Cheticamp Property

21Alpha Resources Inc.

Area 1
EL 52646, 52648, 52790 and 51913

and Area 2
EL 52791 and 52963

UAV Magnetometer Survey Report

Inverness County

NTS 11K10B

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October 15, 2019

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Summary

In July 2019 21Alpha hired Terrane Geoscience Inc. of Halifax to perform an Unmanned Aerial Vehicle (UAV) hosted magnetometer survey over their claims near Cheticamp. The coverage included most of EL's 52646, 52648 and all of 51913, in the northern portion of the property (Area 1), and all of EL 52791 and most of EL 52963 (Area 2, see Figure 2) in the southern area of the Cheticamp Highlands region. UAV surveys provide better definition than previous airborne surveys with line spacing at 50 metres and continuous readings, and lower, more consistent ground separation.

The surveys clearly define a large, strongly magnetic trend anomaly extending north-south through the eastern portion of Area 1, and a weaker trend in the central-western portion. The former is associated with the Salmon Pool Granite and a linear feature possibly associated with the mineralization at the Silvercliff showing, the latter associated with the Triangle, Mountain Top Copper Mine and Road 1 showings, all contained within units of the Jumping Brook Metamorphic Suite (JBMS).

Area 2 shows a strong magnetic trend along its western margins, mainly associated with the Fisset Brook Formation, but extending in some areas to the JBMS. A moderate to strong, somewhat irregular magnetic region occurs in the central-eastern area of EL 52963, within the JBMS.

The majority of the mineral showings in the Cheticamp Highlands region occur within the JBMS, and magnetic anomalies within these rocks deserve exploration attention. The meta-sedimentary and meta-volcanic rocks of the Fisset Brook Formation is also known to host base metal occurrences, and the possibility of precious metals cannot be ruled out, particularly along its contacts.

The two areas covered in the present magnetometer surveys are known to host a number of significant base and precious metal occurrences, and the number and extent of the anomalies obtained require follow-up exploration.

21Alpha wishes to acknowledge and thank the Province for its support through a Mineral Resources Development Fund grant obtained to provide funding to implement these surveys.

Introduction

Exploration in the Cheticamp Highlands began in the late 1800's, with the development of the Galena mine, along the northern reaches of Faribault Brook, as well as at the Mountain Top Copper Mine, a bit further south. More modern efforts began in the early 1960's with some trenching and soil sampling by Sogemines and Noranda. This was followed by several other companies, including Selco-BP who did additional sampling and trenching, as well as geophysics and limited drilling. Regal Goldfields and Northland Resources acquired much of the prospective Cheticamp area ground in the mid-1990's and hired Watts, Griffis and McOuat (WGM) to do a complete compilation of the work done to date and recommend an exploration plan.

The resulting initial document was filed for assessment in 1996 and followed up by another in 1999. They serve as an excellent, one stop resource when assessing the mineral potential of the Cheticamp Highlands. Unfortunately, Regal and affiliates encountered efforts by a political system that saw fit to create the Jim Campbell's Barrens Protected Area, centred on the most prospective gold showings in the Province at that time. Regal and company walked away from the area at that point, but left many good opportunities on the many mineral deposits and showings that occur outside of the PA, including the claims currently held by 21Alpha.

The WGM compilation maps (and the government geoscience and MODS files and maps) show numerous gold and base metal occurrences throughout the present claims of interest. 21Alpha selected a UAV magnetometer survey as the best way to initiate their exploration of these highly prospective claims.

Location and Access

Access to Area 1 is from the Cabot Trail at La Prairie just east of Cheticamp (see Figures 1 and 2). Approximately 1 kilometre west of the bridge that crosses the Cheticamp River there is a good quality gravel road that you take, travelling southeast for approximately 3.6 kilometres, at which point you are at the northern boundary of EL 52646. The location is on NTS map sheet 11K 10B, Tracts 87, 88, 89, 104, 105 and 106.

Access to area 2 is also possible by continuing south along the route described above, but also via Barren Road from downtown Cheticamp, which turns into Barren Forks Road. When you reach Cheticamp Back Road turn left for 750 metres then turn right on a gravel road and continue for 5 km to a "T" in the road. Turn right. From this point on, travel is on foot or by ATV. Approximately 6 kilometres south along this trail brings you to the north end of Area 2.

Another, and possibly better route to Area 2, is via Lefort Road from Point Cross (south of Cheticamp). Approximately 1.6 kilometres along this road, the gravel road proceeds up the mountain. About 6 kilometres along this road brings you to the northwestern portion of Area 1.

Licence and Tabulation

EL 52646 has an Issue Date of September 5th, 2018, EL52648 has an Issue Date of September 7th, 2018 and EL 51913 has an Issue Date of October 20, 2017. All are in the name of 21Alpha Resources Inc., as are EL52791 which has an Issue Date of October 18th, 2018 and EL52963 which has an Issue Date of February 1, 2019.

NTS: 11K 10B (Area 1)

Licence # 52646

Claims	Tract	# of Claims
A,H,J,Q	87	4
All	88	16
D,E,M,N	89	4
D	104	1
A,B,C,D,E,F,G,H,J,Q	105	10
A,H	106	2
Licence # 51913		
E,M,N	104	3
Licence # 52648		
N,O,P,Q	80	4
F,G,K,L,M,N,O,P,Q	81	9
A,B,G,H,J,K,L,O,P,Q	89	10
A,B,C,F,G,H,J,K,L,O,P,Q	104	12
TOTAL		75

NTS: 11K10B (Area 2)

Licence # 52963

A,B,C,D,E,M	**8**	**6**
H,J,K,O,P,Q	**9**	**6**
Q	**15**	**1**
All	**16**	**16**
D,E,M,N	**17**	**4**
D,E	**32**	**2**
All	**33**	**16**
A,H,J,K,P,Q	**34**	**6**
A,B,N,O,P,Q	**39**	**6**
A,B,C,D,E,F,G,H,K,L,M,N,O,P	**40**	**14**
D	**41**	**1**

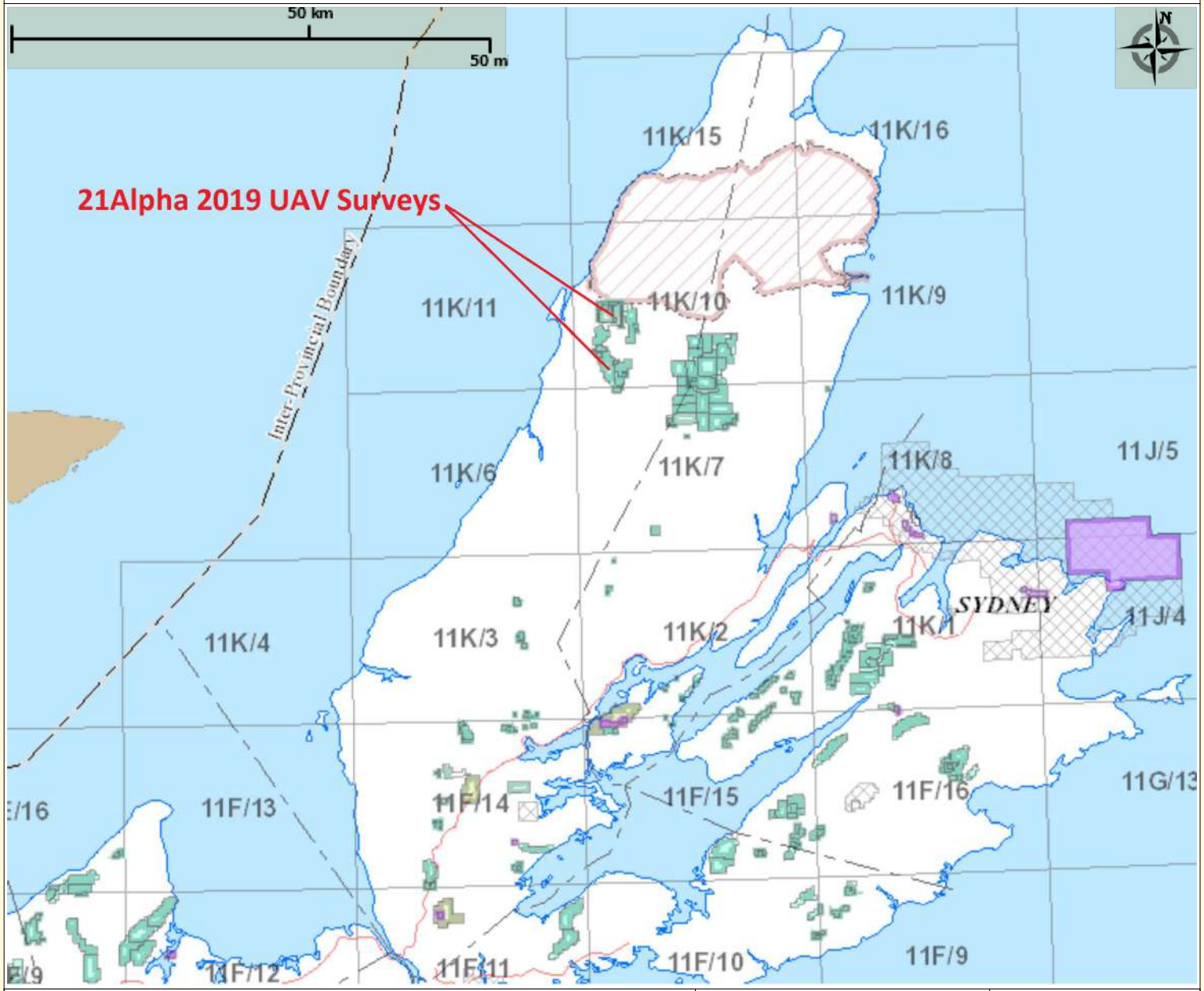
Licence # 52791

C,D,E	**57**	**3**
A,B,C,D,F,G,H,J,K	**58**	**9**
TOTAL		**90**

Figure 1: Location Map

NovaROC
Mineral Rights Online Registry System

Cheticamp 2019 UAV Surveys FIGURE 1



Legend

- Exploration Licences Good Standing
- Exploration Licences Other
- Exploration Licences Other
- Exploration Licences Pending Late Renewal
- Exploration Licences Pending
- Mineral Lease Good Standing
- Mineral Lease Pending
- Mineral Lease Terminated
- Mineral Lease Other
- Non-Mineral Registration Good Standing
- National Parks and Park Adjuncts (T9)
- DNR Closure

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The information on this map may have come from a variety of government and non-government sources.
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Scale: 1:1,000,000
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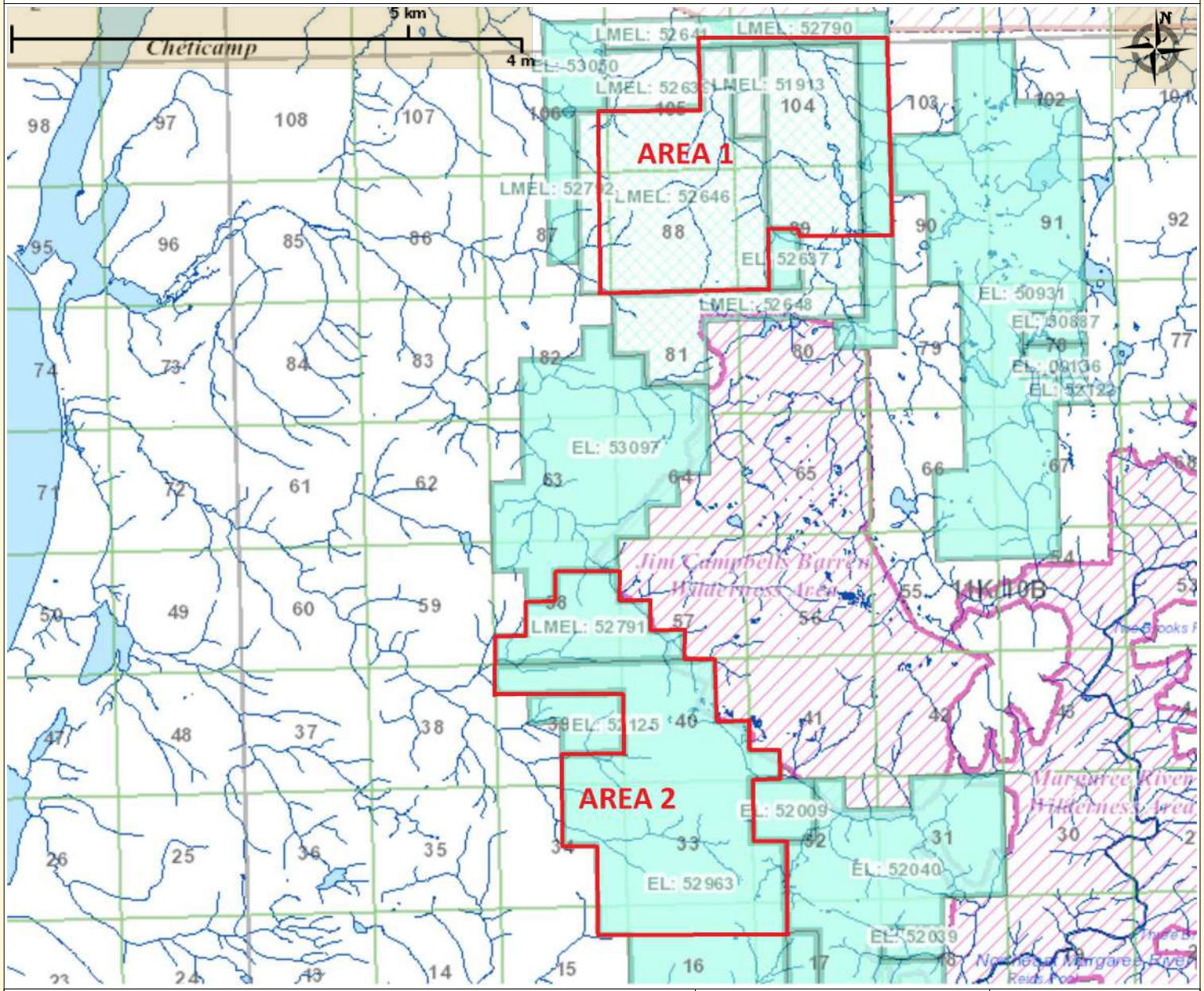
Figure 2: Survey Location/ Claims Map

NovaROC
Mineral Rights Online Registry System

Cheticamp 2019 UAV Survey Location/ Claims Map: FIGURE 2



Legend

- Exploration Licences Good Standing
- Exploration Licences Other
- Exploration Licences Pending Late Renewal
- Claim Reference Maps
- Wilderness Areas (T4)
- National Parks and Park Adjuncts (T9)
- Canadian Heritage Rivers (T29)

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Figure 3: Mineral Occurrence Map of the Cheticamp Area

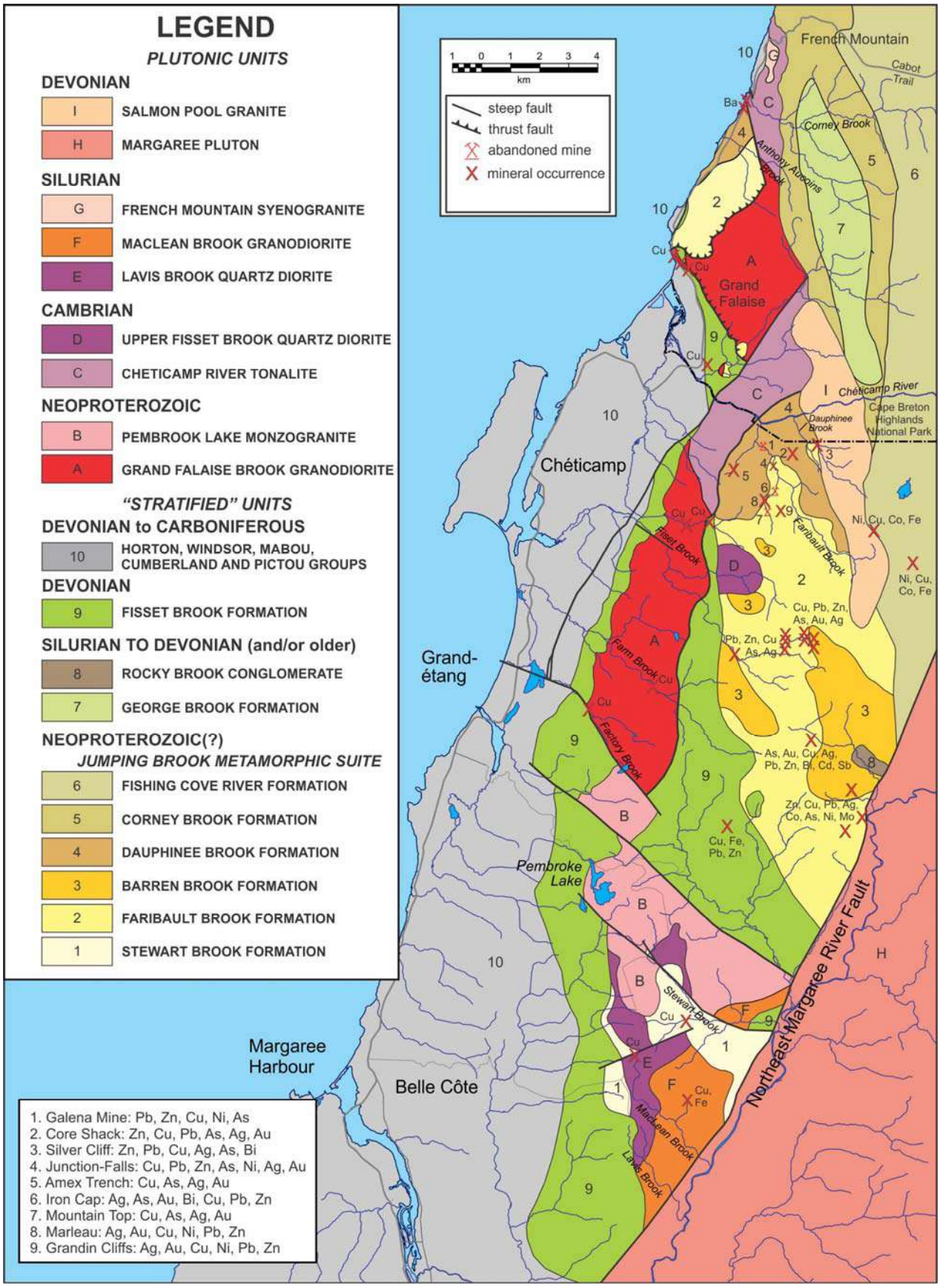


Figure 3. Geological map of the study area, Jamieson et al. (1989), Currie (1987), Lynch and Tremblay (1992), Giles et al. (1997a, b) and Tucker (2011). Main mines and mineral occurrences in the Faribault Brook area shown by numbers in legend.

Work Performed

On July 7th to 14th, 2019, Terrane Geophysics, of Halifax, flew an UAV magnetometer survey on the claims of Area 1, consisting of approximately 260 line kilometres over 9.2 square kilometres. Line separation was approximately 50 metres and ground-instrument separation was approximately 47 metres. A Total Magnetic Intensity (TMI) map is provided as Figure 4. A full report by Terrane is included as Appendix II. Colour contoured maps for Reduced To Pole First Vertical Derivative (1VD) and Reduced To Pole (RTP) are also supplied by Terrane and are included as Appendix II.

For Area 2, Terrane Geophysics flew the survey from July 15th-22nd over 8.35 square kilometres for a total of 180 line kilometres. As with Area 1, the survey lines were east-west with a 50 metre line spacing and approximately 46 metre ground separation. A colour contoured TMI map of the survey is provided in Figure 5. Colour contoured RTP and 1VD maps of the survey are included as Appendix III, as well as the Terrane Geophysics report providing technical details on the survey.

Terrane partnered with MWH Geo-Surveys Ltd. In the implementation of the surveys and processing of the data. The final presentation of deliverable was by Terrane, who also managed the surveys, and were the main contact for 21Alpha. Figure 3 is a location/ claims map showing the locations of the two survey areas.

Interpretation of the above maps with reference to past exploration efforts on the claims was done by the author from October 11th to October 15th, 2019.

Interpretation of Results

Area 1

The area east of Cheticamp has undergone long periods of exploration by a large number of companies. The Watts. Griffis and McQuat (WGM) compilation maps (and the government geoscience and MODS files and maps) show numerous gold and base metal occurrences throughout the present claims of interest. 21Alpha selected a UAV magnetometer survey as the best way to initiate their exploration of these highly prospective claims.

All forms of geophysics have been utilized in attempts to identify conductive horizons, particularly in the Jumping Brook Metamorphic Suite, include a patchwork of Induced Polarization, ground magnetometer and various EM methods. Anomalous areas have been investigated by drilling with mixed success. This may be largely attributable to the generally flat lying strata throughout much of the region, which does not enable effective use of EM methods which function better with tilted strata. In addition, many of the showings are zinc rich, and sphalerite is not a conductive mineral. Also, some of the showings, such as the copper-gold Mountain Top occurrence, have fairly sparse, disseminated mineralization, in the 1-5% range, which may not show a response in conventional EM methods. IP works well on this type of deposit, however the difficulty then is the challenging terrane, with in excess of 400 metre elevation changes on the property (particularly at the Mountain Top, Triangle and Core Shack occurrences), that make line cutting and surveying difficult and introduces inaccuracies in the calculations.

The GSC did an airborne magnetometer survey in 1992 over the area which was helpful with mapping the area on a 1:50,000 scale, however this product does not provide enough useful detail for exploring known showings or identifying new ones. Line separation in these types of fixed wing or helicopter surveys is generally 100 metres or greater, and ground separation, particularly in areas of deeply incised valleys such as the case in the Cape Breton Highlands, is usually greater than 100 metres, and may be several times that in the valleys. In addition, new-age magnetometers have essentially continuous readings along the flight path, whereas older surveys recorded individual point readings with varying separation along the flight line. With the current UAV survey, constant GPS readings on the instrument allow much greater control for straighter flight lines and more accurate plotting of the data, with less than 50 metre ground separation, 50 metre line separation and continuous readings. Drilling and trenching efforts may be located with this amount of accuracy.

The other exploration effort widely employed with minimal success in this area is soil surveys which, when adding the surveys of the individual companies' efforts from the 1960's to present, cover most of the Cheticamp Highlands. Lack of outcrop, particularly in the higher elevations, led to this method being widely employed, but lack of information on glacial direction, and flat lying strata, combine to render this method of limited effectiveness. Depth of overburden combined with flat lying strata also render LiDAR surveys of limited value (the author flew 2 areas of the highlands for LiDAR results which provided little in terms of structural information).

For all of the above reasons a UAV magnetometer survey was chosen as a starting place for a renewed exploration program in the area. Despite the appearance of flat lying strata (confirmed by the author in 2009 in drilling holes over 1 kilometre apart and finding the same, apparently flat lying strata), and Hooey (2018) reporting "foliation parallels bedding/ layering", Tucker (2011) comments from work on holes drilled by the author in his thesis, that "rocks are more deformed than they appear and that foliation is axial planar to large scale recumbent folds". Both the Tucker and Hooey thesis were supervised by Dr. Sandra Barr, with Dr. Chris White, preeminent and prolific authors concerning the interpretation of the complex geological history of the highlands. These authors have produced the latest mapping of the area with their 1:50,000 2017 Bedrock Geology Map of the Cheticamp River Area (Appendix V). This will be used to compare the results of the 21Alpha UAV magnetometer survey.

The highlands of Cape Breton are interpreted to be included in Aspy Terrane, known to extend from the highly productive mining areas of central Newfoundland, through Cape Breton, swinging north under

Figure 4: Modified Terrane Geophysics TMI Map of 21Alpha Claims Area 1

****SEE APPENDIX 1 - Omitted to reduce file size (<50mb) to submit on NovaROC****

PEI, then trending down through the (also) prolific areas of northern New Brunswick and into Maine. The area is understood to be derived from Gondwanan continents which include Ganderian Aspy and Bras D'Or Terrane (Hooey, 2017). Major intercontinental suture type contacts are assumed in the area, resulting in the complex geology that provides the genesis for the number of, and variety of, mineral deposits throughout the area.

Area 1 is predominantly underlain by units of the Cambrian Jumping Brook Metamorphic suite, bounded partly on the east by the Devonian Salmon Pool Granite and the Pre-Cambrian to Cambrian Cheticamp Pluton to the west. The latter has been found to be multi-phased and having both fault and intrusive contacts with the enclosing rocks. The JBMS is comprised of greenschist facies meta-volcanic and meta-sedimentary units, host to the majority of the mineral showings on the property. It is comprised of the metavolcanic Faribault Brook Formation overlain by the mainly metasedimentary Dauphinee Brook Formation (Vibert et al, 2018) and hosts at least 15 known mineral showings of economic interest, including the Mountain Top copper mine, which includes a shaft and adit, but no significant production. Also occurring in the JBMS, but not on 21Alpha claims, is the Galena mine, which has a number of inclined adits, and quite a bit of old mining equipment strewn about, but also no significant production. Many of the other occurrences have adits, shafts and trenches, many largely filled in, as they were put in place over 100 years ago.

E.R. Faribault describes gold values up to 4 ounces per ton (approximately 130 g/t) in a thick quartz-sericite schist unit near the Mountain Top mine. More recently the author recorded significant values of copper and gold values over 10 g/t at nearby Grandin Cliffs, and 21Alpha recorded high values of lead and zinc as well as over 13 g/t gold at the Core Shack showing. Mineralization is both syn-genetic VMS and epithermal arsenopyrite-quartz-carbonate vein type. Given the preponderance of, and spacial distribution of, the occurrences, and considering the favourable rock types, there is a strong incentive for further exploration on the claims of this area.

Starting in the northeast corner of the survey (see Figure 4), the strongest magnetic response is clearly responding to the Salmon Pool granite (see Geology Map, Appendix V), which Barr and White indicate continues north of the survey and into the National Park. The magnetic response decreases to the north (on its western margin) so that the response is quite weak in the area of the Silvercliff occurrence. Barr and White indicate this showing occurs in a narrow, 1 kilometre long exposure of the Faribault Brook Formation, so the granite terminates at that point or plunges beneath the area. The most likely explanation for the strong magnetic response in the granite is the presence of magnetite.

The Silvercliff occurrence is widely known not so much for the mineralization there, but perhaps more for the use of the (in)famous "splash dozer" employed by prospector John Scotynski on the property. This consisted of a large barrel or drum mounted on an axel that when filled with water tipped and caused a sudden, strong flow of water down the hillside, thereby washing away the overburden. The water was piped in from upstream to the barrel. The area in which this device was employed is now devoid of soil and provides an excellent outcrop on which to observe the geology. As the operation was less than environmentally friendly, it was halted by the authorities of the time. The piping is still in evidence at the site.

At this site there can be observed what the author considers the best example of VMS associated alteration mineralogy observed in this Province, that being a chlorite-garnet schist which plunges into the hillside, toward the general area of the Core Shack occurrence (and a host of other occurrences) some 1100 metres to the west. In between the Silvercliff occurrence and the Core Shack occurrence, Barr and White show another member of the JBMS Formation, the Dauphinee (Daphine) Brook Formation. Mineralization at several locations on this property is considered structurally controlled by a north-south fault.

The Core Shack occurrence is described by F. Scott (Highland Range Minerals, 1995) as "thin bedded quartzose sediments and tuffs immediately above a massive andesite contact". Scott describes a domal structure along an anticline in the area of the occurrence, with the axis roughly north-south with a 20^0 Dipping east limb and 40^0 dipping west limb. A number of diamond drill holes in the Core Shack area have

Figure 5: Modified Terrane Geophysics TMI Map of 21Alpha Claims Area 2

****SEE APPENDIX 3 - Omitted to reduce file size (<50mb) to submit on NovaROC****

outlined a continuous gold horizon beginning at that occurrence and continuing south for 700 metres. The mineralization is open at both ends, however a fault is reported just north of the Core Shack area, and it is not known how it affects the continuity of the mineralization.

The TMI map (Figure 4) of the magnetometer survey coverage of the area of these two occurrences shows a weak magnetic response. There is a weak trend immediately south of the Silvercliff area that extends to just short of the Core Shack area, and south. This is pertinent given the alteration described above. The feature is strongest on the 1VD, weaker on the other two versions.

One reason for the general lack of response may be due to the strength of the Salmon Pool granite anomaly, that leaves other responses very weak by comparison, since it is known that there is some pyrrhotite and pyrite associated with both of these occurrences. A slightly stronger (but still relatively weak) magnetic response occurs in the northernmost portion of the survey, just east of the Galena Mine and associated occurrences. A curious magnetic low occurs just south of this area, near the Y-31 As-Ag-Au occurrence (see Figures 3 and 4). In the northwest portion of the survey a large weakly anomalous response appears to strengthen slightly toward the northern claim boundary. Diamond Drill hole AMC-10 was drilled very close to this claim boundary with negligible results.

Another pair of curious magnetic lows occur just south of the above area. The eastern one is located southeast of the Lower Grandin Brook (Cu-Pb-Zn) occurrence, while the western one is located between the Iron Cap (As-Au-Cu-Ni-Pb-Zn) showing and one of the Triangle occurrences (Cu-Pb-Zn-Ag-Au) to the southeast. One of the Triangle occurrence shafts are located in the centre of this low. The results of this magnetometer survey will be helpful in further exploration in the areas of these occurrences. A localized magnetic high occurs just east of the above occurrences, in an area of no known mineralization.

Just southwest of the southwestern low, and extending west and south from there is the largest and most significant response away from the Salmon Pool response. It is strongest at the Road 1 arsenic occurrence, which the author drilled in 2009 with anomalous values in gold and nickel in mafic flows. The narrow band of massive arsenopyrite was sampled at the same time with just anomalous values. West from there, the response is slightly weaker (best viewed on the 1VD map), but covers a number of the Triangle (Cu-Pb-Zn-Ag-Au) occurrences as well as the Mountain Top “mine”. The latter is of particular interest as it is described as quartz-sericite and quartz-chlorite which Faribault reports assaying 4 oz/ton and Henderson in 1903 reported two samples of white talcose schist testing over 4 oz/ton and over 1% copper.

Just west of the Iron Cap, and visible only on the 1VD version, there is a weak to moderate, 800 metre long, east northeast magnetic trend. As it only occurs on this map, this is likely an indication of shallow mineralization.

The magnetic trend narrows to the southwest but appears to get stronger in the far southwestern corner of the survey. There are at least 10 diamond drill holes in that direction, one of which was a deepening (by the author for Globex Mining) of an older hole. Interesting meta-volcanic and meta-sedimentary sequences were encountered in this area, along with significant sulphide mineralization, but mostly sub-economic.

A weak magnetic area may be developing in the south-central portion of the survey, just to the west of the Road 2 occurrences, but additional coverage would have to be flown to make any assertions regarding any mineral potential at this location.

Area 2

The rocks of Area 2 are predominantly JBMS including metavolcanics of the Faribault Brook Formation and touching on the Devonian Fisset Brook Formation on the west side with a band of Barren Brook Formation extending into the central region from the northwest. This area is less endowed with mineral occurrences than Area 1, however this may be due to limited exposure and difficult and limited access.

From the western side of the magnetic survey, the Neo-Proterozoic Cheticamp Pluton (granite) has a strong magnetic signature and is in contact with the Late-Devonian Fisset Brook Formation which occurs along the western margins of the claims of Area 2. This formation consists of tholeiitic basalt, rhyolite,

fluvial alluvial sandstone and conglomerate, and it shows up strongly in all three magnetometer versions. The survey results coincide well with the geological boundaries provided in the mapping of Barr and White. There may be some uncertainty in the interpretation of the magnetometer results as there is known to be magnetite bearing andesitic rocks in this area, which would also show a strong magnetic response.

The only mineral occurrence depicted in the Fisset Brook Formation on the Provinces geoscience map is the Turner Brook Cu-Fe-Pb-Zn showing, located approximately 2 kilometres southwest of the survey, however a number of drill holes were put down on EM anomalies in the 1960's by Sullico Mines. Drilling encountered low values of copper in quartz-sericite schist, with some mafic and quartz porphyritic units as well. Elsewhere in the Cheticamp Highlands there has been noted, by several authors, an apparent association existing between copper and gold, particularly in quartz-sericite schists (such as at Mountain Top), but in altered mafic rocks as well. It should be pointed out that little assaying was done in the above-mentioned holes, and almost none for gold. Most of the drilling is on EL 52125, which is largely enclosed by 21Alpha staking, and the geological trend is on to 21Alpha claims.

The presence of quartz-sericite schist in this area may be more likely part of the JBMS (perhaps the Barren Brook Formation), rather than the Fisset Brook Formation, where no quartz-sericite schist is noted. Barr and White mapping shows a lobe of the Barren Brook Formation occurring just on the eastern edge of the drilling, and extending to the Fisset Brook occurrence. The rocks of both these areas seem similar in the literature.

The Fisset Brook occurrence is the main one located on the claims of Area 2, and has low grades of sphalerite and chalcopyrite with spotty (weak) gold in a pyrite and arsenopyrite bearing quartz-sericite schist. Mineralization is inconsistent along strike, as shown in the seven holes drilled along the strike of the showing. In the area of the Fisset Brook occurrence, the brook is the western border of the Jim Campbells Barrens PA. Barr and White mapping shows this area as at the Barren Brook Formation and Faribault Brook Formation contact, within the JBMS.

The magnetic response from the UAV survey over this occurrence was non-existent in the RTP version, weak in the TMI version, but stronger in the 1VD version, indicating a likelihood of shallow mineralization, as that method detects more effectively any near surface magnetic susceptibility.

Extending south from the Fisset Brook occurrence, then south-southeast for the rest of the coverage, there is weak to moderate magnetic response on the 1VD version, showing a number of trends, some cutting across the regional geologic trend. The trend gets gradually stronger to the south, and the Barren Brook Formation (as interpreted by Barr and White) is responsible for this trend for approximately half its length, the remainder (the central third of the trend) is interpreted as being within the Faribault Brook Formation, before passing again into the Barren Brook Formation just northwest of the Upper Rocky Brook occurrence. This occurrence also occurs in mixed altered mafic and felsic rocks containing (from limited drilling) low grades of Cu-Pb-Zn and gold values up to 7.8 g/t., and government geologists recorded grab samples of over 10 g/t Au. The occurrence is outside of the boundaries of 21Alpha claims, but the trend continues on to 21Alpha claims in both directions.

The Fisset Brook Formation magnetic response is the strongest feature in all three versions of the survey. It is flanked throughout its length on the east by the lowest magnetic values in the survey. The 1VD version shows quite a complex magnetic pattern throughout the Fisset Brook Formation coverage, with smaller trends generally paralleling the overall trend, but some magnetic lows within the Formation occur at other angles and may represent faults or dykes. Presumably the magnetic andesites would follow the regional geologic trend.

The contact between the Fisset Brook Formation and the JBMS presents exploration potential, as the WGM (1996) report of the area states "a deformation zone is known to lie along this contact in some places (Tract 15) and is characterized by arsenopyrite enriched quartz-sericite schist". This area is immediately south of the present survey.

The most interesting area of the Area 2 magnetic survey is the wide anomalous trend extending southwest from the Fisset Brook occurrence for 4 kilometres, past (and probably encompassing) the Upper Rocky Brook mineralization. The 1VD version shows the most definition, with several strong, narrow linear

trends. The most noteworthy occurs in the shape of an angular “S” starting at the far southwest corner of the survey, continuing north and turning 90^{o} twice before terminating near the central eastern area of the survey. The southern 60% of this trend appears to closely follow the geology, but then apparently cuts across it to the north and east. In addition, several “C” shaped features occur. This entire package of features could be the result of a number of different processes, including faulting, dykes and sills, but it may simply be the result of an interference pattern due to two differing folding events.

The TMI and RTP versions show the same features, though much weaker, with the main feature in these versions being a northeast elongated trend just northeast of the Upper Rocky Brook occurrence. Both these versions have increasing magnetic response to the southeast, increasing with distance from the Fisset Brook Occurrence, though the 1VD version shows a fairly strong response immediately south of this area.

In the far southwest portion of the survey, the Fisset Brook Formation is again covered by the survey, showing a strong magnetic response, and coinciding well with the Barr and White mapping.

Conclusions and Recommendations

The UAV magnetometer survey has identified a significant anomalies in both Areas 1 and 2. Concerning Area 1, the anomalous trend between the Silvercliff and Core Shack occurrences is intriguing and requires more work considering the strong alteration at the former and the gold and base metal mineralization at the latter. Anomalous magnetic results also occur in the Grandin Cliffs, Triangle and Mountain Top areas, some of which are somewhat stronger away from the known occurrences. Ground checking and further sampling is recommended in these areas.

The Area 2 survey also resulted in some interesting trends, particularly in the central-eastern region of the claims, northwest of the Upper Rocky Brook occurrence. As it is expected there will be minimal outcrop exposure in the area, and considering that EM and soil surveys have produced mixed to poor results in the area, a Mobile Metal Ion (MMI) test survey is recommended, followed by a larger survey should initial results prove encouraging.

MMI testing along the Fisset Brook/ JBMS contact is recommended as well.

If sufficient budget were available, a number of drill targets are ready to go in both areas.

Bibliography

Covey, G., Report on the Cheticamp Project, AMAX Minerals Exploration Limited, 1980

Johnson, G.; Report on the Cranton Option, Geochemistry, Geophysics and Drilling, Sullico Mines Limited, 1969.

MacKinnon, R.P.; Cheticamp Highlands Drilling Program, 2008; Globex Mining Enterprises Inc., AR 2008-234

MacKinnon, R.P.; EL 52125, Cheticamp Highlands Area,Exploration History and Compilation

Vibert, B., Barr, S.M., White, C.E; Nova Scotia Department of Energy and Mines, Report ME 2018-001

Watts, Griffis and McOuat; Report of Work on the Jumping Brook Project, Inverness County, Cheticamp Area for Regal Goldfields Limited and Northland Resources Inc., AR 96-095

Watts, Griffis and McOuat; Report of Work, 1998 Diamond Drilling Program, Licences 03472 and 034, Inverness County

Woods, G.; Assessment Report on the Faribault Brook Property, Selco-BP Resources Canada, 1986.

Authors Page

I, Perry MacKinnon, do hereby certify that:

I am a self employed consulting geologist.

My mailing address is:
43244 Cabot Trail
Skir Dhu, NS
B0C1H0
I am a graduate of Acadia University, NS
BSc Geology, 1982

Since graduation I have been employed for one year as a mine geologist, four years as a full time surface exploration geologist, a period of time as a part time consultant geologist, and more recently and presently, a full time consultant geologist.

I have acquired P.Geo. status in the Province of Nova Scotia in 2009 and New Brunswick in 2011.

The information contained in this report is based on my research, interpretations and data provided by Terrane Geoscience Inc.

Dated: October 15, 2019
Skir Dhu, NS

Perry MacKinnon, P.Geo

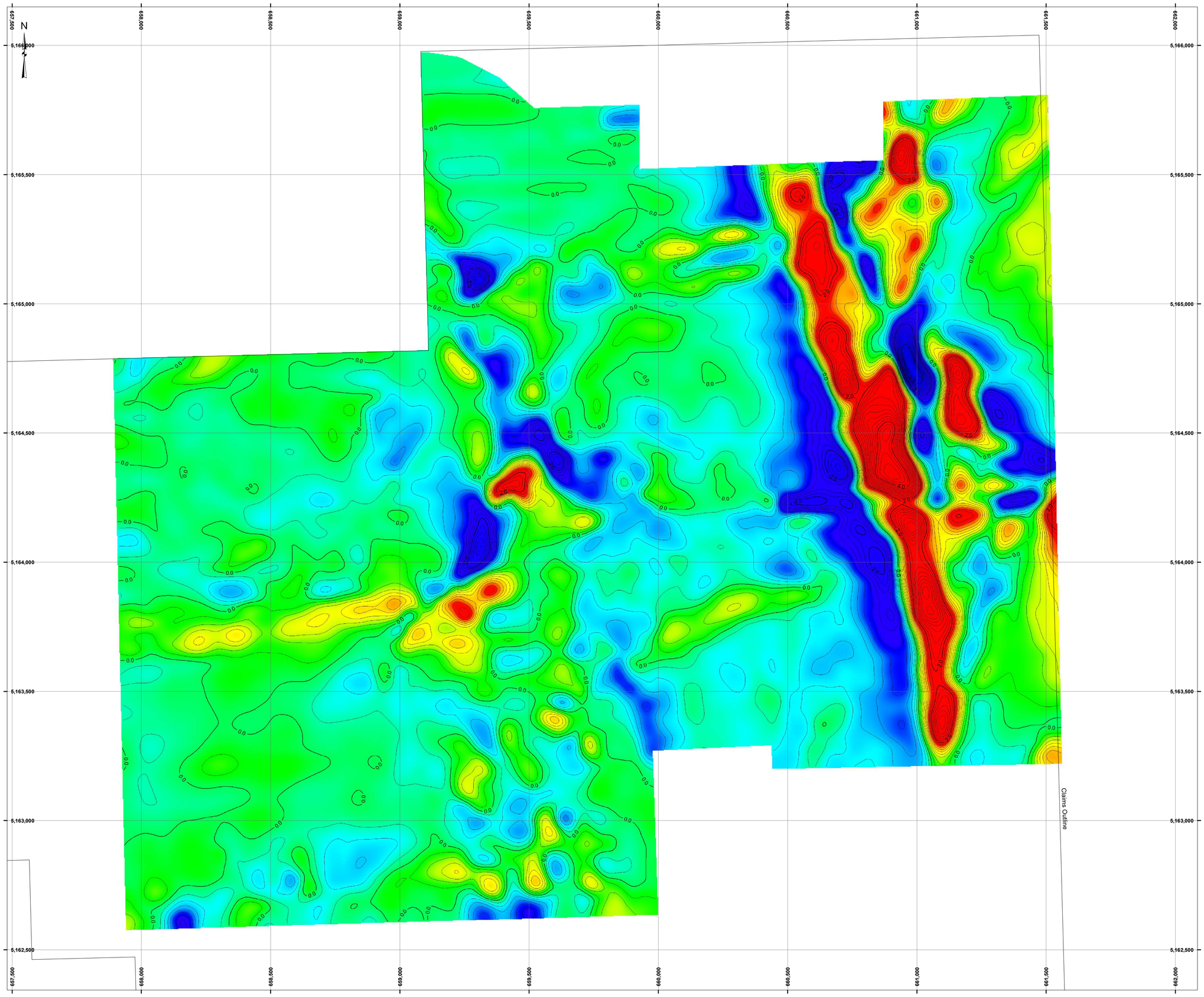
APPENDIX I

Airborne Magnetometer Survey

Terrane Geoscience

AREA 1

MAPS 1VD, TMI and RTP Versions



21ALPHA RESOURCES INC.

CHETICAMP PROPERTY
CAPE BRETON, NOVA SCOTIA

First Vertical Derivative (1VD)
of Reduced-to-Pole (RTP)

Total Magnetic Intensity
UAV Aeromagnetics Acquisition by
MWH GeoSurveys and Terrane Geoscience

LEGEND:

nanoTesla / meter
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0

Scale: 1:7,000

0 150 300 600 Meters

Projection: WGS 84 / UTM Zone 20N	Date: August 11, 2019
Drawn By: ACH	Checked By: KM

Acquired By:

MWH Geo-Surveys Ltd.
3104 - 30th Avenue, Suite 388
Vernon, British Columbia
Canada V1T 2C2

TERRANE GEOSCIENCE INC.
100 - 5435 Portland Place
Halifax, N.S., B3K 2Z8
terranegeoscience.com

Data Source Information:

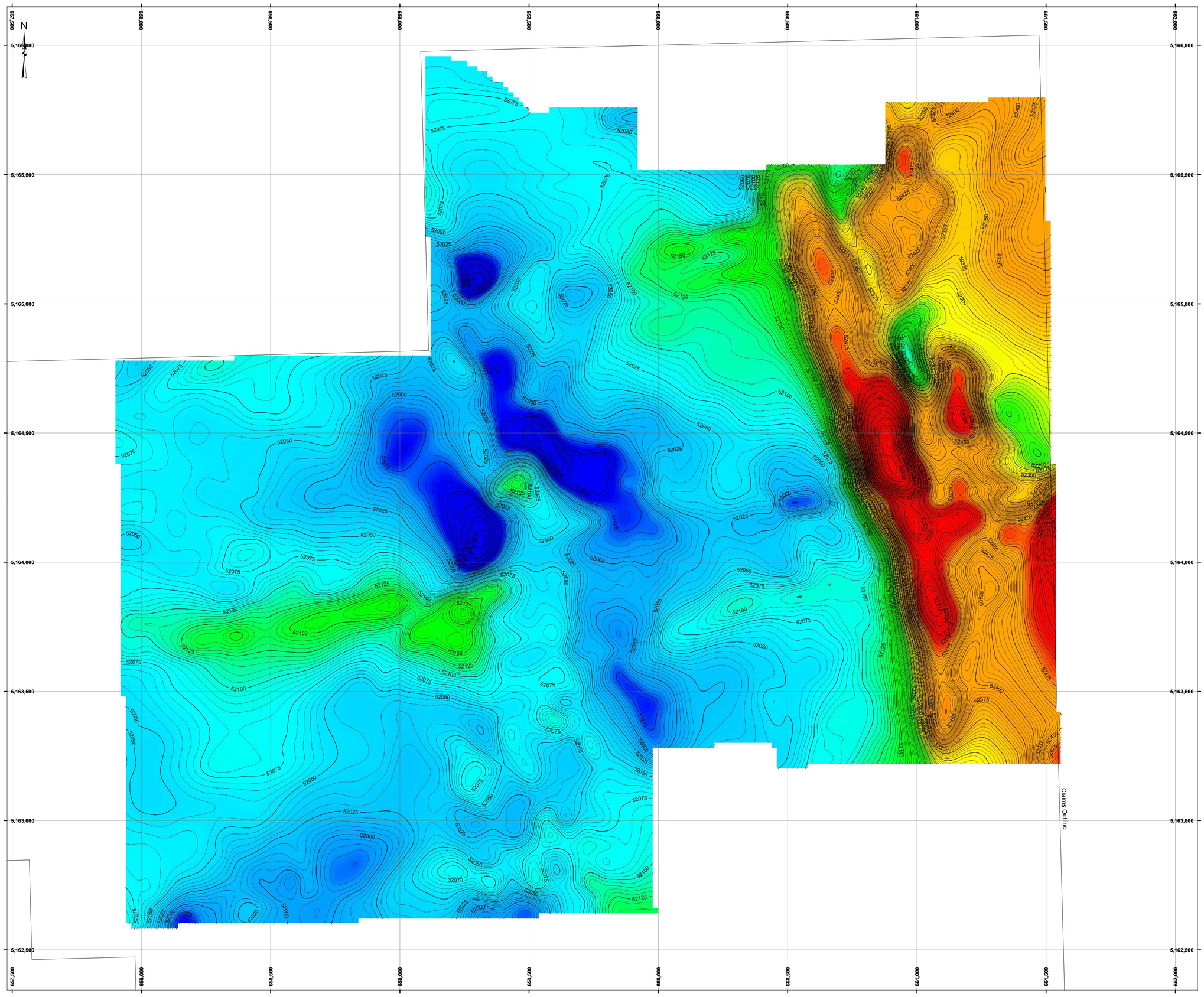
- Data acquisition during period July 7-14, 2019
- Flown ~47 m above ground level
- Line direction East-West at 50 m spacings

Processing Information:

- C.I.= 0.2 nT/m
- Grid increment = 20 m
- The RTP was applied then 52180 nT were added

Processed By:

Integrated Geophysics Corporation
50 Briar Hollow Ln, Suite 400W
Housten, Texas 77027
terranegeoscience.com
www.igcworld.com



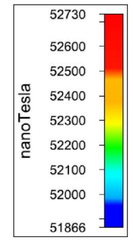
21ALPHA RESOURCES INC.

CHETICAMP PROPERTY
CAPE BRETON, NOVA SCOTIA

Reduced-to-Pole (RTP)

Total Magnetic Intensity
UAV Aeromagnetics Acquisition by
MWH GeoSurveys and Terrane Geoscience

LEGEND:



Scale: 1:7,000

0 150 300 600 Meters

Projection: WGS 84 / UTM Zone 20N | Date: August 11, 2019

Drawn By: ACH | Checked By: KM

Acquired By:

MWH Geo-Surveys Ltd.
3104 - 30th Avenue, Suite 388
Vernon, British Columbia
Canada V1T 2C2

TERRANE GEOSCIENCE INC.
100 - 5435 Portland Place
Halifax, N.S., B3K 2Z8
terranegeoscience.com

Data Source Information:

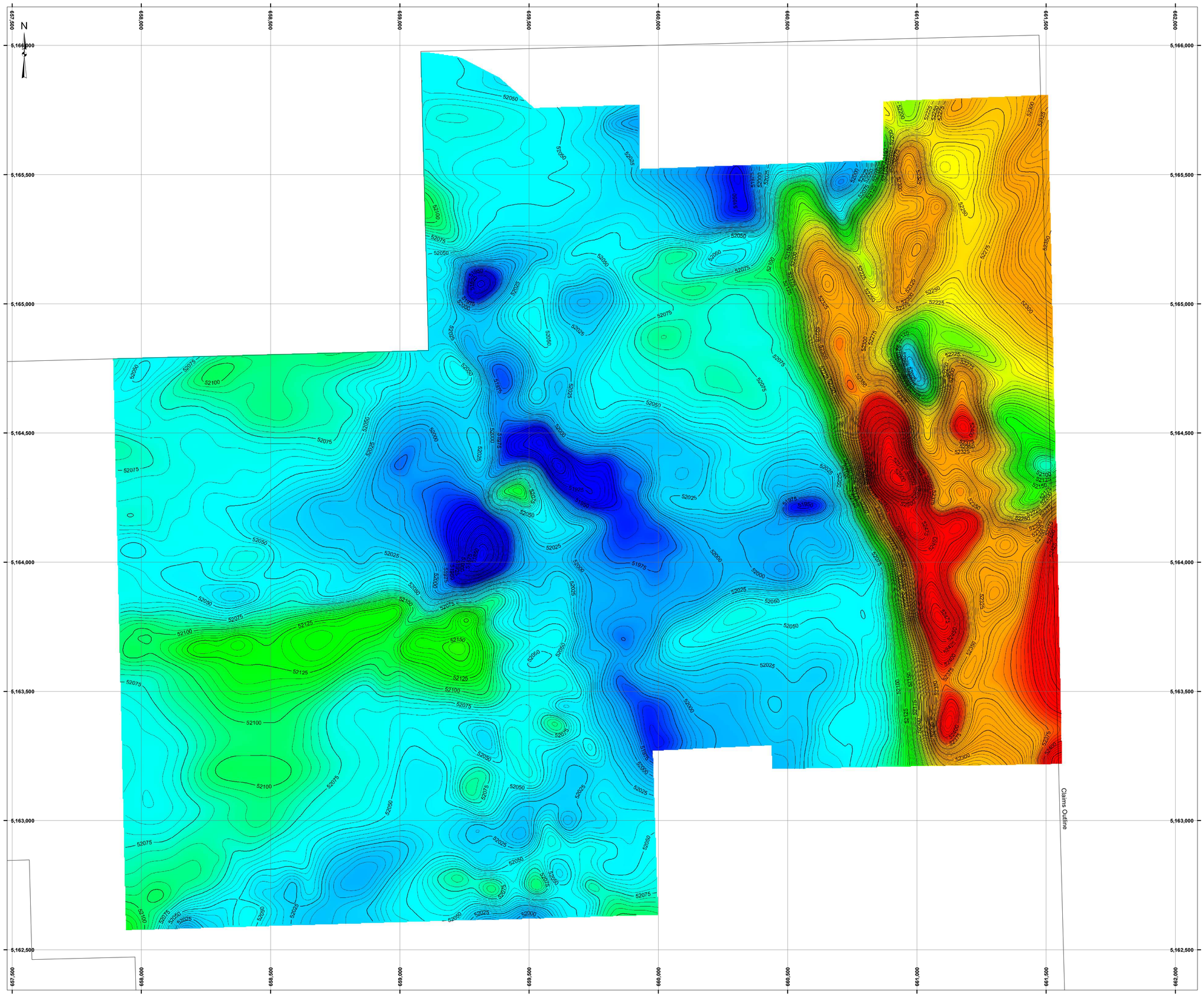
- Data acquisition during period July 7-14, 2019
- Flown ~47 m above ground level
- Line direction East-West at 50 m spacings

Processing Information:

- C.I.= 5 nT
- Grid increment = 20 m
- The RTP was applied then 52180 nT were added

Processed By:

Integrated Geophysics Corporation
50 Briar Hollow Ln, Suite 400W
Housten, Texas 77027
terranegeoscience.com
www.igcworld.com



21ALPHA RESOURCES INC.

CHETICAMP PROPERTY
CAPE BRETON, NOVA SCOTIA

Total Magnetic Intensity

UAV Aeromagnetics Acquisition by MWH GeoSurveys and Terrane Geoscience

LEGEND:

nanoTesla
52609
52500
52400
52300
52200
52100
52000
51900
51838

Scale: 1:7,000

0 150 300 600 Meters

Projection: WGS 84 / UTM Zone 20N | Date: August 11, 2019

Drawn By: ACH | Checked By: KM

Acquired By:

MWH Geo-Surveys Ltd.
3104 - 30th Avenue, Suite 388
Vernon, British Columbia
Canada V1T 2C2

TERRANE GEOSCIENCE INC.
100 - 5435 Portland Place
Halifax, N.S., B3K 2Z8
terranegeoscience.com

Data Source Information:
- Data acquisition during period July 7-14, 2019
- Flown ~47 m above ground level
- Line direction East-West at 50 m spacings

Processing Information:
- C.I.= 5 nT
- Grid increment = 20 m
- The RTP was applied then 51875 nT were added

Processed By:

Integrated Geophysics Corporation
50 Briar Hollow Ln, Suite 400W
Housten, Texas 77027
terranegeoscience.com
www.igcworld.com

APPENDIX II

Terrane Geoscience

2019 UAV Survey

AREA 1

Full Report

MWH Geo-Surveys Ltd.
3104 - 30th Avenue, Suite 388
Vernon, BC, V1T 2C2
info@mwhgeo.com

TERRANE GEOSCIENCE INC.
100-5435 Portland Place
Halifax, NS, B3K Z8
terranegeoscience.com

August 16, 2019

Mr. John Shurko
21Alpha Resources Inc.
RR#1 Chester
Chester, Nova Scotia
B0J 1J0

Dear Mr. Shurko,

RE: UAV Magnetic Processing Report for the Cheticamp Property, Cape Breton, Nova Scotia

1.0 INTRODUCTION

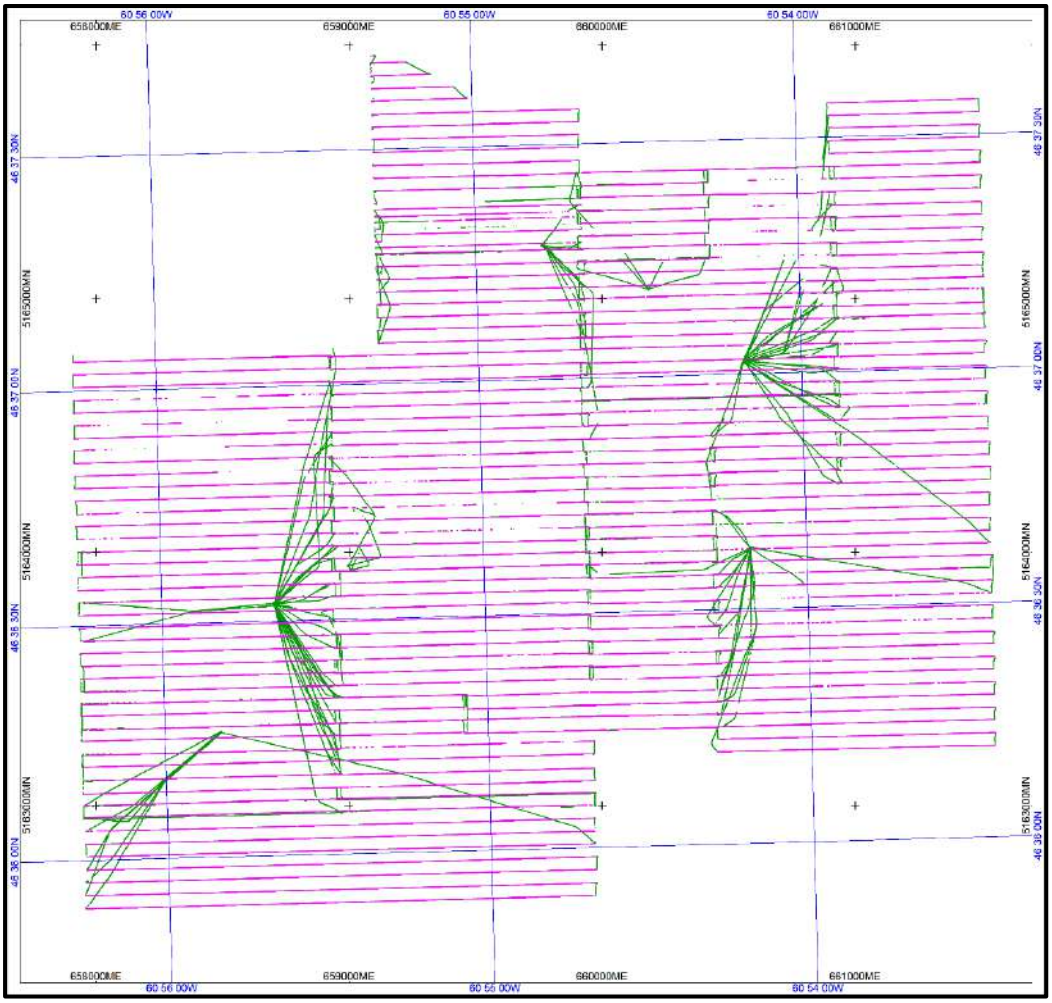
At the request of 21Alpha Resources Inc. (21Alpha), MWH Geo-Surveys Ltd. (MWH) and Terrane Geoscience Inc. (Terrane) conducted an un-manned aerial vehicle (UAV) aeromagnetic survey over their Cheticamp Property, located approximately seven kilometres (km) east of Cheticamp, Cape Breton, Nova Scotia. Elevations on the property range from approximately 90-460 meters (m) above Mean Sea Level (MSL). The survey was completed during July 7-14, 2019 over an area of approximately 9.2 square-kilometres (km^2). Flight lines were flown on east-west bearings, a line spacing of approximately 50 m, and an elevation of approximately 47 m Above Ground Level (AGL). A total of 260 line-kilometres of UAV aeromagnetic surveying was completed over the property.

Acquired UAV aeromagnetic data was then sent to Integrated Geophysics Corporation (IGC) for processing. Processing results were used to map the Total Magnetic Intensity (TMI) field and calculate the Reduced to Pole (RTP) TMI and First Vertical Derivative (1VD). Data points used for the final mapping and calculations are displayed below in Figure 1 (magenta-coloured points). These points have also been delivered as an ASCII comma separated value (csv) formatted file. Green points were removed from the acquired dataset and not included for final mapping.

MWH Geo-Surveys Ltd.
3104 - 30th Avenue, Suite 388
Vernon, BC, V1T 2C2
info@mwhgeo.com

TERRANE GEOSCIENCE INC.
100-5435 Portland Place
Halifax, NS, B3K Z8
terranegeoscience.com

Figure 1 - Aeromagnetic data acquisition for the Cheticamp Property (magenta points – final dataset; green points - removed from the final dataset).



2.0 PROCESSING

Data Editing

Prior to processing, surveyed data points were edited to identify and retain points collected along flight lines (at bearing of east or west) and to remove points captured during one of the following instances:

1) "Transit" lines connecting the ends of flight lines with takeoff and landing locations.

2) "Loops" connecting ends of adjacent flight lines.

3) "Hovers" occurring at takeoff and landing where there is little or no lateral travel.

4) "Re-flights" where a line is re-flown and a duplication is acquired, only one flight may be selected.

5) "Spikes" where a single reading is anomalously much greater or lower than adjacent points. A point was rejected if its value was 5 nT greater or less than the average value of its four adjacent points; that is, the two points recorded approximately 0.2 seconds (1.4 m) before and after it.

International Geomagnetic Reference Field (IGRF) Correction

The IGRF is a mathematical representation of the smooth variation of the earth's magnetic field. The UAV aeromagnetic acquisition records a magnetic value which is the sum of the IGRF and the magnetic anomalies caused by the local geology. Therefore, to isolate the anomalies, the IGRF must be calculated for each acquired data point and subtracted from it. The value of the IGRF for a point depends on the time and location of acquisition: date, time of day, latitude, longitude and elevation (above sea level).

Using the Geomagnetic Field Calculator from the National Oceanic and Atmospheric Administration (NOAA), the method used calculates a grid of the IGRF at the start of the survey then applies the change of the IGRF through the time of the acquisition of each subsequent data point. This value of the IGRF for the particular point is then subtracted from the Diurnally Corrected Magnetic Value producing the IGRF correction, sometimes called the IGRF anomaly. The final TMI was calculated by then adding a constant to the IGRF correction of 51,875 nanoTesla (nT), the average value of the IGRF for the entire survey.

3.0 MAPPING

Total Magnetic Intensity (TMI)

The final TMI values were gridded at 20 m intervals. The resultant data was high quality and therefore contoured at 5 nT increments.

Reduction-to-Pole (RTP)

The TMI grid was then used to calculate the RTP grid using an Inclination=67.88° and Declination=-17.99°. Once the RTP was applied, then 52,180 nT were added; this value is the approximate average difference between the TMI and calculated RTP grids. Contouring was conducted in increments of 5 nT (same as TMI map).

The RTP data enhancement map results from a mathematical operator which corrects for position offset of the skewing of the magnetic anomaly due to the earth's magnetic inclination and declination. The reduction-to-pole mathematically transforms the total magnetic intensity (TMI) field at its observed inclination (I) and declination (D) to that of the north magnetic pole (i.e., I=90°, D=0°); thereby centering the magnetic anomaly directly over the causative body. This processing step facilitates the cross-correlation of the magnetic data with other geophysical and geological data in the interpretation process. For example, the anomaly signature for a body located in an area of high (steep) magnetic inclination such as Nova Scotia (I ≈ 68°N) is illustrated below in Figure 2.

The RTP operator is applied to the TMI grid to adjust the steeply dipping inclination effect to the vertical 90° inclination angle of the magnetic north pole as illustrated in Figure 3.

First Vertical Derivative (1VD) of Reduction-to-Pole (RTP)

The 1VD data enhancement map results from a mathematical operator which calculates the rate of change in magnetic intensity in the vertical direction ($\partial M / \partial z$). This process produces a residual map where longer wavelength anomalies have been removed, thus extenuating short wavelength anomalies. These short wavelength anomalies result from relatively shallow geologic structures and bodies. Additionally, the mapped zero contour can be indicative of vertical or near vertical geologic boundaries and contacts.

Figure 2 - Magnetic inclination affect due to a body located at 68° Inclination along a 0° azimuth south-north traverse.

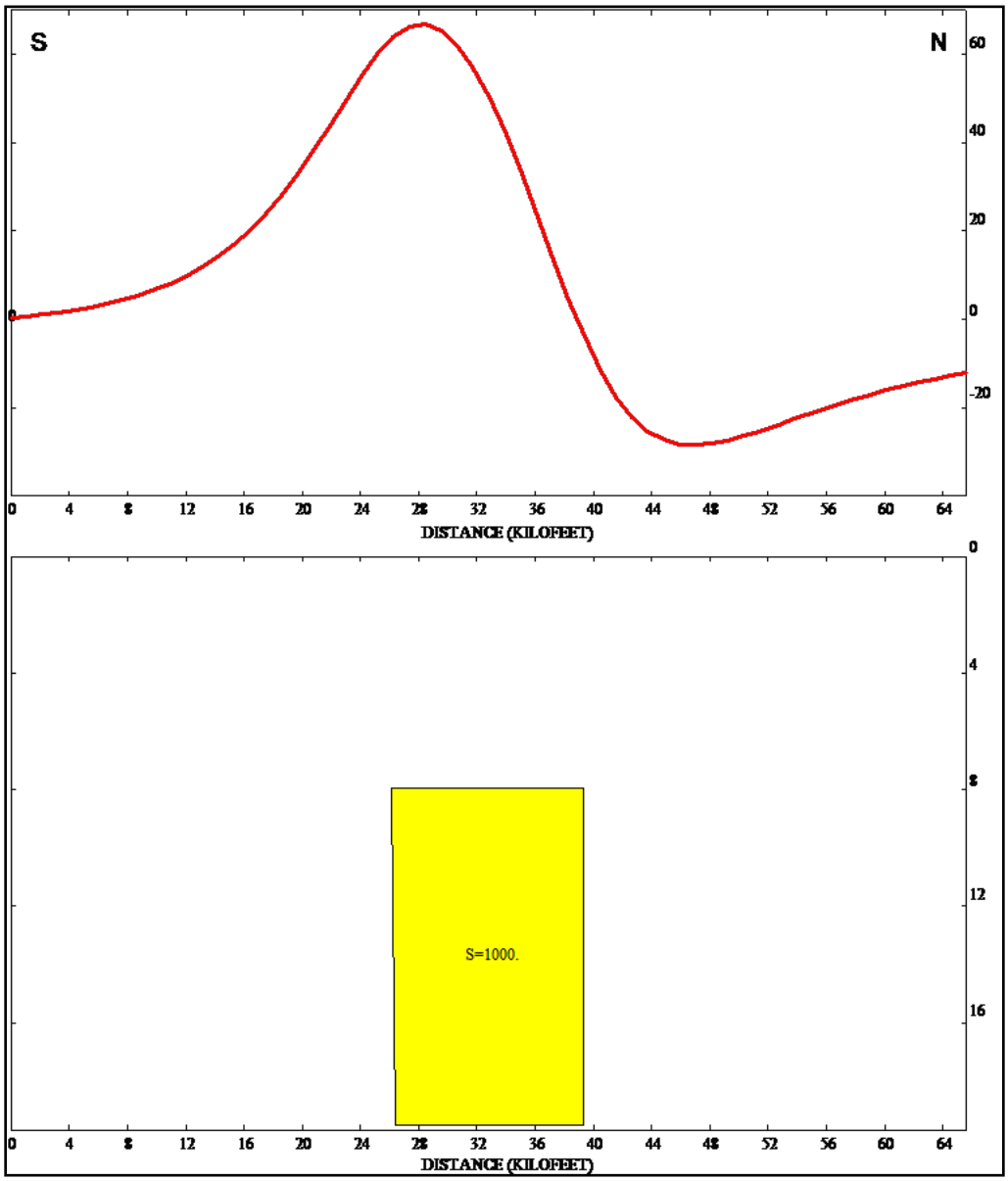
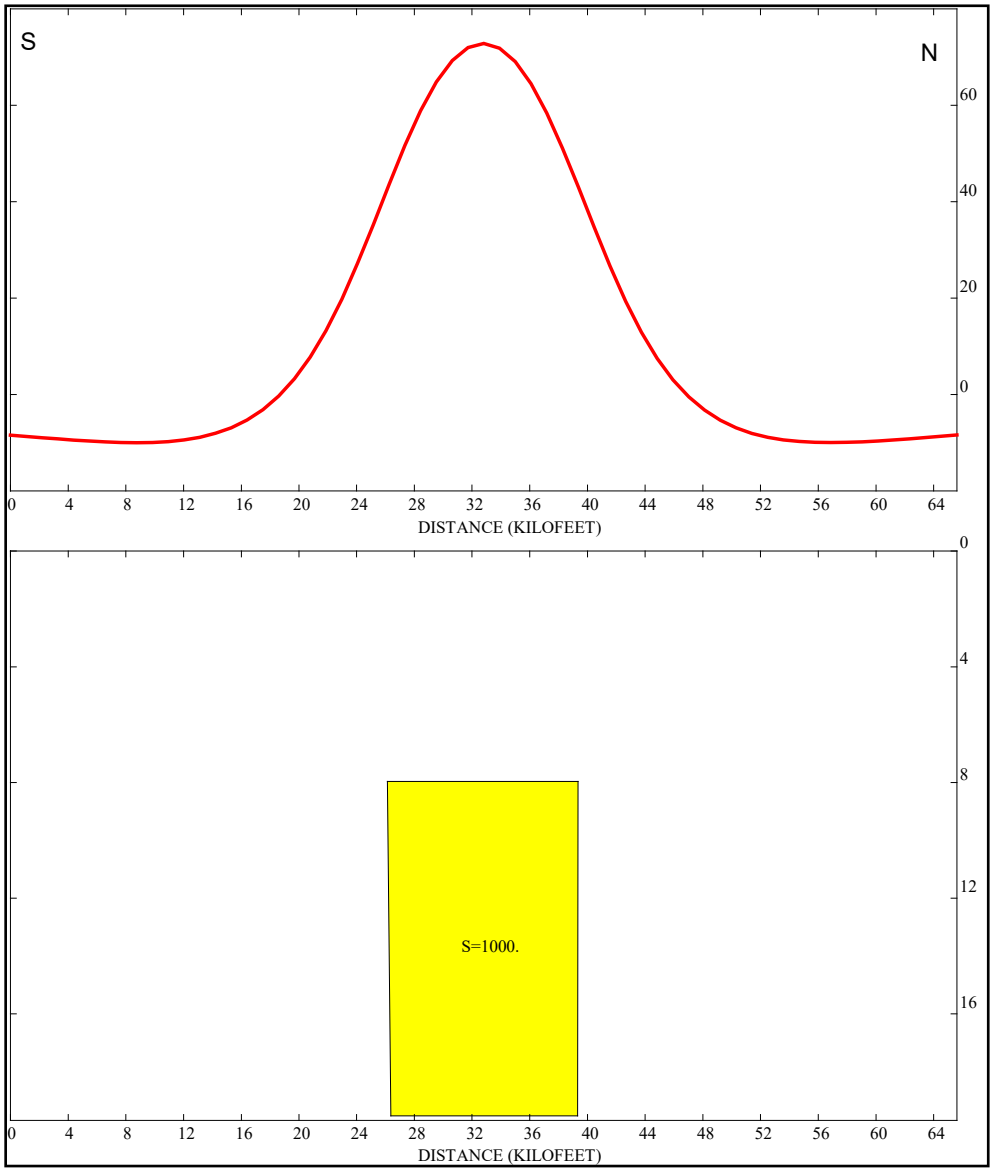


Figure 3 - Magnetic inclination effect due to a body located at magnetic north pole along a 0° azimuth south-north traverse.



Mapping Parameters

Grids for each of the three maps are provided in the following ASCII formats: (1) XYZ and (2) Row-Major (rmg). Full colour maps are also provided in Adobe PDF format. Mapping included the following parameters:

Scale: 1 : 7,000

Distance Units: meters

Projection: UTM zone 20N (EPSG 32611)

Datum: WGS84

Magnetic (z) Units: nanoTesla

Grid increment: 20 meters

Null value: 99999

Geotiff images are provided in GCP and Affine (with a tfw file formats).

4.0 DIGITAL DELIVERABLES

Maps:

- IGC_MWH_TGI_21Alpha_Cheticamp_UAV_Mag_RTP_1VD_20190808.pdf
- IGC_MWH_TGI_21Alpha_Cheticamp_UAV_Mag_RTP_20190808 pdf
- IGC_MWH_TGI_21Alpha_Cheticamp_UAV_Mag_TMI_20190808.pdf

Geotiffs:

- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_TMI_20190808_GCP.tif
- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_RTP_20190808_GCP.tif
- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_RTP_1VD_20190808_GCP.tif
- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_TMI_20190808_AFF.tif
- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_TMI_20190808_AFF.tfw
- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_RTP_20190808_AFF.tif
- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_RTP_20190808_AFF.tfw
- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_RTP_1VD_20190808_AFF.tif
- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_RTP_1VD_20190808-AFF.tfw

Grids:

- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_TMI_20190808_rmg.asc
- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_TMI_20190808_xyz.asc
- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_RTP_20190808_rmg.asc
- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_RTP_20190808_xyz.asc
- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_RTP_1VD_20190808_rmg.asc
  IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_RTP_1VD_20190808_xyz.asc

Data:

- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_20190808_csv.zip
- IGC_MWH_21Alpha_CapeBreton_NS_NorthBlock_UAV_mag_delivery_comments_20190808.txt

Other Important Notes:

1) Re - The ASCII comma separated value (csv) formatted file of the edited data:

- The line numbers begin with 186 then progress from south to north based on an approximate distance value. This data file is sorted by line number then by Easting (west to east for each line).

- File header records define the following:
  - Projection - UTM zone 20N (EPSG 32611)
  - Datum - WGS84
  - Magnetic Field Units – nanotesla
  - Distance Units – meters
  - Geographic Units - degrees north and east
  - Date Units - day-month-year
  - Time Units - hour, minute, second hhmmss_s

- Date and Time are GMT

- The final TMI was calculated by subtracting the IGRF value from the diurnal corrected mag then adding a constant of 51,875 nT (the approximate average IGRF value for the survey).

- The first three records of the csv portion of the file are:

  - LineID#, Easting, Northing, Latitude, Longitude, Date hhmmss.s, UAV #, GPS ASL, Elev AGL, Raw Magnetics, Diurnal correction, Diurnally Corrected Magnetics, IGRF value, IGRF correction, Final IGRF & Diurnally Corrected Mag

  - 186,657960.2,5162591.6,46.598295,-60.937657,8221050.3,14-Jul-19,221050.3,1,43.45,425,52068.296,48.72,52117.016,51873.5651,243.4509,52118.4509

  - 186,657960.7,5162591.6,46.598294,-60.93765,8221050.2,14-Jul-19,221050.2,1,43.43,425,52068.1176,48.72,52116.8376,51873.5636,243.274,52118.274

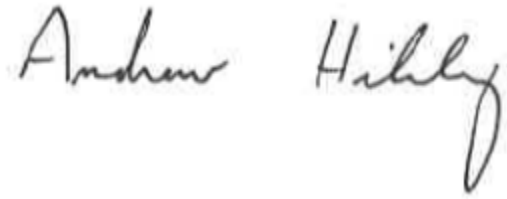
5.0 CLOSURE

We hope that this report meets with your expectations and needs. Please contact us with any questions, comments or concerns. We thank you for the opportunity to participate in this project and look forward to working with 21Alpha in the future.

Yours sincerely,

MWH Geo-Surveys Ltd.

Kevin McNabb, P.Geo



Terrane Geoscience Inc.

Andrew Hilchey, P.Geo

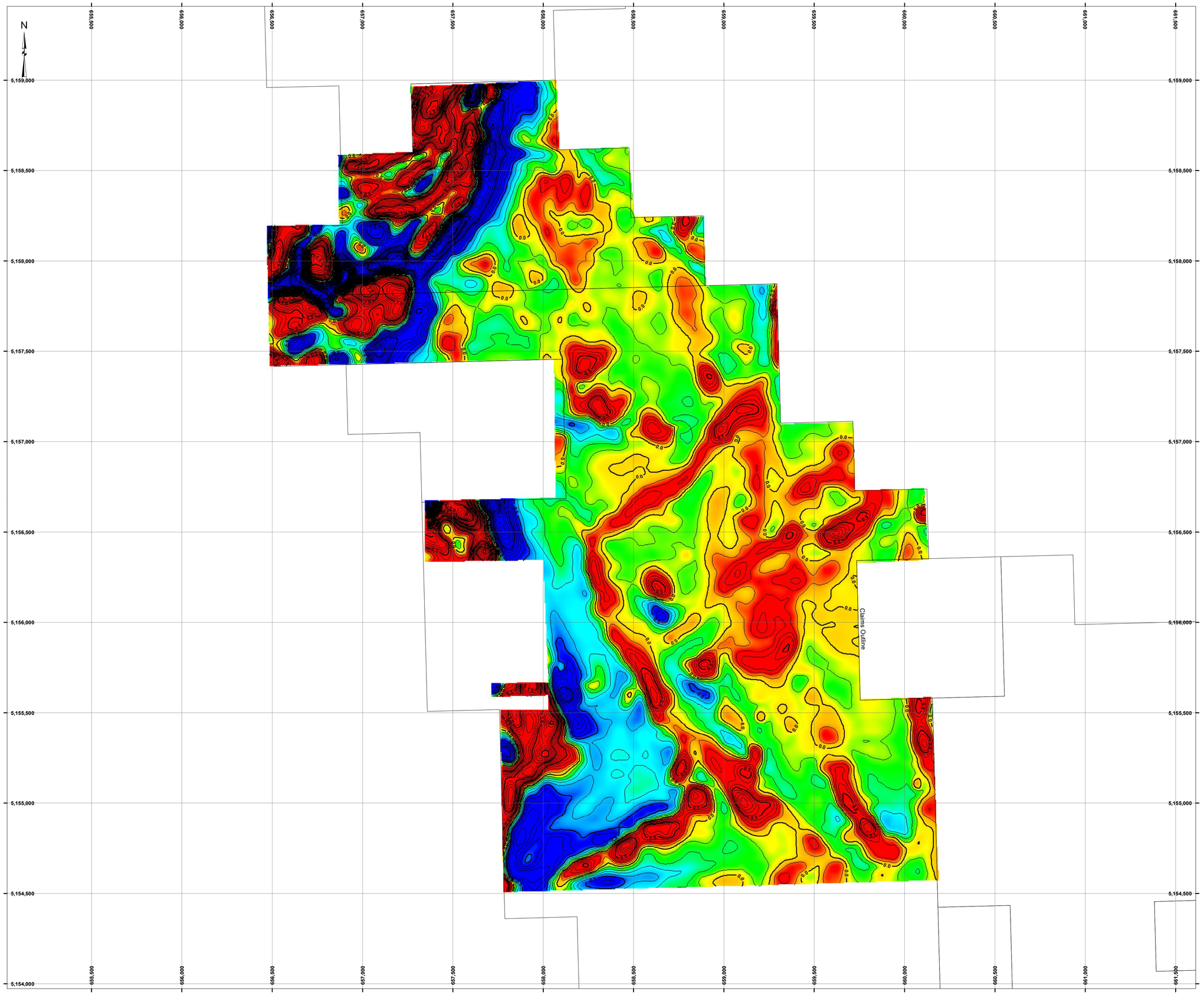
APPENDIX III

Terrane Geoscience

AREA 2

1VD, TMI and RTP MAPS

Airborne Magnetometer Survey



21ALPHA RESOURCES INC.

FISSET BROOK PROPERTY
CAPE BRETON, NOVA SCOTIA

First Vertical Derivative (1VD)
of Reduced-to-Pole (RTP)

Total Magnetic Intensity
UAV Aeromagnetics Acquisition by
MWH GeoSurveys and Terrane Geoscience

LEGEND:

nT/m
3.1
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.5

Scale: 1:10,000
0 125 250 500
Meters

Projection: WGS 84 / UTM Zone 20N	Date: September 24, 2019
Drawn By: ACH	Checked By: KM

Acquired By:

MWH Geo-Surveys Ltd.
3104 - 30th Avenue, Suite 388
Vernon, British Columbia
Canada V1T 2C2

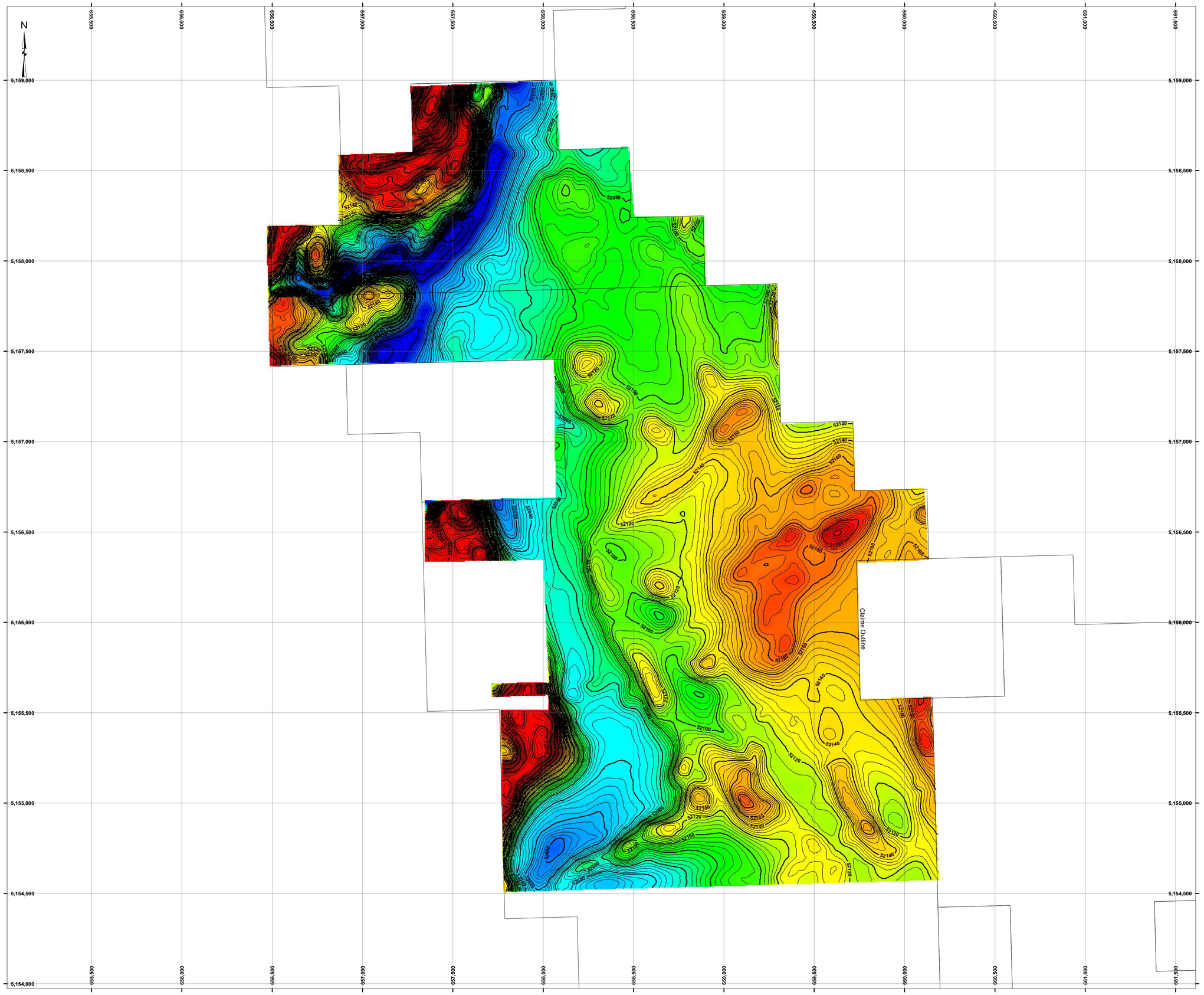
TERRANE GEOSCIENCE INC.
100 - 5435 Portland Place
Halifax, N.S., B3K 2Z8
terranegeoscience.com

Data Source Information:
- Data acquisition during period July 15-20, 2019
- Flown ~46 m above ground level
- Line direction East-West at 50 m spacings

Processing Information:
- C.I.= 0.1 nT/m
- Grid increment = 20 m
- The RTP was applied then 52157 nT were added
- Inc=67.84; Dec=-17.97

Processed By:

Integrated Geophysics Corporation
50 Briar Hollow Ln, Suite 400W
Housten, Texas 77027
terranegeoscience.com
www.igcworld.com



21ALPHA RESOURCES INC.

FISSET BROOK PROPERTY
CAPE BRETON, NOVA SCOTIA

Reduced-to-Pole (RTP)

Total Magnetic Intensity
UAV Aeromagnetics Acquisition by
MWH GeoSurveys and Terrane Geoscience

LEGEND:

NanoTeslas
52455
52400
52350
52300
52250
52200
52150
52100
52050
52000
51950
51877

Scale: 1:10,000

0 125 250 500 Meters

Projection: WGS 84 / UTM Zone 20N	Date: September 24, 2019
Drawn By: ACH	Checked By: KM

Acquired By:

MWH Geo-Surveys Ltd.
3104 - 30th Avenue, Suite 388
Vernon, British Columbia
Canada V1T 2C2

TERRANE GEOSCIENCE INC.
100 - 5435 Portland Place
Halifax, N.S., B3K 2Z8
terranegeoscience.com

Data Source Information:

- Data acquisition during period July 15-20, 2019
- Flown ~46 m above ground level
- Line direction East-West at 50 m spacings

Processing Information:

- C.I.= 4 nT
- Grid increment = 20 m
- The RTP was applied then 52157 nT were added
- Inc=67.84; Dec=-17.97

Processed By:

Integrated Geophysics Corporation
50 Briar Hollow Ln, Suite 400W
Housten, Texas 77027
terranegeoscience.com
www.igcworld.com

N

655,500 656,000 656,500 657,000 657,500 658,000 658,500 659,000 659,500 660,000 660,500 661,000 661,500

5,159,000
5,158,500
5,158,000
5,157,500
5,157,000
5,156,500
5,156,000
5,155,500
5,155,000
5,154,500
5,154,000

Claims Outline

21ALPHA RESOURCES INC.

FISSET BROOK PROPERTY
CAPE BRETON, NOVA SCOTIA

Total Magnetic Intensity (TMI)

UAV Aeromagnetics Acquisition by MWH GeoSurveys and Terrane Geoscience

LEGEND:

NanoTeslas
52459
52400
52350
52300
52250
52200
52150
52100
52050
52000
51950
51900
51872

Scale: 1:10,000

0 125 250 500 Meters

Projection: WGS 84 / UTM Zone 20N	Date: September 24, 2019
Drawn By: ACH	Checked By: KM

Acquired By:

MWH Geo-Surveys Ltd.
3104 - 30th Avenue, Suite 388
Vernon, British Columbia
Canada V1T 2C2

TERRANE GEOSCIENCE INC.
100 - 5435 Portland Place
Halifax, N.S., B3K 2Z8
terranegeoscience.com

Data Source Information:

- Data acquisition during period July 15-20, 2019
- Flown ~46 m above ground level
- Line direction East-West at 50 m spacings

Processing Information:

- C.I.= 4 nT
- Grid increment = 20 m
- The IGRF was applied then 51875 nT were added

Processed By:

Integrated Geophysics Corporation
50 Briar Hollow Ln, Suite 400W
Housten, Texas 77027
terranegeoscience.com
www.igcworld.com

APPENDIX IV

Terrane Geophysics

2019 UAV Survey

AREA 2

Full Report

MWH Geo-Surveys Ltd.
3104 – 30th Avenue, Suite 388
Vernon, BC, V1T 2C2
info@mwhgeo.com

TERRANE GEOSCIENCE INC.
100-5435 Portland Place
Halifax, NS, B3K 2B
terranegeoscience.com

September 30, 2019

Mr. John Shurko
21Alpha Resources Inc.
RR#1 Chester
Chester, Nova Scotia
B0J 1J0

Dear Mr. Shurko,

RE: UAV Magnetic Processing Report for the Fisset Brook Property, Cheticamp Area, Nova Scotia

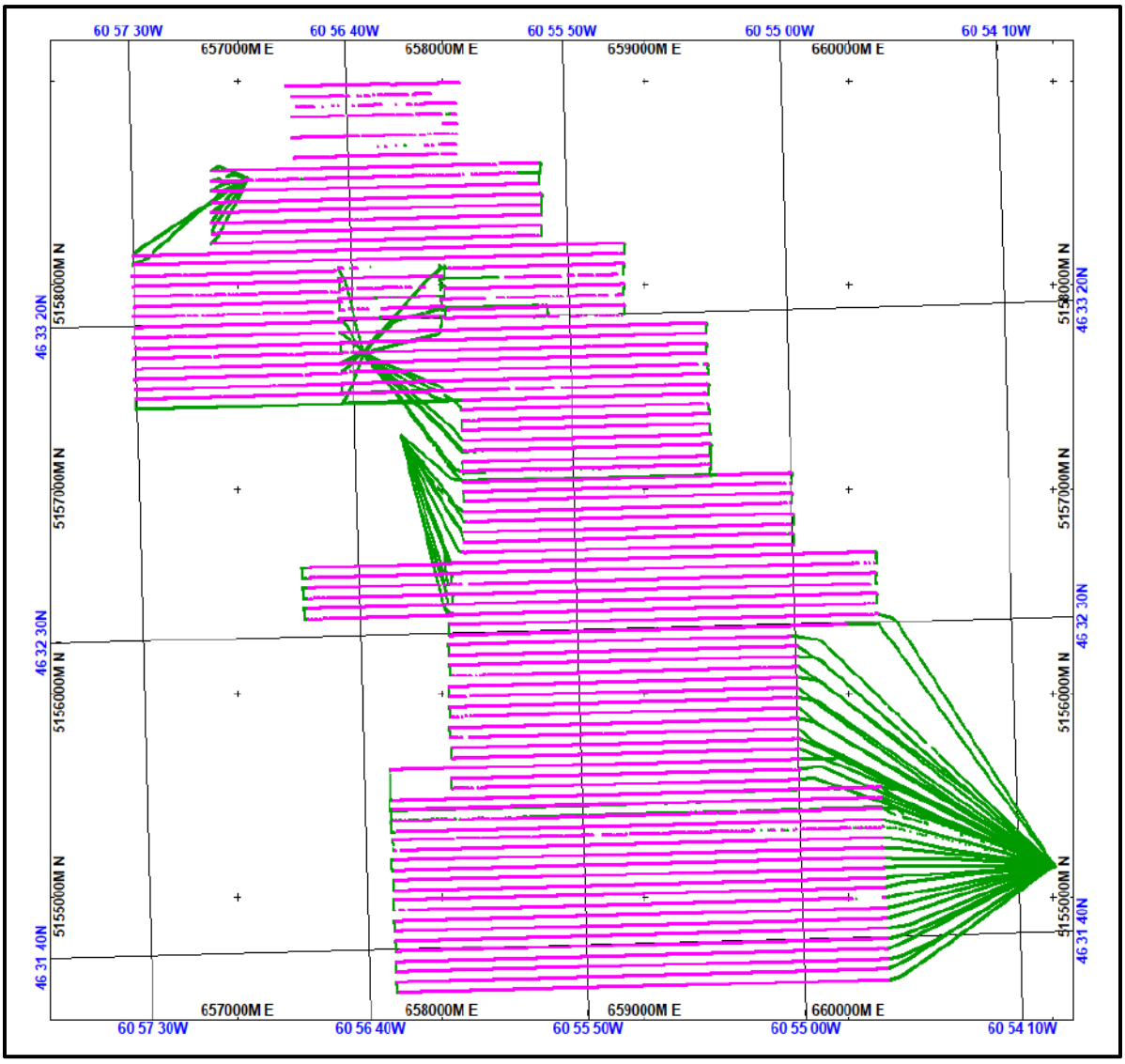
1.0 INTRODUCTION

At the request of 21Alpha Resources Inc. (21Alpha), MWH Geo-Surveys Ltd. (MWH) and Terrane Geoscience Inc. (Terrane) conducted an un-manned aerial vehicle (UAV) aeromagnetic survey over their Fisset Brook Property, located approximately nine kilometres (km) southeast of Cheticamp, Nova Scotia. Elevations on the property range from approximately 340 - 470 meters (m) above Mean Sea Level (MSL). The survey was completed during July 15-20, 2019 over an area of approximately 8.35 square-kilometres (km^2). Flight lines were flown on east-west bearings, a line spacing of

approximately 50 m, and an elevation of approximately 46 m Above Ground Level (AGL). A total of 180 line-kilometres of UAV aeromagnetic surveying was completed over the property.

Acquired UAV aeromagnetic data was then sent to Integrated Geophysics Corporation (IGC) for processing. Processing results were used to map the Total Magnetic Intensity (TMI) field and calculate the Reduced to Pole (RTP) TMI and First Vertical Derivative (1VD). Data points used for the final mapping and calculations are displayed below in Figure 1 (magenta-coloured points). These points have also been delivered as an ASCII comma separated value (csv) formatted file. Green points were removed from the acquired dataset and not included for final mapping.

Figure 1 - Aeromagnetic data acquisition for the Fisset Brook Property (magenta points – final dataset; green points - removed from the final dataset).



2.0 PROCESSING

Data Editing

Prior to processing, surveyed data points were edited to identify and retain points collected along flight lines (at bearing of north or south) and to remove points captured during one of the following instances:

1) "Transit" lines connecting the ends of flight lines with takeoff and landing locations.

2) "Loops" connecting ends of adjacent flight lines.

3) "Hovers" occurring at takeoff and landing where there is little or no lateral travel.

4) "Re-flights" where a line is re-flown and a duplication is acquired, only one flight may be selected.

5) "Spikes" where a single reading is anomalously much greater or lower than adjacent points. A point was rejected if its value was 5 nT greater or less than the average value of its four adjacent points; that is, the two points recorded approximately 0.2 seconds (1.4 m) before and after it.

International Geomagnetic Reference Field (IGRF) Correction

The IGRF is a mathematical representation of the smooth variation of the earth's magnetic field. The UAV aeromagnetic acquisition records a magnetic value which is the sum of the IGRF and the magnetic anomalies caused by the local geology. Therefore, to isolate the anomalies, the IGRF must be calculated for each acquired data point and subtracted from it. The value of the IGRF for a point depends on the time and location of acquisition: date, time of day, latitude, longitude and elevation (above sea level).

Using the Geomagnetic Field Calculator from the National Oceanic and Atmospheric Administration (NOAA), the method used calculates a grid of the IGRF at the start of the survey then applies the change of the IGRF through the time of the acquisition of each subsequent data point. This value of the IGRF for the particular point is then subtracted from the Diurnally Corrected Magnetic Value producing the IGRF correction, sometimes called the IGRF anomaly. The final TMI was calculated by then adding a constant to the IGRF correction of 51,875 nanoTesla (nT), the average value of the IGRF for the entire survey.

3.0 MAPPING

Total Magnetic Intensity (TMI)

The final TMI values were gridded at 20 m intervals. This grid was filtered to address and attenuate short wavelength "herringbone" anomalies. The resultant data was high quality and therefore contoured at 4 nT increments.

Reduction-to-Pole (RTP)

The TMI grid was then used to calculate the RTP grid using an Inclination=67.84° and Declination=-17.97°. Once the RTP was applied, then 52,157 nT were added; this value is the approximate average difference between the TMI and calculated RTP grids. Contouring was conducted in increments of 4 nT (same as TMI map).

The RTP data enhancement map results from a mathematical operator which corrects for position offset of the skewing of the magnetic anomaly due to the earth's magnetic inclination and declination. The reduction-to-pole mathematically transforms the total magnetic intensity (TMI) field at its observed inclination (I) and declination (D) to that of the north magnetic pole (i.e., I=90°, D=0°); thereby centering the magnetic anomaly directly over the causative body. This processing step facilitates the cross-correlation of the magnetic data with other geophysical and geological data in the interpretation process. For example, the anomaly signature for a body located in an area of high (steep) magnetic inclination such as Nova Scotia (I ≈ 68°N) is illustrated below in Figure 2.

The RTP operator is applied to the TMI grid to adjust the steeply dipping inclination effect to the vertical 90° inclination angle of the magnetic north pole as illustrated in Figure 3.

First Vertical Derivative (1VD) of Reduction-to-Pole (RTP)

The 1VD data enhancement map results from a mathematical operator which calculates the rate of change in magnetic intensity in the vertical direction ($\partial M / \partial z$). This process produces a residual map where longer wavelength anomalies have been removed, thus extenuating short wavelength anomalies. These short wavelength anomalies result from relatively shallow geologic structures and bodies. Additionally, the mapped zero contour can be indicative of vertical or near vertical geologic boundaries and contacts. The contour interval was at 0.1 nT/m.

Figure 2 - Magnetic inclination affect due to a body located at 68° Inclination along a 0° azimuth south-north traverse.

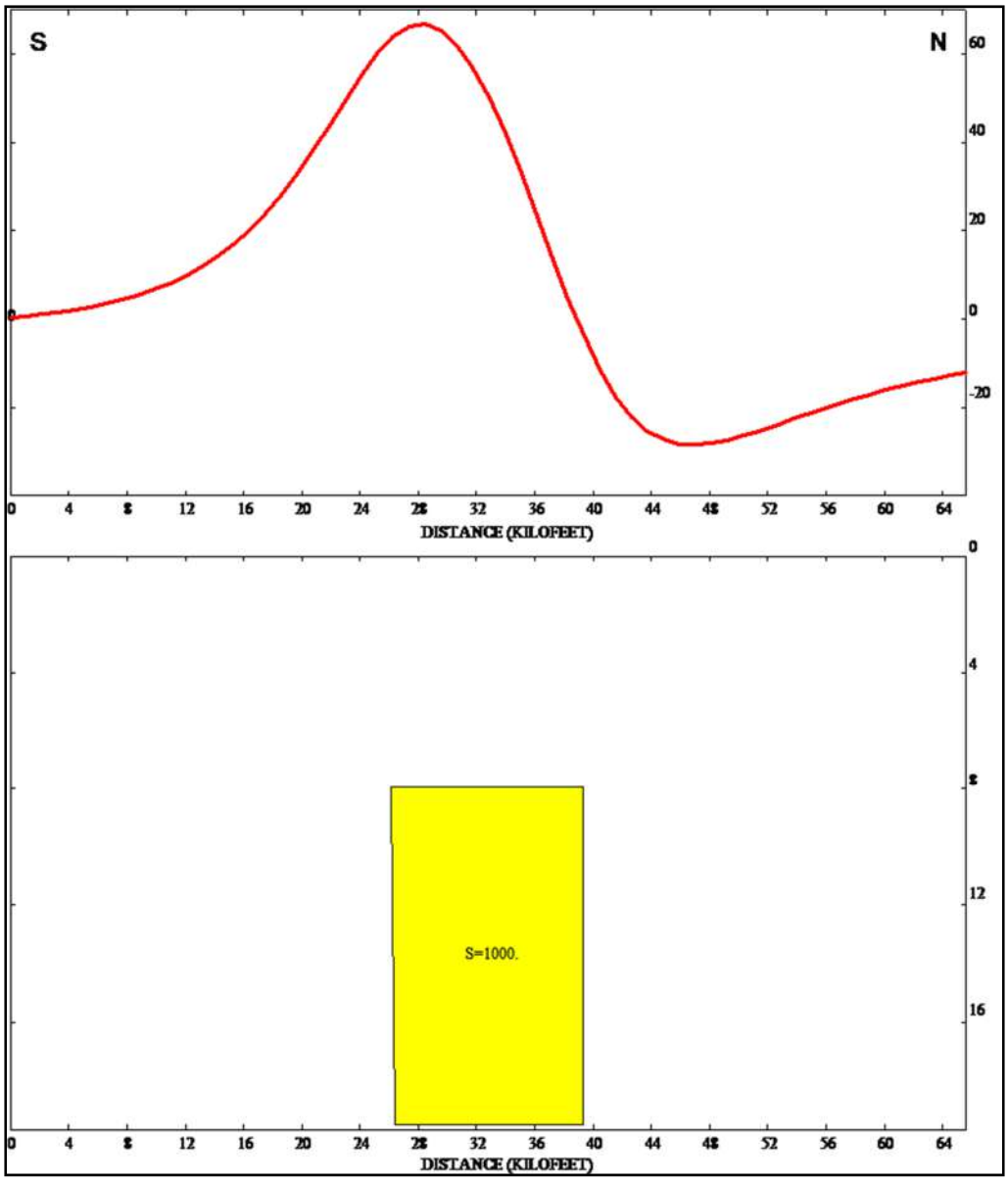
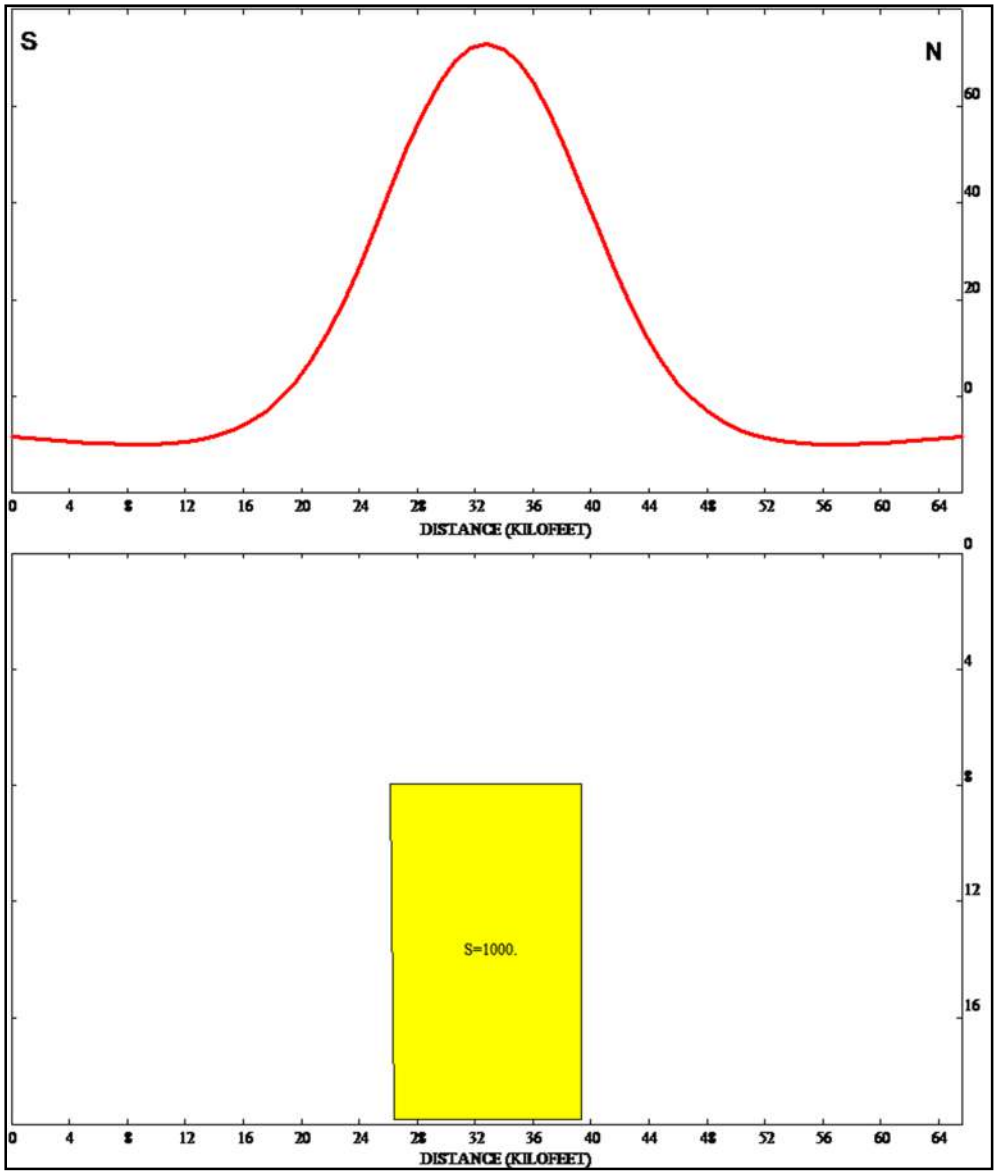


Figure 3 - Magnetic inclination effect due to a body located at magnetic north pole along a 0° azimuth south-north traverse.



Mapping Parameters

Grids for each of the three maps are provided in the following ASCII formats: (1) XYZ and (2) Row-Major (rmg). Full colour maps are also provided in Adobe PDF format. Mapping included the following parameters:

Scale: 1 : 10,000

Distance Units: meters

Projection: UTM zone 20N (EPSG 32620)

Datum: WGS84

Magnetic (z) Units: nanoTesla

Null value: 99999

Geotiff images are provided in GCP and Affine (with a tfw file formats).

4.0 DIGITAL DELIVERABLES

Maps:

- IGC_MWH_TGI_21Alpha_FissetBrook_UAV_Mag_1VD_RTP_20190923.pdf
- IGC_MWH_TGI_21Alpha_FissetBrook_UAV_Mag_RTP_20190923.pdf
- IGC_MWH_TGI_21Alpha_FissetBrook_UAV_Mag_TMI_20190923.pdf

Geotiffs:

- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_RTP_1VD_20190923_GCP tif
- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_RTP_20190923_GCP.tif
- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_TMI_20190923_GCP. tif
- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_RTP_1VD_20190923_AFF.tif
- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_RTP_1VD_20190923_AFF.tfw
- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_RTP_20190923_AFF.tif
- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_RTP_20190923_AFF.tfw
- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_TMI_20190923_AFF.tif
- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_TMI_20190923_AFF.tfw

Grids:

- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_RTP_1VD_20190923_rmg.asc
- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_RTP_1VD_20190923_xyz.asc
- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_RTP_20190923_rmg.asc
- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_RTP_20190923_xyz.asc
- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_TMI_20190923_rmg.asc
- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_TMI_20190923_xyz.asc

Data:

- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_20190923_csv.zip
- IGC_MWH_21Alpha_Fisset_Brook_UAV_mag_delivery_comments_20190829.txt

Other Important Notes:

1) Re - The ASCII comma separated value (csv) formatted file of the edited data:

- The line numbers begin with 95 then progress from south to north based on an approximate distance value. This data file is sorted by line number then by Easting (west to east for each line).

- File header records define the following:
  - Projection - UTM zone 20N (EPSG 32620)
  - Datum - WGS84
  - Magnetic Field Units – nanotesla
  - Distance Units – meters
  - Geographic Units - degrees north and east
  - Date Units - day-month-year
  - Time Units - hour, minute, second hhmmss_s

- Date and Time are GMT

- The final TMI was calculated by subtracting the IGRF value from the diurnal corrected Mag then adding a constant of 51,875 nT (the approximate average IGRF value for the survey).

- The first three records of the csv portion of the file are:

  - Line, ID#, Easting, Northing, Latitude, Longitude, Date, hhmmss.s, UAV #, GPS ASL, Elev AGL, Raw Magnetics, Diurnal correction, Diurnally Corrected Magnetics, IGRF value, IGRF correction, Final IGRF & Diurnally Corrected Mag

  - 95,6220016,657793.1,5154534.01,46258673,-60.9425795,20-Jul-19, 220016,1,473,63.45,52142.8344,48.99,52191.8244,51872.8331,318.9913,52193.99 13

  - 95,6220016.1,657793.72,5154534.06,46258676,-60.9425715,20-Jul-19, 220016.1,1,473,63.47,52142.1525,48.98,52191.1325,51872.8318,318.3007,52193.3 007

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5.0 CLOSURE

We hope that this report meets with your expectations and needs. Please contact us with any questions, comments or concerns. We thank you for the opportunity to participate in this project and look forward to working with 21Alpha in the future.

Yours sincerely,

MWH Geo-Surveys Ltd.

Kevin McNabb, P.Geo

Terrane Geoscience Inc.

Andrew Hilchey, P.Geo

APPENDIX V

Barr, S.M. and White, C.E.

Bedrock Geology Map of the Cheticamp River Area

****SUBMITTED SEPARATELY - Omitted to reduce file size (<50mb) to submit on NovaROC****