

Air Quality in Ontario 2021 Report

Learn about the state of ambient air quality in 2021 and long-term trends for key airborne pollutants affecting Ontario’s air quality.

Air quality highlights

- Overall, air quality in Ontario has improved over time as both ambient concentrations of common air pollutants and emissions to air have decreased. Over the last 10 years, nitrogen dioxide concentrations have decreased by 28%, fine particulate matter concentrations by 18%, and sulphur dioxide concentrations by 54% on average across the province (see table below).
- In 2021, Ontario reported air quality in the low-risk category 93% of the time, based on the Air Quality Health Index (AQHI).
- Ozone and fine particulate matter, the main components of smog, remain as pollutants of concern from a regional perspective. Sulphur dioxide and benzene remain a concern at the local level in some communities.
- In 2021, there were exceedances of the provincial Ambient Air Quality Criteria (<https://www.ontario.ca/document/air-quality-ontario-2021-report/10-year-trends-and-annual-results#section-5>) and/or Canadian Ambient Air Quality Standard (<https://www.ontario.ca/document/air-quality-ontario-2021-report/national-air-quality-management-system#section-0>) for ground-level ozone, fine particulate matter and sulphur dioxide in some communities.
- Decreasing trends were observed for some traffic-related pollutants including black carbon and sulphate in fine particulate matter, while others showed no trend.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long-term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trends in common air pollutants, 2012-2021

Pollutant	Concentrations	Emissions
Nitrogen dioxide/ Nitrogen oxides (NO ₂ /NO _x)	-28%	-37%
Fine particulate matter (PM _{2.5})	-18%	-12%
Ground-level ozone (O ₃)	No trend	N/A
Sulphur dioxide (SO ₂)	-54%	-62%

Trends in volatile organic compounds, 2012-2021

Pollutant	Concentrations
Benzene	-36%
Toluene	-53%
Ethylbenzene	-39%
m- and p-xylene	-39%
o-xylene	-33%

Pollutant	Concentrations
1,3 butadiene	-53%

Introduction

Protecting the air we breathe

The ministry is protecting Ontario's air quality and ensuring we have strong environmental standards that protect human health and the environment. In doing so, the ministry is working to ensure cleaner air for all Ontarians by regulating air contaminants released by certain industrial and commercial facilities, limiting emissions from commercial trucks and buses, and better understanding the transboundary flow of air pollutants into Ontario.

Overall, ambient air quality confirms Ontario's actions to reduce airborne pollutants are working and that regional air quality has been steadily improving in Ontario for many common air pollutants over the past 10 years.

While improvements have been made, we recognize more work needs to be done to ensure communities are protected from local sources of contaminants to air. The ministry will continue to hold facilities accountable, while working with municipalities, Indigenous communities, and industry to improve air quality and address unique challenges in communities with tailored solutions.

Learn more about what Ontario is doing to protect our air. (<https://www.ontario.ca/page/air-quality-ontario>)

About this report

This report summarizes 10-year air quality trends and the state of ambient air quality in Ontario during 2021. It reports on the major sources of emissions to air, pollutant concentrations measured across the ministry's Air Quality Health Index monitoring network, and Ontario's performance against both provincial and federal ambient air quality criteria that were in effect in 2021. The ministry monitored ambient air quality in real time at 39 air monitoring stations in communities across Ontario in collaboration with the federal National Air Pollutant Surveillance (<https://open.canada.ca/data/en/dataset/1b36a356-defd-4813-acea-47bc3abd859b>) (NAPS) program during 2021.^[1] This information was reported 24 hours a day, seven days a week, through the ministry's public website (<http://www.airqualityontario.com/>) .

The ministry's Air Quality Health Index monitoring stations are generally representative of ambient air quality which reflects the contribution of all sources of air contaminants to air. These air monitoring stations are sited to be representative of general population exposure and thus do not necessarily reflect air quality at locations within a community that may be influenced by nearby local sources of air contaminants such as large industrial facilities or major transportation corridors. Concentrations of some air contaminants in neighborhoods located in close proximity to local sources such as an industrial facility may be higher than those measured at the ministry's Air Quality Health Index monitoring stations.

There are local air quality monitoring networks operated by industrial associations in the communities of Hamilton (Hamilton Air Monitoring Network (<http://www.hamnair.ca/>)), Sarnia (Clean Air Sarnia and Area (<https://www.cleanairsarniaandarea.com/>)) and Sudbury (Greater Sudbury Air Quality (<http://www.airquality-sudbury-vale.com/index.asp>)) that provide additional air quality information for these communities.



Two photographs showing the exterior (left) and interior (right) of the Toronto North Air Quality Health Index Station.

Air Quality Health Index monitoring stations

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This is a map depicting the 39 Air Quality Health Index monitoring stations across Ontario that were in operation during 2021.

Notes:

T: telemetry

NO₂: nitrogen dioxide

PM_{2.5}: fine particulate matter

O₃: ground-level ozone

SO₂: sulphur dioxide

CO: carbon monoxide

TRS: total reduced sulphur

Key air contaminants

Ontario monitors levels of common air pollutants associated with smog formation across the ambient air monitoring network. These pollutants have numerous, diverse and widespread sources, and can have adverse effects on human health, the environment, and property. More information on the key air contaminants, their impacts to health and the environment, and their sources is available below.

Nitrogen dioxide

Nitrogen dioxide (NO₂) is a reddish-brown gas with a pungent odour, which transforms in the atmosphere to form gaseous nitric acid and nitrates.

NO₂ plays a major role in atmospheric reactions that produce ground-level ozone, a major component of smog.

NO₂ also reacts with other gaseous contaminants in the air (e.g., ammonia) leading to the formation of PM_{2.5}.

Impacts to health and environment

NO₂ can irritate the lungs and lower resistance to respiratory infection. People with asthma and bronchitis have increased sensitivity to NO₂.

NO₂ chemically transforms into nitric acid in the atmosphere and, when deposited, contributes to the acidification of lakes and soils in Ontario. Nitric acid can also corrode metals, fade fabrics, degrade rubber, and damage trees and crops.

Sources of nitrogen oxides

Combustion or burning of carbon-based materials (e.g., wood, gasoline etc.) in air produces nitrogen oxides (NO_x), of which NO₂ is a component. The transportation sector is the main source of nitrogen dioxide in Ontario.

Fine particulate matter

Airborne particulate is the general term used to describe a mixture of microscopic solid particles and liquid droplets suspended in air. Particulate matter (PM) includes aerosols, smoke (i.e., black carbon), fumes, dust, fly ash, pollen and trace metals (e.g., copper and iron). PM species can be measured with various methods, for instance, continuous monitoring of major components of fine PM in the ambient air can be measured using aerosol mass spectrometric methods such as the Aerosol Chemical Speciation Monitor (ACSM).

Fine particulate matter, denoted as PM_{2.5}, is less than 2.5 micrometres in diameter, approximately 30 times smaller than the average diameter of a human hair. Ultrafine particles are less than 0.1 micrometres in diameter.

Impacts to health and environment

Fine particulate matter can have various negative health effects, especially on the respiratory and cardiovascular systems.

Exposure to fine particulate matter is associated with increased hospital admissions and emergency room visits—and even to death from heart or lung diseases. Both long- and short-term particle exposures have been linked to health problems.

People with heart or lung disease, children and older adults are particularly sensitive to this pollutant.

Sources of fine particulate matter

Fine particulate matter consists of primary and secondary PM_{2.5}. Primary PM_{2.5} is emitted directly to the atmosphere. Major

sources of primary PM_{2.5} include residential fireplaces and wood stoves, motor vehicles, smelters, power plants, industrial facilities, and agricultural burning and forest fires. Secondary PM_{2.5} is formed indirectly in the atmosphere through a series of complex chemical reactions of gaseous precursors such as nitrogen dioxide and sulphur dioxide.

Ground-level ozone

Ground-level ozone (O₃) is a colourless, odourless gas at typical ambient concentrations, and is a major component of smog.

Ground-level ozone is a gas formed when NO_x and volatile organic compounds (VOCs) react in the presence of sunlight. NO₂ breaks down in the presence of sunlight to form oxygen atoms (O) and NO. These oxygen atoms then react rapidly with molecular oxygen (O₂) in the atmosphere to produce ground-level ozone.

The formation and transport of ozone is strongly dependent on weather conditions and emissions of chemicals that contribute to the formation of ozone, such as NO_x and VOCs (also known as ozone precursors).

Schematic formation and scavenging of ozone

Ground-level ozone is a gas formed when nitrogen oxides (NO_x) and volatile organic compounds (VOCs) react in the presence of sunlight. NO_x is comprised of NO₂ and nitric oxide (NO). NO₂ breaks down in the presence of sunlight to form oxygen atoms (O) and NO. These oxygen atoms then react rapidly with molecular oxygen (O₂) in the atmosphere to produce ground-level ozone. This series of reactions, however, can be influenced by the presence of other chemicals, such as VOCs. Ground-level ozone is depleted when it reacts with nitric oxide to form NO₂ (a process known as scavenging) decreasing ozone concentrations.

Ozone formation
(Daytime)



NO₂ + O₂ + VOCs + sunlight → O₃

Ozone scavenging
(Nighttime)



NO + O₃ → O₂ + NO₂

Schematic of ozone formation during the day and the scavenging of ozone at night.

In large urban centres, ozone concentrations are generally lower, because ozone is depleted by reacting with NO emitted by vehicles and other local combustion sources to form NO₂. The NO₂ reacts with volatile organic compounds in the presence of sunlight to form ozone in downwind suburban and rural areas, resulting in higher ozone levels.

Impacts to health and environment

Ozone irritates the respiratory tract and eyes. Exposure to ozone in sensitive people can result in chest tightness, coughing and wheezing. Children who are active outdoors during the summer, when ozone levels are highest, are particularly at risk. Individuals with pre-existing respiratory disorders, such as asthma and chronic obstructive pulmonary disease, are also at risk. Ground-level ozone is associated with increased hospital admissions and premature deaths.

Sources of ground-level ozone

Major sources of ozone precursors, NO_x and VOCs, include the transportation and industrial sectors and general solvent use.

Sulphur dioxide

Sulphur dioxide (SO₂) is a colourless gas that smells like burnt matches. It can also be oxidized in the atmosphere to form sulphuric acid aerosols. In addition, SO₂ is a precursor to sulphates, one of the main components of airborne secondary PM_{2.5}.

Impacts to health and environment

Health effects caused by exposure to high levels of SO₂ include breathing problems, respiratory illness, and the exacerbation of respiratory and cardiovascular disease.

People with asthma, chronic lung disease or heart disease are the most sensitive to SO₂. Health impacts of sulphur dioxide may be more severe when someone is also exposed to elevated levels of other respiratory irritants like nitrogen dioxide and fine particulate matter.

Sulphur dioxide damages trees and crops and reduces visibility.

Sources of sulphur dioxide

Major sources of SO₂ include smelters, other industrial processes and coal-fired electric power generation from outside Ontario.

Volatile organic compounds

Volatile organic compounds (VOCs) are organic chemical compounds that may evaporate under normal ambient conditions of temperature and pressure, such as benzene and toluene. VOCs are precursors of ground-level ozone and PM_{2.5}. VOCs are emitted into the atmosphere from a variety of sources, including vehicles, fossil fuel combustion, steel-making, petroleum refining, fuel-refilling, industrial and residential solvent use, paint application, manufacturing of synthetic materials (e.g., plastics, carpets), food processing, agricultural activities and wood processing and burning.

Benzene

Benzene is primarily used in the production of plastics and other chemical products. Large quantities of benzene are produced from petroleum-related processes, either by direct extraction from certain types of crude oils or by chemical treatment of gasoline. Benzene is classified as a human carcinogen (USEPA, 2016). Additionally, short-term and long-term exposure to benzene can adversely affect blood cells (IARC, 2018).

Toluene

Toluene is used to make chemicals, explosives, dyes and many other compounds. It is also applied as a solvent for inks, paints, lacquers, resins, cleaners, glues and adhesives. Toluene is found in gasoline and aviation fuel. Studies indicate that toluene affects the central nervous system of humans and animals; however, there is little evidence to classify it as a carcinogen (USEPA, 2016).

Ethylbenzene

Ethylbenzene is a colourless liquid that smells like gasoline and is mainly used in the manufacture of styrene. Exposure to ethylbenzene occurs from the use of consumer products, fuel, pesticides, solvents, carpet glues, varnishes and paints. In humans, acute exposure results in respiratory and neurological effects and chronic exposure is associated with developmental and neurotoxic effects. Limited information is available on the carcinogenic effects of ethylbenzene (USEPA, 2016).

Xylene

Xylene is a colourless, sweet-smelling liquid or gas occurring naturally in petroleum, coal and wood tar; it is also used as a solvent in the printing, rubber, paint and leather industries. Xylene, also referred to as mixed xylenes, is a mixture of three isomers: ortho-, meta- and para-xylene, commonly known as o-, m- and p-xylene, which have the same molecular formula but different chemical structure, meaning the arrangement of their atoms is different. In humans, acute and chronic exposures result in respiratory and neurological effects. There is no information on the carcinogenic effects of mixed xylenes on humans (USEPA, 2016).

1,3-Butadiene

1,3-Butadiene is a colourless gas with a mild gasoline-like odour. It is released into the air through motor vehicle exhaust, manufacturing and processing facilities, forest fires or other combustion. Acute exposure to 1,3-butadiene by inhalation in humans results in irritation of the eyes, nasal passages, throat and lungs; in addition, 1,3-butadiene is carcinogenic in humans by inhalation (USEPA, 2016).

10-year trends and annual results

Concentrations of air contaminants measured at the ministry’s Air Quality Health Index monitoring stations are generally representative of ambient air quality which reflects the contribution of all sources of air contaminants to air. These air monitoring stations are sited to be representative of general population exposure and thus do not necessarily reflect air quality at locations within a community that may be influenced by nearby local sources of air contaminants such as large industrial facilities or major transportation corridors. Concentrations of some air contaminants in neighborhoods located in close proximity to local sources such as an industrial facility may be higher than those measured at the Ministry’s Air Quality Health Index monitoring stations.

This section presents the 10-year trends and annual results for concentrations of key air contaminants listed below including volatile organic compounds such as benzene, toluene, ethylbenzene, xylene (BTEx) and 1,3-butadiene as measured at the Ministry’s Air Quality Health Index air monitoring stations. Emission trends for these key air contaminants from major emissions sources in Ontario such as industry, electricity utilities, transportation, and residential properties are also provided.

Nitrogen dioxide

Highlights

10-year trends

• NO₂ concentrations have decreased by 28%

• NO_x emissions have decreased by 37%

2021 results

• No exceedances of Ontario's 1-hour and 24-hour Ambient Air Quality Criteria (AAQC) of 200 ppb and 100 ppb, respectively.

10-year trends

Trend of NO₂ annual means across Ontario, 2012-2021

This is a line graph showing the trend of nitrogen dioxide annual means from 2012 to 2021. The nitrogen dioxide annual mean concentrations across Ontario have decreased 28% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 34 ambient air monitoring stations.
- Ontario does not have an annual AAQC for NO₂.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 10-year trend for NO₂ at individual AQHI air monitoring stations in Ontario is presented in the Appendix: 10-year trend for nitrogen dioxide (NO₂) (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-no2>) .

Ontario NO_x emission trend, 2012-2021

This is a stacked column chart displaying the Ontario NO_x emissions trend from 2012 to 2021 indicating a decrease of approximately 37% or 108 kilotonnes, of which 73 kilotonnes was due to the road vehicles. Sixteen kilotonnes was due to other transportation (e.g. air, marine, rail transportation, and non-road vehicles/engines) and 14 kilotonnes was due to the electricity utilities sector. Please note this chart excludes emissions from open and natural sources (Air Pollutant Emission Inventory 1990-2021, 2023). Ontario's former emissions trading regulations (O. Reg. 397/01 and O. Reg. 194/05) and Drive Clean light duty vehicle program, and the phase-in of more stringent emission and vehicle standards for new vehicles have contributed to the reduction in nitrogen dioxide emissions over time.

2021 results

Summary of NO₂ results for 2021

Averaging time	Low range	High range	Number of sites with AAQC exceedances
NO ₂ 1-hour max	17.4 ppb at Grand Bend	74.2 ppb at Toronto Downtown	0
NO ₂ 24-hour max	6.9 ppb at Port Stanley	40.9 ppb at Hamilton Downtown	0
NO ₂ annual mean	2.2 ppb at Port Stanley	12.9 ppb at Toronto West	Not applicable

The highest NO₂ means were recorded in large, urbanized areas which are influenced by significant vehicular traffic, such as the Greater Toronto Area of southern Ontario.

A summary of the 2021 NO₂ annual statistics for individual AQHI air monitoring stations is detailed in the Appendix: 2021 nitrogen dioxide (NO₂) annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-no2>) .

Ontario NO_x emissions by sector, 2021

Other transportation

33%

Road vehicles

23%

Miscellaneous/Residential

17%

Other industrial sources

14%

Cement and concrete

6%

Smelters/Primary metals

4%

Electricity utilities

3%

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This is a chart depicting Ontario’s NO_x emissions by sector based on 2021 estimates for point/area/transportation sources. Please note this chart excludes emissions from open and natural sources (Air Pollutant Emission Inventory 1990-2021, 2023).

The transportation sector accounted for approximately 56% of total NO_x emissions in 2021.

Fine particulate matter

Highlights

10-year trends

- PM_{2.5} concentrations have decreased by 18%
- PM_{2.5} emissions have decreased by 12%

2021 results

- 32 AQHI air monitoring stations measured above the 24-hour PM_{2.5} Ambient Air Quality Criteria (AAQC) of 27 µg/m³ on at least one occasion.
- 2 AQHI air monitoring stations measured above the annual Ambient Air Quality Criteria (AAQC) of 8.8 µg/m³.

10-year trends

Trend of PM_{2.5} annual means across Ontario, 2012-2021

This is a line graph showing the trend of fine particulate matter annual means from 2012 to 2021. The fine particulate matter annual mean concentrations across Ontario have decreased 18% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 38 ambient air monitoring stations.
- A correction factor was applied to PM_{2.5} concentrations measured by TEOM (2012) to approximate SHARP-like measurements. PM_{2.5} concentrations measured by SHARP are reflected from 2013 and onward.
- The Ontario annual AAQC for PM_{2.5} of 8.8 µg/m³ was introduced in 2020.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 10-year trend for PM_{2.5} at individual AQHI air monitoring stations in Ontario is presented in the Appendix: 10-year trend for fine particulate matter (PM_{2.5}) (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-pm25>).

Ontario PM_{2.5} emissions trend, 2012-2021

This is a stacked column chart displaying the Ontario PM_{2.5} emissions trend from 2012 to 2021 indicating a decrease of approximately 12% or six kilotonnes, of which four kilotonnes was due to the transportation sector (e.g. road vehicles, air, marine, rail transportation, and non-road vehicles/engines) and two kilotonnes was contributed by various industries. Please note this chart excludes emissions from open and natural sources (Air Pollutant Emission Inventory 1990-2021, 2023).

The phase-in of more stringent emission and vehicle standards for new vehicles, Ontario’s closure of coal burning electricity generating utilities, and reduced emissions from industrial processes have contributed to the reduction in PM_{2.5} emissions in Ontario.

2021 results

Summary of PM_{2.5} results for 2021

Averaging time	Low range	High range	Number of sites with AAQC exceedances
PM _{2.5} 1-hour max	41 µg/m ³ at Tiverton and Petawawa	170 µg/m ³ at Toronto Downtown	Not applicable
PM _{2.5} 24-hour max	22.8 µg/m ³ at Chatham	58.7 µg/m ³ at Toronto Downtown	32
PM _{2.5} annual mean	4.3 µg/m ³ at Petawawa	9.6 µg/m ³ at Windsor West	2

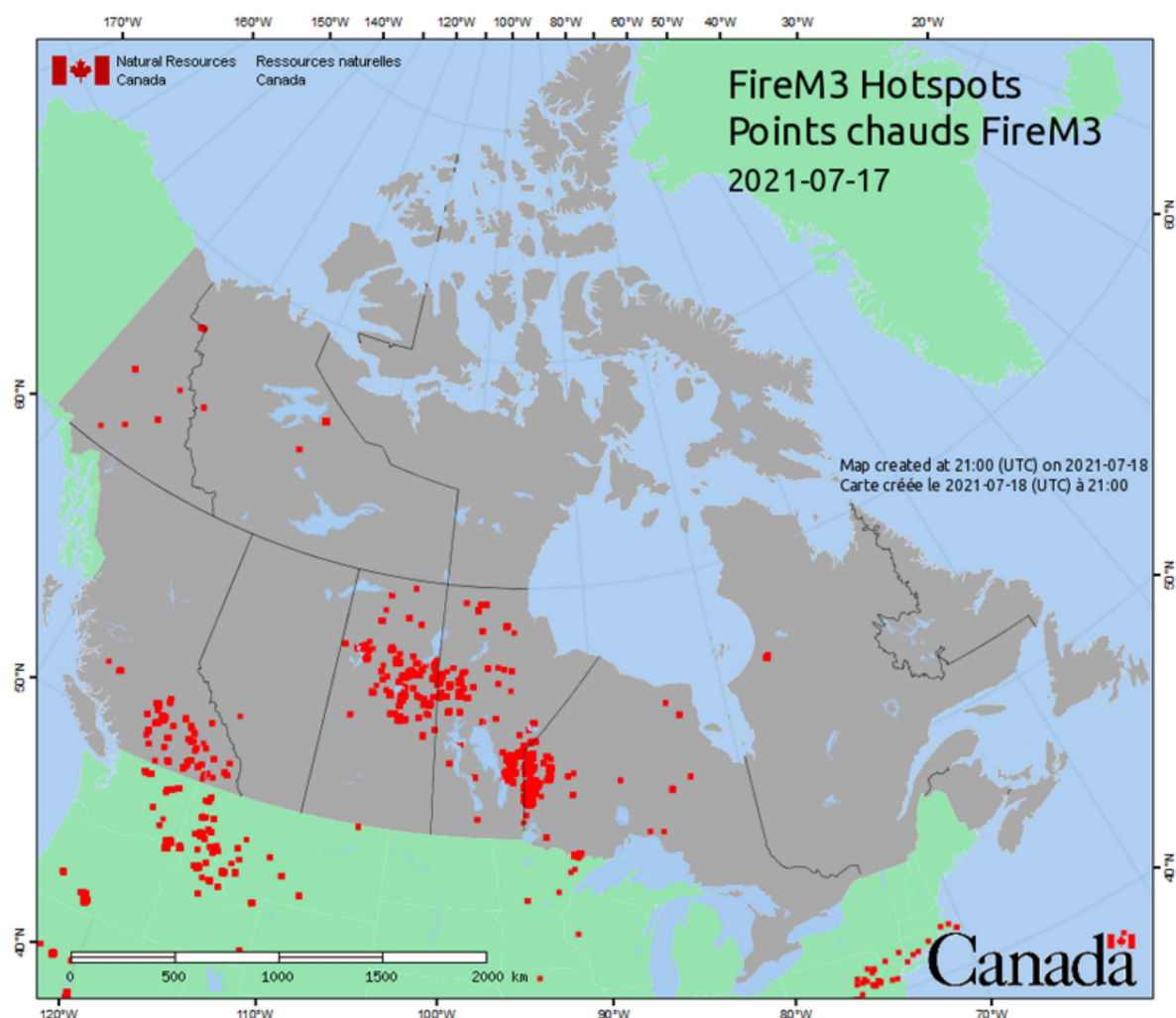
A summary of the 2021 PM_{2.5} annual statistics for individual AQHI air monitoring stations is detailed in the Appendix: 2021 fine particulate matter (PM_{2.5}) annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-pm25>).

Wildfire smoke events in Ontario, 2021

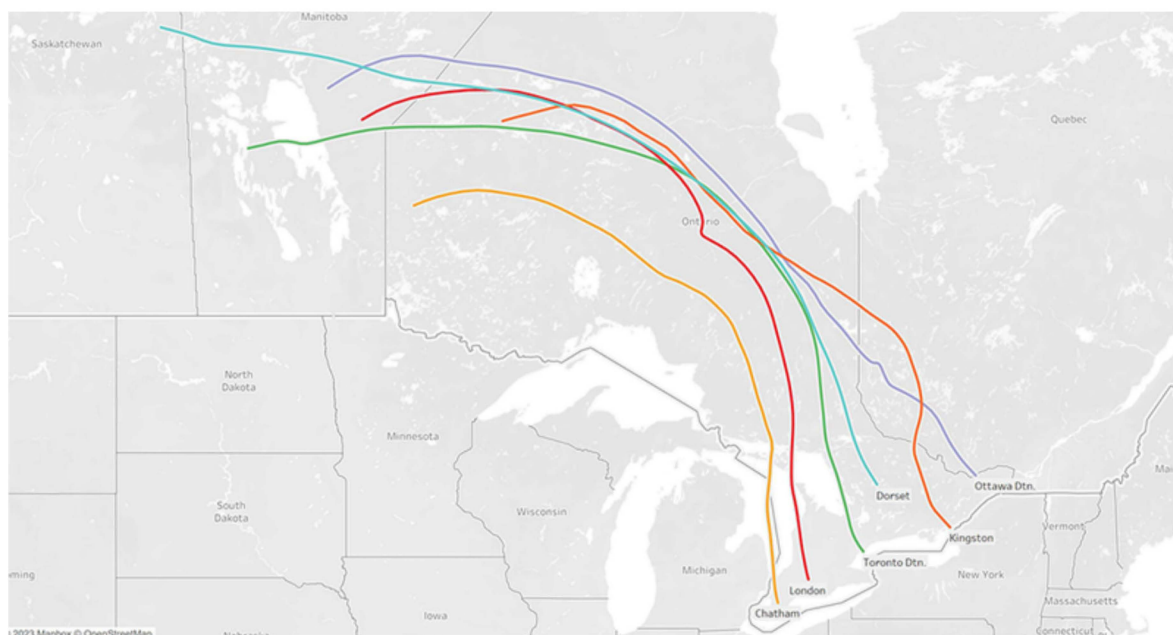
Wildfire season typically occurs from early April to late October in Ontario. As wildfires burn through forests and grasslands, they produce dense smoke. It is difficult to predict when the fires will occur, how big they will be, how much smoke they will generate and what direction the smoke will travel. Wildfire smoke may be carried hundreds or thousands of kilometres from the fire zone (Environment and Climate Change Canada, 2023 (<https://www.canada.ca/en/environment-climate-change/services/air-quality-health-index/wildfire-smoke.html>)).

In 2021, Ontario experienced several wildfire smoke events, including one particular event that caused widespread, elevated PM_{2.5} concentrations across the province on July 19, 2021. Smoke from active forest fires burning in eastern Manitoba and northwestern Ontario travelled through southern Ontario and caused deteriorating air quality and reduced visibility as the smoke descended to the ground-level. Hazy skies were obvious in some communities as smoke drifted across regions.

Forest fire smoke event on July 19, 2021



This map dated July 17, 2021, is a satellite image indicating heat sources from vegetation fires (e.g., forest, grass, cropland, or logging debris), across Canada, including the areas of eastern Manitoba and northwestern Ontario (Natural Resources Canada, 2021 (<https://cwfis.cfs.nrcan.gc.ca/maps/fm3?type=tri&year=2021&month=7&day=19>)).

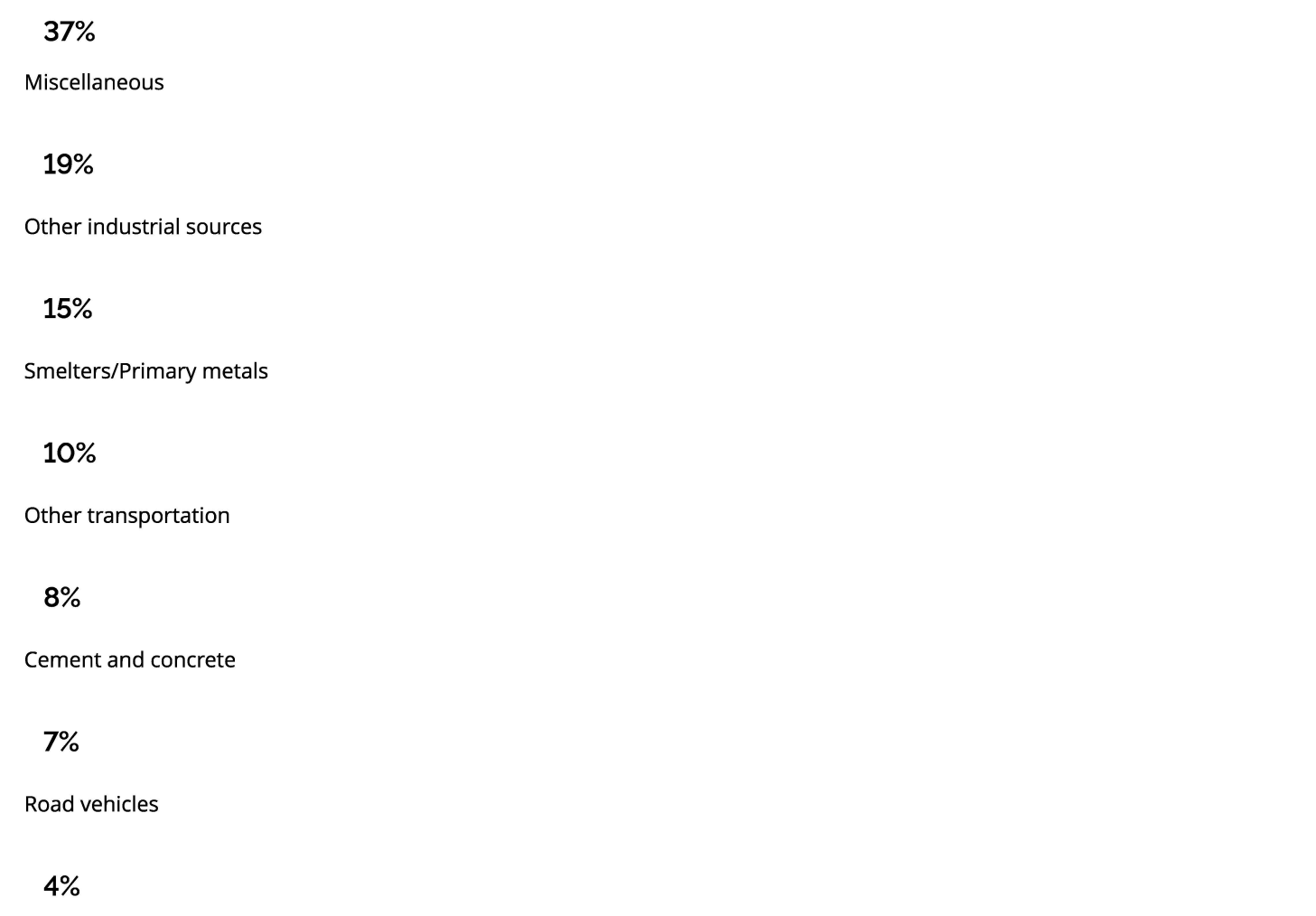


This map is a 72-hour back trajectory analysis at a height of 1000 metres which determines the origin of air masses by modelling the path of an air parcel backward in time (National Oceanic and Atmospheric Administration, 2021 (<https://www.ready.noaa.gov/hypub-bin/trajtype.pl?runtype=archive>)). The back trajectories show that air parcels that arrived in southern Ontario on July 19, 2021, originated from areas where forest fires were occurring in eastern Manitoba and northwestern Ontario.

The smoke plumes from the active fires prompted the issuance of a Special Air Quality Statement (SAQS) for most of the province. On July 19, 2021, the Toronto Downtown AQHI air monitoring station reported both the highest 1-hour and 24-hour $\text{PM}_{2.5}$ concentration of $170 \mu\text{g}/\text{m}^3$ and $58.7 \mu\text{g}/\text{m}^3$, respectively. Twenty-four AQHI air monitoring stations, including Toronto Downtown, exceeded the $\text{PM}_{2.5}$ 24-hour AAQC of $27 \mu\text{g}/\text{m}^3$ on July 19 due to the forest fire smoke. On July 20, a cold front moved across the province and increased winds allowed for good mixing and dispersion of pollutants, and improved air quality.

Ontario $\text{PM}_{2.5}$ emissions by sector, 2021

Residential



This is a chart depicting Ontario's $PM_{2.5}$ emissions by sector based on 2021 estimates for point/area/transportation sources. Please note this chart excludes emissions from open and natural sources, such as forest fires (Air Pollutant Emission Inventory 1990-2021, 2023).

Residential fuel combustion accounted for approximately 37% of the total $PM_{2.5}$ emissions in 2021. The major contributor to residential emissions is fuel wood combustion in fireplaces and wood stoves.

Ground-level ozone

Highlights

10-year trends

- No significant trends in the ozone maximum concentrations
- No significant trends in the annual and seasonal means

2021 results

- 17 AQHI air monitoring stations measured ozone levels above the 1-hour AAQC of 80 ppb on at least one occasion

10-year trends

Trend of ozone maximums across Ontario, 2012-2021

This is a line graph showing the trend of ozone one-hour maximums from 2012 to 2021. There was no significant trend detected for Ontario over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 38 ambient air monitoring stations.
- The Ontario one-hour AAQC for ozone is 80 ppb.

The 10-year trend of one-hour maximum ozone for individual AQHI air monitoring stations in Ontario is presented in the Appendix: 10-year trend for ozone (O_3) maximums (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-o3a>) .

Trend of ozone means across Ontario, 2012-2021

This is a line graph showing the trend of ozone annual, summer and winter means from 2012 to 2021. There were no significant trends detected for Ontario over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 38 ambient air monitoring stations.
- Summer: May - September; Winter: January - April, October - December.
- Ontario does not have an annual or seasonal AAQC for ozone.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

There has been no significant trend (increasing or decreasing) in annual and seasonal ozone means over the past 10 years.

Ozone levels continue to exceed Ontario's 1-hour AAQC for ozone during the warmer months and remain a challenge in some areas of the province, such as southwestern Ontario. However, ozone concentrations during the winter months were well below Ontario's ozone 1-hour AAQC of 80 ppb in 2021.

The 10-year trend of annual, summer and winter ozone for individual AQHI air monitoring stations in Ontario is presented in the Appendix: 10-year trend for ozone (O₃) (https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-o3b) , 10-year trend for ozone (O₃) summer means (https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-o3c) , and 10-year trend for ozone (O₃) winter means (https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-o3d) .

Ozone annual means for urban and rural Ontario, 2012-2021

This is a line graph displaying the ozone annual means for urban and rural Ontario from 2012 to 2021.

Note:

- Urban S. are urban areas in southern Ontario - Windsor, London, Hamilton, Toronto.
- Urban N. are urban areas in northern Ontario - Thunder Bay, Sault Ste. Marie, Sudbury, North Bay.
- Rural areas in Ontario - Port Stanley, Tiverton, Parry Sound, Petawawa.
- Ontario does not have an annual AAQC for ozone.

Ozone annual mean concentrations in urban areas in southern Ontario have been more comparable to those of urban areas in northern Ontario in recent years.

Generally, ozone concentrations are higher in rural, transboundary-influenced sites on the northern shore of Lake Erie and the eastern shore of Lake Huron. Ozone concentrations are lower in urban areas because it is depleted (scavenged) by reacting with NO emitted by vehicles and other local combustion sources.

2021 results

Summary of O₃ results for 2021

Averaging time	Low range	High range	Number of sites with AAQC exceedances
Ozone 1-hour max	56 ppb at Sudbury	104 ppb at Grand Bend	17
Ozone 24-hour max	45.2 ppb at Dorset	64.5 ppb at Tiverton	Not applicable
Ozone annual mean	22.8 ppb at Toronto West	32.4 ppb at Tiverton	Not applicable

A summary of the 2021 ozone annual statistics for individual AQHI air monitoring stations is detailed in the Appendix: 2021 ozone (O₃) annual statistics (https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-o3) .

Sulphur dioxide

Highlights

10-year trends

- SO₂ concentrations have decreased by 54%
- SO₂ emissions have decreased by 62%

2021 results

- Four AQHI air monitoring stations measured sulphur dioxide levels above the 10-minute AAQC of 67 ppb on at least one occasion
- Five AQHI air monitoring stations measured sulphur dioxide levels above the 1-hour AAQC of 40 ppb on at least one occasion
- No exceedances of Ontario's annual AAQC.

10-year trends

Trend of SO₂ annual means across Ontario, 2012-2021

This is a line graph showing the trend of sulphur dioxide annual means from 2012 to 2021. The sulphur dioxide annual mean concentrations across Ontario have decreased 54% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 10 ambient air monitoring stations.
- The Ontario annual AAQC for SO₂ of 4 ppb was introduced in 2018.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 10-year trend for SO₂ at individual AQHI air monitoring stations in Ontario is presented in the Appendix: 10-year trend for sulphur dioxide (SO₂) (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-so2>) .

Ontario SO₂ emission trend, 2012-2021

This is a stacked column chart displaying the Ontario SO₂ emissions trend from 2012 to 2021 indicating a decrease of approximately 62% or 157 kilotonnes, of which 129 kilotonnes was due to the smelter sector and 10 kilotonnes was due to the electricity utilities sector. Please note this chart excludes emissions from open and natural sources (Air Pollutant Emission Inventory 1990-2021, 2023).

Emissions reductions at Ontario smelters through the implementation of site-specific standards under O. Reg. 419/05, Ontario's closure of coal burning electricity generating utilities, Ontario's former emissions trading regulations (O. Reg. 397/01 and O. Reg. 194/05), and low sulphur content in transportation fuels have contributed to the reduction in SO₂ emissions in Ontario.

2021 results

Summary of SO₂ results for 2021

Averaging time	Low range	High range	Number of sites with AAQC exceedances
SO ₂ 10-minutes max	15.4 ppb at Toronto North	208.6 ppb at Sudbury	4
SO ₂ 1-hour max	4.6 ppb at Ottawa Downtown	117.6 ppb at Hamilton Mountain	5

Averaging time	Low range	High range	Number of sites with AAQC exceedances
SO ₂ 24-hour max	0.7 ppb at Ottawa Downtown	33.6 ppb at Hamilton Mountain	Not applicable
SO ₂ annual mean	0.16 ppb at Ottawa Downtown	3.82 ppb at Hamilton Downtown	0

Concentrations of sulphur dioxide in neighborhoods that are located in close proximity to local sources such as an industrial facility may be higher than those measured at the ministry’s Air Quality Health Index monitoring stations which are sited to be representative of general population exposure.

A summary of the 2021 SO₂ annual statistics for individual AQHI air monitoring stations is detailed in the Appendix: 2021 sulphur dioxide (SO₂) annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-so2>).

There are local air quality monitoring networks operated by industrial associations in the communities of Hamilton (Hamilton Air Monitoring Network (<http://www.hamnair.ca/>)), Sarnia (Clean Air Sarnia and Area (<https://www.cleanairsarniaandarea.com>)) and Sudbury (Greater Sudbury Air Quality (<http://www.airquality-sudbury-vale.com/index.asp>)) that provide additional air quality information for these communities. These data have not been integrated into this ministry report; however, they are being addressed with regulations which aim to decrease local concentrations of SO₂.

Ontario SO₂ emissions by sector, 2021

Smelters

37%

Petroleum refineries

22%

Other industrial sources

18%

Iron and steel

11%

Cement and concrete

11%

Miscellaneous/Residential

1%

Transportation

<1%

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This is a chart depicting Ontario’s sulphur dioxide emissions by sector based on 2021 estimates for point/area/transportation sources. Please note this chart excludes emissions from open and natural sources (Air Pollutant Emission Inventory 1990-2021, 2023).

Smelters in northern Ontario are the major sources of SO₂ emissions in Ontario, accounting for approximately 37% of the provincial SO₂ emissions

Volatile organic compounds

Volatile organic compounds (VOC) are measured at select ambient air monitoring stations across Ontario as part of a co-operative federal-provincial program under the National Air Pollution Surveillance program.

Note: VOC samples were limited in 2021 as Environment and Climate Change Canada’s laboratories had restrictions due to COVID-19 measures put in place following Public Health guidelines. As a result, only three of six AQHI air monitoring stations were operational for VOC monitoring in 2021.

Highlights

10-year trends

- Benzene concentrations have decreased by 36%
- Toluene concentrations have decreased by 53%
- Ethylbenzene have decreased by 39%
- m- and p-xylene have decreased by 39%
- o-xylene have decreased by 33%
- 1,3-butadiene have decreased by 53%

2021 results

- Ontario’s AAQC for these volatile organic compounds (where applicable) were met except for one AQHI air monitoring station that measured benzene levels above the 24-hour and annual AAQC of 2.3 µg/m³ and 0.45 µg/m³, respectively.

10-year trends

VOCs are measured at six AQHI air monitoring stations (Windsor West, Sarnia, London, Kitchener, Hamilton Downtown, and Newmarket), however only three (Windsor West, Sarnia and Hamilton Downtown) were operational for VOC monitoring in 2021 due to COVID-19 measures put in place following Public Health guidelines.

In 2021, 107 VOCs were analyzed and reported for each sample at each site. For the purposes of this report, commonly detected VOCs (benzene, toluene, ethylbenzene, xylene, and 1,3-butadiene) between 2012 and 2021 are included in this discussion.

Trend of benzene annual means across Ontario, 2012-2021

This is a line graph showing the trend of benzene annual means from 2012 to 2021. The benzene annual mean concentrations across Ontario have decreased 36% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 6 ambient air monitoring stations.
- The 2021 average is based on 3 ambient air monitoring stations.
- VOC samples were not collected in 2020 as Environment and Climate Change Canada’s laboratories were shut down due to COVID-19 measures put in place following Public Health guidelines.
- The Ontario annual AAQC for benzene of 0.45 µg/m³ was introduced in 2016.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of toluene annual means across Ontario, 2012-2021

This is a line graph showing the trend of toluene annual means from 2012 to 2021. The toluene annual mean concentrations across Ontario have decreased 53% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 6 ambient air monitoring stations.
- The 2021 average is based on 3 ambient air monitoring stations.

- VOC samples were not collected in 2020 as Environment and Climate Change Canada’s laboratories were shut down due to COVID-19 measures put in place following Public Health guidelines.
- Ontario does not have an annual AAQC for toluene.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of ethylbenzene annual means across Ontario, 2012-2021

This is a line graph showing the trend of ethylbenzene annual means from 2012 to 2021. The ethylbenzene annual mean concentrations across Ontario have decreased 39% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 6 ambient air monitoring stations.
- The 2021 average is based on 3 ambient air monitoring stations.
- VOC samples were not collected in 2020 as Environment and Climate Change Canada’s laboratories were shut down due to COVID-19 measures put in place following Public Health guidelines.
- Ontario does not have an annual AAQC for ethylbenzene.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of xylene annual means across Ontario, 2012-2021

This is a line graph showing the trend of xylene annual means from 2012 to 2021. The m- and p-xylene and o-xylene annual mean concentrations across Ontario have decreased 39% and 33%, respectively, over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 6 ambient air monitoring stations.
- The 2021 average is based on 3 ambient air monitoring stations.
- VOC samples were not collected in 2020 as Environment and Climate Change Canada’s laboratories were shut down due to COVID-19 measures put in place following Public Health guidelines.
- Ontario does not have an annual AAQC for xylene.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of 1,3-butadiene annual means across Ontario, 2012-2021

This is a line graph showing the trend of 1,3-butadiene annual means from 2012 to 2021. The 1,3-butadiene annual mean concentrations across Ontario have decreased 53% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 6 ambient air monitoring stations.
- The 2021 average is based on 3 ambient air monitoring stations.
- VOC samples were not collected in 2020 as Environment and Climate Change Canada’s laboratories were shut down due to COVID-19 measures put in place following Public Health guidelines.
- The Ontario annual AAQC for 1,3-butadiene is 2.0 µg/m³.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 10-year trend for VOCs at individual AQHI air monitoring stations in Ontario is presented in the Appendix: 10-year trend for benzene (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-benzene>) , 10-year trend for toluene (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-toluene>) , 10-year trend for ethylbenzene (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-ethylbenzene>) , 10-year trend for m- and p-xylene (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-pxylene>) , 10-year trend for o-xylene (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-oxylene>) , and 10-year trend for 1,3-butadiene (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-butadiene>) .

Ontario VOC emission trend, 2012-2021

This is a stacked column chart displaying the Ontario VOC emissions trend from 2012 to 2021 indicating a decrease of approximately 25% or 87 kilotonnes, of which 47 kilotonnes was due to the transportation sector and 36 kilotonnes was due to the solvent use, surface coating and printing sectors. Please note this chart excludes emissions from open and natural sources (Air Pollutant Emission Inventory 1990-2021, 2023).

The introduction of more stringent vehicle and engine emission standards for new vehicles, the former Drive Clean light duty vehicle program and various regulations, Canadian Council of Ministers of the Environment VOC emissions guidelines and codes of practice for VOC emitting products and materials have contributed to the reduction in VOC emissions in Ontario.

2021 results

Summary of VOC results for 2021

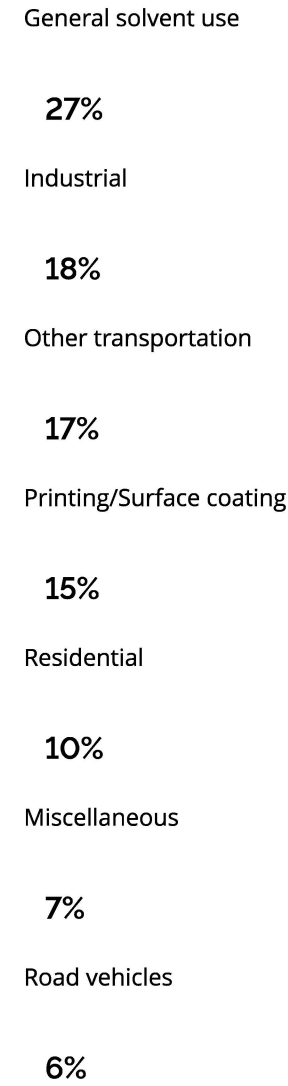
Averaging time	Low range	High range	Number of sites with AAQC exceedances
Benzene 24-hour max	1.966 µg/m ³ at Sarnia	3.122 µg/m ³ at Hamilton Downt own	1
Benzene annual mean	0.527 µg/m ³ at Windsor West	0.613 µg/m ³ at Hamilton Downt own	3
Toluene 24-hour max	2.854 µg/m ³ at Windsor West	18.517 µg/m ³ at Hamilton Downt own	0
Toluene annual mean	1.053 µg/m ³ at Sarnia	1.314 µg/m ³ at Hamilton Downt own	Not applicable
Ethylbenzene 24-hour max	1.743 µg/m ³ at Sarnia	3.299 µg/m ³ at Windsor West	0
Ethylbenzene annual mean	0.172 µg/m ³ at Hamilton Downtown	0.328 µg/m ³ at Windsor West	Not applicable
m- and p-xylene 24-hour max	1.377 µg/m ³ at Sarnia	4.793 µg/m ³ at Hamilton Downt own	Not applicable
m- and p-xylene annual mean	0.319 µg/m ³ at Sarnia	0.619 µg/m ³ at Windsor West	Not applicable

Averaging time	Low range	High range	Number of sites with AAQC exceedances
o-xylene 24-hour max	0.431 µg/m³ at Sarnia	2.136 µg/m³ at Hamilton Downtown	Not applicable
o-xylene annual mean	0.122 µg/m³ at Sarnia	0.246 µg/m³ at Windsor West	Not applicable
1,3-butadiene 24-hour max	0.087 µg/m³ at Hamilton Downtown	0.641 µg/m³ at Sarnia	0
1,3-butadiene annual mean	0.036 µg/m³ at Hamilton Downtown	0.071 µg/m³ at Sarnia	0

Concentrations of some VOCs in neighborhoods that are located in close proximity to local sources such as an industrial facility may be higher than those measured at the ministry's Air Quality Health Index monitoring stations which are sited to be representative of general population exposure.

A summary of the 2021 VOCs annual statistics for individual AQHI air monitoring stations is detailed in the Appendix: 2021 benzene annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-benzene>), 2021 toluene annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-toluene>), 2021 ethylbenzene annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-ethylbenzene>), 2021 m- and p-xylene annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-pxylene>), 2021 o-xylene annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-oxylene>), and 2021 1,3-butadiene annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-butadiene>).

Ontario VOC emissions by sector, 2021



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This is a chart depicting Ontario’s VOC emissions by sector based on 2021 estimates for point/area/transportation sources. Please note this chart excludes emissions from open and natural sources (Air Pollutant Emission Inventory 1990-2021, 2023).

General solvent use (e.g., degreasing, adhesives and sealants, consumer and commercial products) accounted for 27% of VOC emissions in 2021; and transportation sector accounted for 23% (Air Pollutant Emission Inventory 1990-2021, 2023).

Ontario Ambient Air Quality Criteria

Ambient air quality refers to general air quality resulting from all sources of contaminants to air. Ambient Air Quality Criteria (AAQC) are a concentration of a contaminant in air that is protective against adverse effects on health and/or the environment.

AAQC are not regulatory values but are used to assess general (ambient) air quality resulting from all sources (i.e., industrial and non-industrial sources) of a contaminant to air. AAQC are most commonly used in environmental assessments, special studies using ambient air monitoring data, assessment of general air quality in a community and annual reporting on air quality across the province.

Ontario’s Ambient Air Quality Criteria for common air pollutants

Contaminant	10 minutes AAQC Assesses protection against acute effects	1-hour AAQC Assesses protection against acute effects	8-hour AAQC Assesses protection against acute effects	24-hour AAQC Assesses protection against chronic effects	Annual AAQC Assesses protection against chronic effects
NO ₂	N/A	200 ppb	N/A	100 ppb	N/A
PM _{2.5}	N/A	N/A	N/A	27 µg/m ³ [1]	8.8 µg/m ³ [2]
O ₃	N/A	80 ppb	N/A	N/A	N/A
SO ₂	67 ppb	40 ppb	N/A	N/A	4 ppb
CO	N/A	30 ppm	13 ppm	N/A	N/A
Benzene	N/A	N/A	N/A	2.3 µg/m ³	0.45 µg/m ³
Toluene	N/A	N/A	N/A	2,000 µg/m ³ [3]	N/A
Ethylbenzene	1,900 µg/m ³	N/A	N/A	1,000 µg/m ³	N/A
1,3-Butadiene	N/A	N/A	N/A	10 µg/m ³	2 µg/m ³
Manganese in PM _{2.5}	N/A	N/A	N/A	100 ng/m ³	N/A

Notes:

- ppb – parts (of contaminant) per billion (parts of air) – by volume.
- µg/m³ – micrograms (of contaminant) per cubic metre (of air) – by weight.

- ppm – parts (of contaminant) per million (parts of air) – by volume.
- ng/m³ - nanograms (of contaminant) per cubic metre (of air) – by weight.

National Air Quality Management System

The national Air Quality Management System (<https://ccme.ca/en/air-quality-report>) (AQMS) is a collaborative approach for reducing air pollution in Canada. It consists of several elements:

- Canadian Ambient Air Quality Standards (non-regulatory health and environmental-based air quality objectives intended to drive improvements where needed)
- air zones (management areas delineated within a province or territory)
- regional airsheds - transboundary air pollution (broad geographic areas that encompass a number of air zones and may cross provincial/territorial and international boundaries)
- base-level industrial emissions requirements
- mobile emission sources (transportation)

Canadian Ambient Air Quality Standards

The Canadian Council of Ministers of the Environment (<https://www.ccme.ca/en>) have developed Canadian Ambient Air Quality Standards (CAAQS) as a key element of the Air Quality Management System to drive improvement of air quality across Canada. CAAQS are non-regulatory health and environmentally based ambient air objectives that are used to assess general air quality and reflect desirable concentrations of contaminants in air from all sources. CAAQS have been developed for fine particulate matter, ozone, nitrogen dioxide and sulphur dioxide.

Canadian Ambient Air Quality Standards

Pollutant	Averaging time	Numerical value 2015	Numerical value 2020	Numerical value 2025	Statistical form
Fine particulate matter (PM _{2.5})	24-hour	28 µg/m ³	27 µg/m ³	N/A	The 3-year average of the annual 98 th percentile of the PM _{2.5} daily 24-hour average concentrations
Fine particulate matter (PM _{2.5})	Annual	10.0 µg/m ³	8.8 µg/m ³	N/A	The 3-year average of the annual average of all PM _{2.5} 1-hour concentrations
Ozone (O ₃)	8-hour	63 ppb	62 ppb	60 ppb	The 3-year average of the annual 4 th highest of the daily maximum 8-hour average ozone concentrations
Nitrogen dioxide (NO ₂)	1-hour	N/A	60 ppb	42 ppb	The 3-year average of the annual 98 th percentile of the NO ₂ daily maximum 1-hour average concentrations
Nitrogen dioxide (NO ₂)	Annual	N/A	17 ppb	12 ppb	The average over a single calendar year of all NO ₂ 1-hour average concentrations
Sulphur dioxide (SO ₂)	1-hour	N/A	70 ppb	65 ppb	The 3-year average of the annual 99 th percentile of the SO ₂ daily maximum 1-hour average concentrations

Pollutant	Averag ing time	Numeri cal value 2015	Numeri cal value 2020	Numeri cal value 2025	Statistical form
Sulphur dioxide (SO ₂)	Annual	N/A	17.0 ppb	12.0 ppb	The average over a single calendar year of all 1-hour average SO ₂ concentrations

Source: Canadian Council of Ministers of the Environment (<https://ccme.ca/en>)

Air zone management framework

- The air zone management framework (AZMF) is a place-based approach to managing air quality under the AQMS.
- The framework provides guidance on management, monitoring and reporting actions to be implemented in an area to achieve the CAAQS.
- Under the AQMS, each jurisdiction is required to:
 - delineate Air Zones to cover their entire jurisdiction
 - publicly report on monitored levels of the CAAQS pollutants in their Air Zones
 - develop management plans outlining actions to improve air quality in their Air Zones

Air zones – Managing air quality in Ontario

As part of its implementation of the federal Air Quality Management System, Ontario has identified six geographic air zones falling into one of three air zone categories. These air zone designations are based on factors such as pollutant sources, topography, meteorological patterns, population density and other factors that potentially influence ambient air concentrations.

Ontario air zone categories and areas

Air zone categories	Air zone areas
Category 1 Areas with limited pollution from either point or non-point sources or transboundary influence	Northern Ontario (except for Sudbury and Sault Ste. Marie)
Category 2 Areas under pressure from multiple sources including some or all of the following: non-point sources, smaller point sources, individual large industrial point sources, transboundary influences	Southern Ontario (except for Sarnia/St. Clair Township and Hamilton) Sault Ste. Marie Sudbury
Category 3 Areas with a concentration of large industrial sources	Sarnia/St. Clair Township Hamilton

Ontario has designated 27 Air Quality Health Index ambient air monitoring stations located across the province as CAAQS reporting stations for each of the identified air zones in the province. These 27 designated stations report for each of the CAAQS parameters, except for SO₂ which only has 9 CAAQS reporting stations. Designated sites normally refer to communities with populations greater than 100,000 and/or communities with large industrial sources.

CAAQS reporting stations in Ontario air zone categories and areas

This map presents the locations of the designated CAAQS reporting stations within the air zone areas of each air zone category in Ontario

Air zone management levels and objectives

- Four “management levels” provide general guidance on the nature of the management, monitoring and reporting actions to be implemented in an Air Zone.
- The four management levels are identified by specific colours: red, orange, yellow and green, each corresponding to a contaminant concentration range that is specific to each CAAQS.

- Each management level is associated with a suite of actions that become progressively more stringent as air pollution concentrations approach or exceed the CAAQS.
- The air zone management level is determined by the designated CAAQS reporting station(s) with the highest CAAQS metric within the air zone.

The air zone management framework

Progressively more rigorous actions as air pollutant concentrations approach or exceed the CAAQS.

Management level	Objective
Red The highest level of air quality management	To reduce pollutant levels below the CAAQS through advanced air management actions
Orange The second highest level of air quality management	To improve air quality through active air management and prevent exceedance of the CAAQS
Yellow The second lowest level of air quality management	To improve air quality using early and ongoing actions for continuous improvement
Green The lowest level of air quality management	To maintain good air quality through proactive air management measures to keep clean areas clean

The numeric concentration ranges for each management level for each CAAQS pollutant are presented in the Appendix: Management Levels for CAAQS Pollutants (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#management-levels>) .

Air zone management

Taking action within each air zone area to reduce emissions, provide information on air quality conditions and report publicly on these actions is an important part of the air management framework. Ontario's approach to air zone management is to combine a province-wide framework of regulations and programs to protect air quality across Ontario with enhanced activities within specific air zone areas as appropriate.

An inventory of the actions Ontario was taking in 2021 to improve and maintain the air quality across Ontario is presented in the Appendix: Air Quality Management Actions by Air Zone Area (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#airzones>) . This inventory provides an overview of measures likely to have an impact on the four CAAQS pollutants (PM_{2.5}, ozone, NO₂ and SO₂), or their precursors.

This inventory is organized into three sections: (i) Ontario air quality management actions across all air zone areas which describes province-wide initiatives; (ii) Air zone area-specific actions, including regulations, policies, industrial site-specific standards and technical standards; and (iii) Changes that occurred between 2021 and the publication of this report.

Information about Ontario's air zone management planning are presented in the Appendix: Ontario Air Quality Management Actions by Air Zone (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#airzones2>) , Ontario Air Quality Management Actions Across All Air Zones (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#airzones>) , and Changes in Air Quality Management Actions since 2021 (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#airzonechanges>) .

Canadian Ambient Air Quality Standard achievement

Highlights

10-year trends

- 24-hour PM_{2.5} CAAQS metric concentrations have decreased by 17%.
- Annual PM_{2.5} CAAQS metric concentrations have decreased by 18%.

- 8-hour ozone CAAQS metric concentrations have decreased by 10%.
- 1-hour NO₂ CAAQS metric concentrations have decreased by 10%.
- Annual NO₂ CAAQS metric concentrations have decreased by 25%.
- 1-hour SO₂ CAAQS metric concentrations have decreased by 37%.
- Annual SO₂ CAAQS metric concentrations have decreased by 43%.

2021 results

- No exceedances of the 24-hour and annual PM_{2.5} CAAQS.
- Twelve designated sites met the CAAQS of 62 ppb for ozone in 2021.
- No exceedances of the 1-hour and annual NO₂ CAAQS.
- Eight of the 9 designated sites met the 1-hour CAAQS of 70 ppb for SO₂ in 2021.
- No exceedances of the annual SO₂ CAAQS.

10-year trends – Fine particulate matter

10-year trend of 24-hour PM_{2.5} CAAQS metrics in Ontario

This is a line graph showing the trend of the 24-hour fine particulate matter Canadian Ambient Air Quality Standard metrics from 2012 to 2021 in Ontario. This trend shows Ontario's decrease of 17% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 26 ambient air monitoring stations.
- The CAAQS for 24h PM_{2.5} (27 µg/m³) is based on the 98th percentile measurement annually, averaged over three consecutive years.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

10-year trend of annual PM_{2.5} CAAQS metrics in Ontario

This is a line graph showing the trend of the annual fine particulate matter Canadian Ambient Air Quality Standard metrics from 2012 to 2021 in Ontario. This trend shows Ontario's decrease of 18% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 26 ambient air monitoring stations.
- The CAAQS for annual PM_{2.5} (8.8 µg/m³) is based on the annual mean averaged over three consecutive years.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 10-year trends, based on the 24-hour and annual PM_{2.5} CAAQS metrics at each of the designated monitoring sites, are presented in the Appendix: PM_{2.5} and ozone CAAQS metric trends for designated sites across Ontario (2012-2021) (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-caaqs>) .

2021 results – Fine particulate matter

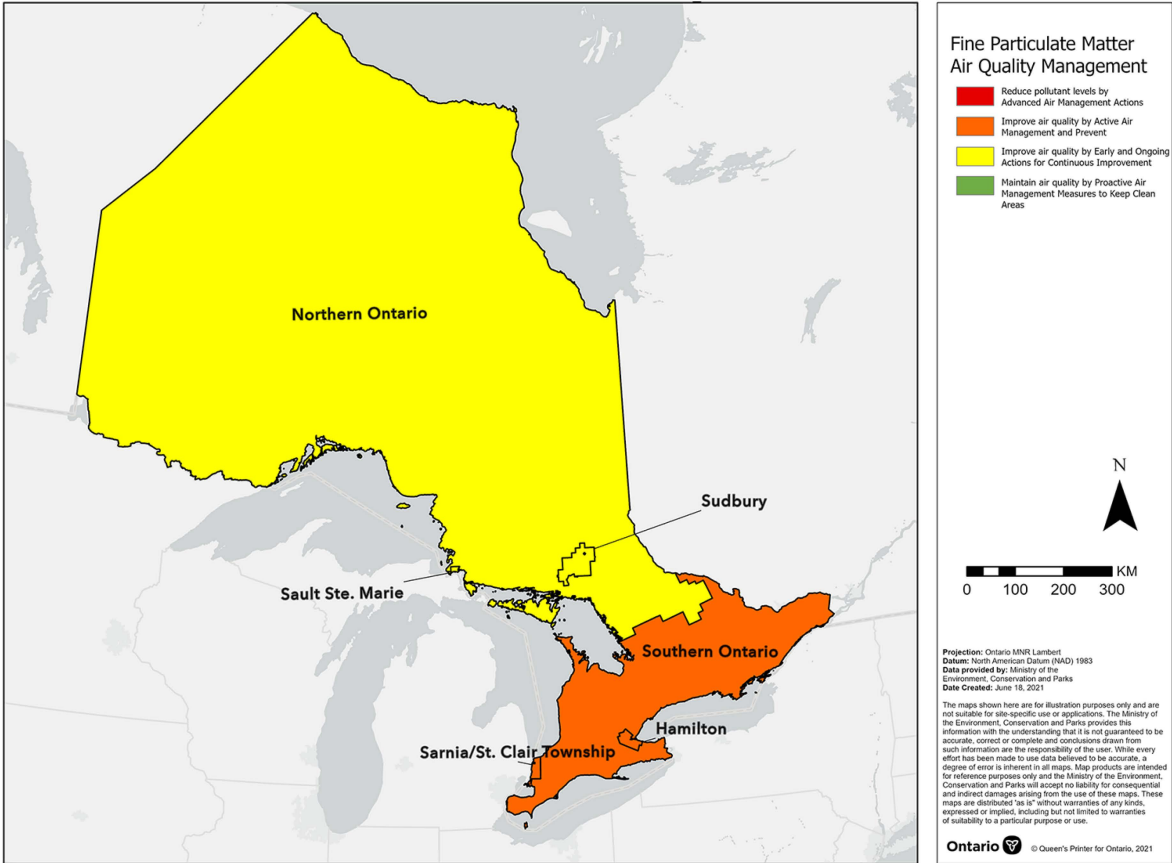
Summary of PM_{2.5} CAAQS metrics for 2021

Averaging time	Range in CAAQS metrics Low	Range in CAAQS metrics High	Number of sites with CAAQS exceedances

Averaging time	Range in CAAQS metrics Low	Range in CAAQS metrics High	Number of sites with CAAQS exceedances
PM _{2.5} 24-hour	14 µg/m ³ at Sault Ste. Marie	21 µg/m ³ at Hamilton Downtown and Toronto Downtown	0
PM _{2.5} annual	5.0 µg/m ³ at Sault Ste. Marie	8.6 µg/m ³ at Hamilton Downtown	0

A summary of the 2021 CAAQS metric values for the 24-hour and annual PM_{2.5} at individual CAAQS reporting stations is in the Appendix: PM_{2.5} and ozone CAAQS metric values for designated sites across Ontario (2021) (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-caaqs>) .

PM_{2.5} CAAQS management levels for air zones across Ontario, 2021



This map displays the fine particulate matter Canadian Ambient Air Quality Standard management levels for air zones across Ontario in 2021. These management levels are based on the highest CAAQS metric value reported by designated CAAQS reporting sites within each air zone. According to the air quality management levels assigned, it is recommended for the Sarnia/St. Clair Township, Hamilton and Southern Ontario air zones to improve air quality by active air management and prevent exceedance of the CAAQS, while the Sudbury, Sault Ste. Marie and Northern Ontario air zones are encouraged to use early and ongoing actions for continuous improvement.

The PM_{2.5} CAAQS metrics associated with the management levels are presented in the Appendix: Management levels for PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#management-levels>) .

10-year trends – Ground-level ozone

10-year trend of 8-hour O₃ CAAQS metrics in Ontario

This is a line graph showing the trend of the 8-hour ozone Canadian Ambient Air Quality Standard metrics from 2012 to 2021 in Ontario. This trend shows Ontario's decrease of 10% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 26 ambient air monitoring stations.
- The CAAQS for ozone (62 ppb) is based on the consecutive three-year average of the annual 4th highest daily maximum eight-hour running average.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural

events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 10-year trends, based on the 8-hour ozone CAAQS metrics at each of the designated monitoring sites, are presented in the Appendix: PM_{2.5} and ozone CAAQS metric trends for designated sites across Ontario (2012-2021) (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-caaqs>) .

2021 results – Ground-level ozone

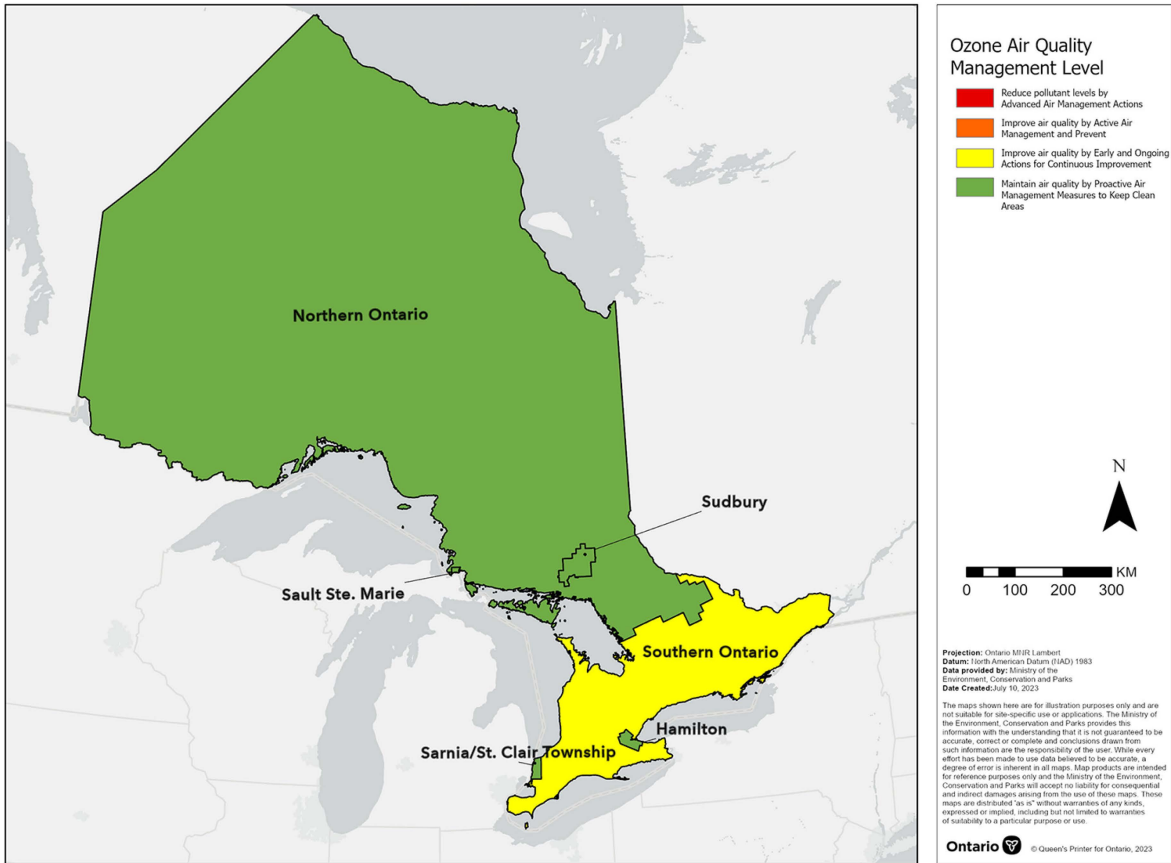
Summary of ozone CAAQS metrics for 2021

Averaging time	Low range	High range	Number of sites with CAAQS exceedances
Ozone 8-hour	51 ppb at Thunder Bay	70 ppb at Sarnia	15

Transboundary influences, from both the U.S. and beyond, account for a significant portion of Ontario's ozone when their levels are elevated. Ontario's CAAQS reporting stations would have met the ozone CAAQS if transboundary flow days were excluded from the calculated metric using a weight of evidence (WOE) analysis.

A summary of the 2021 CAAQS metric values for 8-hour ozone at individual CAAQS reporting stations is in the Appendix: PM_{2.5} and ozone CAAQS metric values for designated sites across Ontario (2021) (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-caaqs>) .

Ozone CAAQS effective management levels for air zones across Ontario, 2021



This map displays the ozone Canadian Ambient Air Quality Standard effective management levels for air zones across Ontario in 2021. The assignment of effective management levels was based upon the removal of transboundary influence using a Weight of Evidence (WOE) approach. These management levels are based on the highest Canadian Ambient Air Quality Standard metric value reported by designated CAAQS reporting sites within each air zone. According to the air quality management levels assigned, it is recommended for the Southern Ontario air zone to use early and ongoing actions for continuous improvement, while the Sarnia/St. Clair Township, Hamilton, Sudbury, Sault Ste. Marie and Northern Ontario air zones are encouraged to maintain good air quality through proactive management measures to keep clean areas clean.

The ozone CAAQS metrics associated with the management levels are presented in the Appendix: Management levels for ozone (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#management-levels>) .

Weight of Evidence analysis

Transboundary influences, from both the U.S. and beyond, account for a significant portion of Ontario's ozone when levels are elevated. A Weight of Evidence (WOE) analysis demonstrates the influence of transboundary flow on days with elevated ozone

concentrations and confirms that Ontario's CAAQS reporting stations would have met the ozone CAAQS if transboundary flow days were excluded from the calculated metric.

The WOE approach consists of performing, evaluating, and documenting a series of technical analyses that collectively support the conclusion that exceedances of the CAAQS on a given day were influenced by transboundary flows or exceptional events. These analyses may include assessing the meteorological conditions (airflow, wind speed and direction, temperature, stability, etc.) and pollutant concentrations in Ontario and upwind locations.

10-year trends – Nitrogen dioxide

10-year trend of 1-hour NO₂ CAAQS metrics in Ontario

This is a line graph showing the trend of the 1-hour nitrogen dioxide Canadian Ambient Air Quality Standard metrics from 2012 to 2021 in Ontario. This trend shows Ontario's decrease of 10% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 25 ambient air monitoring stations.
- The CAAQS for 1-hour NO₂ (60 ppb) is based on the 98th percentile of the daily maximum 1-hour average concentrations, averaged over three consecutive years.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

10-year trend of annual NO₂ CAAQS metrics in Ontario

This is a line graph showing the trend of the annual nitrogen dioxide Canadian Ambient Air Quality Standard metrics from 2012 to 2021 in Ontario. This trend shows Ontario's decrease of 25% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 26 ambient air monitoring stations.
- The CAAQS for annual NO₂ (17 ppb) is based on the average over a single calendar year of all 1-hour average NO₂ concentrations.

The 10-year trends, based on the 1-hour and annual NO₂ CAAQS metrics at each of the designated monitoring sites, are presented in Appendix: NO₂ and SO₂ CAAQS Metric Trends for Designated Sites Across Ontario (2012-2021) (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-caqs-b>) .

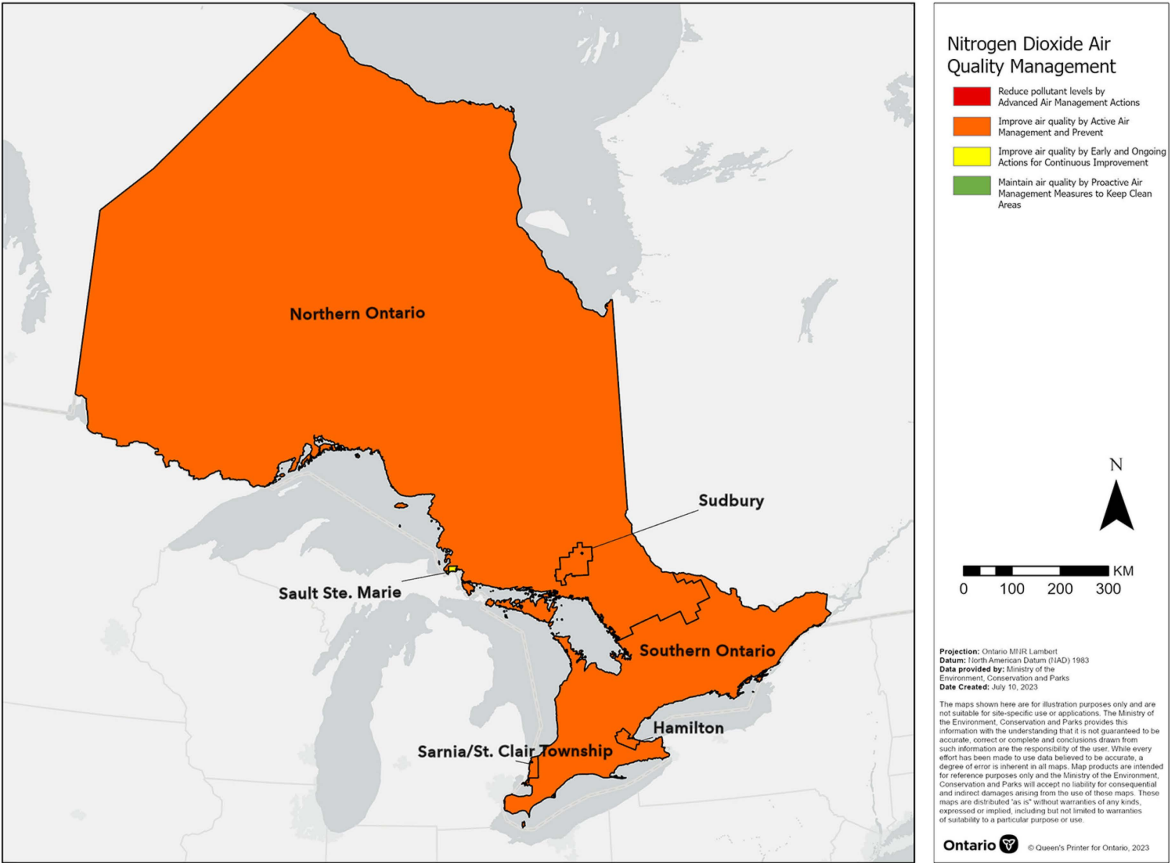
2021 results – Nitrogen Dioxide

Summary of NO₂ CAAQS metrics for 2021

Averaging time	Range in CAAQS metrics Low	Range in CAAQS metrics High	Number of sites with CAAQS exceedances
NO ₂ 1-hour	22 ppb at Oshawa	51 ppb at Toronto Downtown	0
NO ₂ annual	3.3 ppb at Oshawa	12.9 ppb at Toronto West	0

A summary of the 2021 CAAQS metric values for the 1-hour and annual NO₂ at individual CAAQS reporting stations is in the Appendix: NO₂ and SO₂ CAAQS Metric Values for Designated Sites Across Ontario (2021) (https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-caqs_b) .

NO₂ CAAQS management levels for air zones across Ontario, 2021



This map displays the nitrogen dioxide Canadian Ambient Air Quality Standard management levels for air zones across Ontario in 2021. These management levels are based on the highest CAAQS metric value reported by designated Canadian Ambient Air Quality Standard reporting sites within each air zone. According to the air quality management levels assigned, it is recommended for Sarnia/St. Clair Township, Hamilton, Sudbury, Southern and Northern Ontario air zones to improve air quality by active air management and prevent exceedance of the CAAQS, while it is encouraged for the Sault Ste. Marie air zone to improve air quality using early and ongoing actions for continuous improvement.

The NO₂ CAAQS metrics associated with the management levels are presented in the Appendix: Management levels for NO₂ (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#management-levels>) .

10-year trends – Sulphur dioxide

10-year trend of 1-hour SO₂ CAAQS metrics in Ontario

This is a line graph showing the trend of the 1-hour sulphur dioxide Canadian Ambient Air Quality Standard metrics from 2012 to 2021 in Ontario. This trend shows Ontario's decrease of 37% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 8 ambient air monitoring stations.
- The CAAQS for 1-hour SO₂ (70 ppb) is based on the annual 99th percentile of the SO₂ daily maximum 1-hour average concentrations, averaged over three consecutive years.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

10-year trend of annual SO₂ CAAQS metrics in Ontario

This is a line graph showing the trend of the annual sulphur dioxide Canadian Ambient Air Quality Standard metrics from 2012 to 2021 in Ontario. This trend shows Ontario's decrease of 43% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 8 ambient air monitoring stations.
- The CAAQS for annual SO₂ (5.0 ppb) is based on the average over a single calendar year of all 1-hour average SO₂ concentrations.

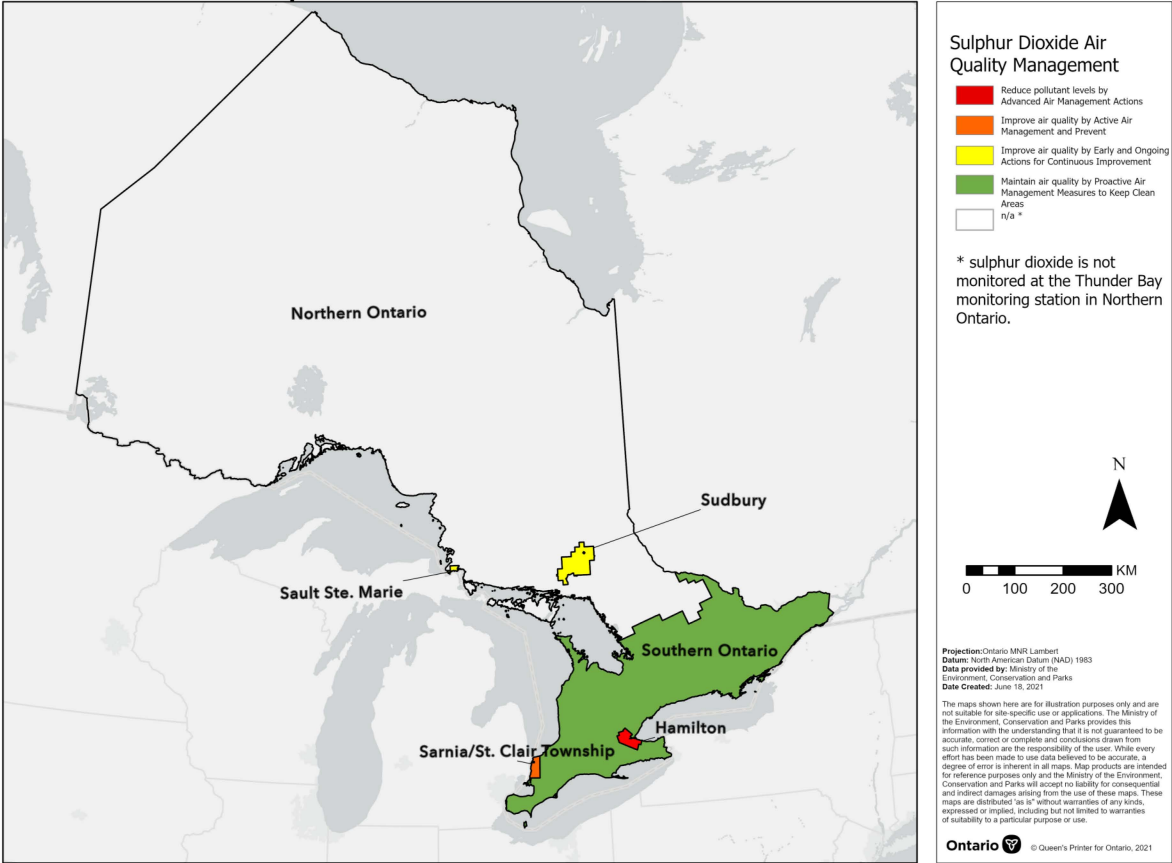
The 10-year trends, based on the 1-hour and annual SO₂ CAAQS metrics at each of the designated monitoring sites, are presented in Appendix: NO₂ and SO₂ CAAQS Metric Trends for Designated Sites Across Ontario (2012-2021) (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#tenyear-caaqsb>) .

Summary of SO₂ CAAQS metrics for 2021

Averaging time	Range in CAAQS metrics Low	Range in CAAQS metrics High	Number of sites with CAAQS exceedances
SO ₂ 1-hour	2 ppb at Ottawa Downtown	82 ppb at Hamilton Downtown	1
SO ₂ annual	0.2 ppb at Toronto West, Toronto North and Ottawa Downtown	3.8 ppb at Hamilton Downtown	0

A summary of the 2021 CAAQS metric values for the 1-hour and annual SO₂ at individual CAAQS reporting stations is in the Appendix: NO₂ and SO₂ CAAQS Metric Values for Designated Sites Across Ontario (2021) (https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-caaqs_b) .

SO₂ CAAQS management levels for air zones across Ontario, 2021



This map displays the sulphur dioxide Canadian Ambient Air Quality Standard management levels for air zones across Ontario in 2021. These management levels are based on the highest CAAQS metric value reported by designated Canadian Ambient Air Quality Standard reporting sites within each air zone. According to the air quality management levels assigned, it is recommended for the Hamilton air zone to reduce pollutant levels below the CAAQS through advanced air management actions. For the Sarnia/St. Clair Township air zone, it is recommended to improve air quality through active air management and prevent exceedance of the CAAQS. Using early and ongoing actions for continuous improvement is encouraged for the Sudbury and Sault Ste. Marie air zones, while the Southern Ontario air zone is to maintain good air quality through proactive management measures to keep clean areas clean. The designated CAAQS site in the Northern Ontario air zone (Thunder Bay) does not measure SO₂.

The SO₂ CAAQS metrics associated with the management levels are presented in the Appendix: Management levels for SO₂ (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#management-levels>) .

Transboundary influences on Ontario's smog

Smog related air pollutants (i.e., PM_{2.5}, ozone and their precursors) are generated both locally and regionally, and, with winds, can travel hundreds of kilometres, affecting areas far from the source of the pollution. The long-range transport and transboundary flow of air pollutants play a significant role in Ontario's air quality. Typically, during the summer, elevated levels of these smog related pollutants are often associated with distinct weather patterns (e.g., slow-moving high-pressure systems originating from

south of the lower Great Lakes) that results in the long-range transport of these pollutants into Ontario from neighbouring U.S. industrial and urbanized states during south to southwesterly flow conditions (Yap et al., 2005).

Transboundary sources from around the globe (global background) are also significant contributors to Ontario's ozone levels.

Long-range transport and transboundary flow of air pollutants

During the smog season (May to September) prevailing southwesterly airflows results in the transport of smog related pollutants from the U.S. (for example, NO_x emissions from electricity generators in the Ohio Valley) into Ontario.

NO_x emissions from electricity generators and prevailing winds

This map shows the nitrogen oxides emissions from electricity generators located in eastern U.S. and Canada with prevailing winds during smog season.

Note:

- Canadian Data: National Pollutant Release Inventory, Environment and Climate Change Canada (ECCC) (<https://www.canada.ca/en/services/environment/pollution-waste-management/national-pollutant-release-inventory.html>)
- US Data: Air Markets Program Data, United States Environmental Protection Agency (USEPA) (<https://campd.epa.gov/>)

Modelling transboundary impacts on Ontario's air quality

The Community Multi-Scale Air Quality model (CMAQ) (USEPA, 2018), developed by the U.S. Environmental Protection Agency, was used to characterize and predict the formation, transportation, deposition and transformation of smog related pollutants (e.g., ozone and PM_{2.5}) in the atmosphere. Emissions of smog precursors from a region that included eastern North America was used along with meteorological conditions to assess ambient concentrations of pollutants for 2015. The CMAQ model results quantify the impact of transboundary flows of smog related pollutants into and across Ontario.

Transboundary influences on Ontario's smog

Fine particulate matter (PM_{2.5})

Transboundary contributions to Ontario's PM_{2.5} concentrations are mainly due to secondary PM_{2.5} formation (i.e., PM_{2.5} is formed in the atmosphere through a series of complex reactions involving precursor emissions such as sulphur dioxide and nitrogen oxides) originating from U.S. sources. These transboundary contributions vary across the province, ranging from approximately 25% to 87%.

Along Canada-U.S. border areas of southwestern Ontario, transboundary sources of PM_{2.5} (mainly secondary PM_{2.5}) dominate, contributing to over 70% of the annual PM_{2.5} concentrations, and decreasing further away from border areas as shown below.

Transboundary influences on Ontario's annual average PM_{2.5} concentrations

This map shows the transboundary influences on Ontario's annual average fine particulate matter concentrations.

In the Greater Toronto Area (GTA) and Ottawa, where there are many more local sources of directly emitted PM_{2.5}, transboundary contributions of PM_{2.5} are much less (e.g. up to 25% in the GTA and 35% in Ottawa).

Outside of urban areas, transboundary influences increase in all directions. In much of northern Ontario the majority of the PM_{2.5} is dominated by transboundary sources (over 80% in most cases) as there are very few local sources of directly emitted PM_{2.5}.

Ozone

The influence of transboundary sources (U.S. and global background) on ozone levels in Ontario varies across the province. Transboundary contributions are most notable in areas of southwestern Ontario, in close proximity to the U.S. border, and along the northern shore of Lake Erie and the eastern shore of Lake Huron/Georgian Bay. In southwestern Ontario, when ozone levels are elevated, over 95% of the ozone is attributable to transboundary sources, with the U.S. contributing to as much as 40% and the remainder attributable to global background, as shown below.

Transboundary contributions vary across the province, ranging from approximately 87% to 99% with the US contributions accounting for approximately 11% to 38%.

Influences on Ontario's ozone concentrations on high concentration days

This map shows influences on Ontario's ground-level ozone concentrations on high concentration days.

Global background plays a significant role in Ontario's transboundary air pollution, contributing to 60-80% of ozone concentrations on poor air quality days across the province. In areas of northern and eastern Ontario, global background levels are much more significant.

As ozone precursor emissions continue to decrease across North America, the rising global background levels play an increasingly important role in Ontario’s air quality (Environment and Climate Change Canada, 2013).

Air Quality Health Index overview

The federal Air Quality Health Index (<https://www.canada.ca/en/environment-climate-change/services/air-quality-health-index/about.html>) (AQHI) is a health protection communication tool designed to help the public make decisions to protect their health by limiting short-term exposure to air pollution and adjusting activities during increased levels of air pollution. It is based on the cumulative health effects of three common air pollutants: ozone, nitrogen dioxide, and fine particulate matter. It is measured on a scale from 1 to 10+, the lower the number, the lower the risk. Each risk category has accompanying health messaging. The health messages associated with the AQHI are outlined in the table below.

Air Quality Health Index categories and health messages

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

Source: Environment and Climate Change Canada.

Air Quality Health Index annual results

- Based on the AQHI categories, in 2021, Ontario reported low risk air quality 93.13% of the time, moderate risk 6.84% of the time, and high risk 0.03% of the time.
- The percentage distribution of hourly AQHI readings for each of the 39 monitoring sites by AQHI value and the number of high risk AQHI days is detailed in the Appendix: 2021 Air Quality Health Index summary (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#section-8>) .

Roadside air monitoring in Ontario

Vehicles are a major source of air pollution in Ontario. Traffic-related air pollution (TRAP) is emitted from vehicle exhausts, fuel evaporation, and non-tailpipe sources such as brakes, tires and road dust. Elevated levels of traffic-related air pollution can be found up to 250 meters from a major road.

Exposure to traffic-related air pollutants has been linked to a wide range of adverse health outcomes, including respiratory and cardiovascular diseases, cancer, adverse birth and developmental outcomes, and premature mortality. Children, seniors, and people with pre-existing health conditions are more vulnerable to the adverse health effects from traffic-related pollution.

In 2015, Ontario, in collaboration with Environment and Climate Change Canada, established a dedicated roadside air monitoring network, the first of its kind in Canada, to better understand traffic-related air pollution in highly urbanized settings. These three dedicated roadside air monitoring stations monitor common air pollutants as well as the traffic-related pollutants such as ultrafine particles, black carbon, metals and major components of PM_{2.5}. The ministry has also designated 10 of its AQHI stations located near major roads as roadside air monitoring stations to complement the roadside air monitoring network.

Roadside air monitoring stations

This is a map depicting the three dedicated and ten AQHI roadside air monitoring stations across Ontario that were in operation during 2021.

Note:

- Roadside air monitoring stations are typically within approximately 100 m of a major roadway with daily traffic volumes greater than 10,000 vehicles per day.

Ultrafine particles

Ultrafine particles are less than 0.1 µm in aerodynamic diameter and are mostly emitted from road traffic in urban environments. These tiny particles have larger surface areas per unit mass to absorb toxic chemicals and can also penetrate deep into the lungs.

Highlights

6-year trends

- No significant trend in ultrafine particles.

2021 results

- There is no AAQC for ultrafine particles.

6-year trends

Trend of ultrafine particles annual means across the roadside air monitoring network, 2016-2021

This is a line graph showing the trend of ultrafine particles annual mean concentrations from 2016 to 2021. There was no significant trend for the roadside air monitoring network over this 6-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 6-year trend is based on data from three roadside air monitoring stations.
- Ontario does not have an annual AAQC for ultrafine particles.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 6-year trend for ultrafine particles at individual roadside air monitoring stations in Ontario is presented in the Appendix: 6-year trend for ultrafine particles (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#sixyear-ultrafine>) .

2021 results

Summary of ultrafine particles results for 2021

Averaging time	Low range	High range	Number of sites with AAQC exceedances
Ultrafine particles 1-hour max	55,900 particles/ cm ³ at Hanlan’s Point	277,000 particles/ cm ³ at Toronto Hwy 401	Not applicable
Ultrafine particles 24-hour max	14,756 particles/ cm ³ at Hanlan’s Point	146,537 particles/ cm ³ at Toronto Hwy 401	Not applicable

A summary of the 2021 ultrafine particles annual statistics for individual roadside air monitoring stations is detailed in the Appendix: 2021 ultrafine particles annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-ultrafine>) .

Black carbon

Black carbon is a sooty black material produced through incomplete combustion processes. It is emitted from anthropogenic (e.g., engines and coal-fired power plants) and natural sources (e.g., forest fires). Black carbon comprises a significant portion of fine particulate matter and is linked to both climate warming and adverse health effects.

Highlights

6-year trends

- Black carbon concentrations have decreased by 21%

2021 results

- There is no AAQC for black carbon.

6-year trends

Trend of black carbon annual means across the roadside air monitoring network, 2016-2021

This is a line graph showing the trend of black carbon annual mean concentrations from 2016 to 2021 across the roadside air monitoring network. The black carbon annual mean concentrations within the network have decreased by 21% over this 6-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 6-year trend is based on data from 8 roadside air monitoring stations.
- Ontario does not have an annual AAQC for black carbon.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 6-year trend for black carbon at individual roadside air monitoring stations in Ontario is presented in the Appendix: 6-year trend for black carbon (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#sixyear-carbon>) .

2021 results

Summary of black carbon results for 2021

Averaging time	Low range	High range	Number of sites with AAQC exceedances
Black carbon 1-hour max	2.96 µg/m³ at Toronto Island	11.26 µg/m³ at Etobicoke South	Not applicable
Black carbon 24-hour max	1.41 µg/m³ at Windsor West	3.88 µg/m³ at Toronto Hwy 401	Not applicable

A summary of the 2021 black carbon annual statistics for individual roadside air monitoring stations is detailed in the Appendix: 2021 black carbon annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-carbon>) .

Heavy metals in PM2.5

Heavy metals is a loose term used to refer to naturally-occurring trace elements, including metals that reside lower in the Periodic Table of Elements. In PM2.5, they are often associated with industrial processes, vehicle emissions, and various human activities. When inhaled, these airborne particles can accumulate in the body over time and have adverse health effects, particularly when exposure levels are high or prolonged.

The ministry measures 24 heavy metals in PM2.5, of which six select metals are presented below since they are often measured above their respective detection limits.

Highlights

6-year trends

- No significant trend for iron in ambient air.
- Ambient copper concentrations have decreased by 19%.
- Ambient manganese concentrations have decreased by 26%.
- No significant trend for lead in ambient air.
- No significant trend for selenium in ambient air.
- Ambient zinc concentrations decreased by 28%.

2021 results

- No exceedances of the 24-hour AAQC for manganese in PM_{2.5}.
- There are no AAQC for iron, copper, lead, selenium and zinc in PM_{2.5}.

6-year trends

Trend of iron in PM_{2.5} annual means across the roadside air monitoring network, 2016-2021

This is a line graph showing the trend of iron in PM_{2.5} annual mean concentrations from 2016 to 2021 across the roadside air monitoring network. There was no significant trend over this 6-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 6-year trend is based on data from 3 roadside air monitoring stations.
- Ontario does not have an annual AAQC for iron in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of copper in PM_{2.5} annual means across the roadside air monitoring network, 2016-2021

This is a line graph showing the trend of copper in PM_{2.5} annual mean concentrations from 2016 to 2021 across the roadside air monitoring network. Copper in PM_{2.5} annual mean concentrations decreased by 19% over this 6-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 6-year trend is based on data from 3 roadside air monitoring stations.
- Ontario does not have an annual AAQC for copper in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of manganese in PM_{2.5} annual means across the roadside air monitoring network, 2016-2021

This is a line graph showing the trend of manganese in PM_{2.5} annual mean concentrations from 2016 to 2021 across the roadside air monitoring network. Manganese in PM_{2.5} annual mean concentrations decreased by 26% over this 6-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 6-year trend is based on data from 3 roadside air monitoring stations.
- Ontario does not have an annual AAQC for manganese in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of lead in PM_{2.5} annual means across the roadside air monitoring network, 2016-2021

This is a line graph showing the trend of lead in PM_{2.5} annual mean concentrations from 2016 to 2021 across the roadside air

monitoring network. There was no significant trend over this 6-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 6-year trend is based on data from 3 roadside air monitoring stations.
- Ontario does not have an annual AAQC for lead in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of selenium in PM_{2.5} annual means across the roadside air monitoring network, 2016-2021

This is a line graph showing the trend of selenium in PM_{2.5} annual mean concentrations from 2016 to 2021 across the roadside air monitoring network. There was no significant trend over this 6-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 6-year trend is based on data from 3 roadside air monitoring stations.
- Ontario does not have an annual AAQC for selenium in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of zinc in PM_{2.5} annual means across the roadside air monitoring network, 2016-2021

This is a line graph showing the trend of zinc in PM_{2.5} annual mean concentrations from 2016 to 2021 across the roadside air monitoring network. Zinc in PM_{2.5} annual mean concentrations decreased by 28% over this 6-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 6-year trend is based on data from 3 roadside research air monitoring stations.
- Ontario does not have an annual AAQC for zinc in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 6-year trend for heavy metals at individual roadside air monitoring stations in Ontario is presented in the Appendix: 6-year trend for iron in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#sixyear-iron>) ; 6-year trend for copper in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#sixyear-copper>) ; 6-year trend for manganese in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#sixyear-manganese>) ; 6-year trend for lead in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#sixyear-lead>) ; 6-year trend for selenium in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#sixyear-selenium>) ; 6-year trend for zinc in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#sixyear-zinc>) .

2021 results

Summary of heavy metals in PM_{2.5} results for 2021

Averaging time	Low range	High range	Number of sites with AAQC exceedances
Iron in PM _{2.5} 1-hour max	2,262 ng/m ³ at Toronto Hwy 401	3,590 ng/m ³ at Etobicoke South	Not applicable

Averaging time	Low range	High range	Number of sites with AAQC exceedances
Iron in PM _{2.5} 24-hour max	324.7 ng/m ³ at Etobicoke South	654.6 ng/m ³ at Toronto Hwy 401	Not applicable
Copper in PM _{2.5} 1-hour max	426.5 ng/m ³ at Etobicoke South	1,646.0 ng/m ³ at Toronto Hwy 401	Not applicable
Copper in PM _{2.5} 24-hour max	34.7 ng/m ³ at Hamilton Downtown	209.1 ng/m ³ at Toronto Hwy 401	Not applicable
Manganese in PM _{2.5} 1-hour max	51.9 ng/m ³ at Etobicoke South	529.7 ng/m ³ at Hamilton Downtown	Not applicable
Manganese in PM _{2.5} 24-hour max	9.6 ng/m ³ at Etobicoke South	35.3 ng/m ³ at Hamilton Downtown	0
Lead in PM _{2.5} 1-hour max	90.4 ng/m ³ at Hamilton Downtown	192.0 ng/m ³ at Toronto Hwy 401	Not applicable
Lead in PM _{2.5} 24-hour max	14.6 ng/m ³ at Hamilton Downtown	27.0 ng/m ³ at Etobicoke South	Not applicable
Selenium in PM _{2.5} 1-hour max	28.17 ng/m ³ at Hamilton Downtown	47.27 ng/m ³ at Toronto Hwy 401	Not applicable
Selenium in PM _{2.5} 24-hour max	3.93 ng/m ³ at Etobicoke South	6.43 ng/m ³ at Toronto Hwy 401	Not applicable
Zinc in PM _{2.5} 1-hour max	780 ng/m ³ at Etobicoke South	1,791 ng/m ³ at Toronto Hwy 401	Not applicable
Zinc in PM _{2.5} 24-hour max	64.5 ng/m ³ at Etobicoke South	184.8 ng/m ³ at Hamilton Downtown	Not applicable

A summary of the 2021 heavy metals in PM_{2.5} annual statistics for individual roadside air monitoring stations is detailed in the Appendix: 2021 iron in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-iron>) ; 2021 copper in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-copper>) ; 2021 manganese in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-manganese>) ; 2021 lead in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-lead>) ; 2021 selenium in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-selenium>) ; and 2021 zinc in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-zinc>) .

Major components in PM_{2.5}

Major components in PM_{2.5}, with the exception of black carbon and metals, are the parts of tiny particles that can change or evaporate when exposed to heat (also known as non-refractory species in PM_{2.5}). In the air, these include organic compounds, sulphate, nitrate and ammonium compounds. Vehicle emissions and industry are major sources of these components which can

affect human health.

The ministry measures five major components in PM_{2.5}, of which four components are presented since chloride is mostly below its detection limit.

Highlights

6-year trends

No significant trend for organics in PM_{2.5}.

Sulphate in PM_{2.5} has decreased 35%.

No significant trend for nitrate in PM_{2.5}.

No significant trend for ammonium in PM_{2.5}.

2021 results

There are no AAQC for major components in PM_{2.5}, such as, organics, sulphate, nitrate and ammonium.

6-year trends

Trend of organics in PM_{2.5} at Toronto Hwy 401, 2016-2021

This is a line graph showing the trend of organics in PM_{2.5} annual mean concentrations from 2016 to 2021 at the Toronto Hwy 401 roadside air monitoring station. There was no significant trend over this 6-year period.

Note:

- Ontario does not have an annual AAQC for organics in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of sulphate in PM_{2.5} at Toronto Hwy 401, 2016-2021

This is a line graph showing the trend of sulphate in PM_{2.5} annual mean concentrations from 2016 to 2021 at the Toronto Hwy 401 roadside air monitoring station. Sulphate in PM_{2.5} annual mean concentrations decreased by 35% over this 6-year period.

Note:

- Ontario does not have an annual AAQC for sulphate in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of nitrate in PM_{2.5} at Toronto Hwy 401, 2016-2021

This is a line graph showing the trend of nitrate in PM_{2.5} annual mean concentrations from 2016 to 2021 at the Toronto Hwy 401 roadside air monitoring station. There was no significant trend over this 6-year period.

Note:

- Ontario does not have an annual AAQC for nitrate in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of ammonium in PM_{2.5} at Toronto Hwy 401, 2016-2021

This is a line graph showing the trend of ammonium in PM_{2.5} annual mean concentrations from 2016 to 2021 at the Toronto Hwy 401 roadside air monitoring station. There was no significant trend over this 6-year period.

Note:

- Ontario does not have an annual AAQC for ammonium in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as forest fires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Relative distribution of major components in PM_{2.5} at Toronto Hwy 401, 2016-2021

This is a stacked column chart showing the relative distribution of major components in PM_{2.5} based on annual mean concentrations from 2016 to 2021 at the Toronto Hwy 401 roadside air monitoring station. Relative contribution of PM_{2.5} components varied from year to year with the organic component representing the largest contribution across all years.

The 6-year trends for the four major components in PM_{2.5} monitored at the Toronto Hwy 401 roadside air monitoring station in Ontario are presented in the Appendix: 6-year trend for organics in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#sixyear-organics>) ; 6-year trend for sulphate in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#sixyear-sulphate>) ; 6-year trend for nitrate in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#sixyear-nitrate>) ; 6-year trend for ammonium in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#sixyear-ammonium>) .

2021 results

Summary of major components in PM_{2.5} results for 2021 at Toronto Hwy 401

Averaging time	Concentration	Number of sites with AAQC exceedances
Organics in PM _{2.5} 1-hour max	50.7 µg/m ³	Not applicable
Organics in PM _{2.5} 24-hour max	23.57 µg/m ³	Not applicable
Sulphate in PM _{2.5} 1-hour max	4.4 µg/m ³	Not applicable
Sulphate in PM _{2.5} 24-hour max	3.02 µg/m ³	Not applicable
Nitrate in PM _{2.5} 1-hour max	18.7 µg/m ³	Not applicable
Nitrate in PM _{2.5} 24-hour max	15.17 µg/m ³	Not applicable
Ammonium in PM _{2.5} 1-hour max	11.8 µg/m ³	Not applicable
Ammonium in PM _{2.5} 24-hour max	9.69 µg/m ³	Not applicable

A summary of the 2021 annual statistics for major components in PM_{2.5} at the Toronto Hwy 401 roadside air monitoring station is detailed in the Appendix: 2021 organics in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-organics>) ; 2021 sulphate in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-sulphate>) ; 2021 nitrate in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2021-report/>

appendix#annual-nitrate) ; 2021 ammonium in PM_{2.5} annual statistics (https://www.ontario.ca/document/air-quality-ontario-2021-report/appendix#annual-ammonium) .

Learn more about what Ontario is doing to protect our air. (https://www.ontario.ca/page/air-quality-ontario)

Acronyms

AAQC
Ambient Air Quality Criterion (Ontario)

AQHI
Air Quality Health Index

CAAQS
Canadian Ambient Air Quality Standard

CCME
Canadian Council of Ministers of the Environment

CO
carbon monoxide

ECCC
Environment and Climate Change Canada

Hwy
Highway

M-K
Mann-Kendall (statistical test)

NAPS
National Air Pollution Surveillance

NO
nitric oxide

NO₂
nitrogen dioxide

NO_x
nitrogen oxides

O₃
ozone

PM
particulate matter

PM_{2.5}
fine particulate matter

SAHA
Smog and Air Health Advisory

SAQS
Special Air Quality Statement

SHARP
Synchronized Hybrid Ambient Real-time Particulate

SO₂
sulphur dioxide

TEOM
Tapered Element Oscillating Microbalance

TRAP
Traffic-related air pollutants

TRS
total reduced sulphur

U.S.
United States (of America)

VOCs
volatile organic compounds

WOE
weight of evidence

Km
kilometres

Kt
kilotonnes

#/cm³
number (of contaminant) per cubic centimetre (of air) – count

ng/m³
nanograms (of contaminant) per cubic metre (of air) – by weight

µg/m³
micrograms (of contaminant) per cubic metre (of air) – by weight

ppb
parts (of contaminant) per billion (parts of air) – by volume

ppm
parts (of contaminant) per million (parts of air) – by volume

Glossary

Air Quality Health Index
Real-time information system that provides the public with an indication of air quality in cities, towns and in rural areas across Ontario. The AQHI derives a value based on the cumulative health effects of three pollutants – O₃, PM_{2.5} and NO₂.

AQHI station
Continuous monitoring station used to inform the public of general ambient air quality levels over an entire region (not a localized area) on a real-time basis; station reports on criteria pollutant levels that are not unduly influenced by a single emission source, but rather are the result of emissions from multiple sources, including those in neighbouring provinces and states.

Ambient air
Outdoor or open air.

Ambient monitoring
Measurements of regional air quality less influenced by local and industrial sources of air contaminants.

Annual mean
The average value of data for a given year.

Area sources
Small collective emission sources that are inventoried as a group, such as any small residential, governmental, institutional, commercial or industrial fuel combustion operations, which are too numerous to inventory as point sources.

Black carbon
The sooty black material produced through incomplete combustion processes. It is emitted from anthropogenic (e.g., engines and coal-fired power plants) and natural sources (e.g., forest fires). Black carbon comprises a significant portion of fine particulate matter and is linked to both climate warming and adverse health effects.

Carbon monoxide
A colourless, odourless, tasteless, and at high concentrations, poisonous gas.

Continuous pollutants
Pollutants for which a continuous measurement record exists; effectively, pollutants that have hourly data (maximum 8,760 values per year except leap year – e.g. 2004 where maximum values for the year are 8,784).

Continuous station
Where pollutants are measured on a real-time basis and data determined hourly (for example ozone, sulphur dioxide).

Criterion
Maximum concentration or level (based on potential effects) of pollutant that is desirable or considered acceptable in ambient air.

Downwind
The direction the wind is going to. If the wind is blowing towards the Southeast (blowing from the Northwest), then the downwind direction is towards the Southeast and the upwind direction is towards the Northwest.

Exceedance
Above the air pollutant concentration levels established by environmental protection criteria or other environmental standards.

Fine particulate matter
Also referred as PM_{2.5} or respirable particles: particles smaller than 2.5 micrometres in aerodynamic diameter, which arise mainly from fuel combustion, condensation of hot vapors and chemically driven gas-to-particle conversion processes. These are fine enough to penetrate deep into the lungs.

Fossil fuels
Natural gas, petroleum, coal and any form of solid, liquid or gaseous fuel derived from organic materials for the purpose of generating heat.

Fly ash
Generated as a by-product of incineration and coal combustion, and is used as a replacement for cement in concrete, among other uses.

Ground-level ozone
Colourless gas formed from chemical reactions between nitrogen oxides and volatile organic compounds (VOCs) in the presence of sunlight near the Earth's surface.

Mann-Kendall (M-K) test
A nonparametric statistical approach that can be applied to data without making assumptions on the nature of the data distribution. The M-K test is suitable for environmental monitoring data to handle missing, trace and below detection limit values.

Meteorological conditions
The conditions in the atmosphere (e.g. temperature, air pressure, water vapour, air flows, etc.), and the variations (over time and space, both vertically and horizontally) and interactions of these conditions.

Metric
Concentrations measured at a monitoring station calculated in the statistical form of a standard.

Micrometre
A millionth of a metre.

Natural sources

Emission sources such as biogenic emissions from vegetation, biological and geological sources, wildfires, and other sources not made by humans.

Nitrogen dioxide

A reddish-brown gas with a pungent and irritating odour.

Non-refractory species in PM_{2.5}

Species or components in PM_{2.5} that require less than approximately 600 – 650°C during analyses, such as organics, sulphate, nitrate and ammonium.

Open sources

Emission sources that emit air contaminants over large geographical areas. Examples include dust from farms, construction, and paved and unpaved roads.

Oxidation

A chemical reaction where a substance gains an oxygen; for example, in the atmosphere, sulphur dioxide is oxidized by hydroxyl radicals to form sulphate.

Particulate matter

The general term used to describe a mixture of microscopic solid particles and liquid droplets suspended in air.

Point sources

Sources that have a fixed location and are identified individually by name and location.

Primary pollutant

Pollutant emitted directly to the atmosphere.

Residence time

The average length of time during which a particle is in a given location or condition.

Respirable particles

See definition for fine particulate matter.

Secondary pollutant

A pollutant formed from other pollutants in the atmosphere.

Sen’s slope

The Sen’s slope (also known as the Thiel-Sen’s estimator) is closely-related to and applied in conjunction with the Mann-Kendall Test. Compared to the common least squares regression, the Sen’s slope procedure is a nonparametric method for computing the value of the true slope when there are gross errors or outliers in the data (Gilbert, 1987) without making assumptions of a normal distribution on the data.

Smog

A contraction of smoke and fog; colloquial term used for photochemical smog, which includes ozone, fine particulate matter and other contaminants; tends to be a brownish haze.

Stratosphere

Atmosphere 10 to 40 kilometres above the Earth's surface.

Stratospheric ozone

Ozone formed in the stratosphere from the conversion of oxygen molecules by solar radiation; ozone found there absorbs some of the sun’s ultraviolet radiation and prevents it from reaching the Earth.

Styrene

Primarily a synthetic chemical that is used extensively in the manufacture of plastics, rubber, and resins. It is also known as vinylbenzene, ethenylbenzene, cinnamene, or phenylethylene.

Sulphur dioxide

A colourless gas that smells like burnt matches.

Transportation sources

Mobile emission sources such as wheeled vehicles, ships, aircraft and railroad locomotives.

Troposphere

Atmospheric layer extending from the surface up to about 10 kilometres above the Earth's surface.

Ultrafine particles

Particles that are less than 0.1 µm in aerodynamic diameter; mostly emitted from road traffic in urban environments. These tiny particles have larger surface areas per unit mass to absorb toxic chemicals and can penetrate deep into the lungs.

Upwind

The direction the wind is coming from. If the wind is blowing from the Northwest (blowing toward the Southeast) then the upwind direction is toward the Northwest and the downwind direction is toward the Southeast.

Appendix

The Appendix is intended for use in conjunction with the 2021 Annual Air Quality in Ontario Report. The Appendix briefly describes the provincial Air Quality Health Index (AQHI) network, quality assurance and quality control procedures, and the Ministry of the Environment, Conservation and Parks’ air quality database. It also includes a series of tables displaying station locations and a listing of the summary statistics including means, maximums, percentile values and the number of exceedances of the Ontario Ambient Air Quality Criteria (AAQC) for each pollutant. In addition, trends for select common pollutants are displayed for a 10-year period, whereas trends for select research parameters are displayed for a 6-year period.

Monitoring network operations

Network description

In 2021, the ministry operated 39 ambient air monitoring sites across Ontario as part of the AQHI network. The AQHI network was comprised of 134 continuous monitoring instruments at 39 sites. These instruments have the capability of recording minute data (approximately 70 million data points per year) that are used to scan and validate the continuous hourly data.

Quality assurance and quality control

Day-to-day maintenance and support of the instruments are administered by ministry staff. Instrumentation precision is verified by daily automatic internal zero and span checks. Data analysts and station operators review span control charts to confirm instrument precision using a telemetry system. A quarterly quality assurance and quality control (QA/QC) review is performed on the ambient data set to highlight anomalies and administer corrective action in a timely manner.

The air monitoring station operators routinely inspect and maintain monitoring equipment and stations with mandatory quarterly on-site visits where secondary transfer standards are used to calibrate instrumentation. Station maintenance activities are recorded using Fieldworker Inc. software, an electronic documentation solution; this information is transferred directly to the ministry’s database. The instrumentation used throughout the provincial air monitoring network has been standardized to Thermo Electron Corporation analyzers to streamline parts inventory and leverage common hardware used within each analyzer. The following is a summary of the instrumentation deployed within the network and are all US EPA designated equivalent methods:

- Nitrogen Oxides – TE42C/I
- Fine Particulate Matter – SHARP 5030
- Ozone – TE49C/I
- Sulphur Dioxide – TE43I
- Carbon Monoxide – TE48I
- Total Reduced Sulphur – TE43I/CDN101

The ministry operates a laboratory with gas reference standards that adhere to those of the U.S. National Institute of Standards and Technology (NIST) and the Air Quality Research Division of Environment and Climate Change Canada. The secondary transfer standards used by station operators are referenced and certified to the ministry’s NIST primary standards on a quarterly basis.

The TRAP instrumentation used throughout the roadside air monitoring network include:

- Ultrafine Particles – Teledyne API Model 651
- Black Carbon in PM_{2.5} – Magee Scientific AE33 Aethalometer
- Heavy Metals in PM_{2.5} – Cooper Environmental Xact 625
- Major Components in PM_{2.5} – Aerodyne Quadrupole Aerosol Chemical Speciation Monitor (ACSM)

The Ontario ambient air quality monitoring network undergoes constant maintenance to ensure a high standard of quality control. Continuous real-time data are consistently reviewed, assessed and validated by ministry staff. Immediate actions are taken to correct any inconsistencies that may affect the validity of the data. These measures ensure ambient air monitoring data are valid, complete, comparable, representative and accurate. As a result, the 2021 ambient air quality monitoring network had 98.6% valid data from over one million hourly data points.

Data base

The ambient air quality data used in this report are stored in the ministry’s air quality information system (AQUIS) and are made available through the Air Quality Ontario web site (<http://www.airqualityontario.com/history/>) , and the Ontario Data Catalogue (<https://www.ontario.ca/search/data-catalogue?sort=asc>) . A statistical pattern test is used to identify data anomalies, such as unusual pollutant concentrations. Each pollutant has a predetermined concentration range based on historical data. Values outside this range are flagged for further investigation.

Data are obtained from automated ambient air monitoring instruments that operate continuously to produce an average measurement for every hour for a possible total of 8,760 measurements in a given year. Hourly parameters measured include NO/NO₂/NO_x, PM_{2.5}, O₃, SO₂, CO and TRS compounds. An annual mean requires at least 6,570 hourly readings. In addition, each quarter of the year should have 75% valid data for PM_{2.5}, whereas for ozone, only the 2nd and 3rd quarters of the year require 75% valid data based on protocols that are consistent with the Canadian Council of Ministers of the Environment (CCME) and the United States Environmental Protection Agency (U.S. EPA). For VOC samples, half of the method detection limit (MDL) is applied as appropriate to concentrations measured below the detection limit. An annual and/or monthly mean for 24-hour VOC samples requires 50% of valid samples. The 50% data requirement also applies to the research parameters (ultrafine particles, black carbon and trace metals and major components of PM_{2.5}).

Network descriptive table

The AQHI network for 2021 is summarized in the 2021 Ontario Continuous Ambient Air Monitoring Network. The table displays the station name, numerical identifier and pollutants measured. The numerical identifier is the station (ID) number, the first digit of which identifies the geographic region in which the station is located. Air monitoring stations within the AQHI network can

measure up to six common pollutants (NO₂, PM_{2.5}, ozone, SO₂, CO and TRS compounds) based on the pollutant(s) of concern for the regional area it represents.

The 2021 Ontario Continuous Ambient Air Monitoring Network also identifies the type of air monitoring site: ambient, roadside, Canadian Ambient Air Quality Standard (CAAQS), and/or National Air Pollution Surveillance (NAPS). Ambient sites represent the general air quality of an area without any direct influence of local industrial sources. Road-side sites are typically within approximately 100 m of a major roadway with daily traffic volumes greater than 10,000 vehicles per day.

Annual statistics and trends

The annual statistical data and trends for various continuous pollutants and selected volatile organic compounds are presented in the Appendix. The annual averages, maximums and percentiles are displayed in the annual statistics tables. (A percentile is the value equal to or below which a given percentage of the data set falls. For example, if 70% of the data are equal to or below 0.10 ppm, the 70th percentile is 0.10 ppm).

The trends are calculated from monthly means through the Mann-Kendall (M-K) test. The M-K test is a nonparametric statistical approach that can be applied to data without making assumptions on the nature of the data distribution. The M-K test is essentially a test for uniform progression (zero change) in the slope of the linear regression of time-ordered data versus time (Gilbert, 1987). The M-K test is particularly suitable for environmental monitoring data since missing, trace and below detection limit values can be handled. This test can also be used to compare trends at multiple stations. The seasonal Kendall test, also performed in this Report, is a generalization of the M-K test (Gilbert, 1987) for use to determine the true trend when there are seasonal cycles in the data which do not constitute a true long-term trend. The change over time was based on the Sen's slope, also known as the Thiel-Sen's estimator of linear trend. The Sen's slope is closely related to and applied in conjunction with the M-K Test. Compared to the common least squares regression, the Sen's slope procedure is a nonparametric method for computing the value of the true slope when there are gross errors or outliers in the data without making assumptions of a normal distribution on the data (Gilbert, 1987).

Other informative tables

Calculated CAAQS metrics for PM_{2.5}, ozone, NO₂ and SO₂ are presented for 2021 (based on a three-year average, 2019-2021) and over a 10-year period in Canadian Ambient Air Quality Standard Reporting. The air zone management levels associated to each CAAQS reporting pollutant are also provided for reference. The percentage distribution of hourly AQHI readings within the various health risk categories for each of the 39 monitoring sites, and the number of air quality alerts issued in Ontario during 2021 are summarized in AQHI and Air Quality Alert Program Reporting.

2021 air monitoring network

2021 Ontario continuous ambient air monitoring network

I D	Stat ion na me	Statio n locatio n	Y e a r	La tit ud e	Lo ng ti ud e	Ai r in ta ke	Ty p e	A Q H I	N O 2	P M 2.5	O 3	S O 2	C O	T R S
12008	Win dsor Dow nto wn	467 Uni versity Ave. W.	1969	42°18' 8"	-83°02' 37. 2"	4	A/ RS / C/ N	Y	T	T	T	T	T	N / A
12016	Win dsor West	College Ave./ South S t.	1975	42°17' 4. 4"	-83°04' 23. 3"	4	A/ RS /N	Y	T	T	T	T	N / A	T
T ot al								39	36	39	39	11	5	4

ID *****	Station name	Station location *****	Year	Latitude	Longitude	Air intake	Type	AQHI ****	NO ₂ ****	PM _{2.5} *****	O ₃ ****	SO ₂ ****	CO ****	TRS ****
13001	Chat ham	435 Grand Ave. W. *****	2005	42° 41' 3.3"	-8° 12' 29.9"	15	A/ C/ N ***	Y **	T **	T **	T **	N /A ****	N / A ***	N / A ***
14111	Sarn ia	700 Christin a St. N. *****	2016	42° 59' 5.0"	-8° 23' 43.2"	3	A/ C/ N ***	Y **	T **	T **	T **	T **	N / A ***	T **
15020	Gran d Ben d	Point Blake Conser vation Area	1991	43° 9' 9.1"	-8° 1° 44' 34.4"	5	A/ N ***	Y **	T **	T **	T **	N /A ****	N / A ***	N / A ***
15026	Lon don	42 St. Julien St. *****	2013	42° 58' 8.1"	-8° 1° 12' 03.1"	5	A/ C/ N ***	Y **	T **	T **	T **	N /A ****	N / A ***	N / A ***
16015	Port Stan ley	43665 Dexter Line, Elgin Water T. Plant *****	2002	42° 40' 9.5"	-8° 1° 09' 46.4"	5	A/ N ***	Y **	T **	T **	T **	N /A ****	N / A ***	N / A ***
18007	Tiver ton	4 th Conces sion/ Bruce Rd. 23 *****	1979	44° 01' 8'52.1"	-8° 1° 32' 59.0"	4	A/ N ***	Y **	N /A ****	T **	T **	N /A ****	N / A ***	N / A ***
21005	Bran tfor d	324 Grand River Ave. *****	2004	43° 08' 9.0"	-8° 0° 17' 33.5"	5	A/ C/ N ***	Y **	T **	T **	T **	N /A ****	N / A ***	N / A ***
26060	Kitc hen er	West Ave./ Homew ood Ave. *****	1990	43° 02' 6'37.8"	-8° 0° 30' 13.7"	5	A/ C/ N ***	Y **	T **	T **	T **	N /A ****	N / A ***	N / A ***
Tot al								39	36	39	39	11	5	4

ID	Station name	Station location	Year	Latitude	Longitude	Air intake	Type	AQHI	NO ₂	PM _{2.5}	O ₃	SO ₂	CO	TRS
27067	St. Catharines	Argyle Cres., Pump Stn.	1987	43°09'36.2"	-79°14'05.1"	4	A/C/N	Y	T	T	T	N/A	N/A	N/A
28028	Guelph	Exhibition St./Clark St. W.	2000	43°30'5.8"	-80°15'51.0"	4	A/C/N	Y	T	T	T	N/A	N/A	N/A
29000	Hamilton Downtown	Elgin St./Kelly St.	1987	43°15'28.0"	-79°42'00"	4	A/RS/C/N	Y	T	T	T	T	T	T
29118	Hamilton West	Main St. W./Hwy 403	1985	43°15'26.8"	-79°54'27.9"	3	A/RS/N	Y	T	T	T	N/A	N/A	N/A
29214	Hamilton Mountain	250 Fennell Ave. W.	2019	43°14'28.4"	-79°53'21.9"	3	A/C/N	Y	T	T	T	T	N/A	N/A
31129	Toronto Downtown	55 John St., Metro Hall	2019	43°38'43.5"	-79°23'20.7"	2	A/RS/C/N	Y	T	T	T	N/A	N/A	N/A
33003	Toronto East	Kennedy Rd./Lawrence Ave. E.	1970	43°44'52.5"	-79°16'26.6"	4	A/RS/C/N	Y	T	T	T	N/A	N/A	N/A
34021	Toronto North	4905 Dufferin St., ECCC	1988	43°46'3.8"	-79°25'03.8"	5	A/RS/C/N	Y	T	T	T	T	T	N/A
Total								39	36	39	39	11	5	4

ID *****	Stat ion na me	Statio n locatio n	Y e a r	La tit ud e	Lo ng tiu de	Ai r in ta ke	Ty pe	A Q HI *****	N O 2 *****	P M 2.5 *****	O 3 *****	S O 2 *****	C O *****	T R S *****
35125	Toro nto West	125 Res ources Rd. *****	2003	43°42'34.0"	-79°32'36.6"	8	A/RS / C/ N	Y	T	T	T	T	T	N / A
44008	Burli ngto n	North Shore Blvd. E./ Lakesh ore Rd. *****	1979	43°18'54.4"	-79°48'09.5"	5	A/ C/ N	Y	T	T	T	N /A	N / A	N / A
44017	Oak ville	EightLi ne/ Glenas hton Dr., Halton Reserv oir *****	2003	43°29'12.9"	-79°42'08.2"	12	A/ C/ N	Y	T	T	T	N /A	N / A	N / A
44029	Milt on	1120 Main St. E. *****	2019	43°31'46.7"	-79°51'44.8"	4	A/ C/ N	Y	T	T	T	T	N / A	N / A
45027	Osh awa	Brittani a Ave. W., Ep Taylor Stables *****	2005	43°57'07.5"	-78°54'45.2"	7	A/ C/ N	Y	T	T	T	N /A	N / A	N / A
46090	Bra mpt on	109 Mclaug hlin Rd. S. *****	2000	43°41'55.5"	-79°46'51.3"	5	A/ C/ N	Y	T	T	T	N /A	N / A	N / A
46108	Miss issa uga	3359 Mississ auga Rd. N., U of T Campu s *****	2007	43°32'49.1"	-79°39'31.3"	5	A/ C/ N	Y	T	T	T	N /A	N / A	N / A
To ta l								39	36	39	39	11	5	4

ID *****	Stat ion na me	Statio n locatio n	Y e a r	La tit ud e	Lo ng tiu de	Ai r in ta ke	Ty pe	A Q HI *****	N O 2 *****	P M 2.5 *****	O 3 *****	S O 2 *****	C O *****	T R S *****
47045	Barrie	83 Perry St. *****	2001	44°2'56.5"	-7°42'08.3"	5	A/C/N ***	Y **	T **	T **	T **	N/A ****	N/A ***	N/A ***
48006	Newmarket	Eagle St. W./ Mccaffrey Rd. *****	2001	44°0'2'39.5"	-7°9'28'59.7"	5	A/N ***	Y **	T **	T **	T **	N/A ****	N/A ***	N/A ***
49005	Parry Sound	7 Bay St. *****	2001	45°2'0'16.3"	-8°0'02'17.4"	5	A/N ***	Y **	T **	T **	T **	N/A ****	N/A **	N/A **
49010	Dorset	1026 Bellwood Acres Rd. *****	1981	45°1'3'27.4"	-7°8'55'58.6"	3	A/N ***	Y **	N/A ****	T **	T **	N/A ****	N/A **	N/A **
51001	Ottawa Downtown	Rideau St./ Wurtemburg St. *****	1971	45°2'6'03.6"	-7°5'40'33.6"	4	A/C/N ***	Y **	T **	T **	T **	T **	T **	N/A ***
51010	Petawawa	Petawawa Research Forest Facility	2007	45°5'9'48.2"	-7°7'26'28.3"	6	A/N ***	Y **	N/A ****	T **	T **	N/A ****	N/A ***	N/A ***
52023	Kingston	23 Beechgrove Lane	2014	44°1'3'11.5"	-7°6'31'16.1"	5	A/C/N ***	Y **	T **	T **	T **	N/A ****	N/A ***	N/A ***
Totall								39	36	39	39	11	5	4

ID *****	Station name	Station location	Year	Latitude	Longitude	Air intake	Type	AQHI *****	NO ₂ ****	PM _{2.5} *****	O ₃ ***	SO ₂ ****	CO ****	TRS ***
54012	Belle ville	2 Sidney St., Water Treatm ent Plant	2002	44° 09'01. 9"	-7° 23'43. 8"	10	A/ N ***	Y **	T **	T **	T **	N /A ****	N / A ***	N / A ***
56051	Corn wall	Bedfor d St./ 3rd St. W. *****	1970	45° 01'04. 7"	-7° 4°44' 06. 8"	4	A/ N ***	Y **	T **	T **	T **	N /A ****	N / A ***	N / A ***
59006	Pete rbor oug h	10 Hospita l Dr. *****	1998	44° 01'08' 6. 9"	-7° 8°20' 46. 4"	10	A/ C/ N ***	Y **	T **	T **	T **	N /A ****	N / A ***	N / A ***
63203	Thu nder Bay	421 James St. S. *****	2004	48° 02'24' 5. 8"	-8° 9°17' 24. 6"	15	A/ RS / C/ N ***	Y **	T **	T **	T **	N /A ****	N / A ***	N / A ***
71078	Saul t Ste. Mari e	Sault College	2004	46° 03'15' 9. 5"	-8° 4°18' 35. 7"	8	A/ C/ N ***	Y **	T **	T **	T **	T **	N / A ***	T **
75010	Nort h Bay	Chippe wa St. W., Dept. Nationa l Defenc e	1979	46° 01'09' 3. 5"	-7° 9°26' 57. 4"	4	A/ RS /N ***	Y **	T **	T **	T **	N /A ****	N / A ***	N / A ***
77233	Sud bury	155 Elm St. *****	2013	46° 02'09' 1. 0"	-8° 1°00' 11. 2"	3	A/ C/ N ***	Y **	T **	T **	T **	T **	N / A ***	N / A ***
To ta l								39	36	39	39	11	5	4

Notes:

ID

station identification number

Year
year station began monitoring

Air intake
height of air intake above ground (m)

Type
type of monitoring site

A
ambient

RS
road-side

C
Canadian Ambient Air Quality Standard (CAAQS)

N
National Air Pollution Surveillance (NAPS)

AQHI
Air Quality Health Index

T
telemetry

NO₂
nitrogen dioxide

PM_{2.5}
fine particulate matter

O₃
ground-level ozone

SO₂
sulphur dioxide

CO
carbon monoxide

TRS
total reduced sulphur

Y
yes

2021 annual statistics

2021 nitric oxide (NO) annual statistics

Unit: parts per billion (ppb)

ID	City	Location	Valid h	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Max 1h	Max 24h
12008	Windsor Downtown	467 University Ave. W.	8688	0.3	0.5	0.9	1.60	4.1	33.8	2.5	219.8	43.6
12016	Windsor West	College Ave./South St.	8636	0.0	0.2	0.5	1.10	3.6	40.0	2.3	143.3	35.3
13001	Chatham	435 Grand Ave. W.	8744	0.0	0.2	0.4	1.00	2.7	12.2	1.2	63.7	10.7
14111	Sarnia	700 Christina St. N.	8682	0.6	1.0	1.2	1.70	3.0	14.0	1.9	84.7	11.2

ID *****	City	Location	Va lid h ***	10 %	30 %	50 %	70 %	90 %	99 %	Me an	Ma x 1h ***	Ma x 24h ***
15 02 0	Grand Bend	Point Blake Conservatio n Area	86 27	0. 0	0. 3	0. 3	0. 40	0. 7	2. 0	0.4	21. 9	1.6
15 02 6	Londo n	42 St. Julien St. *****	86 77	0. 0	0. 1	0. 3	0. 60	1. 4	13 .1	0.9	54. 1	12.5
16 01 5	Port Stanley	43665 Dexter Line, Elgin Water T. Plt *****	82 47	0. 0	0. 0	0. 1	0. 20	0. 8	2. 5	0.3	13. 0	2.6
21 00 5	Brantf ord	324 Grand River Ave. *****	86 56	0. 0	0. 1	0. 2	0. 40	1. 5	9. 1	0.7	42. 7	8.1
26 06 0	Kitche ner	West Ave./ Homewood Ave. *****	86 95	0. 1	0. 2	0. 3	0. 50	1. 4	13 .2	0.9	65. 5	16.3
27 06 7	St. Cathari nes	Argyle Cres., Pump Stn. *****	86 97	0. 2	0. 2	0. 4	0. 70	1. 6	12 .2	1.0	87. 1	12.5
28 02 8	Guelph	Exhibition St./Clark St. W. *****	86 75	0. 1	0. 2	0. 3	0. 50	1. 4	15 .9	1.0	82. 6	18.0
29 00 0	Hamilt on Downt own	Elgin St./ Kelly St. *****	86 23	0. 6	0. 8	1. 3	2. 40	7. 8	35 .0	3.5	163 .3	45.4
29 11 8	Hamilt on West	Main St. W./ Hwy 403 *****	86 79	0. 2	0. 4	0. 9	2. 20	7. 6	37 .1	3.2	113 .9	25.2
29 21 4	Hamilt on Mount ain	250 Fennell Ave. W. *****	86 93	0. 2	0. 3	0. 5	0. 90	3. 1	14 .4	1.4	55. 3	14.3
31 12 9	Toront o Downt own	55 John St. *****	82 13	0. 5	1. 2	2. 1	4. 20	10 .9	39 .0	4.8	323 .0	36.7
33 00 3	Toront o East	Kennedy Rd./ Lawrence Ave. E. *****	86 77	0. 0	0. 4	0. 9	1. 90	4. 8	30 .5	2.4	121 .2	32.3

ID *****	City	Location	Va lid h ***	10 %	30 %	50 %	70 %	90 %	99 %	Me an	Ma x 1h ***	Ma x 24h ***
34 02 1	Toront o North	4905 Dufferin St., ECCC *****	85 27	0. 7	0. 9	1. 2	2. 00	4. 8	32 .2	2.8	108 .8	27.0
35 12 5	Toront o West	125 Resourc es Rd. *****	86 69	0. 1	0. 8	2. 2	5. 40	14 .3	59 .5	6.0	196 .7	48.2
44 00 8	Burling ton	North Shore Blvd. E./ Lakeshore Rd. *****	86 84	0. 0	0. 4	0. 8	1. 70	4. 6	22 .0	2.1	115 .1	25.6
44 01 7	Oakvill e	EightLine/ Glenashton Dr., Halton Res. *****	85 45	0. 4	0. 6	0. 8	1. 20	2. 9	14 .2	1.6	109 .3	16.0
44 02 9	Milton	1120 Main St. E. *****	86 28	0. 3	0. 5	0. 8	1. 50	4. 4	36 .1	2.6	150 .5	26.5
45 02 7	Oshaw a	Brittania Ave. W., EP Taylor Stables	87 23	0. 0	0. 3	0. 5	0. 70	1. 4	6. 6	0.7	31. 5	8.2
46 09 0	Bramp ton	109 McLaughlin Rd. S. *****	86 60	0. 0	0. 2	0. 3	0. 70	3. 0	26 .0	1.5	94. 8	23.9
46 10 8	Mississ auga	3359 Mississauga Rd. N., U of T Campus **	83 84	0. 1	0. 1	0. 3	0. 70	3. 2	25 .5	1.6	86. 6	20.7
47 04 5	Barrie	83 Perry St. *****	87 27	0. 2	0. 4	0. 6	0. 80	2. 1	21 .3	1.4	100 .3	14.8
48 00 6	Newm arket	Eagle St. W./ McCaffrey Rd. *****	86 97	0. 1	0. 3	0. 4	0. 70	1. 5	10 .6	0.9	61. 3	11.6
49 00 5	Parry Sound	7 Bay St. *****	86 97	0. 1	0. 2	0. 3	0. 40	0. 8	6. 1	0.5	27. 7	4.8
51 00 1	Ottawa Downt own	Rideau St./ Wurtemberg St. *****	87 55	0. 4	0. 6	0. 8	1. 10	2. 4	14 .5	1.5	88. 5	15.4

ID *****	City	Location	Valid h ***	10 %	30 %	50 %	70 %	90 %	99 %	Me an	Ma x 1h ***	Ma x 24h ***
52023	Kingston	23 Beechgrove Lane	8682	0.2	0.3	0.4	0.60	1.3	5.2	0.7	24.1	5.6
54012	Belleville	2 Sidney St., Water Treatment Plant	8622	0.0	0.2	0.4	0.70	2.8	17.1	1.3	65.7	18.1
56051	Cornwall	Bedford St./ 3rd St. W.	8692	0.1	0.3	0.4	0.60	1.5	30.8	1.4	109.0	24.4
59006	Peterborough	10 Hospital Dr.	8692	0.0	0.1	0.2	0.50	1.4	11.3	0.8	49.4	10.0
63203	Thunder Bay	421 James St. S.	8756	0.8	1.0	1.4	2.40	8.3	30.2	3.5	119.0	30.8
71078	Sault Ste. Marie	Sault College	8271	0.2	0.3	0.5	1.10	3.1	12.4	1.4	46.6	7.3
75010	North Bay	Chippewa St. W., Dept. National Defence	8624	0.4	0.5	0.6	1.00	2.3	18.0	1.5	65.0	14.5
77233	Sudbury	155 Elm St.	8658	0.3	0.5	0.8	1.30	3.4	22.0	1.9	115.4	21.7

2021 nitrogen dioxide (NO₂) annual statistics

Unit: parts per billion (ppb)

NO₂ 1h AAQC: 200 ppb

NO₂ 24h AAQC: 100 ppb

ID ***	Cit y	Loc atio n	V a li d h ***	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h ***	M a x 24 h ***	Nu mbe r of tim es abo ve 1h crit eria	Nu mbe r of time s abo ve 24h crite ria
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I D	Cit y	Loc atio n	V al id h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M ax 1h	M ax 24 h	Nu mbe r of time s abo ve 1h crite ria	Nu mbe r of time s abov e 24h crite ria
12008	Windsor Downtown	467 University Ave. W.	8688	3.5	5.3	7.4	10.8	18.6	34.7	9.6	51.0	27.3	0	0
12016	Windsor West	College Ave. / South St.	8636	2.5	4.2	6.3	9.6	16.9	36.1	8.4	56.6	27.2	0	0
13001	Chatham	435 Grand Ave. W.	8744	1.8	2.8	3.9	5.8	9.7	21.9	5.1	43.8	20.8	0	0
14111	Sarnia	700 Christina St. N.	8682	1.3	2.8	4.8	8.2	15.2	28.7	6.8	50.1	23.5	0	0
15020	Grand Bend	Point Blake Conservation Area	8627	0.6	1.2	1.9	2.9	4.8	8.7	2.4	17.4	9.0	0	0
15026	London	42 St. Julien St.	8677	1.8	2.8	4.0	5.8	10.1	22.3	5.2	36.3	17.2	0	0

I D	Cit y	Loc atio n	V al id h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1h	M a x 24 h	Nu mbe r of time s abo ve 1h crite ria	Nu mbe r of time s abov e 24h crite ria
16015	Port Stanley	43665 Dexter Line, Elgin Water T. Plt	8247	0.7	1.2	1.8	2.5	4.2	8.2	2.2	21.3	6.9	0	0
21005	Brantford	324 Grand River Ave.	8656	1.6	2.4	3.4	5.1	9.4	18.6	4.6	37.9	16.8	0	0
26060	Kitchen	West Ave. / Homewood Ave.	8695	1.2	2.2	3.3	5.2	10.1	25.0	4.8	44.2	19.0	0	0
27067	St. Catharines	Argyle Cres., Pump Stn.	8697	2.2	3.2	4.3	6.2	11.1	23.7	5.8	36.4	17.4	0	0
28028	Guelph	Exhibition St./Clark St. W.	8675	1.8	2.7	4.0	6.0	10.7	26.0	5.5	39.8	19.4	0	0
29000	Hamilton Downtown	Elgin St./Kelly St.	8623	2.9	4.8	7.5	11.9	21.5	39.3	10.2	55.4	40.9	0	0

I D	Cit y	Loc atio n	V al id h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1h	M a x 24 h	Nu mbe r of time s abo ve 1h crite ria	Nu mbe r of time s abov e 24h crite ria
29118	Ha mil ton We st	Main St. W./ Hwy 403	8679	3.0	4.9	7.6	11.8	21.0	34.6	10.1	48.5	33.2	0	0
29214	Ha mil ton Mo unt ain	250 Fenn ell Ave. W.	8693	0.7	2.1	4.1	7.2	15.3	31.0	6.3	48.7	33.3	0	0
31129	Tor ont o Do wn to wn	55 John St.	8213	5.0	7.7	10.6	14.7	23.6	38.7	12.7	74.2	37.3	0	0
33003	Tor ont o Ea st	Ken ned y Rd./ Lawr ence Ave. E.	8677	3.0	4.9	7.0	10.6	19.5	39.0	9.5	62.8	30.8	0	0
34021	Tor ont o No rth	4905 Duff erin St., ECC C	8527	2.7	4.6	6.9	10.7	19.4	37.2	9.3	52.7	31.4	0	0
35125	Tor ont o We st	125 Reso urce s Rd.	8669	3.9	7.2	10.5	15.3	25.7	41.6	12.9	56.7	31.8	0	0

ID	City	Location	Valid h	10%	30%	50%	70%	90%	99%	Mean	Max 1h	Max 24h	Number of times above 1h criteria	Number of times above 24h criteria
44008	Burlington	North Shore Blvd. E./ Lake shore Rd.	8684	2.6	4.7	6.9	10.0	17.5	33.1	8.7	50.4	26.8	0	0
44017	Oakville	EightLine / Glenashton Dr., Halt on Res.	8545	2.1	3.5	5.2	8.1	15.2	30.4	7.3	63.2	30.8	0	0
44029	Milton	1120 Main St. E.	8628	1.9	3.6	5.4	8.7	18.5	38.3	8.2	61.2	32.2	0	0
45027	Oshawa	Brittania Ave. W., EP Taylor Stables	8723	0.9	1.5	2.4	3.7	7.2	15.1	3.4	27.0	14.0	0	0
46090	Brampton	109 McLaughlin Rd. S.	8660	1.1	2.3	4.1	7.3	15.2	31.3	6.5	44.8	27.8	0	0
46108	Mississauga	3359 Mississauga Rd. N., U of T	8384	1.8	3.2	5.0	7.9	15.1	28.9	7.0	42.4	25.3	0	0

I D ****	Cit y	Loc atio n	V al id h ***	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1h ****	M a x 24 h ***	Nu mbe r of time s abo ve 1h cri te ria	Nu mbe r of time s abov e 24h cri te ria
		Campus												
4 7 0 4 5	Barrie	83 Perry St. *****	8727	1.6	2.6	3.7	5.7	11.9	29.6	5.6	51.0	24.3	0	0
4 8 0 0 6	Newmarket	Eagle St. ***** W./McCaffrey Rd. *****	8697	0.8	1.7	2.8	4.7	9.9	24.9	4.5	42.1	19.3	0	0
4 9 0 0 5	Parry Sound	7 Bay St. *****	8697	0.6	1.1	1.6	2.4	5.1	17.0	2.5	35.4	13.5	0	0
5 1 0 0 1	Ottawa Downtown	Rideau St./Wurtemburg St. *****	8755	1.4	2.4	3.6	6.1	12.7	28.3	5.7	47.6	23.5	0	0
5 2 0 2 3	Kingston	23 Beecroft Lane	8682	1.2	1.8	2.5	3.8	7.7	21.0	3.8	42.6	17.2	0	0
5 4 0 1 2	Belleville	2 Sidney St., ***** Water Treatment Plant	8622	0.9	1.6	2.4	3.9	8.2	21.8	3.8	35.0	16.2	0	0

I D	Cit y	Loc atio n	V al id h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M ax 1h	M ax 24 h	Nu mbe r of time s abo ve 1h crite ria	Nu mbe r of time s abov e 24h crite ria
56051	Co rn wa ll	Bedf ord St./ 3rd St. W.	8692	1.1	1.9	2.8	4.7	10.7	30.5	4.8	52.1	22.2	0	0
59006	Pet erb or ou gh	10 Hos pital Dr.	8692	0.9	1.6	2.6	4.1	8.5	23.7	4.1	42.6	20.2	0	0
63203	Th un der Ba y	421 Jame s St. S.	8756	1.6	2.7	4.4	7.2	14.6	30.6	6.5	45.2	26.0	0	0
71078	Sa ult Ste : Ma rie	Saul t Colle ge	8271	1.2	1.9	2.7	4.2	8.3	18.4	4.0	50.7	12.4	0	0
75010	No rth Ba y	Chip pew a St. W., Dept : Nati onal Defe nce	8624	0.8	1.4	2.1	3.6	8.8	27.2	3.9	36.5	19.7	0	0
77233	Su db ury	155 Elm St.	8658	1.4	2.2	3.4	5.6	12.0	34.1	5.6	56.2	24.3	0	0

2021 nitrogen oxides (NO_x) annual statistics

Unit: parts per billion (ppb)

ID *****	City	Location *****	Va lid h ***	10 %	30 %	50 %	70 %	90 %	99 %	M ea n	Ma x 1h ***	Ma x 24h ***
12008	Windsor Downtown	467 University Ave. W. *****	8688	4.1	6.2	8.6	12.4	21.9	66.6	12.1	259.6	66.7
12016	Windsor West	College Ave./South St. *****	8636	2.8	4.8	7.2	10.9	19.7	69.2	10.7	199.6	59.5
13001	Chatham	435 Grand Ave. W. *****	8744	1.9	3.1	4.6	6.9	11.9	31.6	6.3	107.5	29.6
14111	Sarnia	700 Christina St. N. *****	8682	2.2	4.0	6.0	9.9	18.0	40.4	8.7	114.0	28.8
15020	Grand Bend	Point Blake Conservation Area	8627	0.8	1.5	2.2	3.3	5.4	9.8	2.8	32.2	9.9
15026	London	42 St. Julien St. *****	8677	2.0	3.1	4.4	6.5	11.4	30.2	6.1	77.4	25.3
16015	Port Stanley	43665 Dexter Line, Elgin Water T. Plt *****	8247	0.7	1.3	1.9	2.8	4.8	9.8	2.5	31.6	8.9
21005	Brantford	324 Grand River Ave. *****	8656	1.6	2.6	3.7	5.6	10.8	25.5	5.3	62.0	24.9
26060	Kitchener	West Ave./Homewood Ave. *****	8695	1.5	2.4	3.7	5.8	11.3	35.9	5.7	98.0	29.1
27067	St. Catharines	Argyle Cres., Pump Stn. *****	8697	2.5	3.6	4.9	6.9	12.5	33.3	6.8	105.5	27.4
28028	Guelph	Exhibition St./Clark St. W. *****	8675	2.1	3.1	4.4	6.5	12.1	40.7	6.5	103.8	31.7
29000	Hamilton Downtown	Elgin St./Kelly St. *****	8623	3.8	6.0	9.1	14.6	28.6	67.6	13.7	216.7	86.3

ID *****	City	Location *****	Valid h ***	10 %	30 %	50 %	70 %	90 %	99 %	Me an	Ma x 1h ***	Ma x 24h ***
29 11 8	Hamilt on West	Main St. W./ Hwy 403 *****	86 79	3. 4	5. 7	8. 9	14 .3	28 .4	64. 7	13. 2	141 .5	58.3
29 21 4	Hamilt on Mount ain	250 Fennell Ave. W. *****	86 93	1. 1	2. 6	4. 8	8. 4	18 .2	41. 3	7.7	102 .2	47.6
31 12 9	Toront o Downt own	55 John St. *****	82 13	5. 9	9. 5	13 .4	18 .9	33 .0	73. 9	17. 4	397 .2	66.5
33 00 3	Toront o East	Kennedy Rd./ Lawrence Ave. E. *****	86 77	3. 3	5. 8	8. 2	12 .3	23 .4	64. 77	11. 9	168 .7	61.0
34 02 1	Toront o North	4905 Dufferin St., ECCC *****	85 27	3. 7	5. 9	8. 5	12 .6	23 .2	66. 34	12. 1	147 .2	50.7
35 12 5	Toront o West	125 Resourc es Rd. *****	86 69	4. 5	8. 7	13 .5	20 .6	38 .5	93. 26	18. 9	226 .4	74.7
44 00 8	Burling ton	North Shore Blvd. E./ Lakeshore Rd. *****	86 84	2. 9	5. 2	7. 8	11 .7	21 .2	51. 43	10. 7	165 .6	51.4
44 01 7	Oakvill e	EightLine/ Glenashton Dr., Halton Res. *****	85 45	2. 8	4. 2	6. 2	9. 4	17 .9	41. 6	8.8	150 .2	43.9
44 02 9	Milton	1120 Main St. E. *****	86 28	2. 5	4. 4	6. 5	10 .2	22 .7	67. 77	10. 8	196 .2	58.5
45 02 7	Oshaw a	Brittania Ave. W., EP Taylor Stables *****	87 23	1. 2	2	2. 9	4. 3	8. 3	19. 4	4.1	56. 9	21.1
46 09 0	Bramp ton	109 McLaughlin Rd. S. *****	86 60	1. 4	2. 6	4. 5	8. 2	18 .0	51. 98	8.0	132 .0	50.0
46 10 8	Mississ auga	3359 Mississauga Rd. N., U of T Campus *****	83 84	2. 1	3. 5	5. 5	8. 8	18 .1	50. 02	8.6	115 .7	38.8

ID *****	City	Location *****	Valid h ***	10 %	30 %	50 %	70 %	90 %	99 %	Me an	Ma x 1h ***	Ma x 24h ***
47 04 5	Barrie	83 Perry St. *****	87 27	2. 1	3. 1	4. 3	6. 5	14 .0	46. 8	7.0	151 .3	36.5
48 00 6	Newmarket	Eagle St. W./ McCaffrey Rd. *****	86 97	1. 2	2. 1	3. 3	5. 4	11 .2	34. 11	5.4	81. 9	26.0
49 00 5	Parry Sound	7 Bay St. *****	86 97	0. 8	1. 3	1. 9	2. 8	6. 0	20	3.1	58. 9	18.3
51 00 1	Ottawa Downtown	Rideau St./ Wurtemberg St. *****	87 55	2	3. 2	4. 5	7. 3	14 .8	40. 8	7.2	118 .0	35.1
52 02 3	Kingston	23 Beechgrove Lane *****	86 82	1. 5	2. 2	3	4. 4	8. 7	25. 62	4.5	66. 8	22.8
54 01 2	Belleville	2 Sidney St., Water Treatment Plant *****	86 22	1. 1	1. 9	2. 9	4. 9	11 .1	37. 64	5.1	94. 2	29.3
56 05 1	Cornwall	Bedford St./ 3rd St. W. *****	86 92	1. 4	2. 2	3. 3	5. 2	12 .6	53. 83	6.2	158 .3	39.8
59 00 6	Peterborough	10 Hospital Dr. *****	86 92	1. 1	1. 9	2. 9	4. 6	9. 9	33. 81	4.8	92. 0	28.5
63 20 3	Thunder Bay	421 James St. S. *****	87 56	2. 6	4	6. 2	10 .1	22 .3	54. 15	10. 0	155 .5	56.7
71 07 8	Sault Ste. Marie	Sault College *****	82 71	1. 5	2. 3	3. 4	5. 4	11 .4	28. 23	5.3	97. 3	19.7
75 01 0	North Bay	Chippewa St. W., Dept. National Defence *****	86 24	1. 3	2	2. 9	4. 7	11 .2	42. 13	5.4	96. 4	31.5
77 23 3	Sudbury	155 Elm St. *****	86 58	1. 8	2. 9	4. 4	6. 7	15 .5	51. 63	7.5	158 .5	44.5

2021 fine particulate matter (PM_{2.5}) annual statistics

Unit: micrograms per cubic metre (µg/m³)

PM_{2.5} 24h AAQC: 27 µg/m³

PM_{2.5} Annual AAQC: 8.8 µg/m³

I D	Cit y	Loc atio n	V a li d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	M a x 24 h	Nu mbe r of tim es abo ve 24h crit eria	Nu mbe r of time s abo ve ann ual crite ria
12008	Wind sor Do wn to wn	467 Univ ersit y Ave. W.	8730	2	5	7	10	16	29	8.3	54	22.9	0	0
12016	Wind sor We st	Coll ege Ave. / Sout h St.	8527	3	6	8	12	18	32	9.6	53	27.5	1	1
13001	Ch ath am	435 Gran d Ave. W.	8613	1	3	6	9	14	26	7.1	43	22.8	0	0
14111	Sar nia	700 Chri stina St. N.	8645	2	3	6	10	16	29	7.7	63	28.4	1	0
15020	Gr an d Be nd	Poin t Blak e Con serv atio n Area	8720	2	3	5	7	11	21	5.7	43	23.0	0	0
15026	Lo nd on	42 St. Julie n St.	8742	2	4	7	10	15	26	7.8	43	27.0	0	0
1660	Po rt Sta	4366 5 Dext	852	2	4	6	8	14	25	7.0	66	27.5	1	0

ID	City	Location	Valid h	10%	30%	50%	70%	90%	99%	Mean	Max 1h	Max 24h	Number of times above 24h criteria	Number of times above annual criteria
15	nley	er Line, Elgin Water T. Plt	2											
18007	Tiverton	4th Concession/ Bruce Rd.	8075	1	2	4	7	11	22	5.4	41	23.6	0	0
21005	Brantford	324 Grand River Ave.	8693	2	4	6	9	15	26	7.7	51	30.0	2	0
26060	Kitchener	West Ave. / Homewood Ave.	8535	1	3	6	10	17	32	7.8	57	35.8	1	0
27067	St. Catharines	Argyle Cres., Pump Stn.	8552	2	3	5	8	13	24	6.5	46	25.5	0	0
28028	Guelph	Exhibition St./ Clark St. W.	8669	2	3	6	9	16	30	7.7	69	34.5	2	0
290	Hamilton	Elgin St./ Kelly	858	2	4	7	11	18	32	8.9	86	34.4	4	1

I D	Cit y	Loc atio n	V al id h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M ax 1 h	M ax 24 h	Nu mbe r of time s abo ve 24h crite ria	Num ber of time s abov e ann ual crite ria
00	n Do wn to wn	St.	9											
29118	Ha mil to n We st	Mai n St. W./ Hwy 403	8624	2	4	6	9	16	30	8.0	63	32.7	2	0
29214	Ha mil to n Mo un tai n	250 Fen nell Ave. W.	8672	2	4	7	10	16	29	8.0	62	30.2	1	0
31129	Tor ont o Do wn to wn	55 John St.	8699	3	5	7	10	16	32	8.4	170	58.7	3	0
33003	Tor ont o Ea st	Ken ned y Rd./ Lawr ence Ave. E.	8674	2	4	6	9	14	30	7.4	70	35.1	4	0
34021	Tor ont o No rth	4905 Duff erin St., ECC C	8611	2	4	6	9	14	31	7.4	69	30.2	2	0
35125	Tor ont o We st	125 Reso urce s Rd.	8651	2	4	6	9	14	31	7.7	93	43.2	2	0

ID	City	Location	Valid h	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Max 1 h	Max 24 h	Number of times above 24h criteria	Number of times above annual criteria
44008	Burlington	North Shore Blvd. E./ Lake Shore Rd.	8751	2	3	6	9	14	29	7.2	60	26.6	0	0
44017	Oakville	EightLine/ Glenashton Dr., Halt on Res.	8718	2	4	6	8	14	27	7.1	76	33.9	1	0
44029	Milton	1120 Main St. E.	8678	2	4	6	9	15	30	7.6	89	29.3	1	0
45027	Oshawa	Brittania Ave. W., EP Taylor Stables	8716	2	3	5	7	12	27	6.2	78	32.2	1	0
46090	Brampton	109 McLaughlin Rd. S.	8688	2	4	6	8	14	29	7.2	92	33.4	1	0

ID	City	Location	Valid h	10%	30%	50%	70%	90%	99%	Mean	Max 1h	Max 24h	Number of times above 24h criteria	Number of times above annual criteria
46108	Mississauga	3359 Mississauga Rd. N., U of T Campus	8373	1	3	6	10	16	30	7.6	77	40.1	1	0
47045	Barrie	83 Perry St.	8447	2	3	5	8	13	30	6.9	129	45.5	2	0
48006	Newmarket	Eagle St. W./ McCaffrey Rd.	8751	2	3	5	8	13	26	6.5	65	30.1	2	0
49005	Parry Sound	7 Bay St.	8750	1	2	4	6	11	21	5.0	49	27.7	1	0
49010	Dorset	1026 Bellwood Acres Rd.	8720	1	2	3	6	11	22	4.7	78	37.1	1	0
51001	Ottawa Downtown	Rideau St./ Wurtemburg St.	8657	2	3	5	7	12	24	6.3	54	33.7	2	0
51010	Petawawa	Petawawa Research Fore	8620	2	2	3	5	8	20	4.3	41	30.2	1	0

ID	City	Location	Valid h	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Max 1 h	Max 24 h	Number of times above 24h criteria	Number of times above annual criteria
		st Facility												
52023	Kingston	23 Beecroft Lane	8701	1	3	5	8	13	27	6.5	74	35.1	3	0
54012	Belleville	2 Sidney St., Water Treatment Plant	8549	2	3	5	7	11	23	6.0	65	37.7	2	0
56051	Cornwall	Bedford St./3rd St. W.	8570	2	3	5	7	13	30	6.5	66	32.6	2	0
59006	Peterborough	10 Hospital Dr.	8738	1	2	4	8	15	31	6.5	67	28.6	1	0
63203	Thunder Bay	421 James St. S.	8736	2	3	5	7	12	41	6.6	127	52.2	7	0
71078	Sault Ste. Marie	Sault College	8698	2	3	4	6	11	31	5.8	101	44.8	4	0

I D	Cit y	Loc atio n	V al id h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M ax 1 h	M ax 24 h	Nu mbe r of time s abo ve 24h crite ria	Num ber of time s abov e ann ual crite ria
75010	No rth Ba y	Chip pew a St. W., Dept : Nati onal Defe nce	8743	2	3	4	6	11	25	5.7	91	37.0	2	0
77233	Su db ury	155 Elm St.	8694	2	3	4	6	11	28	5.8	163	48.8	3	0

Notes

Measurements taken by SHARP 5030.

The PM_{2.5} AAQC values, based on the 24-hour PM_{2.5} Canadian Ambient Air Quality Standard (CAAQS), are used "as is" for comparison to an average concentration in a year.

2021 ground-level ozone (O₃) annual statistics

Unit: parts per billion (ppb)

O₃ 1h AAQC: 80 ppb

I D	City	Locati on	V al id h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M ea n	M ax 1h	M ax 24 h	Numb er of times above 1h criteri on
12008	Win dsor Dow nto wn	467 Univers ity Ave. W.	8689	13	22	28	35	46	64	28.8	82	56.13	2
12016	Win dsor Wes t	College Ave./ South St.	8680	13	23	29	35	46	64	29.4	86	57	2

ID *****	City	Locati on	V al id h ***	10 %	30 %	50 %	70 %	90 %	99 %	M ea n	M ax 1h ***	M ax 24 h ***	Numbe r of times above 1h *** criterio n
1 3 0 0 1	Chat ham	435 Grand Ave. W. *****	87 45	17	24	30	35	46	62	30 .4	75	59. 92	0
1 4 1 1 1	Sarn ia	700 Christin a St. N. *****	84 45	15	23	28	36	47	68	30 .2	97	57. 79	6
1 5 0 2 0	Gra nd Ben d	Point Blake Conser vation Area	86 18	17	26	32	37	45	66	32 .0	10 4	62. 13	18
1 5 0 2 6	Lon don	42 St. Julien St. *****	86 75	11	22	29	35	45	61	28 .9	78	59. 83	0
1 6 0 1 5	Port Stan ley	43665 Dexter Line, Elgin Water T. Plt *****	86 88	18	25	31	36	46	63	31 .4	74	58. 67	0
1 8 0 0 7	Tive rton	4th Conces sion/ Bruce Rd. 23 *****	85 93	19	27	32	37	45	64	32 .4	78	64. 5	0
2 1 0 0 5	Bran tfor d	324 Grand River Ave. *****	86 60	11	22	29	35	45	62	28 .5	79	61. 21	0
2 6 0 6 0	Kitc hen er	West Ave./ Homew ood Ave. *****	86 93	14	23	28	34	42	60	28 .4	81	58. 33	1
2 7 0	St. Cath arin	Argyle Cres., Pump	86 45	13	24	30	36	45	62	29 .8	73	61. 71	0

ID ****	City	Locati on	V al id h ***	10 %	30 %	50 %	70 %	90 %	99 %	M ea n	M ax 1h ***	M ax 24 h ***	Numbe r of times above 1h criterio n
67	es	Stn. *****											
28028	Guelph	Exhibiti on St./ Clark St. W. *****	8676	13	23	30	35	44	63	29.5	83	61.08	4
29000	Ham ilton Dow nto wn	Elgin St./ Kelly St. *****	8623	10	19	26	32	43	60	26.4	80	61.92	0
29118	Ham ilton Wes t	Main St. W./ Hwy 403 *****	8683	6	18	25	31	41	58	24.9	78	59.79	0
29214	Ham ilton Mou ntai n	250 Fennell Ave. W. *****	8694	13	22	28	34	44	61	28.7	80	62.54	0
31129	Toro nto Dow nto wn	55 John St. *****	8753	11	20	26	31	41	61	26.3	86	57.5	4
33003	Toro nto East	Kenned y Rd./ Lawren ce Ave. E. ***	8677	10	20	26	32	41	60	26.2	78	55.08	0
34021	Toro nto Nort h	4905 Dufferi n St., ECCC *****	8466	9	19	26	32	43	64	26.4	86	61.39	3
35125	Toro nto Wes t	125 Res ources Rd. *****	8667	5	15	22	29	39	61	22.8	81	56.13	1
444	Burli ngto	North Shore	8681	11	21	27	34	43	60	27.4	80	59.38	0

ID *****	City	Locati on *****	V al id h ***	10 %	30 %	50 %	70 %	90 %	99 %	M ea n	M ax 1h ***	M ax 24 h ***	Numbe r of times above 1h criterio n
008	n	Blvd. E./ Lakesh ore Rd. *****											
44017	Oak ville	EightLi ne/ Glenas hton Dr., Halton Res. *****	8700	13	22	29	34	44	63	28.8	84	61.83	2
44029	Milt on	1120 Main St. E. *****	8663	9	21	28	34	43	63	27.2	84	61.54	3
45027	Osh awa	Brittani a Ave. W., EP Taylor Stables *****	8704	9	21	28	33	42	62	26.9	80	47.58	0
46090	Bra mpt on	109 McLaug hlin Rd. S. ***	8670	11	22	29	35	44	64	28.3	84	61.33	3
46108	Miss issa uga	3359 Mississ auga Rd. N., U of T Campu s *****	8390	8	19	27	33	42	61	26.2	81	60.75	1
47045	Barr ie	83 Perry St. *****	8727	9	19	25	31	39	55	25.0	82	50.21	1
48006	New mar ket	Eagle St. W./ McCaffr ey Rd. *****	8692	15	24	30	36	44	63	30.2	81	61.58	1

ID *****	City	Locati on *****	V al id h ***	10 %	30 %	50 %	70 %	90 %	99 %	M ea n	M ax 1h ***	M ax 24 h ***	Numbe r of times above 1h criterio n ***
4 9 0 0 5	Parr y Sou nd	7 Bay St. *****	87 00	17	25	30	35	44	61	30 .3	80	58. 29	0
4 9 0 1 0	Dors et	1026 Bellwo od Acres Rd. *****	87 41	9	21	28	34	42	59	26 .8	70	47. 64	0
5 1 0 0 1	Otta wa Dow nto wn	Rideau St./ Wurte mburg St. *****	87 56	11	20	26	32	40	56	25 .8	68	51. 21	0
5 1 0 1 0	Peta waw a	Petawa wa Researc h Forest Facility	87 10	11	20	27	33	41	55	26 .7	66	52. 33	0
5 2 0 2 3	King ston	23 Beechg rove Lane	86 92	15	24	30	36	44	62	30 .2	78	62. 5	0
5 4 0 1 2	Bell evill e	2 Sidney St., ***** Water Treatm ent Plant	86 27	14	24	30	36	46	65	30 .3	82	64. 29	1
5 6 0 5 1	Cor nwal l	Bedfor d St./ ***** 3rd St. ***** W. *****	86 96	11	21	27	33	42	57	26 .7	70	58. 25	0
5 9 0 0 6	Pete rbor oug h	10 Hospita l Dr. *****	86 70	13	22	28	35	43	61	28 .6	85	57. 35	1

														cr it er ia	er ia	al cr it er ia
12008	Windsor Downs town	467 University Ave. : W	8553	0.0	0.0	0.1	0.2	0.9	5.10	0.38	27.6	20.2	3.9	0	0	0
12016	Windsor West	College Ave. / South St.	8689	0.0	0.1	0.2	0.5	1.6	7.21	0.66	28.7	22.8	5.9	0	0	0
14111	Sarnia	700 Christina St. N	8567	0.1	0.2	0.3	0.6	4.6	37.77	2.23	133.4	84.2	31.6	85	66	0

29000	Hamilton Downtown	Elgin St. / Kelly St.	8620	0.0	0.2	0.4	1.2	11.6	49.76	3.82	169.8	108.5	30.8	219	169	0
29214	Hamilton Mount ain	250 Fennel Ave. W :	8691	0.0	0.2	0.5	1.2	10.1	37.01	3.16	163.3	117.6	33.6	51	60	0
34021	Toronto North	4905 Dufferin St., ECC	8485	0.0	0.0	0.0	0.1	0.4	2.30	0.17	15.4	9.2	2.0	0	0	0
35125	Toronto West	125 Resources Rd.	8671	0.0	0.0	0.1	0.2	0.5	2.70	0.24	22.2	11.8	2.1	0	0	0

440229	Milton	1120 Main St. E.	5327	0.4	0.6	0.8	1.2	1.6	4.10	INSS	23.5	9.5	2.5	0	0	0
51001	Ottawa Downtown	Rideau St. / Wurtelburg St.	8652	0.0	0.1	0.1	0.2	0.3	0.70	0.16	18.5	4.6	0.7	0	0	0
71078	Sault Ste. Marie	Sault College	8700	0.3	0.4	0.4	0.5	0.9	10.10	0.83	61.8	40.4	6.5	0	1	0
77233	Sudbury	155 Elm St.	8679	0.0	0.1	0.2	0.3	1.3	14.14	0.85	20.86	77.9	13.9	16	5	0

2021 carbon monoxide (CO) annual statistics

Unit: parts per million (ppm)

CO 1h AAQC: 30 ppm

CO 8h AAQC: 13 ppm

ID	City	Location	Valid h	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Max 1h	Max 8h	Number of times above 1h criteria	Number of times above 8h criteria
12008	Windsor Downtown	467 University Ave. W.	8503	0.16	0.19	0.22	0.25	0.32	0.58	0.24	1.57	1.00	0	0
29000	Hamilton Downtown	Elgin St./Kell y St.	8563	0.15	0.17	0.20	0.24	0.33	0.62	0.23	1.45	0.80	0	0
34021	Toronto North	4905 Dufferin St., ECC C	8540	0.15	0.17	0.22	0.23	0.29	0.52	0.21	2.11	0.94	0	0
35125	Toronto West	125 Resources Rd.	8588	0.16	0.19	0.22	0.26	0.35	0.64	0.24	1.18	0.95	0	0
51001	Ottawa Downtown	Rideau St./Wurtemburg St.	3297	0.14	0.16	0.19	0.22	0.28	0.45	INS	0.77	0.52	0	0

2021 total reduced sulphur (TRS) compounds annual statistics

Unit: parts per billion (ppb)

ID	City	Location	Valid h	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Max 1h	Max 24h
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ID	Cit y	Nu mb er of sam ples	10 %	25 %	50 %	75 %	90 %	M ax	M in	M ea n	Sta nd ard dev iati on	Numb er of times above 24h criteri a	Numb er of times above annua l criteri a
26060	Kitchener	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
29000	Hamilton Downtown	41	0.238	0.279	0.425	0.590	1.425	3.122	0.141	0.613	0.629	2	1
48006	Newmarket	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

2021 toluene annual statistics

Unit: micrograms per cubic metre (µg/m³)
Toluene 24h AAQC (based on odour): 2,000 µg/m

ID	City	Num ber of samp les	10 %	25 %	50 %	75 %	90 %	M ax	Mi n	M ea n	Stan dard devi ation	Number of times above 24h criteria
12016	Windsor West	41	0.362	0.485	0.830	1.415	2.353	2.854	0.188	1.085	0.758	0
14111	Sarnia	53	0.174	0.358	0.696	1.440	2.534	4.574	0.120	1.053	1.004	0
15026	London	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
26060	Kitchener	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2900	Hamilton	41	0.30	0.40	0.70	1.31	1.79	18.51	0.15	1.314	2.822	0

ID	City	Num ber of samp les	10 %	25 %	50 %	75 %	90 %	M ax	Mi n	M ea n	Stan dard devi ation	Number of times above 24h criteria
0	Down town		2	8	6	1	5	7	1			
48 00 6	New mark et	N/A	N/ A	N/ A	N/ A	N/ A	N/ A	N/ A	N/ A	N/ A	N/A	N/A

2021 ethylbenzene annual statistics

Unit: micrograms per cubic metre (µg/m³)
Ethylbenzene 24h AAQC: 1,000 µg/m³

ID	City	Num ber of samp les	10 %	25 %	50 %	75 %	90 %	M ax	Mi n	M ea n	Stan dard devi ation	Number of times above 24h criteria
12 01 6	Wind sor West	41	0. 07 2	0. 08 4	0. 15 4	0. 27 7	0. 34 1	3. 29 9	0. 03 5	0.3 28	0.691	0
14 11 1	Sarni a	53	0. 03 5	0. 03 5	0. 10 3	0. 20 5	0. 40 2	1. 74 3	0. 03 5	0.1 87	0.271	0
15 02 6	Lond on	N/A	N/ A	N/ A	N/ A	N/ A	N/ A	N/ A	N/ A	N/ A	N/A	N/A
26 06 0	Kitch ener	N/A	N/ A	N/ A	N/ A	N/ A	N/ A	N/ A	N/ A	N/ A	N/A	N/A
29 00 0	Hamil ton Down town	41	0. 03 5	0. 03 5	0. 11 5	0. 18 9	0. 23 8	2. 13 3	0. 03 5	0.1 72	0.326	0
48 00 6	New mark et	N/A	N/ A	N/ A	N/ A	N/ A	N/ A	N/ A	N/ A	N/ A	N/A	N/A

2021 m- and p-xylene annual statistics

Unit: micrograms per cubic metre (µg/m³)

ID *****	City	Number of samples	10 %	25 %	50 %	75 %	90 %	M ax	Mi n	Me an	Standar d deviatio n
12 01 6	Windsor West	41	0.1 72	0.2 39	0.4 57	0.8 55	1.1 59	2.3 10	0.1 28	0.6 19	0.531
14 11 1	Sarnia	53	0.0 67	0.1 21	0.2 28	0.4 98	0.6 94	1.3 77	0.0 35	0.3 19	0.269
15 02 6	London	N/A *****	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/A *****	N/A *****
26 06 0	Kitchene r	N/A *****	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/A *****	N/A *****
29 00 0	Hamilton Downto wn	41	0.1 32	0.1 88	0.3 10	0.5 54	0.7 40	4.7 93	0.0 41	0.4 86	0.744
48 00 6	Newmar ket	N/A *****	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/A *****	N/A *****

2021 o-xylene annual statistics

Unit: micrograms per cubic metre (µg/m³)

ID *****	City	Number of samples	10 %	25 %	50 %	75 %	90 %	M ax	Mi n	Me an	Standar d deviatio n
12 01 6	Windsor West	41	0.0 40	0.1 12	0.1 89	0.3 46	0.4 33	0.9 39	0.0 40	0.2 46	0.208
14 11 1	Sarnia	53	0.0 40	0.0 40	0.0 95	0.1 71	0.2 56	0.4 31	0.0 40	0.1 22	0.095
15 02 6	London	N/A *****	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/A *****	N/A *****
26 06 0	Kitchene r	N/A *****	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/ **** A ***	N/A *****	N/A *****
29 00	Hamilton Downto	41	0.0 40	0.0 40	0.1 07	0.2 11	0.2 72	2.1 36	0.0 40	0.1 83	0.331

ID	City	Number of samples	10 %	25 %	50 %	75 %	90 %	Max	Min	Mean	Standard deviation
0	wn										
48006	Newmarket	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

2021 1,3-butadiene annual statistics

Unit: micrograms per cubic metre (µg/m³)

1,3-Butadiene 24h AAQC: 10.0 µg/m³

1,3-Butadiene Annual AAQC: 2.0 µg/m³

ID	City	Number of samples	10 %	25 %	50 %	75 %	90 %	Max	Min	Mean	Standard deviation	Number of times above 24h criteria	Number of times above annual criteria
12016	Windsor West	41	0.035	0.035	0.035	0.035	0.035	0.097	0.035	0.038	0.012	0	0
14111	Sarnia	53	0.035	0.035	0.035	0.035	0.104	0.641	0.035	0.071	0.108	0	0
15026	London	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
26060	Kitchener	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
29000	Hamilton Downtown	41	0.035	0.035	0.035	0.035	0.035	0.087	0.035	0.036	0.008	0	0

ID *****	Cit y	Nu m b e r o f s a m p l e s	10 %	25 %	50 %	75 %	90 %	M a x	M i n	M e a n	Sta n d a r d d e v i a t i o n	Numb e r o f t i m e s a b o v e 2 4 h c r i t e r i a	Numb e r o f t i m e s a b o v e a n n u a l c r i t e r i a
48006	Newmarket	N/A *****	N/A *****	N/A *****	N/A *****	N/A *****	N/A *****	N/A *****	N/A *****	N/A *****	N/A *****	N/A *****	N/A *****

10-year trends

10-year trend for nitric oxide (NO)

Annual mean (ppb)

ID *****	City/ Town	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Change over 10 year (%)	Tre nd
12008	Windsor Downtown	4.7	3.7	4.0	3.5	3.1	3.3	3.2	2.7	1.7	2.5	-33.4	SSS *****
12016	Windsor West	4.6	3.6	3.8	4.2	2.9	2.6	2.6	3.1	1.7	2.3	-34.8	SSS *****
13001	Chatham	1.8	1.6	1.5	1.7	1.4	1.9	1.8	1.4	1.5	1.2	-5.1	Non - SSS *****
14111	Sarnia	2.1	1.7	1.9	2.4	IN S **	1.5	1.8	1.7	1.6	1.9	-6.1	SSS *****
15020	Grand Bend	0.3	1.0	0.2	0.3	0.5	0.3	0.2	0.3	0.4	0.4	23.1	Non - SSS *****
15026	London	4.2	1.4	1.3	1.4	1.0	1.0	0.8	0.9	0.7	0.9	-22.1	SSS *****
21005	Brantford	1.1	1.2	0.9	1.3	0.8	0.8	1.0	0.9	0.8	0.7	-15.0	SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
26 06 0	Kitchene r	2. 1	1. 6	1. 6	1. 6	1. 3	1. 0	0. 9	1. 2	0. 7	0. 9	-20. 1	SSS *****
27 06 7	St. Catharin es	2. 5	2. 2	1. 7	2. 1	1. 5	1. 2	0. 9	1. 2	0. 9	1. 0	-42. 8	SSS *****
28 02 8	Guelph	2. 2	1. 1	1. 2	1. 3	1. 1	1. 1	1. 2	0. 9	0. 8	1. 0	-20. 1	SSS *****
29 00 0	Hamilto n Downto wn	4. 6	4. 3	3. 9	1. 3	4. 2	3. 9	3. 9	4. 0	2. 9	3. 5	-17. 5	SSS *****
29 11 8	Hamilto n West	6. 3	5. 4	5. 9	5. 1	6. 2	3. 9	4. 2	4. 2	3. 2	3. 2	-43. 8	SSS *****
29 21 4	Hamilto n Mountai n	1. 9	2. 0	2. 0	1. 8	1. 2	1. 2	1. 2	1. 8	1. 4	1. 4	-22. 0	SSS *****
33 00 3	Toronto East	6. 6	5. 7	6. 2	5. 8	5. 4	4. 4	3. 1	3. 4	2. 3	2. 4	-61. 0	SSS *****
34 02 1	Toronto North	5. 0	4. 1	4. 3	3. 9	3. 5	3. 0	2. 5	2. 7	2. 1	2. 8	-41. 8	SSS *****
35 12 5	Toronto West	11 .3	8. 6	9. 5	9. 2	8. 2	7. 7	6. 7	7. 5	5. 2	6. 0	-38. 4	SSS *****
44 00 8	Burlingt on	4. 6	4. 6	4. 6	3. 9	3. 9	3. 4	2. 7	3. 0	2. 3	2. 1	-50. 4	SSS *****
44 01 7	Oakville	3. 4	2. 1	3. 4	2. 7	1. 8	1. 7	1. 8	1. 8	1. 3	1. 6	-26. 3	SSS *****
44 02 9	Milton	4. 8	2. 8	3. 1	3. 5	4. 2	2. 3	3. 6	3. 6	2. 7	2. 6	-7.4	SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
45 02 7	Oshawa	2. 1	1. 5	2. 0	2. 3	2. 5	2. 4	0. 9	0. 9	0. 9	0. 7	-43. 2	SSS *****
46 09 0	Brampto n	4. 4	4. 6	4. 0	3. 8	3. 4	2. 2	2. 2	2. 2	1. 4	1. 5	-49. 3	SSS *****
46 10 8	Mississa uga	3. 8	3. 1	2. 9	3. 1	3. 6	2. 0	1. 6	2. 6	1. 4	1. 6	-36. 8	SSS *****
47 04 5	Barrie	3. 2	3. 2	3. 7	3. 5	3. 7	2. 6	1. 8	2. 2	1. 4	1. 4	-69. 1	SSS *****
48 00 6	Newmar ket	2. 0	1. 5	1. 4	1. 7	1. 6	1. 4	1. 3	1. 3	0. 8	0. 9	-42. 9	SSS *****
49 00 5	Parry Sound	0. 5	0. 5	0. 6	0. 8	0. 6	0. 5	0. 5	0. 7	0. 4	0. 5	0.0	Non - SSS *****
51 00 1	Ottawa Downto wn	2. 4	2. 1	1. 9	2. 0	1. 7	1. 5	1. 7	1. 6	1. 4	1. 5	-16. 2	SSS *****
52 02 3	Kingston	0. 4	0. 2	0. 8	0. 9	0. 7	0. 6	0. 6	0. 6	0. 7	0. 7	32.9	SSS *****
54 01 2	Belleville	1. 6	1. 7	1. 2	1. 5	1. 8	1. 1	1. 0	1. 3	1. 4	1. 3	-7.6	Non - SSS *****
56 05 1	Cornwall	2. 2	1. 9	1. 5	1. 8	2. 1	1. 2	1. 4	1. 5	1. 2	1. 4	-8.1	SSS *****
59 00 6	Peterbor ough	1. 8	1. 7	1. 8	1. 5	1. 3	1. 2	0. 9	1. 2	1. 0	0. 8	-51. 1	SSS *****
63 20 3	Thunder Bay	5. 1	4. 7	4. 2	5. 2	3. 8	4. 1	3. 8	3. 8	3. 4	3. 5	-20. 7	SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
71 07 8	Sault Ste. Marie	1. 7	1. 3	2. 0	1. 7	1. 0	1. 3	1. 2	1. 5	1. 6	1. 4	-16. 3	SSS *****
75 01 0	North Bay	2. 9	2. 5	2. 6	2. 1	2. 0	1. 6	1. 7	1. 8	1. 4	1. 5	-41. 9	SSS *****
77 23 3	Sudbury	N/ A ***	2. 9	3. 3	2. 9	3. 3	2. 5	2. 3	2. 8	2. 4	1. 9	-12. 8	SSS *****

Notes:

N/A indicates data not available.

INS indicates there was insufficient data to calculate a valid annual mean.

Station 14111 replaced station 14064 as the Sarnia site in 2016.

Station 15026 replaced station 15025 as the London site in 2013.

Station 29214 replaced station 29114 as the Hamilton Mountain site in 2019.

Station 34021 replaced station 34020 as the Toronto North site in 2017.

Station 44029 was operated by the Halton Region prior to 2019.

Station 45027 replaced station 45026 as the Oshawa site in 2018.

Station 46090 replaced station 46089 as the Brampton site in 2017.

Station 52023 replaced station 52022 as the Kingston site in 2014.

SSS - Significant Sen's Slope (significant trend detected).

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for nitrogen dioxide (NO₂)

Annual mean (ppb)

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tr en d *****
12 00 8	Windsor Downto wn	13 .2	12 .4	14 .0	12 .7	11 .4	11 .1	11 .0	10 .9	9. 0	9. 6	-28. 6	SSS *****
12 01 6	Windsor West	11 .4	11 .5	11 .8	11 .4	10 .6	9. 9	8. 8	10 .0	8. 1	8. 4	-33. 3	SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
13 00 1	Chatham	5. 7	6. 0	6. 8	6. 8	5. 4	6. 1	5. 1	5. 8	5. 1	5. 1	-19. 5	SSS *****
14 11 1	Sarnia	8. 6	8. 1	9. 0	9. 3	IN S **	7. 3	7. 6	6. 8	5. 9	6. 8	-25. 0	SSS *****
15 02 0	Grand Bend	3. 6	4. 4	3. 1	3. 4	2. 8	3. 0	3. 3	2. 5	2. 3	2. 4	-37. 7	SSS *****
15 02 6	London	6. 3	6. 4	6. 9	6. 6	5. 4	5. 8	5. 4	5. 8	4. 5	5. 2	-27. 8	SSS *****
21 00 5	Brantfor d	5. 4	4. 8	5. 5	5. 5	4. 8	4. 4	5. 2	5. 6	4. 3	4. 6	-10. 9	SSS *****
26 06 0	Kitchene r	7. 1	6. 7	7. 0	6. 8	6. 2	5. 8	5. 8	6. 3	4. 9	4. 8	-27. 1	SSS *****
27 06 7	St. Catharin es	8. 1	7. 7	7. 3	7. 3	6. 6	6. 6	6. 0	6. 0	5. 3	5. 8	-32. 0	SSS *****
28 02 8	Guelph	6. 5	6. 6	7. 1	6. 3	6. 2	5. 9	5. 9	5. 4	4. 9	5. 5	-25. 5	SSS *****
29 00 0	Hamilton Downto wn	11 .9	12 .4	12 .4	12 .2	11 .9	11 .9	11 .6	12 .5	9. 9	10 .2	-17. 2	SSS *****
29 11 8	Hamilton West	12 .1	12 .7	12 .8	12 .2	11 .8	10 .4	11 .0	11 .3	9. 5	10 .1	-25. 1	SSS *****
29 21 4	Hamilton Mountai n	8. 6	9. 0	9. 3	9. 0	7. 9	7. 8	7. 8	8. 8	6. 9	6. 3	-27. 0	SSS *****
33 00 3	Toronto East	14 .0	13 .6	14 .2	13 .9	12 .1	11 .5	10 .6	10 .2	8. 4	9. 5	-41. 6	SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
34 02 1	Toronto North	13 .4	12 .9	13 .4	12 .9	12 .0	10 .5	10 .4	10 .5	8. 9	9. 3	-36. 5	SSS *****
35 12 5	Toronto West	16 .3	16 .1	17 .1	16 .6	15 .7	15 .0	14 .4	14 .6	12 .1	12 .9	-26. 7	SSS *****
44 00 8	Burlingto n	11 .0	11 .0	10 .9	10 .4	10 .2	9. 7	9. 4	9. 6	8. 2	8. 7	-24. 4	SSS *****
44 01 7	Oakville	9. 1	9. 2	8. 2	7. 5	8. 2	8. 2	8. 5	9. 1	6. 8	7. 3	-17. 7	SSS *****
44 02 9	Milton	10 .4	8. 5	8. 4	9. 4	9. 3	7. 7	9. 8	8. 9	7. 6	8. 2	-11. 2	SSS *****
45 02 7	Oshawa	5. 6	5. 9	6. 8	6. 6	6. 3	6. 4	3. 8	3. 5	3. 6	3. 4	-50. 2	SSS *****
46 09 0	Brampto n	10 .4	9. 1	10 .6	9. 9	9. 7	8. 3	8. 1	8. 6	6. 8	6. 5	-35. 0	SSS *****
46 10 8	Mississa uga	9. 6	9. 5	9. 2	9. 2	8. 6	8. 0	7. 2	8. 4	6. 7	7. 0	-29. 9	SSS *****
47 04 5	Barrie	8. 1	7. 8	8. 1	7. 4	8. 1	7. 3	6. 4	6. 3	5. 6	5. 6	-31. 2	SSS *****
48 00 6	Newmar ket	7. 2	6. 8	6. 8	6. 8	6. 5	6. 3	6. 1	5. 5	4. 5	4. 5	-37. 7	SSS *****
49 00 5	Parry Sound	3. 3	2. 9	3. 3	3. 2	2. 9	2. 7	2. 9	2. 6	2. 4	2. 5	-25. 3	SSS *****
51 00 1	Ottawa Downto wn	7. 8	7. 9	7. 4	7. 4	6. 9	7. 1	7. 3	6. 7	5. 9	5. 7	-24. 9	SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
52 02 3	Kingston	4. 0	3. 6	3. 9	4. 4	4. 4	4. 4	4. 2	4. 0	3. 5	3. 8	-11. 2	SSS *****
54 01 2	Belleville	4. 7	4. 7	4. 5	4. 8	5. 1	4. 3	3. 7	4. 2	3. 5	3. 8	-20. 6	SSS *****
56 05 1	Cornwall	6. 1	6. 2	5. 6	5. 3	5. 5	5. 0	5. 1	5. 0	4. 6	4. 8	-15. 1	SSS *****
59 00 6	Peterbor ough	3. 7	5. 0	5. 3	5. 1	4. 5	4. 7	4. 5	3. 9	4. 1	4. 1	-32. 6	SSS *****
63 20 3	Thunder Bay	7. 3	7. 3	7. 8	7. 5	7. 1	6. 7	7. 5	6. 7	6. 1	6. 5	-15. 5	SSS *****
71 07 8	Sault Ste. ***** Marie	4. 8	5. 0	5. 3	4. 8	4. 0	4. 4	4. 4	4. 5	3. 7	4. 0	-25. 0	SSS *****
75 01 0	North Bay	6. 1	5. 8	5. 6	5. 6	4. 7	4. 6	4. 9	5. 1	4. 3	3. 9	-26. 5	SSS *****
77 23 3	Sudbury	N/ ***** A ***	7. 2	7. 3	7. 2	7. 0	6. 8	6. 5	6. 9	6. 3	5. 6	-8.2	SSS *****

Notes:

- N/A indicates data not available.

- INS indicates there was insufficient data to calculate a valid annual mean.

- Station 14111 replaced station 14064 as the Sarnia site in 2016.
- Station 15026 replaced station 15025 as the London site in 2013.
- Station 29214 replaced station 29114 as the Hamilton Mountain site in 2019.
- Station 34021 replaced station 34020 as the Toronto North site in 2017.
- Station 44029 was operated by the Halton Region prior to 2019.
- Station 45027 replaced station 45026 as the Oshawa site in 2018.
- Station 46090 replaced station 46089 as the Brampton site in 2017.
- Station 52023 replaced station 52022 as the Kingston site in 2014.
- SSS - Significant Sen's Slope (significant trend detected).

10-year trend for nitrogen oxides (NO_x)

Annual mean (ppb)

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tr en d
12 00 8	Windsor Downto wn	17 .8	16 .2	18 .0	16 .2	14 .5	14 .4	14 .2	13 .6	10 .7	12 .1	-29. 5	SSS *****
12 01 6	Windsor West	16 .0	15 .2	15 .7	15 .5	13 .5	12 .5	11 .3	13 .0	9. 9	10 .7	-34. 2	SSS *****
13 00 1	Chatham	7. 5	7. 7	8. 2	8. 5	6. 8	8. 0	6. 9	7. 2	6. 6	6. 3	-17. 4	SSS *****
14 11 1	Sarnia	10 .7	9. 8	10 .9	11 .7	IN S ..	8. 7	9. 4	8. 5	7. 5	8. 7	-20. 5	SSS *****
15 02 0	Grand Bend	3. 9	5. 4	3. 4	3. 8	3. 3	3. 4	3. 4	2. 7	2. 7	2. 8	-34. 0	SSS *****
15 02 6	London	10 .5	7. 8	8. 3	8. 0	6. 5	6. 8	6. 2	6. 6	5. 2	6. 1	-31. 0	SSS *****
21 00 5	Brantfor d	6. 7	5. 7	6. 4	6. 8	5. 7	5. 3	6. 2	6. 5	5. 1	5. 3	-11. 8	SSS *****
26 06 0	Kitchene r	9. 2	8. 3	8. 5	8. 4	7. 5	6. 9	6. 7	7. 4	5. 5	5. 7	-26. 3	SSS *****
27 06 7	St. Catharin es	10 .6	9. 9	9. 1	9. 4	8. 2	7. 9	6. 8	7. 1	6. 2	6. 8	-34. 8	SSS *****
28 02 8	Guleph	8. 8	7. 8	8. 4	7. 7	7. 3	7. 0	7. 1	6. 4	5. 6	6. 5	-26. 4	SSS *****
29 00 0	Hamilton Downto wn	16 .6	16 .8	16 .3	7. 7	16 .1	15 .8	15 .5	16 .5	12 .8	13 .7	-18. 3	SSS *****
29 11 8	Hamilton West	18 .4	18 .1	18 .7	17 .3	17 .9	14 .2	15 .2	16 .5	12 .6	13 .2	-33. 2	SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
29 21 4	Hamilton Mountai n	10 .5	11 .0	11 .3	10 .9	9. 2	9. 1	8. 9	15 .4	8. 3	7. 7	-27. 0	SSS *****
33 00 3	Toronto East	20 .6	19 .4	20 .4	19 .7	17 .5	15 .8	13 .7	13 .7	10 .7	11 .9	-49. 6	SSS *****
34 02 1	Toronto North	18 .5	17 .0	17 .7	16 .9	15 .4	13 .5	12 .8	13 .2	11 .0	12 .1	-40. 2	SSS *****
35 12 5	Toronto West	27 .6	24 .7	26 .5	25 .7	23 .8	22 .7	21 .1	22 .1	17 .2	18 .9	-32. 8	SSS *****
44 00 8	Burlingto n	15 .6	15 .6	15 .5	14 .3	14 .2	13 .2	12 .0	12 .6	10 .5	10 .7	-32. 6	SSS *****
44 01 7	Oakville	12 .6	11 .2	11 .6	10 .1	10 .1	9. 9	10 .4	10 .9	8. 0	8. 8	-24. 4	SSS *****
44 02 9	Milton	15 .3	11 .8	12 .0	13 .2	13 .5	10 .0	13 .4	12 .5	10 .3	10 .8	-13. 0	SSS *****
45 02 7	Oshawa	7. 8	7. 4	8. 8	8. 9	8. 8	8. 8	4. 7	4. 4	4. 5	4. 1	-48. 8	SSS *****
46 09 0	Brampto n	14 .8	13 .9	14 .6	13 .7	13 .1	10 .6	10 .3	10 .7 4	8. 1	8. 0	-44. 1	SSS *****
46 10 8	Mississa uga	13 .4	12 .6	12 .1	12 .3	12 .2	9. 9	8. 8	10 .9 7	8. 0	8. 6	-33. 6	SSS *****
47 04 5	Barrie	11 .3	11 .0	11 .8	10 .9	11 .9	9. 9	8. 3	8. 52	6. 9	7. 0	-42. 4	SSS *****
48 00 6	Newmar ket	9. 2	8. 4	8. 2	8. 5	8. 1	7. 8	7. 4	6. 78	5. 2	5. 4	-37. 2	SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
49 00 5	Parry Sound	3. 8	3. 4	4. 0	4. 0	3. 6	3. 3	3. 3	3. 34	2. 8	3. 1	-23. 4	SSS *****
51 00 1	Ottawa Downto wn	10 .2	10 .1	9. 3	9. 5	8. 6	8. 6	9. 0	8. 31	7. 3	7. 2	-24. 4	SSS *****
52 02 3	Kingston	4. 6	3. 8	4. 8	5. 3	5. 2	4. 9	4. 7	4. 55	4. 1	4. 5	-10. 8	SSS *****
54 01 2	Belleville	6. 4	6. 3	5. 7	6. 2	6. 7	5. 4	4. 7	5. 53	4. 9	5. 1	-18. 9	SSS *****
56 05 1	Cornwall	8. 4	8. 0	7. 0	7. 1	7. 6	6. 2	6. 3	6. 54	5. 8	6. 2	-14. 9	SSS *****
59 00 6	Peterbor ough	5. 4	6. 6	7. 1	6. 6	5. 9	5. 8	5. 3	5. 14	5. 0	4. 8	-36. 5	SSS *****
63 20 3	Thunder Bay	12 .4	12 .0	11 .9	12 .7	11	10 .8	11 .3	10 .4 4	9. 5	10 .0	-18. 7	SSS *****
71 07 8	Sault Ste. Marie	6. 4	6. 3	7. 3	6. 6	5. 1	5. 8	5. 6	5. 95	5. 2	5. 3	-22. 9	SSS *****
75 01 0	North Bay	9. 1	8. 3	8. 1	7. 8	6. 7	6. 2	6. 6	6. 91	5. 6	5. 4	-31. 6	SSS *****
77 23 3	Sudbury	N/ A ***	10 .1	10 .6	10 .2	10 .2	9. 4	8. 8	9. 7	8. 7	7. 5	-12. 1	SSS *****

Notes:

N/A indicates data not available.

INS indicates there was insufficient data to calculate a valid annual mean.

Station 14111 replaced station 14064 as the Sarnia site in 2016.

Station 15026 replaced station 15025 as the London site in 2013.

Station 29214 replaced station 29114 as the Hamilton Mountain site in 2019.

Station 34021 replaced station 34020 as the Toronto North site in 2017.

Station 44029 was operated by the Halton Region prior to 2019.

Station 45027 replaced station 45026 as the Oshawa site in 2018.

Station 46090 replaced station 46089 as the Brampton site in 2017.

Station 52023 replaced station 52022 as the Kingston site in 2014.

SSS - Significant Sen's Slope (significant trend detected).

10-year trend for fine particulate matter (PM_{2.5})

Annual mean (µg/m³)

ID	City/ Town	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Change over 10 year (%)	Trend
12008	Windsor Downtown	9.8	9.2	10.1	9.3	8.1	7.8	8.5	7.8	7.1	8.3	-22.5	SSS
12016	Windsor West	9.5	10.0	10.7	9.9	8.5	8.5	8.7	9.1	8.8	9.6	-8.8	SSS
13001	Chatham	7.5	8.1	8.6	8.1	6.6	6.4	6.8	6.8	6.7	7.1	-16.1	SSS
14111	Sarnia	12.7	8.5	9.0	8.4	IN S	7.0	7.4	7.1	7.1	7.7	-32.1	SSS
15020	Grand Bend	7.4	7.3	8.1	7.7	6.0	5.1	5.6	5.4	4.8	5.7	-35.3	SSS
15026	London	8.1	9.1	8.8	8.3	7.1	7.0	7.3	6.7	6.5	7.8	-22.7	SSS
16015	Port Stanley	7.4	7.4	8.2	8.0	6.5	6.3	6.8	6.7	6.5	7.0	-16.2	SSS
18007	Tiverton	6.0	5.8	6.5	6.4	5.1	5.1	5.7	5.0	4.8	5.4	-18.2	SSS
21005	Brantford	7.8	8.5	9.2	8.7	7.3	7.2	7.7	7.4	6.7	7.7	-17.1	SSS
26060	Kitchener	7.7	8.7	9.3	8.8	7.3	7.0	7.4	7.2	6.6	7.8	-19.6	SSS

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
27 06 7	St. Catharin es	7. 9	8. 5	8. 8	8. 4	6. 9	7. 0	7. 0	7. 0	6. 3	6. 5	-25. 6	SSS *****
28 02 8	Guelph	7. 4	8. 1	8. 9	8. 4	6. 9	6. 8	7. 4	7. 1	6. 9	7. 7	-11. 4	SSS *****
29 00 0	Hamilto n Downto wn	10 .2	10 .1	10 .8	10 .2	8. 2	8. 5	9. 2	8. 8	8. 1	8. 9	-20. 9	SSS *****
29 11 8	Hamilto n West	9. 0	9. 6	9. 9	9. 9	7. 9	7. 5	8. 2	7. 8	7. 8	8. 0	-18. 6	SSS *****
29 21 4	Hamilto n Mountai n	8. 1	9. 2	9. 4	9. 0	7. 2	7. 4	7. 7	7. 9	7. 1	8. 0	-20. 0	SSS *****
33 00 3	Toronto East	7. 8	8. 2	8. 9	8. 5	7. 0	7. 4	7. 2	7. 0	6. 7	7. 4	-16. 1	SSS *****
34 02 1	Toronto North	9. 0	8. 3	9. 2	9. 4	7. 3	7. 4	7. 6	6. 8	6. 4	7. 4	-27. 2	SSS *****
35 12 5	Toronto West	8. 8	8. 8	9. 1	8. 5	7. 0	7. 4	7. 7	7. 2	6. 9	7. 7	-21. 2	SSS *****
44 00 8	Burlingt on	8. 0	8. 7	9. 6	9. 4	7. 6	7. 0	7. 2	7. 0	6. 4	7. 2	-27. 4	SSS *****
44 01 7	Oakville	7. 6	8. 0	8. 5	8. 3	7. 0	6. 9	7. 4	7. 2	6. 3	7. 1	-17. 3	SSS *****
44 02 9	Milton	7. 9	8. 5	10 .3	8. 8	7. 1	7. 0	7. 5	7. 5	7. 1	7. 6	-16. 3	SSS *****
45 02 7	Oshawa	6. 9	7. 4	7. 7	7. 5	5. 9	5. 9	6. 4	6. 1	6. 2	6. 2	-19. 4	SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
46 09 0	Brampton	7. 2	8. 5	8. 9	8. 4	6. 8	7. 0	7. 3	6. 8	6. 7	7. 2	-16. 5	SSS *****
46 10 8	Mississauga	7. 5	7. 9	8. 7	8. 5	7. 2	6. 8	7. 3	7. 0	6. 6	7. 6	-15. 1	SSS *****
47 04 5	Barrie	7. 1	7. 5	7. 6	7. 6	6. 5	7. 0	7. 7	7. 5	6. 8	6. 9	-5.9	Non - ***** SSS *****
48 00 6	Newmarket	7. 1	7. 3	7. 3	7. 1	6. 0	5. 9	6. 4	5. 9	5. 9	6. 5	-18. 4	SSS *****
49 00 5	Parry Sound	6. 0	5. 8	5. 8	5. 7	4. 8	4. 6	5. 0	4. 4	4. 4	5. 0	-31. 0	SSS *****
49 01 0	Dorset	5. 3	5. 4	5. 3	5. 6	4. 6	4. 6	4. 9	4. 1	4. 5	4. 7	-16. 8	SSS *****
51 00 1	Ottawa Downtown	6. 2	7. 0	7. 0	6. 9	5. 9	5. 9	5. 9	5. 9	6. 0	6. 3	-13. 5	SSS *****
51 01 0	Petawawa	4. 8	4. 8	4. 7	4. 8	4. 4	4. 1	3. 6	3. 8	4. 2	4. 3	-23. 1	SSS *****
52 02 3	Kingston	8. 3	6. 5	6. 8	6. 3	5. 8	5. 3	5. 6	5. 4	5. 6	6. 5	-20. 1	SSS *****
54 01 2	Belleville	6. 5	6. 9	6. 8	6. 6	5. 5	5. 8	6. 4	6. 1	6. 3	6. 0	-9.9	Non - ***** SSS *****
56 05 1	Cornwall	6. 9	7. 7	7. 0	6. 9	6. 4	5. 9	6. 3	5. 9	6. 0	6. 5	-18. 7	SSS *****
59 00 6	Peterborough	6. 3	7. 4	6. 9	6. 8	5. 8	5. 8	6. 3	6. 0	5. 6	6. 5	-17. 3	SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
12 00 8	Windsor Downto wn	12 8	89	78	89	95	78	89	82	81	82	-8.2	Non ***** - SSS *****
12 01 6	Windsor West	12 8	87	86	87	95	82	90	80	83	86	-8.2	Non ***** - SSS *****
13 00 1	Chatham	10 4	85	78	79	84	90	78	76	77	75	-12. 1	SSS *****
14 11 1	Sarnia	10 1	83	79	83	83	80	10 1	87	82	97	0.0	Non ***** - SSS *****
15 02 0	Grand Bend	12 4	86	90	87	91	82	10 0	85	93	10 4	3.6	Non ***** - SSS *****
15 02 6	London	88	82	82	77	82	78	76	70	77	78	-12. 3	SSS *****
16 01 5	Port Stanley	10 4	85	87	86	84	90	86	77	76	74	-17. 3	SSS *****
18 00 7	Tiverton	93	92	86	83	85	82	10 4	81	75	78	-16. 1	SSS *****
21 00 5	Brantfor d	88	74	80	79	84	74	76	74	74	79	-10. 2	Non ***** - SSS *****
26 06 0	Kitchene r	89	72	76	76	81	75	75	77	74	81	0.0	Non ***** - SSS *****
27 06 7	St. Catharin es	98	96	70	73	80	73	75	70	75	73	-13. 8	Non ***** - SSS *****
28 02 8	Guelph	94	73	79	79	82	76	78	74	70	83	-9.6	Non ***** - SSS *****
29 00	Hamilton Downto	88	86	74	74	78	73	77	65	77	80	-7.7	Non ***** - SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
0	wn												SSS *****
29 11 8	Hamilton West	85	78	70	71	78	74	76	65	76	78	-3.0	Non ***** - ***** SSS *****
29 21 4	Hamilton Mountai n	91	86	79	79	76	81	80	70	79	80	-9.9	Non ***** - ***** SSS *****
33 00 3	Toronto East	89	87	73	91	99	82	72	67	77	78	-14. 4	Non ***** - ***** SSS *****
34 02 1	Toronto North	92	87	82	90	85	82	83	77	95	86	-6.5	Non ***** - ***** SSS *****
35 12 5	Toronto West	94	83	72	82	79	82	76	77	81	81	-2.7	Non ***** - ***** SSS *****
44 00 8	Burlingt on	91	92	73	84	80	88	83	74	86	80	-8.5	Non ***** - ***** SSS *****
44 01 7	Oakville	96	10 1	72	80	74	84	82	71	81	84	-9.4	Non ***** - ***** SSS *****
44 02 9	Milton	94	93	80	80	79	74	81	77	77	84	-9.6	Non ***** - ***** SSS *****
45 02 7	Oshawa	92	96	73	73	81	86	76	66	88	80	-11. 7	Non ***** - ***** SSS *****
46 09 0	Brampto n	92	84	80	84	79	75	83	72	83	84	-4.9	Non ***** - ***** SSS *****
46 10 8	Mississa uga	81	83	76	79	79	78	79	65	80	81	0.0	Non ***** - ***** SSS *****
47 04 5	Barrie	91	73	68	80	79	75	72	75	70	82	-9.9	Non ***** - ***** SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd ***** - *****
48 00 6	Newmar ket	10 5	72	87	92	94	85	91	88	87	81	-8.6	Non ***** - SSS *****
49 00 5	Parry Sound	94	77	74	86	74	74	80	68	73	80	-9.6	Non ***** - SSS *****
49 01 0	Dorset	82	69	79	78	74	69	77	64	66	70	-14. 6	SSS *****
51 00 1	Ottawa Downto wn	76	67	64	69	73	71	72	57	64	68	-8.9	Non ***** - SSS *****
51 01 0	Petawaw a	77	69	68	70	68	65	66	58	63	66	-11. 7	SSS *****
52 02 3	Kingston	92	79	81	74	82	94	78	68	72	78	-14. 7	Non ***** - SSS *****
54 01 2	Belleville	87	92	80	77	96	86	85	73	81	82	-10. 3	Non ***** - SSS *****
56 05 1	Cornwall	76	73	70	69	74	72	68	58	62	70	-15. 8	SSS *****
59 00 6	Peterbor ough	90	74	74	78	85	80	86	68	87	85	5.0	Non ***** - SSS *****
63 20 3	Thunder Bay	74	63	70	62	62	51	63	56	56	65	-14. 6	Non ***** - SSS *****
71 07 8	Sault Ste. Marie	82	66	73	75	80	70	69	61	77	66	-11. 0	Non ***** - SSS *****
75 01 0	North Bay	82	72	71	70	78	69	63	63	74	71	-11. 0	Non ***** - SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd
77 23 3	Sudbury	84	76	73	67	80	69	70	75	62	56	-25. 0	SSS *****

Notes:

- Station 14111 replaced station 14064 as the Sarnia site in 2016.
- Station 15026 replaced station 15025 as the London site in 2013.
- Station 29214 replaced station 29114 as the Hamilton Mountain site in 2019.
- Station 34021 replaced station 34020 as the Toronto North site in 2017.
- Station 44029 was operated by the Halton Region prior to 2019.
- Station 45027 replaced station 45026 as the Oshawa site in 2018.
- Station 46090 replaced station 46089 as the Brampton site in 2017.
- Station 52023 replaced station 52022 as the Kingston site in 2014.
- Station 77233 replaced station 77219 as the Sudbury site in 2013.

SSS - Significant Sen's Slope (significant trend detected).

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for ground-level ozone (O₃)

Annual mean (ppb)

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd
12 00 8	Windsor Downto wn	28 .0	26 .9	26 .0	27 .0	27 .7	27 .3	26 .9	26 .6	27 .3	28 .8	4.6	SSS *****
12 01 6	Windsor West	28 .0	26 .7	27 .2	26 .5	27 .7	27 .0	27 .0	27 .3	26 .0	29 .4	4.5	SSS *****
13 00 1	Chatham	29 .5	29 .6	29 .3	29 .6	29 .6	29 .5	28 .7	29 .2	29 .1	30 .4	0.4	Non - SSS *****
14 11 1	Sarnia	29 .7	28 .6	27 .1	27 .8	28 .8	28 .4	29 .0	29 .2	26 .7	30 .2	0.5	Non - SSS *****
15 02 0	Grand Bend	33 .2	32 .3	31 .0	30 .4	30 .7	31 .0	31 .5	31 .6	30 .9	32 .0	-0.9	Non - SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
15 02 6	London	27 .7	28 .7	28 .1	27 .9	28 .2	28 .1	27 .6	26 .8	27 .7	28 .9	0.8	Non - SSS *****
16 01 5	Port Stanley	33 .1	33 .9	32 .3	32 .8	32 .9	33 .0	32 .3	32 .3	30 .9	31 .4	-6.0	SSS *****
18 00 7	Tiverton	32 .0	32 .4	31 .8	32 .5	33 .1	32 .4	32 .3	31 .1	30 .5	32 .4	-2.0	Non - SSS *****
21 00 5	Brantfor d	28 .8	29 .0	29 .4	28 .9	29 .5	28 .3	28 .3	27 .5	28 .0	28 .5	-4.6	SSS *****
26 06 0	Kitchene r	28 .0	28 .0	27 .3	27 .9	28 .8	28 .1	27 .7	27 .2	27 .7	28 .4	-0.4	Non - SSS *****
27 06 7	St. Catharin es	28 .7	28 .6	28 .5	28 .6	29 .8	28 .1	28 .5	28 .4	30 .2	29 .8	4.0	SSS *****
28 02 8	Guelph	28 .8	29 .0	27 .8	27 .7	28 .7	28 .4	28 .9	26 .3	27 .0	29 .5	-0.8	Non - SSS *****
29 00 0	Hamilton Downto wn	25 .7	25 .0	25 .3	25 .9	26 .7	25 .6	25 .6	24 .4	26 .3	26 .4	3.9	Non - SSS *****
29 11 8	Hamilton West	24 .2	24 .4	22 .7	23 .9	24 .4	25 .0	25 .5	23 .6	25 .2	24 .9	5.4	SSS *****
29 21 4	Hamilton Mountai n	30 .2	29 .5	29 .1	29 .4	29 .5	29 .1	29 .3	27 .5	29 .3	28 .7	-3.4	Non - SSS *****
33 00 3	Toronto East	24 .6	24 .1	23 .4	23 .5	25 .5	24 .4	25 .2	24 .6	26 .1	26 .2	9.6	SSS *****
34 02 1	Toronto North	25 .7	25 .3	25 .3	25 .7	25 .9	24 .0	25 .5	24 .1	26 .0	26 .4	2.5	Non - SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
35 12 5	Toronto West	21 .5	21 .5	21 .1	21 .3	22 .1	22 .1	22 .3	21 .8	23 .4	22 .8	9.6	SSS *****
44 00 8	Burlingt on	26 .7	26 .4	25 .5	26 .5	27 .6	27 .1	27 .6	26 .6	28 .3	27 .4	7.9	SSS *****
44 01 7	Oakville	27 .7	28 .3	27 .2	27 .4	27 .1	27 .4	28 .7	27 .1	28 .0	28 .8	3.3	Non - SSS *****
44 02 9	Milton	26 .5	27 .6	27 .1	27 .2	27 .2	27 .5	28 .1	26 .9	26 .8	27 .2	0.4	Non - SSS *****
45 02 7	Oshawa	27 .0	27 .2	27 .2	26 .2	27 .2	27 .9	25 .8	24 .4	26 .4	26 .9	-3.5	SSS *****
46 09 0	Brampto n	26 .6	26 .7	26 .5	26 .5	27 .1	27 .2	28 .6	26 .5	28 .4	28 .3	8.2	SSS *****
46 10 8	Mississa uga	25 .6	25 .2	25 .4	25 .4	26 .0	26 .2	26 .1	24 .5	25 .6	26 .2	1.7	Non - SSS *****
47 04 5	Barrie	26 .3	25 .5	25 .6	25 .4	25 .9	25 .9	27 .5	25 .7	25 .9	25 .0	1.0	Non - SSS *****
48 00 6	Newmar ket	29 .4	28 .7	28 .6	28 .5	28 .6	27 .9	29 .8	27 .8	28 .5	30 .2	3.6	Non - SSS *****
49 00 5	Parry Sound	30 .1	30 .4	29 .6	30 .4	29 .6	29 .7	30 .8	29 .8	29 .9	30 .3	1.9	Non - SSS *****
49 01 0	Dorset	28 .0	28 .1	27 .7	27 .0	27 .4	26 .9	28 .2	27 .5	27 .1	26 .8	-2.1	Non - SSS *****
51 00 1	Ottawa Downto wn	26 .0	25 .6	24 .8	25 .6	25 .6	25 .5	26 .4	25 .9	25 .2	25 .8	1.0	Non - SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
51 01 0	Petawawa	27 .7	27 .6	26 .8	26 .7	26 .4	25 .8	27 .3	27 .3	26 .9	26 .7	-0.4	Non - SSS *****
52 02 3	Kingston	32 .7	30 .3	31 .4	30 .3	30 .5	30 .4	30 .5	29 .9	30 .1	30 .2	-4.6	SSS *****
54 01 2	Belleville	28 .0	29 .2	29 .6	29 .6	30 .5	30 .2	29 .9	29 .6	29 .7	30 .3	6.4	SSS *****
56 05 1	Cornwall	27 .1	26 .9	27 .3	27 .9	27 .1	27 .2	27 .6	26 .9	26 .4	26 .7	-3.2	Non - SSS *****
59 00 6	Peterborough	29 .1	28 .6	29 .2	29 .3	29 .7	28 .9	29 .7	28 .3	27 .6	28 .6	-1.9	Non - SSS *****
63 20 3	Thunder Bay	25 .0	26 .3	23 .4	24 .0	23 .2	23 .4	24 .3	23 .7	22 .9	24 .4	-4.7	SSS *****
71 07 8	Sault Ste. Marie	28 .8	28 .9	28 .4	27 .8	27 .3	28 .1	29 .7	28 .1	28 .2	29 .2	1.4	Non - SSS *****
75 01 0	North Bay	26 .1	27 .4	26 .7	27 .0	26 .4	26 .4	26 .0	26 .4	26 .2	26 .4	-0.8	Non - SSS *****
77 23 3	Sudbury	28 .5	27 .2	26 .3	25 .7	25 .1	25 .9	27 .1	26 .3	24 .8	23 .9	-9.7	SSS *****

Notes:

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- Station 46090 replaced station 46089 as the Brampton site in 2017.
- Station 52023 replaced station 52022 as the Kingston site in 2014.
- Station 77233 replaced station 77219 as the Sudbury site in 2013.
- SSS - Significant Sen's Slope (significant trend detected).

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for ground-level ozone (O₃) summer means (May - September)

Summer mean (ppb)

ID	City/ Town	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Change over 10 year (%)	Trend
12008	Windsor Downtown	36.8	32.5	30.9	33.3	33.4	32.8	33.7	31.4	32.7	33.8	0.8	Non-SSS
12016	Windsor West	35.7	30.9	30.9	31.8	33.0	31.8	32.4	31.2	30.6	33.8	-1.1	Non-SSS
13001	Chatham	36.6	34.2	32.4	34.4	32.9	33.1	32.1	31.9	32.5	33.6	-6.8	Non-SSS
14111	Sarnia	36.6	32.0	29.4	31.1	32.1	32.0	34.0	31.5	30.1	35.1	-0.4	Non-SSS
15020	Grand Bend	38.9	33.1	31.5	32.3	32.0	32.1	32.7	31.7	31.7	33.1	-2.7	Non-SSS
15026	London	34.4	30.9	29.5	31.0	30.4	29.8	30.5	27.4	29.1	31.0	-7.7	Non-SSS
16015	Port Stanley	38.4	36.9	33.7	35.6	35.2	35.0	35.3	33.7	32.8	34.3	-10.8	SSS
18007	Tiverton	36.0	32.5	30.8	33.3	34.1	32.2	32.9	29.7	30.5	33.0	-7.3	Non-SSS
21005	Brantford	33.5	30.1	29.9	31.2	32.2	29.4	30.4	28.3	29.5	31.1	-6.4	Non-SSS
26060	Kitchener	33.5	29.8	28.5	30.2	31.8	29.8	30.6	29.2	29.6	30.6	-1.6	Non-SSS
27067	St. Catharines	35.0	31.2	29.5	31.7	33.2	29.8	31.3	29.7	32.6	32.9	0.4	Non-SSS

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd ***** - *****
28 02 8	Guelph	34 .5	30 .4	28 .9	30 .2	31 .2	29 .6	31 .7	27 .3	29 .0	31 .1	-5.1	Non ***** - SSS *****
29 00 0	Hamilton Downto wn	32 .4	28 .4	27 .5	29 .5	30 .6	27 .8	29 .7	26 .1	29 .4	30 .1	-2.4	Non ***** - SSS *****
29 11 8	Hamilton West	29 .2	26 .4	22 .7	26 .5	27 .1	26 .8	28 .5	24 .4	27 .7	27 .9	5.1	Non ***** - SSS *****
29 21 4	Hamilton Mountai n	37 .4	32 .5	31 .6	33 .9	33 .2	31 .5	34 .0	29 .6	32 .3	32 .3	-6.6	Non ***** - SSS *****
33 00 3	Toronto East	30 .6	27 .1	25 .9	27 .7	29 .7	26 .0	29 .2	26 .0	28 .8	29 .2	0.5	Non ***** - SSS *****
34 02 1	Toronto North	32 .7	29 .4	28 .6	30 .7	30 .7	26 .3	30 .4	25 .9	29 .3	29 .8	-5.4	Non ***** - SSS *****
35 12 5	Toronto West	27 .5	24 .4	23 .5	25 .0	25 .9	24 .3	26 .3	24 .3	25 .9	25 .9	0.9	Non ***** - SSS *****
44 00 8	Burlingt on	32 .5	29 .2	27 .4	30 .1	30 .5	29 .0	31 .8	28 .8	31 .2	30 .4	1.4	Non ***** - SSS *****
44 01 7	Oakville	34 .2	30 .6	28 .3	30 .2	29 .9	29 .5	32 .4	28 .8	30 .4	32 .1	-2.5	Non ***** - SSS *****
44 02 9	Milton	32 .2	30 .6	28 .2	30 .4	30 .6	29 .6	34 .3	28 .9	28 .6	30 .6	-7.0	Non ***** - SSS *****
45 02 7	Oshawa	31 .1	28 .3	27 .9	28 .9	29 .4	28 .6	26 .6	24 .4	27 .4	27 .4	-11. 1	SSS *****
46 09 0	Brampto n	32 .7	29 .5	28 .9	30 .3	31 .2	29 .5	32 .7	28 .2	31 .0	31 .6	1.8	Non ***** - SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd ***** - *****
46 10 8	Mississa uga	30 .4	26 .5	26 .5	28 .0	28 .5	27 .2	28 .3	24 .9	27 .0	28 .5	-0.1	Non ***** - SSS *****
47 04 5	Barrie	29 .7	25 .6	25 .4	26 .8	27 .4	25 .6	29 .0	24 .7	25 .8	25 .1	-4.2	Non ***** - SSS *****
48 00 6	Newmar ket	34 .2	30 .3	29 .4	31 .2	31 .7	29 .0	33 .2	28 .4	30 .1	32 .2	-4.5	Non ***** - SSS *****
49 00 5	Parry Sound	32 .8	30 .1	28 .2	31 .4	28 .9	27 .7	30 .9	27 .8	28 .5	30 .0	-6.4	Non ***** - SSS *****
49 01 0	Dorset	28 .3	25 .3	24 .4	24 .6	25 .1	23 .0	25 .8	23 .9	23 .7	24 .1	-6.7	Non ***** - SSS *****
51 00 1	Ottawa Downto wn	29 .3	26 .5	24 .6	27 .8	27 .5	25 .3	27 .6	25 .6	25 .7	27 .4	-2.5	Non ***** - SSS *****
51 01 0	Petawaw a	28 .1	24 .5	22 .9	24 .4	23 .4	21 .1	23 .7	22 .9	22 .7	23 .5	-8.2	SSS *****
52 02 3	Kingston	38 .5	32 .4	32 .7	32 .2	33 .3	30 .9	33 .1	30 .0	31 .3	32 .0	-8.7	Non ***** - SSS *****
54 01 2	Belleville	32 .7	30 .6	30 .4	33 .2	33 .7	30 .9	32 .4	30 .0	31 .0	32 .8	0.2	Non ***** - SSS *****
56 05 1	Cornwall	30 .7	28 .1	27 .0	29 .7	28 .7	27 .1	29 .4	26 .1	26 .3	27 .8	-7.6	Non ***** - SSS *****
59 00 6	Peterbor ough	34 .2	29 .5	30 .0	31 .5	32 .3	29 .2	32 .2	28 .1	28 .4	29 .9	-7.2	Non ***** - SSS *****
63 20 3	Thunder Bay	25 .3	24 .7	22 .7	23 .6	22 .0	20 .4	22 .1	21 .8	21 .3	24 .4	-16. 5	SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
71 07 8	Sault Ste. Marie	30 .3	28 .2	27 .4	28 .1	26 .3	26 .3	29 .1	26 .2	26 .4	28 .8	-5.2	Non - SSS *****
75 01 0	North Bay	28 .5	26 .9	26 .2	27 .8	26 .4	24 .7	26 .3	25 .7	24 .4	27 .4	-7.4	Non - SSS *****
77 23 3	Sudbury	29 .8	28 .0	27 .0	27 .7	26 .6	25 .8	28 .8	25 .9	23 .7	23 .4	-17. 8	SSS *****

Notes:

- Station 14111 replaced station 14064 as the Sarnia site in 2016.
- Station 15026 replaced station 15025 as the London site in 2013.
- Station 29214 replaced station 29114 as the Hamilton Mountain site in 2019.
- Station 34021 replaced station 34020 as the Toronto North site in 2017.
- Station 44029 was operated by the Halton Region prior to 2019.
- Station 45027 replaced station 45026 as the Oshawa site in 2018.
- Station 46090 replaced station 46089 as the Brampton site in 2017.
- Station 52023 replaced station 52022 as the Kingston site in 2014.
- Station 77233 replaced station 77219 as the Sudbury site in 2013.

SSS - Significant Sen's Slope (significant trend detected).

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for ground-level ozone (O₃) winter means (January-April, October-December)

Winter mean (ppb)

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
12 00 8	Windsor Downto wn	21 .7	22 .8	22 .8	22 .4	23 .6	23 .3	22 .4	23 .1	23 .5	25 .1 9	8.9	SSS *****
12 01 6	Windsor West	22 .3	23 .4	24 .5	22 .7	23 .9	23 .6	23 .1	24 .4	22 .8	26 .3 2	6.6	Non - SSS *****
13 00 1	Chatham	24 .3	26 .2	27 .1	26 .3	27 .2	26 .8	26 .2	27 .4	26 .7	28 .2 1	8.4	SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd ***** - *****
14 11 1	Sarnia	24 .7	26 .2	25 .4	25 .4	IN S **	26 .0	25 .4	27 .6	24 .3	26 .2 6	4.3	Non ***** - SSS *****
15 02 0	Grand Bend	29 .1	31 .8	30 .6	29 .1	29 .8	30 .2	30 .7	31 .6	30 .5	31 .3 2	6.3	Non ***** - SSS *****
15 02 6	London	22 .9	26 .9	27 .1	25 .8	26 .6	26 .9	25 .6	26 .4	26 .7	27 .4 9	6.1	Non ***** - SSS *****
16 01 5	Port Stanley	29 .3	31 .8	31 .3	31 .2	31 .2	31 .5	30 .2	31 .4	29 .6	29 .3 7	-6.0	Non ***** - SSS *****
18 00 7	Tiverton	29 .2	32 .4	32 .7	31 .9	32 .4	32 .6	31 .9	32 .1	30 .6	32 .0	-1.0	Non ***** - SSS *****
21 00 5	Brantfor d	25 .4	28 .3	28 .8	27 .2	27 .7	27 .5	26 .7	26 .9	27 .0	26 .8	-6.0	Non ***** - SSS *****
26 06 0	Kitchene r	24 .0	26 .7	26 .5	26 .1	26 .6	27 .1	25 .6	25 .8	26 .4	26 .9 3	2.3	Non ***** - SSS *****
27 06 7	St. Catharin es	24 .1	26 .8	27 .9	26 .3	27 .2	27 .0	26 .4	27 .5	28 .5	27 .8	8.9	SSS *****
28 02 8	Guelph	24 .8	28 .0	27 .0	26 .0	26 .8	27 .5	26 .9	25 .7	25 .6	28 .5	0.5	Non ***** - SSS *****
29 00 0	Hamilto n Downto wn	20 .9	22 .5	23 .7	23 .3	23 .9	24 .2	22 .6	23 .2	24 .1	23 .8 2	7.4	Non ***** - SSS *****
29 11 8	Hamilto n West	20 .6	23 .0	22 .8	22 .1	22 .5	23 .7	23 .3	23 .0	23 .5	22 .8 5	5.1	Non ***** - SSS *****
29 21 4	Hamilto n Mountai n	25 .0	27 .3	27 .3	26 .3	26 .8	27 .4	25 .9	25 .9	27 .2	26 .2 1	-0.5	Non ***** - SSS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
33 00 3	Toronto East	20 .3	22 .0	21 .6	20 .5	22 .5	23 .3	22 .4	23 .5	24 .2	24 .0 7	17.2	SSS *****
34 02 1	Toronto North	20 .7	22 .3	22 .8	22 .1	22 .6	22 .3	22 .0	22 .8	23 .7	23 .8	9.9	SSS *****
35 12 5	Toronto West	17 .2	19 .5	19 .4	18 .6	19 .4	20 .5	19 .4	20 .1	21 .6	20 .7 4	18.2	SSS *****
44 00 8	Burlingt on	22 .5	24 .4	24 .1	23 .8	25 .6	25 .7	24 .7	25 .2	26 .2	25 .2 9	10.7	SSS *****
44 01 7	Oakville	23 .1	26 .6	26 .5	25 .3	25 .1	25 .9	26 .0	26 .0	26 .3	26 .4 9	6.3	Non ***** - ***** SSS *****
44 02 9	Milton	22 .2	25 .5	26 .3	24 .9	24 .7	25 .9	24 .9	25 .5	25 .6	24 .8 1	0.2	Non ***** - ***** SSS *****
45 02 7	Oshawa	24 .1	26 .4	26 .7	24 .3	25 .6	27 .3	25 .4	24 .5	25 .7	26 .7 3	2.3	Non ***** - ***** SSS *****
46 09 0	Brampto n	22 .2	24 .6	24 .8	23 .8	24 .1	25 .6	25 .6	25 .3	26 .5	26 .1	12.6	SSS *****
46 10 8	Mississa uga	22 .2	24 .3	24 .7	23 .6	24 .2	25 .5	24 .6	24 .2	24 .7	24 .6 7	4.7	Non ***** - ***** SSS *****
47 04 5	Barrie	23 .9	25 .5	25 .8	24 .4	24 .8	26 .3	26 .5	26 .4	26 .1	25 .0 7	6.1	Non ***** - ***** SSS *****
48 00 6	Newmar ket	26 .0	27 .5	28 .1	26 .6	26 .3	27 .2	27 .3	27 .3	27 .5	28 .7 8	6.0	Non ***** - ***** SSS *****
49 00 5	Parry Sound	28 .1	30 .6	30 .6	29 .8	30 .0	31 .1	30 .7	31 .3	31 .0	30 .6	4.1	Non ***** - ***** SSS *****

ID	City/ Town	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Change over 10 year (%)	Trend
49010	Dorset	27.7	30.1	30.1	28.8	29.0	29.6	30.0	30.1	29.5	28.84	0.4	Non - SSS
51001	Ottawa Downtown	23.5	24.9	25.1	24.0	24.3	25.6	25.5	26.2	24.9	24.68	6.0	Non - SSS
51010	Petawawa	27.5	29.9	29.6	28.5	28.6	29.3	29.8	30.4	30.0	29.05	4.2	Non - SSS
52023	Kingston	28.6	28.8	30.4	28.9	28.5	30.2	28.6	29.9	29.2	28.94	0.7	Non - SSS
54012	Belleville	24.6	28.2	29.1	27.0	28.2	29.7	28.1	29.3	28.7	28.67	7.1	Non - SSS
56051	Cornwall	24.2	25.7	27.6	26.6	26.0	27.4	26.3	27.5	26.5	26.0	3.7	Non - SSS
59006	Peterborough	25.5	28.0	28.6	27.7	27.8	28.7	27.9	28.5	27.3	27.72	0.0	Non - SSS
63203	Thunder Bay	24.7	27.4	23.8	24.2	24.2	25.6	25.9	25.1	24.1	24.4	-0.4	Non - SSS
71078	Sault Ste. Marie	27.6	29.4	29.2	27.7	28.0	29.5	30.2	29.5	29.6	29.54	3.3	SSS
75010	North Bay	24.4	27.8	27.1	26.4	26.4	27.6	25.9	26.9	27.4	26.23	-0.9	Non - SSS
77233	Sudbury	27.6	26.6	25.8	24.3	24.0	26.1	26.0	26.7	25.7	24.39	-4.5	Non - SSS

Notes:

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- Station 34021 replaced station 34020 as the Toronto North site in 2017.

Station 44029 was operated by the Halton Region prior to 2019.

Station 45027 replaced station 45026 as the Oshawa site in 2018.

Station 46090 replaced station 46089 as the Brampton site in 2017.

Station 52023 replaced station 52022 as the Kingston site in 2014.

Station 77233 replaced station 77219 as the Sudbury site in 2013.

SSS - Significant Sen's Slope (significant trend detected).

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for sulphur dioxide (SO₂)

Annual mean (ppb)

SO₂ 1y AAQC: 4 ppb

ID	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd
12008	Windsor Downto wn	2. 8	2. 4	2. 4	1. 9	1. 1	1. 0	0. 6	0. 4	0. 3	0. 4	-91. 6	SSS
12016	Windsor West	2. 8	2. 6	2. 8	1. 9	1. 4	0. 9	0. 7	0. 8	0. 8	0. 7	-74. 1	SSS
14111	Sarnia	4. 1	3. 8	3. 5	3. 2	IN S	1. 7	1. 9	1. 9	2. 0	2. 2	-44. 8	SSS
29000	Hamilto n Downto wn	4. 8	4. 8	5. 1	4. 3	3. 2	3. 5	5. 0	4. 8	3. 7	3. 8	-14. 2	SSS
29214	Hamilto n Mountai n	3. 7	2. 8	2. 9	2. 6	1. 8	1. 8	2. 4	3. 5	2. 5	3. 2	-9.7	SSS
35125	Toronto West	0. 6	0. 6	0. 7	1. 0	0. 6	0. 5	0. 3	0. 3	0. 2	0. 2	-82. 8	SSS
44029	Milton	1. 3	1. 2	1. 3	1. 1	0. 9	0. 7	0. 7	IN S	IN S	IN S	N/A	N/A
51001	Ottawa Downto wn	0. 3	0. 3	0. 3	0. 4	0	0. 1	0. 2	0. 2	0. 1	0. 2	-22. 2	No n- SSS

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd
71 07 8	Sault Ste. Marie	0. 6	0. 8	0. 8	0. 8	0. 6	0. 7	0. 8	0. 7	0. 6	0. 8	0.0	No n- SSS *****
77 23 3	Sudbury	1. 3	2. 8	2. 4	2. 4	2. 1	1. 3	1. 2	1. 2	0. 9	0. 9	-63. 0	SSS *****

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.

Station 14111 replaced station 14064 as the Sarnia site in 2016.

Station 29214 replaced station 29114 as the Hamilton Mountain site in 2019.

Station 44029 was operated by the Halton Region prior to 2019.

Station 77233 replaced station 77219 as the Sudbury site in 2013.

SSS - Significant Sen's Slope (significant trend detected).

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for carbon monoxide (CO)

1h maximum (ppm)
**
CO 1h AAQC: 30 ppm

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd
12 00 8	Windsor Downto wn	2. 1	1. 9	1. 8	1. 9	2. 3	2. 6	1. 9	2. 3	1. 2	1. 6	-17. 2	Non - SSS *****
29 00 0	Hamilton Downto wn	1. 7	2. 0	2. 9	1. 3	1. 4	2. 1	1. 7	1. 9	1. 2	1. 5	-24. 2	Non - SSS *****
35 12 5	Toronto West	1. 4	1. 4	1. 6	1. 3	1. 7	1. 2	0. 9	1. 5	1. 6	1. 2	-14. 2	Non - SSS *****
51 00 1	Ottawa Downto wn	0. 9	0. 9	0. 8	0. 8	0. 9	0. 7	1. 0	0. 7	0. 9	0. 8	-16. 9	Non - SSS *****

Note:

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for benzene

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd
12 01 6	Windsor West	0. 22 1	0. 17 9	0. 26 7	0. 23 8	0. 23 4	0. 18 1	0. 18 7	0. 13 7	N/ ***** A ***	0. 32 8	-39. 4	SSS *****
14 11 1	Sarnia	0. 27 8	0. 25 5	0. 25 3	0. 36 2	0. 28 2	0. 21 1	0. 23 5	0. 11 8	N/ ***** A ***	0. 18 7	-45. 8	SSS *****
15 02 6	London	0. 14 3	0. 12 5	0. 12 1	0. 14 9	0. 10 8	0. 10 5	0. 14 1	0. 07 0	N/ ***** A ***	N/ ***** A ***	-52. 2	SSS *****
26 06 0	Kitchene r	0. 16 2	N/ ***** A ***	0. 16 7	0. 16 8	0. 15 9	0. 16 4	0. 10 9	0. 07 9	N/ ***** A ***	N/ ***** A ***	-53. 3	SSS *****
29 00 0	Hamilto n Downto wn	0. 19 3	IN **** S **	0. 19 2	0. 21 0	0. 18 6	0. 18 7	0. 12 9	0. 12 6	N/ ***** A ***	0. 17 2	-39. 5	SSS *****
48 00 6	Newmar ket	0. 11 5	0. 13 4	0. 12 5	0. 24 9	0. 21 5	0. 13 0	IN ***** S **	0. 06 7	N/ ***** A ***	N/ ***** A ***	-37. 1	No ***** n- SSS *****

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.

N/A indicates data not available.

The 2016 average for Sarnia is derived from data from May to December 2016.

Station 14111 replaced station 14064 as the Sarnia site in 2016.

The 2018 average for Windsor West is derived from data from February to July, and October to December in 2018.

The 2018 average for Sarnia is derived from data from February to May, July, and October to December in 2018.

The 2018 average for Hamilton Downtown is derived from data from March to June, August, and October to December in 2018.

SSS - Significant Sen's Slope (significant trend detected).

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for m- and p-xylene

Annual mean (µg/m³)

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tr end
12	Windsor	0.	0.5	0.	0.	0.	0.	0.5	0.	N/ *****	0.6	-45.	SS *****

ID *****	City/ Town	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	Cha nge ove r 10 y ear (%)	Tre nd *****
12 01 6	Windsor West	0. 22 8	0. 18 4	0. 28 3	0. 23 9	0. 23 2	0. 19 0	0. 18 4	0. 14 7	N/ ***** A ***	0. 24 6	-33. 6	SSS *****
14 11 1	Sarnia	0. 24 4	0. 17 1	0. 22 6	0. 31 3	0. 17 8	0. 19 2	0. 21 3	0. 10 1	N/ ***** A ***	0. 12 2	-38. 0	SSS *****
15 02 6	London	0. 12 6	0. 11 8	0. 11 3	0. 14 6	0. 10 3	0. 10 3	0. 14 8	0. 07 4	N/ ***** A ***	N/ ***** A ***	-38. 1	SSS *****
26 06 0	Kitchene r	0. 15 7	N/ ***** A ***	0. 16 6	0. 16 4	0. 15 3	0. 16 4	0. 10 7	0. 08 2	N/ ***** A ***	N/ ***** A ***	-58. 0	SSS *****
29 00 0	Hamilto n Downto wn	0. 19 5	IN **** S **	0. 20 6	0. 21 6	0. 18 9	0. 19 8	0. 13 1	0. 14 5	N/ ***** A ***	0. 18 3	-30. 2	SSS *****
48 00 6	Newmar ket	0. 11 6	0. 12 6	0. 13 4	0. 21 8	0. 19 2	0. 12 8	IN ***** S **	0. 06 8	N/ ***** A ***	N/ ***** A ***	-38. 0	No ***** n- SSS *****

Notes:

- INS indicates there was insufficient data to calculate a valid annual mean.

- N/A indicates data not available.

- The 2016 average for Sarnia is derived from data from May to December 2016.
- Station 14111 replaced station 14064 as the Sarnia site in 2016.
- The 2018 average for Windsor West is derived from data from February to July, and October to December in 2018.
- The 2018 average for Sarnia is derived from data from February to May, July, and October to December in 2018.
- The 2018 average for Hamilton Downtown is derived from data from March to June, August, and October to December in 2018.
- SSS - Significant Sen's Slope (significant trend detected).

- Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for 1,3-butadiene

Annual mean (µg/m³)

ID	City/ Town	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Change over 10 year (%)	Trend
12016	Windsor West	0.048	0.036	0.042	0.035	0.032	0.034	0.028	0.028	N/A	0.038	-32.3	SSS
14111	Sarnia	0.205	0.209	0.124	0.216	0.089	0.077	0.088	0.054	N/A	0.071	-66.9	SSS
15026	London	0.040	0.023	0.025	0.026	0.020	0.035	0.025	0.025	N/A	N/A	-12.8	Non-SSS
26060	Kitchener	0.042	N/A	0.029	0.029	0.023	0.038	0.026	0.025	N/A	N/A	-32.3	SSS
29000	Hamilton Downtown	0.046	INS	0.032	0.037	0.025	0.039	0.028	0.028	N/A	0.036	-19.9	Non-SSS
48006	Newmarket	0.039	0.021	0.020	0.028	0.024	0.035	INS	0.025	N/A	N/A	0.0	Non-SSS

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.

N/A indicates data not available.

The 2016 average for Sarnia is derived from data from May to December 2016.

Station 14111 replaced station 14064 as the Sarnia site in 2016.

The 2018 average for Windsor West is derived from data from February to July, and October to December in 2018.

The 2018 average for Sarnia is derived from data from February to May, July, and October to December in 2018.

The 2018 average for Hamilton Downtown is derived from data from March to June, August, and October to December in 2018.

SSS - Significant Sen's Slope (significant trend detected).

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

Canadian Ambient Air Quality Standard reporting

PM2.5 and ozone CAAQS metric values for designated sites across Ontario (2021)

Air zone area	City/Town	24-hour PM2.5 (µg/m³)	Annual PM2.5 (µg/m³)	8-hour ozone (ppb)
Sarnia	Sarnia	19	7.3	70*(41)

Air zone area	City/Town	24-hour PM _{2.5} (µg/m ³)	Annual PM _{2.5} (µg/m ³)	8-hour ozone (ppb)
Hamilton	Hamilton Downtown	21	8.6	61(48)
Hamilton	Hamilton Mountain	19	7.6	64*(50)
Sudbury	Sudbury	15	5.3	56(43)
Sault Ste. Marie	Sault Ste. Marie	14	5	59(44)
Northern Ontario	Thunder Bay	17	5.7	51(44)
Southern Ontario	Windsor Downtown	18	7.7	67*(41)
Southern Ontario	Chatham	17	6.9	64*(43)
Southern Ontario	London	18	7	62(46)
Southern Ontario	Brantford	18	7.3	64*(49)
Southern Ontario	Kitchener	19	7.2	61(48)
Southern Ontario	Guelph	20	7.2	62(49)
Southern Ontario	St. Catharines	17	6.6	63*(48)
Southern Ontario	Burlington	18	6.9	64*(53)
Southern Ontario	Oakville	18	6.9	65*(52)
Southern Ontario	Milton	19	7.4	65*(52)
Southern Ontario	Mississauga	19	7.1	61(48)
Southern Ontario	Brampton	18	6.9	66*(52)
Southern Ontario	Toronto West	18	7.2	63*(50)

Sarnia	Sarnia	38	6.8	66	2.2
Hamilton	Hamilton Downtown	44	10.2	82*	3.8
Hamilton	Hamilton Mountain	40	6.3	61	3.2
Sudbury	Sudbury	46	5.6	45	0.9
Sault Ste. Marie	Sault Ste. Marie	30	3.9	33	0.8
Northern Ontario	Thunder Bay	41	6.5	N/A	N / A
Southern Ontario	Windsor Downtown	43	9.6	13	0.4
Southern Ontario	Chatham	30	5.1	N/A	N / A
Southern Ontario	London	30	5.2	N/A	N / A
Southern Ontario	Brantford	27	4.6	N/A	N / A
Southern Ontario	Kitchener	35	4.8	N/A	N / A
Southern Ontario	Guelph	34	5.5	N/A	N / A
Southern Ontario	St. Catharines	33	5.8	N/A	N / A
Southern Ontario	Burlington	42	8.7	N/A	N / A
Southern Ontario	Oakville	41	7.3	N/A	N / A
Southern Ontario	Milton	44	8.2	INS	I N S

Southern Ontario	Mississauga	38	7	N/A	N / A
Southern Ontario	Brampton	43	6.5	N/A	N / A
Southern Ontario	Toronto West	49	12.9	7	0.2
Southern Ontario	Toronto Downtown	51	12.7	N/A	N / A
Southern Ontario	Toronto North	45	9.3	6	0.2
Southern Ontario	Toronto East	47	9.5	N/A	N / A
Southern Ontario	Oshawa	22	3.3	N/A	N / A
Southern Ontario	Barrie	40	5.6	N/A	N / A
Southern Ontario	Peterborough	34	4.1	N/A	N / A
Southern Ontario	Kingston	31	3.8	N/A	N / A
Southern Ontario	Ottawa Downtown	40	5.7	2	0.2

Note:

Designated sites normally refer to communities with populations greater than 100,000.

The CAAQS for 1h NO₂ is 60 ppb is based on the 3-year average of the annual 98th percentile of the daily maximum 1-hour average NO₂ concentrations.

The CAAQS for annual NO₂ is 17.0 ppb based on the average over a single calendar year of all the 1h average NO₂ concentrations.

The CAAQS for 1h SO₂ is 70 ppb based on the 3-year average of the annual 99th percentile of the SO₂ daily maximum 1-hour average concentrations.

The CAAQS for annual SO₂ is 5.0 ppb based on the average over a single calendar year of all 1h average SO₂ concentrations.

The 1h NO₂ CAAQS metric for Toronto Downtown is based on a 2-year average.

An asterisk denotes an exceedance of the CAAQS.

INS denotes insufficient data to report a valid CAAQS metric.

N/A denotes not applicable (parameter not monitored at location).

PM_{2.5} and ozone CAAQS metric trends for designated sites across Ontario (2012-2021)

Air zone area	City/Town	10-year trend (%) based on 24-hour PM _{2.5}	10-year trend (%) based on annual PM _{2.5}	10-year trend (%) based on 8-hour ozone
Sarnia	Sarnia	-30.6	-46.9	0*
Hamilton	Hamilton Downtown	-26.6	-16.4	-7.9
Hamilton	Hamilton Mountain	-16	-13.4*	-9.4
Sudbury	Sudbury	-14.1	-6.9*	-6.8
Sault Ste. Marie	Sault Ste. Marie	-19.4	-15.5	-10.9
Northern Ontario	Thunder Bay	0*	-8.6*	-10.7
Southern Ontario	Windsor Downtown	-19.6	-18.9	-11.4
Southern Ontario	Chatham	-22	-19.9	-16
Southern Ontario	London	-15.9*	-23.5	-16.9
Southern Ontario	Brantford	-20.7*	-13.4	-13.5
Southern Ontario	Kitchener	-16.3	-15.4	-11.4
Southern Ontario	Guelph	-6.1	-5.9*	-12.5
Southern Ontario	St. Catharines	-19.7	-21.4	-10.3
Southern Ontario	Burlington	-20.2	-20.9	-5.6
Southern Ontario	Oakville	-16.8	-14.9	-6.3
Southern Ontario	Milton	-10.7*	-9.5*	-7.6
Southern Ontario	Mississauga	-17.5*	-11.4	-10.3
Southern Ontario	Brampton	-19.6*	-13	-4.3*
Southern Ontario	Toronto West	-20.2	-20.2	-10.7
Southern Ontario	Toronto Downtown	INS	INS	INS
Southern Ontario	Toronto North	-27.1	-27.3	-3.3
Southern Ontario	Toronto East	-13.8	-14.7	-12.9

Air zone area	City/Town	10-year trend (%) based on 24-hour PM _{2.5}	10-year trend (%) based on annual PM _{2.5}	10-year trend (%) based on 8-hour ozone
Southern Ontario	Oshawa	-15.3	-18.4*	-7.2*
Southern Ontario	Barrie	-15.9*	0*	-11.8
Southern Ontario	Peterborough	-13.8*	-14.6	-12.3
Southern Ontario	Kingston	-40.9	-37.8	-7.9
Southern Ontario	Ottawa Downtown	-22.2	-13.3*	-6

Notes:

Designated sites normally refer to communities with populations greater than 100,000.

*Non-Significant Sen's Slope (significant trend not detected).

INS denotes insufficient data for a valid 10-year trend.

NO₂ and SO₂ CAAQS metric trends for designated sites across Ontario (2012-2021)

Air zone area	City/Town	10-year trend (%) based on 1-hour NO ₂	10-year trend (%) based on annual NO ₂	10-year trend (%) based on 1-hour SO ₂	10-year trend (%) based on annual SO ₂
Sarnia	Sarnia	0*	-25	0*	-44.8
Hamilton	Hamilton Downtown	-7.3	-17.2	7.9*	-14.2

Hamilton	Hamilton Mountain	-7.0*	-27	0*	-9.7
Sudbury	Sudbury	INS *****	-8.2	-87.8	-63
Sault Ste. Marie	Sault Ste. Marie	-8.8	-25	-11.3	0*
Northern Ontario	Thunder Bay	0*	-15.5	N/A *****	N *** / ** A ***
Southern Ontario	Windsor Downtown	-17	-28.6	-80.7	-91.6
Southern Ontario	Chatham	-13.2	-19.5	N/A *****	N *** / ** A ***
Southern Ontario	London	-23.1	-27.8	N/A *****	N *** / ** A ***
Southern Ontario	Brantford	-18.2	-10.9	N/A *****	N *** / ** A ***
Southern Ontario	Kitchener	-15.7	-27.1	N/A *****	N *** / ** A ***
Southern Ontario	Guelph	-11.8	-25.5	N/A *****	N *** / ** A ***
Southern Ontario	St. Catharines	-15.8	-32	N/A *****	N *** / ** A ***
Southern Ontario	Burlington	-6.7	-24.4	N/A *****	N *** / ** A ***
Southern Ontario	Oakville	-9.8	-17.7	N/A *****	N *** / ** A ***
Southern Ontario	Milton	0*	-11.2	INS *****	I N S ***
Southern Ontario	Mississauga	-14	-29.9	N/A *****	N *** / ** A ***

Southern Ontario	Brampton	-11.8*	-35	N/A	N / A
Southern Ontario	Toronto West	-12.9	-26.7	-51.1	-82.8
Southern Ontario	Toronto Downtown	INS	INS	N/A	N / A
Southern Ontario	Toronto North	-8.7	-36.5	N/A	N / A
Southern Ontario	Toronto East	-6.8	-41.6	N/A	N / A
Southern Ontario	Oshawa	-25.7*	-50.2	N/A	N / A
Southern Ontario	Barrie	-7.0*	-31.2	N/A	N / A
Southern Ontario	Peterborough	8.3*	-32.6	N/A	N / A
Southern Ontario	Kingston	0*	-11.2	N/A	N / A
Southern Ontario	Ottawa Downtown	0*	-24.9	-84.4	-22.2*

Notes:

Designated sites normally refer to communities with populations greater than 100,000.

*Non-Significant Sen’s Slope (significant trend not detected).

INS denotes insufficient data for a valid 10-year trend.

N/A denotes not applicable (parameter not monitored at location).

Milton is based on 8 years of available data.

Management levels for CAAQS pollutants

Ozone

Management level	8-hour 2020
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Management level	8-hour 2020
Red	> 62 ppb
Orange	57 to 62 ppb
Yellow	51 to 56 ppb
Green	≤ 50 ppb

Fine particulate matter (PM_{2.5})

Management level	24-hour 2020	Annual 2020
Red	> 27 µg/m ³	> 8.8 µg/m ³
Orange	20 to 27 µg/m ³	6.5 to 8.8 µg/m ³
Yellow	11 to 19 µg/m ³	4.1 to 6.4 µg/m ³
Green	≤ 10 µg/m ³	≤ 4.0 µg/m ³

Sulphur dioxide (SO₂)

Management level	1-hour 2020	Annual 2020
Red	> 70 ppb	> 5.0 ppb
Orange	51 to 70 ppb	3.1 to 5.0 ppb
Yellow	31 to 50 ppb	2.1 to 3.0 ppb
Green	≤ 30 ppb	≤ 2.0 ppb

Nitrogen dioxide (NO₂)

Management level	1-hour 2020	Annual 2020
Red	> 60 ppb	> 17.0 ppb
Orange	32 to 60 ppb	7.1 to 17.0 ppb
Yellow	21 to 30 ppb	2.1 to 7.0 ppb

Management level	1-hour 2020	Annual 2020
Green	≤ 20 ppb	≤ 2.0 ppb

Air quality management actions by air zone area

Ontario air quality management actions across all air zones

Type	Action	Description
Air permissions and approvals framework	Air Emissions Environmental Activity and Sector Registry	Businesses that engage in certain routine and lower risk activities that generate air emissions must self-register online in the Environmental Activity and Sector Registry. They must submit information about their emissions to the MECP and follow standardized rules set out in guidance materials.
Air permissions and approvals framework	Environmental Compliance Approvals	Businesses with complex or unique types of operations must apply for an Environmental Compliance Approval (ECA). By law, a business must meet the specific conditions set out in the ECA. A business may also be inspected to ensure conditions are met.
Regulations	Regulation 271/91: Gasoline Volatility (https://www.ontario.ca/laws/regulation/910271)	O. Reg. 271/91 specifies upper limits for gasoline volatility in southern and northern Ontario for the summer driving season and requires petroleum facilities to track and report gasoline volatility limits during this period.
Regulations	O. Reg. 455/94: Recovery of Gasoline Vapour in Bulk Transfers (https://www.ontario.ca/laws/regulation/940455)	O. Reg. 455/9 reduces the discharge of gasoline vapour into the natural environment from terminals, bulk plants or service stations.
SO ₂ and NO _x emissions trading program	N/A	This program, administered under O. Reg. 397/01 and O. Reg. 194/05, sets limits for NO _x and SO ₂ emissions from the regulated facilities and allows for the transfer or trade of emission allowances and credits between facilities, to provide flexibility for compliance. [1]
Ambient air standards	Ambient Air Quality Criteria (AAQC) (https://www.ontario.ca/page/ontarios-ambient-air-quality-criteria)	The AAQCs set out air contaminant concentrations that are protective against adverse effects on health and/or the environment. AAQCs are used to assess general (ambient) air quality resulting from all sources of a contaminant to air.
Monitoring	Provincial Air Monitoring Network and Air Quality Health Index (AQHI) (http://www.airqualityontario.com/aqi/index.php)	Ontario operates a network of 39 ambient (outside) air monitoring stations across the province that collect real-time air pollution data. The AQHI evaluates air monitoring information and issues hourly forecasts to help you understand what the quality of the air around you means to your health.

Type	Action	Description
Community engagement	Air Standards/Local Air Quality External Working Group	Ministry led facilitated discussions with industry, public health groups, environmental non-government organizations and some First Nations on matters relating to the local air quality regulation (O. Reg. 419/05).

Ontario air quality management actions by air zone

Northern Ontario (excluding Sault Ste. Marie and Sudbury)

CAAQS management level
PM _{2.5} : yellow
Ozone: green
SO ₂ : nil (no monitoring station in air zone)
NO ₂ : orange

Type	Action	Description
Industry standard registrations	Forest products industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/forest-products-industry-standard)	- Imposes requirements on registered forest product facilities (e.g., sawmills) to reduce emissions of acrolein and other contaminants that can contribute to the development of PM_{2.5}. - As of 2021, 13 facilities were registered in the Northern Ontario air zone.
Industry standard registrations	Pulp and paper industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/pulp-and-paper-industry-standard)	- Imposes requirements on registered pulp and paper facilities to reduce emissions of total reduced sulphur, acrolein and other contaminants which can contribute to the development of PM_{2.5}. - As of 2021, 4 facilities were registered in the Northern Ontario air zone.

Southern Ontario (excluding Sarnia/St. Clair Township and Hamilton)

CAAQS management level
PM _{2.5} : orange
Ozone: yellow
SO ₂ : green
NO ₂ : orange

Type	Action	Description
Industry standard registrations	Metal finishers industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/metal-finishers-industry-standard)	- Imposes requirements on registered metal finishing facilities to reduce emissions of various contaminants including hexavalent chromium. - As of 2021, 7 facilities were registered in the Southern Ontario air zone.

Type	Action	Description
Industry standard registrations	Foundries industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/foundries-industry-standard)	- Imposes requirements on registered foundries (e.g., metal works facilities) to reduce emissions of various contaminants including SO₂ and NO₂. - As of 2021, 16 facilities were registered in the Southern Ontario air zone.
Industry standard registrations	Petroleum refining industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/petroleum-refining-industry-standard)	- Requirements related to sources of benzene and benzo[a]pyrene from storage vessels, equipment leaks, sewage treatment operations and truck and railcar product loading racks and marine vessel loading berths. - As of 2021, 1 facility was registered in the Southern Ontario air zone.
Site-specific standards	ADM Agri-Industries Company in Windsor (https://ero.ontario.ca/archive/013-3239)	- Requires action to reduce emissions of, and sets an alternative air standard for, suspended particulate matter emissions at a grain handling and oilseed processing facility. - This site-specific standard was issued in December 2018 and expires in 2028.
Site-specific standards	Stelco Lake Erie Works in Nanticoke (https://ero.ontario.ca/archive/012-4685)	- Requires action to reduce emissions of, and sets an alternative air standard for, suspended particulate matter, benzene and benzo[a]pyrene. - These site-specific standards were issued in March 2015 and May 2016 and all will expire in 2023.
Site-specific standards	Harsco Canada Corp in Nanticoke (https://ero.ontario.ca/archive/012-2815)	- Requires action to reduce emissions of, and sets an alternative air standard for, suspended particulate matter emissions at a slag processing operation located on site at Stelco's Lake Erie Works facility in Nanticoke. - This site-specific standard was issued in March 2015 and expires in 2023.
Site-specific standards	Owens Corning Composite Materials Canada LP in Guelph (https://ero.ontario.ca/archive/012-5061)	- Requires action to reduce emissions of, and sets an alternative air standard for, hexavalent chromium. - This site-specific standard was issued in July 2016 and will expire in 2026.
Site-specific standards	Oxy Vinyls Canada Co. in Thorold	- Requires action to reduce emissions of, and sets an alternative air standard for, vinyl chloride air emissions - This site-specific standard was issued in February 2017 and will expire in 2027.

Sudbury

PM _{2.5} : yellow *****
Ozone: green
SO ₂ : yellow *****
NO ₂ : orange *****

Type	Action	Description
Industry standard registrations	Metal finishers industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/metal-finishers-industry-standard)	- Imposes requirements on registered metal finishing facilities to reduce emissions of various contaminants including hexavalent chromium. - As of 2021, 1 facility was registered in the Sudbury air zone.
Site-specific standards	Glencore Canada Corporation (https://ero.ontario.ca/notice/019-1958)	- Requires action to reduce emissions of, and sets an alternative air standards for, cadmium, nickel and nickel compounds (https://ero.ontario.ca/archive/012-4796) and sulphur dioxide (https://ero.ontario.ca/archive/013-3465) . - These site-specific standards were issued between 2012 and 2020 and expire between 2022 and 2030 (see links for more details).
Site-specific standards	Vale Canada Ltd. (https://ero.ontario.ca/notice/019-4518) ^[2]	- Requires action to reduce emissions of, and sets an alternative air standard for, nickel and nickel compounds. - This site-specific standard was issued in December 2021 and will expire in 2030.

Sault Ste. Marie

CAAQS management level *****
PM _{2.5} : yellow *****
Ozone: green
SO ₂ : nil (no monitoring station in air zone) *****
NO ₂ : orange *****

Type	Action	Description
Industry standard registrations	Forest products industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/forest-products-industry-standard)	- Imposes requirements on registered forest product facilities (e.g., sawmills) to reduce emissions of acrolein and other contaminants that can contribute to the development of PM_{2.5}. - As of 2021, 1 facility was registered in the Sault Ste. Marie air zone.

Type	Action	Description
Site-specific standards	Algoma Steel Inc. (https://ero.ontario.ca/notice/019-2301)	- Requires action to reduce emissions of, and sets an alternative air standards for, benzene, benzo[a]pyrene and suspended particulate matter. - These site-specific standards were issued between 2015 and 2017 and expire between 2022 and 2023.

Sarnia/St. Clair Township

CAAQS management level
PM _{2.5} : orange
Ozone: green
SO ₂ : orange
NO ₂ : orange

Type	Action	Description
Regulations	O. Reg. 530/18: Air Pollution – Discharge of Sulphur Dioxide from Petroleum Facilities (https://www.ontario.ca/laws/regulation/r18530)	Improves how acid gas flaring events are managed and strengthens accountability through reporting, monitoring and environmental penalties.
Regulations	Regulation 350 - Lambton Industry Meteorological Alert (LIMA) (https://www.ontario.ca/laws/regulation/900350#:~:text=%E2%80%9C9CLambton%20Industry%20Meteorological%20Alert%20System,described%20in%20subsection%20(2)%3B)	Public alerts are issued if the running daily (24-hr) average sulphur dioxide concentration reaches 0.07 parts per million at any of the monitoring stations in the LIMA network.
Policy	Cumulative effects assessment in air approvals (https://ero.ontario.ca/notice/013-1680)	Guides decisions on Environmental Compliance Approval (ECA) applications for new or expanding facilities in Sarnia & Hamilton with benzene emissions.
Industry standard registrations	Petroleum refining industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/petroleum-refining-industry-standard)	- Requirements related to sources of benzene and benzo[a]pyrene from storage vessels, equipment leaks, sewage treatment operations and truck and railcar product loading racks and marine vessel loading berths. - As of 2021, 3 facilities were registered in the Sarnia/St. Clair Township air zone.
Industry stan	Petrochemical industrial standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/petrochemical-industrial-standard)	Requirements related to sources of benzene and butadiene from storage vessels, equipment leaks, sewage treatment operations and

Type	Action	Description
Standard registrations	technical-standards-manage-air-pollution/petrochemical-industry-standard)	truck and railcar product loading racks and marine vessel loading berths. As of 2021, 4 facilities were registered in the Sarnia/St. Clair Township air zone.
Enhanced monitoring	Property line monitoring, petroleum refining and petrochemical industries (https://www.cleanairsarniaandarea.com/reporting/property-line-monitoring.aspx)	Facilities registered to the Petroleum Refining and Petrochemical Industry Standards are required to monitor benzene or 1,3-butadiene levels at their fence lines (known as “property line monitoring”) and provide the results on a public website within 60 days.
Enhanced monitoring	SLEA air monitoring network (https://www.lambtonbases.ca/environment-science/local-conditions/)	Nine ambient air monitoring stations in the Sarnia area operated by the Sarnia-Lambton Environmental Association (SLEA), an industrial cooperative of 18 facilities operating in Lambton County.
Enhanced community engagement	Sarnia Area Environmental Health Project (https://www.cleanairsarniaandarea.com/sarnia-area-environmental-health-project/about.aspx)	This project assesses the impact of air exposures and other stressors in the Sarnia Area on human health.
Enhanced community engagement	Clean Air Sarnia Area (CASA) (https://www.cleanairsarniaandarea.com/about/casa.aspx)	Community advisory panel is made up of representatives from the public, government, First Nations, and industry, who are dedicated to providing the community with a clear understanding of ambient air quality in the Sarnia area. Roles include information sharing, identifying and researching local air quality issues, provide info and recommendations to MECP and Sarnia-Lambton Environmental Association, informing public of local air quality, also maintenance of public CASA website which contains air monitoring data from SLEA and MECP as well as 1 AQHI station.
Enhanced strategic planning	Sarnia action plan	- Aims to drive air quality improvements by taking action across several broadly defined categories, including enhanced internal diagnostics, strategic planning of ministry activities, air monitoring improvements, enhancements to internal and external communications, improved incident response, and approvals and enforcement considerations. - One aspect of this is enhanced inspections, which includes assessments of the operation and maintenance of equipment such as above ground storage tanks and vapour recovery systems, acid gas flares, wastewater treatment plant monitoring and assessing compliance with regulatory limits of sulphur content in boiler fuel. Since 2015, 108 storage tanks have been inspected. Using hand-held air monitoring equipment, the ministry is conducting proactive monthly air quality monitoring within priority industrial areas based on previous air quality monitoring and a history of community odour complaints.

CAAQS management level
PM _{2.5} : orange
Ozone: yellow
SO ₂ : red
NO ₂ : orange

Type	Action	Description
Policy	Cumulative effects assessment in air approvals (https://ero.ontario.ca/notice/013-1680)	Guides decisions on Environmental Compliance Approval (ECA) applications for new or expanding facilities in Sarnia & Hamilton with benzene emissions.
Policy	Local Poor Air Quality Notification Protocol	The Local Poor Air Quality Notification (LPAQN) protocol is a program through which companies are asked to voluntarily implement operational practices and control measures to reduce releases of dust and particulate matter to air during poor air quality events. The protocol addresses poor air quality events that are the result of unique conditions in Hamilton that are conducive to the build-up of pollutants in the lower part of the City. Approximately 33 industries and municipal operations participate and enact poor air quality plans when a Notification is issued in response to defined considerations.
Industry standards registrations	Foundries industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/foundries-industry-standard)	- Imposes requirements on registered foundries (e.g., metal works facilities) to reduce emissions of various contaminants including SO₂ and NO₂. - As of 2021, 1 facility was registered in the Hamilton air zone.
Site-specific standards	Stelco (https://ero.ontario.ca/notice/019-3242)	- Requires action to reduce emissions of, and sets an alternative air standards for, benzene, benzo[a]pyrene, (https://ero.ontario.ca/notice/019-2298) and suspended particulate matter. - These site-specific standards were issued in 2015 and 2016 and expire in 2023.
Site-specific standards	ArcelorMittal Dofasco (https://ero.ontario.ca/notice/019-3241)	- Requires action to reduce emissions of, and sets an alternative air standards for, benzene, benzo(a)pyrene, manganese and manganese compounds (https://ero.ontario.ca/notice/019-2297) , and total suspended particulate matter. - These site-specific standards were issued in 2015 and 2016 and expire in 2023.

Type	Action	Description
Site-specific standards	Harsco Canada Corp (https://ero.ontario.ca/archive/012-2815)	- Requires action to reduce emissions of, and sets an alternative air standard for, suspended particulate matter and manganese and manganese compound emissions at a slag processing operation located on site at the ArcelorMittal Dofasco facility in Hamilton. - These site-specific standards were issued in May 2016 and expires in 2023.
Site-specific standards	Rain Carbon (formerly Ruetgers Canada Inc.) (https://ero.ontario.ca/archive/013-0752)	- Requires action to reduce emissions of, and sets an alternative air standards for, benzene and benzo(a)pyrene. - These site-specific standards were issued in 2017 and expire in 2022.
Site-specific standards	Carmeuse Lime (Canada) Limited (https://ero.ontario.ca/archive/012-9911)	- alternative air standards for, calcium oxide and suspended particulate matter. - These site-specific standards were issued in 2018 and expire in 2028.
Enhanced monitoring	Hamilton Air Monitoring Network (HAMN) (http://www.hamnair.ca/)	A comprehensive air monitoring network, made up of industry-operated and ministry-operated stations that measure impacts from industrial operations and is used to assess ambient air conditions in Hamilton. The ministry conducts regular audits of industry station in the network since 2003. HAMN provides the ministry with real-time air quality alerts based on agreed thresholds as well as monthly exceedance reports and quarterly and annual summary reports.
Enhanced community engagement	Clean Air Hamilton (https://cleanairhamilton.ca/who-we-are/)	Clean Air Hamilton is a multi-stakeholder, member-based organization dedicated to improving air quality in Hamilton. The ministry has been a long-standing member of Clean Air Hamilton for over 20 years. Staff from the ministry's West Central Region participate in monthly Clean Air Hamilton meetings to discuss updates on local air quality initiatives and activities and respond to questions regarding ministry air quality related activities in Hamilton. The ministry provides supporting information for the Clean Air Hamilton annual progress report.
Enhanced strategic planning	Hamilton Air Action Plan (HAAP)	The HAAP is a placed-based approach to address air quality issues in the City of Hamilton, in collaboration with other ministry divisions and groups. The overall goal of the HAAP is to continue to reduce concentrations of priority air contaminants in Hamilton, to collectively strategize on and implement actions and compliance approaches to improve air quality in the City of Hamilton. This is achieved through four key project areas: Compliance Activities and Assessment; Air Compliance Approaches and Policies; Air Quality Monitoring and Communication, Outreach and Planning.

Changes in air quality management actions since 2021

Approvals/programs/regulations that have since ended

Air zone	Program/Regulation	Description

Air zone	Program/Regulation	Description
All Ontario Air Zones	SO ₂ and NO _x emissions trading program (https://ero.ontario.ca/notice/019-1233)	This program ended when the regulations were revoked on February 5, 2021.
Sudbury	Glencore Canada Corporation site specific standard for sulphur dioxide	Site-specific standard for sulphur dioxide ended on January 1, 2022, when O. Reg. 652/21: Air Pollution – Discharge of Sulphur Dioxide from Nickel Smelting and Refining Facilities in the Sudbury Area took effect.
Sudbury	Vale Canada Ltd. site-specific standard for sulphur dioxide (https://ero.ontario.ca/notice/019-4518)	Site-specific standard for sulphur dioxide ended on January 1, 2022, when O. Reg. 652/21: Air Pollution – Discharge of Sulphur Dioxide from Nickel Smelting and Refining Facilities in the Sudbury Area took effect.
Hamilton	Rain Carbon (formerly Ruetgers Canada Inc.) site-specific standards for benzene and benzo(a)pyrene (https://ero.ontario.ca/archive/013-0752)	These site-specific standards expired in 2022.

New actions since 2021

Air zone	Program/Regulation	Description
Northern Ontario	Foundries industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/foundries-industry-standard)	- Imposes requirements on registered foundries (e.g., metal works facilities) to reduce emissions of various contaminants including SO₂ and NO₂. - On January 12, 2023, a facility registered to this industry standard bringing the total number of registered facilities in the Northern Ontario Air Zone to one.
Southern Ontario	Ontario Regulation 88/22 - Air Pollution - Discharge of Sulphur Dioxide from Petroleum Facilities (https://www.ontario.ca/laws/regulation/r22088)	This regulation came into effect on February 25, 2022. It requires actions to reduce sulphur dioxide emissions and applies to specific facilities including the PCLI facility located in Nanticoke.
Southern Ontario	Metal finishers industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/metal-finishers-industry-standard)	- Imposes requirements on registered metal finishing facilities to reduce emissions of various contaminants including hexavalent chromium. - On February 25, 2022, an additional facility registered to this industry standard bringing the total number of registered facilities in the Southern Ontario Air Zone to 8.

Air zone	Program/Regulation	Description
South ern Ontari o	OPG Lennox site-specific standards (https://ero.ontario.ca/notice/019-5142)	On March 15, 2023, the MECP issued multiple site-specific standards requiring action to reduce emissions of, and set an alternative air standard for, SO₂, NO_x, and sulfuric acid from natural gas/RFO electricity generation. These site-specific standards expire in 2033.
South ern Ontari o	Asphalt mix industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution-0/asphalt-mix-industry-standard)	- Requirements to control emissions of various compounds, including metals, particulate, and VOCs from asphalt mixing, storage, crushing, roads, and dryers/oil burners and generators. - On January 12, 2023, a facility registered to this industry standard bringing the total number of registered facilities in the Southern Ontario Air Zone to one.
Sudbu ry	O. Reg 652/21: Air Pollution – Discharge of Sulphur Dioxide from Nickel Smelting and Refining Facilities in the Sudbury Area (https://ero.ontario.ca/notice/019-1107)	This regulation came into effect on January 1, 2022. It addresses sulphur dioxide air emissions from the nickel smelting and refining industry in the Sudbury area that will replace certain requirements under the Local Air Quality Regulation.
Sarnia /St. Clair Townsh ip	Ontario Regulation 88/22 - Air Pollution - Discharge of Sulphur Dioxide from Petroleum Facilities (https://www.ontario.ca/laws/regulation/r22088)	This regulation came into effect on February 25, 2022. It requires actions to reduce sulphur dioxide emissions and applies to specific facilities including the IOL – Sarnia facility, the Shell Facility, and the Suncor facility in the Sarnia/St. Clair Township air zone.

AQHI and air quality alert program reporting

2021 Air Quality Health Index summary

S t a t i o n I D	Ci ty / To wn	N o. of va lid h o u r s	Lo w ri sk A Q HI =1	Lo w ri sk A Q HI =2	Lo w ri sk A Q HI =3	M od er at e ris k A Q HI =4	M od er at e ris k A Q HI =5	M od er at e ris k A Q HI =6	Hi g h ri sk A Q HI =7	Hi g h ri sk A Q HI =8	Hi g h ri sk A Q HI =9	Hi g h ri sk A Q HI =10	Ve ry hi gh ris k A Q HI =+	No . of da ys at lea st 1 h ou r > 6
12008	Win dso r Do wn to wn	8721	1.55	42.99	41.30	13.31	0.70	0.13	0.02	0	0	0	0	1

St at io n ID	Ci ty / To wn	N o. of va lid ho ur s	Lo w ris k A Q HI =1	Lo w ris k A Q HI =2	Lo w ris k A Q HI =3	M od er at e ris k A Q HI =4	M od er at e ris k A Q HI =5	M od er at e ris k A Q HI =6	Hi gh ris k A Q HI =7	Hi gh ris k A Q HI =8	Hi gh ris k A Q HI =9	Hi gh ris k A Q HI =10	Ve ry hi gh ris k A Q HI =+	No . of da ys at lea st 1 h ou r > 6
12016	Wind sor West	8475	1.90	43.89	40.60	11.81	1.58	0.17	0.05	0	0	0	0	3
13001	Ch at ham	8613	8.02	55.74	29.58	6.41	0.22	0.02	0	0	0	0	0	0
14111	Sa rni a	8397	5.09	55.19	26.89	10.56	2.18	0.02	0.07	0	0	0	0	2
15020	Gr an d Be nd	8645	15.48	60.45	19.94	3.69	0.23	0	0.19	0.02	0	0	0	6
15026	Lo nd on	8728	11.55	53.36	28.43	6.46	0.21	0	0	0	0	0	0	0
16015	Po rt St an ley	8079	15.20	60.07	19.94	4.57	0.21	0.01	0	0	0	0	0	0
18007	Tiv ert on	8070	11.88	62.29	21.73	3.98	0.11	0	0	0	0	0	0	0

St at io n ID	Ci ty / To wn	N o. of va lid ho ur s	Lo w ris k A Q HI =1	Lo w ris k A Q HI =2	Lo w ris k A Q HI =3	M od er at e ris k A Q HI =4	M od er at e ris k A Q HI =5	M od er at e ris k A Q HI =6	Hi gh ris k A Q HI =7	Hi gh ris k A Q HI =8	Hi gh ris k A Q HI =9	Hi gh ris k A Q HI =10	Ve ry hi gh ris k A Q HI =+	No . of da ys at lea st 1 ho ur > 6
21005	Br an tfo rd	8681	14.51	54.66	25.46	4.99	0.38	0	0	0	0	0	0	0
26060	Kit ch en er	8533	12.53	55.22	27.24	4.68	0.33	0	0.01	0	0	0	0	1
27067	St. Ca th ari ne s	8498	8.66	53.82	31.89	5.34	0.28	0	0	0	0	0	0	0
28028	Gu el ph	8666	10.29	52.35	30.04	6.53	0.74	0	0.05	0	0	0	0	1
29000	Ha mi lto n Do wn to wn	8571	5.16	42.95	37.45	11.03	2.81	0.40	0.21	0	0	0	0	2
29118	Ha mi lto n W es t	8619	6.53	47.77	34.93	8.97	1.46	0.30	0.03	0	0	0	0	2
29214	Ha mi lto n M ou nt ai	8679	8.58	52.94	29.95	7.19	1.13	0.21	0	0	0	0	0	0

St at io n ID	Ci ty / To wn	N o. of va lid ho ur s	Lo w ris k A Q HI =1	Lo w ris k A Q HI =2	Lo w ris k A Q HI =3	M od er at e ris k A Q HI =4	M od er at e ris k A Q HI =5	M od er at e ris k A Q HI =6	Hi gh ris k A Q HI =7	Hi gh ris k A Q HI =8	Hi gh ris k A Q HI =9	Hi gh ris k A Q HI =10	Ve ry hi gh ris k A Q HI =+	No . of da ys at lea st 1 h ou r > 6
	n													
3 1 1 2 9	To ro nt o Do wn to wn	81 62	1. 94	34 .3 9	47 .6 5	12. 99	2.5 2	0.3 2	0. 12	0. 04	0	0. 04	0	5
3 3 0 0 3	To ro nt o Ea st	86 69	5. 48	50 .0 6	33 .9 1	9.3 3	1.1 4	0.0 7	0	0	0	0	0	0
3 4 0 2 1	To ro nt o No rt h	84 06	8. 09	48 .0 1	33 .0 2	9.3 1	1.5 0	0.0 2	0. 04	0	0	0	0	1
3 5 1 2 5	To ro nt o W es t	86 24	3. 46	44 .1 0	40 .0 5	10. 44	1.6 3	0.3 0	0. 02	0	0	0	0	2
4 4 0 0 8	Bu rli ng to n	87 04	6. 61	48 .8 6	34 .0 1	9.2 3	1.3 0	0	0	0	0	0	0	0
4 4 0 1 7	Oa kvi lle	85 63	6. 63	52 .6 3	32 .4 3	7.1 9	0.9 6	0.1 3	0. 02	0	0	0	0	1
4 4 0 2	Mi lto n	86 46	6. 52	52 .2 9	31 .6 4	8.3 7	1.0 8	0.0 6	0. 03	0	0	0	0	1

St at io n ID	Ci ty / To wn	N o. of va lid ho ur s	Lo w ris k A Q HI =1	Lo w ris k A Q HI =2	Lo w ris k A Q HI =3	M od er at e ris k A Q HI =4	M od er at e ris k A Q HI =5	M od er at e ris k A Q HI =6	Hi gh ris k A Q HI =7	Hi gh ris k A Q HI =8	Hi gh ris k A Q HI =9	Hi gh ris k A Q HI =10	Ve ry hi gh ris k A Q HI =+	No . of da ys at lea st 1 ho ur > 6
9														
45027	Os ha wa	8725	23.97	57.56	15.01	3.17	0.28	0.01	0	0	0	0	0	0
46090	Br a m pt on	8659	9.46	53.67	30.57	5.55	0.68	0.03	0.03	0	0	0	0	1
46108	Mi ssi ss au ga	8364	11.31	53.78	27.81	6.43	0.62	0.04	0.01	0	0	0	0	1
47045	Ba rri e	8464	19.70	56.40	19.98	3.54	0.30	0.02	0.02	0.04	0	0	0	2
48006	Ne w m ar ke t	8742	12.21	57.26	24.61	5.44	0.47	0	0.01	0	0	0	0	1
49005	Pa rry So un d	8748	19.83	61.01	16.43	2.64	0.09	0	0	0	0	0	0	0
49010	Do rs et	8734	29.20	55.10	13.69	1.98	0.03	0	0	0	0	0	0	0
51000	Ot ta wa Do	8657	19.06	53.61	23.98	3.34	0.01	0	0	0	0	0	0	0

St at io n ID *****	Ci ty / To wn	N o. of va lid ho ur s ***	Lo w ris k A Q HI =1 ***	Lo w ris k A Q HI =2 ***	Lo w ris k A Q HI =3 ***	M od er at e ris k A Q HI =4 *****	M od er at e ris k A Q HI =5 *****	M od er at e ris k A Q HI =6 *****	Hi gh ris k A Q HI =7 ***	Hi gh ris k A Q HI =8 ***	Hi gh ris k A Q HI =9 ***	Hi gh ris k A Q HI =10 ***	Ve ry hi gh ris k A Q HI =+ ***	No . of da ys at lea st 1 ho ur > 6 *****
1	wn to wn													
51010	Pe ta wa wa	8648	28.67	57.49	12.86	0.98	0	0	0	0	0	0	0	0
52023	Ki ng st on	8693	13.45	58.64	23.19	4.19	0.53	0	0	0	0	0	0	0
54012	Be lle vill e	8502	13.03	61.03	21.92	3.58	0.42	0	0.01	0	0	0	0	1
56051	Co rn wa ll	8572	17.50	56.77	21.79	3.79	0.12	0.03	0	0	0	0	0	0
59006	Pe ter bo ro ug h	8711	19.37	54.12	21.19	4.86	0.42	0.03	0.01	0	0	0	0	1
63203	Th un de r Ba y	8740	17.46	56.17	22.67	3.01	0.58	0.07	0.03	0.01	0	0	0	2
71078	Sa ult St e. Ma rie	8244	18.17	57.52	20.35	3.71	0.19	0.04	0.01	0	0	0	0	0

St at io n ID	Ci ty / To wn	N o. of va lid ho ur s	Lo w ris k AQHI =1	Lo w ris k AQHI =2	Lo w ris k AQHI =3	M od er at e ris k AQHI =4	M od er at e ris k AQHI =5	M od er at e ris k AQHI =6	Hi gh ris k AQHI =7	Hi gh ris k AQHI =8	Hi gh ris k AQHI =9	Hi gh ris k AQHI =10	Ve ry hi gh ris k AQHI =+	No . of da ys at lea st 1 h ou r > 6
75010	No rt h Ba y	8390	23.71	58.99	14.86	2.38	0.06	0	0	0	0	0	0	1
77233	Su db ur y	8647	22.26	60.54	14.95	2.07	0.10	0.02	0.01	0.02	0.01	0	0	1

2021 air quality alert summary

Air quality forecast region	Special air quality statement	Smog and air health advisory
Algonquin	1	0
Atikokan - Upsala - Quetico	2	0
Attawapiskat	1	0
Bancroft - Bon Echo Park	1	0
Barrie - Orillia - Midland	1	0
Belleville - Quinte - Northumberland	2	0
Big Trout Lake - Sachigo Lake	1	0
Brockville - Leeds and Grenville	1	0
Burk's Falls - Bayfield Inlet	1	0
Chapleau - Gogama	1	0
City of Hamilton	4	0
City of Ottawa	1	0
Ontario	9	0

Air quality forecast region	Special air quality statement	Smog and air health advisory
City of Thunder Bay	1	0
City of Toronto	2	0
Cornwall - Morrisburg	1	0
Dryden - Ignace	2	0
Dufferin - Innisfil	2	0
Dunnville - Caledonia - Haldimand	2	0
Elgin	2	0
Elliot Lake - Ranger Lake	1	0
Fort Frances - Rainy Lake	3	0
Fort Hope - Webequie	1	0
Fort Severn	1	0
Geraldton - Manitouwadge - Hornepayne	1	0
Greater Sudbury and Vicinity	1	0
Grey - Bruce	1	0
Haliburton	1	0
Halton - Peel	2	0
Huron - Perth	2	0
Kapuskasing - Hearst	1	0
Kenora - Nestor Falls	4	0
Kingston - Prince Edward	2	0
Kirkland Lake - New Liskeard - Temagami	1	0
Lake Nipigon - Wabakimi	1	0
London - Middlesex	2	0
Ontario	9	0

Air quality forecast region	Special air quality statement	Smog and air health advisory
Manitoulin - Northshore - Killarney	1	0
Moosonee - Fort Albany	1	0
Niagara	2	0
Nipigon - Marathon - Superior North	1	0
North Bay - West Nipissing	1	0
Oxford - Brant	2	0
Parry Sound - Muskoka	1	0
Peawanuck	1	0
Peterborough - Kawartha Lakes	2	0
Pickle Lake - Wunnummin Lake	2	0
Prescott and Russell	1	0
Red Lake - Ear Falls	4	0
Renfrew - Pembroke - Barry's Bay	1	0
Sandy Lake - Pikangikum	3	0
Sarnia - Lambton	3	0
Sault Ste. Marie - Superior East	1	0
Simcoe - Delhi - Norfolk	2	0
Sioux Lookout - Savant Lake	2	0
Smiths Falls - Lanark - Sharbot Lake	1	0
Stirling - Tweed - South Frontenac	2	0
Superior West	1	0
Timmins - Cochrane	1	0
Waterloo - Wellington	2	0
Ontario	9	0

Air quality forecast region	Special air quality statement	Smog and air health advisory
Wawa - White River - Pukaskwa	1	0
Windsor - Essex - Chatham - Kent	2	0
York - Durham	2	0
Ontario	9	0

Roadside air monitoring in Ontario

2021 ultrafine particles annual statistics

Unit: particles per cubic centimetre (#/cm³)

ID	City	Location	Valid h	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Maximum 1h	Maximum 24h
34021	Toronto North	4905 Dufferin St., ECCC	8657	3,527	6,011	8,556	12,040	18,780	35,376	10,261.7	77,780	25,821
83126	Toronto Hwy 401	Hwy 401 at 125 Resources Rd.	8225	8,419	18,282	31,860	51,330	92,080	17,152	42,579.1	277,000	146,537
83133	Toronto Island	535 Lakeshore Ave., Hanlan's Point	7026	2,060	3,657	5,206	7,338	12,145	23,925	6,415.	55,900	14,756

2021 black carbon annual statistics

Unit: micrograms per cubic metre (µg/m³)

ID	City	Location	Valid h	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Maximum 1h	Maximum 24h
12008	Windsor Downtown	467 University Ave. W.	8179	0.15	0.27	0.39	0.56	0.94	2.00	0.49	6.31	1.41
12016	Windsor West	College Ave./South St.	8635	0.16	0.27	0.40	0.56	0.97	2.12	0.50	4.76	1.54

ID *****	City	Location *****	Valid h ***	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Maximum 1h ***	Maximum 24h ***
29000	Hamilton Downtown	Elgin St./ Kelly St. *****	8603	0.14	0.26	0.41	0.63	1.21	2.68	0.57	5.56	2.37
33003	Toronto East	Kennedy Rd./ Lawrence Ave. E. *****	7097	0.12	0.23	0.34	0.50	0.89	1.77	0.44	3.52	1.60
34021	Toronto North	4905 Dufferin St., ECCC *****	8735	0.12	0.21	0.34	0.52	0.96	2.13	0.47	5.15	1.99
35033	Etobicoke South	185 Judson St. *****	8737	0.21	0.37	0.54	0.77	1.29	3.00	0.69	11.26	2.57
83126	Toronto Hwy 401	Hwy 401 at 125 Resources Rd. *****	8577	0.31	0.56	0.87	1.40	2.46	4.59	1.18	7.71	3.88
83133	Toronto Island	535 Lakeshore Ave., Hanlan's Point	8702	0.00	0.13	0.23	0.38	0.75	1.81	0.33	2.96	1.58

2021 iron in PM_{2.5} annual statistics

Unit: nanograms per cubic metre (ng/m³)

ID *****	City	Location *****	Valid h ***	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Maximum 1h ***	Maximum 24h ***
29000	Hamilton Downtown	Elgin St./ Kelly St. *****	7682	15	30	49	83	233	862	104.0	3309	613.4
35033	Etobicoke South	185 Judson St. *****	5116	21	40	63	95	173	441	87.6	3590	324.7
83126	Toronto Hwy 401	Hwy 401 at 125 Resources Rd. *****	7565	47	94	171	317	582	1095	257.0	2262	654.6

2021 copper in PM2.5 annual statistics

Unit: nanograms per cubic metre (ng/m³)

ID	City	Location	Valid h	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Maximum 1h	Maximum 24h
29000	Hamilton Downtown	Elgin St./ Kelly St.	7682	1.2	1.6	2.2	3.5	9.0	32.7	4.4	507.5	34.7
35033	Etobicoke South	185 Judson St.	5116	2.0	2.7	3.3	4.1	6.3	24.1	4.4	426.5	57.4
83126	Toronto Hwy 401	Hwy 401 at 125 Resources Rd.	7565	2.7	3.9	6.3	10.9	17.7	33.1	9.8	1646.0	209.1

2021 manganese in PM2.5 annual statistics

Unit: nanograms per cubic metre (ng/m³)

Mn in PM2.5 24h AAQC: 100 ng/m³

ID	City	Location	Valid h	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Maximum 1h	Maximum 24 h	Number of times above 24h criteria
29000	Hamilton Downtown	Elgin St./ Kelly St.	7682	0.0	0.3	0.8	1.7	6.4	51.2	3.4	529.7	35.3	0
35033	Etobicoke South	185 Judson St.	5116	0.4	0.9	1.4	2.4	4.8	13.1	2.3	51.9	9.6	0
83126	Toronto Hwy 401	Hwy 401 at 125 Resources Rd.	7565	0.9	1.8	2.7	4.1	7.2	16.0	3.6	102.6	17.2	0

2021 lead in PM2.5 annual statistics

Unit: nanograms per cubic metre (ng/m³)

ID *****	City	Location	Valid h ***	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Maximum 1h ***	Maximum 24h ***
29000	Hamilton Downtown	Elgin St./ Kelly St.	7681	0.6	1.4	2.3	3.4	7.3	23.4	3.5	90.4	14.6
35033	Etobicoke South	185 Judson St.	5115	0.4	0.8	1.4	2.3	4.8	26.5	2.8	174.3	27.0
83126	Toronto Hwy 401	Hwy 401 at 125 Resources Rd.	7570	0.7	1.2	1.9	3.0	5.4	16.1	2.9	192.0	26.8

2021 selenium in PM_{2.5} annual statistics

Unit: nanograms per cubic metre (ng/m³)

ID *****	City	Location	Valid h ***	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Maximum 1h ***	Maximum 24h ***
29000	Hamilton Downtown	Elgin St./ Kelly St. *****	7682	0.03	0.12	0.25	0.55	1.59	6.41	0.68	28.17	5.68
35033	Etobicoke South	185 Judson St. *****	5116	0.00	0.05	0.20	0.47	1.42	5.98	0.60	29.06	3.93
83126	Toronto Hwy 401	Hwy 401 at 125 Resources Rd. *****	7565	0.07	0.17	0.27	0.46	1.20	8.57	0.66	47.27	6.43

2021 zinc in PM_{2.5} annual statistics

Unit: nanograms per cubic metre (ng/m³)

ID *****	City	Location	Valid h ***	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Maximum 1h ***	Maximum 24h ***
29000	Hamilton Downtown	Elgin St./ Kelly St. *****	7682	2.2	5.1	8.8	15.3	45.1	298.4	23.9	1,529	184.8

ID *****	City	Location	Valid h ***	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Maximum 1h ***	Maximum 24h ***
83126	Toronto Hwy 401	Hwy 401 at 125 Resources Rd. *****	6481	0.1	0.2	0.4	0.8	2.9	11.1	1.14	18.7	15.17

2021 ammonium in PM_{2.5} annual statistics

Unit: micrograms per cubic metre (µg/m³)

ID *****	City	Location	Valid h ***	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Maximum 1h ***	Maximum 24h ***
83126	Toronto Hwy 401	Hwy 401 at 125 Resources Rd. *****	6481	0.0	0.1	0.4	0.9	2.1	8.1	0.89	11.8	9.69

6-year trend for ultrafine particles

Annual mean (#/cm³)

ID *****	City/Town	2016	2017	2018	2019	2020	2021	Change over 6 years (%)	Trend
34021	Toronto North	11953	12074	12293	10873	9056	10262	-20.1	SSS *****
83126	Toronto Hwy 401 *****	43280	39053	37984	39831	40635	42579	11.5	SSS *****
83133	Toronto Island	INS *****	INS *****	INS *****	6693	6126	6415	-12.3	SSS *****

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.

SSS - Significant Sen's Slope (significant trend detected).

6-year trend for black carbon

Annual mean (µg/m³)

ID *****	City/Town	2016	2017	2018	2019	2020	2021	Change over 6 years (%)	Trend
12008	Windsor Downtown	0.53	0.50	0.57	0.59	0.43	0.49	-15.2	Non-SSS *****

ID *****	City/Town	2016	2017	2018	2019	2020	2021	Change over 6 years (%)	Trend *****
12016	Windsor West	0.70	0.65	0.60	0.59	0.45	0.50	-34.8	SSS *****
29000	Hamilton Downtown	0.51	0.71	0.72	0.67	0.57	0.57	-4.6	Non-SSS *****
33003	Toronto East	0.62	0.62	0.45	0.45	0.45	0.44	-33.9	SSS *****
34021	Toronto North	0.62	0.60	0.49	0.53	0.51	0.47	-15.5	Non-SSS *****
35033	Etobicoke South	0.89	0.97	0.79	0.83	0.88	0.69	-14.5	SSS *****
83126	Toronto Hwy 401 *****	1.62	1.51	1.31	1.43	1.20	1.18	-23.3	SSS *****
83133	Toronto Island	0.44	0.35	0.37	0.37	0.34	0.33	-22.0	SSS *****

Notes:

SSS - Significant Sen's Slope (significant trend detected).

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

6-year trend for iron in PM2.5

Annual mean (ng/m³)

ID *****	City/Town	2016	2017	2018	2019	2020	2021	Change over 6 years (%)	Trend *****
29000	Hamilton Downtown	116.6	116.9	105.9	106.9	88.3	104.0	-19.4	SSS *****
35033	Etobicoke South	110.1	102.5	103.5	91.2	88.1	87.6	-22.7	SSS *****
83126	Toronto Hwy 401 *****	INS *****	261.6	275.7	INS *****	288.6	257.0	1.6	Non-SSS *****

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.

SSS - Significant Sen's Slope (significant trend detected).

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

6-year trend for copper in PM2.5

Annual mean (ng/m³)

ID *****	City/Town	2016	2017	2018	2019	2020	2021	Change over 6 years (%)	Trend d
29000	Hamilton Downtown	4.7	4.8	4.2	4.0	3.5	4.4	-18.8	SSS *****
35033	Etobicoke South	5.8	6.1	5.7	5.4	4.3	4.4	-32.1	SSS *****
83126	Toronto Hwy 401 *****	INS *****	11.5	11.9	INS *****	10.2	9.8	-20.6	SSS *****

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.

SSS - Significant Sen's Slope (significant trend detected).

6-year trend for manganese in PM_{2.5}

Annual mean (ng/m³)

ID *****	City/Town	2016	2017	2018	2019	2020	2021	Change over 6 years (%)	Trend d
29000	Hamilton Downtown	5.5	3.9	3.5	4.2	2.9	3.4	-41.0	SSS *****
35033	Etobicoke South	2.8	3.1	2.5	2.4	2.3	2.3	-27.5	SSS *****
83126	Toronto Hwy 401 *****	INS *****	3.7	3.7	INS *****	3.7	3.6	-5.3	Non-SSS *****

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.

SSS - Significant Sen's Slope (significant trend detected).

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

6-year trend for lead in PM_{2.5}

Annual mean (ng/m³)

ID *****	City/Town	2016	2017	2018	2019	2020	2021	Change over 6 years (%)	Trend d
29000	Hamilton Downtown	3.5	3.6	3.6	3.6	3.3	3.5	-3.2	Non-SSS *****
35033	Etobicoke South	3.3	4.7	3.1	2.6	2.2	2.8	-29.1	Non-SSS *****
83126	Toronto Hwy 401 *****	INS *****	3.5	3.2	INS *****	2.8	2.9	-11.5	Non-SSS *****

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

6-year trend for selenium in PM2.5

Annual mean (ng/m³)

ID *****	City/Town	2016	2017	2018	2019	2020	2021	Change over 6 years (%)	Trend
29000	Hamilton Downtown	0.61	0.59	0.67	0.62	0.58	0.68	-3.2	Non-SSS *****
35033	Etobicoke South	0.61	0.63	0.43	0.49	0.54	0.60	-8.0	Non-SSS *****
83126	Toronto Hwy 401 *****	INS *****	0.45	0.43	INS *****	0.59	0.66	56.2	SSS *****

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.

SSS - Significant Sen's Slope (significant trend detected).

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

6-year trend for zinc in PM2.5

Annual mean (ng/m³)

ID *****	City/Town	2016	2017	2018	2019	2020	2021	Change over 6 years (%)	Trend
29000	Hamilton Downtown	40.1	25.8	26.5	29.0	20.5	23.9	-33.4	SSS *****
35033	Etobicoke South	21.6	24.4	18.5	17.7	16.0	15.1	-36.9	SSS *****
83126	Toronto Hwy 401 *****	INS *****	24.2	22.3	INS *****	18.1	19.5	-26.6	SSS *****

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.

SSS - Significant Sen's Slope (significant trend detected).

6-year trend for organics in PM2.5

Annual mean (µg/m³)

ID *****	City/Town	2016	2017	2018	2019	2020	2021	Change over 6 years (%)	Trend
83126	Toronto Hwy 401 *****	4.13	7.01	5.20	3.88	4.83	3.94	-22.4	Non-SSS *****

Notes:

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

6-year trend for sulphate in PM_{2.5}

Annual mean (µg/m³)

ID	City/Town	2016	2017	2018	2019	2020	2021	Change over 6 years (%)	Trend
83126	Toronto Hwy 401	0.91	1.12	0.66	0.65	0.67	0.56	-34.6	SSS

Notes:

SSS - Significant Sen's Slope (significant trend detected).

6-year trend for nitrate in PM_{2.5}

Annual mean (µg/m³)

ID	City/Town	2016	2017	2018	2019	2020	2021	Change over 6 years (%)	Trend
83126	Toronto Hwy 401	1.31	1.71	1.65	1.20	1.38	1.14	-10.6	Non-SSS

Notes:

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

6-year trend for ammonium in PM_{2.5}

Annual mean (µg/m³)

ID	City/Town	2016	2017	2018	2019	2020	2021	Change over 6 years (%)	Trend
83126	Toronto Hwy 401	0.73	1.46	0.65	0.41	1.06	0.89	-3.7	Non-SSS

Notes:

Non-SSS - Non-Significant Sen's Slope (significant trend not detected).

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