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REPORT ON EXPLORATION ACTIVITIES

AUGUST 2019 – AUGUST 2022

MONCRIEFF PROJECT

GREENER NORTH INC.

GEOGRAPHIC TOWNSHIP OF MONCRIEFF
SUDBURY MINING DIVISION
TERRITORIAL DISTRICT OF SUDBURY
PROVINCE OF ONTARIO

BRYAN C. DORLAND
August 22, 2022

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EXECUTIVE SUMMARY

D.S. Dorland Limited, on behalf of the claim holder, Greener North Inc., has continued the investigation of potential quarry sites on the Moncrieff property near the town of Cartier, Ontario. Activities carried out during the past three years include prospecting, geological mapping, access trail construction, geodetic surveys and environmental/cultural heritage studies. Activities described herein were carried out between May 2019 and August 2022 by D.S. Dorland Limited staff and other sub-consultants. A total of 9 days were spent in the field by D.S. Dorland Limited staff. The work carried out has helped advance the feasibility of a Category 4 - Class "A" quarry under the Aggregate Resources Act. It is recommended that additional testing and environmental baseline studies be carried out to help design the aggregate resource site plans and application. All geodetic coordinates reported herein are expressing in the UTM mapping projection (Zone 17) using the NAD83 horizontal datum.

1.0 PROJECT INFORMATION

1.1 LOCATION AND ACCESS

The Moncrieff Project is located in the annulled Geographic Township of Moncrieff in the Territorial District of Sudbury (Sudbury Mining Division) in the Province of Ontario. 1:50 000 scale NTS map sheet 041I43 encompasses the entirety of the project. The property is located in a remote area approximately 56 kilometres north west of the City of Greater Sudbury downtown core and approximately 7 kilometres north of the Town of Cartier. Travel time to the property is approximately 1 hour from the Sudbury area depending on road conditions.

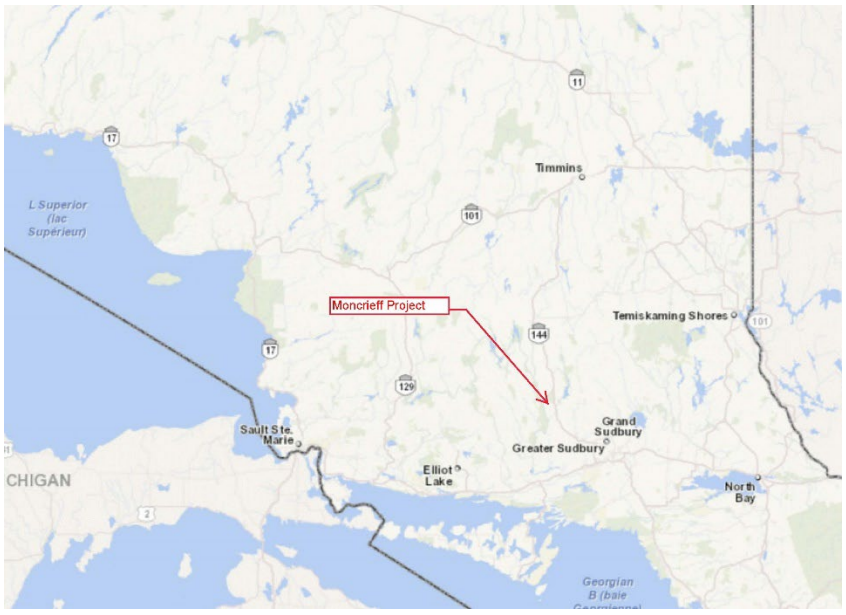

Figure 1 – Project Location

Access to the subject claims is excellent. The project can be accessed by truck by travelling north from Sudbury along Provincial Highway 144. A network of forest access roads currently provides seasonal access by truck to within approximately 200 metres of the southerly property boundary. A former

logging road, now used primarily by ATV's, crosses the property and provides good access to all parts of the claim group. Highway 144 crosses the easterly portion of the property.

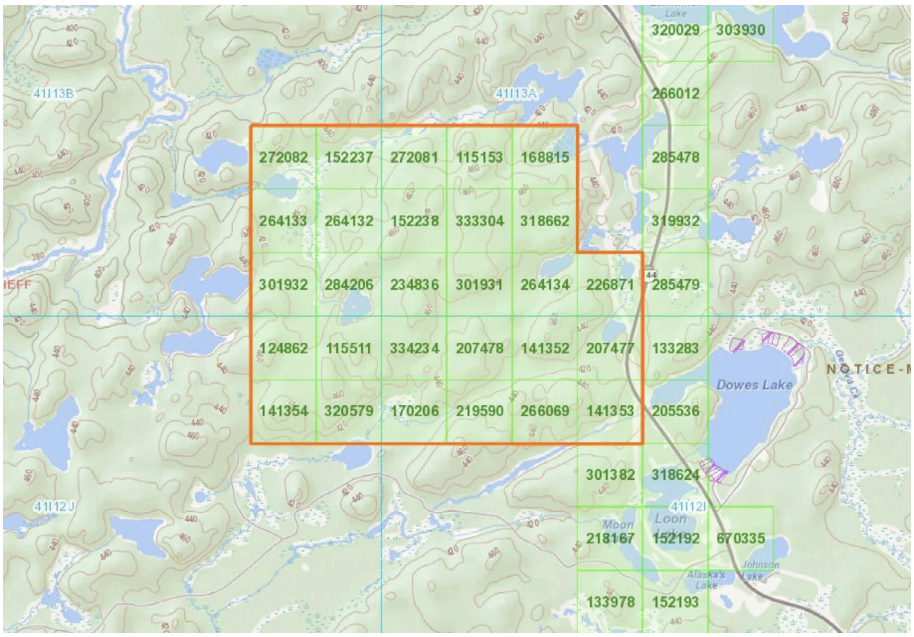

Figure 2 – Claim Map

If a License is obtained, it may be feasible to construct a new road from Highway 144 to access the potential quarry areas given the close proximity of the easterly boundary to the Highway.

1.2 TOPOGRAPHY AND VEGETATION

The Moncrieff Project is located in the boreal forest of northern Ontario in the Canadian shield. Topography generally consists of rugged and rolling bedrock hills with little to no overburden interlaced with lowland swamps and lakes as well as valleys filled with glacial debris. The average elevation in and around the project area is approximately 450 metres and relief about 30 metres.

Fault systems are commonly expressed by prominent topographic lineaments and scarps. The project area lies within the Great Lakes drainage basin and is subsequently drained south by the Spanish River and its tributaries.

The Project area has likely seen two generations of logging campaigns. Timber generally consists of stands of red, jack and white pine, the result of re-forestation, with some old growth white pine interlaced with stands of balsam fir, white birch, poplar, spruce as well as black spruce in the low lying, poorly drained areas.

1.3 TENURE DETAILS

The Moncrieff Project consists of 28 unpatented 1-unit mining claims with a total area of approximately 619.36 hectares. The property was acquired by ground staking in July and August 2017. The two legacy claims (4285271 and 4285272) were subsequently converted to grid cell claims with the advent of the Mining Act Modernization Program. The property has gained additional ground since the previous 2019 assessment report as abutting boundary claims held by others were allowed to lapse.

The claims are registered in the name of Greener North Inc and require $11,200 of annual assessment work to keep in good standing. See Table 1 for specific claim numbers and details.

Table 1 – Mining Claim details

PROJECT: MONCRIEFF				CLAIM DETAILS				
CLAIM No.	HOLDER	UNITS	AREA (ha)	EMCUMBERED	WORK REQD.	DUE DATE	WORK APPLIED	RESERVE
115511	Greener North Inc.	1	22.12	no	$400.00	August 22, 2022	$0.00	$0.00
115153	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
124862	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
141352	Greener North Inc.	1	22.12	no	$400.00	August 22, 2022	$0.00	$0.00
141353	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
141354	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
152237	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
152238	Greener North Inc.	1	22.12	no	$400.00	August 22, 2022	$0.00	$169.00
168815	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
170206	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
207477	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
207478	Greener North Inc.	1	22.12	no	$400.00	August 22, 2022	$0.00	$0.00
219590	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
226871	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
234836	Greener North Inc.	1	22.12	no	$400.00	August 22, 2022	$0.00	$0.00
264132	Greener North Inc.	1	22.12	no	$400.00	August 22, 2022	$0.00	$318.00
264133	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
264134	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
266069	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
272081	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
272082	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
284206	Greener North Inc.	1	22.12	no	$400.00	August 22, 2022	$0.00	$0.00
301931	Greener North Inc.	1	22.12	no	$400.00	August 22, 2022	$0.00	$0.00
301932	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
318662	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
320579	Greener North Inc.	1	22.12	no	$200.00	August 22, 2022	$0.00	$0.00
333304	Greener North Inc.	1	22.12	no	$400.00	August 22, 2022	$0.00	$0.00
334234	Greener North Inc.	1	22.12	no	$400.00	August 22, 2022	$0.00	$0.00
TOTAL		28	619.36		$7,600.00		$0.00	$487.00

Table 1 – Mining Claim details

2.0 PREVIOUS WORK

Based on publicly available sources of information, limited historic exploration activity has been carried on the ground covered by the Moncrieff Project and nothing specifically related to industrial minerals.

Below is a summary of previous assessment work or other work carried out over the Moncrieff Project currently on file at the Geoscience Assessment Office and AFRI database.

1981 – Ontario Geological Survey (Card, K.D. and Innes, D.G.)– Report 206 and accompanying maps (see map 2435)
1991 (published in 2003) - Ontario Geological Survey – Airborne Total Intensity Magnetic Survey and Electromagnetic Survey (Geophysical Data Set 1017) (see map 81541)
2019 – Ontario Geological Survey – Ramsey – Algoma Airborne Magnetic Gradiometer and Gamma-Ray Spectrometer Survey (Geophysical Data Set 1086a and 1086b) (see maps 82961, 82976 and 82991)
2017-2019 – Greener North Inc. – Prospecting, Industrial Mineral Testing (Assessment File Number 20000017912)

Previous work on the property by the author on behalf of Greener North Inc. was successful in locating several areas containing exposures of rock suitable for railway ballast.

3.0 GEOLOGY

3.1 REGIONAL GEOLOGY

The Moncrieff project is located in the southern part of the Superior Province of the Canadian shield north of the main contact between the Early Precambrian rocks of the Superior Province and the Middle Precambrian rocks of the Southern Province (Card/Innes, 1981).

The Benny Greenstone Belt, a preserved remnant of a formerly much larger supracrustal sequence of metavolcanics and metasediments, is located approximately 2 kilometres north of the claim group. The Belt strikes east west and dips strongly to the south with an average width of approximately 2 km, a maximum width of approximately 4.8 km and is over 38 km long.

The rocks of the Belt and surrounding area record a series of igneous, intrusive, deformational and metamorphic events ranging in age from Early to Late Precambrian. After deposition of the Early Precambrian metavolcanics and metasediments, probably on a basement of older sialic rocks, there was deformation, regional metamorphism and emplacement of granitic plutons during the Kenoran Orogeny some 2500 million years or so ago (Stockwell et al., 1970). This was followed, in the latter part of the Early Precambrian and the early part of the Middle Precambrian, by a period of tensional tectonics with emplacement of mafic dike swarms, faulting and foundering of Early Precambrian crustal blocks and deposition of Huronian clastic sedimentary rocks in a series of shallow epicratonic basins (Card/Innes, 1981).

The Moncrieff Project is also located approximately 20 kilometres north west of the northerly contact of the Sudbury Igneous Complex, a 1.85 billion year old Paleoproterozoic impact crater.

3.2 PROPERTY GEOLOGY

The Moncrieff project covers a portion of the Cartier pluton, an early Pre Cambrian intrusion of felsic intrusive and metamorphic rocks. The primary rock type found on the property consists of massive felsic intrusive rocks being fine to coarse grained quartz monzonite (unit 7 – Fig. 3) which have intruded the older foliated, felsic, plutonic and migmatitic rocks (unit 6 – Fig.3). Both units of felsic intrusive and metamorphic rocks have been intruded by younger mafic intrusive dikes and sills.

3.3 EXPLORATION TARGETS

The primary exploration target for the Moncrieff project is the mafic intrusive dikes and sills, primarily the larger Nipissing Diabase type (unit 15 - orange colour – see Fig. 3). The Nipissing Diabase intrusions comprise pyroxene gabbro, hornblende metagabbro, granophyric metagabbro and granophyre. These units are generally a medium grained, dark grey, green to black and brown weathering rock composed of proportions of plagioclase, amphiboles and pyroxene with minor amounts of quartz, feldspar, epidote, biotite and or ilmenite-magnetite (Card/Innes, 1981).

The chemical and physical properties of this mafic intrusive unit make it an ideal candidate for railway ballast. Given the close proximity of the project to the Canadian Pacific Railway (CPR) depot at Cartier, a major railway depot along the transcontinental main line, the Moncrieff Project could produce several quarries of good quality ballast material that could potentially be economically extracted.

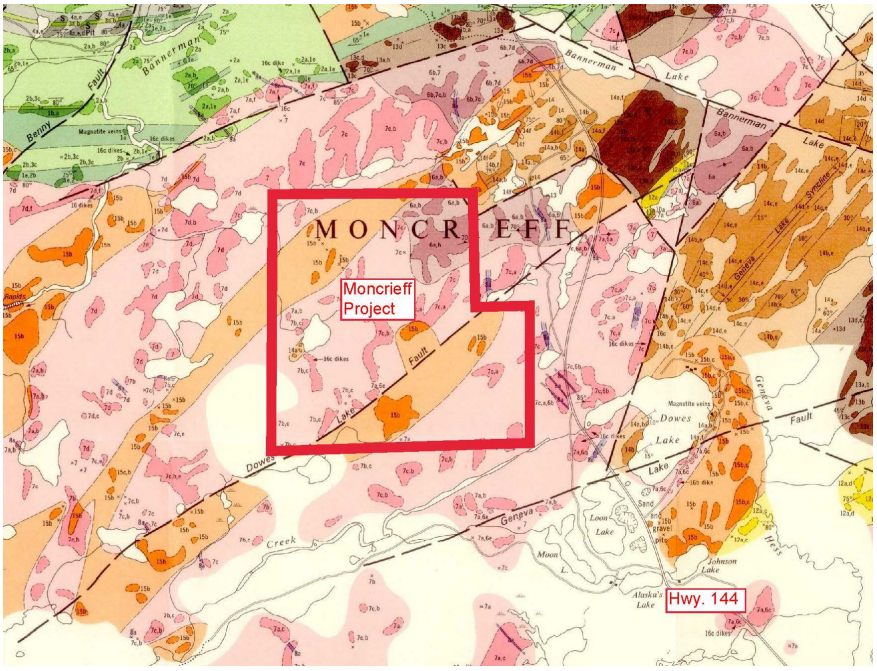

Figure 3 – Local Geology

4.0 ADJACENT PROPERTIES

Several claims currently held by Battery Mineral Resources Ltd abut the easterly property boundary.

5.0 CURRENT EXPLORATION ACTIVITES COVERED BY REPORT

5.1 OVERVIEW

Exploration activities carried out between August 2019 and August 2022 form the basis of this report. Work covered by this report has been completed in anticipation of applying for a Category 4 – Class "A" quarry under the Aggregate Resources Act.

Limited work was carried out during 2020 and 2021 due to issues relating to the COVD-19 pandemic. Exclusions of Time were applied for and received for relief from assessment work requirements during this time period.

A separate statement of costs for assessment credits detailing daily activities and associated costs is being submitted concurrently with this assessment report.

The following work was carried out and being claim by this assessment report:

1. Exploration permit applications for mechanized drilling and trenching
2. Existing access trail maintenance and establishment of approximately 1.4kms of new ATV trails for anticipated drill program
3. GPS control survey and geodetic survey of water level elevations of various lakes and water bodies
4. Geological mapping of select areas
5. Completion of whippoorwill surveys and Natural Environment Level 1 & 2 study by consultant
6. Completion of Cultural Heritage Level 1 Study by consultant

5.1.1 EXPLORATION PERMITS

Two exploration permits were applied for and received for mechanized drilling and trenching on the Moncrieff Project.

Permit number PR-19-000251 was received on October 31, 2019. This permit covers exploration drilling and mechanized stripping on claims in the northerly part of the property as well as establishment of trails required to support exploration activities.

Permit number PR-20-000062 was received on May 21, 2020. This permit covers exploration drilling and mechanized stripping on claims in the south easterly part of the property as well as establishment of trails required to support exploration activities.

5.1.2 ACCESS TRAIL MAINTENANCE/ NEW ACCESS TRAILS

Several days were spent clearing trees from the access trail which traverse the property. This former logging road has grown in with brush and trees and is now passable by ATVs and snowmobiles only. Recent windstorms and heavy snow falls have caused numerous large trees to fall across the trail as well as early growth alders, spruce and balsam.

Two field staff spent several days with axes and chainsaws clearing approximately 4.6 kms of trail which runs through the property up to the turn off to the unnamed lake which straddles the westerly limit of the property in order to provide safe and easy ATV access throughout most of the project area.

Approximately 1.4 kms of new ATV trail was cut in order to provide access to the drill hole sites on the north westerly prospective area which are planned for the fall of 2022. Creation of the new access trails are permitted under the exploration permits noted in Section 5.1.1. The location of these new trails are noted on Appendix 1.

5.1.3 GPS CONTROL & WATER LEVEL SURVEY

In order to control the precise locations and elevations of features for a potential aggregate license, a permanent survey control point has been established on the Moncrieff Project. A Real Time Kinematic (RTK) GPS surveys of various water level elevations of lakes, ponds, creeks and streams was also carried out to assist with a future hydro geological survey which would be required at the quarry licensing stage.

The GPS equipment utilised for the survey consisted of a Leica Geosystems GS15 receiver as a rover and a GS10 receiver and AS10 antenna as the base station setup. Real Time Kinematic corrections between the base and rover GPS receivers was achieved using a Satel EasyPro 35 watt UHF radio modem. Data was recorded in a Leica CS15 data collector. A See Appendix 3 for Leica GPS equipment specifications.

Control Point 1, being a 5/8" square iron bar drilled in bedrock, is located near centre of the property on the east side of the access trail. Final coordinate values for this point were obtained by processing the raw static Rinex data using Natural Resource Canada's Precise Point Positioning (PPP) services. The final position of this point was averaged from 4 separate observation sessions totalling approximately 18.6 hours of data. See Appendix 4 for more information.

The relative RTK GPS observations measured while occupying the base station control point were adjusted accordingly in MicroSurvey CAD. Final coordinate values are expressed in the NAD83 (CSRS) (Ver.6/epoch 2010.0) system using the UTM 17 (north) mapping projection. NAD83 CSRS (Canadian Spatial Reference System) is the most current, nationally recognized, reference frame for relating geospatial information.

Ellipsoidal heights were converted to orthometric elevations by using the H.T. 2.0 height transformation as provided by Natural Resources Canada. Final elevations shown hereon are expressed in the CGVD28 elevation datum.

The water level elevation surveys were carried out in September and October 2019. See Appendix 1 for locations of observations and details.

5.1.4 GEOLOGICAL MAPPING

Geological mapping was carried out over the certain areas to help define the extent and location of the target mafic intrusive rocks as well as overburden coverage and low-lying, poorly drained areas. Mapping was controlled by hand held GPS.

A total of 4 days were spent mapping outcrops and features between August 2019 and August 2022 by the author. A high-level map at 1:5000 scale has been produced and included in this report as Appendix 2.

5.1.5 EASTERN WHIP-POOR-WILL & NATURAL ENVIRONMENT LEVEL 1 & 2 REPORTS

An Eastern Whip-Poor-Will survey was commissioned by D.S. Dorland limited on behalf of the claim holder and affiliated organisation. The survey was requested to confirm the potential presence or lack thereof of this bird which is considered a species at risk in Ontario.

The surveys were carried out by Environmental Ecosystems Inc. of Sudbury in accordance with survey guidelines issued by the Ministry of natural Resources and Forestry (MNRF) during the months of May and June 2018.

The presence of the Eastern Whip-Poor-Will was not observed during the survey. The final report, issued May 2019, is attached as Appendix 5 hereto.

A Natural Environment Level 1 & 2 Study and Technical Report was also commissioned in support of a potential future Class "A", Category 4 quarry license under the Aggregate Resources Act. This work was also completed by Environmental Ecosystems Inc.

The reports did not outline any significant potential issues that could affect licensing a Class "A" quarry on the Moncrieff Project. A copy of the Report is attached hereto as Appendix 6.

5.1.6 CULTURAL HERITAGE LEVEL 1 STUDY

A Cultural Heritage Level 1 Study, also known as a Stage 1 Archaeological Assessment, was commissioned on behalf of the claim holder's affiliate organisation. This study and technical report are required as part of a License application for a Class "A", Category 4 Aggregate License.

The work was completed by Dr. Pat Julig and Gregory Beaton of Laurentian University in 2019 in accordance with the technical guidelines for archaeological studies as published by the Ministry of Tourism, Culture and Sport (MTCS).

The report did not uncover any archaeological or historic sites on the Moncrieff Project. A copy of the final report dated December 3, 2019 is attached hereto as Appendix 7.

6.0 RECOMMENDATIONS

It is recommended that diamond core drilling be carried out to confirm the vertical extent of the target mafic intrusive rocks within the potential quarry areas. In addition, these drill holes can be utilised to measure and monitor the ground water table elevation as its seasonal variations. This information, together with the data reported herein, can be utilised to finalise a hydro geological assessment and ultimately aid in the design of future extraction plans.

Exploration permits are currently in place for diamond drill work. Eight holes are proposed totaling approximately 320 metres. Four holes are proposed in the north westerly prospective area and 4 in the south easterly prospective area. Drill holes should be approximately 40 metres in depth.

7.0 REFERENCES

Card, K.D., & Innes, D.G., 1981: Geology of the Benny Area, District of Sudbury; Ontario Geological Survey Report 206, 117p Accompanied by Maps 2434 & 2435, scale 1:31 680 and 4 Charts

Canadian Pacific Railway, 1984: Specifications for Ballast, Revised January 1, 1984

8.0 CERTIFICATE

I, Bryan C. Dorland certify that:

I graduated with a Mining Engineering Technician diploma from Cambrian College in 2008.

I have held a valid Ontario Prospector's License since 2006 (License No. 1012035)(Client No. 411680)

I have been actively participating in the mining and exploration industry since 2006.

I personally supervised the work described in this report.

I have no interest the property described in this report.

Bryan C. Dorland

Dated August 22, 2022

Sudbury, Ontario

PLAN OF

MONCRIEFF PROJECT
GPS SURVEY WORK
ACCESS TRAILS

GEOGRAPHIC TOWNSHIP OF

MONCRIEFF

SUDBURY MINING DIVISION

DISTRICT OF SUDBURY

SCALE 1:5000

METRES
0 50 100 200 300

NOTE

COORDINATES AND ELEVATIONS SHOWN HEREON ARE EXPRESSED IN THE FOLLOWING:

MAPPING PROJECTION:	UTM ZONE 17N
HORIZONTAL DATUM:	NAD83 (CSRS)(ver.6/2010)
VERTICAL DATUM:	CGVD28 (H.T.2.0)
UNITS:	METRES

SURVEY CONTROL MONUMENTS:

CP1
0.016m (5/8") SQUARE IRON BAR DRILLED IN ROCK ON EAST SIDE OF ATV TRAIL NEAR CENTRE OF PROPERTY.

N	5,1780,93.793
E	452,915.656
ELEV	463.938

MONCRIEFF PROJECT

PREPARED BY : BCD	SCALE : 1:5000 METRIC
CHECKED : BCD	CAD FILE : 17690-GRID.dwg
DATE : AUGUST 22, 2022	P. SPACE TAB : 3-Elev Survey_Trails

ARCH D (24"X36") PAPER SIZE

PLAN OF

MONCRIEFF PROJECT GEOLOGICAL MAPPING 2022

GEOGRAPHIC TOWNSHIP OF
MONCRIEFF
SUDBURY MINING DIVISION
DISTRICT OF SUDBURY

SCALE 1:5000

0 50 100 200 METRES
30

LEGEND

- NIPISSING DIABASE (PYROXENE GABBRO, HORNBLENDE METAGABBRO)
- LATE MAFIC INTRUSIVE ROCKS (DIABASE)
- MASSIVE FELSIC INTRUSIVE ROCKS (QUARTZ MONZONITE)
- FOLIATED PLUTONIC AND MIGMATITIC ROCKS (GNEISSIC AND FOLIATED TRONDHJEMITE AND GRANODIORITE)
- OB OVERBURDEN
- LOW LYING OR POORLY DRAINED AREAS

NOTE

COORDINATES AND ELEVATIONS SHOWN HEREON ARE EXPRESSED IN THE FOLLOWING:

MAPPING PROJECTION:	UTM ZONE 17
HORIZONTAL DATUM:	NAD83 (CSRS)(ver.6/2010)
VERTICAL DATUM:	CGVD28 (H.T.2.0)
UNITS:	METRES

MONCRIEFF PROJECT

PREPARED BY : BCD	SCALE : 1:5000 METRIC
CHECKED : BCD	CAD FILE : 17690-GRID.dwg
DATE : AUGUST 22, 2012	P. SPACE TAB : 2-GEO MAP 5000 scale

ARCH D (24"X36") PAPER SIZE

Leica Viva GS15
Data sheet

Engaging software

The Leica Viva GS15 GNSS smart antenna is accompanied with the revolutionary Captivate software, turning complex data into the most realistic and workable 3D models. With easy-to-use apps and familiar touch technology, all forms of measured and design data can be viewed in all dimensions. Leica Captivate spans industries and applications with little more than a simple swipe, regardless of whether you work with GNSS, total stations or both.

Infinitely bridging the field to the office

Leica Infinity imports and combines data from your GNSS, total station and level instruments for one final and accurate result. Processing has never been made easier when all your instruments work in tandem to produce precise and actionable information.

ACC»

Customer care only a click away

Through Active Customer Care (ACC), a global network of experienced professionals is only a click away to expertly guide you through any problem. Eliminate delays with superior technical service, finish jobs faster with excellent consultancy support, and avoid costly site revisits with online service to send and receive data directly from the field. Control your costs with a tailored Customer Care Package, giving you peace of mind you're covered anywhere, anytime.

Leica Viva GS15

GNSS TECHNOLOGY		
Self-learning GNSS	Leica RTKplus SmartLink (worldwide correction service) SmartLink fill (worldwide correction service)	Adaptive on-the-fly satellite selection Remote precise point positioning (3 cm 2D)[1] Initial convergance to full accuracy 20 - 40 min, Re-convergance < 1 min Bridging of RTK outages up to 10 min (3 cm 2D)[1]
Leica SmartCheck	Continuous check of RTK solution	Reliability 99.99%
Signal tracking		GPS (L1, L2, L2C, L5), Glonass (L1, L2, L3[2]), BeiDou (B1, B2, B3[2]), Galileo (E1, E5a, E5b, Alt-BOC, E6[2]), QZSS[3], NavIC L5[3], SBAS (WAAS, EGNOS, MSAS, GAGAN), L-band
Number of channels		555 (more signals, fast acquisition, high sensitivity)
MEASUREMENT PERFORMANCE & ACCURACY[1]		
Time for initialization		Typically 4 s
Real-time kinematic (Compliant to ISO17123-8 standard)	Single baseline Network RTK	Hz 8 mm + 1 ppm / V 15 mm + 1 ppm Hz 8 mm + 0.5 ppm / V 15 mm + 0.5 ppm
Post processing	Static (phase) with long observations Static and rapid static (phase)	Hz 3 mm + 0.1 ppm / V 3.5 mm + 0.4 ppm Hz 3 mm + 0.5 ppm / V 5 mm + 0.5 ppm
Code differential	DGPS / RTCM	Typically 25 cm
COMMUNICATIONS		
Communication ports	Lemo Bluetooth®	USB and RS232 serial Bluetooth® v2.00 + EDR, class 2
Communication protocols	RTK data protocols NMEA output Network RTK	Leica, Leica 4G, CMR, CMR+, RTCM 2.2, 2.3, 3.0, 3.1, 3.2 MSM NMEA 0183 V 4.00 and Leica proprietary VRS, FKP, iMAX, MAC (RTCM SC 104)
Built-in data links	3.5G phone modem Radio modem	Fully integrated, internal or external antenna Fully integrated, receive and transmit, internal or external antenna 403 - 470 MHz, 1 W output power, up to 28800 bps over air
External data links		GSM / GPRS / UMTS / CDMA and UHF / VHF modem
GENERAL		
Field controller and software	Leica Captivate software Leica SmartWorx Viva software	Leica CS20 field controller, Leica CS35 tablet Leica CS10 and CS15 field controller
User interface	Buttons and LEDs Web server	On / Off and Function button, 8 status LEDs Full status information and configuration options
Data recording	Storage Data type and recording rate	Removable SD card, 8 GB Leica GNSS raw data and RINEX data up to 20 Hz
Power management	Internal power supply External power supply Operation time[4]	2 exchangeable Li-Ion batteries (2.6 Ah / 7.4 V) Nominal 12 V DC, range 10.5 - 28 V DC 10 h receiving (Rx) data with internal radio, 9 h transmitting (Tx) data with internal radio, 7.5 h Rx / Tx data with internal phone modem
Weight and Dimensions	Weight Diameter x Height	1.34 kg (GS15) / 3.30 kg standard RTK rover setup on pole 196 mm x 198 mm
Environmental	Temperature Drop Proof against water, sand and dust Vibration Humidity Functional shock	-40 to 65°C operating, -40 to 80°C storage Withstands topple over from a 2 m survey pole onto hard surfaces IP68 (IEC60529 / MIL STD 810G 506.5 I / MIL STD 810G 510.5 I / MIL STD 810G 512.5 I) Withstands strong vibration (ISO9022-36-08 / MIL STD 810G 514.6 Cat.24) 100% (ISO9022-13-06 / ISO9022-12-04 / MIL STD 810G 507.5 I) 40 g / 15 to 23 msec (MIL STD 810G 516.6 I)

LEICA VIVA GS15 - GNSS SMART ANTENNA	Basic	Performance	Unlimited
SUPPORTED GNSS SYSTEMS			
Multi-frequency	•	✔	✔
GPS / GLONASS / Galileo / BeiDou	✔ / • / • / •	✔ / • / •/ •	✔ / ✔ / ✔ / ✔
RTK PERFORMANCE			
DGPS / RTCM, RTK Unlimited, Network RTK	•	✔	✔
SmartLink fill / SmartLink	• / •	• / •	✔ / •
POSITION UPDATE & DATA RECORDING			
5 Hz / 20 Hz positioning	✔ / •	✔ / ✔	✔ / ✔
Raw data / RINEX data logging / NMEA out	✔ / • / •	✔ / • / •	✔ / ✔ / ✔
ADDITIONAL FEATURES			
RTK reference station functionality	•	✔	✔

✔ Standard • Optional

[1] Measurement precision, accuracy, reliability and time for initialization are dependent upon various factors including number of satellites, observation time, atmospheric conditions, multipath etc. Figures quoted assume normal to favorable conditions. A full BeiDou and Galileo constellation will further increase measurement performance and accuracy.

[2] Believe to comply, but subject to availability of BeiDou ICD and Galileo commercial service definition. Glonass L3, BeiDou B3 and Galileo E6 will be provided through future firmware upgrade.

[3] Support of QZSS / NavIC L5 is incorporated and will be provided through future firmware upgrade.

[4] Might vary with temperature, age of battery, transmit power of data link device.

774504enUS - 04.17

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Leica Viva GS10
Data sheet

Engaging software

The Leica Viva GNSS GS10 receiver is accompanied with the revolutionary Captivate software, turning complex data into the most realistic and workable 3D models. With easy-to-use apps and familiar touch technology, all forms of measured and design data can be viewed in all dimensions. Leica Captivate spans industries and applications with little more than a simple swipe, regardless of whether you work with GNSS, total stations or both.

Infinitely bridging the field to the office

Leica Infinity imports and combines data from your GNSS, total station and level instruments for one final and accurate result. Processing has never been made easier when all your instruments work in tandem to produce precise and actionable information.

ACC»

Customer care only a click away

Through Active Customer Care (ACC), a global network of experienced professionals is only a click away to expertly guide you through any problem. Eliminate delays with superior technical service, finish jobs faster with excellent consultancy support, and avoid costly site revisits with online service to send and receive data directly from the field. Control your costs with a tailored Customer Care Package, giving you peace of mind you're covered anywhere, anytime.

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Leica Viva GS10

GNSS TECHNOLOGY		
Self-learning GNSS	Leica RTKplus SmartLink (worldwide correction service) SmartLink fill (worldwide correction service)	Adaptive on-the-fly satellite selection Remote precise point positioning (3 cm 2D)[1] Initial convergance to full accuracy 20 - 40 min, Re-convergance < 1 min Bridging of RTK outages up to 10 min (3 cm 2D)[1]
Leica SmartCheck	Continuous check of RTK solution	Reliability 99.99%
Signal tracking		GPS (L1, L2, L2C, L5), Glonass (L1, L2, L3[2]), BeiDou (B1, B2, B3[2]), Galileo (E1, E5a, E5b, Alt-BOC, E6[2]), QZSS[3], NavIC L5[3], SBAS (WAAS, EGNOS, MSAS, GAGAN), L-band
Number of channels		555 (more signals, fast acquisition, high sensitivity)
GNSS antenna	Standard or Choke-ring	Leica AS10 / AS05 or Leica AR10 / AR20 / AR25
MEASUREMENT PERFORMANCE & ACCURACY[1]		
Time for initialization		Typically 4 s
Real-time kinematic (Compliant to ISO17123-8 standard)	Single baseline Network RTK	Hz 8 mm + 1 ppm / V 15 mm + 1 ppm Hz 8 mm + 0.5 ppm / V 15 mm + 0.5 ppm
Post processing	Static (phase) with long observations Static and rapid static (phase)	Hz 3 mm + 0.1 ppm / V 3.5 mm + 0.4 ppm Hz 3 mm + 0.5 ppm / V 5 mm + 0.5 ppm
Code differential	DGPS / RTCM	Typically 25 cm
COMMUNICATIONS		
Communication ports	Lemo Bluetooth®	1 x USB and 2 x RS232 serial and Power Bluetooth® v2.00 + EDR, class 2
Communication protocols	RTK data protocols NMEA output Network RTK	Leica, Leica 4G, CMR, CMR+, RTCM 2.2, 2.3, 3.0, 3.1, 3.2 MSM NMEA 0183 V 4.00 and Leica proprietary VRS, FKP, iMAX, MAC (RTCM SC 104)
External data links	Up to 3 simultaneously	GSM / GPRS / UMTS / CDMA / VHF / UHF (up to 28800 bps over air) modem Phone / Radio modem in Leica GFU housing (IP67)
GENERAL		
Field controller and software	Leica Captivate software Leica SmartWorx Viva software	Leica CS20 field controller, Leica CS35 tablet Leica CS10 and CS15 field controller
User interface	Buttons and LEDs Web server	On / Off and Function button, 8 status LEDs Full status information and configuration options
Data recording	Storage Data type and recording rate	Removable SD card, 8 GB Leica GNSS raw data and RINEX data up to 20 Hz
Power management	Internal power supply External power supply Operation time[4]	2 exchangeable Li-Ion batteries (6 Ah / 7.4 V) Nominal 12 V DC, range 10.5 - 28 V DC 15h receiving (Rx) data with UHF radio, 13 h transmitting data with UHF radio (1W), 14 h Rx / Tx data with phone modem
Weight and Dimensions	Weight Dimensions	1.20 kg (GS10) / 5.40 kg standard RTK rover setup using pole and backpack 212 mm x 166 mm x 79 mm
Environmental	Temperature Drop Proof against water, sand and dust Vibration Humidity Functional shock	-40 to 65°C operating, -40 to 80°C storage Withstands topple over from a 2 m survey pole onto hard surfaces IP68 (IEC60529 / MIL STD 810G 506.5 I / MIL STD 810G 510.5 I / MIL STD 810G 512.5 I) Withstands strong vibration (ISO9022-36-08 / MIL STD 810G 514.6 Cat.24) 100% (ISO9022-13-06 / ISO9022-12-04 / MIL STD 810G 507.5 I) 40 g / 15 to 23 msec (MIL STD 810G 516.6 I)

LEICA VIVA GS10 - GNSS RECEIVER	Basic	Performance	Unlimited
SUPPORTED GNSS SYSTEMS			
Multi-frequency	•	✔	✔
GPS / GLONASS / Galileo / BeiDou	✔ / • / • / •	✔ / • / • / •	✔ / ✔ / ✔ / ✔
RTK PERFORMANCE			
DGPS / RTCM, RTK Unlimited, Network RTK	•	✔	✔
SmartLink fill / SmartLink	• / •	• / •	✔ / •
POSITION UPDATE & DATA RECORDING			
5 Hz / 20 Hz positioning	✔ / •	✔ / ✔	✔ / ✔
Raw data / RINEX data logging / NMEA out	✔ / • / •	✔ / • / •	✔ / ✔ / ✔
ADDITIONAL FEATURES			
RTK reference station functionality	•	✔	✔

✔ Standard • Optional

[1] Measurement precision, accuracy, reliability and time for initialization are dependent upon various factors including number of satellites, observation time, atmospheric conditions, multipath etc. Figures quoted assume normal to favorable conditions. A full BeiDou and Galileo constellation will further increase measurement performance and accuracy.

[2] Believe to comply, but subject to availability of BeiDou ICD and Galileo commercial service definition. Glonass L3, BeiDou B3 and Galileo E6 will be provided through future firmware upgrade.

[3] Support of QZSS / NavIC L5 is incorporated and will be provided through future firmware upgrade.

[4] Might vary with temperature, age of battery, transmit power of data link device.

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Leica Viva CS10 & CS15
Data sheet

Easy-to-use software

The CS10 and CS15 controllers are perfectly designed to be used with SmartWorx Viva surveying software. With clear graphics, practical menu structures, understandable terminology and simplified workflows, save time and effort on any site. SmartWorx Viva is incredibly easy to learn and use. You and your field crew will be up to speed in no time.

Flexible communication & data handling

Stay connected with a wide range of communication and data storage options. With fully integrated wireless Intenna technology (Bluetooth®, GSM/UMTS 3.5G), a choice of two connector modules and data storage using an SD card or USB memory stick, your CS10 and CS15 are ready for all challenges on site and in the office.

ACC»

Customer care only a click away

Through Active Customer Care (ACC), a global network of experienced professionals is only a click away to expertly guide you through any challenge. Eliminate delays with superior technical service, finish jobs faster and avoid costly site revisits with excellent consultancy support. Control your costs with a tailored Customer Care Package (CCP), giving you peace of mind you are covered anywhere, anytime.

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Leica Viva CS10 & CS15

CS15 AND CS10 HARDWARE SPECIFICATIONS		CS10	CS15
Ergonomic and cable-free handheld			
Operating System	Windows CE 6.0	✓	✓
Display	8.9 cm (3.5 in) 640 x 480 pixel (VGA) colour TFT, touch screen, sunlight-readable, LED backlight	Portrait	Landscape
I/O	SD slot (SDIO), 5-pin custom connector (USB) RS232 module: RS232, USB A Host, USB Mini AB OTG, 7-pin connector, Power Lemo module: Lemo (USB and serial), USB A Host, 7-pin connector, Power	✓ ○ ○	✓ ○ ○
Interface	Touch screen, Ergonomic cable-free Handheld with numeric/ alphanumeric keyboard, virtual keyboard	Numeric 26 keys	QWERTY 65 keys
Processor	Freescale i.MX31 533 MHz ARM Core	✓	✓
Memory	512 MB DDR SDRAM	✓	✓
Storage	1 GB (non-volatile NAND Flash)	✓	✓
Audio	Integrated sealed speaker and microphone Bluetooth® audio headset support	✓ ✓	✓ ✓
LEDs	Battery and Bluetooth® status LED	✓	✓
Wireless connectivity	Bluetooth® 2.0 Class 2 2.4 GHz total station radio Integrated GSM/UMTS 3.5G module with fully integrated internal antenna Wireless LAN 802.11b/g	✓ ✓ 	✓ ○ ✓ □
SOFTWARE			
Application Software	Viva Controller runs Leica SmartWorx Viva. In addition, a number of regional solutions are available. For more information on the field software that's best for you, contact your local Leica Geosystems authorised distribution partner.	✓	✓
Standard Software	Internet Explorer Mobile, File Explorer, Word Mobile, Microsoft Windows Media™ Player, Online Help	✓	✓
POWER MANAGEMENT			
Removable Battery	GEB212 (7.4 V / 2600 mAh Li-Ion rechargeable)	✓	✓
Battery Charging Time	2 hours	✓	✓
Power	Nominal 12 V DC Range 10.5 – 28 V DC	✓	✓
Operating Time	10 hours (depending on use of embedded devices)	✓	✓
DIMENSIONS AND WEIGHT			
Size	CS10: 200 mm / 102 mm / 45 mm (7.87 in / 4.01 in / 1.77 in) CS15: 245 mm / 125 mm / 45 mm (9.65 in / 4.92 in / 1.77 in)	✓	 ✓
Weight[1]	CS10: 0.54 kg (1.20 lbs) CS15: 0.68 kg (1.50 lbs)	✓	 ✓
ENVIRONMENTAL SPECIFICATIONS			
Operating / Storage temperature range	Operation: –30 to 60° C (–22 to 140° F), Storage: –40 to 80° C (–40 to 176° F)	✓	✓
Dust and Water / Humidity	IP67 (IEC 60529) / 100% non-condensing (MIL-STD-810F, Method 507.4-1)	✓	✓
Drop / Vibration	1.2 m (4 ft)[2] / MIL-STD-810F, Method 514.5 – Cat24	✓	✓
ACCESSORIES			
100 – 240 V AC power supply for all regions		✓	✓
Stylus		✓	✓
2 x anti-glare display foils		✓	✓
Documentation USB card		✓	✓
Docking station		○	○
12 V DC vehicle charger		○	○
Additional cables		○	○
Hand strap		○	○
Pole holder set		○	○
Soft bag		○	○

[1] Without battery 110 g
[2] Onto plywood over concrete

✓ = Standard
○ = Optional
□ = Country specific

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SATELLINE-EASy Pro

SATELLINE-EASy Pro is an IP67 (NEMA 6) classified UHF radio modem with a high power (up to 25 or 35 W) transmitter and wide 70 MHz tuning range. It is designed for easy mobile use in demanding field conditions. According to the IP67 standard, the casing and connectors of the SATELLINE-EASy Pro are waterproof and secured against dust.

In addition to the high output power and wide tuning range, the channel spacing is also selectable to be 12.5, 20 or 25 kHz. The SATELLINE-EASy Pro is equipped with a Liquid Crystal Display (LCD) and a keypad, used to indicate the current operating status, as well as for changing the operating channel and power level of the radio modem.

Setting up a local data transfer network is quick and cost effective with SATEL radio modems. The wireless network is independent and free of operator services. The cost of operation is either free of charge or fixed, depending on the frequency used. SATEL radio modems are type-approved in over 50 countries.

SATEL radio modems are always on line and provide reliable, real-time data communications over distances ranging from tens or hundreds of metres up to around 80 kilometres. Thanks to a store and forward function, any radio modem in a network can be used as a master station, substation and / or repeater.

SATEL radio modem networks are flexible, easy to expand and can cover a wide variety of solutions from simple point-to-point connections to large networks comprising hundreds of modems. Even for expanded networks, only one operating frequency is required.

SATEL, Meriniitynkatu 17 P.O.Box 142,
FI-24101 Salo, FINLAND
Tel. +358 2 777 7800
info@satel.com

SATEL

Mission-Critical Connectivity

Heavy-duty tool for outdoor use

SATELLINE-EASy Pro is an IP67 classified UHF radio modem with a high power (up to 25 or 35 W) transmitter, wide 70 MHz tuning range (403 ... 473 MHz) in one hardware and selectable channel spacing.

SATELLINE-EASy Pro is particularly well suited for mobile field applications (land surveying, for instance) under varying weather conditions. Due to the high transmitting power, connection distances more than 80 kilometres can be covered in favourable conditions.

With the Liquid Crystal Display (LCD) the user can monitor the current operating status (frequency, channel number) as well as condition (power level, voltage level, field strength) of the radio modem.

SATELLINE-EASy Pro is compatible with SATELLINE-EASy family products too.

Dependable data transfer
In the SATELLINE-EASy Pro the error rate is minimized by means of advance checking and correction of the data packets. In Forward Error Correction (FEC), the data packets are split in several blocks. The radio modem adds correction information inside the blocks during transmission.

In a SATELLINE-EASy Pro network, any substation can function as a repeater. In this operating mode (store and forward), the radio modem receives a message, buffers the received data, and transmits it further to another substation, using the same radio channel as in reception.

SATELLINE-EASy Pro features embedded Message Routing software, which takes care of routing messages across a radio modem network automatically after proper settings have been made. Communication is completely transparent, which makes Message Routing directly compatible with most user protocols.

Technical specifications SATELLINE-EASy Pro
SATELLINE-EASy Pro complies with the EN 300 113, EN 301 489-1, -5, EN 60950-1 and FCC Part 90 specifications.

SATELLINE-EASy Pro		
TRANSCEIVER		
Frequency	403…473 MHz	
Tuning Range	70 MHz	
Channel Width	12.5 / 20 / 25 kHz (Software selectable)	
Frequency Error Tolerance	< 1 kHz	
Type of Emission	F1D	
Communication Mode	Half-Duplex	
TRANSMITTER		
Carrier Power	10, 20, 25 or 35 W / 50 ohm (Default) 5, 10, 20 or 25 W / 50 ohm (Option *)	
Carrier Power Stability	(+ 2 dB / - 3 dB)	
TX Duty Cycle ** 35 W 10 W	100 % (22 °C / 35 °C) 40 % 20 min / 13 min no limit no limit / 50 min no limit	
RECEIVER		
Sensitivity	< -114 dBm (BER < 10 E-3) ***	
Co-channel Rejection	> -12 dB	
Adjacent Channel Selectivity	> 47 dB @ 12.5 kHz / > 52 dB @ 25 kHz	
Intermodulation Attenuation	> 60 dB	
Spurious Radiation	< 2 nW	
DATA MODEM		
Interface	RS-232	
Interface Connector	Waterproof IP67, 8-pin ODU	
Data Speed of Serial Interface	300 – 38400 bps	
Data Speed of Radio Interface	19200 bps (25 kHz)	9600 bps (12.5 / 20 kHz)
Data Format	Asynchronous RS-232	

GENERAL	
Input Voltage ****	+9 ... +16 Vdc
Operating voltage feeding	4-pin ODU MINI-Snap Size 1
Power Consumption (average)	1.8 W typical (Receive)
	120 W typical (Transmit 35W output power)
	100 W typical (Transmit 25W output power)
Temperature Range - Operating	-25 oC … +55 oC
	-40 oC … +75 oC (absolute minimum / maximum)
Temperature Range - Storage	-40 oC … +85 oC
Antenna Connector	TNC, 50 ohm, female
Construction	Aluminium Enclosure
Size H x W x D	189 x 138 x 71 mm (w. connectors)
Weight	1420 g
IP Classification	IP67 (NEMA 6)

* Limited output power is available as on order option.
** If high output power is used continuously or with a high duty cycle, the equipment generates excess heat. The output power is automatically decreased when necessary to prevent overheating. Typical operating times are shown in the chart with different output powers and duty cycles @ 22°C and 35°C.
*** Depends on receiver settings.
**** ≥ +12 Vdc @ 35 W output power

Values are subject to change without notice.

Distributor:

SATEL

Mission-Critical Connectivity

CSRS-PPP 2.26.1 (2019-05-31)

10002470.19o
1000

Data Start	Data End	Duration of Observations
2019-09-04 16:34:59.00	2019-09-04 19:25:12.00	2:50:13
Processing Time		**Product Type**
17:39:32 UTC 2019/10/22		IGS Final
Observations	**Frequency**	**Mode**
Phase and Code	Double	Static
Elevation Cut-Off	**Rejected Epochs**	**Estimation Steps**
7.5 degrees	0.00 %	1.00 sec
Antenna Model	**APC to ARP**	**ARP to Marker**
LEIGS15	L1 = 0.202 m L2 = 0.201 m	H:1.464m / E:0.000m / N:0.000m

(APC = antenna phase center; ARP = antenna reference point)

Estimated Position for 10002470.19o

	Latitude (+n)	Longitude (+e)	Ell. Height
NAD83(CSRS) (2010.0)†	46° 45' 17.04511"	-81° 36' 59.42777"	428.109 m
SIG_PPP(95%)‡	0.018 m	0.031 m	0.096 m
SIG_TOT(95%)‡	0.025 m	0.033 m	0.097 m
A priori*	46° 45' 16.98872"	-81° 36' 59.50666"	427.784 m
Estimated – A priori	1.741 m	1.674 m	0.324 m

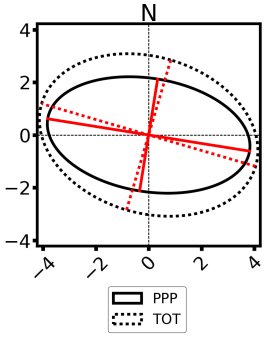
Orthometric Height CGVD28 (HTv2.0)†

463.916 m

(click for height reference information)

95% PPP Error Ellipse (cm)
semi-major: 3.9 cm
semi-minor: 2.2 cm
semi-major azimuth: -80° 7' 44.18"

95% TOT Error Ellipse (cm)
semi-major: 4.2 cm
semi-minor: 3.0 cm
semi-major azimuth: -73° 22' 32.22"



UTM (North) Zone 17

5178093.785 m (N)
452915.649 m (E)

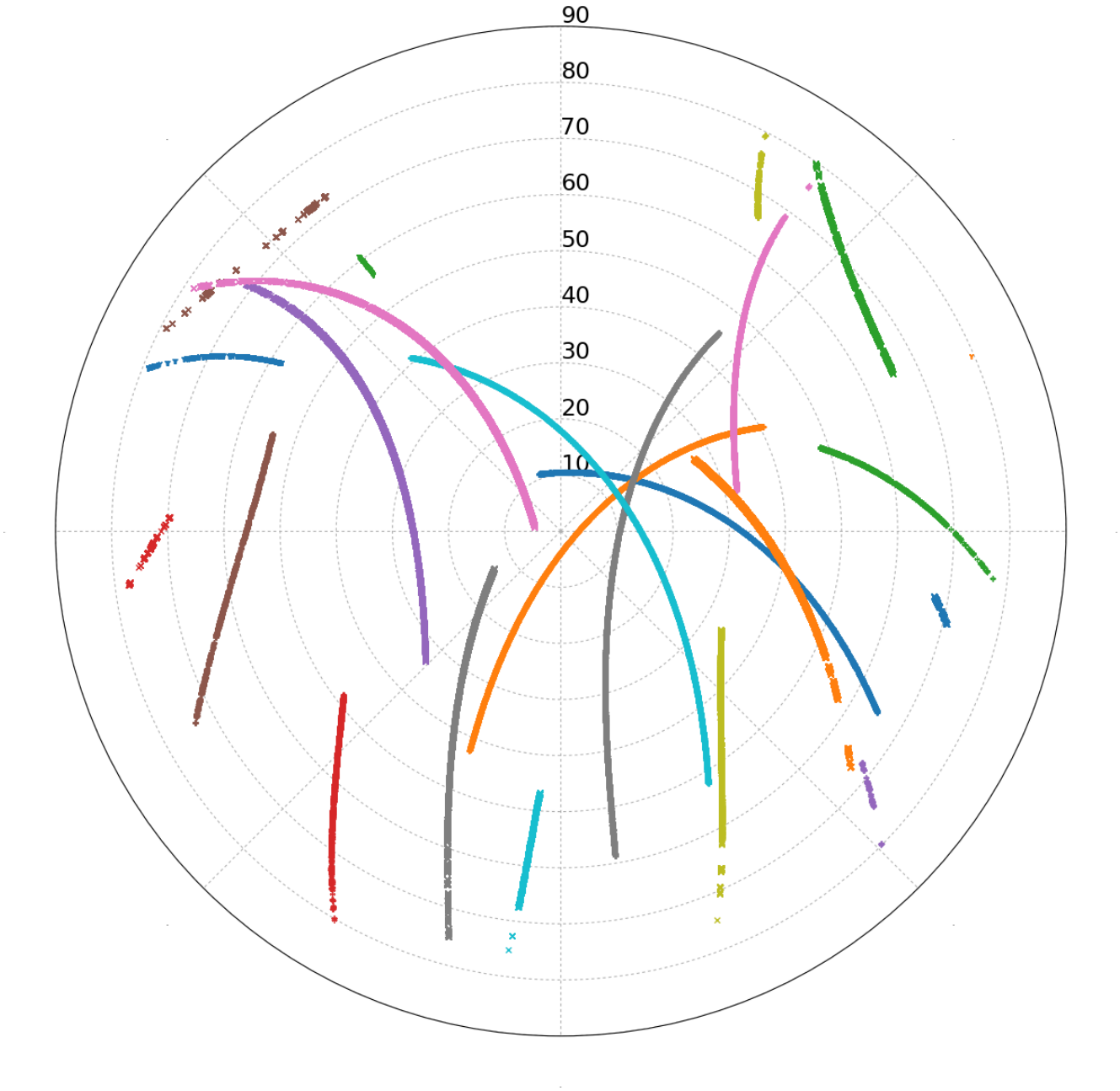
Scale Factors
0.999627 (point)
0.999560 (combined)

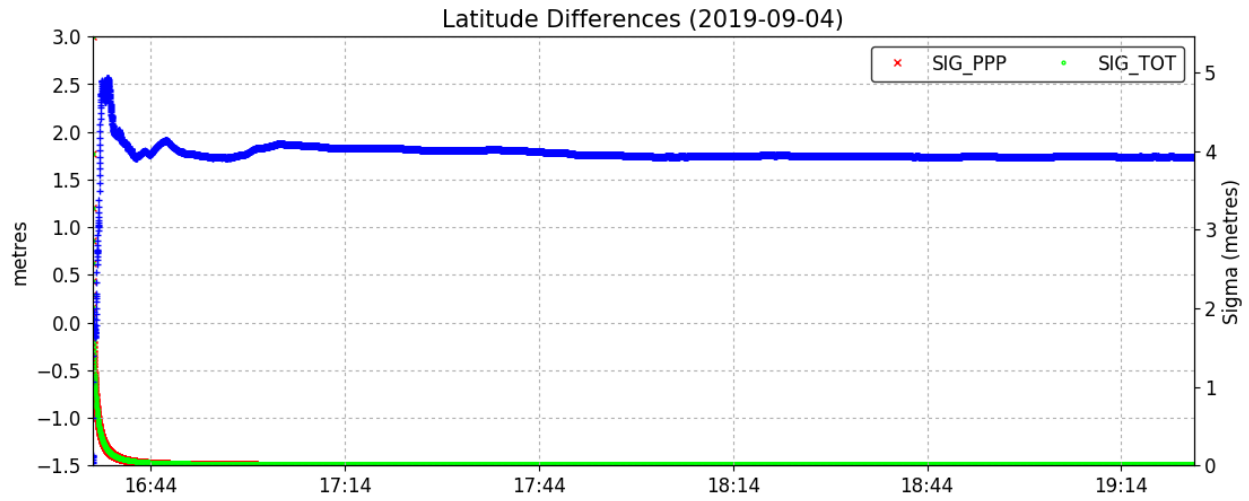
*(Coordinates from RINEX header used as a priori position)

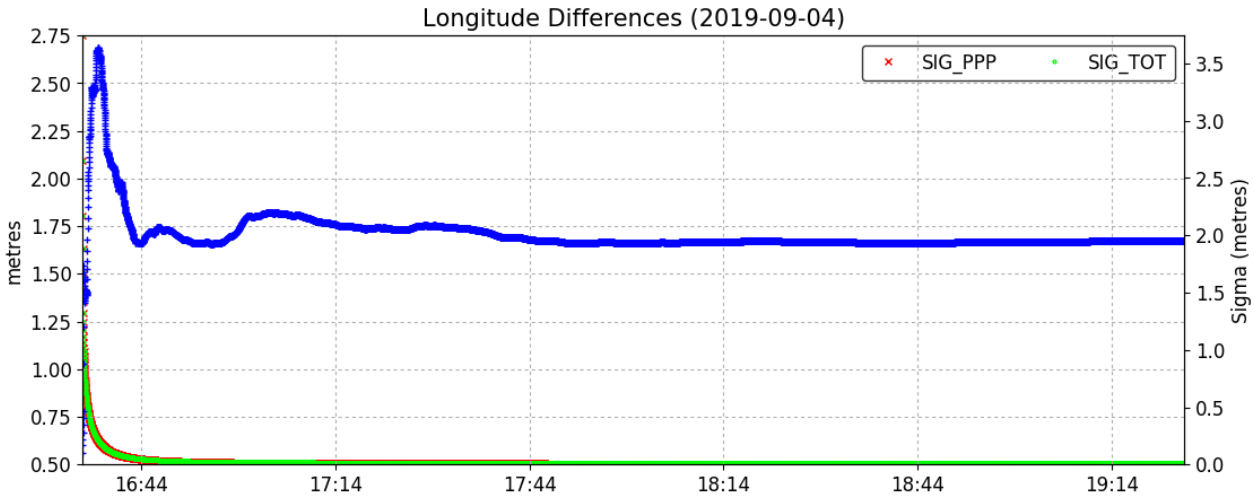
†(Epoch transformation using velocity grid NAD83v70VG (click for documentation))

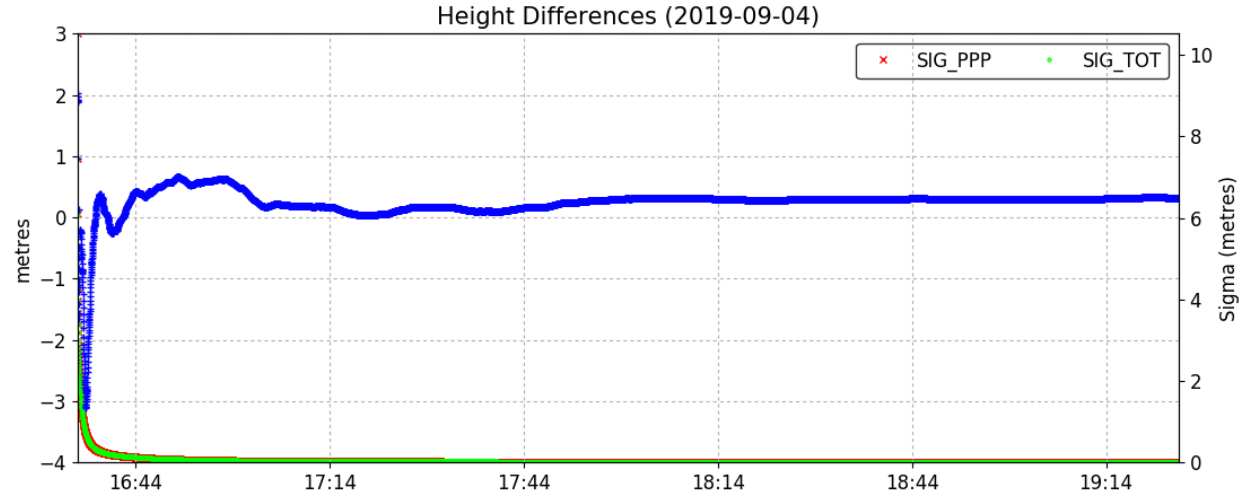
‡SIG_PPP indicates PPP-derived uncertainties, SIG_TOT incorporates uncertainties from epoch transformation

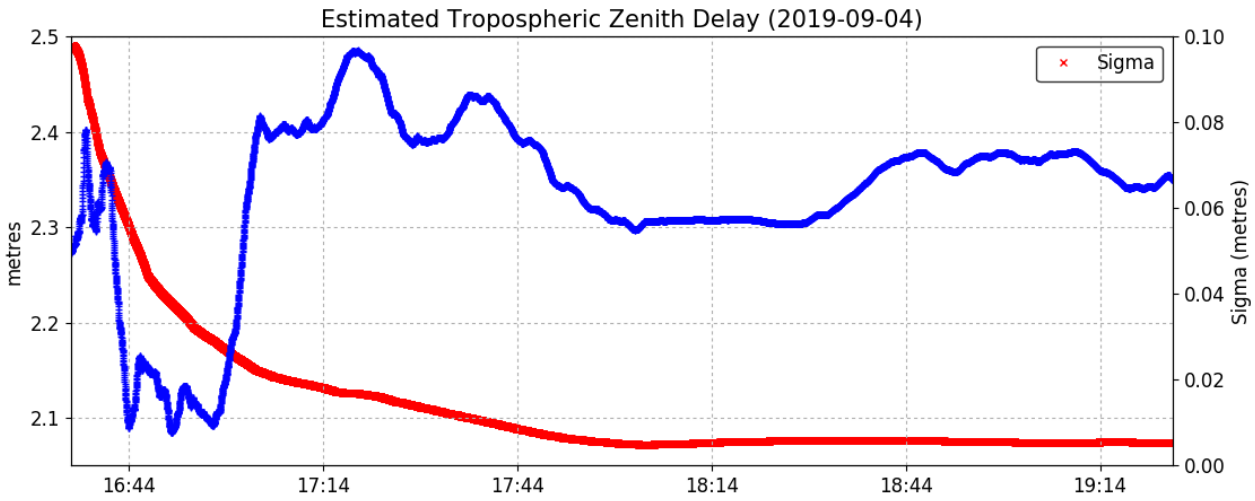
Satellite Sky Distribution

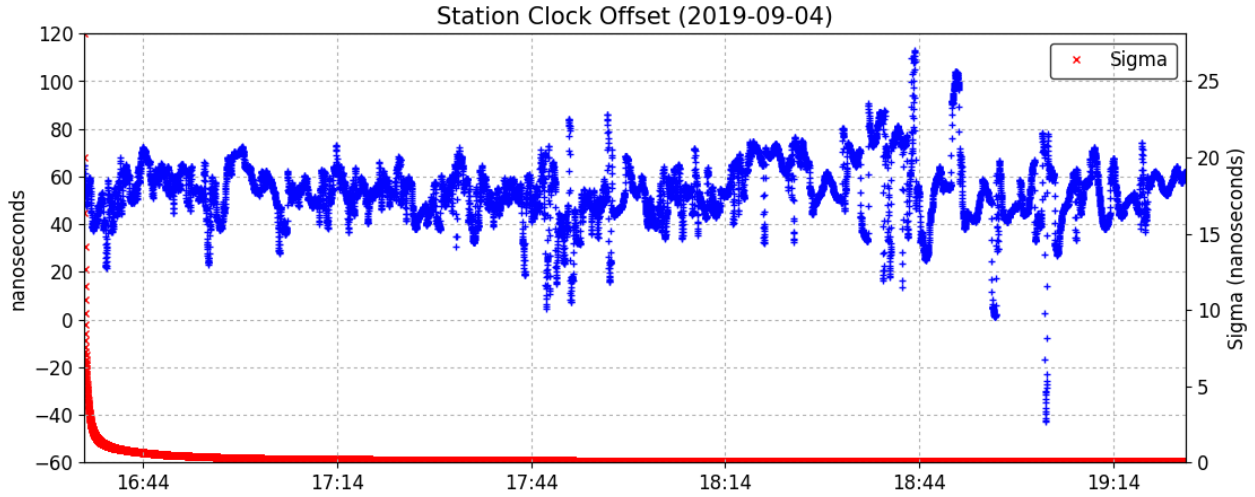


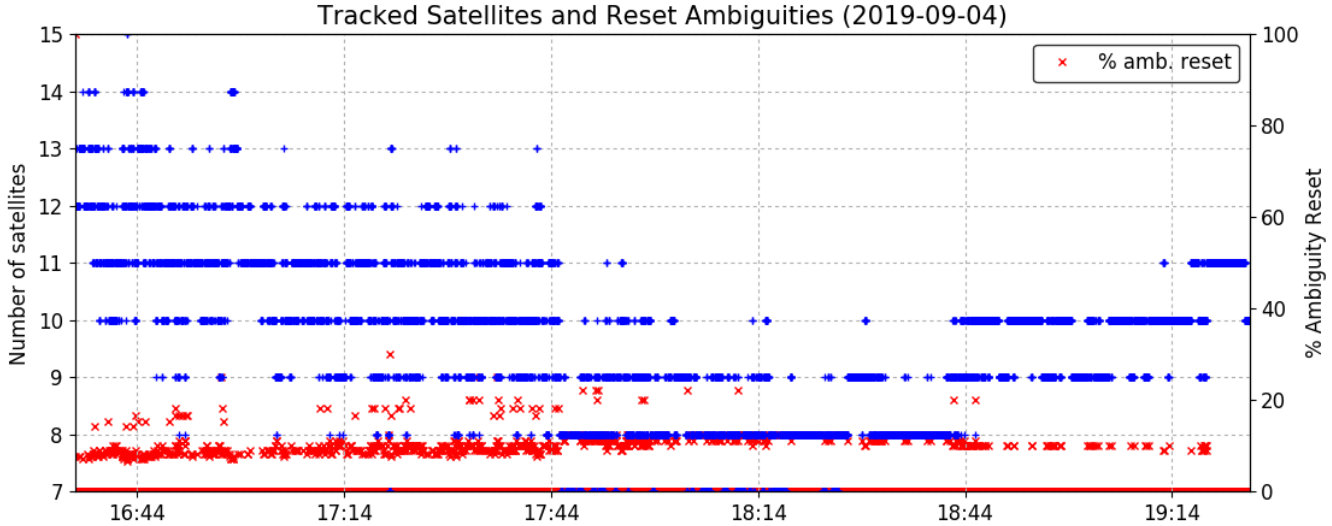

Latitude Differences (2019-09-04)
SIG_PPP
SIG_TOT
metres
Sigma (metres)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
5
4
3
2
1
0
16:44
17:14
17:44
18:14
18:44
19:14

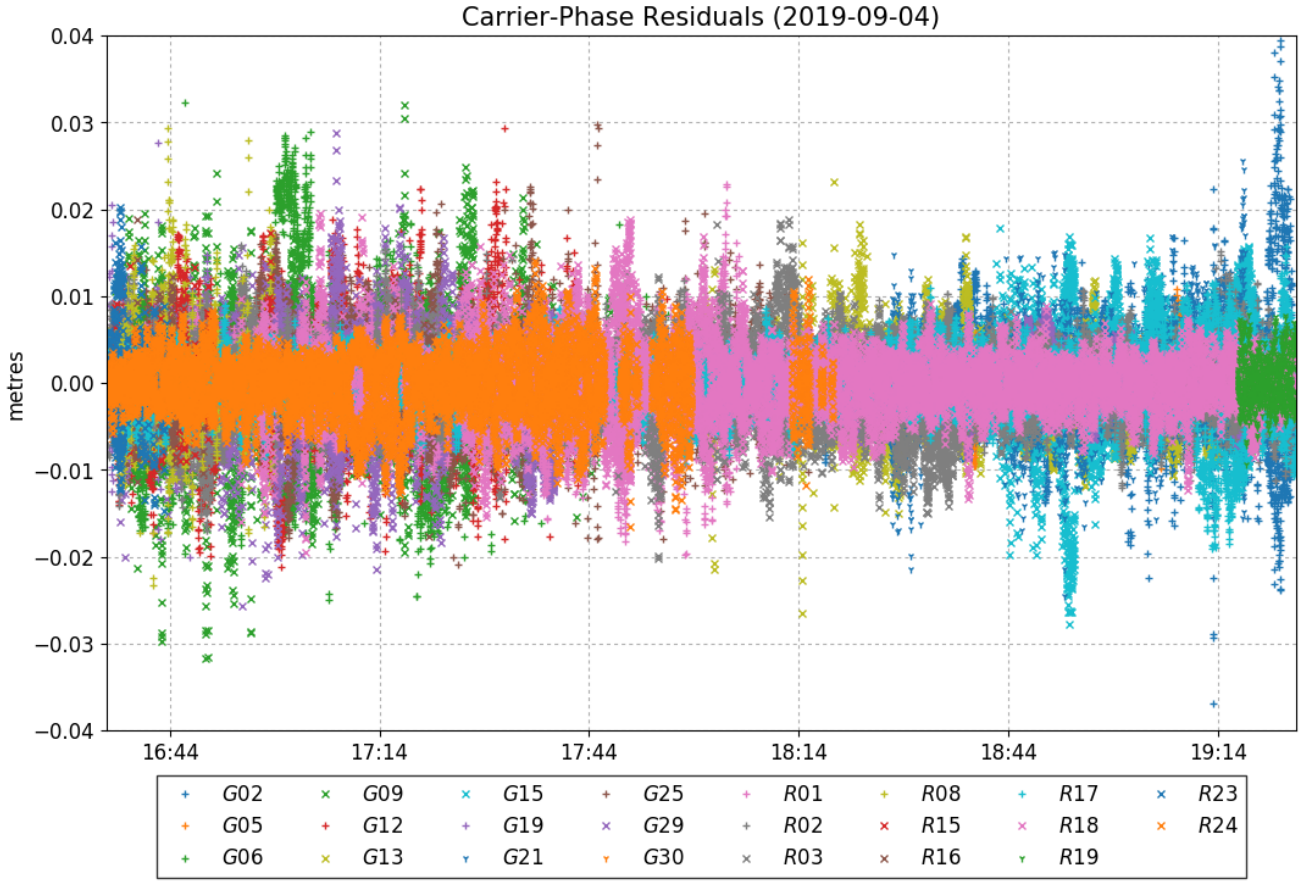

Longitude Differences (2019-09-04)
SIG_PPP
SIG_TOT
metres
Sigma (metres)
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
16:44
17:14
17:44
18:14
18:44
19:14

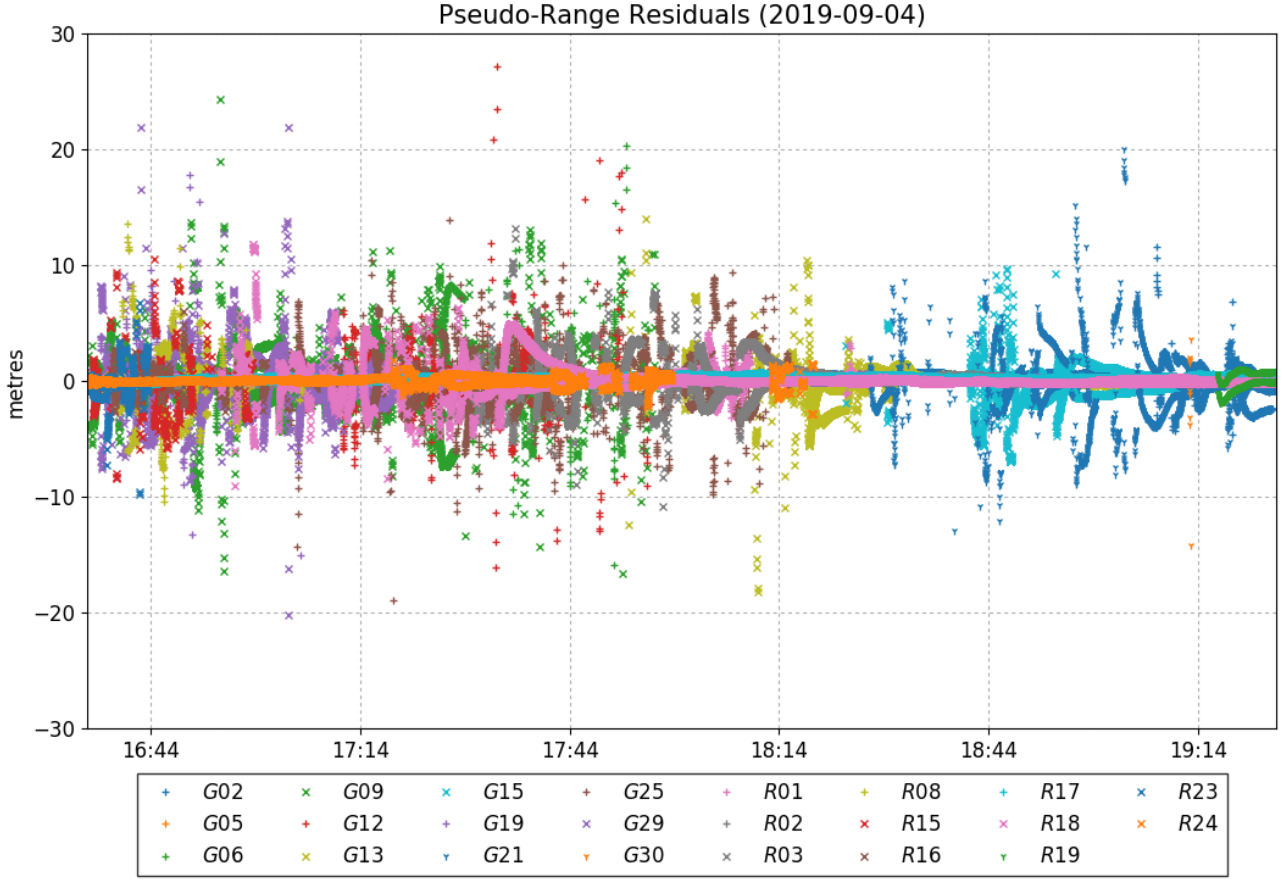

Height Differences (2019-09-04)
SIG_PPP
SIG_TOT
metres
Sigma (metres)
3
2
1
0
−1
−2
−3
−4
10
8
6
4
2
0
16:44
17:14
17:44
18:14
18:44
19:14


Estimated Tropospheric Zenith Delay (2019-09-04)
Sigma
metres
Sigma (metres)
2.5
2.4
2.3
2.2
2.1
0.10
0.08
0.06
0.04
0.02
0.00
16:44
17:14
17:44
18:14
18:44
19:14


Station Clock Offset (2019-09-04)
Sigma
nanoseconds
Sigma (nanoseconds)
120
100
80
60
40
20
0
−20
−40
−60
25
20
15
10
5
0
16:44
17:14
17:44
18:14
18:44
19:14


Tracked Satellites and Reset Ambiguities (2019-09-04)
% amb. reset
Number of satellites
% Ambiguity Reset
15
14
13
12
11
10
9
8
7
100
80
60
40
20
0
16:44
17:14
17:44
18:14
18:44
19:14


Carrier-Phase Residuals (2019-09-04)
metres
0.04
0.03
0.02
0.01
0.00
−0.01
−0.02
−0.03
−0.04
16:44
17:14
17:44
18:14
18:44
19:14
G02 G05 G06 G09 G12 G13 G15 G19 G21 G25 G29 G30 R01 R02 R03 R08 R15 R16 R17 R18 R19 R23 R24


Pseudo-Range Residuals (2019-09-04)
metres
30
20
10
0
−10
−20
−30
16:44
17:14
17:44
18:14
18:44
19:14
G02 G05 G06 G09 G12 G13 G15 G19 G21 G25 G29 G30 R01 R02 R03 R08 R15 R16 R17 R18 R19 R23 R24

~~~ Disclaimer ~~~

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If you have any questions, please feel free to contact:
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Canadian Geodetic Survey
Surveyor General Branch
Natural Resources Canada
Government of Canada
588 Booth Street, Room 334
Ottawa, Ontario K1A 0Y7
Phone: 343-292-6617
Email: nrcan.geodeticinformation-informationgeodesique.rncan@canada.ca

Natural Resources Canada | Ressources naturelles Canada

Canada

CSRS-PPP 2.26.1 (2019-05-31)

1___2520.19o
1

Data Start	Data End	Duration of Observations
2019-09-09 15:53:10.00	2019-09-09 21:02:44.00	5:09:34
Processing Time		**Product Type**
16:17:49 UTC 2019/10/22		IGS Final
Observations	**Frequency**	**Mode**
Phase and Code	Double	Static
Elevation Cut-Off	**Rejected Epochs**	**Estimation Steps**
7.5 degrees	0.00 %	1.00 sec
Antenna Model	**APC to ARP**	**ARP to Marker**
LEIAS10	L1 = 0.058 m L2 = 0.056 m	H:1.485m / E:0.000m / N:0.000m

(APC = antenna phase center; ARP = antenna reference point)

Estimated Position for 1___2520.19o

	Latitude (+n)	Longitude (+e)	Ell. Height
NAD83(CSRS) (2010.0)†	46° 45' 17.04531"	-81° 36' 59.42775"	428.153 m
SIG_PPP(95%)‡	0.010 m	0.022 m	0.057 m
SIG_TOT(95%)‡	0.020 m	0.025 m	0.058 m
A priori*	46° 45' 17.08535"	-81° 36' 59.47577"	422.493 m
Estimated – A priori	-1.236 m	1.019 m	5.659 m

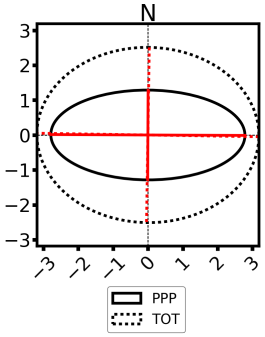
Orthometric Height CGVD28 (HTv2.0)†

463.960 m

(click for height reference information)

95% PPP Error Ellipse (cm)
semi-major: 2.8 cm
semi-minor: 1.3 cm
semi-major azimuth: -89° 15' 20.39"

95% TOT Error Ellipse (cm)
semi-major: 3.2 cm
semi-minor: 2.5 cm
semi-major azimuth: -89° 54' 21.91"



UTM (North) Zone 17

5178093.791 m (N)
452915.649 m (E)

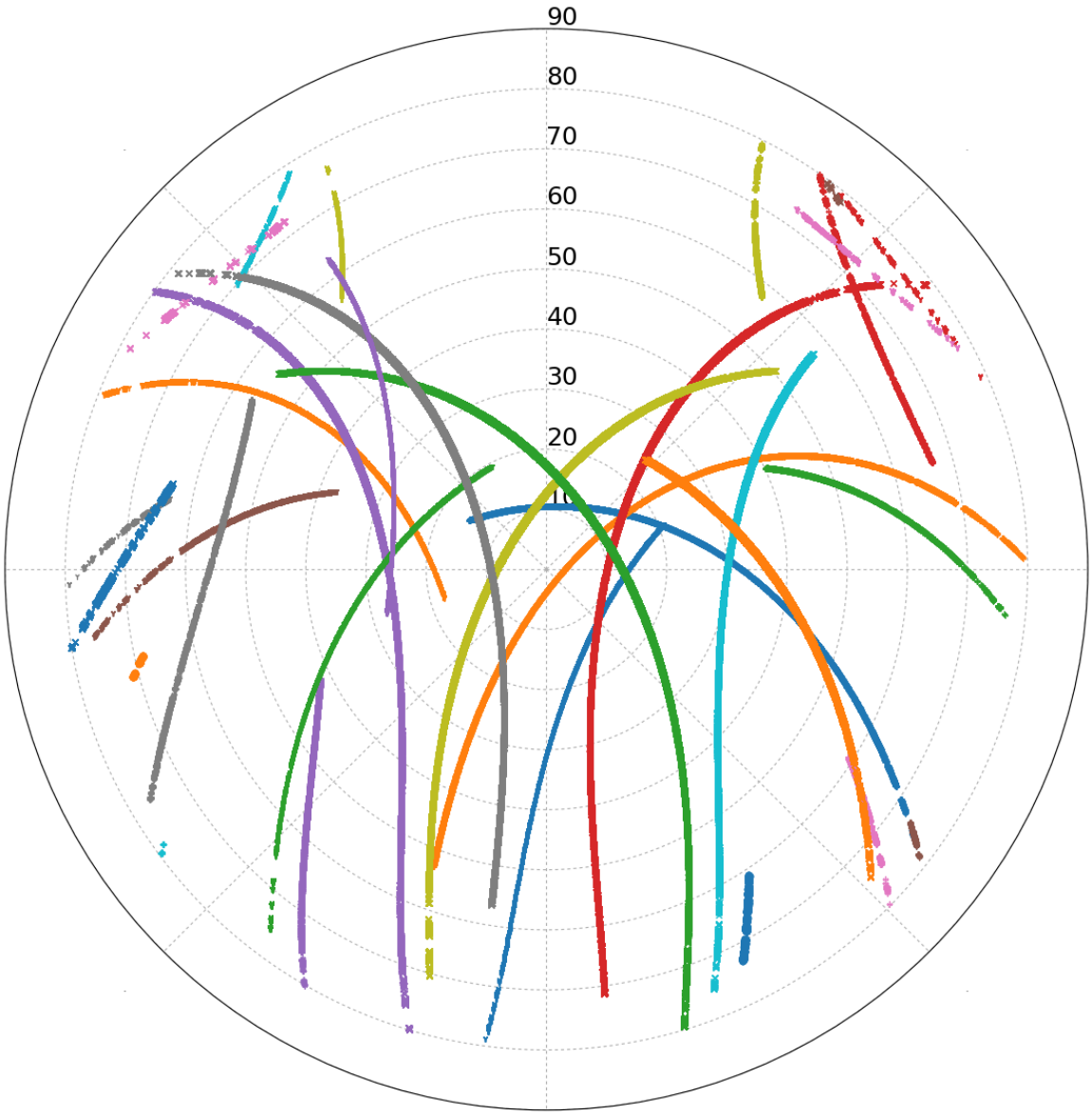
Scale Factors
0.999627 (point)
0.999560 (combined)

*(Coordinates from a code solution used as a priori position)

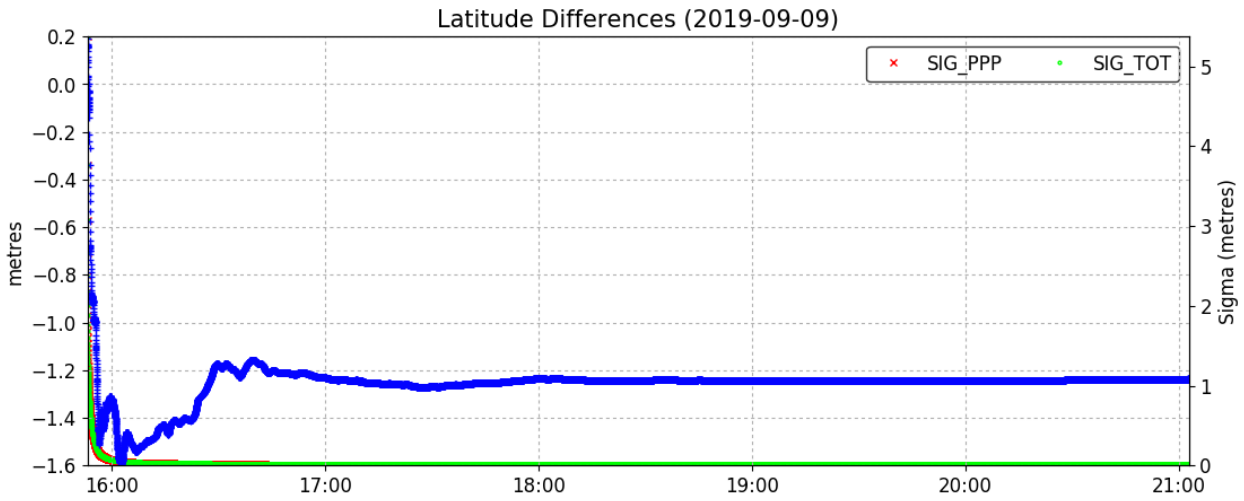
†(Epoch transformation using velocity grid NAD83v70VG (click for documentation))

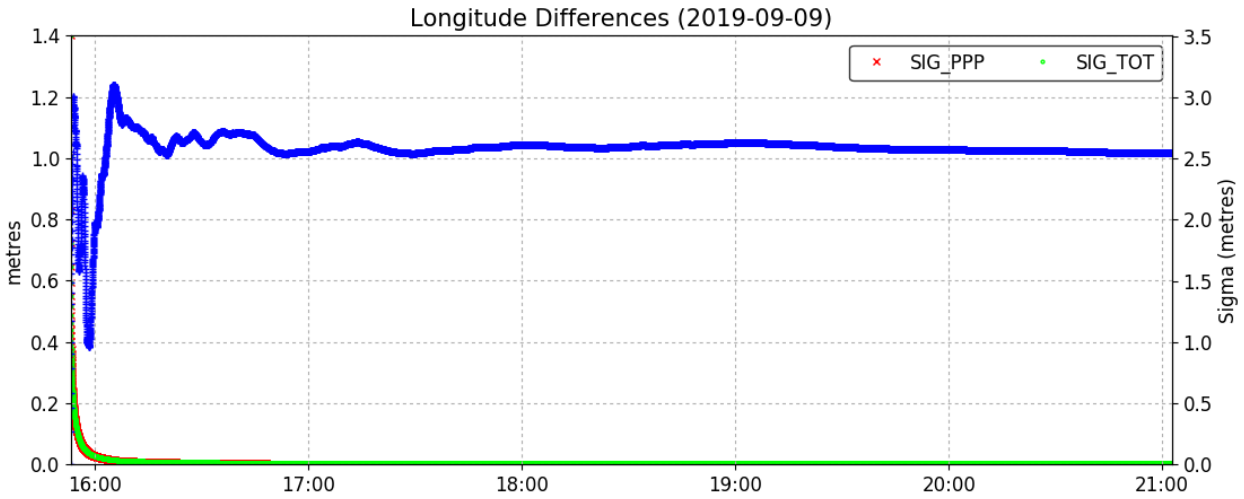
‡SIG_PPP indicates PPP-derived uncertainties, SIG_TOT incorporates uncertainties from epoch transformation

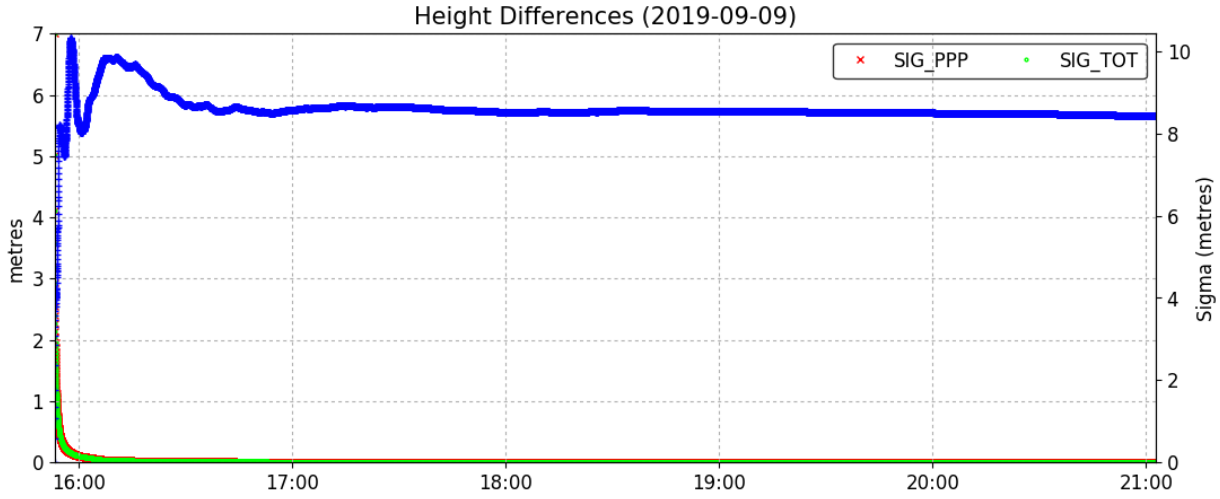
Satellite Sky Distribution

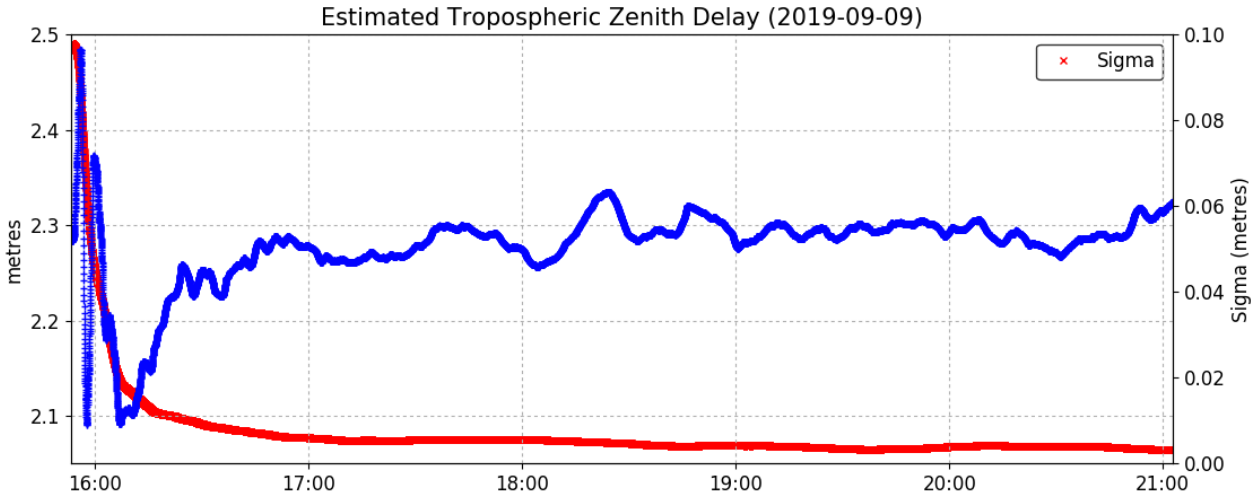


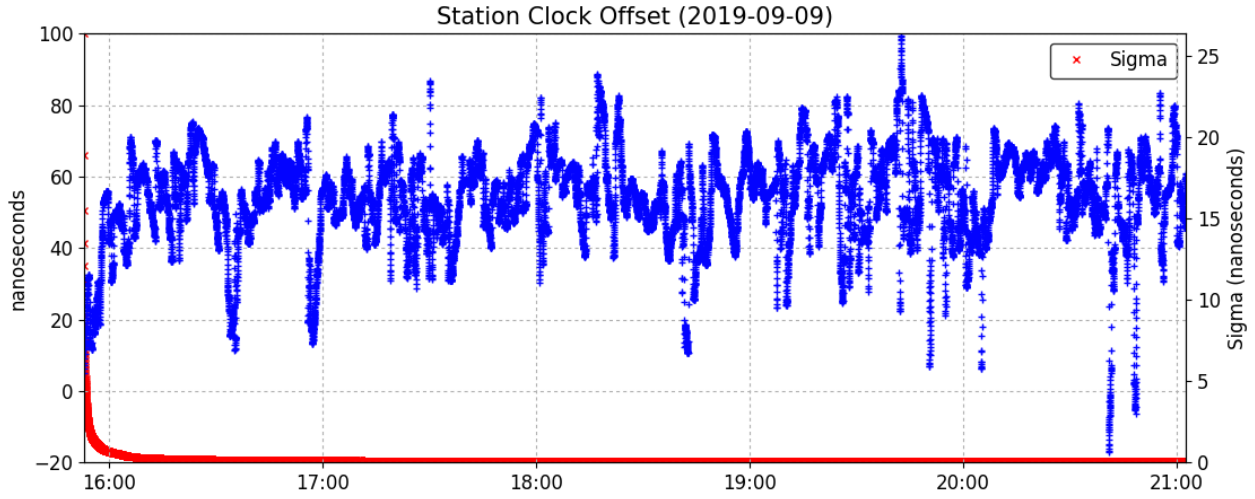
G02	G13	G23	G30	R08	R17
G05	G15	G24	R01	R09	R21
G06	G17	G25	R02	R11	R22
G09	G19	G27	R05	R12	R23
G10	G20	G29	R07	R13	R24
G12	G21				

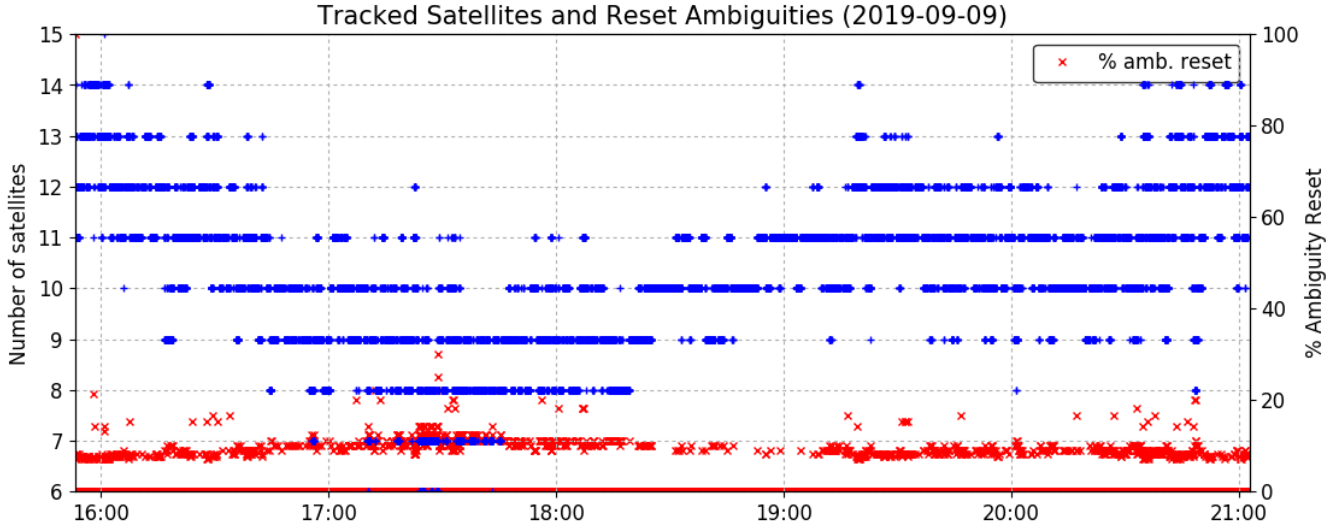

Latitude Differences (2019-09-09)
SIG_PPP
SIG_TOT
metres
Sigma (metres)
0.2
0.0
−0.2
−0.4
−0.6
−0.8
−1.0
−1.2
−1.4
−1.6
5
4
3
2
1
0
16:00
17:00
18:00
19:00
20:00
21:00

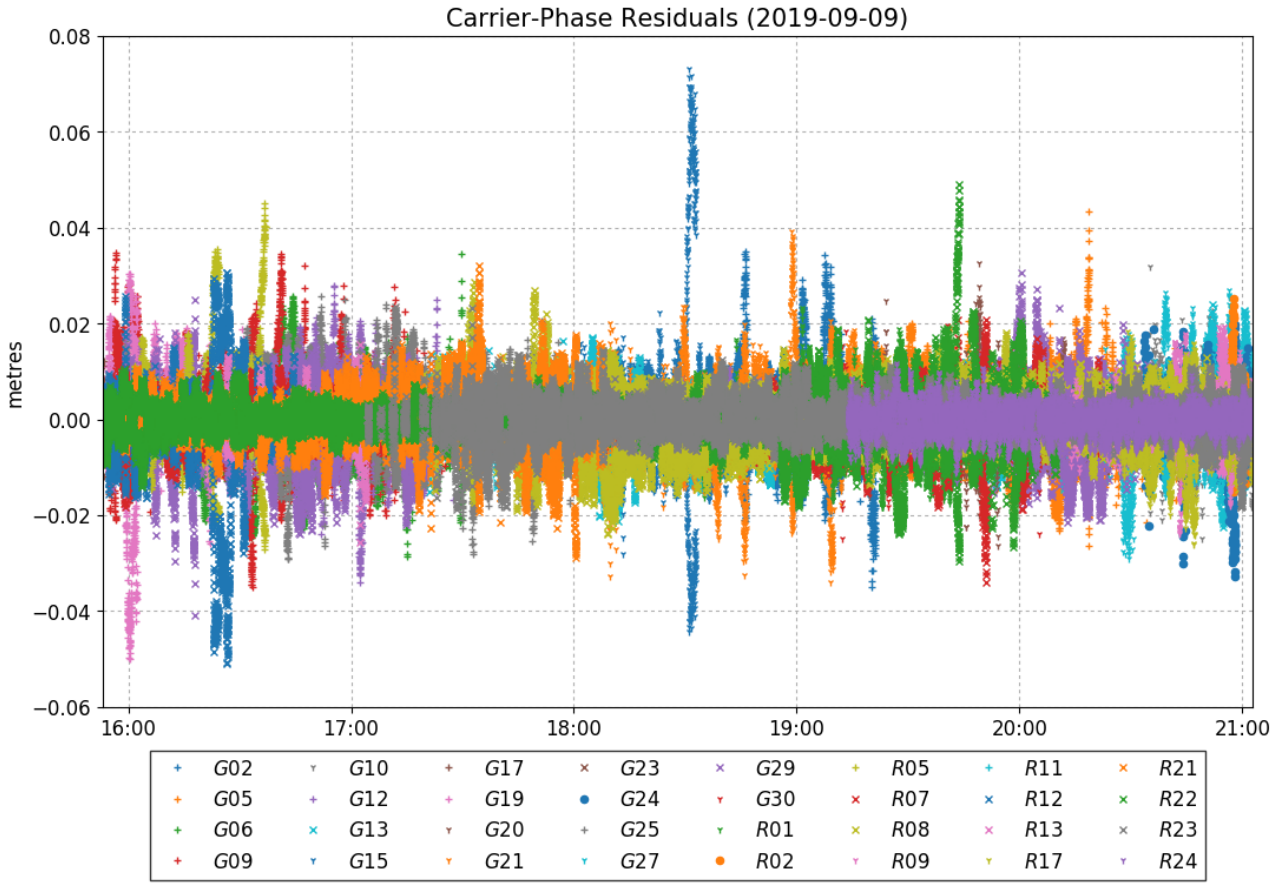

Longitude Differences (2019-09-09)
SIG_PPP
SIG_TOT
metres
Sigma (metres)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
16:00
17:00
18:00
19:00
20:00
21:00

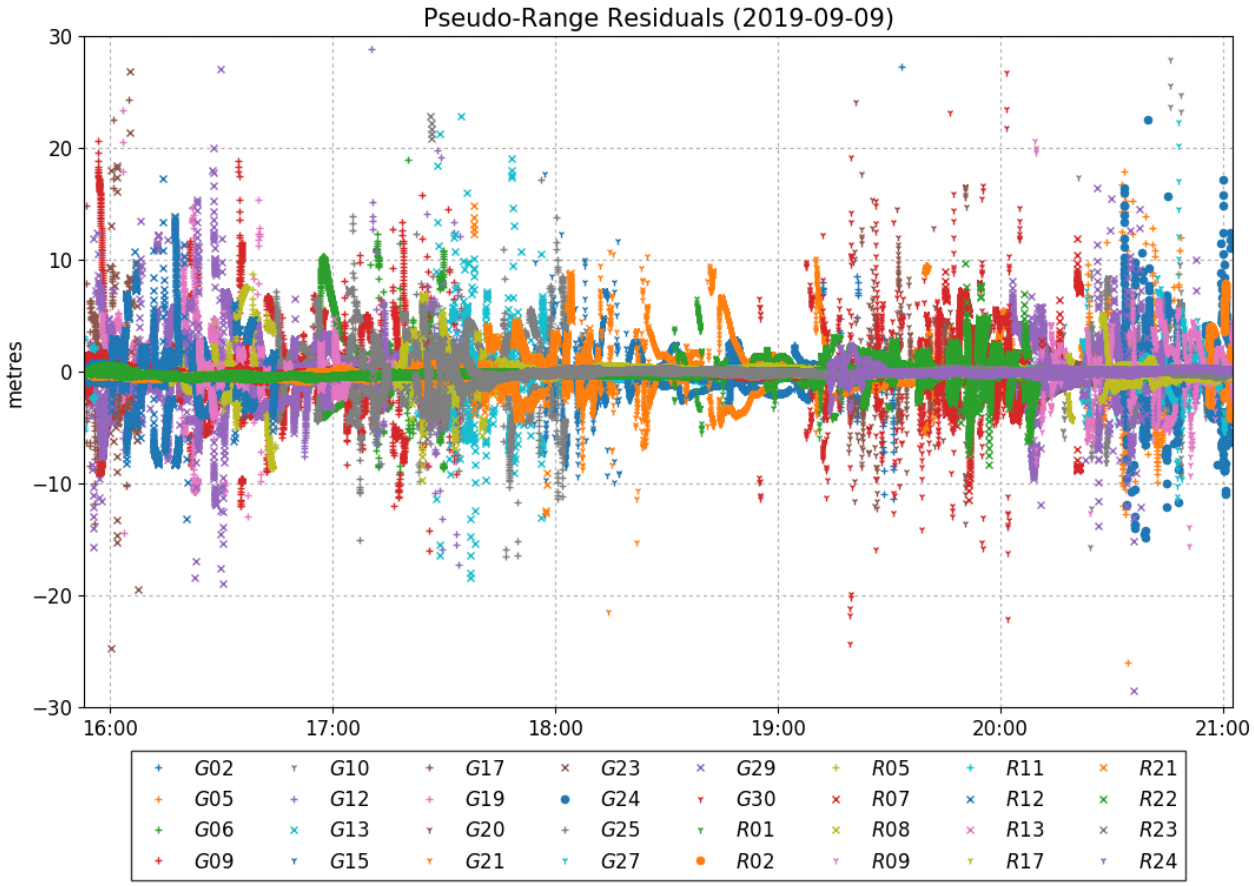

Height Differences (2019-09-09)
SIG_PPP
SIG_TOT
metres
Sigma (metres)
7
6
5
4
3
2
1
0
10
8
6
4
2
0
16:00
17:00
18:00
19:00
20:00
21:00


Estimated Tropospheric Zenith Delay (2019-09-09)
Sigma
metres
Sigma (metres)
2.5
2.4
2.3
2.2
2.1
0.10
0.08
0.06
0.04
0.02
0.00
16:00
17:00
18:00
19:00
20:00
21:00


Station Clock Offset (2019-09-09)
Sigma
nanoseconds
Sigma (nanoseconds)
100
80
60
40
20
0
−20
25
20
15
10
5
0
16:00
17:00
18:00
19:00
20:00
21:00


Tracked Satellites and Reset Ambiguities (2019-09-09)
% amb. reset
Number of satellites
% Ambiguity Reset
15
14
13
12
11
10
9
8
7
6
100
80
60
40
20
0
16:00
17:00
18:00
19:00
20:00
21:00


Carrier-Phase Residuals (2019-09-09)
metres
0.08
0.06
0.04
0.02
0.00
−0.02
−0.04
−0.06
16:00
17:00
18:00
19:00
20:00
21:00
G02 G10 G17 G23 G29 R05 R11 R21
G05 G12 G19 G24 G30 R07 R12 R22
G06 G13 G20 G25 R01 R08 R13 R23
G09 G15 G21 G27 R02 R09 R17 R24


Pseudo-Range Residuals (2019-09-09)
metres
30
20
10
0
−10
−20
−30
16:00
17:00
18:00
19:00
20:00
21:00
G02 G10 G17 G23 G29 R05 R11 R21
G05 G12 G19 G24 G30 R07 R12 R22
G06 G13 G20 G25 R01 R08 R13 R23
G09 G15 G21 G27 R02 R09 R17 R24

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If you have any questions, please feel free to contact:
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Surveyor General Branch
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Government of Canada
588 Booth Street, Room 334
Ottawa, Ontario K1A 0Y7
Phone: 343-292-6617
Email: nrcan.geodeticinformation-informationgeodesique.rncan@canada.ca

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Canada

CSRS-PPP 2.26.1 (2019-05-31)

1___2700.19o
1

Data Start	Data End	Duration of Observations
2019-09-27 15:07:15.00	2019-09-27 19:57:37.00	4:50:22
Processing Time		**Product Type**
16:19:58 UTC 2019/10/22		IGS Final
Observations	**Frequency**	**Mode**
Phase and Code	Double	Static
Elevation Cut-Off	**Rejected Epochs**	**Estimation Steps**
7.5 degrees	0.00 %	1.00 sec
Antenna Model	**APC to ARP**	**ARP to Marker**
LEIAS10	L1 = 0.058 m L2 = 0.056 m	H:1.545m / E:0.000m / N:0.000m

(APC = antenna phase center; ARP = antenna reference point)

Estimated Position for 1___2700.19o

	Latitude (+n)	Longitude (+e)	Ell. Height
NAD83(CSRS) (2010.0)†	46° 45' 17.04536"	-81° 36' 59.42798"	428.012 m
SIG_PPP(95%)‡	0.012 m	0.021 m	0.079 m
SIG_TOT(95%)‡	0.021 m	0.025 m	0.080 m
A priori*	46° 45' 17.02793"	-81° 36' 59.44899"	433.361 m
Estimated – A priori	0.538 m	0.446 m	-5.349 m

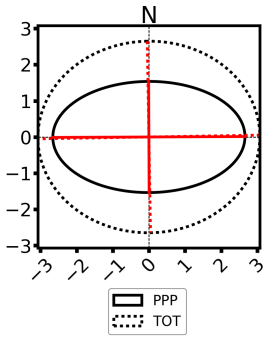
Orthometric Height CGVD28 (HTv2.0)†

463.820 m

(click for height reference information)

95% PPP Error Ellipse (cm)
semi-major: 2.7 cm
semi-minor: 1.5 cm
semi-major azimuth: 89° 44' 48.65"

95% TOT Error Ellipse (cm)
semi-major: 3.1 cm
semi-minor: 2.6 cm
semi-major azimuth: 89° 1' 18.29"



UTM (North) Zone 17

5178093.793 m (N)
452915.644 m (E)

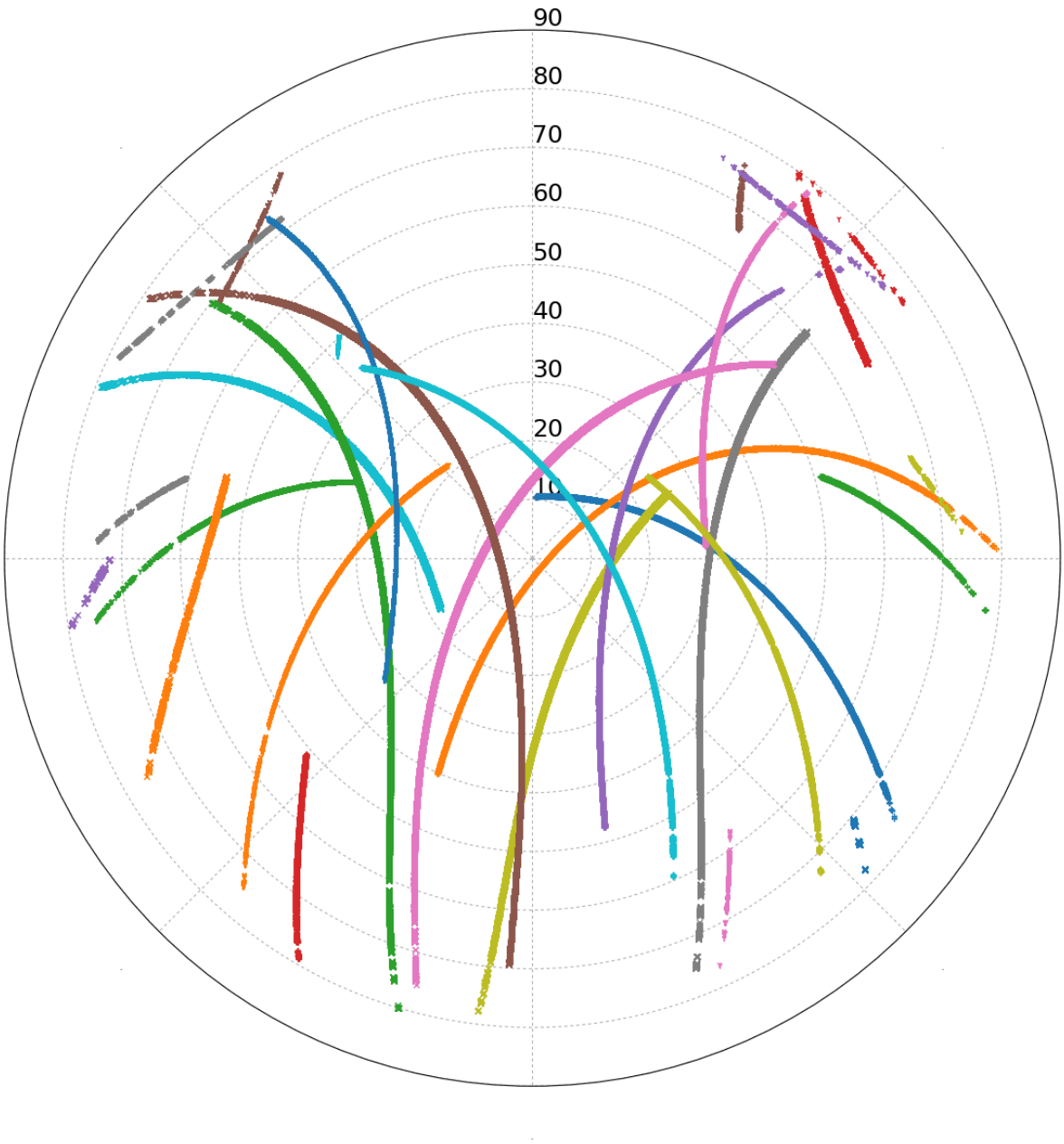
Scale Factors
0.999627 (point)
0.999560 (combined)

*(Coordinates from a code solution used as a priori position)

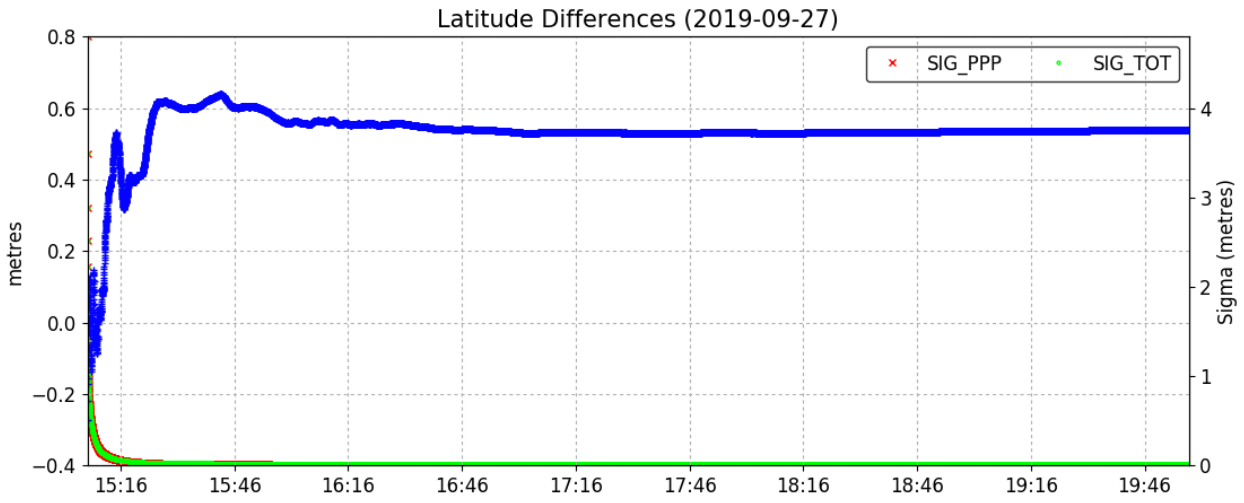
†(Epoch transformation using velocity grid NAD83v70VG (click for documentation))

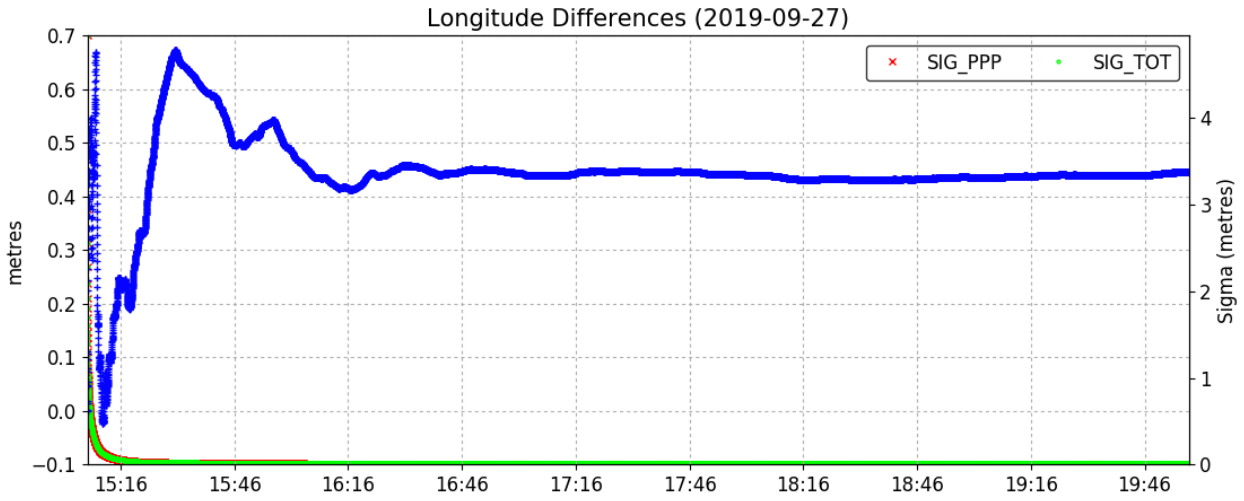
‡SIG_PPP indicates PPP-derived uncertainties, SIG_TOT incorporates uncertainties from epoch transformation

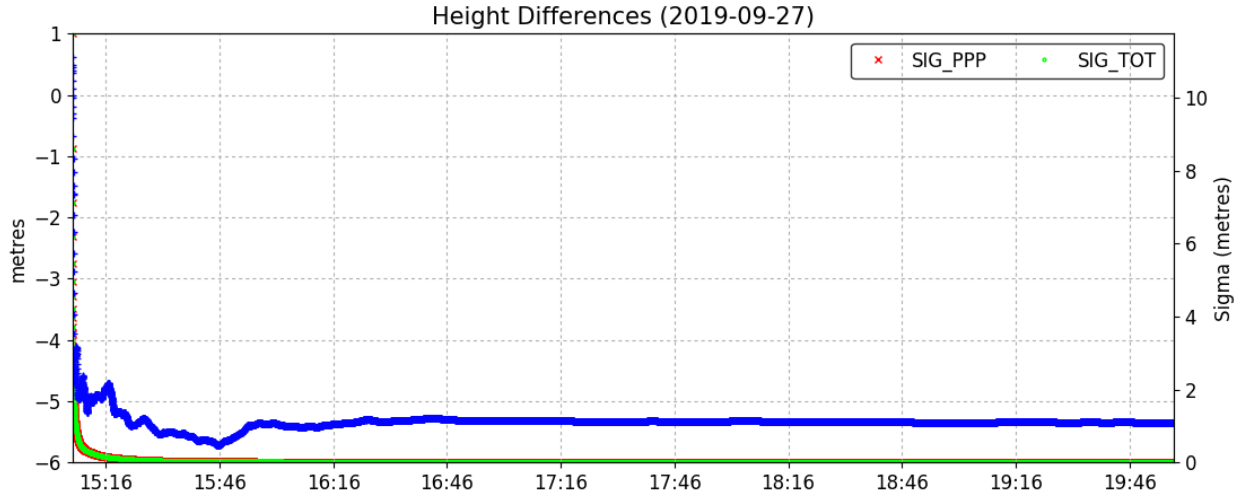
Satellite Sky Distribution

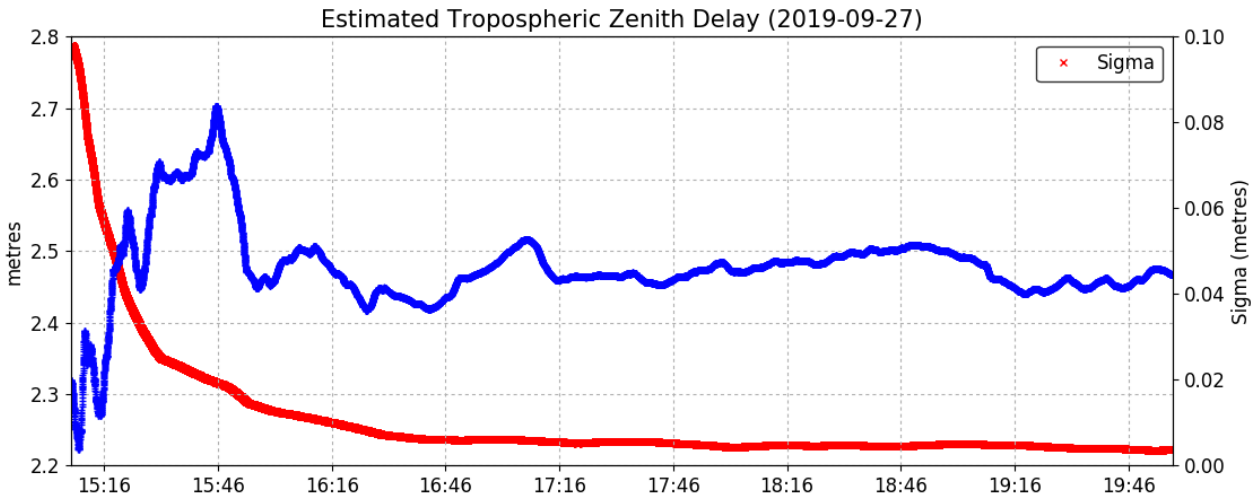


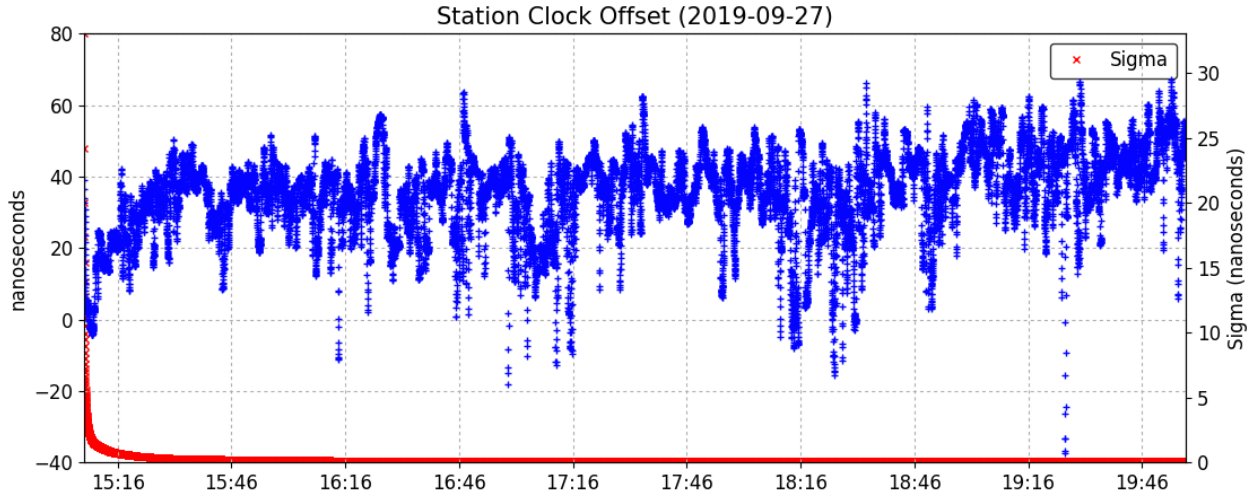
G02	G12	G21	G30	R08	R17
G05	G13	G24	R01	R11	R18
G06	G15	G25	R02	R12	R19
G09	G19	G27	R03	R14	R23
G10	G20	G29	R07	R15	R24

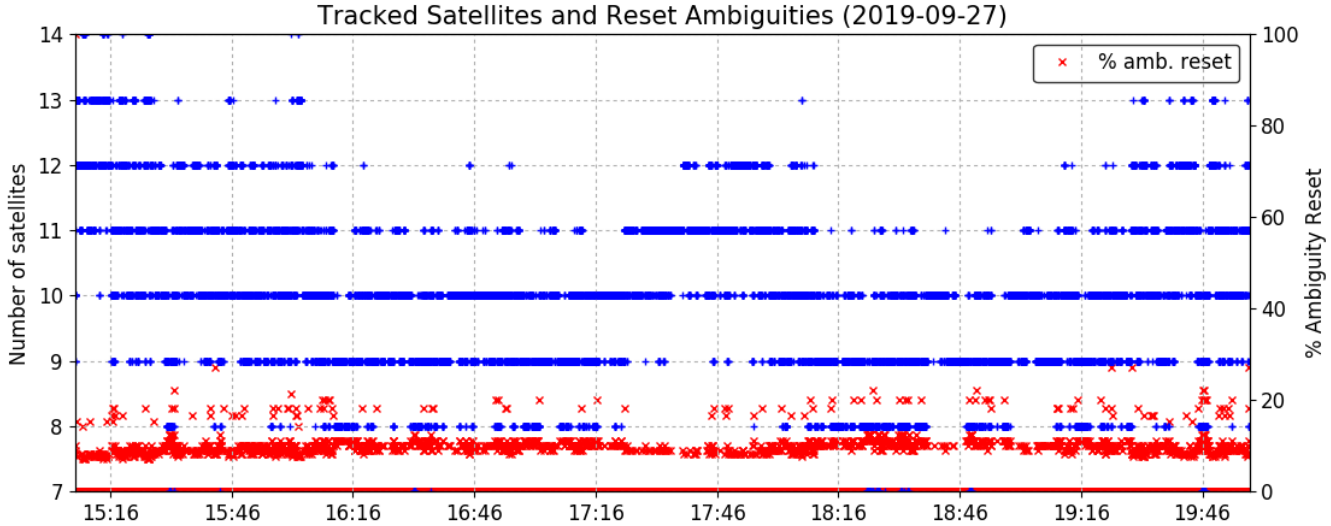

Latitude Differences (2019-09-27)
SIG_PPP
SIG_TOT
metres
Sigma (metres)
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
4
3
2
1
0
15:16
15:46
16:16
16:46
17:16
17:46
18:16
18:46
19:16
19:46

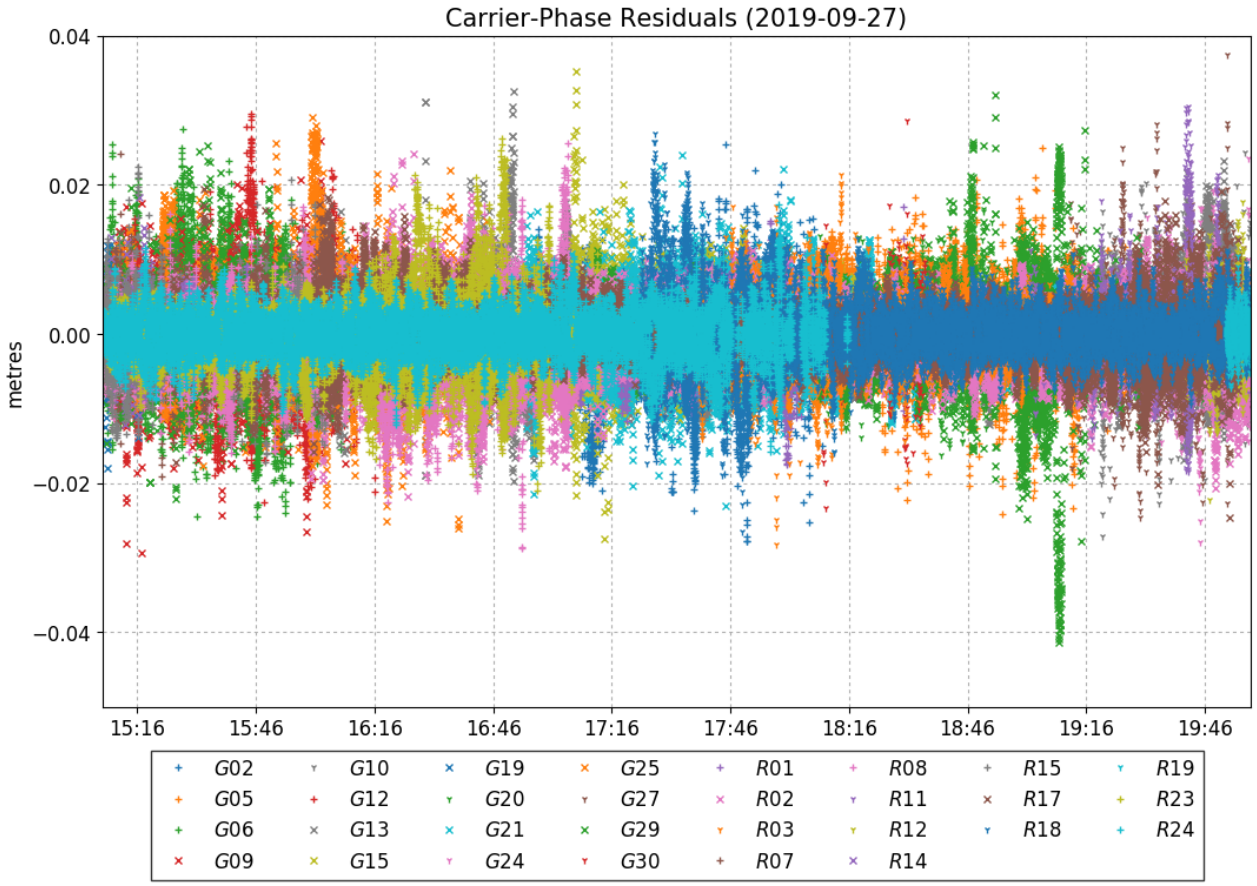

Longitude Differences (2019-09-27)
SIG_PPP
SIG_TOT
metres
Sigma (metres)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
−0.1
4
3
2
1
0
15:16
15:46
16:16
16:46
17:16
17:46
18:16
18:46
19:16
19:46

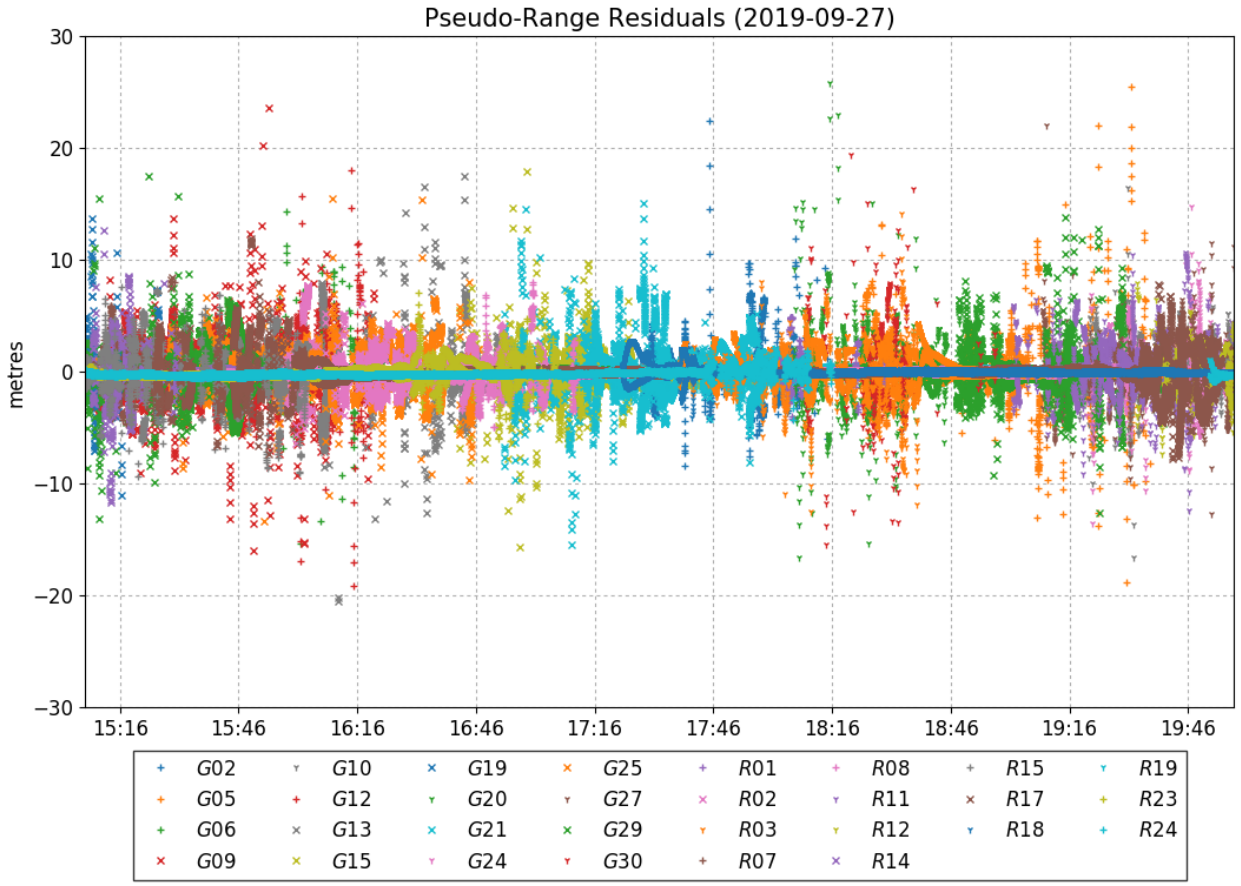

Height Differences (2019-09-27)
SIG_PPP
SIG_TOT
metres
Sigma (metres)
1
0
−1
−2
−3
−4
−5
−6
10
8
6
4
2
0
15:16
15:46
16:16
16:46
17:16
17:46
18:16
18:46
19:16
19:46


Estimated Tropospheric Zenith Delay (2019-09-27)
Sigma
metres
Sigma (metres)
2.8
2.7
2.6
2.5
2.4
2.3
2.2
0.10
0.08
0.06
0.04
0.02
0.00
15:16
15:46
16:16
16:46
17:16
17:46
18:16
18:46
19:16
19:46


Station Clock Offset (2019-09-27)
Sigma
nanoseconds
Sigma (nanoseconds)
80
60
40
20
0
−20
−40
30
25
20
15
10
5
0
15:16
15:46
16:16
16:46
17:16
17:46
18:16
18:46
19:16
19:46


Tracked Satellites and Reset Ambiguities (2019-09-27)
% amb. reset
Number of satellites
% Ambiguity Reset
14
13
12
11
10
9
8
7
100
80
60
40
20
0
15:16
15:46
16:16
16:46
17:16
17:46
18:16
18:46
19:16
19:46


Carrier-Phase Residuals (2019-09-27)
metres
0.04
0.02
0.00
−0.02
−0.04
15:16
15:46
16:16
16:46
17:16
17:46
18:16
18:46
19:16
19:46
G02 G05 G06 G09 G10 G12 G13 G15 G19 G20 G21 G24 G25 G27 G29 G30 R01 R02 R03 R07 R08 R11 R12 R14 R15 R17 R18 R19 R23 R24


Pseudo-Range Residuals (2019-09-27)
metres
30
20
10
0
−10
−20
−30
15:16
15:46
16:16
16:46
17:16
17:46
18:16
18:46
19:16
19:46
G02 G05 G06 G09 G10 G12 G13 G15 G19 G20 G21 G24 G25 G27 G29 G30 R01 R02 R03 R07 R08 R11 R12 R14 R15 R17 R18 R19 R23 R24

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Geodetic Integrated Services
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588 Booth Street, Room 334
Ottawa, Ontario K1A 0Y7
Phone: 343-292-6617
Email: nrcan.geodeticinformation-informationgeodesique.rncan@canada.ca

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Canada

CSRS-PPP 2.26.1 (2019-05-31)

1___2940.19o
1

Data Start	Data End	Duration of Observations
2019-10-21 16:48:20.00	2019-10-21 22:37:45.00	5:49:25
Processing Time		**Product Type**
17:20:58 UTC 2019/10/22		NRCan Rapid
Observations	**Frequency**	**Mode**
Phase and Code	Double	Static
Elevation Cut-Off	**Rejected Epochs**	**Estimation Steps**
7.5 degrees	0.00 %	5.00 sec
Antenna Model	**APC to ARP**	**ARP to Marker**
LEIAS10	L1 = 0.058 m L2 = 0.056 m	H:1.534m / E:0.000m / N:0.000m

(APC = antenna phase center; ARP = antenna reference point)

Estimated Position for 1___2940.19o

	Latitude (+n)	Longitude (+e)	Ell. Height
NAD83(CSRS) (2010.0)†	46° 45' 17.04568"	-81° 36' 59.42613"	428.129 m
SIG_PPP(95%)‡	0.012 m	0.016 m	0.053 m
SIG_TOT(95%)‡	0.021 m	0.021 m	0.055 m
A priori*	46° 45' 16.94421"	-81° 36' 59.49280"	430.079 m
Estimated – A priori	3.133 m	1.415 m	-1.950 m

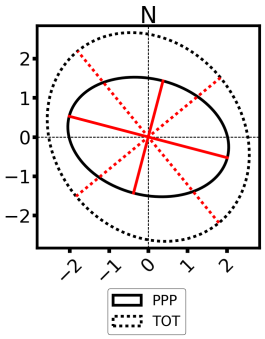
Orthometric Height CGVD28 (HTv2.0)†

463.937 m

(click for height reference information)

95% PPP Error Ellipse (cm)
semi-major: 2.1 cm
semi-minor: 1.5 cm
semi-major azimuth: -75° 42' 14.94"

95% TOT Error Ellipse (cm)
semi-major: 2.8 cm
semi-minor: 2.4 cm
semi-major azimuth: -39° 35' 12.91"



UTM (North) Zone 17

5178093.802 m (N)
452915.684 m (E)

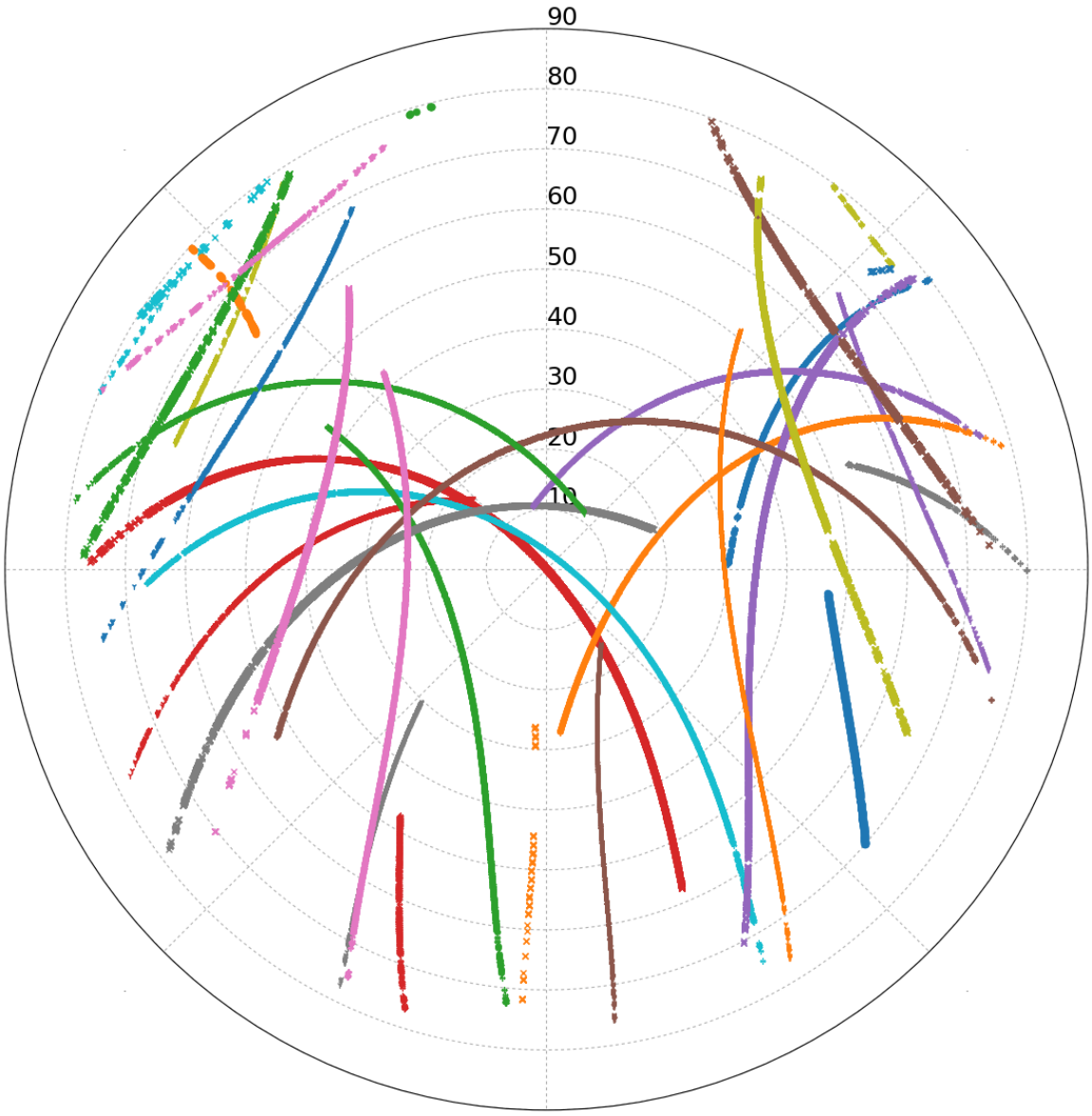
Scale Factors
0.999627 (point)
0.999560 (combined)

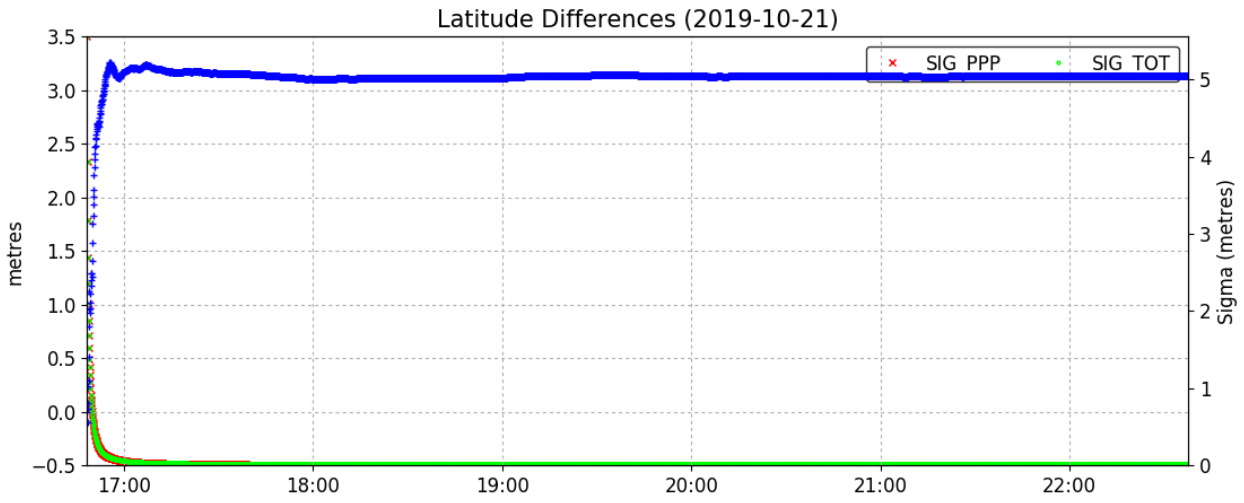
*(Coordinates from a code solution used as a priori position)

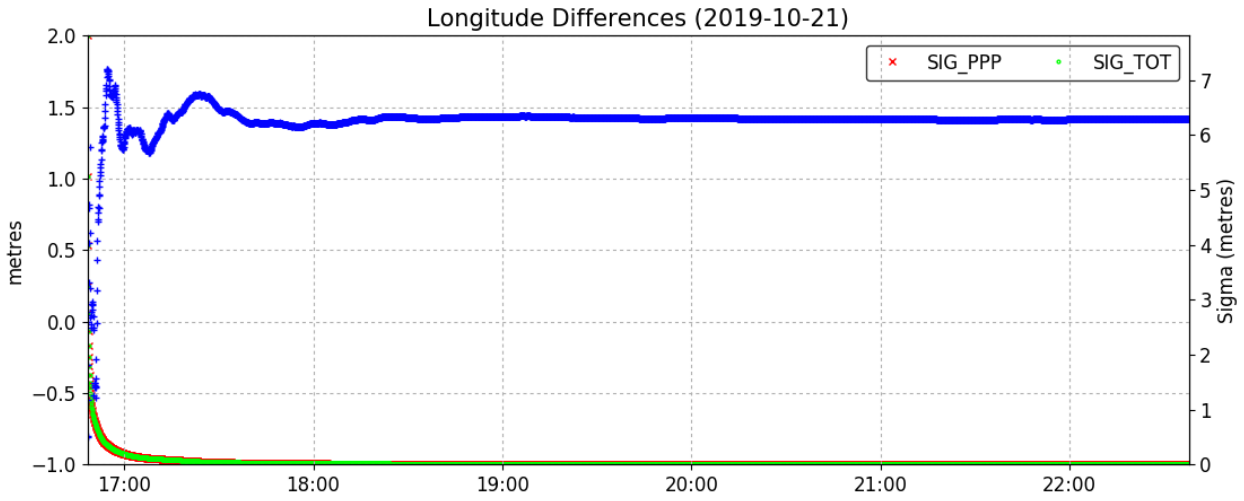
†(Epoch transformation using velocity grid NAD83v70VG (click for documentation))

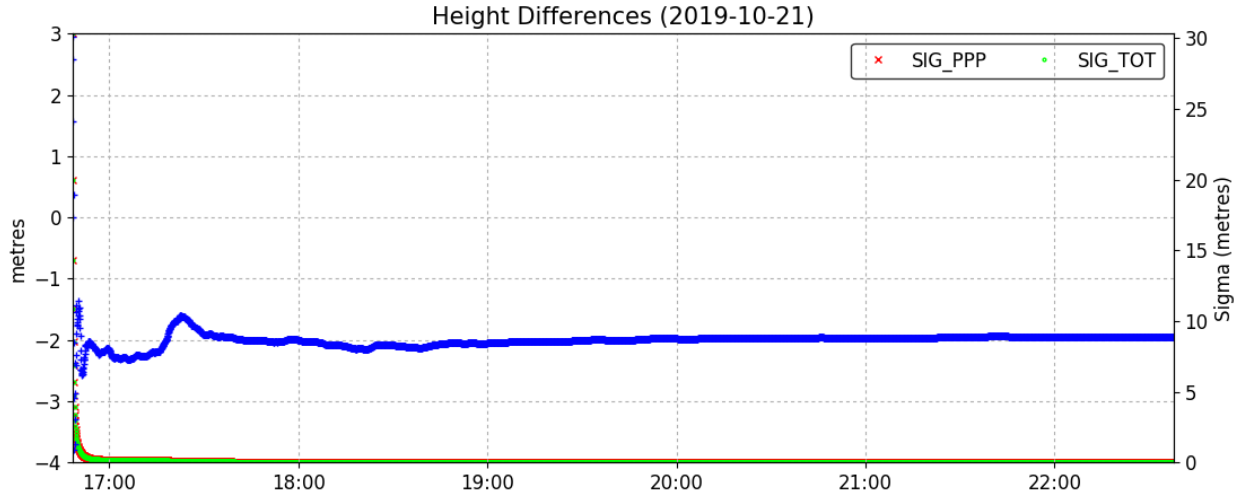
‡SIG_PPP indicates PPP-derived uncertainties, SIG_TOT incorporates uncertainties from epoch transformation

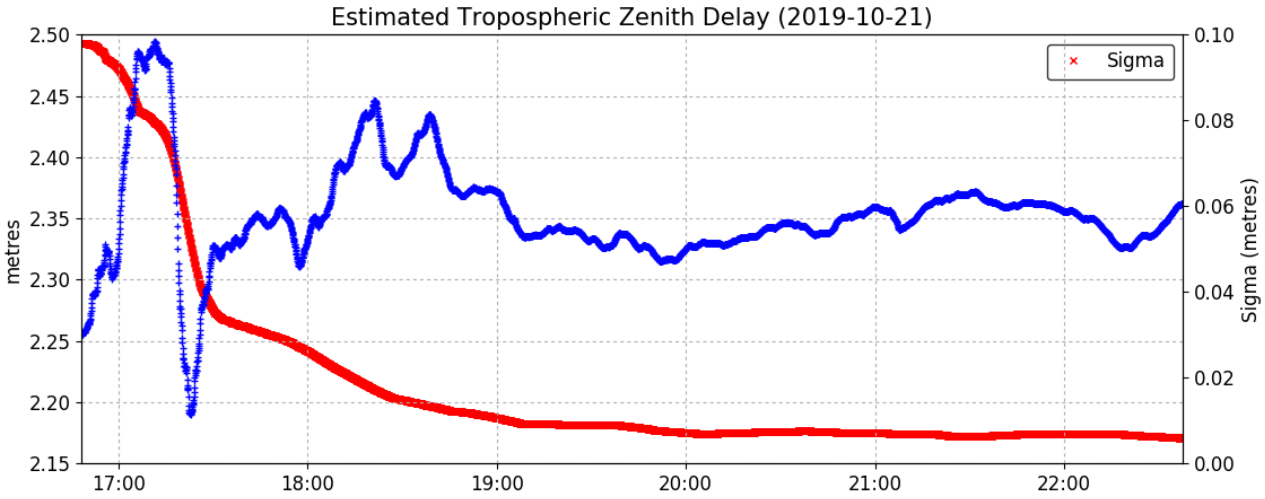
Satellite Sky Distribution




Latitude Differences (2019-10-21)
SIG_PPP
SIG_TOT
metres
Sigma (metres)
17:00
18:00
19:00
20:00
21:00
22:00


Longitude Differences (2019-10-21)
SIG_PPP
SIG_TOT
metres
Sigma (metres)
17:00
18:00
19:00
20:00
21:00
22:00


Height Differences (2019-10-21)
SIG_PPP
SIG_TOT
metres
Sigma (metres)
17:00
18:00
19:00
20:00
21:00
22:00


Estimated Tropospheric Zenith Delay (2019-10-21)
Sigma
metres
Sigma (metres)
2.50
2.45
2.40
2.35
2.30
2.25
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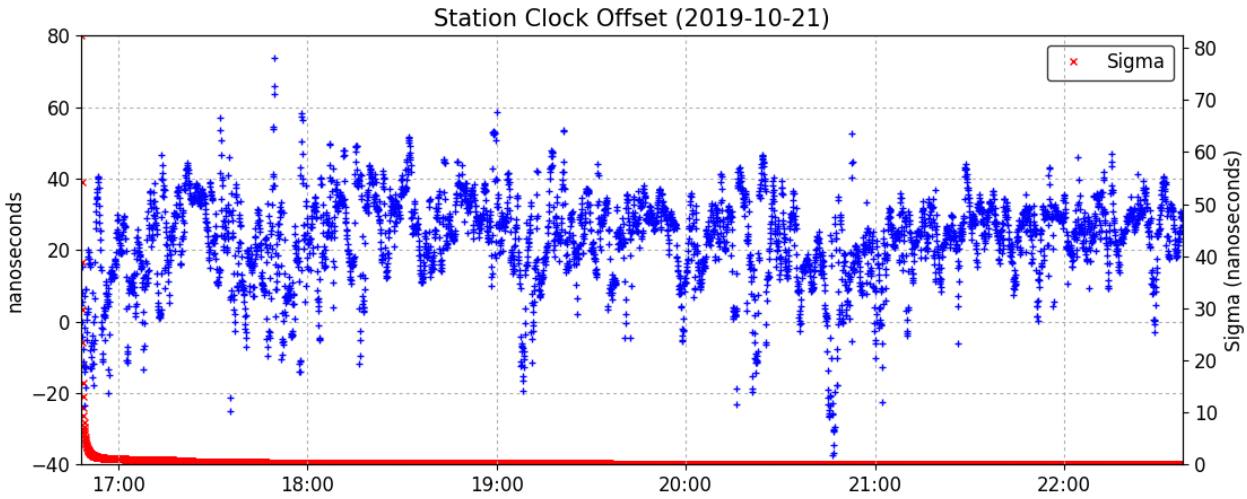
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nanoseconds
Sigma (nanoseconds)
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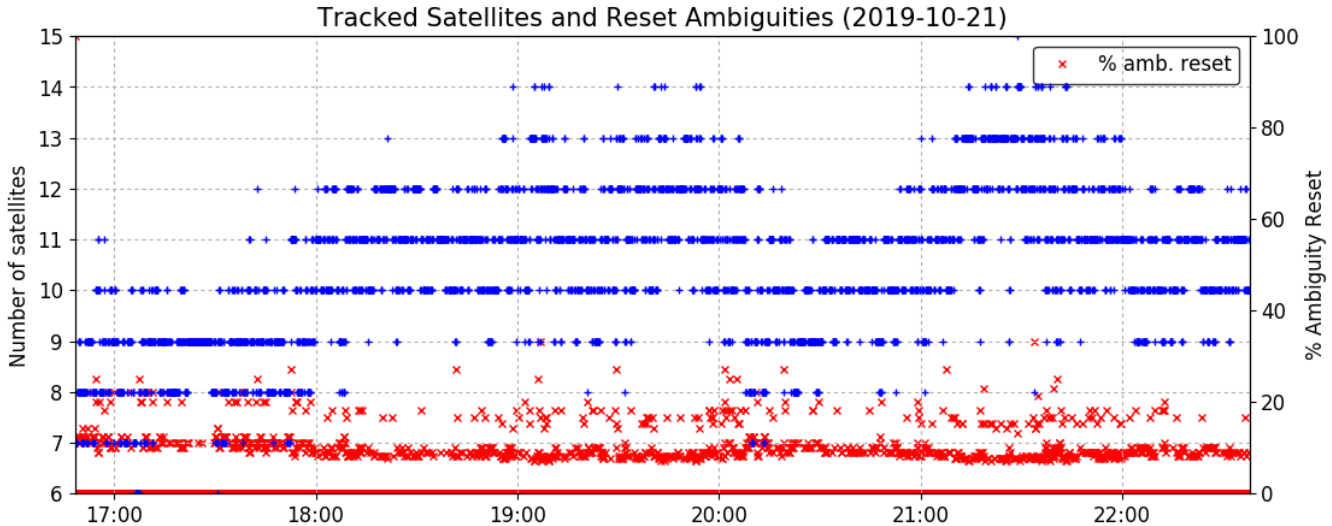
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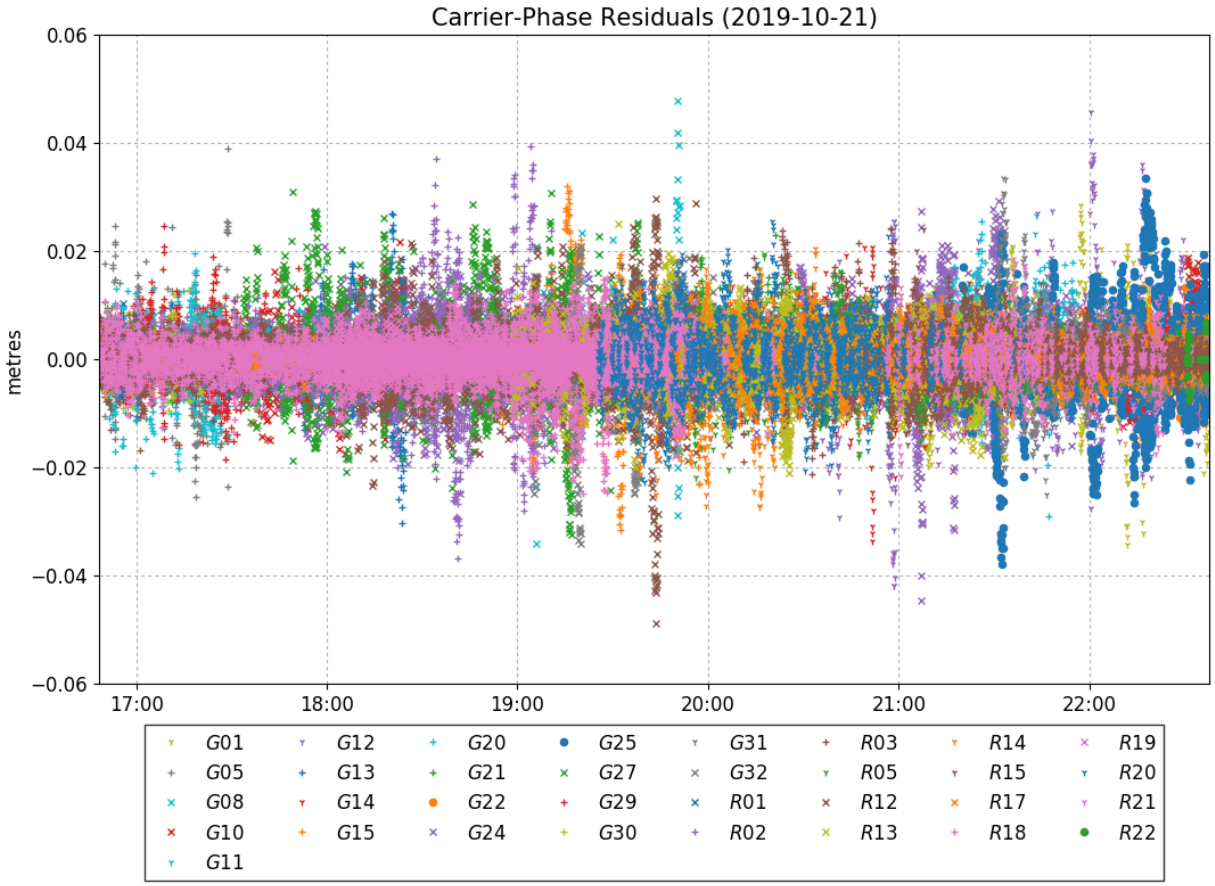
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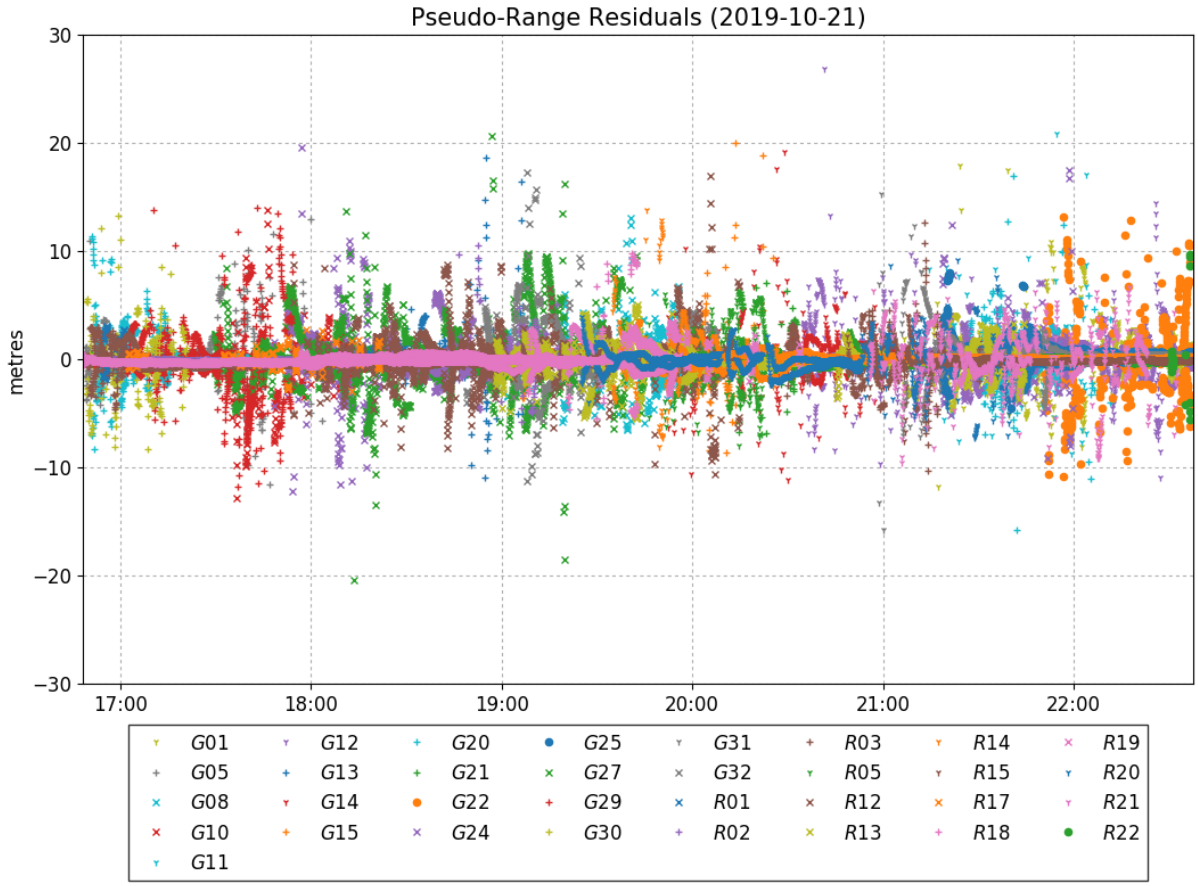
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G20 G21 G22 G24
G25 G27 G29 G30
G31 G32 R01 R02
R03 R05 R12 R13
R14 R15 R17 R18
R19 R20 R21 R22

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D.S. Dorland Limited
298 Larch Street
Sudbury, ON P3B 1M1

May 27, 2019
File No.: 57-18

RE: 2018 Eastern Whip-poor-will Survey Report for a Property located in the Geographic Township of Moncrieff, located North of the Township of Cartier.

1.0 INTRODUCTION

Environmental Ecosystems Inc. (Enviro-Eco) was retained by D.S. Dorland Limited (Dorland) to complete an Eastern Whip-poor-will survey for a property located in the Geographic Township of Moncrief, north of the town of Cartier, formerly S-4285271 and S-4285272, which have now been converted to single cell mining claims 264132, 152238, 333304, 284206, 234836, 301931, 115511, 334234, 207478, 141352, 271414, 170206, 219590, 266069, 141353, 207477, 226871, 264134, 318662, 168815, 152753, 272081, 152237, 272082, 264133, 301932, 124862 and 141354 due to the recent Mining Act Modernization implementation by MNDM. The property is located on and surrounded entirely by Crown Land.

The site in the Township of Moncrieff is approximately 56 kilometres northwest of the City of Greater Sudbury (CGS) Ontario, as shown on Figure 1.

The survey was conducted in accordance with the MNRF's Survey Protocol for the Eastern Whip-poor-will and the General Habitat Description for the Eastern Whip-poor-will. The survey must be conducted in order to determine the presence of the species or habitat within the property boundary.

2.0 METHODOLOGY

The following methodology outlined below is in accordance with relevant excerpts of the 2014 draft occurrence survey protocol for the Eastern Whip-Poor-Will provided to Enviro-Eco through email correspondence from the Ministry of Natural Resources and Forestry obtained in the spring of 2018[1].

The Whip-poor-will draft protocol suggests that surveys be completed at least thirty minutes after dusk between May 18 – June 30 when the moon phase falls either one week before or after the date of a full moon and is positioned above the horizon. The surveys must be completed under the following field conditions:

- No precipitation;
- Low noise levels;
- Little or no wind;
- Clear skies (little or no cloud cover);

[1] **Hall, Mike *"RE: Ecological Site Assessment"* Message to Angela Rainville April 9th, 2018 11:28am [E-mail]**

- Good visibility;
- Greater than 50 % moon illumination; and,
- Temperature at least 10°C or above.

The whip-poor-will survey draft protocol suggests completing a minimum of three (3) surveys during the breeding season.

In accordance with survey protocol, Enviro-Eco conducted pre-survey planning involving the examination of aerial maps and visiting the site during the day, to establish ideal locations for survey points prior to conducting the survey. Point count surveying was conducted at six (6) locations on the subject property. The entire site occupies an area of 384 hectares. According to the survey protocol, there should be at least one (1) point count for every 30 hectares, and that calls under normal conditions, can usually be heard approximately 300 metres in all directions. However, dense conifer trees and large rock outcrops were discovered and rendered a large portion of the site inaccessible due to safety concerns. Furthermore, the applicant intends to carry out operations in the orange hatched areas identified on Figure 2 “Survey Area and Point Count Locations” provided in the Figures section of this report. Therefore, it was appropriate to focus our attention on the areas selected for withdrawal.

Surveys were completed using two Enviro-Eco staff members, as safety policies require visual contact between staff working in isolated areas at night at all times. Upon arrival at each point, Enviro-Eco recorded GPS location, weather conditions and the time. At each location, for a period of at least five minutes, surveyors listened simultaneously for whip-poor-will calls. If a call was heard, the time, compass bearing, and estimated distance to the bird(s) was recorded.

3.0 RESULTS

The surveys were completed on June 1, 2018, June 2, 2018, and June 23, 2018. The field conditions and survey results are presented in the following tables. A site location map identifying the area and surrounding area is provided in Figure 1. A site map identifying survey point locations and 300 m buffer radius around each location is provided in Figure 2.

Table 1: Whip-poor-will Survey Results for June 1, 2018

June 1, 2018 - Recorders: Manon Giroux and Don Drouin					
Wind Speed: Beaufort 3 to 4, 12 - 28 km/hour					
Cloud Cover: Clear Temperature: 9°C					
Location	**Time**	**Info**	**Point 1**	**Point 2**	**EWPW Calls**
Point Count # 1	12:15 am to 12:20 am	Surveyor	MG/DD	-	No calls
		UTM m E	452498.72	-	
		UTM m N	5177070.31	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 2	12:35 am to 12:40 am	Surveyor	MG/DD	-	No calls
		UTM m E	452746.18	-	
		UTM m N	5177514.02	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 3	1:00 am to 1:05 am	Surveyor	MG/DD	-	No calls
		UTM m E	452300.23	-	
		UTM m N	5178581.9	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 4	1:20am to 1:25 am	Surveyor	MG/DD	-	No calls
		UTM m E	451732.91	-	
		UTM m N	5178251.73	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 5	2:20 am to 2:25 am	Surveyor	MG/DD	-	No calls
		UTM m E	454048	-	
		UTM m N	5177026	-	
		Bearing 1	-	-	
		Distance	-	-	
		Bearing 2	-	-	
		Distance	-	-	
Point Count # 6	2:30 am to 2:35 am	Surveyor	MG/DD	-	No calls
		UTM m E	453985	-	
		UTM m N	5177642	-	
		Bearing	-	-	
		Distance	-	-	

Note: - = no data/not applicable

As presented in the table above, on the June 1, 2018 site visit, no whip-poor-wills were heard calling during the survey, at any point count location.

Table 2: Whip-poor-will Survey Results for June 2, 2018

June 2, 2018 - Recorders: Manon Giroux and Don Drouin					
Wind Speed: Beaufort Scale 3, 18 km/hour					
Cloud Cover: Clear Temperature: 10 °C					
Location	**Time**	**Info**	**Point 1**	**Point 2**	**EWPW Calls**
Point Count # 1	12:30 am to 12:35 am	Surveyor	MG/DD	-	No calls
		UTM m E	452498.72	-	
		UTM m N	5177070.31	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 2	12:50 am to 12:55 am	Surveyor	MG/DD	-	No calls
		UTM m E	452746.18	-	
		UTM m N	5177514.02	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 3	1:15 am to 1:20 am	Surveyor	MG/DD	-	No calls
		UTM m E	452300.23	-	
		UTM m N	5178581.9	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 4	1:40 am to 1:45 am	Surveyor	MG/DD	-	No calls
		UTM m E	451732.91	-	
		UTM m N	5178251.73	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 5	11:40 pm to 11:45 pm	Surveyor	MG/DD	-	No calls
		UTM m E	454048	-	
		UTM m N	5177026	-	
		Bearing 1	-	-	
		Distance	-	-	
		Bearing 2	-	-	
		Distance	-	-	
Point Count # 6	11:55 pm to 12:00 am	Surveyor	MG/DD	-	No calls
		UTM m E	453985	-	
		UTM m N	5177642	-	
		Bearing	-	-	
		Distance	-	-	

Note: - = no data/not applicable

As presented in the table above, on the June 2, 2018 site visit, no whip-poor-wills were heard calling during the survey.

Table 3: Whip-poor-will Survey Results for June 23, 2018

June 23, 2018 - Recorders: Manon Giroux and Don Drouin					
Wind Speed: Beaufort Scale 3, 9 km/hour					
Cloud Cover: Clear Temperature: 17°C					
Location	**Time**	**Info**	**Point 1**	**Point 2**	**EWPW Calls**
Point Count # 1	1:30 am to 1:35 am	Surveyor	MG/DD	-	No calls
		UTM m E	452498.72	-	
		UTM m N	5177070.31	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 2	1:50 am to 1:55 am	Surveyor	MG/DD	-	No calls
		UTM m E	452746.18	-	
		UTM m N	5177514.02	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 3	2:15 am to 2:20 am	Surveyor	MG/DD	-	No calls
		UTM m E	452300.23	-	
		UTM m N	5178581.9	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 4	2:40 am to 2:45 am	Surveyor	MG/DD	-	No calls
		UTM m E	451732.91	-	
		UTM m N	5178251.73	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 5	12:30 am to 12:35 am	Surveyor	MG/DD	-	No calls
		UTM m E	454048	-	
		UTM m N	5177026	-	
		Bearing 1	-	-	
		Distance	-	-	
		Bearing 2	-	-	
		Distance	-	-	
Point Count # 6	12:45 am to 12:55 am	Surveyor	MG/DD	-	No calls
		UTM m E	453985	-	
		UTM m N	5177642	-	
		Bearing	-	-	
		Distance	-	-	
Note: - = no data/not applicable					

As presented in the table above, on the June 23, 2018 site visit, no whip-poor-wills were heard calling during the survey, at either point count.

4.0 DISCUSSION

No Whip-poor-will calls were heard during the surveys. As no whip-poor wills were heard during the survey, the General Habitat Categories could not be applied to the site.

5.0 CONCLUSION

No Whip-poor-will calls were identified on the site during the surveys conducted on June 1, 2, and 23, 2018. Based on the survey results, it is assumed that any development at the site will not result in negative impacts to the eastern whip-poor-will or its habitat.

We trust that the information is sufficient to meet your requirements. Should you have any questions or require further information, please do not hesitate to contact the undersigned at your convenience.

Sincerely,

For **Environmental Ecosystems Inc.,**

Angela Rainville, *EPT*
Environmental Scientist
arainville@enviro-eco.ca

Manon Giroux, ***EP., C.E.T., President***
Sr. Environmental Scientist/Project Manager
mgiroux@enviro-eco.ca

ATTACHMENT 1: Figure 1 - Site Map and Survey Point Location

Figure 2: Point Count Locations

ATTACHMENT 1:

Figure 1: Site Map

Figure 2: Point Count Locations

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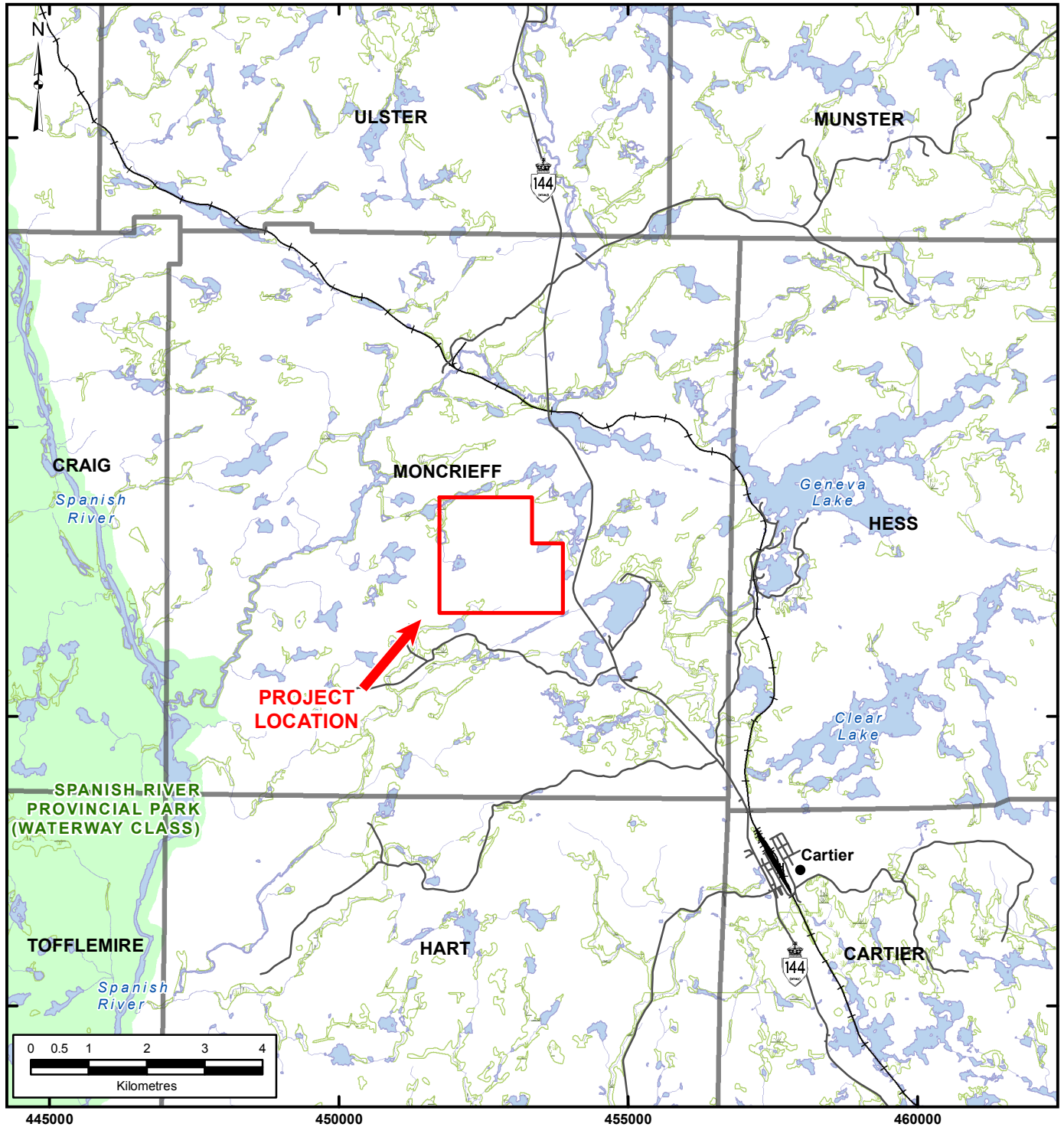

Environmental Ecosystems Inc

Figure 1:

SITE LOCATION MAP & KEY MAP

EASTERN WHIP-POOR-WILL OCCURENCE SURVEY FOR A PROPERTY LOCATED IN MONCRIEFF TOWNSHIP, IN THE GREATER CITY OF SUDBURY, ONTARIO

Project Number: 57-18

Data Sources

Coordinate System

North American Datum (NAD) 1983
Universal Transverse Mercator (UTM) Zone 17N

Cartographer: Dan McCool, Marcin Gasior

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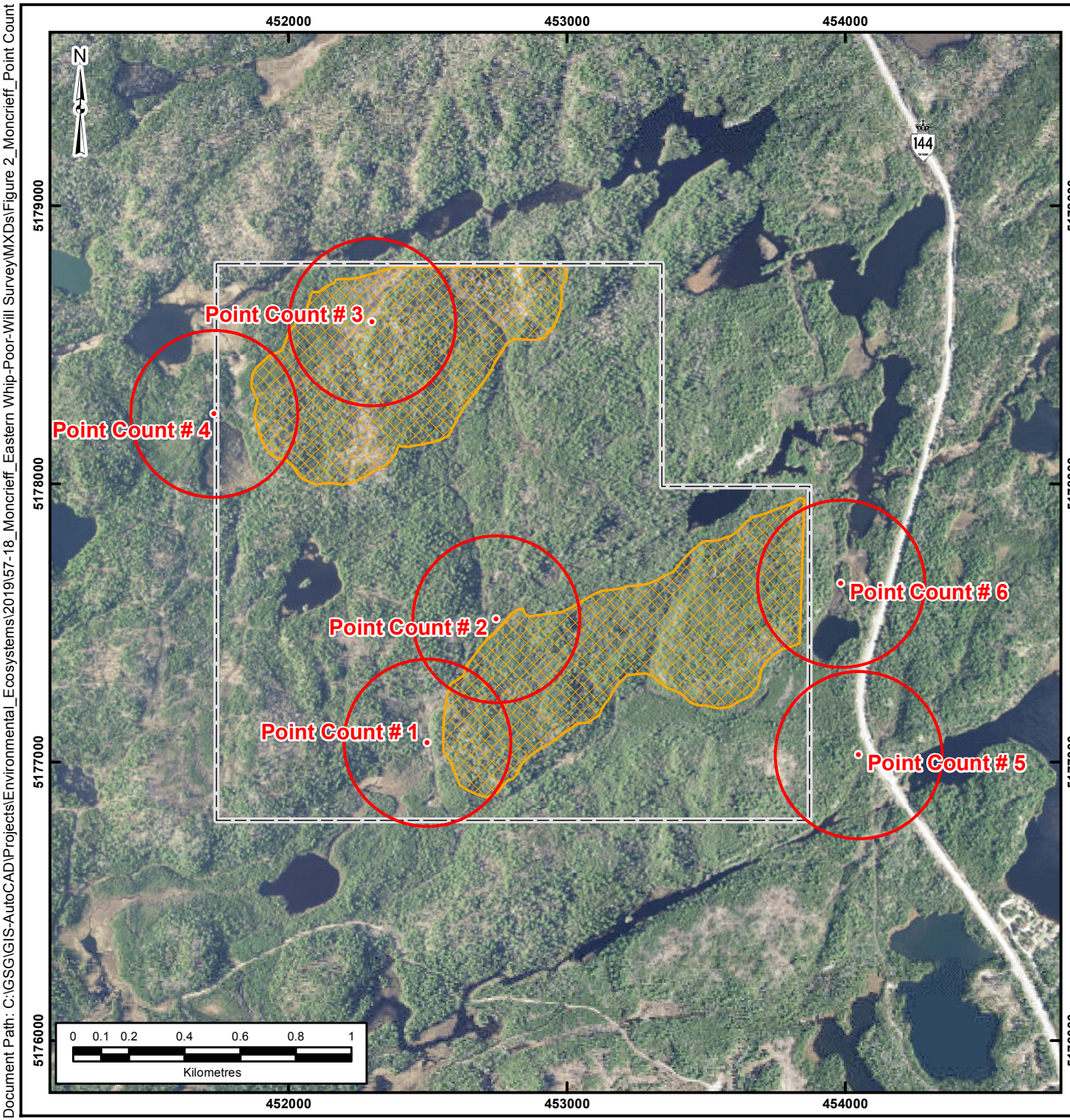

Environmental Ecosystems Inc

Figure 2:

SURVEY AREA & POINT COUNT LOCATIONS

EASTERN WHIP-POOR-WILL OCCURENCE SURVEY FOR A PROPERTY LOCATED IN MONCRIEFF TOWNSIP, IN THE GREATER CITY OF SUDBURY, ONTARIO

Project Number: 57-18

LEGEND:

- Survey area
- Point count locations
- Point location 300m buffer
- Areas of potential mining interest

Data Sources

Coordinate System

North American Datum (NAD) 1983
Universal Transverse Mercator (UTM) Zone 17N

Cartographer: Dan McCool, Marcin Gasior

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Document Path: C:\GSG\GIS-AutoCAD\Projects\Environmental_Ecosystems\2019\57-18_Moncrieff_Eastern Whip-Poor-Will Survey\MXDs\Figure 2_Moncrieff_Point Count Locatio

NATURAL ENVIRONMENT LEVEL 1 and 2 TECHNICAL REPORT
CLASS "A" CATEGORY 4 LICENSE FOR A QUARRY ABOVE WATER
APPLICATION FOR
PART OF THE GEOGRAPHIC TWP. OF
MONCRIEFF (ANNULLED), LOCATED NORTH OF THE TOWNSHIP OF CARTIER, IN THE TERRITORIAL DISTRICT OF SUDBURY, ONTARIO

Prepared For:
William Day Construction Limited
2500 Elm Street
Sudbury, ON. P0M 1N0

March 2021

Enviro-Eco Project: 57-18

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APPENDICES

1.0 INTRODUCTION

Environmental Ecosystems Inc. (Enviro-Eco) was retained by D.S. Dorland Limited (Dorland) to complete a Natural Environment Level 1 (NEL1) Technical Report in support of an application for a Class "A" Category 4 License for a Quarry Above Water under the Aggregate Resources Act R.S.O. 1990, c. A.8 (Ontario Government, September 2020). The subject of the application is Part of the Geographic Township of Moncrieff (annulled), north of the Township of Cartier, in the District of Sudbury, Ontario (herein referred to as the site), as shown in Figure 1 in the Figures section of this report.

2.0 ENVIRONMENTAL POLICY

Section 7 of the Ontario Regulation 244/97 – General (Ontario Government, July 2020), made under the Aggregate Resources Act R.S.O. 1990, c. A.8 (Ontario Government, September 2020), states that applications for licences, aggregate permits or wayside permits and the operation of pits and quarries shall be in accordance with "Aggregate Resources of Ontario: Provincial Standards, Version 1.0", published by the Ministry of Natural Resources (MNRF, April 2020). To meet the requirements of the Aggregate Resources of Ontario Provincial Standards (AROPS) (MNR, 1997), applicants must provide a Level 1 Natural Environment Technical Report to determine whether any of the following features exist on and/or within 120 m of the site:

- Significant wetlands (including significant coastal wetlands);
- Significant habitat of endangered and threatened species;
- Fish habitat;
- Significant woodlands (South and East of the Canadian Shield);
- Significant valleylands (South and East of the Canadian Shield);
- Significant wildlife habitat; and,
- Significant Areas of Natural and Scientific Interest (ANSIs).

If the results of a NEL 1 determine that significant features exist on and/or within 120 m of the application site, a NEL 2 must be completed to determine whether the pit operations will have any negative impacts on the natural features or ecological functions for which the area is identified, and any proposed preventative, mitigative or remedial measures, if necessary, to protect these features.

The information contained in this NEL 1 report is as described in the Ontario Ministry of Natural Resources (OMNR) Policy A.R. 2.01.07, License Applications: Natural Environmental Report Standards (MNR, March 2006), obtained from the online Aggregate Resources Policies and Procedures Manual (MNRF, July 2020). The policy outlines the requirements for the completion of both Natural Environment Level (NEL) 1 and Level 2 Studies and evaluating Natural Heritage Features as defined by the Provincial Policy Statement (PPS) (Ministry of Municipal Affairs and

Housing, May 2020), made under the *Planning Act*, R.S.O. 1990, c. P.13 (Ministry of Municipal Affairs and Housing, July 2020).

The Provincial Policy Statement (PPS) (Ministry of Municipal Affairs and Housing, May 2020) is a planning document that provides a framework for, and governs development within the Province of Ontario. In order to preserve various ecological resources deemed significant in the Province, development lands must be assessed for the presence of Natural Heritage Features prior to construction activities. These Natural Heritage Features are defined and require protection under the PPS (MNRF, July 2020). Linkages between Natural Heritage Features, Surface Water and Groundwater Features are also recognized and require similar protection under the policy. The PPS (MMAH, May 2020) also requires that the diversity and connectivity of all Natural Heritage Features and the long-term ecological function of Natural Heritage Systems be maintained, restored or improved where possible.

It is noted that two (2) of the features listed above, significant woodlands and significant valleylands, are not relevant to this report, as they are situated south and east of the Canadian Shield. The site is located within the Superior Province of the Canadian Shield (Énergie et Ressource Naturelles, September 2017); therefore, these natural features are not found on and/or within 120 m of the Site.

3.0 METHODOLOGY

The information contained in this NEL 1 report is as described in the Ontario Ministry of Natural Resources (OMNR) Policy A.R. 2.01.07, License Applications: Natural Environmental Report Standards (MNR, March 2006).

This report was completed in two (2) phases, consisting of a file review and a field investigation. When determining if significant natural features are present on the site and/or within the 120 m influence boundary, Information Source and Identification and Evaluation guidelines set out in the Natural Heritage Reference Manual (MNR, March 2010), the Significant Wildlife Habitat Technical Guide (SWHTG), Land Information Ontario and National Heritage Information Centre's Make a Map: Natural Heritage Areas, were utilized and part of a detailed file review, which included consultation with the Ministry of Natural Resources and Forestry (MNRF) and the Ministry of the Environment, Conservation and Parks (MECP).

In general, the file review consisted of an examination of various maps and research of the following government databases and publications:

- Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005. Second Edition March, 2010;
- Significant Wildlife Technical Guide (MNR, October 2000);
- Significant Wildlife Habitat Criteria Schedules Draft for Ecoregion 4E, 2019;

- Species at Risk in Ontario (SARO) website;
- Natural Heritage Information Centre (NHIC) database;
- Land Information Ontario (LIO) (MNRF, June 2020);
- MNRF Ontario Flow Assessment Tool;
- Agriculture and Agri-food Canada Soils of Canada Interactive Map;
- Ontario Nature's Ontario Reptile and Amphibian Atlas (HERPs) website;
- Toronto Entomologists Association's Ontario Butterfly Atlas website;
- Ontario Nature, Ontario Reptile and Amphibian (HERP) Atlas;
- MNRF Fish On-Line Interactive Map;
- Toronto Entomologists Association, Ontario Butterfly Atlas;
- The National Audubon Society website;
- The Cornell Lab, All About Birds website;
- Ontario Angler's Atlas;
- eBird website;
- Ministry of Natural Resources and Forestry, Make a Natural Heritage Map (MANHM) (MNRF, n.d.A);
- iNaturalist website;
- Atlas of the Breeding Birds of Ontario, 2001-2005 (second edition);
- Atlas of the Breeding Birds of Ontario, 1981-1985 (first edition);
- National Audubon Society Field Book of Northern Ontario Mammals, 1996;
- MNRF Ontario Flow Assessment Tool; and,
- The Sudbury Forest Management Plan, 2010-2020 (SFMP).

Preliminary discussions with the Ministry of Natural Resources (MNRF) identified the potential for Eastern Whip-poor-will habitat. A survey was subsequently completed in the spring of 2018.

The Ministry of Environment, Conservation and Parks (MECP) were consulted to confirm findings of the file review as well as obtain additional information or considerations that should be warranted as part of the NEL 1 for the site.

Information obtained from the file review and the preliminary site visit were used as a guidance tool to establish transects for the field investigation, and to highlight areas on the site that may have required particular attention because of the potential presence of significant natural features. The field investigation was used to confirm the existence of significant features on the site and/or within the 120 m influence boundary. Conclusions are based on the data derived from information obtained during the field review and the field investigation.

4.0 SITE LOCATION AND DESCRIPTION

The site is identified as Part of the Geographic Township of Moncrieff (annulled), North of the Township of Cartier, in the Territorial District of Sudbury, Ontario, formerly S-4285271 and S-4285272, which have now been converted to single cell mining claims 264132, 152238, 284206, 234836, 301931, 115511, 334234, 207478, 141352, 271414, 170206, 219590, 266069, 141353, 207477, 226871, 264134, 318662, 168815, 152753, 272081, 152237, 272082, 264133, 301932, 124862, and 141354 due to the recent Mining Act Modernization implemented by the Ministry of Northern Development and Mining (MNDM). The property is located on and surrounded entirely by Crown Land.

The site is approximately 64 kilometres northwest of the City of Greater Sudbury (CGS), as shown in Figure 1 in the Figures section of this report.

The site is located west of Downes Lake on the western side of Highway 144. Google Earth (Google, n.d.) imagery identifies access to the site that is gained by a dirt logging road found on the western side of Hwy. 144, which crosses through Geneva Creek and connects to an ATV trail that branches off to the north and runs through the site to the northernmost boundary before turning towards the western boundary of the site. The site is on and surrounded entirely by Crown Land with two (2) large rock outcrops located in the southeast and northwest portions of the site. The two (2) rock outcrops are the proposed extraction areas. The site hosts some disturbed areas found adjacent to the ATV trail on its western side located in the southwest portion of the site, open water near the western boundary within the site, open water and wetland area north and northwest within the site and the 120 m influence area, open water to the south within the 120 m influence area, Geneva Creek and Downes Lake located south and southeast within the 120 m influence area and open water to the east between the two (2) rock outcrops. The natural features of the site and field transects are displayed in Figure 2 in the Figure section of this report.

A map with the licensed area is provided in Appendix A, indicating that the site is approximately 369.79 hectares (ha) consisting of mixed forest, logging (access) roads, rock outcrops, disturbed areas, waterbodies and wetlands on and/or within 120 m of the site. As per correspondence received from Bryan C. Dorland on September 9, 2020, the extraction areas, two (2) large rock outcrops hatched in orange located in the northerly and southerly portions of the site are approximately 94.26 ha (37.01 ha for northerly area (460 masl) and 57.25 ha for the southerly area (460 masl)). The survey area includes the subject site, as well as the surrounding 120 m influence area. The topographical map representing the survey area within the property boundary shows open water near the western boundary within the licensed area with an elevation of 440 masl (meters above sea level), open water and wetland area north and northwest within the 120 m influence area with an elevation ranging from 410 to 390 masl, open water to the south within the 120 m influence area with an elevation of 410 masl, Geneva Creek and Downes Lake located south and southeast within the 120 m influence area with an elevation of 410 masl, open water east and northeast within the 120 m influence area with an elevation of 420 masl and open water

to the east between the two (2) rock outcrops with an elevation of 420 masl. The surrounding land elevation within the survey area ranges from 470 masl to the southwest and 420 masl to the northeast (MNRF, n.d.A).

According to the national Ecological Land Classification (ELC) system (Environment Canada, 1995), the site is found within the Boreal Shield Ecozone, in the Lake Timiskaming Lowland Ecoregion identified as 97, in the Ecodistrict identified as 409 (Agriculture and Agri-Food Canada, 1995). According to the provincial ELC system (Ministry of Municipal Affairs and Housing, July 2020), the site is found within the Ontario Shield Ecozone (Ecozone 4), in the Lake Temagami Ecoregion (4E), within the Mississagi Ecodistrict (4E-3). The underlying bedrock of this Ecoregion is mostly dominated by granitic and gneissic rocks, with ground moraine as the main surficial feature. Substrates within this region consist predominantly of thinly covered Archean acidic bedrock, Humo-ferric Podzols, Mesisols, Gleysols, Dystric Brunisols and Fibrisols throughout the region. More than half of this ecoregion is characterized as having thinly covered acidic bedrock (61%), with very poor substrate development. The Lake Temagami Ecoregion is covered in Humo-ferric Podzols (27%), Mesisols (7%), and Dystric Brunisols (1%) (Crins, W.L., et al., 2009).

A search on the Soils of Canada interactive map (Agriculture and Agri-Food Canada, n.d.), indicates that the soil within the specific area of the site is identified as Soil Order: 35027022, and is comprised of dominant soil: unclassified soil order (94%), and Organic (6%). The dominant land cover types in this Ecoregion consist of mixed forest (33.2%), coniferous forest (19.9%) and deciduous forest (17.1%) (MNRF, n.d.A).

The subject site is also found in the Sudbury Forest, which extends from Georgian Bay in the south to as far north as the Kirkland Lake District in the north. The Sudbury Forest is comprised of two Ecoregions, 4E and 5E, and eight (8) Ecodistricts within these regions (Vermillion Forest Management Company Ltd., April 2020). The site is located within the boundaries of Ecodistrict 4E-3, referred to as the Mississagi Ecodistrict.

The Mississagi Ecodistrict features low-base metamorphic or acid igneous bedrock (67%), overlain with small to moderate silt, sand and gravel plains, and soils that are largely humo-ferric podzol (26%). The district hosts a moist humid mesoclimate, and land cover is predominantly mixed stands of white pine, red pine, white spruce, poplar and white birch. The district also hosts a scattered distribution of jack pine stands and few concentrations of tolerant hardwoods, such as maple and yellow birch (Google, n.d. and the Vermillion Forest Management Company Ltd., April 2020).

5.0 RESULTS

The following sub-sections outline the results of the completed file review and field investigation.

5.1 File Review

The following outlines the results of the file review.

5.1.1 Site Features

The Ministry of Natural Resources Natural Heritage Information Centre (NHIC) database (MNRF, July 10, 2020) was used to help identify watercourses, lakes and/or wetlands within the site and/or adjacent area, as well as to provide an overall indication of site.

A search of the MNRF Make a Natural Heritage Map (MANHM) (MNRF, n.d.A) online tool indicates that the following features exist on and/or within 120 m of the Site:

- A disturbed area located south and southwest on the site;
- Open water near the western licensed boundary on the site;
- Open water and wetland area north and northwest within the 120 m influence area;
- Open water near the eastern licensed boundary on the site;
- Open water and wetland to the northeast within the 120 m influence area;
- Geneva Creek and Downes Lake located within 120 m influence area;
- Open water south and southeast within the 120 m influence area.
- A waterbody located southwest within 120 m influence area;
- A rock outcrop located northwest on the site; and,
- A rock outcrop located southeast on the site.

Based on imagery, the subject site and the area within 120 m of the site has five (5) land types: waterbody, wetland, forest, disturbed area and rock outcrop.

5.1.2 Preliminary Screening for SAR (MECP)

The Ministry of the Environment, Conservation and Parks (MECP) have developed a guide to help clients work through the preliminary screening process, including providing advice to clients on how they can gather information they have requested from publicly available information sources. The guide provides advice on how you can determine if any species at risk are likely to exist at your site.

Using the Significant Wildlife Habitat 4E Criteria Schedule Draft (MNRF, February 2019), a preliminary screening for Species at Risk was completed and submitted to the MECP determining the potential for habitat availability. A response is pending.

5.1.3 Significant Wetlands

A search of the Ontario Ministry of Natural Resources Natural Heritage Information Centre

(NHIC) database (MNRF NHIC, July 2020), was utilized to identify significant wetlands and features in the vicinity of the site.

No significant wetlands were identified on the site and/or within the 120 m site boundary during the file review of the Ontario Natural Resources database or the NHIC database, accessed through the MNRF's ON-Line mapping tool (MNRF NHIC, July 2020).

Google Earth imagery identified a wetland area located to the north, northwest and northeast within the 120 m influence area of the site.

5.1.4 Significant Portions of the Habitat of Endangered and Threatened Species

A search of the Ontario Ministry of Natural Resources NHIC database (MNRF NHIC, July 2020), was utilized to identify the presence or absence of significant habitat of Endangered or Threatened species within the boundaries of the site and/or within 120 m of the site. No species at risk or their habitat were identified on the site and/or within 120 m of the site.

The Sudbury Forest Management Plan (SFMP) (Vermillion Forest Management Company Ltd., April 2020) was reviewed to determine if the subject site and the adjacent area is located within the range of endangered and threatened species documented in the Sudbury Forest. The SFMP (Agriculture and Agri-Food Canada, 1995) identified ten (10) species at risk ranked as either Threatened or Endangered found within the Sudbury Forest. The Species at Risk in Ontario (SARO) list (MECP, July 2019) was also reviewed to identify any SAR that may be on or near the site. The results of the review are listed in table 5.1.4 below.

Table 5.1.4: Summary of Status and Preferred Habitat of Threatened and Endangered Species Identified as Being Potentially Present Within the Subject Site and/or Within 120 m of the Site.

Resource Document / Database	O. Reg 230/08 Species At Risk in Ontario List	2010-2020 Forest Management Plan Sudbury Forest	Provincial Wildlife Atlas Databases	MECP Species at Risk in Ontario Webpage [1]
Species Common Name (*Specific Name*)	Rank	Species or Habitat Potentially Present in Subject Site/Adjacent Area (Yes/No)		
Peregrine Falcon (Falco peregrinus anatum)	Threatened	Yes	No	No
Least Bittern (Ixobrychus exilis)	Threatened	Yes	No	No
Chimney Swift (Chaetura pelagica)	Threatened	Yes	No	No
Barn Swallow	Threatened	No	Yes	No

Resource Document / Database	O. Reg 230/08 Species At Risk in Ontario List	2010-2020 Forest Management Plan Sudbury Forest	Provincial Wildlife Atlas Databases	MECP Species at Risk in Ontario Webpage (1)
Species Common Name (*Specific Name*)	Rank	Species or Habitat Potentially Present in Subject Site/Adjacent Area (Yes/No)		
(Hirundo rustica)				
Bobolink (Dolichonyx oryzivorus)	Threatened	No	No	No
Eastern Meadowlark (Sturnella magna)	Threatened	No	No	No
Eastern Whip-poor-will (Antrostomus vociferus)	Threatened	Yes	Yes	No
Bank Swallow (Riparia riparia)	Threatened	No	Yes	Yes
Mountain Lion – Cougar (Puma concolor)	Endangered	No	No	Yes
Blanding's Turtle (Emydoidea blandingii)	Threatened	Yes	No	Yes
Wood Turtle (Glyptemys insculpta)	Endangered	Yes	N/A	Yes
Spotted Turtle (Clemmys guttata)	EndangeredF	Yes	N/A	Yes
Massasauga Rattlesnake (*Sistrurus catenatus)*	Threatened	Yes	No	Yes
Eastern Foxsnake(1) (*Elaphe gloydi)*	Threatened	Yes	No	No
Eastern Small-footed Myotis (Myotis leibii)	Endangered	No	No	No
Little Brown Myotis/Bat (Myotis lucifugus)	Endangered	No	No	No
Tri-colored Bat (formerly Eastern pipistrelle) (Perimyotis subflavus)	Endangered	No	No	No
Northern Myotis (Myotis septentrionalis)	Endangered	No	No	No
Lake Sturgeon (Acipenser fulvescens)	Threatened	Yes	No	No

(1) Suspect the specimen identified in Balfour Twp. was, based on known range and habitat preferences, a transplanted individual rather than an actual resident.

Provincial Wildlife atlases reviewed included, the Ontario Nature Atlas of the Breeding Birds of Ontario, the Ontario Nature Reptile and Amphibian Atlas (HERPs), the Toronto Entomologist Association's Ontario Butterfly Atlas, the Ministry of Natural Resources and Forestry Fish ON-Line, the Ontario Angler's Atlas, and the National Audubon Society Field Guide to North American Mammals (1996).

Peregrine falcon *(Falco peregrinus anatum)*

According to the information obtained from the SARO website (MECP, May 2020), the Peregrine falcon typically nests on tall, steep cliff ledges close to large bodies of water. The SARO map displaying where the species has been found in Ontario (NHIC, February 2012A), does not identify any Peregrine falcon having been observed near the site which is located in Moncrieff, north of Cartier, Ontario.

These habitat requirements are not present on and/or within 120 m of the site, in addition to the species not being documented in the area; therefore, the site and the surrounding area within 120 m of the site is not considered suitable habitat for the Peregrine falcon.

Least bittern *(Ixobrychus exilis)*

According to the information found on the SARO website (MECP, May 2019A), the Least bittern frequents a variety of wetland habitats with a strong preference for cattail marshes made up of a mix of open pools and channels. The SARO map displaying where the species has been found in Ontario (NHIC, February 2012B), does not identify any Least bittern having been observed on or near the area in which the site is located (Moncrieff, north of Cartier, ON).

The wetland on the site does host cattails with 50% open water, which is a habitat requirement for the Least bittern, but the species does not occur in this area of Ontario, as previously noted; therefore, the site and the surrounding area within 120 m of the site is not considered to be habitat for the Least bittern.

Chimney swift *(Chaetura pelagica)*

According to the information obtained from the SARO website (MECP, May 2019B), the Chimney swift is most likely to be found in and around urban settlements where they nest and roost in chimneys and various other man-made structures.

These habitat requirements are not present on or within 120 m of the site; therefore, the site and the surrounding area within 120 m of the site is not considered suitable habitat for the Chimney swift.

Barn swallow (*Hirundo rustica*)

According to the information obtained from the SARO website (MECP, April 2019A), the Barn swallow almost exclusively nests on man-made open structures, such as old barns and under bridges or culverts.

These habitat requirements are not present on or within 120 m of the site; therefore, the site and area within 120 m of the site is not considered suitable habitat for the Barn swallow.

Bobolink *(Dolichonyx oryzivorus)*

According to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (COSEWIC, 2010), the preferred habitat of the Bobolink features the following characteristics:

- Crops dominated by a variety of species such as clover (*Trifolium* spp.), timothy (*Phleum pretense*), tall grasses such as Kentucky bluegrass (*Poa pratensis*) and broadleaved plants;
- Hayfields and pastures are its preferred habitats;
- Moderate litter depth, high lateral litter cover and high grass to legume ratios, an abundance of small shrubs and a high percent of forb cover, all of which are typically found in old forage crops; and
- Bobolink "responds negatively to the presence of edges separating its habitat, and particularly forest edges".

Neither the site nor the area within the 120 metre influence boundary hosts Bobolink habitat requirements; therefore, it is not considered to be suitable habitat for the species.

Eastern meadowlark *(Sturnella magna)*

The preferred habitat for Eastern meadowlark's are farm fields, grasslands and wet fields. Nests are located on the ground while they sing from exposed perches, such as treetops, fence posts and utility lines (The Cornell Lab, n.d.A).

Eastern meadowlark's breed primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields or other open areas. Small trees, shrubs or fence posts are used as elevated song perches (MECP, May 2019C).

The preferred farm fields, grasslands or wet fields are not present on the site and/or within 120 m of the site; therefore, the site is not considered suitable habitat for the Eastern meadowlark.

***Eastern whip-poor-will* (*Antrostomus vociferus*)**

Whip-poor-will's generally utilize open leafy woodlands, deciduous or mixed wood forests (Kaufman, K., 1996). Foraging occurs in open areas, such as rock or sand barrens with scattered trees, savannahs, old burns or other disturbed sites in a state of early to mid-forest succession, or in open conifer plantations. Dense ground vegetation with dry soils is typically required for nesting (Wilson, M.D. and Watts, B.D., 2008).

Pre-consultation with the MNRF in the spring of 2018, identified the potential presence of the Eastern whip-poor-will and its habitat within the survey area.

An Eastern whip-poor-will survey was completed on June 1, 2018, June 2, 2018 and June 23, 2018, for the site in which no calls were identified on and/or within 120 m of the site. A copy of the survey is included in Appendix C.

Bank swallow *(Riparia riparia)*

Bank swallow's traditionally nest in burrows and in exposed earthen banks created by erosion along watercourses and lakeshores (Bird Studies Canada, 2001-2005). Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable (MECP, May 2019D). Although single nests occur, the vast majority of these birds nest in colonies ranging from two (2) to several thousand (7,000) nests (MECP, May 8, 2019B).

These habitat requirements are not present on and/or within 120 m of the site; therefore, the site and area within 120 m of the site is not considered to host suitable habitat for the Bank swallow.

Mountain lion – Cougar (*Puma concolor)*

Mountain lion's live in large, undisturbed forests or other natural areas where there is little human activity. The forest must support plenty of white-tailed deer, which is an important food source for the Cougar. The species is believed to live predominantly in northern Ontario due to the remoteness of the habitat, however, there have been reported sightings in southern Ontario. The population size is unknown (MECP, May 2019E). The Mountain lion is a habitat generalist and can be found living in deserts, mountains, lowlands, mangrove forests, deciduous forests, canyons and prairies, but their preferred habitat will host rocky outcrops or dense vegetation that they can use to ambush prey from (Animals Network Team, n.d.).

Natural features preferred by the Cougar (i.e. rock outcrops in remote forest) are present on and/or within 120 m of the site, but the site is susceptible to human disturbance due to the nearby road and ATV trail cutting through the entirety of the site. In addition, the disturbed areas found on the site seem to be frequented by people, evidenced by a fire pit and litter; therefore, the site and area within 120 m of the site is not considered to be suitable habitat for the Mountain lion.

Blanding's turtle (Emydoidea blandingii)

Blanding's turtles rely on several different land types for different stages of their life cycle. Their habitat consists of overwintering (hibernation) habitat, basking (thermoregulation) habitat, foraging habitat, and nesting habitat. Overwintering habitat includes permanent bogs, fens, marshes, ponds, channels or other habitats with free (unfrozen) shallow water with soft muddy substrates that they can burry into for hibernation. The Blanding's turtle active season habitat is similar to overwintering habitat in that a water component is essential. The species moves from waterbody to other waterbodies within 500 m of each other for life processes such as feeding, mating, thermoregulation, movement, and protection from predators. Suitable habitat for Blanding's turtles during the active season includes a variety of wetlands, such as marshes,

swamps, ponds, fens, bogs, slow-flowing streams, shallow bays of lakes or rivers, as well as graminoid shallow marshes and slough forest habitats that are adjacent to larger marsh complexes (MECP, 2019F).

Conversely, the Blanding's turtle nesting habitat is found upland of the wetland complex. The species has been known to travel distances ranging from 100 m up to 6 km from the wetland complex to find suitable nesting habitat, overwintering sites and better access to mates. Blanding's turtle nesting habitat requires well-drained soils in open habitats with low vegetation cover and high sun exposure, such as in forest clearings, meadows, shorelines, beaches, rock outcrops, cornfields, gravel roads, road shoulders, ploughed fields, gardens, powerline right-of-ways, yards and abandoned railroad beds (MNR, n.d.).

According to the recovery strategy (Kaufman, K., 1996), the scrubland area on-site contains the shrubland and grassland features required for thermoregulation and refuge. However, according to the general habitat description for the species (MECP, May 2019C), thermoregulation and refuge sites occur within 280 m of a wetland complex.

There are wetlands and open waterbodies located on site and/or within the 120 m influence area. The site does host some habitat requirements (e.g. shoreline, wetland, and rock outcrops); therefore, the site may be considered suitable habitat for the species.

Wood turtle *(Glyptemys insculpta)*

The Wood turtle has a preference for clear rivers, streams or creeks with a slight current and sandy or gravelly bottom, spending more time on land and shores of watercourses than other native Ontario turtles (MECP, May 3, 2019G). Typically, the preferred rivers and streams host deep pools, undercut muddy banks, log piles and a bed of sand or gravel (Ontario Nature, n.d.). Wooded areas are essential habitat for the Wood turtle, but they can be found inhabiting wet meadows, swamps and fields, opting to overwinter (hibernate) on stream bottoms (MECP, May 2019G).

The only two (2) natural features that are preferred by the Wood turtle present on and/or within 120 m of the site, are the forested area and the creek. The current of Geneva Creek can be categorized as slow-moving with areas of fast flow. The waterbody hosts a rocky stream bottom with clear water, as well as a shoreline with a mix of rock and vegetation.

The preferred habitat requirements for this species are not present on the site and/or the area within 120 m of the site; therefore, the area is not considered suitable habitat for the Wood turtle.

Spotted turtle *(Clemmys guttata)*

In Canada, the Spotted turtle is primarily found in Ontario along the north shore of Lake Erie, in the Georgian Bay area and in scattered locations throughout southern and eastern Ontario

(MECP, January 2020). Spotted turtles can be found in marshy meadows, bogs, swamps, ponds, ditches, or other small bodies of still water (New York State Department of Environmental Conservation, n.d.) with an abundant supply of aquatic vegetation. Females will dig their nests in sunny locations where woody vegetation is not abundant. The Spotted turtle typically hibernates in wetlands or seasonally wet areas associated with certain structures such as overhanging banks, hummocks, tree roots, or aquatic animal burrows (MECP, January 2020).

The preferred habitat is outside of its primary range in Ontario.

Massasauga rattlesnake *(Sistrurus catenatus)*

The Massasauga lives in a variety of habitats in Ontario, including tall grass prairie, bogs, marshes, shorelines, forests and alvars in which the species requires open areas to warm themselves in the sun. Pregnant females are usually found in dry, open habitats such as rock barrens or forest clearings where it is easier to maintain their body temperature for the development of their offspring. Non-pregnant females and males tend to forage and mate in lowland habitats, including grasslands, wetlands, bogs and the shorelines of lakes and rivers. Hibernation takes place underground in crevices found in bedrock, sphagnum (moss) swamps, tree root cavities and animal burrows where they can get below the frost line but remain above the water table (MECP, 2019H).

The Massasauga rattlesnake is only found in Ontario, mostly along the eastern side of Georgian Bay and on the Bruce Peninsula. Two (2) small populations are also found in the Wainfleet Bog on the northeast shore of Lake Erie and near Windsor (MECP, 2019H). The preferred habitat is outside of its primary range in Ontario.

Eastern foxsnake *(Elaphe gloydi)*

The Eastern foxsnake is known to hibernate in groups found in deep cracks of bedrock and in some man-made structures. It is only found in Ontario in two (2) distinct populations: the Carolinian population in southwestern Ontario and the eastern Georgian Bay population (MECP, 2019I). The nearest population to the site is the Georgian Bay area where they are usually found within 150 m of the shore in rocky habitats spotted with trees and shrubs.

Although the site does host two (2) rock outcrops with trees and shrubs, the location is much too far from Georgian Bay to be considered habitat for the Eastern foxsnake; therefore, the site and the area within 120 m of the site is not considered to host suitable habitat for the species.

Eastern small-footed myotis (*Myotis leibii)*

In the spring and summer, the Eastern small-footed myotis (bat) will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. In the winter, these bats hibernate, most often in caves and abandoned mines,

seeming to choose colder and drier sites than similar bats, returning to the same spot each year (MECP, 2019J).

The Eastern small-footed myotis has been found from south of Georgian Bay, to Lake Erie and east to the Pembroke area. There are also records from the Bruce Peninsula, the Espanola area, and the Lake Superior Provincial Park. Most documented sightings are of bats in their winter hibernation sites (MECP, 2019J).

Candidate maternity roost sites are identified by determining the density of snag/cavity trees with a breast height diameter (dbh) of ≥ 25 cm. If snag/cavity tree density is ≥10 snags per ha of trees ≥ 25 cm dbh, then the site is a candidate for maternity colony roosts (MNRF, December 2019). The mixed forest within the survey area is approximately 200 ha in size.

According to Appendix Q of the SWHTG (Wester, C. M., et al., 2009), maternity colony roosts are considered significant if they support ten (10) individuals.

There were snags observed on the site along with large boulders, rocks and the two (2) large rock outcrops which makes the area a potentially suitable habitat, but the nearest location to the site that this species has been confirmed to inhabit is in Espanola; approximately 75 kilometers away from the site. In conclusion, these habitat requirements are present on and/or within 120 m of the site, but the distance from the documented sightings is too great; therefore, the site and the area within 120 m of the site is not considered to be suitable habitat for the Eastern small-footed myotis.

Little brown myotis *(Myotis lucifugus)*

The Little brown myotis roosts in trees and buildings during the day, often selecting attics, abandoned buildings and barns for summer colonies where they can raise their young (MECP, December 2019A). Additionally, Appendix G of the SWHTG (Wester, C. M., et al., 2009) indicates that the species may also use caves, quarries, tunnels, hollow trees or buildings for roosting.

According to the Bats and Bat Habitats: Guidelines for Wind Power Projects (MNRF, December 2019), candidate maternity roost sites are identified by determining the density of snag/cavity trees with a breast height diameter (dbh) of ≥ 25 cm. If snag/ cavity tree density is ≥10 snags per ha of trees ≥ 25 cm dbh, then the site is a candidate for maternity colony roosts. The mixed forest within the survey area is approximately 200 ha in size.

According to Appendix Q of the SWHTG (Wester, C. M., et al., 2009), maternity colony roosts are considered significant if they support one hundred (100) individuals.

The site and/or the area within 120 m of the site may have the potential to host suitable habitat for the Little brown myotis.

Northern myotis *(Myotis septentrionalis)*

According to Appendix G-4 of the SWTHG (Wester, C. M., et al., 2009), the Northern myotis (also referred to as the Northern long-eared myotis) hibernates during winter in mines or caves. During the summer, males roost alone and females form maternity colonies of up to sixty (60) adults, in forested habitats, below the canopy, under loose bark and hollow trees, or may use alternative man-made structures such as houses.

According to the Bats and Bat Habitats: Guidelines for Wind Power Projects (MNRF, December 2019), candidate maternity roost sites are identified by determining the density of snag/cavity trees with a breast height diameter (dbh) of ≥ 25 cm. If snag/ cavity tree density is ≥10 snags per ha of trees ≥ 25 cm dbh, then the site is a candidate for maternity colony roosts. The mixed forest within the survey area is approximately 200 ha in size.

According to Appendix Q of the SWHTG (Wester, C. M., et al., 2009), maternity colony roosts are considered significant if they support ten (10) individuals.

The site and/or the area within 120 m of the site may host suitable habitat for the Northern myotis.

Tri-colored bat *(Perimyotis subflavus)*

During the summer, the Tri-colored bat is found in a variety of forested habitats, forming day roosts and maternity colonies in older forests, and occasionally in barns or other structures. Foraging activities take place in open areas over water and along streams in the forest. At the end of the summer they travel to a location where they swarm; it is generally near the cave or underground location where they will overwinter (hibernate). Hibernation occurs in caves where they typically roost by themselves rather than part of a group (MECP, December 2019B).

The site and/or the area within 120 m of the site may have the potential to host suitable habitat for the Tri-colored bat.

Lake sturgeon *(Acipenser fulvescens)*

The Lake sturgeon is designated as Special Concern for the Southern Hudson Bay – James Bay populations and is listed as for the Great Lakes – Upper St. Lawrence populations in Ontario (MECP, April 2019B).

This species almost exclusively lives in freshwater lakes and rivers that have soft substrates such as mud, sand or gravel, and are typically found at depths of 5 m to 20 m. Spawning occurs in fairly shallow, fast-flowing water (i.e. below waterfalls, rapids or dams) with gravel and boulders at the bottom. However, Lake sturgeon will spawn in deeper water where habitat is available and are also known to spawn on open shoals in large rivers with strong currents (MECP, May 2019E). Sources of food include insect larvae, crayfish, molluscs, small fish and sometimes plants (Georgian Bay Biosphere Reserve, n.d.).

The Angler's Atlas (Angler's Atlas, n.d.A) as well as the MNRF's Fish ON-Line tool (MNRF, 2019), were both utilized to identify the presence and/or habitat availability in or around the site for the Lake sturgeon. Both resources displayed negative results for the area.

The necessary habitat components of the species are not present on and/or within 120 m of the site; therefore, the site and the area within 120 m of the site is not considered to be suitable habitat for the Lake sturgeon.

It was determined that the subject site has potential to host habitat for thirteen (13) SAR that are ranked as either Threatened or Endangered in the province of Ontario. Further file screening determined that the subject site and the 120 m influence boundary did not host preferred habitat for SAR with the exception of the Eastern whip-poor-will, Blanding's turtle, Little Brown Myotis, Northern Myotis and the Tri-colored Bat. Further investigation into the presence of these species and their preferred habitat is required during the field investigation.

5.1.5 Fish Habitat

A search of the MNR Natural Heritage Information Centre (NHIC) database (MNRF NHIC, July 2020), was utilized to identify the presence of significant habitat of endangered or threatened fish species on and/or within 120 m of the site, including Downes Lake.

The Angler's Atlas (Angler's Atlas, n.d.A) as well as the MNRF's Fish ON-Line tool (MNRF, 2019), were reviewed for information pertaining to fish habitat on and/or within 120 m of the subject site. There were no results from either source for Geneva creek, Downes Lake, or the waterbodies and wetland located on and/or within 120 m of the site.

The Northern Ontario Fishing Atlas has identified Downes Lake and Geneva Creek located south and southeast respectively, as hosting Brook Trout (*Salvelinus fontinalis*), Walleye (*Sander vitreus*), Whitefish (Coregonus), Sucker *(Catostomus commersonii)* and Burbot *(Lota lota)*. Downes Lake flows into Geneva Creek.

The Northern Ontario Fishing Atlas has identified Shoe Lake #45 located northwest, north and northeast as hosting Rainbow trout (*Oncorhynchus mykiss*), Brook Trout (*Salvelinus fontinalis*) and Sucker *(Catostomus commersonii).*

The results of the file review indicate both cold water and warm water fish species are present in waterbodies found in the Sudbury Forest (Agriculture and Agri-Food Canada, 1995). Coldwater fish species present in the Sudbury Forest include Lake trout (*Salvelinus namaycush*), Brook trout (*Salvelinus fontinalis*) and Rainbow trout (*Oncorhynchus mykiss*), while warm water species include Walleye (*Sander vitreus*), Northern pike (*Esox lucius*), Smallmouth bass (*Micropterus dolomieu*) and Yellow perch (*Perca flavescens*).

5.1.6 Significant Wildlife Habitat

A search of the Ontario Ministry of Natural Resources Natural Heritage Information Centre database (MNRF NHIC, July 2020), was utilized to identify the presence of significant portions of the habitat of endangered or threatened species on the site and/or within 120 m of the site; the MANHM tool (MNRF, n.d.A) was reviewed, and the results displayed no records of species at risk or their habitat occurring on and/or within 120 m of the site.

The Significant Wildlife Habitat Technical Guide (SWHTG) (Wester, C. M., et al., 2009) was utilized to identify potential significant wildlife habitat areas. Significant wildlife habitat includes four (4) categories: seasonal concentration areas; rare vegetation communities or specialized habitat for wildlife; habitat for species of conservation concern; and, animal movement corridors.

5.1.6.2 Seasonal Concentration Areas

Certain wildlife species are concentrated within relatively small areas during specific times of the year. Impacts which occur at sites of seasonal concentration have the potential to affect wildlife populations well beyond the site level. Critical stopover areas for birds and butterflies, winter deer yards, bird breeding colonies, and hibernation sites for bats and snakes are all examples of seasonal concentration areas.

Winter Deer Yards and Moose Wintering Habitat

Winter deer yards and late moose wintering habitat require coniferous forest with a minimum of 60% canopy cover. The file review revealed low-density mixed forest present on the site and within the 120 m influence boundary of the site, and is not considered to host these habitats.

Colonial Bird Nesting Sites

Colonial birds are a diverse group including several species of herons, gulls, terns, and swallows. The subject site and adjacent area are located in Ecodistrict 4E-3. Colonial birds found in Ecoregion 4E include the following: Double-crested cormorant (*Phalacrocoracidae*); Cliff swallow (*Petrochelidon pyrrhonota)*; Great blue heron (*Ardea herodias*); Ring-billed gull (*Larus delawarensis*); Herring gull (*Larus argentatus*); Bonaparte's gull (*Chroicocephalus philadelphia*); American black duck (*Anas rubripes)*; Northern shoveler (*Spatula clypeata)*; Blue-winged teal (*Spatula discors)*; Green-winged teal (*Anas crecca)*; Wood duck (*Aix sponsa)*; Hooded merganser (*Lophodytes cucullatus*); Common merganser (*Mergus merganser)*; Red-breasted merganser (*Mergus serrator);* Mallard (*Anas platyrhynchos)*; Canada goose (*Branta canadensis*); American wigeon (*Mareca americana*); Bufflehead (*Bucephala albeola)*; Common goldeneye (*Bucephala clangula);* Ring-necked duck (*Aythya collaris)*; Lesser scaup (*Aythya affinis)*; Gadwall (*Mareca strepera*); Northern pintail (*Anas acuta)*; Cackling goose (*Branta hutchinsii)*; Snow goose (*Anser caerulescens)*; Northern shoveler (*Spatula clypeata)*; Greater scaup (*Aythya marila)*; Long-tailed duck (*Clangula hyemalis)*; Ruddy duck (*Oxyura jamaicensis)*; Brant (*Branta bernicla)*; Tundra swan (*Cygnus columbianus)*; Surf scoter (*Melanitta perspicillata)*; Black scoter (*Melanitta*

americana); White-winged scoter (*Melanitta deglandi*); Redhead (*Aythya americana)*; Canvasback (*Aythya valisineria*); Osprey (*Pandion haliaetus*); Red-tailed hawk (*Buteo jamaicensis*); Bald eagle (*Haliaeetus leucocephalus);* Great horned owl (*Bubo virginianus)*; Broad-winged hawk (*Buteo platypterus)*; Sharp-shinned hawk (*Accipiter striatus)*; Merlin (*Falco columbarius)*; Cooper's hawk (*Accipiter cooperii)*; Northern goshawk (*Accipiter gentilis)*; Great gray owl (*Strix nebulosi)*; Long-eared owl (*Asio otus)*; Barred owl (*Strix varia)*; Common tern (*Sterna hirundo*); and, Brewer's blackbird (*Euphagus cyanocephalus)* (MNRF, October 2000).

The majority of these colonial bird species are considered waterfowl, water birds, shore birds or landbirds that require nesting habitat in close proximity to water (e.g. Cliff swallow, Surf scoter, Brewer's blackbird, etc.). The nesting, staging and stopover areas required for waterfowl and migratory stopover areas for shorebirds are discussed further in the sections below. The remaining colonial landbirds listed above that do not require close proximity to water for nesting include: Red-tailed hawk; Great horned owl; Broad-winged hawk; Sharp-shinned hawk; Merlin; Cooper's hawk; Northern goshawk; Great gray owl; Long-eared owl; and, Barred owl.

The nesting requirements of the Red-tailed hawk are found in any kind of terrain that provides both open ground for hunting and high perches. This can include open grasslands, woodlands with scattered clearings, prairie groves, mountains, plains, roadsides or deserts with a few trees or utility poles available. Nesting sites are variable for breeding pairs, but are usually found in trees up to 120' above ground or the tallest of the surrounding trees. They are also found to nest on cliff ledges or on man-made structures, buildings or towers (National Audubon Society, n.d.A). The site does not host open areas as defined above for hunting; therefore, it is not considered Red-tailed hawk nesting habitat.

The Great horned owl lives in nearly all habitats found in North America, from swamps and deserts to the northern coniferous forests near treelines. During breeding season, the species will avoid open areas as it requires some trees or heavy brush for cover. Typically utilizes old nests of other large birds, such as hawks, eagles, crows and herons, usually found 20' to 60' above ground. Other nesting habitat that may be used consists of cliff ledges, inside caves, in broken-off tree stumps or sometimes on the ground (National Audubon Society, n.d.B). The site may host Great horned owl nesting habitat as it is somewhat of a habitat generalist and the area provides a mix of land types demanded by the species.

Sharp-shinned hawk nests are usually found in groves of coniferous trees in mixed woods, occasionally using dense deciduous trees, pure coniferous forests with brush or in nearby clearings. Nest sites are very well concealed, typically in a dense conifer stand (spruce or fir is common) within a forest or thick grove and are generally found 20' to 60' above ground, but they can be located in suitably dense cover above or below this range. Sometimes builds nests on top of old squirrel or crow nests (National Audubon Society, n.d.C). The site may host the nesting requirements of the Sharp-shinned hawk as the area provides mixed woods forest.

Formerly known as the Pigeon hawk, the Merlin is the only Ontario falcon that prefers forests and forest edge habitat (Bird Studies Canada, 2001-2005). Typically uses old nests of hawks, crows or magpies found in trees 10' to 60' above ground, but they will use large tree cavities, cliff ledges or the ground as nesting areas. Breeding generally takes place in semi-open terrain while utilizing open areas for hunting (National Audubon Society, n.d.D). The site does host semi-open terrain as well as open areas in the mixed woods forest; therefore, the area does provide nesting habitat for the Merlin on the site and/or within 120 m of the site.

The Cooper's hawk is first and foremost a forest bird, but in a lot of its range there is an increasing tendency for it to occupy more open, human-altered habitats in more urban areas (Bird Studies Canada, 2001-2005). When nesting in mature forests, open woodlands, wood edges or river groves, the species generally opts for tall trees in coniferous, deciduous and mixed woods with openings or edge habitat nearby. Nests are usually 25' to 50' above ground and are placed on top of a pre-existing foundation, such as old nests of large birds, squirrels or on clumps of mistletoe (National Audubon society, n.d.D). The site does host some of the requirements for Cooper's hawk nesting as there are forest openings and edge habitat near the forest; therefore, the site may host suitable habitat on and/or within 120 m of the site for the Cooper's hawk.

The Northern goshawk nests in forested areas that host larger-diameter trees, few smaller-diameter trees, high canopy closure, and low ground and shrub cover. Preferred habitat tree species consist of White pine, Red pine, tolerant hardwoods, and intolerant-mixed woods, which includes a variety of forest types and ages that support its primary food sources (i.e. Snowshoe hare, Ruffed grouse, Spruce grouse and Red squirrel) (Bird Studies Canada, 2001-2005). Nest height in trees varies from 25' to 50' above ground to 15' to 75' above ground with nests sometimes being reused (National Audubon Society, n.d.F) or alternative nests in following years used within 100 m to 300 m of old nests (Bird Studies Canada, 2001-2005). The site does provide the preferred White pine species, but the diameter of the trees does not meet the minimum requirements and the forest only has medium canopy closure; therefore, it is not considered to host nesting habitat required for the Northern goshawk.

Great gray owl habitat is typically confined to the Boreal Forest, in dense, wet evergreen forests in the far north of Canada (The Cornell Lab, n.d.B) with nesting occurring in broken-off dead trees, former Common raven or raptor nests (Bird Studies Canada, 2001-2005). The eggs may be placed in the broken tops of human-made platforms or in clumps of mistletoe as well. The species generally prefers areas with a mix of dense forest for nesting and roosting, along with open areas for hunting. A mated pair may reuse the same nest for up to several years (National Audubon Society, n.d.G). The site does not host Great gray owl nesting habitat as the forest is not located in the far north and is not characterized as a dense, wet evergreen forest.

The Long-eared owl nests in areas with dense coniferous or mixed woods, coniferous plantations, small woodlots, copses, and hedgerows, that are near to open foraging habitat such as fields,

meadows, open woodlands, and marshes. They do not build their own nests, opting to takeover former nests of other raptors, American crows, or Gray squirrels (Bird Studies Canada, 2001-2005). Found to nest in trees 4' to 30' above ground, roughly mid-level with a tendency to avoid unbroken forest (National Audubon society, n.d.H). The site does not host Long-eared owl nesting habitat since there are no fields, small woodlots, open woodlands or marshes required by the species on and/or within 120 m of the site.

The Barred owl typically inhabits large, unfragmented forests that provide mature and old-growth forests with a mix of deciduous and coniferous trees. Nests are found in cavities of large deciduous trees and they occasionally utilize abandoned stick nests (Bird Studies Canada, 2001-2005) of hawks, crows, and squirrels, or they may nest in broken-off snags (National Audubon society, n.d.I). The site is not considered to host nesting habitat for the Barred owl as the forest is fragmented (e.g. disturbed areas, ATV trail) and is not characterized as a mature or old-growth forest.

Waterfowl Nesting, Staging and Stopover Areas

Migrating waterfowl require staging and stopover areas as well as nesting habitat. They prefer large wetlands adjacent to large waterbodies with relatively undisturbed vegetated shorelines for staging and stopover, and undisturbed large upland areas with many ponds and wetlands for nesting. There is a wetland located within 120 m of the site. The site may support the habitat requirements needed for seasonal concentration areas for migrating waterfowl colonial birds.

Shorebird Migratory Stopover Areas

Similarly, the habitat requirements of shorebird migratory stopover areas may be present as there is a wetland located northwest on the site.

Landbird Migratory Stopover Areas

Songbirds (passerines and their close relatives), along with hawks, owls, and grouse, are called "landbirds" because their life cycle is largely terrestrial. The following colonial birds found in Ecodistrict 4E-3 (Mississagi Ecodistrict) are considered landbirds: Brewer's blackbird, Cliff swallow, Red-tailed hawk, Great horned owl, Broad-winged hawk, Sharp-shinned hawk, Merlin, Cooper's hawk, Northern goshawk, Great gray owl, Long-eared owl and the Barred owl.

During migration, large numbers of birds move along the Great Lakes shorelines and stop at traditionally used sites to feed, rest, and/or seek refuge from intense weather events. These stopover areas range from open fields to large woodlands to provide abundant food and cover. Raptors will use updrafts along cliff faces to assist in migration (MNRF, October 2000).

As the site is not within 5 km of the Great Lakes, the site is not considered to be a landbird migratory stopover area.

Raptor Winter Feeding and Roosting Areas

Fields with a rich diversity of herbaceous vegetation that support small mammal populations including open fields, such as hayfields, pastures, and meadows are important to the winter survival of many birds of prey. Birds of prey scour the ground from vantage points; therefore, fields with perches such as scattered trees and fence posts are in indication of potential habitat. Windswept fields are most preferred as deep snow causes hunting to be more challenging. The best roosting sites will likely be found in relatively mature mixed or coniferous woodlands that abut these windswept fields. Some species, such as Northern harriers and Short-eared owls, roost in large grassy fields. Highway corridors appear to attract many hunting raptors throughout the year, because these areas are open and the vegetation is relatively low, making hunting easier (MNRF, October 2000).

Windswept fields are most preferred as deep snow causes hunting to be more challenging. The best roosting sites will likely be found in relatively mature mixed or coniferous woodlands that abut these windswept fields. Some species, such as Northern harriers and Short-eared owls, roost in large grassy fields. Highway corridors appear to attract many hunting raptors throughout the year because these areas are open and the vegetation is relatively low, making hunting easier (MNRF, October 2000).

Raptor winter feeding and roosting areas that are greater than 20 ha in size, support a high number of individuals, are not disturbed by human activity and have been used for many years by the species are considered most significant (MNRF, October 2000). The site features have not changed significantly over the years due to human activity and the site area is greater than 20 ha in size; therefore, the site and the area within 120 m of the site may be considered to be raptor winter feeding and roosting habitat.

Wild Turkey Winter Range

Wild turkey will use fields and pastures, feeding on weed seeds and waste grain if the snow is not too deep. Dense coniferous forests provide the best winter habitat because they minimise snow accumulation on the ground and provide protection from the cold and predators. Favoured roosts are usually large conifer forests situated close to agricultural fields or other winter food supplies, such as acorns. Coniferous stands used by turkeys are usually on valley floors or lower slopes. Hemlock stands appear to provide the best thermal protection and are often used during severe weather. Turkeys also drink water regularly, so the presence of seeps or open watercourses is essential. Wild turkey's do not use winter range areas consistently over time as use appears to depend on food supply conditions and availability of coniferous tree cover. The most consistently used areas have stable, abundant, and high-quality food sources located nearby (MNRF, October 2000).

As there is a wetland located northwest of the site, and no coniferous stands located in proximity to agricultural fields on or within 120 m of the site, it does not support the Wild turkey winter range habitat.

Turkey Vulture Summer Roosting Habitat

Turkey vultures like to roost on rocky cliff ledges and large, dead or partially dead trees, and in tall trees with limbs greater than 18 inches diameter, preferably in undisturbed areas and often near water. Preferred day roosting areas appear to be open areas where the birds can easily take flight or sunbathe. Cliff ledges have excellent rising air currents that are conducive for flight and soaring. Significant sites are those that are used consistently year after year (MNRF, October 2000).

No steep rocky cliffs near waterbodies, nor mature trees of sufficient diameter are present on and/or within 120 m of the site; therefore, it does not support the Turkey vulture's habitat for summer roosting.

Reptile Hibernacula

Some species of snakes and turtles overwinter (hibernate) in sizeable concentrations in sites known as hibernacula that enable the animals to hibernate below the frost line, often in association with water to prevent desiccation. Hibernacula host ideal microclimate conditions, making them invaluable to the long-term sustainability of local populations. Snake hibernacula include slabs of broken or fissured rock, talus slopes, abandoned houses, or broken rocks at the base of cliffs that provide access to subterranean areas. Turtle hibernacula include bogs and oxbows of rivers (MNRF, October 2000).

There is protruding bedrock that may be suitable habitat, however, no abandoned structures, bogs or oxbows are located on or within 120 m of the site; therefore, the area is not considered to support reptile hibernacula.

Bat Hibernacula

Preferred bat hibernacula are usually deep caves or abandoned mines with remote and restricted openings with sufficient space for entry by flight. Flowing water helps moderate temperature and maintain sufficient humidity inside the cave. Largely because of their intolerance of disturbance, large, open caves and crevices are rarely used by bats in winter (MNRF, October 2000).

No caves or abandoned mines are located on and/or within 120 m of the site; therefore, the area is not considered to support bat hibernacula.

Bullfrog Concentration Areas

Bullfrogs are primarily aquatic and found in marsh habitat. They require permanent waterbodies for survival (MNRF, October 2000).

There is a wetland situated in the northwest region of the site within the 120 m influence boundary that may host bullfrog habitat.

Migratory Butterfly Stopover Areas

In fall, during the southward migration, species of butterflies (e.g. monarchs) stop to feed, rest, or wait for poor weather conditions to pass before attempting to cross Lake Ontario, Lake Erie and Lake Superior. Ideal stopover areas host an abundance of preferred nectar plants, in addition to places for shelter and sunning (MNRF, October 2000).

The site and/or within 50 m of the site is not considered to be a migratory butterfly stopover area due to the great distance to Lake Ontario, Lake Erie and Lake Superior.

5.1.6.2 Rare Vegetation Communities or Specialized Habitat for Wildlife

Rare vegetation communities include provincially rare vegetation communities as well as those present within a planning area. Specialised habitats include areas that support species with highly specific habitat requirements, areas with exceptionally high species diversity or community diversity, and areas that provide habitat that greatly enhances species' survival.

Rare Vegetation Communities

Appendix G Table G-5 of the SWHTG – Habitat Descriptions for Rare Vascular Plants (MNRF, October 2000), was referenced to determine if the land types hosting known rare vegetation communities were present on the site and/or within 120 m of the site.

Table 5.1.7 below presents the rare vascular plant species that may potentially be present on and/or within 120 m of the site:

Table 5.1.6.2: Rare and Vascular Plant Species Potentially Present in Survey Area.

Common Name (Scientific Name)	Habitat Description	Vegetation Community	Potentially present in survey area?
Northern Bentgrass (*Agrostis mertensii*)	N/A	N/A	Yes
Limestone Oak Fern (Gymnocarpium robertianum)	Edges and slopes in calcareous rock; occasionally in sphagnum mats in cedar swamps	Rock outcrops and wetlands	Yes
Braun's Holly Fern (*Polystichum braunii)*	Deciduous mixed woods on talus slopes, rocky ravines and streambeds	Cliffs, riparian, rock outcrops and woodlands	Yes
Northern Woodsia (*Woodsia alpine*)	Moist, cool, often shaded crevices in calcareous cliffs	Cliffs	No
Smooth Woodsia (*Woodsia glabella*)	Shaded, calcareous rock crevices	Cliffs and talus slopes	No
Rocky Mountain Woodsia (*Woodsia scopulina*)	Moist to dry shaded crevices and ledges in acidic rock	Cliffs and rock outcrops	Yes
Ground-Fir (Diphasiastrum sabinifolium)	Sandy woods and meadows	Woodland edges	No
Giant Pinedrops (Pterospora andromedea)	Conifer woods, under Pine	Woodlands, woodland edges	Yes
Blue Bilberry (Vaccinium ovalifolium)	Mixed woods	Woodlands	Yes
Milk-vetch (Astragalus australis)	Sandy-gravel and boulder beaches	Shoreline	No
Fir Clubmoss (Huperzia selago)	Rocky forest openings, bogs and cliffs	Cliffs, talus slopes, wetlands, woodlands, woodland edge	Yes
Wheatgrass (Elymus trachycaulus ssp. Violaceus)	N/A	N/A	Yes
Pointed Moonwort (Botrychium acuminatum)	N/A	N/A	Yes

Table 5.1.6.2: Rare and Vascular Plant Species Potentially Present in Survey Area.

Common Name (Scientific Name)	Habitat Description	Vegetation Community	Potentially present in survey area?
Prairie Dunewort (Botrychium campestre)	N/A	N/A	Yes
Bracted Orchid (Coeloglossum viride var. viride)	N/A	N/A	Yes
Wild Rye (Elymus virginicus var. submuticus)	N/A	N/A	Yes
Alkali Grass (Puccinellia tenella)	N/A	N/A	Yes
Coast Jointweed (Polygonella articulata)	Sandy beaches of rivers and lakeshores; sand dunes and hills, sand barrens and sandy openings in jack pine forests; often adventive along sandy or gravelly roadsides and railway embankments	Dunes (sand), riparian, woodlands	No
Willow (Salix lutea)	N/A	N/A	Yes
McCall's Willow (*Salix maccalliana*)	Widespread or common	N/A	Yes
Shoreline Willow (Salix myricoides var. albovestita)	N/A	N/A	Yes
False Mountain Willow (*Salix pseudomonticola*)	N/A	N/A	Yes
Boreal Bedstraw (Galium kamtschaticum)	Cool, moist woods, thickets and valleys	Woodlands	Yes
Northern Bur-reed (Sparganium hyperboreum)	Wetlands	Wetlands	Yes
Northern Golden-carpet (*Chrysosplenium tetrandrum*)	N/A	N/A	Yes

Table 5.1.6.2: Rare and Vascular Plant Species Potentially Present in Survey Area

Common Name (Scientific Name)	Habitat Description	Vegetation Community	Potentially present in survey area?
Long-scaled Tussock Sedge (*Carex haydenii*)	Open and shaded wet habitats	Riparian and wetlands	Yes
Wiegand's Sedge (*Carex wiegandii*)	Black spruce bogs and alder swamps	Wetlands	No
Hawthorn (Crataegus apiomorpha)	N/A	N/A	Yes
Hawthorn (Crataegus ate)	N/A	N/A	Yes
Hawthorn (Crataegus compta)	N/A	N/A	Yes
Hawthorn (Crataegus dilatate)	N/A	N/A	Yes
Hawthorn (Crataegus persimilis)	N/A	N/A	Yes
Grand Hawthorn (Crataegus grandis)	N/A	N/A	Yes
Pale Moonwort (Botrychium pallidum)	N/A	N/A	Yes
Spoon-leaf Moonwort (*Botrychium spathulatum*)	N/A	N/A	Yes

Aerial photography and the Ontario Geological survey were used to determine whether rare vegetation communities have the potential to exist on and/or within 120 m of the site. The file review identified no alvars, areas with limestone, dolostone bedrock, beaches, cliffs, fens, black mixed oak/hickory/hackberry/sugar, black maple, black walnut deciduous forests, black oak-white oak/bur oak-shagbark hickory/ pin oak tallgrass woodlands, marshes, bogs, swamps, dune grasslands, Juniper dune shrublands, cottonwood dune savannah, thicket swamps, prairies, savannahs, rock barrens, sand barrens or Great Lakes dunes on and/or within 120 m of the site.

Specialized Habitat for Wildlife

The Make a Natural Heritage Map (MANHM) online tool (MNRF, n.d.A) was reviewed and did not reveal any specialized habitat of species at risk in Ontario. The MNRF and MECP were consulted as part of this project and did not identify any specialized wildlife habitat on and/or within 120 m of the site. The specialized habitats described in Section 5.4.2.1 to 5.4.2.11 of the SWHTG (MNRF, October 2000) were reviewed and none were identified on and/or within 120 m of the site.

Old growth forests, mature forest stands, amphibian woodland breeding ponds, turtle nesting habitat, moose aquatic feeding areas, mineral licks, cliffs and/or seeps and springs were not observed on and/or within 120 m of the site.

Habitat for Area-Sensitive Species

Based on imagery, the subject site and the area within 120 m of the site have five (5) land types: wetland, waterbody, forest, disturbed area and rock outcrop. The habitat requirements of area-sensitive species within these land types were researched.

In general, the larger and least fragmented forest stands will support the most significant populations of forest area sensitive birds. Suitable forest interior bird nesting habitat requires several large woodlands of 30 ha to 100 ha be present and be a minimum of 100 m from any edge. The most significant woodlands are those which are comprised of a mainly closed canopy of large trees and a variety of vegetation layers as they support a greater diversity of species (MNRF, October 2000).

According to Appendix Q of the SWHTG (MNRF, October 2000), most significant forest stands have a large contiguous canopy cover and contain at least 10 ha of forest interior excluding at least a 200 m buffer around the forest interior. Significant forest stands should have an abundance of large (e.g. >40 cm dbh, >25 m tall) mature trees as they are more significant for certain nesting raptor species as well as a number of songbird species. Significant forest stands should have no gaps greater than 20 m including, roads and natural gaps, such as windblown trees, which are preferred over man-made gaps. Furthermore, level of site disturbance should also be considered when determining significance of habitat; sites with the least amount of human disturbance and that have not had any industrial, or agricultural operations in the past 20 years, are significant (MNRF, October 2000).

The survey area is heavily canopy covered, but the site is not of adequate size nor does it host trees of adequate size to support significant forest species diversity; therefore, the site does not meet the needs to support a diverse number of species and is not considered to be habitat for forest area sensitive bird species.

Grasslands with a variety of vegetation structure, density, and composition tend to support a greater diversity of grassland nesting birds because different species require different nesting habitat. Grasslands that have >30 ha of contiguous habitat are most likely to support and sustain diversity of these species. Area-sensitive grassland bird species require large tracts of grassland to buffer disturbances and habitat edges (MNRF, October 2000).

The survey area does not host grassland and borders a heavily trafficked roadway (Hwy. 144); therefore, the site and the 120 m influence boundary do not support habitat for area-sensitive species.

Forests Providing a High Diversity of Habitats

The most significant forest stands contain a diversity of features such as tree cavities, fallen logs (snags), abundant tree species composition and forest stand age structures, soil moisture

conditions and food for wildlife. sites containing a diversity of cavity sizes provide nesting, denning and foraging habitat for a variety of forest species (MNRF, October 2000).

Older forest stands usually have more cavity trees and support a higher diversity of species than young stands. Forests with features, such as springs and seeps will also provide habitat for a greater diversity of species. Super canopy trees, such as white pine provide important habitat for birds of prey (MNRF, October 2000).

The Ontario Tree Marking Guide (MNR, 2004) suggests the retention of six (6) cavity trees per ha, with at least one (1) being >50 cm dbh, and the other five (5) being at least 25 cm dbh.
Based on imagery, the site hosts five (5) land types: waterbody, wetland, forest, disturbed area and rock outcrop. The site hosts low-density mixed forest in which the trees are not old growth, limiting the diversity of habitat available; therefore, the site is not suitable to provide a high diversity of habitats on and/or within 120 m of the site.

Old Growth / Mature Forest Stands
The greatest significance should be placed on the least disturbed forest stands. The closed canopy and moist growing conditions allow some very sensitive species to grow and these are vulnerable to trampling (MNRF, October 2000).

Based on the satellite imagery mapping as part of the file review, it was determined that there are no old growth forests on or within 120 m of the site.

Foraging Areas with Abundant Mast
Forests containing numerous mast-producing trees are crucial food sources for a variety of wildlife. Large beech and red oak trees are especially important in the fall for bears building fat reserves for hibernation through the consumption of the energy-rich beechnuts and acorns they provide. Mast trees also provide a food source during the winter months for deer. Black cherry, mountain ash, and apple trees are other examples of mast-producing trees. Berry producing shrubs, such as raspberry and blueberry are also important for many forest wildlife species (MNRF, October 2000).

The potential for foraging areas with abundant mast exists on and/or within 120 m of the site.

Woodlands Supporting Amphibian Breeding Ponds
Ideal breeding ponds are untouched by pollution, and host a variety of vegetation structures, both in and around the edges of the pond, for egg-laying and calling by frogs. Closed-canopy woodlands with a dense undergrowth will maintain a damp environment as the best option regarding adjacent habitats. Another important habitat component are moist fallen logs, which are required to support salamander populations. sites providing several ponds and/or ponds close to creeks are especially valuable (MNRF, October 2000).

The area does not host any ponds; therefore, the site is not considered to host suitable amphibian woodland breeding ponds on and/or within 120 m of the site.

Turtle Nesting Habitat

Turtle nesting habitat requires well-drained soils to prevent nest flooding on relatively soft substrates (e.g. sand or fine gravel) that allow turtles to dig their nests in open, sunny areas. Many turtles are unfortunately drawn to gravelly road shoulders in search of suitable nesting habitat, and are killed in the process. The greatest significance should be assigned to turtle nesting sites that are natural, undisturbed and are closest to their habitat. The most significant sites should have safe movement corridors between the nesting and aquatic habitat (MNRF, October 2000).

A wetland is located to the northwest of the site and there is a waterbody (Geneva Creek) located to the south of the site. The site and/or within 120 m of the site is considered to be potentially suitable for turtle nesting habitat.

Specialized Raptor Nesting Habitat

Woodland raptors such as the Red-tailed hawk, Broad-winged hawk, Sharp-shinned hawk, Cooper's hawk, Northern goshawk, Merlin, Great horned owl, Great gray owl, Long-eared owl and the Barred owl require mature trees with full canopy closure with very little undergrowth to scour for prey below the canopy. All woodland raptors require large tracts of un-fragmented mature forest. Similarly, grassland raptors require large tracts of uninterrupted grasslands. For example, the short-eared owl requires grasslands between 75 ha and 100 ha (MNRF, October 2000).

The site does provide large tracts of forest but they are fragmented by some disturbed areas as well as the ATV trail, and the forest does not provide full canopy closure; therefore, the site and/or within 120 m of the site is not considered suitable specialized raptor nesting habitat.

Special Moose Habitats – Aquatic Feeding Areas, Calving Sites and Mineral Licks

Moose require rare specialized habitats throughout the year. In spring, moose seek out isolated calving sites far secluded from human activities that provides cover and escape paths from predators. Calving sites are also within 100 m to 500 m of open water (MNRF, October 2000).
Another specialized habitat important to moose during the spring are mineral licks. Mineral licks are areas where essential minerals are found in upwelled groundwater and the soil of seepage areas. Mineral licks are more often found in areas of sedimentary and volcanic bedrock surrounded by forest cover. These sites may be used by large concentrations of moose as they are so rare, remote and imperative to the moose life cycle (MNRF, October 2000).

Moose will travel up to 30 km in search of aquatic feeding areas during early to mid-summer. Preferred sites will host an abundance of aquatic plants, such as pondweeds, water milfoil, and yellow water lily (MNRF, October 2000).

Open water is found within 0.5 km of the survey area and the site is remote, but the rock outcrops present are unlikely to host mineral licks that are essential to the moose's life cycle; therefore, the site and the area within 120 m of the site is not considered to be specialized moose habitat.

Mink, Otter, Marten and Fisher Denning Sites

Mink, otter, marten and fisher denning sites are underground cavities (mink and otter) or tree/ fallen log cavities (marten and fisher) found on shorelines with abundant shrubs and downed woody debris for coverage. Minks, martens and fishers generally use shoreline abutting large unbroken tracts of coniferous or mixed forest, while otters require shoreline habitats that support large productive fish populations (MNRF, October 2000).

The waterbodies and wetland available on the site and/or within 120 m of the site has the potential to provide mink, otter, marten and fisher denning habitat.

Highly Diverse Areas

Highly diverse areas contain a wide range of habitats or ecosystems, and support a large variety of plants and animals. Known highly diverse areas include the Carolinian Zone, the Frontenac Axis of southeastern Ontario, Grey and Bruce counties, and parts of Frontenac, Lennox-Addington, Lanark, Renfrew, Hastings, and Haliburton counties (MNRF, October 2000).

On the Canadian shield, areas underlain with carbonate bedrock that encourage development of nutrient rich basic soils can support rich communities found in highly diverse areas. Erosion resistant acidic granite and gneiss generally do not support these diverse areas. In southern Ontario, sites situated within the Paleozoic limestone and the Precambrian bedrock of the Canadian Shield support highly diverse communities (MNRF, October 2000).

The subject site is not located in any of the known highly diverse areas listed above. The bedrock geology of the site was researched on the Ontario Geological Survey (OGS) Earth mapping (Ministry of Energy, Northern Development and Mines, June 2020), and the survey area is located within the "Sudbury Igneous Complex" consisting of Norite-gabbro, quartz, norite sublayer and offset rocks.

The site and/or within 120 m of the site, is not considered to be a highly diverse area due to its low-density mixed forest and rock outcrops.

Cliffs

Cliffs provide habitat for numerous species, however, there are no cliffs on and/or within 120 m of the site.

Seeps and Springs

No seeps, springs or pools of inundated water were identified on and/or within 120 m of the site.

Special Woodland Feeding Habitat

Large forest stands containing a diversity of mast producing trees would generally be most significant. Any forest stands that are used consistently year after year should be assigned a higher level of significance, but in many cases, this will not be known. The exception is some areas of black bear range, where evidence of bear use, especially in stands of beech trees, is obvious (MNRF, October 2000).

The subject property is composed of low-density mixed forest but lacks large forest stands; therefore, the site and/or within 120 m of the site is not considered to be special woodland feeding habitat.

Osprey Nesting Habitat

The recommendation for Osprey nests is that any presence be considered significant. Osprey are often considered to be an indicator of good water quality. sites with the best potential for nesting habitat are undisturbed shorelines with large trees near productive shallow water feeding areas (MNRF, October 2000).

The Osprey's nesting habitat requirements may be present, as the wetland does provide an undisturbed shoreline with large trees adjacent to the waterbody.

Maternity Bat Roost Habitat

In Ontario, most bat species roost in small spaces or crevices found in loose bark, hollow trees, rock faces and human structures such as attics, walls and bat boxes. Other bat species roost in foliage in small groups or individually very high up in the tree canopy (Wilson, M. D. and Watts, B. D., 2008).

According to the Significant Wildlife Habitat Criteria Schedule for Ecoregion 4E (MNRF, February 2019E), maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be significant wildlife habitat). Maternity roosts are not found in caves and mines in Ontario. Maternity colonies located in mature (dominant trees > 80 years old) deciduous or mixed forest stands with more than ten (10) large diameter (>25cm dbh) wildlife trees per ha. Female bats prefer wildlife trees (snags) in early stages of decay, i.e. decay class 1 to 3 or class 1 or 2. Colonies within a natural roost may number from a few to hundreds of individuals. During the summer, females often roost in large maternity colonies while males tend

to roost in small groups or individually. According to Appendix Q of the SWHTG (MNRF, October 2000), maternity colony roosts are considered significant if they support the following number of individuals of each species listed in the table below:

Bat Species Common Name	Number of Bats to be Considered Significant Maternity Colony Roost
Big brown bat	30
Little brown bat	100
Eastern pipistrelle	10
Silver haired bat	10
Long eared bat	10
Small footed bat	10

The area may provide maternity colony roost habitat. Snag and cavity trees with >25cm dbh are to be further inspected during the field investigation.

5.1.6.3 Animal Movement Corridors

Animals use movement corridors providing cover, shelter, and minimizing interactions with predators and people, to travel from one habitat to another. These corridors encompass a wide variety of landscape features including riparian zones and shorelines, wetland buffers, stream and river valleys, woodlands, hydro corridors, fencerows, abandoned roads, and abandoned rail lines (MNRF, October 2000).

The site and/or within 120 m of the site may host suitable animal movement corridors considering there are shorelines, riparian zones, woodlands and wetland buffers present.

5.1.7 Areas of Natural and Scientific Interest (ANSI)

According to the Ministry of Natural Resources NHIC database (MNRF NHIC, July 2020), there were no ANSIs or candidate ANSIs identified within the site and/or within 120 m of the site.

5.2 Field Investigation

On June 1, June 2, June 23, 2018, August 16, 2019, and July 23, 2020, the site and the area within 120 m of the site were accessed. The site was divided into five (5) land types: waterbody, wetland, forest, disturbed area and rock outcrop, as shown in Figure 2. Predetermined transects were then followed on the site and adjacent area. A summary of the vegetative species observed on the site is attached in Appendix B, and photographs obtained during the field investigations are attached in Appendix D.

The results of the field investigations have been summarized and are discussed below.

Open water was observed southwest, northwest, east and southeast all within the 120m influence area. Open water was also observed to the west and east within the licensed area. Very little aquatic vegetation was observed. Embankments consisted of some undercut banks, grasses, shrubs and trees.

The wetland describes the north and northwest portion of the site and is located within 120 m of the site. The wetland is less than 5 hectares in size. During the site visits, the wetland was observed to have some open water which was mostly vegetated with sedges in the western portion. The wetland was observed to be shallow with some areas of organic bottom substrate with no defined water channel or noticeable flow. The wetland is part of a Wetland Complex and drains to the east. At the time of the field survey, water was observed within the wetland.

Geneva Creek is located within 120 m in the south region of the site. The waterbody is shallow and flowing, with a cobble bottom, grasses and shrubs along the embankments. No undercut banks were noted and very little aquatic vegetation was observed. Downes Lake is the headwater for Geneva Creek draining west.

The low-density mixed forest is located on and around the site within 120 m, all of which is Crown Forest. Overburden soil is limited as protruding bedrock is observed throughout the area. Where vegetation is present, the area is dominated by grasses, shrubs, ferns and some trees.

A number of disturbed areas within the site were observed. Disturbances include ATV trails throughout the site and 120 m influence area, a sand extraction pit and brushed area for camping trailers. The areas consisted of disturbed vegetation. The exposed rock outcrops host very little vegetation among the rock. Vegetation consisted of mostly conifer trees with a limited understory of mosses and shrubs.

It was determined during the file review that the subject site has potential to host habitat for thirteen (13) SAR that are ranked as either Threatened or Endangered in the province of Ontario. Further file screening determined that the subject site and the 120 m influence boundary did not host preferred habitat for these SAR, with the exception of the Eastern whip-poor-will, Blanding's turtle, Little brown myotis (bat), Northern myotis (bat) and the Tri-colored bat. Further investigation into the presence of these species and their preferred habitat was undertaken during the field investigation.

Eastern whip-poor-will surveys were completed on June 1, 2018, June 2, 2018 and June 23, 2018, for the site in which no calls were identified on and/or within 120 m of the site. A copy of the survey is included in Appendix C.

The potential Blanding's turtle habitat was further assessed during the field investigations conducted on August 16, 2019, and July 23, 2020. Based on those results, it is highly unlikely

the site and/or the area within 120 m of the site can be considered to be Blanding's turtle habitat as defined in the *Blanding's Turtle General Habitat Description* (MECP, 2019F). No turtles were observed on-site during the field investigations.

During the field investigations, there were trees with peeling bark noted, however, they did not have a diameter of ≥ 25 cm. Furthermore, there were no snag/cavity trees of dbh ≥ 25 cm, no old forests, no caves and no man-made structures on-site; therefore, the survey area cannot be considered to be maternity colony/summer roosting habitat for the Little brown myotis (bat), the Northern myotis (bat) or the Tri-colored bat.

6.0 CONCLUSION

Enviro-Eco completed a file review of available information and a field investigation. The results of this work determined the following within the site and within 120 m adjacent area:

- Existence of significant wetlands – **No**
- Existence of habitat of endangered or threatened species – **No**
- Existence of fish habitat – **Yes**
- Existence of significant woodlands – **No**
- Existence of significant valleylands – **No**
- Existence of significant wildlife habitat – **No**
- Existence of significant areas of natural and scientific interest – **No**
- Existence of sites of geological interest – **No**

A Natural Environment Level 2 is required to determine any negative impacts of an aggregate operation to fish habitat and, if necessary, recommend preventative, mitigative or remedial measures in order to protect the habitat.

7.0 PROFESSIONAL QUALIFICATIONS

Manon Giroux, C.E.T., EP., Sr. Environmental Scientist

Manon Giroux is a Senior Professional with Environmental Ecosystems Inc. Mrs. Giroux has over 25 years of experience in the environmental field. She has a diverse background in environmental sciences and biology gained through academia and work experience. Mrs. Giroux has completed and provided senior reviews on numerous Natural Environment Level 1 and 2 Reports, Environmental Impact Assessments, Class Environmental Assessments, Restoration Projects, Wetland Delineation and Species at Risk Surveys. She has extensive experience with mitigation/compensation measures and with the Aggregate Resources Act, Ontario Provincial Standards and Provincial Policy Statement (PPS) requirements for environmental work. She has been involved at a senior level with a number of field investigations in the areas of fisheries, habitat assessment, benthic, water/sediment quality, sediment and erosion control assessments and plans, wildlife assessments, species at risk, terrestrial plant surveys, restoration plans, wetland evaluations and aquatic vegetation projects. She is a *Northern Ontario Certified Wetland Evaluator,* a *Certified Stream Assessment Protocol Assessor, Ichthyology certified and RAQs certified for Species at Risk and Natural Sciences.*

Essa Bertrand – *Environmental Scientist*

Ms. Bertrand is an Environmental Scientist with Environmental Ecosystems Inc. With 5 years in the environmental field, Ms. Bertrand's capabilities include but are not limited to, Environmental Compliance Approvals (ECAs), Environmental Impact Studies (EIS), Natural Environment Level 1 and 2, Species at Risk surveys and monitoring, landfill monitoring, asbestos containing material (ACM) assessments and abatement projects, groundwater and surface water monitoring, hydrology modelling, Radon monitoring and measurement, Indoor Air Quality (IAQ) investigations, as well as carrying out field programs, data management and associated reporting.

Ivanka Papa, Office Manager - Sr. Professional/Project Manager – Sr. Reviewer

Ms. Papa is a Senior Professional with Environmental Ecosystems and the Office Manager. With 20 years of experience in the environmental field, Ms. Papa is a detail-oriented professional with a strong multi-faceted environmental consulting and administrative background. She has valuable experience as an Environmental Technologist in various field investigations, such as supervision of borehole and monitoring well installations, surface water sampling, groundwater sampling, soil sampling and soil remediation.

As a Project Manager she was responsible for the overall direction and management of a soil treatment facility where she established all business and project functions, including administration, finance, human resources, procurement, compliance, health and safety and government relations.

As the Office Manager for Enviro-Eco, Ms. Papa manages the financial activities of projects including, tracking revenue, issuing invoices and recovering receivables. Beyond managing

financial activities, she establishes project needs and monitors works in progress to ensure that final deliverables adhere to requirements. Ms. Papa also brings a senior level to technical and peer reviews.

NATURAL ENVIRONMENT LEVEL 2 TECHNICAL REPORT

1.0 INTRODUCTION

The Natural Environment Level 1 technical portion of this report identified the "Existence of fish habitat" associated with the open water and wetlands on and/or within the 120 metre influence area. The "*Aggregate Resources of Ontario Provincial Standards, Version 1.0*", requires that a Natural Environment Level 2 (NEL 2) report be completed to address significant features found within the site and/or within 120 m of the site. The report must determine any negative impacts of an aggregate operation to fish habitat and, if necessary, recommend preventative, mitigative or remedial measures in order to protect the habitat.

2.0 METHODOLOGY

The NEL 2 was completed by reviewing relevant background documents for a description of the waterbodies and wetlands found on the site and/or within 120 m of the site. Through analyzing the potential impacts from a quarry operation with respect to the existing habitat, mitigation measures can be proposed, if necessary, to protect the natural features present.

3.0 RESULTS and DISCUSSION

The site is identified as Part of the Geographic Township of Moncrieff (annulled), North of the Township of Cartier, in the Territorial District of Sudbury, Ontario, formerly S-4285271 and S-4285272, which have now been converted to single cell mining claims 264132, 152238, 284206, 234836, 301931, 115511, 334234, 207478, 141352, 271414, 170206, 219590, 266069, 141353, 207477, 226871, 264134, 318662, 168815, 152753, 272081, 152237, 272082, 264133, 301932, 124862, and 141354 due to the recent Mining Act Modernization implemented by the MNDM. The property is located on and surrounded entirely by Crown Land.

The site is approximately 64 kilometres northwest of the City of Greater Sudbury (CGS), as shown in Figure 1 in the Figures section of this report.

The site is located west of Downes Lake on the western side of Highway 144. Google Earth (Google, n.d.) imagery identifies access to the site is gained through a dirt logging road found on the western side of Hwy. 144, which crosses through Geneva Creek and connects to an ATV trail that branches off to the north and runs through the site to the northernmost boundary before turning towards the western boundary of the site. The site is on and surrounded entirely by Crown Land with two (2) large rock outcrops located in the southeast and northwest portions of the site. The two (2) rock outcrops are the proposed extraction areas. The site hosts some disturbed areas found adjacent to the ATV trail on the western side in the southwest portion of the site, open water near the western boundary within the site, open water and wetland area north and northwest within the site and the 120 m influence area, open water to the south within the 120 m influence area, Geneva Creek and Downes Lake located south and southeast within the 120 m

influence area and open water to the east between the two (2) rock outcrops. The natural features of the site and field transects are shown on Figure 2 in the Figure section of this report.

A map with the licensed area boundary is provided in Appendix A. The site is approximately 369.79 ha in size, consisting of waterbodies, rock outcrops, mixed forest, disturbed areas, and wetland. The survey area includes the subject site as well as the surrounding 120 m influence boundary. The site plan, provided in Appendix A, shows the two (2) extraction areas, large outcrops hatched in orange located in the northerly and southerly portions of the site are approximately 94.26 ha (37.01 ha for northerly area (460 masl) and 57.25 ha for the southerly area (460 masl)). The topography map within the survey area shows open water near the western boundary within the licensed area with an elevation of 440 masl (meters above sea level), open water and wetland area north and northwest within the 120 m influence area with an elevation ranging from 410 to 390 masl, open water to the south within the 120 m influence area with an elevation of 410 masl, Geneva Creek and Downes Lake located south and southeast within the 120 m influence area also with an elevation of 410 masl, open water east and northeast within the 120 m influence area with an elevation of 420 masl and open water to the east between the two (2) rock outcrops with an elevation of 420 masl. The surrounding land elevation within the survey area ranges from 460 masl to the southwest and 420 masl to the northeast (MNRF, n.d.A).

A search of the Make a Natural Heritage Map (MNRF, n.d.A) online tool indicated that the following features exist on and/or within 120 m of the site and was further assessed during the field investigations:

- Open water near the western licensed boundary on the site;
- Open water and wetland area north and northwest within the 120 m influence area;
- Open water near the eastern licensed boundary on the site;
- Open water and wetland east and northeast within the 120 m influence area; and,
- Geneva Creek and Downes Lake located within 120 m influence area;
- Open water south and southeast within the 120 m influence area.

The results of the file review indicate both cold water and warm water fish species are present in waterbodies found in the Sudbury Forest (Agriculture and Agri-Food Canada, 1995). Coldwater fish species present in the Sudbury Forest include, Lake trout (*Salvelinus namaycush*), Brook trout (*Salvelinus fontinalis*) and Rainbow trout (*Oncorhynchus mykiss*), while warm water species include Walleye (*Sander vitreus*), Northern pike (*Esox lucius*), Smallmouth bass (*Micropterus dolomieu*) and Yellow perch (*Perca flavescens*).

The Northern Ontario Fishing Atlas has identified Downes Lake and Geneva Creek located south and southeast, as hosting Brook Trout (*Salvelinus fontinalis*), Walleye (*Sander vitreus*), Whitefish (Coregonus), Sucker *(Catostomus commersonii)* and Burbot *(Lota lota)*. Downes Lake flows into Geneva Creek.

The Northern Ontario Fishing Atlas has identified Shoe Lake #45 located northwest, north and northeast as hosting Rainbow trout (*Oncorhynchus mykiss*), Brook Trout (*Salvelinus fontinalis*) and Sucker *(Catostomus commersonii).*

The proposed extraction areas are within close proximity to open water and wetland boundaries. The edge of the northwest extraction area varies from approximately 75 m to 315 m and the edge of the southeast extraction area varies from approximately 50 m to 80 m.

4.0 CONCLUSION

The purpose of the NEL 2 is to determine any negative impacts of an aggregate operation to the "Existence of fish habitat" associated with the open water and wetlands on the site and/or within the 120 m influence area.

Given the proximity of the extraction areas to the open water and wetland, a Hydrological Assessment is required as part of the mitigation measure to further assess the biophysical factors, influence of hydrologic dynamics and the slope to further determine the impacts, and provide an effective buffer that will not affect the hydrology of the wetland and fish habitat.

5.0 LIMITATIONS and CLOSURE

This report has been prepared by Environmental Ecosystems Inc. The study represents the conditions at the site only at the time of the study, and is based on the information referenced and contained in the report. The conclusions presented herein, respecting current conditions, represents the best judgment of the assessor based on current environmental standards. Environmental Ecosystems Inc. attests that to the best of our knowledge, the information presented in this report is accurate.

We trust that the information is sufficient to meet your requirements. Should you have any questions or require further information, please do not hesitate to contact the undersigned at your convenience.

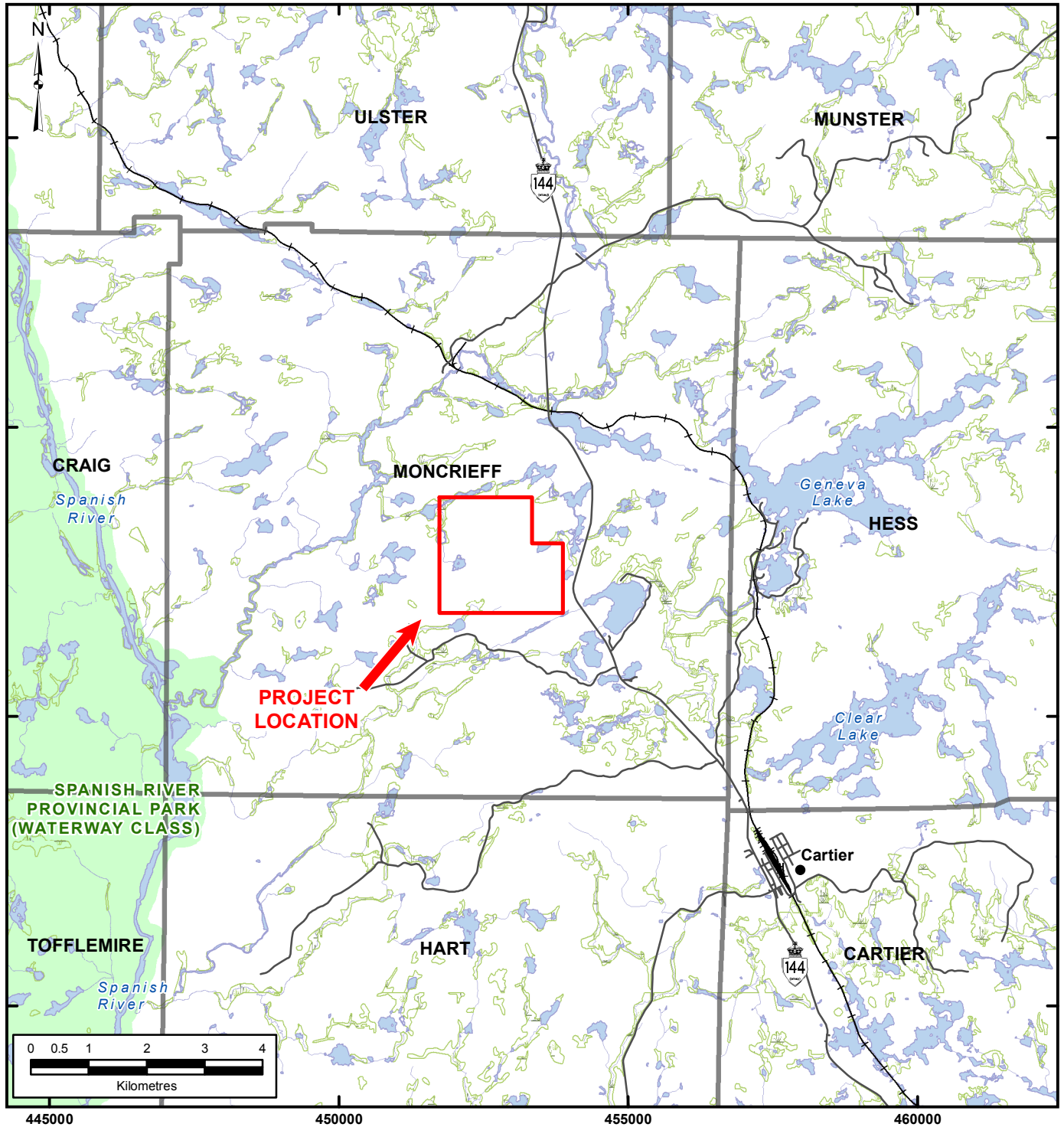
Sincerely,
For **Environmental Ecosystems Inc.,**

Manon Giroux, ***EP, C.E.T.***
Sr. Environmental Scientist
mgiroux@enviro-eco.ca

Ivanka Papa
Office Manage
ipapa@enviro-eco.ca

FIGURES

Document Path: C:\GSG\GIS-AutoCAD\Projects\Environmental_Ecosystems\2019\57-18_Moncrieff_Eastern Whip-Poor-Will Survey\MXDs\Figure 1_Moncrieff_Site Location.mxd



Environmental Ecosystems Inc

Figure 1:

SITE LOCATION MAP & KEY MAP

Natural Environment Level 1 & 2 Technical Report

LOCATED IN MONCRIEFF TOWNSHIP, IN THE GREATER CITY OF SUDBURY, ONTARIO

Project Number: 57-18

Data Sources

Coordinate System

North American Datum (NAD) 1983
Universal Transverse Mercator (UTM) Zone 17N

Cartographer: Dan McCool, Marcin Gasior

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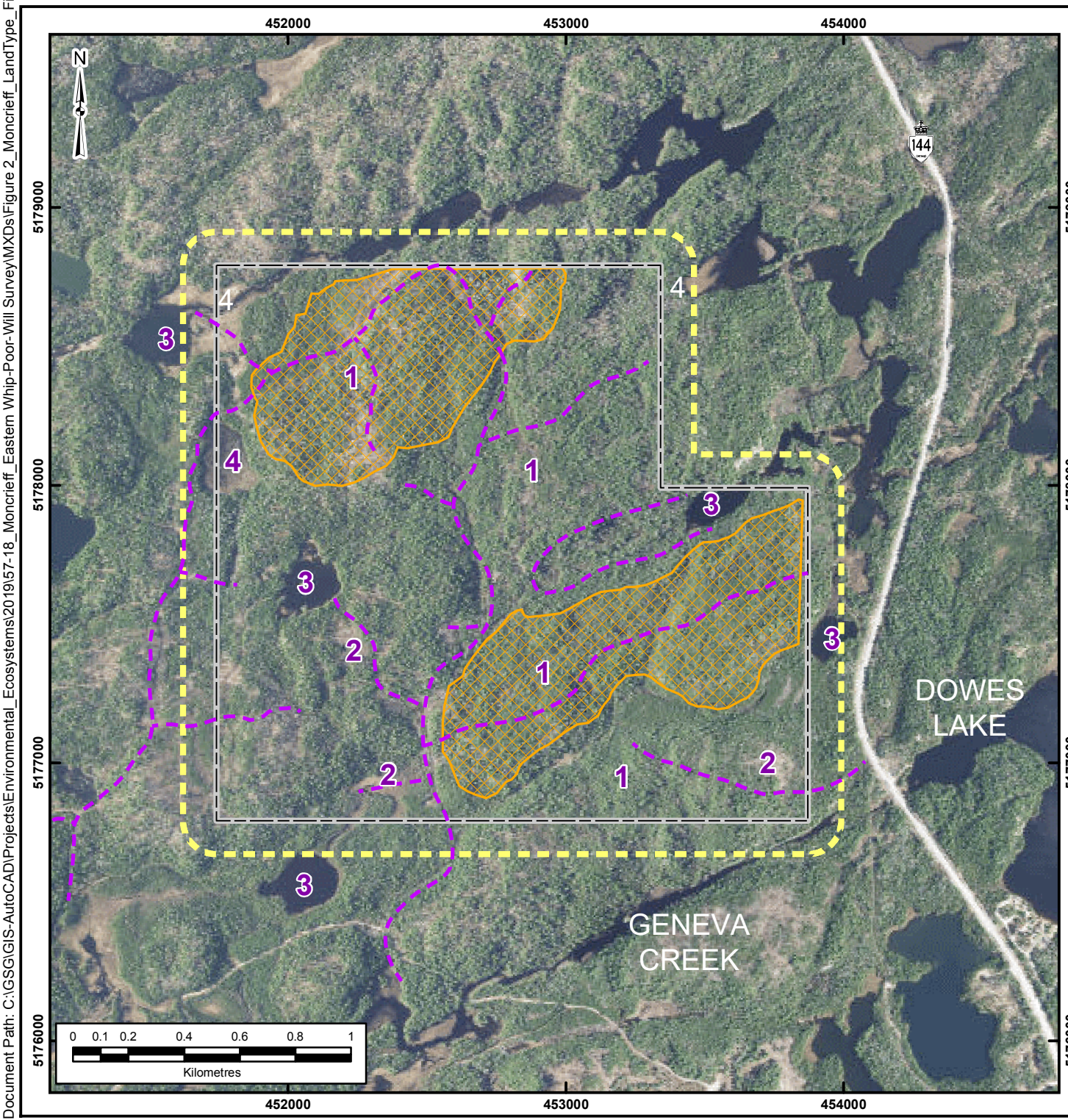

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Figure 2:

LAND TYPE AND FIELD TRANSECTS

NATURAL ENVIRONMENT LEVEL 1 AND 2 TECHNICAL REPORT

Project Number: 57-18

LEGEND:

- License outline
- Extraction area
- 120 m influence area
- Field transects

Land type:

1 - Forested / Rock outcrop

2 - Disburned

3 - Open Water

4 - Wetland

Data Sources

Coordinate System

North American Datum (NAD) 1983
Universal Transverse Mercator (UTM) Zone 17N

Cartographer: Dan McCool, Marcin Gasior

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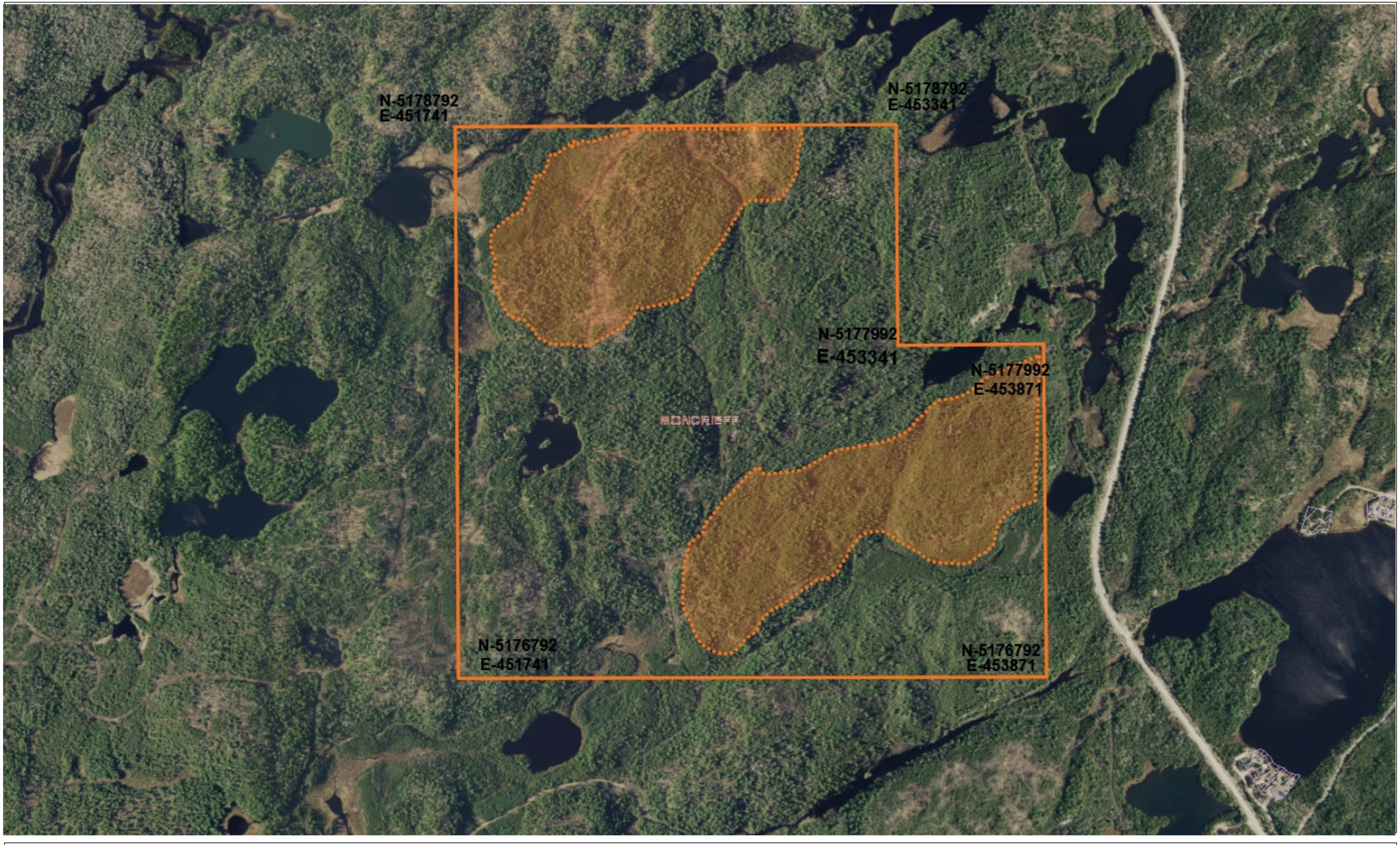
Appendix A

Site Sketch

Ontario MINISTRY OF NORTHERN DEVELOPMENT AND MINES
MLAS Map Viewer

MLAS Map

Notes:



Legend

Mining Lease
- Surface Rights Only
- Mining Rights Only
- Surface and Mining Rights

Mining Licence of Occupation
- Surface Rights Only
- Mining Rights Only
- Surface and Mining Rights

Mining Patent
- Surface Rights Only
- Mining Rights Only
- Surface and Mining Rights

Mining Division

MNDM Townships and Areas

Non-Mining Land Tenure
- Patent, Surface Rights Only
- Patent, Mining Rights Only
- Patent, Surface and Mining Rights
- Lease, Surface Rights Only
- Lease, Mining Rights Only
- Lease, Surface and Mining Rights
- Water Power Lease Agreement
- Licence of Occupation, Surface Rights Only
- Licence of Occupation, Surface and Mining Rights
- Order-in-Council

Alienation
- Withdrawal
- Notice

Indian Reserve

Federal Land Other

CLUPA Protected Area - Far North

0 0.70 km

Projection: Web Mercator

N

Appendix B

Observed Vegetation Species List

Common Name	*Scientific Name*	Creek Crossing	Forest	Disturbed Area	Wetland & Creek	Open Water
Alder	*Alnus*	✓	✓			✓
Arrowhead	*Syngonium podophyllum*	✓				
Birch	*Betula*		✓	✓	✓	
Black spruce	*Picea mariana*	✓		✓		✓
Blue-bead lily	*Clintonia borealis*		✓			
Blueberry	*Vaccinium corymbosum*			✓		
Bracken fern	*Pteridium aquilinum*	✓		✓		
Bulrush	*Scirpoides holoschoenus*	✓				✓
Bunchberry	*Cornus canadensis*		✓			
Canary grass	*Phalaris canariensis*					✓
Cattail	*Typha*					✓
Chickweed	*Stellaria media*					✓
Common plantain	*Plantago major*		✓		✓	
Coontail	*Ceratophyllum demersum*					✓
Coral lichen	*Sphaerophorus*			✓		
Daisy	*Bellis perennis*				✓	
Dogwood	*Cornus florida*			✓		
False solomon's-seal	*Maianthemum racemosum*				✓	
Goldenrod	*Solidago*	✓			✓	
Goldthread	*Coptis trifolia*		✓			
Ground pine	*Lycopodium obscurum*				✓	
Heal-all	*Prunella vulgaris*		✓		✓	
Horsetail	*Equisetum arvense*	✓				
Honeysuckle	*Lonicera periclymenum*				✓	
Interrupted fern	*Osmunda claytoniana*		✓			
Jack Pine	*Pinus banksiana*			✓		
Juniper moss	*Polytrichum juniperinum*			✓		

Common Name	*Scientific Name*	Creek Crossing	Forest	Disturbed Area	Wetland & Creek	Open Water
Lady fern	*Athyrium filix-femina*				✓	
Lily pad	*Nymphaeaceae*	✓				
Marsh skullcap	*Scutellaria galericulata*				✓	
Mayflower	*Maianthemum canadense*		✓			
Milkweed	*Asclepias*	✓				
Moss	*Bryophyta*		✓			
Northern bugleweed	*Lycopus uniflorus*				✓	
Pin cherry	*Prunus pensylvanica*	✓				
Raspberry	*Rubus idaeus*	✓			✓	
Red maple	*Acer rubrum*			✓		
Red pine	*Pinus resinosa*			✓		
Rough grass	*Agrostis scabra*			✓		
Sensitive fern	*Onoclea sensibilis*	✓	✓	✓	✓	
Starflower	*Trientalis borealis*		✓			
St. Johns-wort	*Hypericum perforetum*			✓		
Striped maple	*Acer pensylvanicum*		✓			
Solomon's seal	*Polygonatum biflorum*		✓			
Sweet fern	*Comptonia peregrina*			✓		
Sweet gale	*Myrica gale*	✓				✓
Tamarack	*Larix laricina*			✓		
Twinflower	*Linnaea borealis*		✓			
White cedar	*Thuja occidentalis*		✓	✓		
White pine	*Pinus strobus*			✓		
White spruce	*Picea glauca*		✓		✓	
Wild rose	*Rosa acicularis*	✓				
Wild sarsaparilla	*Aralia nudicaulis*	✓				

Appendix C

Eastern Whip-Poor-Will Survey (2018)

Environmental Ecosystems Inc

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Fax: 705.524.2813
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D.S. Dorland Limited
298 Larch Street
Sudbury, ON P3B 1M1

May 27, 2019
File No.: 57-18

RE: 2018 Eastern Whip-poor-will Survey Report for a Property located in the Geographic Township of Moncrieff, located North of the Township of Cartier.

1.0 INTRODUCTION

Environmental Ecosystems Inc. (Enviro-Eco) was retained by D.S. Dorland Limited (Dorland) to complete an Eastern Whip-poor-will survey for a property located in the Geographic Township of Moncrief, north of the town of Cartier, formerly S-4285271 and S-4285272, which have now been converted to single cell mining claims 264132, 152238, 333304, 284206, 234836, 301931, 115511, 334234, 207478, 141352, 271414, 170206, 219590, 266069, 141353, 207477, 226871, 264134, 318662, 168815, 152753, 272081, 152237, 272082, 264133, 301932, 124862 and 141354 due to the recent Mining Act Modernization implementation by MNDM. The property is located on and surrounded entirely by Crown Land.

The site in the Township of Moncrieff is approximately 56 kilometres northwest of the City of Greater Sudbury (CGS) Ontario, as shown on Figure 1.

The survey was conducted in accordance with the MNRF's Survey Protocol for the Eastern Whip-poor-will and the General Habitat Description for the Eastern Whip-poor-will. The survey must be conducted in order to determine the presence of the species or habitat within the property boundary.

2.0 METHODOLOGY

The following methodology outlined below is in accordance with relevant excerpts of the 2014 draft occurrence survey protocol for the Eastern Whip-Poor-Will provided to Enviro-Eco through email correspondence from the Ministry of Natural Resources and Forestry obtained in the spring of 2018[1].

The Whip-poor-will draft protocol suggests that surveys be completed at least thirty minutes after dusk between May 18 – June 30 when the moon phase falls either one week before or after the date of a full moon and is positioned above the horizon. The surveys must be completed under the following field conditions:

- No precipitation;
- Low noise levels;
- Little or no wind;
- Clear skies (little or no cloud cover);

[1] **Hall, Mike *"RE: Ecological Site Assessment"* Message to Angela Rainville April 9th, 2018 11:28am [E-mail]**

- Good visibility;
- Greater than 50 % moon illumination; and,
- Temperature at least 10°C or above.

The whip-poor-will survey draft protocol suggests completing a minimum of three (3) surveys during the breeding season.

In accordance with survey protocol, Enviro-Eco conducted pre-survey planning involving the examination of aerial maps and visiting the site during the day, to establish ideal locations for survey points prior to conducting the survey. Point count surveying was conducted at six (6) locations on the subject property. The entire site occupies an area of 384 hectares. According to the survey protocol, there should be at least one (1) point count for every 30 hectares, and that calls under normal conditions, can usually be heard approximately 300 metres in all directions. However, dense conifer trees and large rock outcrops were discovered and rendered a large portion of the site inaccessible due to safety concerns. Furthermore, the applicant intends to carry out operations in the orange hatched areas identified on Figure 2 “Survey Area and Point Count Locations” provided in the Figures section of this report. Therefore, it was appropriate to focus our attention on the areas selected for withdrawal.

Surveys were completed using two Enviro-Eco staff members, as safety policies require visual contact between staff working in isolated areas at night at all times. Upon arrival at each point, Enviro-Eco recorded GPS location, weather conditions and the time. At each location, for a period of at least five minutes, surveyors listened simultaneously for whip-poor-will calls. If a call was heard, the time, compass bearing, and estimated distance to the bird(s) was recorded.

3.0 RESULTS

The surveys were completed on June 1, 2018, June 2, 2018, and June 23, 2018. The field conditions and survey results are presented in the following tables. A site location map identifying the area and surrounding area is provided in Figure 1. A site map identifying survey point locations and 300 m buffer radius around each location is provided in Figure 2.

Table 1: Whip-poor-will Survey Results for June 1, 2018

June 1, 2018 - Recorders: Manon Giroux and Don Drouin					
Wind Speed: Beaufort 3 to 4, 12 - 28 km/hour					
Cloud Cover: Clear Temperature: 9°C					
Location	**Time**	**Info**	**Point 1**	**Point 2**	**EWPW Calls**
Point Count # 1	12:15 am to 12:20 am	Surveyor	MG/DD	-	No calls
		UTM m E	452498.72	-	
		UTM m N	5177070.31	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 2	12:35 am to 12:40 am	Surveyor	MG/DD	-	No calls
		UTM m E	452746.18	-	
		UTM m N	5177514.02	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 3	1:00 am to 1:05 am	Surveyor	MG/DD	-	No calls
		UTM m E	452300.23	-	
		UTM m N	5178581.9	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 4	1:20am to 1:25 am	Surveyor	MG/DD	-	No calls
		UTM m E	451732.91	-	
		UTM m N	5178251.73	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 5	2:20 am to 2:25 am	Surveyor	MG/DD	-	No calls
		UTM m E	454048	-	
		UTM m N	5177026	-	
		Bearing 1	-	-	
		Distance	-	-	
		Bearing 2	-	-	
		Distance	-	-	
Point Count # 6	2:30 am to 2:35 am	Surveyor	MG/DD	-	No calls
		UTM m E	453985	-	
		UTM m N	5177642	-	
		Bearing	-	-	
		Distance	-	-	

Note: - = no data/not applicable

As presented in the table above, on the June 1, 2018 site visit, no whip-poor-wills were heard calling during the survey, at any point count location.

Table 2: Whip-poor-will Survey Results for June 2, 2018

June 2, 2018 - Recorders: Manon Giroux and Don Drouin					
Wind Speed: Beaufort Scale 3, 18 km/hour					
Cloud Cover: Clear Temperature: 10 °C					
Location	**Time**	**Info**	**Point 1**	**Point 2**	**EWPW Calls**
Point Count # 1	12:30 am to 12:35 am	Surveyor	MG/DD	-	No calls
		UTM m E	452498.72	-	
		UTM m N	5177070.31	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 2	12:50 am to 12:55 am	Surveyor	MG/DD	-	No calls
		UTM m E	452746.18	-	
		UTM m N	5177514.02	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 3	1:15 am to 1:20 am	Surveyor	MG/DD	-	No calls
		UTM m E	452300.23	-	
		UTM m N	5178581.9	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 4	1:40 am to 1:45 am	Surveyor	MG/DD	-	No calls
		UTM m E	451732.91	-	
		UTM m N	5178251.73	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 5	11:40 pm to 11:45 pm	Surveyor	MG/DD	-	No calls
		UTM m E	454048	-	
		UTM m N	5177026	-	
		Bearing 1	-	-	
		Distance	-	-	
		Bearing 2	-	-	
		Distance	-	-	
Point Count # 6	11:55 pm to 12:00 am	Surveyor	MG/DD	-	No calls
		UTM m E	453985	-	
		UTM m N	5177642	-	
		Bearing	-	-	
		Distance	-	-	

Note: - = no data/not applicable

As presented in the table above, on the June 2, 2018 site visit, no whip-poor-wills were heard calling during the survey.

Table 3: Whip-poor-will Survey Results for June 23, 2018

June 23, 2018 - Recorders: Manon Giroux and Don Drouin					
Wind Speed: Beaufort Scale 3, 9 km/hour					
Cloud Cover: Clear Temperature: 17°C					
Location	**Time**	**Info**	**Point 1**	**Point 2**	**EWPW Calls**
Point Count # 1	1:30 am to 1:35 am	Surveyor	MG/DD	-	No calls
		UTM m E	452498.72	-	
		UTM m N	5177070.31	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 2	1:50 am to 1:55 am	Surveyor	MG/DD	-	No calls
		UTM m E	452746.18	-	
		UTM m N	5177514.02	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 3	2:15 am to 2:20 am	Surveyor	MG/DD	-	No calls
		UTM m E	452300.23	-	
		UTM m N	5178581.9	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 4	2:40 am to 2:45 am	Surveyor	MG/DD	-	No calls
		UTM m E	451732.91	-	
		UTM m N	5178251.73	-	
		Bearing	-	-	
		Distance	-	-	
Point Count # 5	12:30 am to 12:35 am	Surveyor	MG/DD	-	No calls
		UTM m E	454048	-	
		UTM m N	5177026	-	
		Bearing 1	-	-	
		Distance	-	-	
		Bearing 2	-	-	
		Distance	-	-	
Point Count # 6	12:45 am to 12:55 am	Surveyor	MG/DD	-	No calls
		UTM m E	453985	-	
		UTM m N	5177642	-	
		Bearing	-	-	
		Distance	-	-	
Note: - = no data/not applicable					

As presented in the table above, on the June 23, 2018 site visit, no whip-poor-wills were heard calling during the survey, at either point count.

4.0 DISCUSSION

No Whip-poor-will calls were heard during the surveys. As no whip-poor wills were heard during the survey, the General Habitat Categories could not be applied to the site.

5.0 CONCLUSION

No Whip-poor-will calls were identified on the site during the surveys conducted on June 1, 2, and 23, 2018. Based on the survey results, it is assumed that any development at the site will not result in negative impacts to the eastern whip-poor-will or its habitat.

We trust that the information is sufficient to meet your requirements. Should you have any questions or require further information, please do not hesitate to contact the undersigned at your convenience.

Sincerely,

For **Environmental Ecosystems Inc.,**

Angela Rainville, *EPT*
Environmental Scientist
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Manon Giroux, ***EP., C.E.T., President***
Sr. Environmental Scientist/Project Manager
mgiroux@enviro-eco.ca

ATTACHMENT 1: Figure 1 - Site Map and Survey Point Location

Figure 2: Point Count Locations

ATTACHMENT 1:

Figure 1: Site Map

Figure 2: Point Count Locations

Document Path: C:\GSG\GIS-AutoCAD\Projects\Environmental_Ecosystems\2019\57-18_Moncrieff_Eastern Whip-Poor-Will Survey\MXDs\Figure 1_Moncrieff_Site Location.mxd

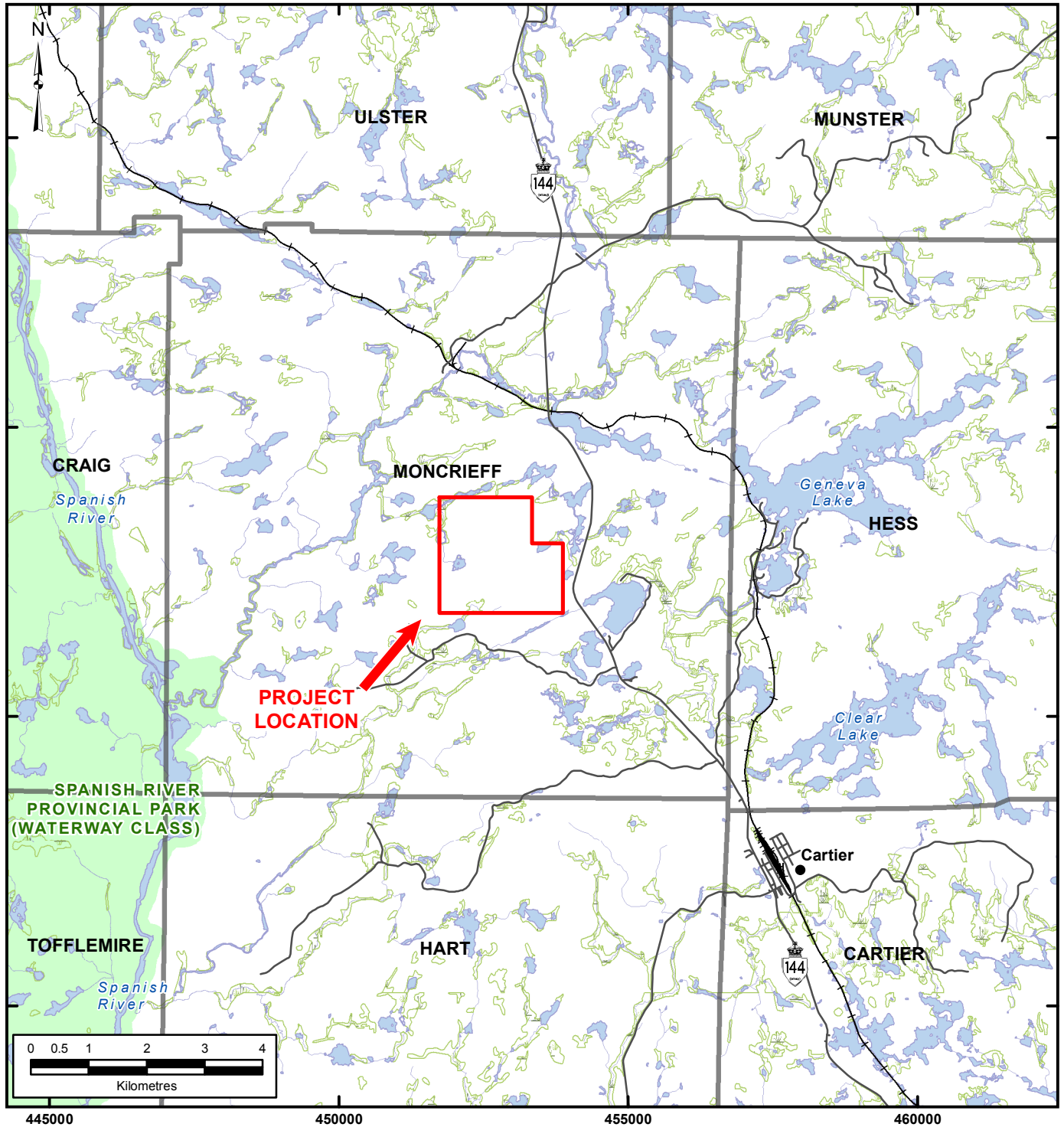

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Figure 1:

SITE LOCATION MAP & KEY MAP

EASTERN WHIP-POOR-WILL OCCURENCE SURVEY FOR A PROPERTY LOCATED IN MONCRIEFF TOWNSHIP, IN THE GREATER CITY OF SUDBURY, ONTARIO

Project Number: 57-18

Data Sources

Coordinate System

North American Datum (NAD) 1983
Universal Transverse Mercator (UTM) Zone 17N

Cartographer: Dan McCool, Marcin Gasior

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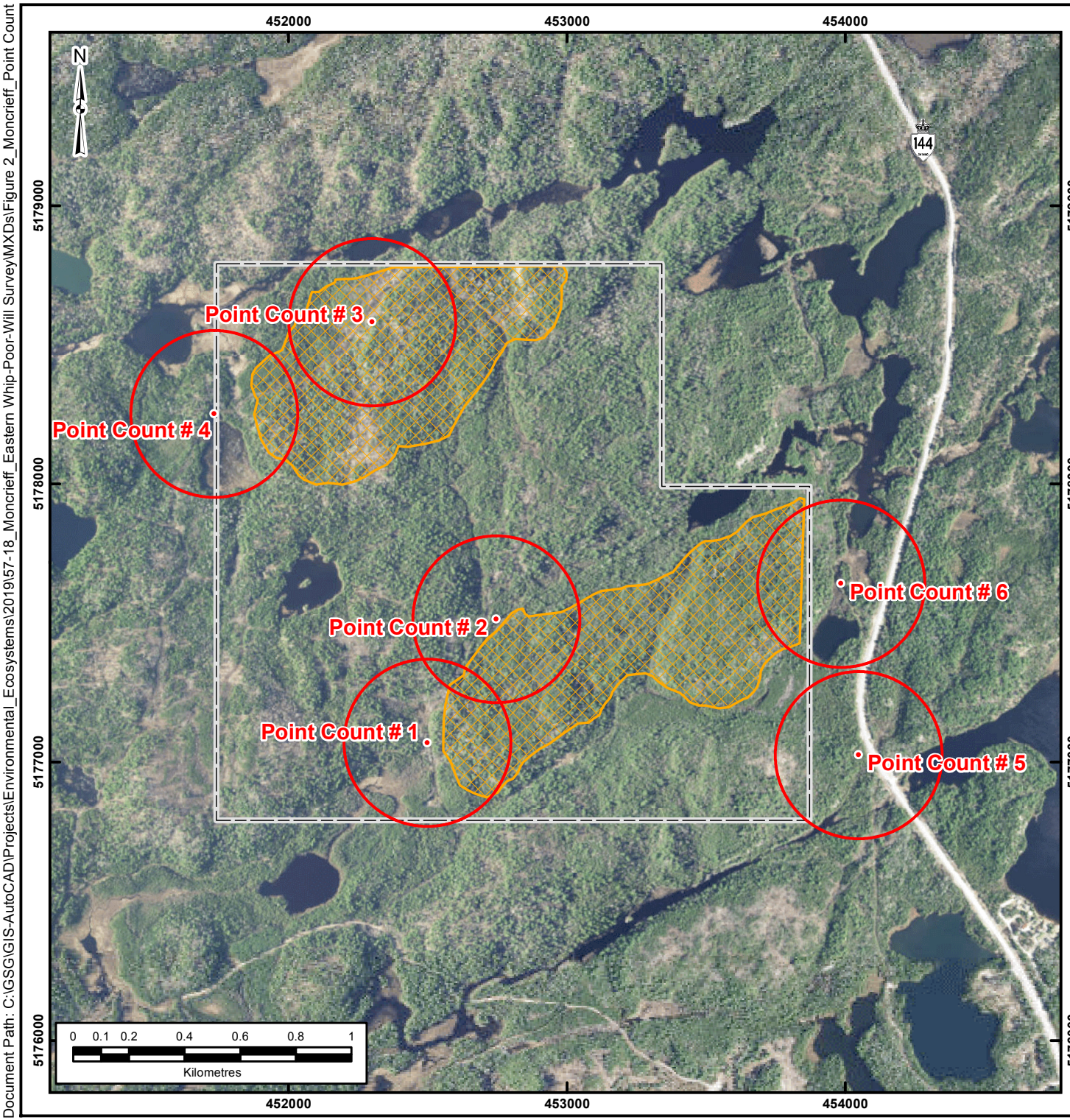

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Figure 2:

SURVEY AREA & POINT COUNT LOCATIONS

EASTERN WHIP-POOR-WILL OCCURENCE SURVEY FOR A PROPERTY LOCATED IN MONCRIEFF TOWNSIP, IN THE GREATER CITY OF SUDBURY, ONTARIO

Project Number: 57-18

LEGEND:

- Survey area
- Point count locations
- Point location 300m buffer
- Areas of potential mining interest

Data Sources

Coordinate System

North American Datum (NAD) 1983
Universal Transverse Mercator (UTM) Zone 17N

Cartographer: Dan McCool, Marcin Gasior

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Appendix D

Site Photographs

Site Photographs
Page 1 of 2

Photo 1: Creek crossing heading to site; direction of view is north.

Photo 2: Forested area around access trail on-site; direction of view is northeast.

Site Photographs
Page 2 of 2

Photo 3: Disturbed area with sparse vegetation; direction of view is west.

Photo 4: Wetland area dammed by beavers; direction of view is southwest.

Appendix E

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Stage 1 Archaeological Assessment of the Moncrieff Quarry, Moncrieff Township, Unorganized North Sudbury District

Original Final Report
Work conducted under Archaeological License P-100
Project Number P-100-0043-2019
Pat Julig and Greg Beaton

December 3, 2019

Proponent: William Day Construction Limited
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EXECUTIVE SUMMARY

In the spring of 2019, the author was contacted by William Day Construction Limited to conduct a Stage 1 Archaeological Assessment on a parcel of land intended to become a quarry south of Bannerman Creek in the Cartier/Benny area north of Sudbury. The target area is heavily forested with two very swampy slough lakes, a swampy section of Bannerman Creek and one very small lake with wet and rocky shorelines (no sandy areas to test) within 50 m of water that would not be suitable for testing. Since no known archaeological or historic sites are known to be located within or adjacent to the property and the lakes are typically very small and swampy, no further work is required.

PROJECT PERSONNEL

Pat Julig, PhD (Author), (License P-100)
Greg Beaton, MA (Co-Author) (License P-363)
Bryan Carrier Dorland (Surveyor)

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1.0 PROJECT CONTEXT

This Stage 1 will review the published and unpublished literature on the archaeological record of this region. It will follow the existing technical guidelines for archaeological studies as published by the Ministry of Tourism, Culture and Sport (MTCS), and the Ontario Regulation 170/04 and the Ontario Heritage Act, rev. 2004. In addition, the field visit will be summarized where random spot checking would be used to confirm archaeological potential on the ground.

1.1 DEVELOPMENT CONTEXT

The project area is just west of Highway 144 approximately 70 km northwest of Sudbury, ON (Figure 1; Appendix 1). It consists of a large parcel of forested land (~500 acres) typical of the Boreal Forest including mostly upland areas with rocky knobs and some smaller swamps, creeks/streams and a couple of very small lakes (Figure 1; Appendix 1). The land has been disturbed by logging over the last 100 years and there are several sand/gravel borrow pits along with some access roads however, portions remain intact. The author was contacted to conduct the Stage 1 Archaeological Assessment during the spring of 2019 and three site visits were carried out by Pat, Julig and Greg Beaton on July 12, 2019 and July 20,2019, and Pat Julig and Bryan Carrier Dorland on October 21, 2019 following mostly existing and overgrown logging roads and trails but also some densely forested inland areas to visit several small lakes.

The assessment was triggered by the Ontario Aggregate Resources Act and the approval authority is the Ministry of Natural Resources and Forestry (MNRF).

1.2 HISTORICAL CONTEXT

Written documentation of the historic period for the Sudbury area came relatively recent in comparison to many other areas of Ontario. The area was undoubtedly an important travel route to prehistoric and historic populations via the Onaping, Spanish, Vermillion and Wanapitei Rivers and also through a series of lakes that can be used to access routes to Lake Huron including Panache, Long Lake, McFarlane Lake, Richard Lake and Daisy Lake (partially documented on Chief Factor John McBean's 1827 map reprinted in Hanks, 1988). The area was primarily used and inhabited by Anishinaabe people who had regular contact with interior regions to the north, Manitoulin Island and northern Georgian Bay, before the arrival of the railroad in the 1880's.

The Hudson's Bay Company established a post at LaCloche on the North Shore of Lake Huron in 1820 (until 1892) taking over from the Northwest Company and subsequently at the mouth of the North River on Lake Wanapitei from 1822-1823 (Higgins and Peake, nd). This post was apparently abandoned since the employees were independently profiting from trade (Kaatari, 1992). Another post was established to the southwest at the north bank of the mouth of Post Creek on the shore of Lake Wanapitei in 1879 run by a man named Parshegonebe and stayed in operation until 1891. The post at Wahnapitae was included within a greater regional trading network in the Sudbury area including the post at Larchwood (1885-1892), the Sudbury Store (1886-1900) and the Whitefish Lake Post at Whitefish Lake and McNaughtonville (1824-1896). There was also a closer post to the north of the study area on Lake Pogamasing just off the Spanish River northwest of Benny(1886-1888).

First Nation Reserves in the Sudbury area were established during the signing of the Huron-Robinson Treaty No 61 of 1850, which some believe to be as a result of pressures from the mining industry hoping to free up lands (Thompson, 2011). The Anishinaabe people who already occupied the area continued to live a relatively, traditional lifestyle utilizing resources from most of the local lakes including Bimitimigamasing (Ramsey) and Nepahwin, where whitefish were harvested; both lakes basically unknown to Eurocanadians until 1883. There are also reports into the 1900s that portages were also maintained in the Lake Wanapitei area by local Anishinaabe people (Creelman, 1905). Fire also ravaged the area, increasing in the Historic era owing to the arrival of the railroad. These are documented several times during the historic period including a particularly large one to the north, that burned from Lake Timiskaming in the east to Lady Evelyn Lake and to the west toward Michipicoten in 1855 (Whitson, 1910). There were also several other large scale fires that probably affected the region including a large one near the French River that spread north in 1871 and a later one in 1896 (Whitson, 1910). It is unclear exactly what areas within the current district of Sudbury were affected by these events but they likely would have impacted local residents.

With the construction of railroads in the 1880s, blasting revealed rich mineral deposits, and the region quickly drew attention from prospectors and mining companies (Wallace, 1993). Mining camps arose near localized deposits and related acidic, air pollution from roasting beds, and also forestry began the processes that devastated the native flora and fauna and altered the landscape to what it looks like today. Initially, Sudbury was mainly a central service town to a series of satellite mining, rail, forestry and agricultural communities in the surrounding area (Stelter, 1983).

In the surrounding area of the proposed quarry the abandoned town of Benny, Ontario (originally Pulp Siding) was established in 1903 with the construction of a lumber mill (location compared to quarry in Figure 1) (Charbonneau, 2002). The population grew to a maximum of approximately 150 by 1920 and subsequently quickly declined by 1930 (Charbonneau, 2002). Most of the town became abandoned by the 1950s although a very

small population of the odd cabin has remained (Charbonneau, 2002). Part of the Benny forest area is claimed as traditional territory by Atigameksheng Anishnawbek with several traplines in the surrounding area along Bannerman Creek (personal communication with members of Atigameksheng Anishnawbek). A portion of this land to the north of the study area was surveyed by the author (Julig, 2015) where no newly identified archaeological sites were recorded.

1.3 Archaeological Context

The prehistory of Ontario goes back to the end of the glacial period of the Pleistocene era at about 11, 000 years ago, in southern Ontario and about 10,000 years ago here in the north. Paleo-Indians (ca. 11, 000 - 7500 years B.P. (Before Present)) moved into the Great Lakes region from the south and west while glaciers receded in the north. The late Paleo-Indians, referred to as the "Eastern Plano", occupied Manitoulin Island at sites such as Sheguiandah (B1H1-2) by 9500 to 10,000 years ago (Julig 1990, 2002; Julig et al. 1991), as well as sites in the Killarney region; however, artifacts of that era have not yet been found right in the immediate vicinity of Sudbury. Because the upland areas were likely free of glacial ice, potential for such sites exist. The Archaic period (7500 to 2000 B.P.), and Middle and Late Woodland periods (ca. 2000 B.P. to European contact), followed, and sites attributed to all these cultures are present in the greater Sudbury Region. These three major cultural periods will be briefly reviewed.

The Georgian Bay and Manitoulin regions are a zone of cultural transition and were used to some extent by both Northern and Southern Great Lakes ancient Native cultures, as the Huron Indians traveled north to the French River and Lake Nipissing, with some Algonquian bands such as the Odawa traveling and spending time with their Huron neighbors south of Georgian Bay. Travel and trade occurred in the ancient times as attested by "southern" and "western" artifacts that are commonly found on regional sites including stone material from as far away as the Dakotas (e.g. Knife River Flint), southern Great Lakes, and from Hudson Bay region to the North.

Paleo-Indians were the first to colonize this region after the ice retreated and were mobile hunter-gatherer bands that relied mainly on hunting large and medium size game species. The Paleo-Indians arrived in the part of North America via the Bering Strait from northeast Asia (Mason 1981), and spread through the Americas before 12,000 years ago. In the western plains regions they hunted mammoth and other large game species with Clovis tipped spears. In the Great Lakes region early Paleo-Indians lived and traveled along the shorelines of the early Great Lakes (by 10,500 B.P.), such as Lake Algonquin, a high water stand of Lake Huron. Glacial ice was still present along the north shores of the Great Lakes with taiga and tundra-like environment present between 10, 000 and 11, 000 B.P. (Julig 1991, 2002). The small mobile bands depended on herd animals such as caribou as well as elk, moose, possibly mastodon, small game and fish. However, archaeologists have not

recovered many bones of the food sources they used, or their houses, so we do not have good information on their subsistence-settlement patterns.

After the water levels of Lake Algonquin started to recede by 10,000 years ago, the Late Paleo-Indians moved into the Killarney district and to Manitoulin Island, which was connected to the Bruce Peninsula of south-central Ontario at that time. The Upper Great Lakes drained through the French River outlet and through Lake Nipissing, just south of Sudbury at that time, and there were large lakes in this local basin.

There is limited direct evidence for the Paleo-Indian way-of-life in the north. Few artifacts other than stone tools remain; however, inferences have been gained from site locations, size and context. Their chipped stone tools include materials from widely spaced geological sources, indicating considerable mobility and interaction with other widely spaced bands (Julig et al. 1989). Their tool forms include large lanceolate shaped points, large bifaces used for flakes and as knives, and many unifacial tools made from flakes, such as scrapers and engraving tools. Such tool kits or assemblages have been recovered on Manitoulin and Killarney at sites such as Giant site (BlHl-1) and Sheguiandah (B1H1-2), along with the waste products (debitage) from the tool making activities (Julig 2002). The Paleo-Indians preferred to obtain their stone tool materials from bedrock outcrops rather than from secondary deposits such as tills and gravels. These early inhabitants also used local chert of Silurian age, from the Fossil Hill Formation on Manitoulin Island. To the east, in Killarney Park, there are similar indications of Paleo-Indian activity at the George Lake site (Greenman 1966) where quartzite from the Bar River Formation was also quarried and chipped for stone tools.

The Archaic period (ca. 7500 to 2000 B.P.) has many similarities to the Paleo-Indian in the upper Great Lakes. In the boreal forest it is referred to as the "Shield Archaic" (Wright 1972), and along the St. Lawrence lowlands the "Laurentian Archaic". This culture is the most common Archaic evidence around Sudbury, with finds at of ground stone at Kelly Lake and Red Deer Lake, chipped stone artifacts at Vermillion Lake, a copper point at the Radar Station near Falconbridge, and finds reported along the north shore of Lake Wanapitei. Many of these are isolated finds and not all are registered as sites.

The people of the Archaic culture followed a hunting-gathering-fishing way of life with evidence of some larger macro-bands using the larger lakes and rivers throughout the region, and greater focus on specific resources such as fish. The regional use of copper from Lake Superior for tools and ornaments occurs prior to 6000 years ago (Beukens et al. 1992). A copper spear point was recovered from a sand dune at the CdHf-1 site (Radar Station) near Falconbridge, by the Sudbury Airport and there are unpublished reports of isolated finds along the shore of Lake Wahnapitae and in Markstay to the east of Sudbury.

During the Archaic people continued to manufacture tools from local quartz and quartzite, and also made use of some poorer quality raw materials such as greywacke (Julig et.al.1991). Studies indicate repetitious and very long-term use of sites including Sheguiandah (B1H1-2), Giant (B1H1-1), Cummins (DcJi-1) and others along the north shore

and Killarney area from Paleo-Indian continuing into Archaic times. Such artifacts are also found in local collections from the sandy moraine deposits of Garson and Falconbridge to the south of Lake Wanapitei.

New hunting technology is evident from the recovery of side-notched Early Archaic spear points. In addition other new stone tool forms appear such as ground stone gouges and trihedral chipped adzes, both of which indicate a variety of woodworking activities. Certainly watercrafts, such as dugout canoes, were used at this time. Few Early Shield Archaic sites have been radiocarbon dated in local region; however, the Foxie Otter site on Spanish River, west of Sudbury, provides a date of 7670 +- 120 B.P. for the Early Archaic occupation in this region (Hanks 1988). Similarly, the Early Archaic component on Sheguiandah site, on Manitoulin dates to ca. 8000 B.P. (Julig 2002; Julig and Beaton, 2015). A survey of the Southwest Highway Bypass located a number of probable Archaic sites around Coniston and south of Ramsey Lake and artifacts have been reported from Falconbridge.

Archaic sites are often difficult to clearly identify unless specific tool forms are found, such as ground stone gouges (Kelly Lake, Vermilion Lake, Red Deer Lake, Little Current on Manitoulin Island), or specific copper points (Radar Station Site), are recovered. Since water levels in the Georgian Bay Basin were both lower and higher than currently (they fluctuated) many coastal Georgian Bay Archaic sites were flooded and "water washed", depending on their elevation.

The Woodland period, occurring after ca. 2,000 years ago is marked by a number of changes in technology, social organization and burial practices, however, basic subsistence practices and resources used continued from earlier times. The Woodland cultural period is normally subdivided into Middle Woodland (ca. 2,000 to 1,000 B.P.) and Late Woodland (ca.1000 B.P. to Historic contact). In northern Ontario, the local Middle Woodland cultures are referred to as Laurel. This term is also applied to Middle Woodland sites from Northern Minnesota to Quebec (Wright 1972). In the Lower Great Lakes, the Point Peninsula Culture is the local variant of the Middle Woodland and is occasionally found in Northern Ontario.

Cultural innovations of the Middle Woodland include the production of pottery, use of larger settlements and burial of the dead in small mounds or sand dunes. A Middle Woodland burial mound complex is present in Killarney (Greenman 1966). A similar Middle Woodland Habitation site is also known from near the Government dock at Sheguiandah (the East Sheguiandah site, B1H1-3). Both of these sites also have ample evidence of settlement. There are also sites of this era on Lake Nipissing (Julig 2003a and b) and artifacts from this period may be present on Lake Wanapitei and to the east along the Veuve river, based on isolated finds.

During the Middle Woodland the use of fishing nets is evident from stone "net sinkers". Copper continued to be used for tools and ornaments, harpoons were manufactured from bone and people continued to manufacture a range of stone tools. Pottery was decorated with a number of tools. At the Speigel site in Killarney, the presence of chert artifacts of

southern flints and the Adena burial mound complex indicates social connections to the southern Lake Huron region and beyond (Julig 2004). The Middle Woodland people had widespread social interaction and trade networks.

The Late Woodland period (1,000 B.P. to contact) is marked by the appearance of a variety of ceramic styles from the northern Great Lakes as well as Iroquoian influence from the south. Considerable trade is evident throughout the Manitoulin and Georgian Bay region, which culminated with the arrival of the Europeans and the establishment of the fur trade. The trade networks of the Odawa of Manitoulin were well established with the Huron and other groups, with whom they traded siltstone beads, along with other materials such as furs, in exchange for tobacco and corn. The artifact assemblages of the Late Woodland include the characteristic ceramics and small triangular and side-notched points, and at around 1620 A.D., the appearance of European trade goods. There are many sites of this era from the region. These are normally identified by the decoration on the pottery. As was the case with earlier people, Late Woodland peoples preferred to locate sites near larger lakes and rivers, such as Lake Wanapitei and the drainages into Georgian Bay.

Referring specifically to the area surrounding the City of Greater Sudbury, the area lay under a massive ice lobe prior to 11000 BP. At 11000 BP it began to retreat toward the Cartier area but it is unclear when the first people moved into the region (Devereux, 1983). The archaeological evidence to this point is sparse at best but likely reflects a lack of survey and possibly the erosional effects of logging and industrial pollution. The earliest evidence is likely from the Early Archaic Period but it is still possible that earlier sites will be found. These artifacts come from Long Lake and further toward the Vermillion River along a chain of lakes that may have served as a travel route including quartzite tools but no radiometric dates (Devereux, 1983). Further to the northwest at the Foxie Otter Site a date of 7670 BP was obtained so it would seem this region was inhabited at least as early as this date (Hanks, 1986). Several later middle Archaic sites are noted by the presence of a Laurentian Archaic ground stone gouge found at Red Deer Lake. Additionally, the Woodland period is represented by sites on Whitefish and Whitewater Lakes.

In addition to the sites listed above, other findspots are known. Laurentian University collections include a Laurentian Archaic ground-stone gouge from the Kelly Lake area and similar ones from Vermillion Lake and West Morgan Lake near Levack. Points have been reported on the North River, on the north side of Wanapitei. These finds and others have not been assigned a Borden numbers because that were found by local residents and lack precise information on the original location on these surface finds.

In Sudbury, many of the “inland” sites appear to be “chipping stations” at vein quartz deposits, which were used for stone-tool manufacture, since chert and flint are locally unavailable in the bedrock. Also, a few sites are reported along the major rivers, such as the Wanapitei, Spanish and Vermilion, and at favored fishing locations, such as Moose Rapids. This is a common pattern since these are favored fishing locations both in prehistoric times and today, however there has been almost no systematic survey, and these are mostly chance finds by local residents such as the Spanish River Cache (Julig and Long, 2013).

Another upland archaeological survey in Sudbury, the Collège Boreal survey (Julig and Buchanan 1994), was of rock knob terrain, with some swamps and swales. Despite the occurrence of considerable vein quartz there was no evidence of prehistoric use, as no sites were found. Two more recent CRM archaeological surveys of the Nickel-Rim south by Julig in 2005 and of the Bowell mining site property by Julig in 2006 did not locate any sites, despite considerable Stage 2 survey. This indicates the sparse nature of archaeological sites in the rugged northern Sudbury basin and interior rocky lands away from the major water sources. The exception to this is the area around Lake Wanapitei, where there appears to be somewhat different pattern. This is exemplified by the recent Vale survey (Julig and Beaton, 2012) which identified two sites along a series of lakes which appear to be along a travel route in the interior. Both contain Gordon Lake chert and HBL chert.

Most known sites are present along the southern and western Sudbury basin, where a travel corridor existed from the Vermillion River, via Whitefish Lake, MacFarlane and Richard Lakes, and into the Wanapitei River system. This travel corridor mentioned in the Historic Context section was active during Contact times and the Fur-trade era, and appears to have great depth in pre-history, with considerable use of the upland vein quartz sources and well as Gordon Lake chert and HBL chert (traded from the north) for tool manufacture in this area. Further to the north and west, along the Spanish River drainage system (Study area) a similar pattern exists.

2.0 STAGE 1 FIELD METHODS

The field nspection followed the Standards and Guidelines for Consulting Archaeologists (Ministry of Tourism, Culture and Sport 2011) outlined in Section 1.2 Property Inspection (Optional). Portions of the project area were examined on July 12, July 20th and October 21st 2019 through random spot checking mostly along the several logging roads crossing the property under good weather conditions with excellent ground visibility. The inspection was conducted across the study area but focused particularly on topographic features that would be indicative of elevated archaeological potential. This includes mostly permanent water features such as small lakes as well as knolls, ridges or plateaus, relic water channels, glacial shorelines, patches of well drained soil and elevated areas. The presence/absence of other features that may affect the assessment strategy were also noted including woodlots, wet areas, steep grades, overgrown vegetation, heavy soils and recent disturbance. In addition, the area was searched for heritage structures/landscapes, cairns/monuments/plaques and cemeteries.

3.0 Stage 1 Analysis and Conclusions

The proposed Moncrieff Quarry mostly consists of upland rock knobs and lacks significant drainages and other hydrological features that would indicate elevated archaeological potential (Figures 2-4). The small lakes and the portion of Bannerman Creek, a fish order stream, that run through the property are ephemeral and mostly swampy and the other lakes are very small with poorly defined banks and wet, rocky and sometimes steeply sloping shorelines (Figures 5-7).

No previously recorded sites are located within or anywhere near the projects area. As most of the project area is located away from the Spanish River, potential would be largely limited to "special use sites" such as monitoring and hunting sites/camps etc. and these would be primarily located along navigable waterways.

The presence of natural resources that may signal site potential include siliceous lithic materials to make stone tools (chert/flint, fine-grained quartzite, etc.). There is considerable exposed bedrock within the development area and one small slate outcrop (no cultural modification) but no known typical raw material sources used by indigenous people in the immediate area. It might be possible in this general area to find the odd HBL cherty cobble in glacial till or other glacial and post glacial strata and some argillite is known further north but lithic resources are sparse at best.

Some topographic features contain elevated archaeological potential such as eskers, drumlines and glaciolacustrine features such as beach ridges. However, no known topographic features of this sort are located within the project area. Hydrological features such as lake, rivers and creeks can also contain archaeological potential along shorelines. These were checked during the field visits, but no sandy beaches are evident.

There are several small lakes and a small section of Bannerman creek in the northwestern portion of the property (Figure 2). However, as observed during property inspection none of these hydrological feature warrant shovel testing as they are mainly shallow, swampy sloughs with an additional two small lakes with swampy shorelines that are sometimes also rocky or sloping in areas (within 50 m of the water). No level sandy beach areas were noted with high potential that should be tested.

Extensive surface ground disturbance would contribute to low archaeological potential. The area has likely been logged over in spots but it is unclear to what extent the land has been disturbed in the forested areas except where logging roads and trails were built. There is a system of access roads and quarrying areas/borrow pits that already exist within the project boundaries and these would hold little potential for finding intact sites. Ground disturbance around these small sandy pockets were looked at during the property inspections with no archaeological artifacts noted.

3.1 Property Inspection

The property inspection consisted of random spot checking across the study area in any locations considered to be high archaeological potential according to the 2011 Standards and Guidelines for Consulting Archaeologists. No new archaeological features or artifacts were identified during the course of the inspection. The primary focus was on walking the study area to examine the characteristic terrain and to visit small lakes and creek areas that may contain elevated archaeological potential. The terrain is typical of the Boreal Forest in the region – heavily forested and difficult to access, with swampy areas located between elevations in topography including many rocky hills. Three permanent water sources that were examined are located in the northwest of the property but they are swampy or have wet and/or rocky or sloping shores within 50 m of the water and are extremely small with few fish resources likely. Two very small lakes in the eastern portion of the property were also visited but also did not contain testable areas with some swampy/wet portions and sloping/rocky shores within 50 m of permanent water. No places visited during the property inspection seemed to contain potential according to the 2011 Standards and Guidelines for Consulting Archaeologists.

4.0 Stage 1 Recommendations

No further work is required as the hydrological features and other terrain located within the study area do not contain archaeological potential according to the 2011 Standards and Guidelines for Consulting Archaeologists. In addition, no previously recorded sites are located within or adjacent to the development area and none were identified during property inspection.

5.0 Advice on Compliance With Legislation

This report is submitted to the Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O., 1990, c0. 18. This report is reviewed to make sure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism, Culture and Sport a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the Ontario Heritage Act.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act.* The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the *Ontario Heritage Act*.

The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c33 (proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Register of Cemeteries at the Ministry of Consumer Services.

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7.0 MAPS

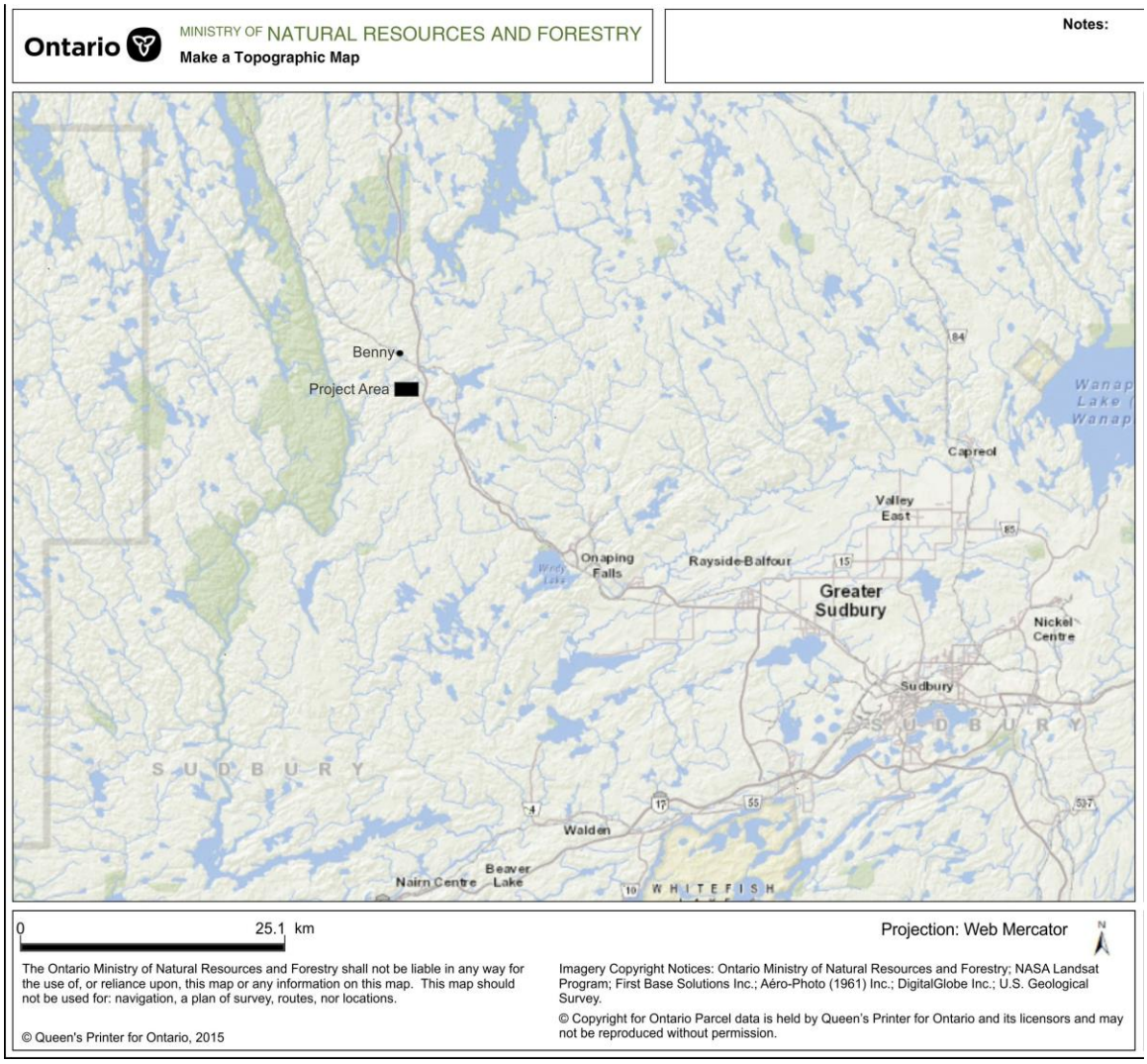

Figure 1: Location of project area

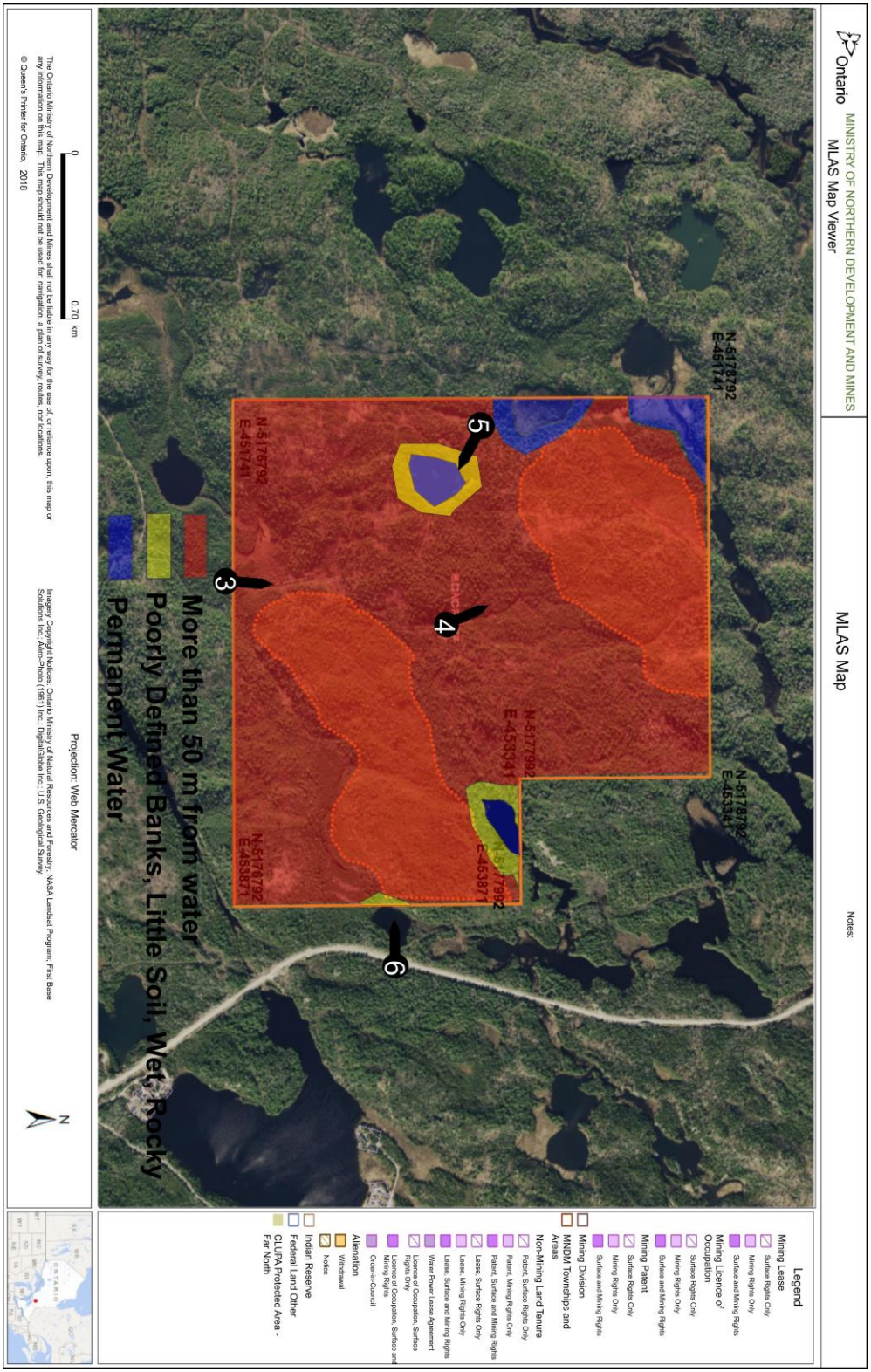

Figure 2: Project area with location of photos

8.0 PHOTOS

Figure 3: Typical swampy terrain

Figure 4: Typical rocky uplands

Figure 5: Shoreline of small lake within western portion showing wet/boggy shoreline and lack of sandy beaches

Figure 6: Low banks and wet shoreline of lake just off eastern portion of property

APPENDIX 1: PROJECT AREA