

# Reconnaissance Soil Geochemistry and Self Potential Geophysical Survey of the Miller Property

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Cariboo Mining District

NTS 093A/13

TRIM 093A.072

Centered near 591403E, 5849906N (UTM Nad 83)

52° 47' 28"N, 121° 38' 40"

Mineral Claim 387352

For

**Ken Miller**

(owner/operator)

1117 17<sup>th</sup> Street

Wainwright, Alberta

T9W 1E5

By

Angelique Justason

**Tenorex GeoServices**

336 Front Street

Quesnel, BC

V2J 2K3

Updated January 2014

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## Summary

Ken Miller acquired the legacy claim group, also called the 'ASP' and 'AMP' claims in September 2012 and also staked a contiguous 175 hectares to the north. Tenorex GeoServices was contracted to explore the property, and it was decided to test a small residual magnetics anomaly with MMI geochemistry and self potential (SP) geophysics. A total of 21 soil samples were taken over a length of 600 meters and 0.85 line kilometers SP surveying was completed. Some correlations with base metals were made.

## Property Description and Location

Mr. Miller's mineral property is located approximately 60 kilometers east of Quesnel and 12 kilometers north of Likely near the headwaters of Porter, Victoria and Kangaroo Creeks. It is centered at approximately 592460E, 5848160N (UTM Nad83) on BC TRIM sheet 093A.072 of the Cariboo Mining District. The property consists of 31 units covering 775 hectares according to Mineral Titles; however, the actual number of hectares defined on the map is 755 hectares. A contiguous celled tenure, 1012810, was added to the property on September 12, 2012 bringing the land package to a total of 950.9 hectares, as described at Mineral Titles Online.

**Table 1:** Statement of Claims at time of filing Event 5422052

<u>Tenure Number</u>	<u>Claim Name</u>	<u>Owner</u>	<u>Map Number</u>	<u>Issue Date</u>	<u>Good To Date</u>	<u>Status</u>	<u>Area (ha)</u>
<a href="#">346957</a>	AMP #3	<a href="#">140383</a> 100%	<a href="#">093A072</a>	1996/jun/15	2014/jan/20	GOOD	25.00
<a href="#">346958</a>	AMP #4	<a href="#">140383</a> 100%	<a href="#">093A072</a>	1996/jun/15	2014/jan/20	GOOD	25.00
<a href="#">346959</a>	AMP #5	<a href="#">140383</a> 100%	<a href="#">093A072</a>	1996/jun/15	2014/jan/20	GOOD	25.00
<a href="#">346960</a>	AMP #6	<a href="#">140383</a> 100%	<a href="#">093A072</a>	1996/jun/15	2014/jan/20	GOOD	25.00
<a href="#">346961</a>	AMP #7	<a href="#">140383</a> 100%	<a href="#">093A072</a>	1996/jun/15	2014/jan/20	GOOD	25.00
<a href="#">346962</a>	AMP #8	<a href="#">140383</a> 100%	<a href="#">093A072</a>	1996/jun/15	2014/jan/20	GOOD	25.00
<a href="#">346963</a>	AMP #9	<a href="#">140383</a> 100%	<a href="#">093A072</a>	1996/jun/15	2014/jan/20	GOOD	25.00
<a href="#">346964</a>	AMP #10	<a href="#">140383</a> 100%	<a href="#">093A072</a>	1996/jun/15	2014/jan/20	GOOD	25.00
<a href="#">349069</a>	AMP #11	<a href="#">140383</a> 100%	<a href="#">093A072</a>	1996/jul/23	2014/jan/20	GOOD	25.00
<a href="#">349070</a>	AMP #12	<a href="#">140383</a> 100%	<a href="#">093A072</a>	1996/jul/23	2014/jan/20	GOOD	25.00

<a href="#">349071</a>	AMP #13	<a href="#">140383</a> 100%	<a href="#">093A072</a>	1996/jul/23	2014/jan/20	GOOD	25.00
<a href="#">349072</a>	AMP #14	<a href="#">140383</a> 100%	<a href="#">093A072</a>	1996/jul/23	2014/jan/20	GOOD	25.00
<a href="#">377893</a>	ASP #1	<a href="#">140383</a> 100%	<a href="#">093A072</a>	2000/jun/15	2014/jan/20	GOOD	25.00
<a href="#">377894</a>	ASP #2	<a href="#">140383</a> 100%	<a href="#">093A072</a>	2000/jun/15	2014/jan/20	GOOD	25.00
<a href="#">377895</a>	ASP #3	<a href="#">140383</a> 100%	<a href="#">093A072</a>	2000/jun/15	2014/jan/20	GOOD	25.00
<a href="#">377896</a>	ASP #4	<a href="#">140383</a> 100%	<a href="#">093A072</a>	2000/jun/15	2014/jan/20	GOOD	25.00
<a href="#">377897</a>	ASP #5	<a href="#">140383</a> 100%	<a href="#">093A072</a>	2000/jun/15	2014/jan/20	GOOD	25.00
<a href="#">377898</a>	ASP #6	<a href="#">140383</a> 100%	<a href="#">093A072</a>	2000/jun/15	2014/jan/20	GOOD	25.00
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<a href="#">386827</a>	ASP #11	<a href="#">140383</a> 100%	<a href="#">093A072</a>	2001/jun/04	2014/jan/20	GOOD	25.00
<a href="#">387350</a>	ASP #12	<a href="#">140383</a> 100%	<a href="#">093A072</a>	2001/jun/08	2014/jan/20	GOOD	25.00
<a href="#">387351</a>	ASP #13	<a href="#">140383</a> 100%	<a href="#">093A072</a>	2001/jun/08	2014/jan/20	GOOD	25.00
<a href="#">387352</a>	ASP #14	<a href="#">140383</a> 100%	<a href="#">093A072</a>	2001/jun/08	2014/jan/20	GOOD	25.00
<a href="#">387353</a>	ASP #15	<a href="#">140383</a> 100%	<a href="#">093A072</a>	2001/jun/08	2014/jan/20	GOOD	25.00
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<a href="#">389348</a>	ASP #17	<a href="#">140383</a> 100%	<a href="#">093A072</a>	2001/aug/29	2014/jan/20	GOOD	25.00
<a href="#">411625</a>	ASP #18	<a href="#">140383</a> 100%	<a href="#">093A072</a>	2004/jun/15	2014/jan/20	GOOD	25.00
<a href="#">411626</a>	ASP #19	<a href="#">140383</a> 100%	<a href="#">093A072</a>	2004/jun/15	2014/jan/20	GOOD	25.00
<a href="#">1012810</a>	REN	<a href="#">140383</a> 100%	<a href="#">093A</a>	2012/sep/12	2014/jan/20	GOOD	175.89

**TOTAL 950.9 ha**

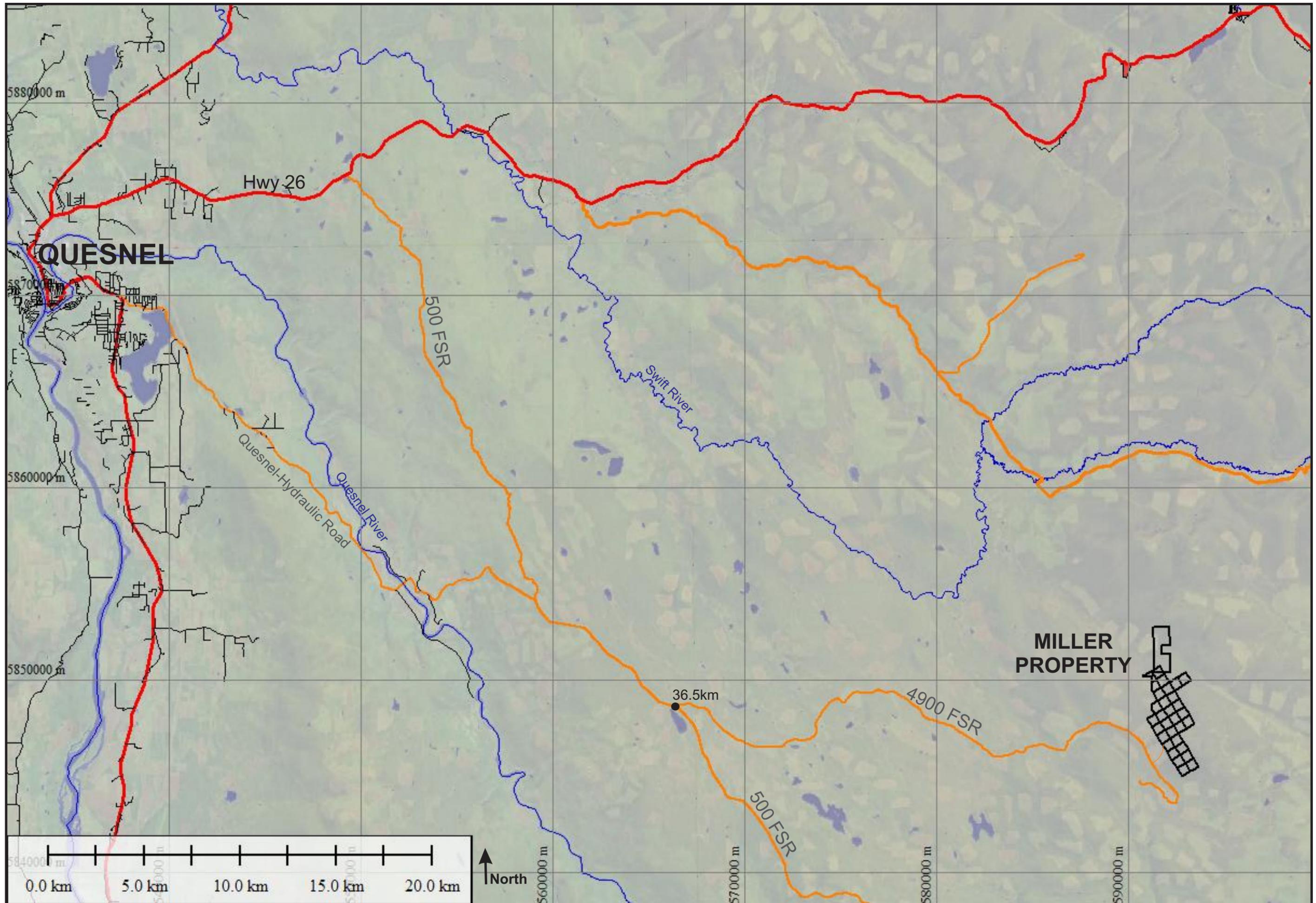
## Access and Physiography

The Miller claim group is located in the relatively broad rolling terrain of the Fraser Plateau in the Quesnel Highlands. The majority of the Miller property is located in at along the margin of a broad northwest-southeast trending trough with moderate westerly facing slopes. Topographic elevations range from 1240 metres at the northern end of the claims to 1500 metres at the eastern portion of the property.

West Fraser Mills Ltd holds a timber license over the area and access is made direct to the property by utilizing their roads. Access is made by travelling from Highway 26 to the 500 Forest Service Road, about 17 kilometers east of Quesnel. Travel 36.5 kilometers along the 500 Road before turning due east and drive about another 23 kilometers before turning north to go uphill into the claim group another 1 kilometer beyond.

Gruenwald (2009) states that several times during the Pleistocene, British Columbia was covered by an interconnected mass of valley and piedmont glaciers and mountain ice sheets, collectively known as the Cordilleran Ice Sheet. In central British Columbia glaciers flowed eastward from the Coast Mountains and westward from the Cariboo Mountains to merge over the Interior Plateau. During most glaciations, the major mountain systems remained the principal source areas of glaciers, and ice flow was controlled by topography. However, occasionally, ice on the plateau thickened to form ice domes, with radial flow away from their centres. During the Fraser glaciation, glaciers from the Coast and Cariboo Mountains coalesced and flowed north over central British Columbia (Clague, 1988).

Gruenwald further describes that glaciation has shaped the regional landforms to what is seen today and resulted in extensive deposition of glaciofluvial till, sand and boulders. The thickness of glacial deposits varies considerably from many tens of metres along river valleys to thinner but extensive veneer on steeper slopes and ridges. The latter appears to be more common on the Miller property. Gruenwald's 2009 exploration and report suggests that there is likely less than 5% outcrop exposed on the ASP property. Limited field work by Tenorex did not explore enough of the property to make any statement about approximate bedrock exposures or subcroppings located here but recent LiDAR surveys and new road cuts throughout the property may provide new locations for future assessment.



5852000 m

5848000 m

592000 m

596000 m

# MILLER PROPERTY

100% owned by K. Miller  
2012 work confined to within  
tenure 387352 of the contiguous group

Project area →

387352

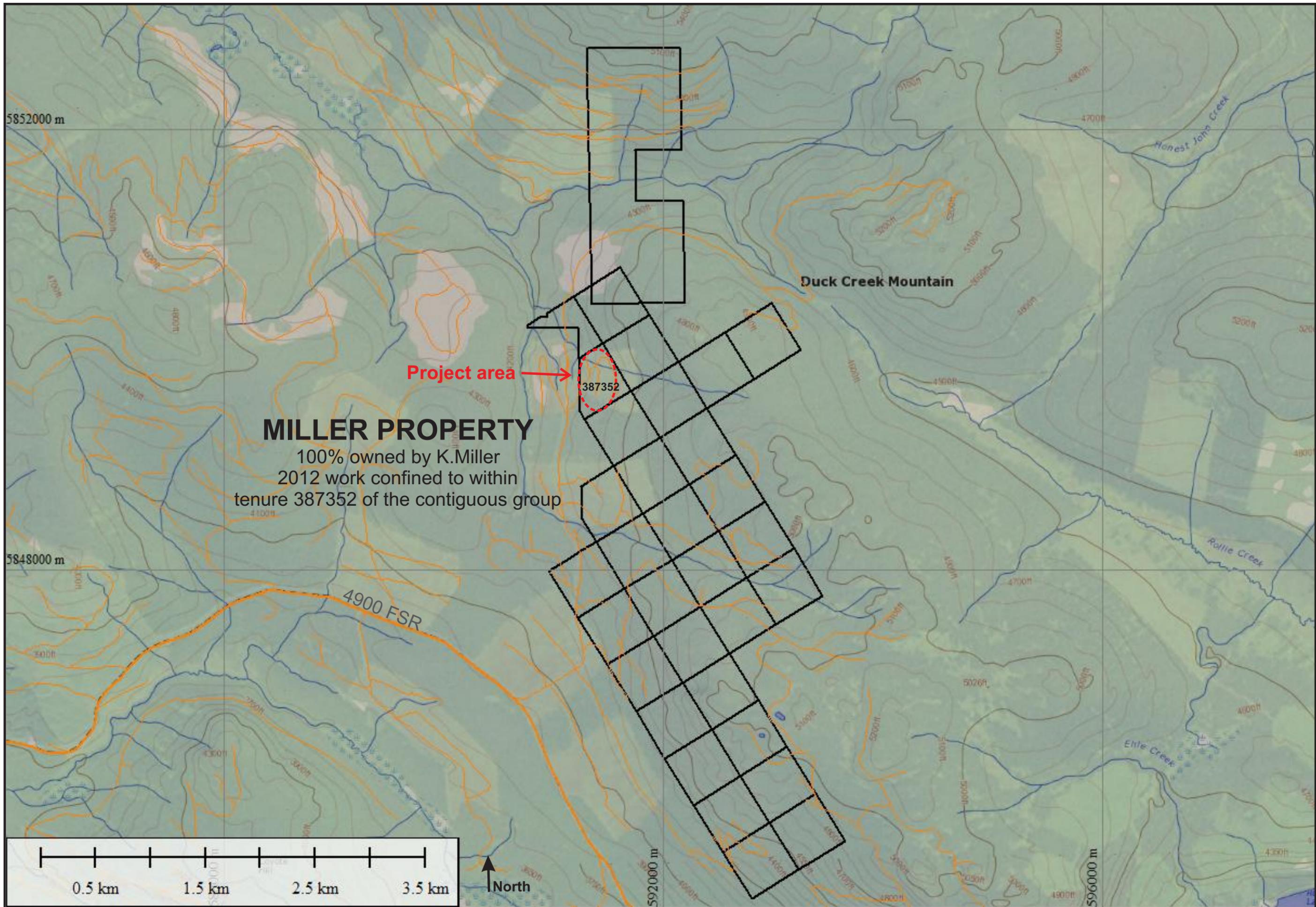
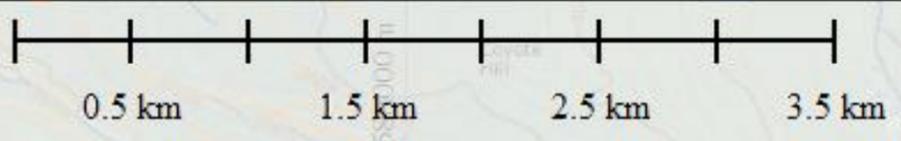
Duck Creek Mountain

Honest John Creek

Rollie Creek

Ette Creek

4900 FSR



## Geology

Struik (1988) describes the northern Quesnel Highlands as underlain by four geological terranes, three of which are fault bounded. The terranes are defined by their unique stratigraphic successions. The easternmost is the Cariboo Terrane consisting of sedimentary rocks in fault contact with the western margin of the Precambrian North American Craton along the Rocky Mountain Trench. The Barkerville Terrane consists of mostly sedimentary rocks and is west of, and in fault contact with, the Cariboo Terrane. The Barkerville and Cariboo Terranes are overthrust by the Slide Mountain Terrane which is composed of basic volcanics and intrusives as well as generally fine grained clastic rocks. The root zone of the Slide Mountain Terrane is considered to be serpentinite and sheared mafic rocks that exist locally at the western boundary of the Barkerville Terrane. West of that root zone is the Quesnel Terrane composed of volcanic, volcanoclastic and fine grained clastic rocks.

The Miller claims occur mainly within the upper Paleozoic Slide Mountain Terrane. The property straddles the Eureka Thrust fault, is centered on a pod of the Slide Mountain Terrain and is in contact with older metasedimentary rocks of the Cariboo Terrane to the north east and was observed by Angelique Justason in 2010. To date, the contact has not been traced out on the ground and more property scale mapping is needed before providing better description of the geology. The Eureka fault can be interpreted in the field from a high elevation while looking northwest along the Porter Creek drainage and can also be interpreted on airphotos.

## Exploration History

The follow timeline of exploration activities is mainly for the area within or immediately adjacent to the Miller property and is not necessarily a complete account of the exploration conducted.

### Regional Exploration

1850's Placer exploration begins in the region and attracts much attention

1964 The discovery of the Cariboo-Bell copper/gold deposit (now called Mt Polley) located about 30km south of the Miller property results in a staking rush and exploration activities throughout the Quesnel Trough or the Quesnel-Cariboo Gold Belt.

1976 Gold and copper anomalies in soils along with geophysical surveys highlight an area of what is now know as the QR gold deposit discovered 15 km south west of the Miller property. (Assessment report 06079)

1981 Dome Mines delineated 950,000 tons grading 0.21opt gold at the QR deposit.

1995 Kinross Gold Corp starts production at QR.

1997 Mount Polley copper-gold mine begins production

1998 Production halts at QR

2004 Cross Lake Minerals purchased the QR Mine

2007-2008 Cross Lake Minerls produces gold at at the QR Minesite

2010 Barkerville Gold Mines Ltd purchased the QR mine and mill, lease and surrounding mineral claims in Cross Lake's name. Production again commences and exploration continues to date.

### Local Exploration History

1983 B.Mickle staked NOR1-4 mineral claims totaling 2000 hectares, located anomalous gold in silts near the southern headwaters of Porter Creek and subsequently optioned the ground to Sheen Minerals Inc.

1984 Gold in shear zones on NOR1-4 were noted by Sheen Minerals geologist, Cardinal, and further reconnaissance prospecting across the property was conducted. The gold in silts reported in 1983 could not be duplicated (Assessment Report 13372)

1984 Mickle staked MAR4-6 mineral claims (1500ha) immediately southeast of the NOR property and Cardinal recorded prospecting work. Report duplicate of report 13372 with direct dates and same map but is on the adjacent ground (Assessment Report 14529)

1996 The first set of Miller's claims are staked and named the AMP group.

2000 More staking conducted by Miller this year. This set is called the ASP.

2001-2002 Miller stakes 10 additional units on the ASP group in 2001 and further explores his ground. His assay results and sample sites are published in Assessment report 31239.

2004 Miller stakes 2 final units on the ASP group which now adds up to 31 units.

2005-2006 Neighboring 'North Mineral Star Exploration Company Inc' conducted field work, sampling and detailed testing of their rocks. Gemologists confirm the primary target area on tenure 520531 hosts nephrite jade. The serpentinite was investigated as an industrial mineral and for use as dimension stone. (Assessment report 28819)

2009 Gruenwald conducted a geochemical survey of the Miller Property including 1.85Lkm of soil sampling (Assessment report 31239)

2010 Miller contracted Tenorex GeoServices to conduct a geochemical survey adjacent the 2009 survey. 103 samples were taken over a distance 2.24 line kilometers.

## **2012 Exploration**

Recent publication of Open File 6164 geophysical surveys provides a detailed update to the previous airborne geophysical surveys across the Miller property. A test line of Mobile Metal Ion (MMI) soil geochemistry and self potential geophysical survey was conducted to target a small magnetic anomaly located partly on tenure 387352. Tenorex GeoServices accessed the property at the anomaly and thinned out thick alder and willow along a deactivated forestry road which accesses an old cutblock to make preparations for soil sampling and a self potential survey.

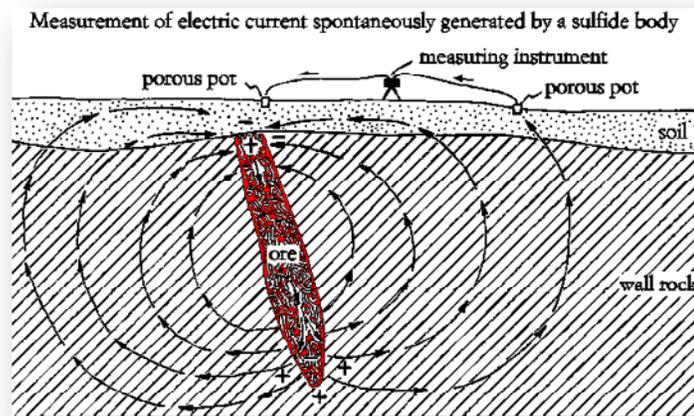
MMI samples were taken first along the upper bank of the road at intervals of 30m. Sample procedures followed the sampling guidelines provided by SGS Minerals as found in the appendices. Each field station has a corresponding pink ribbon labeled at each site should they need to be located in future. A total of 21 samples were taken along a length of about 600 meters. Samples were sent via VanKam to SGS Minerals in Vancouver. Values provided from

the lab are plotted on the map and compared to other available data. Future work may consider a larger survey with additional post processing procedures.

After the soil sampling, a self potential geophysical survey was conducted along the length of the road, with the survey began at the end, working back to the main road and truck. Stations were located at 10 meter intervals for a length of about 850 meters. Procedures are outlined hereafter.

### Self Potential Survey Procedures and Methodology

<sup>1</sup>The self potential geophysical method involves the measurement of naturally occurring electrical potentials between two points on the surface of the earth. It is a passive method which does not involve the introduction of sound waves, electrical currents or other intrusive mechanisms. This method, with some operator experience, can give an indication of possibly locations economic deposits related to stratabound sulphide mineralization, or otherwise, by qualitatively analyzing the final data in both plan view and profile view of the corrected data. It has been found by the author to be an invaluable tool in outlining signatures which represent sulphide rich and economically important vein deposits, replacement type gold deposits, fault structures and their displacement, geologic contacts, lithologic correlation, stratigraphic markers and underground workings.



The equipment needed for a self potential survey is relatively simple and Tenorex's survey equipment consisted of a spooled length of 16gauge insulated copper wire, two non-polarized *Stelth* brand reference electrodes in a supersaturated solution of its own salt and a *Tinkor & Razor CPV-4* digital voltmeter. An electrode is placed on each end of the spooled wire with an in-line voltmeter attached. The electrodes are placed on the ground at a known distance from one another and millivolt values are recorded along with any special notes about the soil or surrounding features. The measurement represents the naturally occurring electrical potential difference of the ground directly below the forward mobile electrode in

<sup>1</sup> Image Source; <http://www.unalmed.edu.co/rrodriguez/geologia/anatomy-of-a-mine/Anatomy%20of%20a%20Mine%20--%20Exploration%20-%20Continued2.htm>

relationship to the fixed electrode and has been found to correlate with conductivity. The values *do not* indicate the amount of gold, silver or any other economic values, nor does it detect depth of an anomaly but, this method can predict the presence of conductive metals and elements such as pyrite, pyrrhotite, chalcopyrite, covellite and graphite.

There are two different ways of setting up the equipment in the field to gather the field data: the roving pot or the leap frog method. Each has their advantages and disadvantages, but the end result is the same.

- The roving pot method involves leaving the negative pot at a stationary point while the positive pot is moved forward along the grid at points where readings are to be recorded until the length of wire on the reel is at its maximum or the area of interest is covered. This arrangement is best suited for large surveys.
- The leap frog method, on the other hand, uses a fixed short length of wire between the negative and the positive pot. At the start of each line, the positive pot is the forward pot; however, in order to move along the line after the initial reading, the negative pot is 'leap-frogged' past the positive pot to the next station. A reading is taken but because the negative pot is now the forward pot, the sign of the reading taken with the voltmeter must be reversed, as such with every time the negative pot is the forward pot. Calculations tend to be more tedious but this method helps to help minimize the effects of telluric activity on the survey results.

Careful planning should be considered when arranging a self potential survey: one should conduct an initial field inspection to determine the placement of the base station and orientation of the grid on which the survey will take place. In most cases, a grid has already been established by previous exploration programs. The preferable placement of the base station and the grid's base line is in barren ground, or ground which is not expected to be anomalous. It should also be traversed to be sure any control stations are not in marshy or rocky areas. The orientation of the grid is best suited to be perpendicular to the strike of the country rock or perpendicular to the general expected trend of the potential anomaly. Line spacing and station spacing should also be carefully considered, depending on the target area and type.

Control stations are established where each cut line crossed the baseline. The measurements taken at each control station are subsequently corrected to represent a value relative to the original base station which is given an arbitrary value of zero millivolts. During the survey, the shaded base electrode is firmly seated within the B-horizon of the soil at the base station location. The traveling electrode, which is connected to the positive voltmeter input, is placed in a hole dug down to the B-horizon of each sample site and protected from sunlight. Holes are consistently dug to a depth where the pots can be placed in the B-horizon, but it sometimes

necessary to skip a station due to subcropping or outcropping of the country rock, significant man made disturbances or discovery of water or wetlands. A note should be made in whichever case may arise. In this survey, only a single line was made and adjacent an existing road. Tie in stations were made when required due to length of wire until the survey line was completed.

It is also good practice to periodically check previously surveyed points to ensure the new values correspond to the older surveyed points. This is a good check to do at the start of each survey day, especially if there is concern of solar flares, recent electrical storms, significant weather change, etc. As there were no issues and only one day was needed to survey the area, no resurveying was conducted.

## **Considerations in Qualitative Analysis**

### *Geology*

The self potential method is used in mineral exploration to outline sulphide bodies which contain pyrite, pyrrhotite and/or chalcopyrite. The equipment responds to good conducting sulphides, both oxidized and unoxidized bodies, graphite and oxidizing disseminated sulphides. Another feature of the self potential method is its ability to differentiate between anomalies caused by sulphides and anomalies caused by graphite. Sulphides typically produce a range of up to 350mV between the most positive and the most negative self potential readings while graphitic zones have a larger range between its most positive and its most negative values, typically up to several hundred millivolts. One must be careful not to rule out that graphitic zones may also contain sulphides or prospective veins. The self potential method has also been found by Tenorex to be useful in highlighting geologic contacts/units, fault zones and various prospective zones in exploration programs where rock exposure is minimal.

### *Ground Conditions*

It is very important to note features encountered in the field that may affect the interpretation of the final self potential data. This may be ground disturbances, possible underground workings, presence of oxidizing metal objects, known subcropping or outcropping of rocks, a high water table, known hydrocarbon contamination –anything notable that may affect the interpretation of the final data as each feature could affect self potential readings recorded while in the field. Ground disturbances made by man may skew reading either to the positive or to the negative depending on the type of disturbance. The varying depth of subcrop below surface is also important to consider. A graphitic unit, for example, located 20 feet below overburden will have a stronger negative self-potential reading than that of the same unit found at a depth of 100 feet below overburden. The clay content in overburden also affects

self potential readings: it will mask an otherwise anomalous area. Also, any area encountered in the field with significant water content should be noted as it will invariably cause reading to be more positive than if the water was not present. It is also important to consistently remove the moss from the ground at each station in order to take a reliable measurement. Moss and rotting debris found in the varying thickness of the A-horizon also has a tendency to hold some amount of water also varying from one place to another and, of course, does not hold conductive properties. In conclusion, solid contact with the B-horizon must be insured at each station and ground conditions should be noted to make for the most reliable measurements and qualitative interpretation.

### *Telluric Currents*

Geomagnetic storms, induced by activity originating from the sun, typically diminish the reliability of self potential readings. It is, however, very easy to detect when such a storm is taking place while conducting a self potential survey. It has been observed in the past that if self potential readings are taken while a significant geomagnetic storm was active, readings will fluctuate sporadically with no commonly recurring value. It has been observed that readings can randomly 'jump' around up to a range of plus or minus 40 millivolts at any given point during an active storm. Reliable measurements are usually next to impossible to obtain during such solar activity. In an effort to track these solar events, real time solar activity data was observed at [www.spaceweather.com](http://www.spaceweather.com). If data cannot be observed while in the field, a chart of recent solar data is also available at the website. The solar wind data, velocity and proton density, presented on [spaceweather.com](http://spaceweather.com) is updated every 10 minutes and has been useful during all geophysical programs. The solar wind data is derived from real-time information transmitted to Earth from the ACE spacecraft and reported by the NOAA Space Environment Center. The ACE spacecraft is located at a point between the earth and the sun which enables it to give about a one hour advance warning of impending geomagnetic activity.<sup>1</sup>

Tenorex's general practice is to observe the density of protons per cubic centimeter before and after each self potential survey, and when possible, during each survey. Predicted activity is also observed for project planning purposes. If a large solar flare is actively hitting the earth's atmosphere, a self-potential survey is found to be unreliable and has to be put on hold until the storm subsides. If SP readings were found to be sporadic while in the field, after checking all wire contacts, ground contacts, and checking the pots for any cracks, communication was made with base camp, if possible, to confirm if there was any significant solar activity. When returning to the field after such solar activity has settled, all the values for the line worked on the previous field day should be rechecked, corrected or redone, if necessary, to confirm the accuracy of the data before work on subsequent lines commenced. No significant solar activity

was noted for the day of the survey, though two spurious data points were noted as they fluctuated up to several millivolts.

### *Topographic Effect*

Topographic highs and lows must be considered when interpreting the self potential data. Topographic lows or flat lying areas may have a high water table and even be marshy. Such areas tend to produce strong positive values. If an anomalous zone should occur here it may not be as apparent. In contrast, a topographic high or a very low water table tends to produce strong negative values. It is, however, possible to dampen the effects of topography on self potential readings. The two prepared pots must be placed in two separate canvas bags filled with damp loam or sawdust. Both pots are then in contact with medium of constant pH and the influence of varying acidity is strongly attenuated. As a result, readings become more uniform, the background displays a narrower range, anomalies at or near swamps and meadows are better defined and anomalies on hills are less negative and less exaggerated (Burr, 1982).

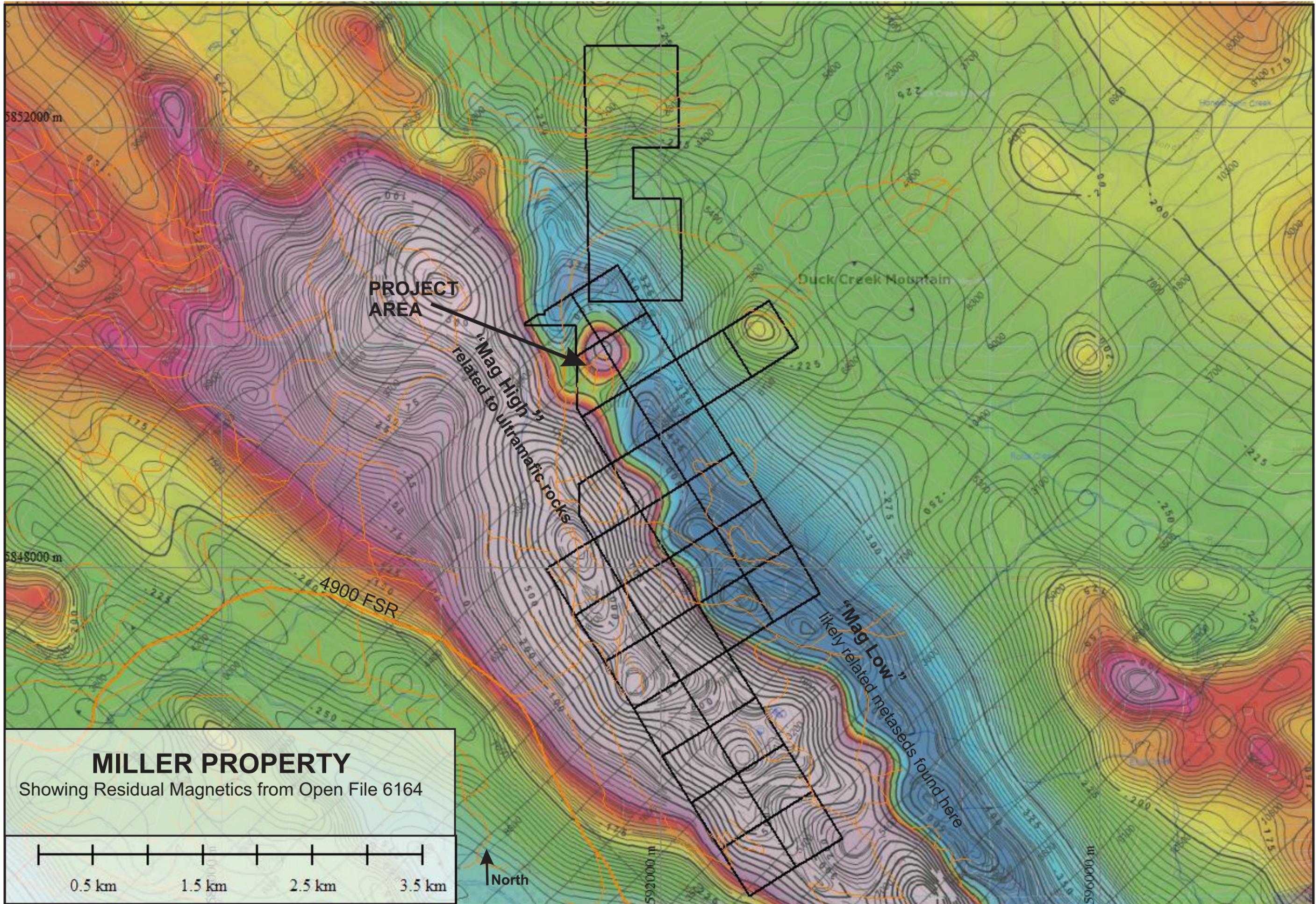
Although this method of dampening the effects of topography is not practiced by Tenorex on a regular basis, the topographic highs, lows and marshy areas are carefully considered in the final interpretation of the self potential data.

### *Wire Condition*

On rare occasion, the spool wire may break or may have become exposed. In addition, it is possible that the connectors between the wire and pots or the wire and voltmeter may have become loose or disconnected. Care must be taken to not kink or pull excessively on the wire and also to not pull on or bend the wire at the connectors. Spurious readings may result and broken wires can add cause much delay to a survey.

### *Radio Transmissions*

Use of hand held radios for communication between the field crew is very important while conducting a self potential survey using the long wire method; however, it can also impede the survey or corrupt the raw data gathered in the field. Self potential readings must not be taken while transmitting over a hand held radio. The radio transmission interferes with the voltmeter and skews the values. The person taking the readings can, however, receive a transmission without skewing the data; but it is very important for this person not to transmit while transcribing the readings.



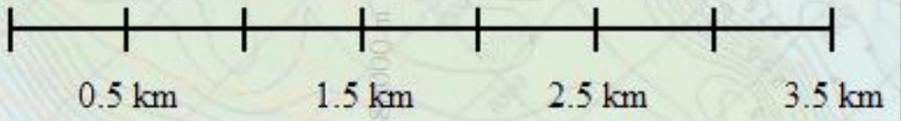
**PROJECT AREA**

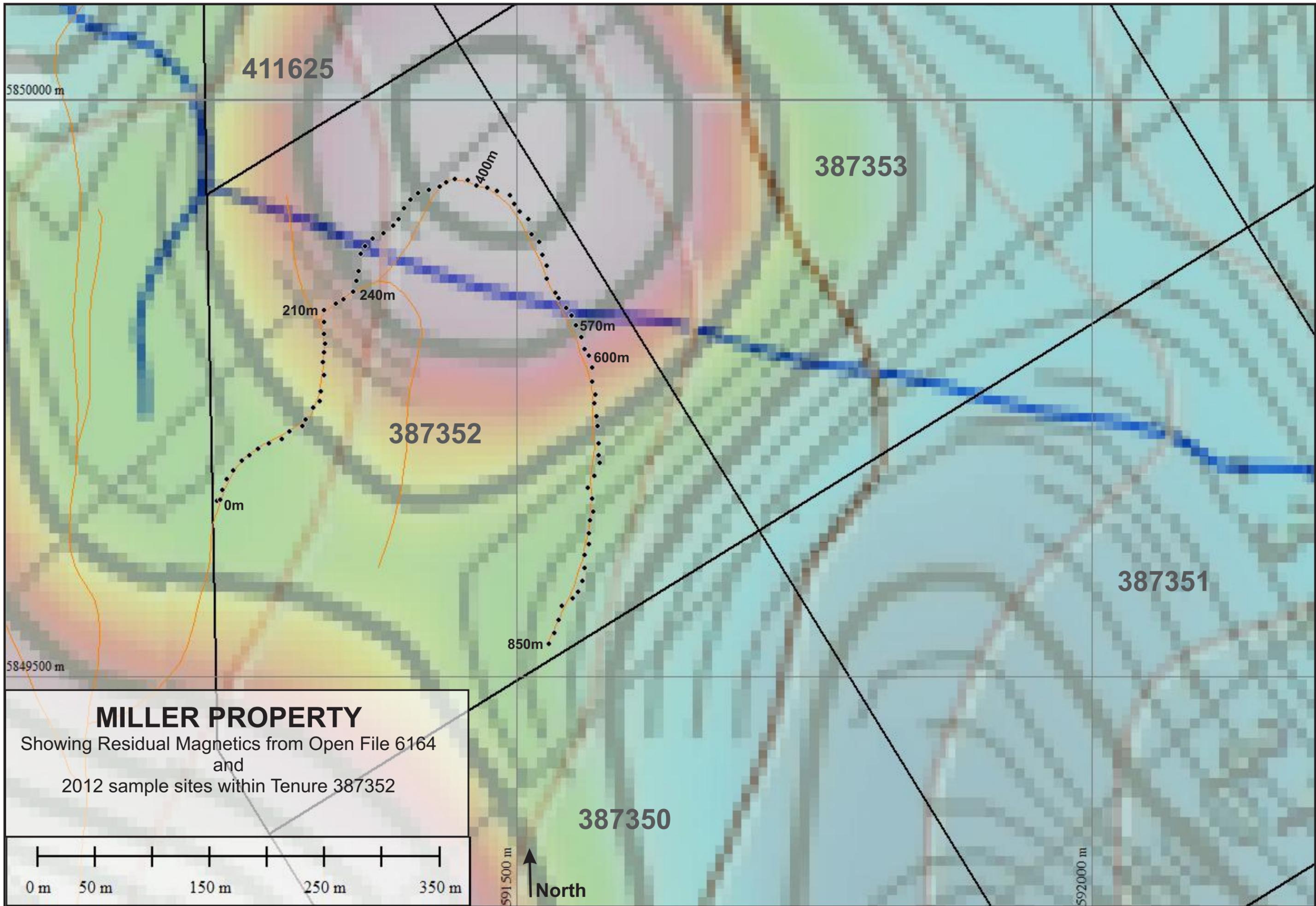
*"Mag High"*  
related to ultramafic rocks

*"Mag Low"*  
likely related metaseds found here

### MILLER PROPERTY

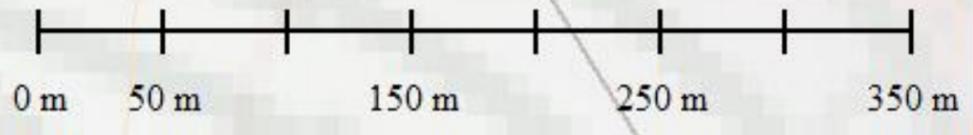
Showing Residual Magnetics from Open File 6164





### MILLER PROPERTY

Showing Residual Magnetics from Open File 6164  
and  
2012 sample sites within Tenure 387352



## **Conclusions**

Upon review of the results, a correlation can be made between the residual magnetics and the MMI data. Base metals in the MMI data appear to be highest within the apparent round magnetic anomaly. The self potential survey may have also highlighted a conductive zone on the west side of the magnetics anomaly. This could be in response to a conductive (mineralized?) sub surface rock or could be related to a fault, or both. Future surveys or other exploration activities may contribute more knowledge.

## **Recommendations**

Exploration is recommended to continue adjacent the 2012 work area and throughout the property. Recent work by West Fraser Mills has provided much new access throughout the property where it was once very remote. Cutblocks and road building activities may have exposed previously unmapped bedrock. It is highly recommended to conduct mapping and sampling, as needed, along each of the new roads. Cutblocks may also have new exposures to inspect and nearby bluffs, where possible, should also be inspected now that accessibility is better to the east. Additional MMI sampling is recommended, using a UTM-based grid and expanding on the 2012 work. Recent LiDAR surveys have also been conducted throughout the eastern Cariboo and it may be useful to acquire the data to make further interpretations as it may be useful in highlighting new exploration targets.

## References

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[http://www.barkerminerals.com/i/pdf/tech\\_report\\_oct\\_2002.pdf](http://www.barkerminerals.com/i/pdf/tech_report_oct_2002.pdf)
- Struik, L.C. (1988). Structural Geology of the Cariboo Gold Mining District, East-Central British Columbia. Geological Survey of Canada, Memoir 421.

## Website links

[http://ftp2.cits.rncan.gc.ca/pub/geott/ess\\_pubs/110/110676/gscgsm\\_1534G\\_e\\_1963\\_mn01.pdf](http://ftp2.cits.rncan.gc.ca/pub/geott/ess_pubs/110/110676/gscgsm_1534G_e_1963_mn01.pdf)  
-1963 airborne magnetics

## Statement of Costs

For work conducted September 19, 23 and 27, 2012

Field Personnel: S. Brownhill, A. Nyquist & J. Hanson (2.75 days at \$550/day)	1650.00
Research and prep 2 hours @ \$50/hr	100.00
Geophysical Equipment Rental	25.00
4x4 vehicles (truck and fuel inclusive for 2.75 days)	285.00
Saw rental	30.00
Supplies	22.00
MMI Geochemistry (21 samples @ \$40)	840.00
Shipping and Handling	100.00
GIS and data reduction (15.0 hours at \$50/hr)	750.00
Technical report (15.0 hours at \$50/hr)	750.00
Misc expenses and admin support (5% of technical)	<u>227.60</u>
	\$4779.60

**TOTAL ASSESSMENT VALUE.....\$4779.60**

TOTAL CREDITS APPLIED (Event#5306956) .....\$4550.83

*PAC requested to be applied to KENNETH DALE MILLER account = \$228.77*

## Statement of Qualifications

I, Angelique Justason, of Quesnel, British Columbia certify the following:

- I am owner of Tenorex GeoServices, a Cariboo based mineral exploration support services company.
- I managed the 2012 reconnaissance exploration at the Miller property.
- I am a member of the Geological Association of Canada and the Association for Mineral Exploration British Columbia.
- I have attended geology courses at Camosun College and the University of Victoria.
- I have successfully completed and received certificates for the Advanced Prospecting Course (1992) and Petrology for Prospectors Course (1993).
- I have 4 seasons work experience with the BC Geological Survey and the Geological Survey of Canada.
- I was employed in the Cariboo Region as a prospector, junior geologist, geotechnician and mine surveyor for over 9 years and held a supervisory position, in that capacity, for over 6 years.
- I have been an avid prospector for over 20 years and have conducted mineral exploration activities in the Wells/Barkerville area on a continuous basis since 2000.
- I do not hold any interest in the Miller property

Signed,



Angelique Justason

APPENDIX 1  
MMI data and maps

# MMI™ SAMPLING GUIDE

## NORMAL ENVIRONMENTS

- In normal soil environments samples should be collected 10 to 25cm below the surface at a consistent depth.
- The initial step in taking an MMI™ soil sample requires the 10cm surface soil layer to be scraped away eliminating loose organic matter, debris, and any possible contamination.
- The sample is then taken between 10 and 25cm depth. The sample should be a “composite” taken over this 15cm interval.
- Using a plastic scoop or shovel take a cross section of the material between the 10 to 25cm depth and put into clean, properly labelled plastic bags. Collect approx. 250 to 350 grams of material.

## BOREAL ENVIRONMENTS

- Scrape away any loose non-decomposed matter, debris, and any possible cultural contamination.
- Dig a small pit to penetrate the organic material that still has structure (i.e. decomposing leaves, bark, twigs and peat).
- Identify where the organics begin to decompose and you start to see soil formation. This is the true interface (organic / inorganic) at which to begin your measurements.
- Collect the sample between 10 and 25cm below this interface. The sample should be a continuous composite taken from the 15cm interval.
- Using a plastic scoop take a cross section of the material between the 10 to 25cm depth and put into clean, properly labelled plastic bags. Collect approx. 250 to 350 grams of material.

## GUIDELINES

- Ensure not to mix organic and inorganic soils in the collected sample. For example, if the material within the 10 to 25cm zone has a mixture of humus and inorganic soil then proceed to the base of this “mixed zone” and collect the sample from the inorganic material.
- Do not vary depth beneath the true soil interface, or target a specific layer/feature of a soil profile when sampling. Extensive research has shown that mobile element concentrations are linked to the process of capillary rise and the depth at which water is removed from a soil by evaporation and evapotranspiration (i.e. expect to see tree roots). Any significant variation in sampling depth and technique can cause severe problems for interpretation. It is imperative that all samples are collected in a consistent manner. In most tropical terrains, the true soil interface is the ground surface. In terrains with deep organic overburden, the true soil interface is the position where plant matter and debris ceases and organic soil material with an obvious mineral content becomes evident.
- Before actually taking the sample, brush sampling equipment to eliminate residue from previous samples and flush it with soil from the new sample site.
- Samples DO NOT have to be completely free of organics but should have a dominant mineral fraction. During sample collection and handling, no jewellery (watches, rings, bracelets, and chains) should be worn, as this can be a major source of contamination.
- Moist Samples – Damp samples should be collected in a similar manner to soils in dry environments. Samples should not be dried in ovens or pulverised in crushers or mills. In the case of dry plastic clays, sample material can be desegregated by crushing with a mallet between disposable plastic sheets. Sieving should be avoided if there is any possibility of serious cross-contamination during sample collection via the sieve. In this case, larger rocks and twigs/leaves etc. can be removed carefully by hand.
- Organic Material – Organic material in the form of fine roots and hairs, decomposing leaf material and other fine organic debris WILL NOT adversely affect MMI™ analyses. Experimental work has shown that variability in sampling depth has a more significant impact on element responses.
- Contaminated Sites – Where there is a potential contamination problem, samples should be collected as to avoid any contaminated material and the sampler’s judgment must be relied upon. Again, it is extremely important to keep good note of all the potential factors that may affect the sampling and interpretation.

## EQUIPMENT

- A 30cm diameter plastic garden sieve or kitchen colander with minus 5mm apertures, available from hardware and supermarkets, is ideal for sample collection. This is used only to remove large pebbles or roots.
- Plastic collection dish with similar diameter and a kitchen floor brush used for cleaning the sieve and dish between samples.
- A bare steel (no paint) garden spade.
- Plastic snap seal bags, do not use calico or brown paper.

Proper labelling of all samples is critical. Do not use water soluble markers or paper inside wet bags.

## OTHER ASSISTANCE

SGS has a number of case studies and technical bulletins to help with all your sampling needs. Please visit our web site for further details or to contact our local SGS representatives. Consultants are available for sampling assistance and/or interpretation.

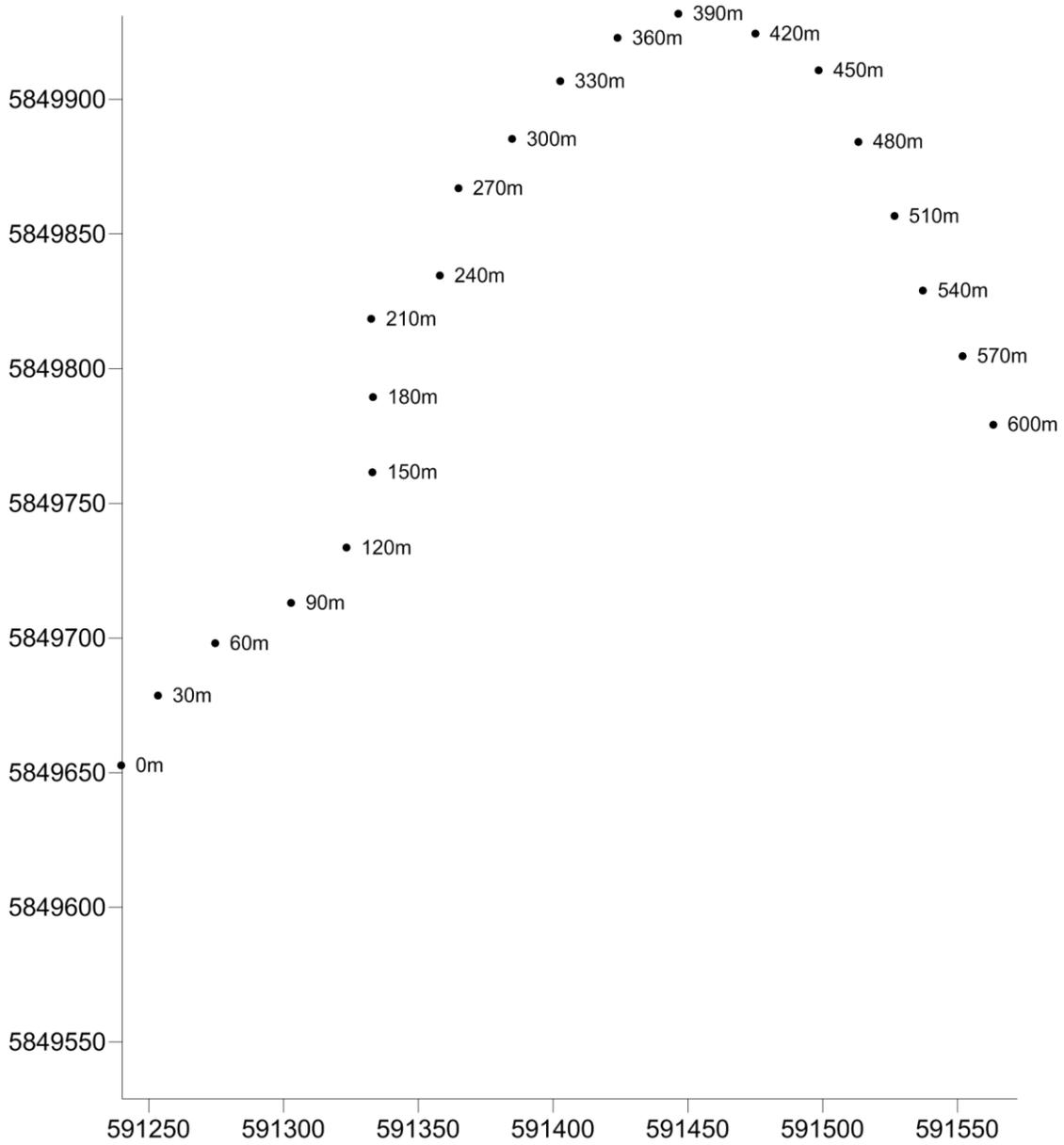
## CONTACT INFORMATION

Email us at [minerals@sgs.com](mailto:minerals@sgs.com)  
[www.sgs.com/mining](http://www.sgs.com/mining)

STATION ID	UTM E	UTM N	GPS elevation	DATE	DEPTH (cm)	COLOUR	DESCRIPTION	Au ppb	Cu ppb	Pb ppb	Zn ppb
0m	591240	5849653	4305 ft	23-Nov-12	25	Medium brown with red hue	Sandy and coarse soil. Angular and rounded cobbles.	<0.1	260	120	460
30m	591254	5849678	4287 ft	23-Nov-12	22	Medium brown with red hue	Sandy and coarse soil. Rounded pebbly to cobbly gravel. 60% rock in the hole.	<0.1	230	90	700
60m	591275	5849698	4283 ft	23-Nov-12	25	Medium to dark brown	Sandy and coarse soil. Round cobbly gravel. 40% rock in the hole.	<0.1	320	80	340
90m	591303	5849713	4285 ft	23-Nov-12	27	Reddish brown	Sandy, loamy and coarse soil. Round cobbly gravel. 70% rock in the hole.	<0.1	290	130	290
120m	591324	5849733	4272 ft	23-Nov-12	30	Medium brown with red hue	Sandy, loamy and fine soil. Angular and rounded pebbly to cobbly gravel. 60% rock in the hole.	<0.1	310	170	1580
150m	591333	5849761	4277 ft	23-Nov-12	30	Black	Loamy soil. Located near a creek. No rocks in the hole.	<0.1	1300	100	510
180m	591333	5849789	4266 ft	23-Nov-12	30	Medium brown	Sandy and fine soil. Rounded cobbly gravel. 10% rock in the hole.	<0.1	440	240	590
210m	591333	5849818	4272 ft	23-Nov-12	30	Black	Very wet, loamy soil. Rounded pebbly to cobbly gravel. 70% rock in the hole.	0.4	3710	210	270
240m	591358	5849834	4294 ft	23-Nov-12	30	Medium brown	Sandy and fine soil. Rounded pebbly to cobbly gravel. 20% rock in the hole.	<0.1	830	250	1180
270m	591365	5849866	4272 ft	23-Nov-12	27	Light brown	Sandy and coarse soil. Round cobbly gravel. 20% rock in the hole.	0.2	1300	220	340
300m	591385	5849884	4283 ft	23-Nov-12	25	Medium to dark brown	Wet, loamy soi. Rounded cobbles. 50% rock in the hole.	0.1	3860	70	540
330m	591403	5849906	4294 ft	23-Nov-12	30	Dark brown	Sandy, loamy soil. Rounded cobbles. 25% rock in the hole.	0.1	2500	310	460
360m	591424	5849922	4304 ft	23-Nov-12	25	Dark bown	Sandy, loamy and coarse soil. Angular pebbles and cobbles. 25% rock in the hole.	<0.1	640	180	2460
390m	591446	5849931	4320 ft	23-Nov-12	30	Dark brown	Sandy, loamy and coarse soil. Angular and rounded pebbly to cobbly gravel. 30% rock in the hole.	<0.1	1370	450	2110
420m	591475	5849924	4340 ft	23-Nov-12	30	Light to medium brown	Sandy and coarse soil. Angular and rounded cobbly gravel. 30% rock in the hole.	0.2	5160	80	200
450m	591498	5849910	4339 ft	23-Nov-12	22	Medium brown	Sandy, loamy and coarse soil. Angular and rounded pebbly to cobbly gravel. 30% rock in the hole.	<0.1	1200	260	1170
480m	591513	5849884	4332 ft	23-Nov-12	32	Black	Loamy soil. Angular and rounded cobbles. 20% rock in the hole.	0.1	3330	10	110
510m	591526	5849856	4380 ft	23-Nov-12	25	Dark brown	Sandy and coarse soil. Angular and rounded pebbly to cobbly gravel. 45% rock in the hole.	<0.1	2740	90	350
540m	591537	5849828	4344 ft	23-Nov-12	25	Black	Wet and loamy soil. Rounded cobbly gravel. 10% rock in the hole.	<0.1	960	130	520
570m	591552	5849804	4348 ft	23-Nov-12	25	Dark brown	Wet and loamy soil. Angular and rounded cobbles. 30% rock in the hole.	<0.1	1530	90	850
600m	591563	5849779	4346 ft	23-Nov-12	22	Dark brown	Loamy soil. Rounded cobbles. A lot of roots. 5% rock in the hole.	<0.1	1290	550	1930

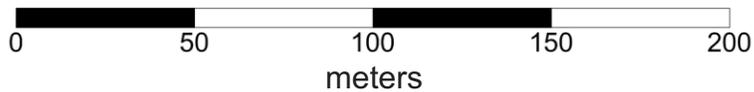
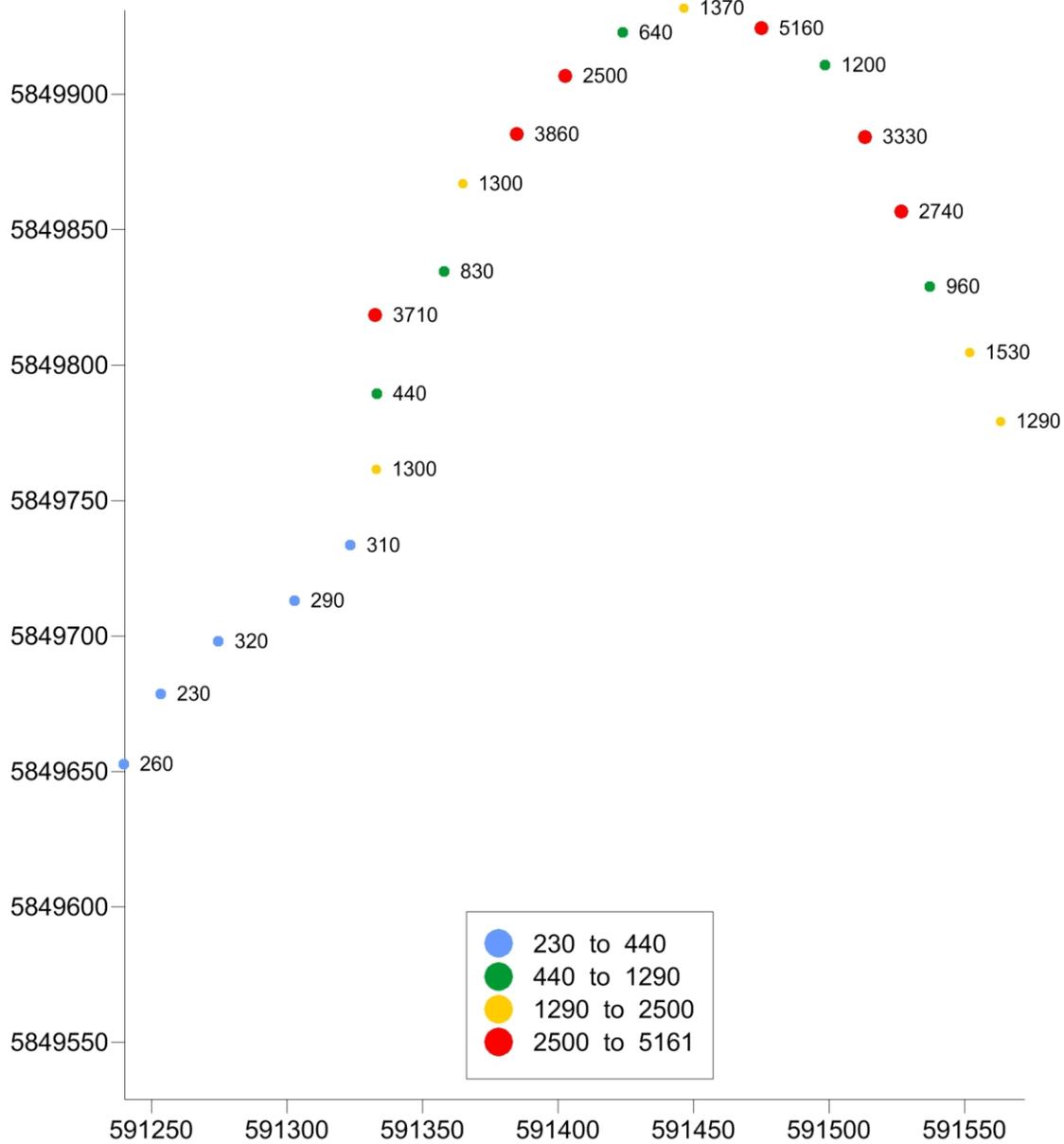
\* top 10% value are highlighted red

# MILLER PROPERTY Soil Sample ID Map

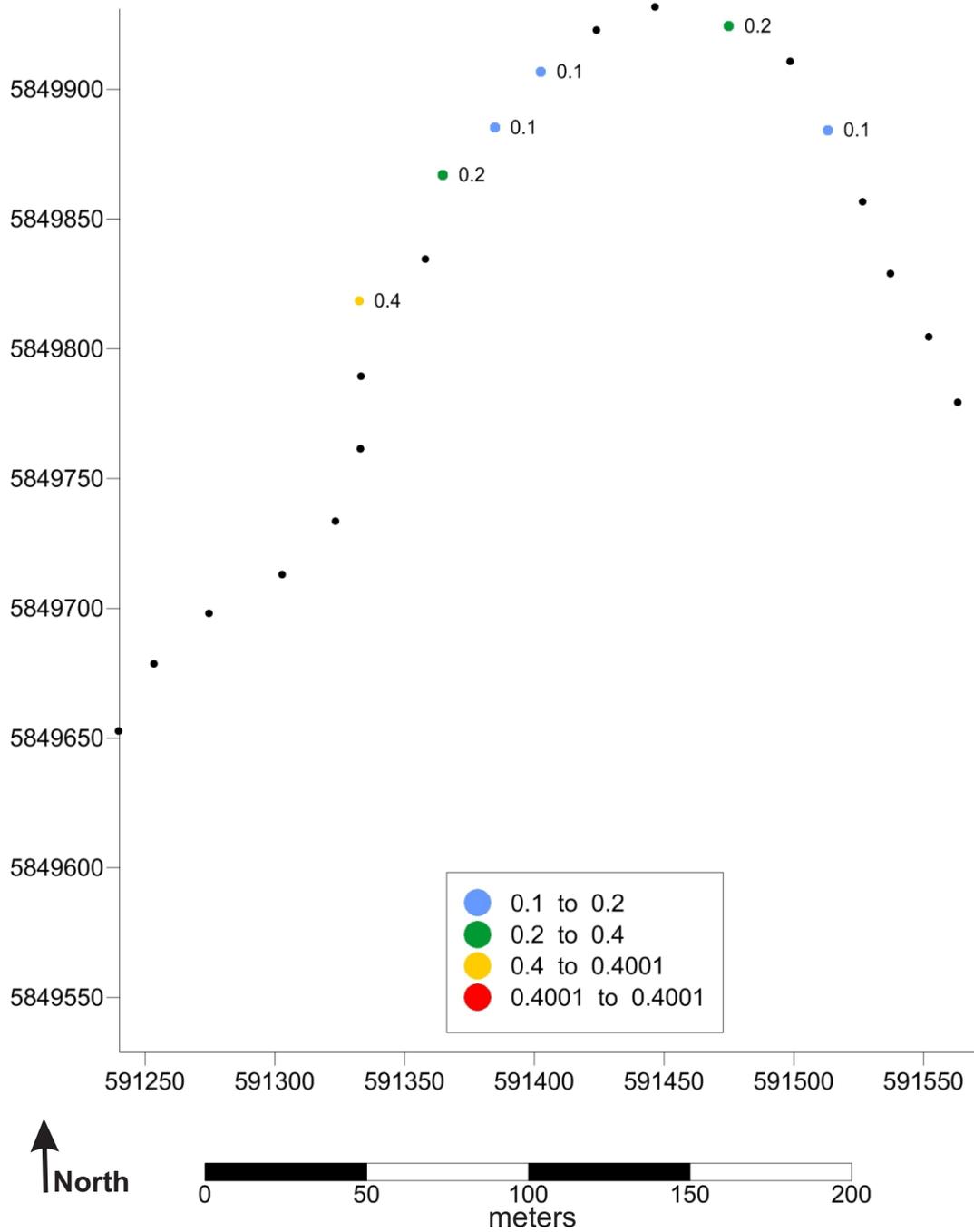


# MILLER PROPERTY

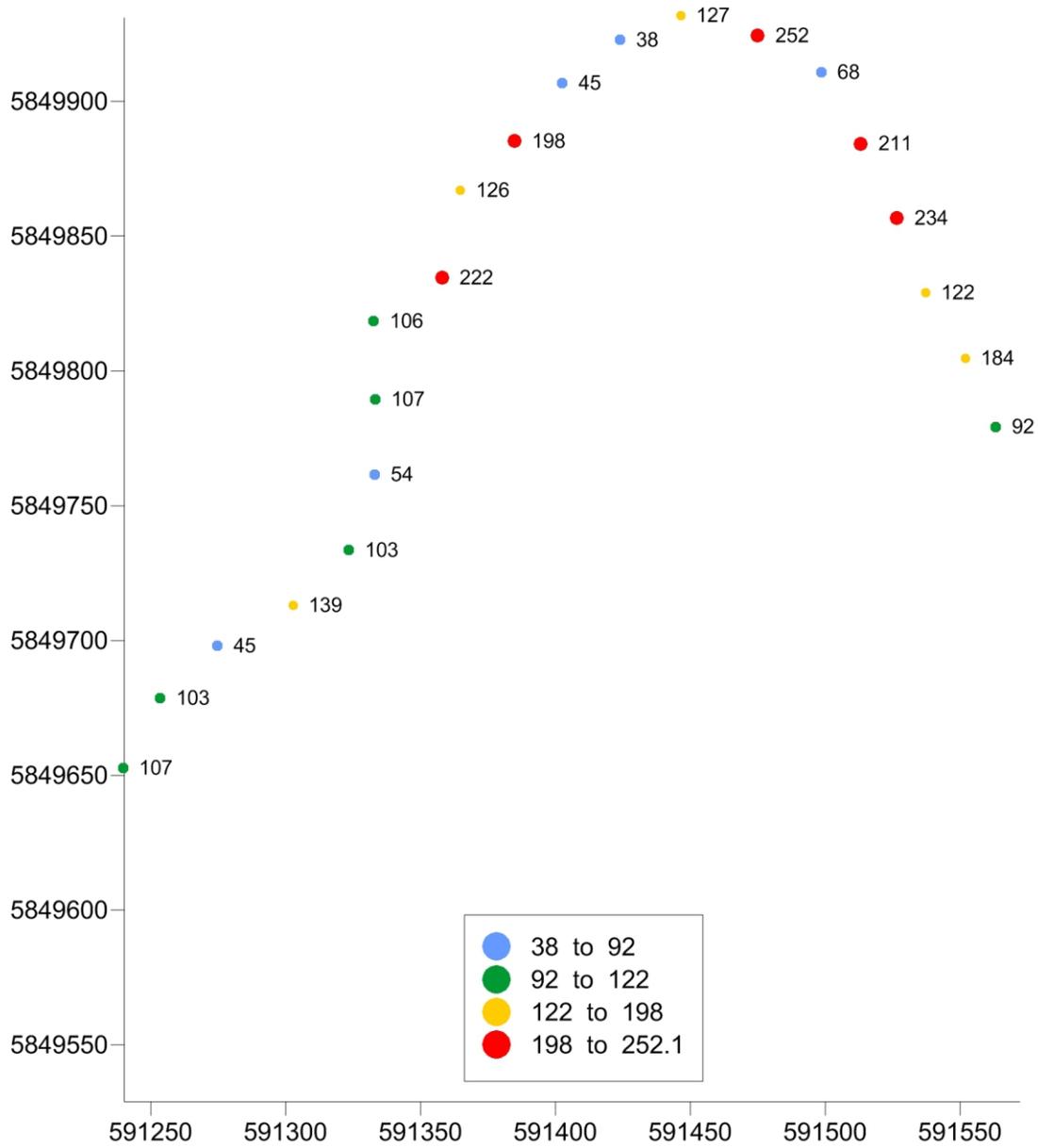
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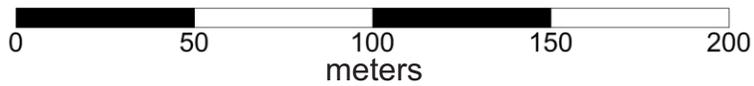
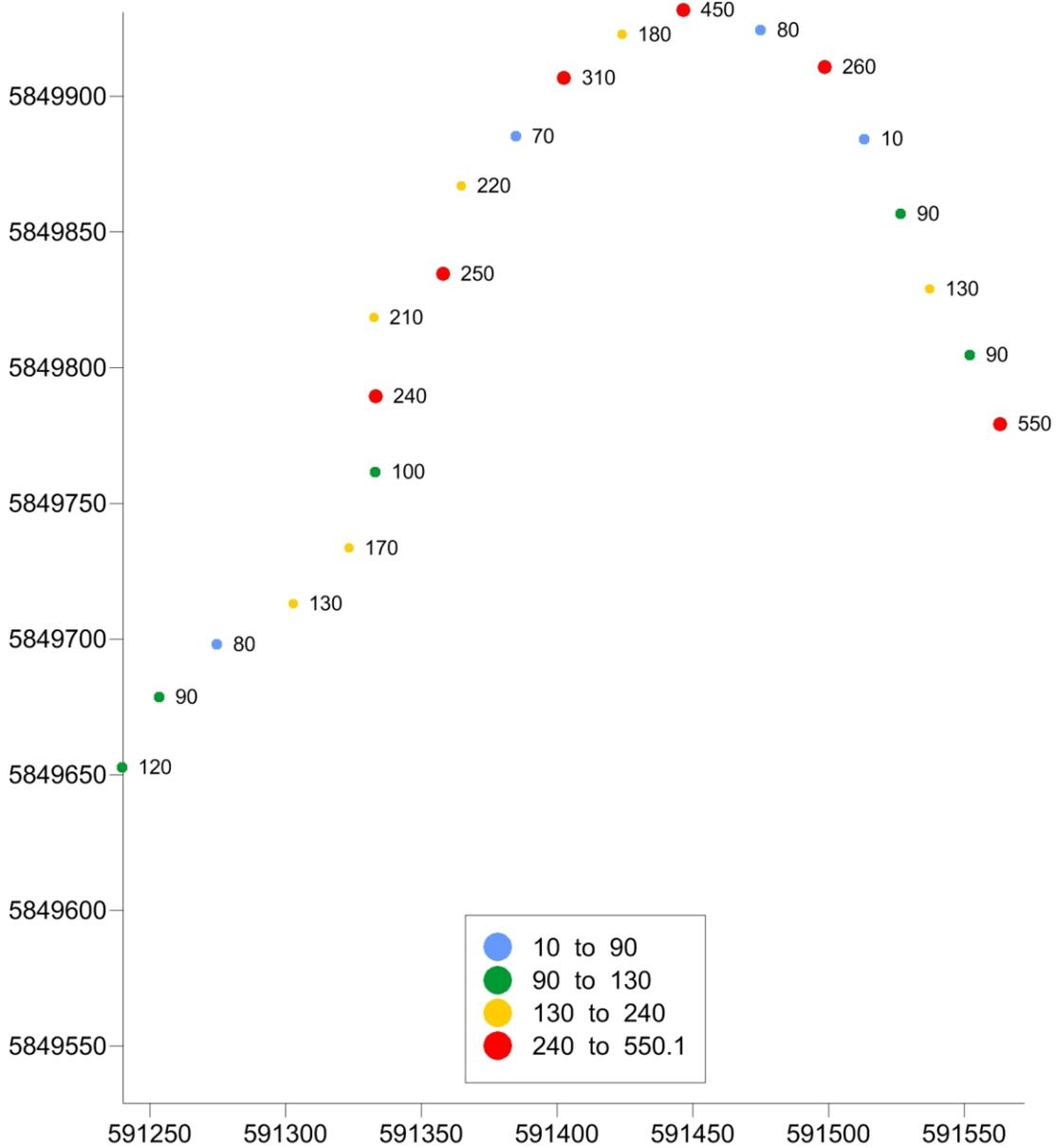
# MILLER PROPERTY MMI Geochemistry : Gold (ppb)



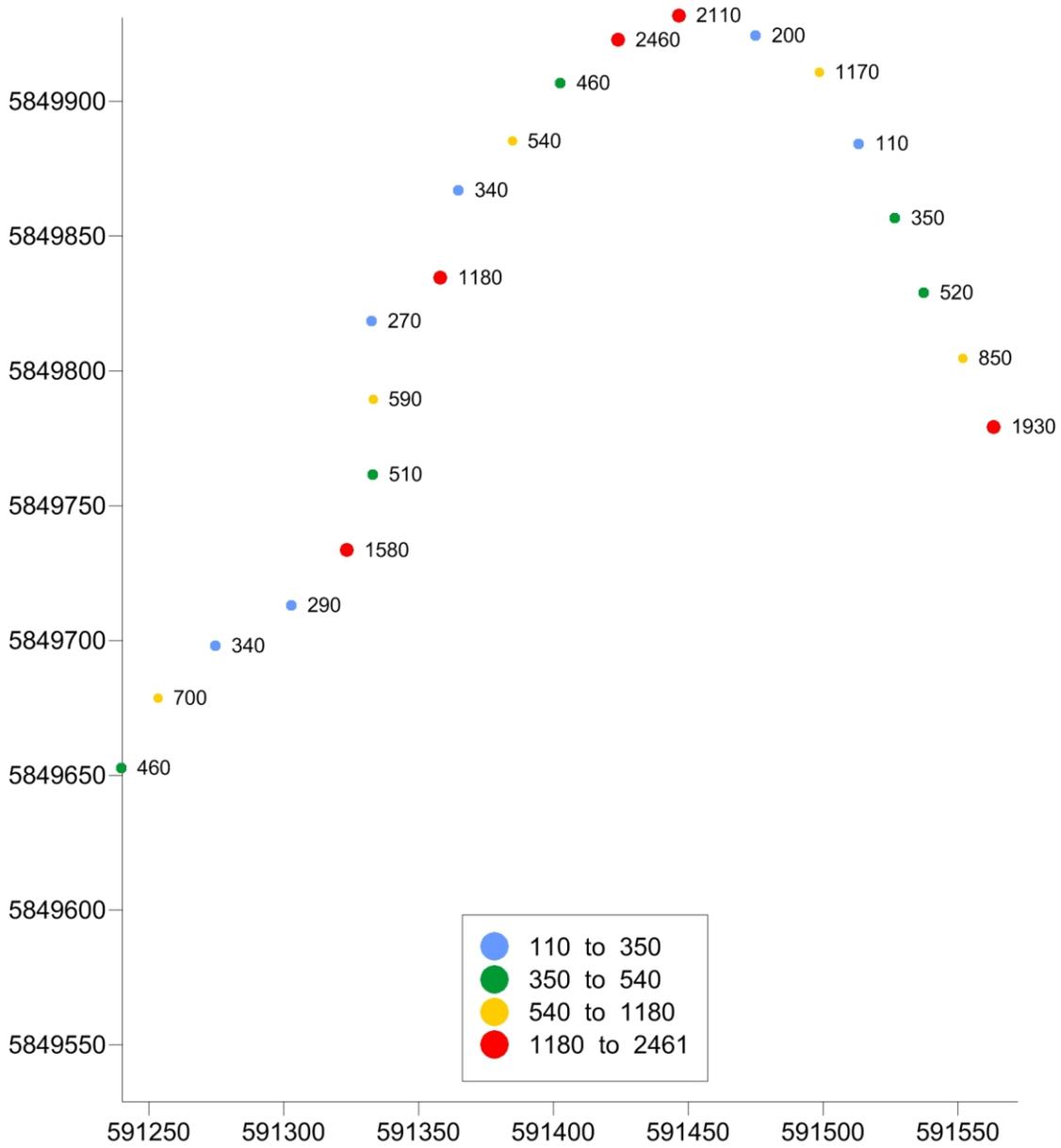
# MILLER PROPERTY MMI Geochemistry : Iron (ppm)

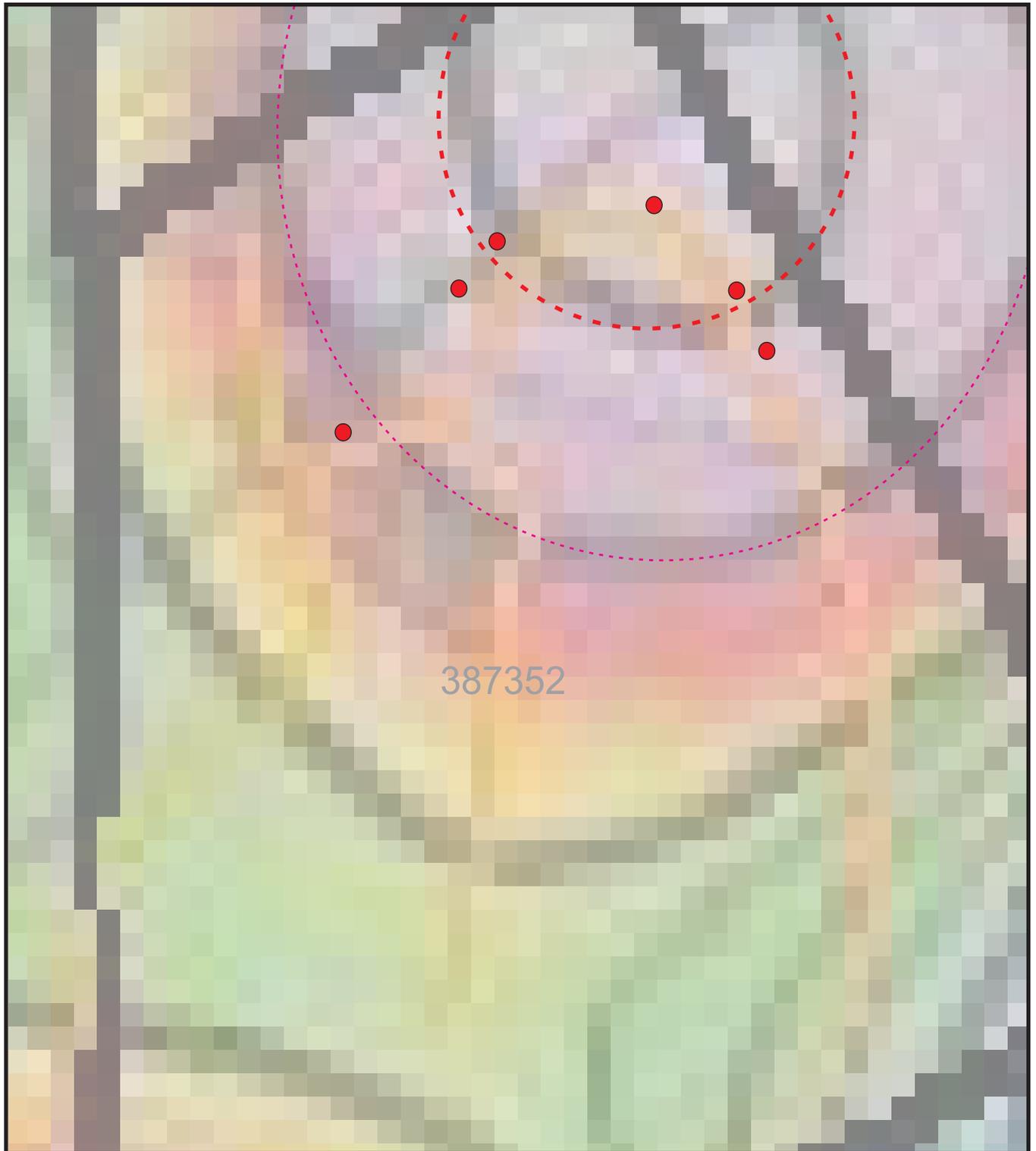


# MILLER PROPERTY MMI Geochemistry : Lead (ppb)



# MILLER PROPERTY MMI Geochemistry : Zinc (ppb)





387352

**MILLER PROPERTY  
REFERENCE MAP**  
showing residual magnetics  
with

75th percentile Copper in soils (red dots)



**\*\*For reference only\*\*** Shaded magnetics image sourced from Open File 6164.

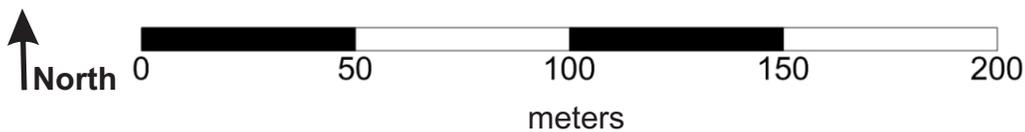
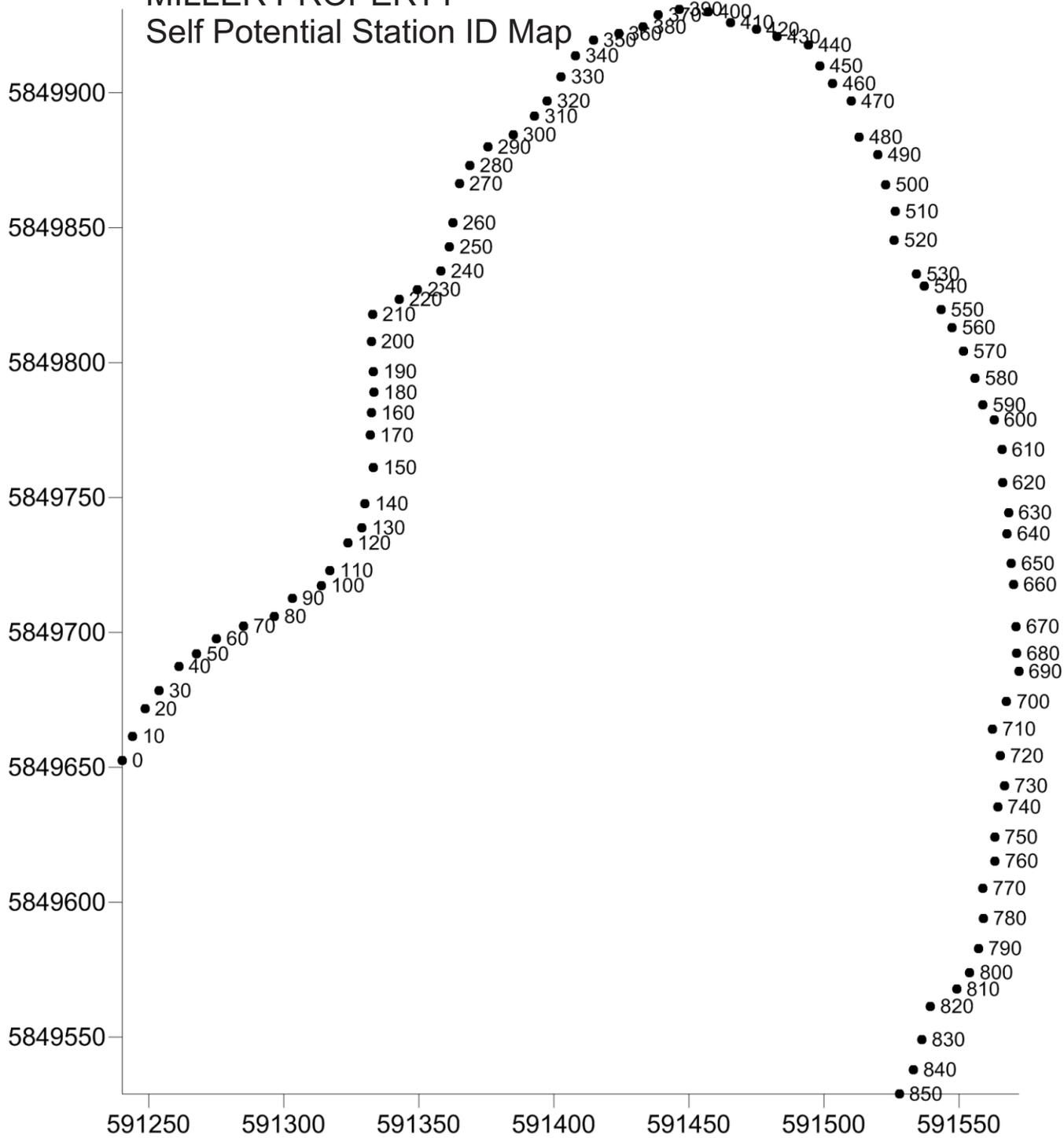
## APPENDIX 2

### Self Potential Geophysical Data and Maps

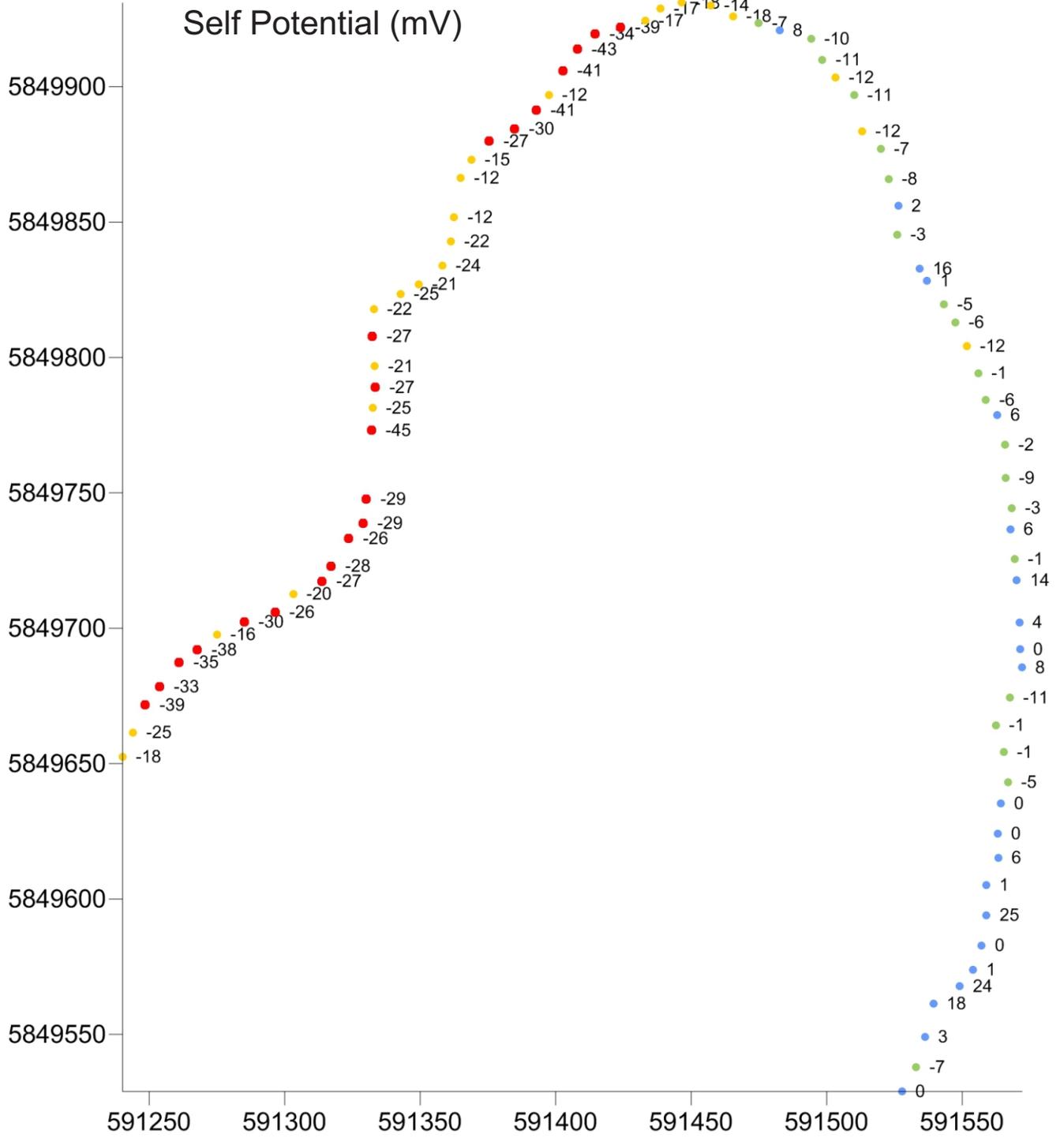
DATE	TIME	STATION (m)	UTM E	UTM N	GPS elevation	READING (mV)	CORRECTED (mV)	COLOR	NOTES
27-Sep-12		850	591528	5849529	4384 ft	-	0	not described	Base Station. Weather is sunny and clear. Brushed up the line with chainsaw in morning from 0-850m. SP started at 850m back downhill to start of line
27-Sep-12	11:26	840	591533	5849538	4397 ft	-7	-7	medium brown	Sandy dry
27-Sep-12		830	591536	5849549	4392 ft	3	3	medium brown	Sandy dry
27-Sep-12		820	591539	5849561	4391 ft	18	18	medium brown	Sandy and damp
27-Sep-12		810	591549	5849568	4395 ft	24	24	medium brown	Sandy and damp
27-Sep-12		800	591554	5849574	4392 ft	1	1	dark brown	Sandy, loamy and damp
27-Sep-12		790	591557	5849583	4381 ft	8	0	medium brown	Sandy and dry. Common round grey pebbles
27-Sep-12	11:40	780	591559	5849594	4380 ft	25	25	light brown	Sandy and damp
27-Sep-12		770	591559	5849605	4380 ft	1	1	light brown	Sandy and damp. Common angular grey pebbles
27-Sep-12		760	591563	5849615	4380 ft	6	6	medium brown	Sandy and damp
27-Sep-12		750	591563	5849624	4374 ft	0	0	medium brown	Sandy and dry
27-Sep-12		740	591564	5849635	4361 ft	0	0	dark brown	Sandy loam. Damp
27-Sep-12		730	591567	5849643	4376 ft	-5	-5	dark brown	Sandy loam. Damp
27-Sep-12	11:55	720	591565	5849654	4356 ft	-1	-1	dark brown	Sandy and damp
27-Sep-12		<b>720</b>				-	<b>-1</b>	-	New tie in point
27-Sep-12	12:22	710	591562	5849664	4354 ft	0	-1	light brown	Sandy and dry
27-Sep-12		700	591568	5849674	4355 ft	-10	-11	medium brown	Sandy and dry
27-Sep-12		690	591572	5849685	4349 ft	9	8	dark brown	Sandy loam. Damp
27-Sep-12		680	591571	5849692	4345 ft	1	0	medium brown	Sandy loam. Fry
27-Sep-12		670	591571	5849702	4361 ft	5	4	medium brown	Sandy and damp. Rich in nearby rounded grey boulder
27-Sep-12		660	591570	5849718	4370 ft	15	14	light brown	Sandy and damp. Weather is sunny and partly cloudy
27-Sep-12		650	591569	5849725	4364 ft	0	-1	light brown	Sandy and dry
27-Sep-12		640	591568	5849737	4361 ft	7	6	medium brown	Sandy and damp
27-Sep-12	12:36	630	591568	5849744	4360 ft	-2	-3	dark brown	Sandy loam. Damp
27-Sep-12		620	591566	5849755	4353 ft	-8	-9	medium brown	Sandy loam. Damp
27-Sep-12		610	591566	5849768	4361 ft	-1	-2	medium brown	Sandy loam. Damp
27-Sep-12		600	591563	5849779	4346 ft	7	6	medium brown	Sandy and damp. Grey rounded boulder
27-Sep-12		590	591559	5849784	4356 ft	-5	-6	dark brown	Sandy loam. Damp
27-Sep-12		580	591556	5849794	4346 ft	0	-1	dark brown	Sandy loam. Damp. Rare angular grey cobbles
27-Sep-12	12:56	570	591552	5849804	4348 ft	-11	-12	dark brown	Sandy and damp
27-Sep-12		<b>570</b>				-	<b>-12</b>	-	New tie in point
27-Sep-12	1:14	560	591547	5849813	4352 ft	6	-6	dark brown	Sandy loam. Damp
27-Sep-12		550	591543	5849820	4350 ft	7	-5	light brown	Sandy and dry. Rich in grey angular pebbles, gravel and cobbles
27-Sep-12		540	591537	5849828	4344 ft	13	1	dark brown	Sandy and damp. Common grey rounded pebbles and gravel
27-Sep-12		530	591534	5849833	4352 ft	28	16	dark grey	Sandy and moist. Rich in rounded grey pebbles, gravel and cobbles
27-Sep-12		520	591526	5849845	4359 ft	9	-3	medium brown	Sandy and damp
27-Sep-12		510	591526	5849856	4380 ft	14	2	medium brown	Sandy and damp. Common grey rounded boulder
27-Sep-12		500	591523	5849866	4346 ft	4	-8	dark brown	Sandy loam. Damp
27-Sep-12	1:31	490	591520	5849877	4343 ft	5	-7	light brown	Sandy and dry. Rich in rounded grey pebbles and gravel
27-Sep-12		480	591513	5849884	4332 ft	0	-12	medium brown	Sandy and dry
27-Sep-12		470	591510	5849897	4341 ft	1	-11	medium brown	Sandy and damp
27-Sep-12		460	591503	5849903	4347 ft	0	-12	medium brown	Sandy loam. Damp
27-Sep-12	1:42	450	591498	5849910	4339 ft	1	-11	dark grey	Damp. Common grey rounded pebbles and gravel
27-Sep-12		440	591494	5849918	4338 ft	2	-10	dark brown	Sandy and damp. Common grey rounded cobbles
27-Sep-12		<b>440</b>				-	<b>-10</b>	-	New tie in point

DATE	TIME	STATION (m)	UTM E	UTM N	GPS elevation	READING (mV)	CORRECTED (mV)	COLOR	NOTES
27-Sep-12	1:58	430	591483	5849921	4331 ft	18	8	brown to grey	Sandy and dry. Rich in grey rounded pebbles, gravel and cobbles
27-Sep-12		420	591475	5849924	4340 ft	3	-7	light brown	Starting down steeper grade. Common grey rounded pebbles
27-Sep-12		410	591465	5849926	4328 ft	-8	-18	dark brown	Sandy and damp
27-Sep-12		400	591457	5849930	4313 ft	-4	-14	medium grey	Sandy and wet
27-Sep-12		390	591446	5849931	4320 ft	-8	-18	medium brown	Sandy and damp. Common rounded cobbles
27-Sep-12		380	591433	5849924	4340 ft	-7	-17	light grey	Sandy and dry. Common grey rounded pebbles, gravel and cobbles
27-Sep-12		370	591439	5849929	4304 ft	-7	-17	medium grey	Sandy and dry
27-Sep-12	2:11	360	591424	5849922	4304 ft	-29	-39	medium grey	Sandy and dry
27-Sep-12		350	591415	5849920	4307 ft	-24	-34	light grey	Sandy loam. Damp
27-Sep-12		340	591408	5849914	4297 ft	-33	-43	dark brown	Dry loam
27-Sep-12		330	591403	5849906	4294 ft	-31	-41	dark brown	Sandy loam. Dry
27-Sep-12	2:18	320	591397	5849897	4300 ft	-2	-12	dark brown	Loamy. Dry
27-Sep-12		<b>320</b>				-	<b>-12</b>	-	New tie in point
27-Sep-12	2:35	310	591393	5849891	4292 ft	-29	-41	dark brown	Sandy loam. Damp
27-Sep-12		300	591385	5849884	4283 ft	-18	-30	dark brown	Loamy. Damp
27-Sep-12		290	591376	5849880	4279 ft	-15	-27	dark brown	Loamy. Damp
27-Sep-12		280	591369	5849873	4276 ft	-3	-15	dark brown	Loamy. Damp
27-Sep-12		270	591365	5849866	4272 ft	0	-12	black	Going slightly uphill now. Loamy. Moist
27-Sep-12		260	591363	5849852	4279 ft	0	-12	dark brown	Wet
27-Sep-12	2:45	250	591361	5849843	4282 ft	-10	-22	dark brown	Loamy and damp
27-Sep-12		240	591358	5849834	4294 ft	-12	-24	medium brown	Terrain levels out. Sandy and damp
27-Sep-12		230	591350	5849827	4275 ft	-9	-21	medium brown	Terrain levels out. Sandy and damp
27-Sep-12		220	591343	5849823	4261 ft	-13	-25	medium brown	Terrain levels out. Sandy and damp
27-Sep-12		210	591333	5849818	4272 ft	-10	-22	dark brown	Sandy and damp
27-Sep-12	2:55	200	591332	5849808	4279 ft	-15	-27	medium brown	Sandy and damp. Rare quartz rounded pebbles
27-Sep-12		<b>200</b>				-	<b>-27</b>	-	New tie in point. Lots of quartz float in area
27-Sep-12	3:07	190	591333	5849797	4291 ft	6	-21	medium brown	Sandy and dry. Common grey rounded pebbles and gravel
27-Sep-12		180	591333	5849789	4266 ft	0	-27	light brown	Heading down into small draw. Sandy and dry
27-Sep-12		170	591332	5849773	4278 ft	-18	-45	dark brown	Loamy and damp
27-Sep-12		160	591332	5849781	4268 ft	2	-25	dark brown	Loamy and damp
27-Sep-12		150	591333	5849761	4277 ft	NS	NS	NS	No sample. Creek bed
27-Sep-12		140	591330	5849748	4277 ft	-2	-29	dark brown	Starting up other side of creek draw. Sandy loam. Damp
27-Sep-12		130	591329	5849739	4275 ft	-2	-29	light brown	Sandy and dry
27-Sep-12		120	591324	5849733	4272 ft	1	-26	light brown	Sandy and dry. Common angular grey pebbles
27-Sep-12		110	591317	5849723	4273 ft	-1	-28	light brown	Sandy and dry
27-Sep-12	3:20	100	591314	5849717	4287 ft	0	-27	light brown	Sandy and dry. Rich in angular pebbles and gravel
27-Sep-12		<b>100</b>				-	<b>-27</b>	-	New tie in point
27-Sep-12	3:29	90	591303	5849713	4285 ft	7	-20	light brown	Sandy and dry. Rich in rounded angular pebbles and gravel
27-Sep-12		80	591297	5849706	4279 ft	1	-26	medium brown	Sandy and dry. Rich in angular and rounded pebbles and gravel
27-Sep-12		70	591285	5849702	4280 ft	-3	-30	medium brown	Sandy and dry. Rich in angular and rounded pebbles and gravel
27-Sep-12		60	591275	5849698	4283 ft	11	-16	medium brown	Sandy and dry. Rich in angular and rounded pebbles and gravel
27-Sep-12		50	591268	5849692	4285 ft	-11	-38	light brown	Sandy and dry. Rich in angular and rounded pebbles and gravel
27-Sep-12		40	591261	5849687	4290 ft	-8	-35	light brown	Sandy and dry. Common angular and rounded pebbles and gravel
27-Sep-12		30	591254	5849678	4287 ft	-6	-33	light brown	Common angular and rounded pebbles and gravel
27-Sep-12		20	591249	5849672	4301 ft	-12	-39	medium brown	Sandy and damp. Common angular and rounded pebbles and gravel
27-Sep-12		10	591244	5849661	4302 ft	2	-25	light brown	Sandy and dry. Common angular pebbles and gravel
27-Sep-12	3:33	0	591240	5849653	4305 ft	9	-18	medium brown	Sandy and damp. Common angular and rounded pebbles and gravel

# MILLER PROPERTY Self Potential Station ID Map



# MILLER PROPERTY Self Potential (mV)



meters