Chapter 15: Air Quality

A. INTRODUCTION

This chapter examines the potential for air quality impacts from the proposed project. The proposed project would redevelop the vacant and historic Pier 57 structure with public open space; retail, restaurant and other commercial uses; a marina; and educational and cultural uses.

The proposed project would create new sources of air pollutant emissions, both mobile (emissions from project generated vehicle trips and motorized boat trips) and stationary (such as exhaust from fossil fuel-fired heating and hot water systems). With respect to the analysis of mobile sources, quantified assessments of the potential impacts on air quality due to carbon monoxide (CO) and particulate matter (PM2.5) emissions from traffic generated by the proposed project were conducted. As the proposed project would include an accessory parking garage, a quantified analysis was conducted to evaluate potential future CO concentrations in the vicinity of the ventilation outlets for the proposed garage. In addition, a quantified analysis was conducted to evaluate potential future pollutant concentrations on the proposed walkway along the marina.

With respect to the analysis of stationary sources, the potential for impacts on air quality from the proposed heating system was analyzed, following the 2012 City Environmental Quality Review (CEQR) Technical Manual guidance. Furthermore, because the proposed project would result in open space, commercial, and institutional uses near an area zoned for manufacturing, a site survey and air emission permit search was conducted to determine whether any businesses within the manufacturing zone are sources of emissions that could have the potential for air quality impacts on the proposed uses.

PRINCIPAL CONCLUSIONS

A detailed assessment found that the proposed project would not result in significant adverse impacts from mobile source emissions. Vehicle emissions inside the proposed parking garage would be mechanically vented, and the concentrations resulting from the emissions within the parking garage and from on-street traffic would be in compliance with the applicable standards and thresholds. Based on a screening analysis of motorized boat emissions and dispersion at the proposed marina and water taxi landing there would be no potential for significant adverse impacts. Based on stationary source screening analyses, there would be no potential for significant adverse air quality impacts from the heat and hot water systems of the proposed project.

The nearby area zoned for manufacturing uses was surveyed to identify potential sources of emissions that could affect the proposed project. There are no existing permitted sources of manufacturing use emissions within the study area that could affect the proposed project. Therefore, there would be no potential for significant adverse impacts on air quality due to industrial sources.
B. POLLUTANTS FOR ANALYSIS

Ambient 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. Particulate matter (PM), volatile organic compounds (VOCs), and nitrogen oxides (nitric oxide, NO, and nitrogen dioxide, NO₂, collectively referred to as NOₓ) are emitted from both mobile and stationary sources. Fine PM is also formed when emissions of NOₓ, sulfur oxides (SOₓ), ammonia, organic compounds, and other gases react or condense in the atmosphere. Emissions of sulfur dioxide (SO₂) are associated mainly with stationary sources, and sources utilizing non-road diesel such as diesel trains, marine engines, and non-road vehicles (e.g., construction engines). On-road diesel vehicles currently contribute very little to SO₂ 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 NOₓ and VOCs. These pollutants are regulated by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act, and are referred to as ‘criteria pollutants’.

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. Since CO is a reactive gas which does not persist in the atmosphere, CO concentrations can vary greatly over relatively short distances; elevated concentrations are usually limited to locations near crowded intersections, heavily traveled and congested roadways, parking lots, and garages. Consequently, CO concentrations must be predicted on a local, or microscale, basis.

During most of the peak hours considered in Chapter 14, “Transportation,” the proposed project would result in new vehicle trips that would be greater than the CEQR Technical Manual screening threshold for the study area of 170 trips. Therefore, a quantified assessment of on-street CO emissions was performed for the peak hours with the highest number of project generated vehicle trips. A parking garage analysis was conducted to evaluate future CO concentrations with the operation of the proposed parking garage.

Marine engines are a source of CO emissions. Therefore, an analysis was conducted to evaluate future CO concentrations with the operation of the proposed marina and water taxi landing.

NITROGEN OXIDES, VOCS, AND OZONE

NOₓ are principally of 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 NOₓ and VOC emissions from all sources are therefore generally examined on a regional basis. The contribution of any action or project to regional emissions of these pollutants would include any added stationary or mobile source emissions. The proposed project would not have a significant effect on the overall volume of vehicular travel in the metropolitan area; therefore, no measurable impact on regional NOₓ
emissions or on ozone levels is predicted. A regional analysis of emissions of these pollutants from mobile sources associated with the proposed project 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 regulated criteria pollutant. Since NO$_2$ is mostly formed from the transformation of NO in the atmosphere, it has mostly been of concern further downwind from large stationary point sources, and not a local concern from mobile sources. (NO$_x$ emissions from fuel combustion consist of approximately 90 percent NO and 10 percent NO$_2$ at the source.) However, with the promulgation of the 2010 1-hour average standard for NO$_2$, discussed further below, local sources such as vehicular emissions may become of greater concern for this pollutant.

The traffic associated with the proposed project is not expected to change NO$_2$ concentrations appreciably, since the vehicular traffic associated with the proposed project would be a very small percentage of the total number of vehicles in the area. The amount of NO emitted that would rapidly transform to NO$_2$ in the immediate vicinity of roadways and intersections with project-generated traffic would be very small. It is not known whether conditions in the future condition without the proposed project will be within or in excess of the NAAQS in these near-road areas.

Potential impacts on local NO$_2$ concentrations from the fuel combustion in the proposed project heating systems, as well as from motorized boat activity at the proposed marina and water taxi landing were evaluated.

**LEAD**

Airborne lead emissions are currently associated principally with industrial sources. Lead in gasoline has been banned under the Clean Air Act. No significant sources of lead are associated with the proposed project and, therefore, analysis is 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 VOC; 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 exhaust) or from precursor gases reacting in the atmosphere to form secondary PM.

Diesel-powered vehicles, especially heavy duty trucks and buses, are a major source of respirable PM, most of which is PM$_{2.5}$; PM concentrations may, consequently, be locally elevated near roadways with high volumes of heavy diesel powered vehicles. During most peak periods analyzed in Chapter 14, the proposed project would result in traffic exceeding the PM$_{2.5}$ vehicle emission screening analysis thresholds as defined in Chapter 17, Sections 210 and 311 of the CEQR Technical Manual. Therefore, the potential impacts from vehicle PM$_{2.5}$ emissions were analyzed, using traffic data for the peak periods during which the greatest project generated PM$_{2.5}$ emissions would occur.

Similarly, diesel-powered marine engines are a source of respirable PM. An analysis was performed to determine the potential for impacts from marine vessel emissions at the proposed marina and water taxi landing.

SULFUR DIOXIDE

SO$_2$ emissions are primarily associated with the combustion of sulfur-containing fuels (oil and coal). Monitored SO$_2$ concentrations in New York City do not exceed national standards. 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 vehicles and marine engines, no significant quantities are emitted from vehicular or motorized boat sources. These sources of SO$_2$ are not significant and therefore, analysis of SO$_2$ from mobile sources and marine vessels was not warranted.

The proposed project would use natural gas as fuel for the heating system. The sulfur content of natural gas is negligible; therefore, no analysis was performed to estimate the future levels of SO$_2$ with the proposed project’s heating system.

NONCRITERIA POLLUTANTS

In addition to the criteria pollutants discussed above, noncriteria pollutants may be of concern. Noncriteria pollutants are emitted by a wide range of man-made and naturally occurring sources. These pollutants are sometimes referred to as hazardous air pollutants (HAP) and when emitted from mobile sources, as Mobile Source Air Toxics (MSATs). Emissions of noncriteria pollutants from industries are regulated by EPA. The existing uses within the area zoned for manufacturing were surveyed as potential sources of noncriteria pollutant emissions that could affect the project.

C. AIR QUALITY STANDARDS, REGULATIONS 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 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 and
secondary standards are the same for NO$_2$ (annual), ozone, lead, and PM, and there is no secondary standard for CO and the 1-hour NO$_2$ standard. The NAAQS are presented in Table 15-1. 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 particulate matter (TSP), settleable particles, non-methane hydrocarbons (NMHC), 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 (H$_2$S).

### Table 15-1

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ppm</td>
<td>µg/m$^3$</td>
</tr>
<tr>
<td><strong>Carbon Monoxide (CO)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-Hour Average $^{(1)}$</td>
<td>9</td>
<td>10,000</td>
</tr>
<tr>
<td>1-Hour Average $^{(1)}$</td>
<td>35</td>
<td>40,000</td>
</tr>
<tr>
<td><strong>Lead</strong></td>
<td>NA</td>
<td>0.15</td>
</tr>
<tr>
<td>Rolling 3-Month Average $^{(2)}$</td>
<td>NA</td>
<td>0.15</td>
</tr>
<tr>
<td><strong>Nitrogen Dioxide (NO$_2$)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-Hour Average $^{(3)}$</td>
<td>0.100</td>
<td>188</td>
</tr>
<tr>
<td>Annual Average</td>
<td>0.053</td>
<td>100</td>
</tr>
<tr>
<td><strong>Ozone (O$_3$)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-Hour Average $^{(4)}$</td>
<td>0.075</td>
<td>150</td>
</tr>
<tr>
<td><strong>Respirable Particulate Matter (PM$_{10}$)</strong></td>
<td>NA</td>
<td>150</td>
</tr>
<tr>
<td>24-Hour Average $^{(5)}$</td>
<td>NA</td>
<td>150</td>
</tr>
<tr>
<td><strong>Fine Respirable Particulate Matter (PM$_{2.5}$)</strong></td>
<td>NA</td>
<td>150</td>
</tr>
<tr>
<td>Annual Mean</td>
<td>NA</td>
<td>15</td>
</tr>
<tr>
<td>24-Hour Average $^{(6)}$</td>
<td>NA</td>
<td>35</td>
</tr>
<tr>
<td><strong>Sulfur Dioxide (SO$_2$)</strong></td>
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<td></td>
</tr>
<tr>
<td>1-Hour Average $^{(7)}$</td>
<td>0.075</td>
<td>197</td>
</tr>
<tr>
<td>Maximum 3-Hour Average $^{(1)}$</td>
<td>NA</td>
<td>0.50</td>
</tr>
</tbody>
</table>

**Notes:**
- ppm – parts per million
- µg/m$^3$ – micrograms per cubic meter
- NA – not applicable
- All annual periods refer to calendar year.
- PM concentrations (including lead) are in µg/m$^3$ since ppm is a measure for gas concentrations. Concentrations of all gaseous pollutants are defined in ppm and approximately equivalent concentrations in µg/m$^3$ are presented.
- $^{(1)}$ Not to be exceeded more than once a year.
- $^{(2)}$ EPA has lowered the NAAQS down from 1.5 µg/m$^3$, effective January 12, 2009.
- $^{(3)}$ 3-year average of the annual 98th percentile daily maximum 1-hr average concentration. Effective April 12, 2010.
- $^{(4)}$ 3-year average of the annual fourth highest daily maximum 8-hr average concentration.
- $^{(5)}$ Not to be exceeded by the annual 98th percentile when averaged over 3 years.
- $^{(6)}$ EPA revoked the 24-hour and annual primary standards, replacing them with a 1-hour average standard. Effective August 23, 2010.
- $^{(7)}$ 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.
EPA revised the 8-hour ozone standard, lowering it from 0.08 to 0.075 parts per million (ppm), effective as of May 2008.

EPA lowered the primary and secondary standards for lead to 0.15 μg/m³, effective January 12, 2009. EPA revised the averaging time to a rolling 3-month average and the form of the standard to not-to-exceed across a 3-year span.

EPA established a 1-hour average NO₂ standard of 0.100 ppm, effective April 12, 2010, in addition to the annual standard. The statistical form is the 3-year average of the 98th percentile of daily maximum 1-hour average concentration in a year.

EPA established a 1-hour average SO₂ standard of 0.075 ppm, replacing the 24-hour and annual primary standards, effective August 23, 2010. The statistical form is the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour concentrations (the 4th highest daily maximum corresponds approximately to 99th percentile for a year.)

Federal ambient air quality standards do not exist for noncriteria pollutants; however, as mentioned above, the New York State Department of Environmental Conservation (NYSDEC) has issued standards for three noncriteria compounds. NYSDEC has also developed a guidance document, DAR-1 (October 2010), which contains a compilation of annual and short term (1-hour) guideline concentrations for numerous other noncriteria compounds. The NYSDEC guidance thresholds represent ambient levels that are considered safe for public exposure.

**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 Clean Air Act.

In 2002, EPA re-designated New York City as in attainment for CO. The Clean Air Act requires that a maintenance plan ensure continued compliance with the CO NAAQS for former non-attainment areas. New York City is also 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.

Manhattan has been designated as a moderate NAA for PM₁₀⁻. On December 17, 2004, EPA took final action designating the five New York City counties and Nassau, Suffolk, Rockland, Westchester, and Orange Counties as a PM₂.₅ non-attainment area under the Clean Air Act due to exceedance of the annual average standard. Based on recent monitoring data (2006-2009), annual average concentrations of PM₂.₅ in New York City no longer exceed the annual standard.

In October 2009 EPA finalized the designation of the New York City Metropolitan Area as nonattainment with the 2006 24-hour PM₂.₅ NAAQS, effective in November 2009. The nonattainment area includes the same 10-county area originally designated as nonattainment with the 1997 annual PM₂.₅ NAAQS. Based on recent monitoring data (2007-2009), 24-hour average concentrations of PM₂.₅ in this area no longer exceed the standard. New York has submitted a “Clean Data” request to the USEPA. Any requirement to submit a SIP is stayed until EPA acts on New York’s request.

The five New York City counties, Nassau, Rockland, Suffolk, Westchester, and Lower Orange County Metropolitan Area (LOCMA) counties had been designated as a severe non-attainment
area for ozone (1-hour average standard). In November 1998, New York State submitted its *Phase II Alternative Attainment Demonstration for Ozone*, which was finalized and approved by EPA effective March 6, 2002, addressing attainment of the 1-hour ozone NAAQS by 2007.

On April 15, 2004, EPA designated the five New York City counties, Nassau, Rockland, Suffolk, and Westchester counties as moderate non-attainment for the 1997 8-hour average ozone standard. EPA revoked the 1-hour standard on June 15, 2005; however, some control measures for the 1-hour standard included in the 1-hour SIP are required to stay in place until the 8-hour standard is attained. On February 8, 2008, NYSDEC submitted final revisions to the SIP to EPA to address the 1997 8-hour ozone standard. On January 25, 2012, EPA proposed to determine that the NYMA has attained the 1997 8-hour ozone NAAQS (0.08 ppm).

In March 2008 EPA strengthened the 8-hour ozone standards. EPA designated the counties of Suffolk, Nassau, Bronx, Kings, New York, Queens, Richmond, Rockland, and Westchester (NY portion of the New York-Northern New Jersey-Long Island, NY-NJ-CT NAA) as a marginal nonattainment area for the 2008 ozone NAAQS, effective July 20, 2012. SIPs are due in 2015.

New York City is currently in attainment of the annual-average NO2 standard. EPA has designated the entire state of New York as “unclassifiable/attainment” for the new 1-hour NO2 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 (2016 or 2017).

EPA has established a 1-hour SO2 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. Additional monitoring will be required. EPA planned to make final attainment designations in June 2012, based on 2008 to 2010 monitoring data and refined modeling, although designations have not yet been issued. SIPs for nonattainment areas will be due by June 2014.

**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. 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 15-1) would be deemed to have a potential significant adverse impact. Similarly, for non-criteria pollutants, predicted exceedance of the DAR-1 guideline concentrations would be considered a potential 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 non-attainment areas, 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 a potential significant adverse impact, even in cases where violations of the NAAQS are not predicted.

DE MINIMIS CRITERIA REGARDING CO IMPACTS

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

PM$_{2.5}$ INTERIM GUIDANCE CRITERIA

NYSDEC has published a policy to provide interim guidance for evaluating PM$_{2.5}$ impacts$^1$. This policy applies only to facilities applying for permits or major permit modifications under SEQRA that emit 15 tons of PM$_{10}$ or more annually. The policy states that such a project will be deemed to have a potentially significant adverse impact if the project’s maximum impacts are predicted to increase PM$_{2.5}$ concentrations by more than 0.3 µg/m$^3$ averaged annually or more than 5 µg/m$^3$ on a 24-hour basis. Projects that exceed either the annual or 24-hour threshold are required to prepare an Environmental Impact Statement (EIS) to assess the severity of the impacts, to evaluate alternatives, and to employ reasonable and necessary mitigation measures to minimize the PM$_{2.5}$ impacts of the source to the maximum extent practicable.

In addition, New York City uses interim guidance criteria for evaluating the potential PM$_{2.5}$ impacts for projects subject to CEQR. The interim guidance criteria currently employed to determine the potential significant adverse PM$_{2.5}$ impacts under CEQR are as follows:

- 24-hour average PM$_{2.5}$ concentration increments which are predicted to be greater than 5 µg/m$^3$ at a discrete receptor location would be considered a significant adverse impact on air quality under operational conditions (i.e., a permanent condition predicted to exist for many years regardless of the frequency of occurrence);
- 24-hour average PM$_{2.5}$ concentration increments which are predicted to be greater than 2 µg/m$^3$ but no greater than 5 µg/m$^3$ would be considered a significant adverse impact on air quality depending on the magnitude, frequency, duration, location, and size of the area of the predicted concentrations;
- Annual average PM$_{2.5}$ concentration increments which are predicted to be greater than 0.1 µg/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

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- Annual average PM$_{2.5}$ concentration increments which are predicted to be greater than 0.3 µg/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 interim guidance criteria will be considered to have a potential significant adverse impact.

The annual emissions of PM$_{10}$ associated with the proposed project are estimated to be well below the 15-ton-per-year threshold under NYSDEC’s PM$_{2.5}$ policy guidance. The above CEQR interim guidance criteria were used to evaluate the significance of predicted impacts of the proposed project on PM$_{2.5}$ concentrations and determine the need to minimize particulate matter emissions from the proposed project.

**D. METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS**

**MOBILE SOURCES**

The number of project-generated trips would exceed the CO screening threshold of 170 peak hour vehicle trips at intersections in the study area, and the particulate matter emission screening threshold discussed in Chapter 17, Sections 210 and 311 of the CEQR Technical Manual. Therefore, the mobile source analysis was conducted for both CO and particulate matter. The proposed parking garage was analyzed for its effects on CO levels.

**ON STREET 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 analysis for the proposed project employs a model approved by EPA that has 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. The assumptions used in the analysis are based on the CEQR Technical Manual guidance.

**Emissions**

Vehicular CO and PM engine emission factors were computed using the EPA mobile source emissions model, MOBILE6.2. This emissions model is capable of calculating engine emission

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factors for various vehicle types, based on the fuel type (gasoline, diesel, or natural gas), meteorological conditions, vehicle speeds, vehicle age, roadway types, number of starts per day, engine soak time, and various other factors that influence emissions, such as inspection maintenance programs. The inputs and use of MOBILE6.2 incorporate the most current guidance available from NYSDEC and NYCDEP.

Vehicle classification was based on data collected in the field. The general categories of vehicle types for specific roadways were further categorized into subcategories based on their prevalence within the fleet.\(^1\)

Appropriate credits were used to accurately reflect the State inspection and maintenance program. The inspection and maintenance programs require inspections of automobiles and light trucks to determine if pollutant emissions from each vehicle exhaust system comply with emission standards. Vehicles failing the emissions test must undergo maintenance and pass a repeat test to be registered in New York State.

All taxis were assumed to be in hot stabilized mode (i.e. excluding any start emissions). The general categories of vehicle types for specific roadways were further categorized into subcategories based on their relative breakdown within the fleet.

An ambient temperature of 50.0°F Fahrenheit was used. Since ambient temperature mostly affects CO emissions, this temperature, calculated based on the latest guidance from EPA and NYSDEC, represents the average temperature measured during the 10 highest 8-hour CO events measured at NYSDEC monitoring stations.

In accordance with the CEQR Technical Manual guidance, PM\(_{2.5}\) emission rates also include fugitive road dust to account for their impacts in local microscale analyses.\(^2\) However, fugitive road dust was not included in the neighborhood scale PM\(_{2.5}\) microscale analysis, because NYCDEP considers it to have an insignificant contribution on that scale.

Traffic Data

Traffic data for the air quality 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. Traffic data for the future without and with the proposed project were employed in the respective air quality modeling scenarios. The weekday midday (12:00 to 1:00 PM), weekday evening event (7:00 to 8:00 PM), and Saturday midday (12:45 to 1:45 PM) peak hour traffic volumes were analyzed, because these periods are predicted to have the highest number of project-generated emissions from mobile sources. Off-peak traffic volumes in the future without the proposed project, and off-peak increments from the proposed project, were determined by adjusting these peak period volumes by the 24-hour distributions of actual vehicle counts collected at appropriate locations.

\(^1\) The MOBILE6.2 emissions model utilizes 28 vehicle categories by size and fuel. Traffic counts and predictions are based on broader size categories, and then broken down according to the fleet-wide distribution of subcategories and fuel types (diesel, gasoline, or alternative).

**Dispersion Model for Microscale Analyses**

Maximum CO concentrations at locations along Route 9A, resulting from vehicle emissions, were predicted using the CAL3QHC model Version 2.0.\(^1\) 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 CO 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, CAL3QHCR, which allows for the incorporation of hourly meteorological data into the modeling, instead of worst-case assumptions regarding meteorological parameters. This refined version of the model, CAL3QHCR, is employed if maximum predicted future CO concentrations are greater than the applicable ambient air quality standards or when *de minimis* thresholds are exceeded using the first level of CAL3QHC modeling and in the analysis of dispersion of particulate matter emissions from mobile sources.

To determine motor vehicle generated PM\(_{2.5}\) concentrations on sidewalks within the study area, the CAL3QHCR model was applied. The CAL3QHCR model can utilize hourly traffic and meteorology data, and is therefore appropriate for calculating 24-hour and annual average concentrations.

**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 I Analyses—CAL3QHC**

In applying the CAL3QHC model, the wind angle was varied to determine the wind direction resulting in the maximum concentrations at each receptor.

Following the EPA guidelines\(^2\), CAL3QHC computations were performed using a wind speed of 1 meter per second, and the neutral stability class D. The 8-hour average CO concentrations were estimated by multiplying the predicted 1-hour average CO concentrations by a factor of 0.79 to account for persistence of meteorological conditions and fluctuations in traffic volumes. A surface roughness of 3.21 meters was chosen. At each receptor location, concentrations were calculated for all wind directions, and the highest predicted concentration was reported, regardless of frequency of occurrence. These assumptions ensured that worst-case meteorology was used to estimate impacts.


Tier II Analyses—CAL3QHCR

Using the CAL3QHCR model, hourly concentrations were predicted based on hourly traffic data and five years (2005–2009) of monitored hourly meteorological data. The data consist of surface data collected at LaGuardia Airport and upper air data collected at Brookhaven, New York. All hours were modeled, and the highest resulting concentration for each averaging period is presented.

Analysis Year

The microscale analyses were performed for 2015, the year by which the proposed project is expected to be completed. The analysis was performed both without the proposed project (No Action condition) and with the proposed project (With Action condition).

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 the analysis site. Background concentrations are added to modeling results to obtain total pollutant concentrations at an analysis site. PM$_{2.5}$ impacts are assessed on an incremental basis and compared with the PM$_{2.5}$ interim guidance criteria. Therefore, a background concentration for PM$_{2.5}$ is not included.

The 8-hour average background CO concentration used in the analysis was 1.8 ppm, which is based on the highest second-highest 8-hour measurements over the most recent four-year period for which complete monitoring data are available (2008-2011). The 1-hour CO background concentration used in the analysis was 2.7 ppm and was obtained using the same procedure as the 8-hour average background. The monitored values were obtained at the CCNY monitoring station, which is the currently operating monitoring station nearest to the proposed site.

Analysis Sites

Two analysis sites were selected for microscale analysis (see Table 15-2). These sites were selected because they are the locations in the study area where the largest levels of project-generated traffic are expected, and, therefore, where the greatest air quality impacts and maximum changes in concentrations would occur. Both of these intersections were analyzed for CO. In addition, the intersection of Route 9A and West 17th Street was analyzed for PM$_{2.5}$ emissions because the greatest number of project generated truck trips would pass through the intersection. Trucks, which typically run on diesel fuel, are the main source of PM$_{2.5}$ emissions from vehicles. Therefore, if the intersection that would experience the greatest increase in truck traffic with the proposed project would not result in a significant adverse impact on air quality, it can be concluded that other intersections with a smaller increase in truck volumes would also not result in a significant adverse impact on air quality.

<table>
<thead>
<tr>
<th>Analysis Site</th>
<th>Location</th>
<th>Pollutants Analyzed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Route 9 A and West 14th Street</td>
<td>CO</td>
</tr>
<tr>
<td>2</td>
<td>Route 9 A and West 17th Street</td>
<td>CO, PM$_{2.5}$</td>
</tr>
</tbody>
</table>
Receptor Placement

Multiple receptors (i.e., locations at which concentrations are predicted) were modeled at the selected sites; receptors were placed along the approach and departure links at spaced intervals. Receptors were placed near the intersections at sidewalk or roadside locations with continuous public access. Receptors in the analysis model for predicting annual average neighborhood-scale PM$_{2.5}$ concentrations were placed at a distance of 15 meters from the nearest moving lanes, based on the NYCDEP procedure for neighborhood-scale corridor PM$_{2.5}$ modeling.

PARKING GARAGE

The proposed project would include a below-grade accessory parking garage with an entrance from the new access road developed as part of the proposed project. The garage would be mechanically ventilated and would be designed to accommodate up to approximately 75 vehicles. Emissions from vehicles using the garage could potentially affect future ambient levels of CO in the vicinity of the garage exhaust vents. Therefore, an analysis was conducted to determine the potential for significant adverse impacts on air quality from the proposed garage.

The analysis of emissions from the outlet vents and their dispersion in the environment was performed to calculate pollutant levels in the surrounding area, using the methodology set forth in the *CEQR Technical Manual*. Emissions from vehicles entering, parking, and exiting the garage were estimated using the EPA MOBILE6.2 mobile source emission model and an ambient temperature of 50°F, as referenced in the *CEQR Technical Manual*. For all arriving and departing vehicles, an average speed of 5 miles per hour was conservatively assumed for travel within the parking garage. In addition, all departing vehicles were assumed to idle for 1 minute before proceeding to the exit. The speed and idling time modeled are conservative analysis assumptions provided in the *CEQR Technical Manual*. The concentration of CO within the garage was calculated assuming a minimum ventilation rate, based on New York City Building Code requirements, of 1 cubic foot per minute of fresh air per gross square foot of garage area. The mechanical designs for the proposed parking garage have not been finalized. Therefore, it was conservatively assumed that the proposed garage would have one vent that would exhaust towards the new access road in order to account for emissions from maximum on-road traffic. Maximum 8-hour average and 1-hour average CO concentrations were predicted. Locations where CO concentrations were modeled included sidewalk locations to the east and west of the access road near the proposed garage entrance, and on the façade of the proposed project building.

To determine CO concentrations, the outlet vent was analyzed as a “virtual point source” using the methodology in EPA’s *Workbook of Atmospheric Dispersion Estimates, AP-26*. This methodology estimates CO concentrations at various distances from an outlet vent by assuming that the concentration in the garage is equal to the concentration leaving the vent, and determining the appropriate initial horizontal and vertical dispersion coefficients at the vent faces.

The CO concentrations were determined for the time periods when overall garage usage would be the greatest. The weekday evening event (7 to 8 PM) peak period and weekend evening event (7 to 8 PM) peak period were therefore analyzed. Departing vehicles were assumed to be operating in a “cold-start” mode, emitting higher levels of CO than arriving vehicles. Vehicle trip generation analysis data were used.
A persistence factor of 0.79 was used to convert the calculated 1-hour average maximum concentrations to 8-hour averages, accounting for meteorological variability over the average 8-hour period. The background CO 1-hour and 8-hour concentrations and concentrations resulting from peak period on-street traffic along the access road were added to the parking garage modeling results to obtain the total ambient CO levels.

**MARINA AND WATER TAXI LANDING**

The proposed project would include the development of a new marina to the north and south of the pier and may include a water taxi landing. The marina would be designed to accommodate up to 141 slips for a range of boat sizes. Emissions from boats using the marina and the water taxis using the landing could potentially affect future ambient pollutant levels in the vicinity of the marina and along the proposed perimeter walkway. Therefore, an analysis was conducted to determine the potential for significant adverse impacts on air quality from the proposed marina.

The analysis of emissions and their dispersion in the environment was performed to calculate pollutant levels in the surrounding area. Emissions from boats entering, berthing, and exiting the marina area were estimated using NONROAD engine exhaust emission rates\(^1\) assuming typical engine sizes for various boat lengths. For all arriving and departing boats, an average speed of 5 nautical miles per hour was conservatively assumed for travel within the marina. In addition, all departing boats were assumed to idle for 1 minute before proceeding to exit. Water taxis were assumed to idle for 3 minutes before proceeding to their next landing. Maximum 8-hour average and 1-hour average CO concentrations, 24-hour average total PM concentrations, and 1-hour average NO\(_2\) concentrations were predicted. It was conservatively assumed that total PM concentrations would be representative for PM\(_{2.5}\) concentrations. Pollutant concentrations were predicted at locations on the perimeter walkway along the pier, as it would be the closest receptor to the marina. NO\(_2\) and PM\(_{2.5}\) annual concentrations were not estimated because the short term standards for these pollutants are more protective and because the usage of the marina is expected to be seasonal.

Maximum hourly emissions were based on projected peak hour motorized boat traffic for the marina slips and water taxi landing. Concentrations were determined for the perimeter walkway along the north side of the pier, in order to conservatively account for both water taxi and marina boat traffic.

A persistence factor of 0.79 was used to convert the calculated 1-hour average maximum concentrations to 8-hour averages, accounting for meteorological variability over the average 8-hour period. The background CO 1-hour and 8-hour concentrations were added to the marina modeling results to obtain the total ambient CO levels. In order to calculate 24-hour PM concentrations, a persistence factor of 0.60 was used to convert the calculated 1-hour average maximum concentrations to 24-hour averages, accounting for meteorological variability over the average 24-hour period.

\(^1\) *Exhaust Emission Factors for Nonroad Engine Modeling – Spark-Ignition*, EPA Office of Transportation and Air Quality, Publication EPA-420/R-10-019
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The 0.80 default ambient ratio of NO₂ to NOₓ average hourly concentrations\(^1\) was used to convert maximum 1-hour average NOₓ concentrations to 1-hour NO₂ results. The ambient background NO₂ 1-hour concentration of 126.8 µg/m³ was used for the analysis. This represents the 2006–2010 average of the annual 98th-percentile of daily maximums monitored at Queens College. The background concentration was added to the modeled results to obtain the total ambient NO₂ levels.

**STATIONARY SOURCES**

A stationary source screening analysis was conducted to evaluate potential impacts from the proposed project’s heating systems. In addition, an assessment was conducted to determine the potential for impacts due to industrial activities near the proposed site.

**HEATING SYSTEMS**

A screening analysis was performed to assess air quality impacts associated with emissions from the heating system. The cooling and hot water systems would use electricity and would not result in on-site air pollutant emissions.

The heating system would have low-NOx emissions and would use exclusively natural gas as fuel. When information on the emissions from heating systems from a project is available, an emissions-based screening analysis procedure included in the *CEQR Technical Manual* can be used. Using the heating system emissions and the exhaust height, the screening analysis determines the closest distance to a building or sensitive use of similar or greater height beyond which there would be no significant impact. In other words, the analysis considers the amount of pollutants emitted from the stack and the distance beyond which the pollutant levels are not significant. Due to dispersion of pollutants in the air, pollutant levels decrease as the distance from the source increases. Under typical conditions, the plume rises from the source and has the potential to affect sources at a similar or greater height. Therefore, if the nearest building or sensitive use of similar or greater height is beyond this threshold distance from the heating system, the source passes the emissions-based screening analysis, and no further analysis is warranted.

**INDUSTRIAL SOURCES**

The proposed site is located in an area zoned for manufacturing. Some manufacturing and industrial uses emit air pollutants and therefore warrant an environmental assessment. The first step in assessing the potential for impact on air quality from industrial and manufacturing uses on a proposed project is to perform a field survey and permit search to identify any processing or manufacturing facilities located within 400 feet of the project site and large emissions sources, such as power plants and asphalt and concrete plants, within 1,000 feet of the project site. Once identified, information regarding the release of air contaminants from these facilities is obtained from NYCDEP, Bureau of Environmental Compliance (BEC). A comprehensive search is also performed to identify NYSDEC Title V permits and permits listed in the U.S. Environmental

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\(^1\) Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO₂ National Ambient Air Quality Standard, EPA Air Quality Modeling Group, C439-01, Mar 01, 2011, [http://www.epa.gov/region7/air/nsr/nsrmemos/appwno2_2.pdf](http://www.epa.gov/region7/air/nsr/nsrmemos/appwno2_2.pdf)
Protection Agency (USEPA) Envirofacts database.\textsuperscript{1} In the next step, if there are emission sources of concern, the potential ambient concentrations of each air toxic contaminant are determined using the \textit{CEQR Technical Manual} screening procedures or the AERMOD dispersion model and compared to applicable guideline concentrations established by NYSDEC and applicable federal air quality standards.

E. EXISTING CONDITIONS

Representative criteria pollutant concentrations measured in recent years at NYSDEC air quality monitoring stations nearest to the project site are presented in \textbf{Table 15-3}. The values presented are consistent with the NAAQS format. For example, the 8-hour ozone concentration shown is the 3-year average of the 4th highest daily maximum 8-hour average concentrations. The concentrations were obtained from the 2011 New York State Ambient Air Quality Report, the most recent report available. 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 mobile source and parking garage analyses. The concentrations presented in \textbf{Table 15-3} provide a comparison of the air quality in the project area with the NAAQS, while background concentrations are obtained from several years of monitoring data, and represent a conservative estimate of the highest concentrations for future ambient conditions.

\textbf{Table 15-3}

\begin{tabular}{|l|l|l|l|l|l|}
\hline
\textbf{Pollutant} & \textbf{Location} & \textbf{Units} & \textbf{Averaging Period} & \textbf{Concentration} & \textbf{NAAQS} \\
\hline
CO & CCNY, Manhattan & ppm & 8-hour & 1.7 & 9 \\
& & & 1-hour & 2.7 & 35 \\
SO\textsubscript{2} & Queens College 2, Queens\textsuperscript{1} & µg/m\textsuperscript{3} & 3-hour & 78 & 1,300 \\
& & & 1-hour & 79 & 196 \\
PM\textsubscript{10} & PS 19, Manhattan & µg/m\textsuperscript{3} & 24-hour & 40 & 150 \\
PM\textsubscript{2.5} & PS 19, Manhattan & µg/m\textsuperscript{3} & Annual & 12 & 15 \\
& & & 24-hour & 27 & 35 \\
NO\textsubscript{2} & Queens College 2, Queens\textsuperscript{2} & µg/m\textsuperscript{3} & Annual & 36 & 100 \\
& & & 1-hour & 126 & 188 \\
Lead & Morrisania, Bronx & µg/m\textsuperscript{3} & 3-month & 0.008 & 0.15 \\
Ozone & CCNY, Manhattan & ppm & 8-hour & 0.072 & 0.075 \\
\hline
\end{tabular}

\textbf{Source:} NYSDEC, New York State Ambient Air Quality Report, 2011.

F. THE FUTURE WITH THE PROPOSED PROJECT

MOBILE SOURCES

\textit{ON STREET SOURCES}

CO concentrations for future 2015 No Action and With Action conditions were predicted using the methodology previously described. \textbf{Table 15-4} shows the future maximum predicted 8-hour average CO concentrations at the two intersections studied. (No one-hour values are shown,

\textsuperscript{1} EPA, Envirofacts Data Warehouse, http://oaspub.epa.gov/enviro/ef_home2.air, 7/27/2011.
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since no exceedances of the NAAQS would occur and the *de minimis* criteria are only applicable to eight-hour concentrations; therefore, the eight-hour values are the most critical for impact assessment.) The values shown are the highest predicted concentration for any of the time periods analyzed. The results indicate that the proposed project would not result in any violations of the eight-hour CO standard. In addition, the incremental increases in eight-hour average CO concentrations are very small, and consequently would not result in a violation of the CEQR *de minimis* CO criteria. Therefore, the proposed project mobile source CO emissions would not result in a significant adverse impact on air quality.

<table>
<thead>
<tr>
<th>Receptor Site</th>
<th>Location</th>
<th>Time Period</th>
<th>8-Hour Concentration (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Route 9A and W 14th St</td>
<td>Saturday Midday</td>
<td>3.9</td>
</tr>
<tr>
<td>2</td>
<td>Route 9A and W 17th St</td>
<td>Saturday Midday</td>
<td>4.0</td>
</tr>
</tbody>
</table>

*Note:* 8-hour standard is 9 ppm.

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 to the interim guidance criteria that would determine the potential significance of any impacts from the proposed project. 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 15-5 and 15-6. Note that PM$_{2.5}$ concentrations without the proposed project are not presented, since impacts are assessed on an incremental basis.

### Table 15-5

**2015 Maximum Predicted 24-Hour Average PM$_{2.5}$ Concentration**

<table>
<thead>
<tr>
<th>Location</th>
<th>Increment (µg/m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 9A and West 17th St</td>
<td>0.38</td>
</tr>
</tbody>
</table>

*Note:* PM$_{2.5}$ interim guidance criteria—24-hour average, 2 µg/m$^3$ (5 µg/m$^3$ not-to-exceed value).

### Table 15-6

**2015 Maximum Predicted Annual Average PM$_{2.5}$ Concentration**

<table>
<thead>
<tr>
<th>Location</th>
<th>Increment (µg/m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 9A and West 17th St</td>
<td>0.05</td>
</tr>
</tbody>
</table>

*Note:* PM$_{2.5}$ interim guidance criteria—annual (neighborhood scale), 0.1 µg/m$^3$.

The results show that the annual and daily (24-hour) PM$_{2.5}$ increments are predicted to be well below the interim guidance criteria. Therefore, there would be no potential for significant adverse impacts on air quality from vehicle trips generated by the proposed project.

**PARKING GARAGE**

The CO levels from the proposed parking garage were predicted using the methodology set forth in the *CEQR Technical Manual*. Based on projected parking demand developed for the proposed
project, the number of vehicles entering the garage would be greatest during the 7 PM to 8 PM hours on weekdays and weekends when there are events and these peak periods were considered in the analysis of the 1-hour average CO concentrations. The peak 8-hours of garage usage (2 PM to 10 PM during weekdays with event conditions and 1 PM to 9 PM during weekends with event conditions) were considered in the analysis of the 8-hour average CO concentrations. Over the weekday event peak 8-hours of garage usage, an average of 36 vehicles per hour would enter the proposed garage, while an average of 44 vehicles per hour would exit. During the weekend event peak 8-hours, an average of 33 and 38 vehicles per hour would enter and exit the garage, respectively. The vent was modeled at a height of 10 feet above ground level, along the new access road. Pollutant levels were predicted at the height of the vents at a distance of 15 feet, accounting for the minimum vent to window distance requirements specified by the New York City Mechanical Code. Receptors (locations where CO levels were predicted) were also modeled on the access road walkway and Route 9A bikeway locations near the proposed garage entrance.

The maximum predicted CO concentration, with ambient background, and on-street traffic levels would be 3.4 ppm for the 1-hour period and 2.2 ppm for the 8-hour period. The maximum 1- and 8-hour contributions from the parking garage alone would be 0.60 ppm and 0.36 ppm, respectively. These maximum predicted CO levels are below the CO NAAQS and the City’s CO de minimis criteria. As these results show, the proposed parking garage would not result in a significant adverse air quality impact based on the reasonable worst-case assumptions regarding the location of the garage exhaust vent. Therefore, there would be no potential for significant adverse impacts on air quality with other parking garage exhaust locations that comply with applicable codes.

**MARINA AND TAXI LANDING**

Pollutant levels from the motorized boat activity at the proposed marina and water taxi landing were predicted using a methodology similar to the CEQR Technical Manual methodology for a surface parking lot. Based on information from other marinas, it was estimated that the maximum number of boats moving within the marina in the peak hour would be 5 percent of the total number of slips and 25 percent of the boats would be sailboats equipped with low horsepower engines for use within the marina. It was conservatively assumed that the number of hourly marina boat trips would persist at this maximum throughout the day. For analysis purposes, it was also assumed that there would be a maximum of 3 water taxi trips within an hour, and that the water taxi would operate at this maximum for 8 hours a day. These assumptions were based on other water taxi schedules.

The maximum 1- and 8-hour CO contributions from the marina and water taxi landing without the ambient background would be 1.2 ppm and 0.8 ppm, respectively. With the ambient background, the predicted CO concentrations would be 3.9 ppm for the 1-hour averaging period and 2.6 ppm for the 8-hour period. These maximum predicted CO levels are below the CO NAAQS and the City’s CO de minimis criteria. The maximum predicted 24-hour PM$_{2.5}$ increment would be 0.3 µg/m$^3$. This would fall below the interim guidance criteria. The maximum NO$_2$ 1-hour concentration increase from the marina and the water taxi landing would be 49.3 µg/m$^3$. The maximum total NO$_2$ concentration, with the ambient background, would be 176.1 µg/m$^3$. The maximum predicted NO$_2$ level would be below the 1-hour NO$_2$ NAAQS.

Based on these results, the proposed marina and water taxi landing would not result in significant adverse air quality impacts based on the reasonable worst case conditions. Therefore, there would be no potential for significant adverse impacts on air quality due to the marina and water taxi.
STATIONARY SOURCES

HEATING SYSTEM

A screening analysis was performed to evaluate the potential for significant adverse impacts to air quality from the operation of heating system at the proposed project. As described in Chapter 1, “Project Description,” the building has been designed to allow natural ventilation and passive cooling as much as possible.

For heating, low-NOx boilers with flue gas recirculation that would run on natural gas exclusively would be specified. The pollutant of concern when using natural gas is NO2, therefore NO2 was considered in the screening analysis. Based on the expected fuel use and the AP-42 emission factor1, average annual NOx emissions would be 0.011 grams per second. The NOx emissions were conservatively assumed to be 100 percent NO2. It is expected that the exhaust stack would be located on the central portion of the upper headhouse rooftop (i.e., the portion of the roof that is directly east of the pier shed), at least 10 feet above any open space or accessible uses. Based on Figure 17-9 in the CEQR Technical Manual Air Quality Appendix, the distance beyond which there would be no potential for significant air quality impacts from NO2 emissions would be 43 feet. There would be no buildings or sensitive uses (such as publicly accessible open space) of similar or greater height within 43 feet of the heating system exhaust location and no other buildings are proximate. Therefore, the proposed project would not result in any significant adverse air quality impacts from the heating system, and no further analysis is required.

Alternative mechanical system designs that would also not result in a significant adverse air quality impact are possible. For example, a stack whose elevation would be 20 feet greater than the elevation of any open space or accessible use (with no restriction on lateral distance to the open space/accessible use) would also not result in any significant adverse air quality impacts from the heating system, and no further air quality analysis would be required.

Moreover, other mechanical system designs could also avoid significant adverse air quality impacts. For instance, with a stack whose elevation would be more than 10 feet greater than the elevation of any open space or accessible use, less than 43 feet of distance between the stack and the accessible/open space use may be sufficient. Future analyses could be performed to demonstrate that an alternative stack location and/or stack height would avoid significant adverse impacts.

INDUSTRIAL SOURCES

A field survey was conducted on July 27, 2011 to identify existing industrial emission sources or manufacturing uses in the proposed project study area that might have NYCDEP air emission permits. No emission sources of concern were observed in the field visit. A request for information on emission sources within 400 feet of the proposed site was sent to NYCDEP to verify the field visit observation. NYCDEP confirmed that there are no active sources with NYCDEP air emission permits on file. No sources of concern were identified through the search of the NYSDEC and Envirofacts databases. Therefore, there is no potential for significant adverse impacts on air quality from industrial sources.