



GEOLOGICAL & GEOCHEMICAL
REPORT
YUKON QUARTZ MINERAL CLAIMS
DAWSON MINING DIVISION
AUGUST 5 - SEPTEMBER 3, 1972
G.G. CARLSON, P.ENG.

This report has been examined by the Geological Survey of Canada and is recommended to be published and to be considered as representation work in the amount of

\$13,385.35

D.B. Craig

~~Assistant Mining Engineer~~

Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

[Signature]

Commissioner of Yukon Territory

**R. G. HILKER
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P.O. BOX 4008, WHITEHORSE
YUKON TERRITORY, CANADA
"LAND OF THE MIDNIGHT SUN"

GEOLOGICAL AND GEOCHEMICAL REPORT
ON THE

DAW 1 - 23

HUN 1 - 16

SON 1 - 48

NUG 1 - 28

SUL 1 - 32

ROD 1 - 22

PUP 1 - 71

JEN 1 - 64

YUKON QUARTZ MINERAL CLAIMS

CLAIM SHEETS

115-0-14

115-0-15

116-B-3

DAWSON MINING DIVISION

AUGUST 5th to SEPTEMBER 3rd, 1972

FOR

SULLIVAN AND RODGERS

VANCOUVER, B.C.

BY

G.G. CARLSON, P.ENG.,

GEOLOGIST

R.G. HILKER LIMITED

SEPTEMBER 20, 1972

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INTRODUCTION

The DAW 1 - 23, HUN 1 - 16, SON 1 - 48, NUG 1 - 28, SUL 1 - 32, ROD 1 - 22, PUP 1 - 71 and JEN 1 - 64 claim groups were staked south of Dawson City, in the west central Yukon, during the spring and early summer of 1972. The claims were staked over areas of known or reported mineral occurrences and over local aeromagnetic anomalies. It was felt that the aeromagnetic anomalies might be associated with potentially copper bearing intrusive plugs.

Between August 5 and September 4, 1972, a preliminary evaluation of the claim groups was conducted. Access was by truck from Whitehorse to the campsite at Grand Forks, the abandoned townsite at the confluence of Bonanza and Eldorado Creeks. A Trans North Turbo Air Jet Ranger helicopter, based in Dawson, was used for access to the SON and PUP claim groups.

The work carried out over the claims included soil sampling at a 500 foot interval along the claim lines, tagging of the posts and reconnaissance geological investigations. As preliminary geochemical results were returned, detail^{ed} soil sampling was centred in areas of high values. Also, a regional silt sampling program was conducted throughout the area of the claim groups.

LOCATION AND ACCESS

The DAW, HUN, SON, NUG, SUL, ROD, PUP, and JEN claim groups are located within the area of the Klondike gold fields, south of Dawson, in the west central Yukon (see Yukon Location Sketch - Sketch No. 1).

Access to Dawson from Whitehorse is by air, a distance of 260 miles, or by the Klondike Highway, a distance of 338 miles. The individual claim groups are generally accessible from the Bonanza Creek road, the Hunker Creek road, and their subsidiary tractor trails, although some of these secondary routes have been overgrown, washed out, or otherwise obstructed by placer workings. Therefore access to the more isolated claims is best by helicopter. A helicopter is usually available on a casual charter basis in Dawson during the summer months. The relative locations of the claim groups and main roads and trails are shown on the Geochemistry Silt Survey maps, Plans 1 and 3.

BEAUFORT SEA

SKETCH NO. 11

NWIT
YUKON

ALASKA

BRITISH COLUMBIA

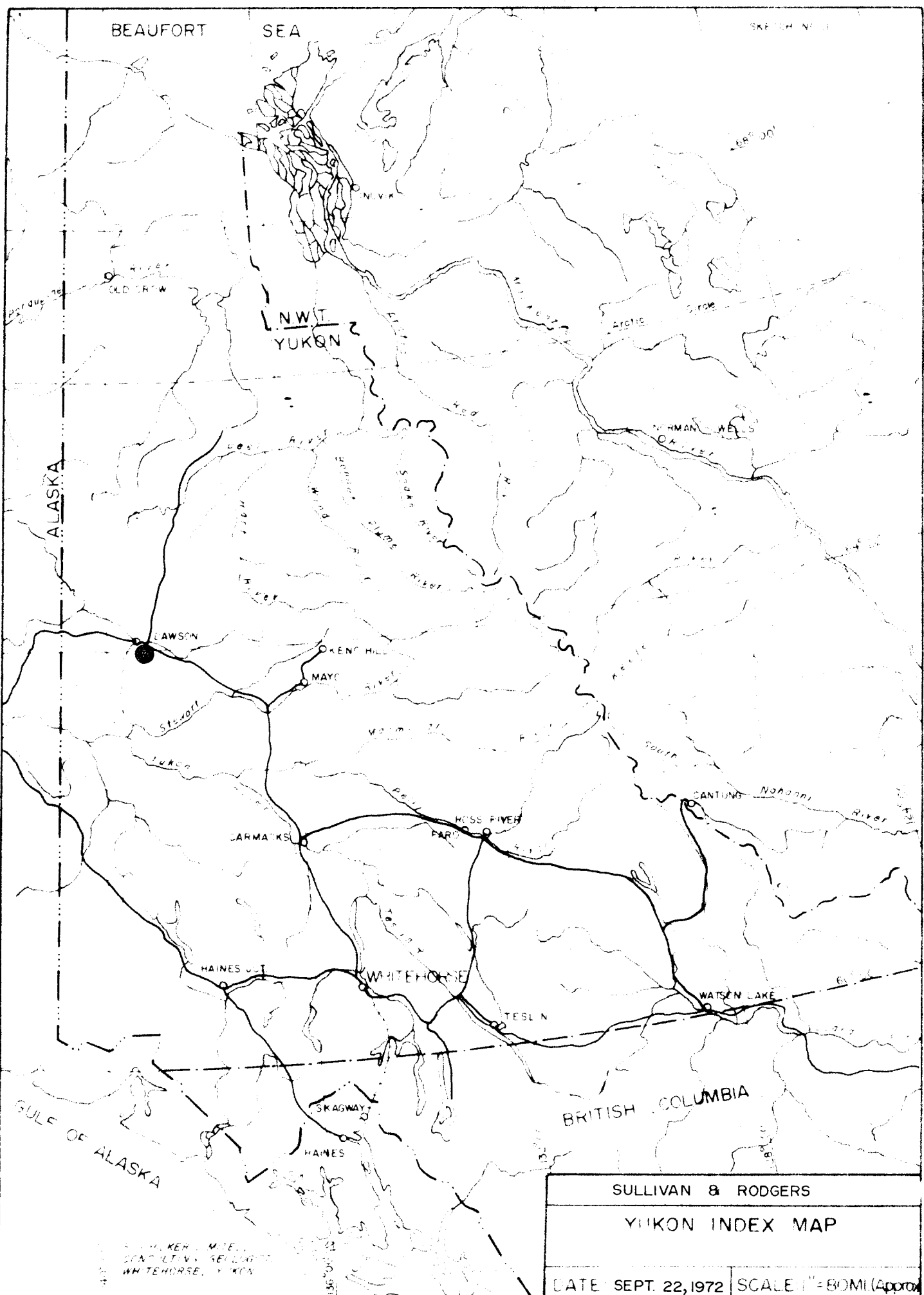
GULF OF ALASKA

SULLIVAN & RODGERS

YUKON INDEX MAP

DATE SEPT. 22, 1972 SCALE 1" = 80MI. (Approx)

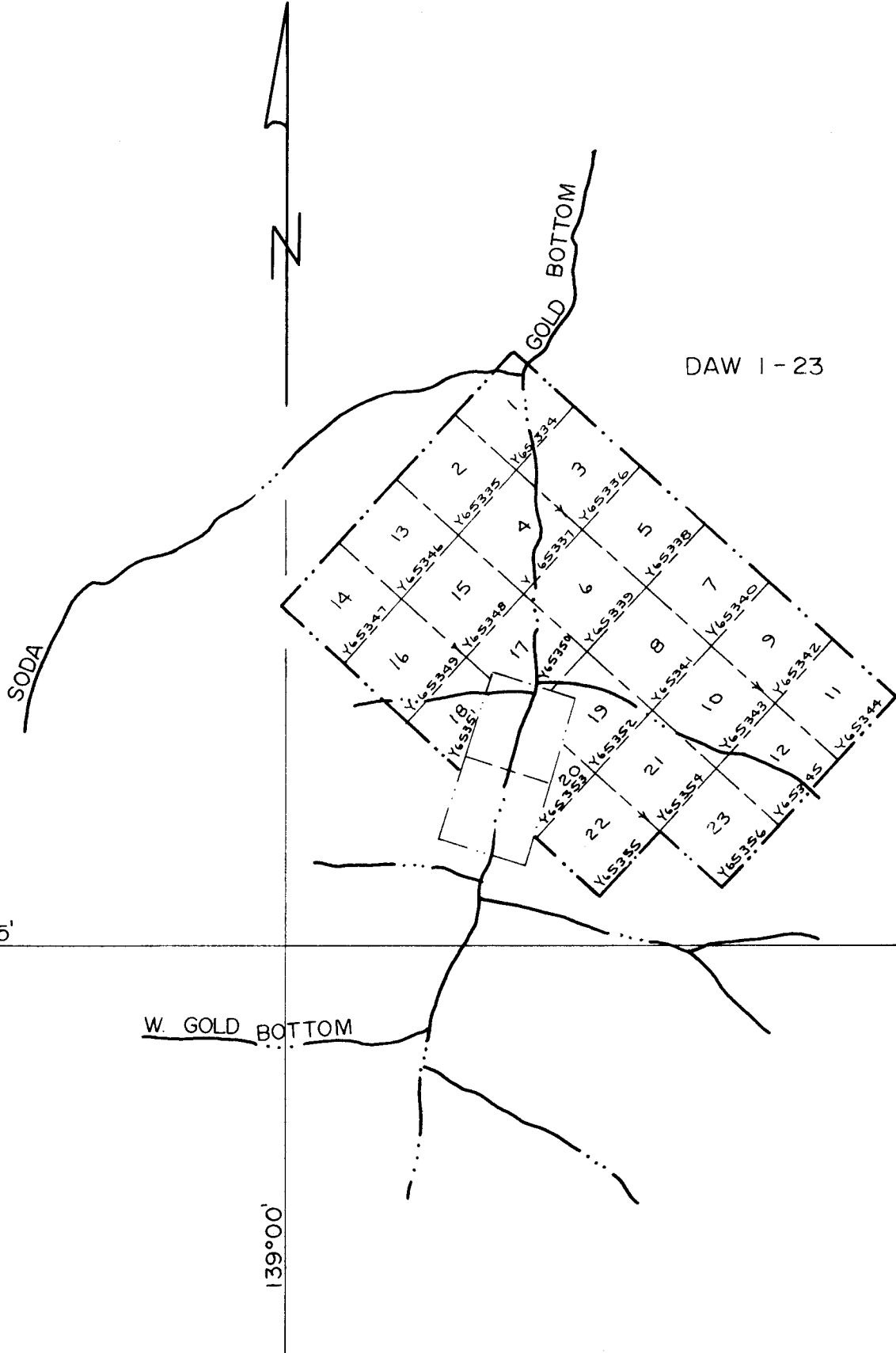
1:50,000 SCALE
CONTINENTAL SHEETS
WHITEHORSE, YUKON



CLAIMS

A total of 304 claims, in 8 separate groups, located on claim sheets 115-0-14, 115-0-15, and 116-8-3, have been recorded in the Dawson Mining Division, Yukon Territory, as listed below (see Claim Sketches 2 - 9):

<u>Claim Name</u>	<u>Grant Number</u>	<u>Anniversary Date</u>
DAW 1 - 23	Y65334 - Y65356 (incl.)	May 18, 1973
HUN 1 - 16	Y65318 - Y65333 (incl.)	May 18, 1973
SON 1 - 48	Y65357 - Y65404 (incl.)	May 18, 1973
NUG 1 - 28	Y65405 - Y65432 (incl.)	May 18, 1973
SUL 1 - 28	Y65433 - Y65464 (incl.)	May 18, 1973
ROD 1 - 22	Y65296 - Y65317 (incl.)	May 18, 1973
PUP 1 - 71	Y65465 - Y65535 (incl.)	May 18, 1973
JEN 1 - 16	Y65548 - Y65563 (incl.)	July 15, 1973
17 - 32	Y65564 - Y65579 (incl.)	July 16, 1973
33 - 48	Y65580 - Y65595 (incl.)	July 17, 1973
49 - 64	Y65596 - Y65610 (incl.)	July 18, 1973



DAW 1-23

63°55'

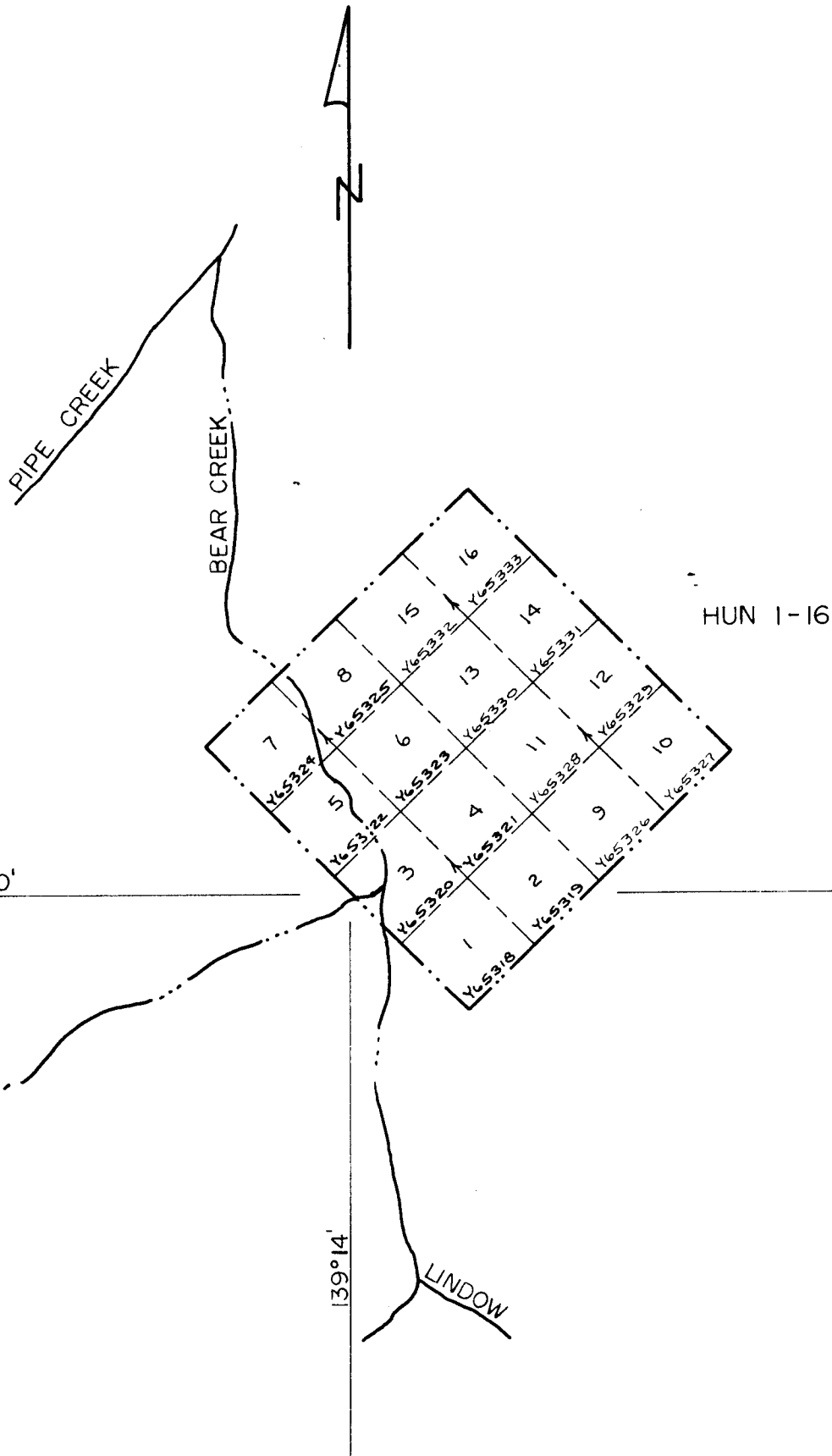
W. GOLD BOTTOM

139°00'

CLAIM SHEET 115-0-15

SULLIVAN & RODGERS

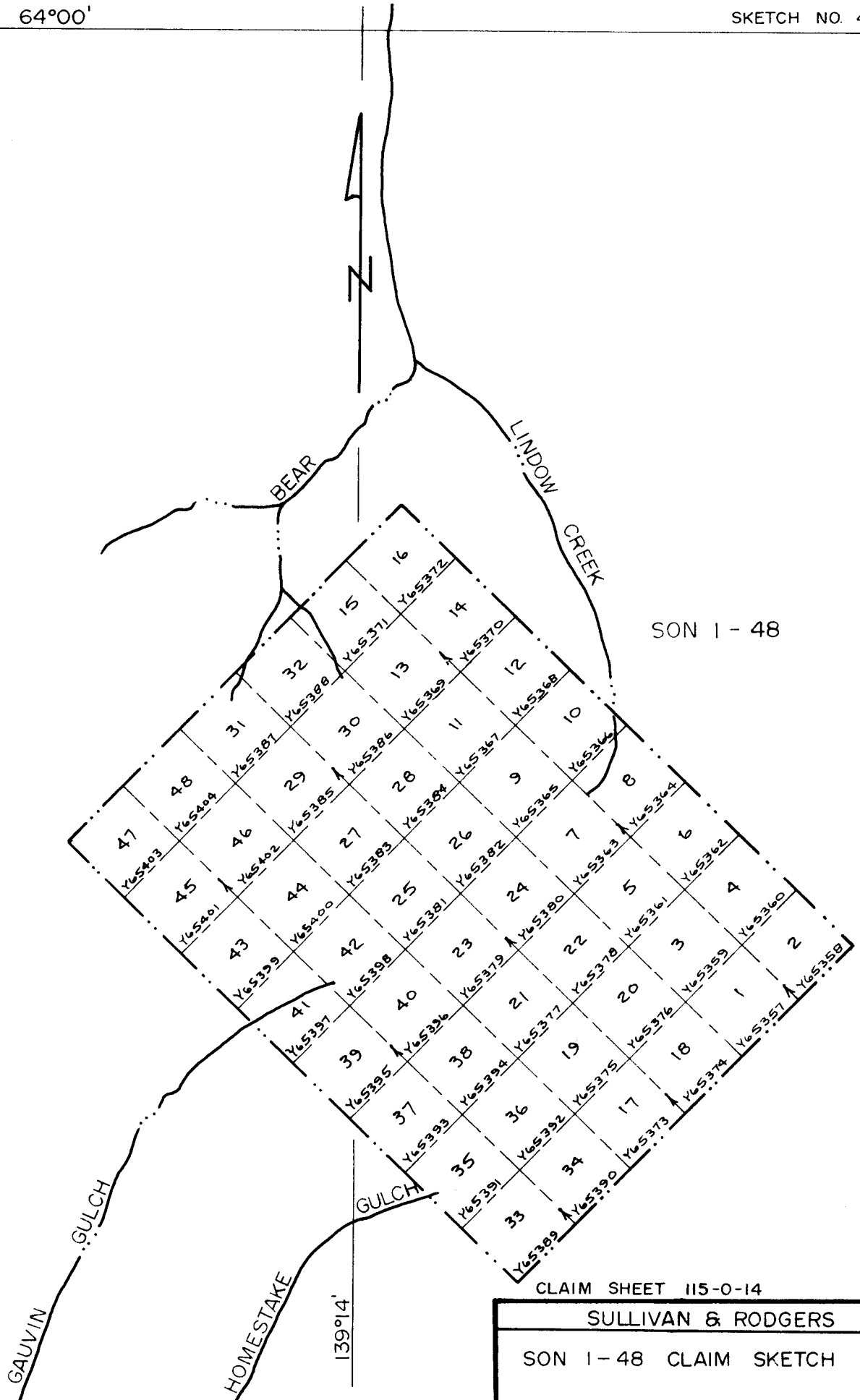
DAW 1-23 CLAIM SKETCH



CLAIM SHEETS I16-B-3, I15-O-14

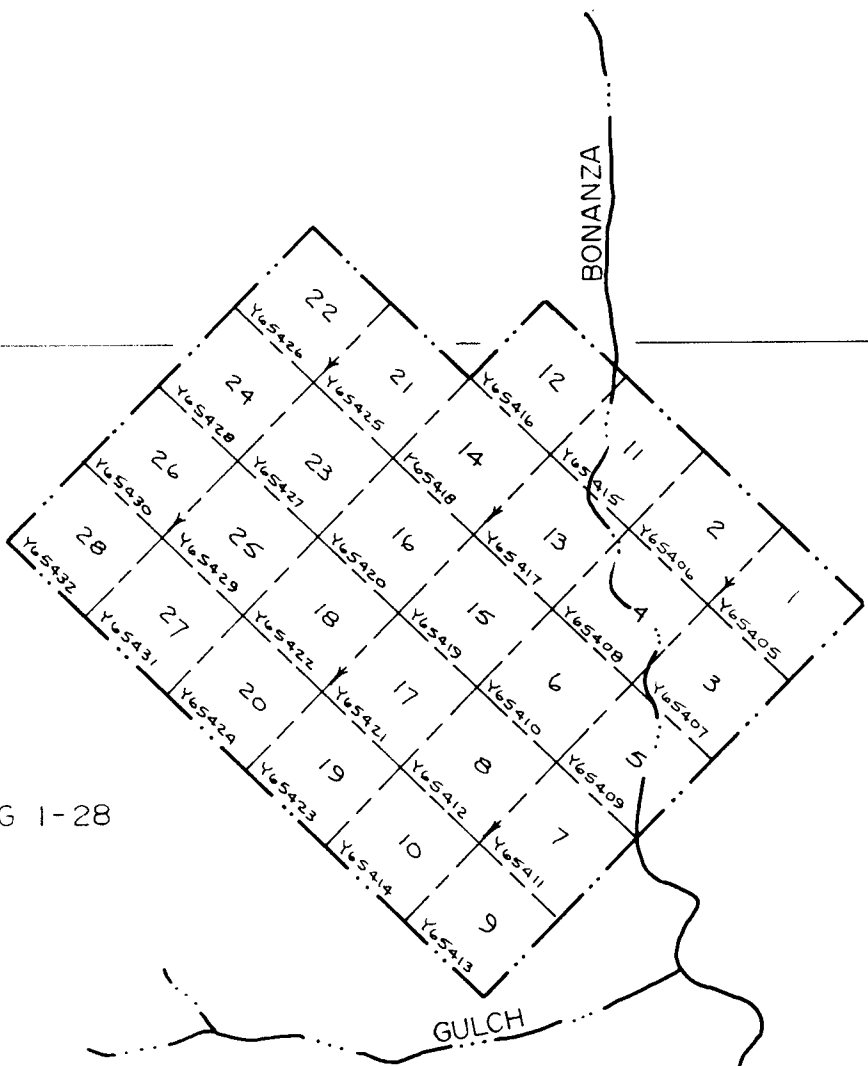
SULLIVAN & RODGERS

HUN 1-16 CLAIM SKETCH





64°00'



NUG 1-28

139°20'

CLAIM SHEETS 115-0-14, 116-B-3

SULLIVAN & RODGERS

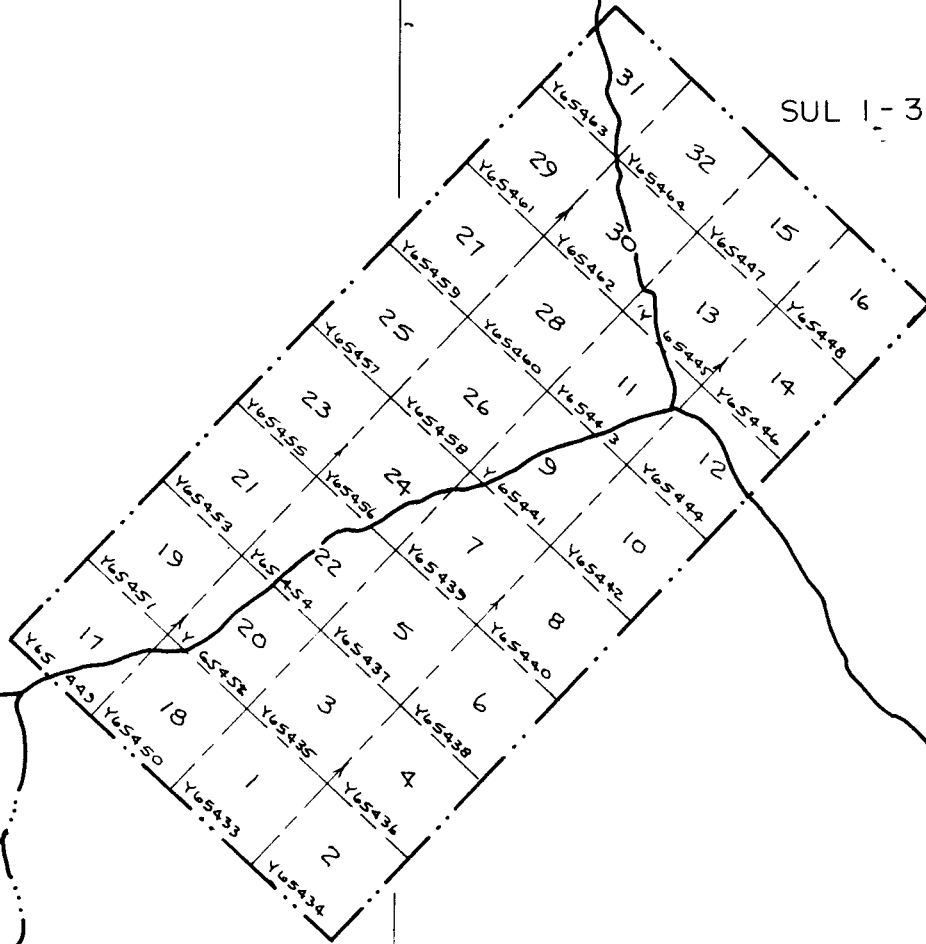
NUG 1-28 CLAIM SKETCH

63°55'

SUL 1-32

FRENCH GULCH

ELDORADO



139°20'

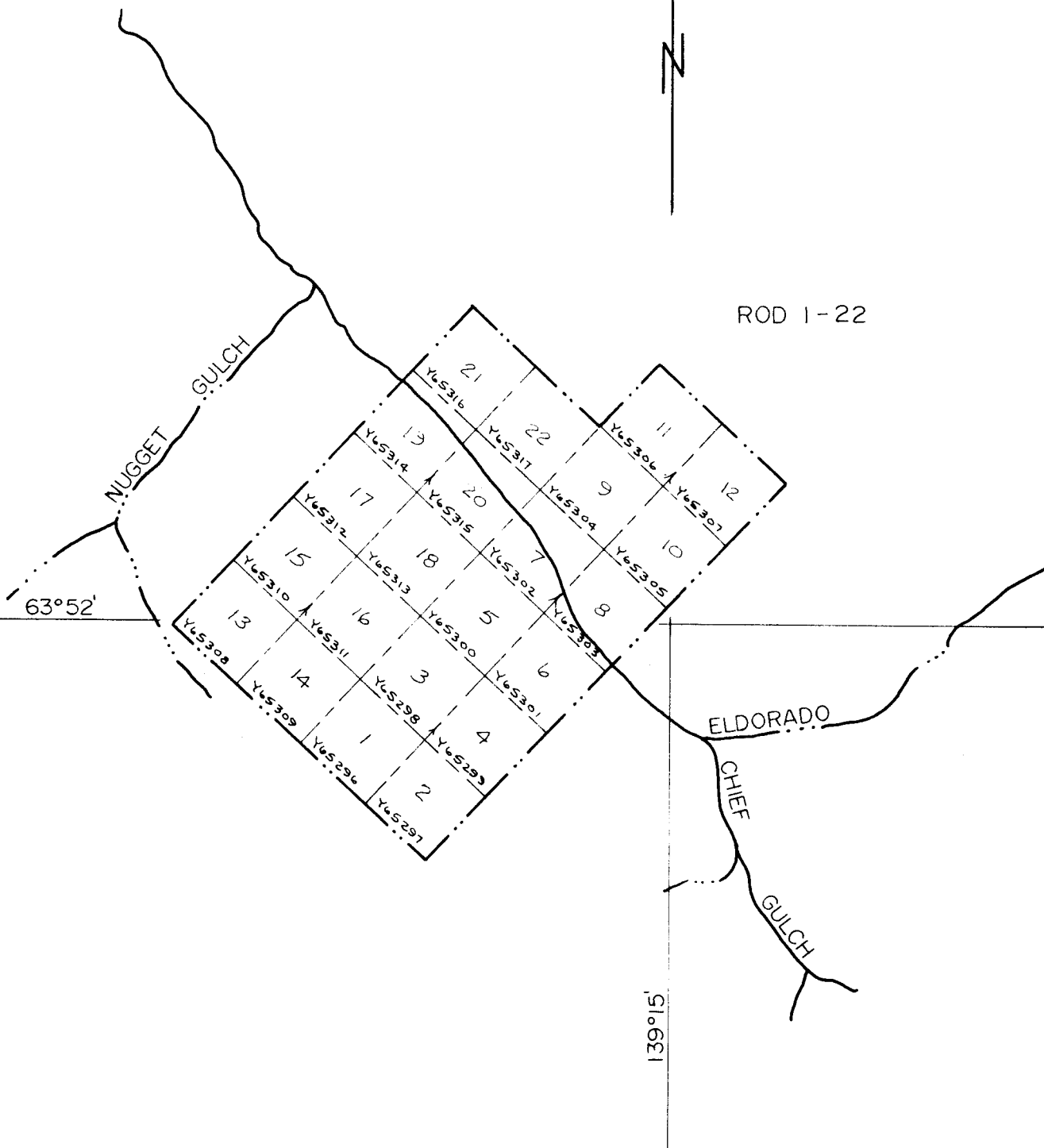
CLAIM SHEET 115-0-14

SULLIVAN & RODGERS

SUL 1-32 CLAIM SKETCH



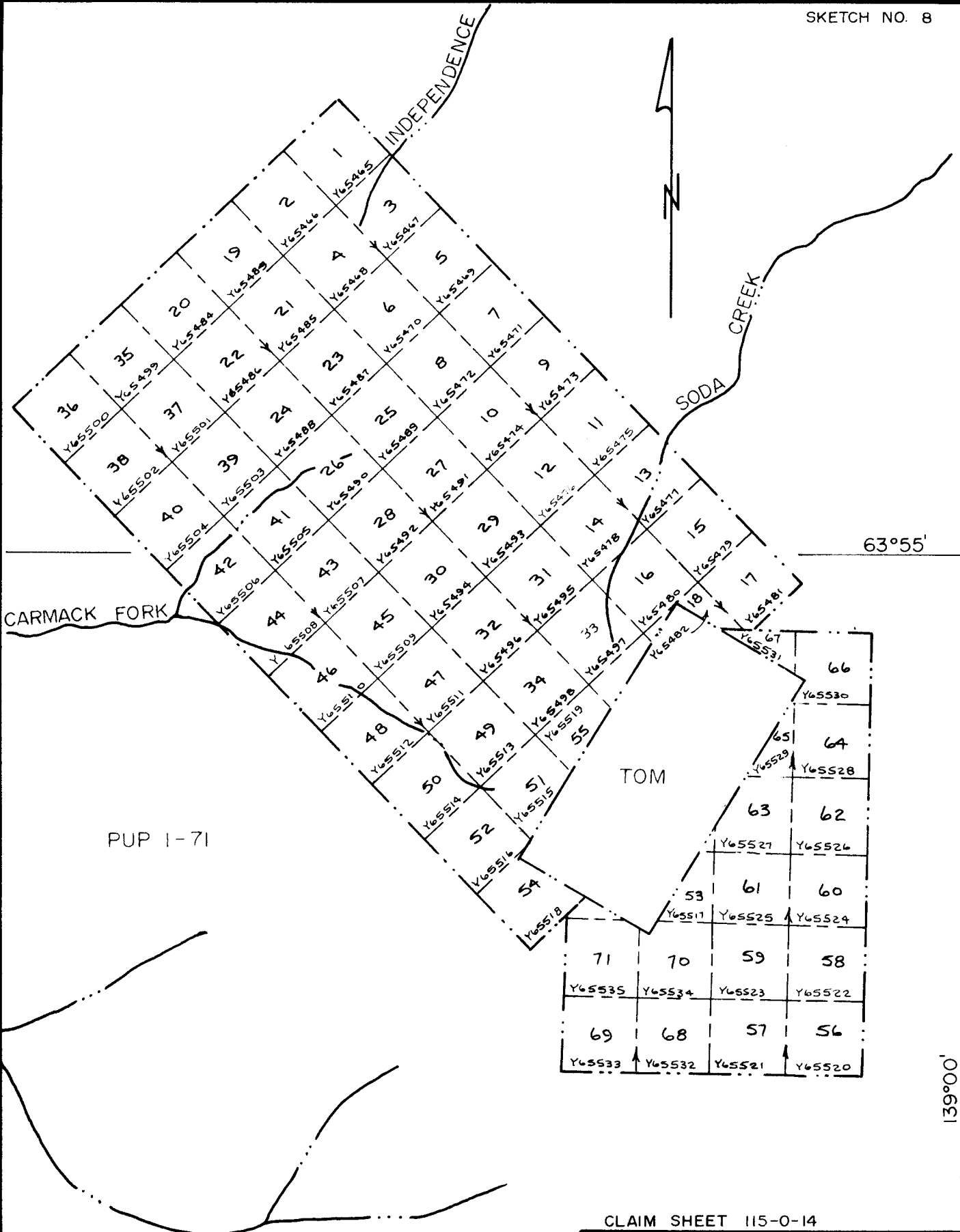
ROD 1-22



CLAIM SHEET 115-0-14

SULLIVAN & RODGERS

ROD 1-22
CLAIM SKETCH



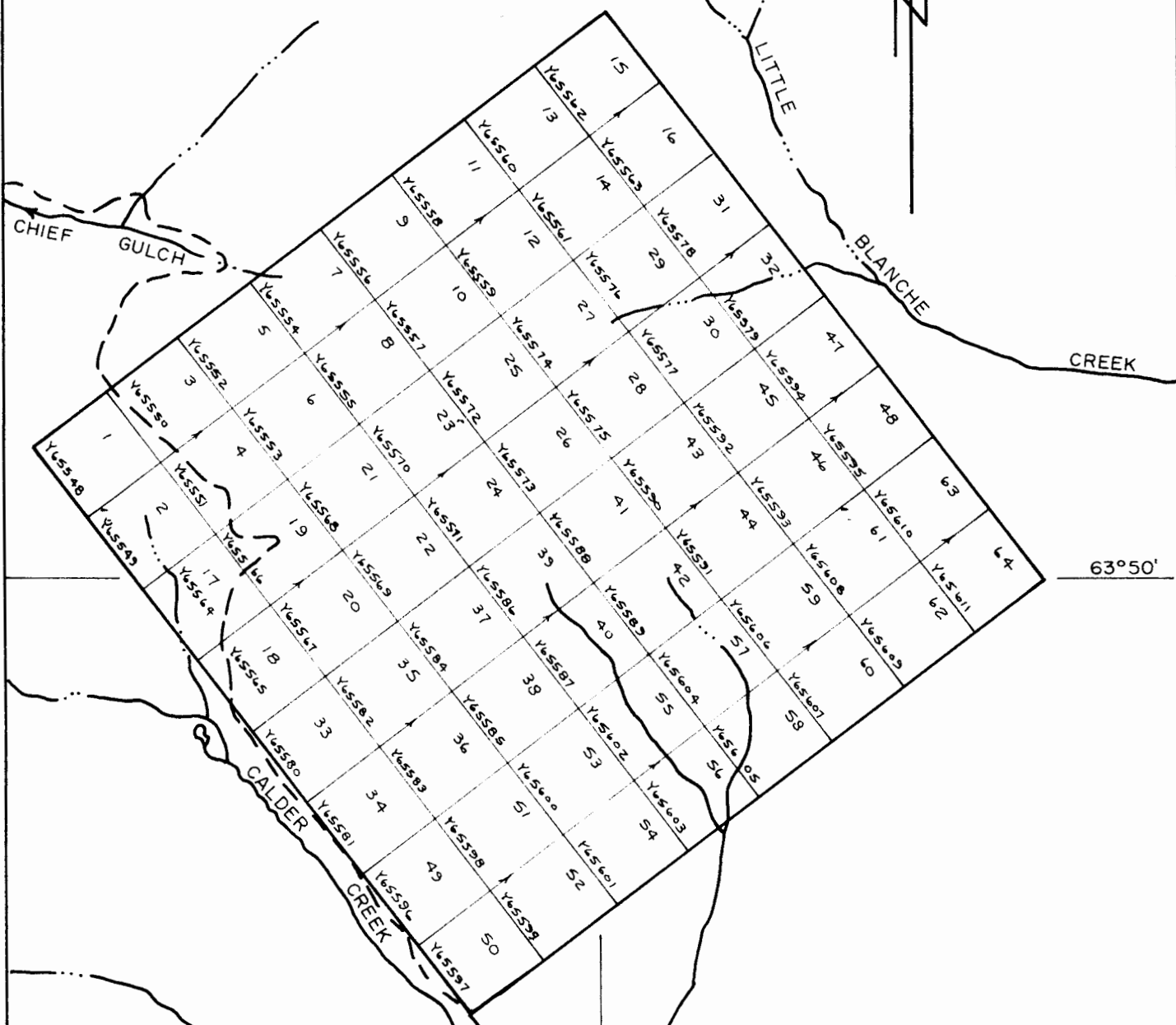
CLAIM SHEET 115-0-14

SULLIVAN & RODGERS

PUP 1-71 CLAIM SKETCH

139°10'

63°50'



NTS SHEET 115-0-14

CONWEST EXPLORATION CO. LTD.

CLAIM LOCATION SKETCH

JEN 1- 64

DATE: JULY 11, 1972

SCALE: 1" = 1/2 mile

RG HILKER LTD.
 CONSULTING GEOLOGIST
 WHITEHORSE, Y.T.

PERSONNEL

The following is a list of personnel of R.G. Hilker Ltd. employed on the Dawson Project field work between August 5 and September 3, 1972.

<u>Name</u>	<u>Address</u>	<u>Position</u>	<u>Dates</u>
R.G. Hilker, P.Eng.	Box 4008, Whitehorse, Y.T.	Geologist, supervision	Aug. 7, 8, 11, 12, 15 - 19, Sept. 2, 3.
G.G. Carlson, P.Eng.	Box 4008, Whitehorse, Y.T.	Geologist, supervision	Aug. 25 - Sept. 3.
B. Slater	Apt. 206-503 Hoge St. Whitehorse, Y.T.	Student geologist	Aug. 11 - 29.
G. Hillson	Apt. 306-503 Hoge St. Whitehorse, Y.T.	Soil sampler	Aug. 5 - 30.
J. Greer	11 Koidern Ave., Whitehorse, Y.T.	Soil sampler	Aug. 5 - 26.
R. Metcalfe	6 Tutshi Rd., Whitehorse, Y.T.	Soil sampler	Aug. 5 - Sept. 3.
W. McTaggart	Box 580, Stettler, Alta.	Soil sampler	Aug. 5 - Aug. 26.
T. Hayden	10 Tutshi Rd., Whitehorse, Y.T.	Soil sampler assistant	Aug. 15 - 30.

GEOLOGY

Regional geology of the Ogilvie map sheet was mapped by H.S. Bostock from 1935 to 1937 and published as G.S.C. Map 711A. The claims lie entirely within Bostock's map unit B, the Klondike schist. The age of these rocks is Precambrian and later. They are described as chiefly sericitic, with some chlorite and abundant quartz commonly segregated into corrugated lenses. Also present is feldspathic quartz-mica schist to augen gneiss. Some phases of this unit have a sheared granitic texture, often porphyritic.

The rock types observed within the claim groups conform to the above descriptions, with the strongly foliated quartz-rich sericite schist most predominant. Outcrops throughout the area are very scarce and are found locally mainly along creek beds and ridge tops.

Of particular interest are granitic phases of the Klondike schist unit and possibly also quartz veining. Rocks of granitic nature were observed on both the NUG and PUP claim groups. The PUP intrusive is a siliceous, fine grained quartz porphyry exposed over approximately 100 feet. It contains 2 to 3% disseminated pyrite, with a trace of malachite stain and with negligible mafic minerals. Exposure is in the south corner of the main claim group adjacent to the TOM claim group, within the PUP 33 claim.

A copper-lead showing has been exposed by tractor trenching and two exploratory shafts near the center of the TOM claim group. The showing consists of a fracture or shear zone, striking at approximately 155°, within which is an irregular galena-chalcopyrite vein with quartz which averages 2 inches in width. The host rock is schist,

and this rock is malachite and azurite stained within 3 to 5 feet of either side of the vein. Continuity of the vein is uncertain.

The NUG porphyry is mainly a coarser grained variety, slightly foliated or sheared, and locally quite rich in disseminated pyrite. It is observed within the NUG 11 claim and is exposed in waste dumps from old exploratory shafts (see NUG Sample Numbers - Sketch 22). Since the rocks on the dumps are relatively uniform in appearance their derivation is most likely local. However, textural and compositional variations are quite extreme compared with typical igneous rocks. Also present here is quartz veining, not necessarily parallel to the foliation, with associated massive pyrite. The veins are up to 2 inches wide, and locally contain over 50% pyrite. Small aplitic veins were also observed. Alteration appears to have affected some of these rocks.

The metamorphic rocks throughout the area are, after preliminary hand specimen examination, quite uniform, with relatively minor compositional variations and no obvious metamorphic grade variations. However, with petrographic examination, perhaps a metamorphic suite of rocks could be identified from within the area. If the intrusive rocks are related to the metamorphic event which has altered the sediments, metamorphic aureoles could possibly be identified and mapped on a regional scale in the area. It is probable that pyritization, quartz veining, and possibly additional metallization, would also be associated with these local areas of more intensive metamorphism.

Positive aeromagnetic anomalies occur over the JEN and NUG claim groups. The NUG anomaly correlates well with the pyritic NUG

porphyry. A similar granitic type of occurrence, on a somewhat larger scale, is thus suggested within the JEN claims.

GEOCHEMISTRY SURVEY

SOIL SAMPLING ENVIRONMENT

Although the area has not been glaciated and the majority of the soils are nearly residual, having undergone relatively minor downslope movement, two important factors hinder the application of soil sampling techniques to the area. These include permafrost and a complex erosional history which has resulted in thick alluvial sand and gravel deposits adjacent to some of the river valleys.

Permafrost is not continuous, at least near surface, but it occurs over broad areas on direct north facing slopes and on valley floors. Areas of strong permafrost are indicated by their surface vegetation. They are generally thinly covered with stunted spruce trees, many dead, which often appear as "drunken forests" in which the trees are leaning in a haphazard manner due to the lack of support from the roots. Low growing vegetation includes usually thick buckbrush and moss.

Soils in these areas may not be available to surface sampling due to the frozen moss and humus cover. It appears that the soils are poorly developed, and in many cases the moss and humus directly overlie broken bedrock. The fine soil fraction which is sampled in these areas is quite possibly derived from upslope, near the ridge top.

The major problems with soil sampling surveys in areas of permafrost are the difficulty in obtaining good sample material and the inhibition of chemical activity, and thus chemical mobility of metals, in the soil. However, if soils are indeed very thin in these areas, and

if reasonable non-organic sample material can be obtained, the soil samples should be valid, at least as an indicator of upslope anomalies.

The thick alluvial deposits occur on elevated benches adjacent to Bonanza, Eldorado, and Hunker Creeks and some of their tributaries. These deposits, up to 200 feet thick, would effectively mask the surface geochemical expression of any underlying mineralization. However, as they have been mapped by Bostock (G.S.C. Map 711A - map unit 7), they are not extensive and should not interfere to a great extent with an effective soil sampling program. These overburden areas should be carefully delineated in conjunction with further sampling programs.

Most of the area of the claim groups, namely the south or southerly facing slopes and ridge tops, appear to be covered by a relatively thin, near residual soil. Vegetation consists of spruce, poplar, and birch trees with grassy to mossy undergrowth. In areas which have undergone intensive logging for fuel in earlier years, thick buckbrush, willows, and poplars are dominant.

The soils have an immature profile which grades almost directly from the surface humic A horizon to the apparent weathered bedrock product C horizon. This C horizon is texturally and mineralogically similar to the schistose fragments found within it, and homogeneity of material suggests a nearby source. The soils have probably undergone at least minor gravity slumping and possibly local alluvial transport. However, they are expected to generally present a good soil sampling medium.

FIELD METHODS AND ANALYTICAL TECHNIQUE

Original sampling was at 500 foot intervals along the staking lines for each claim group. As results from initial sampling were returned, local detail follow-up sampling was conducted in areas of possibly anomalous results. In addition, silt samples were collected on a regional basis throughout the area.

Sample material, from $\frac{1}{4}$ to $\frac{1}{2}$ pound per sample, was collected in prenumbered kraft sample bags. At camp, the pH was determined colorimetrically on all original samples, including silts, and on every second follow-up sample, using a LaMotte Morgan pH Testing Kit (The pH of 157 samples was determined by Chemex).

The samples were shipped to Chemex Labs in Vancouver where all samples were analyzed for copper, lead and silver. Analyses for gold, molybdenum and arsenic were carried out on only part of the samples.

The analytical technique consists of digestion of the -80 mesh fraction of the sample in a hot HClO_4 - HNO_3 mixture, dilution, and determination of metal concentrations on a Techtron A.A.5 Atomic Absorption unit. For gold, a hot aqua regia leach was used followed by organic extraction and determination on Atomic Absorption.

Simple statistics, including mean and standard deviation, have been calculated on both the copper and lead values as an aid to interpretation.

INTERPRETATION

The present survey is of a reconnaissance nature. The definition of true anomalies is a difficult problem and, in order to facilitate this work, simple statistics have been calculated for both copper and lead, as listed below:

	Soils	Silts
Copper: \bar{x} (mean)	20 (21.5)	10 (11.25)
s (standard deviation)	25 (24.9)	5 (5.4)
$\bar{x} + 1s$	45	15
$\bar{x} + 2s$	70	20
Lead: \bar{x}	35 (34.1)	20 (21.0)
s	25 (24.6)	5 (5.9)
$\bar{x} + 1s$	60	25
$\bar{x} + 2s$	85	30

(all values are parts per million - numbers in brackets are precise calculation)

Since the original sampling is very widely spaced, and the geochemical response in the area could be suppressed due to permafrost or transported overburden, an attempt was made to check any possibly anomalous samples, greater than the mean plus one standard deviation, with a small amount of detail follow-up sampling.

Background values for molybdenum, silver and gold are obviously the minimum detection limits, or 1 p.p.m., 0.5 p.p.m. and 30 p.p.b. respectively. Any values greater than these are possibly anomalous and, especially if associated with high copper or lead values, deserve further investigation.

The pH of sample material appears to be a very important factor in the observed geochemical dispersion pattern. Soil pH values are nearly all acidic and extensive areas with pH values less than 6.0, with many lower than 5.0, are evident on all claim groups.

This would suggest a fairly good chemical mobility for copper and lead, but not molybdenum, in the upper soils. This mobility could well be in a downward direction with percolating groundwaters.

The pH of creek sediments, on the other hand, is generally neutral. In this environment both copper and lead would be rapidly precipitated. Depending on where the solution pH changes, these metals might rarely find their way into the stream system.

Gold and, to a slightly lesser extent, silver are of course very chemically inert and would be transported only by mechanical means. The very low concentration of gold in almost all samples, even with a strong hydrofluoric acid leach of sample material, is probably the result of three factors. The gold is probably originally present in extremely low concentrations, to be naturally concentrated only by extensive stream action. Original or primary occurrences would also be possibly very local. Secondly, the concentrated gold is generally with the coarse soil or silt fraction, and that is not the material sampled. Finally, although the gold in the area is referred to as flour gold, most observed flakes are much larger than the -80 mesh fraction of the sample which is analyzed.

A small and random group of samples was analyzed for arsenic. This element is frequently used in geochemical surveys as a pathfinder for gold - sulfide veins due to its greater abundance and somewhat greater chemical mobility. The majority of values here are less than 5 p.p.m. As. However, approximately 20% of the values range from 10 to 70 p.p.m. These values are higher than the apparent threshold, and this therefore represents a higher proportion of possibly anomalous values than any of the other elements determined. There is no apparent

correlation with the other metals or sample type. The source of the arsenic is most likely quartz-sulfide veins and lenses, as it is not expected to strongly associate with any of the major rock types observed in the area. The chemical mobility of arsenic is not great in the presence of iron, and, since many of the soils indicate a relatively high iron content by their reddish color, the greater concentration of arsenic in the upper soils may be explained. This element is suggested as potentially the strongest pathfinder for sulfide mineralization in this area.

One rather unidentified factor which must be mentioned in the interpretation of geochemical results in this area is contamination. The entire area has undergone intensive activity in the search for placer gold, and the presence of this activity is everywhere indicated by old trails, railway ties, campsites and cabins, and abandoned heavy equipment. It is expected that any anomalous results due to contamination would be completely random and could be identified on this factor.

Silt Survey (Plans 1, 2, 3, and 4)

All metals (except possibly arsenic - the number of samples is too small for conclusions) are in very low concentrations in samples collected from the creek sediments. Copper and lead are low possibly because of the high pH of the creeks while gold and silver are mechanically concentrated in the coarse fraction of stream sediment. Possibly anomalous values according to the statistics (greater than $\bar{x} + 1s$) are too low to be considered of much significance. These higher values do show a slight concentration in the north-central

part of the survey area, northeast of the SON and PUP claim groups, although the significance of this observation is uncertain.

DAW Group (Sketches 10 to 12; Plans 5 to 7)

Initial sampling indicated three zones which were investigated with detail sampling. The first of these, 'A' Zone, is within a small, sheltered and steeply sloping valley floor. Detail sampling was not continued in this area due to the poor sample material, consisting mainly of humus with very minor sandy alluvial material. DAW 'B' Zone consists of two quite high lead values, with other scattered moderately high copper and lead values. Of five arsenic values determined from this zone, one value reaches 12 p.p.m. The 'C' Zone is approximately 4000 feet to the northwest, across a valley, and contains four strong lead values, a few moderate lead values and minor weak molybdenum.

The latter two zones are possibly indicative of quartz-galena veining in schist, and the presence of other sulfides is uncertain.

HUN Group (Sketches 13 to 18)

Two moderate copper values from initial sampling on the southeast end of the claims, were checked by close-spaced sampling along the lines and one cross line. No subsequent anomalous area was exposed with this sampling and the significance of this zone is apparently quite low.

SON Group (Sketches 19 to 21)

The SON claims are the least accessible of the claim groups, and thus no follow-up sampling was conducted. One area of high lead values, in the east corner of the claim group, was picked up by initial sampling and is possibly caused by quartz-galena veining

similar to the TOM claims type mineralization.

NUG Group (Sketches 22 to 27)

One rather scattered zone ('A' Zone) of high lead values occurs in the eastern end of the claims, just to the north of the observed pyritized intrusive (see Geology). The detail follow-up indicated associated, but scattered, copper, lead, silver and molybdenum values. A few arsenic values between 10 and 15 p.p.m. are also associated here. The zone does not present a strong anomaly, but some form of mineralizing activity is indicated in bedrock. An association is suggested between the nearby pyritic igneous intrusive activity and quartz veining and the above geochemical response.

SUL Group (Sketches 28 to 33)

The SUL 'A' Zone consists of one quite high lead value of 250 p.p.m., of unknown derivation, which was not reinforced by a small amount of detailed sampling upslope.

The 'B' Zone is stronger and consists of moderately high and scattered copper and lead values. The anomaly is not strong, but this is a permafrost area, of probably not too heavy overburden cover, with possibly suppressed geochemical response.

ROD Group (Sketches 34 to 39)

The ROD 'A' Zone presents the strongest copper anomaly in the area, with associated high lead values to the southeast of the high copper zone. Scattered, moderately high arsenic values are also present. This is a south-facing slope area of residual-type soil cover of unknown depth and no exposed bedrock except in the creekbed approximately 1000 feet northeast of the zone where a small outcrop

of schist is exposed.

The cause of this anomaly is not apparent, but it is not typical of the response to a narrow, copper bearing lead vein. Further sampling is required here to determine the continuity and extent of this anomaly.

One high gold value, 200 p.p.b., occurs in the northern corner of the claim group near the floor of the Eldorado Creek valley and is probably from stream sediment material.

PUP Group (Sketches 40 to 42; Plans 5 to 7)

These claims are adjacent to a showing which consists of a narrow, northwesterly trending quartz-galena-chalcopryrite vein. Southeast of the showing is an outcrop of intrusive porphyry (see Plan 5). Three zones were checked with detail sampling.

The 'A' Zone, consisting of several high lead values and one copper value, is just to the northwest of the showing and is probably an extension of the same type of mineralization.

The 'B' Zone, consisting of one high silver value (11.5 p.p.m.), was not expanded by detail sampling. This one value may be derived from mineralization similar to above, or possibly from float derived from this mineralization. A check run on this sample by Chemex gave a result of <0.5 p.p.m.

The 'C' Zone again consists of high lead values probably associated with the TOM group showing. The southwestern extension of the follow-up sampling is directly downslope from the igneous outcrop, where a trace of malachite stain was noted. No high copper values were found in this area.

Scattered high arsenic values, to a high of 70 p.p.m., occur

through both the 'A' and 'C' Zones.

A fourth zone, consisting of one high lead value and a moderately high copper value in the northwestern part of the claim group was not checked due to difficulty of access.

JEN Group (Sketches 43 to 45; Plans 8 to 10)

Four zones within the JEN group were checked with detail sampling. Zones 'A' and 'B' consist of a few scattered possibly anomalous molybdenum values, including one high value of 10 p.p.m. Mo, and one high copper value. These are not strong zones and their geological association is uncertain.

Zones 'C' and 'D' include high copper, lead and silver values, with minor molybdenum. These zones are again rather weak, and they are possibly more typical of the quartz-sulfide vein type of response. The 'D' Zone is in a permafrost area with relatively poor sampling conditions.

Arsenic is stronger in the JEN claim group than in any of the other areas and high values are present in all four zones. This suggests an abundance of sulfide associated igneous or quartz veining activity which is not particularly well defined by the other elements determined.

CONCLUSIONS

The Dawson claims are located in an area of schistose metasediments with local intrusive rocks which are apparently associated with the metamorphic event. Intrusive rocks observed in the area are mainly porphyritic and often contain disseminated pyrite in concentrations up to 10%. Also present are quartz-pyrite veins, as in the NUG group, and quartz-galena-chalcopyrite veins, as in the TOM group. A trace of malachite stain was observed with the intrusive porphyry in the PUP claim group.

Results of the geochemical survey indicate that the geochemical response to bedrock mineralization may be suppressed because of either the effects of permafrost or a thick overburden cover. The majority of anomalies defined in the various claim groups appear to indicate lead mineralization with associated copper and silver, similar to that exposed in the TOM claim group. The relation of this mineralization to igneous activity is uncertain. Exceptions to this are the NUG, JEN, and in particular, ROD anomalies which also have associated copper and molybdenum values. These appear to be the result of a different geological environment.

Gold was found to be ineffective as a pathfinder element within the area surveyed. Arsenic was determined on a small number of the final samples collected and appears to hold more promise than any other metal tested as an indicator of sulfide mineralization.

These preliminary results apparently justify the use of multi-element soil sampling techniques in order to prospect this area.

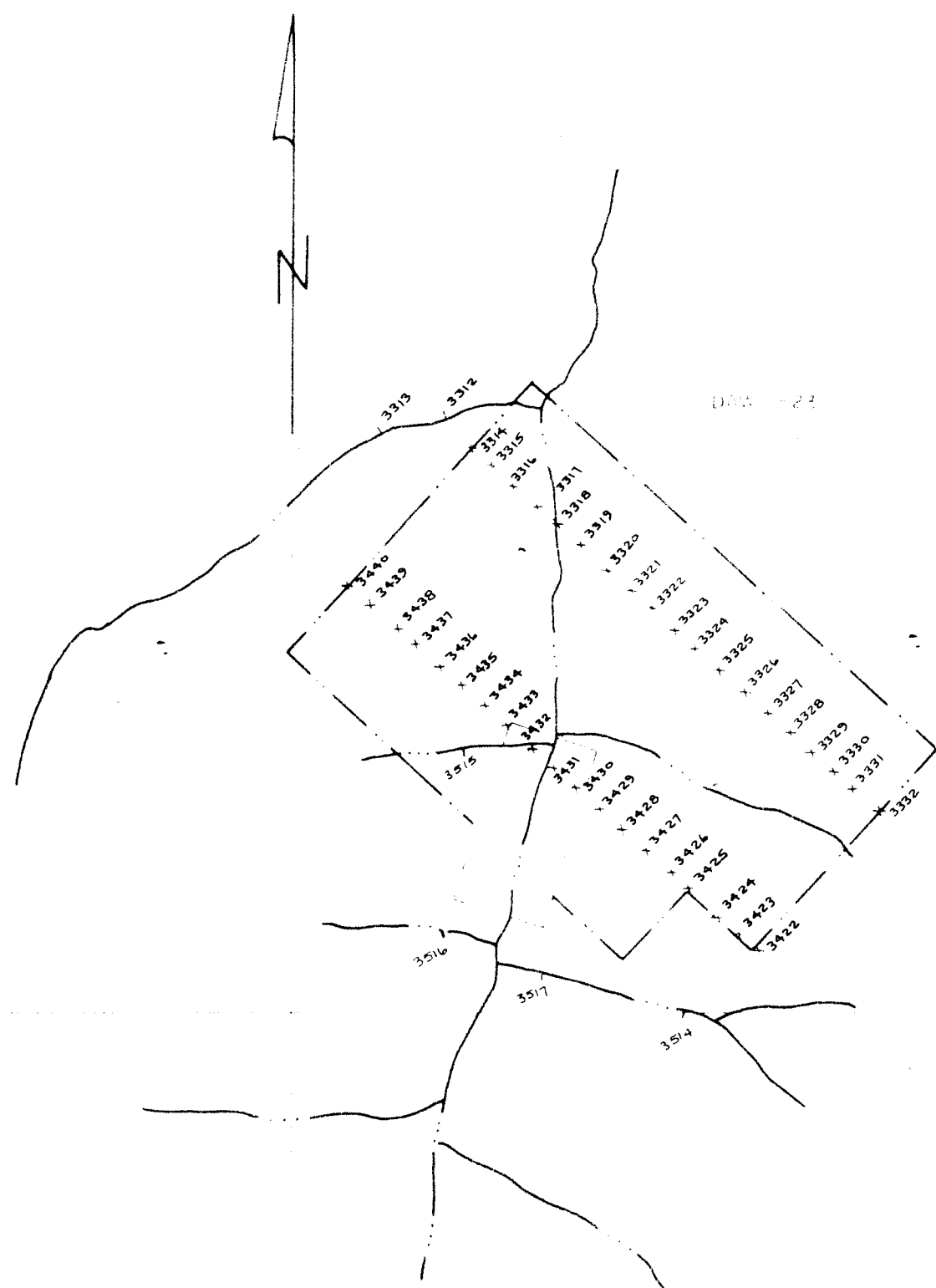
However, further geochemistry surveys should be carried out with a view to understanding and overcoming potential problems created by permafrost and local heavy overburden cover. Initially, test pits are required in all soil environments in order to gain a more complete understanding of the behavior of the pathfinder elements in the soils. These pits should be tractor trenches dug in areas of anomalous geochemical readings and they should be taken if possible to bedrock. It may be found necessary to use a mechanical auger for sampling in certain areas in order to penetrate deep overburden.

From the study of soils in the test pits it would be possible to determine optimum sampling horizons and pathfinder elements according to the nature of the overburden. This in turn would be determined by topography and vegetation. Seismic profiles might also prove very useful here in determining overburden depths.

Dated June 7, 1973.

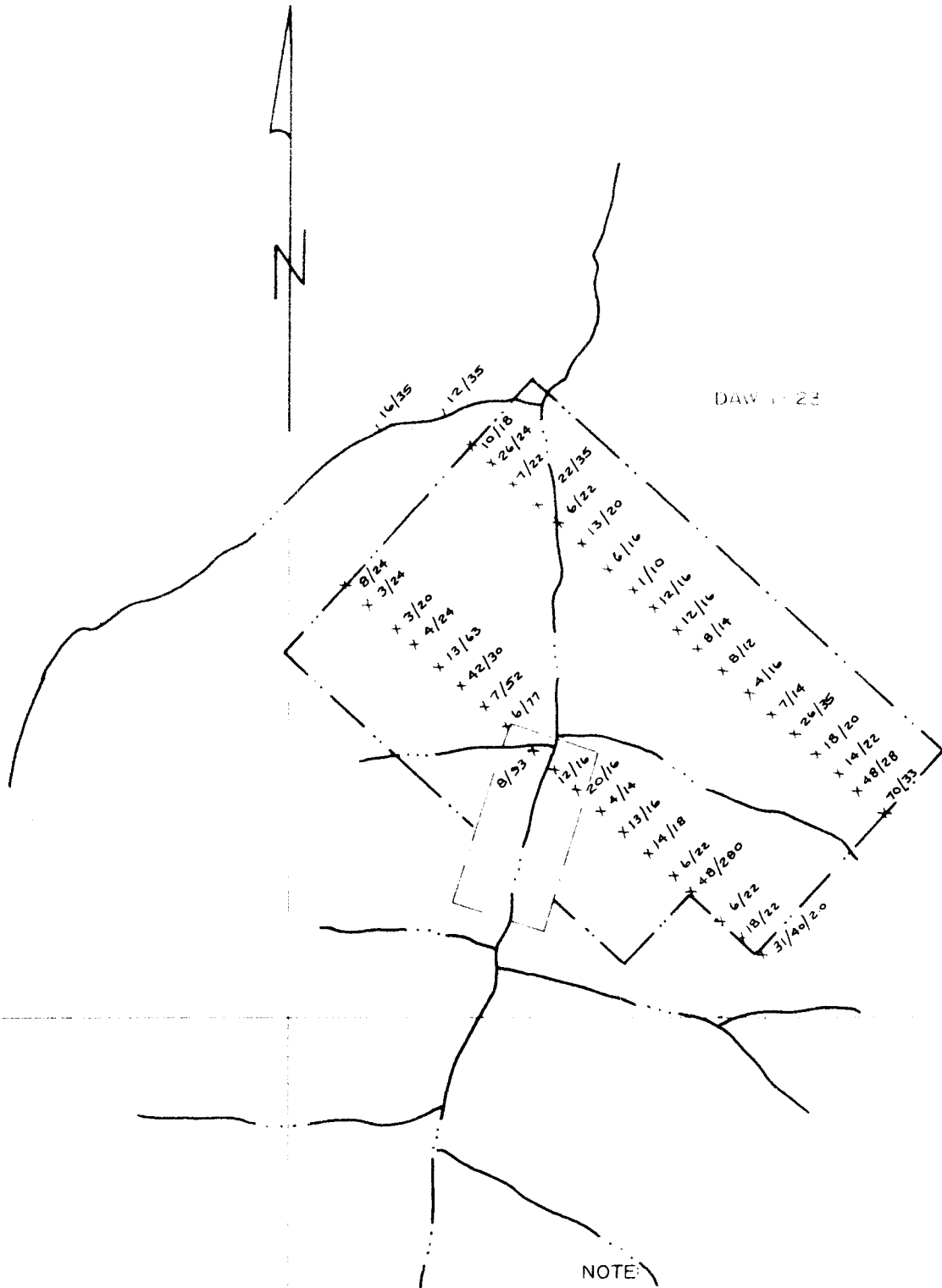
*originally signed
by*

G.G. Carlson, P.Eng.



RG MILKER LTD
 GEOLOGICAL CONSULTANT
 WHITEHORSE, Y.T.

CLAIM SHEET 115-0-15	
SULLIVAN & RODGERS	
DAW 1-23	
SAMPLE NUMBERS	
DATE AUG. 29, 1972	SCALE 1" = 2 mile



NOTE:

DETERMINATIONS ARE IN THE FORM:
ppm Cu / ppm Pb / ppm Ag.

UNLESS OTHERWISE SHOWN,
SILVER RESULTS ARE <0.5 ppm.

CLAIM SHEET 115-0-15

SULLIVAN & RODGERS

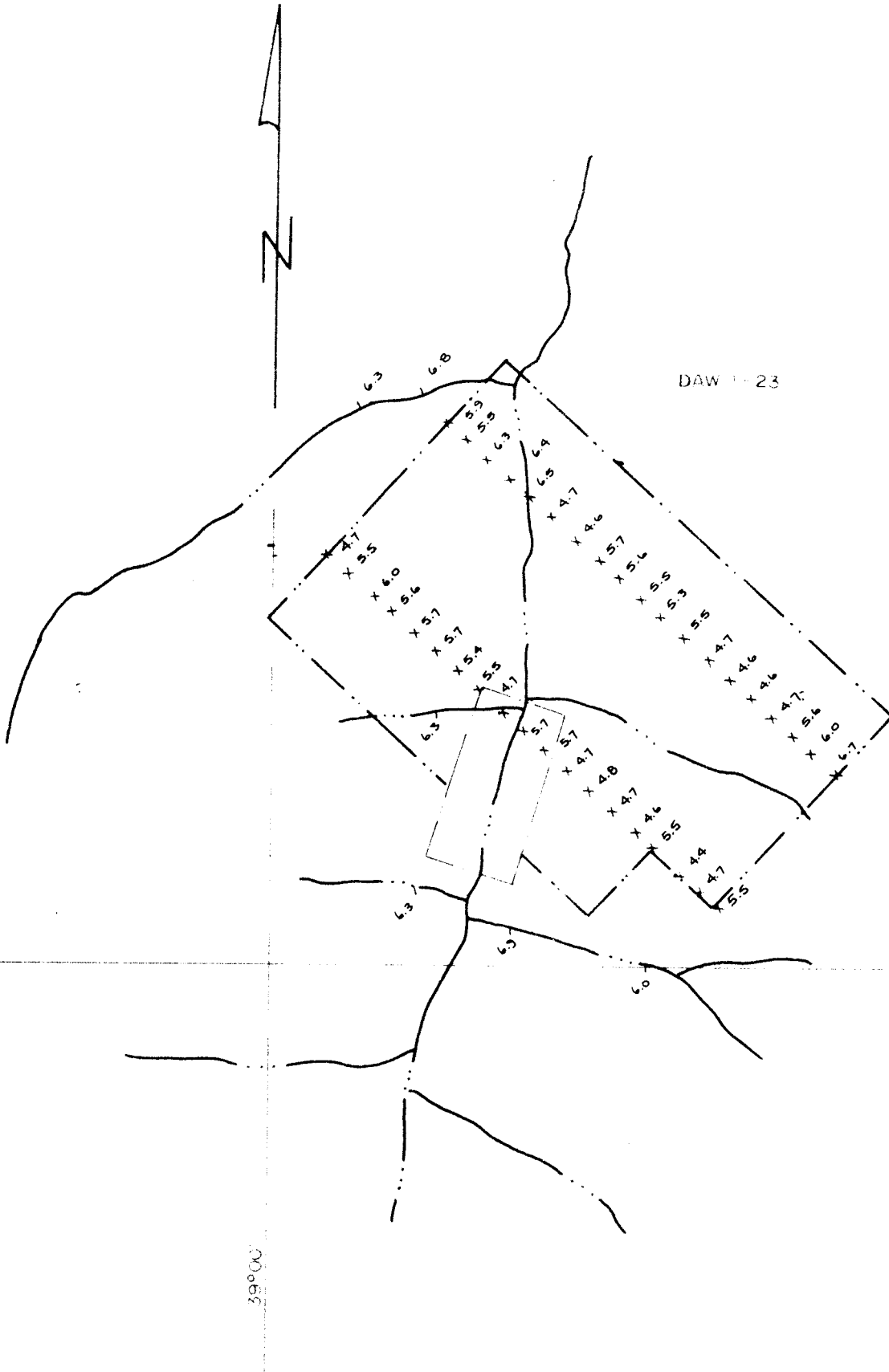
DAW 1-23

COPPER/LEAD/SILVER

DATE AUG. 29, 1972

SCALE 1" = 1/2 mile

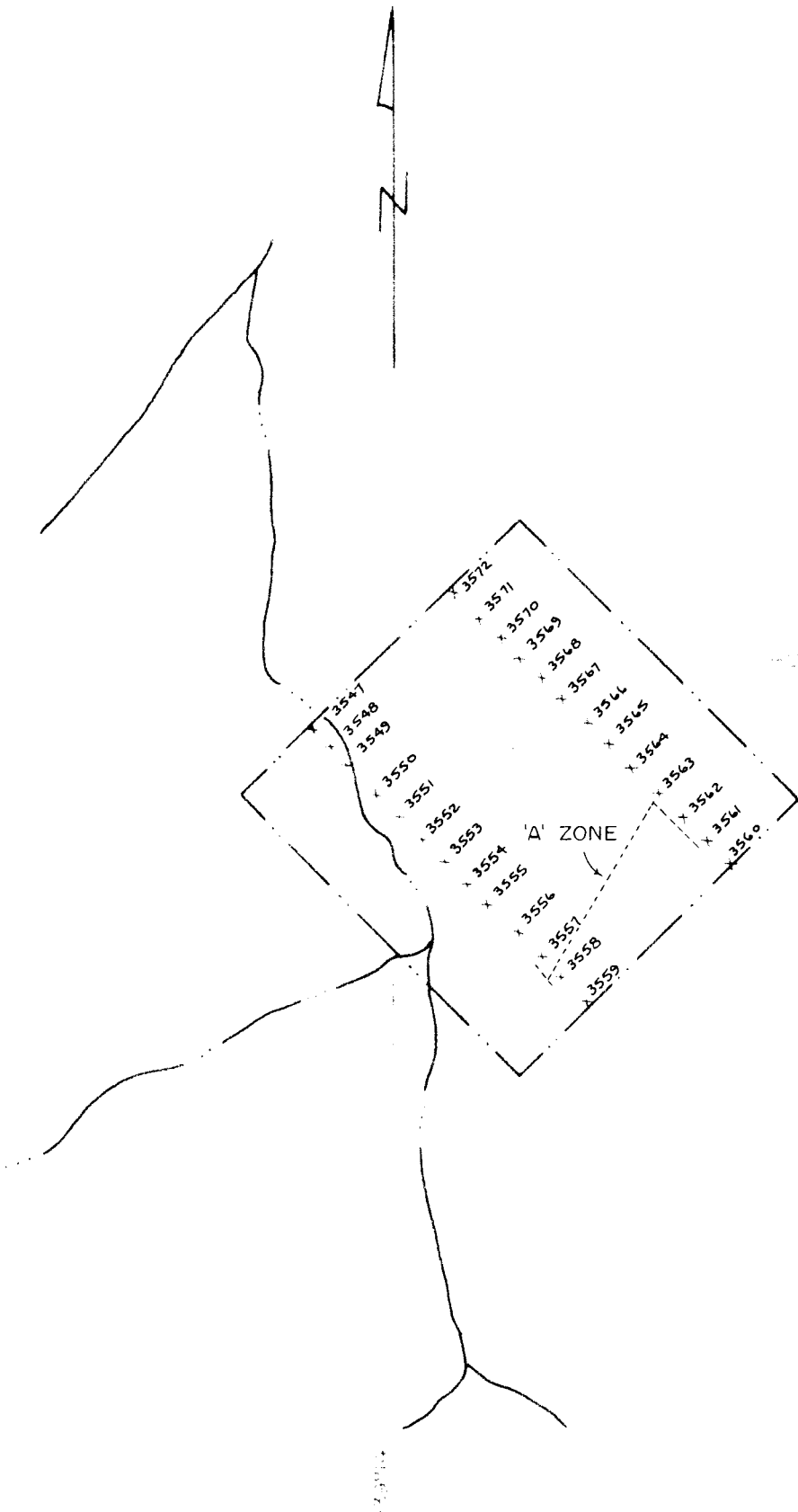
R/S HILKER LTD
GEOLOGICAL CONSULTANT
WHITEHORSE, Y.T.



R.G. HILKER LTD
GEOLOGICAL CONSULTANT
WHITEHORSE, YT

SULLIVAN & RODGERS	
DAW 1-23	
pH	
DATE: AUG, 29, 1972	SCALE: 1" = 1/2 mile

64900



R. S. HILKER LTD.
 CONSULTANT GEOLOGIST
 WH. TERHORSI, Y.T.

CLAIM SHEETS 116-B-3, 115-0-14

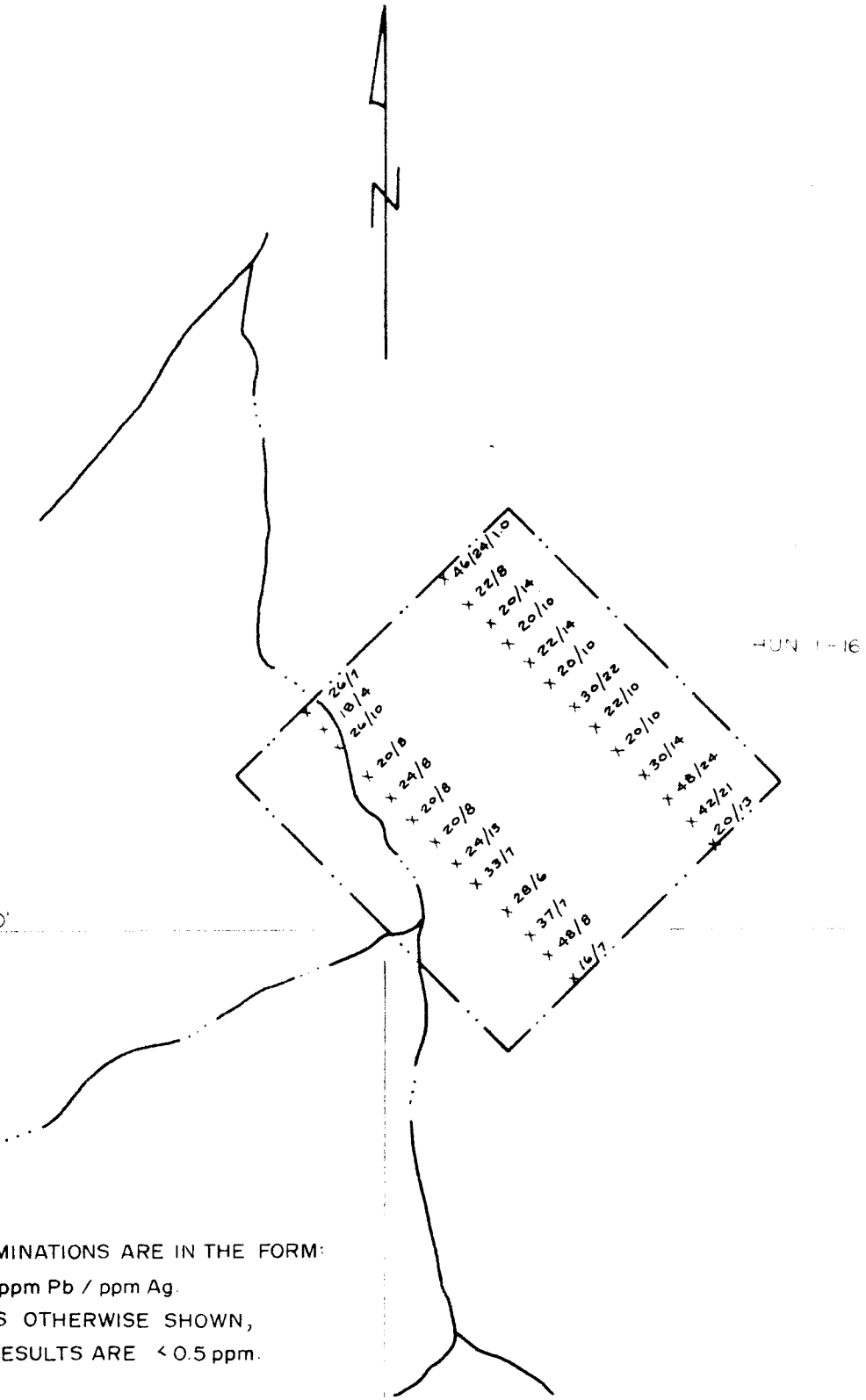
SULLIVAN & ROUSERS

FIG. NO. 6

SAMPLE NUMBERS

DATE AUG 28, 1972

SCALE 1" = 1/2 mile



NOTE:

DETERMINATIONS ARE IN THE FORM:
 ppm Cu / ppm Pb / ppm Ag.
 UNLESS OTHERWISE SHOWN,
 SILVER RESULTS ARE < 0.5 ppm.

R G HILKER LTD
 CONSULTANT GEOLGIST
 WHITEHORSE, N.T.

CLAIM SHEETS 116-B-3, 115-O-14

SULLIVAN & RODGERS

HUN 1-16

COPPER/LEAD/SILVER

DATE AUG 29, 1972

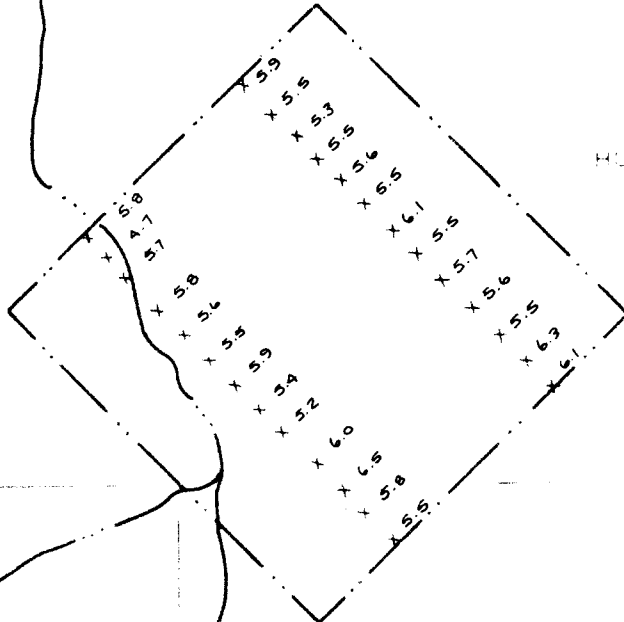
SCALE 1" = 1/2 mile



64°00'

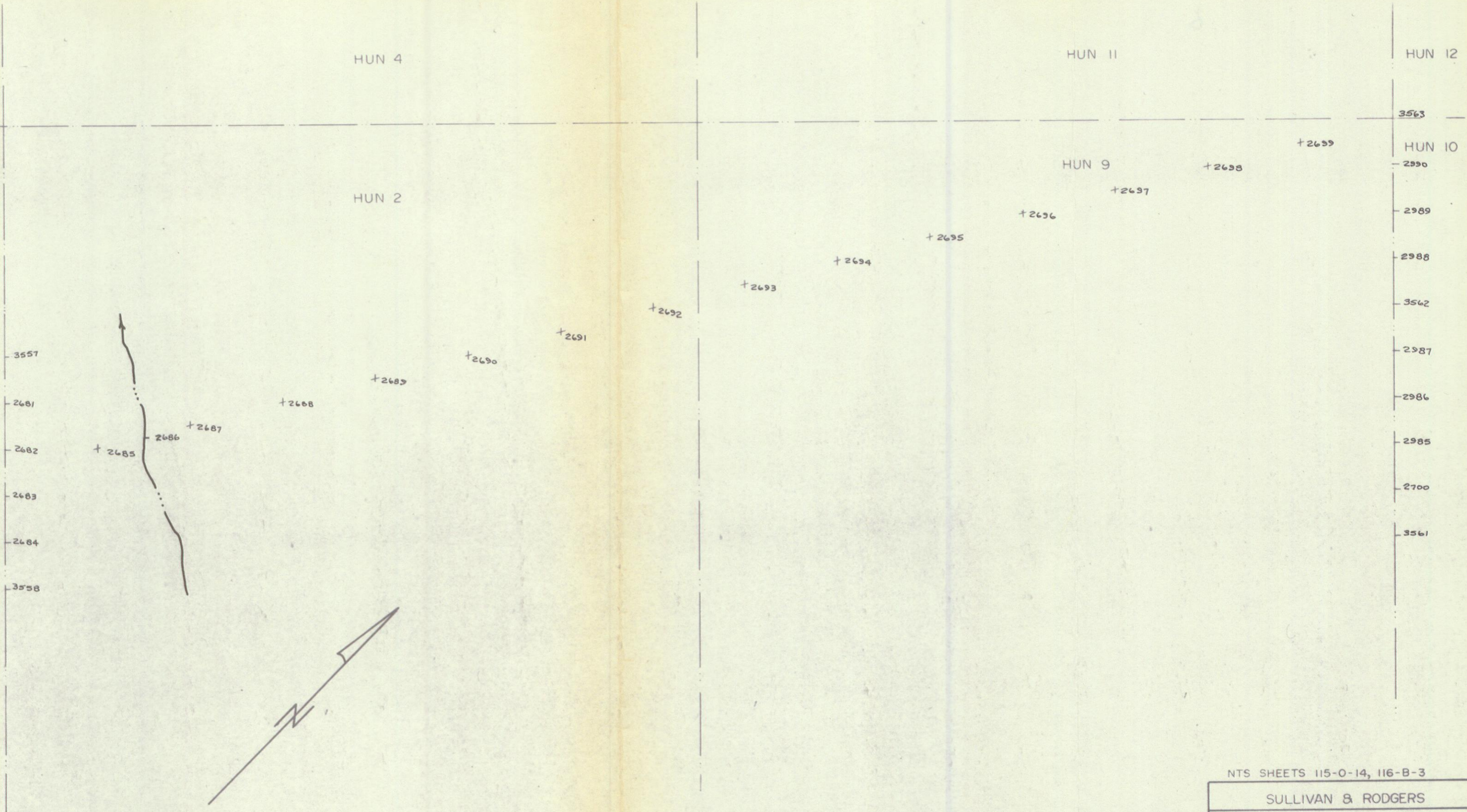
130°14'

HUN 1-16



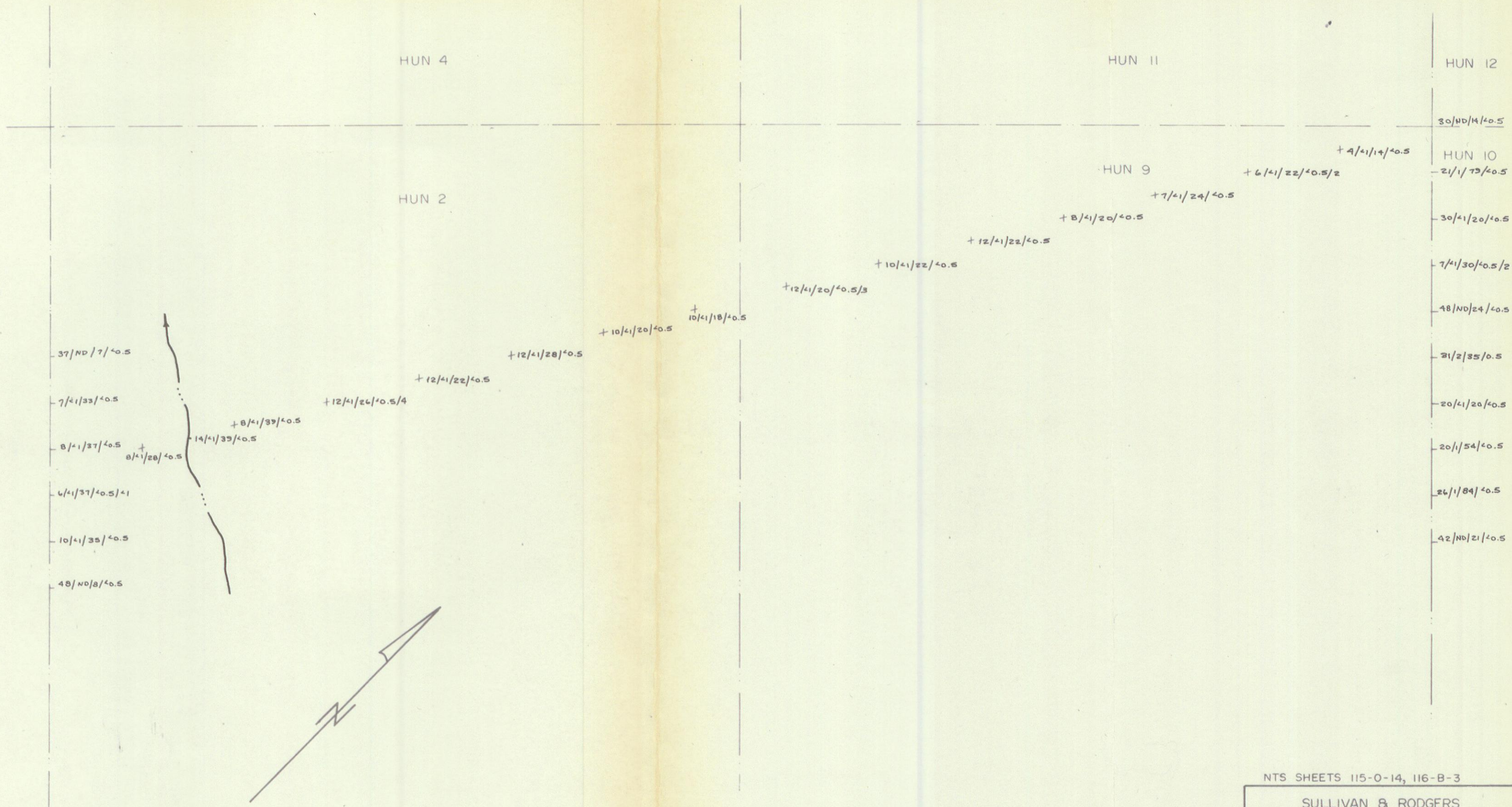
P G HILKER LTD
CONSULTANT GEOLOGIST
WHITEHORSE, Y T

SULLIVAN & RODGERS	
HUN 1-16	
pH	
DATE AUG 29, 1972	SCALE 1" = 1/2 mile



R.G. HILKER LTD.
 GEOLOGICAL CONSULTANT
 WHITEHORSE, Y.T.

NTS SHEETS 115-0-14, 116-B-3	
SULLIVAN & RODGERS	
DETAIL GEOCHEMISTRY	
HUN 'A' ZONE	
SAMPLE NUMBERS	
DATE SEPT 13, 1972	SCALE: 1" = 200'



R.G. HILKER LTD
 GEOLOGICAL CONSULTANT
 WHITEHORSE, Y.T.

NTS SHEETS 115-0-14, 116-B-3

SULLIVAN & RODGERS

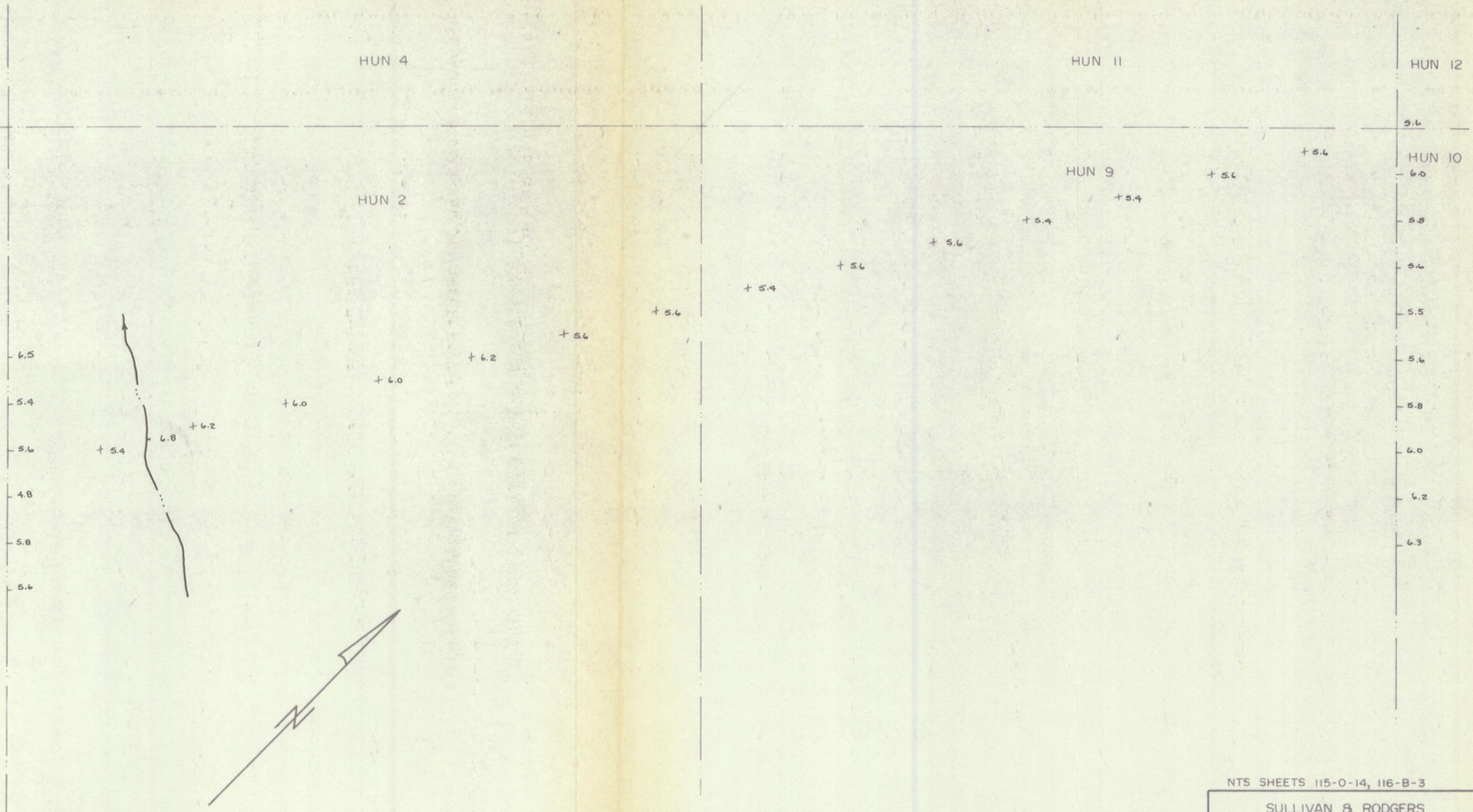
DETAIL GEOCHEMISTRY

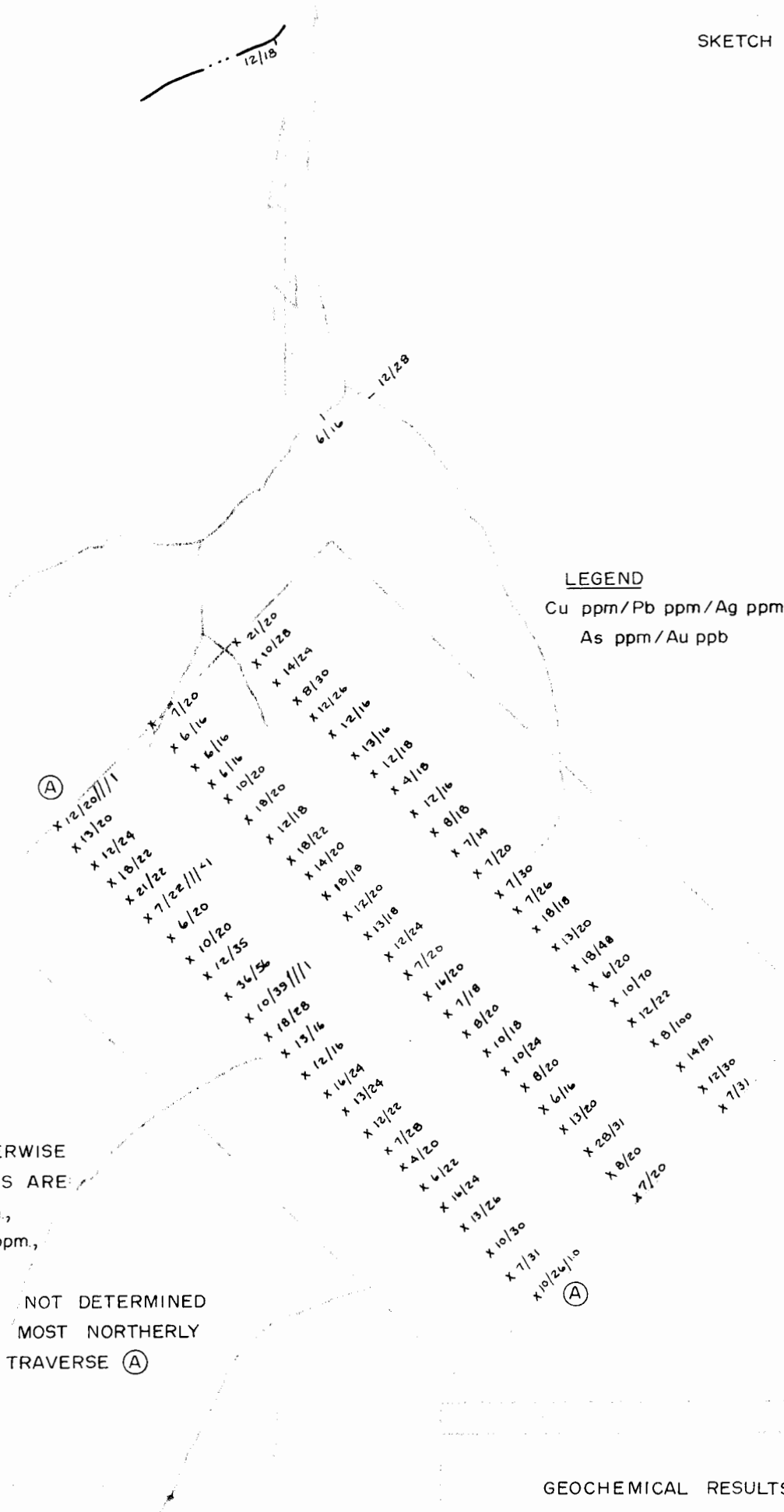
HUN 'A' ZONE

Cu/Mo/Pb/Ag/As P.P.M.

DATE: SEPT. 13, 1972

SCALE: 1" = 200'



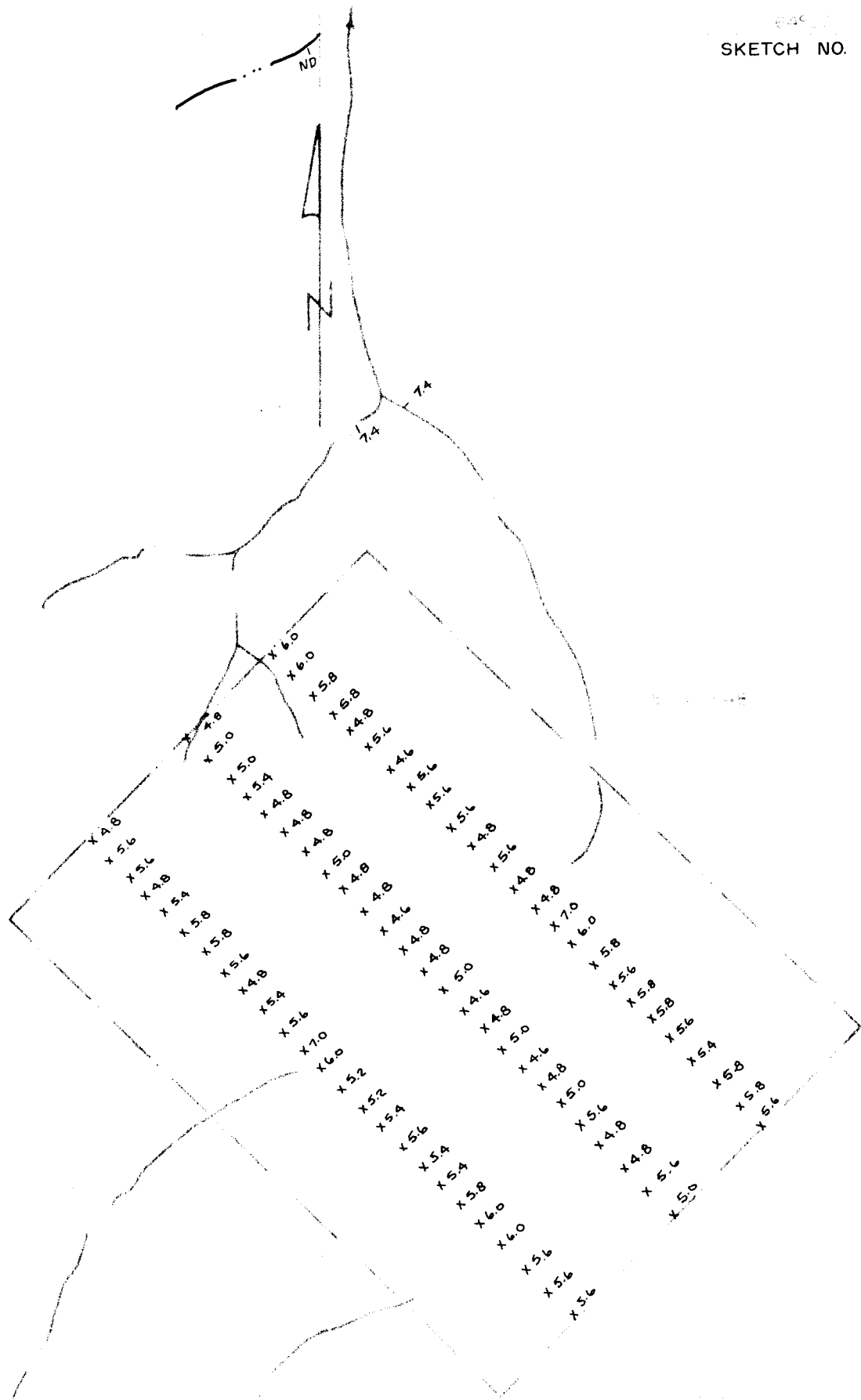


LEGEND

Cu ppm/Pb ppm/Ag ppm/Mo ppm/
As ppm/Au ppb

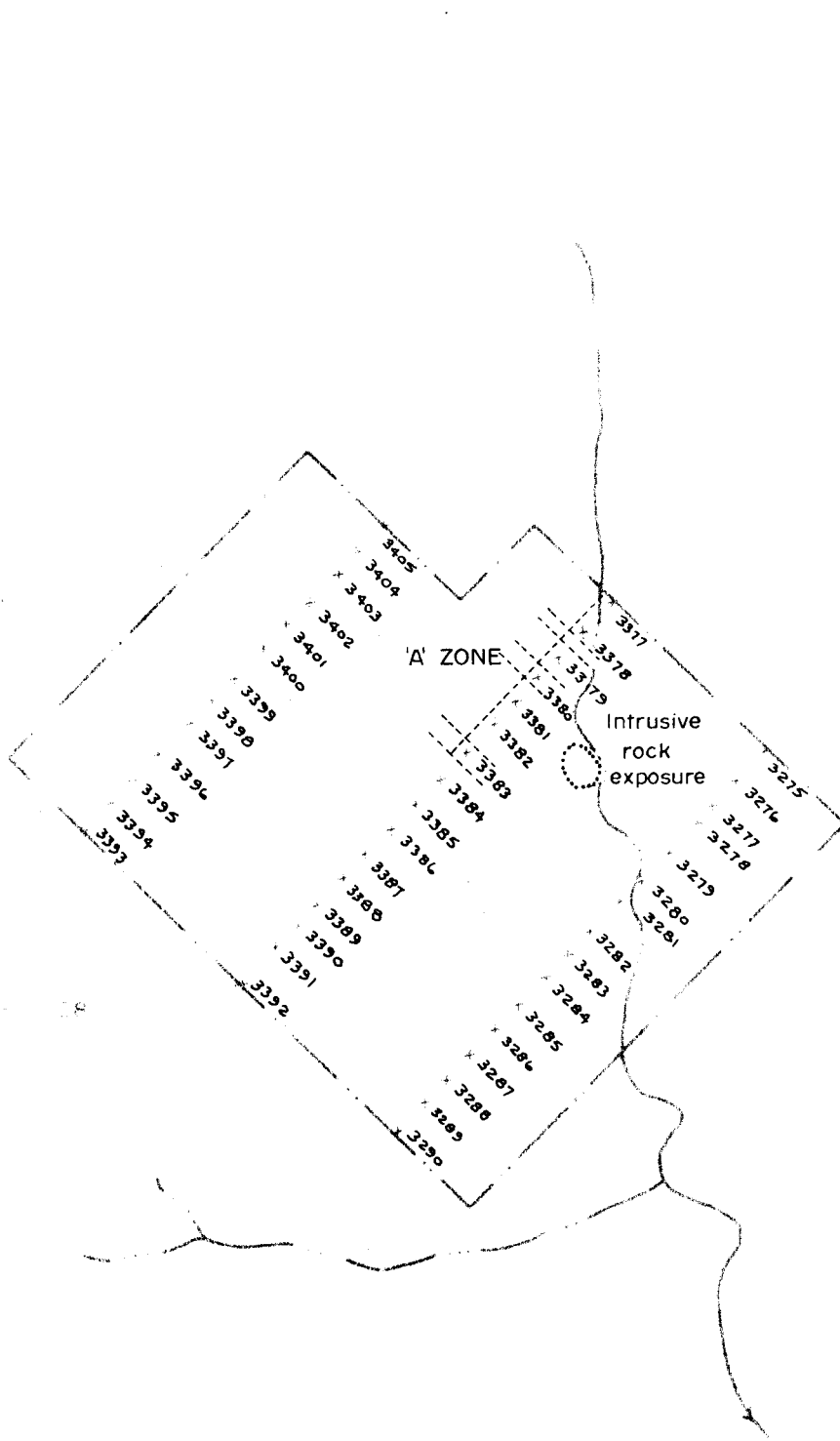
NOTE: UNLESS OTHERWISE
SHOWN, RESULTS ARE:
SILVER < 0.5 ppm,
MOLYBDENUM < 1 ppm,
GOLD < 30 ppb.

GOLD WAS NOT DETERMINED
FOR THE 14 MOST NORTHERLY
SAMPLES ON TRAVERSE (A)

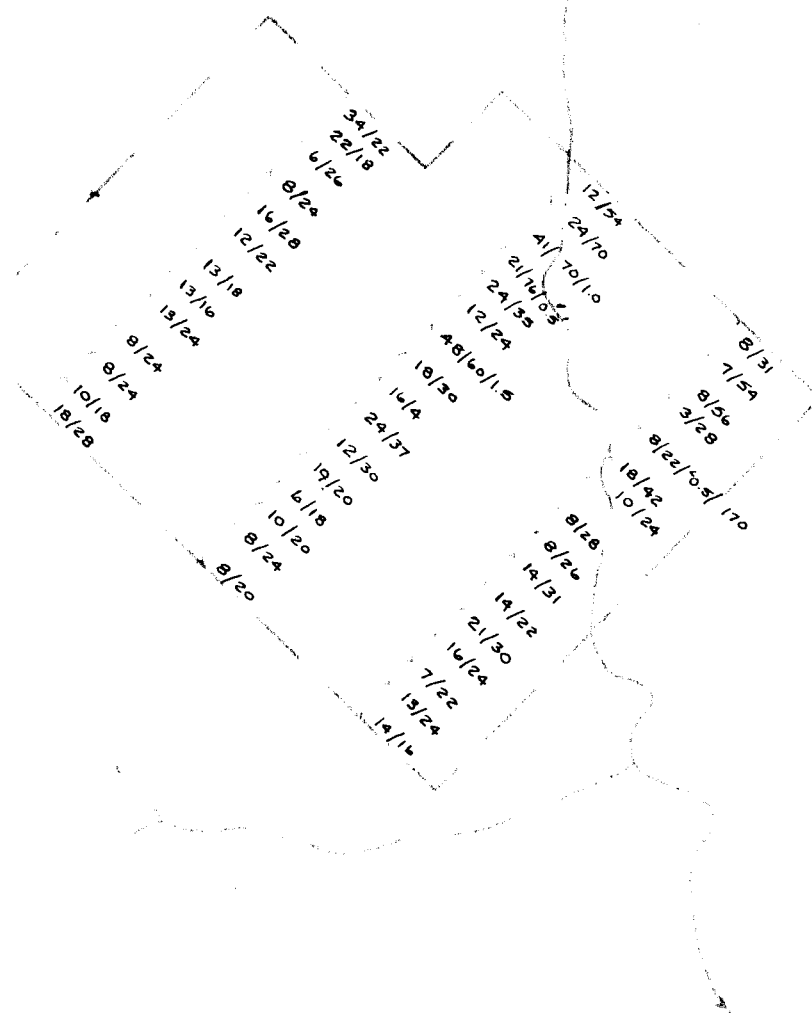


pH

64200



UNIVERSITY OF CALIFORNIA	
GEOLOGICAL ENGINEERING	
DAVID M. B. ROGERS	
NO. 28	
SAMPLE NUMBERS	
DATE: AUG. 29, 1972	SCALE: 1" = 1/2 mile



NOTE:

DETERMINATIONS ARE IN THE FORM:
 ppm Cu / ppm Pb / ppm Ag / ppb Au
 UNLESS OTHERWISE SHOWN, SILVER
 AND GOLD RESULTS ARE <0.5 ppm SILVER
 AND <30 ppb GOLD.

COPPER/LEAD/SILVER/GOLD

NUG 16

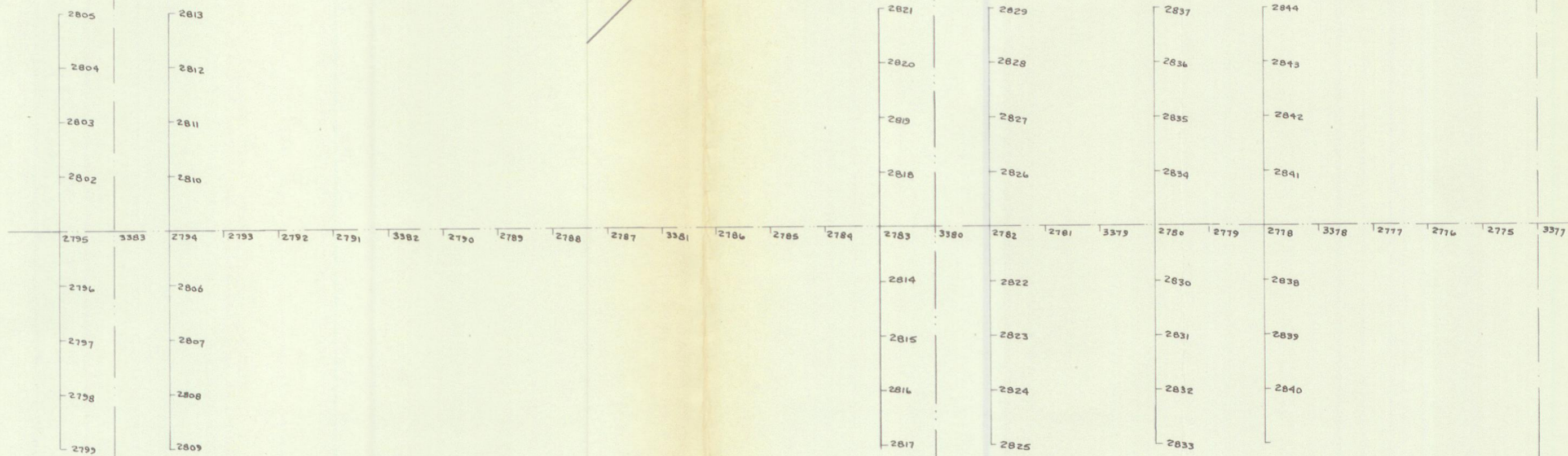
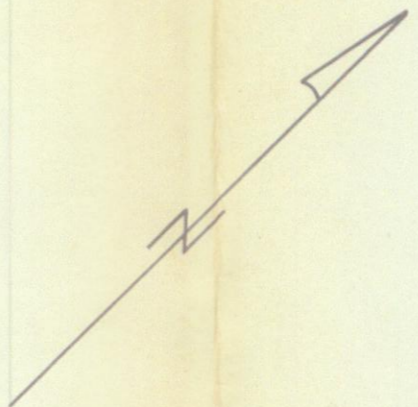
NUG 14

NUG 12

NUG 15

NUG 13

NUG 11



NTS SHEET 115-0-14

SULLIVAN & RODGERS

DETAIL GEOCHEMISTRY

NUG 'A' ZONE

SAMPLE NUMBERS

RG. HILKER LTD
GEOLOGICAL CONSULTANT
WHITEHORSE, Y.T.

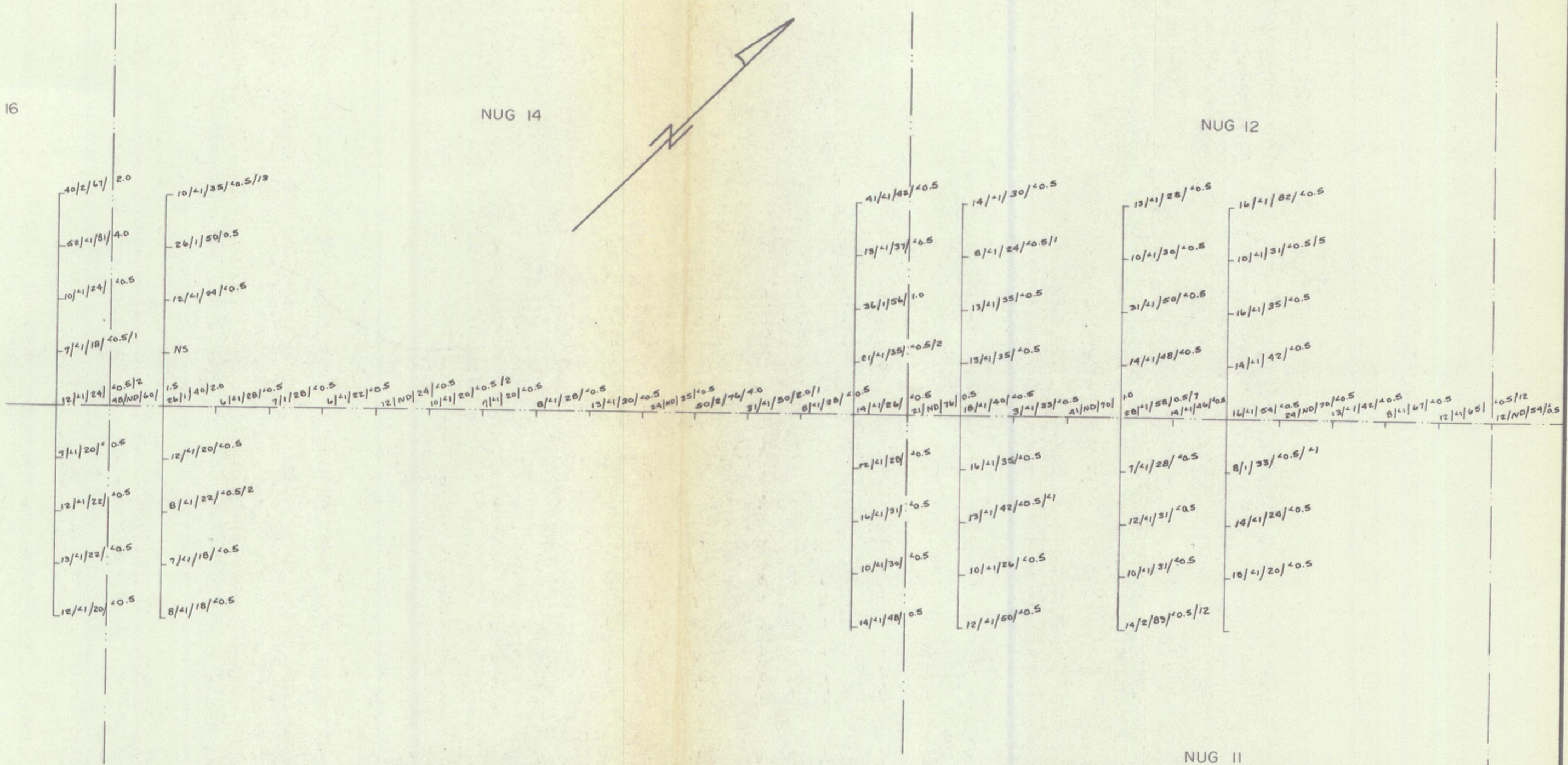
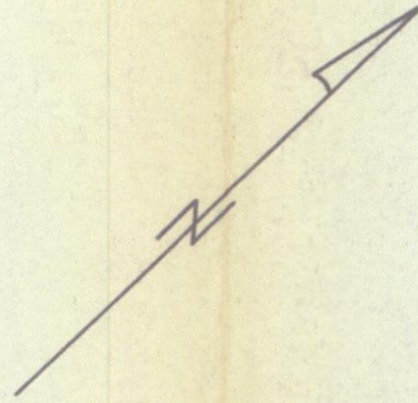
DATE: SEPT 13, 1972

SCALE 1" = 200'

NUG 16

NUG 14

NUG 12



NUG 15

NUG 13

NUG 11

NTS SHEET I15-0-14

SULLIVAN & RODGERS

DETAIL GEOCHEMISTRY

NUG 'A' ZONE

Cu/Mo/Pb/Ag/As P.P.M.

RG. HILKER LTD
GEOLOGICAL CONSULTANT
WHITEHORSE, Y.T.

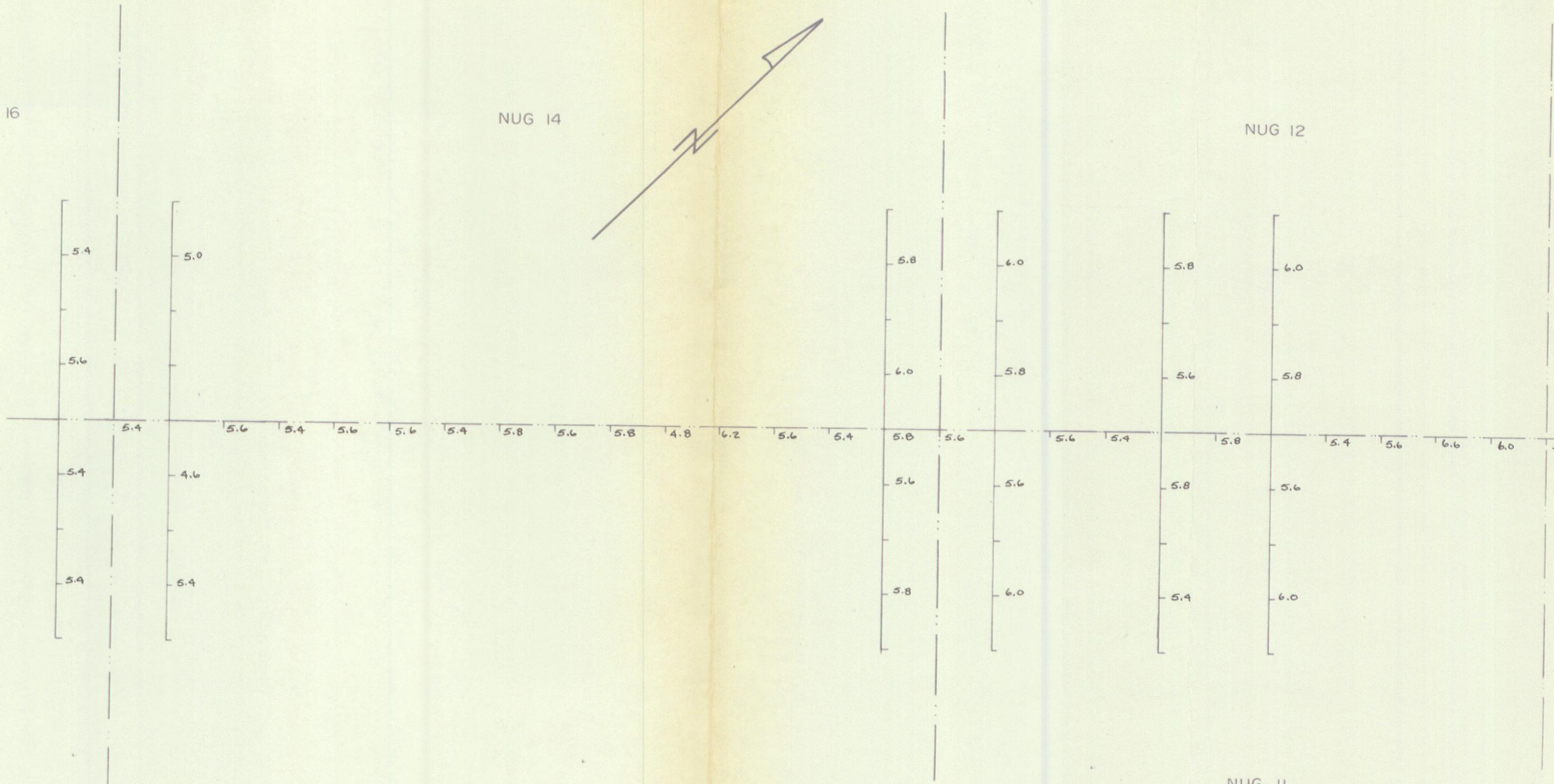
DATE: SEPT 13, 1972

SCALE: 1" = 200'

NUG 16

NUG 14

NUG 12



NUG 15

NUG 13

NUG 11

RG. HILKER LTD.
 GEOLOGICAL CONSULTANT
 WHITEHORSE, Y.T.

NTS SHEET 115-0-14

SULLIVAN & RODGERS

DETAIL GEOCHEMISTRY

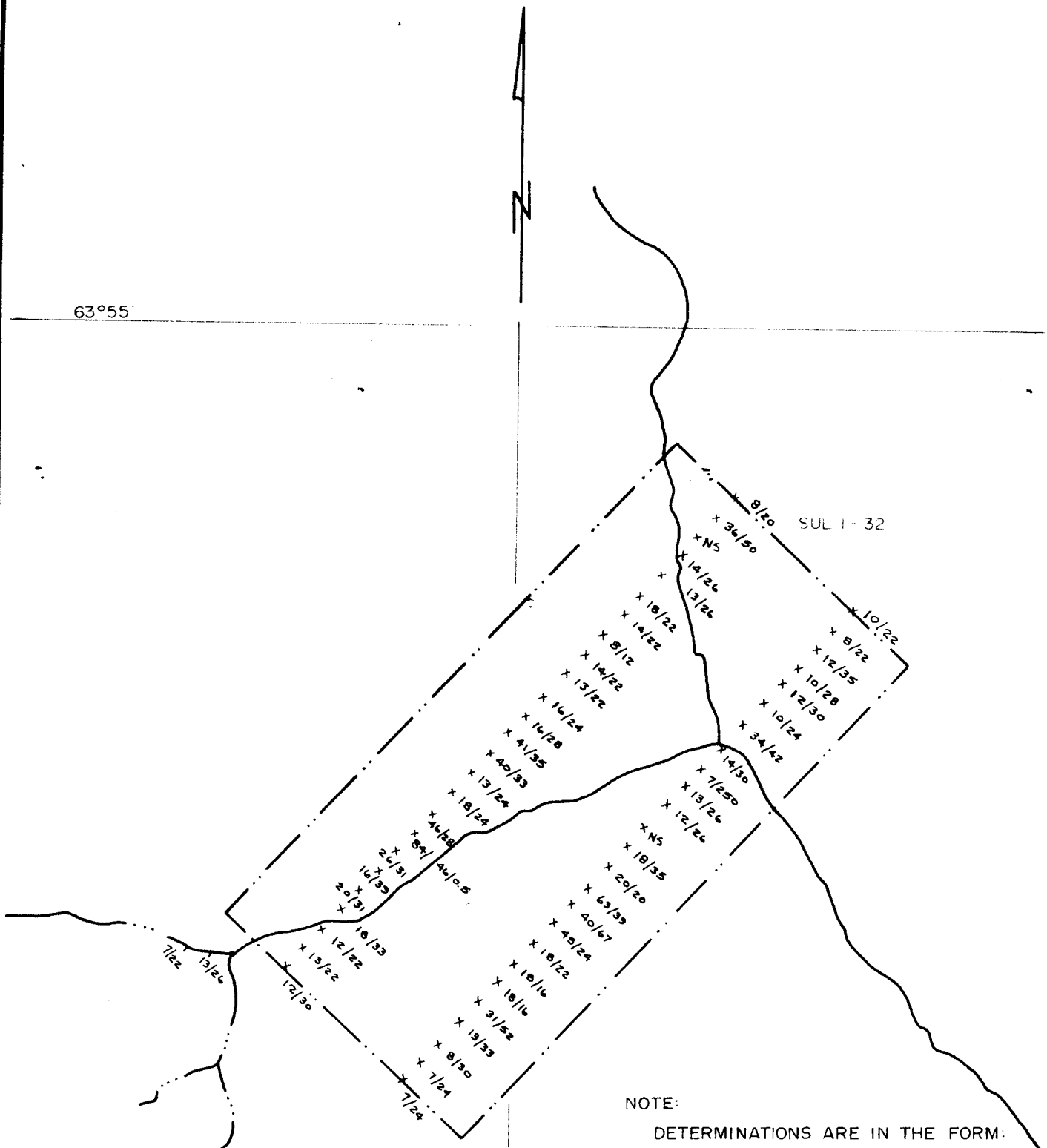
NUG 'A' ZONE

pH

DATE: SEPT 13, 1972

SCALE: 1" = 200'

63°55'



NOTE 'NS' MEANS NO SAMPLE WAS TAKEN

NOTE:

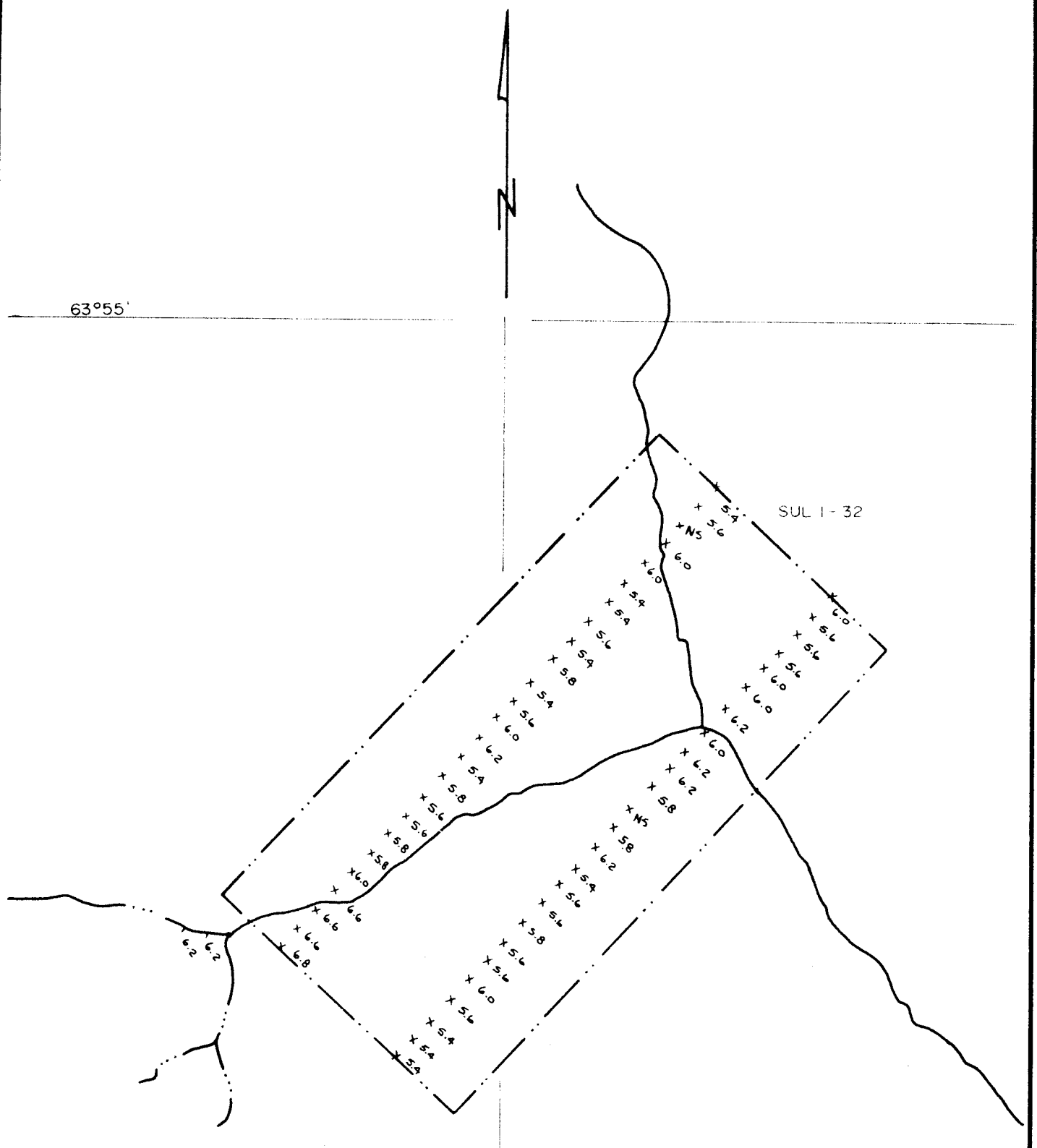
DETERMINATIONS ARE IN THE FORM:
ppm Cu / ppm Pb / ppm Ag / ppb Au.

UNLESS OTHERWISE SHOWN, SILVER
AND GOLD RESULTS ARE <0.5 ppm SILVER
AND <30ppb GOLD.

R.G. HILKER LTD
GEOLOGICAL CONSULTANT
WHITEHORSE, Y.T.

139°20'

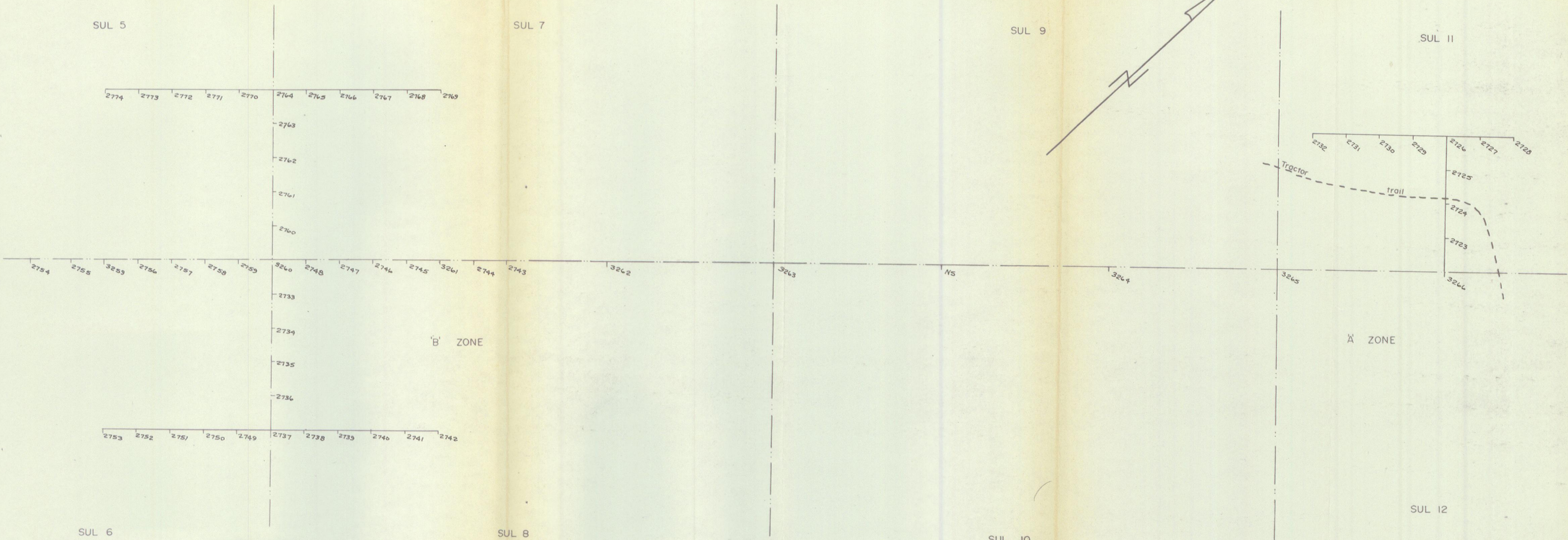
CLAIM SHEET I15-0-14	
SULLIVAN & RODGERS	
SUL 1-32	
COPPER/LEAD/SILVER/GOLD	
DATE AUG. 29, 1972	SCALE 1" = 1/2 mile



NOTE 'NS' MEANS NO SAMPLE WAS TAKEN

R.G. HILKER LTD.
GEOLOGICAL CONSULTANT
WHITEHORSE, Y.T.

SULLIVAN & RODGERS	
SUL I-32	
pH	
DATE AUG. 29, 1972	SCALE 1" = 1/2 mile



R.G. HILKER LTD.
 GEOLOGICAL CONSULTANT
 WHITEHORSE, Y.T.

NTS SHEET 115-0-14	
SULLIVAN & RODGERS	
DETAIL GEOCHEMISTRY	
SUL 'A' & 'B' ZONES	
SAMPLE NUMBERS	
DATE: SEPT. 13, 1972	SCALE: 1" = 200'

SUL 5

SUL 7

SUL 9

SUL 11

31/41/28/0.5 18/41/30/0.5 50/41/76/0.5 18/41/26/0.5 20/41/40/0.5 22/41/33/0.5 31/41/52/0.5 16/41/33/0.5 60/41/44/0.5 60/41/50/1.0

26/41/52/0.5

21/41/54/0.5

31/41/63/0.5

48/41/66/0.5/4

21/41/18/0.5 20/41/18/0.5/2 45/ND/24/0.5 12/41/31/0.5 13/41/28/0.5 16/41/33/0.5 22/41/50/0.5 40/ND/67/0.5 30/41/74/0.5 14/41/26/0.5 46/41/31/0.5 36/41/37/0.5/2 63/ND/39/0.5 40/41/50/0.5 26/41/44/0.5 20/ND/20/0.5 18/ND/35/0.5 12/ND/26/0.5

12/41/35/0.5

12/41/39/0.5

14/41/31/0.5/2

18/41/31/0.5

14/41/42/0.5 18/41/54/0.5 13/41/44/0.5 21/41/40/0.5/1 14/41/42/0.5 14/41/35/0.5 12/41/39/0.5 14/41/48/0.5 21/41/35/0.5/1 14/41/30/0.5 13/41/39/0.5

SUL 6

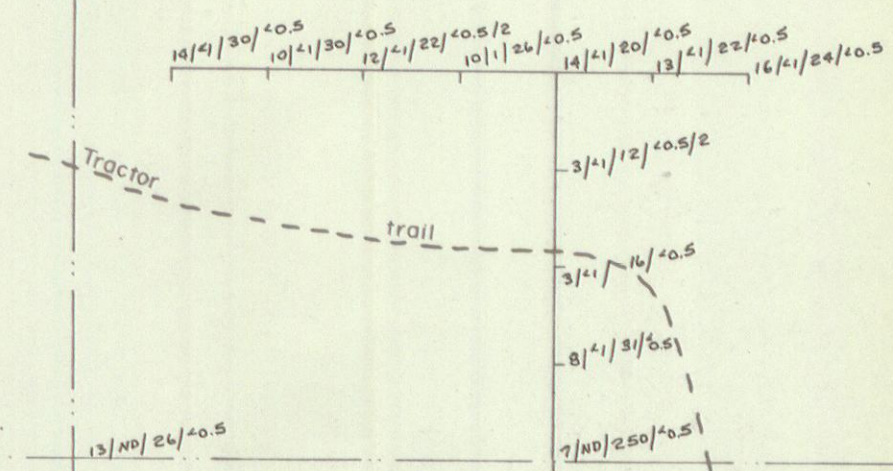
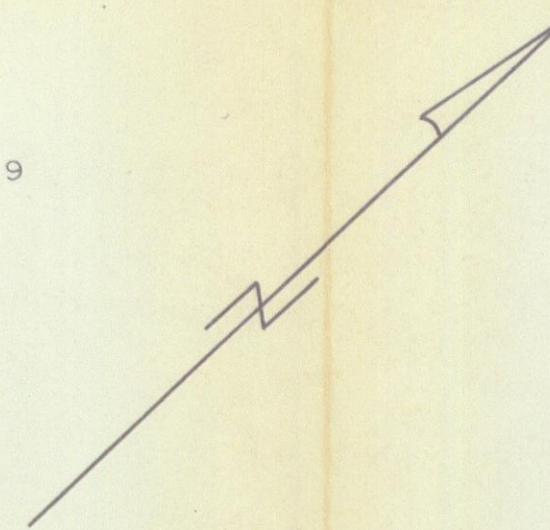
SUL 8

SUL 10

SUL 12

'B' ZONE

'A' ZONE



NTS SHEET 115-0-14

SULLIVAN & RODGERS

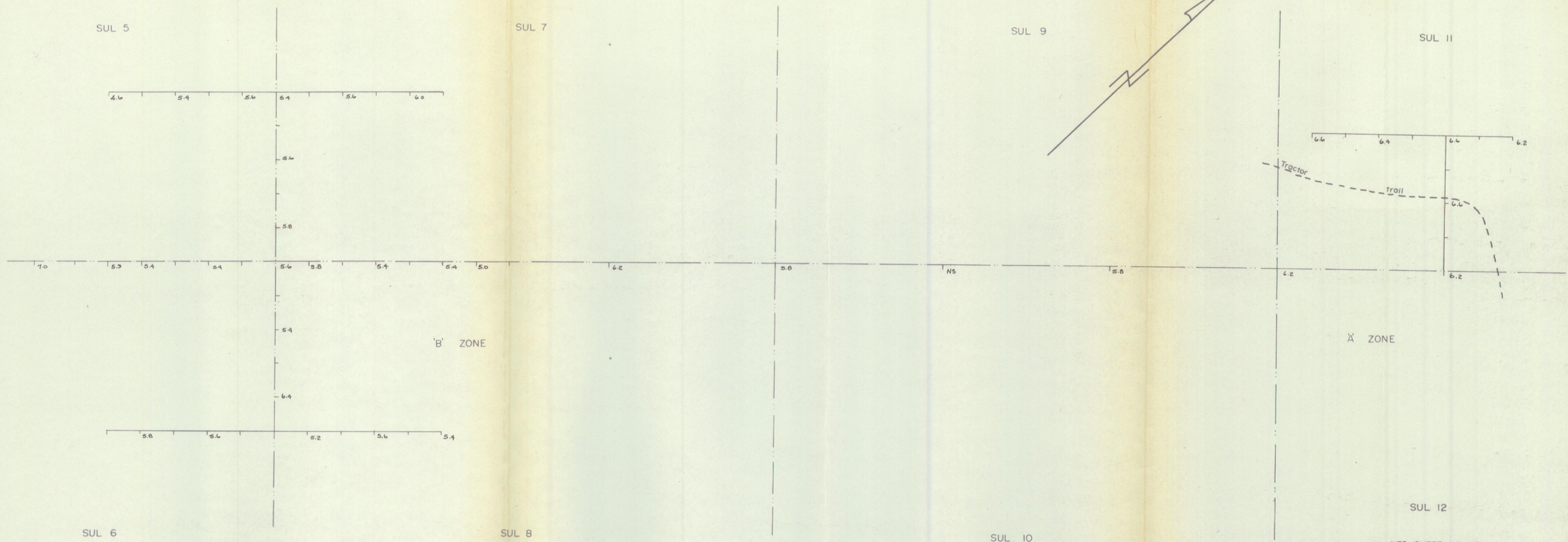
DETAIL GEOCHEMISTRY

SUL 'A' & 'B' ZONES

Cu / Mo / Pb / Ag / As PPM.

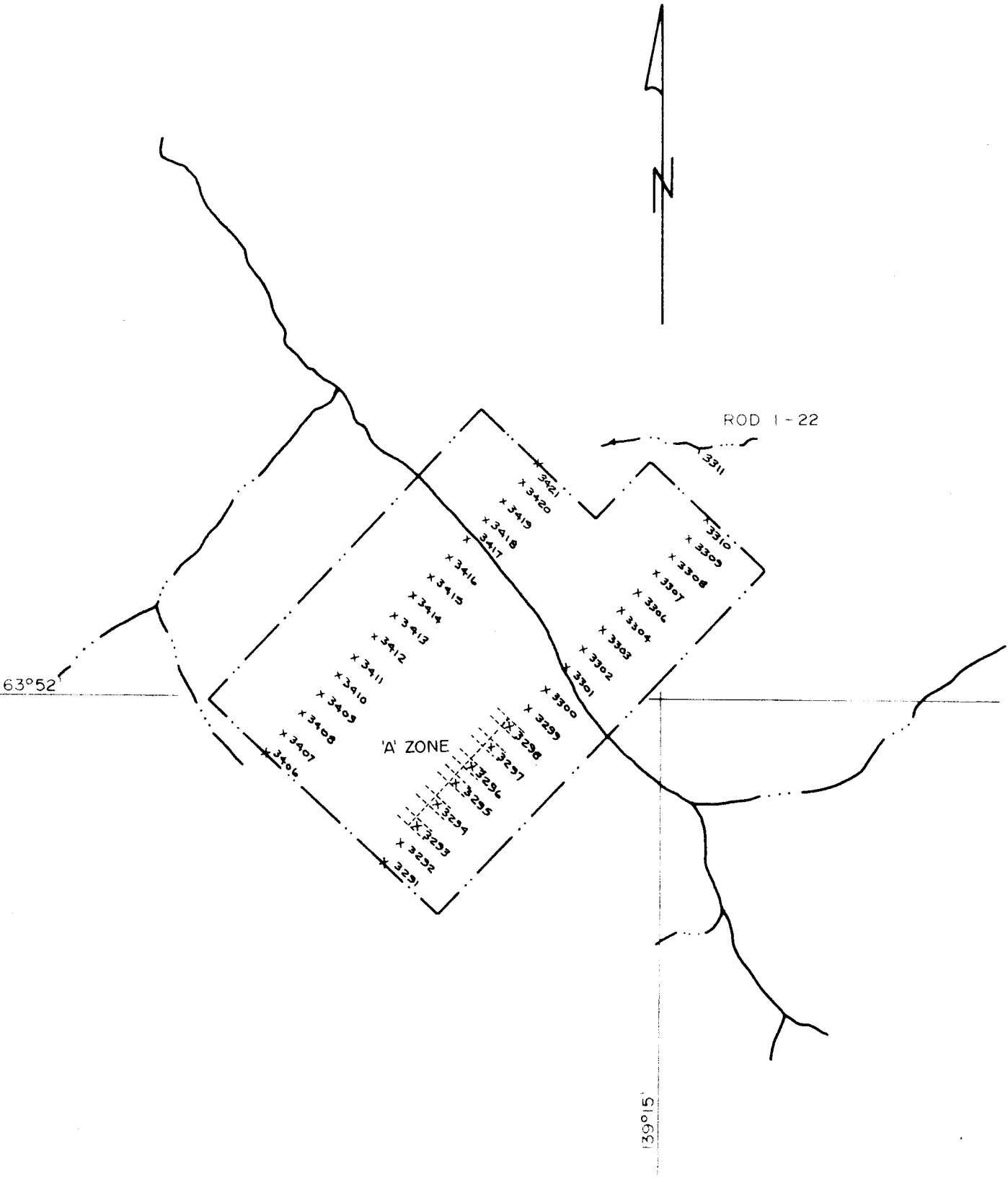
DATE: SEPT. 13, 1972 SCALE: 1" = 200'

R.G. HILKER LTD.
GEOLOGICAL CONSULTANT
WHITEHORSE, Y.T.



R.G. HILKER LTD.
 GEOLOGICAL CONSULTANT
 WHITEHORSE, Y.T.

NTS SHEET 115-0-14	
SULLIVAN & RODGERS	
DETAIL GEOCHEMISTRY	
SUL 'A' & 'B' ZONES	
pH	
DATE: SEPT 13, 1972	SCALE: 1" = 200'



CLAIM SHEET 115-0-14

SULLIVAN & RODGERS

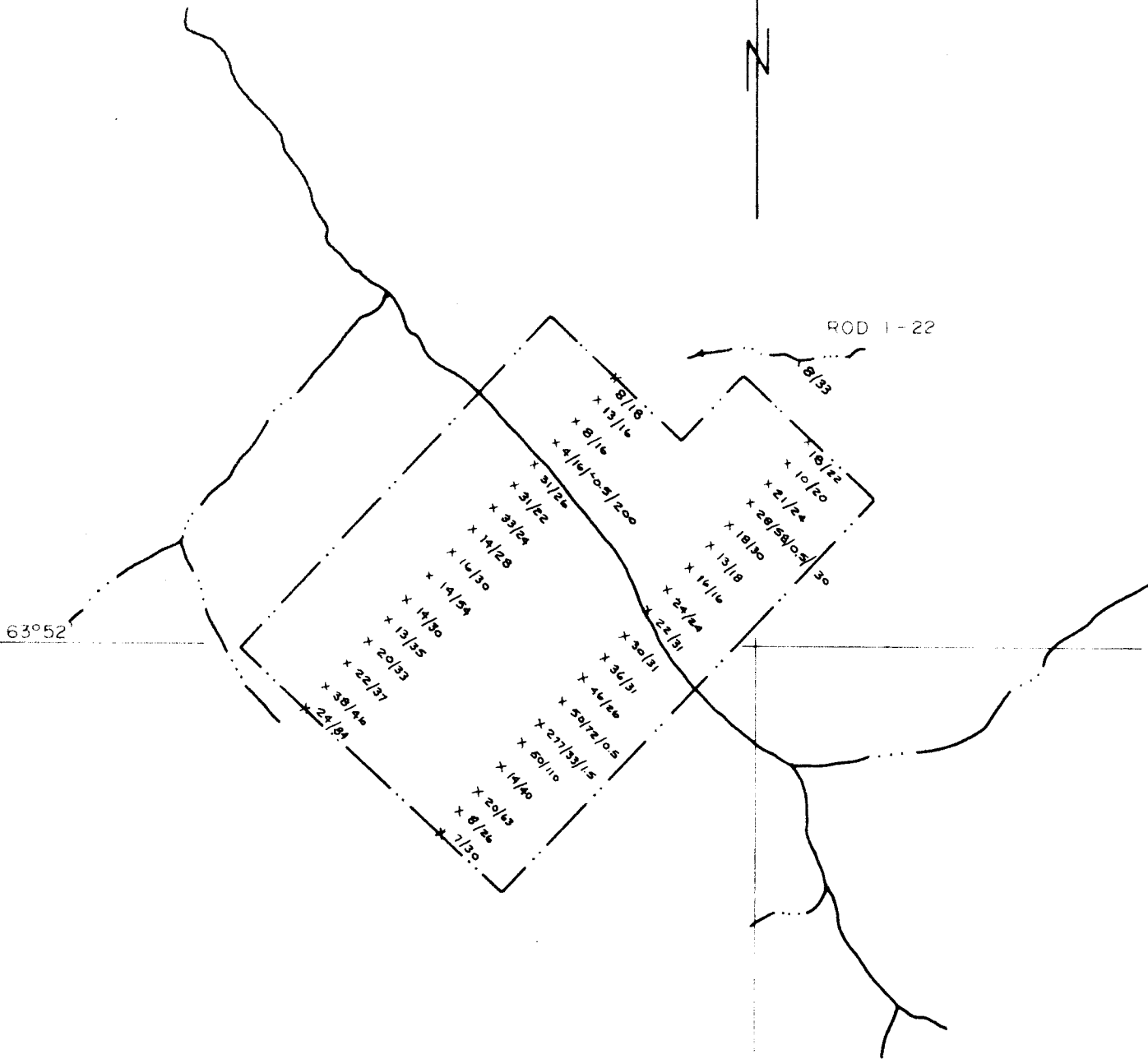
ROD 1-22

SAMPLE NUMBERS

DATE: AUG 29, 1972

SCALE 1" = 1/2 mile

F. S. HILKER LTD
GEOLOGICAL CONSULTANT
WHITEHORSE, N.T.



63°52'

139°15'

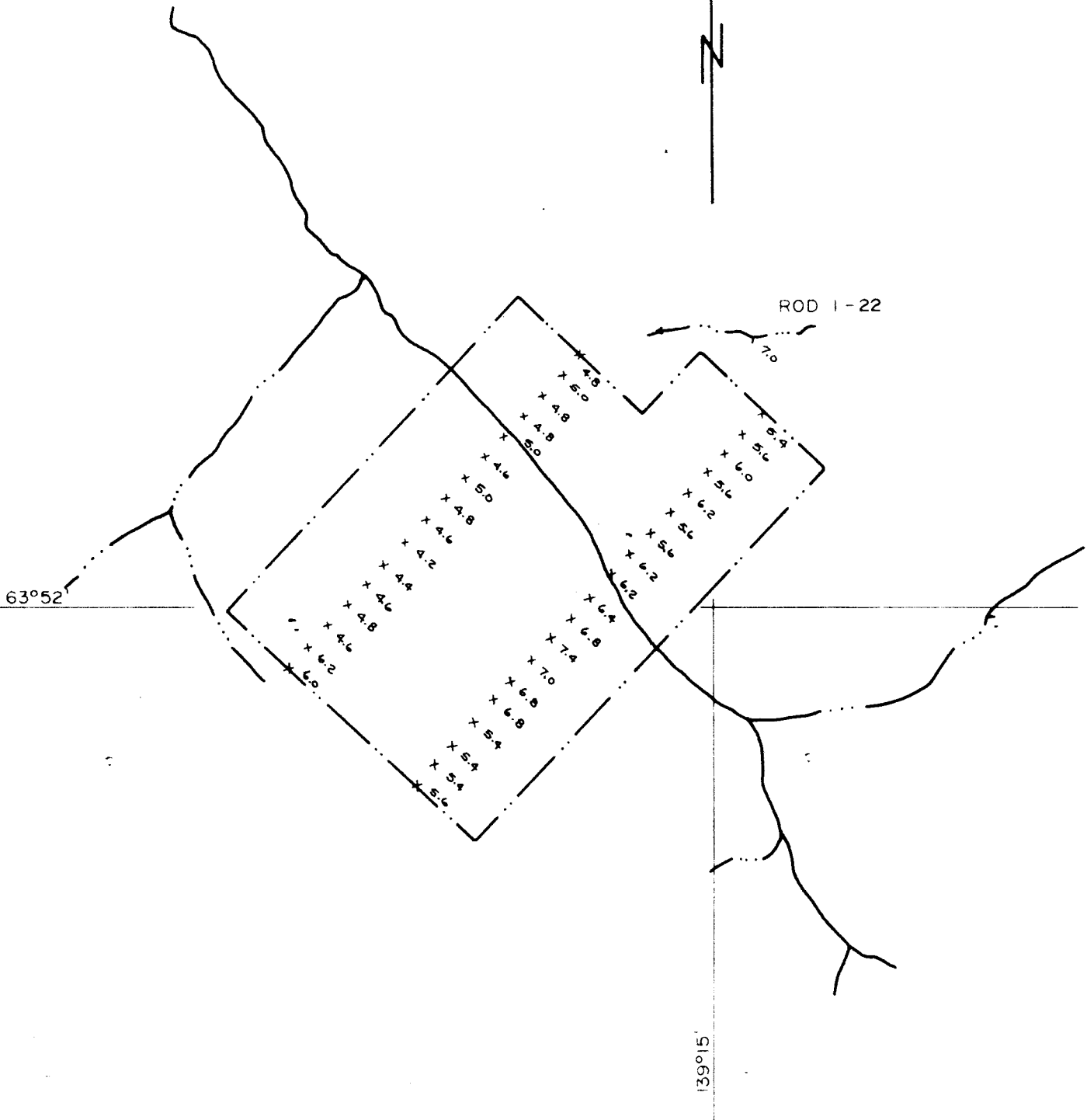
NOTE:

DETERMINATIONS ARE IN THE FORM:
ppm Cu / ppm Pb / ppm Ag / ppb Au.

UNLESS OTHERWISE SHOWN, SILVER
AND GOLD RESULTS ARE <0.5ppm SILVER
AND <30ppb GOLD.

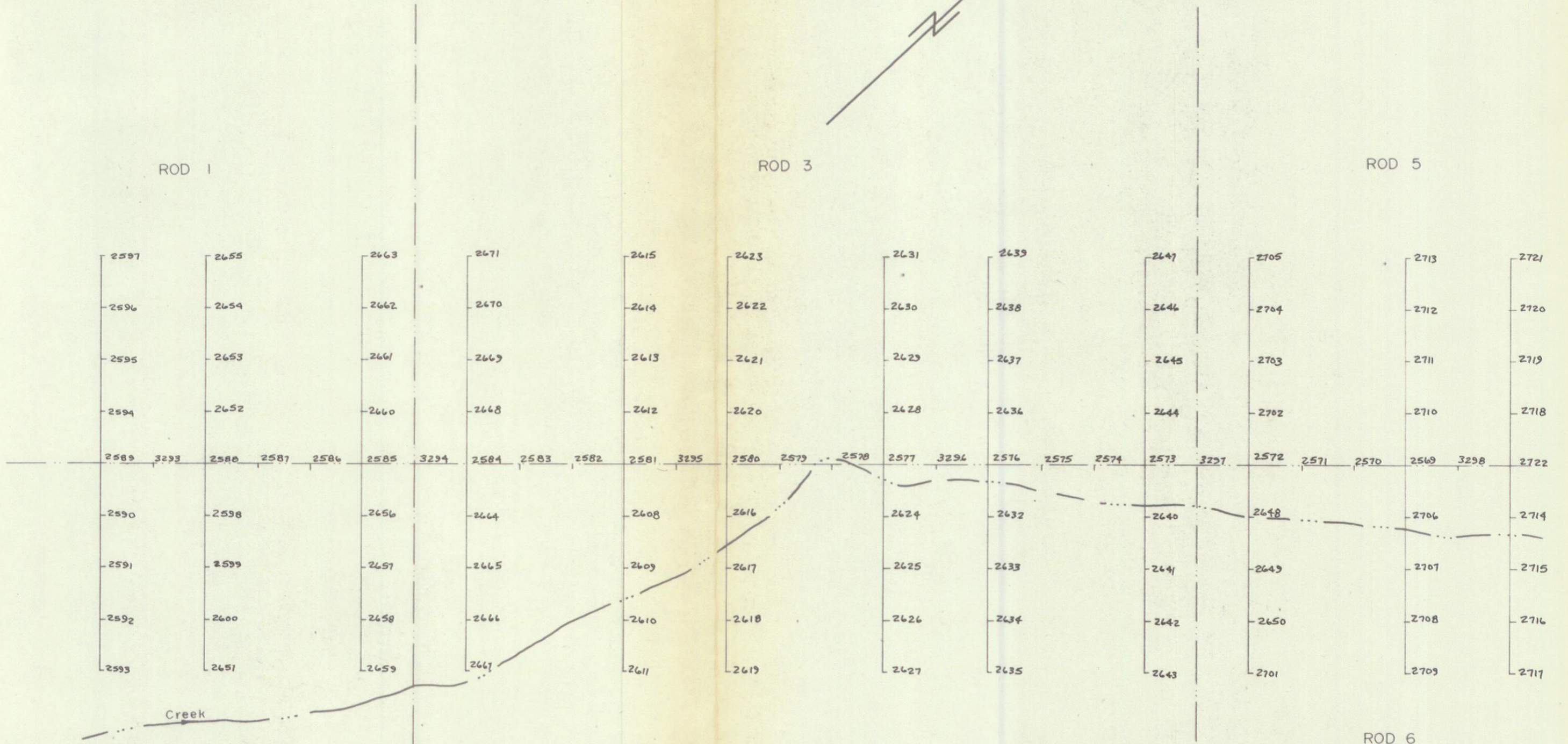
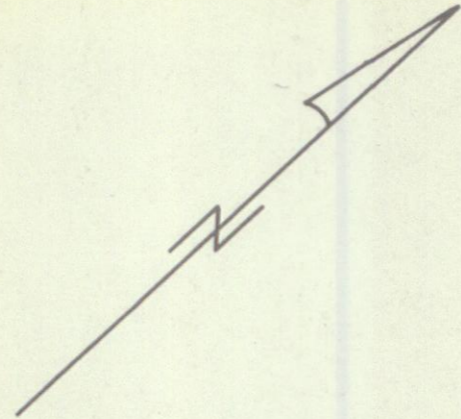
W. G. WALKER LTD
GEOLOGICAL CONSULTANT
411 TENDRILL ST.

CLAIM SHEET 115-0-14	
SULLIVAN & RODGERS	
ROD 1-22	
COPPER/LEAD/SILVER/GOLD	
DATE: AUG 29, 1972	SCALE: 1" = 1/2 mile



P. B. HILKER LTD
 GEOLOGICAL CONSULTANT
 WHITEHORSE, Y.T.

SULLIVAN & RODGERS	
ROD 1-22	
pH	
DATE AUG 29, 1972	SCALE 1" = 1/2 mile



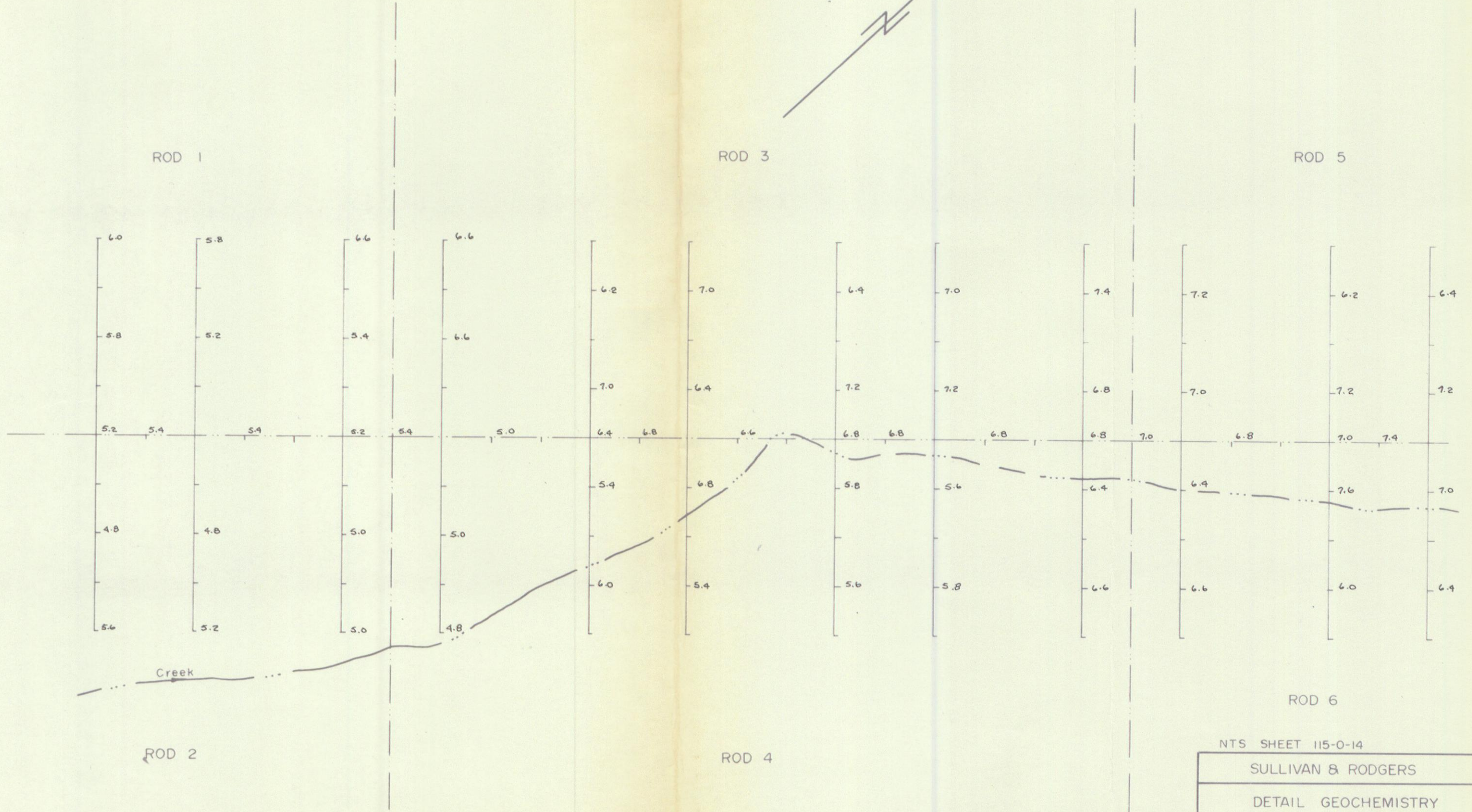
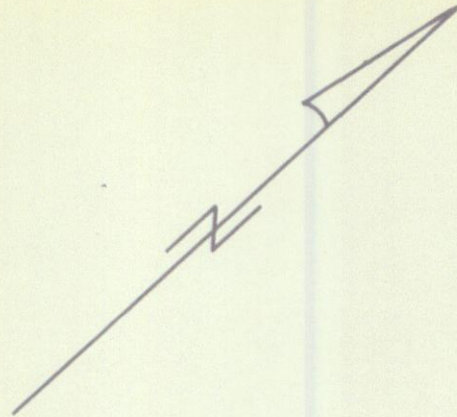
ROD 2

ROD 4

ROD 6

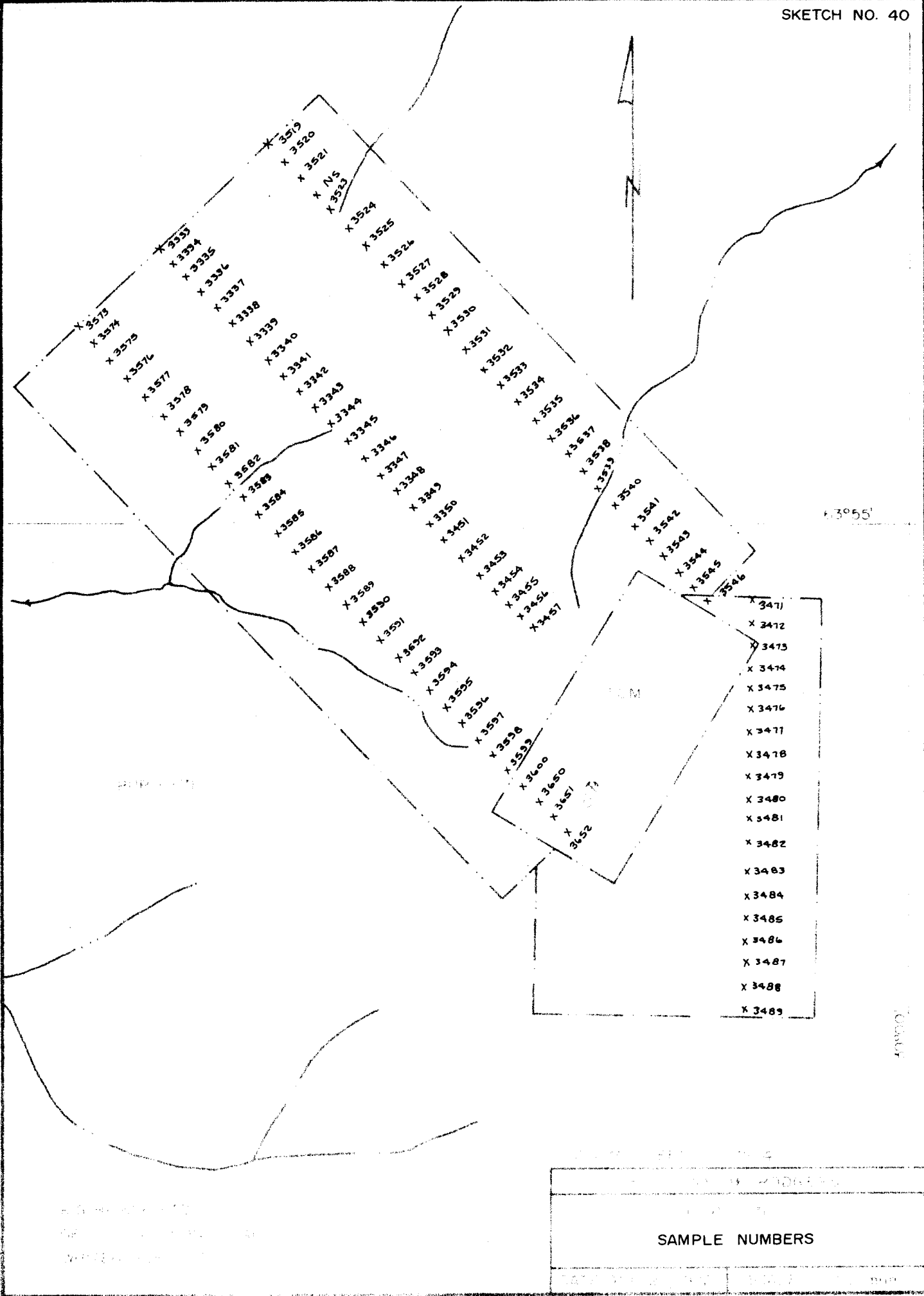
R.G. HILKER LTD.
GEOLOGICAL CONSULTANT
WHITEHORSE, Y.T.

NTS SHEET 115-0-14	
SULLIVAN & RODGERS	
DETAIL GEOCHEMISTRY	
ROD 'A' ZONE	
SAMPLE NUMBERS	
DATE SEPT. 13, 1972	SCALE: 1" = 200'



R.G. HILKER LTD.
 GEOLOGICAL CONSULTANT
 WHITEHORSE, Y.T.

NTS SHEET 115-0-14	
SULLIVAN & RODGERS	
DETAIL GEOCHEMISTRY	
ROD 'A' ZONE	
pH	
DATE SEPT. 13, 1972	SCALE: 1" = 200'

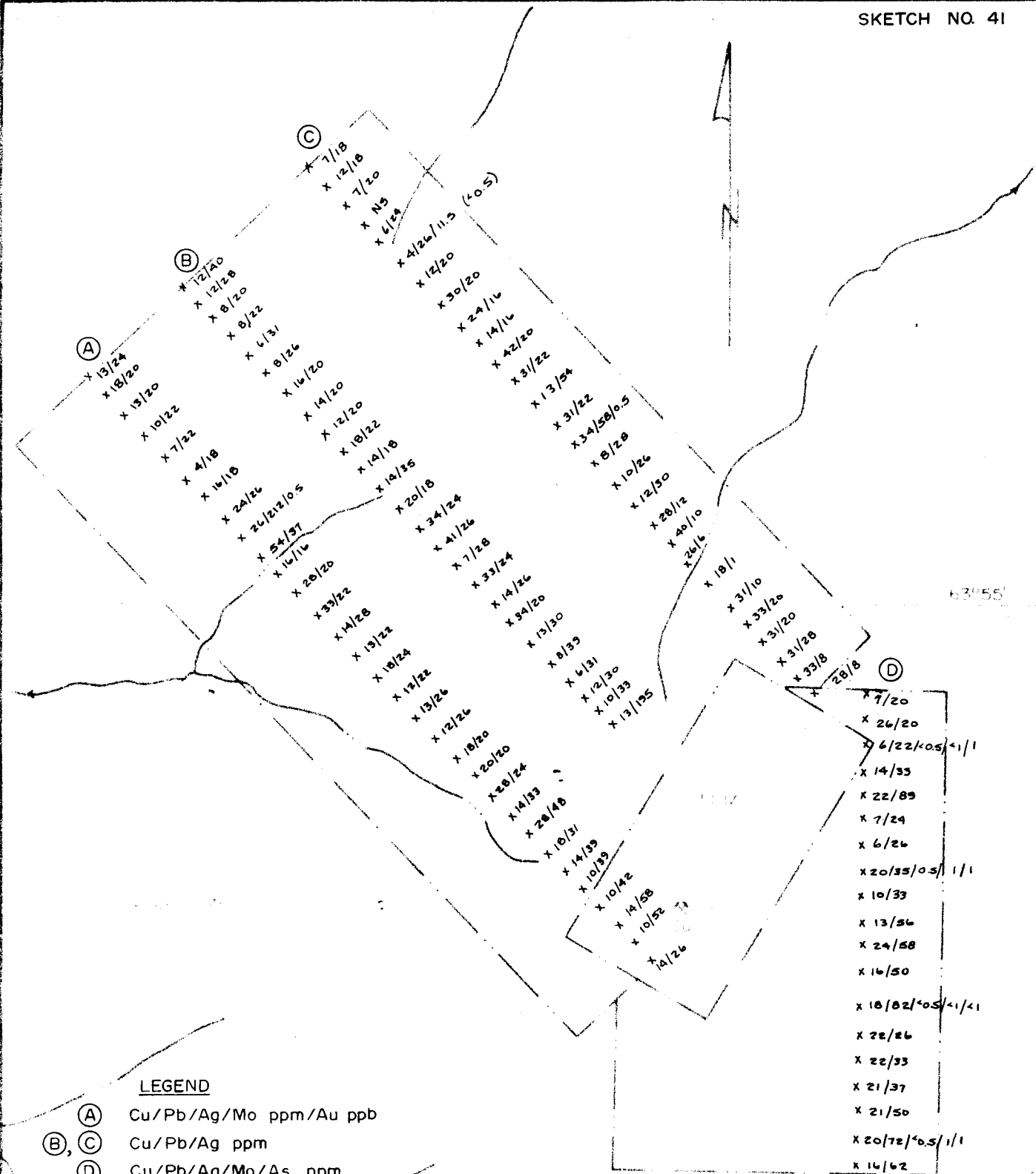


3°55'

- X 3471
- X 3472
- X 3473
- X 3474
- X 3475
- X 3476
- X 3477
- X 3478
- X 3479
- X 3480
- X 3481
- X 3482
- X 3483
- X 3484
- X 3485
- X 3486
- X 3487
- X 3488
- X 3489

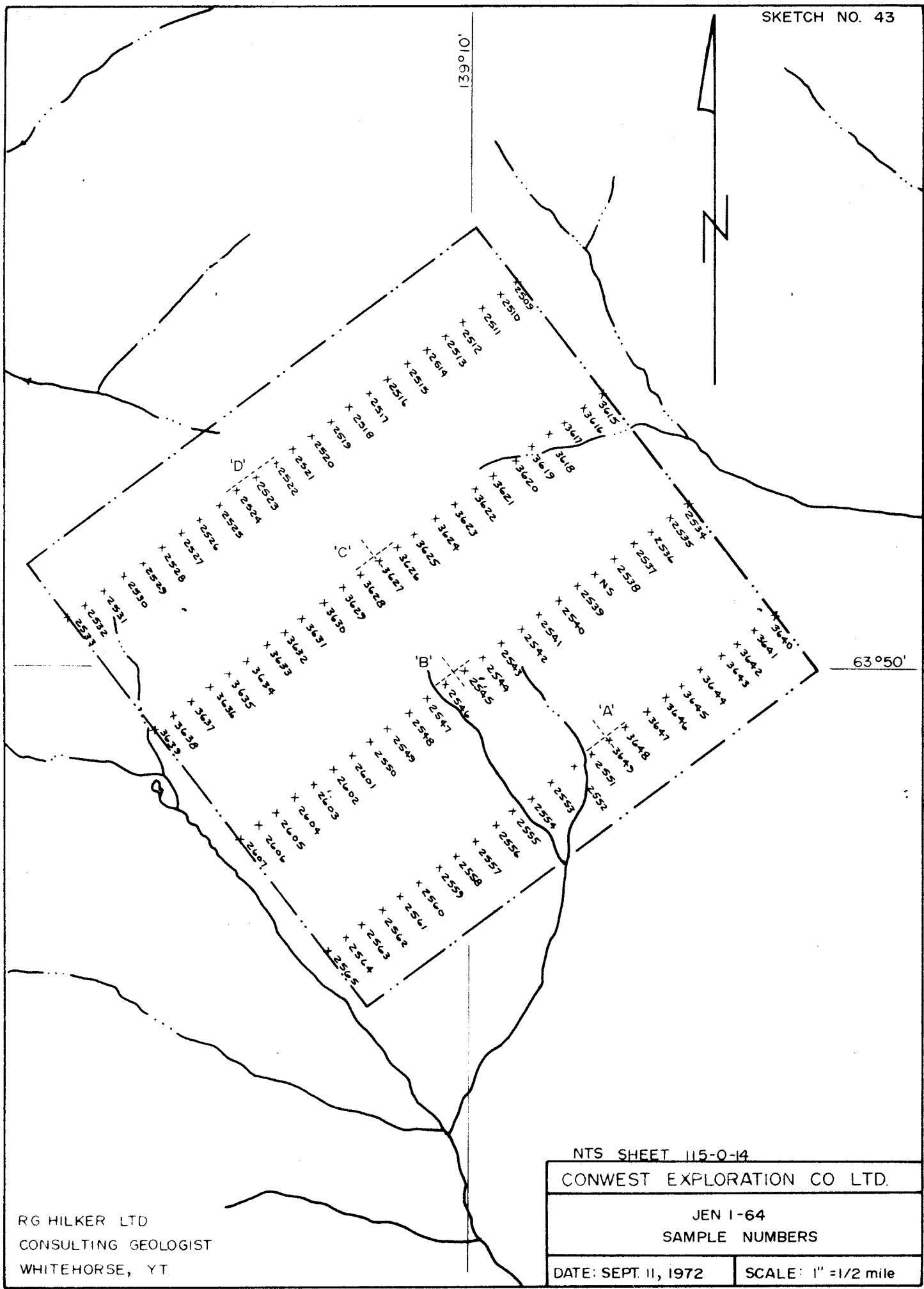
SAMPLE NUMBERS

DATE	TIME	BY	NO.



63955

34700

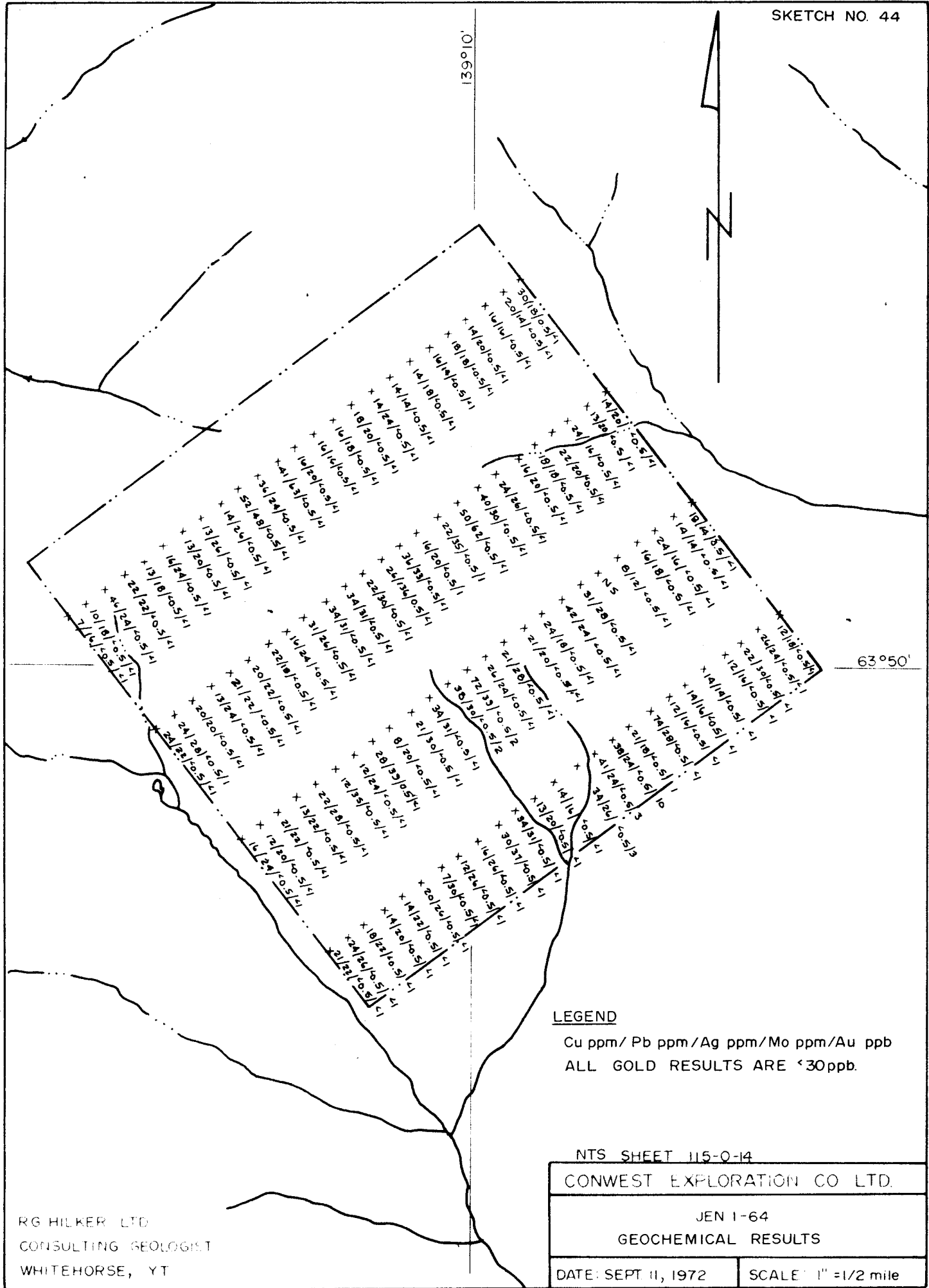


RG HILKER LTD
 CONSULTING GEOLOGIST
 WHITEHORSE, YT.

NTS SHEET 115-0-14	
CONWEST EXPLORATION CO LTD.	
JEN I-64	
SAMPLE NUMBERS	
DATE: SEPT. 11, 1972	SCALE: 1" = 1/2 mile

010631

63°50'



LEGEND

Cu ppm/ Pb ppm/Ag ppm/Mo ppm/Au ppb
ALL GOLD RESULTS ARE <30ppb.

NTS SHEET 115-0-14

CONWEST EXPLORATION CO LTD.

JEN 1-64

GEOCHEMICAL RESULTS

DATE: SEPT 11, 1972

SCALE 1" = 1/2 mile

RG HILKER LTD
CONSULTING GEOLOGIST
WHITEHORSE, YT

139°10'

63°50'



RG HILKER LTD
 CONSULTING GEOLOGIST
 WHITEHORSE, YT

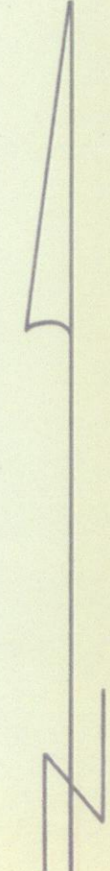
NTS SHEET 115-0-14	
CONWEST EXPLORATION CO LTD	
JEN 1-64	
pH	
DATE: SEPT 11, 1971	SCALE: 1/2" = 1 mi



LEGEND
 X C-154
 X 5-4-4 rock sample locations
 R.G. MILNER LTD.
 GEOLOGICAL CONSULTANT
 WHITEHORSE, YT

KEY PLAN
 2

CLAIM SHEETS 115-0-16, 116-0-3
SULLIVAN & RODGERS
 GEOCHEMISTRY SILT SURVEY
 BONANZA/ELDORADO/QUARTZ CREEKS
 SHEET 1
 SAMPLE NUMBERS
 DATE AUGUST 30, 1972 SCALE: 1" = 1/2 mile



NOTE pH IS SHOWN IN PARENTHESES.

CLAIM SHEETS 115-0-14, 115-8-3

SULLIVAN & RODGERS

GEOCHEMISTRY SILT SURVEY

BONANZA/ELDORADO/QUARTZ CREEKS

SHEET 1

Cu ppm/Pb ppm/Bg ppm/Mo ppm/As ppm/Alu ppb

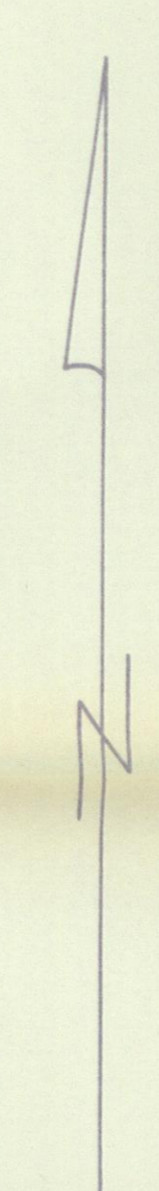
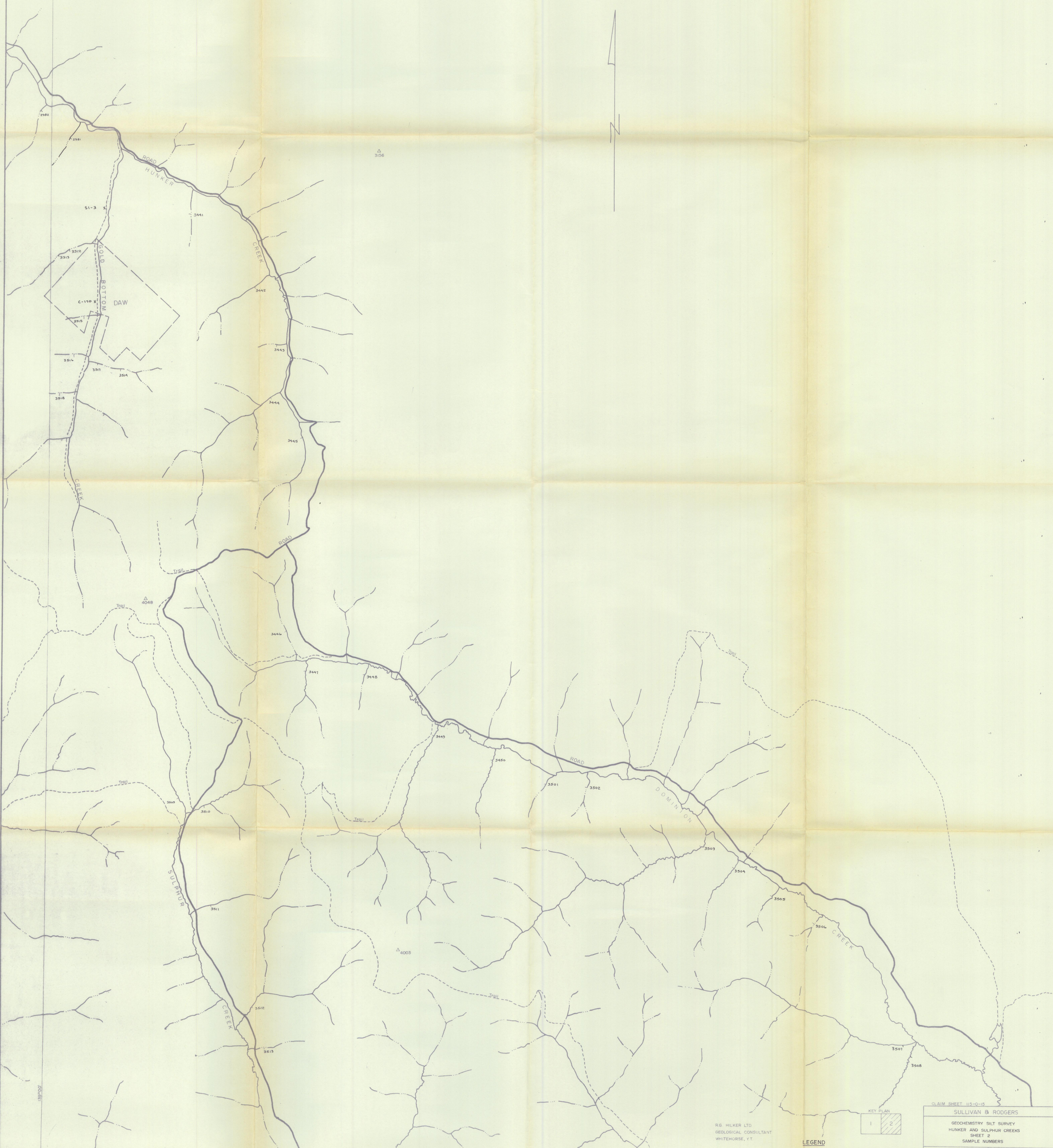
DATE AUGUST 30, 1972

SCALE: 1" = 1/2 mile

R.B. HILKER LTD.
BIOLOGICAL CONSULTANT
WHITEHORSE, Y.T.

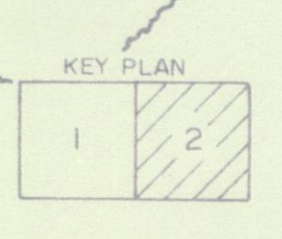


63-95



R.G. HILKER LTD
 GEOLOGICAL CONSULTANT
 WHITEHORSE, Y.T.

LEGEND
 v-c-119 rock sample locations

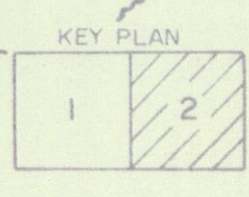


CLAIM SHEET 115-0-15
 SULLIVAN & RODGERS
 GEOCHEMISTRY SILT SURVEY
 HUNKER AND SULPHUR CREEKS
 SHEET 2
 SAMPLE NUMBERS
 DATE: AUGUST 30, 1972 SCALE: 1" = 1/2 mile

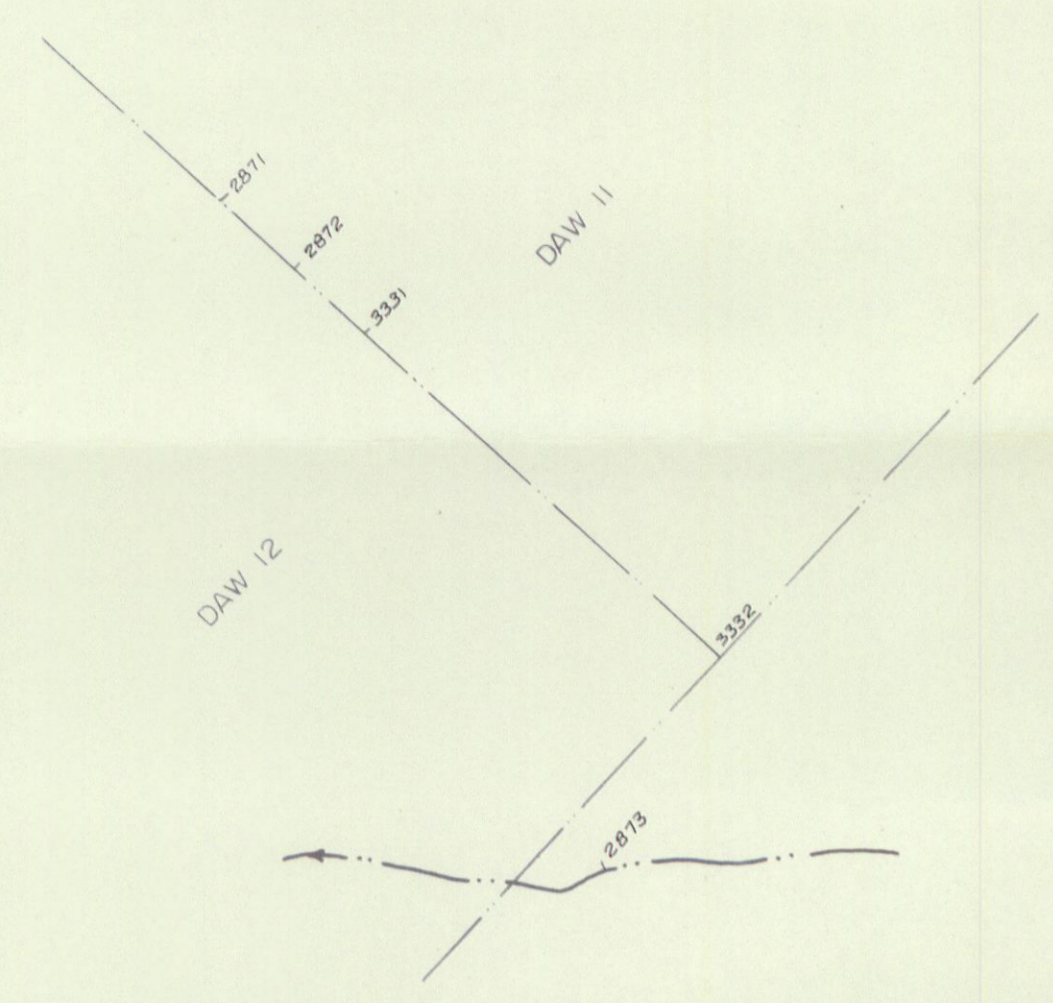


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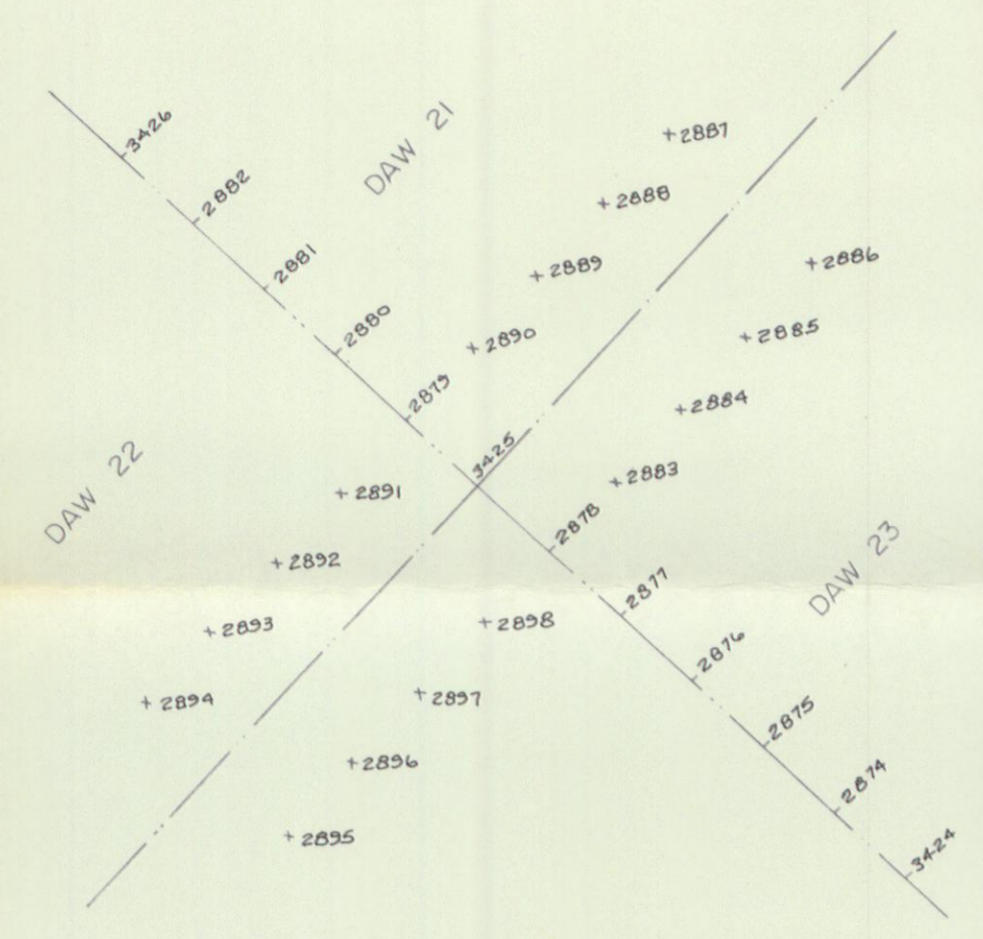
NOTE pH IS SHOWN IN PARENTHESES.



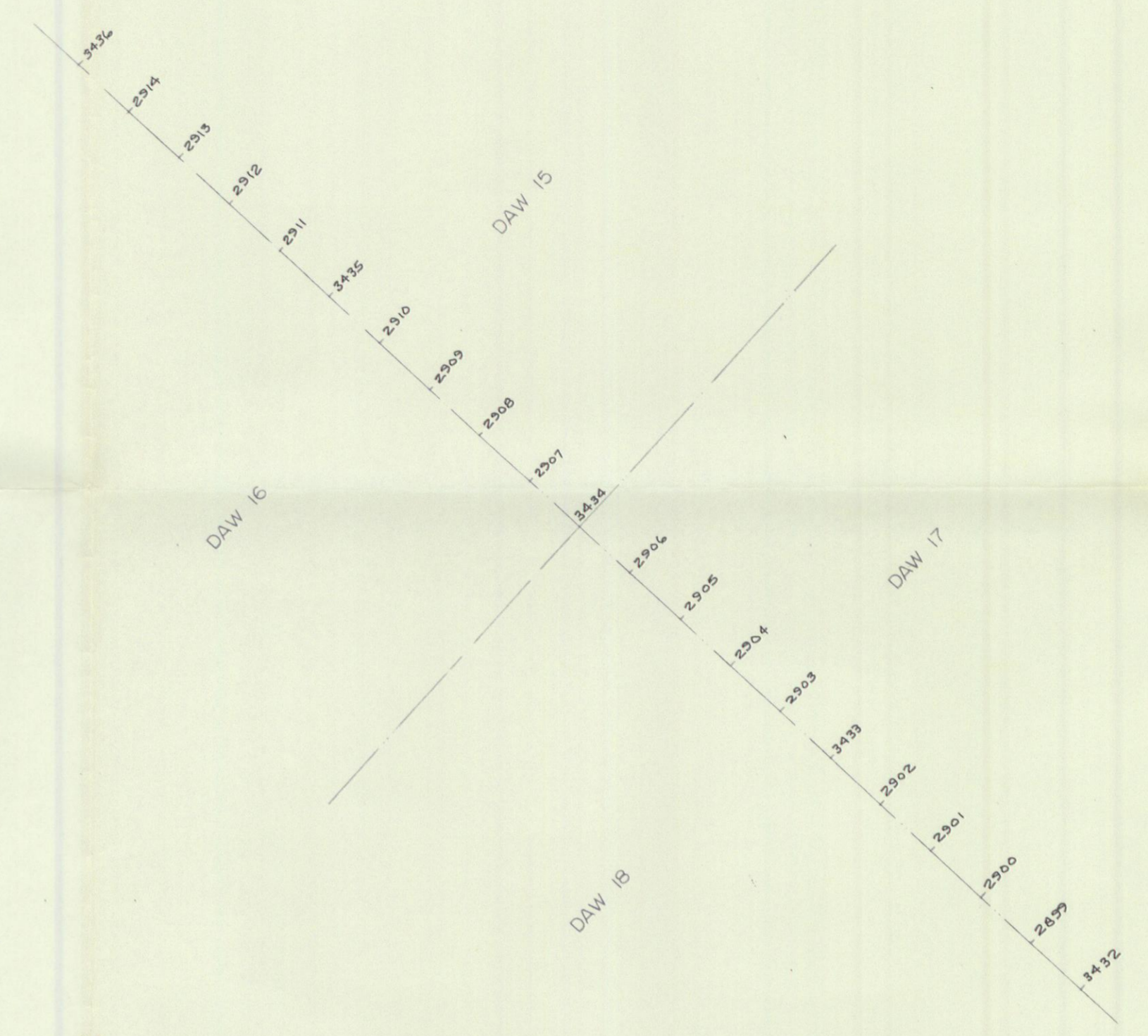
CLAIM SHEET 115-C-15	
SULLIVAN & RODGERS	
GEOCHEMISTRY SILT SURVEY	
HUNKER AND SULPHUR CREEKS	
SHEET 2	
Cu ppm / Pb ppm / Ag ppm	
DATE: AUGUST 30, 1972	SCALE: 1" = 1/2 mile



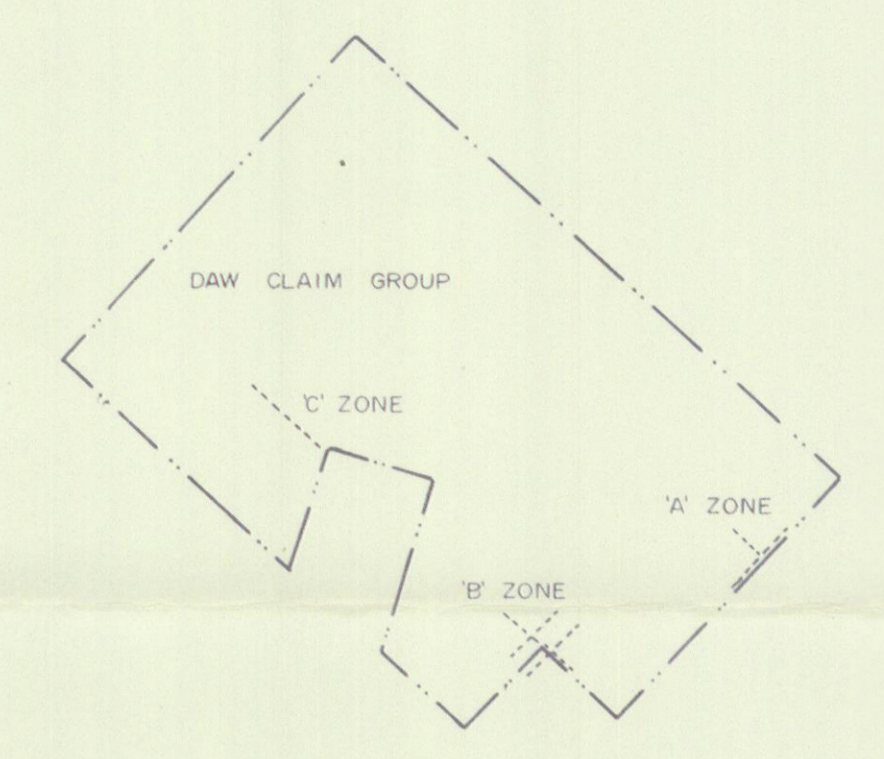
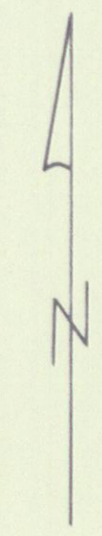
DAW 'A' ZONE
1" = 200'



DAW 'B' ZONE
1" = 200'

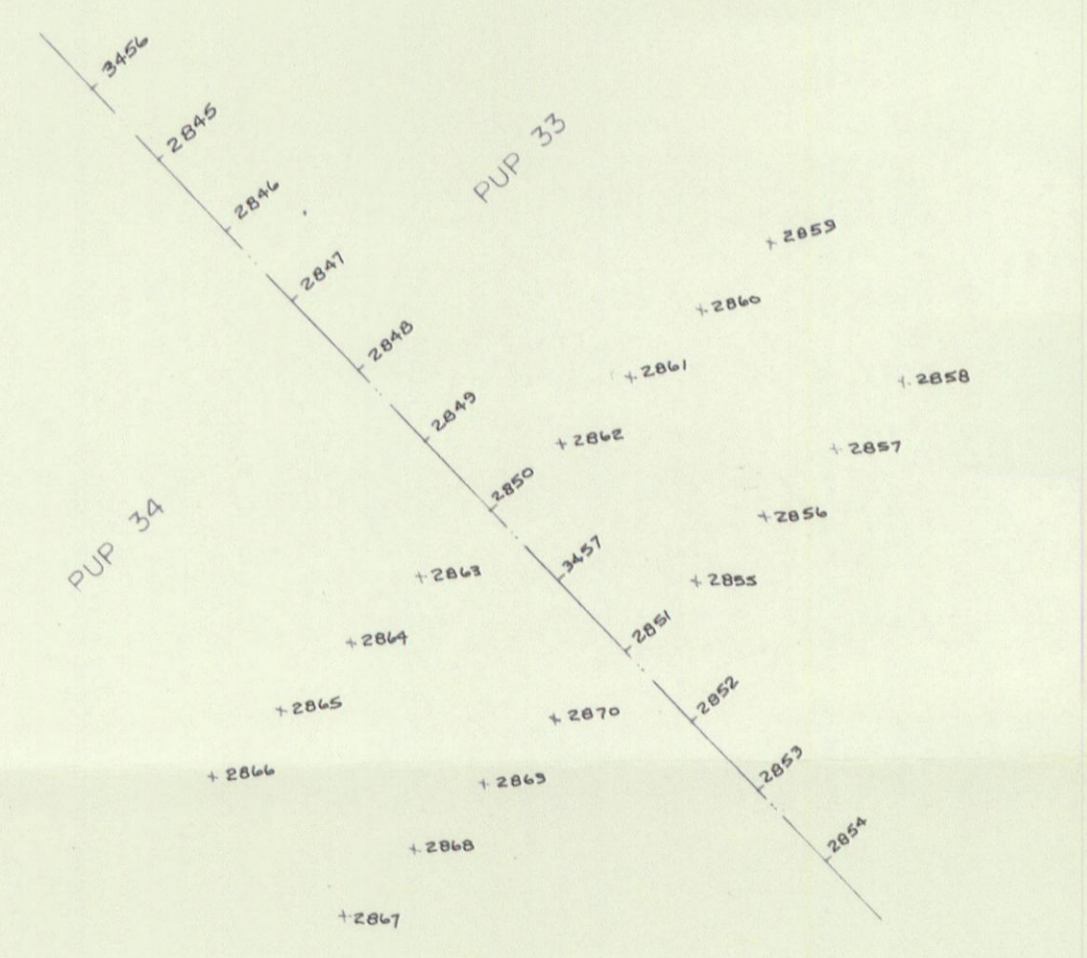


DAW 'C' ZONE
1" = 200'

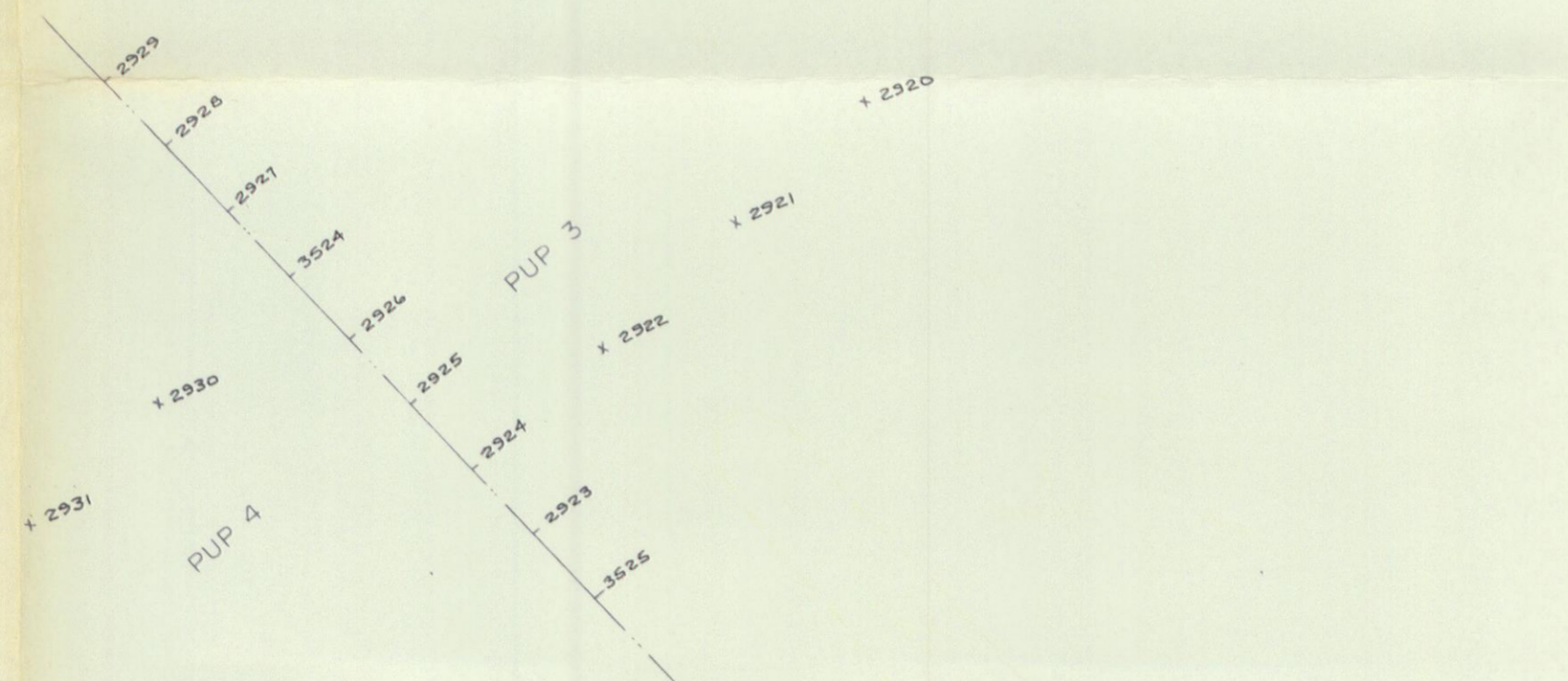


DAW CLAIM GROUP SHOWING 'A', 'B' & 'C' ZONES
1" = 1/2 mile

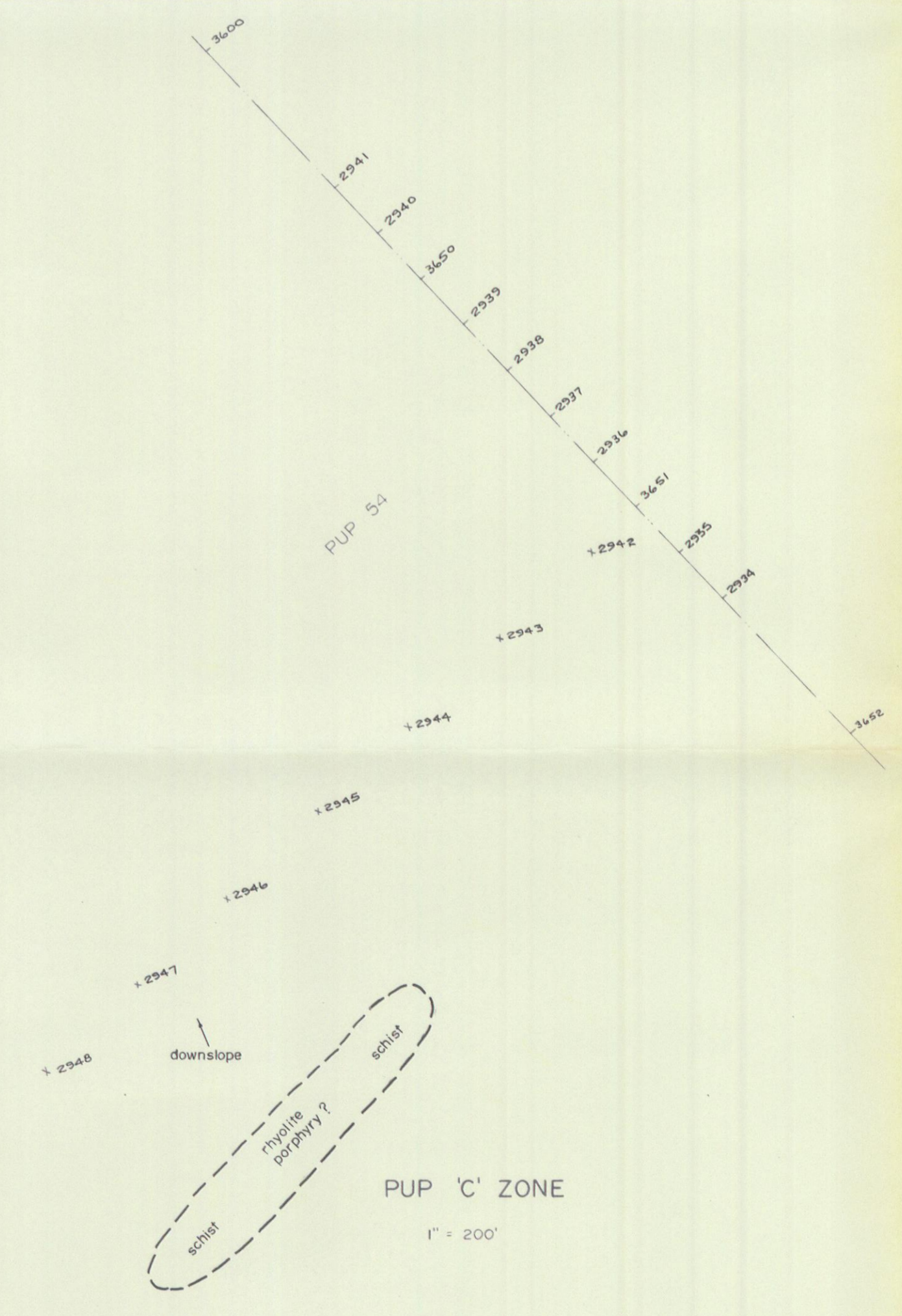
NTS SHEET 115-0-15	
SULLIVAN & RODGERS	
DETAIL GEOCHEMISTRY	
DAW 'A', 'B' & 'C' ZONES	
DATE SEPT 13, 1972	SCALE AS SHOWN



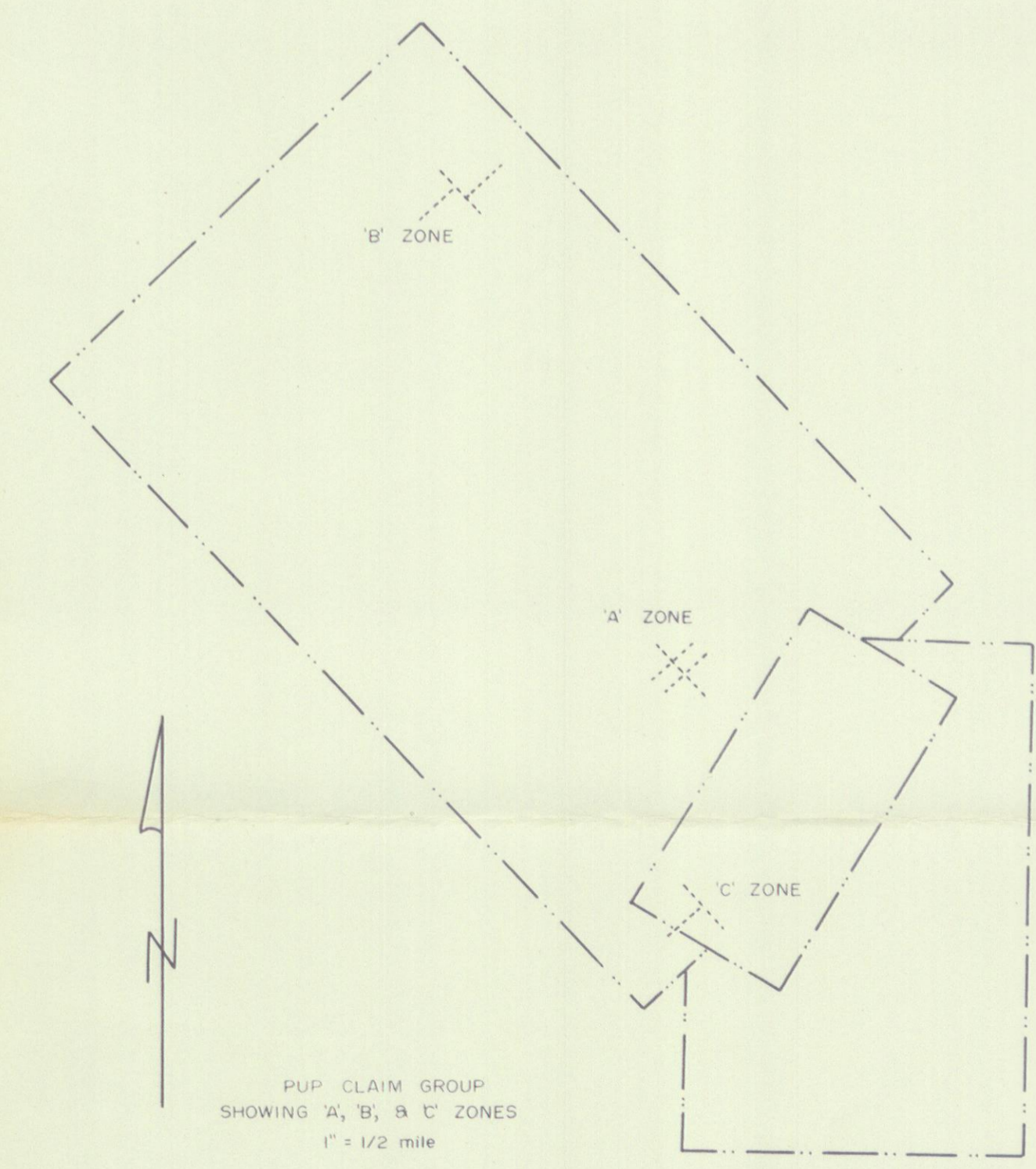
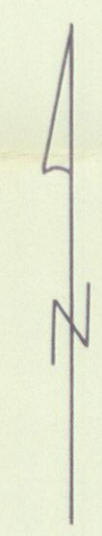
PUP 'A' ZONE
1" = 200'



PUP 'B' ZONE
1" = 200'



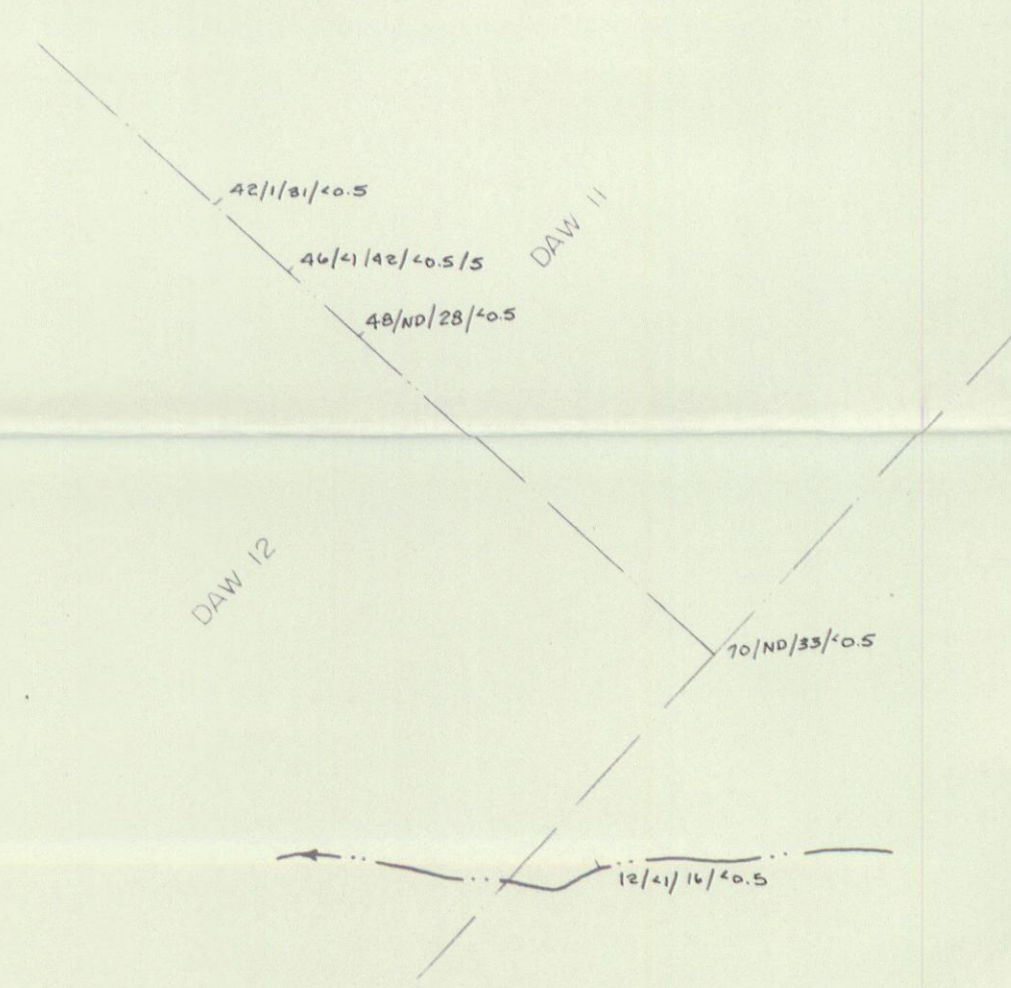
PUP 'C' ZONE
1" = 200'



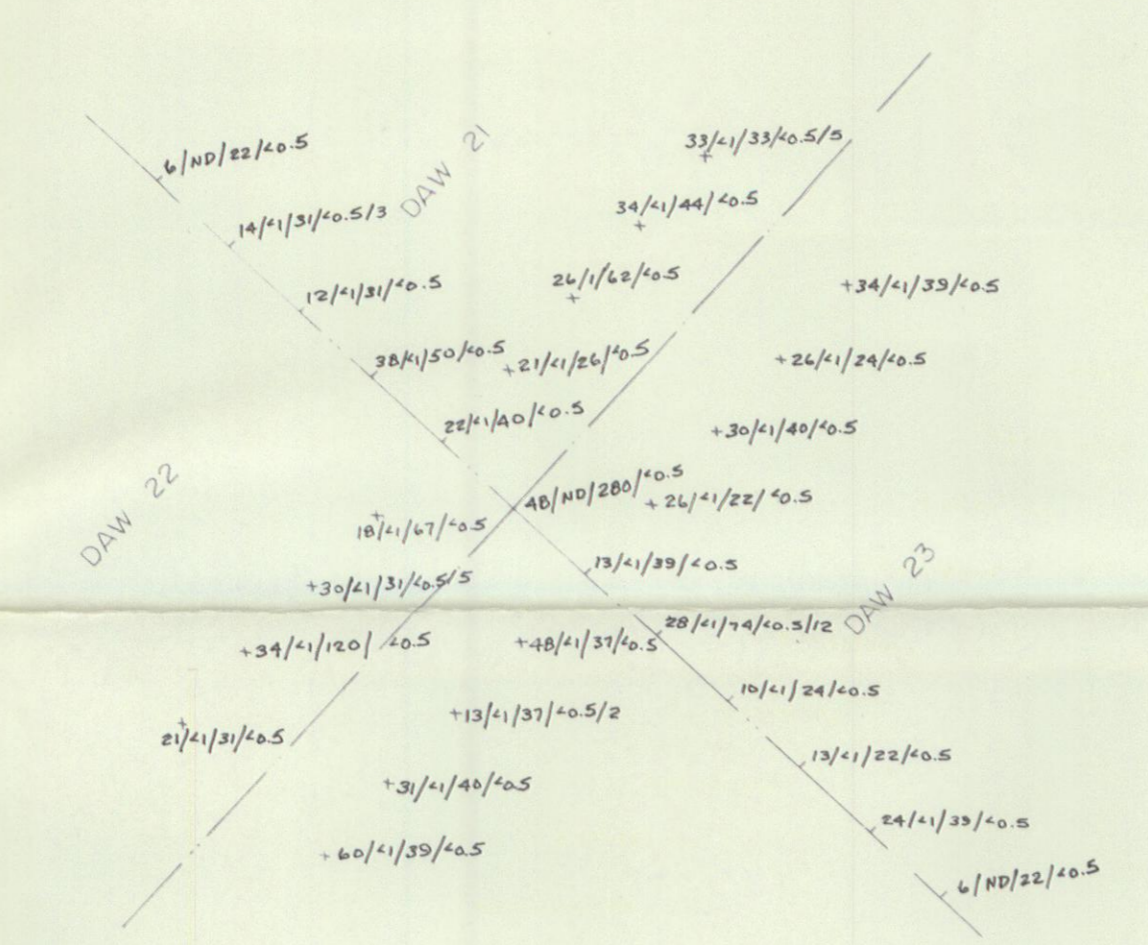
PUP CLAIM GROUP SHOWING 'A', 'B' & 'C' ZONES
1" = 1/2 mile

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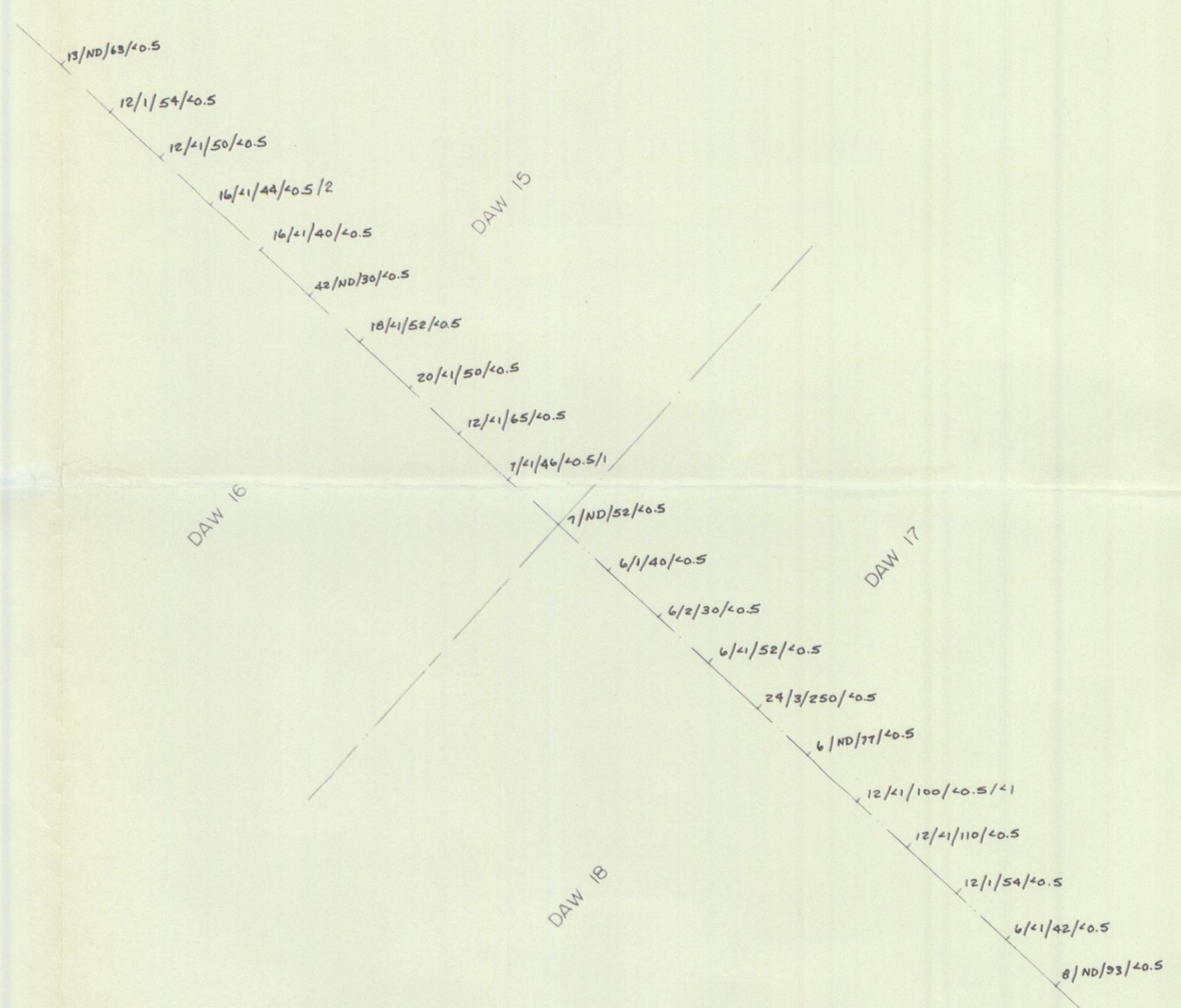
NTS SHEET 115-0-14	
SULLIVAN & RODGERS	
DETAIL GEOCHEMISTRY	
PUP 'A', 'B' & 'C' ZONES	
SAMPLE NUMBERS	
DATE SEPT 13, 1972	SCALE AS SHOWN



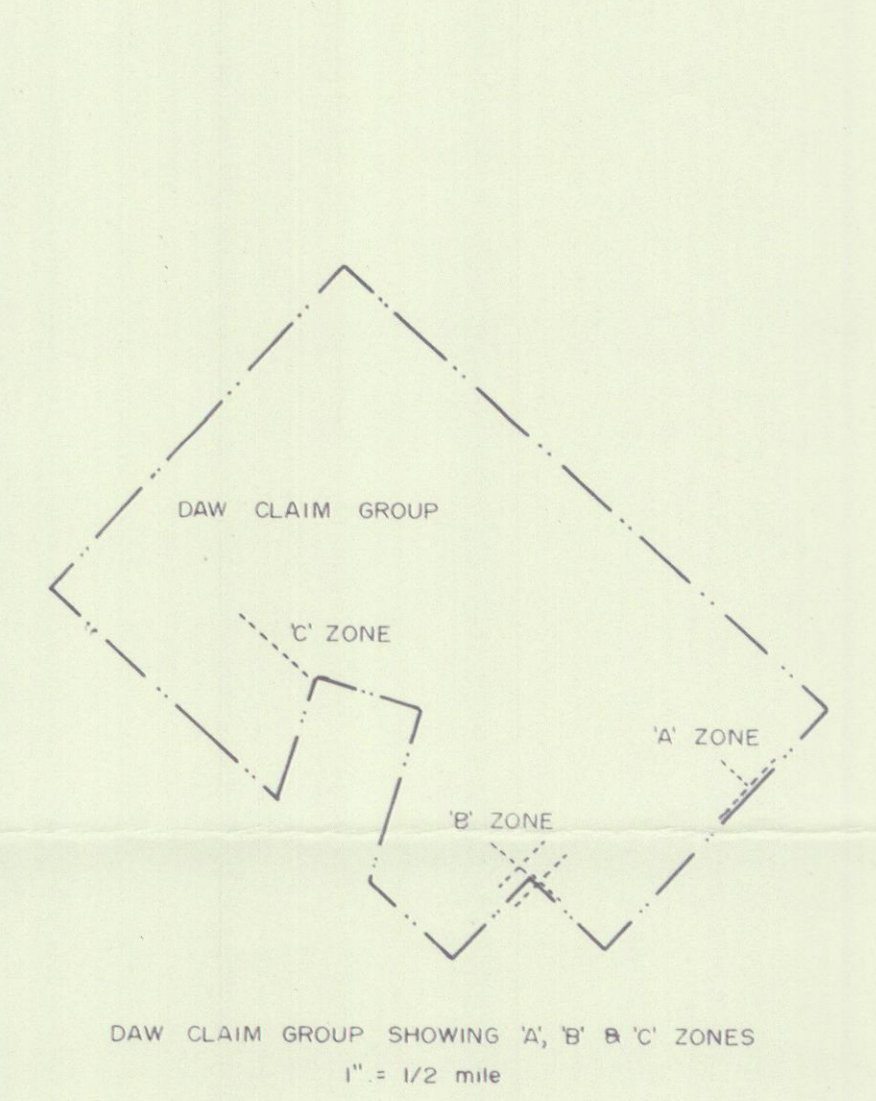
DAW 'A' ZONE
1" = 200'



DAW 'B' ZONE
1" = 200'

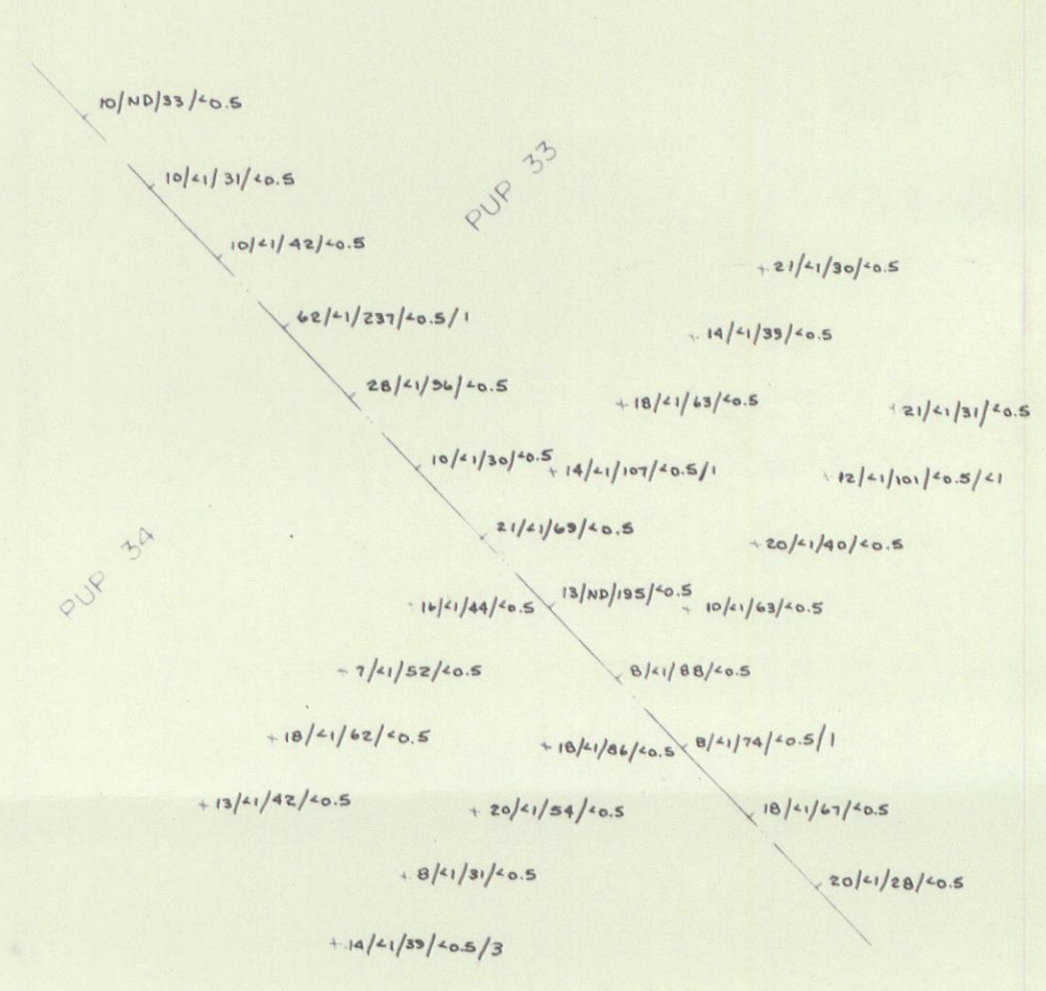


DAW 'C' ZONE
1" = 200'

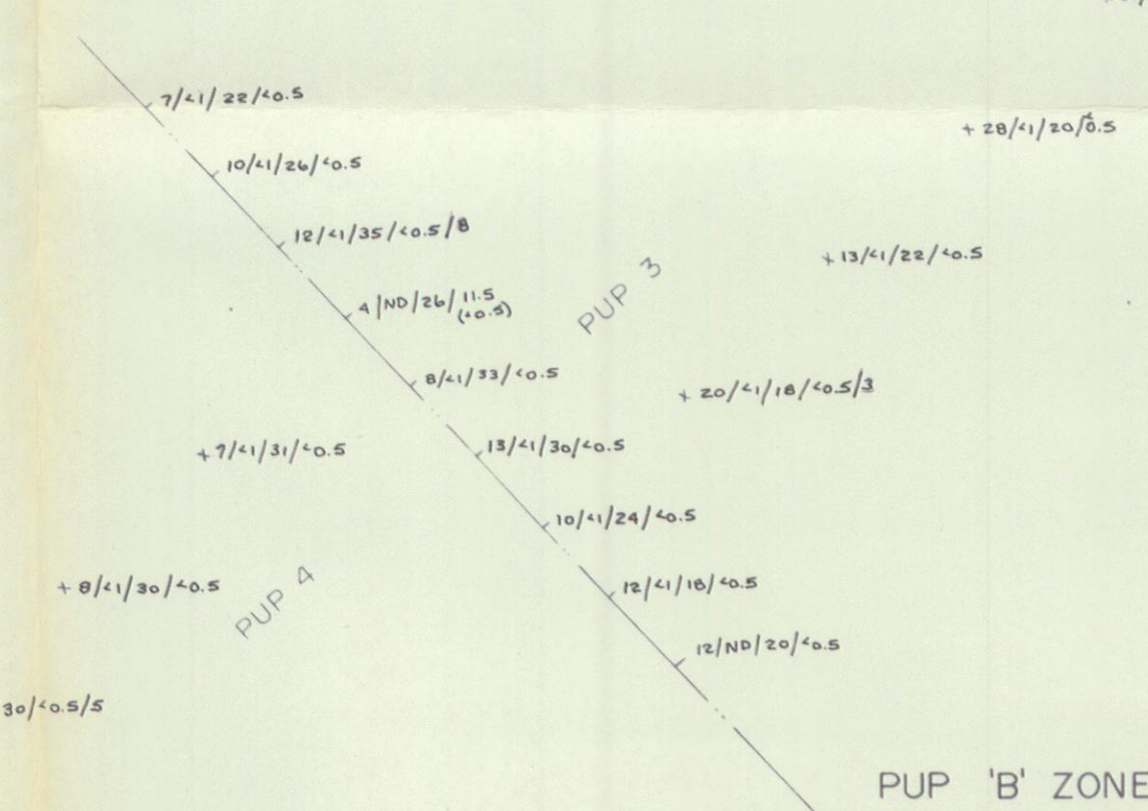


DAW CLAIM GROUP SHOWING 'A', 'B', 'C' ZONES
1" = 1/2 mile

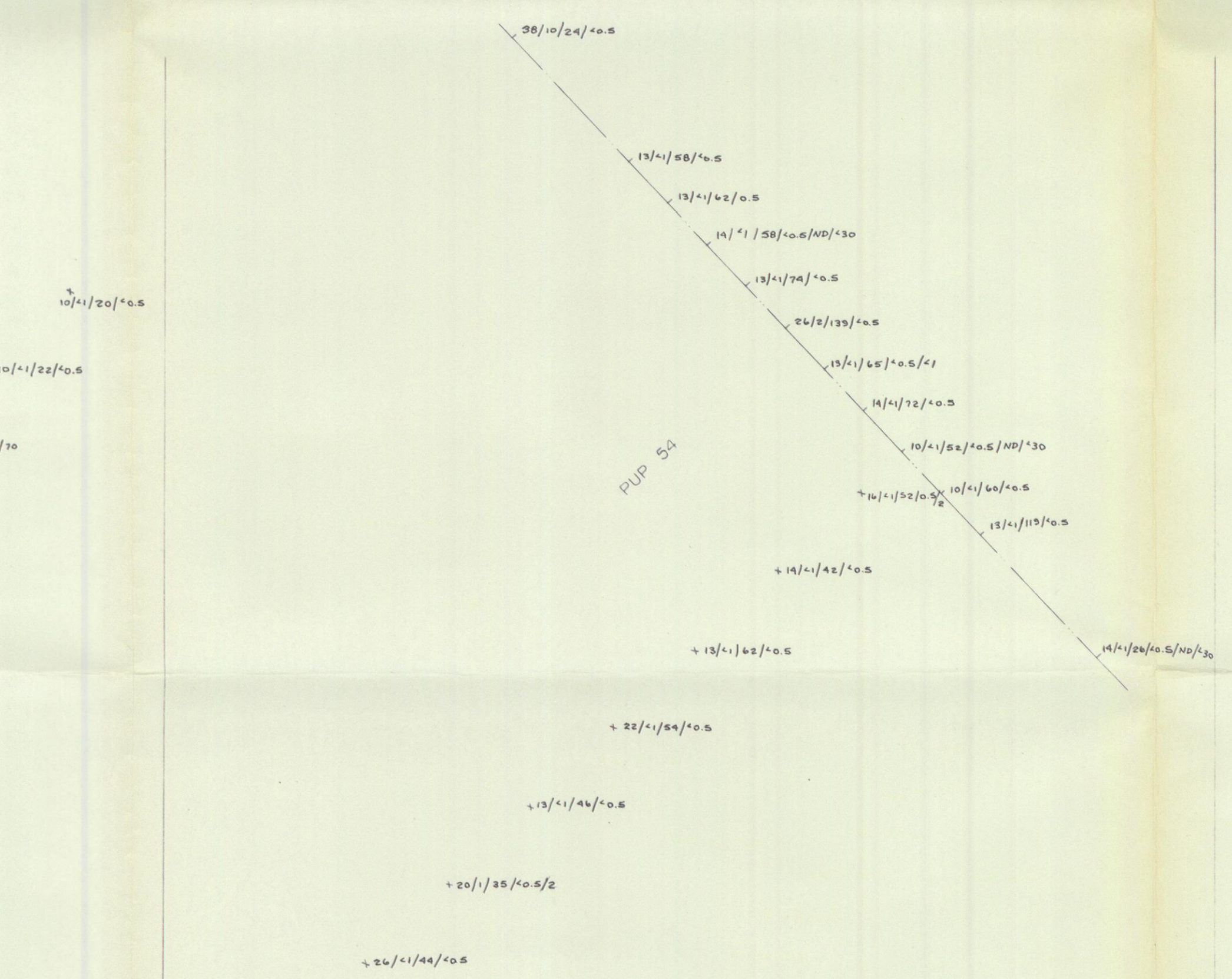
NTS SHEET 115-0-15	
SULLIVAN & RODGERS	
DETAIL GEOCHEMISTRY	
DAW 'A', 'B' & 'C' ZONES	
Cu/Mo/Pb/Ag/As PPM	
DATE SEPT 13, 1972	SCALE AS SHOWN



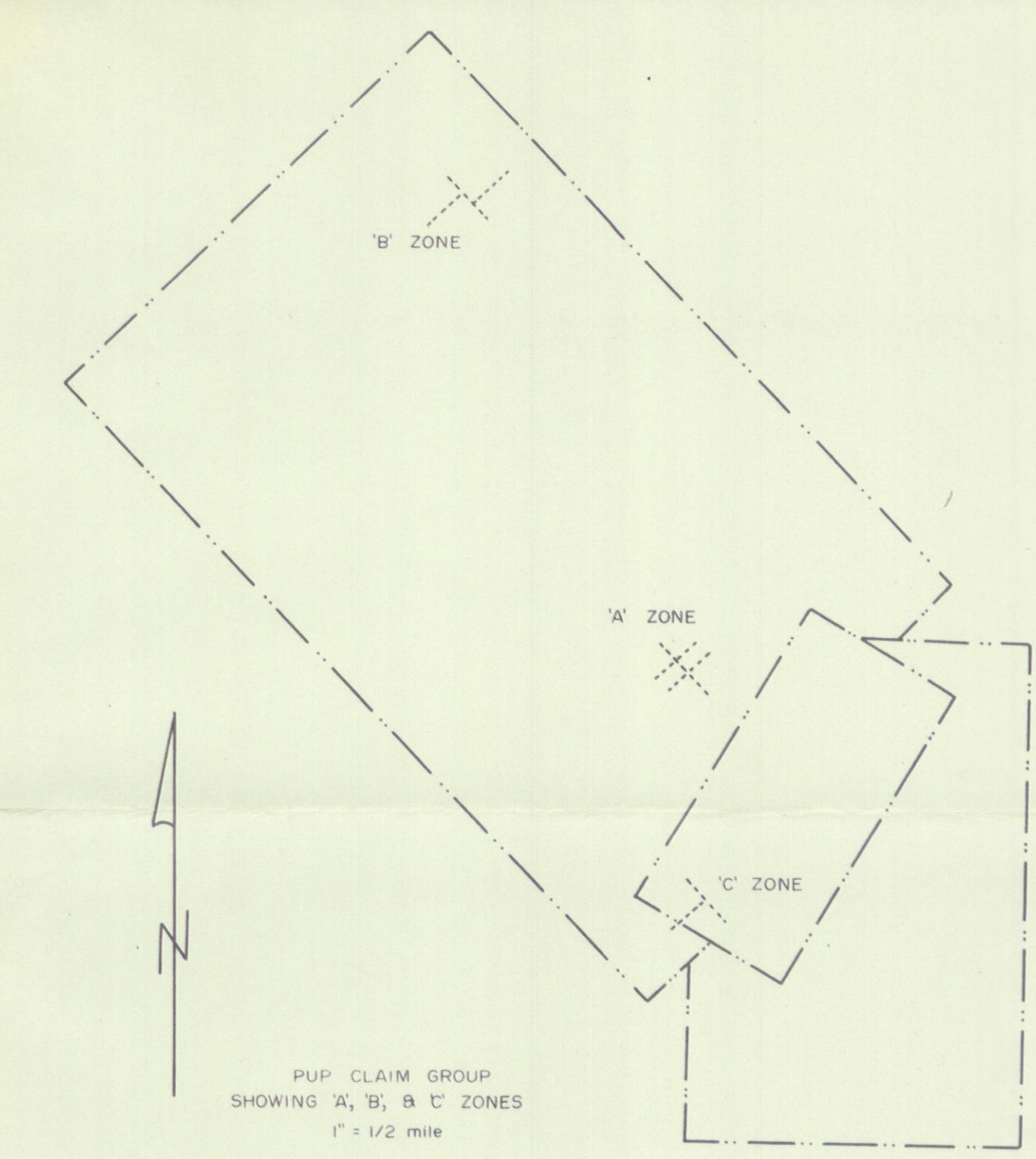
PUP 'A' ZONE
1" = 200'



PUP 'B' ZONE
1" = 200'



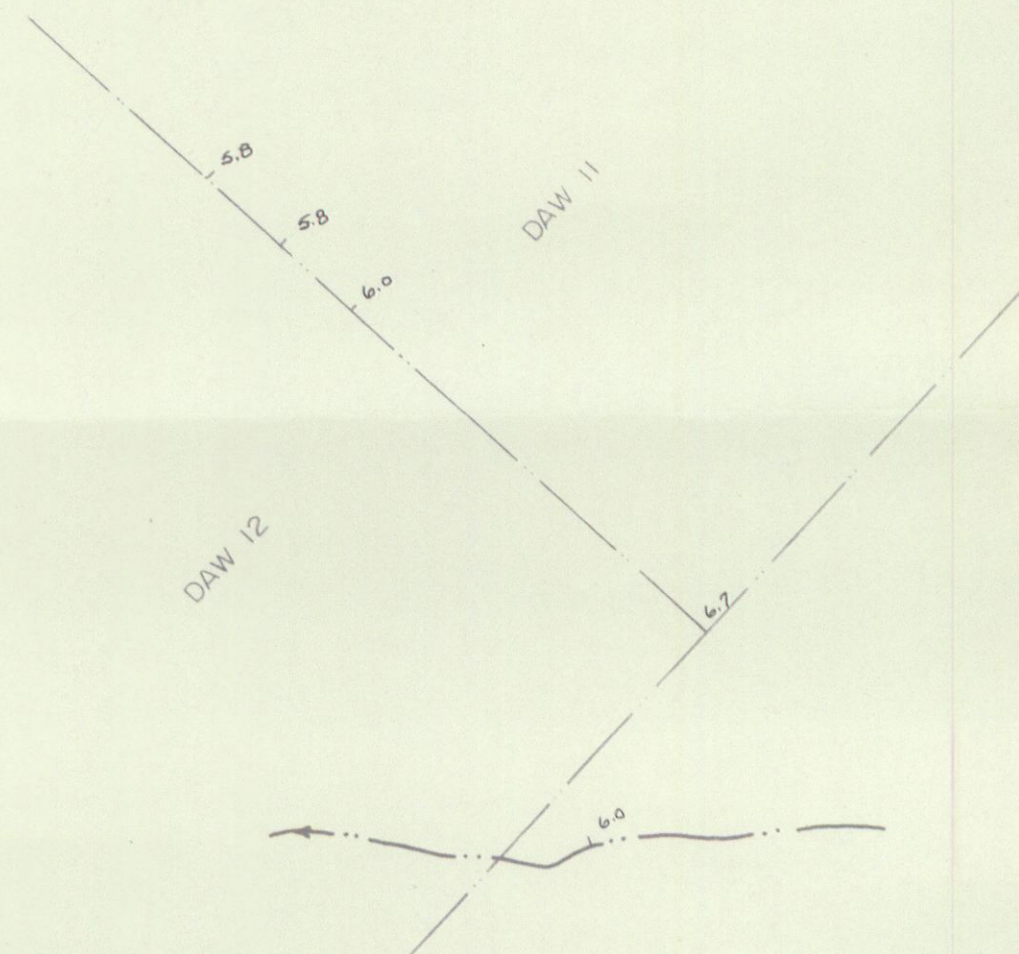
PUP 'C' ZONE
1" = 200'



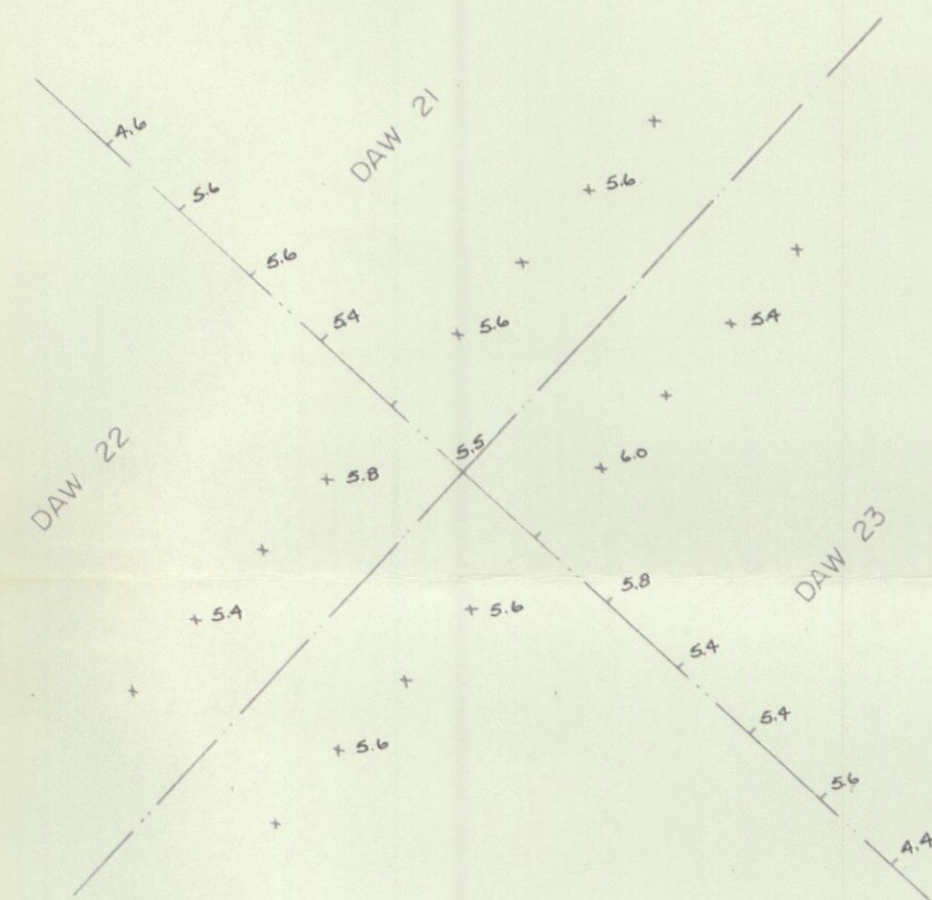
PUP CLAIM GROUP SHOWING 'A', 'B', 'C' ZONES
1" = 1/2 mile

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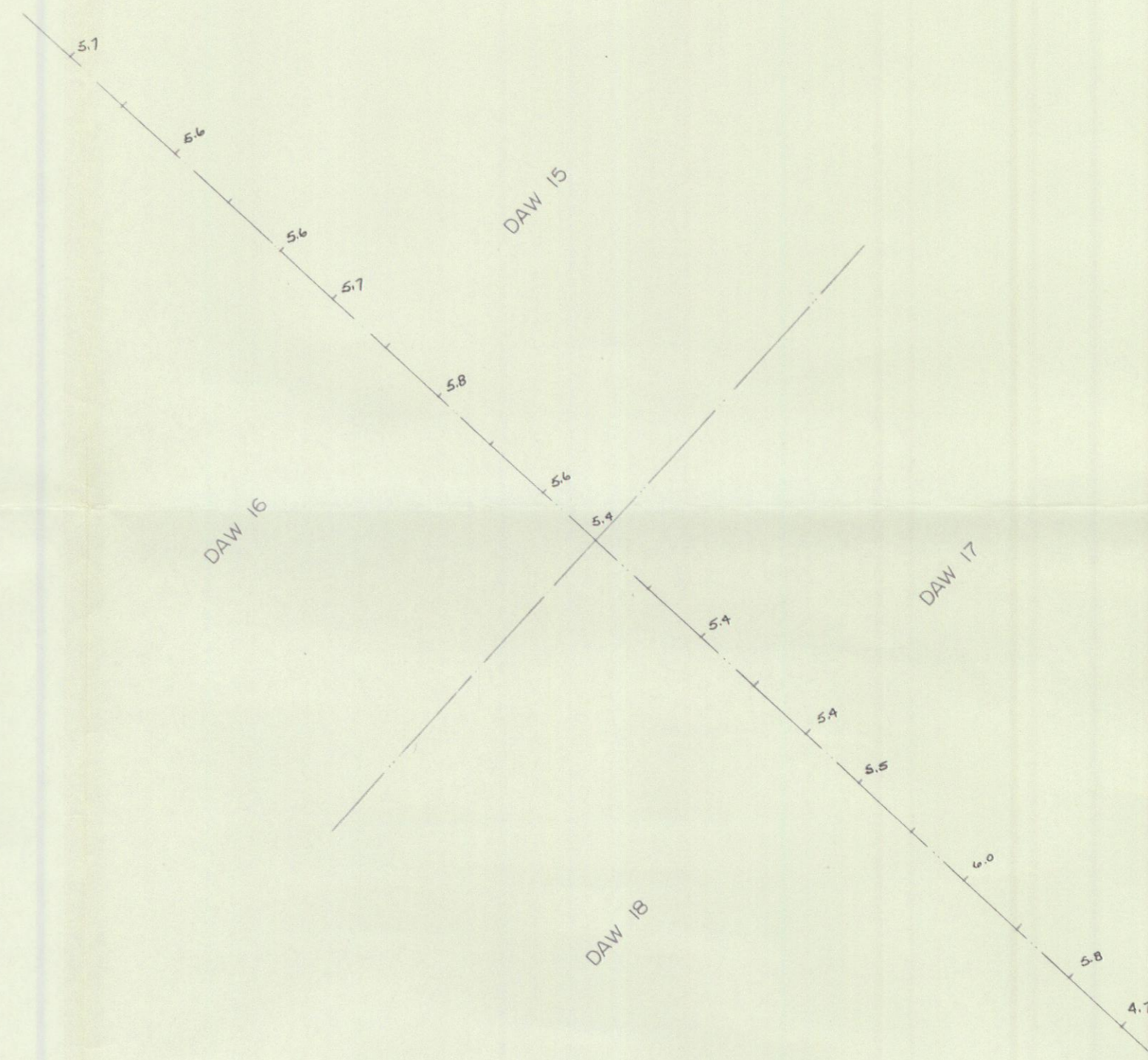
NTS SHEET 115-0-14	
SULLIVAN & RODGERS	
DETAIL GEOCHEMISTRY	
PUP 'A', 'B' & 'C' ZONES	
Cu/Mo/Pb/Ag/As PPM/Au PPB	
DATE SEPT 13, 1972	SCALE AS SHOWN



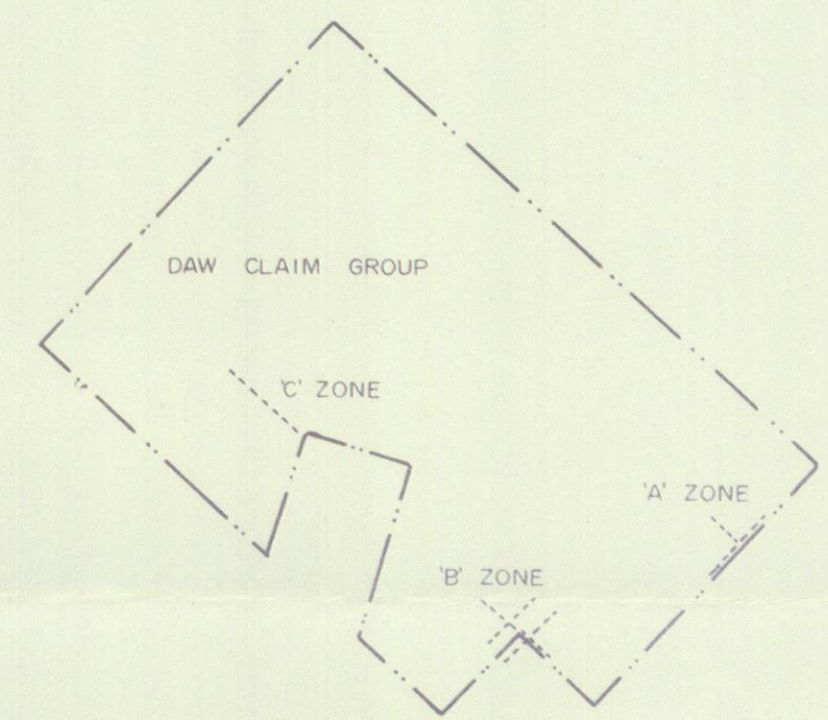
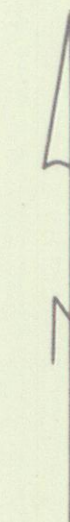
DAW 'A' ZONE
1" = 200'



DAW 'B' ZONE
1" = 200'

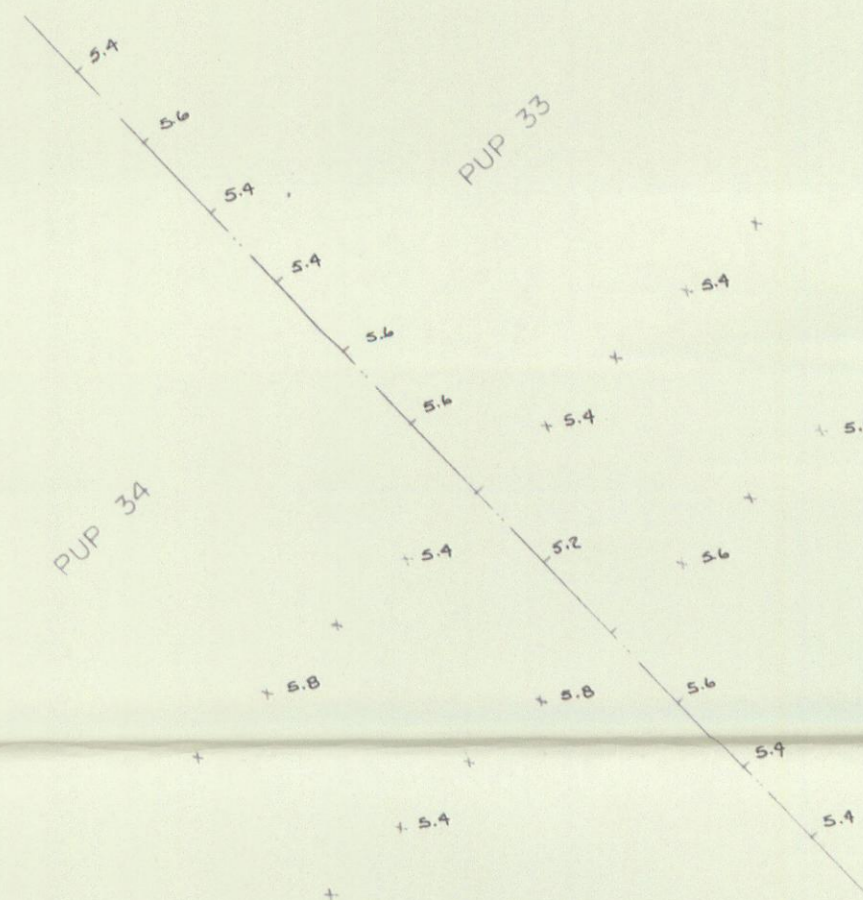


DAW 'C' ZONE
1" = 200'

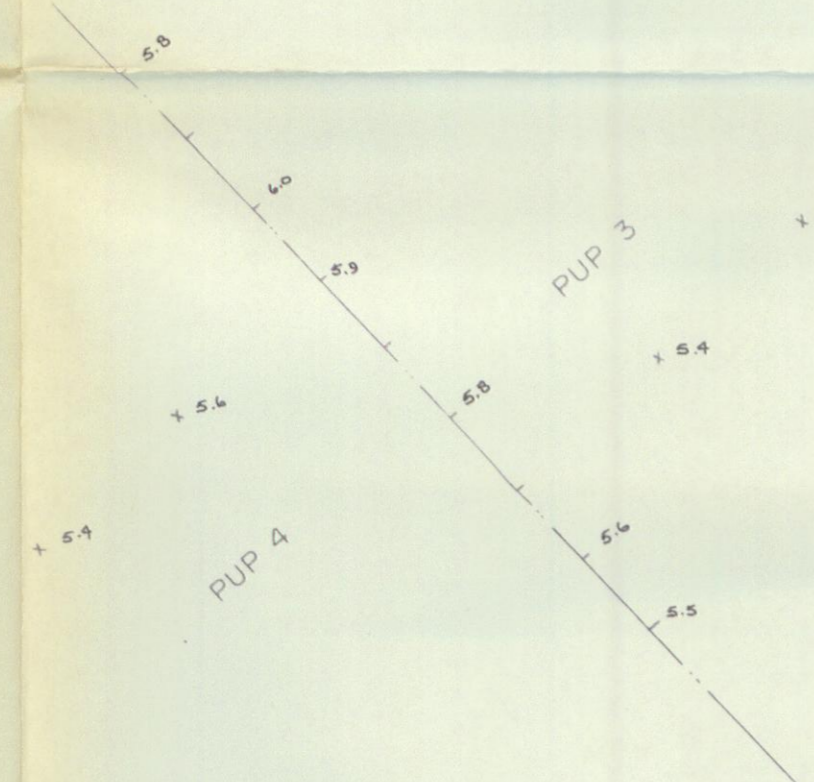


DAW CLAIM GROUP SHOWING 'A', 'B' & 'C' ZONES
1" = 1/2 mile

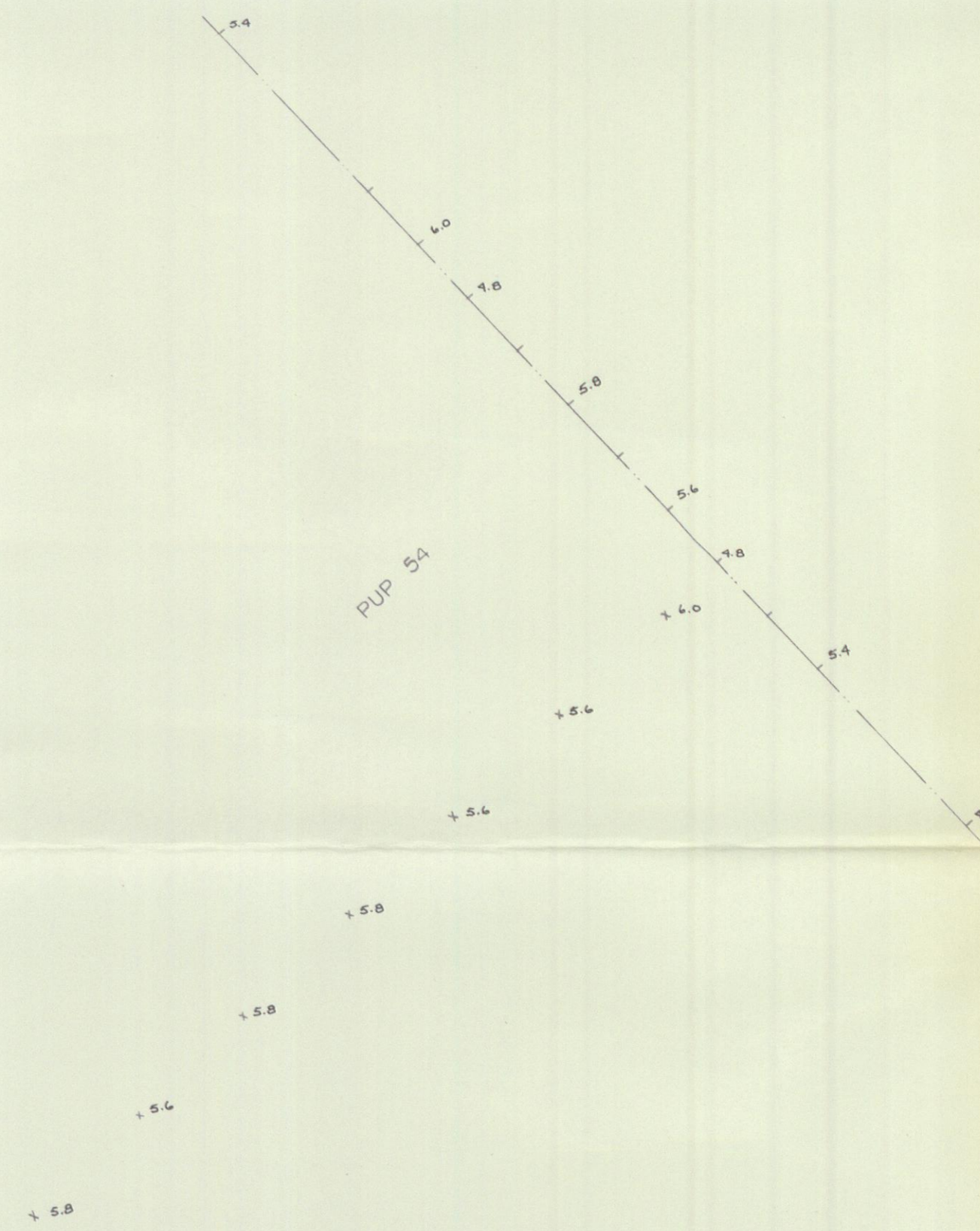
NTS SHEET 115-0-15	
SULLIVAN & RODGERS	
DETAIL GEOCHEMISTRY	
DAW 'A', 'B' & 'C' ZONES	
pH	
DATE: SEPT 13, 1972	SCALE: AS SHOWN



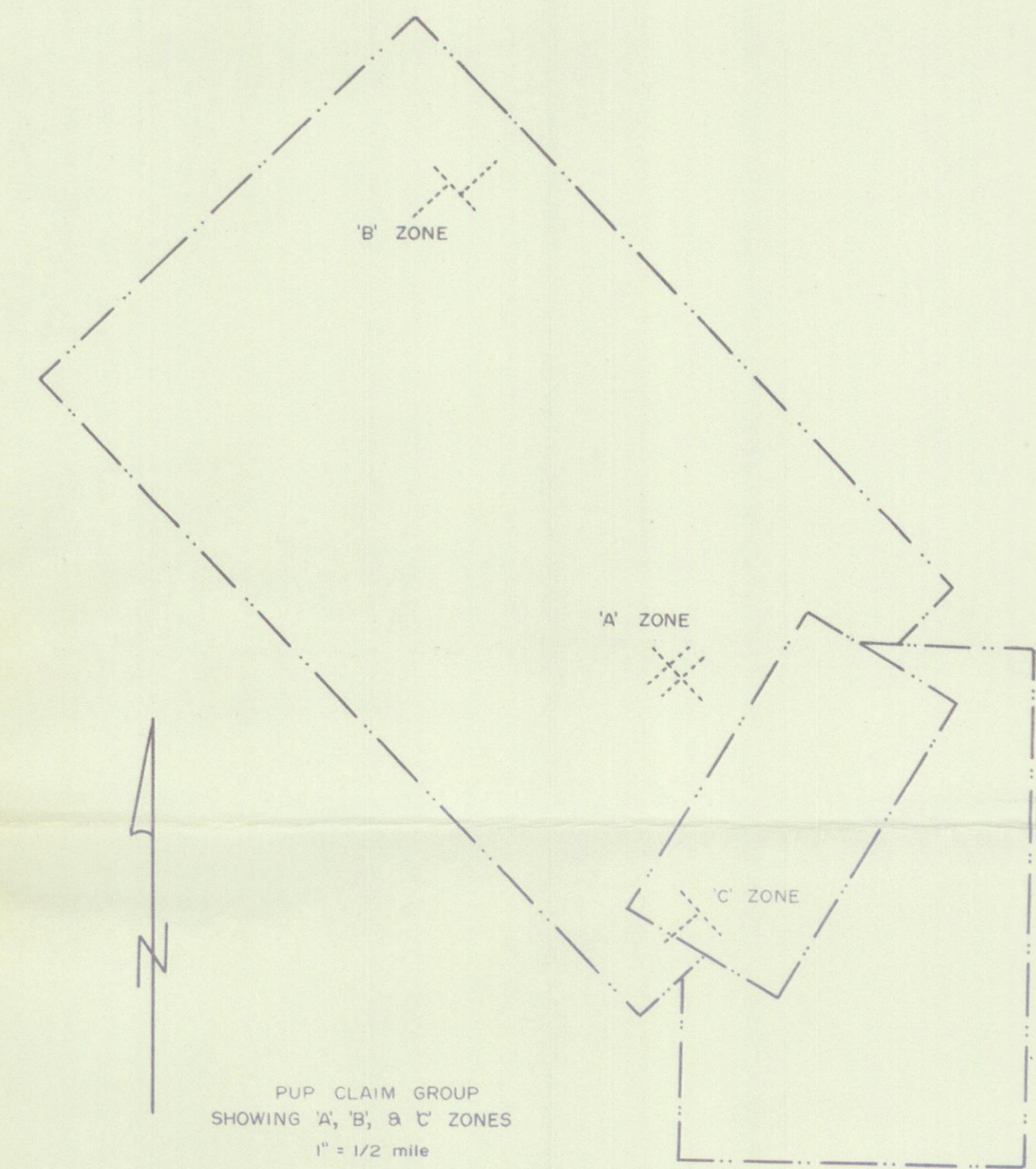
PUP 'A' ZONE
1" = 200'



PUP 'B' ZONE
1" = 200'



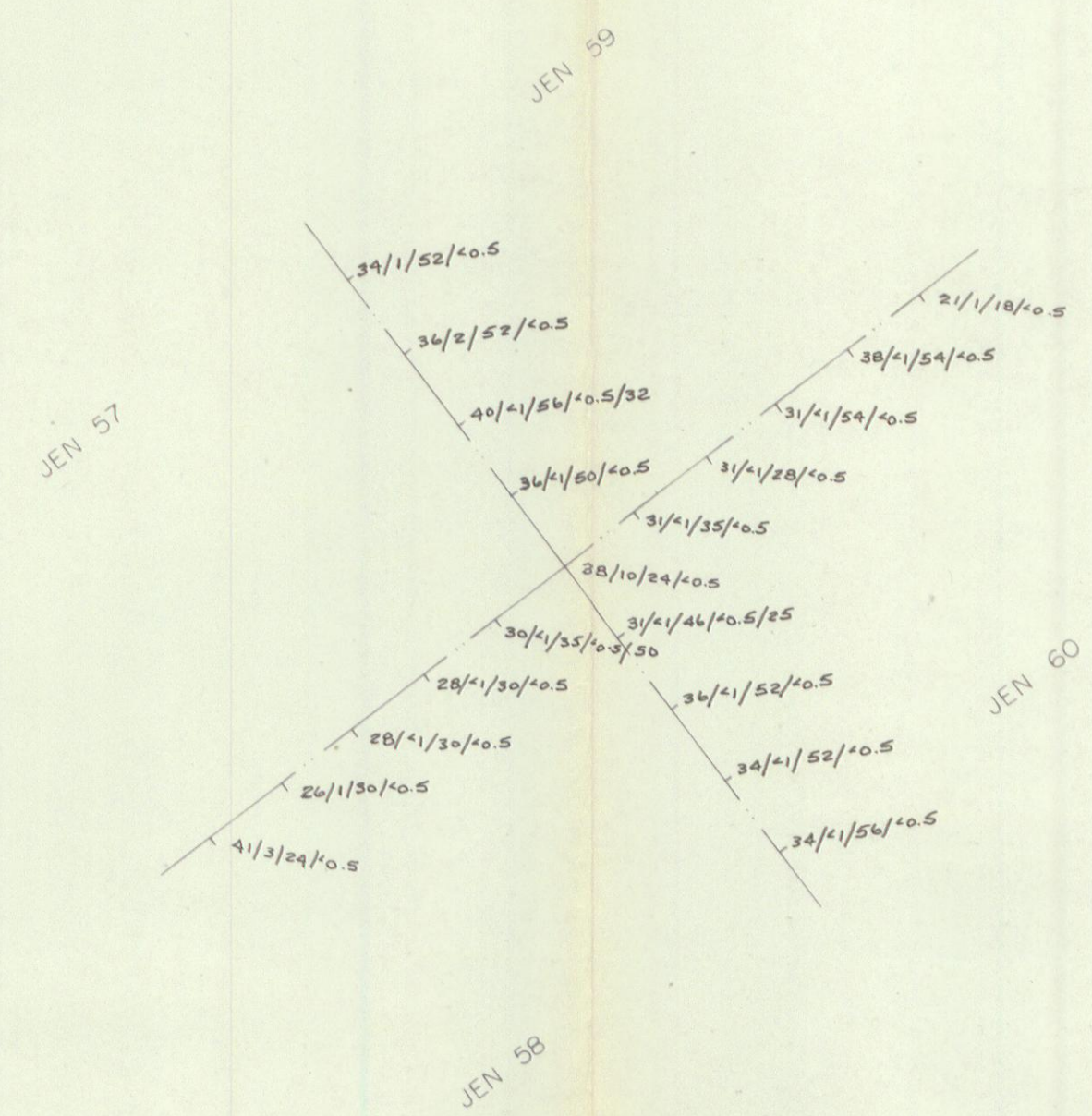
PUP 'C' ZONE
1" = 200'



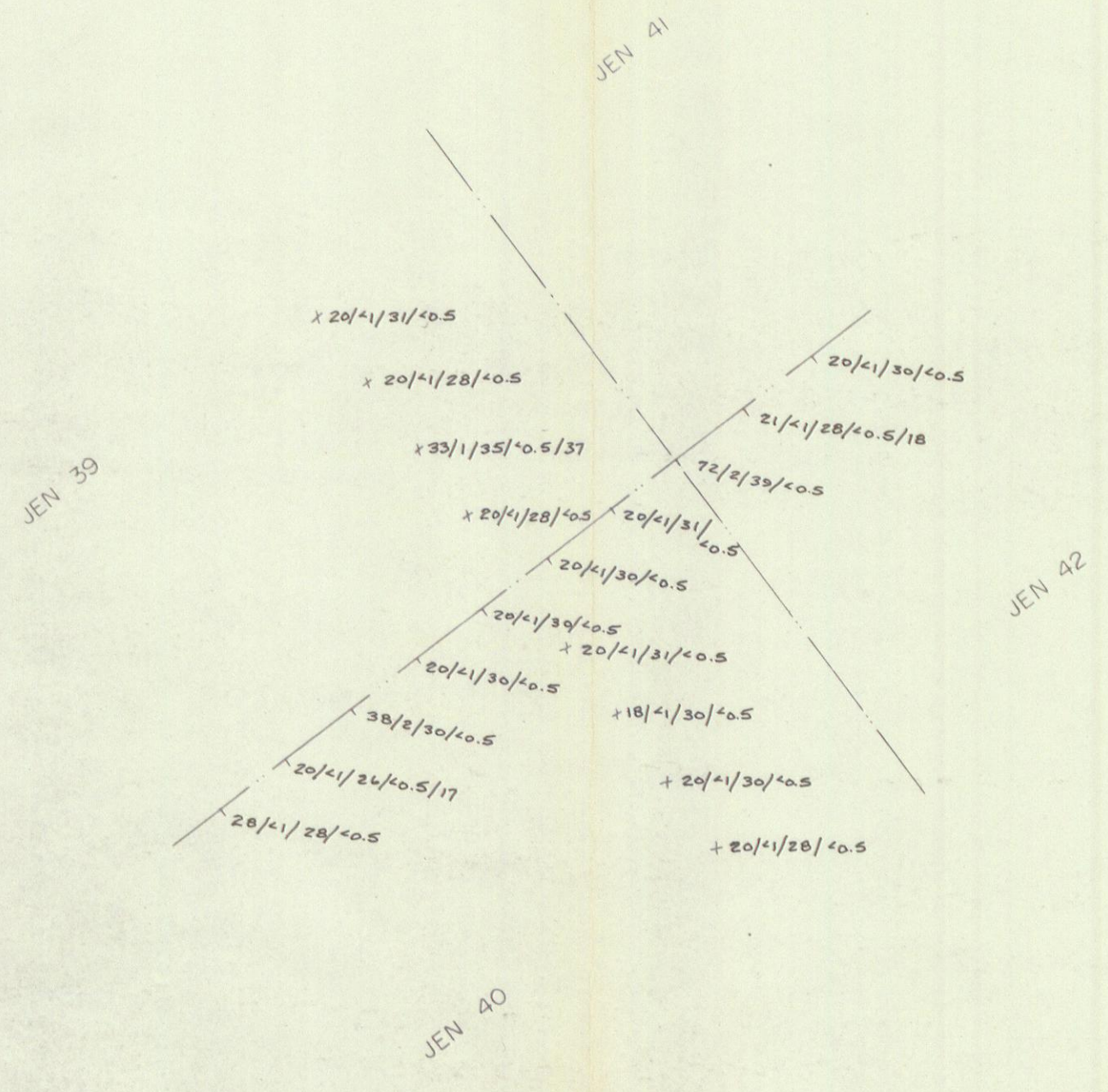
PUP CLAIM GROUP
SHOWING 'A', 'B' & 'C' ZONES
1" = 1/2 mile

NTS SHEET 115-0-14	
SULLIVAN & RODGERS	
DETAIL GEOCHEMISTRY	
PUP 'A', 'B' & 'C' ZONES	
pH	
DATE: SEPT 13, 1972	SCALE: AS SHOWN

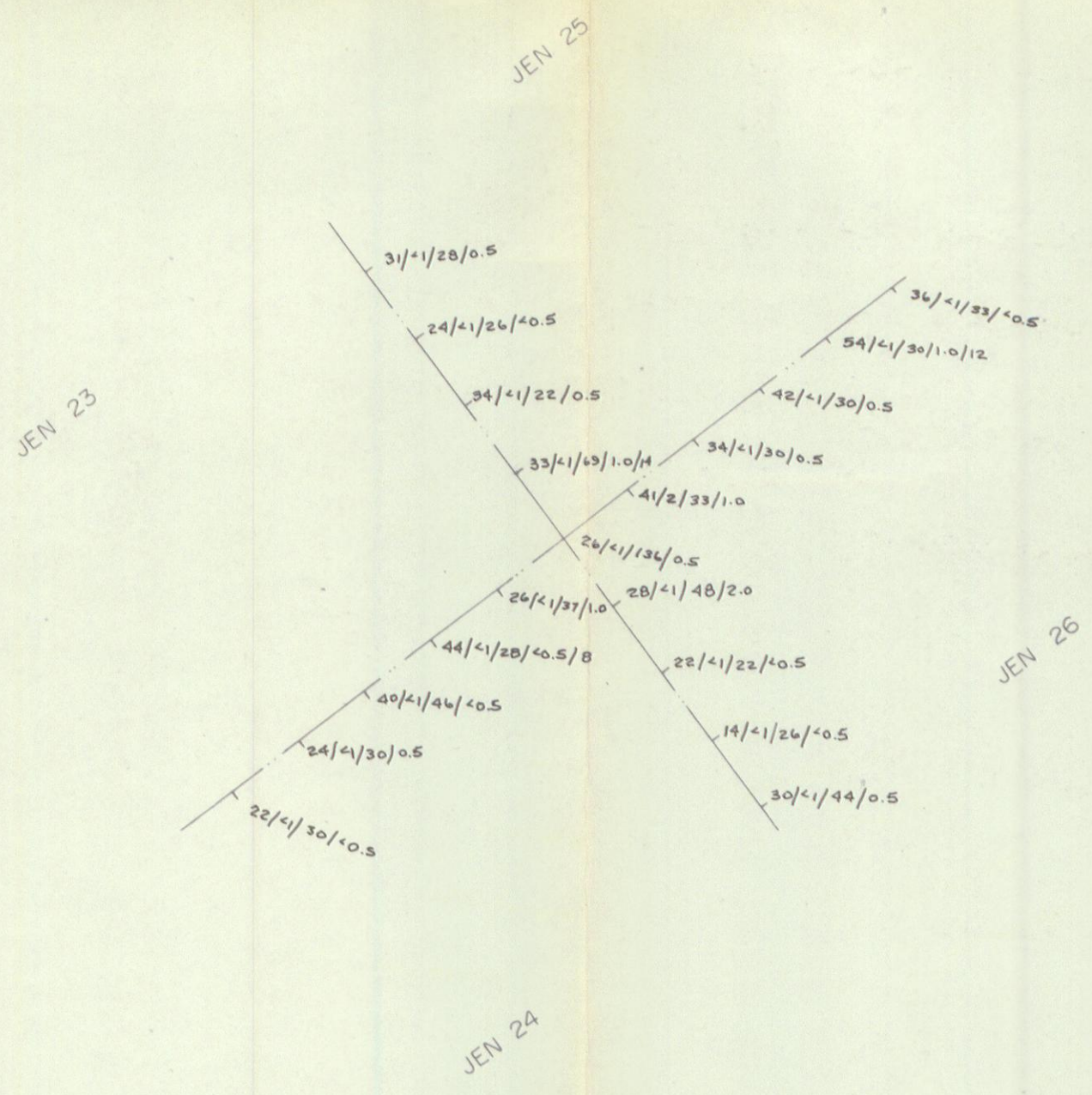
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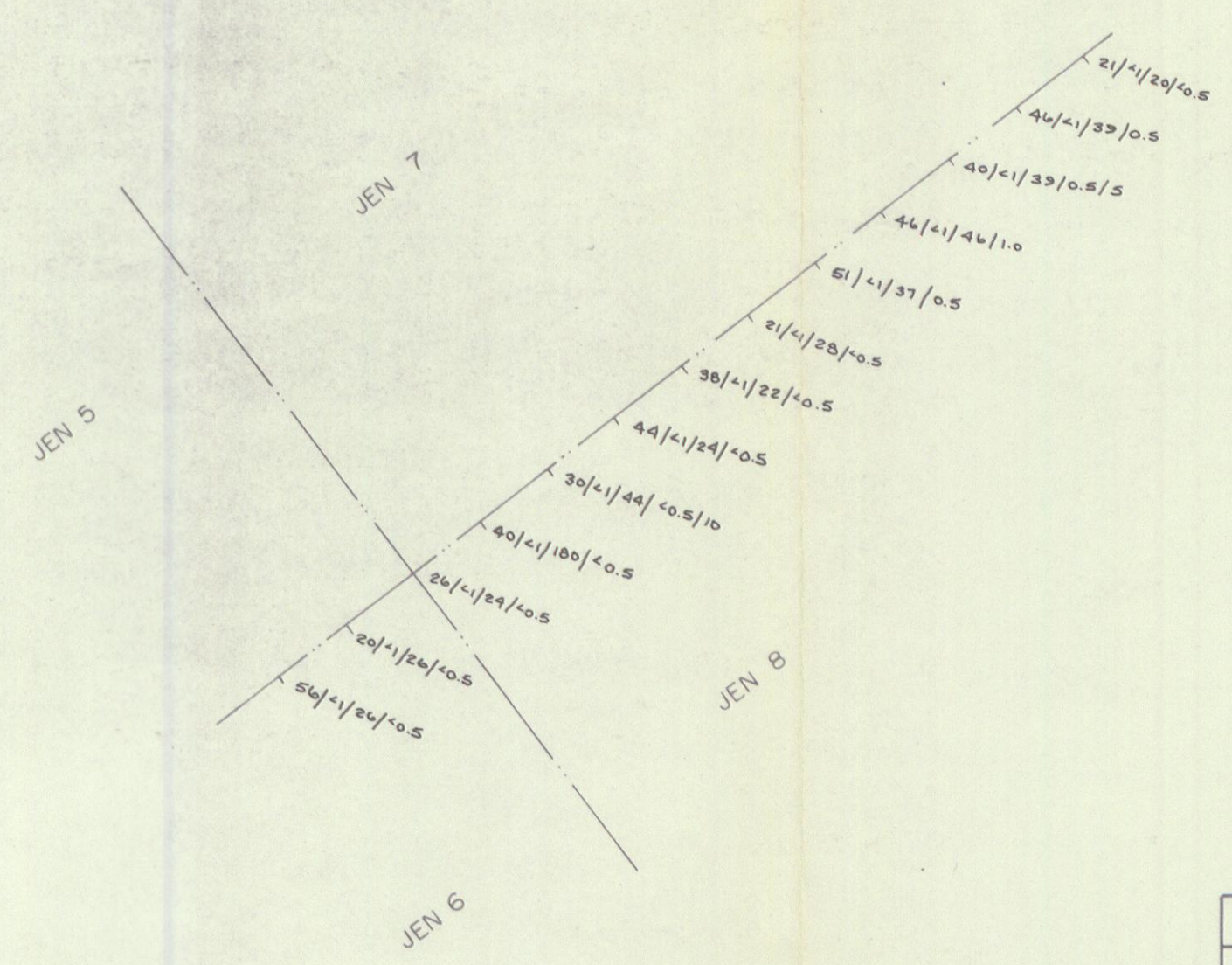
JEN 'A' ZONE



JEN 'B' ZONE



JEN 'C' ZONE

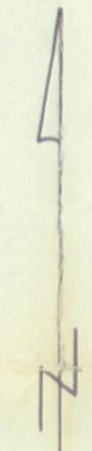
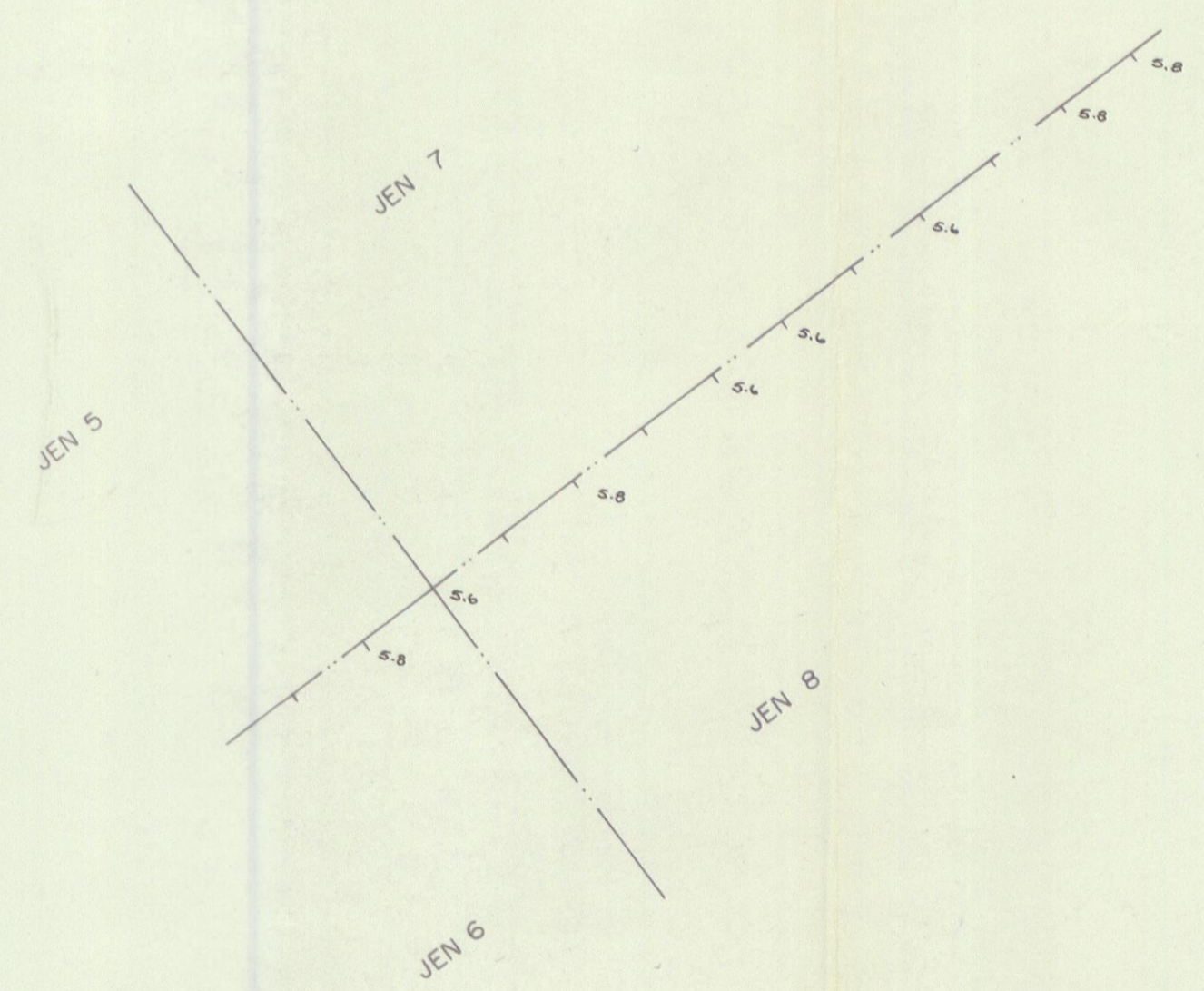
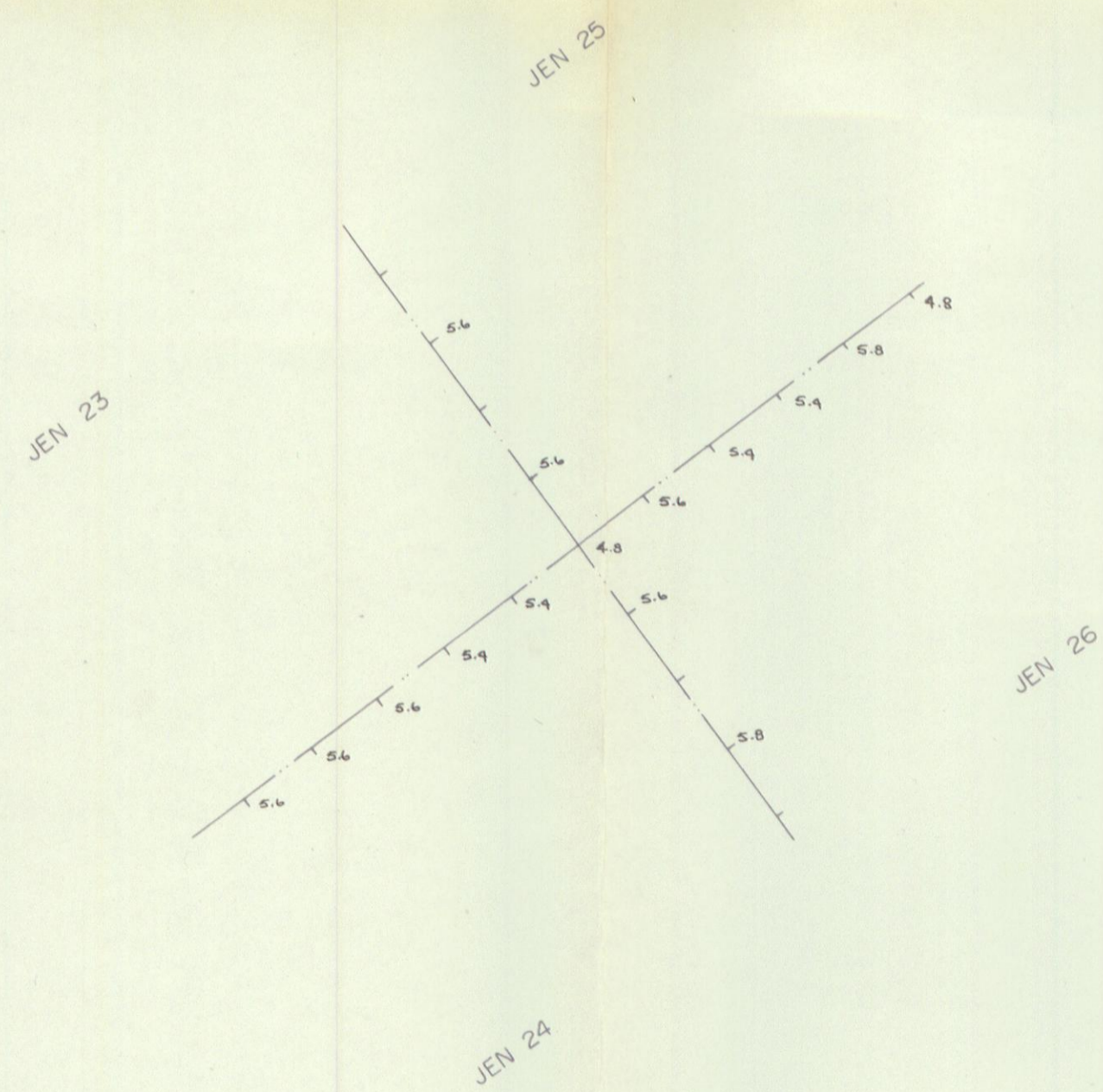
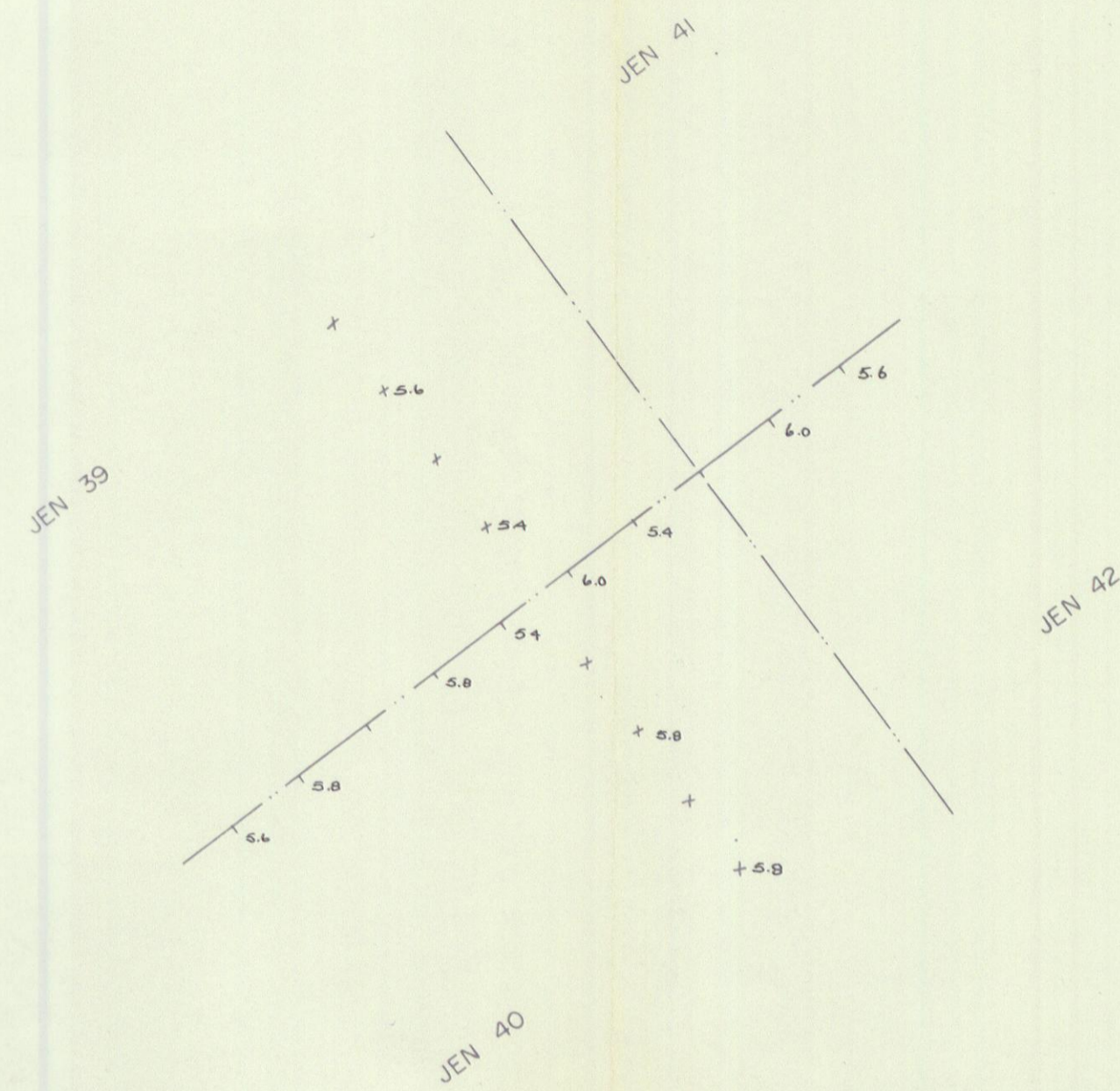
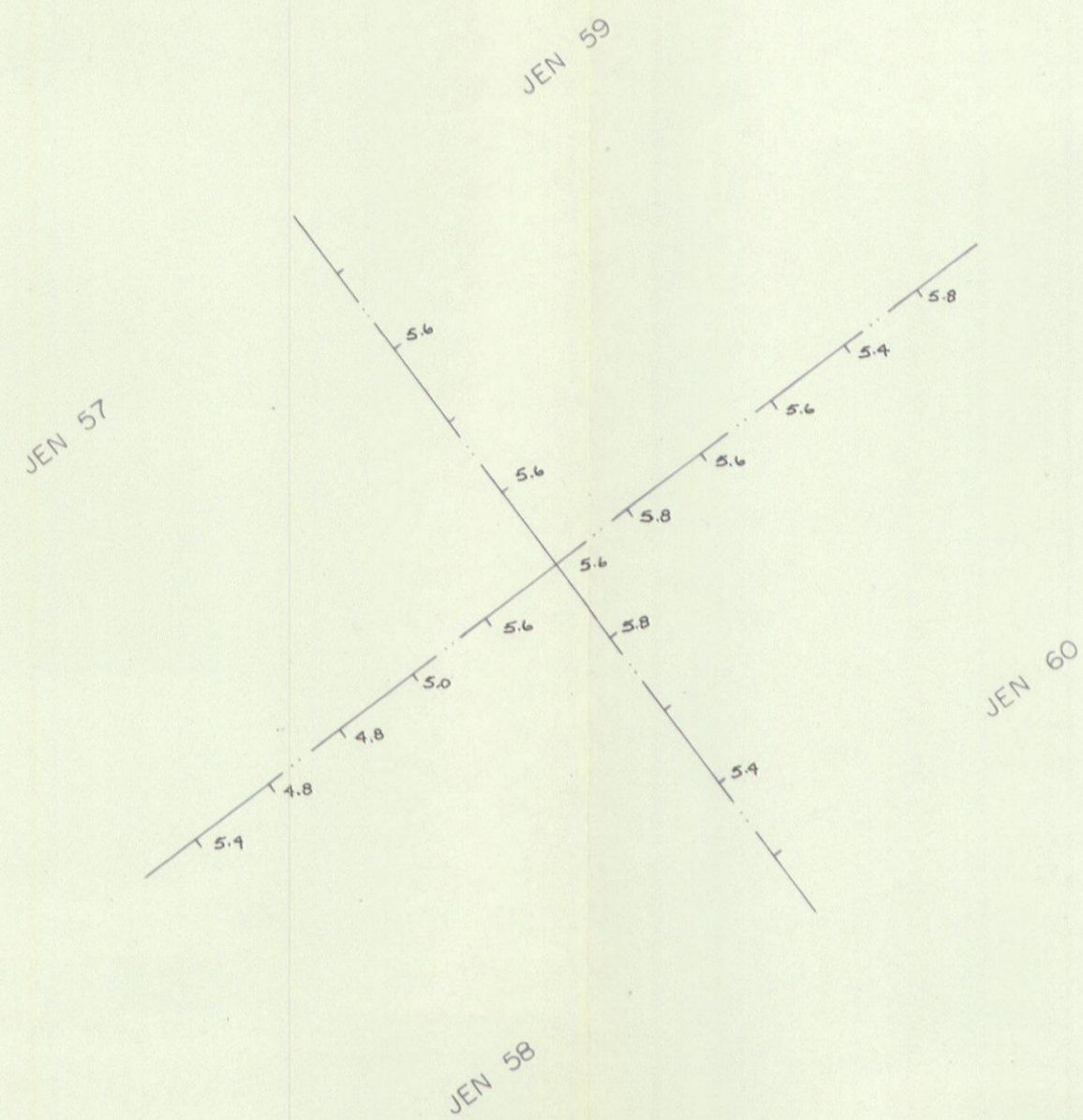


JEN 'D' ZONE



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NTS SHEET 115-0-14	
CONWEST EXPLORATION CO LTD	
DETAIL GEOCHEMISTRY	
JEN 'A', 'B' & 'C' ZONES	
Cu/Mo/Pb/Ag/As PPM.	
DATE: SEPT 13, 1972	SCALE: 1" = 200'



NTS SHEET 115-0-14	
CONWEST EXPLORATION CO. LTD.	
DETAIL GEOCHEMISTRY	
JEN 'A', 'B' & 'C' ZONES	
pH	
DATE: SEPT 13, 1972	SCALE: 1" = 200'

R.G. HILKER LTD.
GEOLOGICAL CONSULTANT
WHITEHORSE, Y.T.