REPORT ON COMBINED HELICOPTER-BORNE MAGNETIC GRADIOMETER AND VLF-EM SURVEY CURTIN TOWNSHIP ONTARIO

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APR 28 1988

MINING LANDS SECTION

for
STRINGER EXPLORATIONS LTD.
by
AERODAT LIMITED
December 24, 1987

87102

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LIST OF MAPS

(Scale: 1:10,000)

Maps (As listed under Appendix "B" of the Agreement)

1. TOPOGRAPHIC BASE MAP;
   Prepared from 1:20,000 topographic maps of the area, showing registration crosses corresponding to NTS co-ordinates on survey maps.

2. TOTAL FIELD MAGNETIC CONTOURS;
   showing magnetic values contoured at 5 nanoTesla intervals, flight lines and fiducials.

3. MEASURED VERTICAL GRADIENT CONTOURS;
   showing vertical gradient values contoured at 0.025 nanoTesla/metre intervals, flight lines fiducials.

4. VLF-EM TOTAL FIELD CONTOURS;
   showing VLF-EM values contoured at 2% intervals, flight lines and fiducials.

1. INTRODUCTION

This report describes an airborne geophysical survey carried out on behalf of Stringer Explorations Ltd. by Aerodat Limited. Equipment operated included a vertical magnetic gradiometer system employing twin Cesium magnetometers, a VLF-EM system, a tracking camera, a radar altimeter and a UHF navigation system. Magnetic, altimeter and VLF-EM were recorded both in digital and analog form. Positioning data were stored in digital form and on film as well as being recorded manually by the operator in flight.

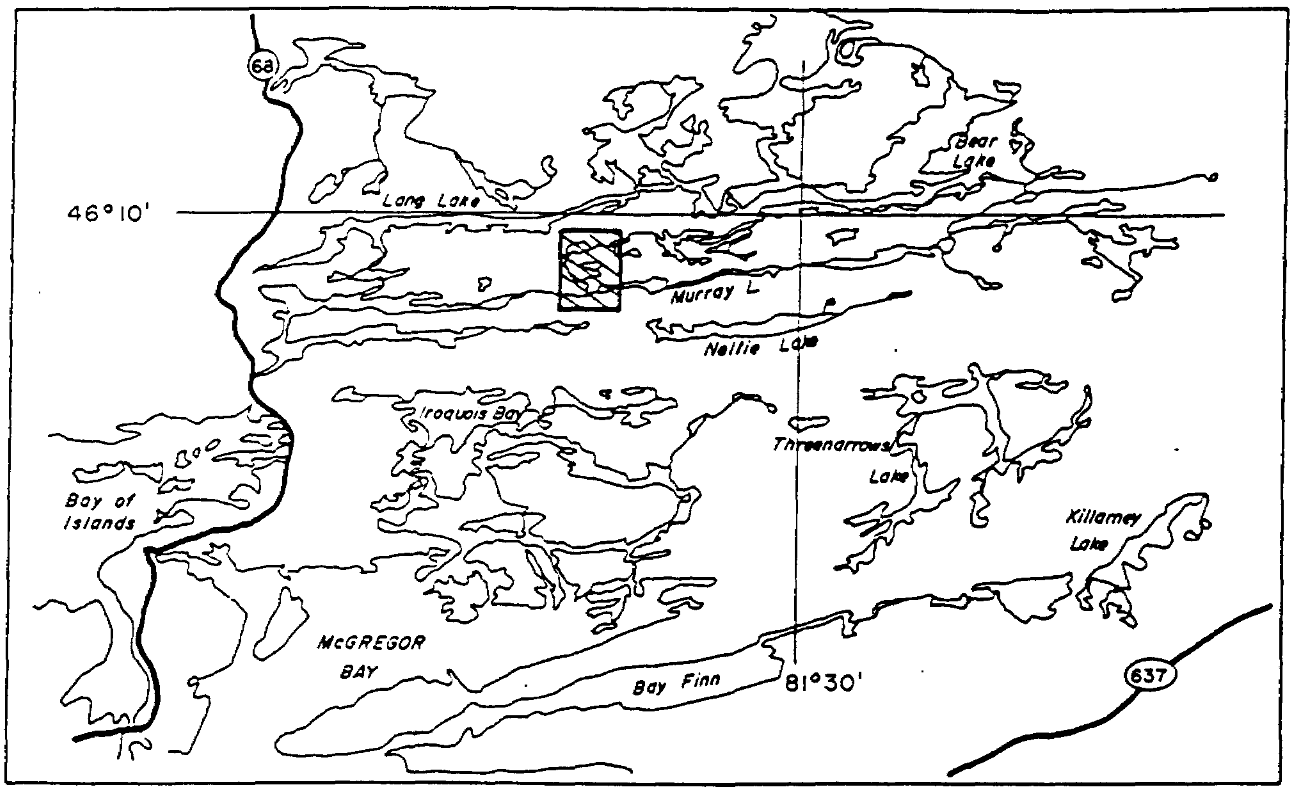
The survey area is located in Curtin Township about 60 kilometres southwest of Sudbury, Ontario. The survey was flown November 26, 1987 employing a North-South line direction at a nominal line spacing of 100 metres. Coverage and data quality were considered to be well within the specifications described in the contract.

The purpose of the survey was to record airborne geophysical data over and around ground that is of interest to Stringer Exploration Ltd.

A total of 55 kilometres of the recorded data were compiled in map form and are presented as part of this report according to specifications outlined by Stringer Explorations Ltd.

2. SURVEY AREA LOCATION

The survey area is depicted on the index map shown below. The area is centred at 46 degrees 9 minutes North latitude and 81 degrees 36 minutes West longitude.



3. AIRCRAFT AND EQUIPMENT

3.1 Aircraft

The helicopter used for the survey was a Aerospatiale A-Star 350-D (CFKBL) owned and operated by Ranger Helicopters Installation of the geophysical and ancillary equipment was carried out by Aerodat. The survey aircraft was flown at a mean terrain clearance of 60 metres.

3.2 Equipment

3.2.1 VLF-EM System

The VLF-EM system was a Herz Totem 2A. This instrument measured the total field and quadrature component from two transmitting stations, providing two channels of both line and ortho information.

The sensor was towed in a bird 15 metres below the helicopter, 45 metres above the terrain. The transmitting station used was NAA (Cutler, Maine, 24.0 kHz) for the line channel and NSS (Annapolis, Maryland, 21.4 kHz) for the ortho channel.

3.2.2 Magnetometer

The Aerodat vertical gradiometer system consists of twin Cesium magnetometer sensors manufactured by Scintrex, rigidly mounted on a towed bird system. The identical magnetometers are separated by a vertical distance of three metres. The sensitivity of the magnetometer sensors is 0.01 gammas and the vertical gradient of the total magnetic field is measured to a sensitivity of 0.005 gammas/metre, or better, in flight at a sampling rate of 5 times per second. The sensors were towed in a bird 30 metres below the helicopter, 30 metres above the terrain.

3.2.3 Magnetic Base Station

A Geometrics 803 proton precession magnetometer was operated at the base of operations to record diurnal variations of the earth's magnetic field.

The clock of the base station was synchronized with that of the airborne system to facilitate later correlation.

3.2.4 Radar Altimeter

A King KRA-10 radar altimeter was used to record terrain clearance. The output from the instrument was a linear function of altitude for maximum accuracy.

3.2.5 Tracking Camera

An Aerodat video camera was used to record flight path on VHS video tape. The camera was operated in strip mode and the fiducial numbers for cross-reference to the analog and digital data were imprinted in the margin of the film.

3.2.6 Analog Recorder

An RMS dot-matrix recorder was used to display the data during the survey. In addition to manual and time fiducials, the following data was recorded:

Channel	Input	Scale
VT00	VLF-EM Total Field - Line	2.5%/mm
VQ01	VLF-EM Quadrature - Line	2.5%/mm
OT02	VLF-EM Total Field - Ortho	2.5%/mm
OQ03	VLF-EM Quadrature - Ortho	2.5%/mm
RA04	Radar Altimeter	10 ft./mm
LN05	Lower Magnetometer Sensor-Noise	.0125 nT/mm
LC06	Lower Magnetometer Sensor-Coarse	2.5 nT/mm
LF07	Lower Magnetometer Sensor-Fine	.25 nT/mm
UC08	Upper Magnetometer Sensor-Coarse	2.5 nT/mm
UF09	Upper Magnetometer Sensor-Fine	.25 nT/mm
UN10	Upper Magnetometer Sensor-Noise	.025 nT/mm
GF11	Vertical Gradient	.01nT/mm
GN12	Vertical Gradient-Noise	.0125 nT/mm
BA13	Barometric Altimeter	20 ft./mm

3.2.7 Digital Recorder

An RMS DGR-33 system recorded the survey on magnetic tape. Information recorded was as follows:

Equipment	Interval
VLF-EM	0.2 seconds
Magnetometer	0.2 seconds
Altimeter	0.5 seconds
Syledis	0.5 seconds

3.2.9 Radar Positioning System

A Sercel Syledis (SR 3) UHF navigation system was utilized for both navigation and track recovery. Transponders located at fixed locations were interrogated several times per second and the ranges from these points to the helicopter were measured to an accuracy of about 10 metres. A navigational computer triangulated the position of the helicopter and provided the pilot with navigational information. The positional data was recorded on magnetic tape for subsequent flight path generation.

4. DATA PRESENTATION

4.0 Base Map and Flight Path

A topographic base at a scale of 1:10,000 was prepared by enlargement of topographic maps of the survey area.

The flight path was derived from the Syledis UHF positioning system. The distance from the helicopter to two established reference locations was measured several times per second, and the position of the helicopter calculated by triangulation. It is estimated that the flight path is generally accurate to about 10 metres with respect to the topographic detail of the base map. The flight path is presented with fiducials for cross-reference to both the analog and digital data.

4.1 Total Field Magnetic Contours

The aeromagnetic data was corrected for diurnal variations by subtraction of the digitally recorded base station magnetic profile. No correction for regional variation was applied.

The corrected profile data were interpolated onto a regular grid at a 25m true scale interval using a cubic spline technique. The grid provided the basis for threading the presented contours at a 5 gamma interval.

The aeromagnetic data have been presented with flight path on a topographic base map.

4.2 Vertical Magnetic Gradient Contours

The vertical gradient was computed by subtraction of the upper sensor total field value from the lower sensor total field value and dividing by the sensor separation of 3 metres to obtain the value in nanoteslas/metre.

The measured gradient profile data derived from the two high sensitivity magnetometers were interpolated onto a regular grid at a 25m true scale interval again using a cubic spline technique. The gridded data were, in turn, contoured at an interval of 0.025 nanoteslas per metre.

The aeromagnetic data have been presented with flight path on a topographic base map.

4.3 VLF Total Field Electromagnetic Contours

The VLF-EM signals from NAA (Cutler, Maine) were compiled in map form for the line transmitting station. The VLF-EM data were also gridded at a 25 metre interval and presented on a topographic base maps with flight lines.

5. GENERAL INTERPRETIVE CONSIDERATIONS

Total Field Magnetics

The total field magnetic maps show contours of the total field using a high sensitivity magnetometer. Furthermore, a very fine contour interval of 2 nanoteslas was used.

The magnetic map is characterized by numerous magnetic features and should be carefully correlated with existing geologic maps of the area. Such correlations should prove extremely useful for updating the known geology of the area.

Measured Vertical Gradient

The vertical gradient map has the inherent advantage of defining contacts between different lithologic units as well as enhancing shorter spatial wavelength features due to near surface bodies of finite dimensions. Hence, the vertical gradient map is a useful supplement to the total field map.

VLF Electromagnetics

The VLF-EM method employs the radiation from powerful military radio transmitters as the primary signals. The magnetic field associated with the primary field is elliptically polarized in the vicinity of electrical conductors. The Herz Totem uses three coils in the X, Y, Z configuration to measure the total field and vertical quadrature component of the polarization ellipse.

The relatively high frequency of VLF (15-25) kHz provides high response factors for bodies of low conductance. Relatively "disconnected" sulphide ores have been found to produce measureable VLF signals. For the same reason, poor conductors such as sheared contacts, breccia zones, narrow faults, alteration zones and porous flow tops normally produce VLF anomalies. The method can therefore be used effectively for geological mapping. The only relative disadvantage of the method lies in its sensitivity to conductive overburden. In conductive ground the depth of exploration is severely limited.

The effect of strike direction is important in the sense of the relation of the conductor axis relative to the energizing electromagnetic field. A conductor aligned along a radius drawn from a transmitting station will be in a maximum coupled orientation and thereby produce a stronger response than a similar conductor at a different strike angle. Theoretically, it would be possible for a conductor, oriented tangentially to the transmitter to produce no signal. The most obvious effect of the strike angle consideration is that conductors favourably oriented with respect to the transmitter location and also near perpendicular to the flight direction are most clearly rendered and usually dominate the map presentation.

The total field response is an indicator of the existence and position of a conductivity anomaly. The response will be a maximum over the conductor, without any special filtering, and strongly favour the upper edge of the conductor even in the case of a relatively shallow dip.

The vertical quadrature component over steeply dipping sheet-like conductor will be a cross-over type response with the cross-over closely associated with the upper edge of the conductor.

The response is a cross-over type due to the fact that it is the vertical rather than total field quadrature component that is measured. The response shape is due largely to geometrical rather than conductivity considerations and the distance between the maximum and minimum on either side of the cross-over is related to target depth. For a given target geometry, the larger this distance the greater the depth.

The amplitude of the quadrature response, as opposed to shape is function of target conductance and depth as well as the conductivity of the overburden and host rock. As the primary field travels down to the conductor through conductive material it is both attenuated and phase shifted in a negative sense. The secondary field produced by this altered field at the target also has an associated phase shift. This phase shift is positive and is larger for relatively poor conductors. This secondary field is attenuated and phase shifted in a negative sense during return travel to the surface. The net effect of these 3 phase shifts determine the phase of the secondary field sensed at the receiver.

A relatively poor conductor in resistive ground will yield a net positive phase shift. A relatively good conductor in more conductive ground will yield a net negative phase shift. A combination is possible whereby the net phase shift is zero and the response is purely in-phase with no quadrature component.

A net positive phase shift combined with the geometrical cross-over shape will lead to a positive quadrature response on the side of approach and a negative on the side of departure. A net negative phase shift would produce the reverse. A further sign reversal occurs with a 180 degree change in instrument orientation as occurs on reciprocal line headings. During digital processing of the quadrature data for map presentation this is corrected for by normalizing the sign to one of the flight line headings.

Respectfully submitted,
AERODAT LIMITED

Douglas H. Pitcher

December 24 1987

J87102

Douglas H. Pitcher

Manager, Data Production
Geophysicist

STATEMENT OF QUALIFICATIONS

1. I am currently Manager, Data Production at Aerodat Limited whose responsibilities include the generation of final geophysical maps and reports as well as the coordination of the geophysicists and data technicians.

2. I obtained a B.Sc. (Hons.) degree in physics from Memorial University (1970) and an M.Sc. degree in geophysics from the University of Toronto (1972).

3. I am a professional geophysicist, and a member of the Society of Exploration Geophysicists, Canadian Exploration Geophysical Society and the Prospectors and Developers Association.

4. I have worked in the mining industry since 1972 both for government and private industry as a research geophysicist and consultant involving all types of conventional ground and airborne geophysical mining techniques.

5. I have published papers on induced polarization, airborne electromagnetics, geomagnetics and data processing using microcomputers.

6. I have no direct or indirect interest in Stringer Explorations Ltd. or in any properties lying within the surveyed area.

Douglas H. Pitcher

Ministry of Northern Development and Mines
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

DOCUMENT No. W8830

#71

41I04NE0074 2.11107 CURTIN 900

Min. 2.11107

Type of Survey(s): AIRBORNE MAG-GRADIOMETER; VLF-EM	Township or Area: CURTAIN TWP.
Claim Holder(s): ROGER STRINGER	Prospector's Licence No.: C-32622
Address: P. O. BOX 2063, ESPANOLA, ONTARIO POP 1CO	
Survey Company: AERODAT LIMITED	Date of Survey (from & to): 26 11 87 / 26 11 87 (Day / Mo. / Yr.)
	Total Miles of line Cut: 55 line kilometers
Name and Address of Author (of Geo-Technical report): DOUGLAS H. PITCHER, MANAGER, DATA PRODUCTION	3883 NASHUA DRIVE MISSISSAUGA, ONTARIO L4V IR3

Credits Requested per Each Claim in Columns at right

Special Provisions	Geophysical	Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	- Electromagnetic	
	- Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Man Days	Geophysical	Days per Claim
Complete reverse side and enter total(s) here	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	

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Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Radiometric	

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.
S	895241	
	895242	
	895243	
	984683	
	984684	
	984685	
	984686	
	984687	
	984688	
	984689	

* REPORTS IN DUPLICATE ATTACHED.

SUDBURY MINING DIV.
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APR 13 1988
A.M. P.M.
7,8,9,10,11,12,1,2,3,4,5,6

Total number of mining claims covered by this report of work: 10

Expenditures (excludes power stripping)

Type of Work Performed:

Performed on Claim(s):

ONTARIO GEOLOGICAL SURVEY
ASSESSMENT FILES OFFICE
JUN 2 1988
RECEIVED

Calculation of Expenditure Days Credits

Total Expenditures $ ÷ 15 = Total Days Credits

Instructions: Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Date	Recorded Holder or Agent (Signature)
[illegible]	[illegible]

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
800	APRIL 26/88	[signature]
	Date Approved as Recorded: 17 May 88	Branch Director: [signature]

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: ROGER STRINGER P. O. BOX 2063 ESPANOLA, ONTARIO POP 1CO

Date Certified	Certified by (Signature)
[illegible]	[illegible]

Aerial Cableway	Pipeline (above ground)
Boundary	Railroad
International	Single Track
Interprovincial	Double Track
District, Township Indian Reserve	Abandoned
Approximate	Turntable
Lot, Concession	Road
Approximate	Highway, County Township
Park Boundary	Access (road of doubtful maintenance or significant driveway)
Bridge	Trail, Bush Road (portage, alley)
Road, Railroad	Rapids
Building	Double line river with multiple rapids
Chimney	Double line river with multiple rapids
Cliff, Pit, Pile	Reservoir
Contours	River, Stream, Canal
Interpolated	Approximate, Assumed, Direction of flow
Approximate	Rock
Depression	Shoal
Control Points	Spot Elevation
Horizontal	Tower
Vertical	Transmission Line
Culvert	Poles, Pylons
Falls	Tunnel
Double line river	Utility Poles
Fence, Hedge, Wall	Wharf, Dock, Pier
Feature Outline	Wooded Area
Flooded Land	
Lock	
Marsh or Swamp	
Mast	
Mine Head Frame	
Outcrop	

AREAS WITHDRAWN FROM DISPOSITION

M.R.O. – MINING RIGHTS ONLY
S.R.O. – SURFACE RIGHTS ONLY
M.+S. – MINING AND SURFACE RIGHTS

Description	Order No.	Date	Disposition	File
(R) RESERVE		SEPT9/69		163005
(R) RESERVE		SEPT9/69		163005
R3 M+S	W-77/87	1987.08.21		
R4 M+S	W-78/87	1987.08.24		

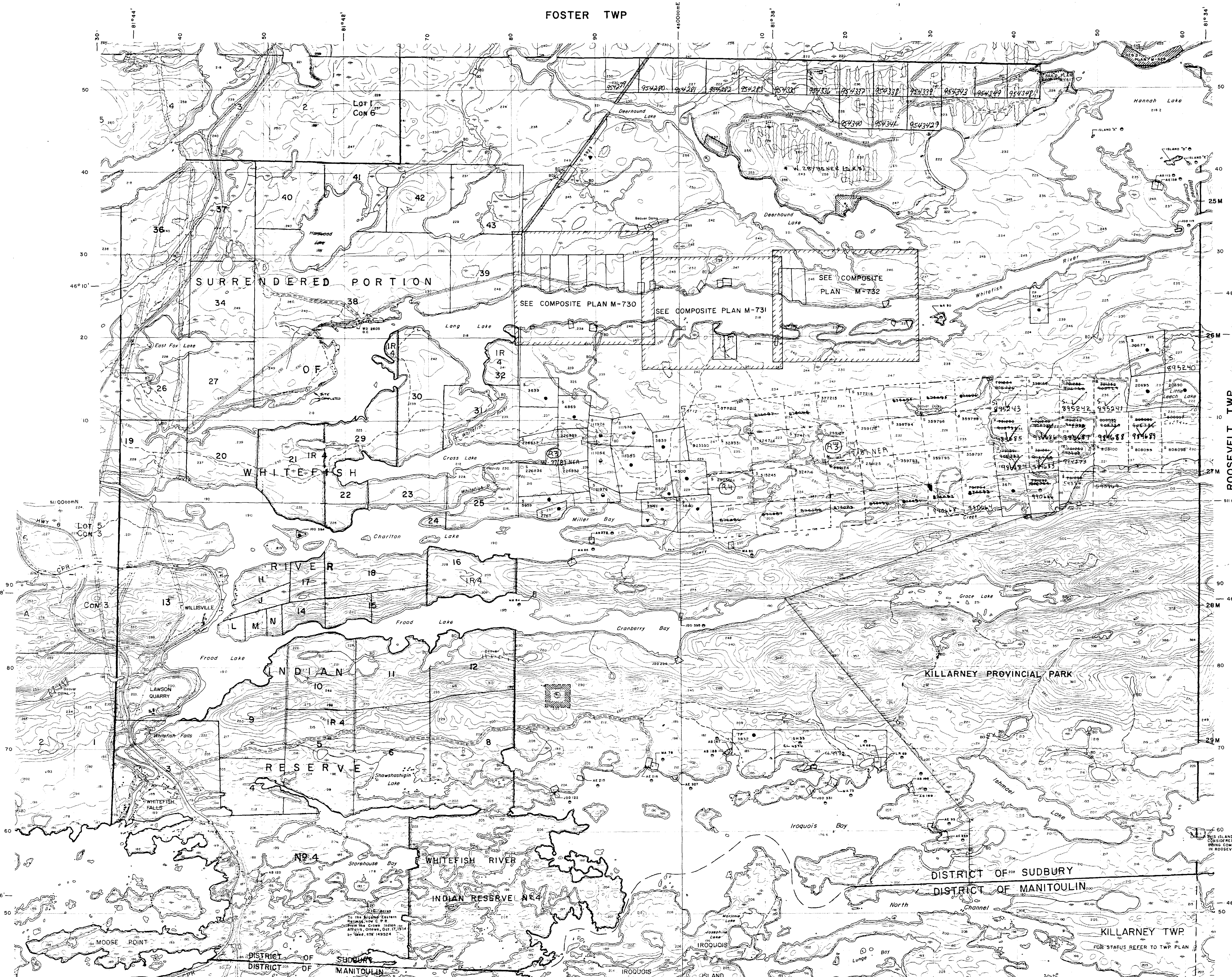
SAND AND GRAVEL

(S) GRAVEL FILE – 161064

FLOODING ON FROOD AND CARLTON LAKES TO CONTOUR ELEVATION 9700 CONTROLLED BY A MINISTRY OF NATURAL RESOURCES DAM NORTH OF WHITEFISH FALLS. FILE 45414 VOL.2

FLOODING ON LANG LAKE TO CONTOUR ELEVATION 99.65 CONTROLLED BY A MINISTRY OF NATURAL RESOURCES DAM BETWEEN CROSS AND LANG LAKES FILE 45414 VOL.3

SURRENDERED PORTION OF THE WHITEFISH RIVER INDIAN RESERVE IS ADMINISTERED BY THE INDIAN AFFAIRS BRANCH OF THE DEPARTMENT OF INDIAN AND NORTHERN AFFAIRS, OTTAWA.



HIGHWAY AND ROUTE No.
OTHER ROADS
TRAILS
SURVEYED LINES:
TOWNSHIPS, BASE LINES, ETC.
LOTS, MINING CLAIMS, PARCELS, ETC.
UNSURVEYED LINES:
LOT LINES
PARCEL BOUNDARY
MINING CLAIMS ETC.
RAILWAY AND RIGHT OF WAY
UTILITY LINES
NON-PERENNIAL STREAM
FLOODING OR FLOODING RIGHTS
SUBDIVISION OR COMPOSITE PLAN
RESERVATIONS
ORIGINAL SHORELINE
MARSH OR MUSKEG
MINES
TRAVERSE MONUMENT

DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT	SYMBOL
PATENT, SURFACE & MINING RIGHTS	●
" , SURFACE RIGHTS ONLY	◐
" , MINING RIGHTS ONLY	◑
LEASE, SURFACE & MINING RIGHTS	■
" , SURFACE RIGHTS ONLY	◧
" , MINING RIGHTS ONLY	◨
LICENCE OF OCCUPATION	▼
ORDER-IN-COUNCIL	OC
RESERVATION	®
CANCELLED	⊕
SAND & GRAVEL	Ⓢ

NOTE: MINING RIGHTS IN PARCELS PATENTED PRIOR TO MAY 6, 1913, VESTED IN ORIGINAL PATENTEE BY THE PUBLIC LANDS ACT, R.S.O. 1970, CHAP. 380, SEC. 63, SUBSEC. 1.

SCALE 1:20 000
GRID ZONE: 17

* Order No. W.28/85 NER (Surface Rights Only) 1985.12.12

Order No. W-77/87NER 1987.08.21

DATE OF ISSUE
MAY 3 - 1988
SUDBURY
MINING RECORDER'S OFFICE

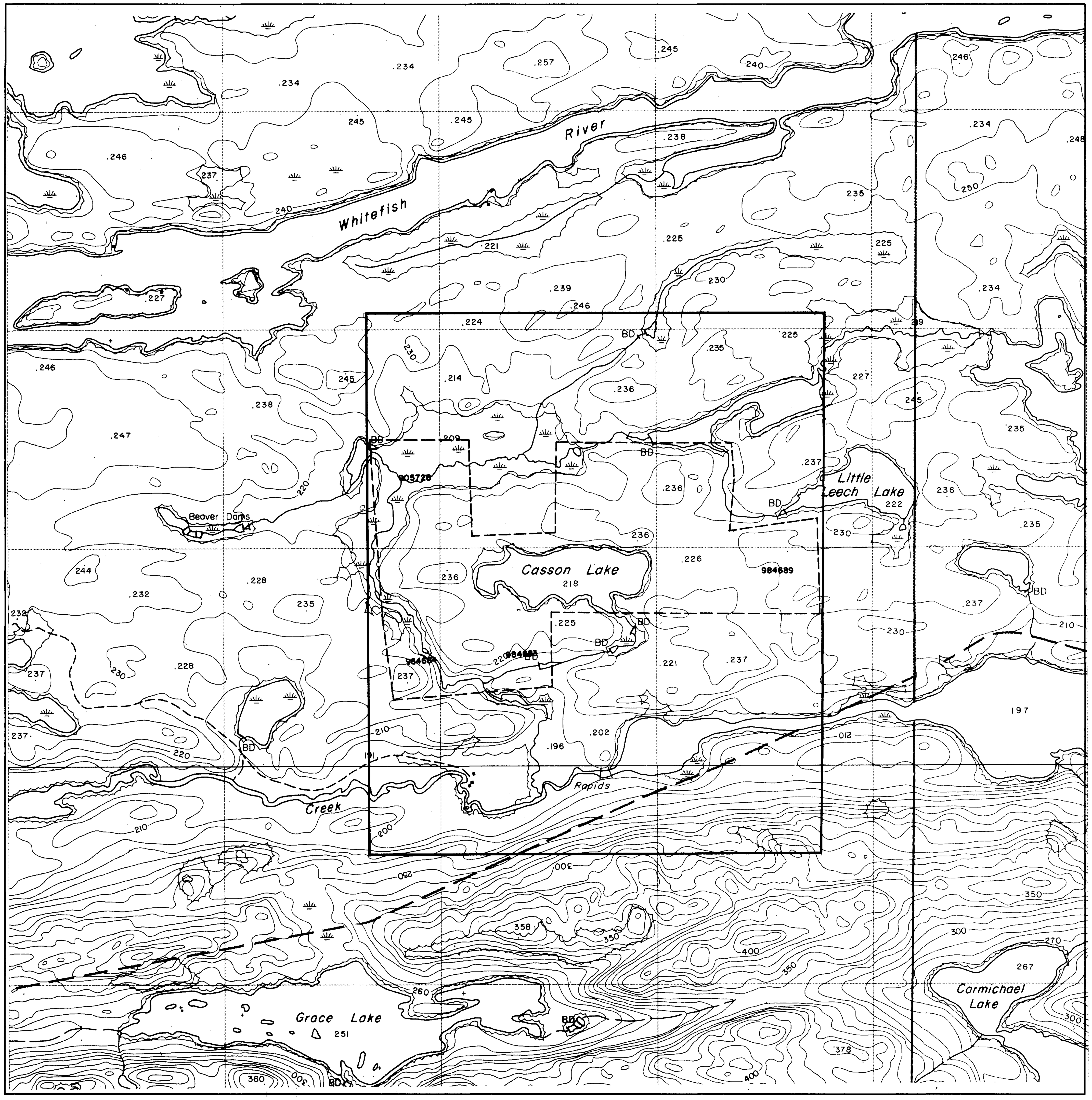
TOWNSHIP

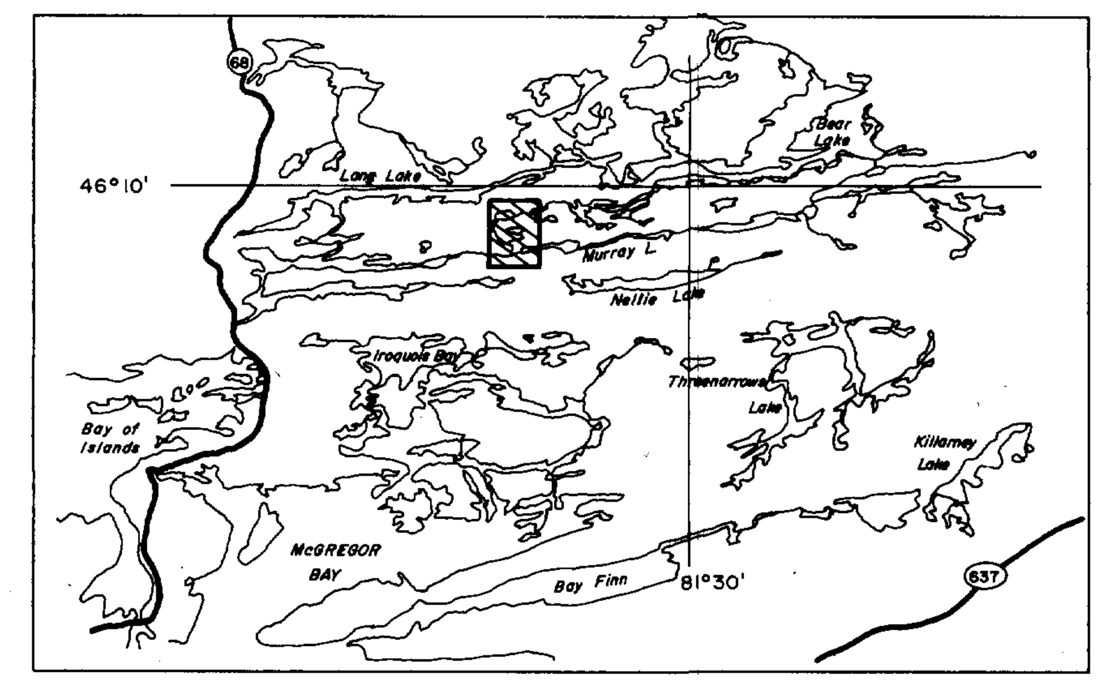
CURTIN

M.N.R. ADMINISTRATIVE DISTRICT
ESPANOLA
MINING DIVISION
SUDBURY
LAND TITLES / REGISTRY DIVISION
SUDBURY

Ministry of Natural Resources
Land Management Branch
Ontario

200





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BASE MAP

CURTIN TOWNSHIP

ONTARIO

SCALE 1:10,000

0 330 660 1320 1/2 MILE

0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE: NOV. 1987

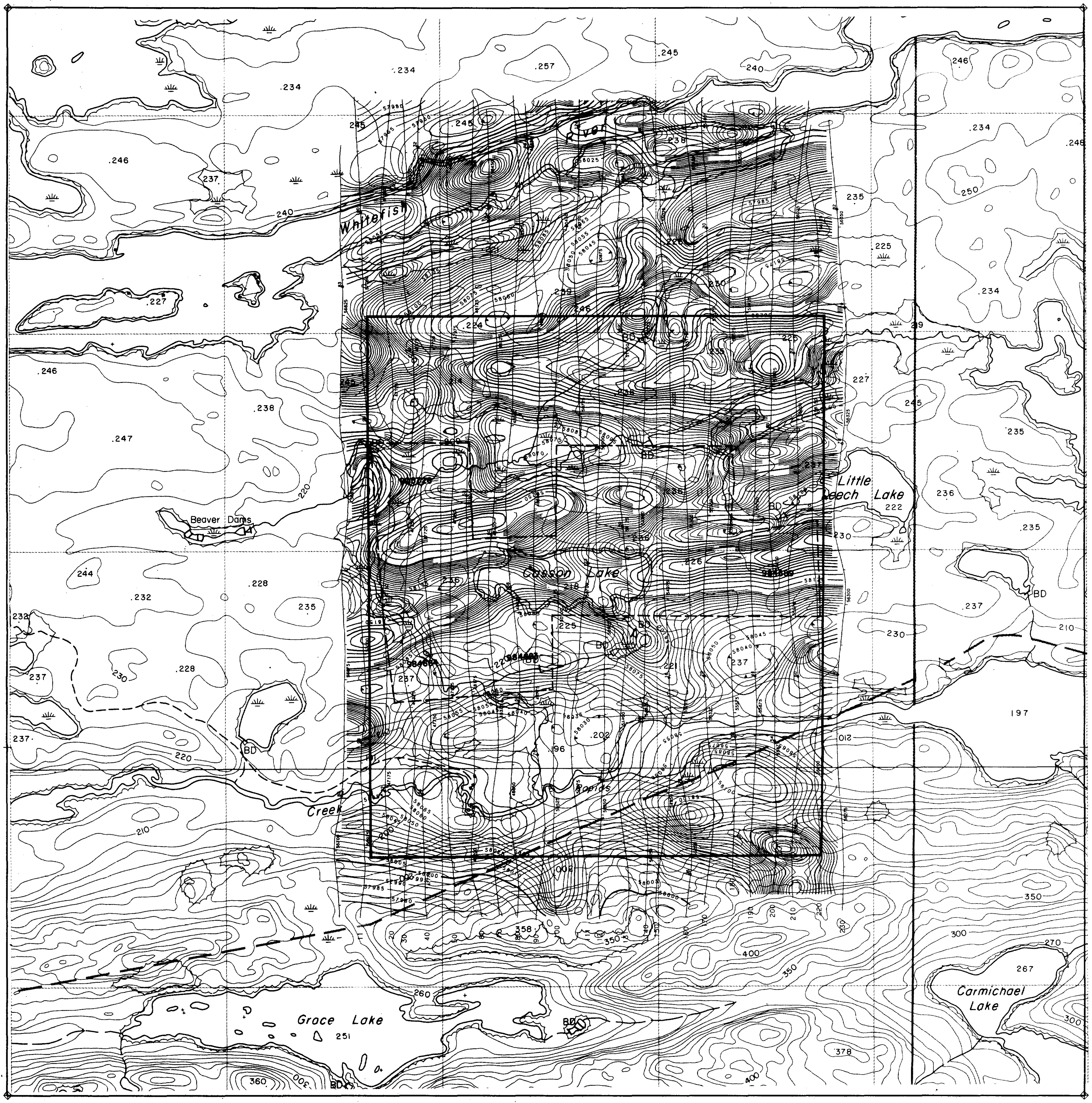
UTM Ref: 10 17 4520 51084

MAP No: 1 J87102

2.11107

41I04NE0074 2.11107 CURTIN

210



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Flight Path

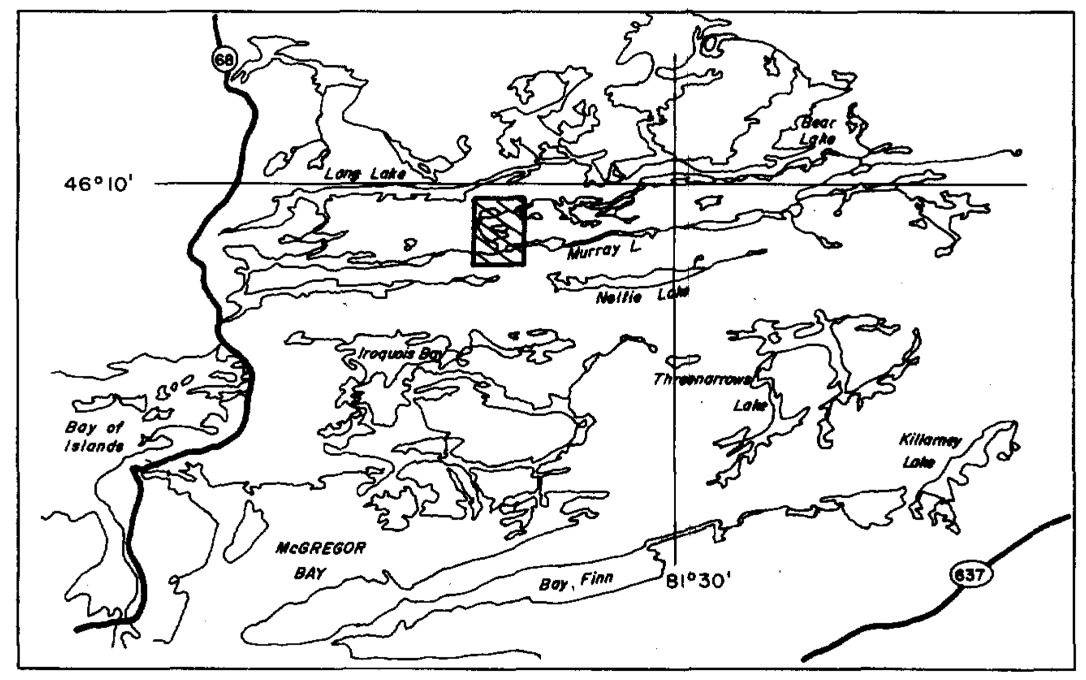
Navigation and recovery using Syledis SR3 radio positioning system

Average terrain clearance 30m
Line spacing = 100m

Magnetics

Cesium high sensitivity magnetometer
Sensor elevation 30m

Total Field Magnetic Intensity
Contour intervals 5, 25, 100, 500 nT



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TOTAL FIELD MAGNETIC CONTOURS

CURTIN TOWNSHIP

ONTARIO

SCALE 1:10,000

0 330 660 1320 1/2 MILE

0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE:	NOV. 1987
UTM Ref:	10 17 4520 51084
MAP No:	2 J87102

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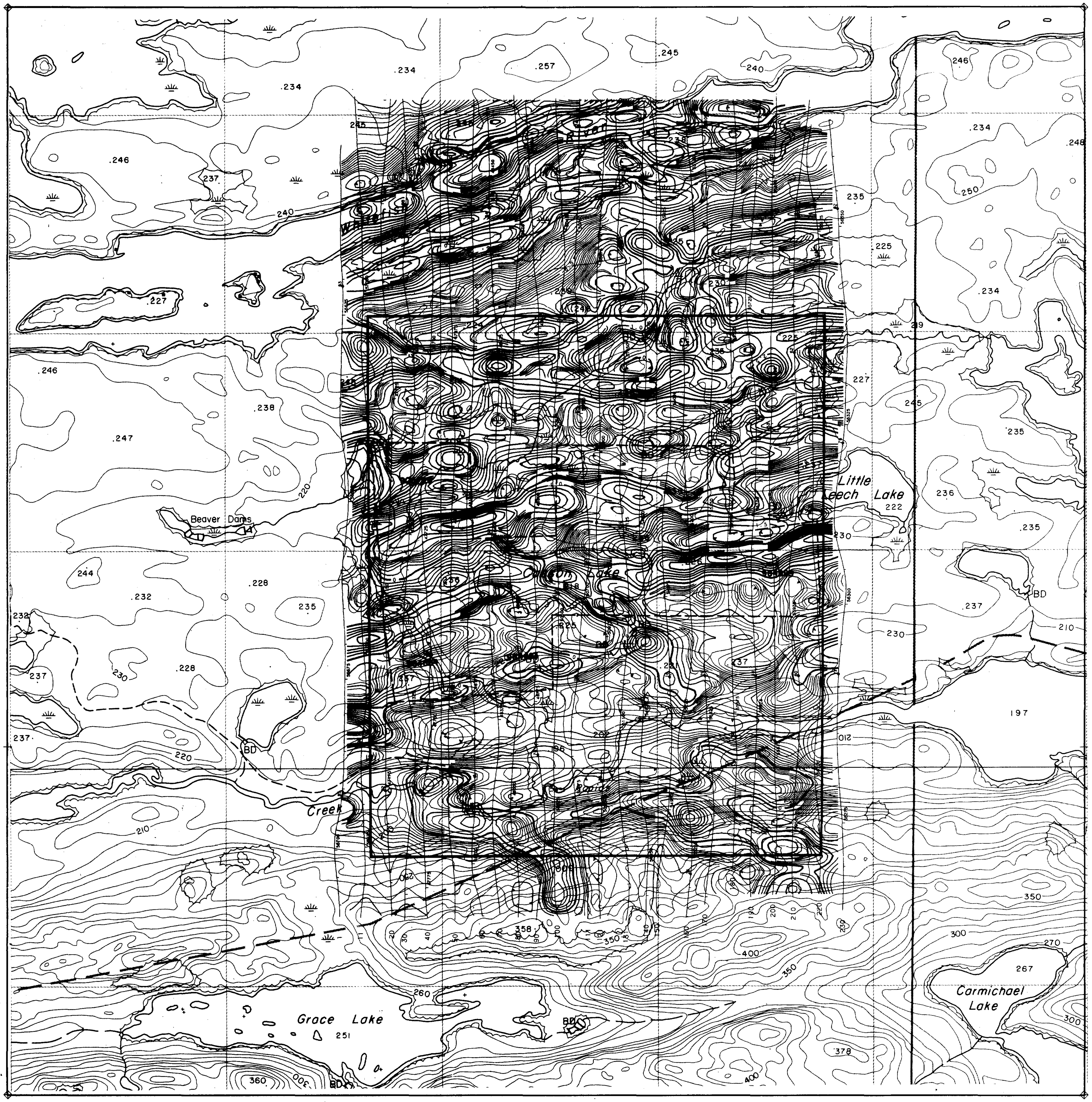
2.11107



N

Flight Path

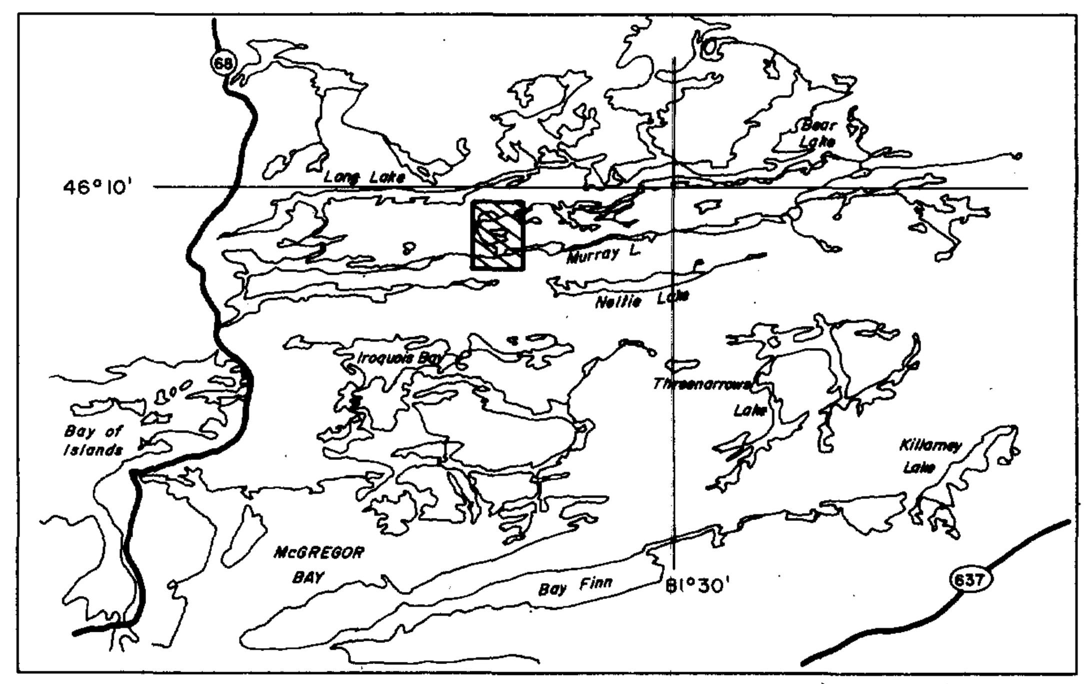
Navigation and recovery using Syledis SR3 radio positioning system

Average terrain clearance 30m
Line spacing = 100m

Vertical Gradient

Vertical Magnetic Gradient (in nanoTeslas per meter) Measured from two Cesium high sensitivity magnetometers vertically separated by 3m. Lower sensor elevation 30m

Contour intervals .025, .1, .5, 2.5 nT/m



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MEASURED VERTICAL MAGNETIC GRADIENT

CURTIN TOWNSHIP

ONTARIO

SCALE 1:10,000

0 330 660 1320 1/2 MILE

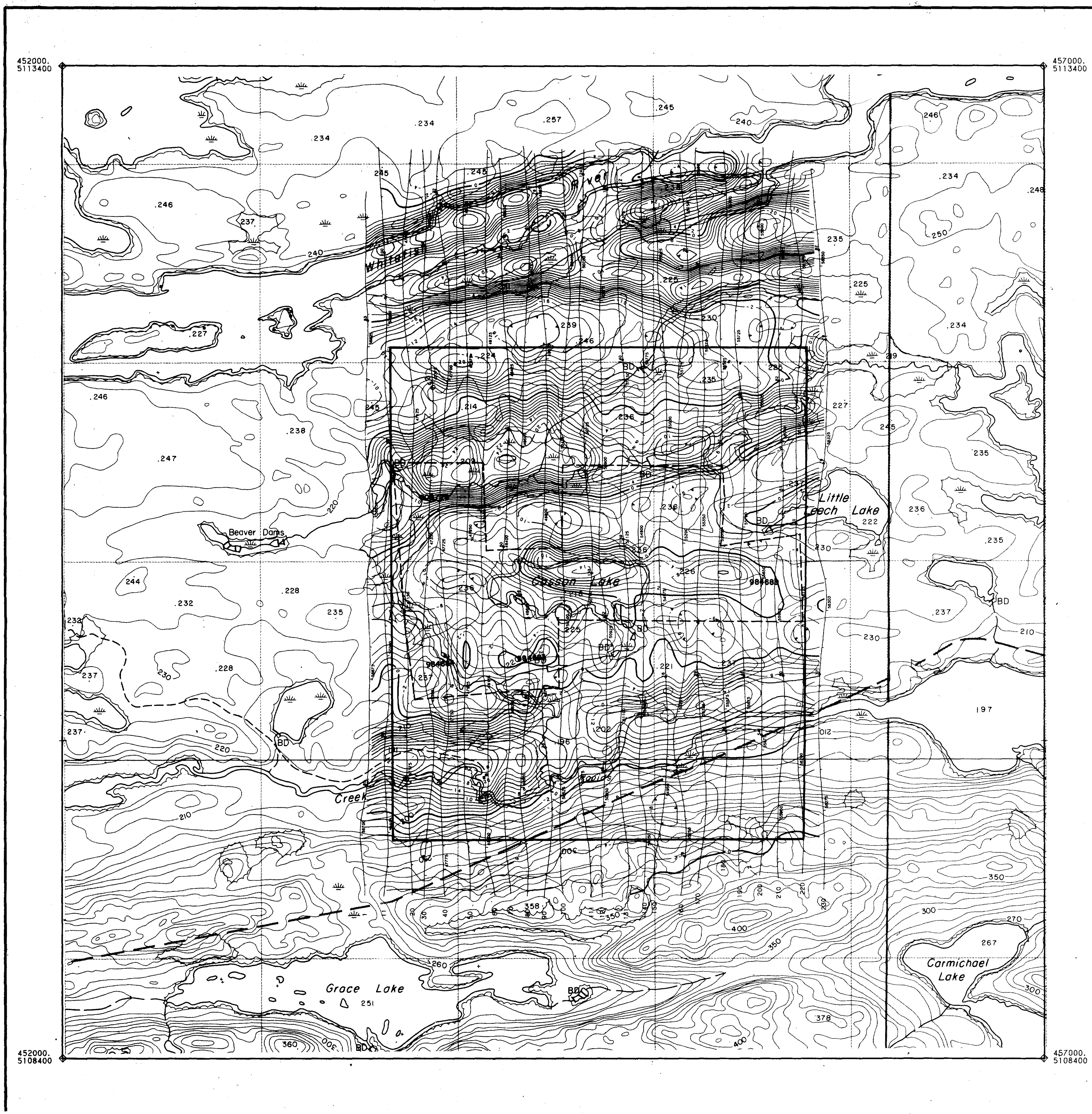
0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE:	NOV. 1987
UTM Ref:	10 17 4520 51084
MAP No:	3 J87102

230

2.11107



N

Flight Path

Navigation and recovery using Syledis SR3 radio positioning system

Average terrain clearance 30m
Line spacing = 100m

VLF-EM

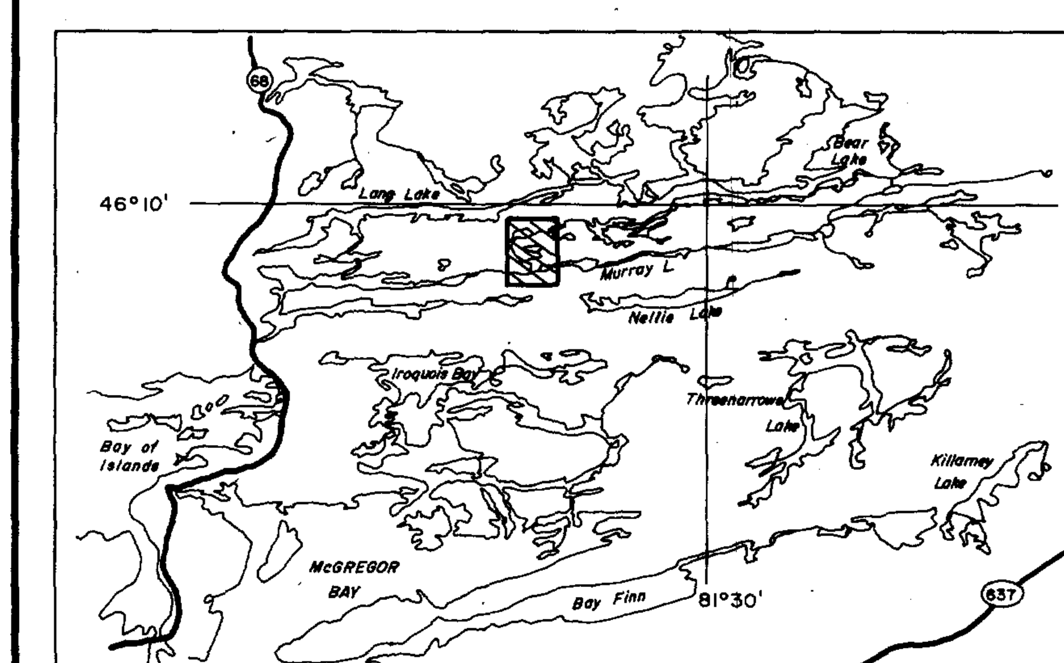
VLF-EM Total Field Intensity in percent

Station: NAA (Cutler, Maine)
24.0 kHz

Sensor elevation 45m

CONTOUR INTERVAL:

50 % ....
10 % ....
2 % ....



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VLF-EM TOTAL FIELD CONTOURS

CURTIN TOWNSHIP

ONTARIO

SCALE 1:10,000

0 330 660 1320 1/2 MILE

0 100 200 500 1 KILOMETRE

AERODAT LIMITED

DATE: NOV. 1987

NTS No: 10 17 4520 51084

MAP No: 4 J87102

41I04NE0074 2.11107 CURTIN 240

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