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Assessment Report

Drone Magnetic Survey

Ottaway Property

Ottaway and Calder Townships

Porcupine Mining Division

Prepared for:

Maurice Valliere (Client #222572)

Prepared by:

Kevin Cool and Sara Wigelsworth

Mining Claims Surveyed:

605923,605924,605925,605926,605927,605928,605929,

605930,605931,605932,605933,605934,605935,605936

May 25th, 2023

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1.0 Summary

Between April 11th and May 12th of 2023 a drone magnetic survey was conducted over the Ottaway Property. The survey was completed by Zen Geomap Inc. on behalf of the claim owner Mr. Maurice Valliere. The objective of the survey was to evaluate bedrock features in the vicinity of a known iron formation, to look for structurally favourable environments for the deposition of massive sulphide mineralization and to improve historical ground magnetic surveys.

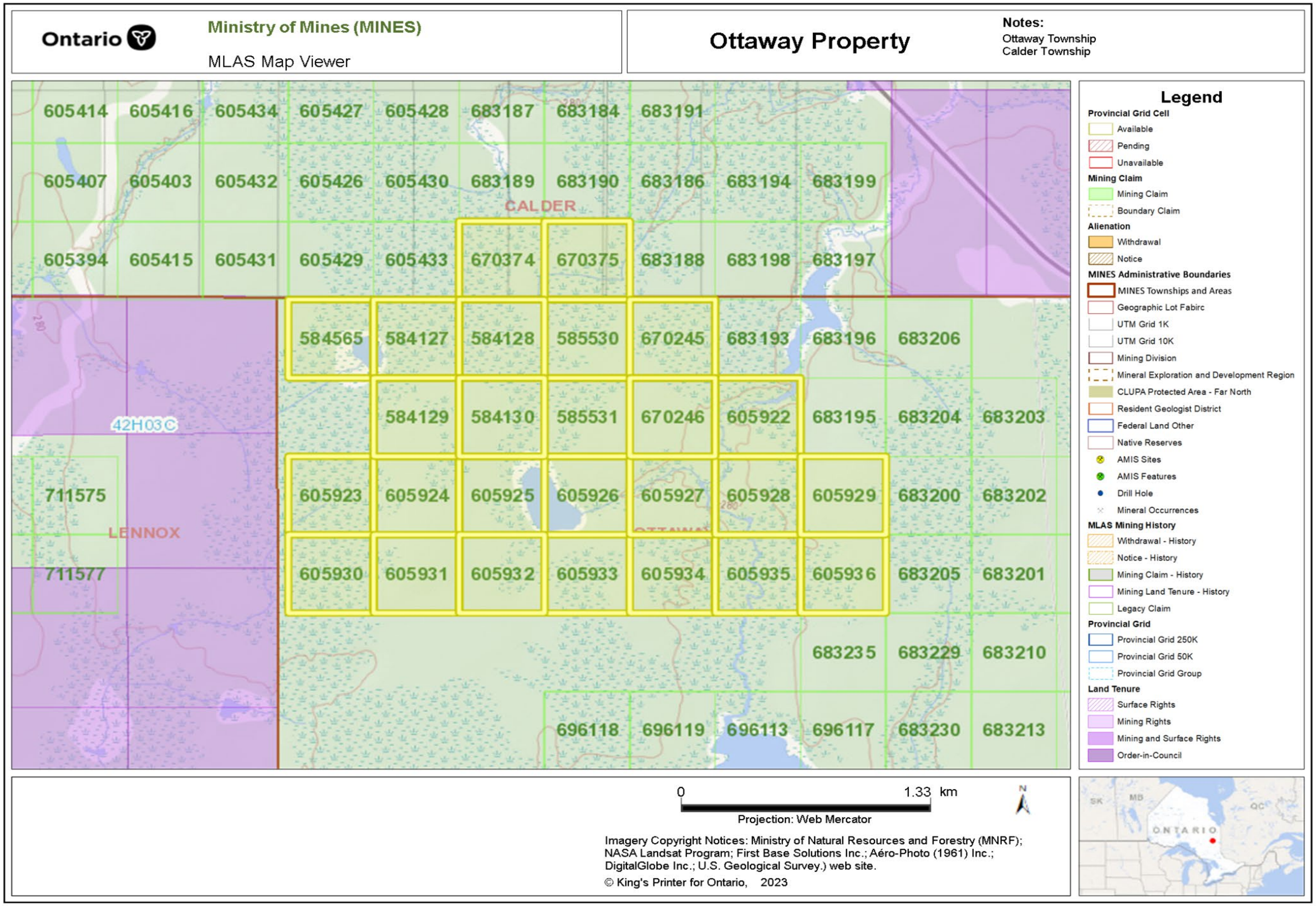
2.0 Mining Lands

The property consists of 26 contiguous mining claims owned by Mr. Maurice Valliere, client number 222572. These are located in Ottaway and Calder Townships of the Porcupine Mining Division in the District of Cochrane. ***Table 1*** lists all active mining land tenure which are also depicted in ***Figure 1***.

Table 1. Mining Land Tenure

Number	Township	Type	Status	Owner	Client Number	Cells	Due Date
584127	Ottaway	Claim	Active	Maurice Valliere	222572	1	2024-04-13
584128	Ottaway	Claim	Active	Maurice Valliere	222572	1	2024-04-13
584129	Ottaway	Claim	Active	Maurice Valliere	222572	1	2024-04-13
584130	Ottaway	Claim	Active	Maurice Valliere	222572	1	2024-04-13
584565	Ottaway	Claim	Active	Maurice Valliere	222572	1	2024-04-14
585530	Ottaway	Claim	Active	Maurice Valliere	222572	1	2024-04-24
585531	Ottaway	Claim	Active	Maurice Valliere	222572	1	2024-04-24
605922	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
605923	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
605924	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
605925	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
605926	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
605927	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
605928	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
605929	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
605930	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
605931	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
605932	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
605933	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
605934	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
605935	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
605936	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-08-08
670245	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-07-16
670246	Ottaway	Claim	Active	Maurice Valliere	222572	1	2023-07-16
670374	Calder	Claim	Active	Maurice Valliere	222572	1	2023-07-26
670375	Calder	Claim	Active	Maurice Valliere	222572	1	2023-07-26

Figure 1. Mining Claims



3.0 Location and Access

The Ottaway Property is located in Northeastern Ontario approximately 21 kilometers west of Cochrane, 50 kilometers northwest of Iroquois Falls and 65 kilometers north of Timmins ***(Figure 2***). It is situated in Ottaway and Calder Townships of the Porcupine Mining Division in the District of Cochrane. The property can be accessed via winter logging roads stemming off of Highway 11.

The area displays low topographic relief and poor drainage. This is marked by the predominant presence of spruce swamp vegetation as well as several small dispersed water bodies. As a result, ground access is better obtained during the winter months as opposed to the spring and summer months.

Figure 2. Locational Map

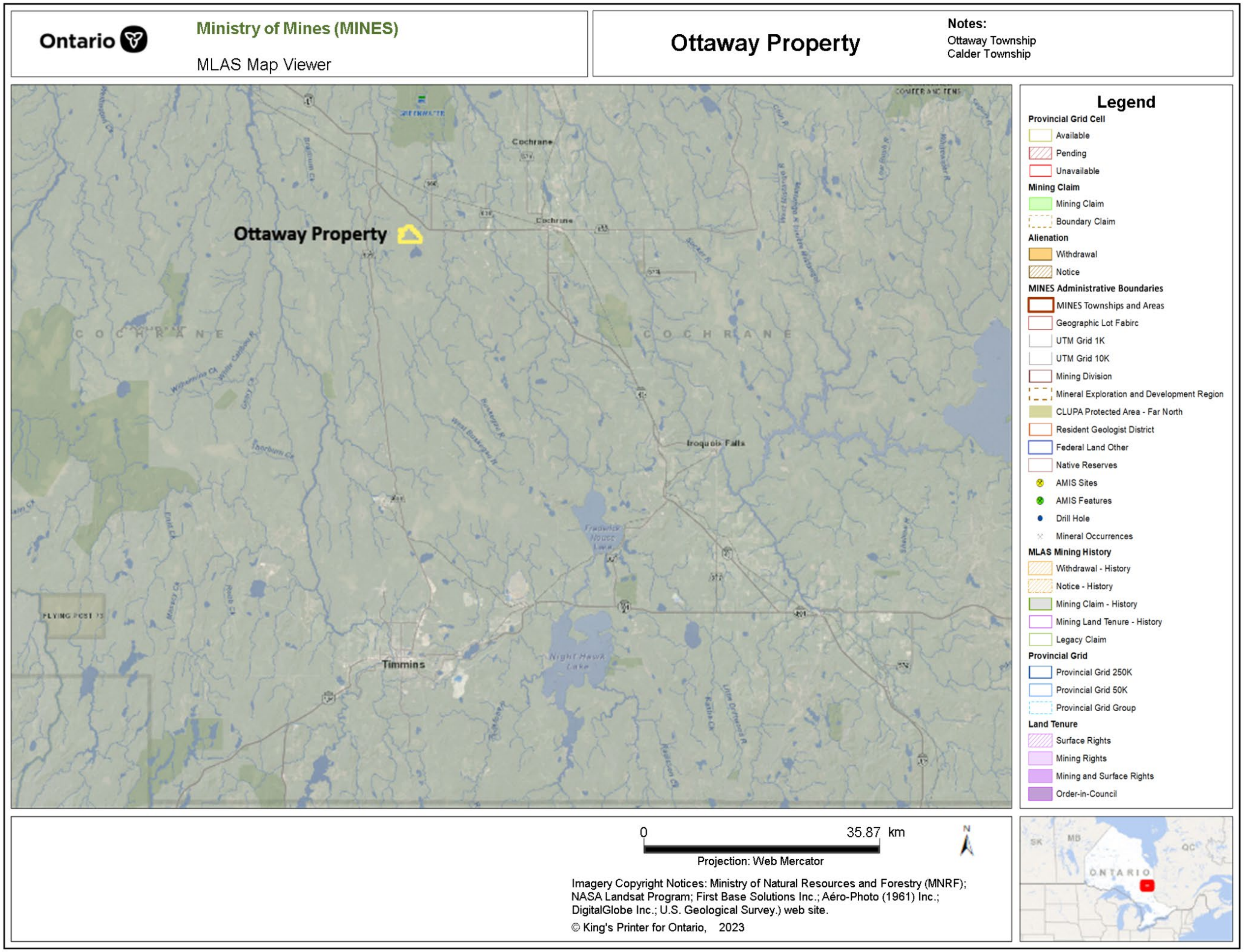
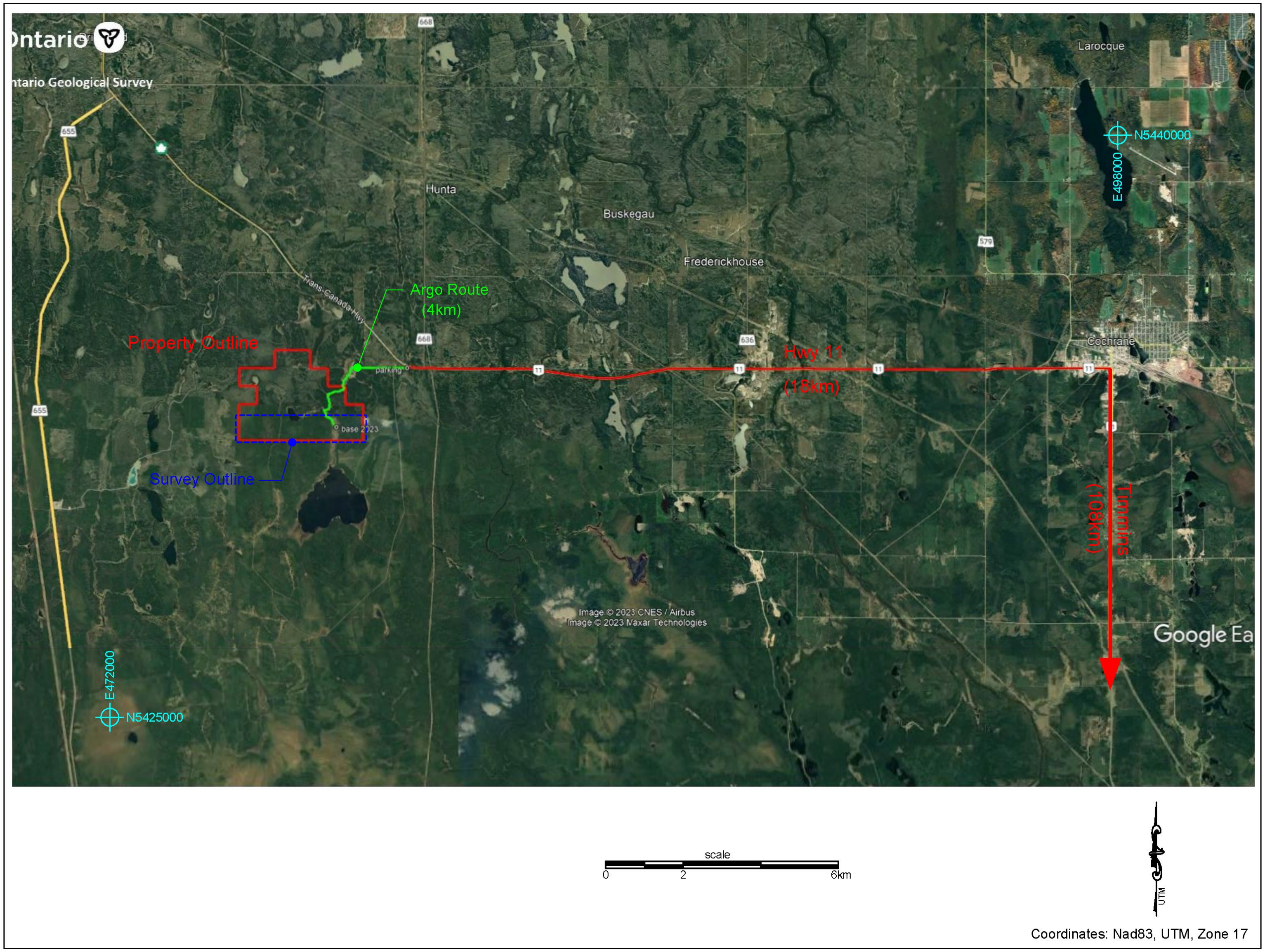


Figure 3. Access Map



4.0 Exploration History

A variety of base metal exploration has been ongoing in the area since the 1960's, including airborne geophysics, ground surveys and diamond drilling:

1962-1964: INCO completed six diamond drill holes totalling 793.4 meters.
1967: Donalda Mines Ltd. completed line cutting and magnetometer surveys (Assessment File 42H03SW0004).
1989: D. Londry and D. Mullen completed a geological mapping survey (Assessment File 42H03SE0001).
2022: M. Valliere completed a drone magnetic survey.

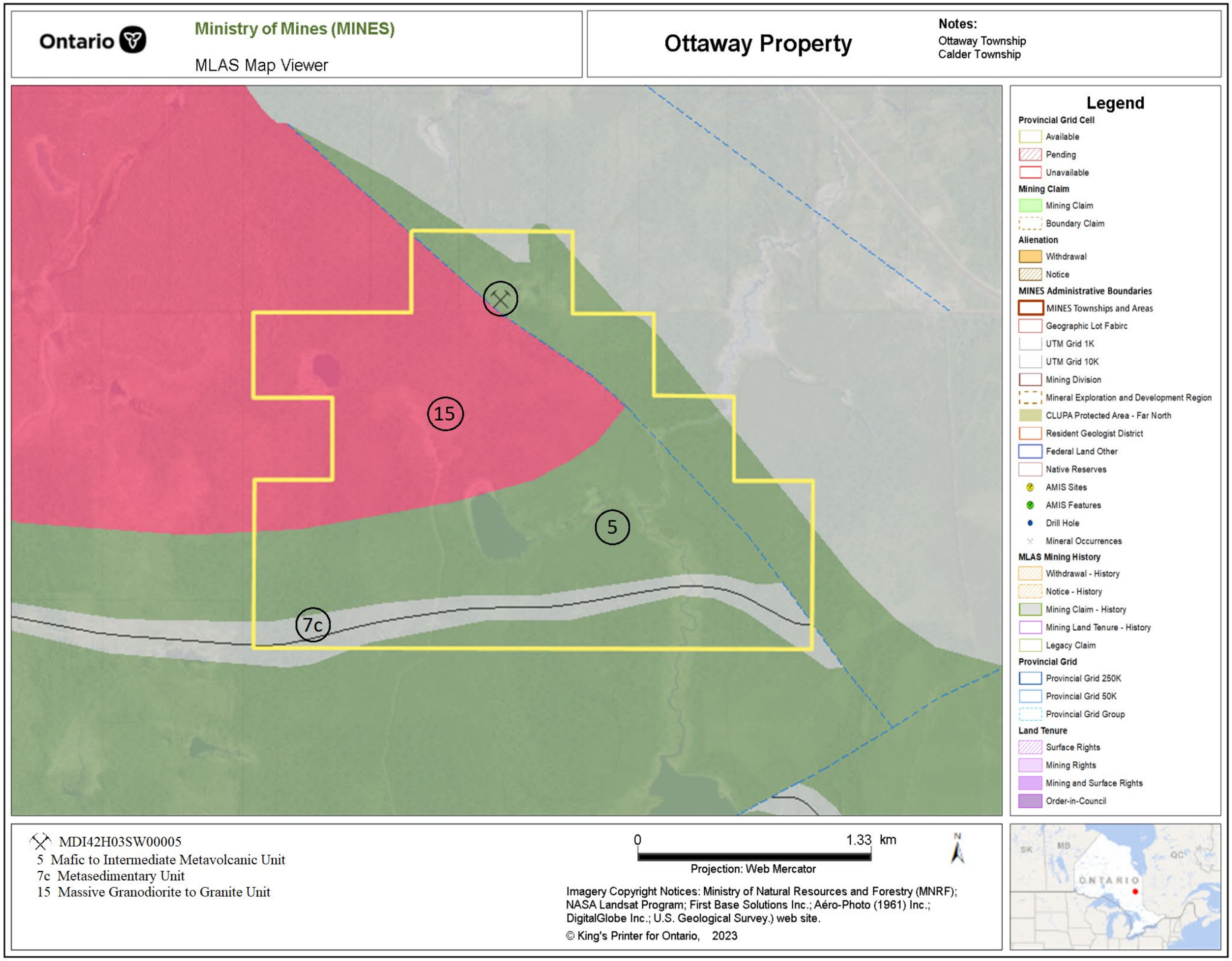
5.0 Regional and Local Geology

The property is located near the northern extent of the Abitibi Greenstone Belt north of the Porcupine Gold Camp. Due to the lack of exposed outcrop, geological interpretation is predominantly based on geophysical data and diamond drill logs. Government maps suggest the area is underlain by east-southeast trending metasediments consisting of iron formations, phyllite, amphibolite, quartzite, arkose and greywacke. Mafic metavolcanic units in contact with migmatitic rocks also occur to the north. Lower magnetic responses in the area suggest small felsic intrusive bodies. There is also the presence of some major northeast and northwest trending structures, such as lamprophyre dikes.

The property is underlain by a sequence of northwest trending metasediments intercalated with minor mafic metavolcanics. The clastic metasediments are often composed of garnets, micas and bands of chert-magnetite iron formation that contain sulphides including pyrite, pyrrhotite and chalcopyrite. The metavolcanics are described as amphiboles, hornblende-plagioclase schists, greenstones and chlorite schists. Minor gabbro and granite is reported as well as a possible mafic intrusion in the central part of the property. Both the metasediment and metavolcanic units are cut by thin dikes of granite and white pegmatite. In the southern part of the property, at least four thin seams of chert-magnetite iron formation constitute one horizon. Mafic metavolcanics are in contact with a large granitic unit to the north.

The Ottaway Property hosts a discretionary iron occurrence listed as “Inco DDH 18144” in the Ontario Mineral Inventory (MDI42H03SW00005). This is a result of 1963 drilling by Inco which intersected 47ft of oxide iron formation overlain by gneisses that contain trace magnetite; amphibolite in the footwall contains quartz-carbonate stringers and veins. The property geology as well as the location of the occurrence are displayed in ***Figure 4***.

Figure 4. Geology Map



6.0 2022 Drone Magnetic Survey

Between April 11th and May 12th of 2023 a drone magnetic survey was conducted over a portion the Ottaway Property. The survey was completed by Zen Geomap Inc. on behalf of the claim owner Mr. Maurice Valliere. The objective of the survey was to evaluate bedrock features in the vicinity of a known iron formation, to look for structurally favourable environments for the deposition of massive sulphide mineralization and to improve historical ground magnetic surveys.

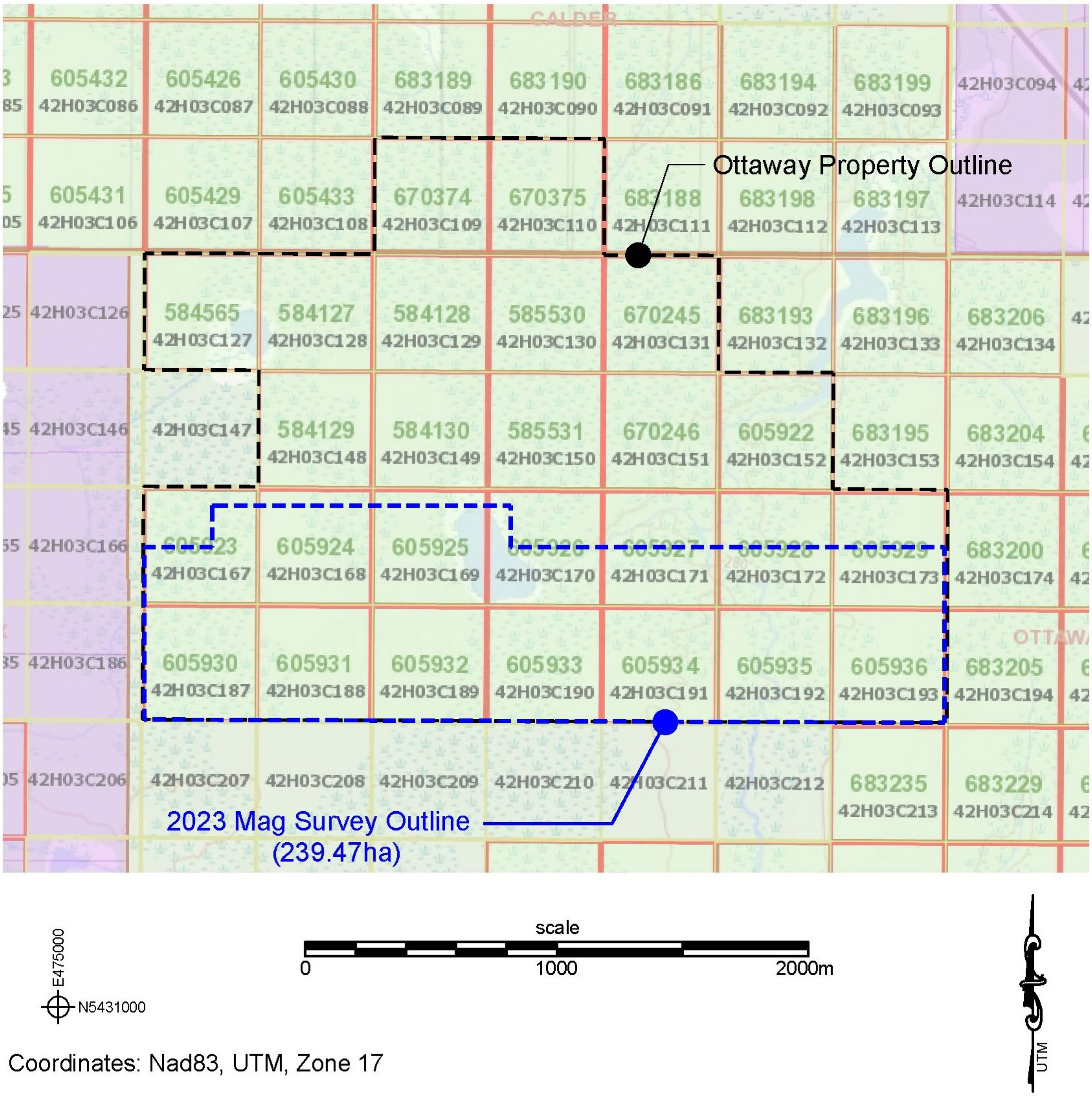
The survey was completed using a Geometrics MFAM magnetometer mounted on a DJI M600 Pro hexacopter drone. A Geometrics G856AX proton procession magnetometer was operated as a base station throughout the survey to provide diurnal monitoring of the local magnetic field variations. Details regarding the specifications for these instruments can be found in the ***Appendix I, II and III*** of this report. Information pertaining to quality control, test calibrations and processing steps can be found in ***Appendix IV***.

The survey was flown over a portion of the Ottaway property. An image of the survey grid can be viewed in ***Figure 5.***
Claims: 605930, 605931, 605932, 605933, 605934, 605935, 605936
Partial Claims: 605923, 605924, 605925, 605926, 605927, 605928, 605929

The program consisted of one grid summarized as follows:

Total survey kilometers: 68.3km
Total survey area: 239.47ha
Survey altitude: 65 meters above ground level (AGL)
Grid line spacing: 40 meters
Grid line azimuth: 0 degrees (N-S)
Tie line spacing: 2 ties lines spaced at 580 meters
Tie line azimuth: 90 degrees (E-W)
Base station location (NAD83, UTM Zone 17): 477854 / 5432489

Figure 5. Survey Grid Location



Processing

Magnetometer data was collected on two sensors operating at 1000hz located on the Geometrics MFAM. The data was processed through a custom program operating in Python. This converts raw data from Geometrics MFAM into a format compatible with Geosoft Oasis Montaj.

Customized import templates were used within Geosoft to identify and separate magnetic readings into organized grid and tie lines. This step eliminates extraneous magnetic data collected as the drone travels to and from the grid.

Grid and tie line data were corrected to remove heading error and lag. Corrected grid data were then levelled based on tie lines.

Data processing, maps and reports were completed between March 26th and May 20th, 2023. A breakdown of these details complete with expenditures can be found in ***Appendix V.***

7.0 Interpretation

The current survey was successful at identifying three magnetic-high anomalies within the Ottaway Property. The anomalies are indicated as M-A1, M-A2 and M-A3 on the interpretive map as seen in ***Figure 6***. The drone magnetic survey covers a total range of approximately 3035 nT.

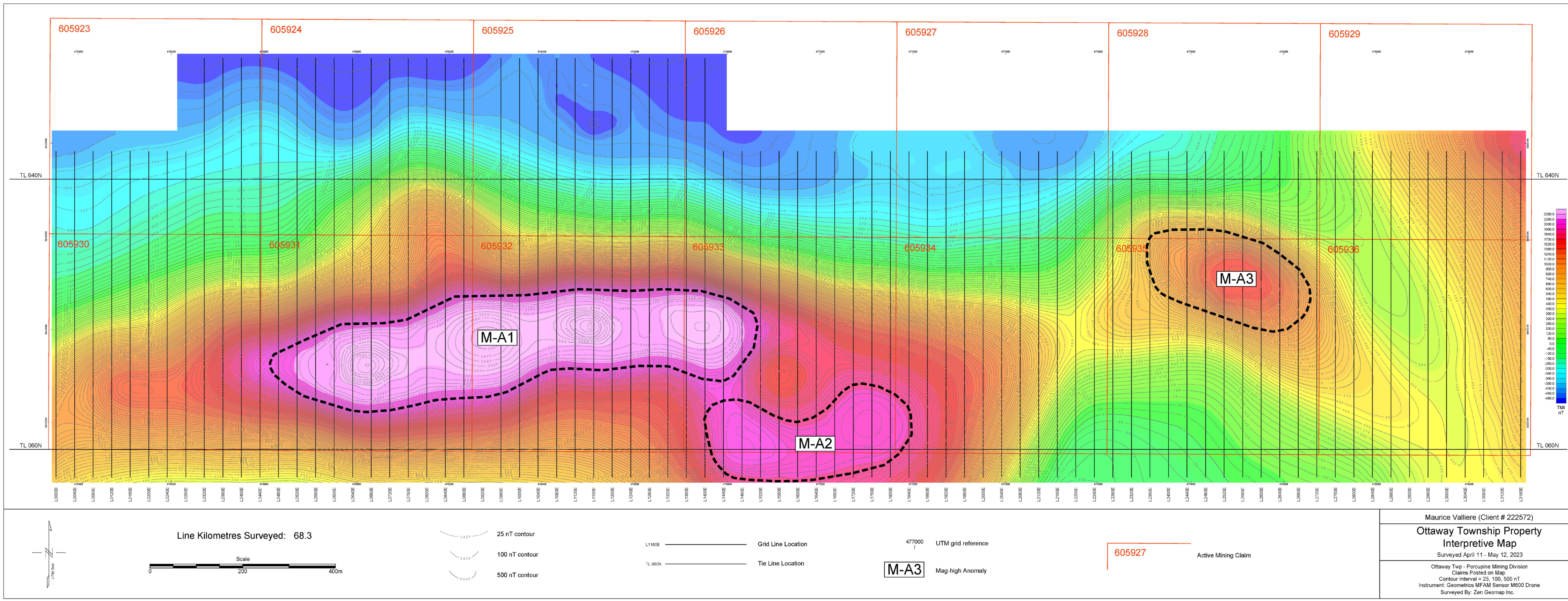
Anomaly M-A1 is an east-west trending magnetic-high anomaly with intensity of approximately 375 nT. The east-west axis has a length of 1000 meters and the width measured N-S is approximately 175 meters.

Anomaly M-A2 is an east-west trending magnetic-high anomaly with intensity of approximately 175 nT. The east-west axis has a length of 440 meters and the width measured N-S is approximately 150 meters.

Anomaly M-A3 is a magnetic-high anomaly trending on azimuth 110 degrees, with an intensity of approximately 600 nT. The axis has a length of 370 meters and the width is approximately 170 meters.

The three magnetic anomalies may represent mafic diabase features common to this geological setting or possibly underlying mafic or ultramafic lithology. They present decent geophysical targets for massive sulphide or nickel exploration as distinct unique magnetic anomalies.

Figure 6. Magnetic Map



8.0 Conclusion and Recommendations

The current survey was successful at identifying three magnetic-high anomalies within the Ottaway Property. The anomalies are indicated as M-A1, M-A2 and M-A3 on the interpretive map.

It is recommended that the client plan a ground-based EM survey across the three anomalies.
The 2023 drone magnetic survey could be used for planning ground-based EM, as the high-resolution data can be used for 3D inversion modeling, which would help to constrain and design a suitable ground EM field program. The cost of an EM survey would depend on line spacing and reading interval.

Prior to flying the 2023 drone magnetic survey, Zen Geomap collected high-resolution air photos across the property, to help design the grid and to aid with ground access. None of the related costs are included in the current report.

It is recommended that the client utilize this work to prepare a 3D terrain model and air photo mosaic. This type of 3D air photo compilation would cost approximately $4,300 to complete.

9.0 Statement of Qualifications

Statement of Qualifications

Author - Kevin Cool		
		Education
from	to	Description
	1983	Photography - 1 year, Humber College, Toronto Ontario
1988	1990	Survey Engineering Technician - 2 year honours diploma, Northern College Porcupine Campus
	2014	Received Permanent Prospectors Licence, by reason of having held a Prospector's Licence for 25 years or more
	2014	Aviation Ground School, Transport Canada Compliant Unmanned Aerial System training seminar
	2014	Radio Operators Certificate - Aeronautical
		Companies owned and operated
1990	2001	**General Surveys & Exploration** - mining, exploration, aggregate, construction survey and computer drafting.
2000	2005	**Big Red Diamond Corp.** - traded publicly on TSX Venture excahange under symbol DIA. Junior mining company exploring for diamonds.
		Participated in and managed regional-scale airborne geophysical programs, stream sampling, geochem sampling and camp construction.
		Property-scale work includes ground magnetometer, grid cutting and survey.
2005	2011	**True North Mineral Laboratories Inc.** - heavy mineral separation by heavy liquid. Crushing / pulverizing for other assay. 30+ employees.
		Provided services to the mining and exploration industry such as claim staking, till and geochem sampling, magnetometer survey.
2014	current	**UAV Timmins** - drone aerial mapping and survey. 1st company to apply drone air photo survey as valid mining claim assessment in Ontario.
2017	current	**Zen Geomap Inc.** - drone magnetometer survey. 1st company to apply drone mag survey as valid mining claim assessment in Ontario.

I, Kevin Scott Cool, of 15 Prospector St., Gold Centre in the City of Timmins, Province of Ontario, hereby certify that:

1) I am a graduate of Northern College of Applied Arts and Technology, May 26th 1990, Porcupine Campus, with a 2 year Honors Diploma in Survey Engineering Technology

2) I have subsequently operated above businesses, directly engaged with the mining and exploration industry.

3) I have been actively engaged in my profession since May, 1990, in all aspects of ground and airborne exploration programs including the planning and execution of regional and property-scale programs, supervision, data processing, maps, interpretation and reports.

Kevin Scott Cool

Zen Geomap
204-70C Mountjoy ST. N.
Timmins, ON P4N 4V7

Statement of Qualifications

I, Sara Wigelsworth, of 450 Harmony Street in the city of Timmins, Ontario, do hereby certify that:

- I am an exploration contractor and have been practicing my profession for over twelve years.

- I am a graduate of the University of Saskatchewan having received a B.Sc. Hon. in Archaeology in 2009.

Respectfully submitted,

Sara Wigelsworth

10.0 References

Mullen, D.V., 1989: Report on the Geology of the Deception Lake Property, Calder and Ottaway Townships, District of Cochrane, Porcupine Mining Division, NTW 42-H-03.

Ontario Mineral Inventory, 1991: Inco DDH 18144 – 1963. Ministry of Energy, Northern Development and Mines Record MDI42H03SW00005.

White, G.E., 1967: Report on the Magnetometer Survey on Property of Donalda Mines Limited, Ottaway Township, Porcupine Mining Division, Province of Ontario; Sulmac Exploration Services Limited.

Appendix I

Geometrics MFAM Magnetometer Specifications

Appendix I

Geometrics MFAM Magnetometer

System Basics

- System utilizes 2 MFAM sensors
- Sensors are controlled by 1 sensor module
- Sensor module communicates with a Texas Instruments main board
- Sensitivity: 0.00003nT
- Sensors operate at 1000Hz (collect 1000 readings per second on both sensors)

Technical Specifications

SPECIFICATIONS:

Mechanical:

Enclosure Dimensions: 9" x 6 5/8" x 1 3/16"

Sensor Cable length (Development box to Sensor): 20.5 inches

Power:

AC adapter: 13.5 to 16 Volts DC at 1.0A

Battery Pack: 12 volt 1800 mA-Hour Lithium Polymer

FEATURES:

1) **TIVA TM4C1294NCPDT Micro controller:** This is a 32 bit ARM Cortex-MF4 based microcontroller running at up to 120 MHz. It has 1024K of flash, with 256K bytes of RAM, and 6 KBytes of EEPROM.

2) **USB 2.0 Micro Connector:** USB functionality is provided by the TIVA microcontroller and TIVAWare support libraries.

3) **Four User LEDs:** Four user controlled LEDs are wired to TIVA microcontroller GPIO pins PK0, PK1, PN0, and PN1.

4) **Two User Switches:** Two user read switches are wired to the microcontroller pins PK6 and PJ1.

5) **One Microcontroller Reset Switch:** This switch is used to reset the microcontroller.

6) **Wi-Fi port for TI CC3100 Wi-Fi Booster Pack:** The Development board layout allows a TI CC3100 Wi-Fi Booster pack to be directly plugged in. Using TIVAWare libraries, software can be developed to allow Wi-Fi communication between the Development board and a computer.

7) **USB XDS110 Port for Firmware Downloading and Debugging:** This second USB port is used as a debug/firmware download interface between the TI Code Composer Studio development suite and the Development Kit.

8) **Two RS-232 Serial Ports with RJ-45 Connectors:** Two general purpose serial ports are available to the user. The first serial port is wired to TIVA microcontroller UART4, and supports RTS and CTS handshaking. The second serial port is wired to TIVA microcontroller UART5. This port supports only TxD and RxD. Both of these ports use +/- 8 volt voltage swings, and support baud rates up to 920 KBaud. Note that these two ports are wired as Data Terminal Equipment (DTE) Thus to connect either of these two ports to a computer it would need to connect through a null modem. .

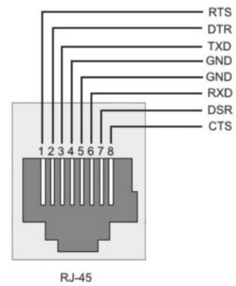


Figure 3: Serial Port Pinout

9) **On Board GPS Module:** An Adafruit GPS module is included with the Development Kit. It features 66 channels, -165 dBm sensitivity, and 3 Meter accuracy. An external GPS antenna is included so that signals can be received inside the box even with the cover in place. By default the GPS powers up to 9600 baud with several GPS sentences being output. The firmware that comes with the Development kit reconfigures the GPS to output only an RMC sentence at 115200 baud. This RMC string is sent with the output TCP data packet as described in the "Ethernet Data Format" section. The GPS is wired to UART7 on the TIVA microcontroller using 0-3.3 volt logic swings.

   The 1PPS pulse from this GPS goes to the MFAM development module and disciplines the cycle rate to exactly 1 kiloSamples per second.

10) **Micro SD Card Slot for Storing Data Locally:** A micro SD card slot is available for the user to read and write data using a SPI interface. It is connected to SPI port 1 of the TIVA microcontroller.

11) **10 MHZ Timing Reference Input Port:** This input port takes a 10 MHz reference signal from a GPS disciplined reference oscillator, buffers and squares it up, and sends it to the MFAM module. The purpose of this signal is to lock the MFAM clocking system to this reference signal so that the Larmor frequency can be measured to an absolute standard. At this time, the MFAM does not support this feature. This function will be implemented in the future.

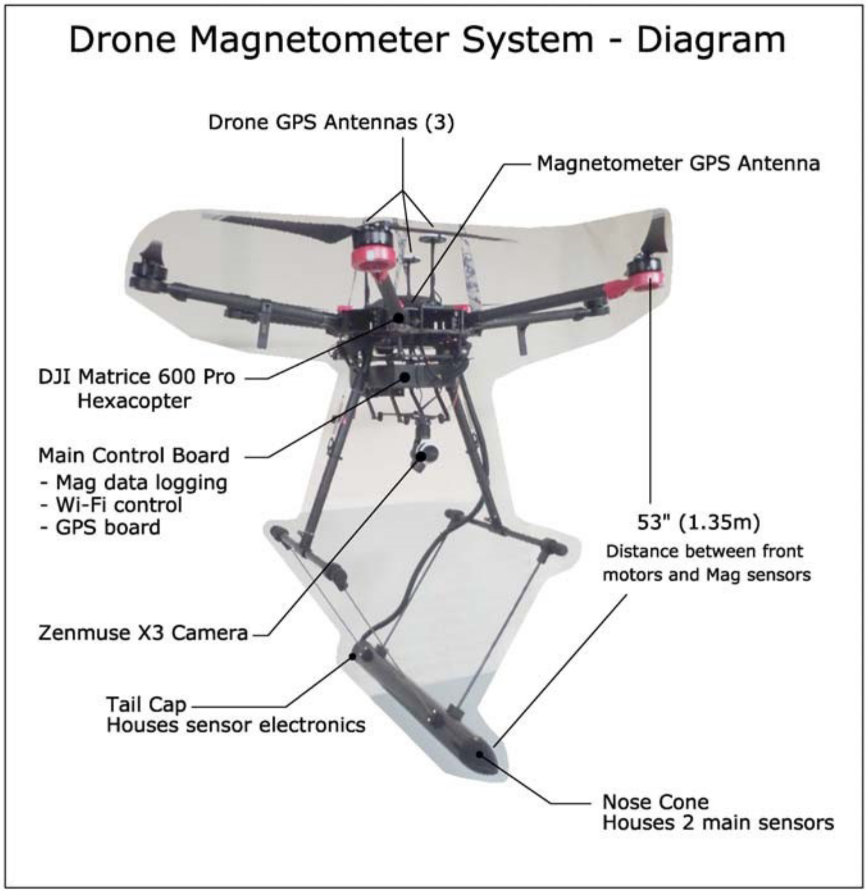
12) **Ethernet port with Power over Ethernet Compatibility**: The Tiva microcontroller contains a fully integrated Ethernet MAC and PHY. In addition, the Ethernet port can power the Development Kit via Power over Ethernet (PoE) using an Ethernet power injector.

13) **1.8 Amp-Hour Battery pack:** Three on board lithium/polymer batteries can power the system for 2 hours. A switch on the Development board allows the battery to be turned on/off. In addition, if the battery voltage falls below 8 volts the MFAM module will automatically shut down while keeping the microcontroller alive.

14) **Integrated Battery Charging system:** A lithium/polymer battery charging system is on board. If the battery switch is turned on, and the AC power adapter is plugged in, the batteries will be charged.

15) **Four Differential Analog Input Channels:** There are four differential analog inputs available for use. Channels 0 and 1 are +/- 2.5 volts full scale, while channels 2 and 3 are 0 to +5 volts full scale. In the firmware supplied with the Development kit (which sends MFAM/GPS data to the MFAMConsole program on the computer), all four channels are sampled synchronously with the MFAM data input to the Tiva are included in the data stream.

16) **On board Power/Status LEDs:** Several Status and Power LEDs are arranged along the front edge of the board. They include the four user LEDs, Power status LEDs (which power source is powering the board, and whether the battery is charging or the voltage low). They are listed in the Front and Back Panel Connection and Indicator section below.



Description and Location of components

The Geometrics MFAM magnetometer "main board" is attached directly below the central body of the DJI Matrice 600 Pro hexacopter drone. This box contains a small, Texas Instruments computer that collects and stores magnetometer readings on a micro-SD card. It also houses a 66 channel Adafruit GPS module, which operates independent of the (3) internal drone GPS modules. The Adafruit GPS collects and stores "GPS readings" (Lat / Long / Altitude / Time). The GPS readings are assigned to each mag reading, as the drone navigates along grid lines. A Wi-Fi module is attached to the Texas Instruments computer, which allows the operator to start and stop the magnetometer at a distance.

The Geometrics MFAM magnetometer operates using 2 separate mag sensors, attached to a "sensor module" with a flexible circuit board. The sensor module and 2 sensors are housed in a carbon graphite tube, which is mounted (suspended) 53 inches (1.35m) below the 2 front motors of the drone.

Magnetic shielding (mu-metal) is installed at 6 locations around the drone body, to provide additional shielding between drone components and the 2 mag sensors.

The magnetometer GPS antenna (for the internal Adafruit GPS) is mounted on top the drone body, to allow for clear signal. The vertical distance between this antenna and the 2 mag sensors, is 1.20m. This value is considered when reporting "mean terrain clearance", by subtracting 1.2m from the elevation assigned to each mag reading.

Appendix II

Geometrics G856AX
Proton Procession Magnetometer Specifications

Appendix II
Geometrics G856AX Proton Procession Magnetometer

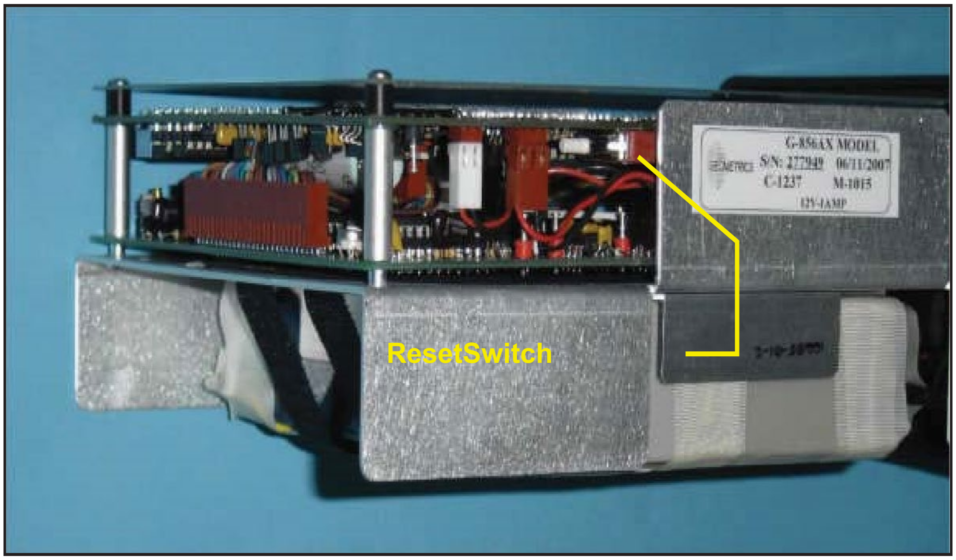


Figure 23. Internal reset switch.

Specifications

- Displays – Six-digit display of magnetic field to resolution of 0.1 gamma or time to nearest second. Additional three-digit display of station, day of year, and line number.
- Resolution - Typically 0.1 gamma in average conditions. May degrade to lower resolution in weak fields, noisy conditions or high gradients.
- Absolute accuracy - One gamma, limited by remnant magnetism in sensor and crystal oscillator accuracy.
- Clock - Julian clock with stability of 5 seconds per month at room temperature and 5 seconds per day over the temperature range of -20 to +50 degrees Celsius. Tuning - Push button tuning from keyboard with current value displayed on request. Tuning range 20 to 90 T.
- Gradient - Tolerates gradients to 1800 gammas/meter. When high Tolerance gradients truncate count interval, maintains partial reading to an accuracy consistent with data.
- Cycle Time - Complete field measurement in three seconds in normal operation. Internal switch selection for faster cycle (1.5 seconds) at reduced resolution or longer cycles for increased resolution.
- Manual Read - Takes reading on command. Will store data in memory on command.
- Memory - Stores more than 5700 readings in survey mode, keeping track of time, station number, line number day and magnetic field reading. In base station operation, computes for retrieval but does not store time of recording designated by sample interval, allowing storage of up to 12,000 readings.

- Output - Plays data out in standard RS-232 format at selectable baud rates. Also outputs data in real time byte parallel, character serial BCD for use with digital recorders.
- Inputs - Will accept an external sample command.
- Special - An internal switch allows:
  - adjustment of Functions polarization time and count time to improve performance in marginal areas or to improve resolution or speed operation
  - three count averaging
  - choice of lighted displays in auto mode.
- Physical
  - Instrument console: 7 x 10 ½ x 3 ½ inches (18 x 27 x 9 cm), 6 LB (2.7 kg)
  - Sensor: 3 1/2 x 5 inches (9 x 13 cm), 4 LB (1.8 kg)
  - Staff: 1 inch x 8 feet (3cm x 2.5m), 2 LB (1kg)
- Environmental: Meets specifications from 1 to 40°C. Operates satisfactorily from -20 to 50°C.
- Power - Depending on version, operates from internal rechargeable Gel-cells or 9 D-cell flashlight batteries . May be operated from external power ranging from 12 to 18 volts external power. Power failure or replacement of batteries will not cause loss of data stored in memory.
- Standard system (P/N 16600-02) components:
  - Sensor (P/N 16076-01) and sensor cable (P/N 16134-01)
  - Console (P/N 16601-01)
  - Staff, one top section (P/N 16535-01), two middle sections (P/N 16536-01) and 1 bottom section (P/N 16537-01)
  - Carry harness (P/N 16002-02)
  - Two sets of rechargeable batteries (P/N 16697-01) and battery charger (P/N 16699-01)
  - Carrying case (P/N 16003-01)
  - Download cable (P/N 16492-01)
  - Hardcopy operation manual (P/N 18101-02)
  - Magnetometer CD (P/N 26648-01)
- Optional accessories:
  - Tripod kit for base-station operation (P/N 16708-02)
  - Gradiometer kit (P/N 166651-01)
  - Gradiometer carry/storage case (16003-01)

Appendix III

DJI Matrice 600 Pro Specifications

Appendix III - DJI Matrice 600 Pro Specifications

Specifications

• Aircraft	
Diagonal Wheelbase	1133 mm
Dimensions	1668 mm × 1518 mm × 727 mm with propellers, frame arms and GPS mount unfolded (including landing gear) 437 mm × 402 mm × 553 mm with propellers, frame arms and GPS mount folded (excluding landing gear)
Weight (with six TB47S batteries)	9.5 kg
Weight (with six TB48S batteries)	10 kg
Max Takeoff Weight Recommended	15.5 kg
Hovering Accuracy (P-GPS)	Vertical: ±0.5 m, Horizontal: ±1.5 m
Max Angular Velocity	Pitch: 300°/s, Yaw: 150°/s
Max Pitch Angle	25°
Max Wind Resistance	8 m/s
Max Ascent Speed	5 m/s
Max Descent Speed	3 m/s
Max Speed	40 mph / 65 kph (no wind)
Max Service Ceiling Above Sea Level	2170 propellers: 2500 m, 2195 propellers: 4500 m
Hovering Time* (with six TB47S batteries)	No payload: 32 min, 6 kg payload: 16 min
Hovering Time* (with six TB48S batteries)	No payload: 38 min, 5.5 kg payload: 18 min
Flight Control System	A3 Pro
Supported DJI Gimbals	Ronin-MX; ZENMUSE™ Z30, Zenmuse X5/X5R, Zenmuse X3, Zenmuse XT, Zenmuse Z15 Series HD Gimbal: Z15-A7, Z15-BMPCC, Z15-5D III, Z15-GH4
Retractable Landing Gear	Standard
Operating Temperature	14° to 104° F (-10° to 40° C)
• Remote Controller	
Operating Frequency	920.6 MHz to 928 MHz (Japan); 5.725 GHz to 5.825 GHz, 2.400 GHz to 2.483 GHz
Max Transmission Distance	FCC Compliant: 3.1 mi (5 km), CE Compliant: 2.2 mi (3.5 km) (Unobstructed, free of interference)
Transmitter Power (EIRP)	10 dBm @ 900M, 13 dBm @ 5.8G, 20 dBm @ 2.4G
Video Output Port	HDMI, SDI, USB
Operating Temperature	14° to 104° F (-10° to 40° C)
Battery	6000 mAh LiPo 2S
• Charger (Model: MC6S600)	
Voltage Output	26.1 V
Rated Power	600 W
Single Battery Port Output Power	100 W
• Standard Battery (Model: TB47S)	
Capacity	4500 mAh
Voltage	22.2 V
Battery Type	LiPo 6S
Energy	99.9 Wh
Net Weight	595 g
Operating Temperature	14° to 104° F (-10° to 40° C)
Max Charging Power	180 W
• Optional Battery (Model: TB48S)	
Capacity	5700 mAh
Voltage	22.8 V
Battery Type	LiPo 6S
Energy	129.96 Wh
Net Weight	680 g
Operating Temperature	14° to 104° F (-10° to 40° C)
Max Charging Power	180 W

CE1313 RoHS

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

HDMI

DJI incorporates HDM™ technology. The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries

* Hovering time is based on flying at 10 meters above sea level in a no-wind environment and landing with a 10% battery level.

Download the detailed user manual at:
www.dji.com/matrice600-pro

※ This content is subject to change without prior notice.

Drone Operation and Ground Control Methods

The DJI Matrice 600 Pro drone is programmed to fly an automated flight path (the survey grid lines and tie lines), using software that is available and ready to use on a wide variety of drones. Zen Geomap uses UgCS software, Drone Deploy and Pix4D software;

- Drone Deploy and Pix4D, on simple grids that do not require advanced control with regards to following complex terrain (example – flying in relatively flat ground, using Google Earth or other simple elevation model).
- UgCS, in rugged terrain, where we obtain a detailed 3D terrain model (DEM or DTM) using photogrammetric drone prior to magnetic survey. In this case we upload our own, custom DEM into UgCS software and the DJI M600 drone will follow the terrain at a fixed offset.

Using a Drape

The automated flight path will always use (follow) a "drape" in one form or another.

- On simple grids in flat terrain, the drape is generated as an offset of a simple DEM, such as Google Earth or other coarse elevation model such as DEMs available on-line through USGS.
- In complex terrain, the drape is generated as an offset of our own, custom DEM.

All of our piloting software is capable of following a drape at a fixed offset. We typically program the drone to fly 50m above coarse DEMs, such as Google Earth, or USGS. When a custom DEM is available, we typically fly 25-30m above DEM.

The actual / final "height above terrain" (or mean terrain clearance), is determined in the field by our crews. They visually inspect and look for obstacles such as hills, trees, buildings and towers.

The height above terrain (or mean terrain clearance) is included in the logistical and assessment reports we prepare for our clients.

Ground Control Methods

The DJI M600 drone uses a combination of 3 separate GPS receivers and 3 separate barometers. This system developed by DJI is called the A3 Controller.

The A3 controller is designed to maintain a stable altitude, relative to the take-off point. Over a 5 year period (2014 to current), we have found the A3 controller to be reliable to sub-metre accuracy, when it comes to maintaining stable altitude over a typical 20 to 30 minute flight.

Based on this long-term record, we rely on the A3 controller to navigate the drone at a preprogrammed, fixed offset above DEM. Over the same 5 year period, we have observed consistent and accurate agreement between the A3 GPS locations and the Adafruit (Magnetometer) GPS locations. When plotted in plan view, the A3 GPS tracks have always agreed with the Adafruit tracks to approximately 1 metre accuracy.

The author if this report has been an active surveyor since 1990 and is familiar with real-time (RTK) GPS and post-processed GPS methods.

Appendix IV

Quality Control, Test Calibrations and Processing Steps

Quality Control

Throughout the data acquisition phase, data are monitored closely for quality control and error-checking on all channels. Output from the Geometrics MFAM magnetometer includes a wide range of error codes, which are written to the raw data file to help diagnose problems when they occur in the field.

All data are checked on a daily basis, as field data are transferred to Zen Geomap offices in Timmins or North Bay, Ontario. When errors or problems occur, the field crew is instructed to re-fly problem areas.

Tests and Calibrations

The following tests and calibrations are carried-out on all magnetometer equipment and sensors employed by Zen Geomap Inc.;

Heading Error

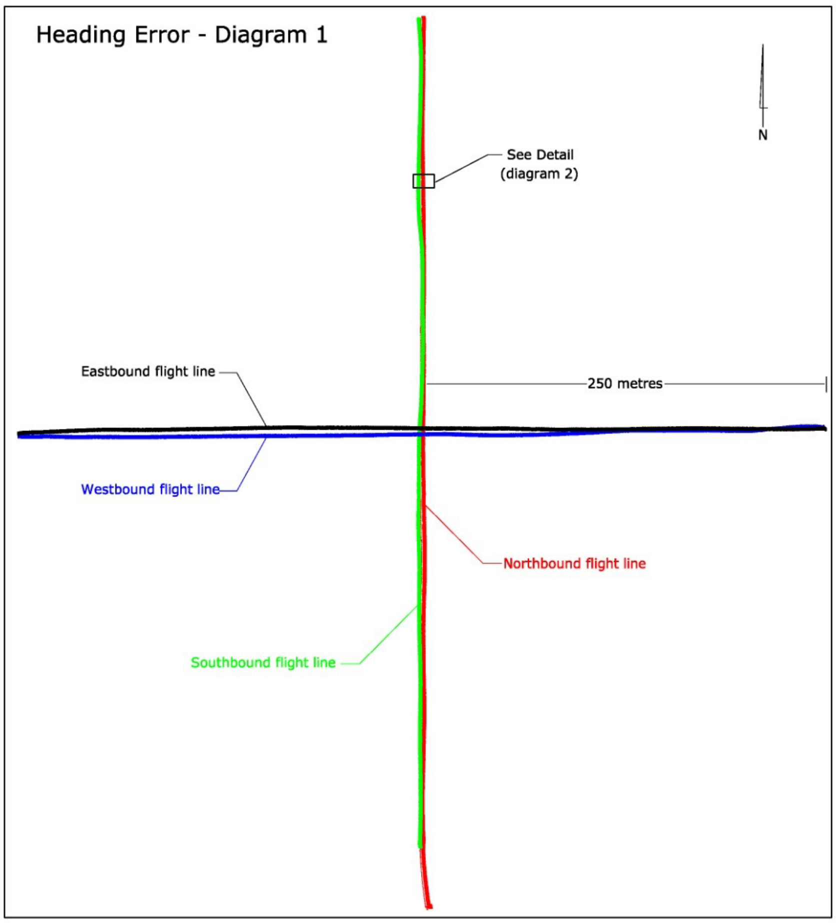
Upon receipt of a new magnetometer (or after significant repair or modification to any system component), a test flight is carried-out to determine heading error.

A cross-pattern is flown as shown in ***Diagram 1***, with 500 metre N-S and E-W lines.

Magnetic readings are collected along the same lines, flown in opposite directions.

Northbound and southbound readings at the same location (+/- 0.2m in this example) are compared. Eastbound and Westbound readings undergo the same process.

(See: Heading Error – ***Diagram 2***).



Example test flight by Zen Geomap, August, 2019

Example – Geometrics MFAM readings, August, 2019

The difference between Northbound and Southbound readings, averaged over a 500m baseline is calculated. The resulting value (6 Nt in above example), is used to apply a correction for heading error during processing.

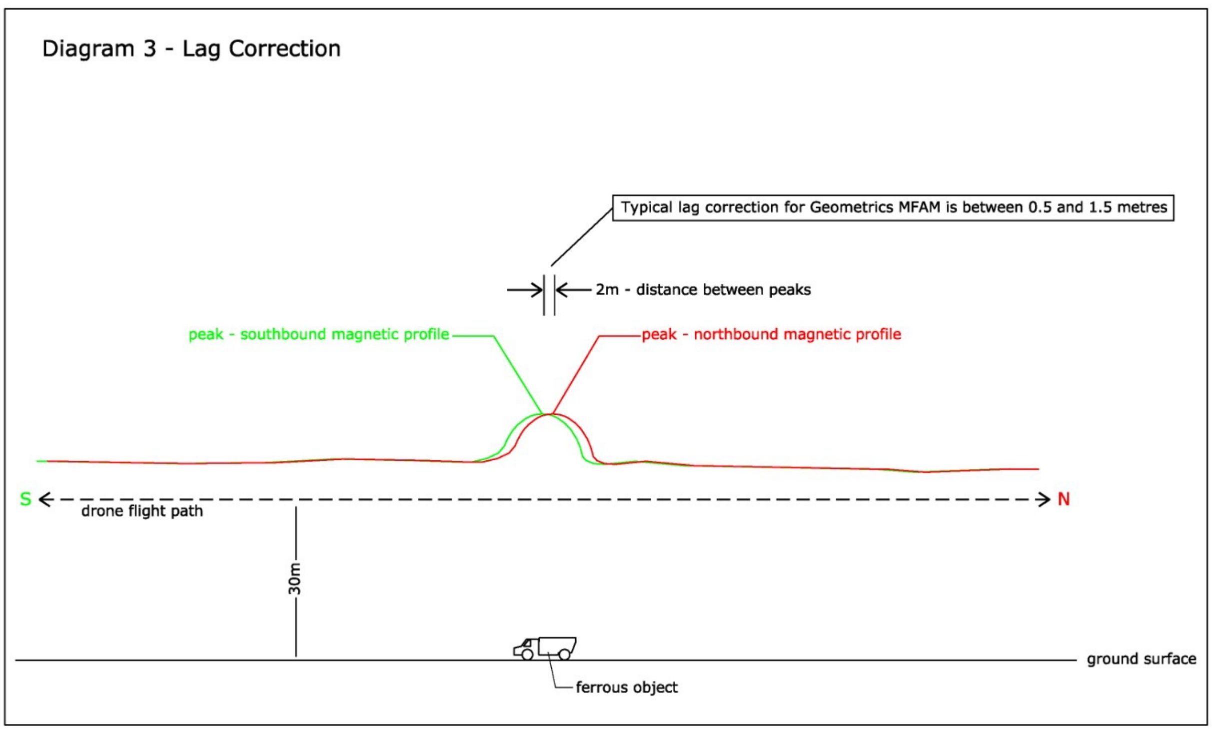
Each mag sensor will produce a unique result, however we typically apply a correction of 3Nt or less, to adjacent flight lines.

Lag Correction

Tests are performed to determine lag correction, by flying the drone magnetometer in opposite directions over top a ferrous object. Suitable objects include steel bridges, vehicles or heavy equipment.

Diagram 3 shows a typical flight test to determine lag correction.

A Geometrics MFAM magnetometer will typically have a lag error between 0.5 and 1.5 metres. Each mag sensor will produce a unique value. We typically apply a correction of 1m or less, to the location of magnetic readings on adjacent lines.



Diurnal Correction

A Geometrics G856AX proton procession magnetometer is operated as a base station on all projects, to provide diurnal monitoring of the local magnetic field variations. Adjustment may be applied to the raw MFAM readings, when variations exceed 10 or more Nt over the course of any flight. However, we typically re-fly grid lines, if the magnetic field variation is excessive.

The location (UTM coordinate) of the base station is included in the report body.

Processing Steps

Diurnal is examined for flights covering tie lines.

If magnetic field variation is excessive during tie line flights, all readings across tie lines are corrected using the base station data.

Tie lines provide a framework for leveling grid lines.

Readings on grid lines (once corrected for heading error and lag), are translated to conform to the tie lines. This process involves adjusting individual grid line segments, based on tie line intersections.

Unlike conventional airborne survey, such as fixed-wing or helicopter, a drone will take-off and land multiple times during the course of a survey. The resulting ferry lines are removed from the overall dataset prior to processing. Zen Geomap has developed import templates that run in Geosoft Oasis Montaj, to accomplish this task.

Geometrics MFAM data is not directly compatible with industry-standard software such as Geosoft. Zen Geomap has developed software (Python code) to convert raw MFAM data into a format compatible with Geosoft and other industry-standard geophysical software. The raw data from MFAM is processed through Python, prior to initial processing.

The Python code developed by Zen Geomap has been adopted by Geometrics, as the standard conversion software for drone-mounted MFAM. Geometrics has been the industry leader for airborne magnetometer equipment since 1969.

Appendix V

Expenditures

Appendix V. Table 2 - Statement of Costs

DRONE MAGNETIC SURVEY – OTTAWAY PROPERTY 2023						
Date	**Work Type**	**Work Description**	**Quantity**	**Rate**	**Amount**	**Notes**
March 26th, 2023	Report writing	Report preparation	8 hours	$110.00	$880.00	
April 5th, 2023	Report writing	Report preparation	8 hours	$110.00	$880.00	
April 11th, 2023	Travel Time	Timmins>site>Timmins	3.2 hours	$200.00	$640.00	
	Travel kilometers	Timmins>site>Timmins	252km	$0.60	$151.20	
	Field work	Break 4km of trail to mobilize equipment	3.5 hours	$200.00	$700.00	
	Survey work	Drone magnetic survey (3 flights)	3 flights	$1,375.00	$4,125.00	Covered 16 westernmost grid lines (long ferry distance) L2560E to L3160E
	Rental	Argo	1 day	$450.00	$450.00	
	Computer Processing	Process 3 flights	3.75 hours	$110.00	$412.50	
May 6th, 2023	Travel Time	Timmins>site>Timmins	3.2 hours	$200.00	$640.00	
	Travel kilometers	Timmins>site>Timmins	252km	$0.60	$151.20	
	Field work	Mobilize crew and equipment	3.5 hours	$200.00	$700.00	
	Survey work	Drone magnetic survey (5 flights)	5 flights	$1,375.00	$6,875.00	Covered 23 grid lines working east (medium ferry distance) L1640E to L2520E
	Rental	Argo	1 day	$450.00	$450.00	
	Computer Processing	Process 5 flights	4.5 hours	$110.00	$495.00	
May 8th, 2023	Travel Time	Timmins>site>Timmins	3.2 hours	$200.00	$640.00	
	Travel kilometers	Timmins>site>Timmins	252km	$0.60	$151.20	
	Field work	Mobilize crew and equipment	3.5 hours	$200.00	$700.00	
	Survey work	Drone magnetic survey (4 flights)	4 flights	$1,375.00	$5,500.00	Covered 23 grid lines working east (short ferry distance) L0760E to L1600E
	Rental	Argo	1 day	$450.00	$450.00	
	Computer Processing	Process 4 flights	4 hours	$110.00	$440.00	
May 12th, 2023	Travel Time	Timmins>site>Timmins	3.2 hours	$200.00	$640.00	
	Travel kilometers	Timmins>site>Timmins	252km	$0.60	$151.20	
	Field work	Mobilize crew and equipment	3.5 hours	$200.00	$700.00	
	Survey work	Drone magnetic survey (3 flights)	3 flights	$1,375.00	$4,125.00	Covered 18 grid lines and 2 tie lines (short ferry distance) L0000E to L0720E +2 TL
	Rental	Argo	1 day	$450.00	$450.00	
	Computer Processing	Process 3 flights including tie line levelling	4.5 hours	$110.00	$495.00	
May 13th, 2023	Computer Processing	Generate TMI mag map to MENDM standards	2.25 hours	$110.00	$247.50	
	Computer Processing	Generate Table 1 and Figure 2 for assessment report	2.5 hours	$110.00	$250.00	
May 18th, 2023	Report writing	Report preparation	4 hours	$110.00	$440.00	
May 19th, 2023	Report writing	Report preparation	8 hours	$110.00	$880.00	
May 20th, 2023	Report writing	Report preparation	8 hours	$110.00	$880.00	
		TOTAL PROJECT			**$34,689.80**	

Appendix V. Table 3 - Break down of cost per claim.

DRONE MAGNETIC SURVEY - OTTAWAY PROPERTY 2023						
Tenure ID	**Anniversary Date**	**Tenure Status**	**Work Required ($)**	**Area Surveyed (sq.m.)**	**Total Area (%)**	**Work Completed ($)**
605923	08-Aug-2023	Active	400.00	130662	5.46	1892.76
605924	08-Aug-2023	Active	400.00	177893	7.43	2576.95
605925	08-Aug-2023	Active	400.00	178787	7.47	2589.90
605926	08-Aug-2023	Active	400.00	119151	4.98	1726.01
605927	08-Aug-2023	Active	400.00	105183	4.39	1523.68
605928	08-Aug-2023	Active	400.00	106025	4.43	1535.87
605929	08-Aug-2023	Active	400.00	104034	4.34	1507.03
605930	08-Aug-2023	Active	400.00	208560	8.71	3021.19
605931	08-Aug-2023	Active	400.00	211561	8.83	3064.66
605932	08-Aug-2023	Active	400.00	211561	8.83	3064.66
605933	08-Aug-2023	Active	400.00	211561	8.83	3064.66
605934	08-Aug-2023	Active	400.00	211561	8.83	3064.66
605935	08-Aug-2023	Active	400.00	211561	8.83	3064.66
605936	08-Aug-2023	Active	400.00	206621	8.63	2993.10
Total			**5600.00**	**2394721**	**100.00**	**34689.80**
Total area surveyed				**(239.47 ha)**		

UTM Grid

Line Kilometres Surveyed: 68.3

Scale

0 200 400m

Coordinates: Nad83, UTM, Zone 17

25 nT contour

100 nT contour

500 nT contour

L1160E Grid Line Location

TL 060N Tie Line Location

Topography

Water - creek / lake

Logging Road

E 477000 UTM grid reference

605927 Active Mining Claim

Maurice Valliere (Client # 222572)

Ottaway Township Property

Drone Magnetic Survey - TMI Contours

Surveyed April 11 - May 12, 2023

Ottaway Twp - Porcupine Mining Division

Claims Posted on Map

Contour Interval = 25, 100, 500 nT

Instrument: Geometrics MFAM Sensor M600 Drone

Surveyed By: Zen Geomap Inc.


605923
605924
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M-A2
M-A3
E 475400
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E 476600
E 476800
E 477000
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E 477400
E 477600
E 477800
E 478000
E 478200
E 478400
N 5433000
N 5432800
N 5432600
N 5432400
N 5432200
TMI
nT
UTM Grid
Line Kilometres Surveyed: 68.3
Scale
0
200
400m
Coordinates: Nad83, UTM, Zone 17
25 nT contour
100 nT contour
500 nT contour
L1160E
Grid Line Location
TL 060N
Tie Line Location
Topography
Water - creek / lake
Logging Road
E 477000
UTM grid reference
M-A3
Mag-high Anomaly
605927
Active Mining Claim
Maurice Valliere (Client # 222572)
Ottaway Township Property
Interpretive Map
Surveyed April 11 - May 12, 2023
Ottaway Twp - Porcupine Mining Division
Claims Posted on Map
Contour Interval = 25, 100, 500 nT
Instrument: Geometrics MFAM Sensor M600 Drone
Surveyed By: Zen Geomap Inc.