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THE CONSOLIDATED SYNDICATE

ANNUAL REPORT

MT. TYNDALL E.L. 9/66

1970 - 71

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1. INTRODUCTION

Work on Mt. Tyndall E.L. 9/66 during the 1970-71 year was concentrated in the following areas:

(i) Lake Selina - Lake Rolleston area.

(ii) Red Hills - Gooseneck area.

(iii) Howard's Anomaly area.

Combined geological, geochemical and detailed geophysical programs were carried out in these localities. A number of interesting anomalous zones have been delineated. A total of six diamond drill holes (total footage 4,697 ft.) were completed to test some of these anomalies and drilling was still in progress at the end of the year. Reconnaissance geological and magnetic surveys were initiated in the NW and NE corners of the licence area.

The exploration program planned in detail for the 1971-72 year consists of two main phases. The first phase involves completing reconnaissance programs northwards to provide a complete coverage of the Cambrian volcanics in the licence area by the end of 1971-72. The second phase will involve completing the detailed coverage and drilling over several interesting anomalous areas outlined by previous work.

Staffing during 1970-71 was provided by The Mount Lyell Mining & Railway Company Ltd. All road construction, track cutting, diamond drilling and I.P. surveys were carried out by contractors.

In May, 1971 the Department of Mines replotted all exploration licence boundaries, leading to a considerable loss of ground on the western and north-western portions of E.L. 9/66. Subsequent representations to the Director of Mines resulted in part of this area being re-allocated to E.L. 9/66. In addition an area of 15 sq. miles over Precambrian quartzites on the eastern side of the licence area was relinquished.

The revised licence boundary is shown on Maps 1, 2, 3. The area of E.L. 9/66 is now 66 sq. miles.

The total expenditure on E.L. 9/66 during 1970-71 was $141,047. A budget if $194,700 has been recommended for The Consolidated Syndicate's operations during 1971-72, including a budget total of $125,200 for the Mt. Tyndall licence area.

2. ACKNOWLEDGEMENTS

Geologist K. Wells worked on the area for the first six months of 1970-71 and submitted reports on various aspects of exploration activities on the licence area. Students R. Poltock and A. Stevens carried out mapping and geophysical work in a number of areas and submitted detailed plans and notes on their work.

These reports have been co-ordinated and re-interpreted in some cases and are embodied in summary within this report. Supervision of all field work was undertaken by Messrs. R. Shakesby, K.O. Reid and L.A. Newnham. All draughting was completed most competently by R. Wilson.

3. LAKE SELINA - LAKE ROLLESTON AREA

3.1 Introduction

The area lies on the eastern side of the Tyndall Range and occupies a low, glaciated north-south valley bounded on the east by the Sticht Range (see Map 4). The southern portion of the area, around Lake Rolleston, is covered by a deep moraine blanket. Most of the grid area is covered by button grass and flat button grass swamps with some thick eucalypt and rain forest on steep country in the north eastern corner.

A grid of 800 ft. spacing over the area has been covered by reconnaissance geochemical, magnetic and geological techniques. Detailed I.P. coverage has been completed over much of the area and has defined several interesting anomalies. A drilling program is in progress on the major anomalous zone.

All field operations were based at Rolleston Camp.

3.2 Road Construction and Track Cutting

Road development was continued northwards and approximately 4 miles of road was constructed, giving access as far north as Anthony Creek Gorge (see Map 2) in extremely difficult and rugged country.

The previous extensive grid in this area was only slightly extended in 1970-71. Eight traverse lines, totalling 25,800 feet, were pegged by field assistants in the area north-west of Lake Rolleston to allow I.P. coverage to be completed in this location.

Three traverses totalling 10,000 feet were pegged by field assistants south of Anthony Creek.

3.3 Geological Mapping

3.3.1 Summary

Geological mapping in the Lake Selina to Lake Rolleston area reveals a narrow north-south trending belt of Cambrian acid volcanics (Mt. Read Volcanics) bounded to the west by Ordovician Owen Conglomerate and to the east by a thin conformable sequence of Lower Cambrian (?) sediments which unconformably overlies Precambrian quartzites. An extensive area of Cambro-Ordovician Jukes Breccia outcrops in the north central

portion of the area mapped in 1970-71, unconformably overlying Mt. Read Volcanics.

Much of the southern portion of the valley is overlain by Pleistocene moraine and swamp deposits. A geological map (Map 5) is appended.

Cu-Pb-Zn, magnetite-pyrite mineralisation is restricted to the acid Mt. Read Volcanics and appears most intense in strongly sheared zones.

A strong, linear I.P. anomaly outcrops sporadically as disseminated pyrite mineralisation with associated chalcopyrite and magnetite. Drilling is currently in progress to evaluate this anomaly.

3.3.2 Previous History

Newnham (1970) adequately summarises all previous work carried out to the south of the area investigated in 1970-71.

A number of small adits, pits and trenches are scattered between traverses 48N and 136N. These old workings are known collectively as the Selina Workings. Little production appears to have taken place and no record of these workings is available to the writer.

3.3.3 Geology

Geological mapping of the gridded Lake Selina - Lake Rolleston area was completed as far north as traverse 80N in 1969-70. In 1970-71 mapping proceeded northwards and was completed as far as traverse 184N (see Map 5).

Mapping was restricted largely to the geophysical grid lines. The grid generally covers the Cambrian Mt. Read Volcanics and associated sediments in the Selina Valley whilst to the west Ordovician Owen Conglomerate crops out as the Tyndall Range and to the east Precambrian quartzites form the Sticht Range.

A detailed account of the rock types and stratigraphy of the area immediately south of traverse 80N is given by Newnham (1970) and is not repeated herein. Most of the above description is immediately applicable to the geology studied in 1970-71.

However in some cases new observations and re-interpretations have been made and are briefly outlined below:

1. Pleistocene Moraine, consisting of Owen Conglomerate boulders, unconsolidated till and fluvioglacial outwash, obscures large portions of the area south of traverse 80N. Electrical soundings conducted by C.G.G. north west of Lake Rolleston suggest moraine thicknesses of up to 300 ft. in that area.

2. Ordovician Owen Conglomerate outcrops -
   (i) as an isolated outcrop on traverse 88N where it is dipping steeply to the west,
   (ii) on the western ends of traverses 168N to 184N, conformably overlying Jukes Breccia and dipping west. This outcrop is terminated by a small SW-NE fault on its southern margin,
   (iii) immediately west of traverses 80N to 160N where a prominent scarp of steeply east-dipping Owen forms the western margin of the Selina Valley.

3. Cambro-Ordovician (?) Jukes Breccia overlies sheared Mt. Read Volcanics apparently unconformably in the central northern portion of the area. It is a haematitic purplish conglomerate-breccia in excess of 300 ft. thick. The Jukes Breccia is conformably overlain by Owen Conglomerate to the north-west (see Map 5).

4. Mt. Read Volcanics

A complex suite of acid volcanic rocks, mainly rhyolites, dacites, keratophyres and pyroclastics, have undergone varying degrees of shearing and chloritisation which has resulted in alteration of the original rock types to quartz-chlorite and quartz-sericite schists. Newnham (1970) describes the volcanics in greater detail.

Mineralisation in D.D.H.'s Selina 4 and 5 is associated with fine grained quartz-sericite schist derivatives of rhyolites and keratophyres.

5. Lower Cambrian (?) Success Creek Group

A thin (500 - 1500 ft.) sequence of micaceous sandstones, shales, laminated siltstone and conglomerate outcrops on the eastern margin of the Mt. Read Volcanics adjacent to the Sticht Range.

In the Walford Peak - Lake Dora area Campana et. al. (1958) and Newnham (1970) assigned an Ordovician age to this sequence, whilst Solomon (1964) regards their age as Lower Cambrian.

Mapping in 1970-71 indicates a sequence of shales, slates and sandstones overlying a basal conglomerate horizon which unconformably overlies Precambrian

quartzites, on the eastern extremeties of traverses 80N to 184N. This sedimentary sequence dips moderately to steeply west.

In addition a section of almost continuous outcrop was mapped from the end of the Selina Road (at Anthony Creek Gorge) east to the Sticht Range. The sequence as revealed in this section is as follows:

Mt. Read Volcanics

		Sedimentary Transition
Success Creek Group (?)	Sheared fine grained quartzite.	50 ft.
	Fine grained bedded quartzite.	60 ft.
	Laminated, fine tuffs	30 ft.
	Thinly bedded quartz sandstones.	180 ft.
	Fine to medium grained conglomerate.	520 ft.
		UNCONFORMITY (?)
Precambrian	Highly sheared graphitic schist.	200 ft.
	Crenulated, highly sheared Precambrian quartzite.	

This sedimentary sequence is quite undeformed with preservation of very fine laminae and bedding striking 360° dipping 80° west. A normal sedimentary transition up the sequence into Mt. Read Volcanics was observed.

In view of this information a Lower Cambrian Success Creek Group correlation is suggested for the sediments on the eastern margin of the Selina Valley. Structural setting, lack of severe deformation and stratigraphic grounds favour this interpretation.

It is envisaged that the provenance of these basal Cambrian sediments was identical to that of the Owen Conglomerate, thus explaining the similarity between the Cambrian conglomerates and the Owen Conglomerate.

More detailed mapping planned for 1971-72 should fully resolve the problem of relative age of this sedimentary succession.

3.3.4 Structural Geology

1. Folding

The distribution and attitude of outcropping Owen Conglomerate on the western margin of the Selina Valley prompts the writer to suggest that this zone represents a series of tightly folded en-echelon synclinal structures with steep or overturned eastern limbs (see Map 4).

This interpretation would infer that the swampy section of the valley may be underlain by Gordon Limestone. Geophysical studies conducted by C.G.G. in the area north-west of Lake Rolleston are not sufficiently diagnostic to confirm or deny this hypothesis (refer 3.4.1.2) and a drill hole has been recommended to test the structure.

More detailed mapping of the Owen Conglomerate on the S.E. slopes of Mt. Murchison should elucidate the structure of the eastern limb of the Tyndall Anticline.

2. Faulting

The only major faulting indicated in the area investigated in 1970-71 is that revealed by geophysical discontinuities on traverses 32N, 24N. A strong E-W fault, with a throw of 400 ft., deeply buried under moraine cover is interpreted (see Map 6).

3.3.5 Mineralisation

Disseminated and veinlet pyrite occurs in sheared, acid volcanics in a long, elongate north-south zone close to the Owen-Cambrian contact in the Selina Valley. Associated chalcopyrite, magnetite, galena and sphalerite occur in minor amounts.

Mineralisation is confined to the volcanics and appears to be more strongly developed in zones of stronger shearing. The mineralisation intersected in D.D.H's Selina 2, 3 occurs in quartz-chlorite and chlorite schists whilst that observed in D.D.H's Selina 4, 5 occurs in quartz-chlorite-sericite schists and massive acid volcanics (rhyolites).

Minor gossan outcrops derived from pyritic zones are present on traverses 136N, 128N in areas of anomalous I.P. response but elsewhere the mineralisation is only rarely apparent in outcrop.

Pyrite is the most abundant sulphide with minor, closely associated, chalcopyrite. Fine grained magnetite and haematite are widely associated with zones of mineralisation. Galena and sphalerite occur in trace quantities in D.D.H.'s Selina 2, 3 whilst minor amounts of molybdenite have been observed in a costean on traverse 120N.

Mineralised zones have been prospected previously in a number of small workings known as the Selina Workings. A few short adits, pits and trenches in quartz-chlorite schists intersected disseminated pyrite-chalcopyrite and massive magnetite-pyrite mineralisation. Little production appears to have resulted from these early prospecting activities.

3.4 Geophysical Coverage

A geophysical coverage, including ground magnetometry, induced polarization, resistivity and self potential surveys, was conducted over areas as shown on Map 3. Significantly anomalous zones are shown on Map 6 which represents a compilation of all geophysical results on the Selina-Rolleston grid.

Ground magnetometry was conducted by Syndicate personnel and reinterpreted by C.G.G. Results have been corrected for daily drift and plotted in detail on 1" = 500' scale plans.

Compagnie Generale de Geophysique conducted a combined I.P.-Resistivity-S.P. survey in two areas of the grid during January, 1971. Details of C.G.G.'s report will not be included in this report but further information is available in C.G.G. (1971).

As a result of these surveys several interesting anomalous zones have been outlined and warrant further testing.

The conclusions and recommendations from C.G.G.'s report are reproduced below (see Map 6).

3.4.1 Lake Rolleston Grid

1. Conclusions & Recommendations

"The detailed gradient array Apparent Resistivity coverage carried out on the Lake Rolleston Grid brought out a structural map of the area in spite of a moraine overburden thicker than 100 feet. Three main units are clearly visible:

- a resistant area to the east corresponding to the Mt. Read Volcanics,
- a north/south conductive strip in the middle, corresponding to shales or perhaps the Gordon Limestone,
- a very resistant area to the west probably corresponding to the Owen Conglomerate.

A transverse east/west fault runs across the area between profiles 32N and 24N.

Ten I.P. anomalies have been detected - all of them, except three small narrow anomalies, coincide with resistant areas. There is no S.P. anomaly.

The main I.P. anomaly, A1, is the southern extension of an anomaly detected during a previous survey.

The southern extension of A1 does not show any variation when compared with the part which has already been drilled.

We would recommend drilling one drill hole on:

A20: A20 is a weak anomaly but it coincides with a conductive axis. Its cause is unknown. A drill hole on A20 would determine the nature of the conductive marker and its significance with respect to possible mineralisation.

- Drill collar at 2,100 feet west from the baseline.
- Dip: 50°W
- Length: 600 ft.

Drilling on A24 and A26 may be considered if their geological and structural setting seem favourable."

2. Discussion

At Lake Rolleston measurements were carried out using a gradient array in order to obtain an accurate structural map of the bedrock beneath the moraine; following the recommendations of Campbell (1970).

High Apparent Chargeability readings (A24, A25), coincident with high Resistivity over what is presumably Owen Conglomerate, have not been explained. All Owen Conglomerate outcrops intersected by I.P. profiles in the Mt. Tyndall area are barren and do not give rise to I.P. anomalies. However several anomalies due to disseminated sulphides in the Mt. Read Volcanics are located along the conglomerate contact. C.G.G. suggests that the gentle Apparent Chargeability gradient indicates that I.P. anomalies A24 and A25 may possibly be due to

polarizable bodies located beneath the conglomerate.

The structural picture of this zone is not clear (refer 3.3.4.1). For this reason the drill hole recommended by C.G.G. should be drilled. The resulting information would enable a better appraisal of the relative merits of anomalies A24, A25.

Current interpretation of the zone favours an anticlinal nose of Mt. Read Volcanics between two synclines of Owen Conglomerate. This would suggest that the anomalies in the central conductive strip may be due to mineralisation within the volcanics. At least one drill hole is warranted to test such an hypothesis.

3.4.2 Lake Selina Grid

1. Conclusions & Recommendations

"Anomaly A1, detected in 1970, extends at least 5,500 ft. north from profile 88N. The percentage of polarizable conductive material is particularly large between profiles 112N and 136N. Between these profiles, a strong I.P. anomaly coincides with a strong conductive anomaly. The anomaly extends further north on the Jukes Breccia body but it becomes wider and more complex near the southern limit of the Jukes Breccia body.

We would recommend the following drill holes:

Location of Drill Collar	Dip	Length
136N - 2200W	50°E	500 feet
136N - 2500W	50°E	200 feet
128N - 2600W	50°E	500 feet
120N - 2700W	50°E	500 feet "

2. Discussion

All results on the Selina Grid were obtained using a pole-dipole array.

The main I.P. anomaly A1 coincides with a conductive axis and in part with a magnetic anomaly. The anomaly transgresses the contact between volcanics and a Jukes Breccia body; however the Jukes Breccia is thin in this position and the anomaly is probably associated with the underlying volcanics.

A series of three diamond drill holes, totalling a minimum of 2,600 ft. of drilling, have been planned (McKibben, 1971) to test this anomaly. To date two of these holes have been drilled and confirm the strongly pyritic mineralisation indicated by a strong S.P. anomaly on traverse 136N (refer 3.6.3).

3.5 Geochemical Coverage

Geochemical soil sampling was conducted along traverse lines from 88N to 128N. All samples were analysed for Cu, Pb, Zn by A.A.S. methods. Results have been plotted on 1" = 500 ft. scale plans but are not included in this report.

No extensive anomalous Cu zones were indicated but several Pb, Zn anomalies of varying intensity and extent are present.

The geochemical approach in this area has been rendered quite ineffective due to the large areas covered by moraine, scree slopes and swamps. Residual soils tend to be poorly developed over acid volcanics causing difficulty in obtaining reliable samples.

It should be borne in mind that I.P. techniques will locate any anomalous area likely to be found by geochemical methods - there does not appear, therefore, to be any advantage conducting blanket geochemical sampling over areas which have been covered by I.P. More realistically in this situation, detailed geochemistry should be used as a potential means of discriminating between I.P. anomalies.

In 1971-72 reconnaissance soil sampling geochemistry will be used to assess the potential of the remaining NE portion of the Tyndall license area. Attempts must be made to ensure maximum effectiveness of such sampling as results obtained will be used to decide on the necessity or otherwise for geophysical work in this difficult area.

3.6 Diamond Drilling

On the basis of geophysical, geochemical and geological results a program of diamond drilling was planned to test the composite anomaly A1 between traverses 56N and 80N (see Map 6).

Initially two holes were planned; the first being completed in 1969-70. The second D.D.H. Selina 2 was commenced in July, 1970 and following its completion a third hole, D.D.H. Selina 3 was drilled on traverse 48N (see Map 5).

Results of the first hole were detailed previously (Newnham, 1970); the results of the subsequent holes are outlined below.

3.6.1 D.D.H. Selina 2

D.D.H. Selina 2 was collared 800 feet west of the baseline on traverse 64N to test a strong I.P. anomaly with a non-coincident strong magnetic anomaly associated with a small geochemical anomaly.

The hole collared in unconsolidated fluvioglacial sands and gravels. At 25 ft. a sequence of coarse pink to dark red grits and quartzites (representing a fine grained facies of the Owen Conglomerate) was encountered and extended to 315 ft. From 315 - 329 ft. a dark green porphyritic quartz chlorite rock with strong haematite and magnetite mineralisation occurred. Dark red, highly sheared haematitic tuff, similar to that in D.D.H. Selina 1 occurred from 329 to 565 ft. No sulphide mineralisation was present in this zone. Dark green, sheared quartz-chlorite schist containing small magnetite veins and disseminated pyrite in small veinlets sub-parallel to Schistosity occurred from 565 - 695 ft. Minor traces of chalcopyrite were present. The 65 ft. section from 565 to 630 ft. assayed:

65 ft. of 0.175% Cu, 1.6% FeS_2, 0.01% Pb, 0.04% Zn.

A basically similar, unsheared quartz-chlorite rock with feldspar groundmass occurs from 695 to 776 ft. Fine grained pyrite occurred very weakly disseminated throughout this zone.

The mineralisation intersected in the hole was sufficient to account for the geophysical anomalies.

3.6.2 D.D.H. Selina 3

Following the completion of D.D.H. Selina 2, it was decided to drill a hole on traverse 4SW to test the southern extension of the anomalous zone intersected in holes Selina 1, 2.

D.D.H. Selina 3 was collared on December 8, 1970 on traverse 4SW, 400 feet west of the baseline at a bearing of 270°, depressed -57°, BXWL size.

The hole collared in 20 feet of unconsolidated Owen Conglomerate rubble. Highly weathered sheared quartz porphyry with quartz phenocrysts in a quartz, sericite and chlorite matrix was intersected from 20 to 200 ft. No sulphide mineralisation was present but strong iron staining suggested leaching. Slightly sheared, unweathered quartz porphyry was intersected from 200 - 450 ft. Mineralisation occurred as very fine grained pyrite throughout with minor blebs and veinlets of chalcopyrite and traces of galena. Massive dark green quartz-feldspar porphyry containing very weak mineralisation occurred from 450 - 522 ft. Extremely fine grained pyrite, chalcopyrite and galena occurred sparsely scattered through this zone. From 522 - 595 ft. grey-green quartz porphyry with no apparent mineralisation was intersected. Extensively sericitised quartz-sericite schist showing strong weathering and bleaching occurred from 595 to 835 ft. probably representing a fault zone. From 835 - 917 ft. haematitic tuff, equivalent to that previously intersected in D.D.H.'s Selina 1, 2, was encountered. Owen Conglomerate was intersected at 917 feet and drilled to 922 ft. at which depth the hole was completed.

The mineralised zone extended from 210 to 522 ft. with mineralisation in general quite weakly disseminated. Intervals of significant mineralisation were:

Interval	Footage	Grade
260 - 290 ft.	30	0.28% Cu
355 - 365 ft.	10	0.20% Cu
440 - 450 ft.	10	0.37% Cu
265 - 280 ft.	15	1.18% Pb
210 - 500 ft.	290	0.80% FeS_2

Following receipt of the geophysical survey report on the northern extension of anomaly A1, from C.G.G., a series of three diamond drill holes were planned to test the large and coincident I.P.-Resistivity and magnetic anomalies between traverses 112N and 136N (refer 3.4.2.2). To date D.D.H. Selina 4 has been completed and D.D.H. Selina 5 had advanced to 640 ft. at the end of the 1970-71 year.

3.6.3 D.D.H. Selina 4

Following the completion of the drilling program at Howard's Anomaly, Associated Diamond Drillers moved their rig to the site on traverse 120N.

D.D.H. Selina 4 was planned to test the southern end of a strong I.P. anomaly with a strong coincident resistivity low which had been outlined by the pole-dipole survey conducted by C.G.G. (refer 3.4.2.1). The hole was collared on April 11, 1971 at a bearing of 270° and depressed at -58°, drilling BQ/L. The hole collared in massive feldspar porphyry but passed into grey, very fine grained acid volcanic lavas from 17 to

130 ft. At 130 ft. dark brown massive keratophyre with slight chloritisation and albite veining occurred and extended to 413 ft. At 413 ft. a distinct change in rock type occurred. Light pinkish grey, sheared quartz-sericite schist, with varying degrees of chloritisation, containing strong medium to coarse grained disseminated pyrite, with blebs and veinlets of pyrite throughout, continued to 695 ft.

At this depth, a similar rock type, but unsheared, occurred and was logged as rhyolite. It is suggested that this is the unsheared equivalent of the zone from 413 - 659 ft. Strong mineralisation, consisting of fine to coarse grained pyrite as disseminations, blebs and veinlets, occurred throughout the entire zone. From 750 ft. onwards the core had a brecciated appearance due to chlorite veining throughout the fine grained acid volcanics. Minor specks of chalcopyrite occurred scattered sparsely throughout associated with pyrite and as discrete blebs in chlorite-quartz patches.

Mineralisation continued to 1059 ft. at which depth it was necessary to stop the hole (still in pyrite mineralisation) due to drilling difficulties.

The mineralisation intersected extended from 413 ft. to 1059 ft. and assayed:

646 ft. of 0.07% Cu, 12.96% FeS_2.

The basic similarity of rock types encountered in this hole to those at Cape Horn and West Lyell, together with the strong pyrite mineralisation encountered, is highly encouraging. Whilst the copper values are modest at

best, the style and grade of the sulphide mineralisation is equivalent to much of that on the Consolidated Mining Lease at Mt. Lyell. The shearing and alteration of the Cambrian volcanics, together with the presence of minor amounts of molybdenite in a surface costean over the zone and of massive magnetite in a short adit north of the section, offer considerable encouragement on the potential of this anomalous area.

3.6.4 D.D.H. Selina 5

D.D.H. Selina 5 was sited 800 ft. north of D.D.H. Selina 4, on traverse 128N, to test the continuation of the same I.P. anomaly.

Drilling commenced on June 3, 1971 and the hole collared in 20 ft. of soil and rubble cover. From 20 to 446 ft. the hole passed through massive, unsheared acid volcanics with varying degrees of chloritisation. Rock types probably represent rhyolites and keratophyres. Pink albite blebs and patches are common throughout this zone. Massive magnetite-pyrite mineralisation occurred in the interval 208 - 212 ft. From 446 to 642 ft. a highly siliceous massive pinkish grey rhyolite (?) contains disseminated fine to medium grained pyrite throughout with very minor traces of chalcopyrite. Pyrite occurs as scattered veinlets and blebs and the mineralisation is generally weaker than that intersected in D.D.H. Selina 4. Assays include:

107 ft. (208 - 315 ft.) of 0.05% Cu, 10.10% FeS_2

195 ft. (445 - 640 ft.) of 0.04% Cu, 6.55% FeS_2.

Drilling was continuing at the end of the year. The main peak of the I.P. anomaly on this section remained to be tested bt this drill hole.

4. RED HILLS - GOOSENECK AREA

4.1 Introduction

Detailed geophysical, geological and geochemical exploration programs were continued in the Red Hills - Gooseneck area in the central north of the licence area (see Map 3).

High interest in this area, stemming from the extent and nature of mineralisation observed in the numerous old workings, prompted detailed exploration in 1969-70. The program undertaken in 1970-71 involved detailing the southern extensions of several strong geochemical and geophysical anomalies situated over favourable acid volcanic environments; in addition detailed geological mapping of the area was completed.

The underground chip sampling program initiated in 1969-70 was completed and a series of percussion drill holes partially outlined zones of interesting disseminated copper mineralisation.

4.2 Road Construction & Track Cutting

Road development was continued to give vehicle access to Red Hills and a series of roads were completed around the area of main interest (see Map 2).

To enable vehicle access to the Gooseneck area approximately 1½ miles of road was constructed southwards from the Red Hills Road. All completed roads are shown on Map 2.

A number of short access roads, and sites were cleared to facilitate percussion drilling on Red Hills.

Intermediate grid lines, spaced at 400 ft. from main traverses, were pegged over Red Hills to provide a detailed grid over the area of main interest.

A total of 26,000 ft. of gridding, consisting of a baseline and five traverses laid out at 800 ft. intervals, was completed over the Gooseneck area to provide control for I.P. surveys and mapping. This grid "tied-in" to the southern portion (traverse 40S) of the Red Hills grid.

All roads, drill sites and the Red Hills grid were surveyed and plotted. The Gooseneck grid was "tape and compass" surveyed and tied in to topographic and drainage features.

4.3 Geological Mapping

4.3.1 Summary

Geological mapping in the Red Hills to Gooseneck area reveals a sequence of interbedded acid volcanics, associated pyroclastics and a black shale-slate horizon all unconformably overlain by Jukes Breccia and flat-lying Owen Conglomerate.

Portion of the Gooseneck area is overlain by swamp and scree deposits but elsewhere outcrop is good. A geological map (Map 9) of the area is appended.

Disseminated pyrite-chalcopyrite mineralisation, with associated magnetite and haematite, outcrops in acid volcanics (rhyolites and dacites) in a number of scattered localities on Red Hills. Massive chalcopyrite-magnetite-pyrite veins are present in shear zones and have been mined on a small scale in No. 1 North Adit.

4.3.2 Previous History

The previous history of mining and investigation of the Red Hills - Gooseneck area is adequately reviewed by Newnham (1970) and will not be repeated herein.

4.3.3 Geology

Geological mapping of the Red Hills grid area as far south as traverse 40S was completed by R. Poltock. This work revealed a well defined sequence of volcanic rock types. Mapping from traverse 32S, south over the entire Gooseneck grid area was completed by Student A. Stevens. The results of both these workers have been integrated and plotted on Map 9.

Regionally, the Red Hills - Gooseneck area consists of a wide belt of north-south striking Cambrian Mt. Read Volcanics exposed in an eroded "window" through overlying Owen Conglomerate. The volcanics are unconformably overlain locally by Jukes Breccia and flat-lying Owen Conglomerate. The southern part of the area is obscured by swamp and scree cover but outcrop is, in general, quite good.

Mapping by R. Poltock indicates that the Cambrian volcanic sequence consists of a north-south striking, steeply (75-80°) westerly dipping series of acid to intermediate lavas, tuffs and agglomerates with an interbedded black slate-shale horizon. The less competent pyroclastics are in general highly sheared and chloritised, whereas the acid lavas have responded less to deformation (shearing) and are less chloritised.

The acid volcanics are identified in thin section as dominantly rhyolites and dacites. In places within the pyroclastic members, outcrops of acid volcanics appear to represent lava flows.

The black slate-shale unit widens considerably southwards into the Gooseneck area (see Map 9). It is interbedded with fine grained "pepper and salt" type tuffs. In all cases bedding within this horizon dips and faces steeply west. Minor amounts of mineralisation have been recorded within this slate band and two drill holes were completed by E.Z. Company and Rio Tinto (see Newnham (1970)).

The Cambrian volcanics are locally overlain unconformably by Jukes Breccia, which is well exposed on the NE side of Red Hills. Flat-lying Owen Conglomerate directly overlies acid volcanics on the eastern wall of the Red Hills - Gooseneck zone. On the western margin of the Gooseneck area, Conglomerate Hill represents an eroded synclinal outlier of Owen Conglomerate unconformably overlying Cambrian volcanics.

4.3.4 Mineralisation

All base metal mineralisation observed in the Cambrian volcanics is confined to the acid lavas on the crest of Red Hills. Disseminated haematite-magnetite-chlorite-pyrite-chalcopyrite-pyrrhotite zones form a prominent horizon corresponding closely with I.P. anomaly A1. Galena and sphalerite occur in minor amounts.

Massive narrow veins of high grade chalcopyrite-magnetite-pyrite mineralisation were mined previously in a number of small workings.

Current exploration activity has two main aims:

(i) to evaluate the large tonnage - low grade potential of the disseminated mineralisation,

(ii) to find and evaluate any zones of higher grade massive mineralisation.

A drilling program has been proposed to test both types of potential economic deposits.

4.4 Geophysical Coverage

Ground magnetometry was conducted over traverses 80S to 32S. A combined I.P.-Resistivity-S.P. survey was conducted by C.G.G. over the Gooseneck area (traverses 80S to 28S) during February, 1971.

The results of both these surveys are shown on a comprehensive map (Map 10). All interpretation work on the results has been done by C.G.G.

4.4.1 Magnetometry

The Gooseneck grid was surveyed by ground magnetometry and the results plotted and contoured.

In general the area is one of "flat" magnetic response; with the only anomalous readings on the eastern ends of traverses 32S, 40S where an anomalous zone (Map 10) represents the southern extension of the Red Hills magnetic anomaly located over a magnetiferous horison within acid volcanics.

All the magnetic results over Red Hills and Gooseneck have been forwarded to C.G.G. for reinterpretation. The final report on this work has not yet been received.

4.4.2 I.P.-Resistivity-S.P.

The conclusions and recommendations from C.G.G.'s (1971) report are reproduced below and discussed. For further details on the I.P. survey the reader is referred to C.G.G.'s report.

1. Conclusions & Recommendations

"The 1971 measurements showed that anomaly A1 extends at least over 4,500 ft. from profile 8S southward. A1 extends further beneath the Owen Conglomerate.

Previous geological observations and percussion drill holes have shown that A1 is due to magnetite, pyrrhotite, pyrite and chalcopyrite disseminated in acid volcanics. The mineralisation has an electrical continuity at profile 8S. The electrical continuity is most likely to be due to massive sulphide veinlets.

Anomaly A5 coincides with a black shale stratum.

We would recommend drilling a hole on the southern extension of A1.

- Drill collar at 2500E/32S
- Dip: 50°E
- Length: 700 feet. "

2. Discussion

A pole-dipole array was used on the Gooseneck grid.

Both Apparent Resistivity and Apparent Chargeability contours outline closely the observed outcrops of black shale and reflect the thickening of this

horizon southwards. A fault observed in geological mapping between traverses 56S, 64S is also detailed.

The southern extension of anomaly A1, coinciding with mineralised acid volcanics, was defined and traced until it disappears under Owen Conglomerate cover. A drilling program has been planned to test the potential of this elongate anomalous zone.

The remainder of the Gooseneck grid appears entirely without anomaly, except for a small resistivity low over the swampy portion of the Gooseneck valley. This has no coincident I.P. effect and is probably related to the peaty material in the swamp.

4.5 Geochemical Coverage

Geochemical soil sampling was conducted over traverses 48S to 80S on the Gooseneck grid; thus extending the previous coverage from 32N to 40S.

The remaining accessible underground workings were chip sampled. A percussion drilling program was carried out, with limited success, on Red Hills.

4.5.1 Soil Sampling

Sampling of the Gooseneck grid was hampered by an extensive swamp and scree cover on the western and south western portions of the area, rendering samples almost useless. More reliable samples were obtained on the eastern section of the grid although soils were in most cases very thin and poorly developed.

No significant Cu or Zn anomalies were obtained. A broad, medium intensity (maximum value 590 ppm) anomalous Pb zone is present on traverse 72S. Comparison with the geological map indicates coincidence of this anomaly with the black shale horizon. This tends to confirm Newham's (1970) observation that black shales have a high Pb background in the Tyndall area.

A small costean across the zone to improve outcrop could enable easy evaluation of this Pb anomaly.

4.5.2 Underground Chip Sampling

Adits No. 1 East, No. 2 East, No. 3 East, No. 1 West, No. 2 West, No. 1 Far West, No. 1 North and No. 2 North together with several surface trenches were chip sampled (using 5 foot sample runs) during the year.

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

The results, together with the results of sampling in 1905 (No. 1 North, No. 2 West and No. 3 East) and in 1969-70, reveal encouraging copper values in various areas. Lead and zinc values are, with exceptions, low and insignificant.

Encouraging copper values were obtained in No. 1 North and No. 2 West Adits and in the trench north of No. 1 North Adit.

1. No. 1 North Adit

The 1905 assays indicate that high values were obtained in the crosscuts, corresponding to massive rich veins. However the grades between veins are

indicative of the disseminated mineralisation.

Results obtained in 1970-71 in this disseminated mineralisation include:

55 ft. of 0.36% Cu and 50 ft. of 0.26% Cu.

2. No. 2 West Adit

The 1905 assays in this adit bulked at 115 ft. of 0.35% Cu, the best interval being 15 ft. of 0.75% Cu.

Assays of samples taken in 1970-71 include:

70 ft. of 0.32% Cu and 40 ft. of 0.21% Cu.

4.6 Drilling

A total of 26 short percussion drill holes were completed on Red Hills during 1970-71, to test the bulk low grade copper potential of the mineralised acid volcanics. The drilling was carried out with an Air-Trac fitted with a special dust and chip sample collector.

Considerable difficulty was encountered in carrying out the drilling due to the high water table which caused slurrying of the cuttings and subsequent jamming of drill steels. The difficulties became so adverse as to finally necessitate abandoning this project.

However a number of interesting results were obtained. The results from all holes completed are tabulated in Table 1. Hole locations are shown on Map 11.

An interesting correlation occurs between geophysical anomaly A1 and the results of P.D.H's 1A, 1B, 1C and 7.

A diamond drilling program has been planned for 1971-72 and is detailed in sections 7.4.2, 7.5.2.

TABLE 1: RED HILLS PERCUSSION DRILLING RESULTS

Hole No.	Depth	Footage	Significant Assays
1A	15'	5 - 15'	10' of 0.14% Cu
1B	40'	10 - 40'	30' of 0.49% Cu
1C	50'	0 - 35'	35' of 0.21% Cu
2	40'	30 - 35'	5' of 0.5% Cu
3	30'	Not Significant	
6	10'	Not Significant	
7	90'	0.- 90'	90' of 0.27% Cu
9	30'	Not Significant	
10	50'	Not Significant	
11	40'	Not Significant	
15	25'	Not Significant	
23	25'		
24	35'	10 - 35'	25' of 0.12% Zn
25	80'	Not Significant	
26	60'	Not Significant	
27	20'	Not Significant	
30	90'	Not Significant	
32	35'	Not Significant	
38	15'	Not Significant	
39	30'	Not Significant	
39I	60'	Not Significant	
51	20'	Not Significant	
52	5'	Not Significant	
53	5'	Not Significant	
54	15'	Not Significant	
56	15'	0 - 10'	10' of 0.20% Cu

5. HOWARD'S ANOMALY AREA

This anomalous area is located on the western margin of the Tyndall Range in the central west of the licence area. Previous work in the area includes detailed investigation by Rio Tinto Aust. Exploration (1957-1961) and by Mt. Lyell and The Consolidated Syndicate in 1967-68, 1968-69 and a small amount in 1969-70. The annual report for 1968-69 gives details of this previous work.

Following mapping in 1969-70, a drill hole was recommended to test the anomalous zone. The hole was sited on traverse 20 + 200 South to test a coincident I.P. and geochemical anomaly. A surface costean (Trench A of the 1968-69 annual report) exposed a sequence of sheared agglomerates, heavily pyritic and containing quartz-chlorite veins with blebs of chalcopyrite. A gossan is developed in the target area at the western end of the costean. Chip sampling of the costean gave anomalous Cu, Pb, Zn values.

D.D.H. Howard's Anomaly 1 was collared on February 1, 1971 and advanced to 450 ft. before excessive flattening of the hole necessitated its abandonment. Subsequently D.D.H. Howard's Anomaly 2 was collared at a steeper angle and with HQ size rods. The cost of redrilling was borne by the drilling contractors Associated Diamond Drillers. H.A. 2 and H.A. 1 intersected very similar lithologies (see Map 12).

From 0 - 50 ft. H.A. 2 passed through massive pink albite porphyry consisting of rounded albite phenocrysts in a fine grained crystalline groundmass. From 50 - 157 ft. the hole passed through typical slightly sheared agglomerates containing blocks of "albite porphyry". Tuffaceous, chloritised volcanics containing subrounded albite grains were intersected from 157 - 177 ft. Agglomerate, similar to that between 50 - 157 ft., was observed from 177 - 294 ft. A coarse, highly chloritised tuff with albite throughout and with patches of intricate calcite veining occurred from 294 - 750 ft. From 750 ft.

to the end of the hole at 850 ft., highly chloritised massive volcanics with euhedral feldspars in a chloritised groundmass occurred.

Mineralisation occurred as extremely fine grained, completely disseminated pyrite with only minor traces of chalcopyrite in quartz-epidote-chlorite-albite patches. In places fine veinlets of pyrite sub-parallel the weak schistosity.

Three zones of fine pyrite mineralisation were intersected and assayed:

33 - 75 ft.	42 ft. of 0.05% Cu	8.76% FeS_2
170 - 205 ft.	35 ft. of 0.02% Cu	3.00% FeS_2
320 - 380 ft.	60 ft. of 0.10% Cu	5.30% FeS_2

Reasonable correlation of mineralised zones was obtained between H.A. 1 and H.A. 2.

The mineralisation intersected was sufficient to explain the observed I.P. anomaly and the surface gossan. No mineralisation occurred in a position coincident with the western "probable" I.P. anomaly but the drilling tested this anomaly adequately at depth.

Whilst a negative result was obtained in this drilling the area remains one of high interest and potential. However, prior to any further drilling, a detailed re-appraisal including further mapping and costeaning is recommended (refer section 7.4.2).

6. OTHER AREAS

6.1 N.W. Corner

Magnetometry was carried out over traverses 8N to 48N to the north of the Red Hills - Mt. Read road (see Map 3) as part of the initial reconnaissance of this area. No significant anomalies were detected.

A road was extended 1½ miles northwards from the Red Hills Road to the H.E.C. transmission line. Good outcrop was provided in this road and geological mapping was completed over it. The road extends almost to the amended northern boundary of the licence area and no further roadwork will be needed at present.

A costean was cut across the area surrounding an old prospect shaft adjacent to the road. Chip sampling at 5 ft. intervals in the costean outlined 40 ft. of 1.22% Cu in quartz-chlorite schist (derivatives of the Mt. Read Volcanics). Massive chalcopyrite-pyrite-magnetite ore is visible on the dump at the collar of the old shaft. Similar quartz-chlorite schists with pyrite mineralisation are exposed elsewhere in the area.

A small I.P. program is planned to test this general area in 1971-72 (refer 7.4.2).

6.2 N.E. Corner

Extension of the Selina Road into the N.E. corner of the licence area has "opened-up" a considerable area of rugged country. The road was developed through difficult terrain as far north as Anthony Creek Gorge (see Map 2). Anthony Creek was forded and a small amount of road formed on the northern bank.

Reconnaissance geological mapping was completed along the road and in creek traverses and enabled the broad structure and distribution of various rock units to be determined.

A total of 10,000 ft. of grid was pegged by field assistants in open button-grass country north of traverse 184W to provide a basis for further track cutting in 1971-72. The newly gridded area was covered by a magnetometer survey which did not reveal any significant anomalies.

Reconnaissance exploration coverage of this area is planned in 1971-72 (refer 7.4.1).

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Summary

Total expenditure on E.L. 9/66 over a period of five years has been $474,302. This expenditure has allowed several detailed drilling targets to be defined. In addition road access has been constructed to all of the Cambrian volcanics, resulting in some form of reconnaissance exploration coverage over more than three quarters of the volcanics within the licence area.

Eight diamond drill holes totalling 6,142 feet have been drilled; of these six holes (total footage 4,697 ft.) were drilled in 1970-71.

A budget of $125,200 for Mt. Tyndall E.L. 9/66 has been proposed and approved for expenditure in the 1971-72 year. It is planned to:

(i) complete the reconnaissance coverage of all Cambrian volcanics in the NE and NW of the licence area,

(ii) conduct detailed follow-up geological, geochemical and geophysical surveys over several areas of high interest,

(iii) conduct detailed investigation of the ultrabasic bodies in the SW corner of the licence area,

(iv) drill approximately 6 holes, if warranted, to test targets developed by previous exploration activities up to 1971.

7.2 Staffing

It is recommended that a staff of one geologist and two field assistants be available for work connected with E.L. 9/66 throughout the year. From mid-October to March this number should be increased to a total of three geologists and six field assistants. Two of the geologists could be recently qualified Goldfield's Graduates and it is envisaged that at least four of the field assistants will be University geology students.

Supervision should be provided jointly by Mt. Lyell and Renison senior staff, with direct operating responsibility lying with Mt. Lyell.

7.3 Road, Track and Camp Construction

Proposed access road development and track cutting is shown on Map 2. It is recommended that the Selina Road be extended a further 1 mile north on the northern bank of Anthony Creek. This road would provide access to the northern boundary in the north-eastern corner of the licence area where a narrow zone of Cambrian volcanics is present.

A small amount of road construction will be required in drill site preparation. The budget also includes amounts for costeaning in the Howard's Anomaly area.

It is recommended that the Lake Dora - Lake Rolleston - Lake Selina grid be extended northwards from traverse 184N to complete the gridding of Cambrian volcanics in the north-eastern section of E.L. 9/66. It is estimated that approximately 60,000 feet of gridding will be required in this area. Most of this gridding will require track cutting.

Approximately 10,000 ft. of grid line re-cutting will be required to enable a small I.P. survey (refer 7.4.2) to be completed in the north-western corner of the licence area.

A total of 32,000 ft. of gridding is recommended for the White-Spur area. Approximately 20,000 ft. of gridding is recommended over the ultrabasic body in the south-western corner of E.L. 9/66. In addition a small amount of gridding is required on traverses 110S to 144S, west of Lake Dora, to enable detailed I.P. coverage of a previously outlined I.P. anomaly.

A tentative estimate of 130,000 ft. of gridding will be required. The majority of this will require track cutting. The contract track cutters previously used have given reasonable service and should be used again in 1971-72. A cutting rate of $40 per thousand feet appears reasonable.

The established camps at Henty and Rolleston have proved satisfactory in size and standard and no major alterations are envisaged for 1971-72. A camp is required on the western side of the Henty River to provide a base for operations at White Spur and on the ultrabasics. It is proposed to erect the Mt. Lyell demountable field unit on Howard's Road to fill this need.

7.4 Exploration Programs

Exploration activities planned for 1971-72 can be divided into reconnaissance and detailed programs. The reconnaissance program involves extending exploration coverage to complete the initial coverage of all Cambrian rocks in the licence area. Detailed programs are planned in areas of high interest defined and delineated by previous work.

7.4.1 Reconnaissance Programs

Two sections of the Tyndall licence area remain to be covered by reconnaissance surveys; viz:

(i) North-East corner (north of traverse 184N),

(ii) North-West corner (north of Mt. Read - Red Hills).

The program for the north-east corner involves gridding (60,000 ft.). Geological mapping, soil sampling and ground magnetometry will be carried out over this grid.

No gridding will be required in the north-west corner. Geological mapping, ground magnetometry and soil sampling is to be carried out; thus completing the reconnaissance coverage of all Cambrian rocks in the licence area.

It is anticipated that this program will be completed by the end of the 1971-72 season.

7.4.2 Detailed Programs

The programs recommended include detailed geological, geochemical, geophysical and drilling coverage of the following areas:

1. Red Hills
2. Mount Read - Red Hills

3. Ultrabasics
4. White Spur
5. Howard's Anomaly
6. Lake Dora - Lake Selina

The program recommended for each of these areas is outlined below.

1. Red Hills

The main potential for the presence of economic mineralisation in the Red Hills area appears to be either as a large tonnage - low grade copper deposit or a series of smaller high grade copper deposits.

A two phase, two rig drilling program is recommended (Newnham, 1970) to test the Red Hills area during the 1971-72 summer season.

Phase 1 involves drilling between 4 - 8 short diamond drill holes to test the low-grade large tonnage copper potential of Red Hills. Phase 2 involves drilling at least one long hole to test a strong I.P. axis, 4,500 feet long, coinciding with interesting surface mineralisation.

Phase 1 drilling will assess the potential grade of the top 200 feet of the Red Hills surface in a series of angle holes across the strike. Unless there is ore grade material within 200 vertical feet of the surface, overburden problems would render grades of about 0.5% copper sub-economic.

Phase 2 drilling will evaluate the strong I.P. axis A1 which correlates with a zone of magnetite-

haematite bearing acid volcanics containing pyrite, pyrrhotite and chalcopyrite at the surface.

2. Mount Read - Red Hills

A small I.P. program, over approximately 10,000 ft. of grid, is recommended to test an area adjacent to the Henty Fault immediately north of the Red Hills Road (see Maps 2, 5).

A shaft was sunk in this area and intersected some interesting copper mineralisation. Sampling in a costean across the shaft site gave encouraging copper results. In addition pyrite is strongly developed in sheared Cambrian schists in this vicinity.

The I.P. program should effectively test the immediately envirous of the old workings.

3. Ultrabasics

Two ultra-basic bodies were outlined during 1968-69; one in the extreme south-west of the licence area, the other in the Henty River Gorge (see Map 4). Newnham (1969, 1970) gives details of these ultra-basic bodies.

An integrated program is recommended to evaluate both of the bodies. A small amount of new gridding, together with re-cutting old traverses, will be required over the ultrabasic in the south-western corner. Geological mapping and detailed magnetics should delineate and accurately outline the ultrabasic mass. Detailed mapping and soil sampling should enable evaluation of its base

metal (Cu, Ni) and asbestos potential.

The Henty River ultrabasic is interesting in that millerite and possible green nickel staining are present. Evaluation will be difficult because of the rugged nature of the terrain. A detailed colluvial geochemical sampling program and geological mapping is recommended to assess this area.

4. White Spur

Detailed work in the White Spur area, conducted by Rio Tinto Aust. Exploration from 1957 - 1960, revealed a slate sequence similar in geology and structural setting to the Rosebery and Hercules host rocks. A series of 5 E.M., gravity and magnetic anomalies were located, only one of which was tested by one drill hole.

The Syndicate has recently acquired the area covering Rio Tinto's grid. It is planned to re-cut portions of this grid and carry out detailed geological and magnetic checking of Rio Tinto's results. Subsequently, if the above work appears favourable, an I.P. survey over 32,000 feet of the grid is recommended to more specifically re-define and confirm Rio Tinto's E.M. anomalies and provide specific drilling targets.

5. Howard's Anomaly

Previous work by Rio Tinto and The Consolidated Syndicate in this area provided some considerable encouragement. The negative drilling result

obtained in 1970-71 indicates that much more detailed knowledge of the area is required prior to any further testing by diamond drilling.

Consequently it is recommended that a series (approximately 5) of costeans be constructed to provide improved outcrop in strategic areas. Detailed geological and geochemical studies of these costeans will be conducted. No further drilling is warranted or recommended on this anomaly until such detailed re-evaluation is completed.

6. Lake Dora - Lake Selina Area

A number of promising geophysical and geochemical anomalies have been outlined by reconnaissance programs in 1969-70 and to a lesser extent 1970-71.

Most of these anomalies appear fairly difficult to evaluate - being either covered by considerable thicknesses (150 - 400 feet) of moraine or in rugged inaccessible positions. Campbell (1970) and Newnham (1970) discuss the anomalies in this area and suggest methods of evaluating them. The detailed gradient array survey conducted north of Lake Rolleston in 1970-71 did not completely resolve this zone. A drill hole (refer 3.4.1.2) has been recommended for this area; in the absence of any further geological information, such a hole is required to provide badly needed information on this anomalous, structurally disturbed zone.

Of the remaining untested anomalies, it is planned in 1971-72 to further assess anomaly A8 and A16

(south of Walford Peak). These anomalies arise from good conductors and yield S.P. anomalies. They lie in an area where a marked off-set in the Cambrian-Ordovician contact is concealed by glacial deposits, and seen therefore to occur in a favourable environment. Anomaly A8 is coincident with a Turam and geochemical anomaly outlined by Rio Tinto.

A detailed gradient array I.P. coverage of this anomaly is recommended to provide more information on depth, width and strength of the anomaly source. Approximately 5,000 ft. of new grid will be pegged to enable this work to be completed.

7.5 Drilling

It is recommended that one diamond drill rig be maintained on the licence area for much of the year. Drilling is currently in progress at Selina and a program has been planned for Red Hills in the summer of 1971-72.

7.5.1 Selina Drilling

Two of the planned series of three diamond drill holes to test the I.P. anomaly between traverses 112N and 136N have virtually been completed. Approximately 1,300 feet remains to be drilled in this current program and should be completed by mid-September. Should more encouragement be received in this latter drilling a fourth hole, to the south of traverse 120N, could be drilled to test the flank of the strong anomaly.

If no further drilling appears warranted at the Selina anomaly the rig may be "stood down" until the Red Hills

program begins. Alternatively the hole (refer 3.4.1.2) recommended for the Rolleston area could be drilled.

7.5.2 Red Hills Drilling

A two phase, two rig drilling program has been recommended (by L. Newnham) for the Red Hills area. Phase 1 would involve drilling between 4 and 8 short holes 450 ft. long. Phase 2 involves drilling one hole about 1,000 - 1,500 ft. long.

Drilling should start in early December, 1971 with a small, easily transportable rig (ideally trailer mounted, mast-type rig) capable of 700 ft. of BQ drilling. In early January, 1972 a long hole F52 machine could be positioned to drill the long hole.

A maximum 5,100 ft., minimum 2,800 ft. of drilling is recommended. The program should be completed by the end of February, 1972. If sufficient encouragement is received, additional drilling may be undertaken.

Should insufficient targets be defined during the year, it is envisaged that drilling will be temporarily halted. It is anticipated, however, that a number of additional drilling targets may be available.

Every effort should be made to obtain trailer mounted, mast-type rigs for the drilling programs on E.L. 9/66. This would ensure maximum manoeuvreability and minimum bulldozer costs in shifting and positioning drill rigs.

7.6 Co-ordination of Exploration Effort

Newnham (1970) emphasised the need for co-ordination of exploration effort between adjacent leases in the Mount Tyndall area.

The Mount Lyell Mining and Railway Company Ltd. has recently applied for an exploration licence over 31 square miles (previously E.L. 12/65) immediately north of Queenstown.

Consequently Syndicate companies will hold the majority of potentially mineralised Cambrian rocks between Mt. Huxley and Mt. Murchison.

Definite efforts should be, and are being, made to integrate and co-ordinate exploration activities over the entire area. This involves, in particular, the co-ordination of geological mapping, geological nomenclature and optimum utilisation of contractors and consultants.

Ultimately it is envisaged that a detailed geological map, summarising the vast amount of scattered, detailed observations already made, will be produced to cover the entire area from Queenstown to Rosebery. A considerable number of new ideas and important observations have been made over the last five years at Mt. Lyell, Renison and Rosebery, which need to be compiled and analysed in the broader regional context.

Such a compilation would greatly assist exploration philosophy both on a regional and detailed scale.

7.7 Budget

A total Consolidated Syndicate budget of $194,700 has been proposed and approved by all Syndicate members.

This amount includes a sum of $125,200 which has been allocated to E.L. 9/66. Attached (Appendix 1) is a cost breakdown of the Mt. Tyndall budget which was originally designed by L.A. Newnham and modified by the writer.

A breakdown of expenditure and more detailed notes on some sections are given below.

7.7.1 Outside Services

This category includes track cutting and bulldozer hire. The amount includes $4,000 for track cutting which should allow 100,000 ft. of track to be cut.

The $17,000 for road building includes preparation of drill sites and costeaning.

7.7.2 Diamond Drilling

$45,000 has been allocated for diamond drilling either by contractors or Mt. Lyell drillers. Approximately 6,000 ft. could be drilled for this amount.

7.7.3 Geophysics

A total of $15,000 has been allocated for geophysical consulting. A sum of $2,000 has been set aside for a colour aerial photographic coverage of the Tyndall licence area. This coverage would be carried out as part of a larger photographic project, currently being investigated, planned to cover a number of areas in Western Tasmania.

The remaining $13,000 should adequately cover the cost of the planned I.P. programs.

The total Consolidated Syndicate budget comprises:

Mt. Tyndall E.L. 9/66	$125,200
Pieman E.L. 48/70 & 49/70	$ 53,000
Capital Expenditure	$ 16,500
	$194,700

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APPENDIX I

MT. TYNDALL E.L. 9/66 BUDGET 1971-72

ITEM	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
Salaries	1,000	1,000	1,000	2,000	2,000	4,000	4,000	4,000	4,000	3,000	2,000	1,000	1,000	30,000
Materials	325	325	325	325	500	800	850	850	850	700	500	325	325	7,000
Outside Services	-	1,000	-	2,000	4,000	4,000	3,000	3,000	2,000	2,000	-	-	-	21,000
Diamond Drilling	6,000	6,000	-	-	1,000	5,000	6,000	6,000	6,000	6,000	3,000	-	-	45,000
Geophysics	-	-	-	-	-	-	-	5,000	5,000	5,000	-	-	-	15,000
Geology	250	-	-	250	-	100	100	350	100	-	-	250	-	1,400
General Costs	250	250	300	600	500	500	500	500	500	500	300	250	250	5,200
Hire of Equipment	-	-	-	-	100	100	100	100	100	100	-	-	-	600
TOTALS	7,825	8,575	1,625	5,175	8,100	14,500	14,550	19,800	18,550	17,300	5,800	1,825	1,575	125,200
Mt. Lyell's ⅓	2,608	3,525	542	1,058	2,700	4,833	4,850	6,600	6,183	5,767	1,933	608	525	41,733

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71-786

NORTH WESTERN TASMANIA

LOCALITY MAP 1 **854054**

SCALE: 1:500,000 001

5 cm

C. Grim
ROBBINS ISLAND
Stanley
Smithton
Rocky Cape
Marrawah
Table Cape
Wynyard
BURNIE
Penguin
ULVERSTONE
DEVONPORT
ARTHUR RIVER
NELSON BAY
Balfour
KENNETH BAY
Sandy Cape
A.C.I. OPERATIONS P/L.
E.L. 49/70
232 S.M.
PIEMAN JOINT VENTURE
Waratah
Savage River
E.L. 8/65
Moina
63 S.M.
Cradle Mt.
Pieman Head
Conical Rock
E.L. 48/70
228 S.M.
PIEMAN RIVER
Corinna
Tullah
Rosebery
Renison Bell
Granville Harbour
S.P.L. 27
E.L. 9/66
66 S.M.
Zeehan
Trial Harbour
E.L. 10/69 (1)
23 S.M.
E.L. 10/69 (II)
45 S.M.
QUEENSTOWN
Strahan
S.P.L. 94
KING RIVER
C. Sorell
Derwent Bridge
TO HOBART

ROSEBERY

Murchison Highway

WILLIAMSFORD

Mt. Read

Red Hills

Mt. Murchison Trig. 855

Lake Selina

Lake Westwood

Lake Julia

Lake Rolleston

Lake Huntley

Lake Dora

Lake Spicer

Lake Margaret

Basin Lake

Mt. Tyndall

Mt. Geike

TYNDALL RANGE

Henty River

HOWARD'S ROAD

BRADSHAWS ROAD

N

71-786 LEGEND

A: COMPLETED PRIOR TO 1970/71
- ROADS.
- TRAVERSE LINES.

B: COMPLETED DURING 1970/71
- ROADS.
- TRAVERSE LINES.

C: PROPOSED FOR 1971/72
- ROADS.
- TRAVERSE LINES.

5 cm

THE CONSOLIDATED SYNDICATE

MT. TYNDALL E.L. 9/66

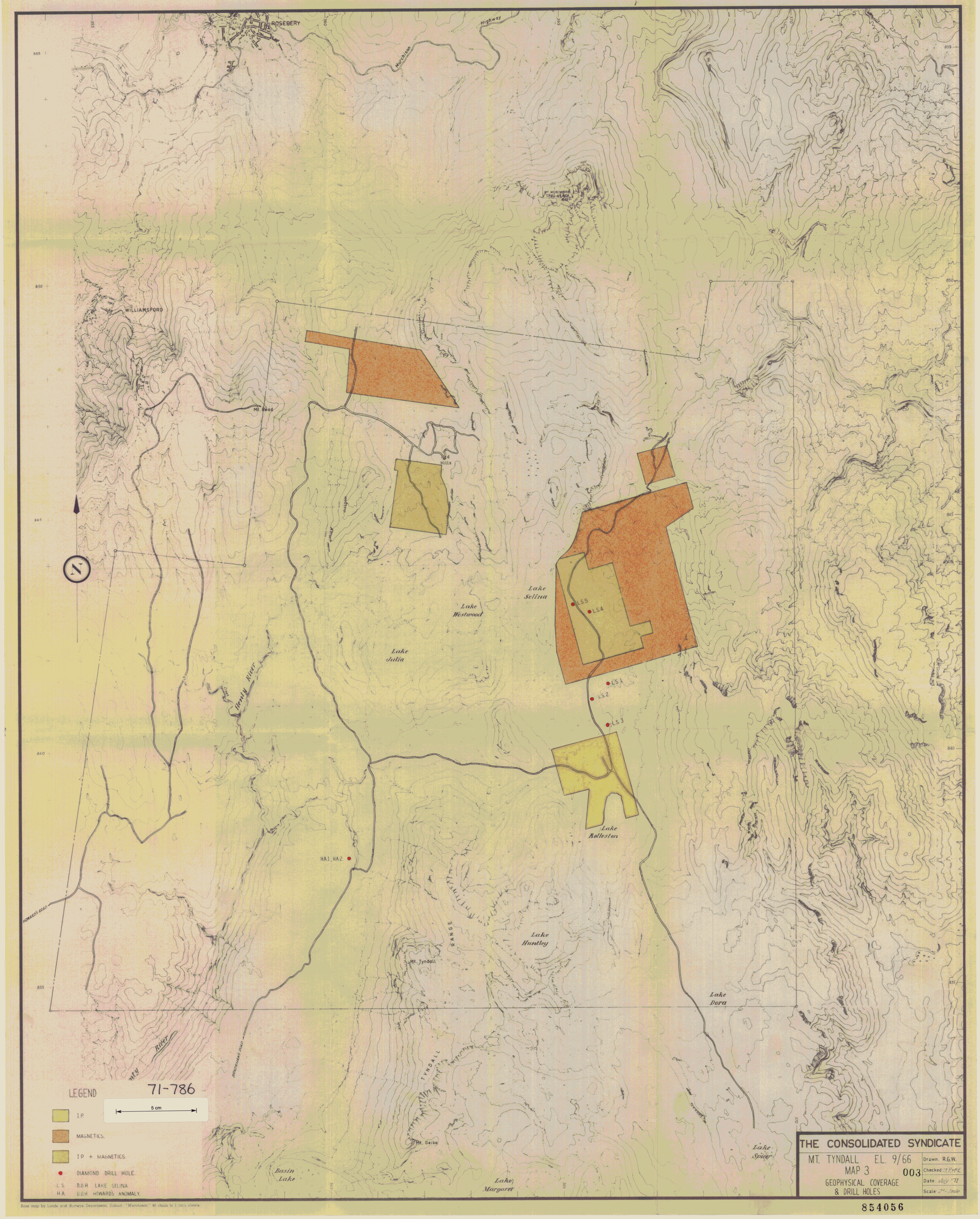
MAP 2 002

ROADS AND TRAVERSE LINES.

Drawn: RGW
Checked: JH
Date: July '71
Scale: 2" = 1 mile

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

854055


ROSEBERY
Murchison Highway
MT. MURCHISON TRIG
WILLIAMSFORD
Mt. Read
Red Hills
Lake Westwood
Lake Selina
Lake Julia
Henty River
L.S.5
L.S.4
L.S.1
L.S.2
L.S.3
Lake Rolleston
HA.1, HA.2
HOWARD'S ROAD
BRADSHAW'S ROAD
RANGE
Mt. Tyndall
Lake Huntley
Lake Dora
TYNDALL
Mt. Geike
Basin Lake
Lake Margaret
Lake Spicer
855
850
845
840
835
355
360
365
370
LEGEND
71-786
5 cm
I.P.
MAGNETICS.
I.P. + MAGNETICS.
DIAMOND DRILL HOLE.
L.S. D.D.H. LAKE SELINA.
H.A. D.D.H. HOWARD'S ANOMALY.
Base map by Lands and Surveys Department, Hobart. "Murchison" 40 chain to 1 inch sheets
THE CONSOLIDATED SYNDICATE
MT. TYNDALL E.L. 9/66
MAP 3
003
GEOPHYSICAL COVERAGE & DRILL HOLES
Drawn. R.G.W.
Checked J.P.McK.
Date July '71
Scale 2" = 1 mile

854056

ROSEBERY

Rosebery Cu-Pb-Zn

Hurchisons

Highway

Stirling Valley

Mt. Murchison 3360 ft.

WILLIAMSFORD

Hercules Cu-Pb-Zn

Mt. Read

FAULT

HENTY

Hills

Lake Westwood

Lake Selina

Lake Julia

Selina Workings Py-Cp

NEWTON

FAULT

RIFT

DORA

Tyndall Cu-Pb-Zn-Ag Mine

Lake Pollestor

RANGE

Mt. Tyndall

Lake Huntley

Pyrite Dora Workings

Lake Dora

TYNDALL FAULT

HOWARDS ROAD

Mt. Geike

Lake Margaret

Lake Spicer

N

LEGEND

71-786

QUATERNARY		Swamps
		Glacials (Fluvioglacials, Morains, Etc.)
ORDOVICIAN		Owen Conglomerate, Jukes Breccia, Tyndall Quartzite.
LOWER CAMBRIAN		Sandstones, Siltstones. Conglomerates.
CAMBRIAN	UPPER — Undifferentiated (Chiefly Volcanics)	Acid Extrusives (Rhyolites, Keratophyres, Etc.)
		Basic Intrusive (?) (Hornblende - Albite Porphyry)
		Pyroclastics (Tuffs, Agglomerates Etc.)
		Shales & Sandstones
	Undifferentiated	Coarse Arkosic Sediments
		Dora Agglomerate Formation
	LOWER — Undifferentiated (Shales, Sandstones, Minor Pyroclastics, Sedimentary in General)	
PRECAMBRIAN		Sticht Quartzites
INTRUSIVES		Gabbro
		Serpentinite

5 cm

Approximate geological boundary
Bedding
Schistosity
Major Fault Inferred
Mine (Operating or Abandoned)
Access Road

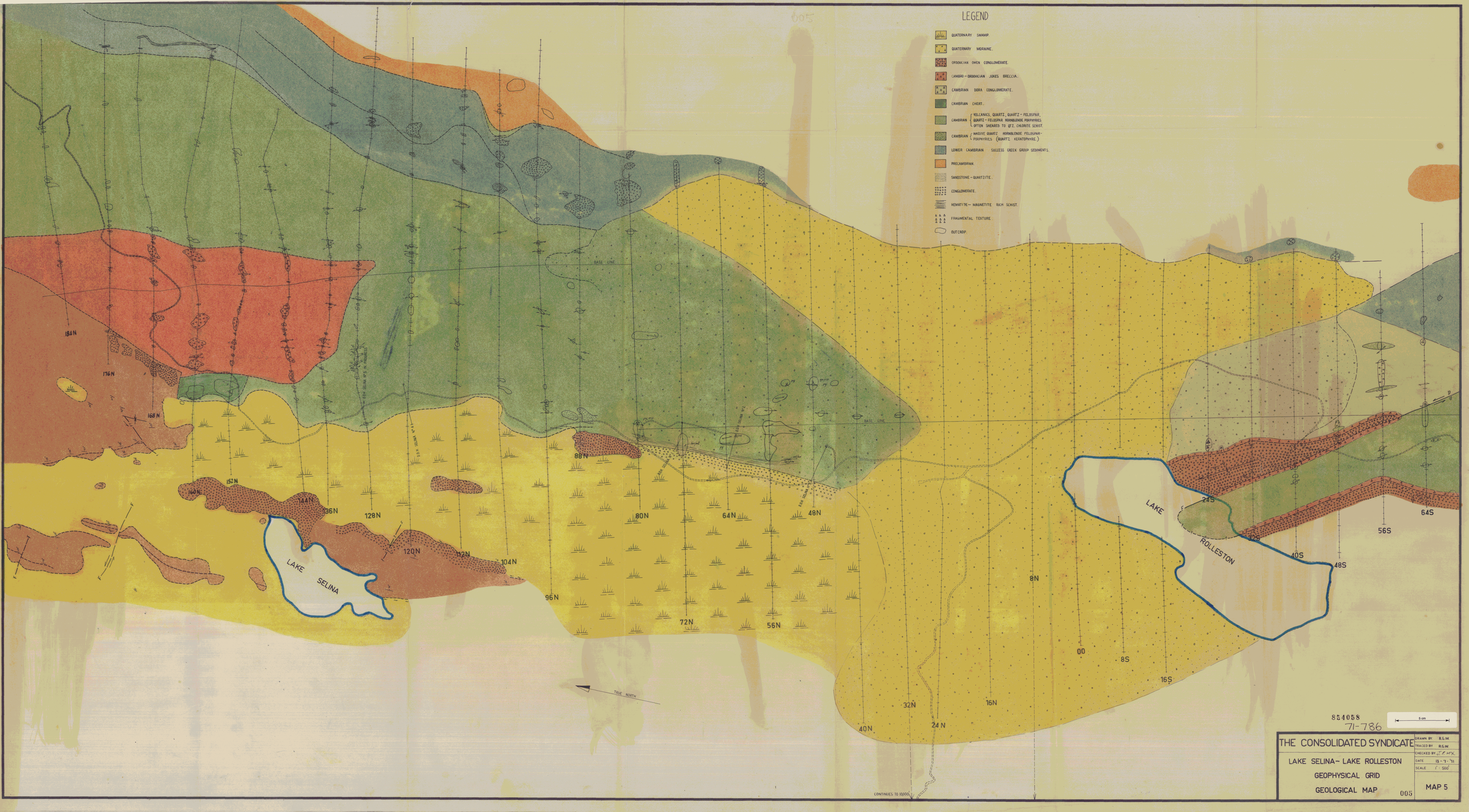
THE CONSOLIDATED SYNDICATE

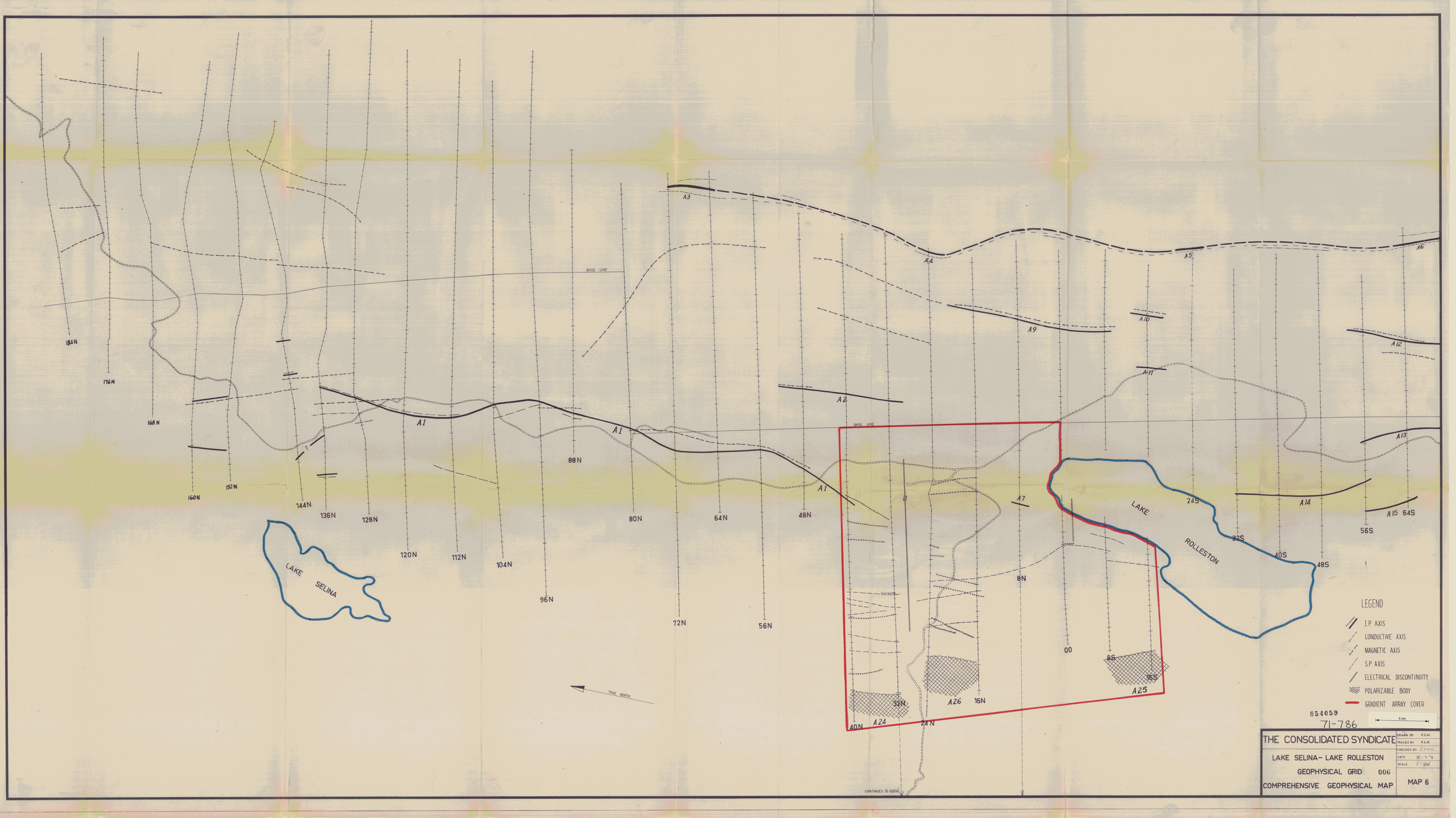
MT. TYNDALL E.L. 9/66
MAP 4 004
GEOLOGICAL MAP

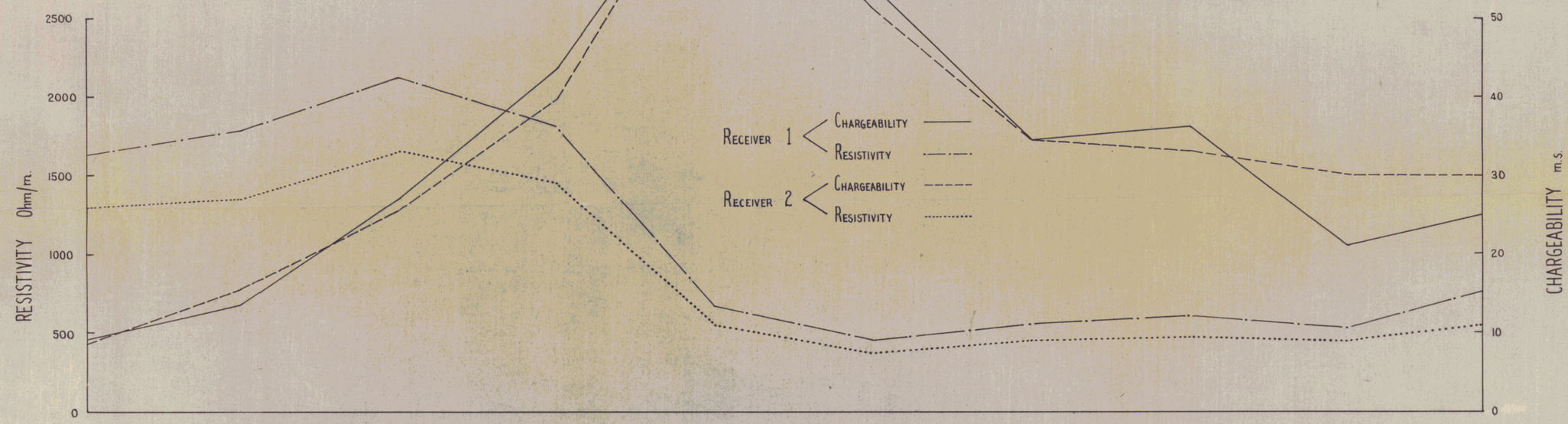
Drawn: RGW
Checked: JTMR
Date: July '71
Scale: 2" = 1 mile

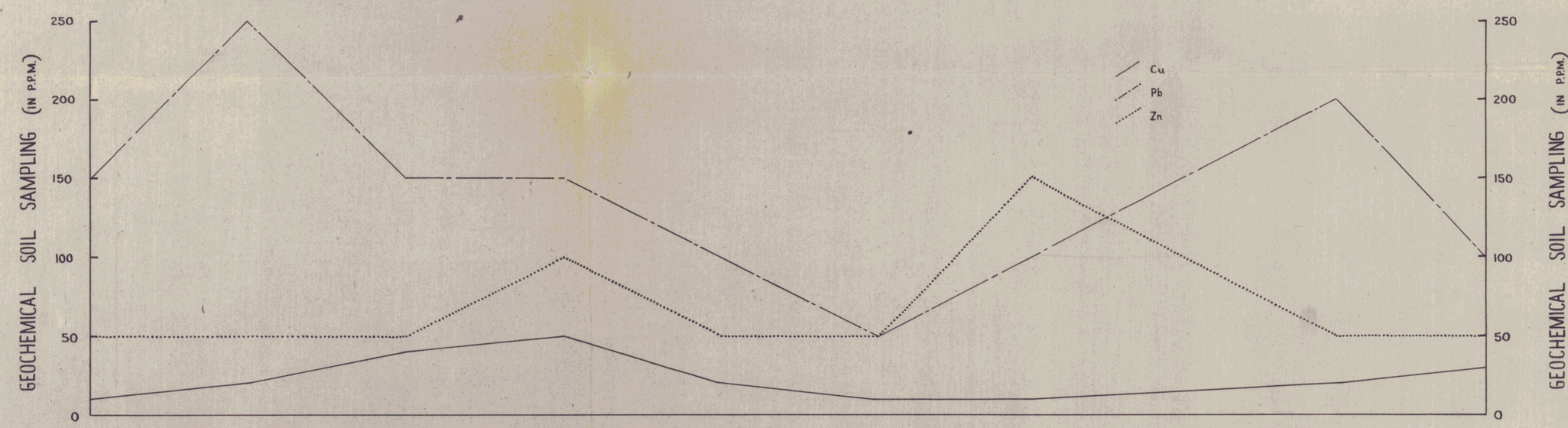
Base map by Lands and Surveys Department, Hobart. "Murchison" 40 chain to 1 inch sheets

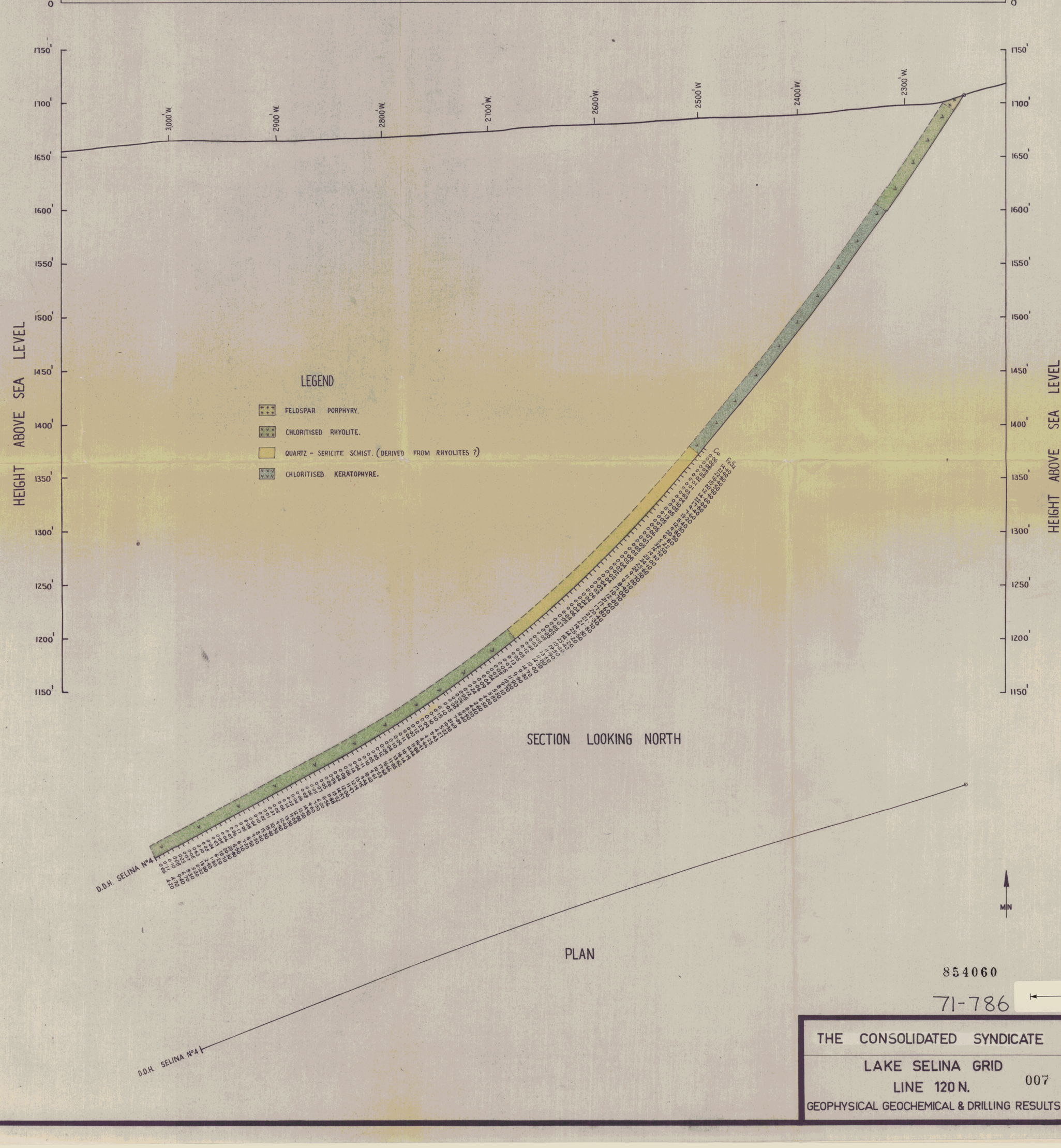
854057


LEGEND
QUATERNARY SWAMP.
QUATERNARY MORAINE.
ORDOVICIAN OWEN CONGLOMERATE.
CAMBRO-ORDOVICIAN JUKES BRECCIA.
CAMBRIAN DORA CONGLOMERATE.
CAMBRIAN CHERT.
CAMBRIAN VOLCANICS, QUARTZ, QUARTZ-FELDSPAR, QUARTZ-FELDSPAR HORNBLENDE PORPHYRIES OFTEN SHEARED TO QTZ. CHLORITE SCHIST
CAMBRIAN MASSIVE QUARTZ HORNBLENDE FELDSPAR-PORPHYRIES (QUARTZ KERATOPHYRE)
LOWER CAMBRIAN SUCCESS CREEK GROUP SEDIMENTS.
PRECAMBRIAN.
SANDSTONE-QUARTZITE.
CONGLOMERATE.
HEMATITE-MAGNETITE RICH SCHIST.
FRAGMENTAL TEXTURE.
OUTCROP.
LAKE SELINA
LAKE ROLLESTON
BASE LINE
TRUE NORTH
CONTINUES TO 10,000
184N
176N
168N
160N
152N
144N
136N
128N
120N
112N
104N
96N
88N
80N
72N
64N
56N
48N
40N
32N
24N
16N
8N
00
8S
16S
24S
32S
40S
48S
56S
64S
005
854058
71-786
5 cm
THE CONSOLIDATED SYNDICATE
LAKE SELINA-LAKE ROLLESTON
GEOPHYSICAL GRID
GEOLOGICAL MAP
005
DRAWN BY R.G.W.
TRACED BY R.G.W.
CHECKED BY J.F.M.K.
DATE 15-7-71
SCALE 1" = 500'
MAP 5


BASE LINE
A1
A2
A3
A4
A5
A6
A7
A9
A10
A11
A12
A13
A14
A15
A24
A25
A26
184N
176N
168N
160N
152N
144N
136N
128N
120N
112N
104N
96N
88N
80N
72N
64N
56N
48N
40N
32N
24N
16N
8N
00
8S
16S
24S
32S
40S
48S
56S
64S
LAKE SELINA
LAKE ROLLESTON
TRUE NORTH
CONTINUES TO 10000
LEGEND
I.P. AXIS
CONDUCTIVE AXIS
MAGNETIC AXIS
S.P. AXIS
ELECTRICAL DISCONTINUITY
POLARIZABLE BODY
GRADIENT ARRAY COVER
854059
71-786
5 cm
THE CONSOLIDATED SYNDICATE
LAKE SELINA- LAKE ROLLESTON
GEOPHYSICAL GRID 006
COMPREHENSIVE GEOPHYSICAL MAP
DRAWN BY R.G.W.
TRACED BY R.G.W.
CHECKED BY J.F.P.C.
DATE 22-1-71
SCALE 1" : 500'
MAP 6







SECTION LOOKING NORTH

PLAN

854060

71-786

5 cm

THE CONSOLIDATED SYNDICATE	DRAWN. R.G.W.
	TRACED. R.G.W.
	CHECKED. J.P.M.K
LAKE SELINA GRID	DATE. 31-5-'71
LINE 120 N. 007	SCALE. 1" = 50'
GEOPHYSICAL GEOCHEMICAL & DRILLING RESULTS	MAP 7

RESISTIVITY Ohm/m.

CHARGEABILITY m.s.

Receiver 1 — Chargeability
Receiver 1 — Resistivity
Receiver 2 — Chargeability
Receiver 2 — Resistivity

VERTICAL MAGNETIC INTENSITY (IN GAMMAS)

-690
-480
3210
6010
2160
1560
2010

GEOCHEMICAL SOIL SAMPLING (IN P.P.M.)

420
1040
Cu
Pb
Zn

HEIGHT ABOVE SEA LEVEL

3000'W. 2900'W. 2800'W. 2700'W. 2600'W. 2500'W. 2400'W. 2300'W. 2200'W. 2100'W. 2000'W.

LEGEND

SOIL & RUBBLE.
CHLORITISED ACID VOLCANICS.
RHYOLITE..

SECTION LOOKING NORTH

D.D.H. SELINA No 5

PLAN

MAGNETIC NORTH

854061

5 cm

71-786

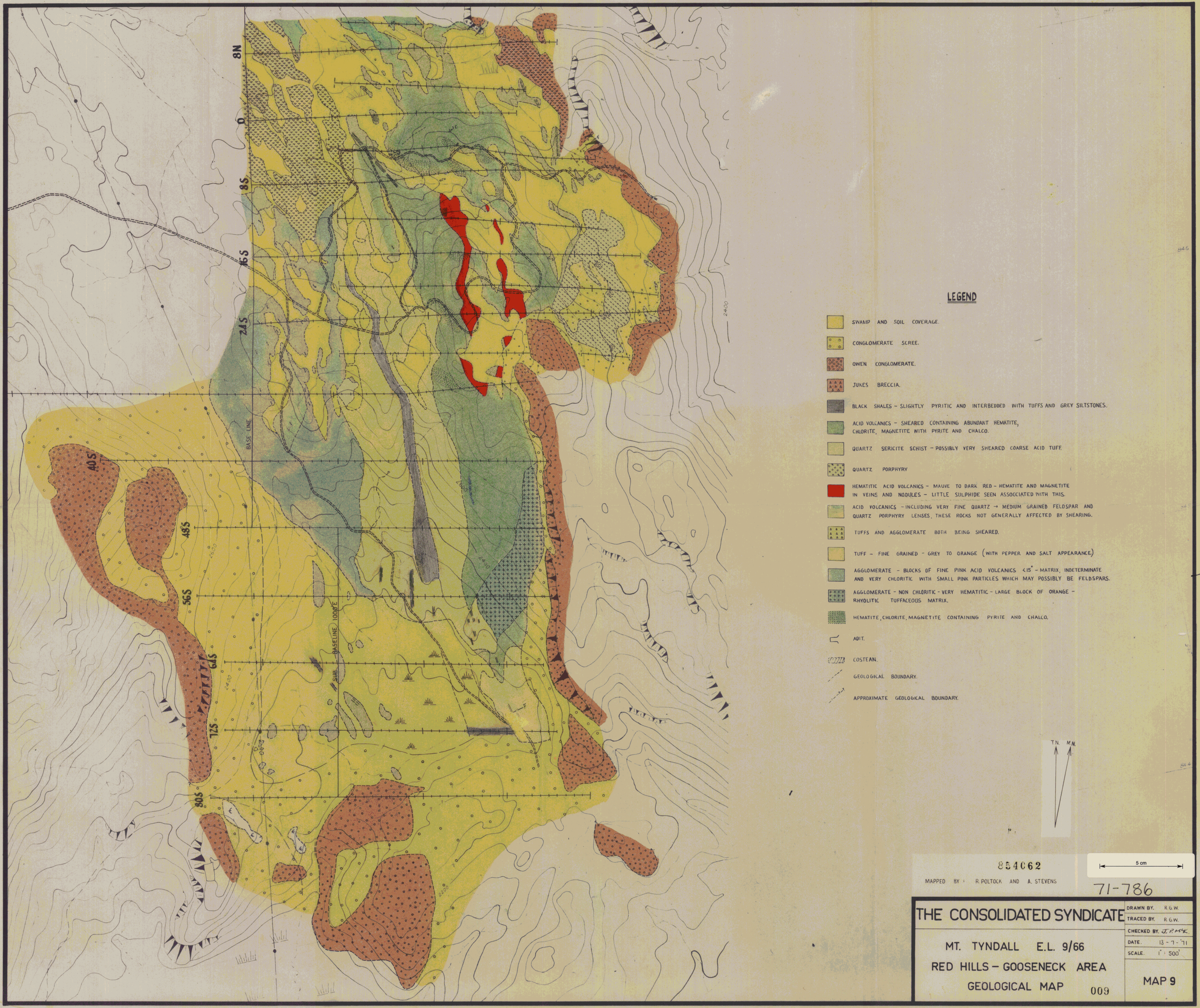
THE CONSOLIDATED SYNDICATE

LAKE SELINA GRID
LINE 128N.
GEOPHYSICAL GEOCHEMICAL & DRILLING RESULTS

008

DRAWN. R.G.W.
TRACED. R.G.W.
CHECKED. J.P.M^cK.
DATE. 20-7-'71
SCALE. 1" = 50'

MAP 8


8N
0
8S
16S
24S
40S
48S
56S
64S
72S
80S
BASE LINE
SUB BASELINE 1000E
LEGEND
SWAMP AND SOIL COVERAGE.
CONGLOMERATE SCREE.
OWEN CONGLOMERATE.
JUKES BRECCIA.
BLACK SHALES ~ SLIGHTLY PYRITIC AND INTERBEDDED WITH TUFFS AND GREY SILTSTONES.
ACID VOLCANICS – SHEARED CONTAINING ABUNDANT HEMATITE, CHLORITE, MAGNETITE WITH PYRITE AND CHALCO.
QUARTZ SERICITE SCHIST – POSSIBLY VERY SHEARED COARSE ACID TUFF.
QUARTZ PORPHYRY
HEMATITIC ACID VOLCANICS – MAUVE TO DARK RED – HEMATITE AND MAGNETITE IN VEINS AND NODULES – LITTLE SULPHIDE SEEN ASSOCCIATED WITH THIS.
ACID VOLCANICS – INCLUDING VERY FINE QUARTZ → MEDIUM GRAINED FELDSPAR AND QUARTZ PORPHYRY LENSES. THESE ROCKS NOT GENERALLY AFFECTED BY SHEARING.
TUFFS AND AGGLOMERATE BOTH BEING SHEARED.
TUFF – FINE GRAINED – GREY TO ORANGE (WITH PEPPER AND SALT APPEARANCE)
AGGLOMERATE – BLOCKS OF FINE PINK ACID VOLCANICS <15" – MATRIX, INDETERMINATE AND VERY CHLORITIC WITH SMALL PINK PARTICLES WHICH MAY POSSIBLY BE FELDSPARS.
AGGLOMERATE – NON CHLORITIC – VERY HEMATITIC – LARGE BLOCK OF ORANGE – RHYOLITIC TUFFACEOUS MATRIX.
HEMATITE, CHLORITE, MAGNETITE CONTAINING PYRITE AND CHALCO.
ADIT.
COSTEAN.
GEOLOGICAL BOUNDARY.
APPROXIMATE GEOLOGICAL BOUNDARY.
T.N.
M.N.
854062
5 cm
MAPPED BY : R. POLTOCK AND A. STEVENS
71-786
THE CONSOLIDATED SYNDICATE
MT. TYNDALL E.L. 9/66
RED HILLS – GOOSENECK AREA
GEOLOGICAL MAP
009
DRAWN BY. R.G.W.
TRACED BY. R.G.W.
CHECKED BY. J.P.McK.
DATE. 13-7-'71
SCALE. 1" : 500'
MAP 9

LEGEND

- I.P. AXIS
- CONDUCTIVE AXIS
- MAGNETIC AXIS
- S.P. AXIS
- ELECTRICAL DISCONTINUITY
- D.D.HOLES RECOMMENDED BY C.G.G.

T.N. M.N.

854063

5 cm

71-786

THE CONSOLIDATED SYNDICATE

MT. TYNDALL E.L. 9/66

RED HILLS – GOOSENECK AREA

COMPREHENSIVE GEOPHYSICAL MAP

DRAWN BY.	R.G.W.
TRACED BY	R.G.W.
CHECKED BY.	J.P.M.K.
DATE.	14 - 7 - '71
SCALE	1" = 500'

MAP 10

010

X HOLES PLANNED

HOLES COMPLETED

854064

5 cm

71-786

THE CONSOLIDATED SYNDICATE	DRAWN. R.G.W.
	TRACED. R.G.W.
	CHECKED. [illegible]
RED HILLS AREA	DATE. 21-1-71
	SCALE. 1" : 200'
PERCUSSION DRILL SITES	MAP 11
	011

GEOCHEMICAL RESULTS (p.p.m.)

600
500
400
300
200
100
0

COPPER
LEAD
ZINC

PROBABLE I.P. ANOMALOUS ZONE

PROBABLE DEFINITE I.P. ANOMALOUS ZONE

VERTICAL MAGNETIC INTENSITY (IN GAMMAS)

300
200
100
0
-100
-200

380
-220
1260

HEIGHT ABOVE SEA LEVEL

1500'
1450'
1400'
1350'
1300'
1250'
1200'
1150'
1100'

2500'W. 2400'W. 2300'W. 2200'W. 2100'W. 2000'W. 1900'W 1800'W 1100'W 1600'W

COSTEAN

Cu FeS2

LEGEND

- SHEARED AGGLOMERATES.
- CHLORITISED TUFFS (ALBITE, QUARTZ CRYSTALS)
- QUARTZ – ALBITE PORPHYRY.
- CHLORITISED FELDSPAR PORPHYRY

H.A.1
H.A.2

SECTION

2000'W. 1900'W. 1800'W. 1700'W. 1600'W.

PLAN

N

854065

5 cm

71-786

THE CONSOLIDATED SYNDICATE	DRAWN R.G.W.
	TRACED
	CHECKED J. P. MCK.
HOWARDS ANOMALY 012	DATE 24-3-'71
SECTION OF LINE 20+200'S	SCALE 1" : 50'
GEOPHYSICAL, GEOCHEMICAL & DRILLING RESULTS	MAP 12