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Assessment Report

Drone Magnetic Survey

Matachewan – Oakes Gold Project

Powell and Cairo Townships

Larder Lake Mining Division

Prepared for:

Sparton Resources Inc.

Prepared by:

Kevin Cool – Technical Report

Matthew Johnston, P. Geo. – Geophysical Maps and Interpretation

Mining Claims Surveyed:

38 Mining Claims – Listed on Table 1

May 15, 2022

Revised August 22, 2022

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1.0 Introduction

The Sparton Resources Inc, ***Matachewan – Oakes Gold Project*** consists of 46 Active Mining Claims. This report covers a drone magnetic survey carried out across 38 of the Active Mining Claims.

A drone magnetic survey was conducted on a portion of the Matachewan – Oakes Gold Property.
(See ***Figure 2*** and ***Table 1***)
Mining claims covered by this survey are located in Powell and Cairo Townships, Larder Lake Mining Division.

Table 1 includes a list of mining claims, including the work value completed on each claim.

On August 1st ,2020 and August 28th / 29th, 2020 the mining claims were surveyed using a Geometrics MFAM magnetometer mounted on a DJI M600 drone. Fera UAV of Timmins, Ontario, carried out the magnetic survey on a contract basis for the client. The survey was performed to evaluate bedrock structure related to gold exploration within the survey grid.

Data processing and maps were completed between August 1st ,2020 and March 15th,2022 and the assessment report was prepared between March 15th and May 15th, 2022. The assessment report was prepared by Zen Geomap Inc. (Author: Kevin Cool).

2.0 Location and Access

The property is accessed from Timmins along Hwy11 to Kenogami (**125km**), Hwy66 to Matachewan (**44.5km**), Hwy 566 northward to the property (**8.7km**), plus an additional **4.4km** along local logging roads, for a total of **183km** driving distance from Timmins.

Figure 1 shows location and access.

Table 1 - List of Mining Claims covered by current survey						
		($)	(sq. m)		($)	($)
	Anniversary	Work	Area	Area %	Work	
Claim #	Date	Required	Surveyed	of Total	Completed	Reserve
596596	2022-06-25	400	0	0.00	0	0
596602	2022-06-25	400	0	0.00	0	0
596594	2022-06-25	400	0	0.00	0	0
596601	2022-06-25	400	0	0.00	0	0
596600	2022-06-25	400	187690	2.74	791	0
596603	2022-06-25	400	186569	2.72	787	0
596598	2022-06-25	400	126982	1.85	535	0
596593	2022-06-25	400	215906	3.15	910	0
596595	2022-06-25	400	215906	3.15	910	0
596591	2022-06-25	400	213742	3.12	901	0
596592	2022-06-25	400	215923	3.15	911	0
596597	2022-06-25	400	215923	3.15	911	0
596604	2022-06-25	400	215923	3.15	911	0
596599	2022-06-25	400	173010	2.52	730	0
556359	2022-08-23	400	209155	3.05	882	0
556360	2022-08-23	400	215939	3.15	911	0
557527	2022-09-10	400	215940	3.15	911	0
557528	2022-09-10	400	215940	3.15	911	0
557529	2022-09-10	400	214465	3.13	904	0
557530	2022-09-10	400	85616	1.25	361	0
557531	2022-09-10	400	0	0.00	0	0
556361	2022-08-23	400	215957	3.15	911	0
556478	2022-08-25	400	215957	3.15	911	0
550884	2022-06-01	400	214773	3.13	906	0
556364	2022-08-23	400	215200	3.14	907	378
557453	2022-09-09	400	92454	1.35	390	0
557454	2022-09-09	400	0	0.00	0	0
557455	2022-09-09	400	0	0.00	0	0
561658	2022-10-13	400	209525	3.06	884	0
556362	2022-08-23	400	215974	3.15	911	778
557459	2022-09-09	400	215974	3.15	911	0
556476	2022-08-25	400	215974	3.15	911	0
550885	2022-06-01	400	122666	1.79	517	0
556365	2022-08-23	400	126295	1.84	533	0
557456	2022-09-09	400	156184	2.28	659	0
557457	2022-09-09	400	7035	0.10	30	0
557458	2022-09-09	400	0	0.00	0	0
561659	2022-10-13	400	179091	2.61	755	0
561660	2022-10-13	400	212697	3.10	897	0
556363	2022-08-23	400	143862	2.10	607	355
557460	2022-09-09	400	151429	2.21	639	0
556477	2022-08-25	400	215991	3.15	911	0
556366	2022-08-23	400	147148	2.15	621	789
558295	2022-09-13	400	26610	0.39	112	0
557461	2022-09-09	400	216009	3.15	911	0
556490	2022-08-27	400	215095	3.14	907	0
		18400		100.00	**28914**	**2300**
		(sq.m.)	6856529	Total Area Surveyed on Active Mining Claims		
		($)	39788	Total Survey Cost		
		(sq.m.)	9435100	Total Area Surveyed across Patents and Active Claims		
		($)	**28914**	Total Survey Cost on Active Claims held by Sparton		

Table 1

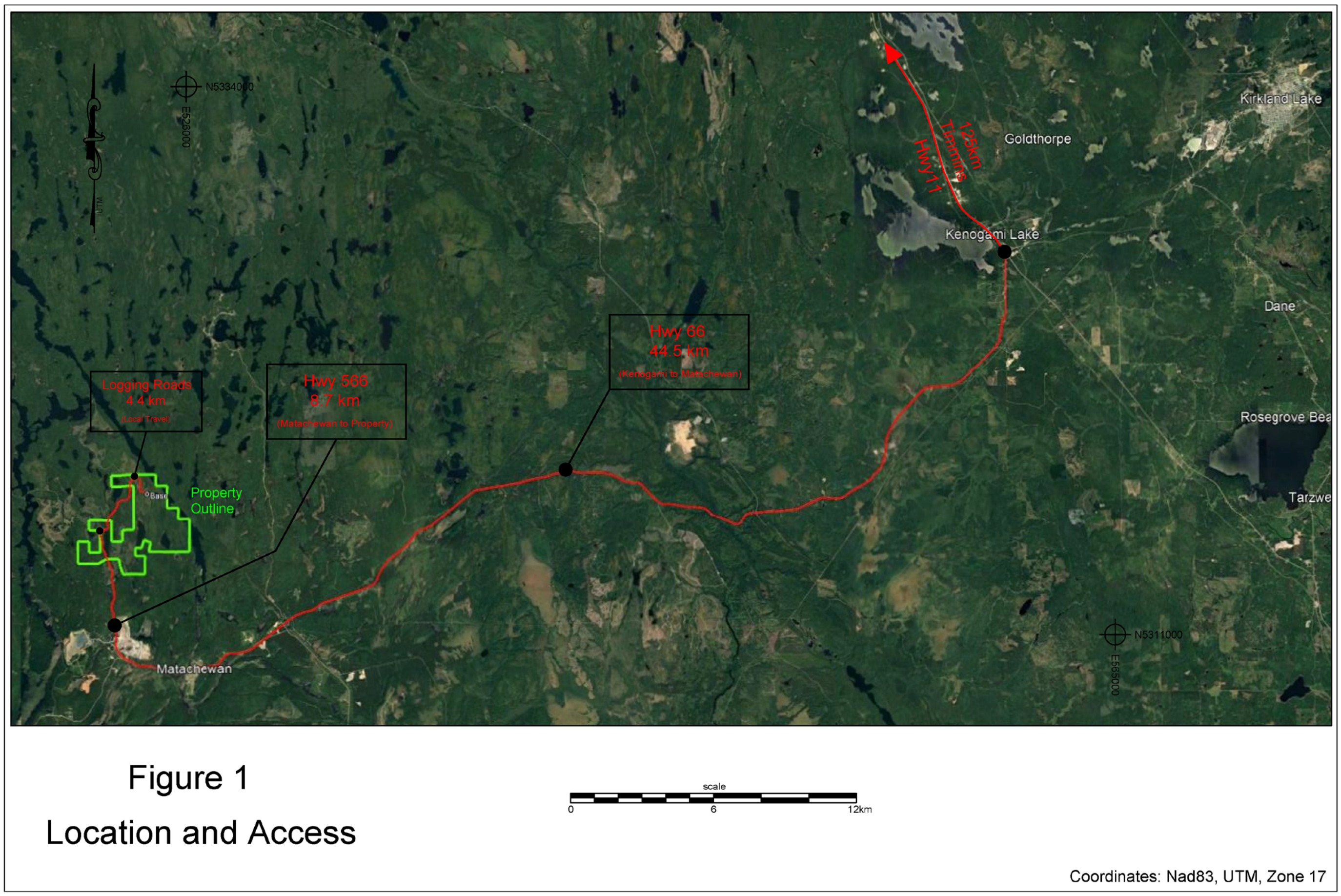


Figure 1 – Location and Access

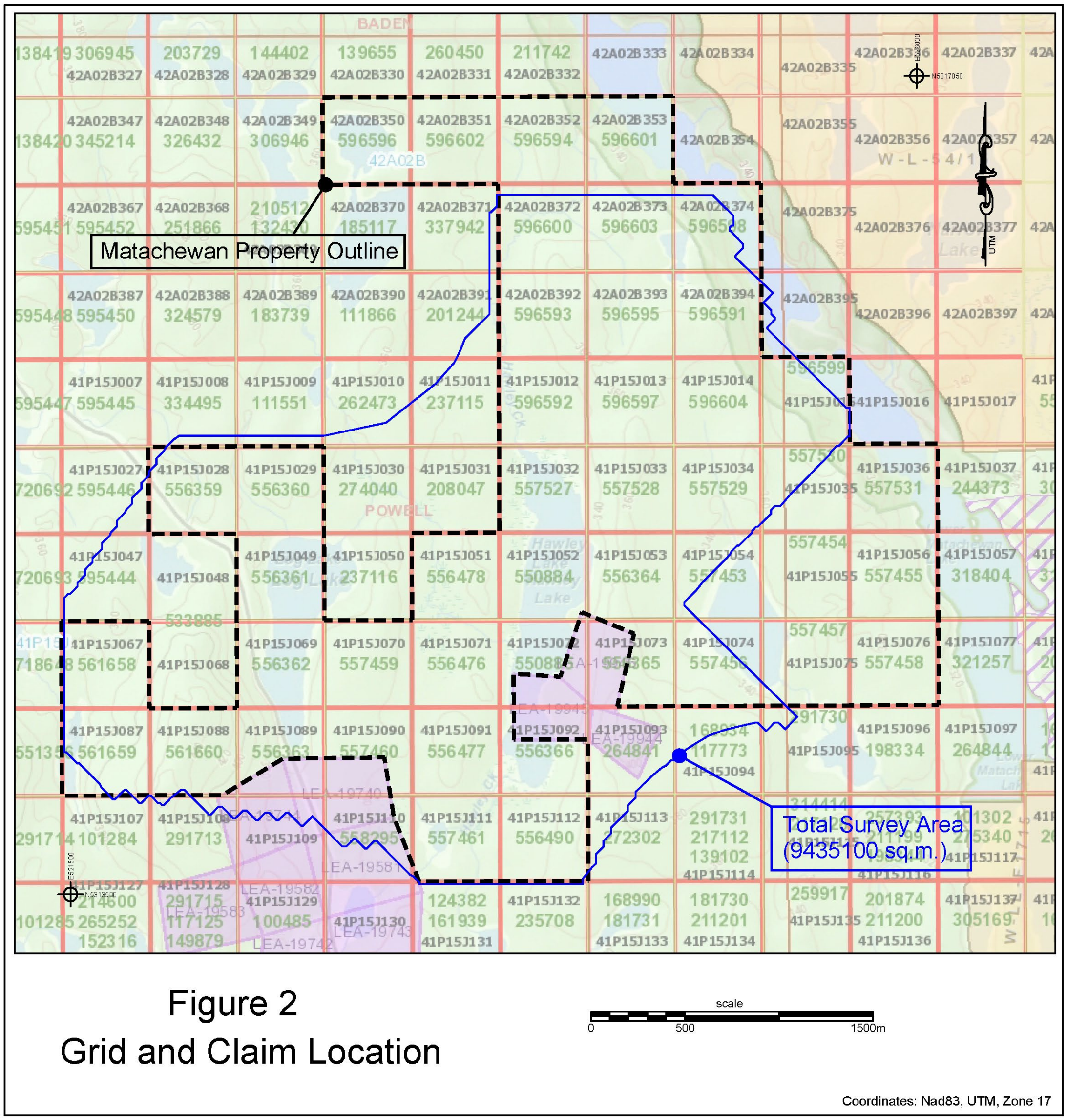


Figure 2 – Grid and Claim Location Map

3.0 Regional and Local Geology

The Oakes Gold project is located in the south-west part of the Abitibi Greenstone Belt, approximately 50km south-west of Kirkland Lake and 70km south-east of Timmins. The Young-Davidson Mine sits 2km due south of the Oakes Gold property.

Figure 3 shows the Oakes Gold project location, within the Abitibi Greenstone Belt.

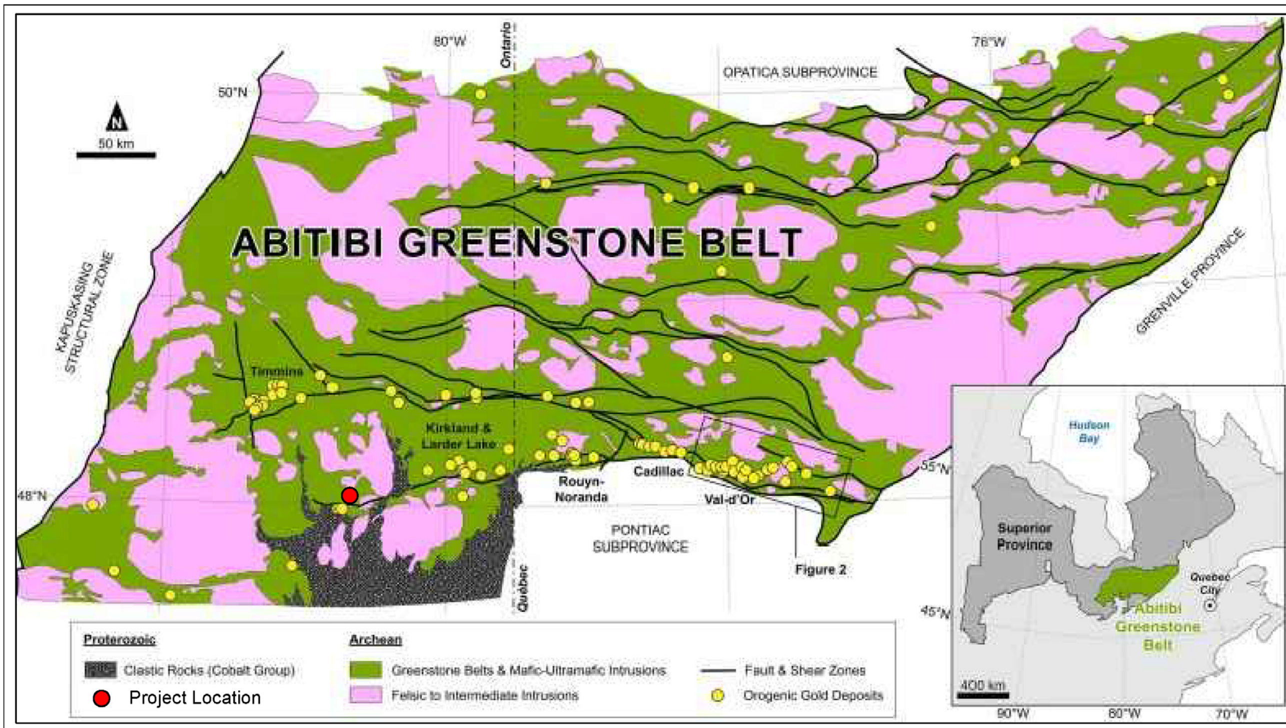


Figure 3

Project Location within the Abitibi Greenstone Belt

Figure 3 – Project Location within the Abitibi Greenstone Belt

MRD126

Overlaid on available bedrock geology (***See Ref 1: MRD126 – Revised Bedrock 250K*** available through OGS Earth);

The Oakes Gold property covers rock types 5, 6a, 6b, 9a and 14, as identified on the MRD126 rock-type legend.

Figure 4 presents above rock types, with the Oakes Gold property outline and the location of Young-Davidson and Ryan Lakes Mine. Other surrounding rock types are included in the map legend.

Information on Young-Davidson Mine and Ryan Lake Mine were researched through MDI Records (***See Ref 2: MDI – Mineral Deposits Inventory***, available through OGS Earth.

Young-Davidson Mine

The Young-Davidson Mine is an active gold mine, owned and operated by Alamos Gold Inc.
Current production is between 185,000 and 200,000 oz Au (source: Alamos Gold website, 2022).
As of December 31, 2021, the proven and probable mineral reserves are reported at 3,394,000 oz Au.

Gold was originally discovered at the mine in 1916 and production began is 1934.
During the subsequent 23-year period, one million ounces of gold were produced from the mine.
The mine lay dormant between 1957 and 2005.

Northgate Minerals merged with Young-Davidson Mines Limited in 2005 and started construction of the current operation. AuRico Gold acquired Northgate Minerals and commenced open pit mining in 2011. First gold was poured in April 2012 and commercial production commenced in 2013.
AuRico Gold merged with Alamos Gold (the current operator) in 2013. (Source: Alamos Gold website, 2022).

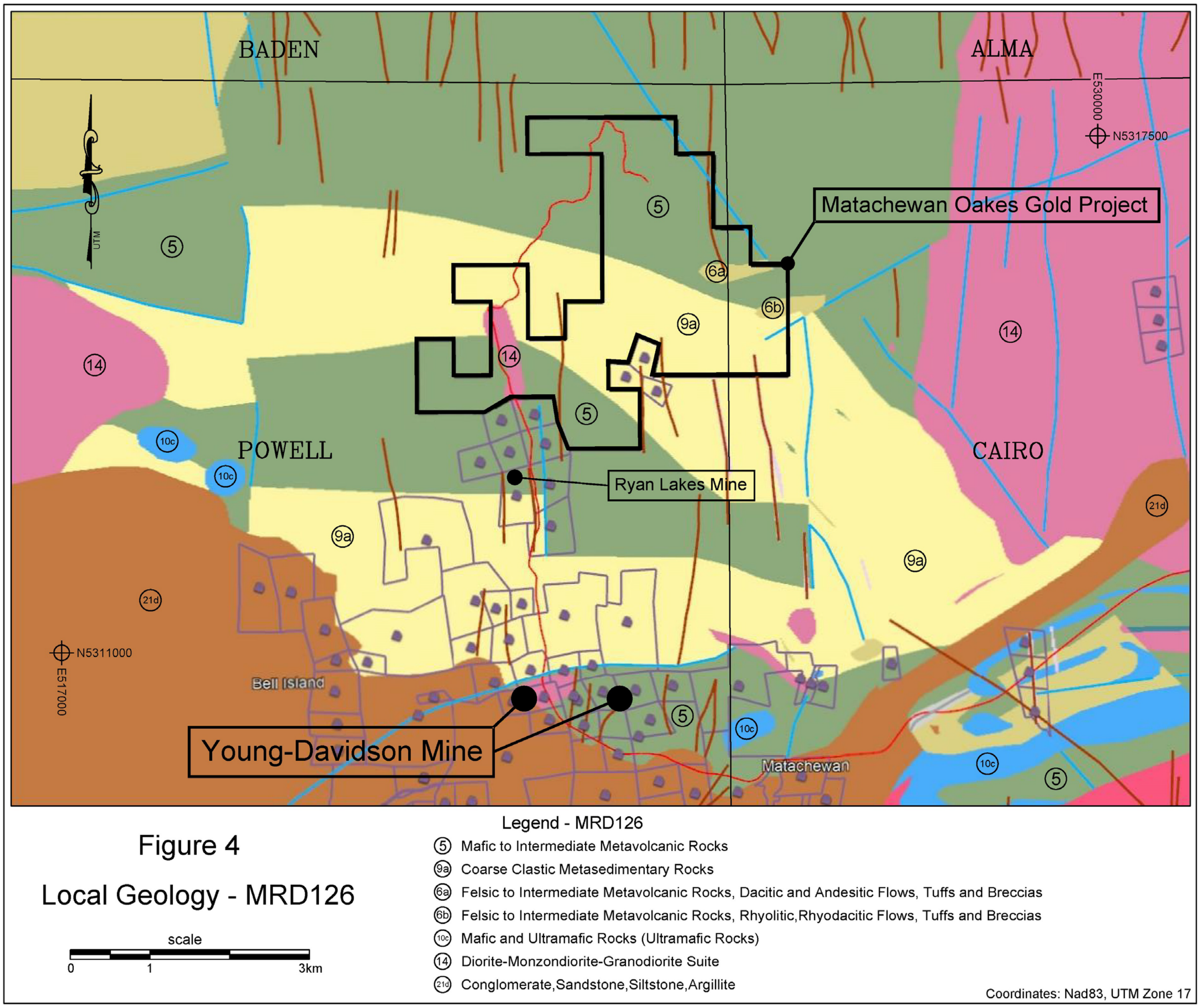


Figure 4 – Oakes Gold Property overlaid on MRD126 bedrock geology

Ryan Lakes Mine

MDI41P15NE00015 (Ryan Lakes Mines – 1948), sits 800m south of the Oakes Gold property and is listed as a ***past producing mine with reserves or resources***. Primary commodities are listed as copper and molybdenum. Secondary commodities are listed as gold and silver.

Exploration history listed through the MDI database, covers from 1926 to 2007. Reserves / Resources info is listed from 1947 to 2008, where the most recent (2008) resource shows 5,969,917 tonnes containing 0.34% copper, 0.09 grams per tonne gold, 0.04% molybdenum and 5.0 grams per tonne silver.

4.0 Property History

Cameco 1996 Powell Project

The 1996 Cameco project covered 126 mining claims (238 claim units) in Powell, Bannockburn, Baden and Argyle Townships. The easternmost block (6 mining claims) covers part of the current, Oakes Gold Project. (See ***Figure 5*** for location of 1996 Cameco project claims).

Other, Past Assessment Work – available through AFRI (***See Ref 3: OAFD – Ontario Assessment File Database,*** available through OGS Earth)

Table 2 is a list of past assessment work, file numbers and other basic information available through AFRI. Comments in blue relate to any ground or airborne magnetic surveys completed within or near the 2022 drone magnetic survey.

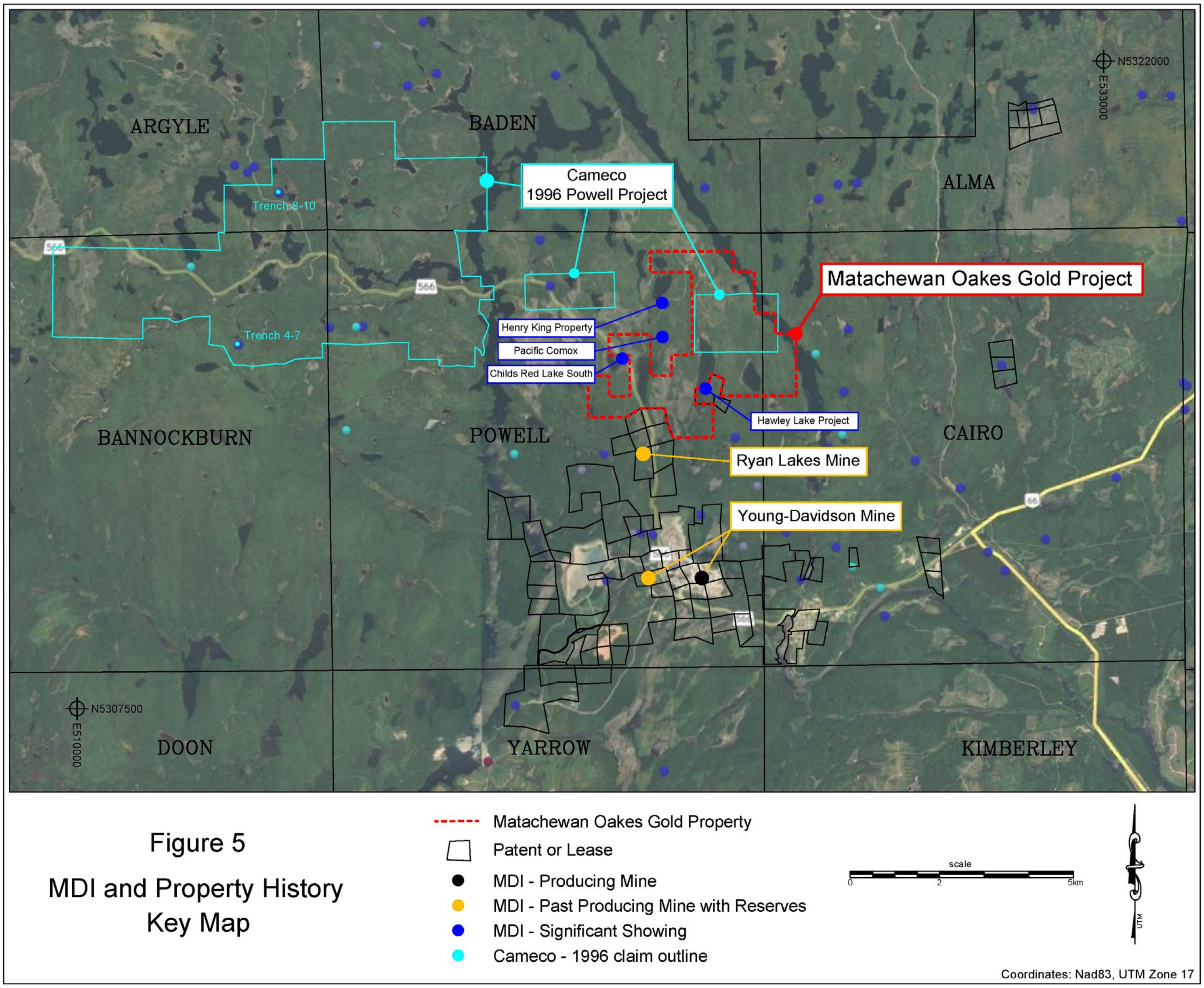


Figure 5 – Oakes Gold Property MDI and Property History Key Map

Table 2 - Past Assessment Work			
	Assessment		
Work Type	File Number	Year	Performed For / Comments relevent to magnetometer survey
Airborne Geophysics	N/A		There are no past Airborne Geophysical Surveys within the Oakes Gold Project
			according to the AFRI database.
Diamond Drilling	41P15NE0024	1997	Norcan Resources Ltd
	41P15NE8253	1984	B Peters
	41P15NE8258	1947	Childs Red Lake Gold Mines
	20000001355	2005 - 2006	Jkate Expl Inc, Robert Maccallum
Geochemistry	42A02SE2011	1997	Abitibi Mining Corp
	42A03SE0328	1972	Canadian Johns-Manville Co Ltd
	42A02SE0041	1996	Cameco Corp
	20000006867	2011	Gary David Welsh
	20000000459	2004 - 2005	Garfield D Pinkerton
	41P15NE0024	1997	Norcan Resources Ltd
	41P15NE8253	1984	B Peters
	41P15NE8235	1986	Matachewan Cons Mines Ltd
Geology	42A02SE0041	1996	Cameco Corp
	41P15NE8266	1965	Pax Intl Mines Ltd
	20000014390	2014	Pacific Comox Resources Ltd.
	41P15NE8235	1986	Matachewan Cons Mines Ltd
	20000004998	1948	J G Crang Et Al
Ground Geophysics	42A02SE0041	1996	Cameco Corp
	42A02SE0051	1997	Cameco Corp
	41P15NE8264	1974	Gold Acres Mines Ltd
	41P15NE8268	1969	Matachewan Cons Mines Ltd
			Each of the above ground geophysical surveys cover a relatively small portion
			of the current Oakes Gold Project. Some of the above surveys consisted of
			both Magnetometer and EM.
Physical	42A02SE0051	1997	Cameco Corp
	20000006814	2011	Pacific Comox Resources Ltd.
	41P15NE8235	1986	Matachewan Cons Mines Ltd
Other	41P15NE8274	1965	Pax Intl Mines Ltd
	41P15NE8261	1973	Gold Acres Mines Ltd
	41P15NE8264	1974	Gold Acres Mines Ltd

Table 2 – List of past assessment work on file through AFRI

5.0 Summary of 2020 Drone Magnetic Survey

The 2020 drone magnetic surveys, cover 1 grid summarized as follows:
(Survey dates: Aug 1, 2020 and August 28th /29th, 2020)

Surveyed Aug 2020:	**Total 148 line kilometers**
Altitude:	**45m above ground level**
Area:	**Total Survey Area 943.5 ha**

The grid lines were spaced 75 m apart and flown at an azimuth of 135/315 degrees with tie lines spaced between 300m and 700m intervals, at an azimuth of 45/225 degrees.
A Geometrics MFAM magnetometer mounted on a DJI M600 Pro hexacopter drone was used to survey all grid lines.

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.
(Loc: **E524353 N5316951**)

Equipment specifications are provided in ***Appendix 1, 2 and 3***.

6.0 Processing

Magnetometer data was collected on 2 Geometrics MFAM sensors operating at 1000hz. 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 mag readings into organized grid and tie lines. This step eliminates extraneous mag 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 was then levelled based on tie lines.

7.0 Interpretation, Conclusions and Recommendations

The magnetic data clearly show the relationship between various rock units and identify a number of structures that may be related to known and unknown mineralization in the survey area.
While the total field map is useful in outlining broader geological units the 1VD (first vertical derivative) data presentation is more useful in identifying geological unit contacts and highlights the location of the north trending diabase dykes which are part of the well known Matachewan Diabase Dyke Swarm. The magnetic linears correlate well with mapped diabase dykes shown on Ontario Geological Survey ("OGS") map P3577(***See Ref 4: Map P3577***) for Powell Township. The basal ultramafic unit trending west north-west in the north part of the survey block is also better seen on the 1VD map. A strong magnetic high adjacent to a dyke south of the old shaft on the east side of Hawley Lake is of interest and should be checked as a possible kimberlite intrusion.

A mapped fault on OGS Map 3577 (***See Ref 4: Map P3577***)along the east side of Hawley Lake is shown as a well defined magnetic low and trends north easterly through the area of the old exploration shaft east of claim 550885 on Mining Lease 19408. There is a well defined magnetic linear trending west north-west intersecting this fault near the old shaft.
On the west side of Hawley Lake several syenite intrusives have been mapped and these rock types are hosts to the Ryan Lake copper-molybdenum and Young Davidson gold mineralization nearby. Several interesting distinct magnetic anomalies and linears are present in this area.
It is recommended that an Induced Polarization("IP") Survey be conducted in the area of the old shaft on the east side of Hawley Lake and the coverage include the syenite intrusives on the west side of the lake and the extensions of the structural zones extending north easterly and south westerly from the old shaft area. The intersections of this structural corridor and the basal ultramafic units in the volcanic stratigraphy in both directions are targets similar the gold hosting zone at the west end of the Young Davidson mine open pit.
It is hoped that magnetite in the diabase dykes will not adversely affect the interpretation of this IP work.

References;

1) MRD126 – Revised Bedrock 250K available through OGSEarth.
OGSEarth can be found at link: geologyontario.mndm.gov.on.ca/ogsearth.html
Under the main menu, you will see "**Bedrock Geology**" which includes a tab to download a KML file.
The KML file will launch automatically if you already have Google Earth installed on your computer.

2) MDI – Mineral Deposits Inventory, available through OGS Earth
OGSEarth can be found at link: geologyontario.mndm.gov.on.ca/ogsearth.html
Under the main menu, you will see "**Ontario Mineral Inventory (OMI)**" which includes a tab to download a KML file.
The KML file will launch automatically if you already have Google Earth installed on your computer.

3) OAFD – Ontario Assessment File Database, available through OGS Earth
OGSEarth can be found at link: geologyontario.mndm.gov.on.ca/ogsearth.html
Under the main menu, you will see "**Ontario Assessment File Database (OAFD)**" which includes a tab to download a KML file.
The KML file will launch automatically if you already have Google Earth installed on your computer.

4) Map P3577: Precambrian Geology Powell Township, Published in 2006 by the Ontario Geological Survey, Scale 1:20,000 and can be found through the Geology Ontario Search website found at ***geologyontario.mndm.gov.on.ca/index.html***

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

This is to certify that: MATTHEW JOHNSTON

I am a resident of North Bay; province of Ontario since November 1, 2017.

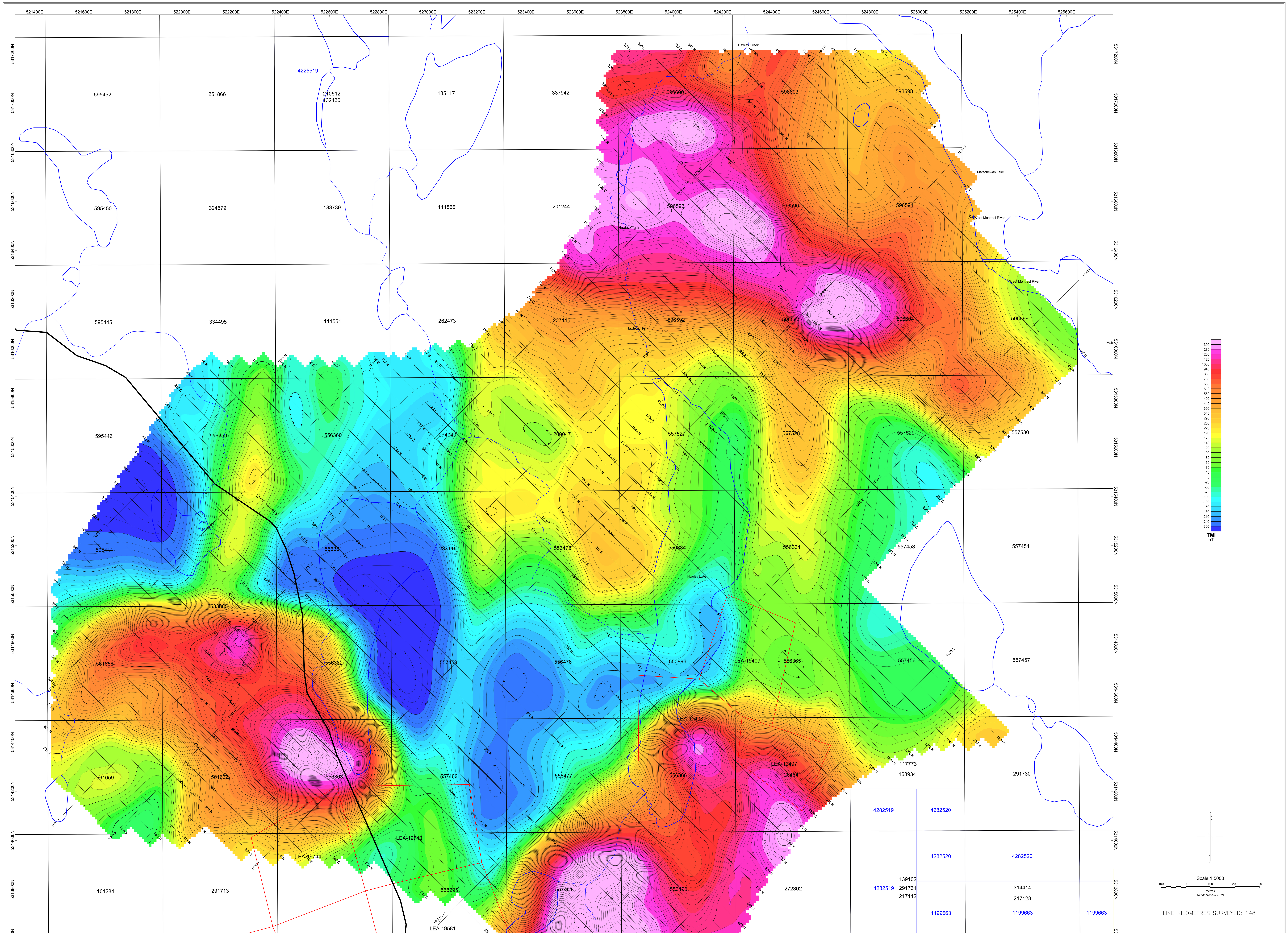
I am self-employed as a Consulting Geophysicist, based in North Bay, Ontario.

I have received a B.Sc. in geophysics from the University of Saskatchewan; Saskatoon, Saskatchewan in 1986.

I have been employed as a professional geophysicist in mining exploration, environmental and other consulting geophysical techniques since 1986.

I am a member in good standing with the Association of Professional Geoscientists of Ontario as a Practicing member; membership no. 2046

Signed in North Bay, Ontario, this May 15, 2022

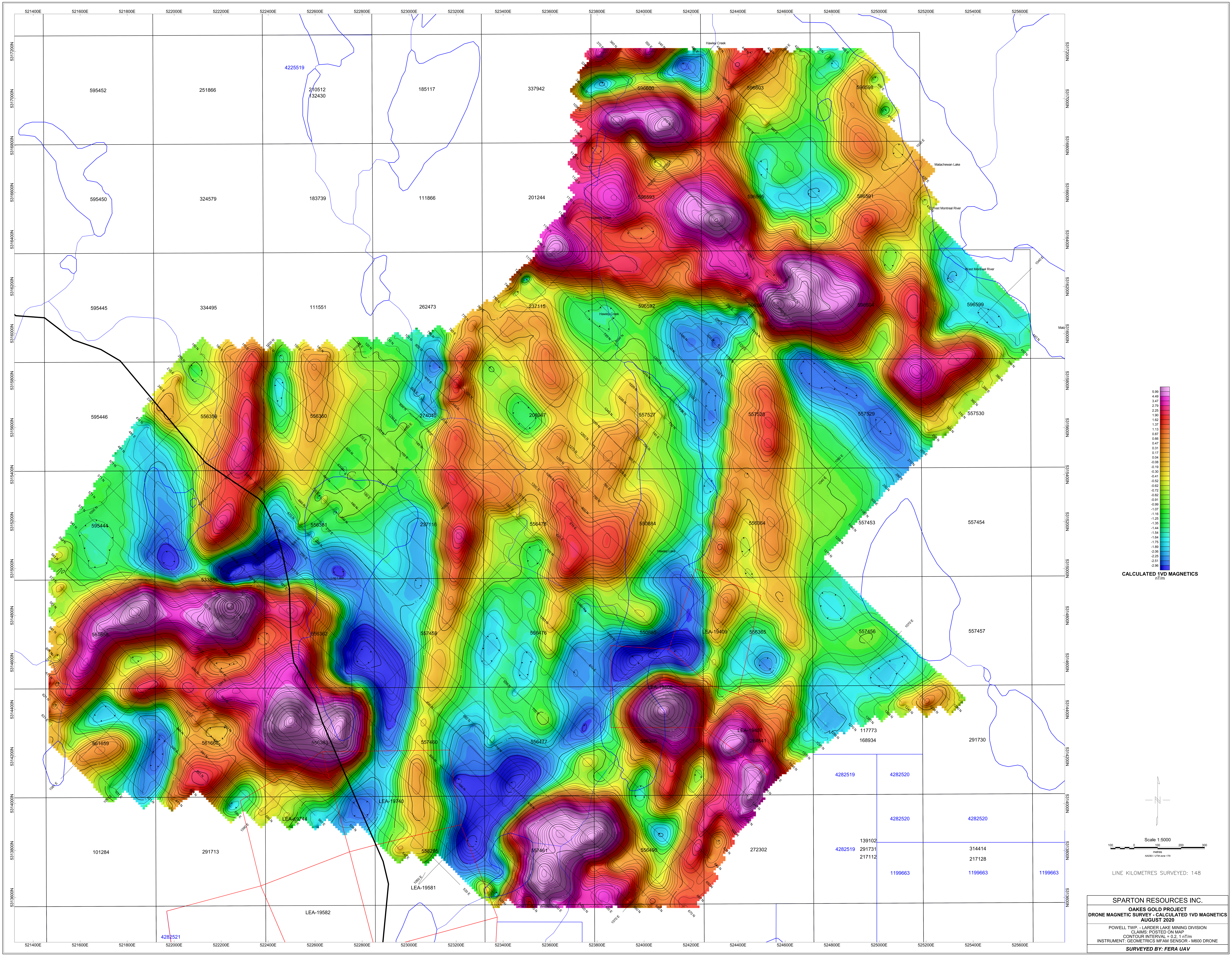


SPARTON RESOURCES INC.

OAKES GOLD PROJECT
DRONE MAGNETIC SURVEY - TMI CONTOURS
AUGUST 2020

POWELL TWP. - LARDER LAKE MINING DIVISION
CLAIMS: POSTED ON MAP
CONTOUR INTERVAL = 20, 100 nT
INSTRUMENT: GEOMETRICS MFAM SENSOR - M600 DRONE

SURVEYED BY: FERA UAV


CALCULATED 1VD MAGNETICS
nT/m
Scale 1:5000
metres
NAD83 / UTM zone 17N
LINE KILOMETRES SURVEYED: 148
SPARTON RESOURCES INC.
OAKES GOLD PROJECT
DRONE MAGNETIC SURVEY - CALCULATED 1VD MAGNETICS
AUGUST 2020
POWELL TWP. - LARDER LAKE MINING DIVISION
CLAIMS: POSTED ON MAP
CONTOUR INTERVAL = 0.2, 1 nT/m
INSTRUMENT: GEOMETRICS MFAM SENSOR - M600 DRONE
SURVEYED BY: FERA UAV

Appendix I

Geometrics MFAM Magnetometer Specifications

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. .

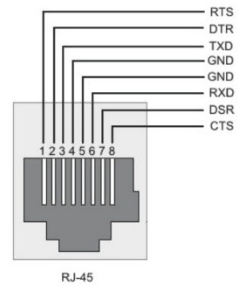


Figure 3: Serial Port Pinout

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.

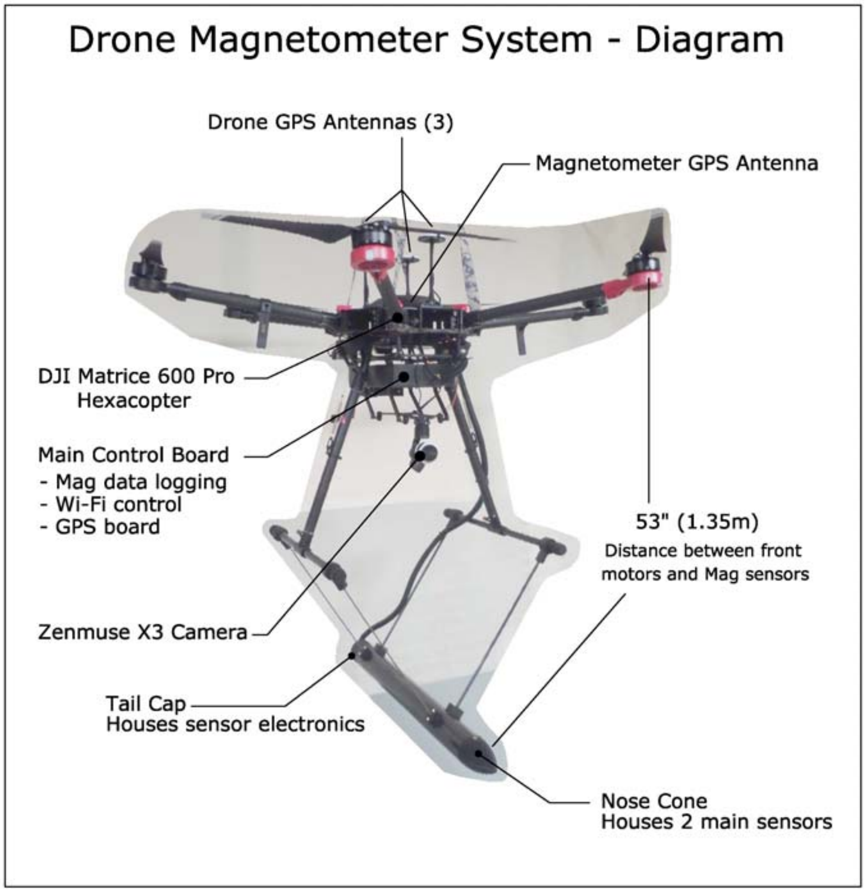
12) **Ethernet port with Power over Ethernet Compatibility**: The Tiva microcontroller contains a fully integrated Ethernet MAC and PHY. In addition, the Ethernet port can power the Development Kit via Power over Ethernet (PoE) using an Ethernet power injector.

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

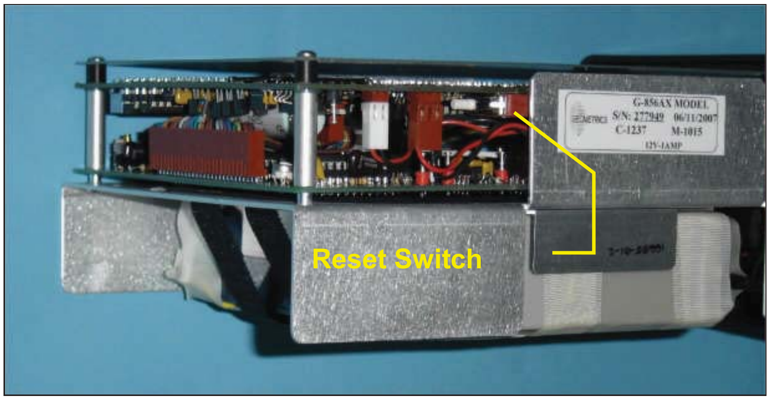


Figure 23. Internal reset switch.

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 μT.

- 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

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.

Appendix III

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 pre-programmed, 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

Statement of Costs

Statement of Costs - Sparton Resources - Matachewan Property			
		$	$
	qty	rate	amt
Mobe / Demobe (Aug 1, 2020)			
Vehicle Km Timmins to site	376.20	0.50	188.10
Field Work (Aug 1, 2020)			
6 flights	6.00	1000.00	6000.00
Mobe / Demobe (Aug 28/29, 2020)			
Vehicle Km Timmins to site	1000.00	0.50	500.00
Field Work (Aug 28/29, 2020)			
27 flights	27.00	1000.00	27000.00
TOTAL FIELD PROGRAM (Sub-contracted to Fera UAV by Zen Geomap Inc.)			**33688.10**
Computer Processing and Report			
Processing and Maps (Aug 1 to Dec 6, 2020)	20.00	80.00	1600.00
Processing and Maps (Aug 28, 2020 to March 15, 2022)	31.25	80.00	2500.00
TOTAL COMPUTER PROCESSING			**4100.00**
Assessment Report to ENDM Standards	25.00	80.00	**2000.00**
SUB			**39788.10**
HST			5172.45
Total Project Cost			**44960.55**

Calculation of Costs – Completed across 38 Active Mining Claims;

The drone magnetic survey covered both Patent and Active Mining Claims.

9435100 sq. m (943.5ha)	Total area covered by survey
6856529 sq. m (685.6ha)	Portion of survey across 38 Active Mining Claims
72.67044%	Percent (%) of total cost that can be applied to Active Claims
$28,914.00	**Total Survey Cost applied across 38 Active Mining Claims**

Table 1 provides detail of how costs are applied to each mining claim

Appendix V

Quality Control / Tests and Calibrations / 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.;

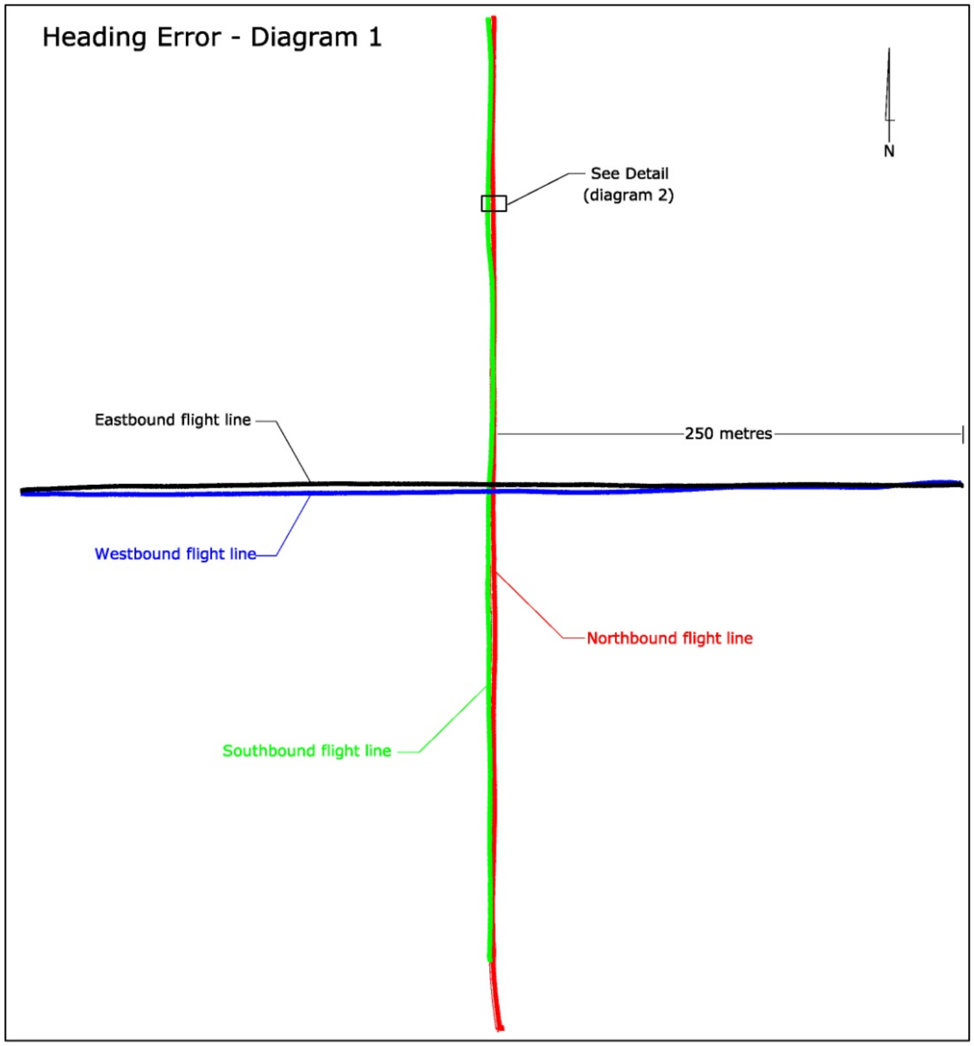
Heading Error

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.

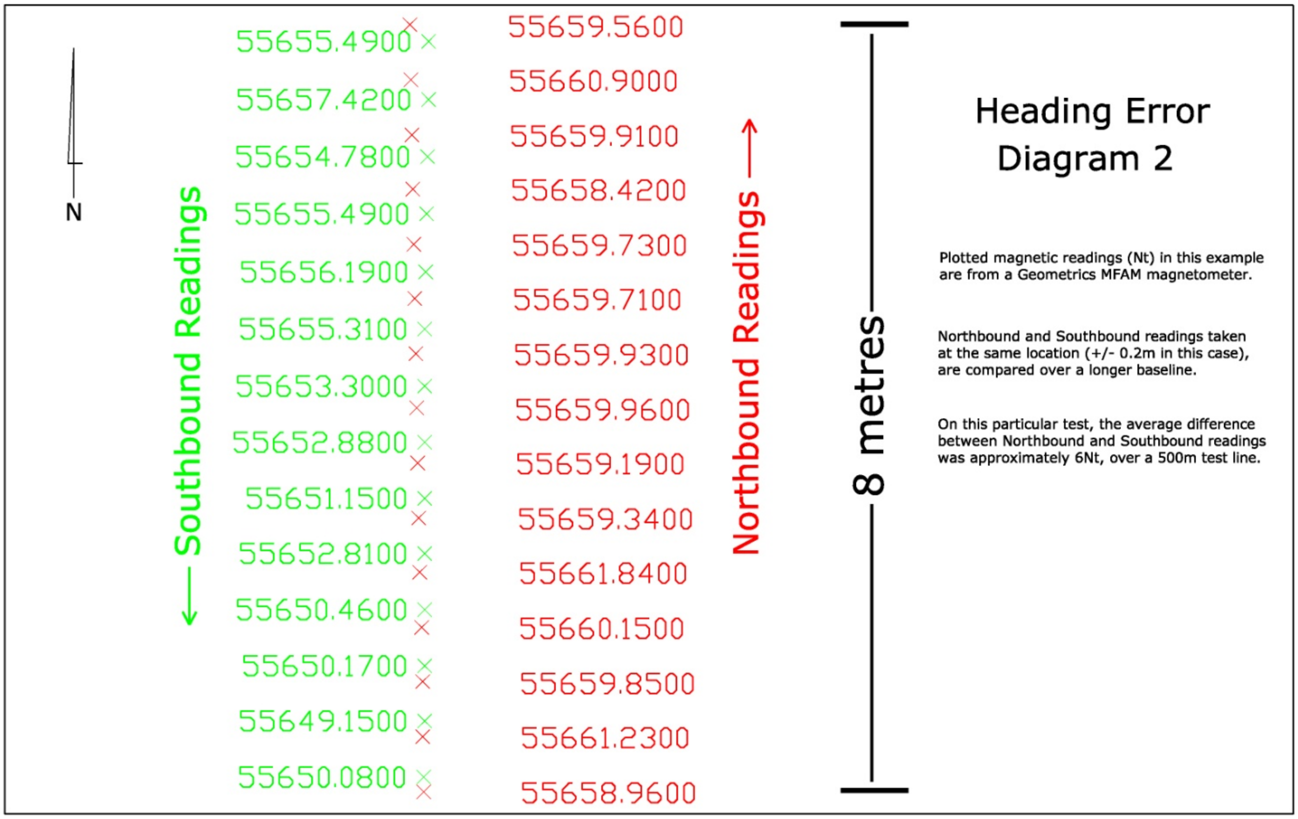
A cross-pattern is flown as shown in ***Diagram 1***, with 500 metre N-S and E-W lines.
Magnetic readings are collected along the same lines, flown in opposite directions.

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.

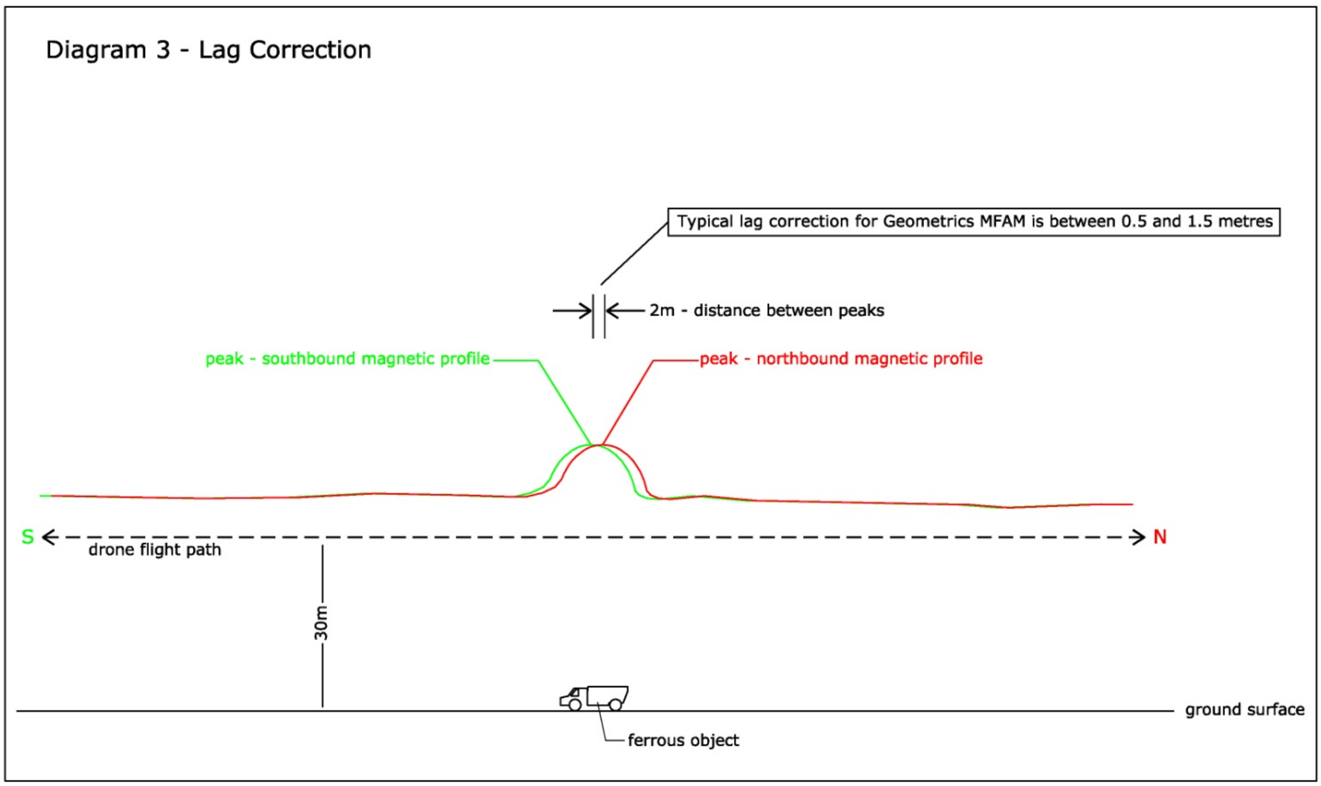
Each mag sensor will produce a unique result, however we typically apply a correction of 3Nt or less, to adjacent flight lines.

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.