



Philadelphia's Air Quality Report 2025



Executive Summary ¹

This report focuses on the air quality of the City of Philadelphia, as presented by the Philadelphia Department of Public Health, Air Management Services (AMS), the local air pollution control agency for the City of Philadelphia. As an urban area, Philadelphia faces many of the same pollution challenges as other densely populated areas, including emissions from vehicles and industry. The information contained in this report reviews Philadelphia's air quality for the calendar year 2025 and reports how the City's air compared with the National Ambient Air Quality Standards (NAAQS). This report covers the following criteria pollutants: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead. It also provides an overview of hazardous air pollutants (HAPs), also referred to as air toxics.

In general, long-term trends show that air pollutant concentrations in Philadelphia have decreased over the last several decades. In 2025, Philadelphia maintained the NAAQS for all pollutants except for ozone. For simplicity, impacts from each pollutant are compared, and a standardized Air Quality Index (AQI) is used to report daily air quality. In 2025, Philadelphia experienced 184 Good days, 173 Moderate days, and 8 Unhealthy for Sensitive Groups (Code Orange) days. Philadelphia had no Unhealthy, Very Unhealthy, or Hazardous days recorded based on AQI values.

For further information, please visit the Air Management Services website at: <https://www.phila.gov/departments/departments-of-public-health/about-us/contact-us/> or contact us at: 215-685-7580.

Cherelle Parker, Mayor
Palak Raval-Nelson, Ph.D., M.P.H., Health Commissioner

¹ Cover photo by [Leo Serrat](#) on [Unsplash](#)

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Introduction

The Philadelphia Department of Public Health, Air Management Services (AMS) is responsible for the prevention, abatement, and control of air pollution and air pollution nuisances; achieving and maintaining the National Ambient Air Quality Standards (NAAQS) in Philadelphia; and protecting the health and quality of life of the Philadelphia community from the adverse effects of air contaminants and noise.

AMS implements the environmental protection mandates contained in city, state, and federal regulations; reviews construction and operating permits for compliance with air regulations, standards, and guidelines; develops emission inventories for large stationary sources; operates and maintains a citywide air sampling network to continuously monitor Philadelphia's air; routinely inspects pollution sources; services citywide complaints of air pollution, asbestos, vibration, idling and noise; issues violations; conducts enforcement actions; and advances voluntary emissions reductions.

Air Monitoring Network

The City of Philadelphia operates a robust air monitoring network comprising nine EPA-regulatory stations, as depicted in Figure 1. An additional regulatory station, Wissahickon (WIS) (formerly HUN), began routine data collection on April 1, 2026, bringing the total number of regulatory stations to ten. These ten stations, strategically located across the city, measure criteria pollutants, including ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and particulate matter (PM₁₀ and PM_{2.5}). Four stations also monitor air toxics, such as formaldehyde, benzene, and carbon tetrachloride. Real-time measurements at many sites provide immediate data on pollution levels, enabling prompt responses. Figure 1 and Table 1 show the locations and pollutants measured at each station. AMS measures air quality for several reasons:

- To ensure that long-term goals and targets to reduce levels of air pollution are being met.
- To provide information to the public as to how good or bad the air quality is in Philadelphia.
- To ensure attainment with standards set forth by the United States Environmental Protection Agency (EPA).

An air monitoring network plan (AMNP) has been made available to the public annually since 2007. The most recent AMNP is located on the AMS reports and documents website:

<https://www.phila.gov/documents/air-management-reports-and-documents/>.

This monitoring network is designed and established following requirements and protocols set forth by the EPA, specified in Title 40 Part 58 of the Code of Federal Regulations.

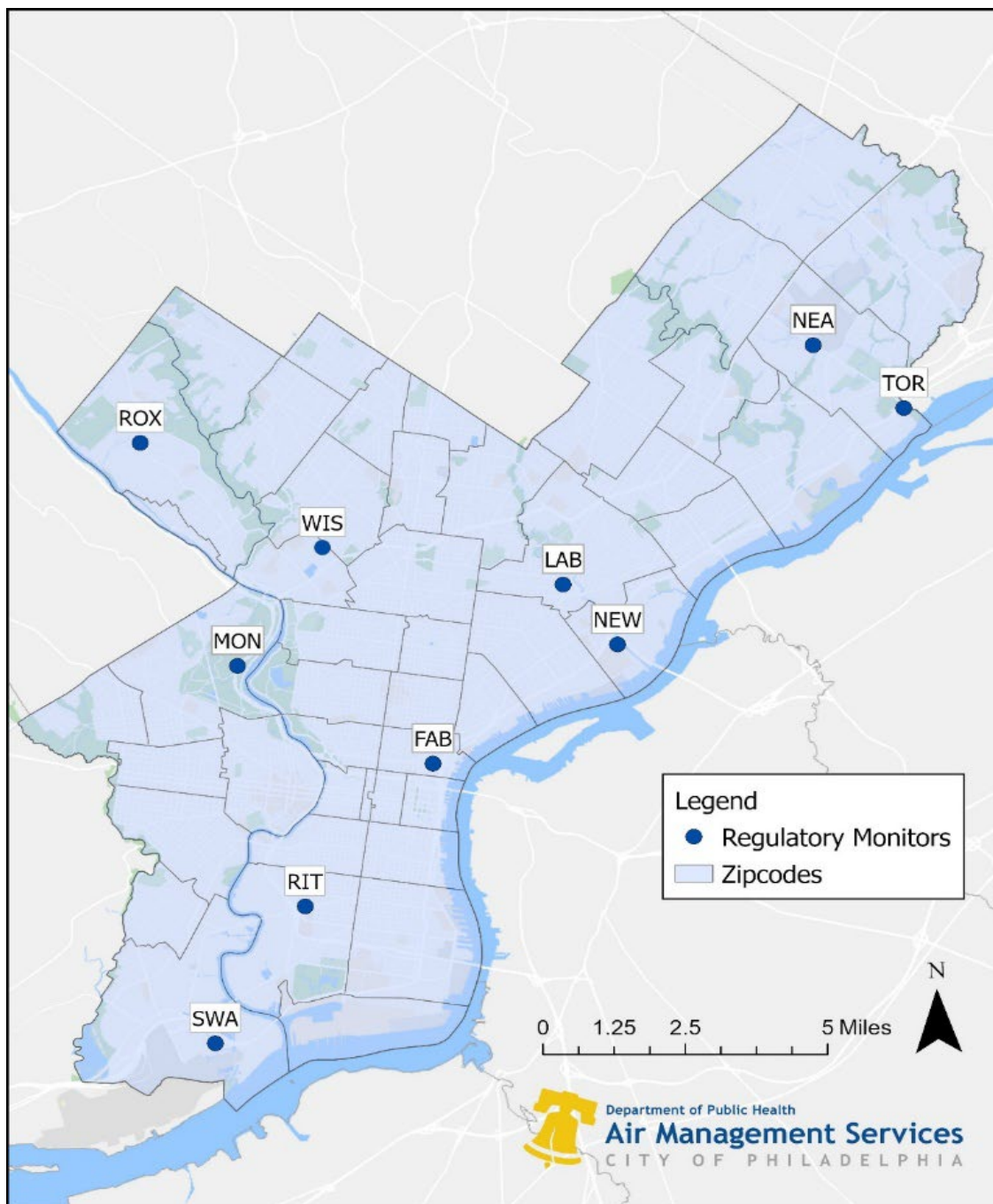


Figure 1. Map of regulatory air monitoring stations in Philadelphia, 2025.

Table 1. Philadelphia AMS air monitoring sites, their locations, and the pollutants or parameters measured at each station.

AQS Site Code	AMS Site	Address	Parameter															AMS Site
			CO	SO ₂	O ₃	NO ₂ , NO _x , NO	NO _y /NO	PM ₁₀	PM _{2.5}	Speciated PM _{2.5}	PM Coarse	Black Carbon / Ultrafine PM	Carbonyls	PAMS VOC	TSP Metals (Be, Cr, Mn, Ni, As, Cd, Pb)	Toxics TO15	MET	
421010004	LAB	1501 E. Lycoming St			X				X									LAB
421010014	ROX	Eva & Dearnley Sts											X			X		ROX
421010024	NEA	Grant Ave & Ashton Rd			X													NEA
421010048	NEW	2861 Lewis St	X	X	X	X	X	X	X	X	X		X	X		X	X	NEW
421010055	RIT	24th & Ritner Sts		X					X	X			X		X	X		RIT
421010057	FAB	3rd & Spring Garden Sts							X									FAB
421010063	SWA	8200 Enterprise Ave											X			X		SWA
421010075	TOR	4901 Grant Ave & James St	X			X			X								X	TOR
421010076	MON	I-76 & Montgomery Drive	X			X			X			X			X		X	MON
421010068	WIS	5200 Wissahickon Ave				X			X				X			X		WIS

Table 2. Philadelphia AMS air monitoring site locations and the purpose of each monitoring site.

AMS Site	Address	Statement of Purpose
LAB	1501 E. Lycoming St	Built in 1964, this monitor assesses the City’s ozone and PM _{2.5} concentrations. New monitoring methods are often evaluated on this site because it is located at the AMS Laboratory.
ROX	Eva St & Dearnley St	As a peripheral site, it is used for measuring Air Toxics and Carbonyls.
NEA	Grant Ave & Ashton Rd	As a peripheral site, it is best for measuring ozone in the city, because as a secondary pollutant, ozone requires some time to form (longer time periods allow precursor emissions to distribute more uniformly across a region, allowing ozone concentrations to develop more uniformly across subregions and even large-scale regions). There are fewer “hot spots” as ozone is not directly emitted from combustion activities, as other pollutants are.
NEW	2861 Lewis St	This site was one of the few sites that was originally established to measure the impact of specific industrial facilities, which are now closed. Today, the monitors conduct continuous particulate monitoring and provide information about the nearby wastewater treatment plant. As of October 2, 2013, the NCore site has been moved to this site from the Baxter water treatment plant (BAX). NEW also serves as the city’s Photochemical Assessment Monitoring Station (PAMS), which means it measures ozone precursors and meteorological conditions that can help predict ozone concentrations.
RIT	24 th St & Ritner St	This site was selected to help assess the impact of the petroleum refinery on the local community. The refinery is now closed, but other industrial work in the area justifies the monitor location. The area was identified by air quality modeling.
FAB	3 rd St & Spring Garden St	This site was established to monitor high levels of fine particulates in the City based on EPA Region III’s air quality modeling of air toxics in Philadelphia. It shows high levels of fine particulate created by vehicle traffic.
SWA	8200 Enterprise Ave	This site was established to measure air toxics, carbonyls, and metals. EPA Region III modeling analysis has shown that areas near the airport have high levels of aldehydes, a type of carbonyl.
TOR	4901 Grant Ave & James St.	This site was established as the 1 st near-road NO ₂ monitor in the Philadelphia-Camden-Wilmington, PA-NJ-DE-MD Metropolitan Statistical Area.
MON	I-76 & Montgomery Drive	This site was established as the 2 nd near-road monitor in the Philadelphia-Camden-Wilmington, PA-NJ-DE-MD Metropolitan Statistical Area.
WIS (Formerly HUN)	5200 Wissahickon Ave	This site, located in western North Philadelphia, began collecting data on April 1, 2026. It monitors nitrogen dioxide (NO ₂), PM _{2.5} , carbonyls, and air toxics to ensure compliance with National Ambient Air Quality Standards and to support the assessment of key criteria pollutants and air toxics for public health protection.

Quality Assurance

The AMS Laboratory's main responsibility is to monitor and provide accurate data on the quality of the City's air, as poor air quality can lead to various health concerns. Pollutants in the atmosphere are measured to answer several questions, such as:

- Are the NAAQS being met in Philadelphia?
- How close or how far away is the city from achieving the projected goals for these standards?
- Which pollutants are getting worse (increasing in concentration) or improving (decreasing in concentration)?

Many measurements require detecting very small amounts of a pollutant, often expressed as parts per million (ppm) or parts per billion (ppb). To illustrate this, imagine a million yellow balls, all the same size, with several red balls in the middle of them; the challenge is to find those red balls and then be able to count them. The instruments used to measure air pollutants need to be reliable in identifying the pollutant and accurate in their measurements every time. The primary way to check if the instruments are giving accurate measurements is to send a sample of air that has a known amount (concentration) of a pollutant and compare the instrument's concentration measurement to the known correct concentration. Adjustments (calibrations) can then be made to an instrument to improve its measurements. If the equipment is significantly off, the instrument needs to be repaired or replaced. The EPA and the AMS Laboratory have standard operating procedures outlining the accuracy and reliability required to answer the necessary questions. The current instruments are much more reliable than those available many years ago. Steps to ensure good data quality include:

- Automated calibration,
- Manual calibration conducted by chemists,
- Review of the data by an experienced Quality Assurance (QA) engineer or scientist.

The system is geared towards public safety; for example, a few measurements can be enough to identify a problem in meeting the NAAQS, but many good measurements over a period of time (often three years), as well as additional types of analysis, are needed to "demonstrate attainment" with the corresponding pollutant's standard on the NAAQS.

The EPA regulations on establishing an air monitoring network are found in Title 40 – Protection of Environment in the Code of Federal Regulations Part 58 – Ambient Air Quality Surveillance². An EPA comprehensive technical systems audit (TSA) is conducted at least once every 3 years to evaluate an ambient air quality monitoring program. AMS's most recent TSA was conducted from July 11–13, 2023. The TSA included on-site interviews with program personnel, evaluations of the agency's ambient air monitoring sites and laboratories, and a review of quality assurance and

² [Ambient Air Quality Surveillance1F](#)

data processing procedures. The next TSA is scheduled for the week of September 28, 2026. AMS follows EPA guidance in the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II³, dedicated to the Ambient Air Quality Surveillance Program and the data collection activities inherent to that program. Additionally, workshops are provided annually for staff to interact with and learn from representatives of nearby state and local monitoring agencies, as well as expert speakers. Participants share experiences meeting challenges with new air quality monitoring technology, updated data analysis and quality assurance methods, and revised regulatory requirements. AMS staff regularly attend training and workshops held by the Mid-Atlantic Regional Air Management Association (MARAMA).

Air Quality Index

The Air Quality Index (AQI) is a color-coding system for air quality used by government agencies across the United States. Daily pollution levels for five pollutants (ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide) are converted into a score ranging from 1 to >300. This scale helps communicate the impacts of air pollution to the public in a clear and simple way. The AQI is calculated for each pollutant, and the highest of the five pollutant scores is reported as the overall air quality rating for Philadelphia for a given day.

A color-coded AQI scale is shown in Figure 2. When the AQI is 100, it typically means the pollutant is at the NAAQS concentration.

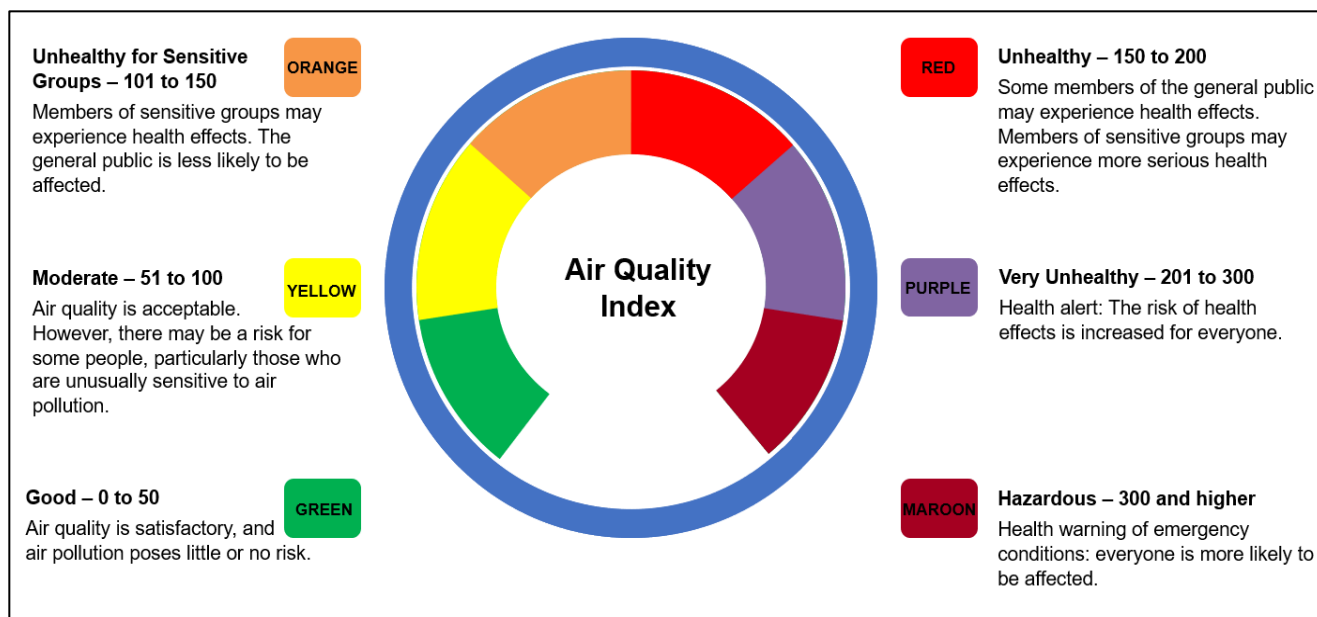


Figure 2. Color Coded AQI

³ <https://www.epa.gov/amtic/ambient-air-monitoring-quality-assurance-guidance-documents>

An “Action Day” occurs when the AQI for any pollutant exceeds 100, indicating that some people should begin taking steps to limit their exposure to pollution. Action Days are more likely to occur in the summer months, but they can happen any time of the year. On these days, the public is advised to take precautions to protect themselves and their families from potential health effects and do their part to reduce pollution. For example, on Code Orange Days, children, seniors, and those with respiratory ailments (sensitive groups) are advised to minimize prolonged outdoor exposure. On a Red or Purple day, all residents are advised to limit outdoor activity. Red and Purple days are uncommon in Philadelphia.

Action Days are reported through television, online media, and by local and regional air agencies. Current air quality conditions in Philadelphia can be found at www.phila.gov/breathephilly or <https://www.phila.gov/services/mental-physical-health/environmental-health-hazards/air-quality/>.

The AQI values for each day of 2025 are shown in Figure 3⁴. In 2024, the EPA lowered the PM_{2.5} NAAQS, resulting in changes to the AQI Breakpoints (the concentrations associated with green, yellow, etc.). This means that PM_{2.5} concentrations that were considered Good in 2023 could now be considered Moderate. Figure 3 shows the daily AQI using the newest breakpoints from 2025. Additionally, these readings were retrieved from the EPA database after the 2025 EPA update of PM_{2.5} FEM data.⁵

In 2025, Philadelphia experienced a total of 184 Good days by AQI value, 173 Moderate days, 8 Unhealthy for Sensitive Groups (Code Orange) days, and 0 Unhealthy, Very Unhealthy, or Hazardous days.

⁴ <https://www.epa.gov/outdoor-air-quality-data/air-data-tile-plot>. Downloaded May 5, 2026.

⁵ <https://www.federalregister.gov/documents/2024/05/16/2024-10750/update-of-pm25-data-from-t640t640x-pm-mass-monitors>.

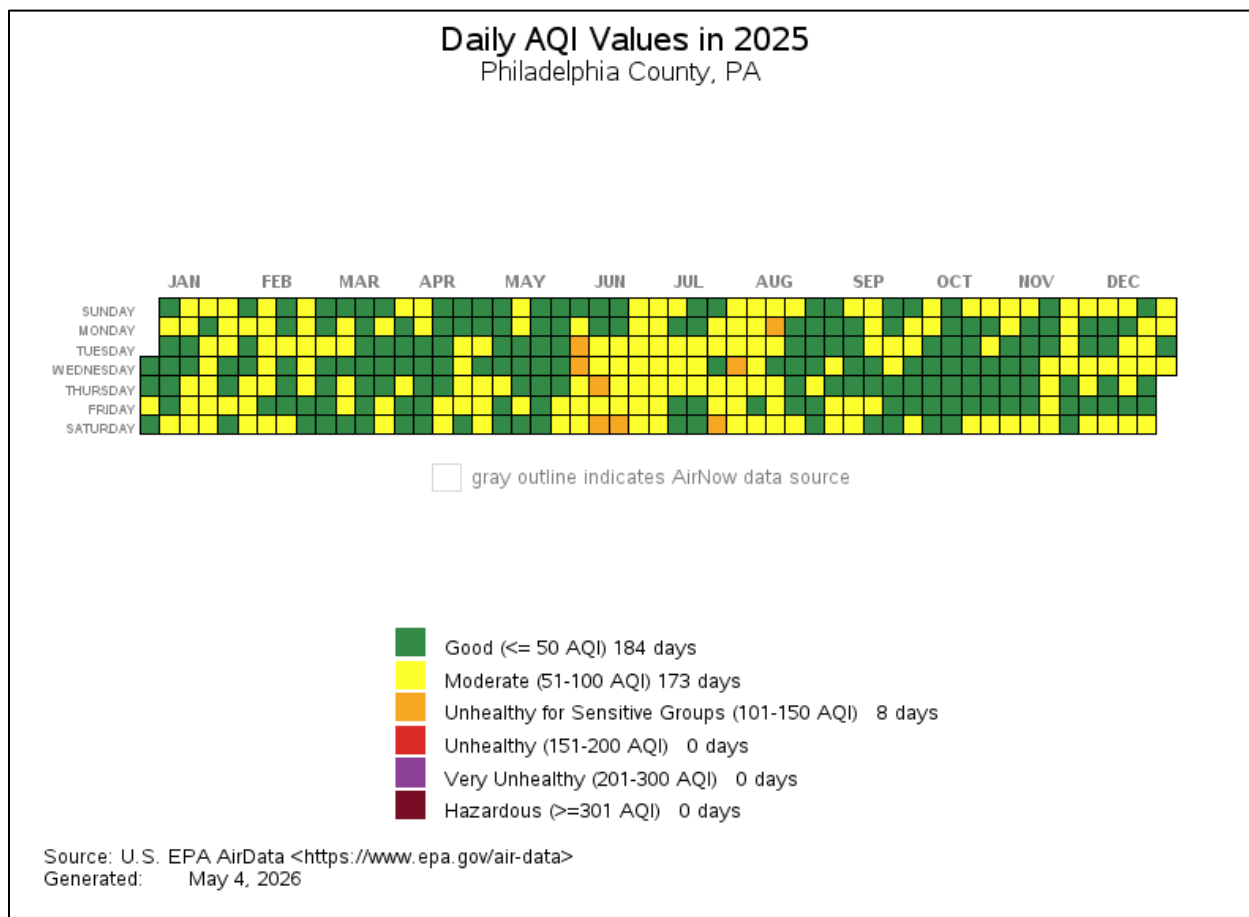


Figure 3. Annual summary of the number of good, moderate, and unhealthy air quality days in Philadelphia based on monitoring conducted by AMS.

Figure 4 summarizes AQI for each year since 1993 and helps identify long-term air quality trends. The figure shows that days with Unhealthy or worse AQI have decreased, but those days with Moderate AQI have increased recently.

Note that in this chart:

- 1) The AQI reflects the recent EPA update of PM_{2.5} FEM data (see Footnote 5).
- 2) All historic AQI values have been standardized with the current EPA AQI breakpoints and are consistent with the EPA 2015 ozone standards and the 2024 PM_{2.5} standards.

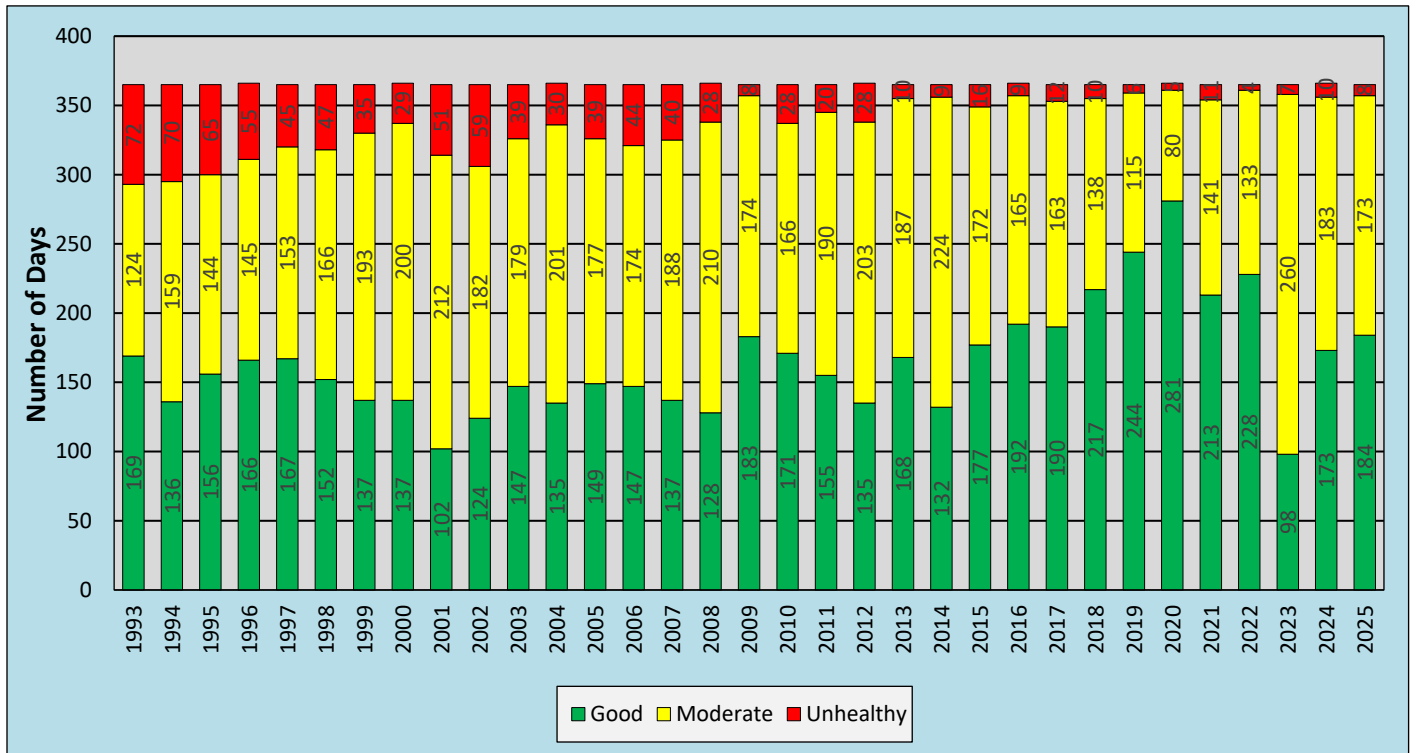


Figure 4. Philadelphia Annual AQI Summary 1993 - 2025

Note: Red color indicates Code Orange, Code Red, and worse air quality days combined

National Ambient Air Quality Standards

The Clean Air Act (CAA), last amended in 1990, requires the EPA to set National Ambient Air Quality Standards (NAAQS) for certain pollutants that are harmful to public health and the environment. The NAAQS is a pollutant concentration considered unhealthy for the public to breathe. The goal is to keep pollutant concentrations below the NAAQS. The CAA identifies two types of NAAQS.

- Primary standards are established to protect public health, including the health of sensitive populations such as people with asthma, children, and older adults.
- Secondary standards are established to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The EPA has set NAAQS for six criteria air pollutants: carbon monoxide, sulfur dioxide, nitrogen dioxide, lead, particulate matter (airborne particles), and ozone. Periodically, the standards are reviewed and may be revised. The current standards are listed here: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>. A history of the standard for each criteria pollutant is shown in Appendix C. The standards are listed as pollutant concentrations in parts per million (ppm) by volume, parts per billion (ppb) by volume, or in micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$).

State and local agencies across the country collect pollutant concentrations year-round. For each pollutant, there is a specific way to compare these concentrations to the NAAQS. Some pollutants have short-term concentrations, such as a day or 8 hours, while others are averaged over the entire year. Based on these specific averaging times and techniques, a value for each year is produced that can be compared to the NAAQS. However, concentrations can vary widely from year to year, and the NAAQS are intended to evaluate pollution levels over the long term. Therefore, most pollutant concentrations are averaged over 3 years and then compared to the NAAQS. This final concentration, compared to the NAAQS, is called a Design Value. Design Value specifications can be found in the EPA NAAQS table here: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>.

In 2025, Philadelphia maintained attainment for all criteria pollutants, except ozone. EPA revised the annual primary PM_{2.5} National Ambient Air Quality Standard (NAAQS) in 2024, lowering the standard from 12.0 $\mu\text{g}/\text{m}^3$ to 9.0 $\mu\text{g}/\text{m}^3$ ⁶. EPA initiated a reconsideration of the 2024 PM_{2.5} NAAQS in 2025⁷; however, no final action has been taken to modify or replace the standard. The 2024 PM_{2.5} NAAQS remains in effect while EPA's regulatory process continues. Philadelphia continues to monitor PM_{2.5} concentrations and evaluate strategies to reduce fine particulate matter levels, and support continued improvement in air quality⁸. AMS is currently reviewing the PM_{2.5} attainment criteria and evaluating Philadelphia's attainment status under the revised standard.

⁶ Federal Register :: Reconsideration of the National Ambient Air Quality Standards for Particulate Matter: Correction

⁷ Trump EPA Announces Path Forward on National Air Quality Standards for Particulate Matter (PM_{2.5}) to Aid Manufacturing, Small Businesses | US EPA

⁸ Particle Pollution Designations for the 2024 Revised Annual PM NAAQS - Where You Live | US EPA

The Pollutants AMS Measures

The following pages provide information on the health effects, sources, and trends of pollutants measured in Philadelphia. The sections include the six criteria pollutants, including ozone (O₃), carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), lead (Pb), and particulate matter (PM₁₀ and PM_{2.5}), for which EPA has established NAAQS, as well as pollutants identified as being toxic or hazardous.

For criteria pollutants, historical trends are presented using annual monitoring statistics and EPA design values, as appropriate for the pollutant and applicable NAAQS. Design values are pollutant-specific statistics calculated in accordance with EPA regulations and are used to determine whether an area meets the NAAQS. Rather than relying on pollution levels from a single day or year, a design value is calculated using pollutant-specific statistical procedures that typically incorporate air quality measurements collected over a three-year period. This approach reduces the influence of unusual short-term events and provides a more representative measure of long-term air quality conditions for comparison with the NAAQS.

For pollutants presented using annual monitoring statistics, the graphs display the range of measured concentrations across monitoring sites (minimum and maximum, shown as the “MIN/MAX RANGE”) along with a solid black line representing the annual mean concentration calculated from all monitoring sites. This annual mean provides an overall indication of pollutant levels across the Philadelphia monitoring network and is less influenced by short-term fluctuations or extreme values. The annual average concentration shown in these graphs represents the average condition across the monitoring sites and is not used for direct comparison with the NAAQS. The dashed NAAQS line is included only as a visual reference to show the relationship between the overall monitored concentrations and the applicable standard.

The design value graphs show the design value at each monitor for each year. Compliance with the NAAQS is determined using the applicable design values at individual monitoring sites. The NAAQS line on each graph is compared to the design value, and if any design values are above the line, Philadelphia does not attain the NAAQS. The regulatory monitors used to establish design values follow specific siting criteria that can change over time. Regulatory monitors must also adhere to strict data completeness requirements to produce a valid design value. As a result, monitors may be removed or relocated if they are no longer necessary. Gaps in trendlines may also appear if a monitor has a data quality or completeness issue.

Appendix B provides tables of historical monitoring data downloaded from EPA’s Air Quality System (AQS) Data Mart.

Ozone (O₃)

NAAQS

The 3-year average of the annual fourth-highest daily maximum 8-hour average O₃ concentration is less than or equal to 0.070 ppm

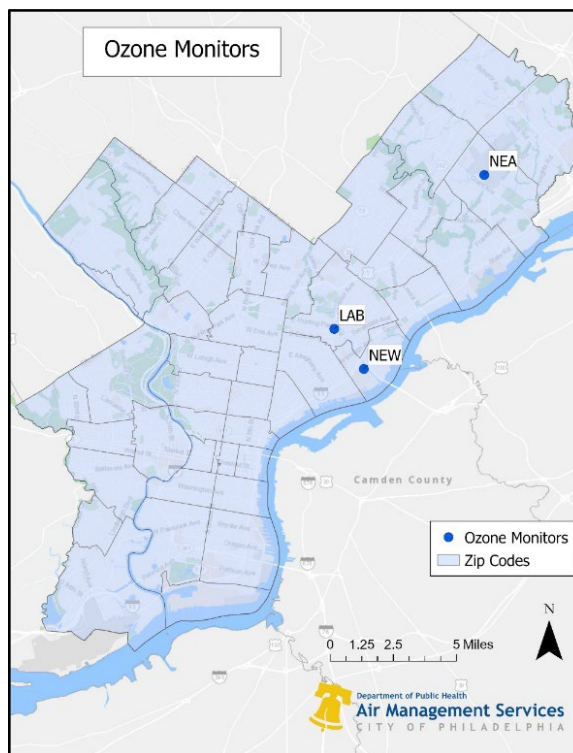


Figure 5. Ozone Monitoring Map

Ground-level ozone (the primary constituent of smog) is one of the pollutants most commonly responsible for air that is Moderate and Unhealthy for Sensitive Groups in the Philadelphia region. Ozone is not emitted directly into the atmosphere; it is formed by chemical reactions between other pollutants. Specifically, Volatile Organic Compounds (VOCs) and Nitrogen Oxides (NO_x) react to create ozone in the presence of heat and sunlight as shown in Figure 6. Ozone levels are consistently higher during the summer months because of the abundant heat and sunlight.



Figure 6. Ozone forms when NO_x and VOCs react in sunlight.

VOCs are organic (i.e., carbon-containing) compounds that evaporate readily, such as gasoline vapors, paint fumes, and many other chemicals. NO_x stands for two compounds, nitric oxide (NO) and nitrogen dioxide (NO₂), which are mostly emitted from burning fuel. Some VOCs are

considerably more reactive in the atmosphere than others, and their reactivity influences how quickly ozone forms. A compound that reacts in a few minutes to produce ozone will have a much greater impact near its source than one that reacts more slowly. Thus, ozone can form at various distances downwind of a VOC source due to the speed of these chemical reactions.

There are four categories of emission sources from human activity that produce VOCs and NO_x:

- Point sources – Large utilities like power plants, industrial facilities, and other operations.
- Nonpoint sources – Commercial, solvent use, waste disposal, emissions from homes throughout the city, road paving, wildfires, and other smaller sources.
- Nonroad sources – Construction and agricultural equipment, ships, lawn equipment, airport and marine port ground vehicles, trains, and other mobile sources.
- On-road sources – Cars, trucks, buses, and motorcycles.

Figure 7 shows NO_x and VOC emissions from all source categories for Philadelphia based on the EPA's 2020 National Emissions Inventory (NEI), the most recent comprehensive national emissions inventory. The 2023 NEI is expected to be released in 2026. Although the 2023 NEI has not yet been released, EPA's 2020 National Emissions Inventory and Trends Report provides national emissions trends through 2022. The development of the NEI requires extensive data collection, emissions estimation, modeling, and quality assurance, resulting in a several-year delay between the emissions year and publication.

2020 NO_x Emissions in Philadelphia (tons):

Total: 10,541			
Point	Nonpoint	Nonroad	Onroad
957.8	4,783.9	1,112.0	3,687.7
9.1%	45.4%	10.5%	35.0%

2020 VOC Emissions in Philadelphia (tons):

Total: 15,555			
Point	Nonpoint	Nonroad	Onroad
530.6	11,375.2	1,194.4	2,454.8
3.4%	73.1%	7.7%	15.8%

Figure 7. 2020 NO_x and VOC Emissions from All Sources ⁹.

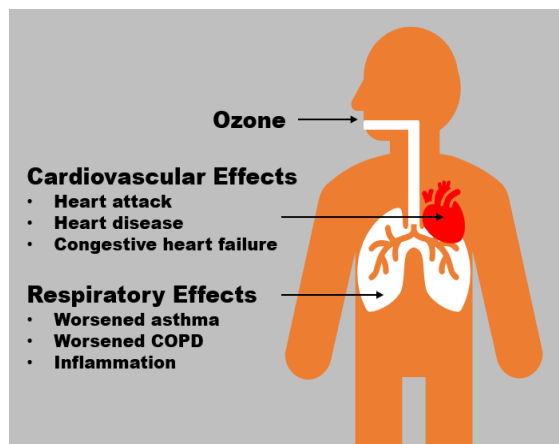
Over the years, NO_x and VOC emissions from point sources have steadily decreased, while nonpoint and on-road sources account for large percentages of NO_x and VOC emissions in Philadelphia.

Emissions of VOC and NO_x may be carried by wind currents while reacting to produce high ozone levels hundreds of miles from their sources. In the eastern United States during the summer months, ground-level ozone is frequently high over wide areas containing several states. This phenomenon is caused by ozone and its precursors traveling via wind currents across great distances.

In any discussion of ozone, it is important to distinguish between the effects of ozone on the ground and ozone high in the atmosphere. An advertisement might use the slogan “good up high, bad

⁹2020 NEI Supporting Data and Summaries | US EPA. Downloaded May 5, 2026

nearby,” to describe ozone. Up high, in what is called the Ozone Layer (about 20 to 25 kilometers above sea level), ozone is essential to the health of nearly every living thing. The Ozone Layer protects the Earth from harmful ultraviolet (UV) light. Near the ground, ozone reacts with buildings, plants, animals, and people, and is one of the most irritating, harmful components of smog.



People who are very young, elderly, or have chronic lung conditions such as asthma are particularly sensitive to ground-level ozone. The EPA concluded that ozone pollution causes respiratory harm, including worsened asthma, COPD, and inflammation, as shown in Figure 8. Ozone can indicate the presence of other harmful gases, which may cause reproductive and developmental harm as well as harm to the central nervous system; and could cause cardiovascular harm such as heart attacks, heart disease, and congestive heart failure.¹⁰

Figure 8. Ozone exposure affects both the heart and lungs.

In 2024, there were three ozone monitoring sites: LAB, NEA, and NEW, as shown in Figure 5. Real-time data from the ozone monitors is available on the Breathe Philly dashboard at www.phila.gov/breathephilly.

Figures 9 and 10 illustrate ozone trends across all monitoring sites and the corresponding ozone design values, incorporating the most recent data through 2025. In 2025, the average of the 4th-highest daily maximum 8-hour ozone concentrations across the three monitoring sites was 0.069 ppm. The ozone design values for the LAB, NEA, and NEW monitoring sites were 0.068 ppm, 0.06 ppm, and 0.073 ppm, respectively, as shown in Figure 10. The design value of 0.073 ppm at NEW means that Philadelphia does not attain the NAAQS of 0.070 ppm.

¹⁰ U.S. Environmental Protection Agency, Integrated Science Assessment for Ozone and Related Photochemical Oxidants, 2013. EPA/600/R-10/076F.

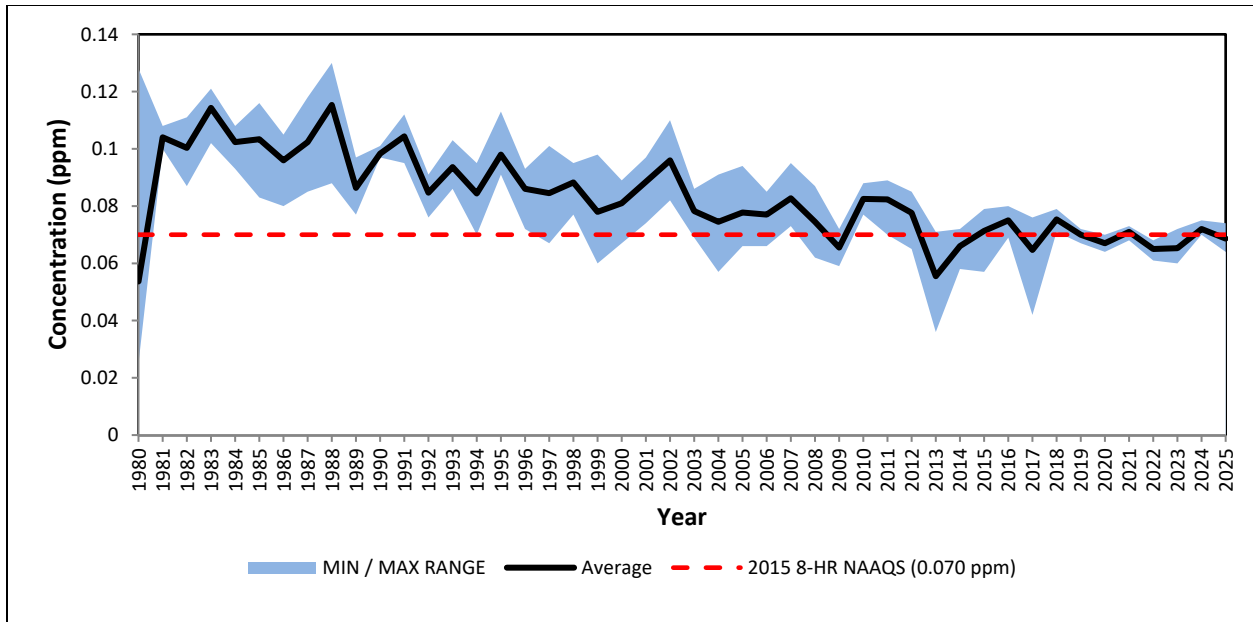


Figure 9. Ozone Trends for the annual 4th Highest Daily Maximum 8-Hour Concentration for All Sites.

Note: The values on this graph are not comparable to the NAAQS value because only Design Values are compared to the NAAQS. The dashed NAAQS line is only for visualization purposes on this chart

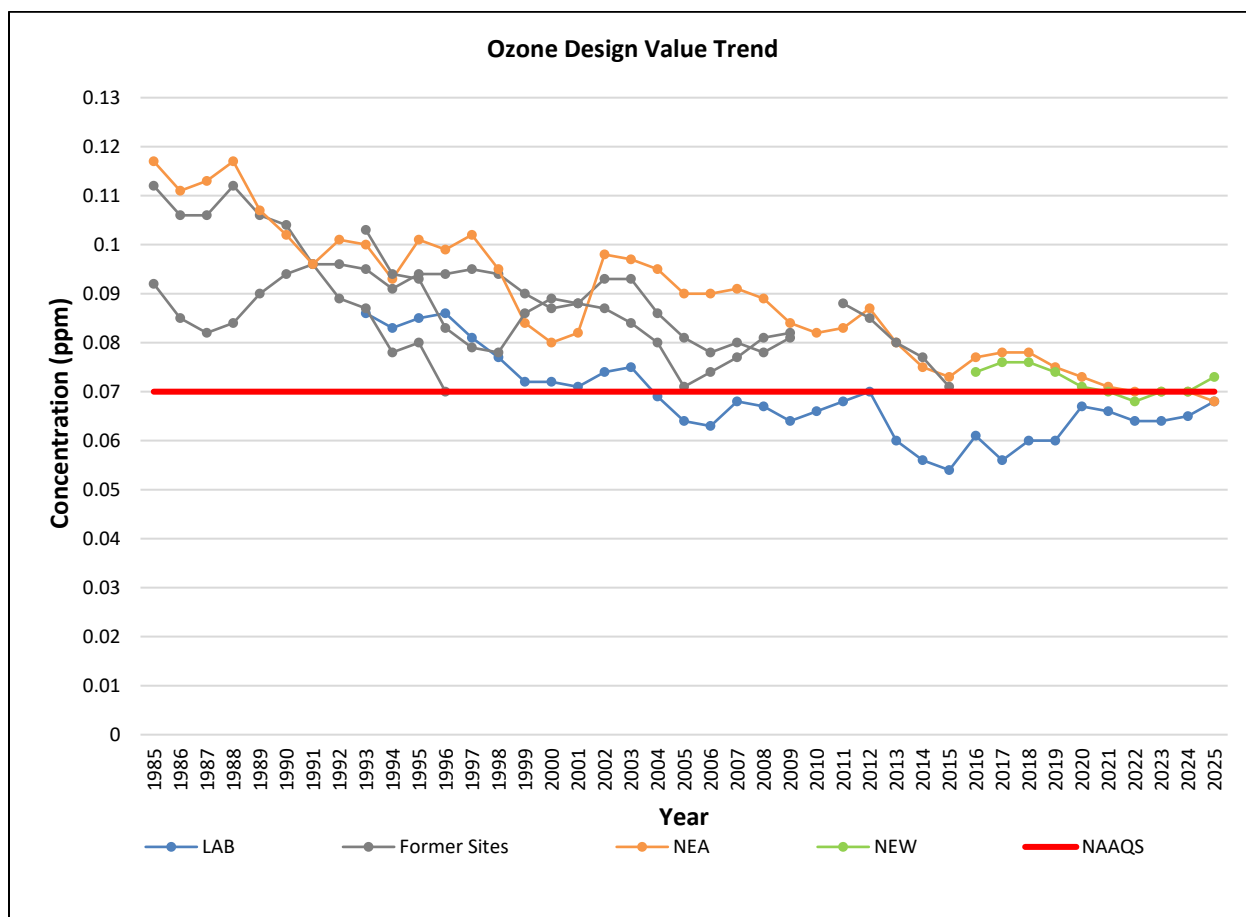


Figure 10. Ozone Design Value Trends for the 4th-Highest Daily Maximum 8-hour Concentration for each Monitoring Site.

Figures 9 and 10 show that ozone concentrations are below the NAAQS line at periodic intervals. However, this does not mean Philadelphia attains the Ozone standard in those years. As previously discussed, ozone forms slowly in the atmosphere and can reach high concentrations far from the location where precursor chemicals are emitted. For this reason, ozone attainment is evaluated across a larger geographic area than Philadelphia County alone. Every monitor in the larger area, called the Core Based Statistical Area (CBSA), must remain below the standard for the CBSA to attain the standard. Philadelphia is part of the Philadelphia-Camden-Wilmington, PA, NJ, DE, MD CBSA. Even in years when Philadelphia County had design values of 0.07 ppm or below (2022, 2023, and 2024), at least one other monitor in the CBSA exceeded the standard. Therefore, the entire CBSA is designated as nonattainment, including Philadelphia.

Carbon Monoxide (CO)

NAAQS

9 parts per million for an 8-hour average concentration not to be exceeded more than once per year (2nd highest).

35 parts per million for a 1-hour average concentration not to be exceeded more than once per year.

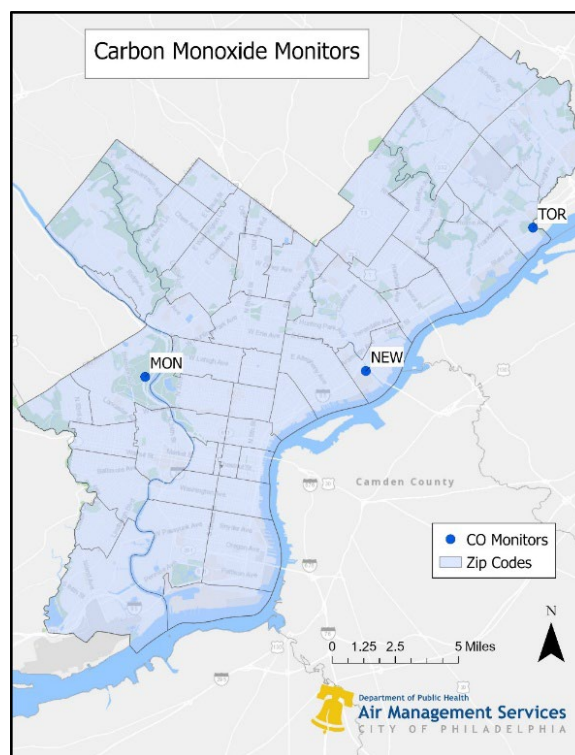


Figure 11. CO Monitoring Map.

Carbon monoxide (CO) is a colorless, odorless gas that is poisonous at high concentrations. It forms when the carbon in fuels is not completely burned. The major source of CO is motor vehicle emissions. Other sources of CO include residential, industrial, and natural processes. Weather greatly affects CO levels, and peak CO concentrations typically occur during the colder months of the year. While CO in the ambient outdoor air is rarely a concern, high CO concentrations are much more common indoors. Poorly ventilated gas appliances and furnaces can produce CO that builds to dangerous levels within a home.

Carbon monoxide enters the bloodstream, reducing oxygen delivery to the body's organs and tissues. The health threat from CO is most serious for those who suffer from cardiovascular disease. Exposure to elevated CO levels is associated with impaired vision, reduced work capacity, reduced manual dexterity, poor learning ability, and difficulty performing complex tasks. At very high levels, carbon monoxide can be fatal.

Over a forty-year period, there has been a continued reduction in CO levels. This is mainly the result of federal requirements for cleaner automobiles and fuel and state inspection/maintenance programs.

Figures 12 and 13 illustrate the trends in 8-hour and 1-hour CO concentrations, respectively, for Philadelphia. In 2025, the CO 8-hour average concentration was 1.5 ppm, and the 1-hour concentration was 1.9 ppm, reflecting current air quality conditions and remaining in compliance with national standards based on the latest monitoring data.

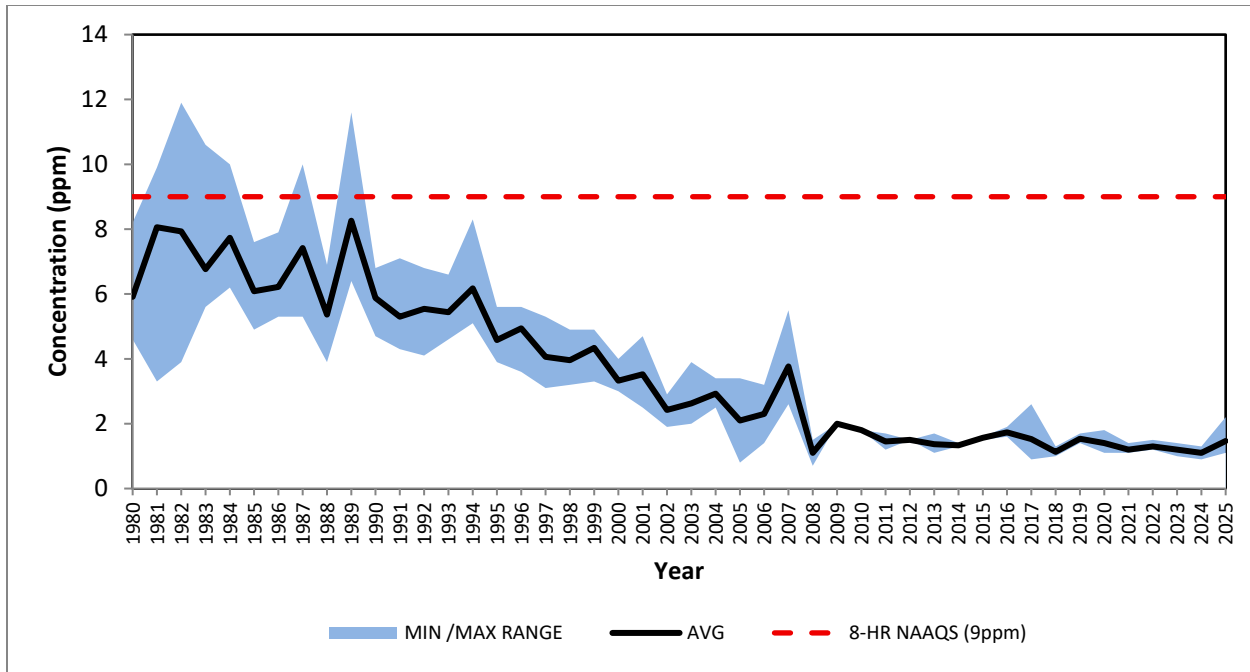


Figure 12. CO Trends for the 2nd Highest 8-Hour Average Concentration.

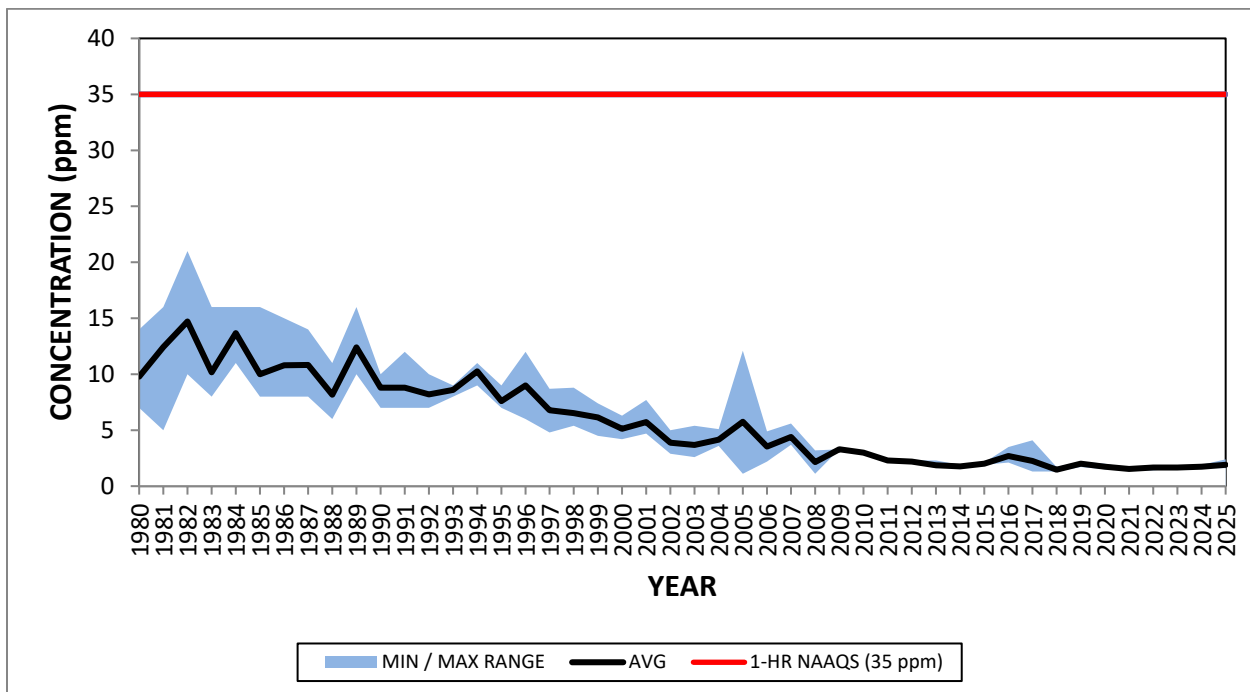


Figure 13. CO Trends for the 2nd Highest 1-Hour Average Concentration.

Figure 14 illustrates the CO design values based on the second-highest 8-hour average concentration across Philadelphia monitoring sites. In 2025, the design values were 1.00 ppm at NEW, 1.63 ppm at TOR, and 1.17 ppm at MON. All monitored values remained well below the

8-hour CO NAAQS of 9 ppm, indicating continued compliance with the national standard.

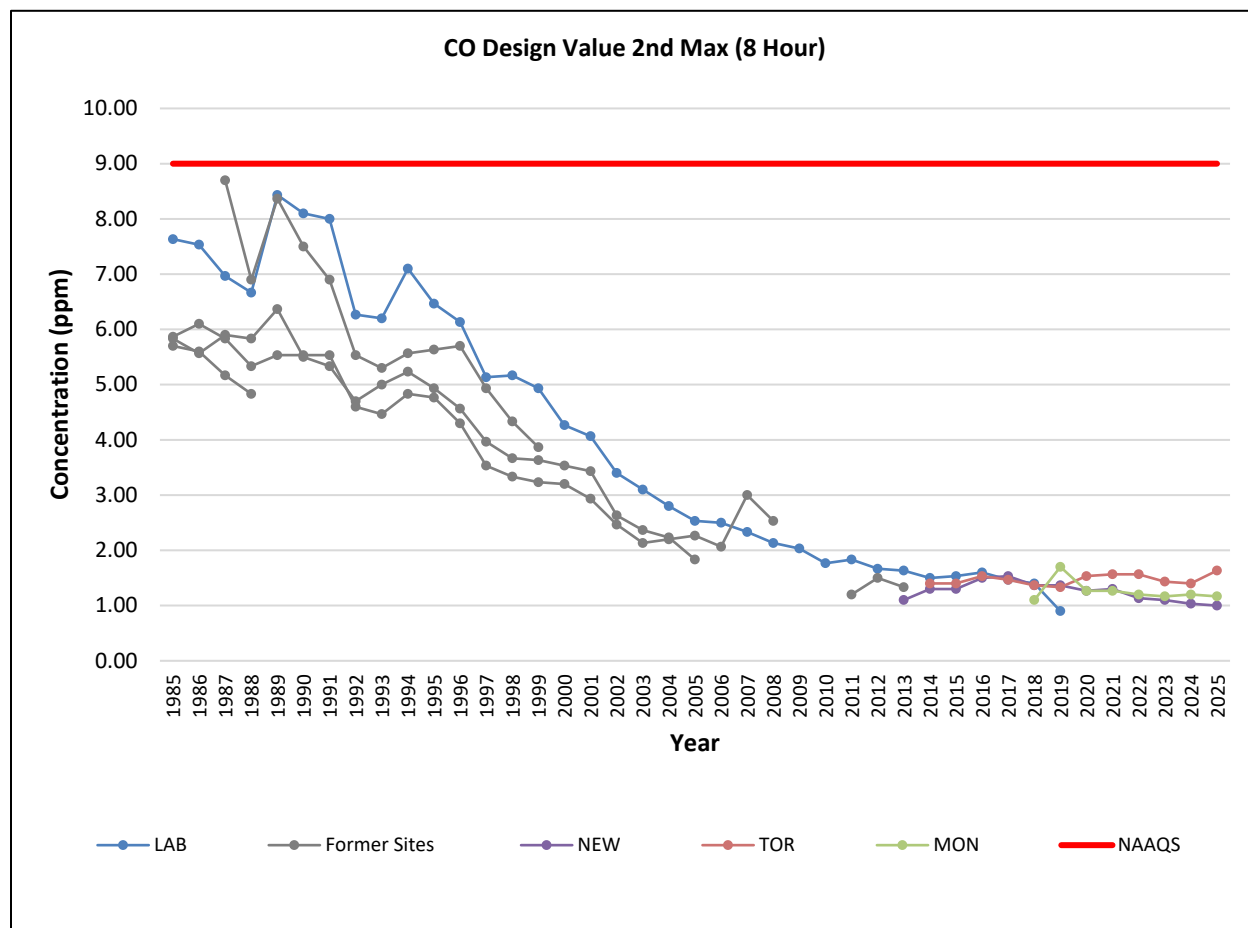


Figure 14. CO Design Value for the 2nd Highest 8-Hour Average Concentration for each Monitoring Site.

Figure 15 illustrates the CO design values based on the 2nd-highest 1-hour average concentration across Philadelphia monitoring sites. In 2025, the design values were 1.73 ppm at NEW, 1.93 ppm at TOR, and 1.63 ppm at MON. All monitored values remained well below the 1-hour CO NAAQS of 35 ppm, demonstrating continued compliance with the national standard.

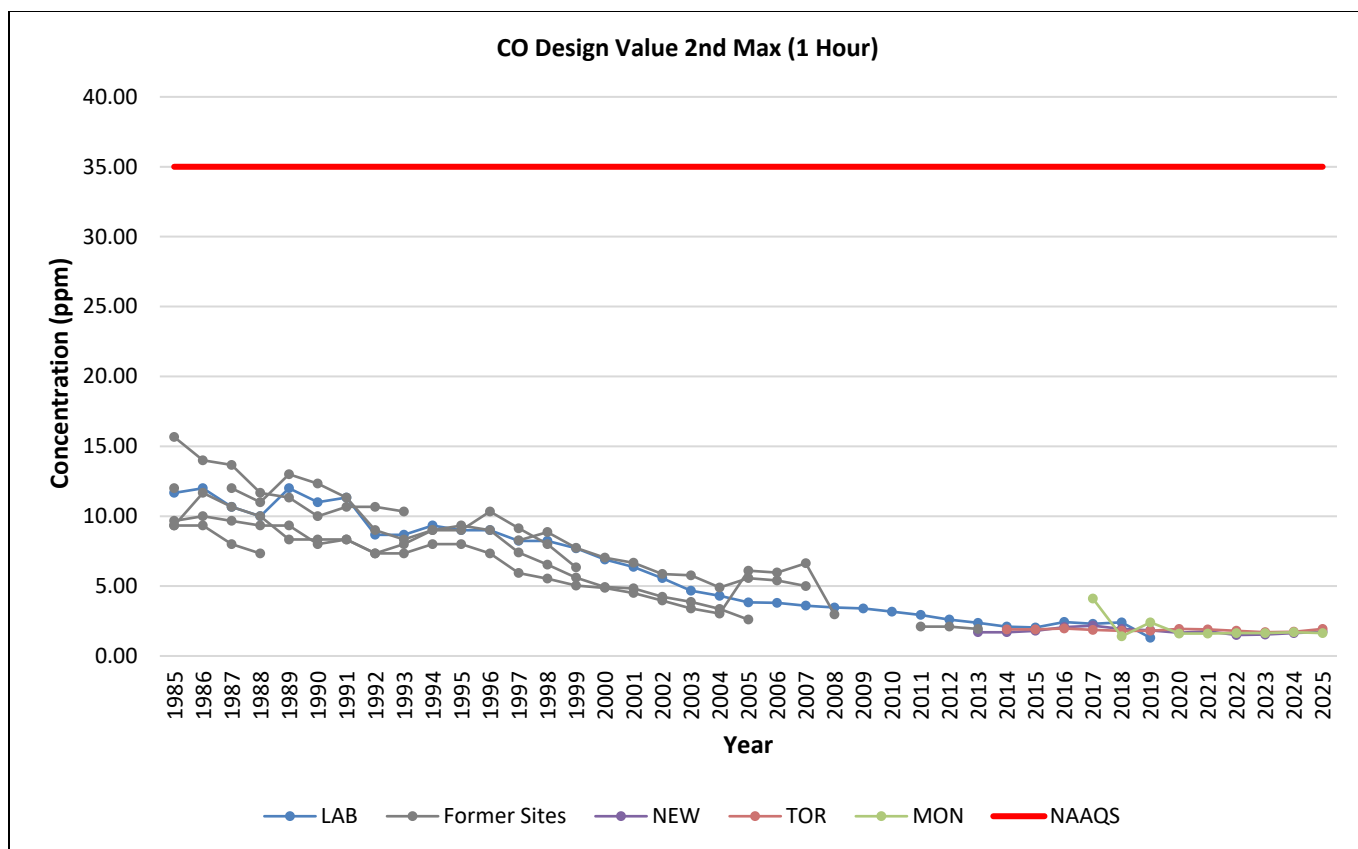


Figure 15. CO Design Value for the 2nd Highest 1-Hour Average Concentration for each Monitoring Site.

Nitrogen Dioxide (NO₂)

NAAQS

The annual average concentration is less than or equal to 53 ppb.

The 3-year average of the annual 98th percentile of the daily maximum 1-hour average concentration is less than or equal to 100 ppb.

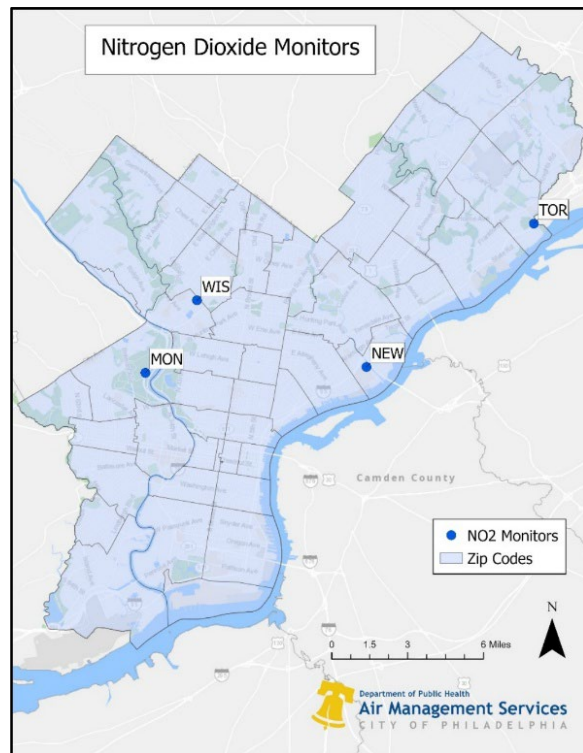


Figure 16. NO₂ Monitoring Map.

Nitrogen dioxide (NO₂) is a light brown gas that is an important component of urban haze. The compound is primarily produced by fuel combustion in motor vehicles, utilities, and industrial sources.

NO₂ can irritate the lungs, cause and worsen asthma, and lower resistance to respiratory infections such as influenza. Nitrogen oxides (NO_x) are important precursors of both ozone and acid rain and can affect terrestrial and aquatic ecosystems. They also contribute to the formation of fine particulate matter, haze, and reductions in visibility.

Ambient NO₂ levels in Philadelphia are significantly below the NAAQS, showing a sustained downward trend over time. Figures 17 and 18 illustrate NO₂ trends for the annual average and the daily maximum 1-hour concentrations, respectively. In 2025, the annual average NO₂ concentration was 11.76 ppb, and the daily maximum 1-hour concentration was 44.33 ppb.

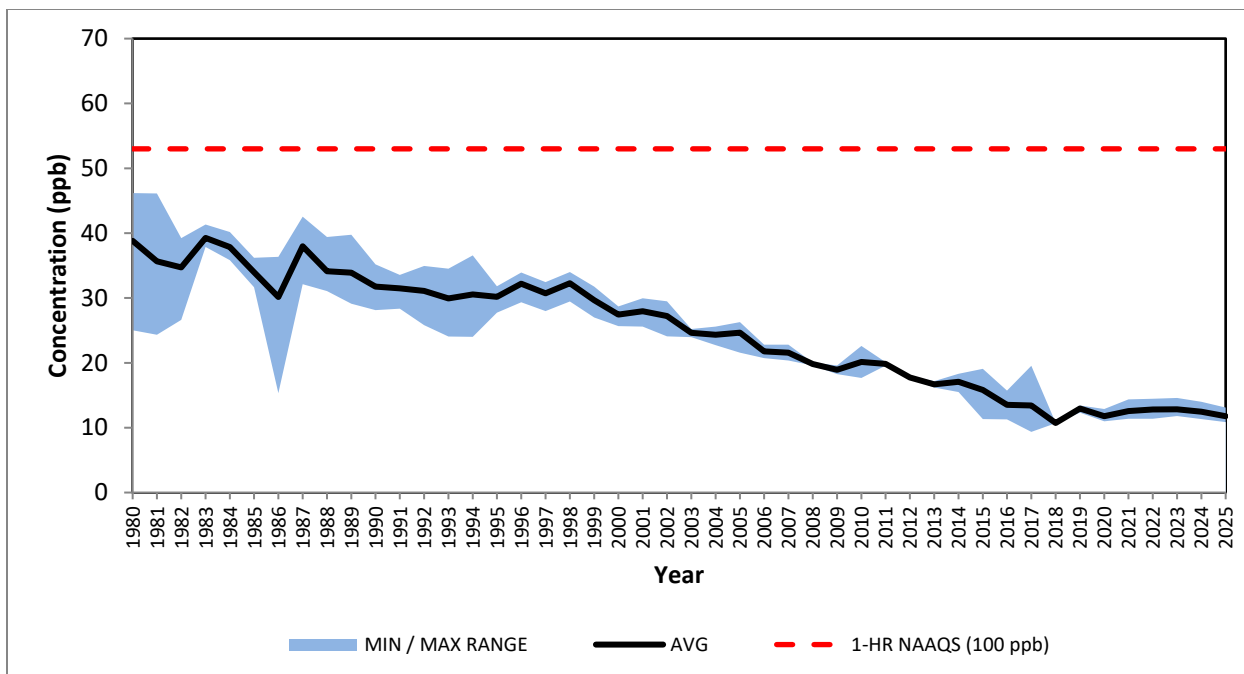


Figure 17. NO₂ Trends for Annual Average Concentration.

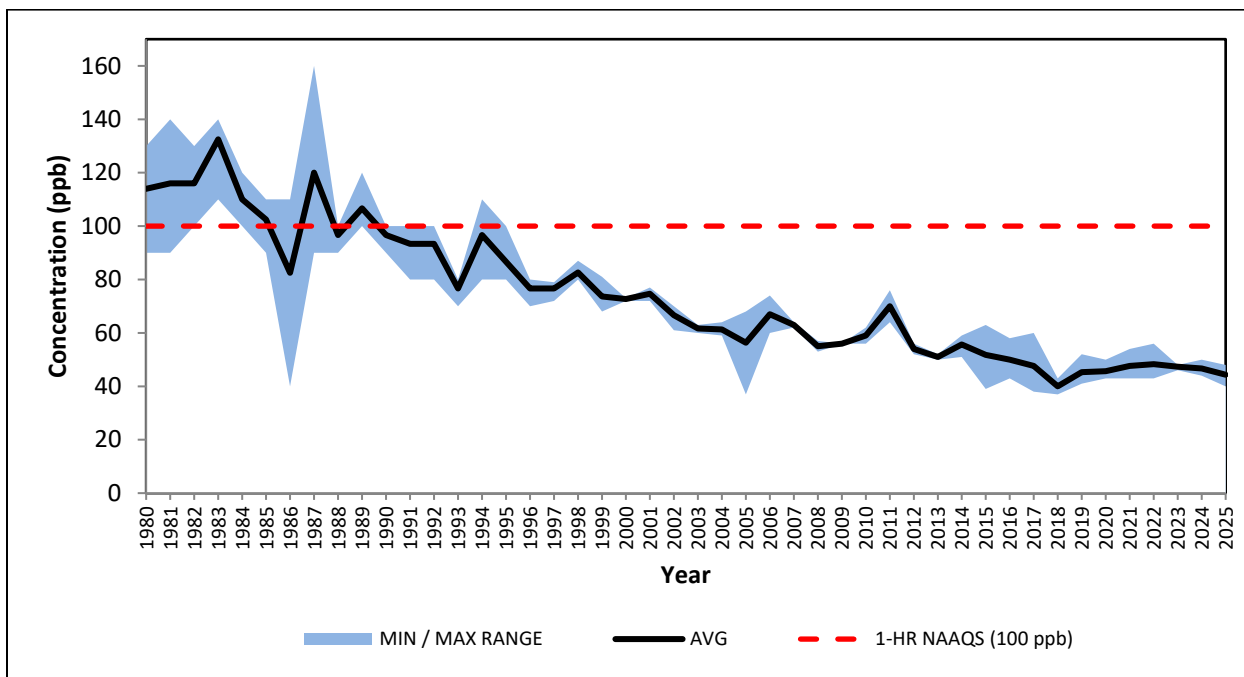


Figure 18. NO₂ Trends for 98th Percentile Daily Maximum 1-Hour Concentration.

Note: The values on this graph are not comparable to the NAAQS value because only Design Values are compared to the NAAQS. The dashed NAAQS line is only for visualization purposes on this chart

Figure 19 illustrates the NO₂ design values based on the annual average concentration across Philadelphia monitoring sites. In 2025, the annual design values were 11.2 ppb at NEW, 13.9 ppb at TOR, and 11.8 ppb at MON. All monitored values remained well below the annual NO₂ NAAQS of 53 ppb, indicating continued compliance with the national standard.

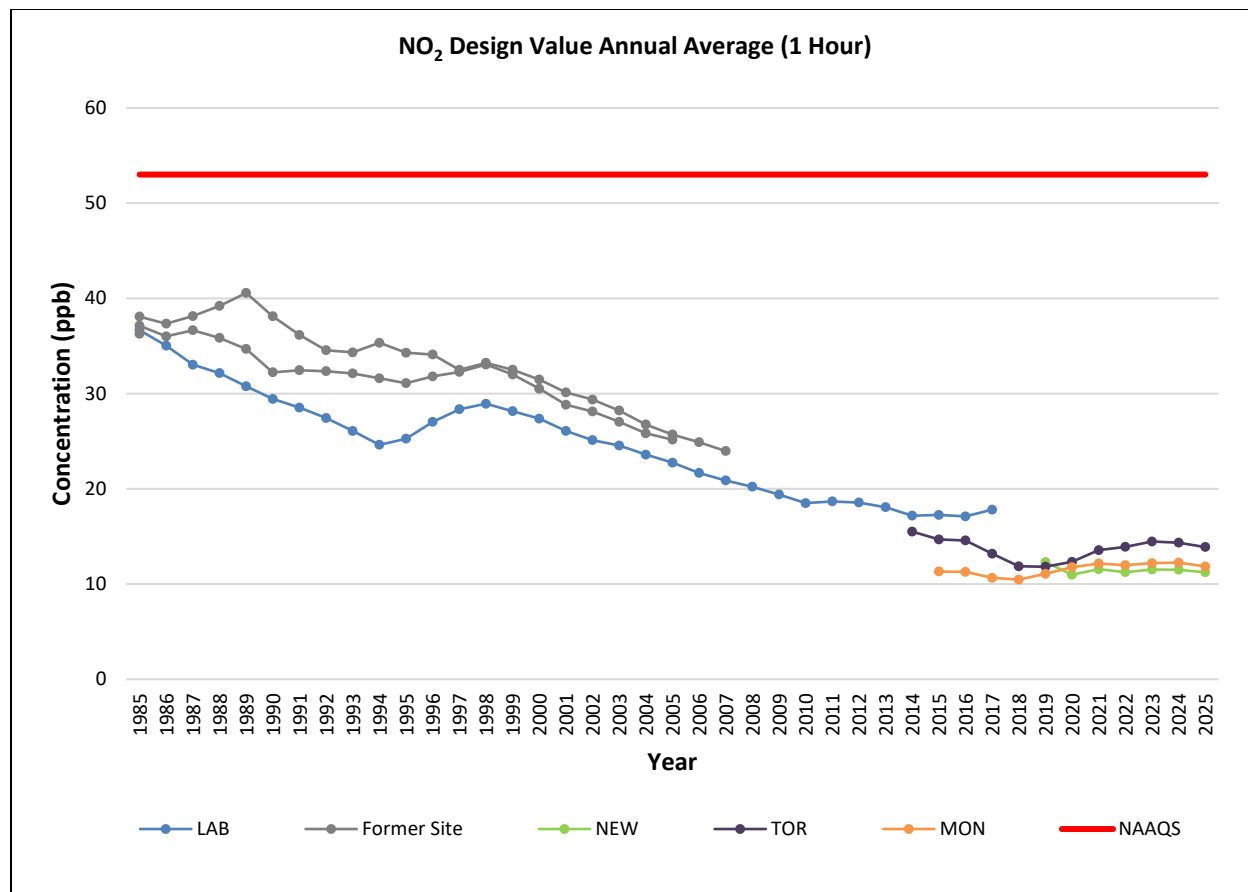


Figure 19. NO₂ Design Value for Annual Average Concentration for each Monitoring Site.

Figure 20 illustrates the NO₂ design values based on the 98th percentile of daily maximum 1-hour concentrations across Philadelphia monitoring sites. In 2025, the design values were 43.3 ppb at NEW, 46.3 ppb at TOR, and 46.7 ppb at MON. All monitored values remained below the 1-hour NO₂ NAAQS of 100 ppb, demonstrating continued compliance with the national standard.

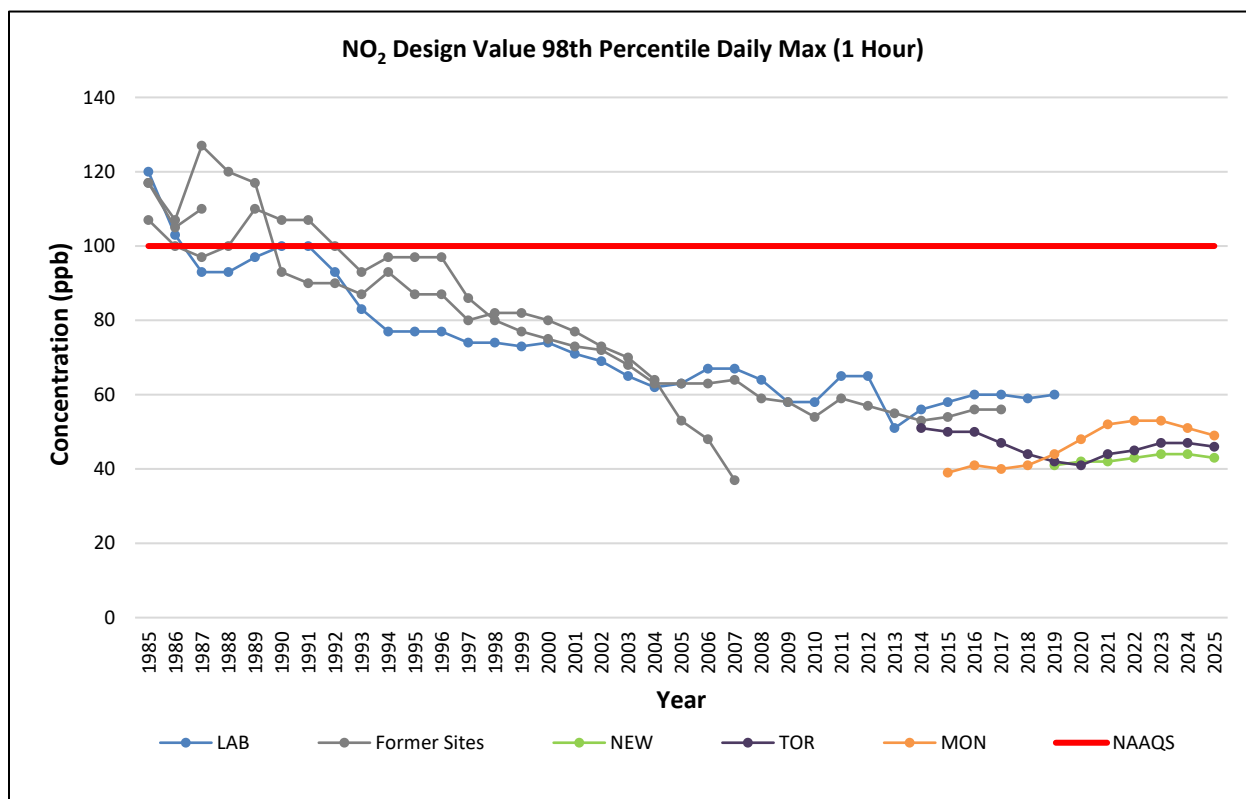


Figure 20. NO₂ Design Value for 98th Percentile Daily Maximum 1-Hour Concentration for each Monitoring Site.

Sulfur Dioxide (SO₂)

NAAQS

The 3-year average of the annual 99th percentile of the daily maximum 1-hour average concentrations is less than or equal to 75 ppb.

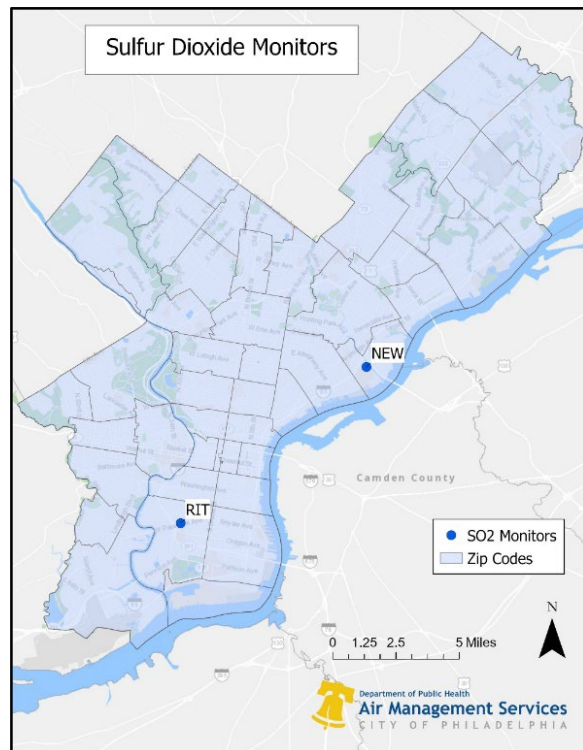


Figure 21. SO₂ Monitoring Map.

Sulfur dioxide (SO₂) is emitted from the burning of fuels that contain sulfur. Industrial-grade fuel oils are the primary source in Philadelphia.

The major health concerns associated with exposure to high concentrations of SO₂ include effects on breathing, respiratory illness, alterations in the lungs' defenses, and aggravation of existing respiratory and cardiovascular disease. Together, SO₂ and NO_x are the major ingredients of acid rain. SO₂ also plays a significant role in the formation of fine particulate matter.

SO₂ levels in Philadelphia are well within air quality standards and show a slow, but steady decline over time. This is mainly due to industry, businesses, and homes switching to lower-sulfur fuels, such as natural gas.

Figure 22 illustrates the trend in the 1-hour SO₂ concentrations for Philadelphia. In 2025, the 1-hour SO₂ concentration was 4 ppb, reflecting current air quality conditions.

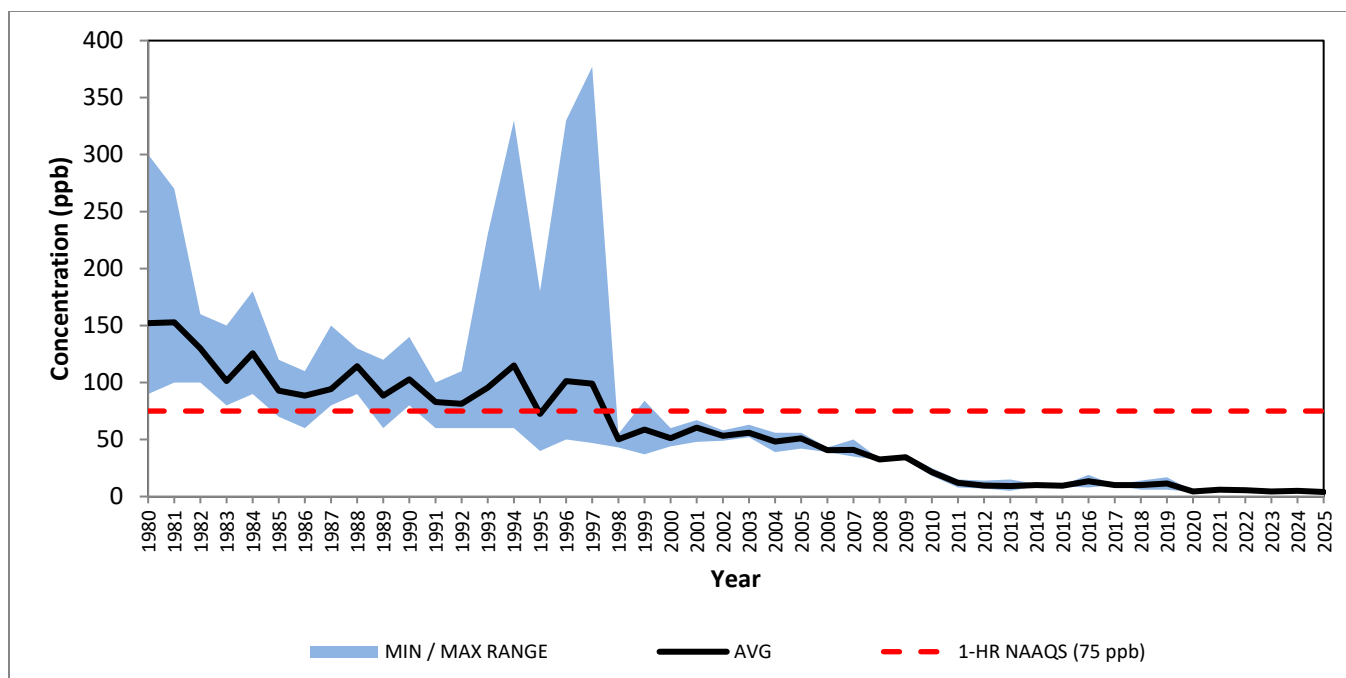


Figure 22. SO₂ Trends for 99th Percentile Daily Maximum 1-Hour Average Concentration.

Note: The values on this graph are not comparable to the NAAQS value because only Design Values are compared to the NAAQS. The dashed NAAQS line is only for visualization purposes on this chart

Figure 23 illustrates the SO₂ design values based on the 99th percentile of daily maximum 1-hour average concentrations across Philadelphia monitoring stations. In 2025, the design values were 5 ppb at NEW and 4 ppb at RIT. All monitored values remained well below the 1-hour SO₂ NAAQS of 75 ppb, indicating continued compliance with the national standard.

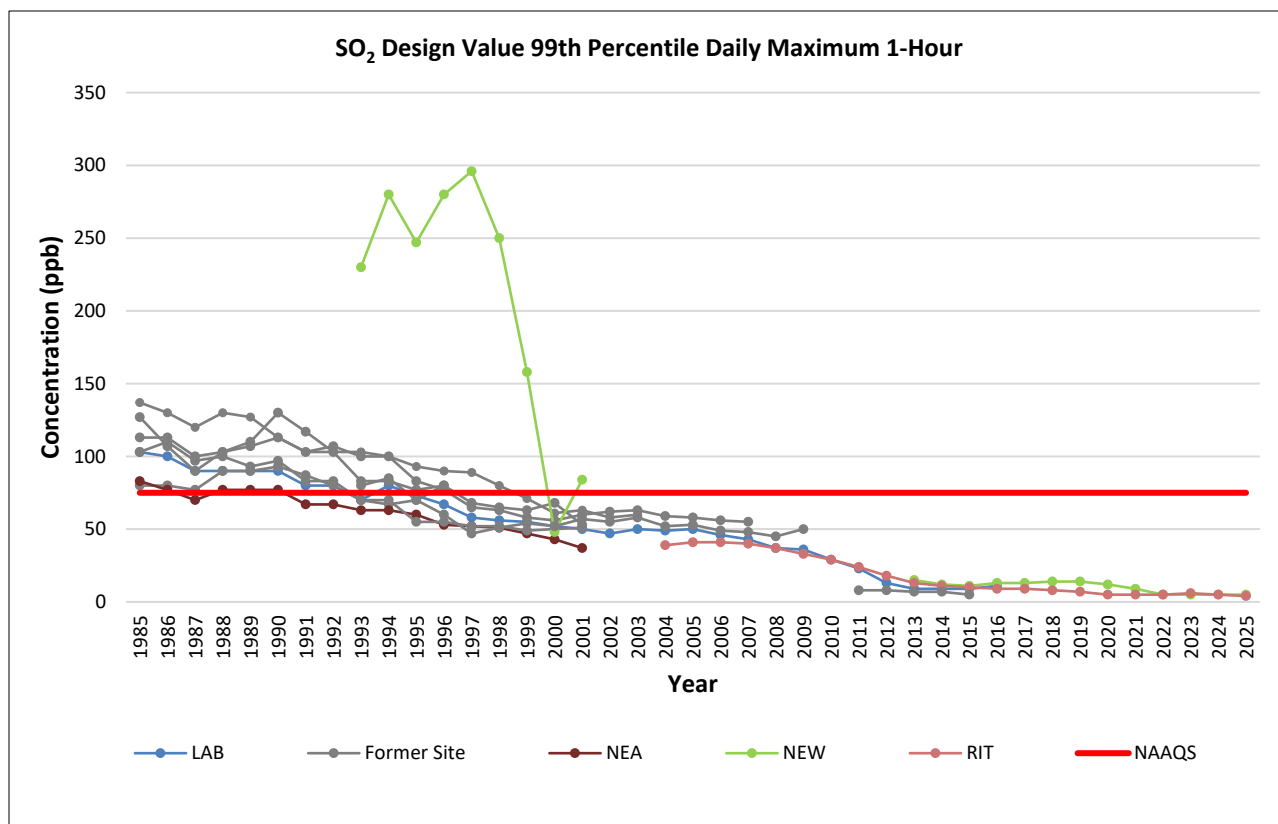


Figure 23. SO₂ Design Value for 99th Percentile Daily Maximum 1-Hour Average Concentration at each Monitoring Station.

Lead (Pb)

NAAQS

The maximum arithmetic rolling 3-month mean concentration for a 3-year period is less than or equal to 0.15 $\mu\text{g}/\text{m}^3$ micrograms per cubic meter.

Metal processing is the major source of lead emissions into the atmosphere. Philadelphia does not have any metal processing facilities, so lead is not a major concern. Lead does not travel over great distances in the air, so the highest levels are often near specific industrial sites.

Lead is a highly toxic metal when inhaled or ingested. It accumulates in the blood, bone, and soft tissue and may affect the kidneys, liver, nervous system, and other organs. Lead can also cause learning difficulties in children.

Ambient lead levels have decreased throughout the city due to the elimination of leaded gasoline and tighter controls on emissions from companies that produce or process lead compounds.

Prior to 1998, lead levels in certain parts of the city were extremely high due to the concentration of industry near Castor and Delaware Avenues. Lead levels in these areas improved drastically, becoming comparable to those in the rest of the city.

On October 15, 2008, the EPA strengthened its lead regulations. The standard was revised from the 1978 level of 1.5 $\mu\text{g}/\text{m}^3$ to a 10-times-more-stringent level of 0.15 $\mu\text{g}/\text{m}^3$, with a different averaging time. For the previous standard, the average time used a quarterly average, while the new standard used a rolling 3-month average. Figure 24 shows the trend of the lead standard from 2009 to 2016. Figure 25 shows the Lead Design Value based on a rolling 3-month average across monitoring stations, from 2009 to 2018.

Consistent monitoring of air lead concentrations showed that ambient levels in Philadelphia were not a concern. On April 28, 2017, the EPA approved Philadelphia AMS' waiver to end the requirement for a source-oriented Lead-TSP monitor in Philadelphia, effective January 1, 2017. As of January 1, 2017, the Total Suspended Particulate Lead monitor at the NEW site was shut down. Philadelphia has no sources that emit 0.5 or more tons of lead per year.

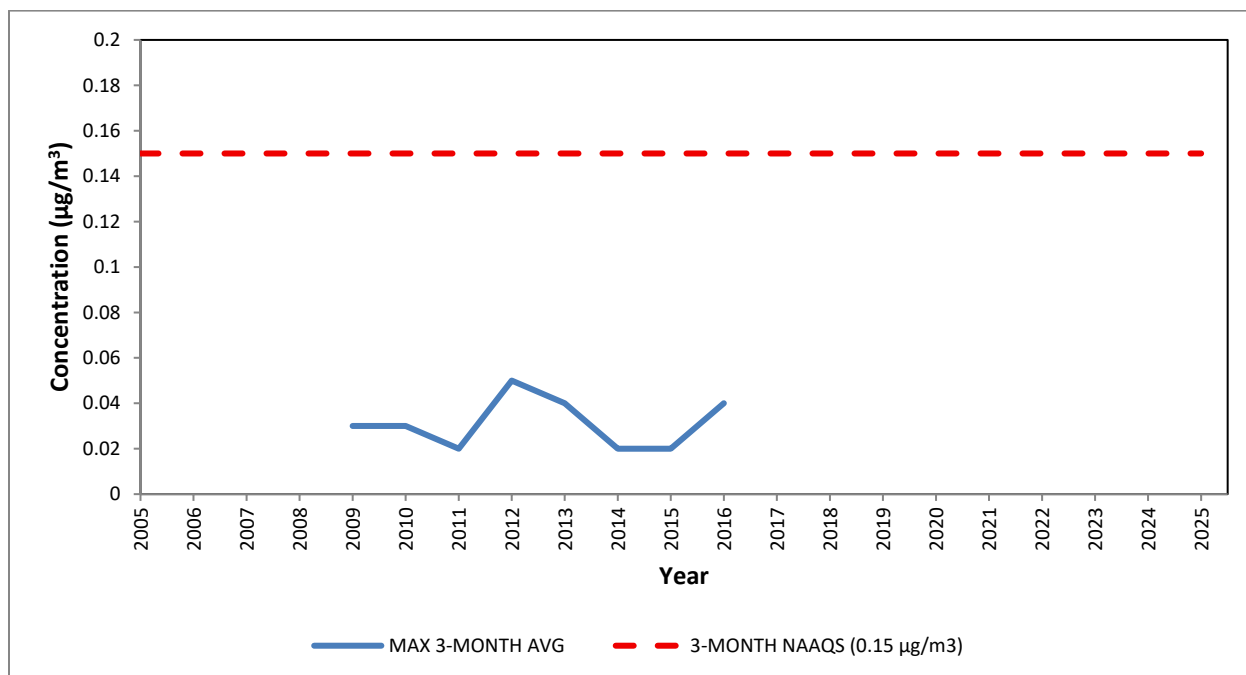


Figure 24. Lead Trends (Maximum) Rolling 3-Month Average.

Note: Maximum 3-month average on this graph are not comparable to the NAAQS value because only Design Values are compared to the NAAQS. The dashed NAAQS line is only for visualization purposes on this chart.

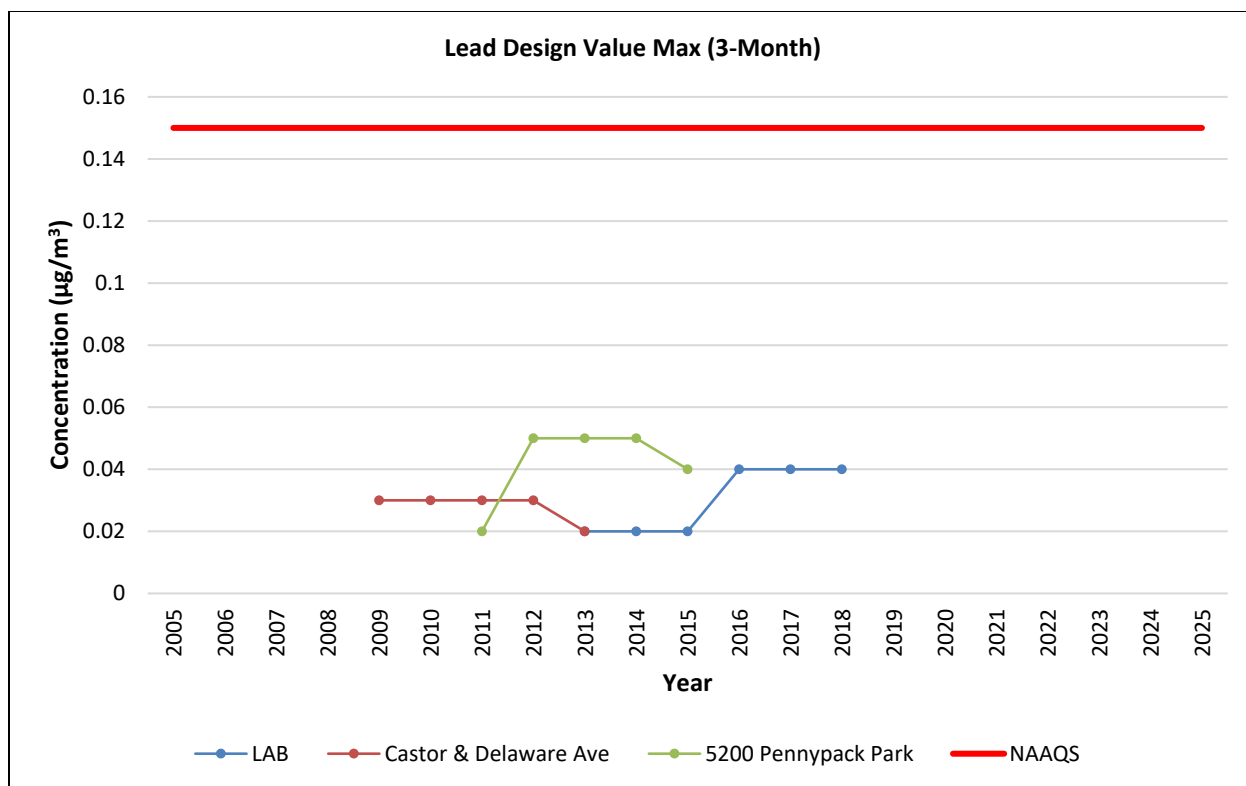


Figure 25. Lead Design Value (Maximum) Rolling 3-Month Average at each Monitoring Station.

Particulate Matter (PM₁₀, PM_{2.5})

Particulate matter is the general term used for a mixture of solid particles and liquid droplets found in the air. These particles come in a wide range of sizes and originate from stationary, mobile, and natural sources.

PM₁₀ and PM_{2.5} refer to small particulates that measure less than 10 micrometers (0.00001 meters) and 2.5 micrometers (0.0000025 meters) in diameter, respectively. In addition to health problems, particulate matter can cause reduced visibility, soiling, and damage to materials such as buildings. Particles of this size remain airborne for long periods of time and disperse in uniform concentrations across wide areas, crossing geographic boundaries¹¹.

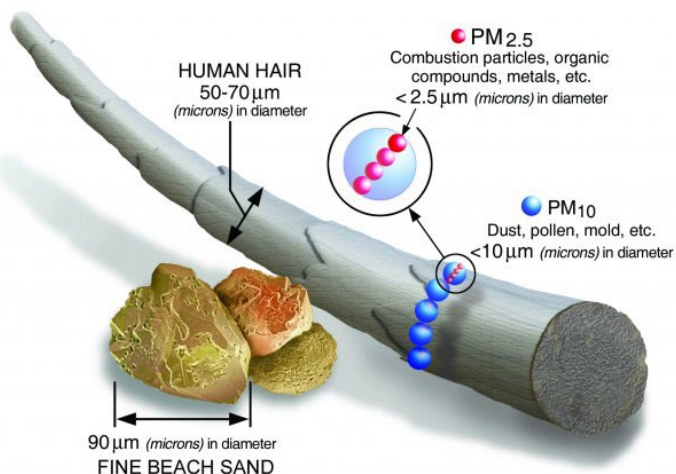


Figure 26. Size Comparisons for PM Particles.

In 1997, the EPA set a separate standard for PM_{2.5}. Particles in the PM_{2.5} size range can travel deeply into the respiratory tract, reaching the lungs. Exposure to fine particles can cause short-term health effects such as eye, nose, throat, and lung irritation; coughing, sneezing, and a runny nose; and shortness of breath. Exposure to fine particles can also affect lung function and worsen medical conditions such as asthma and heart disease. Scientific studies have linked increases in daily PM_{2.5} exposure with increased respiratory and cardiovascular hospital admissions, emergency department visits, and deaths. Particles come in a wide variety of shapes and sizes, which affect their impact on human health and the environment. Bigger particles, such as dust, are easier to see and can cause problems, but smaller particles are worse for our health.

Fine particles are treated as a single pollutant, but they come from many different sources and are composed of many different compounds. Fortunately, these compounds fall into a few dominant categories: sulfates, nitrates, ammonium compounds, soil, organic carbon compounds, and elemental carbon. Water is nearly always an important, variable component of PM. Given the complex composition of PM, it is no surprise that its chemistry is also complex. Particles may be dry or wet. When the wind blows hard enough, soil, silt, and sand can be lifted from the ground, increasing airborne PM concentrations. Human activities such as mining, construction, plowing, and driving on unpaved roads also lift particles into the air. Soot, also referred to as black carbon or elemental carbon, is emitted directly by diesel engines and forest fires, among other sources. Much of the PM_{2.5} in Philadelphia is emitted by burning fuels in cars and trucks, at homes and

¹¹ EPA: www.epa.gov/pm-pollution/particulate-matter-pm-basics#PM

power plants, and by industry. Most individual particles are likely mixtures of different substances, produced by collisions with other particles and by absorbing gases.

In Philadelphia, recent air monitoring data provide an overview of particulate matter conditions in 2025. Figure 28 in this report shows the trend in the maximum 24-hour average PM_{10} concentration, which reached $51 \mu\text{g}/\text{m}^3$ in 2025. Figures 24 and 25 illustrate the $\text{PM}_{2.5}$ trends, with the citywide 98th percentile 24-hour average at $22.88 \mu\text{g}/\text{m}^3$ and an annual mean of $8.43 \mu\text{g}/\text{m}^3$. These levels represent the most recent air quality conditions for Philadelphia.

PM₁₀

NAAQS

150 $\mu\text{g}/\text{m}^3$ for a daily 24-hour average concentration not to be exceeded more than once per year on average over a 3-year period.

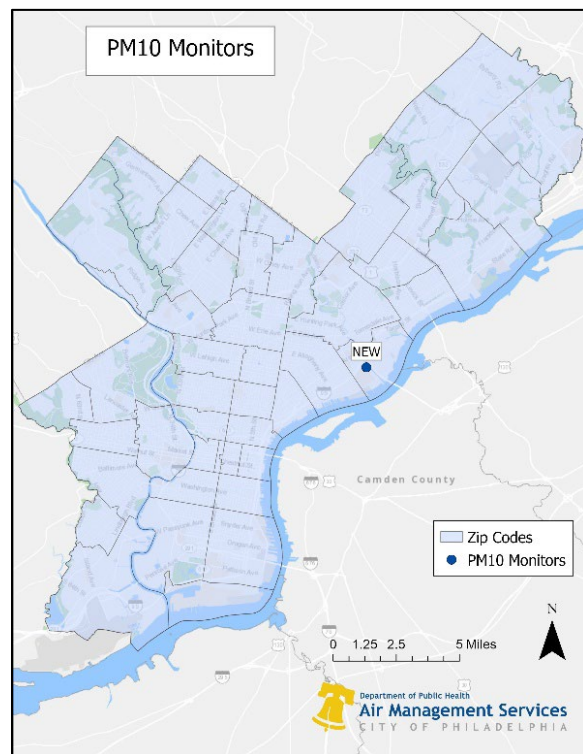


Figure 27. PM₁₀ Monitoring Map.

PM₁₀ levels have been decreasing due to regulations that limit allowable emissions and the shift to cleaner fuels. For example, many industries, businesses, and homes have switched from burning oil to burning natural gas.

During the mid-1990s, particulate emissions from several sources around Castor and Delaware Avenues produced extremely high, localized measurements, with levels many times higher than those at other city locations. Specific actions to abate these sources have resulted in air quality that now meets the NAAQS and is comparable to levels elsewhere in the city.

The EPA revoked the annual PM₁₀ standard of 50 $\mu\text{g}/\text{m}^3$ on December 17, 2006, due to insufficient evidence linking long-term exposure to coarse particle pollution to adverse health effects. Currently, the only PM₁₀ standard is for the 24-hour concentration.

Philadelphia currently has one PM₁₀ monitoring site, NEW, as shown in Figure 28.

Figure 28, key to this 2025 report, illustrates trends for the maximum 24-hour average PM₁₀ concentration in the city. The highest 24-hour average PM₁₀ concentration in 2025 is 51 $\mu\text{g}/\text{m}^3$, reflecting current air quality conditions and remaining in compliance with national standards based on the latest monitoring data. For historical context, the large-scale wildfires in 2023 significantly increased the number of bad air quality days for particulate matter and ozone, with the highest 24-

hour average PM₁₀ concentration reaching 281 µg/m³ on June 7, 2023.

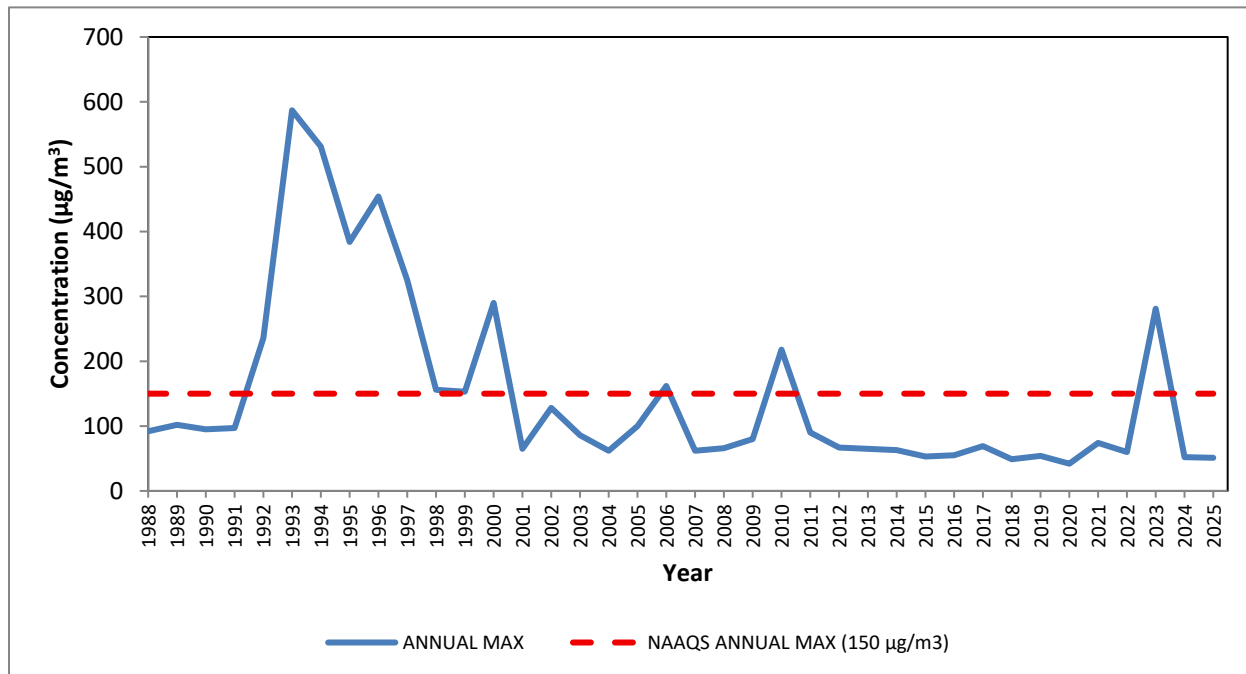


Figure 28. PM₁₀ Trends for the Highest 24-Hour Average Concentration.

Note: The values on this graph are not comparable to the NAAQS value because only Design Values are compared to the NAAQS. The dashed NAAQS line is only for visualization purposes on this chart

Figure 29 illustrates the PM₁₀ design values based on the highest 24-hour average concentration across Philadelphia monitoring sites. In 2025, the design value at the NEW station was 68 µg/m³. This value remained well below the 24-hour PM₁₀ NAAQS of 150 µg/m³, indicating continued compliance with the national standard.

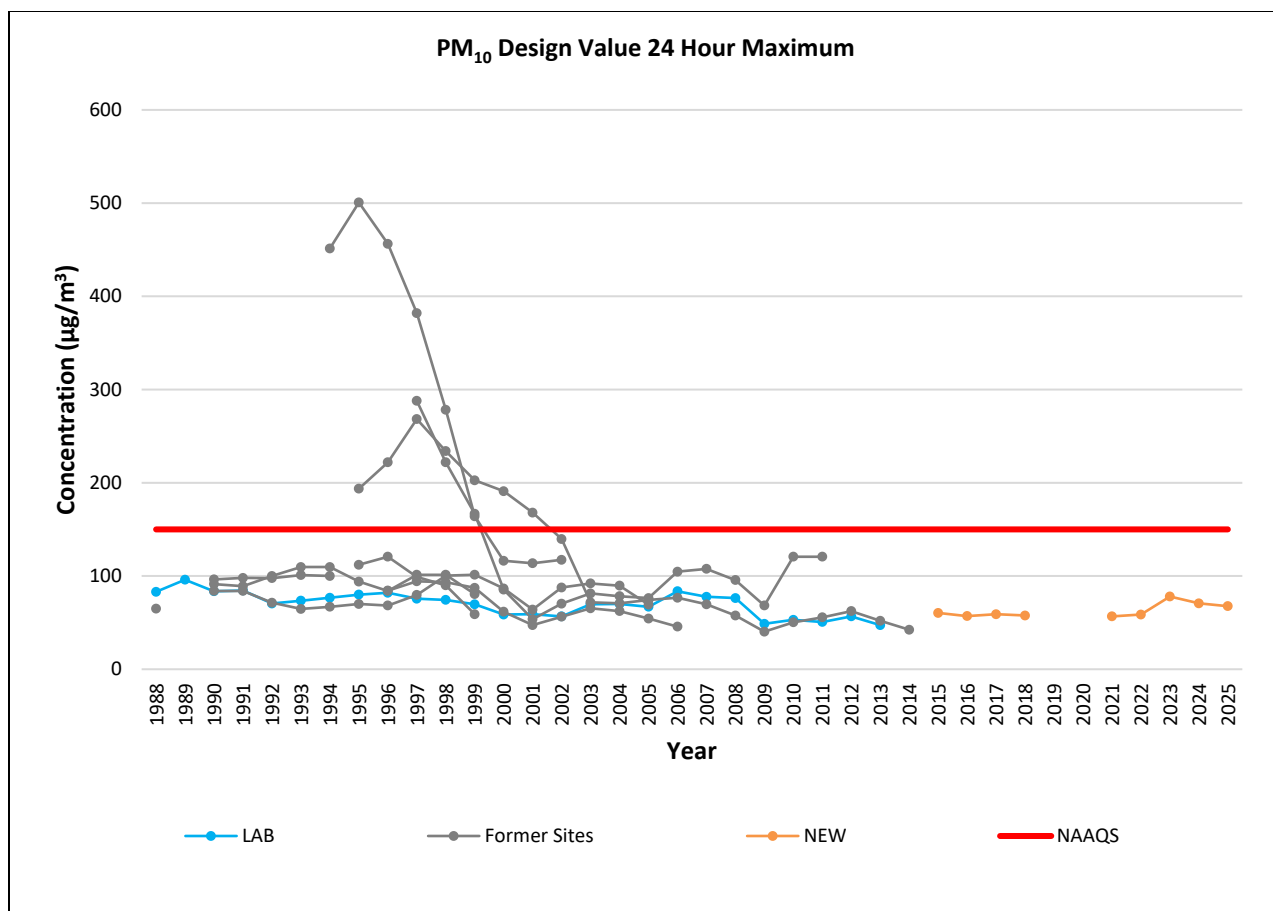


Figure 29. PM₁₀ Design Value for the Highest 24-Hour Average Concentration at each Monitoring Site.

PM_{2.5}

NAAQS

The 3-year average of the annual arithmetic mean concentration is less than or equal to 9.0 $\mu\text{g}/\text{m}^3$ (previously 12 $\mu\text{g}/\text{m}^3$).

The 3-year average of the 98th percentile 24-hour concentration is less than or equal to 35 $\mu\text{g}/\text{m}^3$.

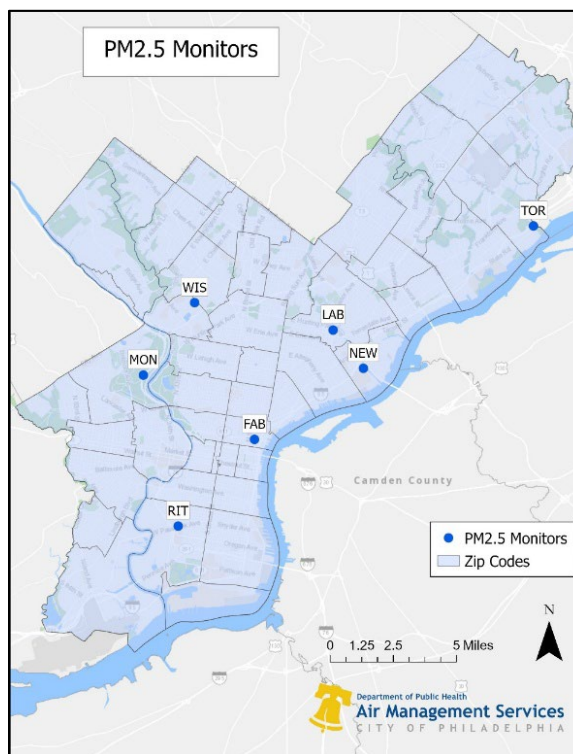


Figure 30. PM_{2.5} Monitoring Map.

PM_{2.5} consists of those particles that are less than 2.5 micrometers (μm) in diameter. They are also referred to as "fine" particles. Fine particles result from fuel combustion from motor vehicles, power generation, and industrial facilities, as well as from gas residential appliances, fireplaces, and wood stoves. A significant amount of fine particles is also formed in the atmosphere by the transformation of gaseous emissions such as SO₂, NO_x, VOCs, and ammonia.

Fine particles can accumulate in the respiratory system and are associated with numerous health effects, including premature death, cardiovascular disease, respiratory symptoms and disease, and decreased lung function. Sensitive groups that appear to be at the greatest risk for such effects include children, seniors, and individuals with cardiopulmonary disease or respiratory ailments such as asthma.

In 2024, the EPA revised the PM_{2.5} NAAQS from 12 $\mu\text{g}/\text{m}^3$ to 9 $\mu\text{g}/\text{m}^3$. This change was the result of a scientific review by health experts of many studies linking lower PM_{2.5} exposure to additional health effects. To remain in attainment for the NAAQS, Philadelphia must meet the stricter PM_{2.5} standard with the 2026 design values. In 2025, the EPA reconsidered the updated NAAQS in an attempt to revert back to the previous 2012 NAAQS of 12 $\mu\text{g}/\text{m}^3$. The courts rejected the EPA reconsideration and ruled that the 2024 PM_{2.5} NAAQS of 9 $\mu\text{g}/\text{m}^3$ will remain the applicable standard. Therefore, Philadelphia must meet the 2024 PM_{2.5} NAAQS by 2026, or it will be reclassified as nonattainment.

In 2025, there were six PM_{2.5} monitoring sites in the network. An additional regulatory station, WIS (formerly HUN), was added in January 2026 and began PM_{2.5} measurements on April 1, 2026, enhancing the network's coverage.

Figures 31 and 32 illustrate trends for the 24-hour concentration and the annual mean of PM_{2.5}, respectively. The citywide highest 98th percentile average 24-hour PM_{2.5} concentration in 2025 is 22.87 µg/m³, with a citywide annual mean of 8.43 µg/m³, reflecting current air quality conditions. For historical context, wildfires significantly increased the 98th-percentile 24-hour particulate matter concentration in 2023, as shown in Figure 31.

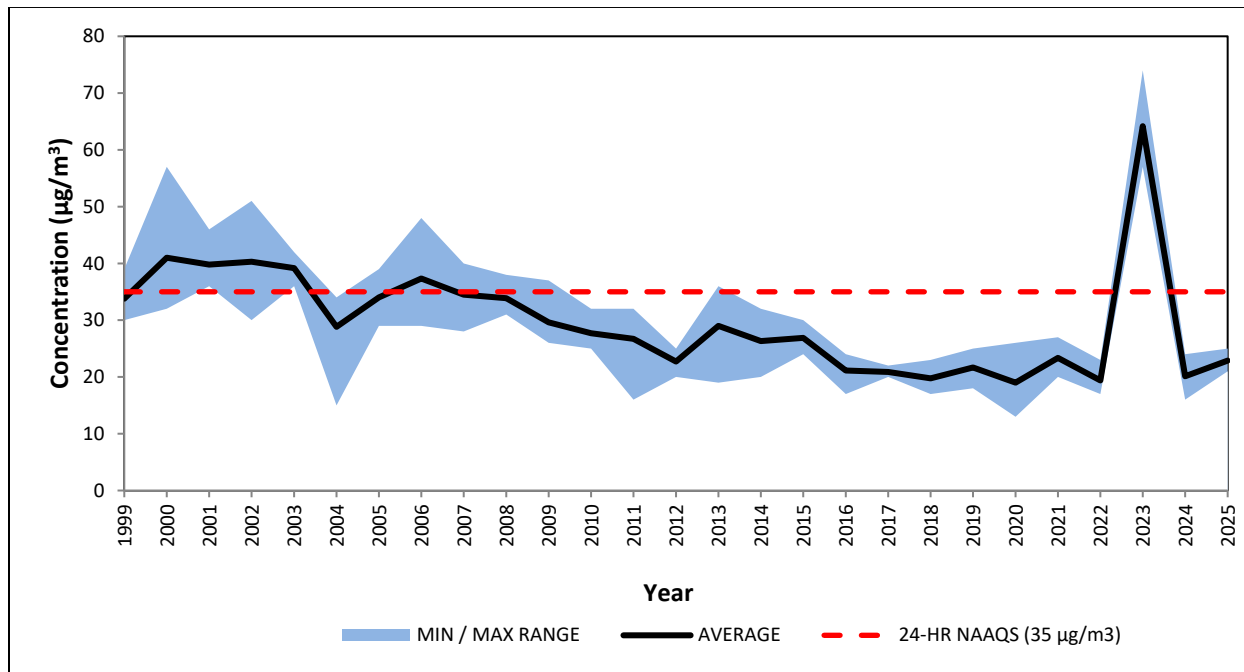


Figure 31. PM_{2.5} Trends for 98th Percentile 24-Hour Concentration.

Note: The values on this graph are not comparable to the NAAQS value because only Design Values are compared to the NAAQS. The dashed NAAQS line is only for visualization purposes on this chart.

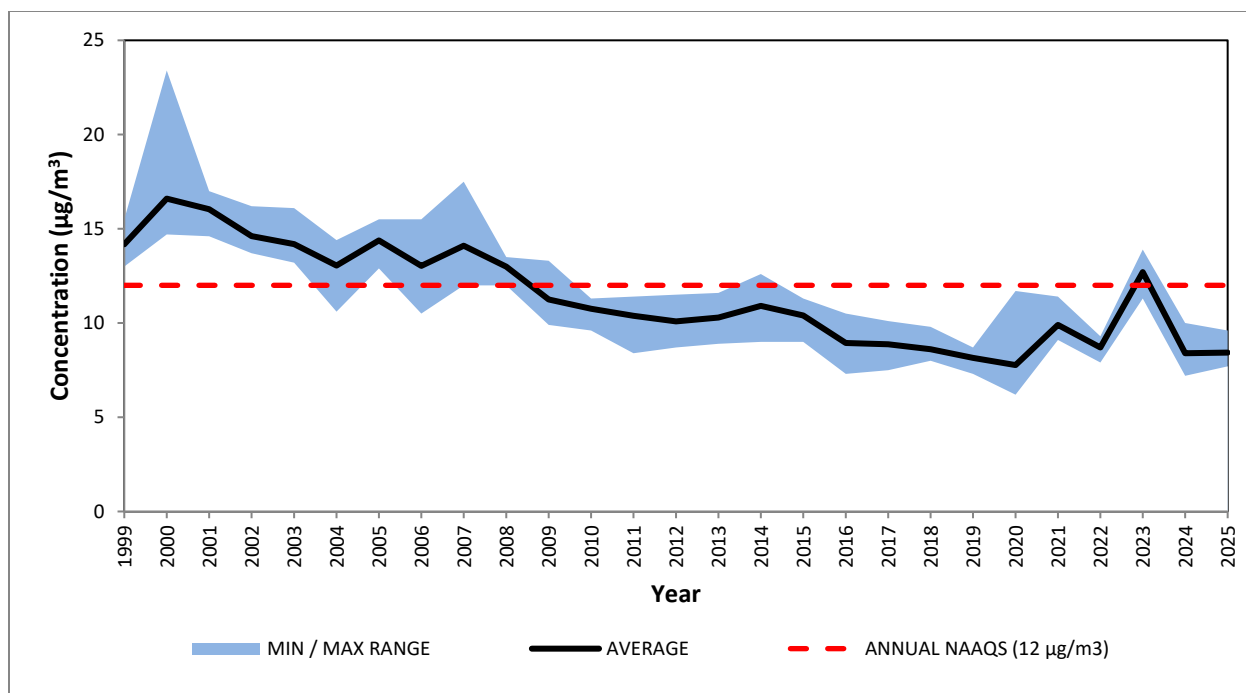


Figure 32. PM_{2.5} Trends for Annual Mean Concentration.

Note: The annual averages on this graph are not comparable to the NAAQS value because only Design Values are compared to the NAAQS. The dashed NAAQS line is only for visualization purposes on this chart.

Figure 33 illustrates the PM_{2.5} design values based on the 98th percentile of 24-hour average concentrations across Philadelphia monitoring sites, averaged over 3 years. In 2025, the design values were 28 µg/m³ at LAB, 23 µg/m³ at NEW, 25 µg/m³ at RIT, 24 µg/m³ at FAB, 27 µg/m³ at TOR, and 23 µg/m³ at MON. The graph shows how design values in 2023, 2024, and 2025 were higher than previous values. This increase is the result of the 2023 Canadian wildfire smoke, which caused elevated PM_{2.5} concentrations. Because design values are averages over 3 years, the higher 2023 value affected the 2024 and 2025 design values. All monitored values remained below the 24-hour PM_{2.5} NAAQS of 35 µg/m³, indicating continued compliance with the national standard.

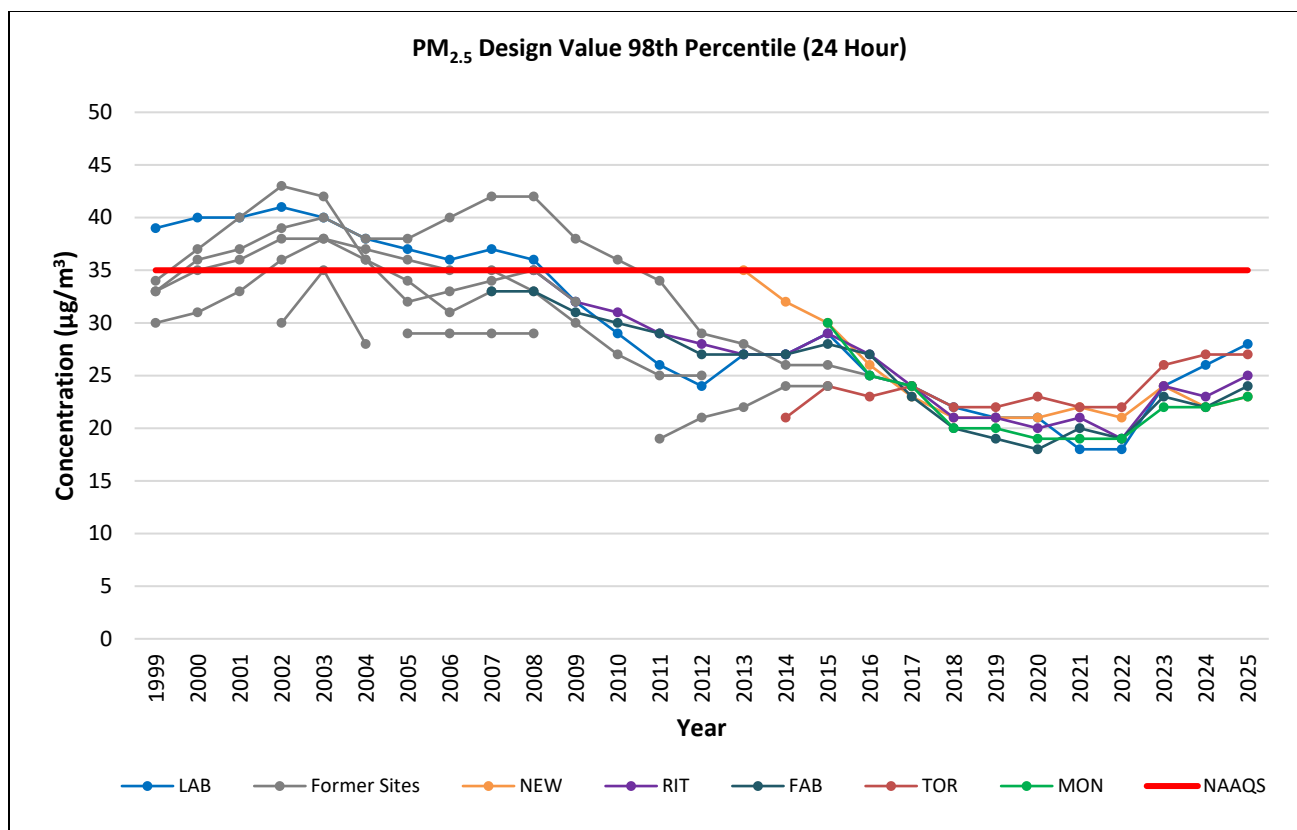


Figure 33. PM_{2.5} Design Value for 98th Percentile 24-Hour Concentration at each Monitoring Site.

Figure 34 illustrates the PM_{2.5} design values based on the annual mean concentration across Philadelphia monitoring sites, averaged over 3 years. In 2025, the annual mean design values were 10 µg/m³ at LAB, 9.2 µg/m³ at NEW, 9.4 µg/m³ at RIT, 9.4 µg/m³ at FAB, 10.2 µg/m³ at TOR, and 8.7 µg/m³ at MON. As with the 24-hour design values, the wildfire smoke-impacted 2023 annual average affected the 2024 and 2025 design values. This resulted in higher design values than in previous years. All monitored values remained below the annual PM_{2.5} NAAQS of 12 µg/m³, indicating continued compliance with the national standard. In 2026, the design values will be compared to the updated NAAQS of 9 µg/m³.

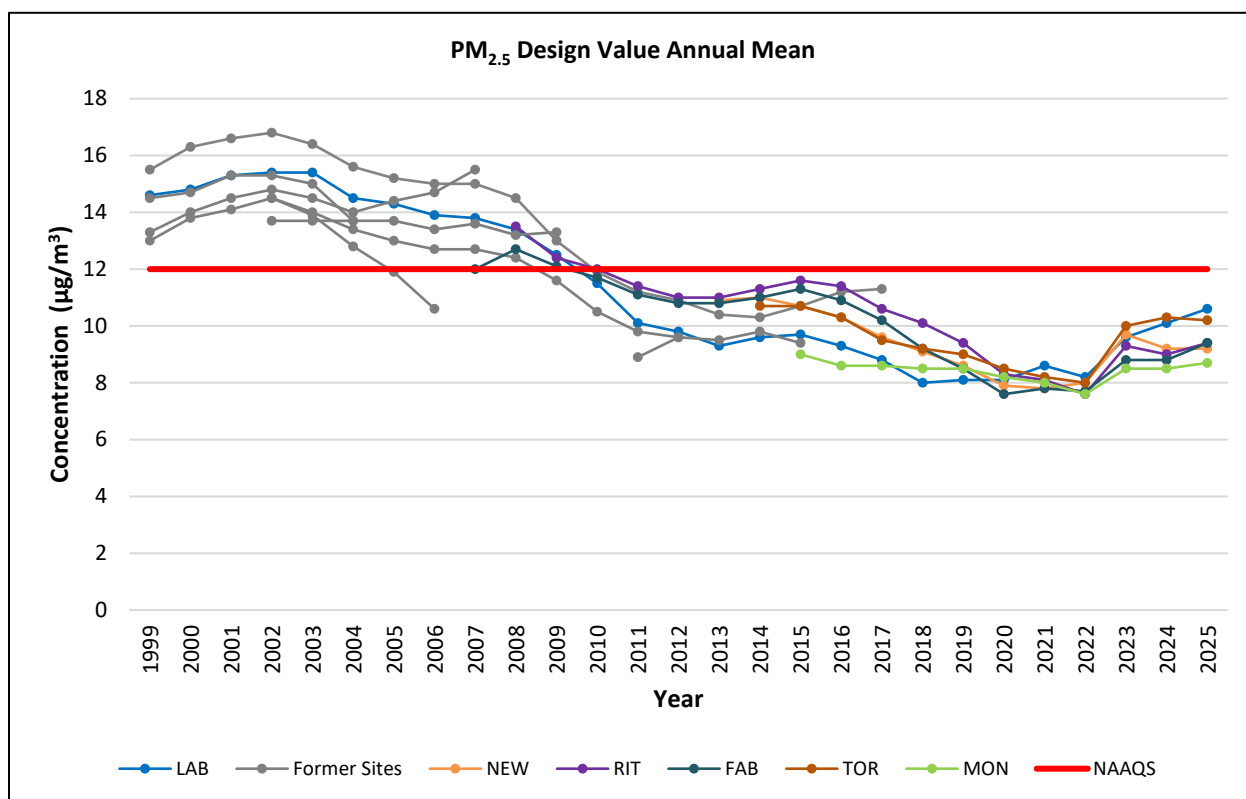


Figure 34. PM_{2.5} Design Value for Annual Mean Concentration at each Monitoring Site.

Air Toxics

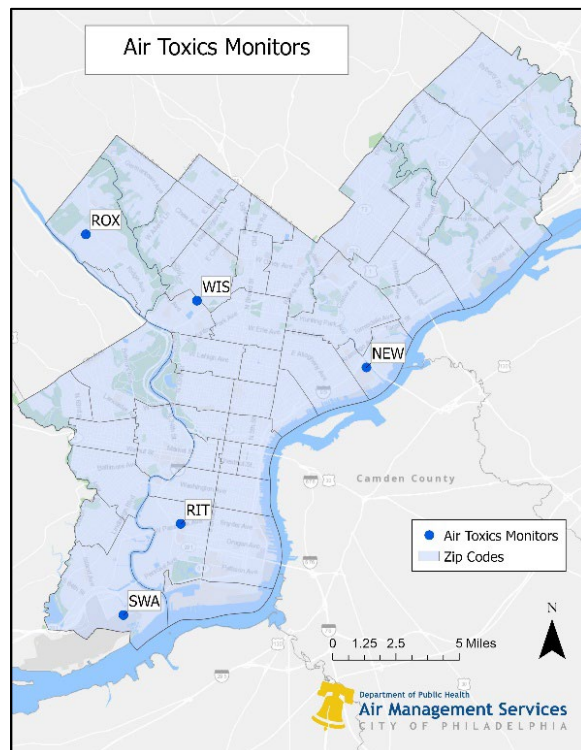


Figure 35. Air Toxics Monitoring Map.

Air toxics, also referred to as toxic air contaminants or hazardous air pollutants (HAPs), are substances that cause adverse health effects or environmental damage. The Federal Clean Air Act Amendments (CAAA) of 1990 list 188 pollutants or chemical groups as HAPs. Examples of air toxics include heavy metals (such as Beryllium, Arsenic, Chromium, etc.), organic chemicals (such as benzene, formaldehyde, etc.), polycyclic organic matter (POM, formed primarily by combustion), pesticides, and asbestos. HAPs are emitted from stationary sources (large industrial facilities), nonpoint sources (dry cleaners, gas stations, and other small facilities), and mobile sources (cars, trucks, and buses).

In 2025, AMS monitored air toxics at 4 locations, as seen in Figure 35. AMS monitors approximately 61 VOCs, 7 carbonyl compounds, 59 hydrocarbons, and 7 metal elements. An additional regulatory station, WIS (formerly HUN), was added in January 2026, and air toxic measurements began on April 1, 2026, enhancing the network's coverage.

Three different sampling methods are employed to obtain air toxics concentrations in ambient air. VOCs are collected in 6-liter stainless steel canisters every 6 days and analyzed via Gas Chromatography/Mass Spectrometry. Carbonyls are also collected every 6 days on a cartridge and analyzed using Ultra-High-Performance Liquid Chromatography. The hydrocarbons are collected and analyzed hourly every day via auto-Gas Chromatography.

There is less information about the health impacts of the 188 HAPs than for criteria pollutants, and no national ambient air quality standards exist for them. However, a number of these pollutants are known or suspected to be carcinogenic, and there is no known “safe concentration.” The danger posed by toxics is often referred to in terms of risk. Risk is often defined as the likelihood of a negative outcome from exposure to a specific chemical or the probability that health problems will occur. For example, many toxics cause cancer, while others cause respiratory problems, birth defects, neurological or immune response problems, and other health concerns. Toxics have varying degrees of danger, and some will cause harm with a very small amount of the substance, while others require large amounts to have a negative effect. A cancer risk of “one in a million” implies a likelihood that up to one person out of one million equally exposed people would contract cancer if exposed continuously (24 hours per day) to the specific concentration over 70 years (an assumed lifetime). This risk is calculated as additional (or incremental) to those cases of cancer that would usually occur in an unexposed population of one million people.

AMS is working to reduce HAPs in Philadelphia by enforcing Federal, State, and locally mandated programs that limit emissions from stationary and area sources. Many toxic emissions have been reduced by regulations designed to bring Philadelphia into compliance with the NAAQS for Ozone. In addition, Philadelphia enforces the National Emission Standards for Hazardous Air Pollutants (NESHAPs), a program designed to reduce emissions from existing major and area sources, as well as New Source Performance Standards (NSPS), which limit toxic emissions from new sources. In 2010, Air Management Regulation XIV – Control of Emissions from Dry Cleaning Facilities was promulgated. This regulation restricted the use of perchloroethylene (PERC) in dry cleaning facilities that share a common wall with businesses or residences. Since 2010, ambient concentrations of PERC have decreased.

Air Management Regulation VI (AMR VI), Philadelphia’s local regulation for controlling toxic air contaminants, was amended and finalized in 2023 and took effect on January 1, 2024. The updated rule includes a list of 217 toxic air contaminants (TACs), closely aligned with the 188 hazardous air pollutants (HAPs) identified by the U.S. Environmental Protection Agency (EPA) under Section 112 of the Clean Air Act. Under this regulation, facilities seeking new installation permits, plan approvals, or Title V Operating Permit renewals must conduct a health risk screening if their potential emissions exceed pollutant-specific reporting thresholds defined in the Technical Guidelines. This process is designed to ensure that new or modified sources do not pose unacceptable health risks to surrounding communities and that the city’s air quality continues to improve through proactive risk-based management of air toxics.

In addition, AMS is currently working with other City departments to enforce the Mayor's Executive Order 1-07, which requires all public works and demolition contracts to use clean diesel technology. This program is expected to significantly reduce particulate matter, hydrocarbons, and carbon monoxide from diesel vehicles contracted by the City, resulting in substantial annual health benefits.

The EPA’s Air Toxics Screening Assessment (AirToxScreen) is a screening tool to provide communities with information about health risks from air toxics. AirToxScreen is EPA's ongoing comprehensive evaluation of air toxics in the U.S. The activities include expanding air toxics

monitoring, improving and periodically updating emission inventories, improving national- and local-scale modeling, continuing research on health effects and exposures to both ambient and indoor air, and improving assessment tools. The latest version of the tool is the 2020 AirToxScreen. Air toxics were assessed for either lifetime cancer risk or non-cancer hazard due to inhalation at the census tract level.

The goal of AirToxScreen is to identify air toxics that pose the greatest potential concern in terms of their contribution to population risk. The results are used to establish strategies, priorities, and programs to reduce air toxics emissions.

The results of the 2020 AirToxScreen for Philadelphia County are summarized below:

- Total air toxics cancer risk was approximately 30 in one million population as estimated by AirToxScreen.
- By source category, secondary formation accounted for 51.2% of cancer risk, and on-road mobile sources accounted for 9.4%. Point sources accounted for 3.5% (see Figure 36).
- The pollutants contributing most to cancer risk were formaldehyde (57.9%), carbon tetrachloride (8.8%), and benzene (7.1%) (see Figure 38).

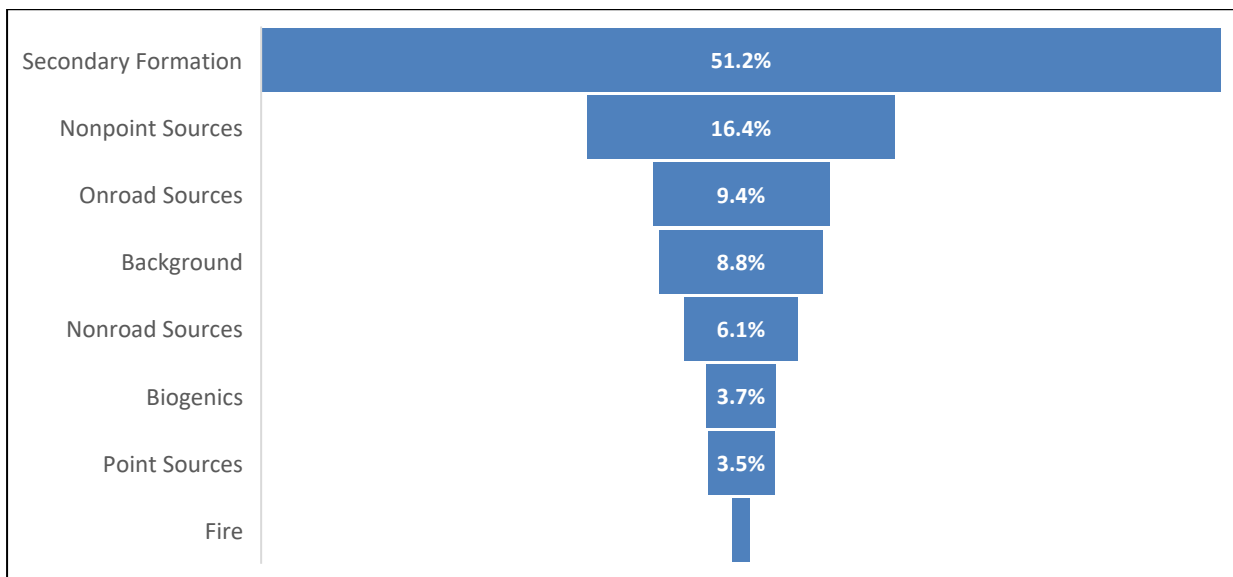


Figure 36. Source Category Contribution to 2020 AirToxScreen Cancer Risk.

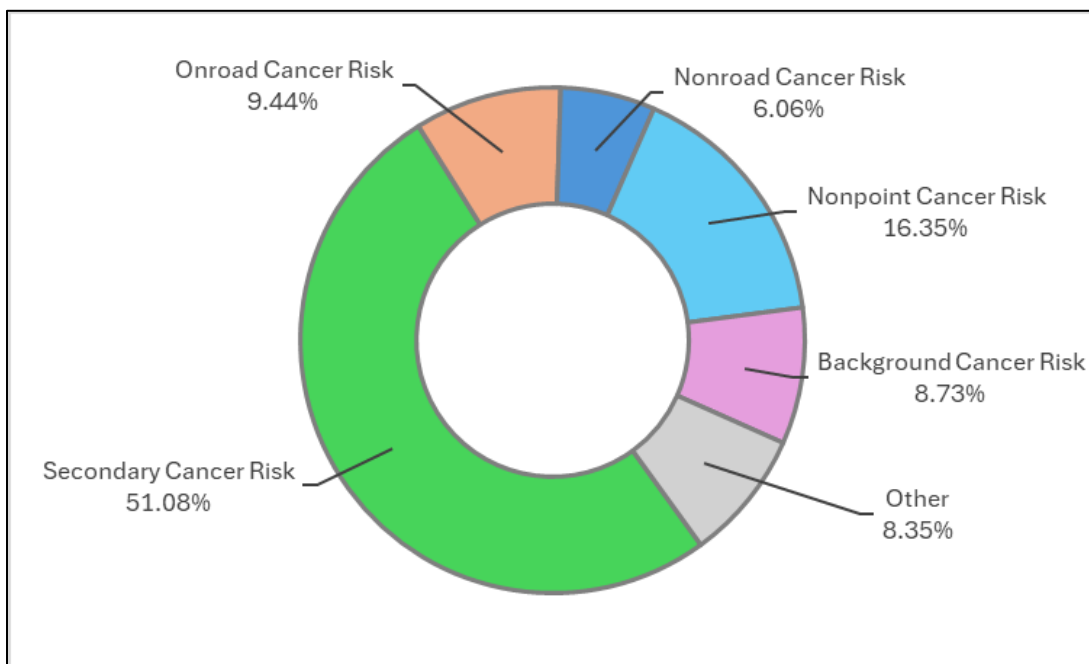


Figure 37. 2020 AirToxScreen Cancer risk sources: Secondary formation dominates, followed by Nonpoint, On-road, and other sources.

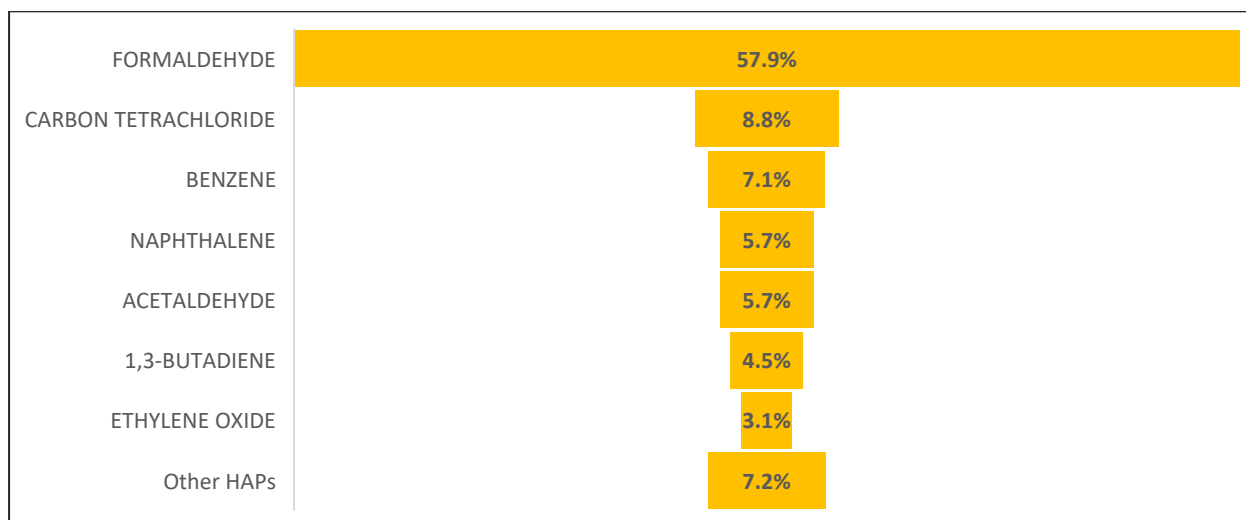


Figure 38. HAP Contributions to 2020 AirToxScreen Cancer Risk.

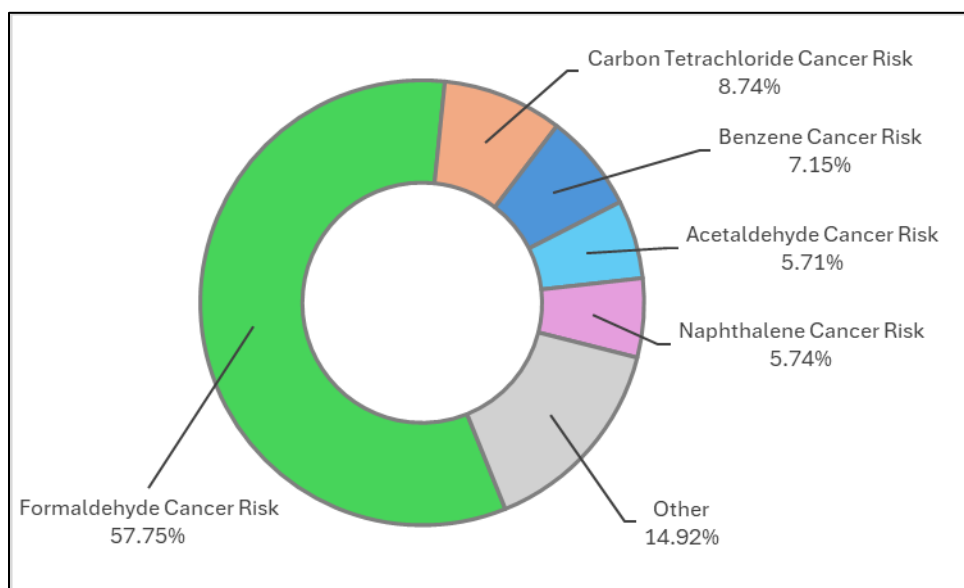


Figure 39. 2020 AirToxScreen Cancer risk by pollutant: Formaldehyde dominates, followed by Others, Carbon Tetrachloride, Benzene, and the rest.

As shown in Figures 36 to 39, secondary pollutant formation and formaldehyde contribute to the majority of the cancer risk. Formaldehyde is primarily formed via secondary formation, with minimal direct emissions. Much of the secondary formation risk comes from the formation and risk of formaldehyde. AMS tries to limit formaldehyde formation by reducing emissions of its precursors, which are mostly the same as those for ozone.

Additional information for the 2020 EPA AirToxScreen can be found here:

<https://www.epa.gov/AirToxScreen/2020-airtoxscreen-assessment-results>

Figure 40 shows the 2025 annual mean formaldehyde concentrations measured by AMS at four monitoring sites (ROX, NEW, RIT, and SWA). Formaldehyde had the highest contribution to air toxics cancer risk in Philadelphia, according to the 2020 AirToxScreen assessment.

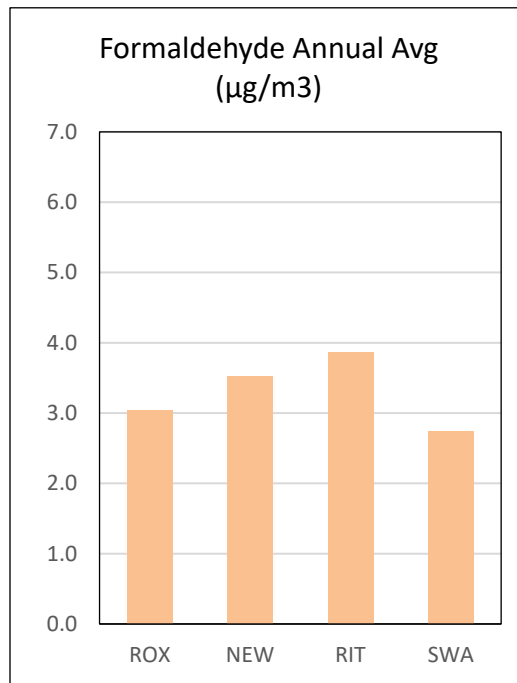


Figure 40. 2025 Mean Concentrations for Formaldehyde.

Data for air toxics can be found on the EPA websites <https://www.epa.gov/outdoor-air-quality-data/monitor-values-report-hazardous-air-pollutants> or https://aqs.epa.gov/aqsweb/airdata/download_files.html.

Non-Regulatory Monitoring Network

VGR Monitor

The Village Green monitoring station in Philadelphia is part of the EPA's Village Green Project, a community-based real-time air pollution monitoring initiative designed to increase public awareness of local environmental conditions. The station operates on solar power and a small wind turbine, allowing it to function as a fully self-contained, off-grid monitoring platform. Located in a public setting to maximize visibility and outreach, the Village Green station measures ozone, PM_{2.5}, and basic meteorological parameters. All parameters are displayed in real time on the monitor for the community. This installation enhances public engagement by providing accessible, highly localized air-quality information and serves as a supplemental education and outreach tool within Philadelphia's monitoring network. Details about the Village Green station are provided in Table 3.

Table 3. VGR site information.

AMS Site ID: VGR
Address: 6th & Arch Streets
Latitude: 39.952608
Longitude: -75.149704

Breathe Philly Project

Network Overview and Deployment Strategy

In 2025–2026, AMS established a citywide network of 76 Clarity Node-S real-time sensors as part of the Breathe Philly program. Breathe Philly is intended to complement the existing regulatory monitoring network and improve public transparency of data. This effort builds on the Philadelphia Air Quality Survey (PAQS), which operated from 2018 through 2024 and provided high-resolution, filter-based measurements across the city.

More than half of the Clarity sensors were deployed at former PAQS locations. This approach leveraged the original site selection analysis, which considered emission sources, roadway density, and population distribution, and allowed for comparison between historical PAQS data and current real-time measurements.

The remaining sensors were strategically placed to improve geographic equity and spatial coverage. Priority was given to residential areas and neighborhoods with limited proximity to regulatory monitors. As a result, every residence in Philadelphia is located within 1.5 miles of either a regulatory monitoring station or a Clarity sensor. Figure 41 presents a map of the Clarity Real-Time Sensor Network.

The compact and modular design of the Node-S units allows AMS to adjust locations as needed to address data gaps, community concerns, or evolving monitoring priorities. AMS will continue evaluating sensor performance and siting effectiveness as part of the ongoing network assessment.

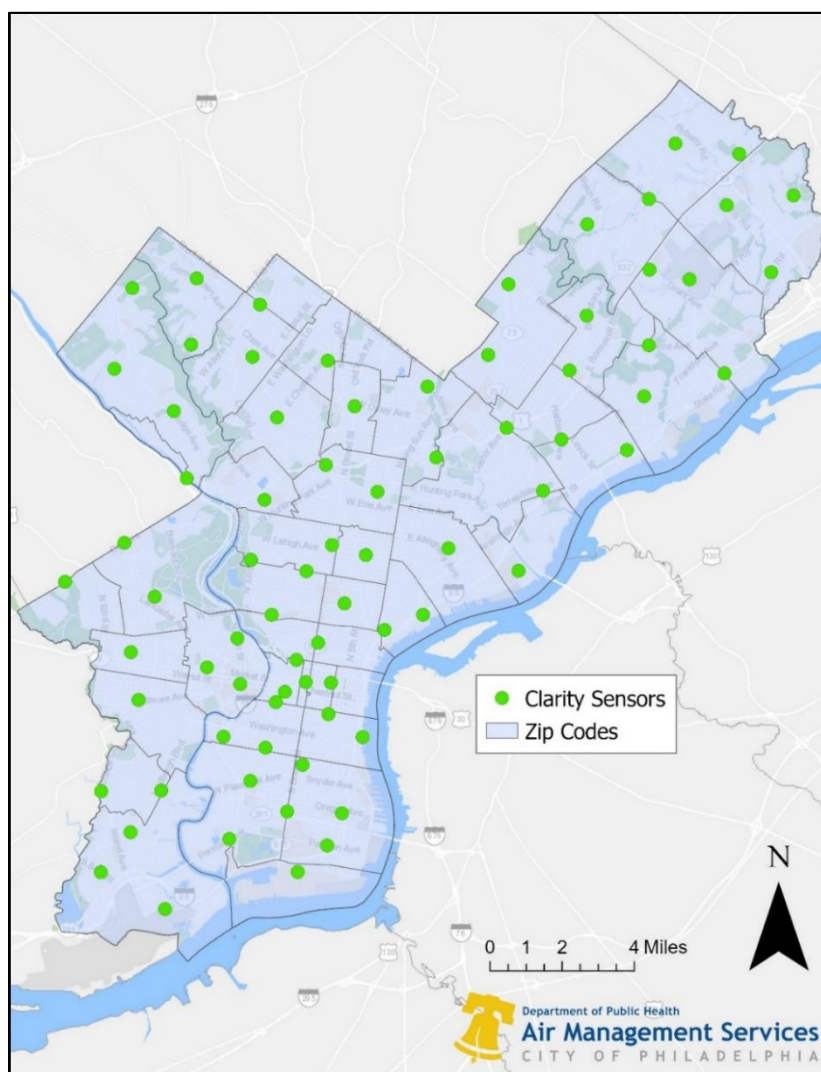


Figure 41. Philadelphia Clarity Real-Time Sensor Network as of April 2026.

Real-Time Data Access

The Clarity sensor network is integrated with AMS regulatory monitors through the Breathe Philly public dashboard. This platform provides unified access to real-time and historical air quality information.

Real-Time Measurements

Real-time measurements are collected for most criteria pollutants and displayed every hour on the Breathe Philly dashboard.

- For PM_{2.5}, the 76 Clarity sensors and the 7 regulatory monitors measure PM_{2.5} continuously and display hourly results.

- For NO₂, the 76 Clarity sensors and 4 regulatory monitors measure NO₂ continuously and display hourly results.
- For Ozone, CO, PM₁₀, and SO₂, the AMS regulatory monitors produce hourly averages that are shown on the Breathe Philly dashboard.

Data are presented as time-series charts showing both pollutant concentration and Air Quality Index (AQI) values. The dashboard also aggregates hourly data to illustrate short-term patterns, seasonal trends, and episodic events. Real-time sensor data are intended to enhance public awareness and situational understanding. Regulatory data remains the official record for compliance determinations and EPA reporting.

Appendix A: Reference Websites

- Appendix A.1. <https://www.airnow.gov/> - The AQI (Air Quality Index) tells you how clean the air is and whether it will affect your health. Through AirNow, the EPA, NOAA, NPS, and state and local agencies work together to report current and forecast conditions for ozone and particle pollution.
- Appendix A.2. www.airqualitypartnership.org – Ground-level ozone and particle pollution forecasts.
- Appendix A.3. www.atsdr.cdc.gov – Agency for Toxic Substances and Disease Registry: public health statements on specific toxics and the effects of exposure.
- Appendix A.4. <https://www.enviroflash.info/> – Sign up for air quality forecasts.
- Appendix A.5. <https://www.dep.pa.gov/> - Pennsylvania Department of Environmental Protection.
- Appendix A.6. www.epa.gov – U.S. Environmental Protection Agency.
- Appendix A.7. <https://www.epa.gov/outdoor-air-quality-data> – EPA’s AQS (Air Quality System) database for air monitoring data.
- Appendix A.8. <https://echo.epa.gov/> – EPA’s ECHO (Enforcement & Compliance History Online) database for compliance inspections conducted by EPA or state/local government, violations, enforcement actions, and penalties assessments in response to environmental law violations.
- Appendix A.9. <https://www.lung.org/> – American Lung Association website: Information on lung health, air pollution, and related matters.
- Appendix A.10. <https://www.phila.gov/departments/departments-of-public-health/about-us/contact-us/> – Philadelphia Department of Public Health, Air Management Services.
- Appendix A.11. <https://www.phila.gov/services/mental-physical-health/environmental-health-hazards/air-quality/> - Philadelphia's Air Quality Website, provides the most up-to-date information about the air quality in Philadelphia and lets you know what you should do to protect your health if the air quality is unhealthy.
- Appendix A.12. <https://www.epa.gov/outdoor-air-quality-data/monitor-values-report>. Data downloaded from EPA’s AirData website.

Appendix B: Air Quality Data Tables¹²

Appendix B. Table 1. Ozone 4th Highest Daily Maximum 8-Hour Concentrations (ppm).

Year	AQS SITE ID - POC												
	421010004-1	421010004-2	421010014-1	421010019-1	421010021-1	421010023-1	421010024-1	421010026-1	421010027-1	421010029-1	421010048-1	421010136-1	421011002-1
1980	0.032		0.113	0.037	0.032	0.062	0.128	0.025	0.026	0.028			
1981			0.1				0.108						
1982			0.111			0.087	0.103						
1983			0.12			0.102	0.121						
1984			0.106			0.093	0.108						
1985			0.111			0.083	0.116						
1986			0.103			0.08	0.105						
1987			0.104			0.085	0.118						
1988			0.13			0.088	0.128						
1989			0.085			0.097	0.077						
1990			0.097			0.097	0.101						
1991			0.106			0.095	0.112						
1992			0.087			0.076	0.091						
1993	0.086		0.092			0.09	0.097					0.103	
1994	0.08		0.095			0.07	0.092					0.085	
1995	0.091		0.096				0.113					0.092	
1996	0.087		0.093				0.092					0.072	
1997	0.067		0.096				0.101					0.074	
1998	0.077		0.095				0.093					0.088	
1999	0.073		0.081				0.06					0.098	
2000	0.067		0.086				0.089					0.082	
2001	0.074		0.097				0.097					0.086	
2002	0.082		0.098				0.11					0.094	
2003	0.069		0.084				0.086					0.074	
2004	0.057		0.077				0.091					0.073	
2005	0.066		0.083				0.094					0.068	
2006	0.066		0.076				0.085					0.081	
2007	0.073		0.081				0.095					0.082	
2008	0.062						0.087						
2009	0.059						0.072						
2010	0.077						0.088						
2011	0.07						0.089						0.088
2012	0.065						0.085						0.083
2013	0.047						0.068				0.036		0.071
2014	0.058						0.072				0.068		
2015	0.057						0.079				0.078		
2016	0.069						0.08				0.076		
2017	0.042						0.076				0.076		
2018		0.071					0.079				0.076		
2019		0.067					0.071				0.072		
2020		0.064					0.070				0.067		
2021		0.068					0.073				0.073		
2022		0.061					0.068				0.066		
2023		0.064					0.072				0.071		
2024		0.072					0.070				0.075		
2025		0.068					0.064				0.074		

¹² Data downloaded from EPA's AirData website (<https://www.epa.gov/outdoor-air-quality-data/monitor-values-report>).

Appendix B. Table 2. Carbon Monoxide 2nd Highest 8-Hour Average Concentrations (ppm).

Year	AQS SITE ID - POC																		
	421010004-1	421010004-2	421010014-1	421010019-1	421010021-1	421010024-1	421010026-1	421010026-2	421010027-1	421010029-1	421010029-2	421010045-1	421010046-1	421010047-1	421010048-1	421010051-1	421010075-1	421010076-1	421011002-1
1980	7.1	4.6		4.9	6.8	5.5		5.3	5.8		5	8.2							
1981	9.9		3.3				7.4		9.3	9.4		9.5	7.6						
1982	9.9		3.9						11.9	7		7.9	7.6	7.3					
1983	6.6								10.6	6.1		6.1	5.6	5.6					
1984	9.5								10	6.3		7.8	6.6	6.2					
1985	6.8								7.6	5.1		6.3	4.9	5.8					
1986	6.3								7.9	5.3			5.3	6.3					
1987	7.8								10	7.3			5.3	5.4		8.7			
1988	5.9								6.3	4.9			3.9	4.3		6.9			
1989	11.6								6.4	6.9				6.9		9.5			
1990	6.8								6.4	4.7				5.4		6.1			
1991	5.6								7.1	4.4				4.3		5.1			
1992	6.4								6.8	5				4.1		5.4			
1993	6.6								4.6	5.6				5		5.4			
1994	8.3									5.1				5.4		5.9			
1995	4.5								4.8	4.1				3.9		5.6			
1996	5.6								5.4	4.5				3.6		5.6			
1997	5.3								5	3.3				3.1		3.6			
1998	4.6								4.9	3.2				3.3		3.8			
1999	4.9								4.9	4.4				3.3		4.2			
2000	3.3								4	3				3					
2001	4								4.7	2.9				2.5					
2002	2.9								2.9	2				1.9					
2003	2.4								3.9	2.2				2					
2004	3.1								3.4	2.5				2.7					
2005	2.1								3.4	0.8				2.1					
2006	2.3								3.2					1.4					
2007	2.6								3.2					5.5					
2008	1.5													0.7					
2009	2																		
2010	1.8																		
2011	1.7																		1.2
2012	1.5																		1.5
2013	1.7														1.1				1.3
2014	1.3														1.3		1.4		
2015	1.6														1.5		1.6		
2016	1.9														1.7		1.6		
2017	0.9														1.4		1.2	2.6	
2018															1		1.3	1.1	
2019															1.7		1.5	1.4	
2020															1.1		1.8	1.3	
2021															1.1		1.4	1.1	
2022															1.2		1.5	1.2	
2023															1		1.4	1.2	
2024															0.9		1.3	1.2	
2025															1.1		2.2	1.1	

Appendix B. Table 3. Carbon Monoxide 2nd Highest 1-Hour Average Concentrations (ppm).

Year	AQS SITE ID - POC																		
	421010004-1	421010004-2	421010014-1	421010019-1	421010021-1	421010024-1	421010026-1	421010026-2	421010027-1	421010029-1	421010029-2	421010045-1	421010046-1	421010047-1	421010048-1	421010051-1	421010075-1	421010076-1	421011002-1
1980	10	8		7	10	7		10	13		9	14							
1981	14		5				12		15	14		16	11						
1982	15		10						21	13		15	13	16					
1983	9								16	9		11	8	8					
1984	16								15	12		16	12	11					
1985	10								16	8		9	8	9					
1986	10								11	10			8	15					
1987	12								14	11			8	8		12			
1988	8								10	7			6	7		11			
1989	16								10	10				10		16			
1990	9								10	7				8		10			
1991	9								12	8				7		8			
1992	8								10	7				7		9			
1993	9								9	9				8		8			
1994	11									11				9		10			
1995	7								7	8				7		9			
1996	9								10	8				6		12			
1997	8.7								7.8	6.2				4.8		6.4			
1998	7								8.8	5.4				5.8		5.6			
1999	7.4								6.6	5.2				4.5		7			
2000	6.3								5.7	4.2				4.3					
2001	5.4								7.7	5.1				4.7					
2002	5								4.2	3.4				2.9					
2003	3.6								5.4	3.1				2.6					
2004	4.3								5.1	3.6				3.6					
2005	3.6								6.2	1.1				12.1					
2006	3.5								4.9					2.2					
2007	3.7								3.9					5.6					
2008	3.2													1.1					
2009	3.3																		
2010	3																		
2011	2.5																		2.1
2012	2.3																		2.1
2013	2.3														1.7				1.6
2014	1.7														1.7		1.9		
2015	2.1														2		1.9		
2016	3.5														2.5		2.1		
2017	1.3														2		1.6	4.1	
2018															1.3		1.7	1.4	
2019															2.2		2.1	1.7	
2020															1.5		2	1.7	
2021															1.6		1.6	1.4	
2022															1.4		1.8	1.8	
2023															1.6		1.7	1.7	
2024															1.9		1.7	1.6	
2025															1.7		2.4	1.6	

Appendix B. Table 4. Nitrogen Dioxide Annual Average Concentrations (ppb).

Year	AQS SITE ID - POC										
	421010004-3	421010022-1	421010023-2	421010024-1	421010026-2	421010027-1	421010029-2	421010047-1	421010048-1	421010075-1	421010076-1
1980	40.89			25.02	46.18	45.82	36.19				
1981	37.4	34.24		24.32	46.12		36.19				
1982	33.05	37.1		26.62			39.23	37.64			
1983	38.15	41.34					39.7	37.87			
1984	38.1	35.82					37.34	40.16			
1985	33.71	31.67					34.34	36.21			
1986	33.28		15.32				36.34	35.67			
1987	32.12						39.28	42.55			
1988	31.06						31.93	39.41			
1989	29.11						32.86	39.74			
1990	28.14						31.91	35.19			
1991	28.35						32.59	33.55			
1992	25.82						32.55	34.93			
1993	24.06						31.22	34.51			
1994	24.01						31.06	36.56			
1995	27.73						31.01	31.81			
1996	29.34						33.35	33.92			
1997	27.99						32.44	31.76			
1998	29.47						33.37	34			
1999	26.99						30.23	31.75			
2000	25.66						27.94	28.69			
2001	25.59						28.32	29.95			
2002	24.09						28.1	29.48			
2003	23.97						24.69	25.23			
2004	22.73						24.69	25.58			
2005	21.57						26.11	26.29			
2006	20.72							22.81			
2007	20.35							22.8			
2008	19.6							20.03			
2009	18.25							19.59			
2010	17.66							22.61			
2011	20.12							19.56			
2012	17.91							17.6			
2013	16.18							17.17			
2014	17.45							18.31		15.51	
2015	18.15							19.07		14.69	11.32
2016	15.73									13.55	11.28
2017	19.55									11.35	9.36
2018										10.69	10.76
2019									12.32	13.43	13.11
2020									10.98	12.89	11.45
2021									11.39	14.36	11.93
2022									11.38	14.47	12.57
2023									11.81	14.58	12.12
2024									11.32	13.99	12.08
2025									10.58	13.1	11.34

Appendix B. Table 5. Nitrogen Dioxide 98th Percentile Daily Maximum 1-Hour Concentrations (ppb).

Year	AQS SITE ID - POC										
	421010004-3	421010022-1	421010023-2	421010024-1	421010026-2	421010027-1	421010029-2	421010047-1	421010048-1	421010075-1	421010076-1
1980	130			90	120	130	100				
1981	110	140		90	130		110				
1982	110	120		100			130	120			
1983	140	140					140	110			
1984	120	100					100	120			
1985	100	110					110	90			
1986	90		40				110	90			
1987	90						160	110			
1988	100						90	100			
1989	100						100	120			
1990	100						90	100			
1991	100						80	100			
1992	80						100	100			
1993	70						80	80			
1994	80						100	110			
1995	80						80	100			
1996	70						80	80			
1997	72						79	79			
1998	80						87	81			
1999	68						81	72			
2000	73						72	73			
2001	72						77	75			
2002	61						70	69			
2003	62						63	60			
2004	64						59	61			
2005	64						37	68			
2006	74							60			
2007	62							64			
2008	57							53			
2009	56							56			
2010	62							56			
2011	76							64			
2012	56							52			
2013	52							50			
2014	59							57		51	
2015	63							56		49	39
2016	58									49	43
2017	60									45	38
2018										37	43
2019									41	43	52
2020									43	44	50
2021									43	46	54
2022									43	46	56
2023									46	48	48
2024									44	46	50
2025									40	45	48

Appendix B. Table 6. Sulfur Dioxide 99th Percentile Daily Maximum 1-Hour Average Concentrations (ppb).

	AQS SITE ID - POC																					
Year	421010004-4	421010004-5	421010014-1	421010019-1	421010020-1	421010021-1	421010022-1	421010022-2	421010023-2	421010023-3	421010024-1	421010026-2	421010026-3	421010027-1	421010029-2	421010029-3	421010047-1	421010048-1	421010048-2	421010055-1	421010136-1	421011002-1
1980	160		120	150	120	90	300	180	160	140	110	170	110	150	170							
1981	140	120					270		100				140	130	170							
1982	120						130		100					120	160		150					
1983	90						130		80		80			80	150	100	100					
1984	120						180		90		100			130	140		120					
1985	100						100		70		70			100	90		120					
1986	80						110		80		60			100	90		100					
1987	90						150		80		80			90	90		80					
1988	100						130		110		90			110	130		130					
1989	80						100		80		60			80	100		120					
1990	90						110		90		80			100	110		140					
1991	70						100		90		60			70	100		90					
1992	80						100		60		60			80	110		80					
1993	80						110		60		70			60	90		80	230			80	
1994	80						90		80		60				100		90	330			90	
1995	60						80				50			50	60		60	180			40	
1996	60						100				50			60	70		90	330			50	
1997	54						87				56			47	65		54	377			52	
1998	53						53				48			48	55		52	43			50	
1999	58						73				37			51	54		84	53			60	
2000	44						56								60						45	
2001	48						60								67						67	
2002	49														58						53	
2003	52														63						53	
2004	47														56					39	51	
2005	51														55					42	56	
2006	40																			43	39	
2007	38																			35	50	
2008	33																			32		
2009	37																			32		
2010	18																			25		
2011	13																			15		8
2012	7																			14		8
2013	8																		15	9		5
2014	11																		9	10		
2015																			9	10		
2016																			19	8		
2017																			10	10		
2018																			14	6		
2019																			17	6		
2020																			5	4		
2021																			6	6		
2022																			4	7		
2023																			5	4		
2024																			6	4		
2025																			5	3		

Appendix B. Table 7. Lead (Maximum) Rolling 3-Month Averages (µg/m3).

Year	AQS SITE ID - POC									
	421010004-5	421010014-1	421010047-1	421010048-1	421010055-1	421010063-1	421010076-1	421010136-1	421010449-1	421011002-1
2009									0.03	
2010									0.03	
2011									0.02	0.02
2012										0.05
2013				0.02						0.04
2014				0.02						
2015				0.02						
2016				0.04						
2017										
2018										
2019										
2020										
2021										
2022										
2023										
2024										
2025										

Appendix B. Table 8. PM₁₀ Highest 24-Hour Average Concentrations (µg/m³).

Year	AQS SITE ID - POC														
	421010003-1	421010004-1	421010004-2	421010037-1	421010038-1	421010047-1	421010048-1	421010048-2	421010049-1	421010136-1	421010149-1	421010449-1	421010449-2	421010649-1	421010649-2
1988	65	83		76	92	91									
1989		96		97	102	96									
1990		72		79	95	87									
1991		85	87	76	97	84									
1992		54		59	101	129					236				
1993		81		59	105	116			103		587	162			
1994		95		83	94	84			143	83	531	186			
1995		64		68		82			90	107	384	233			
1996		87		54		86			129	63	454	247			
1997		76		117		136			78	113	308	325		288	
1998		60		130		82			63	104	73	130		156	
1999		73		57		24			36	45	111	153		56	
2000		43		73						36	165	290		44	
2001		61		62						61	65	61	64	61	
2002		66		128						72	122	68	99	106	
2003		82		86						63		86		77	
2004		62		55						52		58		52	
2005		57		67						48		79		100	
2006		132								37		93		162	161
2007		44										37		61	62
2008		53										43		64	66
2009		49										41		80	78
2010		57										67		218	151
2011		46										59		64	90
2012		67										61			
2013		29					65					36			
2014							63					30			
2015							53								
2016							55								
2017							69								
2018							49								
2019								54							
2020								42							
2021								74							
2022								60							
2023*								100							
2024								52							
2025								51							

*(2023 Exceptional Events data excluded)

Appendix B. Table 9. PM_{2.5} 98th Percentile 24-Hour Concentrations (µg/m3).

Year	AQS SITE ID - POC																															
	421010003-1	421010004-1	421010004-2	421010004-5	421010014-1	421010020-1	421010024-1	421010027-1	421010047-1	421010047-3	421010047-4	421010048-1	421010048-3	421010048-4	421010048-5	421010048-6	421010052-1	421010055-1	421010055-2	421010055-3	421010056-1	421010057-1	421010057-2	421010057-3	421010057-4	421010075-1	421010075-2	421010076-1	421010076-2	421010136-1	421011002-1	421011002-3
1999		39				30	33		33																					34		
2000		41				32	38	57	39																					39		
2001		40				36	37		40																					46		
2002		41			30	40	38		39								51													43		
2003		40			39	39	39		42																					36		
2004		34			15	29	33		32																					30		
2005	29	36				33	36		39																					31		
2006	29	38	36				35		48												0									38		
2007		35	36				34		40		38											33				28				32		
2008		35	33				31		38		33						35					33			33							
2009		26	34				26		37		29						29					28			28							
2010		28	25				25		32		27						29					28										
2011			24						32		28						31					31									25	16
2012			21						24		22						25					23									20	24
2013			35						26	22	34	36	35				35			25		19		33							24	24
2014		20	25						28	26		26	28							31				32		21						
2015		25	27							24		26	26							30				27		27		30				
2016		17	24									19	22										22		22		21					
2017		22	21									22	20							20				20		22		20				
2018		19	21									17	20							21				18		23		19				
2019												25	23							22				18		22		20				
2020												19	14	26	23	13			18	18		20	17				19	25	16	19		
2021				20								21		27	24				25				25				23		22			
2022				20								18		20	20				17				17				23		20			
2023*				26								20		28					28				24				29		24			
2024				24								16		20	17				19				21				23		21			
2025				24								25		23	23				22				23					21		22		

*(2023 Exceptional Events data excluded)

Appendix B. Table 10. PM_{2.5} Annual Mean Concentrations (µg/m³).

Year	AQS SITE ID - POC																															
	421010003-1	421010004-1	421010004-2	421010004-5	421010014-1	421010020-1	421010024-1	421010027-1	421010047-1	421010047-3	421010047-4	421010048-1	421010048-3	421010048-4	421010048-5	421010048-6	421010052-1	421010055-1	421010055-2	421010055-3	421010056-1	421010057-1	421010057-2	421010057-3	421010057-4	421010075-1	421010075-2	421010076-1	421010076-2	421010136-1	421011002-1	421011002-3
1999																																
2000																																
2001	16.5						14.6	17																						16.7		
2002	14.8					14.4	14.3																							14.4		
2003	14.8					13.7																										
2004	13.9					12.8																								12.7		
2005																																
2006		13.2																														
2007	13.7							14.4																								
2008	13	12.5				12	13.5		13.2								13.5					13.3			12.9							
2009	10.9	11.3				9.9	11.1	11.1									11.3					11.1										
2010	10.7					9.6	10.9	10.9									11.3					10.9										
2011		8.9					11.3	11.4									11.4					11.4									9.9	
2012							10.2	10.1									10.3					10.1									8.7	
2013																																
2014							11.3					11.1												12.1								
2015		10.3							10.3	10.1									11.2					11		10.7						
2016											9.8								10.5				9.4		9.4		8.2					
2017											9								10													
2018	8.1								8										9.8				8		9.7		8.7					
2019									7.9	8.3									8.4					7.3		8.7		8.3				
2020									7.1																							
2021									9.1				9.6				10.1					9.7					10		9.3			
2022			8.8						8.4			9	9.5				7.9										9.3		8.6			
2023*			11.0						9.7				10.6				10.3					9.4					11.8		8.8			
2024			10						7.5		7.9	7.2					8.3					8.9					9.4		8			
2025			9.6						10.2		8.3	8.7					8					8.7					8		7.7			

*(2023 Exceptional Events data excluded)

Appendix B. Table 11. AQS Site ID information. This table includes historical monitoring sites no longer in operation.

AQS Site ID	Address
421010003	Community Health Services; 500 S Broad Street
421010004	1501 E. Lycoming Ave.
421010014	Roxy Water Pump Station; Eva & Dearnley Streets
421010019	Fire Boat Station; Allegheny Ave & Del River
421010020	Ford Rd-Belmont Ave Water Treat Plant
421010021	Island Rd, East of Airport Circle PHL Int Airport
421010022	Defense Support Center; 20th & Oregon Ave
421010023	SE Sewage Plant; Front & Packer Streets
421010024	Grant & Ashton Roads; Phila NE Airport
421010026	Broad & Spruce Streets; Mobile Trailer
421010027	S W Corner Broad & Butler
421010029	20th & Race Streets
421010037	13th Street & Montgomery Avenue
421010038	4415 Almond (Near Orthodox Street)
421010045	1421 Arch Street
421010046	1206 Chestnut Street
421010047	500 South Broad Street-Parking Lot (CHS)
421010048	3000 Lewis St. (Near Bath St.), Philadelphia, Pa. 19137
421010049	Richmond St. & Wheatshaf Lane
421010051	323 Race Street
421010052	1439 East Passyunk Avenue
421010055	24th & Ritner Streets
421010056	2851 Island Ave, Eastwick Free Library
421010057	240 Spring Garden Street
421010063	8200 Enterprise Ave
421010075	4901 Grant Avenue & James Street, Philadelphia, Pa. 19114
421010076	4100 Montgomery Drive
421010136	Amtrak, 5917 Elmwood Avenue
421010149	Castor & Carbon Streets on PGW Property
421010449	Castor & Delaware Avenues
421010649	Water Dept. Newpcp Lagoon Area (NEL)
421011002	5200 Pennypack Park, Philadelphia, Pa. 19136

Appendix C: History of the National Ambient Air Quality Standards

Appendix C. Table. 1. History of the National Ambient Air Quality Standards for Carbon Monoxide¹⁰.

Final Rule/Decision	Primary/ Secondary	Indicator	Averaging Time	Level	Form
1971 36 FR 8186 Apr 30, 1971	Primary and Secondary	CO	1-Hour period	35 ppm	Maximum, not to be exceeded more than once in a year ¹³
			8-hour period	9 ppm	Maximum, not to be exceeded more than once in a year
1985 50 FR 37484 Sept 13, 1985	Primary standards retained, without revision; secondary standards revoked.				
1994 59 FR 38906 Aug 1, 1994	Primary standards retained, without revision.				
2011 76 FR 54294 Aug 31, 2011	Primary standards retained, without revision.				

¹³ Second highest, non-overlapping 8-hour average concentration.

Appendix C. Table. 2. History of the NAAQS for Pb-TSP (Lead in total suspended particles) ¹¹.

Final Rule/Decision	Primary/Secondary	Indicator	Averaging Time	Level	Form
1978 43 FR 46246 Oct 5, 1978	Primary and Secondary	Pb-TSP	Calendar Quarter	1.5 µg/m ³	Not to be exceeded
1991	Agency released multimedia " Strategy for Reducing Lead Exposures "				
2008 73 FR 66964 Nov 12, 2008	Primary and Secondary	Pb-TSP	3-month period	0.15 µg/m ³	Not to be exceeded
2016 81 FR 71906 Oct 18, 2016	Primary and secondary standards retained, without revision.				

Appendix C. Table. 3. History of the NAAQS for Nitrogen Dioxide¹².

Final Rule/Decision	Primary/Secondary	Indicator	Averaging Time	Level	Form
1971 36 FR 8186 Apr 30, 1971	Primary and Secondary	NO ₂	Annual	53 ppb ¹⁴	Annual arithmetic average
1985 50 FR 25532 Jun 19, 1985	Primary and secondary NO ₂ standards retained, without revision.				
1996 61 FR 52852 Oct 8, 1996	Primary and secondary NO ₂ standards retained, without revision.				
2010 75 FR 6474 Feb 9, 2010	Primary	NO ₂	1 hour	100 ppb	98th percentile, 1-hour daily maximum, averaged over 3 years ¹⁵
		Primary annual NO ₂ standard retained, without revision.			
2012 77 FR 20218 April 3, 2012	Secondary	Existing secondary NO ₂ standard (annual) retained, without revision.			
2018 83 FR 17226 April 18, 2018	Primary	Existing primary NO ₂ standards retained, without revision.			

¹⁴ The official level of the annual NO₂ standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

¹⁵ The form of the 1-hour standard is the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum NO₂ concentrations.

Appendix C. Table. 4. History of the NAAQS for Ozone¹³.

Final Rule/Decision	Primary/Secondary	Indicator	Averaging Time	Level	Form
1971 36 FR 8186 Apr 30, 1971	Primary and Secondary	Total photochemical oxidants	1 hour	0.08 ppm	Not to be exceeded more than one hour per year
1979 44 FR 8202 Feb 8, 1979	Primary and Secondary	O ₃	1 hour	0.12 ppm	Attainment is defined when the expected number of days per calendar year, with maximum hourly average concentration greater than 0.12 ppm, is equal to or less than 1
1993 58 FR 13008 Mar 9, 1993	EPA decided that revisions to the standards were not warranted at the time				
1997 62 FR 38856 Jul 18, 1997	Primary and Secondary	O ₃	8 hours	0.08 ppm	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
2008 73 FR 16483 Mar 27, 2008	Primary and Secondary	O ₃	8 hours	0.075 ppm	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
2015 80 FR 65292 Oct 26, 2015	Primary and Secondary	O ₃	8 hours	0.070 ppm	Annual fourth-highest daily maximum 8-hour average concentration, averaged over 3 years

Appendix C. 1. History of the NAAQS for Particulate Matter¹⁶.

Final Rule/Decision	Primary/Secondary	Indicator ¹⁶	Averaging Time	Level	Form
1971 36 FR 8186 Apr 30, 1971	Primary	TSP	24 hour	260 µg/m ³	Not to be exceeded more than once per year
1971 36 FR 8186 Apr 30, 1971	Primary	TSP	Annual	75 µg/m ³	Annual geometric mean
1971 36 FR 8186 Apr 30, 1971	Secondary	TSP	24 hour	150 µg/m ³	Not to be exceeded more than once per year
1971 36 FR 8186 Apr 30, 1971	Secondary	TSP	Annual	60 µg/m ³	Annual geometric mean
1987 52 FR 24634 Jul 1, 1987	Primary and Secondary	PM ₁₀	24 hour	150 µg/m ³	Not to be exceeded more than once per year on average over a 3-year period
1987 52 FR 24634 Jul 1, 1987	Primary and Secondary	PM ₁₀	Annual	50 µg/m ³	Annual arithmetic mean, averaged over 3 years
1997 62 FR 38652 Jul 18, 1997	Primary and Secondary	PM _{2.5}	24 hour	65 µg/m ³	98th percentile, averaged over 3 years
1997 62 FR 38652 Jul 18, 1997	Primary and Secondary	PM _{2.5}	Annual	15.0 µg/m ³	Annual arithmetic mean, averaged over 3 years ^{3,4}
1997 62 FR 38652 Jul 18, 1997	Primary and Secondary	PM ₁₀	24 hour	150 µg/m ³	Initially promulgated 99th percentile, averaged over 3 years; when 1997 standards for PM ₁₀ were vacated, the form of 1987 standards remained in place (not to be exceeded more than once per year on average over a 3-year

¹⁶ TSP = Total Suspended Particles

					period) ⁵
1997 62 FR 38652 Jul 18, 1997	Primary and Secondary	PM ₁₀	Annual	50 µg/m ³	Annual arithmetic mean, averaged over 3 years
2006 71 FR 61144 Oct 17, 2006	Primary and Secondary	PM _{2.5}	24 hour	35 µg/m ³	98th percentile, averaged over 3 years ⁶
2006 71 FR 61144 Oct 17, 2006	Primary and Secondary	PM _{2.5}	Annual	15.0 µg/m ³	Annual arithmetic mean, averaged over 3 years ^{2,7}
2006 71 FR 61144 Oct 17, 2006	Primary and Secondary	PM ₁₀	24 hour	150 µg/m ³	Not to be exceeded more than once per year on average over a 3-year period
2012 78 FR 3085 Jan 15, 2013	Primary	PM _{2.5}	Annual	12.0 µg/m ³	Annual arithmetic mean, averaged over 3 years ^{2,7}
2012 78 FR 3085 Jan 15, 2013	Secondary	PM _{2.5}	Annual	15.0 µg/m ³	Annual arithmetic mean, averaged over 3 years ^{2,7}
2012 78 FR 3085 Jan 15, 2013	Primary and Secondary	PM _{2.5}	24 hour	35 µg/m ³	98th percentile, averaged over 3 years ⁶
2012 78 FR 3085 Jan 15, 2013	Primary and Secondary	PM ₁₀	24 hour ⁸	150 µg/m ³	Not to be exceeded more than once per year on average over a 3-year period
2024	Primary	PM _{2.5}	Annual	9.0 µg/m ³	Annual arithmetic mean, averaged over 3 years ^{2,7}