2.3165

32D12SW0098 2.3165 HARKER

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REPORT ON

AN AIRBORNE ELECTROMAGNETIC SURVEY

RECEIVED

DEC 18 1979

MINING LANDS SECTION

MATHESON CLAIMS

HARKER-1

PROJECT 839-08

AMAX MINERALS EXPLORATION

Timmins, Ontario

December 1979

A. Watts

SUMMARY

A detailed radar navigation controlled helicopter electromagnetic survey, executed by Aerodat Limited for Amax Minerals Exploration in April 1979, has outlined six (6) poorly conductive features, of which at least two appear to be overburden derived.

Poor electromagnetic responses and lack of magnetic coincidence are the key negative factors in assessing the conductors on this claim group. Only minimal ground follow-up is suggested.

I. INTRODUCTION

During the period between April 10 and April 19, 1979, Aerodat Limited carried out a combined helicopter-borne, radar-controlled electromagnetic and magnetic survey over fifteen (15) claims in Harker township for Amax Potash Limited.

The purpose of the survey was to follow-up in detail, conductive zones of interest previously located by a regional INPUT A.E.M. survey over the area.

II. PREVIOUS EXPLORATION

Observed in Field:

Evidence of past exploration was seen in the presence of old claim posts and the occasional picket from a grid cut by Canadian Johns-Manville Co. Ltd. in 1973 (ref: Gentleman and Roussain, 1978).

Assessment Files:

Compilation maps of past work filed with the mining recorder's office show fairly extensive work on and about the present claims, in exploration for asbestos, including magnetometer, electromagnetic and diamond drilling by Canadian Johns-Manville Co. Ltd. and by Hunch Mines. Additionally, Satterly (1951) shows parts of the present property to have been held by Dale Gold Mines Ltd. for gold exploration.

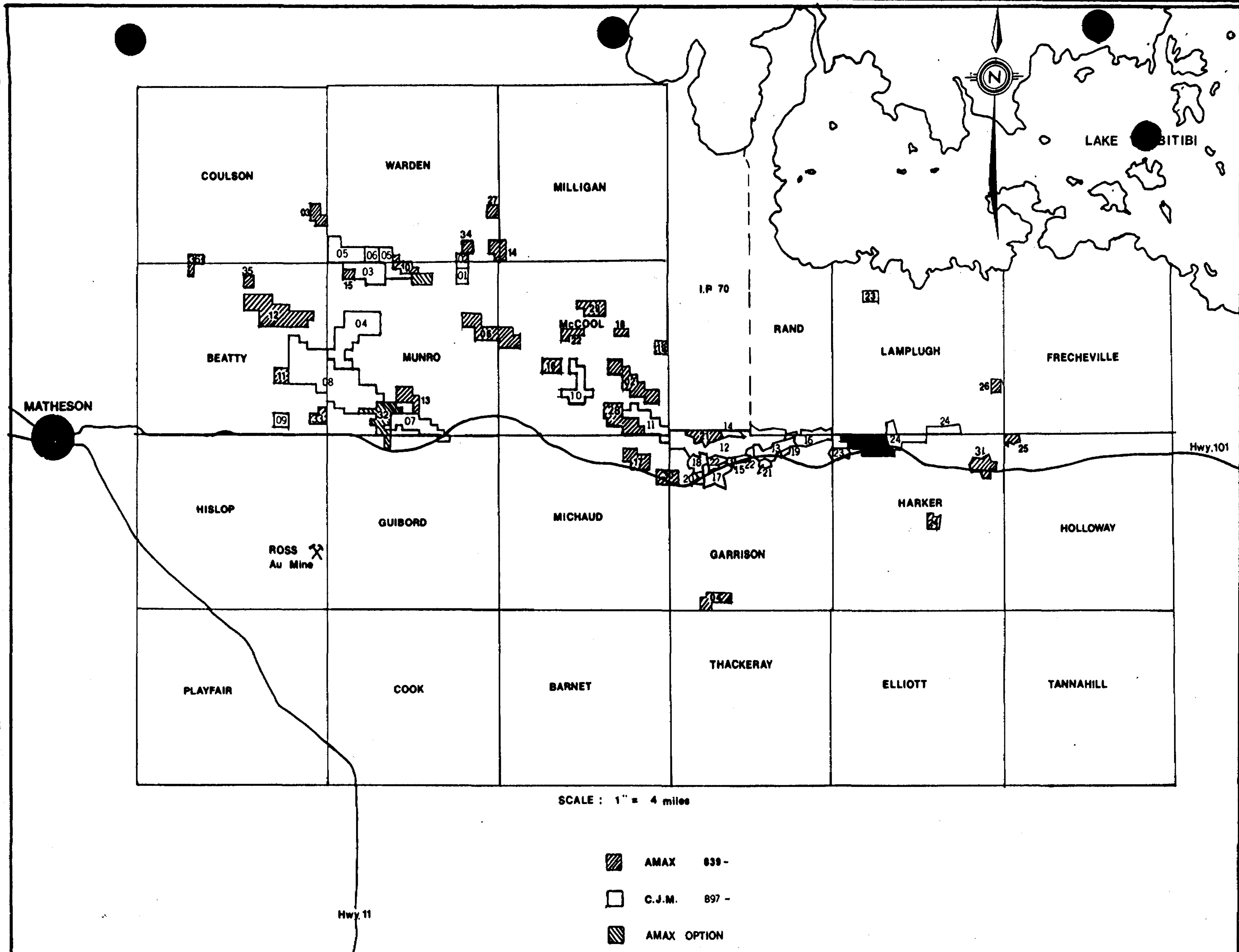
III. GEOLOGY

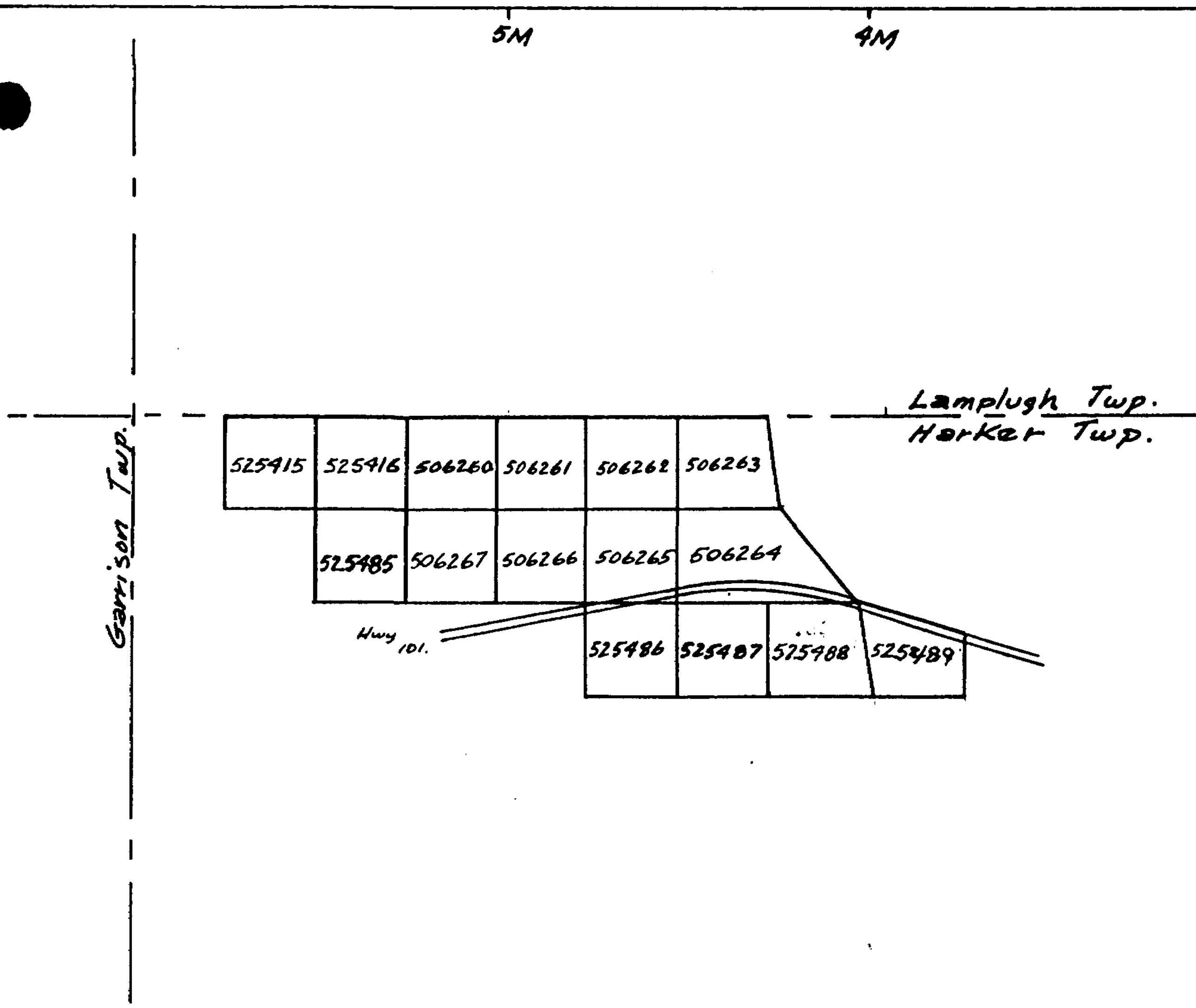
General Geology:

Harker township lies in the central portion of the Abitibi Greenstone Belt. The geology of the area is dominated by the Ghost Range Syncline (a folded succession of mafic to felsic volcanic rocks and ultramafic rock of uncertain origin) which lies within one (1) km south of the property. South of the fault, the bedrock consists of mafic volcanic flows, intruded by granite plutons (from Satterly, 1951).

Property Geology:

Due to the thick blanket of overburden, no outcrop was found during the course of the survey. Past drilling on claim L-506263 has indicated the presence of mafic volcanic flows, felsic tuffs and intercalated volcanoclastic rocks (Gentleman and Roussain, 1978), and ultramafic rock to the west of claim L-525485.


LAKE ABITIBI
MATHESON
COULSON
WARDEN
MILLIGAN
I.P. 70
RAND
LAMPLUGH
FRECHEVILLE
BEATTY
MUNRO
McCOOL
HISLOP
GUIBORD
MICHAUD
GARRISON
HARKER
HOLLOWAY
ROSS
Au Mine
PLAYFAIR
COOK
BARNET
THACKERAY
ELLIOTT
TANNAHILL
Hwy. 101
Hwy. 11
SCALE : 1" = 4 miles
AMAX 839 -
C.J.M. 897 -
AMAX OPTION



CLAIM MAP

Project 839-08

HARKER-1

1" = ½ mile

Harker Township

FIG.

IV. SURVEY EQUIPMENT AND PROCEDURES

Survey equipment consisted of a dual frequency Aerodat/Perle electromagnetic system operating at 915 Hertz and 3800 Hertz, a Barringer AM-104 proton precession magnetometer, a Motorola Mini-Ranger III positioning system (MRS III), an Aerodat-Perle navigational guidance and data acquisition system, a Hoffman radar altimeter, a Geocam 35 mm flight path camera, and a Barringer 8-channel analogue recorder. This system was installed in a Bell Jet-Ranger helicopter.

The survey was flown at a line spacing of 125 metres. Survey airspeed averaged about 70 mph, and the aircraft maintained an average terrain clearance of 235 feet, with the magnetometer sensor located on a tow cable 50 feet below the aircraft and the EM bird 100 feet below, or approximately 135 feet above the ground.

Survey navigation was controlled by an MRS III positioning system. The MRS III, operating on the basic principle of pulse radar, uses a transmitter (located in the aircraft) to interrogate the reference station transponders. The elapsed time between the transmitted interrogation produced by the transmitter and the reply received from each transponder is used as the basis for determining the range to each transponder. This range information, displayed by the MRS III together with the known location of each transponder, is trilaterated to provide a position fix of the helicopter. The MRS III operates at line-of-sight ranges up to approximately 39 kilometers and, with appropriate calibration, the probable range measurement accuracy is better than 3 metres (10 feet).

Processing of the range information is automatically accomplished by microprocessor in the DAC-NAV system to produce a flight-line direction, distance along the flight-line and deviation from proposed line. On completion of a proposed line, the guidance system indicates a turn and the next line at a predetermined line spacing.

MRS III range information is recorded digitally on tape and is subsequently computer processed and plotted to produce maps showing the actual flight-path. Flight-path was also recorded manually by the operator-navigator, and automatically by a 35 mm Geocam sequence camera.

Aerodat personnel involved in the survey were:

W. P. Boyko	Party chief
Fraser Skoreyko	Field assistant
E. B. Morrison	Systems consultant
John Hall	Pilot

V. DATA REDUCTION AND PRESENTATION

The airborne EM survey and results, together with a location map, are presented in Figure 1 at a scale of 1:5000.

Initially, a flight-path map was created from the edited and smoothed MRS III data. Manual fiducials recorded over recognizable terrain features are shown, together with principal topographic features and the claim boundaries.

The in-phase and quadrature EM readings (at the 915 Hertz frequency) are then plotted as profiles along each flight-line, using a vertical scale of 1 ppm of the primary field equal to 3 mm. The zero level for each trace is set using the background observed at the end of each line.

The locations of significant anomalous responses are shown as a circle, with the in-phase amplitude displayed in ppm and the computed apparent conductivity-thickness shown by a graphic representation.

It should be noted that the apparent conductivity-thickness (σt) is computed using the phasor diagram for a narrow vertical dike of infinite extent in free space, shown as an inset in Figure 1. The relationship of apparent σt to the true value depends upon how closely the body approximates a sheet-like form, and upon how nearly at right angles its strike direction is to the flight-line of the aircraft.

For ease of comparison, the derived conductivity-thickness value is divided into 10 ranges (as shown on the map legend) and the range (rather than the actual value) is indicated graphically on the AEM map. While high conductivity-thickness values are generally associated with good bedrock conductors such as graphite or massive sulphides and low values with overburden sources, anomaly amplitude, shape and persistence are equally important in the subsequent evaluation of the AEM anomalies.

Individual zones of interest have been outlined and numbered. The interpreted axis of a particular conductor is indicated by heavy dashed lines.

VI. DISCUSSION OF RESULTS

1. MAGNETIC SURVEY

The western extremity of the Ghost Range Syncline is manifested on the magnetic contour map by north-west trending contours bordering claims L-506263-4. This synclinal structure is probably truncated by a north-south trending fault in the vicinity of Line 18. In general, the claim group occupies a region of rather subdued magnetic relief, the magnetic contour pattern being influenced to a large extent by the highly magnetic ultramafic flows surrounding the property.

The only discrete magnetic anomaly on the claim group is centred on Line 23, just south of Highway 101, but its position relative to the ultramafics belonging to the Ghost Range Syncline to the north indicate that it is probably an offshoot from this structure.

2. ELECTROMAGNETIC SURVEY

Extensive clay and sand overburden across this claim group has brought about a continuous out-of-phase deflection from background, averaging 10 ppm, on the A.E.M. profiles. This complicates interpretation as the quality of a conductor has to be judged on the nature of the in-phase response alone. Most of the anomalous A.E.M. responses obtained over the claim group display weak, ambiguous in-phase response pointing to a probable conductive overburden source. A total of six (6) anomalously conductive zones were outlined by the survey and are elaborated on, in detail, below.

Zone A

After examining original flight tapes, it appears that what were originally clasified as anomalous positive responses over this zone are in fact flanking responses to larger negative responses caused by the magnetic permeability effect of the highly magnetic serpentinite unit immediately north of Zone A. The validity of this zone as a discrete bedrock conductor is thus put in doubt.

Zone B

Unlike Zone A, this conductor is located sufficiently distant from any serpentinite body to allow an undistorted evaluation of the A.E.M. response.

The results indicate a narrow, and poorly conductive source with a strike length of less than 300 metres. A probable bedrock source is interpreted, but detailing on the ground with H.E.M., magnetics and possibly I.P. will be required to validate this interpretation.

Zone C

The broad, out-of-phase dominated responses suggest an increase in conductivity or thickening of the overburden as the source of the anomalous responses over this zone. Minimal ground follow-up, with dual-frequency H.E.M. and magnetics, should be carried out before eliminating this zone as a bedrock feature.

Zone D

This zone displays similar characteristics to Zone C, i.e., broad shape and poor conductivity, and a conductive overburden source is invoked. A ground check consisting of minimal H.E.M. and magnetics should be carried out.

Zone E

East of Line 22 (claim L-525487 eastward), the A.E.M. profiles are characterized by an overall decrease in the out-of-phase response indicating thinning, or decrease in conductivity of the overburden over this portion of the claim group. Zone E is thus located in a part of the survey area which is less subject to the ambiguities caused by conductive overburden.

Zone E consists of a single-line response, Intercept 25A, which falls directly on Highway 101, immediately south of a large gravel pit. The anomaly is extremely weak on both high and low frequencies and classification of conductivity is not possible. The anomaly does exhibit a narrow, bedrock shape and a conductive bedrock source is indicated. Close attention should be paid to selection of coil spacing when following this anomaly up the ground with H.E.M., as too large a coil separation might obscure the response from this short conductor.

Zone G

This zone is situated close to the southern boundary of claim L-525489 and is characterized by a broad, mostly out-of-phase response, with a strike length of 400 metres plus. The zone falls on the southern flank of a weak, 100 gamma magnetic high. Both magnetics and the A.E.M. data suggest substantial thickness of overburden at this location and a depth of at least 50 metres is calculated.

CONCULSIONS AND RECOMMENDATIONS

The Aerodat survey has succeeded in outlining in detail six (6) conductive zones over an area found to be of interest by a previous regional airborne A.E.M. survey.

No direct magnetic coincidence is noted over any of the zones and at least two of them, i.e., Zones C and D, are probably overburden derived responses.

Generally poor conductivity and the lack of supportive in-phase response characterize most of the anomalous responses obtained and there is little to recommend any of the conductive zones encompassed in this claim group. Minimal follow-up with H.E.M. and magnetics is recommended, with any ambiguous H.E.M. profiles (vis-a-vis, bedrock versus overburden response) being checked by a line of I.P.

Respectfully submitted,

A. Watts

A. H. Watts, B. Sc.
Geophysicist

Timmins, Ontario
December 1979

APPENDIX A

SCHEDULE OF CLAIMS

PROJECT 839-08

Claim Group	Township	Number	Claim Numbers	Recording Date
839-08	Harker	15	L-506260	March 23, 1978
			L-506261	March 23, 1978
			L-506262	March 23, 1978
			L-506263	March 23, 1978
			L-506264	March 23, 1978
			L-506265	March 23, 1978
			L-506266	March 23, 1978
			L-506267	March 23, 1978
			L-525415	December 14, 1978
			L-525416	December 14, 1978
			L-525485	December 14, 1978
			L-525486	December 22, 1978
			L-525487	December 22, 1978
			L-525488	December 22, 1978
			L-525489	December 22, 1978

File 839-08

Ontario

Ministry of Natural Resources

GEOPHYSICAL – GEOLOGICAL – GEOCHEMICAL TECHNICAL DATA STATEMENT

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Aeroelectromagnetic - Aeromagnetic

Township or Area Harker

Claim Holder(s) Amax Potash Limited

Survey Company Aerodat

Author of Report A. Watts

Address of Author 255 Algonquin Blvd. W. Timmins Ont.

Covering Dates of Survey April - September 1979 (linecutting to office)

Total Miles of Line Cut

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

	DAYS per claim
Geophysical	
—Electromagnetic	
—Magnetometer	
—Radiometric	
—Other	
Geological	
Geochemical	

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer 40 Electromagnetic 40 Radiometric (enter days per claim)

DATE: October 12/79 SIGNATURE: [signature] Author of Report or Agent

L.D.

Res. Geol. Qualifications 2.2910 + on this file

Previous Surveys

File No.	Type	Date	Claim Holder

MINING CLAIMS TRAVERSED
List numerically

(prefix) (number)

L - 506265
L - 506266
L - 506267
L - 506260
L - 506261
L - 506262
L - 506263
L - 506264
L - 525486
L - 525487
L - 525488
L - 525489
L - 525415
L - 525416
L - 525485

If space insufficient, attach list

TOTAL CLAIMS 15

SELF POTENTIAL

Instrument ______ Range ______

Survey Method ______

Corrections made ______

RADIOMETRIC

Instrument ______

Values measured ______

Energy windows (levels) ______

Height of instrument ______ Background Count ______

Size of detector ______

Overburden ______
(type, depth – include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey ______

Instrument ______

Accuracy ______

Parameters measured ______

Additional information (for understanding results) ______

AIRBORNE SURVEYS

Type of survey(s) Aero E.M. - Aeromagnetic

Instrument(s) A.E.M.-Aerodat Geonics Dual Frequency - Aeromagnetic - Barringer M104
(specify for each type of survey)

Accuracy A.E.M. - .5ppm per scale division Aeromagnetic - 1 gamma
(specify for each type of survey)

Aircraft used Jet Ranger Helicopter

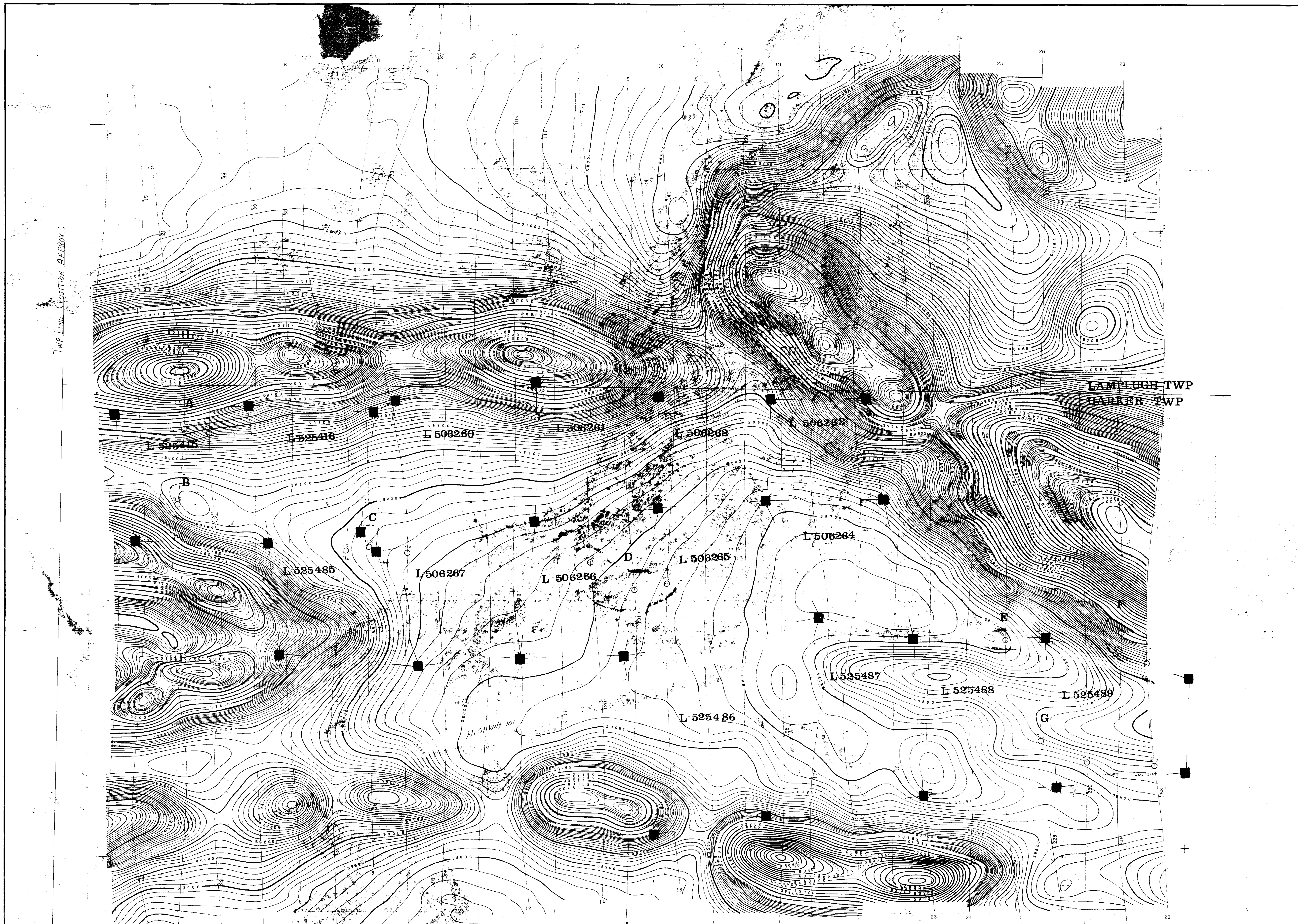
Sensor altitude A.E.M - 50 m Aeromagnetic - 20 m

Navigation and flight path recovery method Radar Transponder - photo mosaic

Aircraft altitude 80 m Line Spacing 125 m

XXXXX flown over total area 818 Km. Over claims only 25.00 km

25440 - 1000 ÷ 15 = 66 or 40 days



TOTAL FIELD MAGNETIC MAP
AND
AIRBORNE ELECTROMAGNETIC SURVEY

HARKER · 1 839 · 08

MATHESON ONTARIO

AMAX MINERALS EXPLORATION

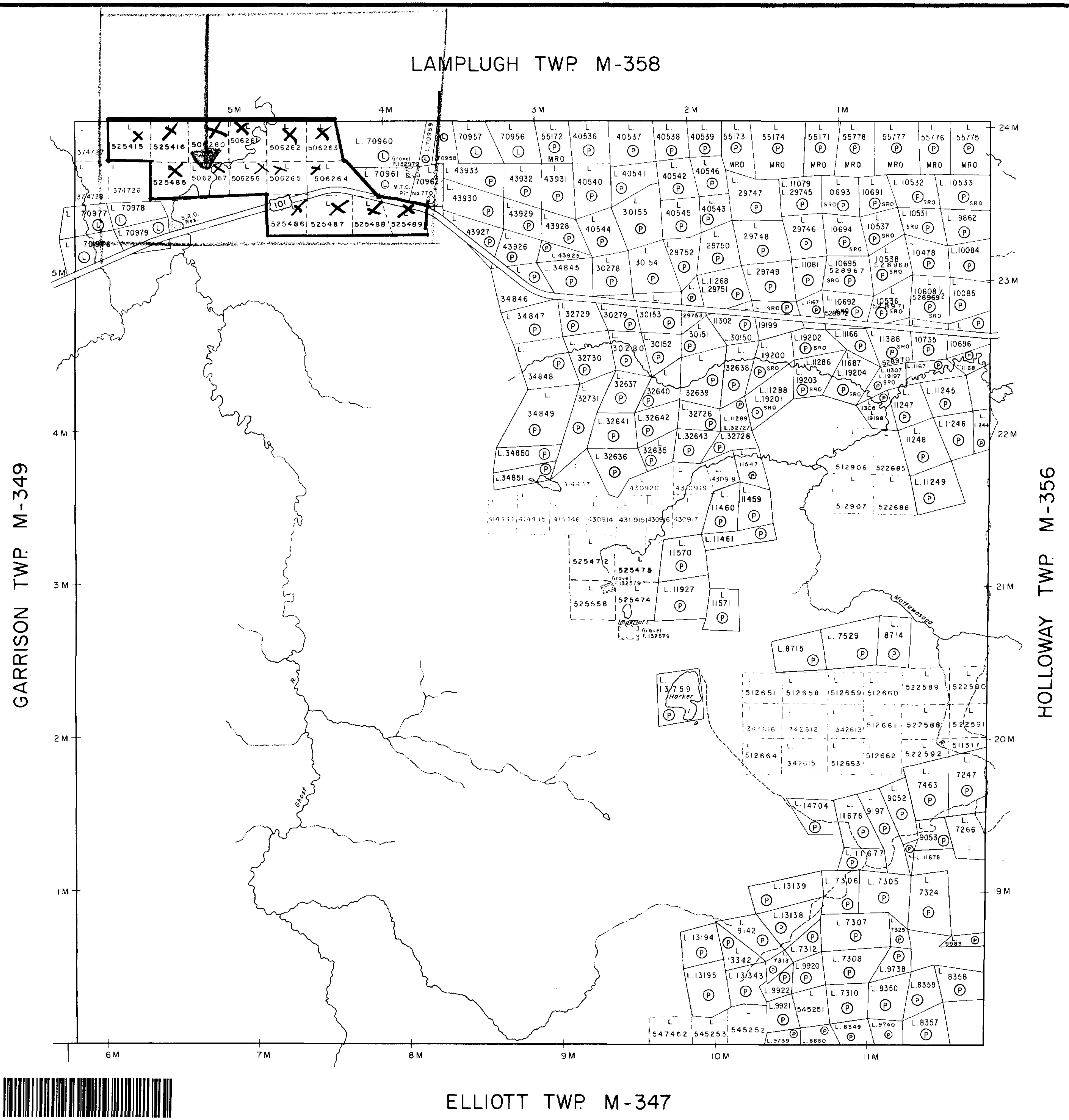
SCALE 1/5,000

1000 0 1000 FEET

200 0 200 METRES

JUNE 1979

200



THE TOWNSHIP
OF

2.3165

HARKER

DISTRICT OF
COCHRANE

LARDER LAKE
MINING DIVISION

SCALE: 1-INCH 40 CHAINS

LEGEND

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

NOTES

400' Surface Rights reservation along the shores of all lakes and rivers.

DATE OF ISSUE
DEC 13 1979
SURVEYS AND MAPPING BRANCH

PLAN NO. M-353

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

32D12SW0098 2.3165 HARKER

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