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COMSTAFF PROPRIETARY LIMITED

REVIEW OF 1969-1970 EXPLORATION PROGRAMME

EXPLORATION LICENCE 5/63, TASMANIA

AMG REFERENCE POINTS ADDED

CONTENTS

1. PREFACE

The Comstaff Exploration Licence No. 5/63 covers an area of 299 square miles in north eastern Tasmania.

This report reviews all the work carried out within the Exploration Licence area during the 1969-1970 summer and, in addition, that conducted in the Pinnacles area during the 1969 winter. Exploration activities were concentrated in the following areas:

Huskisson - Serpentine Area
North Huskisson - Lynch Creek - Serpentine Area
Coldstream - Ramsay River Systems
Renison Bell West Area
Mt. Charter - Upper Que River
Pinnacles - Chester - Silver Falls.

2. HUSKISSON - SERPENTINE AREA

2.1 GENERAL

As a result of very high nickel geochemical values realised on two out of three lines cut and sampled over the Huskisson serpentinite (see plan No.2B-6) in the summer of 1968/69, the following programme was planned and completed:

A grid of eleven, one thousand foot lines five hundred feet apart was cut around the anomalous zone and sampled at intervals of fifty feet, A base line was cut (and sampled every one hundred feet) to extend north and south from the last season's grid co-ordinate 00, 34.00 E. All the new sample lines lie to the west.

Two trenches were excavated to bedrock over last season's anomalies. These were mapped in detail together with the new grid.

The regional vegetal cover is of tall myrtle and white top gum forest having some trees 200 feet high

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whereas sword grass, bauera, tee tree and peppermint gum scrub is found on the serpentinite. Line cutting through the latter proved slow and arduous, a two man team averaging about seven hundred feet per day. Apart from occasional patches of comparatively thin horizontal scrub the tall forest is fairly open at ground level and daily progress between fifteen hundred and two thousand feet obtained.

2.2 GEOLOGY (See plan No. 2B-8)

The Huskisson serpentinite appears to form part of a layered ultramafic intrusion which is severely sheared in part. The northern sector of the grid has layered peridotite, pyroxenite serpentinite with numerous veins of coarse, fibrous magnetite and asbestos. The magnetite appears to be pseudomorphous after fibrous serpentinite or asbestos, both slip and to lesser extent cross fibre. These rocks are veined by unaltered asbestos, the cross fibre being up to ¼" long.

Large blocks of this layered material appear to be separated by zones of highly sheared, pale green serpentinite with numerous veinlets of ore minerals (magnetite, manganese oxides and rarely sulphides). The veins are near vertical and almost parallel to the serpentine-host rock contact but without a distinct preferred orientation. The pale colour is considered to be due to strong leaching of primary material of a much darker hue.

The unsheared ultramafic rock layers are of alternating dark green to blue green serpentinite and medium to coarse grained green pyroxenite. The serpentinite is frequently veined by black serpentine which may contain euhedral crystals of magnetite or chromite. The near vertical pseudostratification strikes north-south.

Certain discordant structures within the ultramafic body have been interpreted as later injections. One dyke of green pyroxenite, identical to the layered pyroxenite

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cuts through sheared serpentinite on line 5N and a dyke of green serpentine occurs south of line 20N within layered rocks. What appears to be a large apophysis of green very coarse grained pyroxenite between lines 20 and 25N is fine grained at its contacts with the serpentinite host and broad bands of similar rocks to the north of it could be sills.

A confusion of strikes and dips on layered serpentinite between lines 14/20N and 20N is unresolved and may be due either to rotation by faulting or large float movement. South of this zone to line 10S only sheared serpentinite outcrops.

The country to the west, of scree covered slopes and relatively flat ground, has a dearth of outcrop despite the thin soil cover of little more than two or three feet. Hence the western contact was not seen but rather is inferred from vegetation and topography changes. The eastern contact lies very close to the base line. This contact is thought to be faulted, as the layering abuts against it at an angle of 25 degrees, and the rocks here are strongly sheared.

No rocks are exposed to the east of the contact but tuffaceous shale and grey shale float was found in the tree roots etc. Specimens of weathered mineralised microgabbro were collected from the contact in tuffaceous sediments.

2.3 GEOCHEMISTRY (See plans Nos. 2B-9, 2B-10)

2.3.1 Results. A strong nickel and cobalt geochemical anomaly centred on sheared pale green serpentinite on lines 00, 5N, 10N and 14/20N has a strike length of 1500 feet and a width of 500 feet . Extensions to the anomaly comprise a narrow strip on line 5S and lower grade zones which indicate possible extensions to line 30N, which would increase the strike length to 3,500 feet.

Background nickel values are in the order of 800 p.p.m. on the layered material and 2,000 p.p.m. on sheared pale green serpentinite. Anomalous values range from 8,000 p.p.m. to over 1%. Assay figures from last season's anomalous soils were as high as 1.6%.

Cobalt background values were in the order of 150 p.p.m. on the layered material and 300 p.p.m. on sheared pale green serpentinite and values over the nickel anomaly are from 550 p.p.m. to 1,200 p.p.m.

The +900 p.p.m. cobalt anomalies plot in narrower zones than the nickel counterparts and furthermore outline en echelon concentrations of metal parallel to the contact.

Whereas the main anomaly is situated within an outcrop area along the ridge, a wide zone of above background soil values up to 9,000 p/p.m. Ni and 1,000 p.p.m Co occurs on flat ground to the west. There is a distinctive halation downslope (+ 5,000 p.p.m. Ni) for one to two hundred feet from the main anomaly.

2.3.2 Soil Type. The serpentinite is covered by black to chocolate btown soil, very rich in humus and containing fragments or boulders of serpentine. Lateritic soil patches are not uncommon. Typically, the soil is thin without development of a profile.

Drainage is effected by sheet flow and much underground circulation along cracks and joints to the degree that a well developed spring line exists at the junction of the hill slope with flatter swampy ground.

The presence of laterite appears to have no effect on nickel or cobalt soil values.

Last season's samples were taken from the supposed C horizon or the point marked by bedrock fragments whereas this season the samples were from the A_1 level. In view of the uniform character of the soils it is not surprising that the results from both projects are comparable although the deeper samples over the tuffaceous rocks east of the contact are generally higher in value.

2.3.3 Comment. Both background and threshold values were difficult to establish by statistical analysis; this was because the number of samples comprising the anomalies was great compared to those carrying only background values. A histogram (see plan 2B-7) of nickel values forms a normal hyperbolic distribution curve from 0 to 2,500 p.p.m with a peak around 800 p.p.m., with a superimposed second curve in the range 0 to 9,000 p.p.m. with a peak at 4,500 p.p.m., and a third sharply inflected curve at + 1%. From this graph contours were selected for drawing at values 2,000 p.p.m. and 8,000 p.p.m. of which the latter outlines the anomalies shown on map No. 3.

The cobalt values histogram is less distinct, having slight peaks at 50 p.p.m., 250 p.p.m. and 450 p.p.m., but by trial and error a similar pattern to the nickel anomaly was derived drawing contours at 300 p.p.m. and 600 p.p.m. Additional contours to embrace values of 900 p.p.m., commented on previously, were drawn. The 600 p.p.m. anomaly contour is presented on map No. 4.

Values of samples collected off the serpentinite were excluded from the statistical analyses.

Chip samples from the serpentinite exposed by trenching on part of the line 00 anomaly, on analysis, yielded values in the order of 2000 to 3500 p.p.m. Ni. These data lead to the tentative conclusion that the serpentinite is strongly leached near surface, and the overlying soils were enriched biochemically rather than through residual accumulation.

2.4 TRENCHES

Two trenches were excavated over geochemical nickel/ cobalt anomalies on lines 00 and 14/20.

Of the 350 feet of trench on line 00, 270 feet reached bedrock. The serpentine ranged in colour from greenish yellow through bright emerald green to blue (dark) green, with a fine-grained smooth waxy texture. The rocks are highly sheared and traversed by a network of fine veinlets of magnetite and manganese oxides. Several open joints parallel to the contact have a marked concentration of these veinlets which could represent the surface expression of

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hydrothermal ore. Certain brecciated zones were weathered and apparently strongly leached; the serpentine becoming darker and more compact with depth.

Excavation, to a depth of 4 feet, to the east and beyond the last serpentinite outcrop failed to expose bedrock but what appeared to be the contact was sheared with chlorite developed and veined by magnetite, dipping 67^{o} east. Some rotted yellow clay fragments retrieved near this contact are correlated with the tuffaceous sediments.

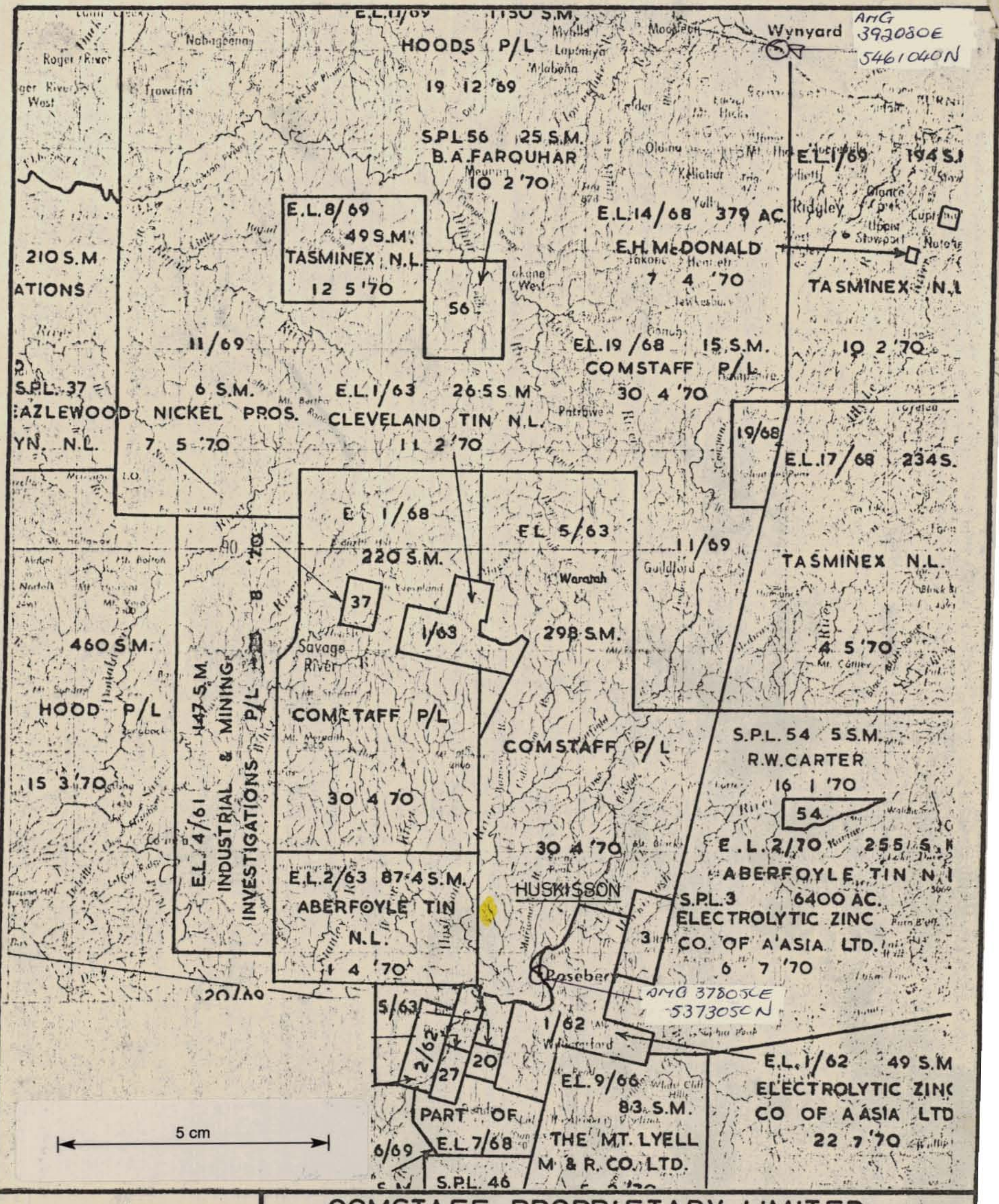
Chip samples over five foot sections of serpentinite in the trench were collected from the contact to a point 115 feet west. A.A.S. analyses of these samples averaged 0.25% Ni and 100 ppm Co rising to 0.35% Ni and 260 ppm Co. Matching peaks in the Ni and Co values coincide with the leached, shattered, pale greenish yellow serpentine which carried a few magnetite veinlets.

The trench on line 14/20N was 800 feet long with an average depth of 6 inches. Despite patchy exposures it seems clear that these rocks are similar to those in the trench on line 00. The first hundred feet (E-W) exposed considerable laterite with occasional outcrops in the soil and is followed by chocolate brown soil and rare outcrop for the next two hundred feet, the remainder being in serpentine scree.

An E100 Mindrill was flown in, set up on line 00 at 32.0E to drill the contact zone and check for sulphides. The machine broke down, then the helicopter crashed and the drilling crew expressed aversion to returning to the site. Because of general uncertainty of replacement of the specific helicopter required for the job the drilling project was postponed.

2.5. PLANS - HUSKISSON SERPENTINITE AREA

Plan No.	Plan
TAS-2B-6	Locality Plan
TAS-2B-7	Histograms for Nickel and Copper
TAS-2B-8	Geology on scale 1:10,000
TAS-2B-9	Soil Samples - Nickel
Tas-2B-10	Soil Samples - Cobalt



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HUSKISSON AREA—LOCALITY PLAN

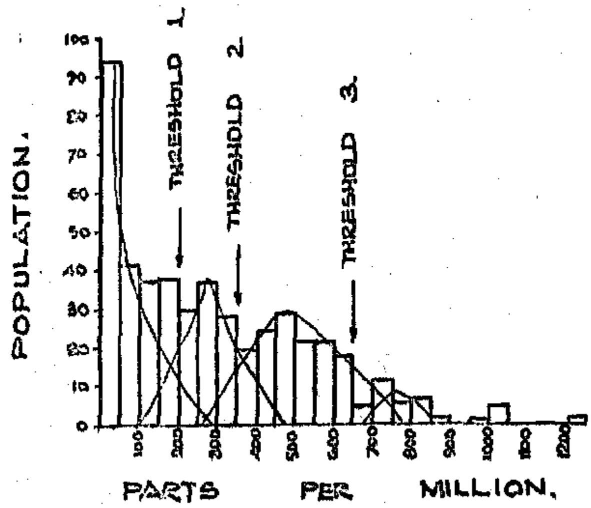
AMG REFERENCE POINTS ADDED

DRAWN

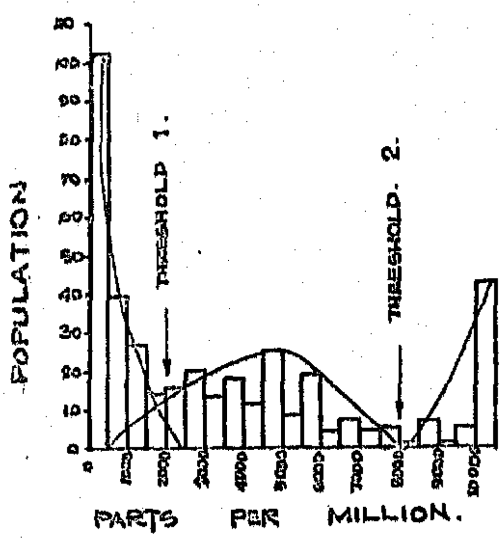
SCALE 1:500,000

PLAN Nº TAS-2B-6

010



COBALT.



NICKEL

93301

5 cm

Compiled I.B, March '70

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HUSKISSON AREA

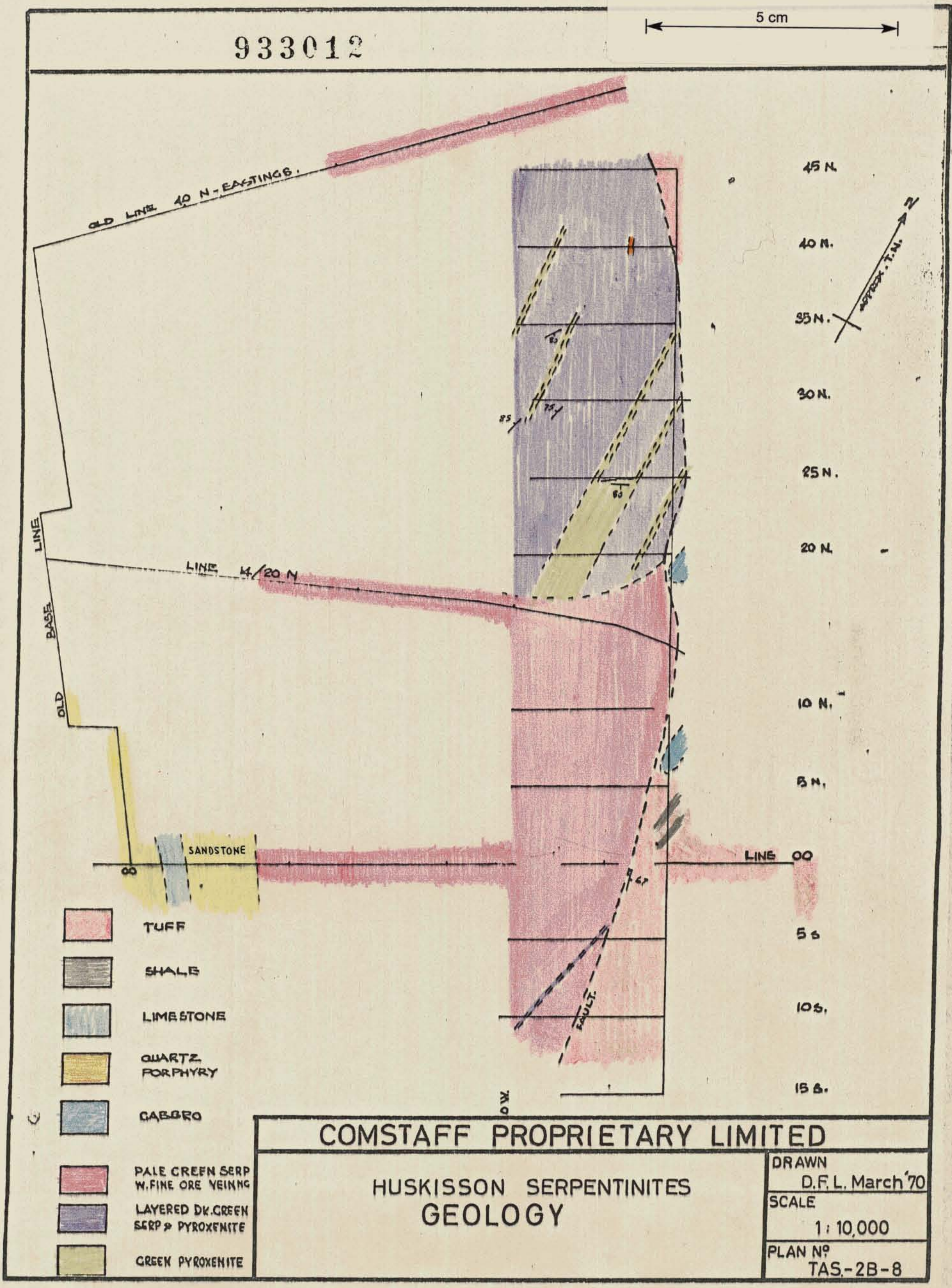
HISTOGRAMS

Population against ppm.

DRAWN	
SCALE	1:10,000
PLAN Nº	TAS-2B-7

011

933012



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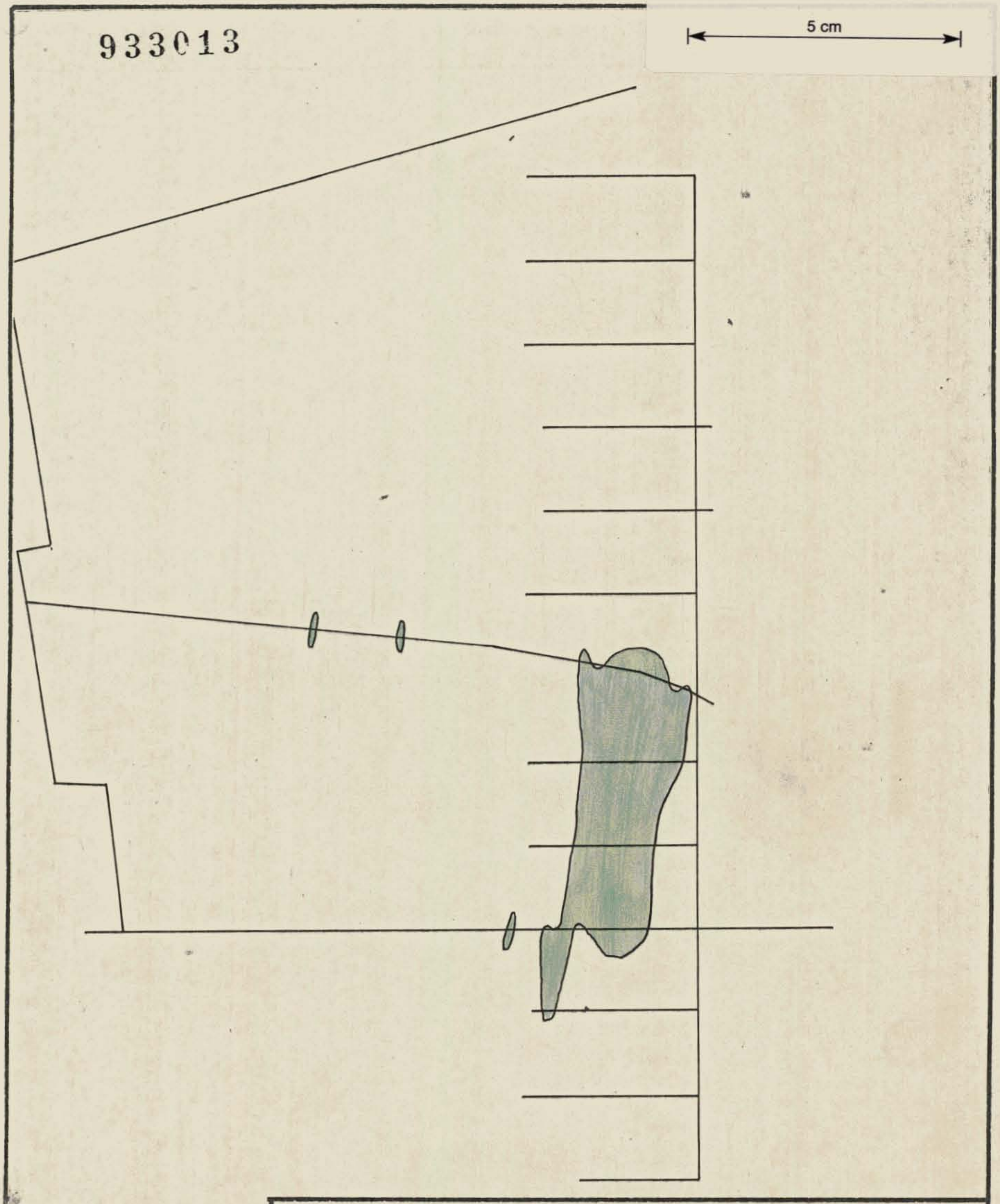
HUSKISSON SERPENTINITES GEOLOGY

DRAWN	D.F.L. March '70
SCALE	1:10,000
PLAN No	TAS.-2B-8

012

933013



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HUSKISSON SERPENTINITE

SOIL SAMPLES

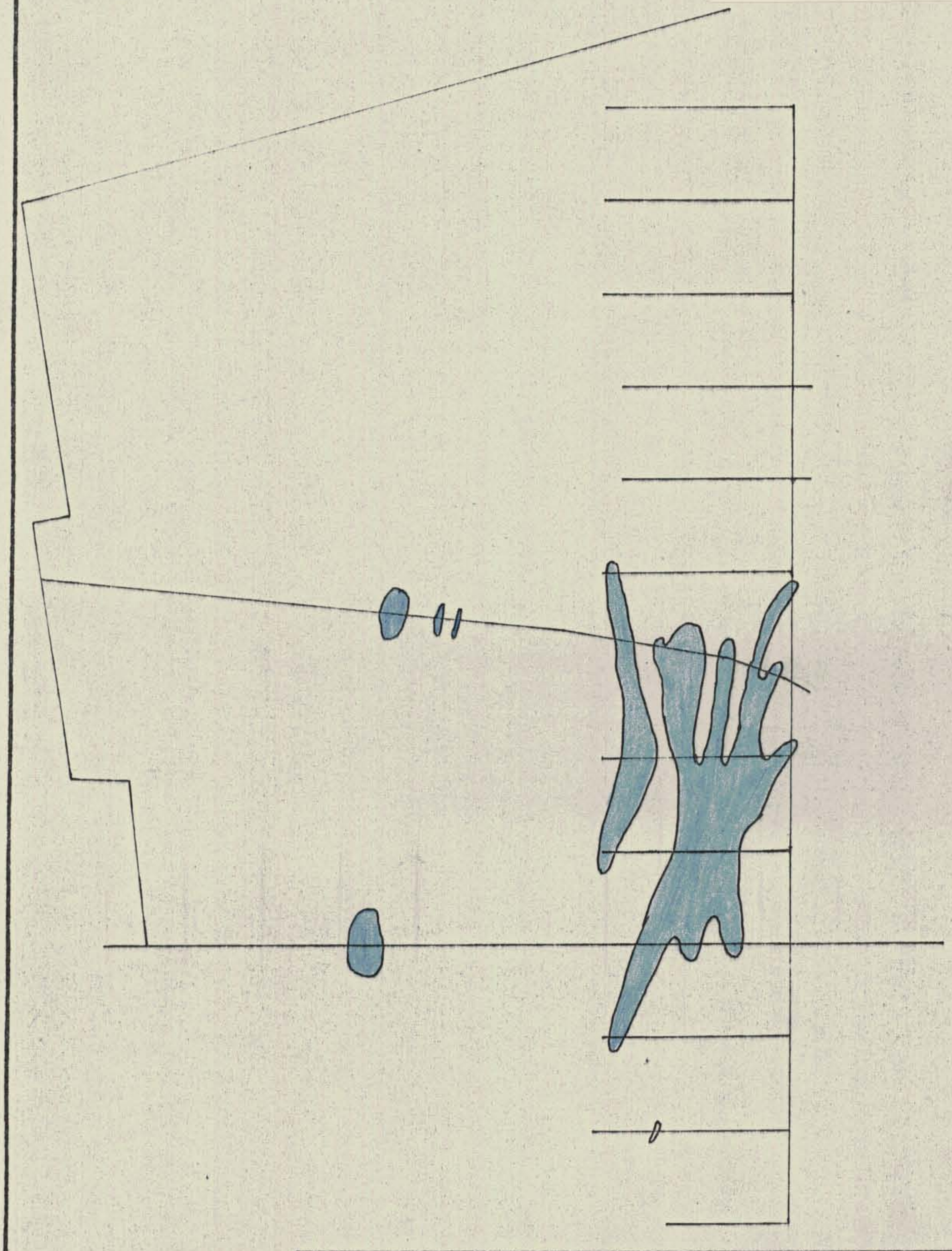
NICKEL

DRAWN	DFL. March '70
SCALE	1 : 10,000
PLAN Nº	TAS - 2B - 9

013

933014

5 cm



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HUSKISSON SERPENTINITES

SOIL SAMPLES

COBALT

SAMPLES OVER 600 ppm

DRAWN	DFL. March '70
SCALE	1:10,000
PLAN Nº	TAS - 2B - 10

3. THE NORTH HUSKISSON - LYNCH CREEK SERPENTINITE AREA.

3.1 GENERAL (See plan No. 2K-1)

A rapid reconnaissance of the Lynch Creek Area to the north of the Huskisson Serpentinite was made in two weeks with a field party consisting of one geologist and a maximum of four field assistants. The object was to find out whether the northern serpentinite body shown on the official geological regional map did in fact exist, and, if so, whether it was separate from the main serpentinite to the south or a continuation thereof. Lynch Creek is shown on the regional geology map as bisecting two serpentinite bodies, so it was geologically mapped from the Huskisson River confluence. In addition, the structure of this area was considered to be of interest because it lies along strike from the serpentinite body to the south.

An investigation of the Huskisson River upstream from Lynch Creek was carried out to examine the possibility of serpentinite extensions to the north. The regional geological map depicts serpentinite at two major bends in the Huskisson River and this was confirmed.

Originally a stream sediment sampling programme involving five hundred feet interval samples was devised to indicate the presence of a northern ultramafic mass, but as serpentinite was recognised in the field it was possible to lay two lines of soil samples (one hundred feet intervals) across the rocks.

3.2 GEOLOGY (See plan No. 2K-2)

The area which lies between the Que Syncline and the Huskisson Syncline is at the approximate position of the supposed axial plane of a hypothetical anticline. The age of the sedimentary rocks in the area is Silurian, some of which are siltstones that contain fossils viz. brachiopods

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(rhynchonellids). Other rocks are quartzites, which form most of the ridges, and calcareous shales.

The general strike of the area changes from approximately 030° in the north to 150° in the south to produce a marked flexure.

The geology exposed in Lynch Creek shows that the two serpentinite bodies are linked. In addition the marked vegetation change, serpentinite covered by sword grass and bauera and other rocks with open high timber, clearly marks the outlines of the rocks on aerial photographs.

The rocks across the area from west (Huskisson River) to east comprise approximately one thousand feet thickness of siltstones and quartzite ridges dipping steeply (70° to 80°) to the east, followed by approximately two thousand feet of calcareous shales (with quartzites always forming the tops of ridges). The latter rocks are folded in a minor syncline the axis of which conforms to the general strike of 150°. The calcareous shales contain disseminated pyrite in part.

The serpentinite body at Lynch Creek is approximately two thousand five hundred feet thick and includes occasional layers of pyroxenite. There is shearing along the eastern boundary in much the same fashion as the main serpentinite to the south. The serpentinite layers are oriented to fit the overall structure i.e. similar strikes and steep dips (80 to 90°) to the outline of the flexure.

A band of micro-gabbro to the east of the serpentinite is about three hundred feet thick and is layered and has a strike of 150° and dips 70° to the east. This rock appears to abut against quartzite although no outcrop was observed.

Of the soil sample lines, Line 1, 1,800 ft. long, crossed the serpentinite, Line 2 was designed to trace the axis of the flexure and over a length of 3,000 ft. the line remained within serpentinite. Both lines started within feet of the estimated position of the western boundary of the serpentinite.

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3.3 GEOCHEMISTRY

Stream sediment samples were taken along Lynch Creek and some of its tributaries crossing the serpentinite. These were tested for copper, nickel and cobalt by A.A.S. The copper values lie between 10 and 30 p.p.m. indicating that none are anomalous.

Soil samples were taken at 100 ft. intervals on lines 1 and 2 and tested for nickel and cobalt. Cutting through the sword grass and bauera was difficult and progress was slow. Hence, although Line 1 was completed by crossing the serpentinite contact within 1,800 ft., Line 2 failed to reach the eastern boundary after 3,000 ft. and it had to be abandoned.

In order to compare values obtained in the soil samples with those from the southern serpentinite being investigated, histograms of population against p.p.m. for nickel and cobalt were drawn from both sets of values. These plots gave various threshold values for each element (see plan 2B-7).

Nickel Stream Sediment Samples (see plan No. 2K-5)

Obviously histograms could not be drawn from the few stream sediment values in hand. Most of these lie between 40 and 80 p.p.m. and only three values of 130, 360 and 1,600 p.p.m. are considered anomalous. The highest value (1,600 p.p.m.) is on a tributary which drains the sheared serpentinite to the east.

Nickel Soil Samples

From the histogram for nickel values (plan 2B-7) it is observed that there are two thresholds, at 2,000 and 8,000 p.p.m. In the area only four values are at or above the lower threshold (2,000 p.p.m.) and none rise to the higher threshold (8,000 p.p.m.). The highest value is 5,400 p.p.m. on line 1 (see plan No. 2K-5). Three anomalous values on Line 2 are around threshold value.

Some of these high values are near mapped layers of pyroxenite with which they are possibly associated.

Cobalt Stream Sediment Samples (see plan No. 2K-4)

Most of the values lie between 20 and 50 p.p.m. with only one considered anomalous at 160 p.p.m. on the tributary draining the sheared serpentinite on the eastern boundary. This coincides with the highest value for nickel (1,600 p.p.m.)

Cobalt Soil Samples

From the histogram for cobalt (Plan 2B-7) three thresholds were selected at 200, 350 and 650 p.p.m. A large number of samples lie above 200 p.p.m. viz. one, 700 p.p.m., on line 1 and one, 720 p.p.m., on line 2. There is little correlation between nickel and cobalt. On line 1 the 5,400 p.p.m. nickel value coincides with 700 p.p.m. cobalt, on the other hand the 720 p.p.m. cobalt on line 2 occurs with a mere 1,600 p.p.m. nickel. Besides the values of 700 plus p.p.m. for cobalt there are three values between 500 and 700 p.p.m.

3.4. PLANS - NORTH HUSKISSON - LYNCH CREEK SERPENTINITE AREA.

Plan No.	Plan.
TAS - 2K-1	Locality Plan
" 2K-2	Geology on scale 1:10,000
" 2K-4	Soil and Stream Sediment Samples - Cobalt
" 2K-5	Soil and Stream Sediment samples - Nickel

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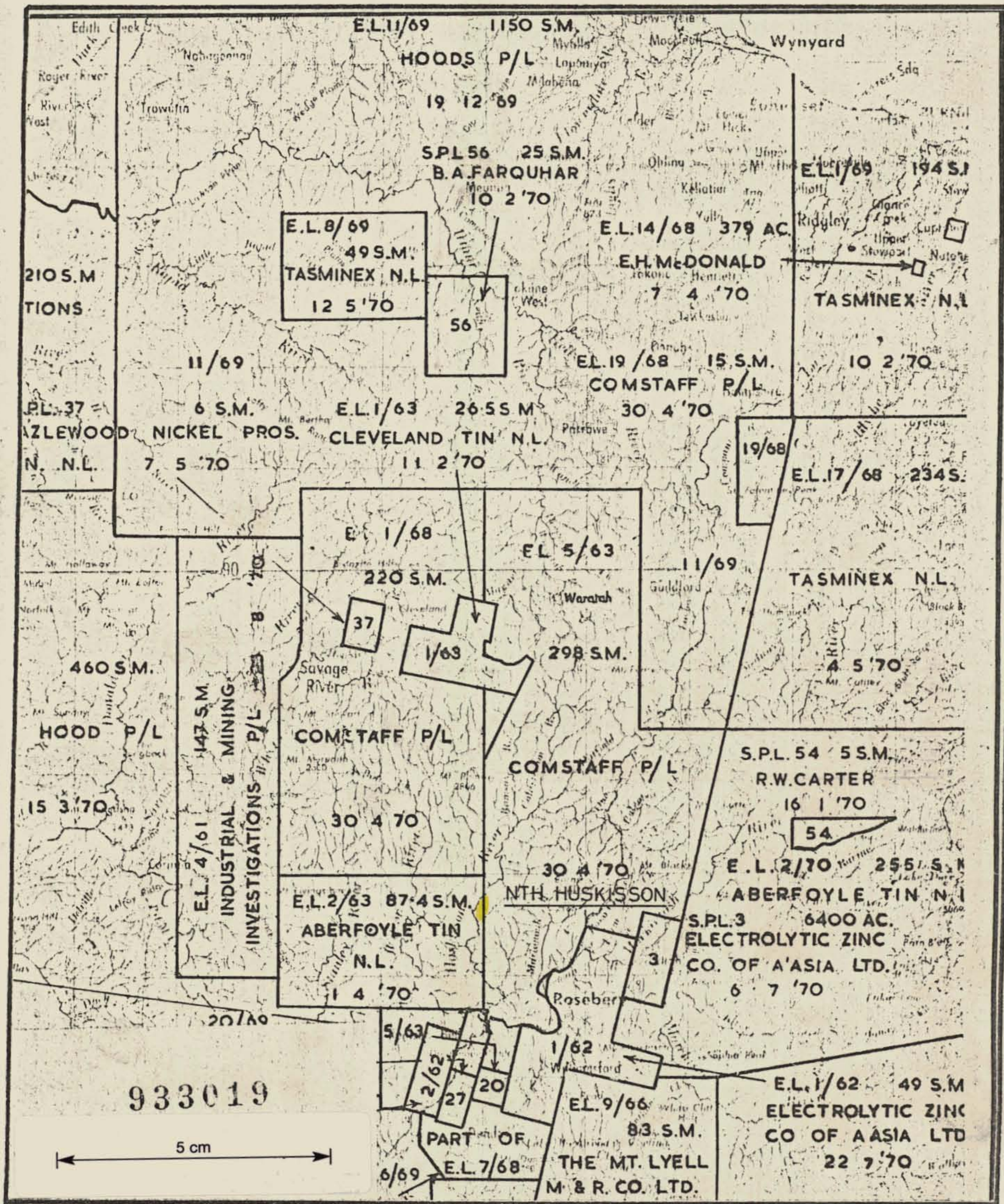

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LYNCH CREEK AREA - (NTH HUSKISSON)

LOCALITY PLAN

DRAWN	
SCALE	1:500,000
PLAN Nº	TAS.-2K-1

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NORTH HUSKISSON - LYNCH CREEK

GEOLOGY

Scale 1 : 10,000

From Sheets 86/34 & 86/35

Plan No TAS-2K-2

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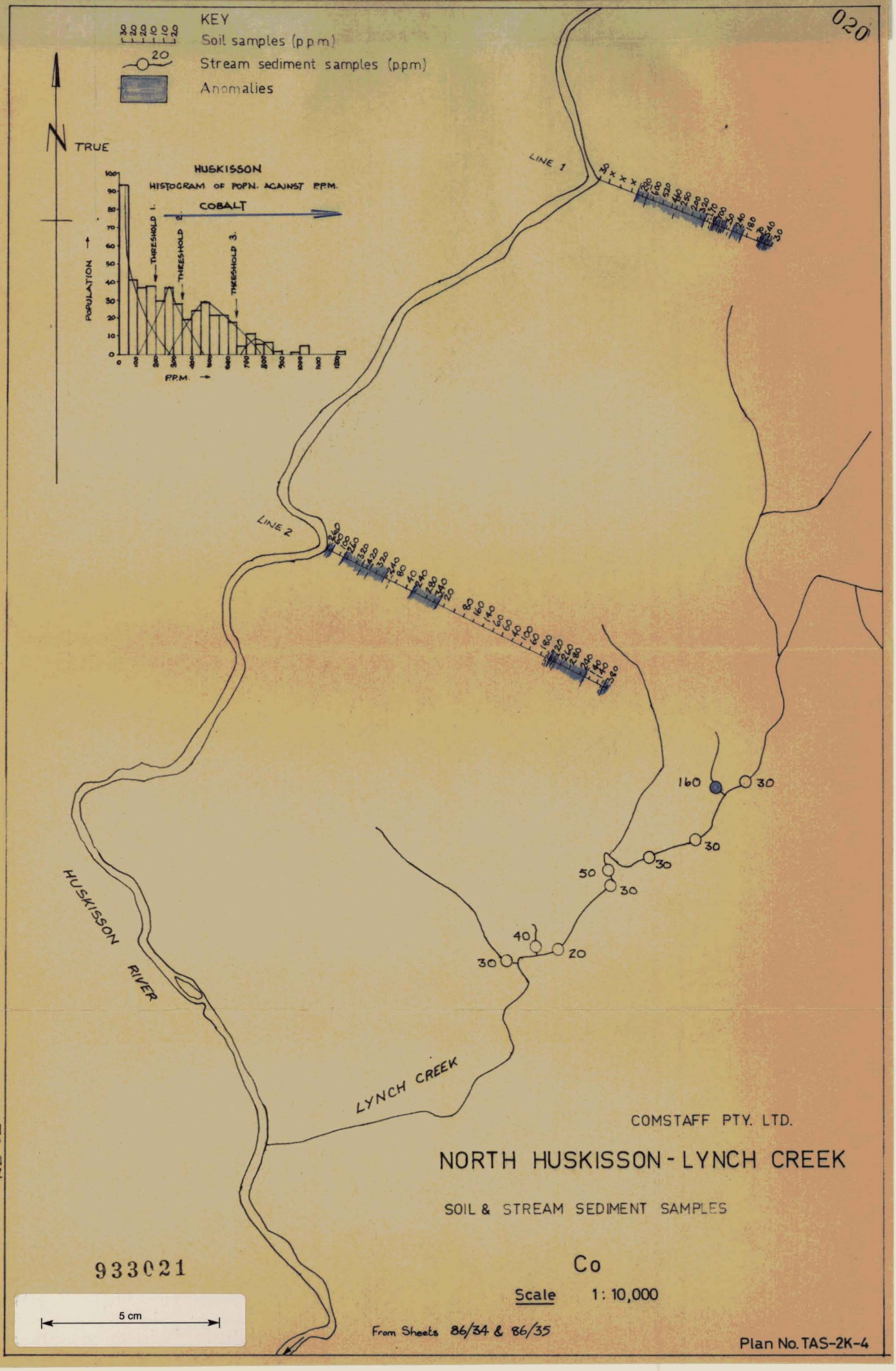
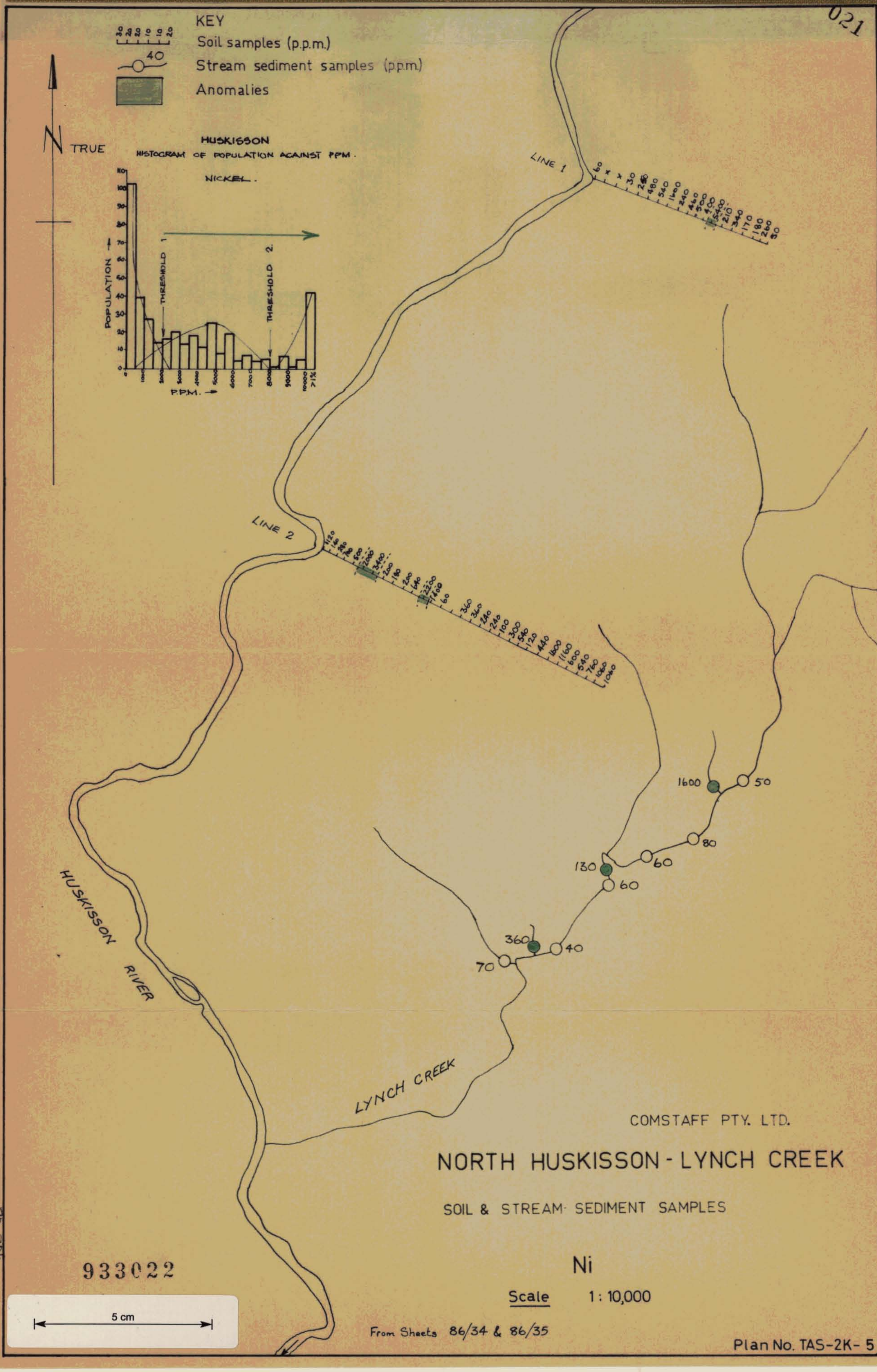


020
KEY
Soil samples (p.p.m.)
Stream sediment samples (p.p.m.)
Anomalies
TRUE
HUSKISSON
HISTOGRAM OF POPN. AGAINST P.P.M.
COBALT
POPULATION
THRESHOLD 1.
THRESHOLD 2.
THRESHOLD 3.
P.P.M.
LINE 1
LINE 2
HUSKISSON RIVER
LYNCH CREEK
160
30
50
40
20
COMSTAFF PTY. LTD.
NORTH HUSKISSON - LYNCH CREEK
SOIL & STREAM SEDIMENT SAMPLES
Co
Scale 1: 10,000
From Sheets 86/34 & 86/35
Plan No. TAS-2K-4
933021
70-196
5 cm



021
KEY
Soil samples (p.p.m.)
40
Stream sediment samples (p.p.m.)
Anomalies
TRUE
HUSKISSON
HISTOGRAM OF POPULATION AGAINST PPM.
NICKEL.
POPULATION
THRESHOLD 1
THRESHOLD 2.
P.P.M.
LINE 1
LINE 2
1600
50
80
130
60
60
360
40
70
HUSKISSON RIVER
LYNCH CREEK
COMSTAFF PTY. LTD.
NORTH HUSKISSON - LYNCH CREEK
SOIL & STREAM SEDIMENT SAMPLES
Ni
Scale 1: 10,000
From Sheets 86/34 & 86/35
Plan No. TAS-2K- 5
933022
5 cm

4. THE COLDSTREAM - RAMSAY RIVER SYSTEMS.

4.1 GENERAL

The reconnaissance entailed a geochemical and geological mapping programme of the Coldstream-Ramsay river systems (both North bank tributaries of the Huskisson). Initial estimates involved 100,000' of drainage to be sampled and mapped in 4 weeks; in fact, seven weeks were needed to complete the programme owing to unexpected delays and a substantial increase in the length of drainage sampled.

Work accomplished comprised 25 miles of creek sampling and 12 miles of geological mapping including detailed mapping across strike in the south of the area (Maps No.2 and 4).

Previous work in the area was minimal being limited to the Mines Department geological survey of the Coldstream (see Mackintosh Sheet 44 1 mile series).

The southern-most tip of the area (the Ramsay-Huskisson confluence) is approximately 12 miles SSW of Waratah, both the Coldstream and Ramsay flowing from North to South (see Plan No.2J-1).

Access to the northern drainage is by foot from the 4 mile post on the Waratah-Savage River road; however, the track to Camp 3 (see Plan 2J-6) is accessible only by Bombardier. The southern-most campsite is accessible only by helicopter.

The terrain, to the north, is flat and largely ill-drained button-grass flats, but becomes increasingly incised to the south having contour differentials up to 1,000'.

In the valleys, the vegetation is largely open woodland with infrequent patches of thick horizontal scrub.

The mainstreams and major tributaries are open and require little cutting but exceedingly steep waterfalls make progress difficult in places.

4.2 GEOLOGY

The Coldstream-Ramsay area lies to the north of, and aligned between, the Huskisson and Que synclines, which initially suggested that the area is an anticline. This has been partially confirmed.

Broadly, the lithology embraces a sequence of Lower Palaoezoic mudstones, sandstones, greywackes and tuffs, with infrequent thin, bedded limestones, the whole being an inlier in the Tertiary Basalt, which abuts in the west against the Devonian Meredith Granite batholith (see Plan 2J-6). The contact zone is adequately drained by the Ramsay and its tributaries.

The region contains two distinct major successions :-

(a) The Ramsay succession - tuffaceous but greywacke free sediments.

(b) The Coldstream succession - greywacke - mudstone sequence.

(a) THE RAMSAY SUCCESSION

This consists of mudstones, shales, sandstones and minor limestones with an increase in tuffaceous sediments to the west. Unlike the Coldstream succession, this succession is essentially greywacke-free and is of Ordo-Silurian (rather than Cambrian) age. The dominant lithology is yellow-brown, laminated, mudstone (with subsidiary shaly texture) which (according to Groves and Solomon) consists of extremely small, angular fragments of quartz, plagioclase, sericite and calcite. The laminations are apparently caused by thin bands of limonite and graphitic material.

The tuffaceous sediments examined were grey green and comprise rock fragments with quartz and felspar set in a fine-grained, predominately chloritic groundmass. These rocks may be confused, in the field, with the Coldstream sub-greywackes but an Amdel description of one of the tuffs states : "The habit of the particles and their sorting is such that it is evident that the clastic components have been subjected to little if any transport. The bulk of the clastic components are derived from an igenous and almost certainly a volcanic provenance. The heterogenous nature of the rock and the lack of evidence for significant transport strongly suggests the rock has formed by a pyroclastic mechanism rather than as a water-laid sediment". The west tuffaceous sequence of the Ramsay succession can probably be equated with the east tuffaceous sequence at Webb's Creek.

(b) THE COLDSTREAM SUCCESSION

This consists of greywacke-conglomerates, greywackes, sub-greywackes and chocolate-brown to grey mudstones with infrequent limestones. These are Cambrian in age - and in general rocks become younger in age from east to west. Chocolate-coloured mudstones are the dominant sediments, their colour being produced by haematite and limonite. Thin carbonate veins may sometimes be present.

The sub-greywackes are poorly sorted with an open framework and consist dominantly of angular quartz grains. Other clastic grains include rounded albite, hornblende, augite, chlorite, magnetite and rare rock fragments. They range in grain size from 0.2 to 0.8m.m. in diameter and generally the grains are not quite contiguous. The matrix consists of chlorite, iron ore and small fragments of other minerals. These sub-greywackes may be confused in the field with fine-grained tuffaceous sediments (see above) and some of these rocks may be volcanic but the presence of quartz and sedimentary rock fragments in quantity suggests they are not tuffs but result from the weathering of volcanic and Pre-Cambrian rocks. (Groves and Solomon).

Nye (1923) classified the greywackes and breccias of this region as micaceous or feldspathic "breccia" but the number of sediments in which mica was an important constituent proved to be very small while almost all of them contained feldspar. (Groves and Solomon).

Folding (see Plan 2J-2)

Folding is complex, with the overall trends still vague. Notwithstanding, present evidence indicates a plunging (?) asymmetric antiform, aligned NNE - SSW: the eastern limb is steeper. Most of the minor folds plunge 50° - 60° at 200° magnetic.

Faulting

Little faulting was observed apart from a minor fault zone on the Ramsay River (see Plan 2J-6); this has no significance as yet.

A possible shear-zone (see Plan 2J-6) was observed to the north and approximately 10,000' from the Coldstream-Hatfield confluence. This may be a continuation to, and the border zone of, the dislocation trending north-south in the Chester-Pinnacles-Silver Falls area (see Pinnacles Report 1969-1970); this is very tentative.

The Ramsay succession in the upper Coldstream seems to be faulted against the underlying mudstone-greywacke sequence but the only field evidence for this beside the lithological change is a marked change in strike direction (see plan No.2J-6).

Metamorphism

This is limited to low-grade chloritic regional metamorphism except near the granite contacts where higher grade thermal metamorphism is evident.

Ultrabasics

Several large boulders and many smaller pebbles of an ultrabasic rock were found at approximately 8 - 9,000' up the Coldstream (see plan No. 2J-6). Unfortunately, limited time and difficult access prevented immediate follow-up of this discovery. However, a specimen of the rock was sent to Amdel for petrographic description viz. "--- is a metamorphosed and deformed ultrabasic rock. The sample could represent a marginal phase of an ultrabasic intrusion which has been deformed by intrusion and metamorphosed. The rock is unusual and could have been a mica peridotite with kimberlitic affinities."

Mineralisation

No minerals of any economic significance were found.

4.3 GEOCHEMISTRY (See plan No. 2J-8)

Only stream sediment samples were collected, and these at various intervals:-

(i) every 1,000' on the two mainstreams;

(ii) every 500' on major tributaries;

(iii) every 300' on some of the minor tributaries.

Coarse, active, stream-bed material was collected in all cases, the samples being sieved to -80 mesh in

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Waratah prior to analysis. Samples were also collected from granite and basalt environments to determine individual background characteristics.

Unfortunately, only a few pH. readings were taken, these all being between 5.5 - 6.5.

Because of the dearth of mines (Just-in-Time and dubious tin alluvial working on the Ramsay - see plan No. 2J-6) and known economic mineral deposits, stream anomaly orientation work could not be undertaken.

Samples were sent to Geomin (Sydney) and analysed by A.A.S. for Zn, Ag, Bi,Cu, Co, and Ni, and colorimetrically for Sn. in the case of samples from waterways draining the granite-sediment contact zone.

(For the following descriptions, refer to Histograms Plan Nos. 2J-3, 2J-4 and geochemical anomaly plan 2J-7)

<u>Zinc</u>

Values range between 20 and 2,400 p.p.m. with the most populous grouping between 60 - 80-p.p.m. A standard concave decay curve follows the peak, tailing off at 350 p.p.m. (threshold 1). Threshold 2 was placed at 600 p.p.m. and any values above this have been regarded as anomalous.

<u>Silver</u>

Values range from less than 0.5 p.p.m., to 11 p.p.m., the population peak being below 0.5 p.p.m. The decay curve ends at 2.0 - 2.5 p.p.m. where there is a second peak. Values above 2.0 p.p.m. have been regarded as anomalous.

<u>Bismuth</u>

Values range between zero and 60 p.p.m., the population peak being approximately 10 p.p.m. It is clear from the histogram that there are no anomalous values.

Copper

Values range between 4 and 180 p.p.m., the peak population being between 20 and 40 p.p.m. Threshold 1 was placed at 100 p.p.m. and anything above this value was regarded as anomalous.

Cobalt

Values vary from zero to over 200 p.p.m.,the latter figure being regarded as the threshold figure. One anomaly was noted and carried between 220 and 240 p.p.m. cobalt.

Nickel

The histogram of nickel values shows a straightforward decay curve tailing off at 240 p.p.m. and with a population peak between 20 and 80 p.p.m. There are no anomalous values.

Tin

The histogram is a confused picture but nevertheless values above 260 p.p.m. are regarded as anomalous. The highest values fall within the West Ramsay area at a small alluvial tin show outside lease EL 5/63; they are therefore not shown on the geochemical-anomalies map.

GENERAL

Values of samples collected from granite were excluded from the histogram populations to avoid the influence on geochemical calculations of a different known lithological environment.

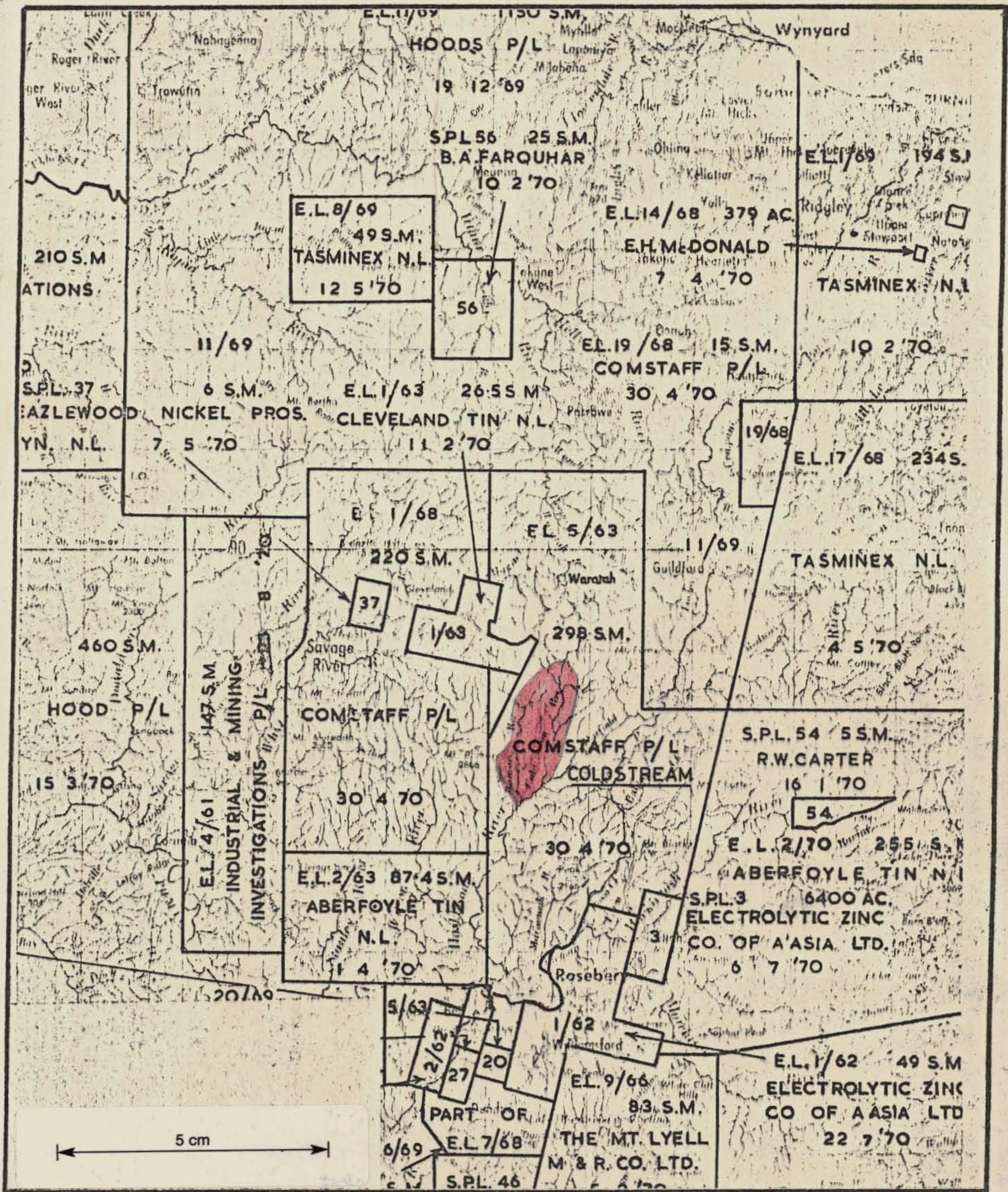
At the time of compilation of this report, the results for the North Coldstream samples were not available.

..18/..

4.4 PLANS - COLDSTREAM - RAMSAY RIVER SYSTEMS

PLAN NO.	PLAN
TAS-2J-1	Locality Plan
TAS-2J-2	Structural Stereogram
TAS-2J-3	Stream Sediment Hisotgram for Silver, Copper & Zinc.
TAS-2J-4	Stream Sediment Histogram for Tin, Cobalt, Bismuth and Nickel.
TAS-2J-6	General Geology on scale 1:50,000
TAS-2J-8	Geochemistry.
TAS-2J-7	Geochemical anomalies

029



COMSTAFF PROPRIETARY LIMITED

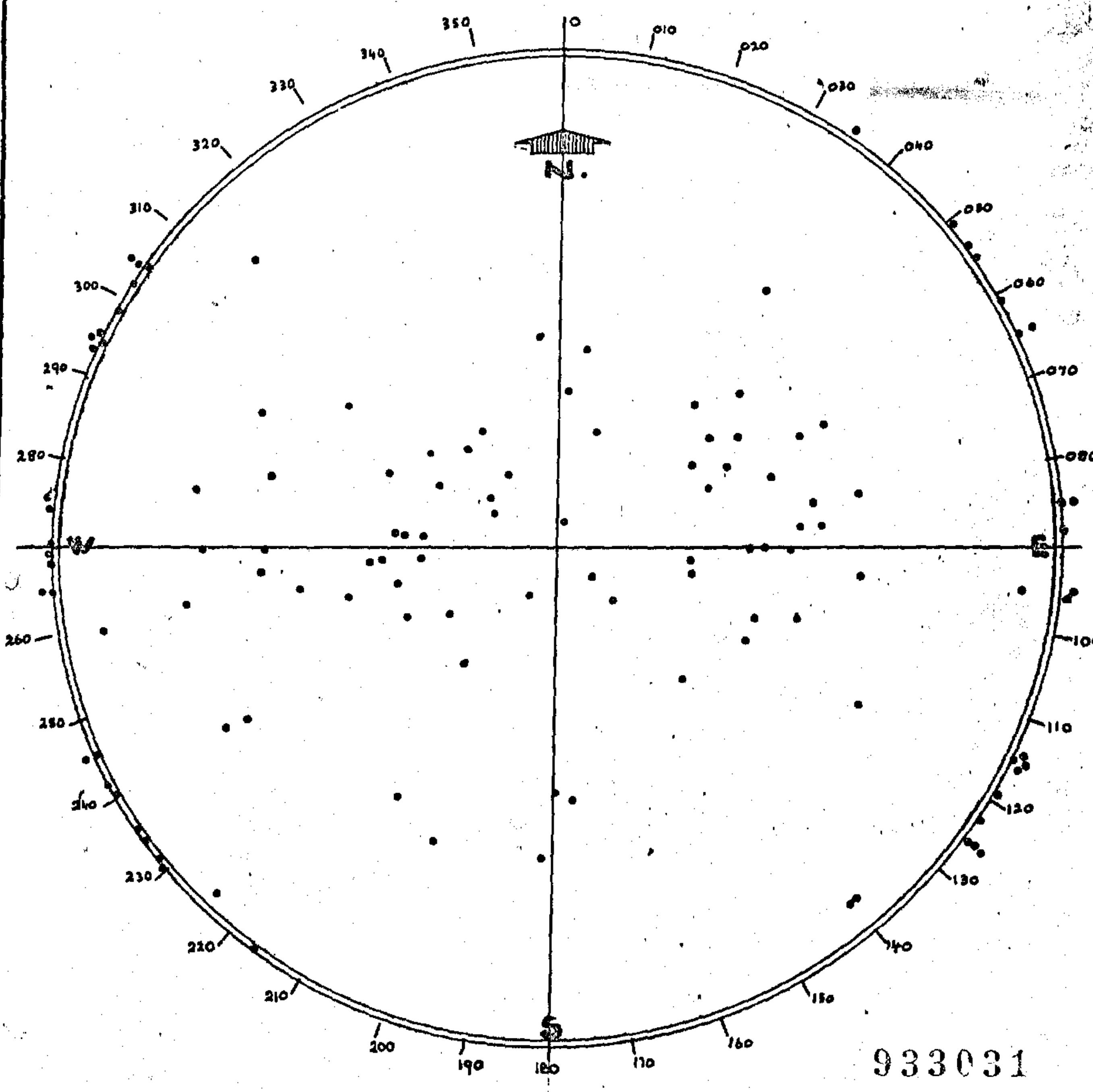
933030

COLDSTREAM AREA–LOCALITY PLAN

DRAWN	
SCALE	1:500,000
PLAN Nº	TAS-2J-1

70-706

030

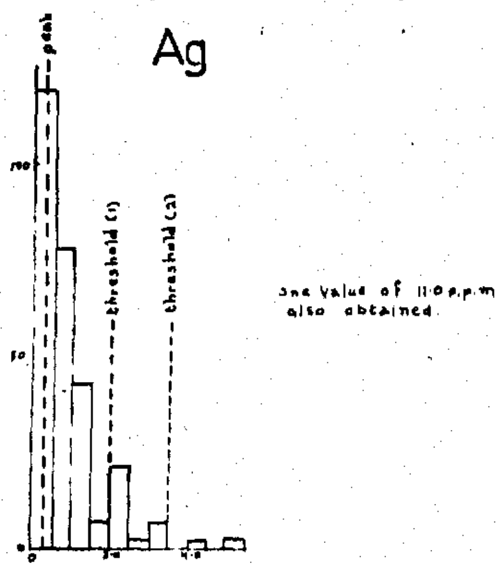


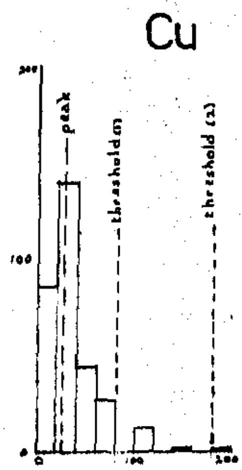
933031

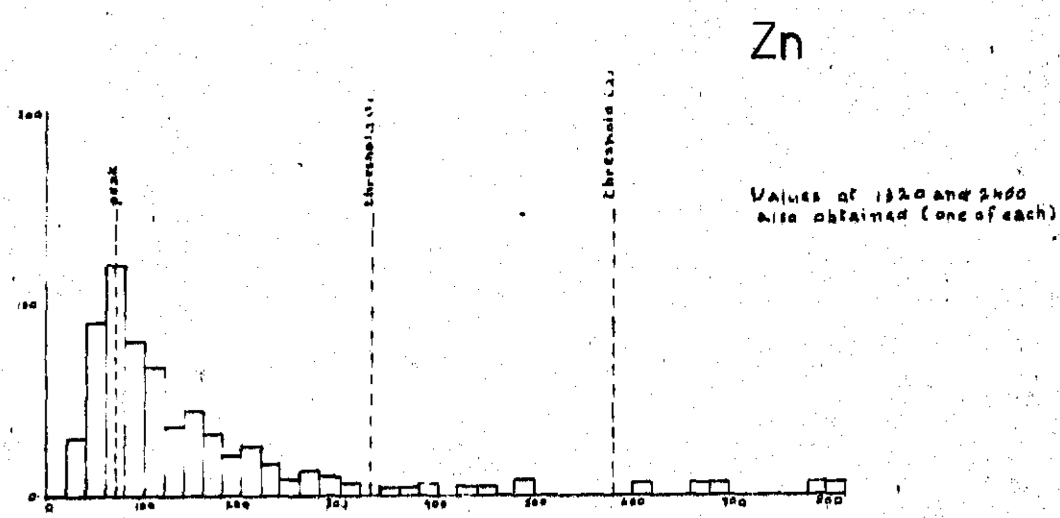
COMSTAFF PROPRIETARY LIMITED

COLDSTREAM AREA STRUCTURAL STEREOGRAM Poles of bedding plotted	DRAWN M.P.E.
	SCALE
	PLAN Nº TAS-2J-2

70-706







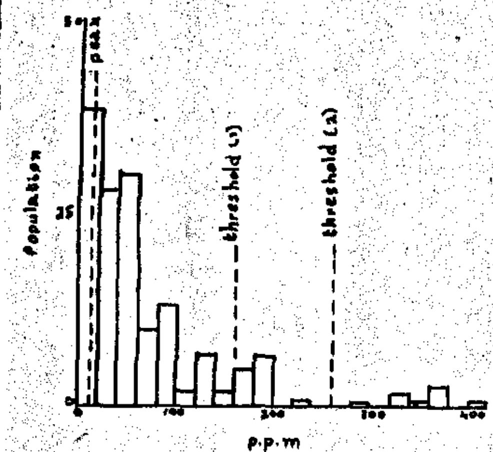
933032

1969 - 70	COMSTAFF PROPRIETARY LIMITED COLDSTREAM AREA STREAM SEDIMENT HISTOGRAM Population against p.p.m.
DRAWN	M.P.E.
SCALE	
PLAN Nº	TAS-2J-3

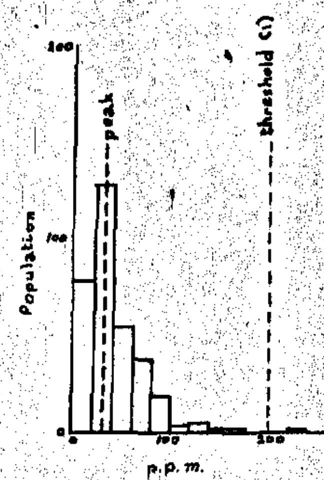
70-706

032

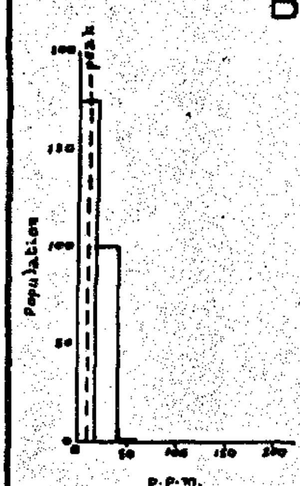
Sn



Co

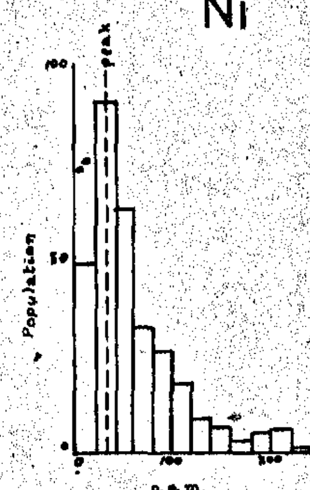


Bi



Standard Decay Curve
- no Anomalies Noted

Ni

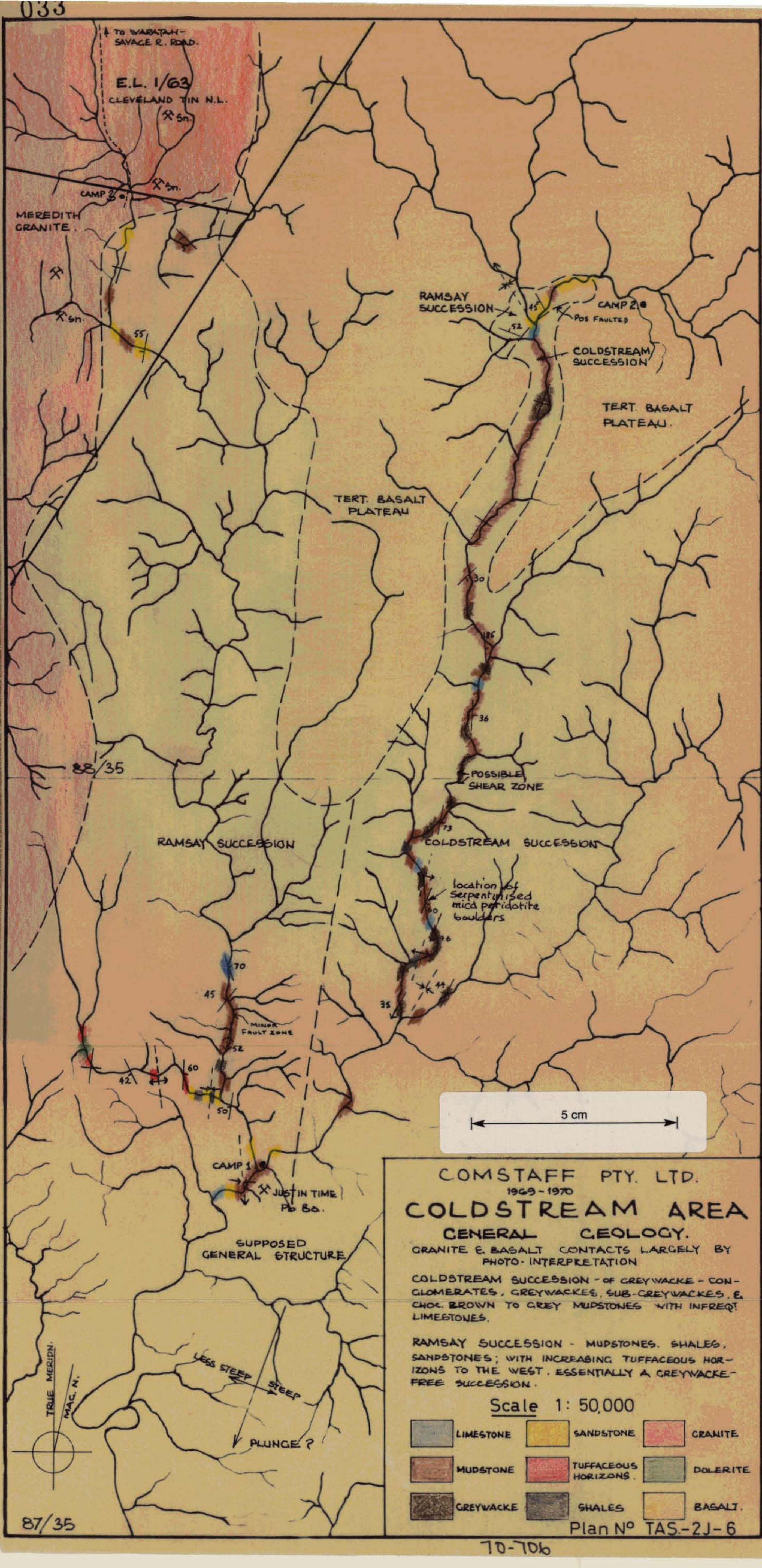


Standard Decay Curve
- no Anomalies Noted

933033

1969 - 70	COMSTAFF PROPRIETARY LIMITED	
	COLDSTREAM AREA STREAM SEDIMENT HISTOGRAM Population against p.p.m.	DRAWN M.P.E. SCALE PLAN Nº TAS-2J-4

70-706



TO WARATAH-SAVAGE R. ROAD.
E.L. 1/63
CLEVELAND TIN N.L.
Sn.
CAMP 3
MEREDITH GRANITE.
Sn.
55
RAMSAY SUCCESSION
45
52
CAMP 2
POS FAULTED
COLDSTREAM SUCCESSION
TERT. BASALT PLATEAU.
TERT. BASALT PLATEAU
30
36
POSSIBLE SHEAR ZONE
88/35
73
RAMSAY SUCCESSION
COLDSTREAM SUCCESSION
location of Serpentinised mica peridotite boulders
70
45
MINOR FAULT ZONE
35
52
60
42
50
5 cm
CAMP 1
JUST IN TIME Pb Ba.
SUPPOSED GENERAL STRUCTURE
LESS STEEP
STEEP
PLUNGE ?
TRUE MERIDN.
MAG. N.
87/35
COMSTAFF PTY. LTD.
1969 - 1970
COLDSTREAM AREA
GENERAL GEOLOGY.
GRANITE & BASALT CONTACTS LARGELY BY PHOTO-INTERPRETATION
COLDSTREAM SUCCESSION - OF GREYWACKE - CONGLOMERATES, GREYWACKES, SUB-GREYWACKES, & CHOC. BROWN TO GREY MUDSTONES WITH INFREQT LIMESTONES.
RAMSAY SUCCESSION - MUDSTONES. SHALES, SANDSTONES; WITH INCREASING TUFFACEOUS HORIZONS TO THE WEST. ESSENTIALLY A GREYWACKE-FREE SUCCESSION.
Scale 1: 50,000
LIMESTONE
SANDSTONE
GRANITE
MUDSTONE
TUFFACEOUS HORIZONS.
DOLERITE
GREYWACKE
SHALES
BASALT.
Plan Nº TAS.-2J-6

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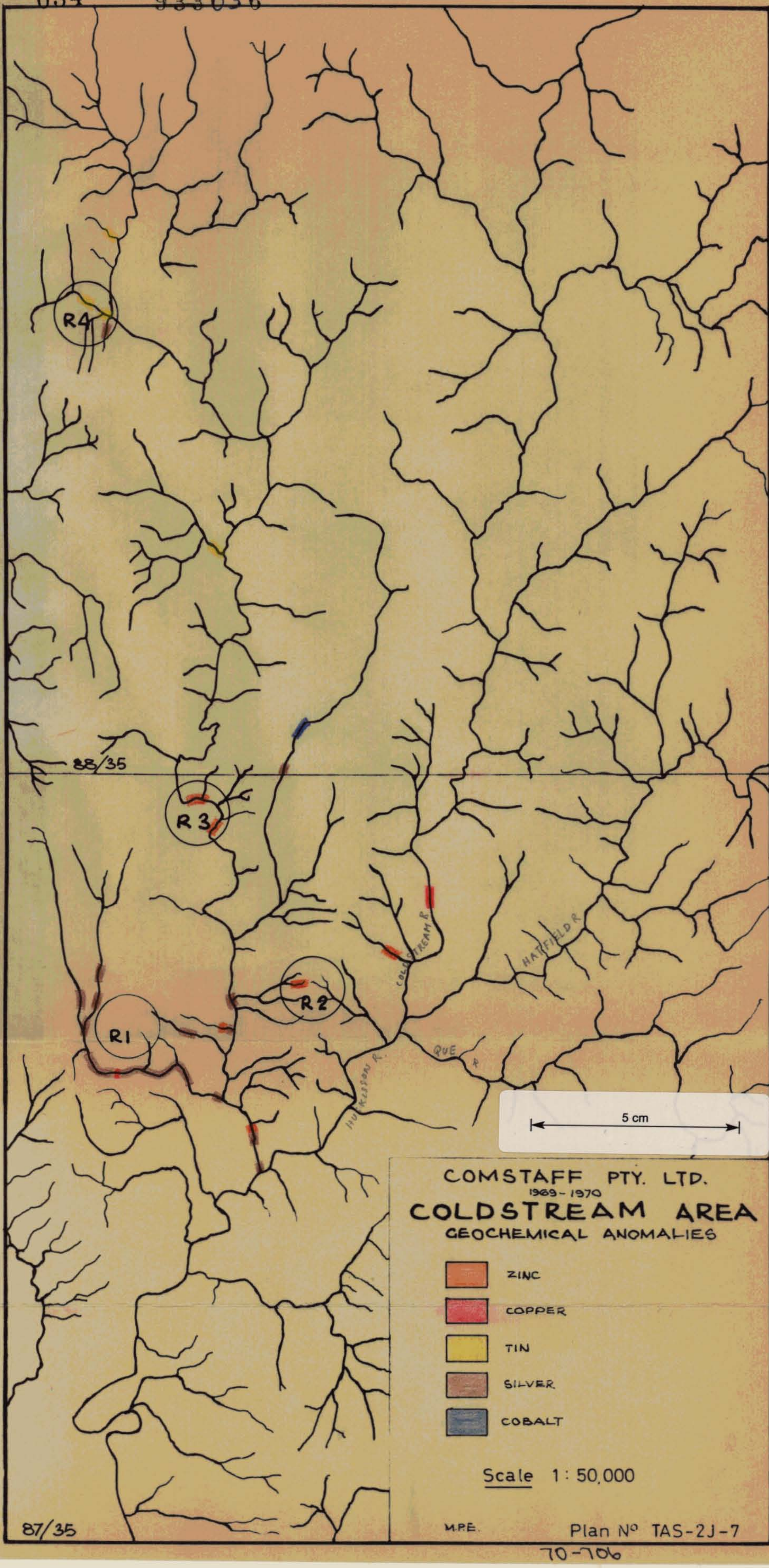
70-706

034 933036



70-706

5. RENISON BELL WEST AREA

5.1. GENERAL

The area is to the west of Renison Bell township and to the north of Zeehan (see Plan 2C-25).

Two types of work were carried out in the area (see Plan 2C-26).

REGIONAL RECONNAISSANCE: A regional stream sediment sampling programme and geological mapping were carried out.

THE SOIL SAMPLE GRID: Extensions to a soil sampling grid were cut and previous anomalies examined by costeaning. A self potential survey was done over some anomalies. The geology of the grid area was mapped in greater detail than previously.

5.2. REGIONAL RECONNAISSANCE

The area in the west and south of the lease was sampled by taking stream sediment samples and the geology mapped along those streams sampled and along Dunkley's Tramway.

5.2.1. Previous Work

1954 The Tasmanian Mines Department carried out a regional geological survey of this part of Tasmania.

1968 to 1969 A start was made on a regional reconnaissance stream sediment survey of the area. Access was by Dunkley's Tramway in the northern half of the area and streams which cross this tramway were sampled.

5.2.2. Geology

The area is bisected by the east-west Dunkley Fault. North of the Fault the rocks are of Precambrian to Cambrian age and consist of sandstones, siltstones, tuffs, black and grey shales and purple/red argillites. A ridge along the western boundary of the lease consists of sandstone. This ridge has a north-south trend although strikes within the sandstone are variable being generally east-west in the south and north-south in the north, all have steep dips. To the east of the ridge is a marshy valley which has a dearth of outcrops but the few seen suggest that the valley has a basement of shales and siltstones. Two outcrops of gossanous material are found near Dunkley's Tramway.

Along the trace of the Dunkley Fault there is a scarp, to the south of which the land is of low relief. In the area to the south of the Fault, part of the Zeehan Syncline occurs in the south-west corner of the lease. The rocks which comprise the Syncline are of Ordovician and Silurian age and consist of sandstone ridges and siltstones forming the valleys. The axis of the Syncline has a bearing of approximately 150^{o} and plunges to the south. According to the regional geological map the Zeehan Syncline is faulted against Cambrian rocks to the east; the presence of this fault is indicated by the sudden change from a steep straight ridge to low undulating country in the east. There are no rocks exposed in this part of the lease which is of low relief and covered with recent alluvium.

5.2.3. Geochemistry

Stream sediment samples were taken at approximately 500 feet intervals along those streams in the lease which were not sampled last year (see Plan 2C-26). These samples were tested by A.A.S. for copper, lead and zinc and by colorimetry for tin.

Histograms of poulation against p.p.m. were plotted for the four elements (see Plan 2C-31). Values were taken for all streams sampled in the area (including previous work) in order to obtain as large a population as possible for more reliable interpretations. Population variations over different rock types have been disregarded. The area south of the Dunkley Fault has a background below detection limits for all elements which makes some of the values possibly anomalous for that population. Thus two tributaries draining from the east may have values of significance as no bedrock is exposed because there is a covering of an unknown thickness of Quaternary sediments.

Only this season's values for tin are available which contain a maximum value of 20 p.p.m. This is not considered to be anomalous and does not warrant further investigation.

Copper (see Plan 2C-29)

A threshold of 30 p.p.m. was selected for anomalous values of copper from Plan 2C-31. This produces anomalies only in the north east of the area, on streams draining the soil sample grid.

Lead. (see Plan 2C-29)

A threshold of 60 p.p.m. was selected (see Plan 2C-31) which shows a similar anomalous area to that of copper.

Zinc. (see Plan 2C-30)

The threshold selected for zinc values is 60 p.p.m. (see Plan 2C-31). As with copper and lead, the anomalous area lies within the soil sample grid. There are, however, a few anomalies which lie outside the grid area. One set of anomalies lies on the headwaters of a Crimson Creek tributary which drains an area outside the lease. The other anomalies are at crossings of the Dunkley Tramway over streams. It is considered that these anomalies are caused by contamination from the tramway.

5.3. THE SOIL SAMPLE GRID (See Plan 2C-26)

Extensions to the existing soil sample grid were out to the northeast towards the Pieman River and one line was cut to the southwest. These lines were soil sampled at 100 feet intervals. Previous anomalies were tested by costeaning and some self-potential surveys were attempted over part of the grid.

5.3.1. Previous Work

1890 to 1913 Five small mines were worked for lead and silver within the area now covered by the grid. There is little information about these mines and none about the amounts and qualities of ore which was extracted. The ore was transported to Zeehan along Dunkley's Tramway which was also used for supplying timber to Zeehan.

1950 North Broken Hill Limited stated an investigation of the area but they failed to complete a programme and there are no records available.

1954 At the same time the Tasmanian Mines Department was carrying out its regional geological survey, the Bureau of Mineral Resources had 90,000 feet of survey lines cut in the area for a geophysical survey. Magnetometer traverses were carried out over these lines which lie just to the northeast of the grid.

..22/..

1966 to 1967 Comstaff Pty. Limited commenced exploration with the area. Seven lines were cut on a bearing of 045° (true) for soil sampling; these were lines 105W, 110W, 115W, 120W, 125W, 130W, and 150W. Induced potential surveys were carried out over lines 115W, 120W, and 150W. A magnetometer survey was done on line 115W. From the results of these surveys it was decided to drill on line 115W to intersect a target indicated by 1.P. Drill hole RB1 (on line 115W) intersected graphitic shales at a depth of 702 feet. A second hole (RB2) was drilled to investigate geochemical anomalies in soil samples and also a magnetic anomaly on line 115W. Poor values were obtained from analyses of the cores.

Yet a third hole (RB3) was drilled to investigate a gossanous outcrop of line 125W. The target depth was not reached because of the difficulty in drilling through the soft argillites.

1968 to 1969 A baseline was cut on a bearing of 315° from peg 108S on line 105W to a length of 8,000 feet. Cross lines 500 feet apart and 2,000 feet long were cut at 90° to and on both sides of the baseline. Soil samples were taken at intervals of 50 feet along the prepared lines.

5.3.2. Geology (see Plan 2C-28)

Geology was mapped along most streams and all tracks which cross the area covered by the grid. Rock exposures along the soil sample lines are rare.

Rocks in the area are of the Success Creek and Crimson Creek formations which are dated as Infra Cambrian and Cambrian ages respectively. Lithologies are sandstone/quartzites in the south and a mixture of interbedded argillites, siltstones, tuffs and grey and black shales with some silicified basic volcanics elsewhere.

The general strike changes from approximately 125° in the south to approximately 170° in the centre and to 135° in the north. The dips are usually steep (50° to 90°) and to the northeast. Thus the general structure consists of a large flexure which consists of an open antiform between the north and centre and an open synform between

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the centre and south of the area. Both the antiform and synform have similar orientations, their axes are oriented at approximately 065° and plunge at approximately 70° to the east. There are many minor folds and evidence of thrusting, especially in the south near the quartzite junction.

An outcrop of limonitic and goethitic rock is found on line 125W to the south of the baseline. This rock is considered to be a gossan capping of a sulphide body. It has been mapped as an outcrop for a strike length of some 500 feet and a width of ten to twenty five feet. The strike of the body is 145° but its dip cannot be determined at present, although the general dip of the argillites nearby is 35° to the northeast.

A large area in the northeast - central part of the grid is covered by Quaternary fluvioglacial deposits.

5.3.3. <u>Geochemistry</u>

All previous geochemical results are included in this report and no distinction is made between this year's and previous sample results. Histograms of population against p.p.m. for soil sample values for copper, lead, tin and zinc were plotted, from which threshold values were selected (see Plan 2C-32) and anomalous areas marked on the maps of the grid.

<u>Copper</u> (see Plan 2C-33)

Two threshold values were selected for copper (60 and 150 p.p.m.) as shown on Plan 2C-32. A contour at 60 p.p.m. copper shows a large area of plus 60 p.p.m. in the north of the grid, and a contour at 150 p.p.m. indicates several narrow zones and one large arcuate zone some 1,300' long and 300' wide. This latter zone was investigated by bulldozing a costean 800 feet long along line 170W (see Costean 1 on Plan 2C-28). The minimum depth of the costean is 5 feet and the maximum depth is 20 feet. Weathered bedrock was reached along most of the length of the costean. A succession of rocks along the costean from south to north consists of pyritic grey siltstones and black shales in the south followed by 600 feet of ellipsoidal weathering, silicified basalt which contains disseminated pyrite in part.

..24/..

Overlying these at the northern end of the costean are red argillites. The dips throughout the costean are towards the northeast. It appears from the geology of the costean that the high copper values are caused by the volcanics and the pyroclastics and siltstones interbedded with the volcanics; the anomaly is in fact merely a high background and should be separate population. The high values for copper do not indicate the presence of an ore body. The maximum value for copper in drill hole RB 2 is 1,000 p.p.m. over five feet and in RB 3 sludge is 400 p.p.m. over five feet.

<u>Lead</u> (see plan No. 2C-34)

From plan 2C-32 a threshold value of 70 p.p.m. was selected. Values greater than 70 p.p.m. were contoured and these form a series of narrow bands (100 to 300 feet wide) which conform to the geological structure.

Costean 1 (see plan No. 2C-28) intersects two of the anomalous zones for lead values but no lead mineralisation was observed.

Costean 2 (see plan 2C-28) was placed to determine the orientation of the gossan on line 125W. A large zone of anomalous lead values covers this area (some 1,500 feet by 500 feet) the highest value for lead is 580 p.p.m. in a soil sample taken over the gossan.

The maximum value for lead in RB 2 is 1200 p.p.m. over a length of five feet, and in RB 3 the sludge gave a maximum value of 300 p.p.m.

<u>Tin</u> (see plan No. 2C-35)

Tin values of 60 p.p.m. and 150 p.p.m. were selected as thresholds from the histogram (see plan 2C-32). After contouring these values it is observed that the anomalous zones occur in the east of the grid and, unlike the other elements, are found in soil samples taken on the Quaternary deposits. There is a large, high anomalous zone (over 150 p.p.m.) on lines 105W and 110W which are close to the lease boundary. Hole R.B.2 on line 115W (some 500 feet to the northwest of this anomaly) did not intercept an ore body, which suggests the lack of

..25/..

extensions to the northwest, of any possible ore body causing the high anomaly. Several anomalies are found near streams and rivers and are probably caused by transported alluvial material.

The gossan in Costean 2 on line 125W (see plan No.2C-28) lies within an anomalous zone of tin values between 60 p.p.m. and 150 p.p.m.

Drill hole values for tin are maximum of 160 p.p.m. for RB 2 and 450 p.p.m. at the bottom of RB 3 from sludge samples.

Zinc (see plan 2C-36)

From the histogram in Plan 2C-31 a threshold value of 80 p.p.m. was selected for zinc values. The anomalous zones of plus 80 p.p.m. are small and scattered except in the north of the grid near to the Pieman River, where they form two zones (which may join together beyond the grid). No previous work has been carried out in this area although copper values in this area are also anomalous.

5.3.4. GEOPHYSICS (see plan 2C-37)

The previous geophysical surveys done in the area are a magnetometer survey on line 115W and I.P. surveys on lines 115W, 120W and 150W. Anomalous I.P. values were found around the baseline which indicate a target which lies along the baseline. The magnetometer survey on line 115W shows two anomalies to the north of the baseline. Drill hole RB 1 intersected the I.P. target at 702 feet after passing through two horizons of unmineralised dolomite. The I.P. target seems to have been caused by graphitic shales.

During this field season self-potential traverses were made along parts of lines 160W, 165W, 170W, 175W and the baseline. There are anomalies to the south of the baseline which do not have accompanying anomalous values in soil samples for copper, lead, zinc or tin. There are no S.P. anomalies over the anomalous zones for copper,lead, zinc and tin which lie to the north of the baseline.

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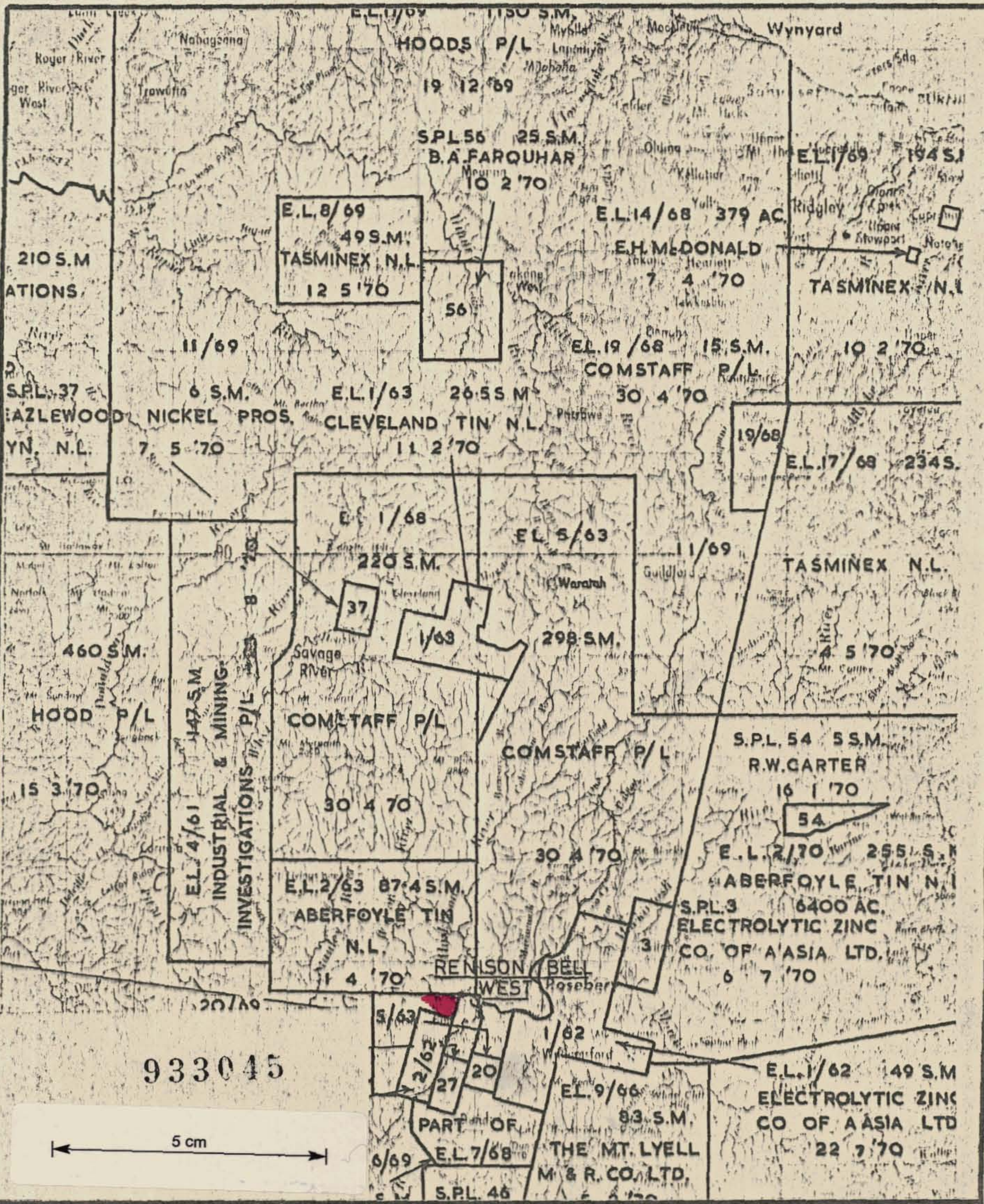
5.4 PLANS - RENISON BELL WEST AREA

Plan No.	Plan
TAS-2C-25	Locality Plan
TAS-2C-26	Geochemistry
TAS-2C-27	Geology on scale 1:50,000
TAS-2C-28	Geology on scale 1:10,000
TAS-2C-29	Stream Sediment Samples - Copper & Lead
TAS-2C-30	Stream Sediment Samples - Zinc
TAS-2C-31	Histograms for Stream Sediment Samples
TAS-2C-32	Histograms for Soil Samples
TAS-2C-33	Copper Soil Samples
TAS-2C-34	Lead Soil Samples
TAS-2C-35	Tin Soil Samples
TAS-2C-36	Zinc Soil Samples
TAS-2C-37	Geophysics

044



COMSTAFF PROPRIETARY LIMITED

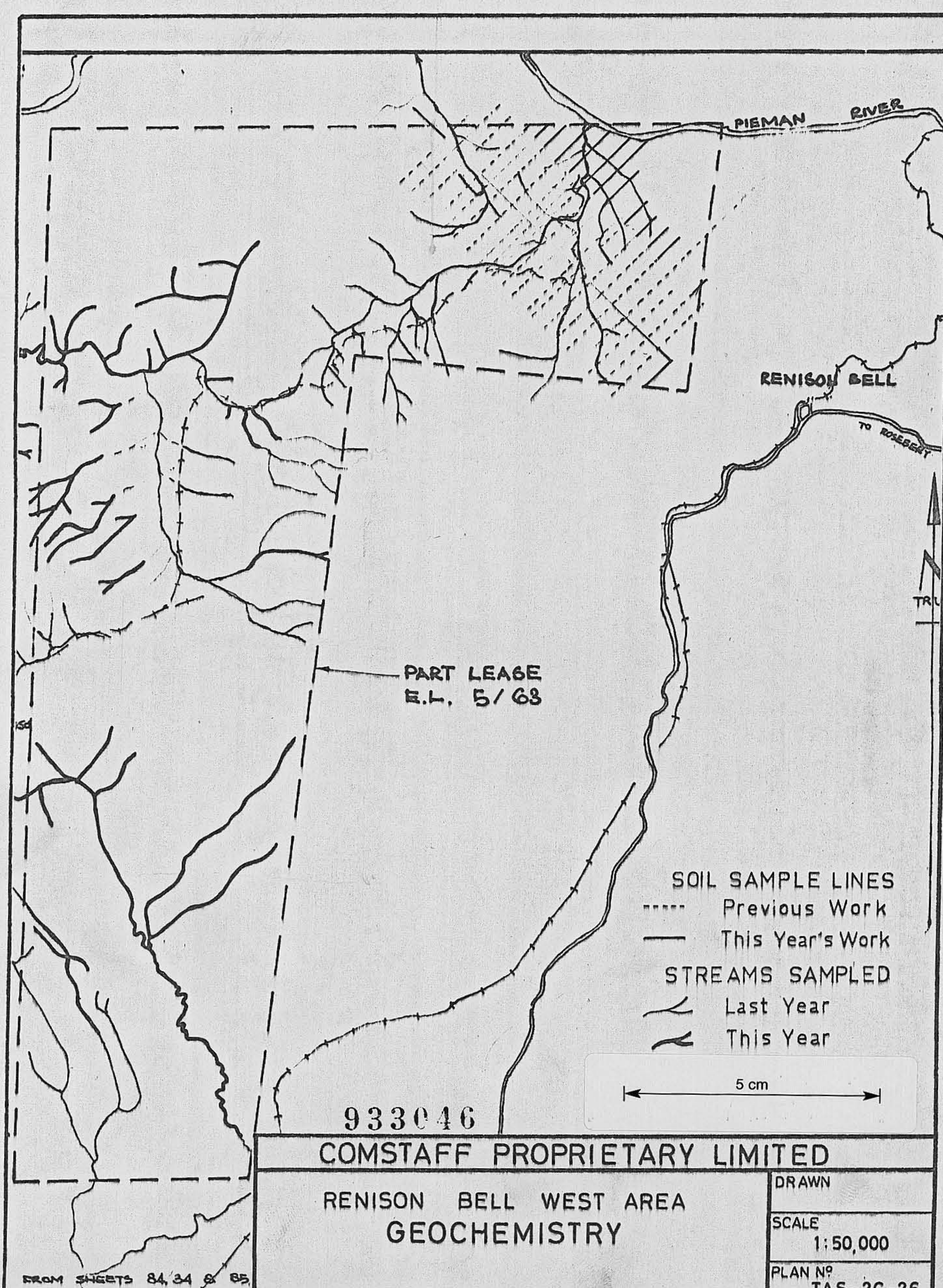
RENISON BELL WEST LOCALITY PLAN

DRAWN

SCALE 1: 500,000

PLAN No. TAS-2C-25

70-706



933046

COMSTAFF PROPRIETARY LIMITED

RENISON BELL WEST AREA
GEOCHEMISTRY

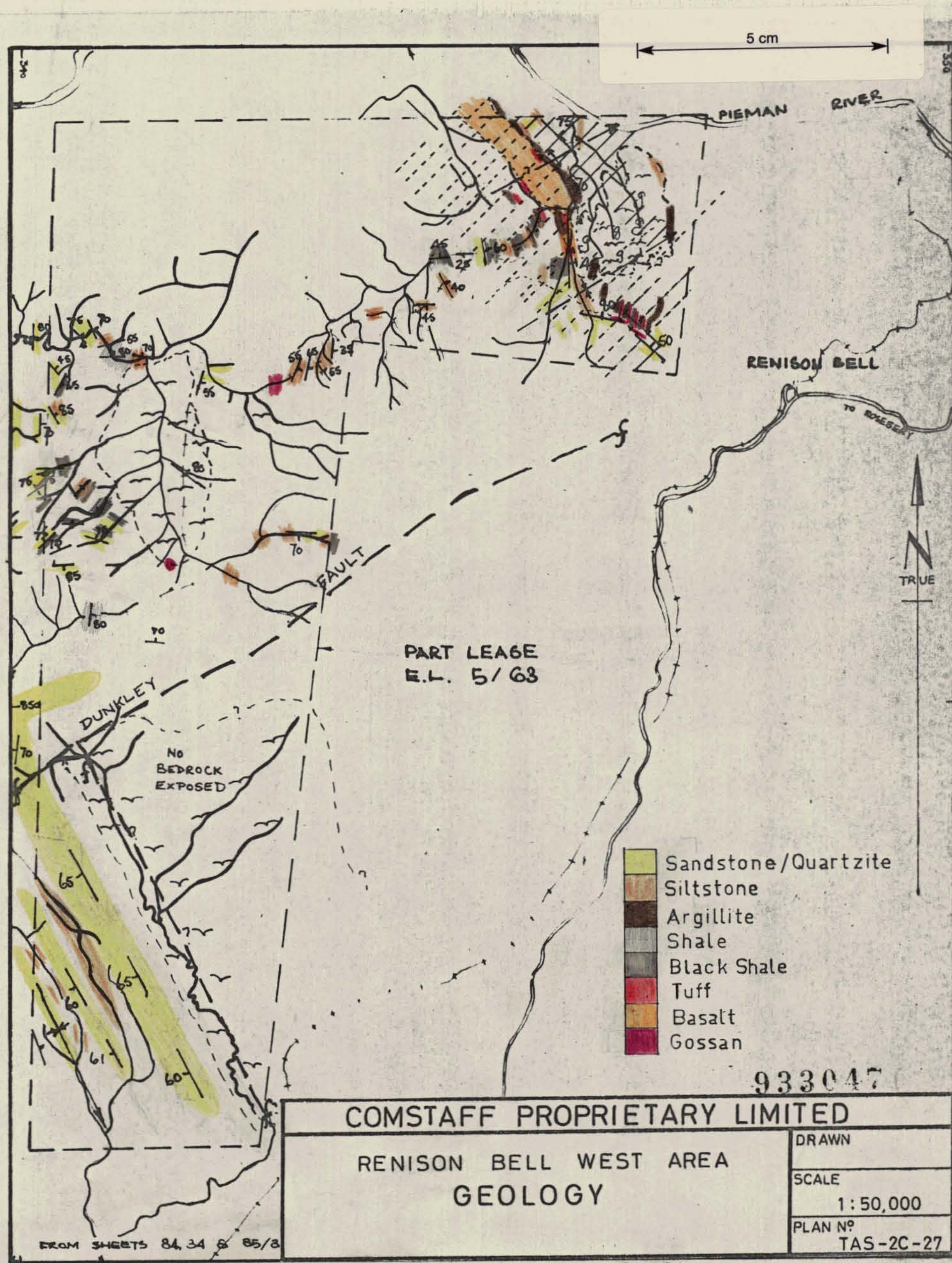
DRAWN

SCALE 1:50,000

PLAN Nº TAS-2C-26

70-706

046



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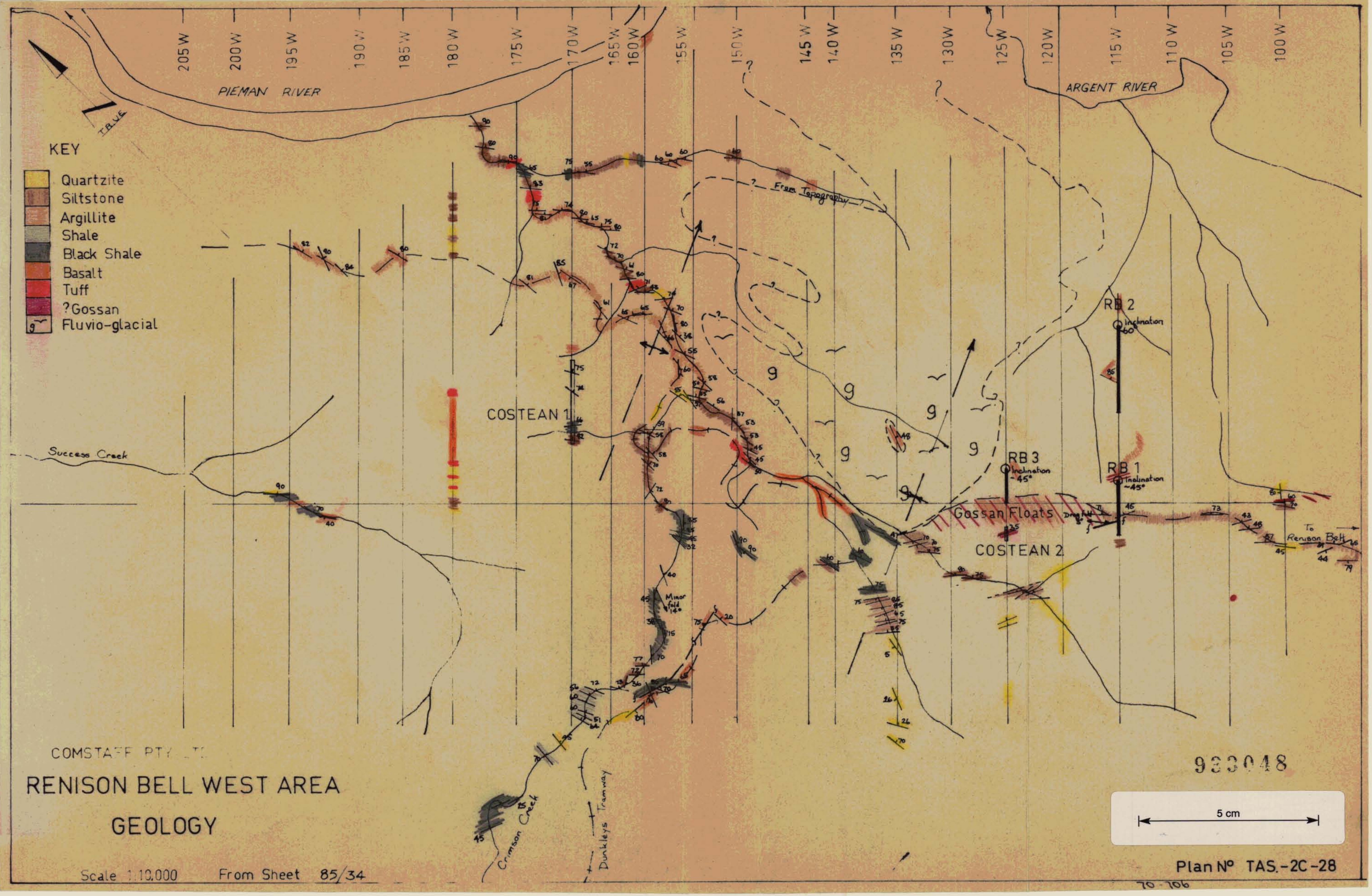
70-706

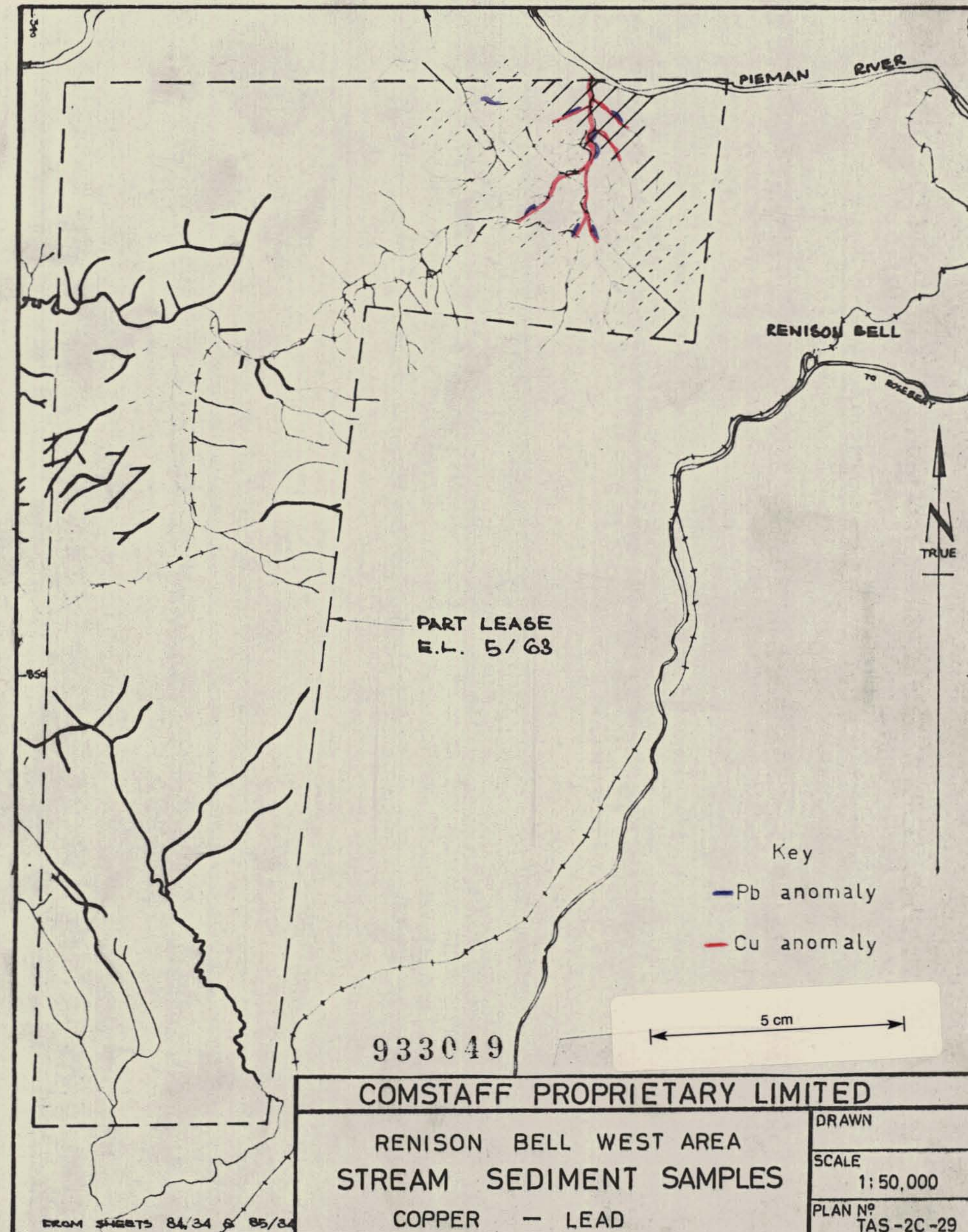
047



205 W
200 W
195 W
190 W
185 W
180 W
175 W
170 W
165 W
160 W
155 W
150 W
145 W
140 W
135 W
130 W
125 W
120 W
115 W
110 W
105 W
100 W
PIEMAN RIVER
ARGENT RIVER
TRUE
KEY
Quartzite
Siltstone
Argillite
Shale
Black Shale
Basalt
Tuff
?Gossan
Fluvio-glacial
From Topography
Success Creek
COSTEAN 1
COSTEAN 2
Gossan Floats
RB 1
Inclination ~45°
RB 2
Inclination 60°
RB 3
Inclination ~45°
Minor fold 14°
To Renison Bell
Crimson Creek
Dunkleys Tramway
COMSTAFF PTY LTD
RENISON BELL WEST AREA
GEOLOGY
Scale 1:10,000
From Sheet 85/34
933048
Plan Nº TAS.-2C-28
70 - 706

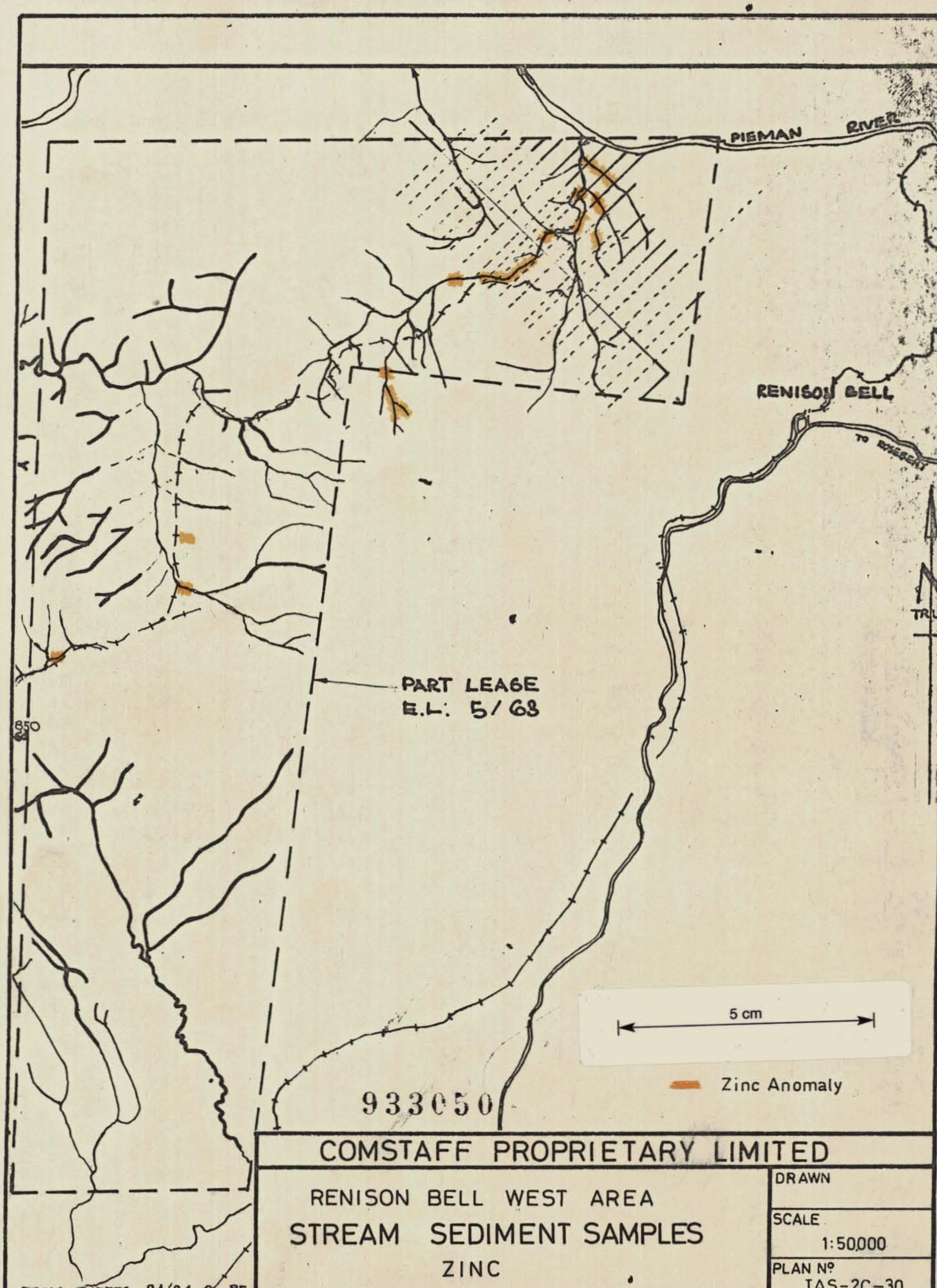
5 cm

073


PIEMAN RIVER
RENISON BELL
TO ROSEBERY
PART LEASE
E.L. 5/63
TRUE
Key
Pb anomaly
Cu anomaly
5 cm
933049
COMSTAFF PROPRIETARY LIMITED
RENISON BELL WEST AREA
STREAM SEDIMENT SAMPLES
COPPER — LEAD
DRAWN
SCALE
1: 50,000
PLAN Nº
TAS-2C-29
FROM SHEETS 84/34 & 85/34

70-706

073



COMSTAFF PROPRIETARY LIMITED

RENISON BELL WEST AREA

STREAM SEDIMENT SAMPLES

ZINC

DRAWN

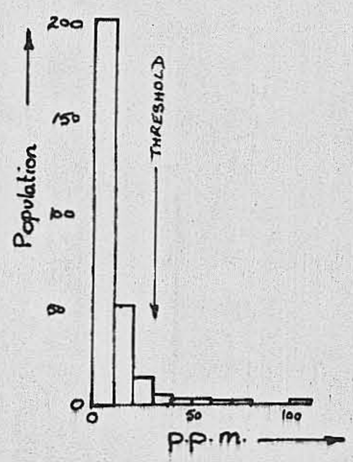
SCALE 1:50,000

PLAN Nº TAS-2C-30

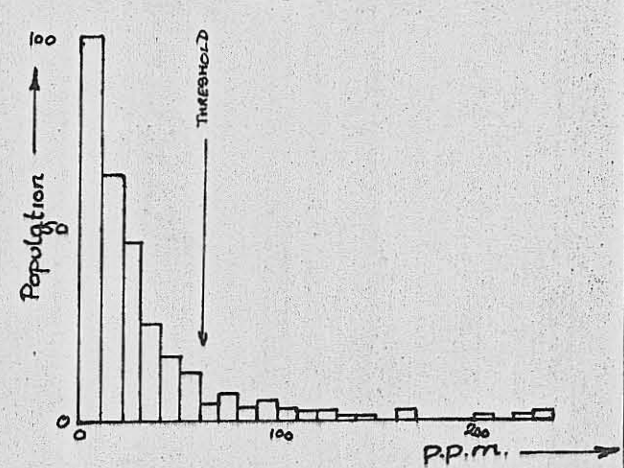
70-706

080

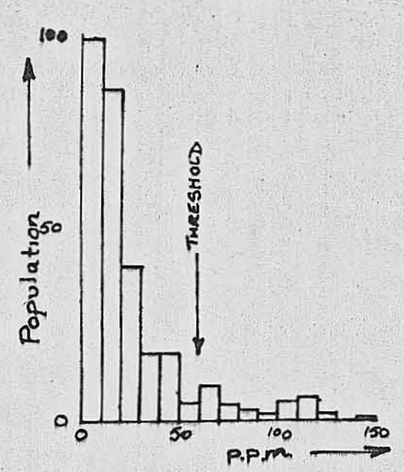
Cu



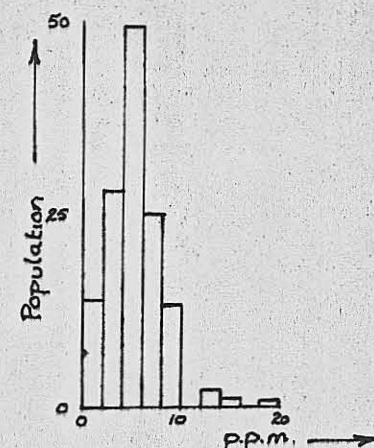
Pb



Zn



Sn



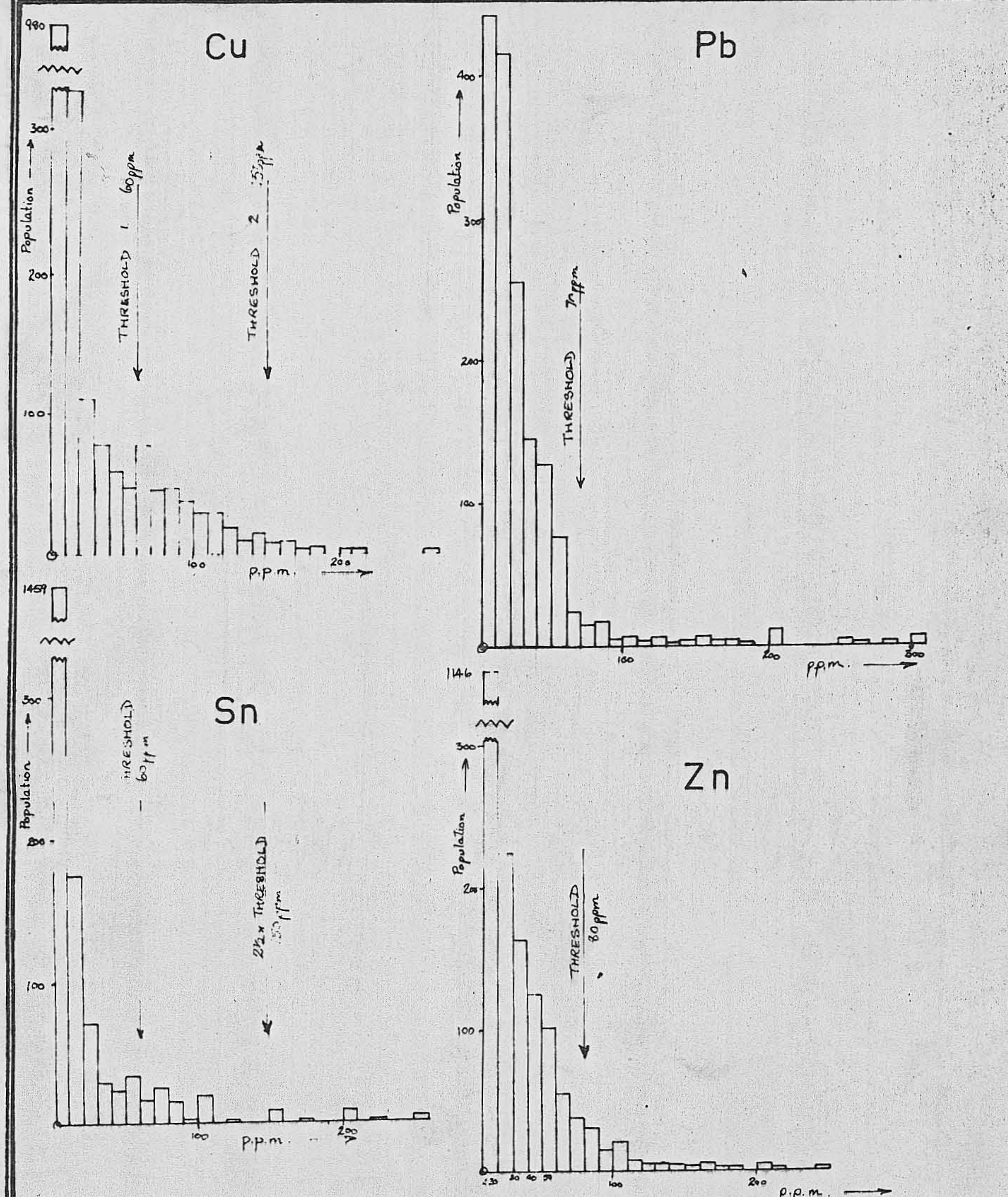
5 cm

933051

COMSTAFF PROPRIETARY LIMITED	
RENISON BELL WEST AREA	DRAWN I.B. March. 70
HISTOGRAMS	SCALE
Stream Sediment Samples – Population against ppm.	PLAN Nº TAS-2C-31

70-706

081



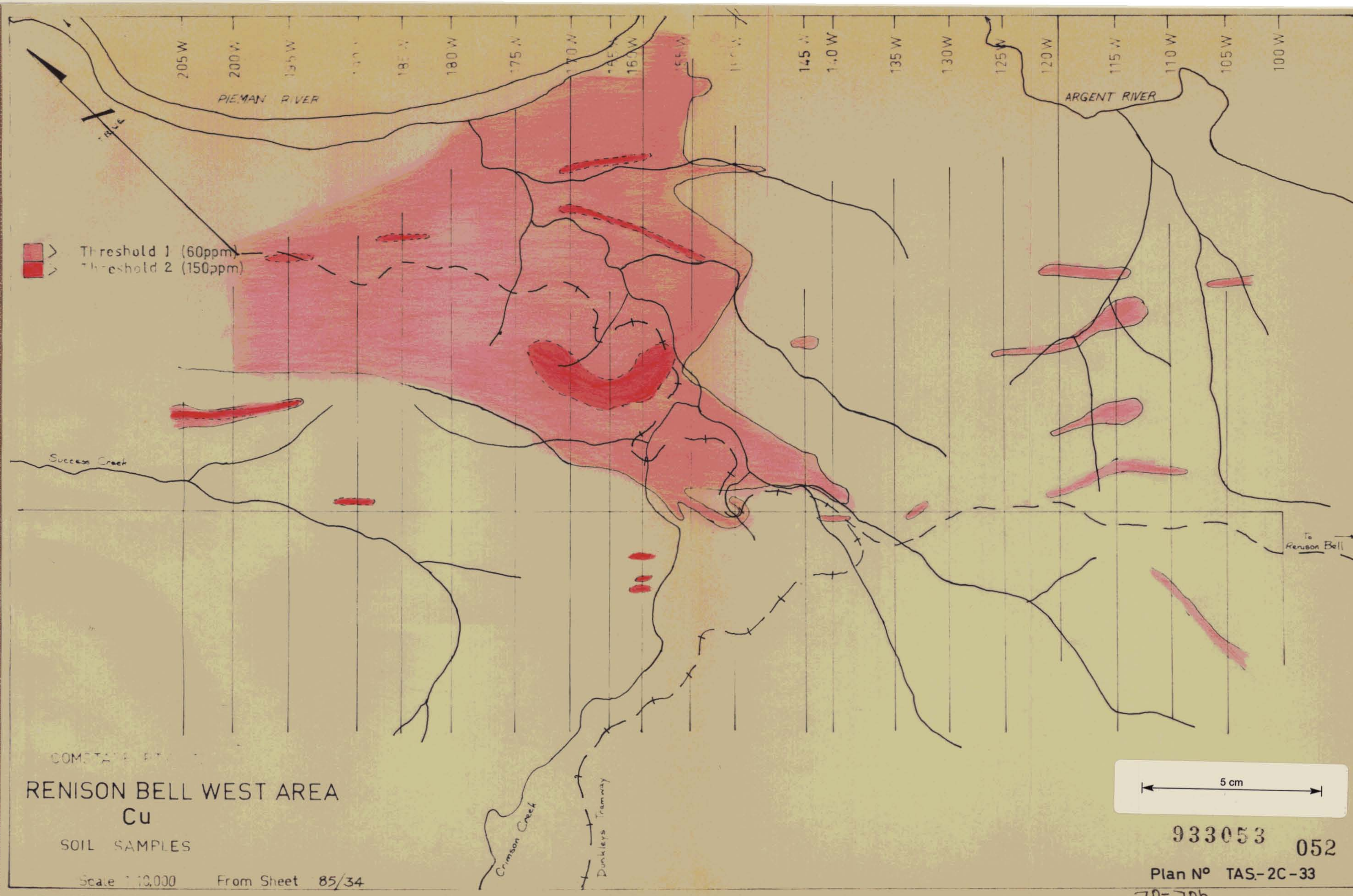
933052

COMSTAFF PROPRIETARY LIMITED

RENISON BELL WEST AREA
HISTOGRAMS
Soil Samples
Population against p.p.m.

DRAWN	
SCALE	
PLAN Nº	TAS-2C-32

70-706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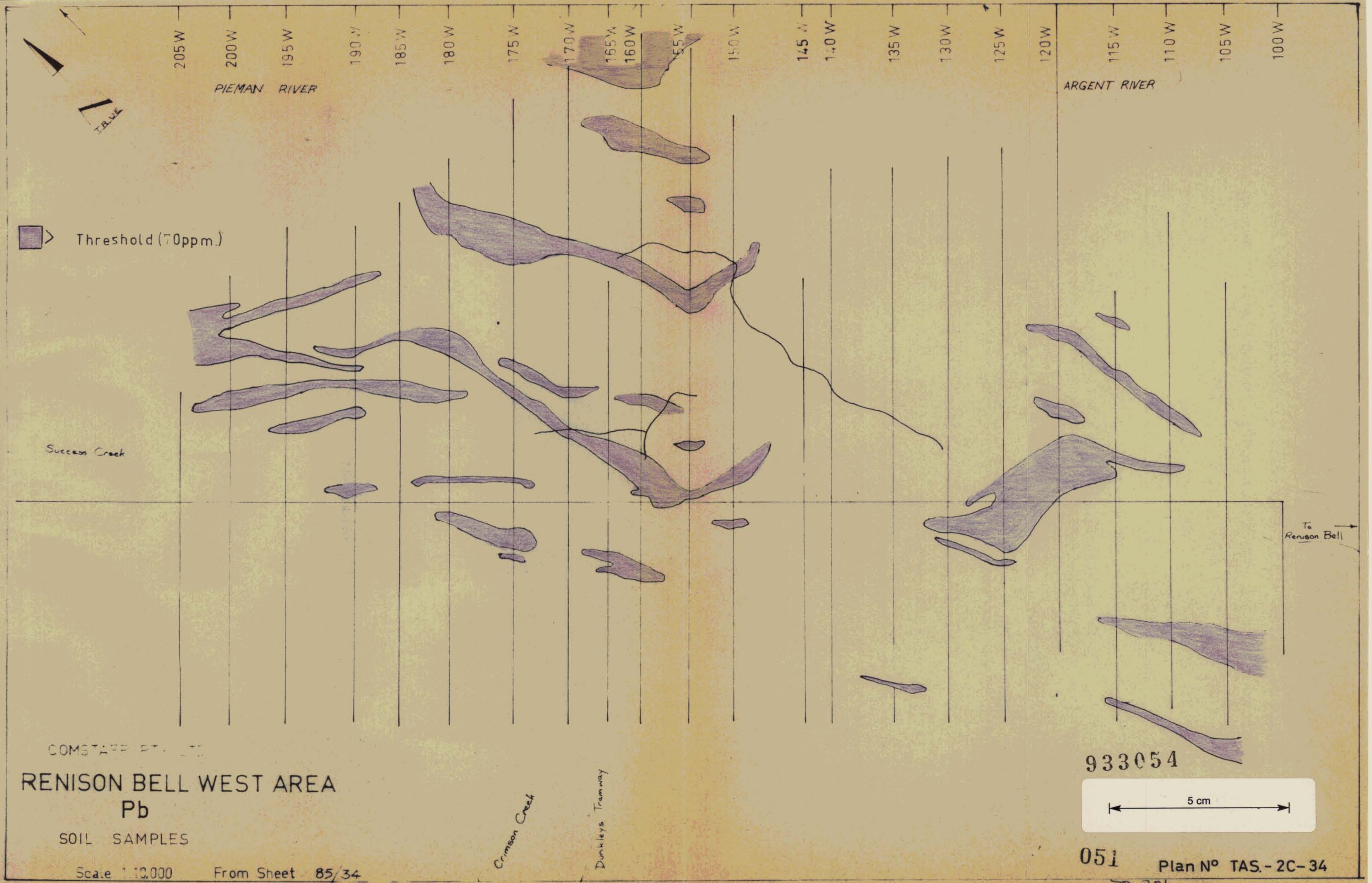
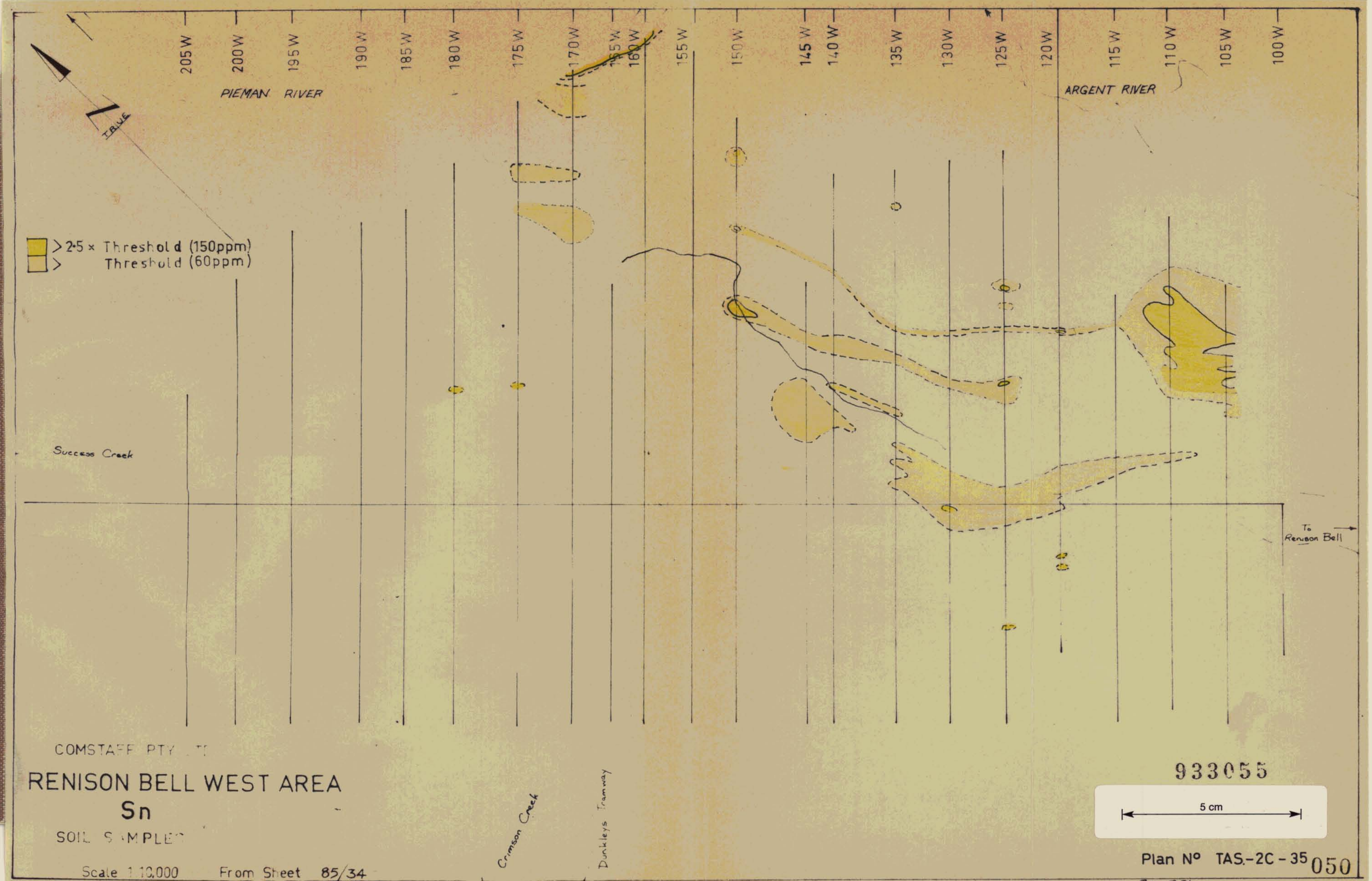
200 W
185 W
180 W
175 W
170 W
160 W
145 W
140 W
135 W
130 W
125 W
120 W
115 W
110 W
105 W
100 W
PIEMAN RIVER
ARGENT RIVER
TRUE
> Threshold 1 (60ppm)
> Threshold 2 (150ppm)
Success Creek
To Renison Bell
Crimson Creek
Dunkleys Tramway
RENISON BELL WEST AREA
Cu
SOIL SAMPLES
Scale 1:10,000
From Sheet 85/34
933053
052
Plan Nº TAS.-2C-33
70-706
5 cm


TRUE
205 W
200 W
195 W
190 W
185 W
180 W
175 W
170 W
165 W
160 W
150 W
145 W
140 W
135 W
130 W
125 W
120 W
115 W
110 W
105 W
100 W
PIEMAN RIVER
ARGENT RIVER
Threshold (70ppm.)
Success Creek
To Renison Bell
Crimson Creek
Dunkleys Tramway
COMSTAFF
RENISON BELL WEST AREA
Pb
SOIL SAMPLES
Scale 1:10,000
From Sheet 85/34
933054
5 cm
051
Plan No TAS.-2C-34
70-706


205 W
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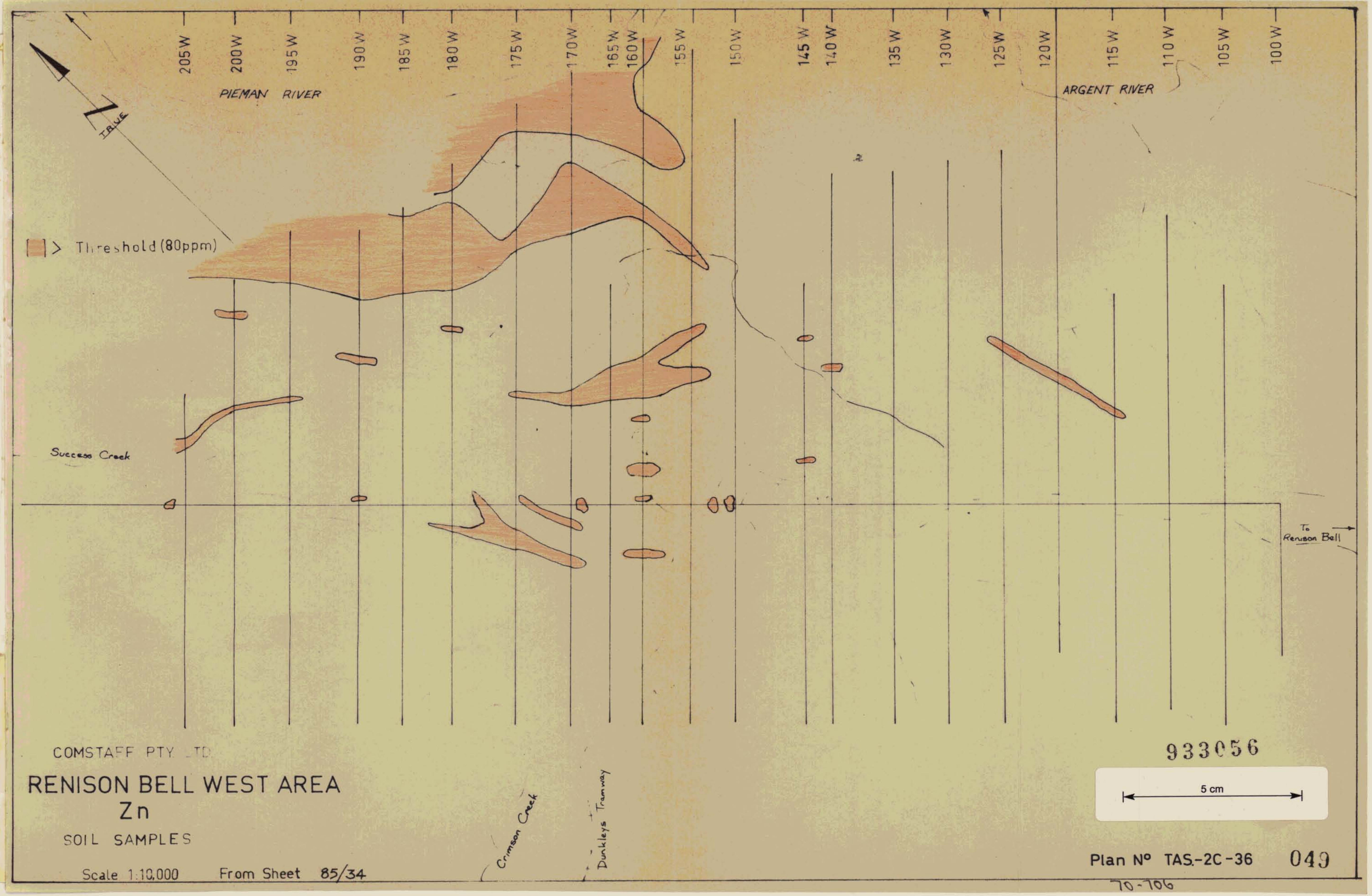
150 W
145 W
140 W
135 W
130 W
125 W
120 W
115 W
110 W
105 W
100 W
TRUE
PIEMAN RIVER
ARGENT RIVER
> 2·5 × Threshold (150ppm)
> Threshold (60ppm)
Success Creek
To Renison Bell
Crimson Creek
Dunkleys Tramway
COMSTAFF PTY LTD
RENISON BELL WEST AREA
Sn
SOIL SAMPLES
Scale 1:10,000
From Sheet 85/34
933055
5 cm
Plan No TAS.-2C-35
050
70-706



205 W
200 W
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190 W
185 W
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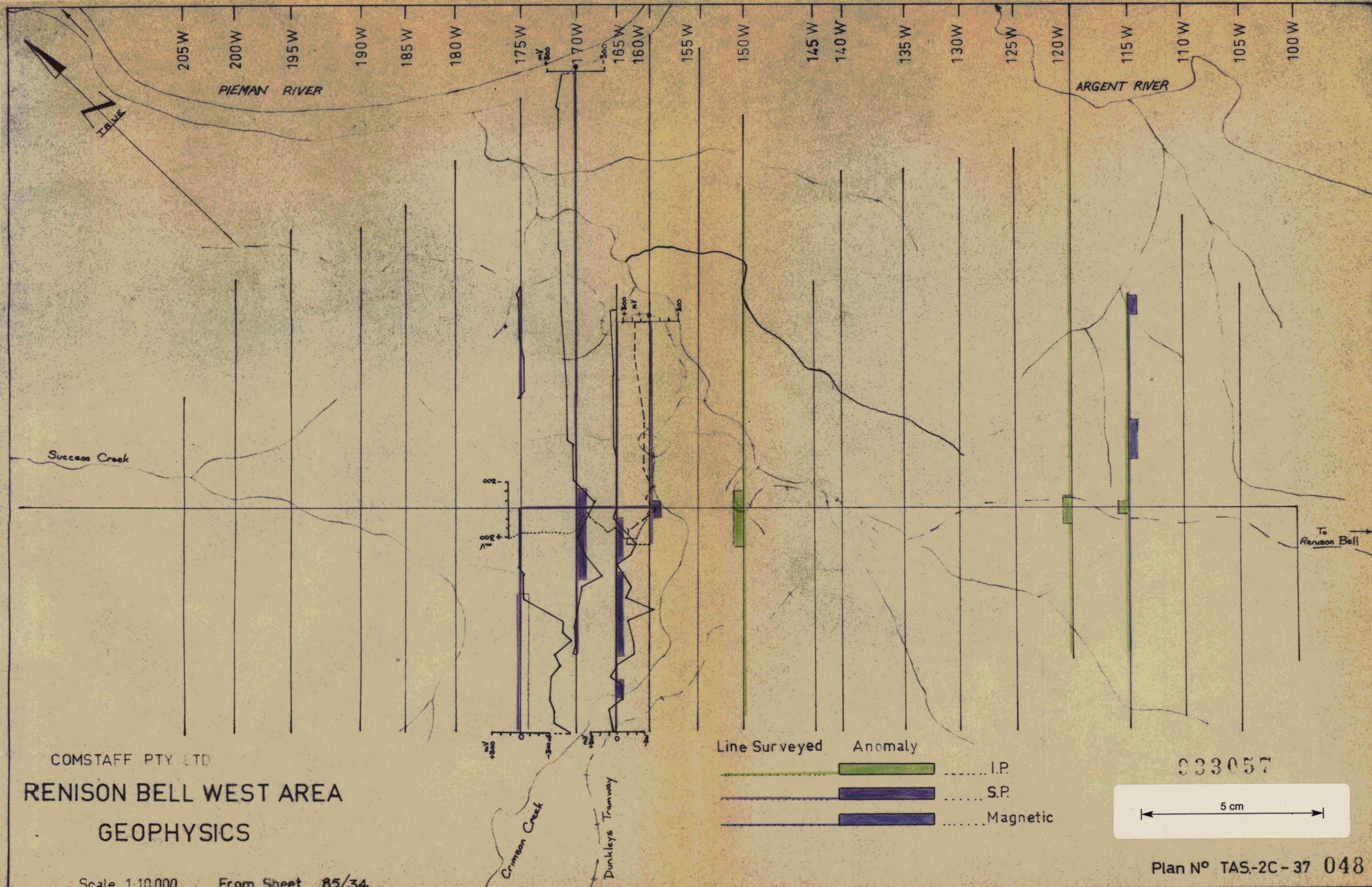
175 W
170 W
165 W
160 W
155 W
150 W
145 W
140 W
135 W
130 W
125 W
120 W
115 W
110 W
105 W
100 W
TRUE
PIEMAN RIVER
ARGENT RIVER
> Threshold (80ppm)
Success Creek
To Renison Bell
Crimson Creek
Dunkleys Tramway
5 cm
COMSTAFF PTY LTD
RENISON BELL WEST AREA
Zn
SOIL SAMPLES
Scale 1:10,000
From Sheet 85/34
Plan N° TAS-2C-36
933056
049
70-706


205 W
200 W
195 W
190 W
185 W
180 W
175 W
170 W
165 W
160 W
155 W
150 W
145 W
140 W
135 W
130 W
125 W
120 W
115 W
110 W
105 W
100 W
TRUE
PIEMAN RIVER
ARGENT RIVER
Success Creek
To Renison Bell
Crimson Creek
Dunkleys Tramway
Line Surveyed
Anomaly
I.P.
S.P.
Magnetic
033057
5 cm
COMSTAFF PTY LTD
RENISON BELL WEST AREA
GEOPHYSICS
Scale 1:10,000
From Sheet 85/34
Plan No TAS.-2C-37 048
70-706

Pyrite is found as a hydrothermal deposit within the shear zone. There is a possible syncline in the south-west of the area plunging to west-southwest. Strikes throughout the rest of the area are variable with no clear structure apparent.

Mineralisation

The trenches and a shaft mentioned by Henderson (1938) were located and mapped (see plan No. 2M-5). Specimens of the pyrite mineralisation were despatched for semi-quantitive analysis for a large number of elements. Traces of green copper staining were observed in the trenches. In addition to the pyrite in the shear zone disseminated pyrite was observed in some exposures of shale to the west.

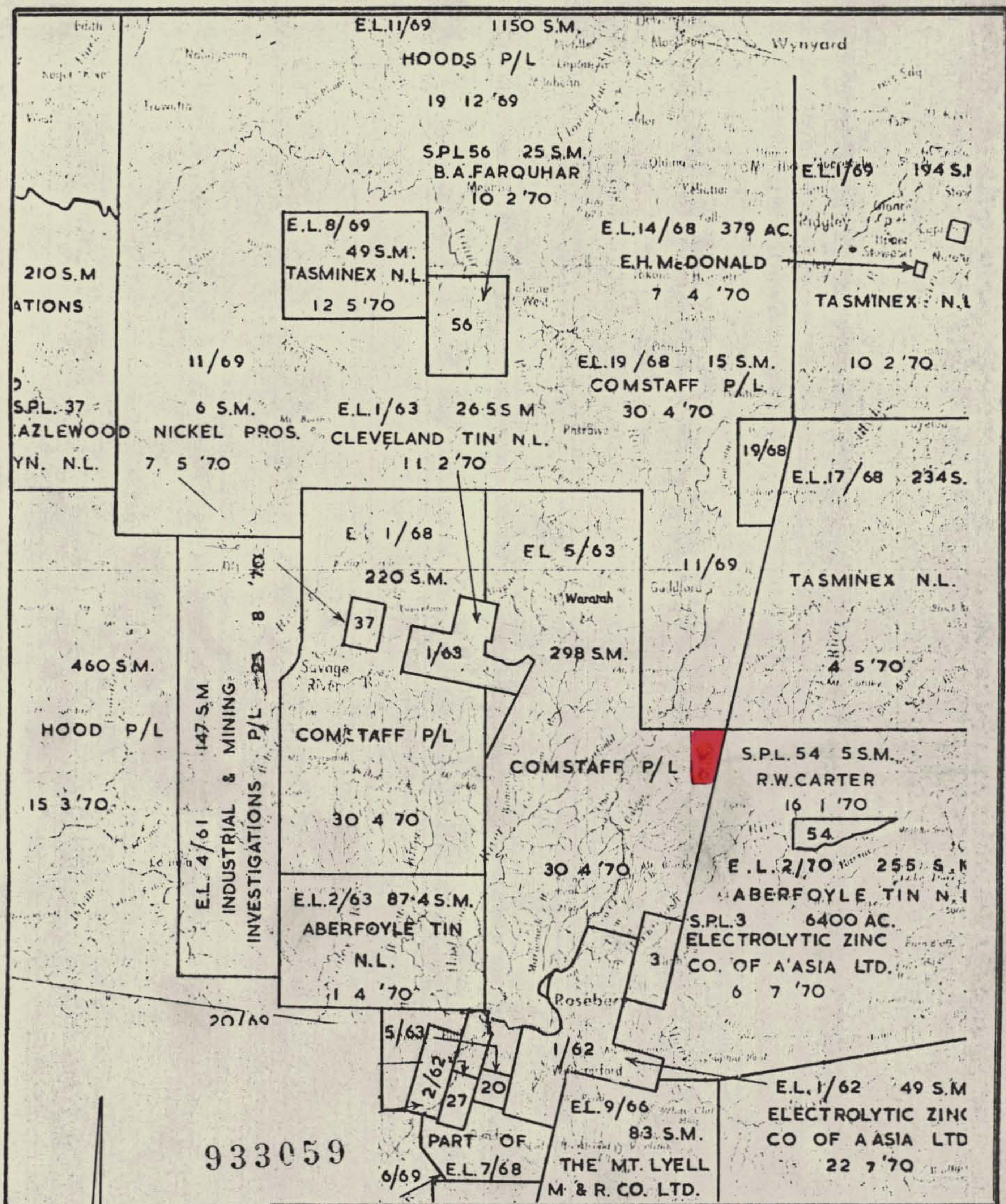
6.3 GEOCHEMISTRY

The stream sediment samples were analysed for Cu, Pb, Zn and Ag, and the results received were plotted on histograms of population against p.p.m. In the case of Cu and Ag, the histograms showed normal decay curves with no anomalies, but for Pb, and Zn, anomalies were observed, with thresholds at 350 p.p.m. and 190 p.p.m. respectively. The locations of these anomalies are indicated on plan No. 2M-6.

6.4 PLANS

Plan No.	Plan
TAS-2M-1	Locality Plan
TAS-2M-2	Geochemistry - Streams Sampled
TAS-2M-3	Geochemistry - Streams Sampled during 1968 Field Season
TAS-2M-4	Geology
TAS-2M-5	Costeans
TAS-2M-6	Anomalies

..29/..



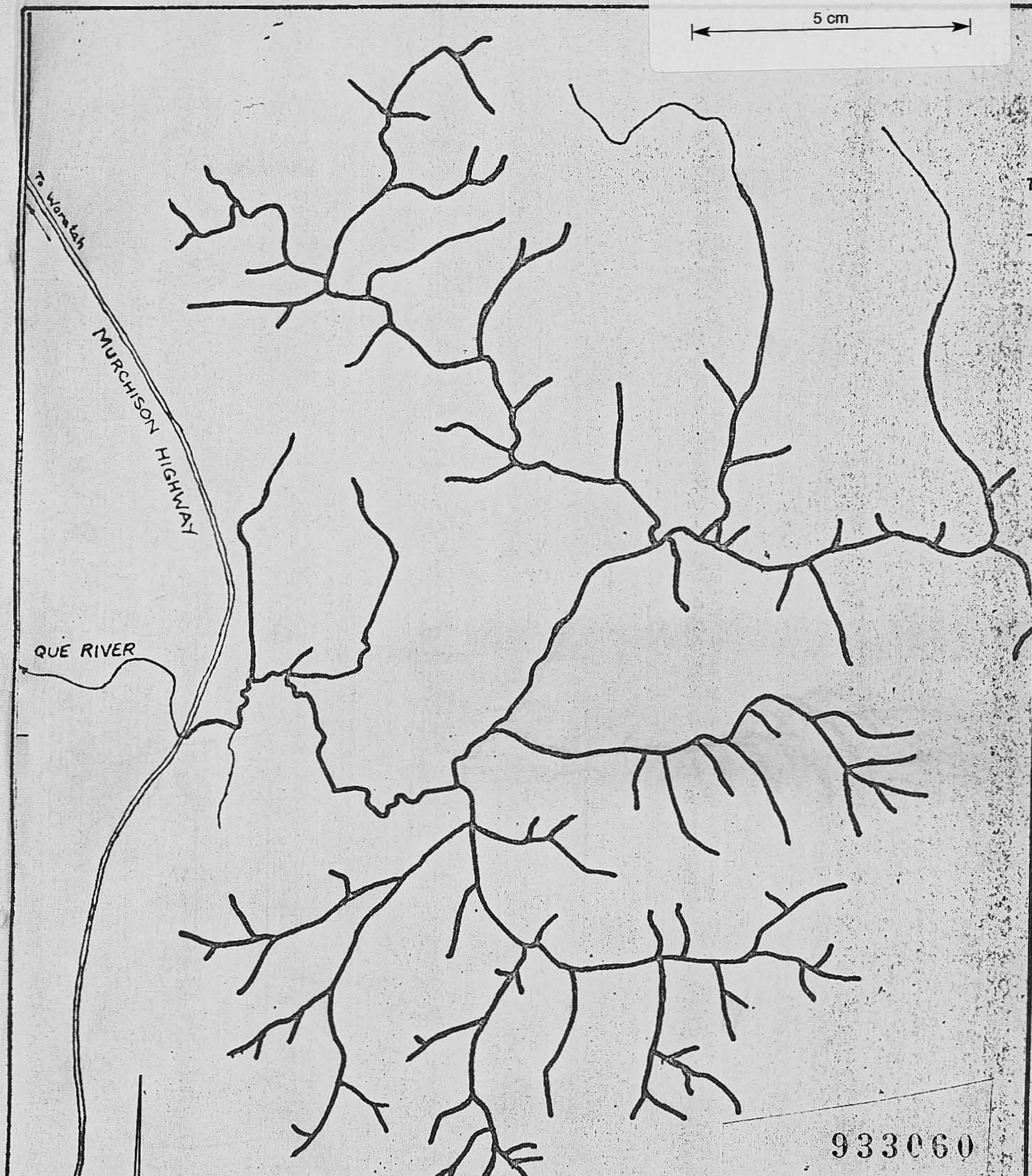
COMSTAFF PROPRIETARY LIMITED

MT CHARTER AREA
LOCALITY PLAN

DRAWN	
SCALE	1: 500,000
PLAN No	TAS-2M-1

70-706

076



COMSTAFF PROPRIETARY LIMITED

MT CHARTER AREA

GEOCHEMISTRY

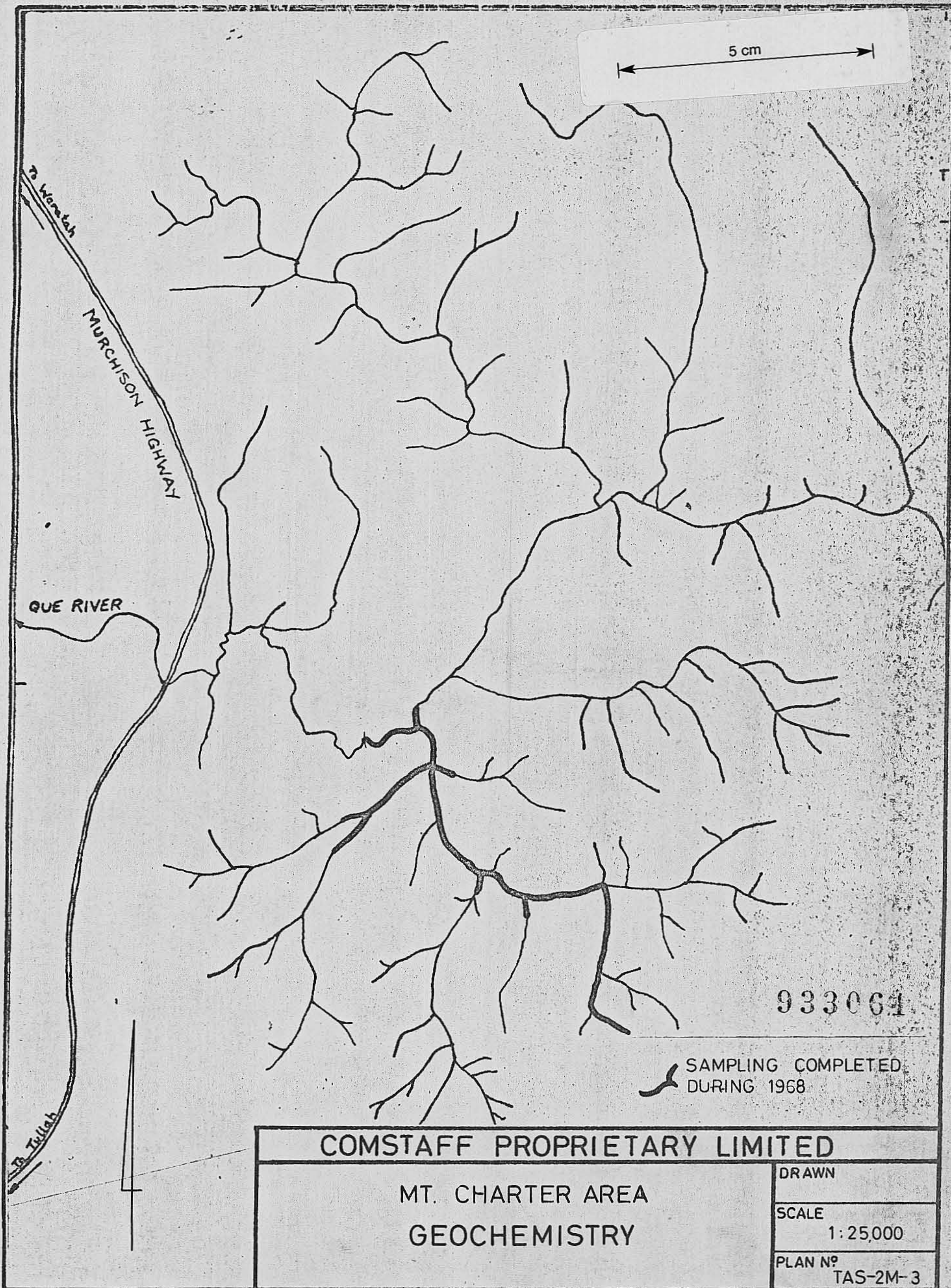
DRAWN

SCALE 1:25,000

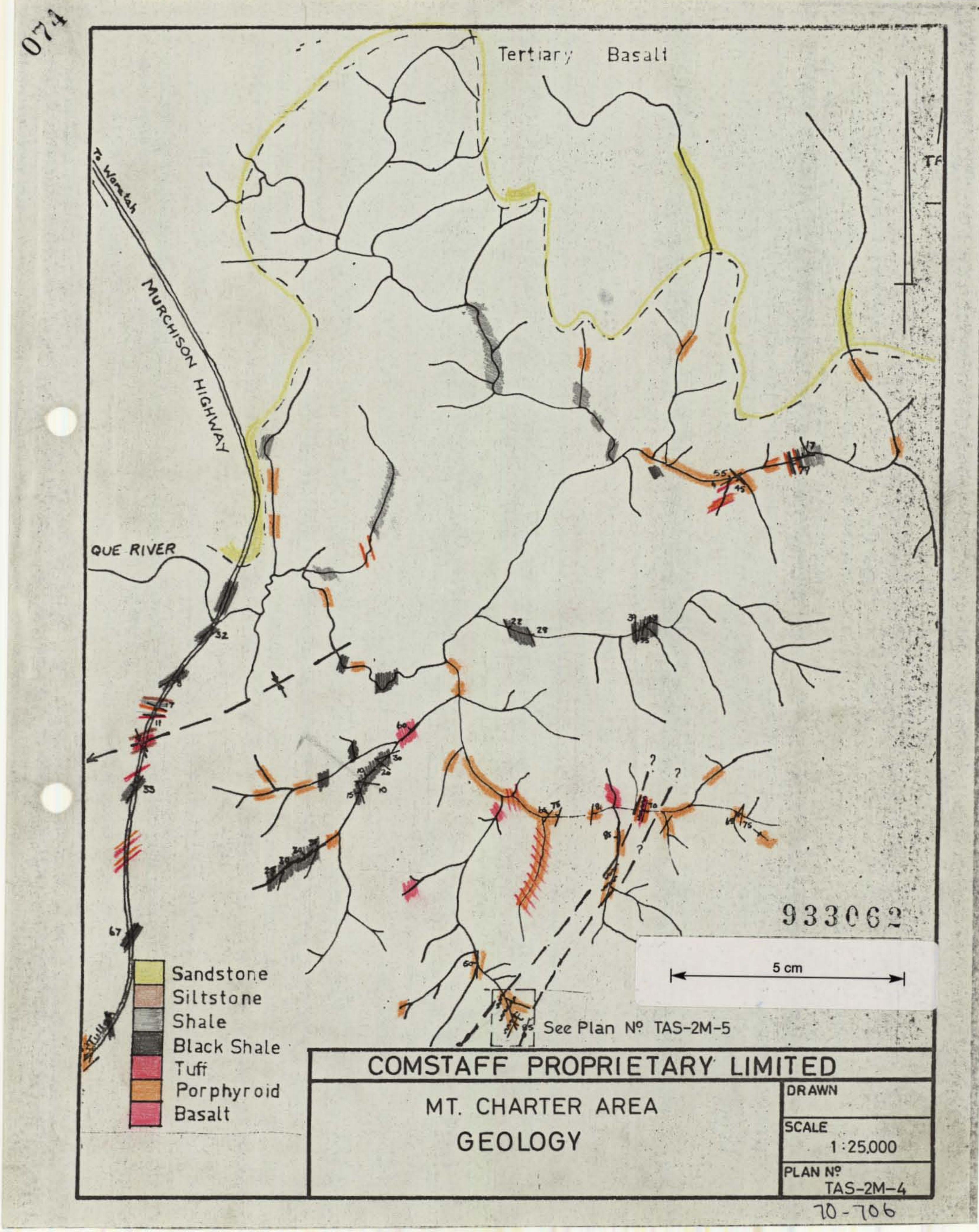
PLAN Nº TAS-2M-2

70-706

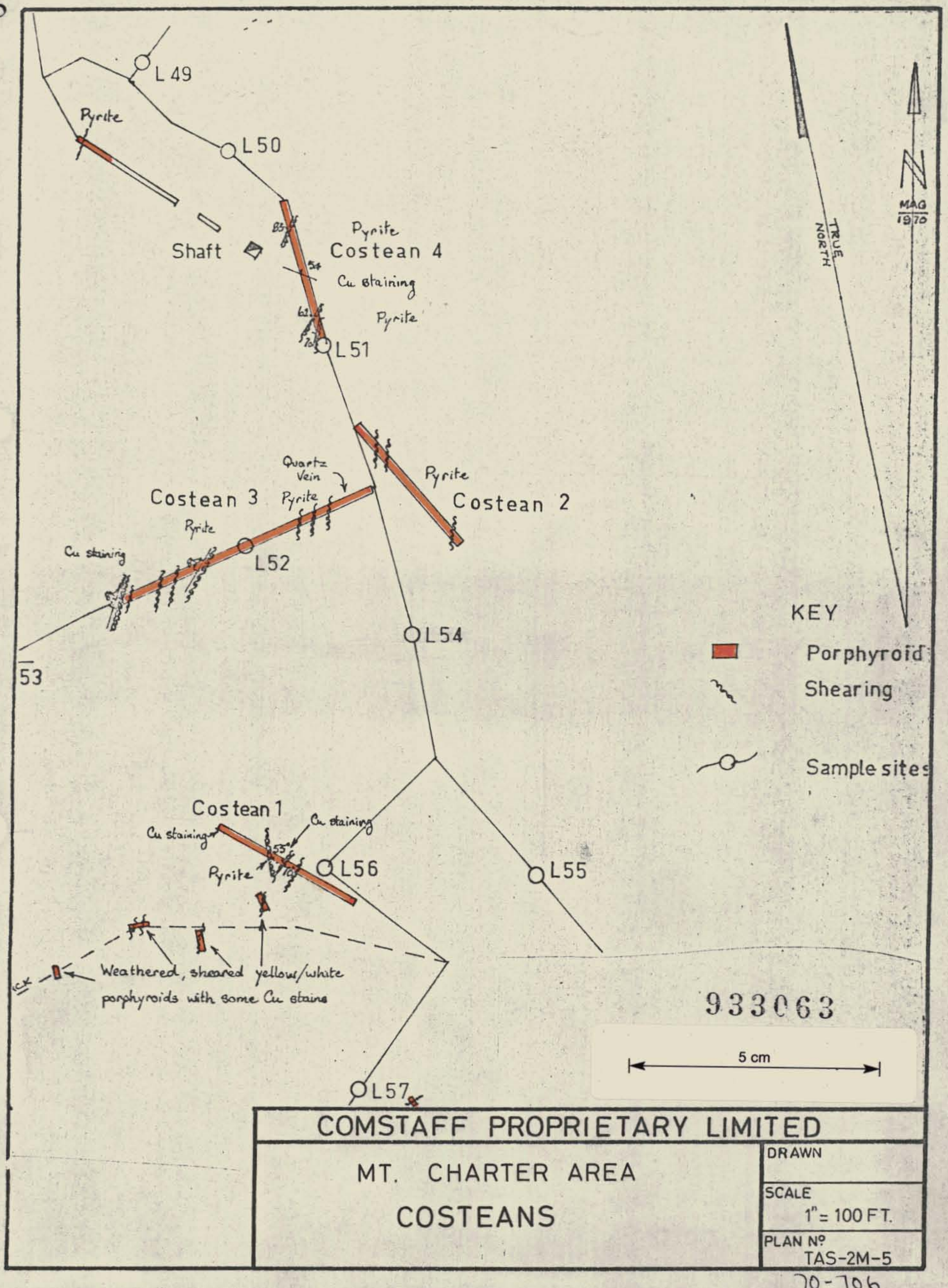
075


5 cm
To Waratah
MURCHISON HIGHWAY
QUE RIVER
To Tullah
933064
SAMPLING COMPLETED DURING 1968
COMSTAFF PROPRIETARY LIMITED
MT. CHARTER AREA
GEOCHEMISTRY
DRAWN
SCALE 1:25,000
PLAN Nº TAS-2M-3

70-706



074
Tertiary Basalt
To Waratah
MURCHISON HIGHWAY
QUE RIVER
Sandstone
Siltstone
Shale
Black Shale
Tuff
Porphyroid
Basalt
See Plan Nº TAS-2M-5
5 cm
933062
COMSTAFF PROPRIETARY LIMITED
MT. CHARTER AREA
GEOLOGY
DRAWN
SCALE
1:25,000
PLAN Nº
TAS-2M-4
70-706


073
L 49
Pyrite
L 50
Shaft
Pyrite
Costean 4
Cu staining
Pyrite
L 51
Quartz Vein
Pyrite
Costean 3
Pyrite
Pyrite
Costean 2
Cu staining
L 52
53
L 54
KEY
Porphyroid
Shearing
Sample sites
Costean 1
Cu staining
Cu staining
Pyrite
L 56
L 55
Weathered, sheared yellow/white porphyroids with some Cu stains
TRUE NORTH
MAG 1970
933063
5 cm
L 57
COMSTAFF PROPRIETARY LIMITED
MT. CHARTER AREA
COSTEANS
DRAWN
SCALE
1" = 100 FT.
PLAN Nº
TAS-2M-5
70-706

072

933064

COMSTAFF PROPRIETARY LIMITED

MT CHARTER AREA

ANOMALIES

DRAWN	
SCALE	1 : 25,000
PLAN Nº	TAS-2M-6

70-706

061

1969-70

933065

MT. CHARTER - UPPER QUE RIVER

6.1 GENERAL (see plan 2M-1)

The Que River drainage was sampled to the east of the Murchison Highway and north of Mount Charter. The river tributaries were sampled at intervals of 500 feet and the geology mapped. (see plan 2M-2). Some follow-up sampling was done at 200 ft. intervals up stream of anomalies shown in the analyses of samples taken last year. The streams were mapped by tape and compass method.

Previous Work

Henderson (1938) reported workings in the area for silver, gold and barytes. The workings consisted of trenches and shafts.

Because of these workings a team of two assistants spent two days last season carrying out rapid reconnaissance stream sediment sampling of the southern tributary of the Que River (see plan No. 2M-3). The samples were taken at intervals of approximately 700 ft. and were tested for copper, lead, zinc and silver by A.A.S. method. Anomalous values for lead and zinc were obtained for samples at the headwaters of the tributary and on some of the other tributaries.

6.2 GEOLOGY (see Plan No. 2M-4)

The rocks in the north western portion of the area are siltstones, grey and black shales with occasional outcrops of sandstone and tuffs. The rocks in the south-east are mainly porphyroids (varying from quartz-feldspar acid porphyries to feldspar intermediate porphyries) which are correlated with the Reid volcanics. The rocks to the north are overlain by Tertiary basalt.

A shear zone in the porphyroids was exposed in three tributaries and has an indicated strike length of nearly one mile. The strike of the shear zone conforms to the general strike of the rocks in the south of approximately 050° and dips are steep viz. 70° to 90°.

..28/..

7. CHESTER SILVER-FALLS AND PINNACLES AREAS

7.1. GENERAL

In an attempt to provide an overall picture and a composite assessment, the areas of Chester, Silver-Falls and Pinnacles are regarded as one.

The history and post exploration of the area are described briefly. The geology is dealt with in more detail and includes a description of the known ore-bodies.

Field work and office assessment of the results of work in this area continued throughout the 1969 winter into the 1969-1970 summer.

The area under consideration is located 15 miles to the south of Waratah (see Plan 2G-23). From the Murchison Highway, good graded tracks run to Chester (Camp Charlie), Pinnacles Mine and Shale Basin and to the North Pinnacles area (Lynch Creek).

History

In 1890, silver-lead ore was discovered at Ross Creek, a tributary of the Huskisson River. The discovery was made by Mr. Jack Lynch and was named by him the Silver-Falls Mine. Owing to the remoteness of the area, there was no possibility of the ore-body becoming a payable mine at that time.

Mining interests in the area remained dormant until in 1896 two men named McGuiness discovered copper-zinc-lead ore at the Pinnacles Hills.

Soon after, the large pyrites deposit now known as Chester, was located at Mount Kershaw by F. Kershaw and M. Sanderson. In the same year, alluvial gold was discovered in Shong's Creek.

Subsequently, several small companies were formed to work their Pinnacles holdings. The results of this work were considered unsatisfactory and active operations ceased.

By 1900, the Emu Bay Railway linked the North West mining areas to the seaport of Burnie. This improved access and gave impetus to the mining/exploration activites in the area.

..30/..

In 1908, the Mount Lyell Company began exploratory work at the Chester ore-body. From 1909-1913, inclusive development and exploration led to the mining of a considerable tonnage of first-grade lump-ore carrying over 37% sulphur. In 1913, the working costs had increased so much, owing to the necessity of removing large quantities of second grade material to obtain first grade ore, that active operations were discontinued.

Subsequent attempts at profitable development have failed, both at Chester and the Pinnacles Mines.

Intensive exploratory work in the area was resumed in 1956 by Rio Tinto Australia Exploration. A gravity survey over the Chester ore-body indicated 2¼ million tons of 40% sulphides with the possibility of a second ore-body of 1.8 million tons to the west. These results were not confirmed by E.M. techniques but the latter together with Afmag results suggest a further conductor north east of Chester.

After 1962, Mining Exploration Pty. Ltd. continued work in the area but do not appear to have made any detailed studies of Chester other than fly an Afmag survey which failed to reveal the ore-body.

In the Pinnacles area, between 1956 and 1962, R.T.A.E. carried out extensive geophysical, geological and geochemical surveys. Geophysical techniques included E.M., magnetics and gravity. Neither these, nor the geochemistry, gave any indication of the knownlodes.

From 1963 to 1968, M.E.P.L. geochemically sampled across the Pinnacles lodes. Some indication of the presence of the lodes was obtained but not their continuity or extent. After 1968, Comstaff Pty. Ltd. made a further intensive study of the area.

7.2 GEOLOGY (see Plan 2G-24)

The geology of this area is dominated by two structural features :-

(i) The Que Syncline

(ii) The Owen Rift Fault

and by three readily distinguishable successions :-

(a) the overlying shales, tuffs and greywacke sequence of probably Middle to Upper Cambrian age.

(b) the underlying Reid Volcanic Group of Lower to Middle Cambrian age,

an (c) the separate sedimentary sequence to the west of the Owen Rift Fault.

(i) <u>The Que Syncline</u>

The syncline plunges 15° - 20° to the north north east and has a steeper eastern limb. It may be observed clearly on aerial photographs, its nose being just north of the Pinnacles Mines. It has two major stratigraphic components in this area, the overlying Middle to Upper Cambrian sequence and the underlying Reid Volcanic Group. The western limb of the syncline is truncated by the Owen Rift Fault.

(ii) <u>The Owen Rift Fault</u>

This fault trends approximately north-south throughout the area and is a zone of shearing separating the formations of the Que Syncline from those to the west. The fault has been traced as far north as the Silver-Falls ore-body and indeed it seems to be a structural control on the latter.

The fault has not been observed, neither on aerial photographs nor in the field, to the north of Silver-Falls and in fact photo-interpretation suggests its displacement by a north west - south east trending fault - this is highly tentative. In any case, it does not appear to be related to the zone of shearing observed in the Coldstream (see Coldstream report 1969-70). Much more detailed mapping is necessary, in the area between the Que River and Silver-Falls, if the position of this fault is to be determined accurately.

However, it does seem certain that the Reid Volcanic Group terminates at Silver-Falls by faulting-out against the Owen Rift Fault - no volcanics were observed in Ross Creek. Photo-interpretation supports this hypothesis and indicates a Coldstream-type succession (greywacke-mudstone sequence) to the north.

In the Chester area, the fault-zone swings to the south east.

(a) Middle to Upper Cambrian Sequence

This sequence is found within the North Pinnacles to Silver-Falls area and probably to the North. It consists largely of shales, tuffs, siltstones and greywackes. A greywacke-conglomerate is observed in Ross Creek 500 feet to the east of the Silver-Falls ore-body. A thick tuffaceous sequence is interbedded with shales.

(b) Reid Volcanics

These consist of a number of silicified acid to intermediate lavas and tuffs interspersed with occasional acid to intermediate intrusions of small dimensions (e.g. porphyrys and, in the Chester area, some supposed dacites). Highly altered conglomerates and thick, altered (often silicified) siltstones also exist. The whole sequence has undergone chloritic grade metamorphism.

(c) The Sequence to the West of the Owen Rift Fault

The general dip is to the east. Folding is observed about north-south axes, often with gentle plunges to the north.

Sandstones are dominant with conglomerates present but rare. Thick shales occur often with thin tuffaceous horizons. Some of the shales are chocolate-brown and bear a striking resemblance to those at Coldstream.

The beds appear to have a lenticular relationship, rather than a pure stratiform one.

Shearing and schistosity is obvious in the fault-zone, especially to the south of the Chester Mine where intense shear-zones strike north-south. Associated with these shear-zones are phyllitic or schistose rocks resembling the Lyell schists.

7.3. DESCRIPTION OF KNOWN ORE-BODIES (see Plan 2G-24)

Chester

The mine is located 4-5 miles north of Rosebery on the eastern slopes of Mount Kershaw.

The ore-body(2) consists essentially of pyrites in an argillaceous and siliceous gangue - mostly pyrophyllite and quartz but with sporadic concentrations of barytes and calcite. Accessory minerals include chalcopyrite, barytes, calcite, dolomite, chlorite and talc.

The pyrite body lies along a wide zone of north north east trending shears within a sequence of Cambrian lavas and pyroclastics and is situated in a broadly analogous geological enviroment to the Mount Lyell mines (King 1960).

One mile to the west and striking north-south is the supposed Owen Rift Fault. It is not known if this has any control on mineralisation.

The pyrite deposits are typically lenticular in form, coinciding in strike and dip with the planes of schistosity of the enclosing rock (McIntosh Reid). The strike varies from 10° - 20° east of north and the dip is 60° - 65° in a south east direction. The main ore-body extends to about 600 feet in depth over a strike length of 400 feet.

The dearth of bedded rocks makes a structural interpretation difficult. It seems, on present evidence, that the pyrite body is situated within or near the hinge-zone of an anticline which plunges gently to the north north east. The pitch of the ore-body seems to be greater than that of the postulated anticline.

Mineral Potential of Chester

The Chester mine has interest as a possibly viable pyrite deposit and potential for Cu., Pb., and Zn. mineralisation. It is possible that the known ore-body has extensions both in depth and strike length. Indeed, the depth to which the deposit has been tested is less than both the length and width of the lode outcrop. Further ore-bodies may be present to the west and north east. The potential of Chester was realised by Henderson (1951) in his paper on the Sulphur Resources of Tasmania where he states, "Perhaps the best source of sulphur in Tasmania is the large body of pyrite .... Chester Mine".

Broad similarities to the Mount Lyell mines suggest that Cu., Pb., and Zn. lodes may be found in the environs. Further, the copper content of the known Chester ore-body may increase with depth as happens in some of the Mount Lyell lodes.

Pinnacles Mines (Brown's Tunnel, Thomas' Tunnel, South open-cut).

The Pinnacles lode system lies within a series of partially silicified siltstones, argillites, cherts, acid to intermediate volcanics, pyroclastics and intrusives of Cambrian (?) age.

North west cross-faults and a zone of shearing complicate a north north east strike trend.

The lodes occur within cherts associated with silicified argillites and in several instances at the sheared boundary of the instrusives.

Half-a-mile to the west is the north-south trending Owen Rift Fault, possibly having some relationship to mineralisation.

The best ore intersected was found in the south open-cut where 15 feet of ore is present containing Cu. 0.83% Pb. 4.27%, Zn. 6.12% and Ag. 0.92 oz/ton (Broken Hill South Assays). Very much higher values are recorded by McIntosh Reid but these may be for hand picked ore.

Silver-Falls

Silver-Falls is located along Ross Creek and is 3½ miles north north west of the Pinnacles Mines.

The ore-body strikes about 010° and dips to the east at 65° to 75°. It appears to be 50 feet wide and is composed of galena, sphalerite and a little chalcopyrite. The country rock is a series of silicified crystal-lithic tuffs of Cambrian age similar to those found in the Pinnacles Area.

The latest mapping shows the ore-body to lie along the Owen Rift Fault.

No accurate assaying has been done but a small sample gave Pb. 9.4%, Zn. 1.7%, Ag. 14 dwt 9gr/ton (McIntosh Reid).

It is believed that Electrolytic Zinc may have carried out a small drilling programme sometime between 1945 and 1955. None of these results have been made available to Comstaff Pty. Ltd.

Examination of the Silver-Falls area failed to reveal any massive sulphides but merely a disseminated deposit of no apparent economic interest.

Lynch Creek Prospect

Two and a half miles west of the Pinnacles Mines is a small lode of Pb and Ba discovered by McIntosh Reid. This is distinct from the porphyroid belt of mineralisation to the east but is probably continuous with the "Just-in-Time" prospect to the north.

No exploratory work of any description has been undertaken over or adjacent to the lode.

Strongs Creek Gold Diggings

Strongs Creek is a small tributary of the Marianoak River and has its source on the west side of the Pinnacles Hills.

The gold-bearing wash is confined within narrow limits to the Marianoak valley. The gold is undoubtedly near its source and is probably a disintergration product of the Pinnacles ore-bodies which are known to contain appreciable quantities of gold. The alluvial gold is associated with galena, pyrites, chalcopyrites and chromite.

7.4. GEOCHEMISTRY (See Plans 2G-25, 2G-26, 2G-27)

Comstaff's geochemical exploratory work in the Chester-Pinnacles-Silver-Falls areas has taken 3 forms :

(1) Stream sediment sampling

(2) Soil-sampling grids

(3) Costeaning and bed-rock sampling.

Stream Sediment Sampling

An experiment was carried out involving the drainage of creek R 87N (see Plan 2G-25) whereby a detailed sediment sampling programme, together with A_o soil sampling near the banks of the creek, was instigated. It was hoped to ascertain whether such a combined technique would be as effective, quick and cheap as grid sampling.

Both the A_o soil samples and sediment samples were analysed for Cu , Pb , Zn , and Ag and results obtained indicated a similar zone of geochemical highs as had been outlined by the grid sampling programme of the previous year.

First evaluation indicated that the sediment and A_o soil sampling method is adequate, far quicker and cheaper, so that it would be used in this area as a useful geochemical reconnaissance method.

Grid Sampling

Soil sampling grids extend from the Chester area to a half-mile south of Silver-Falls.

Along these grids, auger samples of the soil at or near bedrock were taken at 50 foot intervals (25' in some places) and A_o samples at 100' intervals.

A_o samples were taken to locate soil anomalies in areas where auger sampling was ineffective owing to the thick glacial cover (maximum auger depth attempted was 5') - i.e. an auger sample that did not reach bedrock is within a different part of the soil profile and comparison with a near-bedrock sample was not valid.

Some anomalies detected by auger samples (Pinnacles Shale Basin area) were further soil sampled. A_o, B_o, and B_1 soil samples were taken at 25' intervals.

The values from the different horizons were then compared and assessed.

Actual values in p.p.m. of some of the high geochemical results are :

	A_o	B_o	B_1	Auger
Cu	30	110	650	620
Pb	80	90	600	1600
Zn	40	30	90	1300

These values expressed as a percentage of their background values are as follows :

	A_o	B_o	B_1	Auger
Cu	500	110	650	620
Pb	280	320	1620	3326
Zn	200	210	500	4120

These results have not yet been fully evaluated. However, perusal indicates that should the soil depth be too great to permit augering to bedrock, than A_o samples will suffice.

Costeaning

Previous to the '68-'69 season the Pinnacles Shale Basin (3 miles north of Chester Mine) has been geochemically sampled and partially costeaned. A further programme was initiated in 1968-69 to investigate anomalous areas.

The costeans were positioned along the hinge and cutting both limbs of the syncline to cover previously known anomalies.

Prior to costeaning, various types of soil samples were taken (see above) in an attempt to correlate these with values from the bedrock obtained by channel sampling (see Plans 2G-28 and 2G-29 for examples of relationship between A_o and augering and channel sampling).

7.5. SUMMARY OF FIELD PROGRAMME AND ITS OBJECTS

(1) Stream sediment samples were taken every 200' along Ross Creek and over the Silver-Falls ore-body. The objective was to reveal any further ore-bodies and to orientate stream-sediment samples over a known Ag-Pb-Zn ore-body (the latter was chip sampled).

(2) Stream sediment samples taken every 200' along creeks draining southern and western slopes of Mount Kershaw. Also A_o bank samples were taken from both banks at every station, the object being to determine any extensions of the Chester ore-bodies.

(3) Stream sediment samples were taken over a reported Pb gossan near the Pinnacles Mines.

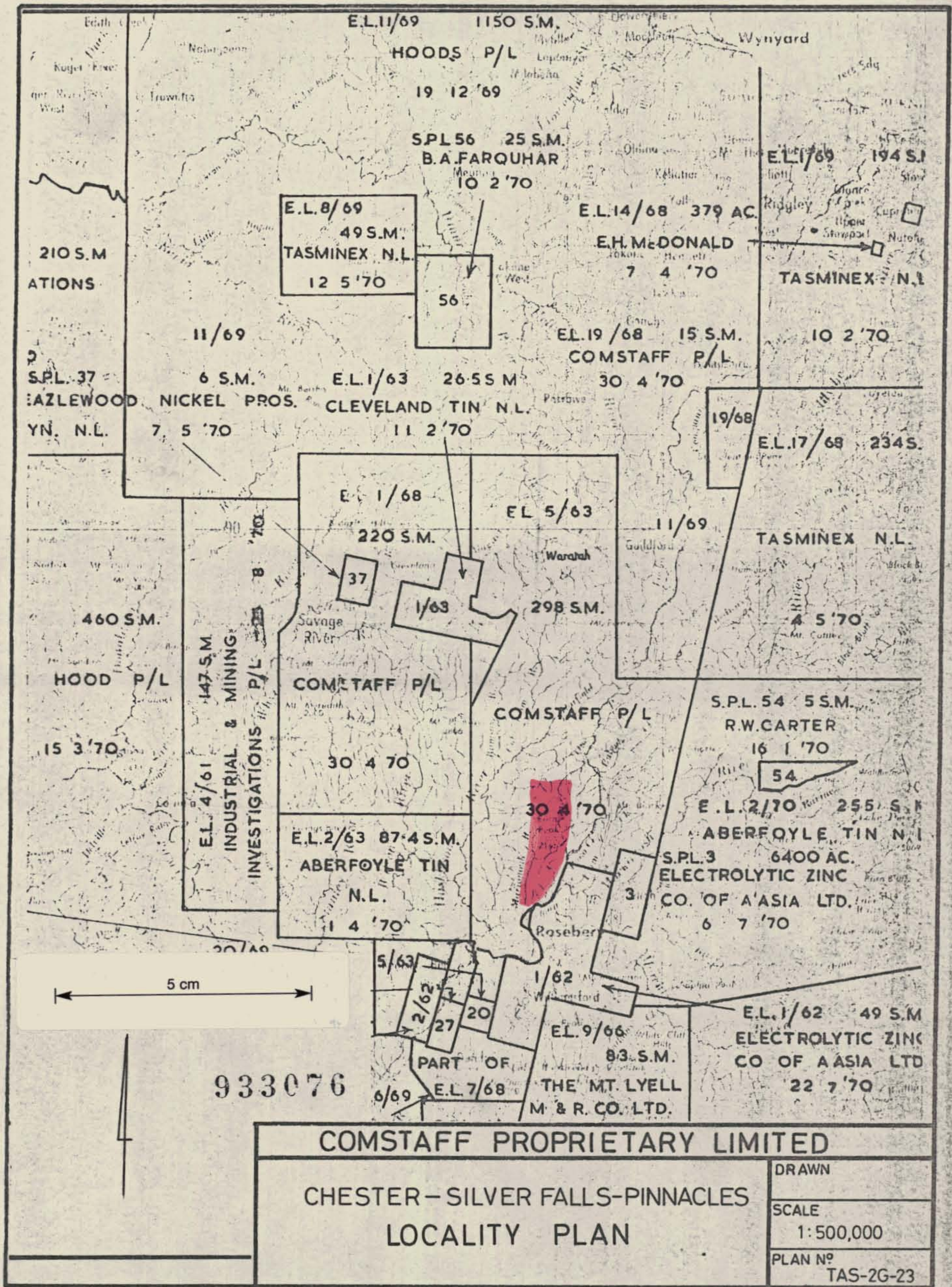
(4) Lines 90N, 95N and 100N were extended 1,500' to the west to cross the Reid Volcanic Group. These extensions were soil sampled (at the A_0 level) every 100'. The object of this was to discover if the Reid volcanics have a naturally high background value and to correlate the results with those obtained from costeaning a Pb-Zn anomaly on line 95N (see Plan 2G-25). Further, stream sediment samples were taken along tributary R 87 N in the hope that the three different sampling methods revealed a relationship.

(5) Cu-Pb-Zn anomalies on the grid covering Mount Kershaw were pitted in an attempt to find gossanous material. No gossan was observed.

7.6 PLANS

Plan No.	Plan
Tas.2G-23	Locality Plan
Tas.2G-24	Geology
Tas.2G-25	Geochemistry - Grid
Tas.2G-26	Geochemistry - Stream Sediments
Tas.2G-27	Geochemistry - Anomalies
Tas.2G-28	Auger, Channel and Chip Sample Relationship
Tas.2G-29	Soil Sample Orientation

059



E.L.11/69 1150 S.M.
HOODS P/L
19 12 '69
Wynyard
S.P.L 56 25 S.M.
B.A. FARQUHAR
10 2 '70
E.L. 8/69
49 S.M.
TASMINEX N.L.
12 5 '70
56
E.L.14/68 379 AC.
E.H. McDONALD
7 4 '70
E.L.1/69 194 S.M.
TASMINEX N.L.
10 2 '70
210 S.M
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E.L.19/68 15 S.M.
COMSTAFF P/L
30 4 '70
S.P.L. 37
6 S.M.
E.L.1/63 26·5 S M
HAZLEWOOD NICKEL PROS.
CLEVELAND TIN N.L.
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19/68
E.L.17/68 234 S.
E.L. 1/68
220 S.M.
EL 5/63
11/69
TASMINEX N.L.
37
1/63
Waratah
298 S.M.
4 5 '70
Savage River
460 S.M.
HOOD P/L
15 3 '70
147 S.M.
E.L. 4/61 INDUSTRIAL & MINING INVESTIGATIONS P/L 8 '70
COMSTAFF P/L
30 4 70
COMSTAFF P/L
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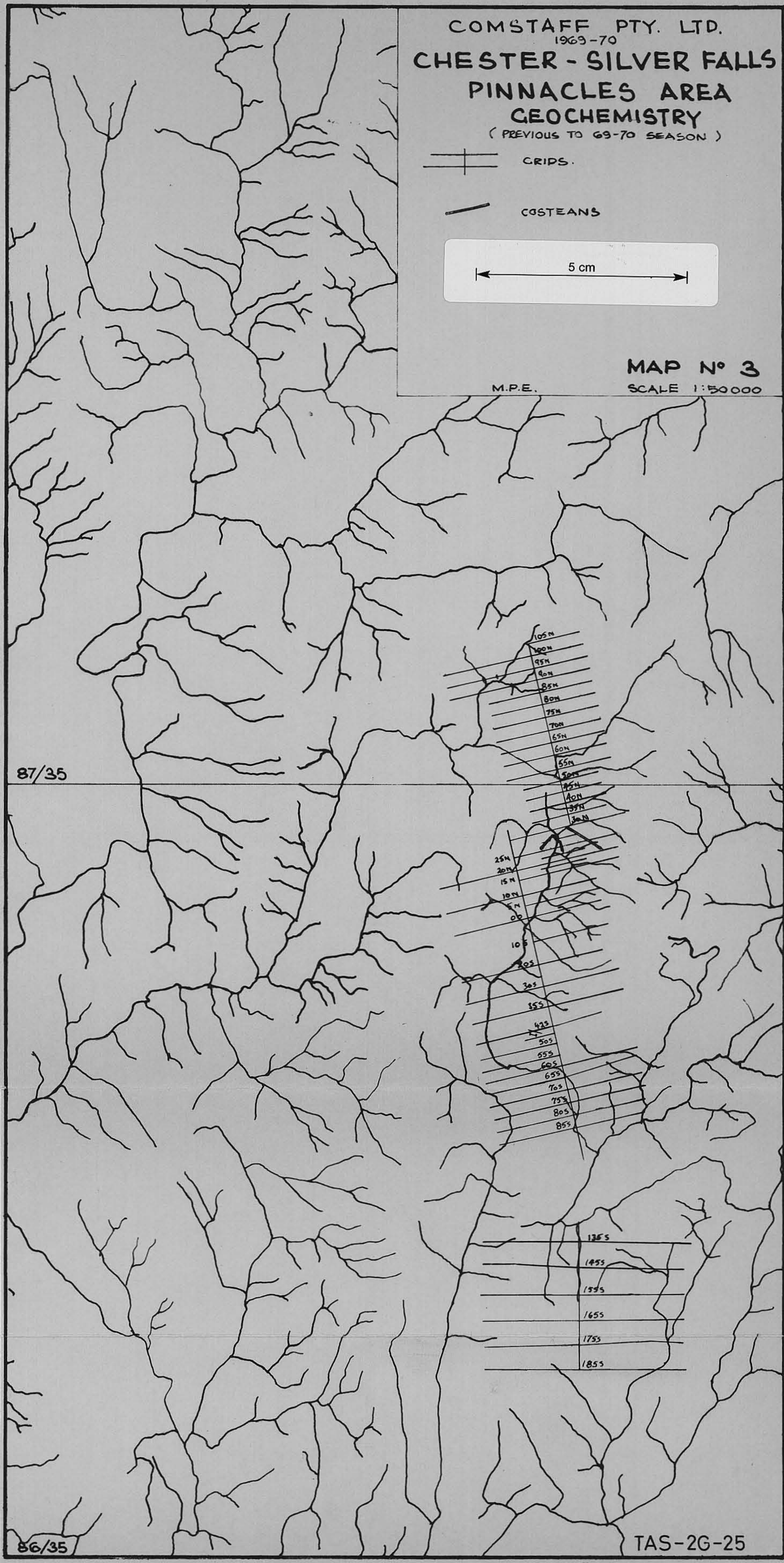
R.W. CARTER
16 1 '70
54
30 4 '70
E.L. 2/70 255 S.M.
ABERFOYLE TIN N.L.
E.L. 2/63 87·4 S.M.
ABERFOYLE TIN
N.L.
1 4 '70
S.P.L. 3 6400 AC.
ELECTROLYTIC ZINC
CO. OF A'ASIA LTD.
6 7 '70
3
Rosebery
5/63
2/62
27
20
1/62
E.L. 1/62 49 S.M
ELECTROLYTIC ZINC
CO OF A ASIA LTD
22 7 '70
E.L. 9/66
83 S.M.
PART OF
E.L. 7/68
THE MT. LYELL
M & R. CO. LTD.
6/69
5 cm
933076
COMSTAFF PROPRIETARY LIMITED
CHESTER – SILVER FALLS - PINNACLES
LOCALITY PLAN
DRAWN
SCALE
1:500,000
PLAN Nº
TAS-2G-23

70-706

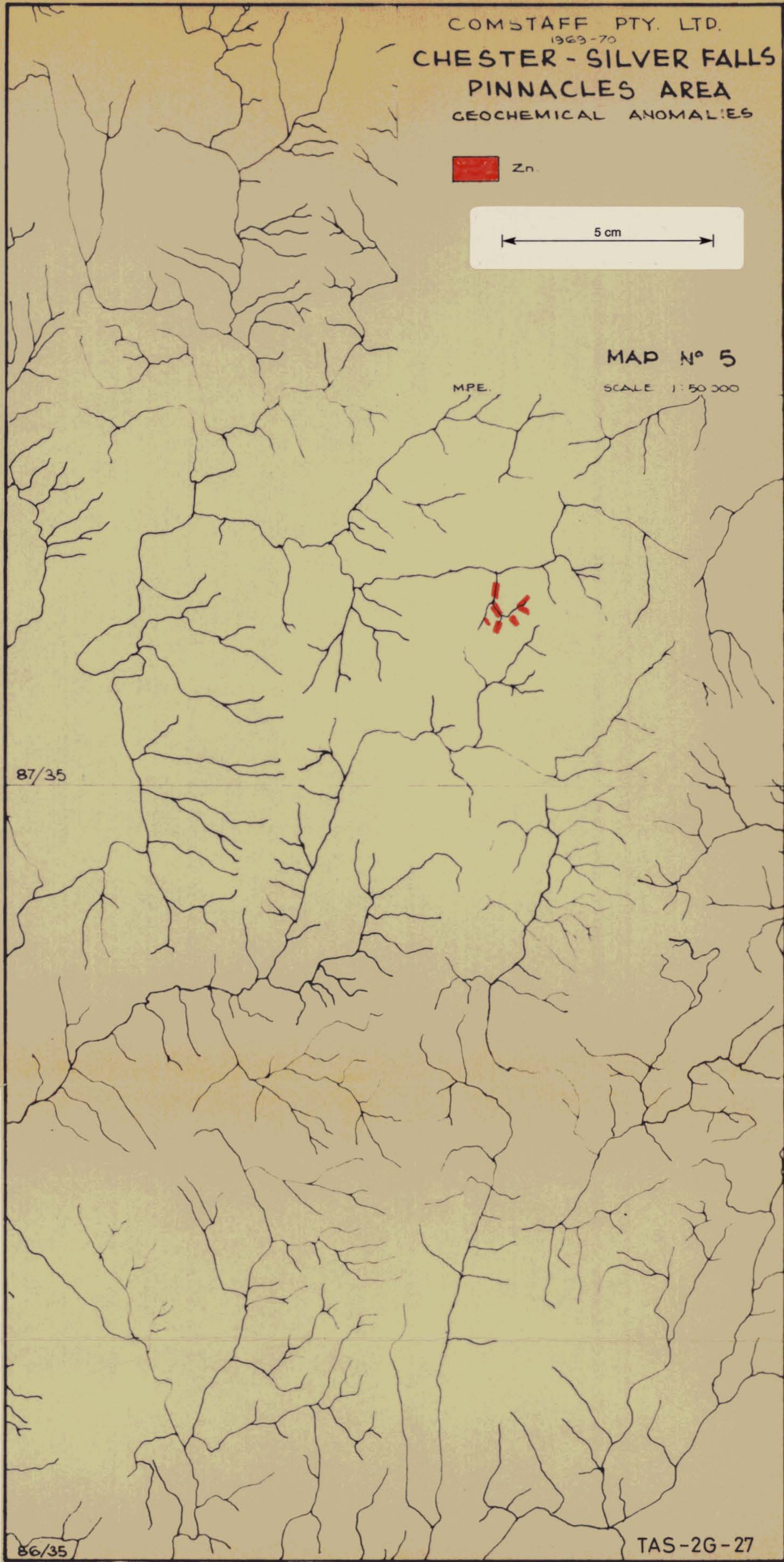
933077 058

70-706

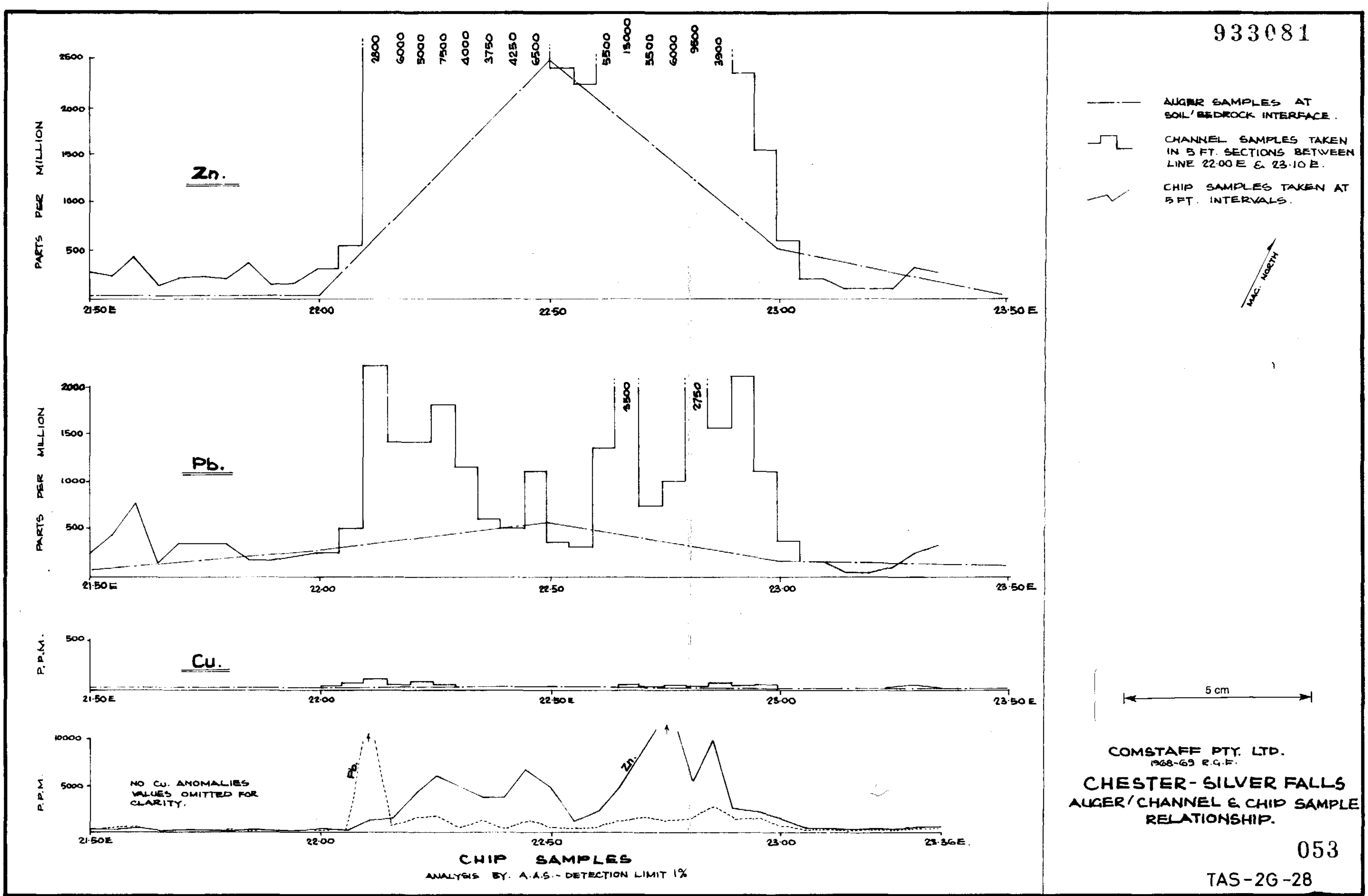

COMSTAFF PTY. LTD.
1969-70
CHESTER - SILVER FALLS
PINNACLES AREA
GEOCHEMISTRY
(PREVIOUS TO 69-70 SEASON)
GRIDS.
COSTEANS
5 cm
MAP N° 3
M.P.E.
SCALE 1:50000
87/35
86/35
TAS-2G-25

933079 056

70-706



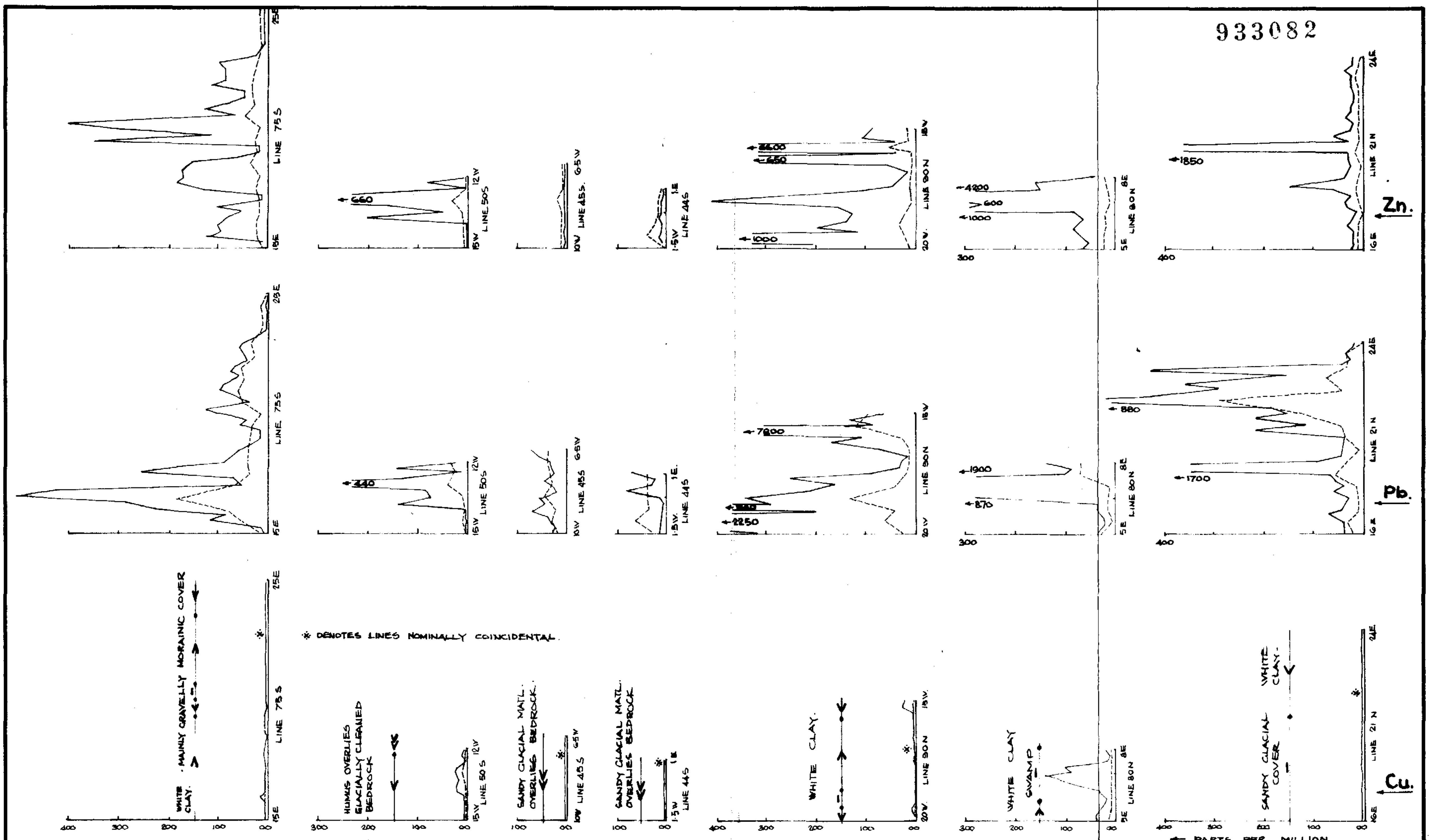
COMSTAFF PTY. LTD.
1969-70
CHESTER - SILVER FALLS
PINNACLES AREA
GEOCHEMICAL ANOMALIES
Zn.
5 cm
MAP Nº 5
M.P.E.
SCALE 1:50 000
87/35
86/35
TAS-2G-27


933081
Zn.
PARTS PER MILLION
2500
2000
1500
1000
500
2800
6000
5000
7500
4000
3750
4250
6500
5500
15000
3500
6000
9500
3900
21·50 E
22·00
22·50
23·00
23·50 E
Pb.
PARTS PER MILLION
2000
1500
1000
500
3500
2750
Cu.
P.P.M.
500
P.P.M.
10000
5000
NO Cu. ANOMALIES
VALUES OMITTED FOR
CLARITY.
Pb.
Zn.
23·36 E.
CHIP SAMPLES
ANALYSIS BY. A.A.S. - DETECTION LIMIT 1%
AUGER SAMPLES AT
SOIL/BEDROCK INTERFACE.
CHANNEL SAMPLES TAKEN
IN 5 FT. SECTIONS BETWEEN
LINE 22·00 E & 23·10 E.
CHIP SAMPLES TAKEN AT
5 FT. INTERVALS.
MAG. NORTH
5 cm
COMSTAFF PTY. LTD.
1968-69 R.G.F.
CHESTER - SILVER FALLS
AUGER/CHANNEL & CHIP SAMPLE
RELATIONSHIP.
053
TAS-2G-28

70-706

054

933082



AUGER SAMPLES AT 25 FT. INTERVALS TAKEN AT SOIL-BEDROCK INTER-FACE.

SOIL SAMPLES AT 50 FT. INTERVALS FROM AMONGST SURFACE ROOTS APPROX 4 IN. DEEP (MAINLY A_0)

LEVEL

SLOPE < 10°

SLOPE > 10°

SCALES :-
'LINES' 1:5000
P.P.M. 1" to 200.
ALL ANALYSES BY 'A.A.S.'

PINNACLES - SILVER FALLS SOIL SAMPLE ORIENTATION
1968-69 R.G.F.

COMSTAFF PTY. LTD. TAS-2G-29

5 cm

70-706