

Chapter 15: AIR QUALITY

15.1 Introduction

This chapter discusses potential impacts to air quality as a result of the operation of the proposed action. The air quality analyses are concerned with both mobile source and stationary source impacts, as follows:

- The potential for traffic volumes and a redistribution of traffic associated with the proposed action (along with the inclusion of new parking areas) to result in significant mobile source air quality impacts;
- The potential for emissions from the heating, ventilation, and air conditioning (“HVAC”) systems of the proposed action to result in stationary source pollutants that would significantly impact existing land uses;
- The potential for emissions from the HVAC systems of individual proposed buildings to result in stationary source pollutants that would significantly impact other proposed buildings;
- The potential for emissions from existing stationary sources of pollution from either large-scale boiler systems or industrial processes to result in significant impacts on the proposed action.

These air quality analyses are conducted in accordance with the *CEQR Technical Manual*, as well as other relevant guidance and protocols provided by New York State Department of Environmental Conservation (“NYSDEC”), New York City Department of Environmental Protection (“NYCDEP”), and United States Environmental Protection Agency (“USEPA”). As appropriate, applicable environmental reports for other projects within the study area have been reviewed. In addition, the air quality characteristics of the proposed action are identified and discussed within the context of the Clean Air Act (“CAA”) requirements and other applicable state and local air quality standards.

15.2 Principal Conclusions

For the proposed action, increases in mobile source emissions of carbon monoxide (“CO”), particulate matter less than 2.5 microns in diameter (“PM_{2.5}”) and particulate matter less than 10 microns in diameter (“PM₁₀”) related to project-induced traffic changes would not result in any exceedances of the National Ambient Air Quality Standards (“NAAQS”) or the NYCDEP/NYSDEC *de minimis* impact criteria at existing or future project-related sensitive receptors. In addition, the cumulative effect of emissions from project-

induced traffic and parking facilities associated with the proposed action would not result in any significant adverse air quality impacts.

Proposed action pollutant emissions of nitrogen dioxide (“NO₂”), sulfur dioxide (“SO₂”), PM_{2.5} and PM₁₀ related to the use of No. 2 fuel oil for HVAC systems would not result in any violations of applicable NAAQS or exceed the NYCDEP/NYSDEC *de minimis* impact criteria. Existing large scale pollutant sources, in addition to industrial sources that would emit air toxics, would not result in any significant adverse impacts to any of the sensitive land uses as part of the proposed action.

Finally, it is not anticipated that malodorous emissions related to the 26th Ward service area would result in significant adverse impacts to the proposed action.

15.3 Pollutants of Concern

CRITERIA POLLUTANTS

USEPA has identified several criteria pollutants as being of concern nationwide: CO, NO₂, ozone (“O₃”), PM, SO₂, and lead. As a result, USEPA has established NAAQS for all of these criteria pollutants and has categorized these standards as “primary” and “secondary.” Primary standards are designed to establish limits to protect public health, including the health of “sensitive” populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. In addition to criteria pollutants, emissions of air toxics are also of concern and are briefly discussed below.

A summary of the characteristics of the criteria pollutants are as follows.

Carbon Monoxide

CO is a colorless and odorless gas, which is primarily associated with the incomplete combustion of vehicle fuel. CO is very reactive and its concentrations are limited to relatively short distances near crowded intersections and along slow moving, heavily traveled roadways. Pursuant to the CAA, each state is committed to offset any CO emissions resulting from vehicle miles traveled (“VMT”) growth in non-attainment areas. In 2010, New York City was re-designated as a maintenance area. To ensure that air quality conditions continue to improve within the New York City metropolitan area, it is important to monitor potential impacts of new traffic-generating projects. Emissions of CO could increase as a result of a project related increase in vehicle volumes in the study area. As a result, concentrations of CO are evaluated on a local, or microscale, basis.

Nitrogen Dioxide and Ozone

NO₂ is formed from the burning of fossil fuels, such as natural gas. Primary sources include on and off road vehicles as well as power generating plants. NO₂ and O₃ are linked in that the production of NO₂ is a precursor to the formation of O₃. It is considered a highly reactive gas that is also linked to the production of acid rain. Because the chemical reactions that form O₃ occur slowly, the effects of the pollutants involved are usually analyzed on a regional level. Although New York City is designated as a non-attainment area for O₃, the relative small scale of this project does not warrant a regional assessment of this pollutant. However, since the boilers for the existing Brooklyn Developmental Center (“BDC”) would continue to utilize natural gas for heating and hot water, a more localized assessment of this pollutant is warranted; therefore, NO₂ is evaluated as a pollutant of potential concern.

Lead

Lead emissions are associated with industrial uses and motor vehicles that use gasoline containing lead additives. Most vehicles available since 1975 and all after 1980 that are manufactured in this country are designed to use unleaded fuel. As a result, lead emissions have decreased significantly. There would also be no industrial sources associated with the operation of the proposed action. Therefore, lead is not a pollutant of concern for the project.

Inhalable Particulates

Inhalable PM is a respiratory irritant and is of most concern when classified as being less than 10 microns in diameter (“PM₁₀”). PM is primarily generated by stationary sources, such as industrial facilities and power plants; however, PM can also be produced by the combustion of diesel fuel used in some buses and trucks, as well as residential and commercial HVAC systems using oil as fuel. PM also develops from the mechanical breakdown of coarse particulate matter (e.g., from building demolition or roadway surface wear as well as other construction-related activities).

Also of concern is PM that is classified as being less than 2.5 microns in diameter (“PM_{2.5}”). PM_{2.5} is extremely persistent in the atmosphere and has the ability to reach the lower regions of the respiratory tract, delivering with it other compounds that absorb to the surfaces of the particles. Many of these particles can be toxic and oftentimes are also carcinogenic in nature. NYCDEP, in conjunction with NYSDEC, has promulgated guidance for the screening and assessment of these fine particulates that is outlined in the *CEQR Technical Manual*. The mobile source screening portion of the guidelines requires that if a proposed action would generate fewer heavy duty diesel vehicles (“HDDV”) per hour (or its equivalent in vehicular emissions) than listed below, the need for a detailed PM_{2.5} analysis is unlikely:

- 12 HDDV: for paved roads with < 5000 vehicles/day
- 19 HDDV: for collector type roads
- 23 HDDV: for principal and minor arterials

- 23 HDDV: for expressways and limited access roads

The proposed action would generate traffic, some of which would be diesel vehicles. In addition, the HVAC systems of the proposed action may also contribute to emissions of PM. As a result, both PM₁₀ and PM_{2.5} are evaluated as a pollutants of particular concern.

Sulfur Dioxide

SO₂ are respiratory irritants associated with the combustion of sulfur-containing fuels (such as heating oil and coal). SO₂ is a precursor to acid rain and to PM_{2.5}, both of which create damage to individual health and the environment. This pollutant is typically associated with large industrial operations, but can also result from much smaller sources. All NYSDEC sulfur dioxide monitoring sites have remained in compliance with the New York State/Federal annual mean standard for over twenty years, consecutively. As it is assumed that the proposed development would use No. 2 fuel oil for its HVAC heating and hot water systems, SO₂ is a pollutant of concern.

Air Toxic Pollutants

In addition to criteria pollutants, a wide range of the non-criteria air pollutants (known as air toxic pollutants), which could be emitted from industrial and commercial facilities, are also of potential concern. These pollutants can be grouped into two categories: carcinogenic air pollutants and non-carcinogenic air pollutants. These two groups include hundreds of pollutants, ranging from high to low toxicity. No federal standards have been promulgated for toxic air pollutants. However, USEPA and NYSDEC have issued guidelines that establish acceptable ambient levels for these pollutants based on human exposure criteria. The relevant study area contains zoned manufacturing areas, which would remain once the proposed action is operational. Therefore, air toxics are potential pollutants of concern.

Malodorous Pollutants

An odor is a chemical in the air that is “smelled” or sensed by our nose (olfactory system). While odors can emanate from a variety of sources, the location of the proposed action could result in malodorous pollutants from the main 26th Ward Waste Water Treatment Plant (“WWTP”) (west of the project site), potentially affecting future residents associated with the proposed action. Other nearby sources of odors associated with the 26th Ward service area include the combined sewer outfalls (“CSO”) and the Spring Creek Auxiliary Water Pollution Control Plant (“AWPCP”), located east of the project site. The primary malodorous pollutant of concern from these facilities would be hydrogen sulfide (“H₂S”). While odors in the environment are rarely cause for serious health concerns, they can result in additional anxiety and annoyance in humans. As a result, odors and their potential impact on future residents of the proposed action are of concern.

In summary, the air pollutants identified as being of concern for the proposed action are considered as follows:

- CO, PM₁₀ and PM_{2.5} are considered as the pollutants of concern for the mobile source analysis because of the additions and/or changes in local vehicular traffic that are anticipated as a result of the proposed action.
- NO₂, SO₂, PM₁₀ and PM_{2.5} are pollutants of concern for the air quality analysis of emissions from the heating systems of the proposed action and the existing BDC; and
- Air toxic emissions from existing industrial/manufacturing land uses are considered to determine the potential for significant adverse impacts on the proposed action.
- Emissions of malodorous pollutants related to the existing 26th Ward service area, which includes the main WWTP west of the project site and the auxiliary WWTP east of the project site.

15.4 Air Quality Standards and Guidelines

AIR QUALITY STANDARDS

National and New York State primary and secondary ambient air quality standards are pollutant concentration limits for each of the criteria pollutants specified by USEPA. The NAAQS for all of the criteria pollutants are listed in Table 15-1, "National Ambient Air Quality Standards." Units of measure for the standards are parts per million ("ppm") by volume, parts per billion ("ppb") by volume, and micrograms per cubic meter of air ("µg/m³").

Table 15-1: National Ambient Air Quality Standards

National Ambient Air Quality Standards Pollutant	Primary / Secondary	Averaging Period	Concentration	
Carbon Monoxide (CO)	Primary	1-hour	35 ppm	<i>Not to be exceeded more than once per year</i>
		8-hour	9 ppm	
Lead (Pb)	Primary and Secondary	Rolling 3 Month Average	0.15 µg/m ³ ⁽¹⁾	<i>Not to be exceeded</i>
Nitrogen Dioxide (NO ₂)	Primary	1-hour	188 µg/m ³	<i>98th percentile of 1-hour daily maximum concentrations, averaged over 3 years</i>
	Primary and Secondary	Annual	100 µg/m ³ ⁽²⁾	<i>Annual Mean</i>
Ozone (O ₃)	Primary and Secondary	8-hour	0.070 ppm ⁽³⁾	<i>Annual fourth highest daily maximum 8-hour concentration, averaged over 3 years</i>
Particulates (PM _{2.5})	Primary	Annual	12 µg/m ³	<i>Annual mean, averaged over 3 years</i>
	Secondary	Annual	15 µg/m ³	<i>Annual mean, averaged over 3 years</i>
	Primary and Secondary	24-hour	35 µg/m ³	<i>98th percentile, averaged over 3 years</i>
Particulates (PM ₁₀)	Primary and Secondary	24-hour	150 µg/m ³	<i>Not to be exceeded more than once per year on average over 3 years</i>
Sulfur Dioxide (SO ₂)	Primary	1-hour	75 ppb ⁽⁴⁾	<i>99th percentile of 1-hour daily maximum concentrations, averaged over 3 years</i>
	Secondary	3-hour	0.5 ppm	<i>Not to be exceeded more than once per year</i>

(1) Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

(2) The official level of the annual NO₂ standard is 100 µg/m³.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O₃ standards additionally remain in effect in some areas. Revocation of the previous (2008) O₃ standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO₂ standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO₂ standards or is not meeting the requirements of a SIP call under the previous SO₂ standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the require NAAQS.

Source: US Environmental Protection Agency; New York State Department of Environmental Conservation, 2015

SIGNIFICANT IMPACT THRESHOLDS

CO – De Minimis Criteria

With respect to CO, in addition to the Federal and State standards, New York City has developed *de minimis* criteria to assess the significance of project-related impacts on local air quality. These criteria set the minimum change in an 8-hour average CO concentration that would constitute a significant adverse environmental impact. The criteria are defined as follows:

- An increase of 0.5 ppm or greater in the maximum eight hour concentration if the projected future ambient No Action concentration is equal to 8.0 ppm or between 8 ppm and 9 ppm.
- An increase of more than half the difference between the baseline concentrations and the 8-hour standards when No Action concentrations are below 8 ppm.

Project-related impacts less than these values are not considered to be significant.

PM_{2.5} Incremental Impact Criteria

With respect to PM_{2.5}, NYSDEC and NYCDEP have developed criteria guidance for the study and assessment of project-related significant adverse impacts. These threshold criteria are related to analyses which determine potential microscale and neighborhood scale incremental (the difference between the future with and without the proposed action) impacts at sensitive receptor locations. The criteria are as follows:

- 24-hour average PM_{2.5} concentration increments which are predicted to be greater than 2 µg/m³ but no greater than 5.0 µg/m³ could be considered a significant adverse impact on air quality based on the frequency, duration and location of the predicted concentrations.
- Predicted increase of more than half the difference between the background concentration and the 24-hour standard.
- The maximum annual impact criteria of 0.3 µg/m³ is applicable to stationary sources and construction only, or;
- The criteria threshold concentration for the neighborhood scale increment on a yearly basis is 0.1 µg/m³ (for stationary sources, receptor locations are based on a 1km x 1km grid centered at the maximum predicted microscale annual concentration - averaged over all receptors; for mobile sources, receptors are located at a distance of 15 meters from the edge of roadway).

NON-CRITERIA AIR TOXICS POLLUTANT THRESHOLDS

In order to evaluate short-term and annual impacts of non-carcinogenic toxic air pollutants, NYSDEC has established short-term guideline concentrations (“SGC”) and annual guideline concentrations (“AGC”) for exposure limits. These are maximum allowable one-hour and annual guideline concentrations,

respectively, that are considered acceptable concentrations below which there should be no adverse effects on the health of the general public.

When cumulative impacts of multiple air toxics from multiple sources could pose a potential health risk to the population of a proposed development, a cumulative impact analysis for industrial sources should be performed. Potential cumulative impacts are determined based on the USEPA Hazard Index Approach for non-carcinogenic compounds and using the USEPA Unit Risk Factors for carcinogenic compounds. These methods are based on equations that use USEPA health risk information (established for individual compounds with known health effects) to determine the level of health risk posed by an expected ambient concentration of that compound at a potentially sensitive receptor. The derived values of health risk are additive and can be used to determine the total risk posed by multiple air contaminants. For carcinogens, the public health risk is based on calculations of the incremental risk associated with each toxic pollutant. These incremental values are then summed to arrive at the total risk. If the total risk is predicted to be less than or equal to one in one million (1×10^{-6}), the carcinogenic risk is considered negligible. For non-carcinogens, the public health risk is based on estimates for inhalation of non-carcinogenic pollutants (i.e. the Hazard Index). Once the Hazard Index of each compound is established, they are summed together. If the total hazard index is less than or equal to one, then the non-carcinogenic risk is considered negligible.

The following equations are used to calculate the incremental risk for carcinogenic pollutants and the hazard index for non-carcinogenic pollutants:

$$\text{Incremental Risk} = C \times \text{URF}$$

Where:

C = annual average ambient air concentration of the compound in $\mu\text{g}/\text{m}^3$

URF = compound-specific inhalation unit risk factor in $(\mu\text{g}/\text{m}^3)^{-1}$

$$\text{Hazard Index} = C / \text{RfC}$$

Where:

C = annual average ambient air concentration of compound in $\mu\text{g}/\text{m}^3$

RfC = compound-specific inhalation reference concentration in $\mu\text{g}/\text{m}^3$

15.5 Existing Conditions and Regulatory Setting

MONITORED DATA

USEPA and NYSDEC operate a network of monitoring stations throughout New York City to measure ambient air quality with the results published on an annual basis. The most recent USEPA and NYSDEC air monitoring databases identify existing air quality levels for the study area based on data from the monitoring stations nearest the project site. Background air quality levels for the study area are shown in Table 15-2, "Monitored Ambient Air Quality Data." Selected locations represent available background sites nearest to the study area.

Table 15-2: Monitored Ambient Air Quality Data

Pollutant	Location	Units	Period	Concentrations			Number of Exceedances of Federal Standard	
				Mean	Highest	Second Highest	Primary	Secondary
CO	Queens College 2	ppm	8-hour	-	1.4	1.4	0	0
			1-hour	-	2.1	1.9	0	0
SO ₂	Queens College 2	ppm	3-hour	-	-	-	0	-
			1-hour	-	10.6	9.6	-	0
Respirable Particulates (PM10)	Queens College 2	µg/m ³	24-hour	-	33	32	0	0
Respirable Particulates (PM2.5)	JHS 126	µg/m ³	Annual	9.0	-	-	0	0
			24-hour	25	27.2	25.4	0	0
NO ₂	Queens College 2	ppb	Annual	17.2	-	-	0	0
			1-hour	63	98	82	0	0
Lead (Pb)	I.S. 52	µg/m ³	3-month	-	0.005	-	0	0
O ₃	Queens College 2	ppm	8-hour	0.073			3	0

Source: USEPA AirData Monitor Values Report, 2016, http://www.epa.gov/airquality/airdata/ad_rep_mon.html; NYSDEC Region 2 – Air Quality Data, 2015, <http://www.dec.ny.gov/chemical/29310.html>

REGULATORY SETTING

Attainment Status/State Implementation Plan (SIP)

The CAA defines non-attainment areas as geographic regions that have not met one or more of the NAAQS. When an area within a state is designated as non-attainment by USEPA, the state is required to develop and implement a State Implementation Plan (“SIP”), which describes how it will meet the NAAQS under deadlines established by the CAA. Kings County complies with the NAAQS for SO₂, NO₂, CO, PM₁₀ and lead, but is designated as a nonattainment area for eight-hour O₃ and an unclassified/attainment area for PM_{2.5}. Violations of the CO standard have not been recorded at the NYSDEC monitoring sites for many years. As part of its ongoing effort to maintain its attainment designation for CO, New York State has committed to the implementation of area-wide and site-specific control measures to continue to reduce CO levels.

Historical monitoring data for New York City indicate that the O₃ eight-hour standard is exceeded. To be in compliance, the three-year average of the annual fourth highest maximum eight-hour average concentration should not exceed the O₃ eight-hour standard. In August 2007, the state submitted the final proposed revision of the SIP for O₃, documenting how the area would attain the eight-hour O₃ standard of 0.08 ppm by 2013. In March 2008, USEPA revised the eight-hour O₃ NAAQS to 0.075 ppm, and on May 2012 designated the New York City region as marginally nonattainment. In November 2014, USEPA proposed to revise the 0.075 ppm standard to within the range of 0.065 ppm to 0.070 ppm. On October 1, 2015, and effective December 28, 2015, the final rule was signed establishing the standard as 0.07 ppm. The previous (2008) O₃ standards remain in effect in some areas, including New York City. Revocation of the previous (2008) O₃ standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

As of 2015, New York City has been designated as a maintenance area for PM_{2.5}. New York State submitted a 2010 draft SIP to USEPA demonstrating that the annual average standard would be met by April 8, 2010. USEPA concurred with the state’s finding, and on December 15, 2010, finalized its determination that this area had attained the annual NAAQS. The state also submitted on May 5, 2011, a clean data petition for this area pertaining to the 24-hour PM_{2.5} NAAQS. On December 31, 2012, USEPA finalized its approval of this petition, determining that the NYC Region nonattainment area had attained the 24-hour NAAQS. USEPA made its initial designations for annual standards on December 18th, 2014. USEPA lowered the annual average primary standard to 12 µg/m³, effective March 2013. USEPA designated the area as in attainment for the new 12 µg/m³ NAAQS effective January 15, 2015.

On February 9, 2010, USEPA revised the CAA primary NAAQS for NO₂ by supplementing the previous annual primary standard of 53 ppb with a new one-hour primary standard at 100 ppb based on the 3-year average of the 98th percentile of the daily maximum one-hour average concentrations, and establishing a new monitoring program (75 Fed. Reg. 6475 (Feb. 9, 2010)). The final rule became effective on April 12,

2010. The current monitoring network focuses upon concentrations for general population exposure at neighborhood and larger scales to support the current annual NO₂ standard and, therefore, does not include monitors near major roadways that could measure the localized concentrations, which are estimated to be responsible for the majority of one-hour peak NO₂ exposures (75 Fed. Reg. 6479 (Feb. 9, 2010)). As a result, states were required to locate NO₂ monitors near roadways and have them operational by January 1, 2013. This means that sufficient air quality data from the new network is not yet available to determine final compliance with the revised NAAQS in certain areas. On January 20, 2012, based on the most recent air quality monitoring data (2008-2010), USEPA determined that no area in the country was violating the 2010 NAAQS for NO₂. On October 5, 2012, USEPA proposed to establish a series of deadlines that would require states and local agencies to begin operating the near-road component of the NO₂ monitoring network in phases between January 1, 2014 and January 1, 2017. This would replace the 2010 rule requirement that all new NO₂ monitors were required to begin operating no later than January 1, 2013. Preparations are currently underway for the commencement of near road monitoring in New York City.

Until the NO₂ designations are made, USEPA states that “major new and modified sources applying for New Source Review (“NSR”)/ Prevention of Significant Deterioration (“PSD”) permits will initially be required to demonstrate that their proposed emissions increases of NO_x will not cause or contribute to a violation of both the annual or one-hour NO₂ NAAQS and the annual PSD increment.” (75 Fed. Reg. 6525 (Feb. 9, 2010) (referring to 40 C.F.R. 51.166(k)). In 2012, USEPA provided additional guidance, “The Near-road NO₂ Technical Assistance Document” (“TAD”), to assist states and emissions sources to comply with the CAA requirements for implementing new or revised NO₂ NAAQS.

On June 22, 2010, USEPA promulgated a new one-hour NAAQS for SO₂, replacing the 24-hour and annual standards. The final rule became effective on August 23, 2010. States were required to submit their initial area designation recommendations for SO₂ to USEPA no later than June 2011. On March 20, 2012, USEPA took final action to retain the current secondary NAAQS for oxides of sulfur (“SO_x”). On July 25, 2013, USEPA designated 29 areas in 16 states as “nonattainment” for the 2010 SO₂ standard. Air quality monitors in each of these areas measured violations of the standard based on 2009 – 2011 data. State plans demonstrating how these areas will meet the SO₂ standard were due to USEPA by April 4, 2015. Currently, USEPA indicates that it intends to address designation for the remainder of the country in separate future actions. As a result, USEPA will complete designations for all remaining areas in the country in up to three additional rounds: the first round by July 2, 2016, the second round by December 31, 2017, and the final round by December 31, 2020. USEPA has not yet made a designation recommendation for the New York City region.

15.6 Mobile Source Analysis

INTRODUCTION

Vehicular traffic, whether on a road or in a parking garage, may affect air quality. Once operational, the proposed action may result in significant adverse mobile source air quality impacts due to increases or redistributions of traffic and the addition of new parking areas located near mobile sources.

The proposed action would be located in the Spring Creek section of Brooklyn. The surrounding area currently consists of a mixture of residential housing and commercial uses (i.e. Gateway Center) and some open space uses. As outlined in the *CEQR Technical Manual*, in this area of the city, actions that would result in the generation of 170 or more peak-hour vehicle trips at an intersection may cause significant adverse air quality impacts and require a detailed air quality analysis for CO. In addition, as described above, NYSDEC and NYCDEP have developed guidelines for determining potential project-related PM_{2.5} impacts. These guidelines are based on the number of project induced heavy vehicle trips. All mobile source analyses are performed for the 2028 future year.

METHODOLOGY

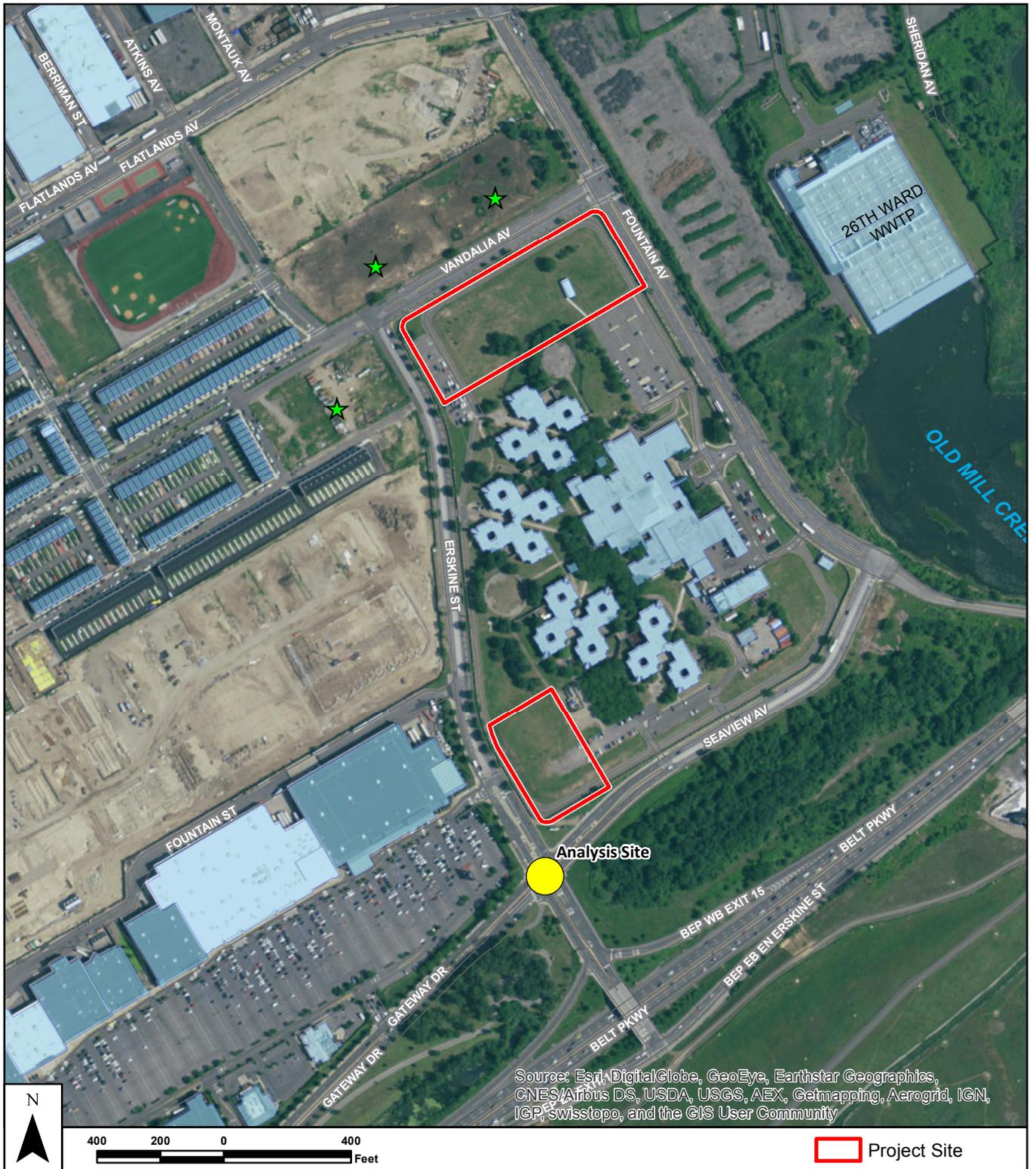
An analysis is conducted to analyze potential significant adverse CO and PM_{2.5} air quality impacts resulting from the implementation of the proposed action. Specific methodology and background information are discussed below.

CARBON MONOXIDE

Selection of Intersection Analysis Sites

A microscale modeling analysis is conducted to estimate CO levels at the most heavily congested intersection (i.e., analysis site) in the study area. Screening procedures described in the *CEQR Technical Manual* are utilized in order to select the worst case analysis sites. These procedures include a determination as to whether future traffic volumes from the studied traffic intersections would exceed the CEQR screening threshold of 170 vehicles during peak traffic hours. Traffic periods considered in the air quality analysis consist of the weekday AM peak hour, midday peak hour, and PM peak hour, and Saturday midday peak hour. Future conditions (2028), with and without the proposed action, are considered in the selection process. Only one intersection located at Gateway Drive/Seaview Avenue and Erskine Street exceeded the CEQR screening threshold. The threshold is projected to be exceeded only during a weekday peak traffic period. As a result, no assessment of the Saturday midday peak hour period

is required. The intersection selected for analysis is shown on Figure 15-1, “Mobile Source Intersection Analysis Site.”



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

Figure 15-1

MOBILE SOURCE INTERSECTION ANALYSIS SITE

Fountain Avenue Land Use Improvement and Residential Project

-  Under Construction (Gateway Estates II)
-  Mobile Source Analysis Site

Receptors

The precise locations at which pollutant concentrations are estimated at the analysis intersection are known as “receptors.” Following guidelines established by USEPA, receptors are typically located where the maximum concentration is likely to occur and where the general public is likely to have access. For this analysis, receptors are distributed along sidewalks near the intersection selected for analysis and surrounding the analysis site.

Traffic Data

Traffic data for the air quality analysis are derived from vehicle counts and other information developed as part of the traffic study analysis. Traffic periods considered in the air quality analysis are the same periods selected for the traffic analysis and consist of the weekday AM peak hour, midday peak hour, PM peak hour, and Saturday midday peak hour. These are the periods when the maximum changes in pollutant concentrations are expected based on overall traffic volumes and anticipated changes in traffic patterns due to the proposed action.

The 2010 Highway Capacity Manual and Highway Capacity Software are used to develop the traffic data necessary for the air quality analysis. The vehicle classification is determined through field data collection. Existing vehicle speeds are obtained from field measurements for the area, and adjusted to estimate future free flow speeds.

Vehicular Emissions

CO emission factors are estimated using the USEPA Motor Vehicle Emissions Simulator (“MOVES”) released in 2010 and updated in 2014. Emissions are supplied for average projected free flow speeds provided by the traffic study. For roadways where speed data are not available, free flow traffic is assumed to travel at a rate of 25 miles per hour (“mph”) in the New York City area. Applicable environmental and vehicular traffic data for MOVES are supplied by NYSDEC to accurately model project conditions. Additional link based data files requirements for MOVES are compiled by obtaining volume, speed and traffic distribution data from the traffic studies.

Dispersion Analysis

Mobile source dispersion models are the basic analytical tools used to estimate pollutant concentrations from the emissions generated by motor vehicles as expected under given conditions of traffic, roadway geometry, and meteorology. CAL3QHC Version 2 is a line-source dispersion model that predicts pollutant concentrations near congested intersections and heavily traveled roadways. CAL3QHC input variables include free flow and calculated idle emission factors, roadway geometries, traffic volumes, site characteristics, background pollutant concentrations, signal timing, and meteorological conditions. CAL3QHC predicts inert pollutant concentrations, averaged over a one-hour period near roadways. This model is used to predict concentrations at affected study-area intersections.

CAL3QHC predicts peak one-hour pollutant concentrations using assumed meteorology and peak-period traffic conditions. Different emission rates occur when vehicles are stopped (idling), accelerating, decelerating, and moving at different average speeds. CAL3QHC simplifies these different emission rates into the following two components:

- Emissions when vehicles are stopped (idling) during the red phase of a signalized intersection.
- Emissions when vehicles are in motion during the green phase of a signalized intersection.

The analyses follow USEPA's Intersection Modeling Guidelines (EPA-454/R-92-005) for CO modeling methodology and receptor placement. All major roadway segments (links) within approximately 1,000 feet from each analysis site (i.e., congested intersection) are considered. A mixing height of 1,000 meters and a surface roughness factor of 321 centimeters are included in all calculations.

A conservative analysis, which assumes that peak period vehicular emissions, traffic volumes, and intersection operating parameters occur every hour of each analysis year, is conducted. The use of peak hour baseline and project-generated traffic conditions also results in conservative predictions of pollutant levels and project impacts.

Background Values

To properly represent the total impact of the proposed action in the analysis, it is necessary to consider representative background levels for each of the analyzed pollutants. The background level is the component of the total concentration not accounted for through the microscale modeling analysis. Applicable background concentrations are added to the modeling results to obtain the total pollutant concentrations at each receptor site for the analysis year. The CO background values are provided by NYCDEP using the latest NYSDEC procedures based on the most recent ambient monitoring data and future decreases in vehicular emissions. PM_{2.5}, PM₁₀, NO₂ and SO₂ background values are also obtained from NYCDEP. These values are added to the modeling results as appropriate to obtain the total pollutant concentrations at each receptor site for the future analysis year. The background values used in the air quality analyses are provided in Table 15-3, "Background Pollutant Concentrations."

Table 15-3: Background Pollutant Concentrations

Pollutant	Average Period	Location	Concentration	NAAQS
NO ₂	Annual ¹	Queens College, Queens	21.62 µg/m ³	100 µg/m ³
	1-hour ²		57.9 µg/m ³	188 µg/m ³
SO ₂	1-hour ³	Queens College, Queens	14.3 µg/m ³	196 µg/m ³
	3-hour ⁴		89 µg/m ³	1,300 µg/m ³
PM _{2.5}	24-hour	JHS 126	20.0 µg/m ³	35 µg/m ³
PM ₁₀	24-hour ⁵	Queens College, Queens	32 µg/m ³	150 µg/m ³
CO	1-hour ⁶	Queens College, Queens	3.4 ppm	35 ppm
	8-hour ⁶	Queens College, Queens	1.7 ppm	9 ppm

Notes:
¹ Annual average NO₂ background concentration is based on the 5-year highest value from 2010-2014.
² The One-hour NO₂ background concentration is based on the maximum 98th percentile One-hour NO₂ concentration averaged over three years of data, from 2012-2014.
³ The One-hour SO₂ background concentration is based on the maximum 99th percentile concentration averaged over three years of data, from 2012-2014.
⁴ The Three-hour SO₂ background concentration is based on the five-year highest second-highest measured value from NYSDEC for 2008-2012.
⁵ PM₁₀ is based on the 3-year highest second-highest value from 2012-2014.
⁶ CO background concentrations are the highest 2nd max values from the latest 5 years of available monitoring data from NYSDEC (2008 - 2012).

Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2009-2014.

FUTURE WITHOUT THE PROPOSED ACTION

CO

A summary of the results of the mobile source air quality modeling analysis for the future without the proposed action in 2028 are provided in Table 15-4, “2028 Maximum 8-hour CO Concentrations – Future Without the Proposed Action.” The values shown are the maximum CO concentrations estimated near the analysis site under the time frames that correspond to the NAAQS.

Table 15-4: 2028 Maximum 8-hour CO Concentrations - Future Without the Proposed Action

Intersection	Highest CAL3QHC Concentration (ppm)	Maximum Concentration (ppm)	NAAQS (ppm)
Gateway Drive at Erskine Street			
AM	0.28	1.98	9
MD	0.21	1.91	9
PM	0.21	1.91	9
Notes: 1. Maximum results of all time periods analyzed. 2. All values include appropriate background concentration. 3. 8-hour CO background concentration = 1.7 ppm, persistence factor = 0.7			

Source: STV Incorporated, 2016.

As shown in Table 15-4, in the future without the proposed action, the analysis location would not experience a violation of the NAAQS for carbon monoxide.

FUTURE WITH THE PROPOSED ACTION

CO

A summary of the results of the mobile source air quality modeling analysis for the future with the proposed action in 2028 are provided in Table 15-5, “2028 Maximum 8-hour CO Concentrations – Future With the Proposed Action.” The values shown are the maximum CO concentrations estimated near the analysis site under the time frames that correspond to the NAAQS.

Table 15-5: 2028 Maximum 8-hour CO Concentrations – Future With the Proposed Action

Intersection	Highest CAL3QHC Concentration (ppm)	Maximum Concentration (ppm)	NAAQS (ppm)
Gateway Drive at Erskine Street			
AM	0.28	1.98	9
MD	0.21	1.91	9
PM	0.21	1.91	9
Notes: 1. Maximum results of all time periods analyzed. 2. All values include appropriate background concentration. 3. 8-hour CO background concentration = 1.7 ppm, persistence factor = 0.7			

Source: STV Incorporated, 2016.

As shown in Table 15-5, in the future with the proposed action, the analysis location would not experience a violation of the NAAQS for carbon monoxide. In addition, the imperceptible incremental increase in the With Action CO concentration over the No Action concentration would not trigger the CO *de minimis* criteria. As a result, the proposed action would not result in a significant adverse impact on air quality.

PM_{2.5} – Mobile Source Air Quality Screen

The screening of mobile source PM_{2.5} is conducted for all of the studied intersections in the study area. Project traffic data indicate that the proposed action would induce 12 heavy duty vehicles at two intersections in the study area. This amount of project generated heavy duty vehicles falls below the PM_{2.5} threshold as outlined by NYCDEP. Therefore, no further analysis of PM_{2.5} from mobile sources is required.

PARKING FACILITIES ANALYSIS

Pollutant concentrations could be affected near the four parking facilities that would be built as part of the proposed action. To estimate the potential significant adverse impacts from the emissions of these facilities, a detailed analysis is performed. Parking facilities would include a below-grade garage with 118 spaces and an outdoor surface parking area with 103 spaces on Parcel A, and two at-grade parking garages with a total of 254 parking spaces located centrally within the Parcel B building groups. Because it is assumed that the proposed parking facilities would be used almost exclusively by gasoline-powered automobiles and not diesel-fueled trucks, CO is the only pollutant considered for this analysis. PM₁₀ and PM_{2.5} concentrations would not be materially affected by emissions from these facilities.

The assessment of parking related traffic emissions are typically conducted for the worst-case condition, which involves studying the traffic period that exhibits the most vehicles exiting in the higher polluting cold start mode where vehicles initially idle before exiting. This worst-case period typically occurs during the AM traffic peak. An examination of the traffic auto accumulation data for parking at the two parcels indicates that, during the AM peak, Parcel A would only have 61 vehicles exiting, while Parcel B would have 141 vehicles exiting from the two garages. In addition, the parking facilities at Parcel A would result in the dispersion of emissions over a wider area when compared to a singular emission point (exhaust vent) as is assumed for the Parcel B parking garages. Therefore, the Parcel B parking garages are assessed as one singular garage (with one exhaust vent) as the worst-case condition. This is a conservative assumption since a combined garage would result in greater overall emissions and assessing one vent location would concentrate pollutant emissions at a specific location. CO concentrations near the parking facility are estimated following the *CEQR Technical Manual* guidelines for parking lots and mechanically ventilated, enclosed garages. Pollutant concentrations are estimated at receptors representative of near and far sidewalk locations from the parking garage exhaust vent. The height of the vent for the parking garage is assumed to be a minimum of 10 feet above street level.

Although none of the intersections nearby the Parcel B parking facility require a detailed mobile source assessment, to obtain a conservative cumulative assessment value for on-street traffic and the parking areas, contributions from emissions generated by the studied air quality intersection (Erskine Street at Gateway Drive) under peak hour With Action conditions are added to the estimated worst-case Parcel B

parking concentrations. This analysis is conducted for the 2028 analysis year for the weekday AM peak period.

The resulting maximum total 8-hour CO concentration (i.e., including background levels and street traffic contributions) predicts that the proposed action would not result in an exceedance of the *de minimis* CO criteria or the NAAQS of 9 ppm. The maximum predicted eight-hour average CO concentration of all the receptors modeled at Parcel B is 2.13 ppm. This value includes a predicted concentration of 0.15 ppm from emissions within the parking garage, an on-street contribution from the intersection of Erskine Street at Gateway Drive of 0.28 ppm, and a background level of 1.7 ppm. Because this worst-case scenario would not result in any exceedances of the CO standards, it is not expected that any significant adverse impacts would occur from the operation of the smaller Parcel A parking facilities.

15.7 Stationary Source Emissions Analysis

INTRODUCTION

The project site consists of a large complex that would be made up of two separate parcels inclusive of three separate building groups. As shown on Figure 15-2, "Analysis Site Building Configurations," Parcel A would include one building group made up of two separate but attached buildings at differing heights. Parcel B would include two building groups, each with four separate but attached buildings at differing heights. The distance between parcels A and B would be approximately 1,000 feet, with the existing BDC located between the two parcels.

The three primary issues with regard to HVAC systems emissions include: 1) the impact of HVAC emissions from the proposed development site on nearby existing and future buildings in addition to other sensitive receptor locations within the study area; 2) the individual impact that each project building may have on another nearby project building of equal or greater height (project on project); and 3) the potential for emissions from existing stationary sources of pollution from either large-scale heating systems or industrial processes to result in significant adverse impacts on the proposed action. Accordingly, issue one addresses the potential impact project HVAC emissions as a whole could have on nearby sensitive receptors such as the Gateway Estates development, the existing BDC, and other discrete sensitive receptor locations within the study area. Issue number two concerns the impact that HVAC emissions from individual project buildings could have on each other.

With regard to issue three, USEPA Envirofacts Database and NYSDEC Bureau of Stationary Sources websites are used to identify major and large emission sources within 1,000 feet of the project site. (Major sources are identified as those sources located at Title V facilities that require PSD permits. The majority of these types of facilities are defined as large facilities that emit a pollutant at or above the major source

threshold of 100 tons per year. Large sources are identified as sources located at facilities which require a State facility permit.) For industrial sources, a review of land use mapping and a visual inspection of the study area are conducted to determine whether any industrial emissions sources could be found within 400 feet of the proposed action.

Consequently, as per the *CEQR Technical Manual*, an evaluation of the potential stationary source significant adverse impacts related to the project site is conducted.

METHODOLOGY

Emissions from the heating and hot water systems of individual project buildings of the proposed action may affect air quality levels at nearby sensitive receptors. Potential significant adverse impacts would be a function of fuel type, stack height, square footage of buildings, and locations of the emission sources relative to the nearby receptors. Fuel uses typically include oil or natural gas for space heating and hot water, and natural gas for cooking. For the purposes of this analysis, the fuel type that would supply heat and hot water to the project site is assumed to be No. 2 fuel oil. This is a conservative assumption since the burning of No. 2 fuel oil results in greater pollutant emissions than natural gas. In addition, stack exhaust locations are assumed to be located a minimum of three feet above roof height (as per the *CEQR Technical Manual*). For the purposes of assessing significant adverse air quality impacts, it is also assumed that each individual building would include one stack for purposes of venting HVAC emissions.

For the assessment of project building-on-building emissions, the potential impact of each individual project building is evaluated by assessing the nearest project building of a similar or greater height as a potential receptor. Exhaust stacks for the heat and hot water systems are first assumed to be located 10 feet from the wall of the adjacent taller building (this wall is assumed to have operable windows or intake vent locations). Where exceedances of thresholds are predicted to occur under this scenario, additional iterations of the analysis are conducted utilizing subsequent increases in distance (by 5-foot intervals) from the wall of the adjacent building. Once the maximum distance is reached (i.e., the edge of the subject rooftop directly opposite the adjacent building property line), then the analysis is run assuming interval increases in stack height.

The BDC facility operates a combustion installation consisting of two boilers rated at 15 mmBtu/hr with each capable of firing natural gas or No. 2 fuel oil. However, according to the information supplied on the NYSDEC permit for the facility, emissions limits are provided for NO_x, and not particulate matter. This indicates that the primary fuel utilized for the boilers would be natural gas. The facility permit limits NO_x emissions to 24.9 tons per year (49,800 lbs/year). The facility's NO_x capping certification worksheet indicates combined peak monthly emissions for both oil and gas usage would be 651 pounds of NO₂. Each of the two boilers exhausts through its own individual stack above the roof of the central plant. The stack release height is 32 feet and the stack diameter is 30 inches. In addition to these two primary boilers, there are two exempt boilers (less than 10 mmBtu/hr each). Also, the facility operates four natural gas

fired emergency generators and one diesel emergency generator, which are also exempt sources. However, based on the facility's NO_x capping certification worksheet, usage of the exempt boilers and emergency generators, when compared to the two primary boilers, would not be significant with respect to the facility's overall NO₂ emissions, as any incremental emissions from them would be small (less than five pounds of NO₂ per month). As a result, they are not included as part of the BDC stationary source assessment.

Analysis Parameters

The geometric complexities of the proposed action, with regard to the varying heights of project buildings and their close proximity to one another, make the nomographic stationary source screening procedures described in the *CEQR Technical Manual* inappropriate. Therefore, a detailed dispersion modeling analysis using the USEPA AERMOD model is conducted for the project site. AERMOD is a versatile model capable of predicting pollutant concentrations from continuous point, area, and volume sources. AERMOD uses enhanced plume and wake dispersion algorithms that are capable of estimating pollutant concentrations in a building's cavity and wake regions. The AERMOD model is used to estimate pollutant concentrations with downwash effects on plume dispersion.

Three pollutants emitted from project stack locations—NO₂, SO₂, PM₁₀ and PM_{2.5} -- are considered. Short-term (1 hr, 3 hr & 24 hr) and long-term (i.e., annual average) concentrations are estimated.

Regarding HVAC emissions, appropriately conservative dispersion modeling stack options and assumptions are applied according to guidance within the *CEQR Technical Manual*.

Emission Rates

Emission rates are estimated as follows:

- A fuel consumption rate for each building is estimated using fuel consumption tables found in the *CEQR Technical Manual*. These factors are then multiplied by the square footage of each building tower to estimate total gallons of fuel consumed annually. The square footage of each building tower is estimated based on parameters in the project concept plan.
- When available, daily values are divided by 24 to obtain hourly values for use in the short-term dispersion analysis, and
- Average annual pollutant emission rates are estimated, as recommended in the *CEQR Technical Manual*, by dividing the total amount of pollution estimated to be emitted in a year by the number of hours in one year (8,760 hours).

Emission factors are obtained from USEPA "Compilation of Air Pollutant Emission Factors" (AP-42), assuming ultra-low No. 2 fuel oil with a sulfur content of 0.0015 percent would be used to heat the new development.

Coordinate System and Receptors

A GIS coordinate system is utilized that includes the location of each stack on the roof of an affected building and nearby elevated receptors. Because highest impacts would occur along the level of the plume centerline at approximately the height of the stack, elevated receptors are placed at varying elevations. It is assumed that all nearby taller buildings would either have air intake vents or operable windows at these levels and are therefore considered as potential sensitive receptor sites. Ground level receptors are also placed at sensitive locations on and off site.

Meteorology

The latest available five years of meteorological data from John F. Kennedy International Airport (“JFK Airport”) are used for the years 2010 through 2014, along with concurrent upper air data from Brookhaven, Suffolk County, New York.

Background Values

Background concentrations (i.e., pollutant levels from other sources in the study area) for the pollutants of concern are obtained from NYCDEP and based on the latest monitoring data collected by the NYSDEC. These values, which are provided in Table 15-3, “Background Pollutant Concentrations,” are added to estimate project impacts, and the resulting total concentrations are compared with appropriate NAAQS for NO₂, SO₂ and PM₁₀.

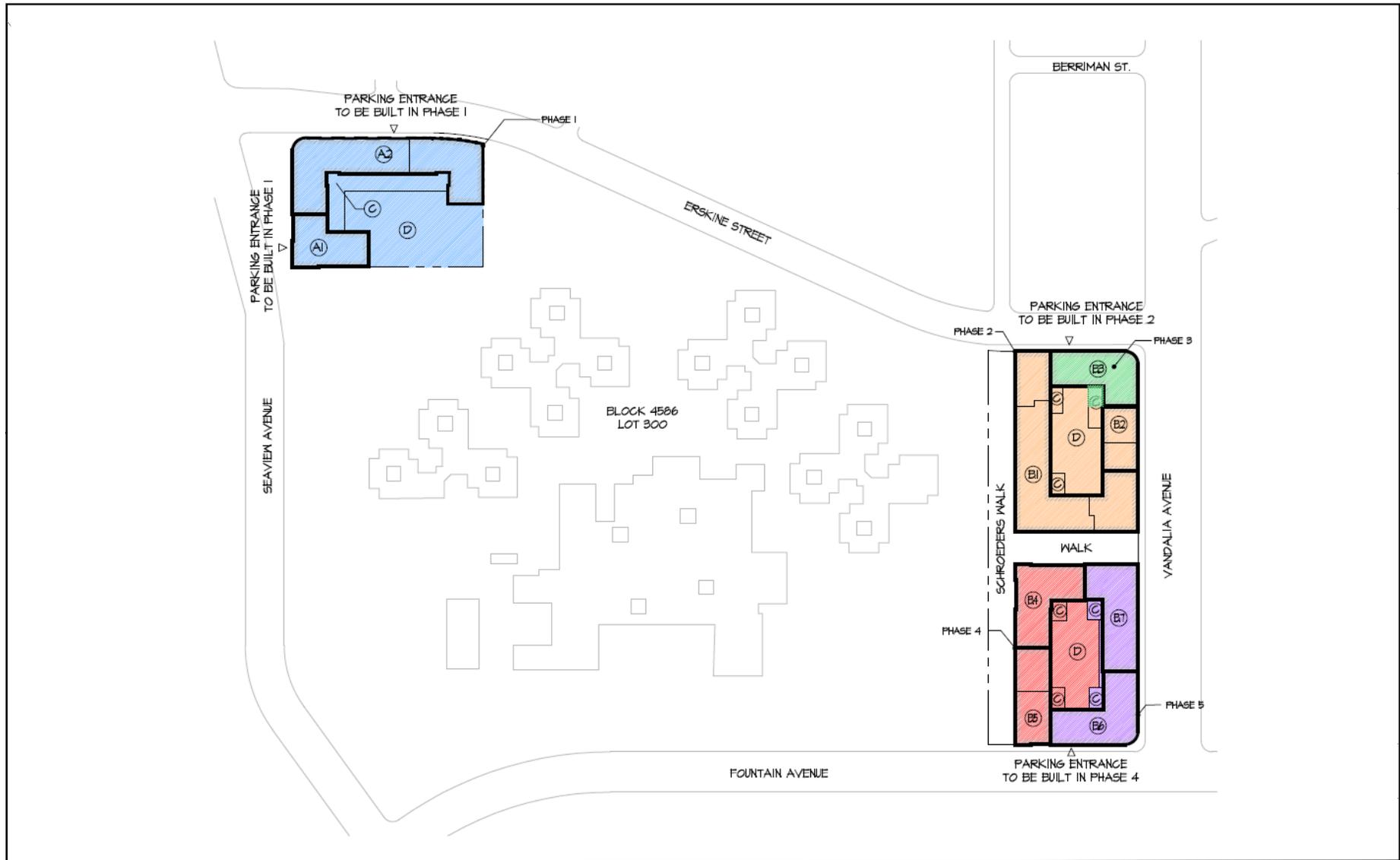
15.8 Stationary Source Analysis

The stationary source analyses are based on the currently assumed building configuration for the proposed action as shown in Figure 15-2, “Analysis Site Building Configurations.” The boundaries of the individual project buildings are shown and identified.

IMPACTS FROM PROPOSED DEVELOPMENT ON OTHER PROPOSED DEVELOPMENT BUILDINGS

For the building-on-building analysis scenarios, the default stack locations as described in the stationary source methodology above would not result in significant adverse impacts (in the form of exceedances of the NAAQS or *de minimis* criteria) being predicted at a neighboring building.

The results are shown in Table 15-6, “Heating and Hot Water System Analysis – Predicted Concentrations for Impact Results from Building-on-Building Assessment (µg/m³).”



Source: The Arker Companies, 2016.

Figure 15-2
ANALYSIS SITE BUILDING CONFIGURATIONS
 Fountain Avenue Land Use Improvement and Residential Project

(A ₁)	6 Story - 65' High	(B ₂)	9 Story - 95' High	(B ₅)	7 Story - 75' High	(C)	Private Open Space
(A ₂)	9 Story - 95' High	(B ₃)	9 Story - 95' High	(B ₆)	9 Story - 95' High	(D)	Parking
(B ₁)	7 Story - 75' High	(B ₄)	5 Story - 50' High	(B ₇)	7 Story - 75' High	Δ	Parking Entrance
■	Phase 1	■	Phase 2	■	Phase 4		
		■	Phase 3	■	Phase 5		

Table 15-6: Heating and Hot Water System Analysis – Predicted Concentrations for Impact Results from Building-on-Building Assessment ($\mu\text{g}/\text{m}^3$)*

Building-on-Building ID's	PM ₁₀ (24-Hour)		PM _{2.5} (24-Hour)		PM _{2.5} (Annual)		SO ₂ (1-Hour)		NO ₂ (1-Hour)	
	Predicted Concentration	NAAQS	Predicted Concentration	<i>De Minimis</i> Criteria	Predicted Concentration	<i>De Minimis</i> Criteria	Predicted Concentration	NAAQS	Predicted Concentration	NAAQS
A1 on A2	<u>40.4</u>	150	0.38	7.5	0.06	0.3	<u>20.9</u>	89	<u>125.4</u>	188
B1 on B2	<u>33.3</u>	150	<u>0.06</u>	7.5	<u>0.01</u>	0.3	<u>15.5</u>	89	<u>59.9</u>	188
B1 on B3	<u>32.8</u>	150	<u>0.04</u>	7.5	<u>0.01</u>	0.3	<u>15.2</u>	89	<u>59.4</u>	188
B4 on B5	<u>37.2</u>	150	<u>0.23</u>	7.5	<u>0.02</u>	0.3	<u>18.0</u>	89	<u>68.3</u>	188
B4 on B7	<u>41.0</u>	150	<u>0.40</u>	7.5	<u>0.08</u>	0.3	<u>27.5</u>	89	<u>81.6</u>	188
B7 on B6	<u>49.5</u>	150	<u>0.78</u>	7.5	<u>0.10</u>	0.3	<u>37.0</u>	89	<u>101.0</u>	188
Notes: * As per CEQR, PM _{2.5} 24-hour average <i>de minimis</i> criteria are defined as the level not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 $\mu\text{g}/\text{m}^3$										

Source: STV Incorporated, 2016.

OFF-SITE IMPACTS FROM PROJECT DEVELOPMENT HEAT AND HOT WATER SYSTEMS

With respect to the impact that the proposed action would have on off-site sensitive receptors, the results of the analysis indicate that, when using No. 2 fuel oil, emissions from the proposed development would not result in any significant adverse air quality impacts. The maximum predicted results are shown in Table 15-7, “Heating and Hot Water System Analysis – Results from the Proposed Development ($\mu\text{g}/\text{m}^3$).”

Table 15-7: Heating and Hot Water System Analysis - Results from the Proposed Development ($\mu\text{g}/\text{m}^3$)*

PM ₁₀ (24-Hour)		PM _{2.5} (24-Hour)		PM _{2.5} (Annual)		PM _{2.5} (Neighborhood Annual)		SO ₂ (1 Hour)		NO ₂ (1 Hour)		NO ₂ (Annual)	
Predicted Concentration	NAAQS	Predicted Concentration	<i>De Minimis</i> Criteria	Predicted Concentration	<i>De Minimis</i> Criteria	Predicted Concentration	<i>De Minimis</i> Criteria	Predicted Concentration	NAAQS	Predicted Concentration	NAAQS	Predicted Concentration	NAAQS
<u>56.0</u>	150	<u>1.1</u>	7.5	<u>0.09</u>	0.3	.002	0.1	<u>61.3</u>	<u>196</u>	<u>95.3</u>	188	<u>25.5</u>	100

Notes:

* As per CEQR, PM_{2.5} 24-hour average *de minimis* criteria defined as the level not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 $\mu\text{g}/\text{m}^3$

Source: STV Incorporated, 2016.

POTENTIALLY SIGNIFICANT EXISTING EMISSION SOURCES

A review of the USEPA Envirofacts database, indicates that emissions from the BDC boilers could potentially impact portions of the project site as the stacks would be located within 1,000 feet of Parcel A. Parcel B would be located beyond 1,000 feet from the BDC stack location, so significant adverse impacts would not be expected. No other large or major emissions sources are identified as being within 1,000 feet of the proposed action. Therefore, based on emissions data obtained from NYSDEC, a detailed analysis using USEPA AERMOD is conducted to determine the potential significant adverse impact that the BDC could have on the proposed development.

Based on the facility’s NO_x capping certification worksheet, the boilers burn natural gas primarily; therefore, only concentrations of NO₂ are calculated. In addition, the emissions rate for the one hour NO₂ is derived from the most recently recorded, maximum monthly on-site emissions (651 pounds per month) as indicated on the facilities NO_x capping certification worksheet. The emissions rate for annual NO₂ is based on the maximum allowable annual emissions (49,800 pounds per year) as per the facility’s NYSDEC permit. The assessment assumes a conservative flue gas exit temperature of 417K, and a flue gas flow rate of 6,750 cubic feet per minute “CFM”). It is also assumed that the NO₂/NO_x ratios would be 0.75 for annual NO₂ and 0.80 for hourly NO₂, as per the USEPA Tier II method described in USEPA’s “Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO₂ National Ambient Air Quality Standard.”¹ The maximum estimated concentrations of NO₂ from the modeling are added to the background concentrations to estimate total air quality concentrations on the proposed action. The results of the modeling analysis shown in Table 15-8, “Potential Air Quality Impacts from the BDC Boilers – Summary of Maximum Predicted Concentrations (µg/m³),” indicate that there would be no exceedances of the NAAQS for NO₂ near any of the proposed sensitive receptor sites. Therefore, there would be no significant adverse impact from the pollutant emissions of the existing BDC.

Table 15-8: Potential Air Quality Impacts from the BDC Boilers – Summary of Maximum Predicted Concentrations (µg/m³)

Pollutant	Averaging Period	Background Concentration	Maximum Predicted Concentration	Maximum Predicted Total Concentration	NAAQS
NO ₂	Annual	21.62	1.36	22.98	100
	1 -Hour	57.9	87.6	123.6	188

Source: STV Incorporated, 2016.

¹ http://www3.epa.gov/scram001/guidance/clarification/NO2_Clarification_Memo-20140930.pdf, September 2014.

ANALYSIS OF AIR TOXICS

This section addresses potential significant adverse impacts from existing toxic emission sources on the proposed action. These emissions are of concern because a large portion of the proposed action includes residential uses. As a result, emissions of toxic pollutants from the operation of any existing facilities may result in pollutant concentrations that could affect these residential uses.

The following procedures are used to estimate the potential significant adverse air quality impacts of these toxic emissions:

- To ensure that the toxics analysis included existing sources with the most potential to affect the proposed action, an analysis zone within approximately 400 feet of the proposed action is selected;
- A survey of land use mapping within the analysis zone, as well as a visual inspection, is conducted.

Results of the search did not identify any industrial or air toxics facilities. As a result, no further analysis of air toxics is required since significant adverse air quality impacts from air toxics on the project site would not occur.

MALODOROUS EMISSIONS

Malodorous emissions from the main 26th Ward WWTP located west of the project site have the potential to impact the proposed action. The *Gateway Estates II Final Environmental Impact Statement ("FEIS")*, completed in February 2009 (which was an update of the 1996 *Gateway Estates II FEIS*), concluded that the Gateway Estates development, which is located immediately to the east of the main treatment plant, would not be significantly impacted by odor related emissions. The detailed quantitative study conducted for the 1996 FEIS reported that the maximum predicted 1-hour average H₂S concentration at a sensitive project receptor location was 0.6 ppb, which is below the NYSDEC site-perimeter standard of 10 ppb and below the NYCDEP significant impact threshold of 1 ppb for sensitive receptors. The proposed action would be located much farther to the east of the main treatment plant than the Gateway Estates development; therefore, concentrations of H₂S at sensitive receptors for the proposed action are not expected to be greater than those predicted for the Gateway Estates development. Furthermore, a report conducted by NYCDEP Bureau of Environmental Engineering ("BEE") "Identification of Odor-Control needs for a Municipal Wastewater Treatment Plant Upgrade: A New York City Success Story," April 19, 2004, indicated that improvements to facilities initiated in 2004 would significantly reduce odors from H₂S to the surrounding community. The then-proposed upgrades were projected to correct a variety of plant deficiencies, as well as improve instrumentation and process-control capabilities. One of the upgrade components was the inclusion of odor controls such that strict compliance with hourly, off-site H₂S standards is ensured.

The 1996 *Gateway Estates II FEIS* also qualitatively assessed potential odors from the Spring Creek AWPCP / CSO facility to the east of the project site. The conclusions from the 1996 FEIS indicated that potential odors from CSO releases to Spring Creek could result in exceedances of the H₂S standards. These exceedances would occur only under certain meteorological and tidal conditions, and, as they were related to occurrences in nature, could not be mitigated. Although the Spring Creek CSO facility is located to the east of the proposed action, according to a NYCDEP report “Waterbody/Watershed Facility Plan – Jamaica Bay and CSO Tributaries,” October 2011, upgrades to this facility (including a new odor control building) went online in 2007. As a result, it is expected that the proposed action sensitive receptors would experience less malodorous emissions from the Spring Creek AWPCP / CSO facility than would previously have been expected. Consequently, while occasional temporary odors may occur, it is not anticipated that malodorous emissions from the 26th Ward service area would result in a significant adverse impact to the proposed action.