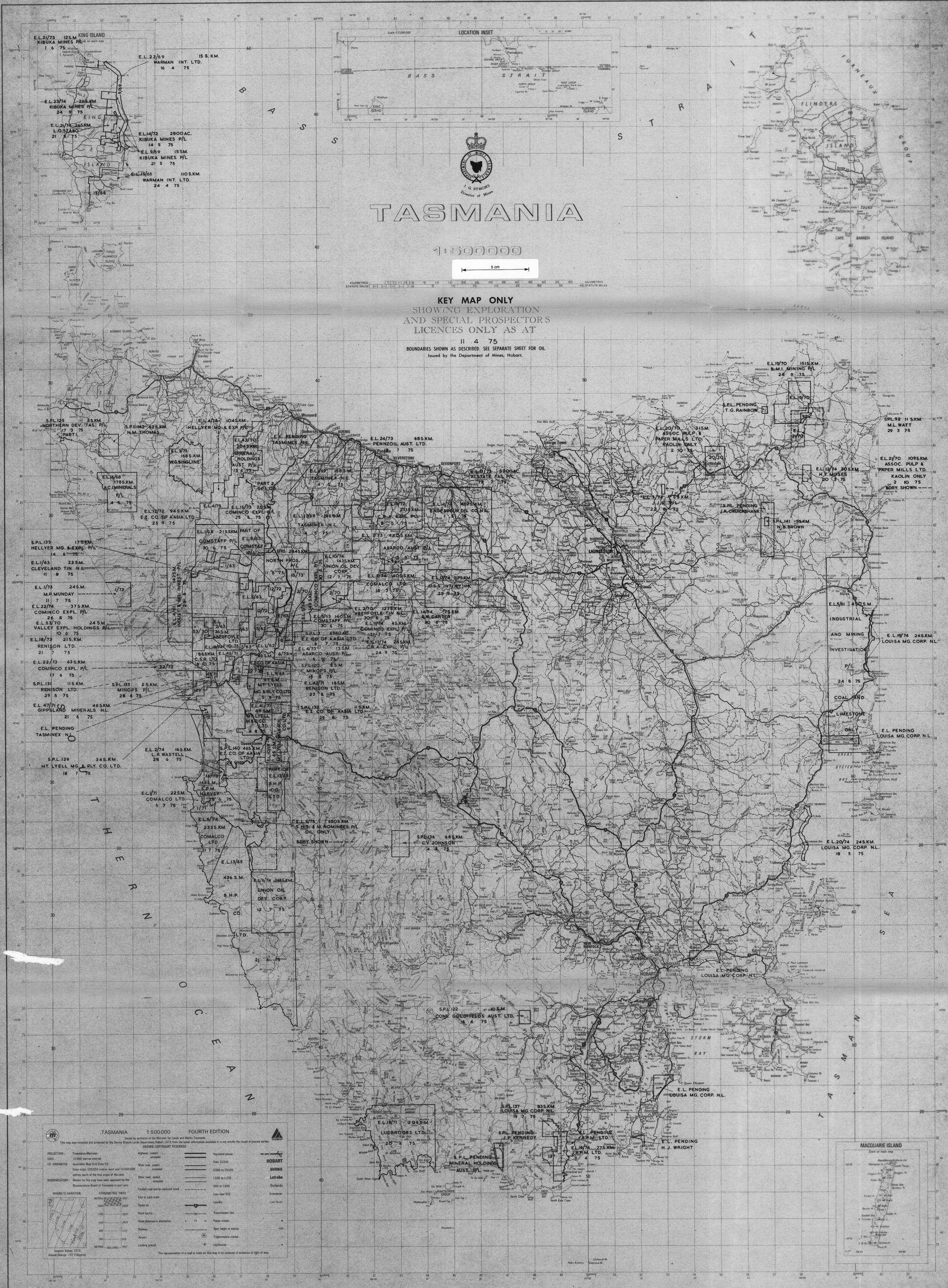
Compiled by the Geological Survey, Department of Mines, Tasmania, in association with the Division of Soils, C.S.I.R.O., Electrolytic Zinc Company of Australasia Ltd. (West Coast Division), Hydro Electric Commission, Lyell E. Z. Explorations, Rio Tinto Australian Exploration Pty. Ltd., and the University of Tasmania.

Cartography by Drawing Office, Department of Mines, Hobart.  
K. T. Kendall, Chief Draughtsman.

T. D. Hughes, B.Sc.  
Chief Geologist  
J. G. Symons, B.E.  
Director of Mines,  
Minister for Mines  
Published 1961

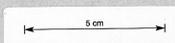
532042  
75-1087

303



# TASMANIA

1:500000



**KEY MAP ONLY**  
 SHOWING EXPLORATION  
 AND SPECIAL PROSPECTOR'S  
 LICENCES ONLY AS AT  
 11 4 75

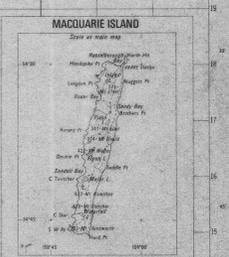
BOUNDARIES SHOWN AS DESCRIBED. SEE SEPARATE SHEET FOR OIL  
 Issued by the Department of Mines, Hobart.

**TASMANIA 1:500000 FOURTH EDITION**

PROJECTION: Transverse Mercator  
 GRID: 10000 metres interval  
 CO-ORDINATES: Australian Map Grid Zone 56  
 FALSE SCAPE: 500000 metres west and 1000000 metres south of the true shape of the state.  
 MAGNETIC VARIATION: Based on the map has been approved by the Geographical Board of Tasmania in 1975.

<ul style="list-style-type: none"> <li>Registered place</li> <li>Dw 25000</li> <li>8000 to 25000</li> <li>1500 to 2000</li> <li>500 to 1500</li> <li>Less than 500</li> <li>Transmission line</li> <li>Power station</li> <li>Spot heights in metres</li> <li>Tide-gauge station</li> <li>Lighthouse</li> </ul>	<ul style="list-style-type: none"> <li>Registered place</li> <li>Dw 25000</li> <li>8000 to 25000</li> <li>1500 to 2000</li> <li>500 to 1500</li> <li>Less than 500</li> <li>Transmission line</li> <li>Power station</li> <li>Spot heights in metres</li> <li>Tide-gauge station</li> <li>Lighthouse</li> </ul>
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The representation of a road on this map is an evidence of maintenance of right of way.



# MIDDLESEX

Geological Survey of Tasmania  
Department of Mines—Hobart

GEOLOGICAL ATLAS 1 MILE SERIES  
ZONE 7 SHEET NO. 45



FIRST EDITION 1958



**REFERENCE**

Cenozoic	QUATERNARY	Qa	RECENT Alluvium	
		Qt	Basalt talus and landslip debris	
		Qs	Dolerite scree fields	
	PLEISTOCENE	Qp	Quartzitic talus	
		Qc	Conglomerate talus	
	TERTIARY	Ts	Varved clays	
		Ta	Fluvioglacial deposits, till and alluvium	
		Tu	Till, talus, marsh deposits and residual gravels	
	Mesozoic	TRIASSIC	Ts	Sands and clays
			Tu	Unassigned
PERMIAN		Pf	Ferntree mudstones and Cygnet coal measures	
		Pw	Woodbridge glacials	
		Pl	Liffey sandstones and shales	
SILURIAN		Ps	Kansas Creek beds	
		Pa	Eldon group	
ORDOVICIAN		Or	Gordon limestone	
		Os	Moina sandstone	
		Ol	Roland conglomerate	
CAMBRIAN	Cg	Gog Range greywacke		
	Cb	Bull Creek pyroclastics		
	Cl	Lorinna greywacke		
	Cu	Unassigned		
Pre-Cambrian	pcd	Dove group		
	pcf	Fisher group		
	pcg	Howell group		

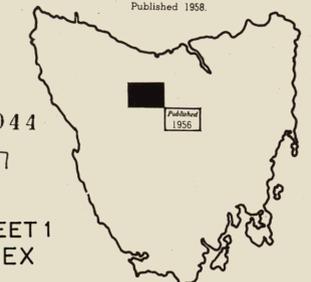
  

**IGNEOUS ROCKS**

Ts	TERTIARY Basalt
Jd	JURASSIC Dolerite
Ddgr	DEVONIAN Dolcoath granite
Ddgr	Dove granite
Ddgr	Lone Pine granite
Ck	CAMBRIAN Keratophyre

Established geological boundary .....	— — — — —
Geological boundary (position approximate) .....	— — — — —
Unconformity .....	— — — — —
Thrust Fault (teeth on upper plate) .....	— — — — —
Transcurrent Fault .....	— — — — —
Fault with direction of movement .....	— — — — —
Anticlinal Axis .....	— — — — —
Synclinal Axis .....	— — — — —
Anticlinal Axis (position approximate) .....	— — — — —
Synclinal Axis (position approximate) .....	— — — — —
Strike and plunge of Dragfolds .....	— — — — —
Strike and dip of strata .....	— — — — —
Strike of vertical strata .....	— — — — —
Strike of strata interpreted from air photos .....	— — — — —
Linears interpreted from air photos .....	— — — — —
Direction of plunge of lineation .....	— — — — —
Landslips showing heel of slip and direction of movement .....	— — — — —
Mine or Prospect .....	— — — — —

Geology by: I. B. Jennings, B.Sc. (Hons.), A.M.A.I.M.M., Regional Geologist.  
K. L. Burns B.Sc. (Hons.) Geologist.  
Base map production by Mapping Branch, Lands and Surveys Department, Hobart, 1956.  
Geological map production by Drawing Office, Department of Mines, Hobart.  
H. G. W. Keid, M.Sc., M.A.I.M.M., Chief Geologist.  
Compiled under the direction of  
I. G. Symons, B.E.  
Director of Mines.  
Issued under the authority of the Honourable Eric Reece, Minister for Mines.  
Published 1958



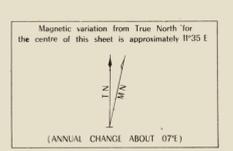
532044  
75-1087  
MAP 3 SHEET 1  
MIDDLESEX  
1775

**CONTROL:** 2nd and 3rd Order Triangulation based on Lachlanes Astronomical Station Lat. 41°38' 27.389"S. Long. 147°17' 48.725" E.  
**DETAIL:** Aerial Photography 1963  
**PROJECTION:** Transverse Mercator  
**LEVEL DATUM:** Mean Sea Level Hobart  
**NOMENCLATURE:** Approved by the Nomenclature Board of Tasmania.  
**GRID CONVERGENCE:** Based on Longitude 146 00'E. To obtain true bearing see correction as shown in margin.  
**PRODUCTION:** In compliance with National Mapping Standards

Trip Stations (2nd and 3rd Order) 14th Order  
State Permanent Mark  
Mine Pit, Mill or Factory  
Post Office, School, Hotel  
Hospital, Garage, Church  
Windpump, Cemetery, Water Tower  
Mine, Lighthouse, Waterhole  
Electric Transmission Line  
Telephone Line

**INDEX TO ADJOINING SHEETS**

VALENTINES PENK	SHEFFIELD	FRANKFORD
MACKINTOSH	MIDDLESEX	QUAMBY
MURCHISON	DU CANE	GREAT LAKE



Swamp or Marsh	1st Class Road	Foot	Unfenced
Quarry	2nd Class Metal or Gravel	Foot	Unfenced
Gravel Pit	3rd Class	Foot	Unfenced
Cliff	4th Class Unmetalled	Foot	Unfenced
	Vehicular Track	Foot	Unfenced
	Foot or Pack Track	Foot	Unfenced
	Gate	Foot	Unfenced
	Cattle-grid Bridge	Foot	Unfenced
	Railway double line	Foot	Unfenced
	Railway single line	Foot	Unfenced
	Embankment	Foot	Unfenced
	Cutting	Foot	Unfenced

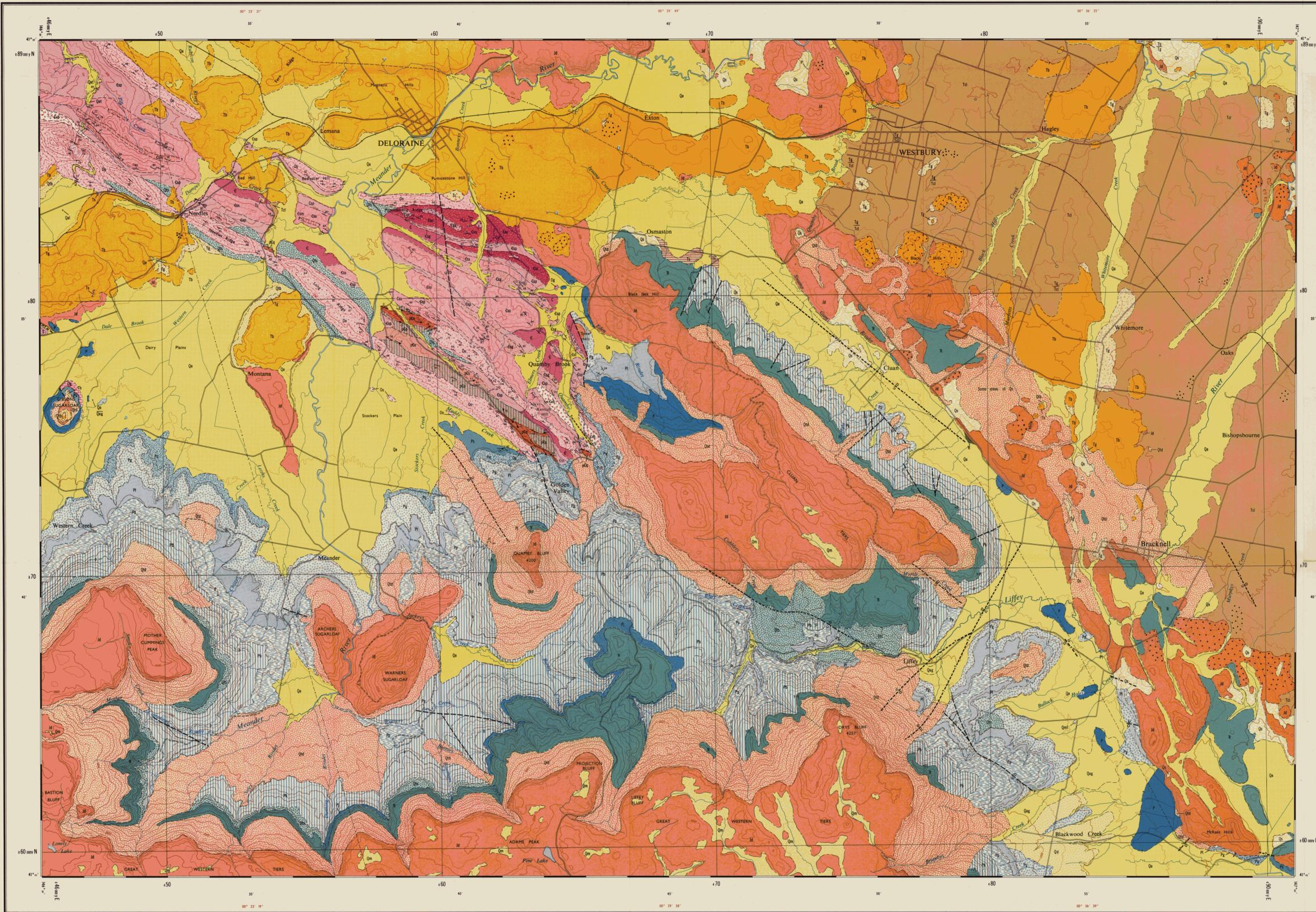
# QUAMBY

GEOLOGICAL SURVEY OF TASMANIA  
DEPARTMENT OF MINES - HOBART.

GEOLOGICAL ATLAS 1 MILE SERIES  
ZONE 7 SHEET No 46 8214 N



FIRST EDITION 1969



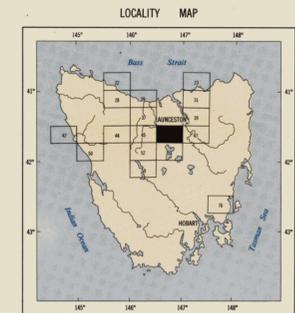
**REFERENCE**

<b>QUATERNARY</b>	Qm Qa Qd Qs Ql Qp Qc	Swamp and marsh deposits; spring limestone deposits (+ Qml) Alluvium including river terrace deposits (Qat), and dolerite gravels and quartz sands (Qag) and ironstone boulder lag (Qal) Windblown and locally derived sands. Predominantly basalt talus Predominantly sandstone talus including deposits which may have been water transported (Qst) Predominantly dolerite talus and scree. (+) Pleistocene dolerite boulder beds.
<b>CAENOZOIC</b>		
<b>TERTIARY</b>	Tb Tc Ts	Inter- and sub-basalt gravels of predominantly quartzite pebbles, stippled where lateritised. Siliceous conglomerate. Litic sandstone.
<b>MESOZOIC</b>		
<b>TRASSIC</b>	Tr	Undifferentiated sandstone, siltstone, shale and occasional mudstone pellet conglomerate.
<b>PERMIAN</b>	Pf Pg Ph Pi Pj Pk Pl Pm Pn Po Pp Pq Pr Ps Pt Pu Pv Pw Px Py Pz	Jackey Formation of carbonaceous sandstone and shale with plant fragments. Bogan Gap Group of predominantly unfossiliferous mudstone with Blackwood Conglomerate (b) and Palmer Sandstone (p) indicated. Postina Group of fossiliferous mudstone and sandstone with Dabool Sandstone indicated (d). Liffey Group of predominantly sandstone with occasional wormcast and carbonaceous horizons, and carbonaceous shale. Golden Valley Group of predominantly fossiliferous and erratic rich mudstone, shale, limestone and sandstone. Quamby Mudstone unfossiliferous dark grey pyritic mudstone with terrane (Q) shale locality indicated (Pq). Stockers Tillite of tillite and erratic rich mudstone.
<b>PALEOZOIC</b>		
<b>ORDOVICIAN</b>	O	Unconformity Unfossiliferous sandstone
<b>CAMBRIAN</b>	C	Correlate of Gordon Limestone Correlate of Owen Conglomerate and Magog Group of siliceous sandstone and conglomerate with thicker horizons of predominantly siliceous conglomerate indicated. Unconformity Pebbles and cobble conglomerate with argillaceous matrix, and subordinate sandstone and siltstone layers. Quartz-feldspar porphyry. Phyllite, slate, sandstone and some volcanic material Grey-green greywacke rich sequences (Cag) Sequences with feldspathic sandstone (Csf)
<b>PRECAMBRIAN</b>		
<b>PRECAMBRIAN</b>	Pp Pq Pr Ps Pt Pu Pv Pw Px Py Pz	Greywacke, conglomerate, phyllite and slate with sequences containing basic igneous rocks. (Evb) and horizons rich in acid volcanic material (Cum) Unconformity Quartz-muscovite schist and phyllite. Massive, platy and banded quartzite with stretched pebble conglomerate indicated (pQc). Schistose quartzite, quartzite and schist assemblage

**Igneous Rocks**

Tb	TERTIARY Basalt with lateritised zones stippled.
Jd	JURASSIC Dolerite with lateritised zones stippled.

Geological boundary - observed.  
Geological boundary - position approximate.  
Geological boundary - inferred.  
Geological boundary - inferred and concealed.  
Geological boundary - airphoto interpretation.  
Fault - exposed (downthrown side indicated).  
Fault - position approximate (downthrown side indicated).  
Fault - position inferred and concealed (downthrown side indicated).  
Strike and dip of beds - right way up, overturned.  
Vertical and horizontal bedding.  
Strike and dip of beds - facing unknown.  
Strike and dip of cleavage, vertical cleavage.  
Direction and plunge of bedding / cleavage intersection lineation.  
Direction and plunge of undifferentiated lineation.  
Minor fold direction and plunge, dip of axial surface indicated.  
Strike and dip of lithological units in pelitic layers, and of platy parting, possibly bedding, in quartzite.  
Direction of sediment bearing current.  
Mineral prospect. Copper Cu.



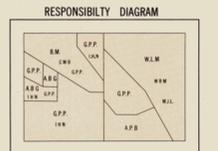
**CONTROL** 2nd and 3rd Order Triangulation based on Lockmeads. Astronomical Station. Lat. 41°38' 23.88" S Long. 147°17' 48.72" E. Actual Photography. Tasmanian Meridian. Mean Sea Level, Hobart. Approved by the Nomenclature Board of Tasmania. Based on Longitude 148°00' E. Origin is 400,000 yards West and 1,800,000 yards South of the True Origin of Zone 7.

**ROAD** ...  
**VEHICULAR TRACK** ...  
**FOOT OR PACK TRACK** ...  
**RAILWAY** ...  
**ELECTRIC TRANSMISSION LINE** ...  
**SWAMP OR MARSH** ...  
**TRIGONOMETRIC STATION** ...  
**WATERHOLE** ...  
**LIGHTHOUSE** ...

**INDEX TO ADJOINING SHEETS**

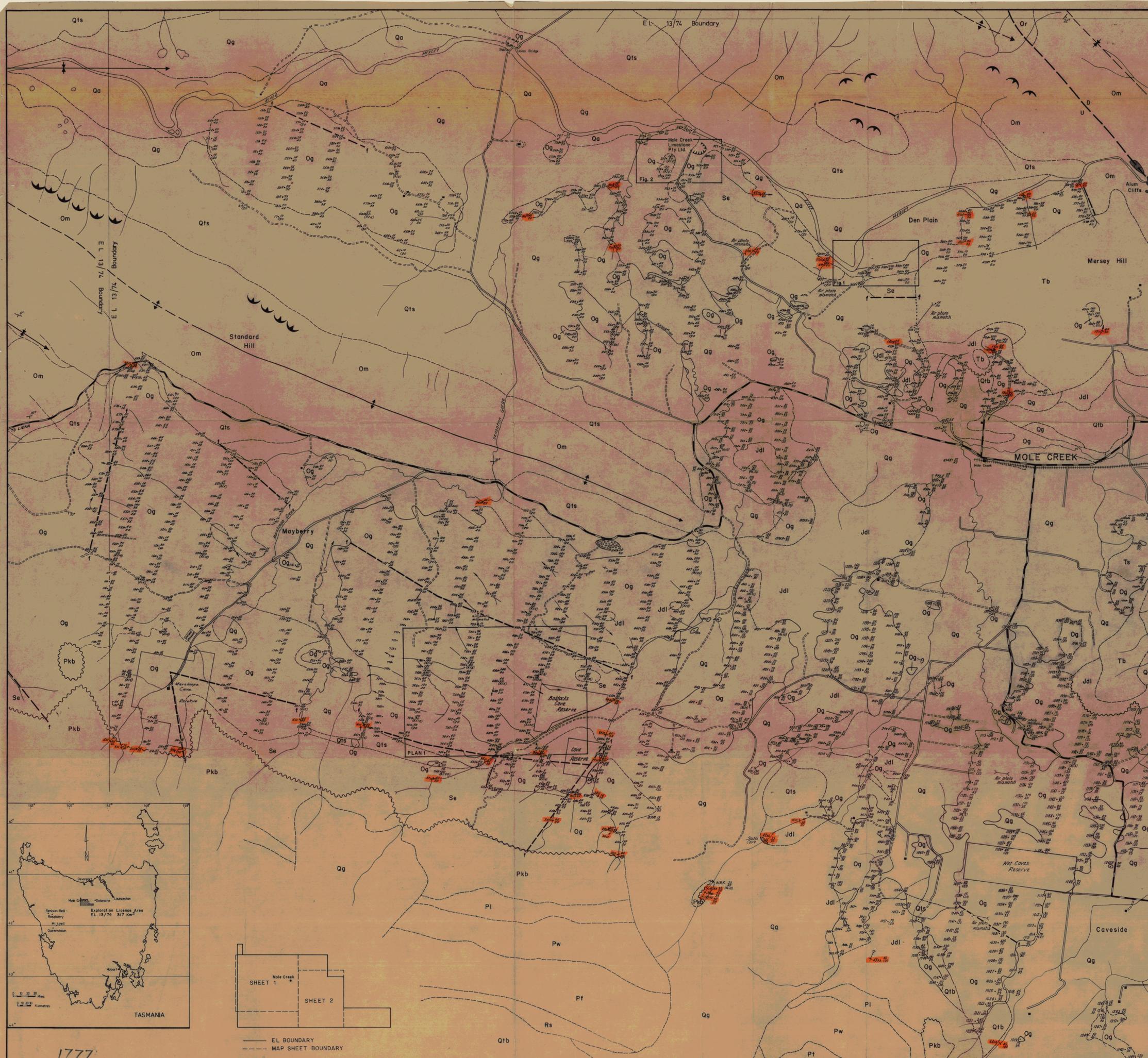
SHEFFIELD	FRANKFORD	LAUNCESTON
MIDDLESEX	QUAMBY	LONGFORD
DU CANE	GREAT LAKE	LAKE RIVER

Magnetic Variation from True North for the centre of this sheet approximately 12°50' Annual Change +05' E (Approx).



Geology by C.M. Barton B.Sc., Ph.D., F.G.S., A.P. Bravo B.Sc. (Hons.), A.B. Gulline B.Sc., M.J. Longman B.Sc., B. Marshall B.Sc., Ph.D., F.G.S., W.L. Matthews B.Sc., W.R. Moore B.A., M.Sc., T.R. Naylor B.Sc. (Hons.), C.P. Piles B.Sc. (Hons.) Dip. Ed. Base map redrawn from 40 sheets to 1 inch sheets produced by Lands and Survey Department, Hobart. Geological map produced by Drawing Office, Department of Mines, Hobart. Cartography by P.B. Newkell and D.M. Hardy. E. Williams B.Sc., Ph.D., F.G.S. Senior Geologist in Charge of Regional Mapping. I.B. Jennings B.Sc. (Hons.) Chief Geologist. Compiled under the direction of J.G. Symons B.E. Director of Mines. Issued under the authority of the Honourable Leonard H. Besell, Minister for Mines. Published 1969.

32045  
75-1087  
MAP 3 SHEET 2  
QUAMBY  
1776



**LEGEND:**

**STRATIGRAPHIC**

- QUATERNARY**
- Qa RECENT Alluvium
  - Q1b Talus - basic igneous rocks
  - Q1s Talus - quartzitic sedimentary rocks
  - Qg Till, talus, residual gravels
- CAINOZOIC**
- TERTIARY**
- Ts Sands & clays
- MESOZOIC**
- TRIASSIC**
- Rs Ross sandstones
- PERMIAN**
- Pf Fernree Mudstones & Cygnet Coal Measures
  - Pw Woodbridge Glacials
  - Pl Liffey Sandstones & Shales
  - Pkb Kansas Creek Beds
- PALAEZOIC**
- SILURIAN**
- Se Eldon Group
- ORDOVICIAN**
- Og Gordon Limestone
  - Om Moina Sandstone
  - Or Roland Conglomerate
- IGNEOUS ROCKS**
- Tb TERTIARY Basalt
  - Jdl JURASSIC Dolerite

**GEOCHEMICAL**

Soil sample location & number

465a 35 Zn p.p.m.  
30 Pb p.p.m. (As b.i.d.)  
(Au 30) Au p.p.b.

Rock sample location & number

515R 25 Zn p.p.m.  
25 Pb p.p.m. (Au b.i.d.)  
(As 400) As p.p.m.

Stream sediment sample location & number

335a 35 Zn p.p.m. (Au & As b.i.d.)

Abbreviations: p.p.m. parts per million  
p.p.b. parts per billion  
b.i.d. below level of detection

Levels of detection: Au 20 p.p.b.  
Zn 5 p.p.m.  
Pb 20 p.p.m.  
As 5 p.p.m.

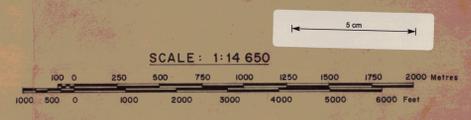
**GEOLOGICAL SYMBOLS**

- Known geological boundary
- Inferred geological boundary
- Unconformity
- Approximate position of fault with direction of movement
- Anticlinal axis with direction of plunge
- Synclinal axis with direction of plunge
- Anticlinal axis approximate position
- Synclinal axis approximate position
- Horizontal strata
- Strike of vertical strata
- Strike & dip of strata

**TOPOGRAPHICAL & CIVIL**

- Landslip showing direction of movement
- Sinkhole
- Quarry
- Cliff
- Gravel pit
- Roads sealed
- Roads unsealed
- vehicle track
- Building
- Railway line & station
- Streams above ground
- Streams underground

Plan of Gordon Limestone compiled from field mapping.  
Other rock units drawn from Middlesex 1 mile to inch  
Geological map, Geological Survey of Tasmania, 1958



75-1087 MAP 4 SHEET 1

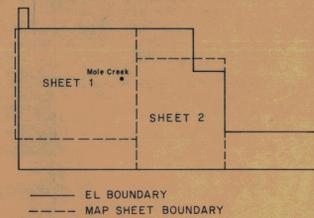
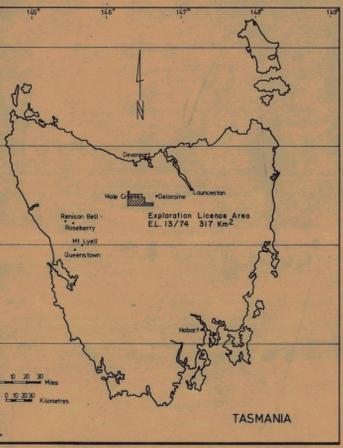
532046 **CYGNATREX PTY. LTD.**

**TASMANIA GOLD**

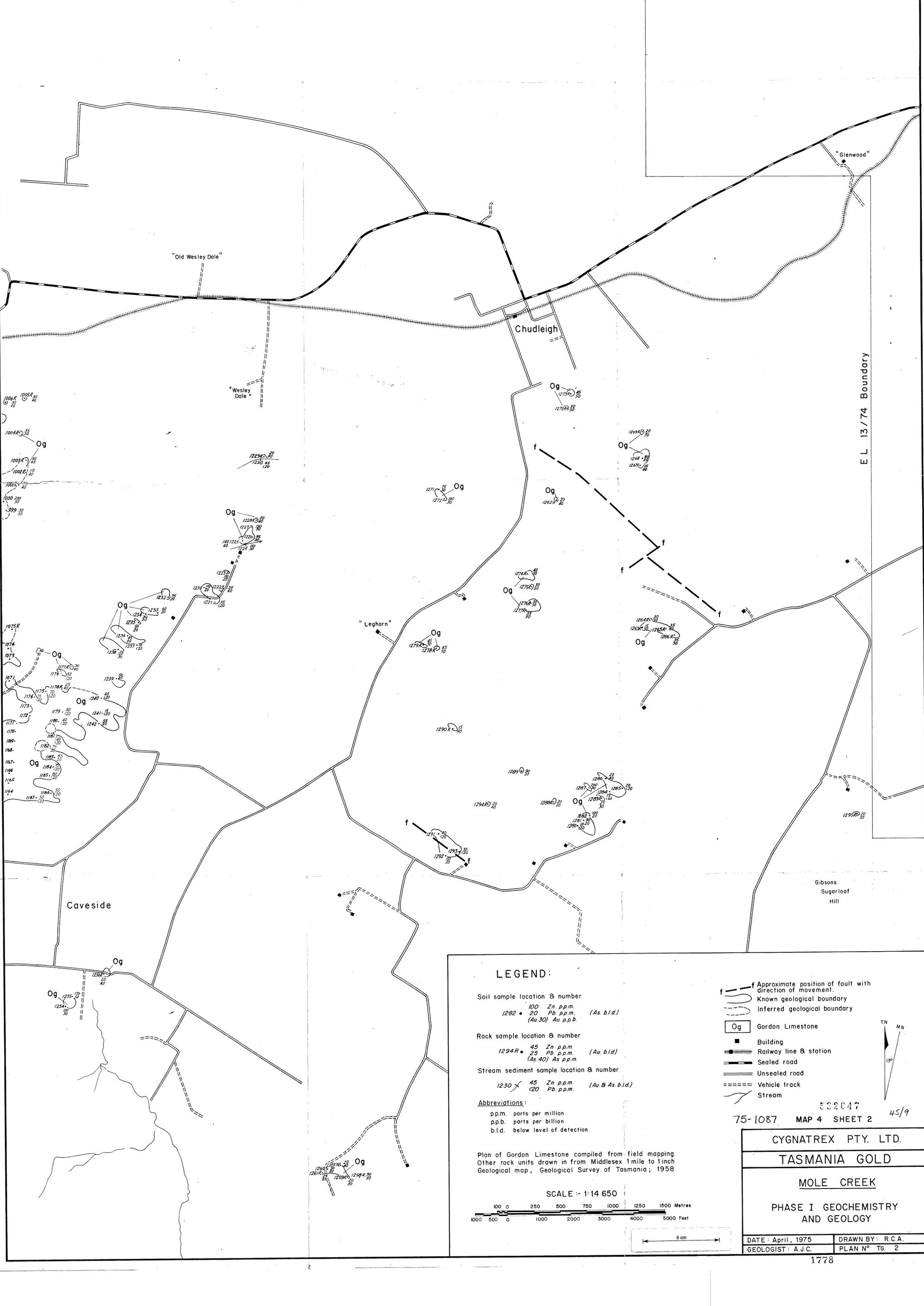
**MOLE CREEK**

**PHASE I GEOCHEMISTRY AND GEOLOGY**

DATE: April, 1975 DRAWN BY: S.H. R.C.A.  
GEOLOGIST: A.J.C. PLAN N° Tg. 1



1777



**LEGEND:**

- Soil sample location & number  
 100 Zn p.p.m.  
 1282 • 20 Pb p.p.m. (As. b.i.d.)  
 (Au.30) Au p.p.b.
- Rock sample location & number  
 1294R • 45 Zn p.p.m. (Au. b.i.d.)  
 25 Pb p.p.m.  
 (As.40) As p.p.m.
- Stream sediment sample location & number  
 1230 / 45 Zn p.p.m. (Au & As. b.i.d.)  
 20 Pb p.p.m.
- Abbreviations:**  
 p.p.m. parts per million  
 p.p.b. parts per billion  
 b.i.d. below level of detection

- f - Approximate position of fault with direction of movement.  
 — Known geological boundary  
 - - - Inferred geological boundary
- Og Gordon Limestone
- Building  
 — Railway line & station  
 = Sealed road  
 — Unsealed road  
 = Vehicle track  
 ~ Stream

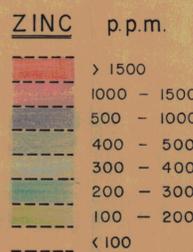
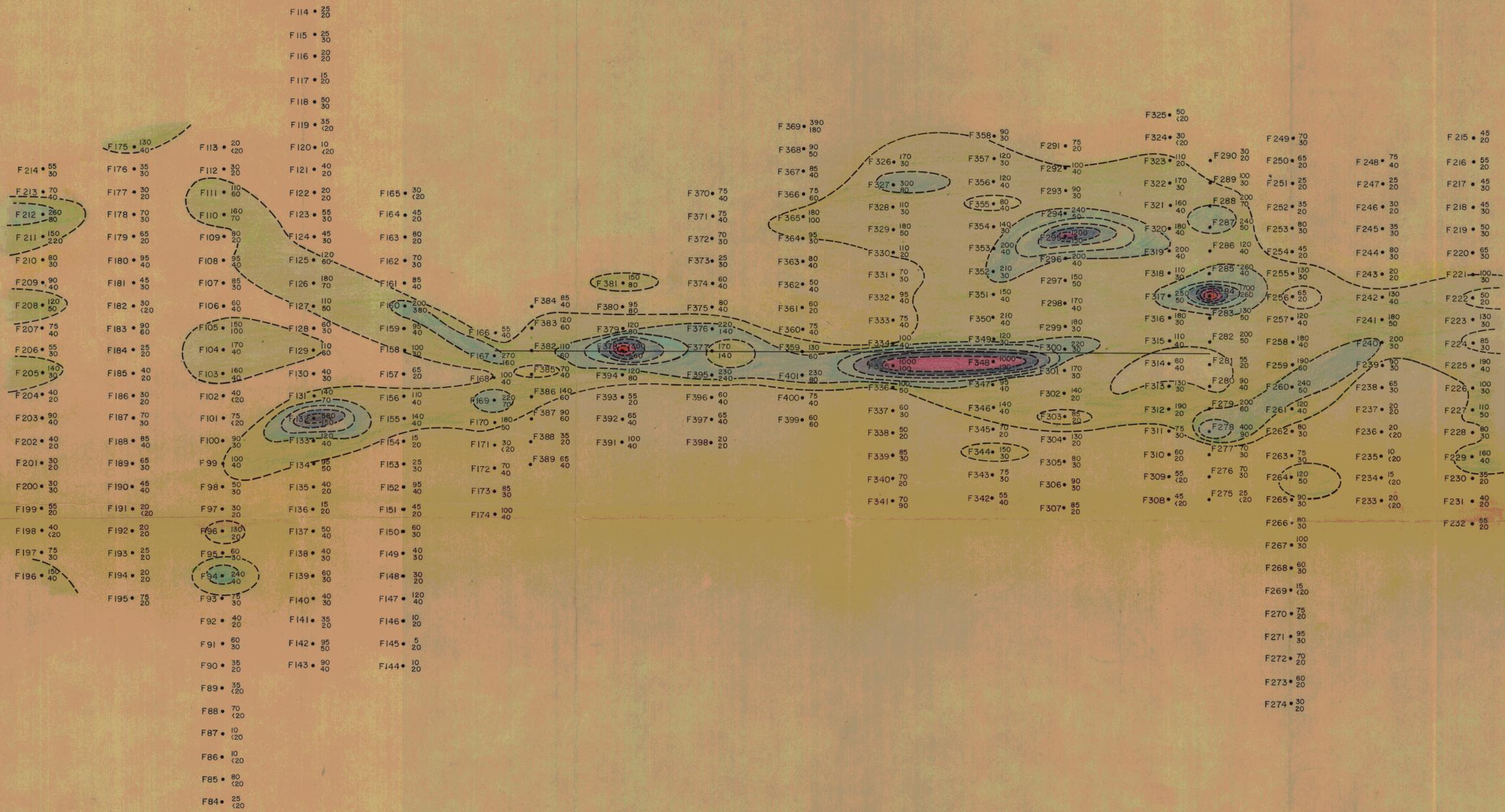
Plan of Gordon Limestone compiled from field mapping.  
 Other rock units drawn in from Middlesex 1 mile to 1 inch Geological map, Geological Survey of Tasmania, 1958

SCALE :: 1:14 650

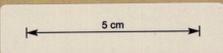


75-1087 MAP 4 SHEET 2 45/9

CYGNATREX PTY. LTD.	
TASMANIA GOLD	
MOLE CREEK	
PHASE I GEOCHEMISTRY AND GEOLOGY	
DATE: April, 1975	DRAWN BY: R.C.A.
GEOLOGIST: A.J.C.	PLAN N° TG. 2



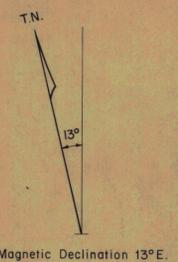
F 345    Sample location and number  
 49        Zinc value in p.p.m.  
 10        Lead value in p.p.m.



SCALE: 1:2 500



Idealized plan of follow-up soil geochemistry  
 All values in parts per million. Analyses by  
 A.A.S. following HClO<sub>4</sub> leach of -80 mesh  
 fraction.

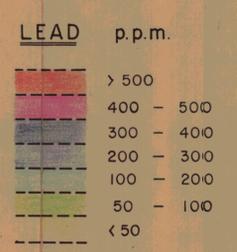
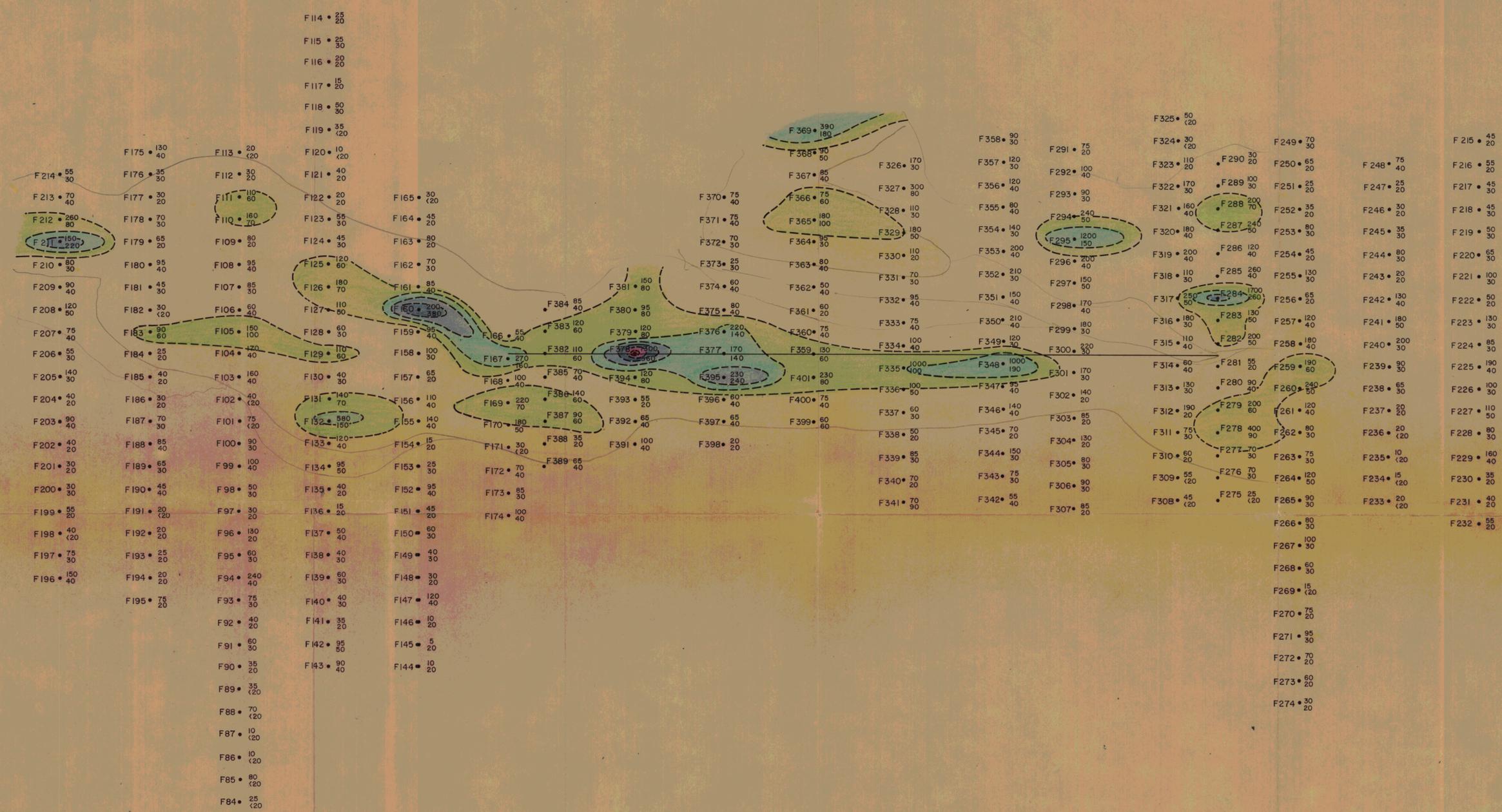


Magnetic Declination 13°E.

532048

75-1087 PLAN 1 SHEET 1 45/9

CYGNATREX PTY. LTD.	
TASMANIA GOLD	
MOLE CREEK	
MAYBERRY	
PHASE II SOIL GEOCHEMISTRY	
ZINC	
DATE: March, 1975	DRAWN BY: R.C.A.
GEOLOGIST: A.J.C.	PLAN N° T6.3

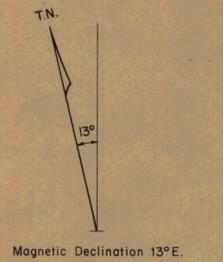
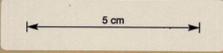


F 345 Sample location and number  
 49 Zinc value in p.p.m.  
 10 Lead value in p.p.m.

SCALE : 1:2 500



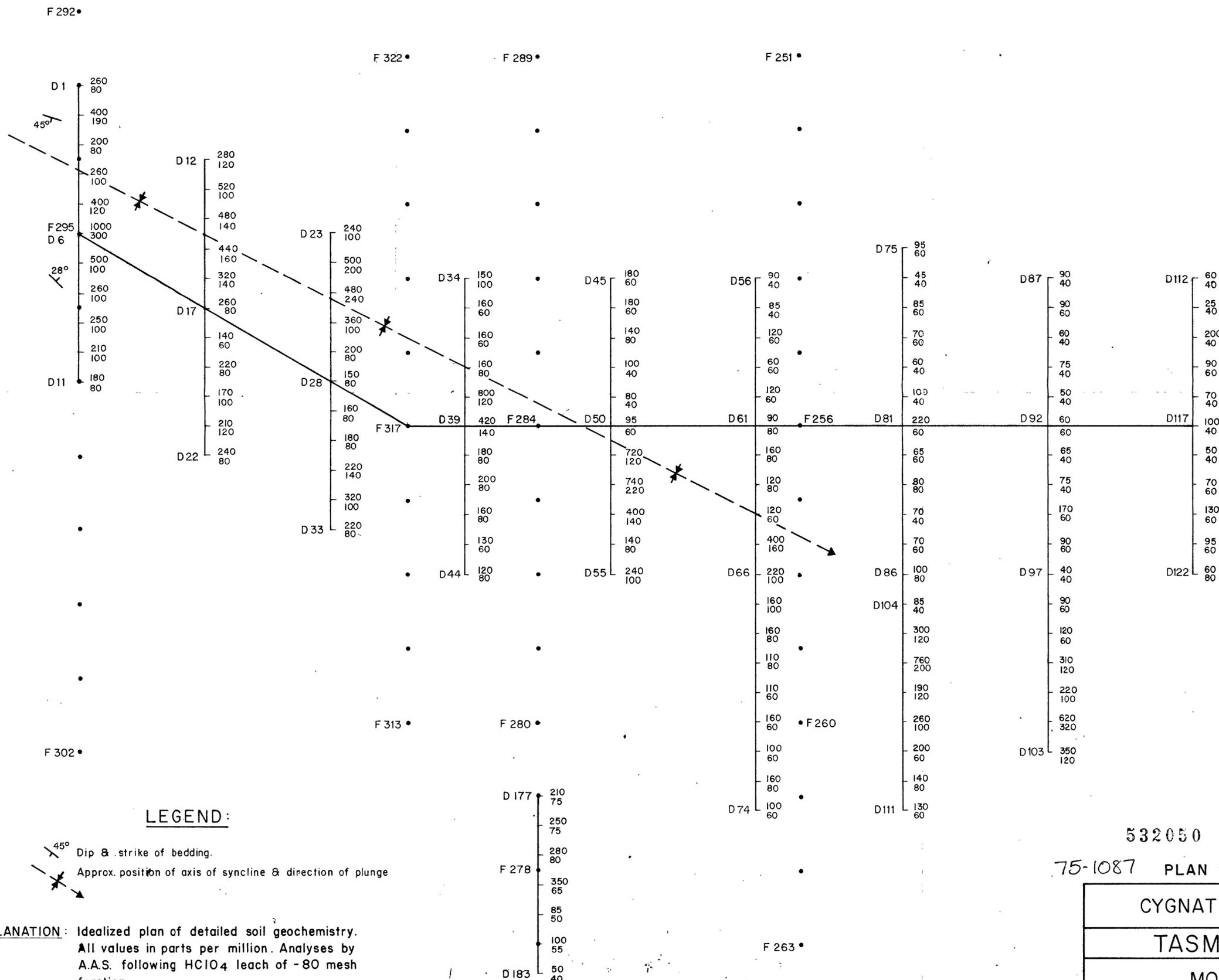
Idealized plan of follow-up soil geochemistry  
 All values in parts per million. Analyses by  
 A.A.S. following HClO<sub>4</sub> leach of -80 mesh  
 fraction.



532049 45/9  
 75-1087 PLAN 1 SHEET 2

CYGNATREX PTY. LTD.  
 TASMANIA GOLD  
 MOLE CREEK  
 MAYBERRY  
 PHASE II SOIL GEOCHEMISTRY  
 LEAD

DATE: March, 1975 DRAWN BY: R.C.A.  
 GEOLOGIST: A. J. C. PLAN N° TG. 4  
 1780

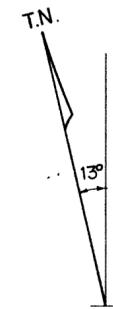
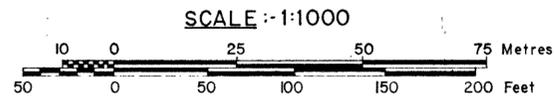


**LEGEND:**

- 45° Dip & strike of bedding.
- Approx. position of axis of syncline & direction of plunge

**EXPLANATION:** Idealized plan of detailed soil geochemistry. All values in parts per million. Analyses by A.A.S. following HClO<sub>4</sub> leach of -80 mesh fraction.

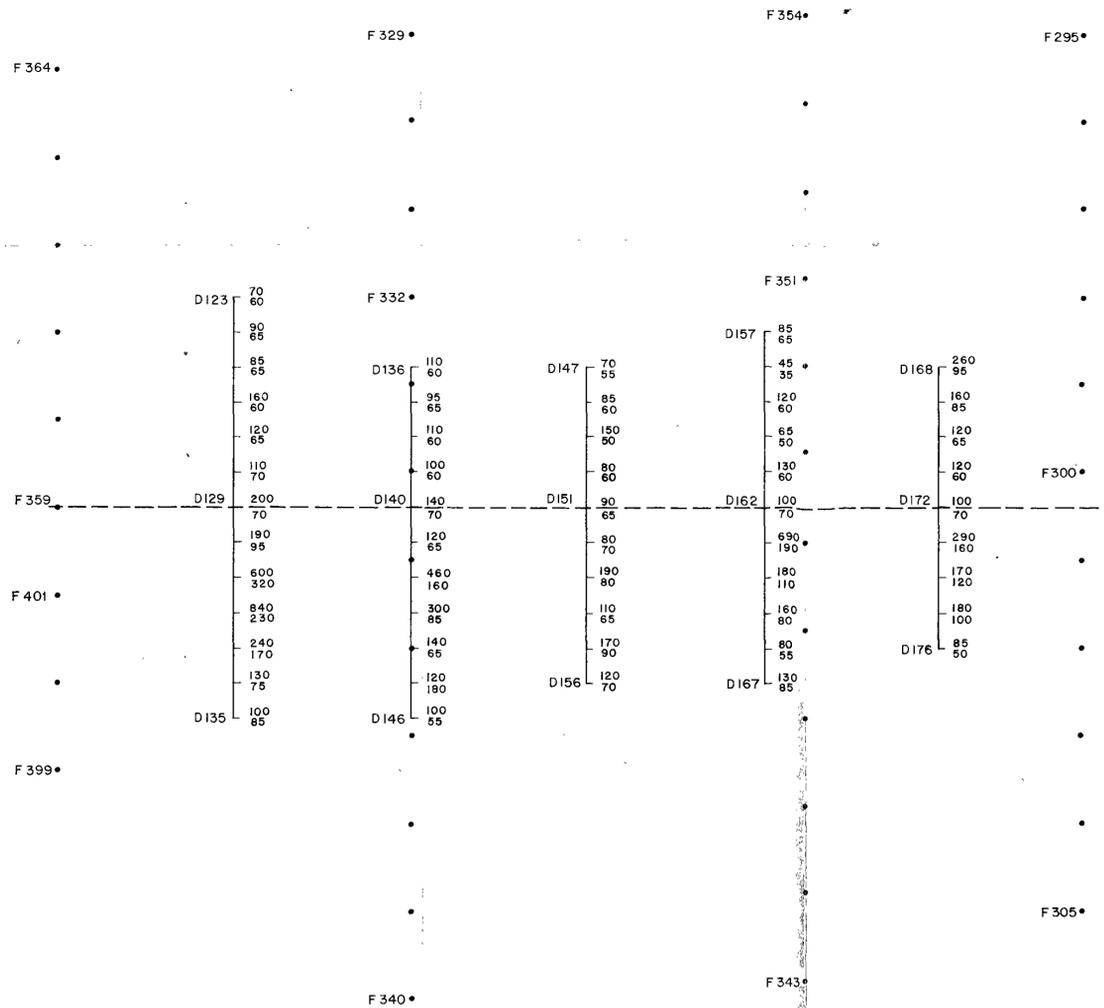
D 17	210 80 80	Pb	PHASE III	Sample location number and values in p.p.m
F 295	1000 300		PHASE II	Sample location number
D 18	300 75			



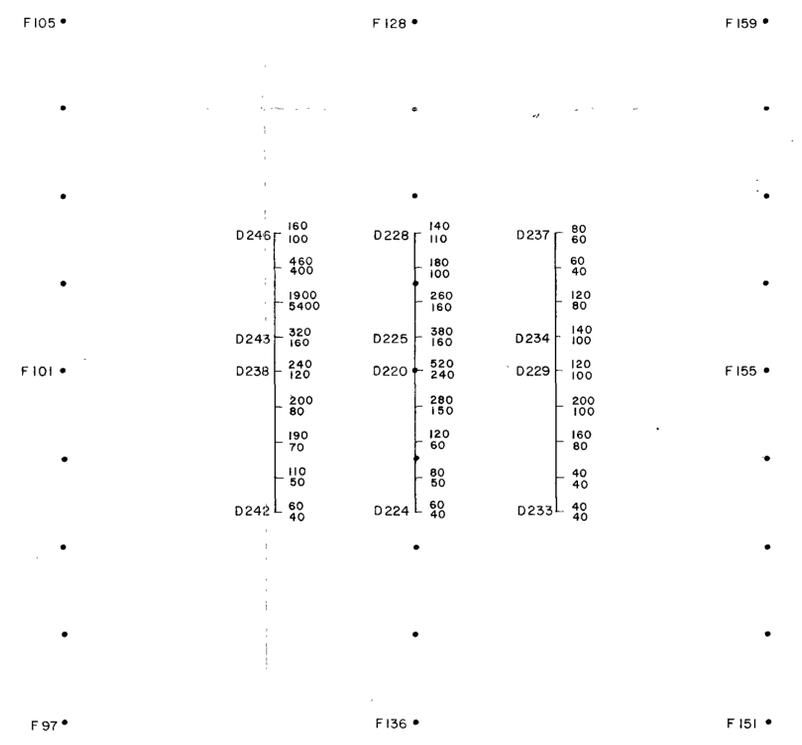
532050 Magnetic Declination 13° E.

75-1087 PLAN 2 SHEET 1 45/9

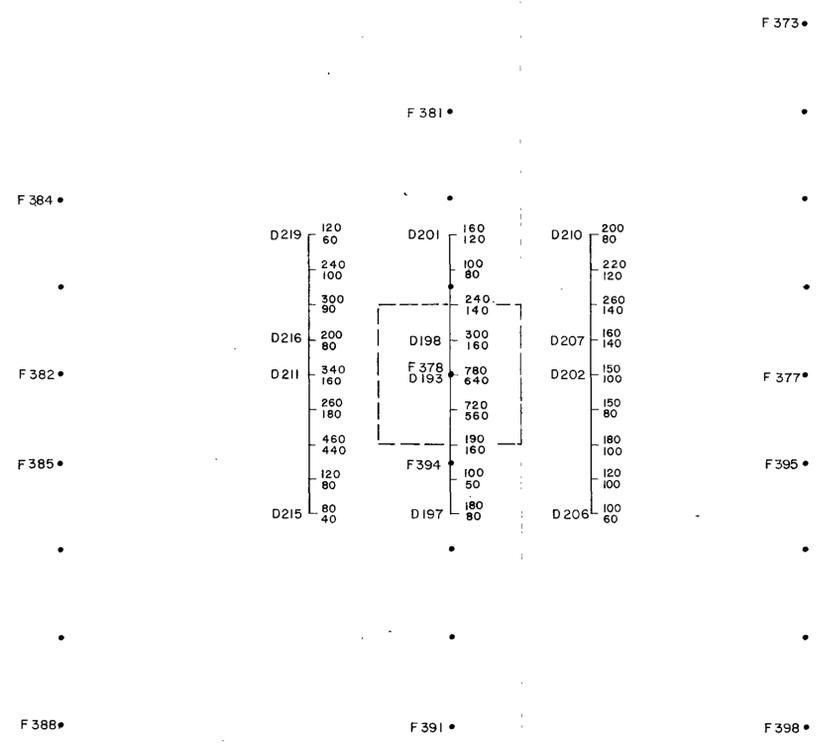
CYGNATREX PTY. LTD.	
TASMANIA GOLD	
MOLE CREEK MAYBERRY	
PHASE III SOIL GEOCHEMISTRY LEAD / ZINC	
DATE: March, 1975	DRAWN BY: R.C.A.
GEOLOGIST: A.J.C.	PLAN N°: Tg. 5



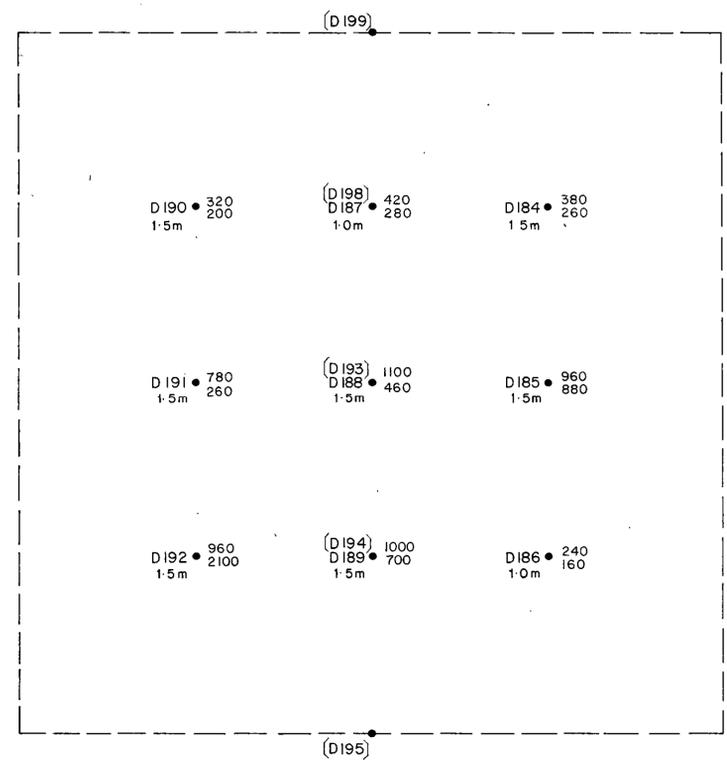
SCALE :- 1:1000 Fig. 1



SCALE :- 1:1000 Fig. 2



SCALE :- 1:1000 Fig. 3a

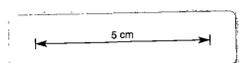


SCALE :- 1:200 Fig. 3b

**EXPLANATION**

Figs. 1, 2, 3a.  
 PHASE III soil sample location D 224 | 100 Zinc in ppm  
 80 Lead in ppm.  
 PHASE II soil sample location F 105

Fig. 3b  
 PHASE III soil sample number (D193)  
 Soil auger sample number D188 | 1100 Zinc in ppm  
 460 Lead in ppm.  
 Depth of sample in metres 1.5m

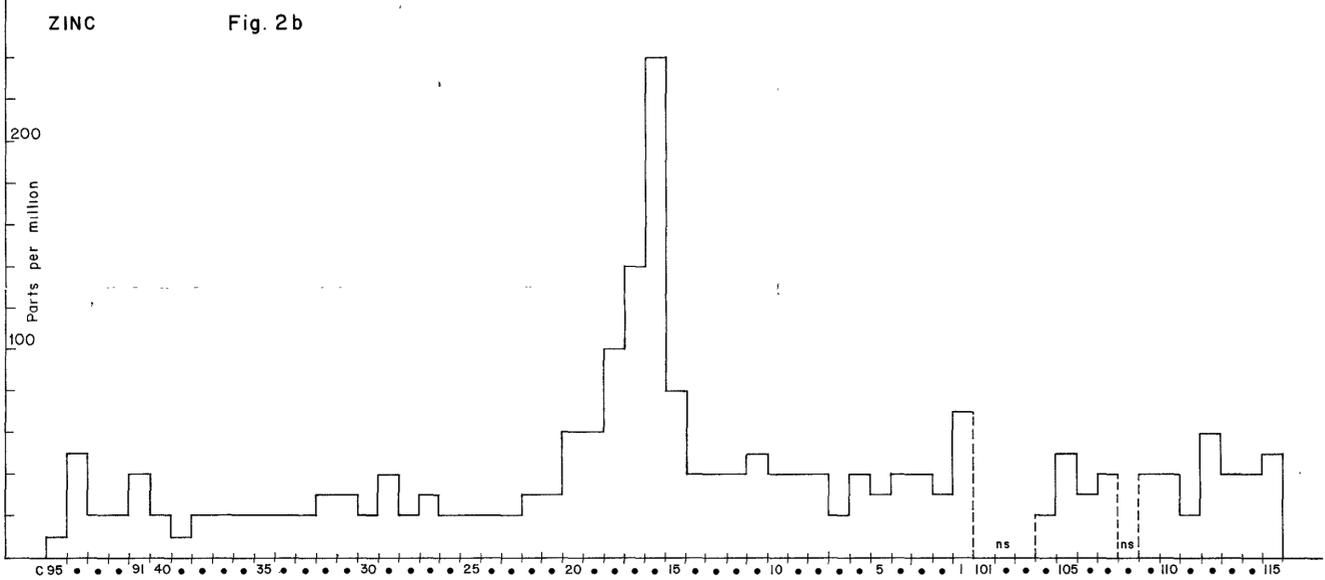
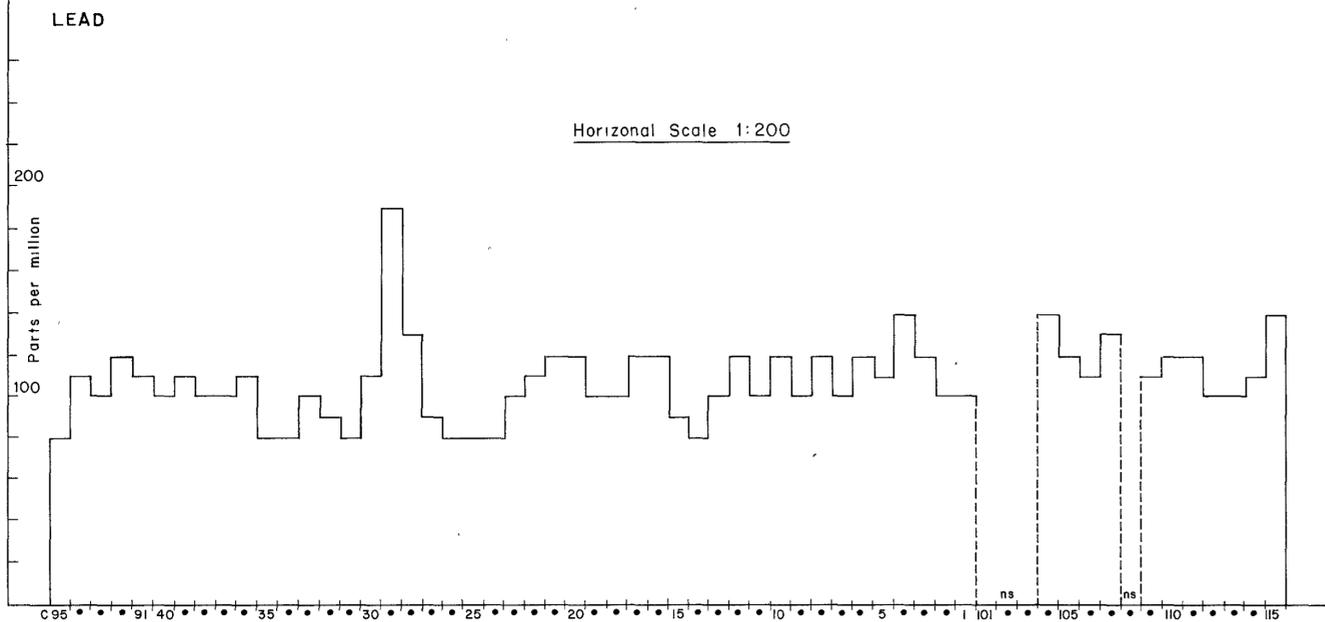


532051 p.p.m. parts per million

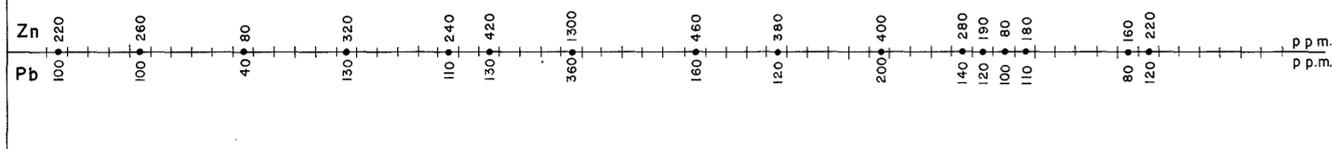
75-1087 PLAN 2 SHEET 2 45/9

CYGNATREX PTY. LTD.	
TASMANIA GOLD	
MOLE CREEK MAYBERRY	
PHASE III SOIL GEOCHEMISTRY LEAD & ZINC	
DATE: March, 1975	DRAWN BY: R.C.A.
GEOLOGIST: A.J.C.	PLAN N° Tg. 6

BEDROCK GEOCHEMISTRY Fig. 2a



SOIL GEOCHEMISTRY Fig. 3



GEOLOGY Fig. 4

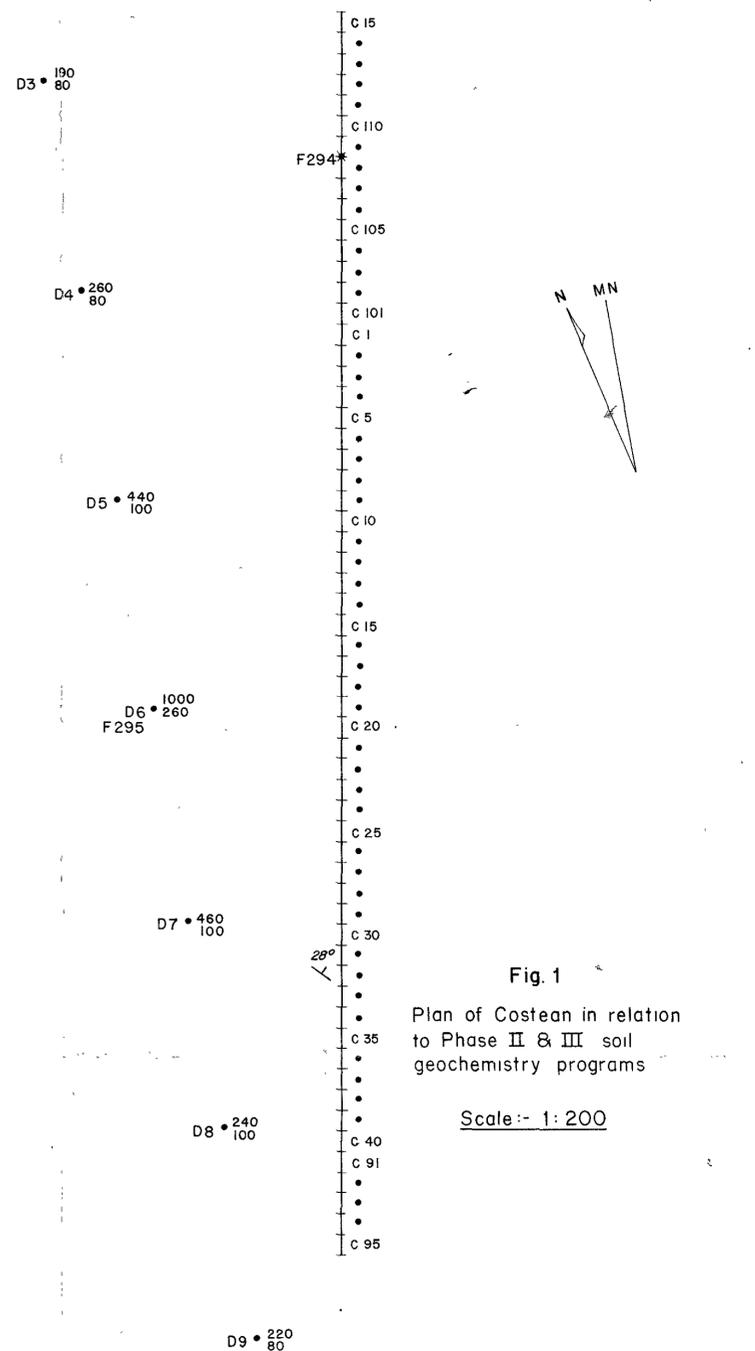
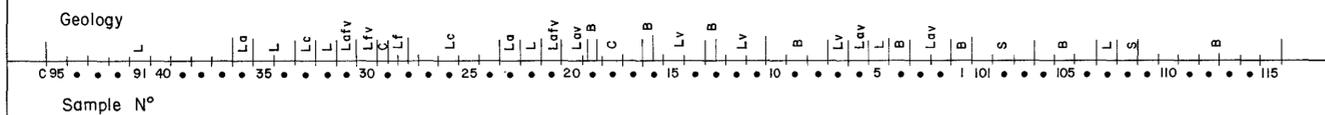


Fig. 1  
Plan of Costean in relation  
to Phase II & III soil  
geochemistry programs

Scale:- 1:200

EXPLANATION:

- B Brecciated limestone
- C Calcite
- L Limestone
- S Soil
- a Argillaceous
- f Foliated
- l Containing minor limestone
- p Fossiliferous
- q Vein quartz
- v Calcite veins
- F294 \* Phase II soil sample location
- D8 • Phase III soil sample location
- c21 Phase IV sample location
- 28° Dip & strike of bedding
- ns No sample taken
- p.p.m. Parts per million

75-1087 PLAN 3 Sheet 1 45/9

CYGNATREX PTY. LTD.

TASMANIA GOLD

MOLE CREEK

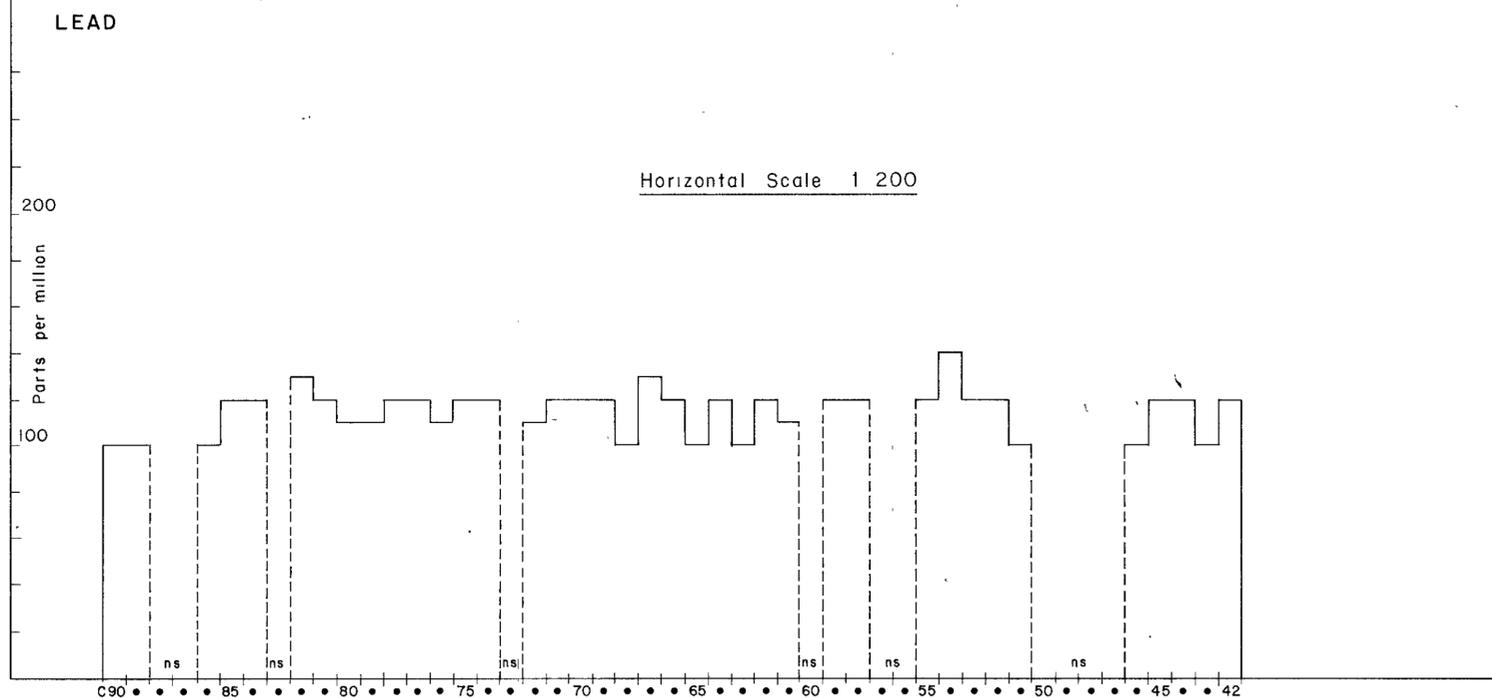
PHASE IV BEDROCK &  
AUGER GEOCHEMISTRY

532052

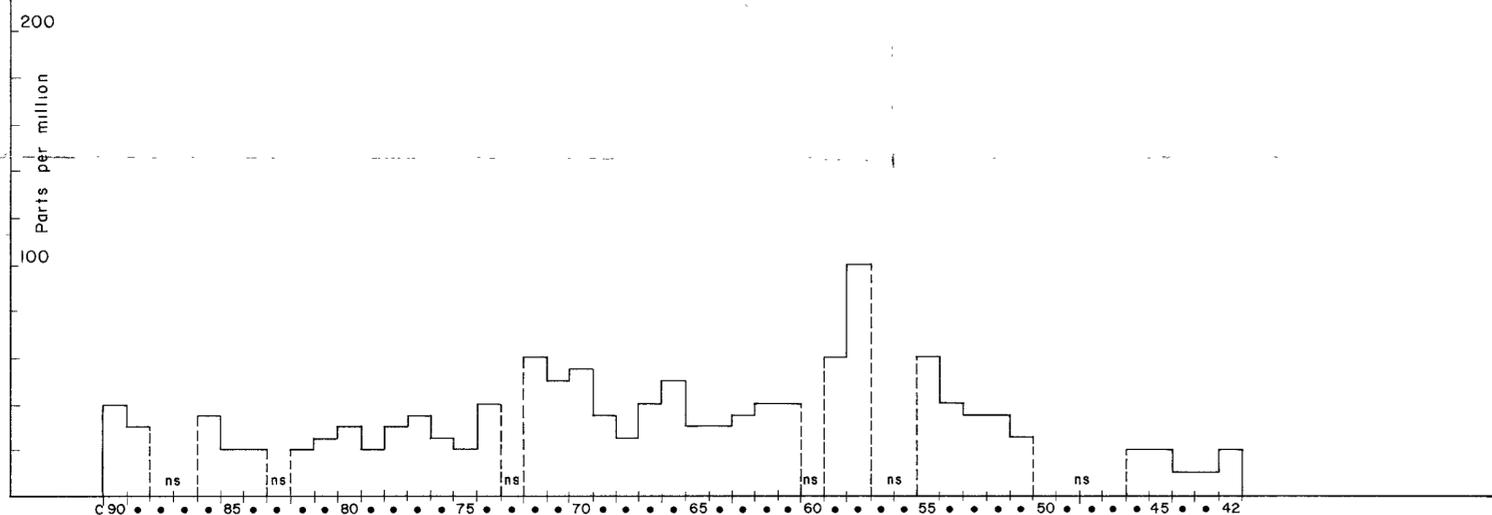
DATE: April, 1975  
GEOLOGIST: A.J.C.

DRAWN BY: R.C.A.  
PLAN N° TG. 7

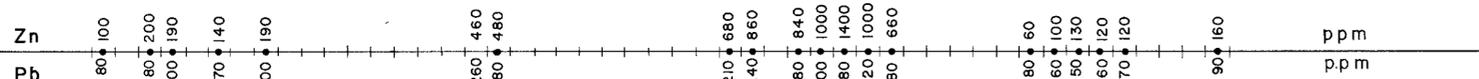
BEDROCK GEOCHEMISTRY Fig 2a



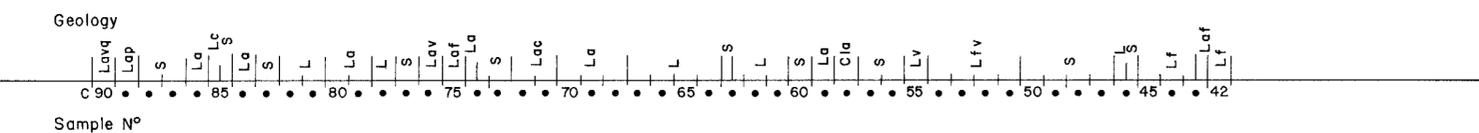
ZINC Fig. 2b



SOIL GEOCHEMISTRY Fig. 3



GEOLOGY Fig. 4



F285\*

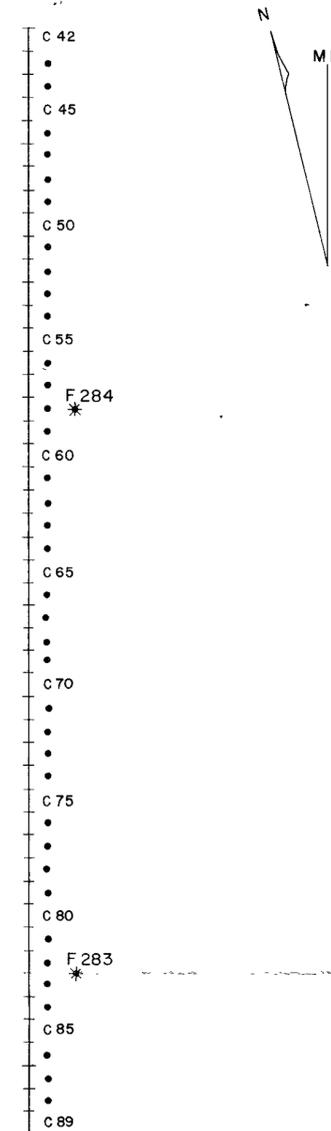
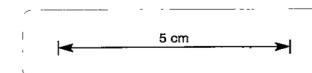


Fig. 1

Plan of Costean in relation to Phase III soil geochemistry program. Scale - 1:200

EXPLANATION:



- B Brecciated limestone
- C Calcite
- L Limestone
- S Soil
- a Argillaceous
- f Foliated
- l Containing minor limestone
- p Fossiliferous
- q Vein quartz
- v Calcite veins
- F284\* Phase II soil sample location
- D6 • Phase III soil sample location
- C28 Phase IV sample location
- 46° Dip & strike of bedding
- ns No sample taken
- pp.m Parts per million

75-1087 PLAN 3 Sheet 2

CYGNATREX PTY. LTD.

TASMANIA GOLD

MOLE CREEK

PHASE IV. BEDROCK & AUGER GEOCHEMISTRY

532053

DATE April, 1975 DRAWN BY R.C.A.  
GEOLOGIST A.J.C. PLAN N° Tg. 8