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THE CONSOLIDATED SYNDICATE

ANNUAL REPORT

ON

MT. TYNDALL AREA - E.L. 9/66

1969 - 70

MICROFILMED

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APPENDED MAPS

1. INTRODUCTION

Following is the annual report on E.L. 9/66, including recommendations for the 1970 - 71 year.

During the year, work was confined to the Red Hills area and the Lake Selina - Lake Dora area. Combined geophysical, geochemical and geological programs were undertaken in both these areas, initially on a reconnaissance basis and in some instances, on a more detailed basis. Many interesting anomalies, both geochemical and geophysical, have been delineated. One of these in the Lake Selina area was drilled (one hole completed, a second in progress).

A two phase exploration program has been designed in detail for the 1970 - 71 year. The first phase will involve expanding the current reconnaissance program northwards to provide a complete coverage of the licence area by the end of the 1970 - 71 year. The second phase will involve conducting detailed surveys over areas of interest outlined in the first phase.

During the 1969 - 70 year, staff was provided jointly by Renison Ltd. and the Mt. Lyell Mining and Railway Co. Ltd. All road construction, track cutting, I.P., and drilling was undertaken by contractors.

A total of $100,930 was expended on the licence area in 1969 - 70, and a budget of $195,000 has been recommended for Consolidated Syndicate work on all exploration areas held during the 1970 - 71 year.

2. ACKNOWLEDGEMENTS

During the year, geologists A. Woodward, N. Williams and K. Wells have submitted detailed reports on certain aspects of exploration on the licence area. These reports have been co-ordinated and in some places ammended, and are presented within this report. Supervision of all field work was undertaken by Messrs. R. Shakesby and K. Reid. All drafting was competantly completed by R. Wilson.

3. LAKE DORA - LAKE SELINA AREA

3.1 Introduction

The area referred to lies in the southern central portion of the exploration lease along the eastern side of the Tyndall Range (See Map 2). The northern portion of the grid area lies in the Anthony Creek valley approximately 1800' above sea level. Lakes Huntley and Rolleston lie at the head of this valley. The southern portion of the grid crosses the relatively flat plateau surrounding Lake Dora (2600'). The highest point in the area is Walford Peak (3300') which is about ¾ miles NW of Lake Dora. The eastern ridge of this peak forms the boundary between the northern and southern sections of the area.

Most of the grid area is covered by button grass together with some eucalypt trees. The only thick rain forrest encountered on the grid is along the steep eastern side of Lake Rolleston on the western ends of Lines 32S to 56S. On the northern end of the grid, near the old Selina workings, it was found that eucalypts always occurred surrounding base rock outcrop, thus enabling most outcrops to be quickly located.

All field personnel operated from the Rolleston Camp (See Map 2). The grid was laid out to enable a reconnaissance geochemical, geophysical and geological coverage to be commenced over the belt of Cambrian volcanics lying on the eastern side of the Tyndall Range, which contain the Lake Dora and Lake Selina mineralised zones.

Several interesting anomalies were defined and detailed work is recommended for each of them.

3.2 Road Construction and Track Cutting

Approximately 7 miles of road were constructed to give access to this area. A 28,800' surveyed base line was laid out along strike from Lake Dora to Anthony Creek. Forty-two (42) traverse lines, totalling 266,000' were laid out 800' apart along this base line.

Field assistants pegged 135,000 ft. of these lines and the remaining 131,000 ft., because of heavy timber, were cut by contract track cutters on a rate of $40/thousand feet. A sub-base line, offset 300'E from the main base line was cut in the northern section of the grid to provide easier access. (All roads and traverse lines are shown on Map 2).

3.3 Geological Mapping

3.3.1 Summary

Geological mapping in the Lake Dora-Selina area shows that the area is underlain by Ordovician conglomerates and sandstones, Cambrian conglomerates and acid volcanic rocks, and Precambrian quartzites, and black schists. A large portion of the area is at present overlain by Pleistocene glacial moraine.

Cu-Pb-Zn mineralisation is restricted to the acid Mt. Read volcanic rocks and is most intense in zones of stronger shearing.

Two geophysically anomalous areas are of particular geological interest. These are (1) the old Selina mines area, which is at present being diamond drilled.

(2) the belt of volcanics along the steep heavily wooded eastern shore of Lake Rolleston.

A long narrow I.P. anomally near the eastern edge of the area is most likely due to black, carbonaceous Precambrian schist. A geological map (Map 4) is appended.

3.3.2 Previous Work

(a) Smith (1898) visited the Dora workings during their period of operation. He discusses the exploration work carried out on the field and describes the mineralisation (together with some assays) found on the various leases.

(b) In May 1938 the Mt. Lyell Mining and Railway Co. sampled the old Dora workings - 22 samples were taken; the highest assayed 1.8% Cu, but most were in the range of 0.1% - 0.3% Cu and the average value of the samples was 0.24% Cu.

(c) In February 1939 the Tasmanian Mines Department (Blake and Henderson 1939) wrote a brief report on the Lake Dora copper deposits. In this report it was concluded that the old Dora workings were valueless under the prevailing economic conditions.

(d) Bradley (1954) refers briefly to the Lake Dora area. He uses the Dora area as the type locality for the Dora Conglomerate.

(e) Bradley (1956) briefly discusses the structure and mineralisation of the Dora area. He remarks on the similarity of the mineralisation of the Red Hills and Dora areas. He suggests that the Cambrian rocks of the Dora area form part of the western limb of an overturned anticlinal structure.

(f) During the summer of 1958 Rio Tinto carried out some work over the old Dora workings. A Turam anomaly was located to the west of the old workings, just south of Walford Peak.

(g) Campana et al. (1958) discuss the Dora region, mentioning that it probably forms part of the eastern edge of the Owen Rift Valley.

(h) Solomon (1964) makes several references to the Dora - Rolleston area. He describes a quartz-keratophyre from the Dora region, and discusses the possible age of a sandstone-shale sequence to the north of Lake Dora. He, like Bradley (1956) concludes that the Cambrian rocks have been folded into an anticline.

3.3.3 Geology

The gridded Dora-Selina area lies on the eastern edge of the Owen Rift Valley as defined by Campana et al. (1958). To the West, the Ordovician Owen Conglomerate crops out as the Tyndall Range. The grid itself covers the Cambrian, Mt. Read Volcanics and associated sedimentary rocks, while to the East, Precambrian quartzites occur as the Sticht Range.

According to Campana et al. the Cambrian volcanics of the grid area form a zone of brecciation and imbricated structures ".. on the eastern edge of the fossil graben. This zone is of the order of ½ mile in width, and the steep and narrow synclinal wedges of Owen Conglomerate, pinched and squeezed between the massive pyroclastics formations, stand out in striking contrast with the partly folded or sub horizontal structures of the Conglomerate westerly of this zone".

Mapping was restricted mainly to the geophysical grid. Those outcrops examined away from lines were located by taking bearings to at least two grid pegs.

A representative suite of samples was collected from the area, and the rocks are housed in the new microscope room, Mt. Lyell Mining and Railway Co., Queenstown.

A selected set of rocks was forwarded to H.W. Fander of Central Mineralogical Services, Norwood, South Australia, for petrological description. Some thin sections were prepared at Mt. Lyell. Several significant descriptions are appended to this report. (Appendix 3).

Rock Units

The following rock types were recognised in the mapped area:

(a) Quaternary-glacial cover.

(b) Ordovician-Owen Conglomerate.

(c) Cambro-Ordovician (?) - Jukes Breccia.

(d) Cambrian - Dora Conglomerate.

- Mt. Read Volcanics.

(e) Indefinite age (Cambrian or Ordovician) - Shales and Sandstones.

(f) Precambrian - Quartzites.

- Black Schists.

(a) Quaternary glacial cover, consisting mainly of Owen Conglomerate boulders, covers a large portion of the grid area. The Rolleston valley, from lines 48S to 80N is almost entirely covered by moraine. Only around the old Selina workings, from lines 32N to 80N are occassional bedrock outcrops seen.

A smaller area of moraine is found on the western extremities of lines 104S to 144S.

Electrical soundings by C.G.G. suggest that the moraine cover is up to 440' thick in some places.

(b) Ordovician Owen Conglomerate occurs (i) on Walford Peak. There the conglomerate dips westwards. At the southern end of the peak dips are in the order of 50° and these increase northwards to 90° near Lake Rolleston. The eastern margin of the conglomerate is cut by numerous quartz veins, suggesting that this boundary has been faulted.

(ii) as a NW-SE trending ridge 1000' east of Walford Peak. This ridge is the nose of a tight NW plunging syncline. The western margin of this syncline is strongly faulted.

(iii) as an isolated outcrop about 400' west of the old Selina workings. Here the Owen is dipping steeply to the west.

(iv) a long belt (2 miles x ¼ mile) of what appears to be Owen Conglomerate lies along the eastern boundary of the grid area between the Mt. Read Volcanics and the Precambrian quartzites of the Sticht Range. This conglomerate is strongly sheared in places and is frequently cut by quartz veins, suggesting that the block of conglomerate was faulted into its present position. At the ends of lines 32S-48S the conglomerate dips 50 - 60° east.

(c) Cambro-Oriovician (?) Jukes Breccia lies immediately beneath the Owen Conglomerate. It is a thin (about 50') conglomerate-breccia and has a characteristic red-purple colour due to hematite staining. At all locations where the base of the Owen if well exposed, the Jukes is seen. This suggests that it underlies all the Owen in the area. The boundary appears to be conformable. Cobbles of both Precambrian quartzite and Cambrian volcanic rock occur in the breccia. The Jukes contains less quartz pebbles than the overlying Owen, but more than the underlying Dora Conglomerate.

(d) Cambrian Dora Conglomerate occurs on both the eastern and western sides of Lake Dora. It appears to lie conformably below the Juke Breccia. The rock type was first described by Bradley (1954) who defined it as follows:-

> ".... the Dora Conglomerate is widely exposed in glaciated surfaces of the type area around the shores of Lake Dora and for half a mile to the east and west of the lake. The formation is of Upper Cambrian age and lies conformably below the Jukes Breccia, but this conformity is expected to pass into unconformity in places. The formation is inferred to be unconformable on Middle Cambrian and Precambrian strata. The formation is

characteristically an ill sorted greywacke conglomerate with much fine matrix. Pebbles, which vary in size from one to six inches, are rounded and, though tabula or elongate, are not angular. The top of the formation is normally marked by a clear break from, or rapid transition into the Jukes Breccia. The base of the formation is not definable owing to metamorphic transition. The full thickness of the formation may be very great and at Lake Dora it is probably between 2,000' and 3,000' thick".

The Dora Conglomerate was distinguished from the Jukes Breccia by the lack of hematite staining in the Dora, and by the greater abundance of quartz pebbles in the Jukes, as compared with the Dora. The strikes of the Dora Conglomerate are approximately N-S and dips appear constant at about 60°W. It is possible that the Dora Conglomerate and Jukes Breccia are members of the same formation.

(e) The Mt. Read Volcanics are found

(1) in the area immediately east of Walford Peak,

(2) surrounding the old Lake Selina workings.

The volcanic sequence consists of extrusive quartz, quartz-felspar and quartz-felspar-hornblende porphyries. Thin sections showed the rocks to be acid volcanics, mainly rhyolites and dacites, and they are thus similar to the acid volcanic suite of rocks from Red Hills described elsewhere in this report by Bradfield and Fander.

In places the porphyries have a fragmental texture and have suffered varying degrees of shearing.

Shearing is strongest in a 320° - 340° trending zone passing west of Lake Dora, parallel to Walford Peak and down into Lake Rolleston between the two Owen Conglomerate ridges.

Where shearing has been intense, the rocks have been altered to quartz-chlorite schists. An attempt to map individual rock units was unsuccessful because of the scale of mapping, and the wide variation and gradation of rock types.

Only one volcanic rock type could be readily distinguished from the schists during mapping, this being a very massive quartz-hornblende-feldspar porphyry. In thin section it was found to be identical to a quartz-keratophyre as defined by Solomon (1964). Weathered surfaces of this quartz-keratophyre had a characteristic reddish brown colour, easily recognisable in the field.

Throughout the volcanic sequence, small lenses of Dora type conglomerate and greywacke occur. Solomon (1964) used these interbedded sediments as evidence of the depositional environment of the volcanics as being "non-terrestrial and in part (probably entirely) marine".

Dips were difficult to determine in the volcanics, but could be measured where thin lenses of sediments occurred.

Strikes of the volcanics were roughly N-S with steep westerly dips.

(f) Shales and sandstones of indefinite age crop out to the east of Walford Peak and Lake Rolleston. The sediments, fine micaceous sandstones, micaceous shales and a thin bed of dolomite form a N-S striking belt. Dips are uniform and range from 50° to 70° west.

Along the eastern margin of the sediments, near the Precambrian quartzites, thin conglomerate beds occur, similar to the Owen Conglomerate. In places the sediments are highly contorted, possibly due to slumping.

Campana et al. (1958) assigned an Ordovician age to the sediments while Solomon (1964) regards their age as Cambrian, because the sediments occur "towards the base of the volcanics, and their westerly dip and the presence of dolomite suggests a possible correlation with the sandstone-dolomite succession on the west side of the volcanic arc".

The Ordovician age for the rocks is suggested by the Owen like conglomerate beds at the base of the sequence, and the apparent lateral change (facies change?) from sandstone-shale-dolomite to Owen conglomerate going north along the western margin of the Sticht Range. Similar contorted micaceous sandstones and shales occur at the base of the Tyndall Range near Newton Creek. These sediments are interbedded with Owen and are without doubt Ordovician. On the basis of similarity of rock type, this also suggests that the sediments are Ordovician.

From the above evidence the author is of the opinion that the sediments are most likely Ordovician. A careful examination of the dolomite beds for fossils would help resolve the question of age.

(g) Precambrian Quartzites crop out along the eastern margin of the area. These quartzites are highly deformed and have been faulted against the Cambrian and Ordovician rocks.

Immediately to the NE of Lake Dora, a solitary outcrop of a black highly deformed schist occurs. A thin section of this rock showed it to be a quartz-chlorite-sericite schist with abundent carbonaceous material. At least three schistosity surfaces could be recognised in this schist. As only the Precambrian rocks of the area have suffered at least three deformation periods, the age of these black schists is taken to be Precambrain.

3.3.4 Structures

(a) F Folding. Folds (with approximate N-S trending axes) are easily discerned in the Owen Conglomerate. This however is not the case with the underlying volcanics. The volcanics all dip steeply westwards. The occurrence of Dora Conglomerate on either side of the southern position of the grid area suggests that the Cambrian sequence is folded.

As the Dora Conglomerate contains fragments of the Mt. Read Volcanics it is assumed that it is younger than the volcanics. Thus the Cambrian would have to be anticlinally folded to produce the observed outcrop pattern. The dips of beds show a progressive flattening to the east (from 80° to about 50°) and Bradley (1956) used this as evidence for the anticline being overturned to the east.

(b) Faulting. The only major fault in the area is one trending at 320°. This fault runs from the northern end of Lake Dora, along the western edge of the small syncline of Owen Conglomerate and into Lake Rolleston. The fault has laterally displaced the Dora Conglomerate north of Lake Dora some 2,500' to the NW. There must have been vertical movement of the fault, bringing Owen Conglomerate on the eastern side of the fault down against Cambrian volcanics on the western side.

Geophysical discontinuities tend to suggest that there are several strong E-W trending faults in the area. This can only be confirmed by more detailed ground work.

(c) Shearing. Shearing of the Mt. Read Volcanics has been discussed above. The shear planes appear to be parallel to the fold axes of the area.

3.3.5 Mineralisation

All the mineralisation of the area is restricted to the volcanic rocks, and appears to be most intense in the areas of strongest shearing.

Disseminated and veinlet pyrite is widespread. Chalcopyrite, galena and sphalerite are less abundant but have a similar mode of occurrence.

Non-economic hematite and magnetite mineralisation, usually as small concordant lenses, often occurs in the schists (see Geological Map 4). These two iron minerals generally accompany base metal mineralisation in this area.

There are two former mining districts within the gridded area, called here: (i) The Selina Workings,
and (ii) The Lake Dora Workings.

(i) The Selina Workings: There are very few records of these workings, and it must therefore be assumed that they were of little economic value. The workings lie on the East side of Anthony Creek, about ¾ mile North of Lake Rolleston. They are shown on the geological map scattered between traverse lines 48N and 80N.

The main workings consist of three short adits, several pits and trenches. Scattered disseminated pyrite and chalcopyrite occurred in quartz-chloritic and chloritic schists in these workings. Pink felspar is common in the mineralised zones.

(ii) Lake Dora Workings: The Lake Dora workings are shown on the Geological map scattered between traverse lines 72S and 136S.

Mineralisation was first discovered here in 1891 and prospecting was vigorous during the "copper boom" of the 1890's. However there was insufficient ore found to maintain mining activity for long and the field was abandoned in 1908. The Mt. Lyell Mining and Railway Co. Ltd. sampled the workings in 1938, the 22 samples taken averaging 0.24% Cu. Government geologists reported on the area in 1939. Rio Tinto Australian Exploration Pty. Ltd. conducted geological, geochemical and geophysical surveys in the area in 1957-58. The workings occur on a plateau approximately 2,500' above sea level.

Mineralisation is confined to sheared volcanics, now outcropping as quartz-chloritic and chloritic schists. The main mineralised zone extends from the south-west end of Lake Dora to the north-east corner of Lake Rolleston and its limits are probably governed by shear zones.

Mineralisation is rarely seen on the surface. The oxidation zone is very shallow (about 2'). Regionally the schists dip steeply west. The mineralisation occurs either as small veinlets and blebs on foliation planes or disseminated through the schists.

Pyrite is the most abundant sulphide present, with which chalcopyrite is closely associated in smaller quantities. The secondary copper minerals covellite and malachite are present at times. Magnetite and hematite are widely associated with the sulphides in a fine grained form. Galena and sphalerite occur in minor amounts.

The more promising mineralised zones were worked by trenches, shafts and adits. Several workings of considerable interest in the Lake Rolleston area are not shown on the geological map because they have not yet been located on the ground. They are in the vicinity of lines 56S and 64S, and may be associated with an I.P. anomaly to be discussed subsequently. These workings were described in the old reports as:

> "... In the northern part of the section a few shallow trenches have been cut, in which a little pyrite is seen disseminated through the schists, and in one trench several small veins of gossan were cut, with bunches of quartz carrying a little galena. The ground slopes steeply to the west, and 80' below this trench a tunnel was started a little N of E, but was discontinued after driving about 10' through schists carrying a little pyrites and galena". (Rept. Sec. of Mines - 1897-8).

Geological, geochemical and geophysical studies have shown this area to be one of considerable interest.

3.4 Geophysical Coverage

A geophysical coverage consisting of ground magnetometry, induced polarization, resistivity and self-potential surveys was conducted on traverse lines 144S to 88N during the year. Significantly anomalous zones are shown on the accompanying Map 6.

The magnetometry survey was conducted by geologists and field assistants using a McPhar M700 instrument. Results were corrected for daily drift and plotted in detail on plans (1" = 500') and profiles (1" = 200') but are not included on a separate map in this report.

A combined I.P., S.P., and resistivity survey was conducted by Compagnie Generale de Geophysique of Brisbane over the gridded area, between November 1969, and February 1970. C.G.G. also interpretted the magnetometry results.

Several interesting anomalous zones have been outlined and warrant further testing.

3.4.1 I.P., S.P., Resistivity and Magnetometry Surveys

Note: This section of the report is a partial reproduction of the geophysical report submitted by G. Omnes of C.G.G. No additions have been made by the author, but several somewhat irrelevent sections have been omitted.

(a) Magnetometry

The general trend of the numerous magnetic anomalies is north-south, parallel to the geological strata, but there are many local variations.

A comparison of an outcrop map, a resistivity map and the isogam map suggest that the anomalies are due to conformable strata and lenses in the Cambrian volcanics. Samples taken on outcrops near Lake Selina and Lake Dora contain pyrrhotite and magnetite.

Three different areas appear on the isogam map:

- a central area where magnetic anomalies are numerous. Amplitudes are sometimes larger than 2000 gammas, (Profile 72N). The magnetic bodies are outcropping except where the moraine is several tens of feet thick.
- an eastern area where magnetic profiles are flat and smooth.
- an area similar to the eastern area exists in the southwestern corner (Profiles 110S to 144S).

The limits of the three above areas probably correspond to geological limits, for example, limits between volcanics and schists.

Three main transverse faults intersect the area:

- F1 between Profile 8S and Profile 16S is at right angles with the strata.
- F2 runs from Profile 48S to Profile 96S and makes a small angle (0^{o} to 30^{o}) with the magnetic strata.

- F3 from 96S to 136S is approximately parallel with F2. F3 intersects the northern compartment strata and is parallel to the magnetic trends of the southern compartment.

The eastern magnetic marker is folded in the north eastern corner of the area; the two limbs of the fold are at right angles.

The highest concentration of magnetic minerals is located on the western magnetic marker on Profile 72N.

(b) Resistivity

Electrical soundings show that the true resistivity of the unweathered Cambrian volcanics varies between 2000 and 15000 ohm-m.

The true resistivity of the non-magnetic schists is lower, between 1000 and 3000 ohm-m (ES88S-3000E). A conductive formation, perhaps graphitic shales, follows the eastern limit of Cambrian compartment. ES88S-3200E shows that its resistivity is less than 30 ohm-m.

Between Profiles 40N and 24S the eastern half of the area is covered by moraine. ES24N-800W, 8S-450E and 16N-1600W show that the top of the moraine is very resistant, about 8000 ohm-m, the bottom is conductive, about 100 ohm-m. It means that the upper part of the moraine is a mixture of sand, pebbles and boulders with a small percentage of clay and that the bottom is very clayey.

The following interpretation fits with ES24N-800W from top to bottom:

Thickness	Resistivity
13 ft.	1500 ohm-m
26 ft.	8000 ohm-m
170 ft.	100 ohm-m
bedrock	2000 Ohm-m

the total thickness of the moraine would then be 209 feet.

At ES16N-1600W the bedrock may be 440 feet deep, at ES8S-450E it is probably not more than 175 feet deep.

The above figures are deduced from hypothetical values of the true resistivities, the real figures may be different but the discrepancies are likely to be not larger than 20%.

Because of the importance of the moraine covered area, in the northern part of the area from Profile 88N to Profile 48S, a larger pole-dipole array was used.

The main trends of the contoured apparent resistivity maps are parallel to the magnetic and geological trends.

As proved by the gradient array test on Profile 72N the conductive area does not coincide with any part of the magnetic body situated near the base line.

A well defined conductive axis follows the eastern limit of the Cambrian compartment. A steep resistant gradient follows the cliff east from the conductive axis.

A discontinuity of resistivity axes coincides with fault F1 defined by the magnetic interpretation. The F2 and F3 discontinuities are also visible.

The south western conductive area coincides with the non-magnetic formation, it is associated with a strong resistant gradient.

The pattern is thus symmetrical from the eastern limit of the Cambrian compartment.

(c) Induced Polarization

It should be kept in mind that with a pole-dipole array the axis of a polarizable body does not coincide with the axis of the anomaly, moreover an I.P. anomaly has often two axes, one of them being due to the current electrode effect and the other one to the potential electrodes effect. When a double pole-dipole is used as in the Mount Tyndall area, the anomalies cross over the axis of the polarizable body.

The chargeability contours follow the general geological, magnetic and resistivity trends.

Seventeen anomalies appear on the Comprehensive Map. (Map 6).

(i) 5 anomalies are located in resistant areas and associated with magnetic anomalies:

A1: A1 is more than 4,800 feet long. From 88N to 48N it coincides with a magnetic body but there is no proportionality even approximate between the areas of the magnetic and I.P. anomalies.

The old Lake Selina adit is located near Profile 80N in the magnetic and polarizable body. Samples contain disseminated pyrrhotite and crystals of galena in joints.

A2: This anomaly has a much smaller amplitude than A1, it coincides with a magnetic anomaly on Profile 48N. It is a narrow anomaly, the polarizable body is nearly outcropping.

A9: This weak anomaly is 2,400 feet long, the axis of the polarizable body coincides with the axis of a magnetic body. The chargeability anomaly is apparently due to the magnetic minerals.

A10: A10 is similar to A9, it coincides with the same body shifted eastward by fault F1.

A12: A12 is similar to A9 and A10.

Remark: All magnetic bodies do not give rise to I.P. anomalies.

(ii) 5 anomalies and parts of 2 anomalies are located in resistant areas but are not associated with any particular magnetic anomaly.

- the southern end of A1:
- the southern part of A2:

A11: A11 is less than 800 feet long. The polarizable body is buried under about 100 feet of moraine.

A13: A13 is 1,600 feet long, a gradient array resistivity profile (Fig. 6) showed that undoubtly the mineralisation does not give rise to any conductive anomaly.

A14 - A15: A14 and A15 are probably due to the same polarizable body as it would appear from the chargeability maps but correlations do not appear easy from the profiles and perhaps A15 should be considered only as an extension of A14 on Profile 56S.

A14 - A15 are the largest anomalies of Group (ii), but actually it might be better to classify them in Group (iii) because there is a small conductive anomaly east from a strong resistant gradient.

A17: Part of the anomaly is visible on Profile 8N, its amplitude is certainly larger than 20 ms but most of it lies outside the surveyed area.

(iii) 7 anomalies are associated with conductive anomalies and generally S.P. anomalies but they are not associated with any magnetic anomaly.

A3 - A4 - A5 - A6 - A7: This string of anomalies follows the eastern limit of the Cambrian compartment, they are all strong anomalies likely to be due to graphitic shales. Actually graphitic shales have been found near Profile 120S.

A8 - A16: These anomalies are similar to the above group, there is probably a fault between A8 and A16.

(d) Self Potential

All the S.P. anomalies are located on the eastern and western edges of the Cambrian compartment. The largest anomalies appear on the eastern ends of Profiles 72S, 80S and 88S. Their amplitudes vary between -00 and -200 mv.

Their amplitudes are not too large for sulfides but their complex shapes rather suggest the existance of graphitic shales.

(e) Conclusions and Recommendations

Three types of I.P. anomalies have been detected all due to subvertical polarizable bodies:

Type (i): I.P. anomalies located in resistant areas and where the polarizable body coincides with a magnetic body: A1, A2, A9, A10, A12.

Type (ii): I.P. anomalies and part of anomalies located in resistant areas but not associated with any particular magnetic anomaly: southern end of A1, southern part of A2, A11, A13, A14, A15, A17.

Type (iii): I.P. anomalies associated with conductive anomalies and generally S.P. anomalies but not associated with any magnetic anomaly: A3, A4, A5, A6, A7, A8, A16.

The following facts are not encouraging:

- most anomalies are elongated and parallel to the geological and magnetic trends. (However in view of the manner in which Mt. Lyell ore bodies roughly parallel schistosity trends, this fact cannot be regarded as too discouraging - author).
- graphitic shales have been found near Lake Dora on anomaly A6 (type (iii)).
- part of type (i) anomalies are due to pyrrhotite and magnetite in the Cambrian volcanics.

On the other hand:

- there is no doubt that type (i) anomalies, particularly A1 and A2, show no proportionality between quantity of magnetic minerals and quantity of polarizable particles, therefore these anomalies may be nearly entirely due to non-magnetic conductive particles (pyrite, chalcopyrite, galena,....).
- showings of chalcopyrite and galena are known, and geochemical anomalies have been detected especially for lead.
- many anomalies of types (ii) and (iii) are located along structural contacts between the Ordovician conglomerates and the Cambrian volcanics, and many mineralisations of the Mount Lyell district are located near such contacts.
- economic mineralisation may be associated with graphitic schists.

We would recommend to drill one or two anomalies of each type in order to get a better understanding of the different types and of their economic potential. The most attractive anomalies following the geological, geochemical and geophysical observations should naturally be drilled first.

The following selection of suggested drill sites is based on geophysical data alone.

Anomaly	Profile	Max. Length	Dip	Rig Position from base line
A1 (i)	72N	900 ft.	45°W	100 ft. E
A1 (i)	64N	800 ft.	45°W	800 ft. W
A1 (ii)	40N	400 ft.	45°W	1300 ft. W
A15 (ii)	56N 5-6S?	800 ft.	45°W	1600 ft. W
A6 (iii)	110S	1000 ft.	45°E	2700 ft. E
A8 (iii)	128S	900 ft.	45°W	2500 ft. W

3.5 Geochemical Coverage

A geochemical sampling program was conducted along traverse lines from 144S to 88N. The program consisted of both soil and chip sampling. Samples were analysed for Cu, Pb and Zn at Mount Lyell and Renison using the A.A.S. method. All results were plotted on 1" = 500' plans but only significantly anomalous values and zones are shown on the accompanying map (Map 5).

Soil samples were taken using a 5' long, hand operated solid barrel auger.

Effective sampling was restricted on this grid by the large areas covered by moraines, scree slopes and peat-filled swamps, which rendered the geochemical approach virtually useless and unreliable. The area not sampled is shown on Map 5. In areas of outcrop or where residual soils were developed, samples were taken at 50' intervals along the traverse lines. Residual soils were generally poorly developed, reflective of the generally acidic nature of the rocks in this section of the Cambrian sequence. Depth to bedrock was generally in the order of 12" - 18". Samples were taken on the bedrock where possible, thus resulting in the inclusion of rock fragments in the soil samples. Soils were mostly clayey with sands and loams in deeper and more developed profiles. Rock samples generally tended to give higher values than adjacent soil samples.

An attempt was made to statistically calculate anomalous values. However, several factors including non-uniformity of sample type, soil type and rock type made a statistical approach unrealistic. A further factor was the strong positive skewness of distribution curves. The statistical distributions are shown on Map 5. For the above reasons, it was decided to arbitarily choose limits and define broad zones of anomalous values rather than precisely defined areas. Anomalous values were classified as first, second and third order anomalies.

As seen from the map, many of the anomalous zones have not been "closed off" because they pass under moraine, or off the existing grid, or under lakes.

The anomalous area west of the base line between lines 56N and 80+N is currently being drilled.

Recommendations concerning the other anomalous areas are detailed in a following section of this report.

3.6 Drilling

On the basis of geophysical, geochemical and geological surveys, it was decided to drill two diamond drill holes into a composite anomaly lying west of the base line and extending between 80N and 56N and beyond.

The first of these holes has been completed and the second was commenced early in July 1970.

The completed hole was collared on Line 72N, 100' east of the base line, depressed 45°, drilling west on 240° bearing, using BX-wireline equipment.

A composite map showing all surface exploration and drilling results along the drill section is attached (Map 7).

Considerable difficulty was experienced in drilling this hole, largely due to the drillers forcing the hole down too fast, resulting in excessive dip and bearing deviations, and slipping of the casing. The hole could only be surveyed to 360' because of bad ground.

The hole collared in glacial gravels, passing out of these into Cambrian acid volcanics and tuffs at 20'. The hole remained in these Cambrian rocks, which exhibited only minor variations of texture, mineral composition, and deformation until it entered a fine grained member of the Ordovician Owen Conglomerate Formation at 703'.

Only minor chalcopyrite, galena, and sphalerite were encountered. There was a thin veinlet of native copper in the last 5 feet of Cambrian rocks. Disseminated pyrite, up to 7.1% (but generally below 3%) was encountered between 265' and 410'. Hematite and minor magnetite were widespread throughout the hole.

The pyrite, combined with the magnetite were present in sufficient quantities to produce the I.P. response obtained. Similarly, the magnetite was present in sufficient quantities, to cause the anomaly obtained.

Geochemically, the surface rock samples taken correlated fairly well with the values obtained in the corresponding zones in the drill hole. The soil samples were unfortunately less indicative of corresponding values in the core.

The second hole is being drilled 800 ft. to the south of the first hole, bearing 62°, dipping 55°. It is aimed to test non-coincident I.P. and magnetic anomalies, again associated with a geochemical anomaly. The stratigraphy is expected to be similar to that of the first hole.

4. RED HILLS AREA

4.1 Introduction

A combined geological, geochemical and geophysical exploration program was completed during the year on the Red Hills plateau in the central north of the licence area. High interest in the type and extent of mineralisation found in the numerous old mines in this area prompted the program undertaken. Several strong geochemical and geophysical anomalies situated in favourable geological environments were delineated and follow up work is planned on each of these prior to possible drilling. Underground sampling also outlined two zones of interesting disseminated copper mineralisation.

4.2 Road Construction, Track Cutting

All completed and proposed road construction and track cutting is shown on Map 2.

To enable easy access into this desolate area, the Mt. Read road was extended east for 1.5 miles to the foot of the Red Hill itself. The open nature of the country here made this construction very simple and inexpensive.

The grid commenced in the 1968-69 season was extended. A base line of 7,200' and a sub-base line of 2,400' were pegged out and grid lines laid out perpendicular to the base line at 800 ft. intervals. The grid lines were pegged every 100 ft., and approximately 80,000 ft. of lines have been pegged in the Red Hills area to date.

4.3 Geological Mapping

Geologist R. Bradfield was responsible for all mapping in the area. His work is presented on Map 8 in this report.

4.3.1 History

Mineral leases were first taken up in the area in 1891. Several companies were formed in the 1890's to work the small copper deposits. Six adits were driven, and numerous small pits, trenches and open cuts developed. Twelvetrees visited the area in 1900 and reported on its geology and mining activity in the 1900-01 "Report of Secretary for Mines".

All mineral rights to the area were acquired by the Mount Lyell Mining & Railway Co. in 1905, who lengthened two of the existing adits along with some other minor developments. All the workings were sampled in 1905 and the results of this work together with a report are held in the Mine Office at Mount Lyell. No active mining was undertaken after 1908.

Blake 1938, reported on the area and presented his findings in an unpublished report, much of which is grossly inaccurate.

Rio Tinto conducted a geological-geophysical survey of the Gooseneck area to the immediate south of the Red Hills area between 1957-59 and finally drilled several holes into an anomalous zone. A black shale sequence containing only minor mineralisation was encountered. Full reports of this work are available.

The E.Z. Co. Ltd., conducted a parallel program to Rio Tinto's in the Red Hills area. Their findings will be commented on further, later in this report.

4.3.2. Geology

Regionally the Red Hills area consists of a wide belt of near north-south striking Cambrian volcanics of the Mt. Read Volcanic Arc, locally overlain by Cambro-Ordovician Jukes Breccia and the Ordovician Owen Conglomerate Formation. Quaternary glacial material, conglomerate scree, and swamps cover much of the area, but outcrop is generally good.

Vegetation consists largely of low scrub and button grass, with isolated patches of taller eucalypt forest.

Bradfield's geological report on the area was too brief and little can be gained from it.

Approximately 80 rock specimens were forwarded to H.W. Fander of C.M.S. for petrographic descriptions, several of which are appended to this report.

The Cambrian sequence consists of sheared acid to intermediate volcanics, with thin interbedded slate bands. Bradfield distringuished four schist types:- quartz-felsite, chlorite quartz felsite, feldspathic chloritic schists, and chloritic schists. He claimed they were subjected to different degrees of dynamic metamorphism. However, the author believes that they were most likely subjected to the same degree of metamorphism but that the more acid members merely responded less to the deformation forces and also appear less sheared in outcrop than the more chloritic schists as a result of weathering effects.

In this section, the majority of the Cambrian rocks appeared to be sheared dacites and rhyolites, the distinction between these two types being based solely on the feldspar type with the rhyolites containing albite and the dacites containing more oligoclase.

The Cambrian-Ordovician contact is not always well exposed, but in the vicinity of Conglomerate Hill it appears to be unconformable whilst further north and east it appears to be faulted. The Jukes Breccia is present only locally. There is a possibility that on Conglomerate Hill, like the Gooseneck, the conglomerate is formed simply as an errosional, unconformable outlier and that the main faulted contact passes further to the east. More mapping of this contact is recommended.

4.3.3 Mineralisation

All known base metal mineralisation is confined to the sheared Cambrian Volcanics. Chalcopyrite and pyrite were the main minerals mined. They occur widespread in the area, in both a disseminated and vein form. Minor galena and sphalerite are also scattered throughout the area. Magnetite and hematite, as in the Lake Dora area, are commonly associated with the mineralisation.

Only the rich veins of ore were profitable for the former workers but current exploration is directed towards finding and proving up a large, low grade disseminated deposit and considerable encouragement has been received along these lines to date.

4.4 Geophysical Coverage

A combined I.P., S.P., resistivity and magnetic survey was conducted over traverse lines 40S to 16N. The results are presented on a comprehensive map (Map 10) in this report.

The I.P., S.P., and resistivity survey was conducted and interpreted by C.G.G. and the ground magnetometry was conducted by Syndicate personnel and interpreted by C.G.G.

4.4.1 I.P., S.P., Resistivity and Magnetometry Surveys

Note: This section of the report is a partial reproduction of the geophysical report submitted by G. Omnes of C.G.G. No additions have been made by the author, but several somewhat irrelevent sections have been ommitted.

(a) Magnetometry

The main anomalies are located on the Red Hills on the eastern parts of Profiles 8S, 16S, 24S.

There are two main positive axes warped from a north-south trend between Profiles 24S and 16S to a northwest-northeast trend between Profiles 16S and 8S. The amplitudes of the anomalies reach 3000 gammas but two narrow maxima on Profile 16S exceed 5000 gammas.

The shape of anomalies show that the magnetic bodies are very shallow.

It is not possible to correlate the anomalous axis from Profile 8S to Profile 00, the magnetic discontinuity may be due to a fault.

The intensity of magnetisation is highest on Profile 8S, this is likely to be due to a higher concentration of magnetic material on Profile 8S, between pegs 20E and 25E.

The geological map does not show much correlation with the magnetic map. The magnetic anomalies are at least partly due to pyrrhotite since this mineral was found in a gully above the adit between Profiles 8S and 00.

(b) Resistivity

The main trends of resistivity contours are parallel to the geological and magnetic trends.

Elongated conductive anomalies are likely to be due to shaley strata:

These include:

- Profiles 24S, 32S and 40S west from the base line.
- Anomaly A5.
- Anomaly A4: the conductive axis is perhaps the TURAM anomaly detected by Rio Tinto.

Anomaly A1 is intersected only by Profile 8S, it has been confirmed by a gradient array profiling. It shows an eastward dip of the conductive body, and is unlikely to be due to a particular stratum.

(c) Induced Polarisation

The five main anomalies are located in the eastern part of the area. The background chargeability is about 3 milliseconds. The largest anomaly has a maximum of 39 ms (integration between 450 and 1150 ms after cut-off).

When using a pole-dipole array, the chargeability is roughly proportional to the concentration of disseminated conductive particles, therefore, the area of an anomaly as plotted on a profile should be roughly proportional to the total quantity of conductive particles.

Anomaly A1 on Profile 8S seems to be the most interesting anomaly with the highest concentration of conductive particles, it has been well confirmed by a gradient array profile on 8S.

(d) Self Potential

A 65 mv anomaly coincides with A1 on Profile 8S, all other S.P. anomalies are weaker and may be due mainly to topographical effects.

(e) Comparison of the Magnetometry, I.P., Resistivity and S.P. Results

The main features of the magnetometry, I.P., resistivity and S.P. results are plotted on Map 10.

A1: on Profiles 24S and 16S, the I.P. axis follows approximately the magnetic axis, on Profile 8S, the I.P. axis coincides also with a conductive axis and a S.P. anomaly. On Profile 8S, A1 is probably due to a net of veinlets with an electrical continuity, the mineralisation may even be locally massive, it dips eastward. On profiles 16S and 24S, A1 is due to a mineralisation of disseminated conductive particles, some of the particles are magnetic .

A2, A3 and A4: do not coincide with conductive anomalies but they show some correlations with magnetic anomalies, they are due to disseminated conductive particles, part of which are magnetic.

A5: the I.P. anomalous axis coincides with a conductive axis but there is not magnetic anomaly. A5 may be due to a sulfide mineralisation devoid of pyrrhotite or magnetite, but it is much more likely to be due to conductive graphic shales.

In order to get an idea of the influence of the magnetic minerals, probably magnetite and pyrrhotite on the I.P. results, the areas of the chargeability anomalies have been plotted versus the areas of the corresponding magnetic anomalies. The influence of the non-magnetic conductive minerals seems the strongest on Profiles 16S and 24S but this is certainly due to I.P. anomaly A5 and may be of no economic interest since A5 is likely to be due to shales. The area of the I.P. anomalies on Profiles 16S and 24S minus the area of A5 have also been plotted on Fig. 3, it shows that the proportion of conductive non-magnetic mineral is about the same on Profiles 8S, 16S and 00, it is probably higher on 24S and certainly lower on 8N.

It confirms that A1 on 8S is certainly the anomaly likely to be due to a higher grade mineralisation than any other anomaly.

(f) Conclusions and Recommendations

The geophysical survey carried out in Red Hills showed that a near surface concentration of conductive minerals occurs mainly on the eastern part of Profiles 8S, 16S and 24S. Part of the mineralisation is magnetic, at least part of which is pyrrhotite.

Anomaly A1 seems to be due to a net of veinlets with an electrical continuity, the mineralisation may even be locally massive. The concentration of conductive minerals is perhaps due to a warping and transverse faulting of the strata.

If geochemical and geological observations seem attractive enough we would recommend drilling a hole from peg 25E on Profile 8S following a 45° westward dip.

4.5 Geochemical Coverage

Surface soil and rock chip sampling was conducted along the grid lines, and the majority of the old workings were chip sampled. The results of the surface work are presented on Map 9, and the underground results on Map 11. Samples were analysed by the A.A.S. method at both Mount Lyell and Renison.

Two large, and several smaller surface anomalies were outlined but it should be appreciated that these may be in part due to contamination from the old workings. There was also considerable encouragement in the underground sample results.

4.5.1 Reconnaissance Surface Sampling (Refer Map 9)

Soil, and in some places, chip samples, were taken at 200 ft. intervals west of the base line between lines 40S to 32N, where no significant geophysical anomalies were outlined, and at 50 ft. intervals east of the base line where all the geophysical anomalies occurred.

Soils were generally thin and poorly developed and in some instances absent, whereupon chip samples were taken. Glacial material and scree slopes also restricted the survey limits.

The topography of the area is such that there is every likelihood of down slope contamination of the soils from the workings in the area. The extent of such contamination should be determined in the follow up work recommended later in this report.

As seen on Map 9, there were essentially two major and three minor anomalous zones delineated by the surface surveys. One of the major anomalies is lead, the remainder are copper. There were no significant zinc anomalies outlined.

The anomalous lead zone with values up to 550 p.p.m. in the soil is large aerially but only moderate in intensity. The anomaly extends over a strike length of about 2,500 ft. and has not been closed off to the south. By studying the comprehensive geophysical map (Map 10) and the geological map (Map 8) of this area, it would be reasonable to postulate the approximate coincidence of this lead anomaly with a black shale bed. Black shales in the Tyndall area have been shown in the past to possess background lead values of the order of 200 p.p.m. Costeaning in this area could easily evaluate this anomaly by improving the outcrop of the shale which is generally poor due to its susceptibility to weathering and erosion.

The major copper anomaly lying east of this lead anomaly extends over a strike length of 5,000 ft. and has not been fully closed off to the north or south. Values range up to 3,900 p.p.m. in the rock and 1,100 p.p.m. in the soil. Parts of this anomaly may be caused by contamination from the workings but most of it is uphill from them. This anomaly certainly warrants follow up work.

The copper anomaly on the eastern end of line 24S, with values up to 1,650 p.p.m. copper could be interesting in that there is the possibility it continues south under the flat lying thin conglomerate cover.

The remaining two copper anomalies are unknown quantities. There is the possibility that they may in part be due to contamination or the presence of black shales. This could be readily evaluated further by costeaning.

4.5.2 Detailed Underground Sampling

Adits No. 1 East, No. 3 East, No. 1 West, No. 2 West, No. 2 North and No. 1 Far West, together with several trenches were chip sampled at five foot intervals during the year. These results, together with the results of samples taken here in 1905 (from No. 1 North, No. 2 West and No. 3 East Adits are shown on Map 11 in this report.) The No. 2 East Adit was not sampled.

Chip samples were also taken on the surface above the adits to study the effects of surface leaching.

Encouraging copper results were obtained in No. 1 North and No. 2 West Adits and the trench north of No. 1 North Adit. Lead and zinc values, with a few exceptions were low and insignificant.

Surface samples above the adits generally yielded results significantly less than the corresponding values in the adits indicating the presence of some surface leaching. It also pointed to the fact that surface chip samples containing say 300 - 400 p.p.m. copper could be representative of higher grades at depth, thus placing much significance on several of the surface anomalies discussed in section 4.5.1.

No. 1 North Adit was not sampled this year because of its dangerous nature. However, 1905 assays were encouraging. The high assays obtained in the crosscuts and in the early part of the adit were due to rich veins. However the grades between Nos. 2 and 3 veins are probably indicative of the disseminated mineralisation. These assays bulk to 0.46% Cu over 40 + ft. (assays stopped at the No. 3 vein). A 38 ft. winze was sunk at the entrance of the adit and an easterly crosscut driven 42 ft. parallel to the upper level. Two crosscuts have in turn been driven off this lower level, presumably on the same veins as driven on in the upper level. The area around this adit warrants more work and will be discussed further on in this report.

In the No. 2 West Adit, copper assays bulked at 115' of 0.35% Cu, with the drive ending in 0.3% Cu. The best interval was 15 ft. of 0.75% Cu. The assays taken in 1905 gave values generally lower than those obtained this year. There is no I.P. coverage over this area yet.

4.5.3 Drilling

From 1957-59, the E.Z. Company Ltd., conducted extensive Turam and magnetic surveys over the Red Hills area. Two drill holes were completed to test geophysical anomalies. The southern most hole encountered black shale beds similar to those drilled by Rio Tinto in the Gooseneck area further to the south.

The second drill hole near No. 1 North Adit encountered semi-massive to massive magnetite with minor chalcopyrite averaging 0.14% Cu over 8 ft.

5. OTHER AREAS

5.1 Newton Creek Grid

A 4,000 ft. base line, trending due north (magnetic) was laid out over swampy ground in the upper reaches of Newton Creek (See Map 2). A total of 35,000 ft. of traverse lines were laid out and cut from this base line. A ground magnetometer survey showed the area to be magnetically unresponsive.

The button grass covered swamp is relatively deep and is most likely underlain by the black shales seen outcropping on the Newton Creek road.

There would be little point in conducting an I.P. survey over this area because of these shales.

Meaningful geochemical sampling is difficult because of the thick overburden, however methods of deep sampling should be investigated. Unless some geochemical encouragement can be obtained, no further work is recommended here.

5.2 Howard's Anomaly

Some mapping was attempted over the Howard's Anomaly which was reported on in detail in the 1968-69 annual report. A drill hole is recommended for this anomaly, and is detailed later in this report.

5.3 Mt. Read

The existing Red Hills and Mt. Read grids were extended to the northern licence boundary, but no exploration was undertaken on these lines. A total of 100,000 ft. of tracks were cut and the coverage is shown on Map 2. The cutting of these lines has meant that all the Cambrian rocks on the western half of the licence area have some form of gridding over them.

6. RECOMMENDATIONS AND CONCLUSIONS

6.1 Summary

To date, $333,254.64 has been spent over a period of four (4) years on E.L. 9/66. With this money, approximately three quarters of the Cambrian rocks in the area have had some form of reconnaissance exploration conducted over them, and several areas have been covered in some detail. Two diamond drill holes have been drilled.

A further $158,000 (approximately) is recommended to be spent on the area in the 1970-71 year. With this money, it is planned to:

(a) Complete a reconnaissance coverage of all Cambrian rocks within the licence area.

(b) Conduct detailed geological, geochemical and geophysical surveys over several areas of interest.

(c) To drill approximately six holes if areas of high interest warranting drilling can be developed.

Details of recommendations as to how and where the work budgetted for should be performed, are outlined below.

6.2 Staffing

It is recommended that a staff of one geologist and two field assistents be maintained on the area for the whole year and that during the months of November to March this number be increased to three geologists and four field assistants. For training purposes, it is suggested that one of these geologists be a fresh graduate, and at least one of the field assistants, a University student.

Supervision should be provided jointly by Mount Lyell and Renison senior staff.

6.3 Road, Track and Camp Construction

Proposed access roads and traverse lines are shown on Map 2. It is recommended that the Red Hills road be extended to the northern licence boundary and that the Lake Selina road also be extended north, as far as possible. Lesser road construction may be necessary for such things as drill site preparation.

Costeaning is also budgetted for in the road construction budget. The above work will involve approximately 5 miles of road construction, and it is estimated that it will cost about $3,000/mile to construct roads in the areas proposed.

It is recommended that the Lake Selina grid be extended north into the Anthony Creek Gorge area. It is difficult to estimate the footage involved here because little is known of the geology or ground conditions in this region. Therefore it is suggested that track cutting be undertaken here only after the road has been constructed and a better knowledge of the area obtained.

Some recutting of former lines in the Mt. Read area may be necessary.

It is tentatively estimated that a total of 150,000 ft. of lines will be required. Contract cutters on a rate of $40/thousand feet have proved reasonably satisfactory in the past and should be used again in 1970-71.

There are currently two established camps in the area, one on the upper reaches of the Henty River, the other near Lake Rolleston. These camps are of a satisfactory size and standard and should not require expansion. If camps are required for work on the western side of the Henty River, mobile caravan camps are recommended because road conditions are better there than in the east.

6.4 Mapping, Geochemistry and Geophysics

As stated previously, the 1970-71 program will consist of extending the reconnaissance coverage north to complete a "first-look" coverage of all Cambrian rocks in the area. Detailed programs should be instigated over areas of interest delineated by this and former reconnaissance programs.

6.4.1 Reconnaissance Programs

Two broad areas are recommended for reconnaissance surveys:

(a) North of Mt. Read.

and (b) North of Lake Selina.

The surveys should include firstly pushing roads north as far as economical and practical, and cutting and pegging grids, also where practical. Grid lines have already been cut in the area north of Mt. Read. Cutting of base lines could be avoided if lines are laid out off the roads which should be mapped and surveyed (using a plane table) by the geologist prior to any track cutting.

Once the grids and roads are completed, a reconnaissance mapping, soil sampling and magnetometry program is recommended with soil samples and magnetic readings taken every 100 ft. This style of program should be finished by the end of the 1970-71 year, thus completing the reconnaissance coverage of the licence area.

6.4.2 Detailed Programs

Programs involving varying forms of detailed work are recommended in the following areas:

(a) Red Hills.

(b) Lake Dora-Lake Selina Area.

(c) White Spur Creek-Mt. Read Area.

(d) Ultra-basics.

(e) Howard's Anomaly.

The programs recommended for each of these areas are outlined below.

(a) Red Hills

During the 1969-70 season several areas of high interest were outlined in the Red Hills area. The detailed program recommended is orientated towards outlining a large, low grade deposit, rather than small, rich vein type deposits.

The program should consist of detailed surface geochemical sampling, making wide use of costeans, detailed underground chip sampling, extensions of the I.P. program completed in 1969-70 and detailed mapping of the conglomerate contact. Hopefully, the results of these surveys should outline justifiable drilling targets.

The Red Hills area lends itself to costeaning because of its open, hilly character. Costeaning has the advantages of producing a continuous, uncontaminated exposure of rock for detailed geochemical and geological sampling, and should be heavily relied on in this area.

The location and geology of each costean should be plane tabled in on surface plans (200' : 1").

Continuous chip sampling of several of the old workings is recommended to confirm the more anomalous intervals outlined during the 1969-70 sampling program.

The 1969-70 I.P. program should be extended to the south commencing on line 32S and continuing south till the anomalies A1, A2 and A3 have been closed off. This should only take about 3 days. Several lines will need to be cut and pegged. There appears to be little justification for detailed I.P. surveys if a large target is sought.

The three I.P. anomalies (above) are coincident with both surface and subsurface geochemical anomalies and, being in a favourable geological setting, should be given top priority.

Detailed mapping of the conglomerate contact is recommended both in the Red Hills area, and those contacts to the east and north of Red Hills.

It is suggested that geochemical rock samples taken in the course of detailed work in the Red Hills area and all other areas, be assayed rather than analysed. All detailed work should be closely supervised by a geologist, and preferably with this type of work being carried out by field teams consisting of one geologist and one field assistant.

(b) Lake Dora-Lake Selina Area

There have been quite a number of anomalies outlined by the 1969-70 reconnaissance surveys in this area. Detailed follow up work similar to that recommended in the Red Hills area is recommended over most of them. However, the extensive glacial cover presents many problems in this area.

Anomalous areas which can readily be evaluated by costeaning are I.P. anomalies A2 and A13 together with their associated geochemical anomalies.

The I.P. anomaly A14 and its associated geochemical anomaly, as mentioned in previous sections of this report, is very interesting, however costeaning here would be difficult (but not impossible). Therefore initially it is recommended that detailed soil and chip sampling and mapping programs be instigated on existing grid lines and also on intermediate lines. Further encouragement would then justify costeaning.

The I.P. anomaly A15 is interesting in that it is within an area mapped as Owen Conglomerate Formation. The area is rugged, and therefore detailed geochemistry and geology along the lines of the work proposed on A14 is recommended. According to the C.G.G. chargeability map, there is a possibility that A15, and A14 are axes of the same polarizable body causing the I.P. anomaly. Only expanded I.P. surveys in this area will confirm this fact.

There is the possibility that I.P. anomalies A1, A17 and A14 are all parts of the one long anomaly. To test this, lines 32N, 24N, 16N, 8N, 00 and 8S should be extended west (in the case of 8S and 00, on the other side of the lake). This area is covered by moraine, thus rendering geochemistry useless.

Anomaly A1 is currently being tested by drilling. The first hole (Selina No. 1) has been completed and was discussed earlier in this report. The second hole is in progress.

Anomalies which will be difficult to evaluate include A10, A12 and A8. Some deep auger sampling on A8 may be of some use. This anomaly (A8) is coincident with a turam and geochemical anomaly outlined by Rio Tinto. Structurally, it is close to a disturbed Owen Conglomerate Formation contact. Detailed I.P. surveys could possibly give more information about strength, width etc. of these anomalies.

(c) <u>White Spur Creek-Mt. Read Area</u>

This area was covered by reconnaissance geological, geochemical and geophysical methods in the 1968-69 season. No work was conducted here during 1969-70.

The reconnaissance work consisted of mapping, soil sampling at 200' intervals, magnetic readings at 100 ft. intervals and a vertical loop ground E.M. coverage. The magnetic and E.M. coverages were not complete.

Several interesting geochemical anomalies were outlined. Magnetic anomalies were generally of a low order. The E.M. system did not prove particularly successful.

It is recommended that the more interesting geochemical anomalies be followed up with detailed sampling and mapping programs. The area is very rugged and unless further encouragement can be obtained from the sampling, no I.P. is recommended.

Improved access is gained into this area by use of Howard's new timber road.

(d) Ultra-basic Areas

Two ultra-basic bodies were outlined during the 1968-69 season, one in the extreme south-west of the licence area, the other in the Henty River Gorge. Details are given in the 1968-69 annual report. The aerial extents of these bodies has not been delineated fully.
The body in the south-west could easily be mapped, with the assistance of magnetometry. A detailed geochemical grid should then be laid out over it. Electrical geophysical methods are rendered virtually useless here because of the high magnetite content and the numerous shear zones present.

The Henty River ultra-basic is the more interesting of the two because of the presence of millerite and possible green nickel staining in the sediments surrounding the body.

The area is very rugged, thus making most geophysical methods physically and technically difficult. Again the use of detailed geochemical and geological programs is recommended. Because laying out a grid system would be difficult, a program involving sampling along the Henty and its numerous small tributaries in this area is suggested.

(e) Howard's Anomaly

This anomalous area lying to the west of the Tyndall Range was reported on in the 1968-69 annual report. Initially one drill hole is recomended to test the anomaly. It should be collared on line 20+200 ft. south, on the main timber track, drilling 260°, depressed 55°. This would adequately test the I.P., and geochemical anomaly. A surface costean has exposed a sequence of sheared agglomerates, heavily pyritic and containing quartz-chlorite veins with associated chalcopyrite. An extensive gossan is also developed in the target area.

6.5 Drilling

It is recommended that one diamond drilling rig be maintained on the licence area for the full year, thus allowing approximately 6,000 ft. of drilling to be completed by way of about six holes. To avoid having this rig idle at any time, it will be necessary to have sufficient detailed follow up work completed in the areas recommended above, to be able, without delay, to position a hole with sufficient confidence at any time. Should insufficient targets be developed during the year, then the drilling will have to temporarily cease until such time as targets are developed. However, with planning, there should be no problem in keeping the drilling going continuously.

6.6 Co-ordination with other Exploration Licences

The Mount Lyell Mining and Railway Company Ltd., currently holds two Exploration Licences to the south of E.L. 9/66. It is hoped that in the near future these two licences will be amalgamated into one area between the southern boundary of E.L. 9/66 and the King River. Thus the Syndicate companies will hold the majority of potential ore bearing Cambrian rocks between the King River and Rosebery.

Because of the similarity of the geological environments within the licence areas, it would be reasonable to assume that the factors governing ore body location at Mount Lyell and Rosebery, would probably also govern the location of ore bodies on the E.L.'s.

It is therefore a logical move to co-ordinate exploration as much as possible on these licences. This would apply in particular to geological mapping and use of contractors. To date, the geological nomenclature within the different areas is chaotic.

Any new geologists working in the E.L. 9/66 area should be given instructive tours of Mount Lyell and Rosebery prior to commencing work in the area.

6.7 Budget

The budget attached to this report (Appendix 1) was designed by Mr. Shakesby of Renison Ltd. A total Consolidated Syndicate budget of $195,000 is proposed, of which $158,000 has been tentatively allotted to E.L. 9/66. The budget has the full approval of all syndicate members.

The $6,000 provided for track cutting should allow 150,000 ft. of track to be cut. This should be more than sufficient.

The cost of costeaning is included within the $20,000 road building item. If road building could be kept to $15,000, this would leave an ample $5,000 for costeaning.

For $10,000, an I.P. crew could be maintained for 30 days in the field, preferably January or February. This would allow probably about 15 line miles of work.

Also appended (Appendix 2) is the total Consolidated Syndicate budget for reference purposes.

985048

Appendix 1

The Consolidated Syndicate Budget 1970-71

E.L. 9/66

Item	Period 1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Salaries & Wages (50% Loading)	1,200	1,200	1,200	3,600	4,000	4,500	4,500	4,500	4,500	1,200	1,200	1,200	1,200	34,000
Purchase of Vehicles	5,000			5,000										10,000
Transport & Plant Maintenance	300	300	300	300	600	600	750	750	600	600	300	300	300	6,000
Consumables & Equipment	500	500	500	1,000	1,300	1,000	500	2,000	600	500	500	500	500	10,000
Track Cutting	500			1,500	1,000	1,000	1,000	1,000						6,000
Road Building	500	4,000	3,500	3,500	2,500	1,500	1,500	1,000	1,000	1,000				20,000
Geophysics						4,000	4,000	2,000						10,000
Geochemistry	100	100	100	100	200	200	300	300	200	100	100	100	100	2,000
Drilling	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,800	60,000
TOTALS	13,200	10,200	10,200	19,600	14,200	13,400	17,250	18,150	13,500	8,000	6,700	6,700	6,700	158,000

047

985049

Appendix 2

The Consolidated Syndicate Budget

1970-71

Item Period	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Salaries & Wages & 5% Loading	1,200	1,200	1,200	3,533	4,133	4,133	4,133	4,133	4,133	3,603	3,533	3,533	3,533	42,000
Purchase of Vehicles	6,725			6,340										13,065
Transport & Plant Maintenance	346	346	346	346	448	548	546	546	546	746	546	546	546	6,402
Consumables & Equipment	600	600	610	625	2,598	3,000	3,000	3,000	3,000	625	625	625	625	19,533
Track Cutting	500	1,000	1,000	1,000	1,000	1,000	1,000	1,000	500					8,000
Road Building	500	4,000	3,500	4,500	4,500	4,000	3,500	2,500						27,000
Geophysics						2,500	4,500	4,500	4,500					16,000
Geochemistry	162	162	162	162	162	162	460	460	460	162	162	162	162	3,000
Drilling	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,800	60,000
TOTAL	18,133	11,408	11,418	20,106	16,441	19,443	21,739	20,739	17,239	9,736	9,466	9,466	9,666	195,000

048

APPENDIX 3

PETROGRAPHIC DESCRIPTIONS - W. FANDER, C.M.S.

Red Hills

A large number of samples were sent away for petrographic descriptions. Invariably they were identified as rhyolites or dacites, with varying degrees of shearing and mineralisation superimposed upon them.

Fander summarised them as follows:

"These extrusives range from rhyolites to dacites in composition, many are sodic thyolites. Sericitization iscommon, and secondary chlorite occurs in many".

Further: "The distinction between rhyolites, toscanites and dacites rests on precise feldspar identification. Where feldspars are sericitized or as fine grained, untwined groundmass components, determinations are difficult or impossible. Compositionally the rocks probably range from sodic rhyolites (where plagioclase is albite) to dacites (where plagioclase is oligoclase). This is not a wide range in any case".

Further: "These rocks are generally within a "copper-porphyry" context, but there is little evidence of interesting mineralisation at this stage. The chloritized, sericitized dacites with hematite veins are probably of the greatest interest".

D.D.H. Selina No. 1

Fourteen core samples were described by Fander between 25 ft. and 340 ft. In general the rocks could be classified as either porphyritic rhyolites of tuffaceous lavas. The pyroclastic fragments in the tuffaceous lavas were usually porphyritic dacite. The description following, relates to a core sample taken within the heavily pyritic zone between 265' - 315':

"Another intensely sheared and sericitized dacitic tock which contains significant amounts of pyrite (10%) and minor sphalerite (pale honey coloured). Quartz segragations which represent recrystallized phenocrysts, veins or groundmass material commonly are associated with chlorite and opaques. Sericite occurs as wispy aggregates or fine grained alteration of groundmass components".

Dora-Selina Grid

Following are several descriptions of specimens of the more significant mappable rock units on the Dora-Selina grid, as described by W. Fander.

(a) Precambrian Specimen: (112S - 2950E)

In hand specimen, a black shaley rock containing large fragments of shale up to 1.5 cm.

In thin section, although the primary rock type was essentially a black shale with high carbon content, relict granular, quartz-rich sedimentary rock fragments are very common. These must have represented silt-sized quartzite beds which were probably detrital rather than primary beds because of the presence of these fine quartzite fragments within shale fragments in the rock.

The rock is now a highly contorted muscovite and carbonaceous phyllite in which these quartzite fragments remain relatively undistorted.

Note: (Author) This type of rock would probably be conductive and also responsive to I.P.

(b) Sediment (mapped as indefinite age) specimens:

88S - 2650E: In hand specimen, a grey brown bedded siltstone, partially distorted.

In thin section, the rock is micaceous siltstone containing up to 15% detrital muscovite and minor biotite. Beds of shaley material are interlayered with the silt beds and these have been severely distorted during low grade metamorphism. The surrounding silty beds are only weakly affected by comparison.

Iron stained rhomb shaped crystals which represent metasomatic carbonate, formed nearly 10 - 15% of the rock but most of this material has been leached away leaving hollow rhombs.

100S - 2350E: A meta-arkose in hand specimen a coarse grained arkosic sandstone.

In this section, the rock consists essentially of detrital constituents, the most abundant of which is quartz (40%), potash feldspar (25-30%) and rock fragments (10-15%) with an interstitial shaley matrix material. Rock fragments include fine-grained quartzitic material and a number of shaley fragments. Regional metamorphism has strained all of the quartz and resulted in the development of muscovite, chlorite and green biotite. The rock was a true arkose which has been weakly metamorphosed.

(c) Dora Conglomerate (as mapped) specimen: 133S-2600E

In hand specimen, a very coarse grained fragmental rock containing porphyry fragments up to 1.5 cm in length.

In thin section, the rock is a very sheared fragmental pyroclastic rock in which components vary in size from 0.5 mm to 1.5 cm (lapilli tuff size). The majority of detrital material is volcanic in origin. The larger rock fragments appear to be quartz-plagioclase porphyritic dacites while finer-grained equivalents probably also occur. At least 15% of the framework material is quartz of volcanic origin. The whole rock has been intensely sheared so that what was probably a volcanic dust groundmass is now strongly schistose muscovite aggregates. Minor opaques (2-3%) are present both in rock fragments and in the matrix material.

Note: (Author) This rock type has always been mapped as the Dora Conglomerate Formation. It would probably be better called the Dora Agglomerate Formation.

The composition and nature of this rock suggests that the Dora Agglomerate is Upper Cambrian in age and that the Cambrian sequence suffered shearing after its deposition.

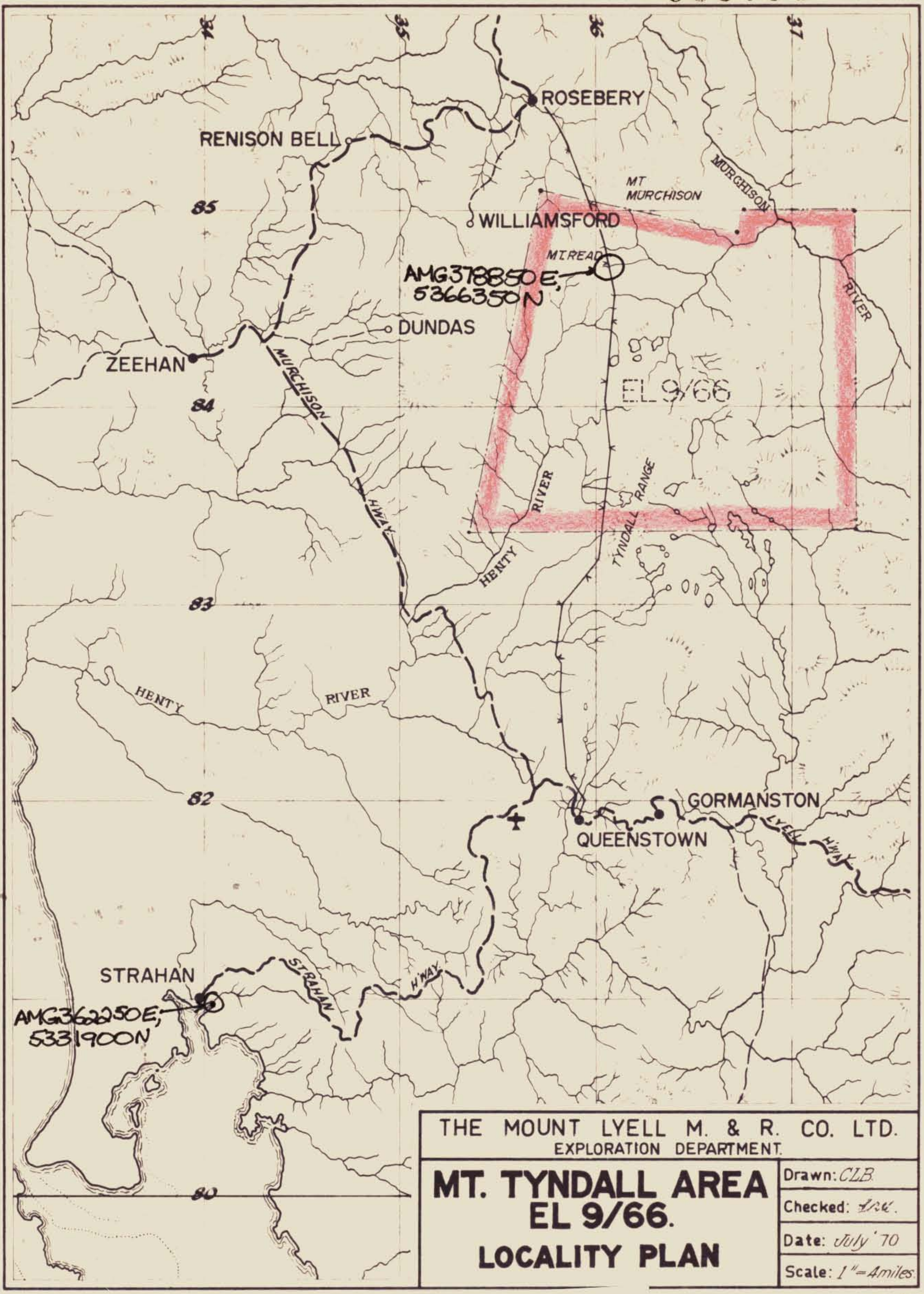
(d) "Typical" indifferential sheared Cambrian Volcanic specimen: 144S-500W: In hand specimen, a grey, schistose, fragmental rock.

In thin section, this rock appears to represent an altered and weakly sheared quartz-feldspar porphyritic dacite rather than a fragmental rock. Quartz phenocrysts are readily recognizable but feldspar phenocrysts have been completely altered to sericite - muscovite orientated, parallel to the schistosity. The quartzo-feldspathic groundmass occurs as a fine grained mosaic in which the feldspar is invariably weakly sericitized.

Minor opaques, sometimes altered to brown iron-oxides, accompany some sericite patches.

053

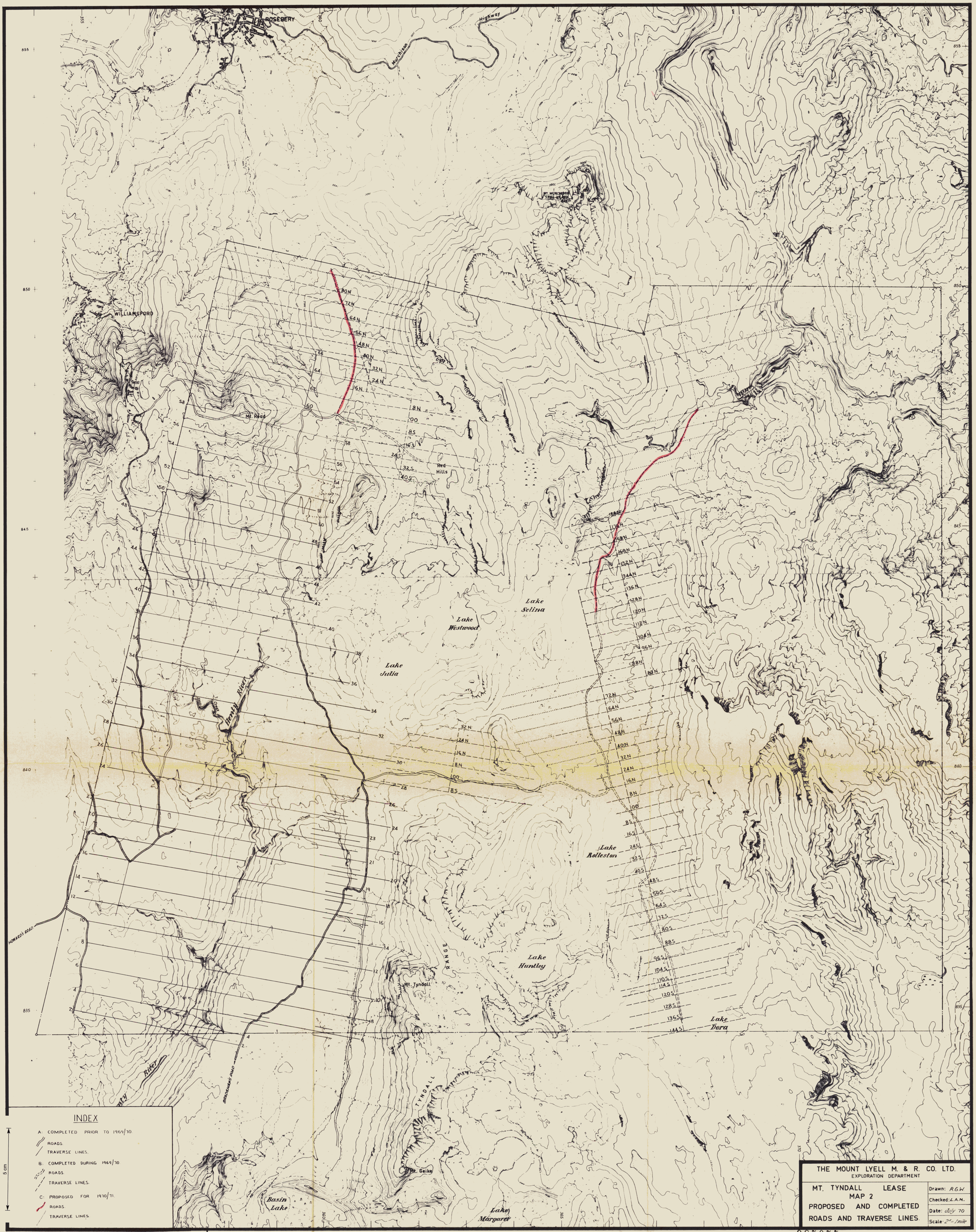
985054



AMG REFERENCE POINTS ADDED

5 cm

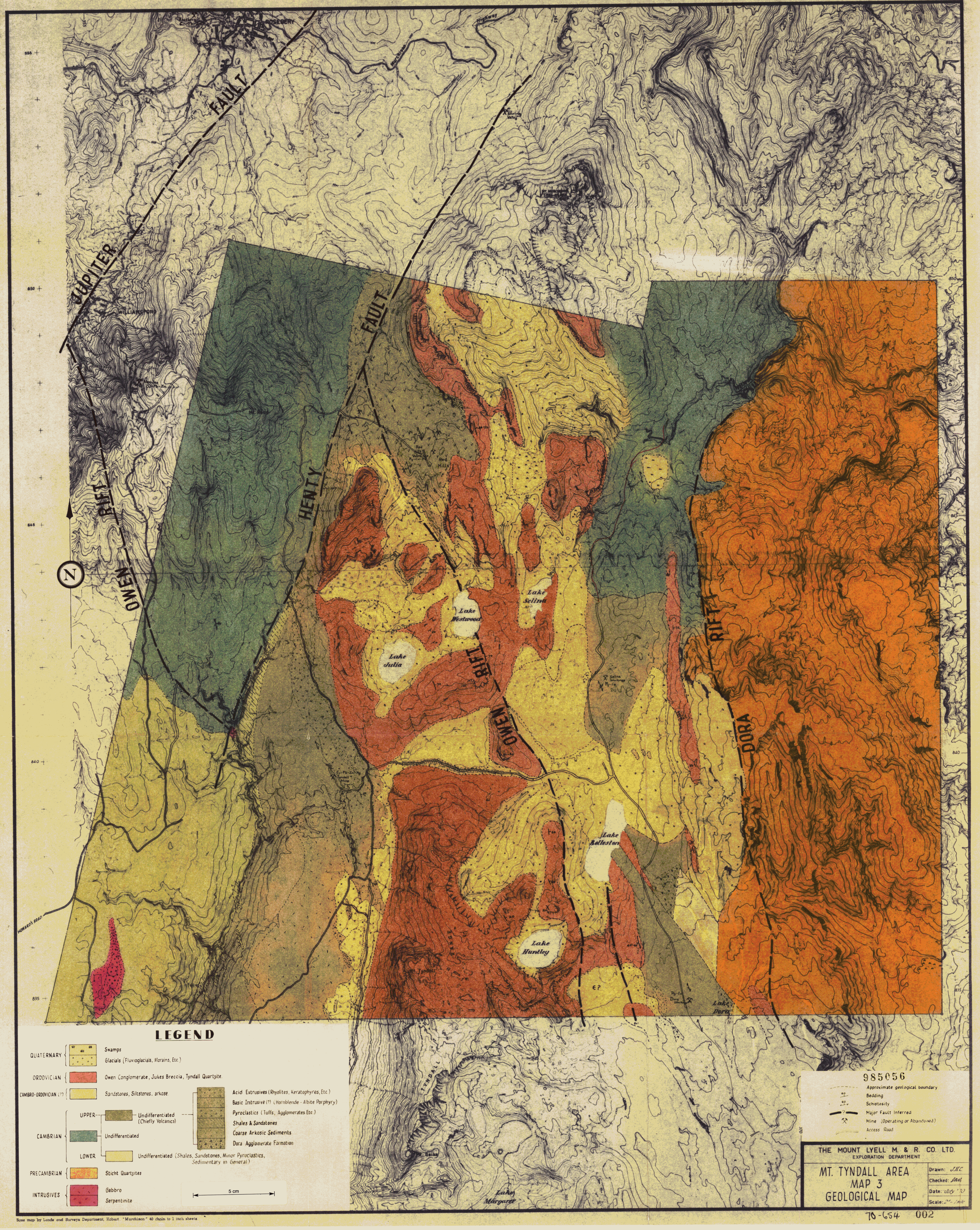
70-654 MAP 1



Base map by Lands and Surveys Department, Hobart. "Murchison" 40 chain to 1 inch sheets.

985055

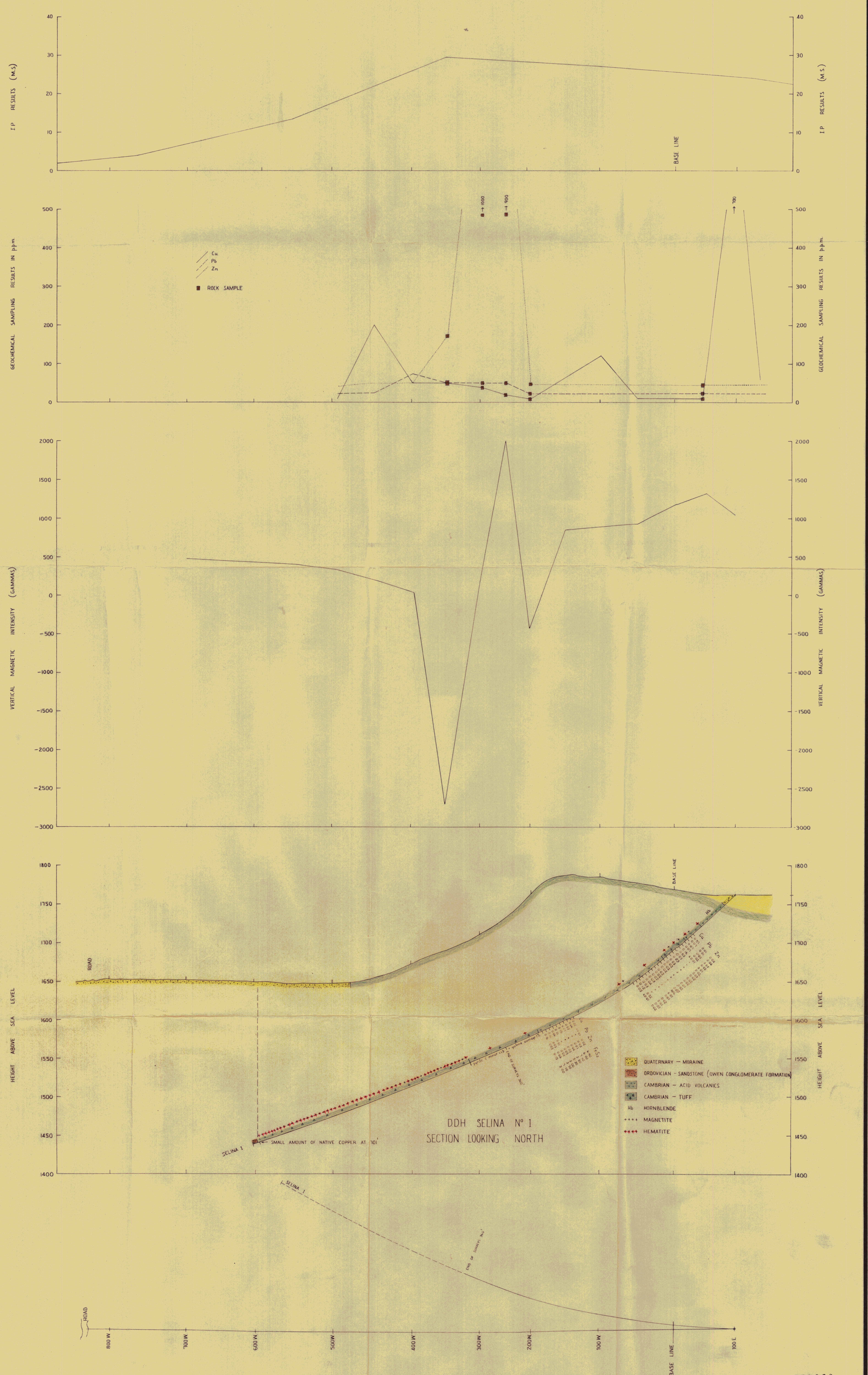
001 70-654


JUPITER
FAULT
RIFT
OWEN
HENTY
FAULT
Lake Westwood
Lake Selina
Lake Julia
OWEN
RIFT
RIFT
DORA
Lake Rolleston
Lake Huntley
Lake Margaret
LEGEND
QUATERNARY
Swamps
Glacials (Fluvioglacials, Morains, Etc.)
ORDOVICIAN
Owen Conglomerate, Jukes Breccia, Tyndall Quartzite.
CAMBRO-ORDOVICIAN (?)
Sandstones, Siltstones, arkose.
CAMBRIAN
UPPER
Undifferentiated (Chiefly Volcanics)
Undifferentiated
LOWER
Undifferentiated (Shales, Sandstones, Minor Pyroclastics, Sedimentary in General)
Acid Extrusives (Rhyolites, Keratophyres, Etc.)
Basic Intrusive (?) (Hornblende - Albite Porphyry)
Pyroclastics (Tuffs, Agglomerates Etc.)
Shales & Sandstones
Coarse Arkosic Sediments
Dora Agglomerate Formation
PRECAMBRIAN
Sticht Quartzites
INTRUSIVES
Gabbro
Serpentinite
5 cm
985056
Approximate geological boundary
Bedding
Schistosity
Major Fault Inferred
Mine (Operating or Abandoned)
Access Road
THE MOUNT LYELL M. & R. CO. LTD.
EXPLORATION DEPARTMENT
MT. TYNDALL AREA
MAP 3
GEOLOGICAL MAP
Drawn: J.H.C.
Date: July '70
Scale: 2" - 1 mile
Base map by Lands and Surveys Department, Hobart. "Murchison" 40 chain to 1 inch sheets
70-654 002

70-654 985057
THE MOUNT LYELL M. & R. COY. LTD.
GEOLOGICAL DEPARTMENT
GEOLOGY
LAKE SELINA GRID
SOUTHERN PORTION
003
DRAWN BY. N.W.
TRACED BY. R.W.
CHECKED BY. L.A.N
DATE. 17-6-70
SCALE. 1" : 500'
MAP 4
LEGEND
Qs QUATERNARY SWAMP
Qg QUATERNARY MORAINE
ORDOVICIAN OWEN CONGLOMERATE
CAMBRO - ORDOVICIAN JUKES BRECCIA
CAMBRIAN DORA CONGLOMERATE
CAMBRIAN VOLCANICS, QUARTZ, QUARTZ-FELDSPAR, QUARTZ-FELDSPAR HORNBLENDE PORPHYRIES OFTEN SHEARED TO QTZ-CHLORITE SCHIST.
CAMBRIAN MASSIVE QUARTZ-HORNBLENDE-FELDSPAR PORPHYRY (QUARTZ KERATOPHYRE)
INDEFINITE AGE / SEDIMENTS
PRECAMBRIAN
Shale
Sandstone - Quartzite
Conglomerate
Hematite / Magnetite rich schist
Fragmental texture
Outcrop
Heavy Colouring - Outcrop
Light Colouring - Inferred Outcrop
Mine
Shearing showing dip
Bedding (Dip & Strike)
Facing
Definite Inferred Fault
Definite Inferred Contact
Syncline showing plunge
Strike of lineations
Grid Lines
Road
py - Pyrite
cpy - Chalcopyrite
gn - Galena
mt - Magnetite
hm - Hematite
sp - Sphalerite
5 cm
MN
TN
80N 72N 64N 56N 48N 40N 32N 24N 16N 8N 0NS 8S 16S 24S 32S 40S 48S 56S 64S 72S 80S 88S 96S 104S 110S 114S 120S 128S 136S 144S

70-654 985058 004

70-654 985059



PLAN OF DDH SELINA No 1 AND LINE 72 N (BEARING 242°)

985060

THE MOUNT LYELL M. & R. COY. LTD.
GEOLOGICAL DEPARTMENT

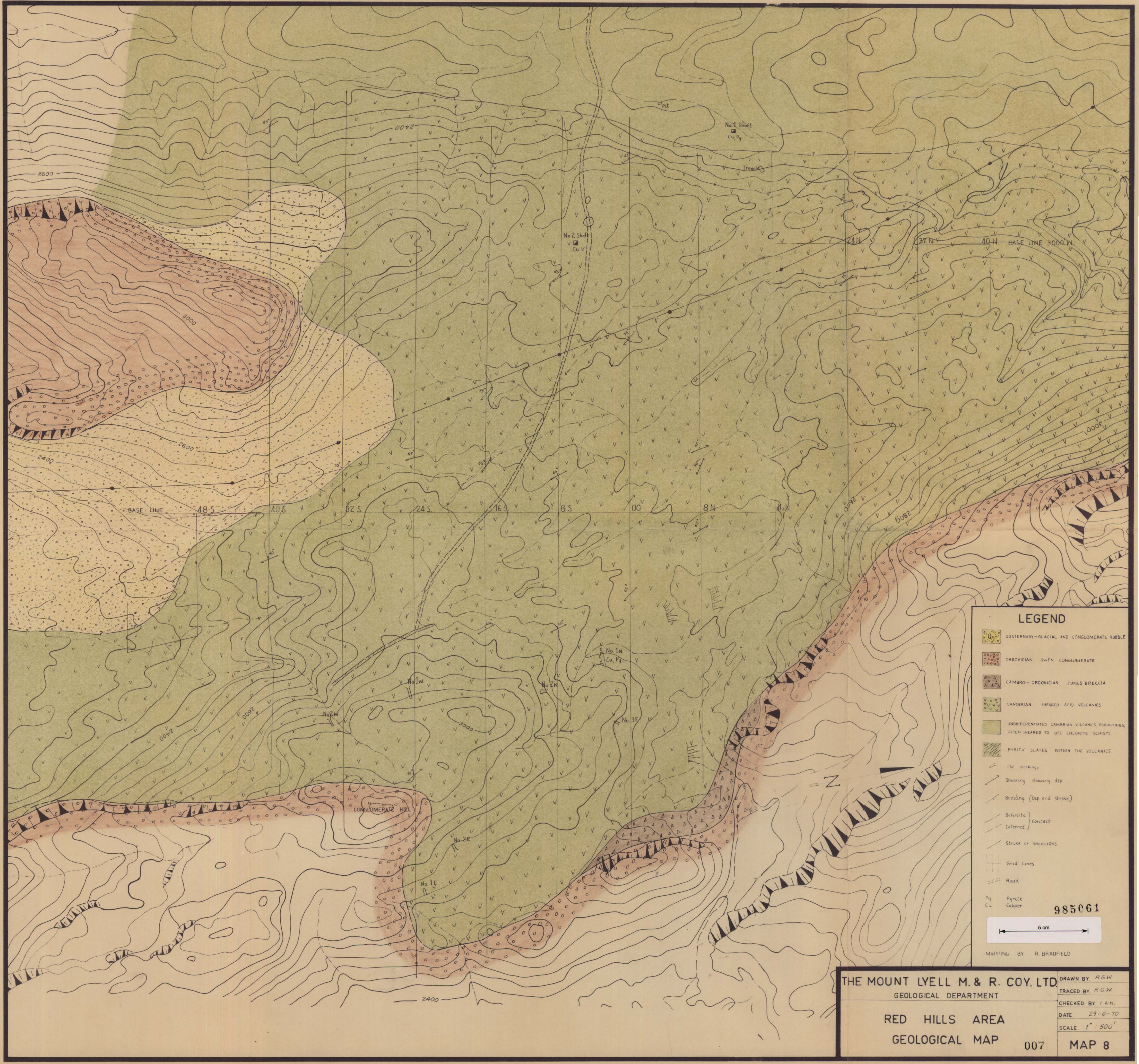
LAKE SELINA GRID
LINE 72 N.
GEOPHYSICAL, GEOCHEMICAL & DRILLING RESULTS

006

DRAWN BY.	R.W.
TRACED BY.	R.G.W.
CHECKED BY.	L.A.N.
DATE.	7-7-1970
SCALE.	1" : 50'

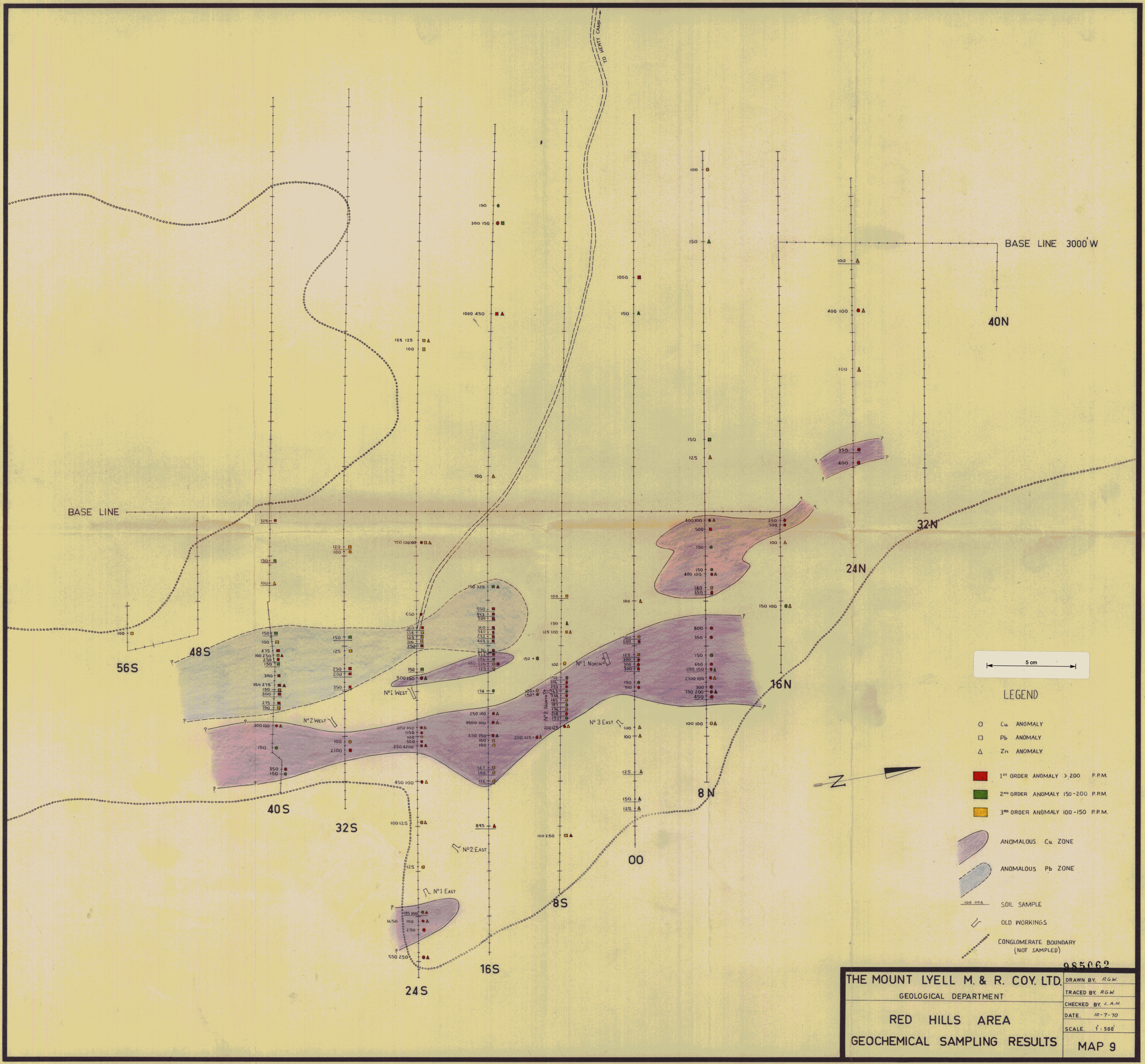
MAP 7

70-654

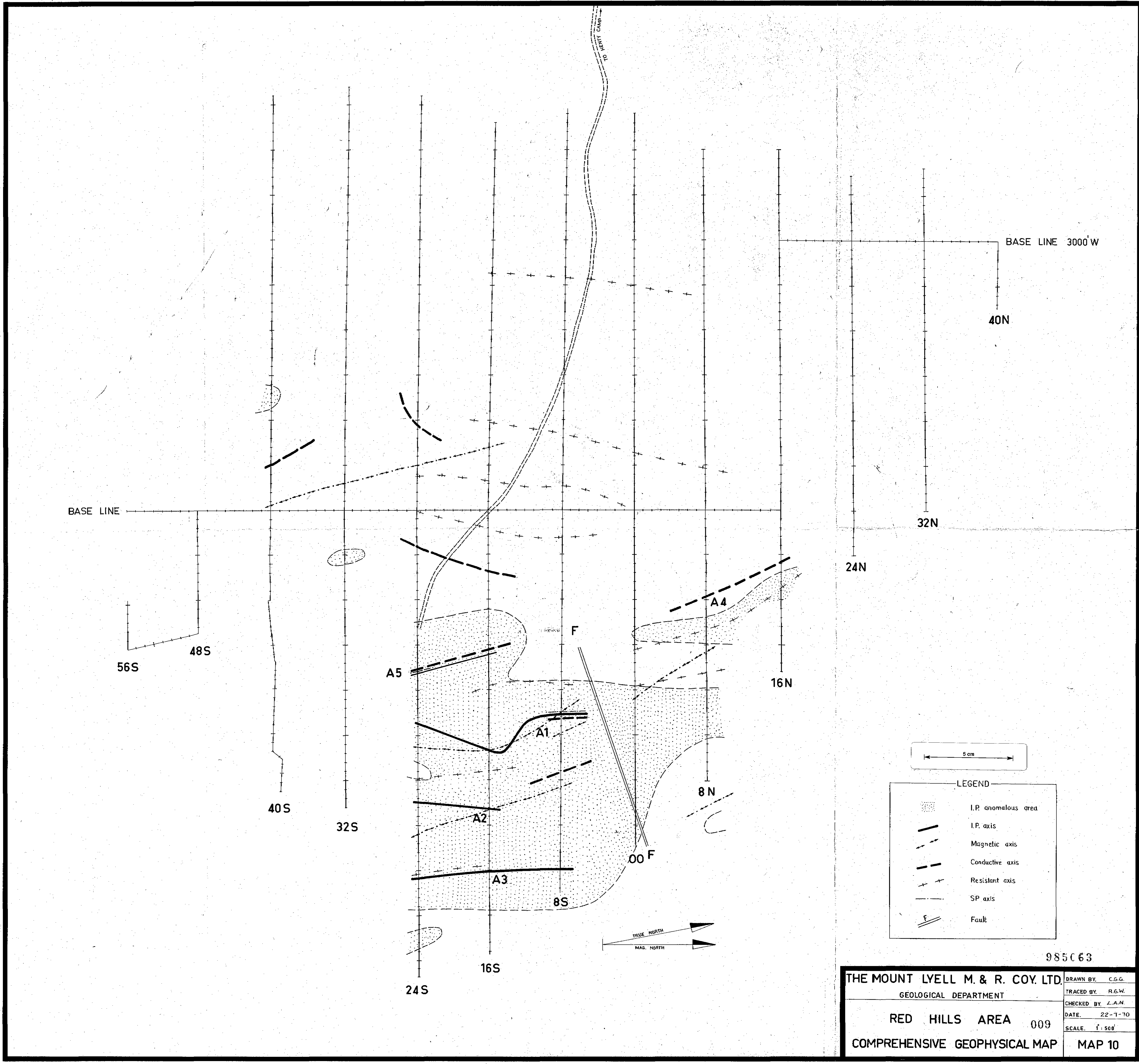


No 1 Shaft
Cu, Py
Trench
Pit
No 2 Shaft
Cu
No 1N
Cu, Py
No 2N
No 3E
No 1W
No 2W
No 2E
No 1E
CONGLOMERATE HILL
BASE LINE
48 S
40 S
32 S
24 S
16 S
8 S
00
8 N
24 N
32 N
40 N
BASE LINE 3000 W
2400
2600
2800
3000
N
LEGEND
QUATERNARY - GLACIAL AND CONGLOMERATE RUBBLE
ORDOVICIAN OWEN CONGLOMERATE
CAMBRO - ORDOVICIAN JUKES BRECCIA
CAMBRIAN SHEARED ACID VOLCANICS
UNDIFFERENTIATED CAMBRIAN VOLCANICS, PORPHYRIES, OFTEN SHEARED TO QTZ CHLORITE SCHISTS
PYRITIC SLATES WITHIN THE VOLCANICS
Old workings
Shearing showing dip
Bedding (Dip and Strike)
Definite / Inferred Contact
Strike of lineations
Grid Lines
Road
Py Pyrite
Cu Copper
985061
5 cm
MAPPING BY: R. BRADFIELD
THE MOUNT LYELL M. & R. COY. LTD.
GEOLOGICAL DEPARTMENT
RED HILLS AREA
GEOLOGICAL MAP
007
DRAWN BY. R.G.W.
TRACED BY. R.G.W.
CHECKED BY. L.A.N.
DATE 29-6-70
SCALE 1" : 500'
MAP 8

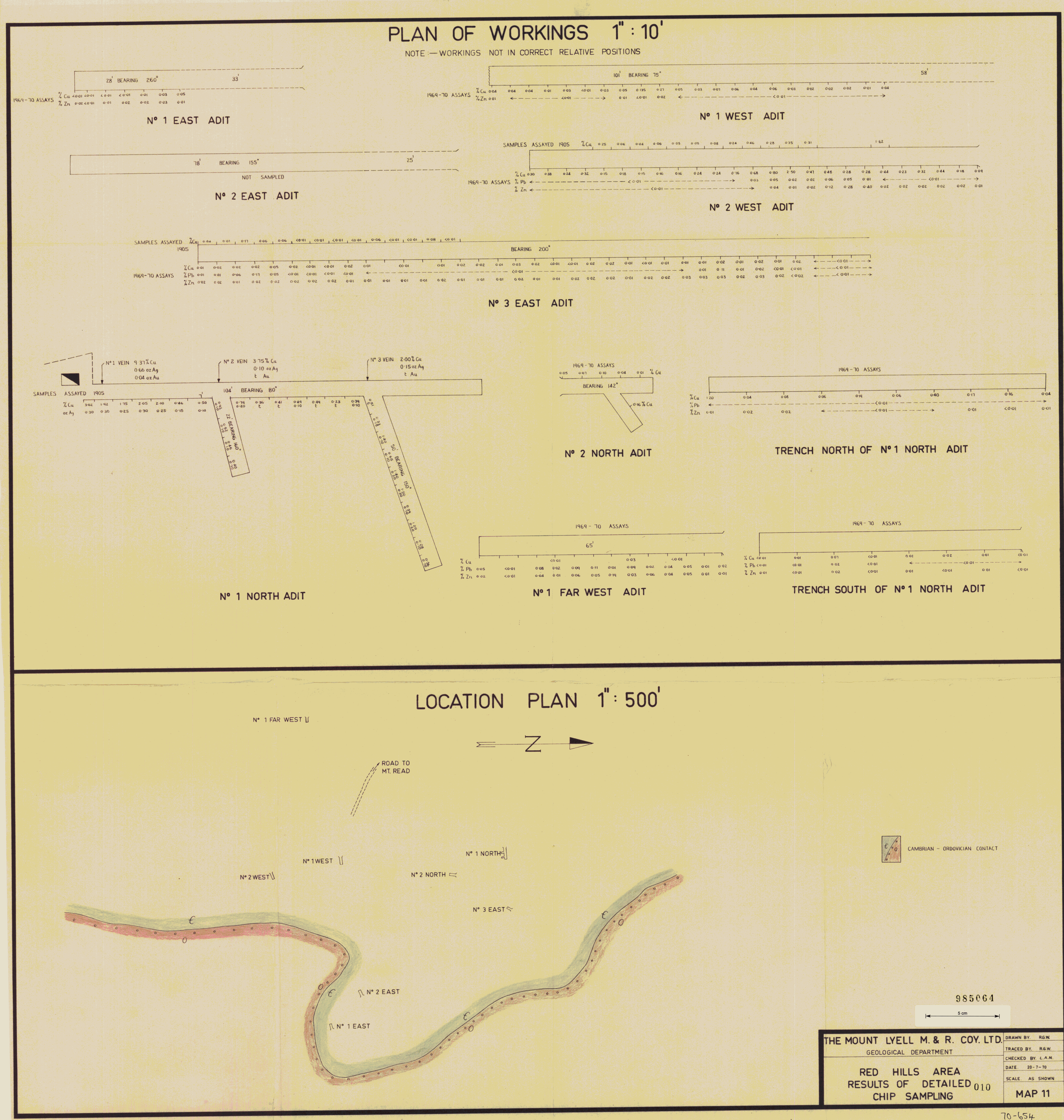
70-654


TO HENTY CAMP
BASE LINE
BASE LINE 3000'W
56S
48S
40S
32S
24S
16S
8S
00
8N
16N
24N
32N
40N
Nº1 West
Nº2 West
Nº1 North
Nº2 North
Nº3 East
Nº2 East
Nº1 East
5 cm
LEGEND
Cu ANOMALY
Pb ANOMALY
Zn ANOMALY
1ST ORDER ANOMALY >200 P.P.M.
2ND ORDER ANOMALY 150-200 P.P.M.
3RD ORDER ANOMALY 100-150 P.P.M.
ANOMALOUS Cu ZONE
ANOMALOUS Pb ZONE
SOIL SAMPLE
OLD WORKINGS
CONGLOMERATE BOUNDARY
(NOT SAMPLED)
985062
THE MOUNT LYELL M. & R. COY. LTD.
GEOLOGICAL DEPARTMENT
RED HILLS AREA
GEOCHEMICAL SAMPLING RESULTS
DRAWN BY. R.G.W.
TRACED BY. R.G.W.
CHECKED BY. L.A.N.
DATE. 10-7-70
SCALE. 1" : 500'
MAP 9

70-654 008


TO HENTY CAMP
BASE LINE 3000'W
40N
32N
24N
16N
8 N
00
BASE LINE
56S
48S
40S
32S
24S
16S
8S
A1
A2
A3
A4
A5
F
F
TRUE NORTH
MAG. NORTH
5 cm
LEGEND
I.P. anomalous area
I.P. axis
Magnetic axis
Conductive axis
Resistant axis
SP axis
Fault
985C63
THE MOUNT LYELL M. & R. COY. LTD.
GEOLOGICAL DEPARTMENT
RED HILLS AREA
009
COMPREHENSIVE GEOPHYSICAL MAP
DRAWN BY. C.G.G.
TRACED BY. R.G.W.
CHECKED BY. L.A.N.
DATE. 22-7-70
SCALE. 1" : 500'
MAP 10

70-654



PLAN OF WORKINGS 1" : 10'
NOTE :— WORKINGS NOT IN CORRECT RELATIVE POSITIONS
Nº 1 EAST ADIT
Nº 1 WEST ADIT
Nº 2 EAST ADIT
NOT SAMPLED
Nº 2 WEST ADIT
Nº 3 EAST ADIT
Nº 1 VEIN 9.37% Cu 0.66 oz Ag 0.04 oz Au
Nº 2 VEIN 3.75% Cu 0.10 oz Ag t Au
Nº 3 VEIN 2.00% Cu 0.15 oz Ag t Au
SAMPLES ASSAYED 1905
1969-70 ASSAYS
Nº 1 NORTH ADIT
Nº 2 NORTH ADIT
TRENCH NORTH OF Nº 1 NORTH ADIT
Nº 1 FAR WEST ADIT
TRENCH SOUTH OF Nº 1 NORTH ADIT
LOCATION PLAN 1" : 500'
Nº 1 FAR WEST
ROAD TO MT. READ
Nº 1 NORTH
Nº 1 WEST
Nº 2 WEST
Nº 2 NORTH
Nº 3 EAST
Nº 2 EAST
Nº 1 EAST
CAMBRIAN - ORDOVICIAN CONTACT
985064
5 cm
THE MOUNT LYELL M. & R. COY. LTD.
GEOLOGICAL DEPARTMENT
RED HILLS AREA
RESULTS OF DETAILED
CHIP SAMPLING
DRAWN BY. R.G.W.
TRACED BY. R.G.W.
CHECKED BY. L.A.N.
DATE. 20-7-70
SCALE. AS SHOWN
MAP 11
010
70-654