81-#971. -#9747

ASSESSMENT REPORT

GEOLOGICAL AND GEOCHEMICAL REPORT
ON THE
NUB MTN. CLAIM GROUP (92 UNITS)

OMINECA MINING DIVISION

94E/7E,7W

by

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and
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9747

LOCATION: 57°15' to 57°18' N Latitude
126°42' to 126°46' W Longitude

OWNER/OPERATOR: SEREM LTD.

DATES WORK PERFORMED: August 26, 27, 1980
June 29th to July 7th, 1981

DATE OF REPORT: NOVEMBER 1981

ABSTRACT

Geological mapping, prospecting and soil and rock geochemical sampling were carried out on the Nub Mtn. claims during late August 1980 and late June to early July 1981. The claims are located in the Toodoggone River area (N.T.S. 94E/7E), 280 kilometres north of Smithers, B.C.

The area is underlain by Takla and Toodoggone volcanics intruded by multiple-phase plutons. Fracture-controlled hydrothermal alteration related to the intrusions occurs in all rocks. Quartz vein stockworks are common and may contain up to ten percent combined pyrite, chalcopyrite, galena and sphalerite. Gold and silver values in veins are highly variable.

Veining appears to be too sparse and too low-grade to be of economic value. However, since heavy snow conditions hampered the 1981 work, further prospecting, systematic sampling and possibly trenching should be carried out.

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INTRODUCTION

The Nub Mtn. claim group is located between 57°15' N and 57°18' N latitude and 126°42' W and 126°46' W longitude in the Toodoggone River map sheet area, N.T.S. 94E/7E, Omineca Mining Division (see Figures 1 and 2). Elevation ranges from about 1080 metres to 2087 metres above sea level: topography is moderately rugged except for a few cliff areas. Outcrop is well exposed on mountaintops, but is generally sparse elsewhere. Over half the property lies above treeline. Heavy snow cover hampered exploration work carried out in late June and early July 1981.

Access to the property is by fixed wing from Smithers to Sturdee Airstrip, a distance of 280 kilometres and from Sturdee Airstrip to the property by helicopter, a distance of 22 kilometres.

The claims are owned and operated by Serem Ltd. The claim group consists of Nub Mtn. 1, 2, 3 and 4, 20 units each, and Nub Mtn. 5, 12 units. They were staked on the basis of anomalous silt samples from streams draining the claims area. No previous work has been reported.

Work performed in 1980 and 1981 by Serem Ltd. includes geochemical soil sampling along contour traverses and on one grid; geological mapping, prospecting and selective geochemical rock sampling. 288 soil samples were analysed for gold, silver, copper, lead and zinc, and 132 rocks were analysed or assayed for one or more of these five elements. The number and type of samples taken on each claim are listed in Table 1. The purpose of work was to locate the source of stream anomalies and evaluate favourable geology.

Table 1.

Claim	Sample type			
	silt	soil (contour)	soil (grid)	rock
Nub Mtn. 1		9	82	20
Nub Mtn. 2	3	19	124	21
Nub Mtn. 3		37		25
Nub Mtn. 4		14		52
Nub Mtn. 5				14
Total	3	79	206	132 (98 geochem. 34 assay)

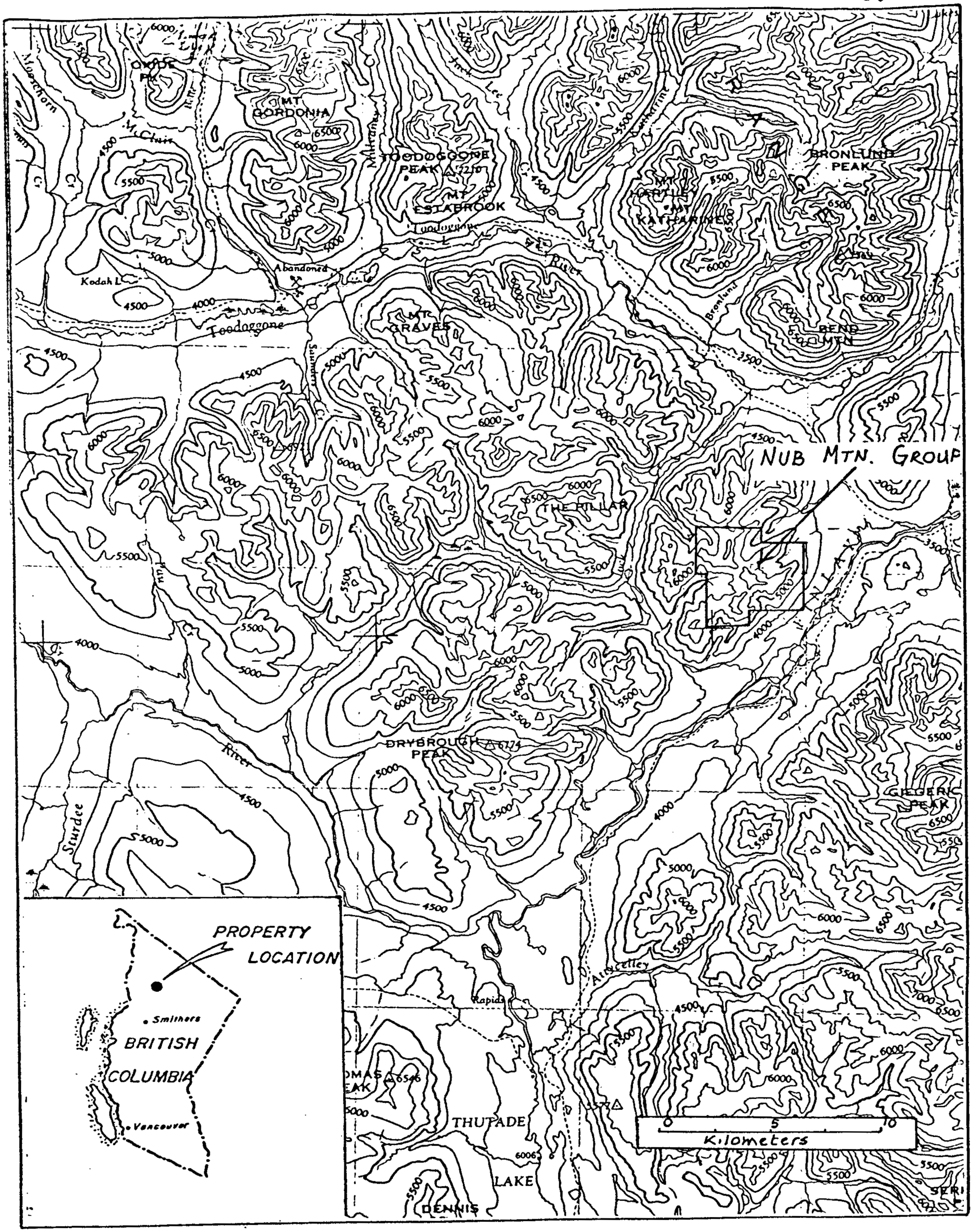

Fig. 1. Location Map: Nub Mtn. Group.

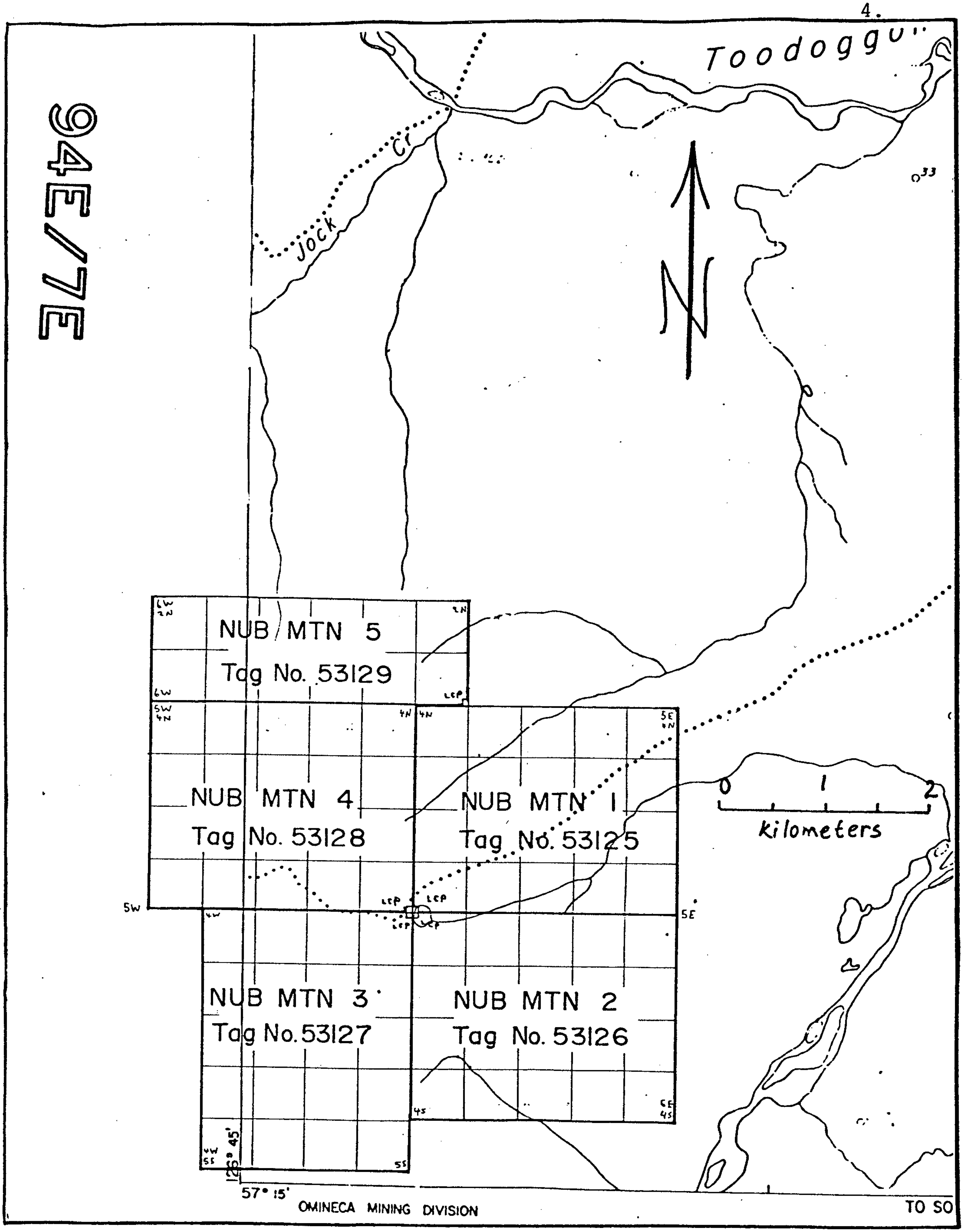

Fig. 2. Claims Map: Nub Mtn. Group.

GEOLOGY

The claims are underlain by volcanics and derived sediments, intruded by multiple-phase plutons (Figure 3a). Volcanics are similar to those described as Upper Triassic Takla and Lower Jurassic Toodoggone Group volcanics, and intrusives similar to Lower to Middle Jurassic Omineca granodiorites and quartz monzonites.

'Takla' volcanics consist of green to grey andesitic flows, subaqueous tuffs and derived greywacke and conglomerate. White plagioclase and dark green pyroxene phenocrysts are common. Coarse, bladed plagioclase porphyry occurs in the northeast corner of the claims.

'Toodoggone' volcanics can be divided into quartz-bearing and non-quartz-bearing groups. The former may contain from 2 to 20% quartz phenocrysts and is the most common type on the claims. Both contain from 10 to 35% plagioclase and rare potassic feldspar phenocrysts. Rock types include unwelded and welded crystal tuff and crystal lapilli tuff, volcaniclastics and rare pyroclastic breccias.

A large multiple-phase pluton outcrops on the east half of the claims, and small stocks and dikes are common throughout the claims area. The coarse-grained older phase of the pluton contains 20-25% quartz, 65-70% equigranular to slightly porphyritic plagioclase and potassic feldspar (plag > K-spar), and 5-10% hornblende and biotite. This phase is intruded by feldspar porphyry, composed of 2-30% coarse, euhedral plagioclase phenocrysts in a pink-orange, fine-grained to aphanitic groundmass. The groundmass stains yellow, indicating abundant potassic feldspar. Visible quartz is rare to absent. Dikes intruding the volcanics may or may not be quartz-eye bearing, and are probably feeders to the two types of volcanic rocks. Fine-grained mafic dikes intrude all other rock types in the area.

The rocks are highly fractured due to extensive faulting and to intrusion of the plutons. The tectonic regime is not well understood, but both oblique shears and normal faults are observed. Dominant trends are approximately 150^{o} and 120^{o}. Fault-related fractures dip from nearly horizontal to vertical and observed offsets range from a few centimetres to a few metres. Offsets occur within the intrusion and in mineralized fractures, indicating that faulting continued after both the intrusive and mineralizing events.

ALTERATION AND MINERALIZATION

Figure 3b illustrates the major types of alteration in the claims area. Propylitic alteration (chlorite + epidote + calcite ± pyrite) is virtually ubiquitous. Exceptions to this are the areas of intense hematization. Potassic feldspar occurs in fractures in volcanics immediately adjacent to intrusives, and 'Takla' volcanics tend to be skarnified (magnetite ± actinolite ± epidote ± pyrrhotite) in contact with intrusives. Extensive portions of the volcanics have been pyritized and in turn acid-leached to produce pronounced gossans. Quartz-sericite-pyrite, zeolite and argillic (kaolinite ?) alteration occur along some faults. In the intrusives themselves, fracture-controlled potassic and propylitic alteration zones are common.

Quartz vein breccias and stockworks occur in both the volcanics and the intrusives. Quartz is generally massive to cockscomb-textured and colourless, white, grey or hematite stained. Veins may contain disseminated pyrite, galena, chalcopyrite, sphalerite and rarely bornite, up to 10% combined. Other gangue minerals include calcite, epidote, chlorite, potassic feldspar, orange zeolites, barite (possibly strontianite), specularite, gypsum (rare), magnetite, manganese oxides and limonite. A few sulphide veins have been observed. The largest one is approximately 12 metres in exposed length and 10 to 30 centimetres wide, and consists of layers of pyrite, sphalerite, galena and chalcopyrite (see sample SC-19-81-5). Gold and silver values are associated with both sulphide-bearing and non-sulphide-bearing veins, but are extremely erratic.

GEOCHEMICAL SOIL AND SILT SAMPLING

Soil samples were taken at 100 to 150 metre intervals on traverses at approximately constant elevation. Pacing or Topofil was used to control distance and the localities were plotted at a scale of 1 centimetre to 100 metres. The soil grid was set using Topofil and compass. Samples were taken at 50-metre intervals on lines 50 metres apart. The soil was placed in brown paper envelopes and the locality, and characteristics such as depth of sampling, horizon, colour, grain size and amount of organic material, were noted. Soils in this area have little or no B horizon, and are developed on talus or glacial till. Thick humus layers are developed in areas of poor drainage.

GEOCHEMICAL ROCK SAMPLING

All rocks are grab samples of outcrop or float with favourable geology. Samples were plotted at a scale of 1 centimetre to 100 metres and the rock type recorded.

GEOCHEMICAL ANALYSIS

All samples were sent to Min-En Laboratories of North Vancouver for analysis. Gold assays are fire assays with an atomic absorption finish. The analytical procedures for geochemical analyses are described below:

> The samples are dried at 95^{o} C. Soil and stream sediment samples are screened by 80 mesh sieve to obtain the minus 80 mesh fraction for analysis. The rock samples are crushed and pulverized by ceramic plated pulverizer.
>
> For gold, a suitable sample, weight 5 or 10 grams, is pretreated with HNO_3 and $HClO_4$ mixture.
>
> After pretreatment, the samples are digested with Aqua Regia solution, and after digestion the samples are taken up with 25% HCl to suitable volume.
>
> Sample solutions are prepared with Methyl Iso-Butyl Ketone for the extraction of gold.
>
> With a set of suitable standard solutions, gold is analysed by Atomic Absorption instruments. The obtained detection limit is 5 ppb.
>
> For silver, lead, zinc and copper, samples weighing 1.0 gram are digested for 6 hours with HNO_3 and $HClO_4$ mixture.
>
> After cooling, the samples are diluted to standard volume. The solutions are analysed by Atomic Absorption Spectrophotometers using the CH_2H_2-Air Flame combination.

GEOCHEMICAL RESULTS AND INTERPRETATION

Gold and silver analyses for contour soils and the three silts are plotted on Figure 4a, and copper, lead and zinc on Figure 4b. Threshold values are underlined with a light line and anomalous values with a heavy line.

Gold and silver are marginally anomalous in the vicinity of quartz vein stockworks (up to 130 ppb gold and 5.6 ppm silver). Copper, lead, and zinc anomalies occur downslope from areas where sulphide-bearing veins have been discovered. These anomalies reflect the erratic nature of vein mineralization.

Gold, silver, copper, lead and zinc analyses of the soil grid are plotted on Figures 5b to 5f respectively. Figure 5a is a 1:10,000 scale location map of the soil grid, and Figure 5g is a plot of anomalies in all five elements.

Anomalies are quite erratic and generally low to moderate. The highest values obtained in each element are 325 ppb gold, 5.0 ppm silver, 265 ppm copper, 150 ppm lead, and 1280 ppm zinc. As can be seen in Figure 5g, anomalies in different elements correlate poorly. The distribution pattern may be explained by several factors. The samples are taken in hummocky terrain consisting of organic rich pockets and mounds and ridges of glacial till. Distribution patterns of float on surface indicate that distance to bedrock varies over the grid area. Lastly, the type of mineralization seen elsewhere in outcrop is erratic in distribution.

Rock assays are listed in Table 2a and rock geochemical analyses in Table 2b. The localities are plotted on Figure 6. Most samples are from quartz vein stockworks in volcanic rocks. Although one quartz vein sample runs .312 oz/ton gold and 11.98 oz/ton silver, values are mostly subeconomic.

CONCLUSIONS AND RECOMMENDATIONS

Extensive, zoned, fracture-controlled alteration in the volcanics and intrusives indicates that a hydrothermal system was active in these rocks. Quartz vein stockwork and base metal sulphides occur in both volcanic and intrusive rocks over a large area of the property. Variable amounts of gold and silver are associated with these occurrences. At present, the veining appears to be too sparse and erratic to be economic. Because heavy snow conditions hampered complete coverage of the area in 1981, further prospecting is required. Systematic channel or chip sampling and trenching should be carried out in areas where high analytical values have been obtained.

Table 2a. Assay Results.

Sample No.		Rock Type	Gold Oz/ton	Gold G/Tonne	Silver Oz/ton	Silver G/Tonne	Copper %	Lead %	Zinc %
JC-10-81-	1	Limonitic grey quartz vein	.001	.03	.29	9.9	.060	.04	1.05
	2	Quartz vein with calcite and hematite	.002	.07	.58	19.8	.288	.10	2.94
	3	Chalcopyrite-epidote-calcite veined, silicified volcanic	.002	.07	.28	9.6	.100	.08	1.28
	4	Hematitic quartz vein	.003	.10	.03	1.0	.016	.01	.03
JC-11-80-	1	Quartz-calcite vein in mafic volcanics	.003	.1	.16	5.5			
	2	Quartz vein	.002	.07	.20	6.8			
	3	Quartz vein in feldspar porphyry	.001	.04	.02	.7			
	3a	Quartz vein	.003	.1	.51	17.4			
	4	Calcite vein in mafic volcanics	.001	.04	.26	8.9			
	8	Quartz vein	.001	.04	.01	.3			
SC-44-80-	10	Grey quartz vein in volcanics	.003	.1	.10	3.4	.006	.01	.02
	11	"	.312	10.7	11.98	409.7	.004	.05	.10
	12	"	.004	.14	.27	9.2	.002	.01	.01
	15	"	.001	.04	.04	1.4	.006	.01	.03
	16	"	.001	.04	.09	3.1	.084	.03	.12
	17	Sphalerite/chalcopyrite vein in volcanic rock	.004	.14	.22	7.5	.042	.01	9.50
	18	Grey quartz vein in volcanics	.002	.07	.03	1.0	.006	.01	.06
	19	Quartz vein	.010	.34	1.41	48.2	1.25	.58	.01
	20	Jasper and grey quartz	.007	.24	1.41	48.2	.098	.01	.13
SC-45-80-	1	Chalcopyrite & pyrite fracture fillings in volcanic conglomerate	.005	.17	1.23	42.1	6.95	.05	.01
	5	Quartz-carbonate vein with chalcopyrite and galena	.004	.14	.72	24.6	.975	.03	.02
	6	Grey quartz	.003	.1	1.78	60.9	6.180	.02	.01
	9	Volcanic with chalcopyrite	.004	.14	2.22	75.9	9.540	.01	.03
	13	Quartz vein in volcanic rock	.006	.2	.30	10.3	.153	1.70	1.28
	14	Grey quartz vein with pyrite	.005	.17	.02	.7			
	15	Quartz veinlets with pyrite	.006	.2	.05	1.7			
	17	Quartz-carbonate vein with sphalerite, pyrite & galena	.002	.07	.21	7.2	.036	.04	.57
	18	Quartz vein	.003	.1	.08	2.7		.01	
	22	Volcanic with limonite staining with chalcopyrite, galena and pyrite	.006	.2	.12	4.1	.040	.09	.11
	26	"	.039	1.3	.23	7.9	.019	.07	.50

.... Continued

Table 2a. (Continued)

Sample No.	Rock Type	Gold Oz/ton	Gold G/Tonne	Silver Oz/ton	Silver G/Tonne	Copper %	Lead %	Zinc %
SC-45-80-28	Quartz-epidote fracture fillings with galena and pyrite	.002	.07	.03	1.0		.06	
31	Quartz-carbonate veinlets with chalcopyrite and pyrite	.006	.2	.12	4.1	.080		.07
32	Chalcopyrite fracture fillings in volcanics	.301	10.3	.89	30.4	5.260		4.94
SC-14-81-14	Quartz K-spar vein with chalcopyrite in intrusive	.002	.07	.20	6.8	.429		

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Table 2b. Rock Geochemical Analyses

Sample No.	Rock Type	Gold parts per billion (ppb)	Silver	Copper	Lead	Zinc
			parts per million (ppm)			
MC-17-80- 2	Quartz vein with pyrite in propylitic altered volcanic	30	1.4	11	25	203
3	"	20	1.9	135	63	53
4	Vuggy quartz vein with pyrite, trace bornite	45	2.2	45	51	258
6	Quartz vein with malachite, chalcopyrite, galena in propylitic altered volcanic	20	3.9	502	3175	3690
10	Quartz-galena vein in silicified andesite			68	7650	5050
[illegible]	Quartz vein with bornite, pyrite in volcanic	320	10.3	1825	5500	5500
JC-11-80- 7	K-spar altered porphyritic volcanic	25	1.2	47	335	406
SC-44-80- 3	Quartz vein breccia in volcanic	5	8.4	1540	1450	5500
5	Feldspar porphyritic volcanic with disseminated pyrite	5	1.2	18	38	220
7	Pyroclastic volcanic with disseminated pyrite	10	1.8	15	42	160
SC-45-80- 3	Quartz calcite pyrite vein in mafic volcanic	260	1.2	86	27	41
25	Quartz calcite pyrite vein in volcanics	105	1.0	39		
19	"	205	5.6	242	136	5700
11	Grey mottled quartz vein with iron oxides	105	1.0	39		
SC-14-81- 1	Quartz + calcite + chlorite + pyrite + manganese oxide vein (float)	5	0.8			
4	Quartz stringers in propylitic altered intrusive (float)	10	0.6			
9	Quartz vein with 1% pyrite + manganese oxide	185	0.9			
10	" in intrusive	5	0.8			
SC-15-81- 3	Propylitic altered volcanic; manganese oxide in vugs (float)	5	1.1			
6	Quartz feldspar crystal tuff; minor chalcopyrite	100	14.2			
9	Massive quartz vein, minor pyrite, chalcopyrite, pyrolusite (float)	85	2.6			
SC-16-81- 2	Quartz feldspar crystal tuff, minor chalcopyrite (float)	280	19.2	5000		
4	Calcite vein with galena, pyrite	3300	3.3			
5	Quartz-calcite vein with galena, sphalerite, pyrite	3900	8.2			
6	Limonitic quartz feldspar crystal tuff	15	0.4			
SC-17-81- 1	Quartz-sericite-pyrite altered feldspar porphyritic volcanic	5	0.4			
8	"	5	0.3			
9	"	5	0.2			

.... Continued

Table 2b. (Continued)

Sample No.	Rock Type	Gold parts per billion (ppb)	Silver	Copper	Lead	Zinc
			parts per million (ppm)			
SC-17-81- 9	Quartz-sericite-pyrite altered feldspar porphyritic volcanic	5	0.2			
10	"	5	0.1			
11	"	5	0.4			
12	"	5	0.7			
13	"	5	0.4			
14	"	5	0.7			
15	"	5	0.4			
16	"	5	0.6			
17	"	5	1.3			
18	"	5	0.5			
SC-18-81- 3	Quartz stringers in intrusive; manganese-iron oxides	40	5.0			
4	½ m. channel samples across quartz vein, massive to vuggy, manganese-iron oxides, pyrite, minor chalcopyrite	15	6.0			
5	"	5	1.0			
6	"	720	3.2			
SC-19-81- 5	Pyrite-sphalerite-chalcopyrite vein	600	64.0	4400	850	35,000
9	Potassic-propylitic altered intrusive with quartz vein	15	1.8			
GD-12-81-11	Quartz vein with galena (float)	5	1.0			
GD-13-81- 8	Quartz vein with galena	150	3.3			
13	Intrusive with calcite + galena vein	5	5.9			
16	Vuggy quartz + barite vein	5	4.4			
17	"	35	1.0			
GD-14-81- 9	Quartz vein in silicified intrusive	5	0.4			
GD-15-81- 8	Silicified mafic volcanic with disseminated pyrite	5	0.5			
GD-16-81- 1	Quartz vein with galena, pyrite, malachite	195	5.6			
2	Mafic volcanic with galena, pyrite, malachite	320	1.6			
CC-14-81- 3	Feldspar porphyritic intrusive with pyrite, malachite	75	3.6			
4	Quartz vein (float)	10	0.8			
5	"	50	1.0			
9	Pyritic, propylitic altered volcanic	5	1.2			
10	"	5	0.8			
11	"	5	0.8			
12	Quartz veins from gossan (float)	5	0.6			

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Table 2b. (Continued)

Sample No.	Rock Type	Gold parts per billion (ppb)	Silver	Copper	Lead	Zinc
			parts per million (ppm)			
CC-15-81- 2	Quartz vein (float)	25	1.8			
4	"	100	4.5			
6	Quartz vein (outcrop)	95	1.7			
7	"	15	0.7			
CC-16-81-10	"	10	0.5			
11	"	25	1.8			
13	"	15	0.7			
14	"	10	1.8			
15	"	45	3.3			
CC-17-81- 1	"	4700	15.0			
2	"	400	4.3			
CC-18-81- 1	"	15	0.8			
2	Quartz vein with galena and sphalerite	7900	6.0			
6	Quartz vein (float)	160	0.5			
CL-13-81- 3	Blue grey quartz + epidote vein	1350	1.1			
CL-14-81- 7	Potassic-altered intrusive with chalcopyrite	10	1.1	260		
CL-15-81- 8	Quartz vein with galena	10	1.2			
BL-11-81- 7	Banded milky quartz vein, limonite stained	5	0.9			
10	"	5	0.7			
BL-12-81- 3	Quartz vein in hematized volcanic	5	1.8			
7	"	15	1.6			
9	"	5	2.3			
10	Quartz veins in argillic altered feldspar porphyry	5	1.2			
BL-13-81- 4	Quartz vein in mafic volcanic; malachite + chalcopyrite	10	2.8			
7	Quartz vein in feldspar porphyry with galena & chalcopyrite	5	1.3			
11	Quartz vein with pyrite, chalcopyrite	5	0.5			
BL-14-81- 2	Quartz vein in feldspar porphyry	5	0.3			
4	Feldspar porphyry with disseminated pyrite	15	1.5	140	30	91
BL-15-81-12	Quartz vein with chalcopyrite, malachite	5	5.1			
CG-14-81- 5	Grey quartz breccia in argillic-potassic altered volc.(float)	5	2.4			
6	"	5	1.9			

.... Continued

Table 2b. (Continued)

Sample No.	Rock Type	Gold parts per billion (ppb)	Silver	Copper	Lead	Zinc
			parts per million (ppm)			
CG-15-81- 2	Quartz vein in silicified volcanic	5	0.5			
CG-16-81- 5	Quartz stringers in potassic altered volcanics	5	0.9			
8	Silicified volcanic with sphalerite	10	3.6			
10	Copper stained argillic altered volcanic	5	3.8			
CG-17-81- 5	Siliceous argillic altered volcanic (float)	5	1.4			
6	"	5	0.2			
CG-18-81-11	Quartz + epidote altered volcanic with chalcopyrite and galena	25	8.5			
13	"	20	7.8			
14	Quartz epidote altered volcanic with pyrite and malachite	545	12.0			

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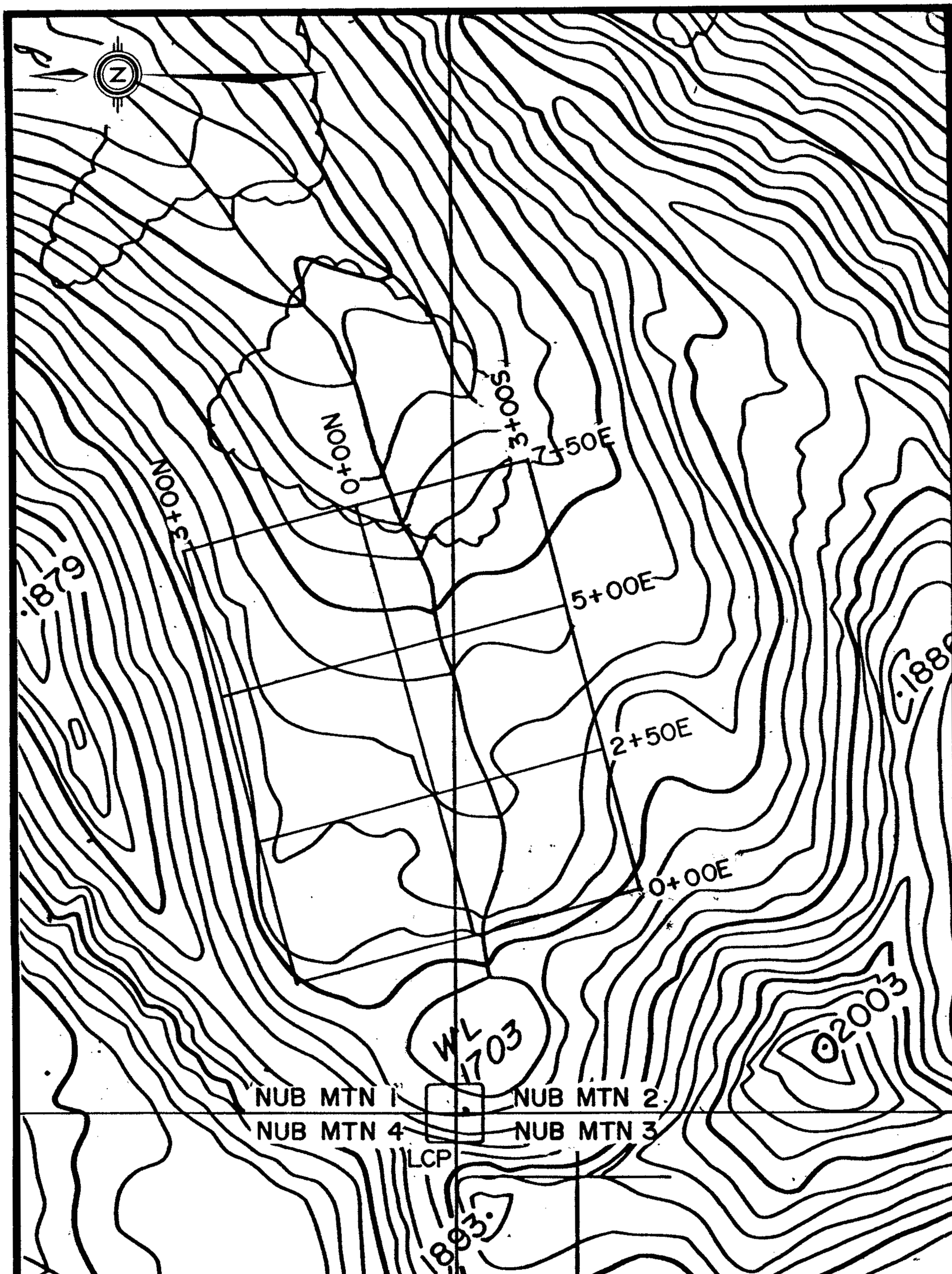
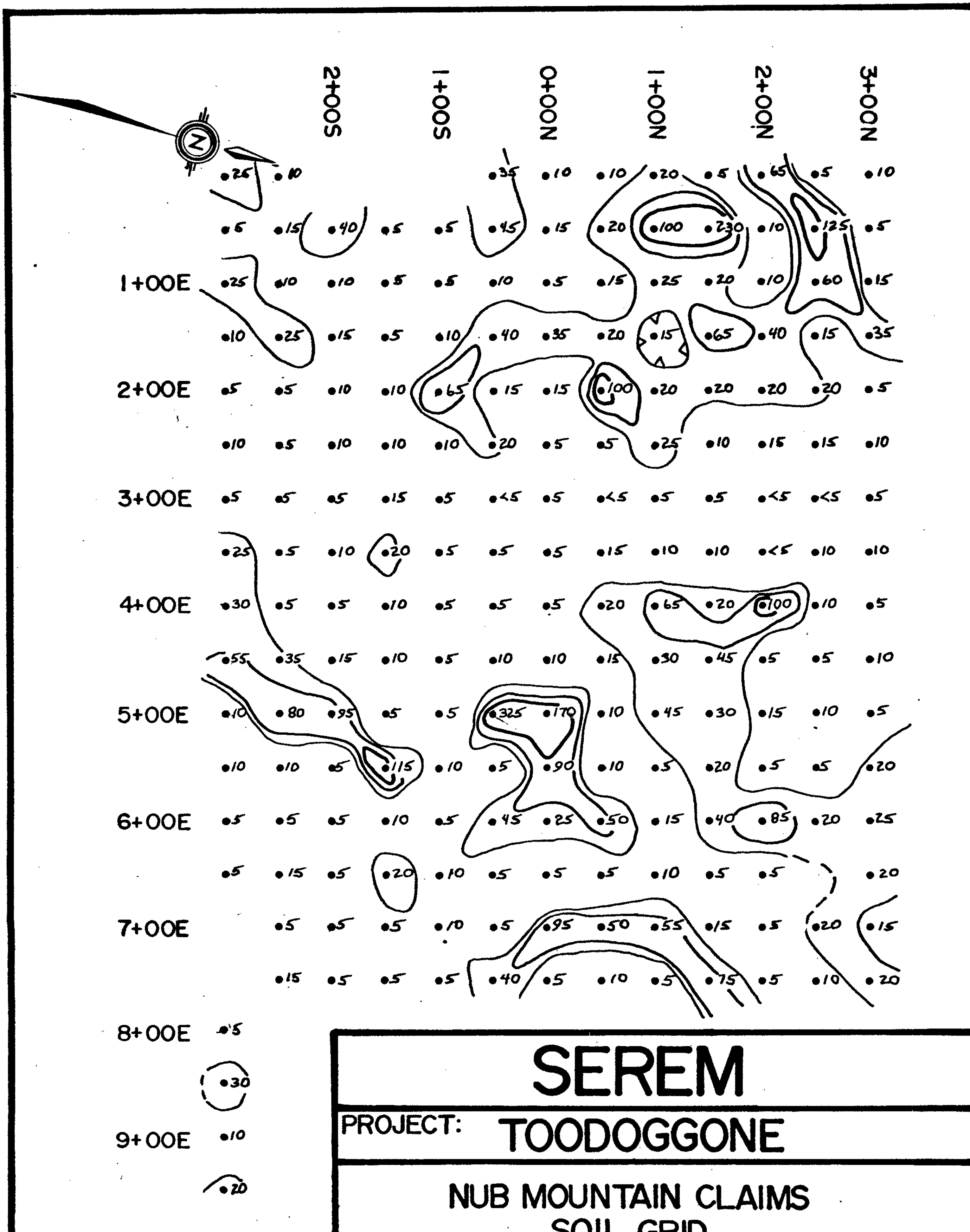


NUB MOUNTAIN SOIL GRID
LOCATION MAP

DATE: OCT. 1981	DATA: S.C.	FIGURE:
NTS: 94E/7W	DRAWN: C.G.	5a
SCALE: 1:10,000	0 100 200 300 400 500 Metres	



SEREM

PROJECT: TOODOGGONE

NUB MOUNTAIN CLAIMS
SOIL GRID,
GOLD IN SOILS

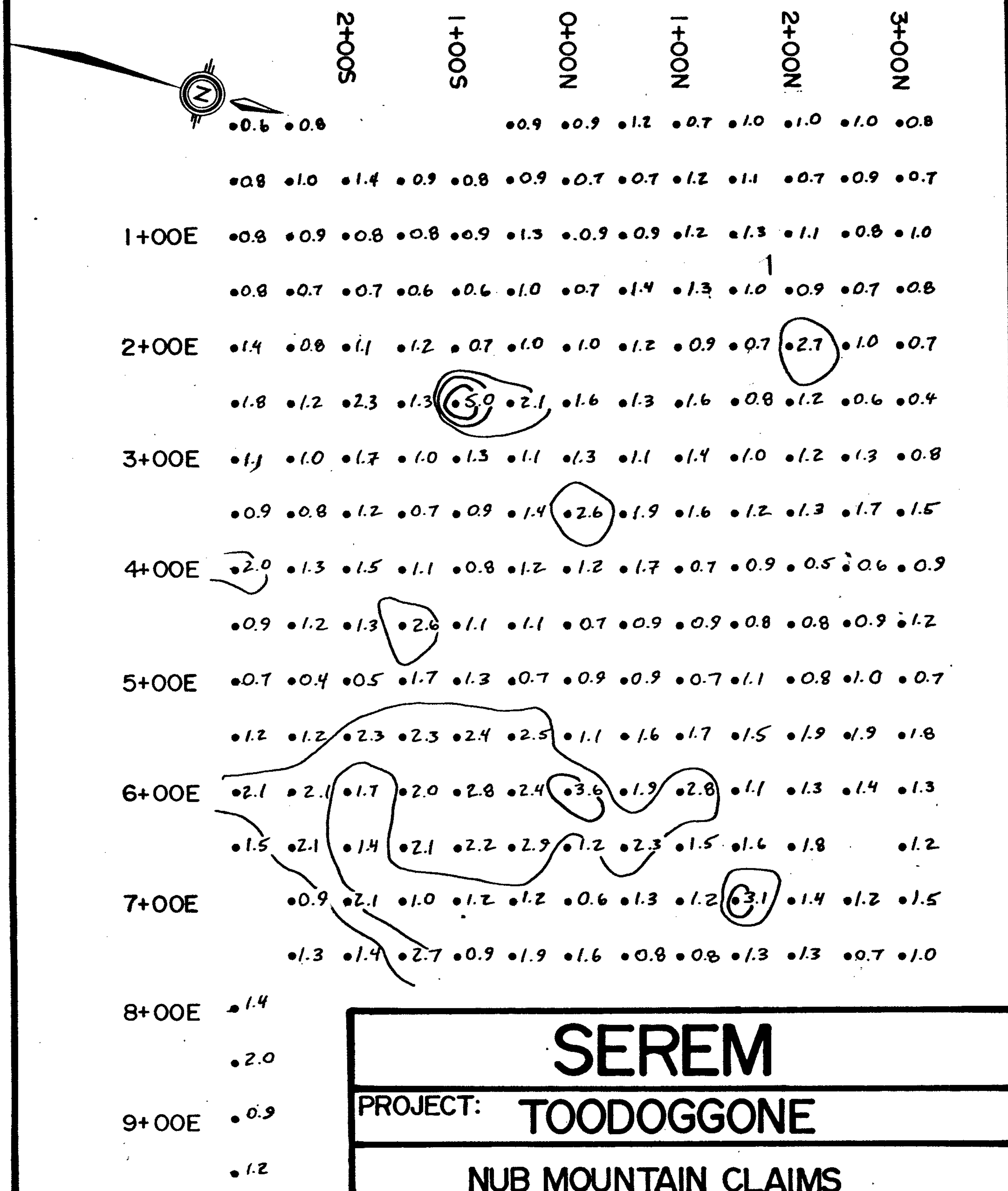
LEGEND

- • sample site, ppb Au
- ≥ 20 ppb Au
- ≥ 50 ppb Au
- ≥ 100 ppb Au

DATE: OCT. 1981	DATA: S.C.
N.T.S. 94E/7W	DRAWN: C.G.
SCALE: 1:5,000	CHECKED: [signature]

50 0 50 100 150 200 250 metres

FIGURE: 5b



SEREM

PROJECT: TOODOGGONE

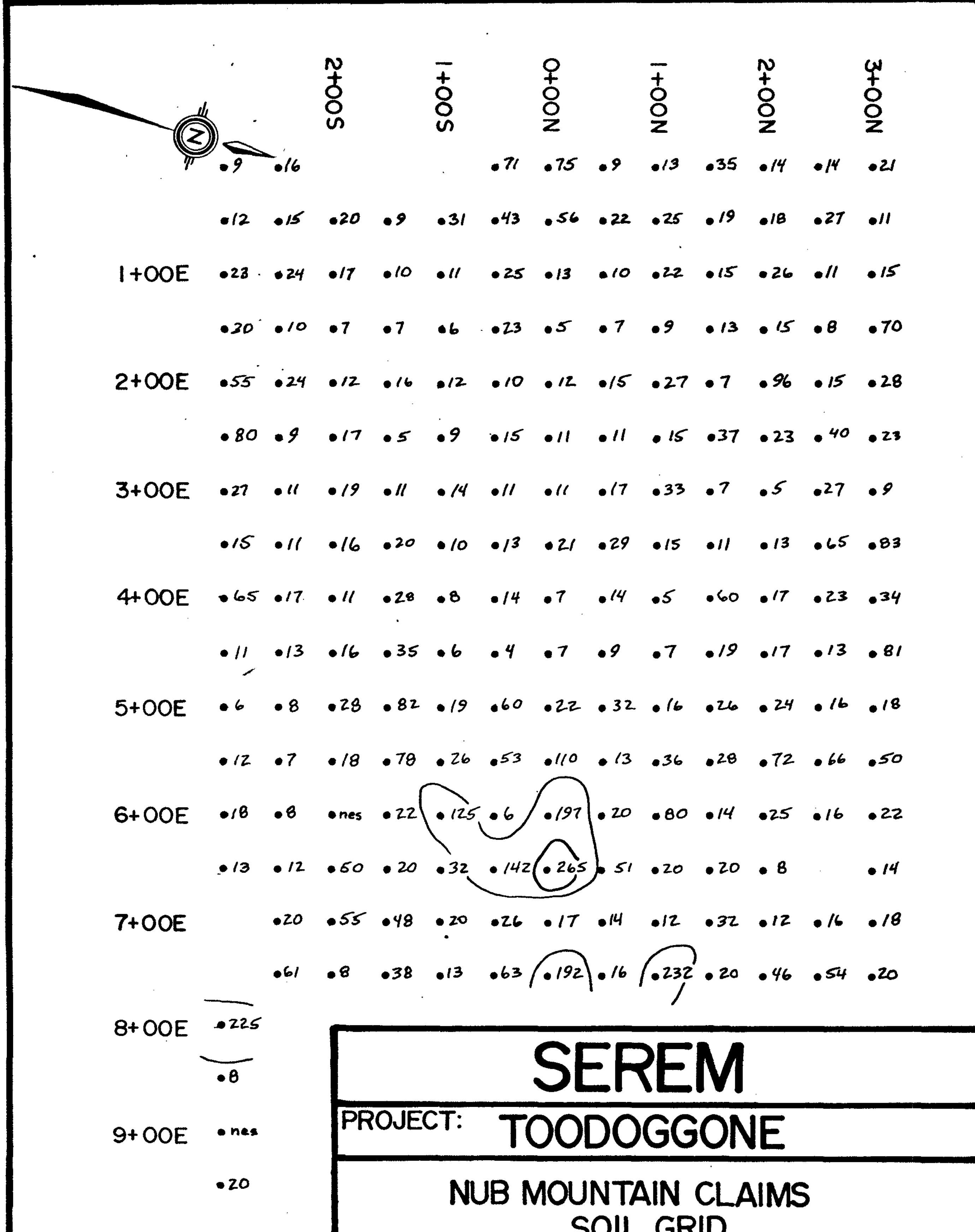
NUB MOUNTAIN CLAIMS
SILVER IN SOILS:
SOIL GRID

LEGEND

- • sample site, ppm Ag
- ≥ 2.0 ppm Ag
- ≥ 3.0 ppm Ag
- ≥ 4.0 ppm Ag

DATE: OCT. 1981	DATA: S.C.	FIGURE:
N.T.S. 94E/7W	DRAWN: C.G.	5c
SCALE: 1:5,000	CHECKED:	

50 0 50 100 150 200 250 metres



SEREM

PROJECT: TOODOGGONE

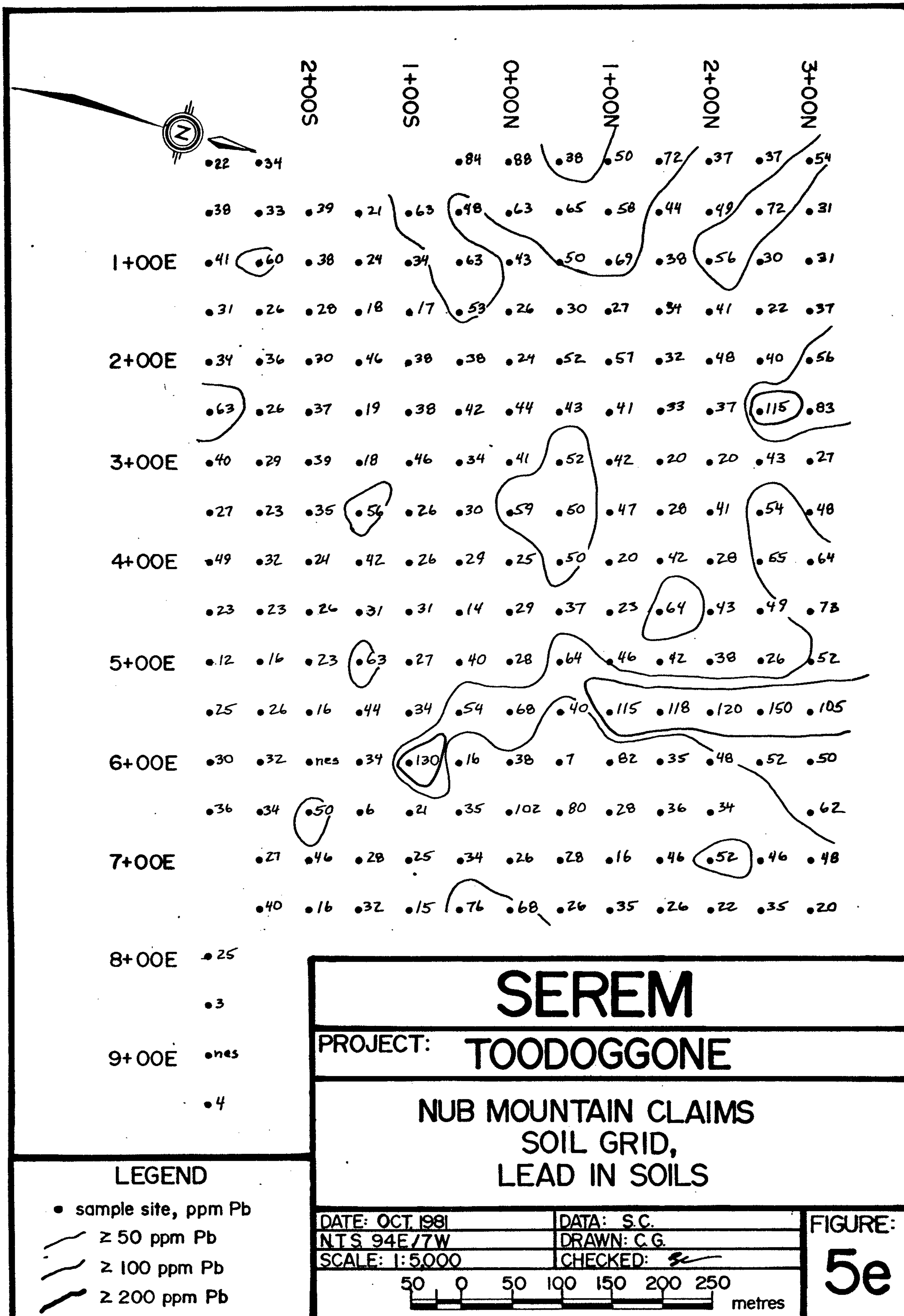
NUB MOUNTAIN CLAIMS SOIL GRID, COPPER IN SOILS

LEGEND

- • sample site, ppm Cu
- ≥ 120 ppm Cu
- ≥ 240 ppm Cu
- ≥ 480 ppm Cu

DATE: OCT. 1981	DATA: S.C.	FIGURE:
N.T.S. 94E/7W	DRAWN: C.G.	5d
SCALE: 1:5,000	CHECKED:	

50 0 50 100 150 200 250 metres



SEREM

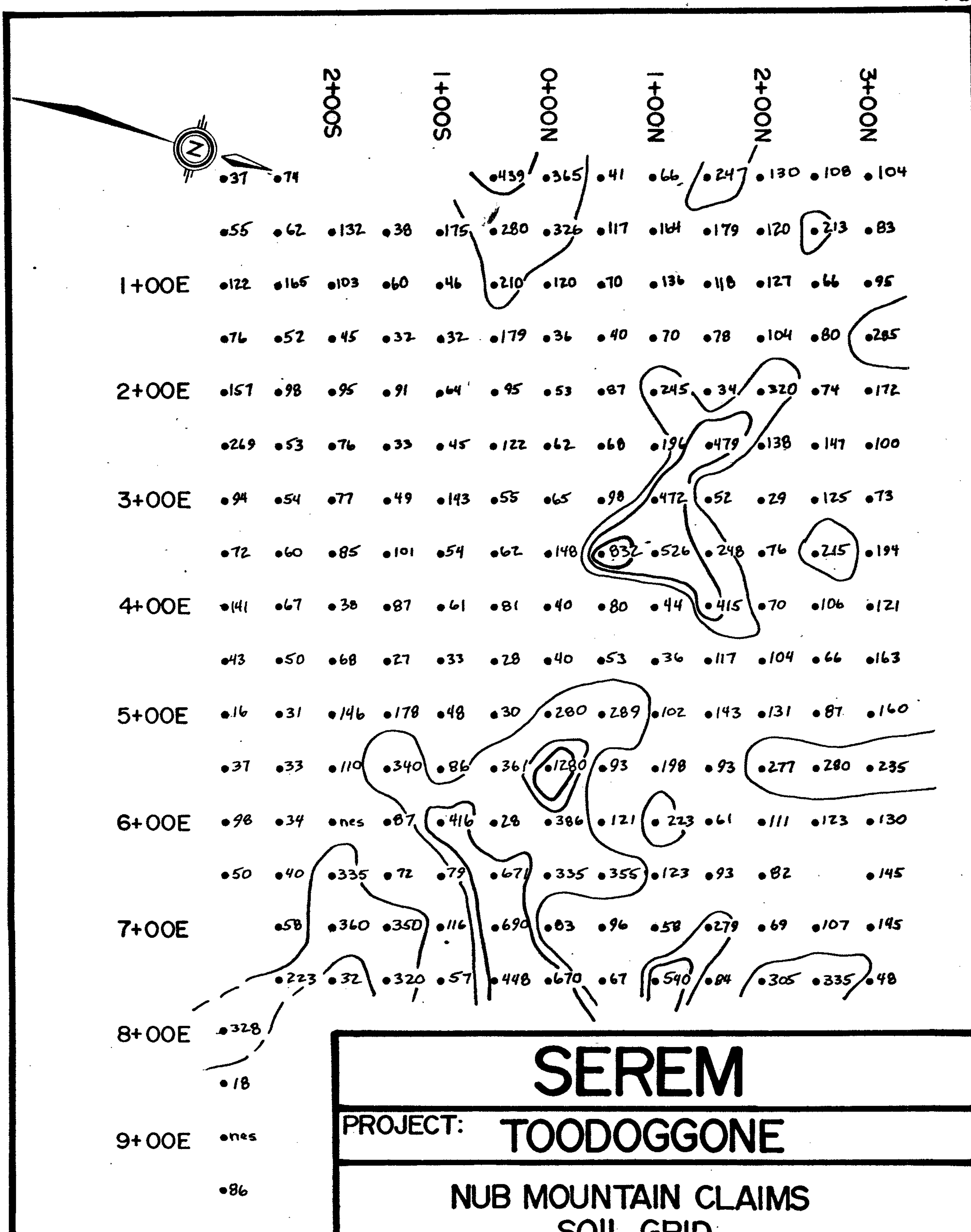
PROJECT: TOODOGGONE

NUB MOUNTAIN CLAIMS
SOIL GRID,
LEAD IN SOILS

DATE: OCT. 1981	DATA: S.C.
N.T.S. 94E/7W	DRAWN: C.G.
SCALE: 1:5,000	CHECKED:

50 0 50 100 150 200 250 metres

FIGURE: 5e



LEGEND

- sample site, ppm Zn
- ≥ 200 ppm Zn
- ≥ 400 ppm Zn
- ≥ 800 ppm Zn

SEREM

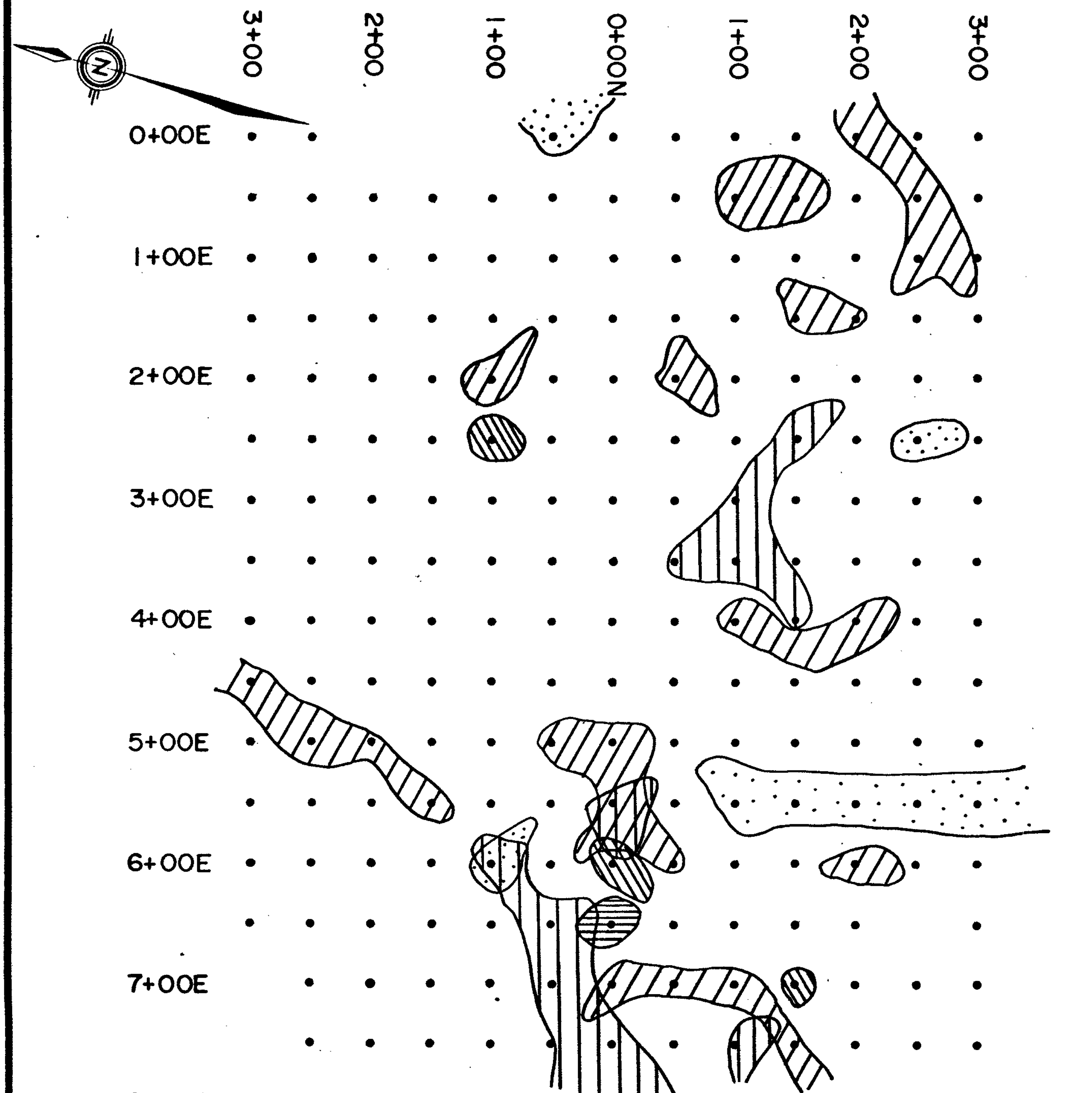
PROJECT: TOODOGGONE

NUB MOUNTAIN CLAIMS SOIL GRID, ZINC IN SOILS

DATE: OCT. 1981	DATA: S.C.
N.T.S. 94E/7W	DRAWN: C.G.
SCALE: 1:5,000	CHECKED:

50 0 50 100 150 200 250 metres

FIGURE: 5f



SEREM

PROJECT: **TOODOGGONE**

NUB MOUNTAIN CLAIMS

Au, Ag, Cu, Pb, Zn anomalies in the soil grid

DATE: OCT. 1981	DATA: S.C.	FIGURE:
N.T.S. 94E/7W	DRAWN: C.G.	5g
SCALE: 1:5,000	CHECKED:	

50 0 50 100 150 200 250 metres

LEGEND

- • sample site
- Au≥50 ppb
- Ag≥3.0 ppm
- Cu≥240 ppm
- Pb≥100 ppm
- Zn≥400 ppm

CERTIFICATE OF QUALIFICATIONS

I, Sheila A. Crawford, certify that:

1. I am a geologist, employed by Serem Ltd.

2. I have a Honours Bachelor of Science degree (First Class) in Geology from Carleton University in Ottawa, Ontario.

3. I have worked in mineral exploration or geological mapping since 1976 and have acted in responsible positions since 1979.

4. I personally examined the property and directed the geochemical survey.

5. I have no financial interest, either direct or indirect, in the property.

Vancouver, B.C.

Sheila A. Crawford.

CERTIFICATE OF QUALIFICATIONS

I, Mohan R. Vulimiri, certify that:

1. I am a geologist, employed by SEREM Ltd.
2. I am a graduate with a Master of Science degree in Economic Geology from the University of Washington.
3. I have been involved in mineral exploration in British Columbia since 1970 and have acted in responsible positions since 1974.
4. I have no financial interest, either direct or indirect, in the property.
5. The information contained in this report was obtained under my supervision.

Vancouver, B.C.

Mohan R. Vulimiri.

STATEMENT OF EXPENDITURES

Analyses: 1980 field season

Geochemical Analyses

11 rocks analysed for	Au, Ag, Cu, Pb, Zn	@ $10.25	$ 112.75	
2 " " "	Au, Ag, Pb	@ $ 8.75	17.50	
1 " " "	Cu, Pb, Zn	@ $ 5.25	5.25	
Assays				
21 rocks assayed for	Au, Ag, Cu, Pb, Zn	@ $30.00	630.00	
2 " " "	Au, Ag, Cu, Zn	@ $24.50	49.00	
2 " " "	Au, Ag, Pb	@ $18.50	37.00	
8 " " "	Au, Ag	@ $13.00	104.00	
Shipping cost from Smithers to Vancouver Laboratory	45 samples	@ $ .30	13.50	
				$ 969.00

Analyses: 1981 field season

Geochemical Analyses

2 rocks analysed for	Au, Ag, Cu, Pb, Zn	@ $11.95	23.90	
2 " " "	Au, Ag, Cu	@ $10.15	20.30	
80 " " "	Au, Ag	@ $ 9.25	740.00	
282 soils " "	Au, Ag, Cu, Pb, Zn	@ $10.55	2,975.10	
6 " " "	Au, Ag	@ $ 7.85	47.10	
Assays				
1 rock assayed for	Au, Ag, Cu	@ $24.75	24.75	
Shipping cost from Smithers to Vancouver Laboratory	373 samples	@ $ .30	111.90	
				$3,943.05

Wages

August 26th, 27th, 1980 - Geological mapping, prospecting and evaluation

J. Carne	1 day	@ $100	$ 100.00
M. Carr	1 day	@ $ 70	70.00
S. Crawford	1 day	@ $ 70	70.00
M. Vulimiri	1 day	@ $100	100.00

.... Continued on next page

STATEMENT OF EXPENDITURES (Continued)

Wages (Continued)

June 29th to July 7th, 1981 - Geological mapping and evaluation

S. Crawford	4 days	@	$ 92	$ 368.00	

- Geochemical rock and soil sampling

G. Dawson	4 days	@	$ 58	232.00	
C. Chisholm	4 days	@	$ 58	232.00	
C. Greig	2 days	@	$ 50	100.00	
B. Lane	2 days	@	$ 56	112.00	
C. Lormand	4 days	@	$ 50	200.00	
Report writing and map preparation					
S. Crawford	5 days	@	$ 92	460.00	
Drafting					
C. Greig	4 days	@	$ 56	224.00	
					$2,268.00

Board, Lodging and Field Expenses

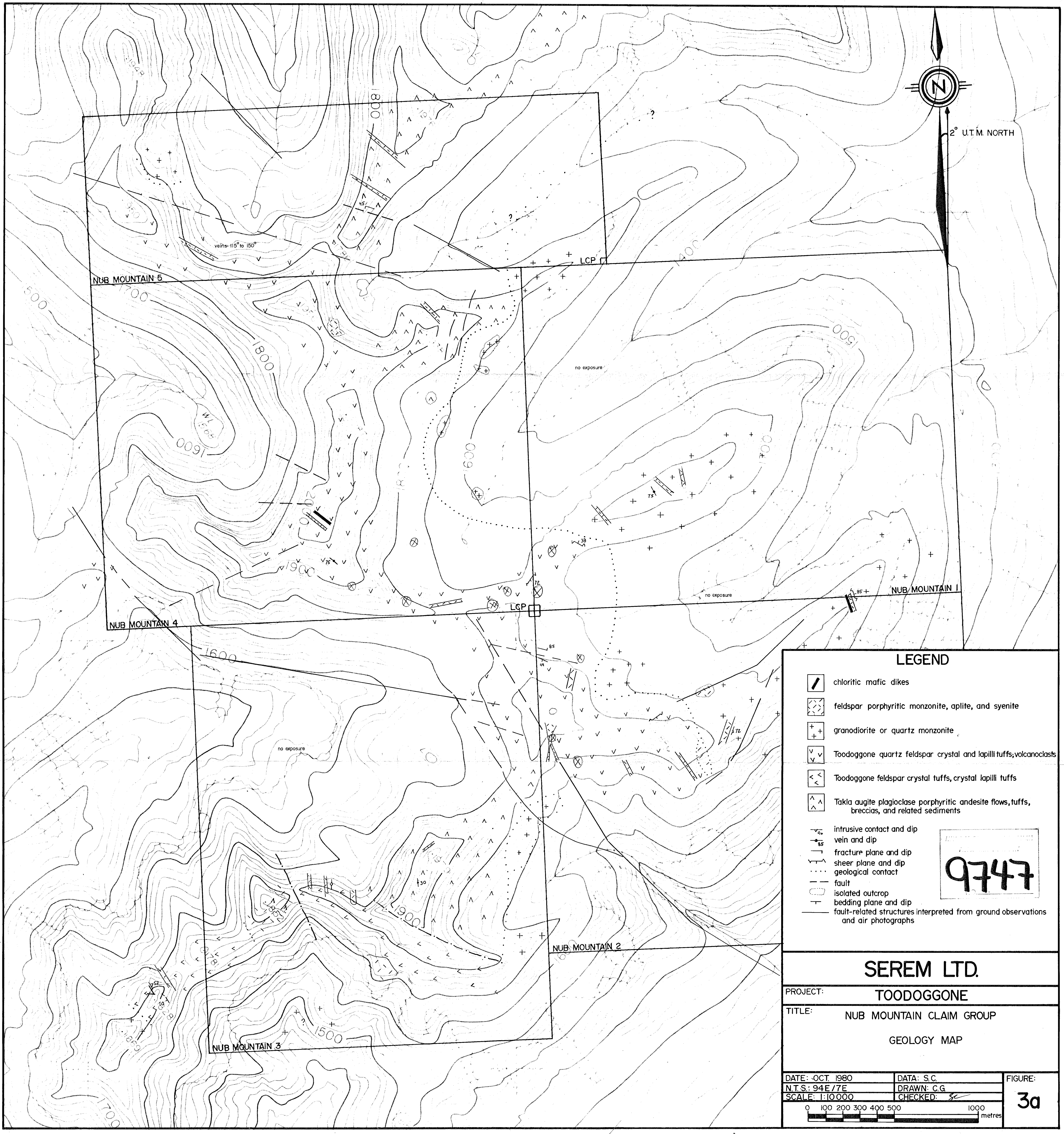
1980: $47.04 x 4 man-days	$ 188.16	
1981: $52.00 (est.) x 20 man-days	1,040.00	
		$1,228.16

Transportation

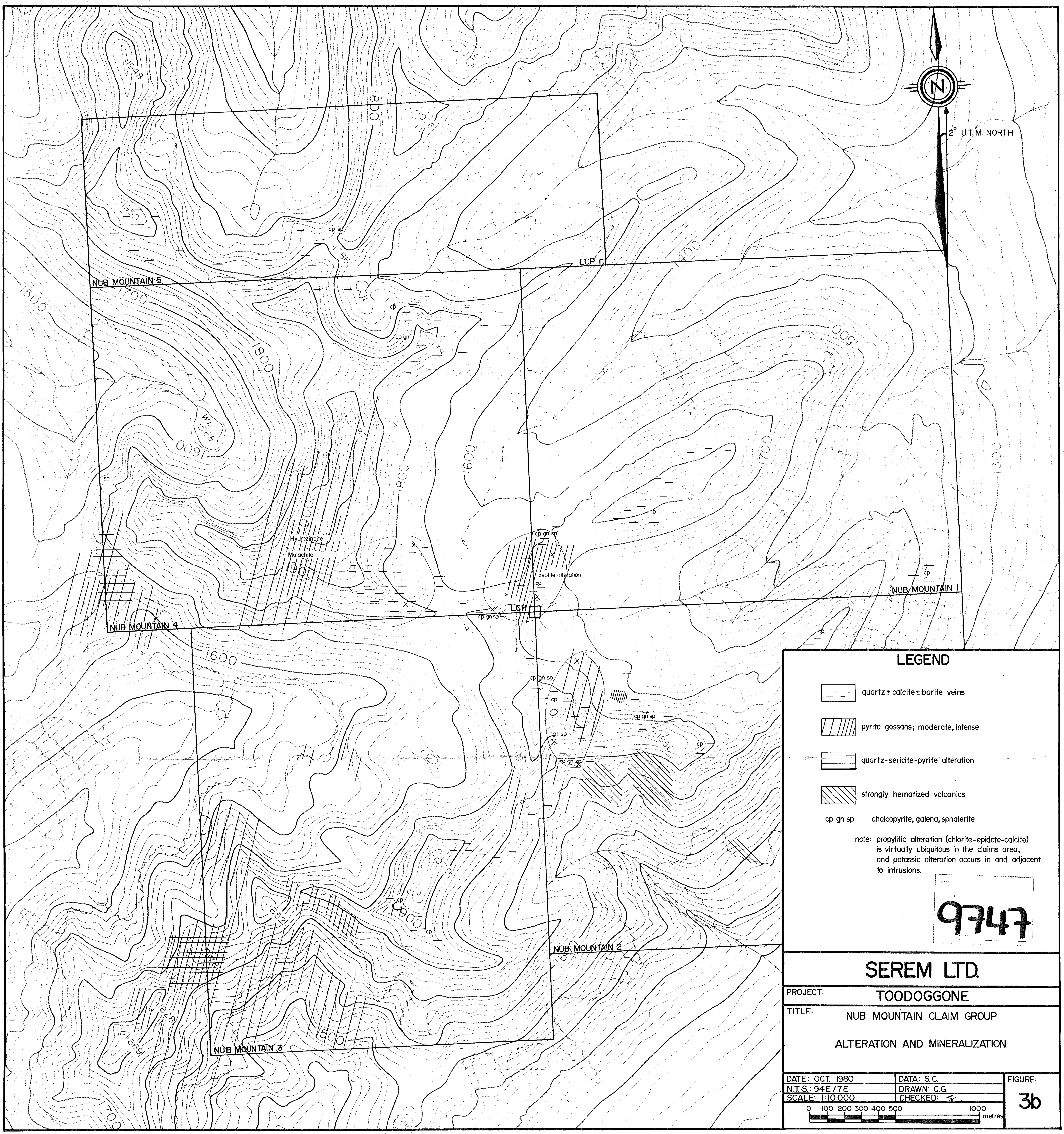
Helicopter - 1980: $310/hr + $102/hr fuel		
1 hour 55 minutes	$ 789.67	
- 1981: $475/hr (est.)		
8 hours 15 minutes	3,918.75	
		$4,708.42

Topographic Map - 1:10,000 scale, 20 m contour interval

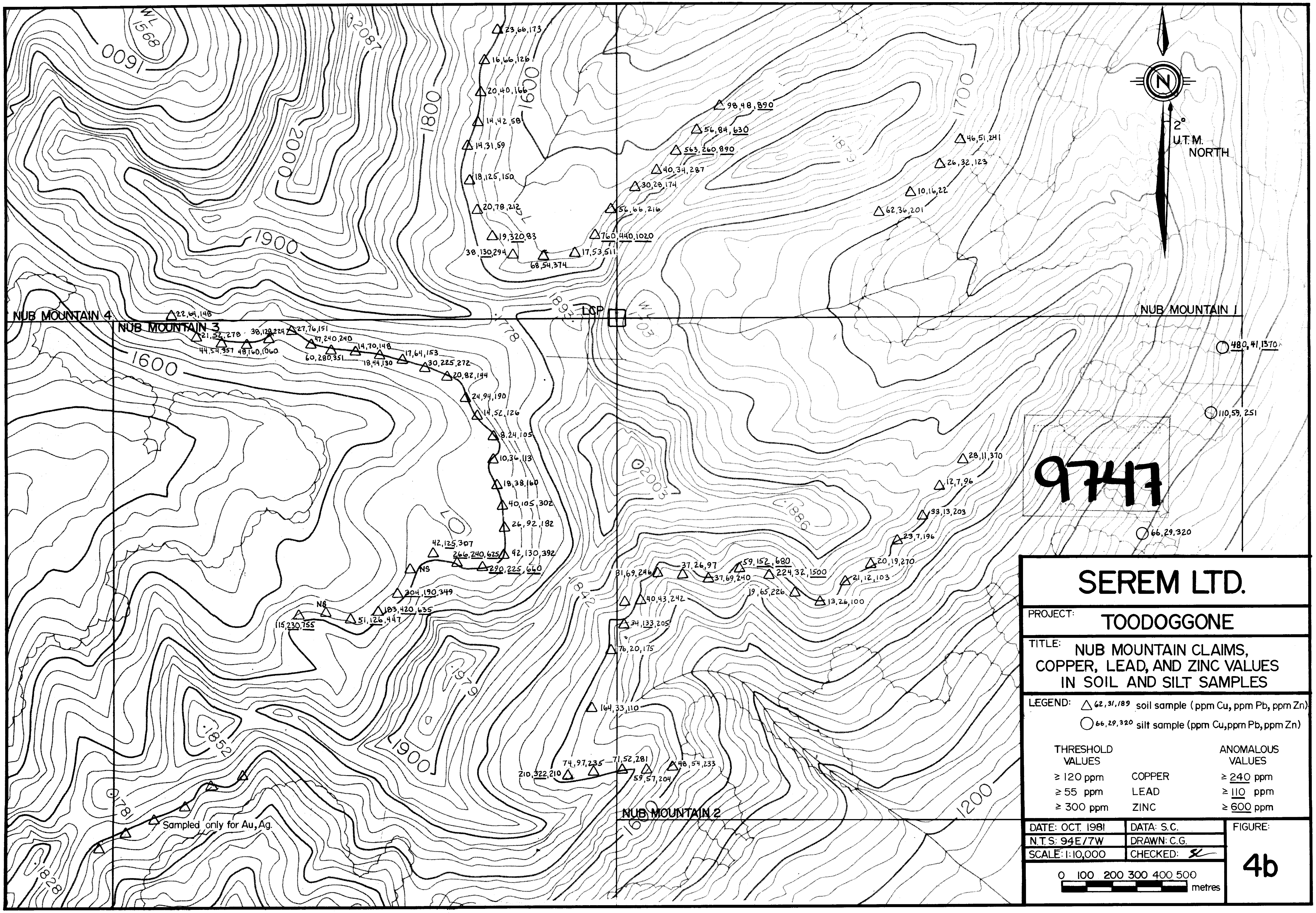
(Burnett Resources)	1,104.00
TOTAL	$14,220.63



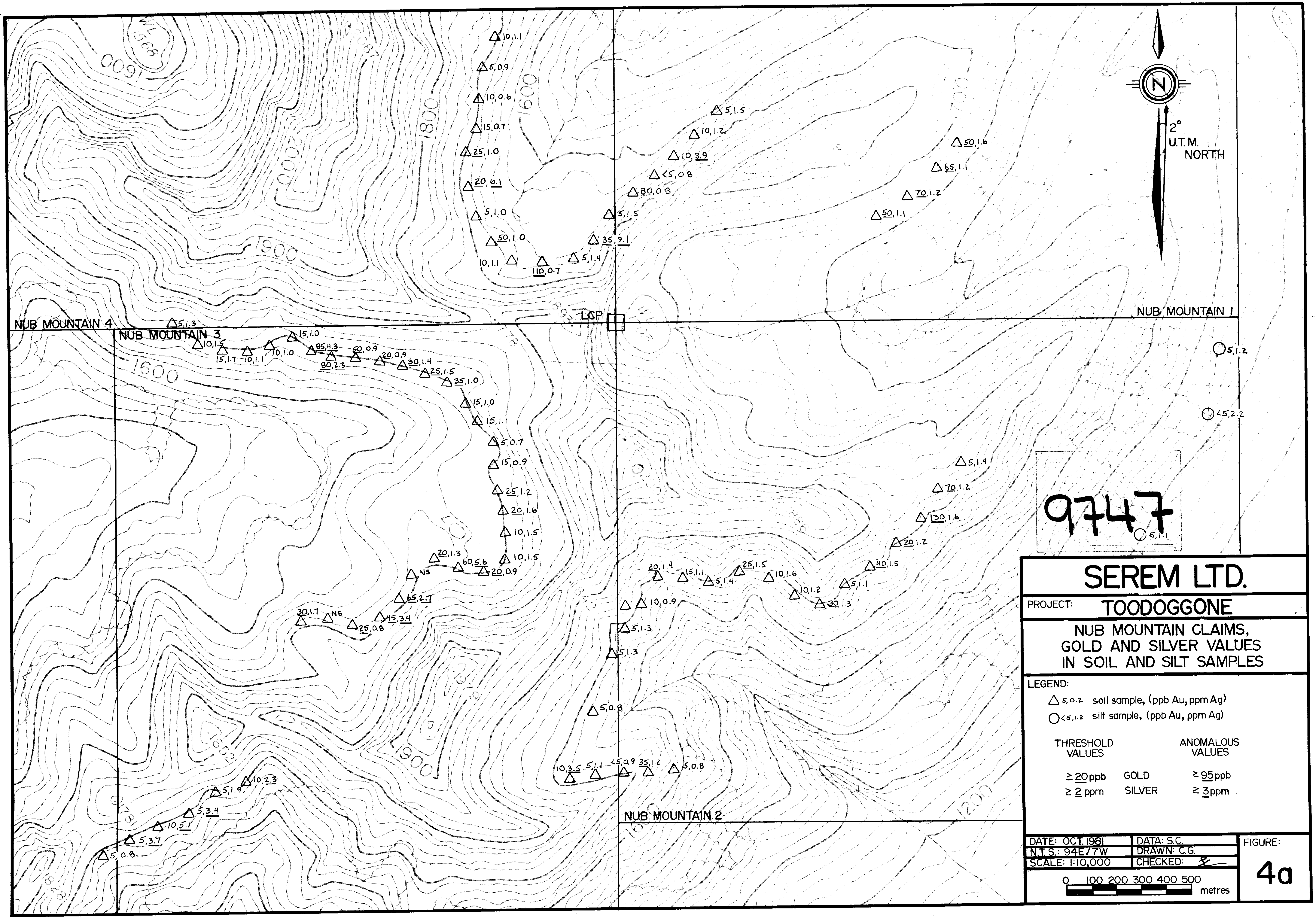
2° U.T.M. NORTH
N
NUB MOUNTAIN 5
NUB MOUNTAIN 4
NUB MOUNTAIN 1
NUB MOUNTAIN 2
NUB MOUNTAIN 3
LCP
no exposure
veins: 115° to 150°
1800
1700
1600
1900
1500
1400
LEGEND
chloritic mafic dikes
feldspar porphyritic monzonite, aplite, and syenite
granodiorite or quartz monzonite
Toodoggone quartz feldspar crystal and lapilli tuffs; volcanoclasts
Toodoggone feldspar crystal tuffs, crystal lapilli tuffs
Takla augite plagioclase porphyritic andesite flows, tuffs, breccias, and related sediments
intrusive contact and dip
vein and dip
fracture plane and dip
sheer plane and dip
geological contact
fault
isolated outcrop
bedding plane and dip
fault-related structures interpreted from ground observations and air photographs
9747
SEREM LTD.
PROJECT: TOODOGGONE
TITLE: NUB MOUNTAIN CLAIM GROUP
GEOLOGY MAP
DATE: OCT. 1980
N.T.S.: 94E/7E
SCALE: 1:10 000
DATA: S.C.
DRAWN: C.G.
CHECKED:
FIGURE: 3a
0 100 200 300 400 500 1000 metres

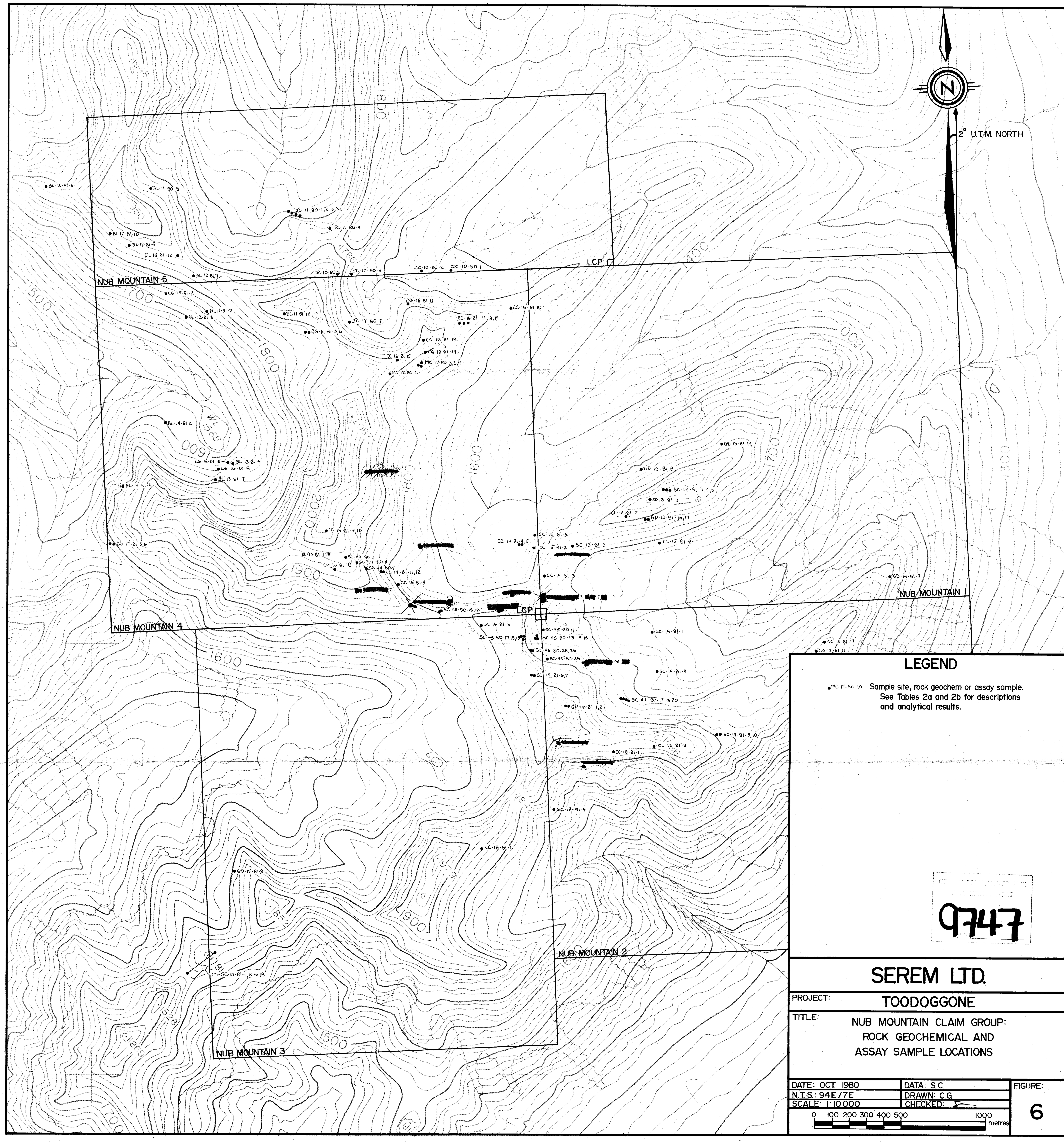


2° U.T.M. NORTH
NUB MOUNTAIN 5
NUB MOUNTAIN 4
NUB MOUNTAIN 1
NUB MOUNTAIN 2
NUB MOUNTAIN 3
LCP
Hydrozincite
Malachite
zeolite alteration
LEGEND
quartz ± calcite ± barite veins
pyrite gossans; moderate, intense
quartz-sericite-pyrite alteration
strongly hematized volcanics
cp gn sp chalcopyrite, galena, sphalerite
note: propylitic alteration (chlorite-epidote-calcite) is virtually ubiquitous in the claims area, and potassic alteration occurs in and adjacent to intrusions.
9747
SEREM LTD.
PROJECT: TOODOGGONE
TITLE: NUB MOUNTAIN CLAIM GROUP
ALTERATION AND MINERALIZATION
DATE: OCT. 1980
N.T.S.: 94E/7E
SCALE: 1:10000
DATA: S.C.
DRAWN: C.G.
CHECKED:
FIGURE: 3b
0 100 200 300 400 500 1000 metres



SEREM LTD.
PROJECT: TOODOGGONE
TITLE: NUB MOUNTAIN CLAIMS, COPPER, LEAD, AND ZINC VALUES IN SOIL AND SILT SAMPLES
LEGEND: 62,31,189 soil sample (ppm Cu, ppm Pb, ppm Zn)
66,29,320 silt sample (ppm Cu, ppm Pb, ppm Zn)
THRESHOLD VALUES
≥ 120 ppm COPPER ≥ 240 ppm
≥ 55 ppm LEAD ≥ 110 ppm
≥ 300 ppm ZINC ≥ 600 ppm
ANOMALOUS VALUES
DATE: OCT. 1981
DATA: S.C.
N.T.S: 94E/7W
DRAWN: C.G.
SCALE: 1:10,000
CHECKED:
FIGURE: 4b
0 100 200 300 400 500 metres
2° U.T.M. NORTH
N
NUB MOUNTAIN 4
NUB MOUNTAIN 3
NUB MOUNTAIN 1
NUB MOUNTAIN 2
LCP
Sampled only for Au, Ag.
9747
1600
1700
1800
1900
2000
1200


NUB MOUNTAIN 4
NUB MOUNTAIN 3
NUB MOUNTAIN 1
NUB MOUNTAIN 2
LCP
2°
U.T.M. NORTH
9747
SEREM LTD.
PROJECT: TOODOGGONE
NUB MOUNTAIN CLAIMS, GOLD AND SILVER VALUES IN SOIL AND SILT SAMPLES
LEGEND:
5,0.2 soil sample, (ppb Au, ppm Ag)
<5,1.2 silt sample, (ppb Au, ppm Ag)
THRESHOLD VALUES
ANOMALOUS VALUES
≥ 20 ppb GOLD ≥ 95 ppb
≥ 2 ppm SILVER ≥ 3 ppm
DATE: OCT. 1981
DATA: S.C.
N.T.S.: 94E/7W
DRAWN: C.G.
SCALE: 1:10,000
CHECKED:
FIGURE: 4a
0 100 200 300 400 500 metres



LEGEND

• MC-17-80-10 Sample site, rock geochem or assay sample. See Tables 2a and 2b for descriptions and analytical results.

SEREM LTD.

PROJECT: TOODOGGONE

TITLE: NUB MOUNTAIN CLAIM GROUP: ROCK GEOCHEMICAL AND ASSAY SAMPLE LOCATIONS

DATE: OCT. 1980	DATA: S.C.	FIGURE:
N.T.S.: 94E/7E	DRAWN: C.G.	6
SCALE: 1:10000	CHECKED:	

0 100 200 300 400 500 1000 metres