

**Quarterly Ambient Air Quality
Monitoring Report for the Durham
York Energy Centre (Crago Road
Station) – October to December
2017**

Durham York Energy Centre



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Sign-off Sheet

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QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE (CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2017

Executive Summary

The Regional Municipalities of Durham and York operate the Durham York Energy Centre (DYEC) which is an Energy from Waste (EFW) facility intended to provide a long-term, sustainable solution to manage the remaining municipal solid waste after waste diversion from the Regions. The facility commenced commercial operation on February 1, 2016.

An Ambient Air Quality Monitoring Plan – Durham York Residual Waste Study (Ambient Monitoring Plan) was developed and included two monitoring stations referred to as the Courtice Water Pollution Control Plant (WPCP) Station and the Rundle Road Station (as well as a temporary Fence Line Station). The plan developed for these stations was based on the Regional Council's mandate to provide ambient air quality monitoring in the area of the DYEC for a three-year period.

Subsequently, the Region decided to add a third ambient air monitoring station located near the corner of Crago and Osborne Roads (referred to as the Crago Road Station), which was installed in October/November 2014. The Crago Road Station is not part of the Ambient Monitoring Plan; however, it is operated following the same protocols as the other two stations. Results from the Crago Road Station are reported separately from the Courtice WPCP and Rundle Road Stations.

The Crago Road Station is equipped to measure concentrations of several air contaminants either continuously or at scheduled intervals (non-continuously) as outlined below:

- Contaminants monitored continuously:
 - Sulphur Dioxide (SO₂)
 - Nitrogen Oxides (NO_x), and
 - Particulate Matter smaller than 2.5 microns (PM_{2.5}).
- Contaminants monitored non-continuously:
 - Metals in Total Suspended Particulate (TSP) matter
 - Polycyclic Aromatic Hydrocarbons (PAHs), and
 - Dioxins and Furans.

Meteorological data is also measured at the station. The predominantly downwind Crago Road Station measures horizontal wind speed, wind direction, atmospheric temperature, relative humidity, and rainfall.

This quarterly report provides a summary of the ambient air quality data collected at the Crago Road Station for the period from October to December 2017 (Calendar Quarter 4). All measured air quality parameters had acceptable data recovery rates during this quarter. Instrumentation recovery rates are presented in Section 3.2 of this report.

Site personnel noted ongoing Highway 418 construction on the north and south sides of Highway 401 between Courtice and Crago Roads during Quarter 4 2017.

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The following observations and conclusions were made from a review of the measured ambient air quality monitoring data:

1. Measured levels of NO₂, SO₂ and PM_{2.5} were below the applicable criteria, standards, and human health risk assessment (HHRA) health-based criteria presented in **Table 2-1** of this report.
2. Since the Canadian Ambient Air Quality Standard (CAAQS) for PM_{2.5} is based on a 98th percentile level over 3 years, whereas the PM_{2.5} measurement period at the Crago Road Station for this quarterly report was three months, there was insufficient data collected to determine with any certainty if exceedances of the CAAQS would occur. Therefore, no comparison of the measured PM_{2.5} data during this quarter to the CAAQS was conducted for this report, as it would not be scientifically accurate or representative.
3. The maximum measured concentrations of TSP and all metals with Ministry of Environment and Climate Change (MOECC) air quality criteria were below their applicable criteria (as presented in **Table 2-2** in this report).
4. The maximum measured concentrations of PAHs with MOECC air quality limits were below their applicable criteria shown in **Table 2-3**, with the exception of the 24-hour benzo(a)pyrene (B(a)P) concentration in two (2) samples which exceeded the applicable Ontario Ambient Air Quality Criteria (AAQC) by 14% and 41%. The current Ontario 24-hour B(a)P AAQC was introduced in 2011 and levels above this AAQC are commonly measured throughout Ontario. The measurements were however, well below the MOECC Schedule 6 Upper Risk Threshold, the MOECC O. Reg. 419/05 24-hour average guideline, and the HHRA health based criterion.
5. The maximum measured toxic equivalent dioxin and furan concentration was below the applicable criteria presented in **Table 2-3**.

In summary, the measured concentrations of the air contaminants monitored were below their applicable MOECC criteria during the monitoring period between October and December 2017, with the exception of two (2) benzo(a)pyrene samples. All measured levels of the monitored contaminants were below their applicable HHRA health-based criteria.

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Abbreviations

AAQC	Ambient Air Quality Criteria
ACB List	Air Contaminants Benchmarks List: Standards, Guidelines and Screening Levels for Assessing Point of Impingement Concentrations of Air Contaminants
CAAQS	Canadian Ambient Air Quality Standard
CAC	Criteria Air Contaminants
CDD	Chlorinated Dibenzo-p-dioxins
CDF	Chlorinated Dibenzo-p-furans
D/Fs	Dioxins and Furans
DYEC	Durham York Energy Centre
EFW	Energy from Waste
HHRA	Human Health Risk Assessment
MOECC	Ontario Ministry of the Environment and Climate Change
SO ₂	Sulphur Dioxide
NO _x	Nitrogen Oxides
O ₃	Ozone
PAH	Polycyclic Aromatic Hydrocarbons
Particulate	A particle of a solid or liquid that is suspended in air.
PCB	Polychlorinated Biphenyl
PCDD/PCDF	Polychlorinated Dibenzo-p-dioxins and Dibenzofurans
PM	Particulate Matter
PM _{2.5}	Particulate Matter smaller than 2.5 microns
Q1, Q2, Q3, Q4	Quarter 1 (January, February, and March); Quarter 2 (April, May, and June); Quarter 3 (July, August, and September); and Quarter 4 (October, November, and December)
TEQ	Toxic Equivalent Quotient
TEQs	Toxic Equivalents
TSP	Total Suspended Particulate
WPCP	Water Pollution Control Plant

**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
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Elements

Cd	Cadmium
Hg	Mercury
Pb	Lead
Al	Aluminum
As	Arsenic
Be	Beryllium
Cr	Chromium
Cu	Copper
Mn	Manganese
Ni	Nickel
Ag	Silver
Tl	Thallium
Sn	Tin
V	Vanadium
Zn	Zinc

Miscellaneous

°C	Temperature in degrees Celsius
N/A	Not Available
%	Percent
ppm	Parts per million
ppb	Parts per billion
ppbv	Parts per billion by volume
ppt	Parts per trillion
min	Minimum
max	Maximum
mm	Millimetre
m	Metre
km/hr	Kilometre per hour
mg/m ³	Milligrams per cubic metre
µg/m ³	Micrograms per cubic metre
ng/m ³	Nanograms per cubic metre
pg/m ³	Picograms per cubic metre
pg TEQ/m ³	Picograms toxic exposure equivalents per cubic metre

QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE (CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2017

Introduction
February 15, 2018

1.0 INTRODUCTION

1.1 BACKGROUND AND OBJECTIVES

The Regional Municipalities of Durham and York operate the Durham York Energy Centre (DYEC) which is an Energy from Waste (EFW) facility intended to provide a long-term, sustainable solution to manage municipal solid waste remaining after diversion from the Regions. The location of the DYEC is shown in **Figure 1-1**. The facility commenced commercial operation on February 1, 2016.

An Ambient Air Quality Monitoring Plan – Durham York Residual Waste Study (Ambient Monitoring Plan) was developed and included two monitoring stations referred to as the Courtice Water Pollution Control Plant (WPCP) Station and the Rundle Road Station (as well as a temporary Fence Line Station). The plan developed for these stations was based on the Regional Council's mandate to provide ambient air quality monitoring in the area of the DYEC for a three-year period.

The purposes of the ambient air quality monitoring program are to:

1. Quantify any measurable ground level concentrations resulting from emissions from the DYEC cumulative to local air quality, including validating the predicted concentrations from the dispersion modelling conducted in the Environmental Assessment (Jacques Whitford, 2009);
2. Monitor concentration levels of EFW-related air contaminants in nearby residential areas; and,
3. Quantify background ambient levels of air contaminants in the area.

At the request of the Regional Municipality of Durham (the Region), a third ambient air monitoring station located near the corner of Crago and Osborne Roads was installed. This station, which is not part of the Ambient Monitoring Plan, is operated following the same protocols as the other two stations (Courtice WPCP and Rundle Road Stations) already in operation.

The Crago Road Station is equipped to measure concentrations of several air contaminants either continuously or at scheduled intervals (non-continuously) as outlined below:

- Contaminants monitored continuously:
 - Sulphur Dioxide (SO₂)
 - Nitrogen Oxides (NO_x), and
 - Particulate Matter smaller than 2.5 microns (PM_{2.5}).

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- Contaminants monitored non-continuously:
 - Metals in Total Suspended Particulate (TSP) matter
 - Polycyclic Aromatic Hydrocarbons (PAHs), and
 - Dioxins and Furans.

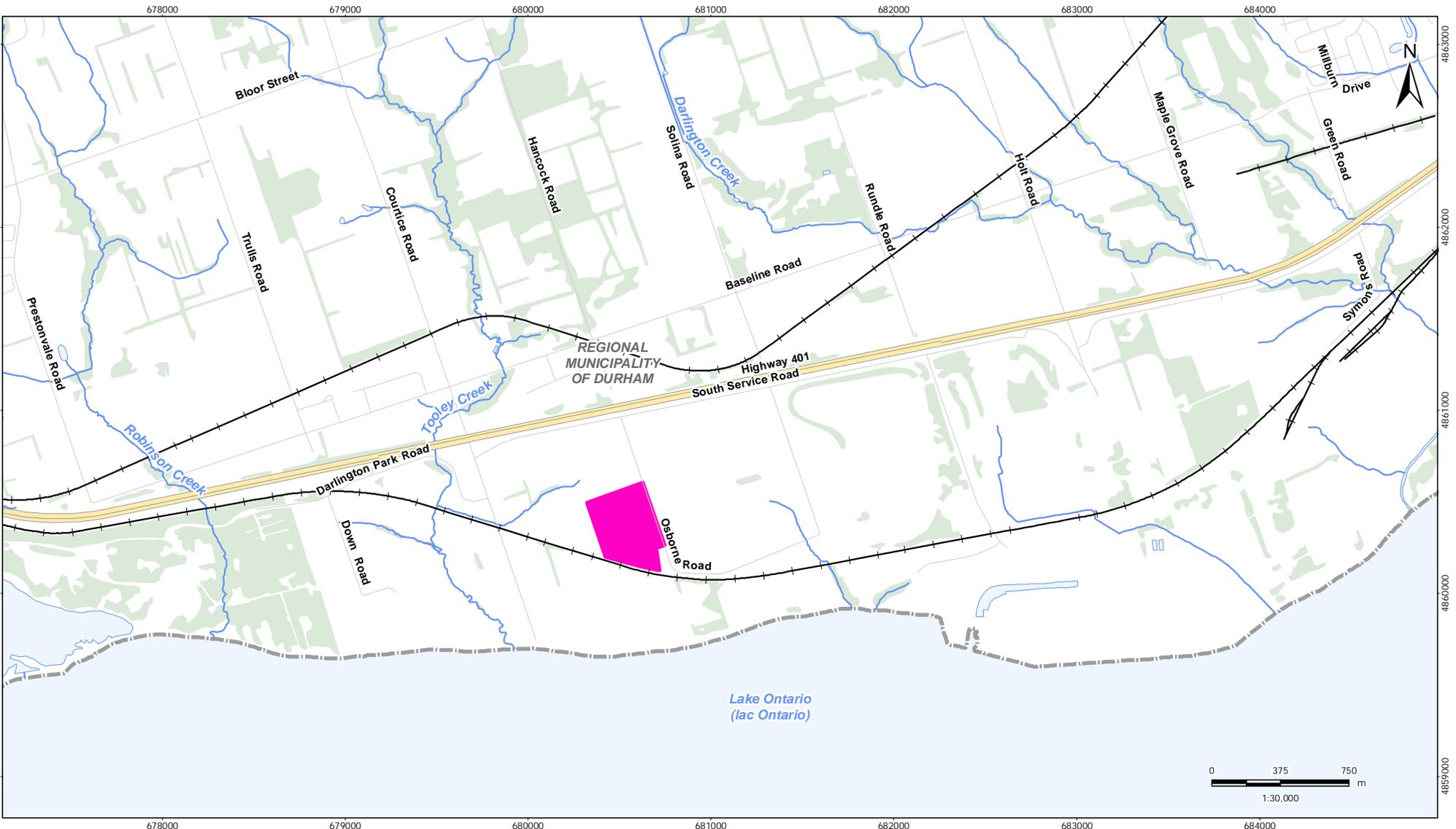
This quarterly report provides a summary of the ambient air quality data collected at this station for the period from October to December 2017 (Q4).

1.2 LOCATION OF AMBIENT AIR QUALITY MONITORING STATION

The selection of the site for the monitoring station was accomplished in consultation with Regional Municipality of Durham representatives, with consideration of the location of the existing monitoring stations and general MOECC siting criteria. The final location of the monitoring station was influenced by the availability of electrical power, accessibility of each location, and security.

The Crago Road Station is sited east of the DYEC near the Darlington Hydro Upper and Lower Soccer Fields on the east side of Crago Road, north of Osborne Road. Its location is shown in **Figure 1-2** and **Figure 1-3**. The monitoring station measures all the air contaminants listed in Section 1.1 and meteorological data.

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 Revised: 2013-10-28 By: seanes



October 2013
 160950528



- Legend**
- Durham York Energy Centre Site
 - Railway
 - Road
 - Highway
 - Watercourse
 - Waterbody
 - Wooded Area

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
 2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.

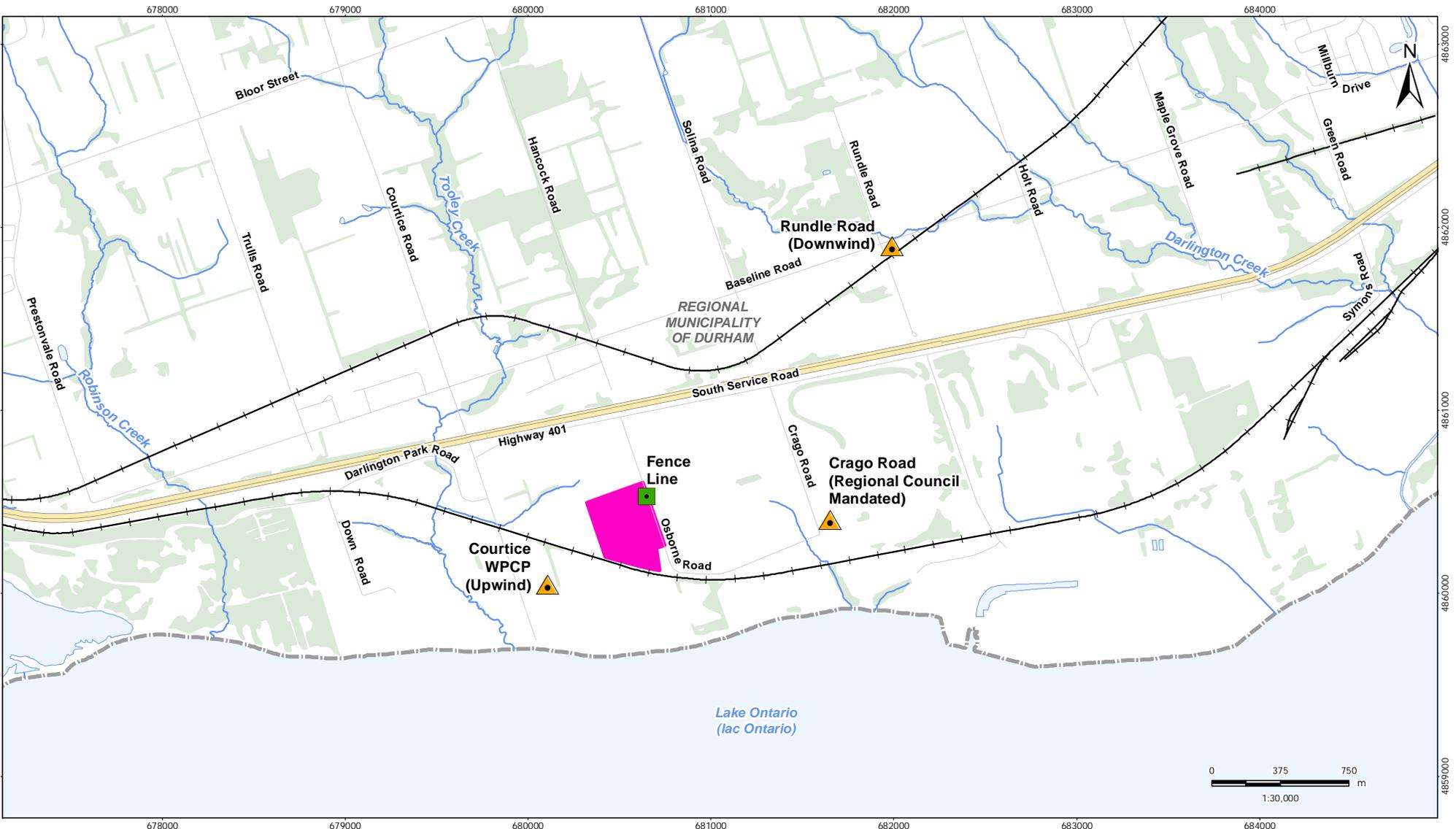


Client/Project
 The Region of Durham
 Durham York Energy Centre

Figure No.
 1-1

Title
 Site Location Plan

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 Revised: 2015-02-27 By: seanes



- Legend**
- Station Location
 - Fence Line Station Location (Monitoring to begin after DYEC commissioning period)
 - Durham York Energy Centre Site
 - Railway
 - Road
 - Highway
 - Watercourse
 - Waterbody
 - Wooded Area

Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.

Client/Project
 The Region of Durham
 Durham York Energy Centre

Figure No.
 1-2

Title
 Locations of Ambient
 Monitoring Stations

February 2015
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QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE (CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2017

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Figure 1-3 View of Crago Road Ambient Air Quality Monitoring Station



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Key Components Assessed
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2.0 KEY COMPONENTS ASSESSED

2.1 METEOROLOGY

The following meteorological parameters are measured at the Crago Road monitoring station:

- Wind Speed and direction at a height of 7.5 m
- Ambient temperature at a height of 2 m
- Relative humidity, and
- Rainfall.

2.2 AIR QUALITY CONTAMINANTS OF CONCERN

The ambient air quality monitoring program for the Crago Road Station includes the following contaminants specified in the Ambient Monitoring Plan (Stantec, 2012):

- Continuously monitored criteria air contaminants (CACs)
 - Sulphur Dioxide (SO₂)
 - Nitrogen Oxides (NO_x), and
 - Particulate Matter smaller than 2.5 microns (PM_{2.5}).
- Non-continuously monitored
 - Metals in Total Suspended Particulate (TSP) matter
 - Polycyclic Aromatic Hydrocarbons (PAHs), and
 - Dioxins and Furans.

The following are lists of the specific metals, PAHs, and dioxins and furans being measured. Rationales for the choice of contaminants being monitored are provided in the Ambient Monitoring Plan (Stantec, 2012).

Metals:

- | | | |
|-------------------------|-------------------|------------------|
| • Aluminum (Al) | • Iron (Fe) | • Thallium (Tl) |
| • Antimony (Sb) | • Lead (Pb) | • Tin (Sn) |
| • Arsenic (As) | • Magnesium (Mg) | • Titanium (Ti) |
| • Barium (Ba) | • Manganese (Mn) | • Uranium (U) |
| • Beryllium (Be) | • Mercury (Hg) | • Vanadium (V) |
| • Bismuth (Bi) | • Molybdenum (Mo) | • Zinc (Zn) |
| • Boron (B) | • Nickel (Ni) | • Zirconium (Zr) |
| • Cadmium (Cd) | • Phosphorus (P) | |
| • Cobalt (Co) | • Selenium (Se) | |
| • Copper (Cu) | • Silver (Ag) | |
| • Chromium (Cr) (Total) | • Strontium (Sr) | |

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Polycyclic Aromatic Hydrocarbons:

- 1-Methylnaphthalene
- 2-Methylnaphthalene
- Acenaphthene
- Acenaphthylene
- Anthracene
- Benzo(a)anthracene
- Benzo(a)fluorene
- Benzo(a)pyrene
- Benzo(b)fluorene
- Benzo(b)fluoranthene
- Benzo(e)pyrene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Biphenol
- Chrysene
- Dibenz(a,h)anthracene
- Dibenz(a,c)anthracene
- Fluoranthene
- Indeno(1,2,3-cd)pyrene
- Naphthalene
- Perylene
- Phenanthrene
- Pyrene
- Tetralin
- o-Terphenyl
- Total PAHs

Dioxins and Furans:

- 2,3,7,8-Tetra CDD
- 1,2,3,7,8-Penta CDD
- 1,2,3,4,7,8-Hexa CDD
- 1,2,3,6,7,8-Hexa CDD
- 1,2,3,7,8,9-Hexa CDD
- 1,2,3,4,6,7,8-Hepta CDD
- Octa CDD
- Total Tetra CDD
- Total Penta CDD
- Total Hexa CDD
- Total Hepta CDD
- 2,3,7,8-Tetra CDF
- 1,2,3,7,8-Penta CDF
- 2,3,4,7,8-Penta CDF
- 1,2,3,4,7,8-Hexa CDF
- 1,2,3,6,7,8-Hexa CDF
- 2,3,4,6,7,8-Hexa CDF
- 1,2,3,7,8,9-Hexa CDF
- 1,2,3,4,6,7,8-Hepta CDF
- 1,2,3,4,7,8,9-Hepta CDF
- Octa CDF
- Total Tetra CDF
- Total Penta CDF
- Total Hexa CDF
- Total Hepta CDF
- Total toxic equivalency (I-TEQ)

2.3 AIR QUALITY CRITERIA

Two sets of criteria were used for comparison to the air quality data as specified in the Ambient Monitoring Plan (Stantec, 2012). The first set was the Ontario Ambient Air Quality Criteria (AAQC) developed by the MOECC (MOECC, 2012). The second set of criteria was the Standards reported in O. Reg. 419/05 (Schedules 3 and 6). These are compliance based Standards used throughout the province of Ontario. These criteria, along with O. Reg. 419/05 Guidelines and Jurisdictional Screening Levels are unchanged but were consolidated in December 2016 into a new format known as the "Air Contaminants Benchmarks List: Standards, Guidelines and Screening Levels for Assessing Point of Impingement Concentrations of Air Contaminants" (MOECC, 2016) (ACB List).

Not all chemicals have AAQCs or O. Reg. 419/05 Standards, or in some instances updated health-based criteria were used in the human health risk assessment (HHRA) conducted in support of the Environmental Assessment (July 31, 2009 - December 10, 2009). These health-based values, which were reported in Table 7-2 (Summary of Inhalation TRVs and Inhalation Benchmarks Selected for CACs) and Table 7-3 (Inhalation TRVs and Inhalation Benchmarks for Selected COPCs) of the HHRA (Stantec, 2009) were used as the second set of criteria.

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The previously applicable 24-hour average Canada-Wide Standard (CWS) for PM_{2.5} of 30 µg/m³ (98th percentile averaged over 3 consecutive years), has been superseded by a new Canadian Ambient Air Quality Standard (CAAQS) of 28 µg/m³ (98th percentile averaged over three consecutive years) and an annual objective of 10 µg/m³ as noted in **Table 2-1**. The proposed CAAQS 24-hour objective for 2020 is 27 µg/m³.

There is an AAQC for nitrogen dioxide (NO₂) as well as a Schedule 3 Standard for nitrogen oxides (NO_x) which is based on health effects of NO₂, as NO₂ has adverse health effects at much lower concentrations than nitric oxide (NO). To be consistent with the reporting for the Courtice WPCP and Rundle Road Stations, ambient NO_x measurements are not compared with the NO₂ AAQC or Schedule 3 NO_x Standard (as requested by the MOECC [MOECC, 2017]).

Summaries of the relevant air quality criteria for the contaminants monitored are presented in **Table 2-1** to **Table 2-3**.

Table 2-1 Summary of Air Quality Criteria for CACs

Contaminant	CAS	MOECC Criteria			HHRA Health-Based Criteria		
		1-Hour (ppb / µg/m ³)	24-Hour (ppb / µg/m ³)	Annual (ppb / µg/m ³)	1-Hour (ppb / µg/m ³)	24-Hour (ppb / µg/m ³)	Annual (ppb / µg/m ³)
Sulphur dioxide	7446095	250 / 690	100 / 275	20 / 55	250 / 690	100 / 275	11 / 29
Nitrogen dioxide	10102-44-0	200 / 400	100 / 200	-	200 / 400	100 / 200	30 / 60
Contaminant	CAS	Canadian Ambient Air Quality Standards (CAAQS)			HHRA Health-Based Criteria		
		1-Hour (µg/m ³)	24-Hour (µg/m ³)	Other Time Period (µg/m ³)	1-Hour (µg/m ³)	24-Hour (µg/m ³)	Other Time Period (µg/m ³)
PM _{2.5}	N/A	-	28 ^A	10 ^B	-	30 ^C	-

Notes:

- A. Canadian Ambient Air Quality Standards (CAAQS) for Respirable Particulate Matter and Ozone, effective by 2015 (CCME, 2012). The Respirable Particulate Matter Objective is referenced to the 98th percentile daily average concentration averaged over 3 consecutive years.
- B. Annual Canadian Ambient Air Quality Standard for Respirable Particulate Matter, effective by 2015. The Respirable Particulate Matter Objective is referenced to the 3-year average of the annual average concentrations.
- C. HHRA Health-Based criterion for PM_{2.5} was selected referencing CCME (2006).

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Table 2-2 Summary of Air Quality Criteria for Metals

Contaminant	CAS	MOECC Criteria			HHRA Health-Based Criteria		
		1-Hour (µg/m ³)	24-Hour (µg/m ³)	Other Time Period (µg/m ³)	1-Hour (µg/m ³)	24-Hour (µg/m ³)	Annual (µg/m ³)
Total Particulate	NA	-	120	-	-	120	60
Aluminum	7429-90-5	-	4.8	-	-	-	-
Antimony	7440-36-0	-	25	-	5	25	0.2
Arsenic	7440-38-2	-	0.3	-	0.2	0.3	0.015 ^A 0.0043 ^B
Barium	7440-39-3	-	10	-	5	10	1
Beryllium	7440-41-7	-	0.01	-	0.02	0.01	0.007 ^A 0.0024 ^B
Bismuth	7440-69-9	-					
Boron	7440-42-8	-	120	-	50	-	5
Cadmium	7440-43-9	-	0.025	0.005; annual	0.1	0.025	0.005 ^A 0.0098 ^B
Chromium (Total)	7440-47-3	-	0.5	-	1	-	60
Cobalt	7440-48-4	-	0.1	-	0.2	0.1	0.1
Copper	8440-50-8	-	50	-	-	-	-
Iron	15438-31-0	-	4	-	-	-	-
Lead	7439-92-1	-	0.5	0.2; 30-day	1.5	0.5	0.5
Magnesium	7439-95-4	-					
Manganese	7439-96-5	-	0.4	-	-	-	-
Mercury	7439-97-6	-	2	-	0.6	2	0.3
Molybdenum	7439-87-7	-	120	-	-	-	-
Nickel	7440-02-0	-	0.2	0.04; annual	6	-	0.05
Phosphorus	7723-14-0	-	-	-	-	-	6.4 x 10 ⁷
Selenium	7782-49-2	-	10	-	2	10	0.2
Silver	7440-22-4	-	1	-	0.1	1	0.01
Strontium	7440-24-6	-	120	-	-	-	-
Thallium	7440-28-0	-	-	-	1	-	0.1
Tin	7440-31-5	-	10	-	20	10	2
Titanium	7440-32-6	-	120	-	-	-	-

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Key Components Assessed
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Table 2-2 Summary of Air Quality Criteria for Metals

Contaminant	CAS	MOECC Criteria			HHRA Health-Based Criteria		
		1-Hour (µg/m ³)	24-Hour (µg/m ³)	Other Time Period (µg/m ³)	1-Hour (µg/m ³)	24-Hour (µg/m ³)	Annual (µg/m ³)
Vanadium	7440-62-2	-	2	-	0.5	1	1
Uranium	7440-61-1	-	1.5	0.03; annual	-	-	-
Zinc	7440-66-6	-	120	-	50	-	5
Zirconium	7440-67-7	-	20	-	-	-	-

Notes:

- A. Annual Average
- B. Carcinogenic Annual Average

Table 2-3 Summary of Air Quality Criteria for PAHs and D/Fs

Contaminant	CAS	MOECC Criteria			HHRA Health-Based Criteria			
		1-Hour (ng/m ³)	24-Hour (ng/m ³)	Other Time Period (ng/m ³)	1-Hour (ng/m ³)	24-Hour (ng/m ³)	Annual (ng/m ³)	Toxic Equivalency Factor Annual ^{A, F} (ng/m ³) ⁻¹
1-Methylnaphthalene	90-12-0	-	12,000	-	-	-	3,000	-
2-Methylnaphthalene	91-57-6	-	10,000	-	-	-	3,000	-
Acenaphthene	83-32-9	-	-	-	1,000	-	-	1
Acenaphthylene	208-96-8	-	3,500	-	1,000	-	-	10
Anthracene	120-12-7	-	200	-	500	-	50	-
Benzo(a)anthracene	56-55-3	-	-	-	500	-	-	100
Benzo(b)fluoranthene	205-99-2	-	-	-	500	-	-	100
Benzo(k)fluoranthene	207-08-9	-	-	-	500	-	-	100
Benzo(a)fluorene	238-84-6	-	-	-	500	-	50	-
Benzo(b)fluorene	243-17-4	-	-	-	500	-	50	-
Benzo (g,h,i) perylene	191-24-2	-	-	-	500	-	-	100
Benzo(a)pyrene	50-32-8	-	0.05 ^B 5 ^C 1.1 ^D	0.01; annual	-	1	87 ^A	-
Benzo(e)pyrene	192-97-2	-	-	-	500	-	-	10
Biphenyl	92-52-4	-	-	-	-	-	224,000	-
Chrysene	218-01-9	-	-	-	-	-	-	-

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Table 2-3 Summary of Air Quality Criteria for PAHs and D/Fs

Contaminant	CAS	MOECC Criteria			HHRA Health-Based Criteria			
		1-Hour (ng/m ³)	24-Hour (ng/m ³)	Other Time Period (ng/m ³)	1-Hour (ng/m ³)	24-Hour (ng/m ³)	Annual (ng/m ³)	Toxic Equivalency Factor Annual ^{A, F} (ng/m ³) ⁻¹
Dibenzo(a,c)anthracene	215-58-7	-	-	-	-	-	-	100
Dibenzo(a,h)anthracene	53-70-3	-	-	-	500	-	-	1,000
Fluoranthene	206-44-0	-	-	-	500	-	-	1
Indeno(1,2,3-cd)pyrene	193-39-5	-	-	-	500	-	-	100
Naphthalene	91-20-3	-	22,500	-	-	22,500	3,000	-
o-Terphenyl	84-15-1	-	-	-	50,000	-	5,000	-
Perylene	198-55-0	-	-	-	500	-	-	1
Phenanthrene	85-01-8	-	-	-	500	-	-	1
Pyrene	129-00-0	-	-	-	500	-	-	1
Tetralin	119-64-2	-						-
Dioxins and Furans Total Toxic Equivalency E	NA	-	0.1 (pg TEQ/m ³) ^E 1 (pg TEQ/m ³) ^C	-	-	-	-	-

Notes:

- A. Carcinogenic Annual Average. Units in (ng/m³)⁻¹.
- B. Ontario Ambient Air Quality Criteria - The standard for benzo(a)pyrene (B(a)P) is for B(a)P as a surrogate for PAHs.
- C. O. Reg. 419/05 Schedule 6 Upper Risk Thresholds
- D. O. Reg. 419/05 24 Hour Guideline
- E. Application of the air standard for dioxins, furans, and dioxin-like PCBs requires the calculation of the total toxicity equivalent (TEQ) concentration contributed by all dioxin-like compounds in the mixture. TEQ is calculated using the methodology as per the O. Reg. 419/05 Summary of Standards and Guidelines, and the corresponding WHO₂₀₀₅ toxic equivalency factors (i-TEFs).
- F. Toxic Equivalency Factors (TEFs) are shown as benzo(a)pyrene equivalents.

QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE (CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2017

Instrumentation Summary and Field Conditions
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3.0 INSTRUMENTATION SUMMARY AND FIELD CONDITIONS

3.1 INSTRUMENTATION

The measurement program at the monitoring site includes both continuous and non-continuous monitors to sample air contaminant concentrations.

Monitoring for respirable particulate matter (PM_{2.5}), nitrogen oxides (NO_x) and sulphur dioxide (SO₂) are conducted on a continuous basis. A summary of the continuous monitors and a brief description of their principle of operation are provided in **Table 3-1** below.

Table 3-1 Summary of Continuous Ambient Air Quality Monitors

Contaminant	Monitor	Principle of Operation	Range	Time Interval
PM _{2.5}	Thermo Sharp 5030 Synchronized Hybrid Ambient Real-time Particulate Monitor	Light Scattering Photometry / Beta Attenuation - Consists of a carbon 14 source, detector, and light scattering Nephelometer in a rack-mountable enclosure. The Thermo Sharp utilizes a continuous (non-step wise) hybrid mass measurement and a combination of beta attenuation and light scattering technology. The unit's filter tape is automatically advanced based upon a user defined frequency or particulate loading.	0 - 10 mg/m ³	1 minute
NO, NO ₂ , NO _x	Teledyne API Model 200E Chemiluminescence Analyzer	Chemiluminescence - Uses a chemiluminescence detection principle and microprocessor technology for ambient continuous emissions monitoring (CEM). Measurements are automatically compensated for temperature and pressure changes.	0 – 1000 ppb	1 second
SO ₂	Teledyne API Model T100	Pulsed Florescence - SO ₂ levels are measured based on the principle that SO ₂ has a strong ultraviolet (UV) absorption at a wavelength between 200 and 240 nanometres (nm). The absorption of photons at these wavelengths results in the emission of fluorescence photons at a higher wavelength. The amount of fluorescence measured is directly proportional to the concentration of SO ₂ .	0 – 1000 ppb	1 second

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Two manually operated, hi-volume air samplers are installed at the Crago Road Station to collect metals in total suspended particulate (TSP), polycyclic aromatic hydrocarbons (PAHs), and dioxins and furans. Sampling for these contaminants is conducted following the methodology and analyses described in the Ambient Monitoring Plan (Stantec, 2012), as presented in **Table 3-2**. The samples were submitted to Maxxam Analytics Inc., a Canadian Association for Laboratory Accreditation Inc. (CALA) / Standards Council of Canada (SCC) accredited laboratory, for analysis.

Table 3-2 Summary of Non-Continuous Ambient Air Quality Monitors

Contaminant	Sampler	Filter Media	Lab Analysis	Sampling Schedule
TSP and metals	Tisch Environmental TE-5170 mass-flow high volume sampler	Pre-weighed, conditioned Teflon coated glass fibre filters	Weighed for particulate loading and analysed using the Atomic Emission Spectroscopy / Inductively Coupled Plasma (AES/ICP) technique to determine metals content	24 hour sample taken every 6 days
PAHs	Tisch Environmental TE-1000 mass-flow high volume air sampler	Dual chambered sampling module with a Teflon-coated glass fibre filter and a Poly-Urethane Foam (PUF) cartridge	Gas Chromatography / Mass Spectrometry (GC/MS)	24 hour sample taken every 12 days
Dioxins and Furans				24 hour sample taken every 24 days.

Horizontal wind speed, wind direction, atmospheric temperature, relative humidity, and rainfall are measured at the predominantly downwind Crago Road Station. The meteorological sensors at the Crago Road Station are mounted on an external 7.5 m aluminum tower and are logged using a digital data acquisition system (DAS). The meteorological equipment at the Crago Road Station is summarized in **Table 3-3**.

Table 3-3 Summary of Meteorological Equipment

Parameter	Equipment
Wind Speed/Wind Direction	Met One Instruments Inc. Model 034B
Temperature/Relative Humidity	Campbell Scientific Model HMP60
Rainfall	Texas Electronic TE525M

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A Campbell Scientific CRX1000 station data acquisition system is used to collect continuous instrument monitoring data and status codes from the ambient air quality monitors. Continuous station data is maintained in the data loggers, and data is viewed locally using a laptop and the relevant DAS software applications. Remote data transmission is accomplished by the periodic transmission of collected station air quality data via cellular phone.

3.2 INSTRUMENTATION ISSUES

A summary of the operational issues for each measurement parameter during the monitoring period is presented in **Table 3-4**.

Table 3-4 Summary of Instrument Issues at the Crago Road Station

Parameter	Issues	Timeframe	Remedial Action
SO ₂	None	-	-
NO _x	None	-	-
PM _{2.5}	None	-	-
TSP/Metals Hi-Vol.	None	-	-
PAH/ D/F Hi-Vol	None	-	-
Other	None	-	-

3.3 INSTRUMENTATION RECOVERY RATES

Data recovery rates for each monitor during this quarter are presented in **Table 3-5**.

Table 3-5 Summary of Data Recovery Rates for the Crago Road Station – October to December 2017

Parameter	Valid Measurement Hours	Data Recovery Rate (%)
SO ₂	2203	99.8% ^B
NO _x	2201	99.7% ^B
PM _{2.5}	2200	99.6% ^B
Temperature	2208	100% ^B
Rainfall	2208	100% ^B
Relative Humidity	2208	100% ^B
Wind Speed/Direction	2208	100% ^B
TSP/Metals	15 ^A	100%
PAHs	7 ^A	100%
Dioxins and Furans	3 ^A	100%

Notes:

- A. Number of filters/24-hour average samples.
- B. Includes any instrumentation issues summarized in Table 3-4, maintenance, and monthly calibrations.

QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE (CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2017

Instrumentation Summary and Field Conditions
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3.4 FIELD CONDITION OBSERVATIONS

During Q4 2017, activities in the vicinity of the Crago ambient air monitoring station were observed that had the potential to be affecting air quality levels. These observations were noted during field visits by Stantec personnel.

Construction of Highway 418, which will connect with Highway 401 between Courtice Road and Crago Road was ongoing during this quarter. Highway 418 will provide a north-south link between Highway 401 and the Phase 2 expansion of Highway 407. The Highway 401/418 interchange will be located almost directly north of the DYEC. Throughout the quarter, excavator/dump truck crews were observed working in a large area immediately north of the DYEC between Megawatt Drive and Highway 401. Major work observed included earthworks and Highway 401 overpass construction for on/off ramps connecting to Highway 418. Photographs of soil berms/ramps and overpass construction activities are provided in **Figure 3-1**, and **Figure 3-2**.

During Q4, there was one period where waste feed to each boiler was halted. The times when these feed stops occurred are summarized in **Table 3-6**.

Table 3-6 Summary of Boiler Operational Status in Q4 2017

Boiler	Date	Time	Status
Boiler 1	November 26	12:19 – 15:34	Feed Stop
Boiler 2	November 26	12:19 – 14:53	Feed Stop

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**Figure 3-1 Looking North from Megawatt Drive at the Highway 401 and Highway 418
Construction (October 23, 2017)**



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**Figure 3-2 Looking North from Megawatt Drive at the Highway 401 and Highway 418
Construction (November 28, 2017)**



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Summary of Ambient Measurements
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4.0 SUMMARY OF AMBIENT MEASUREMENTS

The following sections provide summaries of the validated data and the validation completed on each parameter.

4.1 METEOROLOGICAL DATA

A summary of the maximum, minimum, arithmetic mean, and standard deviation of the hourly average meteorological parameters measured at the monitoring station for the October to December 2017 period are presented in **Table 4-1**.

Table 4-1 Summary of Hourly Meteorological Measurements – October to December 2017

Parameter		Crago Road Station (Predominately Downwind)	Units
Temperature	Maximum	21.4	C
	Minimum	-24.3	C
	Mean (October)	11.8	C
	Mean (November)	3.0	C
	Mean (December)	-6.0	C
	Mean (Period)	2.9	C
	Standard Deviation	9.3	C
Rainfall	Maximum	8.1	mm
	Minimum	0.0	mm
	Mean (October)	0.09	mm
	Mean (November)	0.07	mm
	Mean (December)	0.03	mm
	Mean (Period)	0.07	mm
	Standard Deviation	0.39	mm
Relative Humidity	Maximum	98.3	%
	Minimum	38.4	%
	Mean (October)	77.6	%
	Mean (November)	72.7	%
	Mean (December)	70.7	%
	Mean (Period)	73.7	%
	Standard Deviation	13.7	%

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Table 4-1 Summary of Hourly Meteorological Measurements – October to December 2017

Parameter		Crago Road Station (Predominately Downwind)	Units
Wind Speed ^	Maximum	40.7	km/hr
	Minimum	0.0	km/hr
	Mean (October)	11.1	km/hr
	Mean (November)	12.9	km/hr
	Mean (December)	13.7	km/hr
	Mean (Period)	12.6	km/hr
	Standard Deviation	7.3	km/hr

Note:

A. Wind speed is measured at 7.5 m.

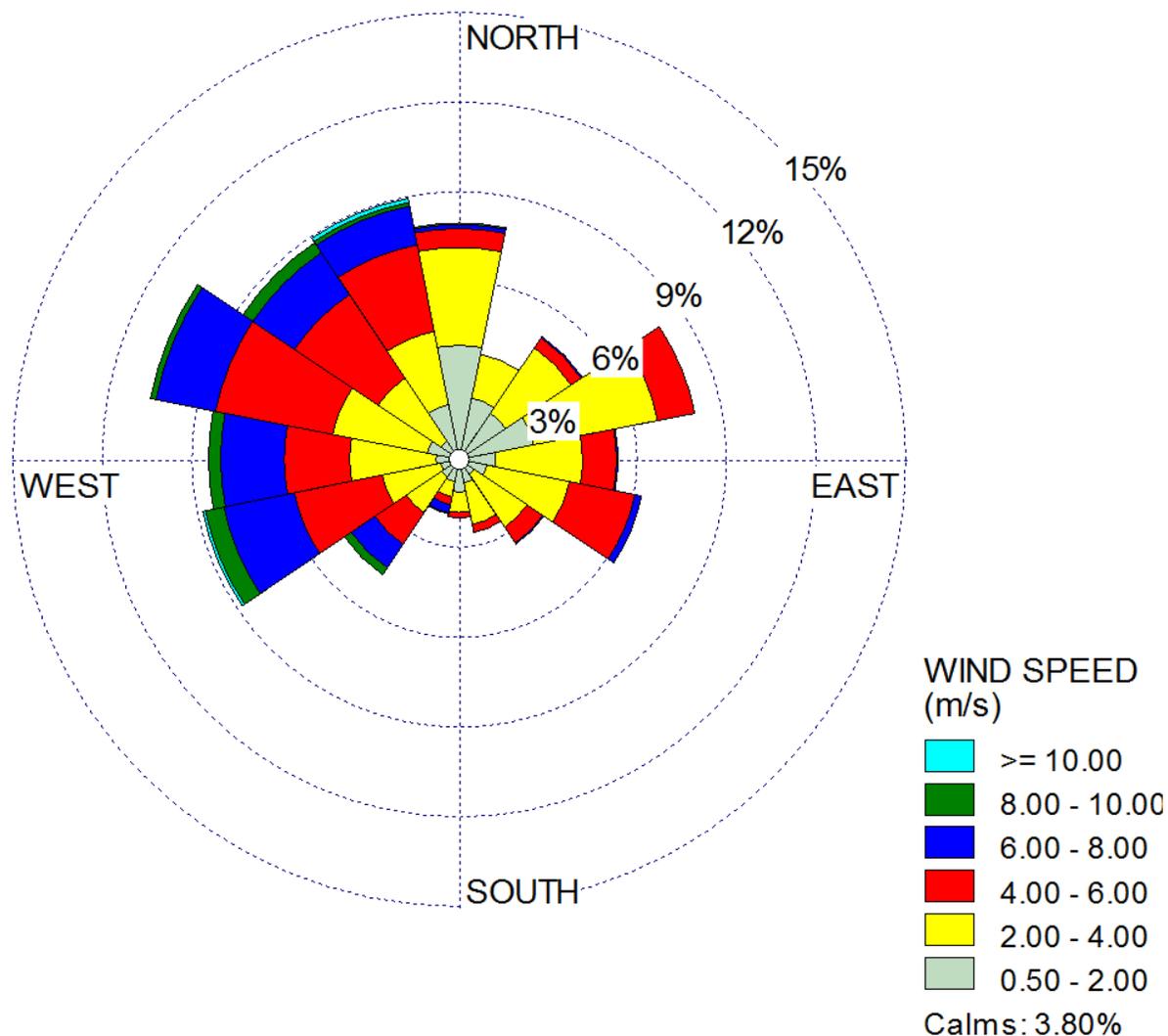
A wind rose showing directionality and speed is presented in **Figure 4-1**. The length of the radial barbs gives the total percent frequency of winds from the indicated direction, while portions of the barbs of different widths indicate the frequency associated with each wind speed category.

Winds over the three-month period occurred predominantly from west-southwesterly to northerly directions. Wind contribution from the northeast and south was low. Higher wind speeds occurred from southwesterly to north-northwesterly directions.

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Summary of Ambient Measurements
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Figure 4-1 Wind Rose for October to December 2017



4.2 CAC AMBIENT AIR QUALITY MEASUREMENTS

A summary of the maximum, minimum, arithmetic mean, and standard deviation of the measured CAC pollutant concentrations are presented in **Table 4-2**. Also, presented in this table are the number of exceedances (if any occurred) of the relevant O. Reg. 419/05 Schedule 3 Standards, Ontario Ambient Air Quality Criteria (AAQC) or health-based criteria for each

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contaminant. All monitored contaminants were below their applicable criteria during the period from October to December 2017.

Nitric oxide (NO) has no regulatory criteria as discussed in Section 4.2.2 below. There are both hourly and daily AAQCs for NO₂ which are based on health effects of NO₂; therefore, the AAQC were compared to measured NO₂ concentrations in this report.

The maximum concentration levels measured at the Crago Road Station in this quarter are compared in **Figure 4-2** to their respective air quality criteria along with the levels measured at the Courtice WPCP and Rundle Road Stations (Stantec, 2018).

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Table 4-2 Summary of Ambient CAC Monitoring Data – October to December 2017

Pollutant	Averaging Period	MOECC Criteria / HHRA Health-Based Criteria		Description	Crago Road Station (Predominately Downwind)	
		ppb	µg/m ³		Concentration (ppbv)	Concentration (µg/m ³)
SO ₂	1	250	690	Maximum	59.0	182.1
				Minimum	0.0	0.0
				Mean (October)	0.3	0.9
				Mean (November)	0.9	2.6
				Mean (December)	1.0	2.9
				Mean (Period)	0.7	2.1
				Standard Deviation	1.9	5.5
				# of Exceedances	0	0
	24	100	275	Maximum	5.9	16.7
				Minimum	0.0	0.0
				Mean (October)	0.3	0.9
				Mean (November)	0.9	2.6
				Mean (December)	1.0	2.9
				Mean (Period)	0.7	2.1
			Standard Deviation	0.7	2.1	
			# of Exceedances	0	0	

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Table 4-2 Summary of Ambient CAC Monitoring Data – October to December 2017

Pollutant	Averaging Period	MOECC Criteria / HHRA Health-Based Criteria		Description	Crago Road Station (Predominately Downwind)	
		ppb	µg/m ³		Concentration (ppbv)	Concentration (µg/m ³)
PM _{2.5}	24	N/A	28 ^A	Maximum	-	15.6
				Minimum	-	0.4
				Mean (October)	-	5.1
				Mean (November)	-	4.1
				Mean (December)	-	5.4
				Mean (Period)	-	4.9
				Standard Deviation	-	2.9
				# of Exceedances	-	N/A
NO ₂	1	200	400	Maximum	62.6	138.9
				Minimum	0.5	0.9
				Mean (October)	6.2	12.2
				Mean (November)	5.9	12.0
				Mean (December)	8.5	17.7
				Mean (Period)	6.9	14.0
				Standard Deviation	6.0	12.5
				# of Exceedances	0	0
	24	100	200	Maximum	27.9	59.2
				Minimum	1.3	2.3
				Mean (October)	6.1	12.0
				Mean (November)	5.9	11.9
				Mean (December)	8.6	17.8

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Table 4-2 Summary of Ambient CAC Monitoring Data – October to December 2017

Pollutant	Averaging Period	MOECC Criteria / HHRA Health-Based Criteria		Description	Crago Road Station (Predominately Downwind)	
		ppb	µg/m ³		Concentration (ppbv)	Concentration (µg/m ³)
NO ^B				Mean (Period)	6.9	13.9
				Standard Deviation	3.8	7.9
				# of Exceedances	0	0
	1	N/A	N/A	Maximum	57.4	77.3
				Minimum	0.0	0.0
				Mean (October)	2.4	3.1
				Mean (November)	2.6	3.5
				Mean (December)	1.9	2.5
				Mean (Period)	2.3	3.0
				Standard Deviation	5.2	6.9
				# of Exceedances	N/A	N/A
	24	N/A	N/A	Maximum	21.7	29.1
				Minimum	0.1	0.1
				Mean (October)	2.3	3.0
				Mean (November)	2.6	3.5
Mean (December)				1.9	2.5	
Mean (Period)				2.3	3.0	
Standard Deviation				2.9	3.9	
# of Exceedances				N/A	N/A	

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Table 4-2 Summary of Ambient CAC Monitoring Data – October to December 2017

Pollutant	Averaging Period	MOECC Criteria / HHRA Health-Based Criteria		Description	Crago Road Station (Predominately Downwind)	
		ppb	µg/m ³		Concentration (ppbv)	Concentration (µg/m ³)
NO _x	1	N/A	N/A	Maximum	77.9	158.6
				Minimum	0.0	0.1
				Mean (October)	8.3	16.4
				Mean (November)	8.2	16.7
				Mean (December)	10.1	21.0
				Mean (Period)	8.9	18.1
				Standard Deviation	9.9	20.3
				# of Exceedances	N/A	N/A
	24	N/A	N/A	Maximum	38.8	82.2
				Minimum	1.2	2.4
				Mean (October)	8.2	16.1
				Mean (November)	8.2	16.7
				Mean (December)	10.2	21.1
				Mean (Period)	8.9	18.0
			Standard Deviation	6.0	12.5	
			# of Exceedances	N/A	N/A	

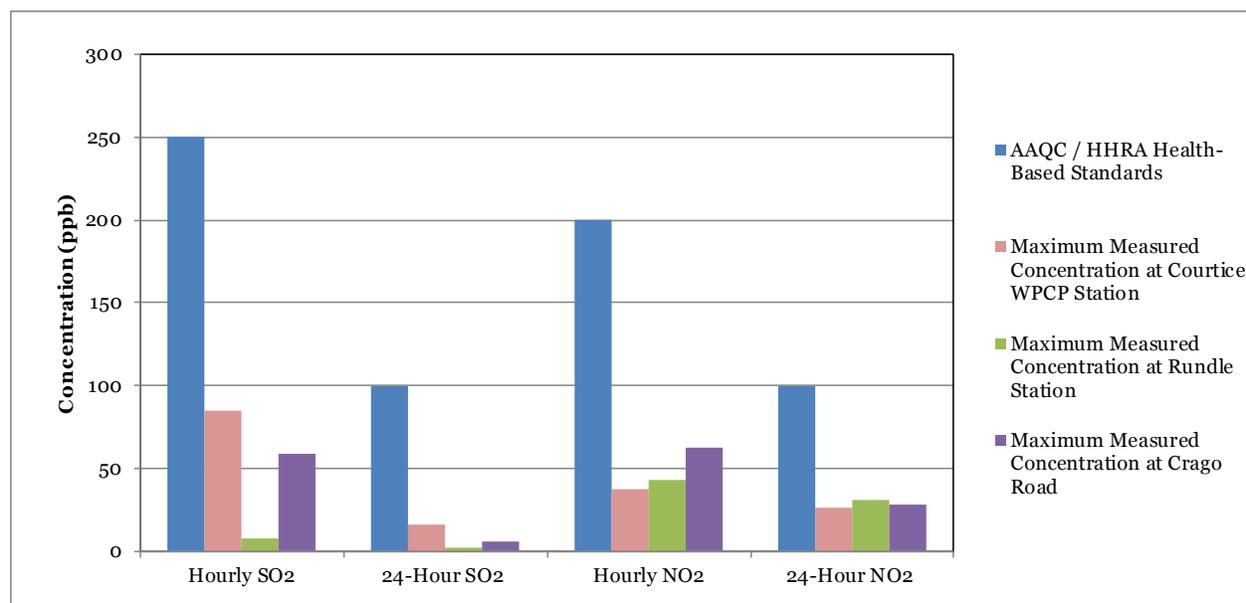
Notes:

- A. Canadian Ambient Air Quality Standards (CAAQS) for Respirable Particulate Matter (CCME, 2012). The Respirable Particulate Matter Objective is referenced to the 98th percentile over 3 consecutive years.
- B. NO has no regulatory criteria.

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Figure 4-2 Comparison of NO₂ and SO₂ Ambient Air Quality Monitoring Data to Applicable Criteria



Detailed discussion for each measured contaminant is presented in the following sections.

4.2.1 Sulphur Dioxide (SO₂)

Data summaries are presented in **Appendix A** for sulphur dioxide for each month as well as time history plots of hourly and 24-hour average SO₂ concentrations. For hourly and 24-hour averages, the Ontario AAQCs of 250 ppb and 100 ppb (690 µg/m³ and 275 µg/m³) are shown with blue lines on the respective plot. As shown in these figures, measured ambient SO₂ concentrations at the station were well below the Ontario AAQCs.

The maximum hourly and 24-hour average SO₂ concentrations measured at the Crago Road Station during October to December 2017 were 59.0 and 5.9 ppb (182.1 and 16.7 µg/m³) respectively, which are 24% and 6% of the applicable 1-hour and 24-hour Ontario AAQCs.

A pollution rose of hourly average SO₂ concentrations measured at the Crago Road Station is presented in **Figure 4-3**. The pollution rose plot presents measured hourly average contaminant concentrations versus measured wind direction (over 10° wind sectors). Concentrations less than 2.5 µg/m³, which account for 75% of the measurements, have been removed from the plot to allow the distribution of maximum levels to be more clearly shown in the figure. In this period, the Crago Road Station generally measured higher hourly concentrations for winds blowing from northwesterly and easterly directions.

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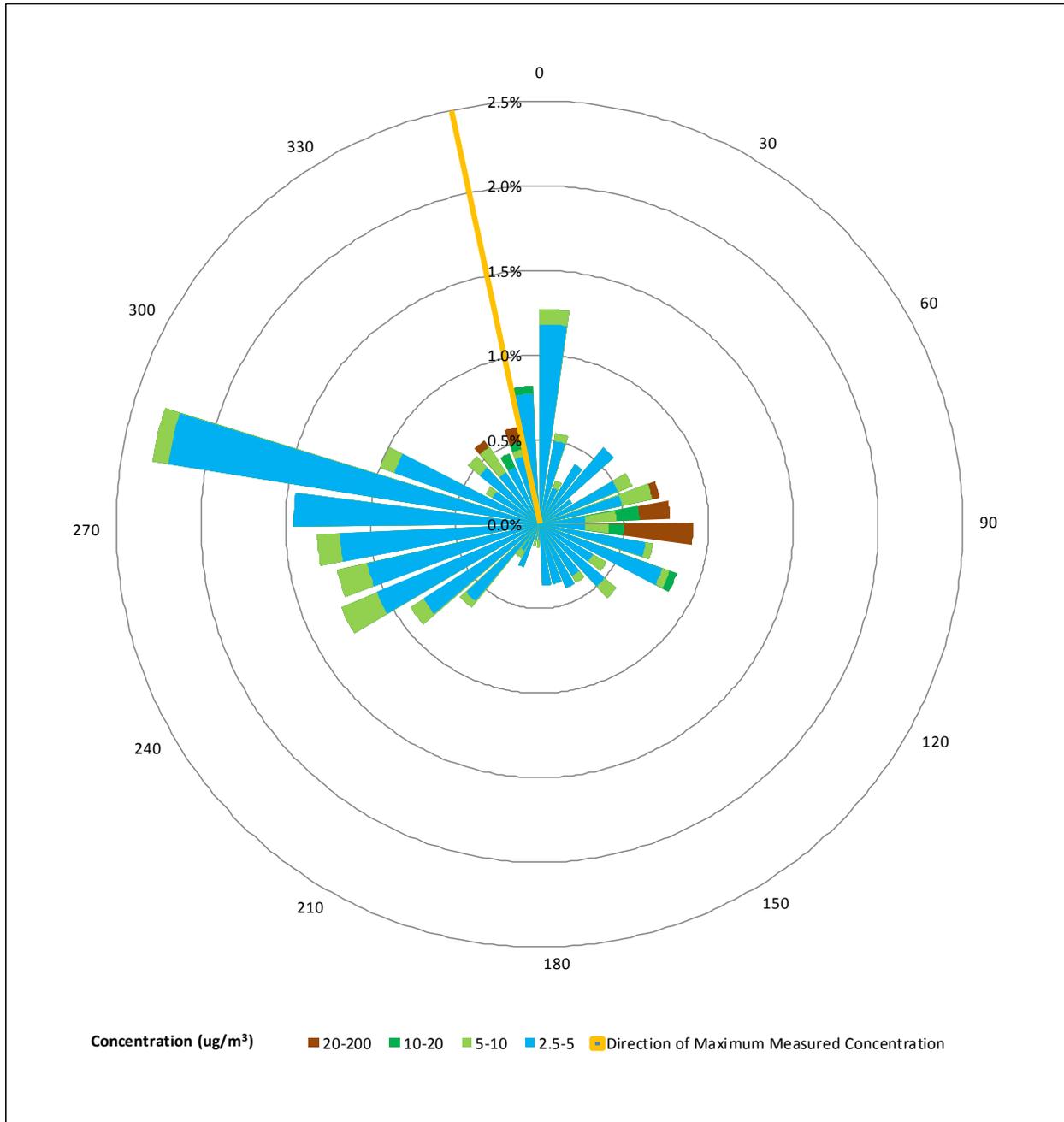
Summary of Ambient Measurements
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The maximum hourly average concentration of SO₂ occurred on December 27, 2017 at 6:00, with winds blowing from the north for which Highway 401 and Highway 418 construction activities were upwind. The maximum 24-hour average SO₂ concentration occurred for winds blowing from the direction of St. Mary's Cement on November 5, 2017.

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Figure 4-3 Pollution Rose of Measured Hourly Average SO₂ Concentrations – October to December 2017



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4.2.2 Nitrogen Dioxide (NO₂)

Nitrogen oxides (NO_x) are almost entirely made up of nitric oxide (NO) and nitrogen dioxide (NO₂). Together, they are often referred to as NO_x. Most NO₂ in the atmosphere is formed by the oxidation of NO, which is emitted directly by combustion processes, particularly those at high temperature and pressure. Exposure to both NO and NO₂ can result in adverse health effects to an exposed population. NO₂ is the regulated form of NO_x. Similar to other jurisdictions (e.g., Alberta Environment, World Health Organization), the O. Reg. 419/05 Schedule 3 Standards for NO_x are based on health effects of NO₂, as health effects are seen at much lower concentrations of NO₂ than NO. In this report, because NO₂ is the regulated form of NO_x, the AAQC were compared to measured NO₂ concentrations.

Data summaries for nitrogen dioxide are presented in **Appendix B** for each month as well as time history plots of the hourly and 24-hour average NO₂ concentrations. For the hourly and 24-hour averages, the Ontario AAQCs of 200 ppb and 100 ppb (400 µg/m³ and 200 µg/m³) are shown with blue lines on the respective plot. As shown in these figures, measured ambient NO₂ concentrations were well below the Ontario AAQCs.

The maximum measured hourly and 24-hour average concentrations were 62.6 and 27.9 ppb (138.9 and 59.2 µg/m³), which are 31% and 28% respectively, of the applicable 1-hour and 24-hour Ontario AAQCs.

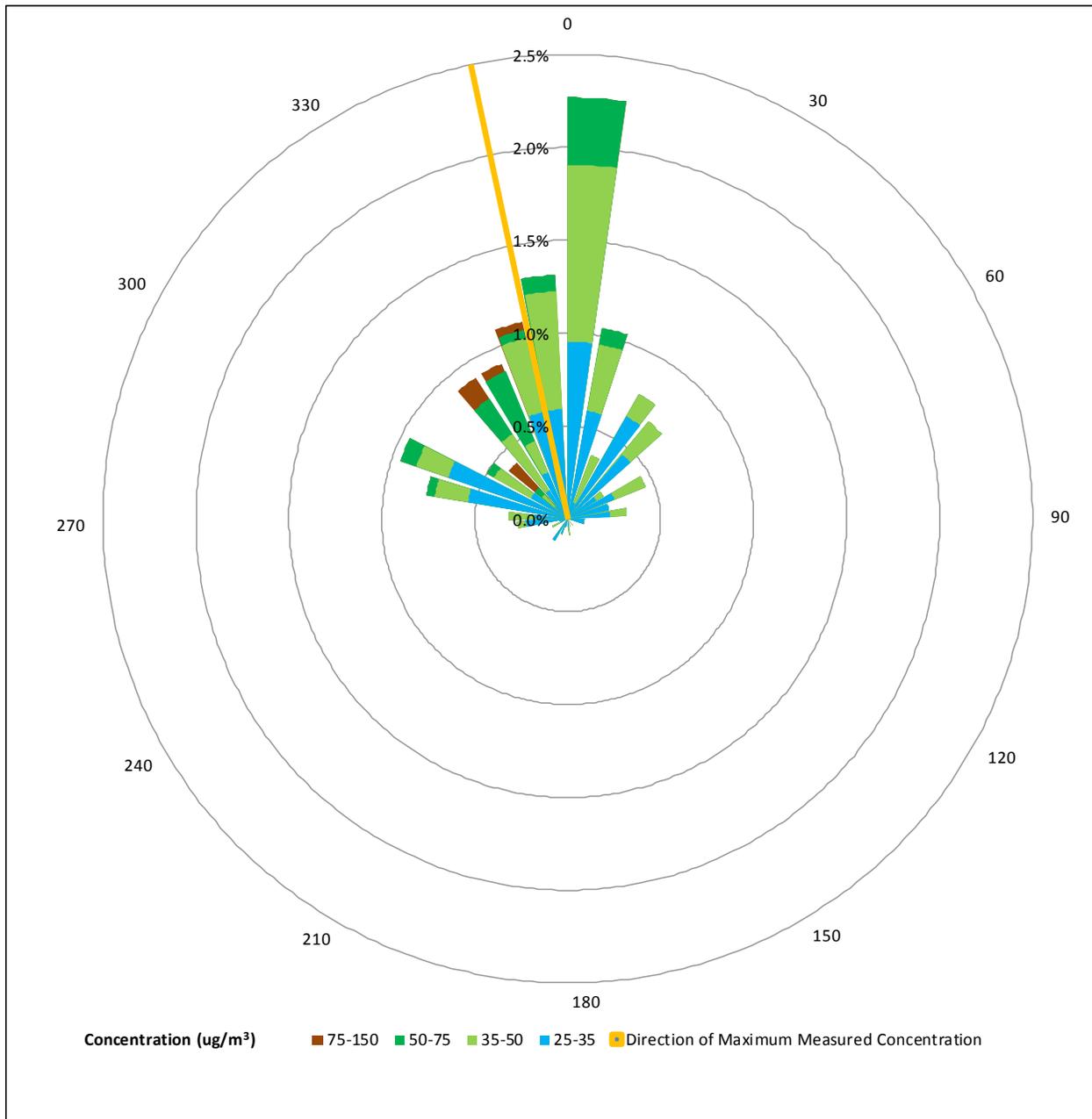
A pollution rose of measured hourly average NO₂ concentrations is presented in **Figure 4-4**. Concentrations less than 25 µg/m³, which account for 85% of the measurements, have been removed from the plot to allow the distribution of maximum levels to be more clearly shown in the figure. Higher measured hourly average concentrations generally occurred for winds blowing from the northwest.

The highest measured hourly average NO₂ concentration occurred on December 27, 2017 at 6:00 (the same date and time as the highest measured hourly SO₂ concentration). During this hour winds were blowing from the north for which Highway 401 and Highway 418 construction activities were upwind. The highest 24-hour average NO₂ concentration occurred when winds were blowing from the west on December 15, 2017, for which the DYEC and a CN Railway were upwind.

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Figure 4-4 Pollution Rose of Measured Hourly Average NO₂ – October to December 2017



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4.2.3 Nitrogen Oxides (NO_x)

Data summaries for each month are presented in **Appendix C** for nitrogen oxides as well as time history plots of the hourly and 24-hour average NO_x concentrations. The maximum hourly NO_x concentration measured at the Crago Road Station was 77.9 ppb (158.6 µg/m³), and the maximum measured 24-hour average NO_x concentration was 38.8 ppb (82.2 µg/m³). See **Table 4-2** for detailed results.

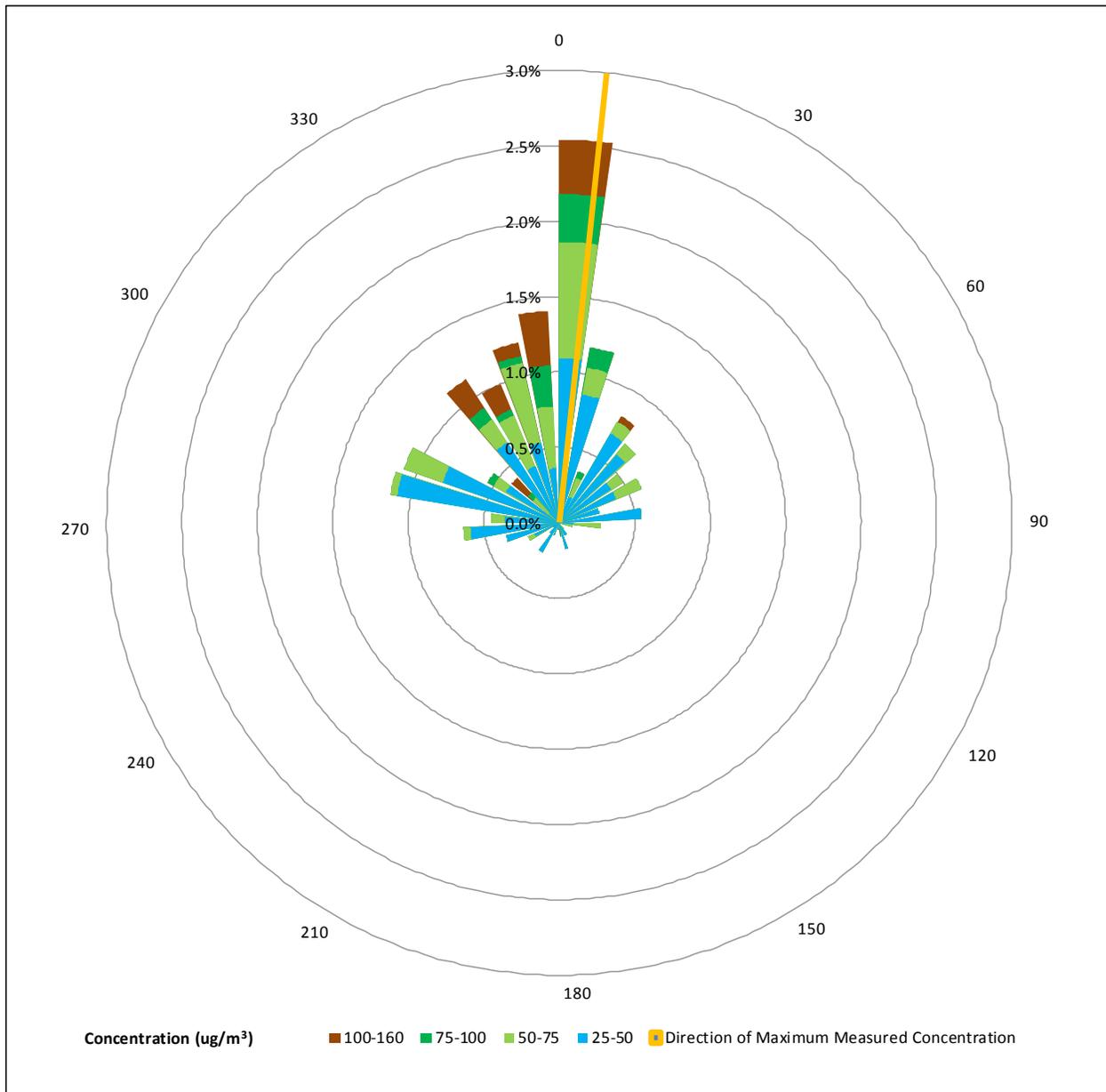
A pollution rose of measured hourly average NO_x concentrations is presented in **Figure 4-5**. Concentrations less than 25 µg/m³, which account for 81% of the measurements, have been removed from the plot to allow the distribution of maximum levels to be more clearly shown. In **Figure 4-5**, higher measured hourly average NO_x concentrations typically occurred for winds blowing from the north.

The highest measured hourly average NO_x concentration occurred for a wind blowing from the north (from the direction of Highway 401 and Highway 418 construction activities) on November 9, 2017 at 8:00. The maximum 24-hour average NO_x concentration was measured on December 15, 2017 when winds were blowing from the west for which the DYEC and a CN Railway were upwind.

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Figure 4-5 Pollution Rose of Measured Hourly Average NO_x Concentrations – October to December 2017



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4.2.4 Particulate Matter Smaller than 2.5 Microns (PM_{2.5})

Data summaries and time history plots of measured 24-hour average concentrations are presented in **Appendix D** for PM_{2.5}.

The maximum measured 24-hour average PM_{2.5} concentration was 15.6 µg/m³ during this quarter. It should be noted that an exceedance of the 24-hour CAAQS for PM_{2.5} requires the average of the 98th percentile levels in each of three consecutive calendar years to be greater than 28 µg/m³. The PM_{2.5} measurements in this report consist of 3 months of data, therefore there is insufficient data to determine with any certainty if exceedances of the CAAQS would occur. Discussion of PM_{2.5} measurements with respect to the CAAQS will be provided in the 2017 annual report, at which time sufficient data will have been collected to make comparisons.

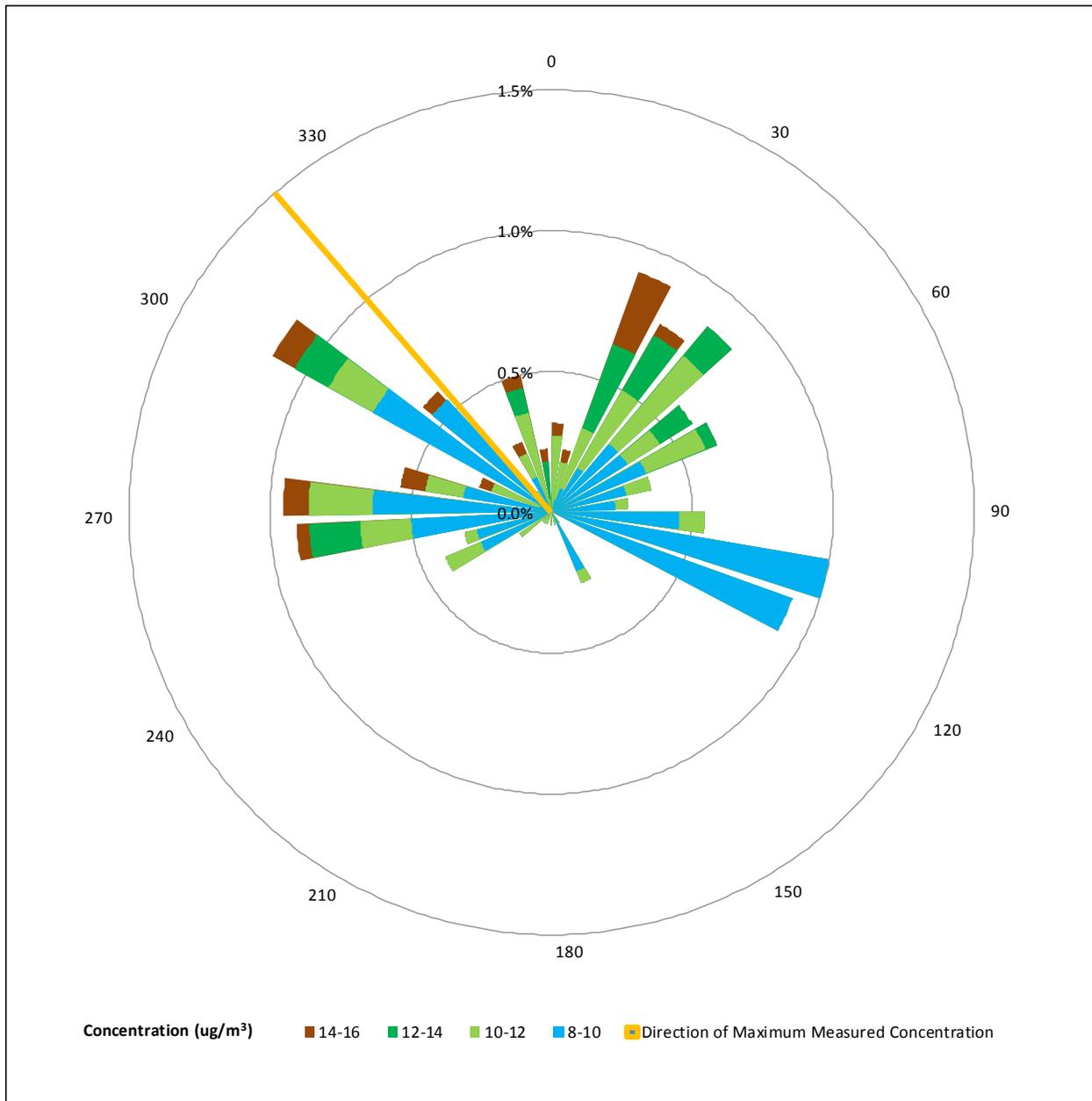
A pollution rose showing the measured 24-hour average ambient PM_{2.5} concentrations versus direction is shown in **Figure 4-6**. Concentrations less than 8 µg/m³, which account for 86% of the measurements, have been removed from the plot to allow the distribution of maximum levels to be more clearly shown in the figure. Higher measured concentrations typically occurred from westerly to northeasterly directions.

The highest measured 24-hour average PM_{2.5} concentration occurred on December 19, 2017 with winds originating from the northwest. For this wind direction, agricultural fields, Highway 401 traffic and Highway 418 construction activities were upwind of the Crago Road Station.

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Figure 4-6 Pollution Rose of Measured 24-Hour Average PM_{2.5} Concentrations – October to December 2017



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4.3 AMBIENT TSP / METALS CONCENTRATIONS

A summary of the maximum and minimum ambient TSP and metals concentrations (for a daily averaging period) are presented in **Table 4-3**. A detailed summary of the concentrations measured for each sample is presented in **Appendix F**.

The maximum measured concentrations of TSP and all metals with MOECC AAQCs were below their applicable 24-hour criteria (shown in **Table 4-3** below).

Table 4-3 Summary of Measured Ambient TSP/Metals Concentrations

Contaminant	Units	MOECC Criteria	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Particulate	µg/m ³	120	120	46	13	0
Total Mercury (Hg)	µg/m ³	2	2	3.80E-05	6.41E-06 ^A	0
Aluminum (Al)	µg/m ³	4.8	-	1.86E-01	2.00E-02 ^A	0
Antimony (Sb)	µg/m ³	25	25	3.99E-03 ^A	3.20E-03 ^A	0
Arsenic (As)	µg/m ³	0.3	0.3	2.39E-03 ^A	1.92E-03 ^A	0
Barium (Ba)	µg/m ³	10	10	1.74E-02	4.07E-03	0
Beryllium (Be)	µg/m ³	0.01	0.01	3.99E-04 ^A	3.20E-04 ^A	0
Bismuth (Bi)	µg/m ³	-	-	2.39E-03 ^A	1.92E-03 ^A	-
Boron (B)	µg/m ³	120	-	4.56E-03	1.92E-03 ^A	0
Cadmium (Cd)	µg/m ³	0.025	0.025	7.98E-04 ^A	6.41E-04 ^A	0
Chromium (Cr)	µg/m ³	0.5	-	2.27E-02	1.60E-03 ^A	0
Cobalt (Co)	µg/m ³	0.1	0.1	7.98E-04 ^A	6.41E-04 ^A	0
Copper (Cu)	µg/m ³	50	-	8.56E-02	6.24E-03	0
Iron (Fe)	µg/m ³	4	-	5.06E-01	1.41E-01	0
Lead (Pb)	µg/m ³	0.5	0.5	1.02E-02	1.01E-03 ^A	0
Magnesium (Mg)	µg/m ³	-	-	2.89E-01	5.91E-02	-
Manganese (Mn)	µg/m ³	0.4	-	2.00E-02	2.87E-03	0
Molybdenum (Mo)	µg/m ³	120	-	1.20E-03 ^A	9.61E-04 ^A	0
Nickel (Ni)	µg/m ³	0.2	-	1.20E-03 ^A	9.61E-04 ^A	0
Phosphorus (P)	µg/m ³	-	-	6.66E-02	9.07E-03 ^A	-
Selenium (Se)	µg/m ³	10	10	3.99E-03 ^A	3.20E-03 ^A	0
Silver (Ag)	µg/m ³	1	1	2.00E-03 ^A	1.60E-03 ^A	0
Strontium (Sr)	µg/m ³	120	-	6.23E-03	1.76E-03	0
Thallium (Tl)	µg/m ³	-	-	3.99E-03 ^A	3.20E-03 ^A	-
Tin (Sn)	µg/m ³	10	10	3.99E-03 ^A	3.20E-03 ^A	0

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Table 4-3 Summary of Measured Ambient TSP/Metals Concentrations

Contaminant	Units	MOECC Criteria	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Titanium (Ti)	µg/m ³	120	-	1.23E-02	3.20E-03 ^A	0
Vanadium (V)	µg/m ³	2	1	2.00E-03 ^A	1.60E-03 ^A	0
Zinc (Zn)	µg/m ³	120	-	2.03E-01	9.74E-03	0
Zirconium (Zr)	µg/m ³	20	-	2.00E-03 ^A	1.60E-03 ^A	0
Total Uranium (U)	µg/m ³	1.5	-	1.80E-04 ^A	1.44E-04 ^A	0

Note:

A. Measured concentration was less than the laboratory method detection limit.

4.4 AMBIENT PAH CONCENTRATIONS

A summary of the maximum and minimum ambient PAH concentrations (for a daily averaging period) are presented in **Table 4-4**. In this summary, both individual PAHs as well as a total PAH concentration are reported. A detailed summary of the concentrations measured for each sample is presented in **Appendix G**.

The maximum measured concentrations of PAHs with MOECC AAQCs were below their applicable 24-hour criteria, with the exception of the benzo(a)pyrene (B(a)P) measurements collected on December 9 and 21, 2017 which exceeded the Ontario AAQC by 41% and 14% respectively. However, both samples were well below the MOECC Schedule 6 Upper Risk Threshold, the MOECC O. Reg. 419/05 24-hour average guideline, and the HHRA health based criteria. Winds were blowing from the west on December 9, 2017 for which direction agricultural fields, the DYEC and the CN rail line were upwind. Highway 418 construction activities and Highway 401 traffic were upwind of the Crago Road Station on December 21, 2017, when winds were blowing from the northeast.

Based on the air quality assessments completed during the Environmental Assessment Study and the Environmental Compliance Approval application for the DYEC, the facility will not be a significant contributor of B(a)P. Therefore, ambient B(a)P levels are not expected to be substantially impacted by the operation of the DYEC

B(a)P is a byproduct of a wide variety of natural and man-made combustion processes (including motor vehicles, natural gas, wood, refuse, oil, forest fires, etc.) and is widely present in the environment (including being present in soil and water).

The current Ontario 24-hour B(a)P AAQC was introduced in 2011 and levels above this AAQC are commonly measured throughout Ontario. B(a)P measurement data available from the National Air Pollutant Surveillance (NAPS) network for Ontario in 2013 (for Simcoe, Toronto, and Hamilton), all had maximum levels above the AAQC (varying between 136% - 6,220% of the criteria). Available NAPS data for Ontario in 2012 (for Windsor, Toronto, and Hamilton) showed

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maximum B(a)P levels at these stations that varied between 716% - 2,920% of the criteria. In 2011, NAPS data available for seven Ontario stations (Windsor, Toronto, Etobicoke, Hamilton, Simcoe, Pt. Petrie, and Burnt Island) showed exceedances at six of the seven stations, with only the remote Burnt Island Ontario station reporting a maximum level below the MOECC AAQC. In 2010, all of these stations, including the Burnt Island station, measured B(a)P levels above the AAQC.

Table 4-4 Summary of Measured Ambient PAH Concentrations

Contaminant	Units	MOECC Criteria	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Benzo(a)pyrene	ng/m ³	0.05 ^A	1	7.06E-02	1.23E-02	2
		5 ^B				0
		1.1 ^C				0
1-Methylnaphthalene	ng/m ³	12,000	-	5.04E+00	1.97E+00	0
2-Methylnaphthalene	ng/m ³	10,000	-	8.04E+00	2.95E+00	0
Acenaphthene	ng/m ³	-	-	1.85E+00	4.00E-01	-
Acenaphthylene	ng/m ³	3500	-	4.24E-01	7.06E-02 ^A	0
Anthracene	ng/m ³	200	-	1.16E-01 ^A	6.99E-02 ^A	0
Benzo(a)anthracene	ng/m ³	-	-	1.16E-01 ^A	6.99E-02 ^A	-
Benzo(a)fluorene	ng/m ³	-	-	2.33E-01 ^A	1.40E-01 ^A	-
Benzo(b)fluoranthene	ng/m ³	-	-	1.16E-01 ^A	6.99E-02 ^A	-
Benzo(b)fluorene	ng/m ³	-	-	2.33E-01 ^A	1.40E-01 ^A	-
Benzo(e)pyrene	ng/m ³	-	-	2.33E-01 ^A	1.40E-01 ^A	-
Benzo(g,h,i)perylene	ng/m ³	-	-	1.16E-01 ^A	6.99E-02 ^A	-
Benzo(k)fluoranthene	ng/m ³	-	-	1.16E-01 ^A	6.99E-02 ^A	-
Biphenyl	ng/m ³	-	-	3.35E+00	1.16E+00	-
Chrysene	ng/m ³	-	-	1.16E-01 ^A	6.99E-02 ^A	-
Dibenz(a,h)anthracene ^D	ng/m ³	-	-	1.16E-01 ^A	6.99E-02 ^A	-
Dibenzo(a,c)anthracene + Picene	ng/m ³	-	-	2.33E-01 ^A	1.40E-01 ^A	-
Fluoranthene	ng/m ³	-	-	7.53E-01	3.29E-01	-
Indeno (1,2,3-cd)pyrene	ng/m ³	-	-	1.16E-01 ^A	6.99E-02 ^A	-
Naphthalene	ng/m ³	22,500	22,500	3.69E+01	1.23E+01	0
o-Terphenyl	ng/m ³	-	-	2.33E-01 ^A	1.40E-01 ^A	-
Perylene	ng/m ³	-	-	2.33E-01 ^A	1.40E-01 ^A	-
Phenanthrene	ng/m ³	-	-	3.19E+00	1.14E+00	-

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Table 4-4 Summary of Measured Ambient PAH Concentrations

Contaminant	Units	MOECC Criteria	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Pyrene	ng/m ³	-	-	4.39E-01	7.08E-02 ^A	-
Tetralin	ng/m ³	-	-	2.20E+00	9.35E-01	-
Total PAH ^E	ng/m ³	-	-	6.03E+01	2.33E+01	-

Notes:

- A. Ontario Ambient Air Quality Criteria (AAQC). The AAQC for benzo(a)pyrene (B(a)P) is a surrogate for PAHs.
- B. O. Reg. 419/05 Schedule 6 Upper Risk Thresholds.
- C. O. Reg. 419/05 24 Hour Guideline
- D. Based on laboratory analyses, dibenzo(a,c)anthracene co-elutes with dibenz(a,h)anthracene. Picene elutes after dibenz(a,h)anthracene
- E. The reported total PAH is the sum of all analyzed PAH species.
- F. Measured concentration was less than the laboratory method detection limit.

4.5 AMBIENT DIOXINS AND FURANS CONCENTRATIONS

A summary of the maximum and minimum ambient dioxins and furans concentrations (for a daily averaging period) are presented in **Table 4-5**. In this summary, both individual dioxin and furan concentrations (pg/m³) as well as the total toxic equivalency concentration (TEQ) are reported. A detailed summary of the concentrations measured for each sample is presented in **Appendix H**.

The maximum measured toxic equivalent dioxin and furan concentration was below the applicable 24-hour Ontario AAQC of 0.1 pg TEQ/m³ (as shown in **Table 4-5**).

Table 4-5 Summary of Measured Ambient Dioxins and Furans Concentrations

Contaminant	Units	MOECC Criteria	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
2,3,7,8-Tetra CDD *	pg/m ³	-	-	5.04E-03 ^A	4.81E-03 ^A	
1,2,3,7,8-Penta CDD	pg/m ³			5.12E-03 ^A	4.94E-03 ^A	
1,2,3,4,7,8-Hexa CDD	pg/m ³			5.43E-03 ^A	4.90E-03 ^A	
1,2,3,6,7,8-Hexa CDD	pg/m ³			1.30E-02	6.20E-03 ^A	
1,2,3,7,8,9-Hexa CDD	pg/m ³			1.67E-02	4.47E-03 ^A	
1,2,3,4,6,7,8-Hepta CDD	pg/m ³			1.99E-01	1.01E-01	
Octa CDD	pg/m ³			8.37E-01	3.19E-01	
Total Tetra CDD	pg/m ³			1.43E-02	4.94E-03 ^A	
Total Penta CDD	pg/m ³			6.05E-03 ^A	4.94E-03 ^A	

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Table 4-5 Summary of Measured Ambient Dioxins and Furans Concentrations

Contaminant	Units	MOECC Criteria	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Total Hexa CDD	pg/m ³			9.60E-02	5.04E-02	
Total Hepta CDD	pg/m ³			4.40E-01	2.09E-01	
2,3,7,8-Tetra CDF **	pg/m ³			1.04E-02	4.96E-03 ^A	
1,2,3,7,8-Penta CDF	pg/m ³			5.58E-03 ^A	4.47E-03 ^A	
2,3,4,7,8-Penta CDF	pg/m ³			5.58E-03 ^A	4.47E-03 ^A	
1,2,3,4,7,8-Hexa CDF	pg/m ³			1.58E-02	4.66E-03 ^A	
1,2,3,6,7,8-Hexa CDF	pg/m ³			4.96E-03 ^A	4.32E-03 ^A	
2,3,4,6,7,8-Hexa CDF	pg/m ³			1.09E-02	5.08E-03 ^A	
1,2,3,7,8,9-Hexa CDF	pg/m ³			6.20E-03 ^A	4.94E-03 ^A	
1,2,3,4,6,7,8-Hepta CDF	pg/m ³			4.98E-02	1.50E-02	
1,2,3,4,7,8,9-Hepta CDF	pg/m ³			1.21E-02	4.80E-03 ^A	
Octa CDF	pg/m ³			7.84E-02	2.49E-02	
Total Tetra CDF	pg/m ³			2.54E-02	4.96E-03 ^A	
Total Penta CDF	pg/m ³			2.56E-02	4.80E-03 ^A	
Total Hexa CDF	pg/m ³			3.98E-02	4.80E-03 ^A	
Total Hepta CDF	pg/m ³			9.45E-02	1.50E-02	
TOTAL TOXIC EQUIVALENCY ^B	pg TEQ/m ³	0.1	-	1.98E-02	1.89E-02	0
		1 ^C				0

Notes:

- A. Measured concentration was less than the laboratory method detection limit.
- B. Total Toxicity Equivalent (TEQ) concentration contributed by all dioxins, furans and dioxin-like PCBs calculated as per O. Reg. 419/05 methodology using corresponding WHO₂₀₀₅ toxic equivalency factors (TEFs) and a value of half the minimum detection limit (MDL) substituted for concentrations less than the MDL.
- C. O. Reg. 419/05 Schedule 6 Upper Risk Thresholds
* CDD - Chloro Dibenzo-p-Dioxin, ** CDF - Chloro Dibenzo-p-Furan

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5.0 CONCLUSIONS

This quarterly report provides a summary of the ambient air quality data collected at the Crago Road monitoring station for the period from October to December 2017.

The following observations and conclusions were made from a review of the measured ambient air quality monitoring data:

1. Measured levels of NO₂, SO₂ and PM_{2.5} were below the applicable criteria, standards, and human health risk assessment (HHRA) health-based criteria presented in **Table 2-1** of this report.
2. Since the Canadian Ambient Air Quality Standard (CAAQS) for PM_{2.5} is based on a 98th percentile level over 3 years, whereas the PM_{2.5} measurement period at the Crago Road Station for this quarterly report was three months, there was insufficient data collected to determine with any certainty if exceedances of the CAAQS would occur. Therefore, no comparison of the measured PM_{2.5} data during this quarter to the CAAQS was conducted for this report, as it would not be scientifically accurate or representative.
3. The maximum measured concentrations of TSP and all metals with Ministry of Environment and Climate Change (MOECC) air quality criteria were below their applicable limits (as presented in **Table 2-2** in this report).
4. The maximum measured concentrations of PAHs with MOECC air quality limits were below their applicable criteria shown in **Table 2-3**, with the exception of the 24-hour benzo(a)pyrene (B(a)P) concentration in two (2) samples which exceeded the applicable Ontario Ambient Air Quality Criteria (AAQC) by 14% and 41%. The current Ontario 24-hour B(a)P AAQC was introduced in 2011 and levels above this AAQC are commonly measured throughout Ontario. The measurements were however, well below the MOECC Schedule 6 Upper Risk Threshold, the MOECC O. Reg. 419/05 24-hour average guideline, and the HHRA health based criterion.
5. The maximum measured toxic equivalent dioxin and furan concentration was below the applicable criteria presented in **Table 2-3**.

In summary, the measured concentrations of the air contaminants monitored were below their applicable MOECC criteria during the monitoring period between October and December 2017, with the exception of two (2) benzo(a)pyrene samples. All measured levels of the monitored contaminants were below their applicable HHRA health-based criteria.

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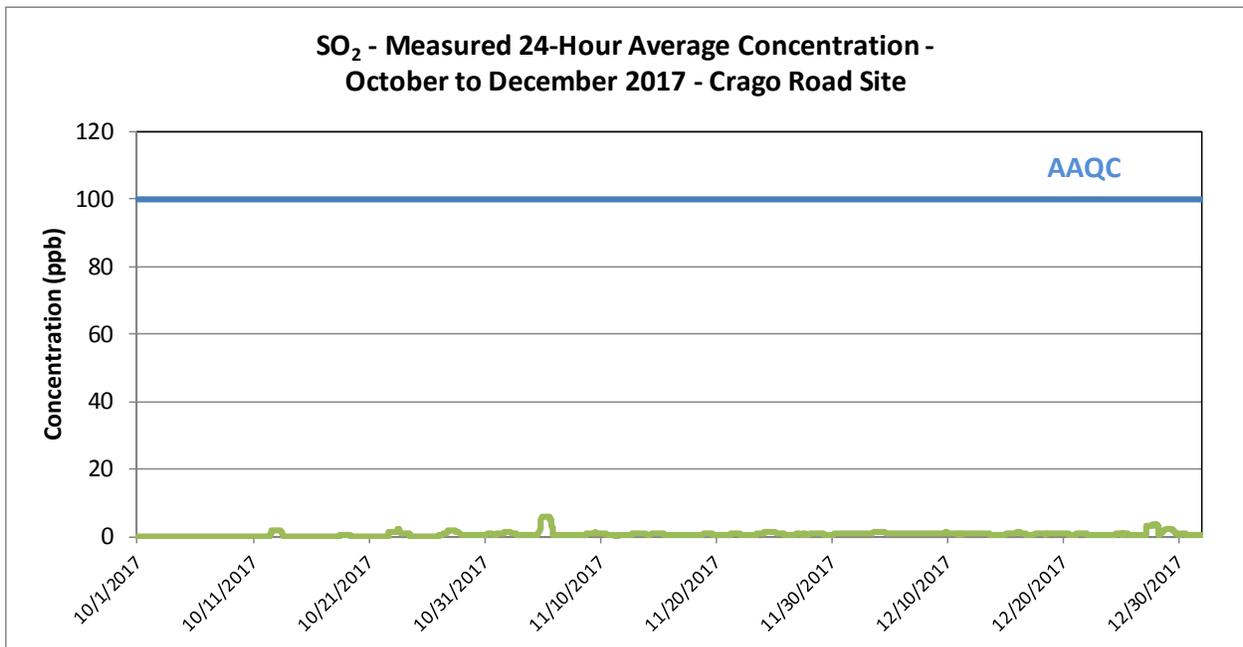
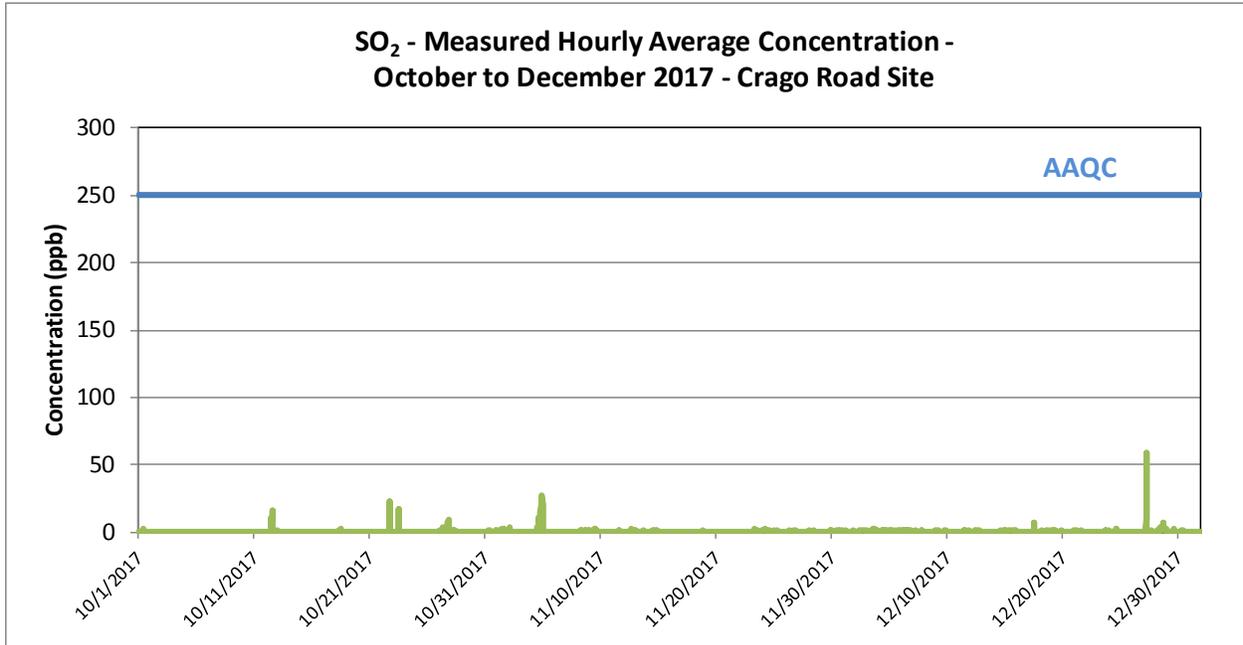
Appendix A SO₂ Data Summaries and Time History Plots
February 15, 2018

**APPENDIX A SO₂ DATA SUMMARIES AND TIME HISTORY
PLOTS**

SO ₂ - Crago Road October 2017 ppb																																	
Day	Hour																				Count	Maximum	Minimum	Average	Hrs>250	Days>100							
	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300									
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	2.8	1.9	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	2.8	0.0	0.3	0	0		
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0		
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0		
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0		
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.6	0.0	0.0	0	0		
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0		
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.4	0.0	0.0	0	0		
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0		
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.4	0.0	0.0	0	0		
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0		
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0		
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	10.3	5.5	11.4	16.7	0.0	0.0	0.0	0.0	0.0	0.2	0.9	0.1	1.1	24	16.7	0.0	2.0	0	0			
13	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	1.0	0.0	0.1	0	0		
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0		
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.1	0.0	0.0	0	0		
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0		
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.3	0.0	0.0	0	0		
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.1	0.6	2.1	3.1	2.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	3.1	0.0	0.4	0	0		
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0		
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	24	0.8	0.0	0.1	0	0			
21	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.2	0.0	0.0	0	0		
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	0.9	0.0	0.0	0.0	0.0	2.2	23.4	9.5	0.4	0.0	0.0	0.0	0.0	0.0	24	23.4	0.0	1.6	0	0		
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.1	0.9	0.0	0.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	17.1	0.0	0.8	0	0		
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0		
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.1	0.0	0.0	0	0		
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C	C	0.6	0.6	0.7	0.7	0.6	0.5	0.8	0.9	22	0.9	0.0	0.2	0	0				
27	1.0	1.2	1.2	0.9	0.8	0.5	0.5	0.6	2.3	4.0	0.9	1.0	1.5	1.9	1.4	0.9	0.8	0.8	1.2	7.0	9.5	2.1	1.1	1.0	24	9.5	0.5	1.8	0	0			
28	0.8	1.0	0.8	0.9	0.9	0.8	1.1	0.7	0.8	1.6	1.3	0.7	0.6	0.7	0.6	0.7	0.5	0.5	0.7	0.6	0.6	0.5	0.5	0.5	24	1.6	0.5	0.8	0	0			
29	0.5	0.7	0.7	0.6	0.6	0.6	0.5	0.8	1.0	1.0	0.6	0.7	0.6	0.5	0.5	0.6	0.6	0.6	0.5	0.6	0.7	0.7	0.7	0.6	24	1.0	0.5	0.6	0	0			
30	0.7	0.7	0.8	0.8	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.6	0.7	0.8	0.9	0.8	0.7	0.8	0.8	0.7	0.8	0.8	0.7	0.7	24	0.9	0.6	0.7	0	0			
31	0.7	0.6	0.7	0.8	0.8	1.0	1.1	1.1	1.1	1.1	0.7	0.7	0.7	0.5	0.5	0.5	0.5	0.4	0.6	0.8	0.8	0.6	0.9	1.2	24	1.2	0.4	0.8	0	0			
Count	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31	742								
Maximum	1.0	1.2	1.2	0.9	0.9	1.0	1.1	1.1	2.3	4.0	2.1	10.3	5.5	17.1	16.7	0.9	2.2	23.4	9.5	7.0	9.5	2.1	1.1	1.2	24	0.2	0.0	0.0					
Minimum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22								
Average	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.3	0.6	0.4	1.1	0.7	0.1	0.2	0.9	0.5	0.3	0.4	0.2	0.2	0.2									
Percentiles		10		20		30		40		50		60		70		80		90		95		99	100								Maximum		
Data		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.5		0.8		1.0		6.4	23.4								23.4	Maximum Hourly	
																																Maximum Daily	
																																	Monthly Average
Notes	C - Calibration / Span Cycle NA - No Data Available T - Test A - MOE Audit M - Equipment Malfunction / Down R - Rate of Change																																

SO ₂ - Crago Road November 2017 ppb																																
Day	Hour	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average	Hrs>250	Days>100	
1	0.8	0.9	1.0	0.8	0.8	1.9	1.6	1.7	1.5	2.1	2.7	1.6	0.9	0.7	0.7	2.6	0.9	1.4	1.7	0.8	0.8	0.5	0.7	0.6	24	2.7	0.5	1.2	0	0		
2	0.8	1.0	3.6	0.9	0.6	0.7	0.5	0.5	0.6	0.5	0.5	0.5	0.7	0.5	0.6	0.5	0.5	0.6	0.5	0.6	0.6	0.5	0.5	0.7	24	3.6	0.5	0.7	0	0		
3	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.4	0.4	0.4	0.5	0.4	0.5	0.4	0.3	0.4	0.3	0.4	0.3	0.3	24	0.6	0.3	0.4	0	0		
4	0.4	0.3	0.4	0.3	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.5	3.9	1.1	11.1	7.0	4.9	2.1	15.4	22.1	16.7	28.0	20.5	24	28.0	0.3	5.7	0	0		
5	2.7	1.1	0.8	0.5	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	24	2.7	0.5	0.7	0	0		
6	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.2	0.4	0.5	0.4	24	0.8	0.2	0.5	0	0		
7	0.3	0.4	0.5	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.8	0.7	0.5	0.5	0.5	0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	24	0.8	0.3	0.5	0	0		
8	0.5	0.6	0.5	0.5	0.3	0.3	0.6	1.1	0.9	2.0	0.7	0.4	0.5	0.5	1.9	1.4	1.1	1.1	1.2	0.9	0.9	1.0	1.1	1.0	24	2.0	0.3	0.9	0	0		
9	1.3	0.9	0.9	1.0	1.0	1.3	1.2	1.1	1.8	1.3	1.1	1.7	2.6	1.4	0.9	1.6	0.9	1.0	1.0	0.5	0.5	0.5	0.5	0.9	24	2.6	0.5	1.1	0	0		
10	0.8	0.6	0.5	0.5	0.7	0.7	1.0	0.8	0.6	0.3	0.3	0.4	0.5	0.3	0.4	0.6	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	24	1.0	0.2	0.5	0	0		
11	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.4	0.8	1.4	0.4	0.2	0.3	0.3	0.3	0.7	0.7	0.9	0.5	24	1.4	0.2	0.4	0	0		
12	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.7	0.6	0.7	0.7	0.8	1.1	1.3	2.5	1.9	1.3	1.3	1.4	1.3	0.8	24	2.5	0.4	0.9	0	0		
13	1.1	1.1	1.2	0.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.9	0.8	0.8	1.0	1.2	1.2	1.1	0.9	0.7	0.8	0.8	0.6	24	1.2	0.5	0.8	0	0		
14	0.5	0.5	0.5	0.5	0.7	0.7	0.5	0.7	1.0	0.8	0.9	1.1	1.1	1.0	1.2	1.2	1.2	1.1	0.8	0.7	1.2	1.1	0.8	0.7	24	1.2	0.5	0.8	0	0		
15	0.6	0.6	0.9	0.7	0.6	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.9	0.7	0.8	0.7	1.0	0.7	0.5	0.8	0.9	24	1.0	0.5	0.7	0	0		
16	0.8	0.7	0.8	0.8	0.6	0.5	0.6	0.6	0.5	0.6	0.8	0.7	0.9	0.7	0.8	0.5	0.7	0.8	0.5	0.5	0.5	0.3	0.4	0.5	24	0.9	0.3	0.6	0	0		
17	0.5	0.5	0.4	0.3	0.3	0.4	0.4	0.2	0.3	0.4	0.3	0.4	0.5	0.5	0.5	0.5	0.7	0.5	0.6	0.6	0.6	0.6	0.7	0.8	24	0.8	0.2	0.5	0	0		
18	0.7	0.7	0.9	0.7	0.8	0.6	0.7	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.8	0.7	0.8	0.8	0.7	1.1	1.6	0.9	0.8	24	1.6	0.6	0.8	0	0		
19	0.8	0.8	0.8	0.8	0.7	0.7	0.8	0.6	0.5	0.6	0.8	0.8	0.7	0.8	0.9	0.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	24	0.9	0.5	0.7	0	0		
20	0.5	0.4	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.8	0.8	0.9	0.8	0.6	0.5	0.7	0.8	24	0.9	0.4	0.7	0	0	
21	0.8	0.8	0.9	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.0	0.8	0.8	0.8	0.9	0.9	0.7	0.7	0.5	0.5	24	1.0	0.5	0.8	0	0		
22	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.8	0.8	0.8	0.8	0.9	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	24	0.9	0.4	0.6	0	0		
23	0.4	0.4	0.6	0.5	0.6	0.6	0.5	0.7	1.3	2.5	1.7	1.1	1.2	1.1	1.2	0.9	0.9	0.7	0.6	0.7	0.8	0.9	1.5	1.2	24	2.5	0.4	0.9	0	0		
24	1.5	1.8	1.7	1.8	2.0	2.5	2.6	2.1	1.5	1.3	1.2	1.0	1.0	1.3	1.4	1.2	1.1	1.0	0.9	0.8	0.8	1.0	1.0	1.0	24	2.6	0.8	1.4	0	0		
25	1.1	1.1	1.0	1.1	0.9	0.8	1.1	1.0	0.8	0.8	0.8	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.5	0.5	0.5	0.5	0.5	24	1.1	0.5	0.7	0	0		
26	0.6	0.5	0.5	0.5	0.6	0.6	0.6	1.1	0.8	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.7	1.9	1.4	1.3	1.1	1.1	1.0	24	1.9	0.5	0.8	0	0		
27	0.9	0.6	0.5	0.5	0.6	0.8	0.7	0.5	0.5	0.5	0.5	0.5	0.8	1.1	1.0	0.8	0.8	0.8	0.7	0.6	0.5	0.5	0.6	0.6	24	1.1	0.5	0.7	0	0		
28	1.3	2.2	1.3	0.7	0.8	0.7	0.7	0.8	0.7	1.0	1.1	1.1	0.9	0.8	0.8	0.9	0.8	0.8	0.7	0.8	0.7	0.7	0.9	0.9	24	2.2	0.7	0.9	0	0		
29	0.9	0.7	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	C	C	1.0	0.9	0.9	1.0	1.0	1.1	1.1	22	1.1	0.4	0.7	0	0			
30	1.2	1.0	0.9	1.0	1.0	1.0	0.9	0.9	1.0	1.0	1.1	1.2	1.2	1.2	1.0	1.1	1.2	1.3	1.2	1.1	1.2	1.3	1.3	1.0	24	1.3	0.9	1.1	0	0		
31																									0	0.0	0.0		0	0		
Count	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	30	30	30	30	30	30	30	718							
Maximum	2.7	2.2	3.6	1.8	2.0	2.5	2.6	2.1	1.8	2.5	2.7	1.7	2.6	3.9	1.9	11.1	7.0	4.9	2.1	15.4	22.1	16.7	28.0	20.5	24							
Minimum	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.3	0.4	0.4	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0							
Average	0.8	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.7	0.8	0.8	0.8	1.2	1.0	1.0	0.9	1.2	1.4	1.2	1.7	1.4								
Percentiles		10		20		30		40		50		60		70		80		90		95		99		100							Maximum	
Data		0.4		0.5		0.5		0.6		0.7		0.8		0.8		1.0		1.2		1.7		4.7		28.0							Maximum Hourly Maximum Daily Monthly Average	28.0 5.7 0.9
Notes	C - Calibration / Span Cycle NA - No Data Available T - Test/Startup period A- MOE Audit M - Equipment Malfunction / Down R - Rate of Change																															

Figure A-1 Time History Plots of Measured Hourly Average and 24-Hour Average SO₂ Concentrations– Crago Road Station



**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2017**

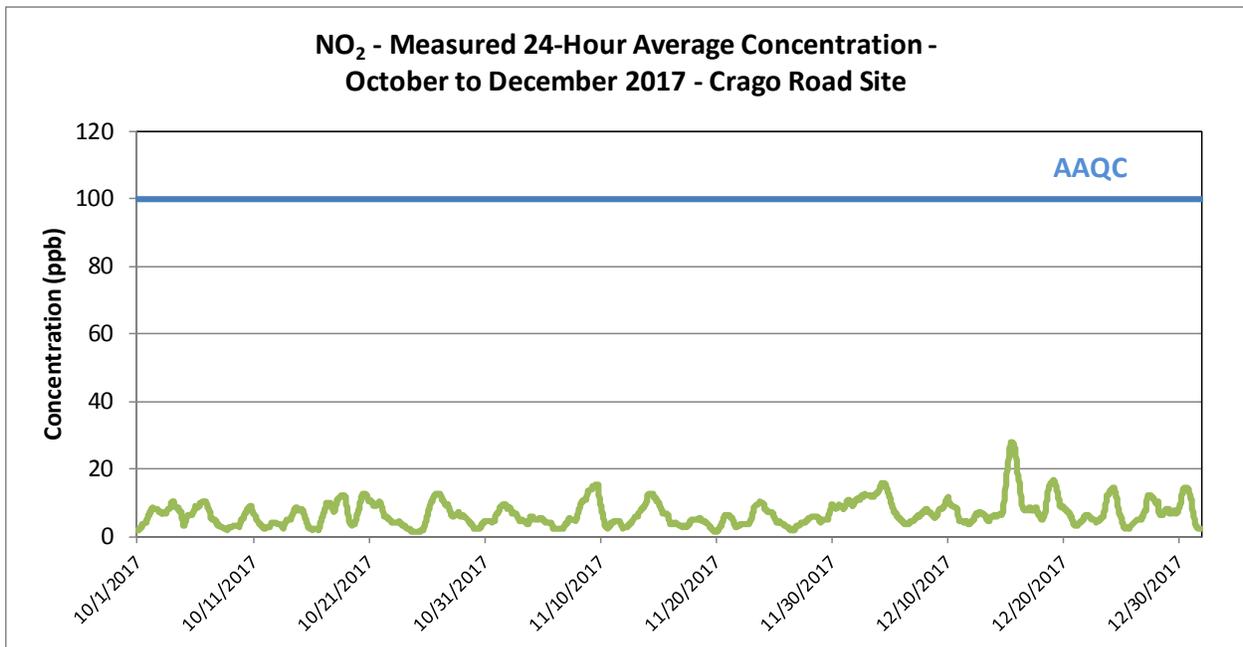
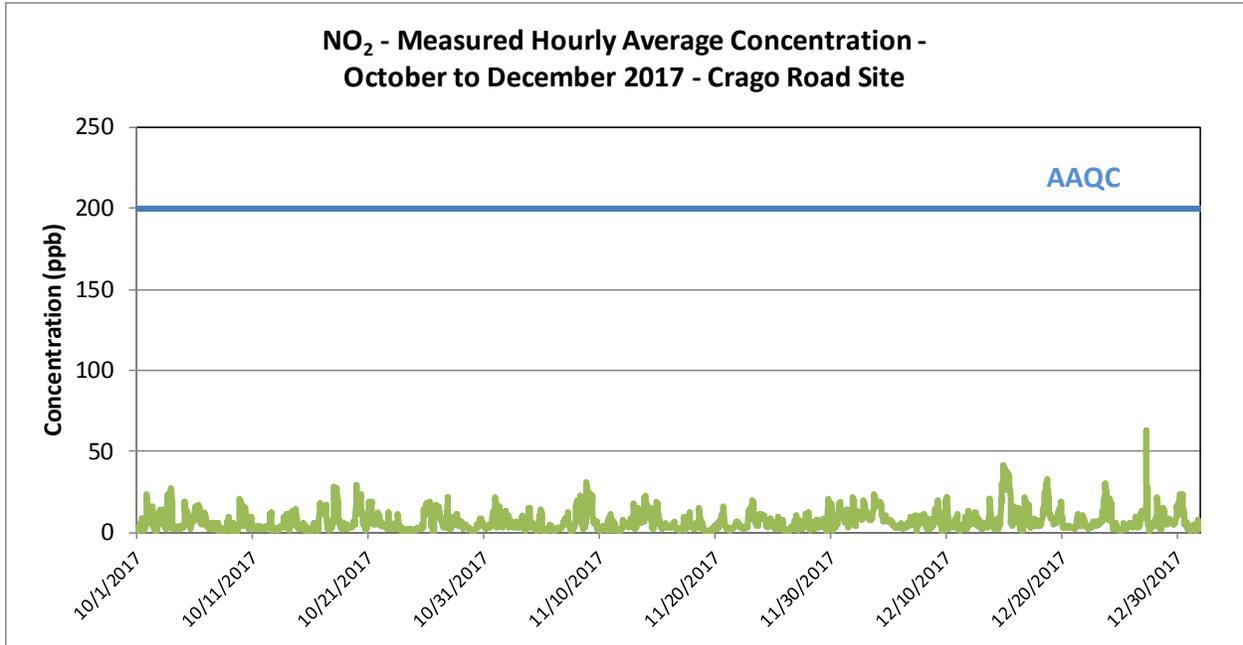
Appendix B NO₂ Data Summaries and Time History Plots
February 15, 2018

**APPENDIX B NO₂ DATA SUMMARIES AND TIME HISTORY
PLOTS**

NO _x - Crago Road October 2017 ppb																															
Day	Hour																				Count	Maximum	Minimum	Average	Hrs>200	Days>100					
	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900							2000	2100	2200	2300	
1	2.6	1.8	2.4	1.6	4.4	4.1	5.0	6.2	6.7	8.3	5.3	3.8	3.4	1.8	1.0	2.2	2.2	2.0	6.2	15.8	23.3	12.7	10.6	16.7	24	23.3	1.0	6.3	0	0	
2	10.3	8.0	8.1	5.8	7.5	12.4	12.5	15.9	8.7	4.3	2.6	1.2	1.2	1.8	1.3	1.3	1.8	1.2	7.8	12.1	10.3	11.3	13.9	12.2	24	15.9	1.2	7.2	0	0	
3	9.8	6.1	5.3	5.4	12.0	11.5	9.4	14.0	10.3	3.8	2.5	2.4	3.2	2.2	23.2	3.5	5.4	3.0	4.4	11.7	20.7	25.9	21.9	27.0	24	27.0	2.2	10.2	0	0	
4	17.8	7.5	2.4	2.1	2.0	2.8	3.7	3.9	4.0	2.8	2.2	2.0	2.0	3.1	2.6	2.4	4.1	2.5	2.4	3.9	4.3	3.0	3.7	2.6	24	17.8	2.0	3.7	0	0	
5	4.2	5.4	18.6	15.0	10.3	13.7	14.6	12.8	8.2	5.7	4.0	3.8	4.1	3.5	2.0	2.1	2.6	7.4	8.5	8.9	10.9	6.9	6.6	16.2	24	18.6	2.0	8.2	0	0	
6	14.5	15.4	12.2	12.6	14.2	12.3	14.9	17.4	15.3	11.9	11.1	6.9	5.2	4.5	5.1	6.6	7.1	6.6	6.8	8.2	12.5	9.2	7.0	4.3	24	17.4	4.3	10.1	0	0	
7	3.6	3.6	4.7	2.6	3.3	5.5	2.2	1.7	4.6	4.0	6.1	3.5	2.3	3.0	5.9	2.7	3.0	5.4	2.9	1.9	1.7	2.8	1.5	6.3	24	6.3	1.5	3.5	0	0	
8	1.3	1.8	1.4	1.6	1.5	1.2	1.6	2.6	2.0	1.8	2.0	2.4	1.3	1.7	1.1	1.6	1.6	1.4	7.1	4.0	3.4	9.9	3.6	6.7	24	9.9	1.1	2.7	0	0	
9	4.5	3.6	3.2	2.3	1.1	1.8	3.6	5.4	2.2	2.1	1.2	0.8	0.5	1.4	1.1	1.5	2.0	2.6	1.9	5.1	4.6	21.0	16.1	19.0	24	21.0	0.5	4.5	0	0	
10	12.0	11.3	4.3	4.6	7.7	5.8	15.7	15.4	8.3	5.9	10.1	7.8	7.5	6.9	2.2	3.1	3.8	9.0	9.5	6.8	9.3	7.3	2.9	1.7	24	15.7	1.7	7.5	0	0	
11	2.3	1.8	2.3	1.6	2.4	2.2	2.0	3.5	3.7	2.5	2.8	2.8	2.1	2.6	2.0	2.3	2.2	3.7	2.9	2.2	3.2	2.5	2.2	3.2	24	3.7	1.6	2.5	0	0	
12	2.6	2.7	2.1	3.1	3.8	3.1	3.4	3.1	3.1	3.4	5.9	11.5	5.5	11.7	12.7	0.9	1.6	1.3	2.0	2.8	1.8	2.0	2.1	2.5	24	12.7	0.9	3.9	0	0	
13	2.3	2.1	1.5	2.5	2.0	2.1	3.2	1.8	4.4	3.2	3.1	3.1	3.7	3.8	3.3	9.9	10.0	9.5	9.9	9.4	9.6	11.9	5.8	4.3	24	11.9	1.5	5.1	0	0	
14	2.1	1.9	2.4	1.6	1.3	4.2	4.0	10.6	12.3	12.2	13.5	11.0	12.9	13.1	13.0	11.4	10.5	14.5	12.6	7.9	3.9	3.3	5.2	2.8	24	14.5	1.3	7.8	0	0	
15	2.1	2.1	3.1	2.8	4.5	2.8	2.1	2.6	5.6	2.8	2.2	1.9	1.5	1.5	1.4	3.0	3.5	2.5	1.9	1.4	1.7	1.1	1.1	0.8	24	5.6	0.8	2.3	0	0	
16	0.8	0.8	0.9	1.8	3.1	5.3	6.3	3.1	2.3	2.5	2.6	2.4	1.2	1.2	1.6	1.5	2.2	6.5	14.5	17.9	14.8	14.3	12.0	13.0	24	17.9	0.8	5.5	0	0	
17	12.6	12.3	12.6	13.0	11.6	13.5	15.6	13.8	17.4	11.8	2.4	2.1	2.1	1.9	1.7	1.4	1.6	1.8	2.2	2.9	4.4	7.8	6.6	5.7	24	17.4	1.4	7.5	0	0	
18	7.8	28.0	25.2	25.4	24.4	27.7	27.3	24.6	18.6	15.4	7.9	7.5	7.0	4.5	2.0	3.0	2.8	2.5	3.4	2.0	2.6	3.6	4.4	5.5	24	28.0	2.0	11.8	0	0	
19	5.0	3.5	2.8	4.5	3.4	2.5	3.3	3.1	3.2	3.9	3.6	3.3	3.0	3.5	3.9	4.6	5.6	6.6	5.7	6.2	5.3	8.6	20.0	28.9	24	28.9	2.5	6.0	0	0	
20	17.7	13.1	12.5	11.1	21.0	21.7	18.3	23.7	19.0	14.0	12.0	10.1	8.4	5.9	3.9	4.2	6.5	3.0	2.7	1.5	3.8	3.4	5.1	10.0	24	23.7	1.5	10.5	0	0	
21	13.8	18.6	16.1	11.8	17.3	18.2	18.6	14.7	12.4	5.2	5.1	7.2	5.3	5.0	5.8	9.0	7.6	6.5	12.1	6.8	4.7	7.7	10.6	9.7	24	18.6	4.7	10.4	0	0	
22	4.5	3.7	3.7	3.6	6.1	5.2	3.7	4.3	4.1	4.8	3.5	4.4	3.3	2.2	2.2	3.0	3.7	12.7	8.3	3.0	2.2	5.7	4.4	2.6	24	12.7	2.2	4.4	0	0	
23	2.6	2.9	2.5	5.2	4.1	4.0	5.6	5.5	2.9	2.3	2.5	2.4	2.6	11.8	2.8	2.6	5.0	3.4	2.8	2.2	1.3	1.8	1.4	2.6	24	11.8	1.3	3.5	0	0	
24	1.3	0.6	0.5	0.5	0.6	0.8	1.3	1.4	1.9	1.5	1.9	1.3	1.4	1.6	1.5	2.3	1.1	1.9	1.3	1.1	1.2	1.1	1.1	1.4	24	2.3	0.5	1.3	0	0	
25	1.0	1.5	2.1	1.3	1.7	2.1	2.7	2.2	1.9	1.8	1.9	2.4	2.2	2.4	2.5	5.3	2.6	2.8	8.9	14.0	15.5	11.9	10.1	13.1	24	15.5	1.0	4.7	0	0	
26	18.0	16.2	13.2	16.3	13.0	12.1	18.7	16.1	13.7	9.0	7.6	3.9	9.8	12.2	C	C	5.6	12.2	10.2	17.3	14.8	12.4	13.5	14.2	22	18.7	3.9	12.7	0	0	
27	15.1	16.4	15.9	10.6	8.5	9.8	8.4	7.2	7.9	7.0	2.9	3.4	4.7	4.2	4.2	4.5	3.9	3.0	6.5	18.6	21.4	7.5	3.1	3.2	24	21.4	2.9	8.2	0	0	
28	2.5	2.5	2.0	4.2	8.1	9.6	7.0	3.9	7.1	6.9	8.8	4.9	6.8	6.1	6.5	11.6	6.8	3.7	7.5	8.0	5.6	3.9	5.3	5.5	24	11.6	2.0	6.0	0	0	
29	4.2	6.4	6.9	4.4	3.7	2.4	5.0	3.5	4.3	4.9	2.9	2.7	3.2	2.8	3.0	2.6	2.6	2.7	2.3	2.0	1.4	1.3	1.1	1.1	24	6.9	1.1	3.2	0	0	
30	1.0	0.8	0.6	0.9	1.4	2.2	1.9	3.8	4.4	3.8	3.0	3.2	4.9	5.9	4.6	5.7	8.3	8.6	7.7	8.2	6.0	5.5	4.6	3.8	24	8.6	0.6	4.2	0	0	
31	3.2	2.8	3.2	2.3	2.1	2.8	3.5	3.8	3.6	4.8	3.6	3.4	2.7	3.2	2.8	5.9	5.3	8.8	13.0	8.2	9.4	6.2	21.0	21.6	24	21.6	2.1	6.1	0	0	
Count	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31	742					
Maximum	18.0	28.0	25.2	25.4	24.4	27.7	27.3	24.6	19.0	15.4	13.5	11.5	12.9	13.1	23.2	11.6	10.5	14.5	14.5	18.6	23.3	25.9	21.9	28.9	24					Maximum	
Minimum	0.8	0.6	0.5	0.5	0.6	0.8	1.3	1.4	1.9	1.5	1.2	0.8	0.5	1.2	1.0	0.9	1.1	1.2	1.3	1.1	1.2	1.1	1.1	0.8	22					Maximum Hourly	
Average	6.5	6.6	6.3	5.9	6.7	7.3	7.9	8.1	7.2	5.6	4.7	4.2	4.0	4.4	4.2	4.1	4.3	5.1	6.3	7.2	7.6	7.5	7.4	8.7					Maximum Daily		
																															Monthly Average
Percentiles		10		20		30		40		50		60		70		80		90		95		99		100						Maximum	
Data		1.6		2.1		2.6		3.2		3.9		5.3		7.0		10.2		13.9		17.4		24.9		28.9						28.9	
Notes	C - Calibration / Span Cycle NA - No Data Available T - Test A- MOE Audit M - Equipment Malfunction / Down R - Rate of Change																														

NO ₂ - Crago Road																																
December 2017																																
ppb																																
Day	Hour																							Count	Maximum	Minimum	Average	Hrs>200	Days>100			
	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200							2300		
1	8.2	7.6	7.8	7.3	5.9	9.1	10.1	14.6	14.6	13.9	6.9	4.6	3.3	3.6	3.9	4.7	12.5	10.8	14.7	10.2	8.2	17.1	21.4	19.6	24	21.4	3.3	10.0	0	0		
2	16.8	13.9	11.5	4.0	12.5	13.7	13.2	10.1	12.1	11.7	11.1	9.8	9.8	8.9	7.6	10.8	11.4	12.8	8.8	20.0	19.9	18.4	14.5	15.3	24	20.0	4.0	12.4	0	0		
3	13.1	12.8	10.8	9.9	10.8	10.0	11.5	10.5	8.2	8.2	7.5	9.4	8.4	8.8	9.8	12.8	13.9	17.1	23.8	20.5	20.0	18.7	16.4	17.2	24	23.8	7.5	12.9	0	0		
4	16.6	17.3	17.8	17.3	18.2	17.8	19.3	17.3	15.9	15.3	10.7	9.6	9.4	6.8	7.1	10.6	10.0	10.2	8.4	8.3	8.1	6.4	7.0	7.7	24	19.3	6.4	12.2	0	0		
5	6.6	7.2	7.8	6.2	6.1	6.8	5.1	6.4	6.5	4.0	4.9	4.8	3.9	3.4	3.8	3.8	3.8	4.1	3.9	3.3	3.7	3.8	4.2	3.5	24	7.8	3.3	4.9	0	0		
6	4.8	5.9	2.7	2.8	2.3	2.2	3.2	3.3	3.6	4.2	3.8	3.1	3.7	4.9	5.4	5.2	6.1	4.3	5.5	7.3	9.7	6.1	5.5	6.0	24	9.7	2.2	4.6	0	0		
7	5.2	4.4	4.9	5.5	4.8	6.4	8.1	10.4	10.4	C	C	5.7	4.4	4.8	5.0	6.5	8.0	9.1	10.7	9.7	9.7	10.4	10.5	10.1	22	10.7	4.4	7.5	0	0		
8	10.9	7.1	11.5	6.0	3.6	3.9	2.4	3.6	3.5	8.8	5.8	4.0	4.1	3.4	3.6	2.5	3.2	3.6	5.0	4.2	5.8	7.7	10.4	11.1	24	11.5	2.4	5.7	0	0		
9	13.9	15.3	12.2	11.9	14.7	13.3	19.5	5.6	5.8	7.1	5.7	5.1	4.9	5.1	C	6.8	5.7	8.4	11.0	11.7	14.4	18.8	20.0	20.2	23	20.2	4.9	11.2	0	0		
10	21.5	19.9	7.3	2.8	2.5	3.1	2.8	3.9	5.0	5.3	4.2	3.9	2.8	4.0	5.6	6.6	6.9	7.8	6.8	7.0	8.3	11.3	4.2	2.0	24	21.5	2.0	6.5	0	0		
11	2.0	1.6	1.6	1.6	1.2	2.0	3.9	4.7	4.1	3.1	2.6	2.1	2.4	4.9	9.8	3.6	2.5	2.7	2.5	5.2	13.6	6.0	5.9	6.0	24	13.6	1.2	4.0	0	0		
12	4.8	6.1	5.1	4.9	4.9	7.2	8.0	8.2	9.3	11.3	12.2	12.8	6.1	5.2	3.9	4.7	7.2	9.3	5.8	7.5	6.9	6.3	6.8	3.2	24	12.8	3.2	7.0	0	0		
13	2.0	2.7	2.4	2.6	3.1	4.7	3.6	4.5	5.4	4.0	2.6	2.6	2.7	2.6	3.3	5.9	11.6	21.0	19.6	11.0	8.4	6.5	4.7	5.8	24	21.0	2.0	6.0	0	0		
14	6.1	3.6	2.3	2.2	3.1	3.2	3.5	9.0	7.0	3.6	2.8	2.5	4.4	5.1	6.8	5.1	7.1	21.8	18.5	30.0	28.6	41.4	39.0	39.3	24	41.4	2.2	12.3	0	0		
15	38.5	39.1	37.8	26.1	28.0	28.4	34.9	36.2	36.4	35.2	33.5	29.5	21.9	5.9	8.1	3.9	4.6	12.3	15.6	12.6	15.8	14.7	13.8	10.5	24	39.1	3.9	22.6	0	0		
16	7.6	10.0	6.2	6.6	12.1	12.2	15.5	8.4	2.6	2.0	1.9	1.5	1.7	1.6	1.7	2.0	4.6	7.8	21.7	14.7	11.3	19.0	10.6	5.6	24	21.7	1.5	7.9	0	0		
17	9.5	14.1	17.2	10.3	9.3	4.6	3.3	3.9	4.6	4.9	3.6	3.8	5.3	8.9	4.8	4.3	4.6	4.9	4.3	5.6	7.3	5.1	5.3	4.3	24	17.2	3.3	6.4	0	0		
18	4.3	3.9	4.3	5.1	6.6	6.5	9.6	10.4	14.1	16.2	17.2	15.9	25.0	26.0	27.7	28.9	32.6	30.7	29.3	20.6	11.8	12.7	11.2	8.5	24	32.6	3.9	15.8	0	0		
19	8.3	8.7	9.7	8.2	6.8	5.6	5.0	5.1	6.3	6.3	6.2	6.0	6.7	8.6	10.0	12.2	11.6	9.3	15.3	11.2	12.5	19.0	7.3	9.2	24	19.0	5.0	9.0	0	0		
20	5.1	3.4	4.2	4.0	4.0	3.1	3.4	2.9	3.1	3.0	4.0	3.3	3.3	3.3	3.5	3.1	2.9	3.7	3.1	2.7	3.5	3.3	3.2	2.9	24	5.1	2.7	3.4	0	0		
21	3.1	3.2	2.4	2.4	2.7	3.5	5.4	11.0	10.7	5.2	6.6	6.0	6.9	6.7	8.3	4.3	3.6	8.0	10.4	8.1	8.7	8.1	8.9	4.4	24	11.0	2.4	6.2	0	0		
22	4.4	4.4	4.7	5.1	3.2	2.7	3.3	2.5	2.8	2.7	3.1	3.4	3.2	3.9	4.9	5.4	6.4	6.6	6.8	6.6	5.1	3.9	5.3	7.0	24	7.0	2.5	4.5	0	0		
23	7.0	6.9	7.2	5.6	5.0	6.8	6.7	6.4	7.9	7.3	6.5	9.5	13.3	14.5	12.9	19.6	24.8	29.9	27.5	25.4	23.6	10.2	7.6	9.5	24	29.9	5.0	12.6	0	0		
24	9.5	12.6	20.3	13.6	8.3	11.0	18.0	6.3	6.3	4.2	2.5	2.1	2.2	2.9	2.9	6.1	5.1	2.9	1.8	1.7	2.1	1.7	1.4	1.4	24	20.3	1.4	6.1	0	0		
25	1.3	1.3	1.5	1.2	1.3	1.2	1.9	5.0	6.0	4.3	3.6	3.1	2.8	2.5	2.8	3.0	4.1	4.9	5.8	5.5	6.2	6.2	5.3	4.8	24	6.2	1.2	3.5	0	0		
26	4.1	3.4	3.5	4.6	4.2	4.9	6.2	7.1	10.0	7.7	5.3	4.5	3.2	2.9	3.2	3.4	5.1	5.8	8.4	11.4	12.9	10.6	11.2	10.7	24	12.9	2.9	6.4	0	0		
27	10.6	13.3	8.9	9.5	9.1	18.3	62.6	29.7	27.6	8.6	4.9	2.1	1.3	1.8	2.0	2.0	3.2	3.6	4.3	5.4	5.9	7.0	4.3	4.1	24	62.6	1.3	10.4	0	0		
28	3.9	4.3	7.3	11.6	18.4	22.2	11.7	7.4	11.7	5.1	3.2	2.9	2.0	2.0	2.3	2.6	6.4	12.7	15.4	13.4	8.1	9.2	8.5	5.8	24	22.2	2.0	8.3	0	0		
29	5.2	4.4	6.9	5.9	8.8	5.9	6.5	7.8	8.1	7.3	7.8	5.8	6.8	7.1	7.2	5.1	5.5	6.1	5.9	6.8	9.9	15.7	15.5	18.1	24	18.1	4.4	7.9	0	0		
30	15.8	10.8	13.0	22.9	22.7	23.8	22.2	22.4	20.3	23.6	22.0	16.3	12.7	8.3	5.2	6.9	6.0	5.3	5.8	2.9	2.3	1.8	2.2	1.9	24	23.8	1.8	12.4	0	0		
31	2.0	1.5	1.7	1.5	1.7	2.6	3.1	5.1	2.6	1.8	1.1	1.2	1.1	1.3	1.2	1.4	2.7	7.7	8.1	2.7	2.4	1.8	2.1	1.7	24	8.1	1.1	2.5	0	0		
Count	31	31	31	31	31	31	31	31	31	30	30	31	31	31	30	31	31	31	31	31	31	31	31	31	741	24						
Maximum	38.5	39.1	37.8	26.1	28.0	28.4	62.6	36.2	36.4	35.2	33.5	29.5	25.0	26.0	27.7	28.9	32.6	30.7	29.3	30.0	28.6	41.4	39.0	39.3	24							
Minimum	1.3	1.3	1.5	1.2	1.2	1.2	1.9	2.5	2.6	1.8	1.1	1.2	1.1	1.3	1.2	1.4	2.5	2.7	1.8	1.7	2.1	1.7	1.4	1.4	22							
Average	8.8	8.7	8.5	7.4	7.9	8.6	10.8	9.3	9.4	8.2	7.1	6.3	6.1	5.8	6.1	6.6	7.9	9.8	10.8	10.1	10.1	10.6	9.5	9.0								
Percentiles		10		20		30		40		50		60		70		80		90		95		99		100							Maximum	
Data		2.5		3.3		4.3		5.1		6.2		7.5		9.5		11.9		17.8		22.4		36.3		62.6							Maximum Hourly	62.6
																															Maximum Daily	22.6
																															Monthly Average	8.5
Notes	C - Calibration / Span Cycle NA - No Data Available T - Test A - MOE Audit M - Equipment Malfunction / Down R - Rate of Change																															

Figure B-1 Time History Plots of Measured Hourly Average and 24-Hour Average NO₂ Concentrations – Crago Road Station



**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2017**

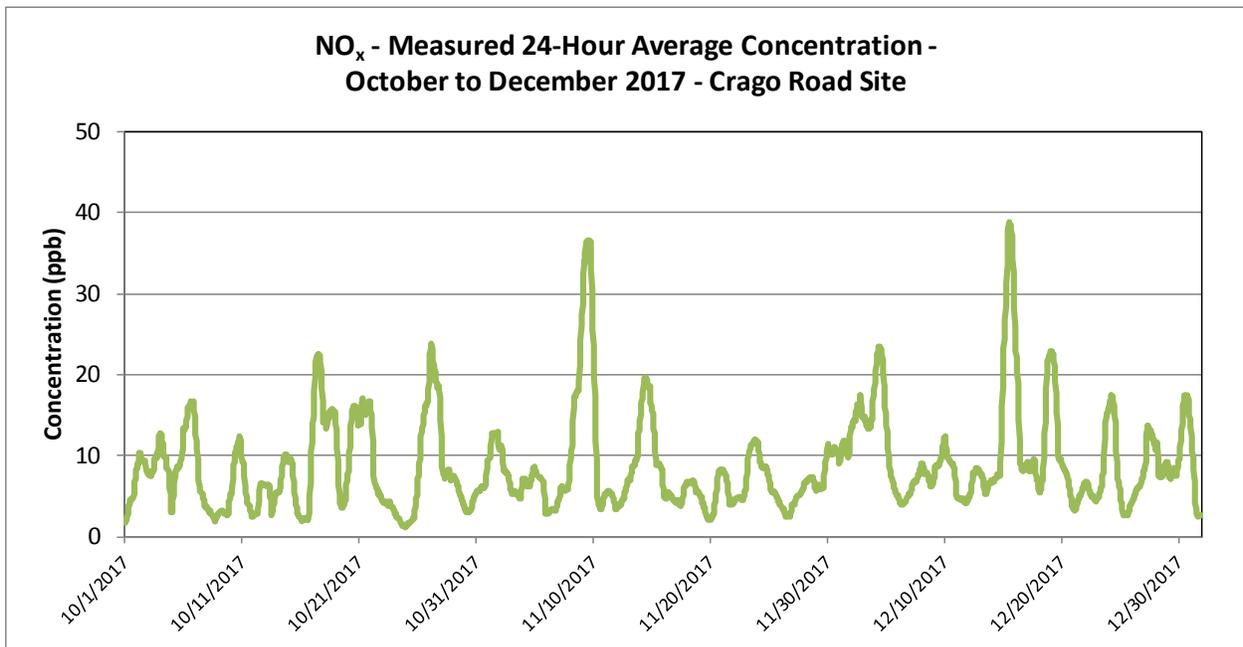
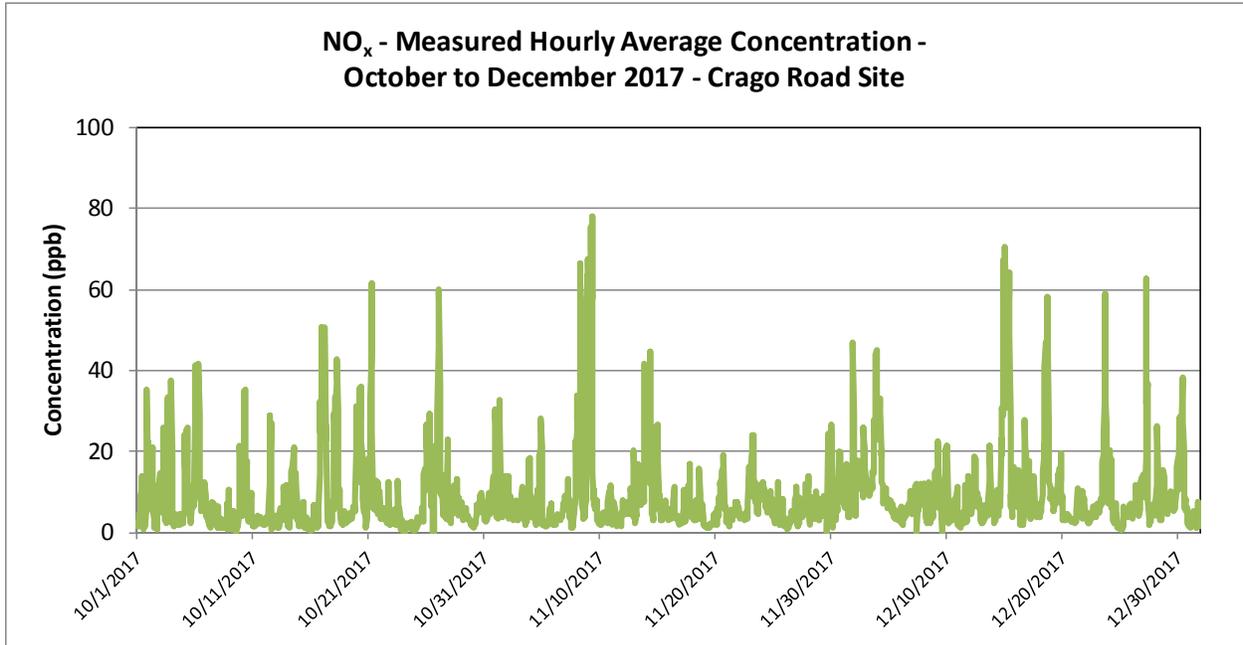
Appendix C NO_x Data Summaries and Time History Plots
February 15, 2018

**APPENDIX C NO_x DATA SUMMARIES AND TIME HISTORY
PLOTS**

NOx Crago Road																														
November 2017																														
ppb																														
Day	Hour																				Count	Maximum	Minimum	Average						
	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900					2000	2100	2200	2300		
1	22.1	6.6	6.5	3.7	3.5	5.8	21.4	20.4	32.8	27.4	9.0	6.3	5.8	3.9	8.3	5.8	6.6	11.6	9.5	10.8	14.0	10.1	9.9	11.7	24	32.8	3.5	11.4		
2	8.3	10.5	13.8	5.0	3.5	4.8	6.8	9.1	7.3	8.0	5.1	6.5	5.0	3.1	4.0	5.8	6.1	7.8	5.7	5.0	4.4	3.0	4.5	3.1	24	13.8	3.0	6.1		
3	4.4	4.5	4.1	5.7	5.2	7.2	11.3	9.8	8.1	4.7	3.6	3.2	2.7	2.8	2.1	2.5	2.7	2.9	4.0	7.5	12.5	18.1	18.3	14.7	24	18.3	2.1	6.8		
4	9.8	8.7	3.7	5.0	5.1	6.7	4.2	3.9	3.6	3.3	2.3	2.0	2.0	5.6	2.6	10.6	7.7	6.0	4.2	18.8	20.8	23.4	28.2	21.2	24	28.2	2.0	8.7		
5	4.0	1.8	2.9	1.9	1.8	1.8	1.8	1.6	2.6	1.7	1.8	2.5	1.9	2.4	2.5	6.2	5.8	4.0	3.4	7.2	3.5	2.3	1.8	1.9	24	7.2	1.6	2.9		
6	2.5	2.3	2.5	1.9	2.0	2.4	2.7	3.6	4.1	4.6	4.0	3.5	3.6	3.1	3.5	4.2	4.3	3.7	3.8	6.7	7.2	6.3	8.0	9.1	24	9.1	1.9	4.2		
7	5.9	6.9	5.7	6.5	7.7	8.4	13.3	9.2	7.9	3.9	5.1	2.9	1.4	1.1	2.1	3.9	1.4	4.8	5.2	6.4	5.1	8.6	22.7	20.3	24	22.7	1.1	6.9		
8	24.9	34.0	27.8	19.9	14.4	23.8	28.2	66.6	47.6	18.7	16.4	7.3	5.0	3.4	8.7	5.5	5.9	3.9	6.0	8.0	30.5	57.3	63.9	55.0	24	66.6	3.4	24.3		
9	67.6	45.8	48.7	48.8	54.3	75.3	70.1	57.9	77.9	44.8	14.4	8.0	10.5	6.9	5.6	7.2	5.6	6.3	7.8	3.0	2.9	2.2	2.5	2.0	24	77.9	2.0	28.2		
10	1.9	2.4	2.4	2.0	1.9	2.8	4.6	3.9	4.8	4.4	5.0	4.3	3.3	3.2	3.4	2.2	2.9	7.5	10.3	6.9	7.0	11.8	10.9	10.1	24	11.8	1.9	5.0		
11	7.2	3.5	3.2	1.8	2.2	5.1	7.4	5.8	5.7	3.7	2.5	1.7	1.6	2.1	3.4	2.8	2.6	4.4	2.1	1.5	1.4	1.5	4.8	4.4	24	7.4	1.4	3.4		
12	8.0	5.2	4.9	5.8	5.1	4.6	5.2	5.9	6.7	6.9	7.7	6.3	4.9	4.6	4.8	6.3	11.1	8.2	6.7	6.4	6.1	3.9	12.1	20.2	24	20.2	3.9	7.0		
13	10.0	5.9	2.5	4.6	4.2	12.0	13.6	13.5	17.0	14.1	9.8	6.6	6.7	8.0	11.2	9.7	12.2	14.4	11.2	7.6	8.0	41.6	40.8	28.2	24	41.6	2.5	13.1		
14	24.9	20.4	19.6	17.5	28.1	27.3	17.3	24.6	44.5	27.0	11.9	12.0	6.3	4.7	3.8	3.2	6.8	5.9	11.2	9.9	6.4	11.1	26.3	26.5	24	44.5	3.2	16.5		
15	15.9	17.2	8.0	8.0	9.4	3.6	3.1	6.4	6.5	3.1	4.4	4.0	6.5	4.6	5.1	7.8	5.0	4.9	5.7	5.9	4.4	4.8	5.5	3.2	24	17.2	3.1	6.4		
16	3.4	3.9	4.0	4.7	3.6	3.4	3.9	6.0	5.6	7.6	11.2	9.3	4.2	3.4	3.6	4.3	4.1	3.1	2.9	2.5	2.6	2.8	2.1	2.9	24	11.2	2.1	4.4		
17	2.6	2.3	2.4	2.6	3.2	6.1	6.1	10.5	4.0	3.2	2.6	4.6	6.3	6.4	10.2	11.7	11.6	9.2	16.9	12.5	7.9	3.7	4.1	5.1	24	16.9	2.3	6.5		
18	5.8	5.5	3.5	3.8	3.0	3.5	3.2	8.0	5.0	6.8	5.2	5.6	7.8	3.3	3.9	16.0	9.5	3.8	6.2	3.7	6.0	7.3	3.9	3.3	24	16.0	3.0	5.6		
19	2.1	1.7	2.1	1.7	1.7	1.2	1.2	1.3	1.5	2.1	1.2	1.1	1.9	2.1	2.0	2.2	2.2	1.9	2.1	2.3	3.2	4.5	3.1	4.9	24	4.9	1.1	2.1		
20	2.7	2.0	1.9	3.6	6.2	4.5	4.2	6.4	8.6	7.5	12.3	11.7	13.7	13.9	15.0	16.3	17.5	19.2	5.6	5.6	6.7	5.2	2.8	3.0	24	19.2	1.9	8.2		
21	3.4	2.5	2.3	2.2	1.8	1.7	1.9	5.6	3.1	3.4	3.0	4.1	3.4	5.2	4.3	4.2	5.1	7.5	6.5	5.0	7.6	7.7	5.6	4.2	24	7.7	1.7	4.2		
22	4.2	6.3	3.5	3.6	3.5	4.6	4.5	4.3	4.0	4.2	3.8	3.2	3.4	3.6	4.9	4.3	3.5	4.8	3.5	4.5	7.0	14.8	16.1	12.3	24	16.1	3.2	5.5		
23	9.2	9.9	15.7	20.4	23.8	24.0	24.1	16.8	8.7	12.4	11.1	7.5	7.8	7.2	5.9	4.9	4.5	6.1	7.7	8.0	11.7	10.7	11.8	10.8	24	24.1	4.5	11.7		
24	9.6	11.5	12.4	10.6	10.8	9.6	9.8	8.1	6.5	7.7	6.2	5.8	5.7	5.0	5.6	7.2	5.4	6.7	10.0	6.2	8.4	7.3	4.2	4.3	24	12.4	4.2	7.7		
25	8.1	3.8	2.6	2.2	2.8	2.5	4.3	3.0	4.8	8.1	12.5	5.9	2.6	2.0	2.5	2.4	2.7	3.1	5.0	8.4	3.0	3.8	1.8	1.5	24	12.5	1.5	4.1		
26	1.8	2.1	1.8	1.4	1.4	1.2	1.0	1.1	1.6	1.5	2.2	2.2	3.8	3.9	5.2	3.0	4.3	4.2	3.1	4.8	7.9	7.9	7.9	9.5	24	9.5	1.0	3.5		
27	11.5	2.6	1.8	1.8	2.0	2.4	3.0	8.6	6.7	4.9	6.4	4.2	4.7	3.7	4.4	4.7	6.0	7.4	5.7	4.9	11.9	12.0	10.8	11.5	24	12.0	1.8	6.0		
28	11.5	13.9	7.1	1.8	3.8	2.8	6.8	6.7	8.0	7.8	8.6	6.0	6.4	4.4	3.6	4.3	6.6	4.5	10.3	3.5	4.9	6.4	4.2	3.0	24	13.9	1.8	6.1		
29	8.3	7.8	5.3	6.3	7.8	7.4	6.6	9.2	8.8	4.2	4.6	5.2	5.0	5.0	5.4	C	C	24.5	24.3	16.8	17.0	14.4	19.0	11.2	22	24.5	4.2	10.2		
30	17.9	26.7	1.3	1.1	1.6	2.6	5.0	4.2	5.8	3.1	5.9	6.0	6.0	5.5	7.8	18.6	20.0	19.6	20.0	14.5	15.9	12.0	12.8	13.5	24	26.7	1.1	10.3		
31																										0	0.0	0.0		
Count	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	30	30	30	30	30	30	30	30	718				
Maximum	67.6	45.8	48.7	48.8	54.3	75.3	70.1	66.6	77.9	44.8	16.4	12.0	13.7	13.9	15.0	18.6	20.0	24.5	24.3	18.8	30.5	57.3	63.9	55.0	24					
Minimum	1.8	1.7	1.3	1.1	1.4	1.2	1.0	1.1	1.5	1.5	1.2	1.1	1.4	1.1	2.0	2.2	1.4	1.9	2.1	1.5	1.4	1.5	1.8	1.5	0					
Average	10.6	9.3	7.5	6.9	7.5	9.0	9.9	11.4	12.0	8.7	6.7	5.3	5.0	4.5	5.2	6.5	6.5	7.4	7.6	7.2	8.5	10.9	12.3	11.1						
Percentiles		10		20		30		40		50		60		70		80		90		95		99		100				Maximum	77.9	
Data		2.1		3.0		3.8		4.5		5.3		6.4		7.8		10.6		16.9		24.3		56.9		77.9				Maximum Hourly	28.2	
																													Maximum Daily	8.2
																													Monthly Average	
Notes	C - Calibration / Span Cycle NA - No Data Available T - Test/Startup period A - MOE Audit M - Equipment Malfunction / Down R - Rate of Change																													

NOx Crago Road December 2017 ppb																														
Day	Hour																				Count	Maximum	Minimum	Average						
	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900					2000	2100	2200	2300		
1	8.3	7.8	7.7	7.3	5.9	8.9	10.4	15.2	15.7	17.0	8.4	5.7	3.7	3.7	4.3	5.0	15.6	11.1	14.9	10.3	8.3	26.3	47.0	29.2	24	47.0	3.7	12.4		
2	24.0	14.7	13.9	4.2	15.1	15.6	17.7	10.5	16.3	17.6	16.5	12.5	13.3	12.9	10.8	13.7	12.0	14.3	8.8	26.1	25.3	20.6	15.5	16.1	24	26.1	4.2	15.3		
3	12.9	13.1	10.7	9.8	11.1	10.0	11.9	11.1	9.1	10.6	10.4	12.1	11.7	11.0	11.7	15.1	14.5	16.8	27.7	22.9	31.9	43.9	45.1	32.2	24	45.1	9.1	17.4		
4	22.9	24.9	27.7	23.5	31.4	33.1	31.3	20.2	19.0	20.3	12.3	11.6	11.2	7.2	7.4	10.9	10.1	11.1	8.6	8.5	8.5	6.2	7.1	8.0	24	33.1	6.2	16.0		
5	6.5	7.1	7.9	6.1	5.8	7.7	4.8	6.6	7.3	4.0	5.5	6.2	4.2	3.4	4.8	4.1	3.9	5.5	4.0	3.2	3.6	3.8	4.1	3.3	24	7.9	3.2	5.1		
6	4.7	6.4	2.4	2.4	2.2	2.1	3.2	3.3	3.9	5.5	5.4	4.2	6.1	6.5	6.4	5.5	7.0	4.8	5.7	7.2	10.1	6.1	5.6	6.9	24	10.1	2.1	5.2		
7	6.2	4.6	5.8	5.8	5.1	7.1	8.5	11.4	12.2	C	C	7.2	5.3	6.1	6.4	7.9	8.8	9.9	12.0	9.8	10.2	10.5	10.4	10.3	22	12.2	4.6	8.3		
8	12.1	7.7	12.2	6.5	4.0	4.0	2.2	4.1	3.5	12.5	7.4	5.0	5.1	4.0	4.3	2.4	4.0	3.5	5.5	3.9	5.8	8.2	11.0	11.4	24	12.5	2.2	6.3		
9	14.5	15.4	12.3	12.0	14.5	13.3	22.5	7.1	6.1	8.6	7.1	6.2	6.0	6.7	C	8.4	6.1	8.2	11.0	11.6	14.3	19.0	20.7	20.3	23	22.5	6.0	11.8		
10	21.5	20.7	7.2	2.5	2.3	2.9	2.9	4.1	5.8	6.3	4.8	4.4	3.0	4.5	6.2	7.1	7.0	8.2	6.9	7.1	8.3	11.5	4.1	1.9	24	21.5	1.9	6.7		
11	1.9	1.5	1.6	1.5	1.1	1.9	3.9	4.8	4.7	3.5	3.1	2.4	3.2	6.0	11.7	5.3	2.8	2.9	2.8	6.7	14.0	5.9	5.8	6.0	24	14.0	1.1	4.4		
12	4.7	6.0	5.0	4.8	4.8	7.3	8.2	8.6	10.1	13.9	18.7	18.2	8.2	7.9	6.5	7.2	8.2	9.9	6.0	8.4	7.8	6.5	7.0	3.2	24	18.7	3.2	8.2		
13	2.2	2.8	2.4	2.7	3.1	4.7	3.6	4.8	6.8	6.0	4.4	4.4	4.6	4.3	5.3	7.5	12.6	21.5	19.8	11.0	8.8	6.7	4.6	6.0	24	21.5	2.2	6.7		
14	6.3	4.0	2.3	2.2	3.2	3.4	4.0	10.7	8.9	5.8	4.7	4.3	8.2	9.1	10.7	6.5	7.5	23.2	19.0	30.7	29.1	67.2	57.8	57.4	24	67.2	2.2	16.1		
15	61.3	70.5	53.7	30.8	33.4	31.3	40.5	41.0	49.8	59.4	64.0	48.6	27.8	6.4	9.6	4.0	5.9	12.6	16.1	12.4	15.6	14.8	14.6	11.1	24	70.5	4.0	30.6		
16	7.6	10.6	6.6	6.8	12.6	13.0	15.5	8.3	2.7	1.9	2.4	1.8	1.9	2.1	2.3	2.1	4.9	7.7	27.8	14.6	11.4	20.0	10.4	5.5	24	27.8	1.8	8.4		
17	9.2	14.3	17.6	10.2	9.4	4.4	3.3	4.2	5.2	6.4	5.4	5.7	7.4	14.0	6.3	4.8	4.6	4.8	4.0	5.5	7.3	5.1	5.1	4.3	24	17.6	3.3	7.0		
18	4.2	3.7	4.3	5.3	6.5	6.6	9.5	10.6	15.0	19.4	21.9	19.0	41.0	46.2	47.1	36.5	51.1	58.2	54.9	26.1	13.0	12.5	11.2	8.3	24	58.2	3.7	22.2		
19	8.6	9.0	10.4	8.3	6.5	5.7	5.3	5.8	6.7	7.6	7.3	7.4	7.4	9.5	12.5	14.3	12.4	9.7	15.9	11.1	13.0	19.6	7.1	9.1	24	19.6	5.3	9.6		
20	5.1	3.1	4.1	3.9	3.8	2.9	3.2	3.0	3.0	3.3	4.7	3.8	3.8	4.1	4.4	3.6	3.0	3.6	3.0	2.7	3.5	3.2	3.2	3.1	24	5.1	2.7	3.5		
21	2.9	3.1	2.3	2.4	2.7	3.5	5.1	10.9	11.0	5.5	8.4	7.9	9.7	8.5	9.9	4.6	3.4	7.9	10.2	7.8	8.4	7.9	8.7	4.1	24	11.0	2.3	6.5		
22	4.4	4.4	4.6	5.0	3.0	2.4	3.1	2.3	2.8	2.8	3.3	3.4	3.6	4.1	5.5	5.5	6.3	6.5	6.6	6.5	5.1	3.7	5.1	6.9	24	6.9	2.3	4.5		
23	6.9	6.8	7.2	5.7	4.8	6.6	6.4	8.3	8.3	7.8	7.1	11.3	17.5	19.1	15.0	25.4	35.2	58.8	34.1	26.5	24.9	10.4	7.3	9.5	24	58.8	4.8	15.4		
24	9.6	12.5	20.2	13.6	8.3	11.3	18.0	6.2	6.7	5.1	3.1	2.6	2.3	3.5	3.2	7.3	5.2	2.7	1.5	1.3	1.8	1.7	1.1	1.1	24	20.2	1.1	6.3		
25	1.0	1.0	1.3	0.9	1.2	1.0	1.7	4.9	6.4	5.0	5.2	4.2	3.9	3.7	4.2	3.8	4.8	5.7	6.4	6.5	6.9	7.0	5.6	5.2	24	7.0	0.9	4.1		
26	4.2	3.5	3.9	5.1	4.6	5.4	6.7	7.5	11.8	11.0	8.7	7.8	5.0	4.2	4.4	4.2	5.8	6.3	9.3	12.0	13.6	10.4	10.9	10.8	24	13.6	3.5	7.4		
27	10.4	14.3	8.8	9.5	9.1	18.3	62.7	32.0	36.7	11.7	7.5	3.3	2.1	2.5	2.8	2.6	3.4	3.8	4.6	5.7	6.2	7.3	4.7	4.4	24	62.7	2.1	11.5		
28	4.2	4.7	7.5	11.7	19.6	26.3	12.7	7.9	13.7	7.2	5.2	4.9	3.2	2.9	3.5	3.6	6.8	12.9	15.3	13.7	8.2	9.4	8.8	6.2	24	26.3	2.9	9.2		
29	5.4	4.6	7.2	6.0	8.9	5.7	6.6	7.8	8.9	8.8	10.1	7.8	9.7	9.9	9.7	5.9	5.5	6.0	5.9	6.9	10.6	15.8	16.1	18.5	24	18.5	4.6	8.7		
30	16.2	10.6	13.3	28.6	22.6	24.5	22.2	22.8	23.7	38.3	37.3	27.3	19.4	10.9	6.2	8.2	6.2	5.2	6.0	2.9	2.3	1.6	2.1	2.0	24	38.3	1.6	15.0		
31	2.0	1.4	1.5	1.5	1.5	2.4	3.1	5.2	2.7	2.4	1.4	1.7	1.6	1.7	1.3	1.8	2.9	7.4	7.7	2.5	2.4	1.8	2.1	1.6	24	7.7	1.3	2.6		
Count	31	31	31	31	31	31	31	31	31	30	30	31	31	31	30	31	31	31	31	31	31	31	31	31	741					
Maximum	61.3	70.5	53.7	30.8	33.4	33.1	62.7	41.0	49.8	59.4	64.0	48.6	41.0	46.2	47.1	36.5	51.1	58.8	54.9	30.7	31.9	67.2	57.8	57.4	24			70.5		
Minimum	1.0	1.0	1.3	0.9	1.1	1.0	1.7	2.3	2.7	1.9	1.4	1.7	1.6	1.7	1.3	1.8	2.8	2.7	1.5	1.3	1.8	1.6	1.1	1.1	22			1.1		
Average	10.1	10.2	9.5	7.9	8.6	9.5	11.6	10.0	11.1	11.2	10.4	8.8	8.4	8.0	8.1	7.9	9.3	12.0	12.3	10.7	11.0	12.7	11.9	10.4				10.1		
Percentiles		10		20		30		40		50		60		70		80		90		95		99		100				Maximum		
Data		2.7		3.8		4.8		5.8		6.9		8.2		10.4		13.0		20.3		30.8		58.1		70.5				Maximum Hourly	70.5	
																													Maximum Daily	30.6
																													Monthly Average	10.1
Notes	C - Calibration / Span Cycle		NA - No Data Available				T - Test			A - MOE Audit			M - Equipment Malfunction / Down			R - Rate of Change														

Figure C-1 Time History Plots of Measured Hourly Average and 24-Hour Average NO_x Concentrations – Crago Road Station



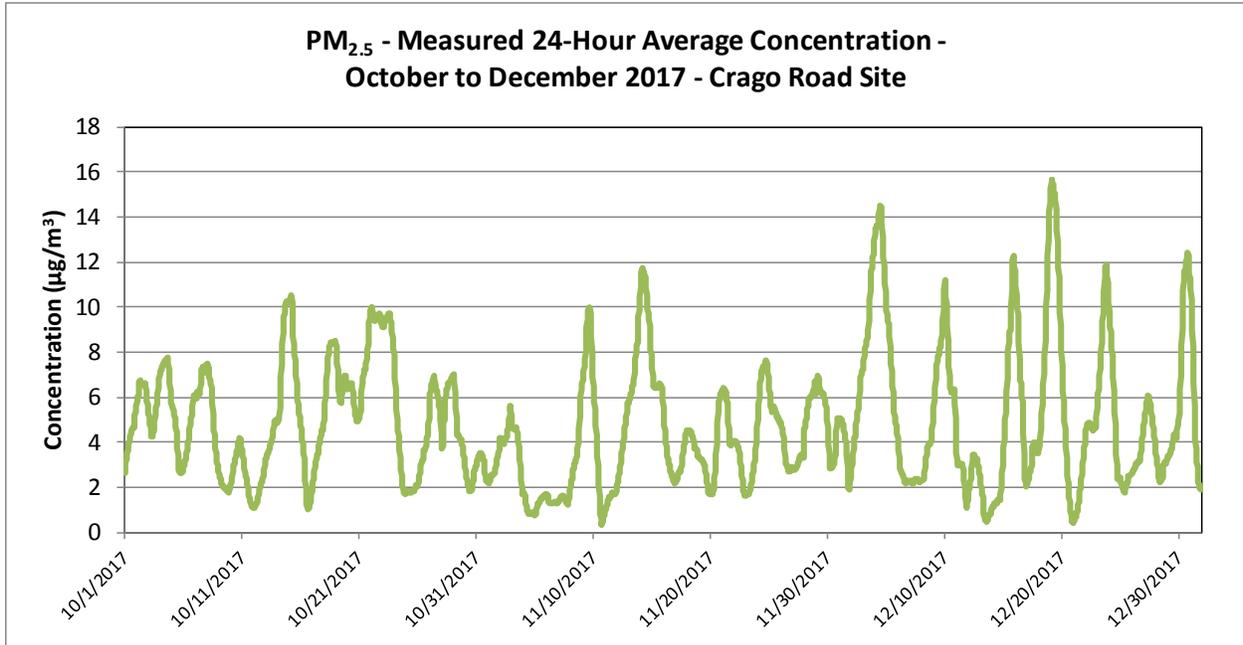
**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2017**

Appendix D PM_{2.5} Data Summaries and Time History Plots
February 15, 2018

**APPENDIX D PM_{2.5} DATA SUMMARIES AND TIME HISTORY
PLOTS**

PM _{2.5} - Crago Road December 2017 (µg/m ³)																															
Day	Hour																							Count	Maximum	Minimum	Average				
	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200							2300	
1	1.9	1.4	1.1	1.0	0.8	1.1	1.4	1.2	1.6	1.7	1.4	1.5	1.2	1.3	1.4	1.2	1.8	2.0	2.5	2.3	2.2	5.3	7.6	7.2	24	7.6	0.8	2.2			
2	8.5	7.0	5.5	4.9	6.4	6.7	7.2	7.5	5.9	4.6	4.7	6.3	5.9	5.9	5.0	5.4	5.8	6.3	7.3	11.1	11.7	11.6	9.9	10.0	24	11.7	4.6	7.1			
3	8.7	9.5	10.0	10.3	10.2	10.7	11.1	11.1	9.6	5.5	8.2	7.2	8.3	11.4	14.4	16.7	17.8	15.8	21.3	17.4	15.9	16.5	15.3	14.2	24	21.3	5.5	12.4			
4	15.0	17.5	16.4	14.7	12.8	12.3	11.6	10.2	12.6	13.4	10.6	13.4	11.6	11.9	11.3	10.5	10.9	11.1	8.0	6.3	5.9	5.6	5.7	6.5	24	17.5	5.6	11.1			
5	5.9	6.0	8.0	9.3	10.9	8.4	8.0	6.6	3.3	2.7	2.7	2.6	2.8	4.4	4.0	3.8	3.7	2.4	1.8	2.1	2.7	2.4	1.9	2.6	24	10.9	1.8	4.6			
6	2.3	1.6	2.1	2.1	2.5	2.4	2.9	3.0	2.7	2.0	1.6	1.4	1.6	1.5	1.7	2.1	2.3	2.5	2.6	3.5	3.6	2.2	1.8	1.9	24	3.6	1.4	2.2			
7	2.0	2.3	2.5	2.1	1.8	2.1	2.0	2.2	2.8	3.7	2.8	C	C	1.9	1.9	1.9	1.9	2.5	2.4	3.1	2.3	2.0	2.2	2.1	22	3.7	1.8	2.3			
8	2.4	2.4	2.6	1.3	1.7	2.3	3.1	4.5	7.3	9.2	8.2	7.0	7.2	5.6	5.1	3.8	3.0	2.8	2.7	3.0	3.8	4.7	5.6	6.1	24	9.2	1.3	4.4			
9	7.6	8.2	9.9	11.2	8.9	8.1	9.8	15.1	15.9	14.6	12.8	11.0	9.4	7.3	7.3	6.7	5.1	6.0	6.7	8.1	10.5	13.1	16.7	17.5	24	17.5	5.1	10.3			
10	20.1	17.7	8.2	2.1	1.3	1.1	0.5	0.6	0.2	0.0	0.1	0.5	1.2	2.5	4.4	5.7	6.6	7.3	6.4	7.8	10.3	14.1	2.5	0.3	24	20.1	0.0	5.1			
11	0.3	0.3	0.3	0.2	0.1	0.2	0.3	0.4	1.1	0.5	0.3	0.4	0.3	1.6	4.3	1.0	1.2	0.6	0.6	2.1	5.6	2.4	2.7	3.6	24	5.6	0.1	1.3			
12	4.2	5.0	5.0	4.4	3.4	3.2	3.0	2.8	4.6	6.6	8.0	5.9	1.4	1.6	0.7	0.6	0.7	1.2	0.8	0.8	0.8	1.0	1.1	0.8	24	8.0	0.6	2.8			
13	0.8	0.6	0.3	0.1	0.0	0.0	0.0	0.0	0.2	0.7	0.3	1.0	0.4	0.1	0.2	0.5	1.2	2.4	2.7	2.3	1.7	1.4	1.8	1.8	24	2.7	0.0	0.8			
14	4.1	2.0	1.4	0.9	1.0	0.6	0.6	1.2	0.9	0.7	0.5	0.5	0.9	1.1	2.1	1.4	1.2	2.8	2.0	3.6	5.7	8.8	9.4	10.9	24	10.9	0.5	2.7			
15	11.6	11.3	10.6	10.2	12.9	9.4	8.4	10.3	13.0	14.9	18.4	14.4	7.9	3.5	6.9	5.3	4.2	8.7	18.3	23.8	25.8	20.5	14.3	7.8	24	25.8	3.5	12.2			
16	3.6	5.1	2.1	3.0	3.5	2.1	2.3	1.6	0.2	0.0	0.0	0.0	0.1	0.3	0.3	0.3	1.3	2.6	4.7	4.8	3.3	4.5	4.0	2.7	24	5.1	0.0	2.2			
17	2.2	3.7	4.8	2.3	6.7	4.2	2.3	8.7	1.9	2.2	1.4	1.9	4.1	16.5	3.3	2.0	1.7	2.1	2.7	2.1	2.3	1.5	1.7	2.0	24	16.5	1.4	3.5			
18	2.5	4.0	5.1	9.7	6.3	11.0	13.9	10.6	15.5	12.6	11.8	12.5	15.3	19.3	19.9	18.7	20.0	18.7	21.0	14.0	11.4	17.7	20.6	17.4	24	21.0	2.5	13.7			
19	14.6	14.1	15.3	14.0	14.0	12.2	10.5	10.1	9.4	9.4	10.8	11.4	10.8	9.8	8.5	7.5	6.6	5.7	6.1	4.9	5.3	4.7	2.6	2.0	24	15.3	2.0	9.2			
20	0.9	0.6	0.5	0.5	0.3	0.2	0.2	0.3	0.3	0.3	1.3	0.3	0.3	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.8	24	1.3	0.1	0.4			
21	0.9	1.3	1.6	1.5	1.7	1.5	1.5	2.0	2.5	2.5	3.4	3.7	4.2	4.4	6.4	3.5	4.2	6.4	6.1	6.0	6.4	7.0	6.9	5.6	24	7.0	0.9	3.8			
22	4.7	4.5	5.6	7.7	5.1	3.4	2.6	2.9	2.6	3.2	3.0	2.6	2.9	3.2	3.7	4.1	4.0	5.0	7.2	6.8	6.3	6.5	8.1	10.5	24	10.5	2.6	4.8			
23	11.8	14.8	14.9	12.4	9.6	7.7	7.9	9.0	9.8	10.4	12.5	14.4	15.8	12.2	12.6	13.8	16.9	20.4	14.9	10.7	7.5	2.2	1.8	1.9	24	20.4	1.8	11.1			
24	2.1	3.8	4.9	3.2	2.6	3.4	4.4	1.9	2.2	2.8	1.7	1.2	1.2	1.2	1.3	1.5	2.2	3.0	2.3	2.1	2.4	2.6	2.4	2.4	24	4.9	1.2	2.4			
25	2.1	1.9	1.8	1.7	1.7	1.3	1.1	1.3	1.3	1.5	1.6	3.2	3.7	3.1	2.4	2.5	4.1	5.9	5.5	2.8	2.8	2.9	3.1	2.9	24	5.9	1.1	2.6			
26	2.5	2.8	3.1	2.9	2.2	2.3	2.4	2.4	3.0	3.1	2.8	2.7	3.1	3.0	3.5	3.6	5.0	6.4	6.8	7.6	8.2	8.1	8.5	7.1	24	8.5	2.2	4.3			
27	7.6	8.1	7.5	7.0	6.5	5.4	6.1	6.8	8.5	5.2	3.3	1.6	0.9	1.4	1.6	1.3	1.4	1.5	2.3	4.4	2.8	3.9	3.8	3.3	24	8.5	0.9	4.3			
28	2.2	1.5	1.5	1.8	2.6	3.0	2.4	2.6	2.3	2.1	2.2	2.2	1.9	1.8	2.2	2.6	3.9	7.2	6.9	6.1	4.4	4.5	2.5	3.3	24	7.2	1.5	3.1			
29	5.0	3.9	2.8	2.7	2.7	3.1	3.7	4.1	4.4	4.0	3.7	2.6	6.0	6.0	5.7	5.3	4.7	4.6	4.7	5.3	5.6	6.3	9.3	9.8	24	9.8	2.6	4.8			
30	6.0	5.7	10.1	12.9	18.2	18.0	20.0	21.3	21.2	25.1	22.8	15.1	12.0	8.9	7.6	6.7	10.7	10.5	9.3	4.8	2.3	1.7	1.7	2.2	24	25.1	1.7	11.4			
31	2.3	1.8	1.9	2.1	2.0	1.9	1.8	1.7	1.6	1.2	1.3	1.3	1.7	1.6	1.5	1.2	1.7	3.4	5.4	2.8	1.4	0.9	2.0	2.3	24	5.4	0.9	1.9			
Count	31	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31	31	31	31	742						
Maximum	20.1	17.7	16.4	14.7	18.2	18.0	20.0	21.3	21.2	25.1	22.8	15.1	15.8	19.3	19.9	18.7	20.0	20.4	21.3	23.8	25.8	20.5	20.6	17.5	24						
Minimum	0.3	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.3	22						
Average	5.4	5.5	5.4	5.2	5.2	4.8	4.9	5.3	5.4	5.4	5.3	5.0	4.8	5.0	4.9	4.6	5.0	5.8	6.2	5.9	5.8	6.0	5.7	5.5							
Percentiles		10		20		30		40		50		60		70		80		90		95		99		100							Maximum
Data		0.8		1.5		2.1		2.5		3.3		4.8		6.6		9.1		12.6		15.8		20.9		25.8							Maximum Hourly Maximum Daily Monthly Average
Notes	C - Calibration / Span Cycle NA - No Data Available T - Test A - MOE Audit M - Equipment Malfunction / Down R - Rate of Change																														

Figure D-1 Time History Plot of Measured 24-Hour Average PM_{2.5} Concentrations – Crago Road Station



**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2017**

Appendix E Continuous Parameter Edit Log
February 15, 2018

APPENDIX E CONTINUOUS PARAMETER EDIT LOG

EDIT LOG TABLE

Durham York Energy Centre Ambient Air Monitoring Program										
Project Name	Durham York Energy Centre Ambient Air Monitoring Program									
Contact	Greg Crooks / Connie Lim / Toni Zbiele			Phone:	905-944-7777		E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, toni.zbieranowski@stantec.com		
Station number:	N/A			Station Name:	Crago Road					
Station address:	Crago Road			Emitter Address:	The Region of Durham, 605 Rossland Rd, Whitby, ON					
Pollutant or parameter:	SO2			Instrument make & model:	Teledyne Monitor Labs Sulphur Dioxide		Serial Number:	1228		
Data edit period	Start date:	1-Oct-17		End date:	31-Dec-17		Time Zone : EST			
Edit #	Edit date	Editor's Name	Edit Action	Starting		Ending		Reason		
				Date (dd/mm/yyyy)	Hour (xxxx)	Date (dd/mm/yyyy)	Hour (xxxx)			
21	8-Jan-18	TZ	Invalidate	26-Oct-17	14:00	26-Oct-17	15:00	Monthly Calibration		
22	8-Jan-18	TZ	Invalidate	29-Nov-17	15:00	29-Nov-17	16:00	Monthly Calibration		
23	10-Jan-18	TZ	Invalidate	7-Dec-17	09:00	7-Dec-17	09:00	Monthly Calibration		
24	10-Jan-18	TZ	Data Review	12-Oct-17	11:00	12-Oct-17	14:00	Elevated SO2 concentrations ranging from 6 to 17 ppb were noted. Elevated concentrations were also measured at the Courtice WPCP during this time at about the same level. Winds were blowing from the east. Possible emission sources include St. Mary's Cement. Data determined to be valid.		
25	10-Jan-18	TZ	Data Review	4-Nov-17	19:00	4-Nov-17	23:00	Elevated SO2 concentrations ranging from 15 to 28 ppb were noted. Elevated concentrations were also measured at the Courtice WPCP during this time at about the same level. Winds were blowing from the east. Possible emission sources include St. Mary's Cement. Data determined to be valid.		
26	10-Jan-18	TZ	Data Review	27-Dec-17	05:00	27-Dec-17	06:00	Elevated SO2 concentrations ranging from 11 to 59 ppb were measured during these two hours. Concentrations were low at both Rundle and Courtice, however, NOx at Crago also higher during this time period. Winds were from the North. Data determined to be valid.		
27	17-Jan-18	TZ	Data Review	1-Oct-17	01:00	1-Oct-17	07:00	Instances of repeating zero values in this timeframe were due to negative instrument zero drift less than -5 ppb and rounded to 0 ppb. As per the MOECC Ambient Monitoring Guideline, no drift correction was applied.		
28	17-Jan-18	TZ	Data Review	1-Oct-17	13:00	5-Oct-17	11:00			
29	17-Jan-18	TZ	Data Review	5-Oct-17	14:00	7-Oct-17	13:00			
30	17-Jan-18	TZ	Data Review	7-Oct-17	16:00	9-Oct-17	06:00			
31	17-Jan-18	TZ	Data Review	9-Oct-17	09:00	12-Oct-17	09:00			
32	17-Jan-18	TZ	Data Review	13-Oct-17	03:00	15-Oct-17	06:00			
33	17-Jan-18	TZ	Data Review	15-Oct-17	09:00	17-Oct-17	07:00			
34	17-Jan-18	TZ	Data Review	17-Oct-17	11:00	18-Oct-17	06:00			
35	17-Jan-18	TZ	Data Review	18-Oct-17	15:00	20-Oct-17	11:00			
36	17-Jan-18	TZ	Data Review	20-Oct-17	15:00	20-Oct-17	21:00			
37	17-Jan-18	TZ	Data Review	21-Oct-17	12:00	22-Oct-17	08:00			
38	17-Jan-18	TZ	Data Review	22-Oct-17	21:00	23-Oct-17	12:00			
39	17-Jan-18	TZ	Data Review	23-Oct-17	19:00	25-Oct-17	12:00			
40	17-Jan-18	TZ	Data Review	25-Oct-17	15:00	26-Oct-17	13:00			
41	17-Jan-18	TZ	Data Review	5-Nov-17	06:00	5-Nov-17	13:00	Repeating values were investigated. Measurements fluctuated, but appear as repeating due to round off.		
42	17-Jan-18	TZ	Data Review	6-Nov-17	03:00	6-Nov-17	10:00			
43	17-Jan-18	TZ	Data Review	12-Nov-17	00:00	12-Nov-17	06:00			
44	17-Jan-18	TZ	Data Review	13-Nov-17	05:00	13-Nov-17	11:00			
45	17-Jan-18	TZ	Data Review	19-Nov-17	16:00	20-Nov-17	00:00			
46	17-Jan-18	TZ	Data Review	21-Nov-17	06:00	21-Nov-17	12:00			
47	17-Jan-18	TZ	Data Review	21-Nov-17	22:00	22-Nov-17	06:00			
48	17-Jan-18	TZ	Data Review	1-Dec-17	14:00	1-Dec-17	20:00			
49	17-Jan-18	TZ	Data Review	12-Dec-17	01:00	12-Dec-17	09:00			
50	17-Jan-18	TZ	Data Review	16-Dec-17	20:00	17-Dec-17	05:00			
51	17-Jan-18	TZ	Data Review	17-Dec-17	18:00	18-Dec-17	02:00			
52	17-Jan-18	TZ	Data Review	20-Dec-17	13:00	20-Dec-17	22:00			
53	17-Jan-18	TZ	Data Review	25-Dec-17	19:00	26-Dec-17	01:00			
54	17-Jan-18	TZ	Data Review	26-Dec-17	04:00	26-Dec-17	11:00			
55	17-Jan-18	TZ	Data Review	26-Dec-17	14:00	26-Dec-17	23:00			
56	17-Jan-18	TZ	Data Review	29-Dec-17	15:00	29-Dec-17	12:00			
57	17-Jan-18	TZ	Data Review	29-Dec-17	18:00	30-Dec-17	00:00			

Examples of Acceptable Edit Actions:

- Add offset of
- Delete hours
- Zero Correction
- Slope Correction
- Manual data entry for missing, but collected data
- Invalidating span & zero check data
- Invalidating data due to equipment malfunctions and power failures.
- Invalidating data when instrumentation off-line
- Marking data as out-of-range

EDIT LOG TABLE

Project Name										Durham York Energy Centre Ambient Air Monitoring Program																																																																															
Contact										Greg Crooks / Connie Lim / Toni Zbiele																																																																															
Station number:					N/A					Station Name:					Crago Road																																																																										
Station address:					Crago Road					Emitter Address:					The Region of Durham, 605 Rossland Rd, Whitby, ON																																																																										
Pollutant or parameter:					NOx					Instrument make & model:					API Model 200E Chemiluminescence Analyzer																																																																										
Data edit period					Start date:					1-Oct-17					End date:					31-Dec-17																																																																					
Edit #										Edit date										Editor's Name										Edit Action										Starting										Ending										Reason																													
26										8-Jan-18										TZ										Invalidate										26-Oct-17										14:00										26-Oct-17										15:00										Monthly Calibration									
27										8-Jan-18										TZ										Invalidate										29-Nov-17										15:00										29-Nov-17										16:00										Monthly Calibration									
28										10-Jan-18										TZ										Invalidate										7-Dec-17										09:00										7-Dec-17										10:00										Monthly Calibration									
29										10-Jan-18										TZ										Invalidate										9-Dec-17										14:00										9-Dec-17										14:00										Monitor unit down for servicing.									
30										10-Jan-18										TZ										Data Review										27-Oct-17										02:00										27-Oct-17										02:00										An elevated NOx concentration of 60 ppb was noted on 27-Oct-17 at 2:00. Elevated NOx was also measured at the Courtice WPCP during this time. Winds were blowing from the north. Concentrations of NO were higher than concentrations of NO2, indicating a nearby combustion source. A possible source could be emissions from HWY 401 or earthworks. Data determined to be valid.									
31										10-Jan-18										TZ										Data Review										9-Nov-17										05:00										9-Nov-17										09:00										Elevated NOx concentrations of 45 to 78 ppb was noted on 9-Nov-17 from 5:00 to 9:00. Elevated NOx was also measured at the Courtice WPCP during this time, where concentrations were higher. Winds were blowing from the north. Concentrations of NO were higher than concentrations of NO2, indicating a nearby combustion source. NO2 concentrations measured at Oshawa during this time were similar to or higher than those measured at Crago and Courtice during this time. A possible source could be emissions from HWY 401 or earthworks. Data determined to be valid.									
32										10-Jan-18										TZ										Data Review										27-Dec-17										06:00										27-Dec-17										06:00										An elevated NOx concentration of 63 ppb was noted on 27-Dec-17 at 5:00. Elevated NOx was also measured at the Courtice WPCP around this time. Winds were blowing from the northwest. For this hour, the measured NO2 concentration was much higher than NO suggesting a relatively distant emissions source. Possible sources include Highway 401, the CP rail line, or the DYEC. Data determined to be valid.									

Examples of Acceptable Edit Actions:

Add offset of

Delete hours

Zero Correction

Slope Correction

Manual data entry for missing, but collected data

Invalidate span & zero check data

Invalidate data due to equipment malfunctions and power failures.

Invalidate data when instrumentation off-line

Marking data as out-of-range

EDIT LOG TABLE

Project Name		Durham York Energy Centre Ambient Air Monitoring Program							
Contact		Greg Crooks / Connie Lim / Toni Zbiele		Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, toni.zbieranowski@stantec.com		
Station number:		N/A		Station Name:		Crago Road			
Station address:		Crago Road		Emitter Address: The Region of Durham, 605 Rossland Rd, Whitby, ON					
Pollutant or parameter:		PM2.5		Instrument make & model:		Thermo Sharp 5030 Synchronized Hybrid		Serial Number:	CM 0269
Data edit period		Start date:	1-Oct-17	End date:	31-Dec-17	Time Zone : EST			
Edit #	Edit date	Editor's Name	Edit Action	Starting		Ending		Reason	
				Date (dd/mm/yyyy)	Hour (xxxx)	Date (dd/mm/yyyy)	Hour (xxxx)		
39	15-Nov-17	TZ	Invalidate minute data	6-Oct-17	11:09	6-Oct-17	11:16	Weekly zero check. Invalidated minute data.	
40	15-Nov-17	TZ	Invalidate minute data	13-Oct-17	09:11	13-Oct-17	9:23	Weekly zero check. Invalidated minute data.	
41	15-Nov-17	TZ	Invalidate minute data	20-Oct-17	12:52	20-Oct-17	13:02	Weekly zero check. Invalidated minute data.	
42	15-Nov-17	TZ	Invalidate	23-Oct-17	09:00	23-Oct-17	09:00	Weekly zero check. Zero check was longer than 15 min, therefore entire hour invalidated.	
43	15-Nov-17	TZ	Invalidate	1-Nov-17	13:00	1-Nov-17	13:00	Weekly zero check. Zero check was longer than 15 min, therefore entire hour invalidated.	
44	15-Nov-17	TZ	Invalidate minute data	6-Nov-17	10:38	6-Nov-17	10:48	Weekly zero check. Invalidated minute data.	
45	8-Jan-18	TZ	Invalidate minute data	10-Nov-17	15:16	10-Nov-17	15:28	Weekly zero check. Invalidated minute data.	
46	8-Jan-18	TZ	Invalidate	17-Nov-17	10:00	17-Nov-17	10:00	Weekly zero check. Zero check was longer than 15 min, therefore entire hour invalidated.	
47	8-Jan-18	TZ	Invalidate minute data	23-Nov-17	13:55	23-Nov-17	14:01	Weekly zero check. Invalidated minute data.	
48	8-Jan-18	TZ	Invalidate minute data	28-Nov-17	10:29	28-Nov-17	10:35	Weekly zero check. Invalidated minute data.	
49	8-Jan-18	TZ	Invalidate minute data	8-Dec-17	14:35	8-Dec-17	14:41	Weekly zero check. Invalidated minute data.	
50	8-Jan-18	TZ	Invalidate minute data	13-Dec-17	08:40	13-Dec-17	8:49	Weekly zero check. Invalidated minute data.	
51	8-Jan-18	TZ	Invalidate minute data	18-Dec-17	12:50	18-Dec-17	13:00	Weekly zero check. Invalidated minute data.	
52	8-Jan-18	TZ	Invalidate minute data	22-Dec-17	08:41	22-Dec-17	08:52	Weekly zero check. Invalidated minute data.	
53	8-Jan-18	TZ	Invalidate minute data	28-Dec-17	14:08	28-Dec-17	14:20	Weekly zero check. Invalidated minute data.	
54	8-Jan-18	TZ	Invalidate	27-Oct-17	09:00	27-Oct-17	10:00	Monthly calibration	
55	8-Jan-18	TZ	Invalidate	29-Nov-17	15:00	29-Nov-17	15:00	Monthly calibration	
56	10-Jan-18	TZ	Data Review	14-Oct-17	07:00	14-Oct-17	16:00	Elevated PM2.5 concentrations were observed during this time, ranging from 13 to 21 µg/m ³ . Elevated concentrations were also observed at the Courtyce and Rundle stations as well as Oshawa but they were not as high. Winds were from the West, a potential source could be the DYEC. Data is determined to be valid.	
57	10-Jan-18	TZ	Data Review	28-Nov-17	01:00	28-Nov-17	01:00	A PM2.5 concentration of 22 µg/m ³ was measured during this hour. An elevated concentration was also measured at Courtyce, concentrations observed at Rundle and Oshawa were lower. Winds were from the east, a possible emission source was St. Mary's Cement. Data is determined to be valid.	
58	10-Jan-18	TZ	Data Review	15-Dec-17	18:00	15-Dec-17	22:00	Elevated PM2.5 concentrations were observed during this time, ranging from 18 to 26 µg/m ³ . Elevated concentrations were also observed at the Courtyce and Rundle stations at similar levels; elevated but slightly lower levels were measured at Oshawa during the same time period. Winds were from the West, potential sources could be the DYEC, earthworks and general ambient conditions.	
59	16-Jan-18	TZ	Invalidate	7-Dec-17	11:00	7-Dec-17	12:00	Monthly calibration	

Examples of Acceptable Edit Actions:

- Add offset of
- Delete hours
- Zero Correction
- Slope Correction
- Manual data entry for missing, but collected data
- Invalidating span & zero check data
- Invalidating data due to equipment malfunctions and power failures.
- Marking data as out-of-range
- Test

EDIT LOG TABLE

Project Name								Durham York Energy Centre Ambient Air Monitoring Program									
Contact				Greg Crooks / Connie Lim / Toni Zbiele				Phone:		905-944-7777		E-mail:		greg.crooks@stantec.com, connie.lim@stantec.com, toni.zbieranowski@stantec.com			
Station number:				N/A				Station Name:		Crago Road							
Station address:				Crago Road				Emitter Address:		The Region of Durham, 605 Rossland Rd, Whitby, ON							
Pollutant or parameter:				Temperature				Instrument make & model:		Campbell Scientific Model HMP60							
Data edit period		Start date:		1-Oct-17		End date:		31-Dec-17		Time Zone : EST							
Edit #		Edit date		Editor's Name		Edit Action		Starting		Ending		Reason					
								Date		Hour (xx:xx)		Date		Hour (xx:xx)			
								(dd/mm/yyyy)				(dd/mm/yyyy)					

EDIT LOG TABLE

Project Name								Durham York Energy Centre Ambient Air Monitoring Program									
Contact				Greg Crooks / Connie Lim / Toni Zbiele				Phone:		905-944-7777		E-mail:		greg.crooks@stantec.com, connie.lim@stantec.com, toni.zbieranowski@stantec.com			
Station number:				N/A				Station Name:		Crago Road							
Station address:				Crago Road				Emitter Address:		The Region of Durham, 605 Rossland Rd, Whitby, ON							
Pollutant or parameter:				Rainfall				Instrument make & model:		Texas Electronic TE525M							
Data edit period		Start date:		1-Oct-17		End date:		31-Dec-17		Time Zone : EST							
Edit #		Edit date		Editor's Name		Edit Action		Starting		Ending		Reason					
								Date		Hour (xx:xx)		Date		Hour (xx:xx)			
								(dd/mm/yyyy)				(dd/mm/yyyy)					

Examples of Acceptable Edit Actions:

- Add offset of
- Delete hours
- Zero Correction
- Slope Correction
- Manual data entry for missing, but collected data
- Invalidating span & zero check data
- Invalidating data due to equipment malfunctions and power failures.
- Invalidating data when instrumentation off-line

EDIT LOG TABLE

Project Name		Durham York Energy Centre Ambient Air Monitoring Program						
Contact	Greg Crooks / Connie Lim / Toni Zbiele	Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, toni.zbieranowski@stantec.com			
Station number:	N/A		Station Name:	Crago Road				
Station address:	Crago Road		Emitter Address:	The Region of Durham, 605 Rossland Rd, Whitby, ON				
Pollutant or parameter:	Relative Humidity	Instrument make & model:		Campbell Scientific Model HMP60				
Data edit period	Start date:	1-Oct-17	End date:	31-Dec-17	Time Zone : EST			
Edit #	Edit date	Editor's Name	Edit Action	Starting		Ending		Reason
				Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/yyyy)	Hour (xx:xx)	

EDIT LOG TABLE

Project Name		Durham York Energy Centre Ambient Air Monitoring Program						
Contact	Greg Crooks / Connie Lim / Toni Zbiele	Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, toni.zbieranowski@stantec.com			
Station number:	N/A		Station Name:	Crago Road				
Station address:	Crago Road		Emitter Address:	The Region of Durham, 605 Rossland Rd, Whitby, ON				
Pollutant or parameter:	Wind Speed/Wind Direction	Instrument make & model:		Met One Instruments Inc. Model 034B				
Data edit period	Start date:	1-Oct-17	End date:	31-Dec-17	Time Zone : EST			
Edit #	Edit date	Editor's Name	Edit Action	Starting		Ending		Reason
				Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/yyyy)	Hour (xx:xx)	

Examples of Acceptable Edit Actions:

- Add offset of
- Delete hours
- Zero Correction
- Slope Correction
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**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2017**

Appendix F Metals Data Summary
February 15, 2018

APPENDIX F METALS DATA SUMMARY

Metals and Total Particulates Location	Crago Road Station																															
Date	dd/mm/yyyy	Crago 04/10/2017		Crago 10/10/2017		Crago 16/10/2017		Crago 22/10/2017		Crago 28/10/2017		Crago 03/11/2017		Crago 09/11/2017		Crago 15/11/2017		Crago 21/11/2017		Crago 27/11/2017		Crago 03/12/2017		Crago 09/12/2017		Crago 15/12/2017		Crago 21/12/2017		Crago 27/12/2017		
Start Time	hh:mm	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00		
Sample Duration	Hours	23.48	23.55	23.47	23.56	23.47	23.56	23.47	23.56	23.47	23.56	23.47	23.56	23.47	23.56	23.47	23.56	23.47	23.56	23.47	23.56	23.47	23.56	23.47	23.56	23.47	23.56	23.47	23.56	23.47	23.56	
Technician	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	TZ	
Filter Number	Report #	17091562	17091934	17091935	17100462	17100463	17100463	17101254	17101255	17102752	17102753	17111530	17111531	17112389	17112390	17120635	17120635	17120635	17120635	17120635	17120635	17120635	17120635	17120635	17120635	17120635	17120635	17120635	17120635	17120635	17120635	
Analyst	Report #	B7M3131	B7M7641	B7N5367	B7N5367	B7O8843	B7O8843	B7P9974	B7Q352	B7Q352	B7Q352																					
Total Volumetric Flow	Am ³ /sample	1561.24	1471.26	1433.83	1476.16	1481.05	1405.14	1360.59	1350.42	1382.96	1377.89	1382.99	1393.25	1316.95	1352.25	1253.05																
Analytical Results	Units	Value	RDL																													
Particulate	mg	29.7	5.0	34.4	5.0	19.3	5.0	47.9	5.0	34.8	5.0	21.7	5.0	44.9	5.0	28.8	5.0	30.2	5.0	27.6	5.0	63.8	5.0	34.6	5.0	37.2	5.0	53.8	5.0	26.2	5.0	
Total Mercury (Hg)	µg	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	0.03	0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	0.02	0.02	0.05	0.02	<0.02	0.02	<0.02	0.02	
Aluminum (Al)	µg	136	50	165	50	94	50	275	50	100	50	67	50	216	50	104	50	117	50	144	50	230	50	179	50	77	50	127	50	<50	50	
Antimony (Sb)	µg	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	
Arsenic (As)	µg	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	
Barium (Ba)	µg	7.9	1.0	21.7	1.0	13.1	1.0	12.9	1.0	11.7	1.0	7.3	1.0	23.7	1.0	7.7	1.0	6.5	1.0	6.9	1.0	14.5	1.0	15.7	1.0	14.9	1.0	8.0	1.0	5.1	1.0	
Beryllium (Be)	µg	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	
Bismuth (Bi)	µg	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	
Boron (B)	µg	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	
Cadmium (Cd)	µg	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	
Chromium (Cr)	µg	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	5.3	5.0	<5.0	5.0	28.5	5.0	
Cobalt (Co)	µg	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	
Copper (Cu)	µg	41.0	5.0	126	5.0	49.2	5.0	76.5	5.0	33.5	5.0	53.3	5.0	64.4	5.0	62.6	5.0	21.4	5.0	26.9	5.0	21.1	5.0	9.2	5.0	21.4	5.0	13.7	5.0	5.0	5.0	
Iron (Fe)	µg	412	50	583	50	288	50	566	50	417	50	198	50	689	50	273	50	329	50	321	50	672	50	586	50	484	50	339	50	231	50	
Lead (Pb)	µg	3.4	3.0	3.9	3.0	<3.0	3.0	8.1	3.0	<3.0	3.0	<3.0	3.0	8.7	3.0	3.8	3.0	3.3	3.0	9.8	3.0	4.5	3.0	13.4	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	
Magnesium (Mg)	µg	241	50	241	50	167	50	278	50	188	50	83	50	376	50	128	50	203	50	184	50	346	50	403	50	118	50	188	50	110	50	
Manganese (Mn)	µg	16.6	1.0	18.2	1.0	10.6	1.0	17.1	1.0	18.6	1.0	6.1	1.0	21.0	1.0	17.5	1.0	13.2	1.0	10.1	1.0	26.7	1.0	23.3	1.0	26.4	1.0	9.4	1.0	3.6	1.0	
Molybdenum (Mo)	µg	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	
Nickel (Ni)	µg	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	
Phosphorus (P)	µg	44	25	98	25	30	25	47	25	28	25	27	25	48	25	<25	25	30	25	<25	25	47	25	26	25	<25	25	<25	25	<25	25	
Selenium (Se)	µg	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	
Silver (Ag)	µg	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	
Strontium (Sr)	µg	4.3	1.0	5.7	1.0	3.9	1.0	9.2	1.0	3.9	1.0	2.5	1.0	6.0	1.0	3.7	1.0	3.3	1.0	5.9	1.0	8.5	1.0	5.7	1.0	3.2	1.0	8.0	1.0	2.2	1.0	
Thallium (Tl)	µg	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	
Tin (Sn)	µg	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	
Titanium (Ti)	µg	<10	10	13	10	<10	10	14	10	<10	10	<10	10	14	10	<10	10	<10	10	<10	10	17	10	10	10	<10	10	<10	10	<10	10	
Vanadium (V)	µg	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	
Zinc (Zn)	µg	27.0	5.0	55.0	5.0	22.6	5.0	29.1	5.0	27.2	5.0	17.8	5.0	69.2	5.0	26.3	5.0	29.3	5.0	27.2	5.0	57.6	5.0	53.6	5.0	26.8	5.0	21.5	5.0	12.2	5.0	
Zirconium (Zr)	µg	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	
Total Uranium (U)	µg	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	

Calculated Concentrations	Quarter 4			Crago 47	Crago 48	Crago 49	Crago 50	Crago 51	Crago 52	Crago 53	Crago 54	Crago 55	Crago 56	Crago 57	Crago 58	Crago 59	Crago 60	Crago 61
	Units	Maximum	Minimum	04/10/2017	10/10/2017	16/10/2017	22/10/2017	28/10/2017	03/11/2017	09/11/2017	15/11/2017	21/11/2017	27/11/2017	03/12/2017	09/12/2017	15/12/2017	21/12/2017	27/12/2017
Particulate	µg/m ³	46.13	13.46	19.02	23.38	13.46	32.45	23.50	15.44	33.00	21.33	21.84	20.03	46.13	24.83	28.25	39.64	20.91
Total Mercury (Hg)	µg/m ³	3.80E-05	6.41E-06	6.41E-06	6.80E-06	6.97E-06	6.77E-06	6.75E-06	7.12E-06	2.20E-05	7.41E-06	7.23E-06	7.26E-06	7.23E-06	3.80E-05	7.40E-06	7.98E-06	
Aluminum (Al)	µg/m ³	1.86E-01	2.00E-02	8.71E-02	1.12E-01	6.56E-02	1.86E-01	6.75E-02	4.77E-02	1.59E-01	7.70E-02	8.46E-02	1.05E-01	1.66E-01	5.85E-02	9.39E-02	2.00E-02	
Antimony (Sb)	µg/m ³	3.99E-03	3.20E-03	3.20E-03	3.40E-03	3.39E-03	3.38E-03	3.39E-03	3.67E-03	3.70E-03	3.62E-03	3.63E-03	3.63E-03	3.6				

**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2017**

Appendix G PAHs Data Summary
February 15, 2018

APPENDIX G PAHS DATA SUMMARY

Polycyclic Aromatic Hydrocarbons		Crago Station													
Location		Crago		Crago		Crago		Crago		Crago		Crago		Crago	
Date	dd/mm/yyyy	10/10/2017	22/10/2017	3/11/2017	15/11/2017	27/11/2017	9/12/2017	21/12/2017							
Start Time	hh:mm	0:00	0:00	0:00	0:00	0:00	0:00	0:00							
Sample Duration	hours	23.58	23.61	23.85	24.05	23.55	23.81	23.98							
Technician															
Filter Number		FDH292-01	FDI130-01	FDI290-01	FJ4303-1	FJY350-01	FOW817-01	FOW836-01							
Maxxam ID		FH2646	FJX016	FMN848	FOT347	FQM635	FTE293	FUY265							
Maxxam Job #		B7M6932	B7N5347	B7O8822	B7P9966	B7Q8641	B7S2445	B7T0961							
Total Volumetric Flow	Am ³ /sample	354.14	322.55	352.91	354.10	349.64	347.05	357.76							
Analytical Results		Units		Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL
Benzo(a)pyrene	µg	0.00437	0.00085	0.0153	0.0014	0.00462	0.00075	0.0176	0.0034	<0.016	0.016	0.0245	0.0035	0.0203	0.0021
1-Methylnaphthalene	µg	1.15	0.10	1.44	0.15	0.82	0.10	1.12	0.15	0.69	0.10	1.75	0.15	1.20	0.10
2-Methylnaphthalene	µg	1.92	0.10	2.18	0.15	1.29	0.10	1.71	0.15	1.03	0.10	2.79	0.15	1.93	0.10
Acenaphthene	µg	0.476	0.050	0.597	0.075	0.210	0.050	0.393	0.075	0.140	0.050	0.255	0.075	0.154	0.050
Acenaphthylene	µg	<0.050	0.050	<0.075	0.075	0.092	0.050	<0.075	0.075	<0.050	0.050	0.147	0.075	0.102	0.050
Anthracene	µg	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Benzo(a)anthracene	µg	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Benzo(a)fluorene	µg	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10
Benzo(b)fluoranthene	µg	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Benzo(b)fluorene	µg	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10
Benzo(e)pyrene	µg	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10
Benzo(g,h,i)perylene	µg	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Benzo(k)fluoranthene	µg	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Biphenyl	µg	0.41	0.10	1.08	0.15	0.41	0.10	0.76	0.15	0.46	0.10	0.87	0.15	0.74	0.10
Chrysene	µg	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Dibenz(a,h)anthracene	µg	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Dibenz(a,c)anthracene + Picene ¹	µg	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10
Fluoranthene	µg	0.160	0.050	0.243	0.075	0.116	0.050	0.183	0.075	0.120	0.050	0.237	0.075	0.227	0.050
Indeno(1,2,3-cd)pyrene	µg	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Naphthalene	µg	4.85	0.072	7.59	0.11	4.34	0.072	8.29	0.11	4.34	0.072	12.8	0.11	7.65	0.072
o-Terphenyl	µg	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10
Perylene	µg	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10
Phenanthrene	µg	0.668	0.050	1.03	0.075	0.520	0.050	0.573	0.075	0.400	0.050	0.654	0.075	0.667	0.050
Pyrene	µg	0.086	0.050	<0.075	0.075	<0.050	0.050	0.087	0.075	0.090	0.050	0.111	0.075	0.157	0.050
Tetralin	µg	0.50	0.10	0.71	0.15	0.33	0.10	0.62	0.15	0.36	0.10	0.55	0.15	0.48	0.10
Calculated Concentrations		Quarter 4													
				Crago		Crago		Crago		Crago		Crago		Crago	
				24		25		26		27		28		29	
		Units	Maximum	Minimum											
					10/10/2017	22/10/2017	3/11/2017	15/11/2017	27/11/2017	9/12/2017	21/12/2017				
Benzo(a)pyrene	ng/m ³	7.06E-02	1.23E-02	1.23E-02	4.74E-02	1.31E-02	4.97E-02	2.29E-02	7.06E-02	5.67E-02					
1-Methylnaphthalene	ng/m ³	5.04	1.97	3.25E+00	4.46E+00	2.32E+00	3.16E+00	1.97E+00	5.04E+00	3.35E+00					
2-Methylnaphthalene	ng/m ³	8.04	2.95	5.42E+00	6.76E+00	3.66E+00	4.83E+00	2.95E+00	8.04E+00	5.39E+00					
Acenaphthene	ng/m ³	1.85E+00	4.00E-01	1.34E+00	1.85E+00	5.95E-01	1.11E+00	4.00E-01	1.85E+00	4.30E-01					
Acenaphthylene	ng/m ³	0.42	0.07	7.06E-02	1.16E-01	2.61E-01	1.06E-01	7.15E-02	4.24E-01	2.85E-01					
Anthracene	ng/m ³	0.12	0.07	7.06E-02	1.16E-01	7.08E-02	1.06E-01	7.15E-02	1.08E-01	6.99E-02					
Benzo(a)anthracene	ng/m ³	1.16E-01	6.99E-02	7.06E-02	1.16E-01	7.08E-02	1.06E-01	7.15E-02	1.08E-01	6.99E-02					
Benzo(a)fluorene	ng/m ³	2.33E-01	1.40E-01	1.41E-01	2.33E-01	1.42E-01	2.12E-01	1.43E-01	2.16E-01	1.40E-01					
Benzo(b)fluoranthene	ng/m ³	1.16E-01	6.99E-02	7.06E-02	1.16E-01	7.08E-02	1.06E-01	7.15E-02	1.08E-01	6.99E-02					
Benzo(b)fluorene	ng/m ³	2.33E-01	1.40E-01	1.41E-01	2.33E-01	1.42E-01	2.12E-01	1.43E-01	2.16E-01	1.40E-01					
Benzo(e)pyrene	ng/m ³	2.33E-01	1.40E-01	1.41E-01	2.33E-01	1.42E-01	2.12E-01	1.43E-01	2.16E-01	1.40E-01					
Benzo(g,h,i)perylene	ng/m ³	1.16E-01	6.99E-02	7.06E-02	1.16E-01	7.08E-02	1.06E-01	7.15E-02	1.08E-01	6.99E-02					
Benzo(k)fluoranthene	ng/m ³	1.16E-01	6.99E-02	7.06E-02	1.16E-01	7.08E-02	1.06E-01	7.15E-02	1.08E-01	6.99E-02					
Biphenyl	ng/m ³	3.35E+00	1.16E+00	1.16E+00	3.35E+00	1.16E+00	2.15E+00	1.32E+00	2.51E+00	2.07E+00					
Chrysene	ng/m ³	1.16E-01	6.99E-02	7.06E-02	1.16E-01	7.08E-02	1.06E-01	7.15E-02	1.08E-01	6.99E-02					
Dibenz(a,h)anthracene	ng/m ³	1.16E-01	6.99E-02	7.06E-02	1.16E-01	7.08E-02	1.06E-01	7.15E-02	1.08E-01	6.99E-02					
Dibenz(a,c)anthracene + Picene	ng/m ³	2.33E-01	1.40E-01	1.41E-01	2.33E-01	1.42E-01	2.12E-01	1.43E-01	2.16E-01	1.40E-01					
Fluoranthene	ng/m ³	7.53E-01	3.29E-01	4.52E-01	7.53E-01	3.29E-01	5.17E-01	3.43E-01	6.83E-01	6.34E-01					
Indeno(1,2,3-cd)pyrene	ng/m ³	1.16E-01	6.99E-02	7.06E-02	1.16E-01	7.08E-02	1.06E-01	7.15E-02	1.08E-01	6.99E-02					
Naphthalene	ng/m ³	36.9	12.30	1.37E+01	2.35E+01	1.23E+01	2.34E+01	1.24E+01	3.69E+01	2.14E+01					
o-Terphenyl	ng/m ³	2.33E-01	1.40E-01	1.41E-01	2.33E-01	1.42E-01	2.12E-01	1.43E-01	2.16E-01	1.40E-01					
Perylene	ng/m ³	2.33E-01	1.40E-01	1.41E-01	2.33E-01	1.42E-01	2.12E-01	1.43E-01	2.16E-01	1.40E-01					
Phenanthrene	ng/m ³	3.19E+00	1.14E+00	1.89E+00	3.19E+00	1.47E+00	1.62E+00	1.14E+00	1.88E+00	1.86E+00					
Pyrene	ng/m ³	4.39E-01	7.08E-02	2.43E-01	1.16E-01	7.08E-02	2.46E-01	2.57E-01	3.20E-01	4.39E-01					
Tetralin	ng/m ³	2.20E+00	9.35E-01	1.41E+00	2.20E+00	9.35E-01	1.75E+00	1.03E+00	1.58E+00	1.34E+00					
Total PAH	ng/m ³	6.03E+01	2.33E+01	3.04E+01	4.87E+01	2.45E+01	4.11E+01	2.33E+01	6.03E+01	3.86E+01					

Note:
RDL = Reportable Detection Limit

1. These parameters have not been subjected to Maxxam's standard validation process nor has it been accredited for the submitted matrix.

**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2017**

Appendix H Dioxins and Furans Data Summary
February 15, 2018

APPENDIX H DIOXINS AND FURANS DATA SUMMARY

Dioxins and Furans											
Crago Station		Crago			Crago			Crago			
Location		22/10/2017			15/11/2017			9/12/2017			
Date	dd/mm/yyyy										
Start Time	hh:mm	0:00			0:00			0:00			
Sample Duration	hours	23.61			24.05			23.81			
Technician		TZ			TZ			TZ			
Filter Number		FDI130-01			FJ4303-1			FOW817-01			
Maxxam ID		FIX016			FOT347			FTE293			
Maxxam Job #		B7NS347			B7P9966			B7S2445			
Total Volumetric Flow	Am ³ /sample	322.55			354.10			347.05			
Analytical Results	Units	Value	EDL	WHO ₂₀₀₅ TEF	Value	EDL	WHO ₂₀₀₅ TEF	Value	EDL	WHO ₂₀₀₅ TEF	
2,3,7,8-Tetra CDD *	pg	<3.1	3.1	1	<3.5	3.5	1	<3.5	3.5	1	
1,2,3,7,8-Penta CDD *	pg	<3.3	3.3	1	<3.5	3.5	1	<3.5	3.5	1	
1,2,3,4,7,8-Hexa CDD *	pg	<3.5	3.5	0.1	<3.8	3.8	0.1	<3.4	3.4	0.1	
1,2,3,6,7,8-Hexa CDD *	pg	<4.0 (1)	4.0	0.1	4.6	3.9	0.1	4.1	3.5	0.1	
1,2,3,7,8,9-Hexa CDD *	pg	<3.8 (1)	3.8	0.1	5.9	3.2	0.1	<3.1	3.1	0.1	
1,2,3,4,6,7,8-Hepta CDD *	pg	64.2	3.3	0.01	35.7	3.4	0.01	37.7	3.2	0.01	
Octa CDD *	pg	270	3.5	0.0003	113	3.4	0.0003	122	2.2	0.0003	
Total Tetra CDD *	pg	4.6	3.1		<3.5	3.5		<3.5	3.5		
Total Penta CDD *	pg	<3.3	3.3		<3.5	3.5		<4.2 (1)	4.2		
Total Hexa CDD *	pg	29.6	3.3		34.0	3.6		17.5	3.3		
Total Hepta CDD *	pg	142	3.3		73.9	3.4		79.6	3.2		
2,3,7,8-Tetra CDF **	pg	<3.2	3.2	0.1	3.7	3.5	0.1	<4.7	4.7	0.1	
1,2,3,7,8-Penta CDF **	pg	<3.6	3.6	0.03	<3.4	3.4	0.03	<3.1	3.1	0.03	
2,3,4,7,8-Penta CDF **	pg	<3.6	3.6	0.3	<3.4	3.4	0.3	<3.1	3.1	0.3	
1,2,3,4,7,8-Hexa CDF **	pg	<3.3	3.3	0.1	<3.3	3.3	0.1	5.5	3.1	0.1	
1,2,3,6,7,8-Hexa CDF **	pg	<3.2	3.2	0.1	<3.3	3.3	0.1	<3.0	3.0	0.1	
2,3,4,6,7,8-Hexa CDF **	pg	<3.6	3.6	0.1	<3.6	3.6	0.1	3.8	3.4	0.1	
1,2,3,7,8,9-Hexa CDF **	pg	<4.0	4.0	0.1	<3.5	3.5	0.1	<3.7	3.7	0.1	
1,2,3,4,6,7,8-Hepta CDF **	pg	12.6	2.9	0.01	5.3	3.0	0.01	17.3	2.9	0.01	
1,2,3,4,7,8,9-Hepta CDF **	pg	<3.9	3.9	0.01	<3.4	3.4	0.01	4.2	3.9	0.01	
Octa CDF **	pg	12.9	3.5	0.0003	8.8	3.5	0.0003	27.2	3.1	0.0003	
Total Tetra CDF **	pg	<3.2	3.2		3.7	3.3		8.8	3.1		
Total Penta CDF **	pg	<3.6	3.6		<3.4	3.4		8.9	3.1		
Total Hexa CDF **	pg	3.9	3.5		<3.4	3.4		13.8	3.3		
Total Hepta CDF **	pg	18.4	3.4		5.3	3.2		32.8	3.4		
Toxic Equivalency	pg										

Notes:
 * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan

Calculated Concentrations	Quarter 4			Crago	Crago	Crago
	Units	Maximum	Minimum	13	14	15
				22/10/2017	15/11/2017	9/12/2017
2,3,7,8-Tetra CDD *	pg/m ³	5.04E-03	4.81E-03	0.005	0.005	0.005
1,2,3,7,8-Penta CDD *	pg/m ³	5.12E-03	4.94E-03	0.005	0.005	0.005
1,2,3,4,7,8-Hexa CDD *	pg/m ³	5.43E-03	4.90E-03	0.005	0.005	0.005
1,2,3,6,7,8-Hexa CDD *	pg/m ³	1.30E-02	6.20E-03	0.006	0.013	0.012
1,2,3,7,8,9-Hexa CDD *	pg/m ³	1.67E-02	4.47E-03	0.006	0.017	0.004
1,2,3,4,6,7,8-Hepta CDD *	pg/m ³	1.99E-01	1.01E-01	0.199	0.101	0.109
Octa CDD *	pg/m ³	8.37E-01	3.19E-01	0.837	0.319	0.352
Total Tetra CDD *	pg/m ³	1.43E-02	4.94E-03	0.014	0.005	0.005
Total Penta CDD *	pg/m ³	6.05E-03	4.94E-03	0.005	0.005	0.006
Total Hexa CDD *	pg/m ³	9.60E-02	5.04E-02	0.092	0.096	0.050
Total Hepta CDD *	pg/m ³	4.40E-01	2.09E-01	0.440	0.209	0.229
2,3,7,8-Tetra CDF **	pg/m ³	1.04E-02	4.96E-03	0.005	0.010	0.007
1,2,3,7,8-Penta CDF **	pg/m ³	5.58E-03	4.47E-03	0.006	0.005	0.004
2,3,4,7,8-Penta CDF **	pg/m ³	5.58E-03	4.47E-03	0.006	0.005	0.004
1,2,3,4,7,8-Hexa CDF **	pg/m ³	1.58E-02	4.66E-03	0.005	0.005	0.016
1,2,3,6,7,8-Hexa CDF **	pg/m ³	4.94E-03	4.32E-03	0.005	0.005	0.004
2,3,4,6,7,8-Hexa CDF **	pg/m ³	1.09E-02	5.08E-03	0.006	0.005	0.011
1,2,3,7,8,9-Hexa CDF **	pg/m ³	6.20E-03	4.94E-03	0.006	0.005	0.005
1,2,3,4,6,7,8-Hepta CDF **	pg/m ³	4.98E-02	1.50E-02	0.039	0.015	0.050
1,2,3,4,7,8,9-Hepta CDF **	pg/m ³	1.21E-02	4.80E-03	0.006	0.005	0.012
Octa CDF **	pg/m ³	7.84E-02	2.49E-02	0.040	0.025	0.078
Total Tetra CDF **	pg/m ³	2.54E-02	4.96E-03	0.005	0.010	0.025
Total Penta CDF **	pg/m ³	2.56E-02	4.80E-03	0.006	0.005	0.026
Total Hexa CDF **	pg/m ³	3.98E-02	4.80E-03	0.012	0.005	0.040
Total Hepta CDF **	pg/m ³	9.45E-02	1.50E-02	0.057	0.015	0.095
Toxic Equivalency	pg/m ³					
TOTAL TOXIC EQUIVALENCY	pg TEQ/m ³	1.98E-02	1.89E-02	0.019	0.019	0.020
Calculated TEQ Concentrations	Units	Crago			Crago	Crago
		22/10/2017			15/11/2017	09/12/2017
2,3,7,8-Tetra CDD *	pg TEQ/m ³			0.005	0.005	0.005
1,2,3,7,8-Penta CDD *	pg TEQ/m ³			0.005	0.005	0.005
1,2,3,4,7,8-Hexa CDD *	pg TEQ/m ³			0.0005	0.0005	0.0005
1,2,3,6,7,8-Hexa CDD *	pg TEQ/m ³			0.0006	0.0013	0.0012
1,2,3,7,8,9-Hexa CDD *	pg TEQ/m ³			0.0006	0.0017	0.0004
1,2,3,4,6,7,8-Hepta CDD *	pg TEQ/m ³			0.0020	0.0010	0.0011
Octa CDD *	pg TEQ/m ³			0.00025	0.00010	0.00011
Total Tetra CDD *	pg TEQ/m ³					
Total Penta CDD *	pg TEQ/m ³					
Total Hexa CDD *	pg TEQ/m ³					
Total Hepta CDD *	pg TEQ/m ³					
2,3,7,8-Tetra CDF **	pg TEQ/m ³			0.0005	0.0010	0.0007
1,2,3,7,8-Penta CDF **	pg TEQ/m ³			0.0002	0.0001	0.0001
2,3,4,7,8-Penta CDF **	pg TEQ/m ³			0.002	0.001	0.001
1,2,3,4,7,8-Hexa CDF **	pg TEQ/m ³			0.0005	0.0005	0.0016
1,2,3,6,7,8-Hexa CDF **	pg TEQ/m ³			0.0005	0.0005	0.0004
2,3,4,6,7,8-Hexa CDF **	pg TEQ/m ³			0.0006	0.0005	0.0011
1,2,3,7,8,9-Hexa CDF **	pg TEQ/m ³			0.0006	0.0005	0.0005
1,2,3,4,6,7,8-Hepta CDF **	pg TEQ/m ³			0.00039	0.00015	0.00050
1,2,3,4,7,8,9-Hepta CDF **	pg TEQ/m ³			0.00006	0.00005	0.00012
Octa CDF **	pg TEQ/m ³			0.000012	0.000007	0.000024
Total Tetra CDF **	pg TEQ/m ³					
Total Penta CDF **	pg TEQ/m ³					
Total Hexa CDF **	pg TEQ/m ³					
Total Hepta CDF **	pg TEQ/m ³					
TOTAL TOXIC EQUIVALENCY	pg TEQ/m ³			0.019	0.019	0.020

Notes:
 EDL = Estimated Detection Limit
 * CDD = Chloro Dibenzo-p-Dioxin, ** CDF = Chloro Dibenzo-p-Furan
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
 (a) The sample from July 18, 2017 was re-analyzed by the laboratory as the initial laboratory result was equal to the MOECC Dioxin and Furan Criteria of 0.1 pg TEQ/m³. Following standard practice, the average of the two analyses results was used in data analysis.