Air Management Services
Annual Report for Calendar Year 2022

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Introduction

Air Management Services (AMS), a division of the Philadelphia Department of Public Health and the air pollution control agency for the City of Philadelphia, has made great strides over the past few years in protecting the people of our city from the adverse effects of air pollution. This report details our unit's goals, a summary of activities and revenues collected, and our progress in calendar year 2022 towards meeting our objectives set under the Clean Air Act.

Mission and Vision

Mission Statement: Air Management Services, a division of the Philadelphia Department of Public Health, is committed to protecting the health, well-being, and quality of life of the people who live, work, and visit Philadelphia from the adverse effects of air pollution.

Vision Statement: To ensure all Philadelphia residents have access to safe, clean air.

Goals and Achievements

Achieve and maintain the National Ambient Air Quality Standards (NAAQS) in Philadelphia by implementing all relevant federal, state, and local air regulations. These air quality standards may be further reduced based on updated scientific information. Among these are:

- Achieve the 2015 ambient ozone NAQQS of 0.070 parts per million (average over eight hours in a day) by August 3, 2024. This can only be achieved by considering mobile source emission reductions. AMS is working with the US Environmental Protection Agency (EPA), Pennsylvania Department of Environmental Protection (PA DEP), and other stakeholders.
- Reduce Philadelphia's average annual fine particle pollution ($PM_{2.5}$) levels to 10 $\mu g/m^3$ for 2021-2023 (the EPA annual standard is 12 $\mu g/m^3$).
- Minimize risks to all Philadelphia city residents from air toxics to less than one in a million risk of cancer risk (for a particular source).

Other agency goals and achievements include:

- **Philadelphia Air Quality Survey (PAQS) project:** Continue monitoring of air pollution at the neighborhood level at 48 locations and produce at least one report of 12 months of continuous measurements. Make data available online to the public as part of increasing transparency for all city agencies.
- **Community-Scale Air Toxics (CSAT) Monitoring**: AMS was awarded an EPA grant in September 2021 to conduct community-scale air toxics monitoring in Philadelphia. AMS started measuring toxic air pollutants in south Philadelphia at the former refinery and plans to continue monitoring for at least one more year and make data available online.
- **America Rescue Plan (ARP) Grant:** AMS won a competitive ARP grant to measure criteria pollutants and air toxics at overburden EJ communities at three locations: the former Refinery area, Nicetown and the Port Richmond area. Procurement of equipment

and monitoring devices is completed, and data measurement will start as soon as constructions of monitoring stations is completed; measurement data will be available online to the public.

- **Mobile Monitoring:** AMS purchased a mobile monitoring van equipped with several air monitoring instruments to measure criteria pollutants and air toxics. Data quality management plans and reporting protocols for the mobile monitoring are being prepared and implemented. The vehicle will be deployed to various parts of the city, especially Environmental Justice (EJ) areas and for special incidents such as fires, to monitor air quality and make data available online.
- **AMR VI**: Air Management Services Air Toxics regulation was initially approved by the Air Pollution Control Board (APCB) on April 28, 2022; Public hearing was held on August 10, 2022. AMS worked to finalize responses to public comments.
- **The Diesel Emissions Reduction Act (DERA) Program:** Continue working with EPA and MARAMA to reduce/eliminate all old diesel trucks that produce a lot of emissions into the atmosphere by utilizing EPA's DERA Program funds, grants, and rebates to reduce harmful emissions from diesel engines, protect human health, and improve air quality.
- **Outreach Activities:** AMS will continue to expand its outreach activities to various community groups, universities, high schools, and stakeholders to explain and teach about air quality and AMS' activities to reduce air pollution that affects public health and the environment.
- AMS will continue to work with EPA and other stakeholders to seek alternative funding sources for the air program from the transportation sector, such as emission fees for mobile sources and/or vehicle registration fees.
- Gather the best information available to appropriately address many factors involved in the regulation of air quality, including health, quality of life, equity, and economic impacts.
- Improve AMS' profile and its community services to Philadelphians and operate in accordance with the PA DEP's Environmental Justice Policy and enhance public participation.
- Educate the public about air quality, energy efficiency and sustainability.
- Plan and coordinate with other authorities to reduce the impact of air pollution from the transportation sector.
- Assist businesses to help them comply with environmental regulations while being sensitive to the economic implications of these regulations.
- Coordinate with the Mayor's Office of Sustainability to support their goal of making Philadelphia the greenest city in America.
- Coordinate with the Philadelphia Port Authority to establish a detailed and robust annual emission inventory and establish an air toxics and particulate matter monitor near the Delaware River.
- Work with the Air Pollution Control Board, the regulated community, and other stakeholders to develop or modify regulations to reduce or control emissions of criteria pollutants to help meet the NAAQS.
- Reduce and resolve all backlogs (NOVs, conformance checking, and permits), targeting 80% by December 2023, despite staff shortage.

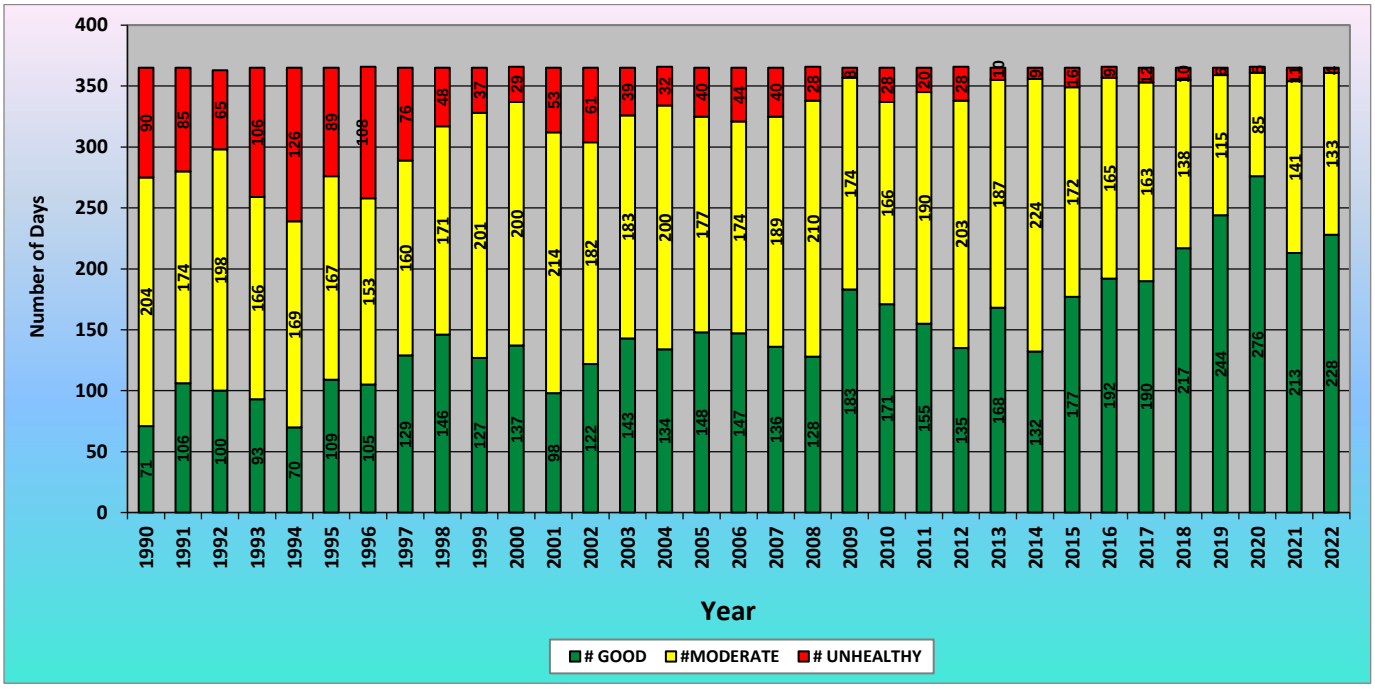
- Continue implementing the plan for enhanced monitoring of air quality at Hilco (Former PES) Redevelopment by issuing asbestos permits, issuing dust permits, and inspect the site.
- PA DEP finalized the RACT III rule in November 2022. AMS will start working on Ozone RACT III implementation.
- In accordance with Executive Order 1-07, AMS has been inspecting and updating mobile sources from non-road emission reductions from construction equipment.
- Issue installation permits and operating licenses for unpermitted facilities.

Air Quality Index

Air quality in Philadelphia has dramatically improved over the past few decades, as evidenced by the relatively fewer number of unhealthy air quality days (adjusted to the current standard) during the past several years, as shown in the graphic below. It is important to note that air pollution, especially ozone which forms in the presence of heat and sunlight, is weather dependent and varies significantly from year to year depending on meteorological trends. The decrease in the number of good days and the increase in the number of moderate days can be attributed to changes in the AQI breakpoints due to strengthening of the NAAQS for ozone and $PM_{2.5}$. In addition, changes to $PM_{2.5}$ sampling from a filter-based to a continuous monitor also affected the number of good and moderate days.

Good, Moderate and Unhealthy Air Quality Days[1]

(Days shown in red indicate Code Orange, Code Red, and worse air quality days combined)



Air quality in Philadelphia has been steadily improving even for ozone and fine particulate matter. The region is in nonattainment only for ozone. Philadelphia is designated as being in attainment for fine particulate matter, or $PM_{2.5}$ (particles less than 2.5 micrometers in diameter), meeting the 2015 standards. EPA changed the annual standard for $PM_{2.5}$ from 15 micrograms per cubic meter to 12 micrograms per cubic meter in 2012.

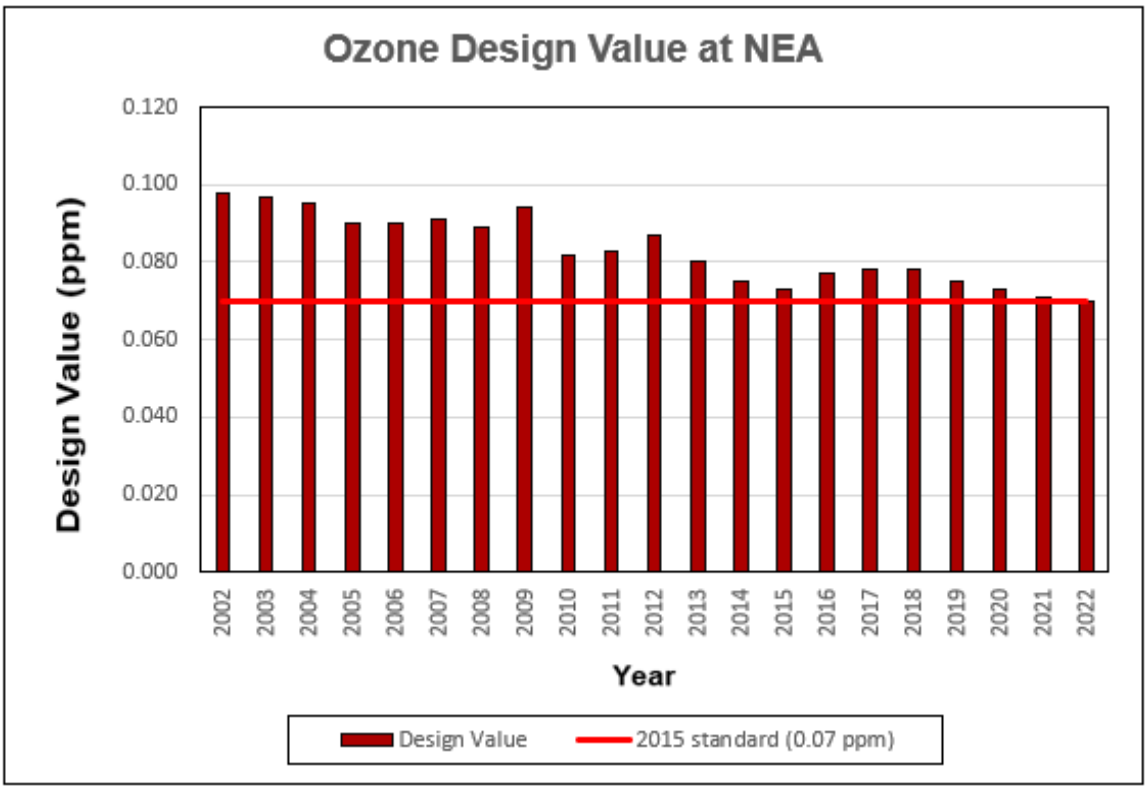
In 2022, Philadelphia experienced a total of 4 unhealthy AQI (Code Orange) days, 3 from Ozone and 1 from PM2.5. For 2023, AMS expects the number of unhealthy days from ozone to remain the same due to the more stringent 2015 standard of 70 parts per billion of ozone over eight hours and the complete recovery of normal activities post the COVID-19 pandemic. AMS expects long term trends for ozone to decrease due to regulations that will reduce ozone precursors.

Although Philadelphia is currently in nonattainment for the 2015 8-hour ozone NAAQS, the trend shows that nonattainment can be achieved in the coming few years. Ozone is a pollutant that is not emitted directly by combustion sources, but forms in the atmosphere in the presence of heat and sunlight as part of chemical reactions between other pollutants – specifically, oxides of nitrogen and volatile organic compounds. Ozone is very irritating to the lungs and contributes to

[1] Data for 2022 obtained from AMS' AirVision database and not EPA's Air Quality System.

heart and lung diseases such as asthma. The following graph shows ozone design values in Philadelphia since 2002.

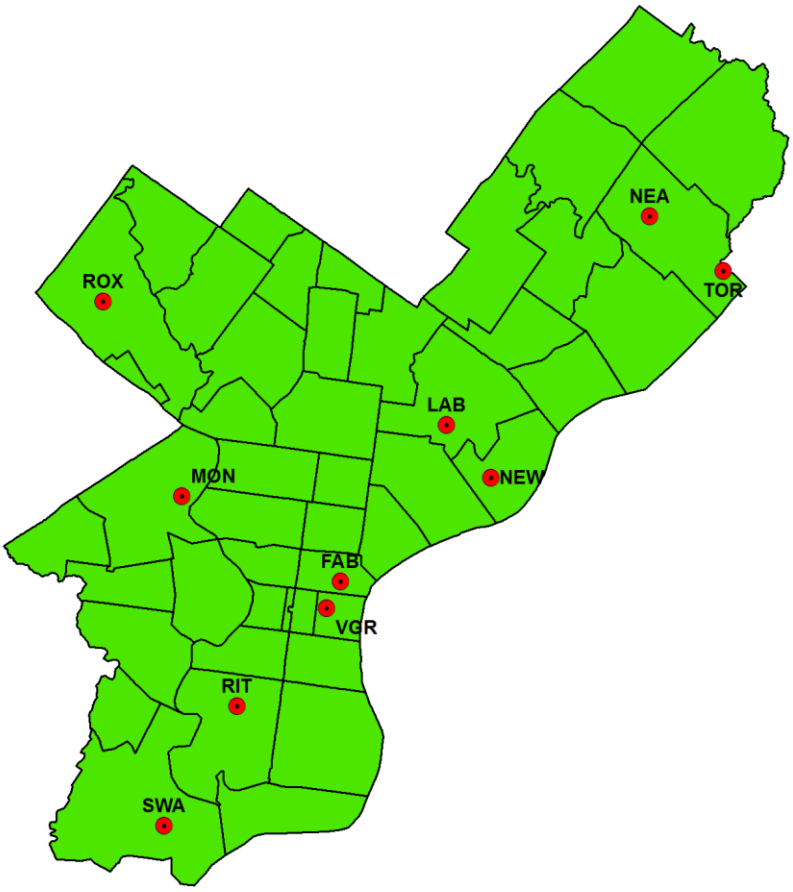
Ozone Design Value



Air Monitoring Programs

In 2022, AMS operated a network of ten air monitoring sites located throughout the City. Eight sites (LAB, NEA, NEW, RIT, FAB, TOR, MON, and VGR) measured criteria pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter (PM_{10} and $PM_{2.5}$). These measurements are made in "real time", meaning measurements show pollution levels as they occur, instead of after the fact. Four sites (ROX, RIT, SWA, and NEW) also measure air toxics through canisters, such as 1,3-butadiene, benzene, carbon tetrachloride, and formaldehyde. One site, VGR, measures O_3 and $PM_{2.5}$ as part of a pilot study for research and development, utilizing solar and wind turbine power.

2022 Philadelphia Air Monitoring Network



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.

AMS strives to achieve a 75% or greater data quality capture rate at each quarter for each criteria pollutant monitor, per federal requirements in each Appendix of 40 CFR Part 50.

The 2022-2023 Air Monitoring Network Plan for Philadelphia is available at: https://www.phila.gov/media/20220712150719/2022-2023_AMNP_Final.pdf .

AMS completed its seven years of monitoring with the Village Green Park Bench Air Pollution Monitoring System at 6th and Arch Streets across from the Constitution Center, measuring $PM_{2.5}$ and ozone, as well as local wind speed, wind direction, temperature, and humidity, utilizing solar

and wind turbine power, to increase community awareness of environmental conditions. Additional information about Village Green can be found here: https://villagegreen.airnowtech.org/welcome?siteID=24292.

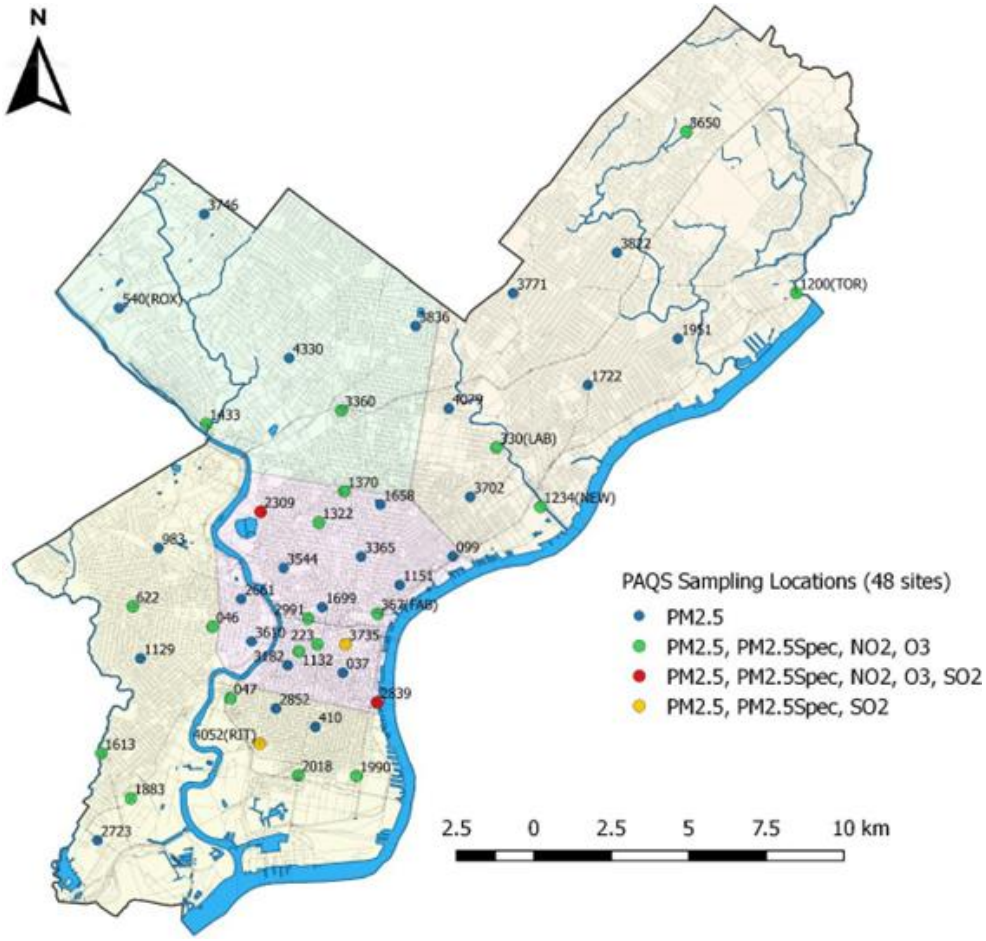
In 2022, AMS planned to install air monitoring devices similar to Village Green to measure particulate at the Port and test sensors from SCAQMD's AQ-SPEC Air Quality Sensor Performance Evaluation Center: http://www.aqmd.gov/aq-spec/evaluations. The EPA Office of Research and Development through an EPA Grant (Regional Sustainability and Environmental Sciences Regional Sensor Loan Program) would like to assess the river port. Due to COVID-19 this project was put on hold. AMS hopes to work with EPA in 2023 on the possible re-start of this program.

In 2022, AMS readied its Photochemical Assessment Monitoring Station (PAMS) for the enhanced monitoring of ozone, oxides of nitrogen (NOx), and volatile organic compounds (VOC) to obtain more comprehensive and representative data on ozone air pollution, for a June 1, 2023 start of the enhanced monitoring. AMS LAB successfully finalized the set up and calibration of the Auto-GC including for PAMS measurement, added its Mixing Layer Height to the Unified Ceilometer Network (UCN) (found here: https://alg.umbc.edu/realtime-update-phil/) and ran measurements of True NO_2, NOy, carbonyls, temperature, relative humidity, barometric pressure, UV radiation, solar radiation, precipitation, wind speed, and wind direction.

In 2020, the EPA announced its air toxics monitoring plans to receive funding under the Agency's Community-Scale Air Toxics (CSAT) Ambient Monitoring grants. AMS was one of the winners and one of two selected in EPA Region 3. AMS finalized preparation for CSAT and started collecting samples in 2022. One year of sampling is completed and the project report is being prepared. Similarly, AMS has won the Enhanced Air Monitoring for Communities (EAMC) Competitive grant from EPA in 2022. AMS is acquiring field instruments and is in the process of submitting the QAPP and QMP for EAMC to EPA. More information can be found here: https://www.epa.gov/amtic/2020-community-scale-air-toxics-ambient-monitoring-csatam-grant-information .

In 2018, AMS began a new project called the Philadelphia Air Quality Survey (PAQS). This project aims to set up street level, neighborhood-oriented air sampling sites (initially 50) throughout the City to sample the ambient air for $PM_{2.5}$, NO_2, SO_2, and O_3. The sites also contain meteorological sensors as well. PAQS captures the seasonal changes and neighborhood-to-neighborhood spatial variances in air quality. At the end of 2022, the project finished 73 sessions of field operation with each session being a 2-week air sampling period. Data have been processed and analyzed. For the period from December 1, 2021, through November 30, 2022, the highest 12-month average $PM_{2.5}$ concentration was 9.3 $\mu g/m^3$, which occurred at a site in Center City. The City-wide all-sites $PM_{2.5}$ average concentration was 7.9 $\mu g/m^3$. When comparing 2-week average values, the PAQS data of $PM_{2.5}$, NO_2, and O_3 concentrations track closely with those of FRM/FEM based on collocated samples. AMS prepared PAQS quarterly summaries based on the data collected from all sites of sampling operation and planned to continue publishing further reports for the remaining duration of the project. More details about the PAQS project can be found in the 2022-2023 Philadelphia Air Monitoring Network Plan and the 2020

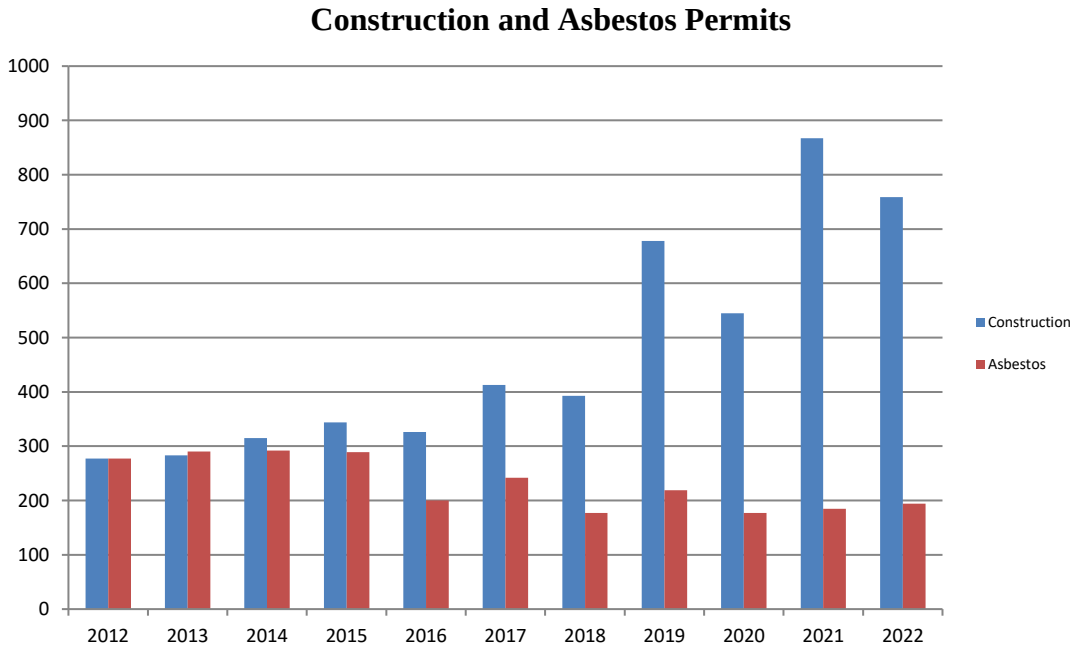
PAQS project report at https://www.phila.gov/media/20210316150355/PAQS_Report_Sept4-2020_final.pdf . The map below shows the current air sampling site locations.



Permitting Activities

In 2022, AMS issued 759 constructions and approximately 194 Asbestos permits. New construction permits in 2022 was less than 2021, and likely continue to decrease for the year 2023 as fewer permit applications are registered in the first quarter of 2023 so far. However, the number of Asbestos permits has slightly increased in 2022, likely due to increased activities of companies and businesses and the ongoing project to find unpermitted sources. The trends seen last year for construction and asbestos permits are expected to continue in 2023.

The chart below lists the number of constructions permits (installation permits, plan approvals, and general permits) to install or modify sources of air pollution and the number of asbestos abatement permits issued from 2012 to 2022.



Enforcement Activities

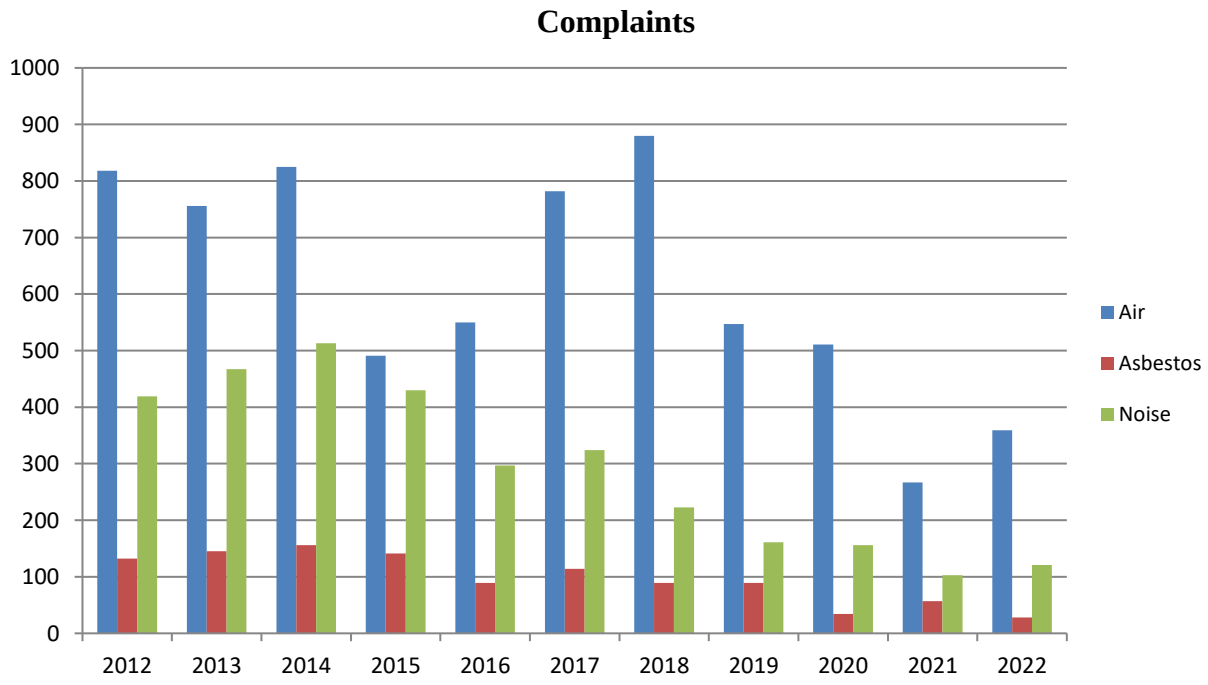
AMS handles citizen complaints, periodic inspections of regulated facilities, and enforces state, local and federal laws related to air quality in the City of Philadelphia. In 2022, the enforcement of violations continued to be distributed amongst AMS Enforcement Engineers and Enforcement Specialist. Having additional staff trained in the enforcement process will help improve efficiency of enforcement. On average, violations issued in 2022 are being resolved within our goal of 180 days from the date of issuance. Enforcement is strained due to staff turnovers and orientation needed for new staff. One engineering supervisor, three engineers and three inspectors left AMS in 2022. Violations issued prior to 2022 are being addressed on a priority to clear up the backlog.

AMS fully implemented the online cloud based Citizenserve system to monitor and track inspections and enforcement activities for the Asbestos and Facility Compliance and Enforcement units. In 2022, AMS continued to use the enforcement timeline and routing system within Citizenserve to assign and track enforcement activities. In 2023, AMS will continue to make changes to the system to tailor it to specific needs and improve user friendliness.

In 2023, AMS anticipates the number of inspections and number of violations to increase as a direct result of a planned staff increase of air pollution control inspectors and filling vacant enforcement engineer positions. The staff increase is needed to inspect new air pollution sources for the dust control and parking garage regulations and to increase inspections of unpermitted facilities.

Complaint Response

AMS responds to complaints from the public regarding various nuisance and air pollution issues, such as noise, vibration, odor, smoke, idling vehicles, dust, asbestos, and carbon monoxide. Below is a summary of recent activities:



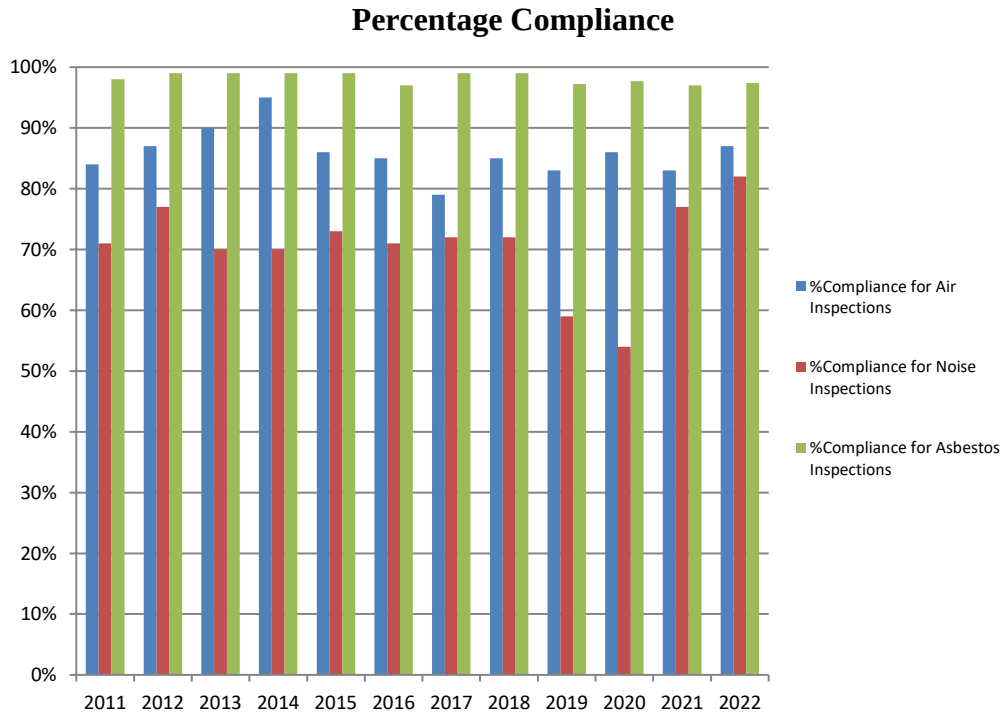
In 2022, there were 28 asbestos complaints, 359 air complaints and 121 noise complaints. As illustrated above, asbestos complaints have tended to stay relatively consistent, albeit with a slightly downward trend since 2015, over time when compared with air and noise complaints. It is anticipated the total number of asbestos complaints received and serviced will remain consistent on an annual basis. Air and Noise complaints tend to be more variable and depend on factors like more warm days, more regulations resulting in increased awareness of health impacts of toxics, noise, dust etc. Complaints are sometimes clustered when there is a significant issue in a particular community and may decline once that problem is resolved. The increase in noise complaints in 2022 was due to increasing public awareness. When violations are unresolved, AMS would receive multiple complaints until the case is closed.

Inspection Activities

AMS is supported by a team of well-trained engineers and inspectors who enforce state, local and federal laws related to air quality and noise. They respond to citizen complaints and conduct periodic inspections of regulated facilities. When necessary, they issue Notices of Violation (NOVs) when regulation or permit deviations are observed.

In 2022, 1726 air inspections were conducted resulting in 227 violations, and 311 noise inspections conducted resulting in 55 violations. The number of air inspections should continue to increase in 2023 due to new sources needing permits to comply with the dust control, parking

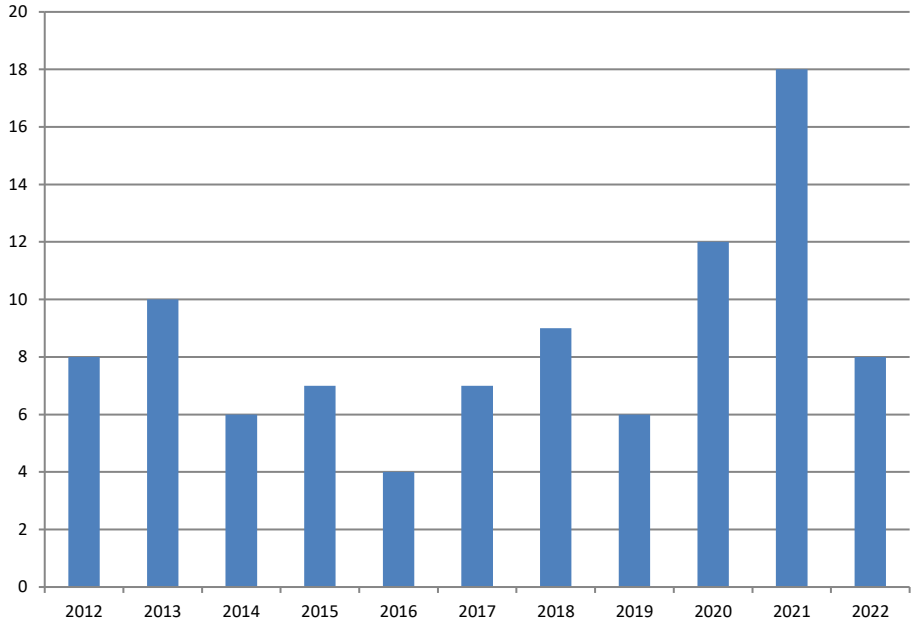
garage regulations and more inspections of unpermitted sources. AMS is planning to hire two more inspectors to address the increased workload. The compliance rate in 2022 for air inspections was 87%, which is around the average over the past nine years. The noise compliance rate increased from around 77% in 2021 to 82% in 2022. As for noise inspections, the compliance rate is generally lower than air inspections due to the longer time frame to resolve violations, which often involves installing and/or repairing equipment to come into compliance with the restrictions of the Code.



AMS issued 36 asbestos violations as a result of inspecting 2,377 total projects in 2022. The compliance rate is 97.4 %, which is relatively consistent with previous years in Philadelphia. The decrease in the number of asbestos violations issued from 2021 to 2022 is directly attributed to the vigilant oversight by the unit inspectors whose primary focus is to properly inspect notified asbestos projects as often as possible in order to bring increased awareness of project compliance. For 2023, it is anticipated that the total number of asbestos violations resulting from inspections will increase as more inspectors are hired in an effort to get back to normal staffing levels as were seen in the past.

A Title V facility is a major source of pollution that is required to have air quality permits to operate under Title V of the 1990 Federal Clean Air Act Amendments. In 2022, AMS issued emission-related violations to eight Title V facilities. The variation from last year is mainly due to staff shortage.

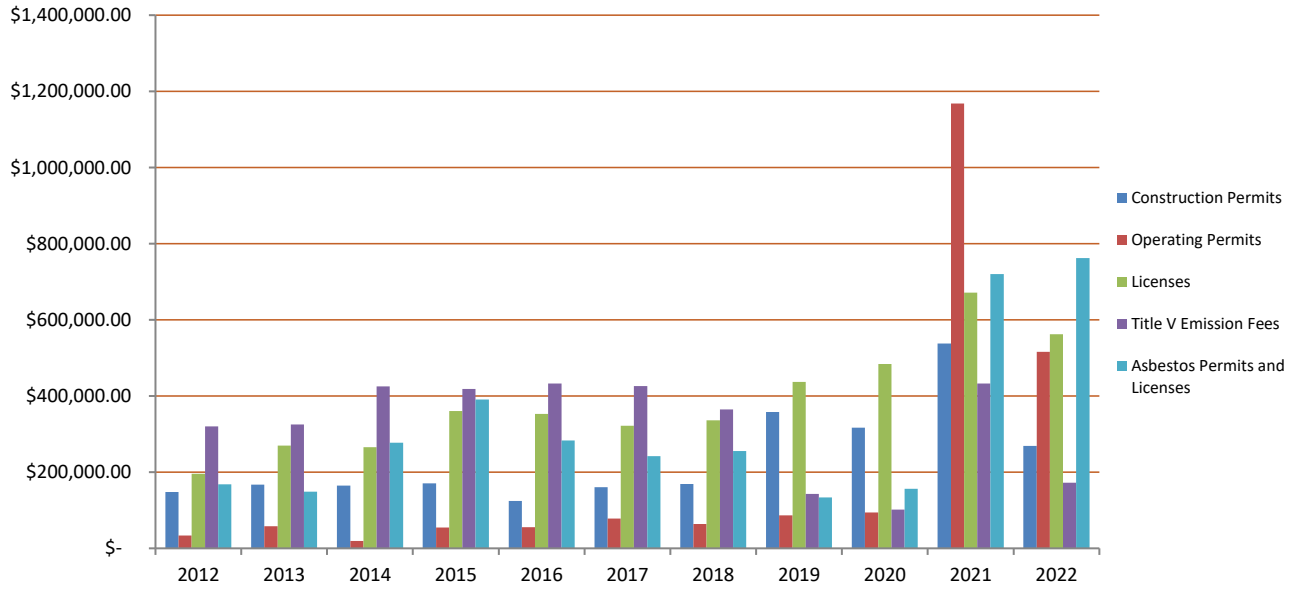
Title V Facilities with Emissions Related Violations



Revenue Generation

The chart below shows the fees received from construction permits (application fees), operating permits (application and annual administration fees), licenses including asbestos (application and renewal fees and Title V permits (emission fees) in the CY years 2012-2022. In 2022, Construction Permits fees of $268,585.00 is lower than 2021 due to fewer applications received and a similar trend is expected in 2023. Asbestos fees from licensing and certifications in CY 2022 was $170,440 and Asbestos Permit Fees was $594,069. AMS expects a decrease in revenue in 2023 due to the expected decrease in the number of applications. Operating permit fees ($515,802.00) significantly decreased from the 2021 value. This is due to the lower number of applications and facilities paying fees at the beginning and at the end of the fiscal year. However, they will only need to pay at the end of the year from ow on. AMS generated $562,393 during 2022 from permitting and licensing of unpermitted sources. The figure is lower than the 2021 income, mainly due to the closure of PES, but it is expected to remain more or less the same for 2023. Title V emission fees in CY 2022 decreased to $172,155. This is largely due to the closure of PES as the refinery was the biggest source of emission fees. Emission fees for 2023 are expected to be the same or slightly lower than the 2022 value for the same reasons.

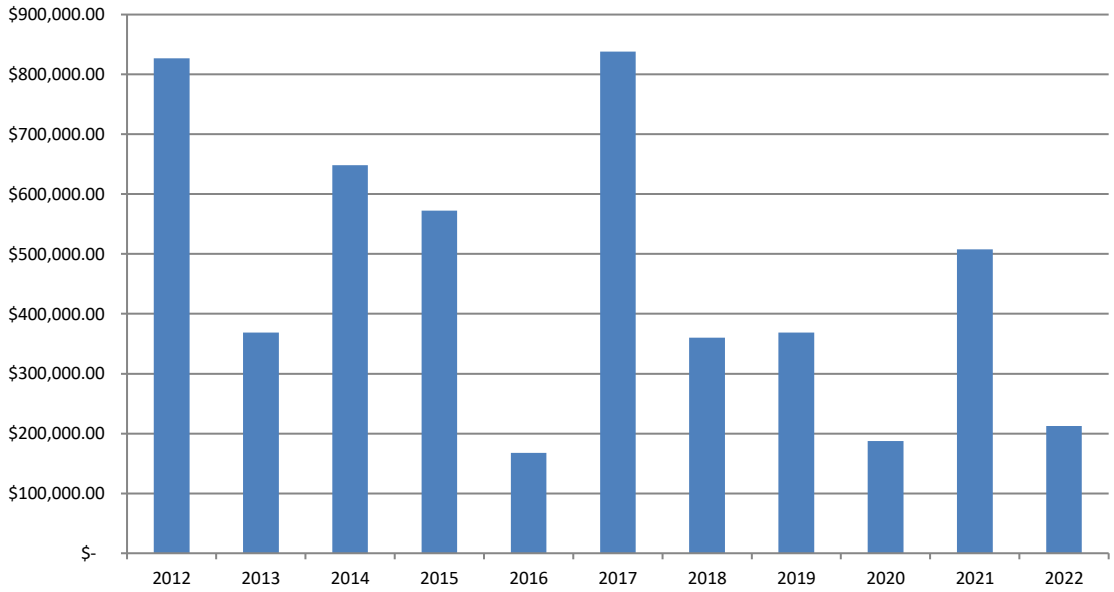
Permitting Revenue



*Note: Asbestos income since 2021 includes both permitting, and licensing and certification

Below is the sum of fines and penalties revenue collected from 2012 to 2022. In 2022, AMS collected $212,589 in penalties. Asbestos penalty revenue (for CY 2022 - $37,600) has been trending lower and more in line with routine asbestos related violations and fewer NESHAP related violations. Other penalties were higher in 2021 due to the PES Refinery shut down. The enforcement of violations is currently distributed amongst enforcement engineers, penalty specialists and the Asbestos Program Manager.

Total Fines and Penalties Revenue



Conclusion

AMS has implemented its agency-wide Strategic Plan to review its operations for improving air quality and reducing the impact of nuisances while promoting sustainability and job creation as well as outreach and education on air quality issues. It has been focused on finding ways to allow permit and license applicants to submit forms and pay fees online, investigating ways to improve staff training and exploring ways to connect more closely to the public as well as partners such as universities and nonprofits. In addition, AMS has been working to educate the public about the importance of air quality. These are the major AMS accomplishments throughout the years:

- The Asbestos, Source Registration, and Facilities Compliances & Enforcement sections continue to utilize a cloud-based permit, license, and enforcement system. The system allows the online submission of asbestos notifications, license applications, and fees. It also allowed inspectors to use (internet and VPN capable laptops in the field to document their inspections.
- AMS continues to operate the PAQS project. AMS is also in the process of purchasing new samplers that will measure the ambient air for the next 5-10 years. AMS will also focus on EJ communities in air quality monitoring.
- Banning of heavy fuel oils was effective on December 4, 2019. Starting April 1, 2020, no person may deliver, exchange in trade, or sell heavy fuel oil to be burned or used in Philadelphia (AMC 3-207). The Air Pollution Control Board amended the Regulation III (AMR III) heavy Fuel oil on July 2021 so that no person may deliver, exchange in trade, or sell heavy fuel oil to be burned or used in Philadelphia.
- AMS has previously found more than 3,000 emission sources that can generate revenue for the city and reduce emissions by permitting sources, inspections, conduction maintenance, and limiting emissions. AMS continues actively to find new unpermitted sources and enforce regulations.
- AMS issued temporary installation permits for minor sources and started analysis of emission controls for major sources (equal to or greater than 10 tons of methyl bromide/year) of fumigation at the port.
- AMS has collected one year of air toxics measurements around the former PES refinery area under the CSAT grant project. AMS also finalized procuring field instruments and developed QAPP and QMP for EAMP for Environmental Justice communities, which will help establish three new air monitoring sites in EJ communities in Philadelphia, especially around Nicetown and Port Richmond.
- AMS acquired a mobile van monitor which measures toxics and criteria pollutants in real time in 2022. The mobile van is collecting data and dispatched to areas of fire and other emergencies, around EJ communities, and facilities with big emission sources. Additional data quality management plans and reporting protocols for the mobile van are being prepared by the Program Services unit. AMS is now in a better position to quickly respond to emergency and citizen’s complaints.
- AMS measures air toxics at the former refinery area.