



2017 Annual Report



Western Yellowhead
Air Management Zone

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List of Terms and Definitions

24-hour	A calendar day, average is calculated midnight-to-midnight
8-hour	8-hour running average for O ₃ Canada-Wide Standards
AQHI	Air Quality Health Index
AQI	Air Quality Index
AQMS	Air Quality Management System
CAAQS	Canadian Ambient Air Quality Standard
Calm	1-hour average wind speed lower than 1 km/hour
CCME	Canadian Council of Ministers for the Environment
CO	Carbon monoxide
H ₂ S	Hydrogen sulphide
NAPS	National Air Pollution Surveillance Program
NO ₂	Nitrogen dioxide
NO	Nitric oxide
NO _x	Oxides of nitrogen
O ₃	Ozone
PM _{2.5}	Particulate matter with aerodynamic diameter less than 2.5 µm, referred to as fine or respirable particles
RH	Relative humidity
SAAQS	Saskatchewan Ambient Air Quality Standards
SO ₂	Sulphur dioxide
WD	Wind direction
WS	Wind speed

Units of Measurement

m	meters
m/s	meters per second
km/hr	kilometers per hour
µg/m ³	micrograms per cubic meter
ppb	parts per billion by volume
°C	degrees Celsius
%	percent (relative humidity, instrument uptime, etc.)
Deg	angle of wind direction from the north

MESSAGE FROM THE EXECUTIVE DIRECTOR

2017 was an excellent year for Western Yellowhead Air Management Zone (WYAMZ) and for air quality monitoring in the western Yellowhead region of Saskatchewan. WYAMZ is very pleased to inform our members that seven (7) continuous air monitoring sites recording criteria air contaminant measurements are now operating in the region and providing real time data. Four of these stations are operated by WYAMZ. We also have the data from the two air monitoring stations operated and independently calibrated by Husky and the data from the National Air Pollution Surveillance Program (NAPS) Station in Saskatoon. We are exploring every opportunity to collaborate with other agencies in bringing additional monitoring into the region.

This monitoring initiative is multi-purpose it: a) collects real time air quality data throughout the WYAMZ region, b) demonstrates companies are operating in a safe, environmentally sound manner that is enabling sustainable growth, and c) provides data to companies considering investment in Saskatchewan operations that show it is a safe place to invest, being that the air quality is well understood and not an impediment to growth. The credibility and strength of the continuous monitoring network is scientifically and financially sound. The continuous data is available live on the internet; it includes hourly concentrations of SO₂, H₂S, NO/NO₂/NO_x, PM_{2.5} and O₃ as well as meteorological data at about two metres above the ground. The data is available on the WYAMZ website at www.wyamz.ca.

After reviewing the past three years of meteorological and ambient air quality data, the WYAMZ Science Committee has made a decision that two of the existing monitoring stations have provided enough relevant data for those areas and can provide additional useful data if they were relocated in communities. The Kindersley airpointer was moved to the Town of Kerrobert on November 20, 2017. The Meadow Lake airpointer will be moved from the Cabana Pasture into the City of Meadow Lake in the spring of 2018.

After an extensive review of our communication strategy our Communication Committee has worked with YasTech Developments Inc. to redesign our website (www.wyamz.ca). It has a new look and easy to access Dashboard reports. Also, monthly quality assured data for each station since July of 2015 is available. There is also a search function that allows visitors to access raw data for the past 120 days at any of the airpointers. The new website is connected to Facebook to allow for better communication opportunities for our members and the public. Real-time air monitoring data can be seen at www.wyamz.ca. Real time and long-term historical data that can be used to evaluate future development scenarios can be obtained from WYAMZ by request.

We have and are continuing to communicate the work we do in many ways. When we do a presentation or place an article or a story in a newspaper we highlight our members wherever possible. We list our members on our website and do as much as we can to inform the public the names of our member companies. This communication work is very important to WYAMZ and to its members.

Some of our recent and upcoming communication initiatives include:

- CBC Radio, Saskatoon Star Phoenix, Lloydminster Meridian Booster interviews, Jan 2014
- Air Symposium in concert with SEIMA, Saskatoon Jan 2014
- Clean Air Day newspaper Campaign, Leader Post and Star Phoenix, Wednesday June 4, 2014
- The Lloydminster Heavy Oil Show, Lloydminster September of 2014 and 2016. This once again provided us with an excellent showcase to inform the public of the work we do and highlight the names of our members and their participation in transparent reporting of air quality. We will maintain our booth at the 2018 Lloydminster Heavy Oil Show.
- Saskatchewan Association of Rural Municipalities (SARM) the Councillor Newsletter Article
- In 2016 the WYAMZ Communications Committee and Board of Directors worked with a communications consultant to review our communications strategy, review our website and has begun to utilize social media such as Facebook in 2017.
- WYAMZ had a booth in April of 2017 at the Saskatchewan Environmental Society's "Living Green Expo" held at Prairie Land Park in Saskatoon. It was an excellent opportunity to showcase the work we do. We will attend again in 2018.

All of these showcase the work we do and our members' involvement. Future plans include determining the need for additional air monitoring stations, development of more communication materials, presentations to municipalities, Chambers of Commerce, high school classes, School Community Council meetings, etc.

WYAMZ is pleased with the excellent response we received from our members. We have had a very good year financially and with our data monitoring capabilities. This is excellent news for the people of the western Yellowhead area of Saskatchewan and for all of our valued members. We now have data to help inform our decision making process. The Science committee will review all of this data and bring recommendations to the Board as to how we should proceed with managing our monitoring capabilities. The data will direct our decisions as to how to improve our monitoring network.

Our objective is to collaboratively identify local air quality issues, and to develop and operate appropriate monitoring programs. Through diverse stakeholder representation WYAMZ recognizes concerns specific to the region, and encourages solutions that are tailored to address the needs of its members. Our goal is to collect credible and defensible air quality data and provide excellent service to our members. WYAMZ thanks all of our members for their participation.

EXECUTIVE SUMMARY

The Western Yellowhead Air Management Zone (WYAMZ), established in 2012, was the second air management association operating in Saskatchewan. WYAMZ is a collaborative group of industry, government, non-government organizations, and private citizens. The WYAMZ design is in-line with the directive from the Canadian Council of Ministers of the Environment under the Canada-wide Air Quality Management System. The association is designed to collect credible, continuous real-time air quality information through collaborative efforts.

WYAMZ manages a continuous air monitoring network. The network consists of four airpointer® compact air monitoring stations near Kerrobert, Maidstone, Meadow Lake and Unity. The Kerrobert station was originally located at Kindersley, but was moved to Kerrobert on November 20, 2017. Two additional stations, located near Lloydminster, are operated by Husky Energy and provide data to WYAMZ. The stations measure real-time data, including hourly concentrations of sulphur dioxide (SO₂), hydrogen sulphide (H₂S), nitrogen oxides (NO/NO₂/NO_x), fine particulate matter (PM_{2.5}) and ozone (O₃), as well as precipitation, ambient temperature, relative humidity (RH), wind speed (WS) and wind direction (WD). The data can be viewed on the WYAMZ website (Reference 1).

Quarterly calibrations and routine maintenance were performed in accordance with a Quality Assurance Plan provided to WYAMZ by contractors responsible for the maintenance, calibration and data management for the airshed. Calibrations were performed in March, June, August and December of 2017.

The measured air quality was within the Saskatchewan Ambient Air Quality Standards (SAAQS) (Reference 2), with the exception of H₂S and PM_{2.5}. There were a total of 25 exceedance events for 1-hour average H₂S, 3 exceedance events for 24-hour average H₂S, and 15 exceedance events for 24-hour average PM_{2.5}. The air quality within the WYAMZ network was rated Low Risk or Good for more than 96% of the time according to the Air Quality Health Index-rated station and the Air Quality Index-rated stations.

Annual average concentrations for the monitored parameters at each station are contained in Table ES-1. Detailed monthly and annual instrument uptimes can be found in the station summary tables in Appendices B-E.

Table ES-1 Annual Average Concentrations for Continuous Parameters for 2017

Pollutant	Conc. Unit	Annual Average Concentrations for Continuous Data				
		Meadow Lake	Maidstone	Unity	Kindersley ^b	Kerrobert ^c
SO ₂	ppb	^a	0.4	^a	0.2	0.3
H ₂ S	ppb	^a	0.5	^a	0.4	0.3
NO	ppb	0.2	0.8	0.5	^a	^a
NO ₂	ppb	0.9	3.6	1.8	^a	^a
NO _x	ppb	1.2	4.3	2.3	^a	^a
O ₃	ppb	29.0	^a	26.6 ^d	^a	^a
PM _{2.5}	µg/m ³	5.2	5.5	6.9	6.7	3.6

^a Parameter was not monitored

^b Data from January 1 to November 20

^c Data from November 20 to December 31

^d Data from July 3 to October 27

1 INTRODUCTION

1.1 History

The Western Yellowhead Air Management Zone (WYAMZ) is a collaborative group of industry, non-government organizations, government and private citizens. WYAMZ was established in 2012 with a mandate to collect credible, scientifically defensible air quality data and to make this data available to the public. Figure 1 illustrates the WYAMZ area which covers the west central region of the province. The air management zone encompasses an area from east of Saskatoon to the Alberta border, and from north of Meadow Lake to south of Rosetown. Major economic activities in the region include agriculture, oil and gas, mining, power generation, and transportation.

Membership in WYAMZ is currently voluntary. The current membership includes members of the agriculture, chemical, oil and gas, mining and power generation sectors, as well as the public. The Government of Saskatchewan Ministry of Environment and Ministry of Energy and Resources, as well as representatives of the City of Saskatoon, University of Saskatchewan, Prairie North Regional Health Authority and the Saskatchewan Environmental Society also participate as members of the Board of Directors. WYAMZ's budget consists of membership fees, environmental footprint, and emissions-based fees assessed to facilities operating within the air management zone.

1.2 WYAMZ Mission

The WYAMZ mission is to collect credible, scientifically defensible air quality data for west central Saskatchewan, and to make this data freely available to all stakeholders. The objective is to bring together stakeholders from all backgrounds to identify significant air quality issues and to develop innovative solutions for managing these issues.

1.3 WYAMZ Air Monitoring Network

Figure 1 illustrates the locations of the air monitoring stations in the WYAMZ region. Real-time data for these stations is available through the WYAMZ website or the Saskatchewan Ministry of Environment. There are six continuous air monitoring stations in the region that report data to WYAMZ: the Kerrobert, Maidstone, Meadow Lake, and Unity airpointer® stations are owned and operated by WYAMZ and have been operating since December 1, 2013. The Kerrobert station was originally located at Kindersley and was moved on November 20, 2017. The Lloydminster East and Lloydminster West stations are owned and operated by Husky Energy.

The network measures continuous data for SO₂, H₂S, NO and NO₂ (collectively NO_x), O₃, PM_{2.5}, ambient temperature, RH, precipitation, WS and WD. Table 1 shows the measured parameters at each station. Please note, climatic factors presented in this report have not been calibrated. Publically available real-time air monitoring data is available on the WYAMZ website at www.wyamz.ca.

Table 1 WYAMZ Monitoring Stations and Measurement Parameters

Monitoring Parameter	Continuous Air Quality Parameters Measured in the WYAMZ Network			
	Meadow Lake	Maidstone	Unity	Kindersley/ Kerrobert
SO ₂		✓		✓
H ₂ S		✓		✓
NO	✓	✓	✓	
NO ₂	✓	✓	✓	
NO _x	✓	✓	✓	
O ₃	✓		✓	
PM _{2.5}	✓	✓	✓	✓
Precipitation	✓	✓	✓	✓
Ambient Temperature	✓	✓	✓	✓
Relative Humidity	✓	✓	✓	✓
Wind Speed	✓	✓	✓	✓
Wind Direction	✓	✓	✓	✓

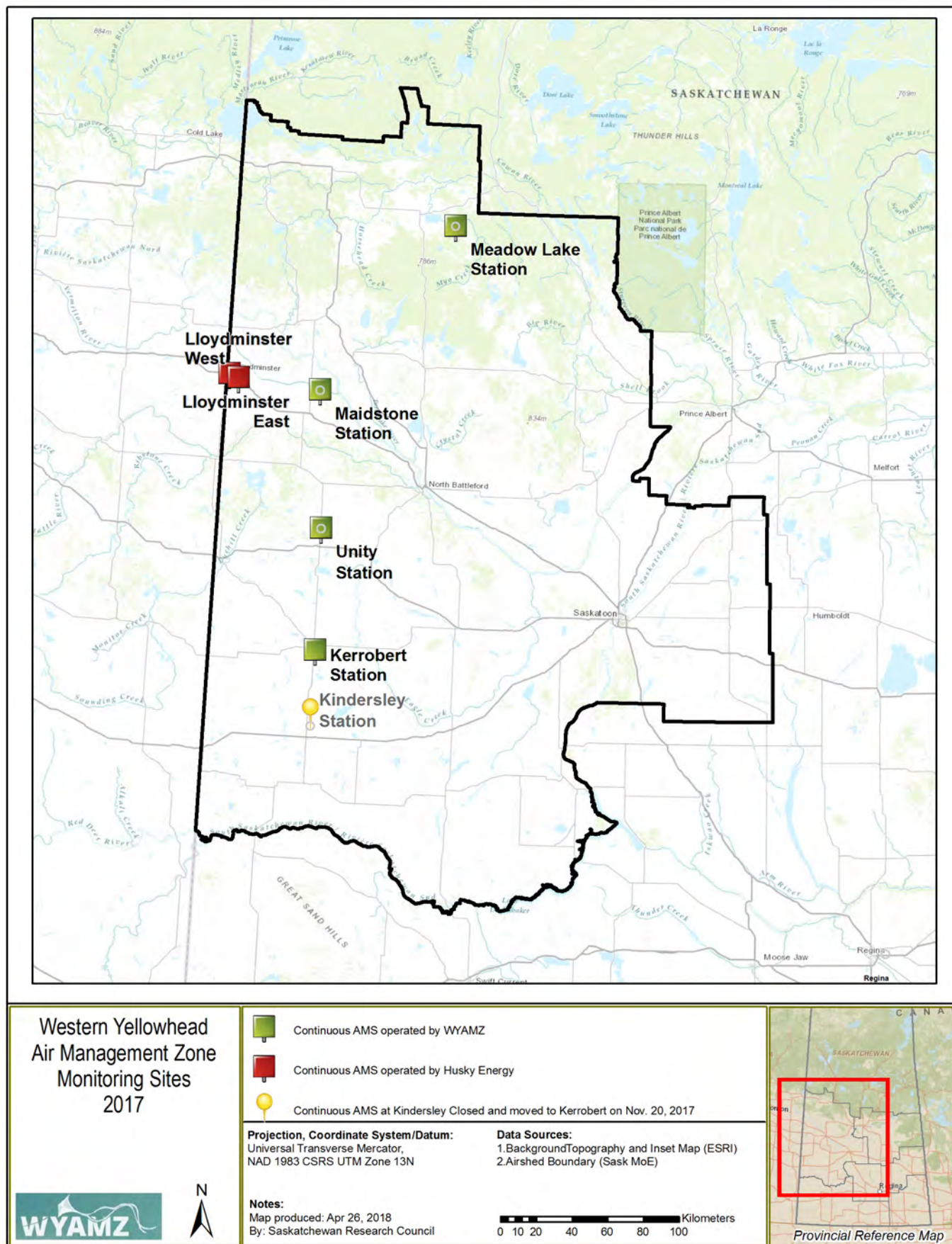


Figure 1 Ambient air monitoring sites of WYAMZ

2 AIR QUALITY MONITORING

2.1 Exceedances above the SAAQS

The WYAMZ ambient air monitoring network measures air pollutant concentrations to indicate the general quality of air in the management zone. Comparing measured air quality data with the Saskatchewan Ambient Air Quality Standards (SAAQS) and Federal guidelines ensures public and environmental health is not impaired. Air quality data is used to evaluate the trends in air quality resulting from emissions of anthropogenic sources (industry, motor vehicles, etc.) and natural processes (such as forest fires, decomposition of organic matter, etc.).

Table 2 summarizes the SAAQS and the number of exceedances recorded in 2017. Twenty-five exceedance events over a total of nine days occurred for 1-hour average H₂S, three exceedance events for 24-hour average H₂S and fifteen exceedance events for 24-hour average PM_{2.5} were recorded for the WYAMZ air monitoring network.

Table 2 Summary of Exceedances in 2017

Parameter	No. of Stations Showing Exceedances	Average Type	SAAQS (ppb)	No. of Exceedances
SO ₂	0	1-hour	172	0
	0	24-hour	48	0
	0	Annual	8	0
H ₂ S	1	1-hour	11	25
	1	24-hour	3.6	3
NO ₂	0	1-hour	159	0
	0	24-hour	106	0
	0	Annual	24	0
O ₃	0	1-hour	82	0
	0	8-hour	63	0
PM _{2.5}	4	24-hour	28 µg/m ³	15
	0	Annual	10 µg/m ³	0

2.1.1 Canadian Ambient Air Quality Standards

Under the Air Quality Management System (AQMS), the Canadian Council of Ministers of the Environment (CCME) established air quality standards for fine particulate matter and ground-level ozone (Reference 3). The air quality standards were established as objectives under sections 54 and 55 of the Canadian Environmental Protection Act, 1999 on May 25, 2013. The provinces and territories, with the exception of Quebec, are required to implement actions to achieve the air quality standards to ensure that the air quality objectives are met.

As a part of the continuing implementation of the AQMS, in 2017 the CCME announced new Canadian Ambient Air Quality Standards (CAAQS) that will drive the improvement of air quality across the country. Updated standards for SO₂ were published in the Canada Gazette in October of 2017 (Reference 4), while new standards for NO₂ were published in December of 2017 (Reference 5). Table 3 summarizes the current CAAQS and future changes to the standards planned for 2020 and 2025 (Reference 6).

Table 3 Canadian Ambient Air Quality Standards (CAAQS)

Pollutants	Averaging Time	Numerical Value			Statistical Form
		2015	2020	2025	
Fine Particulate Matter (PM _{2.5})	24-hour	28 µg/m ³	27 µg/m ³		The 3-year average of the 98 th percentile of the daily 24-hour average concentrations.
	Annual	10.0 µg/m ³	8.8 µg/m ³		The 3-year average of the annual average of all 1-hour concentrations
Ozone (O ₃)	8-hour	63 ppb	62 ppb		The 3-year average of the annual 4 th highest daily 8-hour average concentrations
Sulphur Dioxide (SO ₂)	1-hour	-	70 ppb	65 ppb	The 3-year average of the annual 99 th percentile of the SO ₂ daily maximum 1-hour average concentrations
	Annual	-	5.0 ppb	4.0 ppb	The average over a single calendar year of all 1-hour average concentrations
Nitrogen Dioxide (NO ₂)	1-hour	-	60 ppb	42 ppb	The 3-year average of the annual 98 th percentile of the daily maximum 1-hour average concentrations
	Annual	-	17.0 ppb	12.0 ppb	The average over a single calendar year of all 1-hour average concentrations

2.2 Wind Speed and Direction

Wind speed and wind direction, as well as other meteorological parameters, are important factors that influence regional air quality. The diffusion and dispersion of air pollutant emissions are greatly impacted by variations in wind speed and corresponding air turbulence. Different degrees of turbulence are created by variable mixing conditions due to the vertical gradient of ambient temperatures and terrain roughness unique to each station.

According to the Beaufort Wind Scale (Reference 7), prevailing wind primarily consisted of Light Air (≤ 5.0 km/hr or 1.4 m/s), Light Breeze (< 11 km/hr or 3.1 m/s), and Gentle to Moderate Breeze (< 28 km/hr or 7.8 m/s). Fresh to Strong breezes (> 28 km/hr or 7.8 m/s) were recorded at the Kindersley station, for 24.9% of time. The frequency of Calm wind (< 1 km/hr or 0.3 m/s) ranged from 0.0% (Kindersley) to 1.7% (Unity). Figure 2 shows the wind roses at the WYAMZ continuous monitoring stations for 2017 using a modified Beaufort Wind Scale, with wind categories of 0-5, 5-19, 19-39, 39-61, and > 61 km/hr.

The prevailing wind direction was not consistent among the four air monitoring stations. The Meadow Lake station was characterized with winds from the southwest and southeast quadrants. Maidstone and Unity stations were characterized with a prevalent wind from the northwest quadrant and southeast quadrant. Kindersley station reported stronger winds than reported at the other station from all directions, with somewhat more prevalent winds coming from the southeast and northwest quadrant.

The height of the meteorological towers at each station is approximately 2-3 m. This accounts for the lighter winds reported in comparison to Environment and Climate Change Canada, where the towers are set at 10 m high.

The detailed frequency distribution table and wind roses are presented in the Appendices: Table B-8, Table C-8, Table D-11, Table E-10 and Table F-10.

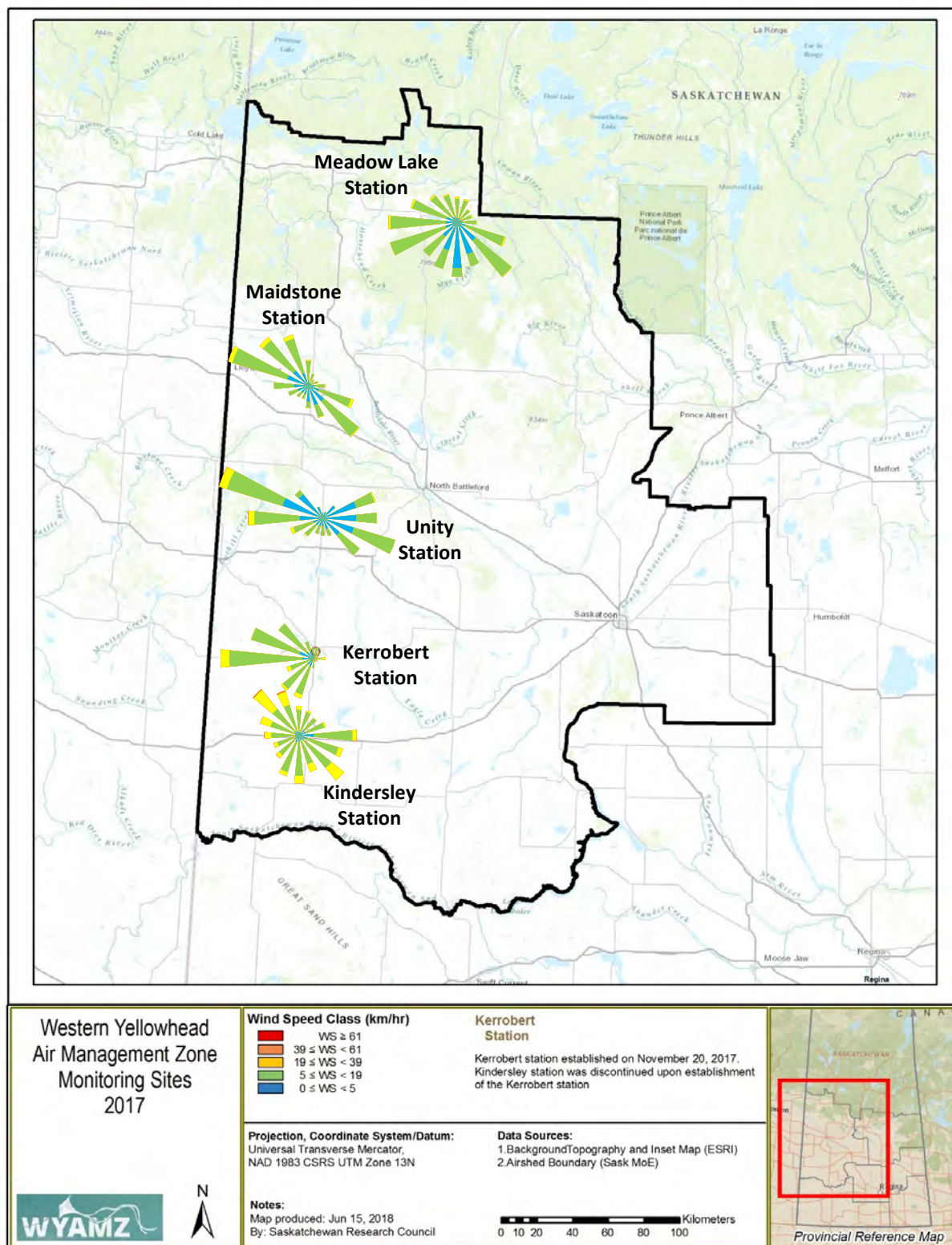


Figure 2 Wind Roses for 1-Hour Average Wind Data for 2017

2.3 Continuous Air Quality Data

2.3.1 Sulphur Dioxide (SO₂)

SO₂ is a colourless gas with a pungent irritating odour at high concentrations. At concentrations above 300 ppb, it can be detected by taste and odour. Short-term exposures to SO₂ can harm the respiratory system and make breathing difficult (Reference 8). SO₂ affects sensitive individuals with pre-existing respiratory conditions such as asthma or bronchitis. At high concentrations, gaseous SO₂ can harm trees and plants by damaging foliage and decreasing growth.

SO₂ along with nitrogen oxides are the main precursors of acid rain, which contributes to the acidification of lakes and streams, accelerated corrosion of buildings, and reduced visibility. SO₂ in the air may deposit onto surfaces (water bodies, vegetation, buildings) quickly or may react during atmospheric transport to form larger particles that can be harmful to human health (Reference 9).

Anthropogenic SO₂ emission sources are primarily from combustion of sulphur-containing fuels (e.g., gasoline, natural gas and coal) and processing of sulphur-containing ores. The major emission sources for SO₂ include large industrial sources (e.g., power plants, petroleum refineries, iron and steel mills, fertilizer plants, pulp and paper mills, smelters) as well as small industries (e.g., small oil and gas plants, battery and well flares).

Table 4 presents the summary statistics for SO₂ measurement results. The measured concentration was low at all stations. The annual average concentration was 0.4 ppb and 0.2 ppb at the Maidstone and Kindersley stations, respectively. The average concentration from November 20 to December 31 at Kerrobert was 0.3 ppb. The maximum 1-hour average concentration of 9.4 ppb and the maximum 24-hour average concentration of 2.6 ppb were detected at the Maidstone station. There was no exceedance of the SAAQS for 1-hour, 24-hour, and annual average concentrations (see Table 5).

Figures 3 to 5 present the pollutant roses for 1-hour average concentration for SO₂. The highest category (shown as purple) represents the SAAQS 1-hr exceedance limit. For more than 99% of the time, SO₂ concentration was less than or equal to 1 ppb (blue petals) at the Kindersley and Kerrobert station. The SO₂ concentration was less than or equal to 5 ppb 99.9% of the time at the Maidstone station. No obvious pattern exists that indicates a stronger contribution of SO₂ from a particular direction.

The detailed frequency distribution tables for the pollutant roses are presented in the Appendices: Table B-2, Table C-2 and Table D-2.

Table 4 Summary of Statistics for SO₂ Measurement Results for 2017

Monitoring Station	Annual Average	Annual Instrument Uptime	Maximum SO ₂ Conc. and Occurrence Time			
	ppb	%	1-Hr Max		24-Hr Max	
Maidstone	0.4	90.1	9.4	1/7/2017 03:00	2.6	1/7/2017
Kerrobert ^a	0.3	10.5	1.3	12/8/2017 22:00	0.7	12/9/2017
Kindersley ^b	0.2	84.1	1.9	9/9/2017 14:00	0.9	2/8/2017

^aData from January 1 to November 20

^bData from November 20 to December 31

Table 5 Number of Exceedance Events for SO₂ in 2017

Monitoring Station	Number of Exceedance Events for Saskatchewan SO ₂ Ambient Air Quality Standard (SAAQS)		
	1-hr SAAQS (172 ppb)	24-hr SAAQS (48 ppb)	Annual SAAQS (8 ppb)
Maidstone	0	0	0
Kerrobert ^a	0	0	0
Kindersley ^b	0	0	0

^aData from January 1 to November 20

^bData from November 20 to December 31

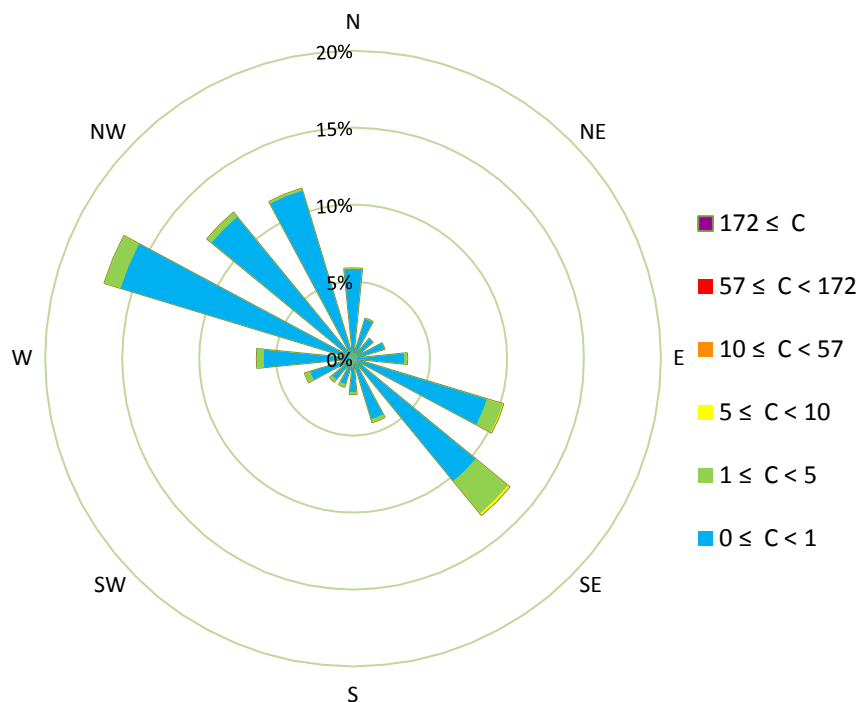


Figure 3 Pollutant Rose for 1-Hour Average SO₂ Data at Maidstone Station (ppb)

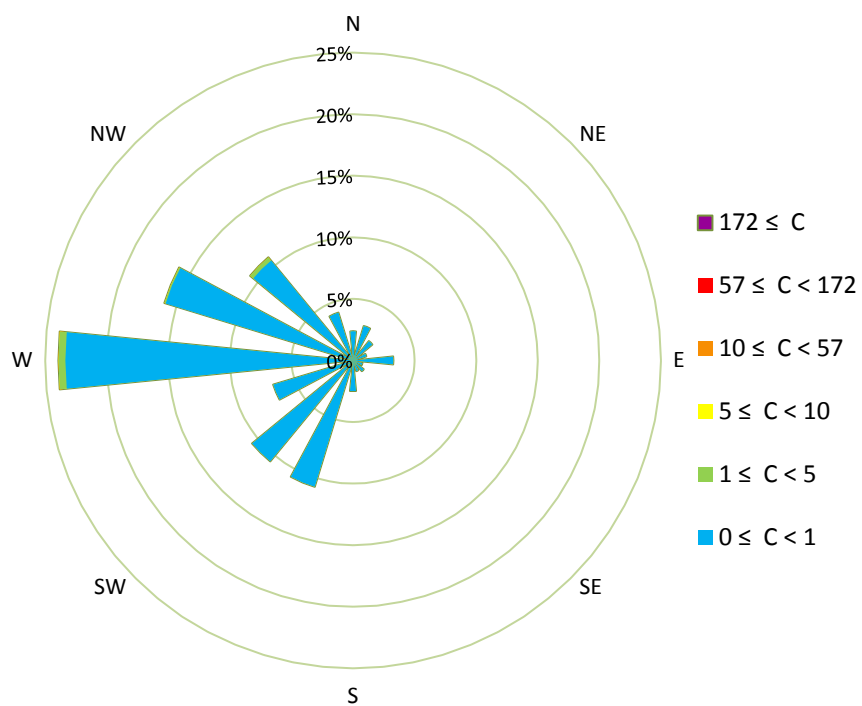


Figure 4 Pollutant Rose for 1-Hour Average SO₂ Data at Kerrobert Station (ppb)

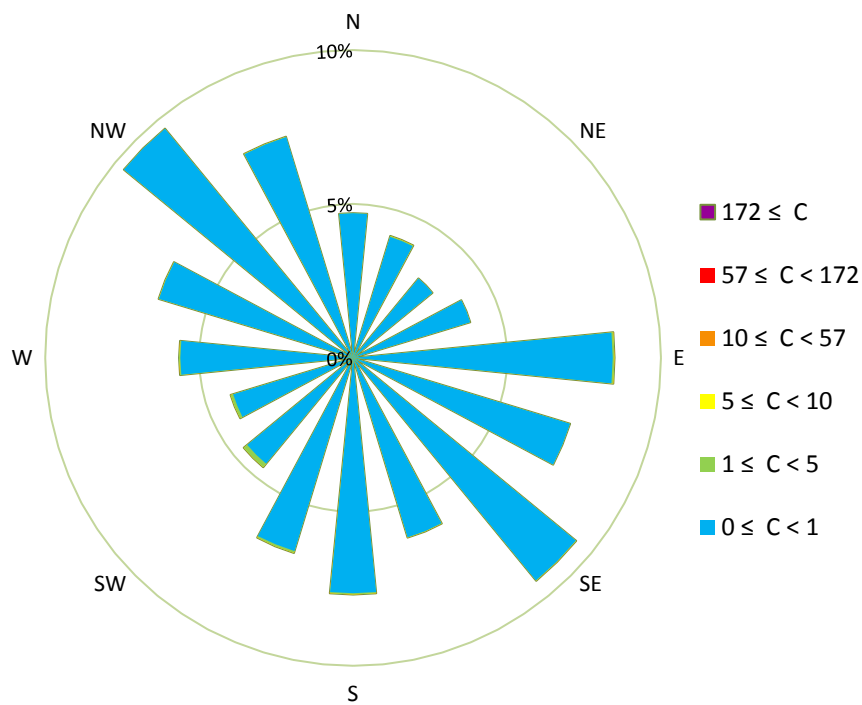


Figure 5 Pollutant Rose for 1-Hour Average SO₂ Data at Kindersley Station (ppb)

2.3.2 Hydrogen Sulphide (H₂S)

H₂S is a colourless gas with a characteristic “rotten egg” odour. It is produced both naturally and through anthropogenic emission sources. H₂S occurs naturally in coal, crude oil, natural gas, sulphur hot springs, volcanic gases, sloughs, swamps and lakes. The major anthropogenic emission sources include natural gas and petroleum production, wastewater treatment, pulp and paper mills, rayon textile manufacturing, and tar and asphalt manufacturing.

Decomposition of organic matter by bacteria under anaerobic conditions releases H₂S as well, forming the characteristic odour commonly associated with sewers, sewage lagoons, and swamps.

H₂S is highly toxic and flammable at high concentrations. It is heavier than air and tends to accumulate at the bottom of poorly ventilated spaces and in low-lying topography. Exposure to H₂S can have serious health impacts at various concentrations. Although very pungent at first, it quickly deadens the sense of smell at concentrations of 100,000-200,000 ppb (Reference 10). Potential victims of H₂S poisoning may be unaware of its presence until it is too late.

Table 6 presents the summary statistics for H₂S measurement results. The measured concentration was low at all stations; the annual average concentration was 0.5 ppb and 0.4 ppb at the Maidstone and Kindersley stations, respectively. The average concentration at the Kerrobert location from November 20 to December 31 was 0.3 ppb. The maximum 1-hour average concentration of 29.1 ppb and the maximum 24-hour average concentration of 5.8 ppb were both measured at the Maidstone station. There were 25 exceedances of the SAAQS for 1-hour average concentration and 3 exceedances for the 24-hour concentration at the Maidstone station (see Table 7).

Figures 6 to 8 present the pollutant roses for 1-hour average H₂S. The highest category (shown as purple) represents the SAAQS 1-hr exceedance limit. For more than 91% of time, the H₂S concentration was less than or equal to 1 ppb (blue petals) at the Maidstone station, and below 3.6 ppb more than 98% of the time. The H₂S concentration was less than or equal to 1 ppb more than 97% of the time at the Kindersley station and for 100% of the time at the Kerrobert station from November 20 to the end of the year.

The detailed frequency distribution tables for the pollutant roses are presented in the Appendices: Table B-3, Table C-3 and Table D-6.

Table 6 Summary of Statistics for H₂S Measurement Results for 2017

Monitoring Station	Annual Average	Annual Instrument Uptime	Maximum H ₂ S Conc. and Occurrence Time			
	ppb	%	1-Hr Max		24-Hr Max	
Maidstone	0.5	89.9	29.1	7/26/2017 06:00	5.8	7/17/2017
Kerrobert ^a	0.3	10.2	0.7	11/25/2017 00:00	0.5	11/24/2017
Kindersley ^b	0.4	73.0	8.4	7/7/2017 04:00	1.2	7/7/2017

^aData from January 1 to November 20

^bData from November 20 to December 31

Table 7 Number of Exceedance Events for H₂S in 2017

Monitoring Station	Number of Exceedance Events for Saskatchewan H ₂ S Ambient Air Quality Standard (SAAQS)	
	1-hr SAAQS	24-hr SAAQS
	(11 ppb)	(3.6 ppb)
Maidstone	25	3
Kerrobert ^a	0	0
Kindersley ^b	0	0

^aData from January 1 to November 20

^bData from November 20 to December 31

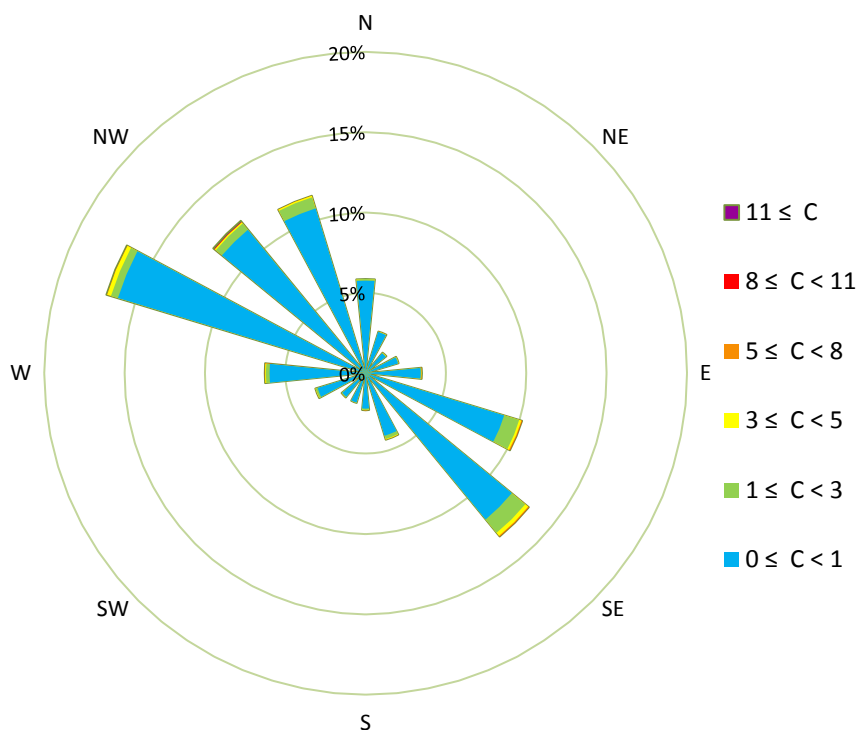


Figure 6 Pollutant Rose for 1-Hour Average H₂S Data at Maidstone Station (ppb)

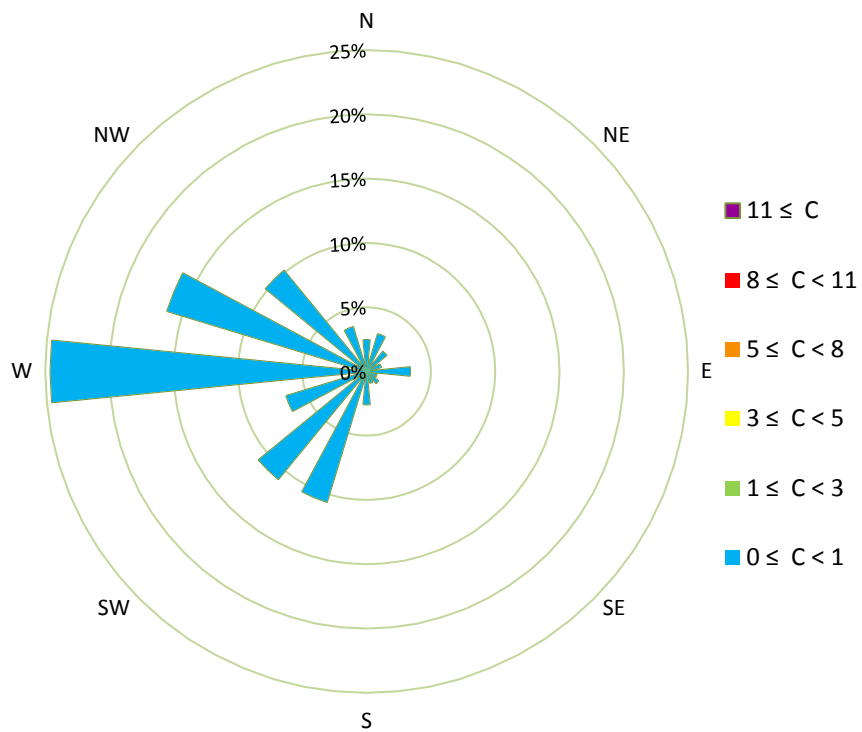


Figure 7 Pollutant Rose for 1-Hour Average H₂S Data at Kerrobert Station (ppb)

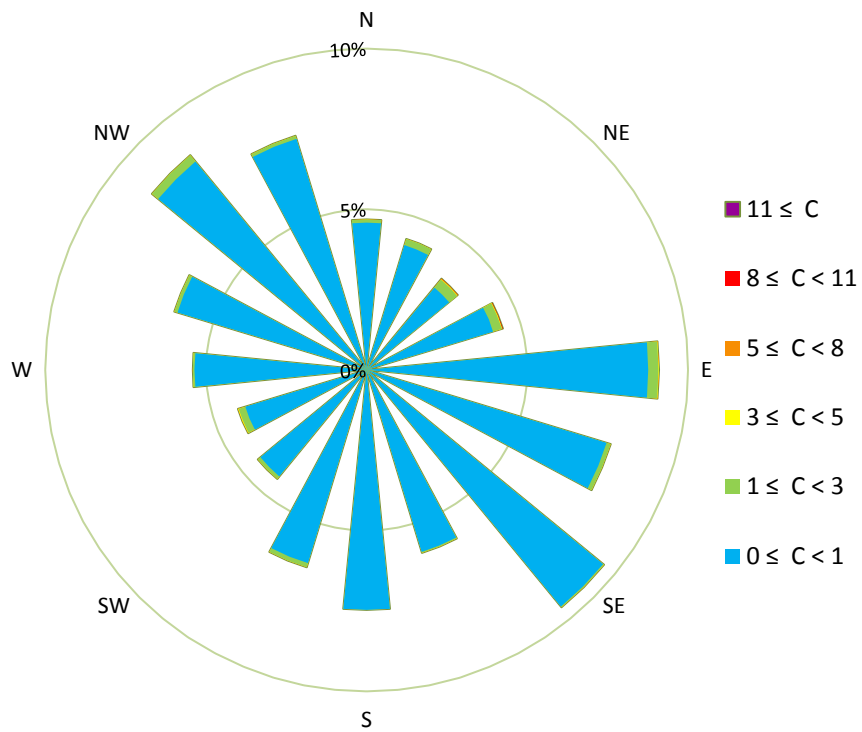


Figure 8 Pollutant Rose for 1-Hour Average H₂S Data at Kindersley Station (ppb)

2.3.3 Nitrogen Dioxide (NO₂)

Nitrogen oxides, also known as oxides of nitrogen (NO_x), is a collective term for NO and NO₂. NO is a colorless gas with a slight odour. NO₂ is a reddish brown, non-flammable gas with a pungent irritating odour. NO₂ is of more interest than NO from both a health and acid rain perspective.

Both NO₂ in its untransformed state, and the acid and nitrate transformation products of NO₂, can have adverse effects on human health or the environment. NO₂ itself can cause adverse effects on respiratory systems of humans and animals and damage to vegetation. When NO₂ is transformed into nitrate particles that are subsequently deposited on aquatic and terrestrial ecosystems, acidification can result. NO₂ is one of the primary contributing pollutants to the formation of ground-level ozone (Reference 11).

NO_x emissions are mainly produced by fossil fuel combustion. High temperature conditions during combustion result in the formation of NO_x as a by-product. NO emitted during combustion quickly oxidizes to NO₂ in the atmosphere (Reference 12). The major anthropogenic emission sources for NO_x are associated with fuel combustion, including both stationary (e.g., power plants, oil & gas operations, incinerators) and mobile (e.g., automobiles and trains) sources and residential heating. Non-combustion sources (e.g., nitric acid manufacture, welding processes, and use of explosives) comprise the smaller emission sources. In large cities, motor vehicle emissions are the major source of NO_x, as well as space heating emissions in the winter. The Saskatchewan Ministry of Environment regulates ambient air concentration for nitrogen dioxide but not nitric oxide.

Table 8 presents the summary statistics for NO₂ measurement results. The Maidstone station measured a higher concentration than the other stations, with an annual average of 3.6 ppb. The annual average concentration recorded at the Unity station was 1.8 ppb, and the Meadow Lake station was 0.9 ppb. Both the maximum 1-hour and 24-hour concentrations were detected at the Maidstone station. There were no exceedances of the 1-hour, 24-hour, or annual SAAQS, as shown in Table 9. The NO_x analyzer was removed at the Unity station for repairs on October 20, 2017, and the repaired analyzer was installed on December 6, 2017, therefore data is not available for that time period.

Figures 9 to 11 present the pollutant roses for 1-hour average concentrations for NO₂. The highest category (shown as purple) represents the SAAQS 1-hr exceedance limit. The concentration at the Meadow Lake station was the lowest among the three stations. 98.8% of the time NO₂ concentration was less than 5 ppb. At the Unity station, the NO₂ concentration was higher than 5 ppb 6.2% of time. The NO₂ concentration at the Maidstone station tended to be the highest among the three stations and was greater than 5 ppb 24.1% of the time. These

events tend to be more frequent when wind was from the northwest quadrant. In addition to the directional trends, a seasonal trend was observed at all stations; NO₂ concentration tends to be higher during the winter months.

The detailed frequency distribution tables for the NO, NO₂ and NO_x pollutant roses are presented in the Appendices: Tables D-3 to D-5, Tables E-2 to E-4, and Tables F-2 to F-4.

Table 8 Summary of Statistics for NO₂ Measurement Results for 2017

Monitoring Station	Annual Average	Annual Instrument Uptime	Maximum NO ₂ Conc. and Occurrence Time			
	ppb	%	1-Hr Max		24-Hr Max	
Meadow Lake	0.9	90.1	10.4	1/25/2017 09:00	5.4	1/20/2017
Maidstone	3.6	95.0	24.4	1/3/2017 00:00	13.9	12/2/2017
Unity	1.8	85.4	16.5	6/20/2017 03:00	7.7	1/26/2017

Table 9 Number of Exceedance Events for NO₂ in 2017

Monitoring Station	Number of Exceedance Events for Saskatchewan NO ₂ Ambient Air Quality Standard (SAAQS)		
	1-hr SAAQS	24-hr SAAQS	Annual SAAQS
	159	106	24
Meadow Lake	0	0	0
Maidstone	0	0	0
Unity	0	0	0

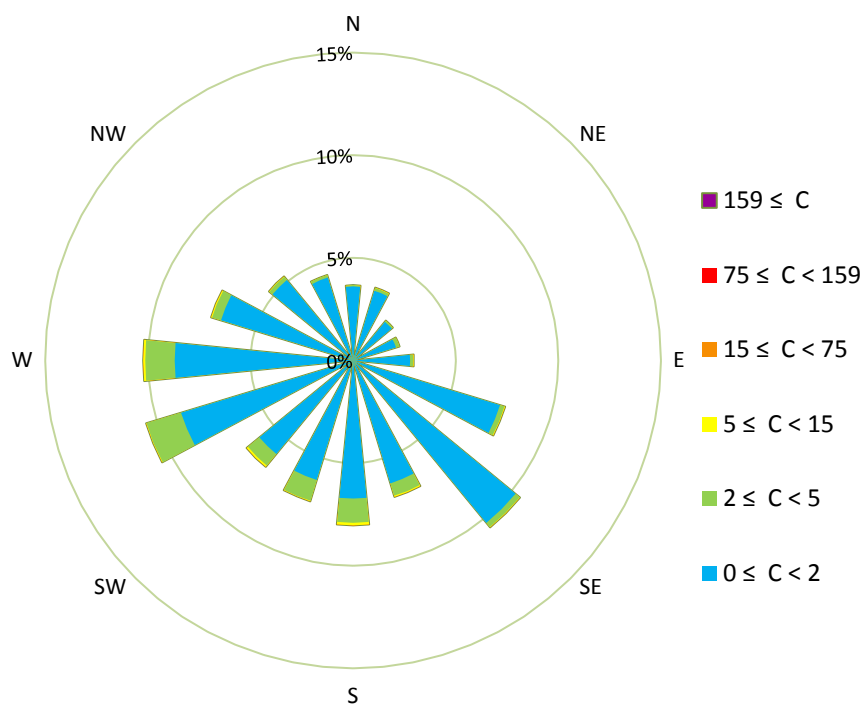


Figure 9 Pollutant Rose for 1-Hour Average NO₂ Data at Meadow Lake Station (ppb)

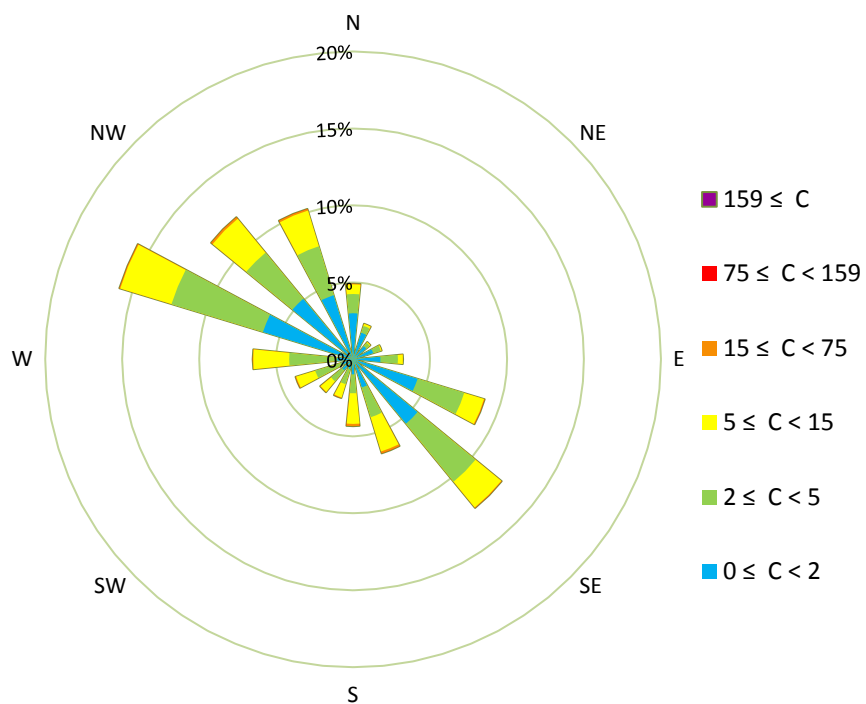


Figure 10 Pollutant Rose for 1-Hour Average NO₂ Data at Maidstone Station (ppb)

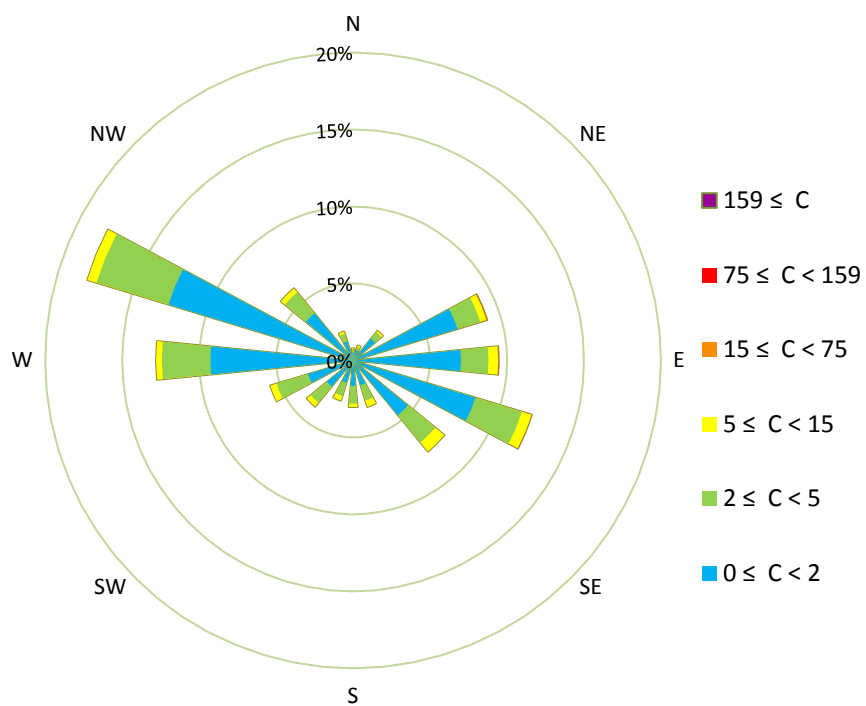


Figure 11 Pollutant Rose for 1-Hour Average NO₂ Data at Unity Station (ppb)

2.3.4 Ozone (O_3)

O_3 in the upper atmosphere (10 to 50 kilometres above the earth's surface) protects the earth from the sun's harmful ultraviolet radiation. In the lower atmosphere and at ground level, O_3 is harmful to human health as it can cause breathing problems, reduce lung function and aggravate asthma and other lung diseases (Reference 12). Ground-level O_3 is a colourless, odourless gas at ambient concentrations and is one of two major components of summertime smog. Ozone can significantly impact vegetation and decrease the productivity of some crops. It damages cotton, acetate, nylon, polyester and other textile materials. Ozone can also damage other synthetic materials, cause cracks in rubber, accelerate fading of dyes, and speed deterioration of some paints and coatings.

In the ambient air, O_3 is a "secondary" pollutant, meaning it is not directly emitted from a source. Instead, ozone is produced from photochemical reactions between NO_x and volatile organic compounds (VOCs) in the presence of sunlight. Ground-level ozone could be from intrusion of ozone from the stratosphere, mixing from the upper troposphere, local photochemistry and the medium and long-range transport. There is no scientific consensus on the relative importance of these mechanisms.

Ozone can be formed by electrical discharges and high-energy electromagnetic radiation. In indoor environments, ozone can be present as a result of electronic equipment such as ionic air purifiers, laser printers, photocopiers, and arc welders.

Table 10 presents the summary statistics for O_3 measurement results. The annual average concentration was 29.0 ppb for the Meadow Lake station and 26.6 ppb for the Unity station. There were no exceedances of the 1-hour or 8-hour SAAQS recorded (Table 11). The three year average of the annual 4th highest daily maximum eight hour concentration was 52.9 ppb at the Meadow Lake station and 59.5 at the Unity station (Table 12).

Due to operational issues with the O_3 analyzer at the Unity station, data from January 1 to July 3 and from October 27 to December 31 were invalidated. A calibration performed in May 2018 showed that the analyzer was performing more coarsely than expected, and subsequent investigation found that operational settings within the instrument were outside acceptable ranges required passing calibrations. Data going back to December 2016 was re-evaluated and determined to be invalid, with the exception of the July 3 to October 27 period where high confidence in the data was confirmed. The analyzer was removed from the airpointer in May of 2018 and sent for repair.

Figures 12 and 13 present the pollutant roses for 1-hour average concentration of O_3 . The highest category (shown as purple) represents the SAAQS 1-hr exceedance limit. The measured concentration was within 20 ppb to 50 ppb range for more than 81% of the time at the

Meadow Lake station and more than 67% at the Unity station. There was no apparent directional trend for the higher concentration events (>50 ppb). The concentration of O₃ tended to be higher from February to May at Meadow Lake and between July and August at Unity.

The detailed frequency distribution tables for the pollutant roses is presented in the Appendices: Tables E-5 and F-5.

Table 10 Summary of Statistics for O₃ Measurement Results for 2017

Monitoring Station	Annual Average	Annual Instrument Uptime	Maximum O ₃ Conc. and Occurrence Time					
	ppb	%	1-Hr Max		8-Hr Max		24-Hr Max	
Meadow Lake	29.0	88.1	58.1	9/6/2017 09:00	49.8	5/6/2017	46.8	2/12/2017
Unity	26.6	30.5	63.5	9/6/2017 17:00	58.0	9/6/2017	44.9	9/7/2017

Table 11 Number of Exceedance Events for O₃ in 2017

Monitoring Station	Number of Exceedance Events for Saskatchewan O ₃ Ambient Air Quality Standard (SAAQS)	
	1-hr SAAQS	8-hr SAAQS
	(82 ppb)	(63 ppb)
Meadow Lake	0	0
Unity	0	0

Table 12 4th Highest Daily Maximum 8-hour O₃ concentrations

Monitoring Station	Concentration (ppb)			
	2015	2016	2017	3-year Average ^a
Meadow Lake	52.6	55.4	50.9	52.9
Unity	67.3	55.2	56.0	59.5

^a The standard applies to 3-year average of the annual 4th-highest daily maximum 8-hour average concentration

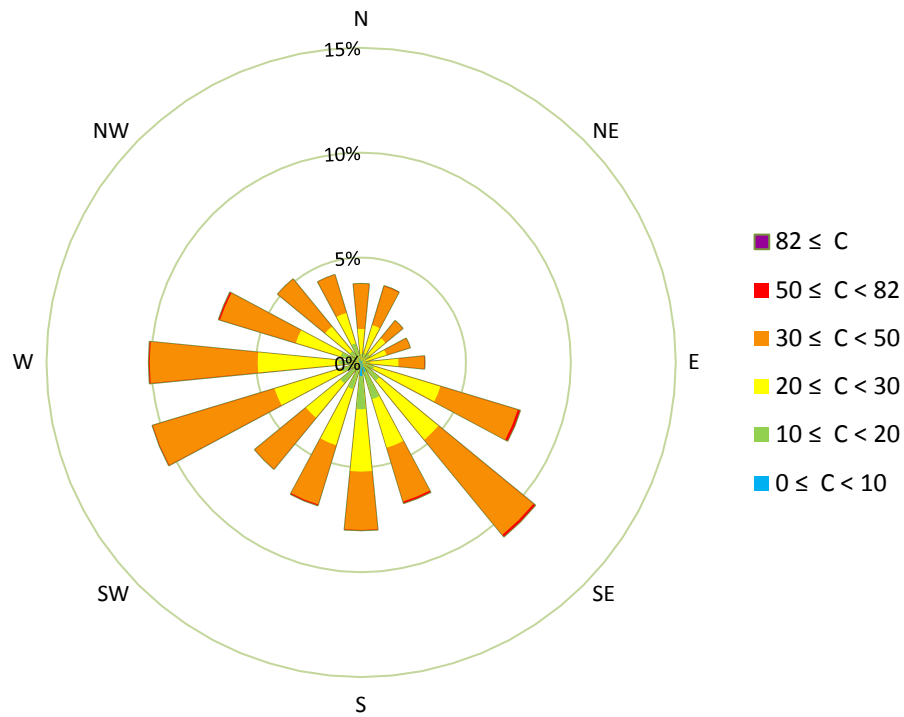


Figure 12 Pollutant Rose for 1-Hour Average O₃ Data at Meadow Lake Station (ppb)

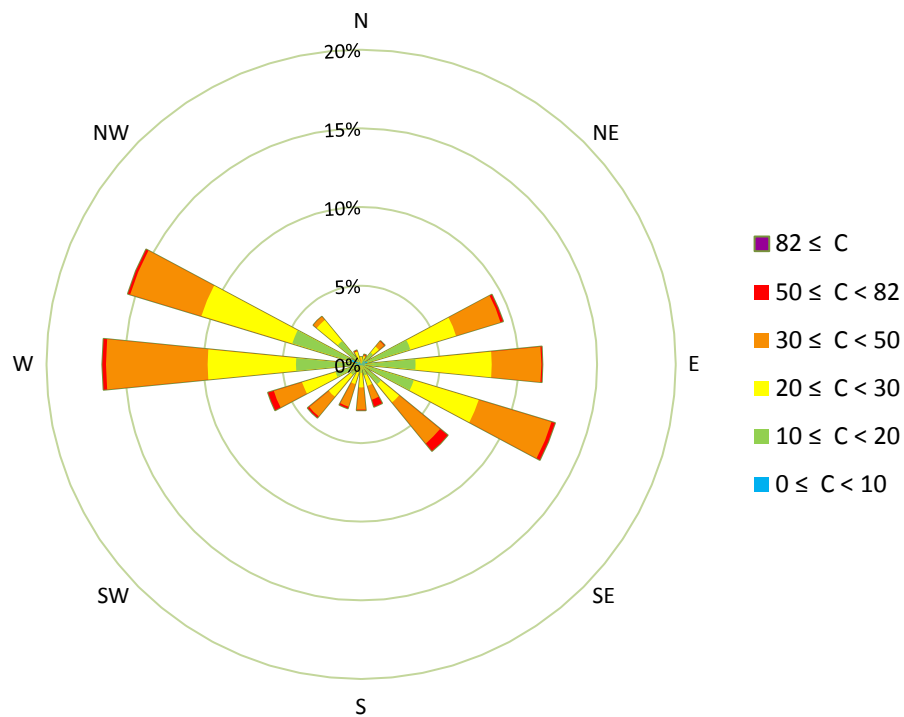


Figure 13 Pollutant Rose for 1-Hour Average O₃ Data at Unity Station (ppb)

2.3.5 Fine Particulate Matter (PM_{2.5})

Particulate matter is unique among air pollutants, as it is identified by its size rather than by its composition. The primary particulate contaminants of concern are fine particles referred to as PM_{2.5}.

Fine particles are generally emitted from activities such as industrial and residential combustion, and from vehicle exhaust. Fine particles are also formed in the atmosphere when gases such as SO₂, NO₂, and VOCs are transformed by chemical and photochemical reactions in the air. The largest natural contribution of PM_{2.5} comes from forest fires.

When inhaled deeply into the lungs, even small amounts of PM_{2.5} can cause serious health problems such as cardiovascular and respiratory diseases. Along with ground-level ozone, PM_{2.5} is one of the two major components of smog. Fine particulate matter can damage vegetation and structures, contribute to haze, and reduce visibility (Reference 13).

Table 13 presents the summary statistics for PM_{2.5} measurement results. The annual average concentrations ranged from 5.2 µg/m³ (Meadow Lake) to 6.0 µg/m³ (Unity), excluding the 3.6 µg/m³ observed in Kerrobert from November 20 to December 31. Kindersley's average of 6.7 µg/m³ excludes the typically low concentration dates after November 20, therefore does not represent a true annual average. The maximum 1-hour concentration of 229.1 µg/m³ was detected at the Kindersley station, and the maximum 24-hour concentration of 57.4 µg/m³ was detected at the Meadow Lake station. There were 15 exceedances of the SAAQS for 24-hour average concentration (see Table 14).

Figures 13 through 17 present the pollutant roses for PM_{2.5} measurement results. The measured concentrations were mostly less than 10 µg/m³ (83.8% to 96.8% of the time for all stations). There was no apparent directional trend for the higher concentration events (>10 µg/m³). All sites experienced peak concentrations in September (except for Kerrobert), which coincides with harvest season.

The detailed frequency distribution tables for the pollutant roses are presented in the Appendices: Table B-4, Table C-7, Table D-6, Table E-6, and Table F-6.

Table 13 **Summary of Statistics for PM_{2.5} Measurement Results for 2017**

Monitoring Station	Annual Average	Annual Instrument Uptime	Maximum PM _{2.5} Conc. and Occurrence Time			
	µg/m ³	%	1-Hr Max		24-Hr Max	
Meadow Lake	5.2	95.3	188.1	9/8/2017 02:00	57.4	9/8/2017
Maidstone	5.5	93.3	169.6	9/8/2017 03:00	39.1	9/8/2017
Unity	6.0	95.6	223.8	9/8/2017 01:00	45.5	9/8/2017
Kerrobert ^a	3.6	11.1	28.3	12/3/2017 09:00	9.4	12/3/2017
Kindersley ^b	6.7	87.4	229.1	9/25/2017 19:00	42.5	9/7/2017

^aData from January 1 to November 20^bData from November 20 to December 31**Table 14** **Number of Exceedance Events for PM_{2.5} in 2017**

Monitoring Station	Number of Exceedance Events for Saskatchewan PM _{2.5} Ambient Air Quality Standard (SAAQS)	
	24-hr SAAQS ^a	Annual SAAQS
	(28 µg/m ³)	(10 µg/m ³)
Meadow Lake	4	0
Maidstone	2	0
Unity	3	0
Kerrobert ^c	0	0
Kindersley ^b	6	0

^aSAAQS applies to 3-year average of the annual 98th percentile of the 24-hour average concentrations^bData from January 1 to November 20^cData from November 20 to December 31

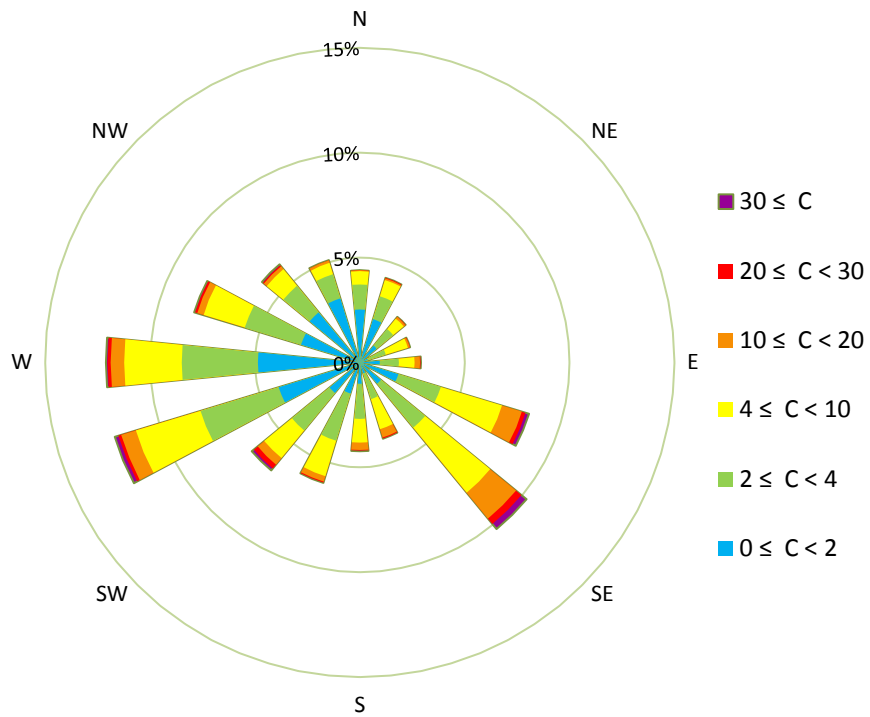


Figure 14 Pollutant Rose for 1-Hour Average PM_{2.5} Data at Meadow Lake Station (µg/m³)

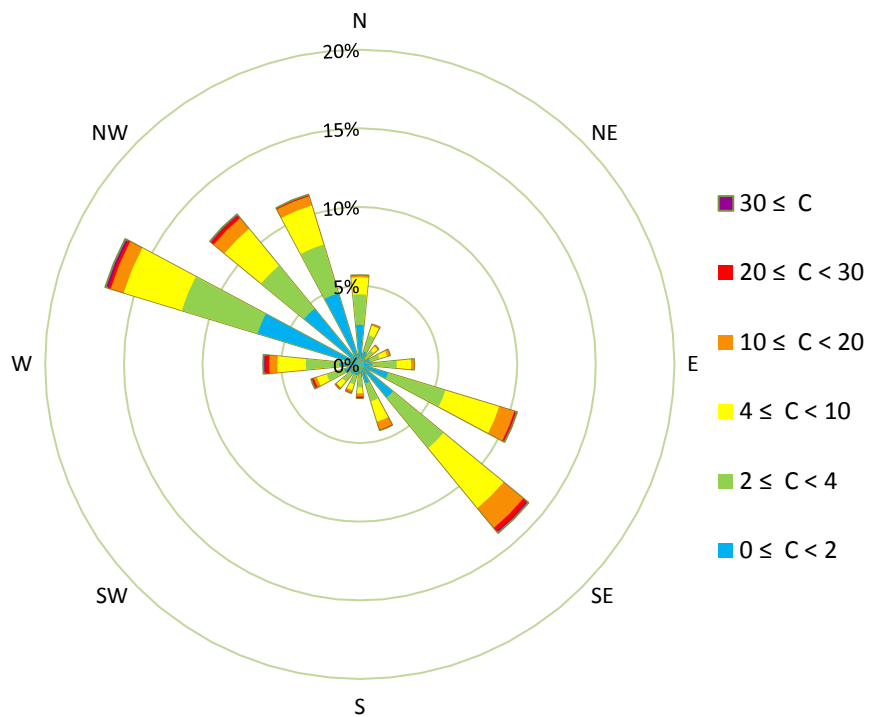


Figure 15 Pollutant Rose for 1-Hour Average PM_{2.5} Data at Maidstone Station (µg/m³)

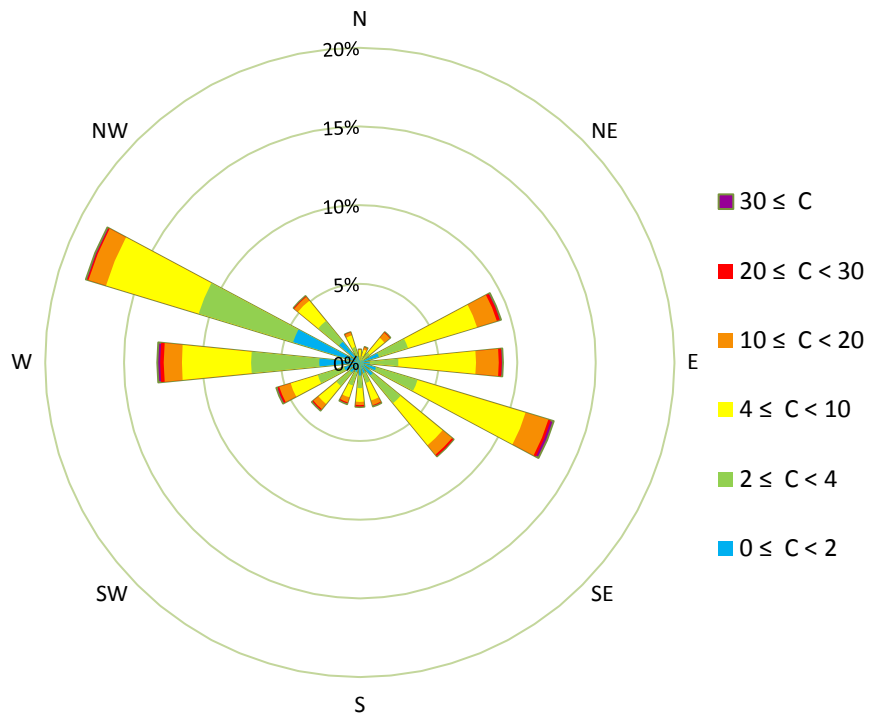


Figure 16 Pollutant Rose for 1-Hour Average PM_{2.5} Data at Unity Station (µg/m³)

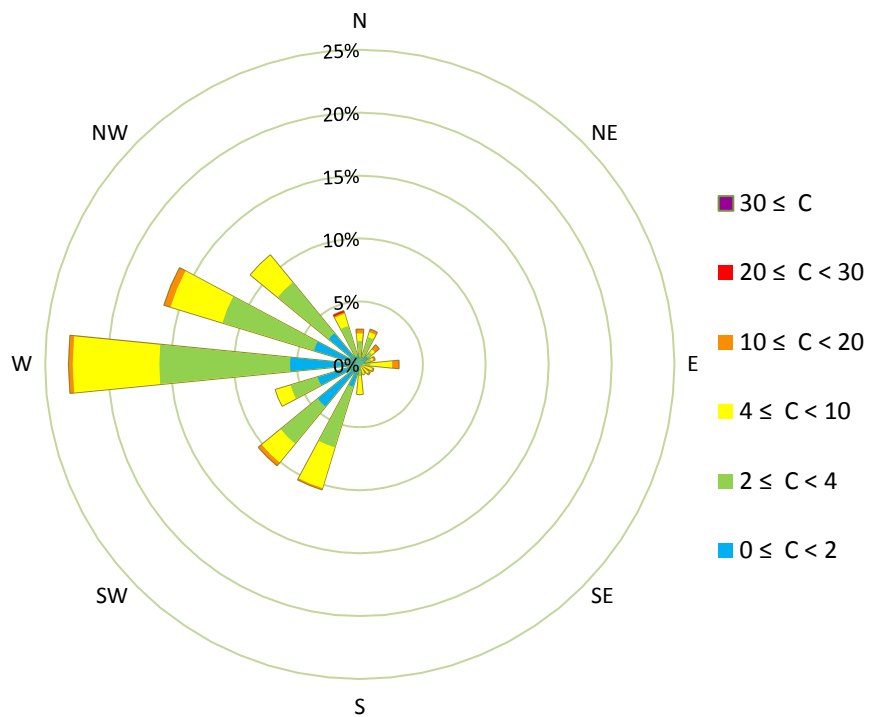


Figure 17 Pollutant Rose for 1-Hour Average PM_{2.5} Data at Kerrobert Station (µg/m³)

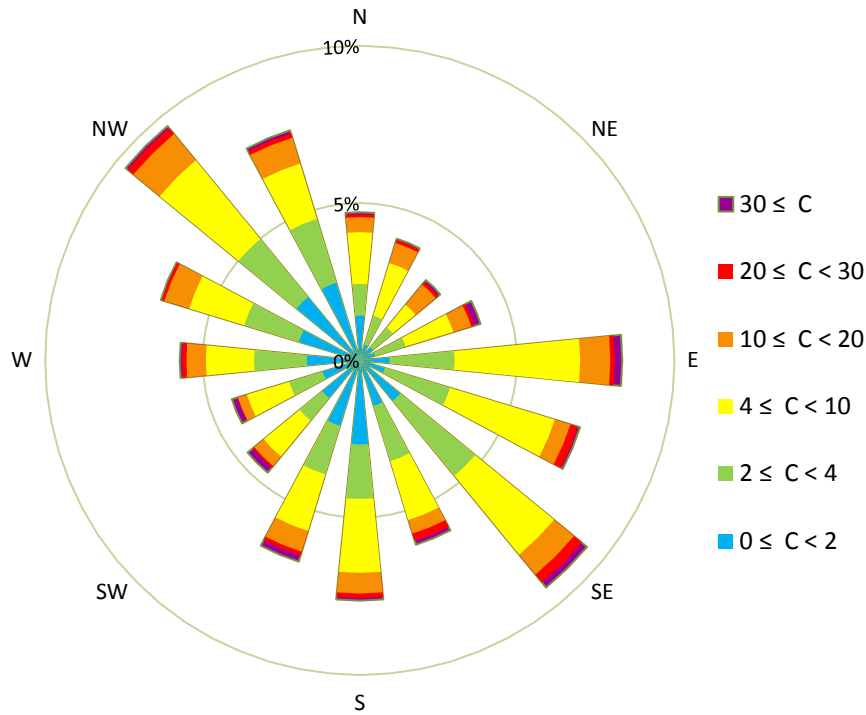


Figure 18 Pollutant Rose for 1-Hour Average PM_{2.5} Data at Kindersley Station (µg/m³)

2.4 Air Quality Health Index (AQHI)

The Air Quality Health Index (AQHI) is a health protection tool that is designed to help the public make decisions to protect their health by limiting short-term exposure to air pollution and adjusting their activity levels during increased levels of air pollution. The AQHI uses three-year rolling averages of PM_{2.5}, NO₂, and O₃ to calculate a single numerical value to evaluate the health risk associated with air pollution. All three pollutants are required to calculate AQHI according to the following equation (Reference 14):

$$AQHI = \left(\frac{1000}{10.4} \right) \times [(e^{0.000537 \times O_3} - 1) + (e^{0.000871 \times NO_2} - 1) + (e^{0.000487 \times PM_{2.5}} - 1)]$$

Among the WYAMZ air monitoring stations, Meadow Lake is eligible for AQHI reporting.

Table 15 illustrates the risk categories and the health messages for the AQHI system. The health risk is classified in four categories: Low Risk (1 to 3), Moderte Risk (4 to 6), High Risk (7 to 10), and Very High Risk (higher than 10).

Table 16 summarizes the summary statistics for AQHI rating. The air quality at the station was rated Low Risk most of the time. The Meadow Lake station had a 0.79% and the Unity station had a 1.76% occurrence frequency at the Moderate Risk rating. Moderate Risk events were primarily associated with a combination of increased concentrations of PM_{2.5} and O₃.

Table 15 Health Risk Classification for Air Quality Health Index (Environment Canada)

Health Risk	Air Quality Health Index	Health Messages	
		At Risk Population	General Population
Low	1-3	Enjoy your usual outdoor activities.	Ideal air quality for outdoor activities.
Moderate	4-6	Consider reducing or rescheduling strenuous activities outdoors if you are experiencing symptoms.	No need to modify your usual outdoor activities unless you experience symptoms such as coughing and throat irritation.
High	7-10	Reduce or reschedule strenuous activities outdoors. Children and the elderly should also avoid outdoor physical exertion.	Consider reducing or rescheduling strenuous activities outdoors if you experience symptoms such as coughing and throat irritation.
Very High	Above 10	Avoid strenuous activities outdoors. Children and the elderly should also avoid outdoor physical exertion.	Reduce or reschedule strenuous activities outdoors, especially if you experience symptoms such as coughing and throat irritation.

Table 16 Summary of Occurrence Statistics for AQHI Rating

Monitoring Station	Occurrence Statistics	Occurrence Hours and Frequency by AQHI Risk Rating			
		Low Risk	Moderate Risk	High Risk	Very High Risk
Meadow Lake	Occurrence Hours	7509	60	3	3
	Occurrence Frequency	99.10%	0.79%	0.04%	0.04%
	Occurrence Hours	2622	47	3	2
	Occurrence Frequency	98.10%	1.76%	0.11%	0.08%

2.5 Air Quality Index (AQI)

The Maidstone station does not meet the reporting requirements for AQHI. The Air Quality Index (AQI) is used as an alternative index. The Air Quality Index (AQI) is a system developed to provide the public with a meaningful and comparable measure of air quality. The AQI index is calculated from readings of five major air pollutants: SO₂, NO₂, O₃, PM_{2.5}, and carbon monoxide (CO). H₂S is not included as part of the AQI due to the fact that at low concentrations H₂S is a nuisance (odour) pollutant and not a health effect pollutant. A minimum of three pollutants is required. The AQI is rated in four categories: Good (0 to 25), Fair (26 to 50), Poor (51 to 100), and Very Poor (>100). Table 17 summarizes the effects associated with the AQI ratings.

Table 18 summarizes the occurrence statistics for AQI rating. The air quality at the Maidstone station was rated Good for 96.01% of the time; 3.67% was rated Fair, 0.27% was rated Poor and 0.05% was rated Very Poor. The Fair and Poor air quality was associated with increased PM_{2.5} concentrations. The Kerrobert/Kindersley station is excluded from index analysis because this station does not meet the reporting requirements of either index system.

Table 17 AQI Rating and Effect Description

AQI	Air Quality Rating	Effect Description
0-25	Good	<u>Desirable Range</u> : No known harmful effects to soil, water, vegetation, animals, materials, visibility or human health. The long-term goal is for air quality to be in this range all of the time in Canada.
26-50	Fair	<u>Acceptable Range</u> : Adequate protection against harmful effects to soil, water, vegetation, animals, materials, visibility and human health.
51-100	Poor	<u>Tolerable Range</u> : Not all aspects of human health or the environment are adequately protected from possible adverse effects. Long-term control action may be necessary, depending on the frequency, duration and circumstances of the readings.
>100	Very Poor	<u>Intolerable Range</u> : Continued high readings could pose a risk to public health.

Table 18 Summary of Occurrence Statistics for AQI Rating

Monitoring Station	Occurrence Statistics	Occurrence Hours and Frequency by AQHI Risk Rating			
		Good	Fair	Poor	Very Poor
Maidstone	Occurrence Hours	7095	271	20	4
	Occurrence Frequency	96.01%	3.67%	0.27%	0.05%

3 AUDITED FINANCIAL STATEMENT

The 2017 audited financial summary for the WYAMZ is presented in the following table. The complete audited report is presented in Appendix H.

Table 19 WYAMZ Financial Summary for the Year 2017

Western Yellowhead Air Management Zone Inc. Statement of Financial Position <i>As at December 31, 2017</i>		
	2017	2016
Assets		
Current		
Cash resources	133,480	121,851
Short term investment (Note 4)	101,150	100,000
Prepaid expenses	3,806	3,806
	238,436	225,657
Capital assets (Note 3)	177,368	199,932
	415,804	425,589
Liabilities		
Current		
Accounts payable and accruals	17,854	17,756
Goods and Services Tax payable	1,744	3,050
Current portion of deferred contributions (Note 5)	20,000	40,000
	39,598	60,806
Deferred contributions (Note 5)	-	20,000
	39,598	80,806
Net Assets		
Unrestricted net assets	376,206	344,783
	415,804	425,589

Approved on behalf of the Board of Directors




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APPENDIX A SASKATCHEWAN AMBIENT AIR QUALITY STANDARDS

Table A-1 Saskatchewan Ambient Air Quality Standards

TABLE 20: SASKATCHEWAN AMBIENT AIR QUALITY STANDARDS ($\mu\text{g}/\text{m}^3$)				
Air Pollutant	1 Hour	8 Hours	24 Hours	Annual
Particulate Matter ($\text{PM}_{2.5}$)			28 ^a	10
Particulate Matter (PM_{10})			50	
Total Suspended Particulates (TSP)			100	60 ^b
Nitrogen Dioxide (NO_2)	300 (159 ppb)		200 (106 ppb)	45 ^c (24 ppb)
Sulphur Dioxide (SO_2)	450 (172 ppb)		125 (48 ppb)	20 ^c (8 ppb)
Hydrogen Sulphide (H_2S)	15 (11 ppb)		5 (3.6 ppb)	
Ozone (O_3)	160 (82 ppb)	124 ^d (63 ppb)		
Carbon Monoxide (CO)	15,000 (13,000 ppb)	6,000 (5,000 ppb)		

Footnotes

- (a) The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations.
- (b) Geometric means
- (c) Arithmetic means
- (d) The 3-year average of the annual 4th-highest daily maximum 8-hour average concentrations.

APPENDIX B KERROBERT STATION: CONTINUOUS MONITORING DATA

Table B-1 Kerrobert Station: Summary Statistics for Continuous Air Monitoring Results for 2017*

Parameter	Unit	Calibration Hours	Hours of Valid Data	Annual Percent Uptime	Summary Statistics for 1-Hour Data		
					Average	Minimum	Maximum
SO ₂	ppb	85	923	10.5%	0.3	< 0.1	1.3
H ₂ S	ppb	85	895	10.2%	0.3	< 0.1	0.7
PM _{2.5}	µg/m ³	5	973	11.1%	3.6	0.4	28.3
Precipitation	mm	0	973	11.1%	3.5 (total)	< 0.1	1.3
Ambient Temperature	°C	0	973	11.1%	-9.1	-34.2	5.7
Relative Humidity	%	0	973	11.1%	69.6	46.9	85.6
Wind Speed	km/hr	0	973	11.1%	10.4	Calm	28.5

*includes data from November 20 to December 31

Table B-2 Kerrobert Station: Summary of Airpointer SO₂ Monitoring Results for the Year 2017*

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance (no.)	Percent of Data in each Concentration Range					
								0 ≤ C < 1	1 ≤ C < 5	5 ≤ C < 10	10 ≤ C < 57	57 ≤ C < 172	C ≥ 172
January	-	-	-	-	-	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-	-	-	-	-	-
March	-	-	-	-	-	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-	-	-	-	-	-	-
October	-	-	-	-	-	-	-	-	-	-	-	-	-
November	218	30.3%	0.2	0.4	0	0.3	0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
December	705	94.8%	0.3	1.3	0	0.7	0	98.7%	1.3%	0.0%	0.0%	0.0%	0.0%
Annual	923	10.5%	0.3	1.3	0	0.7	0	99.0%	1.0%	0.0%	0.0%	0.0%	0.0%

*includes data from November 20 to December 31

Table B-3 Kerrobert Station: Summary of Airpointer H₂S Monitoring Results for the Year 2017*

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance (no.)	Percent of Data in each Concentration Range					
								0 ≤ C < 1	1 ≤ C < 3.6	3.6 ≤ C < 5	5 ≤ C < 8	8 ≤ C < 10.8	C ≥ 10.8
January	-	-	-	-	-	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-	-	-	-	-	-
March	-	-	-	-	-	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-	-	-	-	-	-	-
October	-	-	-	-	-	-	-	-	-	-	-	-	-
November	211	29.3%	0.3	0.7	0	0.5	-	1	0	0	0	0	0
December	684	91.9%	0.3	0.6	0	0.5	-	1	0	0	0	0	0
Annual	895	10.2%	0.3	0.7	0	0.5	0	100.0%	0	0	0	0	0.0%

*includes data from November 20 to December 31

Table B-4 Kerrobert Station: Summary of Airpointer PM_{2.5} Monitoring Results for the Year 2017*

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (µg/m ³)	Maximum 1-Hr Conc. (µg/m ³)	Maximum 24-Hr Conc. (µg/m ³)	24-Hour Exceedance (no.)	Percent of Data in each Concentration Range					
							0 ≤ C < 2	2 ≤ C < 4	4 ≤ C < 10	10 ≤ C < 20	20 ≤ C < 30	C ≥ 30
January	-	-	-	-	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-	-	-	-	-
March	-	-	-	-	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-	-	-	-	-	-
October	-	-	-	-	-	-	-	-	-	-	-	-
November	230	31.9%	4.2	14.0	8.4	0	27.8%	29.6%	36.5%	6.1%	0.0%	0.0%
December	743	99.9%	3.5	28.3	9.4	0	26.9%	45.4%	25.4%	2.2%	0.1%	0.0%
Annual	973	11.1%	3.6	28.3	9.4	0	27.1%	41.7%	28.0%	3.1%	0.1%	0.0%

*includes data from November 20 to December 31

Table B-5 Kerrobert Station: Summary of Airpointer Precipitation Monitoring Results for the Year 2017*

Month	Valid 1-Hr data (no.)	Operational Time (%)	Total Precip. (mm)	Maximum 1-Hr Precip. (mm)	Maximum 24-Hr Precip. (mm)	Percent of Data in each Precipitation Range					
						<=5	5 ~ 10	10 ~ 25	25 ~ 50	50 ~ 75	>75
January	-	-	-	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-	-	-	-
March	-	-	-	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-	-	-	-	-
October	-	-	-	-	-	-	-	-	-	-	-
November	230	31.9%	3.4	1.3	1.7	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
December	743	99.9%	0.0	0.0	0.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Annual	973	11.1%	3.5	1.3	1.7	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%

*includes data from November 20 to December 31

Table B-6 Kerrobert Station: Summary of Airpointer Ambient Temperature Monitoring Results for the Year 2017*

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Temp. (°C)	Minimum 1-Hr Temp. (°C)	Maximum 1-Hr Temp. (°C)	Percent of Data in each Temperature Range					
						<=-30	-30 ~ -15	-15 ~ 0	0 ~ 15	15 ~ 30	>30
January	-	-	-	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-	-	-	-
March	-	-	-	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-	-	-	-	-
October	-	-	-	-	-	-	-	-	-	-	-
November	230	31.9%	-4.9	-23.9	5.4	0.0%	14.3%	53.5%	32.2%	0.0%	0.0%
December	743	99.9%	10.3	-34.2	5.7	7.7%	20.1%	56.3%	16.0%	0.0%	0.0%
Annual	973	11.1%	-9.1	-34.2	5.7	5.9%	18.8%	55.5%	19.8%	0.0%	0.0%

Table B-7 Kerrobert Station: Summary of Airpointer Relative Humidity Monitoring Results for the Year 2017*

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average RH (%)	Minimum 1-Hr RH (%)	Maximum 1-Hr RH (%)	Percent of Data in each Relative Humidity Range					
						<=15	15 ~ 30	30 ~ 60	60 ~ 80	80 ~ 90	>90
January	-	-	-	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-	-	-	-
March	-	-	-	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-	-	-	-	-
October	-	-	-	-	-	-	-	-	-	-	-
November	230	31.9%	73	58	86	0.0%	0.0%	1.7%	83.0%	15.2%	0.0%
December	743	99.9%	69	47	85	0.0%	0.0%	10.5%	85.1%	4.4%	0.0%
Annual	973	11.1%	70	47	86	0.0%	0.0%	8.4%	84.6%	7.0%	0.0%

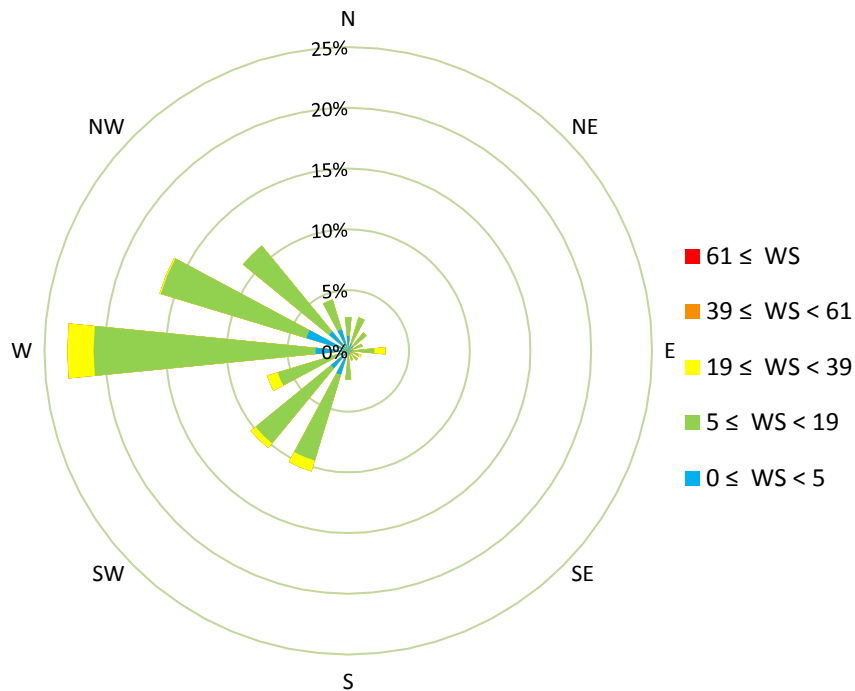
*includes data from November 20 to December 31

Table B-8. Kerrobert Station: Airpointer Wind Frequency Table for the Year 2017*

Wind Direction Sector	Percent Data in each Wind Speed Range, wind speed unit km/hr					
	$0 \leq WS < 5$	$5 \leq WS < 19$	$19 \leq WS < 39$	$39 \leq WS < 61$	$61 \leq WS$	Totals
North NorthEast	0.6%	2.3%	0.0%	0.0%	0.0%	2.9%
NorthEast	0.5%	1.4%	0.0%	0.0%	0.0%	2.0%
East NorthEast	0.2%	1.0%	0.0%	0.0%	0.0%	1.2%
East	0.4%	1.7%	0.9%	0.0%	0.0%	3.1%
East SouthEast	0.3%	0.6%	0.2%	0.0%	0.0%	1.1%
SouthEast	0.2%	0.9%	0.0%	0.0%	0.0%	1.1%
South SouthEast	0.3%	0.5%	0.0%	0.0%	0.0%	0.8%
South	0.3%	2.1%	0.0%	0.0%	0.0%	2.4%
South SouthWest	2.1%	7.4%	0.9%	0.0%	0.0%	10.4%
Southwest	1.8%	8.0%	0.5%	0.0%	0.0%	10.4%
West SouthWest	0.8%	5.2%	0.9%	0.0%	0.0%	7.0%
West	2.7%	18.3%	2.2%	0.0%	0.0%	23.1%
West NorthWest	3.6%	12.5%	0.1%	0.0%	0.0%	16.2%
NorthWest	2.1%	9.1%	0.0%	0.0%	0.0%	11.2%
North NorthWest	1.8%	2.6%	0.0%	0.0%	0.0%	4.4%
North	1.2%	1.5%	0.0%	0.0%	0.0%	2.8%
Total	19.0%	75.3%	5.7%	0.0%	0.0%	100.0%

Percent Calm (<1 km/hr)	0.0%
Number of Valid Hourly-Average Data	973
Total Workable Hours in Time Period	989

**includes data from November 20 to December 31



APPENDIX C KINDERSLEY STATION: CONTINUOUS MONITORING DATA

Table C-1 Kindersley Station: Summary Statistics for Continuous Air Monitoring Results for 2017*

Parameter	Unit	Calibration Hours	Hours of Valid Data	Annual Percent Uptime	Summary Statistics for 1-Hour Data		
					Average	Minimum	Maximum
SO ₂	ppb	678	7366	84.1%	0.2	< 0.1	1.9
H ₂ S	ppb	625	6394	73.0%	0.4	< 0.1	8.4
PM _{2.5}	µg/m ³	24	7673	87.6%	6.7	< 0.1	229.1
Precipitation	mm	0	7739	88.3%	274.4 (total)	< 0.1	8.9
Ambient Temperature	°C	0	7739	88.3%	5.3	-31.6	33.9
Relative Humidity	%	0	7739	88.3%	63.1	8.4	90.5
Wind Speed	km/hr	0	7733	88.3	12.5	Calm	53.4

*includes data from January 1 to November 20

Table C-2 Kindersley Station: Summary of Airpointer SO₂ Monitoring Results for the Year 2017*

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance (no.)	Percent of Data in each Concentration Range					
								0 ≤ C < 1	1 ≤ C < 5	5 ≤ C < 10	10 ≤ C < 57	57 ≤ C < 172	172 ≤ C
January	708	92.2%	0.3	1.4	0	0.7	0	98.9%	1.1%	0.0%	0.0%	0.0%	0.0%
February	641	95.4%	0.3	1.5	0	0.9	0	97.5%	2.5%	0.0%	0.0%	0.0%	0.0%
March	703	94.5%	0.2	1.8	0	0.5	0	99.3%	0.7%	0.0%	0.0%	0.0%	0.0%
April	688	95.6%	0.1	1.3	0	0.2	0	99.9%	0.1%	0.0%	0.0%	0.0%	0.0%
May	712	95.7%	0.2	1.4	0	0.4	0	99.7%	0.3%	0.0%	0.0%	0.0%	0.0%
June	681	94.6%	0.2	0.7	0	0.3	0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
July	709	95.3%	0.2	0.9	0	0.3	0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
August	696	93.5%	0.2	1.1	0	0.3	0	99.9%	0.1%	0.0%	0.0%	0.0%	0.0%
September	686	95.3%	0.2	1.9	0	0.4	0	99.4%	0.6%	0.0%	0.0%	0.0%	0.0%
October	694	93.3%	0.1	0.5	0	0.2	0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
November	448	62.2%	0.1	0.8	0	0.3	0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
December	-	-	-	-	-	-	-	-	-	-	-	-	-
Annual	7366	84.1%	0.2	1.9	0	0.9	0	99.5%	0.5%	0.0%	0.0%	0.0%	0.0%

*includes data from January 1 to November 20

Table C-3 Kindersley Station: Summary of Airpointer H₂S Monitoring Results for the Year 2017*

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance (no.)	Percent of Data in each Concentration Range					
								0 ≤ C < 1	1 ≤ C < 3	3 ≤ C < 5	5 ≤ C < 8	8 ≤ C < 11	11 ≤ C
January	707	92.1%	0.3	1.2	0	0.6	0	99.7%	0.3%	0.0%	0.0%	0.0%	0.0%
February	624	92.9%	0.2	3.4	0	0.4	0	99.5%	0.3%	0.2%	0.0%	0.0%	0.0%
March	622	83.6%	0.3	1.7	0	0.5	0	99.4%	0.6%	0.0%	0.0%	0.0%	0.0%
April	688	95.6%	0.3	1.4	0	0.6	0	99.4%	0.6%	0.0%	0.0%	0.0%	0.0%
May	709	95.3%	0.4	4.9	0	0.7	0	96.6%	3.0%	0.4%	0.0%	0.0%	0.0%
June	674	93.6%	0.4	1.7	0	0.7	0	95.0%	5.0%	0.0%	0.0%	0.0%	0.0%
July	685	92.1%	0.5	8.4	0	1.2	0	94.5%	5.1%	0.1%	0.1%	0.1%	0.0%
August	665	89.4%	0.5	1.9	0	1.0	0	94.4%	5.6%	0.0%	0.0%	0.0%	0.0%
September	575	80.0%	0.4	3.1	0	0.8	0	94.3%	5.6%	0.2%	0.0%	0.0%	0.0%
October	-	-	-	-	0	-	0	-	-	-	-	-	-
November	444	61.7%	0.3	0.6	0	0.4	0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
December	-	-	-	-	0	-	0	-	-	-	-	-	-
Annual	6393	73.0%	0.4	8.4	0	1.2	0	97.2%	2.7%	0.1%	0.0%	0.0%	0.0%

*includes data from January 1 to November 20

Table C-4 Kindersley Station: Summary of Airpointer PM_{2.5} Monitoring Results for the Year 2017*

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (µg/m ³)	Maximum 1-Hr Conc. (µg/m ³)	Maximum 24-Hr Conc. (µg/m ³)	24-Hour Exceedance (no.)	Percent of Data in each Concentration Range					
							0 ≤ C < 2	2 ≤ C < 4	4 ≤ C < 10	10 ≤ C < 20	20 ≤ C < 30	30 ≤ C
January	742	96.6%	3.7	22.4	10.7	0	0	67.7%	26.3%	5.8%	0.3%	0.0%
February	670	99.7%	4.5	84.2	11.9	0	34.9%	27.9%	28.7%	6.7%	1.2%	0.6%
March	743	99.9%	4.0	27.1	8.3	0	33.6%	27.9%	32.8%	5.1%	0.5%	0.0%
April	720	100.0%	3.7	18.0	6.9	0	33.5%	29.4%	33.6%	3.5%	0.0%	0.0%
May	683	91.8%	4.5	30.0	8.5	0	25.3%	33.8%	33.2%	6.7%	0.7%	0.1%
June	716	99.4%	4.9	35.1	8.9	0	23.7%	26.5%	41.2%	7.5%	0.8%	0.1%
July	743	99.9%	11.2	115.4	32.1	1	4.8%	13.6%	42.7%	28.1%	6.3%	4.4%
August	735	98.8%	10.9	93.0	29.1	1	4.8%	17.8%	38.9%	24.6%	9.3%	4.6%
September	720	100.0%	14.2	229.1	42.5	4	16.5%	18.5%	32.8%	11.8%	6.9%	13.5%
October	733	98.5%	3.9	61.6	11.0	0	26.3%	34.9%	34.1%	4.4%	0.1%	0.1%
November	468	65.0%	8.0	57.2	21.2	0	8.8%	26.9%	37.8%	22.6%	1.5%	2.4%
December	-	-	-	-	-	-	-	-	-	-	-	-
Annual	7673	87.6%	6.7	229.1	42.5	6	23.4%	25.7%	34.7%	11.3%	2.6%	2.4%

*includes data from January 1 to November 20

Table C-5 Kindersley Station: Summary of Airpointer Precipitation Monitoring Results for the Year 2017*

Month	Valid 1-Hr data (no.)	Operational Time (%)	Total Precip. (mm)	Maximum 1-Hr Precip. (mm)	Maximum 24-Hr Precip. (mm)	Percent of Data in each Precipitation Range					
						<=5	5 ~ 10	10 ~ 25	25 ~ 50	50 ~ 75	>75
January	742	96.6%	0.1	0.0	0.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
February	670	99.7%	0.8	0.2	0.8	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
March	743	99.9%	0.1	0.0	0.1	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
April	720	100.0%	8.9	1.7	6.4	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
May	744	100.0%	41.7	6.8	9.9	99.9%	0.1%	0.0%	0.0%	0.0%	0.0%
June	719	99.9%	76.6	7.3	13.8	99.6%	0.4%	0.0%	0.0%	0.0%	0.0%
July	743	99.9%	19.6	3.0	5.4	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
August	737	99.1%	30.8	8.2	14.4	99.7%	0.3%	0.0%	0.0%	0.0%	0.0%
September	720	100.0%	12.2	3.9	10.2	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
October	733	98.5%	83.5	8.9	68.8	99.3%	0.7%	0.0%	0.0%	0.0%	0.0%
November	468	65.0%	0.2	0.1	0.2	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
December	-	-	-	-	-	-	-	-	-	-	-
Annual	7739	88.3%	274.4	8.9	68.8	99.9%	0.1%	0.0%	0.0%	0.0%	0.0%

*includes data from January 1 to November 20

Table C-6 Kindersley Station: Summary of Airpointer Ambient Temperature Monitoring Results for the Year 2017*

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Temp. (°C)	Minimum 1-Hr Temp. (°C)	Maximum 1-Hr Temp. (°C)	Percent of Data in each Temperature Range					
						<=-30	-30 ~ -15	-15 ~ 0	0 ~ 15	15 ~ 30	>30
January	742	96.6%	-11.5	-31.6	4.2	0.9%	36.0%	48.0%	15.1%	0.0%	0.0%
February	670	99.7%	-8.8	-30.6	6.9	0.6%	26.1%	53.6%	19.7%	0.0%	0.0%
March	743	99.9%	-4.0	-23.5	15.1	0.0%	17.6%	40.6%	41.5%	0.3%	0.0%
April	720	100.0%	3.7	-7.9	20.7	0.0%	0.0%	27.9%	69.4%	2.6%	0.0%
May	744	100.0%	12.9	-0.7	30.2	0.0%	0.0%	0.1%	63.3%	36.4%	0.1%
June	719	99.9%	16.1	2.6	31.9	0.0%	0.0%	0.0%	46.7%	52.4%	0.8%
July	743	99.9%	19.6	5.2	33.7	0.0%	0.0%	0.0%	22.5%	75.5%	2.0%
August	737	99.1%	17.4	5.1	32.4	0.0%	0.0%	0.0%	39.1%	59.2%	1.8%
September	720	100.0%	12.5	-1.8	33.9	0.0%	0.0%	0.8%	66.9%	30.7%	1.5%
October	733	98.5%	4.4	-10.5	22.6	0.0%	0.0%	21.1%	73.8%	5.0%	0.0%
November	468	65.0%	-10.1	-20.9	2.9	0.0%	17.9%	78.0%	4.1%	0.0%	0.0%
December	-	-	-	-	-	-	-	-	-	-	-
Annual	7739	88.3%	5.3	-31.6	33.9	0.1%	8.5%	22.5%	43.4%	24.9%	0.6%

*includes data from January 1 to November 20

Table C-7 Kindersley Station: Summary of Airpointer Relative Humidity Monitoring Results for the Year 2017*

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average RH (%)	Minimum 1-Hr RH (%)	Maximum 1-Hr RH (%)	Percent of Data in each Relative Humidity Range					
						<=15	15 ~ 30	30 ~ 60	60 ~ 80	80 ~ 90	>90
January	742	96.6%	73	58	87	0.0%	0.0%	0.9%	90.2%	8.9%	0.0%
February	670	99.7%	72	40	88	0.0%	0.0%	4.9%	83.6%	11.5%	0.0%
March	743	99.9%	70	28	89	0.0%	0.3%	16.3%	63.8%	19.7%	0.0%
April	720	100.0%	67	20	89	0.0%	3.5%	26.8%	42.9%	26.8%	0.0%
May	744	100.0%	51	16	88	0.0%	21.5%	39.8%	28.4%	10.3%	0.0%
June	719	99.9%	57	15	89	0.0%	11.1%	41.9%	28.1%	18.9%	0.0%
July	743	99.9%	60	21	89	0.0%	5.0%	43.7%	34.9%	16.4%	0.0%
August	737	99.1%	56	15	91	0.0%	13.0%	41.1%	29.0%	16.0%	0.8%
September	720	100.0%	55	8	88	2.8%	13.6%	38.1%	27.8%	17.8%	0.0%
October	733	98.5%	62	19	88	0.0%	3.0%	40.1%	46.8%	10.1%	0.0%
November	468	65.0%	76	61	85	0.0%	0.0%	0.0%	87.2%	12.8%	0.0%
December	-	-	-	-	-	-	-	-	-	-	-
Annual	7739	88.3%	63	8	91	0.3%	6.7%	27.7%	49.7%	15.5%	0.1%

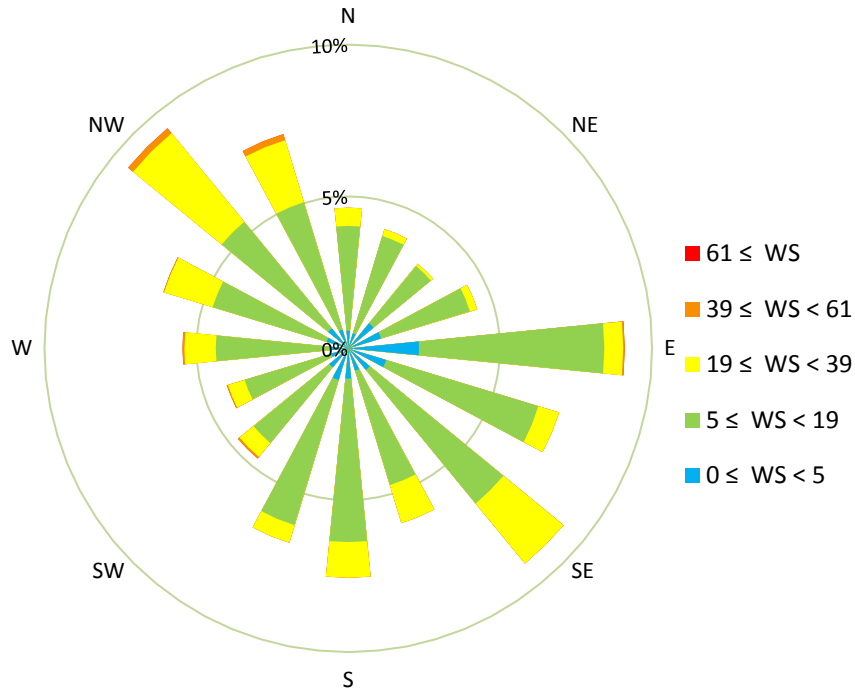
*includes data from January 1 to November 20

Table C-8. Kindersley Station: Airpointer Wind Frequency Table for the Year 2017*

Wind Direction Sector	Percent Data in each Wind Speed Range, wind speed unit km/hr					Totals
	$0 \leq WS < 5$	$5 \leq WS < 19$	$19 \leq WS < 39$	$39 \leq WS < 61$	$61 \leq WS$	
North NorthEast	0.5%	3.3%	0.2%	0.0%	0.0%	4.1%
NorthEast	1.1%	2.4%	0.1%	0.0%	0.0%	3.6%
East NorthEast	1.1%	3.1%	0.2%	0.0%	0.0%	4.4%
East	2.3%	6.1%	0.6%	0.1%	0.0%	9.1%
East SouthEast	1.3%	5.2%	0.7%	0.0%	0.0%	7.3%
SouthEast	0.9%	5.7%	2.6%	0.0%	0.0%	9.2%
South SouthEast	0.8%	3.9%	1.3%	0.0%	0.0%	6.0%
South	1.0%	5.4%	1.2%	0.0%	0.0%	7.6%
South SouthWest	1.1%	5.0%	0.6%	0.0%	0.0%	6.7%
Southwest	0.8%	3.2%	0.6%	0.1%	0.0%	4.7%
West SouthWest	0.6%	3.0%	0.6%	0.0%	0.0%	4.2%
West	0.6%	3.8%	1.0%	0.1%	0.0%	5.5%
West NorthWest	0.7%	3.9%	1.7%	0.0%	0.0%	6.4%
NorthWest	0.9%	4.5%	3.8%	0.2%	0.0%	9.4%
North NorthWest	0.6%	4.4%	2.1%	0.2%	0.0%	7.4%
North	0.6%	3.5%	0.6%	0.0%	0.0%	4.6%
Total	14.9%	66.5%	17.9%	0.7%	0.0%	100.0%

Percent Calm (<1 km/hr)	0.0%
Number of Valid Hourly-Average Data	7733
Total Workable Hours in Time Period	7764

*includes data from January 1 to November 20



APPENDIX D MAIDSTONE STATION: CONTINUOUS MONITORING DATA

Table D-1 Maidstone Station: Summary Statistics for Continuous Air Monitoring Results for 2017

Parameter	Unit	Calibration Hours	Hours of Valid Data	Annual Percent Uptime	Summary Statistics for 1-Hour Data		
					Average	Minimum	Maximum
SO ₂	ppb	382	7890	90.1%	0.4	< 0.1	9.4
NO	ppb	382	8310	94.9%	0.8	< 0.1	18.6
NO ₂	ppb	382	8325	95.0%	3.6	< 0.1	24.4
NO _x	ppb	382	8310	94.9%	4.3	0.3	33.4
H ₂ S	ppb	382	7873	89.9%	0.5	< 0.1	29.1
PM _{2.5}	µg/m ³	43	8177	93.3%	5.5	< 0.1	169.6
Precipitation	mm	0	8745	99.8%	353.2 (total)	< 0.1	12.5
Ambient Temperature	°C	0	8745	99.8%	2.7	-36.0	32.8
Relative Humidity	%	0	8745	99.8%	66.8	11.8	91.3
Wind Speed	km/hr	0	8745	99.8%	7.9	Calm	40.4

Table D-2 Maidstone Station: Summary of Airpointer SO₂ Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Max 1-Hr Conc. (ppb)	1-Hr Exceedance (no.)	Max 24-Hr Conc. (ppb)	24-Hr Exceedance (no.)	Percent of Data in each Concentration Range					
								0 ≤ C < 1	1 ≤ C < 5	5 ≤ C < 10	10 ≤ C < 57	57 ≤ C < 172	172 ≤ C
January	666	89.5%	0.5	9.4	0	2.6	0	90.7%	8.9%	0.5%	0.0%	0.0%	0.0%
February	614	91.4%	0.5	7.2	0	1.6	0	91.2%	8.3%	0.5%	0.0%	0.0%	0.0%
March	670	90.1%	0.5	5.3	0	1.5	0	91.8%	8.1%	0.1%	0.0%	0.0%	0.0%
April	656	91.1%	0.4	4.5	0	0.8	0	96.3%	3.7%	0.0%	0.0%	0.0%	0.0%
May	680	91.4%	0.5	4.6	0	1.1	0	95.7%	4.3%	0.0%	0.0%	0.0%	0.0%
June	646	89.7%	0.3	2.7	0	0.8	0	96.3%	3.7%	0.0%	0.0%	0.0%	0.0%
July	668	89.8%	0.5	4.4	0	0.9	0	94.9%	5.1%	0.0%	0.0%	0.0%	0.0%
August	672	90.3%	0.3	6.1	0	0.8	0	95.8%	4.0%	0.1%	0.0%	0.0%	0.0%
September	652	90.6%	0.4	8.3	0	1.2	0	94.6%	5.1%	0.3%	0.0%	0.0%	0.0%
October	677	91.0%	0.4	6.6	0	1.4	0	96.2%	3.5%	0.3%	0.0%	0.0%	0.0%
November	656	91.1%	0.4	2.6	0	1.0	0	93.4%	6.6%	0.0%	0.0%	0.0%	0.0%
December	633	85.1%	0.5	2.3	0	1.1	0	90.2%	9.8%	0.0%	0.0%	0.0%	0.0%
Annual	7890	90.1%	0.4	9.4	0	2.6	0	94.0%	5.9%	0.2%	0.0%	0.0%	0.0%

Table D-3 Maidstone Station: Summary of Airpointer NO Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Max 1-Hr Conc. (ppb)	Max 24-Hr Conc. (ppb)	Percent of Data in each Concentration Range					
						$0 \leq C < 2$	$2 \leq C < 5$	$5 \leq C < 15$	$15 \leq C < 75$	$75 \leq C < 159$	$159 \leq C$
January	710	95.4%	1.4	17.6	3.7	80.8%	12.5%	6.5%	0.1%	0.0%	0.0%
February	643	95.7%	1.0	11.5	3.3	84.1%	12.8%	3.1%	0.0%	0.0%	0.0%
March	702	94.4%	0.7	12.4	2.0	90.7%	8.8%	0.4%	0.0%	0.0%	0.0%
April	687	95.4%	0.4	4.2	1.0	97.8%	2.2%	0.0%	0.0%	0.0%	0.0%
May	711	95.6%	0.4	8.5	1.1	96.8%	2.7%	0.6%	0.0%	0.0%	0.0%
June	676	93.9%	0.7	12.4	2.5	93.6%	4.7%	1.6%	0.0%	0.0%	0.0%
July	700	94.1%	0.7	13.8	2.4	93.1%	4.4%	2.4%	0.0%	0.0%	0.0%
August	700	94.1%	0.9	18.6	3.1	89.7%	7.0%	3.1%	0.1%	0.0%	0.0%
September	682	94.7%	0.6	8.9	1.5	93.7%	5.4%	0.9%	0.0%	0.0%	0.0%
October	708	95.2%	0.7	12.5	2.1	93.5%	5.1%	1.4%	0.0%	0.0%	0.0%
November	688	95.6%	0.7	12.5	2.4	91.4%	6.3%	2.3%	0.0%	0.0%	0.0%
December	703	94.5%	0.8	14.5	3.4	89.6%	7.5%	2.8%	0.0%	0.0%	0.0%
Annual	8310	94.9%	0.8	18.6	3.7	91.3%	6.6%	2.1%	0.0%	0.0%	0.0%

Table D-4 Maidstone Station: Summary of Airpointer NO₂ Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Max 1-Hr Conc. (ppb)	1-Hr Exceedance (no.)	Max 24-Hr Conc. (ppb)	24-Hr Exceedance (no.)	Percent of Data in each Concentration Range					
								$0 \leq C < 2$	$2 \leq C < 5$	$5 \leq C < 15$	$15 \leq C < 75$	$75 \leq C < 159$	$159 \leq C$
January	711	95.6%	5.8	24.4	0	12.6	0	11.8%	38.0%	47.5%	2.7%	0.0%	0.0%
February	643	95.7%	5.2	22.0	0	10.7	0	17.3%	41.4%	39.0%	2.3%	0.0%	0.0%
March	702	94.4%	2.9	17.9	0	5.9	0	51.6%	32.5%	15.5%	0.4%	0.0%	0.0%
April	688	95.6%	2.0	11.8	0	4.2	0	64.2%	27.6%	8.1%	0.0%	0.0%	0.0%
May	712	95.7%	2.4	12.9	0	4.4	0	60.7%	27.4%	11.9%	0.0%	0.0%	0.0%
June	677	94.0%	2.9	12.3	0	5.0	0	46.7%	34.4%	18.9%	0.0%	0.0%	0.0%
July	702	94.4%	2.5	15.4	0	3.9	0	53.7%	35.5%	10.7%	0.1%	0.0%	0.0%
August	702	94.4%	2.7	14.5	0	4.6	0	50.7%	34.2%	15.1%	0.0%	0.0%	0.0%
September	684	95.0%	3.0	14.4	0	6.2	0	43.6%	40.1%	16.4%	0.0%	0.0%	0.0%
October	711	95.6%	3.0	16.8	0	6.1	0	44.4%	37.1%	18.1%	0.3%	0.0%	0.0%
November	689	95.7%	4.7	19.3	0	11.0	0	22.1%	41.9%	35.1%	0.9%	0.0%	0.0%
December	704	94.6%	5.6	20.9	0	13.9	0	20.0%	32.8%	44.0%	3.1%	0.0%	0.0%
Annual	8325	95.0%	3.6	24.4	0	13.9	0	40.7%	35.2%	23.3%	0.8%	0.0%	0.0%

Table D-5 Maidstone Station: Summary of Airpointer NO_x Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Max 1-Hr Conc. (ppb)	Max 24-Hr Conc. (ppb)	Percent of Data in each Concentration Range					
						0 ≤ C < 2	2 ≤ C < 5	5 ≤ C < 15	15 ≤ C < 75	75 ≤ C < 159	159 ≤ C
January	710	95.4%	7.2	33.4	15.3	7.7%	27.9%	57.7%	6.6%	0.0%	0.0%
February	643	95.7%	6.2	29.1	12.8	10.4%	37.3%	46.8%	5.4%	0.0%	0.0%
March	702	94.4%	3.6	24.5	7.7	38.9%	40.3%	19.8%	1.0%	0.0%	0.0%
April	687	95.4%	2.5	13.2	5.2	58.4%	30.6%	11.1%	0.0%	0.0%	0.0%
May	711	95.6%	2.9	21.0	5.3	52.5%	33.2%	13.9%	0.4%	0.0%	0.0%
June	676	93.9%	3.7	21.4	5.8	36.1%	39.1%	24.3%	0.6%	0.0%	0.0%
July	700	94.1%	3.2	26.5	5.8	46.1%	37.0%	15.9%	1.0%	0.0%	0.0%
August	700	94.1%	3.6	23.3	6.2	42.1%	33.6%	23.6%	0.7%	0.0%	0.0%
September	682	94.7%	3.6	15.8	7.0	33.3%	44.3%	22.3%	0.1%	0.0%	0.0%
October	708	95.2%	3.7	28.0	7.4	36.0%	41.0%	21.5%	1.6%	0.0%	0.0%
November	688	95.6%	5.4	24.9	13.5	17.2%	39.2%	40.4%	3.2%	0.0%	0.0%
December	703	94.5%	6.3	25.7	17.4	16.2%	31.0%	47.1%	5.7%	0.0%	0.0%
Annual	8310	94.9%	4.3	33.4	17.4	33.0%	36.2%	28.6%	2.2%	0.0%	0.0%

Table D-6 Maidstone Station: Summary of Airpointer H₂S Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Max 1-Hr Conc. (ppb)	1-Hr Exceedance (no.)	Max 24-Hr Conc. (ppb)	24-Hr Exceedance (no.)	Percent of Data in each Concentration Range					
								0 ≤ C < 1	1 ≤ C < 3	3 ≤ C < 5	5 ≤ C < 8	8 ≤ C < 11	11 ≤ C
January	663	89.1%	0.3	0.6	0	0.5	0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
February	613	91.2%	0.3	1.2	0	0.4	0	99.7%	0.3%	0.0%	0.0%	0.0%	0.0%
March	666	89.5%	0.3	10.0	0	1.2	0	99.1%	0.6%	0.0%	0.0%	0.3%	0.0%
April	656	91.1%	0.3	0.9	0	0.4	0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
May	680	91.4%	0.4	2.3	0	0.6	0	98.2%	1.8%	0.0%	0.0%	0.0%	0.0%
June	643	89.3%	0.6	4.8	0	1.6	0	85.7%	12.9%	1.4%	0.0%	0.0%	0.0%
July	668	89.8%	1.6	29.1	17	5.8	2	60.5%	25.1%	8.8%	2.4%	0.6%	2.5%
August	669	90.1%	1.2	27.6	7	4.4	1	71.9%	19.3%	5.4%	1.5%	0.9%	1.0%
September	649	90.1%	0.7	12.8	1	2.1	0	80.0%	17.1%	2.0%	0.6%	0.2%	0.2%
October	677	91.0%	0.3	1.8	0	0.6	0	98.7%	1.3%	0.0%	0.0%	0.0%	0.0%
November	656	91.1%	0.2	1.0	0	0.5	0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
December	632	84.9%	0.3	1.0	0	0.5	0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Annual	7872	89.9%	0.5	29.1	25	5.8	3	91.1%	6.6%	1.5%	0.4%	0.2%	0.3%

Table D-7 Maidstone Station: Summary of Airpointer PM_{2.5} Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (µg/m ³)	Max 1-Hr Conc. (µg/m ³)	Max 24-Hr Conc. (µg/m ³)	24-Hr Exceedance (no.)	Percent of Data in each Concentration Range					
							0 ≤ C < 2	2 ≤ C < 4	4 ≤ C < 10	10 ≤ C < 20	20 ≤ C < 30	30 ≤ C
January	744	100.0%	4.5	33.2	12.7	-	0	65.3%	21.6%	11.4%	1.5%	0.1%
February	672	100.0%	4.3	42.2	10.6	-	40.3%	22.6%	27.7%	8.0%	0.7%	0.6%
March	718	96.5%	4.0	36.0	7.1	-	28.0%	34.8%	33.3%	3.1%	0.7%	0.1%
April	629	87.4%	2.8	13.3	5.5	-	39.3%	46.7%	13.0%	1.0%	0.0%	0.0%
May	677	91.0%	3.7	20.9	8.3	-	31.6%	32.8%	32.3%	3.0%	0.3%	0.0%
June	637	88.5%	4.5	23.6	9.3	-	34.1%	27.3%	28.3%	9.6%	0.8%	0.0%
July	657	88.3%	9.4	85.1	23.3	-	11.1%	14.9%	40.8%	25.1%	4.9%	3.2%
August	572	76.9%	8.9	54.7	20.6	-	14.2%	17.3%	35.8%	24.1%	5.6%	3.0%
September	668	92.8%	8.2	169.6	39.1	2	33.7%	17.5%	27.7%	11.8%	4.8%	4.5%
October	744	100.0%	3.9	57.3	9.0	-	26.7%	37.6%	32.3%	2.8%	0.4%	0.1%
November	720	100.0%	8.3	85.5	24.4	-	11.9%	25.1%	36.0%	20.8%	3.3%	2.8%
December	739	99.3%	4.8	42.7	12.1	-	19.4%	41.4%	28.7%	8.5%	1.8%	0.3%
Annual	8177	93.3%	5.5	169.6	39.1	2	27.2%	29.2%	29.8%	10.6%	2.0%	1.2%

Table D-8 Maidstone Station: Summary of Airpointer Precipitation Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Total Precip. (mm)	Maximum 1-Hr Precip. (mm)	Maximum 24-Hr Precip. (mm)	Percent of Data in each Precipitation Range					
						≤5	5 ~ 10	10 ~ 25	25 ~ 50	50 ~ 75	>75
January	744	100.0%	0.1	0.0	0.1	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
February	672	100.0%	3.6	1.6	3.6	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
March	744	100.0%	4.0	1.8	3.6	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
April	720	100.0%	27.0	4.2	10.2	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
May	744	100.0%	61.3	6.5	12.7	99.7%	0.3%	0.0%	0.0%	0.0%	0.0%
June	717	99.6%	99.1	10.3	18.1	99.4%	0.3%	0.3%	0.0%	0.0%	0.0%
July	736	98.9%	71.2	10.4	30.2	99.5%	0.4%	0.1%	0.0%	0.0%	0.0%
August	744	100.0%	50.7	12.5	23.1	99.7%	0.1%	0.1%	0.0%	0.0%	0.0%
September	716	99.4%	11.5	2.0	6.2	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
October	744	100.0%	24.0	9.1	12.6	99.9%	0.1%	0.0%	0.0%	0.0%	0.0%
November	720	100.0%	0.1	0.1	0.1	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
December	744	100.0%	0.6	0.4	0.6	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Annual	8745	99.8%	353.2	12.5	30.2	99.9%	0.1%	0.0%	0.0%	0.0%	0.0%

Table D-9 Maidstone Station: Summary of Airpointer Ambient Temperature Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Temp. (°C)	Minimum 1-Hr Temp. (°C)	Maximum 1-Hr Temp. (°C)	Percent of Data in each Temperature Range					
						<=-30	-30 ~ -15	-15 ~ 0	0 ~ 15	15 ~ 30	>30
January	744	100.0%	-11.8	-34.8	5.9	1.2%	37.5%	49.6%	11.7%	0.0%	0.0%
February	672	100.0%	-9.4	-28.2	8.8	0.0%	29.9%	47.3%	22.8%	0.0%	0.0%
March	744	100.0%	-6.7	-26.9	11.5	0.0%	24.9%	43.8%	31.3%	0.0%	0.0%
April	720	100.0%	2.6	-10.8	19.6	0.0%	0.0%	32.6%	65.4%	1.9%	0.0%
May	744	100.0%	12.1	-0.8	27.8	0.0%	0.0%	0.7%	67.7%	31.6%	0.0%
June	717	99.6%	15.0	3.9	28.2	0.0%	0.0%	0.0%	52.7%	47.3%	0.0%
July	736	98.9%	18.3	6.2	30.5	0.0%	0.0%	0.0%	30.7%	68.9%	0.4%
August	744	100.0%	16.4	5.0	28.8	0.0%	0.0%	0.0%	45.6%	54.4%	0.0%
September	716	99.4%	11.5	-1.3	32.8	0.0%	0.0%	0.6%	73.5%	25.4%	0.6%
October	744	100.0%	4.3	-8.2	20.0	0.0%	0.0%	23.3%	74.1%	2.7%	0.0%
November	720	100.0%	-9.6	-22.6	4.1	0.0%	16.8%	78.1%	5.1%	0.0%	0.0%
December	744	100.0%	-11.1	-36.0	6.8	8.5%	24.9%	48.5%	18.1%	0.0%	0.0%
Annual	8745	99.8%	2.7	-36.0	32.8	0.8%	11.1%	26.9%	41.6%	19.5%	0.1%

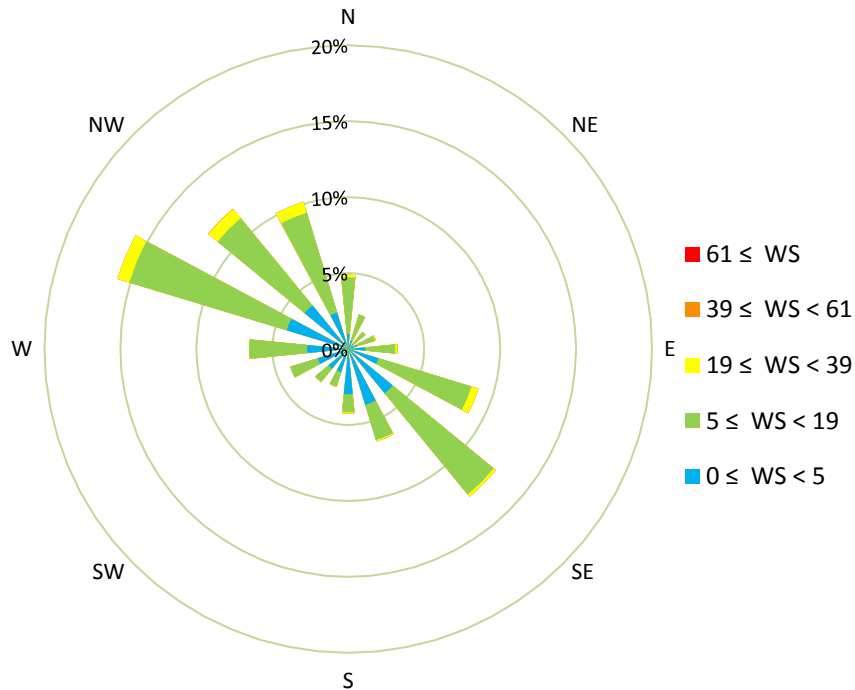
Table D-10 Maidstone Station: Summary of Airpointer Relative Humidity Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average RH (%)	Minimum 1-Hr RH (%)	Maximum 1-Hr RH (%)	Percent of Data in each Relative Humidity Range					
						<=15	15 ~ 30	30 ~ 60	60 ~ 80	80 ~ 90	>90
January	744	100.0%	70	45	87	0.0%	0.0%	9.9%	79.4%	10.6%	0.0%
February	672	100.0%	68	45	88	0.0%	0.0%	19.8%	69.5%	10.7%	0.0%
March	744	100.0%	70	35	88	0.0%	0.0%	16.4%	63.2%	20.4%	0.0%
April	720	100.0%	69	25	89	0.0%	1.8%	25.7%	44.7%	27.8%	0.0%
May	744	100.0%	57	21	90	0.0%	12.9%	39.9%	30.1%	17.1%	0.0%
June	717	99.6%	65	24	91	0.0%	2.1%	38.5%	31.2%	26.4%	1.8%
July	736	98.9%	68	31	91	0.0%	0.0%	35.1%	31.1%	27.7%	6.1%
August	744	100.0%	68	24	91	0.0%	0.7%	33.7%	29.4%	28.8%	7.4%
September	716	99.4%	65	12	90	0.4%	4.1%	31.7%	35.1%	28.5%	0.3%
October	744	100.0%	64	27	86	0.0%	0.5%	37.1%	47.4%	14.9%	0.0%
November	720	100.0%	73	52	84	0.0%	0.0%	2.8%	81.5%	15.7%	0.0%
December	744	100.0%	66	41	80	0.0%	0.0%	17.6%	82.3%	0.1%	0.0%
Annual	8745	99.8%	67	12	91	0.0%	1.9%	25.7%	52.0%	19.1%	1.3%

Table D-11 Maidstone Station: Airpointer Wind Frequency Table for the Year 2017

Wind Direction Sector	Percent Data in each Wind Speed Range, wind speed unit km/hr					
	0 ≤ WS < 5	5 ≤ WS < 19	19 ≤ WS < 39	39 ≤ WS < 61	61 ≤ WS	Totals
North NorthEast	0.6%	1.8%	0.0%	0.0%	0.0%	2.4%
NorthEast	0.4%	1.0%	0.0%	0.0%	0.0%	1.5%
East NorthEast	0.6%	1.3%	0.1%	0.0%	0.0%	1.9%
East	1.1%	2.0%	0.1%	0.0%	0.0%	3.2%
East SouthEast	2.1%	6.4%	0.5%	0.0%	0.0%	9.0%
SouthEast	3.8%	8.6%	0.2%	0.0%	0.0%	12.6%
South SouthEast	3.8%	2.4%	0.1%	0.0%	0.0%	6.4%
South	3.0%	1.2%	0.1%	0.0%	0.0%	4.3%
South SouthWest	1.6%	1.0%	0.0%	0.0%	0.0%	2.6%
Southwest	1.7%	1.2%	0.0%	0.0%	0.0%	2.8%
West SouthWest	2.1%	1.9%	0.0%	0.0%	0.0%	4.0%
West	2.7%	3.8%	0.0%	0.0%	0.0%	6.5%
West NorthWest	4.2%	10.8%	0.8%	0.0%	0.0%	15.9%
NorthWest	3.7%	7.4%	0.8%	0.0%	0.0%	11.9%
North NorthWest	2.5%	6.9%	0.8%	0.0%	0.0%	10.1%
North	1.0%	3.8%	0.2%	0.0%	0.0%	4.9%
Total	34.9%	61.4%	3.6%	0.0%	0.0%	100.0%

Percent Calm (<1 km/hr)	1.1%
Number of Valid Hourly-Average Data	8745
Total Workable Hours in Time Period	8760



APPENDIX E. MEADOW LAKE STATION: CONTINUOUS MONITORING DATA

Table E-1 Meadow Lake Station: Summary Statistics for Continuous Air Monitoring Results for 2017

Parameter	Unit	Calibration Hours	Hours of Valid Data	Annual Percent Uptime	Summary Statistics for 1-Hour Data		
					Average	Minimum	Maximum
NO	ppb	372	7882	90.0%	0.2	< 0.1	7.1
NO ₂	ppb	372	7891	90.1%	0.9	< 0.1	10.4
NO _x	ppb	372	7880	90.0%	1.2	0.1	12.0
O ₃	ppb	372	7717	88.1%	29.0	0.7	58.1
PM _{2.5}	µg/m ³	3	8349	95.3%	5.2	< 0.1	188.1
Precipitation	mm	0	8481	96.8%	377.7 (total)	< 0.1	12.7
Ambient Temperature	°C	0	8481	96.8%	2.9	-33.9	32.0
Relative Humidity	%	0	8481	96.8%	64.6	16.0	91.5
Wind Speed	km/hr	0	8481	96.8%	7.5	Calm	32.4

Table E-2 Meadow Lake Station: Summary of Airpointer NO Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	Maximum 24-Hr Conc. (ppb)	Percent of Data in each Concentration Range					
						0 ≤ C < 2	2 ≤ C < 5	5 ≤ C < 15	15 ≤ C < 75	75 ≤ C < 159	159 ≤ C
January	711	95.6%	0.3	5.6	1.5	97.3%	2.3%	0.4%	0.0%	0.0%	0.0%
February	643	95.7%	0.3	3.6	0.9	98.6%	1.4%	0.0%	0.0%	0.0%	0.0%
March	703	94.5%	0.2	1.0	0.3	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
April	573	79.6%	0.2	0.6	0.2	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
May	709	95.3%	0.2	7.1	0.5	99.7%	0.1%	0.1%	0.0%	0.0%	0.0%
June	614	85.3%	0.2	3.5	0.4	99.3%	0.7%	0.0%	0.0%	0.0%	0.0%
July	485	65.2%	0.2	0.7	0.2	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
August	705	94.8%	0.2	1.1	0.3	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
September	689	95.7%	0.2	3.8	0.5	99.6%	0.4%	0.0%	0.0%	0.0%	0.0%
October	709	95.3%	0.2	3.7	0.4	99.7%	0.3%	0.0%	0.0%	0.0%	0.0%
November	689	95.7%	0.2	2.0	0.5	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
December	652	87.6%	0.3	2.6	0.9	99.7%	0.3%	0.0%	0.0%	0.0%	0.0%
Annual	7882	90.0%	0.2	7.1	1.5	99.5%	0.5%	0.1%	0.0%	0.0%	0.0%

Table E-3 Meadow Lake Station: Summary of Airpointer NO₂ Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance (no.)	Percent of Data in each Concentration Range					
								0 ≤ C < 2	2 ≤ C < 5	5 ≤ C < 15	15 ≤ C < 75	75 ≤ C < 159	159 ≤ C
January	711	95.6%	1.7	10.4	0	5.4	0	74.8%	19.7%	5.5%	0.0%	0.0%	0.0%
February	643	95.7%	1.4	5.6	0	3.2	0	80.6%	19.1%	0.3%	0.0%	0.0%	0.0%
March	703	94.5%	0.7	3.5	0	1.8	0	98.0%	2.0%	0.0%	0.0%	0.0%	0.0%
April	574	79.7%	0.5	2.3	0	1.0	0	99.5%	0.5%	0.0%	0.0%	0.0%	0.0%
May	712	95.7%	0.5	2.9	0	1.1	0	99.6%	0.4%	0.0%	0.0%	0.0%	0.0%
June	614	85.3%	0.7	3.3	0	1.5	0	98.4%	1.6%	0.0%	0.0%	0.0%	0.0%
July	487	65.5%	0.7	2.0	0	1.3	0	99.8%	0.2%	0.0%	0.0%	0.0%	0.0%
August	706	94.9%	0.6	2.4	0	1.0	0	99.6%	0.4%	0.0%	0.0%	0.0%	0.0%
September	689	95.7%	0.6	3.1	0	1.2	0	98.8%	1.2%	0.0%	0.0%	0.0%	0.0%
October	709	95.3%	0.8	4.3	0	1.5	0	95.9%	4.1%	0.0%	0.0%	0.0%	0.0%
November	689	95.7%	1.4	6.1	0	2.6	0	78.4%	21.3%	0.3%	0.0%	0.0%	0.0%
December	654	87.9%	1.6	5.9	0	3.3	0	69.9%	29.8%	0.3%	0.0%	0.0%	0.0%
Annual	7891	90.1%	0.9	10.4	0	5.4	0	90.9%	8.6%	0.6%	0.0%	0.0%	0.0%

Table E-4 Meadow Lake Station: Summary of Airpointer NO_x Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	Maximum 24-Hr Conc. (ppb)	Percent of Data in each Concentration Range					
						0 ≤ C < 2	2 ≤ C < 5	5 ≤ C < 15	15 ≤ C < 75	75 ≤ C < 159	159 ≤ C
January	711	95.6%	2.0	12.0	6.7	68.4%	23.6%	8.0%	0.0%	0.0%	0.0%
February	643	95.7%	1.7	7.7	4.0	70.6%	27.5%	1.9%	0.0%	0.0%	0.0%
March	703	94.5%	0.8	3.8	2.0	96.9%	3.1%	0.0%	0.0%	0.0%	0.0%
April	573	79.6%	0.6	2.9	1.2	98.6%	1.4%	0.0%	0.0%	0.0%	0.0%
May	709	95.3%	0.6	9.9	1.3	99.4%	0.3%	0.3%	0.0%	0.0%	0.0%
June	613	85.1%	0.9	5.3	1.8	96.1%	3.8%	0.2%	0.0%	0.0%	0.0%
July	484	65.1%	0.9	2.6	1.6	99.4%	0.6%	0.0%	0.0%	0.0%	0.0%
August	705	94.8%	0.8	2.9	1.3	98.3%	1.7%	0.0%	0.0%	0.0%	0.0%
September	689	95.7%	0.8	6.9	1.4	96.1%	3.8%	0.1%	0.0%	0.0%	0.0%
October	709	95.3%	1.0	7.4	1.7	90.4%	9.3%	0.3%	0.0%	0.0%	0.0%
November	689	95.7%	1.6	6.4	3.0	72.6%	25.8%	1.6%	0.0%	0.0%	0.0%
December	652	87.6%	1.9	7.1	3.6	60.7%	38.2%	1.1%	0.0%	0.0%	0.0%
Annual	7880	90.0%	1.2	12.0	6.7	87.0%	11.9%	1.2%	0.0%	0.0%	0.0%

Table E-5 Meadow Lake Station: Summary of Airpointer O₃ Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance (no.)	Maximum 24-Hr Conc. (ppb)	Percent of Data in each Concentration Range					
							0 ≤ C < 10	10 ≤ C < 20	20 ≤ C < 30	30 ≤ C < 50	50 ≤ C < 82	82 ≤ C
January	711	95.6%	31.5	44.8	0	42.0	0.8%	10.1%	24.1%	65.0%	0.0%	0.0%
February	643	95.7%	35.1	49.4	0	46.8	0.0%	3.7%	13.5%	82.7%	0.0%	0.0%
March	703	94.5%	32.5	52.1	0	38.6	0.0%	4.3%	22.2%	73.1%	0.4%	0.0%
April	574	79.7%	30.5	50.0	0	36.2	0.0%	4.7%	41.6%	53.7%	0.0%	0.0%
May	712	95.7%	28.3	52.5	0	43.9	5.2%	17.4%	35.8%	39.0%	2.5%	0.0%
June	621	86.3%	26.6	56.0	0	40.6	6.8%	21.6%	35.1%	34.9%	1.6%	0.0%
July	502	67.5%	27.4	49.8	0	44.0	4.0%	16.1%	43.2%	36.7%	0.0%	0.0%
August	702	94.4%	25.8	49.0	0	37.8	4.8%	20.5%	42.6%	32.1%	0.0%	0.0%
September	688	95.6%	24.7	58.1	0	40.1	7.3%	22.7%	41.9%	27.0%	1.2%	0.0%
October	708	95.2%	25.4	44.1	0	34.0	2.0%	20.6%	50.3%	27.1%	0.0%	0.0%
November	689	95.7%	29.3	43.2	0	35.8	0.3%	3.2%	49.9%	46.6%	0.0%	0.0%
December	464	62.4%	32.6	43.6	0	40.0	0.0%	2.2%	27.8%	70.0%	0.0%	0.0%
Annual	7717	88.1%	29.0	58.1	0	46.8	2.7%	12.6%	35.8%	48.5%	0.5%	0.0%

Table E-6 Meadow Lake Station: Summary of Airpointer PM_{2.5} Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (µg/m ³)	Maximum 1-Hr Conc. (µg/m ³)	Maximum 24-Hr Conc. (µg/m ³)	24-Hour Exceedance (no.)	Percent of Data in each Concentration Range					
							0 ≤ C < 2	2 ≤ C < 4	4 ≤ C < 10	10 ≤ C < 20	20 ≤ C < 30	30 ≤ C
January	742	99.7%	4.0	58.2	12.4	0	0	72.1%	19.4%	7.3%	0.8%	0.4%
February	672	100.0%	3.6	24.5	8.9	0	36.5%	35.4%	24.4%	3.6%	0.1%	0.0%
March	719	96.6%	3.8	26.8	6.7	0	26.6%	34.2%	36.6%	2.5%	0.1%	0.0%
April	517	71.8%	2.9	19.5	4.6	0	35.2%	45.8%	18.2%	0.8%	0.0%	0.0%
May	735	98.8%	4.1	34.1	8.4	0	36.3%	26.4%	30.6%	6.3%	0.3%	0.1%
June	689	95.7%	5.4	53.0	16.0	0	26.6%	30.5%	28.9%	10.9%	2.2%	1.0%
July	612	82.3%	7.9	48.4	17.4	0	10.1%	20.3%	40.2%	24.5%	3.8%	1.1%
August	743	99.9%	9.0	64.8	30.8	2	11.6%	16.8%	44.4%	18.4%	5.1%	3.6%
September	720	100.0%	9.8	188.1	57.4	2	29.6%	19.9%	27.8%	10.7%	5.3%	6.8%
October	743	99.9%	3.2	22.9	11.8	0	43.1%	32.7%	19.9%	4.0%	0.3%	0.0%
November	720	100.0%	5.1	29.3	14.8	0	27.2%	25.6%	34.7%	11.0%	1.5%	0.0%
December	736	99.1%	3.3	23.8	6.8	0	38.7%	33.9%	25.4%	1.9%	0.1%	0.0%
Annual	8348	95.3%	5.2	188.1	57.4	4	30.1%	29.3%	29.3%	8.5%	1.7%	1.1%

Table E-7 Meadow Lake Station: Summary of Airpointer Precipitation Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Total Precip. (mm)	Maximum 1-Hr Precip. (mm)	Maximum 24-Hr Precip. (mm)	Percent of Data in each Precipitation Range					
						<=5	5 ~ 10	10 ~ 25	25 ~ 50	50 ~ 75	>75
January	744	100.0%	0.2	0.1	0.2	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
February	672	100.0%	1.0	0.6	1.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
March	744	100.0%	2.5	0.9	0.9	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
April	601	83.5%	24.7	5.1	10.4	99.8%	0.2%	0.0%	0.0%	0.0%	0.0%
May	744	100.0%	51.7	3.2	12.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
June	692	96.1%	161.6	12.7	38.4	98.6%	1.3%	0.1%	0.0%	0.0%	0.0%
July	613	82.4%	59.1	12.7	22.6	99.5%	0.3%	0.2%	0.0%	0.0%	0.0%
August	744	100.0%	33.5	11.9	25.6	99.7%	0.1%	0.1%	0.0%	0.0%	0.0%
September	720	100.0%	30.3	5.5	25.6	99.9%	0.1%	0.0%	0.0%	0.0%	0.0%
October	743	99.9%	12.1	1.6	5.5	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
November	720	100.0%	0.7	0.6	0.6	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
December	744	100.0%	0.6	0.4	0.4	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Annual	8481	96.8%	377.7	12.7	38.4	99.8%	0.2%	0.0%	0.0%	0.0%	0.0%

Table E-8 Meadow Lake Station: Summary of Airpointer Ambient Temperature Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Temp. (°C)	Minimum 1-Hr Temp. (°C)	Maximum 1-Hr Temp. (°C)	Percent of Data in each Temperature Range					
						<=-30	-30 ~ -15	-15 ~ 0	0 ~ 15	15 ~ 30	>30
January	744	100.0%	-10.6	-33.5	8.9	1.3%	39.0%	36.8%	22.8%	0.0%	0.0%
February	672	100.0%	-8.3	-30.9	14.6	0.3%	26.9%	46.9%	25.9%	0.0%	0.0%
March	744	100.0%	-6.9	-31.2	10.9	0.3%	25.9%	39.8%	34.0%	0.0%	0.0%
April	601	83.5%	2.2	-11.0	17.9	0.0%	0.0%	31.6%	67.9%	0.5%	0.0%
May	744	100.0%	11.6	-0.4	28.0	0.0%	0.0%	0.3%	69.1%	30.6%	0.0%
June	692	96.1%	15.0	2.4	28.4	0.0%	0.0%	0.0%	50.4%	49.6%	0.0%
July	613	82.4%	18.8	7.6	31.0	0.0%	0.0%	0.0%	23.3%	75.9%	0.8%
August	744	100.0%	17.2	7.1	27.1	0.0%	0.0%	0.0%	35.3%	64.7%	0.0%
September	720	100.0%	12.3	0.0	32.0	0.0%	0.0%	0.1%	70.4%	28.8%	0.7%
October	743	99.9%	4.6	-5.5	18.8	0.0%	0.0%	18.2%	78.6%	3.2%	0.0%
November	720	100.0%	-8.7	-22.1	5.0	0.0%	6.8%	87.4%	5.8%	0.0%	0.0%
December	744	100.0%	-10.5	-33.9	7.8	6.5%	26.9%	43.5%	23.1%	0.0%	0.0%
Annual	8481	96.8%	2.9	-33.9	32.0	0.7%	10.8%	25.5%	42.2%	20.6%	0.1%

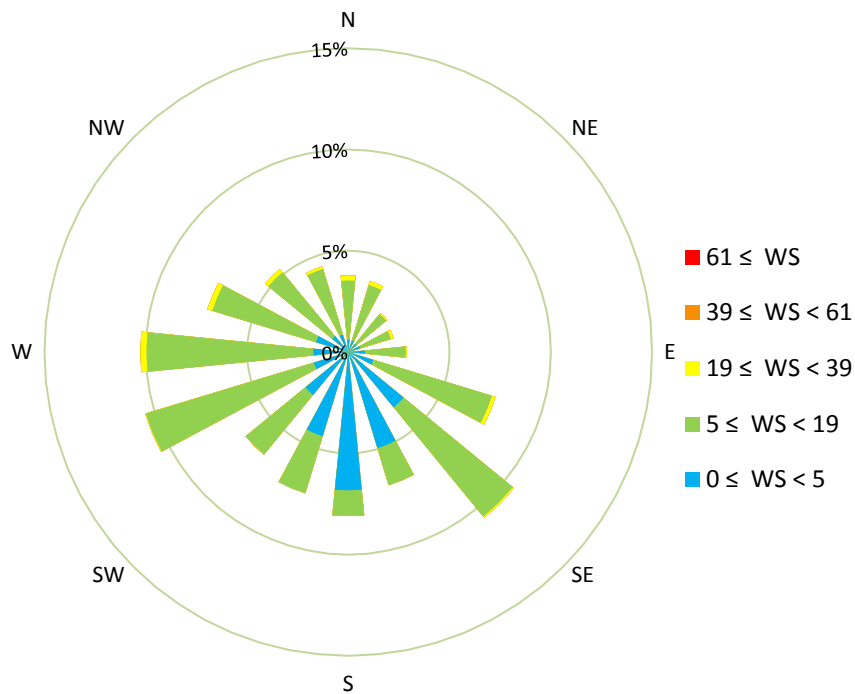
Table E-9 Meadow Lake Station: Summary of Airpointer Relative Humidity Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average RH (%)	Minimum 1-Hr RH (%)	Maximum 1-Hr RH (%)	Percent of Data in each Relative Humidity Range					
						<=15	15 ~ 30	30 ~ 60	60 ~ 80	80 ~ 90	>90
January	744	100.0%	68	39	87	0.0%	0.0%	21.5%	72.6%	5.9%	0.0%
February	672	100.0%	64	24	88	0.0%	0.6%	30.4%	62.6%	6.4%	0.0%
March	744	100.0%	65	32	90	0.0%	0.0%	34.4%	54.0%	11.6%	0.0%
April	601	83.5%	64	22	90	0.0%	4.7%	34.9%	31.9%	28.5%	0.0%
May	744	100.0%	56	20	90	0.0%	13.2%	41.1%	26.1%	19.6%	0.0%
June	692	96.1%	66	23	91	0.0%	3.0%	34.4%	31.4%	29.2%	2.0%
July	613	82.4%	64	30	92	0.0%	0.0%	40.1%	37.7%	18.3%	3.9%
August	744	100.0%	64	29	91	0.0%	0.1%	40.5%	40.9%	15.9%	2.7%
September	720	100.0%	63	16	91	0.0%	2.2%	39.7%	36.1%	20.3%	1.7%
October	743	99.9%	65	25	89	0.0%	0.4%	36.9%	45.5%	17.2%	0.0%
November	720	100.0%	70	43	86	0.0%	0.0%	10.7%	81.7%	7.6%	0.0%
December	744	100.0%	66	43	87	0.0%	0.0%	19.0%	78.8%	2.3%	0.0%
Annual	8481	96.8%	65	16	92	0.0%	2.0%	31.8%	50.4%	15.0%	0.8%

Table E-10 Meadow Lake Station: Airpointer Wind Frequency Table for the Year 2017

Wind Direction Sector	Percent Data in each Wind Speed Range, wind speed unit km/hr					
	$0 \leq WS < 5$	$5 \leq WS < 19$	$19 \leq WS < 39$	$39 \leq WS < 61$	$61 \leq WS$	Totals
North NorthEast	0.6%	2.9%	0.2%	0.0%	0.0%	3.7%
NorthEast	0.5%	1.9%	0.1%	0.0%	0.0%	2.5%
East NorthEast	0.6%	1.6%	0.1%	0.0%	0.0%	2.3%
East	0.8%	2.0%	0.1%	0.0%	0.0%	2.9%
East SouthEast	1.3%	6.1%	0.2%	0.0%	0.0%	7.6%
SouthEast	3.5%	7.0%	0.1%	0.0%	0.0%	10.6%
South SouthEast	5.0%	1.9%	0.0%	0.0%	0.0%	6.9%
South	6.8%	1.3%	0.0%	0.0%	0.0%	8.1%
South SouthWest	4.3%	2.9%	0.0%	0.0%	0.0%	7.3%
Southwest	2.7%	3.8%	0.0%	0.0%	0.0%	6.6%
West SouthWest	1.8%	8.7%	0.0%	0.0%	0.0%	10.5%
West	1.7%	8.3%	0.3%	0.0%	0.0%	10.3%
West NorthWest	1.7%	5.4%	0.3%	0.0%	0.0%	7.3%
NorthWest	1.0%	4.1%	0.2%	0.0%	0.0%	5.3%
North NorthWest	0.9%	3.4%	0.1%	0.0%	0.0%	4.4%
North	0.6%	2.9%	0.3%	0.0%	0.0%	3.8%
Total	34.0%	64.1%	1.9%	0.0%	0.0%	100.0%

Percent Calm (<1 km/hr)	0.3%
Number of Valid Hourly-Average Data	8481
Total Workable Hours in Time Period	8760



APPENDIX F. UNITY STATION: CONTINUOUS MONITORING DATA

Table F-1 Unity Station: Summary Statistics for Continuous Air Monitoring Results for 2017

Parameter	Unit	Calibration Hours	Hours of Valid Data	Annual Percent Uptime	Summary Statistics for 1-Hour Data		
					Average	Minimum	Maximum
NO	ppb	347	7461	85.2%	0.5	< 0.1	29.7
NO ₂	ppb	347	7485	85.4%	1.8	< 0.1	16.5
NO _x	ppb	347	7460	85.2%	2.3	< 0.1	45.9
O ₃	ppb	132	2674	30.5%	26.6	3.8	63.5
PM _{2.5}	µg/m ³	43	8376	95.6%	6.0	< 0.1	223.8
Precipitation	mm	0	8752	99.9%	319.1 (total)	< 0.1	14.4
Ambient Temperature	°C	0	8752	99.9%	2.8	-37.5	33.1
Relative Humidity	%	0	8752	99.9%	66.7	10.3	91.3
Wind Speed	km/hr	0	8723	99.6%	7.0	Calm	51.8

Table F-2 Unity Station: Summary of Airpointer NO Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	Maximum 24-Hr Conc. (ppb)	Percent of Data in each Concentration Range					
						0 ≤ C < 2	2 ≤ C < 5	5 ≤ C < 15	15 ≤ C < 75	75 ≤ C < 159	159 ≤ C
January	702	94.4%	0.7	14.5	1.7	90.6%	9.0%	0.4%	0.0%	0.0%	0.0%
February	642	95.5%	0.6	6.5	1.6	94.9%	4.7%	0.5%	0.0%	0.0%	0.0%
March	699	94.0%	0.3	2.2	0.8	99.4%	0.6%	0.0%	0.0%	0.0%	0.0%
April	683	94.9%	0.3	1.9	0.7	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
May	710	95.4%	0.4	2.2	0.6	99.9%	0.1%	0.0%	0.0%	0.0%	0.0%
June	673	93.5%	0.9	29.7	2.8	92.9%	4.8%	2.2%	0.1%	0.0%	0.0%
July	708	95.2%	0.4	3.6	1.0	99.2%	0.8%	0.0%	0.0%	0.0%	0.0%
August	701	94.2%	0.4	2.7	0.9	98.7%	1.3%	0.0%	0.0%	0.0%	0.0%
September	686	95.3%	0.4	2.7	0.7	99.1%	0.9%	0.0%	0.0%	0.0%	0.0%
October	675	90.7%	0.4	3.3	0.8	98.5%	1.5%	0.0%	0.0%	0.0%	0.0%
November	-	-	-	-	-	-	-	-	-	-	-
December	582	78.2%	0.8	6.4	1.2	91.4%	8.4%	0.2%	0.0%	0.0%	0.0%
Annual	7461	85.2%	0.5	29.7	2.8	96.9%	2.8%	0.3%	0.0%	0.0%	0.0%

Table F-3 Unity Station: Summary of Airpointer NO₂ Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance (no.)	Percent of Data in each Concentration Range					
								0 ≤ C < 2	2 ≤ C < 5	5 ≤ C < 15	15 ≤ C < 75	75 ≤ C < 159	159 ≤ C
January	704	94.6%	3.3	12.6	0	7.7	-	32.5%	47.7%	19.7%	0.0%	0.0%	0.0%
February	643	95.7%	2.6	11.6	0	5.7	0	44.5%	46.3%	9.2%	0.0%	0.0%	0.0%
March	700	94.1%	1.4	6.1	0	2.5	0	79.1%	20.6%	0.3%	0.0%	0.0%	0.0%
April	688	95.6%	0.9	3.8	0	1.9	0	93.3%	6.7%	0.0%	0.0%	0.0%	0.0%
May	712	95.7%	1.8	7.6	0	2.8	0	69.7%	27.7%	2.7%	0.0%	0.0%	0.0%
June	677	94.0%	2.9	16.5	0	5.8	0	55.2%	25.6%	18.3%	0.9%	0.0%	0.0%
July	708	95.2%	0.4	4.8	0	1.6	0	93.4%	6.6%	0.0%	0.0%	0.0%	0.0%
August	705	94.8%	0.3	5.7	0	1.0	0	97.9%	2.0%	0.1%	0.0%	0.0%	0.0%
September	688	95.6%	1.8	11.3	0	3.2	0	64.4%	32.7%	2.9%	0.0%	0.0%	0.0%
October	678	91.1%	1.6	8.7	0	3.2	0	70.6%	27.4%	1.9%	0.0%	0.0%	0.0%
November	-	0.0%	-	-	-	-	-	-	-	-	-	-	-
December	582	78.2%	3.1	8.8	0	5.9	0	31.3%	55.3%	13.4%	0.0%	0.0%	0.0%
Annual	7485	85.4%	1.8	16.5	0	7.7	0	67.3%	26.6%	6.1%	0.1%	0.0%	0.0%

Table F-4 Unity Station: Summary of Airpointer NO_x Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	Maximum 24-Hr Conc. (ppb)	Percent of Data in each Concentration Range					
						0 ≤ C < 2	2 ≤ C < 5	5 ≤ C < 15	15 ≤ C < 75	75 ≤ C < 159	159 ≤ C
January	702	94.4%	4.0	25.9	9.1	27.8%	43.0%	28.9%	0.3%	0.0%	0.0%
February	642	95.5%	3.2	12.2	6.7	30.2%	53.7%	16.0%	0.0%	0.0%	0.0%
March	699	94.0%	1.7	6.3	3.3	65.4%	33.8%	0.9%	0.0%	0.0%	0.0%
April	683	94.9%	1.2	4.7	2.4	85.8%	14.2%	0.0%	0.0%	0.0%	0.0%
May	710	95.4%	2.1	8.2	3.3	60.1%	35.6%	4.2%	0.0%	0.0%	0.0%
June	673	93.5%	3.8	45.9	7.3	45.9%	30.9%	19.0%	4.2%	0.0%	0.0%
July	707	95.0%	0.9	7.0	2.6	89.4%	9.9%	0.7%	0.0%	0.0%	0.0%
August	701	94.2%	0.7	6.9	1.6	92.3%	7.4%	0.3%	0.0%	0.0%	0.0%
September	686	95.3%	2.2	12.2	3.5	52.9%	42.1%	5.0%	0.0%	0.0%	0.0%
October	675	90.7%	2.0	9.6	3.8	59.9%	36.0%	4.1%	0.0%	0.0%	0.0%
November	-	-	-	-	-	-	-	-	-	-	-
December	582	78.2%	3.8	13.6	6.4	23.4%	49.3%	27.3%	0.0%	0.0%	0.0%
Annual	7460	85.2%	2.3	45.9	9.1	58.3%	31.9%	9.4%	0.4%	0.0%	0.0%

Table F-5 Unity Station: Summary of Airpointer O₃ Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance (no.)	Maximum 24-Hr Conc. (ppb)	Percent of Data in each Concentration Range					
							0 ≤ C < 10	10 ≤ C < 20	20 ≤ C < 30	30 ≤ C < 50	50 ≤ C < 82	82 ≤ C
January	-	-	-	-	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-	-	-	-	-
March	-	-	-	-	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-	-
July	662	89.0%	28.8	53.1	-	50.3	39.9	1.1%	23.1%	29.6%	44.6%	1.7%
August	705	94.8%	27.5	57.1	-	52.0	39.8	4.3%	24.4%	30.6%	36.9%	3.8%
September	688	95.6%	25.8	63.5	-	58.0	44.9	4.7%	29.5%	36.3%	24.9%	4.7%
October	619	83.2%	24.4	48.1	-	45.2	34.9	2.3%	30.2%	42.5%	25.0%	0.0%
November	-	-	-	-	-	-	-	-	-	-	-	-
December	-	-	-	-	-	-	-	-	-	-	-	-
Annual	2674	30.5%	26.6	63.5	-	58.0	44.9	3.1%	26.7%	34.6%	32.9%	2.6%

Table F-6 Unity Station: Summary of Airpointer PM_{2.5} Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (µg/m ³)	Maximum 1-Hr Conc. (µg/m ³)	Maximum 24-Hr Conc. (µg/m ³)	24-Hour Exceedance (no.)	Percent of Data in each Concentration Range					
							0 ≤ C < 2	2 ≤ C < 4	4 ≤ C < 10	10 ≤ C < 20	20 ≤ C < 30	C ≥ 30
January	481	64.7%	4.9	30.2	9.8	0	0.0%	52.4%	36.6%	10.6%	0.2%	0.2%
February	672	100.0%	5.6	22.6	11.0	0	18.3%	26.9%	40.9%	13.2%	0.6%	0.0%
March	741	99.6%	5.4	26.9	10.5	0	15.8%	29.0%	43.7%	11.2%	0.3%	0.0%
April	720	100.0%	4.9	21.9	12.4	0	20.6%	26.8%	46.3%	6.0%	0.4%	0.0%
May	650	87.4%	4.2	20.4	10.1	0	38.2%	18.3%	36.6%	6.8%	0.2%	0.0%
June	713	99.0%	5.0	32.5	8.1	0	17.1%	32.1%	45.2%	4.5%	0.7%	0.4%
July	742	99.7%	8.7	126.3	28.9	1	1.5%	24.4%	53.5%	15.6%	1.5%	3.5%
August	742	99.7%	9.1	57.0	27.0	0	4.3%	17.1%	49.9%	20.5%	5.7%	2.6%
September	718	99.7%	8.6	223.8	45.5	2	13.1%	29.1%	37.3%	12.7%	3.9%	3.9%
October	744	100.0%	3.6	18.3	10.8	0	30.8%	37.2%	28.6%	3.4%	0.0%	0.0%
November	719	99.9%	6.9	35.4	16.9	0	15.7%	25.2%	36.2%	19.3%	3.1%	0.6%
December	734	98.7%	4.2	22.8	9.3	0	15.7%	41.8%	39.0%	3.3%	0.3%	0.0%
Annual	8376	95.6%	6.0	223.8	45.5	3	17.6%	28.1%	41.3%	10.6%	1.4%	1.0%

Table F-7 Unity Station: Summary of Airpointer Precipitation Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Total Precip. (mm)	Maximum 1-Hr Precip. (mm)	Maximum 24-Hr Precip. (mm)	Percent of Data in each Precipitation Range					
						<=5	5 ~ 10	10 ~ 25	25 ~ 50	50 ~ 75	>75
January	743	96.7%	0.1	0.0	0.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
February	672	100.0%	2.9	0.9	2.8	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
March	744	100.0%	7.3	5.4	5.7	99.9%	0.1%	0.0%	0.0%	0.0%	0.0%
April	720	100.0%	19.6	3.9	13.7	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
May	744	100.0%	61.2	4.0	13.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
June	720	100.0%	58.8	11.5	12.9	99.7%	0.1%	0.1%	0.0%	0.0%	0.0%
July	742	99.7%	57.6	12.6	25.1	99.6%	0.3%	0.1%	0.0%	0.0%	0.0%
August	743	99.9%	74.0	14.4	38.1	99.6%	0.3%	0.1%	0.0%	0.0%	0.0%
September	718	99.7%	16.4	4.0	8.1	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
October	744	100.0%	21.4	3.0	8.4	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
November	719	99.9%	0.0	0.0	0.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
December	743	99.9%	0.0	0.0	0.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Annual	8752	99.9%	319.1	14.4	38.1	99.9%	0.1%	0.0%	0.0%	0.0%	0.0%

Table F-8 Unity Station: Summary of Airpointer Ambient Temperature Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Temp. (°C)	Minimum 1-Hr Temp. (°C)	Maximum 1-Hr Temp. (°C)	Percent of Data in each Temperature Range					
						<=-30	-30 ~ -15	-15 ~ 0	0 ~ 15	15 ~ 30	>30
January	743	96.7%	-11.8	-34.0	4.3	1.9%	36.3%	51.8%	10.0%	0.0%	0.0%
February	672	100.0%	-9.4	-28.8	5.2	0.0%	29.6%	48.8%	21.6%	0.0%	0.0%
March	744	100.0%	-6.0	-25.2	11.1	0.0%	21.5%	47.7%	30.8%	0.0%	0.0%
April	720	100.0%	2.9	-9.0	19.6	0.0%	0.0%	32.4%	65.3%	2.4%	0.0%
May	744	100.0%	12.1	-1.8	28.5	0.0%	0.0%	0.7%	65.7%	33.6%	0.0%
June	720	100.0%	15.3	2.6	28.5	0.0%	0.0%	0.0%	50.4%	49.6%	0.0%
July	742	99.7%	18.4	6.4	31.6	0.0%	0.0%	0.0%	32.3%	66.7%	0.9%
August	743	99.9%	16.4	4.3	29.6	0.0%	0.0%	0.0%	48.3%	51.7%	0.0%
September	718	99.7%	11.6	-2.5	33.1	0.0%	0.0%	1.0%	71.3%	26.9%	0.8%
October	744	100.0%	3.9	-9.7	21.6	0.0%	0.0%	24.1%	72.8%	3.1%	0.0%
November	719	99.9%	-9.3	-23.1	5.2	0.0%	16.1%	77.9%	6.0%	0.0%	0.0%
December	743	99.9%	-11.8	-37.5	6.2	12.5%	18.7%	56.7%	12.1%	0.0%	0.0%
Annual	8752	99.9%	2.8	-37.5	33.1	1.2%	10.1%	28.3%	40.6%	19.6%	0.1%

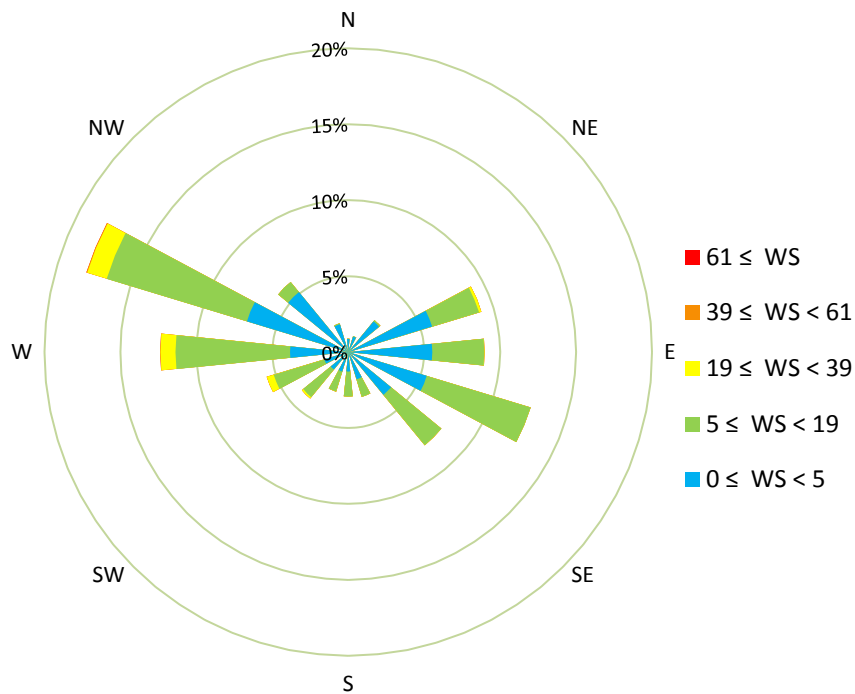
Table F-9 Unity Station: Summary of Airpointer Relative Humidity Monitoring Results for the Year 2017

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average RH (%)	Minimum 1-Hr RH (%)	Maximum 1-Hr RH (%)	Percent of Data in each Relative Humidity Range					
						<=15	15 ~ 30	30 ~ 60	60 ~ 80	80 ~ 90	>90
January	743	96.7%	71	52	87	0.0%	0.0%	3.5%	90.7%	5.8%	0.0%
February	672	100.0%	70	46	88	0.0%	0.0%	10.7%	79.9%	9.4%	0.0%
March	744	100.0%	73	42	88	0.0%	0.0%	10.3%	62.4%	27.3%	0.0%
April	720	100.0%	70	23	90	0.0%	1.4%	22.8%	43.8%	32.1%	0.0%
May	744	100.0%	56	18	90	0.0%	15.3%	40.6%	26.7%	17.3%	0.0%
June	720	100.0%	62	24	91	0.0%	5.7%	38.3%	32.1%	23.1%	0.8%
July	742	99.7%	67	31	91	0.0%	0.0%	36.7%	31.3%	29.6%	2.4%
August	743	99.9%	64	19	91	0.0%	3.4%	38.6%	30.4%	22.7%	4.8%
September	718	99.7%	61	10	90	0.8%	8.1%	34.3%	37.3%	19.5%	0.0%
October	744	100.0%	66	22	89	0.0%	2.0%	30.1%	53.0%	14.9%	0.0%
November	719	99.9%	74	58	85	0.0%	0.0%	0.1%	89.3%	10.6%	0.0%
December	743	99.9%	68	48	85	0.0%	0.0%	10.5%	86.8%	2.7%	0.0%
Annual	8752	99.9%	67	10	91	0.1%	3.0%	23.1%	55.2%	18.0%	0.7%

Table F-10 Unity Station: Airpointer Wind Frequency Table for the Year 2017

Wind Direction Sector	Percent Data in each Wind Speed Range, wind speed unit km/hr					Totals
	$0 \leq WS < 5$	$5 \leq WS < 19$	$19 \leq WS < 39$	$39 \leq WS < 61$	$61 \leq WS$	
North NorthEast	1.1%	0.0%	0.0%	0.0%	0.0%	1.1%
NorthEast	2.6%	0.1%	0.0%	0.0%	0.0%	2.7%
East NorthEast	5.8%	3.2%	0.2%	0.0%	0.0%	9.2%
East	5.5%	3.4%	0.0%	0.0%	0.0%	9.0%
East SouthEast	5.4%	7.2%	0.0%	0.0%	0.0%	12.6%
SouthEast	3.6%	4.3%	0.0%	0.0%	0.0%	7.9%
South SouthEast	1.9%	1.2%	0.0%	0.0%	0.0%	3.1%
South	1.3%	1.7%	0.0%	0.0%	0.0%	2.9%
South SouthWest	1.3%	1.4%	0.0%	0.0%	0.0%	2.7%
Southwest	1.5%	2.4%	0.1%	0.0%	0.0%	4.0%
West SouthWest	1.6%	3.5%	0.5%	0.0%	0.0%	5.6%
West	3.8%	7.5%	1.0%	0.0%	0.0%	12.4%
West NorthWest	7.0%	9.7%	1.3%	0.1%	0.0%	18.0%
NorthWest	5.1%	0.9%	0.0%	0.0%	0.0%	6.0%
North NorthWest	1.9%	0.1%	0.0%	0.0%	0.0%	2.0%
North	0.9%	0.0%	0.0%	0.0%	0.0%	0.9%
Total	50.3%	46.4%	3.1%	0.1%	0.0%	100.0%

Percent Calm (<1 km/hr)	1.7%
Number of Valid Hourly-Average Data	8723
Total Workable Hours in Time Period	8760



APPENDIX G. WYAMZ EXCEEDANCE SUMMARY

Table G-1 Kindersley Station: Summary of Exceedances for 24-hour SAAQS for the Year 2017

24-Hour Exceedance Pollutant			Average of Other Parameters During the Exceedance Event				
Pollutant	Conc.	Exceedance Day dd-mmm-yy	WS km/hr	WD deg	Rain* mm	SO ₂ ppb	H ₂ S ppb
PM _{2.5}	32.1	20-Jul-17	8.3	91.6	0.0	0.3	0.5
PM _{2.5}	29.1	31-Aug-17	8.8	212.1	-	0.1	0.4
PM _{2.5}	37.3	06-Sep-17	5.6	182.0	-	0.1	0.1
PM _{2.5}	42.5	07-Sep-17	6.5	109.0	-	0.2	0.3
PM _{2.5}	31.2	08-Sep-17	15.1	145.1	-	0.2	0.4
PM _{2.5}	41.4	09-Sep-17	10.5	196.5	-	0.4	0.6

*Rain is total, not average

Table G-2 Maidstone Station: Summary of Exceedances for 1-hour SAAQS for the Year 2017

1-Hour Exceedance Pollutant			Average of Other Parameters During the Exceedance Event							
Pollutant	Conc.	Exceedance Time	WS	WD	AQI	Rain*	SO ₂	NO ₂	H ₂ S	PM _{2.5}
		dd-mmm-yy hh:mm	km/hr	deg	-	mm	ppb	ppb	ppb	µg/m ³
H ₂ S	11.6	15-Jul-17 03:00	1.5	206.4	22.7	-	0.3	9.9	11.6	16.8
H ₂ S	11.8	15-Jul-17 04:00	1.2	169.9	21.2	-	0.3	6.3	11.8	15.9
H ₂ S	11.2	15-Jul-17 05:00	1.3	145.1	19.0	-	0.2	5.1	11.2	14.5
H ₂ S	12.8	17-Jul-17 19:00	13.7	300.8	1.6	1.3	0.2	0.6	12.8	1.3
H ₂ S	13.8	17-Jul-17 20:00	10.8	301.7	1.3	-	0.2	1.4	13.8	1.0
H ₂ S	13.9	17-Jul-17 21:00	10.2	308.4	1.2	-	0.2	1.4	13.9	1.0
H ₂ S	15.2	17-Jul-17 22:00	8.6	322.9	0.9	-	0.3	0.6	15.2	0.7
H ₂ S	16.1	17-Jul-17 23:00	4.8	288.5	1.1	-	0.2	2.0	16.1	0.9
H ₂ S	11.5	18-Jul-17 08:00	6.8	305.2	1.9	-	0.3	2.2	11.5	1.5
H ₂ S	11.8	18-Jul-17 23:00	1.4	207.2	-	-	0.3	2.0	11.8	-
H ₂ S	21.1	19-Jul-17 01:00	1.9	261.0	-	-	0.3	5.6	21.1	-
H ₂ S	13.7	19-Jul-17 02:00	3.7	325.4	-	-	0.3	5.3	13.7	-
H ₂ S	18.5	19-Jul-17 03:00	1.5	291.8	-	-	0.2	6.6	18.5	-
H ₂ S	19.5	19-Jul-17 04:00	1.6	282.2	-	-	0.2	5.1	19.5	-
H ₂ S	18.2	19-Jul-17 05:00	3.6	321.9	-	-	0.3	5.7	18.2	-
H ₂ S	29.1	26-Jul-17 06:00	1.4	128.8	4.7	-	0.2	5.9	29.1	3.8
H ₂ S	12.7	26-Jul-17 07:00	3.4	133.6	4.4	-	0.3	4.9	12.7	3.5
H ₂ S	24.2	3-Aug-17 04:00	0.9	231.7	16.1	-	0.1	5.6	24.2	12.7
H ₂ S	18.2	3-Aug-17 05:00	1.2	188.5	16.6	-	0.1	10.2	18.2	13.0
H ₂ S	26.2	6-Aug-17 05:00	1.4	215.5	-	-	0.2	7.8	26.2	-
H ₂ S	27.6	6-Aug-17 06:00	1.8	156.6	-	-	0.1	6.2	27.6	-
H ₂ S	15.1	6-Aug-17 07:00	3.1	148.7	-	-	0.2	4.8	15.1	-
H ₂ S	12.0	27-Aug-17 05:00	1.3	169.7	9.6	-	0.2	7.3	12.0	7.7
H ₂ S	14.4	27-Aug-17 06:00	1.6	172.4	19.1	-	0.2	7.4	14.4	14.6
H ₂ S	12.8	11-Sep-17 06:00	1.7	192.8	2.0	-	0.2	4.7	12.8	1.6

*Rain is total, not average

Table G-3 Maidstone Station: Summary of Exceedances for 24-hour SAAQS for the Year 2017

24-Hour Exceedance Pollutant			Average of Other Parameters During the Exceedance Event							
Pollutant	Conc.	Exceedance Day dd-mmm-yy	WS km/hr	WD deg	AQI -	Rain* mm	SO ₂ ppb	NO ₂ ppb	H ₂ S ppb	PM _{2.5} µg/m ³
H ₂ S	5.8	17-Jul-17	7.8	286.5	44.4	1.3	0.3	1.5	5.8	16.1
H ₂ S	5.0	19-Jul-17	4.9	255.6	36.6	-	0.5	3.2	5.0	19.9
H ₂ S	4.4	06-Aug-17	10.6	207.1	21.6	-	0.3	3.2	4.4	12.3
PM _{2.5}	39.1	08-Sep-17	3.4	152.3	27.6	-	0.6	2.4	1.2	39.1
PM _{2.5}	29.1	09-Sep-17	3.7	238.0	15.5	-	0.7	4.1	1.2	29.1

*Rain is total, not average

Table G-4 Meadow Lake Station: Summary of Exceedances for 24-hour SAAQS for the Year 2017

24-Hour Exceedance Pollutant			Average of Other Parameters During the Exceedance Event					
Pollutant	Conc.	Exceedance Day dd-mmm-yy	WS km/hr	WD deg	AQHI -	Rain* mm	NO ₂ ppb	O ₃ ppb
PM _{2.5}	30.8	30-Aug-17	10.5	122.3	3.0	-	0.6	29.6
PM _{2.5}	30.1	31-Aug-17	6.2	226.7	2.7	-	1.0	23.6
PM _{2.5}	41.6	07-Sep-17	4.5	142.7	3.2	-	0.7	22.8
PM _{2.5}	57.4	08-Sep-17	5.6	140.3	4.9	-	0.9	40.1

*Rain is total, not average

Table G-5 Unity Station: Summary of Exceedances for 24-hour SAAQS for the Year 2017

24-Hour Exceedance Pollutant			Average of Other Parameters During the Exceedance Event					
Pollutant	Conc.	Exceedance Day dd-mmm-yy	WS km/hr	WD deg	AQHI -	Rain* mm	NO ₂ ppb	O ₃ ppb
PM _{2.5}	28.9	20-Jul-17	4.9	79.1	-	0.1	0.3	27.9
PM _{2.5}	45.5	08-Sep-17	7.4	124.6	-	-	1.7	37.9
PM _{2.5}	30.6	09-Sep-17	6.9	188.8	-	-	3.2	33.0

*Rain is total, not average

APPENDIX H. 2017 FINANCIAL STATEMENTS

Western Yellowhead Air Management Zone Inc.
Financial Statements
December 31, 2017

Western Yellowhead Air Management Zone Inc.

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For the year ended December 31, 2017

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Management's Responsibility

To the Members of Western Yellowhead Air Management Zone Inc.:

Management is responsible for the preparation and presentation of the accompanying financial statements, including responsibility for significant accounting judgments and estimates in accordance with Canadian accounting standards for not-for-profit organizations and ensuring that all information in the annual report is consistent with the statements. This responsibility includes selecting appropriate accounting principles and methods, and making decisions affecting the measurement of transactions in which objective judgment is required.

In discharging its responsibilities for the integrity and fairness of the financial statements, management designs and maintains the necessary accounting systems and related internal controls to provide reasonable assurance that transactions are authorized, assets are safeguarded and financial records are properly maintained to provide reliable information for the preparation of financial statements.

The Board of Directors is composed primarily of Directors who are neither management nor employees of the Organization. The Board is responsible for overseeing management in the performance of its financial reporting responsibilities, and for approving the financial information included in the annual report. The Board fulfils these responsibilities by reviewing the financial information prepared by management and discussing relevant matters with management and external auditors. The Board is also responsible for recommending the appointment of the Organization's external auditors.

MNP LLP is appointed by the members to audit the financial statements and report directly to them; their report follows. The external auditors have full and free access to, and meet periodically and separately with, both the Board and management to discuss their audit findings.

March 22, 2018


Executive Director

Independent Auditors' Report

To the Members of Western Yellowhead Air Management Zone Inc.:

We have audited the accompanying financial statements of Western Yellowhead Air Management Zone Inc. which comprise the statement of financial position as at December 31, 2017 and the statements of operations and changes in net assets and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the evidence we have obtained in our audit is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of Western Yellowhead Air Management Zone Inc. as at December 31, 2017 and the results of its operations and cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

Saskatoon, Saskatchewan

March 22, 2018

MNP LLP

Chartered Professional Accountants

Western Yellowhead Air Management Zone Inc.

Statement of Financial Position

As at December 31, 2017

	2017	2016
Assets		
Current		
Cash resources	133,480	121,851
Short term investment (Note 4)	101,150	100,000
Prepaid expenses	3,806	3,806
	238,436	225,657
Capital assets (Note 3)	177,368	199,932
	415,804	425,589
Liabilities		
Current		
Accounts payable and accruals	17,854	17,756
Goods and Services Tax payable	1,744	3,050
Current portion of deferred contributions (Note 5)	20,000	40,000
	39,598	60,806
Deferred contributions (Note 5)	-	20,000
	39,598	80,806
Net Assets		
Unrestricted net assets	376,206	344,783
	415,804	425,589

Approved on behalf of the Board of Directors




The accompanying notes are an integral part of these financial statements

Western Yellowhead Air Management Zone Inc.
Statement of Operations and Changes in Net Assets

For the year ended December 31, 2017

	2017	2016
Revenue		
Membership fees	159,991	151,476
Amortization of deferred contributions (Note 5)	40,000	40,000
Interest	1,600	-
	201,591	191,476
Expenses		
Amortization	43,248	49,983
Consulting	-	4,000
Insurance	5,930	5,511
Management fees	49,980	39,800
Meetings	1,343	1,644
Monitoring	50,430	47,598
Office supplies	489	1,276
Professional fees	6,138	6,041
Promotion	75	2,862
Repairs and maintenance	10,493	389
Telephone	1,835	1,743
Travel	207	466
	170,168	161,313
Excess of revenue over expenses	31,423	30,163
Net assets, beginning of year	344,783	314,620
Net assets, end of year	376,206	344,783

The accompanying notes are an integral part of these financial statements

Western Yellowhead Air Management Zone Inc.

Statement of Cash Flows

For the year ended December 31, 2017

	2017	2016
Cash provided by (used for) the following activities		
Operating		
Excess of revenue over expenses	31,423	30,163
Amortization	43,248	49,983
Amortization of deferred contributions	(40,000)	(40,000)
	34,671	40,146
Changes in working capital accounts		
Accounts payable and accruals	98	(900)
Goods and Service Tax payable	(1,306)	188
	33,463	39,434
Investing		
Purchase of short term investment	(101,150)	(100,000)
Proceeds on disposal of short term investment	100,000	-
Purchase of capital assets	(20,684)	-
	(21,834)	(100,000)
Increase (decrease) in cash resources	11,629	(60,566)
Cash resources, beginning of year	121,851	182,417
Cash resources, end of year	133,480	121,851

The accompanying notes are an integral part of these financial statements

Western Yellowhead Air Management Zone Inc.

Notes to the Financial Statements

For the year ended December 31, 2017

1. Incorporation and nature of the organization

Western Yellowhead Air Management Zone Inc. (the "Organization") was incorporated under The Non-Profit Corporations Act of Saskatchewan on February 14, 2012.

The Organization collects and monitors ambient air quality data in Northwest Saskatchewan and makes the data available to all members.

2. Significant accounting policies

The financial statements have been prepared in accordance with Canadian accounting standards for Not-for-profit organizations using the following significant accounting policies:

Revenue recognition

The Organization follows the deferral method of accounting for contributions. Restricted contributions are recognized as revenue in the year in which the related expenses are incurred. Unrestricted contributions are recognized as revenue when received. Membership fees are recognized when received. Grants are recognized as revenue when the amount to be received can be reasonably estimated and ultimate collection is reasonably assured.

Financial instruments

The Organization recognizes its financial instruments when the Organization becomes party to the contractual provisions of the financial instrument. All financial instruments are initially recorded at their fair value, including financial assets and liabilities originated and issued in related party transactions with management.

At initial recognition, the Organization may irrevocably elect to subsequently measure any financial instrument at fair value. The Organization has not made such an election during the year. All financial assets and liabilities are subsequently measured at cost or amortized cost.

Transaction costs and financing fees are added to the carrying amount for those financial instruments subsequently measured at amortized cost or cost.

Financial asset impairment

The Organization assesses impairment of all of its financial assets measured at cost or amortized cost. The Organization groups assets for impairment testing when available information is not sufficient to permit identification of each individually impaired financial asset in the group. Management considers whether there has been a breach in contract, such as a default or delinquency in interest or principal payments in determining whether objective evidence of impairment exists. When there is an indication of impairment, the Organization determines whether it has resulted in a significant adverse change in the expected timing or amount of future cash flows during the year. If so, the Organization reduces the carrying amount of any impaired financial assets to the highest of: the present value of cash flows expected to be generated by holding the assets; the amount that could be realized by selling the assets; and the amount expected to be realized by exercising any rights to collateral held against those assets. Any impairment, which is not considered temporary, is included in current year excess of revenues over expenses.

The Organization reverses impairment losses on financial assets when there is a decrease in impairment and the decrease can be objectively related to an event occurring after the impairment loss was recognized. The amount of the reversal is recognized in the excess of revenues over expenses in the year the reversal occurs.

Short term investments

Short term investments with prices that are not quoted in an active market are measured at cost less impairment. They consist of Guaranteed Investment Certificates.

Western Yellowhead Air Management Zone Inc.
Notes to the Financial Statements
For the year ended December 31, 2017

2. Significant accounting policies *(Continued from previous page)*

Capital assets

Purchased capital assets are recorded at cost. Contributed capital assets are recorded at fair value at the date of contribution if fair value can be reasonably determined.

Amortization is provided using the declining balance method at rates intended to amortize the cost of assets over their estimated useful lives.

	Rate
Website	50 %
Equipment	20 %

Long-lived assets

Long-lived assets consist of capital assets. Long-lived assets held for use are measured and amortized as described in the applicable accounting policies.

When the Organization determines that a long-lived asset no longer has any long-term service potential to the Organization, the excess of its net carrying amount over any residual value is recognized as an expense in the statement of operations. Write-downs are not reversed.

Deferred contributions related to capital assets

Deferred contributions related to capital assets represent the unamortized portion of contributed capital assets and restricted contributions that were used to purchase the Organization's equipment. Recognition of these amounts as revenue is deferred to periods when the related capital assets are amortized.

Measurement uncertainty

The preparation of financial statements in conformity with Canadian accounting standards for not-for-profit organizations requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period.

Amortization is based on the estimated useful lives of capital assets.

These estimates and assumptions are reviewed periodically and, as adjustments become necessary they are reported in excess of revenues and expenses in the periods in which they become known.

3. Capital assets

	Cost	Accumulated amortization	2017 Net book value	2016 Net book value
Website	7,956	1,989	5,967	-
Equipment	441,318	269,917	171,401	199,932
	449,274	271,906	177,368	199,932

4. Short term investment

Balance consists of a \$101,150 (2016 - \$100,000) Guaranteed Investment Certificate with an interest rate of 1.20% (2016 - 1.15%) maturing on December 20, 2018 (2016 - December 20, 2017).

Western Yellowhead Air Management Zone Inc.
Notes to the Financial Statements
For the year ended December 31, 2017

5. Deferred contributions

Deferred contributions consist of externally restricted grants for the reimbursement of the purchase of four airpointers. Recognition of these amounts as revenue is amortized over the useful life of the related assets. Changes in the deferred contribution balance are as follows:

	2017	2016
Balance, beginning of year	60,000	100,000
Less: Amount recognized as revenue	(40,000)	(40,000)
	20,000	60,000
Less: current portion	20,000	40,000
Balance, end of year	-	20,000

6. Related party transactions

The Organization has entered into a contract agreement for management services, expiring December 2019. The contract is based on hours required, to a maximum of \$50,000. Any overage is required to be approved by the Board of Directors. Included in expenses for the current year are \$49,980 (2016 - \$39,800) of management fees. The expenses were incurred in the normal course of operations and measured at the exchange amount, which is the amount of consideration established and agreed to by the related parties.

7. Financial instruments

The Organization, as part of its operations, carries a number of financial instruments. It is management's opinion that the Organization is not exposed to significant interest, currency, credit, liquidity or other price risks arising from these financial instruments except as otherwise disclosed.

Liquidity risk

Liquidity risk is the risk that the Organization will encounter difficulty in meeting obligations associated with financial liabilities. The Organization's exposure to liquidity risk is dependent on the collection of membership fee revenue and obligations to sustain operations.

8. Commitment

The Organization has entered into a contract agreement for the operation and maintenance of airpointer monitoring stations, expiring June 30, 2018. Payments remaining on the contract total \$22,348.

9. Comparative figures

Certain comparative figures have been reclassified to conform with current year presentation.

APPENDIX I. WYAMZ BOARD OF DIRECTORS

Cory Laferriere Board Chair (Nutrien Potash)



Cory Laferriere, grew up in northeast rural Saskatchewan and moved to Saskatoon and attended the University of Saskatchewan, attaining a BSc in Geographical Sciences. In pursuit of a career in the environmental sector, Cory relocated to Alberta and spent the next fifteen years in the oil in gas industry, providing environmental support as an Environmental Field Technician. Cory has taken employment with Agrium as an Environmental Coordinator with the Vanscoy Potash Operation which duties include the responsibility to maintain the facility license to operate and manage the continual site environmental improvement plans.

Brad Sigurdson Board Vice-Chair (Saskatchewan Mining Association)



Mr. Sigurdson is the Manager, Environment and Safety for the Saskatchewan Mining Association (SMA) and he brings nearly 25 years of mining, industrial and government experience to this role; including working in both Canadian and U.S. mining operations as well as previously with the Ministry of Environment as Manager of the Potash and Central Operations Section. During his time with the Ministry of Environment he acted as the advisor to the Industrial Content Committee during the development of the Saskatchewan Environmental Code. Mr. Sigurdson has indicated that "It is a privilege to be a member of the WYAMZ Board and I really enjoy working with a group of individuals that are committed to working in a collaborative and cooperative manner with a common goal of ensuring excellent air quality in our Air Management Zone"

Phil Burry Secretary Treasurer (Husky Energy Upstream)



Mr. Burry is the Team Lead, Upstream Environmental Operations for Husky Energy, based in Lloydminster, Saskatchewan. Phil is a Professional Agrologist with approximately 15 years environmental management experience. He provides technical/regulatory support regarding air, water, waste, biophysical, spill and site remediation projects. Actively engaging key stakeholders is another key responsibility of his current position with Husky. He is very interested in furthering his understanding of regional air quality issues.

David Henry Member (Saskatchewan Environmental Society)



David Henry has been an active member of the Saskatchewan Environmental Society since 2008. In 2007, he retired from his position as conservation ecologist for Parks Canada in the Yukon Territory. In that work, he developed an ecological monitoring program for each national park in the Yukon. He is presently an Adjunct Professor, Faculty of Environmental Design, University of Calgary. In the past working with others, he coordinated the public campaigns that were instrumental in the establishment Grasslands National Park and the revision of Canada's National Parks Act.

Gary Ericson

Member (Saskatchewan Ministry of Energy and Resources)



Mr. Ericson is the Regional Manager of the Lloydminster Office of The Ministry of Energy and Resources and holds an ASCT. Designation with the Saskatchewan Applied Science Technologists and Technicians. He graduated from Kelsey Institute of Applied Arts and Sciences in Saskatoon with a Diploma in Mechanical Engineering Technology in 1979. He has over 34 years of oil and gas development experience and considered to be one of our Ministry's foremost heavy oil well development and production expert. Mr. Ericson has extensive experience in the upstream Petroleum and Natural Gas Industry relating to drilling, servicing, and production issues gained through his years as a field technician and a manager

Shelley Kirychuk Member (University of Saskatchewan)

Dr. Shelley Kirychuk is a nurse and holds Masters and PhD Degrees in Preventative Medicine and occupational hygiene. She is an Associate Professor at the University of Saskatchewan's Department of Medicine in the division of the Canadian Centre for Health and Safety in Agriculture. Her research and extension activities focus on environmental epidemiology and more specifically respiratory exposures and respiratory health of occupational, rural and agricultural populations.

Darren Letkeman Member (Environmental Protection Branch – Ministry of Environment)

Mr. Letkeman is an Environmental Protection Officer with the Industrial Branch of the Ministry of Environment and has been with the ministry since 1998. He has extensive regulatory experience in Northwestern Saskatchewan, and has worked with municipal, commercial, and industrial operations. Prior to working for the ministry, Darren worked 6 years as an Environmental Co-ordinator for an industrial wood processing facility.

Aaron Studer Member (Husky Energy Downstream)

Aaron Studer joined Husky in 2004, and is currently leading a team of 5 environmental specialists tasked with maintaining environmental compliance at Husky's Downstream Assets in the Lloydminster area. He has worked extensively in the environmental field for 6 years, and was previously working for an international environmental consulting firm. His areas of experience include project and office management; all aspects of groundwater well installation, monitoring, sampling, and reporting; Phase I and II assessments; contaminated site remediation; and licensing, construction and commissioning of new facilities. He has technical experience in reclamation assessments, lease construction, drilling, service, and operations.

Terry Gibson

Executive Director



Mr. Gibson brings more than 30 years of Public Health/Environmental Health experience to the position. He has held the positions of President of the Saskatchewan Public Health Association and Vice-Chair of the Saskatchewan Epidemiology Association. He teaches Public Health Protection at the University of Saskatchewan Master of Public Health Program and has served on many provincial and national boards and committees. Terry is committed to working with industry and regulators in a consensus decision making process to ensure that the health of the environment of Saskatchewan is always protected.

APPENDIX J. WYAMZ MEMBER COMPANIES

The Western Yellowhead Air Management Zone would like to express our gratitude to our members in good standing for their support of WYAMZ, for their very strong support regarding quality air data collection, and for their commitment to the citizens and environment of Saskatchewan.

For information on how to become a member, please contact Terry Gibson, Executive Director at 306.491.9198.

- 101173425 Saskatchewan Ltd.
- 5 Star Resources
- Agrium Inc.
- Akzo Nobel
- Alta Gas
- Bayhurst Gas
- Baytex Energy Ltd.
- Beaumont Energy
- Black Pearl Resources
- Bruin Oil and Gas
- Buzzard Resources
- Caltex Resources
- Canadian Natural Resources Limited
- Can-Expo
- Carrier Forest
- Cenovus Energy
- Chinook Resources
- City of Saskatoon
- Compass Minerals
- Conoco Phillips
- Cory ATCO Operations
- Crescent Point
- Crocotta Energy
- Crocus Oil
- Devon Canada Corporation
- Enerplus Corporation
- ERCO Worldwide
- Gear Energy
- Halo Exploration
- Husky Oil Operations Limited
- Hyzer Energy
- Ish Energy
- Leeco Resources
- Longhorn Oil and Gas
- Longview Oil
- Modexco Petroleum
- Meridian Cogeneration Power
- Mosaic
- NAL Resources Limited
- North Battleford Power L.P.
- North West Bio Energy
- Northern Blizzard
- Novus Energy Inc.
- P&H Milling
- Palliser Oil and Gas
- Pengrowth Energy Corporation
- Plasti-Fab
- Potash Corp
- Prosper Petroleum
- Raven Resources
- Renegade Petroleum
- Rife Resources
- Rifle Shot Oil
- Saputo Products
- SaskEnergy Incorporated/ TransGas Limited
- Sask Power
- Secure Energy Services Inc.
- Serafina Energy
- Smitty's Farms
- Sojourn Energy
- Spartan Energy
- Sphere Energy
- Spur Resources
- SSSS Oil Partnership
- Tamarack Valley
- Talisman Energy
- Tuscany Energy
- Viterro
- West Lake Twin Butte
- Zelmar Energy

