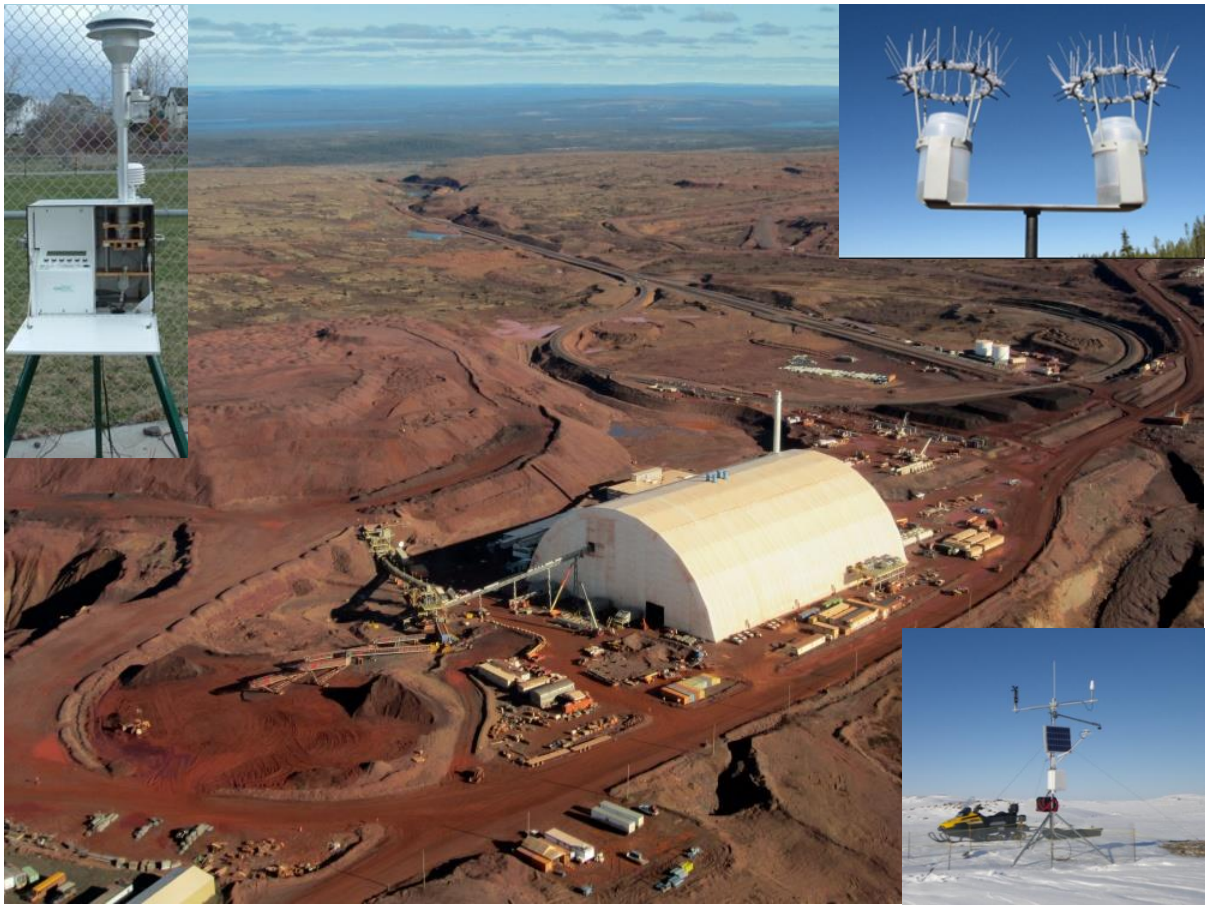
AMBIENT AIR QUALITY MONITORING PLAN

Tata Steel Minerals Canada Ltd.

Direct Shipping Ore Project



March 2015

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1. Name of Undertaking

Proposed Ambient Air Quality Monitoring Plan
Tata Steel Minerals Canada Ltd.
Direct Shipping Ore (DSO) Project

1.1 Proponent

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2. Project Information

2.1 Overview

Tata Steel Minerals Canada Ltd. (TSMC) is completing construction of its iron ore processing plant and associated infrastructure. The plant, located in Labrador approximately 25 km NW of Schefferville, Quebec, is the core of the Direct Shipping Ore (DSO) Project and is scheduled to be operational in 2015. Ore is and will be mined from a series of open pits located both in the provinces of Quebec and Newfoundland & Labrador. Figure 1 shows the location of the different open pits areas (from DSO1 to DSO4). To monitor air quality, TSMC will implement an Air Quality Monitoring (AQM) Program.

For DSO4, Assessment Group 2a (referred to as Goodwood/Sunny), TSMC had submitted to the province of Quebec two documents related to air quality monitoring in the vicinity of this project:

- Air Sampling Program – DSO Project 2A, prepared by AECOM, August 2013; and
- Environmental Monitoring Program - DSO Project 2A. Section 1 – Dust Dispersion, prepared by WSP, April 2014.

Since that time, mining and operation plans have evolved rapidly. For example, an environmental registration and impact statement is currently under review for the Howse Property project; this project is located in NL and is expected to start in 2016, pending approval. Also, the Joan Lake Project (DSO4, 2b) also located in NL started in 2015. Consequently, TSMC conducted an overall review of current and upcoming mining activities and a revised Air Quality Monitoring (AQM) Plan.

This AQM plan will then be used as the basis to develop a detailed AQM Program, which will include detailed Standard Operating Procedures, Quality Control sections and elements listed in Section 2.5.2 of the Air Sampling Program – DSO Project 2A, prepared by AECOM, August 2013. In addition, the AQM Program will be developed in cooperation with the First Nations to include their knowledge of the territory and meet their expectations.

2.2 Conditions of the Certificate of Authorization issued by the MDDELCC for Project 2A

Following submission of the environmental impact study and assessment of the environmental and social impacts by the Kativik Environmental Quality Commission, the Quebec government issued TSMC a certificate of authorization (CA) to mine the Goodwood and Sunny 1 deposits (DSO Project 2a) in Nuvavik, Quebec. The certificate of authorization contains 21 conditions with which TSMC must comply.

Condition 4 specifically contains conditions pertaining to dust and reads as follows:

> *"Within six months of project signoff, the proponent must submit to the Administrator for approval an environmental monitoring program for dust emissions around its facilities and at certain stations whose locations are to be determined according to prevailing winds and the receiving environment. This monitoring program must make it possible to ensure that surrounding bodies of water will not be contaminated by this dust in Quebec and verify whether the activities being carried out in Quebec have an impact in Labrador."*

On November 20, 2014, MDDELCC transmitted a letter to TSMC with a list of questions and comments on the CA conditions. Some of these questions and comments are linked to Condition 4 of the CA and were incorporated in this AQM Plan. A copy of these questions and comments on Condition 4 is provided in Appendix C and under each, TSMC answer is provided.

2.3 Objectives of the AQM Plan

While conducting the overall review of air quality monitoring, the following objectives were set:

1. **The Air Quality Monitoring (AQM) Plan covers DSO3 and DSO4 areas**

   DSO3 and DSO4 areas can be seen on Figure 1. DSO3 and DSO4 are joined by the Goodwood Road and the distance between them is approximately 13 km. Note that for the purpose of this AQM Plan, the Howse project, for which an Environmental Impact Statement was submitted in early 2015[1], is considered part of DSO3. Also note that all ore mined from the different deposits is hauled to the main processing plant located in the DSO3 area, where it is processed and/or shipped by rail.

   Starting in 2015, mining and processing activities will be concurrent in both DSO3 and DSO4 projects. Consequently, the AQM Plan and associated monitoring schedule must encompass both projects anticipated production schedule.

2. **Compatibility with previous Air Monitoring Plans for the DSO4 Project 2a (Goodwood/Sunny) presented to the province of Quebec**

   As indicated in Section 2.1, two reports were already presented to the province of Quebec:
   - Air Sampling Program – DSO Project 2A, prepared by AECOM, August 2013; and
   - Environmental Monitoring Program - DSO Project 2A, Section 1 – Dust Dispersion, prepared by WSP, April 2014.

   Both these reports contained explanations on air monitoring site selection and sampling methods to be used. Air monitoring site selection was based on dispersion modeling results, site accessibility and environmental conditions. The AQM Plan must :

   - combine the two programs from DSO Project 2A and avoid duplication
   - consider the fact that mining at the Joan Lake Project (DSO4, Project 2b, Kivivic pits) has started in 2015 and the deposits are in fairly close proximity (1 to 3 km) to those of the DSO Project 2A (Goodwood/Sunny mining expected to start in 2016/2017)
   - use a similar procedure to identify acceptable air monitoring sites for DSO3 and the deposits nearby Joan Lake (DSO4, Project 2b).

3. **The AQM Plan should meet provincial requirements of both Quebec and Newfoundland and Labrador**

   Some DSO3 and DSO4 deposits are located in Quebec, while others are located in Newfoundland and Labrador. All deposits are located within 5 km from the border between the two provinces. Consequently, activity at any of the work sites has the potential to affect air quality in either province. Each province has its own regulations and procedures pertaining to ambient air quality monitoring, and the sampling approach will be compliant with requirements from both provinces.

4. **Consistent sampling methods and procedures should be used regardless of whether the monitoring point is in Quebec or Newfoundland and Labrador**

   Selected sampling methods and procedures must be chosen to ensure compatibility and consistency of the AQM Plan, whether the monitoring point is located in Quebec or Newfoundland and Labrador. This way, equipment purchase and training of the staff in charge of the monitoring program will be facilitated. Note that sampling methods and procedures applicable in both provinces are usually identical as they are typically issued by Environment Canada or the USEPA; consequently methodology discrepancies are not expected.

[1] *http://www.ceaa-acee.gc.ca/050/documents-eng.cfm?evaluation=80067, Accessed March, 2015.*

5. **Sampling methods and equipment must take into account extreme cold weather conditions AND the remoteness of sampling locations**

   The sampling approach must consider the extended periods of very low ambient temperatures that the site experiences in the winter months, as well as the availability of grid electricity. All electricity at the site is produced by diesel powered generators operated by TSMC. These two factors must be considered when selecting sampling methods and equipment for monitoring ambient air quality of the DSO Complex. Additionally, except for the workers' camp owned by TSMC, there are no immediate permanent inhabited settlements in close proximity to the DSO Complex: Schefferville and Kawawachikamak are located approximately 25 km from the DSO3 Area.

6. **Monitoring equipment must be portable and easily modified as site activities change**

   Mining sites will vary over time. Depending on available ore volumes, mining at some deposits can be completed in two years while at other deposits it may take several years. Selected sampling approach and equipment will have to be moved so that mining operations can be followed.

2.4 Mining Plan - TSMC's DSO projects (including Howse Property)

Table 1 shows the years of operation of the different DSO areas, as currently planned. An "X" in the table indicates that ore is scheduled to be mined during that year.

Table 1: Mining Plan TSMC's DSO projects, including Howse Property (2012-2027)

Project/ Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Howse Property	--	--	--	--	X	X	X	X	X	X	X	X	X	X	X	X
DSO 3 (1a)	X	X	X	X	X	--	--	--	--	--	--	--	--	--	--	--
DSO 4 (2a)	--	--	--	--	(X)	X	X	X	X	X	X	X	X	--	--	--
DSO 4 (2b)	--	--	--	X	X	X	X	X	X	--	--	--	--	--	--	--

Howse Property main deposit is : Howse
DSO3 (1a) main deposits are: Timmins 3N, 4, 7, Fleming 7N
DSO4 (2a) main deposits are: Goodwood, Sunny 1. In 2016, it is possible that preparation and/or mining activities occur at Goodwood.
DSO4 (2b) main deposits are: Kivivic 1C, 2, 3N, 4, 5 (also referred to as Joan Lake Project)

2.5 Provincial Ambient Air Quality Standards (PAAQS)

Table 2 lists QC and NL Ambient Air Quality Standards for parameters included in the AQM Plan.

Table 2: Provincial Ambient Air Quality Standards (PAAQS) – QC and NL

Parameter	Averaging Period	NL Air quality standards[2] (µg/m^3, unless otherwise indicated)	QC Air quality standards[3] (µg/m^3)
Particulate Matter (Total) TPM	1 yr	60	--
	24 hr	120	120
Particulate Matter less than 10µm PM_{10}	24 hr	50	--
Fine Particulate $PM_{2.5}$	1 yr	8.8	--
	24 hr	25	30
Dustfall	30 days	7.0 g/m^2	--
	1 yr	4.6 g/m^2	--
NO_2	1 yr	100	103
	24 hr	200	207
	1 hr	400	414
Metals			
Antimony (Sb)	1 yr	--	0.17
Arsenic (As)	1 yr	--	0.003
	24 hr	0.3	--
Barium (Ba)	1 yr	--	0.05
Beryllium (Be)	1 yr	--	0.0004
Cadmium (Cd)	1 yr	--	0.0036
	24 hr	2	--
Chromium (Cr)	1 yr		0.004
Copper (Cu)	24 hr	50	2.5
Lead (Pb)	1 yr	--	0.1
	30 days	0.7	--
	24 hr	2.0	--
Mercury (Hg)	1 yr	--	0.005
	24 hr	2	--
Nickel (Ni)	1 yr	--	0.014
	24 hr	2	--
Silver (Ag)	1 yr	--	0.23
Thallium (Tl)	1 yr	--	0.25
Vanadium (V)	1 yr	--	1
	24 hr	2	
Zinc	24 hr	120	2.5

[2] *Air Pollution Control Regulations, 2004, NLR 39/04, <http://canlii.ca/t/527dm> retrieved on 2015-03-25*
[3] *Clean Air Regulation, CQLR c Q-2, r 4.1, <http://canlii.ca/t/525tb> retrieved on 2015-03-25*

3. Project Maps and AQM Stations Locations

Three figures are included in this section:

Figure 1: Locations of DSO Projects. This figure shows the general location of all DSO Projects as they were identified for the Howse Property Environmental Impact Assessment

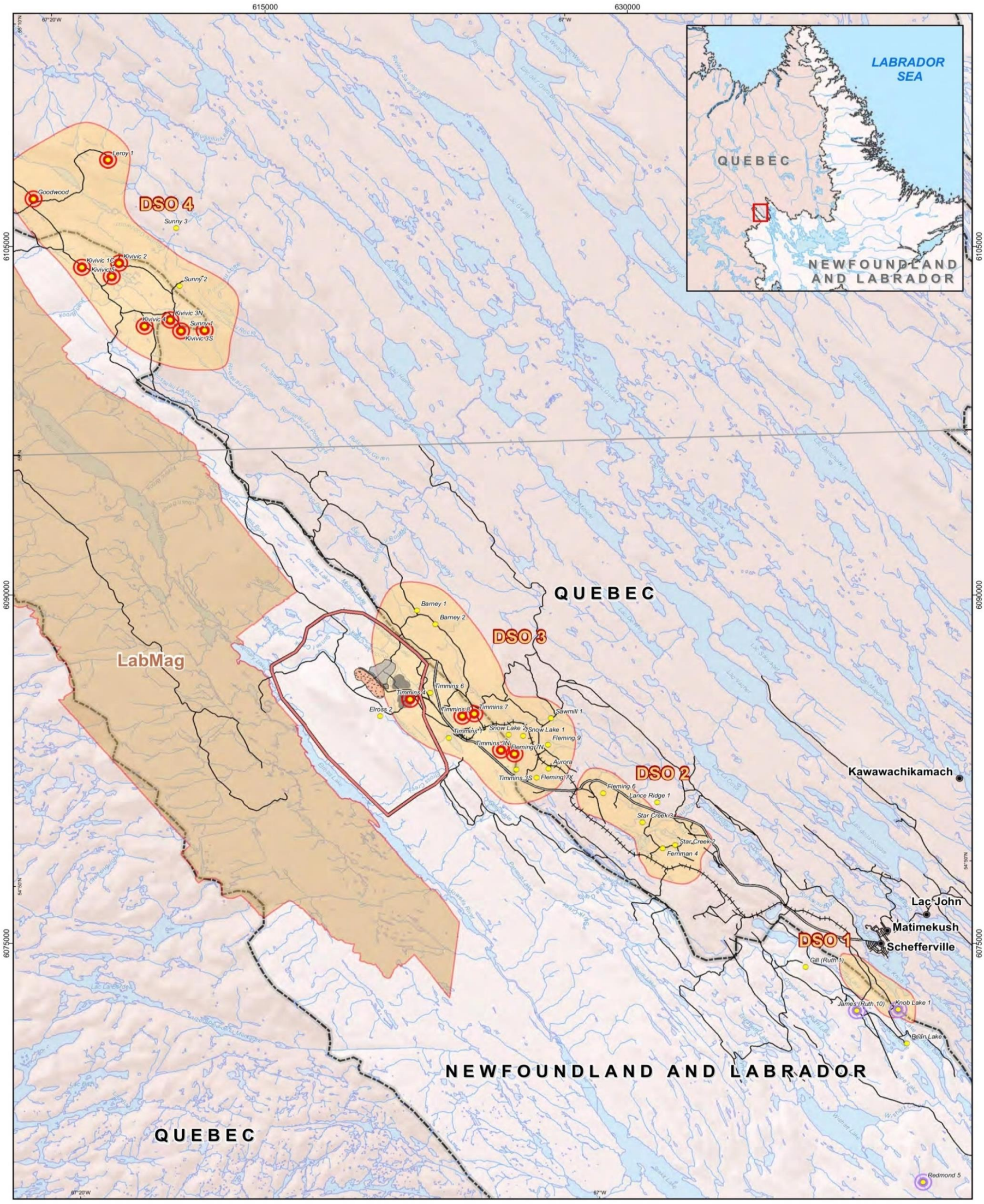
Figure 2: DSO3 Air Quality Monitoring Stations. This figure shows the planned locations of AQM stations in the vicinity of the DSO3 Area.

Figure 3: DSO4 Air Quality Monitoring Stations. This figure shows the planned locations of AQM stations in the vicinity of the DSO4 Area.

Figure 2 and Figure 3 also show the following items:

- Planned location of the meteorological stations;
- Processing plants, workers' camp and offices; and
- Sensitive receptors. Included in the Howse Property Environmental Impact Statement, a list of sensitive receptors was identified (see Appendix B for list of sensitive receptors). These receptors are shown on the figures.

Figure 1: Locations of DSO Projects



LEGEND

Infrastructure And Mining Components

- DSO - Deposit
- LIM Project
- TSMC Project
- Proposed Howse Pit
- Proposed Low Grade/Overburden Stockpile
- Proposed Crushing/Screening Facility
- Proposed Waste Rock Dump
- DSO Howse Local study area
- DSO - Other Site
- Taconite - LabMag

Basemap

- Town
- Railroad
- Road
- Watercourse
- Waterbody
- Provincial Boundary

Figure 1

Location

DSO Howse Property

0 2,5 5 7,5 10

Kilometers

SCALE:
1:150 000

FILE, VERSION, DATE, AUTHOR:
GH-0466, 03, 2014-01-14, E.D., J.T.

SOURCES:

Map base
Government of Canada, NTDB, 1:50,000, 1979
SNC Lavalin, Groupe Hémisphères, Hydrology update, 2013.

Infrastructure and Mining Components
New Millennium Capital Corp., Mining sites and roads
TATA Steel Minerals Canada Limited/ MET-CHEM, Howse Deposit Design for General Layout., 2013

GroupeHemispheres

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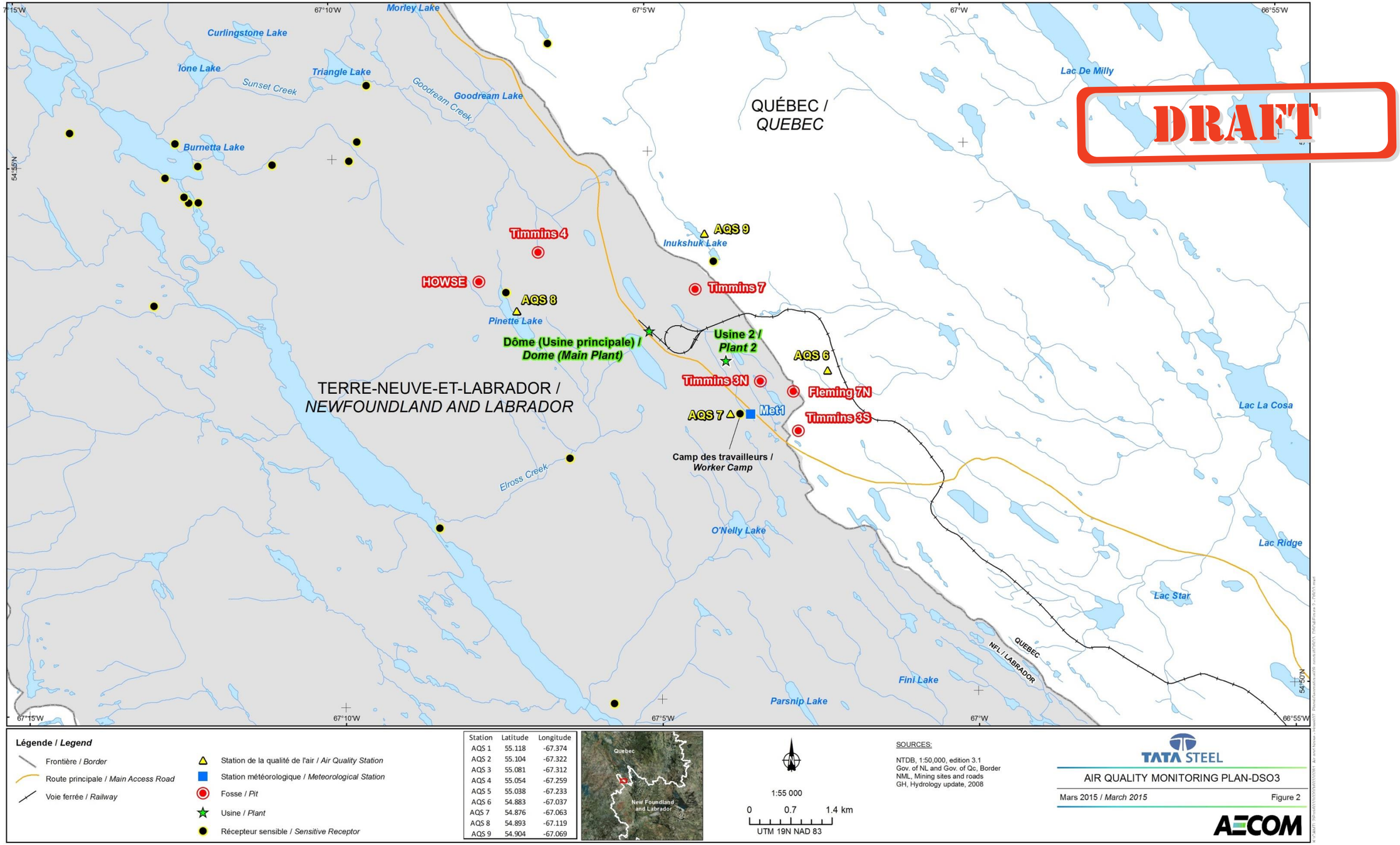
Figure 2: Location of Air Quality Monitoring Stations – DSO3



Légende / *Legend*

- Frontière / *Border*
- Route principale / *Main Access Road*
- Voie ferrée / *Railway*
- Station de la qualité de l'air / *Air Quality Station*
- Station météorologique / *Meteorological Station*
- Fosse / *Pit*
- Usine / *Plant*
- Récepteur sensible / *Sensitive Receptor*

Station	Latitude	Longitude
AQS 1	55.118	-67.374
AQS 2	55.104	-67.322
AQS 3	55.081	-67.312
AQS 4	55.054	-67.259
AQS 5	55.038	-67.233
AQS 6	54.883	-67.037
AQS 7	54.876	-67.063
AQS 8	54.893	-67.119
AQS 9	54.904	-67.069

1:55 000

0 0.7 1.4 km

UTM 19N NAD 83

SOURCES:

NTDB, 1:50,000, edition 3.1
Gov. of NL and Gov. of Qc, Border
NML, Mining sites and roads
GH, Hydrology update, 2008

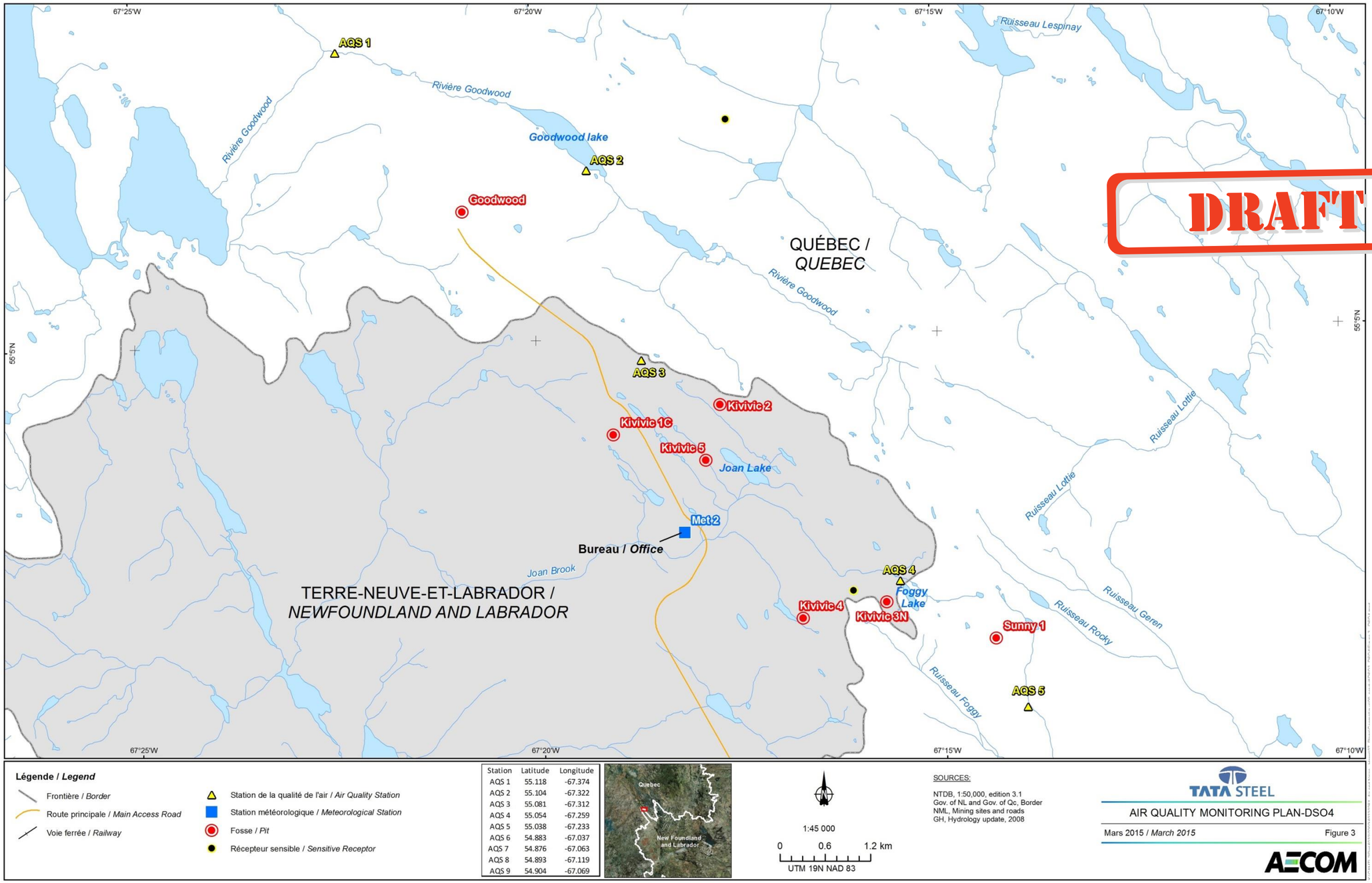
TATA STEEL

AIR QUALITY MONITORING PLAN-DSO3

Mars 2015 / *March 2015* Figure 2

AECOM

Figure 3: Location of Air Quality Monitoring Stations – DSO4



4. Air Quality Monitoring Matrix

Table 3 shows the DSO Ambient Air Quality Monitoring Matrix. This matrix includes the list of monitoring stations, parameters to be measured and measurement frequency. The parameters and frequency vary according to season (winter or summer) to account for equipment limitations and environmental conditions.

Table 3 contains three notes, defined below:

(A) Due to remote location and unavailability of electrical power, operation of sampling equipment at cold temperature is not possible during winter;

(B) During the winter period (7 months), snow sample will be taken at the end of winter/early spring;

(C) Metals analyses will be performed on TPM and dustfall samples. Metals analysis frequency is described in Section **Erreur ! Source du renvoi introuvable.**.

(D) In the comming weeks, equipement type and monitored parameters at station AQS-7 (Workers' camp) may be revised according to specific requireemnts by the Government of TNL (currently in discussion).

* DustTrak (or equivalent portable equipment) to be operated simultaneously to measure $PM_{2.5}$/TPM sampling for calibration and verification purposes. When/if additional immediate short-term measurements are required for assessment purposes or other reasons; the portable equipment will be used.

Sampling methods for each parameter are summarized in Table 4 and a detailed description of each sampling method is provided in Section 5.

Table 3: DSO Ambient Air Quality Monitoring Matrix

Station ID #	Name	Province	Closest pit Closest water body Closest Sensitive Receptor	DSO Project	Assessment Group (Operation Year)	Coordinates		Summer 5 months: May-June-July-August-September					Winter 7 months: Oct-Nov-Dec-Jan-Feb-March-Apr				
						Lat	Long	$PM_{2.5}$	TPM[(C)]	NO_2	Dustfall[(C)]	DustTrak	$PM_{2.5}$	TPM[(C)]	NO_2	Dustfall[(C)]	DustTrak
AQS-1	**Goodwood River** *(Previous ID #: P1 by WSP)*	NL	Goodwood (2.6km) and Kivivic 1C (6.2km) Goodwood River (<100 m) R9 Naskapi Camp (5.2 km)	DSO4	2b (2015) 2a (2016/2017)	55.1182	-67.3737	--	--	--	5	--	--	--	--	(B)	--
AQS-2	**Goodwood Lake** *(Previous ID #: S-R9 by AECOM and ID #: P2 by WSP)*	QC	Goodwood (1.5km) and Kivivic 1C (3.5km) Goodwood Lake (<100 m) R9 Naskapi Camp (2 km)	DSO4	2b (2015) 2a (2016/2017)	55.1035	-67.3221	5	5	5	5	5*	(A)	(A)	3	(B)	(A)
AQS-3	**Between Goodwood pit and Joan Lake** *(Previous ID #: P3 by WSP)*	NL-QC border	Kivivic 1C (1.0 km) and Kivivic 2 (1.4km) Joan Lake (1.5 km) R9 Naskapi Camp (3.3 km)	DSO4	2b (2015) 2a (2016/2017)	55.0808	-67.3115	--	--	--	5	--	--	--	--	(B)	--
AQS-4	**Foggy Lake** *(Previous ID #: S-R1 by AECOM and ID #: P5 by WSP)*	NL-QC border	Sunny 1 and Kivivic3&4 (0.3-1 km) Foggy Lake (<100 m) R1 Innu Camp (1 km)	DSO4	2b (2015) 2a (2016/2017)	55.0538	-67.2589	5	5	5	5	5*	(A)	(A)	3	(B)	(A)
AQS-5	**Sunny 1** *(Previous ID #: P6 by WSP)*	QC	Sunny 1 (1km) and Kivivic3S (1.6 km) Foggy Brook (<100 m) R1 Innu Camp (2.8 km)	DSO4	2b (n/a) 2a (2016/2017)	55.0383	-67.2330	--	--	--	5	--	--	--	--	(B)	--
AQS-6	**Fleming 7N** *(Previous ID #: S-Cl1 by AECOM)*	QC	Fleming 7N (800m) --- Workers' camp (1.6 km)	DSO3	1a (operational)	54.8797	-67.0466	5	5	5	5	5*	(A)	(A)	3	(B)	(A)
AQS-7	**Workers' Camp (D)** (New station, no previous ID #)	NL	Timmins and Fleming 7N (1km) --- Rec17 – Workers' camp (<100m)	DSO3	1a (in operation)	54.8764	-67.0601	10	10	5	5	10*	(A)	(A)	7	(B)	(A)
AQS-8	**Pinette Lake** (New station, no previous ID #)	NL	Howse (500 m) Pinette Lake (<100m) Rec1 - Pinette Lake (<100m)	DSO3	Howse (2016)	54.8930	-67.1190	5	5	5	5	5*	(A)	(A)	3	(B)	(A)
AQS-9	**Inukshuk Lake** (New station, no previous ID #)	QC	Timmins 7 (800 m) InukShuk Lake (<100m) Rec9 - Pinette Lake (<100m)	DSO3	1a (in operation)	54.9040	-67.0690	5	5	5	5	5*	(A)	(A)	3	(B)	(A)
--	~~Joan Lake~~ ~~*(Previous ID #: P4 by WSP)*~~		*In WSP Dustfall monitoring plan, this station (P4) was identified as temporary until mining at the Kivivic Deposits start. Kivivic mining should start in 2015; therefore this station is located within the administrative boundary of the Kivivic site and is not required anymore. Dust effect on water quality will be evaluated via the water quality monitoring plan.*														

SEE PREVIOUS PAGE FOR NOTES (A), (B) and *

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5. Air Monitoring Methods

5.1 Selection of Monitoring Methods and Equipment

Sampling equipment and test methods selected to meet the objectives of the AQM Plan are summarized in Table 4.

The following sections describe in more details the sampling equipment and analytical methods to be used for each parameter. Sample analyses will be performed either by TSMC's on-site laboratory or by outside accredited laboratories. Analyses frequency is also described for each type of sample.

Table 4: Summary - Test Methods and Sampling Equipment - DSO AQM Plan

Parameter	Equipment	Test Method	Duration of a test [1]	Comments
TPM and Metals	BGI PQ-200	High Volume Method, EPS 1-AP-73-2 (Environment Canada), modified (see comments)	24 hours	Due to multiple remote locations and unavailability of grid electricity, an alternative portable battery powered equipment was selected. Sampling flow rate is 16.7 lpm, instead of 1.4 m^3/min for the Hi-Vol method. Metals analysis to be performed by certified lab
$PM_{2.5}$	BGI PQ-200 with Very Sharp Cut Cyclone (VSCC)	Equivalent Method CCME PN1456 Ambient Air Monitoring Protocol for the Canada-wide Standards (CWS) for PM2.5 and Ozone / USEPA, Appendix L to Part 40 CFR Part 50 - Reference Method for the Determination of Fine Particulate Matter as PM2.5 in the Atmosphere	24 hours	Due to multiple remote locations and unavailability of grid electricity, a USEPA approved portable battery powered equipment was selected.
Dustfall and Metals (Summer)	Dustfall jar	ASTM D1739-98 Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter)	30 days	This simple method has no moving parts and does not require electricity. Widely used for monitoring dust at remote locations. Metals analysis to be performed by certified lab
Dustfall and Metals (Winter)	Snow Sampling	Site-specific Method	1 per season	Snow samples will be taken at the end of winter/early spring. Metals analysis to be performed by certified lab.
NO_2	Passive sampler	Developed by Maxxam, Registered with the Standards Council of Canada (SCC)	30 days	Passive samples analyzed by Maxxam.
Surrogate Dust Monitoring	TSI DustTrak (or equivalent)	Portable laser photometer by TSI Inc. (or equivalent)	Simultaneous to TPM sampling and as required	DustTrak is a portable analyzer that can be used to evaluate if TPM or PM10 or PM2.5 exceed pre-determined thresholds and if more precise measurement is required. The analyzer provides instantaneous and continuous readings

[1] Refer to Table 3: DSO Ambient Air Quality Monitoring Matrix for monitoring frequency at each station

5.2 Total Particulate Matter (TPM) & Metals

Total Particulates Matter (TPM) & Metals	
Air Quality Standards (particulate; standards for individual metals vary)	NL: 120 µg/m^3 (24 hours) and 60 µg/m^3 (1 year)
	QC: 120 µg/m^3 (24 hours)
Sampling Duration (each sampling event)	24 hours
Sampling Frequency	Varies with season and test location - See Table 3 Monitoring Matrix

Sampling Method

Modified 40 CFR Part 50, Appendix B: Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method) + USEPA IO-3 Chemical Species Analysis Of Filter-Collected Suspended Particulate Matter (SPM) and Modified Method for the Measurement of Suspended Particulate in the Atmosphere (High Volume Method) EPS 1-AP-73-2 (Environment Canada).

Equipment

BGI Incorporated PQ200 (or equivalent). http://bgi.mesalabs.com/pq200-particulate-sampler/

Summary Description

This air sampling unit is composed of an air mover (diaphragm vacuum pump), a flow controller and timer and a filter holder; the flow rate can be audited with an EPA approved calibration tool. The unit draws air through a Teflon filter at a flow rate of approximately 16.7 L/min. The mass of the collected particulate is the difference between the weight of the filter prior to sampling and the weight following sample collection. The concentration of TPM, expressed in µg/m^3, is determined by dividing the mass of the collected particulate by the volume of air sampled. Similarly, the concentration of any metal present on a filter is determined by dividing the mass of the metal analyzed on the filter by the volume of air sampled.

The sampler can be battery operated for up to 30 hours, which is ideal for remote sampling locations. Battery power can be optionally augmented by solar panels.

The photo shows an example of the BGI PQ200 sampling unit with a PM10 selection attachment; this head is replaced with a non-fractionating inlet for TPM sampling.

Laboratory Analytical Method

The method to determine the concentration of TPM consists in the weight of the filter prior to sampling and the weight following sample collection. The gravimetric weighing is performed by a certified laboratory. Periodically, filters will be analyzed for metal contents.
For the first year (2 seasons), all filters will be analyzed for a selected list of metals (Sb, Ag, As, Ba, Be, Cd, Cr, Cu, Hg, Ni, Pb, Tl, V, Zn).
For subsequent years and depending on results obtained, metal analysis frequency will be re-evaluated.

Sampling procedures and quality control

The "*Operations Manual for Air Quality Monitoring in Ontario*" will be used as a reference to establish the sampling procedures and quality control methods for this type of sampler. The quality control program will include at a minimum:

- Sampling rate calibration procedure and frequency
- Verification of the timer (duration)
- Frequency of field blank
- Frequency of laboratory blanks
- Best practices for location of sampling equipment: height, distance from potential disturbances and water bodies

5.3 Fine Particulate Matter ($PM_{2.5}$)

Fine Particulate Matter ($PM_{2.5}$)	
Air Quality Standards	NL: 25 µg/m^3 (24 hours) and 8.8 µg/m^3 (1 year)
	QC: 30 µg/m^3 (24 hours)
Sampling Duration (each sampling event)	24 hours
Sampling Frequency	Varies with season and test location - See Table 3 Monitoring Matrix

Sampling Method

Designated Manual Reference Method[4]: USEPA, Appendix L to 40 CFR Part 50 - Reference Method for the Determination of Fine Particulate Matter as $PM_{2.5}$ in the Atmosphere and CCME PN1456[5].

Equipment

BGI Incorporated PQ200 (or equivalent). http://bgi.mesalabs.com/pq200-particulate-sampler/

Summary Description

This air sampling unit is composed of an air mover, a flow controller and timer, a filter holder and a Very Sharp Cut Cyclone (VSCC) to select $PM_{2.5}$ only. The flow rate can be audited with an EPA approved calibration tool. The unit draws air through the Teflon filter at a flow rate of approximately 16.7 L/min. Particles that are collected by the filter have an aerodynamic diameter measuring up to 2.5 micron. The mass of the collected particulate is the difference between the weight of the filter prior to sampling and the weight following sample collection. The concentration of $PM_{2.5}$, expressed in µg/m^3, is determined by dividing the mass of the collected particulate by the volume of air sampled.

The sampler can be battery operated for up to 30 hours, which is ideal for remote sampling locations. Battery power can be optionally augmented by solar panels.

The photo shows an example of the BGI PQ200 sampling unit.

Laboratory Analytical Method

The method to determine the concentration of $PM_{2.5}$ consists in the weight of the filter prior to sampling and the weight following sample collection. The gravimetric weighing is performed by a certified laboratory.

Sampling procedures and quality control

The "*Operations Manual for Air Quality Monitoring in Ontario*" will be used as a reference to establish the sampling procedures and quality control methods for this type of sampler. The quality control program will include at a minimum:

- Sampling rate calibration procedure and frequency
- Verification of the timer (duration)
- Frequency of field blank
- Frequency of laboratory blanks
- Best practices for location of sampling equipment : height, distance from potential disturbances and water bodies

[4] *http://www.epa.gov/ttn/amtic/files/ambient/criteria/reference-equivalent-methods-list.pdf, retrieved on 2015-03-25*

[5] *http://www.ccme.ca/files/Resources/air/pm_ozone/pm_oz_cws_monitoring_protocol_pn1456_e.pdf, retrieved on 2015-03-25*

5.4 Dustfall (Summer - May-June-July-August-September)

Dustfall – Summer	
Air Quality Standards	NL: 7.0 g/m^2 (30 days) and 4.6 g/m^2 (1 year)
	QC: n.a.
Sampling Duration (each sampling event)	30 days
Sampling Frequency	Once per month

Sampling Method

ASTM D1739-98: Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter) & MA. 101 – R.P. 1.0 Détermination des retombées de poussières dans l'air ambiant : méthode gravimétrique (CEAEQ 2010)

Equipment

Plastic Jar(s) – typically 47 cm height and 15, 55 cm of interior diameter. The mounting post is typically 2 m high.

Summary Description

Containers of a standard size and shape are prepared (eg. partially filled with liquid) and sealed and then opened and set up at appropriately chosen sites so that particulate matter can settle into them for periods of about 30 days. The containers are then closed and returned to the laboratory. The masses of the water-soluble and -insoluble components of the material collected are determined.

The deposition rate, D, is calculated in grams/square metre/30 day period, g/m^2/30d, for the two masses of material obtained (insoluble and total soluble matter)

SummerDR = ((wd/as)/nd)/30.4

where:
wd = weight of dust per sample, in g
nd = number of days in the summer sampling period
as = area sampled (176.72 cm 2 for a cylindrical sampler with a 15 cm interior diameter)
30.4 = annual average number of days per month

The photo shows an example of a dual jar setup. TSMC will prepare its own design according to ASTM D1739-98.

Laboratory Analytical Method

After 1 mm sieving, evaporate and desiccate jar contents. Weigh to the nearest 0.1 mg.
TSMC laboratory on-site will conduct the analysis. Once per season and per station, samples will be sent to an outside certified laboratory for analysis. For the first year, one sample per monitoring station will be analyzed for a selected list of metals (Sb, Ag, As, Ba, Be, Cd, Cr, Cu, Hg, Ni, Pb, Tl, V, Zn)
For subsequent years and depending on results obtained, metal analysis frequency will be re-evaluated.

Sampling procedures and quality control

The "*Operations Manual for Air Quality Monitoring in Ontario*" and ASTM D1739-98 will be used as a reference to establish the sampling procedures and quality control methods for this type of sampler. The quality control program will include at a minimum:

- Container/jar cleanup procedure
- Frequency of laboratory blanks
- Best practices for location of sampling equipment : height, distance from potential disturbances and water bodies

5.5 Dustfall (Winter - Oct-Nov-Dec-Jan-Feb-March-Apr)

Dustfall – Winter	
Air Quality Standards	NL: 7.0 g/m^2 (30 days) and 4.6 g/m^2 (1 year)
	QC: N/A
Sampling Duration (each sampling event)	1 sample collected
Sampling Frequency	Once per season

Sampling Method
Not available. A site-specific method is to be developed.

Equipment
Core tube (diameter approx. 15 cm), shovel and container

Summary Description

Snow samples will be taken at each station, ideally at the end of winter or in the spring if snow depth permits. For comparative purposes, the same volume of snow—equivalent to a 3 m by 15 cm diameter core sample—will be taken at each station. The volume of snow and water, the weight of the TPM, and concentrations of target elements will be determined. This data will be used to establish dust and target pollutant deposition rates (in g/m^2/30 days). Three samples will be taken at stations AQS-1 and AQS-4 to measure the consistency of the sampling method. If the standard deviation between three samples at the same station is too high and snow conditions are roughly the same, a problem with the sampling method or with some other factor is indicated. If this occurs, a review of the cause of the discrepancy will be conducted and the procedure adjusted accordingly. Winter deposition rates (WinterDR), based on the samples, will be calculated using the following formula:

WinterDR = [(wd/as)/nd]/30.4

where:
wd = weight of dust per sample, in g
as = area sampled (78.54 cm2 for a cylindrical sampler with a 10 cm interior diameter)
nd = number of days in the winter sampling period
30.4 = annual average number of days per month

The result will be converted to g/m^2/30 days

Laboratory Analytical Method
After 1 mm sieving, evaporate and desiccate melted snow. Weigh to the nearest 0.1 mg.
TSMC laboratory on-site will conduct the analysis for total dust. For the first year, one sample per monitoring station will be analyzed for a selected list of metals (Sb, Ag, As, Ba, Be, Cd, Cr, Cu, Hg, Ni, Pb, Tl, V, Zn) by an outside laboratory. For subsequent years and depending on results obtained, metal analysis frequency will be re-evaluated.

Sampling procedures and quality control
The "*Operations Manual for Air Quality Monitoring in Ontario*" will be used as a reference to establish the sampling procedures and quality control methods for this type of sampler. The quality control program will include at a minimum :

- Frequency of field and laboratory blanks
- Best practices for location of sampling site: distance from potential disturbances and water bodies

5.6 Nitrogen Dioxide (NO_2)

Nitrogen Dioxide (NO_2)	
Air Quality Standards	NL: 400 µg/m^3 (1 hour), 200 µg/m^3 (24 hours) and 100 µg/m^3 (1 year)
	QC: 414 µg/m^3 (1 hour), 207 µg/m^3 (24 hours) and 103 µg/m^3 (1 year)
Sampling Duration (each sampling event)	30 days
Sampling Frequency	Varies with season and test location - See Table 3 Monitoring Matrix

Sampling Method

Ambient air monitoring stations are typically installed from 1 to 3 metres in height with sample inlets installed at angles of less than 30° to the top of any obstacle. The sampler will be installed in the chosen site, by strapping and secure the unit to a support and then, left in place for the required duration to collect the sample. After exposure, the cassettes or "puck" will be shipped to the lab in air tight shipping containers for analysis.

Equipment

Sampler Cover holding an NO2 specific cassette (also called "puck") and post.

Summary Description

Maxxam's proprietary Passive Air Sampling System (PASS) units are compact, portable, require no electricity and very little maintenance. The all-weather PASS has a durable top cover to shelter against rain, snow and wildlife. Passive air samplers accurately and cost-effectively measure trace levels of atmospheric pollutants in ambient air. When monitoring air quality for passive sampling allows for the physical uptake of a gas or vapour sample via a permeative or diffusive process. Passive sampling is preferred for use in remote and wilderness locations and for large-scale and regional air quality assessments. It provides low level detection limits equal to 0.1 ppb for NOx.

Laboratory Analytical Method

Maxxam Proprietary, Registered with the Standards Council of Canada (SCC)

Sampling procedures and quality control

Maxxam recommendations in Technical Bulletin "Passive Air Monitoring Overview" will be used as a reference to establish the sampling procedures and quality control methods for this type of sampler. The quality control program will include at a minimum:

- Frequency of blanks
- Cassettes/pucks handling
- Best practices for location of sampling site: distance from potential disturbances and water bodies

5.7 Surrogate Dust Monitoring

Surrogate Dust Monitoring	
Air Quality Standards	There are no regulatory air quality standards for Surrogate Dust. A site-specific action level in µg/m^3 will be established by TSMC during the first year of operation.
Sampling Duration (each sampling event)	As required. The monitor can record on a continuous basis
Sampling Frequency	Varies with season and test location - See Table 3 Monitoring Matrix

Sampling Method

The DustTrak is used for a variety of applications. It can measure $PM_{2.5}$, PM_{10} and TPM using specific size selective inlets. TSMC plans on using the PM_{10} inlet and establish a site-specific action level in µg/m^3. When sampling for TPM and $PM_{2.5}$ using the BGI PQ200 samplers (see Sections 5.2and 5.3), a DustTrak will be will operated simultaneously to establish a correlation. Subsequently, it will be possible to use the DustTrak as a screening tool for short-term monitoring at sites of interest to determine if more precise measurements are necessary.

Equipment

DustTrak 8530 and environmental enclosure (or equivalent)

Summary Description

The DustTrak DRX desktop monitor is a battery operated, data-logging, light-scattering laser photometers that gives real-time aerosol mass readings. It uses a sheath air system that isolates the aerosol in the optics chamber to keep the optics clean for improved reliability and low maintenance. The DustTrak desktop model come with USB (device and host), Ethernet, and analog and alarm outputs. The monitor will be placed in a waterproof environmental enclosure in order to protect the equipment without affecting the accuracy and precision of measures

Laboratory Analytical Method

Not applicable

Sampling procedures and quality control

The TSI DustTrak user manual provides all necessary instructions for obtaining valid results. QA/QC Forms will be prepared and filled-in by personnel responsible for operating the equipment. Quality control will include as a minimum:

- Calibration of the sampling rate
- Periodic zero checks
- Periodic checks of electronic operating parameters as recommended by the manufacturer

6. Meteorological Data

6.1 Meteorological Stations

TSMC will install two meteorological stations: one at DSO3 (nearby the workers' camp) and one at DSO4 (nearby the Kivivic Office Site). The meteorological stations planned locations are shown on Figure 2 and Figure 3.

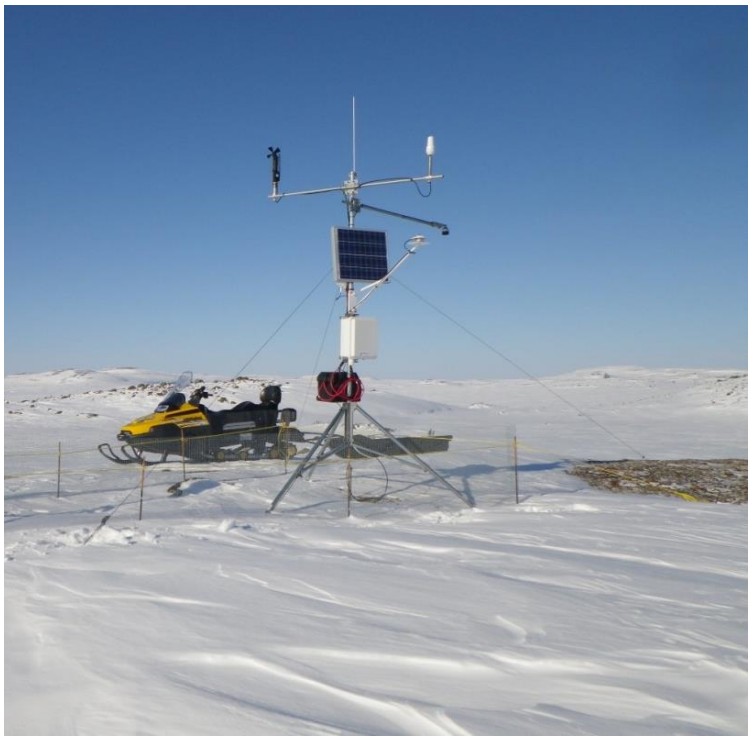
Parameters to be monitored are:

- Wind direction (in degrees);
- Wind speed (in m/s);
- Temperature (in °C);
- Humidity (in %); and
- Barometric Pressure.

It is anticipated that the stations will be tripod mounted. The exact location of each station will be determined based on site characteristics (accessibility, disturbances, vegetation).

Figure 4 shows an example of a tripod mounted meteorological station.

Figure 4: Example of Meteorological Stations Setup



6.2 Climate Data and Wind Roses

When selecting the location of each AQM stations described in this report, the climate and wind conditions were taken into account.

Table 5 is an excerpt of the recent Environmental Impact Statement for the Howse Project and shows the regional climate normal (Schefferville airport).

Appendix A contains 5 years of wind roses for DSO4 Project 2a (Goodwood/Sunny). These wind roses were taken from the report *Air Sampling Program – DSO Project 2A*, prepared by AECOM and dated August 2013.

Table 5: 1981-2010 Climate Normals from the Schefferville A Weather Station

PARAMETERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Monthly average record*													
Daily Average Temperature (˚C)	-24.5	-22.8	-15.9	-7.2	1.0	8.2	12.2	11.4	5.9	-1.4	-9.8	-20.5	-5.3
Total Precipitation (mm)	49.7	29.7	49.8	56.4	50.3	75.2	96.2	82.5	114.6	74.7	63.5	48.1	790.8
Rainfall (mm)	0.3	0.3	1.4	9.0	26.1	69.5	96.1	81.9	103.0	24.5	4.5	0.7	417.3
Snowfall (cm)	53.7	33.3	54.7	50.5	22.4	5.8	0.2	0.4	11.1	50.8	62.8	53.0	398.4
Average Snow Depth (cm)	58.2	57.9	62.0	59.7	14.4	0.1	0.0	0.0	0.1	5.6	21.0	44.6	27.0
Evaporation (mm/d)						3.3	3.4	2.7					
Wind Speed (km/h)	15.4	15.2	16.3	16.0	15.1	15.5	14.0	14.6	16.3	16.4	16.3	15.1	15.5
Most Frequent Direction	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
Extreme Statistics**													
Extreme Maximum Temp. (˚C)	5.1	5.1	9.4	13.1	28.3	**34.3**	31.7	28.7	26.7	20.6	9.8	5.0	34.3
Extreme Minimum Temp. (˚C)	-48.3	**-50.6**	-45.0	-36.1	-23.3	-7.8	0	-3.3	-9.4	-19.4	-35.6	-47.2	-50.6
Extreme Daily Precipitation (mm)	29.0	29.0	36.8	32.8	33.8	51.3	**54.4**	48.5	49.0	41.2	35.8	24.6	54.4
Extreme Daily Rainfall (mm)	24.6	2.8	10.6	23.4	29.5	51.3	**54.4**	48.5	45.2	34.3	34.8	5.8	54.4
Extreme Daily Snowfall (cm)	30.6	29.0	**36.4**	30.2	33.2	23.7	9.0	23.9	28.4	35.6	29.0	25.4	36.4
Extreme Snow Depth (cm)	163	188	**190**	163	132	38	0	18	18	53	89	115	190
Maximum Hourly Speed (km/h)	85	**97**	83	77	66	97	65	61	80	89	84	80	97
Maximum Gust Speed (km/h)	134	148	148	130	101	126	103	117	137	137	142	**153**	153

* Most of the averages are calculated using data from 1981 to 1993, except for the wind, which is calculated using data between 1981 and 2009. Some records were missing, but no less than 98.9% of possible observations are available.

** The extremes were found between 1949 and 1993 for the temperature and precipitation. Wind extremes are from 1953 to 2009.

Appendix A:

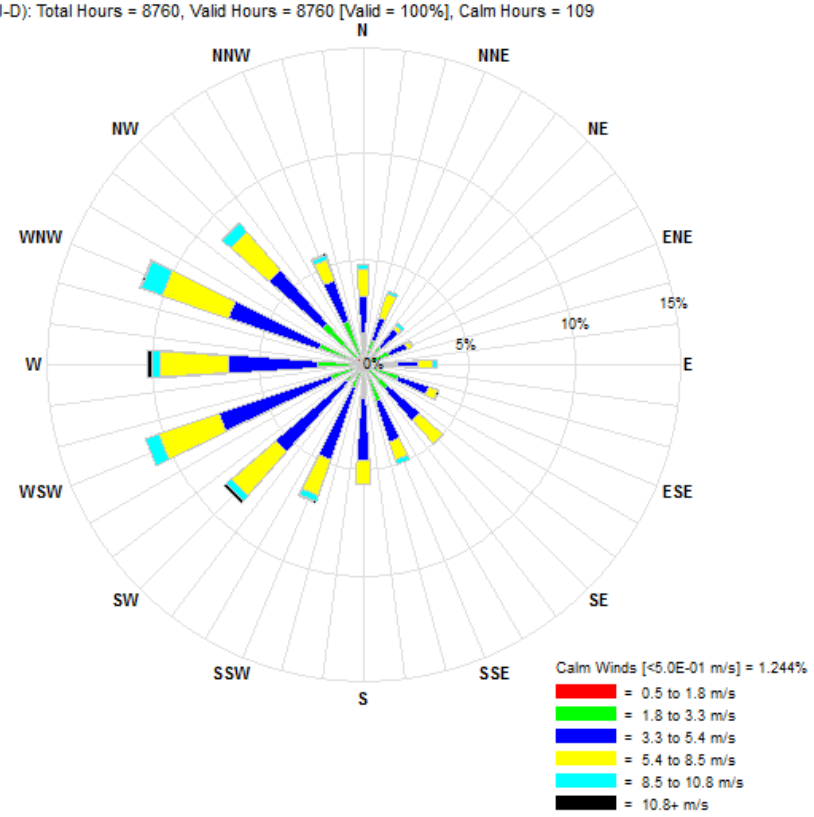
Wind Roses - DSO4 Project 2a (Goodwood / Sunny)

Excerpt from Air Sampling Program – DSO Project 2A, prepared by AECOM and dated August 2013

Projet 2a - Sunny 1 2006

CALMET.DAT: (X,Y) = (612.303km, 6101.578km), Height = 10.0 m

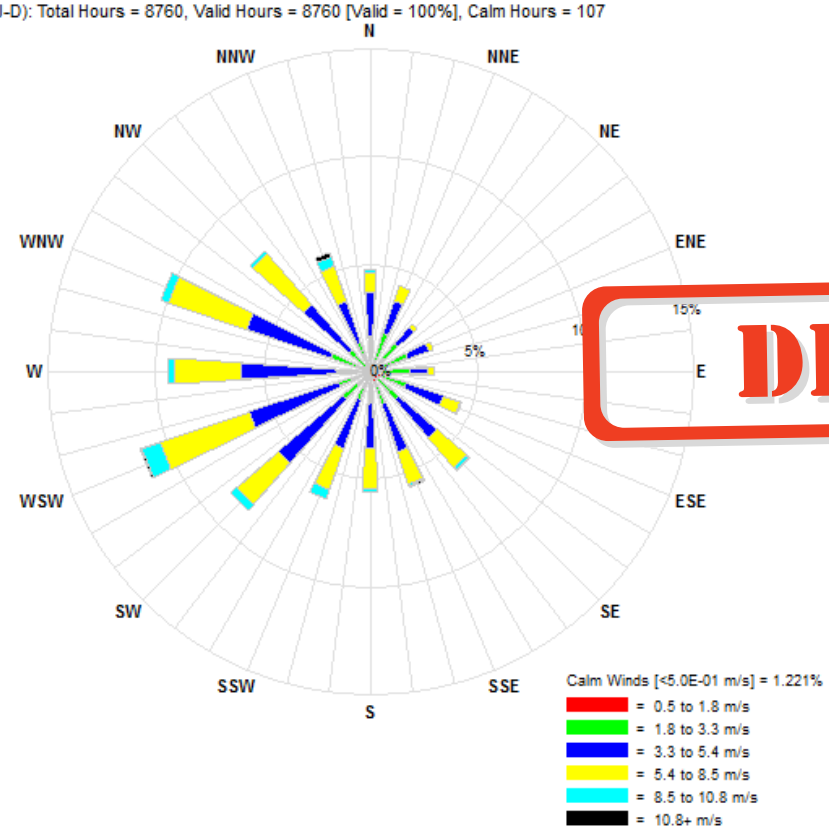
Annual(J-D): Total Hours = 8760, Valid Hours = 8760 [Valid = 100%], Calm Hours = 109



Projet 2a - Sunny 1 2005

CALMET.DAT: (X,Y) = (612.303km, 6101.578km), Height = 10.0 m

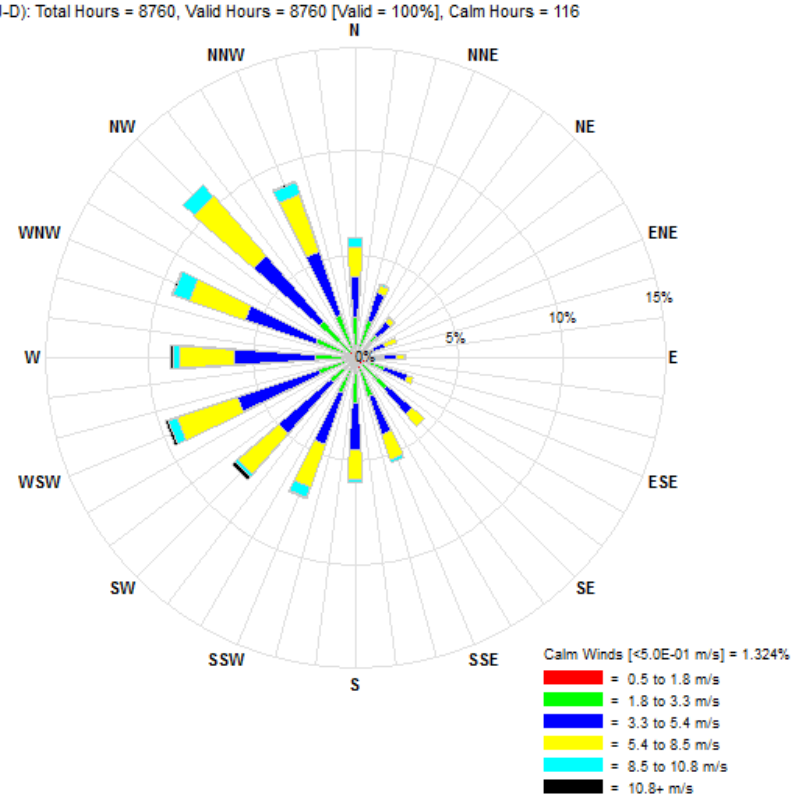
Annual(J-D): Total Hours = 8760, Valid Hours = 8760 [Valid = 100%], Calm Hours = 107



Projet 2a - Sunny 1 2007

CALMET.DAT: (X,Y) = (612.303km, 6101.578km), Height = 10.0 m

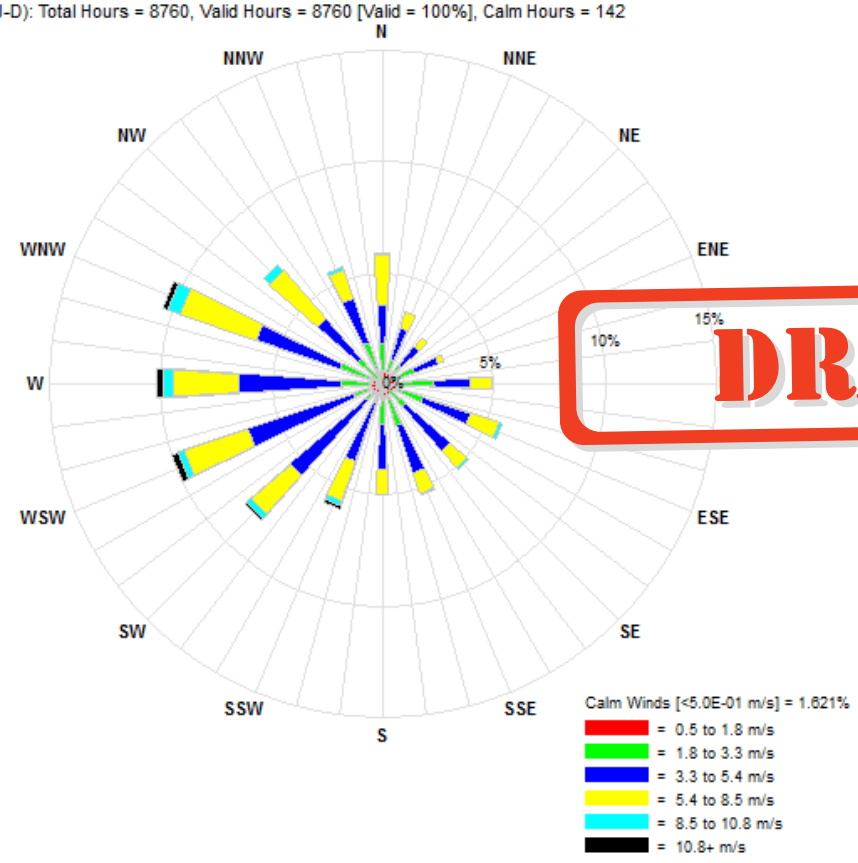
Annual(J-D): Total Hours = 8760, Valid Hours = 8760 [Valid = 100%], Calm Hours = 116



Projet 2a - Sunny 1 2009

CALMET.DAT: (X,Y) = (612.303km, 6101.578km), Height = 10.0 m

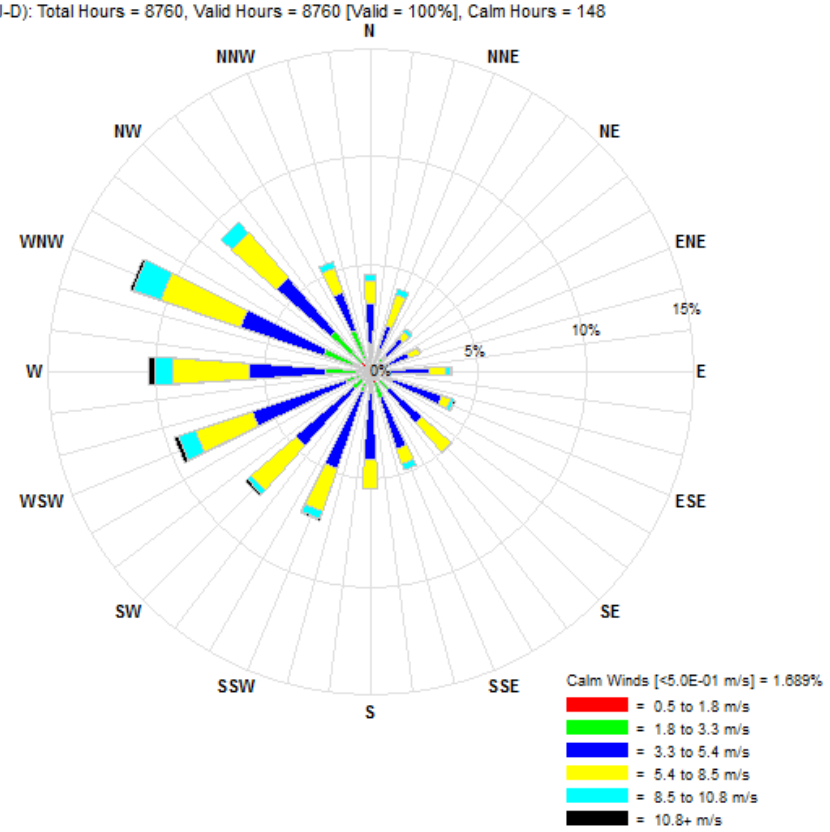
Annual(J-D): Total Hours = 8760, Valid Hours = 8760 [Valid = 100%], Calm Hours = 142



Projet 2a - Goodwood 2006

CALMET.DAT: (X,Y) = (605.426km, 6107.086km), Height = 10.0 m

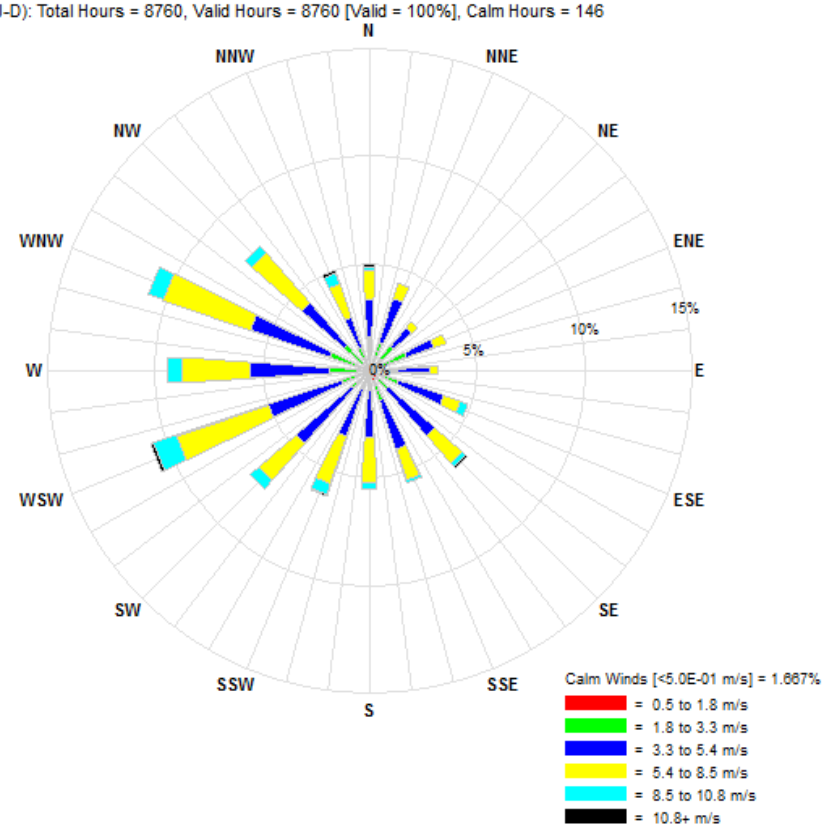
Annual(J-D): Total Hours = 8760, Valid Hours = 8760 [Valid = 100%], Calm Hours = 148



Projet 2a - Goodwood 2005

CALMET.DAT: (X,Y) = (605.426km, 6107.086km), Height = 10.0 m

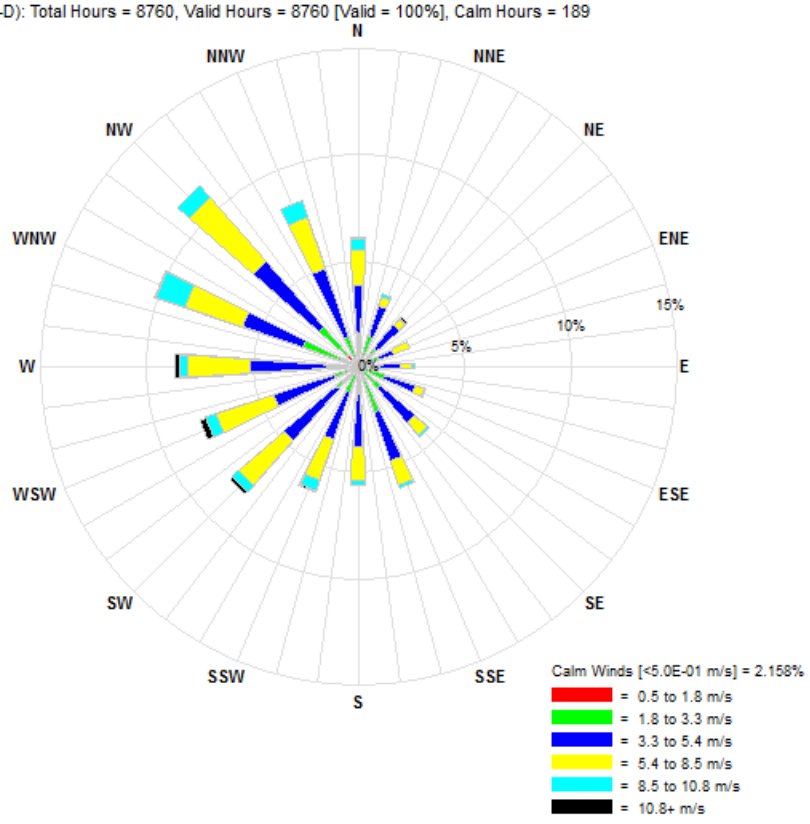
Annual(J-D): Total Hours = 8760, Valid Hours = 8760 [Valid = 100%], Calm Hours = 146



Projet 2a - Goodwood 2007

CALMET.DAT: (X,Y) = (605.426km, 6107.086km), Height = 10.0 m

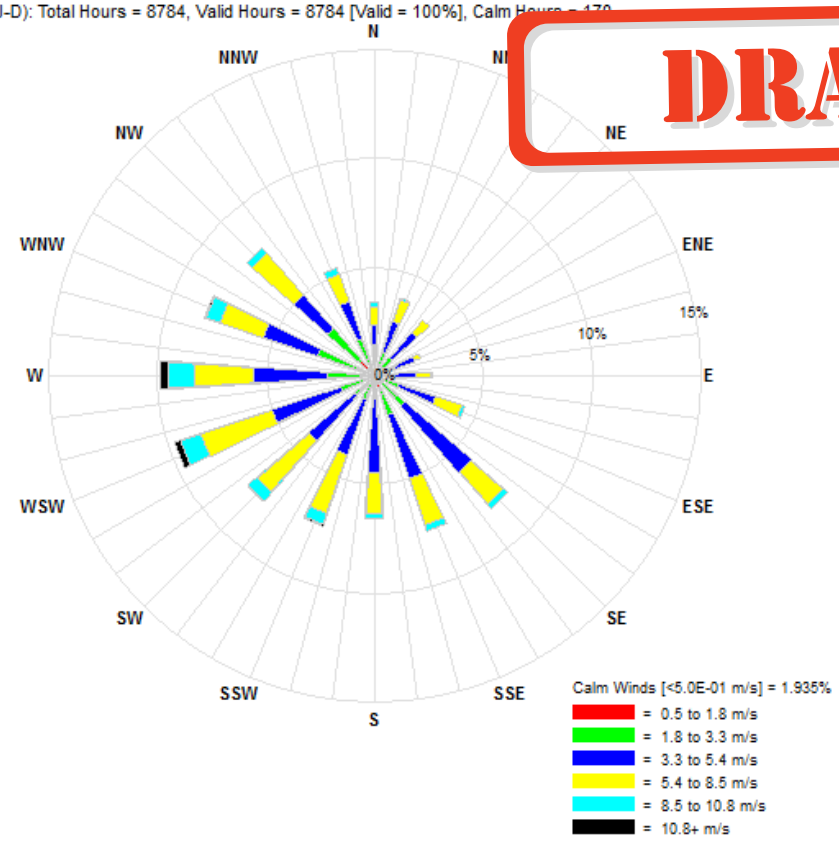
Annual(J-D): Total Hours = 8760, Valid Hours = 8760 [Valid = 100%], Calm Hours = 189



Projet 2a - Goodwood 2008

CALMET.DAT: (X,Y) = (605.426km, 6107.086km), Height = 10.0 m

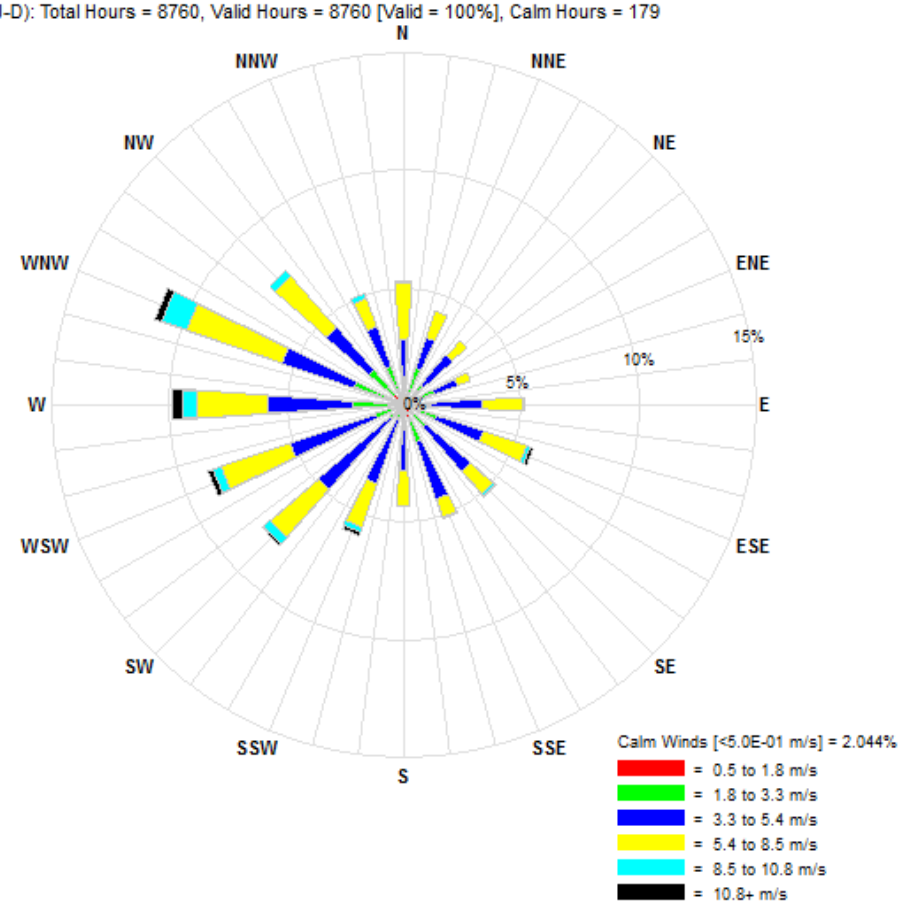
Annual(J-D): Total Hours = 8784, Valid Hours = 8784 [Valid = 100%], Calm Hours = 170



Projet 2a - Goodwood 2009

CALMET.DAT: (X,Y) = (605.426km, 6107.086km), Height = 10.0 m

Annual(J-D): Total Hours = 8760, Valid Hours = 8760 [Valid = 100%], Calm Hours = 179



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Appendix B:

Sensitive Receptors - List

Excerpt from the Howse Property Environmental Impact Statement (January 2015)

Newfoundland & Labrador Discrete Sensitive Receptors

Receptor ID	Receptor Type	First Nations Group	YLatitude	XLongitude	X (UTM)	Y (UTM)
7	Camp	Young Naskapi	54.895831	-67.121703	620455.6998	6084815.2043
8	Camp	Young Naskapi	54.919330	-67.160036	617928.9597	6087364.4443
9	Trailer/Tent	Young Naskapi	54.927852	-67.157177	618087.2402	6088317.3089
10	Camp	Young Naskapi	54.910715	-67.204832	615082.7708	6086331.3418
11	Camp	Young Naskapi	54.911581	-67.205978	615006.7869	6086425.8103
14	Camp	Young Naskapi	54.870395	-67.106019	621537.9537	6082012.4298
19	Camp	Young Naskapi	54.921755	-67.235789	613067.4317	6087509.2149
30	Camp	Young Naskapi	54.832928	-67.095975	622295.7103	6077861.4211
17	Uashat people's camp 2	Naskapi, Uashat	54.916418	-67.162227	617797.0637	6087036.6741
32	Camp	Innu, Uashat - Mani-Utenam	54.916127	-67.182537	616496.1910	6086970.4067
5	Tent	Innu	54.860284	-67.140808	619335.6239	6080827.6953
6	Tent – (exact location unclear)	Innu	54.895126	-67.214676	614495.9907	6084580.8491
36	Camp	Innu	54.919750	-67.208004	614853.6581	6087331.4093
37	Camp	Innu	54.9[illegible]	[illegible]	[illegible]	[illegible].9679
38	Camp	Innu	54.9[illegible]0687	-6[illegible]	[illegible]	608633[illegible].3878
39	Camp	Innu	54.9[illegible]4558	-67.210855	614685.7138	60867[illegible].0031
--	Workers' camp	n/a	54.876435	-67.060101	624465.5000	6082765.0000

Quebec Discrete Sensitive Receptors

Receptor ID	Receptor Type	First Nations Group	YLatitude	XLongitude	X (UTM)	Y (UTM)
31	Camp	Innu, Uashat - Mani-Utenam	54.9335268	-67.1090056	621156.5726	6089031.0605
33	Camp	Innu, Uashat - Mani-Utenam	54.8997266	-67.0667883	623964.9742	6085344.4900
--	Kawawachikamach	n/a	54.8656529	-66.7639825	--	--
--	Schefferville / Lac John	n/a	54.8115 80	-66.8214443		

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Appendix C:

Questions and Comments – Certificate of Authorization Conditions
Excerpts November 20, 2014 letter from MDDELCC and answers from TSMC

Appendix C :

On November 20, 2014, MDDELCC transmitted a letter to TSMC with a list of questions and comments on the CA conditions. Some of these questions and comments are linked to Condition 4 of the CA and were incorporated in this AQM Plan. A copy of these questions and comments on Condition 4 is provided below. Under each, TSMC's answer is provided.

Condition n° 4 (Modification de CA délivrée le 15 décembre 2013)

Le promoteur devra présenter à l'Administrateur, pour approbation au moins six mois avant le début de l'exploitation de l'une ou l'autre des fosses à ciel ouvert un programme de suivi environnemental de la dispersion des poussières autour de ses installations et à certaines stations localisées selon les vents dominants et le milieu récepteur. Ce programme de suivi devra permettre de s'assurer que les plans d'eau environnants ne seront pas contaminés par ces poussières au Québec en plus de vérifier si les activités réalisées au Québec ont un impact au Labrador.

[TSMC : Le présent plan de suivi de la qualité de l'air (SQA) répond aux exigences listées dans ce paragraphe.]

Lors de l'analyse du programme de suivi des émissions atmosphériques, déposé en décembre 2013, le MDDELCC et la Commission avaient demandé au promoteur de s'engager à compléter son programme de suivi en prévoyant l'analyse des métaux et de préciser comment il envisageait de récolter les données de vitesse et de direction du vent.

[TSMC : Le présent plan de SQA prévoit que des analyses de métaux seront effectuées sur des échantillons de poussières totales et de retombées de poussières (réf.: **Erreur ! Source du renvoi introuvable.** et Section **Erreur ! Source du renvoi introuvable.** du Plan de SQA): De plus, l'installation de deux stations météorologiques est prévue et permettra de récolter les données de vitesse et de direction du vent ainsi que d'autres paramètres (réf.: Section **Erreur ! Source du renvoi introuvable.** du plan SQA du Plan de SQA).]

Le promoteur répond qu'il réalisera le suivi des métaux, qu'il prendra les mesures de vents et des conditions météorologiques. Il précise que les équipements de suivi de la qualité de l'air seront installés en 2015.

[TSMC : Suite à l'approbation du présent plan de SQA par le MDDELCC, TSMC procédera à l'achat et l'installation des équipements requis, en 2015.]

QC - 21. Par son programme de suivi des émissions atmosphériques et ses réponses aux questions du MDDELCC et de la Commission, le promoteur répond adéquatement aux conditions n° 4 et 5.

Suivi de la dispersion des poussières dans l'air et de la contamination des plans d'eau.

Dans le programme de suivi environnemental que le promoteur propose en juin 2014, il présente un suivi de la dispersion des poussières autour des sites miniers Goodwood et Sunny 1. Ce suivi permettra dans un premier temps d'établir un état de référence l'année précédant le début de l'exploitation. Il aura ensuite pour but d'évaluer l'ampleur et l'étendue de la dispersion des poussières dans 1'air et conséquemment dans les milieux aquatiques environnants tout au long de 1'exploitation des gisements. Les stations seront situées à proximité de la rivière Goodwood, des lacs Goodwood, Joan, et Foggy, entre le site Goodwood·et le lac Joan et enfin une station sera située au sud-est du site Sunny 1. Pour ce suivi, les matières particulaires totales seront considérées. Un échantillonnage sera réalisé en hiver, par récolte de carottes de neige, une fois dans l'année à la fin de l'hiver ou au printemps. Un autre sera réalisé en été, grâce à des jarres à poussières, dont le contenu sera récolté environ tous les 30 jours, entre le début de mai et la fin d'octobre.

[TSMC : Le présent plan de SQA répond aux exigences listées dans ce paragraphe.]

QC - 22. Est-ce que ce programme de suivi de la dispersion des poussières dans les milieux aquatiques est bien un programme qui vient s'ajouter à celui déjà présenté par le promoteur et produit par AECOM?

[TSMC : Le présent plan de SQA consolide les deux programmes listés, en un seul.]

QC - 23. Quand seront mises en place les stations pour caractériser l'état de référence?

[TSMC : En 2015, Suite à l'approbation du présent plan de SQA par le MDDELCC.]

QC - 24. Le MDDELCC et la Commission souhaitent rappeler que le Règlement sur l'assainissement de l'atmosphère ne contient aucune norme pour la déposition des particules ou des métaux. Les résultats de ce programme de suivi ne pourront donc pas être utilisés pour s'assurer de la conformité du projet à la réglementation en vigueur en ce qui a trait à la qualité de 1'air. Par contre, cette méthodologie peut tout de même fournir des informations intéressantes sur l'impact du projet en comparant les résultats obtenus lors de l'exploitation avec ceux obtenus avant projet et en suivant l'évolution des taux de déposition tout au long de la durée de vie du projet.

[TSMC : D'accord. Il est à noter que la réglementation de la province de TNL contient une norme de déposition des poussières.]

QC - 25. Afin d'être en mesure de mieux évaluer l'emplacement des stations de mesure, le promoteur devra donner davantage de détails quant aux distances de celles-ci par rapport à des cours d'eau ou plans d'eau, des arbres ou tout autre obstacle, ainsi que leur élévation exacte à cet endroit.

[TSMC : Les emplacements prévus des stations de mesure sont montrés dans le plan de SQA (réf.: Figure 2 et Figure 3). Après l'installation des équipements de SQA, les coordonnées et distances par rapport aux cours d'eau, arbres ou tout autre obstacle seront colligées et incluses dans le programme de SQA. De plus, ces informations seront acheminées à l'Administrateur, tel que requis par QC-26.]

Également, tel que recommandé par la norme D1739 intitulé *Standard method for collection and analysis of dustfall (settleable particulates)* publiée par l'American Society for Testing and Materials (ASTM), certaines distances devraient être respectées lors de l'installation de jarres à poussières :

- à l'intérieur d'un rayon de 20 m, aucun objet de plus de 1 rn de haut ne devrait y être retrouvé;
- à une distance de 20 m, l'objet le plus haut ne devrait pas excéder 30° de l'horizontale.

[TSMC : La méthode ASTM D1739 sera la méthode de référence utilisée pour le suivi des retombées de poussières (réf.: **Erreur ! Source du renvoi introuvable.**, Sections **Erreur ! Source du renvoi introuvable.** et **Erreur ! Source du renvoi introuvable.**).]

QC - 26. Afin de s'assurer de l'efficacité de la méthode utilisée, les résultats obtenus ainsi que les emplacements adéquats des stations de mesure devront être acheminés à l'Administrateur avant le début des opérations. Par la suite, les résultats du suivi de la dispersion des poussières devront être présentés dans le rapport annuel exigé à la condition n° 3.

[TSMC : Oui.]

QC - 27. Le promoteur devra démontrer que les stations sont situées dans les zones les plus sensibles par exemple en superposant la localisation des stations avec les résultats des modélisations atmosphériques les plus à jour.

[TSMC : La méthodologie de sélection des emplacements des stations tiens en ligne de compte les zones les plus sensibles, la direction des vents et les zones d'activités identifiées dans les résultats des modélisations atmosphériques les plus récentes. Le type d'équipements utilisés dans le cadre du SQA (eg. portables) permettra une adaptation à l'évolution des activités minières.]

Le promoteur indique que les stations P4 et P5 sont des stations témoins temporaires étant donné qu'elles seront exposées lors de 1'exploitation des gisements Kivivic prévue à partir de 2016.

[TSMC : Les noms de stations ont été révisés. La station P4 est maintenant exclue, car elle se trouvait directement dans la zone d'activité d'un des gisements du projet Joan Lake (eg. Kivivic) dont

l'exploitation débutera en 2015; dans ce cas, un suivi directe de la qualité de l'eau du lac Joan sera préféré. La station P5 située près du lac Foggy et dont le nouveau nom est AQS-4, est toujours prévue. Par ailleurs, d'autres stations ont été rajoutées afin de complémenter le SQA du Projet DSO; ainsi un total de neuf stations est prévu, dont cinq pour le secteur DSO4 (réf.: **Erreur ! Source du renvoi introuvable.**)]

QC - 28. Étant donné que 1'exploitation prévue des gisements Kivivik, Goodwood et Sunny 1 semble finalement simultanée (2016), le promoteur doit justifier l'emplacement des stations P4 et P5 dans ce contexte. En effet, le MDDELCC et la Commission sont d'avis que le promoteur pourrait déplacer les stations P4 et P5 dès la planification de son programme de suivi afin qu'elles servent de stations témoins pour toute la durée de l'exploitation des gisements Goodwood et Sunny 1.

[TSMC : Il est maintenant prévu que l'exploitation des gisements Kivivic débute avant celle de Goodwood et Sunny. La station P4 est maintenant exclue du plan SQA, car elle se trouvait directement dans la zone d'activité d'un des gisements du projet Joan Lake (eg. Kivivic) dont l'exploitation débutera en 2015; dans ce cas, un suivi direct de la qualité de l'eau du lac Joan sera préféré. Les cinq stations du secteur DSO4 permettront un suivi adéquat de la qualité de l'air du secteur. De plus, l'utilisation de moniteur de type DustTrak (indicateur de poussières) permettra de préciser la localisation des échantillonneurs, au besoin (réf.: Figure 2, Figure 3 et **Erreur ! Source du renvoi introuvable.**).]