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ALTABRIT CLAIMS

REPORT NO. 1

GEOCHEMISTRY AND GEOLOGY

OMINECA MINING DIVISION

NTS: 94C/5 56°20 125°44

CLAIM NAMES AND RECORD NUMBERS

BRIT 1	3670(5)
BRIT 2	3671(5)
ALTA 1	3672(5)
ALTA 2	3673(5)

AUTHORS: W. FERREIRA AND J. HELSEN

OWNER: MATTAGAMI LAKE EXPLORATION LIMITED

DATE: JANUARY 1982

ABSTRACT

Anomalous values for Cu and Au in soils in the northern Hogem Batholith, south of Abraham Creek, in 1980 led to the staking of four 20-unit claims, the ALTABRIT claims. Work carried out during the 1981 field season consisted mainly of soil and sediment surveys as well as preliminary geology with several rock analyses. The soil survey in particular singled out the ALTA 1 and BRIT 1 claims as the most interesting areas of the whole property. Anomalous values for other than Au and Cu occur throughout the property but these anomalies seem more spotty. Several recommendations are made for further work.

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INTRODUCTION

High gold and copper values were reported in soils in the Abraham Creek area (Helsen, April 1981). Recommendations for further investigations (Helsen, May 1981) led to the work carried out during the 1982 field season. A camp was set up on the property and an extensive soil and sediment survey with some geology was performed by a crew of five people. This crew consisted of:

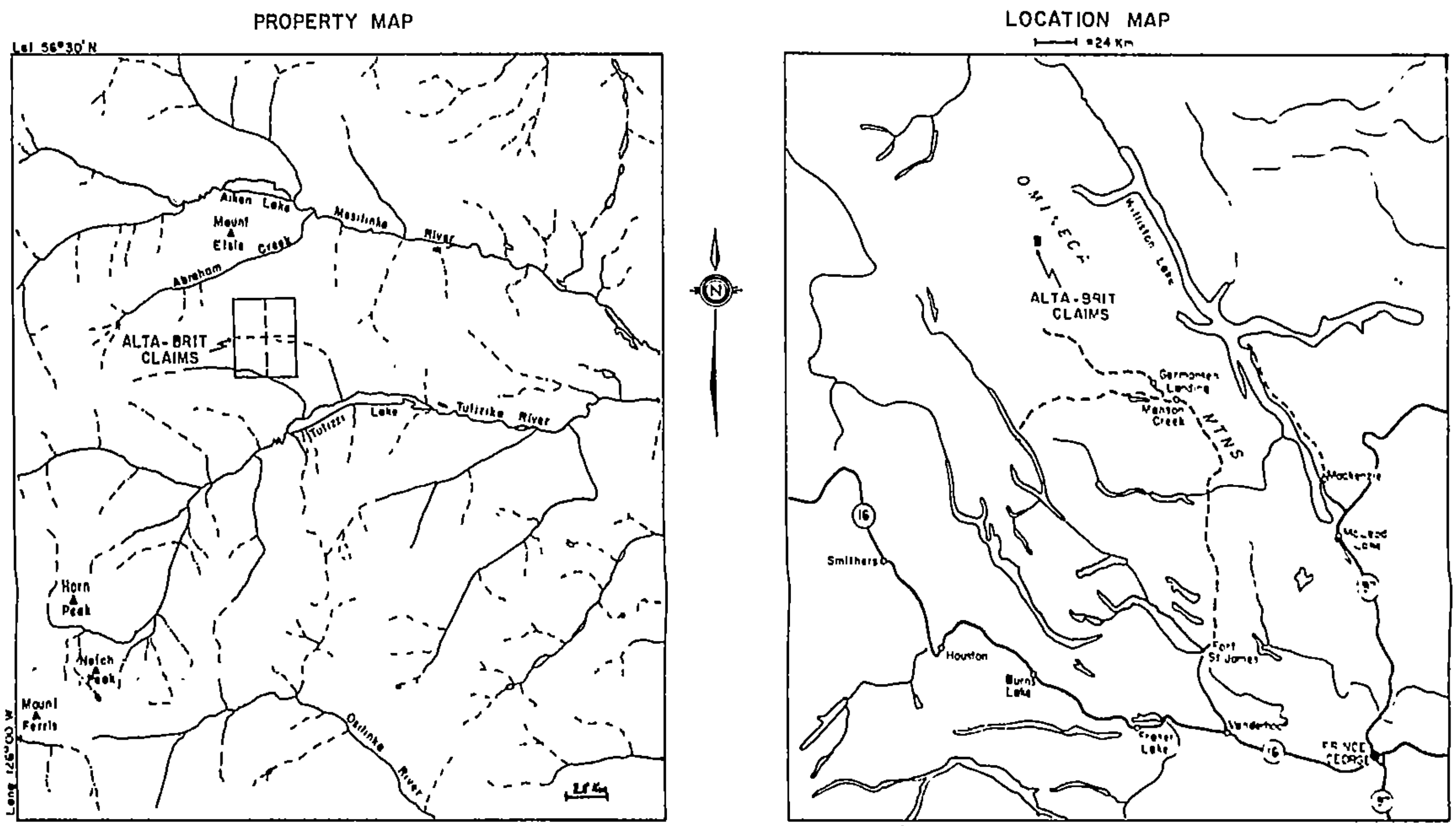
W. Ferreira	Party Chief
T. Donnelly	Senior Assistant
J. Thorpe	Junior Assistant
J. Bell	Junior Assistant
J. Kirk	Junior Assistant

LOCATION AND ACCESS

The ALTABRIT claims are located about 210km northwest of Mackenzie and about 5km south of Aiken Lake, which is accessible via the Manson Creek settlement road. The Tutizzi Lake fishing lodge owns a Beaver float plane and is about 2km southeast of the claims. Figure 1 gives the location of the property.

The claims are situated on rolling grass hills and are accessible only by helicopter. When available a Hiller 12E helicopter from Buffalo Airways Ltd. was used on a contract basis. On one occasion a Bell 206 helicopter from Northern Mountain Helicopters Inc. was used for a partial camp move to the property. A 3-ton truck was rented for the duration of the survey in order to haul food and AV gas supplies from Mackenzie whereafter if was slung by Hiller 12E from the road.

Figure 1 . Location and Property Map for the Altabrit Claims.



PROPERTY DEFINITION

A total of 4 claims of 20 units each had been staked and grouped into the ALTABRIT group. Table 1 and Figure 1 present a breakdown of the claims.

TABLE ONE: ALTABRIT GROUP MINERAL CLAIMS

Claim Name	Record No.	Units	Co-ordinates (L.C.P.)	Recording Date
BRIT 1	3670	20	56°22'N/125°44'W	May 4, 1981
BRIT 2	3671	20	56°22'N/125°44'W	May 4, 1981
ALTA 1	3672	20	56°22'N/125°44'W	May 4, 1981
ALTA 2	3673	20	56°22'N/125°44'W	May 4, 1981

The ALTABRIT group claims are owned and operated by Mattagami Lake Exploration Limited.

WORK DONE

A total of 45 mandays were spent on the property. These include days spent on camp moves to and from the property as well as mandays lost to bad weather. A detailed statement of costs is given in Appendix 1.

Work done consisted of some geology, geochemical sampling and prospecting. Each of these will be discussed separately.

GEOLOGY

The property lies entirely within the northern Hogem Batholith. The major rock units on the property consist of readily distinguishable pyroxenite and plagioclase-hornblende porphyritic monzonite to diorite. A subsidiary intrusive(?) unit of basalt also occurs. Field descriptions and five petrographic descriptions of the rock units are given in Appendix 2. These units form a series of interlayered sills ranging from about 2m to 100m wide and striking roughly N-S. Talc is a ubiquitous metasomatic product forming lenses up to several tens of metres long along the margin of pyroxenite sills. Several concordant faults have also been mapped by Tim Donnelly using alteration to infer faulting.

The thin sections reveal that the pyroxenite and porphyritic monzonite-diorite have undergone deuteric alteration. This type of alteration is very common in intrusions. Only sample 3116 of the porphyritic monzonite-diorite has undergone extensive alteration which is probably hydrothermal.

Quartz veins are ubiquitous throughout the property and range in attitude from flat lying discordant to concordant pod like veins. The discordant varieties range from a few cm to about 50cm wide and appear to continue throughout the property. These veins are relatively barren. The concordant variety has only been observed at one location and containd Cu, Pb, Ag and Au mineralization. This showing is listed as number 53 in the B.C. Government files (Min -File).

A geological map is presented in Figure 2. Due to time constraints and simultaneous geochemical sampling, contacts were not walked out. Where mappable contacts were encountered they were simply marked on the map and sketched in, based on the cliffs.

1:50,000 NTS maps do not exist for this region. For mapping and geochemical surveying purposes enlargements of 1" to ¼ mile B.C. Airphotos BC 7341#178 and BC7342#114 were used, and base maps were drafted from the same enlargements. The approximate scale is estimated at about 1:4,000.

Armstrong and Roots (1953) mapped this area at a scale of 1" = 4 miles, Garnett (1978) mapped a large portion of the batholith well to the south of the property and Woodsworth (1976) mapped a large portion of the batholith immediately west of the property.

Woodsworth (1976) subdivided the northern Hogem Batholith into four plutons. The eastern limit of this map area is about 4km west of the ALTABRIT property. This area adjacent to the property consists of:

Middle Cretaceous:	leuco granodiorites
Lower Jurassic Mesilinka pluton:	biotite quartz monzodiorites
Lower Jurassic Thane pluton:	quartz monzodiorite to monzodiorites
Upper Triassic to Lower Jurassic(?):	ultramafic rocks

"Sheeting" of alternating monzodiorite (up to 70m thick) and amphibolite (up to 30m thick) was observed in one area and is analogous to the rock unit relationships on ALTABRIT. Woodsworth suggested that this relationship represents the roof of the pluton in which monzodiorite was forceably injected.

Armstrong and Roots (1953) subdivided the Hogem Batholith into three phases each consisting of many units. They show the property as consisting of two phases which are represented by peridotite and syenodiorite (suite of rocks from syenite to diorite). The syenodiorite forms a sill striking roughly N-S through peridotite. The property is bounded by granodiorite and derived units to the west and Takla Volcanics to the east.

Garnett (1978) divided the southern Hogem Batholith into 3 phases consisting of nine units (Table 2, taken from Garnett, 1978, p.17).

TABLE 2

SOUTHERN HOGEM BATHOLITH: INTRUSIVE ROCK DIVISIONS

INTRUSIVE PHASES	PHASE DIVISIONS	UNIT	ROCK VARIETIES
PHASE III LOWER CRETACEOUS		9	LEUCOCRATIC GRANITE, Alaskite
PHASE II MIDDLE JURASSIC TO LOWER JURASSIC	CHUCHI SYENITE	8	LEUCOCRATIC SYENITE, Quartz Syenite
	DUCKLING CREEK SYENITE COMPLEX	7	LEUCOCRATIC SYENITE
		6	FOLIATED SYENITE
PHASE I LOWER JURASSIC TO UPPER TRIASSIC	HOGEM GRANODIORITE	5	GRANODIORITE; QUARTZ MONZONITE; minor Tonalite, Quartz Diorite, Quartz Monzonite, Granite
	HOGEM BASIC SUITE	4	MONZONITE to Quartz Monzonite
		3	MONZODIORITE to Quartz Monzodiorite
		2	NATION LAKES PLAGIOCLASE PORPHYRY (a) Monzonite (b) Monzodiorite
		1	DIORITE, minor Gabbro, Pyroxenite, Hornblendite

Rock units on the property correspond to Garnett's subdivisions as follows: pyroxenite - phase 1, unit 1; porphyritic monzonite to diorite - phase 1, unit 2 or 3.

GEOCHEMISTRY

Soil Surveys

Some 169 soil samples were collected on or near the ALTABRIT claims group. These soils were forwarded to the Noranda Exploration Company laboratories for geochemical analysis of Cu, Zn, Pb, Ag, Mo and Au. Pulps of most of these samples were then forwarded to X-Ray laboratories for Instrumental Neutron Activation Analysis (INAA) for W, As and Sb. In addition, some samples were sent for a 26 element Mineral Exploration program to Acme Laboratories. More information on the results of this 26 element M.E. program will be discussed in a separate report.

Due to the screening of the sample, and also because not enough sample was originally collected, some samples bear the connotation I.S. for insufficient sample. This occurs most frequently with Au analysis. More information on the chemical procedures is given in Appendix III and the data are compiled in Appendix IV.

The soils were taken preferentially from the B-horizon. When this horizon was too poorly developed or non-existant a sample was taken from the C-horizon. A typical soil profile is given in Table 3. It was collected near the L.C.P. The results of the profile seem to indicate a slight increase in some base and precious metals towards the bottom.

Thresholds for both soils and sediments in the Osilinka region are usually set at the following values (in ppm, except Au in ppb).

Element	W	Mo	Cu	Pb	Zn	Ag	Au	As*	Sb**
Threshold	15	10	200	30	150	2.0	20	25	3

* calculated for 171 ALTABRIT soils and sediments; ** calculated for 141 soils

TABLE 3: Typical Soil Profile

Location: about 50m south of L.C.P. Scale (Vertical): 1:3

Topography: grassy hill side

Analytical values in ppm, except Au in ppb

Depth (cm)	Soil Horizon	Sample Number	ANALYTICAL RESULTS										
			Cu	Pb	Zn	Ag	Mo	W	Au	As	Sb	Color	Remarks
0–3	A_o	3079	20	10	48	0.2	<2					dark grey	Plant material
3–8	A_o	3080	16	8	38	0.2	<2					medium brown	
8–13	A_E	3081	22	6	42	0.2	<2					orange	
13–45	B											medium grey	Clay, pyroxenite rock fragments
20–25		3082	56	44	42	0.2	<2						
30–35		3083	110	34	42	0.4	<2						
40–45	B	3084	60	16	36	0.2	<2						

The soil geochemical values have been plotted on Figure 3 (Cu, Pb, Zn); Figure 4 (Ag, Mo, W); Figure 5 (Au, As, Sb); and Figure 6 (Anomaly Map). The A.A. method was used for Cu, Pb, Zn, Ag, Mo and Au. The As, Sb and W results were done with Instrumental Neutron Activation Analysis. The results are compiled in Table IV(1) in Appendix IV.

Out of 169 soils collected on or near the ALTABRIT claims, 53 samples were anomalous in Au. Of these 53 soils, 31 were on or above the 100 ppb level.

TABLE 4: Numer of soils above threshold and maximum values (in ppm, except Au in ppb

Element	W	Mo	Cu	Pb	Zn	Ag	As	Sb	Au	Au*
Number of samples ≥ threshold	1	14	62	22	12	6	12	7	53	31
Maximum value	16	38	2200	1500	460	9.8	93	5.9	2400	

*number of samples greater than 100 ppb Au

The overall impression is that the Au anomalies coincide in general with Cu anomalies, but the inverse is not necessarily true. Although Zn, Pb and Ag do frequently coincide it is not a general rule. These three elements coincide on a very irregular basis with Au. An increase in As occurs simultaneously with Au but this increase is not a linear one. The behaviour of Sb with regards to Au and/or As is much more erratic. In other words, the following associations can be established:

1) Cu+Au±Mo (to a lesser extent As).
2) Pb±Zn±Ag±Au (less pronounced relationship).

Sample #P-3074 is the only anomalous W value on the property but it occurs in conjunction with Cu, Zn, Ag, Sb and Au.

In conclusion, the soil anomaly map (Figure 6) indicates a heavy concentration of anomalous Au values often in conjuntion with higher Cu values (and to a lesser extent Zn values) at both sides of the ridge running through the ALTA 1 and BRIT 1 claims. In other words, although the other claims show anomalous spots for several elements, at this time the two northern claims, in particular BRIT 1, seem the most interesting ones. Anomalies other than Au-Cu, occur mainly scattered throughout the whole property and consist of a Pb±Zn±Ag association.

Sediment Survey

A total of 63 sediments were also collected on or near the ALTABRIT claims. The same procedure was followed in terms of chemical analyses for a wide range of elements. The sediment results are much less revealing than the soils as shown below (Table 5).

TABLE 5: Number of sediments above threshold and maximum values (ppm, except Au - ppb

Element	W	Mo	Cu	Pb	Zn	Ag	As	Sb	Au
Number of samples ≥ threshold	-	3	11	5	3	1	3	-	1
Maximum value	-	18	540	60	200	1.0	45	1	160

The sediment values are plotted on Figure 7 (Cu, Pb, Zn); Figure 8 (Ag, Mo, W) and Figure 9 (Au, As, Sb). Anomalies are plotted on Figure 10. These maps were drawn on a 25x enlargement of a 1:250,000 NTS mapsheet and are consequently even more inaccurate than the soil maps.

The samples are compiled in Table IV(2) (Appendix Four).

With regards to W and Sb no reliable results exist. As was analysed either by ICP or INAA. Au results show only one high value but many samples had insufficient amounts left.

In conclusion, the sediment anomalies confirm the area of interest already pinpointed by the soil survey, but are otherwise less indicative.

MINERALIZATION

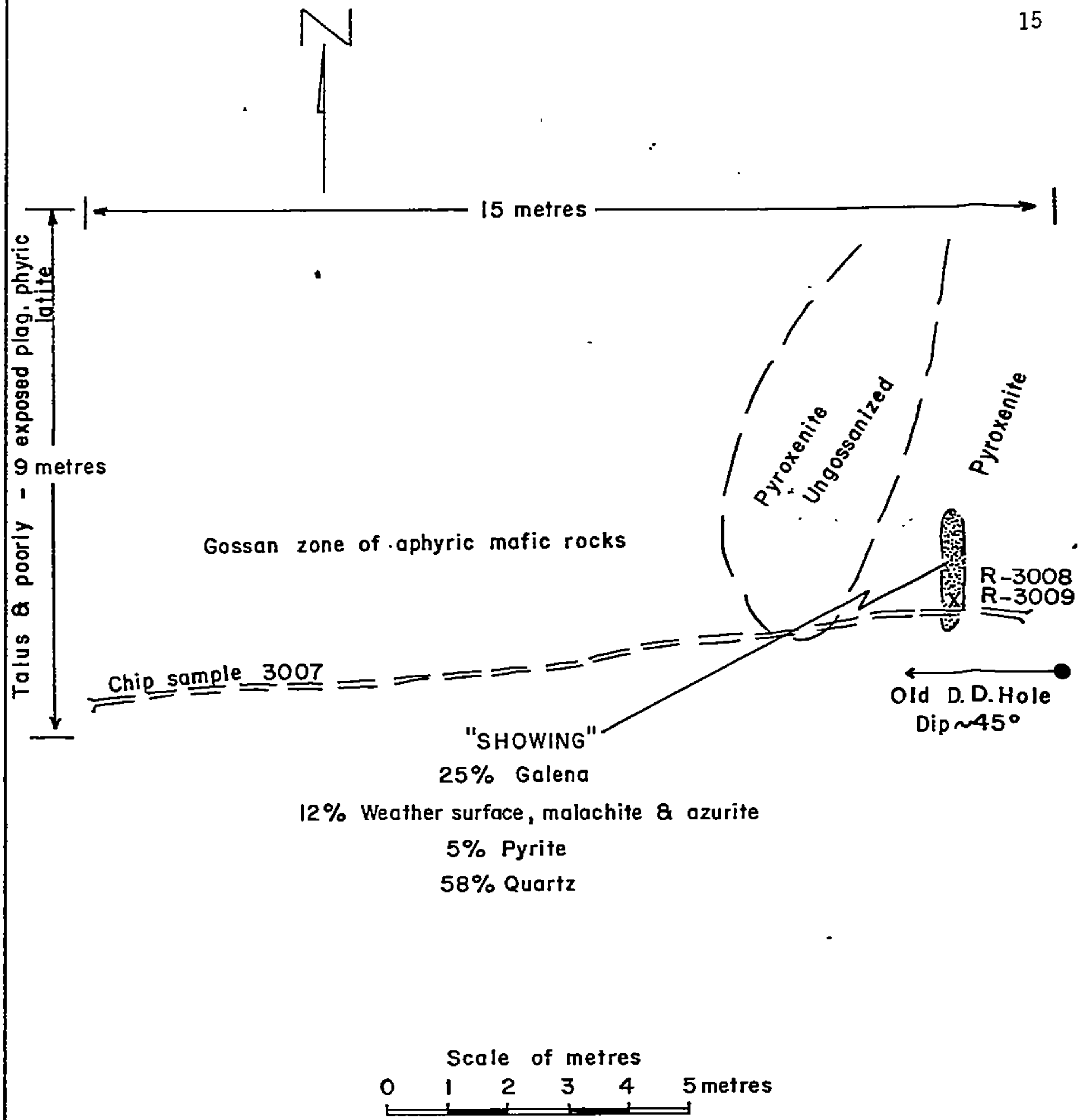
Mineralization discovered on the property consists of galena, chalcopyrite and copper weathering products, arsenopyrite and pyrite. The host rocks are quartz, porphyritic monzonite-diorite and pyroxenite.

A total of 20 rock samples have been collected. Sample locations and results are given in Figure 11 whereas Table 6 gives a brief rock description and geochemical analyses. The table shows that Cu-Pb-Ag-Au mineralization occurs in quartz, low grade Cu-Au mineralization occurs in pyroxenite and low grade Cu-Pb-Au occurs in porphyritic monzonite to diorite.

Both discordant and concordant quartz veins are mineralized. The majority of the discordant veins are approximately flat lying and locally contain gossan patches up to 10cm across. The gossan typically consists of pyrite and galena and rarely chalcopyrite, specular hematite and tetrahedrite(?). These veins have no economic significance, because of small size and low grade.

Mineral showing #53 (Figure 12) of the B.C. Government Index (Min -File) lies on the ALTA 2, BRIT 2 boundary. This showing consists of a concordant Cu-Pb-Ag-Au mineralized quartz pod. This is hosted by a basalt between pyroxenite and porphyritic monzonite-diorite sills. Figure 12 is a sketch map of this showing. The surrounding area to this occurrence is well exposed in outcrop and does not contain any further mineralization. The showing has been previously drilled and is too small to be significant.

Locally, at the contact of pyroxenite and monzonite-diorite sills, minor amounts (trace to 2%) of pyrite and arsenopyrite occur, usually associated with talc. These rocks on BRIT 2 and ALTA 2 are not well fractured. The overall impression is that the fracturing on the BRIT 1 claim is more significant.



Mattagami Lake Exploration Limited.

FIGURE 12

SHOWING '53' (Min. file)

ALTA-BRIT CLAIMS

Cu, Pb, Ag. showing on Alta-2 claim

DRB 9/81

TABLE 6: Rock Descriptions and Geochemical Analyses (in ppm, except Au in ppb)

Sample #	Rock Type	Cu	Pb	Zn	Ag	Mo	Au	Description
3001		298	14	30	1.4	24	20	Scree rock with pyrite
3002	Quartz Vein	172	1192	6	2.0	7	10	Flat lying type, rare galena, gossan
3003	Quartz Vein	34	434	74	7.2	18	150	Same as #3002
3004	Pyroxenite	22	30	14	1.0	2	10	Average unmineralized sample
3007	Basalt	144	546	122	2.4	9	10	Chip sample of basalt host rock to vein where #3008 and #3009 are taken. Showing #53 (Fig. 12).
3008	Quartz Vein	3.17%	6496	32	225.2	7	1100	Concordant quartz vein, grab sample of showing #53
3009	Quartz Vein	2.55%	6934	52	189.4	7	50	Same as #3008.
3011	Pyroxenite	132	26	54	1.4	2	10	Rare disseminated pyrite
3012	Gossan	256	82	200	3.8	2	10	Gossan, sample taken adjacent to quartz vein, rare pyrite and arsenopyrite(?)
3013	Pyroxenite	116	70	24	0.8	4	10	Gossan, 5% pyrite and arsenopyrite(?)
3015	Porphyritic Monzodiorite	142	24	30	0.6	4	10	Scree, 1-2% pyrite; approximately 15-20% of scree contains sulphides, very altered rock.
3016	"	446	36	46	0.6	4	350	Disseminated and veinlets of pyrite, arsenopyrite and tetrahedrite(?)
3103	Pyroxenite with quartz vein	216	62	104	3.8	2	50	Float, quartz vein contains malachite, pyroxenite, disseminated pyrite.
3104	"	0.292%	20	24	3.0	7	1100	Float, same as #3103
3105	Pyroxenite	32	32	140	1.4	2	10	Rare pyrite and a veinlet of galena(?)
3107	Porphyritic Monzodiorite	160	22	38	0.8	2	10	Contains a quartz veinlet which locally is rusty, some calcite
3109	Quartz Vein	1.87%	6284	14	135.6	18	60	Vein is 5cm thick, galena, chalcopyrite, pyrite
3110	Porphyritic Monzodiorite	1.37%	40	136	12.4	2	50	Float, 10% pyrite, 2-5% malachite, arsenopyrite(?)
3111	Pyroxenite	1.40%	32	20	5.8	48	30	Float, azurite staining, weathered.
3114	Pyroxenite	108	134	144	1.2	2	10	Rusty, sample taken along the margin
3115	Talc	20	84	40	1.2	2	10	No mineralization, lens is about 2m wide
3117	Porphyritic Monzonite	100	792	44	2.6	2	10	Rusty, rare pyrite

Several concordant faults were observed on traverse. The country rock in this area contains disseminated pyrite and veinlets of pyrite and arsenopyrite both at, and away from, contacts. Unfortunately all discovered copper in country rock was in scree. Sample #3016, a porphyritic monzonite-diorite is anomalous in Au. This sample was taken about 30m away from a pyroxenite, porphyritic monzonite-diorite contact on BRIT 1.

CONCLUSIONS

A preliminary synthesis of all data is as follows. Pyroxenite was emplaced first followed by porphyritic monzonite-diorite. These intrusions probably did not result in any significant fracturing or alteration as supported by the observation that rocks on BRIT 2 are relatively fracture free. Thin section work indicates that these samples have only experienced deuteric alteration.

A later event, probably the emplacement of a separate phase of the batholith on the western margin of the property, resulted in fracturing of pyroxenites and monzonite-diorite near the contact. This event was also accompanied by a hydrothermal event. This conclusion is supported by sulphide mineralization on BRIT 1, ALTA 1 and 2, thin section work and Mo anomalies that occur on the eastern section of the property.

Hydrothermal fluids then leached the pyroxenite to give Cu-Au mineralization and talc where the rock was well fractured. In adjacent areas where the pyroxenite and monzonite-diorite are not fractured, the fluids moved along contacts to give talc and minor Cu-Au. The original hydrothermal fluids probably only contained Mo because there are no Cu anomalies in sediments to the west, therefore the Cu may have been derived from the pyroxenites. The relationship of Zn anomalies on BRIT 1 and east are unclear.

The scattered Pb-Ag anomalies south of the LCP are probably the results of the discordant quartz veins which have no economic potential.

The concordant quartz pod which contains Cu-Pb-Ag-Au seems to be related to the basalt. The relationship of this unit to other mineralization on the property is unclear. The occurrence is small and therefore not economic but may serve as a prospecting guide.

RECOMMENDATIONS

In view of the anomalous Cu-Au values (to a lesser extent other elements) which occur in particular on the ALTA 1 and BRIT 1 claims the following recommendations are made:

1. Prospecting should be focussed on the BRIT 1 and ALTA 1 claims in the valleys at both sides of the ridge where anomalous soil samples were collected.
2. A grid should be constructed in the valley on the claim boundary between the BRIT 1 and ALTA 1 claims. The baseline should be running N-S. Soil, VLF and magnetometer surveys could be done on lines 100m apart at 25m stations.
3. A traverse along the western contact of the granodiorite-monzodiorite, pyroxenite contact to find if any Cu-Au mineralization has resulted.

REFERENCES

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HELSEN, J.N., May 1981, Germansen Mountains and Northern Hogem Batholith, 1981 Proposal for Exploration, Company Report.

WOODSWORTH, G.J., 1976, Plutonic Rocks of McConnell Creek (94D west half) and Aiken Lake (94C east half) Map Areas, B.C., Project 750016, Geological Survey of Canada, Paper 76-1A.

CERTIFICATE

I, Jan Helsen, of the City of Edmonton, Province of Alberta, do hereby certify that:

1. I am a geologist residing at 7305 - 180th Street, Edmonton.
2. I am a graduate of the University of Leuven, Belgium with a "Licenciaat in Geologie".
3. I am a graduate of McMaster University, Ontario, with a M.Sc. (1970) and a Ph.D. (1976) in geology.
4. I have been practicing my profession since 1976 and am at present Exploration Geologist with Mattagami Lake Exploration Limited.
5. I am a fellow of the Geological Association of Canada.
6. I supervised the work that is described in this report.

Dated: May 31, 1982

GEOLOGICAL ASSOCIATION OF CANADA
J. HELSEN
FELLOW

J. Helsen, Ph.D.

APPENDIX ONE

STATEMENT OF COSTS

STATEMENT OF COSTS

About 45 mandays were spent on the ALTABRIT group of claims. These include travel days to and from the property, set-up and tear down camp, mandays lost to bad weather, etc. A Hiller 12E was in the camp on a continuous basis for transportation of crews, slinging in and out of camp gear, hauling food supplies, etc. On one occasion a Bell Jetranger from Mackenzie (Northern Mountain Helicopters Inc.) supplied services during a breakdown of the Hiller 12E. A breakdown of the wages is given below:

Name	Wage*	Mandays of Geochemistry	Total $ Amount	Mandays of Geology	Total $ Amount
W. Ferreira	84.57/day	7	591.99	2	169.14
T. Donnelly	67.28/day	8	538.24	1	67.28
J. Thorpe	60.07/day	8	480.56	1	60.07
J. Kirk	52.85/day	9	475.65	0	
J. Bell	52.85/day	9	475.65	0	
		41	2,562.09	4	296.49

*Wages include payroll burden and bush bonus

STATEMENT OF COSTS (Con't.), ALTABRIT GROUP OF CLAIMS, 1981

Wages	
45 mandays (i.e. 9 days)	$ 2,858.58
Accomodation	
$ 40.00/manday	1,800.00
Equipment Rental	
SBX 100 Radio @ $ 300.00/month	90.00
Radio from Northern Mountain Helicopters @ $ 115.00/month	34.50
Vehicle Rental	
1 Surburban Vehicle @ $ 975.00/month	292.50
1 3-ton Truck @ $ 950.00/month	285.00
Travel	
3-ton Truck 150 gallons gasoline @ $ 1.75/gallon	262.50
Surburban 75 gallons gasoline @ $ 1.75/gallon	131.25
Helicopter Transportation	
Jetranger 206B 5.5 hours @ $ 425.00/hour	2,337.50
23 gallons Jet fuel/hour @ $ 1.80/gallon	223.70
Hiller 12E 23.5 hours @ $ 200.00/hour	4,640.00
16 gallons AV gas/hour @ $ 3.15/gallon	1,169.28
Geochemical Analyses	
169 soils analyzed for Cu, Zn, Pb, Ag, Mo and Au @ $ 4.25/soil ($ 1.25 first element, 0.60 the following elements)	718.25
142 soils analyzed for W, As, Sb with NAA @ $ 8.00/soil	1,136.00
27 soils analyzed for As (geochemical) @ $ 3.00/soil	81.00
63 seds analyzed for Cu, Zn, Pb, Ag, Mo and Au @ $ 4.25/sed.	267.75
32 seds analyzed for As (geochemical) @ $ 3.00/sediment	96.00
31 seds analyzed for W, As, Sb with I.C.P. @ $ 5.50/sediment (this involved a 26 element I.C.P. analysis)	170.50
26 rocks analyzed for Cu, Pb, Zn, Ag, Mo and Au @ $ 5.50/rock	115.50
6 thin sections @ $ 5.00 each	30.00
Telephone, Postage & Freight	150.00
Drafting	300.00
Report Writing	400.00
Supervision of Crew	300.00
TOTAL COST OF 1981 WORK	$ 17,889.81

APPENDIX TWO

FIELD ROCK DESCRIPTIONS

FIELD ROCK DESCRIPTIONS

Plagioclase, Hornblende Porphyritic Monzonite-Diorite

color: weathered - medium grey; fresh - medium grey
foliation: usually none, weakly developed along margins
phenocrysts: 25-50% plagioclase, 1-5mm tabular; 1-5% hornblende, 1-3mm
groundmass: 74-50% aphantic
distinguishing features: 1) plagioclase phenocrysts
2) aphanitic groundmass

Pyroxenite

color: weathered - dark green; fresh - dark grey
foliation: none
grain size: coarse, equigranular augite
phenocrysts: none
minerals: 85-95% augite; 5-10% interstitial magnetite, biotite and alteration products of serpentine and talc
distinguishing features: 1) abundant augite
NOTE: commonly contains veinlets of carbonate, epidote, serpentine and talc

Basalt

color: weathered - black; fresh - black
groundmass: 100% aphantic, rare sulphide specks
distinguishing features: 1) 100% aphantic

ROCK DESCRIPTIONS (from thin section analysis)

Sample # 81-186-R-3005

Rock Name: Pyroxenite

% Minerals	Description
81% Augite	Very corase grained, 2mm to several cm long
7% Talc(?)	Inclusions in augite and vein-like, dirty yellow color, non-pleochroic
10% Serpentine	Inclusion in augite
Tr. Fe-Ti Oxide	
2% Epidote	Veins and rarely as inclusions
Tr. Carbonate	Veinlets mainly

History: 1) slow crystallization of augite
2) deuteric alteration

Sample # 81-186-R-3151

Rock Name: Pyroxenite

% Minerals	Description
87% Augite	Subhedral prisms 5mm-1mm; inclusions: Fe-Ti oxide, serpentine, apatite, biotite
1% Biotite	Interstitial to clinopyroxene
1% Carbonate	Interstitial to clinopyroxene
10% Serpentine	Inclusions in clinopyroxene and along margins
1% Fe-Ti Oxide	Subhedral to anhedral, up to 0.1mm to needles exsolved from clinopyroxene

History: 1) clinopyroxene crystallizes very slowly
2) deuteric alteration

Sample # 81-186-R-3150

Rock Name: Monzonite

% Minerals	Description
25% Plagioclase Phenocrysts	An_{30}, euhedral tabular, 0.5-3mm long, locally evidence of zoning, epidote in the centre but absent from the rims. Always covered with clay. Broken.
35% Orthoclase (from stained slab)	Phenocrysts subhedral, 0.5-1mm. Spherulites(?) odd in this rock, no clay over spherulite. Spherulite radiating orthoclase and quartz. Clay over phenocrysts, phenocrysts broken From stain the groundmass contains most of the orthoclase.
1% Hornblende	Pseudomorphosed by chlorite, epidote and biotite.
1% Chlorite	Patchy brown birefringent
Tr. Fe-Ti Oxide	Hematite
5% Epidote	Inclusions in plagioclase and euhedral crystals in groundmass
Tr. Biotite	
33% Groundmass	(Excludes orthoclase) Cryptocrystalline feldspar and quartz.

Sample #81-186-$-3150 (Con't.)

History: 1) Plagioclase crystals out.
2) Orthoclase and hornblende crystallize.
3) Emplacement, quick colling and development of spherulites.
4) Deuteric alteration.

Sample # 81-186-$-3116

Rock Name: Diorite

% Minerals	Description
25% Plagioclase	An_{33}, phenocrysts euhedral, tabular, 2.5mm-0.1mm. Inclusior of epidote 30$, carbonate 0-5%. Locally broken, rarely zoned. (epidote 8% of slide).
10% Orthoclase	Phenocrysts euhedral, tabular, 1mm to 0.1mm long.
10% Hornblende	Phenocrysts euhedral, prisms, micropherrocrysts to 2.3mm long. Inclusions of Fe-Ti oxide, epidote, carbonate, biotit
1% Fe-Ti Oxide	Phenocrysts up to 0.1mm, subhedral to anhedral.
54% Groundmass	Cryptocrystalline feldspar and/or quartz.

History: 1) Plagioclase and orthoclase crystallize.
2) Hornblende begins to crystallize (orthoclase and plagioclase still crystallizing).
3) Emplacement and quick cooling to give fine groundmass.
4) Deuteric alteration, very extensive, probably hydrothermal.

Sample # 81-186-R-3006 (Hand sample taken at contact of monzonite and pyroxenite)

Rock Name: Talc

% Minerals	Description
86% Talc	Less than 1mm long fibers which replace clinopyroxene.
1% Serpentine	Antigorite.
12% Fe-Ti Oxide	Tiny specks and subhedral crystals up to 1mm side. Specks outline original clinopyroxene.
5% Carbonate	Forms anhedral patches up to 1mm in the centres of pre-existing clinopyroxene.

History: 1) Orginally a pyroxenite (augite).
2) Hydrothermal water introduced (too much alteration for deuteric). This gives the present mineralogy.

APPENDIX THREE

CHEMICAL PROCEDURES

CHEMICAL PROCEDURES

The following elements are routinely analyzed by atomic absorption: Cu, Pb, Zn, Ag and Mo. The analyses are carried out by Noranda Exploration Company in Vancouver for soils and silts. Rocks were, however, prepared (crushed) and analyzed by the Noranda Bell Copper laboratories in Granisle. The W analyses were done according to a colorimetric method by Noranda Laboratories in Vancouver or by X-Ray Laboratories in Toronto, Ontario. In the case of X-Ray Labs, the analyses performed consisted of an element package in which As and Sb were analyzed as well. In this case the samples were analyzed by a non-destructive neutron activation method carried out in the reactor of McMaster University (Hamilton, Ontario).

The chemical procedures for Cu, Pb, Zn, Ag, Mo Au and colorimetric W are given on the next page.

Methodology of the Geochemical Laboratory

Physical methods of sample treatment.
Rock and core samples involve crushing and pulverizing with a rotary plate or a ring and puck pulverizer, whichever is appropriate. Subsequently, the -200 mesh sample is rolled to insure uniformity.

For sediment and soil samples, these are dryed at ca.80°C for 24 to 48 hours.

The samples are then sieved to -80 mesh with nylon screen; the +80 mesh (reject) material is discarded.

The panned - heavy mineral samples are analyzed as received without further sample preparation, except where the material is too coarse; this material is passed through a -40 mesh screen.

Perchloric-nitric acid decomposition ($HClO_4$-HNO_3)

The analysis of soil, sediment and rock geochemistry to determine the lighter transition elements, is carried out by decomposition with a perchloric plus nitric acid mixture. The procedure for preparing geological samples for trace analysis by atomic absorption is as follows:

> Weigh 0.40g of sample and digest with 4ml perchloric acid (70%) plus nitric acid (4+1) for 4 hours at reflux temperature.
> After digestion, each sample is diluted to 10ml with water. This solution is used for the determination of Cd, Cr, Co, Cu, Fe, Pb, Mn, Mo, Ni, Ag, V and Zn with a Varian AA-475 complete with background correction.
> Complete dissolution of such elements as Cr, Fe, Mn and V is not always achieved, and may be of little significance for geochemical exploration purposes.

A brief description of elements requiring specific techniques

Determination of mercury and the elements that form volatile hydrides i.e. As, Bi, Sb, Se and Te are carried out with a hydride vapour generation accessory (Varian M-65). The hydride is formed by sodium borohydride reaction with an acidified solution of the sample. This enables measurement of trace quantities by atomic absorption.

Fluorine: 0.25g sample is sintered with sodium carbonate-potassium nitrate flux and dissolved in water. The fluoride content is compared to standards on a specific ion electrode meter. (U.S. G.S. Paper 700-C).

Gold: 10.0g sample is digested with aqua regia. Gold is extracted into MIBK from the aqueous HCl solution. Atomic absorption is used to determine gold, and a sensitivity of 10ppb is attained. (At. Absorpt. Newsl. 6, 126, 1979).

Tin: 0.5g sample is heated with ammonium iodide: tin present as cassiterite is converted into stannic iodide, which sublimates. The sublimate is dissolved in 1M HCl. A pink tin complex is formed with gallein. This allows colormetric comparison with standards to determine tin to as low as 2 ppm. (R.E. Stanton, 1962).

Tungsten: 1.0g sample is sintered with carbonate flux and is leached with water. The leachate is treated with KSCN. This forms a yellow tungsten thio-cyanate which is extracted into tri-n-butyl phosphate. This permits colormetric comparison with a standard series to ca. 4 ppm (F.N. Ward, 1963).

Uranium: Sample digestion will depend on the extraction requested, however, if not specified, an aliquot is taken from the perchloric-nitric decomposition. The aliquot is taken diluted with water and buffer, and the luminescence of the uranyl ion is quantitatively measured on the UA-3 (Scintrex). Sensitivity of 0.1 ppm in geological samples is easily obtained.

Hydrofluoric-perchloric-nitric decomposition (HF/HCl_4-HNO_3)

The analysis of silcate rock for major elements, i.e. alkaline and earth alkaline metals, is performed by decomposition with Hydrofluoric-perchloric-nitric acid, with subsequent removal of the fluoride ion. Total dissolution of the major constituents is accomplished and this method is suitable for determination of Na, K, Mg, Ca, Mn, Fe, Rb, Sr, and Ba. Silicon is not determined since it volatilizes during dissolution.

This method is not intended to replace the elaborate fusion techniques (eg. $LiBO_2$ fusion) for major oxide analysis, and should be used as a supplementary method for geochemical exploration where quick results are necessary. (Anal. Chim. Acta 32, 1, 1965).

Whole rock analysis employing lithiumborate fusion

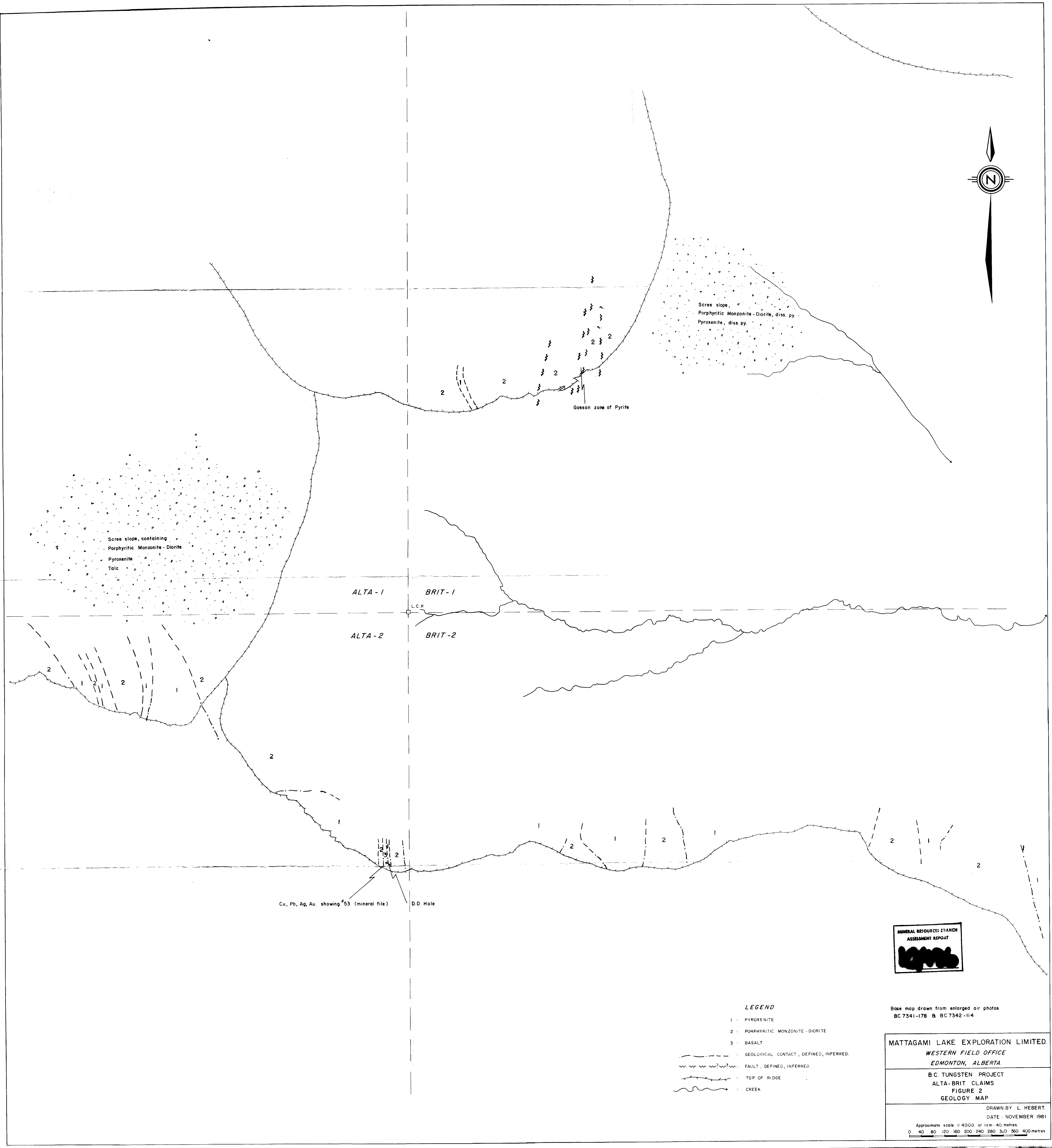
An atomic absorption procedure is used for the analysis of rock to determine Si, Al, Fe, Mg, Ca, K, Na, Mn, Cr, Sr, and Ti. The method employs a lithium metaborate ($LiBO_2$) fusion and dissolution in diluted nitric acid. This is recommended for whole rock analysis of rocks and core of widely ranging major element composition. (Atomic Absorpt. Newsl. 2, 25, 1969).

The lab intends to implement the Bernas Type teflon-lined bomb for decomposition of ores and minerals at a later date.

The lab will continue the policy that after operating costs of the lab have been covered, any surplus will be rebated on a pro-rated basis.

There is considerable difference of opinion regarding what geochemical methods to use in exploration. Since there is no universally suitable method for any geochemical analysis which is mainly due to varying sample material, in order to maintain quality control and consistent data, it is important to request the same decomposition and analytical methods, when various labs are contracted.

For further information please contact the Noranda Vancouver Laboratory at the following number: (604) 684-9246.


Scree slope,
Porphyritic Monzonite - Diorite, diss. py.
Pyroxenite, diss. py.
Gossan zone of Pyrite
Scree slope, containing
Porphyritic Monzonite - Diorite
Pyroxenite
Talc
ALTA - 1
BRIT - 1
L.C.P.
ALTA - 2
BRIT - 2
Cu, Pb, Ag, Au. showing #53 (mineral file)
D.D. Hole
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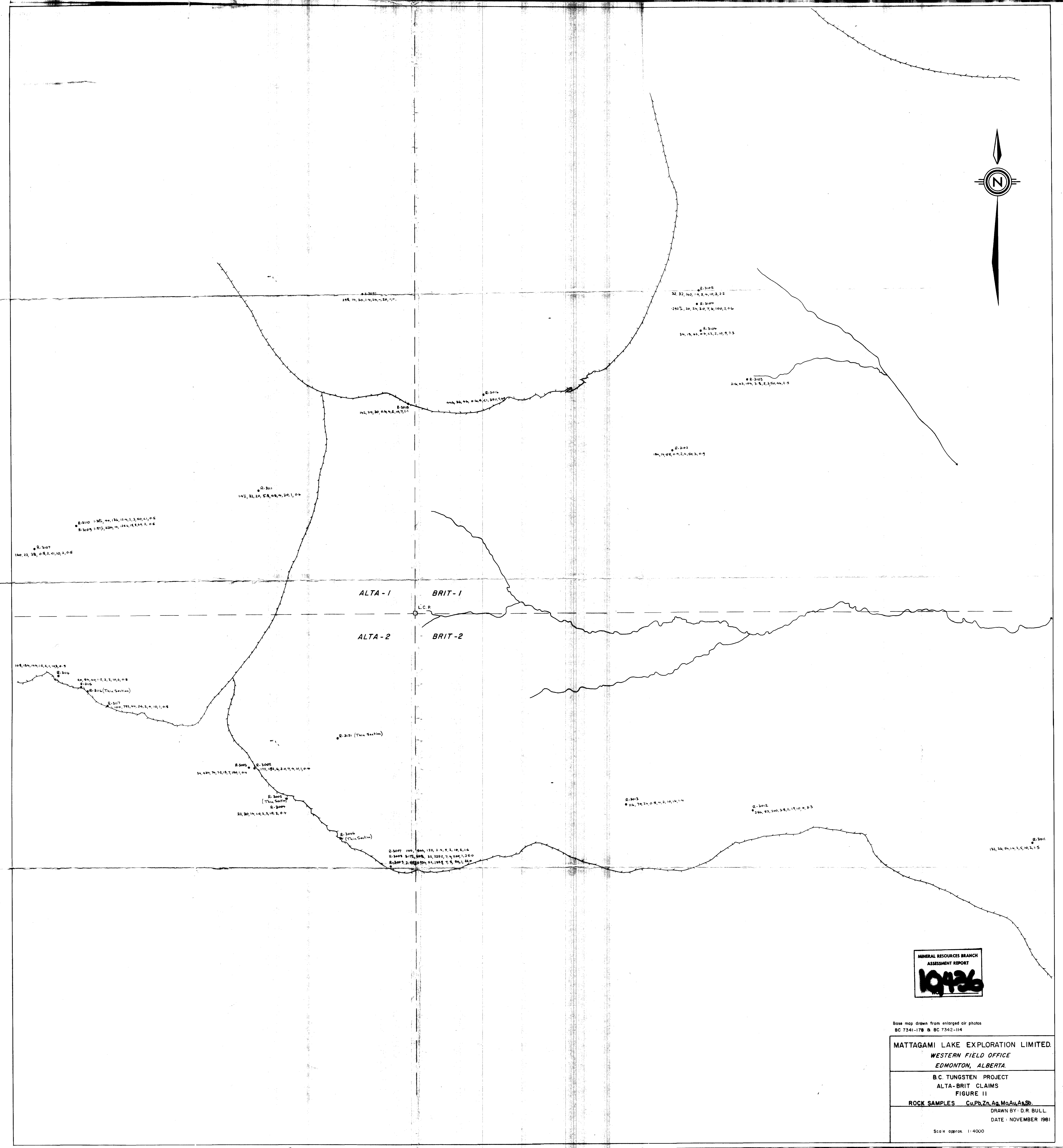
[redacted]
LEGEND
1 : PYROXENITE
2 : PORPHYRITIC MONZONITE - DIORITE
3 : BASALT
: GEOLOGICAL CONTACT ; DEFINED, INFERRED.
: FAULT ; DEFINED, INFERRED.
: TOP OF RIDGE.
: CREEK
Base map drawn from enlarged air photos
BC 7341-178 & BC 7342-114
MATTAGAMI LAKE EXPLORATION LIMITED.
WESTERN FIELD OFFICE
EDMONTON, ALBERTA.
B.C. TUNGSTEN PROJECT
ALTA-BRIT CLAIMS
FIGURE 2
GEOLOGY MAP
DRAWN BY L. HEBERT.
DATE : NOVEMBER 1981
Approximate scale 1:4000 or 1cm : 40 metres.
0 40 80 120 160 200 240 280 320 360 400 metres


N
ALTA - 1
BRIT - 1
L.C.P.
ALTA - 2
BRIT - 2
MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
10,436
Base map drawn from enlarged air photos
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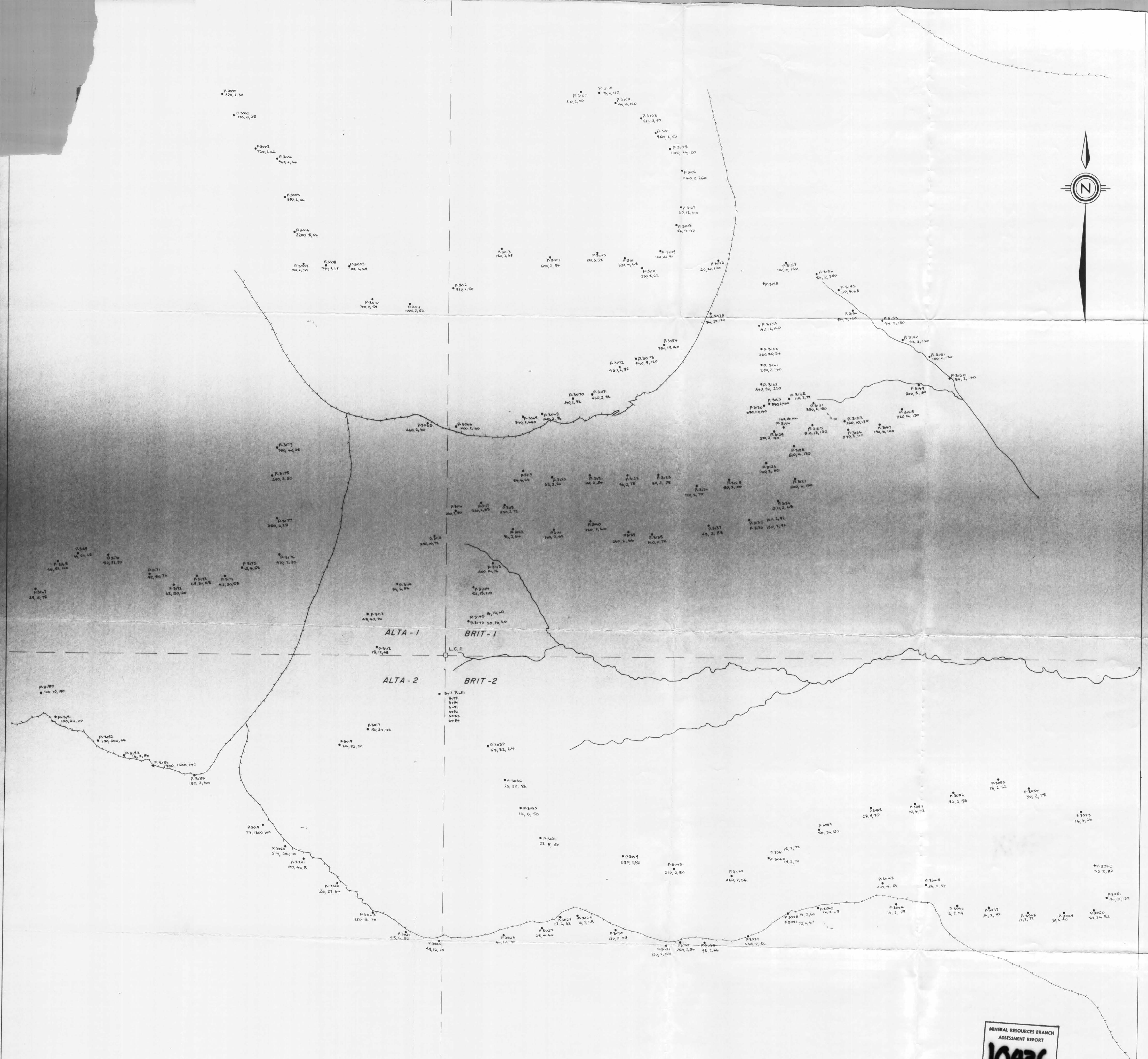
EDMONTON, ALBERTA.
B.C. TUNGSTEN PROJECT
ALTA-BRIT CLAIMS
FIGURE 11
ROCK SAMPLES Cu,Pb,Zn,Ag,Mo,Au,As,Sb.
DRAWN BY: D.R. BULL
DATE: NOVEMBER 1981
Scale approx. 1:4000



Base map drawn from enlarged air photos
BC 7341-178 & BC 7342-114

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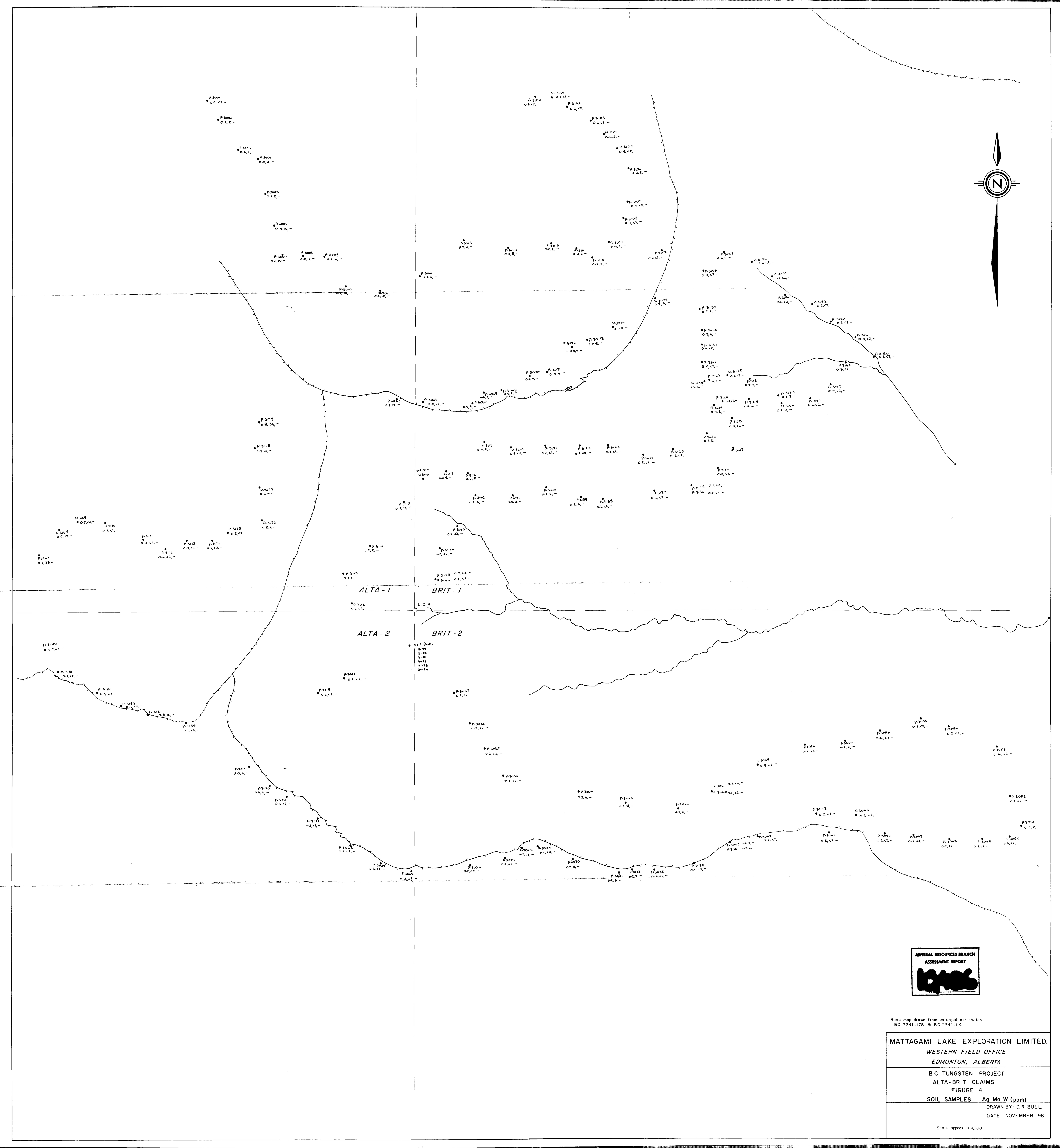
FIGURE 3

SOIL SAMPLES Cu Pb Zn (ppm)

DRAWN BY: D.R. BULL.

DATE: NOVEMBER 1981

Scale approx 1: 4,000



Base map drawn from enlarged air photos
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FIGURE 4
SOIL SAMPLES Ag Mo W (ppm)

DRAWN BY: D.R. BULL
DATE: NOVEMBER 1981

Scale approx 1:4,000

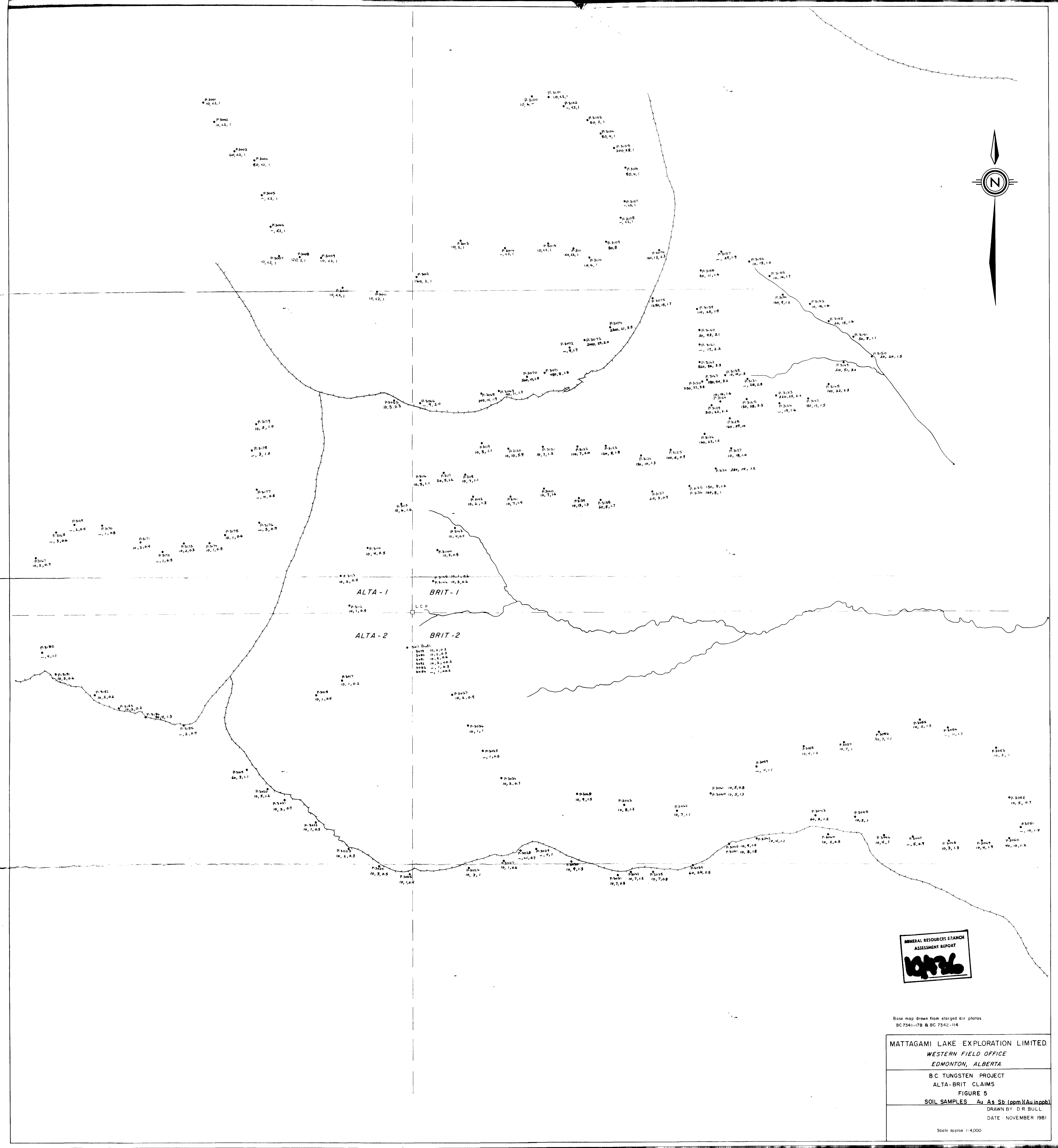

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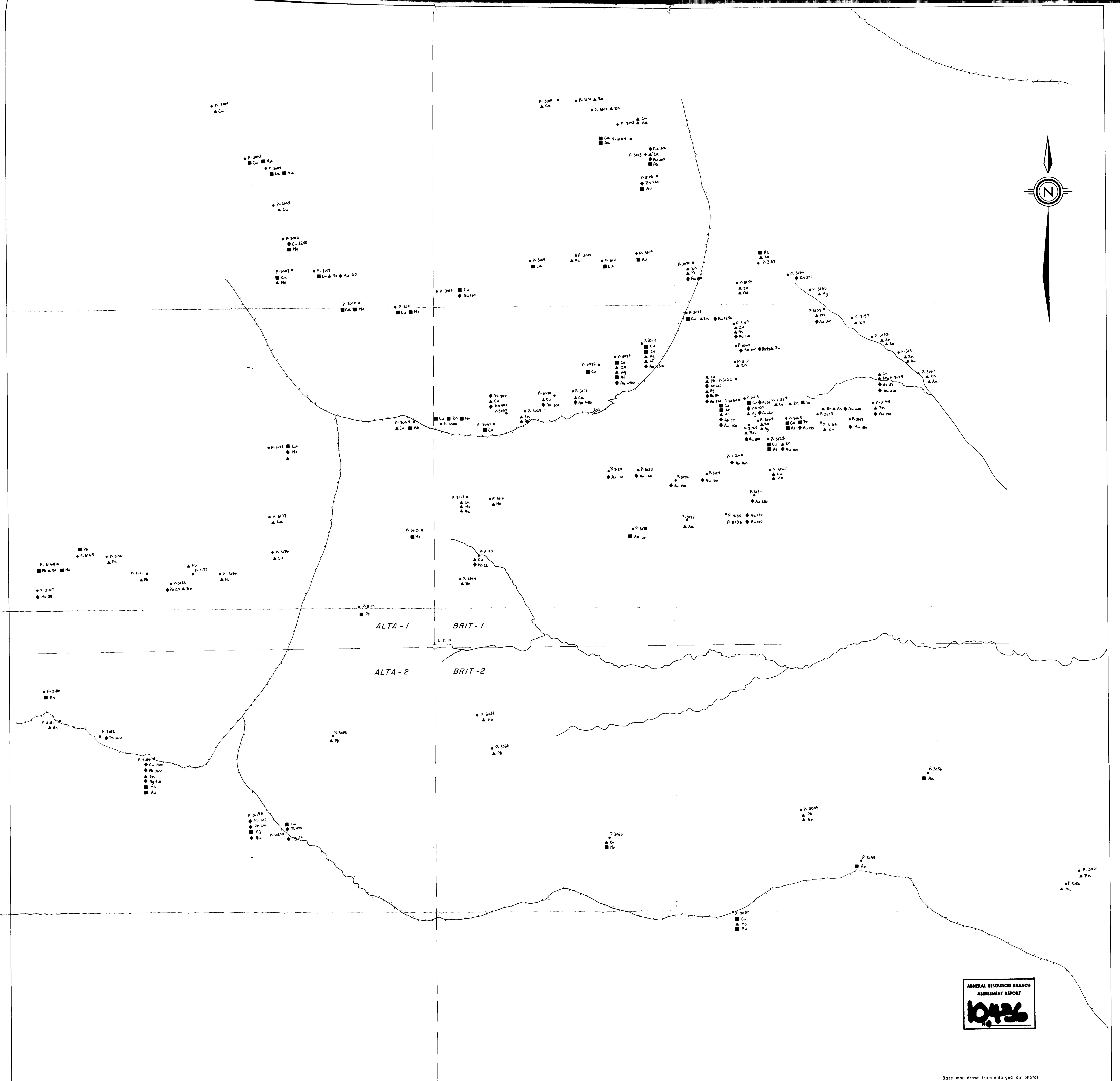
FIGURE 5
SOIL SAMPLES Au As Sb (ppm)(Au in ppb)

DRAWN BY D.R. BULL
DATE: NOVEMBER 1981

Scale approx 1:4,000



	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Mo ppm	Au ppb	As ppm	W ppm
▲ element	300-500	30-50	100-150	1 - 2	7 - 10	20-50	20 - 25	16-20
■ element	501-1000	51 - 100	151 - 200	2.1 - 3	11 - 20	51-100	26 - 30	21 - 30
◆ element value	› 1000	› 100	› 200	› 3	› 20	›100	› 30	› 30

Base map drawn from enlarged air photos
BC 7341-178 & 7342-114

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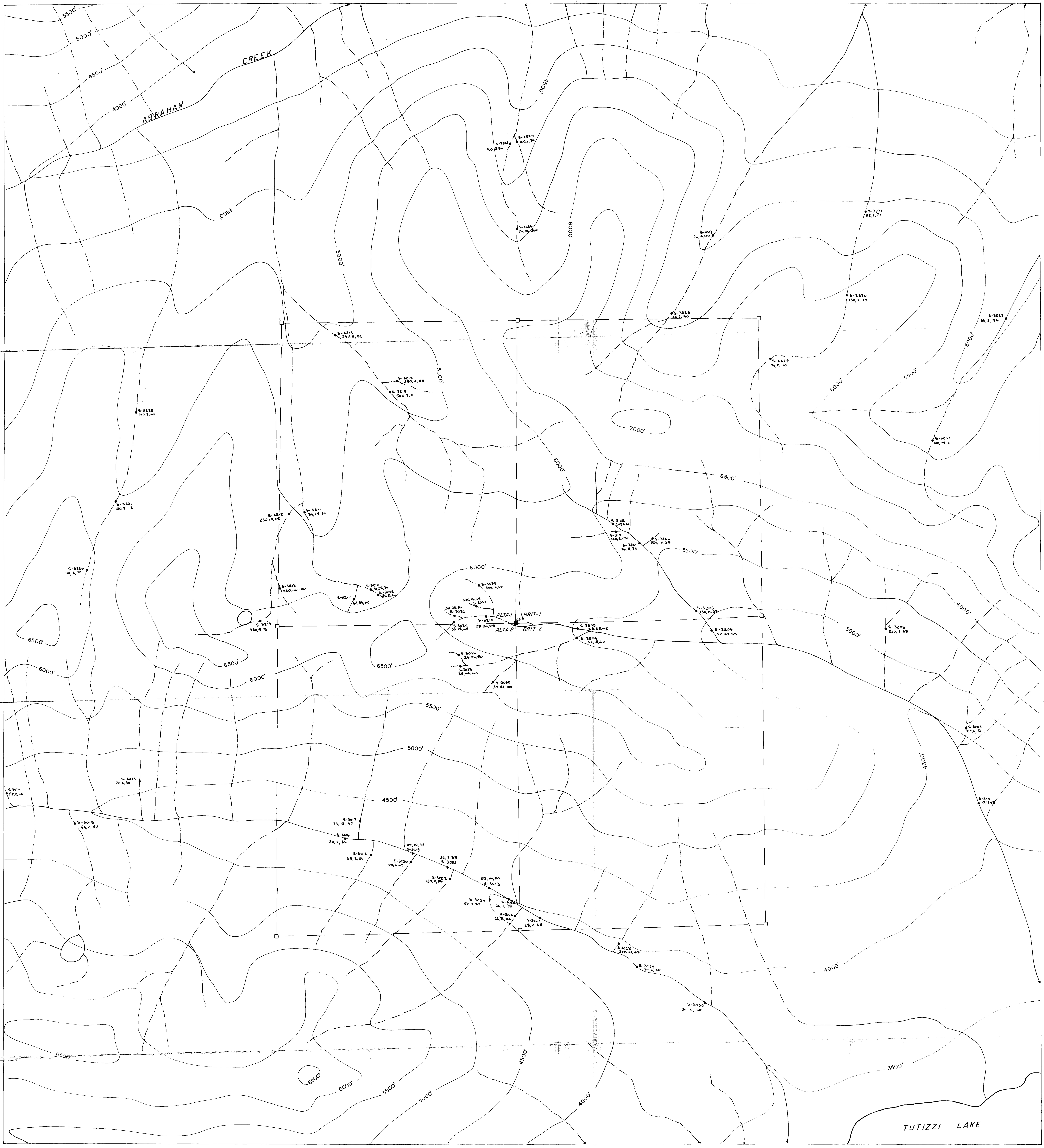
FIGURE 6
ANOMOLOUS SOIL SAMPLES

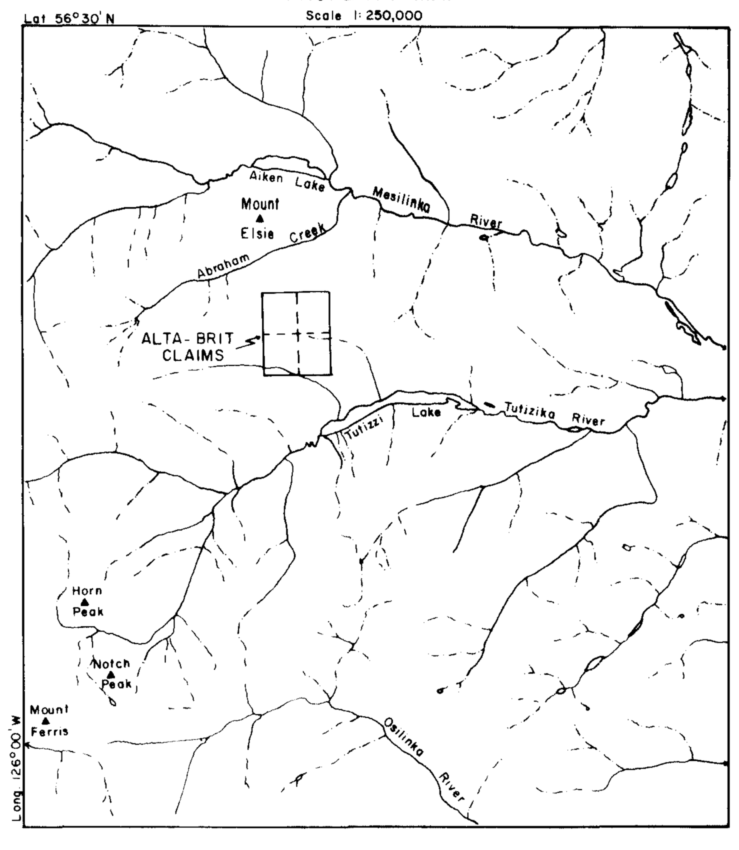
DRAWN BY: D.R. BULL.
DATE: NOVEMBER 1981

Scale approx 1:4,000



PROPERTY MAP

Scale 1:250,000



LOCATION MAP

Scale 1cm : 24 Km.

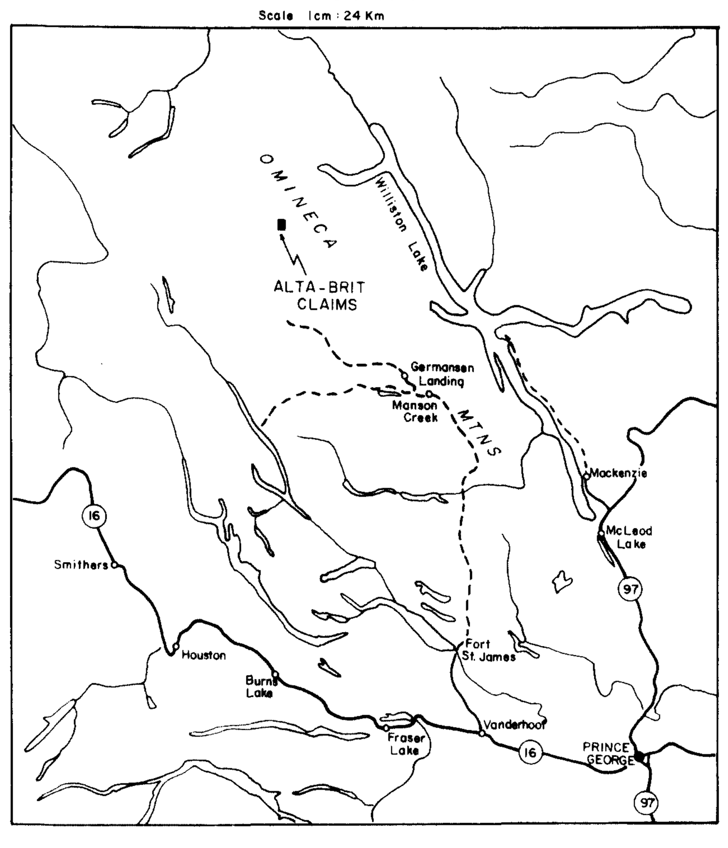


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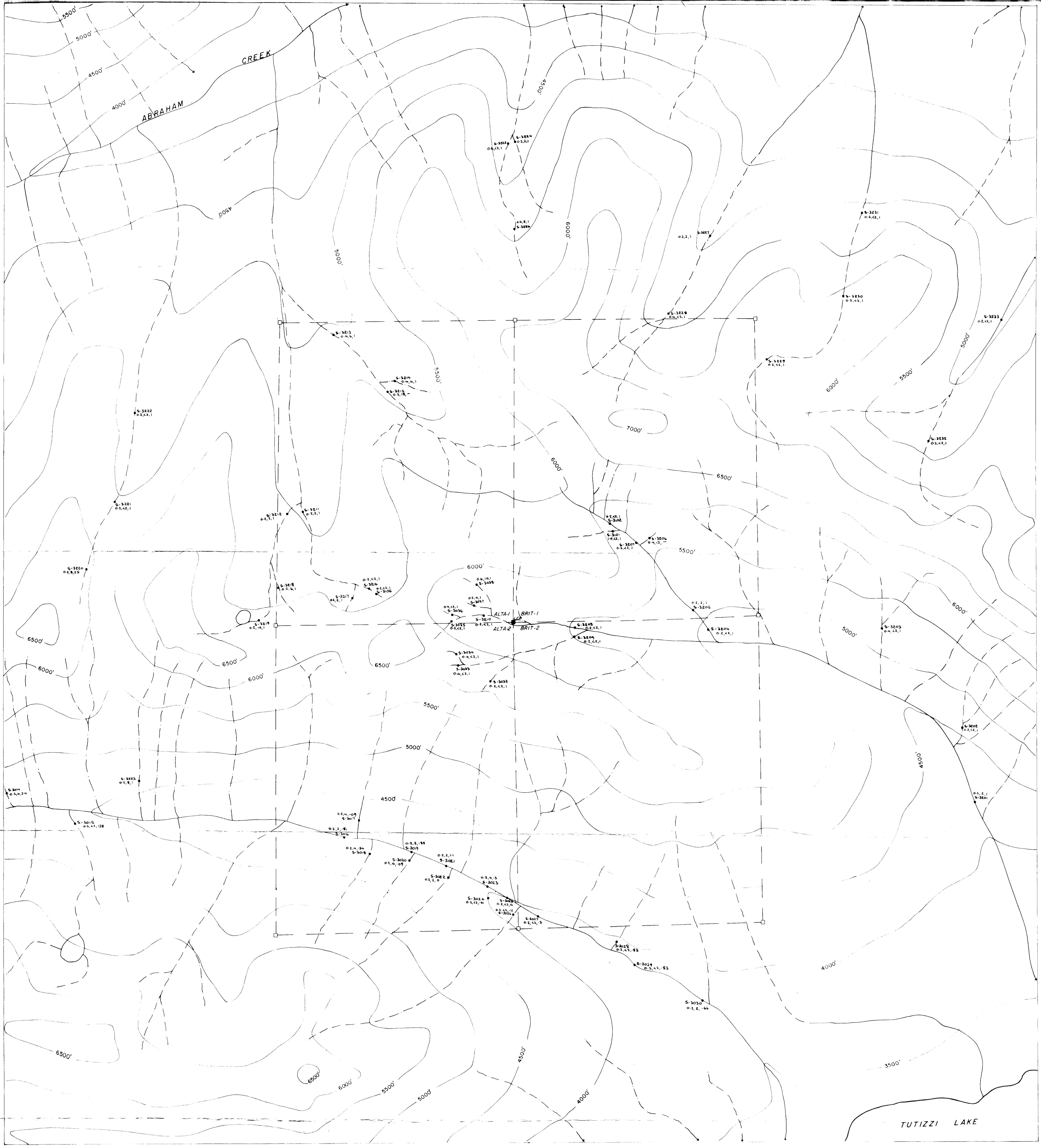
FIGURE 7

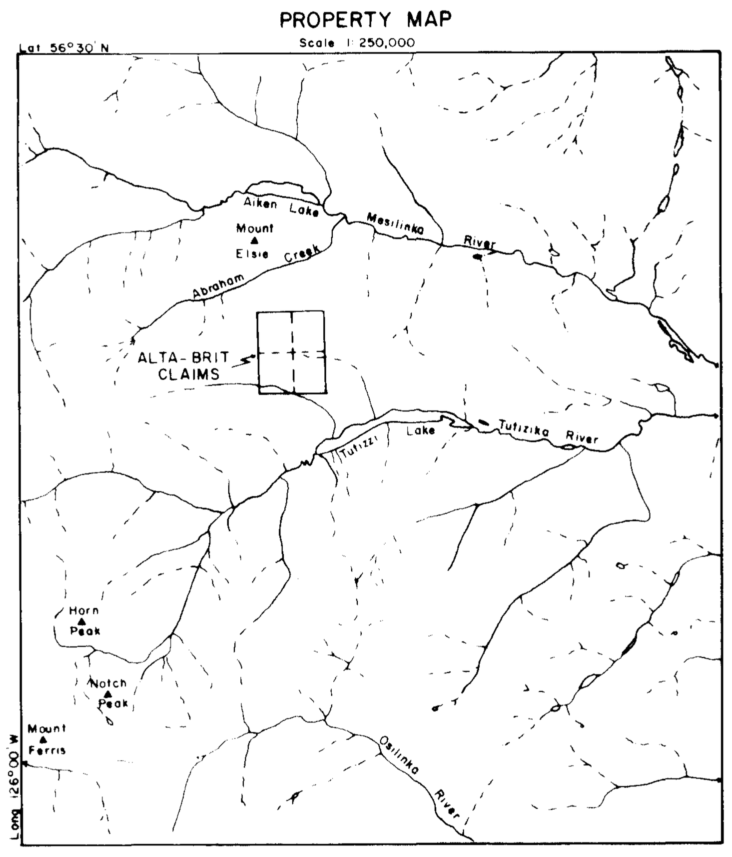
Stream Sediment Geochemistry Cu,Pb,Zn. (ppm)

DRAWN BY: D.R. BULL.

DATE: NOVEMBER 1981

0 100 500 1000 metres





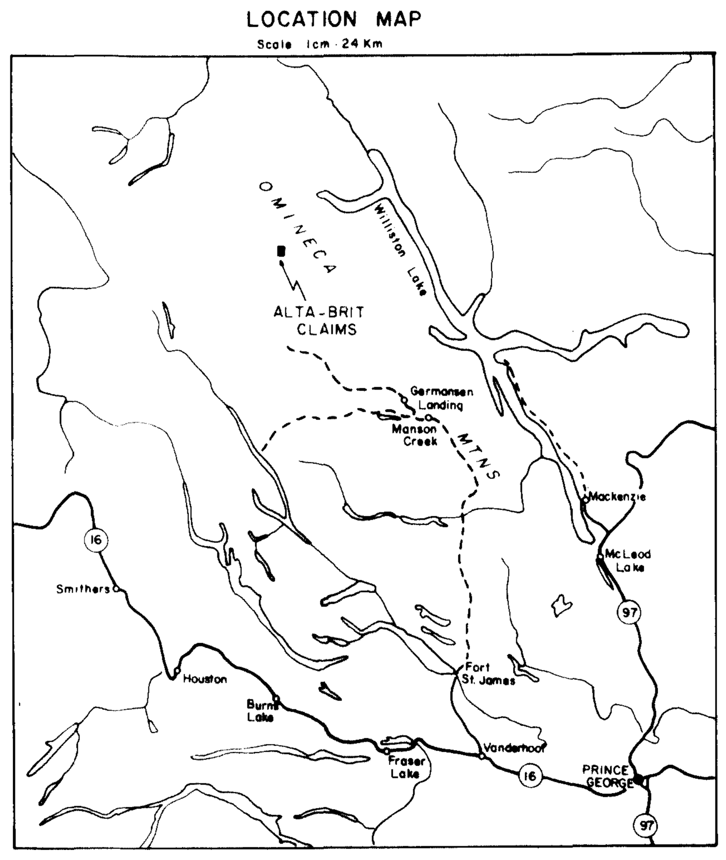


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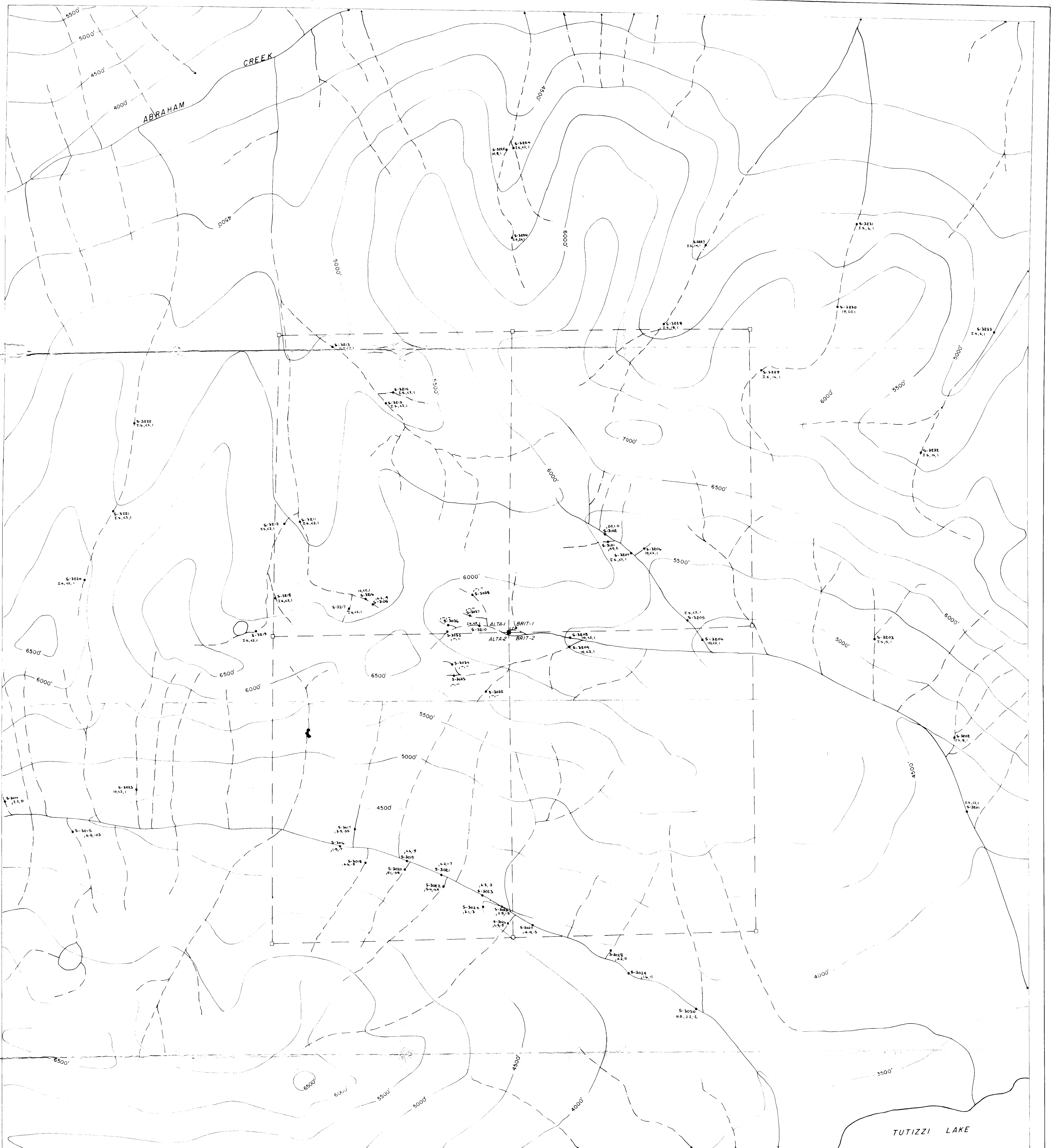
FIGURE 8

Stream Sediment Geochemistry Ag, Mo,W. (ppm)

DRAWN BY: D.R.BULL.

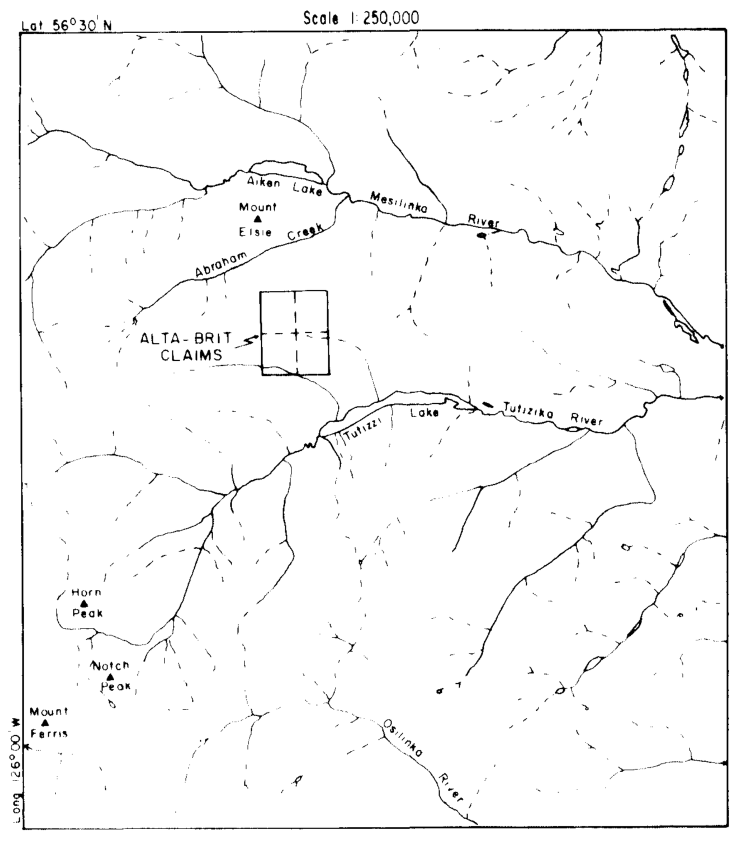
DATE: NOVEMBER 1981

0 100 500 1000 metres.



PROPERTY MAP

Scale 1:250,000



LOCATION MAP

Scale 1cm 24 Km

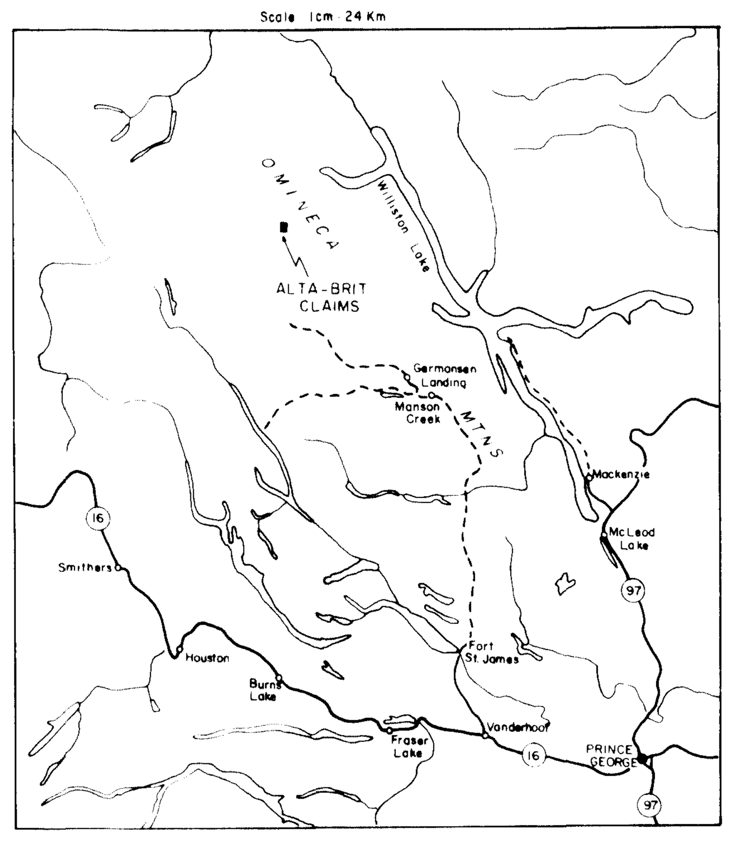


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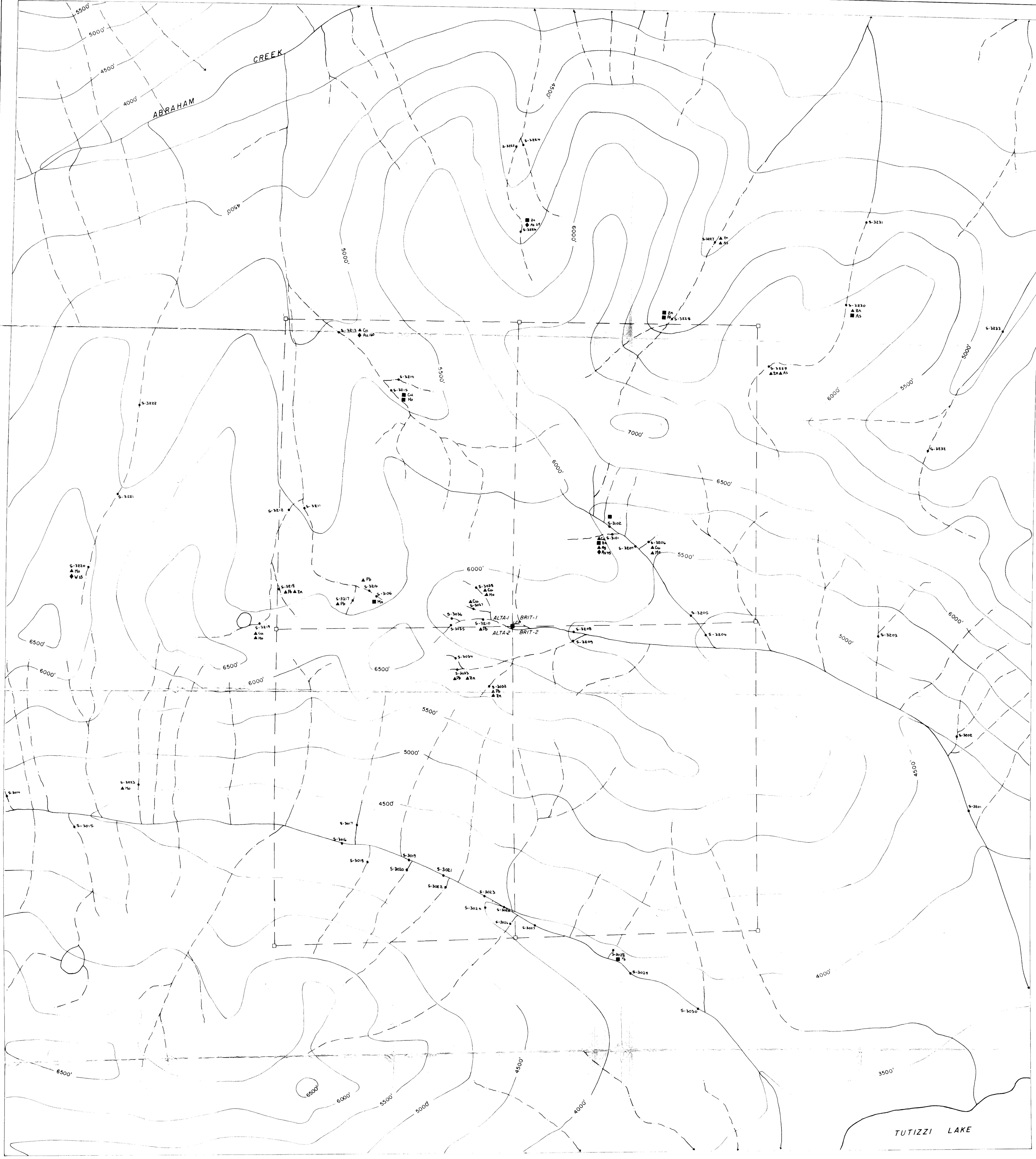
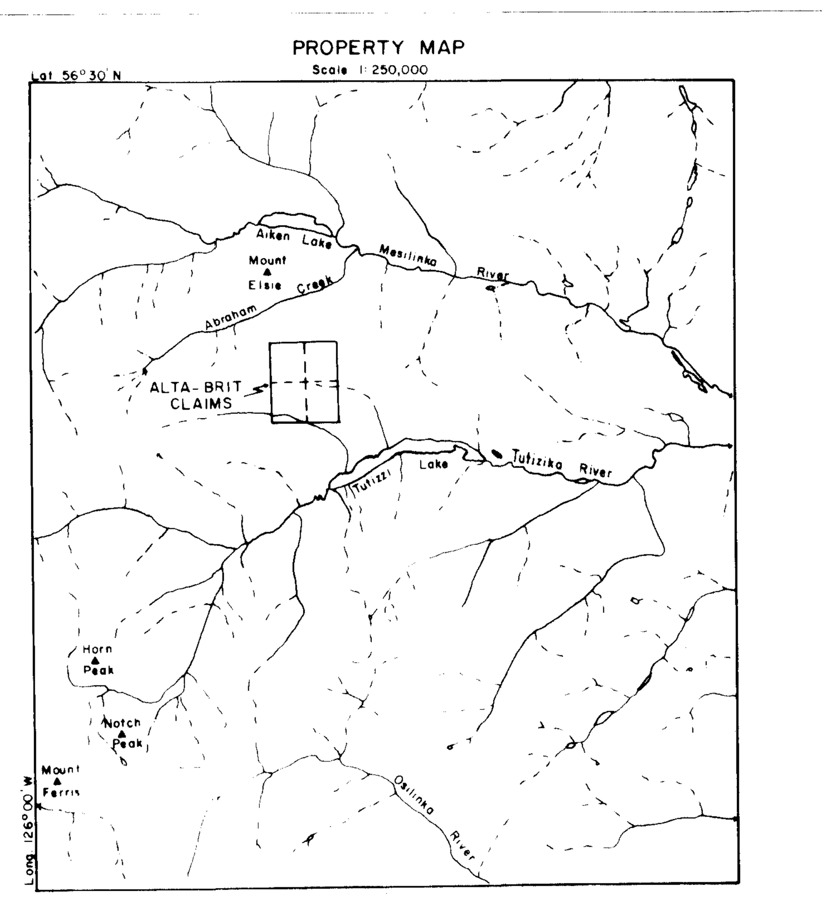
FIGURE 9

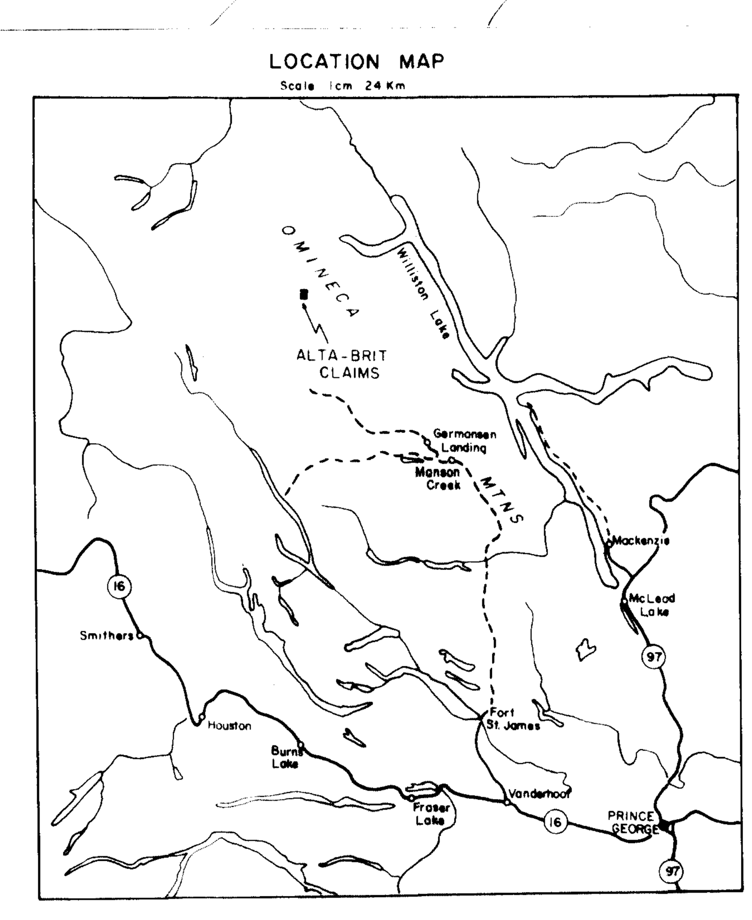
Stream Sediment Geochemistry Au (ppb), As, Sb (ppm)

DRAWN BY D.R. BULL

DATE NOVEMBER 1981







	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Mo ppm	W ppm	Au ppb	As ppm
▲ element	300-500	30 - 50	100-150	1 - 2	7 - 10	10 - 15	30 - 50	10 - 15
■ element	501-1000	51 - 100	151-200	2.1 - 3	11 - 20	16 - 20	51 - 100	16 - 20
◆ element value	› 1000	› 100	› 200	› 3	› 20	› 20	› 100	› 20

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FIGURE 10

STREAM SEDIMENT ANOMALY MAP

DRAWN BY: D.R. BULL.

DATE: NOVEMBER 1981

0 100 500 1000 metres.