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Air Quality

Ambient air quality, or the quality of the surrounding air, may be affected by air pollutants produced by motor vehicles, referred to as "mobile sources"; by fixed facilities, usually referred to as "stationary sources"; or by a combination of both. Under CEQR, an air quality assessment determines both a proposed project's effects on ambient air quality as well as the effects of ambient air quality on the project.

Introduction

This section examines the potential for air quality impacts due to the Proposed Actions. According to the *2021 City Environmental Quality Review (CEQR) Technical Manual*, air quality impacts can be characterized as either direct or indirect impacts. Direct impacts result from emissions generated by stationary sources, such as stack emissions from on-site fuel burned for boilers and heating, ventilation, and air conditioning (HVAC) systems. Indirect effects are caused by off-site emissions associated with a project, such as emissions from on-road motor vehicles (mobile sources) traveling to and from a development site.

As described in **Chapter 1, Project Description**, the Proposed Actions would result in the construction of two buildings: a 44-story, mixed-use residential and commercial building on Development Site 1 and a 38-story, mixed-use residential and commercial building on Development Site 2 (collectively, the Proposed Projects). The Proposed Actions would also allow for the development of buildings with additional residential floors in the building base, rather than commercial use, at both development sites (the Maximum Commercial Scenario). The building at Development Site 1 would be 45 stories tall and contain up to approximately 701 DUs and 50,118 gsf of commercial auto dealership space. The building at Development Site 2 would be 39 stories tall and contain 541 DUs and 38,441 gsf of commercial auto dealership space.

Consistent with the *CEQR Technical Manual*, air quality analyses for a proposed project focus on these main areas of potential concern:

- Potential impacts from mobile sources introduced by a project.
- Potential impacts from atypical mobile sources on the Project.
- Potential impacts from parking facilities.
- Potential impacts from the project's HVAC and hot water system.
- Potential impacts on the Proposed Project manufacturing/processing facilities releasing air toxics located near the Development Site.
- Potential impacts from nearby major and large sources on the Project.

The project would not introduce any incremental parking and therefore is well below the CEQR thresholds for an analysis of parking emissions.

Principal Conclusions

The air quality analysis addressed emissions from mobile sources, HVAC and hot water systems, industrial sources and large or major sources, and determined that the Proposed Actions would not result in significant adverse impacts related to air quality.

Mobile Source Analyses

A mobile source intersection screening analysis was conducted for pollutants carbon monoxide (CO) and particulate matter (PM). The number of project-generated trips and equivalent heavy-duty diesel vehicles (HDDVs) would be below the CEQR thresholds for CO and $PM_{2.5}$, respectively. Additionally, the number of incremental parking spaces would be below the CEQR threshold that requires a parking analysis. Therefore, no adverse air quality impacts are expected from the mobile sources generated by the Proposed Projects.

Furthermore, an analysis of atypical sources was conducted to assess the potential for impact from vehicles emissions along Route 9A on the Proposed Projects. The analysis of this source showed that emissions from vehicles traveling along Route 9A would not produce concentrations at Development Site 1 that exceed the NAAQS.

HVAC and Hot Water Analysis

An HVAC and hot water systems screening analysis was conducted using the *CEQR Technical Manual* guidance. The Maximum Residential Scenario passed the HVAC and hot water screening nomographs provided by the *CEQR Technical Manual*. The Maximum Residential Scenario was analyzed as it was the more conservative scenario due to its increased square footage. To ensure that there are no significant adverse air quality impacts with respect to stationary sources (HVAC and hot water systems), there would be an (E)-Designation (E-869) placed on the development sites.

Industrial Source Analysis

An analysis of existing light industrial/manufacturing uses within 400 feet of the Proposed Projects was conducted. The analysis determined that no adverse air quality impacts would not result from these types of sources on the Proposed Projects.

Large or Major Source Analysis

An analysis of large and/or major sources within 1,000 feet of the Proposed Projects was conducted. The analysis of nearby major sources located at the ConEdison West 59th Street facility found that concentrations at the proposed buildings from emissions of the plant's boilers and combustion turbine would be less than the NAAQS.

National Ambient Air Quality Standards

In accordance with the requirements of the Clean Air Act, as amended in 1990, the U.S. Environmental Protection Agency (EPA) has promulgated NAAQS (40 CFR part 50) for pollutants considered harmful to public health and the environment. The NAAQS are presented in **Table 11-1**.

The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of sensitive populations such as sick, children, and elderly populations. Secondary standards set limits to protect public welfare, including protection against decreased visibility and protection against damage to animals, crops, vegetation, and buildings.

The EPA Office of Air Quality Planning and Standards has set NAAQS for six principal pollutants, which are called "criteria" pollutants. These six pollutants are ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in aerodynamic diameter (PM_{10}) and less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$), and lead (Pb). Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air ($\mu g/m^3$).

These standards are reviewed periodically and may be revised. The State of New York has adopted similar standards as those set by the EPA, with the exception of sulfur dioxide, particulates, fluorides, and hydrogen sulfide.

Table 11-1 National and New York Ambient Air Quality Standards

Pollutant [links to historical tables of NAAQS reviews]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3 month average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	primary	1 year	9.0 µg/m^3	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m^3	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	1 year	10 ppb	Annual mean, averaged over 3 years

Notes:
(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m3 as a calendar quarter average) also remain in effect.
(2) The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.
(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards are not revoked and remain in effect for designated areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) O_3 standards.
(4) The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated non-attainment under the previous SO_2 standards or is not meeting the requirements of a SIP call under the previous SO_2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

Pollutants of Concern

Air pollution is of concern because of its demonstrated effects on human health. Of special concern are the cardiovascular and respiratory effects of air pollutants and their potential toxic effects, as described below.

Carbon monoxide (CO) is a colorless and odorless gas that is a product of incomplete combustion. Carbon monoxide is absorbed by the lungs and reacts with hemoglobin to reduce the oxygen-carrying capacity of the blood. At low concentrations, CO has been shown to aggravate the symptoms of cardiovascular disease. It can cause headaches, nausea, and at sustained high concentration levels, can lead to coma and death.

Particulate matter is made up of small solid particles and liquid droplets. PM_{10} refers to particulate matter with a nominal aerodynamic diameter of 10 micrometers or less, and $PM_{2.5}$ refers to particulate matter with an aerodynamic diameter of 2.5 micrometers or less. Particulates can enter the body through the respiratory system. Particulates over 10 micrometers in size are generally captured in the nose and throat and are readily expelled from the body. Particulates smaller than 10 micrometers, and especially particles smaller than 2.5 micrometers, can reach the air ducts (bronchi) and the air sacs (alveoli) in the lungs. Particulates are associated with an increased incidence of respiratory diseases, cardiopulmonary disease, and cancer.

Nitrogen oxides (NO_X), the most significant of which are nitric oxide (NO) and nitrogen dioxide (NO_2), can occur when fossil fuel combustion temperatures are extremely high (such as in engines), and atmosphere nitrogen gas combines with oxygen gas. NO is relatively harmless to humans but quickly converts to NO_2. Nitrogen dioxide has been found to be a lung irritant and can lead to respiratory illnesses. Nitrogen oxides, along with VOCs, are also precursors to ozone formation.

Sulfur Dioxide (SO_2) emissions are the main components of the "oxides of sulfur," a group of highly reactive gases from fossil fuel combustion at power plants, other industrial facilities, industrial processes, and burning of high sulfur-containing fuels by locomotives, large ships, and non-road equipment. High concentrations of SO_2 will lead to the formation of other sulfur oxides. By reducing the SO_2 emissions, other forms of sulfur oxides are also expected to decrease. When oxides of sulfur react with other compounds in the atmosphere, small particles that can affect the lungs can be formed. This can lead to respiratory disease and aggravate existing heart disease.

Regulatory Context

The 1990 Clean Air Act with Amendments resulted in states being divided into attainment and non-attainment areas, with classifications based upon the severity of their air quality problems. Air quality control regions are classified and divided into one of four categories: attainment, unclassified, maintenance, or non-attainment depending upon air quality data and ambient concentrations of pollutants. Attainment areas are regions where ambient concentrations of a pollutant are below the respective NAAQS; non-attainment areas are those where concentrations exceed the NAAQS. Maintenance areas are former non-attainment that achieved attainment. An unclassified area is a region where data are insufficient to make a determination and is generally considered as an attainment area for administrative purposes. A single area can be in attainment of the standards for some pollutants while being in non-attainment for others.

New York County is designated as a serious non-attainment area for the 2008 8-hour ozone standard and a moderate non-attainment area for the 2015 8-hour ozone standard. Both designations are part of the larger New York-Northern New Jersey-Long Island, NY-NJ-CT non-attainment areas. New York County has been designated as a maintenance area for CO as of May 20, 2002, and for the 2006 $PM_{2.5}$ standard as of April 18, 2014. New York County is in attainment for all other criteria pollutants (PM_{10}, Pb, NO_2, and SO_2).

Impact Criteria

The predicted concentrations of pollutants of concern associated with a proposed project are compared with either the NAAQS for criteria air pollutants or ambient guideline concentrations for non-criteria pollutants. In general, if a project would cause the standards for any pollutant to be exceeded, it would likely result in a significant adverse air quality impact. In addition, the City's *de minimis* criteria are also used to determine the significance of impacts for CO and $PM_{2.5}$.

CO *de Minimis* Criteria

New York City has developed *de minimis* criteria to assess the significance of the increase in CO concentrations that would result from the introduction of project-generated mobile sources, as set forth in the *CEQR Technical Manual*. These criteria set the minimum change in CO concentration that defines a significant adverse environmental impact. Significant increases of CO concentrations in New York City are defined as:

- An increase of 0.5 ppm or more in the maximum eight-hour average CO concentration at a location where the predicted No-Action eight-hour concentration is equal to or between 8.0 and 9.0 ppm; or
- An increase of more than half the difference between baseline (i.e., No-Action) concentrations and the eight-hour standard, when No-Action concentrations are below 8.0 ppm.

$PM_{2.5}$ *de Minimis* Criteria

New York City uses *de minimis* criteria to determine a project's potential to result in a significant adverse $PM_{2.5}$ impact under CEQR. The *de minimis* criteria are as follows:

- Predicted increase of more than half the difference between the background concentration and the 24-hour standard;
- Annual average $PM_{2.5}$ concentration increments which are predicted to be greater than 0.1 µg/m3 at ground level on a neighborhood scale (i.e., the annual increase in concentration representing the average over an area of approximately 1 square kilometer, centered on the location where the maximum ground-level impact is predicted for stationary sources; or at a distance from a roadway corridor similar to the minimum distance defined for locating neighborhood scale monitoring stations); or
- Annual average $PM_{2.5}$ concentration increments which are predicted to be greater than 0.3 µg/m3 at a discrete receptor location (elevated or ground level).

Non-Criteria Pollutant Thresholds

Non-criteria, or toxic air pollutants include a multitude of pollutants of variable toxicity. No federal ambient air quality standards have been promulgated for toxic air pollutants. However, NYSDEC has issued guideline non-criteria pollutant ambient air concentrations and acceptable risk management range to determine the potential effects to the public.

The NYSDEC DAR-1 guidance document presents guideline concentrations in micrograms per cubic meter ($\mu g/m^3$) for the one-hour (SGC) and annual average time (AGC) periods for various air toxic compounds.[1] The offsite concentration should not exceed the SGC at any time.

In order to evaluate the residual risk of non-carcinogenic toxic air emissions, the hazard index is calculated based on annual exposure limits. If the combined ratio of pollutant concentration divided by its annual exposure threshold for each of the toxic pollutants is found to be less than 2.0, according to DAR-1, the residual risk is deemed acceptable.

In addition, the potential cancer risk associated with each carcinogenic pollutant, as well as the total cancer risk of the release of all the carcinogenic toxic pollutants combined, can be estimated. If the total incremental cancer risk of all the carcinogenic toxic pollutants combined is less than ten-in-one million, the residual risk is deemed acceptable.

Background Concentrations

Background concentrations are ambient pollution levels associated with existing stationary, mobile, and other area emission sources, but not those associated with the reasonable worst-case development scenario (RWCDS) (see **Chapter 1, Project Description**). Three years of monitoring data coinciding with the meteorological data used in the detailed analysis (2019 to 2021) from the representative monitoring stations were used to develop background concentrations for all pollutants. CO data was collected from CCNY at 160 Convent Ave. $PM_{2.5}$ data was collected from IS 45 at 2351 First Avenue except for 2020 data which was from IS 52 at 681 Kelly St due to IS 45 having incomplete data for this year. NO_2 data was collected from IS 52. PM_{10} data was collected from 40 Division St, PS 124 except for 2021 when the data was collected for IS 52 as Division St did not operate this year. These concentrations were estimated using the form of the NAAQS (see the "Form" column in **Table 11-1** for more information).

Table 11-2 summarizes the background concentrations for each of the pollutants.

Potential CO and $PM_{2.5}$ impacts are also assessed on an incremental basis and compared with the respective CO or $PM_{2.5}$ *de minimis* criteria. Based on the background concentrations, the 8-hour CO *de minimis* is 3.8 ppm, 24-hour $PM_{2.5}$ *de minimis* is 7.7 $\mu g/m^3$.

[1] NYSDEC DAR-1. http://www.dec.ny.gov/docs/air_pdf/dar1.pdf

Table 11-2 Background Concentrations

Pollutant	Averaging Time	Monitoring Location	Background Concentration
Carbon Monoxide	1-Hour	CCNY	1.7 ppm
	8-Hour	CCNY	1.4 ppm
Nitrogen Dioxide (NO_2)	1-Hour	IS 52	101.5 µg/m^3
	Annual	IS 52	31.7 µg/m^3
Particulate Matter ($PM_{2.5}$)	24-Hour	IS 45[1]	19.7 µg/m3
	Annual	IS 45[1]	7.2 µg/m3
Particulate Matter (PM_{10})	24-Hour	PS 124[2]	37 µg/m3

Source: EPA Monitor Values Report, Outdoor Air Quality Data, https://www.epa.gov/outdoor-air-quality-data/monitor-values-report

Notes:

[1] 2020 data from IS 52 since IS 45 data was deemed incomplete by the EPA for this year.

[2] 2021 data from IS 52 since PS 124 did not operate this year.

Methodology

Given the range of programs that could result from the Proposed Actions, each technical area in this EIS will assess one of two RWCDS in order to ensure a conservative analysis. The Maximum Commercial Scenario will assess the Proposed Projects with a more conservative mix of commercial retail and office uses instead of auto dealership space. The Maximum Residential Scenario will be analyzed in technical areas where increased density has the potential to produce more significant effects than the Maximum Commercial Scenario. The Maximum Residential Scenario serves as the RWCDS for this chapter's stationary source analysis, since it is the more conservative analysis.

Mobile Sources

Mobile Source Intersection Screening Analysis

A screening analysis of mobile source emissions of carbon monoxide (CO) and particulate matter (PM) on ambient pollutant levels in the study area was conducted pursuant to guidance in the *CEQR Technical Manual*. For the project's study area, as described in Chapter 17, Sections 210 and 311 of the *CEQR Technical Manual*, the threshold for conducting an analysis of CO emissions corresponds to 140 project-generated vehicles at a given intersection in the peak hour for Manhattan.

The intersections were ranked by generated traffic volume. The highest vehicle trip generation would be at the intersection of Twelfth Avenue and West Side Highway at West 57th Street in the AM peak hour. The total trips at this intersection is below the CO threshold of 140 trips per hour for Manhattan. Therefore, further analysis of CO was not required.

The need for conducting an analysis of PM emissions is based on road type and the number of project-generated peak hour heavy-duty diesel vehicles or its equivalency (HDDVs) in vehicular $PM_{2.5}$ emissions as determined using the worksheet referenced on pages 17-12 of the *CEQR Technical Manual*.

The $PM_{2.5}$ analysis was conducted using roadway and vehicle classification data and the $PM_{2.5}$ equivalent truck worksheet from the CEQR *Technical Manual*. The intersections were ranked by the generated traffic volumes, trucks, and intersection road types for weekday and Saturday peak hours to select the worst-case location for the analysis screening. Based on these measures, the intersection of 12th Avenue/West Side Highway and West 54th Street was selected for the $PM_{2.5}$ screening. According to the NYSDOT Functional Class Maps, 12th Avenue is a principal arterial expressway and West 54th Street is a major collector. Autos were assumed to be vehicle type LDGT1 and trucks were assumed to be HDDV8A to be conservative. This combination of roadways and vehicle types in the $PM_{2.5}$ equivalent truck worksheet presented 11 HDDV equivalents at the intersection from the project's AM peak hour trip generation.

As the equivalent truck trips at the intersection was below the weighted screen values of 22, the intersection passed the screening for $PM_{2.5}$. Therefore, a detailed analysis of $PM_{2.5}$ and PM_{10} was not warranted.

Overall, a detailed assessment of mobile sources at intersections is not needed, and no significant adverse mobile source air quality impacts from incremental vehicle trips are expected.

Detailed Analysis from Atypical Sources on the RWCDS

Section 210 of the *CEQR Technical Manual* requires the analysis of vehicular emissions from atypical sources within 200 feet of sensitive uses introduced by a proposed project. The Proposed Actions would introduce a building within 200 feet of Route 9A, which is designated as a Principal Arterial Expressway by NYSDOT. As such, a dispersion analysis was conducted to assess the potential impact of emissions from the expressway onto the proposed sensitive use.

Traffic Data and Vehicle Emissions

Traffic volumes for Route 9A were estimated on an hourly basis for a full day (24 hours of data). The PM and CO analysis was conducted using hourly inputs for 24 hours. Historical Google Maps data indicates that this route typically experiences light congestion outside of the delays induced by the signalized intersections. As such, posted speeds were used in the analysis.

Vehicular CO and PM emission factors utilized in the dispersion modeling were computed using the EPA's Motor Vehicle Emission Simulator, MOVES4. This emissions model is capable of calculating engine emission factors for various vehicle types, based on the fuel type (gasoline, diesel, or compressed natural gas), meteorological conditions, vehicle speeds, vehicle age, roadway types, number of starts per day, engine soak time, and various other factors that influence emissions, such as an inspection maintenance program.

MOVES input files (i.e., fuel data, county-specific hourly temperature, relative humidity data, inspection/maintenance coverage, etc.) for New York County were obtained from NYSDEC. Source type age distribution data were obtained from NYSDEC and processed using the EPA's *Age Distribution Projection Tool for MOVES4*.[2]

Fugitive Dust

In addition to exhaust, tire, and brake-wear emission factors estimated by MOVES4 for particulate matter, fugitive dust emissions were estimated using EPA's Compilation of Air Emissions Factors (AP-

[2] EPA. Age Distribution Projection Tool for MOVES4.xlsx. Tools to Develop or Convert MOVES Inputs | US EPA

42)[3] guidance for paved roads. Fugitive dust emissions were used in the short-term, 24-hour modeling of $PM_{2.5}$ and PM_{10}. Consistent with NYCDEP's conclusion that fugitive dust has an insignificant contribution on longer analysis timeframes, fugitive dust emissions were not used in the annual $PM_{2.5}$ modeling.

Dispersion Model

The EPA AERMOD model (version 24142) was used in the analyses of CO, $PM_{2.5,}$ and PM_{10} from the atypical source. The roadway links were modeled using the line source option in the model and following the EPA's PM Transportation Conformity Guidance (EPA PM Guidance). Initial vertical dimensions and source release heights were determined based on the source types in the fleet as described in Appendix J.3 to the EPA PM Guidance. Horizontal dimensions were determined based on roadway geometries. Variable hourly emission rates were utilized for this analysis.

Receptor Placement

Discrete receptors (i.e., locations at which concentrations are calculated) were placed on the façade of the proposed building adjacent to Route 9A/Twelfth Avenue (i.e., Development Site 1). Receptor locations were the same as those described in the major source analysis below. Receptors were conservatively placed on the maximum building envelope using floor heights from the Maximum Residential Scenario, resulting in the largest number of receptors at the closest distance to the source. This placement results in a more conservative analysis.

Analysis Year

The atypical mobile sources analyses were performed for the 2029 analysis year—the year by which redevelopment of the development sites is likely to be completed. This analysis was performed for the With-Action condition only.

Meteorological Data

The dispersion analysis used the latest available 5 years (2017-2021) of hourly meteorological observations from LaGuardia Airport National Weather Service station and upper air data obtained from the Brookhaven station, New York. This meteorological data for the AERMOD model was obtained from the NYSDEC.

Stationary Sources

HVAC and Hot Water Analysis

The Proposed Projects may elect to use natural gas for the building's HVAC or hot water systems. As such, emissions from the hot water system will be analyzed using the *CEQR Technical Manual* screening procedures.

CEQR Graphical Screening (HVAC and Hot Water Screening Analysis)

As described in Section 220 and Section 322 in Chapter 17 of the *CEQR Technical Manual*, for single-building projects that would use fossil fuels (i.e., No. 2 fuel oil or natural gas) for HVAC and hot water

[3] EPA. AP-42, chapter 13.2.1 Paved Roads. https://www.epa.gov/sites/production/files/2020-10/documents/13.2.1_paved_roads.pdf

systems, a preliminary stationary source screening analysis is typically warranted to evaluate the potential for impacts on existing and future buildings from HVAC and hot water systems emissions for the Proposed Projects. The *CEQR Technical Manual* provides screening nomographs based on building use, fuel type, minimum distance from the source to the nearest receptor buildings with similar or greater heights, and floor area of development resulting from the Proposed Projects. If the distances from the Proposed Projects to the nearest existing or proposed buildings of similar or greater height are less than the minimum required distances determined, there is the potential for a significant air quality impact from the project's boilers, and further analysis needs to be conducted using the USEPA's AERMOD model. Otherwise, the air quality impact is deemed insignificant.

Industrial Source Analysis

As described in Section 220 and Section 322 in Chapter 17 of the *CEQR Technical Manual*, an air quality assessment is required to evaluate the potential impacts of air toxics emissions from ventilation exhaust systems of manufacturing or processing facilities within a 400-foot radius of a project site when a project would result in new sensitive uses (particularly residences, schools, hospitals, or parks). If any sources are identified, a screening analysis is performed using Table 17-3 in Chapter 17 of the *CEQR Technical Manual*. The screening table provides maximum 1-hour, 8-hour, 24-hour, and annual average modeled pollutant concentration values at a 20-foot-tall receptor for distances of 30 to 400 feet from a 20-foot-tall stack. These values are based on a generic emission rate of 1 gram per second of a pollutant from a 20-foot-tall point source. Pollutant concentrations predicted from the industrial source of concern based on the screen table are compared with the short-term guideline concentrations (SGCs) and annual guideline concentration (AGCs) recommended in NYSDEC's DAR-1 AGC/SGC tables.

Additionally, according to the NYSDEC's DAR-1 guidance, the residual risk of carcinogenic emissions is evaluated through the excess cancer risks per one million people associated with carcinogenic pollutants. If the total cancer risk of all the carcinogenic toxic pollutants combined is less than 10-in-one million, the residual risk is deemed acceptable, and no significant adverse air quality impacts are predicted to occur due to these pollutant releases. Additionally, the risk of non-carcinogenic toxic air emissions is evaluated through the hazard index, which is based on annual exposure limits. If the sum of all the toxic pollutants' concentrations divided by their annual exposure thresholds is found to be less than 2.0, the residual risk is acceptable and no significant adverse air quality impacts are predicted to occur due to these pollutant releases.

Large or Major Source Analysis

As described in Section 220 and Section 322 in Chapter 17 of the *CEQR Technical Manual*, an air quality assessment is required to evaluate the potential impacts of emissions from a "large" or "major" emission source within a 1,000-foot radius of a project site. "Major" sources are identified as sources with NYSDEC-issued Title V/PSD (Prevention of Significant Deterioration) permits. "Large" sources are identified as sources with NYSDEC-issued Air State Facility (ASF) permits. A detailed analysis is usually performed for such sources to determine any potential for significant adverse impact on a proposed development.

A review of available information identified one major source and one large source with Title V and ASF permits located within a 1,000-foot radius of the development sites. The major source is the Con Edison 59th Street Station located at 850 Twelfth Avenue, which operates five boilers and one

combustion turbine to generate district steam and electricity. The large source is CBS Broadcasting located at 524 West 57th Street, which operates four large generators.

The 59th Street Station operates under a currently expired Title V Permit (2-6202-00032/00013) issued by NYSDEC but is in the process of obtaining a new permit as of this filing. The facility submitted a renewal application to NYSDEC on October 25, 2018. The most recent application data was obtained by the Proponent for the purposes of this analysis via a Freedom of Information Law (FOIL) request submitted to NYSDEC. According to the renewal application, the facility operates 2 "very large boilers" with a heat input of 805 MMBtu/hr and 3 large boilers with a heat input of 192 MMBtu/hr for the purposes of producing district steam that is fed to other buildings for space heating. Additionally, the facility occasionally operates a combustion turbine with a heat input of 275 MMBtu/hr to generate electricity for the local grid. All five boilers exhaust out of a shared stack rising 507 feet above grade. The combustion turbine exhausts out of the stack rising 119 feet above grade. As of September 2023, both the boilers and combustion turbine operate under natural gas during typical operating conditions and fire Number 2 Oil (Diesel) for backup purposes only in the event of a gas supply contingency. Con Edison has indicated that this equates to the use of natural gas more than 95% of the time.[4] The impact of emissions from the Con Edison 59th Street Station facility on the Proposed Project was estimated using the latest version of the EPA's AERMOD model.

CBS Broadcasting operates four generators under an ASF permit (2-6202-01636/00001) with an expiration date of 10/24/2028. All four generators are rated at 2,000 kW and are permitted to operate in non-emergency conditions. The permit limits facility-wide NOx emissions to 24.9 tons per year and requires the submission of annual emissions inventories/operating hours to demonstrate compliance with this cap. The annual emissions inventories were obtained by the Proponent for the purposes of this analysis via a FOIL request submitted to NYSDEC. According to the annual monitoring report to NYSDEC, all four generators were used for less than 30 hours per year in the latest available five years (2019-2023). This low usage indicates that the generators have only operated for periodic testing and maintenance. The EPA guidance[5] on treatment of intermittent sources allows for sources with infrequent and unpredictable hours of operation to be excluded from compliance demonstration. Based on this guidance and the generators' historical usage, the CBS Broadcasting source was excluded from the major source analysis.

Emissions and Dispersion Modeling

Emissions from the 59th Street Station major source facility were estimated based on their potential to emit obtained from the Title V permit, Permit Renewal Application, Permit Air Quality Analysis Report, and the EPA's AP-42, Compilation of Air Pollutant Emissions Factors. As the use of diesel for the boilers and combustion engines represents less than 5% of annual operating hours and is used only during emergency situations, the analysis only considered the use of natural gas for the boilers and combustion turbine. Several pollutants are of concern from this major source: PM, both PM_{10} and $PM_{2.5,}$ and NO_2. Stack parameters listed in the permit renewal were used in the air quality analysis of this facility.

[4] https://www.coned.com/en/community-affairs/community-updates/59th-st-air-quality-permit

[5] EPA, OAQPS, Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO2 NAAQS, March 2011, https://www.epa.gov/sites/production/files/2015-07/documents/appwno2_2.pdf

AERMOD Dispersion Modeling

The dispersion modeling for the major source analysis was conducted using AERMOD version 24142. AERMOD is a state-of-the-art dispersion model, applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources). AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatments of the boundary layer theory, understanding of turbulence and dispersion, and handling of terrain interactions. The AERMOD model calculates pollutant concentrations from one or more points (e.g., exhaust stacks) based on hourly meteorological data and has the capability to calculate pollutant concentrations at locations where the plume from the exhaust stack is affected by the aerodynamic wakes and eddies (downwash) produced by nearby structures. AERMOD can be run with and without building downwash. The downwash option accounts for the effects on plume dispersion created by the structure the stack is located on, and other nearby structures. The potential impacts of the major source were estimated both as a direct plume impact and using the downwash algorithm.

Methodology Utilized for Estimating NO_2 Concentrations

The 1-hour NO_2 concentration was estimated using the AERMOD Plume Volume Molar Ratio Method (PVMRM) module. The PVMRM module limits the NO_x to NO_2 conversion by considering NO_2 formation based on the amount of ozone within the plume volume. Hourly background ozone concentrations from the CCNY ambient monitoring station (with the IS52 monitor as a backup) for the NYSDEC recommended five years (2017-2021) of hourly data were incorporated into the model. Hourly background NO_2 concentrations from the IS52 monitoring station for the years 2019 to 2021 were provided by NYSDEC. Overall, the total 1-hour NO_2 concentration was estimated using 5 years of background ozone concentrations and seasonal hourly background NO_2 concentrations directly in the model. The annual NO_2 concentrations were estimated using an EPA default 0.75 conversion rate.

Receptor Locations

Receptors were placed on the two proposed action buildings. Receptors were placed 20 feet apart horizontally on each floor of the proposed buildings. The Maximum Residential Scenario floor heights were used since they resulted in more receptors combined with maximum building envelopes, conservatively placing receptors as close as possible to the sources. This receptor placement results in a more conservative analysis.

Meteorological Data

The meteorological data used was the recommended set provided by NYSDEC. The data represents surface data from LaGuardia Airport and upper air soundings from Brookhaven for the years 2017 through 2021.

The resultant concentrations from the major source were compared with the NAAQS to determine the potential for adverse air quality impacts.

Assessment

Mobile Sources

Detailed Analysis from Atypical Sources on the RWCDS

An analysis was performed to determine if pollutant concentrations related to emissions from vehicular traffic on Route 9A could potentially result in adverse impacts on Development Site 1's operable windows along all facades. Pollutants of concern from the traffic emissions on the expressway were CO and PM (PM_{10} and $PM_{2.5}$).

2029 vehicular CO and PM emission rates were estimated using MOVES4 and the NYSDEC inputs for New York County. The AERMOD run followed the EPA's Transportation Conformity Guidance for PM Nonattainment and Maintenance Areas to estimate the maximum impacts of Route 9A emissions on the Proposed Project. The results of this analysis are presented in **Table 11-3** through **Table 11-5**.

Table 11-3 Highest Predicted CO Concentration from the Atypical Source (ppm)

Time Period	Highest Impact	Background Concentration	Total Concentration	NAAQS
1 hour	0.51	1.7	2.2	35
8 hours	0.27	1.4	1.7	9

Source: VHB Inc., 2025

Table 11-4 Highest Predicted PM_{10} Concentration from the Atypical Source ($\mu g/m^3$)

Time Period	Highest Impact	Background Concentration	Total Concentration	NAAQS
24 hours	8.9	37.0	45.9	150

Source: VHB Inc., 2025

Table 11-5 Highest Predicted $PM_{2.5}$ Concentration from the Atypical Source ($\mu g/m^3$)

Time Period	Highest Impact	Background Concentration	Total Concentration	NAAQS
24 hours	1.6	19.7	21.3	35
Annual	0.2	7.2	7.4	9

Source: VHB Inc., 2025

The results indicate that the highest CO and PM concentrations at the proposed building would occur on the first floor and would be well below the applicable national ambient air quality standards. As such, no adverse air quality impacts are expected from the atypical source emissions on the Proposed Project.

Stationary Sources

HVAC and Hot Water Analysis

The Proposed Actions would result in the development of two sites. Square footages from the Maximum Residential Scenario were used since they are greater than those under the Maximum

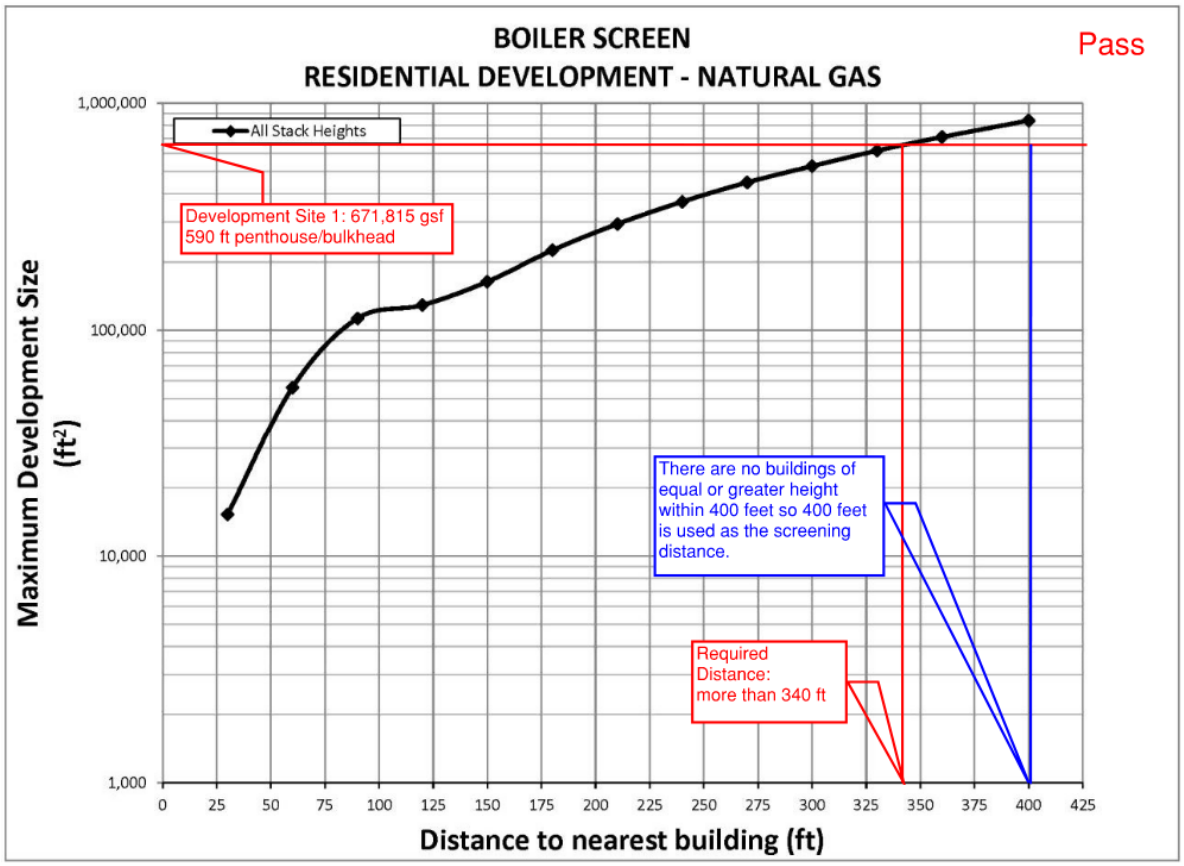
Commercial Scenario. Development Site 1 would total 671,815 gsf and have a penthouse height of 590 feet. Development Site 2 would total 522,558 gsf and have a penthouse height of 525 feet. Development under the both RWCDSs would be predominantly residential with some commercial use. Both RWCDSs may use natural gas for HVAC and hot water systems in the buildings. The local release of fossil fuel emissions from natural gas requires an HVAC and hot water systems screening analysis following the *CEQR Technical Manual* guidelines.

A conservative HVAC and hot water screening analysis for the assessment of the effects of the proposed buildings' HVAC and hot water systems on surrounding existing and future No-Action buildings was conducted by conservatively assuming that natural gas would be used for the total development square footage under the Maximum Residential Scenario. The stack is assumed to be located on the highest tier of each building. The *CEQR Technical Manual* states that mixed-use buildings should use the residential nomographs for the purposes of the HVAC screening.

Development Site 1

No existing or future no-build buildings of similar or greater height than Development Site 1's stack were identified within the study area. Receptors at Development Site 2 were also reviewed for potential project-on-project impacts. The penthouse height of Development Site 2 at 525 feet is substantially shorter than the height of Development Site 1's penthouse (590 feet). Since there are no buildings of similar or greater height to Development Site 1 within 400 feet, 400 feet was used as the screening distance. Based on the size of the Proposed Project, and assuming the use of natural gas for its HVAC and hot water systems, the minimum required distance to potential receptors for no adverse air quality impacts is more than 340 feet (see **Figure 11-1**). Since no receptors were identified within 400 feet, no significant adverse air quality impact is expected from Development Site 1's HVAC and hot water systems.

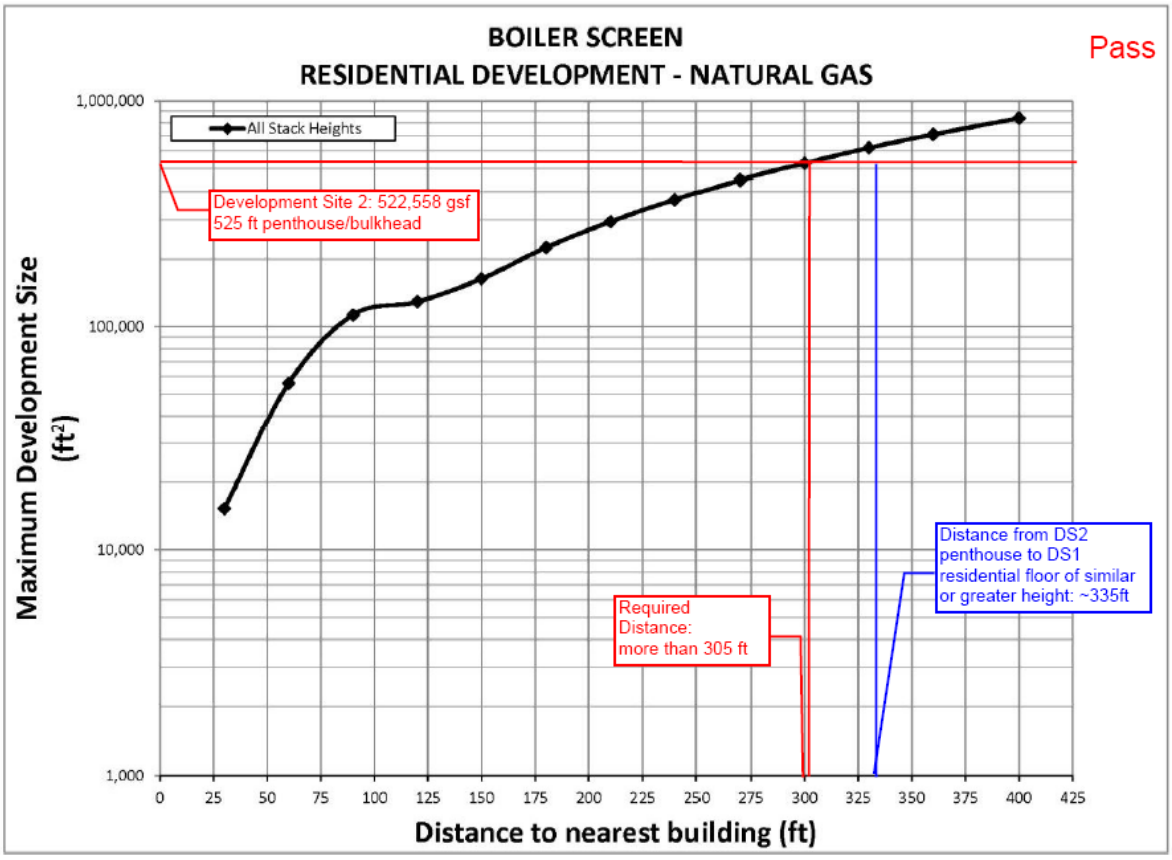
Figure 11-1 Development Site 1 Building Screening



Development Site 2

No existing or future no-build buildings of similar or greater height than Development Site 2's stack were identified within the study area. The closest existing building is 601 West 57th Street located directly north of Development Site 2. However, 601 West 57th is only approximately 450 feet tall (75 feet shorter than Development Site 2's penthouse). Receptors at Development Site 1 were also reviewed for potential project-on-project impacts. The penthouse height of Development Site 1 (at 590 feet) is of greater height to Development Site 2's penthouse (525 feet). The distance from Development Site 2's penthouse to the nearest residential floor of similar or greater height at Development Site 1 is approximately 335 feet. Based on the size of the Proposed Project, and assuming the use of natural gas for its HVAC and hot water systems and the tower setting back at least 50 feet from West 55th Street, the minimum required distance to potential receptors for no adverse air quality impacts is more than 305 feet (see **Figure 11-2**). Since the closest receptor building is at a distance of approximately 335 feet, no significant adverse air quality impact is expected from Development Site 2's HVAC and hot water systems.

Figure 11-2 Development Site 2 Building Screening



Industrial Source Analysis

A study was conducted to analyze potential air quality impacts on the Proposed Projects from existing industrial sources that emit toxic air contaminants. A review of land use maps, the NYCDEP's Clean Air Tracking System (NYCDEP CATS) website, NYCDEP registration forms, and field surveys were conducted to identify land uses that could have NYCDEP-issued industrial permits and land uses that are unpermitted sources of air toxics within 400 feet of the Development Site. Although permits were identified at several sites, further analysis was required for only one facility, which was CBS Corporation at 530 West 57th Street. The remaining permitted sites and potential unpermitted sites were not analyzed for the following reasons:

- 755 Twelfth Avenue (Permit PR015120, PR015020, PW000420, PA040498, PA040598, PA040698, PA040798,): All permits except PW000420 cover portable generators of various sizes. PW00420 covers 4 generators and 1 diesel boilers. 4 of the 5 sources in PW00420 are located at distances greater than 400 feet from the Project Area. All permits associated with this site expired in 2023 or prior. This site was completely demolished and is currently under construction associated with the proposed Sunset Pier 94 Studios. As such, all listed sources in all permits are no longer in operation. Therefore, an industrial source analysis was not warranted for these permits.
- Emergency or Portable Generator Permits: Nine portable or emergency generator permits were found at properties within 400 feet of the Proposed Projects as presented in **Table 11-6**. The

CEQR guidance does not require an analysis of sources that are used infrequently for emergency purposes. Therefore, an industrial source analysis was not warranted for these permits.

› Various Auto Dealerships and Service Centers (Unpermitted): There are multiple auto dealerships with service centers located within 400 feet of the development sites, including Open Road VW Manhattan, Audi Manhattan, Land Rover Manhattan, Jaguar at Manhattan, and Mercedes-Benz Manhattan. These sites were reviewed for potentially unpermitted spray paint booths associated with bodywork/collision centers. It was confirmed by a phone call with the service centers at Open Road VW Manhattan, Audi Manhattan, and Mercedes-Benz Manhattan that their collision center that provides paint spraying is located off-site. A similar off-site collision center was confirmed with Land Rover Manhattan and Jaguar at Manhattan by an in-person site visit. Therefore, an industrial source analysis was not warranted for these sites.

Table 11-6 NYCDEP Permits: Emergency or Portable Generators

Application No.	Expiration Date	Address	Block	Lot
PA078088	10/4/1991	530 West 57th Street	01085	0001
PA078188	10/4/1991	530 West 57th Street	01085	0001
PA078288	12/4/1991	530 West 57th Street	01085	0001
PA078388	10/4/1991	530 West 57th Street	01085	0001
PR032317	12/13/2023	606 West 57th Street	01104	0031
PB036208	9/26/2017	610 West 56th Street	01103	0039
PR007518	4/23/2021	619 West 54th Street	01102	0018
PR019516	6/24/2022	770 11th Avenue	01082	7501
PR026622	9/30/2025	790 11th Avenue	01083	0001

There is one expired permit for CBS Corporation at 530 West 57th Street for a spray booth. This spray booth is approximately 130 feet away from Development Site 2 (it is more than 400 feet from Development Site 1). Industrial permit PB0011-13M indicates that there is a paint spray booth manufactured by Colmet (Model #IB-1009-15) located on the first floor with an exhaust stack that goes to the roof, terminating at a height of 56 feet above grade. The spray booth is used to paint scenery and props associated with the broadcasting studio. Therefore, a *CEQR Technical Manual* industrial screening analysis was performed for the spray booth to assess impacts from paint spraying on the Proposed Projects. The list of contaminants and their corresponding hourly and annual emission rates from the permit records were used for the analysis.

The emission rates and results of this analysis are presented in the **Table 11-7**. The distance between Development Site 2 and the spray booth was conservatively assumed to be 117 feet which represents the distance from the façade of Development Site 2 to the façade of the CBS Corporation. The analysis is applicable to both RWCDS. The results indicate that all individual contaminant concentrations are below their respective short and long-term guidance levels obtained from the DEC DAR-1 Guidelines for the Evaluation and Control of Ambient Air Contaminants.[6] They also show that solid $PM_{2.5}$ is below their respective short-term and annual NAAQS.

[6] https://www.dec.ny.gov/docs/air_pdf/dar1.pdf

Table 11-7 Results of Industrial Source Analysis

Chemical Name	CAS Number	Short-term Emission Rate (g/s)	Total Short-term Concentration (µg/m³)	SGC (µg/m³)	Annual Emission Rate (g/s)	Total Annual Concentration (µg/m³)	AGC (µg/m³)
Misc Solids (PM2.5)1	NY075-00-0	0.0008	23.4	35	0.0002	7.31	9
Propane	00074-98-6	0.0050	70.2	-	0.0012	0.74	-
Butane	00106-97-8	0.0025	35.1	-	0.0006	0.37	-
Heptane	00142-82-5	0.0010	14.0	210,000	0.0002	0.15	3,900
V.M.&P. Naphtha	64742-89-8	0.0019	26.3	-	0.0004	0.28	3,200
Toluene	00108-88-3	0.0031	43.9	37,000	0.0007	0.46	5,000
Ethylbenzene	00100-41-4	0.00003	0.4	-	0.00001	0.005	1000
Light Aromatic HCs	64742-95-6	0.0003	4.4	-	0.0001	0.05	100
1,2,4-Trimethylbenzene	00095-63-6	0.0006	8.8	-	0.0001	0.09	60
Acetone	00067-64-1	0.0094	131.7	180,000	0.0022	1.39	30,000
Talc	14807-96-6	0.0031	43.9	-	0.0007	0.46	4.8
Titanium Dioxide	13463-67-7	0.0006	8.8	-	0.0001	0.09	24
Carbon Black	01333-86-4	0.00003	0.4	-	0.00001	0.005	7

Notes:
[1] Total $PM_{2.5}$ concentrations include background concentrations from **Table 11-2**. Particulates are compared against the NAAQS, as there are no SGCs or AGCs for particulate matter. All Misc Solids (NY075-00-0) were conservatively assumed to be $PM_{2.5}$ for this analysis.

Health risk is characterized using excess cancer risks per one million people for carcinogenic compounds and as hazard index for non-carcinogens. None of the chemicals present have been identified as carcinogenic. Therefore, a cancer risk assessment was not warranted. Non-cancer health risk (i.e., hazard index) was estimated using procedures from the NYSDEC DAR-1 based on the annual concentrations and AGC levels. The non-cancer hazard index is presented in **Table 11-8.**

Table 11-8 Hazard Index Assessment

Chemical Name	CAS	DAR-1 classification	Hazard Quotient
Toluene	00108-88-3	Low	9.28E-05
Ethylbenzene	00100-41-4	Medium	4.64E-06
Hazard Index			**0.0001**

Source: VHB Inc., 2025

As shown above, the hazard index at the Proposed Project is below the threshold of 2.0. Therefore, no significant adverse air quality impacts from the spray booth are anticipated at the Proposed Project.

Major Source Analysis

The AERMOD dispersion modeling analysis was conducted to assess potential impacts on the Proposed Project from emissions from the 59th Street Station. Stack parameters obtained from the air permit and used in the modeling—including stack height, diameter, temperature, and exit velocity of the plume—are presented in **Table 11-9.**

Table 11-9 Major Source Stack Parameters

Parameter	Combined Boilers	Combustion Turbine	Unit
Stack Height	507	119	feet
Stack Diameter	198	144	inches
Exit Velocity	61	68	ft/sec
Exhaust Temperature	370	660	^{o}F

Source: 59th Street Station NYSDEC Permit and NYSDEC Renewal Application

Emission rates used in the analysis were estimated based on the permit information and EPA's AP-42 and are presented in **Table 11-10**. As described above, both the boilers and combustion turbine were considered to use natural gas as a fuel source.

Short-term emission factors were based on all equipment operating at full load. Annual emission factors were determined using each maximum annual operating hours in the past seven years (2017-2023). Operating hour data was sourced from the EPA's Clean Air Markets Program Data (CAMPD).[7] This data showed that the combustion turbine operated for a maximum of 70 hours in 2021 (an outlier from other years where usage was typically less than 10 hours). Boilers operated for a maximum combined 21,128 hours in 2018.

[7] https://campd.epa.gov/data/custom-data-download

Emission factors amongst the Very Large boilers are similar, as are the emission factors amongst the Large boilers since each group has the same heat input. As such, historical boiler operating hours were grouped by Very Large and Large boilers in order to determine the combined emission rates in the boiler stack. In the past five years, the two Very Large boilers accounted for 49.8 percent of annual operating hours on average, while the three Large boilers accounted for 50.2 percent of annual operating hours on average. As such, combined boiler long-term emission factors were apportioned using the 21,128 annual operating hours and the corresponding percentage splits amongst Very Large and Large boiler operating hours.

Table 11-10 Major Source Emission Rates (g/sec)

Pollutant	Time period	Emission Rate			
		Very Large Boiler	Large Boiler	Combined Boiler	Combustion Turbine
Nitrogen Oxides	1-hour[1]	15.21	3.63	41.31	16.29
	Annual[2]	-	-	22.68	0.13
Particulate Matter ($PM_{2.5}$)	24-Hour[1]	0.756	0.180	2.052	0.229
	Annual[2]	-	-	1.127	0.0018
Particulate Matter (PM_{10})	24-Hour[1]	0.756	0.180	2.052	0.229
Sulfur Dioxide (SO_2)	1-hour[1]	0.060	0.014	0.162	0.118

Source: VHB, Inc., 2025
Notes:
[1] Short-term factors represent equipment operating at full load. Combined boiler emissions are the summation of two Very Large boilers and three Large boilers.
[2] Annual emission factors represent the equipment operating at their maximum operating hours over the past seven years (2017-2023). Combined boiler emissions represent an annual max operating hours of 21,128 hours and near 50-50 split of Very Large boiler to Large boiler. Combustion Turbine emissions represent an annual max operating hours of 70 hours.

The AERMOD analysis calculated pollutant concentrations resulting from both sources cumulatively for the two scenarios, with and without downwash effects, at receptor locations on the Proposed Project. **Table 11-11** presents the highest impacts resulting from the analysis along with the background concentrations and a comparison to the NAAQS.

Table 11-11 Highest Concentrations from the Major Source

Pollutant	Time period	Unit	Predicted Impact	Background Concentration	Total Concentration	NAAQS
Nitrogen Dioxide	1-hour	ppb	82.4		82.4	100
	Annual	ppb	4.6	16.9	20.3	53
Particulate Matter ($PM_{2.5}$)	24-Hour	$\mu g/m^3$	5.2	19.7	24.9	35
	Annual	$\mu g/m^3$	0.3	7.2	7.5	9
Particulate Matter (PM_{10})	24-Hour	$\mu g/m^3$	10.1	37	47	150

Source: VHB Inc., 2025
Note:
The total concentration includes predicted impact and the background level as they were added by AERMOD during the modeling run.

Results of the major source analysis show that potential impacts on the Proposed Projects are below the respective ambient standards for all pollutants of concern. Therefore, no significant adverse air quality impacts on the Proposed Project are anticipated from the large source.

Conclusion

The number of project-generated trips and incremental parking spaces would be below the CEQR thresholds. Therefore, no adverse air quality impacts are expected from the mobile sources generated by the Proposed Projects.

The analysis of the nearby atypical source showed emissions from vehicles traveling along Route 9A are not expected to produce concentrations at t Development Site 1 that exceed the NAAQS.

The Maximum Residential Scenario passed the HVAC and hot water screening nomographs provided by the *CEQR Technical Manual*. The Maximum Residential Scenario is analyzed as it is the more conservative scenario due to its increased square footage, and significant adverse impacts are not expected from its HVAC and hot water system. To ensure that there are no significant adverse impacts, there would be an (E)-Designation for air quality.

The (E)-Designation text would be as follows:

Block 1102, Lot 11 (Projected Development Site 1):

Any new residential and/or commercial development must exclusively use natural gas as the type of fuel for HVAC systems, and ensure that the heating, ventilating and air conditioning (HVAC) system and hot water equipment stack is located at the highest tier and at least 590 feet above grade to avoid any potential significant adverse air quality impacts.

Block 1103, Lot 36 (Projected Development Site 2):

Any new residential and/or commercial development must exclusively use natural gas as the type of fuel for HVAC systems, and ensure that the heating, ventilating and air conditioning (HVAC) system and hot water equipment stack is located at the highest tier and at least 525 feet above grade, and at least 50 feet from the southern lot line facing West 55th Street to avoid any potential significant adverse air quality impacts.

The analysis of existing light industrial/manufacturing uses in the surrounding study area determined that no adverse air quality impacts are expected from these types of sources on the Proposed Project.

The analysis of nearby major sources located at the ConEdison West 59th Street facility found that concentrations at the proposed buildings from emissions of the plant's boilers and combustion turbine would be less than the NAAQS.

Overall, no significant adverse air quality impacts are anticipated from mobile or stationary sources of air pollution associated with the Proposed Actions.