1969 - 1970

# CHESTER
# SILVER FALLS
# PINNACLES

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ANGLO AMERICAN CORPORATION (AUSTRALIA) LIMITED

# AN ASSESSMENT AND REVIEW OF THE CHESTER SILVER-FALLS AND PINNACLES AREAS ('60-'70).




## ABSTRACT

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

This season's programme is outlined and conclusions drawn where possible.


## GENERAL

The area under consideration is located 15 miles to the south of Waratah (see Map No. 1). 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).

The climate and vegetation of the area are nauseatingly typical of the North West corner of Tasmania.

## 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.

/2. Mining interests. ..........

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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 gave impetus to the mining/exploration activities of the area.

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 R.T.A.E. 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.

/3. After 1962, ..............

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 known lodes.

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 (see later).

GEOLOGY (see Map No 2)

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,

and (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.

/5. In the Chester. ..........

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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 of the Coldstream.

/6. The beds appear. .......

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.

DESCRIPTION OF KNOWN ORE-BODIES (See Map 2)

(A) CHESTER

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

The ore-body 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 anologous geological environment 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

/7 a south east. ..............

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

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 realized 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.

The entire zone of sheared rock in which Chester Mine lies is a potential area of economic mineralisation but the extent of the zone is unknown.

/8. (B) Pinnacles Mines. ......

(B) 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 intrusives.

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 (B.H.S. 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 (Fitch).

/9. The latest. ............

The latest mapping (Everett 1970) shows the ore-body to be along the Owen Rift Fault (see earlier).

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 P/L.

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

(C) LYNCH CREEK PROSPECT

2½ 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.

(D) 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 disintegration 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.

/10. GEOCHEMISTRY. ........

GEOCHEMISTRY (see Maps 3, 4, and 5)

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.

Details of the extent of previous stream sediment sampling and their results are not available in Waratah. (It is believed that these details are "lost" in the Melbourne Office).

An experiment was carried out involving the drainage of creek R 87N (see Map 4) 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 (see Report on Lease E.L. 5/63 - R. Fitch 1968-69).

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

/11. GRID SAMPLING. ..........

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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 have been 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 is ineffective owing to the thick glacial cover (maximum auger depth attempted was 5') - i.e. an auger sample that does not reach bedrock is within a different part of the soil profile and comparison with a near-bedrock sample is 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 every 25' station.

The values from the different horizons were then compared and their worth 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:

| | $A_o$ | $B_o$ | $B_1$ | Auger |
|---|---|---|---|---|
| Cu | 500 | 110 | 650 | 620 |
| Pb | 280 | 320 | 1,620 | 3,326 |
| Zn | 200 | 210 | 500 | 4,120 |

Further work in other environments must be undertaken in order that these results may be fully evaluated. However, first perusal indicates that should the soil depth be too great to permit augering to bedrock, then $A_o$ samples will sufficé/.

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 iniated 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 Figs. 1 and 2 for examples of relationship between $A_o$ and augering and augering and channel sampling).

SUMMARY OF 1969-70 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).

/13. (2) Stream sediemnt. .....

(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 ($A_o$) 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 Map 4). 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.

CONCLUSIONS AND FUTURE PROGRAMME

(1) Drill the ore-body in the southern open-cut at the Pinnacles Mine to discover if the ore-body expands at depth. The area should be re-mapped geologically first.

(2) The zinc anomalies (1969-1970 programme) to the north of the area, near Silver Falls (see Map No. 5) will be shelved until the regional stream sampling programme in the environs is completed. Samples were analysed variously for Cu., Pb., Co., Bi., Ni and Ag. in addition but there were no anomalies.

(3) The new costean on line 95N should be mapped.

/14. (4) The Silver-Falls. ......

(4) The Silver Falls regional programme should be extended to tie in with the Coldstream-Ramsay area. This will mean extending the Pinnacles road to the Que River.

(5) Seemingly, the Reid Volcanic rocks represent a natural high background geochemically compared to associated sediments in this area. Certain geochemical sample results connected to line extension 95N and stream sediments over the reported Pb. gossan near the Pinnacles mine, [redacted] have import only in connexion with our geochemical experiments.

M. P. Everett.

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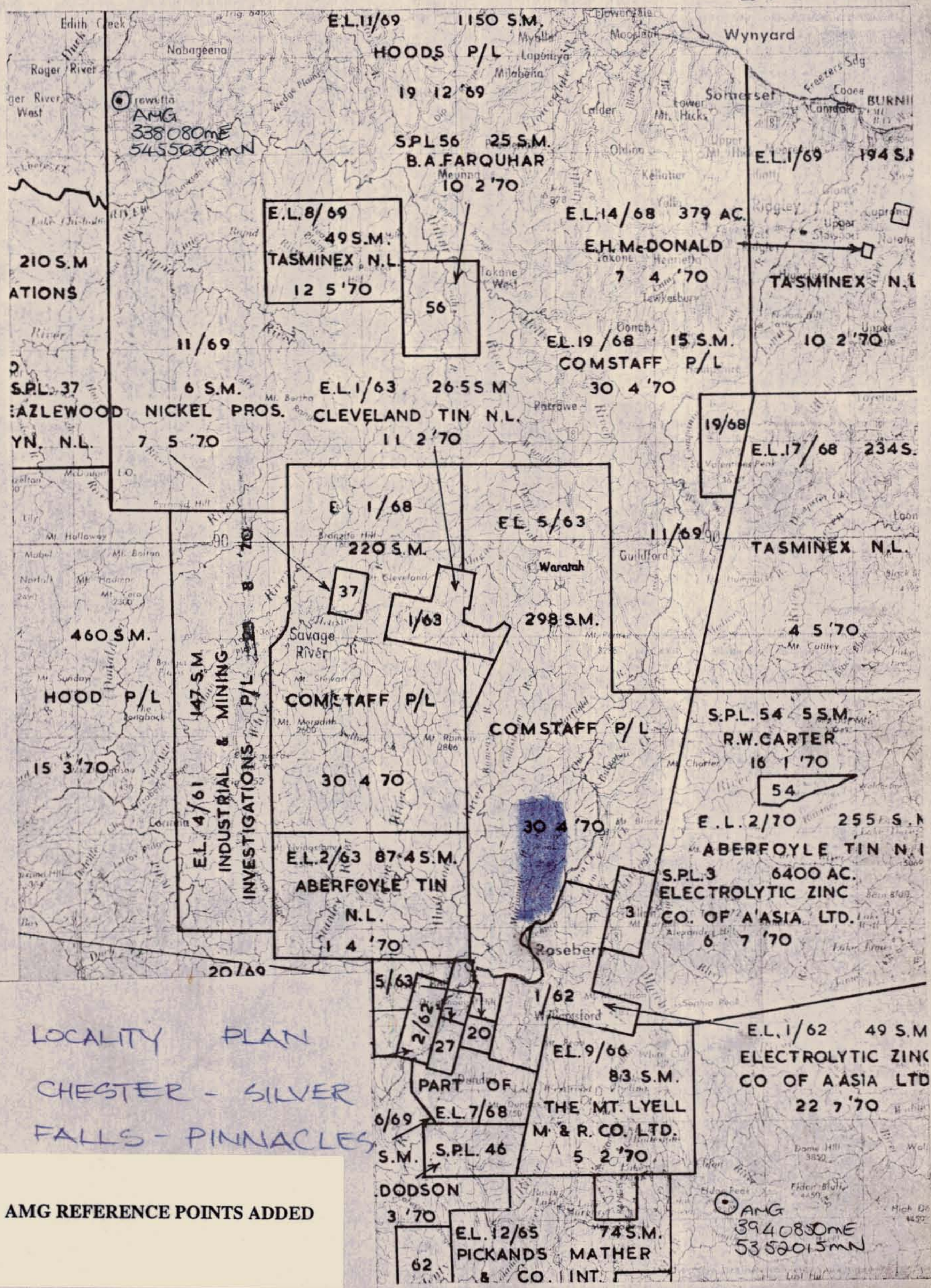
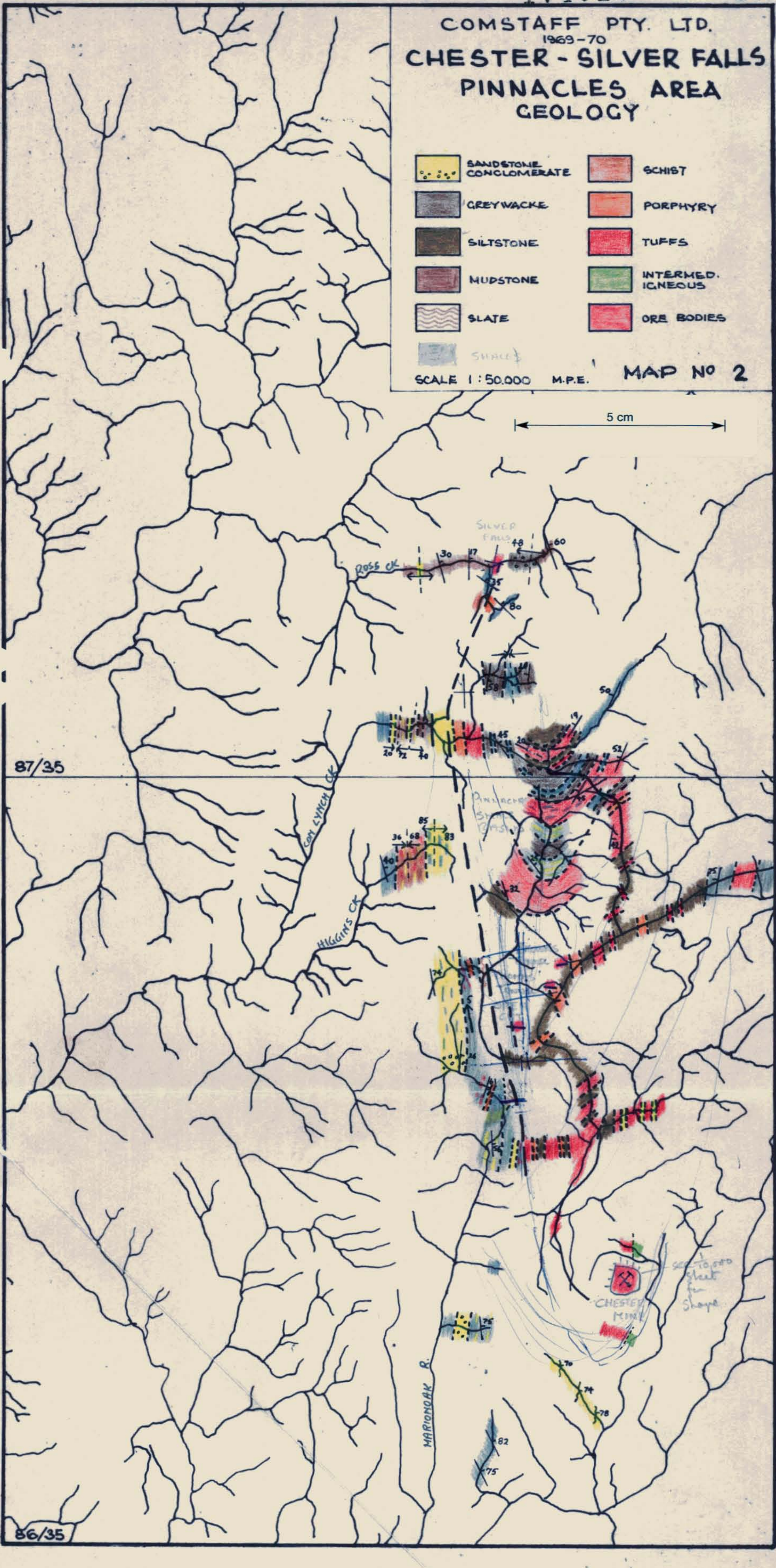


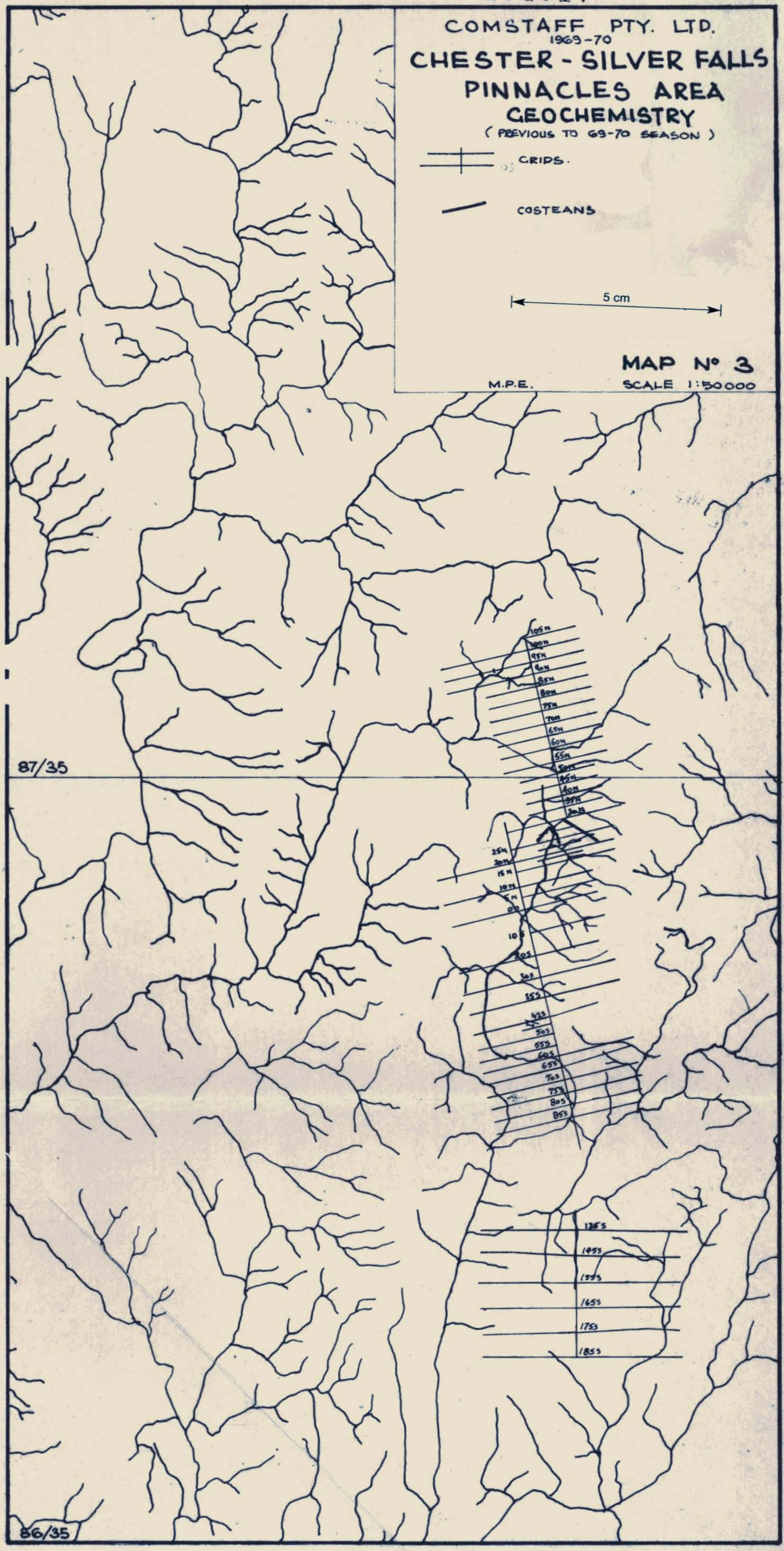

AMG REFERENCE POINTS ADDED

MAP 1

174016 001


COMSTAFF PTY. LTD.
1969-70
CHESTER - SILVER FALLS
PINNACLES AREA
GEOLOGY
SANDSTONE CONGLOMERATE
GREYWACKE
SILTSTONE
MUDSTONE
SLATE
SCHIST
PORPHYRY
TUFFS
INTERMED. IGNEOUS
ORE BODIES
SCALE 1:50,000
M.P.E.
MAP No 2
5 cm
87/35
86/35
ROSS CK
SILVER FALLS
HIGGINS CK
MARIONOAK R.
CHESTER MINE

174017 002

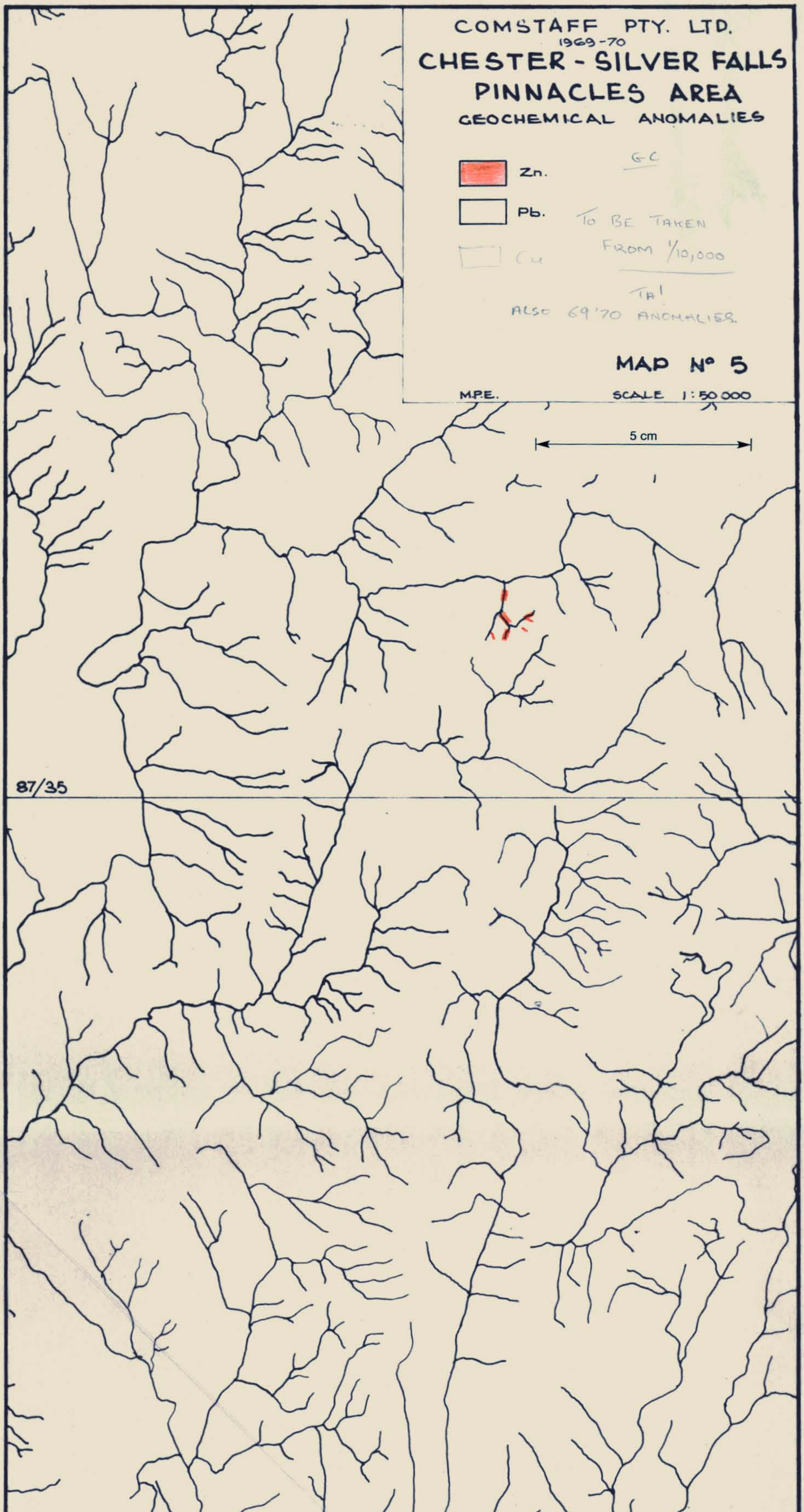


COMSTAFF PTY. LTD.
1969-70
CHESTER - SILVER FALLS
PINNACLES AREA
GEOCHEMISTRY
( PREVIOUS TO 69-70 SEASON )
GRIDS.
COSTEANS
5 cm
MAP No 3
M.P.E.
SCALE 1:50000
87/35
86/35
135S
145S
155S
165S
175S
185S

174018 003


COMSTAFF PTY. LTD.
1969-70
CHESTER - SILVER FALLS
PINNACLES AREA
GEOCHEMISTRY
1969-70 PROGRAMME
STREAM SEDIMENT
EXTENDED GRIDS
COSTEANS
5 cm
MAP No 4
SCALE 1:50 000
M.P.E.
100N
95N
90N
DRAINAGE
R 87 N.
87/35
86/35

174019 · 004

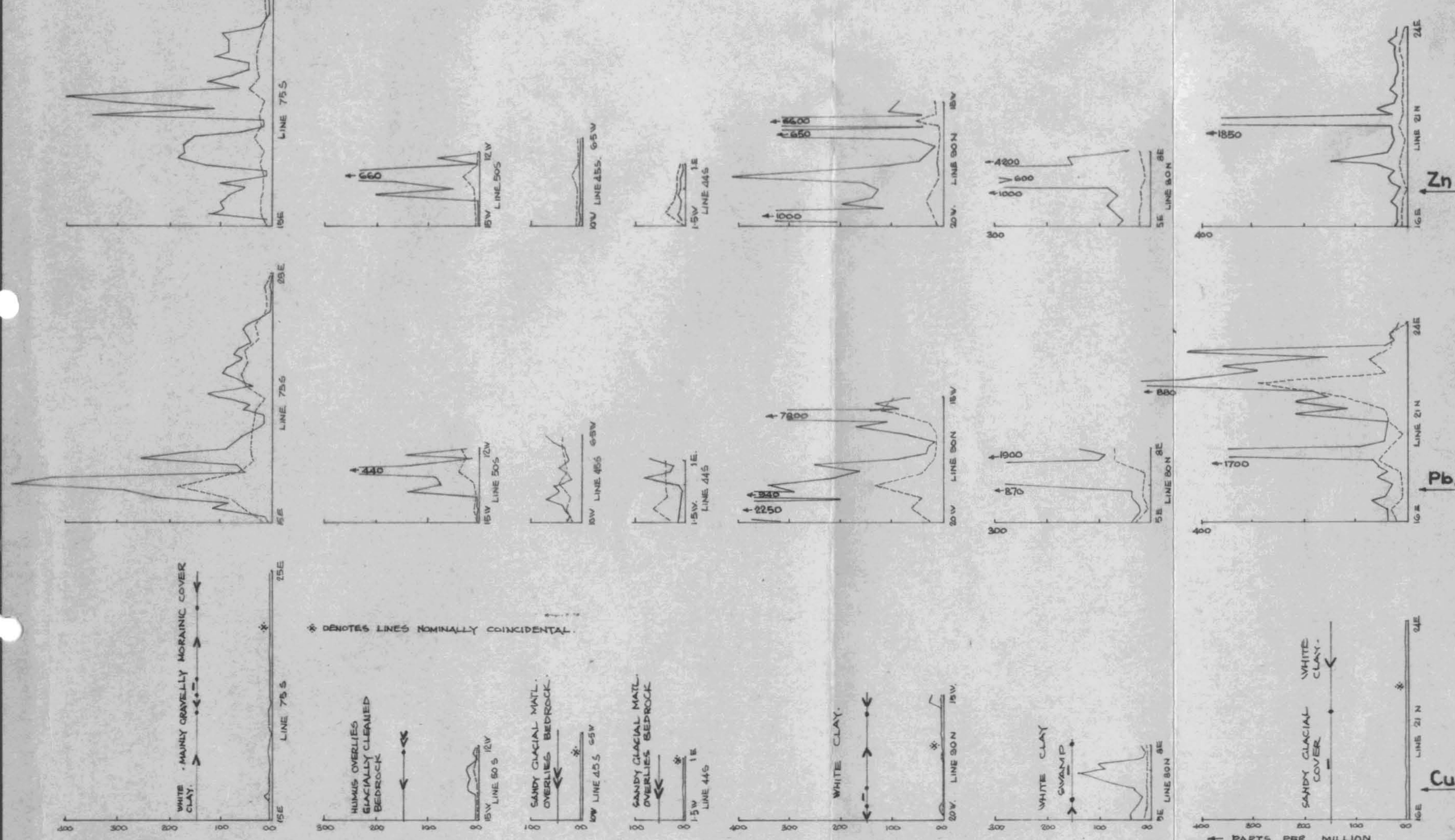


COMSTAFF PTY. LTD.
1969-70
CHESTER - SILVER FALLS
PINNACLES AREA
GEOCHEMICAL ANOMALIES
Zn.
Pb.
Cu
GC
To BE TAKEN
FROM 1/10,000
TA!
ALSO 69'70 ANOMALIES.
MAP Nº 5
M.P.E.
SCALE 1:50 000
5 cm
87/35
86/35


COMSTAFF PTY. LTD.
1968-69 R.G.F.

CHESTER-SILVER FALLS
AUGER/CHANNEL & CHIP SAMPLE RELATIONSHIP.

FIG. 1




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.

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FIG. 2