



**REPORT**

# Air Quality Monitoring Plan

Proposed Caledon Pit / Quarry

Submitted to:

**CBM Aggregates (CBM), a Division of St Marys Cement Inc. (Canada)**

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# Distribution List

1 e-copy: CBM Aggregates (CBM), a Division of St. Marys Cement Inc. (Canada)

1 e-copy: WSP Canada Inc.

## Document Version Control

This Air Quality Monitoring Plan (AQMP) has been prepared for CBM Aggregates (CBM), a Division of St Marys Cement Inc. (Canada) to describe the monitoring program to be implemented for the proposed Caledon Pit / Quarry operations in Caledon, Ontario (the Pit / Quarry). The AQMP should be reviewed periodically and updated if required. Therefore, it is necessary to have appropriate version control. This version control will allow facility personnel and compliance auditors to track and monitor changes to the AQMP over time.

Version	Date	Revision Description	Prepared By	Reviewed By (Facility Contact)
1.0	May 2025	Original document	WSP Canada Inc.	M. L
1.1	27 February 2026	Additional Monitoring Location	WSP Canada Inc.	J. D

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## ACRONYMS AND ABBREVIATIONS

AAQC	Ontario Ambient Air Quality Criteria
AQMP	Air Quality Monitoring Plan
AQMS	Canada-Wide Air Quality Management System
CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
ECCC	Environment and Climate Change Canada
L/min	Litres Per Minute
MECP	Ontario Ministry of the Environment, Conservation and Parks
NIST	National Institute of Standards and Technology
PM <sub>10</sub>	Particulate Matter less than 10 micrometres in diameter
PM <sub>2.5</sub>	Particulate Matter less than 2.5 micrometres in diameter
QA / QC	Quality Assurance / Quality Control
SPM	Suspended Particulate Matter
TSP	Total Suspended Particulate
US EPA	United States Environmental Protection Agency
µg/m <sup>3</sup>	Microgram per Cubic Metre

## 1.0 INTRODUCTION AND OBJECTIVE

This Air Quality Monitoring Plan (AQMP) has been prepared to describe the dust monitoring program in support of the proposed Caledon Pit / Quarry operations (including development) located in the vicinity of Charleston Sideroad and Main Street (Regional Road 136) Caledon, Ontario (the Site).

CBM Aggregates, a Division of St Marys Cement Inc. (CBM) submitted an application under the *Planning Act* and *Aggregate Resources Act* for a new pit/quarry operation at the Site. As part of this application, and since late 2021, continuous particulate monitoring has been undertaken at the proposed Site to establish existing conditions.

The objective of the dust monitoring program outlined in this AQMP is to establish air concentrations of particulate during quarry operations. This program will add two downwind monitors at the Site in addition to using the existing monitor currently installed at the Site (as an upwind location), for a total of three monitors at the Site.

## 2.0 SCOPE AND CONTENT

The Ministry of the Environment, Conservation, and Parks (MECP) Operations Manual for Air Quality Monitoring in Ontario last updated in November 2023 (hereafter referred to as the MECP Operations Manual) is the accepted guidance for establishing and operating an ambient air quality network.

The following are the required elements of the AQMP:

- Purpose or objectives of the monitoring program;
- Expected duration of the monitoring program;
- Identified and suspected air emission sources;
- Identified and suspected receptors;
- Number and location of monitoring sites (including meteorological sites);
- Air quality parameters to be monitored and the monitoring frequency;
- Monitoring methods and instruments to be used;
- Analytical methods and procedures and laboratory services support to be used;
- Quality assurance / quality control (QA / QC) plan; and
- Data reporting procedures.

## 3.0 EXPECTED DURATION OF AIR MONITORING PROGRAM

The monitoring will commence at the start of the pit/quarry operations (including Site development) and continue through operations unless otherwise warranted.

## 4.0 AIR EMISSION SOURCES

Ambient air quality at the proposed Site is influenced by natural and anthropogenic sources at the local and regional scales. Natural sources would include, but not be limited to, pollen from vegetation during spring and summer months. Anthropogenic sources include road traffic along nearby roads, building heating, wind-blown particulate from exposed area sources, air emissions from regional industrial facilities, and contributions from transboundary or long-range transport of air contaminants. Local sources would mainly be other mineral aggregate operations and agricultural operations with potential for fugitive dusts.

The Site operations are expected to include site preparation, extraction, processing, rehabilitation and off-Site transport of aggregate. Drilling and blasting will be used to extract material, and the extracted material will be transported from the extraction face by haul trucks to a crushing plant within the project footprint. Initially a mobile crushing plant will be used at grade until there is sufficient space below grade for a permanent plant. Processed material will be stored in various stockpiles before being shipped off-Site. These operations all have the potential to generate fugitive dusts.

## 5.0 POTENTIAL RECEPTORS

Sensitive receptors near the Site include rural residences, primarily located along Main Street, Charleston Sideroad, and Mississauga Road that are along the perimeter of the Site. These include farmsteads and parcels that have been severed from the original agricultural lot fabric. In addition, the community of Cataract located to the south southeast of the Site also includes sensitive receptors. The locations of receptors in relation to the Site boundary are shown in Figure 3.

## 6.0 LOCAL METEOROLOGY

Wind data (direction, speed, frequency) from Environment and Climate Change Canada's Mono Centre Station (ID: 6157000; 23 km to the north) has been summarized and illustrated as a Wind Rose in Figure 1.

Figure 2 depicts a subset of wind data from June to September when dry conditions are more likely to generate airborne emissions. Winds are most frequent coming from the northwest to the southwest with a similar trend during June to September, although winds are typically weaker in the summer.

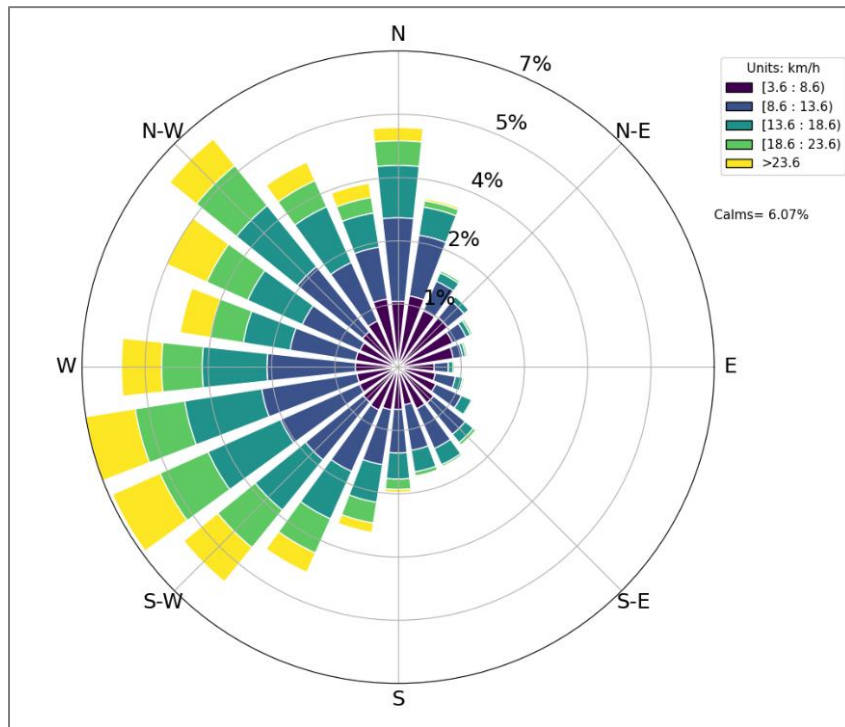


Figure 1: Wind Rose (MONO CENTRE; 2019-2023)

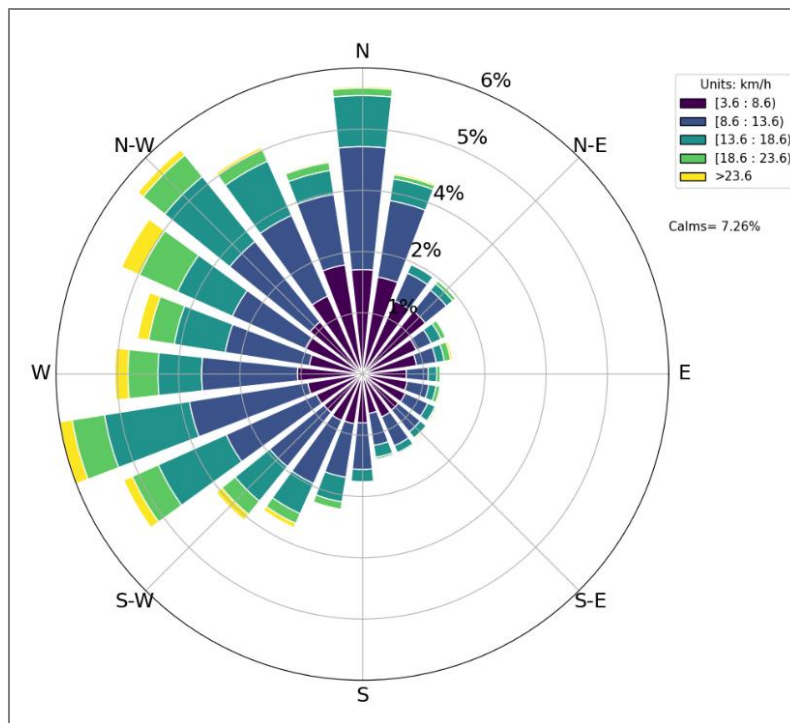


Figure 2: Wind Rose (MONO CENTRE; 2019-2023) - June 1st to September 30th

## 7.0 TARGET CONTAMINANTS AND MONITORING

The following relevant air contaminants are expected from the Project and will be measured as part of this monitoring program:

- Suspended Particulate Matter (SPM);
- Particulate Matter less than 2.5 micrometres in diameter (PM<sub>2.5</sub>); and
- Particulate Matter less than 10 micrometres in diameter (PM<sub>10</sub>).

### 7.1 Suspended Particulate Matter

SPM is particulate in the atmosphere comprised of either solid particles or fine liquid droplets (aerosols). Included in this group are aerosols, smoke, fumes, dust, fly ash and pollen. SPM aerosols may include nitrates, sulfates, elemental carbon, organic carbon compounds, acid aerosols, trace metals and other components. Some of the aerosols are formed in the atmosphere from gaseous combustion by-products such as volatile organic compounds (VOCs), sulfur oxides (SO<sub>x</sub>) and nitrogen oxides (NO<sub>x</sub>).

For the Site, natural sources such as pollen, and anthropogenic sources such as road dust and other activities associated with construction may contribute to SPM concentrations.

Real-time measurements of total suspended particulate matter (TSP; a surrogate for SPM) concentrations will be carried out. An Aeroqual Dust Sentry Pro will be used for continuous monitoring of TSP which uses an optical particle counter. The Dust Sentry Pro samples at a rate of 1 litre per minute (L/min) at a height of about 2 metres. The sampler records data every ten minutes and is automatically upload via cellular modem to a data server.

### 7.2 Particulate Matter <10 Micrometres

PM<sub>10</sub> is defined as particulate less than 10 µm and is also called “inhalable particulate”. In addition to nuisance effects, there are possible health effects that may be attributed to PM<sub>10</sub> and the MECP’s interim Ontario Ambient Air Quality Criteria (AAQC) is based upon these potential health effects.

The main source of PM<sub>10</sub> on-Site is fugitive dusts generated from open sources that are susceptible to air dispersion. Sources of fugitive dust include unpaved roadways, aggregate storage piles, and quarrying activities.

Real-time measurements of PM<sub>10</sub> concentration will be carried out. An Aeroqual Dust Sentry Pro will be used for continuous monitoring of PM<sub>10</sub> which uses an optical particle counter. The Dust Sentry Pro samples at a rate of 1 L/min at a height of about 2 metres. The sampler records data every ten minutes and is automatically upload via cellular modem to a data server.

#### 7.2.1 Co-location

Discrete measurements using a collocated sampler will act as a quality assurance and control measure for the “near-reference” real time monitor.

The discrete PM<sub>10</sub> concentrations will be measured using a BGI PQ200, as per the method cited on the US EPA List of Designated Reference and Equivalent Methods (US EPA 2024) and approved for use by the MECP in the Operations Manual (MECP 2023). This method uses gravimetric analysis to quantify the PM<sub>10</sub> collected on a filter that is located downstream of a size-selective inlet.

The PM<sub>10</sub> sampler is fitted with a Teflon™ filter, the detection limit of this method is approximately 1.2 µg/m<sup>3</sup> which is more than a factor of 10 lower than the CAAQS of 27 µg/m<sup>3</sup>.

### 7.3 Particulate Matter <2.5 Micrometres

PM<sub>2.5</sub> is defined as particulate less than 2.5 µm. Due to the small particle size, PM<sub>2.5</sub> acts similar to a gas, can transport long distances and have regional impacts. Sources include power generation, industrial processes, and other combustion activities. PM<sub>2.5</sub> can also be formed in the atmosphere through secondary reactions involving NO<sub>x</sub>, sulfur dioxide (SO<sub>2</sub>), VOCs, and other atmospheric constituents.

Real-time measurements of PM<sub>2.5</sub> concentration will be carried out. An Aeroqual Dust Sentry Pro will be used for continuous monitoring of PM<sub>2.5</sub> which uses an optical particle counter. The Dust Sentry Pro samples at a rate of 1 L/min at a height of about 2 metres. The sampler records data every ten minutes and is automatically uploaded via cellular modem to a data server.

## 8.0 REGULATORY CRITERIA AND GUIDELINES

Ontario AAQCs are used to assess general (ambient) air quality resulting from sources of a contaminant to air. AAQCs are most commonly used in environmental assessments, special studies using ambient air monitoring data, assessment of general air quality in a community, annual reporting on air quality across the province, and are the most appropriate criteria for this program. AAQC are not regulatory values but are protective against adverse effects on health and/or the environment.

In addition to provincial legislation, the Canadian Council of Ministers of the Environment (CCME) implemented the Canada-Wide Air Quality Management System (AQMS) in 2013 which has been supported by the Ontario government. Through the AQMS, Canadian Ambient Air Quality Standards (CAAQS) have been set for PM<sub>2.5</sub> and Ontario defaults to the CAAQS for PM<sub>2.5</sub> as the applicable Ambient Air Quality Criteria.

The relevant ambient air quality criteria are presented in Table 1 for each contaminant.

**Table 1: Summary of Ambient Air Quality Monitoring Program Criteria and Methods**

Parameter	Ambient Air Quality Criteria (µg/m <sup>3</sup> )	Averaging Time	Method
SPM	120	24-hour	▪ “Near-reference” real-time monitor
	60	Annual (Geometric Mean)	▪ “Near-reference” real-time monitor
PM <sub>10</sub> <sup>(1)</sup>	50	24-hour	▪ “Near-reference” real-time monitor ▪ PQ200 discrete reference monitor
PM <sub>2.5</sub>	27	24-hour	▪ “Near-reference” real-time monitor
	8.8	Annual	▪ “Near-reference” real-time monitor

Notes: <sup>1</sup> Interim AAQC

## 9.0 MONITORING STATION LOCATIONS

The preferred locations of the air monitoring stations will be selected:

- To meet the requirements of the MECP Operations Manual where possible;
- Where consistent and safe access is available;
- To approximate the upwind and downwind directions; and

- In consideration of the findings of the Air Quality Impact Assessment (WSP, 2023).

Figure 3 provides a general location for the proposed upwind and downwind locations as well as the Site licence boundary (red line), limit of extraction (yellow line), and identified residential sensitive receptors (green squares). Based on siting requirements, three areas are delineated for one upwind (existing) and two downwind monitors respectively. Specific locations shall be specified closer to the commencement of monitoring with a preference of siting the northeastern downwind location near 18722, 18659, or 18473 Regional Road 136 where highest concentrations of particulate were generally predicted by the Air Quality Impact Assessment (WSP, 2023) in the early phases. A southeastern downwind location would be located between the extraction area and the community of Cataract.

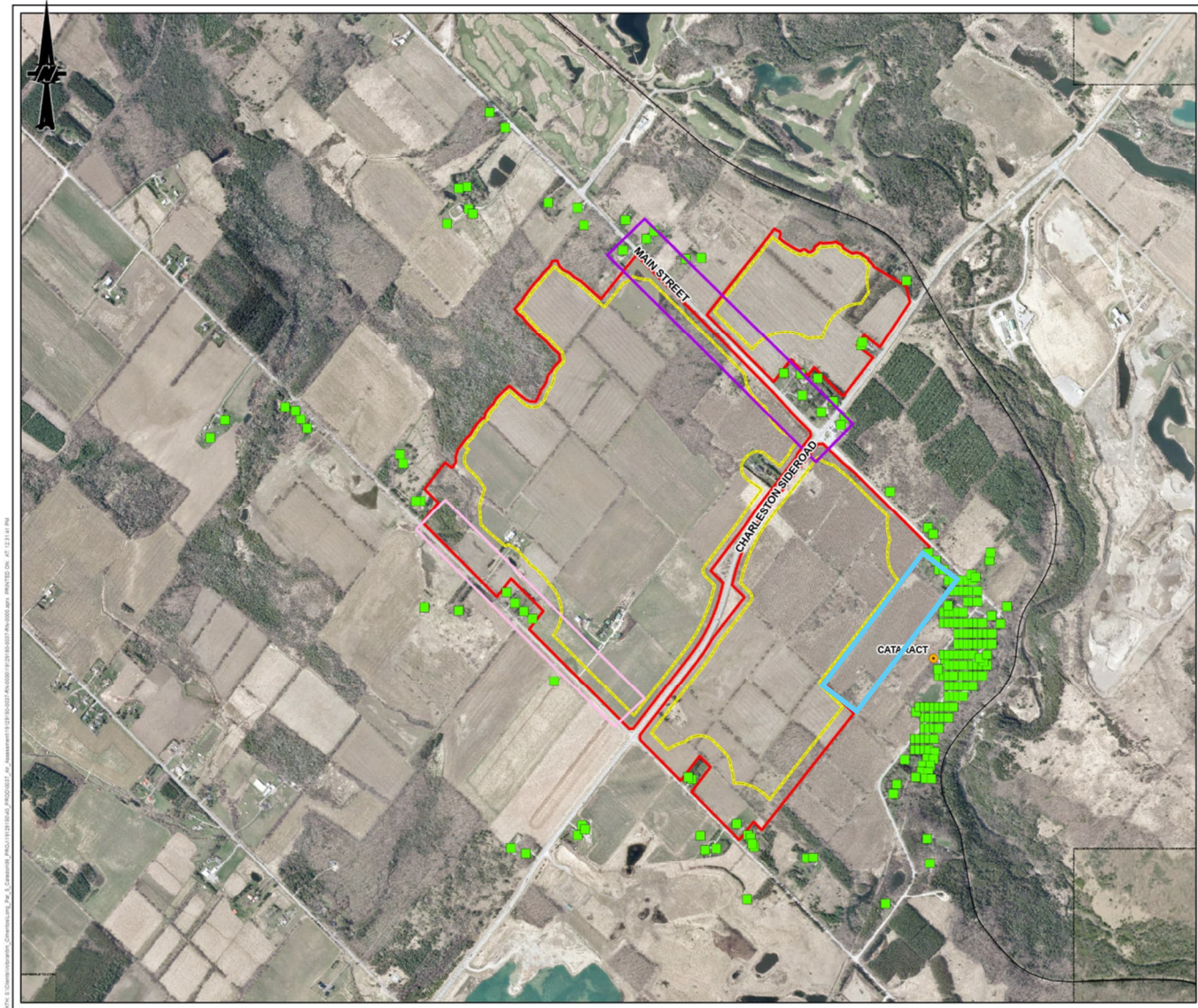
The upwind monitoring location should be at the location where the existing air quality monitor is installed at the Site, or, if it needs relocation to accommodate Project operations, the upward monitoring location should be at a location north of Regional Road 24 on the northeast side of Mississauga Road (Figure 3).

All locations will be located on CBM owned lands or on lands with appropriate permit approvals in place..

The suggested number and location of monitors are based on the earlier phases of the quarry operations and locations will be updated periodically to adequately cover the operations.

**Table 2: Location of Monitoring Stations and Monitoring Contaminants**

Station	UTM Coordinates NAD83, Zone 17T		Parameters to be Measured
	N (m)	E (m)	
Station 1 (Upwind)	TO BE DETERMINED CLOSER TO WORKS	TO BE DETERMINED CLOSER TO WORKS	SPM, PM <sub>10</sub> , PM <sub>2.5</sub>
Station 2 (Downwind)	TO BE DETERMINED CLOSER TO WORKS	TO BE DETERMINED CLOSER TO WORKS	SPM, PM <sub>10</sub> , PM <sub>2.5</sub>
Station 3 (Downwind)	TO BE DETERMINED CLOSER TO WORKS	TO BE DETERMINED CLOSER TO WORKS	SPM, PM <sub>10</sub> , PM <sub>2.5</sub>



- LEGEND**
- TOWN/VILLAGE
  - RECEPTOR LOCATION
  - LIMIT OF EXTRACTION
  - LICENCE BOUNDARY
  - PROPOSED SITING FOR AIR QUALITY MONITOR - DOWNWIND
  - PROPOSED SITING FOR AIR QUALITY MONITOR - UPWIND
  - PROPOSED SITING FOR AIR QUALITY MONITOR - DOWNWIND



**REFERENCE(S)**

1. BASE DATA MNR/LIO OBTAINED 2020
2. IMAGERY FIRSTBASE SOLUTIONS SPRING 2021, SPRING 2019 (15CM RESOLUTION) AND WORLD TOPOGRAPHIC MAP, CITY OF BRAMPTON, REGION OF PEEL, ONTARIO BASE MAP, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, © OPENSTREETMAP CONTRIBUTORS, HERE, GARMIN, USGS, NOAA, EPA, USGS, NPS, AAFIC, NRCAN
3. SITE TOPOGRAPHIC DATA - SPRING 2021, FIRSTBASE SOLUTIONS, 2021
4. LICENSE AND EXTRACTION LIMIT PROVIDED BY MIBC IN JUNE 2023
5. PROJECTION: TRANSVERSE MERCATOR DATUM, NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

**CLIENT**  
 CBM AGGREGATES, A DIVISION OF ST. MARYS CEMENT INC. (CANADA)  
**PROJECT**  
 CALEDON PIT / QUARRY

**TITLE**  
 LOCATION OF PROPOSED MONITORING STATIONS AND SENSITIVE RECEPTORS

CONSULTANT	YYYY-MM-DD	2025-05-27
	DESIGNED	CGE
	PREPARED	CGE
	REVIEWED	SC
	APPROVED	HM
	PROJECT NO.	CONTROL

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2025-05-27 10:00:00 AM      1:15,000      METRES

## 10.0 AIR SAMPLING EQUIPMENT AND MONITORING PROGRAM

### 10.1 Particulate Matter

A “near-reference” Optical Particle Counter, demonstrating good precision and accuracy in the field when calibrated against reference methods, will be used to collect real-time SPM, PM<sub>10</sub>, and PM<sub>2.5</sub> data at the three Stations. The unit operates as a sampling rate of 1.0 L/min. The operation, service and maintenance procedures detailed in the manual provided by the equipment manufacturer will be followed.

See Figure 4 for a depiction of similar sampling equipment.

#### 10.1.1 Correlation Factor

Field calibration of Aeroqual instruments with particulate matter monitoring modules is recommended for applications that have very high data quality needs.

Discrete measurements of PM<sub>10</sub> using a collocated PQ200 sampler at each station will be undertaken. The PQ200 samples at a flow rate of 16.7 L/min.

A correlation factor will be calculated and applied to the Dust Sentry Pro Instrument Gain.

### 10.2 Meteorological Station

One of the Dust Sentry Pro Stations will be fitted with a Vaisala weather sensor to provide local wind speed, wind direction, and temperature data. A summary of the ambient air quality sampling methods is provided in Table 1.



Figure 4: PQ200 and Aeroqual Monitor

## 11.0 DATA MANAGEMENT AND REPORTING

### 11.1 Data Validation

#### Discrete Samplers

Data validation for the discrete samples (PM<sub>10</sub>) will be carried out when the results are reported by the laboratory, including, at minimum, verification that the sample volume collected is within 10% of the target sample volume (24 actual m<sup>3</sup>), that the Laboratory Certificate of Analysis and Chain of Custody forms are in agreement, there are no signs of sample spoiling (i.e., missing filter pieces, droppings, etc.), and the data are reasonable (e.g. investigate and verify extreme values).

#### Real-time Samplers

Data validation for the “near-reference” real-time sampler will include validation against a reference or equivalent method. Regular monitoring of concentrations and investigations into suspect data will be undertaken as applicable. Maintenance schedules, as provided by the manufacturer, will be followed.

### 11.2 Data Reporting

Quarterly reports summarizing the monitoring data and meteorological data will be issued to CBM.

## 12.0 LABORATORY SERVICES

The laboratory that will conduct sample analyses has not yet been selected. The certifications and accreditations will be confirmed prior to commencing the monitoring program to ensure that the laboratory is appropriately accredited, and this Plan will be subsequently updated.

## 13.0 QA/QC PROTOCOLS

The ambient air quality monitoring will be carried out in accordance with defined QA / QC protocols in order to adhere to the basic elements outlined in the MECOP Operations Manual, which include:

- Strategic site selection to minimize interferences and obstacles that may affect airflow;
- Sampling system requirements;
- Site and analyzer operation;
- Frequency of PQ200 flow checks and equipment calibrations;
- Performance and system audits;
- Field calibration of real-time samplers as required;
- Data validation, editing, and reporting;
- Documentation of field notes;
- Personnel training; and, Submission of a blank 47 mm filter to a laboratory for analysis for every other PQ200 co-location period.

## 14.0 REFERENCES

Canadian Council of Ministers of the Environment (CCME). 2014. State of the Air Report.  
<http://airquality-qualitedelair.ccme.ca/en/> (Accessed March, 2021)

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2023. Operations Manual for Air Quality Monitoring in Ontario.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2024. Standards Development Branch, Ontario's Ambient Air Quality Criteria, Updated May 2020. (ISBN: 978-1-4868-4498-2)

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WSP Canada Inc (WSP). 2023. Air Quality Impact Assessment – Proposed Caledon Pit / Quarry (Revised July 2023)

# Signature Page

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