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Assessment Report for 2022 Drone Magnetic Survey

Goldarm Project, Taylor Claim Group

Ontario, Canada

Larder Lake Mining Division, Taylor Township

NTS sheet: 42AO/10

Prepared for:

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Date: October 18 , 2022

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EXECUTIVE SUMMARY

This report describes the logistics, data acquisition, processing and presentation of results of a drone-borne geophysical survey carried out for GFG Resources Inc. ("GFG") over part of the Goldarm Gold Project northeast of Timmins, Ontario. The survey was conducted April 7 2022 by Pioneer Exploration Consultants Ltd. ("Pioneer"). A total of 56.7 line-kilometres were flown over parts of 6 unpatented mining claims, all of which, were optioned by GFG from International Explorers and Prospectors Inc. ("IEP") who hold 100% ownership.

The data were acquired using a caesium magnetometer hung from a Matrice M600 Pro unmanned aerial vehicle ("UAV") platform. The UAV magnetometer (Gem Systems Canada GSMP-35U) configuration includes a global position system ("GPS") for recording measurement location, laser altimeter for recording altitude, and an Inertial Measurement Unit for recording the roll, pitch, and yaw of the unit during flight.

A stationary GSM-19 Overhauser magnetometer was used as a base station. Raw aerial magnetometer data was collected at a rate of 10 Hz while base station data was collected at a rate of 0.16 Hz. Total field and GPS UTC time were recorded with each data point, enabling diurnal correction to be applied during final data processing.

The objectives of the survey were to acquire geophysical data in order to produce maps displaying magnetic characteristics of the area and allow for a structural interpretation. The purpose of the interpretation was to better understand and target geological structures and zones of mineralization.

The aeromagnetic survey will be used in mapping lithological contacts and any related structural breaks.

PROPERTY DESCRIPTION, LOCATION AND ACCESS

The Taylor property is located 6 kms east of Highway 11 on County Road in Val Gagne and 50km east-northeast of Timmins, Ontario (Figure 1). The project is situated within the Northeast Ontario Exploration Region, in the Larder Lake in Taylor Township (Figure 2).

The claim group is made up of 6 unpatented mining claims. The unpatented mining claims are held by International Explorers and Prospectors Inc. (IEP) and are under option to GFG as of February 2022.

The geophysical survey was conducted in a single block over the optioned area that includes the 6 unpatented mining claims as well as some over flight of the Patents that encumber the cells. Unless otherwise stated, location data presented in this report are provided as Universal Transverse Mercator (UTM) coordinates using North American Datum NAD83 in Zone 17 North.

Figure 1. Regional location map (modified from Natural Resources Canada, 2002).

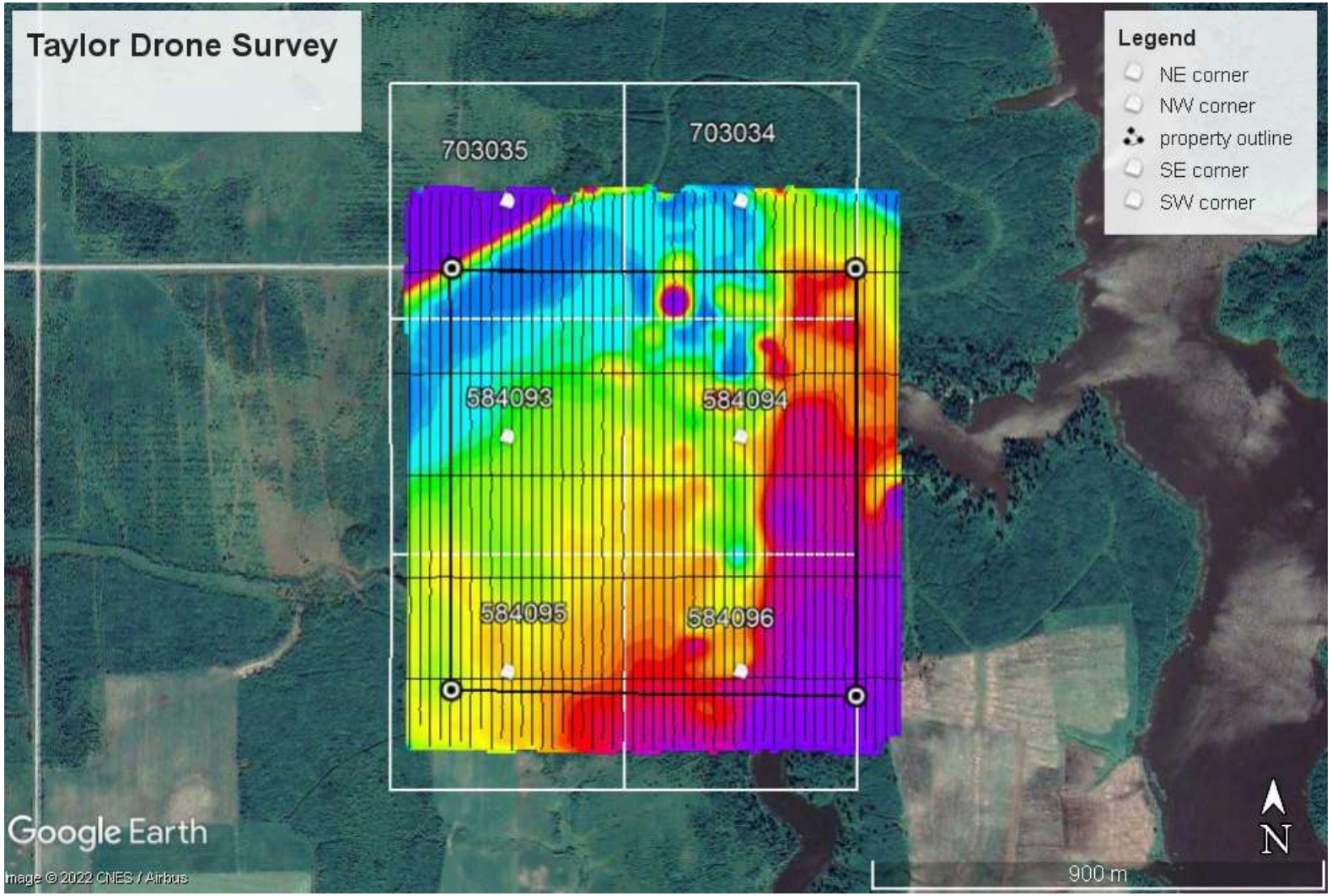

Figure 2. Project location map showing drone survey

PREVIOUS WORK

Given the lack of outcrop, only limited geological mapping and explration has been conducted in the region that is applicable to the project area and the claims are unexplored.

GEOLOGICAL SETTING

REGIONAL GEOLOGY

The Goldarm project is in the southern part of the Abitibi greenstone belt which forms the northeast portion of the Abitibi-Wawa subprovince within the Superior province (Figure 3 & 4, Thurston et al., 2008 and Monecke et al., 2017). While a formal all-encompassing, Abitibi-wide nomenclature scheme does not exist, in general, the bedrock of Abitibi greenstone belt can be divided into 8 supracrustal assemblages that formed within a ~80 million year period between ~2750 and ~2669. From oldest to youngest the volcanic assemblages are: Pacaud (2750-2735 Ma), Deloro (2734-2724 Ma), Stoughton-Roquemaure (2723-2720 Ma), Kidd-Munro (2720-2710 Ma), Tisdale (2710-2704 Ma), and Blake River (2704-2695 Ma). These volcanic successions are postdated by two distinct sedimentary successions, Porcupine (2690-2685 Ma) and Timiskaming (2679-2669 Ma). Concurrent with the formation of these assemblages, was the emplacement of a multitude of plutons which, as summarized by Beakhouse (2011) , can categorized based on their ages and affinities into the following groups: Pretectonic, Early Syntectonic, Syntectonic, Late Tectonic and Post Tectonic.

Of particular importance to the structural architecture of the Abitibi greenstone belt are the occurrence of major east-trending ductile-brittle fault zones that transect the entire belt. In the southern Abitibi, these are the Porcupine-Destor and Cadillac-Larder Lake fault zones. These structures and related subsidiary faults and fault splays are believed to mark zones of crustal weakness which acted as conduits for gold mineralizing fluids and intrusions vital to the formation of gold deposits in the Timmins and Kirkland Lake gold camps of Ontario.

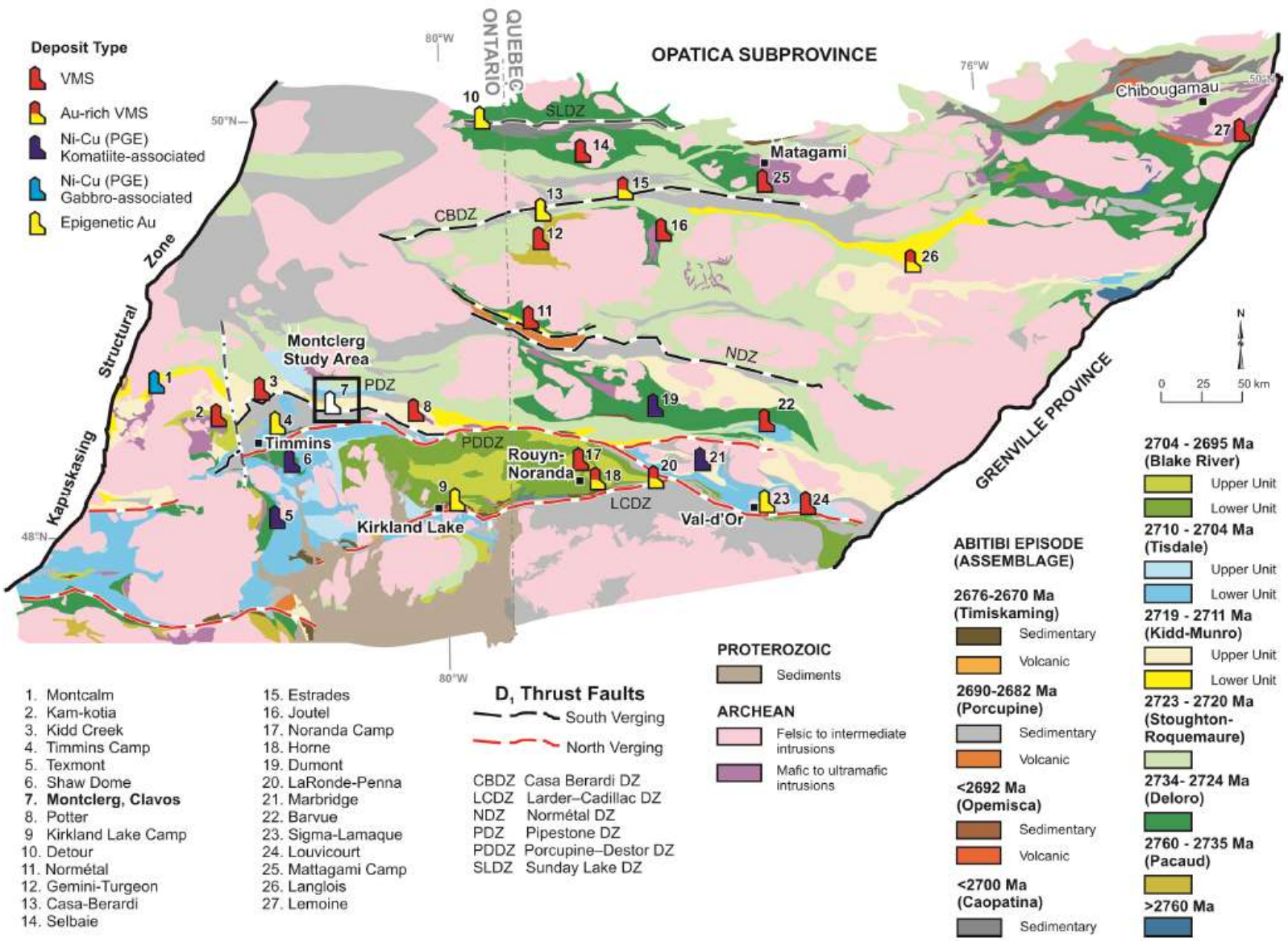

Figure 3: Tectonostratigraphic assemblages and mineral deposits of the Abitibi Greenstone Belt (from Barrett et al., 2013)

LOCAL GEOLOGY

The Goldarm project straddles the contact between Porcupine assemblage metasediments to the south and Kidd Munro assemblage metavolcanic and metasedimentary rocks to the north (Figure 5, Dinel et al., 2008). The Pipestone deformation zone, a splay off of the Porcupine-Destor fault zone, forms preferentially along the boundary of these two assemblages and is often marked by a magnetite bearing ultramafic body. North-trending mafic dikes of the Proterozoic Matachewan dike swarm are prevalent across the project area. These dikes which can be numerous are magnetite-bearing, and thus complicate geological and structural interpretation of magnetic survey data.

In Clergue and Walker townships the Kidd-Munro assemblage is dominated by mafic volcanic rocks and lesser felsic volcanic and intrusive units (Dinel et al., 2013). Komatiitic flows are documented near the southern margin of the assemblage where they are in contact with the Pipestone deformation zone. Additional komatiite horizons are interpreted further north within the Kidd-Munro assemblage based airborne magnetic data. Mafic volcanic rocks occur as primarily pillowed and massive flows with occassional flow top breccias and rarely tuffaceous, variolitic or amygdaloidal (Berger, 2000). The rhyolite unit displays various textures including massive, banded, fragmental (lapilli), and breccia. Dinel et al. (2008) interpreted 3 main fold axes trending east to northeasterly based on changes in basalt pillow-facing directions.

The age of the volcanic rocks is constrained by a U-Pb zircon age of 2710 +/- 1.3 Ma from a quartz-feldspar porphyry in the west part of the MC trend (Barrett et al., 2013). Further to the south across the Pipestone deformation in the CX zone a feldspar-quartz porphyry intrusion with an alkaline affinity was dated at 2671 +/- 6.2 Ma (Barrett et al., 2013). The age and alkaline nature of this felspar-quartz porphyry body places it in the Late-Tectonic subdivision of Beakhouse et al. (2013) which includes intrusions from gold camps at Hislop, Garrison, Fenn-Gib, and Holloway.

Based on the lithogeochemical study of Barrett et al. (2013), which included both surface grab and drill core samples from within the project area, the Kidd-Munro assemblage volcanics consist of, from south to north, a ultramafic unit that forms the base of the succession, which is successively 'overlain by' a ferro-basalt (& lesser ferro-dacite), the main rhyolite unit (tholeiitic), a dacite unit and a basalt hanging wall. West of the Driftwood River a quartz-felspar porphyry occurs at the northern contact of the rhyolite with the basalts to the north.

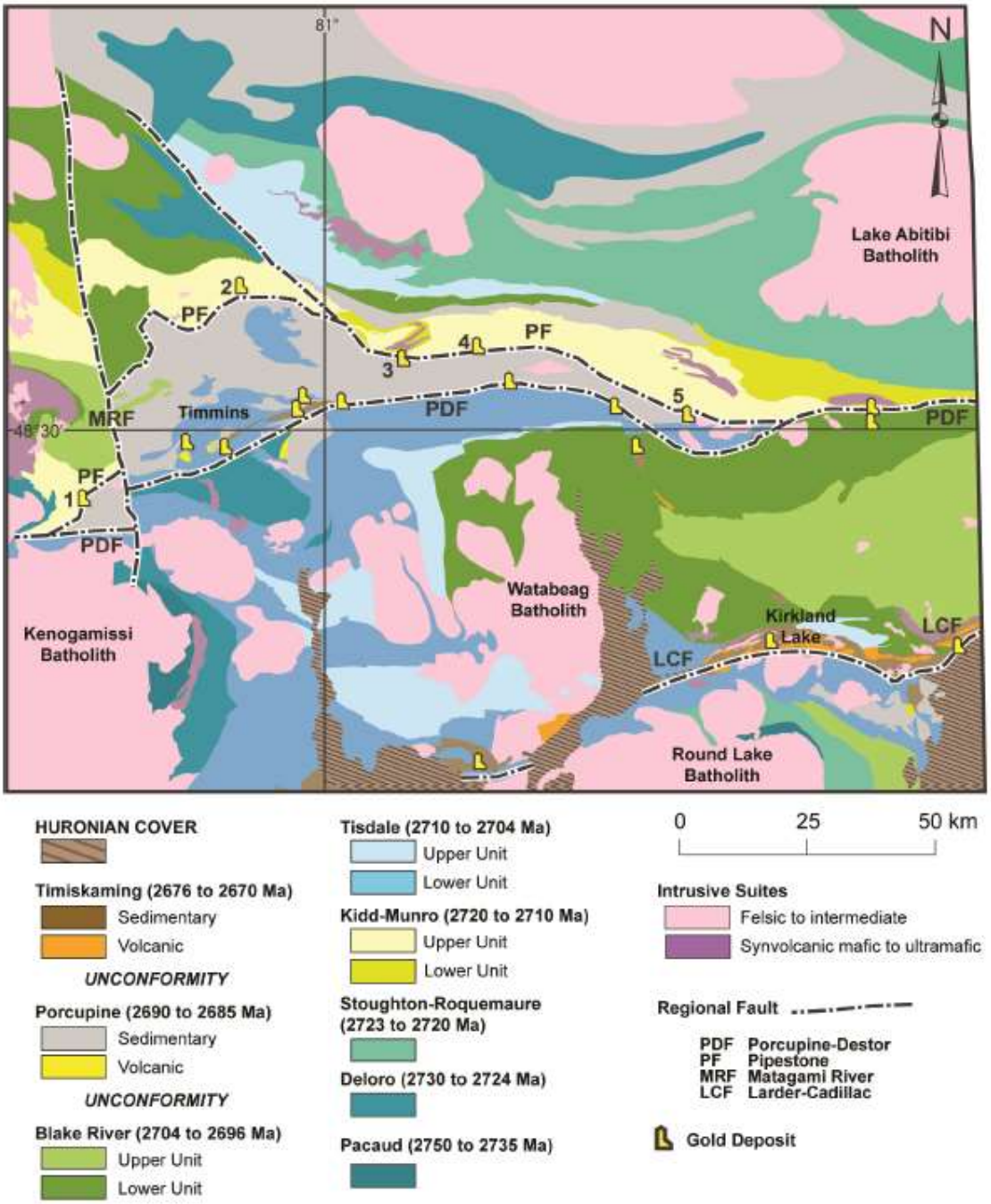

Figure 4: Tectonostratigraphic assemblages and mineral deposits in the Timmins-Kirkland Lake area of the Abitibi Greenstone Belt. Gold deposits along the Pipestone deformation zone are numbered 1) Timmins and Thunder Creek deposits, 2) Bradshaw deposit, 3) Clavos deposit, 4) Montclerg deposit, 5) Fenn-Gibb deposit (from Barrett et al., 2013)

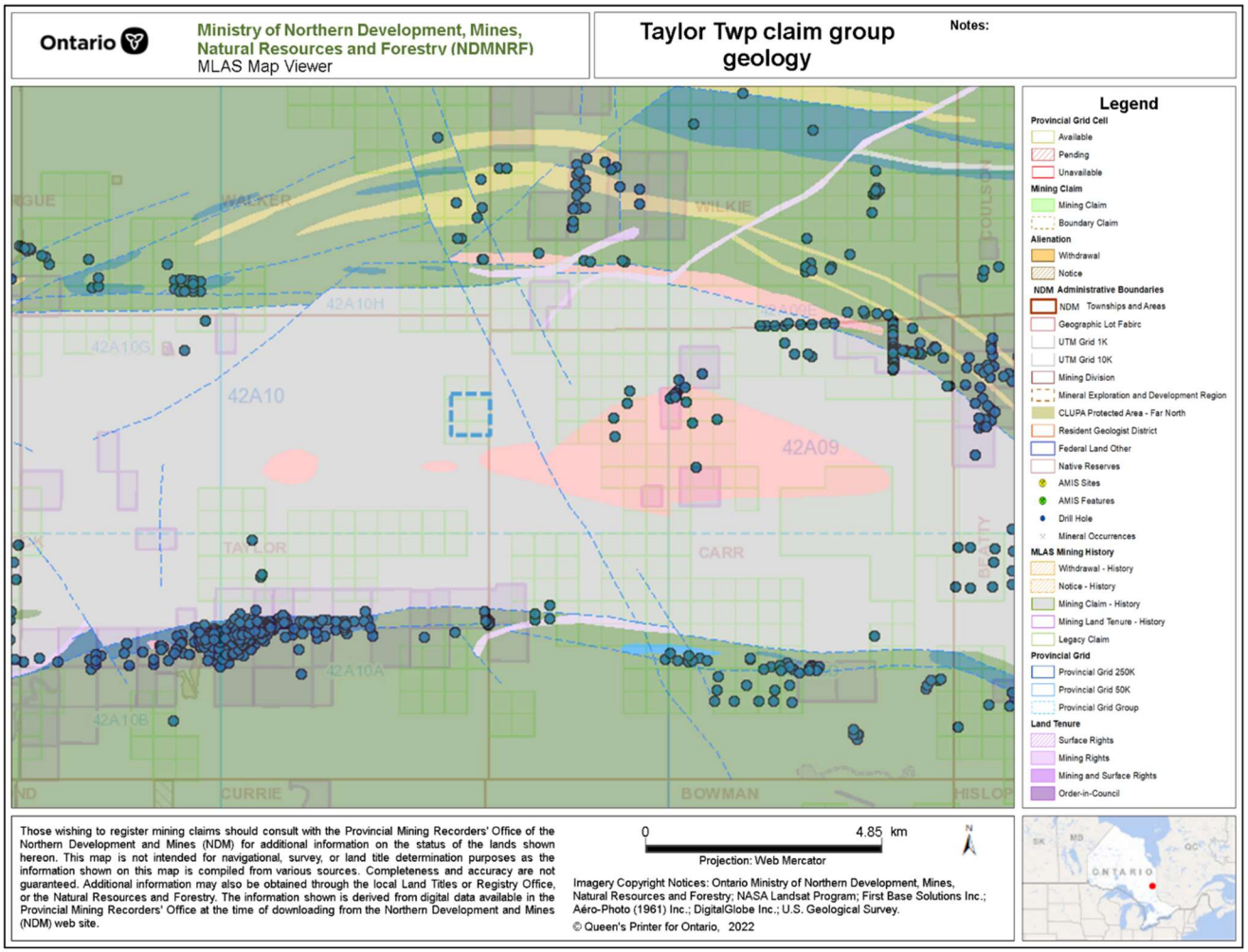

Figure 5 The regional geology with historical drill holes.

GOLD MINERALIZATION - PIPESTONE DEFORMATON ZONE

Although not proven to be as prolific as the Porcupine-Destor fault zone (PDFZ), the Pipestone deformation zone and related structures are highly prospective for orogenic gold mineralization. The following provides brief descriptions of the main gold prospects and deposits that occur along the Pipestone deformation zone from east to west including Fenn-Gib, Croesus, Maude Lake, Montclerg, Clavos and Bradshaw.

FENN-GIB

The Fenn Gib gold deposit (MDI 42A08SE00121), approximately 37 kilometres southeast of Montclerg, occurs near the eastern end of the Pipestone fault. This deposit, current held by Mayfair Gold Corporation, has an indicated mineral resource of 2.08 million ounces of gold at 0.921 g/t Au using a 0.35 g/t Au cut-off (Makarenko et al., 2021). The mineralization at Fenn-Gib occurs within and proximal to an east-west trending deformation zone that occurs along the contact between metasedimentary rocks to the south and mafic volcanic rocks of the Kidd-Munro Assemblage to the north. The deformation zone at Fenn-Gib is termed the "contact fault" which is the main Pipestone fault that separates the two tectonostratigraphic assemblages. Gold mineralization is associated with quartz-carbonate veins, stringers and breccias within pyrite-mineralized, albitized and silicified volcanic rocks and felsic intrusions.

CROESUS

Approximately 5 kilometres northwest of Fenn-Gib (33 kilometres east of Montclerg) is the Croesus gold prospect (MDI 42A09SE00012) currently held by High Gold. Gold mineralization at Croesus occurs in mafic volcanic units within the Kidd-Munro Assemblage proximal to the Pipestone deformation zone. Unlike the mineralization at Fenn-Gib where the deposit is located along the Pipestone deformation zone, mineralization at Croesus occurs at 200 and 800 metres to the northeast of this structure. The gold mineralized veins have various orientations including northwest (parallel to the Pipestone), northeast, and east-northeast. Gold mineralization is also recorded within the Porcupine Assemblage to the southwest and is associated with a quartz-felspar porphyry.

MAUDE LAKE

Approximately 10 kilometers northwest of Croesus (20 kilometres east of Montclerg) is the Maude Lake gold prospect which also occurs in the volcanic rocks northeast of the Porcupine Assemblage. At Maude Lake (MDI 42A09SW00133) gold mineralization occurs in veined and altered basalt in the footwall of an ultramafic body. The zones are steeply dipping and have two main strike orientations, easterly and north-easterly. It has been interpreted that the Pipestone deformation zone occurs on the northeast flank of the ultramafic body and is not situated along the contact with the Porcupine Assemblage. Alternatively, the structure at Maude Lake could represent a separate fault that parallels the Pipestone deformation zone (ie. Munro Fault).

MONTCLERG

Exploration on the Montclerg project has identified two east-northeast trending gold mineralized trends, MC and CX, that are subparallel to the east-west trending Pipestone deformation zone. The MC trend (occurs about 300 metres north of the Pipestone deformation zone whereas the CX trend occurs within or directly adjacent to this structure.

Gold mineralization along the MC trend (MDI 42A10SE00002) occurs within both felsic and mafic volcanic rocks which display distinct styles of mineralization. In the felsic volcanic rocks gold is associated with extensional quartz-carbonate vein arrays, sericite altered wall rock, and disseminated to stringer pyrite and arsenopyrite. Within the footwall mafic volcanic rocks (often fragmental) gold is associated with intense carbonate alteration, abundant arsenopyrite, and both breccia and shear-veins.

Along the CX trend (formerly known as the CMX or Canamax zone), gold mineralization occurs in metasedimentary, ultramafic and felsic porphyry rocks directly adjacent to the Pipestone deformation zone. Gold mineralization is associated with quartz-carbonate veins, carbonate alteration and arsenopyrite. The close association of gold mineralization with felsic porphyry that emplaced along the contact with metasediment and ultramafic rocks is direct analogue to the mineralization at the Clavos deposit.

CLAVOS

The Clavos gold deposit (MDI 42A10SW00046) occurs approximately 10 kilometres west of Montclerg with the mineralized zones occurring within or directly adjacent to the Pipestone deformation zone. The gold zones occurs mainly within a steeply dipping zone of intensely altered ultramafic rocks that occur in between Porcupine assemblage metasediments to the south and weakly altered ultramafic rocks of the Kidd-Munro assemblage to the north. Historically the main host rock was referred to as a pseudo-fragmental unit with intercalations of serpentinite and metasediments (Malczak, 1986). More recently, the term "DL Zone" has been used as the main host unit referring to a package of highly-altered ultramafic flows and volcanic clastic fragmental rocks (Ritchie, 2013). A system of strongly altered feldspar porphyry bodies, up to 20 metres thick, occur within the altered package of rocks. According to Malczak (1986) the dikes appear to be boudinage or splayed.

Five gold zones or subzones have been identified at Clavos, they are the sediment zone, contact zone, hanging wall zone, foot wall zone, and other zone (Ritchie, 2013). All subzones are present with the "Main Zone" however only the hanging wall, footwall and sediment subzones are present at the "960 Zone". The sediment zone is characterized by sericite altered siltstone/greywacke with blebby to stringer arsenopyrite and contorted/boudinage grey quartz-carbonate veins that are subparallel to fabric (forming breccia locally). The contact, HW, FW and contact zones are in sericite-carbonate altered and intensely deformed rocks of the DL zone. The contact zone occurs near the sediment contact to the south within sericite altered ultramafic rocks of the DL Zone. The HW and FW zones occur along the south and north contact of felspar porphyritic bodies respectively. Gold is associated with quartz and quartz-carbonate veins, fuchsite-sericite alteration, and stringers that occur within high sulphidized host rocks. Disseminated sulphides including pyrite, arsenopyrite, galena, gersdorffite and rarely chalcopyrite occur primarily adjacent to the veins and can account for up to 10% of the rock.

A resource estimate completed in by Ritchie (2013) suggests that, using a 2.75 g/t Au cut-off, the Clavos deposit contains and indicated resource of 194,600 ounces of gold at 4.61 g/t, and a inferred resources 120,000 ounces of gold at 4.7 g/t. The main contributors to this resource are the sediment, foot wall and hanging wall sub-zones within the Main Zone of the deposit.

BRADSHAW

The Bradshaw deposit (MDI 42A11NE00007) occurs approximately 40 kilometres west-northwest of Montclerg and similarly occurs within Kidd-Munro Assemblage volcanic rocks north of the Pipestone deformation zone. That said the prospect occurs approximately 2 kilometres north of the Pipestone deformation zone and thus the genetic link with the Pipestone deformation zone is not certain.. Gold occurs

in a series of steeply north dipping mineralized zones within the deformed southern portion of a mafic volcanic rock package within 120 metres the contact with an ultramafic footwall. The higher-grade gold mineralization occurs mainly in the lower or southern two subzones (MZ1 and MZ2) where it is associated with pervasive silicification, minor quartz-carbonate veining, rare tourmaline, and 3%, up to locally 30%, arsenopyrite and pyrite. Sulphides occur dominantly as seams, bands and clots with accompanying zones of heavy disseminations of 5-15%. The hanging wall zones (1 to 6) have similar characteristics but also display overprinting of silica flooding and white quartz veining. Compared to many orogenic gold deposits in the region, the mineralization at Bradshaw contains less veining and carbonate alteration and more wallrock silicification and sulphidation.

A resource estimate completed in 2015 describes, using a 3.0 g/t cut-off, probable mineral reserve of 277,101 ounces of gold at 4.82 g/t, an indicated resources of 422,059 ounces of gold at 6.19 g/t and an inferred resources of 754,553 ounces of gold at 6.47 g/t.

2021 AIRBORNE MAGNETIC SURVEY

INTRODUCTION

The purpose of the aeromagnetic survey was to generate maps showing the magnetic pattern of the area to interpret lithology and structural characteristics of the bedrock. A specific target for the interpretation of the survey data is to constrain the location of the Pipestone deformation zone and other subsidiary structures to guide follow-up drilling.

On April 7th, 2022 Pioneer Exploration Consultants Ltd. (Pioneer) completed an airborne magnetic survey using an Unmanned Aerial Vehicle (UAV) over 6 mineral claims close to Val Gagne, Ontario. The survey was flown at the request of GFG Resources Inc. A total of 56.7 line kilometers were flown. The reader is referred to Appendix II which contains the survey report completed by Pioneer that outline the specifications of the data collection, data processing, and product generation.

SURVEY SPECIFICATIONS

The survey, a single survey grid, was flown in a north-to-south (N 0° E azimuth) direction, with traverse line spacing of 20 metres. Tie lines were flown at 200 metre spacing, perpendicular (N 90° E azimuth) to the traverse lines. Due to the irregular property boundary, approximately 39.6% of the survey was conducted outside of the claim boundary, on the periphery of the claims.

DATA COLLECTION

The data were acquired using a laser pumped caesium magnetometer hung from a DJI M300 Pro unmanned aerial vehicle ("UAV") platform. The UAV magnetometer configuration includes a global position system ("GPS") for recording measurement location, laser altimeter for recording altitude, and an Inertial Measurement Unit for recording the roll, pitch, and yaw of the unit during flight. A single GSM-19 (Overhauser) magnetometer was used as a base station. Quality control and assurance were completed daily throughout the survey.

DATA PROCESSING

All general magnetic QA/QC and data processing techniques have been applied to the data. All post-field data processing was carried out using Geosoft Oasis Montaj, Python and Microsoft Excel software/programming languages. Presentation of final maps used ESRI ArcMap and/or Geosoft Oasis Montaj. Results were gridded using minimum curvature method and a grid cell size of approximately 1/3 of flight line spacing

.RESULTS AND INTERPRETATION

Axiom provided to GFG the survey data as a digital database in Geosoft .gdb format, raster grids in Geosoft .grd format, and images in geotiff format for the following products: line path map, total magnetic intensity (TMI) map, residual magnetic intensity (RMI) map, Analytical signal (AS) map, and First vertical derivative map (1VD) map. An example of the magnetic survey data and maps generated by Geotech is shown in Figure 6. The magnetics shows a clear magnetic high in the eastern portion of the claims. This is thought to be a lithological contact possibly related to the Carr Porphryr

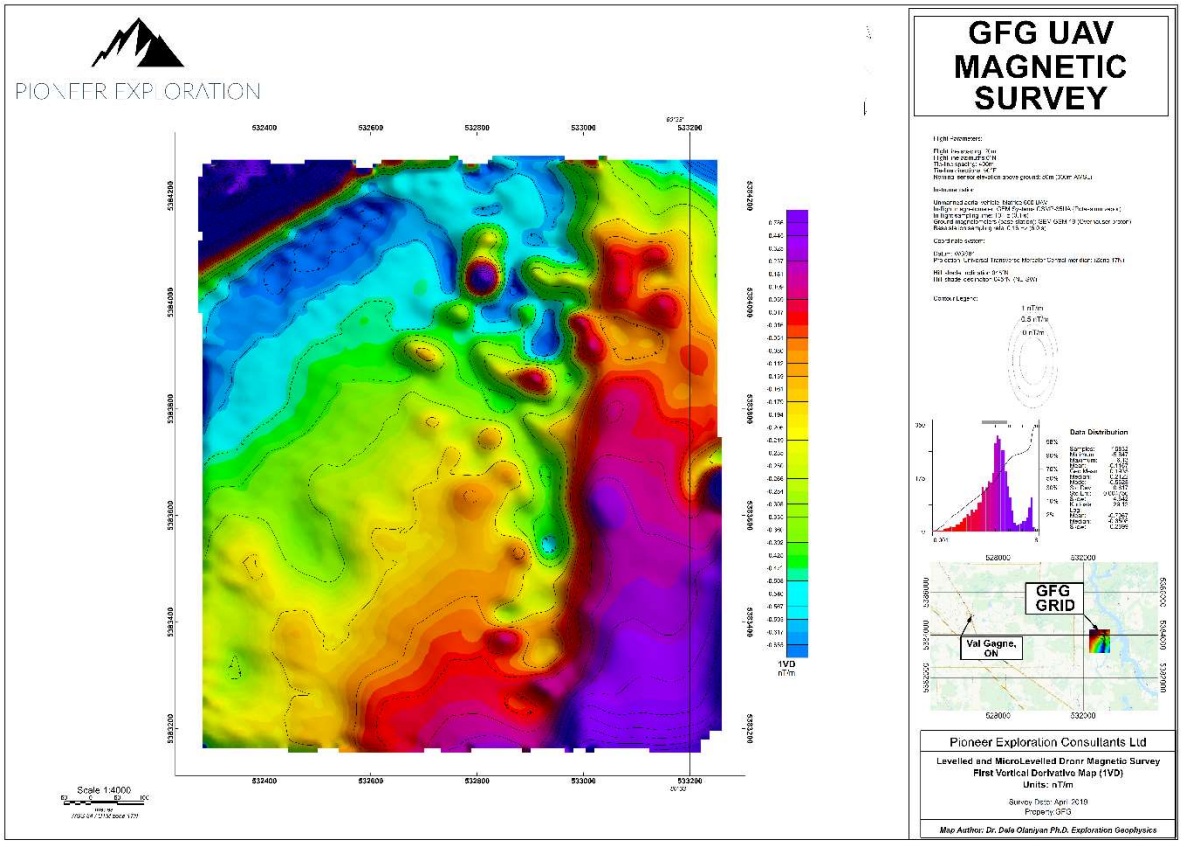

Figure 6. Aeromagnetic data represented as total magnetic intensity (TM

CONCLUSION AND RECOMMENDATIONS

In April 2022, Pioneer completed a 56.7 line-kilometre drone-borne magnetic survey parts of 6 unpatented mining claim cells, all of which, were optioned by GFG from International Explorers and Prospectors Inc. ("IEP") who hold 100% ownership. This report provides a description of logistics, equipment, and execution of the survey as well as data processing procedures. Presentation of the results in the form of high-resolution maps that display the magnetic pattern of the survey area.

Interpretation of survey results successfully delineated a lithological contact and is probably related to the Carr Porphyry. These interpreted features, will guide future prospecting and mapping efforts.

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STATEMENT OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS – MONICA OOSTERMAN

I, **Monica Oosterman,** do hereby certify that:

1. I am a Professional Geologist employed by GFG Resources Inc. as Exploration Manager
2. I graduated with a Bachelor of Science (Earth Science) from Laurentian University in 2002.
3. I am a Professional Geoscientist Registered with the Association of Professional Geoscientists of Ontario.
4. I have worked as a geologist for a total of 18 years since my graduation from university.
5. I certify that this 2021 Drone Magnetic Survey report on the Montclerg Project meets the technical standards for reporting assessment work under the provisions of the Ontario Mining Act

Dated this December 5, 2021.

M. Oosterman

MONICA OOSTERMAN, P.Geo.

GFGRESOURCES INC.

UAV Aeromagnetic Survey Logistics Report

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Introduction

On April 7th , 2022 Pioneer Exploration Consultants Ltd. (Pioneer) completed an airborne magnetic survey using an Unmanned Aerial Vehicle (UAV) over ValGagne mineral claims close to the township of Matheson, Ontario. The survey was flown at the request of GFG Resources Inc.

This report covers data acquisition, instrument descriptions, data processing and presentations. The digital data delivery is described later in this report. This report does not include any geological interpretations of the geophysical dataset. Key survey personnel are listed in Table 1.

Table 1: Personnel involved with the project.

Pilot in Command	Vlad Shutyi
Ground Crew	Andrew Murrical
Data Processing and QA/QC	Dr. Oladele Olaniyan (PhD Geophysics)

Location

The project area is located approximately 10 km north of Matheson, and about 60 km east of Timmins, Ontario, Canada. The staging locations were accessed by a 4x4 truck. The completed survey lines are illustrated in Figure 1 in addition to the nearby populated areas.

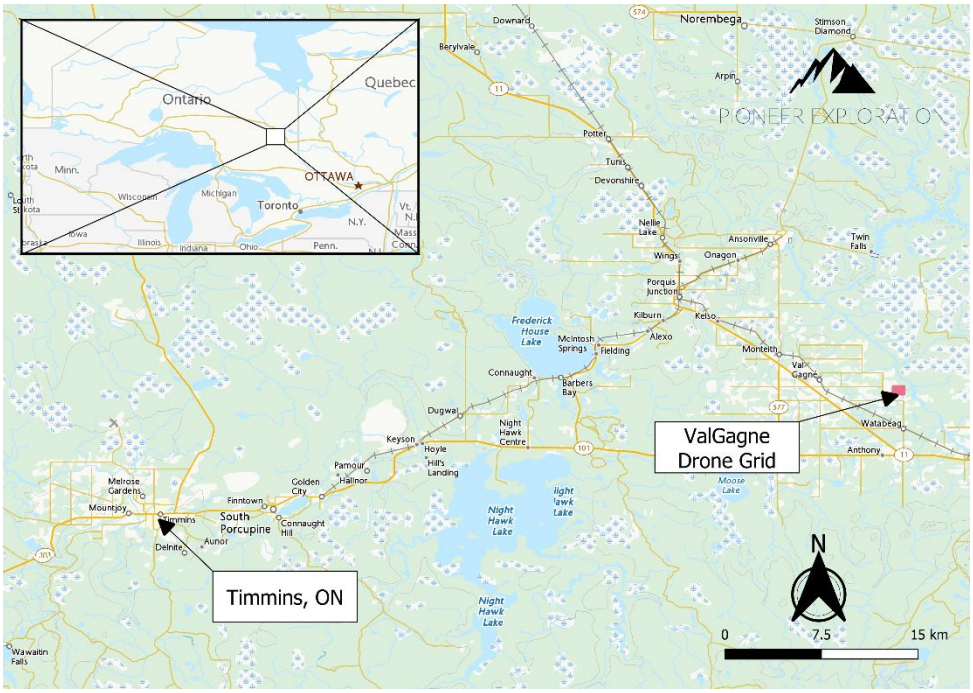

Figure 1: Flight lines are shown in red in relation to the nearby town of Timmins, ON.

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t. 1-306-715-6802

Survey Specifications and Procedures

Data collection for this survey area was conducted at 20m spaced lines with 200 m spaced tie lines. The nominal magnetic sensor altitude above ground level (AGL) was set to 35 m. Elevation from the terrain may vary depending on the treeline and obstacles on the flight route. Satellite imagery was used to create a high-resolution DSM to assist the UAV terrain following procedure and to minimize the possible topographic effects on the magnetic data. The nominal production groundspeed is 9 m/s for flat topography with no wind. The survey speed may vary depending on the terrain and environmental conditions.

The ground crews performed daily safety meetings and pre-flight checks prior to the start of drone flight operations. The Pilot in Command (PIC) is responsible for the safety of the crew and equipment during the survey operations. Each survey flight is pre-planned using ground control software, then the flight plans are uploaded to the UAV prior to takeoff. The UAV system flies the pre-defined waypoint-based flight plans while the ground crew maintains visual line of sight with the craft and the flight telemetry information. Flights are terminated and the UAV returns for landing when the battery voltage reaches a certain limit, or when the flight plan is complete. The survey flights can be manually terminated and taken over with full manual pilot control at anytime. Upon landing, the flight batteries are exchanged and the sensor is downloaded for data QAQC. The average distance covered by each flight is approximately 6-10-line kms of data acquisition.

Addition details on the completed survey can be found in Table 2.

Table 2: Survey details.

Area Name	Line Spacing (m)	Line Direction (deg)	Tie Line Spacing (m)	Total Line Kilometres (km)
ValGagne	20	000	200	56.702

Instrumentation and Software

The principal airborne sensor used was a Gem Systems Canada GSMP-35U potassium vapor sensor mounted on a UAV platform. Ancillary equipment included a laser altimeter with range of 130m, Global Positioning Satellite (GPS) system antenna and Inertial Measurement Unit (IMU). A stationary GSM-19 Overhauser magnetometer was used as a base station. Raw aerial magnetometer data was collected at a

rate of 10 Hz while base station data was collected at a rate of 0.16 Hz. Total field and GPS UTC time were recorded with each data point, enabling diurnal correction to be applied during final data processing.

Magnetic Base Station

A GSM-19 Overhauser Magnetometer base station was placed in a location of low magnetic gradient, away from electrical transmission lines and moving metallic objects, such as motor vehicles and aircrafts. The data collected from this base station was used to diurnally correct the aeromagnetic data. The GSM-19 Overhauser Magnetometer is supplied by GEM systems of Markham, Ontario. General specifications of the magnetometer are included in Appendix 1: Instrument Specification.

Unmanned Aerial Vehicle – Matrice 600

Pioneer used the Matrice M600 Pro UAV to complete this survey. The Matrice 600 (M600) is DJI's platform designed for professional aerial photography and industrial applications. It is built to closely integrate with a host of powerful DJI technologies, including the A3 flight controller, Lightbridge 2 transmission system, Intelligent Batteries and Battery Management system, for maximum performance and quick setup. As stated by the manufacturer, some of the advantages to using this type of multirotor systems are:

Total Integration: The modular design makes the M600 easy to set up and ready to use in just minutes. Its dust proof propulsion systems simplify maintenance while actively cooled motors make for reliable operation during extended use.

Smart Flight Safety: The M600 uses sine-wave driven, intelligent ESCs to ensure it performs accurately, safely and efficiently while A3's self-adaptive flight systems adjust flight parameters automatically based on different payloads. The A3 can be upgraded with two additional GNSS and IMU units to A3 Pro or with D-RTK GNSS for enhanced accuracy.

Extended Flight Time and Transmission Range: The M600 features an extended flight time and a 5 km long-range, ultra-low latency HD image transmission for accurate image composition and capture. The system uses 6 small DJI Intelligent Batteries, allowing it to be shipped easily to wherever it is needed. A customized battery management system and power distribution board allows all six batteries to be turned on with the press of a single button and keeps the system in flight in the event of a battery failure. It also allows users to check the battery status in real-time during flight.

Powerful App Control: The M600 supports a live HD view, battery status, redundancy status, transmission strength and much more, straight from the tablet application.

UAV Aeromagnetic Configuration

GEM System's UAV GSMP-35U is a potassium magnetometer providing unmatched sensitivity in addition to a low heading error effect. The GSMP-35U operates similarly to other alkali vapor magnetometers while benefiting from the unique spectral properties of potassium. Each GSMP-35U system has 0.0002 nT sensitivity combined with +/- 0.1 nT absolute accuracy over its full operating range. More details on the instrument can be found in Appendix 1: Instrument Specification. The UAV aeromagnetic setup consists of a towed bird configuration with a sensor-aircraft separation distance of either 3 or 5m. The sensor is

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flown along the survey lines with a fixed heading to maximize the signal amplitude and provide the best sensor orientation for the local conditions. This action minimizes heading errors. The data is both stored on board during acquisition and transmitted in real-time back to the ground control station to monitor the collection during flight and ground clearance of the sensor from the laser altimeter data.

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Data Deliverables and Channel Descriptions

All data is typically delivered in either Geosoft Database (GDB) or simple formats such as .txt or csv. The data deliverables are client specific to best suit their needs and software requirements. Regardless of software, a database is supplied to the client with channel descriptions as described in Table 3.

Table 3: Database channel descriptions.

Parameter	Explanation	Units/Format
Date	Flight Date	Yyyy/mm/dd
Time	GNSS time stamp	hhmmss.ss
lat	Latitude (WGS84)	Decimal degrees
lon	Longitude (WGS84)	Decimal degrees
alt	GPS altitude above the average sea level	metres
utmE	UTM easting (WGS84)	metres
utmN	UTM northing (WGS84)	metres
sat	Number of locked satellites	metres
zone	UTM zone	-
yaw	IMU yaw reading	Degrees
pitch	IMU pitch reading	Degrees
roll	IMU roll reading	Degrees
nT	Magnetic field readings (Raw)	Nanotesla
nT2	Diurnal correction has been applied on the nT channel (Diurnal datum: 55500 nT)	Nanotesla
Final	Final Total Magnetic Intensity	Nanotesla
Levelled	Levelled data based on tie line intersections	Nanotesla
VD1	1st Vertical derivative	nT/m
AS	Analytic Signal	nT/m

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Magnetic Maps and Derived Data Products

The final magnetic data has been presented in the form of several different magnetic maps (Appendix 2: Final Maps). Each of these different data presentations is a useful tool for identifying geological structures and other features.

Total Magnetic Intensity

Based on the flight lines covered by the drone, the total magnetic field map grid was created by interpolating the filtered magnetic data. The purpose of this data presentation is to highlight geological structures that may be visible in the survey area by their magnetic signature or their magnetic contrast to their surroundings.

First Vertical Derivative

The first order vertical derivative quantifies the rate of change of the magnetic field as a function of elevation. It is an approximation of the vertical magnetic gradient, which could be directly measured with separate magnetometers vertically spaced apart. The purpose of this type of filter is to eliminate the long wavelength signatures and make sharp features more detectable, such as the edges of magnetic bodies. This filter also increases the noise level, which limits the use of higher order derivatives (n=2 for example). The vertical derivative is used to delineate the contacts between large-scale magnetic domains because its value is zero over vertical contacts.

3D Analytic Signal

The analytic signal is the square root of the sum of the squares of the derivatives in the x, y, and z directions:

$$Analytical\ Signal = \sqrt{dx * dx + dy * dy + dz * dz}$$

The analytic signal is useful in locating the edges of magnetic source bodies, particularly where remanent magnetic signals and/or low magnetic latitude complicates interpretation.

Data Processing

All general magnetic QA/QC and data processing techniques have been applied to the data. All post-field data processing was carried out using Geosoft Oasis Montaj, Python and Microsoft Excel software/ programming languages. Presentation of final maps used ESRI ArcMap and/or Geosoft Oasis Montaj. Results were gridded using minimum curvature method and a grid cell size of approximately 1/3 of flight line spacing.

The geophysical images accompanying this report are positioned using the WGS 1984 datum. The survey geodetic GPS positions have been map-projected using the Universal Transverse Mercator (UTM) projection. A summary of the map datum and projection specifications are as follows:

- Datum: WGS 1984 UTM Zone 17 U
- Scale Factor: 1:4000
- Linear Unit: Metre (1)

The magnetic data was first quality checked in the field and any points lacking sufficient georeferenced data or which were excessively noisy were removed. The resulting data was processed as mosaics throughout the survey area as data was collected daily. The final result is a combination of all collected data, including lines that were re-flown due to weak or insufficient magnetic signal.

The base station readings were initially processed and filtered to remove high frequency noise. The filtered base station dataset was then used to perform a diurnal correction on the magnetic survey data. The diurnally corrected profile data were interpolated into a grid using the minimum curvature technique with a grid size of approximately 1/3 of flight line spacing. All final maps have a normalized color interval.

After finishing interpolation, initial processing subjected the data to a non-linear filter with a wavelength limit of 3-4 fiducials and tolerance of 0.001. This filter removes high frequency noise which mostly occur because the sensor is in the dead zone due to sudden changes in sensor orientation, effect of ferro-metallic objects, or the influence of weather conditions on the sensor. This filter smooths out noise and high frequency features.

After leveling the data using the tie lines, the data was micro-levelled. This step is performed to mitigate the corrugation effect associated with gaps between the data lines and is completed by applying a high-pass butterworth filter with the threshold of 80 metres (line spacing x 4) followed by a directional cosine filter perpendicular to the line direction. The resulted noise channel was then subtracted from the leveled values to microlevel the data. The final result of the leveling and micro-leveling processes was then put in “Final” Channel of the database.

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The following corrections were applied to the airborne magnetic data:

- Correction for diurnal variation using the digitally recorded ground base station magnetic values as described above
- Lag was measured by a lag test prior to the operation. Only a minor lag correction is applied to final data (0.2s)
- Heading biases were applied based on clover leaf data collected
- Micro-leveling
- Analytic Signal calculation
- First Vertical Derivative calculation

The final maps are included in Appendix 2: Final Maps.

Data Comments

Pioneer's UAV aeromagnetic surveys result in a high quality, high resolution data product. The increased flight line density and lower flight elevation possible with the use of a UAV platform results in superior resolution data products when compared to conventional airborne magnetic data. Using an auto-controlled UAV platform also allows for minimal deviation from pre-planned flight lines, and greatly reduces the impact of human errors during data acquisition.

Logistics remains a major challenge of UAV surveying. In order to operate legally within the guidelines set by Transport Canada, line of sight must be maintained to the UAV and surrounding airspace at all times. This often results in the necessity of several staging locations for covering the survey area, and sometimes requires the employment of additional equipment such as an aerial platform or scissor lift to achieve unobstructed line of sight beyond surrounding buildings or vegetation. The smaller flight sorties are typical in UAV-based surveys and require greater attention in post processing.

Pioneer makes every effort to identify potential sources of noise in order to mitigate their impact on our collected survey data. The magnetic noise envelope of our UAVs has been mapped in 3D prior to use. Our flight lines are planned with a minimum of 50 m overlap past the survey boundaries so that the magnetic sensor has time to stabilize itself after the UAV has completed its turns. Additionally, weather is carefully monitored and when excessive data inconsistency is noted due to weather conditions, flights are suspended until conditions improve.

Pioneer is very pleased with the results from this survey and confirms that the level of error and noise in the dataset falls below our threshold, which is set based on the Geological Survey of Canada guidelines for airborne magnetometer survey data.

Respectfully submitted,

Kiyavash Parvar, M.A.Sc. UAV Geophysics
Vice President of Geophysics
Pioneer Exploration Consultants Ltd.
Ottawa, Ontario

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Appendix 1: Instrument Specification

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GSM-19 Overhauser Magnetometer

Performance

Sensitivity: Standard
GSM-19 0.022 nT @ 1 Hz
GSM-19PRO 0.015 nT @ 1 Hz
Resolution: 0.01 nT
Absolute Accuracy: 0.1 nT
Dynamic Range: 20,000 to 120,000 nT
Gradient Tolerance: up to 10,000 nT/m
Samples at: 60+, 5, 3, 2, 1, 0.5, 0.2 sec
Operating Temperature: -40°C to +50°C

Operating Modes

Manual: Coordinates, time, date and reading stored automatically at up to 0.2 sec.
Base Station: Time, date and reading stored at 1 to 60 second intervals.
Remote Control: Optional remote control using RS-232 interface.
Input / Output: Input/Output: RS-232 using 6-pin weatherproof connector with USB adapter.

Memory - (# of Readings in millions)

Mobile: 1.4M,
Base Station: 5.3M,
Gradiometer: 1.2M,
Walking Mag: 2.6M

Dimensions

Console: 223mm x 69mm x 240 mm(8.7x2.7x9.5in)
Sensor: 175mm x 75mm diameter cylinder (6.8in long by 3 in diameter)

Weights

Console with Belt: 2.1 kg
Sensor and Staff Assembly: 1.0 kg

Matrice 600

Structure

Diagonal Wheelbase: 1133 mm
Aircraft Dimensions: 1668 mm x 1518 mm x 759 mm (Propellers, frame arms and GPS mount unfolded)
640 mm x 582 mm x 623 mm (Frame arms and GPS mount folded)
Package Dimensions : 620 mm x 320 mm x 505 mm
Intelligent Flight Battery Quantity: 6
Weight (with six TB47S batteries): 9.1 kg
Weight (with six TB48S batteries): 9.6 kg
Max Takeoff Weight: 15.1 kg

Performance

Hovering Accuracy (P-Mode, with GPS) Vertical: ±0.5 m, Horizontal: ±1.5 m
Max Angular Velocity: Pitch: 300°/s, Yaw: 150°/s
Max Pitch Angle: 25°
Max Speed of Ascent: 5 m/s
Max Speed of Descent: 3 m/s
Max Wind Resistance: 8 m/s
Max Flight Altitude above Sea Level: 2500 m
Max Speed: 18 m/s (No wind)
Hovering Time (with six TB47S batteries)* No payload: 35 min, 6 kg payload: 16 min
Hovering Time (with six TB48S batteries)* No payload: 40 min, 5.5 kg payload: 18 min

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

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 (unobstructed, free of interference) :

- FCC Compliant: 3.1 miles (5 km)
- CE Compliant: 2.1 miles (3.5 km)

EIRP:

- 10 dBm @ 900 M/li>
- 13 dBm @ 5.8 G
- 20 dBm @ 2.4 G

Video Output Port: HDMI, SDI, USB
Dual Users Capability: Master-and-Slave control
Mobile Device Holder: Supports smartphones and tablets
Output Power: 9 W
Operating Temperature: 14° to 104° F (-10° to 40° C)
Storage Temperature:
Less than 3 months: -4° to 113° F (-20° to 45° C)
More than 3 months: 72° to 82° F (22° to 28° C)

Charge Temperature: 32° to 104° F (0° to 40° C)
Built-in Battery: 6000 mAh, 2S LiP
Max Tablet Width: 170 m

Propulsion System

Motor Model: DJI 6010
Propeller Model: DJI 2170

Battery

Model: TB48S
Capacity: 5700 mAh
Voltage: 22.8 V
Type: LiPo 6S
Energy: 129.96 Wh
Net Weight: 680 g
Operating Temperature: 14° to 104° F (-10° to 40° C)
Storage Temperature: Less than 3 months: -4° to 113° F (-20° to 45° C)
More than 3 months: 72° to 82° F (22° to 28° C)
Charge Temperature: 41° to 104° F (5° to 40° C)
Max Charging Power: 180 W

Charger

Model: A14-100P1A
Voltage: Output26.3 V
Power Rating: 100 W

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GEM GSMP-35UA: Ultra Light-Weight Potassium Magnetometer

Magnetometer Specifications

Sensitivity: 0.0002 nT @ 1 Hz
Resolution: 0.0001 nT
Absolute Accuracy: +/- 0.1 nT
Heading Error: + / – 0.05 nT
Dynamic Range: 15,000 to 120,000 nT
Gradient Tolerance: 50,000 nT/m
Sampling Intervals: 1, 2, 5, 10, 20 Hz
Operating Temperature: -40°C to +55°C

Orientation

Sensor Angle: optimum angle 35° between sensor head axis & field vector.
Proper Orientation: 10° to 80° & 100° to 170
Heading Error: +/- 0.05 nT between 10° to 80°and 360° full rotation about axis.

Environmental

Operating Temperature: -40°C to +55°C
Storage Temperature: -70°C to +55°C
Humidity:0 to 100%, splashproof

Dimensions & Weight

Sensor: 161mm x 64mm (external dia) with 2m cabling ; 0.43 kg
Electronics Box: 236mm x 56mm x 39mm; 0.46 kg
Option 1 cabling; .125kg
Option 3 light weight battery; .250kg

Power

Power Supply:18 to 32 V DC
Power Requirements: approx. 50 W at start up, dropping to 12 W after warm-up
Power Consumption:12 W typical at 20°C
Warm-up Time: <15 minutes at -40°C

Outputs

20 Hz RS-232 output with comprehensive Windows Personal Computer (PC) software for data acquisition and display.

Outputs UTC time, magnetic field, lock indication, heater, field reversal, GPS position (latitude, longitude altitude, number of satellites)

Components

Sensor, pre-amplifier box, 2m sensor /pre-amplifier cable (optional cable 3-5m), manual & shipping case

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Appendix 2: Final Maps

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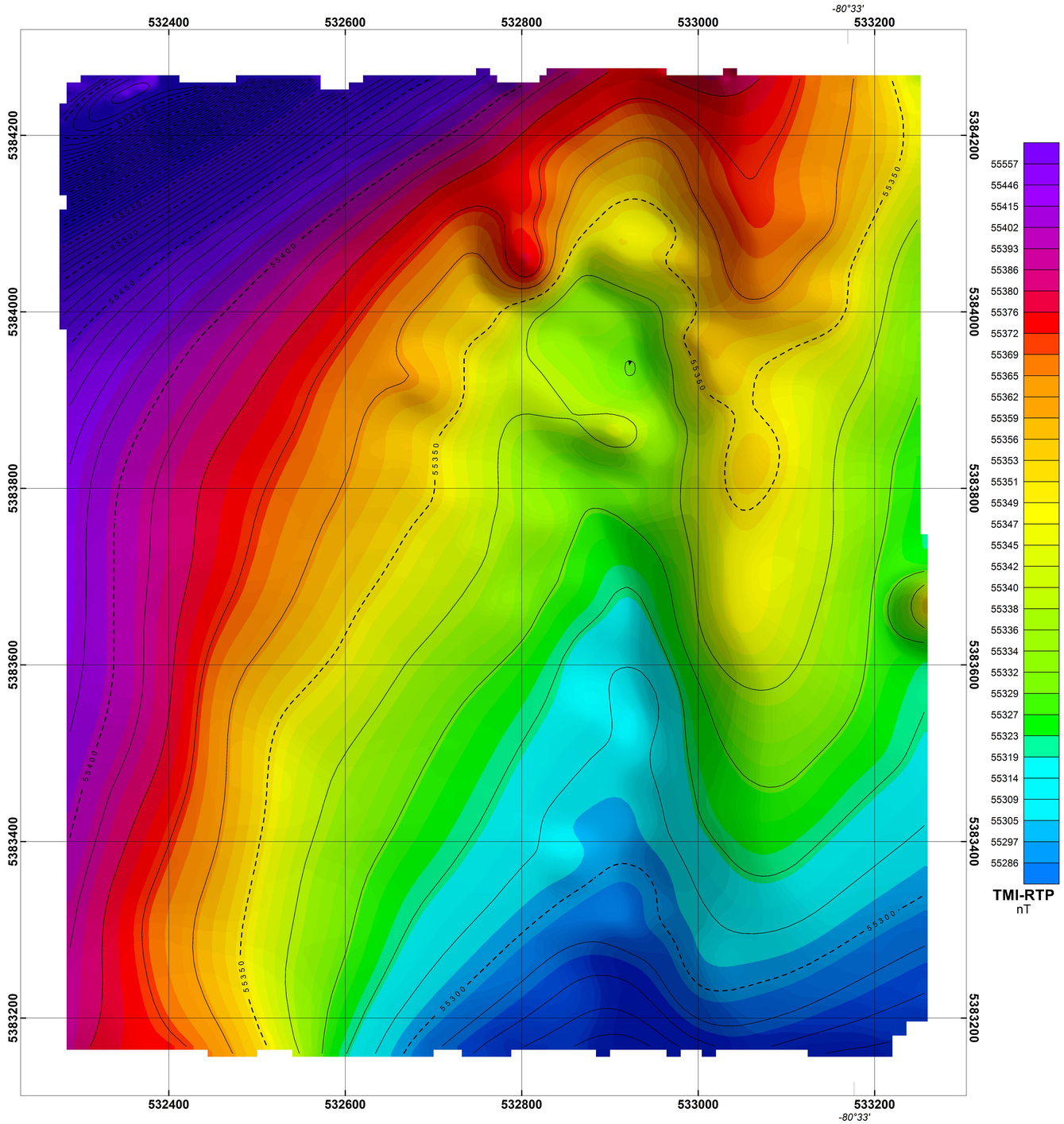
GFG UAV MAGNETIC SURVEY



Scale 1:4000

50 0 50 100

metres

WGS 84 / UTM zone 17N

Flight Parameters:

Flight line spacing: 20m
Flight line azimuths:0°N
Tie-line spacing: 400m
Tie-line directions: 90°E
Nominal sensor elevation above ground: 50m (300m AMSL)

Instrumentation:

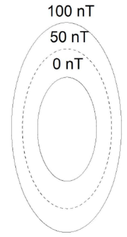
Unmanned aerial vehicle: Matrice 600 UAV
In-flight magnetometer: GEM Systems GSMP-35UA (Potassium vapor)
In-flight sampling lime: 10 Hz (0.1 s)
Ground magnetometers (base station): GEM GSM-19 (Overhauser proton)
Base station sampling rate: 0.16 Hz (6.0 s)

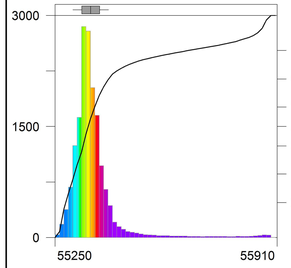
Coordinate system:

Datum: WGS84
Projection: Universal Transverse Mercator Central meridian: (Zone 17N)

Hill shade inclination:045°N
Hill shade declination:045°N (NE-SW)

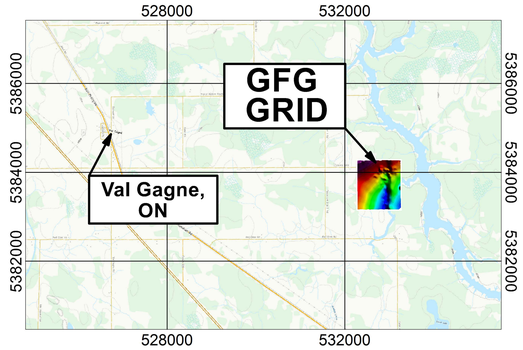
Contour Legend:





Data Distribution

Samples:	16832
Minimum:	55250
Maximum:	55890
Mean:	55360
Geo.Mean:	55360
Median:	55350
Mode:	55340
Std.Dev.:	76.35
Std.Err.:	0.5885
Skew:	3.978
Kurtosis:	20.12
Log:	
Mean:	4.743
Median:	4.743
Skew:	3.965



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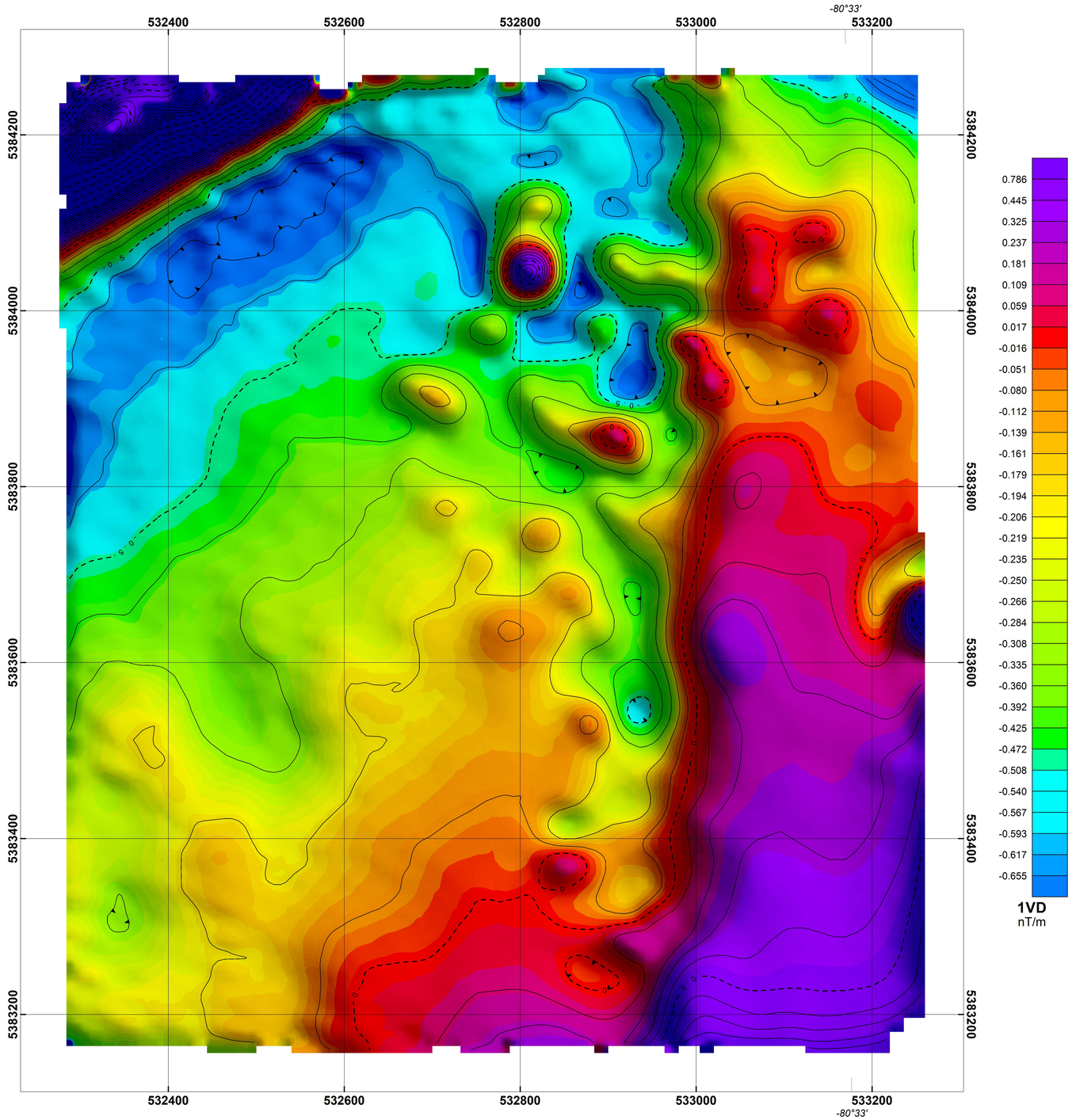
Levelled and MicroLevelled Dronr Magnetic Survey
Total Magnetic Intensity -Reduced to Pole (TMI-RTP)
Units: nT

Survey Date: April 2019
Property:GFG

Map Author: Dr. Dele Olaniyan Ph.D. Exploration Geophysics

PIONEER EXPLORATION

GFG UAV MAGNETIC SURVEY



Scale 1:4000

50 0 50 100

metres

WGS 84 / UTM zone 17N

Flight Parameters:

Flight line spacing: 20m
Flight line azimuths:0°N
Tie-line spacing: 400m
Tie-line directions: 90°E
Nominal sensor elevation above ground: 50m (300m AMSL)

Instrumentation:

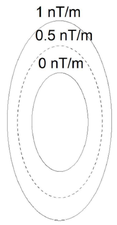
Unmanned aerial vehicle: Matrice 600 UAV
In-flight magnetometer: GEM Systems GSMP-35UA (Potassium vapor)
In-flight sampling lime: 10 Hz (0.1 s)
Ground magnetometers (base station): GEM GSM-19 (Overhauser proton)
Base station sampling rate: 0.16 Hz (6.0 s)

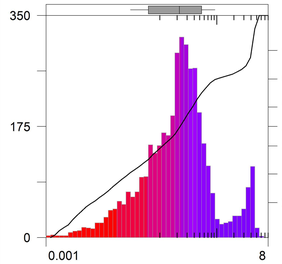
Coordinate system:

Datum: WGS84
Projection: Universal Transverse Mercator Central meridian: (Zone 17N)

Hill shade inclination:045°N
Hill shade declination:045°N (NE-SW)

Contour Legend:





Data Distribution

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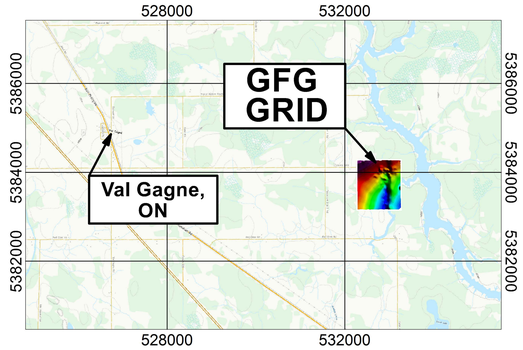
Minimum:	-5.847
Maximum:	6.13
Mean:	-0.1167
Geo.Mean:	0.1935
Median:	-0.2122
Mode:	-0.5628
Std.Dev.:	0.617
Std.Err.:	0.004756
Skew:	4.642
Kurtosis:	29.13
Log:	
Mean:	-0.7067
Median:	-0.6508
Skew:	-0.2699



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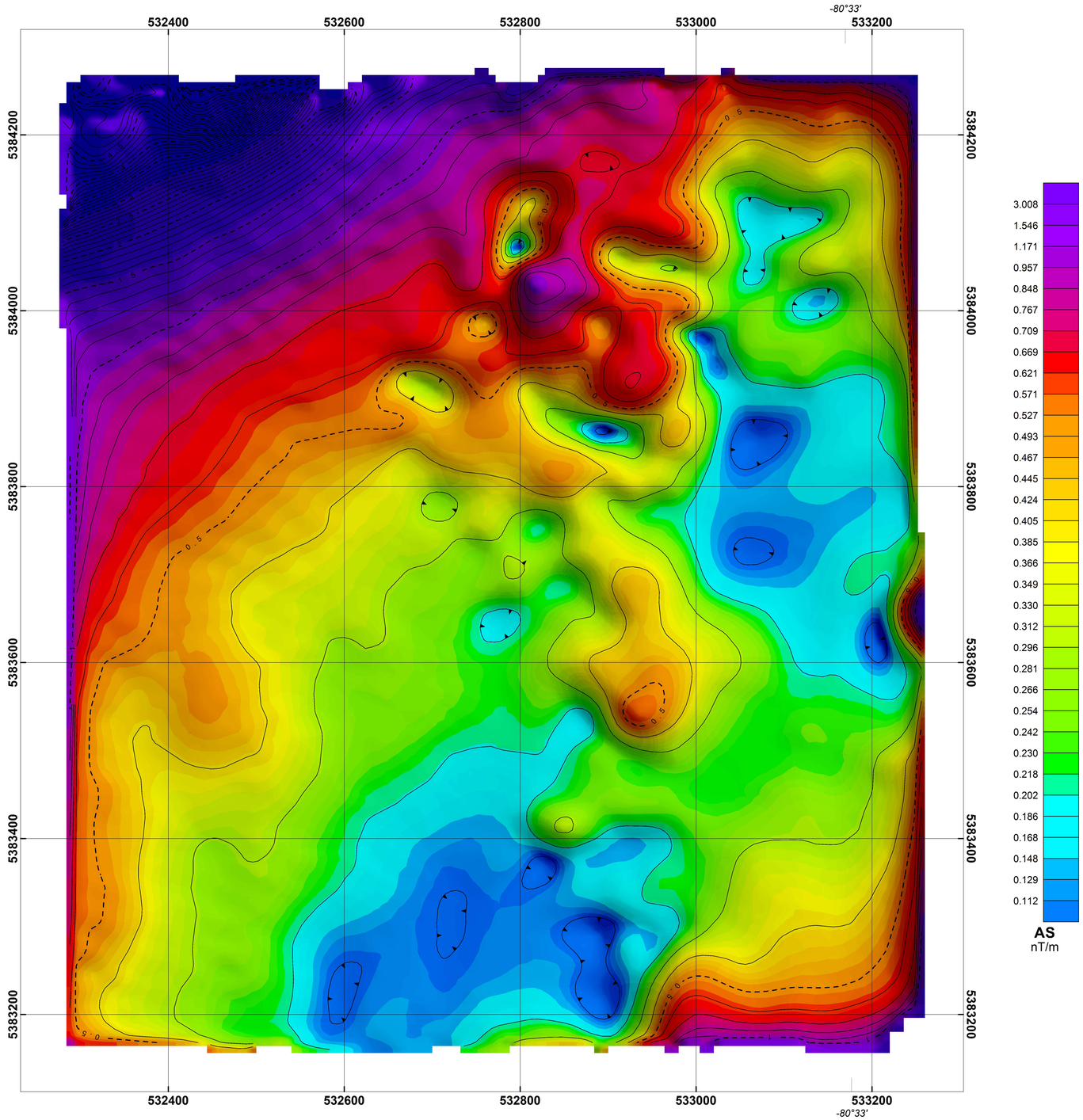
Levelled and MicroLevelled Dronr Magnetic Survey
First Vertical Derivative Map (1VD)
Units: nT/m

Survey Date: April 2019
Property:GFG

Map Author: Dr. Dele Olaniyan Ph.D. Exploration Geophysics

PIONEER EXPLORATION

GFG UAV MAGNETIC SURVEY



Scale 1:4000

50 0 50 100

metres

WGS 84 / UTM zone 17N

Flight Parameters:

Flight line spacing: 20m
Flight line azimuths:0°N
Tie-line spacing: 400m
Tie-line directions: 90°E
Nominal sensor elevation above ground: 50m (300m AMSL)

Instrumentation:

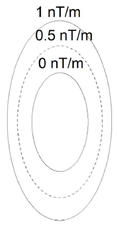
Unmanned aerial vehicle: Matrice 600 UAV
In-flight magnetometer: GEM Systems GSMP-35UA (Potassium vapor)
In-flight sampling lime: 10 Hz (0.1 s)
Ground magnetometers (base station): GEM GSM-19 (Overhauser proton)
Base station sampling rate: 0.16 Hz (6.0 s)

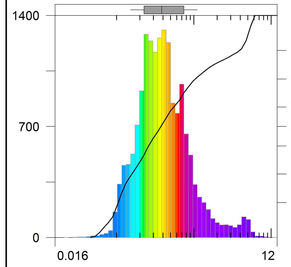
Coordinate system:

Datum: WGS84
Projection: Universal Transverse Mercator Central meridian: (Zone 17N)

Hill shade inclination:045°N
Hill shade declination:045°N (NE-SW)

Contour Legend:





Data Distribution

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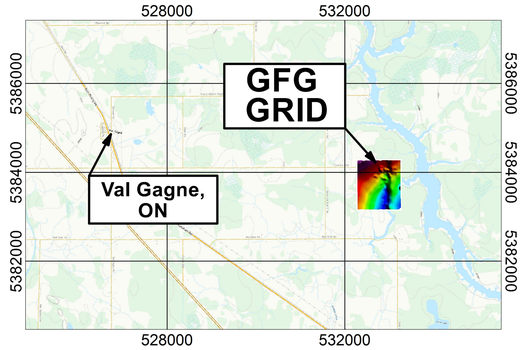
Minimum:	0.01604
Maximum:	11.73
Mean:	0.5976
Geo.Mean:	0.4035
Median:	0.3757
Mode:	0.1433
Std.Dev.:	0.7966
Std.Err.:	0.00614
Skew:	4.373
Kurtosis:	23.69
Log:	
Mean:	-0.3941
Median:	-0.4252
Skew:	0.7534



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Levelled and MicroLevelled Dronr Magnetic Survey
Analytical Signal Map (AS)
Units: nT/m

Survey Date: April 2019
Property:GFG

Map Author: Dr. Dele Olaniyan Ph.D. Exploration Geophysics

Taylor Twp drone survey Flown April 6-8 2022
International Explorers / GFG Resources

drone survey cost per meter

mob/demob		2,500
109.167	56.702	6,190
		8,690
meters flown		56,702
cost per meter		0
meters in filing		34,191
survey cost for filing		5,240

Total costs for filing

survey	34.191	153.26	5240
P Colbert	2	400	800
		total	6040
	KM's in filing		34.191
	cost per KM		176.65797

All cells are encumbered by Patented lands
Flown meterage is calculated on the unemcumbered
part of each cell

Cell #	meters/cell	km's/cell	$/km	filing $
584093	8,298	8.298	176.66	1466
584094	10,603	10.603	176.66	1873
584095	4,878	4.878	176.66	862
584096	6,394	6.394	176.66	1130
703034	2,254	2.254	176.66	398
703035	1,764	1.764	176.66	312
		34.191		6040

Cell #	# lines	length	total	km's
584093	18	461	8298	8.298
584094	23	461	10603	10.603
584095	18	271	4878	4.878
584096	23	278	6394	6.394
703034	23	98	2254	2.254
703035	18	98	1764	1.764
		total kms in filing		34.191
patents		Flown not in filing		22.511
		Total flown on invoice		56.702