Assessment Report

on

Prospecting and Mag and VLF

on the

Dokis Property,
Dokis and Pontiac Townships

Larder Lake Mining Division
Northeastern Ontario

NTS: 32 D/5

Written by:

Graham Stone
6 Finch Trail McDougall, Ontario
P2A 0B3

October 2016

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Introduction:

The Dokis Property is located in the southeastern portion of Dokis Twp and the north eastern part of Pontiac Twp. The claims are within the Larder Lake Mining Division, Northeastern Ontario.
The property itself is comprised of 3 contiguous claims, #'s 4269569, 4269570 and 4269571.(36 units) covering an area of 576 hectares.
The property is within the historic Kirkland Lake Gold Camp, but, surprisingly has seen very little exploration over the years. The original purpose of this project was to locate a trench and pit that was identified on OGS map 2367 which accompanies Geological Report #165, and was later sampled by Edouard Poirier on an OPAP grant in 1993. His samples yielded anomalous Copper values. We wanted to further prospect this area in the hope of finding more showings that would suggest a massive sulphide depositional environment. As well as massive sulphides we were interested in prospecting for Lode Gold deposits. During the course of our prospecting we discovered a new gold showing in claim 4269571. A total of 22 samples were collected and sent to the Lab for analysis.

Location and Access:

The general location of the property is approximately 25km due north of Virginiatown Ontario, see Figure 1.
More accurately from the town of Kearns(on hwy 66) you travel north along a forest access road for approx 25 kms. Here you turn north on an ATV trail for another 4kms which brings you to the property boundary. The claim package butts up against the Quebec border.

Regional Geology:

The project area is underlain by the Blake River Group which consists of flat lying calc-alkaline volcanic and some associated mafic intrusive bodies. These rocks have undergone low-grade regional metamorphism and are classed as lower greenschist facies. Several major northeast faults transect the property, including the Murdoch Creek – Kennedy Lake fault, as well as numerous north trending faults. The claim topography varies from flat and swampy areas to extremely rugged terrain some of which is inaccessible due to cliffs.

Historical Work:

Very little work has been filed with the MNDM on this property. In 1960, the South-West Potash did a regional mapping program which included a section of Southeast Dokis Township, report 32D05NE0018. In 1992, under funding from the Provincial government OPAP program, Edouard Poirier and Dean Cutting did a prospecting program in the area, (File No. OP92-688). More recent work was conducted by Golden Chalice Resources in 2006 and 2007 which included mag, maxmin and vlf. (20003207, 20003807 and 20001913). Much older work is evident in the form of a trench and pit(now referred to as the "Poirier Occurrence"). This trench and pit are shown on government map(M2367 Tannahill and Dokis Townships). This map and associated report was published in 1978, so this work was done before that and no record of it could be found in the assessment files.

Personnel:

Gord Hume
#3-5th Avenue
Larder Lake, Ont.
P0K 1L0

Melanie Tremblay
#3-5th Avenue
Larder Lake, Ont.
P0K 1L0

Bill Hume
#125 3rd Avenue
Box1107
Englehart, Ont.
P0J 1H0

Graham Stone
6 Finch Trail
McDougall Ont.
P2A 0B3

Work Log:

The following personnel worked on this property during the period of this report and conducted the following work activities summarized below:

Personnel	Activity	Dates Worked	Man Days
Gord Hume	Prospecting	Oct 12, 2014 and June 16, 17, 18, 19, 20, 2015	6 days
	Mag Survey	June 21, 2015	1 day
	Trail Clearing	Sept 2, 2016	1 day
	Trenching /Sampling	Sept 3, 4, 5, 2016	3 days
Graham Stone	Mob/Demob	June 15, 22, 2015	
		Sept 1, 6, 2016	4 days
	Prospecting	Oct 12, 2014 and June 16, 17, 18, 19, 20, 2015	6 days
	VLF Survey	June 21, 2015	1 day
	Trail Clearing	Sept 2, 2016	1 day
	Trenching /Sampling	Sept 3, 4, 5, 2016	3 days
	Assessment Report	Oct 24, 25, 26, 2016	3 days
Bill Hume	Mob/Demob	June 15, 22, 2015	
		Sept 1, 6, 2016	4 days
	Prospecting	June 16, 17, 18, 19, 20, 2015	5 days
	Trail Clearing	Sept 2, 2016	1 day
	Trenching /Sampling	Sept 3, 4, 5, 2016	3 days
Melanie Tremblay	Prospecting	June 16, 17, 18, 19, 20, 2015	5 days
	Trail Clearing	Sept 2, 2016	1 day
	Trenching /Sampling	Sept 3, 4, 5, 2016	3 days
		Total	**51 man days**

Conclusions and Recommendations:

Prospecting: Prospecting yielded some interesting results. During the course of one of our prospecting traverses, we found a very small outcropping of Quartz. We realized this was a vein and were able to grab 4 samples as it was late in the day. The vein was covered with regolith and vegetation but we were able to follow it for about 35 meters. Of the initial 4 grabs we got values of 6.6g/t, 1.1g/t and .8g/t gold and 1160ppb, 8190ppb copper. Based on these results we decided to do a small power stripping program and try and expose the vein further. This was done and more samples were collected along the vein and the best of these were over 5g/t. The vein itself seems to be quartz with a rhyolite component with abundant sulphides in places and fuchsite visible as well.

Magnetometer Survey: The Magnetic survey was done over a small area in claim # 4269571, for a total of 2400m which also included readings taken along the trail while walking in. We were trying to establish whether or not the Quartz vein showing that contained abundant sulphides could be delineated using mag data. Also, prospecting in the immediate area of the showing(50 meters south), we found numerous rhyolite boulders with heavy sulphide content. We thought that the mag may pick this up if there was enough pyrrhotite.

VLF Survey: The Vlf survey was also conducted over the immediate area of the Quartz vein to see if the abundant sulphides would be conductive enough to show up. Also, there are interpreted sulphide stringers that were interpreted by others, that we thought could be similar to our vein and may be detectable using this method. 2 lines of 250meters each were Chained and flagged and subsequently surveyed.

Trenching: The trenching part of our program was specifically aimed at our gold showing. It was the only trenching/stripping we did although we had initially applied to do more. Time constraints meant we could only do this one area. The area was heavily treed and covered with regolith and was difficult to clear. Once this was accomplished the pump could be used to wash down the exposed vein so that we could better look at it and sample.

Recommendations: The mag and vlf surveys need to be extended to get better coverage to know whether or not the surveys will work on a broader scale. It appears that the mag relief will be low so any results may be very subtle. The vlf showed an extremely high out of phase response at the southend of the short survey lines. The response was so high it could not be nulled out. The lines should be extended back a least another 300 meters to try and get behind the source of this quadrature response if possible.
Based on the prospecting results, we feel more prospecting is warranted in the area, and if possible an IP survey to try and find more of these veins, as they would definitely show up due to the sulphide content. The trenching was successful in that it did expose the quartz vein better and allowed us to get more samples. It showed however, that the vein exposure disappears and heavy equipment would be needed to further trace it. For now, we will leave it and concentrate on trying to find others.

Qualifying Statement

I, Graham Stone, residing at #6 Finch Trail, McDougall Ontario, P2A 0B3 state the following with respects to this report:

I wrote this report and produced the accompanying tables and maps based on information collected by myself and others mentioned in this report.

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Respectfully Submitted

Graham Stone

in McDougall, ON
Oct 26, 2016

Additional Information:

Trail Clearing: One day was spent clearing an ATV trail into the area of the quartz vein. This was done so we could get the wajax pump and hose and other trenching tools into the site..

Flagged lines for VLF: We Chained and flagged the two lines that the vlf survey was read along.

Prospecting: The prospecting work was carried out in teams of 2 people. One gps was used per group and represents the track of the person carrying it. The second person was walking a similar path usually only 10 – 20m away at a maximum. This was done for safety reasons and also to minimize the chance of missing something on the traverse.

References:

Jensen, L.S. Ontario Geological Survey, Report 165
Geology of Thackeray, Elliott, Tannahill, and
Dokis Townships 1978.

Cutting, D.R. Summary Report, Southeast Dokis(and Adjoining Northeast Pontiac)
Township, Prospecting Project 1992. File no. OP92-688
32D05NE0067.

Ploeger, J.C. VLF and HLEM Max Min Surveys over the Dokis Property. On behalf
of Golden Chalice Resources Inc., 2007. (20003807)

Ploeger, J.C. Magnetometer Survey over the Dokis Property. On behalf
of Golden Chalice Resources Inc., 2007. (20003207)


Figure 1
KEY LOCATION MAP
Ontario
0 80 160 240 320
Kilometers
© World Sites Atlas (sitesatlas.com)
Project Area
HUDSON BAY
NUNAVUT
MANITOBA
Thompson
Fort Severn
Winisk
Winisk R.
Severn R.
Big Trout L.
Ekwan R.
James Bay
NUNAVUT
Attawapiskat R.
Fort Albany
QUÉBEC
Central Patricia
Albany R.
Albany R.
Moosonee
Red Lake
ONTARIO
CANADA
Lac Seul
Kenora
Dryden
L. of the Woods
L. Nipigon
Missinaibi R.
Abitibi R.
Hearst
Geraldton
Kapuskasing
Fort Frances
Nipigon
Cochrane
Iroquois Falls
Timmins
L. Abitibi
Thunder Bay
Pukaskwa Nat. Park
Kirkland Lake
Rouyn-Noranda
Wawa
L. Superior
Chapleau
New Liskeard
Duluth
Trois-Rivières
MINNESOTA
Sault Ste. Marie
Elliot Lake
Valley East
North Bay
MICHIGAN
Sudbury
Pembroke
MONTRÉAL
Ottawa R.
Algonquin Prov. Park
Minneapolis
Manitoulin I.
Georgian Bay
Ottawa
St. Paul
Huntsville
Cornwall
Parry Sound
Brockville
St. Lawrence R.
Green Bay
Orillia
Owen Sound
Peterborough
Kingston
Rochester
WISCONSIN
UNITED STATES
L. Huron
Barrie
Belleville
VT
Newmarket
Oshawa
MICHIGAN
TORONTO
L. Ontario
NEW YORK
Rochester
Kitchener
Syracuse
Madison
MILWAUKEE
Grand Rapids
Brantford
Sarnia
Albany
IOWA
Lansing
Buffalo
London
Hamilton
Cedar Rapids
Rockford
Chatham
L. Erie
Erie
DETROIT
Windsor
Des Moines
Davenport
CHICAGO
South Bend
PENNSYLVANIA
Scranton
ILLINOIS
INDIANA
Toledo
OHIO
Cleveland
NEW YORK

Figure 2

CONTIGUOUS CLAIM MAP

DOKIS PROPERTY

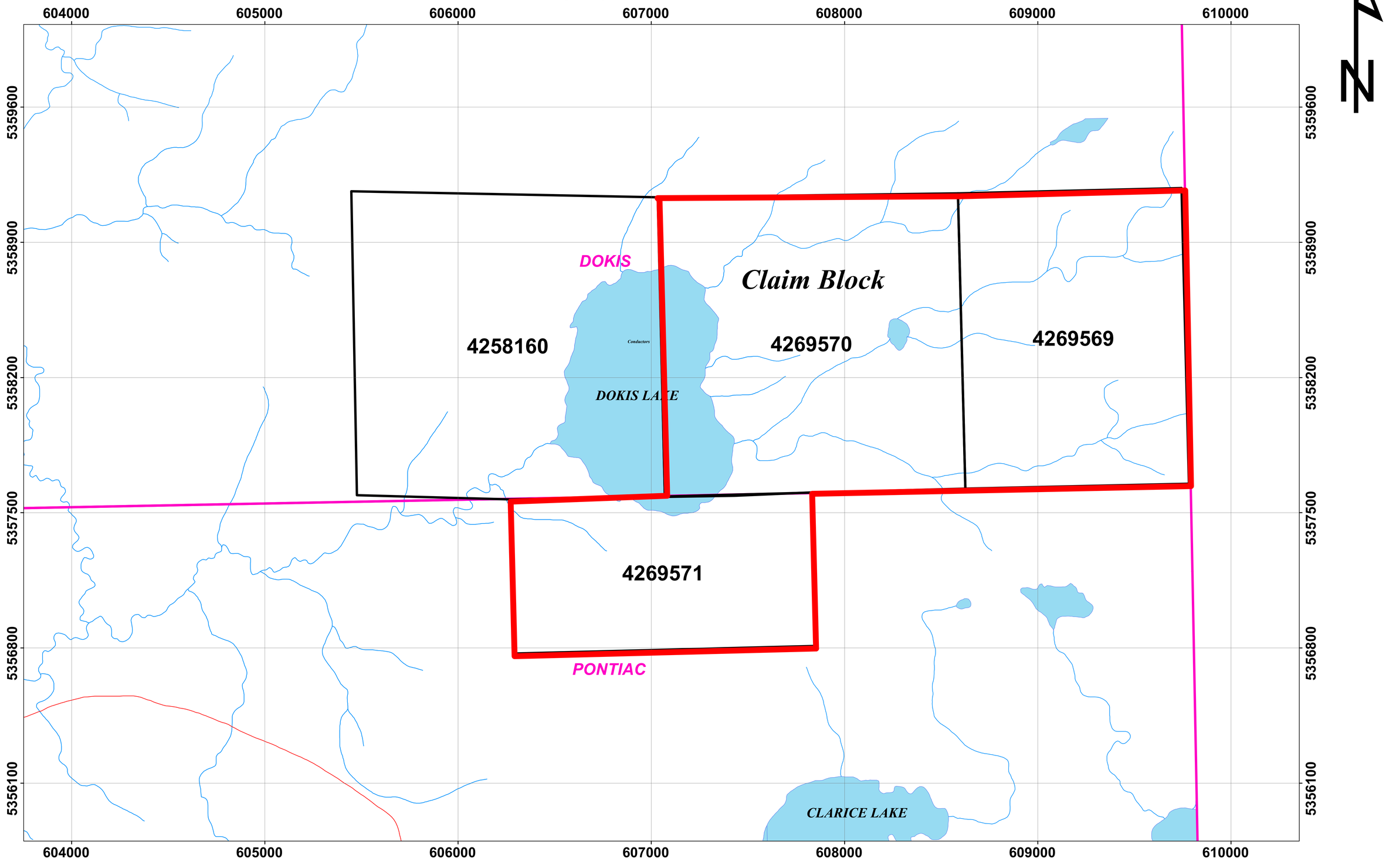

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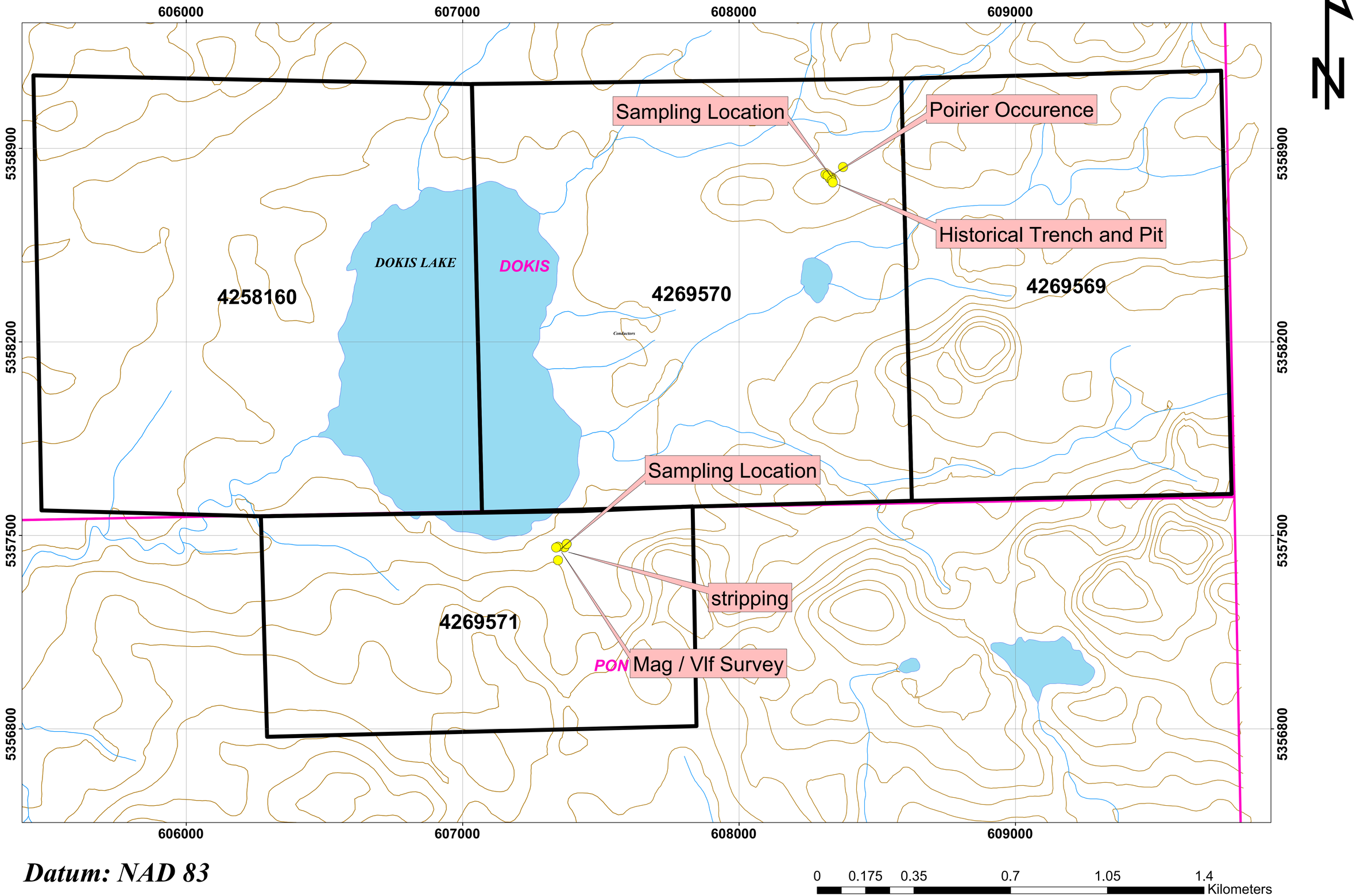
Figure 3

Property Overview with Sampling Areas

DOKIS PROPERTY

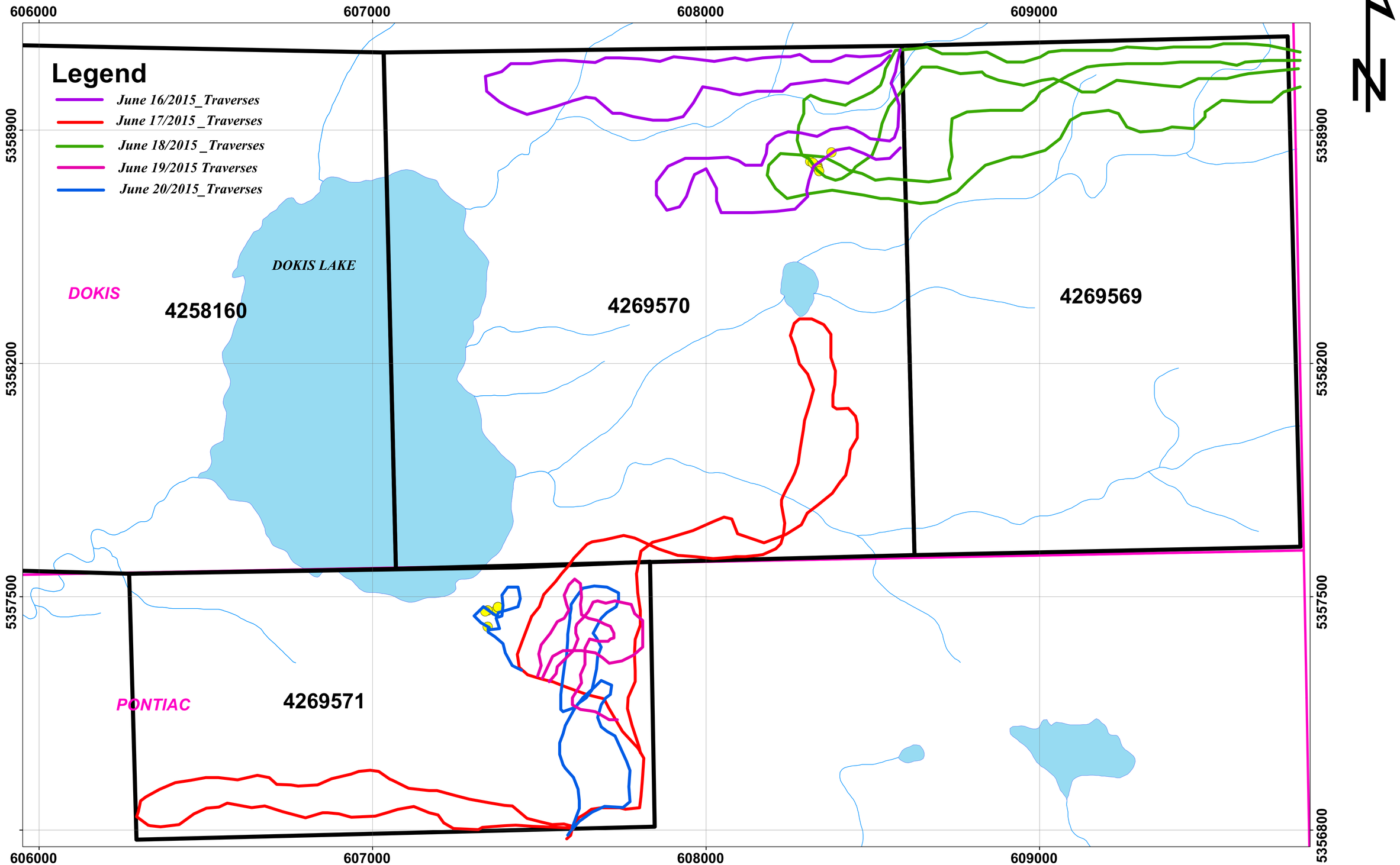


Datum: NAD 83

Figure 4

Prospecting Traverses

DOKIS PROPERTY



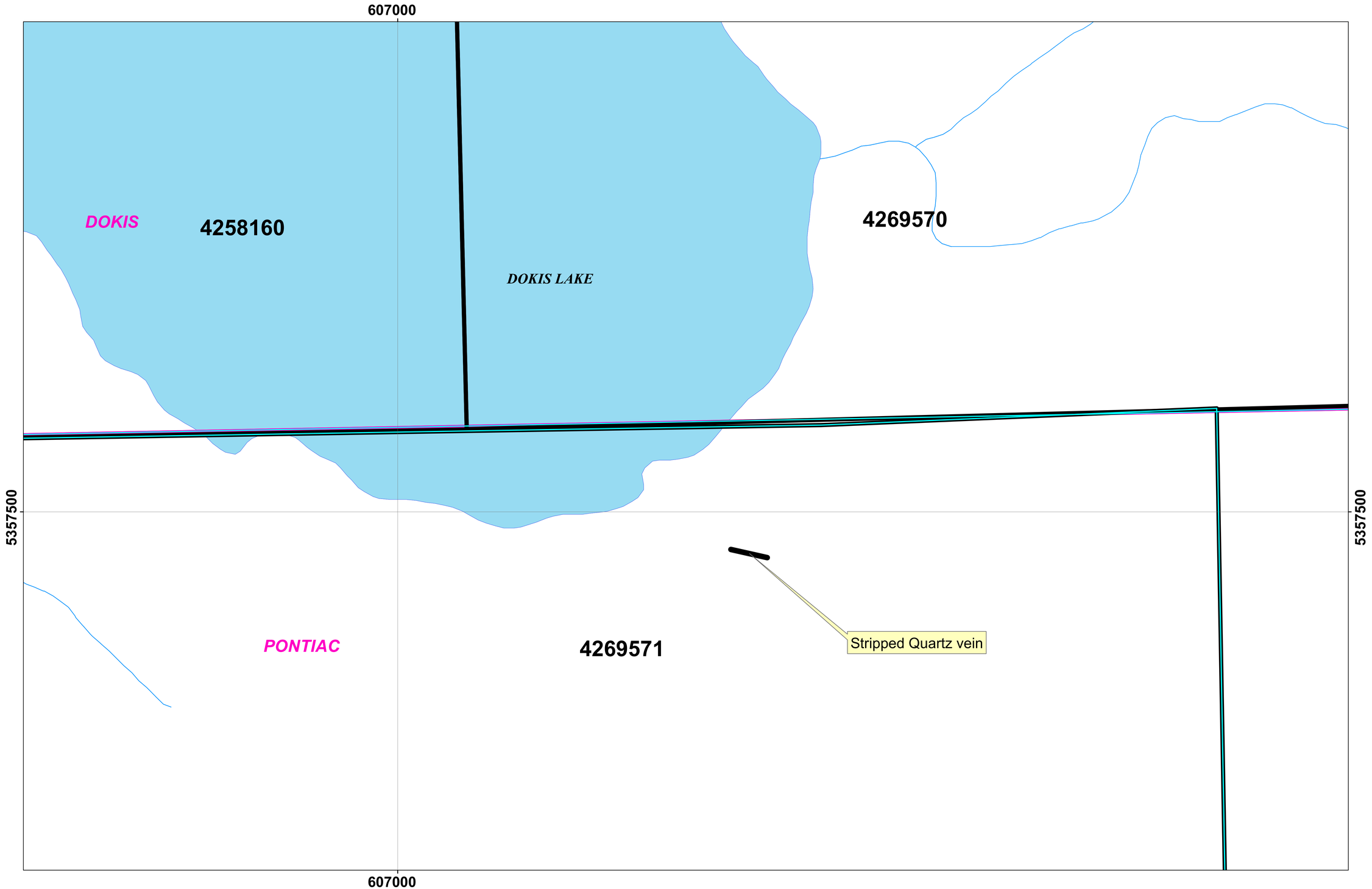
Datum: NAD 83

0 0.15 0.3 0.6 0.9 1.2 Kilometers

Figure 5

Stripping Location Map

DOKIS PROPERTY

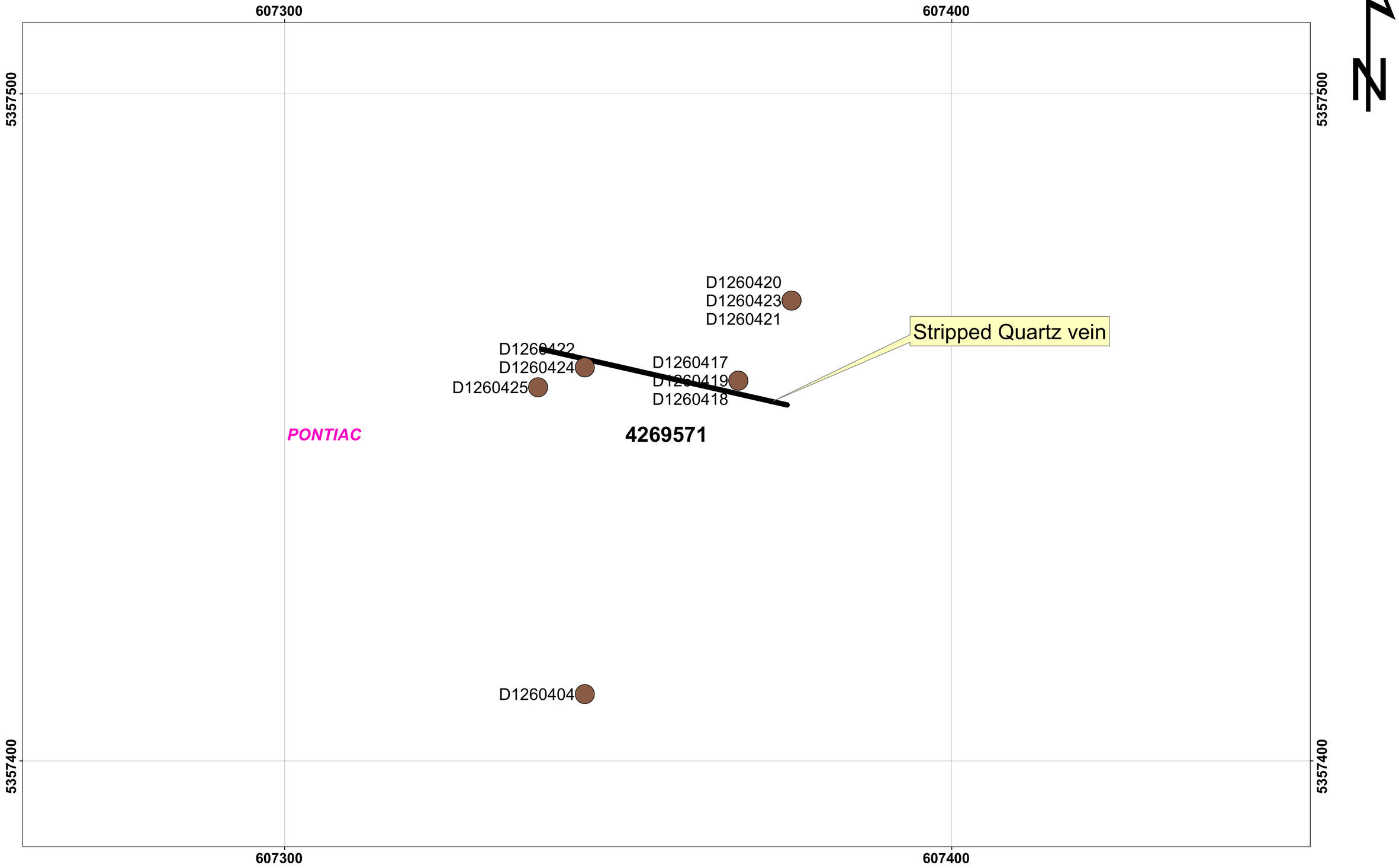


Datum: NAD 83

Figure 6

Sample Location Map 1

DOKIS PROPERTY

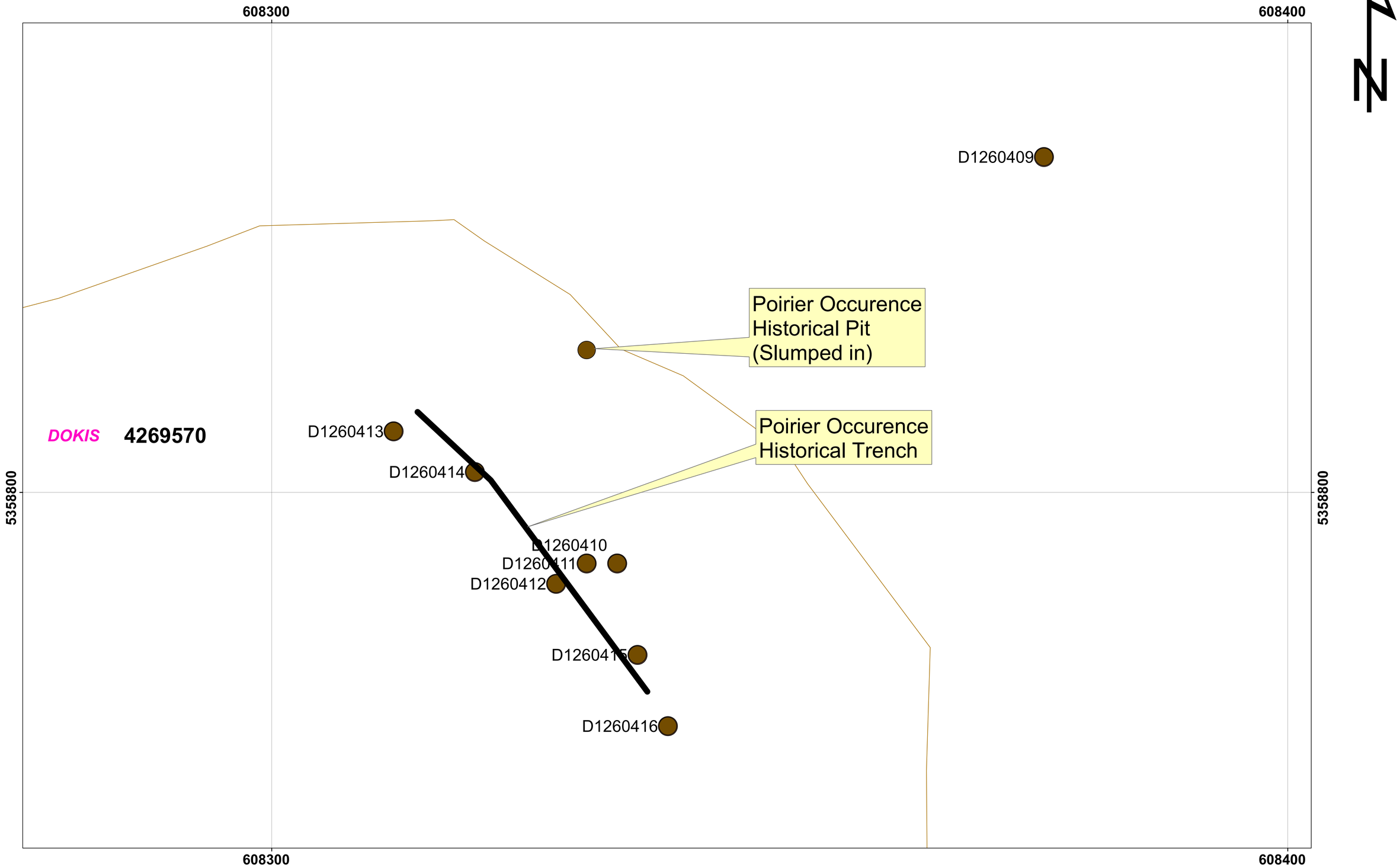


Datum: NAD 83

Figure 7

Sample Location Map 2

DOKIS PROPERTY

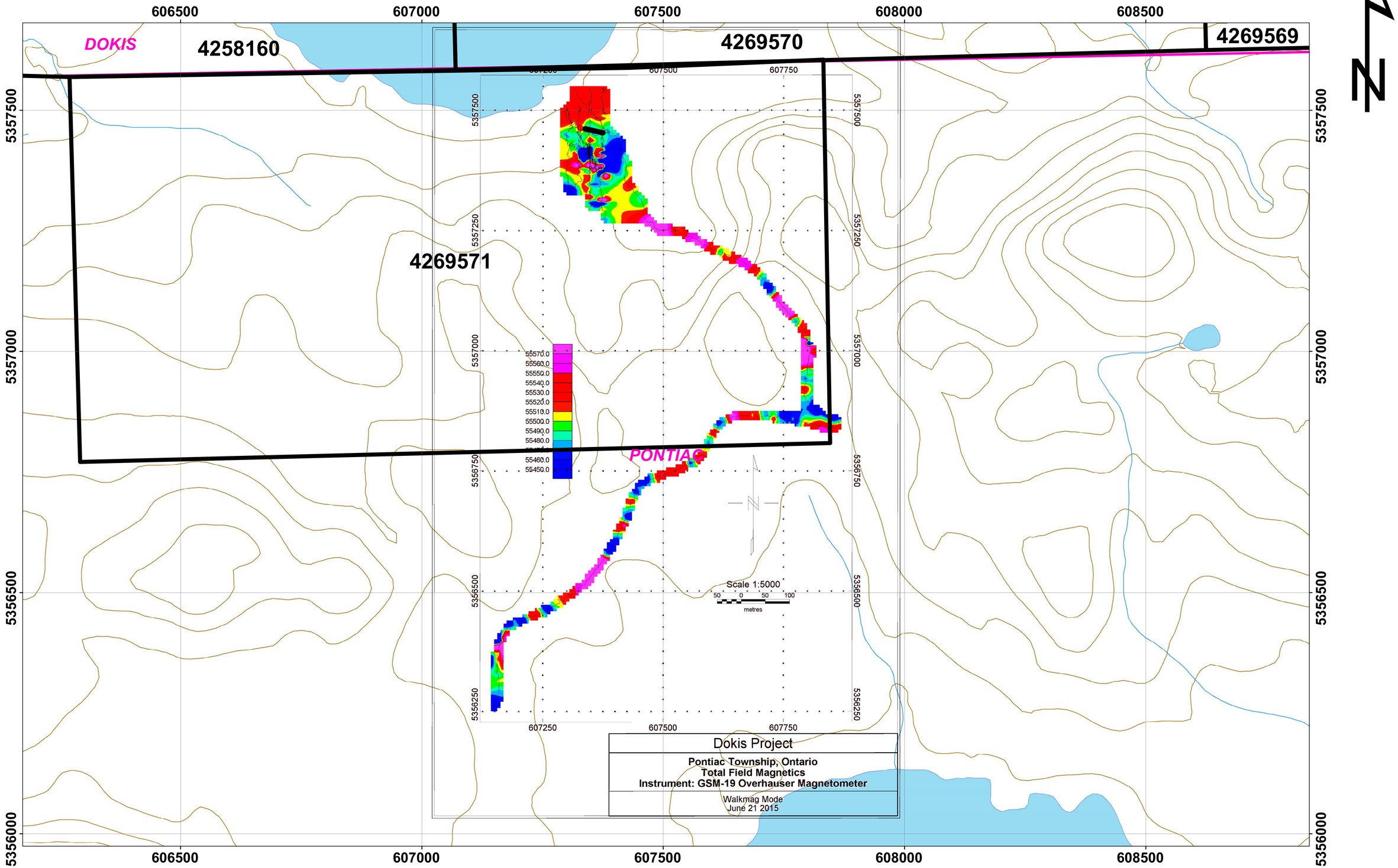


Datum: NAD 83

Figure 8

Magnetometer Survey

DOKIS PROPERTY



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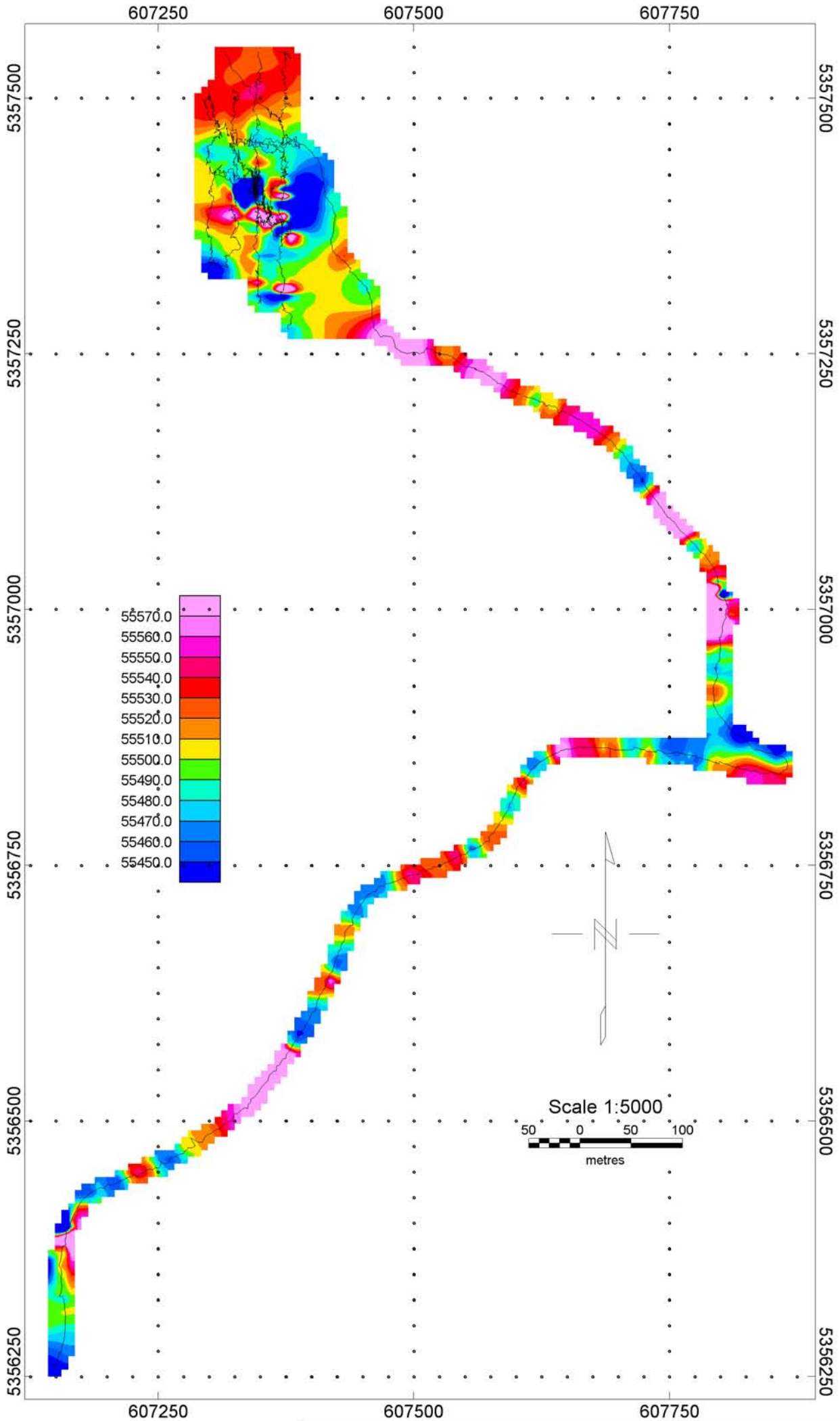

Dokis Project

Pontiac Township, Ontario
Total Field Magnetics
Instrument: GSM-19 Overhauser Magnetometer

Walkmag Mode
June 21 2015

Figure 9

VLF test lines over Quartz vein								
Line		Station		NAD83_East	Nad83_North	InPhase	Quadrature	
7350	E	150	S			-5	-44	
7350	E	137.5	S			14	-44	
7350	E	125	S			20	-44	
7350	E	112.5	S			33	-42	
7350	E	100	S			50	-42	
7350	E	87.5	S			50	-36	
7350	E	75	S			60	-33	
7350	E	62.5	S			65	-32	
7350	E	50	S			76	-30	
7350	E	37.5	S			82	-26	
7350	E	25	S			88	-24	
7350	E	12.5	S			104	-24	
7350	E	0	N			110	-18	qtz vein with sulphides 1m wide
7350	E	12.5	N			130	-14	
7350	E	25	N			136	-12	bottom of hill start of swamp
7350	E	37.5	N			98	-20	
7350	E	50	N			66	-26	
7350	E	62.5	N			36	-28	
7350	E	75	N			15	-26	
7350	E	87.5	N			7	-24	
7350	E	100	N			5	-21	
7375	E	100	N			2	-18	
7375	E	87.5	N			5	-20	
7375	E	75	N			17	-24	
7375	E	62.5	N			38	-26	
7375	E	50	N			58	-25	
7375	E	37.5	N			84	-24	
7375	E	25	N			128	-14	
7375	E	12.5	N			140	-14	bottom of hill start of swamp
7375	E	0	N			120	-18	qtz vein with sulphides 1m wide
7375	E	12.5	S			105	-20	
7375	E	25	S			88	-24	
7375	E	37.5	S			78	-24	
7375	E	50	S			72	-28	
7375	E	62.5	S			66	-30	
7375	E	75	S			65	-30	
7375	E	87.5	S			60	-35	
7375	E	100	S			55	-38	
7375	E	112.5	S			48	-42	
7375	E	125	S			42	-45	
7375	E	137.5	S			33	-44	
7375	E	150	S			12	-45	

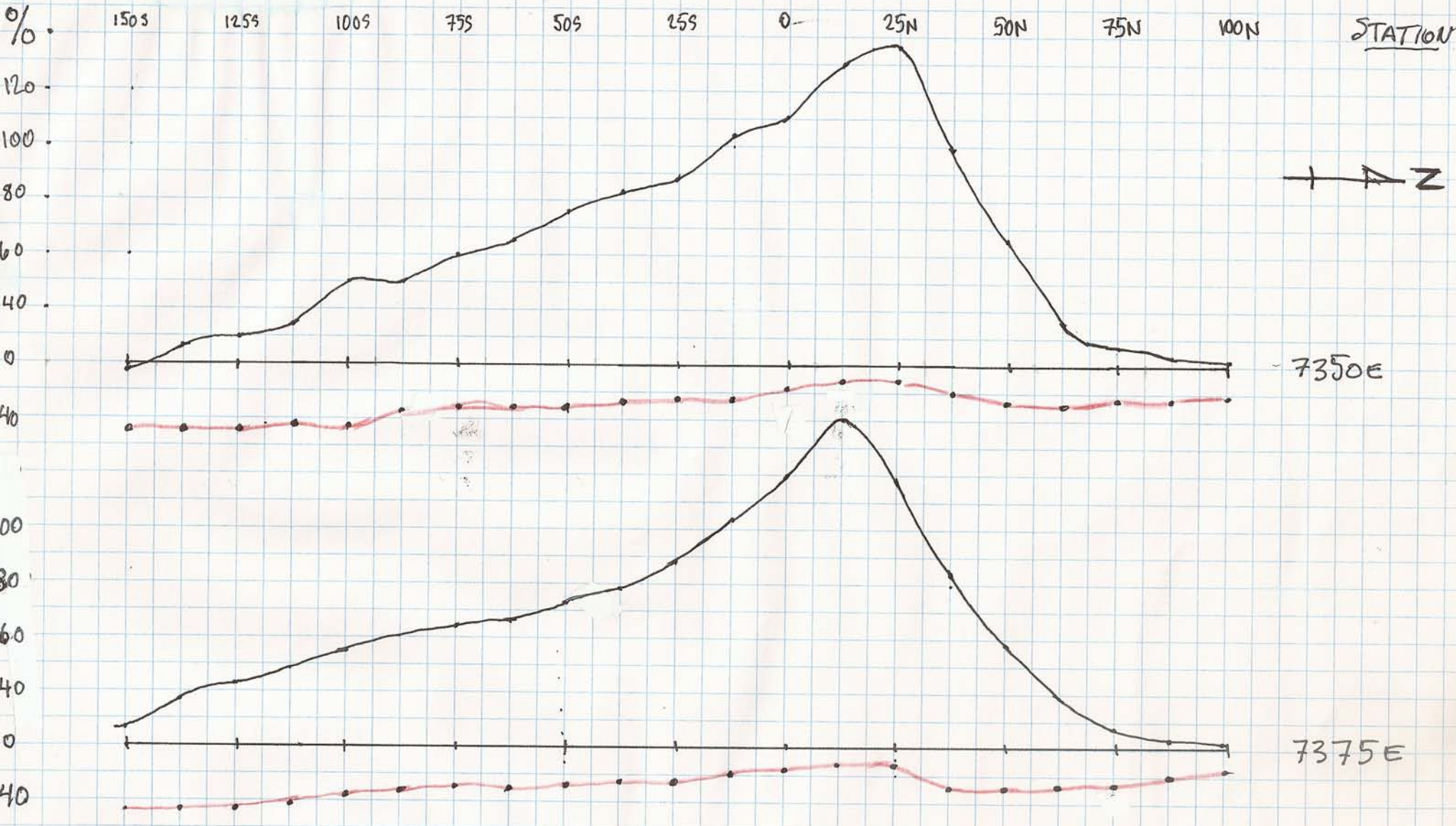
%
150S
125S
100S
75S
50S
25S
0
25N
50N
75N
100N
STATION
120
100
80
60
40
0
40
N
7350E
00
80
60
40
0
40
7375E
%
Vertical Scale – %
Horizontal Scale – meters
Inphase
Quadrature
VLF Profiles
QTZ Vein
Tx: Cutler Maine 24.0khz
Pontiac Twp
EM-16 Geonics
June 2015

FIGURE 10

Appendix I

Waypoint and Sample
Locations

Sample #	UTM Zone	NAD83_East	NAD83_North	Waypoint Description	Geological Description	Acid Test	Magnetic
P15-01P	17U	607346	5357404	boulder	calc alkaline basalt 1/2m x 1/4m	weak/ spotty	no
D1260404	17U	607345	5357410	angular boulder	Rhyolite with quartz veining, py, fuchsite	weak/ spotty	no
D1260409	17U	608376	5358833	65m ENE(62 degrees)of trench	outcrop Rhyolite light green/grey, py, po	negative	weak/spotty
D1260410	17U	608334	5358793	Trench(Poirier Occ)	Rhyolite 1% py, Phyrotite		yes/strong spotty
D1260411	17U	608331	5358793	Trench(Poirier Occ)	outcrop Rhyolite light green/grey, py, po	yes/strong pervasive	yes/strong spotty
D1260412	17U	608328	5358791	Trench(Poirier Occ)	outcrop Rhyolite light green/grey, py, po	negative	yes/strong
D1260413	17U	608312	5358806	Trench(Poirier Occ)	intermediate volcanic 20% sulphide	negative	yes/strong/ spotty
D1260414	17U	608320	5358802	Trench(Poirier Occ)	outcrop Rhyolite light green/grey, py, po	negative	yes/strong
D1260415	17U	608336	5358784	Trench(Poirier Occ)	outcrop Rhyolite light green/grey, py, po	negative	yes/strong
D1260416	17U	608339	5358777	outcrop just south of Poirier Occurence	rhyolite 3-5% po	negative	strong/spotty
D1260417	17U	607368	5357457		sheared intermediate(rhyolite?) py ep	negative	non
D1260418	17U	607368	5357457		Qtz vein contact with rhyolite. Ep, py	negative	non
D1260419	17U	607368	5357457		intermediate volcanic(rhyolite?) silicious grey green, epidote. Lots of Py.	strong very spotty	non
D1260420	17U	607376	5357469		Qtz vein disseminated Py, Ch py.	negative	non
D1260421	17U	607376	5357469		intermediate volcanic(rhyolite?) silicious grey green, epidote. Lots of Py.	negative	non
D1260422	17U	607345	5357459		intermediate volcanic with qtz veining (Rhyolite fuccsite%, narrow qtz vein with) py disseminated throughout	negative	non
D1260423	17U	607376	5357469		med -coarse grn mafic volcanic. Py	strong spotty	non
D1260424	17U	607345	5357459		silicious mafic Volcanic w/ minor sulphides and feldspar porphyry no sulphides		
D1260425	17U	607338	5357456		intermediate volcanic(rhyolite?) Altered silicious grey green, epidote. Very minor py, brown carbonate	strong	non
P14-1	17U	607373	5357454	outcrop	Qtz vein	yes	no
P14-2	17U	607373	5357454	outcrop	Qtz vein disseminated cpy py(-Qtz carb vein)strike @ 102 dip 40S	yes	no
P14-3	17U	607339	5357462	outcrop	carbonate altered basalt weakly silicified malachite cpy py	yes	no
P14-4	17U	607339	5357462	outcrop	intermediate volcanic with qtz vein 5% disseminated sulphides in vein(-Rhyolite 1% fuccsite, narrow qtz vein with 1% py)	yes	no
PIT	17U	608331	5358814	PIT	slumped in, no bedrock exposed		
BD	17U	607698	5357192	Beaver Dam			
CUTLINE	17U	606365	5357580	Old Cutline N/S			

CUTLINE	17U	606683	5357586	Old Cutline N/S			
CUTLINE	17U	607580	5357588	Old Cutline N/S			
CUTLINE	17U	608169	5357633	Old Cutline N/S			
CUTLINE	17U	608272	5358333	Old cutline L5E 250N			
CUTLINE	17U	608353	5359188	Old Cutline N/S			
CUTLINE	17U	607280	5357464	Old Cutline N/S			
CUTLINE	17U	608353	5359188	Old Cutline N/S			
PILLOWS	17U	608275	5357917	pillows	excellent view of a vertical wall of pillow lavas		
TRAIL	17U	607425	5359114	Trail intersect E/W			
TRAIL	17U	608442	5358810	trail junction			
TRAIL	17U	609945	5358534	Trail intersect E/W			
TRAIL	17U	608607	5358741	Trail intersect E/W			
TRAIL	17U	608631	5358269	Trail intersect E/W			
TRAIL	17U	608633	5357863	Trail intersect E/W			
TRAIL	17U	607108	5359117	Trail intersect E/W			
26	17U	607378	5357459	outcrop	Qtz vein dip @40 S/Strike 102		
27	17U	607378	5357459	soil sample from P14-02	Regolith to pan		
258_ppb_a	17U	607657	5357391	(Not yet found)historical sample	258ppb		
258_ppb_b	17U	607782	5357333	(Not yet found)historical sample	258ppb		
28	17U	607340	5357462	soil sample from P14-03	Regolith to pan		
29	17U	607340	5357462	soil sample from P14-03	Regolith to pan		
30	17U	607587	5357380	old Cutline L2W 700S or 750S?			
31	17U	607378	5357548	End of VLF Line L 7375E 100N			
32	17U	607346	5357546	End of VLF Line L 7350E 100N			
34	17U	607341	5357402	angular boulder	intermediate volcanic, rusty staned py	weak/ spotty	no
110	17U	607678	5357418	outcrop	oc basalt pillows qtz stringers dissem py	negative	
111	17U	607671	5357358	boulder	large rounded boulder-conglomerate?		
TRAIL	17U	606296	5356858	Trail intersect E/W			
#3	17U	607070	5357584	#3 of 4269570			
BD	17U	607698	5357524	Beaver Dam			
Cutline	17U	608352	5358799	Old Cutline N/S			
Cutline	17U	607591	5357426	old Cutline N/S EOL			
L 7350E 100N	17U	607345	5357546	vlf line end			
L 7375E 100N	17U	607378	5357548	vlf line end			

Appendix II

ICP and Gold Fire Assay
Results and Certificates

Quality Analysis ... *Innovative Technologies*

Date Submitted: 10-Nov-14
Invoice No.: A14-08684
Invoice Date: 18-Nov-14
Your Reference:

Graham Stone
6 Finch Trail
McDougall
ON P2A 0B3
Canada

ATTN: Graham Stone

CERTIFICATE OF ANALYSIS

4 Rock samples were submitted for analysis.

The following analytical package was requested: Code 1A2 Au - Fire Assay AA
Code 1E3 Aqua Regia ICP(AQUAGEO)

REPORT **A14-08684**

Notes:
If value exceeds upper limit we recommend reassay by fire assay gravimetric-Code 1A3
Values which exceed the upper limit should be assayed for accurate numbers.

CERTIFIED BY:

Emmanuel Eseme , Ph.D.
Quality Control

SCC Accredited LAB
LAB Accrédité CCN

ACTIVATION LABORATORIES LTD.
41 Bittern Street, Ancaster, Ontario, Canada, L9G 4V5
TELEPHONE +905 648-9611 or +1.888.228.5227 FAX +1.905.648.9613
E-MAIL Ancaster@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Results

Analyte Symbol	Au	Th	Ag	Cd	Cu	Mn	Mo	Ni	Pb	Zn	Al	As	B	Ba	Be	Bi	Ca	Co	Cr	Fe	Ga	Hg	K
Unit Symbol	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%
Lower Limit	5	20	0.2	0.5	1	5	1	1	2	2	0.01	2	10	10	0.5	2	0.01	1	1	0.01	10	1	0.01
Method Code	FA-AA	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP
P14-01	13	< 20	0.5	< 0.5	81	263	2	33	< 2	44	2.31	14	< 10	201	< 0.5	< 2	1.56	11	18	1.97	< 10	< 1	0.94
P14-02	> 3000	< 20	8.9	0.8	1160	33	2	28	44	76	0.59	162	< 10	50	< 0.5	< 2	0.19	10	74	1.54	< 10	< 1	0.35
P14-03	858	< 20	11.6	< 0.5	8190	662	< 1	195	2	78	3.40	5	< 10	20	< 0.5	3	4.15	78	44	5.49	10	< 1	0.05
P14-04	1130	< 20	3.1	< 0.5	156	39	6	28	22	8	1.48	234	< 10	64	< 0.5	< 2	0.21	9	37	1.90	< 10	< 1	0.86

Results

Analyte Symbol	La	Mg	Na	P	S	Sb	Sc	Sr	Ti	Te	Tl	U	V	W	Y	Zr	Au
Unit Symbol	ppm	%	%	%	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	g/tonne
Lower Limit	10	0.01	0.001	0.001	0.01	2	1	1	0.01	1	2	10	1	10	1	1	0.03
Method Code	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	FA-GRA
P14-01	< 10	1.09	0.044	0.048	0.16	< 2	6	14	0.34	4	< 2	< 10	68	< 10	12	14	
P14-02	< 10	0.10	0.026	0.006	1.46	< 2	1	4	0.07	< 1	< 2	< 10	16	< 10	3	9	6.64
P14-03	< 10	1.39	0.037	0.024	1.52	2	7	50	0.23	5	< 2	< 10	105	< 10	12	12	
P14-04	< 10	0.11	0.033	0.011	1.22	< 2	3	7	< 0.01	< 1	< 2	< 10	33	< 10	2	11	

QC

Analyte Symbol	Au	Th	Ag	Cd	Cu	Mn	Mo	Ni	Pb	Zn	Al	As	B	Ba	Be	Bi	Ca	Co	Cr	Fe	Ga	Hg	K
Unit Symbol	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%
Lower Limit	5	20	0.2	0.5	1	5	1	1	2	2	0.01	2	10	10	0.5	2	0.01	1	1	0.01	10	1	0.01
Method Code	FA-AA	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP
GXR-1 Meas		< 20	28.4	2.2	1180	836	15	31	634	716	0.38	391	10	350	0.8	1500	0.82	5	7	22.2	< 10	2	0.03
GXR-1 Cert		2.44	31.0	3.30	1110	852	18.0	41.0	730	760	3.52	427	15.0	750	1.22	1380	0.960	8.20	12.0	23.6	13.8	3.90	0.050
DH-1a Meas		950																					
DH-1a Cert		910																					
GXR-4 Meas		< 20	3.4	< 0.5	6320	144	330	37	43	70	2.78	104	< 10	68	1.4	17	0.95	13	55	2.95	10	< 1	1.87
GXR-4 Cert		22.5	4.0	0.860	6520	155	310	42.0	52.0	73.0	7.20	98.0	4.50	1640	1.90	19.0	1.01	14.6	64.0	3.09	20.0	0.110	4.01
GXR-6 Meas		< 20	0.3	< 0.5	71	1120	2	23	92	129	7.45	235	< 10	1270	0.9	< 2	0.13	13	83	5.54	20	< 1	1.30
GXR-6 Cert		5.30	1.30	1.00	66.0	1010	2.40	27.0	101	118	17.7	330	9.80	1300	1.40	0.290	0.180	13.8	96.0	5.58	35.0	0.0680	1.87
SAR-M (U.S.G.S.) Meas		< 20	4.5	5.8	346	5180	15	44	1080	1080	1.27	43		307	1.1	< 2	0.33	11	98	2.94	< 10		0.33
SAR-M (U.S.G.S.) Cert		17.2	3.64	5.27	331.0000	5220	13.1	41.5	982	930.0	6.30	38.8		801	2.20	1.94	0.61	10.70	79.7	2.99	17		2.94
OxN92 Meas																							
OxN92 Cert																							
CDN-GS-1L Meas	1170																						
CDN-GS-1L Cert	1160.00																						
OxD108 Meas	396																						
OxD108 Cert	414.000																						
OxK110 Meas																							
OxK110 Cert																							
P14-02 Orig																							
P14-02 Dup																							
P14-04 Orig	1150																						
P14-04 Dup	1110																						
Method Blank		< 20	< 0.2	< 0.5	< 1	< 5	< 1	< 1	< 2	< 2	< 0.01	< 2	< 10	12	< 0.5	< 2	< 0.01	< 1	< 1	< 0.01	< 10	< 1	< 0.01

QC

Analyte Symbol	La	Mg	Na	P	S	Sb	Sc	Sr	Ti	Te	Tl	U	V	W	Y	Zr	Au
Unit Symbol	ppm	%	%	%	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	g/tonne
Lower Limit	10	0.01	0.001	0.001	0.01	2	1	1	0.01	1	2	10	1	10	1	1	0.03
Method Code	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	FA-GRA
GXR-1 Meas	< 10	0.14	0.054	0.043	0.20	84	1	197	< 0.01	14	< 2	33	84	147	26	17	
GXR-1 Cert	7.50	0.217	0.0520	0.0650	0.257	122	1.58	275	0.036	13.0	0.390	34.9	80.0	164	32.0	38.0	
DH-1a Meas												2700					
DH-1a Cert												2629					
GXR-4 Meas	54	1.65	0.135	0.118	1.70	4	7	77	0.14	1	< 2	< 10	80	15	12	11	
GXR-4 Cert	64.5	1.66	0.564	0.120	1.77	4.80	7.70	221	0.29	0.970	3.20	6.20	87.0	30.8	14.0	186	
GXR-6 Meas	< 10	0.42	0.086	0.032	0.01	5	19	29		< 1	< 2	< 10	181	< 10	5	11	
GXR-6 Cert	13.9	0.609	0.104	0.0350	0.0160	3.60	27.6	35.0		0.0180	2.20	1.54	186	1.90	14.0	110	
SAR-M (U.S.G.S.) Meas	53	0.38	0.040	0.064		4	4	35	0.06	3	< 2	< 10	39	< 10	22		
SAR-M (U.S.G.S.) Cert	57.4	0.50	1.140	0.07		6.0	7.83	151	0.38	0.96	2.7	3.57	67.2	9.78	28.00		
OxN92 Meas																	7.63
OxN92 Cert																	7.64
CDN-GS-1L Meas																	
CDN-GS-1L Cert																	
OxD108 Meas																	
OxD108 Cert																	

Analyte Symbol	La	Mg	Na	P	S	Sb	Sc	Sr	Ti	Te	Tl	U	V	W	Y	Zr	Au
Unit Symbol	ppm	%	%	%	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	g/tonne
Lower Limit	10	0.01	0.001	0.001	0.01	2	1	1	0.01	1	2	10	1	10	1	1	0.03
Method Code	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	AR-ICP	FA-GRA
OxK110 Meas																	3.56
OxK110 Cert																	3.602
P14-02 Orig																	6.70
P14-02 Dup																	6.58
P14-04 Orig																	
P14-04 Dup																	
Method Blank	< 10	< 0.01	0.014	< 0.001	< 0.01	< 2	< 1	< 1	< 0.01	< 1	< 2	< 10	< 1	< 10	< 1	< 1	

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To: DETOUR GOLD CORPORATION
86- 2ND STREET PO BOX 1325
COCHRANE ON P0L 1C0

Finalized Date: 30- AUG- 2016
Account: DETGLD

CERTIFICATE SD16134769

Project: DGWR- 003

P.O. No.: DGC 4800002804

This report is for 29 Rock samples submitted to our lab in Sudbury, ON, Canada on 16- AUG- 2016.

The following have access to data associated with this certificate:

APRIL COOMBS	ADREE DELAZZER	GUY MAC GILLIVRAY
KELLY MALCOLM	JEAN FRANCOIS METAIL	LINDSAY RICHAN
LARRY THON	JAMES TOLHURST	ASHLEY WALKER
DETOUR GOLD WEBTRIEVE		

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
WEI- 21	Received Sample Weight
LOG- 22	Sample login - Rcd w/o BarCode
CRU- 31	Fine crushing - 70% < 2mm
CRU- QC	Crushing QC Test
PUL- QC	Pulverizing QC Test
SPL- 22Y	Split Sample - Boyd Rotary Splitter
PUL- 32	Pulverize 1000g to 85% < 75 um

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
Au- AA24	Au 50g FA AA finish	AAS
ME- ICP61	33 element four acid ICP- AES	ICP- AES
Au- GRA22	Au 50 g FA- GRAV finish	WST- SIM

To: DETOUR GOLD CORPORATION
ATTN: KELLY MALCOLM
86- 2ND STREET PO BOX 1325
COCHRANE ON P0L 1C0

This is the Final Report and supersedes any preliminary report with this certificate number. Results apply to samples as submitted. All pages of this report have been checked and approved for release.

***** See Appendix Page for comments regarding this certificate *****

Signature:
Colin Ramshaw, Vancouver Laboratory Manager

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Finalized Date: 30- AUG- 2016
Account: DETGLD

Project: DGWR- 003

CERTIFICATE OF ANALYSIS SD16134769

Sample Description	Method / Analyte / Units / LOR	WEI- 21 Recvd Wt. kg 0.02	Au- AA24 Au g/t 0.005	ME- ICP61 Ag ppm 0.5	ME- ICP61 Al % 0.01	ME- ICP61 As ppm 5	ME- ICP61 Ba ppm 10	ME- ICP61 Be ppm 0.5	ME- ICP61 Bi ppm 2	ME- ICP61 Ca % 0.01	ME- ICP61 Cd ppm 0.5	ME- ICP61 Co ppm 1	ME- ICP61 Cr ppm 1	ME- ICP61 Cu ppm 1	ME- ICP61 Fe % 0.01	ME- ICP61 Ga ppm 10
D1260401		0.82	<0.005	<0.5	5.98	8	50	1.2	<2	7.40	0.9	86	22	145	14.25	20
D1260402		1.17	<0.005	<0.5	7.77	<5	40	<0.5	<2	4.66	<0.5	47	236	127	6.96	20
D1260403		1.37	<0.005	<0.5	6.38	5	120	<0.5	<2	4.03	<0.5	35	67	72	7.22	20
D1260404		1.51	5.14	6.9	6.99	329	290	0.7	<2	0.12	<0.5	6	51	22	3.74	10
D1260405		1.21	0.039	<0.5	8.00	<5	170	0.6	<2	5.43	<0.5	23	53	24	4.23	20
D1260406		1.58	0.033	<0.5	4.17	<5	130	<0.5	<2	7.82	0.6	31	99	27	8.91	10
D1260407		1.00	<0.005	<0.5	2.77	<5	50	<0.5	<2	3.38	<0.5	19	96	935	4.02	10
D1260408		1.55	0.005	<0.5	6.31	<5	20	<0.5	<2	10.60	<0.5	40	161	93	10.20	20
D1260409		1.17	<0.005	<0.5	8.40	<5	380	<0.5	<2	8.99	<0.5	38	245	99	6.38	20
D1260410		1.98	<0.005	<0.5	7.15	<5	260	<0.5	<2	7.47	<0.5	24	104	189	5.42	20
D1260411		0.79	<0.005	1.1	8.07	<5	1330	<0.5	<2	5.17	<0.5	31	176	2010	5.80	20
D1260412		1.07	<0.005	<0.5	7.95	<5	250	<0.5	<2	6.57	<0.5	49	186	132	7.13	10
D1260413		1.28	<0.005	<0.5	8.08	<5	90	<0.5	<2	6.69	<0.5	33	117	108	6.67	10
D1260414		1.74	<0.005	<0.5	8.66	<5	200	<0.5	<2	6.66	<0.5	35	118	115	7.54	20
D1260415		1.17	<0.005	<0.5	7.78	<5	90	<0.5	<2	6.42	<0.5	25	114	139	6.46	20
D1260416		1.14	<0.005	<0.5	8.26	<5	40	0.5	3	13.35	<0.5	25	125	127	6.32	30
D1260417		2.34	5.06	1.7	8.21	135	530	1.1	<2	0.36	<0.5	14	17	24	6.21	20
D1260418		4.76	2.27	4.4	1.46	180	120	<0.5	<2	0.08	<0.5	2	58	35	1.70	<10
D1260419		3.14	4.70	9.3	5.98	262	380	0.7	<2	0.35	<0.5	12	37	264	3.31	10
D1260420		2.53	5.55	5.1	1.64	125	120	<0.5	<2	0.07	1.0	5	73	387	1.57	<10
D1260421		2.45	0.717	3.0	7.56	211	480	0.9	<2	0.60	<0.5	27	18	700	4.82	20
D1260422		2.90	2.37	4.3	7.06	304	240	0.7	<2	0.10	<0.5	7	64	12	2.58	10
D1260423		2.23	0.074	0.8	7.65	<5	90	<0.5	6	6.05	<0.5	93	53	630	8.35	20
D1260424		1.91	<0.005	<0.5	8.24	<5	90	<0.5	<2	6.88	<0.5	23	57	29	5.24	20
D1260425		2.70	0.005	<0.5	8.23	<5	140	0.9	<2	6.94	<0.5	18	81	20	4.98	20
D1260426		1.49	0.007	<0.5	7.26	27	480	0.8	<2	1.42	<0.5	7	8	17	3.75	20
D1260427		0.97	<0.005	<0.5	6.51	13	470	1.1	<2	0.46	<0.5	6	15	9	3.92	20
D1260428		0.52	0.043	1.0	5.46	42	120	0.7	<2	2.35	<0.5	10	6	21	11.65	10
D1260429		2.42	<0.005	<0.5	5.76	<5	140	0.8	<2	0.24	<0.5	<1	24	4	1.34	20

***** See Appendix Page for comments regarding this certificate *****

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To: DETOUR GOLD CORPORATION
86- 2ND STREET PO BOX 1325
COCHRANE ON P0L 1C0

Finalized Date: 30- AUG- 2016
Account: DETGLD

Project: DGWR- 003

CERTIFICATE OF ANALYSIS SD16134769

Sample Description	Method	ME- ICP61	ME- ICP61	ME- ICP61	ME- ICP61	ME- ICP61	ME- ICP61	ME- ICP61	ME- ICP61	ME- ICP61	ME- ICP61	ME- ICP61	ME- ICP61	ME- ICP61	ME- ICP61	ME- ICP61
	Analyte	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Sr	Th	Tl
	Units	%	ppm	%	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%
	LOR	0.01	10	0.01	5	1	0.01	1	10	2	0.01	5	1	1	20	0.01
D1260401		0.03	<10	2.25	3300	1	0.04	61	980	6	2.14	<5	39	160	<20	1.30
D1260402		0.09	<10	3.88	1355	<1	2.50	109	200	2	0.08	<5	38	107	<20	0.45
D1260403		0.14	<10	1.63	1155	<1	2.52	53	830	2	0.12	<5	37	63	<20	1.17
D1260404		3.35	10	0.28	55	1	0.09	24	290	45	2.17	<5	13	12	<20	0.42
D1260405		1.16	10	1.42	967	1	4.42	116	430	4	0.51	6	18	95	<20	0.41
D1260406		0.89	<10	2.95	1810	<1	0.23	63	270	2	2.00	7	26	56	<20	0.14
D1260407		0.21	<10	1.64	717	1	0.27	41	180	<2	0.09	<5	14	13	<20	0.27
D1260408		0.01	<10	3.47	2010	<1	0.22	82	310	3	0.19	10	33	354	<20	0.55
D1260409		0.85	10	2.92	1600	1	1.88	195	480	4	1.18	<5	26	100	<20	0.50
D1260410		1.02	10	3.00	1735	3	2.64	96	420	9	1.48	<5	25	108	<20	0.60
D1260411		2.87	10	3.65	2040	1	2.07	164	350	6	1.28	5	21	170	<20	0.43
D1260412		0.78	10	3.33	1745	1	2.13	248	480	5	1.47	<5	28	132	<20	0.60
D1260413		0.22	10	2.97	1575	1	2.89	148	520	3	2.12	<5	29	62	<20	0.68
D1260414		0.35	10	2.86	1540	2	3.07	102	530	<2	1.63	<5	29	156	<20	0.69
D1260415		0.31	10	2.95	1325	1	2.42	61	530	3	1.35	5	30	67	<20	0.71
D1260416		0.02	10	1.22	1100	3	0.16	48	450	5	2.20	<5	26	55	<20	0.60
D1260417		4.28	10	0.61	92	1	0.06	25	740	15	2.84	<5	19	42	<20	0.69
D1260418		0.70	<10	0.12	77	3	0.02	10	70	23	0.75	<5	2	3	<20	0.08
D1260419		2.95	<10	0.28	65	2	0.07	19	320	62	2.73	<5	14	11	<20	0.50
D1260420		0.81	<10	0.10	65	5	0.02	14	60	28	0.89	<5	2	3	<20	0.08
D1260421		3.87	10	0.55	83	1	0.06	39	780	15	4.15	<5	17	21	<20	0.63
D1260422		3.37	<10	0.27	52	1	0.06	35	80	30	1.69	<5	13	7	<20	0.37
D1260423		0.40	10	2.41	1280	<1	1.12	360	340	8	1.42	<5	18	125	<20	0.39
D1260424		0.29	10	2.21	974	1	1.81	78	510	2	0.04	<5	20	122	<20	0.51
D1260425		1.90	10	2.33	884	<1	2.44	92	370	5	0.02	<5	17	123	<20	0.39
D1260426		1.50	20	0.27	293	1	2.03	3	730	17	2.25	<5	13	112	<20	0.50
D1260427		1.67	10	0.21	112	1	1.05	2	680	9	3.20	<5	11	118	<20	0.44
D1260428		1.46	20	0.71	479	1	0.88	5	500	36	>10.0	10	8	55	<20	0.36
D1260429		0.44	20	0.21	95	2	3.84	1	100	10	0.11	<5	7	29	<20	0.04

***** See Appendix Page for comments regarding this certificate *****

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Finalized Date: 30- AUG- 2016
Account: DETGLD

Project: DGWR- 003

CERTIFICATE OF ANALYSIS SD16134769

Sample Description	Method	ME- ICP61	ME- ICP61	ME- ICP61	ME- ICP61	ME- ICP61	Au- GRA22
	Analyte	Tl	U	V	W	Zn	Au
	Units	ppm	ppm	ppm	ppm	ppm	g/t
	LOR	10	10	1	10	2	0.05
D1260401		<10	<10	418	<10	248	
D1260402		<10	<10	273	<10	131	
D1260403		<10	<10	387	<10	94	
D1260404		<10	<10	145	<10	15	5.09
D1260405		<10	<10	136	20	57	
D1260406		<10	<10	271	<10	85	
D1260407		<10	<10	131	<10	40	
D1260408		<10	<10	274	<10	78	
D1260409		<10	<10	201	<10	81	
D1260410		<10	<10	225	<10	74	
D1260411		<10	<10	174	<10	99	
D1260412		<10	<10	215	<10	78	
D1260413		<10	<10	261	<10	62	
D1260414		<10	<10	278	<10	56	
D1260415		<10	<10	262	<10	146	
D1260416		<10	<10	230	<10	95	
D1260417		<10	<10	182	10	24	3.36
D1260418		<10	<10	31	<10	8	
D1260419		<10	<10	125	<10	12	5.10
D1260420		<10	<10	33	<10	86	5.31
D1260421		<10	<10	163	10	15	
D1260422		<10	<10	151	10	12	
D1260423		<10	<10	172	<10	97	
D1260424		<10	<10	173	<10	64	
D1260425		<10	<10	151	10	131	
D1260426		<10	<10	67	<10	167	
D1260427		10	<10	52	<10	28	
D1260428		<10	<10	49	<10	54	
D1260429		<10	<10	<1	<10	21	

***** See Appendix Page for comments regarding this certificate *****

ALS Canada Ltd.
2103 Dollarton Hwy
North Vancouver BC V7H 0A7
Phone: +1 (604) 984 0221 Fax: +1 (604) 984 0218
www.alsglobal.com

To: DETOUR GOLD CORPORATION
86- 2ND STREET PO BOX 1325
COCHRANE ON P0L 1C0

Finalized Date: 30- AUG- 2016
Account: DETGLD

Project: DGWR- 003

CERTIFICATE OF ANALYSIS SD16134769

CERTIFICATE COMMENTS

LABORATORY ADDRESSES

Processed at ALS Sudbury located at 1351- B Kelly Lake Road, Unit #1, Sudbury, ON, Canada.

Applies to Method:				
	CRU- 31	CRU- QC	LOG- 22	PUL- 32
	PUL- QC	SPL- 22Y	WEI- 21	

Processed at ALS Vancouver located at 2103 Dollarton Hwy, North Vancouver, BC, Canada.

Applies to Method:			
	Au- AA24	Au- GRA22	ME- ICP61

Appendix III

EM-16 VLF
Specifications

GEONICS LIMITED

2 Thorncliffe Park Drive, Toronto 17, Ontario, Canada. Tel. (416) 425-1821, Cables: Geonics

EM 16

S/N 10589

VLF ELECTROMAGNETIC UNIT

Pioneered exclusively by Geonics Limited the VLF-method of electromagnetic surveying by utilization of the uniform horizontal fields generated by an existing network of reliable, fully operational Very Low Frequency transmitting stations has proved to be a major advance in geophysical exploration.

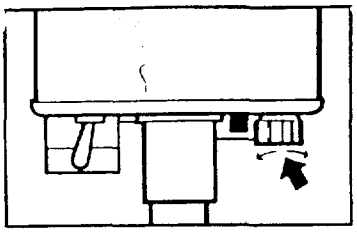
Very extensive world-wide experience since the beginning of 1965 by a large and rapidly increasing number of users, including a high proportion of major mining and exploration companies, has provided conclusive evidence of the effectiveness of the technique and the EM 16 has gained general acceptance as a basic electromagnetic tool. This evidence has also indicated the response of disseminated bodies. to the VLF-method.

The unique self-contained EM 16 offers the unrivalled combination of LIGHT WEIGHT, ONE-MAN OPERATION and DEEP PENETRATION allowing rapid, economical surveys. Assessing the data is simplified due to the use of the uniform horizontal primary field. The patented design feature of the measurement of both the in-phase and out-of-phase (quadrature) component of the vertical field provides the information necessary for comprehensive interpretation of the field results.

SPECIFICATIONS

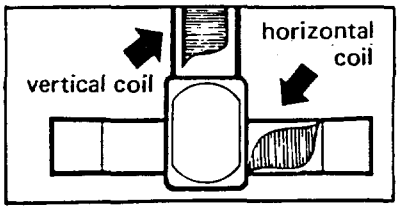
Source of primary field:	VLF transmitting stations.
Transmitting stations used:	Any desired station frequency supplied with the instrument in the form of plug-in tuning units. Two tuning units can be plugged in at one time. A switch selects either station.
Operating frequency range:	About 15 – 25 kHz
Parameters measured:	(1) The vertical in-phase component (tangent of the tilt angle of the polarization ellipsoid). (2) The vertical out-of-phase (quadrature) component the short axis of the polarization ellipsoid compared to the long axis).
Method of reading:	In-phase from a mechanical inclinometer; out-of-phase from a calibrated dial. Nulling by audio tone.
Scale range:	In-phase ± 150%; Out-of-phase ± 40%.
Readability:	± 1%
Reading time:	10 -- 40 seconds depending on signal strength.
Operating temperature range:	–40 to 50°C
Power Supply:	6 size AA (penlight) alkaline cells. Life about 200 hours.
Dimensions:	16 x 5.5 x 3.5 in (42 x 14 x 9 cm)
Weight:	2.5 lbs (1.1 kg)
Instrument supplied with:	Monotonic speaker, carrying case, manual of operation, 3 station selector plug-in tuning units (additional frequencies are optional), set of batteries.
Shipping weight:	10 lbs (4.5 kg)

SIMPLE ONE-MAN OPERATION



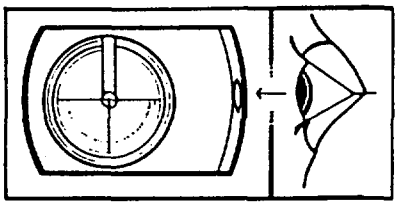
STATION SELECTOR

after selection of 2 VLF stations and insertion of proper plug-in units, knob rotation allows switching.



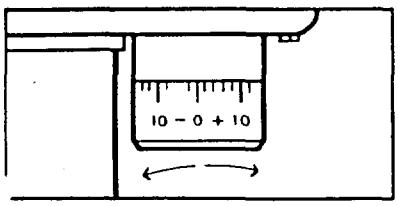
RECEIVING COILS

vertical receiving coil circuit in instrument picks up any vertical signal present. Horizontal receiving coil circuit, after automatic 90° signal phase shift, feeds signal into out-of-phase dial in series with the receiving coil.



IN-PHASE DIAL

shows the tilt-angle of the instrument for minimum signal. This angle is the measure of the vertical in-phase signal expressed in percentage when compared to the horizontal field.

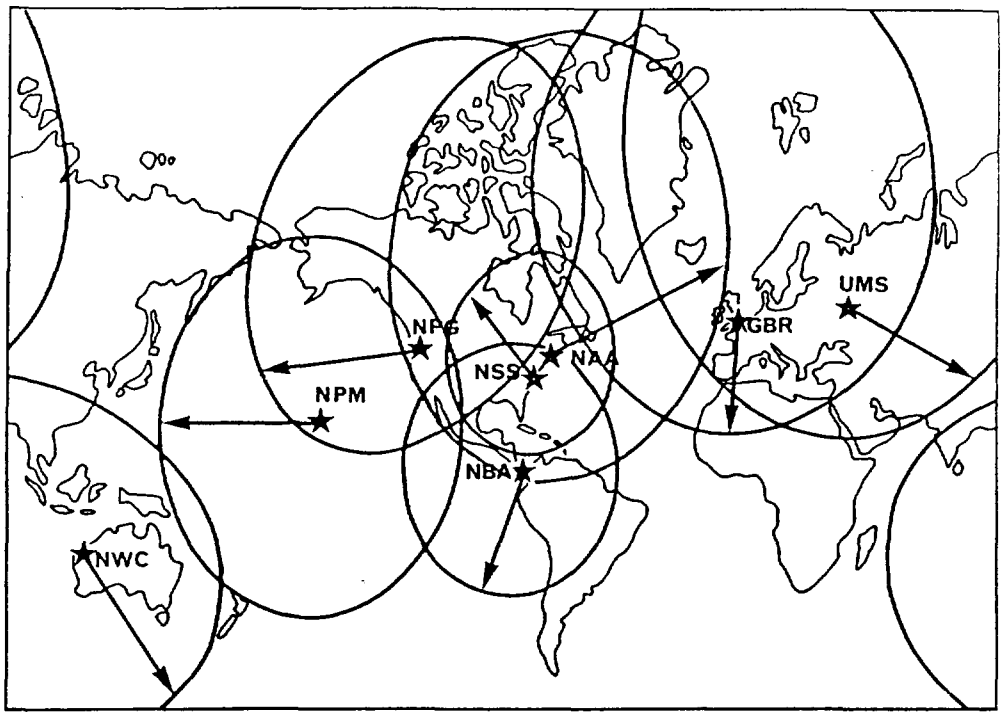


OUT-OF-PHASE DIAL

is calibrated in percentage markings and nulls the vertical quadrature signal in the vertical coil circuit.

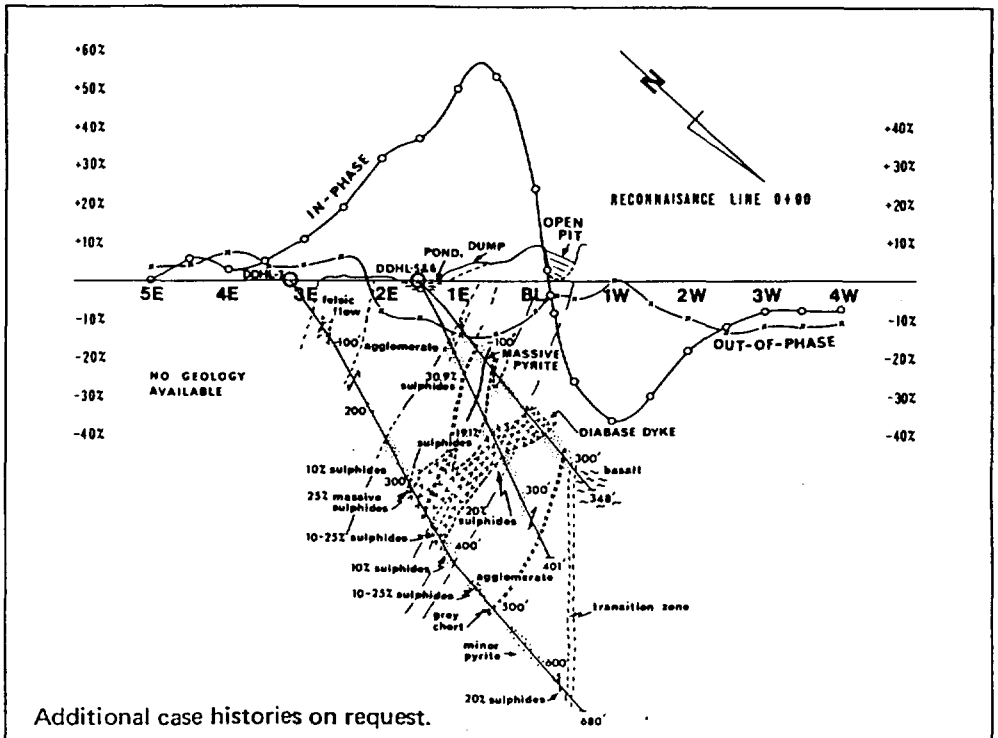
AUTHORIZED AGENT:

AREAS OF VLF SIGNALS



△ Coverage shown only for well-known stations. Other reliable, fully operational stations exist. For full information regarding VLF signals in your area consult Geonics Limited. Extensive field experience has proved that the above circles of coverage are very conservative and are actually much larger in extent.

EM16 PROFILE
over Lockport Mine property, Newfoundland



Additional case histories on request.

Appendix IV

GSM-19 Overhauser
Magnetometer specifications

Overhauser

Magnetometer / Gradiometer / VLF (GSM-19 v7.0)

Version 7.0

Our World is **Magnetic.**

GEM's unique Overhauser system combines data quality, survey efficiency and options into an instrument that takes the leading place in the industry.

And the latest v7.0 technology upgrades provide even more value:

Data export in standard XYZ (i.e. line-oriented) format for easy use in standard commercial software programs

Programmable export format for full control over output

GPS elevation values provide input for geophysical modeling
Enhanced GPS positioning resolution

Standard GPS:
<1.5m SBAS (WAAS, EGNOS, MSAS)
High resolution CDGPS Option:
<0.6m SBAS (WAAS, EGNOS, MSAS)
<0.6m CDGPS (Canada, USA, Mexico)
<0.7m OmniStar VBS2

Multi-sensor capability for advanced surveys to resolve target geometry

Picket and line marking / annotation for capturing related surveying information on-the-go

And all of these technologies come complete with the most attractive savings and warranty in the business!

Overhauser (GSM-19) console with sensor and cable. Can also be configured with additional sensor for gradiometer (simultaneous) readings.

The GSM-19 v7.0 Overhauser instrument is the total field magnetometer / gradiometer of choice in today's earth science environment -- representing a unique blend of physics, data quality, operational efficiency, system design and options that clearly differentiate it from other quantum magnetometers.

With data quality exceeding standard proton precession and comparable to costlier optically pumped cesium units, the GSM-19 is a standard (or emerging standard) in many fields, including:

- **Mineral exploration** (ground and airborne base station)
- **Environmental and engineering**
- **Pipeline mapping**
- **Unexploded Ordnance Detection**
- **Archeology**
- **Magnetic observatory measurements**
- **Volcanology and earthquake prediction**

Taking Advantage of the Overhauser Effect

Overhauser effect magnetometers are essentially proton precession devices - except that they produce an order-of magnitude greater sensitivity.

These "supercharged" quantum mag-netometers also deliver high absolute accuracy, rapid cycling (up to 5 readings / second), and exceptionally low power consumption.

The Overhauser effect occurs when a special liquid (with unpaired electrons) is combined with hydrogen atoms and then exposed to secondary polarization from a radio frequency (RF) magnetic field.

The unpaired electrons transfer their stronger polarization to hydrogen atoms, thereby generating a strong precession signal -- that is ideal for very highsensitivity total field measurements.

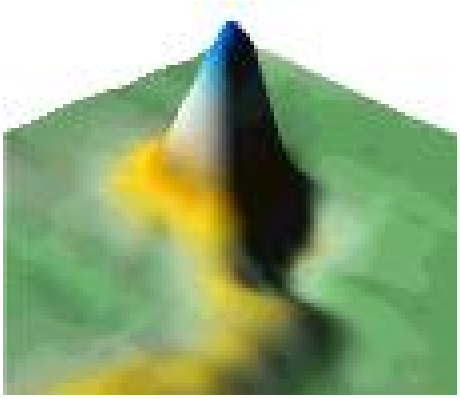
In comparison with proton precession methods, RF signal generation also keeps power consumption to an absolute minimum and eliminates noise (i.e. generating RF frequencies are well out of the bandwidth of the precession signal).

In addition, polarization and signal measurement can occur simultaneously - which enables faster, sequential measurements. This, in turn, facilitates advanced statistical averaging over the sampling period and/or increased cycling rates (i.e. sampling speeds).

Other advantages are described in the section called, "GEM's Commercial Overhauser System" that appears later in this brochure.

Maximizing Your Data Quality with the GSM-19

Data quality is a function of five key parameters that GEM has taken into consideration carefully in the design of the GSM-19. These include sensitivity, resolution, absolute accuracy, sampling rates and gradient tolerance.



Data from Kalahari Desert kimberlites. Courtesy of MPH Consulting (project managers), IGS c. c. (geophysical contractor) and Aegis Instruments (Pty) Ltd., Botswana.

Sensitivity is a measure of the signal-to-noise ratio of the measuring device and reflects both the underlying physics and electronic design. The physics of the Over-hauser effect improves sensitivity by an order of magnitude over conventional proton precession devices. Electronic enhancements, such as high-precision precession frequency counters (see the v6.0 & v7.0 - New Milestones section) enhance sensitivity by 25% or more.

The result is high quality data with sensitivities of 0.02 nT / √Hz. This sensitivity is virtually the same as the sensitivity of costlier optically-pumped cesium systems.

Resolution is the minimum step of the counter used to measure precession frequency and its conversion into magnetic field. It is generally higher than the sensiti-vity to avoid a contribution of the counter to overall system noise. The GSM-19 has unmatched resolution (0.01 nT).

This level of resolution translates into well-defined, characteristic anomalies; impro-ved visual display; and enhanced numeri-cal data for processing and modeling.

Absolute accuracy defines maximum deviation from the true value of the measu-

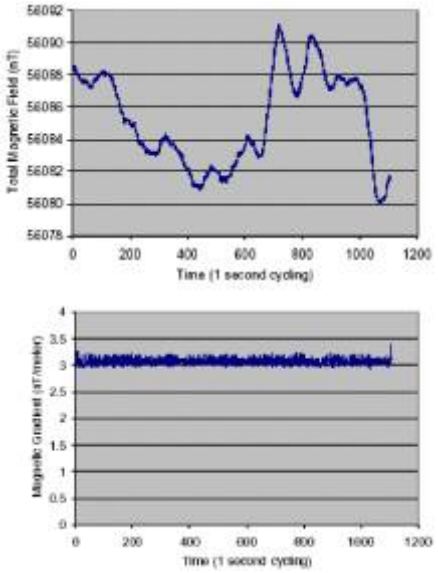
knows the true value of the field, absolute accuracy is determined by considering factors involved in determining the field value and their accuracy, including the gyromagnetic constant, maximum offset of the time base frequency, etc.

With an absolute accuracy of +/- 0.1 nT, the GSM-19 is ideal for total field work and gradient measurements maintain the same high standard of quality. Both configurations are also specially designed to minimize overall system noise, so you can be sure that results truly reflect the geologic signal that is of most interest to you.

Sampling rates are defined as the fastest speed at which the system can acquire da-ta. This is a particularly important parame-ter because high sampling rates ensure accurate spatial resolution of anomalies and increase survey efficiency.

GEM's Overhauser system has 3"measurement modes" or maximum sampling rates - "Standard" (3 sec. / reading), "Walking" (0.5 sec. / reading) and "Fast" (0.2 sec. / reading). These rates make the GSM-19 a versatile system for all ground uses (including vehicle-borne applications).

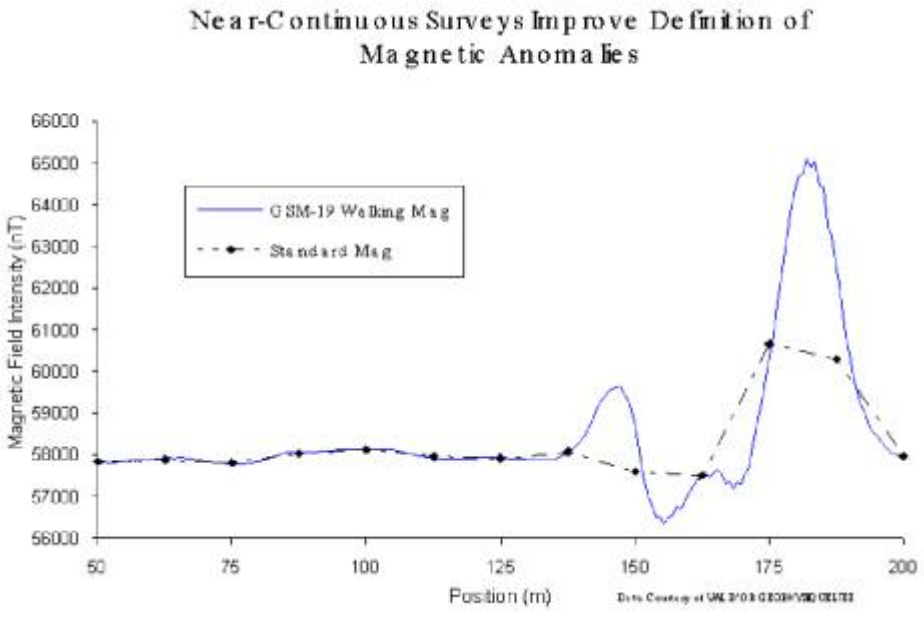
Gradient tolerance is the ability to obtain reliable measurements in the presence of extreme field variations. GSM-19 tolerance is maintained through internal



Total Field and Stationary Vertical Gradient showing the gradient largely unaffected by diurnal variation. Absolute accuracy is also shown to be very high (0.2 nT/meter).

signal counting algorithms, sensor design and Overhauser physics. For example, the Overhauser effect produces high amplitude, long-duration signals that facilitate measurement in high gradients.

The system's tolerance (10,000 nT/m) makes it ideal for many challenging environments, such as highly magnetic rocks in mineral exploration or near cultural objects in environmental, UXO or archeological applications.



Much like an airborne acquisition system, the GSM-19 "Walking" magnetometer option delivers very highly-sampled, high sensitivity results that enable very accurate target location and / or earth science decision-making.

Increasing Your Operational Efficiency

Many organizations have standardized their magnetic geophysical acquisition on the GSM-19. This reflects enhancements such as memory capacity; light weight; GPS and navigation; no warm-up time; no dead zones or heading errors; easy dumping and processing.

Memory capacity controls the efficient daily acquisition of data, acquisition of positioning results from GPS and the ability to acquire high volumes of data to meet daily survey objectives.

V7.0 upgrades have established the GSM-19 as the commercial standard for memory with over 838,000 readings (based on a basic configuration of memory, a survey with time, coordinate and field values).

Optional increments of memory to over 2 million readings making the GSM-19 an ideal system for acquisition of data with integrated GPS readings (when required).

Portability characteristics (ruggedness, light weight and power consumption) are essential for operator productivity in both normal and extreme field conditions.

GEM's Overhauser magnetometer is established globally as a robust scientific instru-ment capable of withstanding temperatu-re, humidity and terrain extremes. It has the reputation as the lightest and lowest power system available, reflecting Overhau-ser effect and RF polarization advantages.

In comparison with other systems, the GSM-19 is the choice of operators as an easy-to-use and robust instrument

GPS and navigation options are very important for earth science professionals. GPS technologies are revolutionizing data acquisition, productivity, increasing spatial resolution and providing a new level of data quality for informed decision-making.

GEM has made GPS a cornerstone of its magnetic R&D program. Real time GPS and DGPS options are now available in different survey resolutions. For more details, see the GPS and DGPS section.

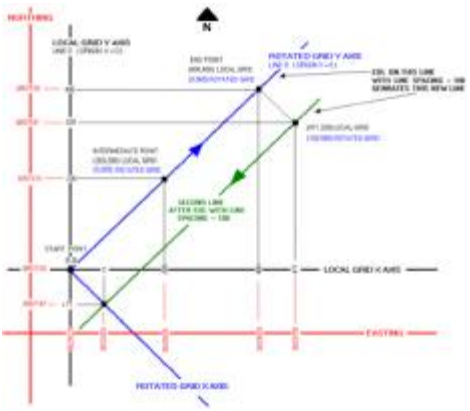
GEM has also developed a GPS Navigation feature with real-time coordinate transformation to UTM, local X-Y coordinate rotations, automatic end-of-line flag, guidance to the next line, and survey "lane" guidance with cross-track display and audio indicator.

Other enhancements include way point preprogramming of up to 1000 points. Professionals can define a complete survey on PC and download points to the magnetometer via RS-232 before leaving for the field.

The operator performs the survey using the way points as a survey guide. This capability decreases survey errors, improves efficiency and ensures more rapid survey completion.

Dumping and processing effectiveness is also critical consideration. Historically, up to 60% of an operator's "free" time can be spent on data dumping. Data dumping times are significantly reduced through GEM's implementation of high-speed, digital data links (up to 115 kBaud).

This functionality is facilitated through a new RISC processor and GEM's proprietary GEMLinkW acquisition/display software. This software serves as a bi-directional RS-232 terminal. It also has integrated processing functionality to streamline key processing steps, including diurnal data reduction. GEMLinkW is provided free to all GSM-19 customers. Regular updates are



Navigation and Lane Guidance

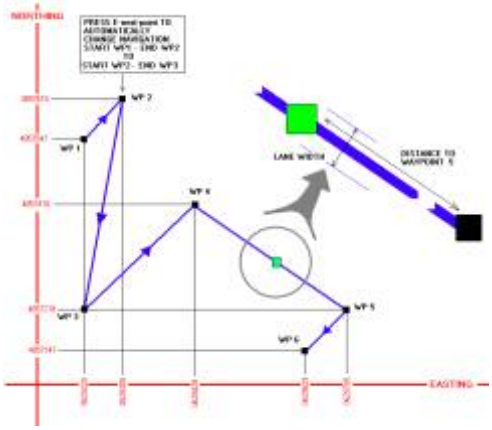
The figure above shows the Automatic Grid (UTM, Local Grid, and Rotated Grid). With the Rotated Grid, you can apply an arbitrary origin of your own definition. Then, the coordinates are always in reference to axes parallel to the grid. In short, your grid determines the map, and not the NS direction.

The Local Grid is a scaled down, local version of the UTM system, and is based on your own defined origin. It allows you to use smaller numbers or ones that are most relevant to your survey.

The figure below shows how programmable waypoints can be used to plan surveys on a point-by-point basis.

Initially, you define waypoints and enter them via PC in the office or via PC in the field or office. When you perform your survey, the unit guides you to each point.

While walking between waypoints, lane guidance keeps you within a lane of pre-defined width using arrows (< - or - >) to indicate left or right. The display also shows the distance (in meters) to the next waypoint.



Adding Value through Options

When evaluating the GSM-19 as a solution for your geophysical application we recommend considering the complete range of options offered by GEM. These options can be added at time of original purchase or later to expand capabilities as your needs change or grow.

GEM's approach with options is to provide you with an expandable set of building blocks:

o Gradiometer
o Walking Magnetometer / Gradiometer
o Fast Magnetometer / Gradiometer
o VLF (3 channel)
o GPS (built-in or external)

GSM-19G Gradiometer Option

The GSM-19 gradiometer is a versatile, entry level system that can be upgraded to a full-featured "Walking" unit (model GSM-19GW) in future. The GSM-19G configuration comprises 2 sensors and a "Standard" console that reads data to a maximum of 1 reading every 3 seconds.

An important GEM's design feature allows gradiometer sensors measure the 2 magnetic fields concurrently to avoid any temporal variations that could distort gradiometer readings. Other features, such as single-button data recording, are included for operator ease-of-use.

GSM-19W / GW "Walking" Magnetometer / Gradiometer Option

GEM Systems pioneered the innovative "Walking" option that enables the acquisi-tion of nearly continuous data on survey lines. Since introduction, the GSM-19W and GSM-19GW have become one of the most popular magnetic instruments in the world.

Similar to an airborne survey in principle, the system records data at discrete time intervals (up to 5 readings per second) as the instrument is carried along the line.

At each survey picket (fiducial), the operator touches a designated key. The system automatically assigns a picket coordinate to the reading and linearly interpolates the coordinates of all intervening readings (following survey completion during post-processing). A main benefit is that the high sample den-sity improves definition of ge-ologic struc-tures and other targets (UXO, archeological relics, drums, etc.).

It also increases survey efficiency because the operator can record data almost continuously. Another productivity feature is the instantaneous recording of data at pickets. This is a basic difference between the "Walking" version and the GSM-19 / GSM-19G (the "Standard" mode version which requires 3 sec. to obtain a reading each time the measurement key is pressed).

GSM-19W / GW Magnetometer

The GSM-19 reads up to 5 readings per sec. (sensors and console are the same as other models.) This system is ideal for vehicle-borne surveys, such as UXO, archaeological or some mineral exploration applications, where high productivity is required.

GSM-19 "Hands-Free" Backpack Option

The "Walking" Magnetometer and Gradiometer can be configured with an optional backpack-supported sensor. The backpack is uniquely constructed - permitting measurement of total field or gradient with free hands.

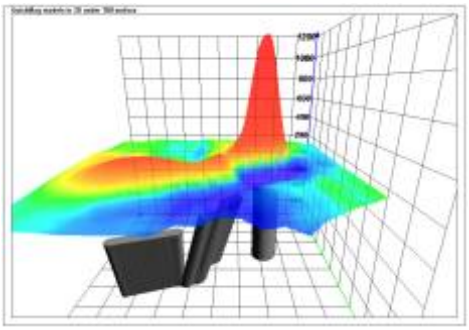
This option provides greater versatility and flexibility, which is particularly valuable for high-productivity surveys or in rough terrain.

GSM-19V / GV "VLF" Option

With GEM's omnidirectional VLF option, up to 3 stations of VLF data can be acquired without orienting. Moreover, the operator is able to record both magnetic and VLF data with a single stroke on the keypad.

3rd Party Software - A One-Stop Solution for Your Potential Field Needs

Now it's even easier to take data from the field and quality control stage through to final map preparation and modeling.



GEM-VIS provides links to fast 3D modeling via Encom's professional QuickPro software.

GEM provides very comprehensive solution available for working with magnetometer data:

o Free GEMLinkW Transfer and Internet Upgrade software
o Optional, low-cost GEM-VIS Quality Control, Visualization and Analysis
o Optional Data Processing
o Optional QuickMag Pro Automated Modeling and Inversion

V7.0 and V6.0 - Technology Developments

One of the main differences between GEM and other manufacturers is GEM's 30 years consistent focus on developing leading-edge magnetic technologies.

This commitment has led to many innovations in sensor technology; signal counting; firmware and software; and hardware and console design, culminating in the release of v7.0.

v7.0 and the previous release (v6.0) of the GSM-19 system provides many examples of the ways in which GEM continues to advance magnetics technologies for its customers.

Enhanced data quality:

o 25% improvement in sensitivity (new frequency counting algorithm)
o new intelligent spike-free algorithm (in contrast to other manufacturers, GEM does not apply smoothing or filtering to achieve high data quality)

Improved operational efficiency:

o Enhanced positioning (GPS engine with optional integrated / external GPS and real-time navigation)
o 16 times increase in memory to 32 Mbytes standard
o 1000 times improvement in processing and display speed (RISC microprocessor with 32-bit data bus)
2 times faster digital data link
(115 kBaud through RS-232)

Innovative technologies:

o Battery conservation and survey flexibility (base station scheduling option with 3 modes - daily, flexible and immediate start)
o Survey pre-planning (up to 1000 programmable waypoints that can be entered directly or downloaded from PC for greater efficiency)
o Efficient GPS synchronization of field and base units to Universal Time (UTC)
o Cost saving with firmware upgrades

GEM's Proven Overhauser System

In a standard Proton magnetometer, current is passed through a coil wound around a sensor containing a hydrogen-rich fluid. The auxiliary field created by the coil (>100 Gauss) polarizes the protons in the liquid to a higher thermal equilibrium.

When the current, and hence the field, is terminated, polarized protons precess in the Earth's field and decay exponentially until they return to steady state. This process generates precession signals that can be measured as described below. Overhauser magnetometers use a more efficient method that combines electron-proton coupling and an electron-rich liquid (containing unbound electrons in a solvent con-taining a free radical). An RF magnetic field that corresponds to a specific energy level transition, stimulates the unbound electrons.

Instead of releasing this energy as emitted radiation, the unbound electrons transfer it to the protons in the solvent. The resulting polarization is much larger, leading to stronger precession signals.

Overhauser and proton precession, measure the scalar value of the magnetic field based on the proportionality of precession frequency and magnetic flux density (which is linear and known to a high degree of ac-curacy). Measurement quality is calculated using signal amplitude and its decay cha-racteristics. Values are averaged over the sampling

As the world's experienced manufacturer of commercial Overhauser systems, GEM's technical focus on the GSM-19 has resulted in a superior magnetic measuring device with high sensitivity, high cycling speed, low noise, and very low power consumption over a wide temperature range.

With minor software modifications (i.e. addition of a small auxiliary magnetic flux density while polarizing), it can be easily configured for high sensitivity readings in low magnetic fields (for equatorial work).

GPS - Positioning You for Effective Decision Making

The use of GPS technology is increasing in earth science disciplines due to the ability to make better decisions in locating anomalies, and in improving survey cost effectiveness and time management.

Examples of applications include:

o Surveying in remote locations with no grid system (Arctic for diamond exploration)

o High resolution exploration mapping

o High productivity ferrous ordnance (UXO) detection

o Ground portable magnetic and gradient surveying for environmental and engineering applications

o Base station monitoring for observing diurnal magnetic activity and disturbances with integrated GPS time

GEM addresses requests for GPS and high-resolution Differential GPS (DGPS) through internal and external options. Customer units can also be integrated. GPS surveys return a variety of real data to the user, including Time, Latitude and Longi-tude, UTM, Elevation and # of Satellites. This data is available to be applied in various ways by the user. The table below shows GPS modes, ranges and services.

Description	Range	Services
GPS Option A		Time reception only
GPS Option B	<1.5m	DGPS*
GPS Option C	<0.6m	DGPS*, OmniStar
GPS Option D	<0.6m <0.6m <0.7m	CDGPS, DGPS*, OmniStar
Output		
Time, Lat / Long, UTM, Elevation and number of Satellites		
***DGPS with SBAS (WAAS / EGNOS / MSAS)**		

Key System Components

Key components that differentiate the GSM-19 from other systems on the market include the sensor and data acquisition console. Specifications for components are provided on the right side of this page.

Sensor Technology

GEM's sensors represent a proprietary innovation that combines advances in electronics design and quantum magnetometer chemistry.

Electronically, the detection assembly includes dual pick-up coils connected in series opposition to suppress far-source electrical interference, such as atmospheric noise. Chemically, the sensor head houses a proprietary hydrogen-rich liquid solvent with free electrons (free radicals) added to increase the signal intensity under RF polarization.

From a physical perspective, the sensor is a small size, light-weight assembly that houses the Overhauser detection system and fluid. A rugged plastic housing protects the internal components during operation and transport.

All sensor components are designed from carefully screened non-magnetic materials to assist in maximization of signal-tonoise. Heading errors are also minimized by ensuring that there are no magnetic inclusions or other defects that could result in variable readings for different orientations of the sensor.

Optional omni-directional sensors are available for operating in regions where the magnetic field is near-horizontal (i.e. equatorial regions). These sensors maximize signal strength regardless of field direction.

Data Acquisition / Console Technology

Console technology comprises an external keypad / display interface with internal firmware for frequency counting, system control and data storage / retrieval. For operator convenience, the display provides both monochrome text as well as real-time profile data with an easyto-use interactive menu for performing all survey functions.

The firmware provides the convenience of upgrades over the Internet via the GEMLinkW software. The benefit is that instrumentation can be enhanced with the latest technology without returning the system to GEM -- resulting in both timely implementation of updates and reduced shipping / servicing costs.

Specifications

Performance

Sensitivity:	0.022 nT / √Hz
Resolution:	0.01 nT
Absolute Accuracy:	+/- 0.1 nT
Range:	20,000 to 120,000 nT
Gradient Tolerance:	< 10,000 nT/m
Samples at:	60+, 5, 3, 2, 1, 0.5, 0.2 sec
Operating Temperature:	-40C to +50C

Operating Modes

Manual: Coordinates, time, date and reading stored automatically at minimum 3 second interval.
Base Station: Time, date and reading stored at 1 to 60 second intervals.
Remote Control: Optional remote control using RS-232 interface.
Input / Output: RS-232 or analog (optional) output using 6-pin weatherproof connector.

Storage - 32 MB (# of Readings)

Mobile:	1,465,623
Base Station:	5,373,951
Gradiometer:	1,240,142
Walking Mag:	2,686,975

Dimensions

Console:	223 x 69 x 240 mm
Sensor:	175 x 75mm diameter cylinder

Weights

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

Standard Components

GSM-19 console, GEMLinkW software, batteries, harness, charger, sensor with cable, RS-232 cable and USB adapter, staff, instruction manual and shipping case.

Optional VLF

Frequency Range: Up to 3 stations between 15 to 30.0 kHz. Parameters: Vertical in-phase and out-of-phase components as % of total field. 2 components of horizontal field amplitude and total field strength in pT.

Resolution:	0.1% of total field

Our World is Magnetic.

About GEM Advanced Magnetometers

GEM Systems, Inc. delivers the world's only magnetometers and gradiometers with built-in GPS for accurately positioned ground, airborne and stationary data acquisition. The company serves customers in many fields including mineral exploration, hydrocarbon exploration, environmental and engineering, Unexploded Ordnance Detection, archeology, earthquake hazard prediction and observatory research.

Key products include the Proton Precession, Overhauser and Optically-Pumped Potassium instruments.

Each system offers unique benefits in terms of sensitivity, sampling, and acquisition of high-quality data. These core benefits are complemented by GPS technologies that provide metre to sub-metre positioning.

With customers in more than 50 countries globally and more than 25 years of continuous technology R&D, GEM is known as the only geophysical instrument manufacturer that focuses exclusively on magnetic technology advancement.

GEM SYSTEMS
ADVANCED MAGNETOMETERS

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