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REPORT
ON
HILLER-CHURCHILL
DEPOSITS
ZEBALLOS AREA
VANCOUVER ISLAND, B. C.

1965

ALBERNI

MINING DIVISION

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PROPERTY FILE

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REPORT ON

HILLER-CHURCHILL DEPOSITS

1965

Toronto, Ontario.
February 10, 1966

R. N. Saukko
Geologist.

C O N T E N T S

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REPORT ON HILLER-CHURCHILL DEPOSITS
SUMMARY ZEBALLOS AREA VANCOUVER ISLAND.

(1). A series of contact metamorphic magnetic deposits occur over a distance of 5 miles, extending Northwest from Zeballos Iron Mines.

(2). The Hiller No.4 and the Churchill are the largest individual undeveloped deposits known to date in the area. The Churchill has been estimated at 800,000 tons and the Hiller No. 4 shows 1,400,000 tons with a potential of at least twice this amount. A guess at the grade including dilution of dike rock and included waste would be 40 - 45% Sol Fe. Both occur at elevations of approximately 3500 feet.

(3). The Hiller No. 4 and the Churchill would be the backbone of any operation in the area. Access and approach problems would probably set a lower limit of 150,000 to 200,000 tons on the smaller zones once the approach to the top can be justified.

In this case the smaller deposits can probably be largely ignored at this time, since it is doubted whether they will influence the economics of the situation significantly.

(4). Approximately 12,000 feet of diamond drilling is recommended for the Hiller No. 4 deposit. General layout of proposed drilling is included with the maps in the appendix. The drilling is laid out to indicate something in the order of 3,000,000 to 5,000,000 tons, which would be sufficient to warrant detailed feasibility studies.

(5). Dip length of the Zeballos Iron Mines, Hiller No. 8, and the Artlish zones is quite limited relative to widths and strike length. It may be more critical to drill the deep holes, first, to prove the existence of the zone at depth.

(6). For the Churchill 3-800 ft. vertical holes are recommended to determine whether the underlying diorite is the true basement. These holes would also clarify the mining method to be used, i.e. open pit with tramline or open pit with ore pass combined with underground operation.

(7). Both the Hiller No. 4 and the Churchill deposits are more sulphurous than Zeballos Iron Mines. The Hiller averaging 0.90% S and the Churchill averaging 2-3% S. The bulk of the sulphides, pyrite and pyrrhotite, occur as large blebs or concentrations within the narrow waste sections that occur throughout the magnetite. Bulk samples will have to be taken next year for metallurgical testing.

(8). The Hiller No. 8 deposit contains 200,000 tons or less and does not warrant additional work. The Hiller No. 12 is probably in the same range of tonnage. The Hiller No. 9, 10 and 11 are all too small to warrant further consideration.

(9). Cost of the drilling proposed is difficult to estimate since last year's drilling costs cannot be used as a base. Cost per foot on a program of this size recommended would be in the order of \$8.00 to \$10.00. Total cost of the program would be \$125,000 to \$150,000.

(10). Zeballos Iron Mines reserves will probably be depleted within $1\frac{1}{2}$ to 2 years. In which case the proposed drilling should be done next summer in order to have data for feasibility studies by late 1966.

ADDENDUM TO HILLER-CHURCHILL REPORT

Additional information in the form of the Zeballos Iron Mines Limited Annual Report has been received, which would necessitate some corrections in the Hiller-Churchill report.

The following comments are intended to bring this report up to date.

Ore reserves are estimated at 3 years, which includes a hazardous B zone estimate, so that there is more time for assessment of the Hiller #4.

Estimated cost for Zeballos Iron Mines is \$7.22 per D.M.T. including \$1.00 Anyox royalty. Using concentration ratio of 1.4:1 would give a cost of \$4.40 per ton mined with no royalty payment. This figure was assumed at \$4.00 per ton mined. The price received on the basis of a 62.5% concentrate is estimated at \$11.19 per D.M.T. whereas a figure of \$12.00 per ton was used in the Hiller-Churchill report.

Using the new estimates would give a figure of \$2.00 per ton as against \$3.50 per ton possible operating profit. (See #13 - Economics of Hiller #4.)

REPORT ON HILLER-CHURCHILL PROPERTIES

INTRODUCTION:

A program of geophysical surveying, geological mapping, topographic surveying and diamond drilling was done during the period of May to November 4th, 1965.

The basic purpose of the program was to evaluate the tonnage potentials of the Hiller Nos. 4, 8 and 12 deposits and the feasibility of mining these, using equipment and the mill of Zeballos Iron Mines. It is thought that the reserves at Zeballos Iron Mines will be exhausted within 2 or 3 years, at most, and they will be requiring mill feed at that time.

Also several smaller zones which occur in the general area at the north end of this belt, i.e. the Hiller Nos. 5, 9, 10 and 11 deposits were either geologically mapped, magnetically surveyed or examined.

Personnel on the project were L. J. Basher, surveyor and drill supervisor, R. McDonald, geophysicist, C. Cameron, assistant to surveyor, J. Martin, drill foreman, E. Leonard, drill runner, D. Randall and D. Leonard, drill helpers, G. Savage, cook. Later in the season, mid-September, another drill was added to help on the evaluation of the Hiller No. 4. At that time, J. Schussler and C. Holtz joined the crew. A. Gautier was the other runner with G. Savage as helper and N. Howitz as cook.

Servicing was done by Okanagan Helicopters based from Campbell River until the death of Glyn Fitzgerald, pilot on one of the service runs. H. Clement provided expediting services and was generally helpful in Zeballos. For the last 3 weeks of the program, R. Hepworth and the Falconbridge helicopter were in Zeballos.

Reports Available:

J. J. McDougall	Hiller Iron Prospects, 1961.
J. J. McDougall	Hiller Magnetite Properties, 1964.
J. J. McDougall	Churchill Magnetite Deposit, 1964.
H. M. Jones	Utah Construction & Mining Artlish Zones.

LOCATION AND ACCESS:

The Hiller-Churchill and Artlish magnetite zones extend in a rough line, a maximum distance of $5\frac{1}{2}$ miles northwesterly from Zeballos Iron Mines. Zeballos is at an elevation of 2300 to 2500 feet. The Churchill deposit, the Hiller Nos. 1 to 7 inclusive, and the Artlish Zones occur in the range 3500 to 3900 feet. The Hiller Nos. 8 to 12 are at an elevation of 1700 to 1800 feet.

The main deposits, the Hiller No. 4 and the Churchill, if these were considered as a combined operation, would have the easiest access from the Port of Fair Harbour, rather than Zeballos.

A logging road extends 6 miles from Fair Harbour up the Kaouk Valley and could easily be extended another 6 miles where tramline or ore pass and manway system would be required to approach the Hiller No. 4.

BACKGROUND AND PREVIOUS WORK:

The Hiller group of claims were staked in the spring of 1960, to cover 4 airborne magnetometer anomalies, found during Helicopter reconnaissance by J. J. McDougall.

Work later in the season included 3 packsack drill holes, some transit stadia work, and dip needling of the general Hiller No. 4 area.

During 1961, an additional 13 holes (No. 4 to No. 16) were drilled in the Hiller No. 4 and No. 5 showings. More prospecting located the Hiller No. 5, 6 and 8 deposits.

In 1964, with assessment work due, 10 holes were drilled along with mapping and geophysical work in the Hiller No. 8. Prospecting from the Hiller No. 8 camp located the Hiller No. 9 to 12 deposits. Work on the No. 9 to No. 12 deposits consisted of pace and compass mag. surveys. The No. 3 and No. 6 were also covered by magnetometer surveys.

WORK DONE - 1965

Magnetometer surveys covering the area from the Hiller No. 8 extending to the Hiller Nos. 9, 10, 11 and 12 on a scale of 1" = 200 ft.

Detailed Mag. and Geology of the Hiller No. 12, 1" = 50 ft.

Magnetometer Survey of the Hiller No. 4, No. 5, on 1" = 200 ft. scale.

Tellurometer Survey and Low Level Aerophotography for Topographic Control.

Diamond Drilling - Hiller No. 8	1639 feet
Hiller No. 4	2469 feet
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TOTAL	4108 feet
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GENERAL GEOLOGY:

The regional geology has been covered in many reports and only a general statement is required here.

The Karmutsen series of Triassic flows is the oldest rock in the area. These are conformably overlain by Quatsino series of crystalline limestones. The Quatsino is conformably overlain by the Bonanza sequence of andestie, tuffs, agglomerates and minor sediments. The above is intruded by the Zeballos Batholith phase of the Coast Range intrusives and ranges in composition from granite to diorite.

The regional structure is a broad northwest anticline with the Hiller-Churchill and Artlish magnetite zones occurring as replacements within the lower Bonanza, near the limestone contact, on the southwest limb of the fold.

The main faults in the area are the N-N-W trending Zeballos River and Hiller Creek Faults. The magnetite zones are modestly closely aligned along the Hiller Creek Faults. This fault may correlate with the Blacksand Creek Fault which bisects the Zeballos Iron Mines, Ford deposit.

ROCK TYPES - HILLER No. 4 and HILLER No. 8

The descriptions which follow are intended as additional comments and comparison with the more complete descriptions given with the report on Zeballos Iron Mines.

Andesite Dikes:

These are similar to the andesite dikes at Zeballos, though they occur less frequently at the Hiller No.4. The dikes can be distinguished in the core from the volcanics by the lack of skarn development. Orientation as yet is unknown, though presumably there are several preferred directions.

Feldspar Porphyry:

Very similar to Zeballos Iron Mines area. A more siliceous, highly quartzose variety is common often grading into the more feldspathic varieties. Fine feldspar phenocrysts visible throughout. Weak skarn development is common and consists mainly of epidote with garnet quite rare. Orientation for one set of dikes appear to be N-W roughly paralleling the Hiller Creek Fault. This type is the same as J. J. McDougall's leucogranite.

Diorite - Gabbro:

This type occurs as a series of flat dipping dikes intersecting the magnetite zone. The rock is distinct from the diorites at Zeballos in that it is more basic in composition and texturally becomes a gabbro when coarser grained. Commonly shows well developed chilled borders. Fine grained types often have porphyritic texture with small feldspar phenocrysts. This particular type is unknown at Zeballos Iron Mines.

Magnetite Zone:

The magnetite occurs within a broad general zone 150 or more feet wide over a strike length of 800 feet or so. For the most part, the separate pods or lenses are erratically distributed with little correlation possible as yet. The zone appears to have a very steep dip to the south west. The boundaries of the zone are ill defined as yet, as is the structure, so that the dip could be in any direction.

From the magnetics, the zone would appear to run under the volcanics or plunge to the N-W.

The magnetite occurs chiefly as high-grade lenses with sharp contacts separated by considerable waste rocks, i.e. the volcanics and various intrusives.

There is some indication that the zone may be widening at depth and possibly also improving in grade. The waste sections carry minor amounts of disseminated magnetite so that a fairly high-grade concentrate should be possible with only coarse crushing.

Skarn:

The skarn occurs throughout the area drilled. Only the diorite-gabbro and the andesite dikes show no evidence of skarnification.

Massive skarn sections, as at Zeballos Iron Mines are rare and usually narrow. Skarnification is not as intense in the Hiller No. 4 and No. 8 deposits. In most cases the skarn can be seen to be replacing either the volcanic or the feldspar porphyry. Garnet is the main skarn mineral accompanied by epidote and amphibole. Epidote and amphibole occur in much greater percentages of the total skarn than is found at Zeballos.

There does not appear to be marked zoning or particular skarn bands in the Hiller No. 4, though the extent of wallrock drilled may be insufficient to show this. The Hiller No. 8 does show an increase in skarn as the magnetite zone is approached.

Another significant difference with Zeballos is the epidote skarn which forms with the feldspar porphyries.

Volcanics:

Various phases of the lower Bonanza were intersected in the core. The most commonly occurring type is andesite or tuffaceous andesite. In hand specimen the rock is medium green, fine grained, usually well fractured, and vaguely schistose. Porphyritic phases with fine feldspar phenocrysts to 1/8" are common. These would appear to be secondary rather than primary features.

Brecciated phases with light green fragments and a darker green amphibolitic matrix were noted. Skarn either as fracture filling or replacement occurs throughout the volcanics in varying degree.

Minor acidic phases, possibly rhyolites and some sediments were found.

Limestone:

Narrow sections of limestone less than 2 feet were intersected in three of the drill holes. As yet there does not appear to be any correlation. The limestone is quite impure, coarsely recrystallized and brownish in colour.

The main limestone band is repeated by the Hiller Creek fault and there is a possibility that limestone may occur, abutting the fault, at depth in the vicinity of the Hiller No. 4. If this is so, it may account for the apparent improvement in the grade of magnetite at depth.

MAGNETOMETER SURVEY

The magnetometer survey of Hiller No. 4 shows a length of 1000 feet within the 5000 foot contour and length of 600 feet within the 15,000 gamma contour. The dip indicated is steep to the west and the spread of contours to the north indicated an increasing depth of cap rock or a plunge in this direction.

The zone outlined by drilling roughly conforms to the 15,000 gamma contour, though it is somewhat offset. To the north the magnetite widens past the 15,000 gamma contour which is probably caused by the capping.

The Hiller No. 5 anomaly may be an extension, either faulted or along the same horizon as No. 4. The anomaly was only partly surveyed due to the topography and shows a length of 500 feet within the 5000 gamma contour. This zone may be worth a few drill holes depending on how No. 4 develops.

The other minor highs are very local pods of magnetite and the only other anomaly of interest is the 400 foot long negative anomaly in lines 80 N and 82 N. The possibility of a magnetite zone to the N-E associated with this low should be investigated.

TONNAGE AND GRADE:

Correlation of zones, with the limited information available, is difficult. Probably the only approach at this stage is to take a somewhat larger, lower grade block since it seems that distribution of magnetite lenses is too erratic to allow selective mining methods.

Tonnage outlined (blocks as shown on the assay sections) from 102 + 50 N to 106 + 50 N is 1,160,000 tons using a tonnage factor of 40 cu.ft. per ton. Average grade, obtained by taking a straight average of drill holes per section, weighted as to core length and tonnage per section gives 41% Fe. Unassayed blocks within the zone are carried at 0% Fe. Adding a block of lower grade material from the 102 N section brings the tonnage to 1,400,000 tons of 40% Sol. Fe. over a strike length of 480 feet, and a maximum dip length of 300 feet.

POTENTIAL TONNAGE:

The drilling, as laid out, should, if future results are at all comparable to those to date and the zone continues to depth, outline somewhere in the range of 3,000,000 to 5,000,000 tons grading possibly 40% Sol. Fe.

The main problems are depth extension and grade. Strike length is moderately well defined by the magnetics, widths so far are adequate for blast hole stoping. Possibly 1,000,000 tons will be available as open pit ore.

Strike Length (main part of anomaly)	800 feet.
Widths	60 to 150 feet.
Dip Length (to date)	300 feet.

Assuming a block 800 feet long, with an average width of 100 feet, and a dip length of 500 feet would obtain 4,000,000 tons. Assuming an average grade of 40% Sol Fe and a possibility of 35% as recoverable iron, would obtain 2,300,000 tons of concentrate grading 62% Fe.

IMPURITIES

Both the Miller No. 4 and the Churchill deposits are more highly sulphurous than the Ford deposit. Figures are not available for the Churchill but presumably they are somewhat higher than the Artlich Zones, i.e. in the range of 1.5 to 3.0 % S. The average assay of the Miller No. 4 sampled sections is 0.90% Sulphur.

The figure is deceptive since the high sulphur zones usually occur in the waste lenses within the magnetite zones.

The pyrite and pyrrhotite occur as thin fracture fillings and plating or small blebs within the magnetite and not contributing much sulphur. The higher grade sulphur zones usually occur as more massive blebs or stringers within the narrow waste sections of the magnetite zone. The sulphur may not be that critical, mainly because of how it occurs.

It is doubtful whether the sulphur can be reduced to acceptable limits in a circuit similar to Zeballos Iron Mines without somewhat finer crushing.

In many cases metallurgical tests on bulk samples could be undertaken next year. If flotation and fine crushing is required to remove the sulphur, then a study as to what additional costs would be involved is necessary, and what type of product could be produced.

The distribution of sulphur relative to the various grade ranges of magnetite is fairly consistent from 10% Fe to 55% Fe averaging in the range of .90 to 1.22 and dropping off rapidly, as expected, in the range less than 10% Fe and over 55% Fe to 0.41 to 0.52% S.

The following table list the sulphur distribution relative to Fe. grade:

<u>% Sol Fe</u>	<u>% S.</u>
5-10	0.41
10-15	1.18
15-20	1.22
20-25	1.09
25-30	1.27
30-35	0.96
35-40	1.10
40-45	1.07
45-50	1.01
50-55	0.90
55-60	0.48
60-65	0.52
65 +	0.43

Copper is very low, averaging .02 with the assumption of trace assay of .01% Cu. There does not appear to be any preferential distribution of copper.

ECONOMICS OF HILLER NO.4

The purpose of the following exercise is to determine what targets, as far as tonnage and grade are required in order to establish some minimal requirements as to the economic feasibility of mining the Hiller No. 4 deposit.

Zeballos Iron Mines Limited has reserves which may keep the operation going for $1\frac{1}{2}$ to 2 years (?). At that time all mining equipment, mill and staff will be available.

At the time that Falconbridge took over the operation the ore reserves were as follows; 1,115,000 tons averaging 50% iron of positive ore, and 794,000 tons of indicated ore of the same grade. As the situation has developed these figures are probably very conservative and the ultimate tonnage is probably twice these figures.

ASSUMPTIONS FOR HILLER NO. 4.

- (1). 1,400,000 tons grading 40% soluble Fe.
- (2). Recoverable iron allowing for mill losses and sulphide iron = 35% Fe.
- (3). A saleable concentrate grading 60-65% Fe can be produced. Bessemer grade requires less than 0.50% S for 51.5% Fe. The only other serious impurity is Cu and this is required to be under .015%.
- (4). Price received by Zeballos Iron Mines for an average 62% Fe concentrate of 3 inch material, with limited fines is \$12.00/ton.
- (5). Concentration ratio at ZIM is supposedly 1:1.2 though this is doubted and on the life of the mine will probably be closer to 1.3 or 1.4.
- (6). Direct operating cost is \$5.00 (Approx. from C.E.G. Brown) per ton concentrates, or approximately \$4.00 per ton mined.
- (7). Drilling and blasting costs at Hiller No. 4 would be higher due to greater percentage of waste rock.

- (8). Haulage costs would be higher because of the greater elevation.
- (9). Milling costs will be higher because of a finer grind will probably be required to bring sulphur to an acceptable level.
- (10). Therefore assumed additional cost at \$1.00/ton mined and milled.
- (11). Concentration ratio = $\frac{62}{35}$ for a similar grade product or 1 to 1.7.
- (12). Direct mining and milling transport cost $\$5.00 \times 1.7 = \8.50 per ton (probably high).
- (13). Operating profit $12.00 - 8.50 = 3.50$ per ton concentrate.
- (14). Tons concentrate available $\frac{1,400,000}{1.7} = 830,000$ tons.
- (15). Total operating profit at prestn stage $830,000 \times 3.50 = 2,900,000$.
- (16). Capital cost, interest, working capital, etc., of dismantling, moving and approaching Hiller No. 4 is a nebulous item at this time, but would be expected to be under \$3,000,000.
- (17). It appears that it would be fairly safe to assume that 1.4 to 1.5 million tons would be more or less a break-even point.
- (18). Probably twice this tonnage at the same grade would be required to justify detailed feasibility studies.
- (19). Mill capacity of Zaballos Iron Mines is 3,000 tons per day, though currently operating at 1,000 to 1,400 tons per day. There is sufficient excess capacity to allow a rapid mining rate on the Hiller No. 4.

CAPITAL COSTS

The following comparison is included to show that the above figures are at least within the realm of possibility.

As of October 19, 1959, H. L. Hill estimated the reserves at Zeballos Iron Mines at 1,500,000 tons proven, 700,000 tons indicated, and 1,000,000 tons possible for a total of 3,200,000 tons grading 50% Fe. Capital and production costs of the mine and road, \$1,370,000. Cost for 3.3 mile road included in the above was \$160,000. Mining cost delivered at the mill was \$2.10 for the "A" Zone and \$2.77 for the "B" Zone per ton mined, for an underground operation.

Capital cost for the mill and ship loading facilities estimated at \$1,180,000. Milling, haulage and loading costs were estimates at \$1.26 per ton concentrate F.O.B.

The cost of dismantling and of moving this equipment to Fair Harbour and the Kaouk Valley would probably be less than \$1,000,000.

The fundamental problem, and the one where there is the greatest range for error would be the expense of putting in the road and approach to the Hiller No. 4 at an elevation of 3500 feet.

At Zeballos Iron Mines there is some confusion as to the cost of their road. The road is about $3\frac{1}{2}$ miles long running from an elevation of 300 feet to the upper portal at 2440 feet and also to the top of the old pit at 2900 feet. Estimates as high as \$750,000 have been heard. In any case the estimate of \$160,000 would appear to be much to low.

The road to Hiller No. 4 could be carried fairly readily to the 2400 - 2500 foot level, from which point a 2000 - 3000 foot haulage level and ore pass to the 3500 foot elevation could be driven. An alternative method would be the road and tramline set up as used at Zeballos, though snow problems and year round operation may be too much to cope with in the latter method.

PROPOSED DRILLING

Total footage proposed for the Hiller No. 4 is 12,000 feet composed of 8, 200 foot holes under 600 feet and 3 holes of approximately 900 - 1000 feet.

With the relatively short season drilling on top (July to end of October), and slow drilling rate, probably two machines will be required to assure the completion of the work.

Timing will be of the essence since any decision as to production will be required by early 1967 in order to start preliminary development work, road construction, etc. It is difficult to see Zaballos Iron Mines reserves lasting much beyond 1967. Data for feasibility studies will be required by late 1966.

Possibly the drilling should be contracted next year if a contract in the order of 6000 to 8000 feet can be obtained. A machine capable of 1000 foot holes will be required.

Whether a contractor would be willing to accept a set footage rate plus transportation remains to be seen. If a contractor insists on a cost plus contract, then Falconbridge may be able to do the job just as cheaply. With the difficult and frustrating drilling the contractor will have more personnel problems.

COST OF PROGRAM

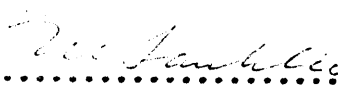
The cost of the drilling on last year's program was quite high, averaging about \$15.00 per foot. The main reason for this was down time due lack of parts and the difficult and time consuming drilling of the overburden on the Hiller No.8. Once the drills were moved to the Hiller No. 4 the work proceeded at a much more favourable rate.

It is critical, of course, to start the program as early as possible that in the event of difficulties we still have time to adjust the program to accomplish the season's objectives. With diamond drilling being the main requirement this might start as early as mid-June, even if considerable snow remains on the ground.

Assuming a four month season, with two machines, the requirement will be 1500 feet per month, per machine, which is probably more than can be accomplished.

Estimate of Cost: 2 Drills, 8 man drill crew, 1 cook,
1 surveyor-drill supervisor.

Transportation @ \$2,000.00 per month	\$8,000.00
Rejuvenation of camp facilities	1,000.00
Camp Supplies @ \$2,000. per month	8,000.00
Cook @ \$500. per month	2,000.00
Drilling at \$8.00 per foot	96,000.00
	or
Drilling at \$10.00 per foot	120,000.00
Supervision @ \$1,000. per month	4,000.00
Assaying and Metallurgical Work	5,000.00
Geology	1,000.00
	<hr/>
TOTAL	\$125,000.00
	or
	<u>\$150,000.00</u>


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R. N. Saukko

Toronto, Ontario.
February 10, 1966.

SUMMARY OF OTHER DEPOSITS

OF THE

HILLER - CHURCHILL AREA

CHURCHILL DEPOSIT

This deposit is covered more thoroughly in a report by J. J. McDougall and these comments may be considered as additional.

The Churchill deposit is located about 2 miles north of Zeballos Iron Mines, S-E of the Hiller No. 4, at an elevation of 3500 - 3700 feet.

The property has recently been purchased from Mr. Norman Ray.

Argonaut Development, a subsidiary of Utah Mining and Construction, did the work on the Churchill Area in 1951 and 1952, consisting of 20 short diamond drill holes. Only 10 holes were drilled on the Churchill deposit itself. The magnetometer survey and geological mapping on the property was done in 1962 by Utah Construction and Mining Limited.

Eleven holes (No. 7-17 incl.) totalling 918 feet give \pm 1,000,000 tons grading in the range 30 to 40% Fe. Sulphur content, occurring mainly as pyrrhotite, is \pm 3%.

With this amount of sulphur, blending (with Hiller No. 4 for example) or a flotation system would seem a prerequisite.

The deposit would be easily open-pitted with the best access probably from Lime Creek Valley which extends to the Zeballos River road. Approaching in this direction would require a 3000 foot haulage level and 500 foot plus of raising from 3000 feet elevation range.

The deposit occurs as a shallow saucer shaped body on the limestone-diorite contact, the bulk of it being underlain by diorite. Dip would be very flat easterly. The deposit may be plug shaped with diorite occurring as a false basement.

Access from the Kaouk Valley would be somewhat more difficult requiring a haulage level in the 2500 foot range. Distance would be \pm 4000 feet followed by raising from the 2500 foot elevation to the 3500 foot elevation.

Operation would probably be limited to 3 or 4 months as underground mining of the deposit would not be feasible.

The prospect would be more attractive if ore was available at depth. There is some indication from Utah's mapping that diorite occurs as a partial capping as well as being the immediate basement to the deposit. McDougall also suggest that these basement rocks may be dioritized andesites. The Utah drill holes were all short and did not penetrate too deeply into the diorite. Several deep vertical holes, say in the range 800 to 1000 feet are suggested to at least cover the range through which the haulage level raise would be done.

UTAH CONSTRUCTION AND MINING WORK ON ARTLISH GROUP

INTRODUCTION:

During 1961, and 1962, Utah Construction and Mining Limited carried out a program of geological mapping, magnetometer surveying and diamond drilling on the 6 Artlish Claims held by O.L. Skoglund. The showings range in elevation from 3800 to 3900 feet.

A total of 2497 feet of diamond drilling in 14 holes was done on 3 zones.

The claims are located, covering the top of the ridge between the Hiller No.1 and 2 on the south and the Hiller No. 7 and 8 claims on the north.

Tonnage estimates by Utah give 700,000 tons of "possible ore" grading between 45 and 50% iron and 1.5 to 3.0% sulphur.

GENERAL GEOLOGY

Numerous small pods of magnetite occur replacing Bonanza Volcanics. These have been subdivided into 3 zones; Footwall Zone, Middle Zone, and Hanging Wall Zone. Each zone consists of several, apparently discontinuous, pods.

The Middle and Footwall Zones occur as parallel bands dipping to the west, the Footwall Zone being \pm 100 feet from the Quatsino Limestone contact, and the Middle Zone 300 to 400 feet farther west. Both zones parallel the limestone contact and appear to be replacing specific bands with the Bonanza, the Footwall Zone in amphibolite skarn, and the Middle Zone in chloritized andesite.

The Hanging wall zone occurs near the limestone contact on the west side of the Hiller fault. This zone extends to the Falconbridge ground where the main part of it occurs, and becomes the Hiller No. 5 and No. 6 Zones. The repetition of the limestone band is due to the Hiller Creek Fault, in which case the Hanging Wall Zone may correlate with the Footwall Zone. Similarly the Middle Zone may be repeated farther downhill if it is not cut off by the diorite. The Hanging Wall Zone, from limited diamond drilling, dips 45° easterly, but apparently changing to westerly in the vicinity of the Hiller Nos. 5 and 6.

? 6 & 7 ?
uh

Intrusives are common. Seven dike types have been mapped in the area. The subdivisions here can probably be simplified to variants of the feldspar porphyries or rhyolites and the andesite dikes. Strikes are generally north-south.

Regional structure is a broad northwesterly trending anticlinal fold with the Artlish and Hiller claims lying on the south-west limb.

The main fault in the area is the Hiller Creek Fault which strikes northwesterly and apparently dips 60° northwest. Displacement is not known. Minor northeast striking faults are common with displacements less than 20 feet. These are, in part at least, post magnetite.

Localization of the magnetite zones may be related to the northeast trending faults since each mineralized zone is cut by at least one of these faults.

TONNAGE AND GRADE:

The Artlish Zones have very little depth extent and would have to be considered as shallow open pit propositions, possibly being mined in conjunction with the Hiller No. 4 or the Churchill.

Whether there is sufficient tonnage to warrant building a road on top to either the Hiller No. 4 or the Churchill remains to be seen.

Road distance from the Middle Zone to the Hiller No. 4 with switchbacks, etc., would be between 8,000 and 10,000 feet involving considerable rock work and filling. In this distance the road would drop approximately 400 feet for an average 5% grade. The area being considered is virtually 50% rock exposure, and adequate fill or gravel suitably located will be a problem. A tramline maybe a more practical answer to transportation on ridge top.

None of the Artlish deposits approach in size what has already been outlined at the Hiller No. 4.

The grade, averaging all drill assays is 44.1% iron, 0.08% copper and 3.16% sulphur.

Calculations by Utah Construction give a total of 500,000 tons "possible ore" for the Footwall and Middle Zones, and 200,000 tons of "possible ore" in the Hanging Wall Zone. Of this total possibly 300,000 tons occur in pods of 50,000 tons or more which would be accessible in shallow open pits.

CONCLUSIONS: - ARTLISH GROUP

The Artlish magnetite zones are small, difficult of access, and probably contain less than 700,00 tons in 5 deposits or so located roughly mid-way between the Hiller No.4 and the Churchill. Possibly 300,000 tons would be available in open pit ore. The drilling to date shows a very limited depth extent, so that underground mining would be out of the question.

The economic feasibility of any mining operation in the region of the Hiller No. 4 and the Churchill will not be critically influenced by what the Artlish ground has to offer.

It is doubtful whether further drilling would contribute anything of value, without approaching the area on such a scale as to make the cost prohibitive. Surface magnetite zones would mask anything at depth, and location of down dip extensions would involve considerable deep pattern drilling. Undoubtedly there are repetitions of the magnetite zones down dip but it would be impossible to locate these without the structural key to predict the loci of mineralization.

HILLER NO. 8

A total of 1639 feet was drilled in 6 complete holes. At least 6 other holes were started but unable to penetrate to bedrock. The drilling was done from the period of July 8th to about September 20th. Main causes of the slow rate of drill progress were the difficulties with deep overburden encountered in drilling downslope. Helicopter service was poor due to the many fires in the area and caused several long delays in receiving parts and bits.

Magnetics

The magnetometer map shows two distinct highs with readings ranging up to 30,000 gammas separated about 150 feet by an area of lower readings. The total possible length of the anomaly was originally projected at 600 feet.

Magnetite

The drilling showed very much the same as the magnetics, with two somewhat wider pods joined by a narrow central section.

The zone at the east end decreases in width with depth and presumably dies out. The westerly pod, exposed in Evans Creek has width of 85 feet and then trails out to the west to a width of 10 feet within a strike length of 100 feet. Grade and widths decrease very rapidly outside the 20,000 gamma contour.

The deposit strikes approximately E-W and dips very steeply to the south. The plunge would appear to be to the west. The deposit lies completely within various phases of the volcanics with the usual skarn and feldspar porphyry rock types.

Contacts of magnetite lenses are usually fairly sharp.

The deposit contains something in the order of 200,000 tons without allowing for a roof pillar.'

The Hiller No. 8 does not warrant any additional work at this time.

HILLER NO. 9

The Hiller No. 9 occurs on line 11 + 60 on the 200" magnetometer map. It is shown here only by a few negative readings. The zone is exposed in the creek bottom about 100 feet up creek from the baseline.

The exposure shows a flatlying band of massive magnetite varying from 1 to 5 feet in width and occurring on contact with limestone. The zone occurs on the crest of a small anticlinal dragfold which apparently plunges and or dips roughly parallel with the creek. The magnetite is exposed over 100 foot length of the creek bottom.

The magnetics and the geology show this deposit to be too small to warrant any further work.

HILLER NO. 11

This anomaly is shown as a broad weak 1,000 - 2,000 gamma anomaly, which either represents a pyrrhotite zone or a smaller deep seated magnetite. The area of the weak magnetics is about 400 feet long by 40 to 100 feet wide. Any large zone would show a broader spread of magnetic contours.

In either case this zone is too small to warrant a drill hole.

HILLER NO. 12

This zone was mapped on 1" - 50 scale and a magnetometer survey on approximate 50 foot centres was done. This zone occurs about 1 mile N-W of the Hiller No. 8 at approximately the same elevation between 1800 and 2000 feet.

The magnetometer work shows two distinct mag highs about 100 feet apart. Overall length potential would be 500 feet. The anomaly appears much the same as the Hiller No. 8. Mapped widths are a maximum of 50 feet.

Elevations within the anomaly area are fairly constant and follow the side hill, so that the weak central part of the anomaly is probably representative and not decreased due to negative topographic effects.

Dips would appear to be steep S-W, though there is insufficient rock exposure to determine this for certain.

The deposit occurs 200 - 300 feet into the volcanics from the limestone contact. Outcrops are too limited to say what the local control is, though presumably similar to the others, it is faulting.

It is thought from the work done to date that Hiller No. 12 will prove to be much the same as the Hiller No. 8. The showing probably does not warrant drilling at this time, since the Hiller No. 8 was disappointing and since it does not appear that the potential at Hiller No. 12 is any greater.

Toronto, Ontario.
February 8, 1966.

R. N. Saukko
.....
R. N. Saukko

RNS/aw

LEGEND for DRILL SECTIONS

BASIC INTRUSIVES



Diorite - Gabbro



Andesite

ACID INTRUSIVES



Feldspar Porphyry



Rhyolite or highly silicic Feldspar Porphyry



MAGNETITE ZONE



SKARN

BASIC VOLCANICS



Andesite or Tuffaceous Andesite



Porphyritic Andesite



Tuff ?

SEDIMENTS



Limestone

PROPERTY HILLER #8

HOLE NUMBER 14
 SHEET NUMBER 1
 SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT. 57698
 DEP. 4056
 ELEVATION OF COLLAR 1788
 DATUM _____
 DIRECTION AT START: BEARING North
 DIP -60°

STARTED July, 1965
 COMPLETED July, 1965
 ULTIMATE DEPTH 283'
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE				
0 - 40	Overburden							
40 - 43	Volcanic - f.g. med grey-green. Cut by quartz strgrs. at 15°-45°. Sharp lower contact at 35-40. No sign of any lineation.							
43 - 44	Skarn - Lt. apple green. M.G. Almost all ep. poss. minor amph. Some car. Lower cont. sharp 35-40							
44 - 46	Q.V. - white, bull, amorphous finely granular look 45-46 core ground							
46 - 50	Volcanic - med. grey green. Cs grained vaguely porphyritic. "Dioritized"? Cut by fine carb. strgrs. at 30-35°.							
50 - 93	Feldspar porphyry - white, m.g. felds phenos to 1/8" 7-10% fine acic amph as mafic 74-77.5 mixed volcanic & skarn. Upper con. 60 Lower 40. some garn and amph with skarn. Sect. finely fract.							
93 - 101	Volcanic - similar to sect 40-43 99-100 Ep felds skarn							
101 - 119.5	Skarn - bright green, mainly ep, minor amph & carb. fine to med fine. Minor So blebs & strgrs.							
119.5 - 126.5	Volcanic - f.g. Similar to 40-43. 121-125 Core ground.							

PROPERTY Hiller #8

HOLE NUMBER 14
 SHEET NUMBER 2
 SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT. _____
 DEP. _____
 ELEVATION OF COLLAR _____
 DATUM _____
 DIRECTION AT START: BEARING _____
 DIP _____

STARTED _____
 COMPLETED _____
 ULTIMATE DEPTH _____
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %	
126.5 - 146.5	Skarn - more variable in comp. with garnet bands & sects of cs amph. Upper part appears to have formed replacing porphyry eg. sects 132-134, 135-146 of porph within skarn zone. Felds phenos - usually well formed in matrix similar to volc from 40-43. Poss feldspath volc or porphyritic flows.							
146.5 - 151	Porphyritic volcanic. Similar to 132-134 above							
151 - 159.5	Skarn - 7-10% Po. Minor sects mass & dissem mag. Consid. garn and amph. At 158 carb vein with cs amph. being replaced by Po.	155-160		5	31.26			
159.5 - 202	Magnetite. med. fine, sects mass mag alternating with short skarns. Skarn sects. carrying consid. Po become prom in last 12 ft. Minor chalco assoc. with late carb sulph strgrs. Unreplcd. amph blobs common within mag zones. Following sects skarn 191.5-192, 193-196.5, 197.5-198.8	160-170	170-180	180-190	190-200	200-202		
				10	55.91			
				10	50.10			
				10	58.12			
				10	36.57			
				2	62.52			
202 - 207	Q.V. Amorphous bull qtz							
207 - 213.5	Core ground							
213.5 - 215	Magnetite. As before	213.5-221		7.5	58.32			
215 - 220	Core ground							
220 - 221	Magnetite. As before							

PROPERTY HILLER #8

HOLE NUMBER #14

SHEET NUMBER 3

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT. _____

STARTED _____

DEP. _____

COMPLETED _____

ELEVATION OF COLLAR _____

ULTIMATE DEPTH _____

DATUM _____

DIRECTION AT START: BEARING _____
DIP _____

PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %			
221 - 231	Porphyritic Volcanic. Similar to prev. sects. Felds phenos to 1/4". Highly fract cemented by feldspathic stringers							
231 - 256	Volcanic - partly skarn. typical f.g. volc. Zone partly skarned - 40-50% mainly ep. minor garn.							
256 - 283	Volcanic - typical f.g. Skarning dies out about 258, though very minor ep veining to end of hole. White bull qtz. veins at 263-266.5, 268-270.5, 275-277. Some narrow amphibolite bands at 60°. 273.5-274 Fine grd dike conts. sharp upper at 60 lower 45. Comp appears same as volc. though finer grd. than volc. 280 to end. several minor sects. amph skarn and minor magnetite.							
283	End of hole	160-202		42	50.76			

PROPERTY _____ HILLER #8

HOLE NUMBER H-15
 SHEET NUMBER 1
 SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT. 57698
 DEP. 4056
 ELEVATION OF COLLAR 1788
 DATUM _____
 DIRECTION AT START: BEARING North
 DIP -80°

STARTED July, 1965
 COMPLETED August 13, 1965
 ULTIMATE DEPTH 400'
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE			
0 - 35	Casing						
35 - 41	Volcanic & Felds Porph. Finely porph volc, short sect felds porph. Minor ep strgrs. Bleached patches in fels porph.						
41 - 61.5	Felds Porphyry Lt. grey m.g. felds phenos. Lower part i.e. 56-60 weakly skarned with ep strgrs. Porph text still visible. Upper cont. 45° irreg. Lower sharp 30°						
61.5 - 89	Volcanic Part Skarn Green grey, minor alt. felds. phenos. Partly skarn with garn and ep. Ep later than garn. Occurs as fract. filling & replcmts. out from fract. Felds porph from 80-81, 83-84, 85.5-87 mainly epidote						
89 - 91.5	Sediment Poss tuff, well dev. cs banding						
91.5 - 97.5	Volcanic & felds porph. As sect 61.5-89. Minor skarn						
97.5 - 155	Feldspar Porphyry Matrix irrel in comp varying amounts amph phenos 1-3 mm. Minor epid of felds assoc with fractures. Short sects of amorphous QV which also show felds phenos.						

HILLER #8
 PROPERTY

HOLE NUMBER H-15
 SHEET NUMBER 2
 SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT
 DEP
 ELEVATION OF COLLAR
 DATUM
 DIRECTION AT START: BEARING
 DIP

STARTED
 COMPLETED
 ULTIMATE DEPTH
 PROPOSED DEPTH

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE				
	Contacts sharp. Short sects volc or alt?							
	Lower contact 30°							
155 - 158	Volcanic							
	Med green at top to pale green at bottom. Banded short cherty sects. or poss silicification.							
	Scattered felds phenos. Sharp lower cont. at 20°							
158 - 163	Quartz vein							
	White, bull, amorphous. Minor fine felds phenos.							
	Lower cont abs.							
163- 164.5	Volcanic							
	f.g. scat felds phenos							
164.5 - 174	Feldspar Porphyry							
	Parts ident. to above. Some minor brecc patches & volc inclusions. Ep veining in last 3 ft.							
174 - 178	Volcanic							
	As before. Highly fract. with carb. ep py strgrs.							
178 - 192.5	Feldspar porphyry							
	As before. Core highly broken							
192.5 - 195	Volcanic							
	Finely po-ph. 15-20% felds phenos.							

PROPERTY HILLER #8

HOLE NUMBER H-15

SHEET NUMBER 3

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT. _____
 DEP. _____
 ELEVATION OF COLLAR _____
 DATUM _____
 DIRECTION AT START: BEARING _____
 DIP _____

STARTED _____
 COMPLETED _____
 ULTIMATE DEPTH _____
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE			
195 - 196	Skarn - Mainly ep. Forming in finely porph volc.						
196 - 200	No core. Not all missing from this section.						
200 - 202	Felds porphyry - as above						
202 - 206	Volcanic - as 192.5 - 195						
206 - 266	Skarn in Volcanic						
	Ep. and garn. Ep later. Formed mainly in cs porphy						
	volc. Some short unalt. sects. of volc. Greenish						
	zones felds phenos.						
	230-232 volc.						
	235-245 recovery 2 ft. of fine volc.						
	Minor short felds porph.						
266 - 272	Felds porphyry						
272 - 300	Skarn - as before. Somewhat more intensely skarnified.						
	Minor felds porph.; f.g. volc. from 278-279, 293-295.						
	Garn becomes more prominent						
300 - 302	Felds porphyry - some ep.						
302 - 311	Acid Volcanic ?						
	Lt grey rhyolitic, partly skarn. May be silicified						
	Minor short zones with cherty look						
311 - 313	Skarn - as before. Amphibole appears						
313 - 315	Magnetite - 7% sulphides 50% Fe						

HILLER #8

PROPERTY.....

HOLE NUMBER..... H-15

SHEET NUMBER..... 4

SECTION FROM..... TO.....

DIAMOND DRILL RECORD

LOCATION: LAT.....

STARTED.....

DEP.....

COMPLETED.....

ELEVATION OF COLLAR.....

DATUM.....

ULTIMATE DEPTH.....

DIRECTION AT START: BEARING.....

PROPOSED DEPTH.....

DIP.....

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
315 - 316.5	Skarn and volc. - as before						
316.5 - 330	Quartz vein. 8 ft. recovered, white bull amorph.						
330 - 352	Magnetite zone.	330-337		7.0	27.45		
	Several short virtually mass sects mag. alt. with	337-344		7.0	13.03		
	zones of skarn and brecc volc. Amph. main skarn	344-352		8.0	46.99		
	vein. Mag in part occurs as breccia filling. Minor carb str. Minor sulph				- 2%		
352 - 355	Volcanic						
	F.g. typ med green, broad bands pale green alt						
355 - 365.5	Quartz vein						
	Mass bull, white. Minor mafic						
	Rounded fine amyg. Lower cont irreg.						
365.5 - 370	Volcanic						
	Fine, grey green, similar to 352-355						
	May be dike, less fract. Conts obs.						
370 - 400	Volcanic Minor Skarn						
	More greenish than above. Different flow?						
	Brecc patches. Minor amph skarn						
	Short Magnetite sect. 373-375						
400	End of Hole	330-352		22	29.97		

PROPERTY HILLER #8

HOLE NUMBER H-16

SHEET NUMBER 1

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. 57647
 DEP. 3954
 ELEVATION OF COLLAR 1774
 DATUM
 DIRECTION AT START: BEARING North
 DIP -55°

STARTED August, 1965
 COMPLETED August, 1965
 ULTIMATE DEPTH 253'
 PROPOSED DEPTH

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE				
0 - 63	Overburden "B" to 40'							
63 - 90	Feldspar Porphyry Typ felds phenos to 1/8". Light grey. Core badly broken and weathered. Minor garn amph and ep amph bands - mainly fract fill. Only minor repl and that by ep. At 35-40° regular. Lower cont obs.							
90 - 107	Porphyritic Volc. Zoned felds phenos lathlike 1/8" up to 1/2" Minor skarn, in lower part. Pale green bleaching proceeding from fract. Not identical to previous porphy volcs in that phenos more prominent. Could be gabbro. Sharp lower contact at 45-60. May be rock type change							
107 - 114	Skarn Prob. formed in fine volc. Mainly garn, minor ep. Lower cont. 40°							
114 - 124.7	Feldspar Porphyry Much contam. volc material. Matrix variable from pale green to light grey. Both conts. obsc.							
124.7 - 145.5	Fine Volcanic Med. dk grey. F.g. rare fine felds phenos. Cut by							

PROPERTY HILLER #8

HOLE NUMBER H-16
 SHEET NUMBER 2
 SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT. _____
 DEP. _____
 ELEVATION OF COLLAR _____
 DATUM _____
 DIRECTION AT START: BEARING _____
 DIP _____

STARTED _____
 COMPLETED _____
 ULTIMATE DEPTH _____
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
	numerous slips from which lt grey green alt starts.						
	Porph volc from 126-127.5, 128.5 - 131.0. Minor skarn with these.						
	Felds porph from 132-133.5, 139.5-140.5, 144.5-145.5						
145.5 - 185.5	Mixture						
	Alternating short sects of felds porph, fine volc, and ep skarn. All typical						
185.5 - 187.5	Skarn						
	Amph minor garn 7% sulph.						
187.5 - 226	Magnetite zone	187-197		10'	60.32		
	Est. 50-55% Fe. Fairly cs massive. Avg. 7% sulph	197-207		10'	59.12		
	occurring mainly with unrepl volc sects and amph skarn sects. Core recovery good. 4 ft. missing	207-217		10'	59.72		
	187-200. Minor carb. amph veins. Sulph in magn. as fracture fillings. Lower cont sharp 30-35°	217-226		9'	61.22		
226 - 253	Skarn and volc. Numerous short sects of unrepl fine volcs. Mainly ep skarn with minor garn seams						
	249.5 4" magnetite. 250.5-252.9 - lt green grey both conts charp at 60°. v.f.g. Consid. string & dissem sulph. volc or dike?						
253	End of Hole	187-226		39'	60.06		

PROPERTY HILLER #8

HOLE NUMBER Hole H-17

SHEET NUMBER 1

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT. 57647
 DEP. 3954
 ELEVATION OF COLLAR 1774
 DATUM _____
 DIRECTION AT START: BEARING North
 DIP -70°

STARTED August, 1965
 COMPLETED September, 1965
 ULTIMATE DEPTH 378'
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE			
0 - 51	Casing						
51 - 110.5	Feldspar Porphyry						
	As before. Not as markedly porph. Partially assim. breccia blocks of more mafic rock. These blocks porphyritized in spots. Minor ep str. Incls. of porph volc. 85-86, 96-97. Several short sects of pale grey green alt rock with weak vague banding, poss tuff, cut by F.P. To bottom of sect porph more typical less mafic with sharp contact at 102						
110.5 - 117	Skarn						
	Typ alt ep 4 ft. core ground. formed in ?						
117 - 125.5	Volcanic						
	First 3 ft. porph type. then f.g. volc cut by pale green str. Occ pale green, bomb like up to 6" Distinct alt rims or poss chilled cont.						
125 - 129.5	Porph volcanic						
	Greyish more acid in comp. Sharp, line contact with above though not chilled. Cuts vague banding in fine volc. Zoned felds phenos.						
129.5 - 133	Feldspar Porphyry						
	U.C. obsc. L.C.-60°. L.C. highly alt.						

HILLER #8

PROPERTY.....

HOLE NUMBER..... Hole H-1,

SHEET NUMBER..... 2

SECTION FROM..... TO.....

DIAMOND DRILL RECORD

LOCATION: LAT.....

DEP.....

ELEVATION OF COLLAR.....

DATUM.....

DIRECTION AT START: BEARING.....
DIP.....

STARTED.....

COMPLETED.....

ULTIMATE DEPTH.....

PROPOSED DEPTH.....

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
133 - 159	Porph Volcanic						
	As above. Tightly packed phenos. Minor short feldspathized sects. Bands pale green alt. Looks gabbroic in spots. 154-156 lighter green f.g. zone						
	Sharp irreg. U.C. L.C. shows chill or alt rim at 50°						
159 - 165	Felds porphyry - as before						
165 - 212	Porph volcanic						
	As above. Felds patches. In spots feldspars prefer. feldspathized. 184 1 ft. Q.V.						
	Minor felds porphyry from 195-198, 207-209, 211-212						
	Minor sects fine volc.						
212 - 238	Skarn						
	Mainly garnet. Minor short skarnified F.P. Minor unrepl. volc. Heavy sulph PoPy for 6" from lower contact.						
238 - 243	Magnetite Zone	238-243		5'	61.22		
	55-60% Fe Cs mag. 3% sulph Some mag with brecc text, with amph matrix						
243 - 244.5	Skarn - all epidote						
244.5 - 249.5	Fine volcanic	243-248		5'	14.83		
	Little alt. Minor ep strgrs. Later dike? 247 sulph mag seam						

PROPERTY HILLER #8

HOLE NUMBER H-17

SHEET NUMBER 3

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT _____
 DEP _____
 ELEVATION OF COLLAR _____
 DATUM _____
 DIRECTION AT START: BEARING _____
 DIP _____

STARTED _____
 COMPLETED _____
 ULTIMATE DEPTH _____
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
249.5 - 258.5	Quartz vein Mass bull quartz. At 256-258.5 feldspar dike. Apparent sharp cont. though obsc.						
258.5 - 260.5	?						
xxxx	Grey aphanite. More acid phase of volc or poss sed. No banding evident. L.C. obsc.						
260.5 - 275	Skarn & fine volcanic Minor sects. of f.g. volc, med grey green. Intensely fract with ep filling. Skarn fract with carb. filling. From 265 occ minor mag sects with sulph Becomes mainly amph garn skarn with appearance of mag.	265-275	275-285	10' 10'	13.94 31.56		
275 - 295	Magnetite zone Short sects up to 3-4' of 80-90% magnetite, alt with f.g. volc and minor skarn 2-3% sulph - Zone possibly 30% Fe. Fract - carb. & sulphide filling	285 - 295	295 - 305	305 - 315	315 - 325	10' 10' 10'	47.80 16.03 13.23
295 - 325	Volc. f.g. & skarn Usual skarn str. & patches 15-20% of zone. Minor short mag sects. Well fract. Skarn cement of breccias	325 - 337		12'	38.28		
325 - 337	Magnetite Zone (cont. on next page)	265-337		72	24.94		

PROPERTY HILLER #8

HOLE NUMBER H-17

SHEET NUMBER 4

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. _____
DEP. _____

ELEVATION OF COLLAR _____

DATUM _____

DIRECTION AT START: BEARING _____
DIP _____

STARTED _____

COMPLETED _____

ULTIMATE DEPTH _____

PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE			
	Mag throughout sect avg 30% Fe. Unusual reticulate texture as mag appears to be direct partial replcmt of volc with little or no skarn. Sulph 1-2%						
337 - 378	Volcanic Med grey green f.g. minor ep str. No porph phases - poss a distinct footwall type. Usual minor breccia patches and fracturing. Finely recryst amph ? in breccia sect? Irreg shaped carb fillings May be a distinct type						
378	End of Hole						

PROPERTY HILLER #8

HOLE NUMBER 20

SHEET NUMBER 1

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT. 57819
 DEP. 3743
 ELEVATION OF COLLAR 1682
 DATUM _____
 DIRECTION AT START: BEARING South
 DIP -40°

STARTED September, 1965
 COMPLETED September, 1965
 ULTIMATE DEPTH 161'
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
0 - 17	Overburden Casing to 27						
17 - 23	Magnetite Probable boulder. Poss 40-45% Mag. Fair amph & calcite						
23 - 35	Volcanic Lt grey green; part skarn. Local breccia text. 4-5 ft. core missing	27-35		8	13.13	Tr	0.85
35 - 37.5	Magnetite	35-38		3.0	38.48	0.09	3.35
37.5 - 47	Volcanic Minor skarn. 41-42 Cs porph volc. 37.5-39 grey 10% very fine sulph. Looks vgly. sedimentary.	38-47		9	21.14	0.04	2.30
47 - 55	Magnetite - 50-55% Fe 5%+ pyrite	47-55		8	60.52	0.07	2.44
55 - 78	Acid volcanic? Good breccia text. 15-20% ep. Several bands massive sulph	27 - 55		28'	31.58	0.04	2.04
78 - 137	Volcanic Dk green. Minor skarn. Minor mag zones. 83-84.5 Magnetite. Other minor sects to 4"-5". Mag ends about 90'						
137 - 144	Andesite dike. clearly intrusive. Comp same as main volc. Lower cont good chill at 45°. U.C. obsc. Lt grey green						

HILLER #8

PROPERTY.....

HOLE NUMBER 20

SHEET NUMBER 2

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT.....

STARTED.....

DEP.....

COMPLETED.....

ELEVATION OF COLLAR.....

ULTIMATE DEPTH.....

DATUM.....

PROPOSED DEPTH.....

DIRECTION AT START: BEARING.....

DIP.....

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE			
144 - 161	Volcanic						
	Dk green. Much garn amph skarn						
161	End of Hole						
	Hole stopped due to excessive water pressure						

PROPERTY..... HILLER #8

HOLE NUMBER..... 21

SHEET NUMBER..... 1

SECTION FROM..... TO.....

DIAMOND DRILL RECORD

LOCATION: LAT..... 57819
 DEP..... 3743
 ELEVATION OF COLLAR..... 1682
 DATUM.....
 DIRECTION AT START: BEARING..... South
 DIP..... -60°

STARTED..... September, 1965
 COMPLETED..... September, 1965
 ULTIMATE DEPTH..... 164'
 PROPOSED DEPTH.....

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
0 - 15	Overburden						
15 - 23	Volcanic Dk green; good breccia text; high % amph; sharp lower contact at 45°						
23 - 71	Volcanic & magnetite Lt grey green; weak dissem mag and short mass sects start about 38'. Patches ep through most of sect						
71 - 85	Magnetite	71-75		4'	27.56	tr	0.85
	30% fair amt carb. light & dk green volcanic - host	78-85		10'	38.18	0.07	0.82
85 - 137	Volcanic Dk green, locally good brecc text. Minor patches lt green volc - bleached equivalent? Fair amt carb stringers garn skarn						
137 - 143	Volcanic Pale grey green. Distinct change from above Dissem magnetite (15% Fe from 138-158)	138-148		10'	16.83	tr	0.77
143 - 158	Volcanic Dk green as before. Dissem mag	148-158		10	19.14	tr	0.75
158 - 162	Andesite dike sharp cont. as before						

PROPERTY HILLER #8

HOLE NUMBER 21

SHEET NUMBER 2

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT.
DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING
DIP

STARTED

COMPLETED

ULTIMATE DEPTH

PROPOSED DEPTH

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
162 - 164	Volcanic						
	Dk green. As before						
164	End of Hole	71 - 85		14	35.14	0.05	0.83
		138 - 158		20	17.98	tr	0.76

HILLER #4

PROPERTY.....

HOLE NUMBER 17

SHEET NUMBER 2

SECTION FROM..... TO.....

DIAMOND DRILL RECORD

LOCATION: LAT.....

DEP.....

ELEVATION OF COLLAR.....

DATUM.....

DIRECTION AT START: BEARING.....
DIP.....

STARTED.....

COMPLETED.....

ULTIMATE DEPTH.....

PROPOSED DEPTH.....

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
173 - 183	Volcanic and skarn - minor F.P. zones	170-180		10'	7.08	tr	0.13
183 - 193	Magnetite - 55% Fe+; 3% S	180-190		10'	55.46	tr	0.31
193 - 199	Distinctive. fine fels phenos set in f.g. green matrix and skarn and minor mag sects.	190-200		10'	38.35	tr	0.26
		200-210		10'	60.92	tr	0.22
199 - 254	Magnetite	210-220		10'	63.65	tr	0.09
	50%+ Fe 3% S Minor volcs within zone	220-230		10'	54.85	tr	0.65
	251-252 Cs porph volc 50% epidotized felds phenos	230-240		10'	57.26	tr	0.20
		240-250		10'	65.38	tr	0.68
254 - 299	Volcanic & Skarn	250-260		10'	38.66	tr	0.33
	Bleached fract. type of volc. Garn ep skarn.	260-270		10'	10.07	tr	0.11
	Minor breccia patches 292-294	270-280		10'	11.84	tr	0.05
		280-290		10'	13.86	tr	0.52
299 - 302	Feldspar porphyry - typ.	290-300		10'	9.21	tr	0.02
302 - 306	Core ground	300 - 310		10'	4.45	tr	0.07
306 - 308.5	Limestone - greenish yellow. Unusual texture	310-320		10'	19.23	tr	2.14
308.5 - 311	Feldspar Porphyry	320-330		10'	24.09	0.04	2.14
311 - 335	Tuff ?? Vague banded sects though highly distorted.	330-340		10'	36.43	0.04	2.97
	F.g. Lt green bands alt with dk green amph bands.	340-350		10'	14.07	tr	0.61
	Heavy Po 10-15%						
335 - 340	Magnetite						
	Much Po						

PROPERTY _____ HILLER #4 _____

HOLE NUMBER 17

SHEET NUMBER 3

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT _____
 DEP _____

ELEVATION OF COLLAR _____

DATUM _____

DIRECTION AT START: BEARING _____
 DIP _____

STARTED _____

COMPLETED _____

ULTIMATE DEPTH _____

PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
340 - 343.5	Tuff ?? Same as 311-335						
343.5 - 348	Volcanic Fine ebn gate linear amph blobs set in lt green volc matrix. Alternates with typ f. green volc.						
348 - 359	Diorite F.g. Bleached finely porph.						
359 - 365	Volcanic Typ. F.g.						
365 - 371	Felds porphyry						
371	End of Hole	180-260		80'	54.25	tr	0.34

PROPERTY HILLER #4

HOLE NUMBER 18

SHEET NUMBER 1

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT. 53732
 DEP. 7733
 ELEVATION OF COLLAR 3445
 DATUM _____
 DIRECTION AT START: BEARING N 33° 28' E
 DIP -60°

STARTED October, 1965
 COMPLETED October, 1965
 ULTIMATE DEPTH 368'
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
0 - 5	Overburden						
5 - 7	Volcanic - marker ? Felds phenos in f.g. green matrix						
7 - 21.5	Feldspar porphyry Sil beige type alternating with grey unalt type						
21.5 - 22.5	Volcanic - typ.						
22.5 - 77	Diorite Grey. Broad chill zone to cs grd centre from 50-75. Almost gabbro. L.C. chill at 40°						
77 - 92	Volcanic & Skarn 60% of sect garnet	75-80		10'	10.93	0.02	1.09
92 - 97.5	Magnetite 55% +; 3% sulphides	85-95		10'	30.97	Tr	0.44
97.5 - 100	Volcanic - typ.	95-105		10'	31.98	Tr	0.55
100 - 112	Feldspar Porphyry - bleached siliceous type	105-115		10'	9.72	tr	0.04
112 - 120	Skarn - mainly garn. 115-117 magnetite	115-125		10'	49.49	0.04	0.74
120 - 131	Magnetite - 55%+ 3% sulph	125-135		10'	45.34	0.01	0.76
131 - 136.5	Volcanic - typ. banded tuff ? at 70° at 132						
136.5 - 141	Diorite - fine felds phenos	135-145		10'	34.91	0.02	0.02
141 - 145	Magnetite						
145 - 148	Skarn - garn mainly	145-155		10'	43.01	0.05	1.11

PROPERTY Hiller #4

HOLE NUMBER 18

SHEET NUMBER 2

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT _____

STARTED _____

DEP _____

COMPLETED _____

ELEVATION OF COLLAR _____

DATUM _____

ULTIMATE DEPTH _____

DIRECTION AT START: BEARING _____
DIP _____

PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
148 - 178	Magnetite Zone						
	Some Skarn. 40-55% Fe.	155-165		10'	47.36	0.04	2.62
	Heavy local Po.						
178 - 186	Skarn & Volcanic	165-175		10'	42.50	TR	0.87
	Minor sects similar to						
	so-called "tuff" of Hole 17.	175-185		10'	28.94	0.01	0.92
186 - 190	Limestone						
	Brownish Lst bands with volc.	185-195		10'	10.37	TR	0.33
	Recrys Calc 187-189						
190 - 197	Skarn & Volc.	195-205		10'	29.96	0.04	2.05
197 - 200	Magnetite						
200 - 207	Skarn						
207 - 225	Magnetite Z	205-215		10'	43.92	TR	1.55
	55% + 3% Sulph.						
225 - 229	Diorite	215-225		10'	66.69	"	0.37
	Bleached. Lower chill? at 35°						
229 - 245	Magnetite 55% +	225-235		10'	36.94	"	0.70
245 - 251	Porph Volcanic						
	Pale green Felds phenos to 1/8"	235-245		10'	50.20	"	0.22
251 - 265	Magnetite Zone						
	55% + 3% Sulphides	245-255		10'	52.73	"	0.22

PROPERTY Hiller #4

HOLE NUMBER 18

SHEET NUMBER 3

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT _____

STARTED _____

DEP _____

COMPLETED _____

ELEVATION OF COLLAR _____

ULTIMATE DEPTH _____

DATUM _____

PROPOSED DEPTH _____

DIRECTION AT START: BEARING _____
DIP _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
265 - 285	Skarn Minor Mag. Volcanic						
	Last 3 ft. porph volc.	255-265		10'	47.26	TR	1.16
285 - 311.5	Magnetite						
	55% + 3% Sulph.	265-275		10'	20.04	0.01	0.68
311.5 - 313	Skarn	275-285		10'	10.27	TR	0.37
313 - 330	Felds Porphyry	285-295		10'	51.41	TR	0.61
	Grey Silicified Type	295-305		10'	55.56	"	0.15
330 - 345	Magnetite	305-315		10'	43.92	"	0.26
	Lower grade - higher sulph.	315-325		10'	8.19	"	0.09
	consid amph skarn	325-335		10'	34.10	"	0.85
		335-345		10	36.94	"	0.72
345 - 356	Diorite Type?	345-355		10'	6.78	TR	0.15
	Not typ. - could be volc. Lower contact shows silic by porph.						
356 - 368	Felds Porph.						
	Silic type						
368	End of hole						
		85-345		260	37.77	0.01	0.70
		205-315		110	43.54	TR	0.57

PROPERTY Hiller #4

HOLE NUMBER 19

SHEET NUMBER 1

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT 53874
 DEP 7695
 ELEVATION OF COLLAR 3463
 DATUM
 DIRECTION AT START: BEARING N 33 - 28' E
 DIP -45°

STARTED October, 1965
 COMPLETED October, 1965
 ULTIMATE DEPTH 253'
 PROPOSED DEPTH

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
0 - 8	Oberburden						
8 - 19	Volcanic						
	F.g. mid green grey. No skarn. Could be dike though no conspic chill at lower cont. 10-13 Acid dike - sharp conts. Sharp Lower contact with mag.						
19 - 27	Magnetite	19-29		10'	25.75	0.03	1.92
	55% + Locally v heavy Sulph. 20% from 23-24						
27 - 37	Garnet Skarn						
	Fair Sulph; grades to volc at lower cont.	29-39		10'	27.86	TR	0.38
37 - 40	Magnetite						
40 - 44	Feldspar Porphyry & Volcanic	39-49		10'	50.80	TR	0.94
	Siliceous type porphyry						
44 - 47	Magnetite						
47 - 56	Feldspar Porphyry & Volc.						
	Sil type porph.						
56 - 60	Magnetite	49-59		10'	37.98	TR	0.49
60 - 80.5	Porphyritic Volcanic	59-69		10'	20.74	0.05	2.45
	Bleached along fractures. V minor skarn. Minor mag.	69-79		10'	22.55	0.01	0.79

PROPERTY Hiller #4

HOLE NUMBER 19

SHEET NUMBER 2

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT _____

STARTED _____

DEP _____

COMPLETED _____

ELEVATION OF COLLAR _____

ULTIMATE DEPTH _____

DATUM _____

PROPOSED DEPTH _____

DIRECTION AT START: BEARING _____
DIP _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE			
80.5 - 102	Magnetite	79-89	10'	59.92	TR	0.40	
	55% + ; 3-4% Po & Py.	89-99	10'	68.74	TR	0.36	
102 - 108.5	Skarnified Acid Volcanic						
	Could be acid dike, but not typ.	99-109	10'	33.57	0.01	0.23	
108.5 - 129	Volcanic & Skarn	109-119	10'	9.37	TR	0.06	
	Breccia type skarn. at 122	119-129	10'	10.77	0.04	0.89	
	Some acid sects.						
129 - 157.5	Magnetite	129-139	10'	41.28	0.03	1.77	
	45%+ Fair amt. garn amph	139-149	10'	52.10	0.05	1.51	
	Skarn.	149-159	10'	48.50	TR	3.39	
157.5 - 176	Diorite Intrusive						
	Not altered. Fine felds phenos	159-169	10'	8.37	TR	0.19	
	in dark grey matrix						
176 - 178	Shear						
	Rusty - siliceous	169-179	10'	7.77	TR	0.11	
	Rock type??						
178 - 186.5	Volcanic						
	Finely porph from 182	179-189	10'	16.08	TR	0.68	
186.5 - 193	Magnetite						
	35% 7-10% Sulphides						
	Consid amph Skarn.	189-199	10'	24.25	0.03	2.02	

PROPERTY Hiller #4

HOLE NUMBER 19

SHEET NUMBER 3

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT _____
 DEP _____
 ELEVATION OF COLLAR _____
 DATUM _____
 DIRECTION AT START: BEARING _____
 DIP _____

STARTED _____
 COMPLETED _____
 ULTIMATE DEPTH _____
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE			
193 - 205.5	Volcanic Bleached & Epidotized						
205.5 - 209	Diorite Grey finely porph rock. Intrusive. Prob rel to andesite dikes.	199-209		10'	16.53	TR	0.66
209 - 216	Volcanic Bleached & silicified patches Minor diorite dikes	209-219		10'	27.15	0.04	1.02
	1½ ft. mag at lower contact	219-229		10'	16.73	0.03	0.75
216 - 228	Porph Volcanic Felds phenos to 1/8"	19-109		90'	38.65	0.01	0.88
	Minor mag sects	19-159		140'	36.42	0.01	1.11
228 - 247	Volcanic Sil phases. Minor Ep & garn zones.	79-159		80'	40.53	0.02	1.08
247 - 253	Silicified Porph Volcanic Similar to 216 - 228 but brown grey siliceous look						
253	End of hole						

PROPERTY Hiller #4

HOLE NUMBER 20

SHEET NUMBER 1

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT 53874
 DEP 7695
 ELEVATION OF COLLAR 3463
 DATUM
 DIRECTION AT START: BEARING N 33° 28' E
 DIP -65°

STARTED October, 1965
 COMPLETED October, 1965
 ULTIMATE DEPTH 330'
 PROPOSED DEPTH

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
0 - 8	Overburden						
8 - 10	Volcanic						
	Typ.						
10 - 53	Magnetite Zone	10-20		10'	39.87	TR	1.40
	Main massive sects are as follows: 10-12; 14-19; 22-26.5; 36-41; 51-53. Heavy sulphides						
	Volc main waste	20-30		10'	39.06	0.05	2.18
	Felds porph 20-22, 32-36						
	At 43 Short bedded sects at 35-40	30-40		10'	33.60	0.02	1.05
	43-45 Quartz vein	40-50		10'	25.50	TR	0.46
53 - 59	Garn Skarn						
	Volc patches	50-60		10'	28.23	0.01	1.66
59 - 63	Magnetite						
	10% Sulphides	60-70		10'	32.18	0.05	2.05
63 - 74	Felds Porphyry						
	Silic type Minor volc on mag contacts.	70-80		10'	41.59	TR	0.33
74 - 98	Magnetite	80-90		10'	53.33	"	0.44
	Volc inclusions 3% Sulph.						
98 - 126	Volc & Skarn - Garn as replc along fract.	90-100		10'	57.28	TR	0.41
	Mag from 112-114. Other minor sects.	100-110		10'	18.32	"	0.09

PROPERTY Hiller #4

HOLE NUMBER 20

SHEET NUMBER 2

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT _____

STARTED _____

DEP _____

COMPLETED _____

ELEVATION OF COLLAR _____

DATUM _____

ULTIMATE DEPTH _____

DIRECTION AT START: BEARING _____
DIP _____

PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE			
126 - 155	Diorite	110-120	10'	32.38	TR	0.11	
	As before. Finely porph text						
	126 rusty shear at 30°.	120-130	10'	11.54	"	0.17	
	Fine chill at 45°						
155 - 260	Mag. Zone	150-160	10'	28.13	"	0.28	
	Fair amount included waste	160-170	10'	49.18	"	0.74	
	mainly volc and amph skarn	170-180	10'	43.92	"	0.24	
	brecc in spots with mag	180-190	10'	46.05	"	0.09	
	stringers. Poss 5% sulph.	190-200	10'	57.08	"	0.20	
	Avg 45% Fe?	200-210	10'	60.01	"	0.48	
	Carb veining 226-227	210-220	10'	52.93	0.04	0.59	
	232-238 heavy Sulph. 10-12%	220-230	10'	50.70	TR	1.16	
260 - 300	Skarn	230-240	10'	44.12	0.02	3.66	
	Mainly amphibole skarn	240-250	10'	43.52	TR	1.85	
	alternating with volc.	250-260	10'	50.70	0.02	1.66	
	15-20% Fe. Locally very	260-270	10'	37.14	0.05	2.31	
	heavy sulphides 10% avg.	270-280	10'	29.75	0.02	2.05	
	Volc dk. green	280-290	10'	22.97	0.05	2.16	

PROPERTY Hiller #4

HOLE NUMBER 20

SHEET NUMBER 3

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT _____
 DEP _____
 ELEVATION OF COLLAR _____
 DATUM _____
 DIRECTION AT START: BEARING _____
 DIP _____

STARTED _____
 COMPLETED _____
 ULTIMATE DEPTH _____
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
300 - 330	Volcanic	290	300	10'	17.01	0.04	1.46
	Light green. Minor epidote	300	310	10'	6.38	TR	0.13
	stringers Locally finely	310	320	10'	13.36	TR	0.59
	Porphyritic	320	330	10'	8.50	0.01	0.61
	Last 6" limestone						
330	End of Hole						
		10	100	90	38.97	0.01	1.11
		150	290	140	44.00	0.01	1.25
		160	260	100	49.82	TR	1.10

PROPERTY Hiller #4

HOLE NUMBER 21

SHEET NUMBER 1

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT 53699
 DEP 7793
 ELEVATION OF COLLAR 3434
 DATUM _____
 DIRECTION AT START: BEARING N 33° 28' E
 DIP -45°

STARTED October, 1965
 COMPLETED October, 1965
 ULTIMATE DEPTH 319'
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
0 - 2	Overburden						
2 - 37	Diorite						
	Med Grd. Almost gabbro in spots.						
37 - 51.5	Volcanic 50% Skarn Garn 50%						
51.5 - 54	Felds porph						
	Same as 36-38 in hole 22						
	UC 60° LC 60°						
54 - 83	Skarn + Volc.						
	As before. Minor porph volc.	75-85		10'	19.63	0.07	2.33
	73-74.5 Andesite Dike						
	Minor mag sects start at 75' to 83'	85-95		10'	15.18	0.14	5.39
83 - 97	Volc Skarn Minor Porph	95-105		10'	45.74	0.02	3.34
97 - 116	Magnetite						
	55% Fe+ 5% Sulph.	105-115		10'	59.81	TR	1.09
116 - 120	Skarn						
120 - 125	Diorite	115-125		10'	18.01	"	0.20
	Lighter green. Typical. Some epid UC 25°						
125 - 130	Feldspar Porph.						
	L.C. 60°						

PROPERTY Hiller #4

HOLE NUMBER 21

SHEET NUMBER 2

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT
DEP

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING
DIP

STARTED

COMPLETED

ULTIMATE DEPTH

PROPOSED DEPTH

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
130 - 137	Diorite						
	As before						
137 - 148	Volcanic 30% Skarn						
148 - 161	Diorite Typical						
161 - 166	Magnetite	160-170		10'	31.78	TR	0.89
	55% 7% Sulphides Minor Skn	170-180		10'	5.62	"	0.11
166 - 170	Feldspar Porph.	180-190		10'	16.70	"	0.76
	Silicified	190-200		10'	38.15	0.04	1.57
170 - 174	Epidotized Porphyry?	200-210		10'	51.81	TR	1.26
174 - 188	Volcanic Ep & Carn	210-220		10'	10.78	"	0.09
188 - 210	Magnetite	220-230		10'	21.76	0.01	0.94
210 - 217	Feldspar Porph.	230-240		10'	41.39	TR	0.24
217 - 225	Volcanic	240-250		10'	63.25	"	0.19
	Typ Edpid.	250-260		10'	51.01	"	0.31
225 - 255	Magnetite	260-270		10'	40.38	"	0.61
	Porph volc 232-234						
	40-45% Fe						
255 - 266	Felds Porphyry						
	Siliceous - intrusive.						
266 - 298	Magnetite	270-280		10'	59.91	TR	1.13
	50% Fe 4% Sulphides	280-290		10'	40.58	0.01	1.13

PROPERTY Hiller #4

HOLE NUMBER 21

SHEET NUMBER 3

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT _____
 DEP _____
 ELEVATION OF COLLAR _____
 DATUM _____
 DIRECTION AT START: BEARING _____
 DIP _____

STARTED _____
 COMPLETED _____
 ULTIMATE DEPTH _____
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
298 - 306	Porph. Volcanic & Skarn.	290-300		10'	41.09	0.02	0.76
306 - 309.5	Feldspar Porph.	300-310		10'	15.79	0.04	1.18
	Silicified						
309.5 - 319	Volcanic						
	Parts possibly diorite						
	Short porph phases. Light green						
	Last 3" feldspar porph.						
319	End of hole						
		75-125		50	30.17	0.48	2.47
		230-300		70	48.23	0.01	0.62

PROPERTY Hiller #4

HOLE NUMBER 22

SHEET NUMBER 1

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

53699
 LOCATION: LAT 7793
 DEP 3434
 ELEVATION OF COLLAR _____
 DATUM _____
 DIRECTION AT START: BEARING N 33° 28' E
 DIP -65°

STARTED October, 1965
 COMPLETED October, 1965
 ULTIMATE DEPTH 338
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
0 - 26	Gabbro Good texture. Very cs. phase of the diorite. Fresh unaltered. 10-12 Bleached broken zone 15-17 Breccia, qtz. vein diorite altered. Fault?? Chills to LC at 55°						
26 - 31	Feldspar Porphyry Poor care recovery broken						
31 - 36	Skarn Garn - carb mainly Lower part skarn & volc.						
36 - 38	Feldspar Porph. Light grey - fine grd. not typical						
38 - 44	Skarn Mainly garnet						
44 - 50.5	Andesite Dike Sharp UC at 30° Lower 45° Dk. green, mod fract. minor ep. strgrs.						
50.5 - 52	Skarn						

PROPERTY Hiller #4

HOLE NUMBER 22

SHEET NUMBER 2

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT _____

STARTED _____

DEP _____

COMPLETED _____

ELEVATION OF COLLAR _____

DATUM _____

ULTIMATE DEPTH _____

DIRECTION AT START: BEARING _____

PROPOSED DEPTH _____

DIP _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
52 - 56	Feldspar Porph. Fine grd. Not distinctly porphyritic Contacts irreg. Same as 36-38						
56 - 68	Mag. Zone & Skarn 20% Magnetite Minor volc. inclusions.	55-65		10'	12.80	0.04	1.21
68 - 71	Shear? Breccia rusty, possibly in felds porph.	65-70		5'	7.86	0.05	1.00
71 - 75	Feldspar Porph. Rusty weathered stringers						
75 - 87	Skarn Garn. Consid. late fracturing						
87 - 90	Volcanic Vaguely porph., Vague banding 30-45°						
90 - 97	Andesite or Diorite Dike fine porph. text phenos 1/32"						
97 - 100	Feldspar Porphyry Typ.						
100 - 106	Diorite As before. Fine porph. text.	100-110		10'	7.76	0.01	0.34
106 - 108.5	Magnetite Poor Skarny						

PROPERTY Hiller #4

HOLE NUMBER 22

SHEET NUMBER 3

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT

DEP

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING
DIP

STARTED

COMPLETED

ULTIMATE DEPTH

PROPOSED DEPTH

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
108.5 - 118	Volcanic						
	Silicified, porph. text.	100-110		10'	7.76	0.01	0.34
118 - 130.5	Skarn & Porphyritic Volc.						
	Short F.P. Silicified						
130.5 - 142	Feldspar Porphyry						
	Closely packed phenos. Some skarn stringers.						
142 - 200	Volcanic & Skarn	150-160		10'	8.01	0.08	1.87
	Mainly garn. Volcanic	160-170		10'	14.36	0.08	3.75
	with bleached stringers	170-180		10'	14.26	0.07	2.57
	becomes mainly skarn with	180-190		10'	11.59	0.07	1.74
	minor mag. zones from	190-200		10'	32.16	0.04	1.19
	160. 7-10% Sulphides	200-210		10'	63.30	0.05	1.53
200 - 223	Magnetite	210-220		10'	60.28	0.04	2.16
	55%+ 5-7% Sulphides	220-230		10'	47.78	TR	0.42
223-253	Feldspar Porphyry						
	Siliceous type.						
	at 233' 6" carb vein or recryst limestone						
233 - 278	Skarn						
	Mainly epidote in volc.						
	Minor porph phases still visible						

PROPERTY Hiller #4

HOLE NUMBER 22
 SHEET NUMBER 4
 SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT _____
 DEP _____
 ELEVATION OF COLLAR _____
 DATUM _____
 DIRECTION AT START: BEARING _____
 DIP _____

STARTED _____
 COMPLETED _____
 ULTIMATE DEPTH _____
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
278 - 285	Fedlspar Porphyry						
	Phenos rounded, amygdular looking						
285 - 290	Skarn & Volc Minor Mag.	285-295		10'	33.36	TR	0.47
290 - 298	Magnetite	295-305		10'	9.27	"	0.11
	Skarn sects.	305-315		10'	35.08	"	0.59
298 - 308	Diorite	315-325		10'	37.90	"	0.23
	Finely porphyritic f.g.	325-335		10'	22.58	"	0.81
	med. green grey.						
308 - 318	Magnetite						
	50% + 7-10% Sulph.	190-230		40'	50.88	0.03	1.32
318 - 320	Porph. Volcanic.						
320 - 327	Magnetite	285-335		50'	27.62	TR	0.44
327 - 330	Diorite						
	UC 30° Typical						
330 - 334	Magnetite						
334 - 338	Feldspar Porph.						
	Typ.						
338	End.						
	Hole stopped. Needle valve						
	on pump broke.						

PROPERTY Hiller #4

HOLE NUMBER 23

SHEET NUMBER 1

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT. 54076
 DEP. 7591
 ELEVATION OF COLLAR 3480
 DATUM _____
 DIRECTION AT START: BEARING S 33° 28' W
 DIP -45°

STARTED October, 1965
 COMPLETED October, 1965
 ULTIMATE DEPTH 233
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
0 - 4	Casing						
4 - 6.5	Diorite						
	Or fine gabbro. More basic than previous holes.						
6.5 - 15	Volcanic						
	Light green, brecc., highly weathered.						
	10-13 Rusty Felds porph.						
15 - 23.5	Diorite						
	As before - fresh looking unalt.						
	Post fault.						
23.5 - 55	Volcanic						
	Highly weathered Rusty Stringers qtz.						
	Fault Zone. Few pieces of diorite.						
	Core Recovery 25-50 5 ft.						
55 - 89	Diorite						
	Med. grd. type. Fine dior text.						
	in spots. Unaltered. Minor epidote at						
	lower contact.						
89 - 92	Andesite						
	Fine Grd. Dk. green grey - prob dike - poss						
	border phase of diorite.						

PROPERTY Hiller #4

HOLE NUMBER 23

SHEET NUMBER 2

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT _____
 DEP. _____

STARTED _____

ELEVATION OF COLLAR _____

COMPLETED _____

DATUM _____

ULTIMATE DEPTH _____

DIRECTION AT START: BEARING _____
 DIP _____

PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
92 - 101	Volc. Vaguely porph in spots. Minor skarn. Cont. obsc.						
101 - 134	Magnetite 65% Fe 3-5% Sulphides	100-110		10'	52.52	TR	0.42
134 - 139	Locally cs pods of Po. Volcanic 137-138 good amyg. volc. poss marker.	110-120		10'	60.88	"	0.49
139 - 145.5	Magnetite As before	120-130		10'	52.42	"	0.64
145.5 - 152	Volcanic or Diorite Weakly ep at conts. L.C. at 30 ⁰⁺	130-140		10'	36.29	0.04	0.38
152 - 161	Magnetite 60% + 7% Sulph.	140-150		10'	40.82	TR	0.98
161 - 165	Amygdular Acid Volcanic pinkish rhyolite 10% fine dissem Py.	150-160		10'	32.05	"	0.81
165 - 177	Volcanic Appears to be fragmental tuff in spots i.e. 170	160-170		10'	22.18	0.05	2.25
177 - 189	Magnetite Zone 55% Fe + 5-7% Sulph.	170-180		10'	33.67	0.04	3.05

PROPERTY Hiller #4

HOLE NUMBER 23

SHEET NUMBER 3

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT _____
DEP _____

STARTED _____

ELEVATION OF COLLAR _____

COMPLETED _____

DATUM _____

ULTIMATE DEPTH _____

DIRECTION AT START: BEARING _____
DIP _____

PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
189 - 195	Andesite Dike	180-190		10'	59.27	0.01	0.57
	Fg. green grey, typical, fresh looking	190-200		10'	37.80	TR	0.66
195 - 201	Magnetite Zone						
	55% + 5% Sulph.	200-210		10	24.19	"	0.32
201 - 209	Volcanic						
	Minor porph - ep skarn	210-220		10'	53.22	0.01	1.61
209 - 227	Magnetite						
	40% Fe 7-10% Sulph. Also ep and amph skarn sects.	220-230		10'	17.44	0.04	0.59
227 - 233	Feldspar Porph						
	Typical	100-227		127'	42.19	0.01	1.06
233	End Hole stopped						
	bad caving						

PROPERTY Hiller #4

HOLE NUMBER 24

SHEET NUMBER 1

DIAMOND DRILL RECORD

SECTION FROM _____ TO _____

LOCATION: LAT 54076
 DEP 7591
 ELEVATION OF COLLAR 3480
 DATUM _____
 DIRECTION AT START: BEARING S 33° 28' W
 DIP -60°

STARTED October, 1965
 COMPLETED November, 1965
 ULTIMATE DEPTH 257
 PROPOSED DEPTH _____

DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
0 - 2	Casing						
2 - 15 (approx)	Volcanic	77-85		8'	64.31	TR	0.32
	Minor porph phases. Minor short weathered rusty feldspar porph's. Much fine stringer qtz.						
	Core recovery to 25' - 25%						
	Either in or near fault						
15 - 25	Diorite	85-95		10'	64.41	"	0.30
	Gabbroic phase						
25 - 56	Volcanic	95-105		10'	56.65	0.02	0.09
	Mainly volcanic fragments						
	brx in spots	105-115		10'	59.37	TR	1.10
56 - 77.5	Diorite						
	More basic than in previous holes.	115-125		10'	61.08	"	0.15
	Occ amph phenos L.C. 55°?	125-135		10'	52.82	0.05	2.16
77.5 - 239	Magnetite						
	65% + 3% Sulph.	135-145		10'	44.76	0.04	2.01
	Core recovery 75-100 12 ft.						
	100-125 18 ft.	145-155		10'	65.52	0.10	0.23
	V minor waste. Brx. Volc.						
	some minor amph skarn						

PROPERTY Hiller #4

HOLE NUMBER 24

SHEET NUMBER 2

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT _____
 DEP _____

STARTED _____

ELEVATION OF COLLAR _____

COMPLETED _____

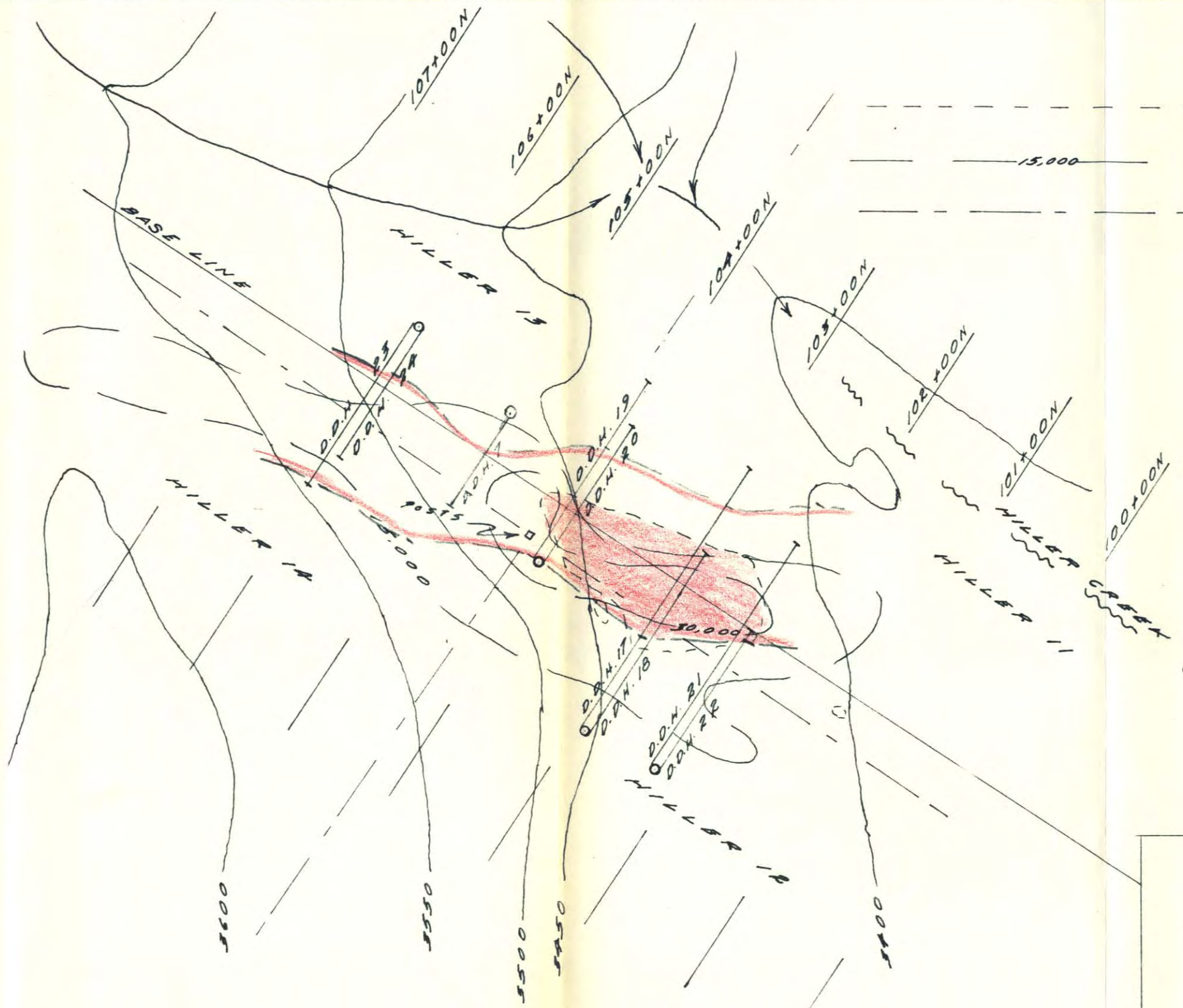
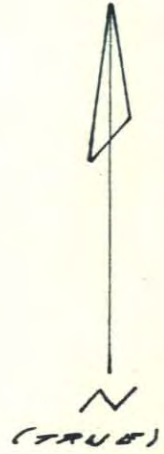
DATUM _____

ULTIMATE DEPTH _____

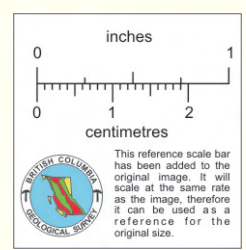
DIRECTION AT START: BEARING _____
 DIP _____

PROPOSED DEPTH _____

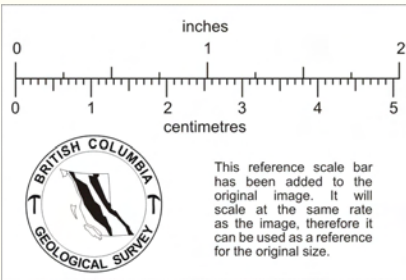
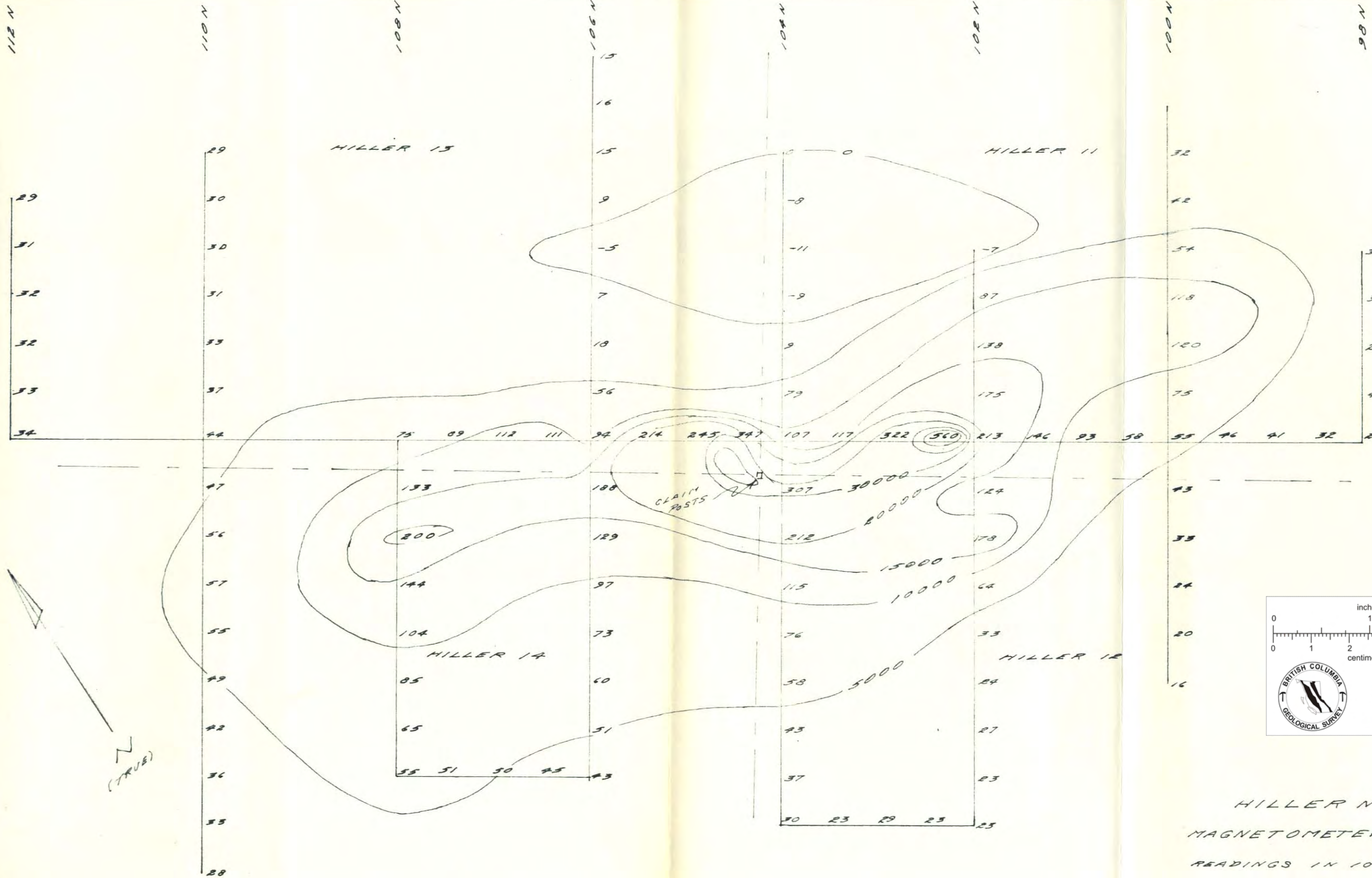
DEPTH FEET	FORMATION	FROM	TO	WIDTH OF SAMPLE	Fe %	Cu %	S %
	133-141 Vaguely banded light green - dk. green. + volc. minor skarn. Some mag 5-7% Sulph.	155	165	10'	63.10	TR	0.21
	190-239 - 55% + Fe very minor sulphides	165	175	10'	62.90	"	0.19
	209-211 Vaguely banded epidotized. Poss tuff band	175	185	10'	58.87	"	0.06
	minor skarny sects	185	195	10'	46.77	"	0.15
	232' 6" banded magnetite	195	205	10'	43.14	"	0.15
239 - 257	Diorite	205	215	10'	45.26	"	0.89
	Greenish, med fine grd.	215	225	10'	63.30	"	0.38
	becomes gabbroic over last few feet	225	235	10'	49.59	0.05	0.21
257	End.	235	245	10'	43.95	0.01	1.44
		245	255	10'	21.97	TR	0.23
		77	255	178'	54.44	0.02	0.58



--- MAGNETITE OUTCROP
--- 15,000 ---
--- CLAIM BOUNDARY



HILLER N#4
LOCATION OF D.D.H.S.
SCALE 1" = 100'
NOV. 1965



HILLER N^o 4
 MAGNETOMETER SURVEY
 READINGS IN 100'S OF GAUSS
 SCALE 1" = 100'
 AUGUST 1965

MAGNETIC PROFILE

GAMMAS

50,000

20,000

10,000

0

EARLIER SURVEY
SHARPE A-3

W

E

BASE LINE



D.O.H. 21 160' - 310'
150' - 35% Fe, 0.01% Cu, 0.74% S

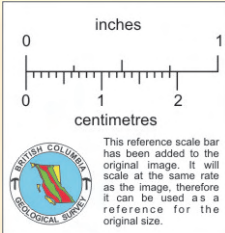
25' - 310'
835' - 29% Fe, 0.02% Cu, 1.01% S

125' to 160' BARREN, NOT SAMPLED

D.O.H. 22 150' to 230'
80' - 32% Fe, 0.05% Cu, 2.52% Cu

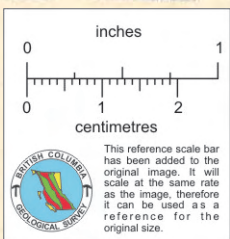
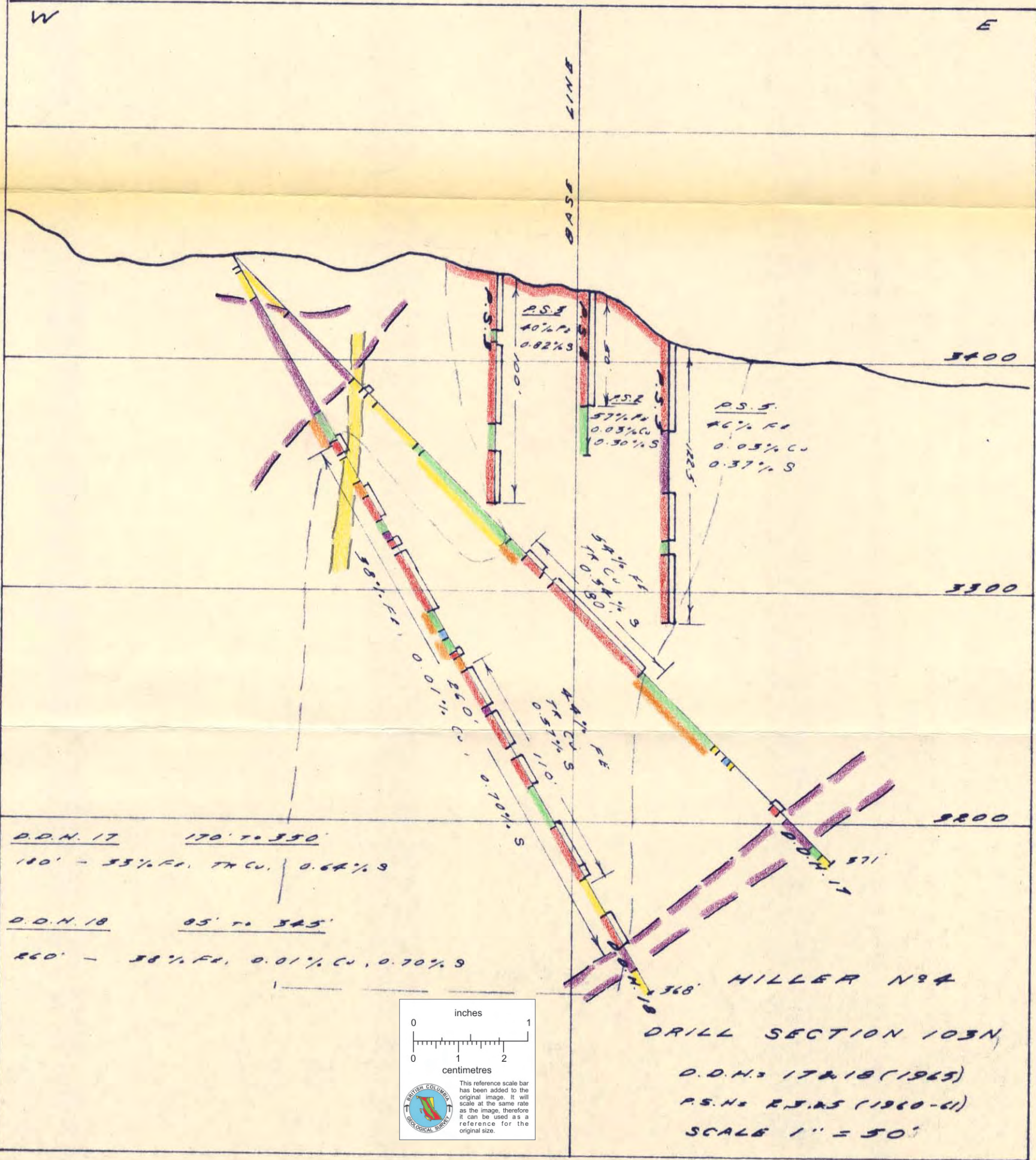
150' to 335'
185' - 21% Fe, 0.02% Cu, 1.21% S

230' to 285' BARREN, NOT SAMPLED



HILLER N#4
DRILL SECTION 102N
D.O.H.s 21 & 22 (1965)
P.S. H.s 8, 12, 13, & 14 (1961)
SCALE 1" = 50'

MAGNETIC PROFILE



MAGNETIC PROFILE

GAMMAS

30,000

20,000

10,000

0

EARLIER SURVEY

SHARP A-5

W

E

BASE LINE

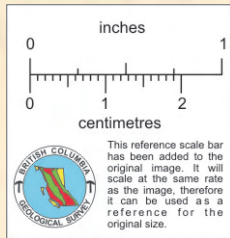
3500

3400

3300

D.D.H. 19 19' to 229'
 210' - 30% Fe, 0.01% Cu, 0.91% S

D.D.H. 20 10' to 330'
 320' - 34% Fe, 0.01% Cu, 0.95% S



HILLER N94
 DRILL SECTION 104N
 D.D.H.s 19 & 20 (1965)
 SCALE 1" = 50'

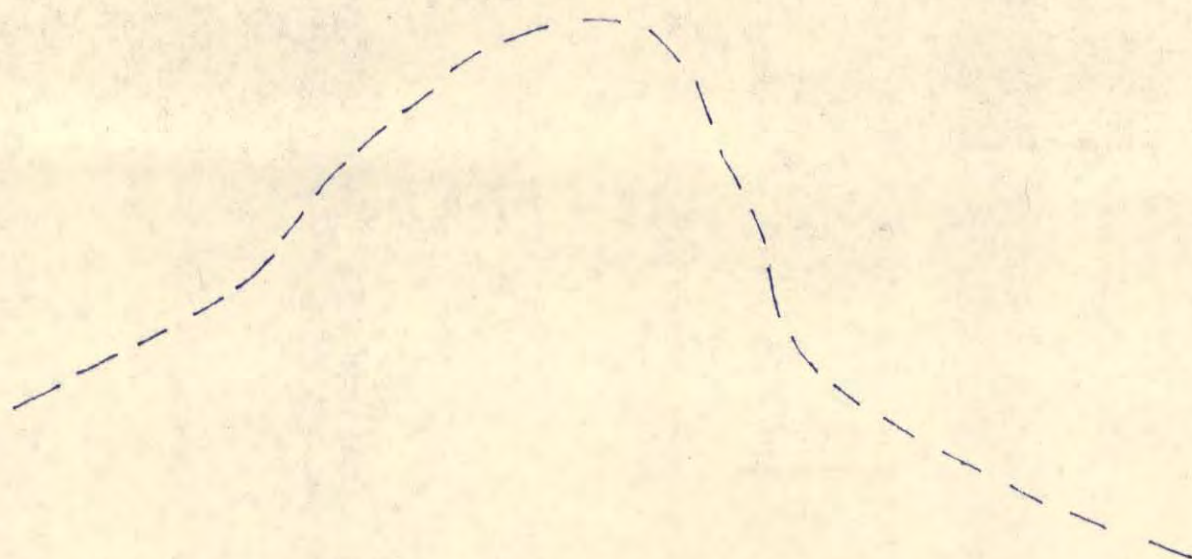
MAGNETIC PROFILE

GAMMAS

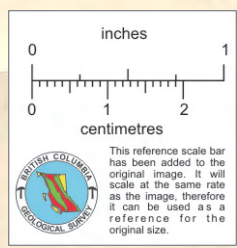
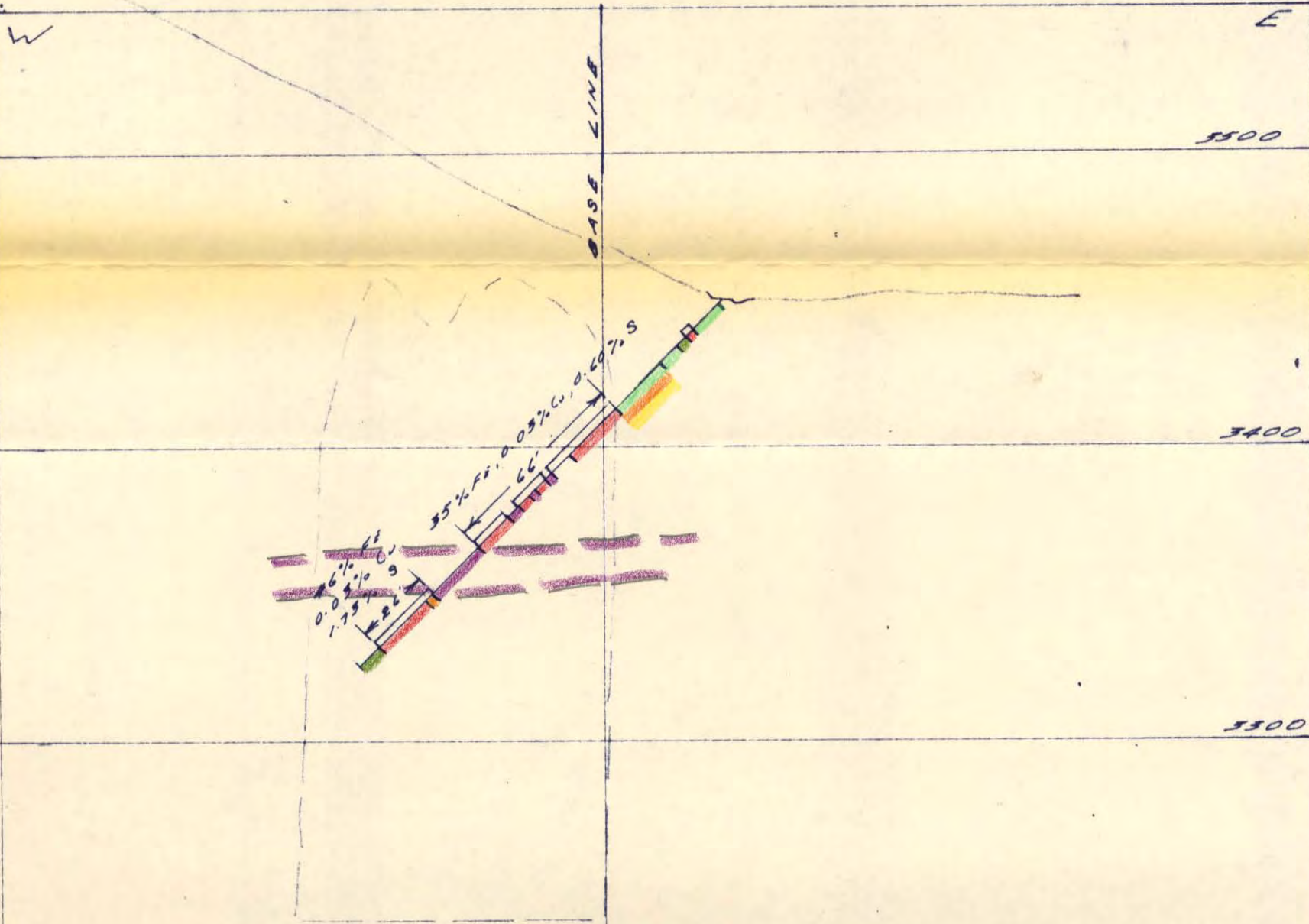
30,000

20,000

10,000



SHARPE A-5



D.D.H. 7 58' to 166.5'
 114.5' - 3 1/4% Fe, 0.01% Cu, 0.73% S

HILLER No 4
 DRILL SECTION 105N
 D.D.H. 7 (1961)
 SCALE 1" = 50'

MAGNETIC PROFILE

GAMMAS

30,000

20,000

10,000

0

EARLIER SURVEY

SHARPE A-3

W

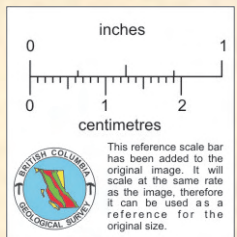
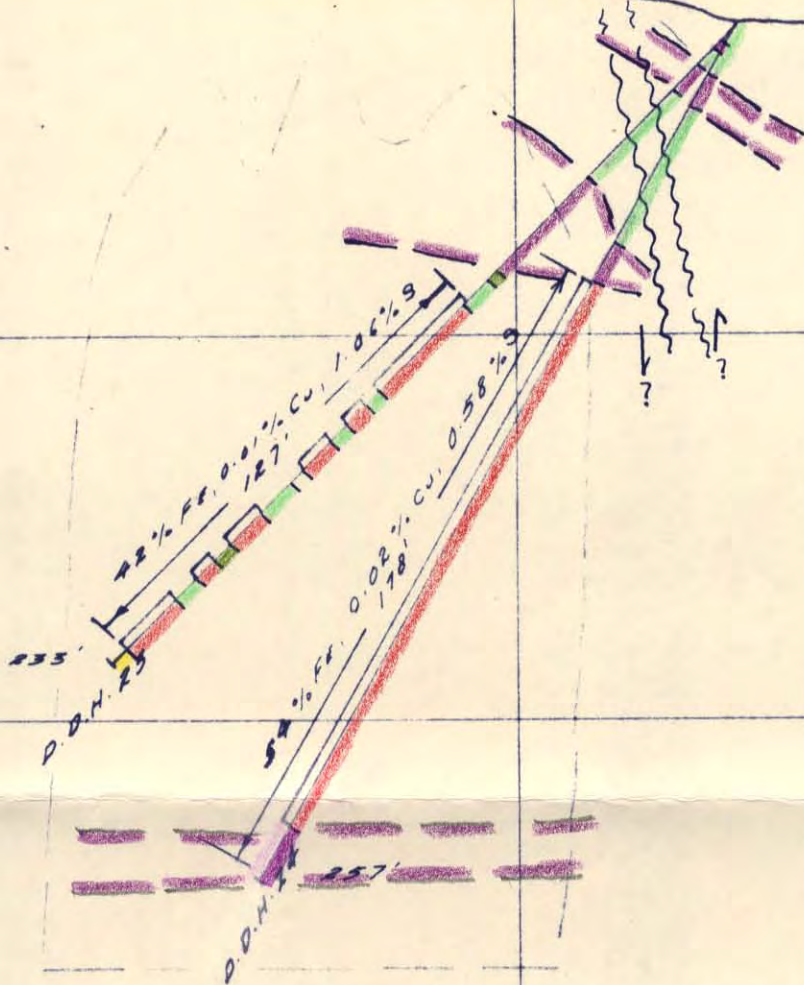
E

BASE LINE

3500

3400

3300



HILLER N94
 DRILL SECTION 106N
 D.D.Hs 23 & 24 (1965)
 SCALE 1" = 50'

MAGNETIC PROFILE

GAMMAS

30,000

20,000

10,000

0

EARLIER SURVEY

SHARPE A-5

W

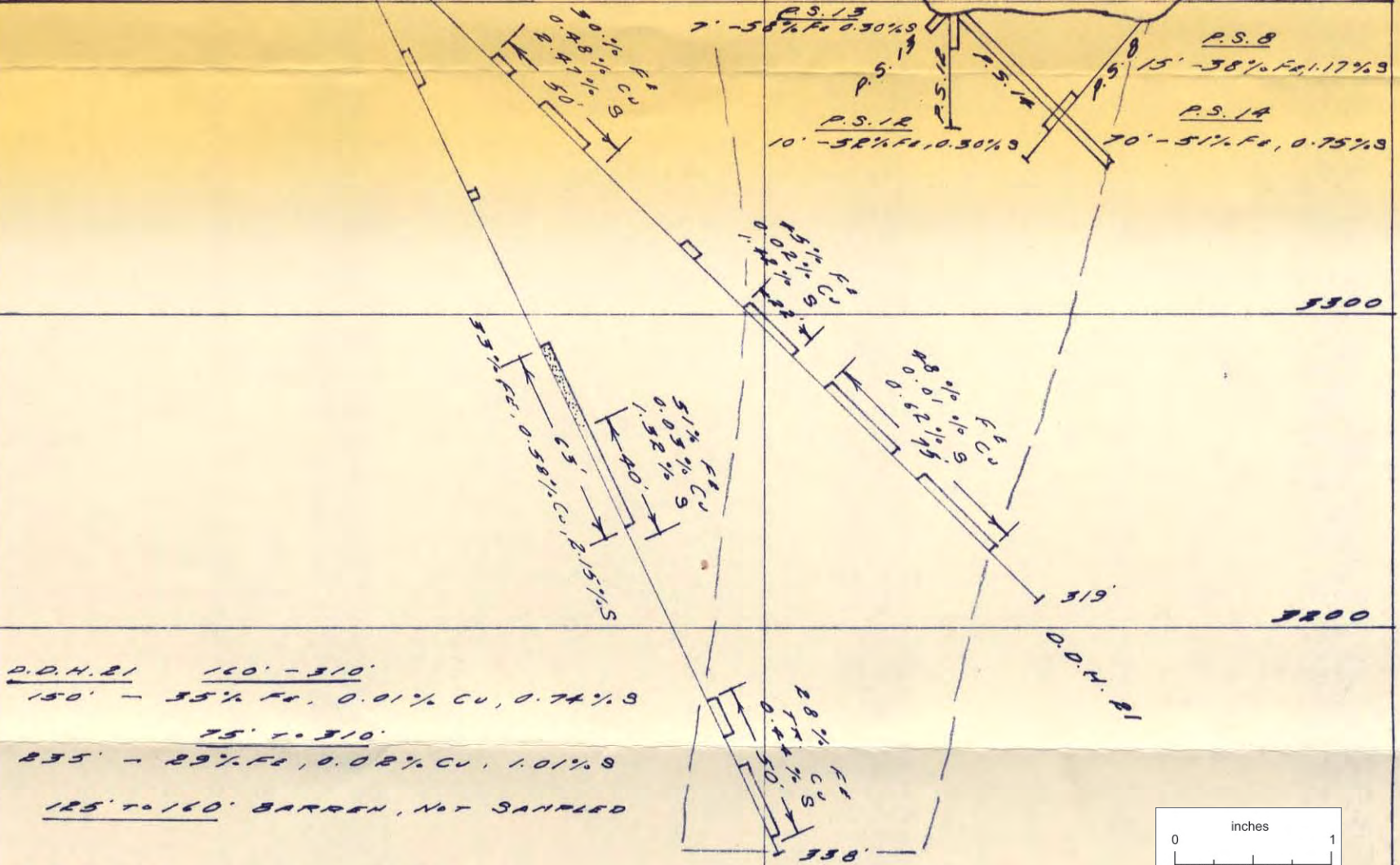
E

BASE LINE

3400

3300

3200



D.D.H. 21 150' - 310'
150' - 35% Fe, 0.01% Cu, 0.74% S

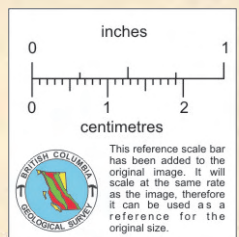
75' - 310'
29% Fe, 0.02% Cu, 1.01% S
125' TO 160' BARREN, NOT SAMPLED

D.D.H. 22 150' TO 230'
80' - 32% Fe, 0.05% Cu, 2.52% S

150' TO 335'
185' - 21% Fe, 0.02% Cu, 1.81% S

230' TO 285' BARREN, NOT SAMPLED

AREA 11 5/9 inches
TONNAGE 11x50x50x85 \times length
= 234,000 tons
AVERAGE GRADE 33.9% 501 Fe



HILLER

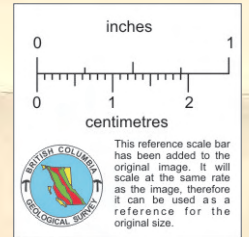
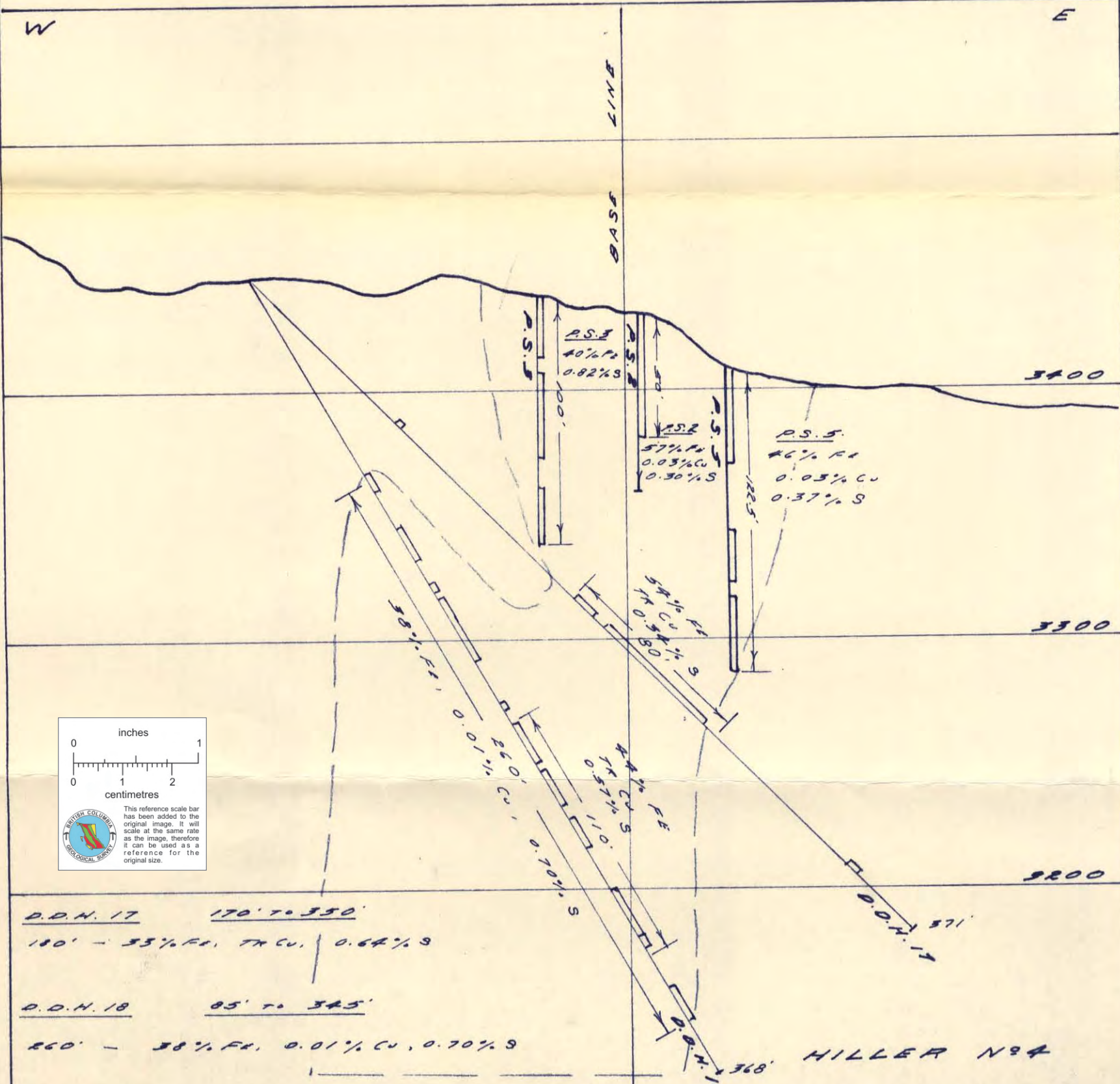
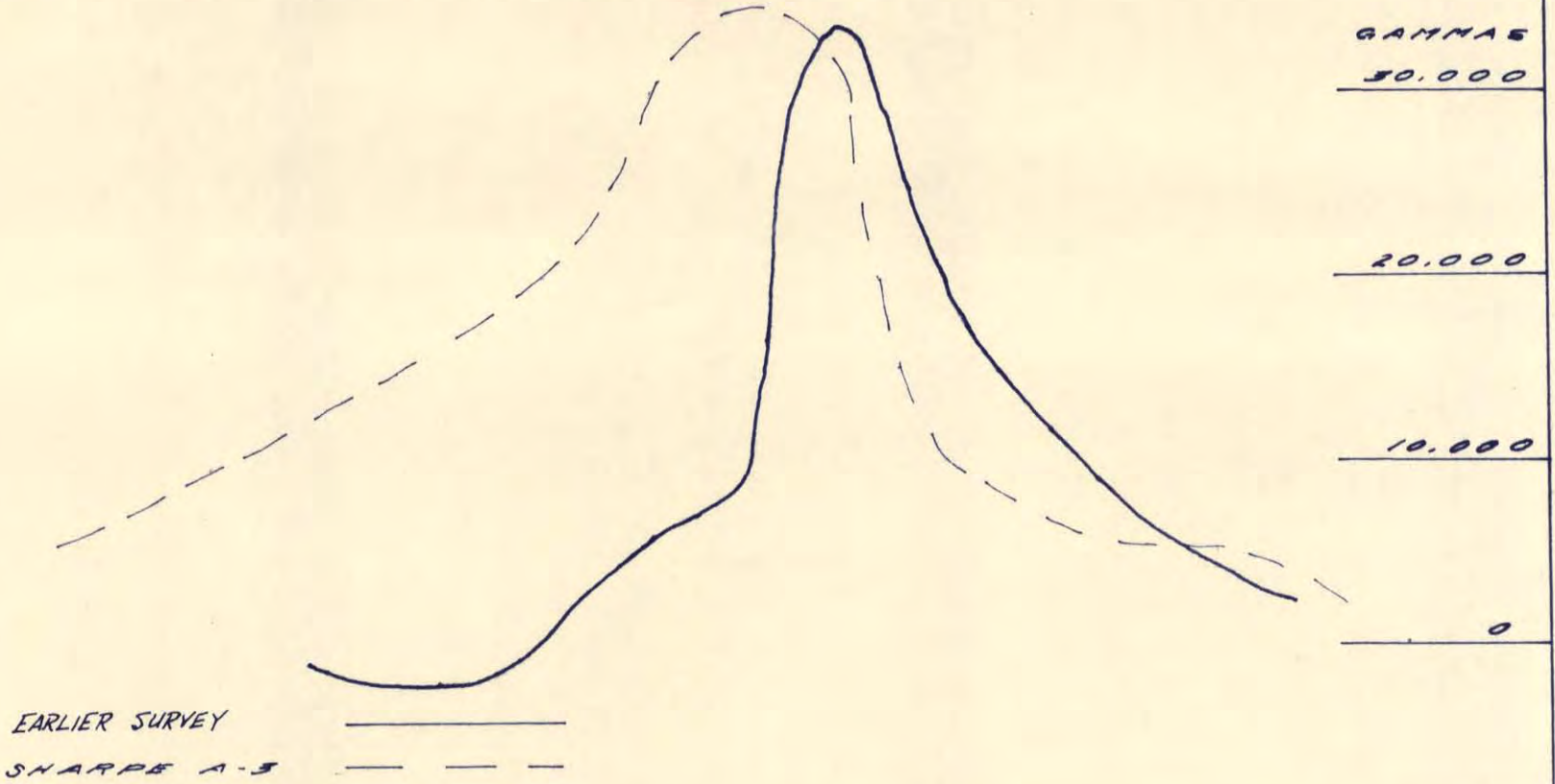
DRILL SECTION 102N

D.D.H.s 21 & 22 (1965)

P.S.H.s 8, 12, 13, & 14 (1961)

SCALE 1" = 50'

MAGNETIC PROFILE

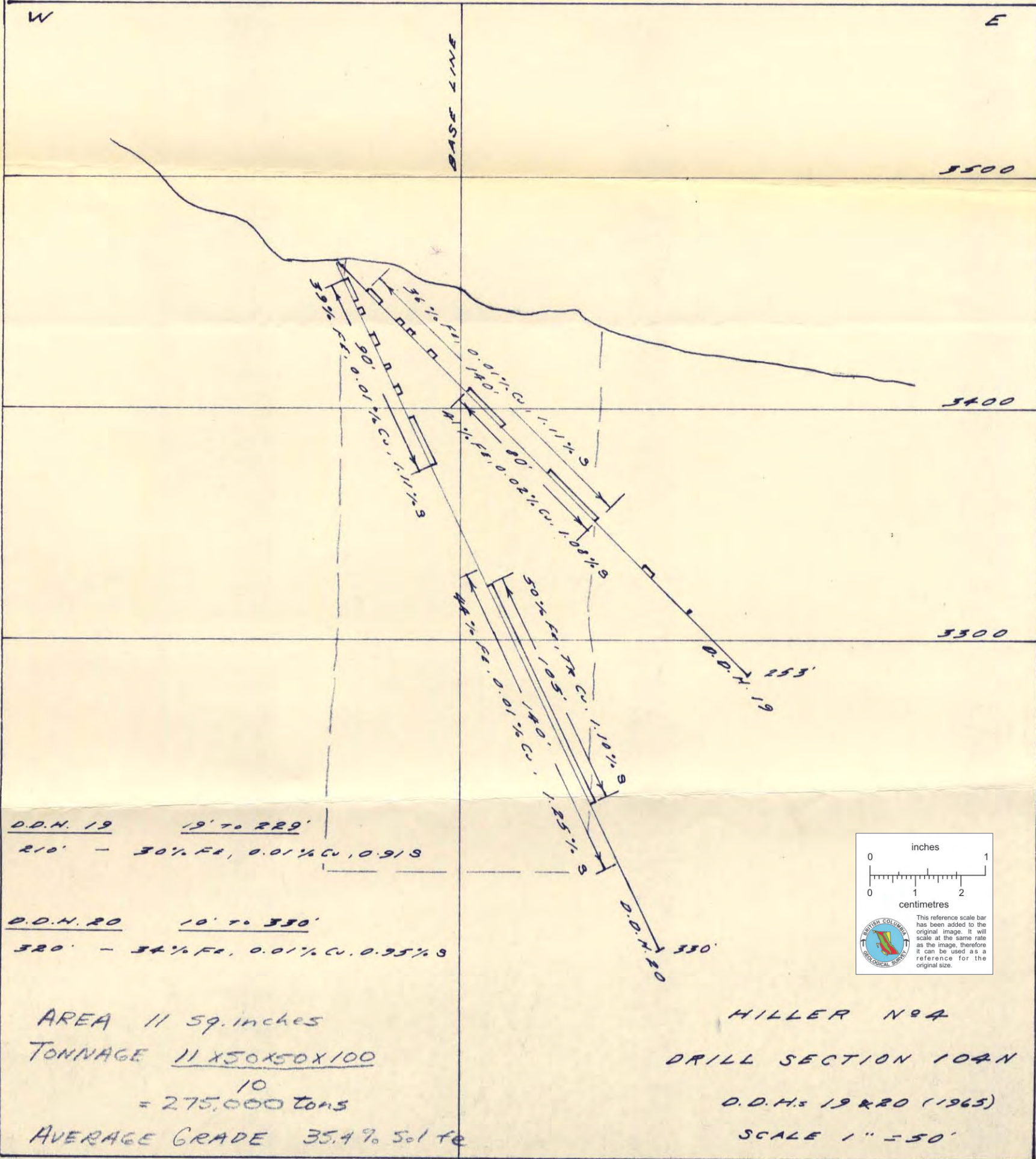
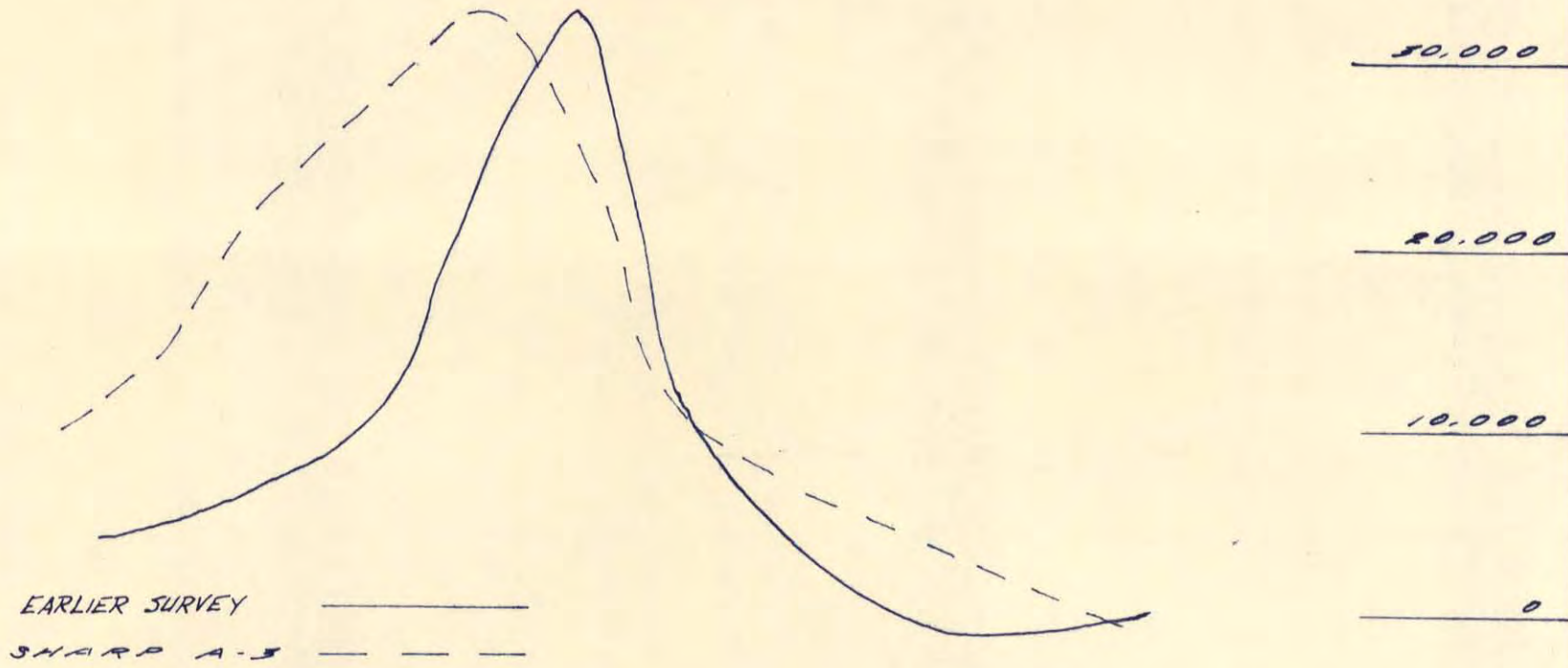


AREA 17 Sq. inches.
 TONNAGE $\frac{17 \times 50 \times 50 \times 85}{10}$ (strike length)
 = 361,000 TONS.
 AVERAGE GRADE 43.6% Sol. Fe

DRILL SECTION 103N
 D.D.H.s 17 & 18 (1965)
 P.S. No. P.S. 25 (1960-61)
 SCALE 1" = 50'

MAGNETIC PROFILE

GAMMAS

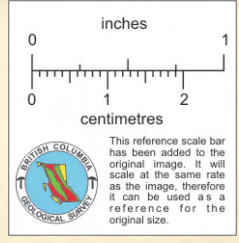


D.D.H. 19 19' to 229'
 210' - 30% Fe, 0.01% Cu, 0.91% S

D.D.H. 20 10' to 330'
 320' - 34% Fe, 0.01% Cu, 0.95% S

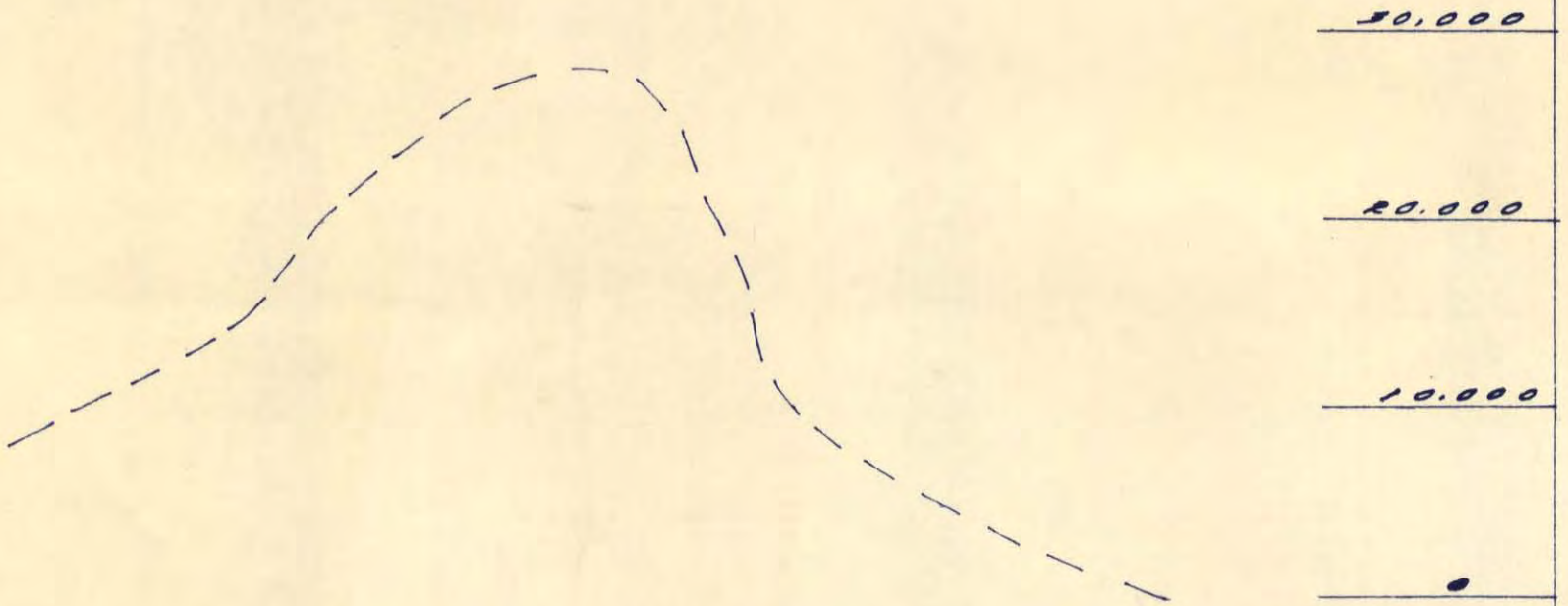
AREA 11 59. inches
 TONNAGE 11 x 50 x 50 x 100
 10
 = 275,000 tons
 AVERAGE GRADE 35.4% Sol Fe

HILLER No 4
 DRILL SECTION 104N
 D.D.H.s 19 & 20 (1965)
 SCALE 1" = 50'

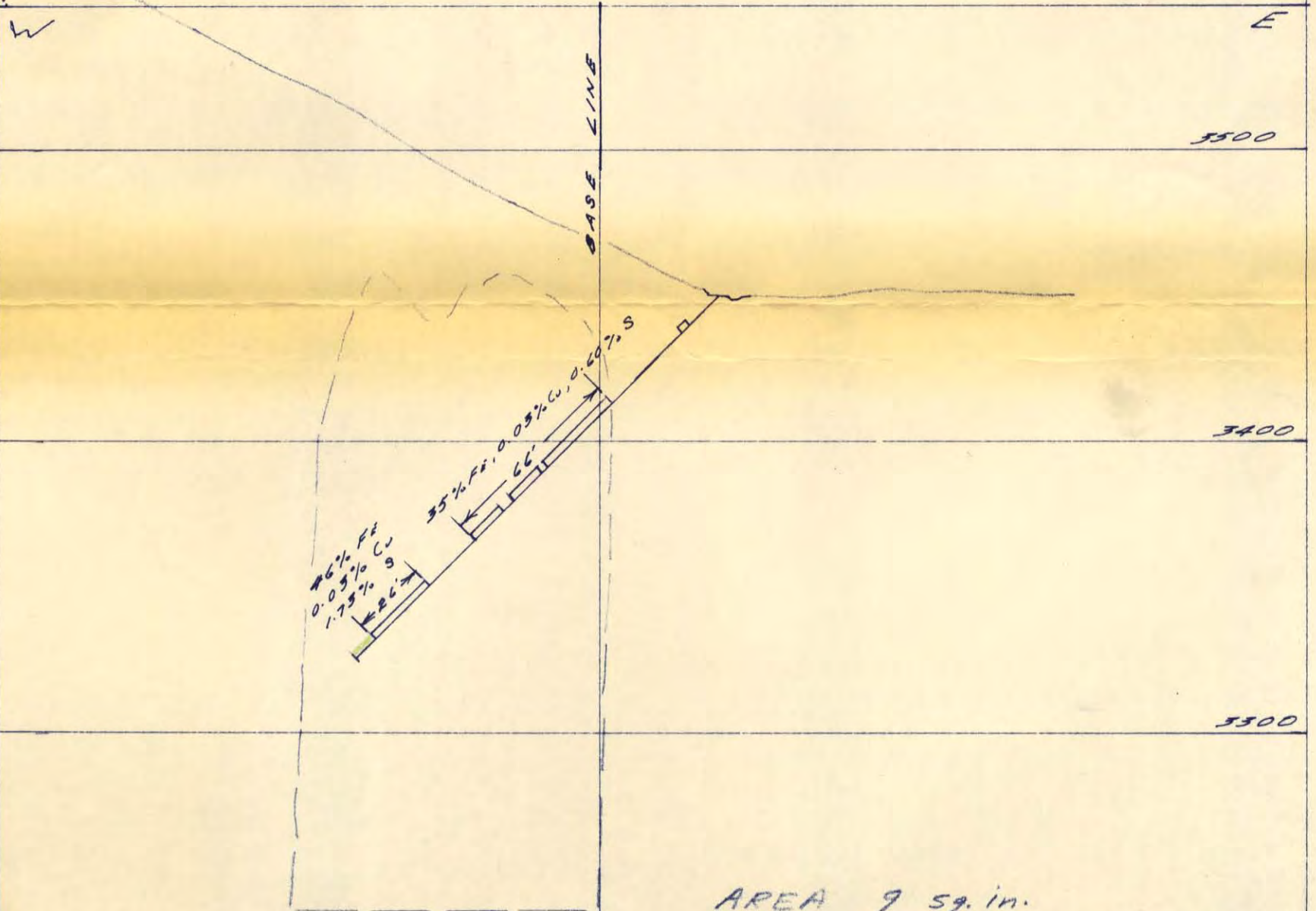


MAGNETIC PROFILE

GAMMAS



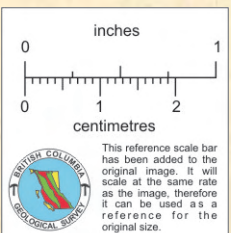
SHARPE A-3



AREA 9 sq. in.
 TONNAGE $\frac{9 \times 50 \times 50 \times 100}{10}$ (str length)
 = 225,000 tons
 AV. GRADE = 34.4% sol Fe

D.D.H. 7. 52' to 166.5'
 114.5' - 31% Fe, 0.01% Cu, 0.75% S

HILLER No 4
 DRILL SECTION 105N
 D.D.H. 7 (1961)
 SCALE 1" = 50'



MAGNETIC PROFILE

GAMMAS

30,000

20,000

10,000

0

EARLIER SURVEY

SHARPE A-3



W

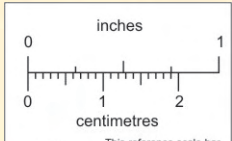
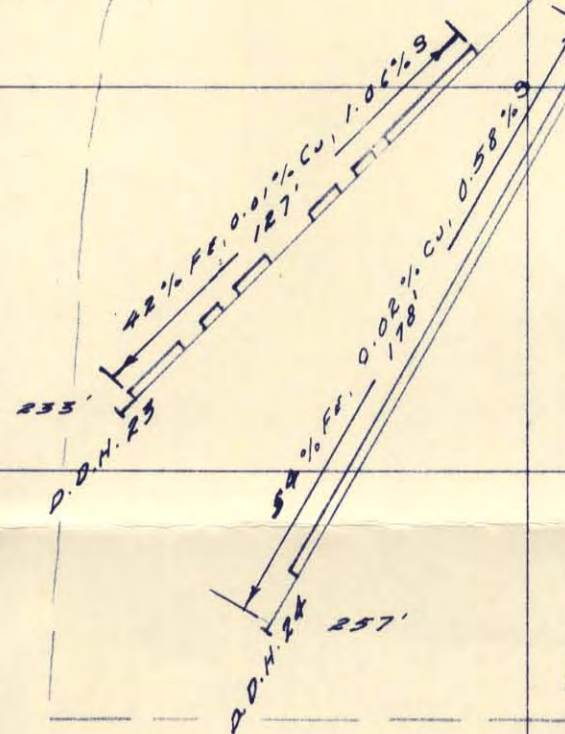
E

BASE LINE

3500

3400

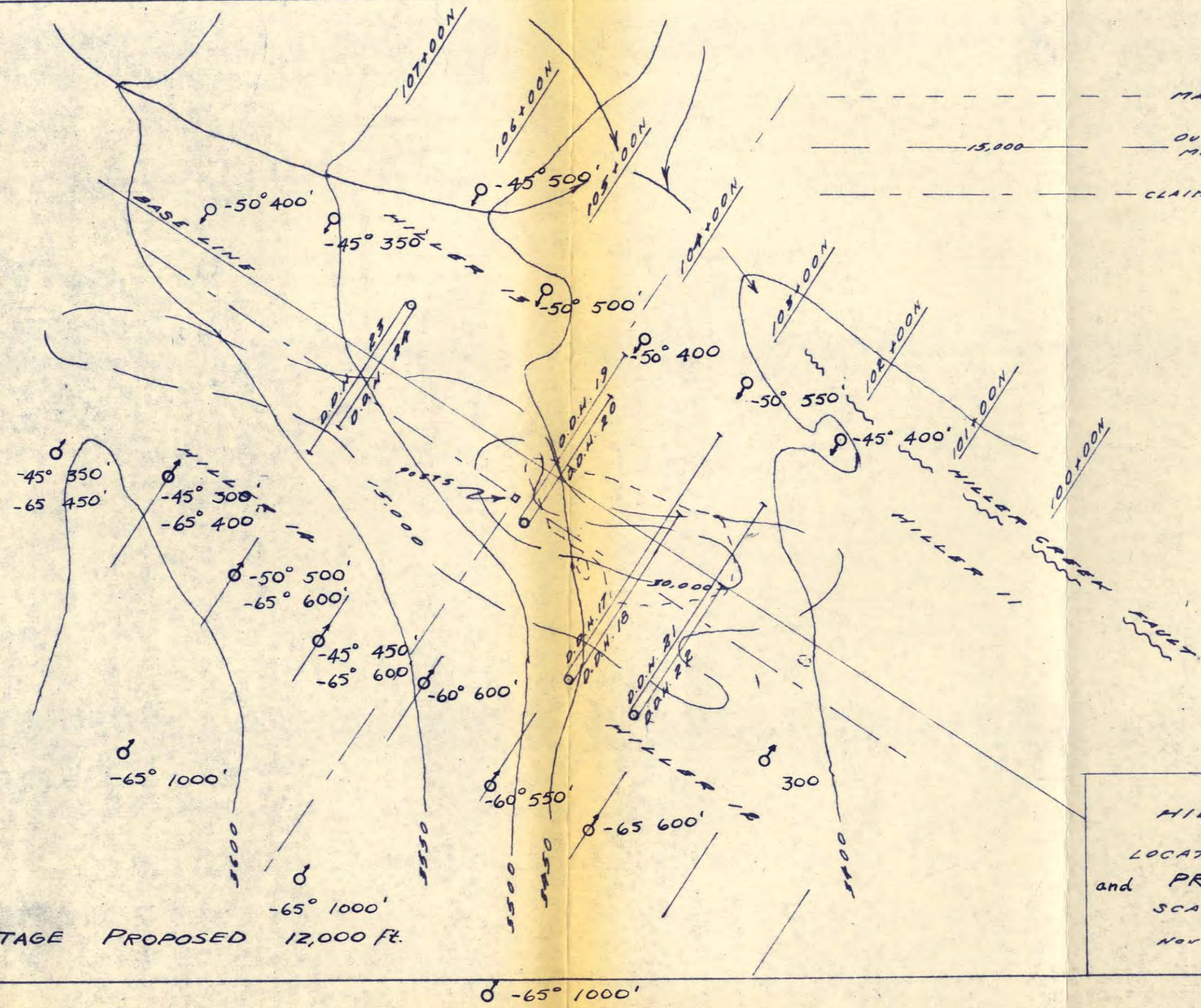
3300



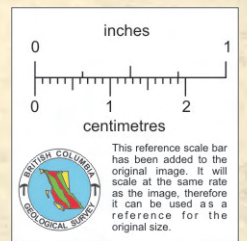
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

AREA 12 sq. inches
 TONNAGE $\frac{12 \times 50 \times 50 \times 100}{10}$ sta length
 = 300,000 tons
 AVERAGE GRADE 49.0% Sol Fe

HILLER N94
 DRILL SECTION 106N
 D.D.H.s 23 & 24 (1965)
 SCALE 1" = 50'



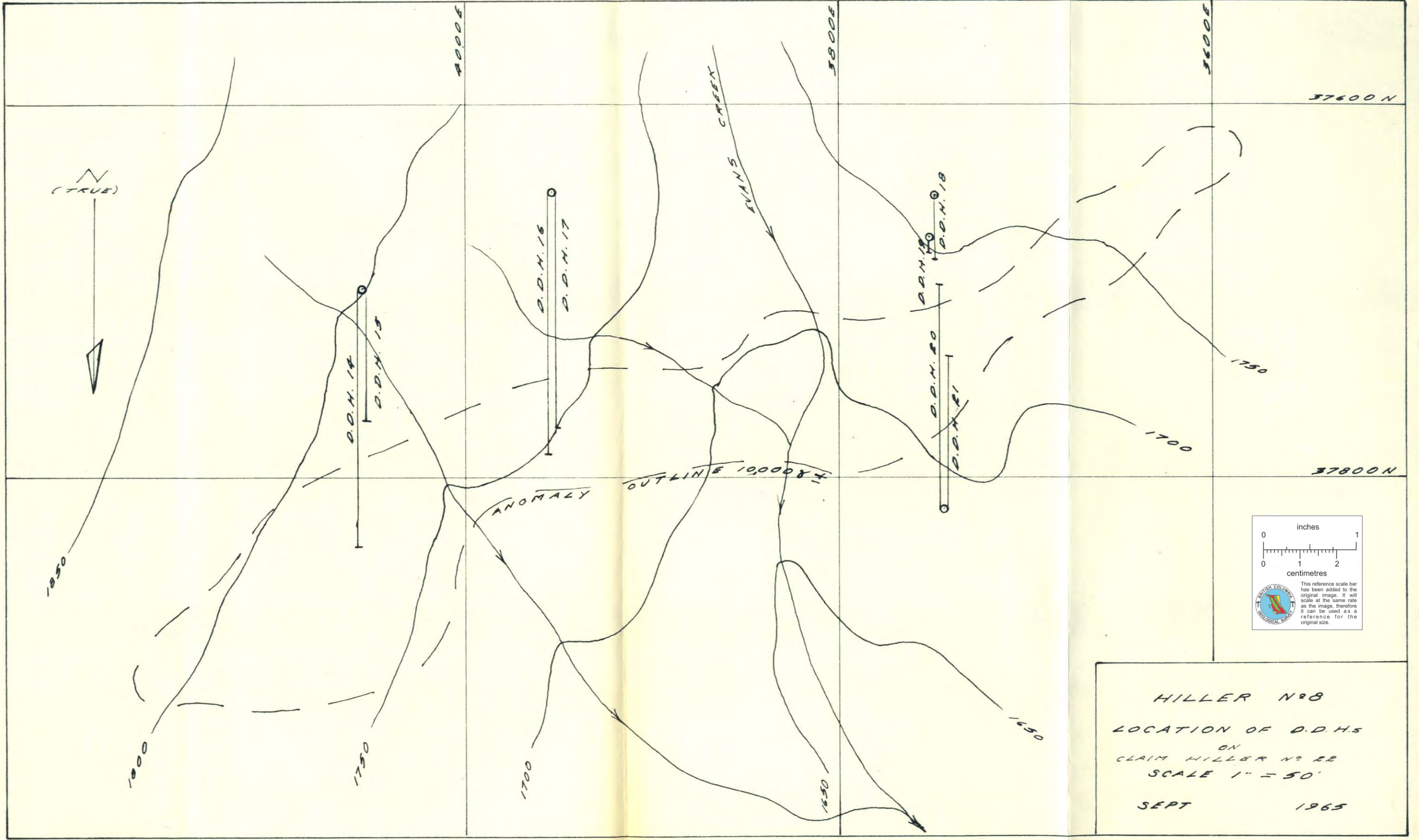
--- MAGNETITE OUTCROP
--- 15,000 --- OUTLINE OF MAGNETIC ANOMALY
--- CLAIM BOUNDARY



TOTAL FOOTAGE PROPOSED 12,000 ft.

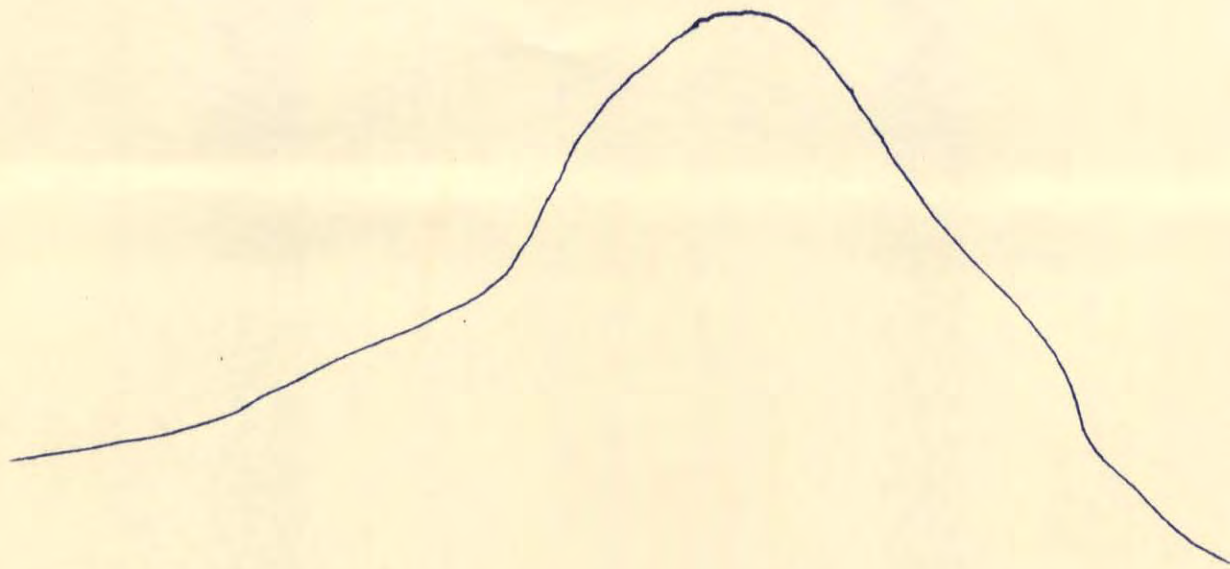
HILLER N#4
LOCATION OF D.D.H.s.
and PROPOSED DRILLING
SCALE 1" = 100'
Nov. 1965

♂ -65° 1000'



HILLER NRB
 LOCATION OF D.D.H.S
 ON
 CLAIM HILLER N# 22
 SCALE 1" = 50'
 SEPT 1965

MAGNETIC PROFILE



GAMMAS

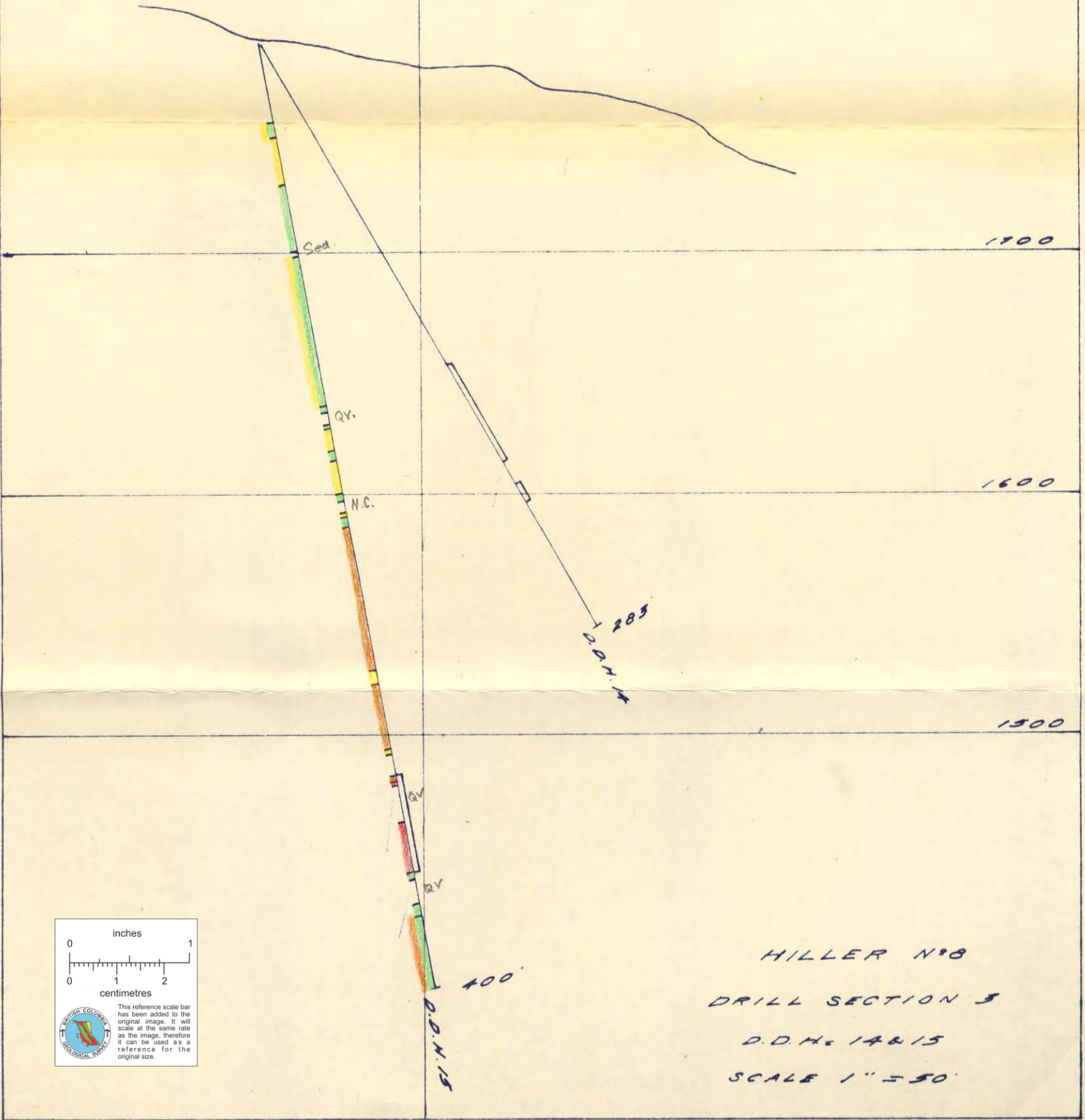
20,000

10,000

0

S

N



Sed

1700

Qv.

1600

N.C.

D.D.H. 283

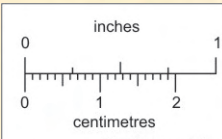
1500

Qv

Qv

400'

D.D.H. 15



This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.



HILLER N°8
 DRILL SECTION 3
 D.D.Hs 14 & 15
 SCALE 1" = 50'

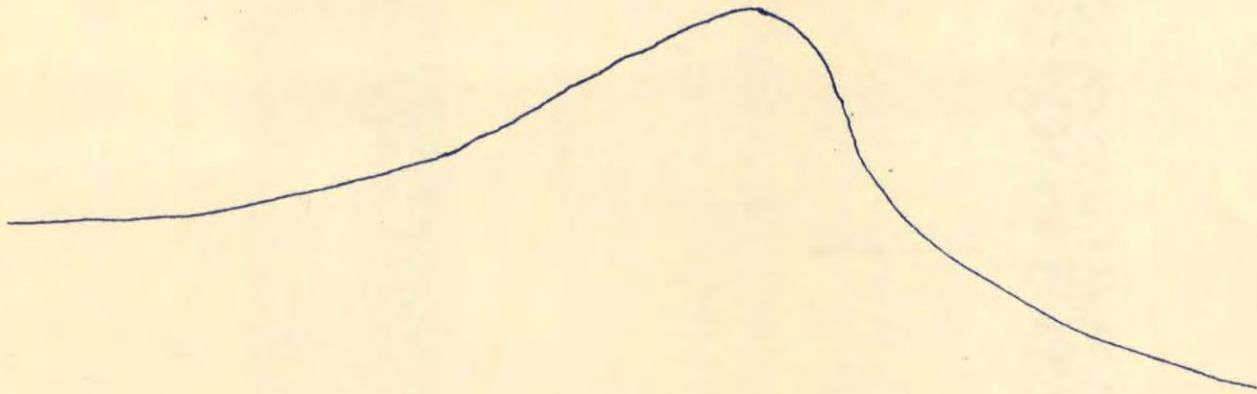
MAGNETIC PROFILE

GAMMAS

20.000

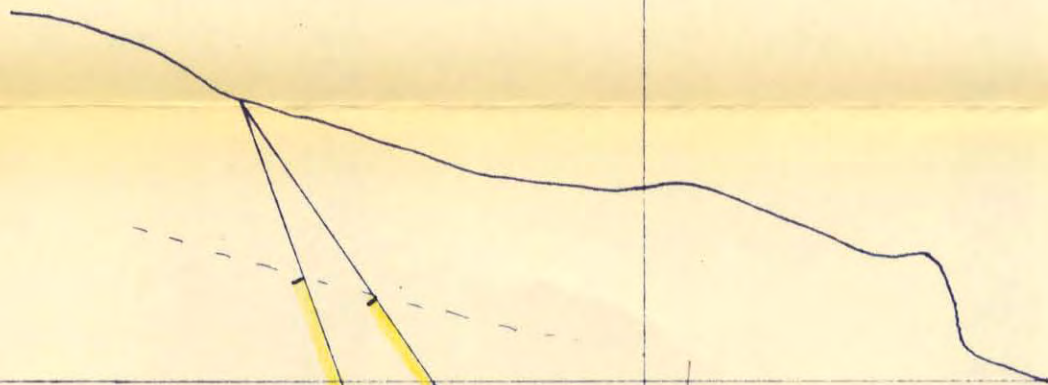
10.000

0



S

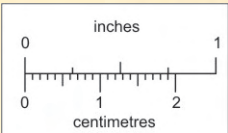
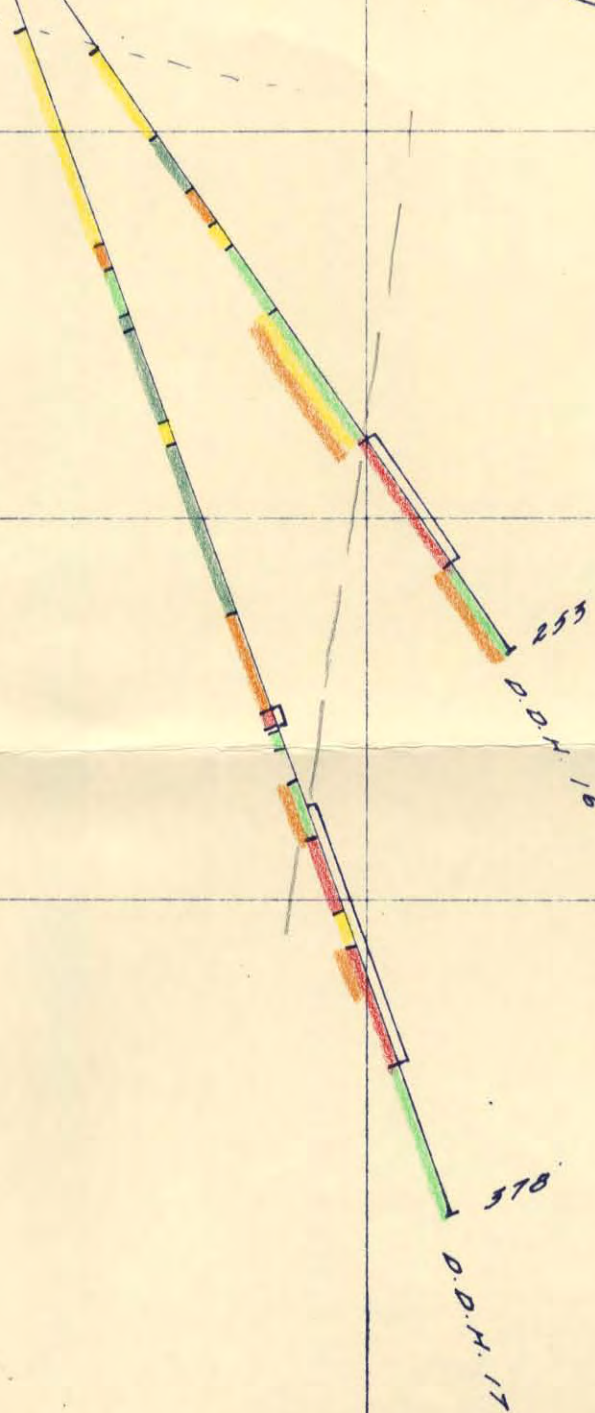
N



1700

1600

1500



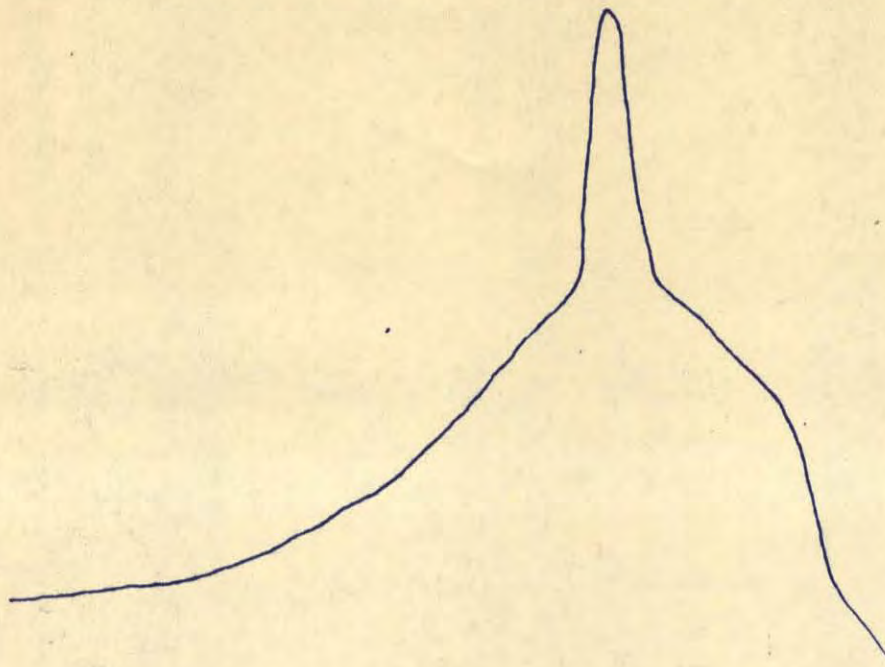
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

HILLER N°8
DRILL SECTION 2
D.D.H. 16 & 17
SCALE 1" = 50'

MAGNETIC

PROFILE

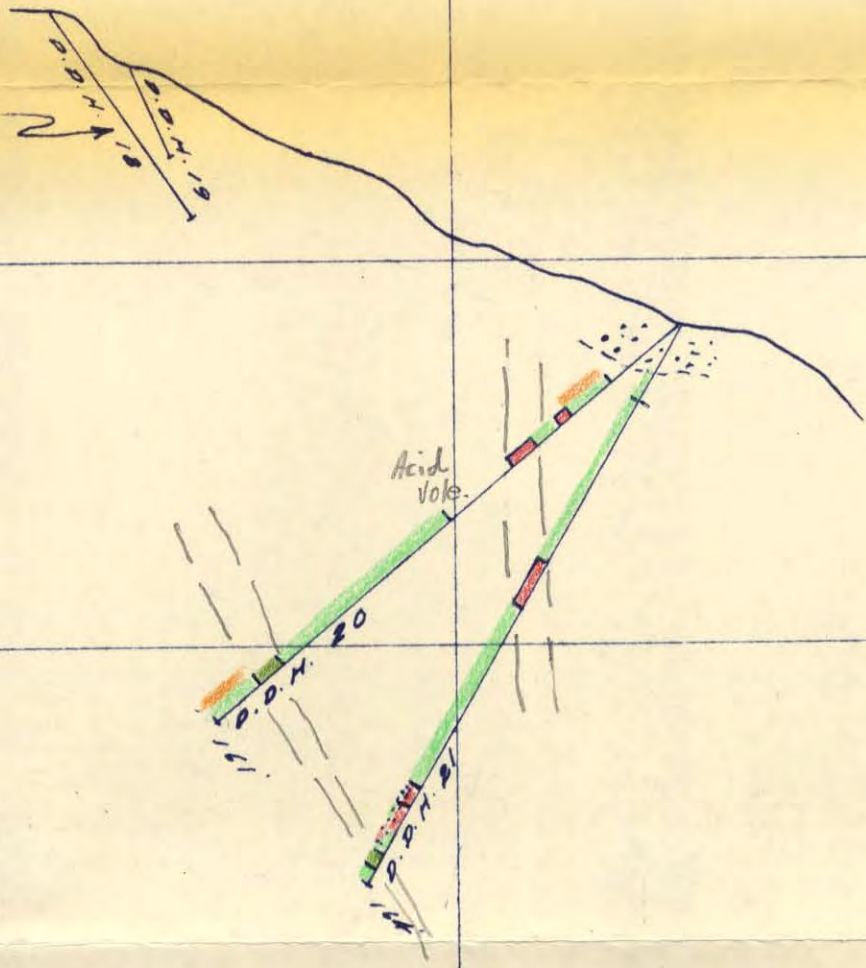
GAMMAS
30.000



S

N

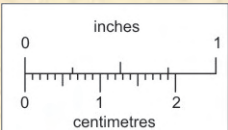
BOTH THESE HOLES
ABANDONED DUE TO
HEAVY OVERBURDEN



1700

1600

1500

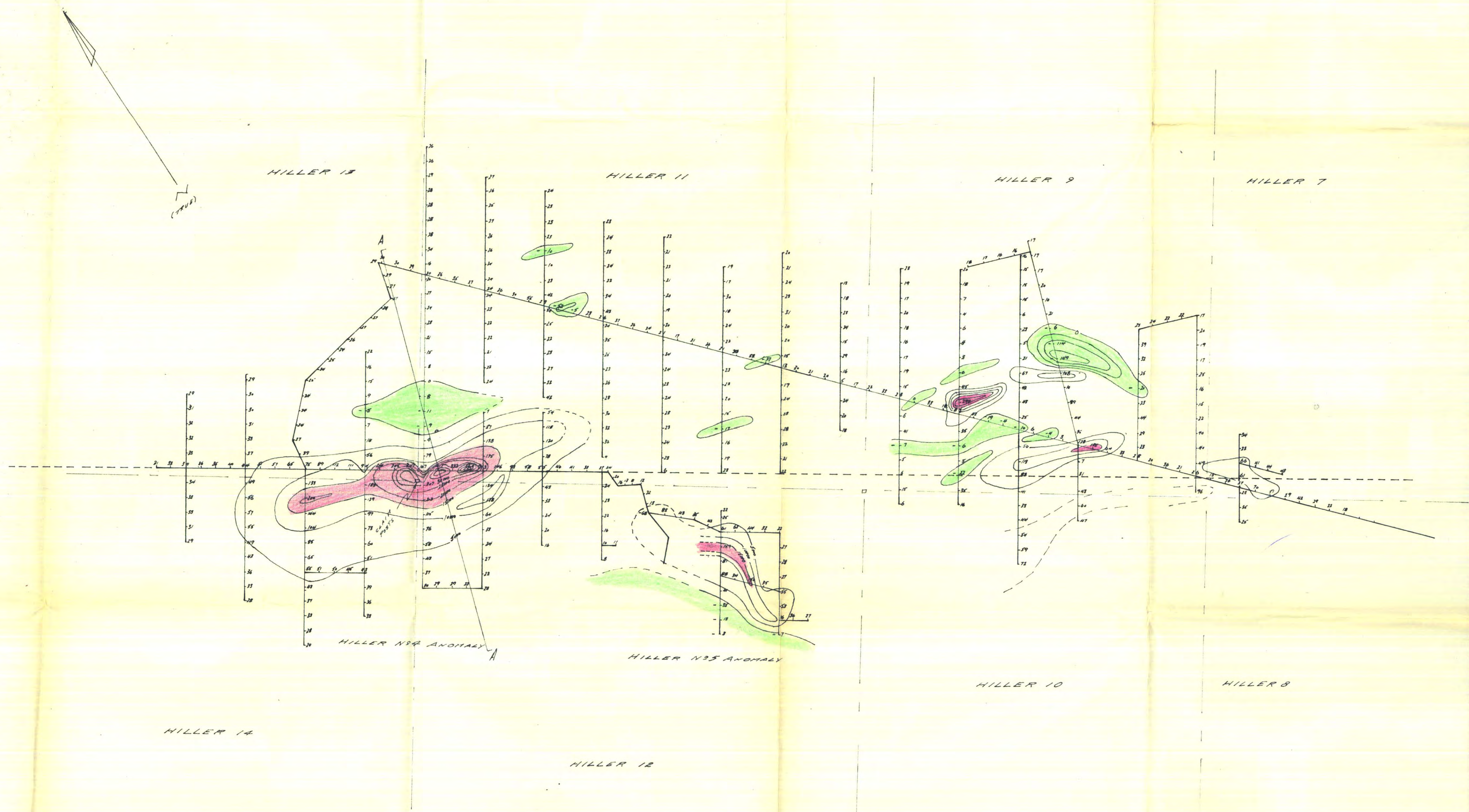


This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.



HILLER N° 8
 DRILL SECTION 5
 O.D.N. = 18, 19, 20 & 21
 SCALE 1" = 50'

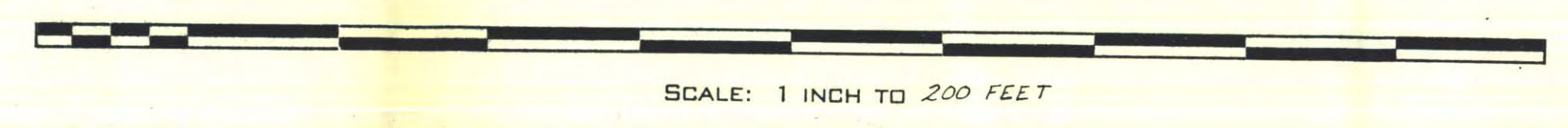
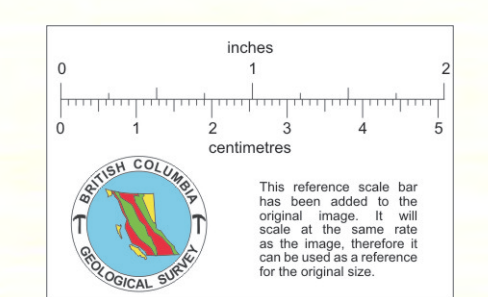
Line 112-000N
 Line 110-000N
 Line 108-000N
 Line 106-000N
 Line 104-000N
 Line 102-000N
 Line 100-000N
 Line 98-000N
 Line 96-000N
 Line 94-000N
 Line 92-000N
 Line 90-000N
 Line 88-000N
 Line 86-000N
 Line 84-000N
 Line 82-000N
 Line 80-000N



LEGEND

- > 5000γ
- < 0γ

Note - All readings are positive except where noted.
 Background is arbitrarily set at 5000 gammas (γ)
 Contour interval: - 5000



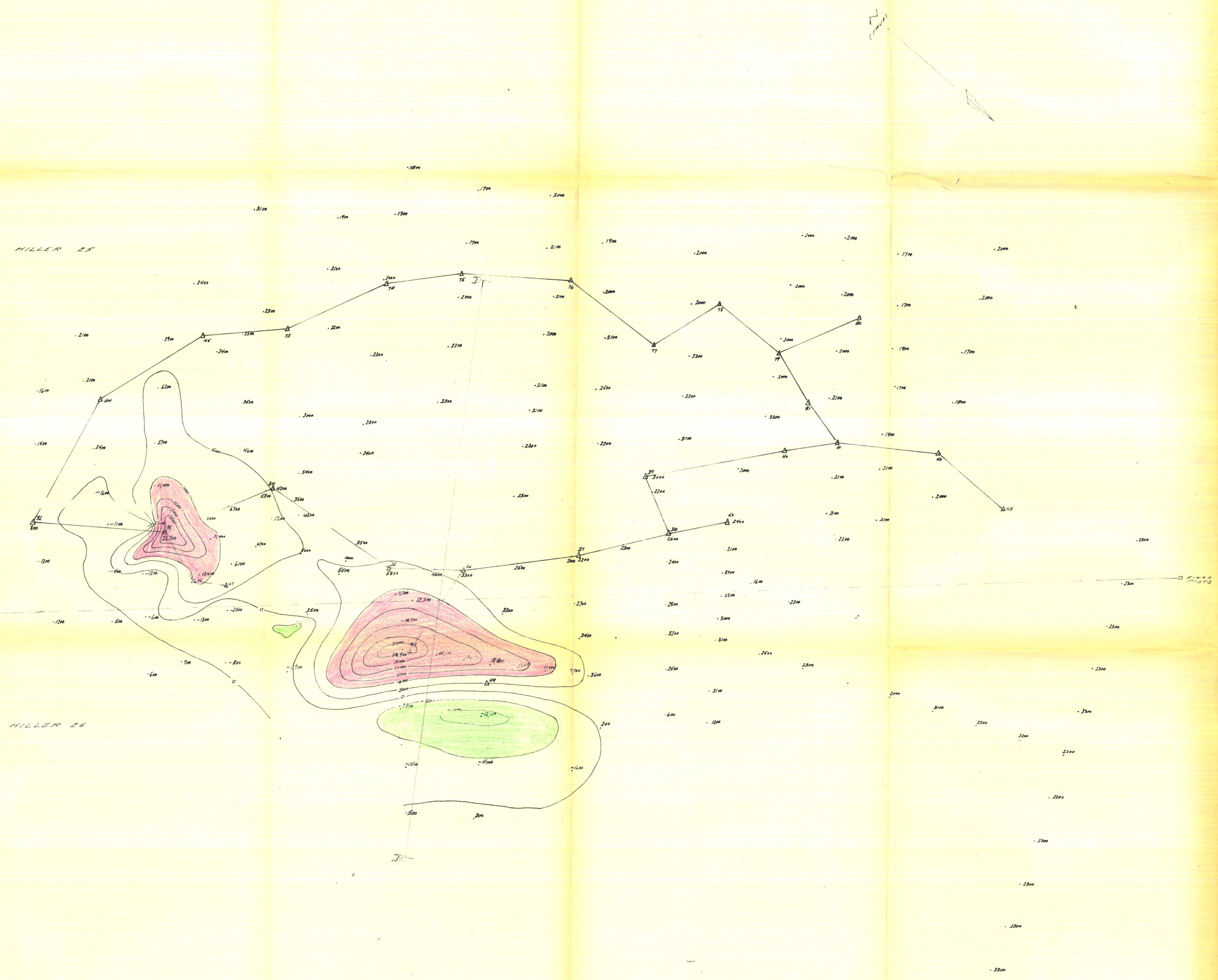
COMPANY . . . FALCONBRIDGE NICKEL MINES LTD.
 PROPERTY . . . HILLER GROUP (Claims #12-14)
 LOCATION . . . ZEBALLOS, VANCOUVER ISLAND

WORKING PLACE . . .
 TYPE OF MAP . . . Magnetometer (Reconnaissance)
 BASED ON . . . Sharpe A-3 Survey by L.B., C.C., R.M.

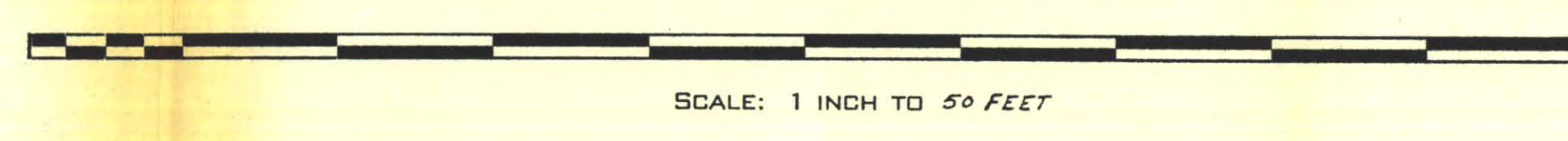
DATE . . . August 1965
 DRAWN BY . . . R.M.
 DATE OF WORK . . . August 1965

LEGEND

- > 10000
- < 5000
- Survey Stations



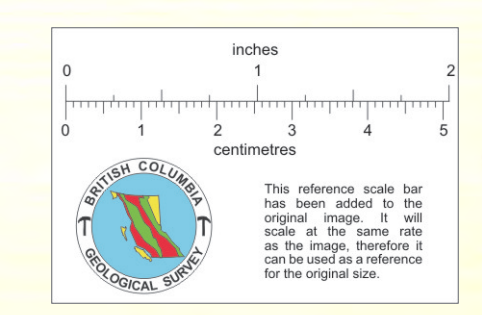
Note: All readings are positive except where noted.
 Background is arbitrarily set at 56000
 Contour interval: 5000

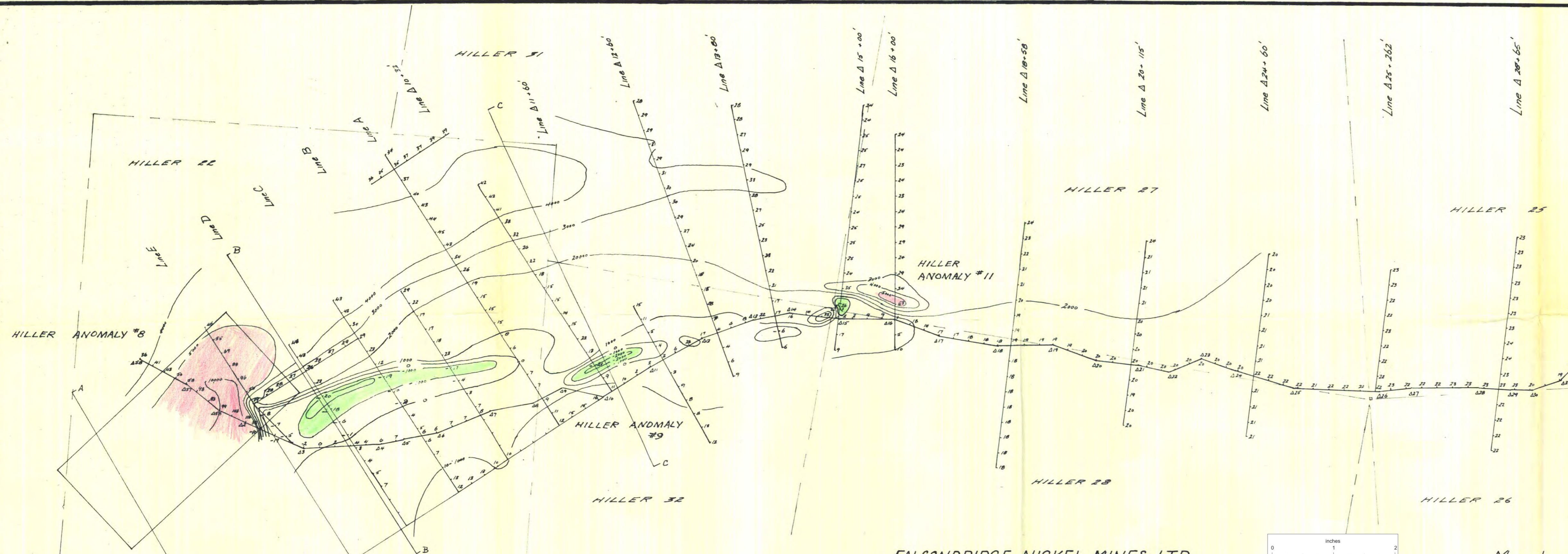


COMPANY . . . FALCONBRIDGE NICKEL MINES LTD.
 PROPERTY . . . HILLER GROUP (#12 Anomaly)
 LOCATION . . . ZEBALLOS, VANCOUVER ISLAND

WORKING PLACE . . .
 TYPE OF MAP . . . Magnetometer (Sharpe A-3)
 BASED ON . . . Survey by L.B. V.B. R.M.

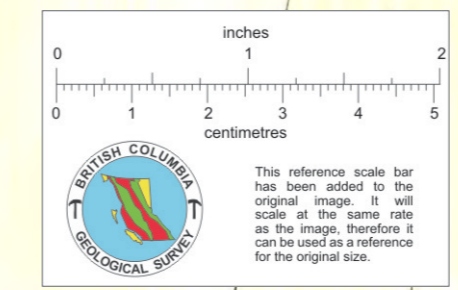
DATE . . . August 1965
 DRAWN BY . . . R.M.
 DATE OF WORK . . . August 1965





SCALE: 1 INCH TO 200 FEET

FALCONBRIDGE NICKEL MINES LTD.
 HILLER GROUP
 ZEBALLOS, VANCOUVER ISLAND



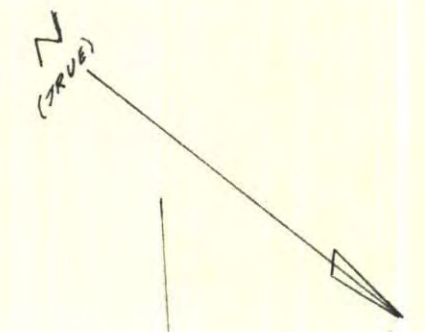
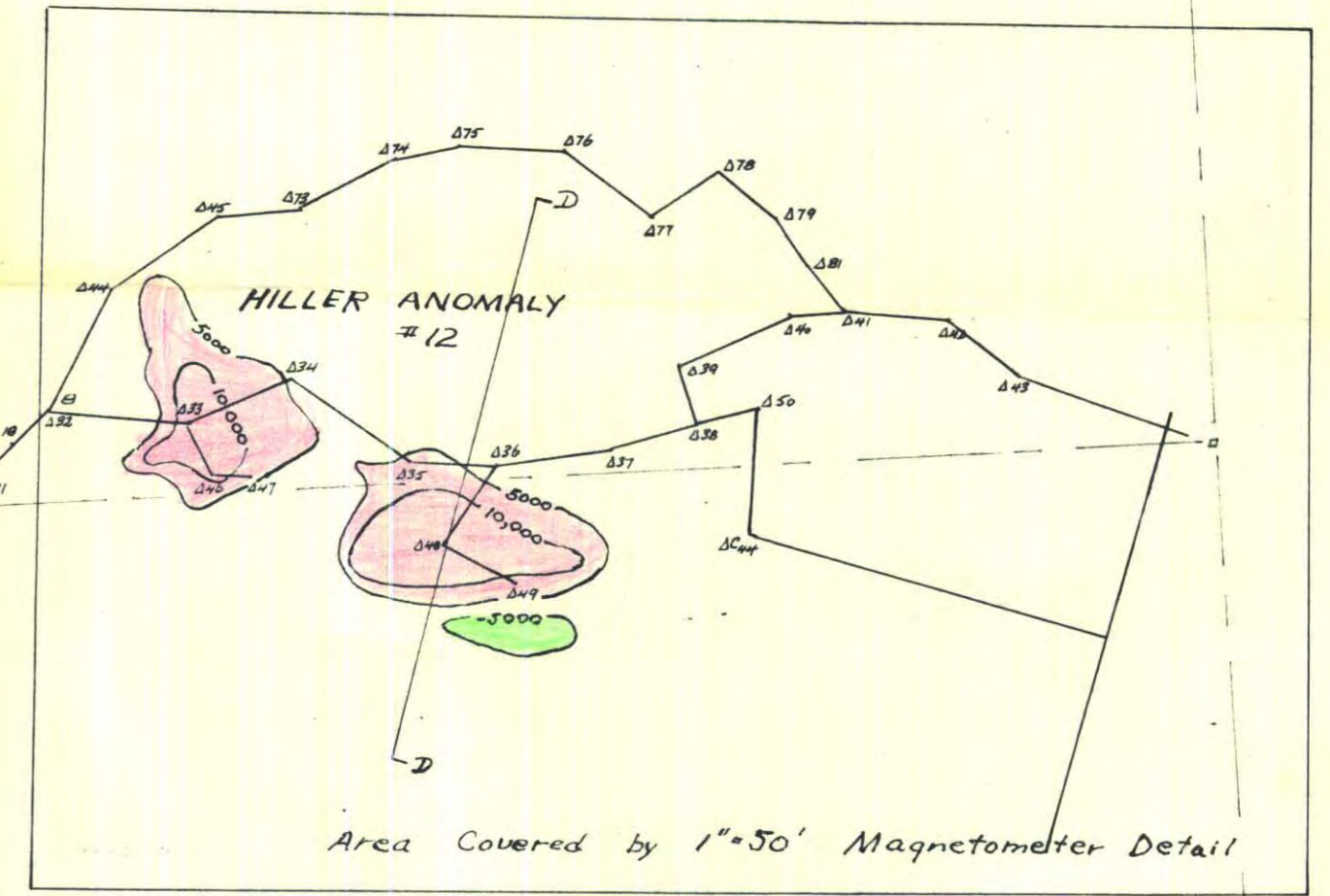
Magnetometer - Sharpe A-3
 Survey by L.B., V.B., C.C., R.M.

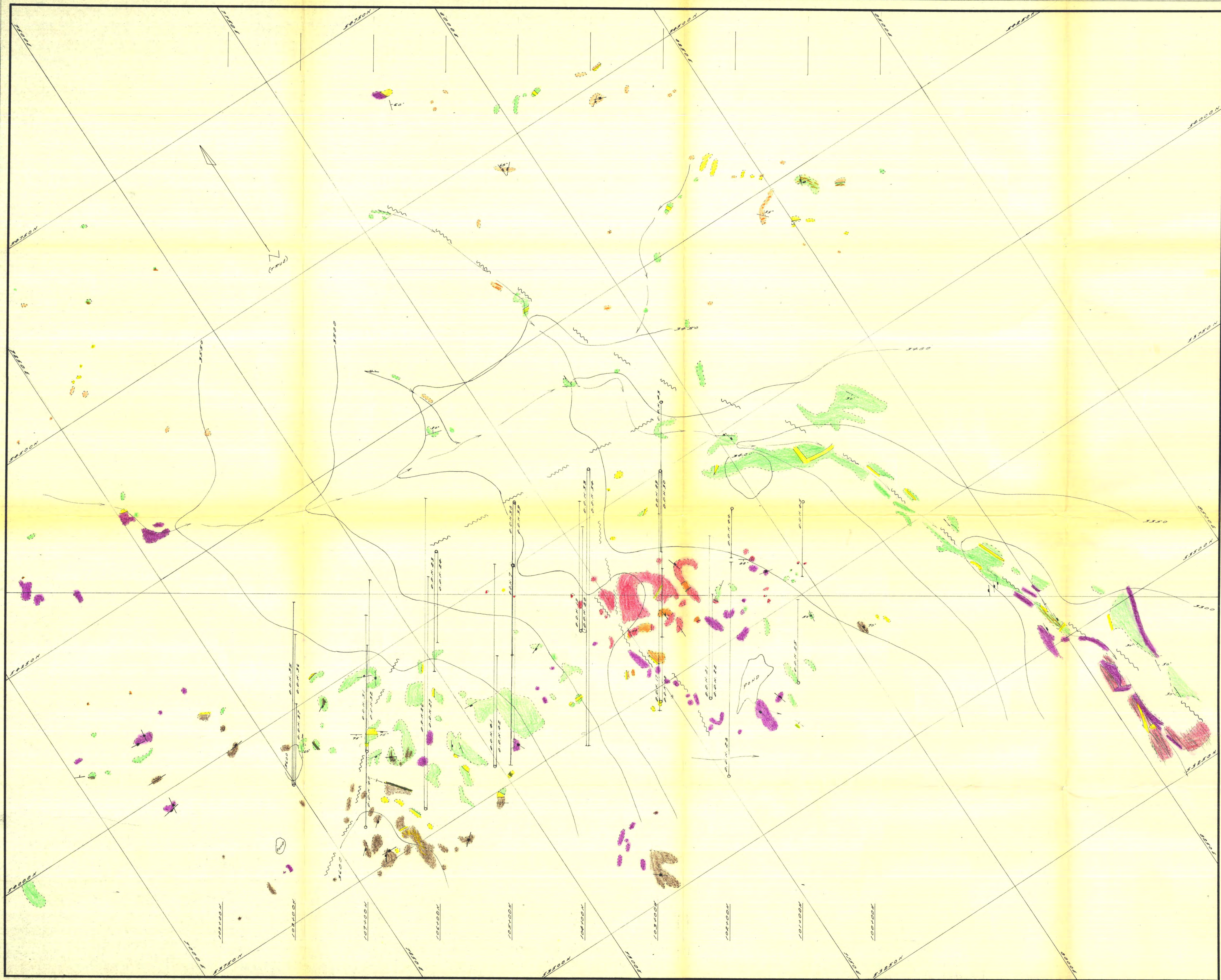
Date August 1965
 Drawn by L.B., R.M.
 Date of work July - August 1965

LEGEND

- > 5000 γ
- < -1000 γ
- Survey Station
- Claim Boundary

Note: All readings are positive except where noted.
 Background is arbitrarily set at 56000 γ
 Contour interval: - 1000 γ





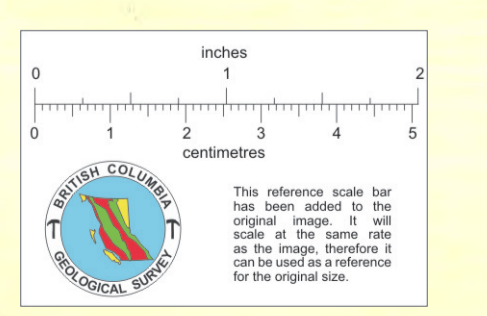
LEGEND

- BATHOLITH**
- GRANODIORITE
 - DIORITE
 - GRANITE QUIT
- DIKES**
- ANDESITE QUIT
 - BIOTITE
 - FELDSPAR PORPHYRY
 - ANHYLITE
- MAGNETITE**
- MAGNETITE
 - SARKIN
- VOLCANIC**
- TYPICAL
 - PORPHYRYIC QUIT
- LIMESTONE**
- LIMESTONE

#52m

SYMBOLS

- STRIKE & DIP OF BEDDING AND CONTACTS
- STRIKE & DIP OF SCHISTOSITY
- STRIKE & DIP OF STRUCTURES AND JOINTS
- FAULT - OBSERVED
- FAULT - ASSUMED
- OUTCROP
- WATER COURSE
- D.M. PROJECTED



SCALE: 1 INCH TO 50 MILES

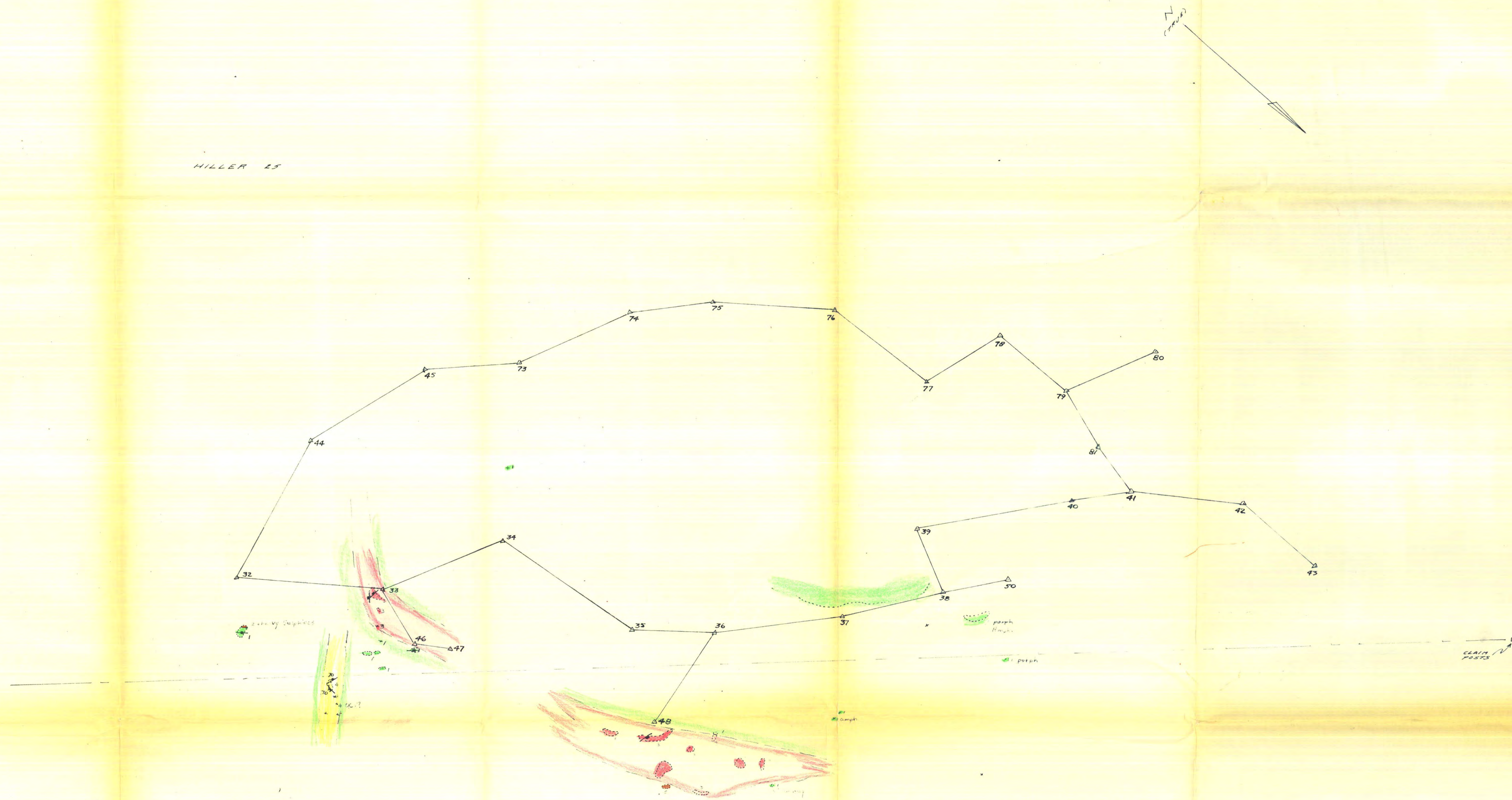
COMPANY . . . FALCONBRIDGE NICKEL MINES LTD.
 PROPERTY . . . MILLER CLAIM GROUP
 LOCATION . . . ISBALLOS, V.I., B.C.

WORKING PLACE . . . MILLER NEA ANOMALY
 TYPE OF MAP . . . GEOLOGICAL
 BASED ON . . . FIELD WORK BY R.H. SAUND

DATE . . . DECEMBER 1966
 DRAWN BY . . . L.V.B.
 DATE OF WORK . . . JULY 1966

HILLER 25

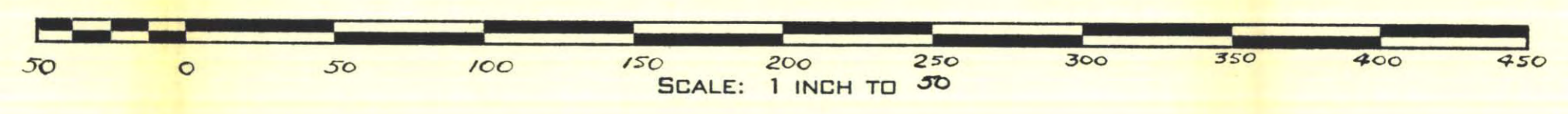
HILLER 26



LEGEND

- 4 FELDSPAR PORPHYRY
- 3 MAGNETITE
- 2 SKARN
- 1 VOLCANIC (ANDESITE)

- Δ SURVEY HUB
- ▲ STRIKE + DIP of FRACTURING



COMPANY . . . FALCONBRIDGE NICKEL MINES LTD.
 PROPERTY . . . HILLER GROUP *12 Anomaly
 LOCATION . . . ZEBALLOS VANCOUVER ISLAND

WORKING PLACE . . .
 TYPE OF MAP . . . GEOLOGY
 BASED ON . . . SURVEY F.N.S.

DATE . . . August 1965
 DRAWN BY . . . R.M.S.
 DATE OF WORK . . . August 1965

