

We are committed to providing [accessible customer service](#).  
If you need accessible formats or communications supports, please [contact us](#).

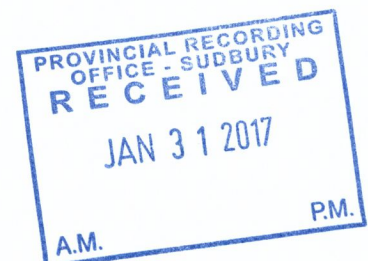
Nous tenons à améliorer [l'accessibilité des services à la clientèle](#).  
Si vous avez besoin de formats accessibles ou d'aide à la communication, veuillez [nous contacter](#).

2 · 57497



**2016 Prospecting Report  
Prospecting & Beep Mat 8 Test Survey  
Ray Property, Ray Township  
Larder Lake Mining Division, Ontario**

**By:  
Todd Mathieu  
Northern Sun Mining Corp.  
January 29, 2017**



## CONTENTS

---

1.0	INTRODUCTION .....	1
1.1	Scope of Work.....	1
1.2	Technical Parameters .....	1
2.0	PROPERTY DESCRIPTION.....	1
2.1	Location and Access .....	1-2
2.2	Property Overview.....	3
3.0	GPS GEOREFERENCING OF DATA.....	4
3.1	Collection of Data & Quality Control.....	4
4.0	RAY PROPERTY.....	4
4.1	Historic Work.....	4
4.2	Beep Mat 8 Test Survey, Prospecting, Sampling .....	4-6
5.0	CONCLUSION .....	6-7
6.0	STATEMENT OF QUALIFICATIONS .....	8
7.0	APPENDIX A – PROPERTY MAPS .....	9-13
8.0	APPENDIX B – DAILY WORK LOG .....	14-19
9.0	ASSAY CERTIFICATES .....	20-22

## **1.0 INTRODUCTION**

### **1.1 Scope of Work**

This report describes the prospecting, manual trenching, sampling and Beep Mat 8 test survey work completed on December 7<sup>th</sup> 2016 to December 8<sup>th</sup> 2016 on the Northern Sun Mining Corp. 100% owned Ray Property.

### **1.2 Technical Parameters**

GPS Receiver Type:

- Garmin GPSMap 62ST
- Differential correcting enabled
- Averaging (minimum 150 positional fixes over 150 seconds)

Coordinate System:

- NAD83, UTM Zone 17

Camera Type:

- Canon PowerShot D30, 12.1MP, waterproof/shockproof,

Beep Mat 8 – Rented from GDD Instrumentation

## **2.0 PROPERTY DESCRIPTION**

### **2.1 Location and Access**

The Northern Sun Mining Corp. 100% owned Ray Property resides 23km southwest of the town of Gowganda, Ontario in the Larder Lake Mining Division.

Ground access to the property is possible by proceeding 18km east on highway 560 from Gowganda to Beauty Lake Road and an additional 40km southwest/west on Beauty Lake Road until reaching claim number 04277177 (Figure 1-1, Figure 1-2, Figure 1-3)



## Ray Property – 2016 Prospecting Report

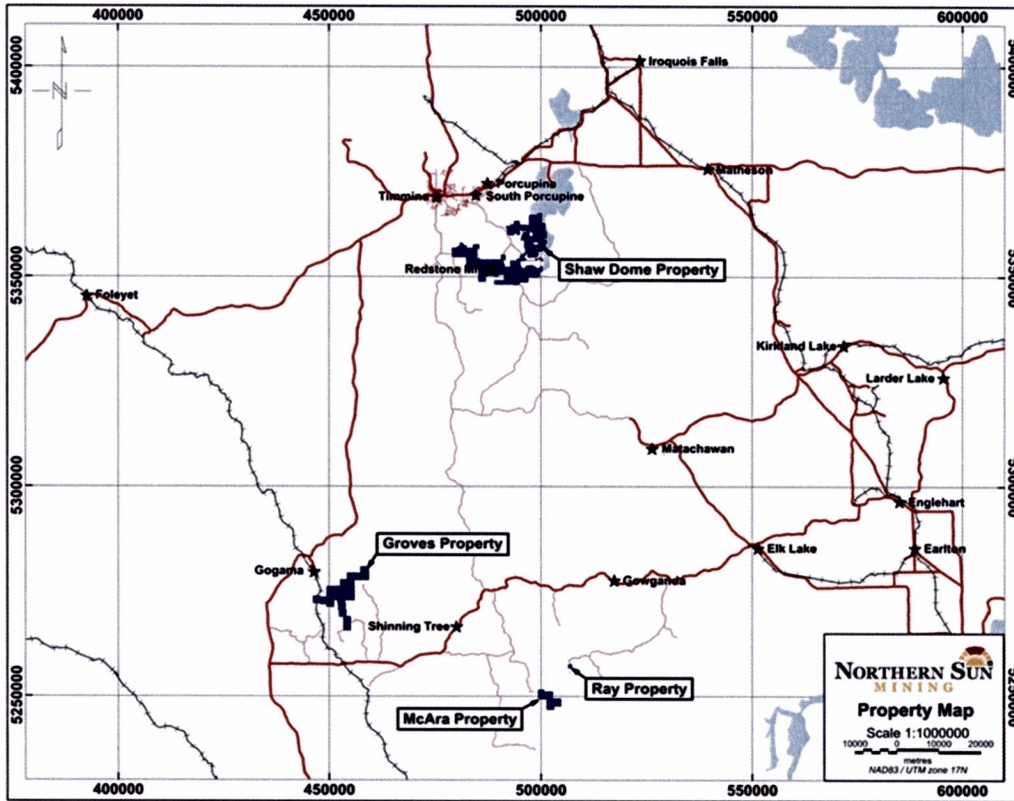


Figure 1-1

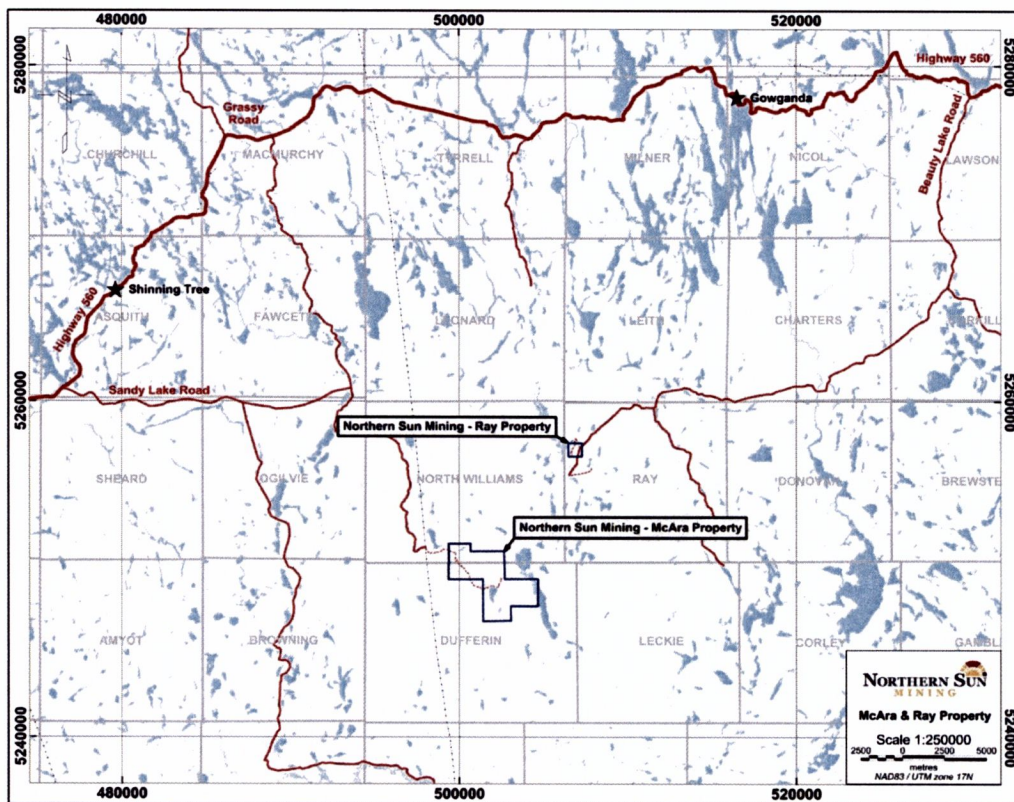


Figure 1-2

## 2.2 Property Overview

The Ray Property currently consists of 1 claim block with 4 claim units/64 hectares (Figure1-3).

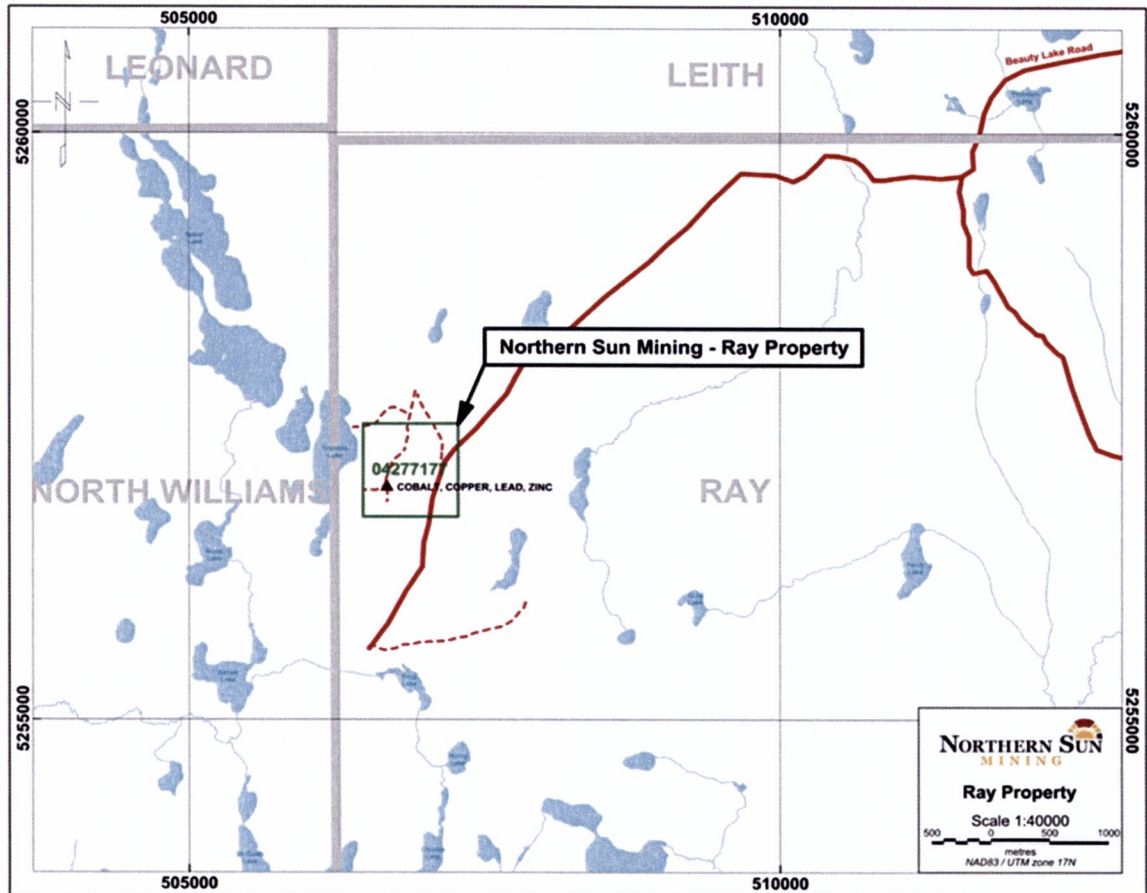


Figure 1-3

The property is host to the Tremble Lake Showing which is a set of arsenide veins within an intrusive gabbro (Nipissing diabase). The arsenide veins host significant values of Co and As. In 2008 Liberty Mines (currently Northern Sun Mining) drilled a total of 7 drill holes for a total of 983.7 meters. Significant narrow results included assays up to 1.265% Co over 0.2 m, 6.23% Cu over 0.2 m 0.83% Pb over 0.3m and 1.8% Zn over 0.3 m which suggests additional base metal minerals may be associated with the Tremble Lake Showing. In addition, assays obtained from the 2016 prospecting program included anomalous values of Au which increased the potential of the Ray Property.



### 3.0 GPS GEOREFERENCING OF DATA

#### 3.1 Collection of Data & Quality Control

Data was collected by Todd Mathieu and Nishanthan Logeswaran of Northern Sun Mining Corp. The technical specifications as outlined in the document labelled “Georeferencing Standards for Unpatented Mining Claims” obtained from the MNDM was used as a guide. Weather on the days of data collection was overcast with occasional minor precipitation in the form of light snow. Satellite reception was adequate and provided accuracy of 3-5 meters during the program.

### 4.0 Ray PROPERTY

#### 4.1 Historic Work

The Ray Property has seen very little exploration over the last century and has been limited to mostly prospecting and test pits. Due to the Temagami Land Caution the area was also restricted to exploration from 1973 to 1995. In the last decade Northern Sun Mining (previously Liberty Mines) has taken up significant exploration efforts at the Tremble Lake showing as seen in Table 1-1. In addition, as part of Discover Abitibi Initiative a portion of Ray Township, including the Tremble Lake Showing, was flown in 2008 with an airborne magnetic survey. It is noted that eastern portions of Ray Township have been designated “Wind Power Area” which could affect exploration efforts in the future.

**Ray Property - Exploration History**

Item	AFRI Number	Performed For	Year	Notes
Ground MAG & Line Cutting	20000001930	Liberty Cobalt (Liberty Mines)	2007	grid north/south
Ground Induced Polarization	20000004341	Liberty Cobalt (Liberty Mines)	2008	grid north/south
Diamond Drilling - 983.7m BQ	20000003491	Liberty Cobalt (Liberty Mines)	2008	Tremble Lake Showing
GDS 1064 - Airborne Magnetics Survey		Liberty Cobalt (Liberty Mines)	2009	23,662 line-kilometer, 2008 survey
Prospecting	20000004435	Liberty Cobalt (Liberty Mines)	2009	
Prospecting	20000005570	Liberty Cobalt (Liberty Mines)	2010	
Ground MAG, VLF, Line Cutting	20000007703	Liberty Cobalt (Liberty Mines)	2012	grid east/west

**Table 1-1**

#### 4.2 Beep Mat 8 Test Survey, Prospecting, Sampling

A Beep Mat 8 Survey unit was rented from GDD Instrumentation Inc. as a test survey at the Tremble Lake Showing. The main mineralization is disseminated, but the hopes were to locate additional high grade mineralization of Cu as seen in the 2008 drill campaign.

Unfortunately the BM8 test did not provide any positive results and in fact provided the surveyor/writer with the belief that even the magnetic portion of the BM8 survey was highly skewed by the minimal overburden and snow that was present at the survey location. The entire Nipissing diabase outcrop was magnetic and registered as a magnetic anomaly where ever there was little to no overburden. For this reason no map was created with the BM8 MAG anomalies as the test information was redundant.

The BM8 did provide useful in locating the 2008 drill collars that were buried in the snow.

As part of the program all drill holes, surface trenches, and shafts located were GPSed and added to the Northern Sun GIS database (Table 1-2 & Figure 1-4).

**Ray Property - 2016 GPS Points**

PointID	Easting (NAD83)	Northing (NAD83)	Elevation (meters)
RA-08-01	506682	5256925	421
RA-08-02	506682	5256925	421
RA-08-03	506668	5256984	420
RA-08-04	506675	5256872	421
RA-08-05	506704	5256927	423
RA-08-06	506668	5257010	415
RA-08-07	506668	5257044	414
RA-2016GRAB-01	506643	5256928	422
RA-2016GRAB-02	506643	5256928	422
RA-2016GRAB-03	506643	5256928	422
RA-2016GRAB-04	506645	5256949	422
RA-SHF01	506646	5256927	422
RA-SHF02	506658	5256912	421
RA-TR01-START	506644	5256949	422
RA-TR01-FIN	506643	5256926	422
RA-TR02-START	506644	5256914	420
RA-TR02-FIN	506649	5256889	420
RA-TR03-START	506658	5256912	420
RA-TR03-FIN	506658	5256870	419
RA-TR04-BigHole	506650	5256881	418

**Table 1-2**

Manual trenching within the historic trenches also took place with follow up sampling. The manual trenching was successful at locating a portion of the main showing where the vein widened to 20 centimeters. A total of 4 samples were taken as part of this 2016 program (Table 1-2, Figure 1-4). Most promising analytical results can be found in Table 1-3.



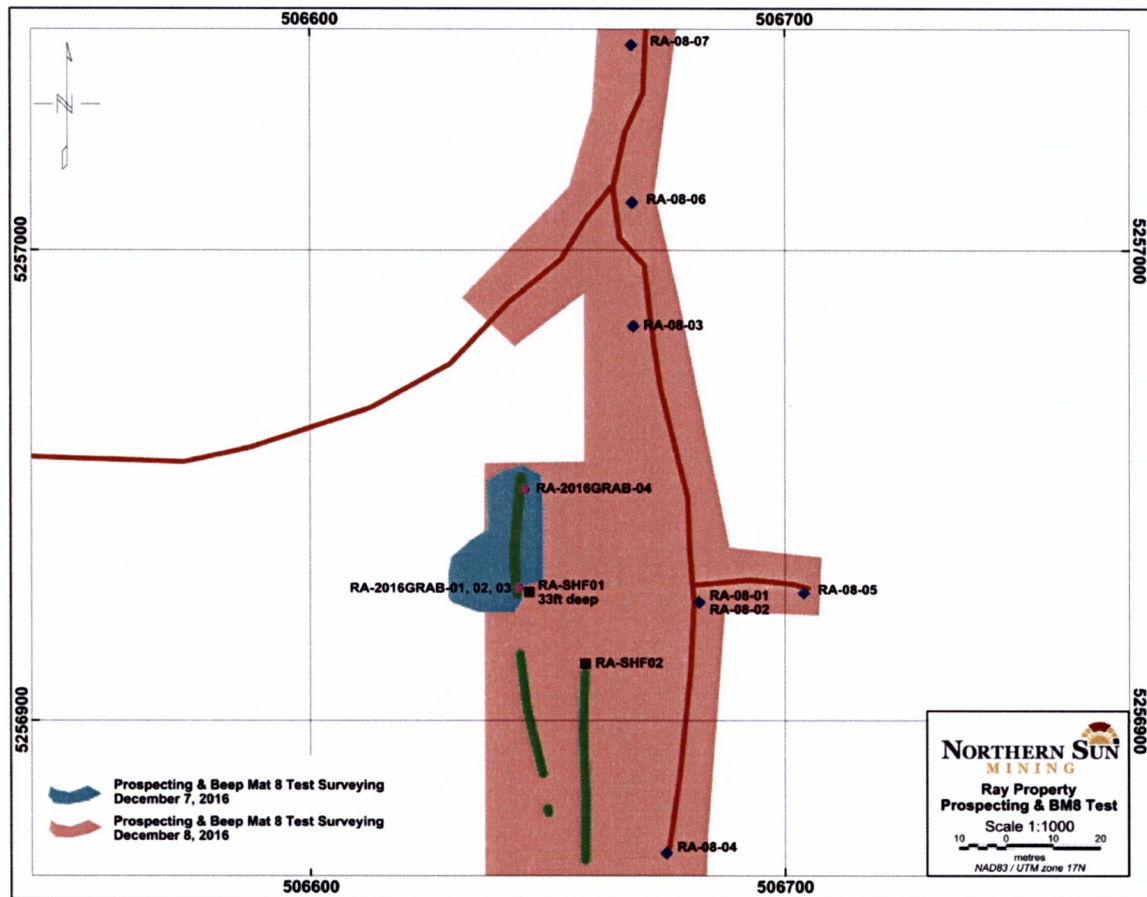


Figure 1-4

	Au	Ag	As	Bi	Co	Cu	Ni	Pb
Sample Description	gpt	gpt	%	%	%	%	%	%
RA-2016GRAB-01	0.11	4.20	0.50	0.00	0.45	0.01	0.03	0.01
RA-2016GRAB-02	1.15	21.20	2.50	0.50	2.20	0.04	0.31	0.15
RA-2016GRAB-03	0.31	0.50	0.16	0.00	0.17	0.00	0.01	0.01
RA-2016GRAB-04	0.01	<0.2	0.01	0.00	0.01	0.01	0.00	0.00

Table 1-3

## 5.0 Conclusion

The program was successful in locating, sampling, and GPSing several key surface points at the Tremble Lake Showing. To date the mineralization appears to be narrow, pinches and swells, and resides in an intrusive gabbro (Nipissing Diabase).

## Ray Property – 2016 Prospecting Report

The 2016 sampling program indicates that Au appears to be associated with the Co/As veins. Next steps should include verifying if the Au values encountered are refractory and tied to the As.

The cobalt and gold grades encountered suggest further exploration is warranted.



Todd Mathieu



## 6.0 STATEMENT OF QUALIFICATIONS

I, Todd Mathieu, do hereby certify that:

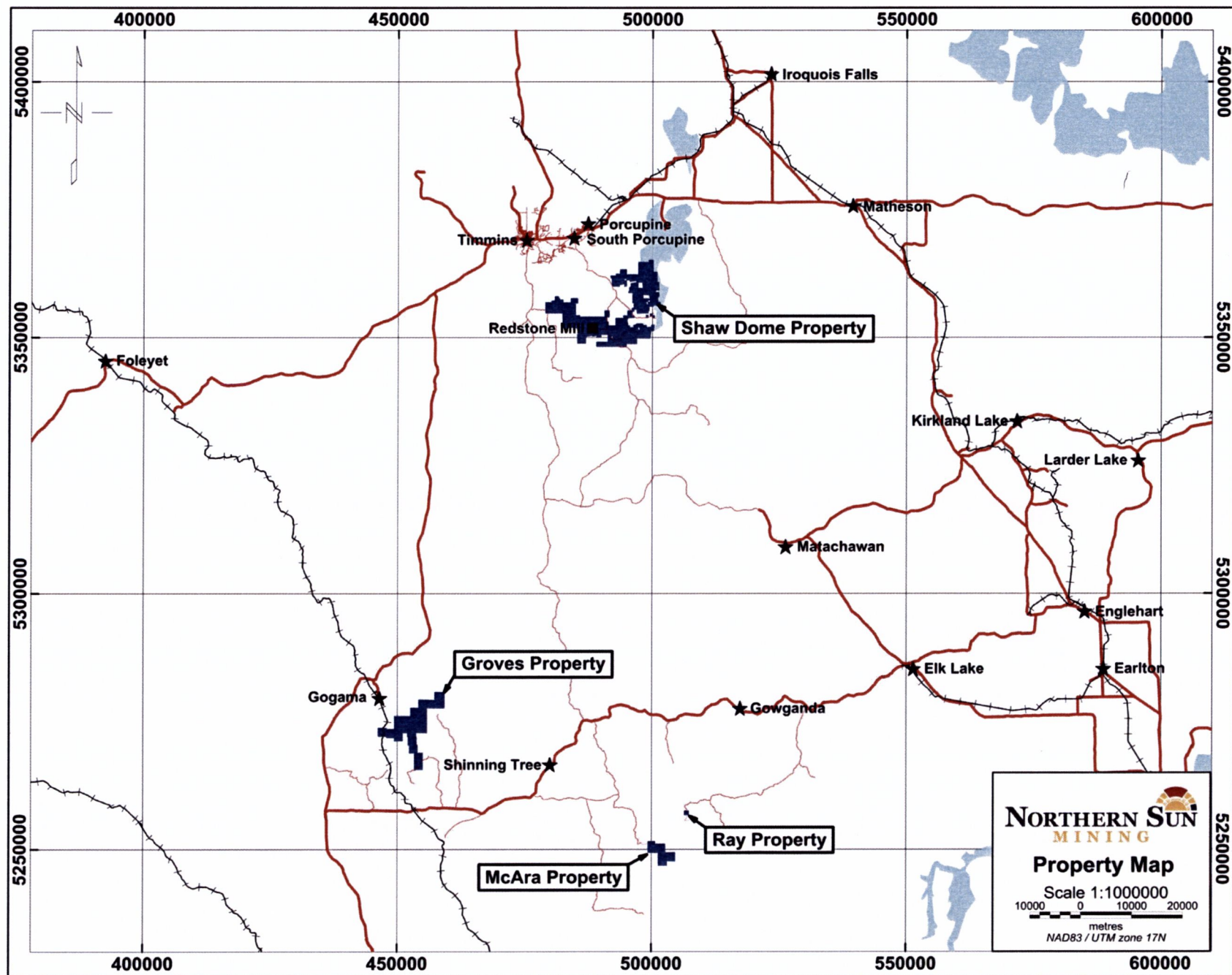
1. I reside at 216 Tisdale Street, South Porcupine, Ontario, Canada, P0N 1H0.
2. I am a graduate of the Computer Programmer/Analyst Program at Canadore College, North Bay, Ontario.
3. I have practiced my geological and geophysical profession intermittently from 1994 to 2009, and consistently from 2009 to present. I have been directly involved in the exploration of several mineral commodities in Ontario and have a strong technical background in geophysics and GIS.
4. I am employed as a Project Geology Technician for Northern Sun Mining Corp. based from its Timmins office.
5. I have knowledge and experience of the geology, geophysics, core logging, sampling, claims management, security practices of Northern Sun Mining Corp. and their portfolio of properties.
6. I have completed the Mining Act Awareness Program (verification number: BE8C-9100-C9D2-3E6E) and I am familiar with the mining act regulations, policies and procedures.

January 29, 2017

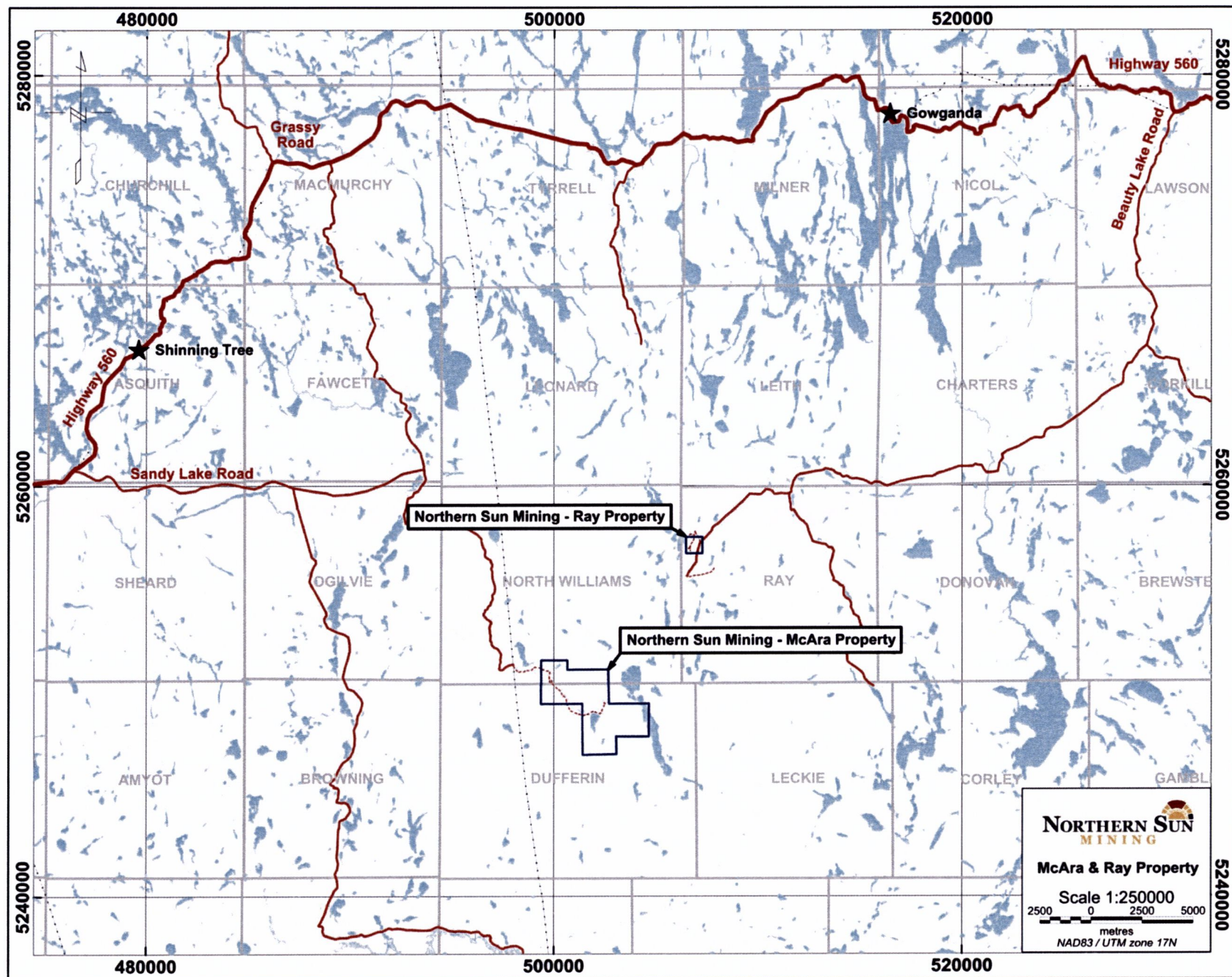
A handwritten signature in dark ink, appearing to read "Todd Mathieu", is written over a horizontal line.

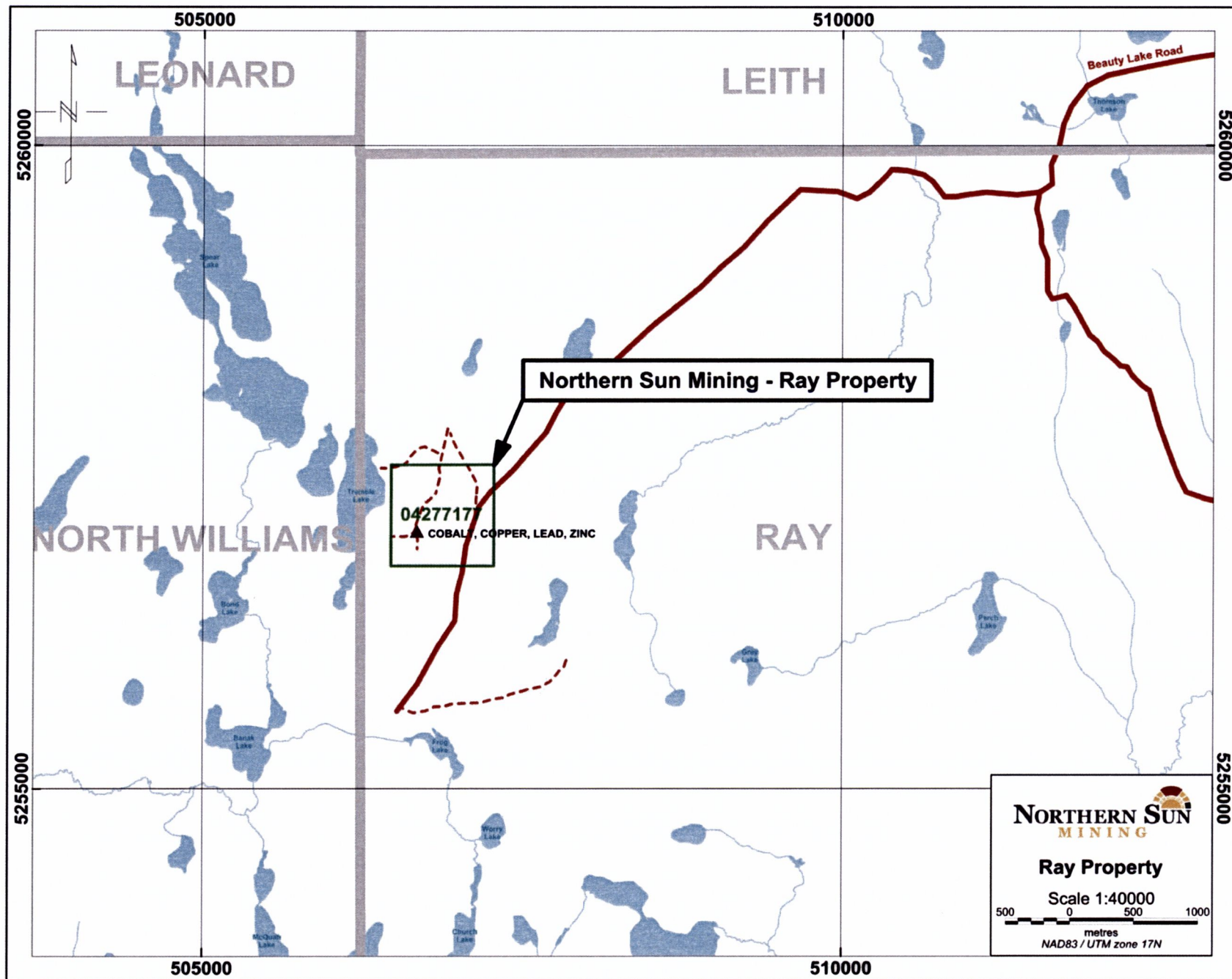
Todd Mathieu  
Project Geology Technician

## 7.0 Appendix A – Property Maps

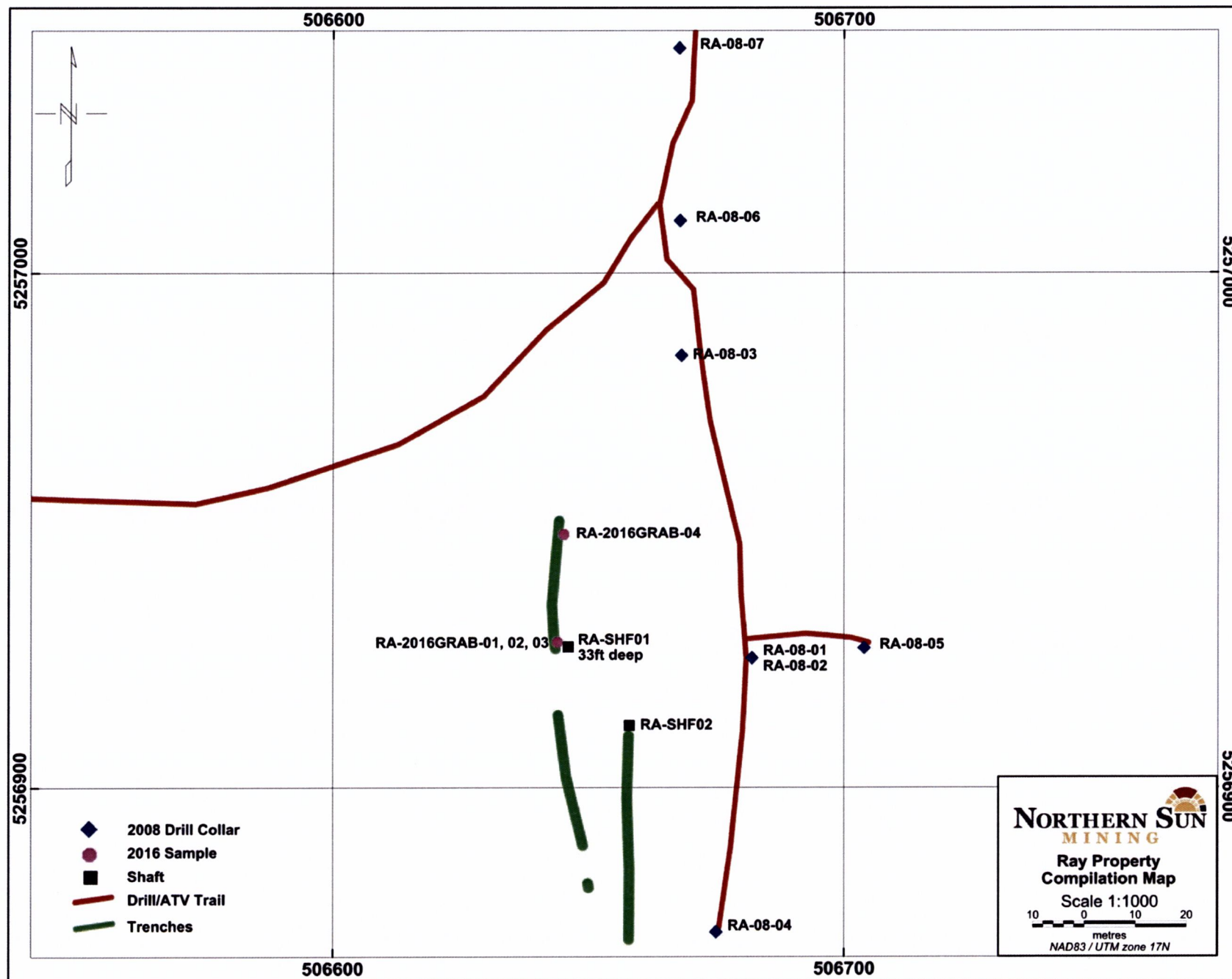


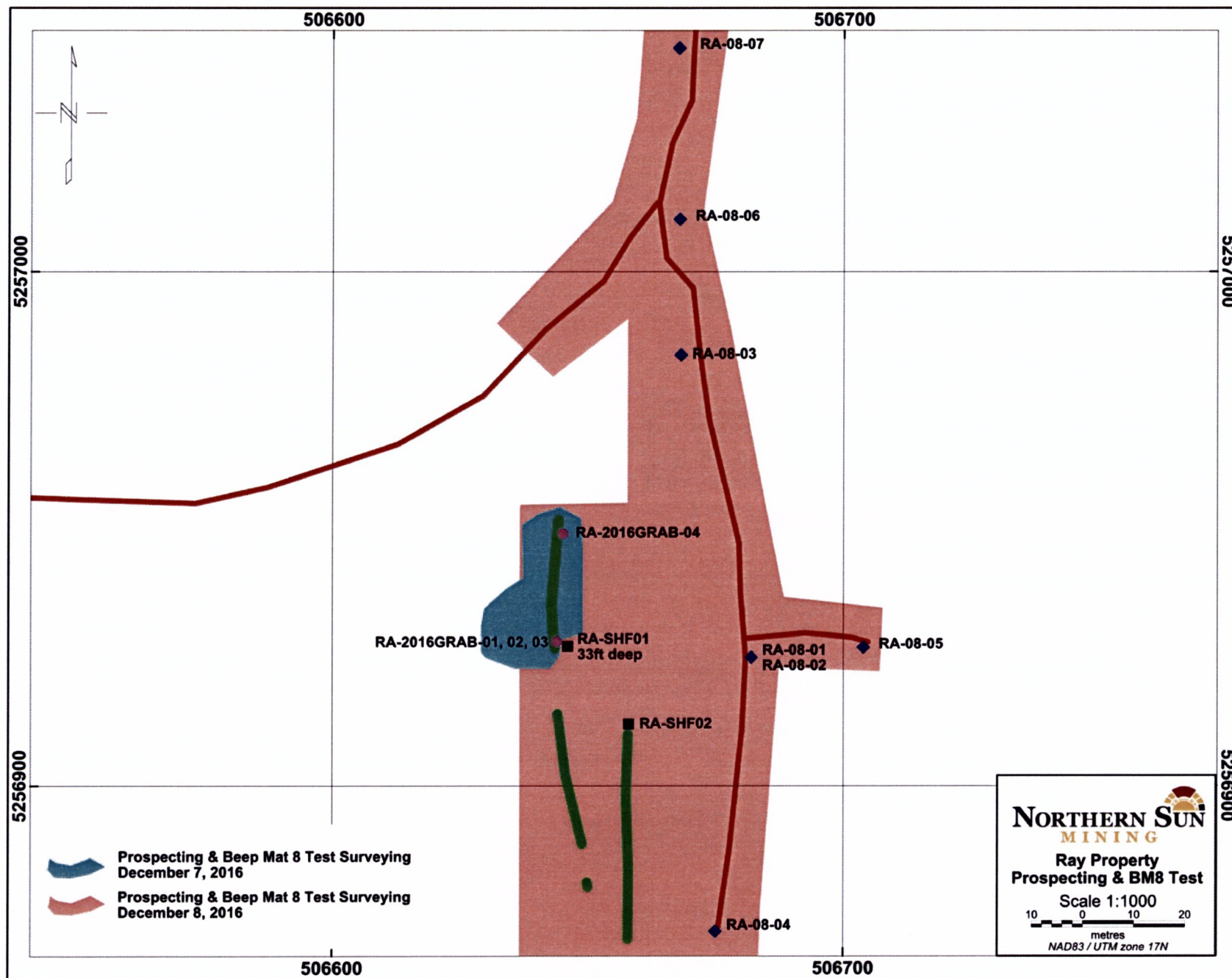














## 8.0 Appendix B – Daily Work Logs

### Ray Property 2016 Logistics

**Project Manager:** Todd Mathieu

**Helper:** Nishanthan Logeswaran

**Access from Timmins:** 3.5 hours of travel one way from South Porcupine, Ontario

#### December 6, 2016

Mobilization/loading of ATV rentals and other require gear. Mobbed gear from Redstone Mine Site to South Porcupine for early departure the following morning.

2.5 hours

#### December 7, 2016

Nish and I picked up the Beep Mat 8 unit at Purolator as it was a day late arriving due to shipping issues, and drove 3.5 hours from South Porcupine, Ontario to the Ray Property. Winter weather was bad, so travel was slow. To our surprise a new logging road corridor has been establish through the east side of the Ray Property. Utilizing the historic ATV trail, we used the 2 ATV's to transport gear 1.65km to the Ray Property main Co showing/shaft area. A chainsaw was used to cut fallen trees from the trail.

At the main showing we began trenching back snow, moss and waste rock northwest of the Ray Shaft (RA-SHF01). Trees in this area vary from jackpine, birch, balsam, and spruce. There is a narrow vein that pinches and swells that the historic trenching/sampling has followed. In the hopes that the vein widened, which it did, we trenched towards the shaft. A significant amount of the waste rock contains cobalt bloom (pink) was encountered while trenching. The samples containing cobalt bloom registered elevated Co values with anomalous Ni on the hand held XRF.





Additional stripping took place elsewhere along the same vein but heading north of the shaft. Unusual anomalous readings of Pd were noted on the hand held XRF on the north end of the trenching/outcrop in gabbro (Nipissing diabase), but seemed suspicious.

Once the Beep Mat 8 unit had warmed up, I began surveying across the outcrop. Nish continued to trench at the main showing. The BM8 unit did not register any sort of conductivity over the main vein, and the magnetic response appears directly related to the overburden/cover on the outcrop of the Nipissing diabase the showing is hosted in. Areas stripped right to bedrock registered as a magnetic anomaly of -2000 or more. Areas covered with minor moss and snow registered as a magnetic anomaly of -400 to -1000 and areas with deep snow and more than 6 inches of overburden registered around 0. It is believed that the Beep Mat 8 unit is not the right tool for prospecting Co/As veins on the Ray Property.

It began to get dark and cold, so we mobilized the gear back to the truck via the ATV's. Due to the limited daylight time, we chained the ATV's and trailer to a tree at the ATV trail, packed the truck and travelled back to South Porcupine. Highway 560 was ice covered with slow moving traffic, so the drive home took 4 hours.





13 hour day, 2 personnel, truck, trailer, 2 ATVs, Beep Mat 8, chainsaw

### **December 8, 2016**

Nish and I traveled the 3.5 hours back to the Ray Property and once again utilized the ATV's to access the shaft and Co/As showing. The Co/As vein we are following is beginning to widen, so we continued cleaning off the vein towards the shaft while the BM8 warmed up. Using some of the water we brought with us for the channel saw, we washed back the showing and took pictures. The cobalt bloom is visually evident. Where the mineralization widened to approximately 20 cm within the Nipissing Diabase I took 3 samples. Visually most of the cobalt bloom/mineralization was situated within the center of the vein.

While I performed the sampling, Nish began surveying with the BM8 in an attempt to locate and GPS each of the 2008 drill collars.





Due to the limitations of the main showing sample location to obtain a proper channel sample, the samples were taken with the use of a hammer and chisel. All three samples were sent to the lab for assaying.

Sample RA-2016GRAB-01 was a 5cm sample taken from the west part of the vein.

Sample RA-2016GRAB -02 was a 10cm sample from the center of the vein.

Sample RA-2016GRAB -03 was a 5cm sample from the east part of the vein.





One additional sample, RA-2016GRAB-04, was a channel sample taken from the area that gave the suspicious anomalous Pd values on the hand held XRF. This sample was taken from the Nipissing Diabase and sent to the lab for assaying.





In addition to the sampling, Nish and I prospected the immediate area. Although the Beep Mat 8 survey unit did not respond to the mineralized showing, we did use it to survey in conjunction with the prospecting. During prospecting we located a continuation of the main trench, and a second set of trenches that run parallel to the main trench. On strike with the second set of trenches we also located an additional shaft (RA-SHF02). RA-SHF02 was frozen and covered with deadfall, so it was unsafe to test the depth. All surface structures located were GPSed and are to be added to the Northern Sun Mining GIS database.

Nish and I packed up and transported the gear back the 1.65km to the truck where we loaded the ATV's and all gear and travelled back to South Porcupine. Once again the roads were icy and snow covered, so it took 4 hours to arrive in South Porcupine.

14 hour day, 2 personnel, truck, trailer, 2 ATVs, Beep Mat 8

**December 9, 2016**

Demobilization/unloading of ATV rentals and other require gear.

2.5 hours

  
Todd Mathieu



## 9.0 ASSAY CERTIFICATES


**AGAT** Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 16T170509

PROJECT:

 5623 McADAM ROAD  
 MISSISSAUGA, ONTARIO  
 CANADA L4Z 1N9  
 TEL (905)501-9998  
 FAX (905)501-0589  
<http://www.agatlabs.com>

CLIENT NAME: NORTHERN SUN MINING

ATTENTION TO: TODD MATHIEU

(201-073) Aqua Regia Digest - Metals Package, ICP-OES finish																
DATE SAMPLED: Dec 14, 2016			DATE RECEIVED: Dec 14, 2016					DATE REPORTED: Jan 04, 2017					SAMPLE TYPE: Rock			
Analyte:	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cu	Fe		
Unit:	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	
RDL:	0.2	0.01	1	5	1	0.5	1	0.01	0.5	1	0.5	0.5	0.5	0.5	0.01	
Sample ID (AGAT ID)																
RA-2016GRAB-01 (8088798)	4.2	3.30	4960	9	16	1.9	47	1.52	<0.5	44	4540	1.5	104	8.06		
RA-2016GRAB-02 (8088799)	21.2	1.85	>10000	<5	19	1.0	4990	0.70	<0.5	17	>10000	41.0	403	4.64		
RA-2016GRAB-03 (8088800)	0.5	3.09	1610	7	14	1.5	9	1.43	<0.5	22	1670	1.0	21.4	7.62		
RA-2016GRAB-04 (8088801)	<0.2	0.81	55	5	31	0.8	9	0.90	<0.5	39	70.4	21.1	95.2	4.63		
Analyte:	Ga	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Ni	P	Pb	Rb		
Unit:	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm		
RDL:	5	1	1	0.01	1	1	0.01	1	0.5	0.01	0.5	10	0.5	10		
Sample ID (AGAT ID)																
RA-2016GRAB-01 (8088798)	20	<1	2	0.01	16	59	3.27	921	91.4	0.03	328	516	145	<10		
RA-2016GRAB-02 (8088799)	<5	<1	12	0.02	5	34	1.82	771	188	0.02	3100	304	1520	<10		
RA-2016GRAB-03 (8088800)	22	<1	<1	0.01	8	56	3.08	875	4.8	0.03	102	685	51.7	<10		
RA-2016GRAB-04 (8088801)	9	2	1	0.09	16	9	0.62	503	1.0	0.08	13.9	886	31.4	<10		
Analyte:	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W		
Unit:	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm		
RDL:	0.01	1	0.5	10	5	0.5	10	10	5	0.01	5	5	0.5	1		
Sample ID (AGAT ID)																
RA-2016GRAB-01 (8088798)	0.21	7	32.9	<10	<5	9.8	<10	<10	<5	0.28	<5	<5	677	2		
RA-2016GRAB-02 (8088799)	0.73	11	16.0	<10	<5	10.3	22	<10	<5	0.06	6	53	287	<1		
RA-2016GRAB-03 (8088800)	0.07	6	29.3	14	<5	10.8	<10	<10	<5	0.22	<5	<5	489	7		
RA-2016GRAB-04 (8088801)	0.09	<1	9.7	<10	<5	9.3	<10	<10	<5	0.15	<5	<5	155	3		
Analyte:	Y	Zn	Zr													
Unit:	ppm	ppm	ppm													
RDL:	1	0.5	5													
Sample ID (AGAT ID)																
RA-2016GRAB-01 (8088798)	21	85.1	42													
RA-2016GRAB-02 (8088799)	26	53.0	23													
RA-2016GRAB-03 (8088800)	16	74.5	44													
RA-2016GRAB-04 (8088801)	16	117	47													

Comments: RDL - Reported Detection Limit

Certified By:

**AGAT** Laboratories**Certificate of Analysis**

AGAT WORK ORDER: 16T170509

PROJECT:

5623 McADAM ROAD  
MISSISSAUGA, ONTARIO  
CANADA L4Z 1N9  
TEL (905)501-9998  
FAX (905)501-0589  
<http://www.agatlabs.com>

CLIENT NAME: NORTHERN SUN MINING

ATTENTION TO: TODD MATHIEU

(201-075) Aqua Regia Digest - 24Hr Base Metal Overlimit, ICP finish				
DATE SAMPLED: Dec 14, 2016		DATE RECEIVED: Dec 14, 2016		DATE REPORTED: Jan 04, 2017
				SAMPLE TYPE: Rock
Analyte:		As-OL	Co-OL	
Unit:		ppm	ppm	
Sample ID (AGAT ID)		RDL:	5	1
RA-2016GRAB-02 (8088799)		25000	22000	

Comments: RDL - Reported Detection Limit

Certified By: 


**AGAT** Laboratories

## Certificate of Analysis

AGAT WORK ORDER: 16T170509

PROJECT:

 5623 McADAM ROAD  
 MISSISSAUGA, ONTARIO  
 CANADA L4Z 1N9  
 TEL (905)501-9998  
 FAX (905)501-0589  
<http://www.agatlabs.com>

CLIENT NAME: NORTHERN SUN MINING

ATTENTION TO: TODD MATHIEU

(202-055) Fire Assay - Au, Pt, Pd Trace Levels, ICP-OES finish				
DATE SAMPLED: Dec 14, 2016		DATE RECEIVED: Dec 14, 2016		DATE REPORTED: Jan 04, 2017
				SAMPLE TYPE: Rock
	Analyte:	Au	Pd	Pt
	Unit:	ppm	ppm	ppm
Sample ID (AGAT ID)	RDL:	0.001	0.001	0.005
RA-2016GRAB-01 (8088798)		0.106	<0.001	<0.005
RA-2016GRAB-02 (8088799)		1.15	<0.001	<0.005
RA-2016GRAB-03 (8088800)		0.311	<0.001	<0.005
RA-2016GRAB-04 (8088801)		0.005	<0.001	<0.005

Comments: RDL - Reported Detection Limit

Certified By: