Chapter 6: Air Quality

A. INTRODUCTION

The proposed 307 Kent Avenue development located in the Williamsburg neighborhood of Brooklyn would require a zoning map amendment and zoning text amendment (the Proposed Actions). The Proposed Actions would cover Projected Development Site 1 on Block 2415, Lot 1, Projected Development Site 2 on Lot 6, and Lots 10, 7501, and 7502, and portions of (p/o) Lots 16 and 38, collectively known as the Rezoning Area. The Project Area is coterminous with the Rezoning Area. The Project Area is generally bounded by Wythe Avenue to the east, South 2nd Street to the north, Kent Avenue to the west, and South 3rd Street to the south. The potential for air quality impacts from the Proposed Actions is examined in this attachment. The Proposed Actions would facilitate the development of a nine-story mixed-use building on the Projected Development Site 1 (the Proposed Project).

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 on the buildings within the Project Area) or by emissions from on-road vehicle trips (mobile sources) generated by a proposed action or other changes to future traffic conditions due to a project.

The maximum projected hourly incremental traffic volumes generated by the Proposed Actions would not exceed the 2020 *City Environmental Quality Review (CEQR) Technical Manual* carbon monoxide (CO) (170 peak-hour vehicle trips at an intersection in the study area). However, the incremental traffic volumes would exceed the particulate matter (PM) emission screening threshold discussed in Chapter 17, Sections 210 and 311, of the *CEQR Technical Manual*. Therefore, a quantified assessment of emissions from traffic generated by the proposed project was performed for PM.

The Proposed Actions would facilitate development that would include fossil fuel-burning heating and hot water systems. Therefore, a stationary source analysis was conducted to evaluate potential future pollutant concentrations with the proposed heating and hot water systems.

The Project Area is located in a manufacturing district; therefore, potential effects of stationary source emissions from existing nearby industrial facilities on the Proposed Area were assessed. The RWCDS for the Proposed Actions includes up to 70,000 gross square feet (gsf) of commercial uses at Projected Development Site 1. For the purposes of the CEQR analyses, a portion of the 70,000 gsf commercial uses are assumed to be light industrial in order to present a conservative analysis for certain technical areas, including Air Quality. Therefore, potential impacts from pollutant emissions from manufacturing uses on nearby sensitive receptors were evaluated.

The New York Power Authority's North 1st Street simple cycle power plant is within 1,000 feet of the Project Area. Therefore, an analysis of the potential air quality impacts of this emissions source on the Proposed Project is required, as described in the *City Environmental Quality Review (CEQR) Technical Manual*.

PRINCIPAL CONCLUSIONS

As discussed below, the maximum pollutant concentrations and concentration increments from mobile sources with the Proposed Actions are projected to be lower than the corresponding CEQR *de minimis* criteria.

Based on a detailed dispersion modeling analysis, no potential significant adverse air quality impacts were predicted from the proposed heating and hot water systems for Projected Development Sites 1 and 2. To ensure that there is no potential for significant adverse impacts of $PM_{2.5}$ or NO_2 from the Proposed Project's heating and hot water system emissions, certain restrictions would be required that would be placed on the Projected Development Site 1 (Block 2415, Lot 1) and Projected Development Site 2 (Block 2415, Lot 6) through an Air Quality (E) Designation (E-592) that would be placed on the projected development sites.

The analysis of existing manufacturing uses in the surrounding study area determined that emissions of air toxic compounds would not result in any potential significant adverse air quality impacts on the Proposed Project. An analysis of the potential industrial sources associated with the Proposed Actions determined that there would be no significant adverse air quality impacts.

The analysis of the NYPA North 1st Street plant determined there would be no significant adverse air quality impact on the Proposed Project.

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),[1] 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

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

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 Actions are 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, a mobile source analysis to evaluate future CO concentrations was not warranted.

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 Actions 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 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, and not a local concern from mobile sources. (NO_x emissions from fuel combustion are mostly in the form of NO at the source.) However, with the promulgation of the 2010 1-hour average standard for NO_2, local sources such as vehicular emissions may be of greater concern. The increases in NO_2 concentrations associated with mobile sources have not been analyzed explicitly due to limitations in guidance and modeling tools. However, any increase in NO_2 associated with the Proposed Actions would be relatively small, as demonstrated below for CO and PM, due to the very small increases in the number of vehicles. This increase would not be expected to significantly affect levels of NO_2 experienced near roadways.

The potential for impacts on local NO_2 concentrations from the fuel combustion for the heating and hot water systems associated with the Proposed Actions 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 Actions. Therefore, an analysis of this pollutant was not warranted.

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.

All 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.

Since the traffic generated by the Proposed Actions would potentially exceed the PM emission screening threshold discussed in Chapter 17, Sections 210 and 311, of the *CEQR Technical Manual*, a quantified assessment of emissions was performed for PM. The Proposed Actions would facilitate development that would include natural gas-fired heating and hot water systems; therefore, emissions of PM from the existing and proposed stationary sources were analyzed.

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; therefore, analysis of SO_2 from mobile and/or non-road sources was not warranted.

It is assumed that natural gas would be burned in the proposed heating and hot water systems. The sulfur content of natural gas is negligible; therefore, no analysis was undertaken to estimate the future levels of SO_2 with the Proposed Actions.

AIR TOXICS

In addition to the criteria pollutants discussed above, non-criteria air pollutants, also called air toxics, may be of concern. Air toxics are those pollutants that are known or suspected to cause serious health effects in small doses. Air toxics are emitted by a wide range of human-made and naturally occurring sources. Emissions of many air toxics from industries are regulated by EPA.

As the Project Area is located within 400 feet of a manufacturing district, an analysis to examine the potential for impacts from industrial emissions was performed.

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[2] 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 ~~5~~6-1**. 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.

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, the New York State Department of Environmental Conservation (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[3] 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 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.

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[2] EPA. National Ambient Air Quality Standards. 40 CFR Part 50.

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

Table 6-1
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary		Secondary	
	ppm	µg/m³	ppm	µg/m³
Carbon Monoxide (CO)				
8-Hour Average	9(1)	10,000	None	
1-Hour Average	35(1)	40,000		
Lead				
Rolling 3-Month Average	N/A	0.15	N/A	0.15
Nitrogen Dioxide (NO_2)				
1-Hour Average(3)	0.100	188	None	
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average(4,5)	0.070	140	0.070	140
Respirable Particulate Matter (PM_{10})				
24-Hour Average(1)	N/A	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Annual Mean(6)	N/A	12	N/A	15
24-Hour Average(7)	N/A	35	N/A	35
Sulfur Dioxide (SO_2)(8)				
1-Hour Average(9)	0.075	196	N/A	N/A
Maximum 3-Hour Average(1)	N/A	N/A	0.50	1,300

Notes:
ppm – parts per million (unit of measure for gases only)
µg/m³ – 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/m³ 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.

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 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 µg/m³ effective March 2013. EPA designated the area as in attainment for the 12 µg/m³ 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, as requested by New York State, EPA reclassified the area as a "moderate" NAA. NYSDEC determined that the NYMA is not projected to meet the July 20, 2018 attainment deadline and NYSDEC 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.[4] 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 6-1**) 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

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

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.

NON-CRITERIA POLLUTANT THRESHOLDS

Non-criteria, or toxic, air pollutants include a multitude of pollutants of ranging toxicity. No federal ambient air quality standards have been promulgated for toxic air pollutants. However, EPA and NYSDEC have issued guidelines that establish acceptable ambient levels for these pollutants based on human exposure.

The NYSDEC DAR-1 guidance document presents guideline concentrations in micrograms per cubic meter for the one-hour and annual average time periods for various air toxic compounds. These values are provided in **Table 6-2** for the compounds affecting receptors located at projected and potential development sites. The compounds listed are those emitted by existing sources of air toxics in the rezoning area.

Table 6-2
Industrial Source Analysis:
Relevant NYSDEC Air Guideline Concentrations

Pollutant	CAS Number	SGC (μg/m³)	AGC (μg/m³)
Acetone	00067-64-1	180,000	30,000
Aluminum	07429-90-5	---	2.4
Ammonia	07664-41-7	2,400	100
Butoxyethanol, 2-	00111-76-2	14,00	1,600
Butyl Acetate	00123-86-4	95,000	17,000
Carbon Monoxide	00630-08-0	40,000	---
Copper	07440-50-8	---	490
Copper Cyanide	00544-92-3	380	3.5
Dibutyl Phthalate	00084-74-2	---	12
Ethanol	00064-17-5	---	45,000
Ethyl Acetate	00141-78-6	---	3,400
Gylcerin	00056-81-5	---	240
Hydrogen Chloride	07647-01-0	2,100	20
Hydrogen Cyanide	00074-90-8	520	0.8
Iron	01309-37-1	---	12
Isopropyl Alcohol	00067-63-0	98,000	7,000
Lead Oxide	01309-60-0	---	0.044
Methyl Chloroform	00071-55-6	9,000	5,000
Nitric Acid	07697-37-2	86	12
Nitrogen Dioxide	10102-44-0	188	100
Particulates	NY075-02-5	---	12
Sodium Cyanide	00143-33-9	380	3.5
Sodium Hydroxide	01310-73-2	200	---
Toluene	00108-88-3	37,000	5,000
VM&P Naptha	08032-32-4	---	900
Xylene, M,O&P Mixture	01330-20-7	22,000	100
Zinc	07440-66-6	---	45
Propane	00074-98-6	---	43,000
Total Organic Solvents	NY998-00-0	98,000	7,000
Dicholoromethane (Methylene Chloride)	00075-09-02	14,000	60
Ethyl Benzene	00100-41-4	---	1,000
Tetracholoroethylene	00127-18-4	300	4
Sources: NYSDEC, DAR-1 AGC/SGC Tables, August 2016.			

D. METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS

MOBILE SOURCES

The prediction of vehicle-generated emissions and their dispersion in an urban environment incorporates meteorological phenomena, traffic conditions, and physical configuration. Air pollutant dispersion models mathematically simulate how traffic, meteorology, and physical configuration combine to affect pollutant concentrations. The mathematical expressions and formulations contained in the various models attempt to describe an extremely complex physical phenomenon as closely as possible. However, because all models contain simplifications and approximations of actual conditions and interactions, and since it is necessary to predict the reasonable worst-case condition, most dispersion analyses predict conservatively high concentrations of pollutants, particularly under adverse meteorological conditions.

The mobile source analyses for the proposed project employ models approved by USEPA that have been widely used for evaluating air quality impacts of projects in New York City, other parts of New York State, and throughout the country. The modeling approach includes a series of conservative assumptions relating to meteorology, traffic, and background concentration levels resulting in a conservatively high estimate of expected pollutant concentrations that could ensue from the proposed project.

INTERSECTION ANALYSIS

Vehicle Emissions

Engine Emissions

Vehicular PM engine emission factors were computed using the USEPA mobile source emissions model, MOVES2014b.[5] 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 the NYSDEC.

Vehicle classification data were based on field studies. Appropriate credits were used to accurately reflect the inspection and maintenance program.[6] County-specific hourly temperature and relative humidity data obtained from NYSDEC were used.

Road Dust

The contribution of re-entrained road dust to PM_{10} concentrations, as presented in the PM_{10} SIP, is considered to be significant; therefore, the PM_{10} estimates include both exhaust and road dust. $PM_{2.5}$ emission rates were determined with fugitive road dust to account for their impacts in local microscale analyses. However, fugitive road dust was not included in the neighborhood-scale $PM_{2.5}$ microscale analyses, since the New York City Department of Environmental Protection (DEP) considers it to have an insignificant contribution on that scale. Road dust emission factors were calculated according to the latest procedure delineated by USEPA[7] and the *CEQR Technical Manual*.

Traffic Data

Traffic data for the intersection analysis were derived from existing traffic counts, projected future growth in traffic, and other information developed as part of the traffic analysis for the proposed project (see Chapter 5, "Transportation"). Traffic data for the future without the project (the No

[5] Motor Vehicle Emission Simulator (MOVES), User Guide for MOVES2014a, November 2015. MOVES2014 User Interface Reference Manual Appendix: MOVES2014b, August 2018.

[6] The inspection and maintenance programs require inspections of automobiles and light trucks to determine if pollutant emissions from each vehicle's exhaust system are lower than emission standards. Vehicles failing the emissions test must undergo maintenance and pass a repeat test to be registered in New York State.

[7] USEPA. *Compilations of Air Pollutant Emission Factors AP-42*. Fifth Edition, Volume I: Stationary Point and Area Sources, Ch. 13.2.1. NC. http://www.epa.gov/ttn/chief/ap42. January 2011.

Action condition) and the With Action condition were employed in the respective air quality modeling condition. The peak morning, midday, and evening period traffic volumes were used as a baseline for determining off-peak volumes. Off-peak traffic volumes in the No Action condition were determined by adjusting the peak period volumes by the 24-hour distributions of actual vehicle counts collected at appropriate locations, and off-peak increments from the proposed project were estimated based on the parking demand as a result of the proposed project. For annual impacts, average weekday 24-hour distributions were used to more accurately simulate traffic patterns over longer periods.

Dispersion Model for Microscale Analyses

The CAL3QHC model employs a Gaussian (normal distribution) dispersion assumption and includes an algorithm for estimating vehicular queue lengths at signalized intersections. CAL3QHC predicts emissions and dispersion of pollutants from idling and moving vehicles. The queuing algorithm includes site-specific traffic parameters, such as signal timing and delay calculations (from the 2000 *Highway Capacity Manual* traffic forecasting model), saturation flow rate, vehicle arrival type, and signal actuation (i.e., pre-timed or actuated signal) characteristics to accurately predict the number of idling vehicles. The CAL3QHC model has been updated with an extended module, CAL3QCHR, which allows for the incorporation of hourly meteorological data into the modeling, instead of worst-case assumptions regarding meteorological parameters.

Maximum contributions from vehicular emissions to PM concentrations adjacent to each analysis site were calculated using the CAL3QHCR model Version 2.0.[8] This refined version of the model can utilize hourly traffic and meteorology data, and is therefore more appropriate for calculating the 24-hour and annual average concentrations required to address the timescales of the PM NAAQS.

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

Tier II PM_{10}/$PM_{2.5}$ Analysis—CAL3QHCR

For computation of PM concentrations, the CAL3QHCR model includes the modeling of hourly concentrations based on hourly traffic data and 5 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 2015–2019. All hours were modeled, and the highest predicted concentration for each averaging period is presented.

Analysis Year

The microscale analyses were performed for 2023, the year by which the Proposed Actions are anticipated to be completed. The future analysis was performed for both the No Action condition and the With Action condition.

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[8] USEPA. User's Guide to CAL3QHC, A Modeling Methodology for Predicted Pollutant Concentrations Near Roadway Intersections. EPA454R92006.

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 6-3**. PM concentrations are based on the latest available three years of monitored data (2017–2019) consistent with the statistical format of the NAAQS. These values were used as the background concentrations for the mobile source analysis.

Table 6-3
Maximum Background Pollutant Concentration for Mobile Source Analysis

Pollutant	Average Period	Location	Concentration	NAAQS
PM_{10} (1)	24-hour	Division Street, Manhattan	39.3 μg/m^3	150 μg/m^3
$PM_{2.5}$ (2)	24-hour	JHS 126, Brooklyn	17.8 μg/m^3	35 μg/m^3

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

Analysis Site

Intersections in the study area were reviewed for microscale analysis based on the *CEQR Technical Manual* guidance. One intersection was selected for microscale analysis—at Wythe Avenue and South 6th Street. This site was selected because it is the location in the study area projected to have the highest levels of equivalent truck traffic and road dust, and, therefore, where the greatest potential for air quality impacts and maximum changes in concentrations would be expected. The potential impact from vehicle emissions of PM_{10} and $PM_{2.5}$ was analyzed at this intersection.

Receptor Placement

Multiple receptors (i.e., discrete locations at which concentrations are evaluated) were modeled at the selected site; receptors were placed along the approach and departure links and roadway segments at regularly spaced intervals. Ground-level receptors were placed at sidewalk or roadside locations near intersections with continuous public access, at a pedestrian height of 1.8 meters. Receptors in the analysis models for predicting annual average neighborhood-scale $PM_{2.5}$ concentrations were placed at a distance of 15 meters, from the nearest moving lane at each analysis location, based on the *CEQR Technical Manual* procedure for neighborhood-scale corridor $PM_{2.5}$ modeling.

STATIONARY SOURCES

HEATING AND HOT WATER SYSTEMS

Screening Analysis

An initial screening analysis was performed to assess the potential for air quality impacts associated with emissions from heating and hot water systems for Projected Development Site 1 and Projected Development Site 2. 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).

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 heating 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 about the proposed design for the heating and hot water systems is not yet available, Projected Development Site 1 and Projected Development Site 2 were each evaluated with the nearest existing residential development of a similar or greater height analyzed as a potential receptor. The maximum gross floor area of the projected development sites was used as an input for the screening analysis.

It was assumed that natural gas would be used in the projected development sites' heating 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*).

AERMOD Analysis

Since the screening analysis determined the potential for project-on-project impacts due to the distance from Projected Development Site 2 to Projected Development Site 1, further analysis was performed using the more refined American meteorological Society (AMS) / Environmental Protection Agency (EPA) Regulatory Model (AERMOD) dispersion model.[9] 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 and source types. AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatment of the boundary layer theory and understanding of turbulence and dispersion, and includes handling of the plume interaction with terrain. AERMOD is EPA's preferred regulatory stationary source model.

AERMOD calculates pollutant concentrations from simulated sources (e.g., exhaust stacks) based on hourly meteorological data and surface characteristics, and has the capability to calculate pollutant concentrations at locations where the plume from the exhaust stack is affected by the

[9] EPA. *AERMOD Implementation Guide*. 454/B-16-013. December 2016;
EPA. AERMOD Model Formulation and Evaluation. 454/R-17-001. May 2017; and
EPA. User's Guide for the AMS/EPA Regulatory Model (AERMOD). 454/B-16-011. December 2016.

aerodynamic wakes and eddies (downwash) produced by nearby structures. The analysis of potential impacts from exhaust stacks assumed stack tip downwash, urban dispersion and surface roughness length, and elimination of calms.

AERMOD also incorporates the algorithms from 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). AERMOD uses the Building Profile Input Program for PRIME (BPIPPRM) to determine the projected building dimensions for modeling with the building downwash algorithm enabled. The modeling of plume downwash accounts for all obstructions within a radius equal to five obstruction heights of the stack.

The analysis was prepared both with and without downwash in order to assess the worst-case impacts at elevated locations close to the height of the source, which would occur without downwash, as well as the worst-case impacts at lower elevations and ground level, which would occur with downwash, consistent with the *CEQR Technical Manual* guidance.

For the analysis of the 1-hour average NO_2 concentration from the projected development sites' 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 2015–2019 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, which is considered representative.

Five years of surface meteorological data collected at LaGuardia Airport (2015–2019) and concurrent upper air data collected at Brookhaven, New York were used in the analysis.

Emission Rates and Stack Parameters

The projected development sites were assumed to use fossil-fuel fired heating and hot water systems, with the exhaust stack(s) located on the roof of the buildings. Annual emission rates for 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 buildings as recommended in the *CEQR Technical Manual*, and applying emission factors for natural gas-fired boilers.[10] $PM_{2.5}$ emissions include both the filterable and condensable components. The short-term emission rates (24-hour and shorter) were calculated by scaling the annual emissions to account for a 100-day heating season. The exhaust from the heating and hot water systems was assumed to be vented through a single stack located three feet above the roof of the buildings at a height of approximately 154 feet above grade for Projected Development Site 1 and 128 feet above grade for the Projected Development Site 2.

To calculate exhaust velocity, the fuel consumption of the projected development sites was multiplied by EPA's fuel factor for natural gas,[11] providing the exhaust flow rate at standard temperature; the flow rate was then corrected for the exhaust temperature, and exhaust velocity was calculated based on the stack diameter. Assumptions for stack diameter and exhaust

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

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

temperature for the proposed systems were obtained from a survey of boiler exhaust data prepared and provided by DEP,[12] and were used to calculate the exhaust velocity.

The emission rates and exhaust stack parameters used in the modeling analyses are presented in **Table 6-4**.

Table 6-4
Exhaust Stack Parameters and Emission Rates

Stack Parameter	Projected Development Site 1	Projected Development Site 2
Stack Height (feet)	154	128
Stack Diameter (feet)(1)	2(1)	2(1)
Exhaust Velocity (meters/second)(2)	0.86	0.68
Exhaust Temperature (degrees Fahrenheit)(1)	307.8	307.8
Emission Rate (grams/second)		
NO_2 (1-hour average)	0.009	0.007
NO_2 (Annual average)	0.0024	0.0019
$PM_{2.5}$ (24-hour average)	0.0018	0.0015
$PM_{2.5}$ (Annual average)	0.00050	0.00040

Note:
(1) Stack parameter assumptions are based on boiler specifications for similar sized systems from *DEP Boiler Permit Database.*
(2) The stack exhaust flow rate and velocity estimated based on the type of fuel and the heat input rate.

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 6-5**). To develop background levels, concentrations measured at the most representative NYSDEC ambient monitoring station over the latest available three-year period (2017–2019).

For the analysis, total 1-hour NO_2 concentrations were refined following a more detailed approach (EPA "Tier 3"). 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, as follows: 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 are assessed on an incremental basis and compared with the $PM_{2.5}$ *de minimis* criteria. The $PM_{2.5}$ 24-hour average background concentration of 17.8 $\mu g/m^3$ from the JHS 126 ambient monitoring station (based on the 98th percentile concentration, averaged over the years 2017–2019) was used to establish the *de minimis* value of 8.6 $\mu g/m^3$. The annual average background concentrations of $PM_{2.5}$ was not used since impacts were compared with the $PM_{2.5}$ *de minimis* criteria defined in the *CEQR Technical Manual*.

[12] DEP. *Boiler Database*. Personal communication from Mitchell Wimbish on August 11, 2017.

Table 6-5
Maximum Background Pollutant Concentrations

Pollutant	Average Period	Location	Concentration (µg/m³)	NAAQS (µg/m³)
NO_2	1-hour	Queens College	103.8	188
	Annual	Queens College	28.7	100
$PM_{2.5}$	24-hour	JHS 126, Brooklyn	17.8	35
	Annual	JHS 126, Brooklyn	7.7	12
Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2017–2019.				

Receptor Placement

Discrete receptors were modeled along existing and proposed-building façades to represent potentially sensitive locations such as operable windows and intake vents. Rows of receptors at spaced intervals on the modeled buildings, including the projected development sites and nearby off-site buildings, were analyzed at multiple elevations. Potential air intakes locations for Projected Development Site 1 and Projected Development Site 2 were modeled at roof height, set a minimum of ten feet back from the lot line shared between the two sites, according to New York City building code. A ground-level grid of receptors, centered on the point of maximum ground-level concentration was used obtain the neighborhood-scale $PM_{2.5}$ maximum concentration.

INDUSTRIAL SOURCES

Analysis of Potential Impacts from Existing Uses

The potential impacts of existing industrial operations on pollutant concentrations at Projected Development Site 1 and Projected Development Site 2 were evaluated. Potential industrial air pollutant emission sources within 400 feet of the Project Area were surveyed for inclusion in the air quality impact analyses, as recommended in the *CEQR Technical Manual*.

Land use maps were reviewed to identify potential sources of emissions from manufacturing/industrial operations. A field survey was conducted on April 10, 2019 to identify buildings within 400 feet of the Project Area that have the potential for emitting air pollutants. A search of federal- and state-permitted facilities within the study area was conducted using the EPA Envirofacts database.[13] DEP's online permit search database was also used to identify any permitted industrial uses in the study area.[14]

One permitted source, Williamsburg Feather Company (DEP Air Permit ID: PB013603 and PB014603) located at 34 South 4th Street, was found to be located within 400 feet of the Project Area. The pollutants and emission rates for the permitted emission sources are presented in **Table 6-6**.

[13] EPA. *Envirofacts*. https://www3.epa.gov/enviro/. Accessed April 5, 2019.

[14] DEP. *NYC DEP CATS Information.* https://a826-web01.nyc.gov/dep.boilerinformationext. Accessed April 5, 2019.

Table 6-6
Modeled Emission Rates of Existing Industrial Sources

Facility	Description of Process	DEP Permit ID	CAS No.: Pollutant Name	24-hour Emissions (lb/hr)	Annual Emissions (lb/yr)
Williamsburg Feather Company	Feather Processing	PB013603	NY075-00-0: Particulates	0.00042[1]	2
		PB014603	NY075-00-0: Particulates	0.00042[1]	0.2

Notes:
(1) Particulate matter emissions were conservatively assumed to be $PM_{2.5}$.

Maximum potential pollutant concentrations from the identified and proposed sources, at various distances from the source, were estimated based on the reference values found in Table 17-3 of the *CEQR Technical Manual*. The database provides screening factors for estimating maximum concentrations based on emissions levels at the source derived from generic AERMOD dispersion modeling for the New York City area. Impact distances selected for each source were the minimum distances between the property boundary of the project sites and the source site. Projected worst-case concentrations at the proposed buildings and nearby existing buildings were compared with the short-term guideline concentrations (SGCs) and annual guideline concentrations (AGCs) recommended in NYSDEC's DAR-1 AGC/SGC tables.[15] These guidelines represent the airborne concentrations which are applied as a screening threshold to determine if the future occupants of the project sites could be significantly impacted by nearby sources of air pollution.

Analysis of Potential Impacts from Future Uses

The Proposed Actions would result in some light industrial development. Specifically, the development expected to occur under the RWCDS for the Proposed Actions includes up to 70,000 gross square feet (gsf) of commercial uses at Projected Development Site 1, of which up to 2/3rds (46,667 gsf) are assumed to be light industrial uses for the purposes of environmental review in order to present a conservative analysis for certain technical areas including Air Quality. Therefore, potential impacts from pollutant emissions from manufacturing uses on sensitive receptors on Projected Development Site 2, existing buildings, and no-build projects were evaluated.

Emissions Profile

To estimate emissions from light industrial uses that are considered foreseeable in the Project Area, a detailed review of permitted emissions was performed. The uses that were assumed for this analysis were considered based on a previous rezoning in the area, and typical uses found in the Williamsburg community.[16] These uses include a brewery, jewelry manufacturing (including gold precipitation), cleaning, polishing, and plating; digital printing, photocopying, and commercial art and graphic design; and baking bread and cookies/pastries. DEP air permit records were reviewed and permitted facilities representing uses considered as foreseeable in the Project Area were identified. Pollutants listed in air permits associated with these facilities were included in the analysis.

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[15] NYSDEC. *Policy DAR-1: Guidelines for the Evaluation and Control of Ambient Air Contaminants under Part 212*. August 10, 2016.

[16] 25 Kent Avenue, Environmental Assessment Statement, Attachment G, "Air Quality," May 2016.

The representative permits used for the industrial source analysis is presented in **Table 6-7**. The table presents the air toxics emissions for processes in the identified use categories, using the emission rate for each pollutant for each use reported in DEP air permits for each air toxic.

Dispersion Analysis

Industrial sources of emissions were analyzed using the refined AERMOD dispersion model, using a unitary emission rate of 1 gram per second to determine potential air toxics concentrations for each use at receptor locations at Projected Development Site 2, and existing and no-build developments. Since the specific locations and emission characteristics of the potential industrial sources of emissions are not known, the analysis was performed assuming the stack was located three feet above the roof on Projected Development Site 1.

The results were used to predict the worst-case potential air toxics concentrations and were compared with the SGC and AGC values reported in the NYSDEC's DAR-1 Tables guidance document to determine the potential for significant impacts.[17]

EPA's AERMOD dispersion model was used to estimate the short-term and annual concentrations of air toxic pollutants at sensitive receptor locations in the Project Area. Predicted impacts on sensitive receptors were compared with SGC and AGC reported in NYSDEC's DAR-1 AGC/SGC Tables guidance document to determine the potential for significant impacts.

[17] NYSDEC, DAR-1 Guidelines for the Evaluation and Control of Ambient Air Contaminants Under Part 212; Appendix A, Toxicity Classification and Guideline Development Methodology for AGC/SGC, August 2016.

Table 6-7
Representative Industrial Source Permits Modeled for Proposed On-Site Industrial Uses

Permit Number	Type of Business	Pollutant Information		Emission Rates			Operating Schedule	
		CAS NUMBER	Pollutant Name	Hourly (g/sec)	Annual (g/sec)	24-Hour (g/sec)	Hrs/Day	Days/yr
PA053190	Commercial Art & Woodworking	00067-63-0	Isopropyl Alcohol	0.31	0.00641	--	1	180
PA053190	Commercial Art & Woodworking	00067-64-1	Acetone	0.57	0.01165	--	1	180
PA053190	Commercial Art & Woodworking	00071-55-6	Methyl Chloroform	0.60	0.01243	--	1	180
PA053190	Commercial Art & Woodworking	00123-86-4	Butyl Acetate	0.23	0.00466	--	1	180
PA016476	Jewelry Mfg	01310-73-2	Sodium Hydroxide	0.00013	0.00003	--	9	231
PA016476	Jewelry Mfg	NY075-02-5	Particulate	0.0033	0.00078	0.0012	9	231
PA014088	Jewelry Plating	00143-33-9	Sodium Cyanide	0.00013	0.00002	--	8	200
PA014088	Jewelry Plating	00544-92-3	Copper Cyanide	0.00013	0.00002	--	8	200
PA055794, PA083986	Jewelry Cleaning	00143-33-9	Sodium Cyanide	0.00025	0.00001	--	1	250
PA055794, PA083986	Jewelry Cleaning	00074-90-8	Hydrogen Cyanide	0.00025	0.00001	--	1	250
PA083586	Jewelry Cleaning	07664-41-7	Ammonia	0.00013	2.9E-08	--	8	250
PA055794, PA083986	Jewelry Cleaning	NY075-02-5	Particulate	0.00013	2.9E-08	0.000042	8	250
PA018595	Printing	NY998-00-0	Total Organic Solvents	0.27	0.00006	--	24	365
PA018595	Printing	00075-09-02	Dichloromethane (Methylene Chloride)	0.03	0.00594	--	24	365
PA018595	Printing	01330-20-7	Xylene,M,O&P Mixt	0.01	0.00158	--	24	365
PA018595	Printing	00067-63-0	Isopropyl Alcohol	0.01	0.00217	--	24	365
PA018595	Printing	00100-41-4	Ethyl Benzene	0.0013	0.00040	--	24	365
PA018595	Printing	00111-76-2	Butoxyethanol, 2-	0.01	0.00211	--	24	365
PA017896, PA017996, PA019696, PA019596, PA019496, PA019396	Printing	08032-32-4	VM&P Naphtha	0.0005	0.00011	--	8	249

Table 6-7 (cont'd)
Representative Industrial Source Permits Modeled for Proposed On-Site Industrial Uses

Permit Number	Type of Business	Pollutant Information		Emission Rates			Operating Schedule	
		CAS NUMBER	Pollutant Name	Hourly (g/sec)	Annual (g/sec)	24-Hour (g/sec)	Hrs/Day	Days/yr
PA017896, PA017996, PA019696, PA019596, PA019496, PA019396	Printing	00075-09-02	Dichloromethane (Methylene Chloride)	0.01	0.00156	--	8	249
PA017896, PA017996, PA019696, PA019596, PA019496, PA019396	Printing	00111-76-2	Butoxyethanol, 2-	0.01	0.00121	--	8	249
PA017896, PA017996, PA019696, PA019596, PA019496, PA019396	Printing	00127-18-4	Tetrachloroethylene	0.002	0.00036	--	8	249
PA017896, PA017996, PA019696, PA019596, PA019496, PA019396	Printing	00056-81-5	Glycerin	0.001	0.00032	--	8	249
PA017896, PA017996, PA019696, PA019596, PA019496, PA019396	Printing	07429-90-5	Aluminum	0.0004	0.00049	--	8	249
PA017896, PA017996, PA019696, PA019596, PA019496, PA019396	Printing	01309-37-1	Iron	0.0003	0.00037	--	8	249
PA017896, PA017996, PA019696, PA019596, PA019496, PA019396	Printing	07440-50-8	Copper	0.00013	0.00005	--	8	249
PA017896, PA017996, PA019696, PA019596, PA019496, PA019396	Printing	07440-66-6	Zinc	0.00013	0.000004	--	8	249
PA031794, PA031594, PA031494	Commercial art & Graphic Design Service	NY075-02-5	Particulate	0.01	0.00037	0.0027	8	260
PA031794, PA031594, PA031494	Commercial art & Graphic Design Service	00111-76-2	Butoxyethanol, 2-	0.03	0.00693	--	8	260
PA031794, PA031594, PA031494	Commercial art & Graphic Design Service	00067-63-0	Isopropyl Alcohol	0.004	0.00964	--	8	260
PA031594, PA031494	Commercial art & Graphic Design Service	00141-78-6	Ethyl Acetate	0.01	0.00150	--	8	260

Table 6-7 (cont'd)
Representative Industrial Source Permits Modeled for Proposed On-Site Industrial Uses

Permit Number	Type of Business	Pollutant Information		Emission Rates			Operating Schedule	
		CAS NUMBER	Pollutant Name	Hourly (g/sec)	Annual (g/sec)	24-Hour (g/sec)	Hrs/Day	Days/yr
PA031594, PA031494	Commercial Art & Graphic Design Service	00108-88-3	Toluene	0.05	0.01257	--	8	260
PA031394	Commercial Art & Graphic Design Service	00067-64-1	Acetone	0.004	0.00102	--	8	260
PA031394	Commercial Art & Graphic Design Service	00084-74-2	Dibutyl Phthalate	0.003	0.00089	--	8	260
PA031794	Commercial Art & Graphic Design Service	00123-86-4	Butyl Acetate	0.04	0.00898	--	8	260
PA031594, PA031494	Commercial Art & Graphic Design Service	00141-78-6	Ethyl Acetate	0.01	0.00299	--	8	260
PA030797	Gold Precipitation	00143-33-9	Sodium Cyanide	0.0001	0.00003	--	1	250
PA030797	Gold Precipitation	01309-60-0	Lead Oxide	0.01	0.00026	--	1	250
PA030797	Gold Precipitation	NY075-02-5	Particulate	0.00013	0.000004	0.000005	1	250
PA030679, PA030597	Gold Precipitation	10102-44-0	Nitrogen Dioxide	0.002	0.00535	--	8	250
PA030679, PA030597	Gold Precipitation	07697-37-2	Nitric Acid	0.004	0.00092	--	8	250
PA030679	Gold Precipitation	07647-01-0	Hydrogen Chloride	0.00025	0.00003	--	8	250
PA016798R	Baking of Cookies	NY075-02-5	Particulate	0.0014	0.00030	0.0005	8	240
PA016798R	Baking of Cookies	10102-44-0	Nitrogen Dioxide	0.0088	0.00193	--	8	240
PA016798R	Baking of Cookies	00630-08-0	Carbon Monoxide	0.0001	0.00003	--	8	240
PA016798R	Baking of Cookies	00064-17-5	Ethanol	0.4725	0.01273	--	8	240
PA016898	Baking of Pastries/Bread	NY075-02-5	Particulate	0.00101	0.00022	0.0003	8	240
PA016899	Baking of Pastries/Bread	10102-44-0	Nitrogen Dioxide	0.0058	0.00127	--	8	240
PA016900	Baking of Pastries/Bread	00630-08-0	Carbon Monoxide	0.0001	0.00003	--	8	240
PA016901	Baking of Pastries/Bread	00064-17-5	Ethanol	0.4725	0.01273	--	8	240
NA	Proposed Brewery	00074-98-6	Propane	1.66E-07	0.00145	--	24	365
NA	Proposed Brewery	00064-17-5	Ethanol	1.69E-05	0.14800	--	24	365
NA	Proposed Brewery	NY075-02-5	Particulate	1.6E-09	4.01E-06	1.61E-09	24	365

ADDITIONAL SOURCES

The *CEQR Technical Manual* requires an analysis of projects that may have the potential to 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 Project Area, a review of existing permitted facilities was conducted. Sources of information reviewed included the NYSDEC Title V and State Facility Permit websites.

One facility with a Title V permit was identified: New York Power Authority's North 1st Street simple cycle power plant, which is within 1,000 feet of the project site. Therefore, an analysis was performed using the AERMOD dispersion model.

The facility has a natural gas combustion turbine and one low NO_x (<30ppm) natural gas-fired boiler. The boiler is used during winter months to heat the gas turbine combustion inlet air when ambient temperature and humidity could cause icing in the turbine inlet.

Emissions data for the combustion turbine were obtained from the *Domino Sugar Rezoning Final Environmental Impact Statement, May 2010* and the *In-City Generation Project Final Environmental Impact Statement, New York Power Authority, January 2002.* The stack parameter data for the turbine and the boiler was obtained from the NYSDEC Title V permit. Per the NYCDEC Title V permit, the NO_x emission rate for the boiler were calculated using factors for low NO_x burner technology, with a maximum emission concentration of 30 parts per million (ppm). The boiler PM emissions were calculated based on emission factors obtained from the EPA *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources*. $PM_{2.5}$ emissions include both the filterable and condensable components. For the $PM_{2.5}$ emissions and NO_2 emissions, the boiler capacity of 7.4 MMBtu/hr was used. The analysis assumes the boiler is only running during the winter months.

Stack parameters for the turbine and boiler were obtained from the NYSDEC Title V Permit application, except the exhaust temperature for the boiler, which was obtained from a survey of boiler exhaust data provided by DEP. **Table 6-8** presents the emission rates and stack parameters used in the AERMOD analysis for the analyzed facility.

Table 6-8
Stack Parameters and Emission Rates from NYPA North 1st Street Facility

Parameter	Turbine	Boiler
Stack Height (ft)	107[(1)]	15[(1)]
Stack Diameter (ft)	12[(1)]	1.83[(1)]
Exhaust Flow Rate (m/s)	23.47[(1)]	4.8[(1)]
Exhaust Temperature (°F)	719[(1)]	307.8[(2)]
Fuel Type	Natural Gas	Natural Gas
NO_2 Short Term Emission Rate (g/s)	0.567	0.034[(3)]
NO_x Annual Emission Rate (g/s)	0.567	0.034[(3)]
$PM_{2.5}$ Short Term Emission Rate (g/s)	0.1865	0.007[(3)]
$PM_{2.5}$ Annual Emission Rate (g/s)	0.1865	0.007[(3)]

Note:
[1] The stack height, diameter, flow rate, and temperature are based on the NYSDEC Title V Permit application.
[2] Exhaust temperature was obtained from a survey of boiler exhaust data provided by DEP.
[3] Per the NYSDEC Title V permit, the emissions were calculated assuming the boiler would only operate during the winter months.

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 6-9**. As shown, the recently monitored levels did not exceed the NAAQS. It should be noted that these values are somewhat different from the background concentrations used in the analyses. For most pollutants the concentrations presented in **Table 6-8** are based on measurements obtained in 2019, the most recent year for which data are available; the background concentrations are obtained from several years of monitoring data and represent a conservative estimate of the highest background concentrations for future conditions. There were no monitored violations of NAAQS at these monitoring sites in 2019.

Table 6-9
Representative Monitored Ambient Air Quality Data

Pollutant	Location	Units	Averaging Period	Concentration	NAAQS
CO	Queens College, Queens	ppm	8-hour	1.1	9
			1-hour	1.5	35
SO_2	Queens College, Queens[1]	µg/m^3	3-hour	42.1	1,300
			1-hour	13.5	196
PM_{10}	Division Street, Manhattan[2]	µg/m^3	24-hour	39.3	150
$PM_{2.5}$	JHS 126, Brooklyn[3,4]	µg/m^3	Annual	7.7	15
			24-hour	17.8	35
NO_2	Queens College, Queens[5,6]	µg/m^3	Annual	26.7	100
			1-hour	103.8	188
Lead	IS 52, Bronx[7]	µg/m^3	3-month	0.0041	0.15
Ozone	Queens College, Queens[8]	ppm	8-hour	0.074	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] The PM_{10} concentration is based on the three-year average (2017–2019) of the highest monitored concentration. [3] Annual value is based on a three-year average (2017–2019) of annual concentrations.
[4] The 24-hour value is based on the three-year average of the 98th percentile of 24-hour average concentrations.
[5] Annual value is based on the annual average value for 2019.
[6] The 1-hour value is based on a three-year maximum (2017–2019) of the 98th percentile of daily maximum 1-hour average concentrations.
[7] Based on the highest quarterly average concentration measured during 2017 to 2019.
[8] 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.

F. THE FUTURE WITHOUT THE PROPOSED PROJECT

MOBILE SOURCES

PM_{10} concentrations in the No Action condition were determined by using the methodology previously described. Predicted future PM_{10} 24-hour concentrations, including background concentrations, at the analyzed intersections in the No Action condition are presented in **Table 6-10**. The values shown are the highest predicted concentrations for the receptor locations. As shown in the table, No Action condition concentrations are predicted to be well below the PM_{10} NAAQS.

Table 6-10
Maximum Predicted 24-Hour Average
PM_{10} No Action Concentrations (µg/m³)

Analysis Site	Location	Concentration
1	Wythe Avenue and South 6th Street	52.8

Notes:
NAAQS—24-hour average 150 µg/m³.
Concentration includes a background concentration of 39.3 µg/m³.

$PM_{2.5}$ concentrations for the No Action condition are not presented, since impacts are assessed on an incremental basis.

STATIONARY SOURCES

Absent the approvals, there would be no change on the project site, and the existing single-story warehouse building on the site would remain as is in existing conditions. Accordingly, in the No Action condition, emissions in the area from heating and hot water systems would be similar to existing conditions, which would be less than the Proposed Project.

G. THE FUTURE WITH THE PROPOSED PROJECT

MOBILE SOURCES

PM_{10} concentrations with the proposed project were determined using the methodology previously described and used in the No Action condition. **Table 6-11** presents the predicted PM_{10} 24-hour concentrations at the analyzed intersections in the With Action condition. The value shown is the highest predicted concentration for the modeled receptor locations and includes background concentration.

Table 6-11
Maximum Predicted 24-Hour Average PM_{10}
With Action Concentration (µg/m³)

Analysis Site	Location	No Action	With Action
1	Wythe Avenue and South 6th Street	52.8	54.9

Notes:
NAAQS—24-hour average 150 µg/m³.
Concentrations presented include a background concentration of 39.3 µg/m³.

Using the methodology previously described, maximum predicted 24-hour and annual average $PM_{2.5}$ concentration increments were calculated so that they could be compared with the *de minimis* criteria. Based on this analysis, the maximum predicted localized 24-hour average and neighborhood-scale annual average incremental $PM_{2.5}$ concentrations are presented in **Tables 6-12 and 6-13**, respectively. Note that $PM_{2.5}$ concentrations in the No Action condition are not presented, since impacts are assessed on an incremental basis.

Table 6-12
Maximum Predicted 24-Hour Average $PM_{2.5}$
With Action and Incremental Concentration (µg/m³)

Analysis Site	Location	No Action	With Action	Increment	Criterion
1	Wythe Avenue and South 6th Street	-	-	0.73	8.6[(1)]
		21.3[(2)]	21.9[(2)]	-	35[(3)]

Notes:
(1) $PM_{2.5}$ *de minimis* criterion—24-hour average, not to exceed more than half the difference between the background concentration (17.8 µg/m³) and the 24-hour standard of 35 µg/m³.
(2) The 24-hour $PM_{2.5}$ concentration presented represents the maximum of the total 98th percentile. Concentrations presented include a background concentration of 17.8 µg/m³.
(3) NAAQS.

Table 6-13
Maximum Predicted Annual Average $PM_{2.5}$
With Action Incremental Concentration (µg/m³)

Analysis Site	Location	No Action	With Action	Increment	Criterion
1	Wythe Avenue and South 6th Street	-	-	0.066	0.1
		7.82[(2)]	7.88[(2)]	-	12[(3)]

Notes:
(1) $PM_{2.5}$ *de minimis* criterion—annual (neighborhood scale), 0.1 µg/m³.
(2) Concentrations presented include a background concentration of 7.7 µg/m³.
(3) NAAQS

STATIONARY SOURCES

HEATING AND HOT WATER SYSTEMS

Tables 6-14 and 6-15 present the maximum predicted concentration from the heating and hot water systems of Projected Development Sites 1 and 2 on the proposed buildings and existing buildings, respectively. As shown in the tables, all predicted pollutant concentrations are less than the applicable impact criteria. Therefore, there would be no potential for significant adverse air quality impacts from the Proposed Project's heating and hot water systems.

Table 6-14
Maximum Modeled Pollutant Concentrations
On Projected Development Sites (μg/m³)

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	Criterion
NO_2	1-hour	172(1)	-	172	188(2)
	Annual	0.86	28.7	29.56	100
$PM_{2.5}$	24-hour	7.31	N/A	7.31	8.6(3)
	Annual	0.24	N/A	0.24	0.3(4)

Notes:
N/A – Not Applicable
(1) The 1-hour NO_2 concentration presented represents the maximum of the total 98th percentile 1-hour NO_2 concentration predicted at any receptor using seasonal-hourly background concentrations.
(2) NAAQS
(3) $PM_{2.5}$ *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
(4) $PM_{2.5}$ *de minimis* criteria—annual (discrete receptor)

Table 6-15
Maximum Modeled Pollutant Concentrations
On Existing Buildings (μg/m³)

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	Criterion
NO_2	1-hour	147(1)	-	147	188(2)
	Annual	0.49	28.7	29.2	100
$PM_{2.5}$	24-hour	6.76	N/A	6.76	8.6(3)
	Annual	0.14	N/A	0.14	0.3(4)
	Annual – Neighborhood	0.001	N/A	0.001	0.1

Notes:
N/A – Not Applicable
(1) The 1-hour NO_2 concentration presented represents the maximum of the total 98th percentile 1-hour NO2 concentration predicted at any receptor using seasonal-hourly background concentrations.
(2) NAAQS
(3) $PM_{2.5}$ *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
(4) $PM_{2.5}$ *de minimis* criteria—annual (discrete receptor)

To ensure that there is no potential for significant adverse impacts of $PM_{2.5}$ or NO_2 from the Proposed Project's heating and hot water system emissions, certain restrictions would be required that would be placed on the Projected Development Site 1 (Block 2415, Lot 1) and Projected Development Site 2 (Block 2415, Lot 6) through an Air Quality (E) Designation (E-592) that would be placed on the projected development sites. These restrictions were assumed in the analysis results presented in **Tables 6-14 and 6-15**, and would avoid the potential for significant air quality impacts from stationary sources based on the conservative assumptions used in the analysis.

The restrictions would be as follows:

Projected Development Site 1

Any new development on Projected Development Site 1 (Block 2415, Lot 1) must utilize only natural gas in any fossil fuel-fired heating and hot water equipment, be fitted with low NO_x burners

(30 ppm), and locate heating and hot water exhaust stacks at least 154 feet above grade, to avoid potential significant air quality impacts.

Projected Development Site 2

Any new development on the Projected Development Site 2 (Block 2415, Lot 6), must utilize only natural gas in any fossil fuel-fired heating and hot water equipment, be fitted with low NO_x burners (30 ppm) and ensure that fossil fuel-fired heating and hot water exhaust stacks are located at least 128 feet above grade, and be located at least 39 feet away from the lot line facing South 3rd Street, to avoid potential significant air quality impacts.

INDUSTRIAL SOURCES

Impacts of Existing Industrial Uses on the Proposed Project

Tables 6-16 and 6-17 present the maximum potential modeled short-term and long-term impacts of the analyzed industrial sources on toxic air pollutant concentrations on the Proposed Project. The table also lists the SGC and AGC for each toxic air pollutant.

Table 6-16
Maximum Predicted 24-hour Average Pollutant Concentrations from Industrial Sources on the Proposed Project (μg/m³)

Pollutant	CAS No.	Maximum Modeled Impact	Background	Total Concentration	NAAQS
$PM_{2.5}$	NY075-00-0	0.062	17.8	17.9	35
PM_{10}		0.062	39.3	39.4	150

Note:
All particulate matter was assumed to be $PM_{2.5}$ and PM_{10}.

Table 6-17
Maximum Predicted Annual Average Pollutant Concentrations from Industrial Sources on the Proposed Project (μg/m³)

Pollutant	CAS No.	Maximum Modeled Impact	Background	Total Concentration	NAAQS
$PM_{2.5}$	NY-075-00-0	0.0027	7.7	7.7	12

Note:
All particulate matter was assumed to be $PM_{2.5}$ and PM_{10}.

The analysis determined that emissions of air toxic compounds from existing industries in the area would not result in any potential significant adverse air quality impacts on the Proposed Project.

Impacts of Future Processes at Projected Development Site 1

The results of the AERMOD model were used to predict the worst-case potential air toxics concentrations at modeled receptor locations. The unitary concentrations (μg/m³ per g/s) were multiplied by the emission rates obtained from the emissions profile to determine. The results were compared with the SGC and AGC values reported in the NYSDEC's DAR-1 guidance document to determine the potential for significant impacts.[18]

[18] NYSDEC, DAR-1 Guidelines for the Evaluation and Control of Ambient Air Contaminants Under Part 212; Appendix A, Toxicity Classification and Guideline Development Methodology for Annual and Short-Term Guideline Concentrations (AGC/SGC), August 2016.

A summary of the analysis results is presented in **Table 6-18**.

Table 6-18
Maximum Predicted Pollutant Concentrations from Processes at Projected Development Site 1 (μg/m^3)

Pollutant	CAS No.	1-Hour Average (μg/m^3)	SGC (μg/m^3)[1]	Annual Average (μg/m^3)	AGC (μg/m^3)[1]
Acetone	00067-64-1	2,808	180,000	1.76	30,000
Aluminum	07429-90-5	1.9	--	0.068	2.4
Ammonia	07664-41-7	0.62	2,400	4.0 E-06	100
Butoxyethanol, 2-	00111-76-2	213	14,000	1.42	1,600
Butyl Acetate	00123-86-4	1,300	95,000	1.89	17,000
Carbon Monoxide	00630-08-0	1.2	40,000	0.008	--
Copper	07440-50-8	0.62	--	0.0072	490
Copper Cyanide	00544-92-3	0.62	380	0.0032	3.5
Dibutyl Phthalate	00084-74-2	12	--	0.12	12
Ethanol	00064-17-5	4,645	--	24	45,000
Ethyl Acetate	00141-78-6	124	--	0.62	3,400
Glycerin	00056-81-5	6.8	--	0.045	240
Hydrogen Chloride	07647-01-0	1.2	2,100	0.0045	20
Hydrogen Cyanide	00074-90-8	1.2	520	0.0010	0.8
Iron	01309-37-1	1.2	--	0.051	12
Isopropyl Alcohol (includes Total Organic Solvents)	00067-63-0	2,912	98,000	2.54	7,000
Lead Oxide	01309-60-0	56	--	0.036	0.044
Methyl Chloroform	00071-55-6	2,973	9,000	1.73	5,000
Nitric Acid	07697-37-2	20	86	0.13	12
Nitrogen Dioxide	10102-44-0	187[1]	188	30[2]	100
Sodium Cyanide	00143-33-9	2.5	380	0.0082	3.5
Sodium Hydroxide	01310-73-2	0.62	200	0.0042	--
Toluene	00108-88-3	260	37,000	1.75	5,000
VM&P Naphtha	08032-32-4	2.5	--	0.016	900
Xylene, M,O&P Mixt	01330-20-7	37	22,000	0.22	100
Zinc	07440-66-6	0.62	--	0.00054	45
Propane	00074-98-6	0.00082	--	0.20	43,000
Dichloromethane (Methylene Chloride)	00075-09-02	158	14,000	1.04	60
Ethyl Benzene	00100-41-4	6	--	0.056	1,000
Tetrachloroethylene	00127-18-4	7.4	300	0.050	4
$PM_{2.5}$	NY075-02-5	26[3,5]	35[4]	7.9[6]	12
		8.23	8.6[7]	0.23	0.3[8]
PM_{10}	NY075-00-5	48[4,9]	150[4]	0.23	--

Notes:
[1] One-hour nitrogen dioxide predicted concentration was added to a background concentration of 103.8 (μg/m^3).
[2] Annual nitrogen dioxide predicted concentration was added to a background concentration of 28.7 (μg/m^3).
[3] 24-hour average concentration including background concentration.
[4] NAAQS 24-hour average.
[5] $PM_{2.5}$ 24-hour maximum predicted concentration was added to a background concentration of 17.8 (μg/m^3).
[6] $PM_{2.5}$ annual maximum predicted concentration was added to a background concentration of 7.7 (μg/m^3).
[7] $PM_{2.5}$ *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/m^3
[8] $PM_{2.5}$ *de minimis* criteria—annual (discrete receptor)
[9] PM_{10} 24-hour maximum predicted concentration was added to a background concentration of 39.3 (μg/m^3).
Source: NYSDEC Division of Air Resources. *DAR-1 AGS/SGC Tables.* August 2016.

Based on the modeling performed for the project light industrial sources, it was determined that certain restrictions are required to avoid any potential air quality impacts from emissions of air toxic compounds associated with light industrial processes at Projected Development Site 1 through an Air Quality (E) Designation (E-592) that would be placed on Projected Development

Site 1. These restrictions were assumed in the analysis results presented in **Table 6-18**, and would avoid the potential for significant air quality impacts from stationary sources based on the conservative assumptions used in the analysis.

The restrictions would be as follows:

Projected Development Site 1

Any new development on Projected Development Site 1 (Block 2415, Lot 1) must have exhaust stacks for industrial processes located at least 154 feet above grade, and be located at least 77 feet from the lot line facing South 3rd Street and at least 55 feet from the lot line facing Kent Avenue, to prevent potential significant adverse air quality impacts at nearby sensitive receptors.

ADDITIONAL SOURCES

Potential stationary source impacts on the Proposed Project from the existing major source were determined using the AERMOD model. The maximum estimated annual concentrations of NO_2 from the modeling were added to the background concentrations to estimate total concentrations on the proposed project, while $PM_{2.5}$ concentrations were compared with the $PM_{2.5}$ *de minimis* criteria. 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 6-19**.

Table 6-19
Maximum Modeled Pollutant Concentrations on the Proposed Project (µg/m³)—N 1st Street Plant

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	NAAQS
NO_2	Annual[1]	0.33	28.7	29.0	100
	1-hour[2]	N/A	N/A	99	188
$PM_{2.5}$	24-hour	2.35	17.8	20.1	35
	Annual	0.14	7.7	7.8	12

Notes:
[1] Annual NO_2 impacts were estimated using a NO_2/NO_x ratio of 0.75.
[2] Reported concentration is the maximum total 98th percentile concentration at any receptor using seasonal-hourly background concentrations.

As shown in **Table 6-19**, the predicted pollutant concentrations for all of the pollutant time averaging periods shown are below their respective standards. Therefore, no potential for significant adverse air quality impacts on the proposed project from the existing large source is predicted. ✷