Chapter 12: Air Quality

A. INTRODUCTION

This chapter assesses the potential impacts of the ~~Proposed Project~~previously proposed project, the development of an up to approximately 680,500-gross square foot (gsf) mixed-use building containing market-rate and affordable housing, retail, office, and community facility spaces as well as parking on the Development Site (Block 98, Lot 1) at 250 Water Street, as well as the restoration, reopening, and potential expansion of the South Street Seaport Museum (the Museum) on the Museum Site (Block 74, portion of Lot 1) at 89-93 South Street, 2-4 Fulton Street, and 167-175 John Street.[1] Air quality impacts can be either direct or indirect. Direct impacts result from emissions generated by stationary sources at a development site, such as emissions from on-site fuel combustion for heating and hot water systems. Indirect impacts are caused by off-site emissions associated with a project such as emissions from nearby existing stationary sources (i.e., impacts from buildings within the Project Area) or by emissions from on-road vehicle trips (mobile sources) generated by the ~~Proposed Project~~previously proposed project or other changes to future traffic conditions due to a project.

The analysis presented in Chapter 11, "Transportation," found that the maximum hourly incremental traffic volumes generated by the ~~Proposed Project~~previously proposed project would not exceed the 2020 *City Environmental Quality Review* (*CEQR) Technical Manual* carbon monoxide (CO) screening threshold of 170 peak-hour vehicle trips at intersections in the traffic study area, nor would they exceed the particulate matter (PM) emission screening threshold discussed in Chapter 17, Sections 210 and 311, of the *CEQR Technical Manual*. Therefore, a mobile source intersection analysis is not warranted. However, the ~~Proposed Project~~previously proposed project would include a 108-space parking garage. Therefore, an analysis was conducted to evaluate potential future pollutant concentrations in the vicinity of the ventilation outlets with the proposed parking garage. The potential expansion of the existing Museum on the Museum Site would also introduce sensitive uses within 200 feet of the elevated section of the Franklin D. Roosevelt (FDR) Drive. The effect of this existing roadway on the proposed uses was therefore analyzed, as recommended in the *CEQR Technical Manual*.

The ~~Proposed Project~~previously proposed project would include fossil fuel-burning heating and hot water systems. Therefore, a stationary source analysis was conducted to evaluate potential pollutant concentrations from the proposed heating and hot water systems.

A review of New York City Department of Environmental Protection (DEP) and New York State Department of Environmental Conservation (NYSDEC) air permits was performed to determine

[1] Since the publication of the DEIS, the Applicant has withdrawn the application for the previously proposed project and submitted a modified application (Application Number C 210438(A) ZSM; the "A-Application") with proposed changes to the project—this modified version of the project is described and considered in this FEIS as the Reduced Impact Alternative, as outlined in Chapter 18, "Alternatives."

whether there are any permitted industrial sources of emissions within the 400-foot study area referenced in the *CEQR Technical Manual*. No such industrial sources were identified.

A City-owned building defined as a large source as per the *CEQR Technical Manual* was identified within 1,000 feet of the Development Site. Therefore, an analysis of the potential air quality impacts of this emissions source on the ~~Proposed Project~~previously proposed project is required, as described in the *CEQR Technical Manual*.

PRINCIPAL CONCLUSIONS

An analysis of air quality determined that the ~~Proposed Project~~previously proposed project would not result in significant adverse impacts related to mobile source or stationary source air quality. The analysis of the proposed parking facilities determined that the emissions from vehicles using the parking facility would not result in any significant adverse air quality impacts.

The analysis of the elevated FDR Drive determined that maximum 24-hour and annual concentrations of PM less than 2.5 microns in diameter ($PM_{2.5}$) and carbon monoxide (CO) were predicted to be less than the corresponding National Ambient Air Quality Standards (NAAQS).

In terms of industrial sources, no businesses were found to have a NYSDEC air permit or DEP certificate of operation within the study area, and no other potential sources of concern were identified. Therefore, no potential significant adverse air quality impacts would occur on the ~~Proposed Project~~previously proposed project from industrial sources.

The analysis of the existing large source of emissions determined there would be no significant adverse air quality impact on the ~~Proposed Project~~previously proposed project.

No potential significant adverse air quality impacts would result from the ~~Proposed Project~~previously proposed project's heating and hot water systems on either the Development Site or the Museum Site. An (E) Designation (E-621) would be applied to the Development Site (Block 98, Lot 1), and an equivalent mechanism would be placed on the Museum Site (Block 74, Lot 1) to ensure that the ~~Proposed Project~~previously proposed project would not result in any significant adverse air quality impacts from fossil fuel-fired heat and hot water systems emissions.

B. POLLUTANTS FOR ANALYSIS

Air quality is affected by air pollutants produced by both motor vehicles and stationary sources. Emissions from motor vehicles are referred to as mobile source emissions, while emissions from fixed facilities are referred to as stationary source emissions. Ambient concentrations of CO are predominantly influenced by mobile source emissions. PM, volatile organic compounds (VOCs), and nitrogen oxides (nitric oxide [NO] and nitrogen dioxide [NO_2], collectively referred to as NO_x) are emitted from both mobile and stationary sources. Fine PM is also formed when emissions of NO_x, sulfur oxides (SO_x), ammonia, organic compounds, and other gases react or condense in the atmosphere. Emissions of sulfur dioxide (SO_2) are associated mainly with stationary sources, and some sources utilizing non-road diesel such as large international marine engines. On-road diesel vehicles currently contribute very little to SO_2 emissions since the sulfur content of on-road diesel fuel, which is federally regulated, is extremely low. Ozone is formed in the atmosphere by complex photochemical processes that include NO_x and VOCs. Ambient concentrations of CO, PM, NO_2, SO_2, ozone, and lead are regulated by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act (CAA),[2] and are referred to as 'criteria pollutants'; emissions of precursors to criteria pollutants, including VOCs, NO_x, and SO_2, are also regulated by EPA.

CARBON MONOXIDE

CO, a colorless and odorless gas, is produced in the urban environment primarily by the incomplete combustion of gasoline and other fossil fuels. In urban areas, approximately 80 to 90 percent of CO emissions are from motor vehicles. CO concentrations can diminish rapidly over relatively short distances; elevated concentrations are usually limited to locations near crowded intersections, heavily traveled and congested roadways, parking lots, and garages. Consequently, CO concentrations must be analyzed on a local (microscale) basis.

The ~~Proposed Project~~previously proposed project is not expected to result in an increase in vehicle trips higher than the *CEQR Technical Manual* screening threshold of 170 trips at any intersection. Therefore, an analysis to evaluate future CO concentrations from project-generated sources was not warranted. However, an analysis was performed to evaluate CO impacts from the elevated section of the FDR Drive on the Museum Site.

NITROGEN OXIDES, VOCS, AND OZONE

NO_x are of principal concern because of their role, together with VOCs, as precursors in the formation of ozone. Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Because the reactions are slow, and occur as the pollutants are advected downwind, elevated ozone levels are often found many miles from sources of the precursor pollutants. The effects of NO_x and VOC emissions from all sources are therefore generally examined on a regional basis. The contribution of any action or project to regional emissions of these pollutants would include any added stationary or mobile source emissions.

The ~~Proposed Project~~previously proposed project would not have a significant effect on the overall volume of vehicular travel in the metropolitan area; therefore, no measurable impact on regional NO_x emissions or on ozone levels is predicted. An analysis of ~~Proposed Project~~previously proposed project-related emissions of these pollutants from mobile sources was therefore not warranted.

In addition to being a precursor to the formation of ozone, NO_2 (one component of NO_x) is also a criteria pollutant. Since NO_2 is mostly formed from the transformation of NO in the atmosphere, it has mostly been of concern farther downwind from large stationary point sources. (NO_x emissions from fuel combustion are mostly in the form of NO at the source.) Consequently, potential for impacts on local NO_2 concentrations from the fuel combustion for the ~~Proposed Project~~previously proposed project's heating and hot water systems were evaluated.

LEAD

Current airborne lead emissions are principally associated with industrial sources. Lead in gasoline has been banned under the CAA and would not be emitted from any other component facilitated by the ~~Proposed Project~~previously proposed project. Therefore, an analysis of this pollutant was not warranted.

[2] The Clean Air Act of 1970, as amended 1990 (42 U.S.C. §7401 et seq.).

RESPIRABLE PARTICULATE MATTER—PM_{10} AND $PM_{2.5}$

PM is a broad class of air pollutants that includes discrete particles of a wide range of sizes and chemical compositions, as either liquid droplets (aerosols) or solids suspended in the atmosphere. The constituents of PM are both numerous and varied, and they are emitted from a wide variety of sources (both natural and anthropogenic). Natural sources include the condensed and reacted forms of naturally occurring VOCs; salt particles resulting from the evaporation of sea spray; wind-borne pollen, fungi, molds, algae, yeasts, rusts, bacteria, and material from live and decaying plant and animal life; particles eroded from beaches, soil, and rock; and particles emitted from volcanic and geothermal eruptions and from forest fires. Naturally occurring PM is generally greater than 2.5 micrometers in diameter. Major anthropogenic sources include the combustion of fossil fuels (e.g., vehicular exhaust, power generation, boilers, engines, and home heating), chemical and manufacturing processes, all types of construction, agricultural activities, as well as wood-burning stoves and fireplaces. PM also acts as a substrate for the adsorption (accumulation of gases, liquids, or solutes on the surface of a solid or liquid) of other pollutants, often toxic, and some likely carcinogenic compounds.

As described below, PM is regulated in two size categories: particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$) and particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}, which includes $PM_{2.5}$). $PM_{2.5}$ has the ability to reach the lower regions of the respiratory tract, delivering with it other compounds that adsorb to the surfaces of the particles, and is also extremely persistent in the atmosphere. $PM_{2.5}$ is mainly derived from combustion material that has volatilized and then condensed to form primary PM (often soon after the release from a source) or from precursor gases reacting in the atmosphere to form secondary PM.

Gasoline-powered and diesel-powered vehicles, especially heavy-duty trucks and buses operating on diesel fuel, are a significant source of respirable PM, most of which is $PM_{2.5}$; PM concentrations may, consequently, be locally elevated near roadways. The ~~Proposed Project~~previously proposed project would not result in any significant increases in truck traffic near the Development Site or in the region, nor other potentially significant increase in $PM_{2.5}$ vehicle emissions as defined in Chapter 17, Sections 210 and 311, of the *CEQR Technical Manual*. Therefore, an analysis of potential impacts from project-generated mobile sources of PM was not warranted. However, an analysis was performed to evaluate PM impacts from the elevated section of the FDR Drive on the Museum Site.

An assessment of PM emissions from the ~~Proposed Project~~previously proposed project's parking garage and heat and hot water systems was conducted, following the *CEQR Technical Manual* and EPA guidance.

SULFUR DIOXIDE

SO_2 emissions are primarily associated with the combustion of sulfur-containing fuels (oil and coal). SO_2 is also of concern as a precursor to $PM_{2.5}$ and is regulated as a $PM_{2.5}$ precursor under the New Source Review permitting program for large sources. Due to the federal restrictions on the sulfur content in diesel fuel for on-road and non-road vehicles, no significant quantities are emitted from vehicular sources. Vehicular sources of SO_2 are not significant and therefore analysis of SO_2 from mobile and/or non-road sources was not warranted.

Based on the design information for the ~~Proposed Project~~previously proposed project, natural gas heating and hot water systems would be utilized. The sulfur content of natural gas is negligible;

therefore, no analysis was undertaken to estimate the future levels of SO_2 with the ~~Proposed Project~~previously proposed project.

C. AIR QUALITY REGULATIONS, STANDARDS, AND BENCHMARKS

NATIONAL AND STATE AIR QUALITY STANDARDS

As required by the CAA, primary and secondary National Ambient Air Quality Standards (NAAQS) have been established[3] for six major air pollutants: CO, NO_2, ozone, respirable PM (both $PM_{2.5}$ and PM_{10}), SO_2, and lead. The primary standards represent levels that are requisite to protect the public health, allowing an adequate margin of safety. The secondary standards are intended to protect the nation's welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. The primary standards are generally either the same as the secondary standards or more restrictive. The NAAQS are presented in **Table 12-1**. The NAAQS for CO, annual NO_2, and 3-hour SO_2 have also been adopted as the ambient air quality standards for New York State, but are defined on a running 12-month basis rather than for calendar years only. New York State also has standards for total suspended particles, settleable particles, non-methane hydrocarbons, 24-hour and annual SO_2, and ozone which correspond to federal standards that have since been revoked or replaced, and for the noncriteria pollutants beryllium, fluoride, and hydrogen sulfide.

[3] EPA. *National Ambient Air Quality Standards*. 40 CFR part 50.

Table 12-1
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary		Secondary	
	ppm	µg/m^3	ppm	µg/m^3
Carbon Monoxide (CO)				
	9[1]	10,000	None	
	35[1]	40,000		
Lead				
Rolling 3-Month Average	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)				
1-Hour Average[2]	0.100	188	None	
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average[3,4]	0.070	140	0.070	140
Respirable Particulate Matter (PM_{10})				
24-Hour Average[1]	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Annual Mean[5]	NA	12	NA	15
24-Hour Average[6]	NA	35	NA	35
Sulfur Dioxide (SO_2)				
1-Hour Average[7]	0.075	196	NA	NA
Maximum 3-Hour Average[1]	NA	NA	0.50	1,300

Notes:
ppm – parts per million (unit of measure for gases only)
µg/m^3 – micrograms per cubic meter (unit of measure for gases and particles, including lead)
N/A – not applicable
All annual periods refer to calendar year.
Standards are defined in ppm. Approximately equivalent concentrations in µg/m^3 are presented.
(1) Not to be exceeded more than once a year.
(2) 3-year average of the annual 98th percentile daily maximum 1-hr average concentration.
(3) 3-year average of the annual fourth highest daily maximum 8-hr average concentration.
(4) EPA has lowered the NAAQS down from 0.075 ppm, effective December 2015.
(5) 3-year average of annual mean.
(6) Not to be exceeded by the annual 98th percentile when averaged over 3 years.
(7) 3-year average of the annual 99th percentile daily maximum 1-hr average concentration.
Source: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards

Effective December 2015, EPA reduced the 2008 ozone NAAQS, lowering the primary and secondary NAAQS from the current 0.075 ppm to 0.070. EPA issued final area designations for the revised standard on April 30, 2018.

Federal ambient air quality standards do not exist for noncriteria pollutants; however, NYSDEC has issued standards for certain noncriteria compounds, including beryllium, gaseous fluorides, and hydrogen sulfide. NYSDEC has also developed guideline concentrations for numerous noncriteria pollutants. The NYSDEC Division of Air Resources (DAR) guidance document DAR-1[4] contains a compilation of annual and short-term (1-hour) guideline concentrations for these compounds. The NYSDEC guidance thresholds represent ambient levels that are considered safe for public exposure. EPA has also developed guidelines for assessing exposure to noncriteria

[4] NYSDEC. *DAR-1: Guidelines for the Evaluation and Control of Ambient Air Contaminants Under Part 212*. August 2016.

pollutants. These exposure guidelines are used in health risk assessments to determine the potential effects to the public.

NAAQS ATTAINMENT STATUS AND STATE IMPLEMENTATION PLANS

The CAA, as amended in 1990, defines non-attainment areas (NAA) as geographic regions that have been designated as not meeting one or more of the NAAQS. When an area is designated as non-attainment by EPA, the state is required to develop and implement a State Implementation Plan (SIP), which delineates how a state plans to achieve air quality that meets the NAAQS under the deadlines established by the CAA, followed by a plan for maintaining attainment status once the area is in attainment.

In 2002, EPA re-designated New York City as in attainment for CO. Under the resulting maintenance plans, New York is committed to implementing site-specific control measures throughout the city to reduce CO levels, should unanticipated localized growth result in elevated CO levels during the maintenance period. The second CO maintenance plan for the region was approved by EPA on May 30, 2014.

Manhattan had been designated as a moderate NAA for PM_{10}; on July 29, 2015, EPA clarified that the designation only applied to the revoked annual standard.

The five New York City counties and Nassau, Suffolk, Rockland, Westchester, and Orange Counties, which had been designated as a $PM_{2.5}$ NAA (New York Portion of the New York–Northern New Jersey–Long Island, NY–NJ–CT NAA), were redesignated as in attainment for that standard effective April 18, 2014 and are now under a maintenance plan. EPA lowered the annual average primary standard to 12 $\mu g/m^3$ effective March 2013. EPA designated the area as in attainment for the 12 $\mu g/m^3$ NAAQS effective April 15, 2015.

Effective June 15, 2004, EPA designated Nassau, Rockland, Suffolk, Westchester, and the five New York City counties as a “moderate” NAA for the 1997 8-hour average ozone standard. In March 2008 EPA strengthened the 8-hour ozone standards, but certain requirements remain in areas that were either nonattainment or maintenance areas for the 1997 ozone standard (“anti-backsliding”). EPA designated these same areas as a “marginal” NAA for the 2008 ozone NAAQS, effective July 20, 2012. On April 11, 2016, EPA reclassified the area as a “moderate” NAA. NYSDEC determined that the NYMA was not projected to meet the July 20, 2018 attainment deadline and therefore requested that EPA reclassify the NYMA to “serious” nonattainment. EPA reclassified the NYMA from “moderate” to “serious” NAA, effective September 23, 2019, which imposes a new attainment deadline of July 20, 2021 (based on 2018–2020 monitored data). On April 30, 2018, EPA designated the same area as a moderate NAA for the revised 2015 ozone standard. SIP revisions are due by August 3, 2021.

New York City is currently in attainment of the annual average NO_2 standard. EPA has designated the entire state of New York as “unclassifiable/attainment” of the 1-hour NO_2 standard effective February 29, 2012. Since additional monitoring is required for the 1-hour standard, areas will be reclassified once three years of monitoring data are available.

EPA has established a 1-hour SO_2 standard, replacing the former 24-hour and annual standards, effective August 23, 2010. Based on the available monitoring data, all New York State counties currently meet the 1-hour standard. In December 2017, EPA designated most of the State of New York, including New York City, as in attainment for this standard.

DETERMINING THE SIGNIFICANCE OF AIR QUALITY IMPACTS

The State Environmental Quality Review Act (SEQRA) regulations and the *CEQR Technical Manual* state that the significance of a predicted consequence of a project (i.e., whether it is material, substantial, large or important) should be assessed in connection with its setting (e.g., urban or rural), its probability of occurrence, its duration, its irreversibility, its geographic scope, its magnitude, and the number of people affected.[5] In terms of the magnitude of air quality impacts, any action predicted to increase the concentration of a criteria air pollutant to a level that would exceed the concentrations defined by the NAAQS (see **Table 12-1**) would be deemed to have the potential for a significant adverse impact.

In addition, in order to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in NAAs, *de minimis* threshold levels have been defined for certain pollutants; any action predicted to increase the concentrations of these pollutants above the thresholds would be deemed to have the potential for a significant adverse impact, even in cases where violations of the NAAQS are not predicted.

CO DE MINIMIS CRITERIA

The *CEQR Technical Manual* defines *de minimis* criteria to assess the significance of the increase in mobile-source related CO concentrations that would result from proposed projects or actions. These criteria set the minimum change in CO concentration that defines a significant environmental impact. Significant increases of CO concentrations in New York City are defined as: (1) an increase of 0.5 ppm or more in the maximum 8-hour average CO concentration at a location where the predicted No Action 8-hour concentration is equal to or between 8 and 9 ppm; or (2) an increase of more than half the difference between baseline (i.e., No Action) concentrations and the 8-hour standard, when No Action concentrations are below 8.0 ppm.

$PM_{2.5}$ DE MINIMIS CRITERIA

For projects subject to CEQR, the *de minimis* criteria currently employed to determine the potential for significant adverse $PM_{2.5}$ impacts under CEQR 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 that are predicted to be greater than 0.1 $\mu g/m^3$ 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 that are predicted to be greater than 0.3 $\mu g/m^3$ at a discrete receptor location (elevated or ground level).

Actions under CEQR predicted to increase $PM_{2.5}$ concentrations by more than the above *de minimis* criteria will be considered to have the potential for a significant adverse impact.

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[5] New York City. *CEQR Technical Manual*. Chapter 1, Section 222. 2020; and New York State Environmental Quality Review Regulations. 6 NYCRR § 617.7

D. METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS

MOBILE SOURCES

PARKING GARAGE

Emissions from vehicles using the parking facility at the Development Site could potentially affect ambient levels of CO and PM at adjacent receptors. An analysis of the emissions from the outlet vents and their dispersion in the environment was performed, calculating pollutant levels in the surrounding area, using the methodology set forth in the *CEQR Technical Manual*.

Emissions from vehicles entering, parking, and exiting the garage were estimated using the EPA mobile source emissions model, Motor Vehicle Emission Simulator (MOVES 2014b).[6] This emissions model is capable of calculating engine, brake wear, and tire wear emission factors for various vehicle types, based on the fuel type (e.g., gasoline, diesel, or natural gas), meteorological conditions, vehicle speeds, vehicle age, roadway type and grade, number of starts per day, engine soak time, and various other factors that influence emissions, such as inspection maintenance programs. The inputs and use of MOVES incorporate the most current guidance available from DEC.

For all arriving and departing vehicles, an average speed of five miles per hour was conservatively assumed for travel within the parking garage. In addition, all departing vehicles were assumed to idle for one minute before proceeding to the exit. Although specific design plans for the project have not yet been defined, at the minimum, the garage would be designed for a minimum airflow of one cubic foot per minute of fresh air per gross square foot of garage area, based on New York City Building Code requirements. To determine compliance with the NAAQS, CO concentrations were determined for the maximum 1-hour and 8-hour average periods.

To determine pollutant concentrations, the outlet vents were analyzed as a “virtual point source” using the methodology in USEPA’s *Workbook of Atmospheric Dispersion Estimates, AP-26*. This methodology estimates CO and PM concentrations at various distances from an outlet vent by assuming that the concentration in the garage is equal to the concentration leaving the vent, and determining the appropriate initial horizontal and vertical dispersion coefficients at the vent faces. It was assumed for the purpose of this analysis that all levels of the parking garage would be mechanically ventilated.

The CO concentrations were determined for the time periods when overall garage usage would be the greatest, considering the hours when the greatest number of vehicles would enter and exit the facility (PM concentrations were determined on a 24-hour and annual average basis). Traffic data for the parking garage analysis were derived from the parking demand described in Chapter 11, “Transportation.” Background and on-street concentrations were added to the modeling results to obtain the total ambient levels for CO. The 24-hour average $PM_{2.5}$ background concentration was used to determine the *de minimis* criteria threshold.

ANALYSIS OF ELEVATED FDR DRIVE

The restoration, reopening, and potential expansion of the Museum on the Museum Site would include sensitive uses within 200 feet of the elevated section of the FDR Drive. The effect of this

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6 EPA. Motor Vehicle Emission Simulator (MOVES): User Guide for MOVES2014a. EPA420B15095. November 2015.

existing roadway on the Museum Site was therefore analyzed, as recommended in the *CEQR Technical Manual*.

Dispersion Model for Microscale Analyses

CO and PM concentrations due to vehicular emissions from the elevated FDR Drive adjacent to the Museum Site were predicted using the American Meteorological Society/Environmental Protection Agency Regulated Model (AERMOD) Version 19191.[7] 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 includes handling of terrain interactions. AERMOD has been a recommended model for transportation air quality analyses for several years and EPA mandated its use for transportation conformity purposes after a three-year transition period.[8] Following EPA guidelines, the analysis was performed using an area source representation of emission sources in order to simulate traffic-related air pollutant dispersion.[9] In addition, the weighted average release height and initial vertical source parameters were calculated for the modeled roadway. Hourly traffic volumes and associated emission factors were used to estimate hourly emission rates from each modeled roadway segment and predict traffic-related air pollutant concentrations at receptor locations.

The microscale analysis was performed for the ~~Proposed Project~~previously proposed project's analysis year of 2026, the year by which the ~~Proposed Project~~previously proposed project is assumed to be completed. The analysis was performed for the future with the ~~Proposed Project~~previously proposed project (the With Action condition).

Emission Data

Emission factors for CO and PM ($PM_{2.5}$ is the relevant pollutant for this analysis) were estimated using estimated speeds, volumes, and vehicle classification data published by the New York State Department of Transportation (NYSDOT).[10] Receptors were placed at various locations and elevations on the Museum Site with sensitive uses adjacent to the FDR Drive to predict concentrations from vehicles.

Meteorology

In general, the transport and concentration of pollutants from vehicular sources are influenced by three principal meteorological factors: wind direction, wind speed, and atmospheric stability. Wind direction influences the direction in which pollutants are dispersed, and atmospheric

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[7] EPA. *User's Guide for the AMS/EPA Regulatory Model (AERMOD)*. Office of Air Quality Planning and Standards. EPA-454/B-19-027. Research Triangle Park, North Carolina. August 2019.

[8] EPA. Revisions to the Guideline on Air Quality Models: Final rule. Federal Register, Vol. 82, No. 10, January 2017.

[9] EPA. *Project-Level Conformity and Hot-Spot Analyses*, available at: https://www.epa.gov/state-and-local-transportation/project-level-conformity-and-hot-spot-analyses#pmguidance

[10] The ratio between passenger cars and passenger trucks calculated from the county-specific vehicle population data used in the NYSDEC inventory projections for 2017 was applied as an additional breakdown of the fraction coded as autos in the data published by NYSDOT.

stability accounts for the effects of vertical mixing in the atmosphere. These factors, therefore, influence the concentration at a particular prediction location (receptor).

The AERMOD model includes the modeling of hourly concentrations based on hourly traffic data and five years of monitored hourly meteorological data. The data consists of surface data collected at LaGuardia Airport and upper air data collected at Brookhaven, New York for the period 2016–2020. All hours were modeled, and the highest predicted concentration for each averaging period is presented.

Background Concentrations

Background concentrations are those pollutant concentrations originating from distant sources that are not directly included in the modeling analysis, which directly accounts for vehicular emissions on the streets within 1,000 feet and in the line of sight of an analysis site. Background concentrations must be added to modeling results to obtain total pollutant concentrations at an analysis site.

The background concentrations for the nearest monitored location are presented in **Table 12-2**. PM concentrations are based on ~~the latest available three years of~~ monitored data from a recent three-year period (2017–2019) consistent with the statistical form of the NAAQS. CO concentrations are also based on ~~the latest available three years of~~ monitored data of the same period (2017–2019). These values were used as the background concentrations for the mobile source analysis.

Table 12-2
Maximum Background Pollutant Concentrations for Mobile Source Analysis

Pollutant	Average Period	Location	Concentration	NAAQS
CO	1-hour	CCNY	2.52 ppm	35 ppm
	8-hour	CCNY	1.2 ppm	9 ppm
PM_{10}	24-hour	Division Street	39.3 µg/m³	150 µg/m³
$PM_{2.5}$	24-hour	Division Street	19.7 µg/m³	35 µg/m³
	Annual	Division Street	9.0 µg/m³	12 µg/m³

Notes:
(1) CO concentrations represent the maximum second-highest monitored concentrations from ~~the most recent three years of data~~ 2017-2019.
(2) PM_{10} concentration represents the average highest monitored concentration ~~from the most recent three years of data~~ over the years 2017-2019.
(3) $PM_{2.5}$ concentration represents the average of the 98th percentile day ~~from most recent three years of data~~ over the years 2017-2019.
Source: New York State Air Quality Report Ambient Air Monitoring System, DEC, 2017–2019.

STATIONARY SOURCES

A stationary source analysis was conducted to evaluate the potential for impacts from the Development Site's heat and hot water systems. In addition, an assessment was conducted to determine the potential for impacts from any nearby large or major emissions sources.

The ~~Proposed Project~~previously proposed project would contain a maximum development envelope of up to approximately 395 feet under the Reasonable Worst Case Development Scenario assessed in this ~~DEIS~~ FEIS (see Figure 1-3). To be conservative, the screening analysis for the Development Site's heat and hot water systems considered a potential stack location at a lower height of 335 feet, while the assessment of potential impacts from nearby large sources considered the façades of the maximum development envelope.

HEAT AND HOT WATER SYSTEMS

An initial screening analysis was performed to assess the potential for air quality impacts associated with emissions from heat and hot water systems for the ~~Proposed Project~~previously proposed project. The methodology described in the *CEQR Technical Manual* was used for the analysis, and considered impacts on sensitive uses (i.e., existing residences and proposed developments). To evaluate potential 1-hour average NO_2 and 24-hour and annual average PM impacts from the ~~Proposed Project~~previously proposed project's heat and hot water systems, an additional screening analysis was performed using the USEPA AERSCREEN model.

Initial Screening Analysis

The methodology determines the threshold of development size below which the action would not have a significant adverse impact. The screening procedures utilize information regarding the type of fuel to be used, the maximum development size, and the heat and hot water systems' exhaust stack height, to evaluate whether a significant adverse impact may occur. Based on the distance from the Development Site to the nearest building of similar or greater height, if the maximum development size is greater than the threshold size shown in the *CEQR Technical Manual*, there is the potential for significant air quality impacts, and a refined dispersion modeling analysis would be required.

Since information on the heat and hot water systems' design was not available, the Development Site and the Museum Site were evaluated with the nearest existing development of a similar or greater height analyzed as a potential receptor. The maximum gross floor area of the ~~Proposed Project~~previously proposed project was used as an input for the screening analysis.

It was assumed that natural gas would be used in the ~~Proposed Project~~previously proposed project's heat and hot water systems, and that the exhaust stack(s) would be located three feet above roof height (the default assumption in the *CEQR Technical Manual*).

AERSCREEN Analysis

Potential 1-hour average NO_2 and 24-hour and annual average $PM_{2.5}$ impacts from the ~~Proposed Project~~previously proposed project's heat and hot water system's emissions were evaluated using ~~the latest version of~~ USEPA's AERSCREEN model (Version 16216). The AERSCREEN model predicts worst-case 1-hour average concentrations downwind from a point, area, or volume source. Concentrations over longer-period averages are estimated by multiplying the 1-hour results by persistence factors established by USEPA. AERSCREEN generates application-specific worst-case meteorology using representative minimum and maximum ambient air temperatures, and site-specific surface characteristics such as albedo, Bowen ratio, and surface roughness length.[11]

The model incorporates the Plume Rise Model Enhancements (PRIME) downwash algorithm, which is designed to predict concentrations in the "cavity region" (i.e., the area around a structure which under certain conditions may affect an exhaust plume, causing a portion of the plume to become entrained in a recirculation region). AERSCREEN uses the Building Profile Input Program for PRIME (BPIPPRM) to provide a detailed analysis of downwash influences on a direction-specific basis. AERSCREEN also incorporates AERMOD's complex terrain algorithms

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[11] Albedo is the fraction of the total incident solar radiation reflected by the ground surface. The Bowen ratio is the ratio of the sensible heat flux to the latent (evaporative) heat flux. The surface roughness length is related to the height of obstacles to the wind flow and represents the height at which the mean horizontal wind speed is zero based on a logarithmic profile.

and utilizes the AERMAP terrain processor to account for the actual terrain in the vicinity of the source on a direction-specific basis.

The AERSCREEN model was run both with and without the influence of building downwash, using urban diffusion coefficients that were based on a review of land-use maps of the area. Other model options were selected based on USEPA guidance.

Maximum 1-hour average NO_2 concentrations were estimated using an NO_2 to NO_x ratio of 0.8—the recommended default ambient ratio per USEPA guidance.[12]

Emission Rates and Stack Parameters

The ~~Proposed Project~~previously proposed project would utilize natural gas-fired heating and hot water systems. Annual emission rates for the ~~Proposed Project~~previously proposed project's heating and hot water systems were calculated based on fuel consumption estimates, using energy intensity estimates based on type of development and size of the Development Site (approximately 776,340 gsf, including below-grade accessory residential and commercial space) and Museum Site (32,383 gsf) as recommended in the *CEQR Technical Manual*, and applying emission factors for natural gas-fired boilers.[13] $PM_{2.5}$ emissions include both the filterable and condensable components. The short-term emission rates (24-hour and less) were calculated by scaling the annual emissions to account for a 100-day heating season. The exhausts from the heat and hot water systems were assumed to be vented through a single stack located three feet above the roof of the building.

To calculate the exhaust flow rate, the estimated fuel consumption of the ~~Proposed Project~~previously proposed project's heating and hot water systems was multiplied by USEPA's fuel factor for natural gas[14] providing the exhaust flow rate at standard temperature; the flow rate was then corrected for the exhaust temperature. The exhaust velocity was then calculated based on the estimated stack diameter and calculated exhaust flow rate. Assumptions for stack diameter and exhaust temperature for the proposed systems were obtained from a survey of boiler exhaust data prepared and provided by New York City Department of Environmental Protection (DEP),[15] and were used to calculate the exhaust velocity.

The emission rates and exhaust stack parameters used in the modeling analysis are presented in **Table 12-3**.

[12] USEPA. *Memorandum: Clarification on the use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 National Ambient Air Quality Standard*. September 30, 2014.

[13] USEPA. *Compilation of Air Pollutant Emission Factors AP-42*. 5th Ed., V. I, Ch. 1.4. September 1998.

[14] USEPA. *Standards of Performance for New Stationary Sources.* 40 CFR Chapter I Subchapter C Part 60. Appendix A-7, Table 19-2. 2013.

[15] DEP. *Boiler Database*. E-mail communication from Mitchell Wimbish on August 11, 2017.

Table 12-3
Previously Proposed Project's Heating and Hot Water Systems Exhaust Stack Parameters and Emission Rates

Stack Parameter	Development Site	Museum
Stack Height (feet)	335	65
Stack Diameter (feet)	5[(1)]	2[(1)]
Exhaust Velocity (feet/second)	2.6 [(1)]	0.8 [(1)]
Exhaust Temperature (degrees Fahrenheit)	120	307.8[(1)]
Emission Rate (grams/second)		
NO_2 (1-hour average)	0.1018	0.0075
NO_2 (Annual average)	0.0279	0.0021
$PM_{2.5}$ (24-hour average)	0.0155	0.0006
$PM_{2.5}$ (Annual average)	0.0042	0.0002
Note: [(1)] Stack parameter assumptions were obtained from a survey of boiler exhaust data provided by DEP.		

Background Concentrations

To estimate the maximum expected pollutant concentration at a given location (receptor), the predicted impacts must be added to a background value that accounts for existing pollutant concentrations from other sources that are not directly accounted for in the model (see **Table 12-4**). To develop background levels, concentrations measured at the most representative NYSDEC ambient monitoring station over the latest availablea recent three-year period (2017–2019).

Total 1-hour NO_2 concentrations were refined following the EPA Tier 3 approach. The methodology used to determine the total 1-hour NO_2 concentrations from the facility was based on adding the monitored background to modeled concentrations. The hourly modeled concentrations from the boilers were first added to the seasonal hourly background monitored concentrations; then the highest combined daily 1-hour NO_2 concentration was determined at each location and the 98th percentile daily 1-hour maximum concentration for each modeled year was calculated within the AERMOD model; finally, the 98th percentile concentrations were averaged over the latest five years.

$PM_{2.5}$ impacts were assessed on an incremental basis and compared with the $PM_{2.5}$ *de minimis* criteria. The $PM_{2.5}$ 24-hour average background concentration based on the 98th percentile concentration, averaged over the years 2017–2019 was used to establish the *de minimis* value of 8.4 ug/m^3.

Table 12-4
Maximum Background Pollutant Concentrations

Pollutant	Average Period	Location	Concentration (μg/m^3)	NAAQS (μg/m^3)
NO_2	1-hour	Queens College	103.7	188
	Annual		28.7	100
$PM_{2.5}$	24-hour	Division Street	19.7	35
	Annual		9.0	12
PM_{10}	24-hour	Division Street	39.3	150
Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2017–2019.				

Receptor Placement

Discrete receptors were modeled at the nearest building of similar or greater height from the Development Site and the Museum Site, respectively. For the Development Site, the nearest building of similar or greater height is located at a distance of approximately 400 feet from the maximum envelope of the Development Site's tower, at 200 Water Street. Receptors were also modeled at the next tallest building from the Development Site, at a distance of 112 feet, at 299 Pearl Street. For the Museum Site, the nearest buildings of a similar or greater height is are the existing museum uses adjacent to the site of potential expansion, at 91-93 South Street. Additional receptors at lower heights were included at the same distance a greater height were modeled at a distance of 130 feet, at 170 John Street. For both sites, additional receptors at lower heights were included at the above distances modeled. The worst-case ground level concentrations wereas also evaluated for each site.

ADDITIONAL SOURCES

The *CEQR Technical Manual* requires an analysis of projects that may result in a significant adverse impact due to certain types of new uses located near a "large" or "major" emissions source. Major sources are defined as those located at facilities that have a Title V or Prevention of Significant Deterioration air permit, while large sources are defined as those located at facilities that require a State Facility Permit. To assess the potential effects of these existing sources on the Proposed Projectpreviously proposed project, a review of existing permitted facilities was conducted. Sources of information reviewed included EPA's Envirofacts database, the NYSDEC Title V and State Facility Permit websites, the New York City Department of Buildings website, and DEP permit data.

One facility with a State Facility Permit was identified: the City-owned building at 100 Gold Street. Pollutant concentrations were estimated from this source to evaluate potential impacts on the Proposed Projectpreviously proposed project.

Potential impacts were evaluated using the AERMOD dispersion model. The AERMOD model calculates pollutant concentrations from one or more sources (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. The analysis of potential impacts from exhaust stacks was performed assuming stack tip downwash, urban dispersion and surface roughness length (with and without building downwash), and elimination of calms. The AERMOD model also incorporates the algorithms from the PRIME model, which is designed to predict impacts in the "cavity region" (i.e., the area around a structure, which under certain conditions may affect an exhaust plume, causing a portion of the plume to become entrained in a recirculation region). The Building Profile Input Program (BPIP) program for the PRIME model (BPIPRM) was used to determine the projected building dimensions modeling with the building downwash algorithm enabled. The modeling of downwash from sources accounts for all obstructions within a radius equal to five obstruction heights of the stack.

The boiler stacks at 100 Gold Street are 140 feet above grade, on the roof of the building. The boiler stack plume exhaust is therefore influenced by the building massing under all wind conditions and is further influenced by the taller residential towers located between 100 Gold Street and the Development Site. Therefore, the AERMOD model was run with downwash only, rather than with and without downwash as per the *CEQR Technical Manual*.

Potential 1-hour average NO_2 concentrations, added to representative background concentrations in the area, were compared with the NAAQS. Potential 24-hour and annual average concentrations of $PM_{2.5}$ were also compared with the NAAQS. For the analysis of the 1-hour average NO_2 concentration from the building's heating and hot water systems, AERMOD's Plume Volume Molar Ratio Method (PVMRM) module was used to analyze chemical transformation within the model. PVMRM incorporates hourly background ozone concentrations to estimate NO_x transformation within the source plume. The model applied ozone concentrations measured in 2016–2020 at the nearest available NYSDEC ozone monitoring station—the Queens College monitoring station in Queens. An initial NO_2 to NO_x ratio of 10 percent at the source exhaust stack was assumed for the heating and hot water systems emission sources, which is considered representative.

Five years of surface meteorological data collected at LaGuardia Airport (2016–2020) and concurrent upper air data collected at Brookhaven, New York were used in the analysis.

The facility consists of three boilers capable of firing natural gas or No. 2 fuel oil. To be conservative, the analysis was performed assuming No. 2 oil is used, since this fuel has higher pollutant emissions. The facility emissions were estimated using the information developed for the air permit, and applying the EPA's Compilations of Air Pollutant Emission Factors (AP-42)[16] emission factors for boilers. **Table 12-5** presents the emission rates and stack parameters used in the AERMOD analysis for the analyzed facility.

Table 12-5
Stack Parameters and Emission Rates from 100 Gold Street

Parameter	Value
Stack Height (ft)(1)	140
Stack Diameter (ft)(1)	2.5
Exhaust Flow Rate (acfm)(2,3)	14,237
Exhaust Temperature (°F)(4)	308
Fuel Type	Fuel Oil
Emission Rates (g/s) (5)	
NO_x ~~Emission Rate (g/s)~~	0.927
SO_2 ~~Emission Rate (g/s)~~	0.110
PM_{10} ~~Emission Rate (g/s)~~	0.099
$PM_{2.5}$ ~~Emission Rate (g/s)~~	0.010

Notes:
(1) Based on NYSDEC State Facility Permit.
(2) acfm = actual cubic feet per minute.
(3) The stack exhaust flow rate was estimated based on the type of fuel and heat input rate.
(4) Stack exhaust temperature obtained from *DEP Boiler Permit Survey*.
(5) Emission rates represent the total emissions from all three exhaust stacks.

INDUSTRIAL SOURCE ANALYSIS

The Project Area is located in C4-6, C5-3, and C6-2A commercial zoning districts, and is within the boundaries of the Special Lower Manhattan District's South Street Seaport Subdistrict. Based on the zoning and land use characteristics of the study area, it is unlikely that any industrial sources of emissions exist that would require analysis. However, a review of DEP and NYSDEC air

[16] EPA, Compilations of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, http://www.epa.gov/ttn/chief/ap42

permits was performed to determine whether there are any permitted industrial sources of emissions within the 400-foot study area. Land use maps were reviewed to identify potential sources of emissions from manufacturing/industrial operations. A search of federal- and state-permitted facilities within the study area was conducted. DEP's online permit search database was also used to identify any permitted industrial uses in the study area.[17]

No businesses were found to have a NYSDEC air permit or DEP certificate of operation for industrial processes within the study area, and no other potential sources of concern were identified. Therefore, no potential significant adverse air quality impacts would occur on the ~~Proposed Project~~previously proposed project from industrial sources.

E. EXISTING CONDITIONS

The most recent concentrations of all criteria pollutants at NYSDEC air quality monitoring stations nearest to the Project Area are presented in **Table 12-6**. As shown, the recently monitored levels did not exceed the NAAQS. For CO, the concentrations presented in **Table 12-6** are based on measurements obtained in 2019~~, the most recent year for which data are available~~. There were no monitored violations of NAAQS at these monitoring sites in 2019.

Table 12-6
Representative Monitored Ambient Air Quality Data

Pollutant	Location	Units	Averaging Period	Concentration	NAAQS
CO	CCNY	ppm	1-hour	1.68	35
			8-hour	1.1	9
SO_2	Queens College(1)	µg/m^3	1-hour	13.5	196
PM_{10}	Division Street	µg/m^3	24-hour	43	150
$PM_{2.5}$	Division Street(2,3)	µg/m^3	Annual	9.0	12
			24-hour	19.7	35
NO_2	Queens College(4)	µg/m^3	Annual	28.7	100
			1-hour	103.8	188
Lead	IS 52(5)	µg/m^3	3-month	0.0041	0.15
Ozone	IS 52(6)	ppm	8-hour	0.069	0.075

Notes:
(1) The 1-hour value is based on a three-year average (2017–2019) of the 99th percentile of daily maximum 1-hour average concentrations.
(2) Annual value is based on a three-year average (2017–2019) of annual concentrations.
(3) The 24-hour value is based on the three-year average of the 98th percentile of 24-hour average concentrations.
(4) The 1-hour value is based on a three-year average (2017–2019) of the 98th percentile of daily maximum 1-hour average concentrations. The annual value is based on the highest concentration over the period of 2017–2019.
(5) Based on the highest quarterly average concentration measured during 2017–2019.
(6) Based on the three-year average (2017–2019) of the 4th highest daily maximum 8-hour average concentrations.
Source: NYSDEC, New York State Ambient Air Quality Data.

[17] DEP. *NYC DEP CATS Information.* https://a826-web01.nyc.gov/dep.boilerinformationext.

F. THE FUTURE WITHOUT THE PREVIOUSLY PROPOSED PROJECT

Absent the ~~Proposed Project~~previously proposed project, the Applicant would construct a new building that would not require any discretionary approvals requiring environmental review on the Development Site, which would be smaller in size than the ~~Proposed Project~~previously proposed project and with a smaller parking capacity. Accordingly, in the future without the ~~Proposed Project~~previously proposed project, emissions in the area from heating and hot water systems and parking facilities would be less than the ~~Proposed Project~~previously proposed project. There would be no restoration, reopening, and potential expansion of the Museum on the Museum Site absent the ~~Proposed Project~~previously proposed project.

G. THE FUTURE WITH THE PREVIOUSLY PROPOSED PROJECT

MOBILE SOURCES

PARKING ANALYSIS

Under With Action condition, the maximum predicted CO and PM concentrations from the 108-space accessory parking garage was analyzed. Based on the methodology previously described, a near side sidewalk receptor on the same side of the street as each parking facility was assumed, as well as a far side sidewalk receptor on the opposite side of the street from the parking facility.

The maximum predicted eight-hour average CO concentration of all the receptors modeled for the four analyzed parking facilities are presented in **Table 12-7**. As shown in the table, the maximum predicted concentration is substantially below the applicable 1-hour standard of 35 ppm and 8-hour standard of 9 ppm, as well as the *de minimis* CO criteria.

Table 12-7
2026 Maximum Predicted 8-Hour Average Parking Garage CO Concentrations (ppm)

Receptor with Maximum Concentration	Averaging Period	Garage Contribution	On-street Contribution	Background Concentration	Total Concentration
Building Receptor	1-Hour	0.45~~[1]~~	N/A~~[2]~~[1]	2.52	2.97
Far-side Receptor	8-Hour	0.01~~[1]~~	0.13	1.2	1.34

Notes:
The 1-hour average CO standard is 35 ppm. The 8-hour average CO standard is 9 ppm.
~~1. The analysis was initially performed for a 128-space parking facility. Therefore, the reported pollutant concentrations from the garage are somewhat conservative.~~
1~~2~~. Contribution from adjacent street not included since receptor is not downwind of on-street sources.

The maximum predicted 24-hour and annual average $PM_{2.5}$ incremental concentrations are shown in **Table 12-8**.

As shown in **12-8**, 24-hour average $PM_{2.5}$ total incremental concentrations for the garage would be below the $PM_{2.5}$ *de minimis* criterion of 7.7 µg/m^3. The maximum predicted $PM_{2.5}$ increment from the garage alone is also well below the respective $PM_{2.5}$ *de minimis* criteria of 7.7 µg/m^3 for the 24-hour average concentration and 0.3 µg/m^3 for the annual average concentration. Therefore, no violation of the NAAQS would result from the ~~Proposed Project~~previously proposed project's parking garage, and thus no significant adverse air quality impacts are predicted.

Table 12-8
2026 Maximum Predicted 24-Hour and Annual Average Parking Garage $PM_{2.5}$ Increments (μg/m³)

Averaging Period	Receptor with Maximum Concentration	Garage Contribution	On-street Contribution	*Total Increment*
24-Hour	Building Receptor	0.7	0	0.7
Annual	Building Receptor	0.1	0	0.1

Notes:
The 24-hour average $PM_{2.5}$ *de minimis* criterion is 7.7 μg/m³. The annual average $PM_{2.5}$ *de minimis* criterion is 0.3 μg/m³.
1. Contribution from adjacent street not included since receptor is not downwind of on-street sources.

ANALYSIS OF ELEVATED FDR DRIVE

Carbon Monoxide

As described in Section D, "Methodology for Predicting Pollutant Concentrations," an analysis was undertaken to determine maximum CO concentrations on the ~~Proposed Project~~previously proposed project at the Museum Site from vehicle emissions along the nearby elevated portion of the FDR Drive. The maximum predicted 1-hour and 8-hour average CO concentrations are presented in **Table 12-9**. The results show that With Action CO concentrations at the buildings within the Project Area near the elevated roadway would be well below the 1-hour and 8-hour CO NAAQS.

Table 12-9
Maximum Predicted 1-Hour and 8-Hour Average CO Concentrations from the Elevated FDR Drive on the Previously Proposed Project

Averaging Period	1-Hour Concentration (ppm)	NAAQS (ppm)
1-hour	2.7	35
8-hour	1.3	8

Note: Concentrations include a background concentration of 2.52 ppm for the 1-hour average and 1.2 ppm for the 8-hour average.

Particulate Matter

$PM_{2.5}$ concentrations at the Museum Site buildings due to vehicle emissions along the elevated FDR Drive were determined for the With Action condition using the methodology previously described. Since the analysis is for an existing emissions source, the emissions do not represent an increase due to the ~~Proposed Project~~previously proposed project. The results of the analysis were compared with the 24-hour and annual average $PM_{2.5}$ NAAQS. **Table 12-10** shows the With Action maximum predicted 24-hour and annual average $PM_{2.5}$ concentrations. Concentrations were predicted along the façades of the Museum Site adjacent to and facing the elevated FDR Drive.

Table 12-10
Maximum Predicted 24-Hour and Annual Average $PM_{2.5}$ Concentrations from the Elevated FDR Drive on the Previously Proposed Project

Averaging Period	Concentration (μg/m³)	NAAQS (μg/m³)
24-hour	20.6	35
Annual	9.3	12

Note: Concentration includes a background concentration of 19.7 μg/m³ for the 24-hour average and 9.0 μg/m³ for the annual average.

STATIONARY SOURCES

HEAT AND HOT WATER SYSTEMS

The results of the AERSCREEN analysis for the ~~Proposed Project~~previously proposed project's heating and hot water systems are presented in **Table 12-11**. As shown in the table, no exceedance of the NO_2 NAAQS were predicted, and incremental concentrations of $PM_{2.5}$ were predicted to be less than the CEQR *de minimis* criteria. Therefore, no significant adverse air quality impacts from the ~~Proposed Project~~previously proposed project's heating and hot water systems are predicted.

Table 12-11
Previously Proposed Project's Heating and Hot Water Systems Maximum Modeled Pollutant Concentrations (μg/m³)

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	NAAQS / *De Minimis* Criteria
Development Site					
NO_2	1-hour	48.9 (1)	103.8	152.7	188 (2)
	Annual	1.3 (3)	27.5	28.9	100 (2)
$PM_{2.5}$	24-hour	5.6	N/A	5.6	7.7 (4)
	Annual	0.25	N/A	0.25	0.3 (5)
Museum Site					
NO_2	1-hour	21.8 (1)	103.8	125.6	188 (2)
	Annual	0.6 (3)	27.5	28.1	100 (2)
$PM_{2.5}$	24-hour	1.2	N/A	1.2	7.7 (4)
	Annual	0.06	N/A	0.06	0.3 (5)

Notes:
N/A – Not Applicable
(1) Reported concentration is the maximum total 98th percentile concentration at any receptor using seasonal-hourly background concentrations.
(2) NAAQS.
(3) Annual NO_2 concentrations from heating and hot water sources were estimated using a NO_2 to NO_x ratio of 0.75, based on EPA modeling guidance.
(4) $PM_{2.5}$ *de minimis* criteria—24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 μg/m³.
(5) $PM_{2.5}$ *de minimis* criteria—annual (discrete receptor).

To ensure that there are no potential significant adverse air quality impacts, certain restrictions would be required as part of the ~~Proposed Project~~previously proposed project through an Air Quality (E) Designation or an equivalent mechanism. These restrictions were assumed in the analysis results presented in **Table 12-11** and would avoid the potential for significant air quality impacts from stationary sources based on the conservative assumptions used in the analysis.

The text of the (E) Designation restrictions (E-621) that would be placed on the Development Site (Block 98, Lot 1) are outlined below.

> **Block 98, Lot 1 (Development Site): Any new development on the referenced property must ensure that only natural gas be used for fossil fuel-fired heating and hot water systems fitted with low NO_x (30 ppm) burners and ensure that the heating and hot water systems stack are located at least 335 feet above grade to avoid any potential significant air quality impacts.**

On the Museum Site (Block 74, Lot 1), to ensure that there are no potential significant air quality impacts, the following restrictions would be placed through a mechanism equivalent to an (E) Designation:

> **Block 74, Lot 1 (Museum Site): Any new development on the referenced property must ensure that only natural gas be used for fossil fuel-fired heating and hot water systems and ensure that the heating and hot water systems stack are located at least 65 feet above grade to avoid any potential significant air quality impacts.**

ADDITIONAL SOURCES

Potential stationary source impacts on the Development Site from the existing large source were determined using the AERMOD model. The maximum estimated concentrations of NO_2, SO_2, $PM_{2.5}$, and PM_{10} from the modeling analysis were added to the background concentrations to estimate total air quality concentrations on the ~~Proposed Project~~previously proposed project. Total 1-hour NO_2 concentrations were determined following the refined EPA Tier 3 approach described earlier for the heating and hot water system analysis. The results of the AERMOD analysis are presented in **Table 12-12**.

Table 12-12
Maximum Modeled Pollutant Concentrations (μg/m³)
from 100 Gold Street on the Previously Proposed Project

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	NAAQS
NO_2	Annual(1)	1.72~~3.5~~	32.3	34.0~~35.8~~	100
	1-hour(2)	128.7~~161.4~~	NA	128.7~~161.4~~	188
SO_2	1-hour	0.15~~0.3~~	14.8	14.9~~15.1~~	196
PM_{10}	24-hour	1.9~~3.7~~	39.3	41.2~~43.0~~	150
$PM_{2.5}$	24-hour	1.3~~2.7~~	19.7	21.0~~22.4~~	35
	Annual	0.23~~0.5~~	9.0	9.2~~9.5~~	12

Notes:
(1) Annual NO_2 concentrations were estimated using a NO_2/NO_x ratio of 0.75, based on EPA modeling guidance.
(2) Reported concentration is the maximum total 98th percentile concentration at any receptor using seasonal-hourly background concentrations.

As shown in **Table 12-12**, the predicted pollutant concentrations for all of the pollutant averaging periods are below their respective standards. Therefore, no significant adverse air quality impacts on the ~~Proposed Project~~previously proposed project from the large emission source at 100 Gold Street are predicted. *