Title:	Geological and Geophysical Report on the Whelakis Property
Claims:	Whelakis 1 420(4) (15 units) Whelakis 2 421(4) (12 units) Whelakis 3 422(4) (10 units) Lee 1 424(5) (10 units) Lee 2 425(5) (12 units) Lee 3 426(5) (15 units) Mine 1 613(12)(1 unit) Mine 2 614(12)(1 unit)
Mining Division:	Vancouver
NTS Location:	51°00' 127°13'
Owner:	Frank Beban Logging Ltd.
Consultant:	Nevin Sadlier-Brown Goodbrand Ltd.
Authors:	D.J. Brownlee, Geologist G.A. Shore, Geophysicist A.E. Nevin, P.Eng.
Dates Work Done:	March 18 - April 15, 1980
Submitted:	12 MAY 1980

SUMMARY

Nevin Sadlier-Brown Goodbrand Ltd. conducted a geological survey on the Whelakis property, Vancouver Mining District, on behalf of Frank Beban Logging Limited. This report is for submittal under Mineral Act Regulations to apply assessment work.

The Whelakis property consists of the Whelakis 1 to 3, Lee 1 to 3, and Mine 1 and 2 mineral claims. The property is located at Latitude 51^{o} 00' and Longitude 127^{o} 13'.

The property is situated in a northwest trending fault zone of the western margin of the Coast Plutonic Belt.

A 1:20 000 scale outcrop geology map of the property was compiled. This map indicated the property is underlain by a sequence of meta-volcanic and sedimentary rocks comprising a roof pendant in a grano-diorite stock.

A 1:500 scale outcrop geology map was compiled on the main showing. The main showing is comprised of slaty argillite, with small interbeds of altered tuff, bounded by greenstone to the south and metabasalt to the north. The slaty argillite is cut by quartz veins which have in-truded along the footwall of faults.

In conjunction with the geological survey, eight samples were taken and assayed for Au, Ag, Pb, As, Fe, and S.

VLF EM and total field magnetic surveys over the area of the main showings provide a series of linear responses which are related to geologic structure. Two of the anomalous responses have been investigated by trenching, revealing in one case a quartz vein and stockwork system, and in another 2 metre thick tuff bed, thus confirming the usefulness of the methods on this property. Numerous other geophysical anomalies have not yet been tested.

TABLE OF CONTENTS

TABLE OF CONTENTS (cont'd)

DRAWINGS

APPENDICES following page 12

1.0 INTRODUCTION

1.1 Terms of Reference

Nevin Sadlier-Brown Goodbrand Ltd. has been retained by Frank Beban Logging Ltd. as technical consultants on their Whelakis property. We conducted geological and geophysical surveys on the claims, during March, 1980. We have prepared this report for submission to the Ministry of Energy, Mines and Petroleum Resources as required under Mineral Act Regulations to apply assessment work.

1.2 Location and Access

The property is located at latitude 51° 00' and longitude 127° 13', at the junction of NTS Sheets 92M/3E and 92L/14E 1:50 000 topographic maps (Drawing 1). Access is by boat or float plane from any convenient point on the Coast or on Vancouver Island.

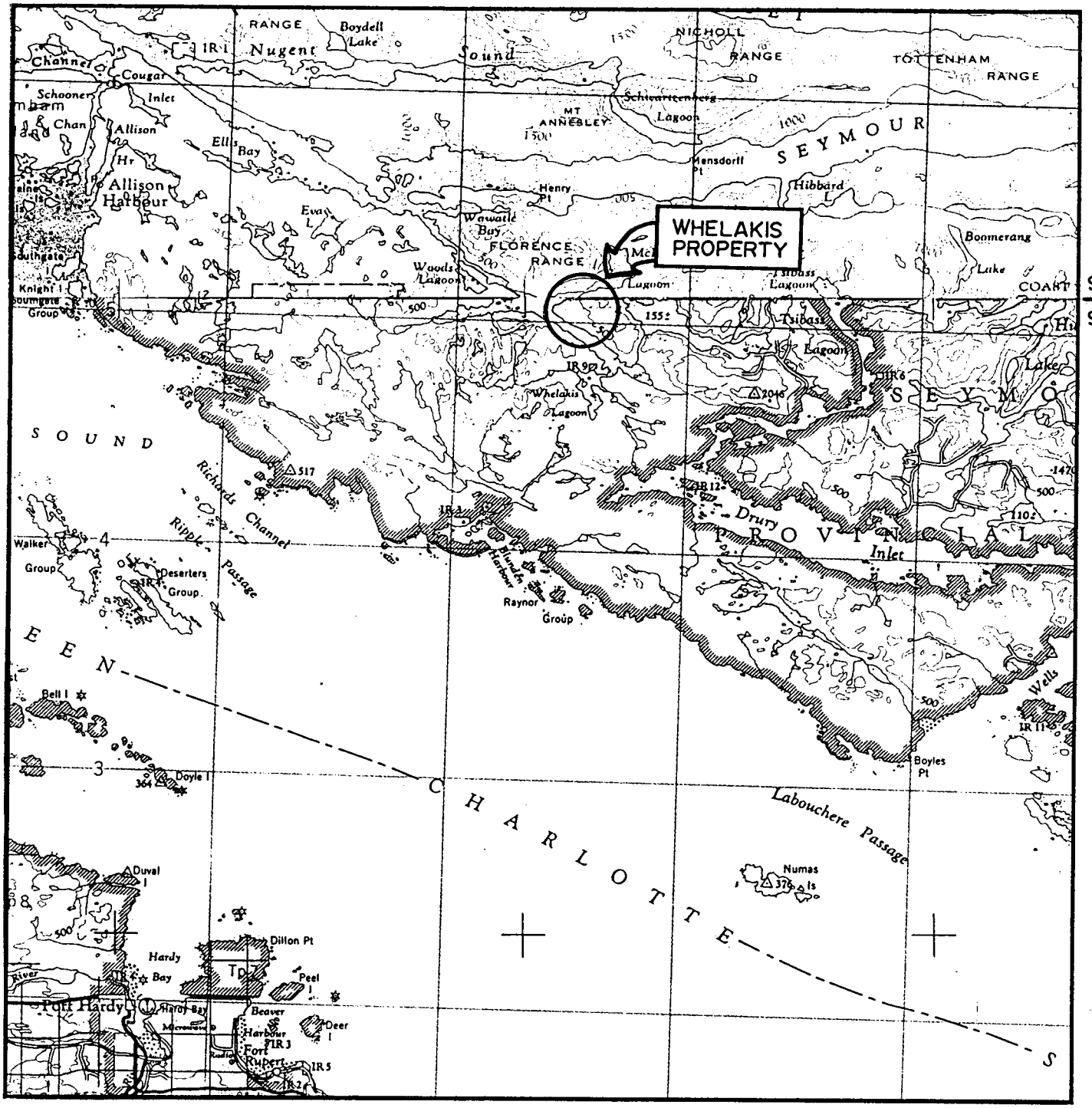
1.3 Terrain

The property lies on a roughly triangular-shaped peninsula in the Coast Mountains. The topography is semi-mountainous, with local relief of up to 350 metres. The drainage is rectangular in pattern, with major drainage east-west and seasonal in nature. The vegetation is mainly cedar with some douglas fir and balsam, and a lesser deciduous population.

1.4 Property

The entire Whelakis property consists of eight contiguous claims (Drawing 2):

Claim	Record No.	Units
Whelakis 1	420	15
Whelakis 2	421	12
Whelakis 3	422	10
Mine 1	613	1
Mine 2	614	1
Lee 1	424	10
Lee 2	425	12
Lee 3	426	15



FRANK BEBAN LOGGING LTD.

LOCATION MAP
WHELAKIS PROPERTY

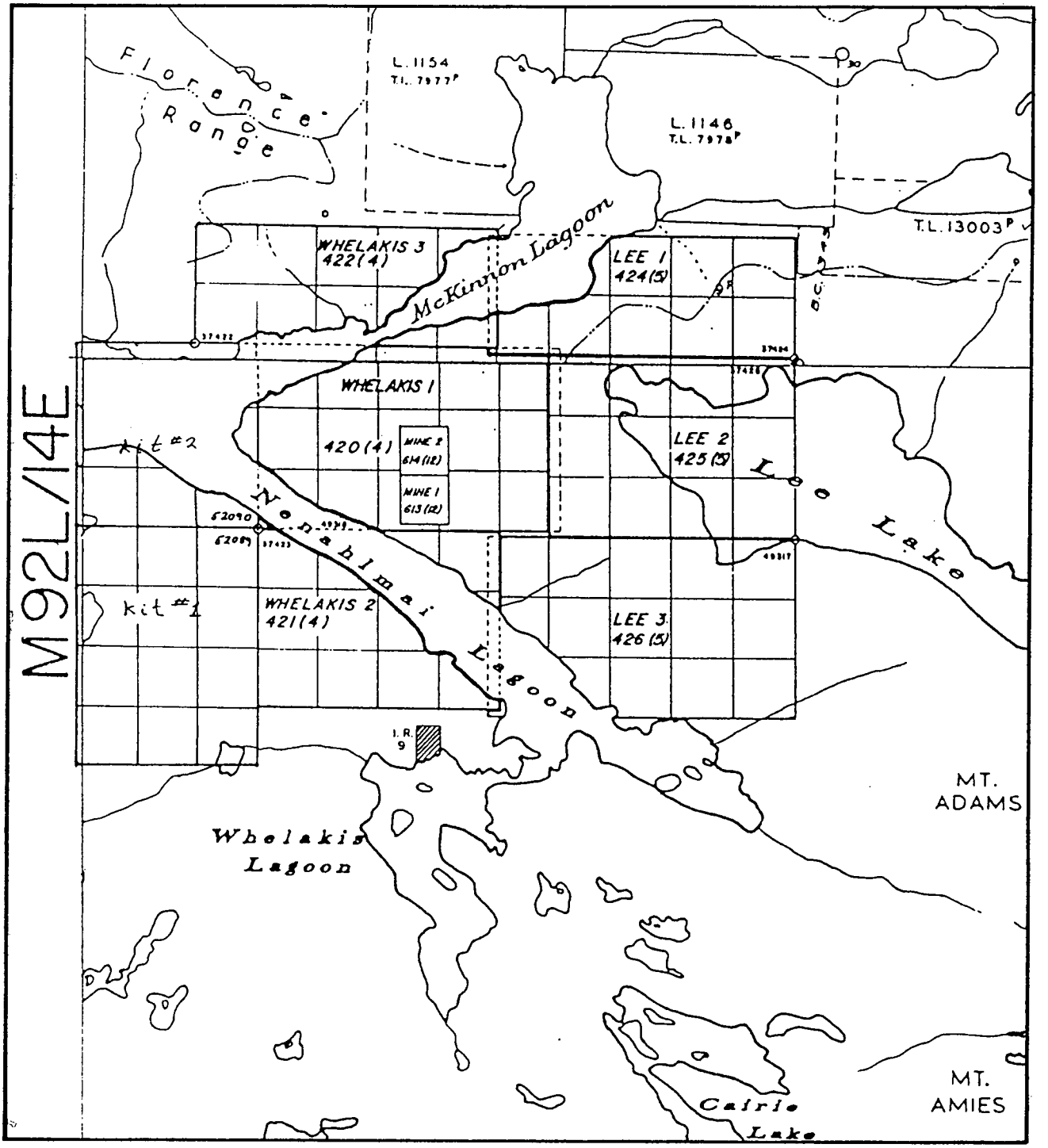
VANCOUVER M.D., B.C. NTS MAP 92M/3E 92L/14E

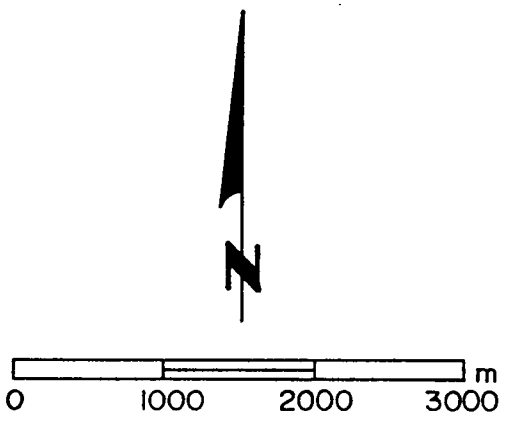
DRAWING BY D.J.B.	DRAWING N° 1

SCALE 1:250,000

NEVIN SADLIER-BROWN GOODBRAND LTD.

APRIL 1980





FRANK BEBAN LOGGING LTD.

CLAIM MAP
WHELAKIS PROPERTY

VANCOUVER M.D., B.C. NTS MAP 92M/ 3E 92L /14E

DRAWING BY D.J.B.	DRAWING N°2

SCALE 1:50,000

NEVIN SADLIER-BROWN GOODBRAND LTD.

APRIL 1980

1.5 Previous Work

The property was first explored and worked on during the 1940's. At that time a 1.5 kilometre corduroy road was built from Nenahlmai Lagoon to the showing. A 15-metre-long pit was excavated to a depth of 5 metres, and two small shipments of ore were allegedly made to a smelter. In the 1960's, some diamond drilling was carried out on the property utilizing a Winkie Diamond Drill. Mr. A. Allan, P.Eng. carried out a preliminary survey of the property for QC Exploration Ltd. during the period 1972-73.

1.6 Work Completed

In March, 1979, Mr. E. Buck was engaged by Frank Beban Logging Ltd. to stake the Whelakis claims, and subsequently the adjacent claims. During the period of March, 1979, to April, 1980, Mr. E. Buck conducted three staking and prospecting trips to the property and in April, 1979, and December, 1979, collected rock samples for assay (Drawing 5). In November, 1979, Dr. A.E. Nevin of Nevin Sadlier-Brown Goodbrand Ltd. conducted a preliminary reconnaissance of the property and collected several samples for assay (Drawing 5).

The subject of this report is a geologic map made in the period March 18 - April 15, 1980, and a geophysical survey done concurrently. The geophysical survey consisted of 1.2 line km of VLF EM survey and 2.2 line km of total field magnetic survey.

2.0 GEOLOGY

2.1 Regional Geology

The property is situated on the western margin of the Coast Crystalline Belt, a belt composed of stocks and batholiths mainly of granodiorite composition. These batholiths contain roof pendants of varying sized composed of metavolcanic and sedimentary rocks. The western margin of the belt is a zone cut by generally NNW trending transverse faults.

. . . 3

2.2 Property Geology

The Whelakis property is composed of metavolcanic and sedimentary sequence which forms a roof pendant in a granodiorite intrusive. Drawing 3 shows the outcrop geology of the property from which the general geology of the property was inferred (Drawing 4).

The intrusive underlying the property ranges in composition from a well foliated granodiorite along the shoreline to a fine-grained diorite in the centre of the intrusive. In parts of the intrusive, gabbroic diorite plugs cut the diorite and small pendants in the intrusive.

The metavolcanics range in composition from basalt to andesite, and on the northern edge of the intrusive form greenstones. Along Nenahlmai Lagoon, the metavolcanics consist of light greenish brown andesite with some remnant pillow structures. A siliceous tuff occurs along the contact with the metasediments. The greenstone contains veins of epidote 1-2 cm in width. The metasediments contain lenses of a porphyritic basalt which are most likely feeder dykes to the fine grained basalt found to the north of the metasediments. Along the shore of McKinnon Lagoon the metavolcanic is mainly a massive greenstone, which is locally well foliated.

The metasediments are comprised of dark grey slaty argillite, siliceous in some areas. North of the intrusive, the slaty argillite contains interbeds or altered tuff, which weather a light buff colour.

The whole property is cut by small widely scattered quartz veins. However, in the slaty argillite to the north of the intrusive, large continuous quartz veins up to 2 metres in width are found.

2.3 Main Showing

The main showing occurs in a slaty argillite, cut by large continuous quartz veins. The slaty argillite is bounded to the south by

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the massive greenstone and to the north by fine-grained grey basalt, containing 1-2 mm plagioclase phenocrysts.

The slaty argillite contains at least two interbeds of altered tuff, one at 1+50 W on the base line and the other at 15S Line 0+50W. These interbeds are siliceous approximately 2 metres thick, and weather a light buff colour.

At 2S Line 0+50W is a small 1 by 3 metre plug of diorite, it is dark greyish-green in colour with 3-4 mm plagioclase phenocrysts.

At the eastern end of the main showing, 0+00 on the baseline a 15 metre long pit has been excavated to a depth of 5 metres. (This is at the terminus of the corduroy road). The quartz vein continues east and west of the pit. The quartz vein east of the pit is 2 metres wide, with a 2 cm gouge seam on the hanging wall, and it disappears under overburden 3 metres from the pit. There is a 1 metre wide trench bearing east south east, from the southeast corner of the pit. This may have been a quartz vein, for along the projected path of the vein, 1 by 0.25 metre blocks of quartz have been found at the south end of line 0+50E.

The 1.5-metre-wide quartz vein at the east end of the pit has been traced to 15N on line 0+50W and is likely to connect with the quartz veins at the western edge of the main showing. There appear to be at least four main quartz veins at the western end of the showing, with a major intersection at 10N line 3+09W.

All quartz veins are fault bounded on the hanging wall, with a breccia on the footwall contact.

2.4 Structural Geology

The property lies on the eastern margin of the Malaspina Fault (Drawing 4) which runs through Nenahlmai Lagoon on a bearing of approximately 305^{o} true. This orientation is reflected in the general

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trend of the structural elements found on the property which is 313° 66N. Three sets of fractures were observed on the property; their altitudes are 233° 73W, 357° 65E, and 281° 53N.

A set of faults with an average orientation of 291° 74N, provided the access for quartz to intrude the slaty argillite.

2.5 Mineralization

Pyrite occurs throughout the metavolcanics and sediments disseminated and along the fracture surfaces. Pyrite was also noticed in the epidote veins in the greenstones.

The mineralization in the quartz veins consists of pyrite, galena, and minor chalcopyrite and sphalerite. There is no even distribution of mineralization through or along the veins. Generally the mineralization appears to occur in brecciated segments of the vein.

The mode of occurrence of gold and silver, which report in several assays, is not known at the present time.

2.6 Assays

Eight samples were collected for assay, 7 of these were collected on the main showing (Drawing 5) and one was collected near the Legal Corner Post for Whelakis 1. All samples were channel samples except for 89465A which was a grab sample. All samples were assayed for Au, Ag, Pb, As, Fe and S by Chemex Labs Limited of North Vancouver, B.C. (Appendix A).

2.7 Interim Conclusions

Work on the property is continuing, and it would be premature to further analyze existing data on geology and mineralization at this stage. Briefly, however, current interest and programs are aimed at developing exploration guides (eg. covariance among ore and trace metals) and pursuit of mineralized structures under overburden and down-dip.

. . . 6

3.0 GEOPHYSICS

3.1 Electromagnetic Survey Equipment and Method

A VLF electromagnetic (EM) survey method was chosen because the high operating frequencies (15-25 kHz) employed provide responses from very weak conductors as well as from the strongly conductive structures on which other EM systems are exclusively targeted. In the geological environment of the Whelakis property, no strong conductors were expected; indeed, the mineralogy of the quartz veins suggests that very weak conductors within the argillite may be of primary interest.

The instrument used in this survey was a Geonics EM-16 VLF EM receiver, tuned to the Hawaii transmitter, and operated on 5-metre station intervals on 200-metre long lines spaced 50 metres apart. A copy of the instrument specifications is attached in Appendix D.

The in-phase (primary) field measurements are plotted in profile form on Drawing 6, together with the signed numerical value of each reading.

3.2 Magnetic Survey Equipment and Method

Magnetic survey was specified as a typical tool for the location of quartz veins in a (moderately) magnetic host rock environment. In general, the lack of susceptible iron compounds in quartz veins provides a decrease in total intensity of the magnetic field within the vein itself, and provided that the vein structure is not too deeply buried beneath overburden, the magnetic low will be discernible at surface with a survey instrument. In general, the factors contributing to detectability at surface are:

a. width of non-susceptible quartz vein material,

b. nearness of the quartz vein to ground surface, and

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c. "smoothness" of the background magnetic response (over the host argillites in this case) within which the magnetic low caused by the quartz vein must be discernible.

The instrument used in this survey was a Geometrics G-806 proton precession magnetometer, providing total magnetic field intensity measurements to an accuracy of ± 1 gamma, in a local field averaging 56 000 gammas. The instrument was used in a simple base-looping mode for diurnal control, and with the short, quickly covered lines, adequate diurnal control was effected.

Because of the known narrow nature of the quartz vein targets, a measurement interval of 1 metre was employed, using 200 metre survey lines located 50 metres apart. The magnetic data are plotted on Drawing 6 in profile form, in this case omitting the customary recording of the numerical values of the readings for reasons of space (more typical surveys for large targets will have datum intervals of 10 to 15 metres). The numerical values are maintained on file at the offices of Nevin Sadlier-Brown Goodbrand Ltd. for subsequent review or use.

3.3 Geophysical Results

3.3.1 General Statement

The results of the magnetic and EM surveys provide a complex geophysical picture. Certain specific characteristics have been determined to be indicative of the target quartz vein structures, while many of the other trends and expressions observed can not be immediately tied to any geological features because of the lack of outcrop for correlation. The results presented in Drawing 6 are therefore a compilation of obvious trends, proposed probable trends, and a network of options to be tied together as physical examination of the ground (by trenching) provides the necessary correlation in terms of rock types and observed structural strike directions.

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3.3.2 Broad Geophysical Indicators

Survey coverage was laid out to provide detailed magnetics and EM over the 300-metre long area between the principal showings, and to provide magnetic survey coverage of the areas east of the main showing and west of the other showings around 309W.

Referring to Drawing 6, the following observations are made: Line to line correlation of magnetic profile signature indicates an undisturbed sequence of major linear features running roughly parallel to the baseline, except in the southwestern grid quadrant where a sequence of magnetic peaks on lines 200W, 250W, 309W and possibly 350W indicates the presence of beds of more magnetic rocks, probably greenstones, bucking the general trend with an orientation 20^{o} further north.

There is northerly displacement of the features on lines 250W, 309W and 350W, leading to the possiblity that the first peak of the three peak magnetic series seen on lines 250W and 350W is the same structure as that seen as a magnetic peak at the extreme south end of all lines from 200W through 100E. In that case the assemblage of rocks seen in the east half of the grid would be interpreted as lying parallel to the baseline from 100E to 200W, where it bends northerly some 20^{o}, with or without attendant fault displacement. (There is some weak evidence for fault displacement to the NE in the available data, in the area between lines 200W and 300W).

On the north side of the grid a magnetic high with characteristically notched south flank borders a broad magnetic low 20 to 25 metres wide, centred on 50 to 60 north on all lines. Near the centre of the grid, the south edge of this zone coincides with a strong EM conductor, which then appears to curve south by lines 200W and 250W. On some lines, the mag low seems to lie in a flat zone, swampy on one line, possibly morphologically significant because of its distinct appearance on the lines

. . . 9

near the centre of the grid. Outcrop in this area is limited so far to two observations, basalt on line 150W and argillite on line 200W. A reasonable interpretation would be a long and deeply (15 to 30 metres) buried structure of granodiorite or quartz or quartz stockwork, possibly associated with a fault, and exhibiting strongly coincident magnetic-electromagnetic anomaly correlation at its edges.

South of this structure lies a 40 to 60 metre wide sequence of basically high magnetic signatures cut by magnetic lows in a pattern that correlates reasonably line to line. Included in this section is the main showing, with magnetic and EM responses from the remaining vein material identified and reported in detail later. The trend of this zone is again parallel to the baseline, and it joins the two main showing areas with a consistently signed indication of continuous structures. The pattern correlation begins to deteriorate near the westerly showings; this and the geology in the existing trenching and outcrop in that area suggest that the westerly showing area is geologically more complex than that of the main showing area.

The magnetic signature on lines 0, 50E and 100E indicates an undisturbed extension to the east of the same assemblage of rocks that exist from the main showing near line 0 through to and beyond line 200W. This eastern area is thus identified as reasonable ground for inclusion in on-going mapping and investigations.

South of the central high-mag zone is an area 30 to 50 metres wide of generally low mag with some local highs, which may again indicate increased silicic content (proximity to the underlying granodiorite intrusion?) and within which certain EM conductors, associated with sharp magnetic inflections, may be important targets for investigation.

At the extreme south edge of lines 100E to 150W is recorded flank of a major magnetic high, probably the first appearance of the southern greenstone, as mentioned earlier. On all EM lines except line 200W

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the VLF in-phase goes off-scale to the south, indicating a conductor or a contact between resistive rocks (metavolcanics) to the south and conductive rocks (sediments) to the north, with alteration and/or faulting providing the conductivity. Negative off-scale EM readings at 40 to 60 north on lines 50W, 100W, 150W, 200W indicate a possible fault/fracture zone or alteration zone possibly associated with the south flank of the magnetic low. There is another major conductor 25 metres to the north, seen on lines 100W and 200W, hinted at on 250W and not tested on line 50W. This appears to be associated with the indicated highly magnetic unit at the extreme north ends of these lines, and may signal contact with the greenstones, with alteration and/or faulting providing the elevated conductivity. The notch in the south flank of this most northerly magnetic expression is matched by an indication of an EM conductor, and represents another possibly favourable situation to be tested by trenching. The mapped basalt in the area appears to have no significant or consistent geophysical signature.

3.3.3 Interpretation of Detailed Geophysical Signatures

Initial orientation work over the west end of the Main Showing, where the westerly vein extension is uncovered, resulted in a well-defined EM conductor located directly over the vein (see Drawing 6, line 25W, at baseline). When a similar magnitude conductor near a similar magnetic expression was identified on adjacent line 50W at 11 to 16 north, a test trench was immediately excavated, revealing a quartz vein and adjacent quartz stockwork structure, striking in the general direction of the exposed vein on line 25W at baseline.

A similar excavation test of a smaller EM inflection, with magnetic association, at 15S on line 50W revealed a bed of altered tuff within the argillite. This is a weak EM inflection, and demonstrates that the technique is responding to structures other than the target quartz veins.

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From these three test orientations it is concluded that most EM inflections should be investigated by trenching, or considered as untested possibilities as a mapping and trenching follow up plan is executed, in particular in the area fifty metres either side of the baseline, between the two principal mineralized showings. Any EM conductor with well-defined magnetic signature (either a low bounded by higher levels on both sides, or a single sharp drop in intensity in one direction) should receive priority investigation.

3.4 Conclusions and Recommendations, Geophysics

Both geophysical techniques have provided a high density of anomalies, many with favourable magnetic-EM correlation. The large scale picture is one of a sequence of rock units lying parallel to the baseline, within which are found many smaller scale responses possibly indicative of the target quartz vein structures. Having confirmed the relationship between some geophysical signatures and exposed quartz veins and tuff bedding on lines 25W and 50W, the recommended procedure for further confirming geophysically indicated structures would involve trenching and geological mapping.

The areas which should be considered for initial physical examination include:

1. All EM conductors and clear magnetic lows within 50 metres of baseline on lines 50W through 200W.
2. All Em conductors and magnetic lows on lines 250W and 309W from 50N to 100S.
3. The flanks and centre of the magnetic low north of baseline at 40-60N, probably trenching on lines 150W and 250W to start.

. . . 12

4. The two major conductive trends near the northerly magnetic low, particularly on line 150 at 40N and 62N, and line 50 at 45N.

Respectfully submitted

D.J. Brownlee, Geologist

G.A. Shore, Geophysicist

A.E. Nevin, P.Eng.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
ANDREW E. NEVIN

APPENDIX A

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: [redacted] 984-0221
AREA CODE: 604
TELEX: 043-52597

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ASSAY

CERTIFICATE NO. 67777

TO: Nevin Sadlier-Brown Goodbrand Ltd.,
401 - 134 Abbott St.,
Vancouver, B.C.
V6B 2K4

ATTN: Mr. D. J. Brownlee

INVOICE NO. 35467

RECEIVED April 2/80

ANALYSED April 21/80

SAMPLE NO. :	oz/ton Ag	oz/ton Au	% Pb	% As	% Fe	% S
89458A	0.10	0.078	0.16	0.006	3.03	0.24
89459	0.03	0.012	0.06	0.003	3.45	1.03
89460	0.02	0.005	< 0.01	0.003	1.55	0.12
89461	0.22	0.152	0.11	0.004	3.09	0.04
89462	0.94	0.138	0.30	0.003	2.31	0.08
89463	0.27	0.310	0.02	0.002	2.39	0.29
89464	0.01	< 0.003	< 0.01	< 0.001	8.56	0.07
89465A	0.52	0.102	< 0.01	< 0.001	9.38	8.76

NOTE: As Done by Neutron Activation

APPENDIX B-1

Itemized Cost Statement for Geologic Mapping

I Fees for Personnel

Name	Position	Days	Duration	Rate	Total
A.E. Nevin	P. Eng.	2	March 18, 19	$480/day	$ 960
D.J. Brownlee	Geologist	16	March 18, 19 25-31 April 2-3,8-10, 14, 15	225/day	3600
E. Buck	Geol. Asst.	6	March 23,27-31	125/day	750
M. Gabriele	Geol. Asst.	6	March 23,27-31	125/day	750
R. Brooks	Geol. Asst.	9	March 18 - 31	125/day	1125
				Total	$7185

II Disbursements

Beaver, 10 hrs $170/hr, March 18-19, April 1	1700
8 rock samples - assayed for Au, Ag, Pb, S, Fe, As, $44.50/sample	356
Float House, $500/month, March 15 - April 15, 1980	500
Food and Supplies	600
Boats and motors, $100/day, 2 days March 28-29	200
Total	$3356

GRAND TOTAL $10,541

APPENDIX B-2

Itemized Cost Statement: Geophysical Surveys

I Fees for Personnel

Name	Position	Days	Duration	Rate	Total
G. Shore	Geophysicist	10	March 19 - 24, April 2,3,8-16	$200/day	$ 2200
D.J. Brownlee	Geologist	6	March 19 - 24	$200/day	1200
E. Buck	Linecutter & Mag. Operator	5	March 20 - 22, 25 - 26	$125/day	625
M. Gabriele	Linecutter & Mag. Operator	5	March 20 - 22, 25 - 26	$125/day	625
					$4,650

II Disbursements

Beaver 6 hrs $170/hr, March 19 - 24	1,020
VLF EM rental, 4 weeks minimum @ $117/wk, March 15-April 15, 1980	468
Proton Magnetometer, 2 weeks @ $100/wk, March 19 - April 1	200
TOTAL	$ 6,338

APPENDIX C-1

QUALIFICATION OF THE AUTHOR

I, Douglas J. Brownlee, hereby certify that:

1. My residence address is 206 - 1330 Bute Street, Vancouver, B.C., my office address is 4th Floor - 134 Abbott Street, Vancouver, B.C., V6B 2K4; and that I am a Geologist by occupation.
2. I have completed all requirements for a B.Sc. (specialization) in Geology, and expect to receive my degree from the University of Alberta in June, 1980. I have been practicing my profession since January, 1980.
3. I conducted the geological work described in this report.

Douglas J. Brownlee

Douglas J. Brownlee, Geologist

APPENDIX C-2

Certificate of Qualification

I, Greg A. Shore, of 1184 Forge Walk, Vancouver, B.C., hereby certify that:

1. I am a graduate at technologist level of the Radio College of Canada, Toronto; RCA Institute in Montreal; the Provincial Institute of Automotive and Allied Trades, Toronto.

2. I have been employed continuously since 1966 in geophysical exploration in North America, Europe and Africa, and since 1972 I have been a principal in a geophysical consulting company presently known as Premier Geophysics Inc., with responsibility for the design, operation and interpretation of geophysical survey programs.

3. I conducted the geophysical work described in this report.

G. A. Shore per

Greg A. Shore, Geophysicist

APPENDIX C (cont'd)

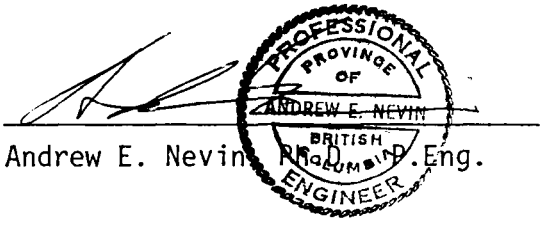
STATEMENT OF AUTHOR'S QUALIFICATIONS

I, Andrew E. Nevin, hereby certify that:

1. My residence address is 1201 - 1875 Robson Street, Vancouver, B.C., my office address is 4th floor - 134 Abbott Street, Vancouver, B.C. V6B 2K4; and that I am a Geologist by occupation.

2. I hold a B.Sc. in Geophysics from St. Lawrence University, an M.A. in Geology from University of California, Berkeley, and a Ph.D. in Geology from University of Idaho. I have been practicing my profession since 1961, and I am a member of the Association of Professional Engineers (Geological) of the Province of British Columbia, and a Registered Professional Geologist in the State of Idaho.

3. The work described in this report was conducted under my direct supervision.



Andrew E. Nevin, Ph.D., P.Eng.

APPENDIX D

VLF EM

EM16

One of the most popular and widely used electromagnetic instruments, the EM16 VLF receiver makes the ideal reconnaissance EM. This can be attributed to its field reliability, operational simplicity, compactness and mutual compatibility with other reconnaissance instruments such as portable magnetometers and radiometric detectors.

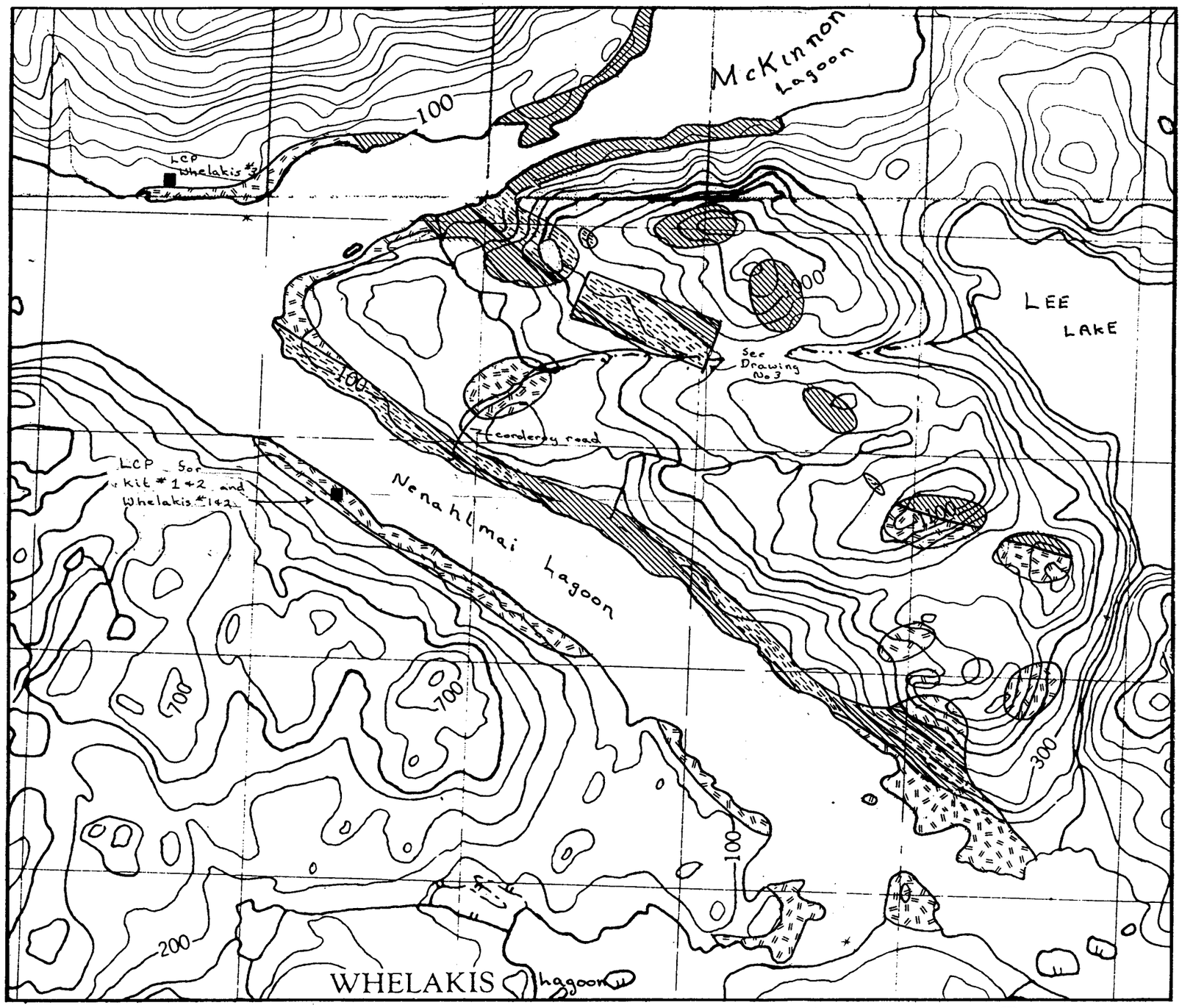
The VLF method of EM surveying, pioneered by Geonics, has proven to be a simple economical means of mapping geological structure and fault tracing. The applications are many and varied, ranging from direct detection of massive sulphide conductors to the indirect detection of precious metals and radioactive deposits.

FEATURES

- The EM16 is the only VLF instrument that measures the quad-phase as well as the in-phase secondary field. This has the advantage of providing an additional piece of data for a more comprehensive interpretation and also allows a more accurate determination of the tilt angle.
- The secondary fields are measured as a ratio to the primary field making the measurement independent of absolute field strength.
- The EM16 is the only VLF receiver that can be adapted to measure VLF resistivity.

Specifications

MEASURED QUANTITY	In-phase and quad-phase components of vertical magnetic field as a percentage of horizontal primary field. (i.e. tangent of the tilt angle and ellipticity)
SENSITIVITY	In-phase : ±150% Quad-phase : ± 40%
RESOLUTION	±1%
OUTPUT	Nulling by audio tone. In-phase indication from mechanical inclinometer and quad-phase from a graduated dial.
OPERATING FREQUENCY	15-25 kHz VLF Radio Band. Station selection done by means of plug-in units.
OPERATOR CONTROLS	On/Off switch, battery test push button, station selector switch, audio volume control, quadrature dial, inclinometer.
POWER SUPPLY	6 disposable 'AA' cells
DIMENSIONS	42 x 14 x 9 cm
WEIGHT	Instrument: 1.6 kg Shipping : 5.5 kg



92M/3E
92L/14E

N

GRANODIORITE, QUARTZ DIORITE, DIORITE

ANDESITE, BASALT, GREENSTONE

SLATY ARGILLITE

GEOLOGICAL BOUNDARY, ASSUMED

0 400 800 m

FRANK BEBAN LOGGING LTD.

GENERAL OUTCROP MAP
WHELAKIS PROPERTY

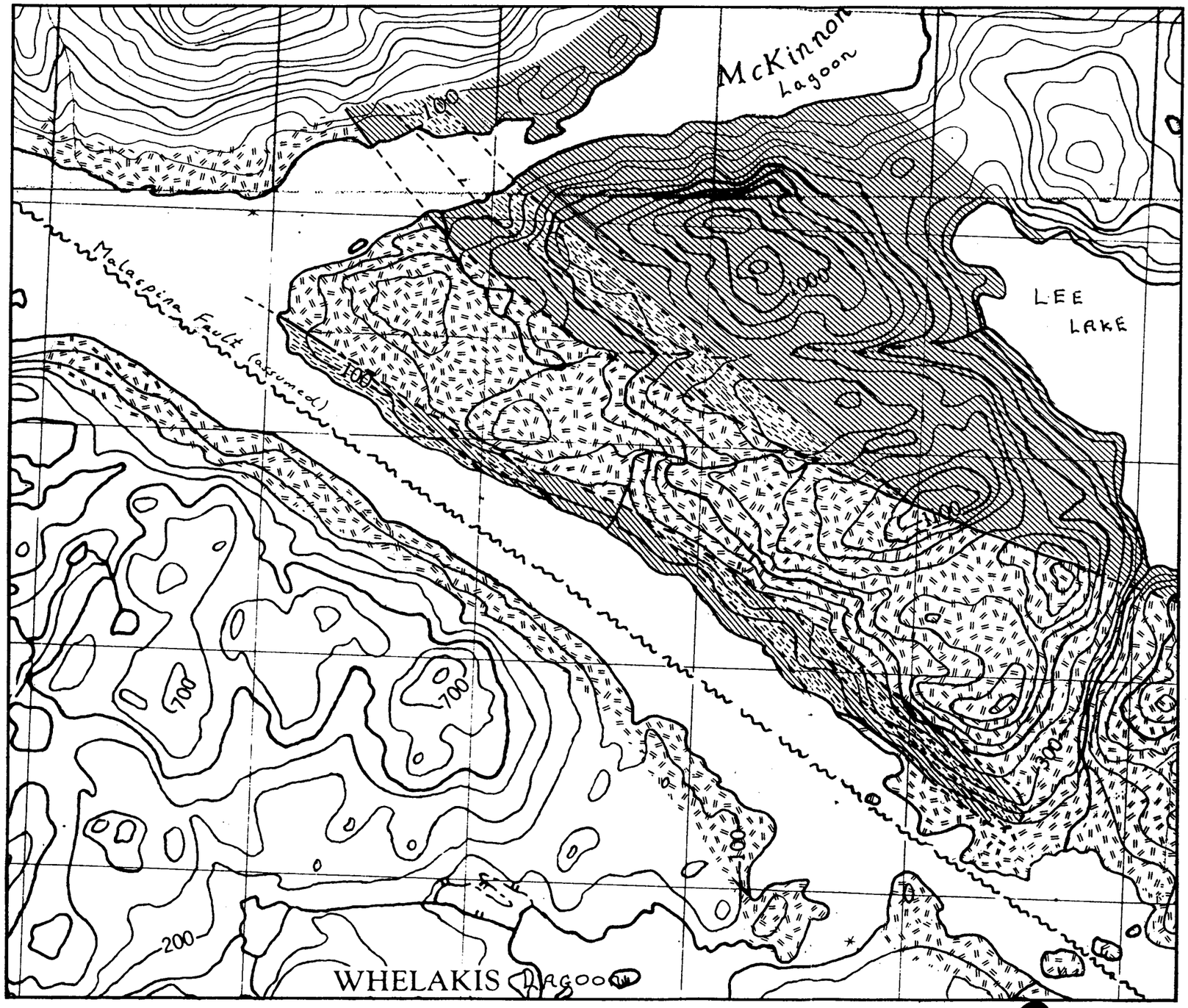
VANCOUVER M.D., B.C. NTS MAP 92M/ 3E 92L /14E

DRAWING BY D.J.B.	DRAWING N° 3

SCALE 1:20,000

NEVIN SADLIER-BROWN GOODBRAND LTD.
APRIL 1980

~~7489~~ 7991



92M/3E
92L/14E

N

GRANODIORITE, QUARTZ DIORITE, DIORITE

ANDESITE, BASALT, GREENSTONE

SLATY ARGILLITE

GEOLOGICAL BOUNDARY, ASSUMED

FAULT, ASSUMED

m
0 400 800

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GENERAL GEOLOGY
WHELAKIS PROPERTY

VANCOUVER M.D., B.C. NTS MAP 92M/ 3E 92L /14E

DRAWING BY D.J.B.	DRAWING N° 4

SCALE 1:20,000

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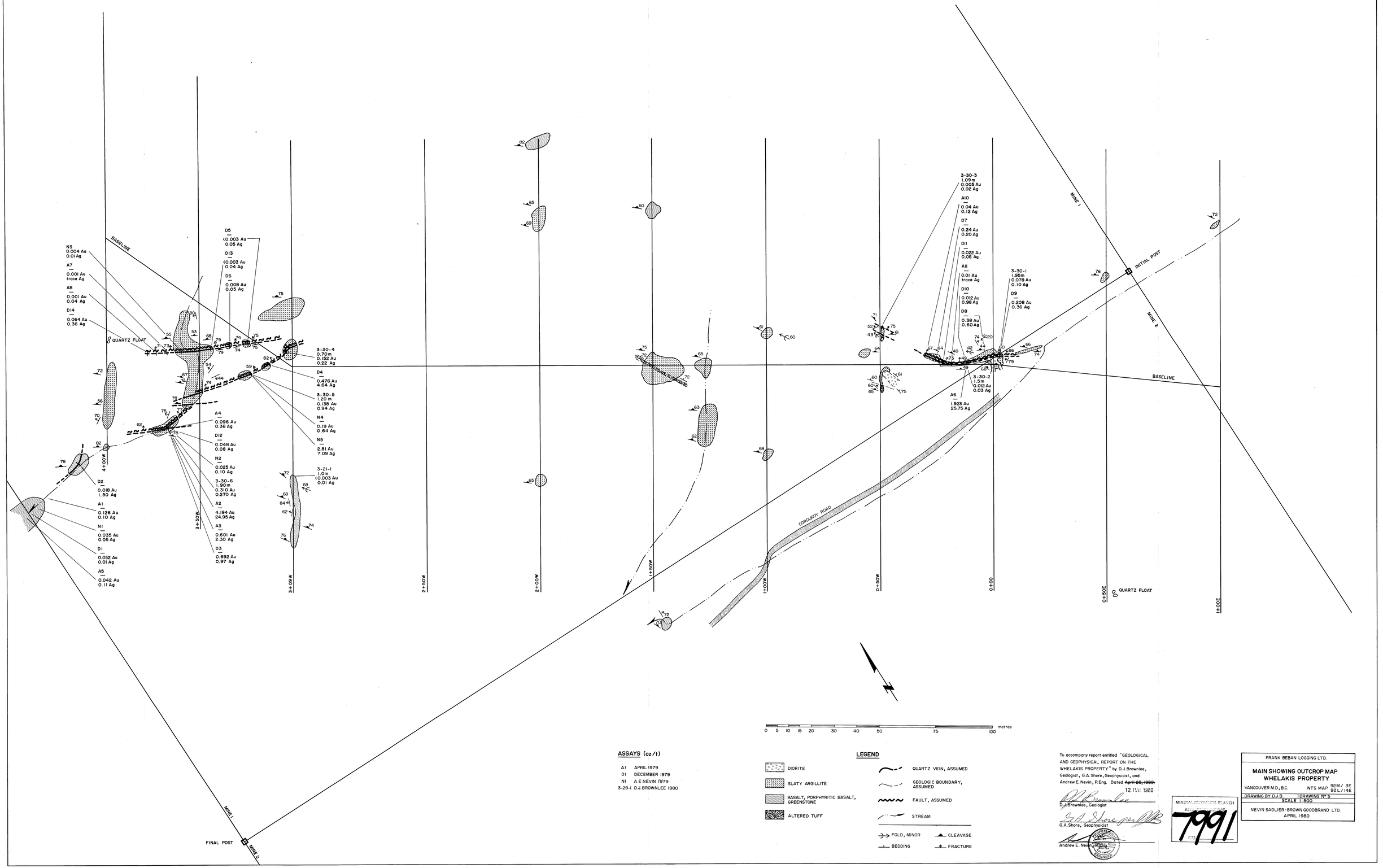

ASSAYS (oz/t)

A1 APRIL 1979
D1 DECEMBER 1979
N1 A.E.NEVIN 1979
3-29-1 D.J.BROWNLEE 1980

LEGEND

- DIORITE
- SLATY ARGILLITE
- BASALT, PORPHYRITIC BASALT, GREENSTONE
- ALTERED TUFF
- QUARTZ VEIN, ASSUMED
- GEOLOGIC BOUNDARY, ASSUMED
- FAULT, ASSUMED
- STREAM
- FOLD, MINOR
- CLEAVAGE
- BEDDING
- FRACTURE

To accompany report entitled "GEOLOGICAL AND GEOPHYSICAL REPORT ON THE WHELAKIS PROPERTY" by D.J.Brownlee, Geologist, G.A.Shore, Geophysicist, and Andrew E.Nevin, P.Eng. Dated ~~April 28, 1980~~ 12 MAY 1980

D.J.Brownlee, Geologist

G.A.Shore, Geophysicist

Andrew E.Nevin, P.Eng.

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MAIN SHOWING OUTCROP MAP
WHELAKIS PROPERTY

VANCOUVER M.D., B.C. NTS MAP 92M/ 3E 92L/14E

DRAWING BY D.J.B. | DRAWING N° 5

SCALE 1:500

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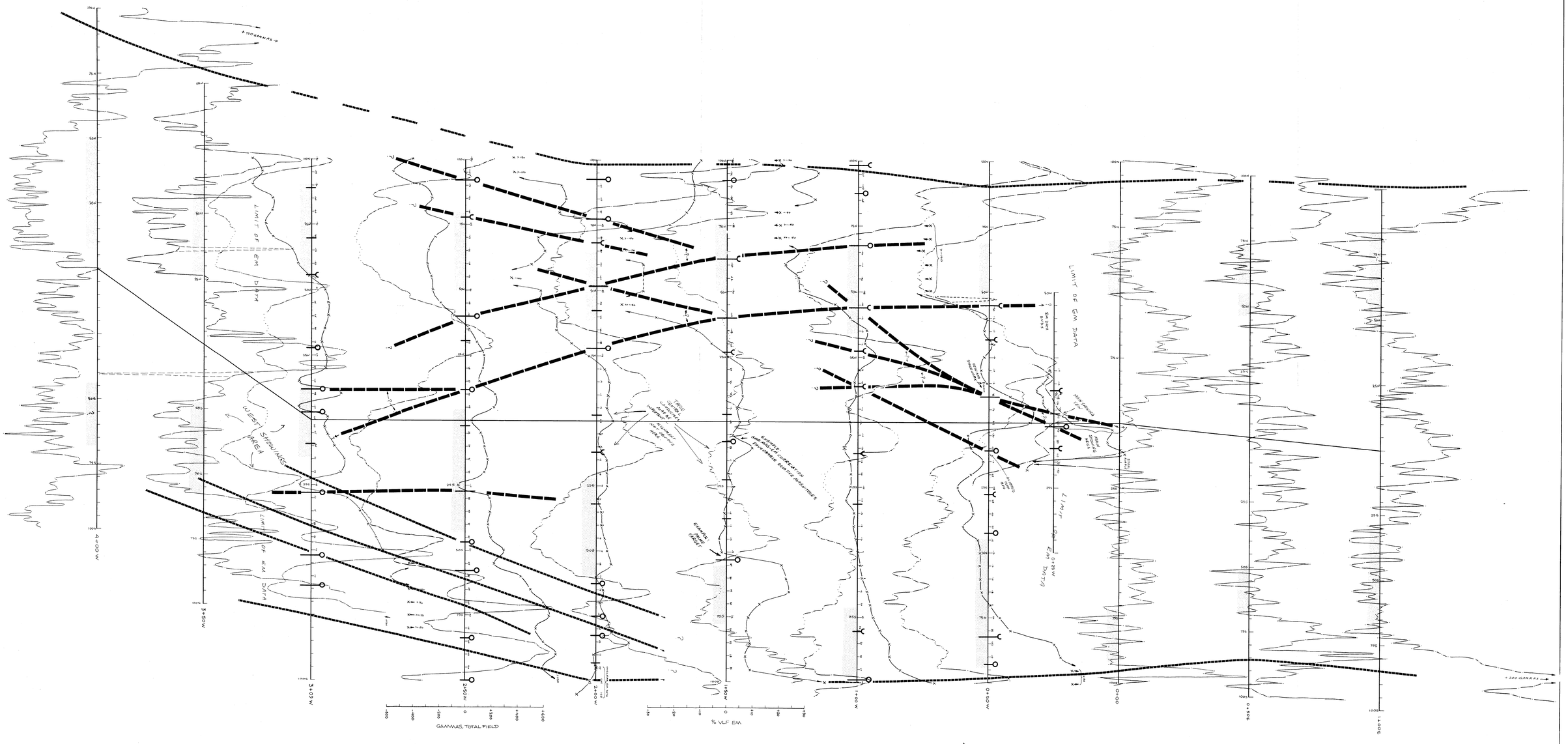

0 5 10 15 20 30 40 50 75 100 metres

LEGEND

DATA PLOTTING

- TOTAL FIELD MAGNETICS VERTICAL SCALE: 100 GAMMAS/CM ZERO DATUM: 56 400 GAMMAS
- VLF EM (NAA#21) IN-PHASE (OPERATOR FACING NORTH) ON-LINE.
- "CROSSOVER" IN THIS SENSE
- IN-PHASE READING

INTERPRETATION

MAGNETIC ASSOCIATION: NOTE, POSSIBLE, DOUBTFUL

- STRONG EM CONDUCTOR
- MODERATE OR WEAK EM CONDUCTOR
- MAJOR MAGNETIC LOW
- HIGH MAGNETICS LINEAMENT
- EM CONDUCTOR AXIS

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D.J. Brownlee, Geologist

G.A. Shore, Geophysicist

Andrew E. Nevin, P.Eng

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MAP

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MAGNETIC AND VLF EM SURVEYS
WHELAKIS PROPERTY

VANCOUVER M.D., B.C. NTS MAP 92M / 3E 92L / 14E

DRAWING BY B.E.M. | DRAWING N° 6

SCALE 1:500

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APRIL 1980