

92G/11W
GEOPHYSICAL REPORT

on the

AIRBORNE MAGNETOMETER

AIRBORNE ELECTROMAGNETIC

AIRBORNE RADIOACTIVITY

SURVEYS

of the

KAREN 1-16 MINERAL CLAIMS

MOUNT DONALDSON AREA

Vancouver Mining Division

British Columbia

Latitude $49^{\circ}43'$ North; Longitude $123^{\circ}27'$ West

ATHENA MINES LTD. (NPL)

Airborne Surveys by: Waterton Airex Ltd.

Interpretation by: Weymark Engineering Ltd.

7 August 1972

WEYMARK ENGINEERING LTD.
CONSULTING ENGINEERS
WEST VANCOUVER, B.C.

4003

41003

GEOPHYSICAL REPORT
on the
Airborne Magnetometer
Airborne Electromagnetic
Radioactivity
of the
KAREN 1-16 MINERAL CLAIMS
MOUNT DONALDSON AREA
VANCOUVER MINING DIVISION

Athena Mines Ltd, (NPL)

Airborne Surveys by: Waterton Airex Ltd.

Interpretation by: Weymark Engineering Ltd.

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|--|
| Department of Mines and Geotechnical Resources AERIAL GEOPHYSICAL REPORT NO. 4003 |
|--|

7 August 1972

DOMINION OF CANADA:
PROVINCE OF BRITISH COLUMBIA:
To Wit:

In the Matter of A Geophysical Survey on behalf of Athena Mines Ltd (NPL)

I, William James Weymark P. Eng., President of Weymark Engineering Ltd. of 3310 Westmount Road, West Vancouver, British Columbia

of

in the Province of British Columbia, do solemnly declare that an aeromagnetic, electromagnetic and radioactivity survey has been conducted on the Karen 1-16 Mineral Claims, Mount Donaldson area, Sechelt, Vancouver Mining Division, British Columbia July - August 1972 with Report issued 7 August 1972.

The following expenses were incurred

- 1. Waterton Airex Ltd. - Flying, positioning and reading airborne magnetometer, electromagnetic and radioactivity tests on aforesaid claims:

Approx 45 miles @ \$7.00 per mile ... \$300.00

- 2. Paid to Weymark Engineering Ltd to cover geophysists supervision, calculating plotting and fairdrawing data and preparation of final reports

Approx 45 miles @\$11.00 per mile 500.00

Total \$800.00

Navigational aids were furnished by Athena Mines Ltd. and Weymark Engineering Ltd. to assist flight navigation.

And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Declared before me at the CITY of VANCOUVER, in the Province of British Columbia, this 11th day of August, A.D.

Signature of William J. Weymark, President of Weymark Engineering Ltd.

A Commissioner for taking Affidavits for British Columbia or A Notary Public in and for the Province of British Columbia.

DAVID L. YOUNG, BARRISTER & SOLICITOR, 924 WEST KING EDWARD, VANCOUVER 9, B. C.

Department of Mines and Petroleum Resources ASSESSMENT REPORT No. 4003 MAP

ATHENA MINES LTD. (N.P.L.)

KAREN MINERAL CLAIMS
VANCOUVER MINING DIVISION
BRITISH COLUMBIA

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Department of
 Mines and Petroleum Resources
 ASSESSMENT REPORT
 NO. **4003** M.P. #1

LOCATION

ATIBIA MINES LTD (NPL)

KARX 1-16 MINERAL CLAIMS

VANCOUVER MINING DIVISION

BRITISH COLUMBIA

WEYMARK ENGINEERING LTD.

Consulting Engineers

3310 WESTMOUNT ROAD
WEST VANCOUVER, B.C.
CANADA

TELEPHONE
922-1538

7 August 1972

ATHENA MINES LTD. (N.P.L.)
Suite 315 - 543 Granville Street,
VANCOUVER 1, British Columbia.

Gentlemen:

Re: Mount Donaldson "Karen" Claims
Vancouver Mining Division
British Columbia

I am pleased to submit for your information, this Report of the Results of the Aerial Geophysical Surveys completed on the 5th July 1972 by Waterton Airex Ltd., Sidney British Columbia and the interpretation by William Chang M. Sc. Geophysics, McGill University and W. J. Weymark P. Eng. of the recorded field readings over the Karen 1-16 Mineral Claims, Mount Donaldson Area, Vancouver Mining Division, British Columbia.

Background technical references relating to the Karen Mineral Claims are given in British Columbia, Minister of Mines Reports dating from 1876 and most recently in 1965 and 1967 when they were known as the Zel Claims and under option by Bralorne Pioneer Mines Ltd., (1965) and Grasset Mines Limited (1967), and Summary Report on The Karen Group, Vancouver Mining Division, May 4th, 1972 by A. Allan, P. Eng. These Geophysical Surveys were conducted in accordance with the recommended programme of field investigations given in that report.

1.0 Property: The area covered by the aerial geophysical surveys involved the Karen 1-16 Mineral Claims. Designation details are given in the following table.

| <u>Claim Name</u> | <u>Staking Date</u> | <u>Record Number</u> | <u>Record Date</u> |
|-------------------|---------------------|----------------------|--------------------|
| Karen 1-16 | 30 March 1972 | 19499-514 | 7 April 1972 |

The claims were located by Walter Uyeyama of 312-9288 Cameron Street, Burnaby, British Columbia and all interests were conveyed to Athena Mines Ltd. (NPL) by Bill of Sale No. 3643 with date of record 9 May 1972. The claims are in good standing until 7 April 1972.

No survey has been made of the claim lines, posts or tags, so compliance with the Regulations of the Mineral Act of the Province of British Columbia cannot be verified at this time. There are no structures or buildings on the property. Workings consist of an adit, trenches, pits and related exploration facilities.

2.0 Location:

The Karen 1-16 Mineral Claims are located in the Vancouver Mining Division, The New Westminster Land District, The Sechelt Provincial Forest, The Coast Mountain Range and encloses Mount Donaldson. The geographic reference is 123°27' West and 49°43' North approximately. The holdings are about 35 air-miles Northwesterly from Vancouver and may be reached by helicopter or by boat up Salmon Inlet and thence overland via logging and old haul trails. Elevations on the claims area range from 4300 to over 5500 feet above sea level. Reference is to Figures 1, 2, and 3.

3.0 Geology:

The presented interpretation of the geological formations of the area are given on Map 42-1963, Squamish, British Columbia with compilation by H.H. Bostock, 1963 and cartography by the Geological Survey of Canada 1963, see Figure 4.

The area is within the Coast Range Complex and the country rock in the vicinity of Mount Donaldson is quartz-biotite granite. This rock is medium grained with mafics being biotite-hornblende. Within the quartz-biotite granite plutons, there are pendants and/or inliers of muscovite dominant granites. It would appear that these masses are from the same parent magma albeit a later stage. It is within the muscovite granitic phase that all of the potentially economic mineralization has been located to date. A study of the core from the drill holes of 1967 confirms a correlation between the muscovite containing granites and copper-gold-silver and molybdenum. Some pyrite is found in the biotite rich containing granites.

4.0 Mineral Zones: The mineral zones worked upon to date occur to the North-West of Smithe Lake and about the eastern areas of Slippery Lake. Several workings have been excavated, including a 90-ft adit and surface trenches. Mineralization occurs as bornite, chalcopyrite, malachite-azurite, and unidentified minerals containing gold, silver and molybdenum.

Chalcopyrite is disseminated in lenses within the quartz muscovite masses, especially in those sections that show sericitization. As an aid to the localization of these zones, it was considered that an aerial geophysical survey would provide a ready medium.

5.0 Geophysical Surveys:

In accordance with the programme of investigations recommended in the May 4th, 1972 Report by A. Allan P. Eng., and as a preliminary phase of the geophysical survey recommended, an airborne geophysical survey of the Karen Mineral Claims was conducted under contract by Waterton Airex Ltd. of Sidney, British Columbia during the early part of July 1972. Flight readings were taken on 5 July 1972 and consisted of combined aermagnetic, electromagnetic and radioactivity testing.

The survey covered an area of about 3,000 acres, involving 14 runs each of 16,500 feet in length. These runs were 500 feet apart and were flown to a true bearing of 315° or alternatively 135°. Readings were taken every 500-foot interval

and flight lines were 500 feet above ground cover. The plane was captained by Claude Waterton, VRS-536 Senior Commercial, the co-pilot was Gerald Jeromen, both of Sidney, British Columbia. The flight Plan was filed with the D.O.T. Vancouver. Figure 5 shows the flight plan pattern. Figure 6 gives the readings for each of the surveys submitted by Waterton Airex Ltd.

Appendix 1 contains the details relating to the aircraft and instrumentation used.

Referring to Figure 6, it will be noted that,-

- the variation in Radioactivity readings ranged from 1 to 2/100 MR/HR
- the variation in Electromagnetic readings ranged from 1 to 15 (x.1 microamps)
- the variation in magnetometer readings varied from - 15 to +10 (x 100) gammas. Background average was set at "0"

For the Radioactivity and electromagnetic tests, background was dialed out.

Results: Referring to Figure 7, it will be noted that there is a generally low trending zone (magnetically) between flight runs 5 to 13 extending northwesterly from row 10. Coincidence of a low magnetic with a high EM occurs at 13-11; 15-9; 15-5; Line 7 - 26 to 29 and Flight Line 9-18 & 19; Line 9-25 to 31. Of significant interest is the coincidence of the low Magnetic - High EM readings within the known mineralization zones and possible extensions on strike.

Increased radioactivity appears to trend northerly and localized to the south and northwesterly of the located mineral zones.

6.0 Summary Conclusions:

The results of the surveys, as presently interpreted are:

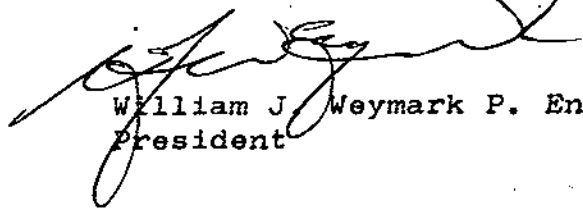
- i. There is a coincidence between the known copper-gold silver-molybdenum containing mineral zones and the "low" magnetic anomalous zone.
- ii. Projections of the anomalous zones on to the unexplored areas Smithe and Slippery Lakes and trending to the Northwest should provide areas of opportunity for localizing similarly mineralized zones as background referenced.
- iii. Interpretation of the High Magnetic readings cannot be definitively interpreted from the information base available. Further ground geological information is required.

7.0 Recommendations:

On the bases of the results obtained from the relating geophysical surveys referred to in this report, it is considered

that further field investigations are warranted and that the next phases of the programme presented in the May 4th, 1972 Report be initiated in order to assess the mineral potentialities of the Karen 1-16 Mineral Claims Holdings of Athena Mines Ltd. (NPL).

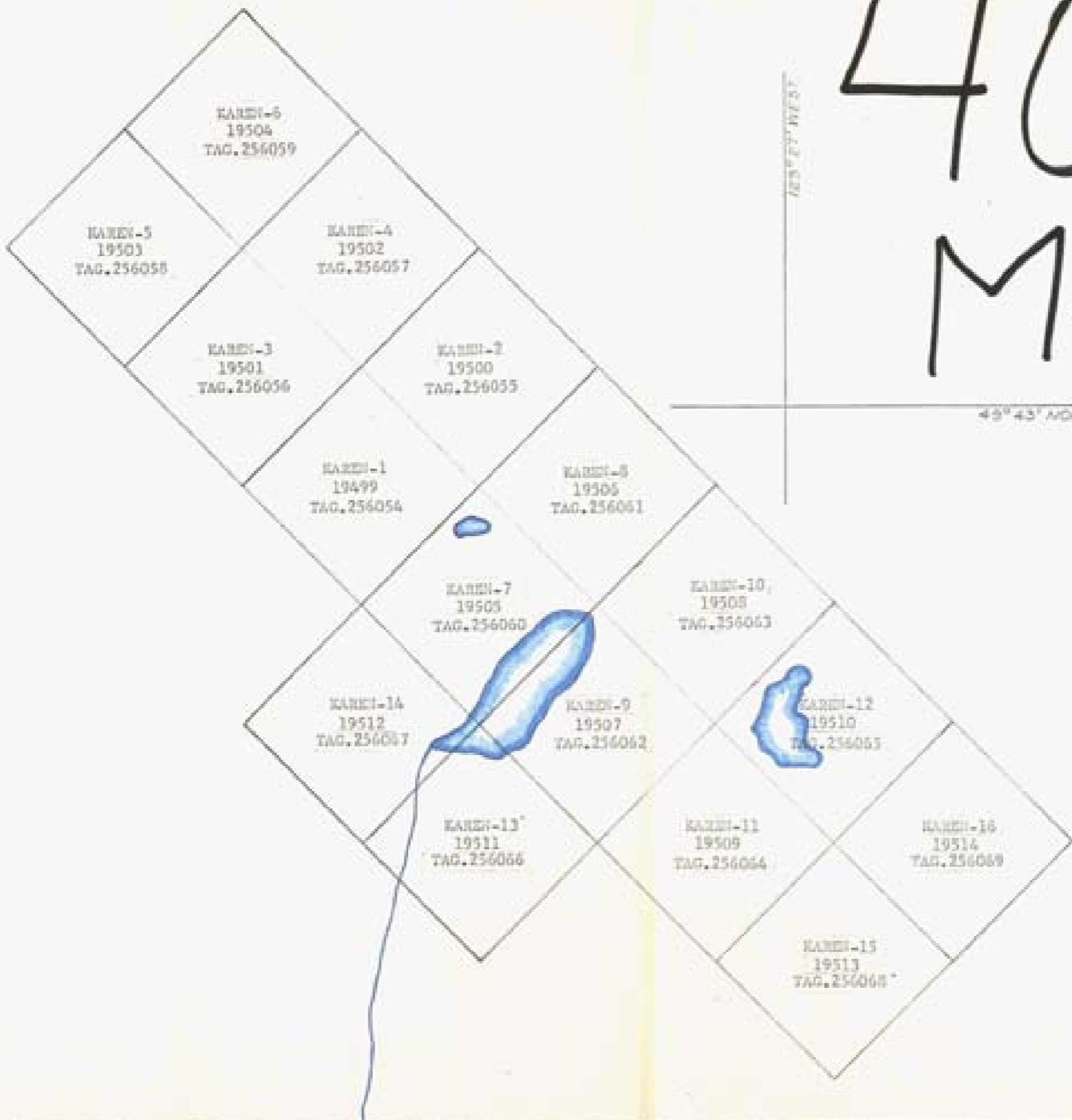
Respectfully submitted



William J. Weymark P. Eng.
President

40003

M-2



Department of
 Mines and Petroleum Resources
ASSESSMENT REPORT
 NO. **4003** MAP **#2**

REFERENCE (MINERAL CLAIMS MAP
 880/100, DEPT. MINES & PETROLEUM
 RESOURCES, VICTORIA, B.C. AUGUST 1978)

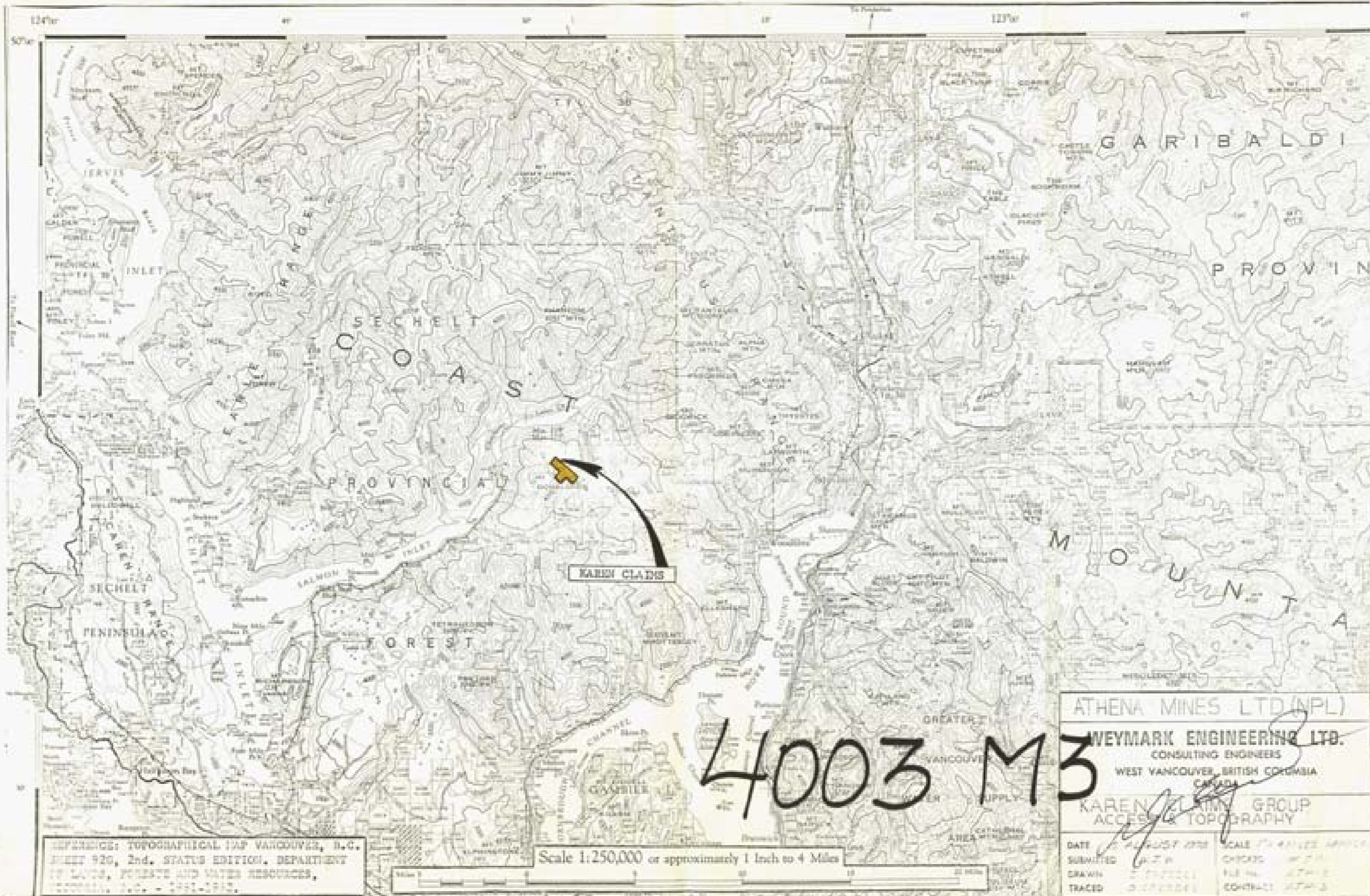
ATHENA MINES LTD (NPL)

WEYMARK ENGINEERING LTD.
 CONSULTING ENGINEERS
 WEST VANCOUVER, BRITISH COLUMBIA
 CANADA

KAREN MINERAL CLAIMS
 CLAIMS LOCATION

| | |
|---------------------|--------------------------|
| DATE 15 AUGUST 1978 | SCALE 1" = 1000' APPROX. |
| SUBMITTED BY ATHENA | CHECKED G.J.A. |
| DRAWN BY G.J.A. | FILE NO. ATH-3 |
| TRACED BY G.J.A. | CONTRACT ATH-3 |

FIG. 2.



KAREN CLADS

4003 M3

ATHENA MINES LTD (NPL)

WEYMARK ENGINEERING LTD.

CONSULTING ENGINEERS
WEST VANCOUVER, BRITISH COLUMBIA
CANADA

KAREN CLADS GROUP
ACCESS & TOPOGRAPHY

| | | | |
|-----------|-------------|----------|---------------------|
| DATE | AUGUST 1978 | SCALE | 1" = 4 MILES APPROX |
| SUBMITTED | A.T.H. | CHECKED | A.T.H. |
| DRAWN | S. POTTOL | FILE NO. | A.T.H. |
| TRACED | S. POTTOL | CONTRACT | A.T.H. |

REFERENCE: TOPOGRAPHICAL MAP VANCOUVER, B.C.
SHEET 920, 2nd. STATUS EDITION, DEPARTMENT
OF LANDS, FORESTS AND WATER RESOURCES,
VICTORIA, B.C. - 1951-1972.

Scale 1:250,000 or approximately 1 inch to 4 Miles

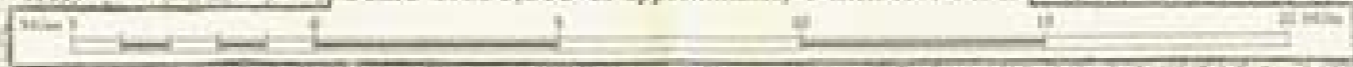
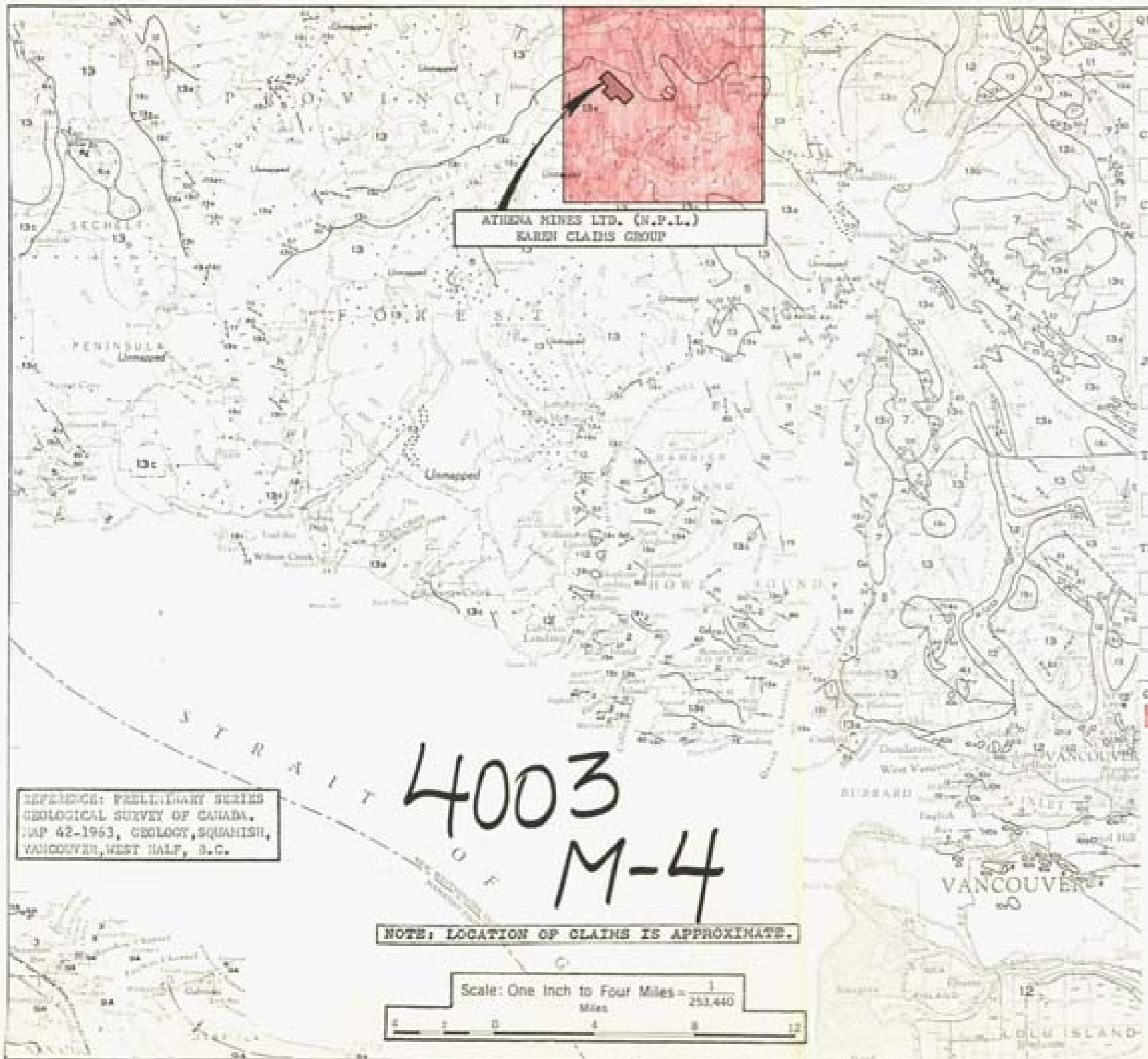


FIG 3



- QUATERNARY**
- 12 Alluvial, marine, and glacial deposits
- GAMBRIER GROUP**
- 11 Basalt, andesite, dacite, and rhyolitic flows; minor pyroclastic rocks. May include some Tertiary rocks
- CRETACEOUS AND TERTIARY**
- UPPER CRETACEOUS, MIDDLE EOCENE, AND LATER**
- 10 10a, basalt flows or sills, dykes and minor pyroclastic rocks; 10b, sandstone, shale, conglomerate, minor silt and coal
- CRETACEOUS**
- 9 9A. NANAIMO GROUP: shale, sandstone, conglomerate, coal
 - 9B. BELM FORMATION: metavolcanic rocks, conglomerate, limestone
 - 9C. EMPETRUM FORMATION: metavolcanic rocks, conglomerate, limestone
 - 9D. CHELANCUS FORMATION: greywacke, conglomerate, arkose; minor argillaceous and calcareous rocks
- JURASSIC AND CRETACEOUS (?)**
- GAMBIER GROUP**
- 7 Tuff, breccia, agglomerate, andesite, argillite, chert, greywacke, quartzite, conglomerate; minor schist, granite, lime-silicate rock, scoria
- TRIASSIC**
- UPPER TRIASSIC (mainly or entirely)**
- VANCOUVER GROUP**
- 3 Andesite, basalt, quartzite, argillite, limestone, schist. May include some undifferentiated late Palaeozoic rocks
- TRIASSIC OR EARLIER**
- BOWEN ISLAND GROUP**
- 2 Mainly greenstone; minor chert and greywacke
- TWIN ISLAND GROUP**
- 1 Hornblende-andesite granite, gneiss, schist, amphibolite, conglomerate, quartzite, meta-arkose, lime-silicate rocks, migmatite
- CRETACEOUS AND EARLIER (mainly)**
- 13 Undivided; 13a, leucocratic rocks, granodiorite, quartz monzonite, quartz diorite; minor granite and mesocratic rocks; 13b, leucocratic rocks; probably Tertiary; 13c, mesocratic and melanocratic rocks; quartz diorite, diorite, granodiorite, minor hornblende gabbro and leucocratic rocks

REFERENCE: PRELIMINARY SERIES
GEOLOGICAL SURVEY OF CANADA,
MAP 42-1963, GEOLOGY, SQUAMISH,
VANCOUVER, WEST HALF, B.C.

4003
M-4

NOTE: LOCATION OF CLAIMS IS APPROXIMATE.



ATHENA MINES LTD. (N.P.L.)

WEYMARK ENGINEERING LTD.
CONSULTING ENGINEERS
WEST VANCOUVER, BRITISH COLUMBIA
CANADA

KAREN CLAIMS GROUP
GEOLOGY

| | |
|----------------------|---------------------------|
| DATE: 15 AUGUST 1972 | SCALE: 1" = 4000' APPROX. |
| SUBMITTED BY: J.H. | CHECKED BY: J.H. |
| DRAWN BY: T.H.S. | FILE NO.: 477-5 |
| TRACED BY: T.H.S. | CONTRACT: 477-5 |

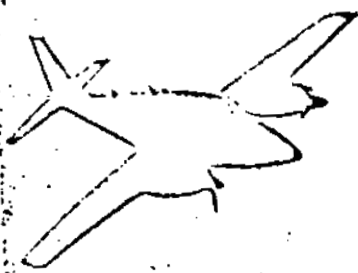
CLOWRITH LAKES

T
 MAP USED FOR AIRBORNE GEOPHYSICAL
 RECONNAISSANCE July 5, 1972
 REVISED REPORT AIR 500 RESON. GROUP
WATERTON AIREX Ltd.
 AIRBORNE GEOPHYSICS
 PAT. NO. 788308 CANADA 1
Claude J. Roberts
 1972

AIR 500 REPORT AIR 500 RESON. GROUP

4003 M-5

AIRBORNE GEOPHYSICAL SURVEYS
 WATERTON AIREX LTD.
 5 July 1972



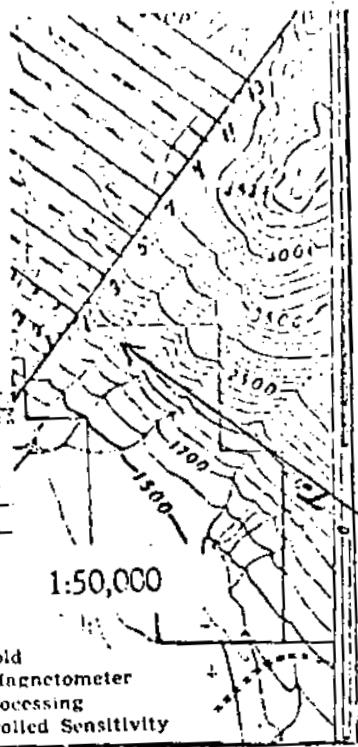
WATERTON AIREX LTD.

AIRBORNE GEOPHYSICS

(Incorporated 1964)

Patented Combined Method
Total Radioactivity

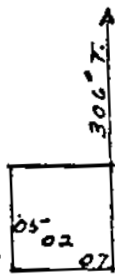
Selective Radioactive Threshold
Electromagnetic + Magnetometer
Computer Processing
Controlled Sensitivity



1:50,000

| | | | | | |
|---|-------------|---|-------------|---|---|
| | | | APPROXIMATE | | |
| 3 | 05° 02' 07" | | | | |
| 2 | 06° 02' 07" | | | | |
| 1 | 05° 02' 07" | | | | |
| | | 2 | 3 | 4 | 5 |

GRID SCALE: 1000' TO 1 INCH



HIGH MAG. +
 LOW MAG. -
 ELECTROMAGNETIC
 RADIOACTIVITY

ELECTROMAGNETIC .7 MICROMPS
 RADIOACTIVITY .002 MR/HR.
 MAGNETOMETER 500 GAMMAS

VICTORIA INTERNATIONAL AIRPORT

BOX 496, SIDNEY, B.C., CANADA

PHONE 656-2194

Proven in Western and Northern Canada for the highest degree of accuracy at the lowest cost. \$10. Per lineal mile including base and positioning expenses on average surveys.

A 400 square mile area costing \$10,000. taking three weeks could put your ground party a year or more ahead in their exploration program.

By the use of the combination method ~~and our T.E. Indicator~~ 80% of the unproductive anomalies can be calculated out of the survey which results in keeping the ground follow up costs to a minimum.

- Electromagnetic: Waterton quadrature system.
Tran. on 1,000 CPS. Rec. in units of .1 Microamps.
- Magnetometer: Sharpe PMF-3 or McPhar M700 modified to our method.
Flux-gate in units of 10 to 100 Gammas.
- Radioactivity: Detectron - DR299, 24 tubes.
Rec. in units of .001 MR/HR, total count.
- Threshold: McPhar TV-5 Crystal
Positions 1.3 - 1.63 - 2.5 Mev.

Grid supplied in scales of 1,000 to 2,000 feet per inch with clear overlays showing the anomalous areas.

Ground checks over mountain areas have found the accuracy to be within 500 feet on a 500 foot grid and capable of disseminated sulphide detection.

Over 15,000 lineal miles of reconnaissance and assessment assistance completed in 40 different areas by the end of 1970.

Operations range up to 400 miles from base.

Aircraft type: Cherokee 235 - Twin Comanche.



Our patented method incorporates the combined readings from a flux-gate magnetometer, a nucliometer and a miniaturized electromagnetic unit. The readings are recorded instantly on film and timed electrically to enable the readings to be entered on a grid of a chosen scale.

To obtain anomalies of most value level lines are flown in a certain plane and a fixed wing aircraft is chosen as the most suitable vehicle for this purpose.

Any inaccuracy in the timed readings due to airspeed error is calculated out before the readings are entered on the grid.

The instruments are set on "0" over a predetermined spot near the survey area and this adjustment is made after each $1\frac{1}{2}$ hours. The survey flying is done in certain conditions and at certain times of the day.

Station-keeping is accomplished by electrical counter, reference to topographical features, directional gyro set from compass or astro compass and a set flying technique. Ground checks from over twenty mountainous areas have found the accuracy of this method to be between 250 feet and 500 feet on a 500 foot grid.

Anomalies are plotted from the grid on to transparent sheets and the resulting overlays give us the combination anomalies which, in our experience, have been the most successful.

Magnetometer: PMF-3 Sharpe or McPhar M-700 is used when adjusted to our method. Readings are in units of 100 gammas for mineral reconnaissance and in units of 10 gammas for oil reconnaissance.

Electromagnetic: Built by our company to a miniature scale to enable us to use small aircraft to keep the cost of survey to our rates.

With the sensitivity set at 30%, disseminated sulphides usually read in the 3 to 5 range and heavy sulphides in the 10 to 15 range on a scale division of 25.

The transmitted electrical field is from 200 feet of copper wire attached to the bottom of the aircraft in the horizontal plane and power is taken from the aircraft generator and built up to required strength by the field transmitter which operates in the 1,000 CPS range.

A small 10 oz bird is drawn behind the aircraft powered by its own mercury cell and its receiving coil is in the vertical, 90° to the transmitted field. A booster receiver in the aircraft produces the received signal in units of .1 microamperes.

Nucliometer: Detectron - DR299, 24 tubes suited to airborne work to obtain total radioactive readings in units of .001 MR/HR, milliroentgens per hour. Threshold readings are taken from McPhar TV-3B with 3" crystal.

Computer processing is used when requested, but for this the magnetometer average in the areas is set at 3,000 gammas.

CERTIFICATE

1. William James Weymark, P. Eng., Consulting Engineer President of Weymark Engineering Ltd., of the District of West Vancouver, of the Province of British Columbia hereby certify that:

1. I am a graduate of Mining Engineering, of Queen's University, Kingston, Ontario, B. SC., 1940 and have been practising my profession for twenty-five years.

2. I am a practising Consulting Engineer and reside at 3310 Westmount Road, West Vancouver, Province of British Columbia.

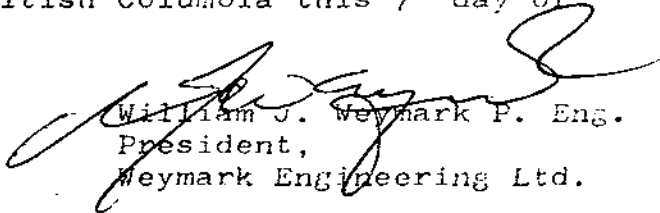
3. I am a member of the Association of Professional Engineers of the Province of British Columbia and also of the Consulting Engineers' Division of the Association of Professional Engineers of British Columbia.

4. I am a member of the Canadian Institute of Mining and Metallurgy, of the American Institute of Mining, Metallurgical and Petroleum Engineers and of the American Geophysical Union.

5. I have no direct or indirect interest whatsoever in Athena Mines Ltd (NPL) or do I expect to receive any interest, direct or indirect in the properties of Athena Mines Ltd (NPL), or any affiliate or any security of the company or affiliate.

6. The findings of the accompanying report are based on my personal examinations and study of the geophysical field test readings and the relating geological-mineralogical information. The geophysical readings and studies were made together with William Chang M.Sc. Geophysics, McGill University.

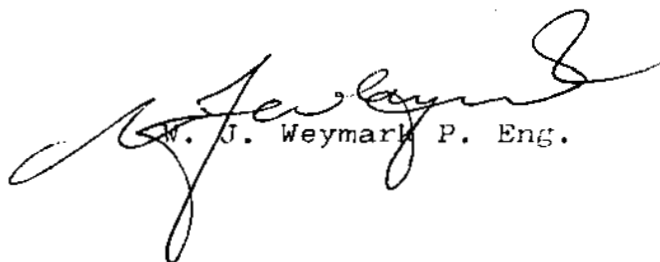
Dated at West Vancouver, British Columbia this 7th day of August 1972.


William J. Weymark P. Eng.
President,
Weymark Engineering Ltd.

-APPENDIX 11

COST DISTRIBUTION

| | |
|---|---------------|
| 1. Waterton Airex Ltd. conducting airborne Aeromagnetic, Electromagnetic and Radioactivity readings at 500-ft intervals, 4.5 miles flight lines Karen 1-16 Mineral Claims, Vancouver Mining Division..... | \$300.00 |
| 2. Weymark Engineering Ltd. interpretation of geophysical surveys readings and preparation and submission of Report dated 7 August 1972 | <u>500.00</u> |
| Total | \$800.00 |


W. J. Weymark P. Eng.