Final Report for OPAP Grant # OP92-264

Vermiculite Occurrences in Cavendish Township

Southeastern Ontario.

Frederick T. Archibald, B.Sc.Geologist.

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Summary-

Previously vermiculite was known to exist in a pit in the northwest corner of patented claim EO 35362 which is controlled and co-owned by the author. Extents of this vermiculite-bearing material was unknown until present.

A program consisting of: prospecting, geological surveying, magnetometer surveying, electromagnetic surveying, geochemical/soil sampling, and lab analyses were used to define the area for vermiculite potential. The author has had previous experience in evaluating vermiculite deposits in Ontario (during 1975 and 1976); although there was insufficient tonnages to progress these areas further.

This exploration program was conducted from July to December ,1992 using OPAP grant number OP692-133 (registration number OP92-264). This program was the only mining property evaluated by the author in Canada in 1992.

A total of five vermiculite-bearing zones were delineated by the surveys, with a potential for continuance over a larger area. All of these zones have values of over ten percent vermiculite by volume, and values as high as 69.4% vermiculite by volume were observed during this program. These zones are between 500 and 1100 meters in length and average between 25 and 125 meters in width. All of the zones are truncated to the north but continue off of the survey grid onto open crown-land to the southwest. Two claim blocks totalling six claims were picked up during the program to cover some of the areas showing better grades however some of the areas underlie open (crown-land) ground.

Laboratory studies of the material shows that the exfoliated vermiculite is of sufficient size and grade for marketing purposes; however sufficient tonnages would have to be outlined to accomplish this. For this reason another exploration program is warranted.

Final Report

on

Cavendish Vermiculite Project

OPAP File Number OP92-264

Introduction-

The objective of this project was to evaluate the size and potential of vermiculite bearing materials in the southern part of Cavendish Township, in the Lindsay-Peterborough District. No changes have been made to the project, with exception of the orientation of the grid system due to intense folding in the area.

Previously, several high-tonnage and good-grade vermiculite deposits were encountered some 2.4 kilometers to the east. Unfortunately, the close proximity of these deposits to cottages decreased the tonnage potential for mining and withdrew some of the best areas from mining.

The work performed on the property consisted of: geophysical surveys (consisting of Crone V.L.F. electromagnetics and proton magnetometer), line cutting and flagging of lines, geological surveys, and geochemical sampling of the weathered bedrock horizons. The surveys and sampling was done during eight phases between July 8 and November 30, 1992. Sample exfoliation and studies were completed between November 1 and December 24, 1992.

Some 15.9 kilometers of line was cut and/or flagged during the program. A total of 10.6 kilometers of magnetometer and V.L.F. electromagnetics was run, with a spacing of 100 meters between lines and intervals of 25 meters between stations on the lines (see Plates C through E). A total of 22.8 kilometers of geological survey was run during this program (see Plate B).

A total of some 338 samples were collected during the

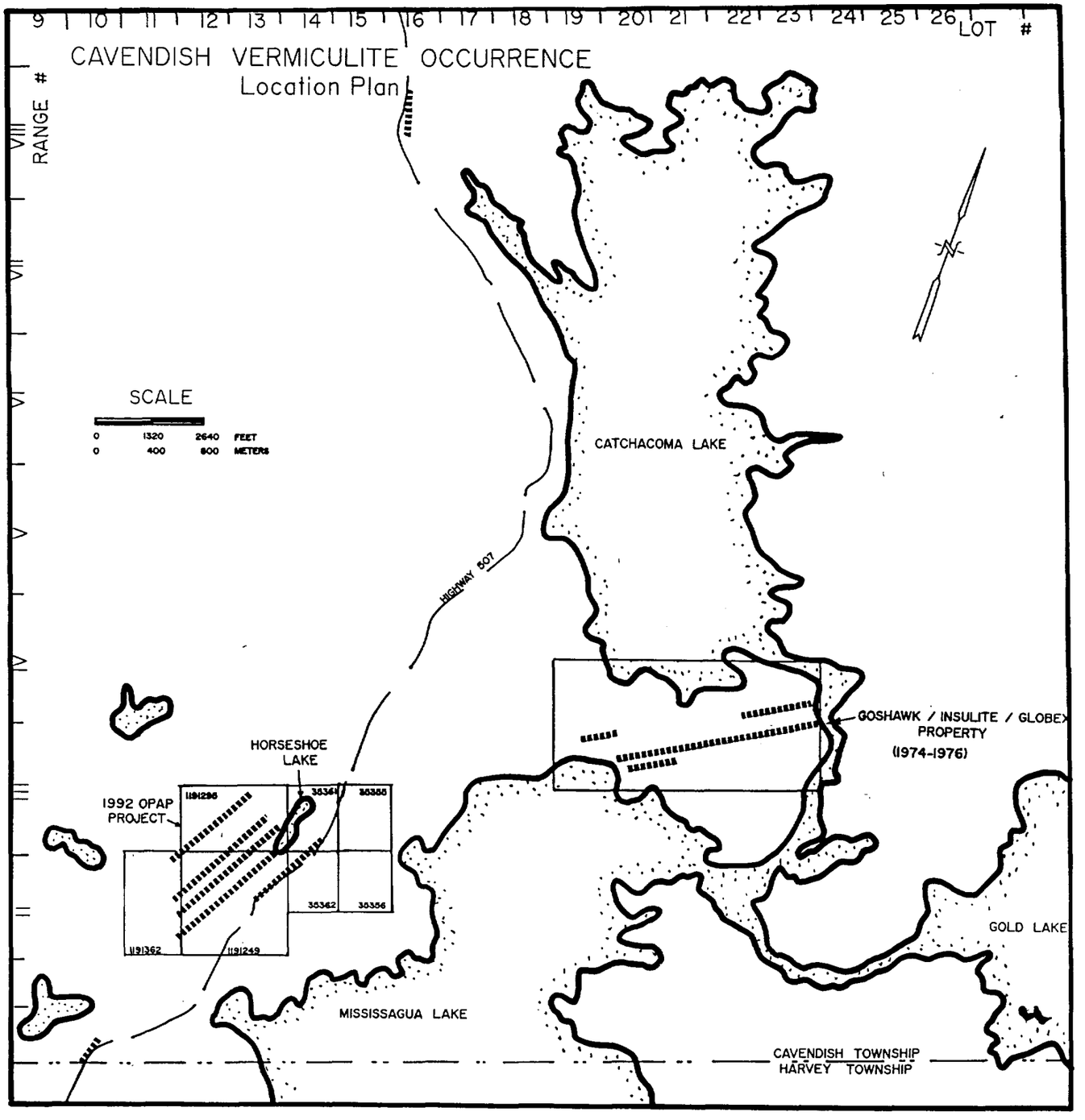
geochemical sampling program; ten of which have come from adjacent areas to the north, east, and south of the main survey area. A majority of the samples have come from a marble-dolomite metasediment unit. Approximately 118 of these samples have indicated vermiculite values; and of these approximately 35 have significant values (26 of which are covered by claims controlled by the author.

The second phase of this project involves the evaluation of approximately 92 of these samples for percentage of vermiculite and for the size and density of the vermiculite. The size and density will be graded into different specific uses as outlined in this report.

Two other individuals, C.W.Archibald (mining engineer) and J.C.Archibald (geologist), (OPAP grants OP92-264 and OP92-236 respectfully) have qualified to work on the same project and location. OP92-264 consists of drilling underneath of areas that have indicated significant results to see if the values extend at depth, and to have assaying results done through an independent laboratory. OP92-236 has been used to do infill sampling (between lines).

A total of 71 days were spent on field work and laboratory analysis, 9 days on map preparation, and 5 days on report preparation. A total of $3903.77 was spent on project expenditures for OP92-264. A total of $12,403.77 was spent on this project by F.T. Archibald; a total of which $10,000 has been approved under grant OP92-264.


LOCATION
PLAN
ONTARIO
Red Lake
property
Thunder Bay
N
SCALE
120 0 120 240 mi
Sudbury
North Bay
Toronto


CAVENDISH VERMICULITE OCCURRENCE
Location Plan
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
LOT #
VIII
RANGE #
VII
VI
V
IV
III
II
SCALE
0 1320 2640 FEET
0 400 800 METERS
CATCHACOMA LAKE
HIGHWAY 507
GOSHAWK / INSULITE / GLOBEX
PROPERTY
(1974-1976)
HORSESHOE
LAKE
1992 OPAP
PROJECT
1191296
35361
35355
35362
35356
1191362
1191249
GOLD LAKE
MISSISSAGUA LAKE
CAVENDISH TOWNSHIP
HARVEY TOWNSHIP

Property-

The original property consisted of three patented claims numbered 35355, 35356, and 35362. The original discovery of vermiculite was located on the north-west section of claim 35362. Consequently, it was found that this original discovery was along the eastern contact of a dolomite/marble unit which contained several parallel zones of vermiculite-bearing material, and claims 1191249 and 1191295 were picked up to cover these areas. The original claims consisted of approximately 130 acres. It was found that the vermiculite-bearing lenses continued off the property onto crown-land, and an additional 260 acres was added (for a total of 390 acres). The actual surveys cover an area of approximately 450 acres.

The original vermiculite discovery was made on Lots 19 to 23 in Concessions III and IV in the southeast section of Cavendish Township. This program located parallel vermiculite systems on Lots 12 to 14 in Concessions II and III of Cavendish Township.

The property is located some seven kilometers north on Highway #507 which runs between Buckhorn and Gooderham. It is approximately 35 kilometers northwest of Peterborpugh and 45 kilometers northeast of Lindsay. The property is also approximately 243 kilometers northeast of Toronto. The property is located approximately 1.2 kilometers north of the Cavendish/Harvey Township line along Highway # 507.

The property consists of gently rolling terrain with mature pine, maple, and oak (4 to 12 inch diameter). Overburden cover is shallow and on average is approximately 0.5 to 1.0 meters to bedrock. In the swamp areas, depths of up to 10 meters of overburden were encountered.

History-

In 1950, H. Greene acquired the area where the work program was run, and the surrounding area. Vermiculite was located at: Lot 14-Concession II, LOt 23-Concession IV, Lot 25-Concession IV, and Lot 22-Concession IV.

In 1973, Globex Minerals Inc. prospected and drilled the area immediately to the east of the claims. This drilling consisted of a limited amount of diamond drilling and augur drilling.

In 1975 and 1976, under the supervision of the author, Goshawk Mines Ltd. had an exploration program consisting of: linecutting, soil sampling (auguring), diamond drilling, and backhoe trenching. Approximately 1183 meters of diamond drilling and 3460 meters of backhoe trenching was accomplished during this program. Vermiculite was located over a strike length of some 1737 meters and over a width

A total of three vermiculite zones were outlined by these previous programs. The zones averaged 122 meters to 274 meters in width, and 183 meters to 823 meters in length. Some 93,3000 cubic yards of vermiculite (of over 5% vermiculite by volume) was located in an area of 366 meters by 152 meters. Due the close proximity to cottages, the program was terminated.

Geology-

The area is underlain by carbonate-rich metasediments of marble and diopside (Grenville), amphibole-rich metasediments, syenite/syenite gneiss, and quartz monzonite. These units are all cut by pegmatite and syenite dykes. The metasediments are formed from metamorphosed limestone. Bands of altered biotite or amphibole rich material can be seen within areas of intenses shearing. (See Plate B)

The vermiculite is mainly found within the weathered -silicified marble and dolomite bedrock; particularily in the areas of shallow swamps and bordering the swamps. Some pseudo-vermiculite can be seen within the amphibolite rich shears; caused in part to partial hydrothermal alteration. A majority of the vermiculite horizons are located within the marbles at the edge of the Anstruther granite batholith. A thin band of amphibolite is found between the Grenville marbles and the Anstruther batholith. Band of biotite-rich amphibolite and granite are found to cut the marble metasediments along schist (shear) contacts.

The modal makeup of the vermiculite is as follows:

40.0-42.4% SiO2

23.6-29.3% MgO

9.8-12.2% Al2O3

5.1-6.7% FeO

0.7-1.1% TiO2/CaO/K2O

The phlogopite, tremolite, and biotite hydrothermally alter to vermiculite, talc, and serpentinite. The vermiculite forms/precipitates at higher temperatures and different PH than the other minerals. Vermiculite is essentially hydrated aluminum and magnesium. In this case the

vermiculite is found in beige (phlogopite-biotite origin) and green (tremolite-serpentinite origin)sheets; the latter being the higher-grade material. There are (in minor amounts) red colour vermiculite flakes, caused by alteration of actinolite. The Mg content is caused by dissolution of dolomite from the calc-silicate rocks.

On the Goshawk/Insulite property to the east of the area prospected, the vermiculite bands strike at North 70 degrees East, and dip 20 to 60 degrees to the south.

Geological Survey-

The geological survey was run during four periods between July and November, 1992. There was a one-week period in November when there was up to seven centimeters of snow cover; although this did not effect the survey as the ground conditions were not frozen.

A total of some 22.8 kilometers was traversed during the survey, along flagged lines and claim lines. Although this was a reconnaissance program attempting to locate vermiculite bearing material within the marble and dolomite units primarily, differentiation between biotite rich amphibolites and amphibole-rich amphibolites was not made.

A metasediment complex of marble and dolomite was located on the property. This unit is approximately 750 meters in width and at least 1200 meters in length; continuing off the property onto crown land in the southwest. Where the metasediment unit continues off the property, it is narrowing but still averages approximately 350 meters in width. To the north, at line 5 south or the mid-section of Horeshoe Lake, the metasediment unit is terminated by both amphibolite and syenite units. This same metasediment unit appears to outcrop approximately 0.9 kilometers to the south of the property and also 3.2 kilometers to the north of the property. It appears that the Goshawk Mines Ltd. vermiculite deposit is not connected to the zones outlined during the survey. The new zones occur on the north-west flank of a fold, and the Goshawk deposits occur on the ridge of the same fold; both are separated by biotite-amphibole-syenite amphibolite units. The Goshawk marble-dolomite metasediment units extend as far as the east boundary of claim 35355 (See Plate B).

Vermiculite bearing material is found all around the contact area of the metasediment unit; and within amphibolite rich shears which are trending off of the metasediment and within the sediment unit.

Along the edges of the metasediment unit, the vermiculite bearing zones appear to be confined within lenses. These lenses dip from 45 degrees (flat-lying) to 80 degrees (steeply-dipping); the latter being the prevalent dip (to the southwest). The vermiculite bearing materials in the central portion of this metasediment unit appear to be wider and have a greater potential for depth.

The metasediment unit is terminated north of Line 6 South (west side of Horseshoe Lake), and appears to pinch south of Line 17 South (southwest of claim 1191249). However, extensions of this zone can be found along Highway #507 a few kilometers south and north of the claim group.

VLF Electromagenetic Survey - Specifics and Results-

The Crone Raden V.L.F. electromagnetic unit utilizes higher than normal frequencies and is capable of detecting small sulphide bodies and disseminated sulphide deposits. It is also used to detect fault or shear displacements, and can be used to suggest if the vermiculite horizons are fault or shear controlled. This method accurately isolates banded conductors and operates through areas of high noise or interference levels.

This method is capable of deep penetration but due to the low frequency used, its penetration is limited in areas of clay and conductive overburden. The components of dip angle in degrees of the magnetic field component, and field strength of the magnetic component of the VLF field are measured at each station.

There are several channels or stations available; each with a different frequency. A channel to be used should be parallel to the general strike of the area. If this cannot be determined, then two orthogonal stations are used to define any possible conductors. In this case, due to the southwest trend underlying the survey area, the station of Seattle, Washington with a frequency of 24.0 Khz was used.

The dip angle measurement measures the angle of inclinationfrom horizontal of the direction of the resultant V.L.F., or the amplitude of major axis of the pollarization ellipse. It is dertected by a minimum reading on the field strength meter and is read from an inclinometer with a range of plus or minus ninety degrees. A conductor is designated by a true crossover pattern of the readings. The measurement is taken from an audio null when the instrument is held in a vertical position; after turning perpendicular to the direction in alignment with the V.L.F. field. The V.L.F. field is found by an audio null or minimum field strength measurement when the instrument is held in a horizontal position. The accuracy of the dip angle is plus or minus 1/2 degree.

The field strength measurement defines the shape and attitude of the conductor by the strength of the field in the horizontal plane, or the amplitude of the major axis of the pollarization ellipse. It is the minimum reading obtained from the field strength meter when the instrument is rotated in the horizontal plane; and is measured as a percent of the normal filed strength established at a base station. The field strength of the V.L.F. stations drifts with time and must be adjusted with the base station every few hours. The field strength measurement has an accuracy of plus or minus two percent.

The readings were taken on lines at 100 meters apart and stations every 25 meters on each line. A total of 10.6 kilometers was run during the survey.

The field strength readings were plotted and contoured at ten percent of the total field. The base reading was set at one hundred percent.

The dip angle measurements were plotted and contoured at one inch to twenty degrees.

A total of four anomalous trends were outlined by the survey; all of which are in a north-south to northeasterly trend (parallel to the geological strike).(See PLATE D and E). One of these anomalies corresponds to a powerline on the west side of Highway #507. The other anomalies correspond to wet-swampy areas; two of which correspond with major shear zones. There are vermiculite anomalous areas corresponding with these other three anomalies. The survey was run in July and August of 1992.

It has been deduced that the vermiculite bearing areas occur in areas of low-wet overburden where the rocks have been subjected to weathering processes; thus helping to form vermiculite under optimum temperature and PH conditions.

The VLF electromagnetic survey has only been useful in locating the low-swampy ground channels, and was therefore not influencial in determining the vermiculite-bearing materials.

Proton Magnetometer Survey- Specifics and Results-

The survey was completed with the use of the Exploranium-Geometrics 'Unimag' Proton Magnetometer. It has a digital readout with a sensitivity of plus or minus ten gammas.

Station readings were taken at intervals of twenty-five meters on lines spaced at one hundred meters apart. A total of 10.6 kilometers was traversed during the survey.

The accuracy of the readings was increased by averaging two or three readings; especially in areas of high magnetic fluctuation. There were several areas of high magnetic conductivity encountered during the survey.

The 'world gamma range' selector on the instrument was brought down to a scale relative to the airborne magnetics in the area when plotting the final resultant readings. A scale of 58,500 gammas was set as the world gamma range for the area. The survey was run in July and August, 1992.

Results, after plotting corrections for diurnal drift, are plotted at a scale of one inch to one hundred meters. The results were contoured at one hundred gamma intervals.

Four anomalous trends were outlined by the survey; trending in a north-south to northeasterly direction and parallel to the geological strike of the area (See PLATE C).

The anomalous trends correlate with iron-rich amphibolite dykes which run through the marble-dolomite metasediment unit; and along the eastern contact of the metasediment unit. Vermiculite-bearing material has been found associated with some sheared amphibolite dykes which cut the metasediment unit.

The magnetometer survey has been useful in delineating the amphibolite dykes which cut the metasediment units, and the contact

areas of the metasediment units. In areas overlain by swamp, where geological information is lacking, the survey helped to locate these contact areas.

It has been found that iron-rich areas do coincide with vermiculite-bearing materials, although it is not known if there is any correlation betwen the two. It is thought that the iron and magnesium are precipitated out during the metamorphic processes; during which time (under high temperatures) the vermiculite is formed. The magnesium and iron content within vermiculite averages from 29 to 36 percent of the total modal makeup of the vermiculite.

The magnetometer survey has been useful in delineating geological contacts between the iron-rich amphibolite units and the iron-free dolomite/marble units. There appears to be some correlation between the vermiculite bearing materials and the contact areas of the metasediment units, and also with amphibole-rich shears which cut the metasediment units.

Geochemical-Soil Testing Program-

Approximately 338 samples were taken during this phase of the program. Of these, ten were taken in areas adjacent to the main section of the survey grid. (See Plate A for locations)

The samples were taken for the most part from the soil horizon immediately above the bedrock. Extra care was taken to try and obtain chips of the bedrock. Dolomite/marble units appeared for the most part to be weathered to semi-weathered. The amphibolite units, with exception of the sheared units, appeared to be more massive and less resistant to weathering processes.

On average the samples were taken at 0.5 to 1.0 meters in depth. The southern and extreme northern sections of the property were overlain by shallow overburden. The areas surrounding Horseshoe Lake and to the southwest of Horseshoe Lake were overlain by deeper overburden averaging 1.0 to 3.0 meters in depth. Drilling by C.W. Archibald (OPAP Grant * OP92-265) indicated that depths of up to 10.0 meters of overburden are found in some of the swamps surrounding Horseshoe Lake. The drilling program was run over areas which indicated high surface values and areas of possible high tonnage situations.

It was found by initial prospecting that the main vermiculite values coincide with the marble/dolomite metasediment units, and within sheared amphibolite/amphibolite gneiss units which are in close contact with the metasediment units. For this reason a majority of the samples were taken from the marble/dolomite units.

Samples were taken every 25 meters on lines spaced at 100 meters apart.

These samples were evaluated visually by using a propane torch to exfoliate a portion of the samples. Samples were first pulverized before exfoliating. The samples were divided into three catagories:

A) no visual vermiculite exfoliating

B) visual indication of vermiculite under 10% volume (V or *)

C) visual indication of vermiculite over 10% volume (VG or **or***)

Samples which indicated vermiculite were used in a qualitative determination program to determine:

A) exact percentage of vermiculite

B) size distribution of vermiculite

C) weight of vermiculite (pounds per cubic foot determination).

The initial phase of logging and visual determination took between 0.5 and 1.5 hours per sample on average. The detailed analyses of size distribution and weight determination (including sample drying) averaged 6.6 hours per sample. The samples were dried in a convection oven at temperatures of under 100 degrees F. Low temperatures are needed as higher temperatures will change the exfoliation potential of the vermiculite molecules. The samples are then pulverized and weighed. before exfoliating. After exfoliating each sample, the vermiculite is weighed. The samples are then screened using: +4, +4 to -8, +8 to -14, +14 to -28, -28 screen fractions. Each fraction is weighed and then pound per cubic foot determinations are made.

Results of Program-

Some 338 geochemical/soil samples were taken during the program. Most of these were obtained within the marble/diopside units; the rest within amphibolite rich shear zones. Of the samples taken, 135 (40%) contained vermiculite. Approximately thirty-five of the samples or 34.9% of the vermiculite-bearing samples have visually indicated values of over ten percent vermiculite by volume (upon exfoliation).

Ninety two samples have been analyzed for quantitative analyses and size distribution/density analyses.

Results of Surveys-

Five zones with vermiculite-bearing material were outlined by this project. All of these zones trend in a southwest to northeast direction; parallel to the geological trend for the area.

All of these zones are contained within a marble/dolomite complex which occurs under claims 35362, 1191249, and 1191295. These zones are terminated to the north but although the marble complex narrows and squeezes to the southwest it does continue further past the survey grid.

Anomaly A which contains two vermiculite- bearing bands from 25 to 75 meters in width, has been traced for a distance of at least 500 meters in length. This trend occurs along the west contact area of the marble complex. The vermiculite, although finer in size, has been found in amounts ranging from 4 to 38 percent by volume. The richest material is found from line 7 south to line 9 south and approximately 825 meterds west of Highway #507. This vermiculite is characteristically beige colour.

Anomaly B, some 100 meters east of Anomaly 1, averages between 25 and 40 meters in width. It has been traced for a distance of at least 1100 meters. This anomaly is in the central section of the marble complex and is bordered by low swamp areas. The richest sections, averaging between 8 and 25 percent vermiculite by volume, is located between lines 9 south and 11 south at a distance of approximately 500 meters west of Highway # 507. It is of the beige variety.

Anomaly C, some 50 to 100 meterds east of Anomaly B, is considered to have the greatest potential for grade and tonnage. It ranges from 25 to 75 meters in width and has been traced for a length distance of at least 700 meters. This anomaly is in the central portions of the marble complex, and appears to narrow to the south. The richest sections,

between lines 8 south and 10 south, average between 4 and 26 percent vermiculite by volume. Although most of this zone lies along the edge of a low-swamp area, it is felt that there is a high-tonnage situation underneath of the swamp. This zone lies approximately 400 meters west of Highway #507. The vermiculite consists of both beige material and of green-platy material. The green-mica rich material generally is of higher grade.

Anomaly D, approximately 150 meters east of Anomaly C, is approximately 25 to 75 meters in width and 700 meters in length. It is located approximately 150 to 250 meters west of Hiughway #507. Although values as high as 13 to 18 percent vermiculite by volume can be associated with this zone, it is generally of lower grade than the other zones. The richest material is found between line 13 south and line 15 south. The vermiculite associated with this zone is of the massive/beige variety. This zone is located in the central portions of the marble complex.

Anomaly E, approximately 100 to 125 meters east of Anomaly D, is located along the east contact of the marble complex. It is associated with shear zones. The vermiculite is of the beige variety and the green-mica variety, and the grade varies between 3 and 18 percent vermiculite by volume on average. Although grades as high as 69 percent have been encountered, these higher grades are associated with narrow lenses within the sheared marbles. This zone is from 25 to 100 meters in width and consists of several bands of vermiculite-bearing material which can be traced for a legth of at least 700 meters. It generally lies along the west side of Highway #507 and lies under and along the side of a low-swamp area. The vermiculite is of both beige/massive and green-mica varieties.

Although vermiculite has been found to be associated with sheared amphibolite within the marble unit and trending away from the marble unit, it is generally of low grade and uneconomical

Sample/Locate	Dry Weight grams	Wt.Vermiculite grams	%Vermiculite	+4 mesh % total verm.	-4/+8mesh % total verm.	-8/+14mesh % total verm.	-14/+28mesh % total verm.	-28/+48 % total verm.	Density(+4) lb/cu.ft.	Density(4-8) lb/cu.ft.	Dens.(8-14) lb/cu.ft.	Dens.(14-28) lb/cu.ft.
0/L18-700S	942	12	1.27%	-----	-----	2.32%	18.60%	79.08%	-----	-----	3.8	15.24
1/L18-675S	811	57	7.03%	-----	-----	2.77%	22.22%	75.01%	-----	-----	9.52	15.23
2/L18-650S	1185	37	3.12%	-----	-----	5.55%	16.67%	77.78%	-----	-----	3.8	11.4
3/L18-625S	795	40	5.03%	-----	-----	3.56%	14.26%	82.14%	-----	-----	7.61	12.69
4/L18-600S	846	43	5.08%	-----	-----	-----	21.43%	78.57%	-----	-----	-----	11.31
5/L18-575S	585	26	4.44%	-----	-----	-----	26.67%	73.33%	-----	-----	-----	19.04
6/L18-550S	529	117	22.12%	-----	-----	14.47%	36.85%	48.68%	-----	-----	13.96	12.69
8/L18-500S	504	89	17.66%	-----	2.00%	8.00%	22.00%	68.00%	-----	3.8	10.16	11.43
9/L18-475S	247	152	61.54%	-----	-----	-----	-----	-----	-----	-----	-----	-----
10/L18-450S	456	121	26.54%	-----	-----	1.49%	10.45%	88.06%	-----	-----	7.61	22.22
11/L18-425S	231	37	16.02%	-----	-----	-----	17.65%	82.35%	-----	-----	-----	22.85
12/L18-400S	484	68	14.05%	-----	-----	2.27%	15.91%	81.82%	-----	-----	7.62	13.33
13/L18-375S	638	443	69.44%	0.20%	3.80%	18.20%	41.00%	35.10%	5.33	5.61	7	8.96
15/L18-325S	447	75	16.78%	-----	-----	8.00%	34.00%	58.00%	-----	-----	12.69	15.41
16/L18-300S	528	73	13.83%	-----	-----	11.53%	48.07%	40.40%	-----	-----	11.42	10.35
17/L18-275S	614	172	28.01%	-----	-----	7.37%	36.07%	56.56%	-----	-----	13.71	11.16
18/L18-250S	596	28	4.70%	-----	-----	4.54%	4.56%	90.90%	-----	-----	3.81	3.81
19/L18-225S	458	189	41.27%	-----	-----	4.79%	34.25%	60.96%	-----	-----	8.87	10.57
20/L18-200S	568	132	23.24%	-----	-----	5.32%	35.11%	59.57%	-----	-----	8.65	9.31
21/L18-175S	550	24	4.36%	-----	-----	9.09%	18.18%	72.73%	-----	-----	7.6	12.69
22/L18-150S	454	2	0.44%	-----	-----	-----	-----	-----	-----	-----	-----	-----
23/L18-125S	679	64	9.43%	-----	-----	2.12%	14.89%	82.99%	-----	-----	7.62	9.88
24/L18-100S	425	9	2.12%	-----	-----	-----	-----	100.00%	-----	-----	-----	-----
25/L18-75S	466	97	20.82%	-----	1.47%	5.88%	33.82%	58.83%	-----	7.61	15.23	21.9
26/L18-50S	179	67	37.43%	-----	-----	5.71%	31.43%	62.86%	-----	-----	7.61	20.95
27/L18-25S	339	98	28.91%	-----	-----	3.85%	17.30%	78.85%	-----	-----	15.33	42.85
28/L18-0	407	36	8.85%	-----	-----	2.56%	5.13%	92.31%	-----	-----	3.8	6.34
29/L18-725S	230	34	14.78%	-----	-----	-----	-----	-----	-----	-----	-----	-----
30/L18-750S	796	40	5.03%	-----	8.69%	13.04%	17.39%	60.88%	-----	15.23	22.85	4.01
31/L18-775S	750	0	0%	-----	-----	-----	-----	-----	-----	-----	-----	-----
32/L18-800S	695	81	11.66%	-----	-----	3.71%	14.81%	81.48%	-----	-----	19.04	30.48
33/L18-825S	821	6	0.73%	-----	-----	-----	-----	-----	-----	-----	-----	-----
34/L18-850S	669	31	4.63%	-----	-----	2.23%	17.77%	80.00%	-----	-----	3.8	30.47
35/L18-875S	706	11	1.56%	-----	-----	-----	20.00%	80.00%	-----	-----	-----	3.8
36/L18-900S	466	14	3.00%	-----	-----	-----	22.22%	77.78%	-----	-----	-----	19.04
37/L18-925S	194	5	2.58%	-----	-----	-----	33.30%	66.70%	-----	-----	-----	3.8
38/L18-950S	283	8	2.83%	-----	-----	-----	16.67%	83.33%	-----	-----	-----	7.62
39/L18-975S	374	78	20.86%	68.89%	8.66%	6.29%	1.57%	14.59%	27.77	13.96	12.19	6.92
40/L18-1000	490	19	3.88%	-----	-----	4.00%	16.00%	80.00%	-----	-----	3.8	15.23
41/L18-1025	261	14	5.36%	-----	-----	7.69%	30.70%	61.61%	-----	-----	3.81	2.54
42/L18-1050	248	3	1.21%	-----	-----	-----	-----	100.00%	-----	-----	-----	-----
43/L18-1075	666	0.2	0.03%	-----	-----	-	-----	-----	-----	-----	-----	-----
44/L18-1100	720	0	0.00%	-----	-----	-----	-----	-----	-----	-----	-----	-----
45/L18-1125	662	13	1.96%	-----	-----	-----	-----	-----	-----	-----	-----	-----
46/L18-1150	564	18	3.19%	-----	-----	-----	28.57%	71.43%	-----	-----	-----	15.23
47/L18-1175	555	0	0%	-----	-----	-----	-----	-----	-----	-----	-----	-----
48/L18-1200	993	993	0.00%	-----	-----	-----	-----	-----	-----	-----	-----	-----
49/L18-1225	704	69	9.80%	50.00%	1.72%	13.79%	13.79%	20.70%	13.81	3.8	20.31	30.41
50/L18-1250	573	573	0.00%	-----	-----	-----	-----	-----	-----	-----	-----	-----
51/L18-1275	569	4	0.70%	-----	-----	-----	-----	-----	-----	-----	-----	-----
52/L18-1300	296	29	9.80%	-----	-----	-----	14.29%	85.71%	-----	-----	-----	3.8
L5S-0+50W	542	0	0%	-----	-----	-----	-----	-----	-----	-----	-----	-----
L7S-175W	423	81	19.15%	-----	-----	8.00%	24.00%	68.00%	-----	-----	3.81	22.85
L7S-600W	317	21	6.62%	-----	-----	16.69%	16.67%	66.64%	-----	-----	7.62	7.62
L7S-650W	469	38	8.10%	-----	-----	16.66%	16.68%	66.66%	-----	-----	7.62	7.62
L7S-825W	473	180	38.05%	-----	-----	-----	14.29%	85.71%	-----	-----	-----	7.62
L7S-850W	489	34	6.95%	-----	-----	3.22%	6.45%	90.33%	-----	-----	7.62	7.62
L7S-925W	619	117	18.90%	-----	-----	-----	6.06%	93.94%	-----	-----	-----	15.23
L8S-175W	533	91	17.07%	-----	9.09%	4.54%	15.91%	70.46%	-----	15.23	7.62	21.32
L8S-225W	282	1	0.35%	-----	-----	5.55%	22.22%	72.23%	-----	-----	7.62	19.04
L8S-525W	344	45	13.08%	-----	-----	7.14%	7.14%	85.72%	-----	-----	7.62	3.81
L8S-550W	251	52	20.72%	-----	-----	5.00%	30.00%	65.00%	-----	-----	7.61	15.24
L8S-575W	533	117	21.95	-----	-----	2.04%	6.12%	91.84%	-----	-----	7.62	12.7
L8S-600W	581	3	0.52%	-----	-----	-----	-----	100.00%	-----	-----	-----	-----
L8S-625W	400	34	8.50%	-----	8.33%	8.33%	16.67%	66.67%	-----	7.62	7.62	15.24
L8S-775W	507	34	6.71%	-----	-----	-----	5.55%	94.45%	-----	-----	3.8	38.09
L8S-825W	499	48	9.62%	-----	-----	1.33%	13.33%	85.34%	-----	-----	3.81	9.52
L8S-900W	515	37	7.18%	-----	-----	4.00%	8.00%	88.00%	-----	-----	7.62	22.85
L8S-950W	471	57	12.10%	-----	-----	8.33%	8.33%	83.34%	-----	-----	7.06	7.06
L9S-525W	590	177	30.00%	-----	-----	0.90%	7.27%	91.83%	-----	-----	7.61	5.08
L9S-550W	273	65	23.80%	-----	-----	-----	8.00%	92.00%	-----	-----	-----	15.23
L9S-575W	1101	39	4%	-----	-----	1.49%	23.88%	74.63%	-----	-----	9.52	15.23
L9S-600W	282	73	25.89%	-----	-----	-----	11.90%	88.10%	-----	-----	-----	14.65
L9S-625W	325	92	28.31%	-----	-----	1.89%	20.76%	77.35%	-----	-----	7.62	13.96
L9S-650W	732	62	8.47%	-----	-----	3.13%	21.88%	74.99%	-----	-----	3.81	21.33
L9S-675W	387	0	0%	-----	-----	-----	-----	-----	-----	-----	-----	-----
L9S-850W	486	77	15.84%	-----	-----	4.54%	22.72%	72.74%	-----	-----	3.81	16.19
L9S-875W	495	99	20.00%	-----	-----	1.61%	11.29%	87.10%	-----	-----	7.62	13.33
L9S-900W	417	35	8.39%	-----	-----	-----	15.75%	84.22%	-----	-----	-----	12.67
L9S-925W	731	31	4.24%	-----	-----	6.25%	25.00%	68.75%	-----	-----	3.81	7.61
L10S-225W	474	5	1.05%	-----	-----	-----	20.00%	80.00%	-----	-----	-----	15.23
L10S-550W	468	44	9.40%	-----	-----	-----	6.66%	93.34%	-----	-----	-----	7.6
L10S-575W	160	40	25.00%	-----	-----	-----	33.33%	66.67%	-----	-----	-----	7.61
L10S-650W	288	74	25.69%	-----	3.57%	3.57%	28.57%	67.86%	-----	3.81	3.81	22.85
L10S-800W	450	74	16.44%	-----	-----	6.25%	12.50%	81.25%	-----	-----	7.62	15.24
L10S-925W	507	34	6.71%	-----	-----	-----	9.09%	90.91%	-----	-----	-----	3.81
L11S-700W	272	33	12.13%	-----	-----	5.26%	26.32%	68.42%	-----	-----	3.81	3.81
L11S-725W	129	21	16.28%	-----	-----	-----	25.00%	75.00%	-----	-----	-----	11.43
L12S-150W	343	13	3.79%	-----	-----	-----	25.00%	75.00%	-----	-----	-----	12.7
L12S-250W	505	0	0%	-----	-----	-----	-----	-----	-----	-----	-----	-----
L12S-950W	423	0	0%	-----	-----	-----	-----	-----	-----	-----	-----	-----
L13S-325W	301	40	13.29%	-----	-----	-----	5.88%	94.12%	-----	-----	-----	3.81
L13S-675W	327	6	1.83%	----	-----	-----	-----	-----	-----	-----	-----	-----
L14S-250W	425	12	2.82%	----	-----	-----	-----	100.00%	-----	-----	-----	-----
L16S-650W	501	65	12.97%	-----	-----	4.17%	16.67%	79.16%	-----	-----	7.75	10.16
L17S-825W	566	100	17.66%	-----	-----	5.55%	11.11%	83.34%	-----	-----	7.61	12.69
Clm.E038139	777	110	14.16%	1.28%	5.12%	26.94%	39.74%	26.92%	7.6	7.62	8.88	14.17

SAMPLING RESULTS - VERMICULITE PERCENTAGE/SIZE DISTRIBUTION/DENSITY

Industrial Use for Vermiculite-

Vermiculite is primarily used in gypsum plaster, insulation, and replacing sand in concrete. It is desirable due to its low density, high heat resistance, low thermal conductivity, light weight,chemical properties, and acoustic (sound-proofing) qualities. It is also cheaper to transport as it expands only upon heating.

Other vermiculite deposits located in Canada are in the Sudbury and Perth areas. Due to the high asbestos/talc contents, these deposits are not in high demand. There are only four other producers of vermiculite in the world. These are: Libby (Montana), Palabora (South Africa), Enoree (South Carolina), and Santa Luzia (Brazil). The first three are high grade (~90% vermiculite) but within narrow lenses and pods. The last is not in high demand due to a high biotite content.

Vermiculite is generally graded into six catagories: #1 is coarser than +4 mesh (density of 7 pounds per cubic foot), #2 is between -4 and +14 mesh (density of 6 pounds per cubic foot), #3 is between -14 to +28 mesh (5 pounds per cubic foot), and #4 to #6 is between -28 and +48 mesh (4 pounds per cubic foot). #1 is used for loose fill and agricultural purposes, #2 is used for refrigerator insulation or ashphalt impregnation or plaster/concrete aggregate, #3 is used for agricultural growing or plaster/concrete aggregate, and #4-6 is used for fillers/insecticide carriers/paint extenders and home insulation. Vermiculite competes with gypsum, perlite, foamed slag, clay, and sand. Vermiculite has a higher K factor and is lighter than the others; although it has less compressive strength

Summary of Results-

Of the 338 samples taken during the surface geochemical/sampling program, 92 of the samples returned vermiculite values. Of the samples which returned vermiculite values, some fourty-one (44.6% of the samples) of them contained significant values. Significant values are determined as those which are over ten percent vermiculite by volume.

Significant values were returned from all five of the vermiculite-bearing anomalies. The highest percentage of vermiculite found in each anomaly is as follows:

Anomaly A- up to 38.05% vermiculite (4-38% average)

Anomaly B- up to 16.28% vermiculite (8-25% average)

Anomaly C- up to 25.89% vermiculite (4-26% average)

Anomaly D- up to 12.97% vermiculite (13-18% average)

Anomaly E- up to 69.44% vermiculite (3-18% average)

Samples were also analyzed from the Insulite/Goshawk property to the east of the survey area and from the roadcut some 1.2 kilometers to the south of the survey area. These returned 14.16% and 14.47% vermiculite rerspectively.

Sampling has indicated that the zones continue to the south-southwest and to the east of the survey area. Two claim blocks of six claims were staked during this program to cover some of the important areas.

A majority of the vermiculite is contained within the -28 to +48 mesh size fraction (grades 4 to 6), but there is sufficient material also in the -14 to +28 (grade 3) mesh size fraction.

Approximately 42 percent of the samples within the -8 to +14 mesh fraction contain material with a density ofd 3 to 7 pounds per cubic foot, and approximately 23 percent of the samples within the -14 to +28 mesh fractions contain material with the same density. Only 10.9 percent of the samples containing vermiculite contained material coarser than +8 mesh size.

Visual indications during the field studies indicated that Anomaly C and Anomaly E contained coarser vermiculite material with lower densities.

The method of exfoliation of vermiculite using propane torches is sufficient for field studies but it has been found that without proper temperatures at specific time intervals, vermiculite will not expand to its fullest potential. It is therefore estimated that the vermiculite under ideal conditions will occupy more of the coarser mesh intervals, and that the densities will be lower than what this study has indicated. An oven with 1350 to 1700 degrees F. should be used for future exfoliation of materials.

A total of ninety two samples returned vermiculite assays. Approximately forty-five percent of the vermiculite-bearing samples contained over ten percent vermiculite by volume. A majority of the highest-grade samples cover an area of approximately 600 meters square (800 meters east-west and 400 meters north-south). This area is located to the south and southwest of Horseshoe Lake.

Most of the vermiculite-bearing materials are located in low ground or at the edges of swamps. It is possible that there is one large area of accumulation in some areas where some of the anomalous zones are one of the same. It is also thought that some of these anomalous zones are close enough to each other to be mined together.

There is sufficient quantities of vermiculite within the -8 to +28 mesh fractions, (the majority in the -14 to +28 mesh range), with a density of 3 to 7 pounds per cubic foot. The exfoliated vermiculite coincides with the industrial catagories of #3 grade to #6 grade. The size and grades outlined by lab analyses indicate that this material is useful as plaster/concrete aggregate, fillers, and paint extenders. With a proper method of exfoliation (using an ideal exfoliation temperature of 1350 to 1650 degrees F. over a specific time period), it is thought that there is sufficient material in the higher-grade/ coarser size fractions which would be useful for insulation purposes. There appeared to be coarser material associated with Anomalies B, C, and E.

It visually appears that the vermiculite in this deposit is relatively free of talc, serpentinite, and other gangue minerals. It also appears that this vermiculite is anhydrous or of the non-absorbing type; thus it would be more useful as an insulating material than for planting/agricultural material

Results of Surveys-

Five zones with vermiculite-bearing material were outlined by this project. All of these zones trend in a southwest to northeast direction; parallel to the geological trend for the area

All of these zones are contained within a marble/dolomite complex which occurs under claims 35362, 1191249, and 1191295. These zones are terminated to the north but although the marble complex narrows and squeezes to the southwest it does continue further past the survey grid.

Anomaly A which contains two vermiculite- bearing bands from 25 to 75 meters in width, has been traced for a distance of at least 500 meters in length. This trend occurs along the west contact area of the marble complex. The vermiculite, although finer in size, has been found in amounts ranging from 4 to 38 percent by volume. The richest material is found from line 7 south to line 9 south and approximately 825 meterds west of Highway #507. This vermiculite is characteristically beige colour

Anomaly B, some 100 meters east of Anomaly 1, averages between 25 and 40 meters in width. It has been traced for a distance of at least 1100 meters. This anomaly is in the central section of the marble complex and is bordered by low swamp areas. The richest sections, averaging between 8 and 25 percent vermiculite by volume, is located between lines 9 south and 11 south at a distance of approximately 500 meters west of Highway # 507. It is of the beige variety.

Anomaly C, some 50 to 100 meterds east of Anomaly B, is considered to have the greatest potential for grade and tonnage. It ranges from 25 to 75 meters in width and has been traced for a length distance of at least 700 meters. This anomaly is in the central portions of the marble complex, and appears to narrow to the south. The richest sections,

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December 6, 1974

Wilson, H.S.- Investigation of Vermiculite-Bearing Samples from Olympus
Mines Ltd - Stanleyville, Ontario. April 18, 1961

Recommendations-

The next phase should be to evaluate the area and depth of the higher grade vermiculite-bearing materials to outline the tonnage and grade potential. There is surface area of approximately 400 meters by 800 meters (between Lines 7 south and 11 south on the south and southwest side of Horseshoe Lake) which should be tested by a "grid" pattern of testing to see if this is in effect a large bowl-type accumulation of residual material. At the same time a backhoe should be used to bulk-test and sample at depth (to approximately 4.5 to 5.5 meters depth)on each of the anomalies where high values were indicated. One fence per anomaly would total approximately 500 to 600 meters of trenching. These trenches could be logged, sampled, and backfilled in approximately 40-50 hours of backhoe time.

This vermiculite deposit, contained within a marble complex, terminates to the north but extends to the southwest. The extent of this deposit is unknown and continues to the southwest into an area overlain by crown-land. As the highgrade values continue into this area, it should be geologically mapped and sampled to see the extent of this zone. A magnetometer survey would be useful in outlining geological contacts under swamp or heavy-overburden areas.

Vermiculite-bearing material has been located in several other locations: on the Harvey-Cavendish Township line some 0.8 kilometers to the south, on the Insulite/Goshawk property some 2.4 kilometers to the east, and in a roadcut on Highway #507 in line of strike and some 4.4 kilometers to the northeast. It is possible that all of these areas are inter-related.

Although the marble complex is truncated to the north, it is possible it squeezes and bulges; thus giving the possibility that there are a series of marble complexes. There is a large area of open crown-land

underlain by metamorphosed limestone or marble some 3.6 to 4.4 kilometers to the north of the present survey area which should be investigated during the next program phase; at the same time the detailed survey and bulk-sampling programs are being run.

December 31, 1992.
Toronto, Ontario.

F.T.Archibald, B.Sc.Geologist.

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APPENDIX A - Sample Descriptions / Locations

CAVENDISH VERMICULITE

* - Visible vermiculite
** - Very visible vermiculite

Location	Description	Special Remarks
Scotts Road & Highway	Brown, Amphibolite	*
Scotts Rd & Highway	Weathered amphibolite., dark brown	**
0.7 km N baldwin Marina	Beige dolomite	*
0.7 km N Baldwin Marina	Beige, weathered dolomite	*
0.7 km N Baldwin Marina	Beige dolomite, weathered, coarse	**
0.8 km N Baldwin Marina	Beige, weathered, coarse dolomite	**
0.8 km N Baldwin Marina west side	Beige, weathered, coarse, dolomite	**
Cav./Harv. Township Line	Dark brown amph., coarse, weathered, coarse flakes	**
Cav./Harv. Township Line	Weathered amph., green layers	*
Cav./Harv. Township Line	Weathered amph. gniss, coarse	**
L0S 1425W	Amphibolite gneiss	
L0S 125W	Amphibolite gneiss, black, mica rich	
L0S 475W	Amph., iron formation, rock	
L2S 175W	Amph. gniess, mafic rich	
L5S 0+50W	Brown/green flake, weathered dolomite	*
L6S BL A	Red, dolomite, weathered, amph. gneiss	
L6S 0+50W	Amph. rock, weathered, iron stain gneiss	
L6S 450W	brown,sand,green mica flakes, fine verm.dolom.	*
L6S 475W	brown sand, mixed with organics, fine mica	
L6S 500W	fine beige sand,mica rich, low verm.,dolomite	*
L6S 525W	beige sand-silt,green mica, dolomite	
L6S 550W	brown sand, mica rich,dolomite	
L6S 575W	beige-brown sand,mica rich,marble frag.	
L6S 600W	brown sand, marble fragments	
L6S 625W	beige-weathered marble, low/fine verm.	*
L6S 650W	dark brown/organic rich,sand (dolomite)	
L6S 675W	sand/marble fragments,mica/verm. rich	*
L6S 725W	sand with mica(silver),brown, marble	
L6S 775W	orange/brown,sand (marble)-mica/verm.	*
L6S 850W	orange/beige sand, marble frag.,low mica	
L7S 0+25W	Rusty, dolomite	
L7S 0+50W	beige, dolomite	
L7S 0+75W	beige, dolomite	
L7S 100W	beige, dolomite	
L7S 125W	beige, sand, dolomite	*

L7S 150W	beige, coarse sand, dolomite	
L7S 625W	weathered marble,coarse,beige	
L7S 650W	beige/brown,weathered marble,coarse,mica	
L7S 675W	beige, weathered marble	
L7S 700W	beige, weathered marble	
L7S 725W	beige, marble, mica rich	*
L7S 750W	beige, weathered marble/dolomite	
L7S 775W	sand/silt, beige, mica rich	
L7S 800W	fine grained, beige sand, marble	*
L7S 825W	brown sand/organics,green mica, low verm.	*
L7S 850W	weathered marble, brown/beige, high mica	
L7S 875W	weathered marble, high mica, beige	
L7S 900W	beige marble, green mica rich,low verm.	*
L7S 925W	weathered marble, beige/brown, low mica	
L7S 950W	brown/orange sand,low verm.,marble	*
L7S 975W	weathered marble,beige/brown, silver mica	
L7S 1000W	sand with organics,marble fragments	
L7S 175W	beige, coarse sand, dolomite	
L8S 0+75W	Calcite/marble, coarse, grainy, rock	
L8S 100W	Buff, marble, grainy, rock, epidote rich	
L8S 125W	Green, weathered dolomite, flake	*
L8S 150W	Pink/green, marble, rock, coarse	**
L8S 200W	Beige, weathered, dolomite, gritty	
L8S 225W	iron stain dolomite, beige, coarse, grainy	*
L8S 250W	Coarse, weathered dolomite	
L8S 475W	beige sand, weathered marble	
L8S 500W	beige sand, weathered marble	
L8S 525W	beige sand, weathered marble	
L8S 550W	beige sand, weathered marble	
L8S 575W	beige sand, weathered marble	
L8S 700W	sand/silt,beige/brown,low mica,marble	
L8S 725W	coarse sand, beige,marble, mica rich	
L8S 750W	coarse sand, marble,mica rich	
L8S 775W	beige sand, weathered marble, low verm.	*
L8S 800W	orange/beige sand, mica rich,amphibolite	*
L8S 825W	beige sand, marble, low mica content	*
L8S 850W	fine sand, marble, beige	
L8S 875W	fine sand, marble, beige colour	
L8S 900W	fine brown sand, mica rich,amphibolite	
L8S 925W	fine sand with marble fragments	
L9S 150W	Beige, weathered, fine	*

L9S 175W	Coarse weathered dolomite, beige	
L9S 225W	Beige marble, green sheets, rock	
L9S 400W	Buff, marble, grainy, rock	
L9S 450W	Buff, marble, grainy	
L9S 525W	Brown, weathered, green flakes	***
L9S 550W	Brown, green flakes, weathered	**
L9S 575W	Brown, weathered, green flakes, coarse	***
L9S 600W	Marble, white/buff, rock	
L9S 625W	brown, weathered marble with green mica	*
L9S 650W	brown, weathered marble with green mica	**
L9S 675W	brown, weathered marble, mica rich	**
L9S 775W	beige, weathered, low mica, marble	
L9S 800W	sand, weathered marble, mica rich	
L9S 825W	medium sand, weath. marble, beige, low verm	*
L9S 850W	fine sand, weathered marble, mica rich	*
L9S 875W	beige, weathered marble, mica rich	**
L9S 900W	coarse weathered marble, buff/beige	**
L9S 925W	weathered marble, beige/buff,fine verm	**
L10S 125W	Brown, iron formation, dolomite, rock weathered amph. (flakes), brown	
L10S 150N	Brown, iron formation, dolomite, rock weathered amph. (flakes), brown	
L10S 175W	brown, weathered dolomite	
L10S 200W	brown, weathered dolomite	
L10S 225W	Brown/green flake, weathered	*
L10S 250W	Beige, dolomite, massive, iron formation, rock	
L10S 400W	Buff marble, rock, massive	
L10S 425W	Beige, marble, grainy, rock	
L10S 450W	Marble/calcite, red stain, rock	
L10S 475W	Beige/pink dolomite, grainy	
L10S 500W	Buff marble, rock, massive	
L10S 500W	Marble, red splotches, massive, rock	
L10S 525W	Beige dolomite, weathered, coarse, grainy	
L10S 575W	Marble, green layers/flakes (50%)	**
L10S 600W	beige marble, weathered	
L10S 625W	Pink & beige, fine marble, massive	
L10S 800W	coarse marble, beige, mica rich	*
L10S 825W	coarse beige marble, mica rich	
L10S 850W	fine sand, beige, low mica	
L10S 875W	orange, fine sand, marble, low mica	
L10S 900W	coarse, beige, marble, low mica	

L10S 925W	coarse, beige , marble, mica rich	*
L10S 950W	fine sand, beige, low mica, marble	
L11S 200W	Beige, weathered dolomite	**
L11S 225W	Beige/pink, green flakes, marble	*
L11S 250W	beige/pink, green flakes, marble	*
L11S 275W	beige, coarse, marble/dolomite	
L11S 325W	beige, marble/dolomite	
L11S 350W	beige, marble/dolomite, green flakes	**
L11S 375W	beige, marble/dolomite	*
L11S 400W	beige, marble/dolomite, mica rich	*
L11S 425W	beige, marble/dolomite	*
L11S 450W	beige colour, coarse weathered marble	
L11S 475W	beige, weathered marble/dolomite	
L11S 500W	weathered marble	
L11S 525W	brown/beige, weathered marble	
L11S 550W	beige, weathered marble	
L11S 575W	beige colour, marble/dolomite	
L11S 600W	beige/buff, marble/dolomite	
L11S 625W	weathered marble, beige/buff colour	
L11S 650W	weathered marble, beige/buff colour	
L11S 675W	beige/buff, marble/dolomite	*
L11S 700W	beige/buff, dolomite/marble	*
L11S 725W	beige/buff, marble/dolomite	*
L11S 775W	beige, weathered dolomite/marble	
L11S 825W	beige, weathered dolomite/marble	
L11S 850W	beige, weathered dolomite/marble	
L11S 900W	coarse, beige, marble, mica rich,marble	
L11S 925W	fine sand, orange colour, low mica,amph.	
L12S 150W	Marble, weathered, granular	*
L12S 150W A	Marble, rock, red/buff	
L12S 175 A	Beige, weathered, marble, rock	
L12S 200W A	Pink, marble, rock	
L12S 225W A	Buff, marble rock, granular	**
L12S 250W A	Rusty, weathered, marble rock	*
L12S 275W	rusty, weathered marble/dolomite, beige	
L12S 300W A	Beige, weathered dolomite	
L12S 325W	Pink dolomite, green layers	**
L12S 325 A	Brown/green, rock	*
L12S 340W	Beige/green splotches, rock	
L12S 350W A	Pink/beige marble, green	*
L12S 350W	Buff, marble, rock	

L12S 375W	Pink marble, green layers	
L12S 400W	Brown dolomite, weathered	*
L12S 425W A	Beige marble, rock	*
L12S 425W	Buff, marble, rock	
L12S 450W A	Red/brown, weathered, dolomite	
L12S 450W	Buff, marble rock	
L12S 475W A	Beige, fine weathered dolomite	*
L12S 475W	Marble, weathered, rock	
L12S 500W	Buff, marble, rock	
L12S 525W	Buff/pink, marble, rock	
L12S 525W A	Buff/green marble, layers, rock	
L12S 550W A	Beige, fine weathered dolomite, fine, rock	
L12S 575W A	Beige/buff, red layers, calcite layers, rock	
L12S 600W	Buff/pink, marble, rock	
L12S 625W A	Brown dolomite, green layers	*
L12S 625W	Buff, marble, rock	
L12S 650W	Buf, marble, green tinge, massive	
L12S 650W A	Dark brown/green, amph.	*
L12S 675W A	Pink, marble, rock, green layers	*
L12S 750W	Buff/pink, marble rock	
L12S 775W	Buff, marble, fine grain	
L12S 825W	Weathered, brown, weathered amphibolite	
L13S 175W	Marble, rock, red/buff	
L13S 200W	Brown marble/dolomite with organics	
L13S 225W	brown/beige, marble/dolomite	
L13S 250W	Marble, green layers,marble	
L13S 275W	Green layers, marble/dolomite	
L13S 325W	Brown soil, marble/dolomite	*
L13S 350W	weathered marble, beige colour	
L13S 375W	Sandstone (altered marble)	
L13S 425W	Green layer, altered marble	
L 13S 450W	Pink, marble, green layers, rock(marble)	
L13S 475W	Buff, marble, rock(marble)	
L13S 525W	Marble, weathered, rock(marble)	
L13S 550W	Buff, marble, rock, green epidote	

L13S 575W	Marble rock, rock/buff	*
L13S 600W	White, marble rock	
L13S 625W	white/buff, rock, marble	
L13S 650W	white/buff, marble rock	
L13S 675W	beige/buff, marble/dolomite, weathered	*
L13S 700W	Marble, green layers	
L13S 725W	marble with green mica layers	
L13S 750W	marble, buff/pink colour, massive	
L13S 775W	Buff/pink marble, rock, massive	
L13S 800W	buff/pink colour, marble/dolomite	
L13S 825W	marble, buff colour, massive	
L13S 850W	White, marble rock	
L14S 250W	Fine, green flakes (marble/dolomite)	*
L14S 275W	Buff/pink marble, weathered	
L14S 300W	buff/pink marble	
L14S 325W	Buff/pink marble	
L14S 350W	buff/pink marble/ weathered	
L14S 375W	Marble/dolomite, beige colour	
L14S 400W	Marble/dolomite, weathered, beige/buff	
L14S 425W	marble/dolomite, beige colour	
L14S 450W	Buff, marble, rock	
L14S 475W	Marble, beige colour, weathered	
L14S 500W	brown/green mica flakes, pink marble	**
L14S 525W	Brown/green flakes, weathered, amphibolite	*
L14S 550W	rusty, mica rich, amphibolite	
L14S 575W	green mica, weathered marble	*
L14S 600W	weathered marble, beige	
L14S 625W	Marble, weathered, beige	
L14S 650W	Marble, buff colour, massive	
L14S 675W	Buff, marble, rock	
L14S 700W	Sandstone (altered marble), green layer, rock	
L14S 725W	Beige, marble, fine, rock	
L14S 750W	marble, massive/unweathered	
L14S 775W	marble, mica rich, beige/buff colour	*
L14S 800W	Marble, buff/pink colour	
L14S 825W	Buff/pink, marble, rock	
L15S 450W	Brown, mica rich, amphibolite	
L15S 475W	Amphibolite, mica rich, black colour, rusty	
L15S 500W	Buff, marble, rock	
L15S 525W	Marble, weathered	
L15S 550W	Buff, marble, rock	

L15S 575W	Buff, marble, rock	
L15S 600W	marble, coarse/weathered, beige colour	*
L15S 625W	Buff/pink marble, rock, massive	*
L15S 650W	beige/buff colour, weathered dolomite	*
L15S 675W	Buff, marble, rock	
L15S 700W	Buff, marble, rock	
L15S 725W	Buff, marble, rock	
L15S 750W	Buff, marble, rock	
L15S 775W	Buff, marble rock, granular	
L15S 800W	Marble, coarse grained, beige colour	
L15S 825W	Marble, beige, coarse grained	
L15S 850W	Buff/pink marble, rock, massive	
L15S 875W	Marble, weathered	
L16S 475W	Amphibolite	
L16S 500W	Amphibolite, rusty, mica rich, brown/black	
L16S 525W	Beige, marble, rock, calcite	
L16S 550W	Beige, calcite/marble, rock	
L16S 600W	Chert rich (marble), massive	
L16S 625W	Buff, marble, rock	
L16S 650W	Dark brown marble, weathered	**
L16S 675W	Buff, marble, grainy, rock	
L16S 700W	Weathered, amph. schist (mafic rich)	
L16S 725W	Buff/pink, marble, rock	
L16S 750W	Pink/buff marble, rock, brown splotches	
L16S 775W	Buff, marble, grainy, rock	
L16S 800W	Buff, marble, rock	
L16S 825W	buff, weathered marble	*
L16S 850W	Weathered marble, buff colour	
L16S 875W	Brown marble, iron formation, rock	
L16S 900W	Granite, rock	
L17S 650W	Amphibolite, rusty	
L17S 675W	Amphibolite, rusty, mica rich, brown/black	
L17S 700W	Buff, marble, rock	
L17S 750W	Buff/red, coarse, marble, rock	
L17S 825W	Marble, massive, iron formation, rock	
L17S 725W	Marble, coarse, buff/green, epidote	
L17S 775W	Brown, weathered, amph. gneiss	
L18S 825W	beige,weathered dolomite,green mica,verm	**
1	Green flakes, fine, dolomite/marble,-70 SW	*
2	beige, dolomite/marble,-70 SW	*

3	Green, flake, coarse dolomite,lenses to 1"	*
4	Green flake, dolomite, -45 SW dip	*
5	Green flakes, dolomite, -80 SW dip	*
6	Green flake, dolomite, -70 SW dip	**
7	Green flakes, dolomite, -70 SW dip	*
8	Soil, brown, dolomite with organics	**
9	Rock, green layers, dolomite, -70 SW dip	*
10	Fine sand, dolomite, green mica flakes	**
11	Soil, sand and organics, dolomitic	*
12	Fine dolomite, red/brown colour, low mica	**
13	Green flakes, dolomite/marble, -80 SW dip	**
14	Rock, green layers, dolomite, at old pit	*
15	Green flakes, dolomite	**
16	Green flakes, coarse marble, -85 SW dip	**
17	Green flakes, dolomite/marble, -85 SW dip	**
18	Weathered, rock, dolomite, coarse, pink/green	
19	Green flakes, coarse dolomite, -70 SW dip	**
20	beige weathered dolomite, pebbly,-70 SWdip	**
21	beige weatherted dolomite, -70 SW dip	*
22	Marble, buff/beige,coarse, -75 SW dip	
23	Green, fine marble/dolomite,beige,coarse	**
24	Rock, marble	
25	Green flakes, dolomite,beige/purple/green	*
26	weathered dolomite/marble, beige,coarse	*
27	Soil dolomite and organics,beige/coarse	*
28	Soil, dolomite and organics,beige/coarse	*
29	Soil, dolomite and organics,beige/coarse	*
30	marble,beige colour	*
31	Marble, weathered	
32	beige, marble, pebbly texture, -70 SW dip	*
33	weathered dolomite,pebbly, -70 SW dip	
34	marble/dolomite, beige, weathered	*
35	marble/dolomite, beige/red,weathered	*
36	beige/buff, marble layers,red splotches,-70	*
37	Beige, marble, coarse, granular, weathered	
38	beige-green/coarse marble,-75 SW dip	*
39	Green flakes, coarse marble, -80 SW dip	**
40	Marble dykebeige/green layers, -60 SW dip	*
41	beige dolomite, coarse/pebbly, -60 SW dip	*
42	Weathered marble, coarse, granular,pink,-65	
43	Marble, rock, massive, buff colour	

44	Marble, rock, semi-massive, -50 SW dip	
45	Marble, weathered, -45 SW dip	
46	beige/pebbly ,massive marble, -50 SW dip	*
47	beige/red,weathered marble,-55 SW dip	*
48	Marble,beige/red/green layer,granular,-60 dip	
49	Brown weathered dolomite, green flakes coarse, green splotches	**
50	Marble, green splotches,weathered	
51	Marble, rock, beige, pebbly textured	
52	Sand, red/brown colour@edge of amphibolite	*

Cavendish Vermiculite Occurrence

Sample #	Description
1	green verm. lenses in marble, -70 degree dip to SW,sheared
2	green vermiculite in marble, -70 degree dip SW
3	green/pink lenses, marble, -80 degree dip SW
4	green/dark purple lenses,dolomite, coarse verm., -80 degree dip SW
5	darkpurple/green lenses, marble, -80 degree dip SW
6	thin green layers in dolomite(weathered/pebbly)beige colour with -70 degree dip to SW
7	brown/beige,dolomitic,pebbly appearance,coarse green plates of mica(vermiculite),-70 degree dip to SW
8	green/dark purple colour marble + organics
9	purple with green layers and coarse mica plates,-70 degree dip to SW,dolomite/marble
10	soil with green vermiculite plates/books,dolomite
11	soil with green vermiculite plates/books,dolomite
12	red/brown soil with brown vermiculite plates,dolomite
13	dark brown/black vermiculite/weathered amphibole,-80 degree dip SW
14	purple/red colour with green layers vermiculite,sheared, close to pit,dolomite/marble
15	purple/green layers, weathered/sheared dolomite
16	purple/green layers, -85 degree dip SW, massive dolomite
17	green/pink colour,weathered marble with vermicuite,-85 degree dip SW
18	pink/red/green colour with coarse vermiculite books,-80 degree dip to SW,dolomite/marble
19	pink/purple colour, -70 degree dip to SW,dolomite/marble
20	beige/green layers in marble, -70 degree dip SW,marble
21	beige pebbly textured dolomite with fine green layers , -70 degree dip SW,dolomite,marble
22	buff/beige/pebbly texture,dolomitic,weathered with vermiculite plates, -75 degree dip to SW
23	beige/buff with green layers,dolomite/marble
24	beige coilour, weathered marble/dolomite
25	beige/purple/green layers,dolomite/marble
26	beige coloured marble, pebbly texture,weathered
27	beige coloured marble, pebbly texture,
28	beige coloured marble, pebbly texture,
29	beige coloured marble,pebbly texture,sheared
30	beige coloured marble, pebbly texture,sheared
31	beige coloured marble, pebbly texture,sheared
32	beige colour with pebbly texture, -70 degree dip to SW,marble
33	beige colour with pebbly texture, -70 degree dip SW marble

34	beige colour with pebbly texture, -70 degree dip SW,marble
35	beige/red colour with some green layers,marble
36	beige/buff with red splotches,dolomite/marble,-70 degree dip SW,marble/dolomite
37	beige colour with coarse grained,-75 degree dip SW,marble
38	beige with coarse grained,-75 degree dip SW,marble
39	marble layers with green layers,coarse verm, -80 deg.dip
40	edge of marble dyke,beige/coarse grained,-60 deg.dip
41	beige/pebbly texture,-60 degree dip SW,marble
42	pink/pebbly texture, -55 degree dip SW,marble/dolomite
43	buff marble (massive)
44	massive marble, -50 degree dip SW
45	pink marble, -45 degree dip SW
46	beige marble,pebbly/weathered, -59 degree dip
47	marble weathered,beige/red colour -50 deg.dip SW
48	red granular,beige/green layers,-60 deg.dip SW,marble
49	pink/beige with green splotches,weathered vermic.,marble
50	pink/beige with green splotches,weathered vermic.,marble
51	beige with pebbly texture,marble/dolomite
52	red/brown soil,amphibolite gneiss

OP92-264

Glamorgan Twp. (M-95)

Galway Twp. (M-94)

Anstruther Twp. (M-45)

Harvey Twp. (M-101)

Burleigh Twp. (M-62)

THE TOWNSHIP OF CAVENDISH

COUNTY OF PETERBOROUGH

SOUTHERN ONTARIO MINING DIVISION

SCALE: 1 INCH = 40 CHAINS

LEGEND

PATENTED LAND	(P)
CROWN LAND SALE	C.S
LEASE	(L)
LOCATED LAND	Loc
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	
IMPROVED ROADS	
KING'S HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	
CANCELLED	C
PATENTED FOR S.R.O.	

NOTES

This Map Is Not To Be Used - FOR SURVEY PURPOSES -

400' Surface Rights Reservation along the shores of all navigable waters

For status of summer resort locations & islands please contact Ministry of Natural Resources

Original shoreline shown thus

FRI shoreline shown thus

Patents Map shoreline shown thus

Area shown thus reserved for proposed Provincial Park, withdrawn from staking Sec 34(d) of Mining Act File 160708

Mining claims staked in this Tp subject to Sec 118 of Mining Act

SAND & GRAVEL

- (R1) Gravel File 154616
- (R2) Gravel " 21547
- (R3) M.N.R. Gravel Pit 76 File 21538
- (R4) Gravel File 40832
- (R5) Gravel " "
- (R6) Gravel " 73125
- (G) QUARRY PERMIT

- (R8) MNR Gravel Pit No. 138 File 152744
- (R9) Gravel File 104960
- (R10) Gravel File 40832

Areas withdrawn from staking under Section 43 of the Mining Act

	Plan	File	Date	Disposition
(43)	W.67/74	7598V4	19/12/74	S.R.&M.R.
(R1)	W.3/77	34261	[illegible]/77	S.R.&M.R.
(R2)	W.50/83	160708	29/8/83	S.R.&M.R.
	BEDS OF LAKES AND RIVERS WITHIN PARK LIMIT			
(R3)	W.11/83	73118	30/9/83	S.R.&M.R.
(R4)	W.67/74	7598V4	19/12/74	M.R.O.

DATE OF ISSUE
MAR 13 1992
SOUTHERN ONTARIO MINING DIVISION

THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES AND ACCURACY IS NOT GUARANTEED. THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING RECORDER, MINISTRY OF NORTHERN DEVELOPMENT AND MINES FOR ADDITIONAL INFORMATION ON THE STATUS OF THE LANDS SHOWN HEREON

PLAN NO. - M-72

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

31D09NW0015 OP92-264 CAVENDISH

200

4 CLAIMS (UNDER LEASE) AREA FOR PROJECT EXPLORATION

51 CLAIMS (CROWN LAND) AREA FOR PROJECT EXPLORATION

PLATE A

Scotts Road

garbage dump

L0

L1 south

L2 south

L3 south

35355

L4 south

Horseshoe Lake

L5 south

L6 south

West Road

L7 south

L18

L8 south

35356

A

B.

C

E

L9 south

35362

L10 south

L11 south

L12 south

L13 south

Open Swamp

L18

L14 south

D

L15 south

base line A

Kings Road

L16 south

L17 south

base line B

Snowmobile Road

Open Swamp

Mississagua Lake

Trappers Inn

Highway # 507

Legend

V- vermiculite (-10%)

VG- vermiculite (+ 10%)

•⁂ - sampling station

Vermiculite rich zones / trends

CAVENDISH VERMICULITE OCCURRENCE

GEOCHEMICAL SAMPLING LOCATIONS

Scale

0 100 200 300 meters

E.F. Archibald

210

PLATE B

Scotts Road

garbage dump

Maple / Oak / Pine 4-12"

Horseshoe Lake

Jack Pine 14-22"

Pine & Spruce

Poplar / Birch / Spruce

Pine & Spruce

Birch

Maple / poplar 6-14"

Flat Ground

Open Swamp

swampy D

Low Ground

Maple / Oak

Maple / Oak 4-12"

Maple / Oak 4-12"

Open Swamp

Mississagua Lake

Trappers Inn

SKIDOO TRAIL

POND

Snowmobile Road

West Road

Kings Road

base line A

base line B

Highway # 507

L0 south

L1 south

L2 south

L3 south

L4 south

L5 south

L6 south

L7 south

L8 south

L9 south

L10 south

L11 south

L12 south

L13 south

L14 south

L15 south

L16 south

L17 south

35355

35356

35361

35362

1191295

1191249

1191249

Legend

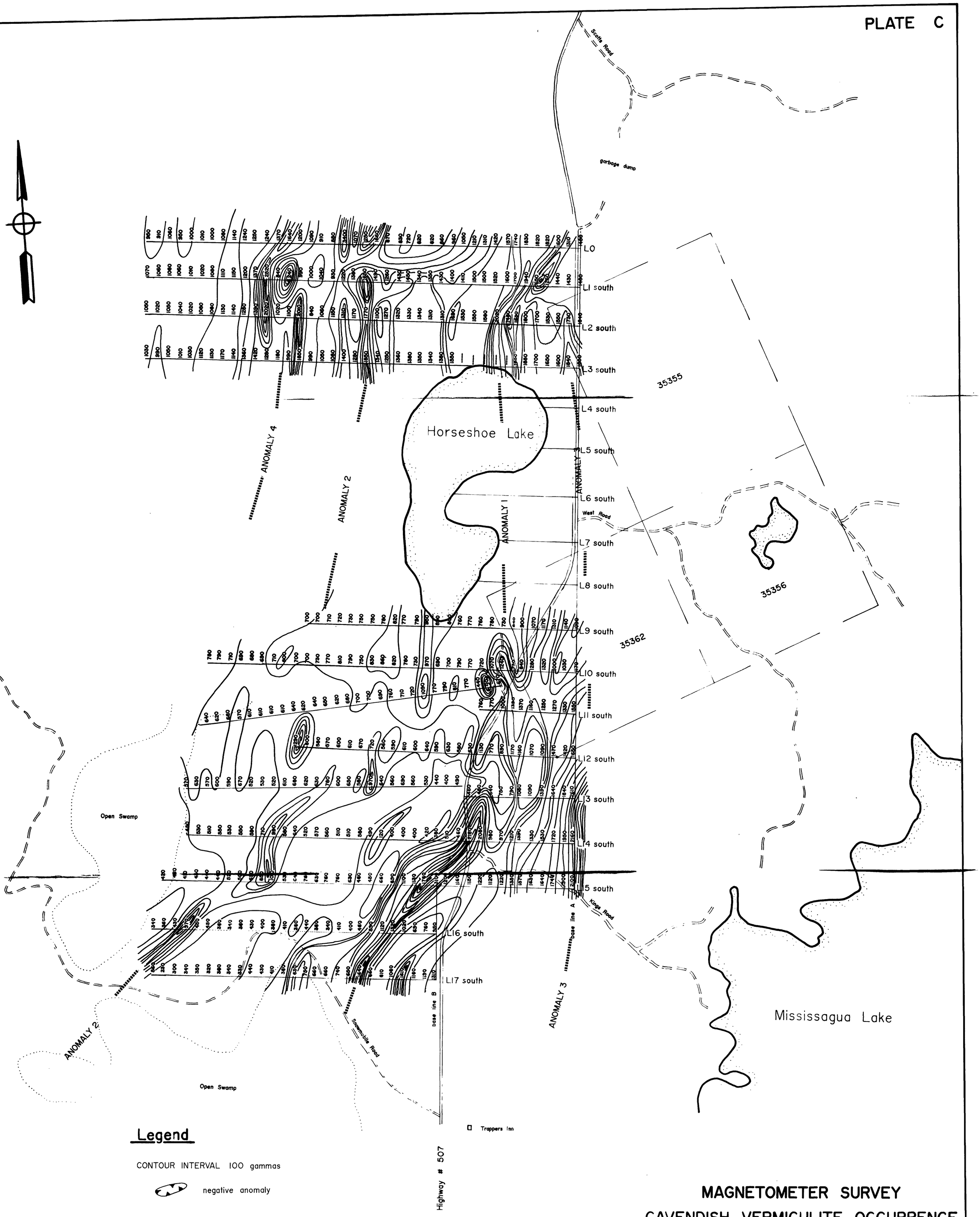
- vermiculite rich trend
- 12 Potassic Pegmatitic INTRUSIVE ROCKS
- 10 Granitic INTRUSIVE ROCKS
- 9 Foliated / Gneissic Syenite INTRUSIVE ROCKS
- 5 CALCAREOUS METASEDIMENT ROCKS (Marble / Diopside / Dolomite)
- 4 Amphibole rich METASEDIMENT ROCKS
- 45 bedding / schistocity
- geological contact
- swamp
- outcropping
- trail
- road

GEOLOGICAL SURVEY
CAVENDISH VERMICULITE OCCURRENCE

Scale
0 100 200 300 meters

J.F. Archibald

PLATE C



Legend

CONTOUR INTERVAL 100 gammas

negative anomaly

MAGNETOMETER SURVEY
CAVENDISH VERMICULITE OCCURRENCE

Scale
0 100 200 300 meters

PLATE D

Scotia Road

garbage dump

L0

L1 south

L2 south

L3 south

L4 south

L5 south

L6 south

West Road

L7 south

L8 south

L9 south

L10 south

L11 south

L12 south

L13 south

L14 south

L15 south

L16 south

L17 south

base line A

base line B

Kings Road

Snowmobile Road

Horseshoe Lake

35355

35356

35362

Open Swamp

Open Swamp

Mississagua Lake

Trappers Inn

Highway # 507

Legend

-VE — ANOMALY / CROSSOVER — +VE

Contour interval 1 inch to 20 degrees

STATION Seattle Washington 24.0 Khz.

ELECTROMAGNETIC SURVEY
Dip Angle Measurements

CAVENDISH VERMICULITE OCCURRENCE

Scale
0 100 200 300 meters

F.J. Archibald

240

31D09NW0015 OP92-264 CAVENDISH

PLATE E

Scotia Road

garbage dump

L0

L1 south

L2 south

L3 south

L4 south

Horseshoe Lake

L5 south

L6 south

West Road

L7 south

L8 south

L9 south

L10 south

L11 south

L12 south

L13 south

L14 south

L15 south

L16 south

L17 south

35355

35356

35362

A

B

C

Open Swamp

Open Swamp

base line A

base line B

Kings Road

Snowmobile Road

Highway # 507

Trappers Inn

Mississagua Lake

Legend

RESULTANT FIELD STRENGTH @ 10% intervals
(base station set at 100%)

STATION ------ Seattle, Washington 24.0 Khz.

ELECTROMAGNETIC SURVEY
Field Strength Measurements

CAVENDISH VERMICULITE OCCURRENCE

Scale
0 100 200 300 meters

PLATE F

Scotts Road

garbage dump

L0

L1 south

L2 south

L3 south

35355

L4 south

Horseshoe Lake

L5 south

L6 south

West Road

L7 south

18.90 / 6.95 / 38.05 / 8.10 / 6.62 /

1191295

12.10 / 7.18 / 9.62 / 6.71 /

8.50 / 0.52 / 21.95 / 20.72 / 13.08 /

0.35 / 17.07 / 20.82 / 2.12 / 9.43 /

8.85 / 28.91 / 37.43 /

L8 south

0.44 / 4.36 / 23.24 / 41.27 /

4.24 / 8.39 / 20.00 / 15.84 /

8.47 / 28.31 / 25.89 / 4.00 / 23.80 / 25.89 /

4.70 / 28.01 / 13.83 / 16.78

L9 south

35356

35362

69.44 / 14.05 / 16.02 / 26.54 / 61.54 / 17.66 / 22.12 / 5.08 / 5.03 / 3.12 / 7.03 / 1.27 / 14.78 / 5.03

6.71 / 16.44 /

25.69 / 25.00 / 9.40 /

1.05 /

L10 south

15.28 / 12.13 /

11.66 / 0.73 / 4.63 / 1.56 / 3.00 / 2.58 / 2.83 / 3.88 / 5.36 / 1.21 / 0.03 / 1.96 / 3.19 / 9.80 / 0.70 / 9.80 /

L11 south

20.86 /

L12 south

1.83 / 13.29 /

L13 south

1191249

Open Swamp

2.82 /

L14 south

L15 south

12.97 /

L16 south

base line A

Kings Road

L17 south

base line B

Snowmobile Road

17.66 /

Open Swamp

Trappers Inn

Highway # 507

Mississagua Lake

Legend

SURFACE / GEOCHEMICAL SAMPLE → 2.49 / 5.43 (% vermiculite by volume) E.T.ARCHIBALD

LINE

SAMPLE LOCATION

DRILLING SAMPLE (% vermiculite by volume) E.W.ARCHIBALD

VERMICULITE PERCENTAGES & LOCATIONS

CAVENDISH VERMICULITE OCCURRENCE

Scale

0 100 200 300 meters

E.T. Archibald