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**DIAMOND DRILLING REPORT**  
**ON THE**  
**LEO D'OR MINERAL CLAIM**  
**Bonanza Lake, Vancouver Island**  
**Nanaimo Mining Division**  
**British Columbia**

**NTS 92L/7W**

<b>SUB-RECORDER</b> <b>RECEIVED</b> <b>APR - 7 1992</b> M.R. # ..... \$ ..... VANCOUVER B.C.	<b>Latitude: 50°24' North</b> <b>Longitude: 126°48' West</b>
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**OWNER: LEO D'OR MINING INC.**  
**OPERATOR: HARVARD CAPITAL CORPORATION**  
**AUTHOR: N.C. CARTER, Ph.D. P.Eng.**  
**DATE: March 25, 1992**

**GEOLOGICAL BRANCH**  
**ASSESSMENT REPORT**

**22,218**

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## INTRODUCTION

Harvard Capital Corporation completed seven short diamond drill holes on the Leo D'Or mineral claim on northern Vancouver Island in August of 1991.

This report describes the nature and results of the 1991 drilling program.

## LOCATION AND ACCESS

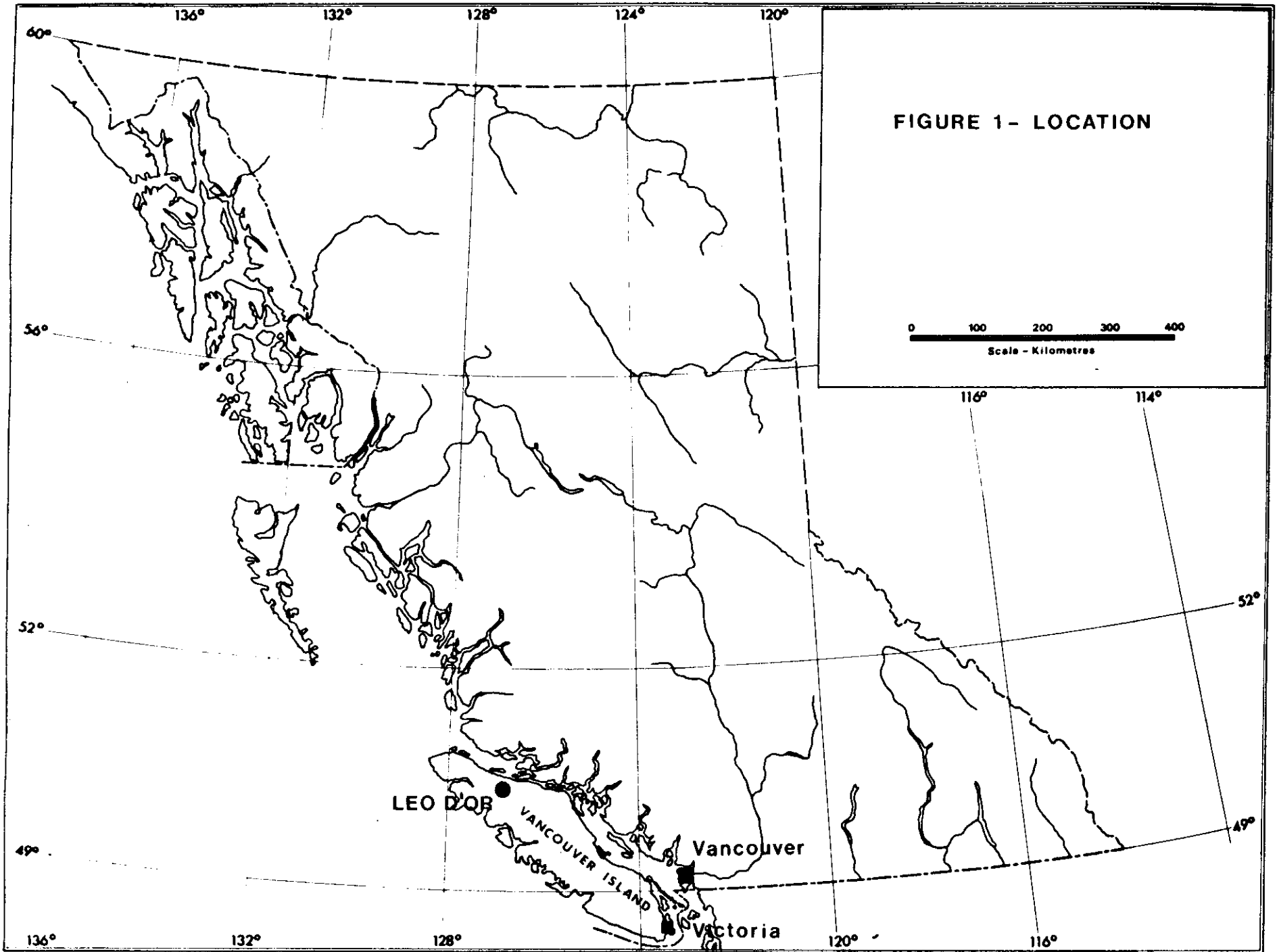
The Leo D'Or mineral claim covers a 225 hectare area adjacent to the northeast shore of Bonanza Lake 30 km southeast of Port McNeill on northern Vancouver Island (Figure 1). The claim Legal Corner Post is near latitude  $50^{\circ}24'$  North and longitude  $126^{\circ}48'$  West in NTS map-area 92L/7W.

Access to the lower, northwest part of the claim is by Provincial highway 19 and paved road to Beaver Cove and from there by Fletcher Challenge Main Road South (Figure 2). Total road distance from Port McNeill is approximately 45 km.

The upper, or southeastern claim area is accessible by helicopter or by way of a 3.3 km flagged trail from the end of a logging road (Figure 3).

## MINERAL PROPERTY

The Leo D'Or mineral claim consists of 9 mineral claim



units in the Nanaimo Mining Division as shown on Figure 3.

Details of the claim are as follows:

<u>Claim Name</u>	<u>Record Number</u>	<u>Units</u>	<u>Date of Record</u>
Leo D'Or	2202	9	June 10, 1985

The mineral claim is in current good standing until June 19, 1994. Leo D'Or Mining Inc., owner of the claim, entered into an option/joint venture agreement with Harvard Capital Corporation in July, 1991 for the purpose of carrying out further investigation of the property. The agreement was terminated in the fall of 1991.

#### **PHYSICAL SETTING**

The western half of the Leo D'Or claim covers a fairly steep (35°) slope extending from Bonanza Lake (270 metres above sea level) to an elevation of about 760 metres or 2,500 feet (Figure 3 - note that elevations are in Imperial units). Bedrock is well exposed throughout this previously logged area.

The eastern claim area features more subdued topography rising to a maximum elevation of 900 metres (3,000 feet) along the eastern claim boundary. Old growth forest cover, with locally thick underbrush, is broken by small swamps and several creeks.

The dominant topographic feature is "Onyx Hill", bounded

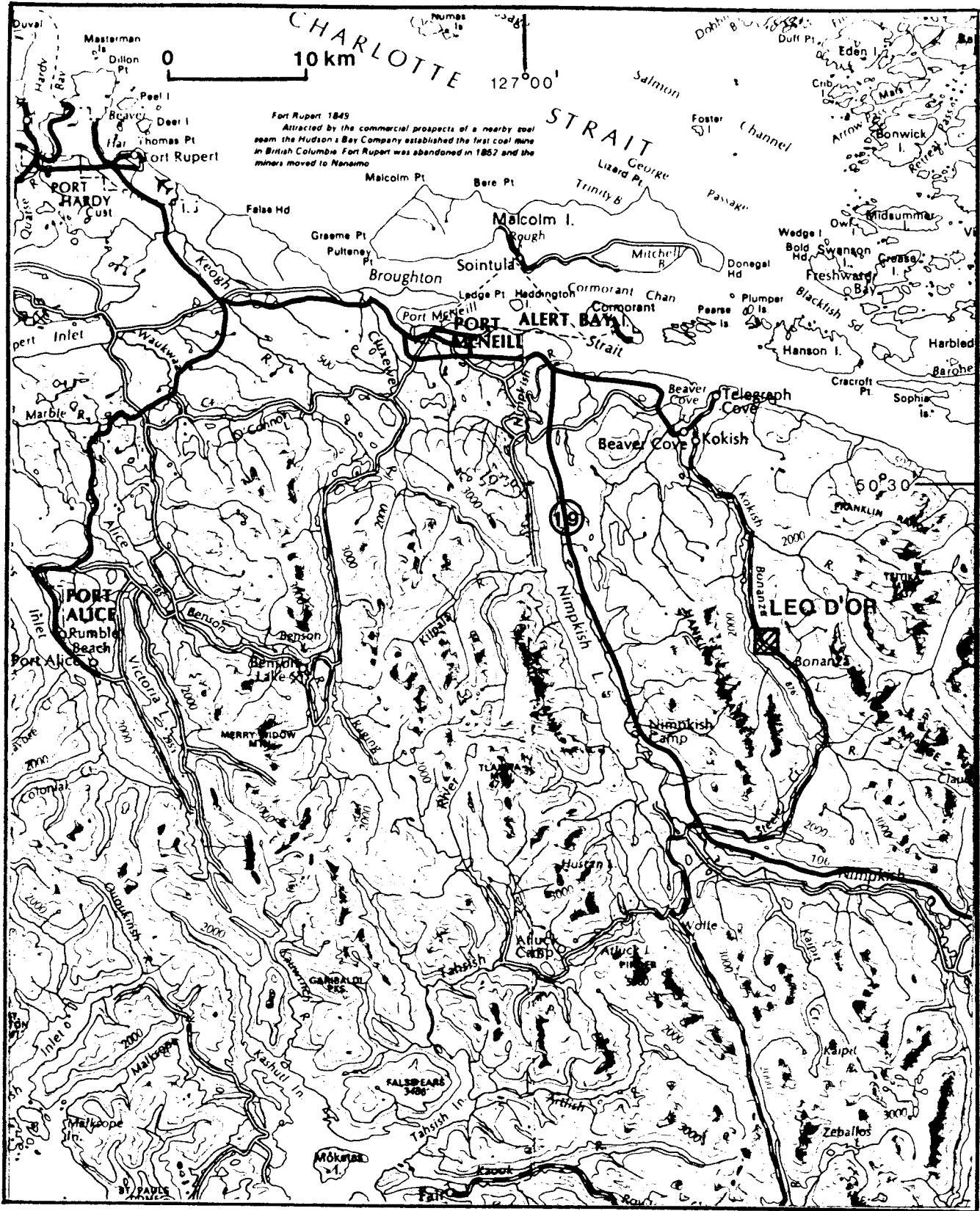


FIGURE 2 LOCATION LEO D'OR PROPERTY

by +100 metre high cliffs in the southeastern claim area.

#### **PREVIOUS WORK**

The present mineral claim was located in 1985 following the identification of marble by Massoud Shariat Madari, president of Leo D'Or Mining Inc. Work since that time has included prospecting and preliminary geological mapping (Game, 1986; Devlin and Rychter, 1987) and the collection of samples for chemical and physical analyses.

Klohn Leonoff Ltd. undertook detailed geological mapping of a 6 hectare area adjacent to the main access road in the northwestern claim area in early 1988. Petrographic studies and X-Ray diffraction analyses were carried out on 12 rock samples collected during this program. A short access road was constructed into this area in early 1991.

#### **1991 DIAMOND DRILLING PROGRAM**

Eight vertical holes totalling 213.5 metres were drilled within a 240 x 170 metre area at the top of "Onyx Hill" in the southeastern claim area (Figure 3) between August 4 and 19, 1991.

A light-weight Prospector 89 diamond drill, supplied by Hydracore Drills Ltd., was transported to a camp area at the south end of "Onyx Hill" by helicopter. Helicopter support

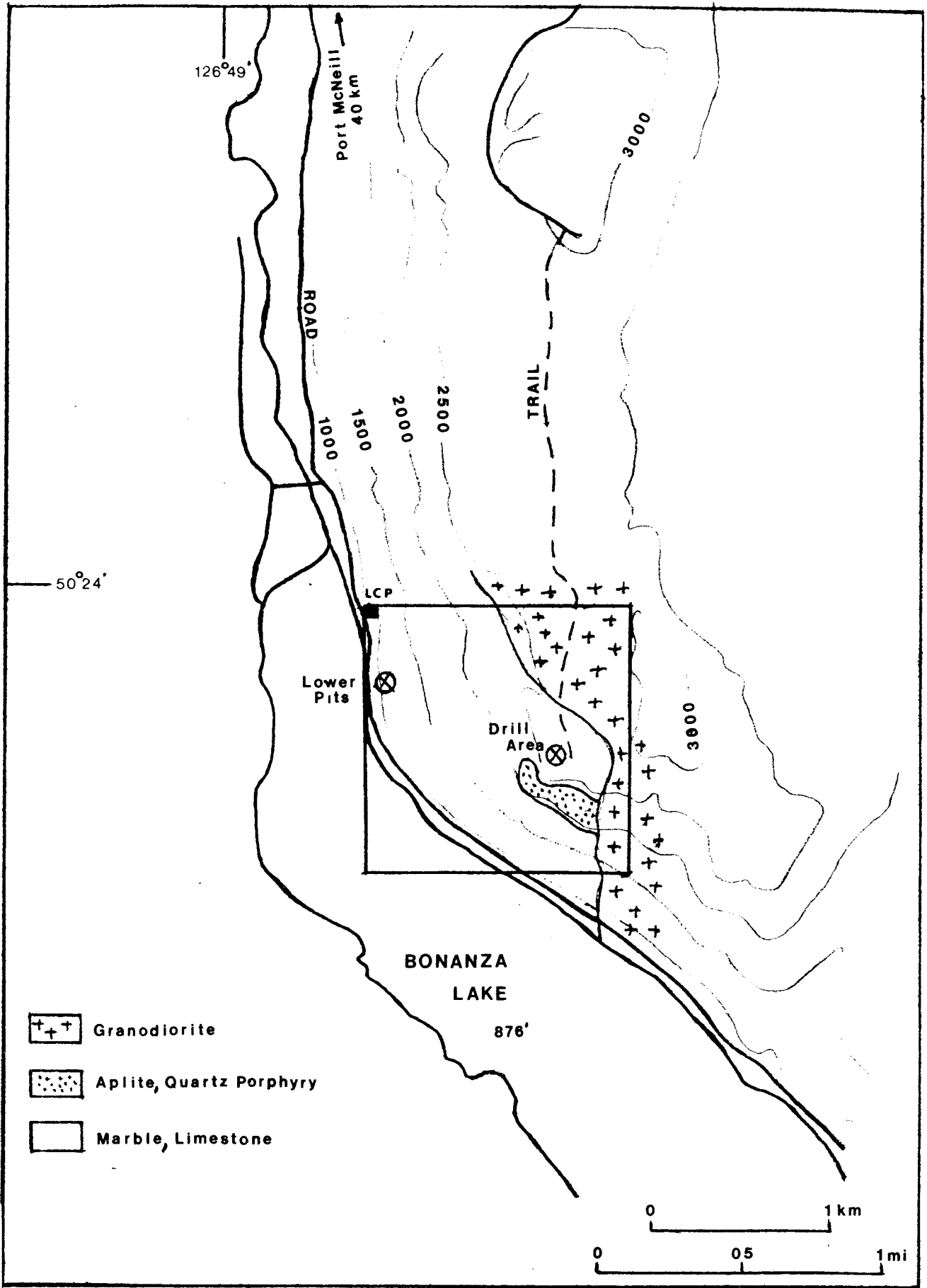


FIGURE 3 - LEÓ D'OR MARBLE PROPERTY



was also used for most of the drill moves.

195 metres of JKT 48-size core (almost identical to BQ-size) was recovered from six of the holes drilled; holes 1 and 1A were lost in overburden at 9.5 metre depths. Hole depths ranged from 9.5 to 63.1 metres.

Drill hole locations shown on Figure 4 were determined by the writer and by Mr. Rupert Seel of McElhanney Engineering Services Ltd. Holes were logged by the writer on August 8, 15 and 16, 1991 and drill logs are included as Appendix I to this report. Two core samples were submitted for chemical analyses.

Drill cores are stored in the camp area (Figure 4) and at the various drill sites.

#### **GEOLOGICAL SETTING**

Vancouver Island makes up the southern part of the Insular belt, the westernmost tectonic subdivision of the Canadian Cordillera. The southern Insular belt is dominated by Paleozoic and Mesozoic volcanic-plutonic complexes overlain on the east coast of Vancouver Island by clastic sedimentary rocks of Cretaceous age. Tertiary basic volcanic rocks are prevalent in the south island area and granitic intrusions of equivalent age are widespread along the west coast.

Northern Vancouver Island, and in particular, the Port McNeill - Nimpkish - Bonanza Lakes area, includes most of the foregoing geological elements. Much of this area is underlain by late Triassic - early Jurassic Vancouver Group volcanics and sediments which are intruded by mid-Jurassic Island intrusions granitic rocks. Late Cretaceous clastic sediments are preserved along the Island east coast in the Squash Basin between Port Hardy and Port McNeill.

Late Triassic Karmutsen Formation basaltic flows and pyroclastic rocks of the Vancouver Group are the most widespread geological unit. These are overlain by Quatsino Formation carbonate-rich sediments, Parson Bay clastic sediments and by slightly younger (Lower Jurassic) Bonanza volcanics in the Nimpkish - Bonanza Lakes area.

Quatsino Formation limestones are well exposed in the area bordering Bonanza Lake where they are intruded by an elongate mass of Island intrusions granitic rocks east of the lake. A north-northwest regional fault extends through Bonanza Lake (Muller et al, 1974).

The granite - limestone contact, extending in a northerly direction through the Leo D'Or claim (Figure 3), was accurately mapped by Hoadley (1953). Granitic rocks observed by the writer north of "Onyx Hill" and along the road south of the claim consist of medium- to coarse-grained

diorite and granodiorite which is weakly magnetic. Limestones marginal to the granite contact and throughout the claim have been converted to marble which exhibits a variety of colours and textures. The gently dipping marble sequence is cut by a 150 metre thick, fine-grained, pink quartz porphyry sill which extends northwesterly from the granite contact and appears to underlie "Onyx Hill". A number of 0.5 - 5 metre wide quartz porphyry sills are also exposed on the cliffs bounding "Onyx Hill". These sills contain minor amounts of disseminated pyrite. Basic sills and lesser dykes were also noted in some of the drill cores and near the road in the "Lower Pits" area (Figure 3).

Fine- to medium-grained creamy white and light to dark grey marble is exposed in the "Lower Pits" area adjacent to the main road. Colour banding is evident, with 0.5 - 3 metre wide alternating bands of light and dark grey marble. Some karst development in this area includes two caves and crevice karst developed along pre-existing joints and fractures (Broughton and Bruce, 1988).

The frequency of fracturing and jointing ranges from closely spaced (0.3 - 0.5 metre), both along the main road in proximity to the regional fault and marginal to the large quartz porphyry sill, to several metres apart in the Lower Pits area where standard-size blocks (2.05 x 1.50 x 1.85

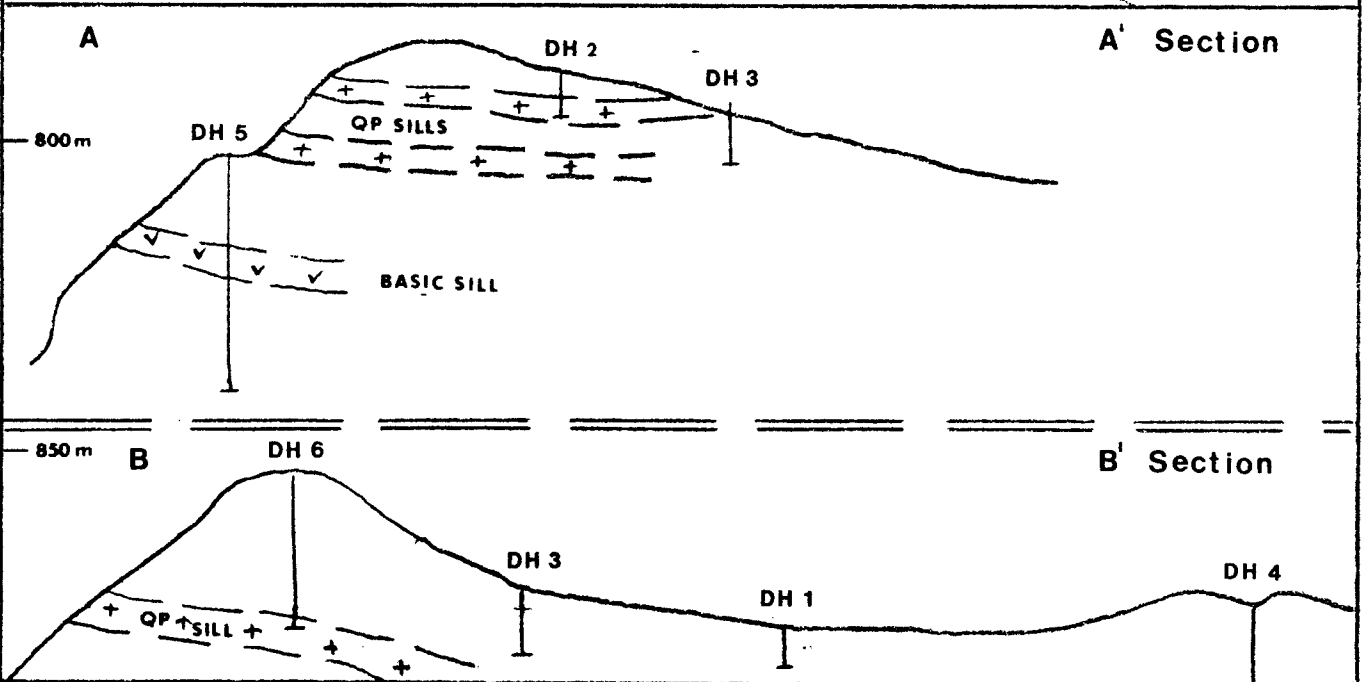
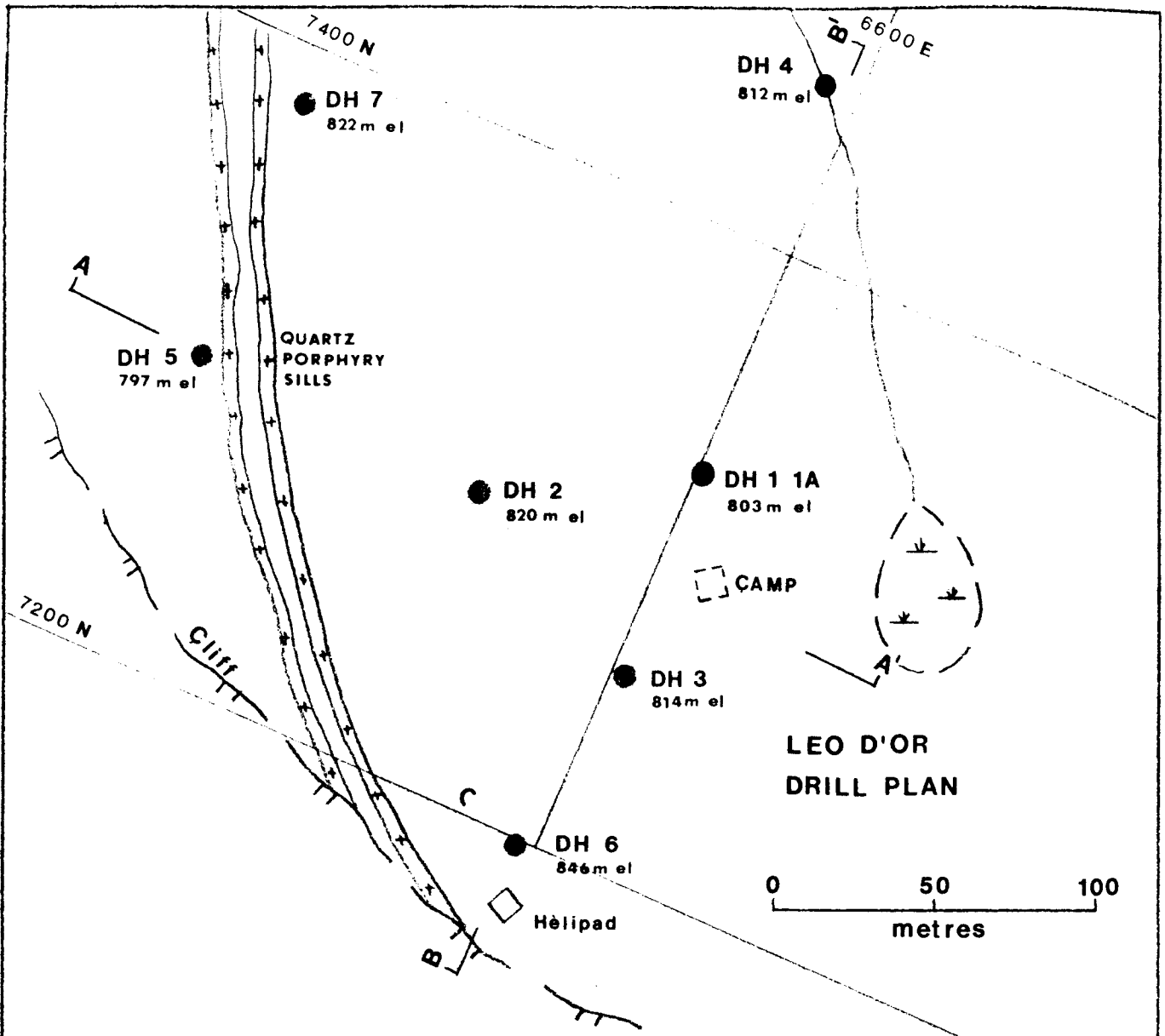
metres = 15 tonnes) could be extracted.

X-ray diffraction tests of samples collected from the Lower Pits area indicate  $\text{CaCO}_3$  contents of 99.5% (Broughton and Bruce, 1988) while physical analyses showed compressive strengths of more than 15,000 PSI.

### **1991 DRILLING RESULTS**

A reconnaissance, short hole drilling program was undertaken in August of 1991 to provide a preliminary assessment of the potential marble resource of "Onyx Hill" in the southeastern part of the Leo D'Or mineral claim. Core was recovered from six vertical holes within a 250 x 150 metre area and over a vertical range of 100 metres (Figure 4).

Medium-grained, faintly banded, light to medium grey marble was the dominant rock type encountered during the drilling program. This unit has gradational contacts with a creamy white to buff, medium-grained variety which commonly contains scattered 0.5 - 1 cm calcite crystals. Drill hole lengths of the two principal varieties of marble range from 1 to 10 metres which should be very close to true thicknesses considering the generally flat lying nature of the sequence. Hole 4 intersected a unique coarse grained, light grey marble consisting of 1 - 2 cm calcite crystals. A short section at the beginning of this hole contained the only epidote-garnet



**FIGURE 4**

skarn seen on the property by the writer. This suggests very few impurities in the original limestone.

The marble sequence is cut by a number of quartz porphyry and basic sills. Drilling provided some information on the location and nature of these (see sections-Figure 4), some of which are at least 10 metres thick.

The frequency of fracturing and jointing seen in drill cores appears to be within acceptable limits for the extraction of blocks. Two chemical analyses of selected core samples of marble indicated few impurities and  $\text{CaCO}_3$  contents of 99.14 and 99.51% (Appendix II).

#### **CONCLUSIONS AND RECOMMENDATIONS**

Two areas comprising 10 hectares or less than 5% of the Leo D'Or claim area have been investigated in any detail. These include the "Lower Pits" area which was subjected to detailed geological mapping in 1988 and "Onyx Hill" where six short vertical diamond drill holes were completed in 1991.

The density of fracturing, jointing and karst development in marble in the two areas examined would allow for the extraction of 15 tonne blocks. Chemical testing of marbles from both areas of the property indicates few impurities and  $\text{CaCO}_3$  contents exceeding 99%. Physical tests conducted on samples from the Lower Pits area yielded results

exceeding ASTM minimum standards.

Geological mapping should be undertaken over the entire claim area with particular emphasis on colours, textures and frequency of fractures, joints and karst development within the marble units. Quartz porphyry and basic sills and dykes should be accurately located as should the main granite contact in the eastern claim area.

Detailed geological mapping is recommended for two areas of the property including a 500 x 500 metre area on "Onyx Hill" and a smaller area adjacent to that mapped in 1988. Detailed magnetometer surveys within these two areas may assist in defining the position of some of the intrusive sills.

Large core (NQ-size) diamond drilling is recommended to further evaluate continuity of marble varieties in the two areas and to provide samples for chemical and physical testing.

**COST STATEMENT**

Diamond Drilling - (Hydracore Drills Ltd.) - 210 metres @ \$101.83/metre	\$21,385.98
Surveying - McElhanney Engineering Services Ltd.	\$9,922.39
Personnel:	
Clayton Horsberg - Aug.4-19,1991	\$2,003.62
Bernard Benoit - Aug.4-19,1991	\$2,003.62
N.C. Carter - Aug.13-16,1991	<u>\$1,605.00</u>
	\$5,612.24
Camp Costs - August 4 - 20	\$1,540.53
Helicopter Access - (Canadian Helicopters Ltd.) - 25.8 hours @ \$635/hour	\$16,362.95
Accomodation, meals (Port McNeill - August 1-20)	\$3,532.24
Miscellaneous Travel Costs	\$2,904.47
Report Preparation	
N.C. Carter	\$1,070.00
Duplicating	\$5.07
Report binders	<u>\$4.68</u>
	\$1,079.75
 Total	 \$62,340.55



**REFERENCES**

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- Madari, M.S. (1986): Geological Report on Leo D'Or Property, Nanaimo Mining Division, Vancouver Island, British Columbia, -private report for Westcoast Marble Ltd.
- Muller, J.E., Northcote, K.E. and Carlisle, D. (1974): Geology and Mineral Deposits of Alert-Cape Scott Map-Area, Vancouver Island, British Columbia, Geological Survey of Canada Paper 74-8

**AUTHOR'S QUALIFICATIONS**

I, NICHOLAS C. CARTER, do hereby certify that:

1. I am a Consulting Geologist resident at 1410 Wende Road, Victoria, British Columbia.
2. I am a graduate of the University of New Brunswick with B.Sc.(1960), Michigan Technological University with M.S.(1962) and the University of British Columbia with Ph.D.(1974).
3. I have been a registered Professional Engineer with the Association of Professional Engineers and Geoscientists of British Columbia since 1966.
4. I have practised my profession in eastern and western Canada and in parts of the United States for more than 25 years.
5. The foregoing report describes the results of a diamond drilling program carried out on the Leo D'Or mineral claim in August of 1991. I visited the property July 5 and 13, and August 8,13-16,1991 and personally logged core recovered from the various drill holes.

Dated at Victoria, British Columbia this 25th day of March,1991



N.C. Carter, Ph.D. P.Eng.

**APPENDIX I**

**Diamond Drill Hole Logs**

Drill Hole 1

0 - 9.4 metres - Overburden (hole lost)

Drill Hole 1A

0.- 9.1 metres - Overburden (hole lost)

Drill Hole 2

0 - 3 metres - Overburden

3 - 7.9 m - Fractured, creamy white to buff marble

7.9 - 9.4 m - Fractured, broken, pink quartz porphyry  
sill

End of Hole

Drill Hole 3

0 - 3 metres - Overburden

3 - 7.6 m - fractured, creamy white to buff marble;  
one fracture per 1 - 15 cm

7.6-16.8 m - alternating creamy white - buff and  
light grey marble; samples M, O from this  
section

End of Hole

Drill Hole 4

- 0 - 4 metres - coarse grained light grey marble consisting of 1 - 2 cm interlocking calcite crystals; 10-15 cm bands of epidote-garnet-K-feldspar skarn
- 4 - 4.3 m - Coarse grained creamy white marble
- 4.3 - 7.3 m - Coarse grained light grey marble
- 7.3 - 14.3 m - Alternating light grey to creamy white coarse grained marble
- 14.3 - 15.5 m - Light grey coarse grained marble
- 15.5 - 16.5 m - Alternating light grey to creamy white coarse grained marble
- 16.5 - 22.9 m - Alternating light grey to creamy white medium to coarse grained marble; minor skarn @ 22.9 m; few fractures
- 22.9 - 28.0 m - Light grey medium grained marble

End of Hole

Drill Hole 5

- 0 - 1.5 metres - Overburden
- 1.5 - 2.7 m - Light grey medium grained marble; massive; gradational lower contact
- 2.7 - 4.9 m - Creamy white medium to coarse grained marble; iron stained fractures, 1 per 0.3 m
- 4.9 - 5.5 m - Light grey medium grained marble
- 5.5 - 13.4 m - As previous, medium to coarse grained, massive
- 13.4 - 15.5 m - Light grey, medium grained, one fracture
- 15.5 - 16.5 m - Light grey to creamy white medium to coarse grained marble; faint banding @ 60° to core axis
- 16.5 - 22.9 m - Banded, dark grey marble sections with pyrite @ 20.4 m; some sections gradational to 0.3 m bands of creamy white material @ 22.6 m, then massive to end of section.
- 22.9 - 24.7 m - Creamy white, coarse grained marble,
- 24.7 - 33.2 m - Basalt sill or dyke, contact @ 70° to core axis; weakly magnetic
- 33.2 - 63.1 m - Creamy white medium to coarse grained marble; massive

End of Hole

Drill Hole 6

- 0 - 2.1 metres - Overburden
- 2.1 - 5.5 m - Buff to creamy white marble, medium-grained, some 1 cm calcite crystals
- 5.5 - 6.7 m - Light grey, medium grained marble; no fracturing to this point
- 6.7 - 9.8 m - As previous but with scattered 1 cm calcite crystals; 2 fractures 0.6 m apart
- 9.8 - 14.3 m - Light grey, medium grained marble; 2 fractures 1.8 m apart
- 14.3 -15.2 m - Light grey to creamy white marble with occasional 1 cm calcite crystals
- 15.2 -17.5 m - As previous
- 17.5 -21.3 m - Alternating uniform medium grained light grey to variety with 1 cm calcite crystals
- 21.3 -24.4 m - Light grey, medium grained, massive
- 24.4 -30.8 m - Buff to creamy white marble, medium grained with occasional 1 cm calcite crystals, some gradations to grey variety; one fracture @ 35°
- 30.8 -35.1 m - As previous; broken 31.7-33.2 m; grades to fine grained buff variety; iron staining on fractures
- 35.1 -39.5 m - Light grey, medium grained, massive
- 39.5 -41.1 m - Quartz Porphyry - aplite; sharp upper contact @ 45° to core axis

End of Hole

Drill Hole 7

- 0 - 0.9 metres - Overburden
- 0.9 - 4.3 m - Buff to creamy white medium to coarse grained marble
- 4.3 - 9.3 m - Quartz Porphyry sill - contacts @ 60°
- 9.3 - 11.3 m - Buff to creamy white marble - mg to cg
- 11.3 -15.2 m - As Previous
- 15.2 -15.4 m - Skarn - epidote, pink carbonate
- 15.4 -18.0 m - Light grey, medium gained marble
- 18.0 -20.4 m - Alternating creamy white, mg to cg to banded light grey marble
- 20.4 -36.6 m - Quartz Porphyry sill

End of Hole

**APPENDIX II**  
**Chemical Analyses**



# Chemex Labs Ltd.

Analytical Chemists \* Geochemists \* Registered Assayers  
212 Brooksbank Ave., North Vancouver  
British Columbia, Canada V7J 2C1  
PHONE: 604-984-0221

HARVARD CAPITAL CORP.

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Project :  
Comments:

## CERTIFICATE OF ANALYSIS

### A9119579

SAMPLE DESCRIPTION	PREP CODE		Al2O3 %	BaO %	CaO %	Fe2O3 %	K2O %	MgO %	MnO %	Na2O %	P2O5 %	SiO2 %	TiO2 %	LOI %	TOTAL %
SAMPLE M	208	294	0.21	< 0.01	54.72	0.21	< 0.01	0.38	< 0.01	0.08	0.07	0.50	0.01	42.94	99.14
SAMPLE O	208	294	< 0.01	< 0.01	55.60	0.09	< 0.01	0.33	< 0.01	0.09	0.03	< 0.01	< 0.01	43.31	99.51

CERTIFICATION:

*B. Coughlin*