OPAP GRANT 93-615
SUMMARY REPORT

CAVENDISH TOWNSHIP

NTS 31D 9/16

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SUMMARY

In 1993 an OPAP Grant Proposal was submitted seeking prospecting assistance to explore for zinc occurrences hosted by metamorphosed dolomites in the Salmon/Fortescue Lakes area of southeastern Ontario. As a result of a OPAP Grant in the same area in 1992, detailed prospecting and soil geochemistry had previously located a potentially mineralized horizon in zinc having an overall strike extent of at least 900 metres with values as high as 5000 ppm in the soils. As this anomaly appeared to be remarkably similar to the soil anomaly associated with the former Long Lake zinc deposit, three claim units were staked at the conclusion of the 1992 work programme. Further work was recommended. This report summarizes the continuing exploration on this zinc prospect under Grant 93-615.

In 1993 additional soil sampling extended the anomalous zone towards the west a further 125 metres, however, detailed prospecting and hand trenching at the site of the highest geochemical soil value measuring 5000 ppm zinc failed to discover any surface mineralization. Given the absence of any outcropping of zinc mineralization and the fact that the geochemical anomaly follows the contours of a hillside it was interpreted early in the 1993 programme that the anomaly is more than likely hydromorphic in origin (that is, occurring on surface at the level of the groundwater table). Since the data suggested that the source of the zinc anomaly may be due to a blind orebody further blasting and trenching (as stated in the proposal for work) was not carried out. Instead, detailed induced polarization, magnetic gradiometic and VLF surveys were carried out. In preparation for these surveys, lines were cut as close as possible to the original flagged lines.

*The result of the 1993 work has been the delineation of several strong, coincident geophysical anomalies associated within and slightly upslope of the geochemical zone. Drilling of this target area, ('**The Cavendish Zinc Prospect**') is recommended.*

The attached report, (which is submitted to satisfy the requirements of the OPAP Grant) restates the exploration rationale, the work carried out which led to the discovery of the soil anomaly, the details of the 1993 exploration programme and a summary of exploration expenses.

The Cavendish claims are located 1.7 kilometres east of Salmon Lake along Salmon Lake road in northeast Cavendish Township, County of Peterborough. The claims lie within the Southern Ontario Mining Division and fall under the administration by the Resident Geologist in Tweed. The central portion of the claims is centred on long. 78° 25' and lat. 44° 50' in quadrant NTS 31 D 9/16. The property consists of one block of three mineral claims which are registered on Plan No. M-72 as Claim Number 1191290. The claims were staked on October 18, 1992 and consist of 16 ha units which cover lots 10, 11 and 12, south half of Concession XVIII.

The claims are wholly owned by the writer and are in good standing under the new Mining Act.

TABLE OF CC

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LIST OF FIGURES

After Page

APPENDIX

REPORT COPY NUMBER ....
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PAUL W PITMAN

EXPLORATION SUMMARY - CAVENDISH ZINC PROSPECT
CAVENDISH TOWNSHIP,

1. INTRODUCTION

Recent studies in the late 1980's by EMR commodity analysts have suggested that Canada's zinc reserves are rapidly being depleted as no significant zinc-rich deposits have been discovered during the past decade[1]. In order to capitalize on the renewed interest of major mining companies to option properties containing favourable geology for the formation of base-metal rich deposits, it was decided to focus efforts on prospecting for zinc occurrences. The Salmon Lake area which is described in this report, is believed to offer excellent potential for discovery of a carbonate hosted zinc deposit as the local geology indicates that an environment for deposition of a carbonate-hosted zinc deposit is present. The concept of exploring for zinc in this area is not an original one however, in fact zinc encrusted boulders were discovered in the northern portion of Cavendish Township in 1988 by Northgate Exploration during the course of regional prospecting across Grenville marble terrains. It was these discoveries that partially led the author to carry out exploration in this township.

In addition to the discovery of bedded sphalerite in carbonate boulders this area has not had several generations of previous prospecting as is typical for most areas of the Canadian Shield. The Salmon Lake area, therefore was believed to offer a better opportunity for discovery by traditional prospecting methods where funding was limited.

[1] Cranstone D., Bouchard, G. EXPLORATION AND DISCOVERY. EMR Policy Paper in Northern Miner Magazine, March 1992.

The Grenville Province was selected as the Grenville Supergroup marbles of Ontario, Quebec and New York State host numerous occurrences of zinc mineralization, several of which have been periodically mined since the beginning of this century. Past zinc production has been from two types of ore bodies; a polymetallic group (Zn, Pb, Cu, Au, Ag) with a volcanic association (Mountauban/Calumet) and a monomineralic group (Zn) with a carbonate association (Balmat Edwards, Long Lake). While the Balmat-Edwards district of New York is the giant of the carbonate hosted deposit-type[2] several smaller but high grade deposits have been mined in Canada, the Long Lake Zinc Mine in southern Ontario being one such example.

Following a compilation study on the potential of rocks in the Grenville Province to host zinc mineralization, the **`*Salmon/Fortescue Lakes area*'** in Cavendish Township was selected for examination and potential funding through the Ontario Prospectors Assistance Program. This **`prospecting area'** satisfied the exploration criteria used to select potentially prospective ground; eg the presence of favourable geology, known zinc mineralization and comparably little in the way of past work.

Prospecting efforts have long been hampered in the Ontario portion of the Grenville Province by the lack of availability of crown land. The **`prospecting area'** near Salmon/ Fortescue Lake, however is situated within a large tract of crown land where both the surface and mining rights could be acquired if a prospecting discovery was made (see claim map in Appendix 6). In fact, 3 claims were staked following the initial examination of the Salmon Lake/Fortescue Lakes area in 1992 and the discovery of the **`Cavendish Zinc Prospect'**.

This report summarizes the work which led to the discovery of a significant geochemical zinc anomaly (the Cavendish Zinc Prospect) in 1992 and the follow-up work on this discovery in 1993 using funding from OPAP 93-615.

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2. The Balmat-Edwards deposit has produced a total of about 26 million tons grading 10% zinc and 0.5% lead and continues to host reserves of the same magnitude and grade.

2. LOCATION/ACCESS

The Cavendish claims are located in Cavendish Township (Figure 1) along the northeastern shore of Fortescue Lake and further eastward. The central portion of the claims is centred on long. 78°25' and lat. 44°50' in quadrant NTS 31 D 9/16.

Access to the property is excellent. The claims lie roughly 3 kilometres west off Highway 507 along the gravel Salmon Lake Road. Numerous trails and old logging roads provide excellent access to within 25 metres of the south side of Salerno Creek which, at this location marks one point along the south claim boundary. Crossing of Salerno Creek can be exceptionally difficult due to the presence of numerous beaver dams which have swollen the creek along most of its length to widths of 50 metres or more. It is however, possible to traverse the river at L 0+00, the same point mentioned above (refer to Figure 5.1).

Surprisingly, the topography within the `prospecting area' is quite rugged, particularly in the area north of Salerno Creek where hills as high as 30 metres were encountered and small cliffs of massive outcrop were located and prospected. As is typical for the Grenville, cedar swamps and beaver ponds are plentiful and hindered the laying out of straight, flagged cross-lines during regional prospecting and soil sampling in 1992. The cutting of the new lines in 1993 was slow and tedious work due to numerous dead-falls, thick underbrush and cedar swamps and the difficulty of re-locating the 1992 flagged lines.

The depth of overburden proved to be quite shallow over much of the staked area, however depth to outcrop remains unknown in the swamp covered ground. Test pits dug over the geochemically anomalous sites (in both the 1992/93 work) intersected bedrock at depths ranging from less than 20 centimetres up to one to two metres. Glacial deposits in this area appeared to be quite thin, thus increasing the usefulness of the geochemical survey method employed to focus in on potentially mineralized areas.

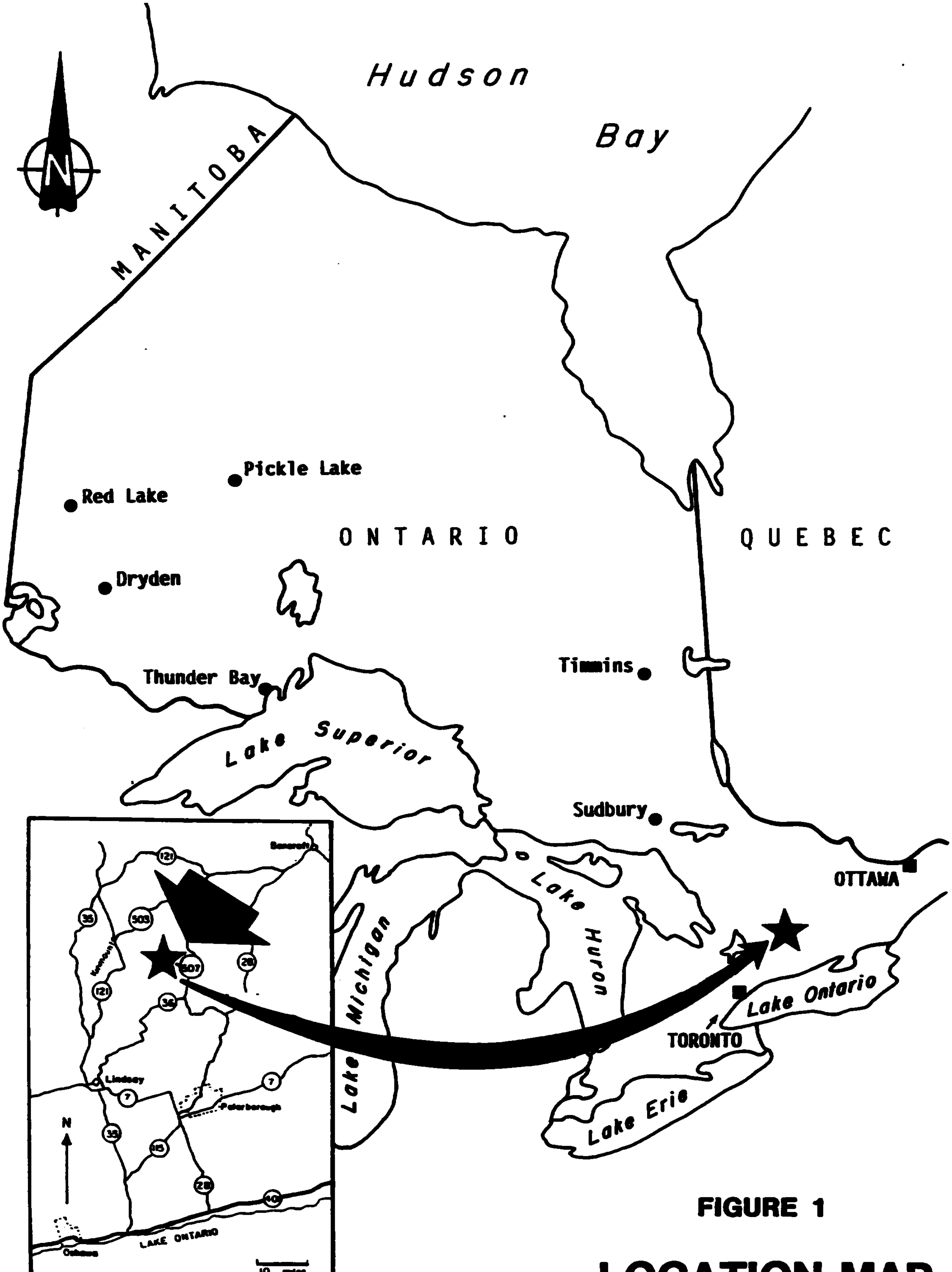

FIGURE 1

LOCATION MAP

3. PROSPECTING AREA - PROPERTY STATUS

The prospecting area for the 1993 work programme consists of one block of three mineral claims located in northern portion of Cavendish Township, County of Peterborough (Plan No. M-72). The claims lie within the Southern Ontario Mining Division under the administration by the resident geologist in Tweed (Figure 2).

The claims were staked on October 18, 1992 and were recorded as Tag Number 1191290. The 3 claims consist of 16 ha units and cover lots 10, 11 and 12, south half of Concession XVIII. (see Appendix 3 - attached Plan M-72). The claims are wholly owned by the writer and are in good standing under the new Mining Act. All work carried out under OPAP 93-615 falls within the recorded claim boundaries.

4. REGIONAL AND PROPERTY GEOLOGY

The 'prospecting area' (figure 3) is located within the inner portion of the central metasedimentary belt of the Grenville Province. Four progressively younging stratigraphic units characterize the geology contained in the Cavendish Township; a Middle Precambrian basement gneiss unit, the Anstruther Lake group clastic metasediments, the Hermon group clastic to carbonate metasediments & interbedded volcanics and the Mayo Group calcareous metasediments. It has been suggested by various workers that the depositional environment for the Precambrian sediments was a volcanic-carbonate rich basin (referred to as the Hastings basin) which covered most of the southern third of the Grenville Province of Ontario. The Cavendish Township claim group lies along the western margin of the Hastings basin.

On the local scale, detailed mapping by Government geologists (map P2420, 1981) indicate that the 'prospecting area' is underlain primarily by foliated to gneissic marbles of the

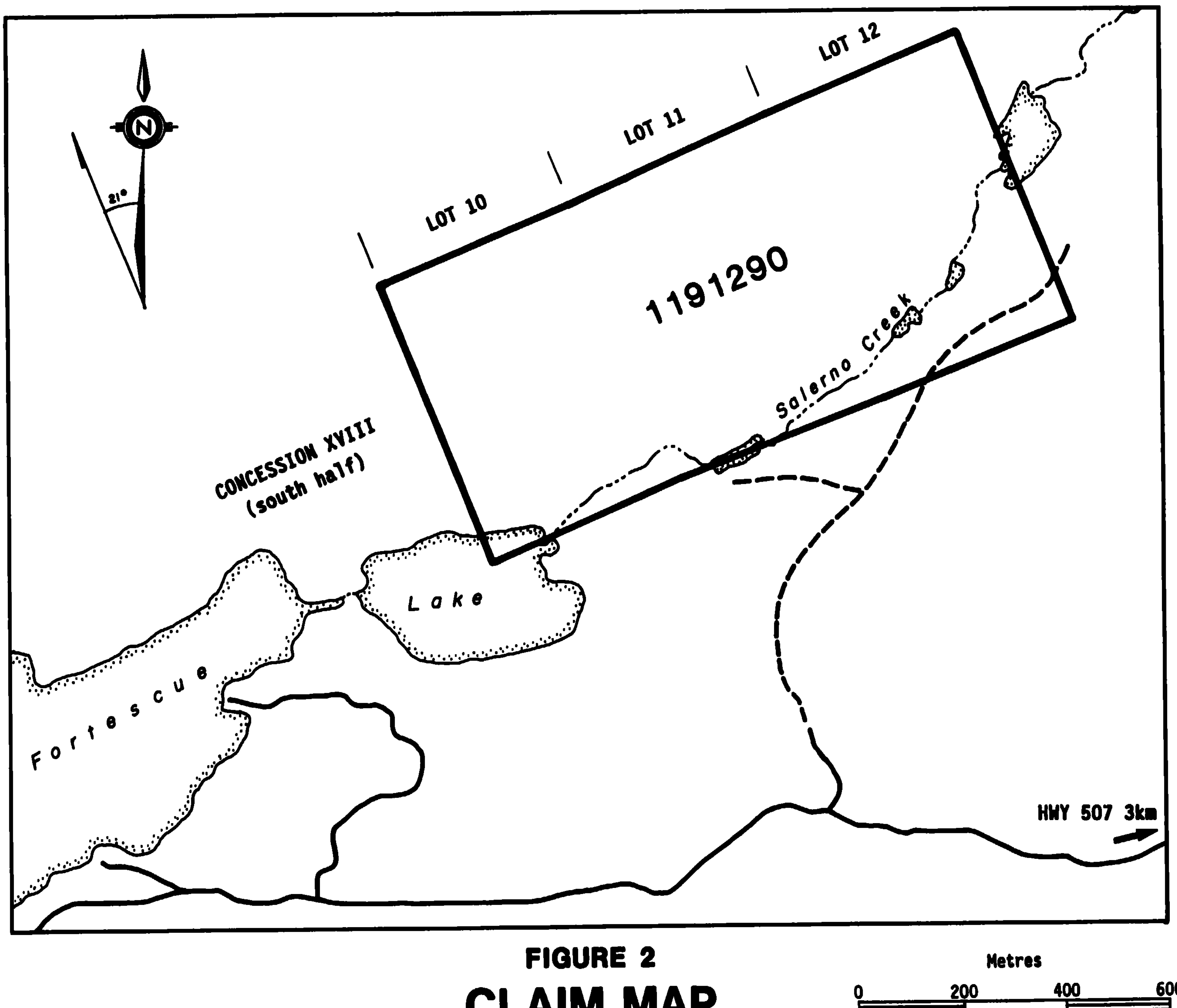

FIGURE 2

CLAIM MAP

Dungannon Formation, in contact with older clastic-siliceous metasediments. It is important to note here that in the adjoining Anstruther Township, the **Dungannon Formation** marbles are stromatolitic bearing. Several bodies of algal, laminate stromatolites have been observed by Bartlett & DeKemp (1987), thus indicating that the sediments were laid down in a shallow water environment. The association between stromatolite bearing marbles and carbonate hosted lead-zinc ore bodies has been amply demonstrated in the field by several researchers (eg Mendelsohn - 1976) thus suggesting that the **Dungannon Formation** carbonates lie in an extremely favourable geological setting.

The general lithological trend for the rocks striking across the Cavendish property is northeast. Because the property is located within one of the postulated north-northeast trending local synclinal structures the marbles are tightly folded. Small scale 'z' folds have been mapped in several of the marble units.

The regional geology in the area of the claims (figure 4) was subdivided in 1992 into four main rock groups;

(i) Metamorphosed high-grade carbonate rocks

type 1a - massive, finely recrystallized, marble with a bluish tint

type 1b - rubbly weathering, coarsely crystalline marble

type 1c - banded, finely recrystallized marble

(ii) Metamorphosed basement, volcanic ? - clastic metasediments

type 2a - felsic, quartz rich metasediments, massive to gneissic textures

type 2b - mafic, biotite-hornblende rich metasedimentary or metavolcanic rock unit, predominately gneissic in character

type 2c - ferruginous, rusty weathering, mica-rich, schistose unit

iii) Intrusive mafic to ultramafic bodies

iv) Intrusive felsic plutons

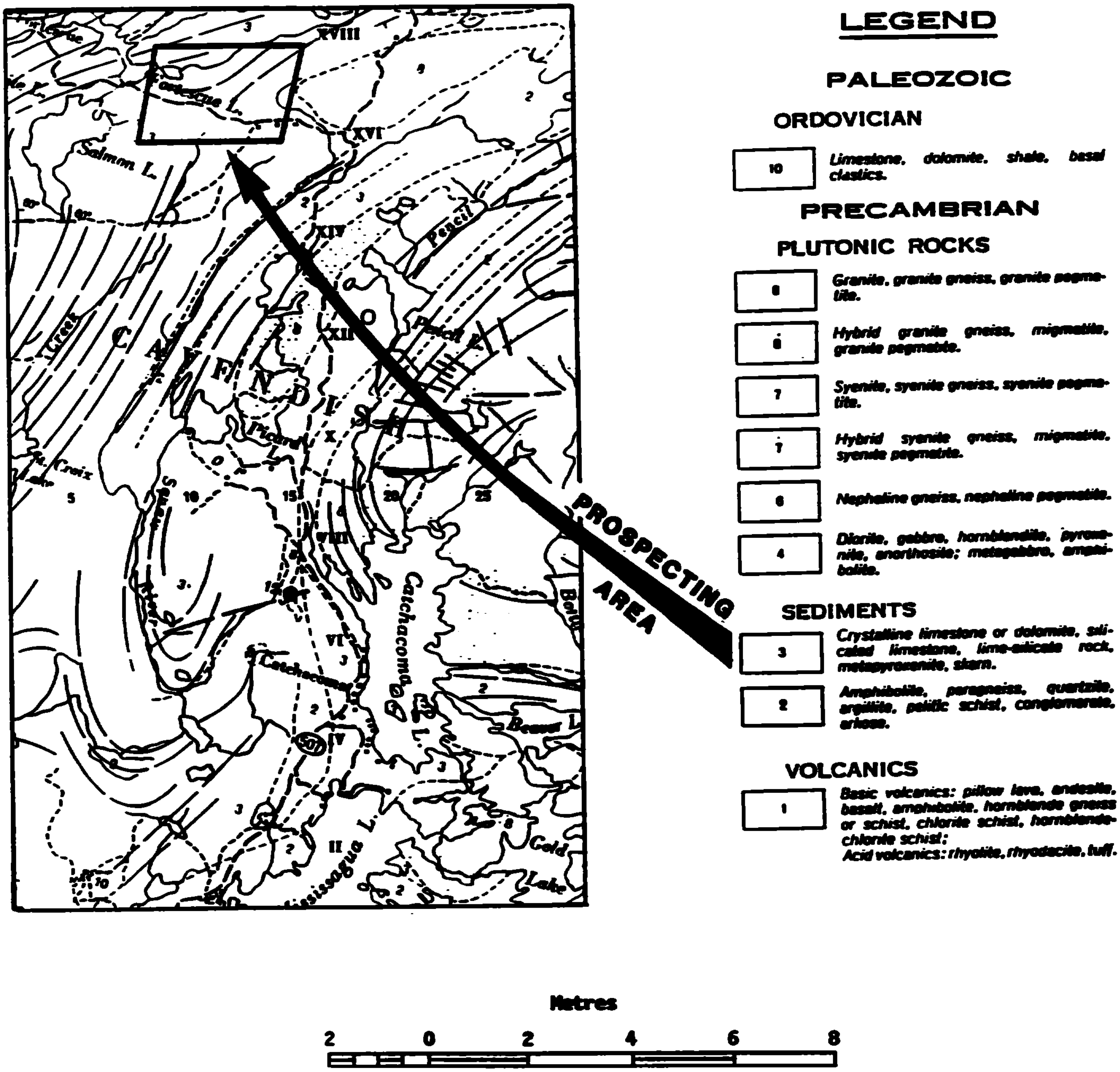

FIGURE 3

REGIONAL GEOLOGY

The carbonate rocks (Unit 1) were found to occur as three distinct habits;

(i) As a massive, very finely crystalline, weakly banded unit having a characteristic bluish tint,

(ii) As a massive, white, very coarsely crystalline rock containing minor disseminated crystals of white mica and unidentified calc-silicate minerals. This rock weathers easily to a fine calcitic sand which often occurred as a fine grit in the B horizon soils.

(iii) As a banded, off white to grey, highly resistant metamorphosed marble.

Outcrop exposure within the staked area is poor and consists entirely of marble. Outcrops are generally flat and small in area, however several moss-covered ridges were encountered. It was not possible to subdivide the rocks into separate beds based on a distinct mineralogical composition, weathering characteristics, forest type[3] or through the zinc content in the soils.

All rock units trend northeasterly with a moderate to steep, south dip. Evidence of folding of the calcareous sediments is apparent however is confined to folding around mafic to ultramafic bodies outside of the staked area. In addition, in close proximity to these mafic intrusives the marbles developed a strong banding and the development of coarse mica books and pyroxene crystals which measured up to several centimetres in size. Upper amphibolite grade metamorphism is indicated in this instance.

The sulphide content seen in the marble exposures was negligible. Only two outcrops displayed a trace amount of pyrite (?), both of which were found in 1992 and lay outside of the claim boundaries. None of the outcrops were rusty in appearance, nor were any gossans found with the carbonate terrain within the claims.

Figure 4 illustrates the local and property geology.

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[3] The forest type also defined the underlying bedrock. In the case of the clastic metasediments the forests were predominately maple or birch while the marble units favoured the growth of mixed forests of spruce, pine or cedar trees.

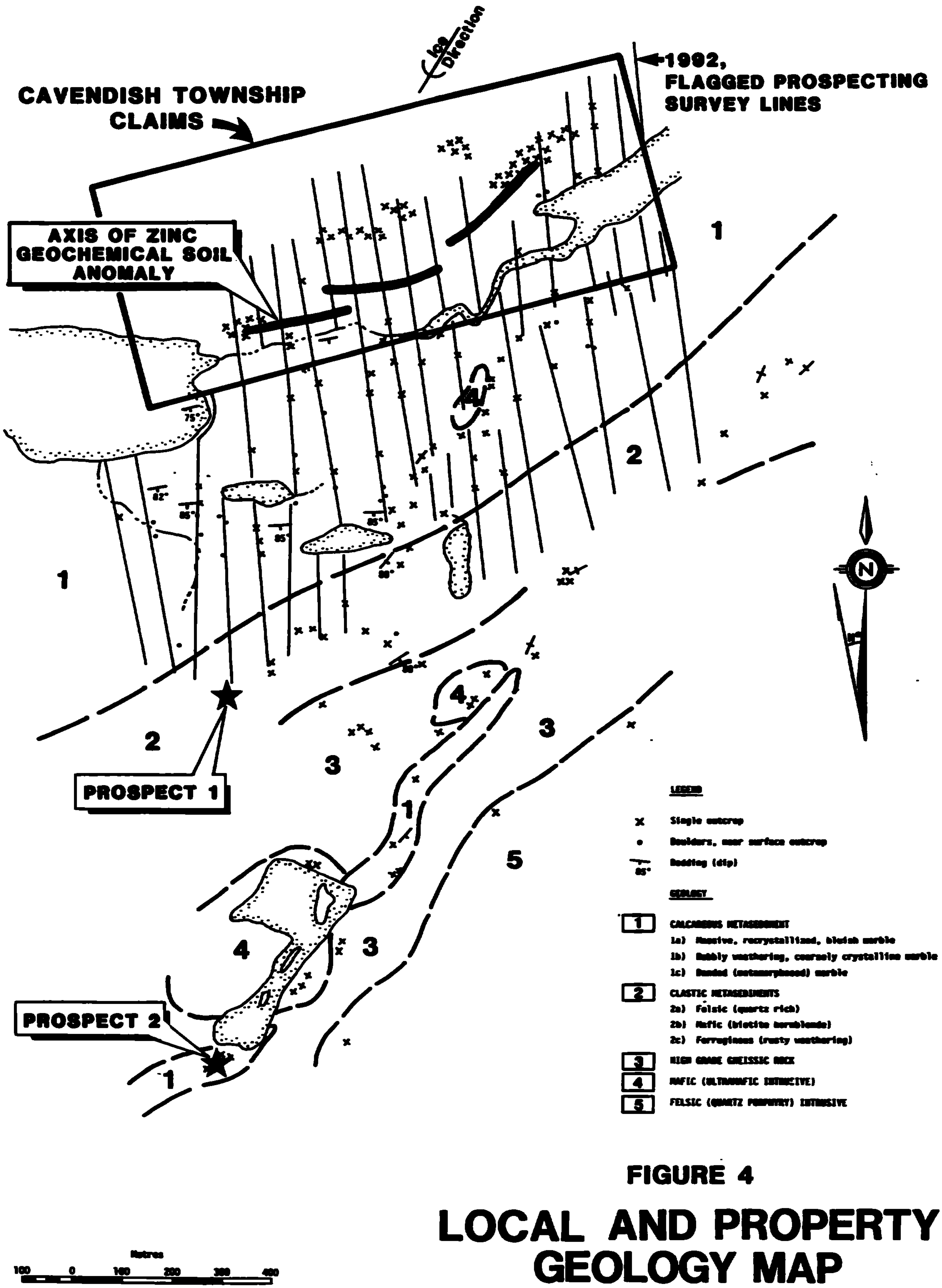

FIGURE 4

LOCAL AND PROPERTY GEOLOGY MAP

5. EXPLORATION PHILOSOPHY

Exploration Rationale

As a result of a reconnaissance study on Grenville marbles by an intermediate sized mining company in 1988, a discovery of two 'zinc enriched' mineralized boulders was made in an area for which there is no record of past exploration. The first prospect (see Figure 4) consisted of smithsonite coating on a marble boulder. The second prospect consisted of bands of sphalerite in a marble boulder which assayed between 0.97% to 3% zinc and a nearby rusty outcrop containing weathered out pyrite, disseminated sphalerite grains and black hematite occurring as fracture fillings. The significance of the discovery of the two mineralized erratics is enhanced by the fact that they were made while conducting a reconnaissance style program consisting of very widely spaced traverses (involving only several traverses per Township) in order to explore the geological setting of the Grenville marble formations. Following this discovery the company staked 20 claims along the projected strike of the locations of the boulders and a limited exploration programme was designed which attempted to locate the source rock for the mineralized boulders. Prospecting traverses were carried out along trails and an MNR access road and one soil grid, measuring 300 metres square, was cut and sampled in the area of prospect no. 2 (Figure 4). The exploration results were not encouraging; a third prospect (boulder) was located south of prospect 2 (assaying 1.07% zinc) and only narrow, discontinuous anomalous zones, in the order of 5 times background (ppm zinc), were outlined in soils north of boulder No 2. There was no reported attempt to trace the northern most boulder (Prospect 1) back to a source rock and the claims were allowed to expire.

In addition to the zinc values contained in the boulders, the following criteria would seem to indicate that a favourable geological setting for the formation of a carbonate hosted zinc deposit is present in the Salmon/Fortesque Lakes area.

These criteria include:

i) **The presence, in northern Cavendish Township, of aerially restricted dolomitic marbles within a thick sequence of calcitic metamorphosed limestones** (ref: Assessment Files Record # 2.12692). Historically, mono-mineralic zinc mineralization previously discovered in the Grenville has commonly been described as marble-hosted, without further definition of the marble composition. Since Sangster's (GSC) study on the metallogeny of base metals in the Grenville Province in the early 1970's it has been recognized that zinc mineralization is normally associated directly with dolomitic marbles which show a much more restricted distribution than the calcitic variety. **Mississippi Valley type (MVD) and other carbonated hosted deposits worldwide, typically occur in dolomitic hosts within a sea of unmineralized calcitic carbonate rocks.**

ii) **The presence of stromatolitic bearing marbles** in the Dungannon Formation marbles suggests a shallow water origin for the carbonates, thus indicating a favourable depositional environment for zinc deposits. The economic significance of the presence of the stromatolite occurrences in the Grenville is due to the fact that there is a strong correlation between zinc and lead-zinc carbonate hosted ore deposits with stromatolite bearing host rocks. The Balmat-Edwards mining district, for instance, is one such example. Recent studies in the Madoc Area (Map 3079, Marginal Notes) have verified that a strong correlation exists between zinc mineralization in dolomitic rocks with those of stromatolite occurrences.

iii) **Dolomitic marbles which lie at, or near the contact of sulphide bearing metaclastic rocks. This setting indicates that the carbonates lie near the edge of a former basin.** Studies on MVD deposits world-wide have not only shown an affinity with dolomitic rocks, but more precisely, they have been found to be located at transitional contacts from that of pure dolomites to that of siliceous dolomites and/or calc-silicate rocks along the margins of shallow basins.

iv) **The presence of fold structures.** Ore deposits, such as the Balmat-Edwards type are concentrated and thickest at the nose of fold hinges. While no definitive patterns of folding have been outlined in the Cavendish marbles, reconnaissance mapping by Provincial geologists have discovered small-scale `z-folds' and at least one interpretation of the regional geological setting suggests that the carbonate rocks may lie within a synclinal structure.

v) **The habit of the mineralization in the boulders found near Cavendish Lake road appears to be clearly stratiform as opposed to vein like.** Whether massive or disseminated the majority of MVD deposits are stratiform in character and are localized as narrow lenses along sedimentary horizons.

Regardless of the ore model evoked for known Grenville zinc and/or polymetallic carbonate hosted deposits[4], the exploration parameters, which include the stratiform character of the mineralization, association with dolomitic rocks within a major carbonate basin and close proximity to the margins of a basin are all present within the **Salmon/Fortesque Lakes area.**

6. WORK PROGRAMMES

Summary of Work Proposal (1992)

In 1992 it was proposed that exploration be carried out up-ice from the discovery of several zinc encrusted and zinc mineralized boulders found along and due south of the Salmon Lake Road. It was proposed that:

(i) A **geochemical soil sampling survey** be extended over a wide area to include the locations between prospect No. 2 and prospect No 1 as well as up-ice, or to the north of, No. 1. Geochemical sampling of the B soil horizon was suggested as the best exploration tool to employ in this area. Case studies of geochemical patterns in soils over glaciated - carbonate rocks have consistently shown that zinc anomalies in B-horizon soils are useful in indicating the general trend of the dispersion trains with which mineralized boulders are associated. One particular study (the Clyde River zinc prospect, Sinclar, 1979) for instance, proved that geochemical sampling of B-horizon soils was capable of discovering bedrock zinc mineralization 400 metres up ice from sphalerite bearing float. These two facts suggested that geochemical sampling of soils could lead to the discovery of concealed, bedrock mineralization and that extending the survey area over a broad

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[4] Epigenetic, Mississippi Valley, platform-marginal sedimentary, distal exhalative or volcanogenic stratiform ore types.

area was necessary, particularly for glaciated terrains.

All soil samples were geochemically tested for zinc only. In addition all rock outcrops were tested with "Zinc Zap" [5] as an aid to identifying smithsonite[6] while prospecting.

(ii) As carbonate-hosted ore deposits exhibit very little geochemical signatures distant from the ore rock [7], it was also proposed that a detailed prospecting of outcroppings of carbonate rocks in the vicinity of the `boulder discoveries' be carried out. Up to this point maps filed with the Ontario Government indicated that only the small trails and the one MNR access road had been prospected. The importance of combining prospecting with geochemical sampling cannot be understated. The Bouchette-Des Negres zinc prospect in the Maniwaki area of Quebec for instance could easily have been missed as there is no visible expression of sphalerite on the outcrop surface at this occurrence. The sphalerite has been leached out by weathering up to a depth of 5cm. In the unaltered rock below this weathering rind up to 10% was discovered !!!

The above proposed programme was only partially carried out (the area between Prospects 1 and 2 was eliminated as unprospective ground due to the width of the carbonate horizon and the lack of any surface mineralization in the exposed rocks). This work resulted in the discovery of a linear and continuous 900 metre long zinc anomaly in soils. This anomaly is found north of Salerno Creek or roughly 1 kilometre north of Prospect 1. Verification of the anomaly position and strength was determined by re-examination of the sites by way of duplicate samples and the digging of profile test pits from surface to bedrock. In order to test the geophysical response of the geochemical zone a reconnaissance VLF/Mag survey was run across

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[5] Zinc Zap - a solution of equal quantities of i) 3% potassium ferrocyanide [$K_4Fe(CN)_6$], ii) 3% oxalic acid and iii) 0.5% diethylanine. When applied to oxidized zinc-bearing minerals; the solution turns bright orange-red color.

[6] Smithsonite - a white to yellow, gray, brown, or greenish mineral of the calcite group: $ZnCO^3$. It is a secondary mineral associated with sphalerite and often found as a replacement in limestone.

[7] "In fact lead-zinc values generally fall to background levels in the rocks at less than 60 metres away from the ore, regardless of the deposit size" In smaller deposits this distance has been apparently measured to be less than 30 metres. (Sangster, 1968 p7)

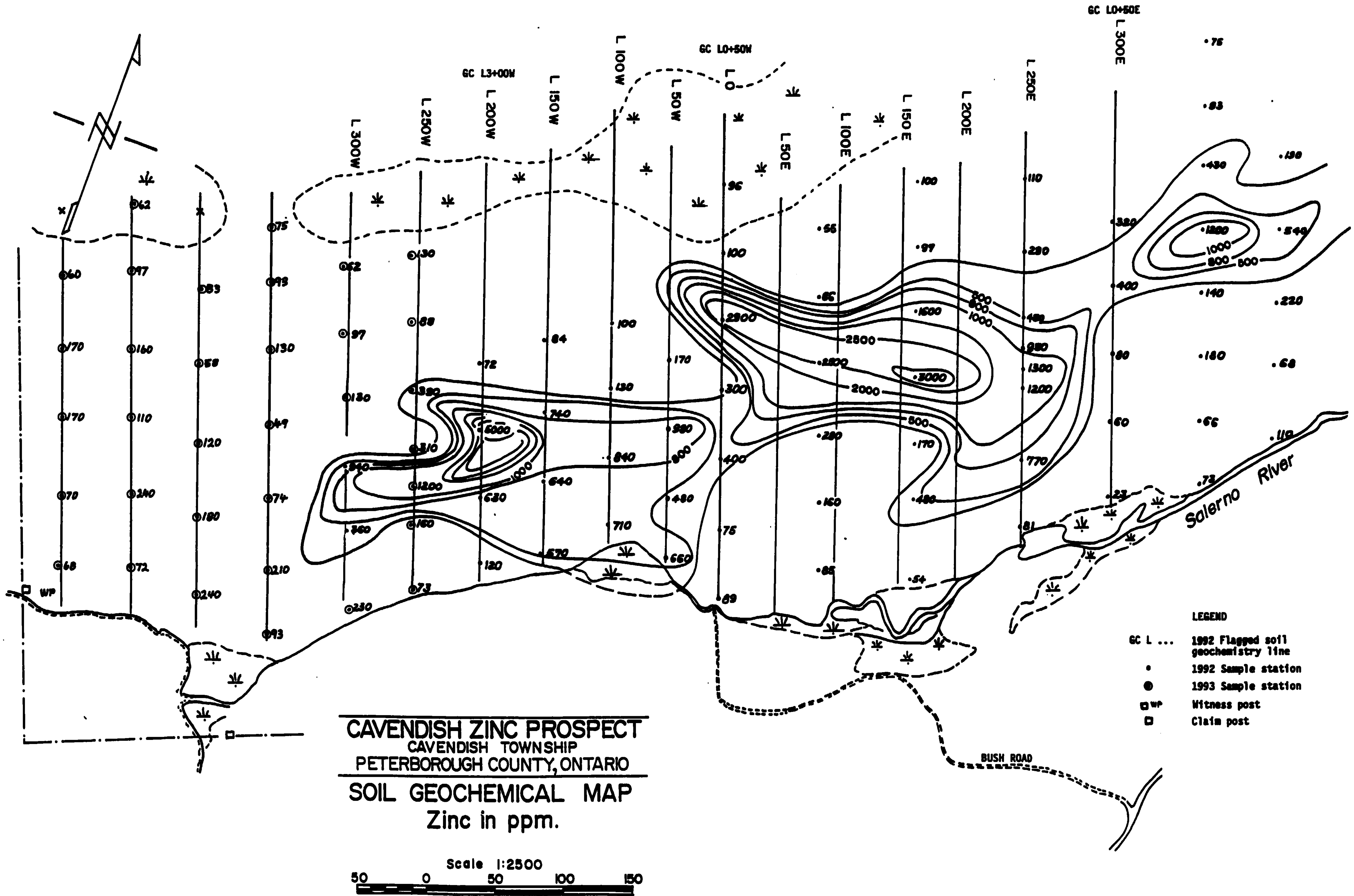
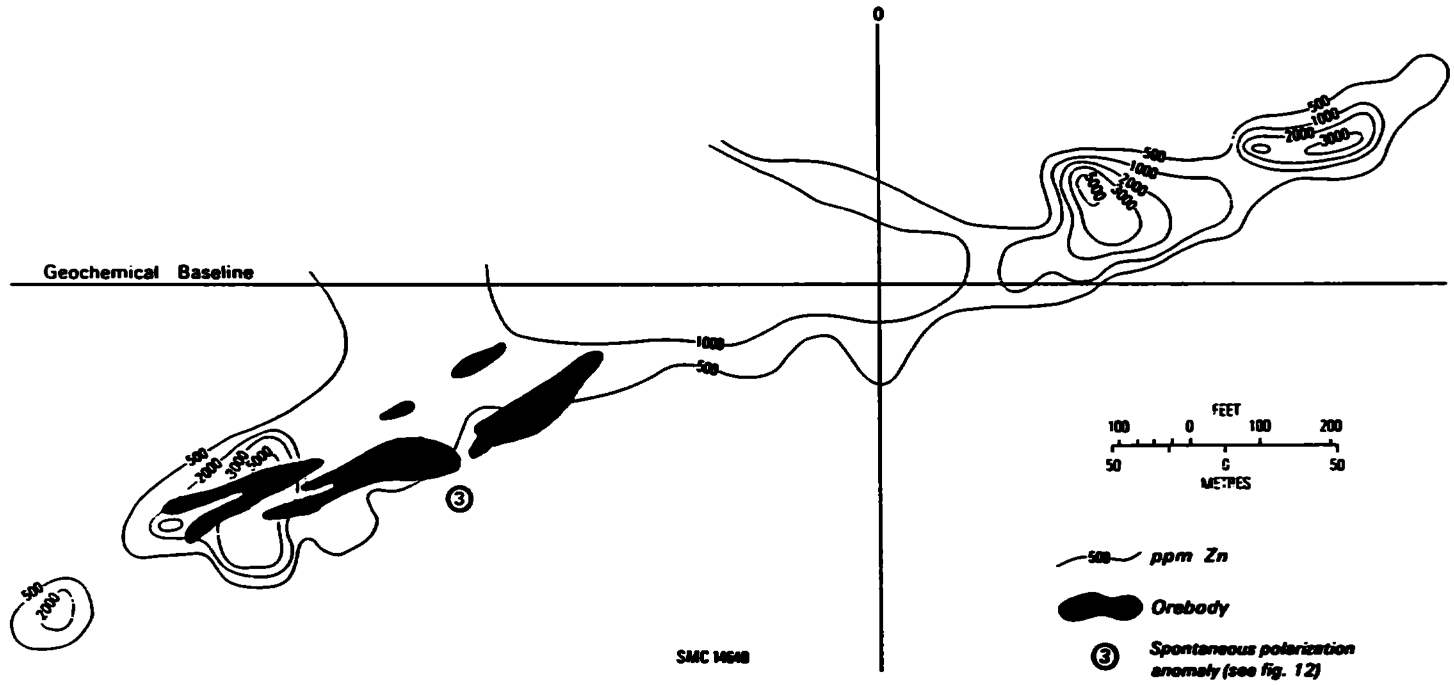

CAVENDISH ZINC PROSPECT
CAVENDISH TOWNSHIP
PETERBOROUGH COUNTY, ONTARIO
SOIL GEOCHEMICAL MAP
Zinc in ppm.
Scale 1:2500
50 0 50 100 150
(metres)
GC L3+00W
GC L0+50W
GC L0+50E
L 300W
L 250W
L 200W
L 150W
L 100W
L 50W
L 0
L 50E
L 100E
L 150E
L 200E
L 250E
L 300E
WP
Salerno River
BUSH ROAD
LEGEND
GC L ... 1992 Flagged soil geochemistry line
1992 Sample station
1993 Sample station
Witness post
Claim post

Figure 5.1

in the soil.

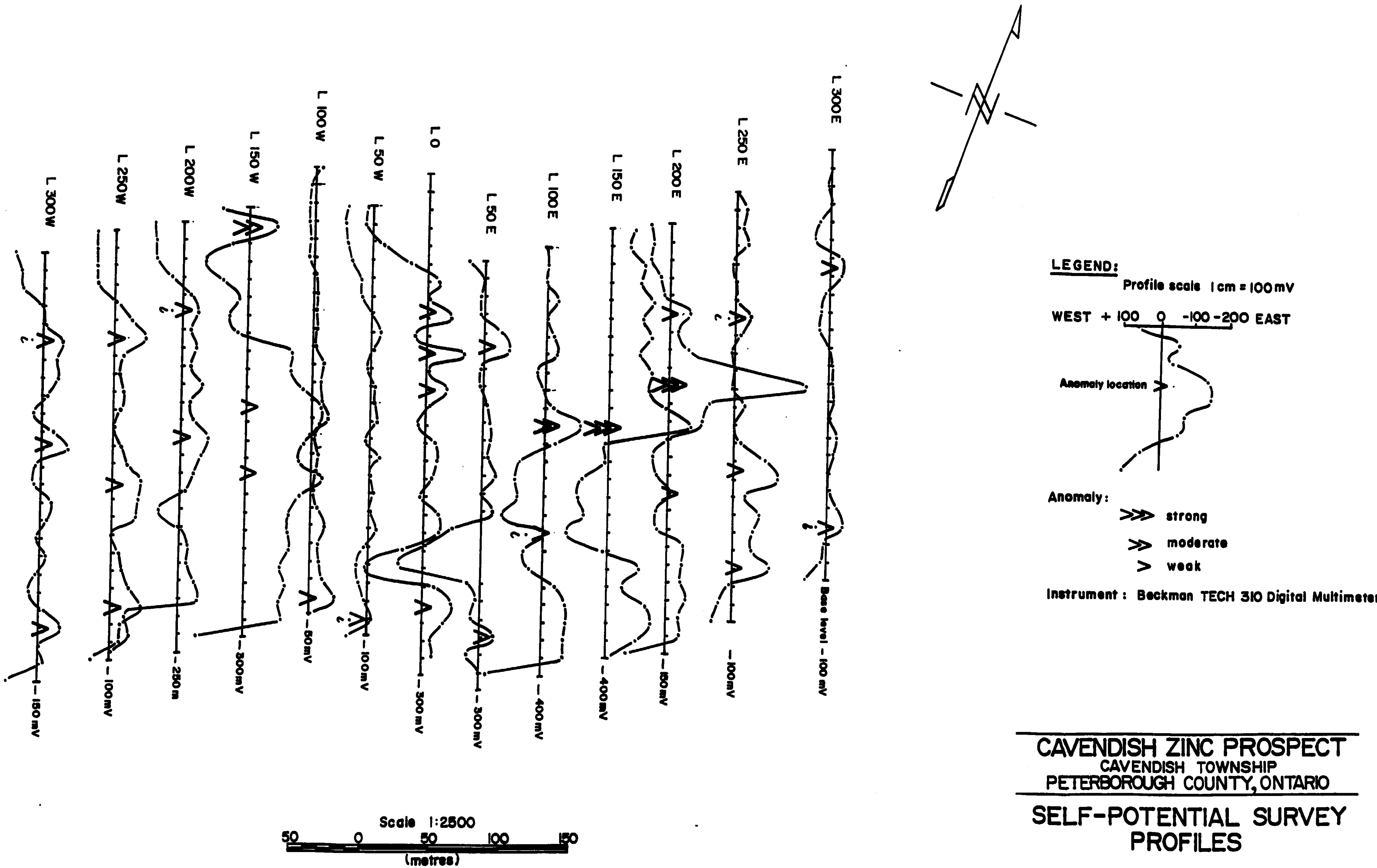
As stripping and trenching in either 1992 or 1993 did not uncover any surface mineralization it was felt that the soil anomaly is probably hydromorphic, that is forming at the side of the hill, at or close to, the point of exit of the watertable. This interpretation suggests a transported anomaly and that the source for the zinc would be either further up-slope or at depth. As the possibility of uncovering mineralization from near-surface seemed unlikely, further exploration by trenching was abandoned and other exploration methods were considered.

Previous consultation with the Regional Geologist at Tweed had recommended a Self Potential survey to be used in conjunction with geochemistry in order to outline buried sulphide mineralization consisting mainly of either oxidized disseminated sulphides or massive, unoxidized iron rich sulphides containing sphalerite. While having been replaced by more sophisticated survey methods, the self potential method had been successful in outlining the location of the Long Lake zinc deposit, a high-grade zinc orebody hosted by Grenville marbles (see figure, next page). Based on this recommendation and the Long Lake zinc deposit as a case study the remainder of the work programme consisted of re-location of the old flagged lines, line cutting, an S.P survey and a total field & vertical gradiometric Magnetometer/VLF-EM survey. In 1992 a preliminary magnetic/VLF survey was carried out on the flagged lines and indicated that VLF targets were present. As the 1992 VLF data could not be tied accurately into the new grid the survey was repeated. The magnetic survey was repeated for the same reason but also due to the fact that a base-station recorder had not been employed in the 1992 survey and the data was rendered useless (the diurnal variation from line to line was greater than the line anomalies). A description of the survey instruments and parameters are listed in Appendix 3. The results of the Magnetometer/VLF survey (postings, contoured and profiled data) are compiled in Appendix 4). Although considerable care was taken to re-locate the flagged lines and to tie in the geochemical data with the new grid the location of the exact samples sites is only approximate (probably within 25-30 metres). Figure 5.1 illustrates the soil geochemical data in ppm zinc and



—Zinc soil geochemical survey of Long Lake zinc deposit. Compiled from data provided by Lynx-Canada Explorations Limited.

SOILS



CAVENDISH ZINC PROSPECT
CAVENDISH TOWNSHIP
PETERBOROUGH COUNTY, ONTARIO

SELF-POTENTIAL SURVEY PROFILES

Figure 5.2

the location of the new cut lines.

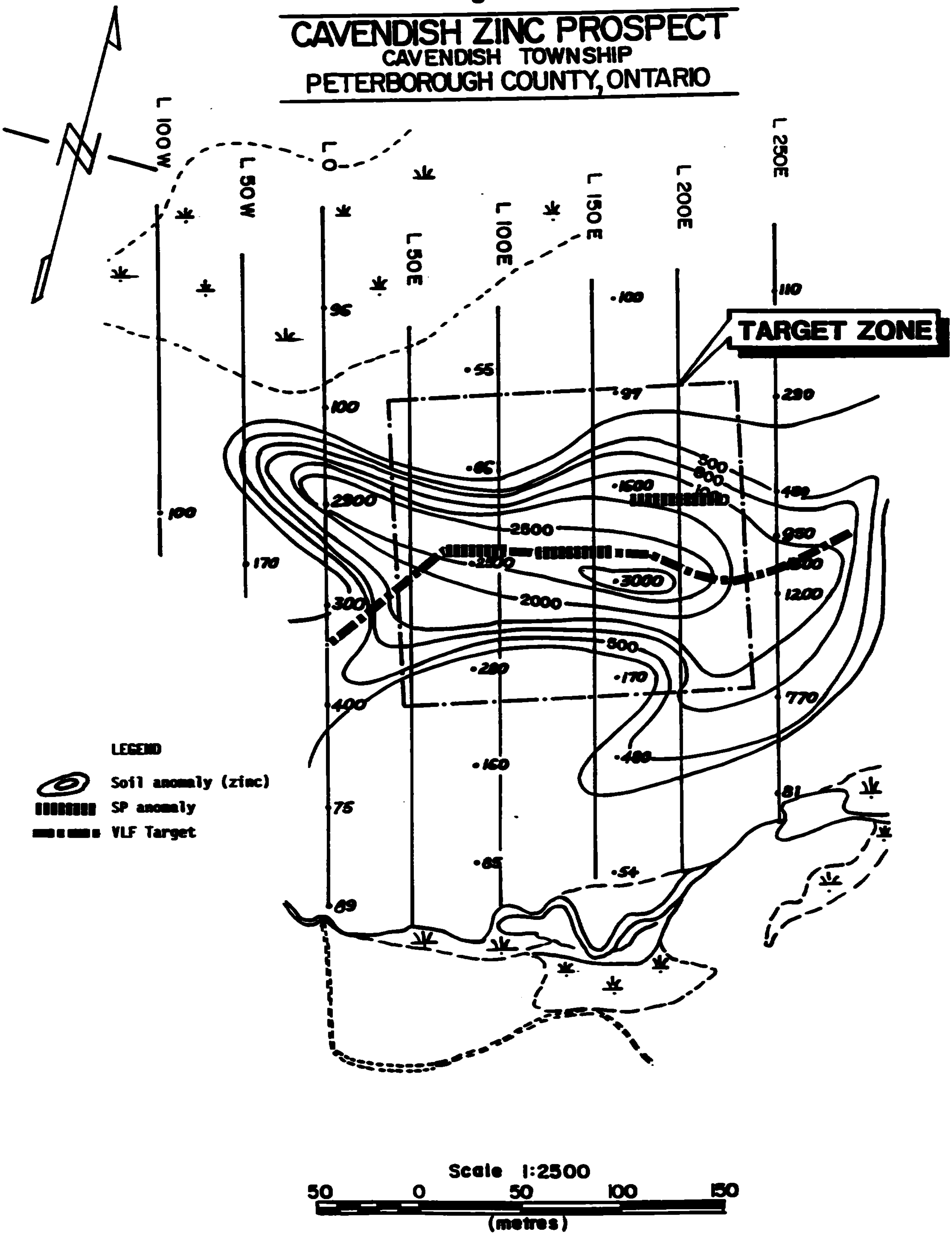
7. EXPLORATION TARGETS AND MINERALIZATION

In 1992/93, prospecting and soil geochemistry surveys led to the discovery of a linear and continuous zinc anomaly following the strike of the underlying metamorphosed carbonate rocks roughly 800 to 900 metres in length. This anomaly lies along the side of a hill as well as at a break in slope and has an apparent down-slope dispersion of roughly 100 metres. Near surface outcrop is not abundant, but the entire anomaly appears to be underlain by a rubbly weathering marble unit paralleling the strike of the anomaly. Stripping and hand trenching has confirmed the existence and relative strengths of the soil anomaly but did not uncover and surface mineralization. Rocks assayed for zinc were geochemically anomalous (200 - 400 ppm zinc) but not high enough to explain the presence of the high zinc content in the soils. Where trenched however, the outcrops were flat and difficult to sample. Fresh, unweathered samples could not be taken.

Geophysical surveys outlined an anomalous magnetic, VLF-EM and Self-Potential zone coincident with the high geochemical values in the soil (refer to Compilation Map - figure 5.3). This target is centred on Line 1+50E, 175 metres north of the Salemo River. Together the Magnetic and VLF-EM data suggest a near-surface strike extent of the zone to be in the order of about 150 - 200 metres. The S.P. data indicates a shorter strike length, however as an S.P anomaly defines the source of the anomaly where closest to the surface rather than the concentration of sulphides, the VLF data and Magnetic data more accurately reflect the actual strike length of the zone. In fact the geochemical data suggests an even much broader and longer extent to the mineralized zone. As the S.P. method does not respond to subsurface valleys, wet clays, shears or faults and rarely gives a false anomaly (Burr, 1982) it seems likely that the V.L.F. indicated conductor is reflecting the presence of buried, **massive sulphides**.

Figure 5.3

CAVENDISH ZINC PROSPECT
CAVENDISH TOWNSHIP
PETERBOROUGH COUNTY, ONTARIO



While an S.P. anomaly can also be due to disseminated sulphides it is unlikely that this is the case as the pH of the groundwater would be extremely basic in this carbonate terrain. No evidence of oxidized sulphides in the marbles were noted. In the two instances where sulphides were noted in outcrop (outside of the claims) the pyrite cubes were fresh and unaltered. This additional evidence strongly points to that of a buried massive sulphide body rather than bedded, disseminated sulphides. According to Burr, 1982 the S.P. anomaly is not strong enough to be due to a graphite (sulphides produce a range of up to 350 millivolts, graphite has a higher range in the order of thousands of millivolts).

The combination of coincident zinc geochemical values - magnetic high - well defined S.P. anomaly - VLF indicated conductor and interpreted rock contact by the vertical gradient mag. contours strongly indicates the presence of buried sulphides, part of which will likely be composed of zinc rich mineralization. This zone is a definite, **`bull's eye'** drill target.

8. CONCLUSIONS AND RECOMMENDATIONS

Through detailed prospecting, soil geochemistry and geophysical surveys a potentially mineralized horizon in zinc has been outlined within carbonate rocks in Cavendish Township. The soil anomaly, part of which is conductive & magnetic and exhibits a strong Self Potential anomaly, has an overall strike extent of at least 900 metres.

The source for the enhanced zinc content in the soil profiles has not been identified by prospecting of outcrop exposures. This could be explained by either of two factors; a transported anomaly from a buried body, or due to surface weathering and removal of the zinc from the exposed rocks. There are examples in Grenville carbonate rocks where a surface expression of high grade zinc mineralization has weathered out, leaving a barren weathered rind on the outcrops. The geophysical data appears to contradict the transported `soil anomaly' theory as these data are coincident with high geochemical zone.

The soil anomaly was verified in many localities in 1991 by re-sampling of several anomalous sites as well as by profiling many of the soil horizons. The data from the lab is therefore real as are the locations in the field. The geophysical data was collected and computer plotted by an independent geophysical contractor with over 30 years of experience in the industry. The data presented in this report represent a well-defined drill target with an exceptional opportunity to intersect zinc rich ore.

It is recommended that the *'Cavendish Zinc Prospect'* merits further exploration in the way of testing by diamond drilling.

Respectfully submitted,

09/01/93

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CONSULTING GEOLOGIST

CERTIFICATE

I, Paul W. Pitman residing at 51 Isabella Street, Brampton, Ontario, (905) 451-5057 do hereby certify that:

1. I have been a Consulting Geologist since 1983.

2. I am a graduate of Carleton University, Ottawa, having received an Honours B.Sc. in Geology and have been practising my profession for over two decades.

3. I wholly own the claims for which application is being made to apply the outlined exploration work and expenditures carried out under OPAP Grant 93 - 615 for assessment credits.

4. I have personally carried out the surveys on the claims during the summer and fall of 1993 and have supervised all sub-contractors.

5. I consent to, and authorize, any use of the attached report by the Government of Ontario and the Ministry of Northern Development and Mines.

6. Dated September, 1993.

Fact Finders

P.W. PITMAN
51 ISABELLA ST.
BRAMPTON, ONT.
L6X 1P8
(416) 451-5057

PAUL PITMAN BSc.
Consulting Geologist

APPENDICES

1. Expense Summary
2. List of Selected References
3. Geophysical Survey Equipment - Specifics and Map Legends
4. Maps
5. Assay Certificates
6. Claim Map
7. Work Permit

APPENDIX 1 - EXPENSE SUMMARY

Phase 1. Extension of Soil Sampling & Prospecting and Line Cutting

(A) Preparation

blowup of airphoto, topographic map, MP 99		73.49
topofil string, flagging tape		44.38
field supplies (string, sample bags, fibre tape, axe file, plastic bags, zinc-zap solution, magic markers, picket stakes, spray paint, 2 field note books		136.87
long distance calls		5.32

(B) Lodging

(11 nights) @ $61.09/night + tax		772.80

(C) Meals

Travel meals	35.71	
Groceries	209.18	
Breakfasts	19.11	
	264.00	264.00

(D) Prospecting Field Costs

2 travel days		n/c
10 field days (applicant) @ 100		1000.00
6.5 days - field assistant @ 100/day + vehicle		680.00
9 days - field assistant @ 100/day + axe rental		925.00
1 day (applicant) plotting geochem.+ interpretation @ 100/day		100.00
chain saw rental		136.20

(E) Travel Costs

Brampton to Area & Return	394 km	
daily travel @ 51 km to site	1100 km	
	1494 km x $.30	448.20

(F) Geochemical Costs

assays	182.70	
courier to lab	8.55	
	191.25	191.25

SUBTOTAL——$4,777.51

Phase 11. Cont'd Line Cutting & Geophysical Surveys

(A)	Preparation: long distance calls		2.49
	field supplies		41.76
(B)	Lodging: 4 nights @ $50/night + tax		224.00
(C)	Meals: 3/day for 5 days @ aver 9/meal		158.72
(D)	Prospecting - field costs:		
	2 travel days	n/c	
	4 field days (applicant)	400.00	
	1 day replotting 1992 geochem data to new cut lines & to new airphoto scale (applicant)	100.00	
		500.00	500.00
(E)	Travel Costs: 400 km mob + 440 to/from site = 840 km @ $0.30/km		252.00
(F)	Contractor Costs		
	Geophysical surveys (S.P., VLF/Mag), line cutting, equipment rental		2500.00
	Contract computerization of geophysical data		197.95

SUBTOTAL———$3,876.92

REPORT COSTS

(A)	Contract Typing	225.00	
	Drafting Of Figures & Maps	256.80	481.80
(B)	Report Writing; (applicant) 5 days @ 100		500.00
(C)	Photo reduction of computer maps		10.75
(D)	Printing, binding, maps		49.60

SUBTOTAL———$1042.15

TOTAL ———$9,696.58

	Auto Kilometers		PHASE 1 WORK		7
	SUN.		kilometers		
	MON.		kilometers		
06/29	TUES.	196	kilometers Travel to site		N/C
06/30	WED.	110	kilometers on claims: soil geochem L2150,3		100
07/1	THUR.	110	kilometers on claims: soil geochem L350-L450		100
07/2	FRI.	110	kilometers on claims: prospecting new lines		100
07/3	SAT.	110	kilometers on claims: line cutting		100
07/4	SUN.	110	kilometers on claims: line cutting		100
07/5	MON.	110	kilometers on claims: line cutting		100
07/6	TUES.	110	kilometers on claims: line cutting		100
07/7	WED.	110	kilometers on claims: line cutting		100
07/8	THUR.	110	kilometers on claims: line cutting		100
07/9	FRI.	110	kilometers on claims: line cutting		100
07/10	SAT.	198	kilometers Return to Brampton		N/C
	SUN.		kilometers		
	MON.		kilometers		
	TUES.		kilometers		
	WED.		kilometers		
	THUR.		kilometers		
07/23	FRI.	—	kilometers plot geochem values/interpret		100
	SAT.		kilometers re further line cutting		
	SUN.		kilometers		
	MON.		kilometers		
	TUES.		kilometers		
	WED.		kilometers		
	THUR.		kilometers		
	FRI.		kilometers		
	SAT.		kilometers		
	TOTAL	1494	kilometers at per km 0.30	Total $ 448.20	1100.00
	1494 Km, 11 days			Total $	

This is an accurate statement of my Expenditures and Car Kilometers (if any) for the above weeks

Approved ____________ Signed [signature]

Received Amount ____________

	Auto Kilometers			PHASE 2 WORK		
	SUN.		kilometers			
	MON.		kilometers			
	TUES.		kilometers			
	WED.		kilometers			
	THUR.		kilometers			
	FRI.		kilometers			
	SAT.		kilometers			
	SUN.		kilometers			
	MON.		kilometers			
08/31	TUES.	200	kilometers	Travel to Site		N/C
09/1	WED.	110	kilometers	@ claims - line cutting		100
09/2	THUR.	110	kilometers	@ claims - line cutting		100
09/3	FRI.	110	kilometers	@ claims - S.P survey		100
09/4	~~SAT.~~	110	kilometers	@ claims - S.P survey		100
	~~SUN.~~	200	kilometers	Travel from Site / home		N/C
09/6	MON.		kilometers	plotting geophysical (new		100
	TUES.		kilometers	data) on new grid - align		
	WED.		kilometers	1992 data on flagged lines to		
	THUR.		kilometers	new grid lines.		
	FRI.		kilometers			
	SAT.		kilometers			
	SUN.		kilometers			
	MON.		kilometers			
	TUES.		kilometers			
	WED.		kilometers			
	THUR.		kilometers			
	FRI.		kilometers			
	SAT.		kilometers			
	TOTAL	840	kilometers at 840	per km 0 30 Total $	252.00	500
				Total $		

This is an accurate statement of my Expenditures and Car Kilometers (if any) for the above weeks

Approved ______________ Signed [signature]

Received Amount ______________

	Auto Kilometers		PHASE III - Report		
	SUN.		kilometers		
09/20	MON.	80	kilometers - Pickup geophysical data (computer plots) + wrote report		100
09/21	TUES.		kilometers Report writing		100
09/22	WED.		kilometers Report writing		100
09/23	THUR.	80	kilometers Report writing		100
09/24	FRI.		kilometers Report writing		100
	SAT.		kilometers		
	SUN.		kilometers		
	MON.		kilometers		
	TUES.		kilometers		
	WED.		kilometers		
	THUR.		kilometers		
	FRI.		kilometers		
	SAT.		kilometers		
	SUN.		kilometers		
	MON.		kilometers		
	TUES.		kilometers		
	WED.		kilometers		
	THUR.		kilometers		
	FRI.		kilometers		
	SAT.		kilometers		
	SUN.		kilometers		
	MON.		kilometers		
	TUES.		kilometers		
	WED.		kilometers		
	THUR.		kilometers		
	FRI.		kilometers		
	SAT.		kilometers		
	TOTAL	160	kilometers at 0.30 per km Total $	48.00	500.00
			Total $		

This is an accurate statement of my Expenditures and Car Kilometers (if any) for the above weeks

Approved ____________ Signed ____________

Received Amount ____________

APPENDIX 2 - LIST OF SELECTED REFERENCES

Publications:

° Anderson, GM, Macqueen, RW. (1988): Mississippi Valley-Type Lead-Zinc Orebodies. in/ Ore Deposit Models. Geoscience Canada Reprint Series 3. p 79-90

° Bartlett J.R., DeKemp E. (1987); Lithofacies, Stromatolite Localities - Metallic Mineral Occurrences and Geochemical Anomalies Associated with Carbonate Metasediments - Burleigh Falls, Bancroft, Madoc Areas. Notes on Map, OGS 3079, 1:126,720 scale.

° Burr, S.V. (1982): A Guide to Prospecting by the Self-Potential Method. OGS MP 99, 15pp.

° DeLorraine WF, Dill, DB (1982): Structure, Stratigraphic Controls, and Genesis of the Balmat Zinc Deposits, Northwest Adirondacks, New York. in/ Precambrian Sulphide Deposits, GAC Special Volume 25, p571-596

° Gauthier M, Brown A.C. (1980); Exploration Guidelines For Stratiform Zinc Deposits in the Grenville Supergroup of the Mount Laurier Basin, Quebec. CIM Bull, Vol 73, No. 819, July 1980 p56-61.

° Sangster A.L. (1968); Some Geochemical Features of Lead-Zinc Deposits in Carbonate Rocks. GSC Paper 68-39.

° Sangster A.L. (1982): Geology of the Grenville Province, and Regional Metallogenesis of the Grenville Supergroup. in GAC Precambrian Sulphide Deposits, Special Paper 25, p 91-125

° Sangster, A.L. (1970); Metallogeny of Base Metals, Gold and Iron Deposits of the Grenville Province of SE Ontario. PhD Thesis, Queens Univ., Kingston.

° Sinclar, I.G.L. (1979); Geochemical Investigation of the Clyde River Zinc Prospect, Lanark County, On. p 487-495; in/ Geochemical Exploration 1978 - Proceedings of the 7th International Geochemical Exploration Symposium, Golden Co.

° Mendelsohn F. (1976); Mineral Deposits Associated with Stromatolites. p645-662. in/ Stromatolites, ed. MR Walker, Elsevier Scientific Publications, New York.

MAPS:

° P-2699; Precambrian Geology, Howland Area, NTS 31/ D 15SE, Haliburton, Peterborough & Victoria Counties, On by RM Easton, JR Bartlett, (1984), 1:1584 scale.

° P-3096; Precambrian Geology, Burleigh Falls, On.

° P-2205; Precambrian Geology, Eels Lake Area, On.

° Map 2418; OGS Compilation Map, Southern Ontario

° Map 1957b: Haliburton - Bancroft Area, by DF Hewitt, J. Satterly, 1955/56, revised in 1972, 1" = 2 miles.

Assessment Files:

° 2.12692 B. LeRoy (1989); Geology, Zinc and Mineralization; Cavendish Township Claims, Ontario (Northgate Exploration Ltd.)

° Cavendish Airborne Test Site; McPhar Geophysics Ltd, Airborne EM Survey, (F-400) Test Area, Centennial Coference Test Area.

APPENDIX 3 - GEOPHYSICAL SURVEY EQUIPMENT SPECIFICS AND MAP LEGENDS

1) MAGNETIC/GRADIOMETER/VLF-EM

Instrument: EDA Omni 4 Plus (Total Field, Gradiometer, Base Station Corrected)
Operator: D. Dmitrovic

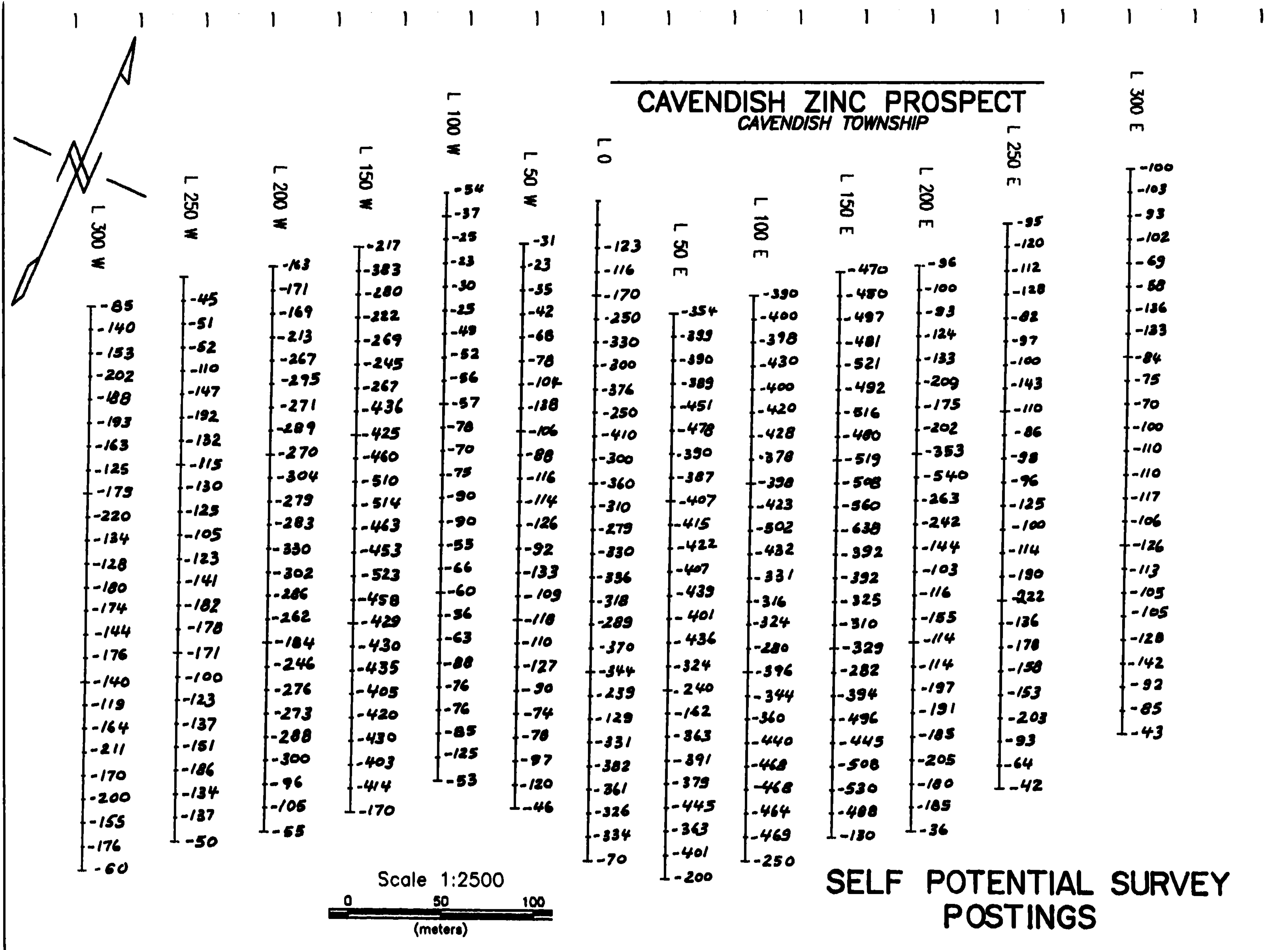
Specifics:

(A) MAGNETIC (Total Field):	Total Field in nT Intervals: 5, 20, 100 nT Data gridded on 5 metre grid Diurnal Correction - Base Station Profile Scale: 1 cm = 250 nT Profile Base: 56,600 nT Positive Direction: Right (East)
(B) MAGNETIC (Vert. Gradient)	Intervals: 5, 25 nT/m Data gridded on 5 metre grid Vertical Gradient in nT/m Posting and Profile Base: Zero Profile Scale: 1 cm = 100 nT/m Positive Direction: Right (East)
(C) VLF EM	Transmitter: NSS (21.4 kHz) Filter Intreval: 12.5 metres Contour Intervals: 5, 20 units Data gridded on 5 metre grid Facing Direction: South In-Phase Plotting: Left of Line, Solid Line Quadrature Plotting: Right of Line, Dotted Line Positive Direction: Right (East)

2. SELF POTENTIAL

Uncorrected Readings in mV.
Instrument: Backman Tech 310
1000 metre cable, readings taken every 15 m
Pots: Scintrex I.P. Pots

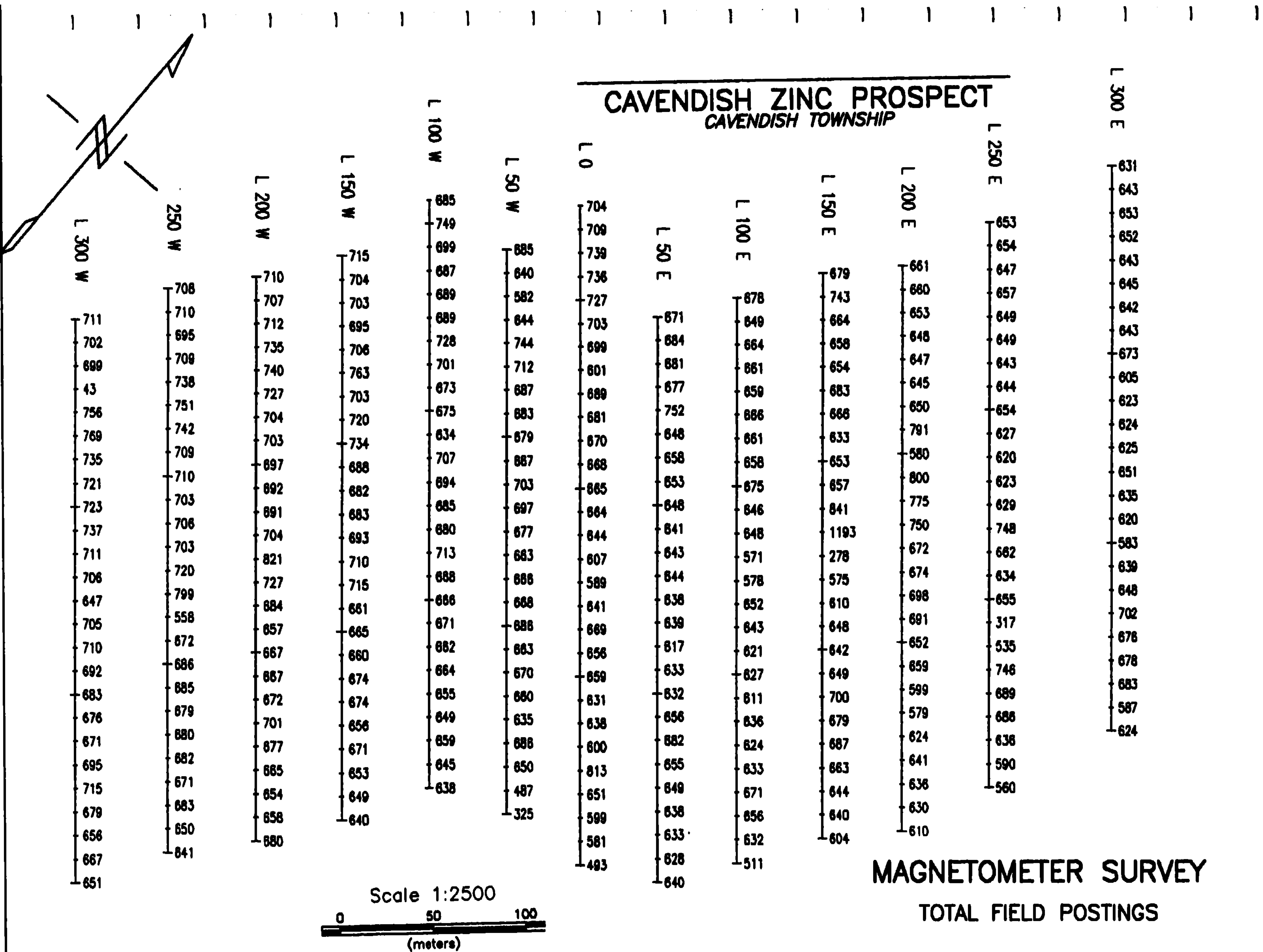
APPENDIX 4 - GEOPHYSICAL MAPS

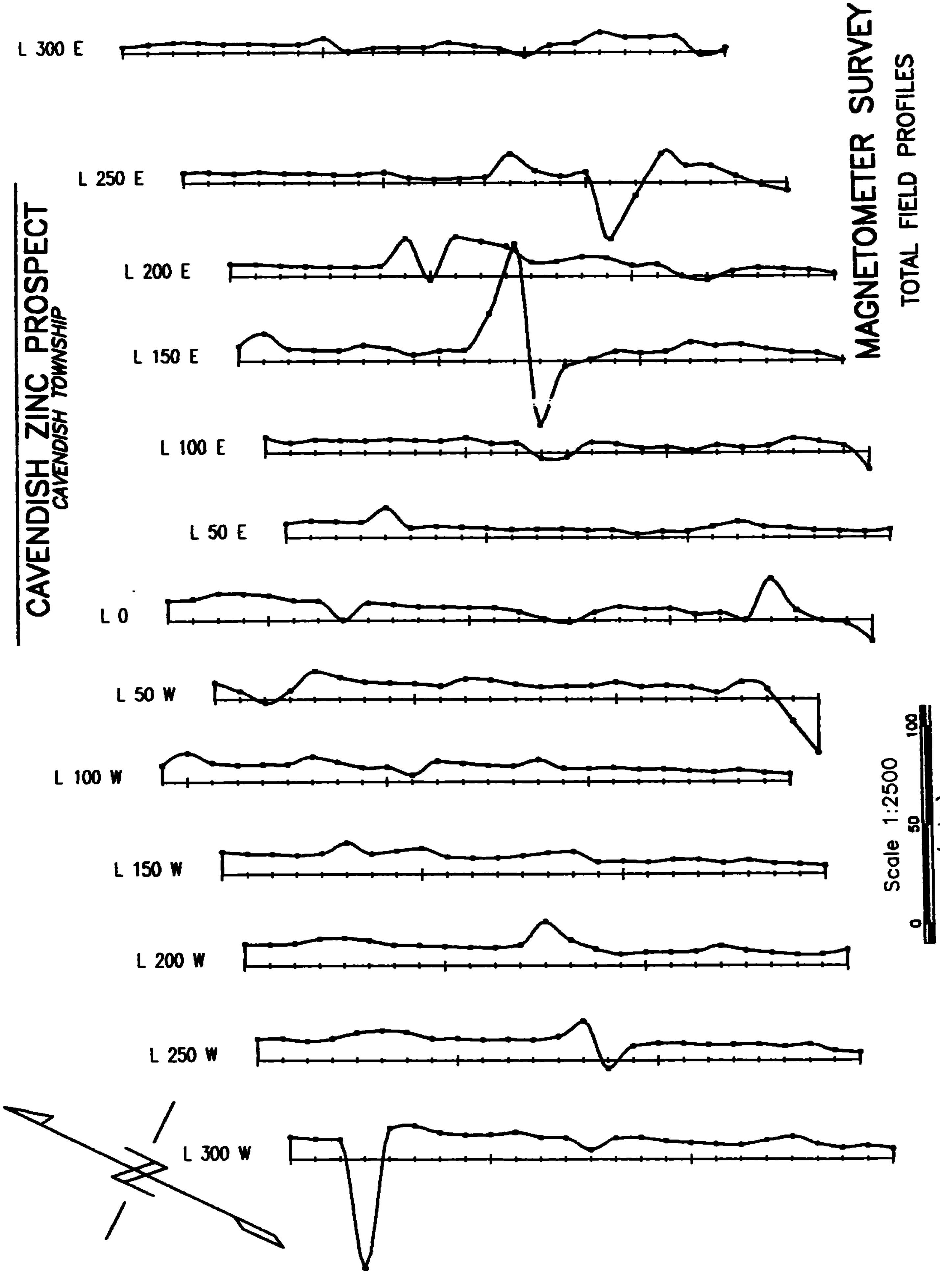


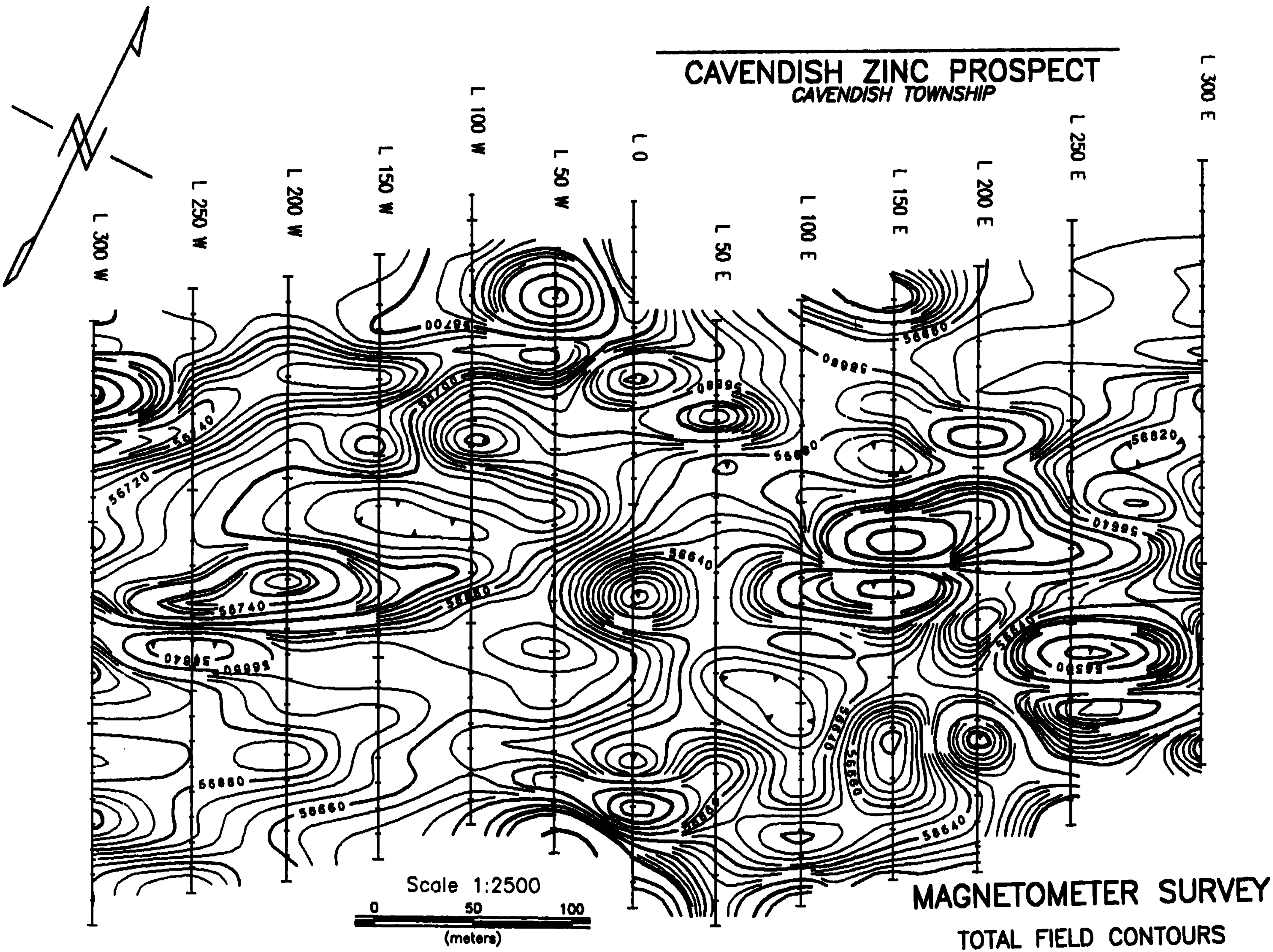
CAVENDISH ZINC PROSPECT
CAVENDISH TOWNSHIP
L 300 W
L 250 W
L 200 W
L 150 W
L 100 W
L 50 W
L 0
L 50 E
L 100 E
L 150 E
L 200 E
L 250 E
L 300 E
Scale 1:2500
0
50
100
(meters)
SELF POTENTIAL SURVEY
POSTINGS

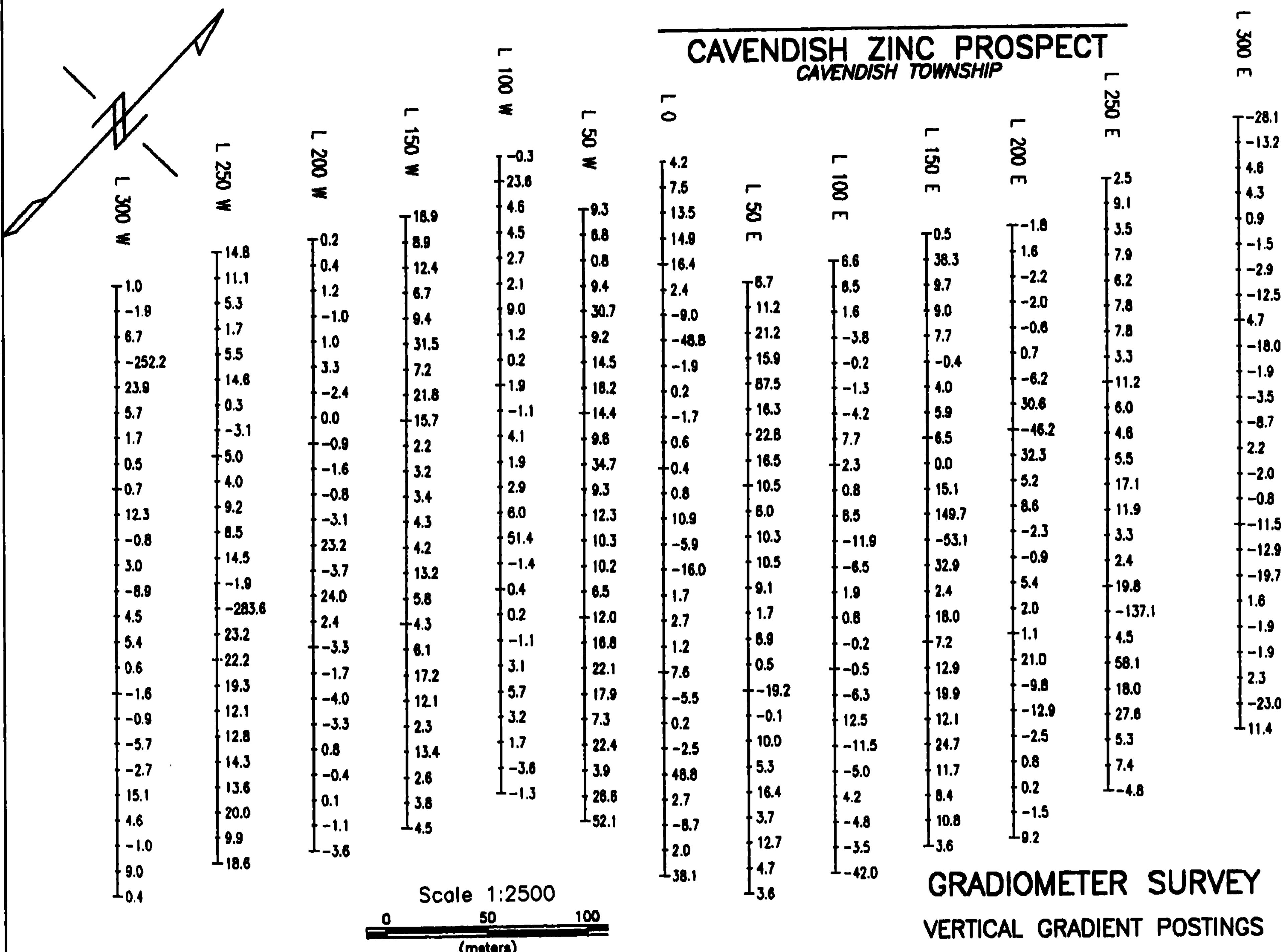
CAVENDISH ZINC PROSPECT
CAVENDISH TOWNSHIP

MAGNETOMETER SURVEY
TOTAL FIELD POSTINGS




CAVENDISH ZINC PROSPECT
CAVENDISH TOWNSHIP
MAGNETOMETER SURVEY
TOTAL FIELD PROFILES
L 300 E
L 250 E
L 200 E
L 150 E
L 100 E
L 50 E
L 0
L 50 W
L 100 W
L 150 W
L 200 W
L 250 W
L 300 W
Scale 1:2500
0
50
100
(meters)


CAVENDISH ZINC PROSPECT
CAVENDISH TOWNSHIP
L 300 W
L 250 W
L 200 W
L 150 W
L 100 W
L 50 W
L 0
L 50 E
L 100 E
L 150 E
L 200 E
L 250 E
L 300 E
56700
56740
56720
56680
56660
56640
56620
Scale 1:2500
0
50
100
(meters)
MAGNETOMETER SURVEY
TOTAL FIELD CONTOURS


CAVENDISH ZINC PROSPECT
CAVENDISH TOWNSHIP
L 300 W: 1.0 -1.9 6.7 -252.2 23.9 5.7 1.7 0.5 0.7 12.3 -0.8 3.0 -8.9 4.5 5.4 0.6 -1.6 -0.9 -5.7 -2.7 15.1 4.6 -1.0 9.0 0.4
L 250 W: 14.8 11.1 5.3 1.7 5.5 14.6 0.3 -3.1 5.0 4.0 9.2 8.5 14.5 -1.9 -283.6 23.2 22.2 19.3 12.1 12.8 14.3 13.6 20.0 9.9 18.6
L 200 W: 0.2 0.4 1.2 -1.0 1.0 3.3 -2.4 0.0 -0.9 -1.6 -0.8 -3.1 23.2 -3.7 24.0 2.4 -3.3 -1.7 -4.0 -3.3 0.8 -0.4 0.1 -1.1 -3.6
L 150 W: 18.9 8.9 12.4 6.7 9.4 31.5 7.2 21.8 15.7 2.2 3.2 3.4 4.3 4.2 13.2 5.8 4.3 6.1 17.2 12.1 2.3 13.4 2.6 3.8 4.5
L 100 W: -0.3 23.6 4.6 4.5 2.7 2.1 9.0 1.2 0.2 1.9 -1.1 4.1 1.9 2.9 6.0 51.4 -1.4 0.4 0.2 -1.1 3.1 5.7 3.2 1.7 -3.6 -1.3
L 50 W: 9.3 6.8 0.8 9.4 30.7 9.2 14.5 18.2 14.4 9.6 34.7 9.3 12.3 10.3 10.2 6.5 12.0 16.8 22.1 17.9 7.3 22.4 3.9 28.6 52.1
L 0: 4.2 7.5 13.5 14.9 16.4 2.4 -9.0 -48.8 -1.9 0.2 -1.7 0.6 0.4 0.8 10.9 -5.9 -16.0 1.7 2.7 1.2 7.6 -5.5 0.2 -2.5 48.8 2.7 -8.7 2.0 38.1
L 50 E: 8.7 11.2 21.2 15.9 87.5 16.3 22.8 16.5 10.5 6.0 10.3 10.5 9.1 1.7 6.9 0.5 -19.2 -0.1 10.0 5.3 16.4 3.7 12.7 4.7 3.6
L 100 E: 6.6 6.5 1.6 -3.8 -0.2 -1.3 -4.2 7.7 2.3 0.8 6.5 -11.9 -6.5 1.9 0.8 -0.2 -0.5 -6.3 12.5 -11.5 -5.0 4.2 -4.8 -3.5 -42.0
L 150 E: 0.5 38.3 9.7 9.0 7.7 -0.4 4.0 5.9 6.5 0.0 15.1 149.7 -53.1 32.9 2.4 18.0 7.2 12.9 19.9 12.1 24.7 11.7 8.4 10.8 3.6
L 200 E: -1.8 1.6 -2.2 -2.0 -0.6 0.7 -6.2 30.6 -46.2 32.3 5.2 8.6 -2.3 -0.9 5.4 2.0 1.1 21.0 -9.8 -12.9 -2.5 0.8 0.2 -1.5 9.2
L 250 E: 2.5 9.1 3.5 7.9 6.2 7.8 7.8 3.3 11.2 6.0 4.6 5.5 17.1 11.9 3.3 2.4 19.8 -137.1 4.5 58.1 18.0 27.6 5.3 7.4 -4.8
L 300 E: -28.1 -13.2 4.6 4.3 0.9 -1.5 -2.9 -12.5 4.7 -18.0 -1.9 -3.5 -8.7 2.2 -2.0 -0.8 -11.5 -12.9 -19.7 1.6 -1.9 -1.9 2.3 -23.0 11.4
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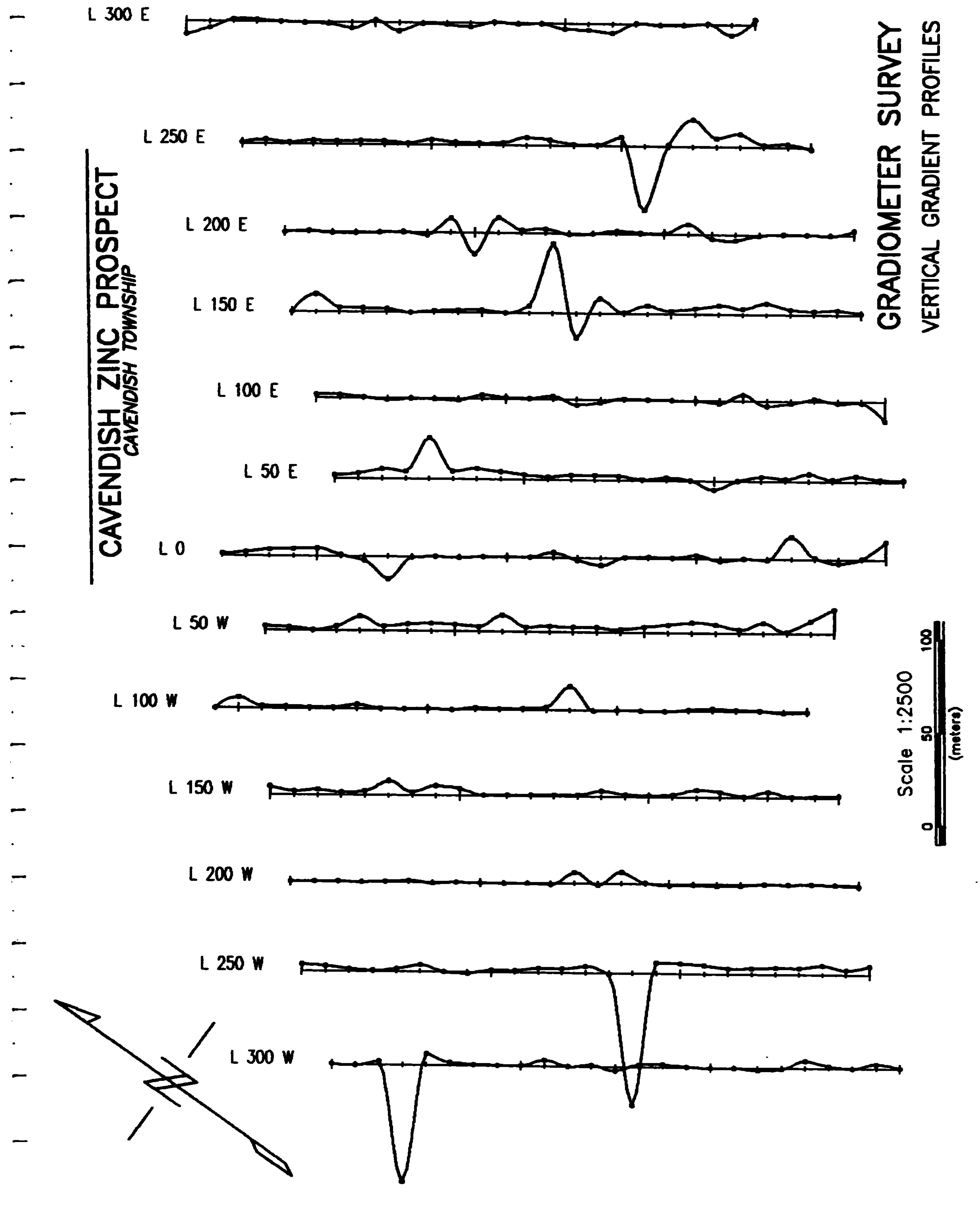
VERTICAL GRADIENT POSTINGS



CAVENDISH ZINC PROSPECT
CAVENDISH TOWNSHIP
GRADIOMETER SURVEY
VERTICAL GRADIENT PROFILES
L 300 E
L 250 E
L 200 E
L 150 E
L 100 E
L 50 E
L 0
L 50 W
L 100 W
L 150 W
L 200 W
L 250 W
L 300 W
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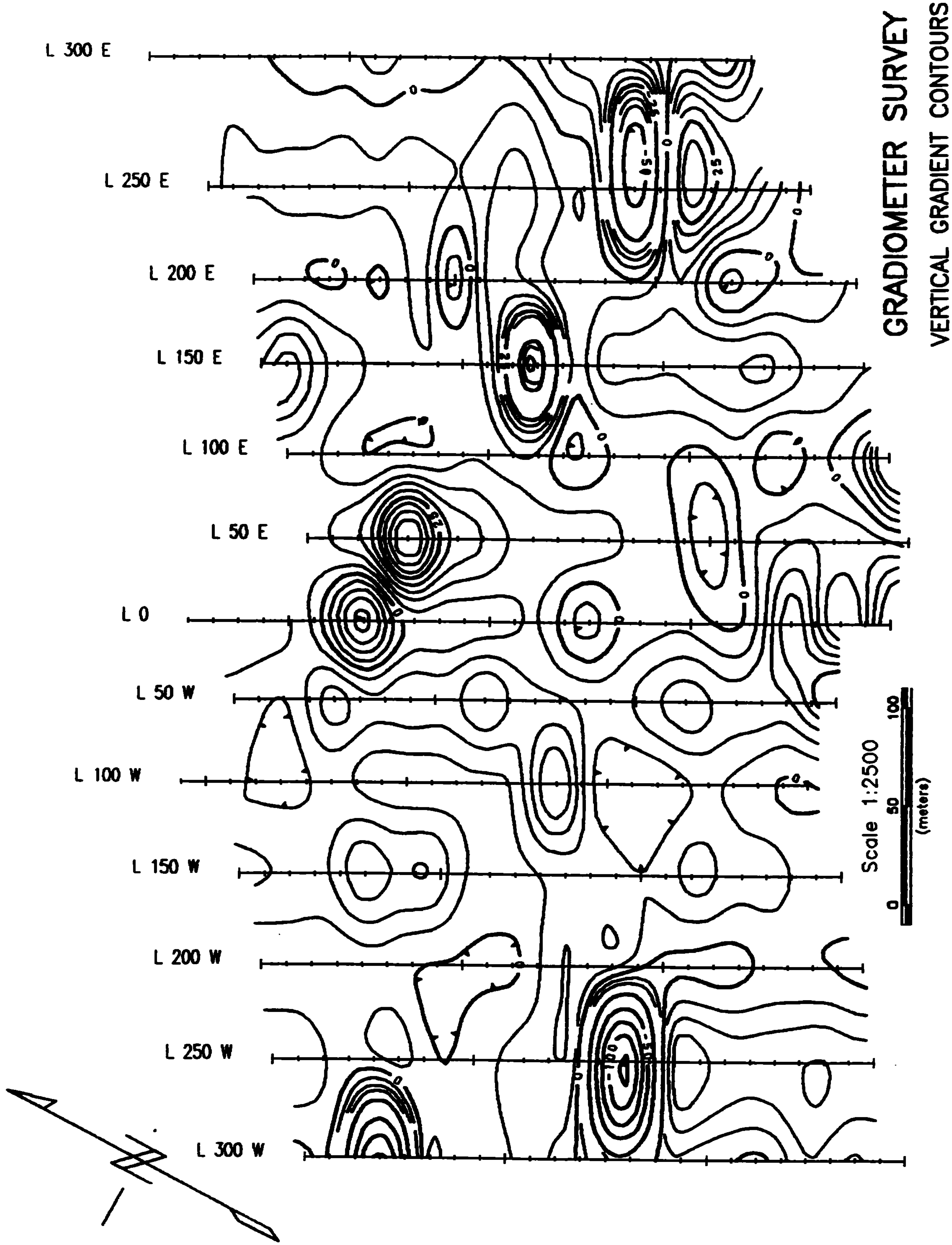
50
100
(meters)



GRADIOMETER SURVEY
VERTICAL GRADIENT CONTOURS
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L 250 E
L 200 E
L 150 E
L 100 E
L 50 E
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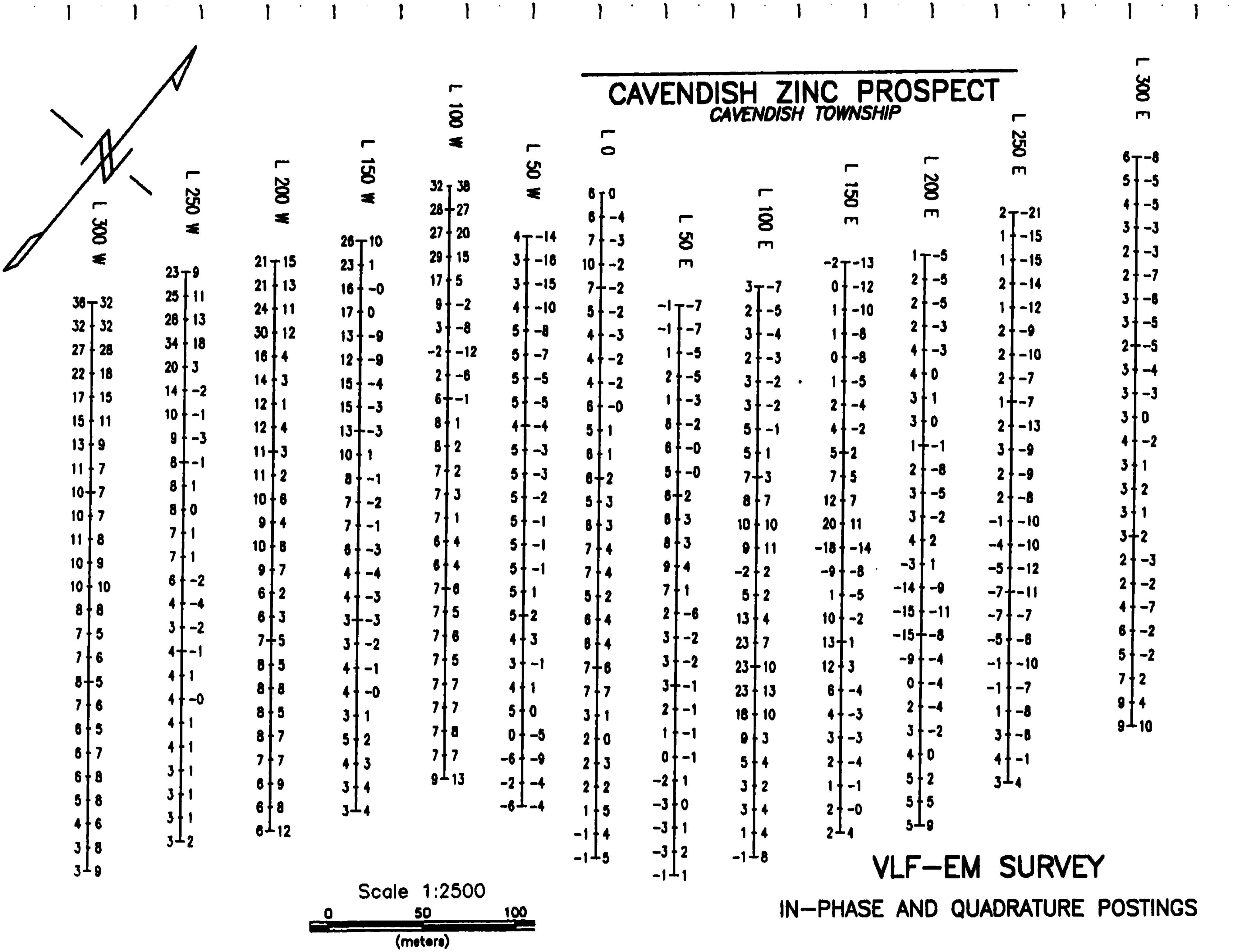
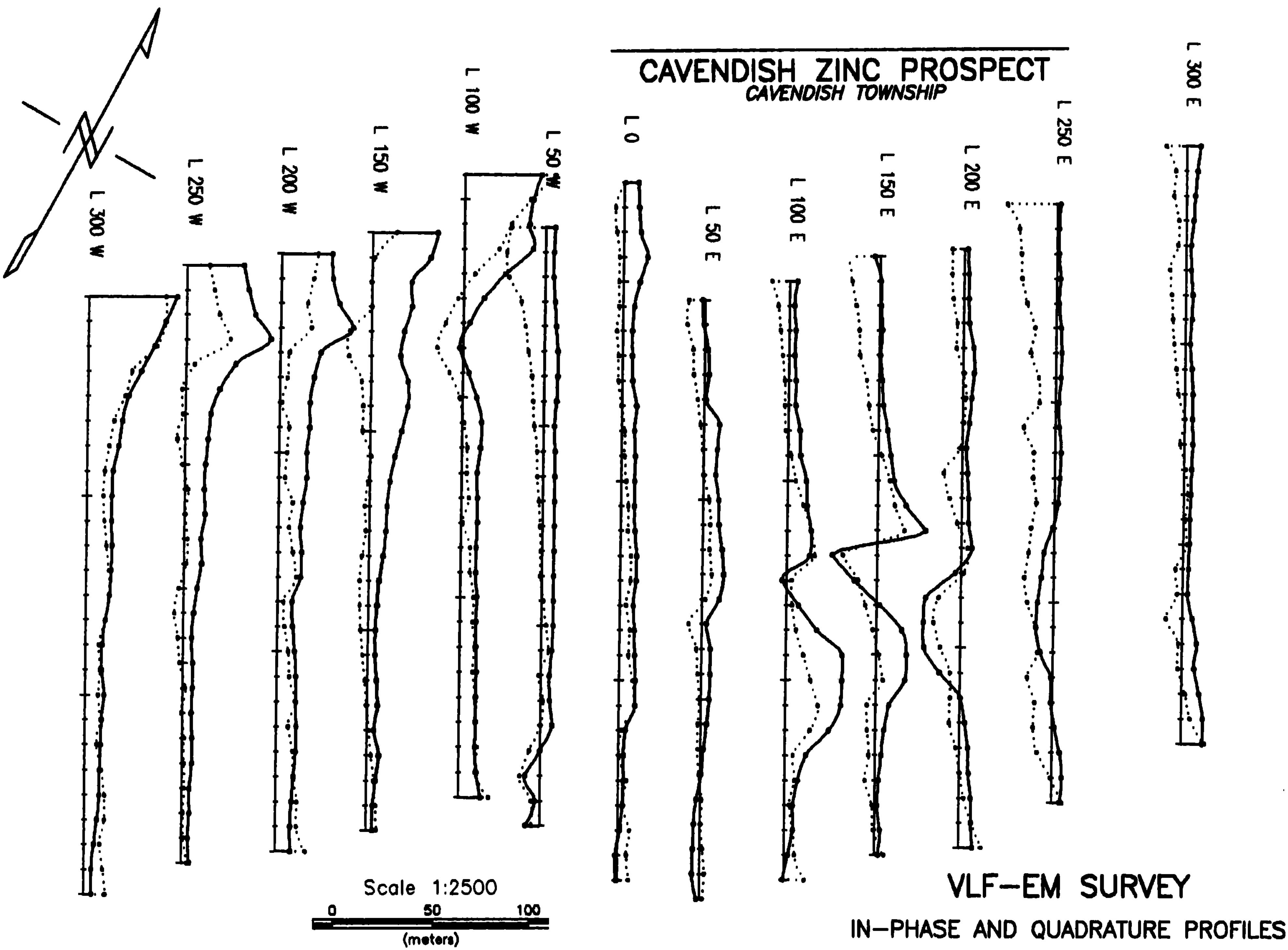
L 50 W
L 100 W
L 150 W
L 200 W
L 250 W
L 300 W
Scale 1:2500
0
50
100
(meters)

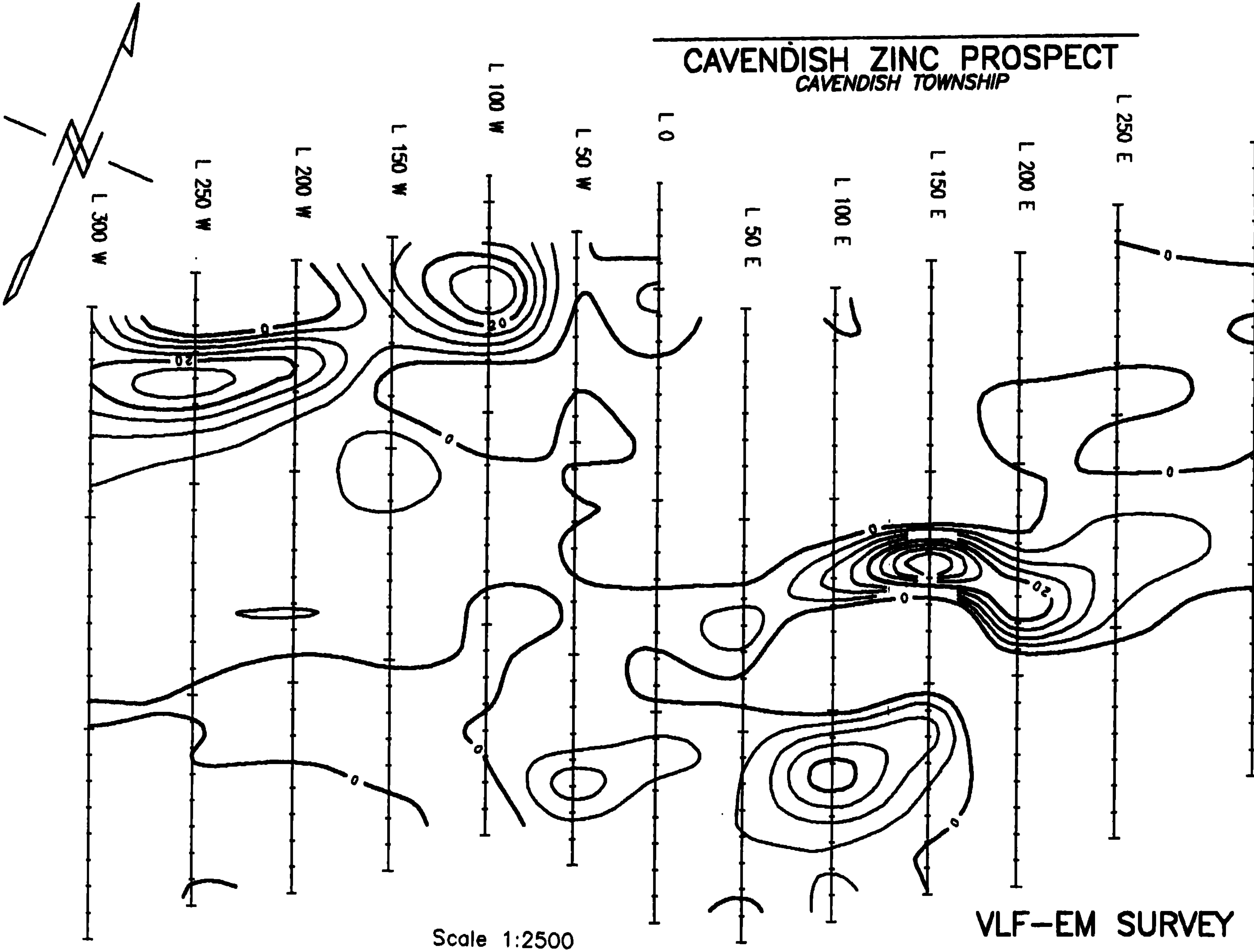

CAVENDISH ZINC PROSPECT
CAVENDISH TOWNSHIP
L 300 W
L 250 W
L 200 W
L 150 W
L 100 W
L 50 W
L 0
L 50 E
L 100 E
L 150 E
L 200 E
L 250 E
L 300 E
Scale 1:2500
0
50
100
(meters)
VLF—EM SURVEY
IN—PHASE AND QUADRATURE POSTINGS



CAVENDISH ZINC PROSPECT
CAVENDISH TOWNSHIP
L 300 W
L 250 W
L 200 W
L 150 W
L 100 W
L 50 W
L 0
L 50 E
L 100 E
L 150 E
L 200 E
L 250 E
L 300 E
Scale 1:2500
0
50
100
(meters)
VLF—EM SURVEY
IN—PHASE AND QUADRATURE PROFILES

CAVENDISH ZINC PROSPECT

CAVENDISH TOWNSHIP



Scale 1:2500

0 50 100

(meters)

VLF–EM SURVEY

FRASER FILTERED IN–PHASE DATA

APPENDIX 5 - ASSAY CERTIFICATES

ACCURASSAY LABORATORIES
A DIVISION OF BARRINGER LABORATORIES LIMITED, REXDALE, ONTARIO
BOX 426
KIRKLAND LAKE, ONTARIO, CANADA P2N 3J1
TEL.: (705) 567-3361

President: Dr. GEORGE DUNCAN, M.Sc., Ph. D., C. Chem (Ont.), C. Chem (U.K.), M.C.I.C., M.R.S.C., A.R.C.S.T.

47395

Certificate of Analysis

Pitman, Mr. Paul
20 Toronto Street
Suite 1270
TORONTO, Ontario
M5C 2B8

August 5 93

Work Order # : 930080
Project : OPAP 93-615

SAMPLE NUMBERS		Zinc
Accurassay	Customer	ppm
930853	Soil 93-293	73
930854	Soil 93-294	160
930855	Soil 93-295	1200
930856	Soil 93-296	310
930857	Soil 93-297	390
930858	Soil 93-298	89
930859	Soil 93-299	130
930860	Soil 93-300	62
930861	Soil 93-301	97
930862	Soil 93-302	130
930863	Soil 93-303	940
930864	Soil 93-304	360
930865	Soil 93-305	230
930866	Soil 93-306	93
930867	Soil 93-307	210
930868	Soil 93-308	74
930869	Soil 93-309	49
930870	Soil 93-310	130
930871	Soil 93-311	93
930872	Soil 93-312	75
930873	Soil 93-313	83
930874	Soil 93-314	58
930875	Soil 93-315	120
930876	Soil 93-316	180
930877	Soil 93-317	240
930878	Soil 93-318	72
930879	Soil 93-319	240
930880	Soil 93-320	110
930881	Soil 93-321	160
930882	Soil 93-322	97
930883	Soil 93-323	62

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
Dr. G. Duncan
CHEMIST

Per: G. Duncan

LF-30

ORIGINAL

ACCURASSAY LABORATORIES
A DIVISION OF BARRINGER LABORATORIES LIMITED, REXDALE, ONTARIO
BOX 426
KIRKLAND LAKE, ONTARIO, CANADA P2N 3J1
TEL.: (705) 567-3361

President: Dr. GEORGE DUNCAN, M.Sc., Ph. D., C. Chem (Ont.), C. Chem (U.K.), M.C.I.C., M.R.S.C., A.R.C.S.T.

47396

Certificate of Analysis

Pitman, Mr. Paul
20 Toronto Street
Suite 1270
TORONTO, Ontario
M5C 2B8

August 5 93

Work Order # : 930080
Project : OPAP 93-615

SAMPLE NUMBERS		Zinc
Accurassay	Customer	ppm
930884	Soil 93-324	60
930885	Soil 93-325	170
930886	Soil 93-326	170
930887	Soil 93-327	70
930888	Soil 93-328	68
930889	Rock 933-329	390
930890	Rock 933-330	240
930891	Rock 933-331	Sample Missing
930892	Soil 93-332	400

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
Dr. G. Duncan
CHEMIST

Per: G. Duncan

LF-30

ORIGINAL

CHARTFRED CHEMISTS, ASSAYERS, ANALYTICAL CONSULTANTS
Box 426, 3 Industrial Dr., Kirkland Lake, Ontario, Canada P2N 3J1 - Tel.: (705) 567-3361
Branches at Thunder Bay, Red Lake, Timmins
President: Dr. George Duncan, M.Sc., Ph.D., M.C.I.C., M.R.S.C., C. Chem. (Ont.), C. Chem. (UK), A.R.C.S.T.

SAMPLE PREPARATION

ACCURASSAY LABORATORIES

ROCKS

Rocks, drill core, grab samples, etc. are first dried if necessary and then crushed, split and ground to a homogenous powder from which the assay samples are taken. A silica-sand clean-out is performed between each batch of samples or between every sample, if required.

Drying up to 5lbs	$ 1.00
Jaw Crush up to 5lbs (2.5Kg) to 0.25in, cone crush to -8 mesh, riffle split and pulverise 200g to 95% -150 mesh	
- with silica sand clean-out between batches	$ 4.25
- with silica sand clean-out between each sample	$ 4.60

Sample over 4Kg will be charged at $0.60/lb for crushing and splitting

SOILS

Soils are dried and sieved through an 80-mesh screen prior to analysis.

Drying & Screening soil samples up to 250g	$ 1.50

HUMUS

Humus samples are dried and power-blended to produce the sample for analysis

Drying and power-blending	$ 1.25

CYANIDE LEACH SAMPLE PREPARATION

Rocks and drill-core samples for cyanide leach assay require pulverising of greater amounts of material than normal fire assays and this is charged out as follows:

Additional Pulverising of further crushed sample (up to 800g)	$ 4.00

PRECIOUS METAL ASSAYS

Gold and other precious metals are analysed by traditional fire assay procedures using lead fluxes followed by cupellation of the lead button. Silver inquart is added and the assay is completed either by the "classical" gravimetric procedure or by atomic absorption spectroscopy.

	Wt. Sample	Detection Limit	Cost
GOLD			
Classical Fire Assay	30g	0.002oz/T	$ 9.65
Fire Assay/AA finish	20g	5ppb	8.95
Acid Digest/AA	5g	100ppb	8.00
SILVER			
Nitric Acid Digest	5g	200ppb	8.00
PLATINUM			
Fire Assay/AA	40g	15ppb	9.95
PALLADIUM			
Fire Assay/AA	40g	10ppb	9.95
GOLD + PLATINUM + PALLADIUM	40g		18.75
TOTAL METALLICS (performed on 500g sample) includes 3 fire assays			29.50

QUALITY CONTROL PROCEDURES

The above prices include the following QUALITY CONTROL PROCEDURES:

An "in-house" standard is run with each batch of samples. This standard is checked regularly against CANMET standards. Blank assays are also run with each batch. In addition, a replicate assay is run on every 10th sample to be used for checking the REPRODUCIBILITY of the assays. Non-reproducible check assays are an indication of nugget problems with the sample and we recommend that a cyanide leach assay be performed on these.

GEOCHEMICAL (BASE METAL) ANALYSIS

Geochemical analysis is used by exploration geologists and others to determine the relative concentrations of numerous metals in rocks, soils, humus, etc. The technique involves digesting about 0.25 - 0.3g of pulverized sample in a number of acids and then running the solution for the metals required either by Atomic Absorption or ICAP.

GEOCHEMICAL ANALYSIS

Element	Detection Limit		Cost $
Silver, Copper, Lead, Zinc, Nickel, Cobalt, Iron, Molybdenum, Chromium, Cadmium, Bismuth, etc.	1 ppm		
Arsenic, Selenium, Antimony	20 ppm	Aqua Regia Digest	2.25 for 1st Element 1.75 for Subsequent Elements
Hydride Elements - Arsenic, Selenium, Antimony	0.1ppm	Aqua Regia Digest	4.75 for 1st Element 3.95 for Subsequent Elements

INDIVIDUAL ASSAYS

Copper, Nickel, Lead, Zinc, Cobalt, Chromium, Iron and Molybdenum	1 ppm	Aqua Regia Digest	9.00 for first element 6.00 for sunsequent
Silver	0.1 ppm		

NOTE: Some elements are only partially extracted by aqua regia digest. For a more complete digestion, use Nitric/hydrochloric/perchloric digest or LMBF (Lithium metaborate fusion).

For nitric/hydrochloric/perchloric digest, add $ 3.25 to above prices.

For LMBF, add $ 5.50 to above prices.

MULTI-ELEMENT PACKAGES

ICAP - Inductively Coupled Argon Plasma

QUICKSCAN - ICAP 28 $ 8.50

This is an analytical package designed for a "first-look" at the relative element values within a sample, using an aqua regia digest. A 0.25 - 0.3g sample of the pulverised material is digested and analysed by ICAP spectroscopy. The values obtained will allow an estimation of the relative abundance of the various metal present, suitable for the plotting of geochemical contours, etc.

Element	Detection Limit (ppm)	Element	Detection Limit (ppm)	Element	Detection Limit (ppm)
Si*	100	Ag	0.1	Hg	3
Al*	100	As	2	La*	1
Fe*	100	Sb	2	Ni	1
Mg	100	Ba*	1	Mo	1
Ca*	100	Be	0.1	Mn	1
Na*	100	Bi	3	Pb	2
Ti*	100	Cd	1	Sr*	1
P*	100	Co	1	V	1
		Cr*	1	W*	1
		Cu	1	Zn	1

* Partial extraction only. For more complete digest, use Nitric/hydrochloric/perchloric acids ($3.25)

Prices are based on minimum batches of 20 or more samples.

WHOLE ROCK GEOCHEMISTRY

Packages have been designed to give the geologist all the major oxides or a combination of major oxides plus trace elements. The whole-rock plus ICAP-28 package gives an excellent all-round analysis with good accuracy for trace elements thus aiding in the discrimination between barren and ore-bearing horizons.

WHOLE-ROCK PACKAGE $ 18.50

WHOLE ROCK PLUS ICAP-28 PACKAGE $ 26.00

Element	Detection Limit (%)	Element	Detection Limit (%)
SiO_2	0.01	CaO	0.01
MgO	0.01	TiO_2	0.001
K_2O	0.02	Fe_2O_3	0.01
$Al_2)_3$	0.01	Na_2O	0.02
LOI	0.01	P_2O_5	0.02

Ministry of Natural Resources — Ministère des Richesses naturelles — Ontario

Work Permit/ Permis de travail

Permit No./Permis nº	
01.03	7-051

This permit is issued under the authority and provisions of the following indicated Provincial Acts and their regulations, and is subject to the limitations and provisions thereof and is also subject to the terms and conditions herein.
Ce permis est émis conformément aux dispositions des lois provinciales ci-après et des règlements y afférents et est sujet aux restrictions et dispositions de ces lois et règlements ainsi qu'aux conditions ci-énoncées.

- ☐ Forest Fires Prevention Act/Loi sur la prévention des incendies de forêt
- ☐ Lakes and Rivers Improvement Act/Loi sur l'aménagement des lacs et des rivières
- ☐ Section 13, Public Lands Act as amended/Loi sur les terres publiques, article 13, tel que modifié
- ☒ Section ~~13a~~ 14 Public Lands Act as amended/Loi sur les terres publiques, article 13a, tel que modifié

Note: The issuance of this permit does not relieve the applicant from the responsibility of acquiring any other agency, board, government, etc., approval as may be required nor does it relieve the permittee from the requirements of any legislation.

Remarque : La délivrance d'un permis n'exonère pas le demandeur de l'obligation d'obtenir l'autorisation de tout autre organisme, commission, gouvernement, etc. qui pourrait être exigée, non plus qu'elle exempte le détenteur des dispositions des lois.

This Permit is issued to:/Ce permis est délivré :

Name of Permittee/Nom du détenteur :
PAUL PITMAN

Post Office Address/Adresse postale :
20 TORONTO STREET, SUITE 1270
TORONTO ONT M5C 2B8

To conduct an operation from the / Pour effectuer des travaux du 01 day of / jour de JUNE, 19 93 to and including the / jusqu'au 31 day / jour of / de OCTOBER, 19 93 on the following work permit area: / au site objet du présent permis :

8,9,10,11,12,1 CON XVIII
CAVENDISH TOWNSHIP FORTESCUE LAKE AREA

as per your application dated:/conformément à la demande de permis en date du : APRIL 15, 1993

For the purpose of:/Aux fins de :

MINERAL EXPLORATION - SOIL SAMPLE AND HAND DUG & BLASTING OF BEDROCK FOR TRENCHES OF UP TO 5' IN DEPTH

Subject to the following conditions:/Et sous les conditions suivantes :

1. The Permittee shall keep this permit or a true copy thereof on the work permit area.
   Le détenteur conservera ce permis ou une copie conforme sur les lieux des travaux.
2. The person in charge of the operation conducted under this permit shall produce and show this permit or the true copy kept on the work permit area to any officer whenever requested by the officer.
   Le responsable des travaux couverts par ce permis doit produire le permis ou sa copie conforme si un agent le lui demande.
3. Other conditions as listed on the reverse side of this permit as well as those contained in Schedule(s) A & B attached.
   Autres conditions énoncées au verso de ce permis ainsi que celles apparaissant aux annexes suivantes ________.

Place of Issue/Emis à	Date/Date de délivrance	Signature of Issuing Officer/Signature du délivreur
MINDEN, ONTARIO	June 2/93	[signature]

877

Ministry of Natural Resources
Ontario

Mineral Exploration

Schedule B

PITMAN 01.03.1141

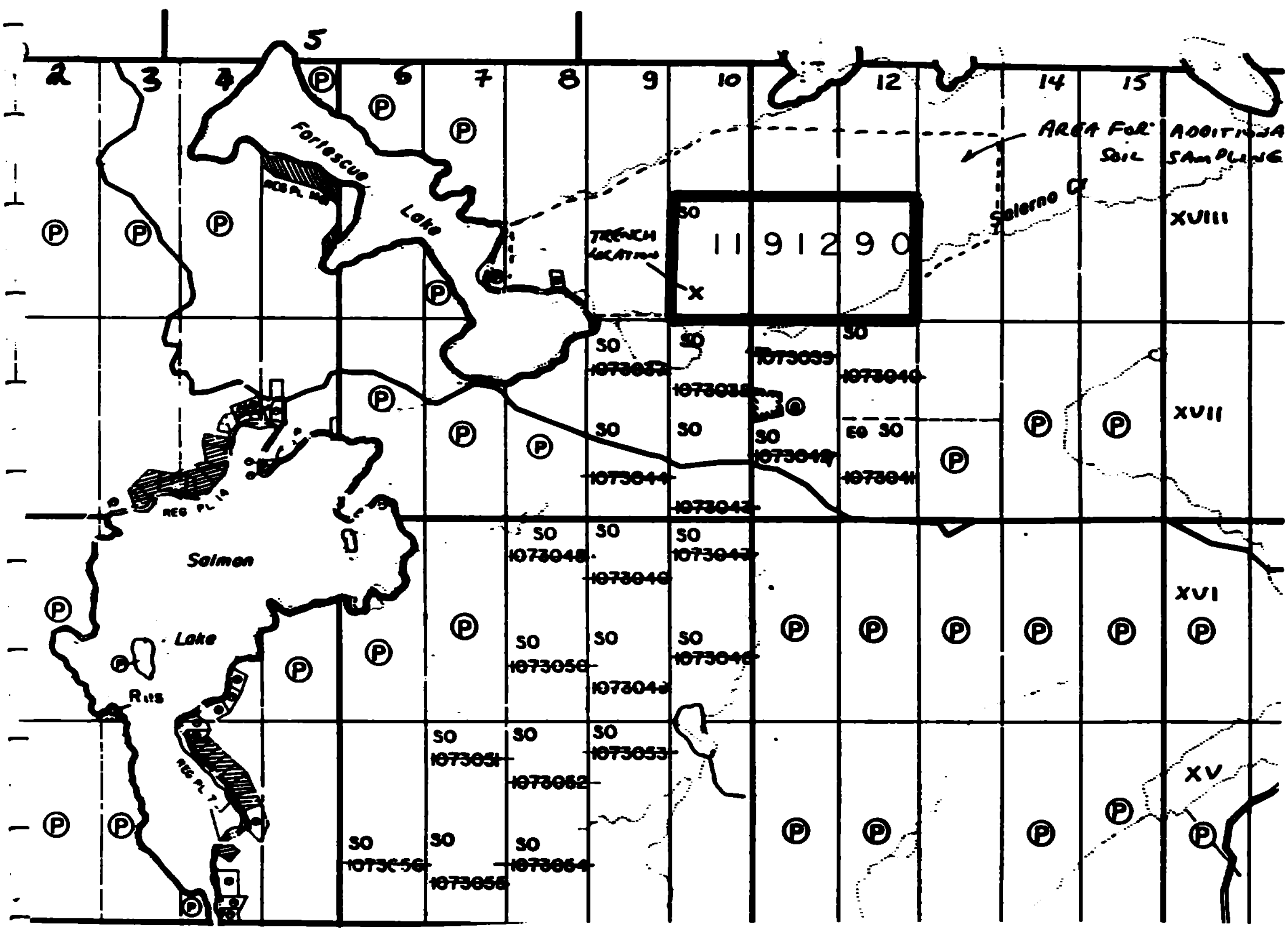
1) Deleterious substances as defined in the Canada Fisheries Act are not to be deposited or allowed to enter any waterbody or watercourse as a result of activities by the permittee.

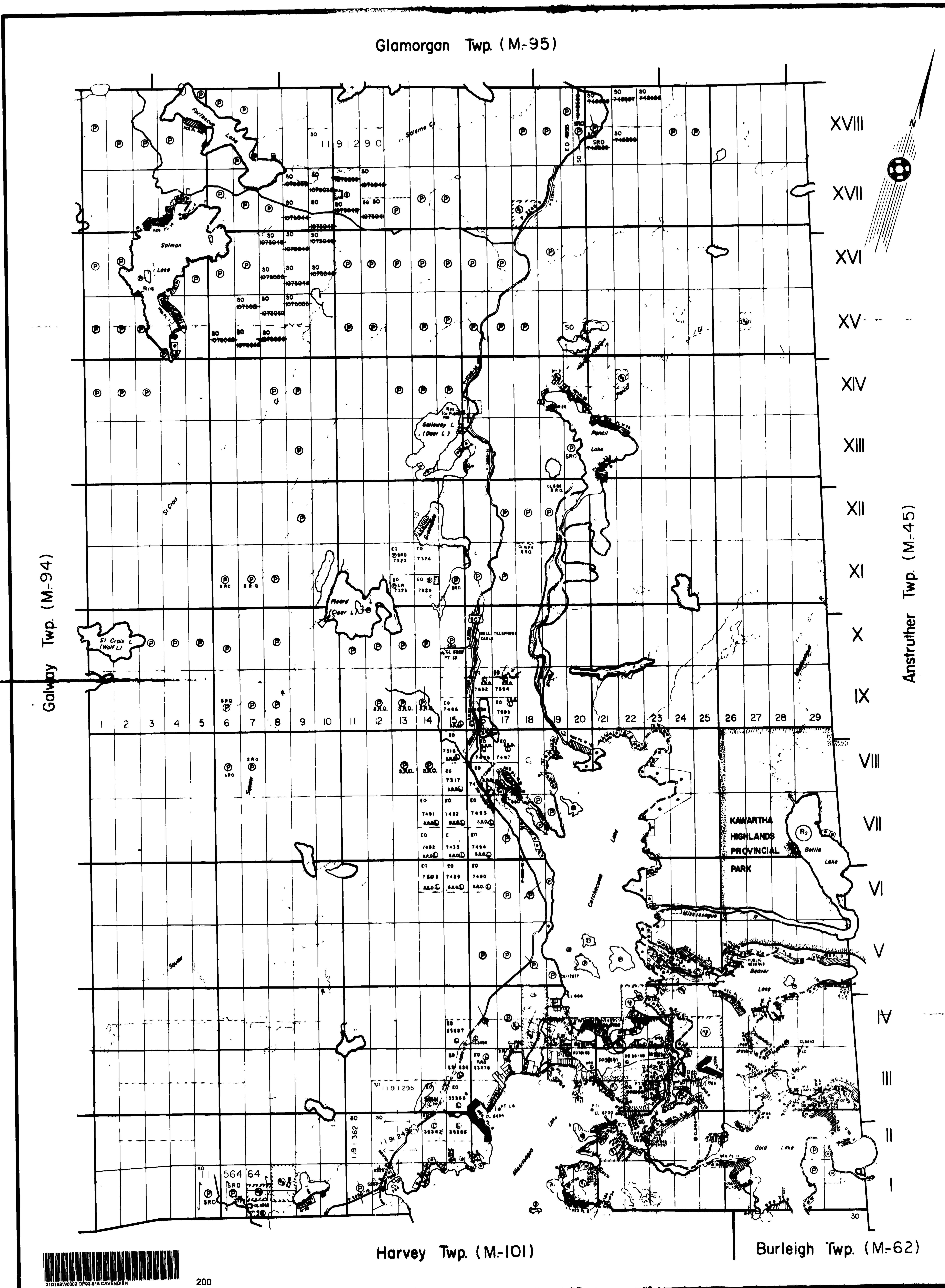
2) The permittee is responsible to maintain the site in a safe condition. The permittee assumes liability for the safety of the work area during and after operations.

3) Only hand tools to be used, i.e. shovels, grubhoes, etc, plugger drill

4) Area of extraction to be filled back in.

5) No trees to be cut.





THE TOWNSHIP OF CAVENDISH

COUNTY OF PETERBOROUGH

SOUTHERN ONTARIO MINING DIVISION

SCALE: 1 INCH = 40 CHAINS

LEGEND

PATENTED LAND	Ⓟ
CROWN LAND SALE	CS
LEASE	Ⓛ
LOCATED LAND	Loc
LICENSE OF OCCUPATION	LO
MINING RIGHTS ONLY	MRO.
SURFACE RIGHTS ONLY	SRO
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 lakes and rivers

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

- Gravel File 154616
- Gravel " 21547
- MNR Gravel Pit 76 File 21538
- Gravel File 40832
- Gravel " "
- Gravel " 73125
- Ⓖ QUARRY PERMIT

- MNR Gravel Pit No 138 File 152744
- Gravel File 104960
- Gravel File 40832

Areas withdrawn from staking under Section of the Mining Act

	File	Date	Disposition
W 67/74	7598 v 4	19 12 74	S R & M R.
W 3/77	34261	7/1/77	S.R & M R
W 50/83	160708	29/8 83	S R & M R
BEDS OF LAKES AND RIVERS		WITHIN PARK LIMIT	
W 11/83	73118	30/9/83	S R & M R
W.67/74	7598V.4	19/12/74	M.R.O.

DATE OF ISSUE
OCT 1993
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