

2022 Annual Report



Western Yellowhead Air Management Zone

Prepared by: WSP E&I Canada Limited (formerly Wood Environment & Infrastructure Solutions) 5681 - 70 Street Edmonton, Alberta T6B 3P6

> For more information, please contact: Glen White Executive Director Western Yellowhead Air Management Zone Phone: (306) 227-8548 E-mail: wyamz@sasktel.net

TABLE OF CONTENTS

| List of Tables | i |
|-------------------------------------|----|
| List of Figures | ii |
| List of Appendices | ii |
| List of Terms and Definitions | iv |
| Units of Measurement | iv |
| | |
| MESSAGE FROM THE EXECUTIVE DIRECTOR | V |
| | |

| | | 1/1 |
|-----|--|-----|
| EXE | | VI |
| 1.0 | | 1 |
| 1.1 | WYAMZ MISSION | 2 |
| 1.2 | WYAMZ AIR MONITORING NETWORK | 2 |
| 2.0 | AIR QUALITY MONITORING | 6 |
| 2.1 | SUMMARY OF EXCEEDANCES ABOVE THE SAAQS | 6 |
| 2.2 | WIND | 7 |
| 2.3 | CONTINUOUS AIR QUALITY DATA | 9 |
| | 2.3.1 Sulphur Dioxide (SO ₂) | 9 |
| | 2.3.2 Hydrogen Sulphide (H ₂ S) | 12 |
| | 2.3.3 Oxides of Nitrogen (NOx) | 15 |
| | 2.3.4 Ozone (O ₃) | 19 |
| | 2.3.5 Fine Particulate Matter (PM _{2.5}) | 22 |
| 2.4 | AIR QUALITY HEALTH INDEX (AQHI) | 26 |
| 2.5 | AIR QUALITY INDEX (AQI) | 27 |

Page

TABLE OF CONTENTS

LIST OF TABLES

Page

| Table 1 | Annual average concentrations for continuous parameters for 2022 | vii |
|-----------|--|----------|
| Table 2 | WYAMZ ambient air continuous monitoring stations and the measurement param | neters.5 |
| Table 3. | Number of exceedance events for 2022 | 6 |
| Table 4. | Summary statistics for SO ₂ measurement results for 2022 | 10 |
| Table 5. | Number of exceedance events for SO ₂ for 2022 | 10 |
| Table 6. | Summary statistics for H ₂ S measurement results for 2022 | 13 |
| Table 7. | Number of exceedance events for H ₂ S for 2022 | 13 |
| Table 8. | Summary statistics for NO2 measurement results for 2022 | 16 |
| Table 9. | Number of exceedance events for NO ₂ for 2022 | 16 |
| Table 10. | Summary statistics for O_3 measurement results for 2022 | 20 |
| Table 11. | Number of exceedance events for O ₃ for 2022 | 20 |
| Table 12. | Summary statistics for PM _{2.5} measurement results for 2022 | 23 |
| Table 13. | Number of exceedance events for PM _{2.5} for 2022 | 23 |
| Table 14. | Summary of occurrence statistics for AQHI rating | 27 |
| Table 15. | AQI rating and effect description | 28 |
| Table 16. | Summary of occurrence statistics for AQI rating | 28 |

TABLE OF CONTENTS

LIST OF FIGURES

Page

| Figure 1. | The Western Yellowhead Air Management Zone (WYAMZ) | 3 |
|------------|--|----|
| Figure 2 | Locations of the continuous air monitoring stations in the WYAMZ zone | 4 |
| Figure 3. | Wind roses for 1-hour average wind data for 2022 | 8 |
| Figure 4. | Pollutant rose for 1-hour average SO ₂ data at the Maidstone station | 11 |
| Figure 5. | Pollutant rose for 1-hour average SO ₂ data at the Kerrobert station | 11 |
| Figure 6. | Pollutant rose for 1-hour average H ₂ S data at the Maidstone station | 14 |
| Figure 7. | Pollutant rose for 1-hour average H ₂ S data at the Kerrobert station | 14 |
| Figure 8. | Pollutant rose for 1-hour average NO ₂ data at the Maidstone station | 17 |
| Figure 9. | Pollutant rose for 1-hour average NO ₂ data at the Clavet station | 17 |
| Figure 10 | Pollutant rose for 1-hour average NO ₂ data at the Meadow Lake City station | 18 |
| Figure 11. | Pollutant rose for 1-hour average O ₃ data at the Clavet station | 21 |
| Figure 12. | Pollutant rose for 1-hour average O ₃ data at the Meadow Lake City station | 21 |
| Figure 13. | Pollutant rose for 1-hour average PM _{2.5} data at the Maidstone station | 24 |
| Figure 14. | Pollutant rose for 1-hour average PM _{2.5} data at the Clavet station | 24 |
| Figure 15. | Pollutant rose for 1-hour average PM _{2.5} data at the Kerrobert station | 25 |
| Figure 16. | Pollutant rose for 1-hour average PM _{2.5} data at the Meadow Lake City station | 25 |
| Figure 17. | Health risk classification and health messages for Air Quality Health Index | |
| (Environm | ent Canada) | 26 |

LIST OF APPENDICES

- APPENDIX A. Saskatchewan Ambient Air Quality Standards
- APPENDIX B. Maidstone Station: Continuous Monitoring Data
- APPENDIX C. Clavet Station: Continuous Monitoring Data
- APPENDIX D. Kerrobert Station: Continuous Monitoring Data
- APPENDIX E. Meadow Lake City: Continuous Monitoring Data
- APPENDIX F. WYAMZ Exceedance Summary
- APPENDIX G. 2022 Financial Statements
- APPENDIX H. WYAMZ Board of Directors
- APPENDIX I. WYAMZ Member Companies

List of Terms and Definitions

- 24-hour A calendar day, average is calculated midnight-to-midnight.
- 8-hour 8-hour running average for O₃ Canada-Wide Standards.
- SAAQS Saskatchewan Ambient Air Quality Standard
- AIC Automatic Instrument Check (instrument self-verification process)
- Calm 1-hour average wind speed lower than 1 km/hour
- CWS Canada-Wide-Standards
- ET Ambient temperature
- H₂S Hydrogen sulphide
- NO₂ Nitrogen dioxide
- NO Nitric oxide
- NOx Oxides of nitrogen
- O₃ Ozone
- PM_{2.5} Particulate matter with aerodynamic diameter less than 2.5 μm, referred to as fine or respirable particles
- QA/QC Quality Assurance / Quality Control
- RH Relative humidity
- SO₂ Sulphur dioxide
- WD Wind direction
- WS Wind speed

Units of Measurement

- average arithmetic average = n Xi / n
- kph kilometre per hour
- μg/m³ microgram per cubic meter
- ppb part per billion by volume
- mm millimeter of precipitation
- °C degree centigrade
- % percent of relative humidity, instrument uptime, etc.
- Degree angle of wind direction from true north

MESSAGE FROM THE EXECUTIVE DIRECTOR

On behalf of the Western Yellowhead Air Management Zone (WYAMZ) Board of Directors, I would like to thank the association members for their commitment to air quality improvement and for the ongoing financial support that keeps our association viable and able to respond to the needs of WYAMZ members. 2022 members and a summary of membership benefits is included in Appendix I.

WYAMZ is an independent, collaborative non-profit organization of industry, government, and other representatives formed for the purpose of collecting high quality continuous air quality data. Through diverse stakeholder representation, the association strives to recognize concerns specific to the air zone and encourage solutions to address these needs.

WYAMZ operates, maintains and reports on 4 ambient air quality monitoring stations called Airpointers. These Airpointers work in combination with 2 Airpointer stations operated by Cenovus in the Lloydminster area and the National Air Pollution Surveillance Program (NAPS) station in Saskatoon. This equipment collectively provides an extensive ambient air quality monitoring and data collection network across the air zone. Data for both the WYAMZ and Cenovus stations is available in real time on our website @ www.wyamz.ca. The WYAMZ data for 2022 is summarized in this annual report. This data, as well as data for previous years, is available in electronic form upon request by member organizations, government agencies, and the general public.

WYAMZ also supports the use of Purple Air Monitoring (PAM) devices as a cost-effective way to extend particulate monitoring to more WYAMZ communities. Our intention is to help communities make use of government environmental and Indigenous air quality monitoring initiatives to keep costs to a minimum. A link to the real time worldwide Purple Air monitoring network is also provided on the WYAMZ website.

WYAMZ is now participating in a Saskatchewan MOE led 2021 initiative to include air zone associations in the development of Air zone Management Plans (AMP)s. Our goal is to have our data accepted and used along with NAPS station to better characterize our air zone beyond what is achieved using the NAPS station data alone. The SK ENV group is undertaking audits of the air zone association data and data collection protocols in 2023 to support this effort.

We will continue WYAMZ industry and public outreach programs in 2023, taking the opportunities to demonstrate our efforts to ensure good ambient air quality and cost-effective, well managed air quality management programs in our air zone. We also use these opportunities to highlight the names of our current industrial members and look for other opportunities to showcase our efforts to other potential members. Our public outreach programs in 2023 will include sponsoring school science fairs events and awards, as well as making presentations to interested school and community organizations within the air zone where the opportunity presents.

I look forward to reporting back on the success of these initiatives in next year's report.

EXECUTIVE SUMMARY

The Western Yellowhead Air Management Zone (WYAMZ), established in 2012, is the second air management association in Saskatchewan. WYAMZ is a collaborative group of industry, government, non-government organizations, and private citizens. The air management zone covers an area that stretches from east of Saskatoon to the Alberta border, and from north of Meadow Lake to south of Rosetown, as shown in Figure 1 of the main report. Major economic activities in the region include agriculture, oil and gas, mining, power generation, and transportation.

WYAMZ manages a continuous air monitoring network. Figure 2 of the main report illustrates spatial distribution of the air monitoring stations in the WYAMZ region. The continuous air monitoring network consists of four airpointers[®] at the Meadow Lake City, Maidstone, Clavet, and Kerrobert stations. Three additional continuous monitoring stations also operate within the WYAMZ region. A continuous air monitoring NAPS (National Air Pollution Surveillance Program) station is operated by the Ministry of Environment in Saskatoon, and the Cenovus East and West stations in Lloydminster are owned and operated by Cenovus Energy.

The WYAMZ network monitors sulphur dioxide (SO₂), hydrogen sulphide (H₂S), nitrogen oxides (NO, NO₂, NOx), ozone (O₃), fine particulate matter (PM_{2.5}), ambient temperature (ET), relative humidity (RH), precipitation, wind speed (WS) and wind direction (WD). The annual uptime for all analyzers was greater than 90% in 2022 for all stations. Monthly operational uptime was greater than 90% with the exception of nitrogen oxides (NO, NO₂, NOx) in August and September at Meadow Lake, SO₂/H₂S in August at Kerrobert and PM_{2.5} in September at Maidstone.

Table 1 summarizes the annual average concentration data for January to December 2022; the measured air quality was within the Saskatchewan Ambient Air Quality Standards (SAAQS), with the exception of PM_{2.5}. There was a total of seven exceedance events 24-hour average PM_{2.5}. The air quality at the WYAMZ air monitoring stations was rated Low Risk or Good for more than 99% of the time according to the Air Quality Health Index and Air Quality Index.

| Pollutant | ant Conc. Unit — | Annual Average Concentration for Continuous Data | | | | |
|-------------------|------------------|--|-----------|-----------|-------------|--|
| | | Clavet | Maidstone | Kerrobert | Meadow Lake | |
| SO ₂ | ppb | а | 0.6 | 0.1 | а | |
| H_2S | ppb | а | 0.2 | 0.2 | а | |
| NO | ppb | 1.4 | 0.6 | а | 0.9 | |
| NO ₂ | ppb | 4.5 | 3.0 | а | 2.8 | |
| NOx | ppb | 5.9 | 3.6 | а | 3.6 | |
| O ₃ | ppb | 30 | а | а | 26 | |
| PM _{2.5} | µg/m³ | 3 | 4 | 5 | 6 | |

 Table 1
 Annual average concentrations for continuous parameters for 2022

a. Parameter was not monitored.

1.0 Introduction

The Western Yellowhead Air Management Zone (WYAMZ), established in 2012, is the second air management association 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.

Figure 1 illustrates the WYAMZ zone 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 the WYAMZ is currently voluntary. The current membership includes members of the agriculture, chemistry, oil and gas, mining and power generation sectors, as well as the public. The Government of Saskatchewan Ministry of Environment, Ministry of Economy, 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.

1.1 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 local air quality issues and to develop innovative solutions for managing these issues.

1.2 WYAMZ Air Monitoring Network

Figure 2 illustrates a map 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 seven continuous air monitoring stations in the region. The Meadow Lake City, Maidstone, Clavet and Kerrobert stations are owned and operated by WYAMZ; the Saskatoon NAPS station is owned and operated by the Ministry of Environment. The Cenovus East and West stations in Lloydminster are owned and operated by Cenovus.

WYAMZ operates four airpointers[®] at the Meadow Lake City, Maidstone, Clavet and Kerrobert stations. The network measures continuous data for sulphur dioxide (SO₂), hydrogen sulphide (H₂S), nitrogen oxides (NO, NO₂, NOx), ozone (O₃), fine particulate matter (PM_{2.5}), ambient temperature (ET), relative humidity (RH), precipitation, wind speed (WS) and wind direction (WD). Table 2 presents a combination matrix of the monitoring stations and the measured parameters. The airpointers[®] have been operating since December 1, 2013. Publicly available real-time air monitoring data is available on the WYAMZ website at: www.wyamz.ca.



Figure 1. The Western Yellowhead Air Management Zone (WYAMZ)



Figure 2 Locations of the continuous air monitoring stations in the WYAMZ zone

| Monitoring | Continuous air quality parameters measured in the WYAMZ network | | | | | | |
|-------------------|--|--------------|--------------|--------------|--|--|--|
| Parameters | Meadow Lake City | Maidstone | Clavet | Kerrobert | | | |
| SO ₂ | а | \checkmark | а | \checkmark | | | |
| H ₂ S | а | \checkmark | а | \checkmark | | | |
| NO | \checkmark | \checkmark | \checkmark | а | | | |
| NO ₂ | \checkmark | \checkmark | \checkmark | а | | | |
| NOx | \checkmark | \checkmark | \checkmark | а | | | |
| O ₃ | \checkmark | а | \checkmark | а | | | |
| PM _{2.5} | \checkmark | \checkmark | \checkmark | \checkmark | | | |
| Precipitation | \checkmark | \checkmark | \checkmark | \checkmark | | | |
| Ambient | \checkmark | \checkmark | \checkmark | \checkmark | | | |
| Relative Humidity | \checkmark | \checkmark | \checkmark | \checkmark | | | |
| Wind Speed | \checkmark | \checkmark | \checkmark | \checkmark | | | |
| Wind Direction | \checkmark | \checkmark | \checkmark | \checkmark | | | |

Table 2WYAMZ ambient air continuous monitoring stations and the measurement
parameters

a. Parameter was not monitored.

2.0 Air Quality Monitoring

2.1 Summary of 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 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 3 summarizes the Saskatchewan Ambient Air Quality Standards (SAAQS) and the number of exceedances recorded in 2022. A total of seven 24-hour PM_{2.5} exceedances were recorded for the WYAMZ air monitoring network.

| Parameter | No. of Stations | Average Type | SAAQS | No. of Exceedance |
|-------------------|--------------------|--------------|----------------------|----------------------|
| | | 1-hour | 172 ppb | 0 |
| SO ₂ | 2 | 24-hour | 48 ppb | 0 |
| | | Annual | 8 ppb | 0 |
| Ц.C | 2 | 1-hour | 11 ppb | 0 |
| П2 3 | 2 | 24-hour | 3.6 ppb | 0 |
| NO | Э | 1-hour | 159 ppb | 0 |
| | 5 | Annual | 24 ppb | 0 |
| 0 | 2 | 1-hour | 82 ppb | 0 |
| 03 | 2 — | 8-hour | 63 ppb CWS ª | 0 |
| PM _{2.5} | 4 | 24-hour | 28 µg/m ³ | 7 |

Table 3.Number of exceedance events for 2022

a. The 3-year average of the annual 4th-highest daily maximum 8-hour average concentrations

2.2 Wind

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.

Figure 3 presents the wind roses at the WYAMZ continuous monitoring stations. Generally, the prevailing wind speed was calm most of time. According to the international wind classification system, prevailing wind primarily consisted of Light Air (0.3 kph – 1.4 kph) and Light Breeze (1.4 kph – 3.1 kph), Moderate Breeze (3.1 kph – 7.8 kph) and fast wind (>7.8 kph). All stations wind speed ranges were Light Air, Light Breeze or Moderate Breeze most of the time.

The prevailing wind direction was not consistent among the four air monitoring stations. The Meadow Lake station was characterized with winds from the northwest and southeast quadrant. The Clavet station winds were primarily from the east. The Maidstone station was characterized with a prevalent wind from the northwest and southeast quadrant. Prevalent winds from the northwest and southwest were seen at the Kerrobert station.

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



Figure 3. Wind roses for 1-hour average wind data for 2022

2.3 Continuous Air Quality Data

2.3.1 Sulphur Dioxide (SO₂)

Sulphur dioxide (SO₂) is a colourless gas with a strong suffocating odour. It smells like burnt matches. At concentrations above 300 ppb, it can be detected by taste and odour. The health effects caused by exposure to high levels of SO₂ include breathing problems, respiratory illness, changes in lung function, and worsening respiratory and cardiovascular disease. People with asthma or chronic lung or heart disease are the most susceptible to SO₂. SO₂ also damages trees and crops.

SO₂, along with nitrogen oxides, are the main precursors of photochemical smog and acid rain, which contributes to the acidification of lakes and streams, accelerated corrosion of buildings, and reduced visibility. SO₂ in the air can form microscopic acid aerosols, which have serious health implications, as well as, contributing to climate change.

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 such as power plants, petroleum refineries, iron and steel mills, fertilizer plants, pulp and paper mills, and smelters, as well as small industries, such as small oil and gas plants, battery and well flares.

The Saskatchewan Ambient Air Quality Standards (SAAQS) for sulphur dioxide are:

- 1-hour average SAAQS = 172 ppb
- 24-hour average SAAQS = 48 ppb
- Annual average SAAQS = 8 ppb

Table 4 presents the summary statistics for SO₂ measurement results. The measured concentration was low at both stations. The concentration for 2022 was 0.6 ppb and 0.1 ppb at the Maidstone and Kerrobert stations, respectively. The maximum 1-hour average concentration of 15.2 ppb and the maximum 24-hour average concentration of 4.4 ppb were detected at the Maidstone station. There was no exceedance of the SAAAQS for 1-hour, 24-hour, and annual average concentrations (see Table 5).

Figures 4 and 5 present the pollutant roses for 1-hour average concentration for SO₂. For more than 95% of the time, SO₂ concentration was less than or equal to 1 ppb (blue petals); the concentration seldom exceeded 5 ppb (green petals). The higher concentration events (>1 ppb) tend to be detected more frequently when wind was from the southeast quadrant for Maidstone. The detailed frequency distribution tables for the pollutant roses are presented in the Appendices: Table C-2 and Table E-2.

| Monitoring | Annual Instrument | | Maximum SO ₂ Conc. and Occurrent Time | | | |
|------------|-------------------|--------|---|--------------|------|----------|
| Station | Average | Uptime | 1 | -hour Max. | 24-h | our Max. |
| | ppb | % | ppb | Time | ppb | Date |
| Maidstone | 0.6 | 99.8 | 15.2 | Dec-23 12:00 | 4.4 | Dec 8 |
| Kerrobert | 0.1 | 98.6 | 7.1 | Dec-25 07:00 | 1.0 | Dec 25 |

Table 4. Summary statistics for SO₂ measurement results for 2022

Table 5. Number of exceedance events for SO₂ for 2022

| Monitorina | No. of Exceedance of Saskatchewan SO₂ Ambient Air Quality Standard (SAAQS) | | | | | |
|------------|---|-------------|--------------|--|--|--|
| Station | 1-hr SAAQS | 24-hr SAAQS | Annual SAAQS | | | |
| | 172 ppb | 48 ppb | 8 ppb | | | |
| Maidstone | 0 | 0 | 0 | | | |
| Kerrobert | 0 | 0 | 0 | | | |



Figure 4. Pollutant rose for 1-hour average SO₂ data at the Maidstone station



Figure 5. Pollutant rose for 1-hour average SO₂ data at the Kerrobert station

2.3.2 Hydrogen Sulphide (H₂S)

Hydrogen sulphide (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, oil, 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.

Hydrogen sulfide is a highly toxic and flammable gas. It is heavier than air and tends to accumulate at the bottom of poorly ventilated spaces. Although very pungent at first, it quickly deadens the sense of smell. Potential victims may be unaware of its presence until it is too late.

The Saskatchewan Ambient Air Quality Standards (SAAQS) for hydrogen sulphide are:

- 1-hour average SAAQS = 11 ppb
- 24-hour average SAAQS = 3.6 ppb

Table 6 presents the summary statistics for H₂S measurement results. The measured concentration was low at both stations; the average concentration from 2022 were 0.2 ppb at both Maidstone and Kerrobert stations. The maximum 1-hour average concentration of 10.2 ppb and the maximum 24-hour average concentration of 1.4 ppb were both measured at the Maidstone station. There were no exceedances of the SAAAQS for 1-hour average concentration at the Maidstone station (see Table 7).

Figures 6 and 7 present the pollutant roses for 1-hour average H_2S . For more than 99% of time, H_2S concentration was less than or equal to 1 ppb (blue petals) at both stations. The higher concentrations (>1 ppb) at the Maidstone station tend to be slightly more frequent when wind was from the northwest and southeast directions. The higher concentration events at the Kerrobert station tend to be slightly more frequent when wind was from the northwest station tend to be slightly more frequent when wind was from the Nerrobert station tend to be slightly more frequent when wind was from the northwest quadrant, however the sample size was small.

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

| Monitoring | Annual Instrument | | Max | kimum H₂S Conc Tim | . and Oo e | currence |
|------------|-------------------|--------|------|-----------------------|---------------|----------|
| Station | Average | Uptime | 1 | -hour Max. | 24-h | our Max. |
| | ppb | % | ppb | Time | ppb | Date |
| Maidstone | 0.2 | 99.8 | 10.2 | July 18 06:00 | 1.4 | July 18 |
| Kerrobert | 0.2 | 98.6 | 3.9 | Sept 29 12:00 | 0.7 | Nov 11 |

Table 6. Summary statistics for H₂S measurement results for 2022

Table 7. Number of exceedance events for H_2S for 2022

| Monitoring | No. of Exceedances of Saskatchewan H₂S Ambient Air Quality Standard (SAAQS) | | | |
|------------|--|-------------|--|--|
| Station | 1-hr SAAQS | 24-hr SAAQS | | |
| | 11 ppb | 3.6 ppb | | |
| Maidstone | 0 | 0 | | |
| Kerrobert | 0 | 0 | | |



Figure 6. Pollutant rose for 1-hour average H₂S data at the Maidstone station



Figure 7. Pollutant rose for 1-hour average H₂S data at the Kerrobert station

2.3.3 Oxides of Nitrogen (NOx)

Nitrogen oxides, also known as oxides of nitrogen (NO_X), is a collective term for nitric oxide (NO) and nitrogen dioxide (NO₂). Nitric oxide is a colorless, flammable gas with a slight odour. Nitrogen dioxide 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.

 NO_X can cause respiratory disease, damage vegetation, and reduce visibility. The primary concern with NO_X emissions is their contribution to formation of ground-level ozone, smog and acid rain. To a lesser extent, some NO_X compounds (e.g. N_2O) contribute to stratospheric ozone layer depletion and global warming.

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. The major anthropogenic emission sources for NO_X are associated with fuel combustion, including both stationary sources, such as power plants, oil and gas industries, incinerators, as well as mobile sources such as automobiles. Non-combustion sources, for example nitric acid manufacture, welding processes and the 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. The Saskatchewan Ambient Air Quality Standards (SAAQS) for nitrogen dioxide are:

- 1-hour average SAAQS = 159 ppb
- Annual average SAAQS = 24 ppb

Table 8 presents the summary statistics for NO₂ measurement results. The Clavet station measured a higher concentration than the other two stations, with an annual average of 4.5 ppb. The average concentration recorded at the Maidstone station was 3.0 ppb and 2.8 ppb at Meadow Lake City station. Both the maximum 1-hour concentration and maximum 24-hour concentration were detected at the at the Meadow Lake City station. There was no exceedance of the 1-hour or annual SAAQS (see Table 9).

Figures 8 to 11 present the pollutant roses for 1-hour average concentrations for NO₂. The concentration at the Meadow Lake City station was the lowest among the three stations; for more than 84% of the time NO₂ concentration was less than 5 ppb. The >5 ppb events tend to be slightly more frequent when wind was from the west and southeast quadrants, however the sample size was too small to conclude the trend. At the Clavet station, 17.9% of the time NO₂ concentration was higher than 5 ppb. The >5

ppb events tend to be more frequent when wind was from the southwest and east directions. The NO₂ concentration was greater than 5 ppb at the Maidstone station 18.8% of the time; these events tend to be more frequent when wind was from the northwest and southeast quadrants. 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, NO_2 and NOx pollutant roses are presented in the Appendices: Tables B-2 to B-4, Tables C-4 to C-6, and Tables D-2 to D-4.

| Monitorina | Annual | Instrument | Maximum NO ₂ Conc. and Occurrence Time | | | |
|------------------|---------|------------|--|--------------|------|----------|
| Station | Average | Uptime | 1 | -hour Max. | 24-h | our Max. |
| | ppb | % | ppb | Time | ppb | Date |
| Maidstone | 3.0 | 99.8 | 26.8 | Dec 23 04:00 | 11.5 | Dec 10 |
| Clavet | 4.5 | 98.8 | 28.3 | Jan 25 00:00 | 10.6 | Dec 31 |
| Meadow Lake City | 2.8 | 97.7 | 44.3 | Mar 02 21:00 | 14.2 | Feb 21 |

Table 8. Summary statistics for NO2 measurement results for 2022

Table 9. Number of exceedance events for NO2 for 2022

| Monitorina | No. of Exceedances to Saskatchewan NO ₂ Ambient Air Quality Standard (SAAQS) | | | | | | | |
|------------------|--|--------------|--|--|--|--|--|--|
| Station | 1-hr SAAQS | Annual SAAQS | | | | | | |
| | 159 ppb | 24 ppb | | | | | | |
| Maidstone | 0 | 0 | | | | | | |
| Clavet | 0 | 0 | | | | | | |
| Meadow Lake City | 0 | 0 | | | | | | |



Figure 8. Pollutant rose for 1-hour average NO₂ data at the Maidstone station



Figure 9. Pollutant rose for 1-hour average NO₂ data at the Clavet station



Figure 10 Pollutant rose for 1-hour average NO₂ data at the Meadow Lake City station

2.3.4 Ozone (O₃)

Ozone (O₃) is a pale blue gas, slightly soluble in water. Most people can detect a sharp odour resembling chlorine bleach at about 10 ppb concentration. Ozone can be formed by electrical discharges and high energy electromagnetic radiation. In the indoor environments, ozone can be present as a result of electronic equipment such as ionic air purifiers, laser printers, photocopiers, and arc welders.

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 oxides of nitrogen (NO_X) and volatile organic compounds (VOC) in the presence of sunlight. Some research suggests that 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 are split opinions regarding relative importance of these mechanisms. A study in Regina suggested that high ozone events could be due to downward transport from the stratosphere for the reviewed data.

Exposure to ozone has been linked to premature mortality and a range of morbidity health end-points, such as hospital admissions and asthma symptoms. Acute exposure to high concentrations of ozone can cause eye irritation and breathing difficulty. 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.

The Saskatchewan Ambient Air Quality Standard (SAAQS) for ozone is:

• 1-hour average SAAQS = 82 ppb

The Canada-Wide Standard (CWS) for ozone is:

• 8-hour average CWS = 63 ppb; achievement evaluation is based on the 4th highest measurement annually, averaged over three consecutive years.

Table 10 presents the summary statistics for O_3 measurement results. The average concentration in 2022 was 30 ppb and 26 ppb respectively for Clavet and Meadow Lake City stations. The maximum 1-hour concentration of 71 ppb was detected at the Meadow Lake station while the 4th highest 8-hour running averages of 58 ppb was detected at the Clavet station. There were no 8-hour running averages higher than the CWS standard (see Table 11) recorded at Clavet.

Figures 11 to 12 present the pollutant roses for 1-hour average concentration of O_3 . The measured concentration was within 20 ppb to 40 ppb range for 60-70% of the time at both stations. There was no apparent directional trend for the higher concentration events (>40 ppb). The concentration of O_3 tends to be higher in the spring months.

The detailed frequency distribution table for the pollutant roses are presented in the Appendices: Table B-5 and Table D-5.

| Manitanina | Annual | Instrument | Maxi | imum O₃ Conc. a | c. and Occurrence Time | | |
|------------------|----------------|------------|------|-----------------|--------------------------------|---------------|--|
| Station | Average Uptime | | 1 | -hour Max. | 8-hour 4 th Highest | | |
| Station | ppb | % | ppb | Time | ppb | Time | |
| Clavet | 30 | 99.6 | 65 | Jun 18 18:00 | 58 | June 18 11:00 | |
| Meadow Lake City | 26 | 98.5 | 71 | Sep 26 15:00 | 48 | Mar 19 14:00 | |

Table 10. Summary statistics for O₃ measurement results for 2022

Table 11. Number of exceedance events for O_3 for 2022

| Monitoring | No. of Exceedances of Saskatchewan O ₃ Ambient Air Quality Standard (SAAQS) | | | | | | | |
|---------------|---|----------|--|--|--|--|--|--|
| Station | 1-hr SAAQS | 8-hr CWS | | | | | | |
| | 82 ppb | 63 ppb | | | | | | |
| Clavet | 0 | 0 | | | | | | |
| Meadow Lake C | ity 0 | 0 | | | | | | |

a. These events do not constitute an exceedance because the CWS standard is based on the 4th highest measurement annually, averaged over three consecutive years.



Figure 11. Pollutant rose for 1-hour average O₃ data at the Clavet station



Figure 12. Pollutant rose for 1-hour average O₃ data at the Meadow Lake City station

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 major concern for particulate matter deals with small particles referred to as inhalable particulate, or PM₁₀. PM₁₀ is defined as particles that have an aerodynamic diameter less than 10 microns (or 0.01 mm). PM₁₀ can be divided into two groups of particles based on size: fine particles and coarse particles. The fine particles are those particles with an aerodynamic diameter smaller than 2.5 microns (0.0025 mm) and are identified as PM_{2.5}. In contrast, coarse particles are those with aerodynamic diameter greater than 2.5 microns and less than 10 microns.

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 sulphur dioxide, nitrogen oxides, and volatile organic compounds, emitted by combustion activities, are transformed by chemical reactions in the air.

Adverse health effects from breathing air with a high PM_{2.5} concentration include: premature death, increased respiratory symptoms and disease, chronic bronchitis, and decreased lung function particularly for individuals with asthma. Particulate matter can clog stomatal openings of plants and interfere with photosynthesis functions, leading to growth stunting or mortality in some plant species.

Saskatchewan endorses the Canada-Wide Standards (CWS) for fine particulate matter (PM_{2.5}):

 28 μg/m³ averaged over a` 24-hour period from midnight to midnight; the standard is based on the 98th percentile annually, averaged over three consecutive years.

Table 12 presents the summary statistics for $PM_{2.5}$ measurement results. The average concentration in 2022 ranged between 3 and 6 µg/m³. The maximum 1-hour concentration of 227 µg/m³ and the maximum 24-hour concentration of 58 µg/m³ were both detected at the Meadow Lake station. There were 7 exceedances of the CWS 24-hour average standard (see Table 13).

Figures 13 through 16 present the pollutant roses for $PM_{2.5}$ measurement results. The measured concentrations were mostly less than 10 µg/m³ (83% to 88% of the time for the four stations). Winds from the east were more prevalent with higher concentration events (>10 µg/m³) for the Clavet station, while a higher occurrence frequency was observed in summer months. Higher concentration events at Maidstone occur more frequently with northwest and southeast wind and Kerrobert occur more frequently when the wind was from the northwest and southwest. Highest concentrations were detected when the wind was from the southwest and southeast at the Meadow Lake City station.

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

| | Annual | Instrument | Maximum PM _{2.5} Conc. and Occurrence Time | | | | | |
|--------------------|---------|------------|--|---------------|--------------|--------|--|--|
| Monitoring Station | Average | Uptime | 1- | hour Max. | 24-hour Max. | | | |
| | µg/m³ | % | µg/m³ Time | | µg/m³ | Date | | |
| Maidstone | 4 | 93.7 | 52 | Nov 14 00:00 | 24 | Dec 10 | | |
| Kerrobert | 5 | 99.0 | 110 | June 07 12:00 | 28 | Sept 5 | | |
| Clavet | 3 | 99.6 | 92 | Oct 18 20:00 | 29 | Oct 19 | | |
| Meadow Lake City | 6 | 99.9 | 227 | Sep 04 17:00 | 58 | Aug 21 | | |

Table 12. Summary statistics for PM_{2.5} measurement results for 2022

Table 13. Number of exceedance events for PM_{2.5} for 2022

| | No. of Exceedance of Canada-Wide PM _{2.5} Standards (CWS) |
|--------------------|--|
| Monitoring Station | 24-hr CWS |
| | 28 μg/m³ |
| Maidstone | 0 |
| Kerrobert | 0 |
| Clavet | 1 |
| Meadow Lake City | 6 |



Figure 13. Pollutant rose for 1-hour average PM_{2.5} data at the Maidstone station



Figure 14. Pollutant rose for 1-hour average PM_{2.5} data at the Clavet station



Figure 15. Pollutant rose for 1-hour average PM_{2.5} data at the Kerrobert station



Figure 16. Pollutant rose for 1-hour average PM_{2.5} data at the Meadow Lake City station

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 readings from three air pollutants to calculate a single numerical value to evaluate the health risk associated with air pollution. The three pollutants are fine particulate matter (PM_{2.5}), nitrogen dioxide (NO₂), and ground-level ozone (O₃). All three pollutants are required to calculate AQHI. Among the WYAMZ air monitoring stations, Meadow Lake City and Clavet are eligible for AQHI reporting.

Figure 17 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), Moderate Risk (4 to 6), High Risk (7 to 10), and Very High Risk (higher than 10).

Table 14 summarizes the summary statistics for AQHI rating. The air quality at both stations was rated Low Risk most of the time. The Meadow Lake City station had 0.6% of time in the Moderate Risk, 0.1% of time in the High-Risk category and 0.0% in the Very High-Risk category. The Clavet station had 0.3% of time in the Moderate Risk category and 0.0% in the High-Risk category and Very-High Risk category.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | + | | | | |
|----------------|-------------|-----------------|--|--------------------------------------|--|------------------------------------|--|--------------------------------------|--|--|---|---|---|---------------------------------------|-----------------|
| | Low R | isk 1-: | 3 M | oderate | Risk 4 | 1-6 | High Ri | ¥ isk 7–1 | 0 Ve | ery High | Risk 1 | 10+ | | | |
| Health Risk | Air Heal | Quali th Inc | ity dex | | At Ri | sk Po | pulati | Hea ion | ilth M | Messages General Population | | | | | |
| Low Risk | 1 – 3 | | | Enjo activ | y you | ur usu | al out | door | | Ideal air quality for outdoor activities. | | | | | |
| Moderate Risk | 4 – 6 | | | Con resc activ are e sym | renuous usu ors if you unle g sym and | | | | No need to modify your usual outdoor activities unless you experience symptoms such as coughing and throat irritation. | | | | | | |
| High Risk | 7 – 1 | | Reduce or reschedule strenuous activities outdoors. Children and the elderly should also take it easy. | | | | | Con resc activ expe coug | sider hedul rities o erienc ghing | red ling outc e sy and | ucing strenu loors mpto throa | or Ious if you ms sucl t irritati | h as on. | | |
| Very High Risk | Above 10 | | | Avoi outd elde outd | id stre loors. rly shi loor p | enuou Child ould a hysica | s activ ren ar Ilso av al exe | vities nd the void rtion. | | Red stren espe sym and | uce on nuous ecially ptoms throat | or re act if y s su t irri | sche ivities ou ex ch as tation | dule outdoo perience coughin | ors, e ng |

Figure 17. Health risk classification and health messages for Air Quality Health Index (Environment Canada)

| Station Name | Occurrence | Occurre | currence Hours and Frequency by AQHI Risk Rating | | | | | |
|------------------|-------------------------|-------------|---|--------------|----------------|--|--|--|
| Station Name | Statistics | Low Risk | Moderate Risk | High Risk | Very High Risk | | | |
| | Occurrence Hours | 8418 | 48 | 9 | 0 | | | |
| Meadow Lake City | Occurrence Frequency | 99.3% | 0.6% | 0.0% | 0.0% | | | |
| Clavet | Occurrence Hours | 8632 | 27 | 0 | 0 | | | |
| | Occurrence Frequency | 99.7% | 0.3\$ | 0.0% | 0.0% | | | |

Table 14. Summary of occurrence statistics for AQHI rating

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 Kerrobert station is excluded from index analysis because this station does not meet the reporting requirements of either index system.

The Air Quality Index (AQI) is a system developed to provide the public with a meaningful and comparable measure of air quality. The AQI uses readings from five major air pollutants: SO₂, NO₂, O₃, PM_{2.5}, and carbon monoxide (CO), to calculate the AQI. 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 15 summarizes the effects associated with the AQI ratings.

Table 16 summarizes the occurrence statistics for AQI rating. The air quality at the Maidstone station was rated Good for 99.7% of the time; and 0.3% was rated Fair, 0.0% of time in the High-Risk category and Very High-Risk category. The Fair and Poor air quality was associated with an increased PM_{2.5} concentration.
| AQI | Air Quality Rating | Effect Description |
|----------|-----------------------|---|
| | | Desirable Range: No known harmful effects to soil, |
| 0 25 | Good | water, vegetation, animals, materials, visibility or human |
| 0 - 23 | GUUU | health. The long-term goal is for air quality to be in this |
| _ | | range all of the time in Canada. |
| | | Acceptable Range: Adequate protection against harmful |
| 26 – 50 | Fair | effects to soil, water, vegetation, animals, materials, |
| | | visibility and human health. |
| | | <u>Tolerable Range</u> : Not all aspects of human health or the |
| | | environment are adequately protected from possible |
| 51 – 100 | Poor | adverse effects. Long-term control action may be |
| | | necessary, depending on the frequency, duration and |
| | | circumstances of the readings. |
| > 100 | | Intolerable Range: Continued high readings could pose a |
| >100 | very Poor | risk to public health. |

 Table 15. AQI rating and effect description

Table 16. Summary of occurrence statistics for AQI rating

| Station | Occurrence Statistics | Occurrenc | e Hours and F | requency by | AQI Rating |
|-----------|-----------------------|-----------|---------------|-------------|------------|
| Name | Occurrence Statistics | Good | Fair | Poor | Very Poor |
| | Occurrence Hours | 7793 | 24 | 0 | 0 |
| Maidstone | Occurrence Frequency | 99.7% | 0.3% | 0.0% | 0.0% |

APPENDIX A. SASKATCHEWAN AMBIENT AIR QUALITY STANDARDS

| TABLE 20: SASKA | ATCHEWAN AMBIE | NT AIR QUALITY | STANDARDS (µg/ | m ³) |
|---|------------------------|------------------------------|------------------|----------------------------|
| Air Pollutant | 1 Hour | 8 Hours | 24 Hours | Annual |
| Particulate Matter (PM _{2.5}) | | | 28° | 10 |
| Particulate Matter (PM ₁₀) | | | 50 | |
| Total Suspended Particulates (TSP) | | | 100 | 60 ⁶ |
| Nitrogen Dioxide (NO ₂) | 300 (159 ppb) | | 200 (106 ppb) | 45° (24 ppb) |
| Sulphur Dioxide (SO ₂) | 450 (172 ppb) | | 125 (48 ppb) | 20 [°] (8 ppb) |
| Hydrogen Sulphide (H2S) | 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.

Table A-1. Saskatchewan Ambient Air Quality Standards

APPENDIX B. MAIDSTONE STATION: CONTINUOUS MONITORING DATA

| Parameter | Unit | Calibration & AIC | Valid Data | Uptime | Summary S | itatistics for Ho Data | urly Average |
|------------------------|-------|-------------------|------------|--------|---------------------------|---------------------------|--------------|
| | | (hours) | (hours) | (%) | Average | Minimum | Maximum |
| SO ₂ | ppb | 421 | 8326 | 99.8% | 0.6 | < 0.1 | 15.2 |
| H ₂ S | ppb | 421 | 8326 | 99.8% | 0.2 | < 0.1 | 10.2 |
| NO | ppb | 421 | 8326 | 99.8% | 0.6 | < 0.1 | 20.6 |
| NO ₂ | ppb | 421 | 8326 | 99.8% | 3.0 | < 0.1 | 26.8 |
| NO _x | ppb | 421 | 8326 | 99.8% | 3.6 | < 0.1 | 35.5 |
| PM _{2.5} | µg/m³ | 3 | 8208 | 93.7% | 4 | < 1 | 53 |
| Precipitation | mm | 0 | 8747 | 99.9% | 364.4 ^b | < 0.1 | 22.7 |
| Ambient Temperature | °C | 0 | 8747 | 99.9% | 1.7 | -38.8 | 34.7 |
| Relative Humidity | % | 0 | 8747 | 99.9% | 63 | 6 | 90 |
| Wind Speed | kph | 0 | 8740 | 99.8% | 7.8 | Calm | 30.5 |

Table B-1 Maidstone Station: Summary statistics for continuous air monitoring results for 2022

a. Automatic Instrument Check

b. Total precipitation

| Month | Valid | Operational Time | Average | Maximum | 1-Hour Exceedance ^a | Maximum | 24-Hour | Percent of Data in each Concentration Range | | | | | ange |
|---------------------|-------|---------------------|---------|---------|-----------------------------------|---------|---------|---|------|--------|---------|----------|------|
| wonth | (no.) | (%) | (dqq) | (dqq) | (no.) | (ppb) | (no.) | ≤1 | 1 -5 | 5 - 11 | 11 - 57 | 57 - 172 | >172 |
| January | 712 | 100.0% | 1.0 | 11.3 | 0 | 4.1 | 0 | 73.4 | 22.4 | 4.1 | 0.1 | 0.0 | 0.0 |
| February | 643 | 100.0% | 0.8 | 12.1 | 0 | 2.8 | 0 | 79.5 | 17.4 | 3.0 | 0.2 | 0.0 | 0.0 |
| March | 702 | 100.0% | 0.7 | 13.3 | 0 | 3.0 | 0 | 81.1 | 16.7 | 2.1 | 0.1 | 0.0 | 0.0 |
| April | 689 | 100.0% | 0.5 | 10.0 | 0 | 2.2 | 0 | 88.4 | 10.3 | 1.3 | 0.0 | 0.0 | 0.0 |
| May | 712 | 100.0% | 0.3 | 4.7 | 0 | 1.2 | 0 | 92.7 | 7.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 674 | 100.0% | 0.4 | 6.6 | 0 | 1.4 | 0 | 93.5 | 6.1 | 0.4 | 0.0 | 0.0 | 0.0 |
| July | 703 | 98.7% | 0.3 | 5.2 | 0 | 0.9 | 0 | 95.3 | 4.6 | 0.1 | 0.0 | 0.0 | 0.0 |
| August | 712 | 100.0% | 0.4 | 7.4 | 0 | 1.7 | 0 | 92.4 | 6.6 | 1.0 | 0.0 | 0.0 | 0.0 |
| September | 675 | 99.4% | 0.6 | 14.7 | 0 | 3.1 | 0 | 87.3 | 10.5 | 1.9 | 0.3 | 0.0 | 0.0 |
| October | 712 | 100.0% | 0.4 | 7.4 | 0 | 1.5 | 0 | 91.6 | 7.9 | 0.6 | 0.0 | 0.0 | 0.0 |
| November | 689 | 100.0% | 0.4 | 8.6 | 0 | 2.4 | 0 | 92.9 | 6.5 | 0.6 | 0.0 | 0.0 | 0.0 |
| December | 703 | 100.0% | 1.2 | 15.2 | 0 | 4.4 | 0 | 70.6 | 23.6 | 4.7 | 1.1 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8326 | 99.8% | 0.6 | 15.2 | 0 | 4.4 | 0 | 86.5 | 11.7 | 1.7 | 0.2 | 0.0 | 0.0 |

Table B-2. Maidstone Station: Summary of airpointer® SO₂ monitoring results for 2022

a. 1-hour Saskatchewan Ambient Air Quality Standard = 172 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 48 ppb

c. Annual Saskatchewan Ambient Air Quality Standard = 8 ppb

| | Valid | Operational | Average | Maximum | 1-Hour | Maximum | 24-Hour | Percent of Data in each Concentration Range | | | | | Range |
|---------------------|-----------|-------------|---------|------------|-------------------------|-------------|-------------------------|---|---------|---------|-------|--------|-------|
| Month | 1-Hr data | Time | Conc. | 1-Hr Conc. | Exceedance ^a | 24-Hr Conc. | Exceedance ^b | | | | | | |
| | (no.) | (%) | (ppb) | (ppb) | (no.) | (ppb) | (no.) | ≤1 | 1 - 3.6 | 3.6 - 5 | 5 - 8 | 8 - 11 | >11 |
| January | 712 | 100.0% | 0.1 | 1.7 | 0 | 0.3 | 0 | 99.3 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| February | 643 | 100.0% | 0.1 | 2.2 | 0 | 0.3 | 0 | 99.8 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| March | 702 | 100.0% | 0.1 | 1.4 | 0 | 0.3 | 0 | 99.9 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| April | 689 | 100.0% | 0.2 | 2.7 | 0 | 0.6 | 0 | 99.3 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| May | 712 | 100.0% | 0.2 | 1.6 | 0 | 0.6 | 0 | 99.3 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 674 | 100.0% | 0.3 | 2.3 | 0 | 0.7 | 0 | 97.5 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| July | 703 | 98.7% | 0.4 | 10.2 | 0 | 1.4 | 0 | 89.0 | 10.1 | 0.4 | 0.3 | 0.1 | 0.0 |
| August | 712 | 100.0% | 0.5 | 4.0 | 0 | 0.9 | 0 | 88.3 | 11.5 | 0.1 | 0.0 | 0.0 | 0.0 |
| September | 675 | 99.4% | 0.3 | 2.6 | 0 | 0.7 | 0 | 96.6 | 3.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| October | 712 | 100.0% | 0.2 | 2.4 | 0 | 0.8 | 0 | 97.8 | 2.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| November | 689 | 100.0% | 0.1 | 1.1 | 0 | 0.4 | 0 | 99.9 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| December | 703 | 100.0% | 0.2 | 1.5 | 0 | 0.6 | 0 | 99.7 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8326 | 99.8% | 0.2 | 10.2 | 0 | 1.4 | 0 | 97.2 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 |

Table B-3. Maidstone Station: Summary of airpointer® H₂S monitoring results for 2022

a. 1-hour Saskatchewan Ambient Air Quality Standard = 11.0 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 3.6 ppb

| Month | Valid 1-Hr data | Operational Time | Average Conc. | Maximum 1-Hr Conc. | 1-Hour Exceedance ^{<i>a</i>} | Maximum 24-Hr Conc. | 24-Hour Exceedance ^b | , Percent of Data in each Concentration Range | | | | nge | |
|---------------------|--------------------|---------------------|------------------|-----------------------|--|------------------------|------------------------------------|---|--------|---------|----------|-----------|------|
| | (no.) | (%) | (ppb) | (ppb) | (no.) | (ppb) | (no.) | ≤5 | 5 - 15 | 15 - 53 | 53 - 100 | 100 - 159 | >159 |
| January | 712 | 100.0% | 0.5 | 11.3 | - | 2.1 | - | 98.4 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| February | 643 | 100.0% | 0.6 | 19.4 | - | 2.1 | - | 99.1 | 0.8 | 0.2 | 0.0 | 0.0 | 0.0 |
| March | 702 | 100.0% | 0.5 | 12.7 | - | 1.2 | - | 99.6 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| April | 689 | 100.0% | 0.3 | 4.2 | - | 1.0 | - | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| May | 712 | 100.0% | 0.4 | 10.8 | - | 1.6 | - | 99.3 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 674 | 100.0% | 0.6 | 20.6 | - | 2.2 | - | 98.2 | 1.6 | 0.1 | 0.0 | 0.0 | 0.0 |
| July | 703 | 98.7% | 0.5 | 12.1 | - | 1.2 | - | 99.1 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| August | 712 | 100.0% | 0.5 | 19.8 | - | 2.3 | - | 99.4 | 0.4 | 0.1 | 0.0 | 0.0 | 0.0 |
| September | 675 | 99.4% | 0.5 | 15.4 | - | 1.3 | - | 98.4 | 1.5 | 0.1 | 0.0 | 0.0 | 0.0 |
| October | 712 | 100.0% | 0.6 | 15.4 | - | 2.5 | - | 98.0 | 1.8 | 0.1 | 0.0 | 0.0 | 0.0 |
| November | 689 | 100.0% | 0.7 | 10.4 | - | 2.0 | - | 98.8 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| December | 703 | 100.0% | 0.8 | 13.6 | - | 2.3 | - | 97.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8326 | 99.8% | 0.6 | 20.6 | - | 2.5 | - | 98.8 | 1.2 | 0.1 | 0.0 | 0.0 | 0.0 |

Table B-4. Maidstone Station: Summary of airpointer® NO monitoring results for 2022

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. No 24-hour Saskatchewan Ambient Air Quality Standard

| | Valid | Operational | Average | Maximum | 1-Hour | Maximum | 24-Hour | Percent of Data in each Concentration Range | | | | nae | |
|---------------------|-----------|-------------|---------|------------|-------------------------|-------------|-------------------------|---|--------|---------|----------|-----------|------|
| Month | 1-Hr data | Time | Conc. | 1-Hr Conc. | Exceedance ^a | 24-Hr Conc. | Exceedance ^b | | | | | | -9- |
| | (no.) | (%) | (ppb) | (ppb) | (no.) | (ppb) | (no.) | ≤5 | 5 - 15 | 15 - 53 | 53 - 100 | 100 - 159 | >159 |
| January | 712 | 100.0% | 4.5 | 22.5 | 0 | 9.1 | - | 61.3 | 37.8 | 1.0 | 0.0 | 0.0 | 0.0 |
| February | 643 | 100.0% | 3.8 | 25.4 | 0 | 7.2 | - | 76.4 | 22.2 | 1.4 | 0.0 | 0.0 | 0.0 |
| March | 702 | 100.0% | 3.1 | 17.6 | 0 | 6.7 | - | 81.6 | 17.5 | 0.9 | 0.0 | 0.0 | 0.0 |
| April | 689 | 100.0% | 2.2 | 17.5 | 0 | 4.8 | - | 89.3 | 10.4 | 0.3 | 0.0 | 0.0 | 0.0 |
| May | 712 | 100.0% | 2.3 | 13.3 | 0 | 4.4 | - | 89.6 | 10.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 674 | 100.0% | 2.8 | 18.8 | 0 | 6.7 | - | 85.0 | 14.2 | 0.7 | 0.0 | 0.0 | 0.0 |
| July | 703 | 98.7% | 1.7 | 10.6 | 0 | 2.7 | - | 95.0 | 5.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| August | 712 | 100.0% | 1.5 | 8.2 | 0 | 2.8 | - | 96.9 | 3.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| September | 675 | 99.4% | 2.0 | 10.5 | 0 | 4.2 | - | 94.2 | 5.8 | 0.0 | 0.0 | 0.0 | 0.0 |
| October | 712 | 100.0% | 3.0 | 18.1 | 0 | 6.6 | - | 80.3 | 19.5 | 0.1 | 0.0 | 0.0 | 0.0 |
| November | 689 | 100.0% | 4.6 | 23.4 | 0 | 10.2 | - | 61.5 | 36.1 | 2.3 | 0.0 | 0.0 | 0.0 |
| December | 703 | 100.0% | 4.9 | 26.8 | 0 | 11.5 | - | 63.7 | 32.0 | 4.3 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8326 | 99.8% | 3.0 | 26.8 | 0 | 11.5 | 0 | 81.2 | 17.9 | 0.9 | 0.0 | 0.0 | 0.0 |

Table B-5. Maidstone Station: Summary of airpointer® NO₂ monitoring results for 2022

a. 1-hour Saskatchewan Ambient Air Quality Standard = 159 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 106 ppb

c. Annual Saskatchewan Ambient Air Quality Standard = 24 ppb

| Month | Valid 1-Hr data | Operational Time | Average Conc. | Maximum 1-Hr Conc. | 1-Hour Exceedance ^{<i>a</i>} | Maximum 24-Hr Conc. | 24-Hour Exceedance ^b | , Percent of Data in each Concentration Range | | | | nge | |
|---------------------|--------------------|---------------------|------------------|-----------------------|--|------------------------|------------------------------------|---|--------|---------|----------|-----------|------|
| | (no.) | (%) | (ppb) | (ppb) | (no.) | (ppb) | (no.) | ≤5 | 5 - 15 | 15 - 53 | 53 - 100 | 100 - 212 | >212 |
| January | 712 | 100.0% | 5.0 | 23.2 | - | 10.7 | - | 55.3 | 42.8 | 1.9 | 0.0 | 0.0 | 0.0 |
| February | 643 | 100.0% | 4.4 | 31.0 | - | 8.3 | - | 67.5 | 30.8 | 1.7 | 0.0 | 0.0 | 0.0 |
| March | 702 | 100.0% | 3.6 | 24.7 | - | 7.3 | - | 76.2 | 22.8 | 1.0 | 0.0 | 0.0 | 0.0 |
| April | 689 | 100.0% | 2.5 | 17.7 | - | 5.1 | - | 87.5 | 12.0 | 0.4 | 0.0 | 0.0 | 0.0 |
| May | 712 | 100.0% | 2.8 | 21.1 | - | 6.0 | - | 86.9 | 12.2 | 0.8 | 0.0 | 0.0 | 0.0 |
| June | 674 | 100.0% | 3.5 | 31.6 | - | 8.1 | - | 81.0 | 16.3 | 2.7 | 0.0 | 0.0 | 0.0 |
| July | 703 | 98.7% | 2.2 | 19.0 | - | 3.6 | - | 89.5 | 10.2 | 0.3 | 0.0 | 0.0 | 0.0 |
| August | 712 | 100.0% | 2.0 | 22.4 | - | 4.5 | - | 90.6 | 9.1 | 0.3 | 0.0 | 0.0 | 0.0 |
| September | 675 | 99.4% | 2.5 | 22.8 | - | 5.0 | - | 90.1 | 9.8 | 0.1 | 0.0 | 0.0 | 0.0 |
| October | 712 | 100.0% | 3.6 | 24.1 | - | 8.4 | - | 74.3 | 24.7 | 1.0 | 0.0 | 0.0 | 0.0 |
| November | 689 | 100.0% | 5.3 | 33.6 | - | 11.5 | - | 53.3 | 43.4 | 3.3 | 0.0 | 0.0 | 0.0 |
| December | 703 | 100.0% | 5.6 | 35.5 | - | 13.8 | - | 55.8 | 38.1 | 6.1 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8326 | 99.8% | 3.6 | 35.5 | - | 13.8 | - | 75.6 | 22.7 | 1.6 | 0.0 | 0.0 | 0.0 |

Table B-6. Maidstone Station: Summary of airpointer® NOx monitoring results for 2022

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. No 24-hour Saskatchewan Ambient Air Quality Standard

| Month | Valid 1-Hr data | Operational Time | Average Conc. | Maximum 1-Hr Conc. | 1-Hour Exceedance ^a | Maximum 24-Hr Conc. | 24-Hour Exceedance ^{<i>b</i>} | Percent of Data in each Concentration Range | | | | | nge |
|---------------------|--------------------|---------------------|------------------|-----------------------|-----------------------------------|------------------------|---|---|--------|---------|---------|---------|-----|
| | (no.) | (%) | (µg/m³) | (µg/m³) | (no.) | (µg/m³) | (no.) | ≤5 | 5 - 10 | 10 - 15 | 15 - 30 | 30 - 80 | >80 |
| January | 744 | 100.0% | 4 | 28 | - | 7 | 0 | 67.7 | 26.0 | 5.9 | 0.4 | 0.0 | 0.0 |
| February | 672 | 100.0% | 4 | 46 | - | 19 | 0 | 69.6 | 23.7 | 3.1 | 1.8 | 1.8 | 0.0 |
| March | 744 | 100.0% | 4 | 29 | - | 10 | 0 | 76.6 | 16.0 | 3.1 | 4.3 | 0.0 | 0.0 |
| April | 720 | 100.0% | 4 | 21 | - | 8 | 0 | 78.2 | 18.2 | 2.9 | 0.7 | 0.0 | 0.0 |
| May | 744 | 100.0% | 4 | 16 | - | 7 | 0 | 75.7 | 21.4 | 2.8 | 0.1 | 0.0 | 0.0 |
| June | 720 | 100.0% | 5 | 30 | - | 10 | 0 | 56.9 | 29.7 | 11.1 | 2.1 | 0.1 | 0.0 |
| July | 735 | 98.8% | 1 | 8 | - | 2 | 0 | 99.3 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| August | 744 | 100.0% | 1 | 14 | - | 2 | 0 | 99.3 | 0.4 | 0.3 | 0.0 | 0.0 | 0.0 |
| September | 567 | 79.0% | 3 | 43 | - | 10 | 0 | 87.3 | 9.5 | 1.8 | 0.9 | 0.5 | 0.0 |
| October | 744 | 100.0% | 7 | 49 | - | 22 | 0 | 50.5 | 26.3 | 9.4 | 13.2 | 0.5 | 0.0 |
| November | 720 | 100.0% | 7 | 53 | - | 20 | 0 | 52.8 | 25.8 | 11.3 | 9.4 | 0.7 | 0.0 |
| December | 354 | 47.6% | 7 | 50 | - | 24 | 0 | 52.8 | 26.3 | 12.7 | 7.1 | 1.1 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8208 | 93.7% | 4 | 53 | - | 24 | 0 | 72.9 | 18.5 | 5.1 | 3.2 | 0.4 | 0.0 |

Table B-7. Maidstone Station: Summary of airpointer® PM_{2.5} monitoring results for 2022

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. 24-hour Canada-Wide Standard = $28 \mu g/m^3$

| Month | Valid 1-Hr data | Operational Time | Total Precip. | Maximum 1-Hr Precip. | Maximum 24-Hr Precip. | Percent of Data in each Precipitation Range | | | | | |
|-----------|--------------------|---------------------|------------------|-------------------------|--------------------------|---|--------|---------|---------|---------|-----|
| | (no.) | (%) | (mm) | (mm) | (mm) | ≤5 | 5 - 10 | 10 - 25 | 25 - 50 | 50 - 75 | >75 |
| January | 744 | 100.0% | 11.5 | 7.6 | 2.4 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| February | 672 | 100.0% | 2.8 | 1.0 | < 0.1 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| March | 744 | 100.0% | 0.8 | 0.3 | 0.3 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| April | 720 | 100.0% | 1.8 | 1.1 | 0.1 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| May | 744 | 100.0% | 58.1 | 4.5 | 52.9 | 99.6 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 720 | 100.0% | 153.6 | 22.7 | 21.7 | 99.4 | 0.3 | 0.3 | 0.0 | 0.0 | 0.0 |
| July | 735 | 98.8% | 88.9 | 10.9 | 12.0 | 99.6 | 0.3 | 0.1 | 0.0 | 0.0 | 0.0 |
| August | 744 | 100.0% | 44.9 | 8.9 | 11.2 | 99.9 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| September | 716 | 99.4% | 1.1 | 0.3 | 2.6 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| October | 744 | 100.0% | 0.4 | 0.2 | 18.4 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| November | 720 | 100.0% | 0.1 | 0.1 | 8.7 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| December | 744 | 100.0% | 0.4 | 0.4 | 0.8 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | |
| Annual | 8747 | 99.9% | 364.4 | 22.7 | 52.9 | 99.9 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |

 Table B-8. Maidstone Station: Summary of airpointer® precipitation monitoring results for 2022

| Month | Valid 1-Hr data | Operational Time | Average Temp. | Minimum 1-Hr Temp. | Maximum 1-Hr Temp. | Р | ercent of Da | ata in each | n Temper | rature Ran | ge |
|-----------|--------------------|---------------------|------------------|-----------------------|-----------------------|------|--------------|-------------|----------|------------|-----|
| | (no.) | (%) | (°C) | (°C) | (°C) | ≤-30 | -30 ~ -15 | -15 ~ 0 | 0 ~ 15 | 15 ~ 30 | >30 |
| January | 768 | 100.0% | -14.6 | -38.0 | 4.7 | 14.5 | 32.0 | 44.8 | 8.7 | 0.0 | 0.0 |
| February | 672 | 100.0% | -14.9 | -36.5 | 7.1 | 7.0 | 44.2 | 35.6 | 13.2 | 0.0 | 0.0 |
| March | 744 | 100.0% | -6.1 | -30.6 | 7.7 | 0.4 | 10.6 | 62.8 | 26.2 | 0.0 | 0.0 |
| April | 720 | 100.0% | 1.0 | -12.5 | 15.2 | 0.0 | 0.0 | 41.5 | 58.2 | 0.3 | 0.0 |
| May | 744 | 100.0% | 10.8 | -1.2 | 23.8 | 0.0 | 0.0 | 0.9 | 73.5 | 25.5 | 0.0 |
| June | 720 | 100.0% | 15.3 | 1.2 | 25.1 | 0.0 | 0.0 | 0.0 | 49.4 | 50.6 | 0.0 |
| July | 735 | 98.8% | 18.3 | 7.0 | 29.3 | 0.0 | 0.0 | 0.0 | 28.0 | 72.0 | 0.0 |
| August | 744 | 100.0% | 18.6 | 6.0 | 32.1 | 0.0 | 0.0 | 0.0 | 30.2 | 68.0 | 1.7 |
| September | 716 | 99.4% | 13.3 | -1.6 | 34.7 | 0.0 | 0.0 | 0.8 | 62.6 | 35.2 | 1.4 |
| October | 744 | 100.0% | 6.4 | -9.8 | 24.2 | 0.0 | 0.0 | 17.5 | 71.0 | 11.6 | 0.0 |
| November | 720 | 100.0% | -9.2 | -26.4 | 3.7 | 0.0 | 19.9 | 72.8 | 7.4 | 0.0 | 0.0 |
| December | 744 | 100.0% | -18.5 | -38.8 | -1.9 | 8.9 | 49.6 | 41.5 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | |
| Annual | 8747 | 99.9% | 1.7 | -38.8 | 34.7 | 2.6 | 12.9 | 26.5 | 35.7 | 22.0 | 0.3 |

 Table B-9. Maidstone Station: Summary of airpointer® ambient temperature monitoring results for 2022

| Month | Valid 1-Hr data | Operational Time | Average RH | Minimum 1-Hr RH | Maximum 1-Hr RH | Р | ercent of Da | ta in each R | Relative Hu | midity Rang | je |
|-----------|--------------------|---------------------|---------------|--------------------|--------------------|-----|--------------|--------------|-------------|-------------|-----|
| | (no.) | (%) | (%) | (%) | (%) | ≤15 | 15 - 30 | 30 - 60 | 60 - 80 | 80 - 90 | >90 |
| January | 744 | 100.0% | 65 | 50 | 85 | 3.1 | 0.0 | 13.3 | 81.1 | 2.5 | 0.0 |
| February | 672 | 100.0% | 65 | 48 | 83 | 0.0 | 0.0 | 19.9 | 79.0 | 1.0 | 0.0 |
| March | 744 | 100.0% | 65 | 7 | 85 | 0.1 | 0.1 | 30.4 | 65.7 | 3.6 | 0.0 |
| April | 720 | 100.0% | 58 | 23 | 85 | 0.0 | 5.0 | 45.7 | 41.1 | 8.2 | 0.0 |
| May | 744 | 100.0% | 51 | 15 | 88 | 0.1 | 15.6 | 48.5 | 29.3 | 6.5 | 0.0 |
| June | 720 | 100.0% | 62 | 20 | 89 | 0.0 | 8.9 | 33.6 | 35.0 | 22.5 | 0.0 |
| July | 735 | 98.8% | 68 | 34 | 90 | 0.0 | 0.0 | 34.3 | 35.2 | 29.7 | 0.8 |
| August | 744 | 100.0% | 68 | 25 | 90 | 0.0 | 1.7 | 32.0 | 32.3 | 33.2 | 0.8 |
| September | 716 | 99.4% | 60 | 18 | 89 | 0.0 | 8.9 | 35.2 | 39.7 | 16.2 | 0.0 |
| October | 744 | 100.0% | 56 | 6 | 87 | 0.1 | 8.1 | 47.2 | 37.4 | 7.3 | 0.0 |
| November | 720 | 100.0% | 69 | 43 | 84 | 0.0 | 0.0 | 12.2 | 81.0 | 6.8 | 0.0 |
| December | 744 | 100.0% | 69 | 14 | 80 | 0.1 | 0.1 | 3.1 | 96.0 | 0.7 | 0.0 |
| | | | | | | | | | | | |
| Annual | 8747 | 99.9% | 63 | 6 | 90 | 0.3 | 4.0 | 29.6 | 54.3 | 11.5 | 0.1 |

 Table B-10.
 Maidstone Station: Summary of airpointer® relative humidity monitoring results for 2022

| Wind Direction | Perce | ent of Data | within Wi | nd Speed R | ange, wind s | peed unit | kph |
|-----------------|-----------|-------------|-----------|------------|--------------|-----------|--------|
| Sector | 0.3 - 1.4 | 1.4 - 3.1 | 3.1 - 7.8 | 7.8 - 10.6 | 10.6 - 13.6 | >13.6 | Totals |
| North NorthEast | 0.1% | 0.2% | 1.3% | 0.6% | 0.3% | 0.6% | 3.2% |
| NorthEast | 0.1% | 0.2% | 0.8% | 0.5% | 0.2% | 0.2% | 1.9% |
| East NorthEast | 0.1% | 0.2% | 0.9% | 0.5% | 0.5% | 0.7% | 2.9% |
| East | 0.1% | 0.4% | 1.3% | 0.6% | 0.5% | 0.8% | 3.7% |
| East SouthEast | 0.2% | 0.8% | 3.0% | 1.9% | 1.4% | 1.8% | 9.1% |
| SouthEast | 0.2% | 1.3% | 5.0% | 2.6% | 1.8% | 1.7% | 12.6% |
| South SouthEast | 0.8% | 2.3% | 2.7% | 0.8% | 0.6% | 0.7% | 7.9% |
| South | 1.1% | 1.5% | 1.0% | 0.4% | 0.2% | 0.1% | 4.3% |
| South SouthWest | 1.0% | 0.5% | 0.7% | 0.3% | 0.1% | 0.1% | 2.7% |
| SouthWest | 0.7% | 0.4% | 0.4% | 0.1% | 0.1% | 0.0% | 1.7% |
| West SouthWest | 0.6% | 0.5% | 1.1% | 0.2% | 0.1% | 0.0% | 2.6% |
| West | 0.9% | 0.6% | 2.2% | 1.4% | 0.7% | 0.2% | 6.0% |
| West NorthWest | 1.4% | 1.2% | 3.6% | 2.1% | 1.8% | 1.9% | 12.0% |
| NorthWest | 0.7% | 1.9% | 3.6% | 2.0% | 1.8% | 2.4% | 12.3% |
| North NorthWest | 0.3% | 1.2% | 4.4% | 1.4% | 1.4% | 3.2% | 11.9% |
| North | 0.2% | 0.5% | 1.6% | 0.5% | 0.6% | 1.1% | 4.5% |
| | | | | | | | |
| Total | 8.5% | 13.6% | 33.5% | 15.9% | 12.0% | 15.7% | 99.3% |

 Table B-11.
 Maidstone Station: Wind frequency table for 2022

| Percent Calm (≤0.3 kph) | 0.7% |
|-------------------------------------|------|
| Number of Valid Hourly-Average Data | 8740 |
| Total Workable Hours in Time Period | 8760 |



APPENDIX C. CLAVET STATION: CONTINUOUS MONITORING DATA

| Parameter | Unit | Calibration & AIC | Valid Data | Uptime | Summary Sta | tistics for Hourly | Average Data |
|------------------------|-------|-------------------|------------|--------|--------------------|--------------------|--------------|
| | | (hours) | (hours) | (%) | Average | Minimum | Maximum |
| NO | ppb | 408 | 8253 | 98.8% | 1.4 | < 0.1 | 35.4 |
| NO ₂ | ppb | 408 | 8253 | 98.8% | 4.5 | < 0.1 | 28.3 |
| NO _x | ppb | 408 | 8253 | 98.8% | 5.9 | < 0.1 | 57.0 |
| O ₃ | ppb | 410 | 8316 | 99.6% | 30 | < 1 | 65 |
| PM _{2.5} | µg/m³ | 3 | 8723 | 99.6% | 3 | < 1 | 92 |
| Precipitation | mm | 0 | 8726 | 99.6% | 173.4 ^b | < 0.1 | 11.8 |
| Ambient Temperature | °C | 0 | 8726 | 99.6% | 2.7 | -38.0 | 36.2 |
| Relative Humidity | % | 0 | 8726 | 99.6% | 67 | < 1 | 89 |
| Wind Speed | kph | 0 | 8708 | 99.6% | 7.6 | Calm | 34.4 |

 Table C-1 Clavet Station: Summary statistics for continuous air monitoring results for 2022

a.Automatic Instrument Check

b. Total precipitation

| Month | Valid 1-Hr data | Operational Time | Average Conc. | Maximum 1-Hr Conc. | 1-Hour Exceedance ^{<i>a</i>} | Maximum 24-Hr Conc. | 24-Hour Exceedance ^b | Pei | rcent of I | Data in ea | ach Concer | ntration Rar | ige |
|---------------------|--------------------|---------------------|------------------|-----------------------|--|------------------------|------------------------------------|-------|------------|------------|------------|--------------|------|
| | (no.) | (%) | (ppb) | (ppb) | (no.) | (ppb) | (no.) | ≤5 | 5 - 15 | 15 - 53 | 53 - 100 | 100 - 159 | >159 |
| January | 712 | 100.0% | 1.3 | 13.4 | - | 3.7 | - | 96.6 | 3.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| February | 643 | 100.0% | 1.5 | 22.4 | - | 4.6 | - | 96.6 | 3.3 | 0.2 | 0.0 | 0.0 | 0.0 |
| March | 705 | 100.0% | 0.9 | 7.9 | - | 2.1 | - | 98.4 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| April | 689 | 100.0% | 0.4 | 4.7 | - | 0.8 | - | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| May | 712 | 100.0% | 0.5 | 11.1 | - | 1.2 | - | 99.4 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 680 | 100.0% | 0.8 | 23.7 | - | 4.3 | - | 98.7 | 1.0 | 0.3 | 0.0 | 0.0 | 0.0 |
| July | 695 | 97.5% | 0.4 | 5.4 | - | 1.0 | - | 99.7 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| August | 684 | 95.9% | 0.8 | 10.3 | - | 1.9 | - | 99.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| September | 657 | 96.8% | 0.8 | 5.8 | - | 2.5 | - | 99.8 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| October | 712 | 100.0% | 0.8 | 11.6 | - | 1.9 | - | 98.9 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| November | 689 | 100.0% | 1.2 | 35.4 | - | 5.5 | - | 98.0 | 1.9 | 0.1 | 0.0 | 0.0 | 0.0 |
| December | 675 | 95.7% | 1.5 | 17.8 | - | 3.7 | - | 96.3 | 2.8 | 0.9 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8253 | 98.8% | 1.4 | 35.4 | - | 5.5 | - | 98.5 | 1.4 | 0.1 | 0.0 | 0.0 | 0.0 |

Table C-2. Clavet Station: Summary of airpointer® NO monitoring results for 2022

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. No 24-hour Saskatchewan Ambient Air Quality Standard

| | Valid | Operational | Average | Maximum | 1-Hour | Maximum | 24-Hour | | | | | | |
|---------------------|-------|----------------|------------|----------------|-------------------------|-------------|-------------------------|------|-----------|------------|------------|--------------|------|
| | 1-Hr | | | | | | | Per | cent of I | Data in ea | ach Concer | ntration Rar | nge |
| Month | data | Time | Conc. | 1-Hr Conc. | Exceedance ^a | 24-Hr Conc. | Exceedance ^b | | - | - | - | | - |
| | (no.) | (%) | (ppb) | (ppb) | (no.) | (ppb) | (no.) | ≤5 | 5 - 15 | 15 - 53 | 53 - 100 | 100 - 159 | >159 |
| January | 712 | 100.0% | 4.4 | 28.3 | 0 | 8.5 | - | 66.0 | 33.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| February | 643 | 100.0% | 4.2 | 21.1 | 0 | 8.4 | - | 72.0 | 26.6 | 1.4 | 0.0 | 0.0 | 0.0 |
| March | 705 | 100.0% | 3.0 | 15.8 | 0 | 5.7 | - | 86.8 | 13.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| April | 689 | 100.0% | 1.8 | 11.5 | 0 | 3.3 | - | 95.2 | 4.8 | 0.0 | 0.0 | 0.0 | 0.0 |
| May | 712 | 100.0% | 2.3 | 12.5 | 0 | 4.2 | - | 90.7 | 9.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 680 | 100.0% | 3.7 | 20.4 | 0 | 6.1 | - | 75.7 | 22.9 | 1.3 | 0.0 | 0.0 | 0.0 |
| July | 695 | 97.5% | 2.0 | 12.8 | 0 | 4.0 | - | 92.9 | 7.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| August | 684 | 95.9% | 2.0 | 13.4 | 0 | 4.1 | - | 93.0 | 7.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| September | 657 | 96.8% | 2.1 | 11.3 | 0 | 3.7 | - | 92.8 | 7.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| October | 712 | 100.0% | 2.8 | 18.1 | 0 | 6.1 | - | 86.8 | 12.9 | 0.3 | 0.0 | 0.0 | 0.0 |
| November | 689 | 100.0% | 4.1 | 24.0 | 0 | 9.6 | - | 69.8 | 29.8 | 0.4 | 0.0 | 0.0 | 0.0 |
| December | 675 | 95.7% | 4.7 | 25.9 | 0 | 10.6 | - | 64.1 | 33.3 | 2.5 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8253 | 98.8% | 4.5 | 28.3 | 0 | 10.6 | 0 | 82.2 | 17.2 | 0.6 | 0.0 | 0.0 | 0.0 |
| | a 1_h | our Sackatchow | an Ambiant | Air Quality St | andard - 150 nn | h | | | | | | | |

Table C-3. Clavet Station: Summary of airpointer® NO2 monitoring results for 2022

a. 1-hour Saskatchewan Ambient Air Quality Standard = 159 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 106 ppb

c. Annual Saskatchewan Ambient Air Quality Standard = 24 ppb

| Month | Valid | Operational | Average | Maximum | 1-Hour | Maximum | 24-Hour | Pe | rcent of I | Data in ea | ach Concer | ntration Rar | nge |
|---------------------|-----------|-------------|---------|------------|--------------|-------------|------------|------|------------|------------|------------|--------------|------|
| wonth | I-Hr data | Time | Conc. | I-Hr Conc. | Exceedance - | 24-Hr Conc. | Exceedance | | 1 | 1 | 1 | | - |
| | (no.) | (%) | (ppb) | (ppb) | (no.) | (ppb) | (no.) | ≤5 | 5 - 15 | 15 - 53 | 53 - 100 | 100 - 159 | >159 |
| January | 712 | 100.0% | 5.7 | 31.7 | - | 11.6 | - | 54.6 | 42.1 | 3.3 | 0.0 | 0.0 | 0.0 |
| February | 643 | 100.0% | 5.7 | 32.6 | - | 13.0 | - | 56.3 | 39.3 | 4.4 | 0.0 | 0.0 | 0.0 |
| March | 705 | 100.0% | 3.8 | 21.5 | - | 7.1 | - | 77.0 | 22.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| April | 689 | 100.0% | 2.2 | 13.2 | - | 3.9 | - | 92.7 | 7.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| May | 712 | 100.0% | 2.8 | 16.3 | - | 4.6 | - | 87.4 | 12.5 | 0.1 | 0.0 | 0.0 | 0.0 |
| June | 680 | 100.0% | 4.4 | 41.3 | - | 10.0 | - | 68.7 | 29.4 | 1.9 | 0.0 | 0.0 | 0.0 |
| July | 695 | 97.5% | 2.3 | 13.3 | - | 4.8 | - | 90.2 | 9.8 | 0.0 | 0.0 | 0.0 | 0.0 |
| August | 684 | 95.9% | 2.7 | 15.3 | - | 6.0 | - | 87.1 | 12.6 | 0.3 | 0.0 | 0.0 | 0.0 |
| September | 657 | 96.8% | 2.9 | 12.0 | - | 4.7 | - | 87.2 | 12.8 | 0.0 | 0.0 | 0.0 | 0.0 |
| October | 712 | 100.0% | 3.5 | 29.7 | - | 7.7 | - | 78.8 | 19.4 | 1.8 | 0.0 | 0.0 | 0.0 |
| November | 689 | 100.0% | 5.3 | 57.0 | - | 15.1 | - | 54.3 | 42.5 | 3.0 | 0.1 | 0.0 | 0.0 |
| December | 675 | 95.7% | 6.3 | 39.0 | - | 14.3 | - | 48.3 | 46.4 | 5.3 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8253 | 98.8% | 5.9 | 57.0 | - | 15.1 | - | 73.6 | 24.6 | 1.8 | 0.0 | 0.0 | 0.0 |

Table C-4. Clavet Station: Summary of airpointer® NOx monitoring results for 2022

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. No 24-hour Saskatchewan Ambient Air Quality Standard

| Month | Valid 1-Hr data | Operational Time | Average Conc. | Maximum 1-Hr Conc. | 1-Hour Exceedance ^a | Maximum 8-Hr Conc. | 8-Hour Conc. Above CWS ^b | Perc | ent of Da | ta in eac | h Concen | tration R | ange |
|---------------------|--------------------|---------------------|------------------|-----------------------|-----------------------------------|-----------------------|--|------|-----------|-----------|----------|-----------|------|
| | (no.) | (%) | (ppb) | (ppb) | (no.) | (ppb) | (no.) | ≤10 | 10 - 20 | 20 - 40 | 40 - 65 | 65 - 82 | >82 |
| January | 712 | 100.0% | 28 | 41 | 0 | 39 | 0 | 3.7 | 4.6 | 91.2 | 0.5 | 0.0 | 0.0 |
| February | 643 | 100.0% | 32 | 46 | 0 | 44 | 0 | 0.0 | 4.0 | 87.1 | 8.9 | 0.0 | 0.0 |
| March | 705 | 100.0% | 35 | 47 | 0 | 46 | 0 | 0.3 | 2.1 | 72.8 | 24.8 | 0.0 | 0.0 |
| April | 689 | 100.0% | 32 | 46 | 0 | 45 | 0 | 0.0 | 7.7 | 74.6 | 17.7 | 0.0 | 0.0 |
| May | 712 | 100.0% | 29 | 53 | 0 | 51 | 0 | 2.0 | 19.1 | 63.5 | 15.4 | 0.0 | 0.0 |
| June | 680 | 100.0% | 26 | 65 | 0 | 58 | 0 | 5.4 | 28.2 | 55.0 | 11.3 | 0.0 | 0.0 |
| July | 709 | 99.6% | 23 | 52 | 0 | 44 | 0 | 8.6 | 32.3 | 55.1 | 3.9 | 0.0 | 0.0 |
| August | 712 | 100.0% | 21 | 49 | 0 | 46 | 0 | 16.7 | 30.8 | 47.9 | 4.6 | 0.0 | 0.0 |
| September | 679 | 100.0% | 22 | 55 | 0 | 45 | 0 | 6.3 | 36.8 | 53.2 | 3.7 | 0.0 | 0.0 |
| October | 712 | 100.0% | 21 | 44 | 0 | 41 | 0 | 6.7 | 33.8 | 58.4 | 1.0 | 0.0 | 0.0 |
| November | 689 | 100.0% | 24 | 36 | 0 | 35 | 0 | 1.9 | 21.5 | 76.6 | 0.0 | 0.0 | 0.0 |
| December | 674 | 95.6% | 27 | 38 | 0 | 37 | 0 | 0.7 | 12.9 | 86.4 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8316 | 99.6% | 30 | 65 | 0 | 58 | 0 | 4.4 | 19.5 | 68.4 | 7.6 | 0.0 | 0.0 |

Table C-5. Clavet Station: Summary of airpointer[®] O₃ monitoring results for 2022

a. 1-hour Saskatchewan Ambient Air Quality Standard = 82 ppb

b. 8-hour Canada-Wide Standard = 65 ppb

| Month | Valid 1-Hr data | Operational Time | Average Conc. | Maximum 1-Hr Conc. | 1-Hour Exceedance ^a | Maximum 24-Hr Conc. | 24-Hour Exceedance ^{<i>b</i>} | Perc | ent of Da | ta in each | Concent | ration Ra | nge |
|---------------------|--------------------|---------------------|------------------|-----------------------|-----------------------------------|------------------------|---|------|-----------|------------|---------|-----------|-----|
| | (no.) | (%) | (µg/m³) | (µg/m³) | (no.) | (µg/m³) | (no.) | ≤5 | 5 - 10 | 10 - 15 | 15 - 30 | 30 - 80 | >80 |
| January | 744 | 100.0% | 4 | 14 | - | 5 | 0 | 82.7 | 16.8 | 0.5 | 0.0 | 0.0 | 0.0 |
| February | 672 | 100.0% | 3 | 9 | - | 6 | 0 | 85.7 | 14.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| March | 744 | 100.0% | 3 | 19 | - | 7 | 0 | 87.0 | 11.8 | 0.9 | 0.3 | 0.0 | 0.0 |
| April | 720 | 100.0% | 3 | 12 | - | 6 | 0 | 93.3 | 6.4 | 0.3 | 0.0 | 0.0 | 0.0 |
| May | 744 | 100.0% | 4 | 18 | - | 6 | 0 | 78.1 | 21.0 | 0.8 | 0.1 | 0.0 | 0.0 |
| June | 720 | 100.0% | 5 | 38 | - | 14 | 0 | 64.0 | 27.6 | 6.1 | 1.8 | 0.4 | 0.0 |
| July | 741 | 99.6% | 6 | 41 | - | 23 | 0 | 54.0 | 28.6 | 10.4 | 5.9 | 1.1 | 0.0 |
| August | 744 | 100.0% | 7 | 37 | - | 24 | 0 | 50.4 | 30.2 | 10.8 | 8.2 | 0.4 | 0.0 |
| September | 718 | 100.0% | 8 | 55 | - | 22 | 0 | 46.2 | 30.9 | 10.4 | 9.5 | 2.9 | 0.0 |
| October | 744 | 100.0% | 8 | 92 | - | 29 | 1 | 46.8 | 28.6 | 9.1 | 14.1 | 1.1 | 0.3 |
| November | 720 | 100.0% | 6 | 30 | - | 19 | 0 | 57.1 | 27.8 | 8.9 | 6.1 | 0.1 | 0.0 |
| December | 712 | 95.8% | 5 | 28 | - | 14 | 0 | 63.5 | 25.4 | 7.3 | 3.8 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8723 | 99.6% | 3 | 92 | - | 29 | 1 | 67.3 | 22.5 | 5.5 | 4.2 | 0.5 | 0.0 |

Table C-6. Clavet Station: Summary of airpointer® PM_{2.5} monitoring results for 2022

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. 24-hour Canada-Wide Standard = $28 \mu g/m^3$

| Month | Valid 1-Hr data | Operational Time | Total Precip. | Maximum 1-Hr Precip. | Maximum 24-Hr Precip. | Pe | rcent of D | ata in eac | h Precipit | ation Ran | ge |
|-----------|--------------------|---------------------|------------------|-------------------------|--------------------------|-------|------------|------------|------------|-----------|-----|
| | (no.) | (%) | (mm) | (mm) | (mm) | ≤5 | 5 - 10 | 10 - 25 | 25 - 50 | 50 - 75 | >75 |
| January | 744 | 100.0% | 3.5 | 1.5 | 2.6 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| February | 672 | 100.0% | 1.1 | 0.5 | 0.5 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| March | 744 | 100.0% | 3.0 | 0.6 | 1.3 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| April | 720 | 100.0% | 4.3 | 1.5 | 2.3 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| May | 744 | 100.0% | 28.9 | 1.9 | 12.1 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 720 | 100.0% | 42.3 | 6.7 | 17.1 | 99.6 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| July | 741 | 99.6% | 49.9 | 11.8 | 14.1 | 99.6 | 0.3 | 0.1 | 0.0 | 0.0 | 0.0 |
| August | 744 | 100.0% | 34.4 | 9.8 | 11.1 | 99.6 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| September | 720 | 100.0% | 3.5 | 0.9 | 1.9 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| October | 744 | 100.0% | 1.1 | 0.7 | 1.0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| November | 720 | 100.0% | 1.4 | 0.5 | 1.2 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| December | 713 | 95.8% | 0.2 | 0.2 | 0.2 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | |
| Annual | 8726 | 99.6% | 173.4 | 11.8 | 17.1 | 99.9 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |

 Table C-7. Clavet Station: Summary of airpointer® precipitation monitoring results for 2022

| Month | Valid 1-Hr data | Operational Time | Average Temp. | Minimum 1-Hr Temp. | Maximum 1-Hr Temp. | Р | ercent of Da | ata in each | Tempera | ature Rang | Je |
|-----------|--------------------|---------------------|------------------|-----------------------|-----------------------|------|--------------|-------------|---------|------------|-----|
| | (no.) | (%) | (°C) | (°C) | (°C) | ≤-30 | -30 ~ -15 | -15 ~ 0 | 0 ~ 15 | 15 ~ 30 | >30 |
| January | 744 | 100.0% | -14.5 | -38.0 | 2.7 | 10.4 | 35.3 | 50.1 | 4.2 | 0.0 | 0.0 |
| February | 672 | 100.0% | -15.2 | -32.8 | 4.8 | 4.5 | 49.6 | 36.5 | 9.5 | 0.0 | 0.0 |
| March | 744 | 100.0% | -5.8 | -30.4 | 8.8 | 0.1 | 14.4 | 55.4 | 30.1 | 0.0 | 0.0 |
| April | 720 | 100.0% | 1.9 | -9.5 | 17.6 | 0.0 | 0.0 | 36.8 | 59.9 | 3.3 | 0.0 |
| May | 744 | 100.0% | 11.8 | -1.0 | 26.4 | 0.0 | 0.0 | 0.4 | 69.0 | 30.6 | 0.0 |
| June | 720 | 100.0% | 16.3 | 4.0 | 33.8 | 0.0 | 0.0 | 0.0 | 42.6 | 56.5 | 0.8 |
| July | 741 | 99.6% | 19.8 | 6.7 | 36.2 | 0.0 | 0.0 | 0.0 | 19.6 | 76.4 | 4.0 |
| August | 744 | 100.0% | 20.2 | 6.1 | 34.4 | 0.0 | 0.0 | 0.0 | 19.5 | 73.8 | 6.7 |
| September | 720 | 100.0% | 15.0 | 0.5 | 35.7 | 0.0 | 0.0 | 0.0 | 55.8 | 41.0 | 3.2 |
| October | 744 | 100.0% | 6.9 | -6.1 | 24.5 | 0.0 | 0.0 | 12.8 | 75.8 | 11.4 | 0.0 |
| November | 720 | 100.0% | -7.7 | -23.9 | 6.9 | 0.0 | 15.8 | 72.5 | 11.7 | 0.0 | 0.0 |
| December | 713 | 95.8% | -18.0 | -35.9 | -3.0 | 7.4 | 50.4 | 42.2 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | |
| Annual | 8726 | 99.6% | 2.7 | -38.0 | 36.2 | 1.9 | 13.5 | 25.5 | 33.3 | 24.6 | 1.2 |

 Table C-8. Clavet Station: Summary of airpointer® ambient temperature monitoring results for 2022

| Month | Valid 1-Hr data | Operational Time | Average RH | Minimum 1-Hr RH | Maximum 1-Hr RH | Perce | ent of Data | in each Re | lative Hu | imidity Ra | ange |
|-----------|--------------------|---------------------|---------------|--------------------|--------------------|-------|-------------|------------|-----------|------------|------|
| | (no.) | (%) | (%) | (%) | (%) | ≤15 | 15 - 30 | 30 - 60 | 60 - 80 | 80 - 90 | >90 |
| January | 744 | 100.0% | 66 | 53 | 81 | 3.1 | 0.0 | 7.6 | 88.5 | 0.8 | 0.0 |
| February | 672 | 100.0% | 65 | 33 | 82 | 0.0 | 0.0 | 14.3 | 85.4 | 0.3 | 0.0 |
| March | 744 | 100.0% | 67 | 37 | 84 | 0.0 | 0.0 | 25.1 | 69.2 | 5.6 | 0.0 |
| April | 720 | 100.0% | 57 | 19 | 84 | 0.0 | 6.8 | 43.8 | 42.6 | 6.8 | 0.0 |
| May | 744 | 100.0% | 51 | 13 | 87 | 0.5 | 18.7 | 44.8 | 26.3 | 9.7 | 0.0 |
| June | 720 | 100.0% | 57 | 16 | 89 | 0.0 | 12.5 | 40.6 | 30.1 | 16.8 | 0.0 |
| July | 741 | 99.6% | 60 | 16 | 89 | 0.0 | 3.6 | 43.0 | 35.0 | 18.4 | 0.0 |
| August | 744 | 100.0% | 60 | 19 | 89 | 0.0 | 8.6 | 36.4 | 37.2 | 17.7 | 0.0 |
| September | 720 | 100.0% | 52 | 12 | 88 | 1.0 | 15.7 | 46.0 | 29.3 | 8.1 | 0.0 |
| October | 744 | 100.0% | 56 | 0 | 85 | 0.4 | 6.5 | 50.1 | 35.5 | 7.5 | 0.0 |
| November | 720 | 100.0% | 71 | 51 | 85 | 0.0 | 0.0 | 7.2 | 87.1 | 5.7 | 0.0 |
| December | 713 | 95.8% | 68 | 25 | 79 | 0.0 | 0.1 | 4.5 | 95.4 | 0.0 | 0.0 |
| | | | | | | | | | | | |
| Annual | 8726 | 99.6% | 67 | 0 | 89 | 0.4 | 6.1 | 30.4 | 54.9 | 8.2 | 0.0 |

 Table C-9. Clavet Station: Summary of airpointer® relative humidity monitoring results for 2022

| Wind Direction | Per | cent of Dat | ta within W | /ind Speed | Range, wind s | speed unit | kph |
|-----------------|-----------|-------------|-------------|------------|---------------|------------|--------|
| Sector | 0.3 - 1.4 | 1.4 - 3.1 | 3.1 - 7.8 | 7.8 - 10.6 | 10.6 - 13.6 | >13.6 | Totals |
| North NorthEast | 0.1% | 0.3% | 2.3% | 1.4% | 1.3% | 1.5% | 6.9% |
| NorthEast | 0.2% | 0.4% | 2.1% | 0.7% | 0.6% | 0.3% | 4.4% |
| East NorthEast | 0.3% | 1.1% | 2.5% | 0.8% | 0.4% | 0.1% | 5.1% |
| East | 0.5% | 1.8% | 4.5% | 2.1% | 0.7% | 0.3% | 9.8% |
| East SouthEast | 0.7% | 2.0% | 5.1% | 1.7% | 0.4% | 0.1% | 10.0% |
| SouthEast | 0.4% | 1.2% | 3.8% | 0.9% | 0.3% | 0.2% | 6.7% |
| South SouthEast | 0.5% | 1.0% | 1.6% | 0.6% | 0.3% | 0.1% | 4.1% |
| South | 0.4% | 1.6% | 3.6% | 0.7% | 0.3% | 0.0% | 6.6% |
| South SouthWest | 0.2% | 0.7% | 4.8% | 2.2% | 0.7% | 0.2% | 8.8% |
| SouthWest | 0.1% | 0.5% | 2.9% | 1.1% | 0.7% | 0.1% | 5.4% |
| West SouthWest | 0.1% | 0.4% | 3.2% | 1.6% | 1.2% | 0.6% | 7.1% |
| West | 0.1% | 0.5% | 1.9% | 0.6% | 0.4% | 0.3% | 3.7% |
| West NorthWest | 0.1% | 0.5% | 1.7% | 0.5% | 0.4% | 0.6% | 3.8% |
| NorthWest | 0.1% | 0.4% | 1.8% | 1.0% | 1.1% | 3.1% | 7.5% |
| North NorthWest | 0.1% | 0.4% | 1.0% | 0.7% | 0.5% | 2.2% | 5.0% |
| North | 0.1% | 0.3% | 1.1% | 0.9% | 0.7% | 1.9% | 4.9% |
| | | | | | | | |
| Total | 3.9% | 13.0% | 43.8% | 17.4% | 9.8% | 11.7% | 99.5% |

Table C-10Clavet Station: Wind frequency table for 2022

| Percent Calm (<0.3 kph) | 0.5% |
|--|------|
| Number of Valid Hourly-Average Data | 8708 |
| Total Workable Hours in Time Period | 8745 |



APPENDIX D. KERROBERT STATION: CONTINUOUS MONITORING DATA

| Parameter | Unit | Calibration & AIC | Valid Data | Uptime | Summary Statistics for Hourly Average Data | | | | |
|------------------------|-------|-------------------|------------|--------|---|---------|---------|--|--|
| | | (hours) | (hours) | (%) | Average | Minimum | Maximum | | |
| SO ₂ | ppb | 400 | 8240 | 98.6% | 0.1 | < 0.1 | 7.1 | | |
| H_2S | ppb | 400 | 8240 | 98.6% | 0.2 | < 0.1 | 3.9 | | |
| PM _{2.5} | µg/m³ | 7 | 8661 | 99.0% | 5 | < 1 | 110 | | |
| Precipitation | mm | 0 | 8738 | 99.7% | 316.9 <i>°</i> | < 0.1 | 22.9 | | |
| Ambient Temperature | °C | 0 | 8738 | 99.7% | 2.7 | -36.6 | 35.4 | | |
| Relative Humidity | % | 0 | 8738 | 99.7% | 61 | 15 | 91 | | |
| Wind Speed | kph | 0 | 8735 | 99.7% | 10.6 | Calm | 43.3 | | |

Table D-1 Kerrobert Station: Summary statistics for continuous air monitoring results for 2022

a. Automatic Instrument Check

b. Total precipitation

| | Valid | Operational | Average | Maximum | 1-Hour | Maximum | 24-Hour | Perce | Percent of Data in each Concentration Range | | | | ange |
|---------------------|-----------|-------------|---------|------------|-------------------------|-------------|-------------------------|-------|---|--------|---------|----------|------|
| Month | 1-Hr data | Time | Conc. | 1-Hr Conc. | Exceedance ^a | 24-Hr Conc. | Exceedance ^b | | | | | | unge |
| | (no.) | (%) | (ppb) | (ppb) | (no.) | (ppb) | (no.) | ≤1 | 1 -5 | 5 - 11 | 11 - 57 | 57 - 172 | >172 |
| January | 712 | 100.0% | 0.2 | 2.7 | 0 | 0.8 | 0 | 97.8 | 2.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| February | 643 | 100.0% | 0.2 | 1.6 | 0 | 0.4 | 0 | 99.7 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| March | 704 | 99.6% | 0.1 | 0.7 | 0 | 0.3 | 0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| April | 689 | 100.0% | < 0.1 | 1.0 | 0 | 0.2 | 0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| May | 713 | 100.0% | 0.1 | 0.6 | 0 | 0.1 | 0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 682 | 100.0% | 0.1 | 1.0 | 0 | 0.3 | 0 | 99.9 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| July | 713 | 100.0% | 0.1 | 0.6 | 0 | 0.3 | 0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| August | 635 | 88.8% | 0.1 | 2.0 | 0 | 0.4 | 0 | 99.1 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| September | 643 | 94.6% | 0.1 | 3.0 | 0 | 0.4 | 0 | 99.5 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| October | 712 | 100.0% | 0.1 | 0.9 | 0 | 0.3 | 0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| November | 689 | 100.0% | 0.1 | 0.3 | 0 | 0.2 | 0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| December | 705 | 100.0% | 0.2 | 7.1 | 0 | 1.0 | 0 | 98.0 | 1.8 | 0.1 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8240 | 98.6% | 0.1 | 7.1 | 0 | 1.0 | 0 | 99.5 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 |

Table D-2.Kerrobert Station: Summary of airpointer® SO₂ monitoring results for 2022

a. 1-hour Saskatchewan Ambient Air Quality Standard = 172 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 48 ppb

c. Annual Saskatchewan Ambient Air Quality Standard = 8 ppb

| | Valid | Operational | Average | Maximum | 1-Hour | Maximum | 24-Hour | Parca | Percent of Data in each Concentration Range | | | | Range |
|-----------|-----------|-------------|---------|------------|-------------------------|-------------|-------------------------|-------|---|---------|-------|----------|-------|
| Month | 1-Hr data | Time | Conc. | 1-Hr Conc. | Exceedance ^a | 24-Hr Conc. | Exceedance ^b | Terce | | | | | |
| | (no.) | (%) | (ppb) | (ppb) | (no.) | (ppb) | (no.) | ≤1 | 1 - 3.6 | 3.6 - 5 | 5 - 8 | 8 – 11.0 | >11.0 |
| January | 712 | 100.0% | 0.1 | 1.1 | 0 | 0.3 | 0 | 99.9 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| February | 643 | 100.0% | 0.1 | 0.4 | 0 | 0.1 | 0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| March | 704 | 99.6% | 0.1 | 0.5 | 0 | 0.3 | 0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| April | 689 | 100.0% | 0.1 | 1.1 | 0 | 0.5 | 0 | 98.8 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| May | 713 | 100.0% | 0.1 | 1.7 | 0 | 0.3 | 0 | 99.4 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 682 | 100.0% | 0.2 | 1.5 | 0 | 0.4 | 0 | 99.6 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| July | 713 | 100.0% | 0.3 | 3.6 | 0 | 0.6 | 0 | 96.1 | 3.8 | 0.1 | 0.0 | 0.0 | 0.0 |
| August | 635 | 88.8% | 0.3 | 3.2 | 0 | 0.6 | 0 | 95.6 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| September | 643 | 94.6% | 0.2 | 3.9 | 0 | 0.7 | 0 | 98.1 | 1.7 | 0.2 | 0.0 | 0.0 | 0.0 |
| October | 712 | 100.0% | 0.2 | 1.5 | 0 | 0.4 | 0 | 99.6 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| November | 689 | 100.0% | 0.2 | 1.4 | 0 | 0.7 | 0 | 98.8 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| December | 705 | 100.0% | 0.2 | 1.1 | 0 | 0.3 | 0 | 99.7 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual | 8240 | 98.6% | 0.2 | 3.9 | 0 | 0.7 | 0 | 98.8 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 |

Table D-3.Kerrobert Station: Summary of airpointer® H₂S monitoring results for 2022

a. 1-hour Saskatchewan Ambient Air Quality Standard = 11.0 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 3.6 ppb

| Month | Valid 1-Hr data | Operational Time | Average Conc. | Maximum 1-Hr Conc. | 1-Hour Exceedance ^a | Maximum 24-Hr Conc. | 24-Hour Exceedance ^b | Per | Percent of Data in each Concentration Range | | | | |
|-----------|--------------------|---------------------|------------------|-----------------------|-----------------------------------|------------------------|------------------------------------|------|---|---------|---------|---------|-----|
| | (no.) | (%) | (µg/m³) | (µg/m³) | (no.) | (µg/m³) | (no.) | ≤5 | 5 - 10 | 10 - 15 | 15 - 30 | 30 - 80 | >80 |
| January | 744 | 100.0% | 4 | 23 | - | 9 | 0 | 75.1 | 20.8 | 3.8 | 0.3 | 0.0 | 0.0 |
| February | 672 | 100.0% | 4 | 14 | - | 8 | 0 | 78.9 | 19.2 | 1.9 | 0.0 | 0.0 | 0.0 |
| March | 744 | 100.0% | 4 | 15 | - | 8 | 0 | 74.6 | 22.0 | 3.2 | 0.1 | 0.0 | 0.0 |
| April | 720 | 100.0% | 4 | 21 | - | 8 | 0 | 79.9 | 17.1 | 2.2 | 0.8 | 0.0 | 0.0 |
| May | 744 | 100.0% | 5 | 27 | - | 11 | 0 | 64.0 | 31.3 | 3.8 | 0.9 | 0.0 | 0.0 |
| June | 720 | 100.0% | 8 | 110 | - | 28 | 0 | 47.1 | 31.4 | 12.5 | 6.5 | 2.2 | 0.3 |
| July | 744 | 100.0% | 4 | 15 | - | 11 | 0 | 74.9 | 20.6 | 4.3 | 0.3 | 0.0 | 0.0 |
| August | 678 | 91.1% | 9 | 46 | - | 28 | 0 | 36.1 | 37.5 | 13.4 | 8.4 | 4.6 | 0.0 |
| September | 688 | 96.4% | 9 | 69 | - | 28 | 0 | 39.7 | 34.2 | 13.4 | 8.4 | 4.4 | 0.0 |
| October | 744 | 100.0% | 7 | 29 | - | 21 | 0 | 49.9 | 26.7 | 12.9 | 10.5 | 0.0 | 0.0 |
| November | 720 | 100.0% | 5 | 44 | - | 25 | 0 | 63.9 | 21.3 | 8.5 | 5.4 | 1.0 | 0.0 |
| December | 743 | 100.0% | 5 | 41 | - | 12 | 0 | 59.9 | 25.6 | 11.0 | 3.2 | 0.3 | 0.0 |
| | | | | | | | | | | | | | |
| Annual | 8661 | 99.0% | 5 | 110 | - | 28 | 0 | 62.2 | 25.5 | 7.5 | 3.7 | 1.0 | 0.0 |
| | N1 1 1 | | | | | | | | | | | | |

Table D-4.Kerrobert Station: Summary of airpointer® PM_{2.5} monitoring results for 2022

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. 24-hour Canada-Wide Standard = $28 \mu g/m^3$

| Month | Valid 1-Hr data | Operational Time | Total Precip. | Maximum 1-Hr Precip. | Maximum 24-Hr Precip. | Percent of Data in each Precipitation Range | | | | | ge |
|-----------|--------------------|---------------------|------------------|-------------------------|--------------------------|---|--------|---------|---------|---------|-----|
| | (no.) | (%) | (mm) | (mm) | (mm) | ≤5 | 5 - 10 | 10 - 25 | 25 - 50 | 50 - 75 | >75 |
| January | 744 | 100.0% | 7.3 | 4.3 | 6.1 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| February | 672 | 100.0% | 21.8 | 6.9 | 20.5 | 99.7 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| March | 744 | 100.0% | 0.4 | 0.3 | 0.3 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| April | 720 | 100.0% | 2.2 | 0.8 | 0.8 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| May | 744 | 100.0% | 10.3 | 3.0 | 4.7 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 718 | 99.7% | 158.3 | 22.9 | 34.4 | 99.0 | 0.4 | 0.6 | 0.0 | 0.0 | 0.0 |
| July | 744 | 100.0% | 71.5 | 11.3 | 16.2 | 99.3 | 0.5 | 0.1 | 0.0 | 0.0 | 0.0 |
| August | 724 | 97.3% | 23.3 | 4.6 | 9.5 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| September | 720 | 100.0% | 10.3 | 2.5 | 6.6 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| October | 744 | 100.0% | 2.2 | 1.2 | 1.3 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| November | 720 | 100.0% | 3.2 | 1.6 | 1.9 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| December | 744 | 100.0% | 6.3 | 2.6 | 3.2 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | |
| Annual | 8738 | 99.7% | 316.9 | 22.9 | 34.4 | 99.8 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |

 Table D-5.Kerrobert Station: Summary of airpointer® precipitation monitoring results for 2022

| Month | Valid 1-Hr data | Operational Time | Average Temp. | Minimum 1-Hr Temp. | Maximum 1-Hr Temp. | Percent of Data in each Temperature Range | | | | | 9 |
|-----------|--------------------|---------------------|------------------|-----------------------|-----------------------|---|-----------|---------|--------|---------|-----|
| | (no.) | (%) | (°C) | (°C) | (°C) | ≤-30 | -30 ~ -15 | -15 ~ 0 | 0 ~ 15 | 15 ~ 30 | >30 |
| January | 744 | 100.0% | -12.3 | -35.6 | 3.6 | 7.0 | 32.3 | 53.4 | 7.3 | 0.0 | 0.0 |
| February | 672 | 100.0% | -12.5 | -30.0 | 5.2 | 0.3 | 39.3 | 49.1 | 11.3 | 0.0 | 0.0 |
| March | 744 | 100.0% | -4.8 | -26.9 | 12.3 | 0.0 | 10.8 | 55.1 | 34.1 | 0.0 | 0.0 |
| April | 720 | 100.0% | 1.7 | -12.8 | 19.0 | 0.0 | 0.0 | 39.2 | 58.9 | 1.9 | 0.0 |
| May | 744 | 100.0% | 11.0 | -0.6 | 24.5 | 0.0 | 0.0 | 0.7 | 72.6 | 26.7 | 0.0 |
| June | 718 | 99.7% | 15.6 | 3.8 | 28.4 | 0.0 | 0.0 | 0.0 | 47.9 | 52.1 | 0.0 |
| July | 744 | 100.0% | 18.9 | 7.9 | 33.0 | 0.0 | 0.0 | 0.0 | 27.2 | 70.3 | 2.6 |
| August | 724 | 97.3% | 19.8 | 4.8 | 34.4 | 0.0 | 0.0 | 0.0 | 28.0 | 66.2 | 5.8 |
| September | 720 | 100.0% | 14.6 | 0.3 | 35.4 | 0.0 | 0.0 | 0.0 | 56.7 | 40.3 | 3.1 |
| October | 744 | 100.0% | 7.2 | -7.5 | 24.8 | 0.0 | 0.0 | 13.8 | 71.9 | 14.2 | 0.0 |
| November | 720 | 100.0% | -9.1 | -26.6 | 5.3 | 0.0 | 22.4 | 68.2 | 9.4 | 0.0 | 0.0 |
| December | 744 | 100.0% | -18.1 | -36.6 | 1.4 | 14.2 | 41.0 | 44.5 | 0.3 | 0.0 | 0.0 |
| | | | | | | | | | | | |
| Annual | 8738 | 99.7% | 2.7 | -36.6 | 35.4 | 1.8 | 12.1 | 27.0 | 35.5 | 22.7 | 0.9 |

 Table D-6.Kerrobert Station: Summary of airpointer® ambient temperature monitoring results for 2022

| Month | Valid 1-Hr data | Operational Time | Average RH | Minimum 1-Hr RH | Maximum 1-Hr RH | Percent of Data in each Relative Humidity Range | | | | | ange |
|-----------|--------------------|---------------------|---------------|--------------------|--------------------|---|---------|---------|---------|---------|------|
| | (no.) | (%) | (%) | (%) | (%) | ≤15 | 15 - 30 | 30 - 60 | 60 - 80 | 80 - 90 | >90 |
| January | 744 | 100.0% | 69 | 0 | 85 | 3.3 | 0.0 | 1.7 | 88.4 | 6.6 | 0.0 |
| February | 672 | 100.0% | 68 | 53 | 85 | 0.0 | 0.0 | 4.6 | 92.6 | 2.8 | 0.0 |
| March | 744 | 100.0% | 68 | 22 | 84 | 0.0 | 0.5 | 15.5 | 74.7 | 9.3 | 0.0 |
| April | 720 | 100.0% | 45 | 22 | 86 | 0.0 | 6.3 | 47.6 | 37.8 | 8.3 | 0.0 |
| May | 744 | 100.0% | 48 | 5 | 88 | 0.7 | 22.0 | 50.1 | 22.2 | 5.0 | 0.0 |
| June | 718 | 99.7% | 52 | 11 | 89 | 0.3 | 13.6 | 36.5 | 31.3 | 18.2 | 0.0 |
| July | 744 | 100.0% | 55 | 24 | 91 | 0.0 | 2.4 | 38.3 | 38.6 | 20.4 | 0.3 |
| August | 724 | 97.3% | 56 | 17 | 90 | 0.0 | 11.7 | 44.1 | 30.4 | 13.8 | 0.0 |
| September | 720 | 100.0% | 50 | 0 | 89 | 1.3 | 16.5 | 47.6 | 24.2 | 10.4 | 0.0 |
| October | 744 | 100.0% | 54 | 19 | 88 | 0.0 | 6.5 | 52.6 | 35.8 | 5.2 | 0.0 |
| November | 720 | 100.0% | 66 | 47 | 85 | 0.0 | 0.0 | 3.8 | 84.7 | 11.5 | 0.0 |
| December | 744 | 100.0% | 69 | 44 | 81 | 0.0 | 0.0 | 0.4 | 98.7 | 0.9 | 0.0 |
| | | | | | | | | | | | |
| Annual | 8738 | 99.7% | 58 | 0 | 91 | 0.5 | 6.6 | 28.6 | 54.9 | 9.4 | 0.0 |

 Table D-7.Kerrobert Station: Summary of airpointer® relative humidity monitoring results for 2022

| Wind Direction | Perce | ent of Data | a within Wi | nd Speed R | ange, wind s | peed unit | kph |
|-----------------|-----------|-------------|-------------|------------|--------------|-----------|--------|
| Sector | 0.3 - 1.4 | 1.4 - 3.1 | 3.1 - 7.8 | 7.8 - 10.6 | 10.6 - 13.6 | >13.6 | Totals |
| North NorthEast | 0.0% | 0.2% | 2.2% | 0.8% | 0.5% | 0.5% | 4.2% |
| NorthEast | 0.0% | 0.2% | 1.8% | 0.8% | 0.5% | 0.2% | 3.6% |
| East NorthEast | 0.1% | 0.2% | 1.1% | 0.8% | 0.7% | 0.9% | 3.8% |
| East | 0.1% | 0.2% | 1.2% | 0.8% | 0.5% | 2.3% | 5.1% |
| East SouthEast | 0.0% | 0.1% | 1.1% | 1.1% | 1.1% | 3.6% | 7.2% |
| SouthEast | 0.0% | 0.1% | 0.7% | 0.7% | 0.8% | 1.8% | 4.3% |
| South SouthEast | 0.1% | 0.1% | 0.8% | 0.8% | 0.8% | 1.7% | 4.3% |
| South | 0.0% | 0.3% | 0.7% | 0.5% | 0.6% | 1.4% | 3.6% |
| South SouthWest | 0.1% | 0.2% | 1.5% | 0.8% | 0.8% | 1.9% | 5.3% |
| SouthWest | 0.1% | 0.5% | 3.5% | 1.8% | 1.6% | 2.1% | 9.6% |
| West SouthWest | 0.1% | 0.6% | 1.9% | 0.7% | 0.8% | 1.6% | 5.6% |
| West | 0.0% | 0.4% | 1.1% | 0.6% | 0.8% | 2.1% | 5.1% |
| West NorthWest | 0.1% | 0.5% | 4.1% | 2.5% | 1.6% | 1.8% | 10.6% |
| NorthWest | 0.1% | 0.5% | 5.1% | 2.4% | 2.4% | 3.4% | 14.1% |
| North NorthWest | 0.0% | 0.4% | 3.4% | 2.2% | 1.8% | 1.2% | 9.0% |
| North | 0.1% | 0.5% | 2.2% | 0.9% | 0.5% | 0.1% | 4.3% |
| | | | | | | | |
| Total | 1.1% | 5.0% | 32.4% | 18.4% | 16.0% | 26.8% | 99.7% |

 Table D-8 Kerrobert Station: Wind frequency table for the year 2022

| Percent Calm (≤0.3 kph) | 0.3% |
|--|------|
| Number of Valid Hourly-Average Data | 8735 |
| Total Workable Hours in Time Period | 8760 |

APPENDIX E. MEADOW LAKE CITY STATION: CONTINUOUS MONITORING DATA

| Parameter | Unit | Calibration & AIC ^a | Valid Data | Uptime | Summary Statistics for Hourly Average Data | | | | |
|------------------------|-------|--------------------------------|------------|--------|---|---------|---------|--|--|
| | | (hours) | (hours) | (%) | Average | Minimum | Maximum | | |
| NO | ppb | 405 | 8163 | 97.7% | 0.9 | < 0.1 | 61.8 | | |
| NO ₂ | ppb | 405 | 8163 | 97.7% | 2.8 | < 0.1 | 44.3 | | |
| NO _x | ppb | 405 | 8163 | 97.7% | 3.6 | < 0.1 | 90.5 | | |
| O ₃ | ppb | 408 | 8229 | 98.5% | 26 | < 1 | 71 | | |
| PM _{2.5} | µg/m³ | 4 | 8751 | 99.9% | 6 | < 1 | 227 | | |
| Precipitation | mm | 0 | 8755 | 99.9% | 331.6 <i>°</i> | < 0.1 | 13.7 | | |
| Ambient Temperature | °C | 0 | 875579 | 99.9% | 2.4 | -37.0 | 32.8 | | |
| Relative Humidity | % | 0 | 8755 | 99.9% | 60 | < 1 | 89 | | |
| Wind Speed | kph | 0 | 8752 | 99.9% | 4.2 | Calm | 18.4 | | |

Table E-1 Meadow Lake City Station: Summary statistics for continuous air monitoring results for 2022

a. Automatic Instrument Check

b. Total precipitation

| Month | Valid 1-Hr data | Operational Time | Average Conc. | Maximum 1-Hr Conc. | 1-Hour Exceedance ^{<i>a</i>} | Maximum 24-Hr Conc. | 24-Hour Exceedance ^b | Percent of Data in each Concentration Range | | | | | |
|---------------------|--------------------|---------------------|------------------|-----------------------|--|------------------------|------------------------------------|---|--------|---------|----------|-----------|------|
| | (no.) | (%) | (ppb) | (ppb) | (no.) | (ppb) | (no.) | ≤5 | 5 - 15 | 15 - 53 | 53 - 100 | 100 - 159 | >159 |
| January | 712 | 100.0% | 1.3 | 29.5 | - | 4.7 | - | 96.6 | 2.7 | 0.7 | 0.0 | 0.0 | 0.0 |
| February | 643 | 100.0% | 1.5 | 47.2 | - | 8.1 | - | 95.0 | 3.7 | 1.2 | 0.0 | 0.0 | 0.0 |
| March | 705 | 100.0% | 0.9 | 46.2 | - | 5.5 | - | 98.2 | 1.6 | 0.3 | 0.0 | 0.0 | 0.0 |
| April | 689 | 100.0% | 0.4 | 5.6 | - | 1.3 | - | 99.7 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| May | 710 | 99.7% | 0.3 | 4.1 | - | 0.6 | - | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 681 | 100.0% | 0.3 | 10.7 | - | 1.7 | - | 99.3 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| July | 712 | 100.0% | 0.3 | 3.5 | - | 0.5 | - | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| August | 616 | 86.2% | 0.3 | 3.2 | - | 0.6 | - | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| September | 589 | 86.6% | 0.9 | 24.6 | - | 2.6 | - | 96.4 | 3.2 | 0.3 | 0.0 | 0.0 | 0.0 |
| October | 712 | 100.0% | 1.5 | 40.9 | - | 5.3 | - | 92.4 | 6.5 | 1.1 | 0.0 | 0.0 | 0.0 |
| November | 689 | 100.0% | 1.2 | 41.5 | - | 8.1 | - | 96.2 | 2.3 | 1.5 | 0.0 | 0.0 | 0.0 |
| December | 705 | 100.0% | 1.5 | 61.8 | - | 9.5 | - | 94.9 | 4.5 | 0.4 | 0.1 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8163 | 97.7% | 0.9 | 61.8 | - | 9.5 | - | 97.4 | 2.1 | 0.5 | 0.0 | 0.0 | 0.0 |

Table E-2. Meadow Lake City Station: Summary of airpointer® NO monitoring results for 2022

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. No 24-hour Saskatchewan Ambient Air Quality Standard

| | Valid | Operational | Average | Maximum | 1-Hour | Maximum | 24-Hour | | | | | | |
|---------------------|-------|-------------|---------|------------|-------------------------|-------------|-------------------------|---|--------|---------|----------|-----------|------|
| | 1-Hr | | | | | | | Percent of Data in each Concentration Range | | | | | |
| Month | data | Time | Conc. | 1-Hr Conc. | Exceedance ^a | 24-Hr Conc. | Exceedance ^b | | | | | | |
| | (no.) | (%) | (ppb) | (ppb) | (no.) | (ppb) | (no.) | ≤5 | 5 - 15 | 15 - 53 | 53 - 100 | 100 - 159 | >159 |
| January | 712 | 100.0% | 4.7 | 39.5 | 0 | 12.8 | - | 68.5 | 26.1 | 5.4 | 0.0 | 0.0 | 0.0 |
| February | 643 | 100.0% | 5.0 | 37.7 | 0 | 14.2 | - | 69.4 | 24.6 | 6.1 | 0.0 | 0.0 | 0.0 |
| March | 705 | 100.0% | 3.7 | 44.3 | 0 | 10.7 | - | 81.7 | 13.6 | 4.7 | 0.0 | 0.0 | 0.0 |
| April | 689 | 100.0% | 1.4 | 17.4 | 0 | 3.8 | - | 94.8 | 5.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| May | 710 | 99.7% | 1.1 | 11.7 | 0 | 2.5 | - | 97.9 | 2.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 681 | 100.0% | 1.3 | 12.4 | 0 | 3.9 | - | 96.8 | 3.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| July | 712 | 100.0% | 0.9 | 6.7 | 0 | 1.5 | - | 99.3 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| August | 616 | 86.2% | 1.1 | 8.4 | 0 | 1.9 | - | 98.4 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| September | 589 | 86.6% | 1.4 | 18.3 | 0 | 3.1 | - | 95.4 | 4.4 | 0.2 | 0.0 | 0.0 | 0.0 |
| October | 712 | 100.0% | 3.0 | 22.2 | 0 | 7.6 | - | 83.3 | 15.6 | 1.1 | 0.0 | 0.0 | 0.0 |
| November | 689 | 100.0% | 4.5 | 35.5 | 0 | 13.7 | - | 71.4 | 23.9 | 4.6 | 0.0 | 0.0 | 0.0 |
| December | 705 | 100.0% | 4.5 | 29.9 | 0 | 13.0 | - | 70.1 | 25.5 | 4.4 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8163 | 97.7% | 2.8 | 44.3 | 0 | 14.2 | - | 85.3 | 12.4 | 2.3 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |

Table E-3. Meadow Lake City Station: Summary of airpointer® NO₂ monitoring results for 2022

a. 1-hour Saskatchewan Ambient Air Quality Standard = 159 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 106 ppb

c. Annual Saskatchewan Ambient Air Quality Standard = 24 ppb

| | Valid | Operational | Average | Maximum | 1-Hour | Maximum | 24-Hour | Percent of Data in each Concentration Range | | | | | |
|---------------------|-----------|-------------|---------|------------|-------------------------|-------------|-------------------------|---|--------|---------|----------|-----------|------|
| Month | 1-Hr data | Time | Conc. | 1-Hr Conc. | Exceedance ^a | 24-Hr Conc. | Exceedance ^b | | | | | | |
| | (no.) | (%) | (ppb) | (ppb) | (no.) | (ppb) | (no.) | ≤5 | 5 - 15 | 15 - 53 | 53 - 100 | 100 - 159 | >159 |
| January | 712 | 100.0% | 6.0 | 69.0 | - | 16.9 | - | 60.2 | 32.6 | 6.9 | 0.3 | 0.0 | 0.0 |
| February | 643 | 100.0% | 6.5 | 81.7 | - | 22.4 | - | 58.3 | 32.8 | 8.2 | 0.6 | 0.0 | 0.0 |
| March | 705 | 100.0% | 4.6 | 90.5 | - | 16.3 | - | 77.0 | 17.0 | 5.7 | 0.3 | 0.0 | 0.0 |
| April | 689 | 100.0% | 1.8 | 19.8 | - | 5.1 | - | 92.6 | 7.1 | 0.3 | 0.0 | 0.0 | 0.0 |
| May | 710 | 99.7% | 1.3 | 14.1 | - | 3.0 | - | 97.3 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 681 | 100.0% | 1.6 | 21.8 | - | 5.5 | - | 95.4 | 3.8 | 0.7 | 0.0 | 0.0 | 0.0 |
| July | 712 | 100.0% | 1.2 | 9.9 | - | 1.9 | - | 99.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| August | 616 | 86.2% | 1.3 | 11.5 | - | 2.3 | - | 96.4 | 3.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| September | 589 | 86.6% | 2.3 | 37.2 | - | 5.7 | - | 90.5 | 8.3 | 1.2 | 0.0 | 0.0 | 0.0 |
| October | 712 | 100.0% | 4.5 | 55.5 | - | 10.1 | - | 74.0 | 20.1 | 5.8 | 0.1 | 0.0 | 0.0 |
| November | 689 | 100.0% | 5.7 | 77.0 | - | 21.8 | - | 62.7 | 31.5 | 5.2 | 0.6 | 0.0 | 0.0 |
| December | 705 | 100.0% | 5.9 | 87.6 | - | 20.5 | - | 59.7 | 32.9 | 7.1 | 0.3 | 0.0 | 0.0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8163 | 97.7% | 3.6 | 90.5 | - | 22.4 | - | 80.0 | 16.3 | 3.5 | 0.2 | 0.0 | 0.0 |

Table E-4. Meadow Lake City Station: Summary of airpointer® NO_x monitoring results for 2022

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. No 24-hour Saskatchewan Ambient Air Quality Standard

| Month | Valid 1-Hr data | Operational Time | Average Conc. | Maximum 1-Hr Conc. | 1-Hour Exceedance ^a | Maximum 8-Hr Conc. | 8-Hour Conc. Above CWS ^b | Percent of Data in each Concentration Range | | | | | | | |
|---------------------|--------------------|---------------------|------------------|-----------------------|-----------------------------------|-----------------------|--|---|---------|---------|---------|---------|-----|--|--|
| | (no.) | (%) | (ppb) | (ppb) | (no.) | (ppb) | (no.) | ≤10 | 10 - 20 | 20 - 40 | 40 - 65 | 65 - 82 | >82 | | |
| January | 712 | 100.0% | 24 | 40 | 0 | 38 | 0 | 6.4 | 15.2 | 78.3 | 0.1 | 0.0 | 0.0 | | |
| February | 643 | 100.0% | 29 | 42 | 0 | 41 | 0 | 2.3 | 8.7 | 85.4 | 3.6 | 0.0 | 0.0 | | |
| March | 705 | 100.0% | 34 | 50 | 0 | 48 | 0 | 1.7 | 3.5 | 76.5 | 18.3 | 0.0 | 0.0 | | |
| April | 689 | 100.0% | 34 | 48 | 0 | 47 | 0 | 1.0 | 6.8 | 71.7 | 20.5 | 0.0 | 0.0 | | |
| May | 679 | 95.2% | 28 | 50 | 0 | 48 | 0 | 1.9 | 16.3 | 73.9 | 7.8 | 0.0 | 0.0 | | |
| June | 636 | 93.4% | 28 | 54 | 0 | 46 | 0 | 2.0 | 11.8 | 75.2 | 11.0 | 0.0 | 0.0 | | |
| July | 709 | 99.6% | 23 | 44 | 0 | 40 | 0 | 5.8 | 31.6 | 61.9 | 0.7 | 0.0 | 0.0 | | |
| August | 712 | 100.0% | 21 | 45 | 0 | 41 | 0 | 10.8 | 36.4 | 51.5 | 1.3 | 0.0 | 0.0 | | |
| September | 678 | 100.0% | 21 | 71 | 0 | 44 | 0 | 12.5 | 32.4 | 52.5 | 2.4 | 0.1 | 0.0 | | |
| October | 712 | 100.0% | 23 | 52 | 0 | 44 | 0 | 9.4 | 22.2 | 67.3 | 1.1 | 0.0 | 0.0 | | |
| November | 689 | 100.0% | 24 | 34 | 0 | 32 | 0 | 4.6 | 16.5 | 78.8 | 0.0 | 0.0 | 0.0 | | |
| December | 665 | 94.2% | 25 | 37 | 0 | 36 | 0 | 6.2 | 19.1 | 74.7 | 0.0 | 0.0 | 0.0 | | |
| | | | | | | | | | | | | | | | |
| Annual ^c | 8229 | 98.5% | 26 | 71 | 0 | 48 | 0 | 5.5 | 18.5 | 70.5 | 5.5 | 0.0 | 0.0 | | |

Table E-5. Meadow Lake City Station: Summary of airpointer® O₃ monitoring results for 2022

a. 1-hour Saskatchewan Ambient Air Quality Standard = 82 ppb

b. 8-hour Canada-Wide Standard = 65 ppb
| Month | Valid 1-Hr data | Operational Time | Average Conc. | Maximum 1-Hr Conc. | 1-Hour Exceedance ^a | Maximum 24-Hr Conc. | 24-Hour Exceedance ^{<i>b</i>} | Perc | Percent of Data in each Concentration Range | | | | |
|---------------------|--------------------|---------------------|------------------|-----------------------|-----------------------------------|------------------------|---|------|---|---------|---------|---------|-----|
| | (no.) | (%) | (µg/m³) | (µg/m³) | (no.) | (µg/m³) | (no.) | ≤5 | 5 - 10 | 10 - 15 | 15 - 30 | 30 - 80 | >80 |
| January | 744 | 100.0% | 5 | 45 | - | 8 | 0 | 64 | 26 | 7 | 3 | 0 | 0 |
| February | 672 | 100.0% | 4 | 37 | - | 8 | 0 | 71 | 22 | 5 | 2 | 0 | 0 |
| March | 744 | 100.0% | 4 | 43 | - | 13 | 0 | 79 | 12 | 4 | 4 | 1 | 0 |
| April | 720 | 100.0% | 4 | 51 | - | 14 | 0 | 73 | 15 | 9 | 3 | 1 | 0 |
| May | 742 | 99.7% | 4 | 40 | - | 9 | 0 | 72 | 23 | 3 | 2 | 0 | 0 |
| June | 720 | 100.0% | 6 | 43 | - | 14 | 0 | 60 | 24 | 10 | 4 | 2 | 0 |
| July | 744 | 100.0% | 7 | 52 | - | 32 | 1 | 55 | 29 | 10 | 3 | 3 | 0 |
| August | 744 | 100.0% | 10 | 171 | - | 58 | 2 | 68 | 11 | 5 | 7 | 6 | 2 |
| September | 714 | 99.6% | 7 | 227 | - | 39 | 2 | 65 | 18 | 6 | 6 | 4 | 1 |
| October | 744 | 100.0% | 8 | 64 | - | 29 | 1 | 50 | 21 | 14 | 12 | 3 | 0 |
| November | 720 | 100.0% | 6 | 69 | - | 21 | 0 | 62 | 18 | 7 | 11 | 2 | 0 |
| December | 743 | 100.0% | 6 | 84 | - | 18 | 0 | 61 | 21 | 10 | 6 | 1 | 0 |
| | | | | | | | | | | | | | |
| Annual ^c | 8751 | 99.9% | 6 | 227 | - | 58 | 6 | 65.1 | 20.0 | 7.4 | 5.3 | 1.8 | 0.3 |

Table E-6. Meadow Lake City Station: Summary of airpointer® PM2.5 monitoring results for 2022

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. 24-hour Canada-Wide Standard = $28 \mu g/m^3$

c. No annual Saskatchewan Ambient Air Quality Standard

| Month | Valid 1-Hr data | Operational Time | Total Precip. | Maximum 1-Hr Precip. | Maximum 24-Hr Precip. | Percent of Data in each Precipitation Range | | | | | |
|-----------|--------------------|---------------------|------------------|-------------------------|--------------------------|---|--------|---------|---------|---------|-----|
| | (no.) | (%) | (mm) | (mm) | (mm) | ≤5 | 5 - 10 | 10 - 25 | 25 - 50 | 50 - 75 | >75 |
| January | 744 | 100.0% | 2.4 | 0.6 | 1.7 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| February | 672 | 100.0% | 6.2 | 3.6 | 4.8 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| March | 744 | 100.0% | 3.4 | 1.0 | 2.5 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| April | 720 | 100.0% | 2.4 | 1.1 | 1.6 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| May | 742 | 99.7% | 27.2 | 5.1 | 5.8 | 99.9 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| June | 720 | 100.0% | 156.1 | 11.6 | 61.0 | 99.2 | 0.6 | 0.3 | 0.0 | 0.0 | 0.0 |
| July | 744 | 100.0% | 39.0 | 11.8 | 13.1 | 99.6 | 0.3 | 0.1 | 0.0 | 0.0 | 0.0 |
| August | 744 | 100.0% | 65.1 | 13.7 | 18.2 | 99.5 | 0.4 | 0.1 | 0.0 | 0.0 | 0.0 |
| September | 717 | 99.6% | 11.2 | 2.0 | 3.5 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| October | 744 | 100.0% | 5.0 | 1.4 | 2.7 | 100.0 | 0.0 | 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% | 13.7 | 11.4 | 13.7 | 99.9 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | |
| Annual | 8755 | 99.9% | 331.6 | 13.7 | 61.0 | 99.8 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |

 Table E-7. Meadow Lake City Station: Summary of airpointer® precipitation monitoring results for 2022

| Month | Valid 1-Hr data | Operational Time | Average Temp. | Minimum 1-Hr Temp. | Maximum 1-Hr Temp. | Percent of Data in each Temperature Range | | | | | |
|-----------|--------------------|---------------------|------------------|-----------------------|-----------------------|---|-----------|---------|--------|---------|-----|
| | (no.) | (%) | (°C) | (°C) | (°C) | ≤-30 | -30 ~ -15 | -15 ~ 0 | 0 ~ 15 | 15 ~ 30 | >30 |
| January | 744 | 100.0% | -14.7 | -37.0 | 5.5 | 8.5 | 40.2 | 43.0 | 8.3 | 0.0 | 0.0 |
| February | 672 | 100.0% | -14.9 | -34.1 | 5.2 | 5.1 | 47.3 | 35.3 | 12.4 | 0.0 | 0.0 |
| March | 744 | 100.0% | -5.6 | -25.7 | 14.7 | 0.0 | 11.7 | 58.9 | 29.4 | 0.0 | 0.0 |
| April | 720 | 100.0% | 1.1 | -12.9 | 14.7 | 0.0 | 0.0 | 39.9 | 60.1 | 0.0 | 0.0 |
| May | 742 | 99.7% | 10.5 | -0.9 | 22.3 | 0.0 | 0.0 | 1.1 | 78.0 | 20.9 | 0.0 |
| June | 720 | 100.0% | 15.7 | 4.5 | 25.5 | 0.0 | 0.0 | 0.0 | 45.4 | 54.6 | 0.0 |
| July | 744 | 100.0% | 19.2 | 7.3 | 31.6 | 0.0 | 0.0 | 0.0 | 21.2 | 77.7 | 1.1 |
| August | 744 | 100.0% | 19.6 | 9.7 | 30.4 | 0.0 | 0.0 | 0.0 | 19.8 | 79.4 | 0.8 |
| September | 717 | 99.6% | 14.1 | 3.3 | 32.8 | 0.0 | 0.0 | 0.0 | 60.4 | 38.2 | 1.4 |
| October | 744 | 100.0% | 7.6 | -3.6 | 24.4 | 0.0 | 0.0 | 8.9 | 78.5 | 12.6 | 0.0 |
| November | 720 | 100.0% | -7.2 | -25.4 | 5.8 | 0.0 | 10.4 | 77.1 | 12.5 | 0.0 | 0.0 |
| December | 744 | 100.0% | -17.4 | -34.7 | -3.5 | 3.9 | 51.2 | 44.9 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | |
| Annual | 8755 | 99.9% | 2.4 | -37.0 | 32.8 | 1.5 | 13.3 | 25.7 | 35.5 | 23.7 | 0.3 |

 Table E-8. Meadow Lake City Station: Summary of airpointer® ambient temperature monitoring results for 2022

| Month | Valid 1-Hr data | Operational Time | Average RH | Minimum 1-Hr RH | Maximum 1-Hr RH | Percent of Data in each Relative Humidity Range | | | | | |
|-----------|--------------------|---------------------|---------------|--------------------|--------------------|---|---------|---------|---------|---------|-----|
| | (no.) | (%) | (%) | (%) | (%) | ≤15 | 15 - 30 | 30 - 60 | 60 - 80 | 80 - 90 | >90 |
| January | 744 | 100.0% | 65 | 51 | 83 | 3.1 | 0.0 | 11.6 | 83.3 | 2.0 | 0.0 |
| February | 672 | 100.0% | 63 | 36 | 81 | 0.0 | 0.0 | 32.4 | 67.0 | 0.6 | 0.0 |
| March | 744 | 100.0% | 58 | 28 | 84 | 0.0 | 0.7 | 56.9 | 37.8 | 4.7 | 0.0 |
| April | 720 | 100.0% | 56 | 21 | 83 | 0.0 | 4.0 | 51.5 | 41.5 | 2.9 | 0.0 |
| May | 742 | 99.7% | 52 | 17 | 88 | 0.0 | 10.4 | 53.6 | 31.3 | 4.7 | 0.0 |
| June | 720 | 100.0% | 61 | 19 | 89 | 0.0 | 10.0 | 34.9 | 34.0 | 21.1 | 0.0 |
| July | 744 | 100.0% | 60 | 21 | 89 | 0.0 | 1.9 | 45.7 | 38.7 | 13.7 | 0.0 |
| August | 744 | 100.0% | 63 | 27 | 88 | 0.0 | 1.1 | 37.4 | 45.3 | 16.3 | 0.0 |
| September | 717 | 99.6% | 61 | 25 | 88 | 0.0 | 3.6 | 41.1 | 41.1 | 14.1 | 0.0 |
| October | 744 | 100.0% | 55 | 15 | 84 | 0.0 | 5.8 | 55.2 | 32.9 | 6.0 | 0.0 |
| November | 720 | 100.0% | 66 | 35 | 82 | 0.0 | 0.0 | 18.1 | 78.2 | 3.8 | 0.0 |
| December | 744 | 100.0% | 65 | 42 | 77 | 0.0 | 0.0 | 11.7 | 88.3 | 0.0 | 0.0 |
| | | | | | | | | | | | |
| Annual | 8755 | 99.9% | 60 | 15 | 89 | 0.3 | 3.1 | 37.5 | 51.6 | 7.5 | 0.0 |

 Table E-9. Meadow Lake City Station: Summary of airpointer® relative humidity monitoring results for 2022

| Wind Direction | Perce | ent of Data | a within Wi | ind Speed R | ange, wind | speed unit | kph |
|-----------------|-----------|-------------|-------------|-------------|----------------|------------|--------|
| Sector | 0.3 - 1.4 | 1.4 - 3.1 | 3.1 - 7.8 | 7.8 - 10.6 | 10.6 - 13.6 | >13.6 | Totals |
| North NorthEast | 1.7% | 2.6% | 3.2% | 0.4% | 0.0% | 0.0% | 7.9% |
| NorthEast | 2.4% | 2.2% | 0.7% | 0.0% | 0.0% | 0.0% | 5.2% |
| East NorthEast | 2.1% | 1.8% | 0.3% | 0.0% | 0.0% | 0.0% | 4.2% |
| East | 1.7% | 2.0% | 0.7% | 0.0% | 0.0% | 0.0% | 4.4% |
| East SouthEast | 1.0% | 2.0% | 4.2% | 0.6% | 0.2% | 0.1% | 8.1% |
| SouthEast | 1.0% | 1.6% | 3.6% | 0.8% | 0.3% | 0.1% | 7.3% |
| South SouthEast | 0.8% | 0.9% | 1.4% | 0.2% | 0.0% | 0.0% | 3.3% |
| South | 0.7% | 0.9% | 0.7% | 0.1% | 0.0% | 0.0% | 2.4% |
| South SouthWest | 0.7% | 1.0% | 2.0% | 0.3% | 0.1% | 0.0% | 4.1% |
| SouthWest | 0.8% | 1.4% | 6.2% | 1.2% | 0.1% | 0.0% | 9.7% |
| West SouthWest | 0.6% | 1.7% | 6.3% | 0.5% | 0.1% | 0.0% | 9.1% |
| West | 0.7% | 1.1% | 2.8% | 0.6% | 0.2% | 0.0% | 5.4% |
| West NorthWest | 0.9% | 1.2% | 3.9% | 1.2% | 0.4% | 0.1% | 7.6% |
| NorthWest | 1.2% | 1.0% | 3.1% | 1.3% | 0.9% | 0.3% | 7.7% |
| North NorthWest | 1.2% | 1.3% | 1.7% | 1.1% | 0.5% | 0.1% | 5.8% |
| North | 0.7% | 1.8% | 2.6% | 0.6% | 0.3% | 0.0% | 5.9% |
| | | | | | | | |
| Total | 18.2% | 24.3% | 43.3% | 8.8% | 3.0% | 0.8% | 98.3% |

Table E-10Meadow Lake City Station: Wind frequency table for 2022

| Percent Calm (<0.3 kph) | 1.7% |
|-------------------------------------|------|
| Number of Valid Hourly-Average Data | 8752 |
| Total Workable Hours in Time Period | 8760 |



APPENDIX F. WYAMZ EXCEEDANCE SUMMARY

Table F-1 Maidstone Station: Summary of 24-hour exceedances for 2022

* No recorded 1-hour or 24- hour exceedances

Table F-2 Clavet Station: Summary of exceedances for 2022

| 24-hour Exceedance Information | | | Summary of Other Parameters During Exceedance | | | | | | | | | |
|--------------------------------|-------|-----------------|---|-----|-----|------|-----|-----------------|-----|----------------|-------------------|--|
| Dollutant | Conc | Exceedance Time | WS | WD | AQI | Rain | NO | NO ₂ | NOx | O ₃ | PM _{2.5} | |
| Pollutant | Conc. | mmm-dd | kph | deg | - | mm | ppb | ppb | ppb | ppb | µg/m³ | |
| PM _{2.5} | 29 | Oct-19 | 4.0 | 232 | 3 | 0.0 | 1.6 | 6.1 | 7.7 | 19 | 29 | |

Table F-3 Kerrobert Station: Summary of exceedances for 2022

* No recorded 1-hour or 24- hour exceedances

Table F-4 Meadow Lake City Station: Summary of exceedances for 2022

| 24-hour Exceedance Information | | | | Summary of Other Parameters During Exceedance | | | | | | | | | |
|--------------------------------|-------|-----------------|-----|---|-----|------|-----|--------|-----|----------------|-------------------|--|--|
| Pollutant | Conc | Exceedance Time | WS | WD | AQI | Rain | NO | NO_2 | NOx | O ₃ | PM _{2.5} | | |
| | Conc. | mmm-dd | kph | deg | - | mm | ppb | ppb | ppb | ppb | µg/m³ | | |
| PM _{2.5} | 58 | Aug-21 | 2.6 | 104 | 4 | 0.0 | - | 1 | - | 22 | 58 | | |
| PM _{2.5} | 43 | Aug-22 | 1.6 | 205 | 3 | 0.0 | 0 | 2 | 2 | 16 | 43 | | |
| PM _{2.5} | 32 | Jul-30 | 2.2 | 103 | 2 | 0.5 | 0 | 1 | 1 | 14 | 32 | | |
| PM _{2.5} | 39 | Sep-4 | 1.8 | 120 | - | 0.0 | - | - | - | 28 | 39 | | |
| PM _{2.5} | 33 | Sep-3 | 2.6 | 156 | - | 0.0 | - | - | - | 30 | 33 | | |
| PM _{2.5} | 29 | Oct-19 | 2.5 | 217 | 3 | 0.0 | 2.6 | 6.6 | 9.2 | 24 | 29 | | |

APPENDIX G. 2022 FINANCIAL STATEMENTS

Western Yellowhead Air Management Zone Inc. Financial Statements December 31, 2022

| P | age |
|---|-----|
| Management's Responsibility | |
| Independent Auditor's Report | |
| Financial Statements | |
| Statement of Financial Position | |
| Statement of Operations and Changes in Net Assets | |
| Statement of Cash Flows | |
| Notes to the Financial Statements | |

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. 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 entirely 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. 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 31, 2023

Executive Director



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

Opinion

We have audited the financial statements of Western Yellowhead Air Management Zone Inc. (the "Organization"), which comprise the statement of financial position as at December 31, 2022, and the statements of operations, changes in net assets and cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the Organization as at December 31, 2022, and the results of its operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are independent of the Organization in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the 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.

In preparing the financial statements, management is responsible for assessing the Organization's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Organization or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Organization's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

1 (877) 500-0778 T: (306) 665-6766 F: (306) 665-9910



As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit 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 Organization's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Organization's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Organization to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Saskatoon, Saskatchewan

MNPLLP

March 31, 2023

Chartered Professional Accountants



Western Yellowhead Air Management Zone Inc.

Statement of Financial Position

As at December 31, 2022

| | 2022 | 2021 |
|----------------------------------|---------|---------|
| Assets | | |
| Current | | |
| Cash resources | 346,611 | 198,122 |
| Short-term investment (Note 3) | · - | 106,559 |
| Prepaid expenses | 5,426 | 6,406 |
| | 352,037 | 311,087 |
| Tangible capital assets (Note 4) | 66,336 | 83,059 |
| | 418,373 | 394,146 |
| Liabilities | | |
| Current | | |
| Accounts payable and accruals | 13,758 | 10,599 |
| Goods and Services Tax payable | 2,328 | 1,915 |
| | 16,086 | 12,514 |
| Commitment (Note 7) | | |
| Net Assets | | |
| Unrestricted net assets | 402,287 | 381,632 |
| | 418,373 | 394,146 |

Approved on behalf of the Board of Directors

Director

Director

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, 2022

| | 2022 | 2021 |
|---------------------------------|---------|---------|
| Revenue | | |
| Membership fees | 184,865 | 164,799 |
| Investments | 1,521 | 737 |
| | 186,386 | 165,536 |
| Expenses | | |
| Amortization | 16,724 | 21,044 |
| Insurance | 7,455 | 6,676 |
| Consulting | 1,000 | - |
| Management fees (Note 5) | 51,625 | 49,850 |
| Meetings | 1,640 | - |
| Monitoring | 50,170 | 48,961 |
| Office supplies | 1,668 | 533 |
| Professional fees | 8,665 | 6,929 |
| Promotion | 4,324 | - |
| Repairs and maintenance | 20,002 | 16,298 |
| Telephone | 2,458 | 2,496 |
| | 165,731 | 152,787 |
| Excess of revenue over expenses | 20,655 | 12,749 |
| Net assets, beginning of year | 381,632 | 368,883 |
| Net assets, end of year | 402,287 | 381,632 |

Western Yellowhead Air Management Zone Inc.

Statement of Cash Flows

For the year ended December 31, 2022

| | 2022 | 2021 |
|--|---------------------|-----------------------|
| Cash provided by (used for) the following activities | | |
| Excess of revenue over expenses Amortization | 20,655 16,724 | 12,749 21,044 |
| | 37,379 | 33,793 |
| Changes in working capital accounts Prepaid expenses Accounts payable and accruals Goods and Services Tax payable | 980 3,158 413 | (161) 4,724 837 |
| | 41,930 | 39,193 |
| Investing Purchase of short-term investment Proceeds on disposal of short-term investment | - 106.559 | (106,559) 105,977 |
| | 106,559 | (582) |
| Increase in cash resources Cash resources, beginning of year | 148,489 198,122 | 38,611 159,511 |
| Cash resources, end of year | 346,611 | 198,122 |

The accompanying notes are an integral part of these financial statements

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:

Cash resources

Cash and cash equivalents include cash, term deposits, and marketable securities with maturities of three months or less.

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.

Financial instruments

The Organization recognizes financial instruments when the Organization becomes party to the contractual provisions of the financial instrument.

Arm's length financial instruments

Financial instruments acquired or issued in an arm's length transaction ("arm's length financial instruments") are initially recorded at their fair value.

At initial recognition, the Organization may irrevocably elect to subsequently measure any arm's length financial instrument at fair value. The Organization has not made such an election during the year.

The Organization subsequently measures investments in equity instruments quoted in an active market at fair value. Fair value is determined by published price quotations. All other financial assets and liabilities are subsequently measured at amortized cost.

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

2. Significant accounting policies (Continued from previous page)

Related party financial instruments

The Organization initially measures the following financial instruments originated/acquired or issued/assumed in a related party transaction ("related party financial instruments") at fair value:

- Investments in equity instruments quoted in an active market
- Debt instruments quoted in an active market
- Debt instruments when the inputs significant to the determination of its fair value are observable (directly or indirectly)
- Derivative contracts.

All other related party financial instruments are measured at cost on initial recognition. When the financial instrument has repayment terms, cost is determined using the undiscounted cash flows, excluding interest, dividend, variable and contingent payments, less any impairment losses previously recognized by the transferor. When the financial instrument does not have repayment terms, but the consideration transferred has repayment terms, cost is determined based on the repayment terms of the consideration transferred. When the financial instrument and the consideration transferred both do not have repayment terms, the cost is equal to the carrying or exchange amount of the consideration transferred or received.

Transaction costs and financing fees directly attributable to the origination, acquisition, issuance or assumption of related party financial instruments are immediately recognized in excess of revenue over expenses.

Financial asset impairment

The Organization assesses impairment of all 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; there are numerous assets affected by the same factors; no asset is individually significant. Management considers whether the issuer is having significant financial difficulty; 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.

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 at the statement of financial position date; 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 revenue 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 excess of revenue over expenses in the year the reversal occurs.

Tangible capital assets

Purchased tangible capital assets are recorded at cost. Contributed tangible 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.

2. Significant accounting policies (Continued from previous page)

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. Short-term investment

Guaranteed Investment Certificate with an interest rate of 0.75% (2021 - 0.75%) matured on December 20, 2022.

4. Tangible capital assets

| | Cost | Accumulated amortization | 2022 Net book value | 2021 Net book value |
|-----------|---------|--------------------------|---------------------------|---------------------------|
| Website | 7,956 | 7,769 | 187 | 373 |
| Equipment | 462,174 | 396,025 | 66,149 | 82,686 |
| | 470,130 | 403,794 | 66,336 | 83,059 |

5. Related party transactions

The Organization has entered into a contract agreement for management services, expiring May 31, 2023. The contract is based on hours required, to a maximum of a yearly \$50,000 as at the May 31 contract date. Any overage is required to be approved by the Board of Directors. Included in expenses for the current fiscal year are \$51,625 (2021 - \$49,850) 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.

6. 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.

7. Commitment

The Organization has entered into a contract for the operation and maintenance of airpointer monitoring stations expiring July 31, 2024 with minimum annual payments as follows:

| 2023 | 49,020 |
|------|--------|
| 2024 | 28,595 |
| | 77,615 |

APPENDIX H. WYAMZ BOARD OF DIRECTORS



Brad Sigurdson Board Chair (Saskatchewan Mining Association)

Mr. Sigurdson is the Vice President – Environment, Safety and Regulatory Affairs 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".



Jocelan Lundquist

Member (Cenovus Energy Inc)

Jocelan holds a BSc in Environmental Science from the University of Alberta, is a Professional Agrologist and has worked in an environmental role within the Western Canadian Oil and Gas Industry for over 17 years. She currently resides in Lloydminster, Alberta and works for Husky Energy Downstream. Jocelan began her career working on soil/groundwater remediation and reclamation as part of company asset retirement and liability management programs. She now provides technical and regulatory support for operational activities related to air quality, water quality, waste management, spill response, soil remediation and vegetation management.



Matthew Reiger Science Committee Chair

Matthew is an Environmental Coordinator with the City of Saskatoon's Sustainability Department. He has undergraduate degrees in Physical Education and Land Use & Environmental Studies from the University of Saskatchewan, and has been employed with the City of Saskatoon since 2008. His current portfolio includes tracking and reporting progress towards the City's Climate Action Plan, as well as various other reporting requirements related to the overall environmental performance of the City and community.

| Kari Hamilton Communications Committee Chair | |
|---|--|
| Kari Hamilton is an Environmental Regulatory Lead for The Mosaic Company. She has a B.Sc. in Environmental Science & Biology from the University of Alberta along with over 18 years of environmental, industrial and regulatory experience. In her current role, she supports operations, chairs Fertilizer Canada's Environmental Committee, sits on the Board of Directors for two other air zones within Saskatchewan, and manages various regulatory files including air quality. Kari is passionate about environmental education especially with youth in hopes to inspire them to catch "the science bug". | |
| Curtis Ferguson Member | |
| Curtis has been employed with the Ministry of Environment, Mosaic Colonsay, and Nutrien Allan Potash Operations. His current role is Lead Environmental Engineer at Nutrien Allan which duties include the responsibility to maintain the facility license to operate and undertake environmental improvements related to fresh water use, air quality, energy, and waste management. | |
| Gary EricsonMember (Saskatchewan Ministry of the Economy) | |
| Mr. Ericson is the Regional Manager of the Lloydminster Office of The Ministry of Economy 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. | |

Dr. Simon Kapaj Member (Saskatchewan Health Authority)



Dr. Simon Kapaj has worked as a Medical Health Officer in Saskatoon since 2014. He obtained his degree in medicine at the University of Tirana in Albania in 1993 and practiced family medicine before coming to Canada. He completed his Master of Public Health and the residency training in Public Health and Preventive Medicine at the University of Saskatchewan. His interests and contributions to improving the health of residents of Saskatchewan include work across broad spectrum of public health services. He has been active in Immunizations, Occupation Health and Safety, Environmental Health, Prevention and Protection including infectious diseases and outbreaks, Disaster and Emergency Planning, and fostering partnerships with community groups. He serves as Medical Director for Environmental Public Health/Health Protection for the Saskatchewan Health Authority.

Dr. Kapaj is a Fellow in Public Health and Preventive Medicine of the Royal College of Physicians of Canada and a Diplomate of American Board of Preventive Medicine. He also is an Assistant Professor at the University of Saskatchewan, where he continues to supervise medical students and residents in Public Health and Preventive Medicine.



Anya Gawor Member (on leave)

Anya is an air emissions management engineer with Cenovus Energy Inc. She holds a BASc degree in Chemical Engineering Honours – Environmental Engineering Option from the University of Waterloo as well as a MSc in Environmental Chemistry from the University of Toronto. Anya has over 10 years of experience in the environmental field, specializing in air emissions and research and development.



Chidiebiere Anokwute Member

Chidi is an Environmental Coordinator with Canadian Natural Resources Limited (CNRL). He holds a Bachelor of Technology degree in geology from Federal University of Technology, Owerri, Nigeria and a Master's degree in Environmental Technology from University of Wolverhampton, United Kingdom. He worked in the environmental industry in the UK for over seven years before relocating to Canada in 2014 to continue his environmental practice in the oil and gas

| | industry. He is located at the CNRL field office in Lloydminster Alberta. |
|--|---|
| | Pamela Beaudin Member Pamela is a born and raised Saskatoon community leader. She holds a degree in Mechanical Engineering from the University of Saskatchewan and began her career in the energy industry. She works to combine engineering principles with Indigenous ways of knowing regarding sustainability and respect for the |
| | environment. She currently works as the Senior Indigenous Relations Manager at Nutrien. |
| | Ryan LeBlancMemberRyan LeBlanc is an Environmental Protection Officer with the EnvironmentalProtection Branch of the Ministry of Environment and had been with the ministrysince 2020. He holds an undergraduate degree in Environmental Geochemistryand a diploma in Environmental Engineering Technology. Ryan brings 6 years ofexperience in the field of ambient air monitoring to WYAMZ. |
| | Niels Koehncke Member Dr. Koehncke is a specialist in Occupational Medicine, practicing in Saskatoon for over 20 years. He completed his residency training in Occupational Medicine at the University of Alberta in 2000. He is an Associate Professor in the Department of Medicine and Faculty member of the Canadian Centre for Health and Safety in Agriculture (CCHSA) at the University of Saskatchewan. He served as Director of CCHSA from 2012-2022, and presently leads the CCHSA Outreach Division. He also served as the Chief Occupational Medical Officer with the Saskatchewan Ministry of Labour Relations and Workplace Safety from 2000-2019. He has an outpatient occupational medicine practice at Royal University Hospital, teaches occupational medicine and health at the undergraduate and graduate level, and is involved in or leads research and outreach projects related to agricultural and occupational health. |

| Aaron RognvaldsonInterim MemberAaron is currently the Manager of the Air Emissions Management Team at Cenovus Energy. He joined Cenovus when Husky Energy and Cenovus merged. Prior to the merge, Aaron was part of Husky's Air Team in Calgary for 2 years, and, Environmental Operations in Husky's Foothills district for 12 years. Aaron's background is in environmental assessment and remediation with experience coordinating regulatory and compliance aspects for environmental issues related to air, water, soils and waste. He is a registered professional technologist (P.Tech. (Eng.)) with the Alberta Society of Engineering Technologist (ASET) and currently serves on the board of directors of a central Alberta airshed.Bruce HesselinkMember |
|---|
| Bruce grew up in the Estevan area and attended the University of Saskatchewan where he earned a Bachelor's Degree in Agriculture. After twenty-five or so years in agriculture R&D, including Agriculture Canada Research Branch in Saskatoon and the PFRA in Indian Head, Bruce joined SaskPower to manage their Shand Greenhouse Program. Currently Bruce is a Specialist with the Environmental Strategic Issues Management group of SaskPower's Environment Department, involved in files such as water and waste management, biodiversity, and air emissions. He has been involved in the Southeast Saskatchewan Airshed Association since 2020 and Chair of its Board of Directors since 2021. |
| Glen White Executive Director Mr. White brings more than 30 years of environmental management experience in the Saskatchewan mining and clean energy industries. His roles have included management of mine site environmental programs, conducting major project federal- provincial environmental assessments for new mining projects, and completing prefeasibility studies for utility scale renewable energy projects. Glen is committed to working with industry, regulatory agencies and other stakeholders to build efficient and effective air management programs based upon consistent, high quality air quality data collected within the WYAMZ. |

APPENDIX I WYAMZ HISTORICAL MEMBER COMPANIES

The Western Yellowhead Air Management Zone would like to express our gratitude to our members over the years 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.

- 5 Star Resources
- Agrium Inc.
- Akzo Nobel
- Alta Gas
- **Bayhurst Gas**
- **Beaumont Energy**
- Black Pearl Resources
- Bruin Oil and Gas
- Buzzard Resources
- Caltex Resources
- Canadian Natural **Resources Limited**
- Carrier Forest
- Cenovus Energy
- 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
- Cenovus Energy Inc
- Hyzer Energy •
- Ish Energy
- Kaisen Energy
- Leeco Resources
- Longhorn Oil and Gas
- Longview Oil
- Modexco Petroleum
- Meridian Cogeneration Power
- NAL Resources Limited
- Niven Fisher
- 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 Energy
- **Raven Resources**
- Renegade Petroleum
- Repsol Canada
- Rife Resources
- Saputo Products
- SaskEnergy Incorporated/ TransGas Limited
- Smitty's Farms
- Sojourn Energy
- Spartan Energy
- Sphere Energy
- SSSS Oil • Partnership
- Tamarack Valley
- Talisman Energy •
- **Tuscany Energy**
- Twin Butte Energy
- Viterra

CONTRIBUTING MEMBERS THIS YEAR

For information on how to become a member, please contact Glen White, Executive Director at (306) 227-8548.

- 102031850 Sask
- Baytex Energy
- Canadian Natural Resources
- Can Expo Energy
- Cargill
- Carriere Forest
 Products
- Compass Minerals
- City of Saskatoon
- CNH Industrial
- Crescent Point Energy
- Cenovus
 Downstream
- Cenovus
 Upstream
- Chronos Resources Ltd

- Edge LRM Operations Ltd
- Federated Coop
- IPC Canada
- LongHorn Oil and Gas
- Meadow Lake
 Mechanical Pulp
- Meridian Cogen Plant
- Mosaic Potash
- Northland Power
- Northwest Pure Alcohol and Spirits
- P&H Milling
 Group
- Pele Energy
- Nutrien Vanscoy
- Nutrien PCS

- SaskPower
- Saturn Oil and Gas
- Smitty's Farms
- Strathcona Resources Ltd
- Steel Reef Infrastructure Corp
- Surge Energy Inc
- TransGas
- Vermilion Resources
- Viterra
- West Lake Energy
- Zelmar Energy

* A listing and website link to current WYAMZ members can also be found at http://wyamz.ca/member-companies/

Member Benefits

Supporting WYAMZ through membership fees provides several member benefits, including:

- Membership in an association helping to foster a business-friendly environment that promotes future industrial growth.
- A collective voice for members to provide additional input to government mandated air zone management plans.
- Access to Federal Reference Method (FRM) quality regional air quality data.
- Shared monitoring equipment and air quality program operating costs amongst emitters. These efforts also potentially avoid less cost effective and more bureaucratic government mandated operation-based monitoring programs.
- An opportunity to build productive working relationships among industry, government, and public stakeholder groups.
- An effective forum for open discussion at WYAMZ Board meetings and the annual AGM.
- A contribution to building public trust through participation in open association processes and direct public involvement in the Association.
- An opportunity to use the information collected for public relations and education purposes.

End of the Report