East New York Rezoning Proposal
Chapter 14: Air Quality

A. INTRODUCTION

The potential for air quality impacts from the Proposed Actions is examined in this chapter. Air quality impacts can be either direct or indirect. Direct impacts result from emissions generated by stationary sources at a development site, such as emissions from on-site fuel combustion for heat and hot water systems, or emissions from parking garage ventilation systems. Indirect impacts are caused by off-site emissions associated with a project, such as emissions from nearby existing stationary sources (impacts on the projected and potential development sites) or by emissions from on-road vehicle trips generated by the Proposed Actions or other changes to future traffic conditions due to a project.

It is anticipated that each of the projected and potential development sites would include fossil fuel-fired heat and hot water systems. Therefore, a stationary source analysis was conducted to evaluate potential future pollutant concentrations with the Proposed Actions.

The maximum hourly traffic generated by the Proposed Actions are predicted to exceed the *City Environmental Quality Review* (CEQR) *Technical Manual* carbon monoxide (CO) screening threshold of 170 peak-hour vehicle trips at certain intersections in the study area. In addition, the particulate matter emissions screening threshold discussed in Chapter 17, Sections 210 and 311 of the *CEQR Technical Manual* are predicted to be exceeded. Therefore, a quantified assessment of the potential impacts on air quality from traffic generated by the Proposed Actions was conducted for CO and PM.

Certain development sites within the rezoning area would include on-site parking. Therefore, an analysis was conducted to evaluate potential future pollutant concentrations from the proposed parking facilities.

Since portions of the affected area are within areas zoned for manufacturing uses, potential effects of stationary source emissions from existing nearby industrial facilities on the Proposed Actions were assessed. In addition, potential effects from large and major sources of emissions in the study area on the Proposed Actions were evaluated.

B. PRINCIPAL CONCLUSIONS

The analyses conclude that the Proposed Actions would not result in any significant adverse air quality impacts on sensitive uses in the surrounding community, and the Proposed Actions would not be adversely affected by existing sources of air emissions in the rezoning area. A summary of the general findings is presented below.

The stationary source analyses determined that there would be no potential significant adverse air quality impacts from fossil fuel-fired heat and hot water systems at the projected and potential development sites. At certain sites, an (E) designation (E-366) would be mapped as part of the zoning proposal to ensure the developments would not result in any significant air quality impacts from fossil fuel-fired heat and hot water systems emissions due to individual or groups of development sites.

An analysis of the cumulative impacts of industrial sources on projected and potential development sites was performed. Maximum concentration levels at projected and potential development sites were below the air toxic guideline levels and health risk criteria established by regulatory agencies, and below National Ambient Air Quality Standards (NAAQS). Large and major emissions sources within 1,000 feet of a projected or potential development site were also analyzed.

The mobile source analyses determined that concentrations of CO and fine particulate matter less than ten microns in diameter (PM_{10}) due to project-generated traffic at intersections would not result in any violations of NAAQS, and furthermore, CO concentrations were predicted to be below CEQR de minimis criteria. The results show that the daily (24-hour) $PM_{2.5}$ increments are predicted to be below the *de minimis* criteria. At three of the four intersection sites analyzed, the maximum annual incremental $PM_{2.5}$ concentration is below the *de minimis* criteria; however, the annual $PM_{2.5}$ maximum annual incremental concentration is predicted to exceed the *de minimis* criteria at the intersection of Atlantic Avenue and Logan Street. This would be considered a significant adverse air quality impact. Therefore, traffic mitigation measures were examined to avoid a potential significant impact at this intersection location. Mitigation measures are discussed in Chapter 20, "Mitigation."

The parking facilities assumed to be developed as a result of the Proposed Actions would not result in any significant adverse air quality impacts.

C. 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 (NO_2), collectively referred to as NO_x) are emitted from both mobile and stationary sources. Fine PM is also formed when emissions of NO_x, sulfur oxides (SO_x), ammonia, organic compounds, and other gases react or condense in the atmosphere. Emissions of sulfur dioxide (SO_2) are associated mainly with stationary sources, and some sources utilizing non-road diesel such as large international marine engines. On-road diesel vehicles currently contribute very little to SO_2 emissions since the sulfur content of on-road diesel fuel, which is federally regulated, is extremely low. Ozone is formed in the atmosphere by complex photochemical processes that include NO_x and VOCs. Ambient concentrations of CO, PM, NO_2, SO_2, ozone, and lead are regulated by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act, and are referred to as 'criteria pollutants'; emissions of VOCs, NO_x, and other precursors to criteria pollutants are also regulated by EPA.

Carbon Monoxide

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

The Proposed Actions would increase traffic volumes on streets within and surrounding rezoning area and could result in localized increases in CO levels. Therefore, a mobile source analysis was conducted at critical intersections in the study area to evaluate future CO concentrations with and without the proposed actions. An analysis was also conducted to evaluate future CO concentrations with the operation of the parking facilities assumed to be developed as a result of the Proposed Actions.

Nitrogen Oxides, VOCs, and Ozone

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

In addition to being a precursor to the formation of ozone, NO_2 (one component of NO_x) is also a regulated 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.) While NO_2 emissions are a concern from stationary sources of combustion, with the promulgation of the 2010 1-hour average standard for NO_2, local sources such as vehicular emissions may also become of greater concern for this pollutant in the future. However, any increase in NO_2 associated with the Proposed Actions would be relatively small, as demonstrated below for CO and PM, due to the very small increases in the number of vehicles. This increase would not be expected to significantly affect levels of NO_2 experienced near roadways.

Potential impacts on local NO_2 concentrations from the fuel combustion for projected and potential development sites' heat and hot water systems were evaluated.

Lead

Airborne lead emissions are currently associated principally with industrial sources. Lead in gasoline has been banned under the Clean Air Act and would not be emitted from any other component of Proposed Actions. Therefore, an analysis of this pollutant was not warranted.

Respirable Particulate Matter —PM_{10} and $PM_{2.5}$

PM is a broad class of air pollutants that includes discrete particles of a wide range of sizes and chemical compositions, as either liquid droplets (aerosols) or solids suspended in the atmosphere. The constituents of PM are both numerous and varied, and they are emitted from a wide variety of sources (both natural and anthropogenic). Natural sources include the condensed and reacted forms of naturally occurring 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) or from precursor gases reacting in the atmosphere to form secondary PM.

Gasoline-powered and diesel-powered vehicles, especially heavy duty trucks and buses operating on diesel fuel, are a significant source of respirable PM, most of which is $PM_{2.5}$; PM concentrations may, consequently, be locally elevated near roadways. The Proposed Actions would result in traffic exceeding the $PM_{2.5}$ vehicle emissions screening analysis thresholds as defined in Chapter 17, Sections 210 and 311 of the *CEQR Technical Manual*. Therefore, the potential impacts from vehicle-based $PM_{2.5}$ emissions were analyzed. An analysis was also conducted to evaluate future PM concentrations with the operation of the parking facilities assumed to be developed as a result of the Proposed Actions.

An assessment of PM emissions from heat and hot water systems at the projected and potential development sites was conducted, following the *CEQR Technical Manual* and EPA guidance.

Sulfur Dioxide

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

As part of the Proposed Actions, No. 2 fuel could be burned in heat and hot water systems of the projected and potential development sites. Therefore, potential future levels of SO_2 from these sources were examined.

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.

Federal ambient air quality standards do not exist for noncriteria pollutants; however, the New York State Department of Environmental Conservation (NYSDEC) has issued standards for certain noncriteria compounds, including beryllium, gaseous fluorides, and hydrogen sulfide. NYSDEC has also developed guideline concentrations for numerous noncriteria pollutants. The NYSDEC guidance document DAR-1 (February 2014)[1] contains a compilation of annual and short term (1-hour) guideline concentrations for these compounds. The NYSDEC guidance thresholds represent ambient levels that are considered safe for public exposure. EPA has also developed guidelines for assessing exposure to noncriteria pollutants. These exposure guidelines are used in health risk assessments to determine the potential effects to the public.

The project area contains and existing manufacturing-zoned areas, which would remain in the Proposed Actions. Therefore, an analysis to examine the potential for impacts to the proposed actions from industrial emissions was performed.

D. AIR QUALITY REGULATIONS, STANDARDS, AND BENCHMARKS

National and State Air Quality Standards

As required by the CAA, primary and secondary National Ambient Air Quality Standards (NAAQS) have been established for six major air pollutants: CO, NO_2, ozone, respirable PM (both $PM_{2.5}$ and PM_{10}), SO_2, and lead. The primary standards represent levels that are requisite to protect the public health, allowing an adequate margin of safety. The secondary standards are intended to protect the nation's welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. The primary standards are generally either the same as the secondary standards or more restrictive. The NAAQS are presented in Table 14-1. The NAAQS for CO, annual NO_2, and three-hour SO_2 have also been adopted as the ambient air quality standards for New York State, but are defined on a running 12-month basis rather than for calendar years only. New York State also has standards for total suspended particles, settleable particles, non-methane hydrocarbons, 24-hour and annual SO_2, and ozone which correspond to federal standards that have since been revoked or replaced, and for the noncriteria pollutants beryllium, fluoride, and hydrogen sulfide.

[1] NYSDEC DAR-1 (Air Guide-1) AGC/SGC Tables, February 2014.

TABLE 14-1
National Ambient Air Quality Standards (NAAQS)

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

Notes:
ppm – parts per million (unit of measure for gases only)
µg/m^3 – micrograms per cubic meter (unit of measure for gases and particles, including lead)
NA – not applicable
All annual periods refer to calendar year.
Standards are defined in ppm. Approximately equivalent concentrations in µg/m^3 are presented.

1 Not to be exceeded more than once a year.
2 EPA has lowered the NAAQS down from 1.5 µg/m^3, effective January 12, 2009.
3 Three-year average of the annual 98th percentile daily maximum one-hr average concentration. Effective April 12, 2010.
4 Three-year average of the annual fourth highest daily maximum eight-hr average concentration.
5 EPA has proposed lowering the primary and secondary standards further to within the range 0.065-0.070 ppm. EPA will take final action on the proposed standards by Oct. 1, 2015.
6 Three-year average of annual mean. EPA has lowered the primary standard from 15 µg/m^3, effective March 2013.
7 Not to be exceeded by the annual 98th percentile when averaged over three years.
8 EPA revoked the 24-hour and annual primary standards, replacing them with a one-hour average standard. Effective August 23, 2010.
9 Three-year average of the annual 99th percentile daily maximum one-hr average concentration.

Source: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards.

EPA has revised the NAAQS for PM, effective December 18, 2006. The revision included lowering the level of the 24-hour $PM_{2.5}$ standard from 65 µg/m^3 to 35 µg/m^3 and retaining the level of the annual standard at 15 µg/m^3. The PM_{10} 24-hour average standard was retained and the annual average PM_{10} standard was revoked. EPA later lowered the primary annual $PM_{2.5}$ average standard from 15 µg/m^3 to 12 µg/m^3, effective March 2013.

EPA has also revised the eight-hour ozone standard, lowering it from 0.08 to 0.075 parts per million (ppm), effective as of May 2008. On November 25, 2014, EPA proposed a change in the 2008 ozone NAAQS, lowering the primary and secondary NAAQS from the current 0.075 ppm level to within the range of 0.065 to 0.070. EPA will take final action on the proposed standards by Oct. 1, 2015. EPA expects to issue final area designations by October 1, 2017; those designations likely would be based on 2014-2016 air quality data.

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

EPA established a one-hour average NO_2 standard of 0.100 ppm, effective April 12, 2010, in addition to the annual standard. The statistical form is the three-year average of the 98th percentile of daily maximum one-hour average concentration in a year.

EPA also established a one-hour average SO_2 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 99^{th} percentile of the annual distribution of daily maximum one-hour concentrations (the fourth highest daily maximum corresponds approximately to 99^{th} percentile for a year.)

Federal ambient air quality standards do not exist for non-criteria pollutants; however, as mentioned above, the NYSDEC has issued standards for three non-criteria compounds. NYSDEC has also developed a guidance document DAR-1 (February 2014), which contains a compilation of annual and short term (one-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, followed by a plan for maintaining attainment status once the area is in attainment.

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

Manhattan, which had been designated as a moderate NAA for PM_{10}, was reclassified by EPA as in attainment on July 29, 2015.

The five New York City counties and Nassau, Suffolk, Rockland, Westchester, and Orange Counties, which had been designated as a $PM_{2.5}$ non-attainment area since 2004 under the CAA due to exceedance of the 1997 annual average standard, were redesignated as in attainment for that standard on April 18, 2014, and are now under a maintenance plan. As stated above, EPA lowered the annual average primary standard to 12 μg/m^3, effective March 2013. EPA designated the area as in attainment for the new 12 μg/m^3 NAAQS effective January 15, 2015.

On April 18, 2014, EPA redesignated the New York City Metropolitan Area, which had been nonattainment with the 2006 24-hour $PM_{2.5}$ NAAQS since November 2009, as in attainment. The area, now under a maintenance plan for this standard, includes the same ten-county area as the maintenance area for the 1997 annual $PM_{2.5}$ NAAQS.

Effective June 15, 2004, EPA designated Nassau, Rockland, Suffolk, Westchester, and the five New York City counties (NY portion of the New York–Northern New Jersey–Long Island, NY-NJ-CT, NAA) as moderate non-attainment area for the 1997 eight-hour average ozone standard. Based on recent monitoring data (2007-2011), EPA determined that the NY-NJ-CT nonattainment area has attained the 1997 8-hour ozone NAAQS (0.08 ppm). Although not yet a redesignation to attainment status, this determination removes further requirements under the 1997 eight-hour standard. In March 2008 EPA strengthened the eight–hour ozone standards. EPA designated the New York–Northern New Jersey–Long Island, NY-NJ-CT NAA as a marginal NAA for the 2008 ozone NAAQS, effective July 20, 2012. In

June, 2012 and again in March, 2015 New York State formally requested that the EPA reclassify the area as a moderate NAA. New York State has begun submitting SIP documents in December, 2014.

New York City is currently in attainment of the annual-average NO_2 standard. EPA has designated the entire state of New York as "unclassifiable/attainment" of the one-hour NO_2 standard effective February 29, 2012. Since additional monitoring is required for the one-hour standard, areas will be reclassified once three years of monitoring data are available (likely 2017).

EPA has established a one-hour SO_2 standard, replacing the former 24-hour and annual standards, effective August 23, 2010. Based on the available monitoring data, all New York State counties currently meet the one-hour standard. Additional monitoring will be required. Draft attainment designations were published by EPA in February 2013, indicating that EPA is deferring action to designate areas in New York State and expects to proceed with designations once additional data are gathered.

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.[2] 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 14-1) 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.

CO De Minimis Criteria

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

$PM_{2.5}$ De Minimis Criteria

NYSDEC has published a policy to provide interim direction for evaluating $PM_{2.5}$ impacts.[3] 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 $\mu g/m^3$ averaged annually or

[2] New York City. *CEQR Technical Manual*. Chapter 1, section 222. March 2014; and New York State Environmental Quality Review Regulations, 6 NYCRR § 617.7

[3] NYSDEC. CP33: Assessing and Mitigating Impacts of Fine Particulate Emissions. December 29, 2003.

more than 5 μg/m^3 on a 24-hour basis. Projects that exceed either the annual or 24-hour threshold will be 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 *de minimis* criteria to determine the potential for significant adverse $PM_{2.5}$ impacts under CEQR are as follows:

- Predicted increase of more than half the difference between the background concentration and the 24-hour standard;
- Annual average $PM_{2.5}$ concentration increments 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
- 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 *de minimis* criteria will be considered to have a potential significant adverse impact.

The above *de minimis* criteria have been used to evaluate the significance of predicted impacts of the Proposed Actions on $PM_{2.5}$ concentrations.

Non-Criteria Pollutant Thresholds

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

The NYSDEC DAR-1 guidance document presents guideline concentrations in micrograms per cubic meter for the one-hour and annual average time periods for various air toxic compounds. These values are provided in Table 14-2 for the compounds affecting receptors located at projected and potential development sites. The compounds listed are those emitted by existing sources of air toxics in the rezoning area.

In order to evaluate impacts of non-carcinogenic toxic air emissions, EPA developed a methodology called the "Hazard Index Approach." The acute hazard index is based on short-term exposure, while the chronic non-carcinogenic hazard index is based on annual exposure limits. If the combined ratio of pollutant concentration divided by its respective short-term or annual exposure threshold for each of the toxic pollutants is found to be less than 1, no significant air quality impacts are predicted to occur due to these pollutant releases.

In addition, the EPA has developed unit risk factors for carcinogenic pollutants. The EPA considers an overall incremental cancer risk from a proposed action of less than one-in-one million to be insignificant. Using these factors, the potential cancer risk associated with each carcinogenic pollutant, as well as the total cancer risk of the releases of all of the carcinogenic toxic pollutants combined, can be estimated. If the total incremental cancer risk of all of the carcinogenic toxic pollutants combined is less than one-in-one million, no significant air quality impacts are predicted to occur due to these pollutant releases.

TABLE 14-2
Industrial Source Analysis: Relevant NYSDEC Air Guideline Concentrations

Pollutant	CAS Number	SGC (µg/m³)	AGC (µg/m³)
Ethanol	00064-17-5	---	45,000
Isopropyl Alcohol	00067-63-0	98,000	7,000
Acetone	00067-64-1	180,000	30,000
1-Butanol	00071-36-3	---	1,500
Propane	00074-98-6	---	43,000
Isobutyl Alcohol	00078-83-1	---	360
MethylEthyl Ketone	00078-93-3	13,000	5,000
Butyl BenzylPhthalate	00085-68-7	---	0.42
Ethylbenzene	00100-41-4	---	1,000
Butane	00108-88-3	238,000	---
Toluene	00108-88-3	37,000	5,000
Ethylenglycolmonobutyl	00111-76-2	14,000	1,600
Butyl Carbitol	00112-34-5	370	200
Butyl Acetate	00123-86-4	95,000	17,000
Tetrachloroethylene	00127-18-4	300	4
Ethylacetate	00141-78-6	---	3,400
Carbon Monoxide	00630-08-0	14,000	---
Ethyl 3-Ethoxyproprioanate	00763-69-9	140	64
Xylene M,O& P Mix	01330-20-7	22,000	100
Sulfur Dioxide	07446-09-5	197	80
Oil Mist (Mineral)	08012-95-1	380	12
Mineral Spirits	08032-32-4	---	900
Stoddard Solvents	08052-41-3	---	900
Aliphatic Hydrocarbons	64742-89-8	---	3,200
Aromatic Petroleum Distillates	64742-94-5	---	100
Particulates[(1)]	NY075-02-5[(2)]	88	12
Liquid Mist NEC	NY105-00-0	380	12
Oxides of Nitrogen	NY210-00-0	188.1	100
Misc. VOC	NY990-00-0	98,000	7,000

Source: NYSDEC, DAR-1 AGC/SGC Tables, February 2014.
Notes:
[(1)] Pollutant includes emissions from both Particulates (NY075-00-0) and Total Solid Particulate (NY079-00-0)
[(2)] Conservatively assumes all particulate emissions would be $PM_{2.5}$. SGC and AGC from Particulate (PM-2.5) used.

E. METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS

Mobile Sources

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

The mobile source analyses for the Proposed Actions employ models 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 Actions.

Vehicle Emissions

Vehicular CO and PM engine emission factors were computed using the EPA mobile source emissions model, Motor Vehicle Emission Simulator, or MOVES.[4] This emissions model is capable of calculating engine emission 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 MOVES incorporate the most current guidance available from NYSDEC.

Vehicle classification data were based on field studies. Appropriate credits were used to accurately reflect the inspection and maintenance program.[5] County-specific hourly temperature and relative humidity data obtained from NYSDEC were used.

ROAD DUST

$PM_{2.5}$ emission rates were determined with fugitive road dust to account for their impacts in local microscale analyses. However, fugitive road dust was not included in the neighborhood scale $PM_{2.5}$ microscale analyses, since the New York City Department of Environmental Protection (DEP) considers it to have an insignificant contribution on that scale. Road dust emission factors were calculated according to the latest procedure delineated by EPA[6] and the *CEQR Technical Manual*.

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 Actions (see Chapter 13, "Transportation"). Traffic speed data, existing vehicle distribution, and lane configuration for the future without and with the Proposed Actions were employed in the respective air quality modeling scenarios. For CO, traffic conditions for the each of the peak periods (weekday morning [7 to 8 AM], midday [12 to 1 PM], evening [5 to 9 PM], and Saturday midday [12 to 1 PM]) were used for the analysis.

For PM, traffic conditions for the same peak periods were used to describe traffic conditions for both the daily and weekly time scales. In addition, traffic volumes for these peak periods were used as the baseline for determining off-peak volumes. Off-peak traffic volumes in the future without the Proposed Actions, and off-peak increments from the Proposed Actions, were determined by adjusting the peak period volumes by the 24-hour distributions of actual vehicle counts collected at appropriate locations. For annual impacts, average weekday and weekend 24-hour distributions were used to more accurately simulate traffic patterns over longer periods.

Dispersion Model for Microscale Analyses

Maximum CO concentrations adjacent to streets within the surrounding area, resulting from vehicle emissions were predicted using the Tier 1 CAL3QHC model Version 2.0.[7] The CAL3QHC model employs a Gaussian (normal

[4] EPA, MOVES Model, User Guide for MOVES2014, July 2014.

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

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

[7] EPA, User's Guide to CAL3QHC, A Modeling Methodology for Predicted Pollutant Concentrations Near Roadway Intersections, Office of Air Quality, Planning Standards, Research Triangle Park, North Carolina, EPA-454/R-92-006.

distribution) dispersion assumption and includes an algorithm for estimating vehicular queue lengths at signalized intersections. CAL3QHC calculates emissions and dispersion of CO from idling and moving vehicles. The queuing algorithm includes site-specific traffic parameters, such as signal timing and delay (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 project 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 (Tier 2) 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.

To determine motor vehicle generated $PM_{2.5}$ concentrations adjacent to streets within the traffic study area, the CAL3QHCR model was applied. This refined version of the model can use hourly traffic and meteorology data, and is therefore more 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 CO ANALYSIS—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[8], CAL3QHC computations were performed using a wind speed of one meter per second, and the neutral stability class D. The eight-hour average CO concentrations were estimated by multiplying the predicted one-hour average CO concentrations by a factor of 0.7 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 reasonable worst-case meteorology was used to estimate impacts.

TIER II $PM_{2.5}$ ANALYSIS—CAL3QHCR

A Tier II analysis performed with the CAL3QHCR model includes the modeling of hourly concentrations based on hourly traffic data and five years of monitored hourly meteorological data. The data consist of surface data collected at JFK Airport and upper air data collected at Brookhaven, New York for the period 2010–2014. All hours were modeled, and the highest resulting concentration for each averaging period is presented.

Analysis Year

The microscale analyses were performed for existing conditions and 2030, the year by which the Proposed Actions is likely to be completed. The future analysis was performed both without the Proposed Actions (the No-Action condition) and with the Proposed Actions (the 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

[8] *Guidelines for Modeling Carbon Monoxide from Roadway Intersections*, EPA Office of Air Quality Planning and Standards, Publication EPA-454/R-92-005.

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.

The background concentrations used in the mobile source analysis were based on concentrations recorded at a monitoring station representative of the county or from the nearest available monitoring station and in the statistical format of the NAAQS (see Table 14-1), as provided in the *CEQR Technical Manual*. These represent the most recent 3-year average for 24-hour average $PM_{2.5}$ and 1-hour average NO_2 and SO_2, the highest value from the three most recent years of data available for PM_{10}, and the highest value from the five most recent years of data available for all other pollutant and averaging period combinations. The background concentrations are presented in Table 14-3.

TABLE 14-3
Maximum Background Pollutant Concentrations for Mobile Source Analysis

Pollutant	Average Period	Location	Concentration	NAAQS
CO[(1)]	1-hour	Queens College, Queens	3.4 ppm	35 ppm
	8-hour	Queens College, Queens	1.7 ppm	9 ppm
PM_{10}[(1)]	24-hour	Division Street, Manhattan	48 µg/m^3	150 µg/m^3
$PM_{2.5}$	24-hour	JHS 126, Brooklyn	23.4 µg/m^3	35 µg/m^3

Source: CEQR Technical Manual, 2014.

Note:

[1] CO and PM_{10} are not measured in Brooklyn, so the nearest available monitoring station was used.

Analysis Sites

Intersections in the study area were reviewed for analysis based on the *CEQR Technical Manual* guidance. The incremental traffic volumes for the weekday AM, midday, PM, and Saturday PM periods were reviewed and intersections with increments exceeding the CO and PM volume thresholds were identified. Of those intersections, four were selected for microscale analysis (see Table 14-4 and Figure 14-1). Consistent with the *CEQR Technical Manual,* each of these sites were selected initially for analysis because the projected number of vehicles generated due to the Proposed Actions would exceed the *CEQR Technical Manual* threshold of 170 vehicles for CO. In addition, Sites 1 and 2 have the overall highest number of project-generated vehicles and each of these sites has an overall high level of total With-Action volumes and high levels of congestion (based on the projected Level of Service). Site 3 was selected based on the projected number of project-generated trips, and Site 4 was selected based on the number of project-generated trips and congestion. The potential impact from vehicle emissions of CO, PM_{10}, and $PM_{2.5}$ was analyzed for each of these intersections.

TABLE 14-4
Mobile Source Analysis Sites

Analysis Site	Location
1	Atlantic Avenue & Pennsylvania Avenue
2	Atlantic Avenue & Logan Street
3	Atlantic Avenue & Liberty Avenue
4	Fulton Street & Logan Street

RECEPTOR PLACEMENT

Multiple receptors (i.e., precise locations at which concentrations are predicted) were modeled at each of the selected sites; receptors were placed along the approach and departure links at spaced intervals. Receptors were placed at sidewalk or roadside locations near intersections with continuous public access. Receptors in the analysis models for predicting annual average neighborhood-scale $PM_{2.5}$ concentrations were placed at a distance of 15



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Figure 14-1
Air Quality Mobile Source Analysis Sites

meters from the nearest moving lane at each analysis location based on the *CEQR Technical Manual* procedure for neighborhood-scale corridor $PM_{2.5}$ modeling.

Receptor Placement

Multiple receptors (i.e., precise locations at which concentrations are evaluated) were modeled at each of the selected sites; receptors were placed along the approach and departure links and roadway segments at regularly spaced intervals. Receptors in the analysis models for predicting annual average neighborhood-scale $PM_{2.5}$ concentrations were placed at a distance of 15 meters, from the nearest moving lane at each analysis location, based on the *CEQR Technical Manual* procedure for neighborhood-scale corridor $PM_{2.5}$ modeling.

Parking Facilities

The Proposed Actions would include parking facilities to account for the new parking demand and supply. Emissions from vehicles using the parking areas could potentially affect ambient levels of CO and PM at the project intersections analyzed in the With-Action conditions. Of the parking associated with the projected development sites, the prototypical parking garages at projected development sites 66 and 67 were analyzed. Projected development site 66 was analyzed due to its capacity and proximity to intersections that were analyzed, while projected development site 67 was analyzed since it has the maximum overall capacity (241 parking spaces) and the maximum predicted number of vehicle ins/outs, and, therefore, the highest potential incremental concentrations of pollutants.

An analysis of the emissions from the outlet vents and their dispersion in the environment was performed, calculating pollutant levels in the surrounding area, using the methodology set forth in the *CEQR Technical Manual*. Emissions from vehicles entering, parking, and exiting the garages were estimated using the EPA MOVES mobile source emission model, as referenced in the *CEQR Technical Manual*. For all arriving and departing vehicles, an average speed of five miles per hour was conservatively assumed for travel within the parking garages. In addition, all departing vehicles were assumed to idle for one minute before proceeding to the exit. The concentrations of CO and PM within the garages were calculated assuming a minimum ventilation rate, based on New York City Building Code requirements, of one cubic foot per minute of fresh air per gross square foot of garage area. To determine compliance with the NAAQS, CO concentrations were determined for the maximum eight-hour average period. (No exceedances of the one-hour standard would occur, and the eight-hour values are the most critical for impact assessment.)

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

The CO concentrations were determined for the time periods when overall garage usage would be the greatest, considering the hours when the greatest number of vehicles would exit the facility (PM concentrations were determined on a 24-hour and annual average basis). Traffic data for the parking garage analysis was derived from the trip generation analysis described in the traffic section of this DEIS. Background and on-street concentrations were added to the modeling results to obtain the total ambient levels for CO and PM_{10}. The 24-hour average $PM_{2.5}$ background concentration was used to determine the *de minimis* criteria threshold.

Stationary Sources

A stationary source analysis was conducted to evaluate potential impacts from the projected and potential development sites' heat and hot water systems. In addition, an assessment was conducted to determine the potential for impacts due to industrial activities within the affected area, and from any nearby large emission sources.

Individual Heat and Hot Water Systems

SCREENING ANALYSIS

A screening analysis was performed to assess air quality impacts associated with emissions from heat and hot water systems associated with each projected and potential development site. The methodology described in the *CEQR Technical Manual* was used for the analysis and considered impacts on sensitive uses (i.e., existing residences and other developments under construction).

The methodology determines the threshold of development size below which the action would not have a significant adverse impact. The screening procedures utilize information regarding the type of fuel to be used, the maximum development size, and the heat and hot water systems exhaust stack height to evaluate whether a significant adverse impact may occur. Based on the distance from the development site to the nearest building of similar or greater height, if the maximum development size is greater than the threshold size in the *CEQR Technical Manual,* there is the potential for significant air quality impacts, and a refined dispersion modeling analysis would be required. Otherwise, the source passes the screening analysis, and no further analysis is required.

Since information on the heat and hot water systems' design was not available, each projected and potential development site was evaluated with the nearest existing or proposed residential development of a similar or greater height analyzed as a potential receptor. The maximum floor area of each projected and potential development site from RWCDS was used as input for the screening analysis.

It was assumed that No. 2 fuel oil or natural gas would be used in the projected and potential development sites' heat and hot water systems, and that exhaust stacks would be located three feet above roof height (as per the *CEQR Technical Manual*). For sources that did not pass the screening analyses using the *CEQR Technical Manual* procedures, a refined modeling analysis was performed. For fuel oil, the primary pollutants of concern are SO_2 and PM, while for natural gas, the primary pollutant of concern is NO_2.

REFINED DISPERSION ANALYSIS

Projected and potential development sites that did not pass the screening analysis were further analyzed using a refined dispersion model, the EPA/AMS AERMOD dispersion model[9]. AERMOD is a state-of-the-art dispersion model, applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources). AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatments of the boundary layer theory, understanding of turbulence and dispersion, and includes handling of terrain interactions.

The AERMOD model calculates pollutant concentrations from one or more points (e.g., exhaust stacks) based on hourly meteorological data, and has the capability to calculate pollutant concentrations at locations where the plume from the exhaust stack is affected by the aerodynamic wakes and eddies (downwash) produced by nearby structures. The analyses of potential impacts from exhaust stacks were made assuming stack tip downwash, urban dispersion and surface roughness length, and elimination of calms. AERMOD can be run with and without building downwash (the downwash option accounts for the effects on plume dispersion created by the structure the stack is located on, and other nearby structures). In general, modeling "without" building downwash produces higher estimates of pollutant concentrations when assessing the impact of elevated sources on elevated receptor locations. Therefore, the analysis was performed using the AERMOD model with the no downwash option only.

For the refined analysis, the exhaust stacks for the heat and hot water systems were assumed to be located at the edge of the development massing closest to the receptor, unless the source and receptor were immediately adjacent

[9] EPA, AERMOD: Description Of Model Formulation, 454/R-03-004, September 2004; and EPA, User's Guide for the AMS/EPA Regulatory Model AERMOD, 454/B-03-001, September 2004 and Addendum December 2006.

to each other. In these cases, the stack was assumed to be located at an initial distance of 10 feet from the nearest receptor.

The refined dispersion modeling analysis was performed for $PM_{2.5}$, PM_{10}, NO_2 and SO_2 (for sites where fuel oil was modeled). The analysis was then performed using calculated emission rates for fuel oil and natural gas. If a source could not meet the NAAQS or $PM_{2.5}$ *de minimis* criteria, the stack would then be set back in 5 foot increments until the source met the respective criteria.

Receptor Placement

Discrete receptors (i.e., locations at which concentrations are calculated) were modeled along the existing and proposed building façades to represent potentially sensitive locations such as operable windows and intake vents. Rows of receptors at spaced intervals on the modeled buildings were analyzed at multiple elevations.

Emission Estimates and Stack Parameters

Fuel consumption was estimated based on procedures outlined in the *CEQR Technical Manual* as discussed above. Using worst-case assumptions, fuel was assumed to be No. 2 fuel oil for SO_2 and PM, and natural gas for NO_2.

Emission factors from the fuel oil and natural gas combustion sections of EPA's AP-42 were used to calculate emission rates for the projected and potential development site's heat and hot water systems. Annual NO_2 concentrations from heating and hot water sources were estimated using a NO_2 to NO_x ratio of 0.75, as described in EPA's *Guideline on Air Quality Models* at 40 CFR part 51 Appendix W, Section 5.2.4.[10]

EPA's preferred regulatory stationary source model, AERMOD, is capable of producing detailed output data that can be analyzed at the hourly level required for the form of the one-hour standards. EPA has also developed guidance to estimate the transformation ratio of NO_2 to NO_x, applicable to heating and hot water systems, as discussed further below.

One-Hour average NO_2 concentration increments associated with the projected and potential development sites' hot water systems were estimated using AERMOD model's Plume Volume Molar Ratio Method (PVMRM) module to analyze chemical transformation within the model. The PVMRM module incorporates hourly background ozone concentrations to estimate NO_x transformation within the source plume. Ozone concentrations were taken from the NYSDEC Queens College monitoring station that is the nearest ozone monitoring station and had complete five years of hourly data available. An initial NO_2 to NO_x ratio of ten percent at the source exhaust stack was assumed, which is considered representative for boilers.

The methodology used to determine the compliance of total one-hour NO_2 concentrations from the proposed sources with the one-hour NO_2 NAAQS was based on adding the monitored background to modeled concentrations, as follows: hourly modeled concentrations from proposed sources were first added to the seasonal hourly background monitored concentrations; then the highest combined daily one-hour NO_2 concentration was determined at each receptor location and the 98th percentile daily one-hour maximum concentration for each modeled year was calculated within the AERMOD model; finally the 98th percentile concentrations were averaged over the latest five years. This methodology is recognized by EPA and the City and is referenced in EPA modeling guidance[11].

Background Concentrations

To estimate the maximum expected pollutant concentration at a given location (receptor), the predicted impacts must be added to a background value that accounts for existing pollutant concentrations from other sources that are not directly accounted for in the model (see Table 14-5). To develop background levels, concentrations measured at the most

[10] http://www.epa.gov/scram001/guidance/guide/appw_05.pdf
[11] http://www.epa.gov/ttn/scram/guidance/clarification/NO2_Clarification_Memo-20140930.pdf

representative NYSDEC ambient monitoring station over the latest available five-year period (2009-2013) were used for annual average NO_2 and three-hour average SO_2 background (consistent with DEP guidance), while the latest available three-year period was used for the 24-hour PM_{10} background concentration.

TABLE 14-5
Background Pollutant Concentrations

Pollutant	Average Period	Location	Concentration (µg/m³)	NAAQS (µg/m³)
NO_2	Annual[1]	Queens College 2, Queens	40.7	100
	1-hour[2]		113.8	188
SO_2	1-hour[3]	Queens College 2, Queens	52.6	196
	3-hour[4]		89	1,300
$PM_{2.5}$	24-hour	JHS 126	23.4	35
PM_{10}	24-Hour[5]	Division Street, Manhattan	48	150

Notes:
[1] Annual average NO_2 background concentration is based on the 5-year highest value from 2009–2013.
[2] The One-Hour NO_2 background concentration is based on the maximum 98th percentile One-Hour NO_2 concentration averaged over three years of data, from 2011–2013.
[3] The One-Hour SO_2 background concentration is based on the maximum 99th percentile concentration averaged over three years of data, from 2011–2013.
[4] The Three-hour SO_2 background concentration is based on the five-year highest second-highest measured value from 2008–2012.
[5] PM_{10} is based on the 3-year highest second-highest value from 2011–2013.
Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2008-2013.

$PM_{2.5}$ annual average impacts are assessed on an incremental basis and compared with the $PM_{2.5}$ *de minimis* criteria, without considering the annual background. Therefore the annual $PM_{2.5}$ background is not presented in the table. The $PM_{2.5}$ 24-hour average background concentration of 26 µg/m³ (based on the 2011 to 2013 average of 98th percentile concentrations measured at the JHS 126 monitoring station) was used to establish the *de minimis* value for the 24-hour increment, consistent with the guidance provided in the *CEQR Technical Manual.*

Cumulative Impacts from Heat and Hot Water Systems

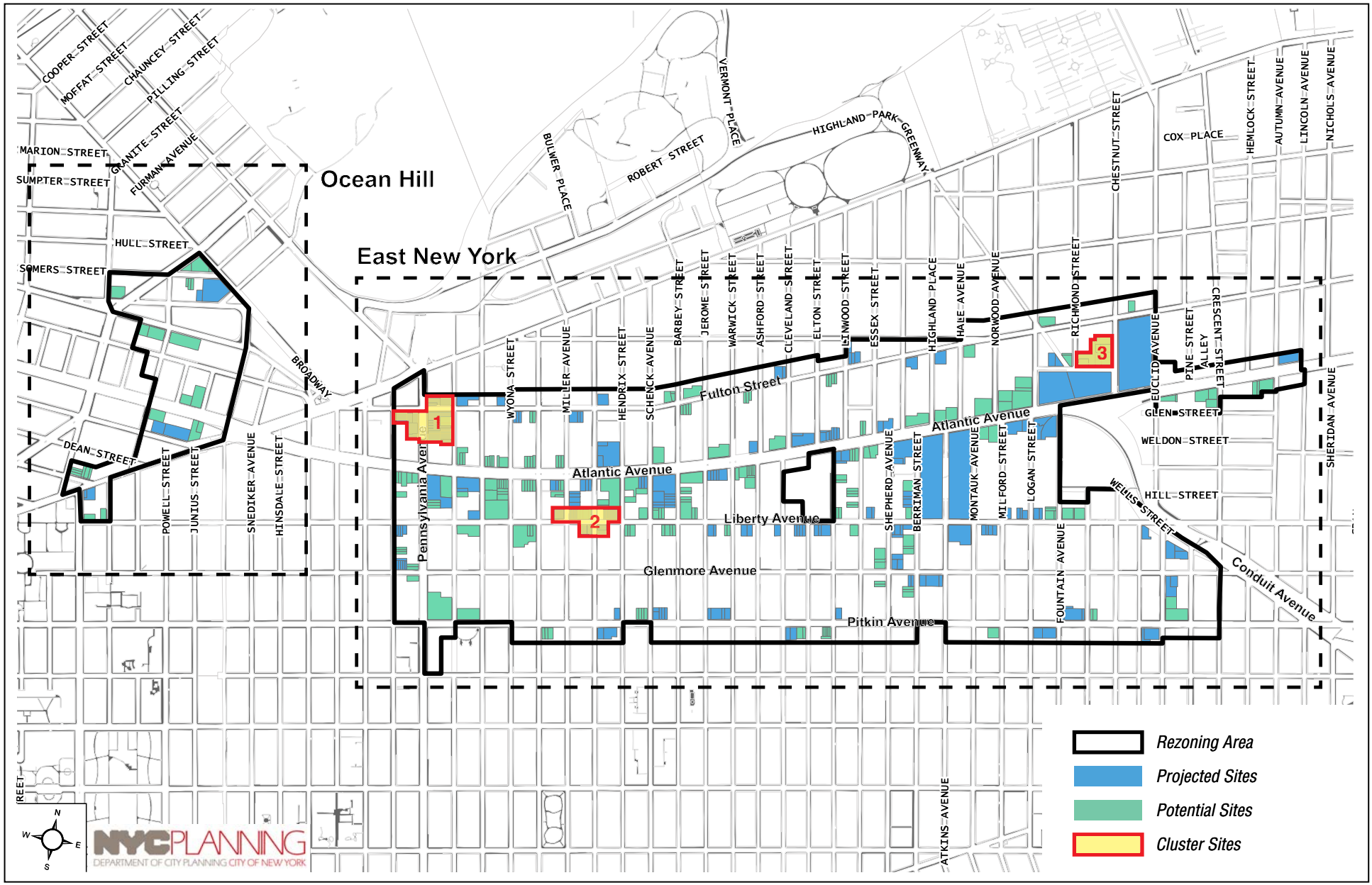
In addition to the individual source analysis, groups or "clusters" of heat and hot water sources with similar stack heights were analyzed, to address the cumulative impacts of multiple sources. The affected area was reviewed to determine areas where clusters with high density of development sites with similar building heights would be located which could result in cumulative impacts on nearby buildings of a similar or greater height. A total of three clusters were selected for analysis. The development sites associated with each cluster and their location are presented in Table 14-6 and Figure 14-2.

TABLE 14-6
Cluster Analysis Sites

Cluster	Development Sites
1	Projected Sites 3, 6, 7, 8, 9, & 10 Potential Sites A66
2	Projected Sites 17, 33, 34, 47, & 48 Potential Sites A37, & A38
3	Potential Sites A99, A100, A101

The cluster analysis was performed using the EPA-approved AERSCREEN model (version 14147, EPA, 2014). AERSCREEN predicts worst-case one-hour impacts downwind from a point, area, or volume source. The model generates worst-case meteorology using representative minimum and maximum ambient air temperatures, and site-specific surface

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Figure 14-2
HVAC Cluster Locations

characteristics such as albedo, Bowen ratio, and surface roughness.[12] If the worst-case concentrations predicted by AERSCREEN are above significant impact levels for each pollutant analyzed, further analysis with AERMOD is required to determine the potential for air quality impacts from the Proposed Actions. However, if the worst-case concentrations predicted by the AERSCREEN model are below impact levels for an analyzed pollutant, there is no potential for impact and no further analysis is required.

The AERSCREEN model predicts impacts over a one-hour average using default meteorology. In order to predict pollutant concentrations over longer periods of time, EPA-referenced persistence factors were used. These consist of 0.6 and 0.1 for the 24-hour and annual average periods, respectively.

The AERSCREEN model considered each cluster as a single area source. The cluster analysis was performed to identify impacts of SO_2, NO_2, PM_{10}, and $PM_{2.5}$. Using information in the Air Quality Appendix of the *CEQR Technical Manual*, an estimate of the emissions from the cluster development's HVAC systems was made. The appendix includes tables which can be used to estimate emissions based on the development size, type of fuel used and type of construction. Fuel consumption factors of 60.3 ft^3/ft^2-year and 0.43 gal/ft^2-year were used for natural gas and fuel oil, respectively. Mixed-use developments used the residential fuel consumption factors since they are more conservative. Short-term factors were determined by using peak hourly fuel consumption estimates for heating and cooling systems.

Emission factors for each fuel were obtained from the EPA *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources*. The SO_2 emissions rates were calculated based on a maximum fuel oil sulfur content of 0.0015 percent (based on use of ultra-low sulfur No. 2 oil) the fuel using the appropriate AP-42 formula.

The average minimum distance from the sites within the source clusters to the nearest buildings were used in the modeling analysis. The analysis focused on existing buildings or other projected or potential development sites which are of a similar or greater height than the source cluster.

To estimate the maximum expected pollutant concentration at a given receptor, the calculated impact must be added to a background value that accounts for existing pollutant concentrations from other sources (see Table 14-5).

Industrial Sources

Pollutants emitted from the exhaust vents of existing permitted industrial facilities were examined to identify potential adverse impacts on future residents of the projected and potential development sites. All industrial air pollutant emission sources within 400 feet of a projected or potential development site boundary were considered for inclusion in the air quality impact analyses.

Based on a review of the PLUTO database, 345 potential manufacturing or industrial sources were identified. A request was made to DEP's Bureau of Environmental Compliance (BEC) and NYSDEC for information regarding the release of air pollutants from these potential sources within the entire study area. The DEP and NYSDEC air permit data provided was compiled into a database of source locations, air emission rates, and other data pertinent to determining source impacts. A comprehensive search was also performed to identify NYSDEC Title V permits and permits listed in the EPA Envirofacts database.[13]

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

[13] EPA, Envirofacts Data Warehouse, http://oaspub.epa.gov/enviro/ef_home2.air, July 2010.

A field survey was conducted on February 14, 2015 to determine the operating status of permitted industries and identify any potential industrial sites not included in the original permit request or the permit databases. Of the requested sites, 21 sites were determined to be active and not located on a projected development site.

A number of permitted sources were found at projected and potential development sites. Under the Proposed Actions, it is assumed that all of the projected developments would be completed by the 2030 build year. Therefore, the industrial sources at these sites were eliminated since a developed site would not continue to be a source of industrial emissions. However, at potential development sites, which may not be developed by the Proposed Action's build year, existing industrial sources could operate in the future and were, therefore, included in the analysis. This is conservative, since it also assumed that the Proposed Actions would result in the redevelopment of these properties.

For sources that perform paint spraying, such as autobody shops, in some cases the solvent emissions were not listed as individual air toxic compounds. To estimate the individual air toxic emissions in these cases, material safety data sheet information from representative sources was used, which provides maximum percentage by weight for individual air toxics that are commonly found in coatings used in paint spraying operations. The solvent usage from the source permit was multiplied by the weight percentage for each air toxic to estimate the maximum emission rate for the air toxics, by source.

REFINED DISPERSION ANALYSIS

After compiling the information on facilities with manufacturing or process operations in the study area, maximum potential pollutant concentrations from different sources, at various distances from the projected and potential development sites, were evaluated with a refined modeling analysis using the EPA/AMS AERMOD dispersion model. The AERMOD model calculates pollutant concentrations from one or more points (e.g., exhaust stacks) based on emission rates, source parameters and hourly meteorological data, stack tip downwash, urban dispersion and surface roughness length, and elimination of calms. Since the highest concentrations were predicted to occur at nearby elevated locations, the AERMOD model was run without downwash—a procedure which produces the highest concentrations at elevated locations. The meteorological data set consisted of five years of meteorological data: surface data collected at JFK Airport (2010–2014) and concurrent upper air data collected at Brookhaven, Suffolk County, New York.

Predicted worst-case impacts on the projected and potential development sites were compared with the short-term guideline concentrations (SGCs) and annual guideline concentrations (AGCs) recommended in *NYSDEC's DAR-1 AGC/SGC Tables*.[14] These guidelines present the airborne concentrations which are applied as a screening threshold to determine if the future residents of the projected and potential development sites could be significantly impacted by nearby sources of air pollution.

To assess the effects of multiple sources emitting the same pollutants, cumulative source impacts were determined. Concentrations of the same pollutant from industrial sources that were within 400 feet of an individual development site were combined and compared to the guideline concentrations discussed above.

Discrete receptors (i.e., locations at which concentrations were calculated) were placed on the potentially affected projected and potential development sites. The receptor network consisted of receptors located at spaced intervals along the sides of the development site from the ground floor to the upper level.

Emission rates and stack parameters, obtained from the DEP permits, were input into the AERMOD dispersion model.

[14] NYSDEC Division of Air Resources, February 2014.

HEALTH RISK ASSESSMENT

Potential cumulative impacts were evaluated based on EPA's Hazard Index Approach for non-carcinogenic compounds and EPA's Unit Risk Factors for carcinogenic compounds. Both methods are based on equations that use EPA health risk information at referenced concentrations for individual compounds to determine the level of health risk posed by an expected ambient concentration of these compounds at a sensitive receptor. For non-carcinogenic compounds, EPA considers a concentration-to-reference dose level ratio of less than 1.0 to be acceptable. For carcinogenic compounds, the EPA unit risk factors represent the concentration at which an excess cancer risk of one-in-one million is predicted. In cases where an EPA reference dose or unit risk factor did not exist, the NYSDEC AGC was used.

Additional Sources

The *CEQR Technical Manual* requires an analysis of projects that may result in a significant adverse impact due to certain types of new uses located near a "large" or "major" emissions source. Major sources are defined as those located at facilities that have a Title V or Prevention of Significant Deterioration air permit, while large sources are defined as those located at facilities that require a State Facility Permit. To assess the potential effects of these existing sources on the projected and potential development sites, a review of existing permitted facilities was conducted. Sources of information reviewed included the USEPA's Envirofacts database[15], the NYSDEC Title V and State Facility Permit websites[16], the New York City Department of Buildings website[17], and DEP permit data.

One facility with a state facility permit was identified: the New York City Transit (NYCT) Authority East New York Bus Depot & Shops at 1 Jamaica Avenue, which is within 1,000 feet of projected development sites 3, 4, 6, 7, 8, 9, 10, and 13 and potential development sites A10, A17, A66, A68, A69, and A70.

Pollutant concentrations were estimated from this facility to evaluate its potential impact on the Proposed Actions. The AERMOD dispersion model was used in the analysis, with the same set of meteorological data and the same background concentration values.

The facility has three natural gas-fired 47.3 mmBtu/hr boilers. Each boiler vents through a separate exhaust stack. The facility NO_x emissions are capped at 24.9 tons per year as per the State Facility Permit. For the purposes of the analysis the short-term and annual emissions from the NYCT East New York Bus Depot & Shops were based on two boilers operating simultaneously at 60 percent maximum operating load capacity, based on the information provided by NYCT. The third boiler is a stand-by unit.

The facility emissions were estimated using the information developed for the State Facility Permit application, and applying the EPA's *Compilations of Air Pollutant Emission Factors (AP-42)*[18] emission factors for natural gas-fired boilers. Table 14-7 presents the emission rates and stack parameters used in the AERMOD analysis.

[15] EPA, Envirofacts Data Warehouse, http://oaspub.epa.gov/enviro/ef_home2.air

[16] NYSDEC Title V and State Facility permit websites: http://www.dec.ny.gov/dardata/boss/afs/issued_atv.html; http://www.dec.ny.gov/dardata/boss/afs/issued_asf.html

[17] DOB website: http://a810-bisweb.nyc.gov/bisweb/bispi00.jsp

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

TABLE 14-7
Stack Parameters and Emission Rates from the Existing Emission Source

Parameter	Value
Stack height (ft)[3]	67
Stack Diameter (ft)[3]	3.0
Exhaust Flow Rate (acfm)[1,2]	9,585
Exhaust Temperature (°F)[3]	520
Fuel Type	Natural Gas
NO2 Emission Rate (g/s)	0.358
SO2 Emission Rate (g/s)	0.002
PM10 Emission Rate (g/s)	0.027
PM2.5 Emission Rate (g/s)	0.027

Notes:
1 ACFM = actual cubic feet per minute.
2 The stack exhaust flow rate is estimated based on the type of fuel and heat input rates.
3 The stack exhaust height, diameter and Temperature are based on information received from NYCT.

F. EXISTING CONDITIONS

The Representative criteria pollutant concentrations measured in recent years at NYSDEC air quality monitoring stations nearest to the rezoning area are presented in Table 14-8. The values presented are consistent with the form of the NAAQS. For example, the eight-hour ozone concentration shown is the three-year average of the 4th highest daily maximum 8-hour average concentrations. As shown in Table 14-8, 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 stationary source and parking garage analyses, since these are the most recent reported monitored values, rather than more conservative values used for dispersion modeling. The concentrations presented in Table 14-8 provide a comparison of the air quality in the rezoning 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.

G. THE FUTURE WITHOUT THE PROPOSED ACTIONS (NO-ACTION CONDITION)

Mobile Sources

Intersection Analysis

CO concentrations in the No-Action condition were determined for using the methodology previously described. Table 14-9 shows future maximum predicted eight-hour average CO concentrations, including background concentrations, at the analysis intersections in the No-Action condition. The values shown are the highest predicted concentrations for the receptor locations for any of the time periods analyzed.

As shown in Table 14-9, No-Action values are predicted to be well below the eight-hour CO standard of nine ppm.

PM_{10} concentrations for the No- Action condition were determined using the methodology described above. Predicted future PM_{10} 24-hour concentrations, including background concentrations, at the analyzed intersections in the No-Action condition are presented in Table 14-10. The values shown are the highest predicted concentrations for the receptor locations.

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

TABLE 14-8
Representative Monitored Ambient Air Quality Data

Pollutant	Location	Units	Averaging Period	Concentration	NAAQS
CO	Queens College 2, Queens	ppm	8-hour	1.4	9
			1-hour	2.0	35
SO_2	Queens College 2, Queens	µg/m^3	3-hour	45	1,300
			1-hour	52.6 [1]	196
PM_{10}	Division Street, Manhattan	µg/m^3	24-hour	47	150
$PM_{2.5}$	JHS 126, Brooklyn	µg/m^3	Annual	9.3	15
			24-hour	32.1	35
NO_2	Queens College 2, Queens	µg/m^3	Annual	32.9	100
			1-hour	113.8 [2]	188
Lead	IS 52, Bronx	µg/m^3	3-month	0.005	0.15
Ozone	Queens College 2, Queens	ppm	8-hour	0.079	0.075

Notes:
[1] The one-hour value is based on a three-year average (2011-2013) of the 99th percentile of daily maximum one-hour average concentrations.
[2] The one-hour value is based on a three-year average (2011-2013) of the 98th percentile of daily maximum one-hour average concentrations.
Source: NYSDEC, New York State Ambient Air Quality Report (2011-2013).

TABLE 14-9
Maximum Predicted Eight-Hour Average CO No-Action Concentrations

Analysis Site	Location	Time Period	Eight-Hour Concentration (ppm)
1	Atlantic Avenue & Pennsylvania Avenue	AM	2.1
2	Atlantic Avenue & Logan Street	PM	2.0
3	Liberty Avenue & Logan Street	PM	1.8
4	Fulton Street & Logan Street	AM	1.8

Notes:
Eight-hour standard (NAAQS) is nine ppm.
Concentration includes a background concentration of 1.7 ppm.

TABLE 14-10
Maximum Predicted 24-Hour Average PM_{10} No-Action Concentrations (µg/m^3)

Analysis Site	Location	Concentration
1	Atlantic Avenue & Pennsylvania Avenue	75.7
2	Atlantic Avenue & Logan Street	68.5
3	Liberty Avenue & Logan Street	53.9
4	Fulton Street & Logan Street	55.5

Notes:
NAAQS—24-hour average 150 µg/m^3.
Concentration includes a background concentration of 48.0 µg/m^3.

Stationary Sources

Some development within the study area would occur in the future without the Proposed Actions by 2030. The Proposed Actions would result in more development and therefore the emissions from heat and hot water systems associated with the Proposed Actions would cumulatively be greater than the emissions from heat and hot water systems under the No-Action condition.

H. THE FUTURE WITH THE PROPOSED ACTIONS (WITH-ACTION CONDITION)

Mobile Sources

CO concentrations for future conditions in the With-Action condition were predicted using the methodology previously described. Table 14-11 shows the future maximum predicted 8-hour average CO concentrations at the intersection studied. (No 1-hour values are shown, since no exceedances of the NAAQS would occur and the *de minimis* criteria are only applicable to 8-hour concentrations; therefore, the 8-hour values are the most critical for impact assessment.) The values shown are the highest predicted concentrations. The results indicate that the proposed actions would not result in any violations of the 8-hour CO standard. In addition, the incremental increases in 8-hour average CO concentrations are very small, and consequently would not result in a violation of the CEQR *de minimis* CO criteria. Therefore, mobile source CO emissions the proposed actions would not result in a significant adverse impact on air quality.

TABLE 14-11
Maximum Predicted Eight-Hour CO With-Action Concentrations (ppm)

Analysis Site	Location	Time Period	No-Action	With Action	*De Minimis*
1	Atlantic Avenue & Pennsylvania Avenue	AM	2.1	2.1	5.6
2	Atlantic Avenue & Logan Street	PM	2.0	2.2	5.6
3	Liberty Avenue & Logan Street	PM	1.8	1.9	5.4
4	Fulton Street & Logan Street	AM	1.8	1.9	5.5

Notes:
Eight-hour standard is nine ppm.
Concentration includes a background concentration of 1.7 ppm.

PM_{10} concentrations for the With-Action condition were determined using the methodology previously described and used in the No Build condition. Table 14-12 presents the predicted PM_{10} 24-hour concentrations at the analyzed intersections in the With-Action condition. The values shown are the highest predicted concentrations for the modeled receptor locations and include background concentrations.

TABLE 14-12
Maximum Predicted 24-Hour Average PM_{10} Concentrations ($\mu g/m^3$)

Analysis Site	Location	No-Action	With-Action
1	Atlantic Avenue & Pennsylvania Avenue	75.7	77.6
2	Atlantic Avenue & Logan Street	68.5	73.8
3	Liberty Avenue & Logan Street	53.9	57.7
4	Fulton Street & Logan Street	55.5	58.0

Notes:
NAAQS—24-hour average 150 $\mu g/m^3$.
Concentrations presented include a background concentration of 48.0 $\mu g/m^3$.

Using the methodology previously described, maximum predicted 24-hour and annual average $PM_{2.5}$ concentration increments were calculated so that they could be compared with the *de minimis* criteria. Based on this analysis, the maximum predicted localized 24-hour average and neighborhood-scale annual average incremental $PM_{2.5}$ concentrations are presented in Tables 14-13 and 14-14, respectively. Note that $PM_{2.5}$ concentrations in the No-Action condition are not presented, since impacts are assessed on an incremental basis.

TABLE 14-13
Maximum Predicted 24-Hour Average $PM_{2.5}$ Incremental Concentrations (μg/m³)

Analysis Site	Location	Increment (μg/m³)	*De Minimis* (μg/m³)
1	Atlantic Avenue & Pennsylvania Avenue	0.53	5.8
2	Atlantic Avenue & Logan Street	2.81	5.8
3	Liberty Avenue & Logan Street	1.34	5.8
4	Fulton Street & Logan Street	0.68	5.8

Note:
$PM_{2.5}$ *de minimis* criteria — 24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 μg/m³.

TABLE 14-14
Maximum Predicted Annual Average $PM_{2.5}$ Incremental Concentrations (μg/m³)

Analysis Site	Location	Increment
1	Atlantic Avenue & Pennsylvania Avenue	0.01
2	Atlantic Avenue & Logan Street	0.14
3	Liberty Avenue & Logan Street	0.05
4	Fulton Street & Logan Street	0.03

Note: $PM_{2.5}$ *de minimis* criteria—annual (neighborhood scale), 0.1 μg/m³.

The results show that the daily (24-hour) $PM_{2.5}$ increments are predicted to be below the *de minimis* criteria. At three of the four intersection sites analyzed, the maximum annual incremental $PM_{2.5}$ concentration is below the *de minimis* criteria; however, the annual $PM_{2.5}$ maximum annual incremental concentration is predicted to exceed the *de minimis* criteria at the intersection of Atlantic Avenue and Logan Street. This would be considered a significant adverse air quality impact. Therefore, traffic mitigation measures were examined to avoid potential significant impact at this intersection location. Mitigation measures are discussed in Chapter 20, "Mitigation."

Parking Analysis

Based on the methodology previously described, the maximum predicted CO and PM concentrations from the proposed parking facilities at projected development sites 66 and 67 were analyzed, assuming a near side sidewalk receptor on the same side of the street (three feet) as the parking facility and a far side sidewalk receptor on the opposite side of the street (55 feet and 50 feet for projected development sites 66 and 67, respectively) from the parking facility.

The maximum predicted eight-hour average CO concentration of all the receptors modeled at either projected development site 66 or 67 is 2.2 ppm. This value includes a predicted concentration of 0.04 ppm from emissions within the parking garage, on-street contribution of 0.42 ppm, and a background level of 1.7 ppm. The maximum predicted concentration is substantially below the applicable standard of nine ppm and the *de minimis* CO criteria.

The maximum predicted 24-hour and annual average $PM_{2.5}$ increments including increments associated with on street traffic are 2.3 μg/m³ and 0.14 μg/m³, respectively. The maximum predicted $PM_{2.5}$ increments are well below the respective $PM_{2.5}$ *de minimis* criteria of 5.8 μg/m³ for the 24-hour average concentration and 0.3 μg/m³ for the annual concentration. Therefore, the proposed parking garage would not result in any significant adverse air quality impacts.

Stationary Sources

Individual Heat and Hot Water Systems

SCREENING ANALYSIS

The screening analysis was performed to evaluate whether potential air quality impacts from the heat and hot water systems associated with the projected and potential development sites could potentially impact other projected and potential development sites, or existing buildings.

A total of 56 projected and 75 potential development sites failed the screening analysis using No. 2 fuel oil as the fuel source. Therefore, each of these development sites required a refined modeling analysis for the use of No. 2 fuel oil. Of the sites that failed the screening analysis for No. 2 oil, 47 projected and 64 potential development sites were found also fail using natural gas as the fuel source. Therefore, a refined modeling analysis for the use of natural gas was performed for these sites.

REFINED DISPERSION ANALYSIS

As indicated above, 131 projected and potential development sites (56 projected and 75 potential development sites) required a refined modeling analysis to determine the potential for air quality impacts. The results of the refined modeling analysis determined the following:

- 21 (eight projected and 13 potential development sites) of the 131 sites analyzed using refined dispersion modeling passed the refined analysis for fuel oil; therefore, no restrictions are required for these sites.
- If the fuel type is restricted to natural gas, no significant adverse impacts are predicted at 61 of the sites (28 projected and 33 potential development sites).
- If the fuel type is restricted to natural gas only, and heating and hot water system stacks are set back from the building edge to address $PM_{2.5}$ and NO_2 emissions, no significant adverse impacts are predicted at 14 of the sites (eight projected and six potential development sites).
- If the fuel type is restricted to natural gas only, heating and hot water system stacks are set back from the building edge to address $PM_{2.5}$ and NO_2 emissions, and low NO_x burners are required to address NO_2 emissions, no significant adverse impacts are predicted at one of the potential development sites.
- If the fuel type is restricted to natural gas only, and the height of the exhaust stack is increased where feasible to address $PM_{2.5}$ and NO_2 emissions, no significant adverse impacts are predicted at 28 of the sites (eight projected and 20 potential development sites) [19].
- If the fuel type is restricted to natural gas only, heating and hot water system stacks are set back from the building edge, and the height of the exhaust stack is increased where feasible to address $PM_{2.5}$ and NO_2 emissions, no significant adverse impacts are predicted at three of the projected development sites.
- If the fuel type is restricted to natural gas only, heating and hot water system stacks are set back from the building edge, and the height of the exhaust stack is increased where feasible to address $PM_{2.5}$ and NO_2 emissions, and low NO_x burners are required to address NO_2 emissions, no significant adverse impacts are predicted at two of the potential development sites.

Table 14-15 presents a summary of the analysis results and proposed restrictions, with additional detail provided in Tables 14-16 (projected development sites) and 14-17 (potential development sites).

[19] In addition to the 28 projected and potential development sites, for the City-owned parcel located within projected development site 66 (Block 4142, Lot 32), the implementation of the restrictions would be required through the Land Disposition Agreement between HPD and future developer with oversight provided through HPD and the NYCDEP.

TABLE 14-15
Heating and Hot Water System Analysis Summary

Analysis	Projected Development Sites		Potential Development Sites	
	Pass	**Fail**	**Pass**	**Fail**
#2 Oil Screening	24	56	30	75
#2 Oil Refined Analysis	8	48	13	62
Total	**32**	**48**	**43**	**62**
Sites with Requirements[1]	**Pass**	**Fail**	**Pass**	**Fail**
Natural Gas Screening	3	45	3	59
Natural Gas Refined Analysis	25	20	30	29
Natural Gas and Stack Setback Requirement	8	-	6	-
Natural Gas, Stack Setback and Low NOx Requirement	0	-	1	-
Natural Gas and Stack Height Requirement	8	-	20	-
Natural Gas, Stack Setback and Stack Height Requirement	3	-	0	-
Natural Gas, Stack Setback, Stack Height and Low NOx Requirement	0	-	2	-

Notes:

[1] In addition to the 28 projected and potential development sites, for the City-owned parcel located within Projected development site 66 (Block 4142, Lot 32), the implementation of the restrictions would be required through the Land Disposition Agreement between HPD and future developer with oversight provided through HPD and the NYCDEP.

Overall, to preclude the potential for significant adverse air quality impacts on other projected and potential development sites, or existing buildings, from the heat and hot water emissions, an (E) designation (E-366) would be assigned as part of the Proposed Actions for 109 projected and potential development sites (including 47 projected and 62 potential development sites). These designations would specify the various restrictions, such as type of fuel to be used, the use of low NO_x burners, the distance that the vent stack on the building roof must be from its lot line(s), and/or the increase of the exhaust stack height.

TABLE 14-16

Heating and Hot Water System Analysis—Results for Projected Development Sites

Site	Building Height	#2 Oil Modeled Concentration(µg/m³)				Pass/ Fail	Natural Gas Modeled Concentration (µg/m³)				Pass/ Fail	Requires E-Designation (Yes/No)
		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	SO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/SO_2 One-hour Standard		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	NO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/NO_2 One-hour Standard		
1	125	>5.8	>0.3	54.02	5.8/0.3/196	Fail	4.0	0.13	153.3	5.8/0.3/188	Pass	Yes
2	95	>5.8	0.09	53.48	5.8/0.3/196	Fail	2.5	0.03	156.7	5.8/0.3/188	Pass	Yes
3	95	>5.8	>0.3	53.57	5.8/0.3/196	Fail	3.5	0.11	164	5.8/0.3/188	Pass	Yes
4	75	>5.8	0.16	54.50	5.8/0.3/196	Fail	2.2	0.05	183.8	5.8/0.3/188	Pass	Yes
5	95	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
6	95	>5.8	>0.3	54.16	5.8/0.3/196	Fail	5.3	0.13	171.5	5.8/0.3/188	Pass	Yes
7	95	>5.8	>0.3	54.27	5.8/0.3/196	Fail	5.3	0.1	168.7	5.8/0.3/188	Pass	Yes
8	95	>5.8	>0.3	58.31	5.8/0.3/196	Fail	4.2	0.14	186.6	5.8/0.3/188	Pass	Yes
9	95	>5.8	>0.3	62.68	5.8/0.3/196	Fail	3.7	0.12	169.6	5.8/0.3/188	Pass	Yes
10	95	>5.8	>0.3	61.18	5.8/0.3/196	Fail	2.9	0.07	166.6	5.8/0.3/188	Pass	Yes
11	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
12	105	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
13	75	>5.8	>0.3	57.31	5.8/0.3/196	Fail	5.6	0.19	159	5.8/0.3/188	Pass	Yes
14	145	>5.8	0.24	54.03	5.8/0.3/196	Fail	4.9	0.08	151.8	5.8/0.3/188	Pass	Yes
15	85	>5.8	0.17	53.45	5.8/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	Yes
16	145	>5.8	>0.3	61.79	5.8/0.3/196	Fail	3.0	0.11	175.2	5.8/0.3/188	Pass	Yes
17	85	>5.8	0.19	53.41	5.8/0.3/196	Fail	2.1	0.06	156.7	5.8/0.3/188	Pass	Yes
18	105	>5.8	0.27	53.72	5.8/0.3/196	Fail	3.4	0.09	174.1	5.8/0.3/188	Pass	Yes
19	105	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
20	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
21	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
22	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
23	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
24	145	>5.8	>0.3	53.88	5.8/0.3/196	Fail	4.7	0.13	180.2	5.8/0.3/188	Pass	Yes
25	145	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
26	145	>5.8	0.21	53.91	5.8/0.3/196	Fail	3.6	0.07	181.1	5.8/0.3/188	Pass	Yes
27	145	>5.8	0.12	53.61	5.8/0.3/196	Fail	2.6	0.04	163.5	5.8/0.3/188	Pass	Yes
28	145	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No

TABLE 14-16 (cont'd)
Heating and Hot Water System Analysis—Results for Projected Development Sites

Site	Building Height	#2 Oil Modeled Concentration(µg/m³)				Pass/ Fail	Natural Gas Modeled Concentration (µg/m³)				Pass/ Fail	Requires E-Designation (Yes/No)
		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	SO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/SO_2 One-hour Standard		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	NO_2One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/NO_2 One-hour Standard		
29	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
30	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
31	55	>5.8	>0.3	56.31	5.8/0.3/196	Fail	1.9	0.06	160.7	5.8/0.3/188	Pass	Yes
32	145	>5.8	0.18	53.43	5.8/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	Yes
33	85	>5.8	>0.3	62.13	5.8/0.3/196	Fail	2.2	0.08	148.3	5.8/0.3/188	Pass	Yes
34	85	>5.8	>0.3	60.12	5.8/0.3/196	Fail	5.6	0.2	183.3	5.8/0.3/188	Pass	Yes
35	145	>5.8	>0.3	61.60	5.8/0.3/196	Fail	4.0	0.07	183.5	5.8/0.3/188	Pass	Yes
36	85	>5.8	>0.3	58.66	5.8/0.3/196	Fail	3.9	0.17	168.1	5.8/0.3/188	Pass	Yes
37	85	>5.8	0.08	53.34	5.8/0.3/196	Fail	4.1	0.11	179.6	5.8/0.3/188	Pass	Yes
38	85	>5.8	0.21	53.50	5.8/0.3/196	Fail	2.3	0.07	161.8	5.8/0.3/188	Pass	Yes
39	145	>5.8	0.19	53.62	5.8/0.3/196	Fail	3.0	0.06	167	5.8/0.3/188	Pass	Yes
41	145	>5.8	>0.3	57.32	5.8/0.3/196	Fail	4.7	0.12	180.2	5.8/0.3/188	Pass	Yes
42	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
43	145	>5.8	0.22	53.87	5.8/0.3/196	Fail	4.2	0.07	180.2	5.8/0.3/188	Pass	Yes
44	55	>5.8	>0.3	56.46	5.8/0.3/196	Fail	1.9	0.09	130.5	5.8/0.3/188	Pass	Yes
45	55	>5.8	>0.3	58.14	5.8/0.3/196	Fail	1.9	0.06	136.3	5.8/0.3/188	Pass	Yes
46	145	>5.8	>0.3	>196	5.8/0.3/196	Fail	5.8	0.15	179.5	5.8/0.3/188	Pass	Yes
47	85	>5.8	0.28	53.43	5.8/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	Yes
48	85	4.78	0.2	53.36	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
49	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
50	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
51	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
52	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
53	85	5.16	0.14	53.25	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
54	85	>5.8	>0.3	53.72	5.8/0.3/196	Fail	4.0	0.16	173.5	5.8/0.3/188	Pass	Yes
55	85	>5.8	>0.3	>196	5.8/0.3/196	Fail	3.1	0.1	140.2	5.8/0.3/188	Pass	Yes
56	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No

TABLE 14-16 (cont'd)
Heating and Hot Water System Analysis—Results for Projected Development Sites

Site	Building Height	#2 Oil Modeled Concentration(µg/m³)				Pass/ Fail	Natural Gas Modeled Concentration (µg/m³)				Pass/ Fail	Requires E-Designation (Yes/No)
		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	SO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/SO_2 One-hour Standard		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	NO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/NO_2 One-hour Standard		
57	105	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
58	105	>5.8	0.11	53.39	5.8/0.3/196	Fail	2.3	0.04	153.6	5.8/0.3/188	Pass	Yes
59	105	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
60	105	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
61	85	>5.8	>0.3	53.84	5.8/0.3/196	Fail	3.4	0.1	180.8	5.8/0.3/188	Pass	Yes
62	85	4.46	0.08	53.14	5.8/0.3/196	Pass	1.5	0.03	139.9	5.8/0.3/188	Pass	No
63	105	3.7	0.13	53.19	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
64	105	>5.8	>0.3	60.47	5.8/0.3/196	Fail	4.1	0.11	162.2	5.8/0.3/188	Pass	Yes
65	85	>5.8	>0.3	54.61	5.8/0.3/196	Fail	3.0	0.1	173.9	5.8/0.3/188	Pass	Yes
66	145	>5.8	>0.3	58.85	5.8/0.3/196	Fail	3.4	0.09	151.5	5.8/0.3/188	Pass	Yes
67	145	>5.8	>0.3	57.41	5.8/0.3/196	Fail	5.7	0.05	147.8	5.8/0.3/188	Pass	Yes
68	105	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
69	145	>5.8	0.23	53.83	5.8/0.3/196	Fail	4.0	0.07	145.2	5.8/0.3/188	Pass	Yes
70	85	2.37	0.06	53.08	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
71	75	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
72	145	>5.8	0.26	54.52	5.8/0.3/196	Fail	4.5	0.09	165.3	5.8/0.3/188	Pass	Yes
73	85	>5.8	>0.3	54.85	5.8/0.3/196	Fail	4.7	0.13	168.8	5.8/0.3/188	Pass	Yes
74	75	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
75	105	>5.8	0.19	53.45	5.8/0.3/196	Fail	2.3	0.06	158.9	5.8/0.3/188	Pass	Yes
76	105	>5.8	0.11	53.38	5.8/0.3/196	Fail	1.9	0.04	153.2	5.8/0.3/188	Pass	Yes
77	105	3.44	0.08	53.36	5.8/0.3/196	Pass	1.1	0.03	149.3	5.8/0.3/188	Pass	No
78	105	4.7	0.14	53.21	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
79	145	5.74	0.13	53.26	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
80	85	>5.8	0.14	53.31	5.8/0.3/196	Fail	2.2	0.05	150.1	5.8/0.3/188	Pass	Yes
81	105	>5.8	0.2	53.59	5.8/0.3/196	Fail	3.1	0.07	164.6	5.8/0.3/188	Pass	Yes

Note: SO_2 one-hour and NO_2 one-hour concentrations presented include the respective background concentrations.

TABLE 14-17

Heating and Hot Water System Analysis—Results for Potential Development Sites

Site	Building Height	#2 Oil Modeled Concentration(μg/m³)				Pass/ Fail	Natural Gas Modeled Concentration (μg/m³)				Pass/ Fail	Requires E-Designation (Yes/No)
		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	SO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/SO_2 One-hour Standard		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	NO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/NO_2 One-hour Standard		
A1	125	>5.8	0.19	53.64	5.8/0.3/196	Fail	3.1	0.06	165.6	5.8/0.3/188	Pass	Yes
A2	105	>5.8	0.22	53.31	5.8/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	Yes
A3	125	>5.8	0.25	53.62	5.8/0.3/196	Fail	3.2	0.08	164.2	5.8/0.3/188	Pass	Yes
A4	95	5.54	0.22	53.21	5.8/0.3/196	Pass	1.8	0.07	143	5.8/0.3/188	Pass	No
A5	85	3.45	0.09	53.37	5.8/0.3/196	Pass	1.1	0.03	149.7	5.8/0.3/188	Pass	No
A6	125	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A7	125	>5.8	0.23	53.70	5.8/0.3/196	Fail	4.0	0.07	169.6	5.8/0.3/188	Pass	Yes
A8	125	>5.8	0.1	53.48	5.8/0.3/196	Fail	2.3	0.03	156.2	5.8/0.3/188	Pass	Yes
A9	125	>5.8	0.15	53.30	5.8/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	Yes
A10	145	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A11	145	>5.8	0.21	54.71	5.8/0.3/196	Fail	5.8	0.07	181.3	5.8/0.3/188	Pass	Yes
A12	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A13	145	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A14	145	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A15	105	4.54	0.12	53.40	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A16	105	3.23	0.08	53.36	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A17	145	4.18	0.16	53.43	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A18	145	3.56	0.11	53.33	5.8/0.3/196	Pass	1.1	0.04	147.3	5.8/0.3/188	Pass	No
A19	55	>5.8	>0.3	59.94	5.8/0.3/196	Fail	2.1	0.09	133	5.8/0.3/188	Pass	Yes
A20	55	4.12	0.17	53.62	5.8/0.3/196	Pass	1.8	0.08	161.1	5.8/0.3/188	Pass	No
A21	85	>5.8	>0.3	54.65	5.8/0.3/196	Fail	3.1	0.13	171.3	5.8/0.3/188	Pass	Yes
A22	145	>5.8	0.18	53.84	5.8/0.3/196	Fail	3.5	0.06	168	5.8/0.3/188	Pass	Yes
A23	145	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A24	105	>5.8	>0.3		5.8/0.3/196	Fail	1.9	0.05	151.2	5.8/0.3/188	Pass	Yes
A25	105	>5.8	0.15	53.70	5.8/0.3/196	Fail	2.4	0.05	169.8	5.8/0.3/188	Pass	Yes
A26	85	>5.8	0.08	53.34	5.8/0.3/196	Fail	2.1	0.03	147.6	5.8/0.3/188	Pass	Yes

TABLE 14-17 (cont'd)
Heating and Hot Water System Analysis—Results for Potential Development Sites

Site	Building Height	#2 Oil Modeled Concentration(μg/m³)				Pass/ Fail	Natural Gas Modeled Concentration (μg/m³)				Pass/ Fail	Requires E-Designation (Yes/No)
		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	SO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/SO_2 One-hour Standard		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	NO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/NO_2 One-hour Standard		
A27	105	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A28	105	>5.8	>0.3	57.59	5.8/0.3/196	Fail	2.1	0.05	178.5	5.8/0.3/188	Pass	Yes
A29	105	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A30	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A31	85	4.15	0.18	53.36	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A32	145	>5.8	0.23	53.32	5.8/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	Yes
A33	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A34	145	>5.8	0.19	53.63	5.8/0.3/196	Fail	2.9	0.06	164.5	5.8/0.3/188	Pass	Yes
A35	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A36	145	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A37	85	>5.8	>0.3		5.8/0.3/196	Fail	2.1	0.05	148.8	5.8/0.3/188	Pass	Yes
A38	85	>5.8	>0.3	55.31	5.8/0.3/196	Fail	1.8	0.08	139.5	5.8/0.3/188	Pass	Yes
A39	55	2.57	0.07	53.37	5.8/0.3/196	Pass	1.3	0.03	148.9	5.8/0.3/188	Pass	No
A40	55	>5.8	>0.3	54.75	5.8/0.3/196	Fail	1.4	0.05	128.2	5.8/0.3/188	Pass	Yes
A41	55	>5.8	>0.3	54.92	5.8/0.3/196	Fail	3.9	0.13	158.7	5.8/0.3/188	Pass	Yes
A42	85	>5.8	>0.3	58.76	5.8/0.3/196	Fail	1.8	0.05	138.1	5.8/0.3/188	Pass	Yes
A43	145	>5.8	>0.3	58.08	5.8/0.3/196	Fail	3.3	0.07	178.8	5.8/0.3/188	Pass	Yes
A44	55	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A45	55	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A46	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A47	145	>5.8	0.12	53.67	5.8/0.3/196	Fail	2.7	0.04	163.9	5.8/0.3/188	Pass	Yes
A48	145	>5.8	0.2	53.95	5.8/0.3/196	Fail	3.7	0.07	181.7	5.8/0.3/188	Pass	Yes
A49	85	5.54	0.14	53.32	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A50	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A51	85	>5.8	0.14	53.79	5.8/0.3/196	Fail	3.7	0.05	139.5	5.8/0.3/188	Pass	Yes

TABLE 14-17 (cont'd)
Heating and Hot Water System Analysis—Results for Potential Development Sites

Site	Building Height	#2 Oil Modeled Concentration(μg/m³)				Pass/ Fail	Natural Gas Modeled Concentration (μg/m³)				Pass/ Fail	Requires E-Designation (Yes/No)
		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	SO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/SO_2 One-hour Standard		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	NO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/NO_2 One-hour Standard		
A52	105	>5.8	0.2	53.45	5.8/0.3/196	Fail	2.3	0.06	157.5	5.8/0.3/188	Pass	Yes
A53	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A54	105	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A55	105	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A56	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A58	85	>5.8	>0.3	55.69	5.8/0.3/196	Fail	4.0	0.06	155.2	5.8/0.3/188	Pass	Yes
A59	85	>5.8	0.28	53.84	5.8/0.3/196	Fail	3.5	0.09	169	5.8/0.3/188	Pass	Yes
A60	105	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A61	105	4.07	0.09	53.46	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A62	145	>5.8	>0.3	58.30	5.8/0.3/196	Fail	4.3	0.08	152.5	5.8/0.3/188	Pass	Yes
A63	145	>5.8	0.21	53.85	5.8/0.3/196	Fail	3.4	0.07	176.5	5.8/0.3/188	Pass	Yes
A64	145	>5.8	>0.3	56.15	5.8/0.3/196	Fail	3.5	0.11	166.3	5.8/0.3/188	Pass	Yes
A65	85	>5.8	0.21	53.41	5.8/0.3/196	Fail	2.3	0.07	155	5.8/0.3/188	Pass	Yes
A66	95	>5.8	>0.3	62.55	5.8/0.3/196	Fail	2.5	0.1	156.2	5.8/0.3/188	Pass	Yes
A67	145	>5.8	>0.3	54.71	5.8/0.3/196	Fail	3.7	0.09	155.8	5.8/0.3/188	Pass	Yes
A68	145	>5.8	>0.3	61.38	5.8/0.3/196	Fail	3.2	0.11	180.7	5.8/0.3/188	Pass	Yes
A69	145	>5.8	>0.3	62.60	5.8/0.3/196	Fail	3.3	0.07	185.1	5.8/0.3/188	Pass	Yes
A70	145	>5.8	0.25	54.00	5.8/0.3/196	Fail	4.9	0.08	185.4	5.8/0.3/188	Pass	Yes
A71	85	>5.8	>0.3	56.01	5.8/0.3/196	Fail	2.6	0.11	174.6	5.8/0.3/188	Pass	Yes
A72	145	>5.8	>0.3	63.26	5.8/0.3/196	Fail	3.6	0.07	183.6	5.8/0.3/188	Pass	Yes
A73	145	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A74	85	>5.8	0.19	53.38	5.8/0.3/196	Fail	2.4	0.06	153.4	5.8/0.3/188	Pass	Yes
A75	145	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A76	145	>5.8	>0.3	56.04	5.8/0.3/196	Fail	3.2	0.06	167	5.8/0.3/188	Pass	Yes
A77	145	>5.8	>0.3	58.14	5.8/0.3/196	Fail	5.0	0.11	180.3	5.8/0.3/188	Pass	Yes
A78	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A79	145	>5.8	0.2	53.80	5.8/0.3/196	Fail	3.5	0.07	173.2	5.8/0.3/188	Pass	Yes
A80	55	>5.8	>0.3	54.16	5.8/0.3/196	Fail	1.2	0.05	123.6	5.8/0.3/188	Pass	Yes
A81	145	>5.8	>0.3	59.21	5.8/0.3/196	Fail	4.7	0.1	178.3	5.8/0.3/188	Pass	Yes

TABLE 14-17 (cont'd)
Heating and Hot Water System Analysis—Results for Potential Development Sites

Site	Building Height	#2 Oil Modeled Concentration(μg/m³)				Pass/ Fail	Natural Gas Modeled Concentration (μg/m³)				Pass/ Fail	Requires E-Designation (Yes/No)
		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	SO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/SO_2 One-hour Standard		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	NO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/NO_2 One-hour Standard		
A82	55	>5.8	>0.3	57.47	5.8/0.3/196	Fail	0.8	0.01	127.7	5.8/0.3/188	Pass	Yes
A83	85	5.5	0.16	53.50	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A84	85	>5.8	>0.3	54.23	5.8/0.3/196	Fail	4.1	0.18	167.1	5.8/0.3/188	Pass	Yes
A85	85	>5.8	>0.3	61.96	5.8/0.3/196	Fail	2.6	0.11	155.9	5.8/0.3/188	Pass	Yes
A86	145	>5.8	0.2	53.76	5.8/0.3/196	Fail	3.2	0.07	172.4	5.8/0.3/188	Pass	Yes
A87	145	>5.8	>0.3	61.54	5.8/0.3/196	Fail	3.0	0.12	178.3	5.8/0.3/188	Pass	Yes
A88	55	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A89	145	>5.8	>0.3	62.70	5.8/0.3/196	Fail	3.6	0.07	178.6	5.8/0.3/188	Pass	Yes
A90	85	>5.8	>0.3	53.78	5.8/0.3/196	Fail	3.2	0.14	176.1	5.8/0.3/188	Pass	Yes
A91	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A92	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A93	85	>5.8	>0.3	54.15	5.8/0.3/196	Fail	4.4	0.16	163.4	5.8/0.3/188	Pass	Yes
A94	105	>5.8	>0.3	62.33	5.8/0.3/196	Fail	3.0	0.06	159.1	5.8/0.3/188	Pass	Yes
A95	85	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A96	85	>5.8	>0.3	150.00	5.8/0.3/196	Fail	3.0	0.09	175.1	5.8/0.3/188	Pass	Yes
A97	145	>5.8	>0.3	56.38	5.8/0.3/196	Fail	3.1	0.08	167	5.8/0.3/188	Pass	Yes
A98	85	4.05	0.09	53.35	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A99	105	>5.8	>0.3	59.76	5.8/0.3/196	Fail	5.0	0.13	135.3	5.8/0.3/188	Pass	Yes
A100	105	>5.8	>0.3	56.13	5.8/0.3/196	Fail	3.0	0.08	119.1	5.8/0.3/188	Pass	Yes
A101	105	>5.8	>0.3	59.13	5.8/0.3/196	Fail	3.8	0.11	119.1	5.8/0.3/188	Pass	Yes
A102	85	>5.8	0.1	53.39	5.8/0.3/196	Fail	2.2	0.03	150.8	5.8/0.3/188	Pass	Yes
A103	105	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A104	105	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.8/0.3/188	Pass	No
A105	145	>5.8	>0.3	54.16	5.8/0.3/196	Fail	2.3	0.03	150.9	5.8/0.3/188	Pass	Yes
A106	85	>5.8	0.2	53.43	5.8/0.3/196	Fail	2.3	0.07	156.1	5.8/0.3/188	Pass	Yes

Note: SO_2 1-hour and NO_2 1-hour concentrations presented include the respective background concentrations.

Cumulative Impacts from Heat and Hot Water Systems

An analysis was conducted to evaluate potential air quality impacts from groups or "clusters" of heat and hot water systems in close proximity with similar stack heights. Three clusters were identified.

SCREENING ANALYSIS

The analysis was initially performed using the AERSCREEN model as described above. The maximum NO_2 annual, SO_2 one-hour, and PM_{10} 24-hour concentrations predicted by the AERSCREEN analysis are presented in Table 14-18.

TABLE 14-18
Maximum Screening Pollutant Concentrations (µg/m³)

Pollutant	Averaging Period	Maximum Concentration			Background	Total Concentration			NAAQS
		Cluster 1	Cluster 2	Cluster 3		Cluster 1	Cluster 2	Cluster 3	
NO_2	Annual	5.1	4.2	20.3	40.7	45.8	44.9	61.0	100
SO_2	1-Hour	2.0	1.64	7.9	52.6	54.6	54.2	60.5	196
	3-Hour	2	2	8	89	91	91	97	1,300
PM_{10}	24-Hour	18	15	73	48	66	63	121	150

Note:
For the one-hour SO_2 averaging period, the three-year average of the maximum 99th percentile concentration was taken from NYSDEC's *New York State Ambient Air Quality Report for 2013*. http://www.dec.ny.gov/chemical/8536.html

REFINED DISPERSION ANALYSIS

Based on the cumulative effects of the sources each of the clusters failed the screening analysis for both No. 2 fuel oil and natural gas for NO_2 one-hour, $PM_{2.5}$ 24-hour, and $PM_{2.5}$ annual. Therefore, a refined analysis was performed for these pollutants using the AERMOD model. Since the screening analysis determined that the clusters failed for natural gas, and all of the projected and potential development sites included in the cluster analysis were determined to fail using No. 2 oil based on the refined individual heat and hot water system analysis, the refined cluster analysis was performed for natural gas only.

The analysis was performed using the EPA AERMOD model using the general assumptions and procedures outlined earlier for individual development sites. The results of the analysis determined that that Clusters 1 and 2 would not result in significant adverse air quality impacts when assuming natural gas as the fuel type. For Cluster 3, potential development sites 99, 100, and 101 would be required to utilize heating and hot water equipment fitted with low NO_x burners.

The maximum NO_2 one-hour, $PM_{2.5}$ 24-hour, and $PM_{2.5}$ annual concentrations predicted by the AERMOD model are presented in Table 14-19.

TABLE 14-19
Maximum Pollutant Concentrations (µg/m³)

Pollutant	Averaging Period	Maximum Concentration			Background	Total Concentration			NAAQS / *De Minimis*
		Cluster 1	Cluster 2	Cluster 3		Cluster 1	Cluster 2	Cluster 3	
NO_2	1-Hour	N/A	N/A	N/A	113.8	185.8	113.9	133.5	188
$PM_{2.5}$	24-Hour	2.8	3.4	5.7	23.4	N/A	N/A	N/A	5.8
	Annual	0.14	0.16	0.19	N/A	N/A	N/A	N/A	0.3

Notes: N/A – Not Applicable
The $PM_{2.5}$ *de minimis* criteria for the 24-Hour period is half the difference between the NAAQS of 35 µg/m³ and the ambient monitored background of 23.4 µg/m³, and 0.3 µg/m³ for the annual period.

Additional Source Analysis

Potential stationary source impacts on the projected and potential development sites from the existing boilers at the existing NYC-Transit Authority East New York Bus Depot & Shops were determined using the AERMOD model. The

maximum estimated concentrations of NO_2, SO_2, and PM_{10} from the modeling were added to the background concentrations to estimate total air quality concentrations on the Proposed Actions, while $PM_{2.5}$ concentrations were compared with the $PM_{2.5}$ *de minimis* criteria. The results of the AERMOD analysis are presented in Table 14-20.

TABLE 14-20
Maximum Modeled Pollutant Concentrations on Projected and Potential Development Sites(μg/m³)

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	NAAQS / *De Minimis*
NO_2	Annual[2]	2.3	40.7	43.0	100
	1-hour[1]	-	-	143.2	188
SO_2	3-Hour	0.4	89	89.4	1,300
	1-Hour	0.4	52.6	53.0	196
PM_{10}	24-hour	2.7	48	50.7	150
$PM_{2.5}$	24-hour	2.70	N/A	2.70	5.8[3]
	Annual	0.23	N/A	0.23	0.3[4]

Notes:
[1] Reported concentration is the maximum total 98th percentile concentration at any receptor using seasonal-hourly background concentrations.
[2] Annual NO_2 impacts were estimated using a NO_2/NO_x ratio of 0.75.
[3] $PM_{2.5}$ *de minimis* criteria — 24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 μg/m³.
[4] $PM_{2.5}$ *de minimis* criteria—annual (discrete receptor), 0.3 μg/m³.

As shown in the table, the predicted pollutant concentrations for all of the pollutant time averaging periods shown are below their respective standards. Therefore, no significant adverse air quality impacts on the proposed and potential development sites from existing sources are predicted.

Proposed (E) Designation Requirements

At affected projected and potential development sites, the proposed (E) designation (E-366) would specify the type of fuel to be used, whether low NO_x burners are required, the distance that the vent stack on the building roof must be from its lot line(s), and/or the minimum stack height. A summary of the proposed (E) designations is presented in Appendix F.

For each of the projected and potential development sites with a proposed (E) designation, the (E) designation process, as set forth in Zoning Resolution Section 11-15 and Chapter 24 of Title 15 of the Rules of the City of New York, allows for the modification of the measures required under an (E) designation in the event of new information or technology, additional facts or updated standards that are relevant at the time the site is ultimately developed. Since the air quality analysis is based on conservative assumptions due to the absence of information on the actual design of buildings that would be constructed, the actual design of buildings may result in modification of the (E) designation measures under these procedures. When an (E) designation is placed for more than one pollutant (e.g., for $PM_{2.5}$ and NO_2), any modifications must address the measures required with respect to each pollutant.

With the foregoing, the evaluation of $PM_{2.5}$, and thus the (E) designations, would be able to take into account the fact that air quality in New York City is expected to improve. As discussed in the Section "NAAQS Attainment Status and Implementation Plan", EPA recently redesignated the New York City Metropolitan Area, which had been nonattainment with the 2006 24-hour $PM_{2.5}$ NAAQS since November 2009, as in attainment. Under the required maintenance plans, NYSDEC will continue to address the attainment of the 24-hour and annual NAAQS in the area, which will require further reductions in emissions of $PM_{2.5}$ and its precursors. In addition, New York City has prohibited the use of No. 6 and No. 4 oil in new boiler installations, and is phasing out their use at existing installations, which will result in direct reductions of $PM_{2.5}$ emissions and SO_2 emissions, which is a $PM_{2.5}$ precursor. Although these measures do not address the emissions of $PM_{2.5}$ associated with Proposed Actions, taken together, they are anticipated to result in an improvement in air quality

in the rezoning area, resulting in significant reductions from current levels of the ambient background $PM_{2.5}$ concentrations and, consequently, in the total $PM_{2.5}$ concentrations with the Proposed Actions.

Industrial Source Analysis

As discussed above, a study was conducted to analyze industrial uses within 400 feet of the projected and potential development sites, large sources or major sources within 1,000 feet of a projected or potential development site. NYCDEP-BEC and EPA permit databases were used to identify existing sources of emissions. A total of 19 facilities (consisting of 24 sources) were analyzed. The information from these permits (emission rates, stack parameters, etc.) was input to the AERMOD dispersion model.

Table 14-21 presents the maximum predicted impacts at the projected and potential development sites using the AERMOD refined dispersion model. As shown in Table 14-21, for all projected and potential development sites, the refined modeling demonstrates that there would be no predicted significant adverse air quality impacts on these development sites from existing industrial sources in the area.

TABLE 14-21
Maximum Predicted Impacts on Projected and Potential Sites from Industrial Sources

Pollutant	Chemical Abstracts Service (CAS) Number	AERMOD Model Short-Term Impact (µg/m3)	SGC (µg/m3)	AERMOD Model Annual Impact (µg/m3)	AGC (µg/m3)
Ethanol	00064-17-5	---	---	1.20	45,000
Isopropyl Alcohol	00067-63-0	213.7	98,000	0.82	7,000
Acetone	00067-64-1	2,052.2	180,000	4.73	30,000
1-Butanol	00071-36-3	---	---	0.48	1,500
Propane	00078-83-1	---	---	3.28	43,000
Isobutyl Alcohol	00078-83-1	---	---	2.31	360
MethylEthyl Ketone	00078-93-3	238.5	13,000	0.55	5,000
Butyl BenzylPhthalate	00085-68-7	---	---	0.01	0.42
Ethylbenzene	00100-41-4	---	---	0.98	1,000
Butane	00106-97-8	238.5	238,000	---	---
Toluene	00108-88-3	663.5	37,000	2.33	5,000
Ethylenglycolmonobutyl	00111-76-2	107.6	14,000	0.53	1,600
Butyl Carbitol	00112-34-5	68.9	370	1.28	200
Butyl Acetate	00123-86-4	242.2	95,000	0.93	17,000
Tetrachloroethylene	00127-18-4	181.8	300	1.53	4
Ethylacetate	00141-78-6	---	---	0.58	3,400
Carbon Monoxide	00630-08-0	5.5	14,000	---	---
Ethyl 3-Ethoxyproprioanate	00763-69-9	95.3	140	0.22	64
Xylene M,O& P Mix	01330-20-7	3,555.3	22,000	17.75	100
Sulfur Dioxide	07446-09-5	0.4	197	0.003	80
Oil Mist (Mineral)	08012-95-1	5.9	380	0.11	12
Mineral Spirits	08032-32-4	---	---	0.05	900
Stoddard Solvents	08052-41-3	---	---	0.87	900
Aliphatic Hydrocarbons	64742-89-8	---	---	1.09	3,200
Aromatic Petroleum Distillates	64742-94-5	---	---	0.55	100
Particulates[(1)]	NY075-02-5[(2)]	62.0	88[(2)]	0.31	12[(2)]
Liquid Mist NEC	NY105-00-0	11.7	380	0.12	12
Oxides of Nitrogen	NY210-00-0	55.1	188.1	1.03	100
Misc VOC	NY999-00-0	118.2	98,000	0.44	7,000

Notes:
[(1)] Pollutant includes emissions from both Particulates (NY075-00-0) and Total Solid Particulate (NY079-00-0)
[(2)] Conservatively assumes all particulate emissions would be $PM_{2.5}$. SGC and AGC from Particulate (PM-2.5) used.

HEALTH RISK ASSESSMENT

Cumulative impacts were also determined for the combined effects of multiple air contaminants in accordance with the approach described above in the "Methodology for Predicting Pollutant Concentrations" section. Using the predicted

concentrations of each pollutant, the maximum hazard index and total cancer risk were calculated for each affected projected and potential development site associated with the Proposed Actions. The hazard index approach was used to determine the effects of multiple non-carcinogenic compounds and unit risk factors were used to determine the effects of carcinogenic compounds.

Table 14-22 presents the results of the assessment of cumulative carcinogenic and non-carcinogenic effects on the proposed actions.

TABLE 14-22
Estimated Maximum Cancer Risk and Hazard Index

Pollutant	CAS Number	Estimated Pollutant Concentration (µg/m³)	AGC (µg/m³)	Concentration to AGC Pollutant Ratio
Carcinogenic Compounds				
Tetrachloroethylene	00127-18-4	1.53	4[(1)]	3.83E-01
			Total Estimated Cancer Risk (per million)	**0.383**
			Cancer Risk Threshold Value (per million)	**1.0**
Non-Carcinogenic Compounds				
Ethanol	00064-17-5	1.20	45,000	2.67E-05
Isopropyl Alcohol	00067-63-0	0.82	7,000	1.17E-04
Acetone	00067-64-1	4.73	30,000	1.58E-04
1-Butanol	00071-36-3	0.48	1,500	3.19E-04
Propane	00074-98-6	3.28	43,000	7.63E-05
Isobutyl Alcohol	00078-83-1	2.31	360	6.43E-03
MethylEthyl Ketone	00078-93-3	0.55	5,000[(2)]	1.10E-04
Butyl BenzylPhthalate	00085-68-7	0.01	0.42	1.81E-02
Ethylebenzene	00100-41-4	0.98	1,000	9.79E-04
Toluene	00108-88-3	2.33	5,000[(2)]	4.66E-04
Ethylenglycolmonobutyl	00111-76-2	0.53	1,600[(2)]	3.32E-04
Butyl Carbitol	00112-34-5	1.28	200	6.41E-03
Butyl Acetate	00123-86-4	0.93	17,000	5.47E-05
Ethylacetate	00141-78-6	0.58	3,400	1.70E-04
Ethyl 3-Ethoxyproprioanate	00763-69-9	0.22	64	3.44E-03
Xylene M,O& P Mix	01330-20-7	17.75	100[(2)]	1.78E-01
Sulfur Dioxide	07446-09-5	0.003	80	4.08E-05
Oil Mist (Mineral)	08012-95-1	0.11	12	9.39E-03
Mineral Spirits	08032-32-4	0.05	900	6.02E-05
Stoddard Solvents	08052-41-3	0.87	900	9.65E-04
Aliphatic Hydrocarbons	64742-89-8	1.09	3,200	3.40E-04
Aromatic Petroleum Distillates	64742-94-5	0.55	100	5.51E-03
Particulates[(3)]	NY075-02-5[(4)]	0.31	12[(4)]	2.62E-02
Liquid Mist NEC	NY105-00-0	0.12	12	9.70E-03
Oxides of Nitrogen	NY210-00-0	1.03	100	1.03E-02
Misc VOC	NY999-00-0	0.44	7,000	6.23E-05
			Total Hazard Index	**0.277**
			Hazard Index Threshold Value	**1.0**

Notes:
[(1)] Unit Risk E-6 Risk Level Concentration Estimate (µg/m³) established by the EPA's Inhalation Risk Information System (IRIS) was used instead of the AGC.
[(2)] Rfc Value (µg/m³) established by the EPA's IRIS was used instead of the AGC.
[(3)] Pollutant includes emissions from both Particulates (NY075-00-0) and Total Solid Particulate (NY079-00-0)
[(4)] Conservatively assumes all particulate emissions would be $PM_{2.5}$. SGC and AGC from Particulate (PM-2.5) used.

As shown in Table 14-22, the results of this assessment indicated that there would be no significant adverse air quality impacts on the projected and potential development sites because the hazard index for any affected site would not exceed 1.0, and the cancer risk would not exceed one in one million.

The procedures used to estimate maximum potential impacts from industrial sources showed that their operations would not result in any predicted violations of the NAAQS or any exceedances of the recommended SGC or AGC.

Therefore, based on the data available on the surrounding industrial uses, development resulting from the Proposed Actions would not experience significant air quality impacts from these facilities.