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. Indirect impacts are caused by off-site emissions associated with a project such as emissions from nearby existing stationary sources (i.e., impacts on the 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.

The maximum projected hourly incremental traffic volumes generated by the Proposed Actions would exceed the 2021 City Environmental Quality *Review (CEQR) Technical Manual* carbon monoxide (CO) traffic screening threshold of 140 or 170 peak-hour vehicle trips at a number of intersections in the study area, as well as the particulate matter (PM) traffic screening threshold discussed in Chapter 17, Sections 210 and 311 of the *CEQR Technical Manual*. Therefore, a quantified assessment of emissions from traffic generated by the Proposed Actions was performed for CO and PM.

The Proposed Actions' RWCDS does not include any on-site parking on projected development sites or any new off-street public parking. Therefore, an air quality parking analysis was not required for this assessment.

It is anticipated that each of the projected and potential development sites would include fossil fuel-fired hot water systems, and most would include fossil fuel-fired heating systems. A heating and hot water systems stationary source analysis was conducted to evaluate potential future pollutant concentrations from these sources.

The With-Action condition includes projected and potential development sites containing a mix of residential and commercial (retail and other office) uses. Potential impacts by light industrial facilities were evaluated from pollutant emissions from existing light industrial uses that would remain because they are not located on projected or proposed development sites.

Ten facilities with New York City Department of Environmental Protection (NYCDEP) permits were identified within 400 feet from the proposed and potential sites. In addition, three New York State Department of Environmental Conservation (NYSDEC) air state facilities (ASF) and one facility with a Title V permit were identified within 1,000 feet; as such, potential effects from these sources of emissions on nearby sensitive receptors in projected and potential development sites were analyzed.

B. Principal Conclusions

The air quality analysis for the Proposed Actions considered the potential for both mobile and stationary source impacts. The mobile source analyses determined that Proposed Action-generated traffic resulting in concentrations of CO and $PM_{2.5}$ at the analyzed intersections would not result in any violations of National Ambient Air Quality Standards (NAAQS). Further, the 8-

hour CO incremental concentrations and the 24-hour and annual incremental $PM_{2.5}$ concentrations were predicted to be below the City's de minimis criteria. An E-Designation would be placed on several sites to ensure that an HVAC stationary source impacts do not occur. The light industrial source analyses determined that one non-criteria carcinogenic pollutant from a NYCDEP permitted small industrial facility exceeds the NYSDEC DAR-1 annual guideline concentration threshold for air toxics and fails the cancer risk assessment at a potential development site. In addition, one NYSDEC permitted large facility's 1-hour NO_2 concentrations exceed the NAAQS standard at nearby development sites. As such, the Proposed Actions are anticipated to result in significant, adverse impacts related to air quality at a few development sites. An E-designation would be placed on the affected sites to ensure industrial and large/major source impacts are minimized.

C. Pollutants for Analysis

Air quality is affected by air pollutants produced by both motor vehicles and stationary sources. Emissions from motor vehicles are referred to as mobile source emissions, while emissions from fixed facilities are referred to as stationary source emissions. Ambient concentrations of CO are predominantly influenced by mobile source emissions. PM, volatile organic compounds (VOCs), and nitrogen oxides (nitric oxide [NO] and nitrogen dioxide [NO_2], collectively referred to as NOx) are emitted from both mobile and stationary sources. Fine PM is also formed when emissions of NOx, sulfur oxides (SOx), ammonia, organic compounds, and other gases react or condense in the atmosphere. Emissions of sulfur dioxide (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 NOx and VOCs. Ambient concentrations of CO, PM, NO_2, SO_2, ozone, and lead are regulated by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act (CAA) and are referred to as criteria pollutants; emissions of VOCs, NOx, 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.

Nitrogen Oxides, VOCS, and Ozone

NOx 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 NOx and VOC emissions from all sources are therefore generally examined on a regional basis. The contribution of any action or project to regional emissions of these pollutants would include any added stationary or mobile source emissions.

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

In addition to being a precursor to the formation of ozone, NO_2 (one component of NOx) 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 sources, and not a local concern from mobile sources. (NOx emissions from fuel combustion consist of approximately 90 percent NO and 10 percent NO_2 at the source.) With the promulgation of the 2010 1-hour average standard for NO_2, local sources such as vehicular emissions may be of greater concern. However, any increase in NO_2 associated with the Proposed Actions would be relatively small 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 the projected and potential development sites' heat and hot water systems and potential impact from large and major sources, were evaluated.

Lead

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

Respirable Particulate Matter - PM_{10} AND $PM_{2.5}$

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

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

primary PM (often soon after the release from a source) or from precursor gases reacting in the atmosphere to form secondary PM.

Gasoline-powered and diesel-powered vehicles, especially heavy-duty trucks and buses operating on diesel fuel, are a significant source of respirable PM, most of which is $PM_{2.5}$; PM concentrations may consequently be locally elevated near roadways. Since the traffic generated by the Proposed Actions would exceed the PM emission traffic screening threshold discussed in Chapter 17, Sections 210 and 311 of the *CEQR Technical Manual*, a quantified assessment of emissions from traffic generated by the Proposed Actions was performed for PM.

An assessment of $PM_{2.5}$ emissions from heat and hot water systems at the projected and potential development sites was conducted, following the *CEQR Technical Manual* and EPA guidance. $PM_{2.5}$ impacts from the large and major sources were also evaluated.

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. Also, only natural gas would be used in heat and hot water sources. Therefore, mobile and future developments' heat and hot water systems are not sources of significant SO_2 emission and analysis of SO_2 for these sources was not warranted.

Non-criteria 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 and include multitude of pollutants of ranging toxicity. 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.

No Federal ambient air quality standards have been promulgated for non-criteria pollutants. However, EPA and New York State Department of Environmental Conservation (DEC) have issued guidelines that establish acceptable ambient levels for these pollutants based on human exposure. The DEC guidance document DAR-1[1] contains a compilation of annual and short-term (1-hour) guideline concentrations for these compounds. The DEC 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.

D. Air Quality Regulations, Standards, and Benchmarks National and State Air Quality Standards

As required by the CAA, primary and secondary 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

[1] DEC.DAR-1 (Air Guide-1) AGC/SGC Tables, February 2021

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**.

Table 14-1: National Ambient Air Quality Standards

Pollutant		Primary		Secondary	
		ppm	µg/m³	ppm	µg/m³
Carbon Monoxide (CO)	8-Hour Average	9[1]	10,000	None	
	1-Hour Average	35[1]	40,000		
Lead	Rolling 3-Month Average	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)	1-Hour Average[2]	0.100	188	None	
	Annual Average	0.053	100	0.053	100
Ozone (O_3)	8-Hour Average[3]	0.070	140	0.070	140
Respirable Particulate Matter (PM_{10})	24-Hour Average[1]	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)	Annual Mean[4]	NA	9	NA	15
	24-Hour Average[5]	NA	35	NA	35
Sulfur Dioxide (SO_2)	1-Hour Average[6]	0.075	196	NA	NA
	Maximum 3-Hour Average[1]	NA	NA	0.50	1,300

Source: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards.
Notes: ppm – parts per million (unit of measure for gases only)
µg/m³ – micrograms per cubic meter (unit of measure for gases and particles, including lead)
NA – not applicable
All annual periods refer to calendar year.
Standards are defined in ppm. Approximately equivalent concentrations in µg/m³ are presented.
[1] Not to be exceeded more than once a year.
[2] 3-year average of the annual 98th percentile daily maximum 1-hr average concentration.
[3] 3-year average of the annual fourth highest daily maximum 8-hr average concentration.
[4] 3-year average of annual mean.
[5] Not to be exceeded by the annual 98th percentile when averaged over 3 years.
[6] 3-year average of the annual 99th percentile daily maximum 1-hour average concentration.

Effective December 2015, EPA lowered the 2008 ozone NAAQS from 0.075 ppm to 0.070. EPA issued final area designations for the revised standard on April 30, 2018. Effective May 8, 2024, the annual $PM_{2.5}$ NAAQS was lowered from 12 µg/m³ to 9 µg/m³.

Federal ambient air quality standards do not exist for noncriteria pollutants; however, as mentioned above, DEC has issued standards for three noncriteria compounds. DEC has also developed a guidance document DAR-1 (February 2021), which contains a compilation of annual and short term (1-hour) guideline concentrations for numerous other noncriteria compounds. The DEC 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 CAA, followed by a plan for maintaining attainment status once the area is in attainment.

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

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

The five New York City counties and Nassau, Suffolk, Rockland, Westchester, and Orange Counties had been designated as a $PM_{2.5}$ NAA (New York Portion of the New York–Northern New Jersey–Long Island, NY–NJ–CT NAA) since 2004 under the CAA due to exceedance of the 1997 annual average standard and were also nonattainment with the 2006 24-hour $PM_{2.5}$ NAAQS since November 2009. The area was redesignated as in attainment for that standard effective April 18, 2014, and is now under a maintenance plan. EPA lowered the annual average primary standard to 9 $\mu g/m^3$ effective May 2024. EPA designated the area as in attainment for the 12 $\mu g/m^3$ NAAQS effective April 15, 2015, and will re-assess the status for the 2024 standard.

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 a moderate non-attainment area for the 1997 8-hour average ozone standard. In March 2008 EPA strengthened the 8–hour ozone standards, but certain requirements remain in areas that were either nonattainment or maintenance areas for the 1997 ozone standard ('anti-backsliding'). EPA designated the same NAA as a marginal NAA for the 2008 ozone NAAQS, effective July 20, 2012. On April 11, 2016, as requested by New York State, EPA reclassified the area as a moderate NAA. On July 19, 2017 DEC announced that the NYMA is not projected to meet the July 20, 2018 attainment deadline and DEC therefore requested that EPA reclassify the NYMA to "serious" nonattainment. EPA reclassified the NYMA from "moderate" to "serious" NAA effective September 23, 2019, which imposes a new attainment deadline of July 20, 2021 (based on 2018-2020 monitored data). NYSDEC's proposed draft revisions to the SIP (June 2021) state that based on monitoring data, New York State has not demonstrated compliance with the 2008 ozone NAAQS. NYSDEC has requested EPA redesignate the area for the 2008 ozone NAAQS as severe on November 29, 2021. On April 30, 2018, EPA designated the same area as a moderate NAA for the revised 2015 ozone standard. EPA is currently reviewing revisions to New York's SIP plan.

New York City is currently in attainment of the annual-average NO_2 standard. EPA has designated the entire state of New York as "unclassifiable/attainment" of the 1-hour NO_2 standard effective February 29, 2012. This designation remains in effect.

EPA has established a 1-hour SO_2 standard, replacing the former 24-hour and annual standards, effective August 23, 2010. In December 2017, EPA designated the entire State of New York as in attainment for this standard, with the exception of Monroe County, which was designated "unclassifiable."

E. 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, to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations would 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 8-hour average CO concentration at a location where the predicted No Action 8-hour concentration is equal to or between 8 and 9 ppm; or (2) an increase of more than half the difference between baseline (i.e., No Action) concentrations and the 8-hour standard, when No Action concentrations are below 8.0 ppm. Project-related impacts less than these values are not considered to be significant.

$PM_{2.5}$ de minimis Criteria

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 $\mu g/m^3$ at ground level on a neighborhood scale (i.e., the annual increase in concentration representing the average over an area of approximately 1 square kilometer, centered on the location where the maximum ground-level impact is predicted for stationary sources; or at a distance from a roadway corridor similar to the minimum distance defined for locating neighborhood scale monitoring stations); or

[2] New York City. *CEQR Technical Manual*, chapter 1, Section 222, March 2014; and SEQR Regulations, 6 NYCRR § 617.7

- Annual average $PM_{2.5}$ concentration increments that are predicted to be greater than 0.3 $\mu g/m^3$ at a discrete receptor location (elevated or ground level).

Actions under CEQR predicted to increase $PM_{2.5}$ concentrations by more than the above *de minimis* criteria will be considered to have 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, DEC has issued guidelines that establish acceptable ambient levels for these pollutants based on human exposure.

The DEC 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 from DAR-1 (February 2021) are provided in **Table 14-7** for the compounds potentially affecting receptors located at projected and potential development sites. The compounds listed are those emitted by existing sources. There are no new proposed sources of air toxics within 400 feet of the Project Area.

In order to evaluate health risk of non-carcinogenic toxic air emissions, DAR-1 includes a methodology called the “hazard index” to characterize the cumulative risk from potential air toxic emissions. The hazard index is based on predicted annual concentrations and annual exposure limits. If the combined ratios of pollutant concentration divided by its respective annual exposure threshold for each of the toxic pollutants is found to be less than 2, no significant adverse air quality impacts are predicted to occur due to these pollutant releases.

In addition, DEC characterizes risks of non-criteria carcinogenic pollutants. According to DAR-1, an overall incremental cancer risk from a proposed action of less than one-in-one million is considered to be insignificant. The potential cancer risk associated with each carcinogenic pollutant, as well as the total cancer risk 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. Alternatively, if refined air dispersion modeling is used to estimate the maximum concentrations of pollutants, a threshold of 10-in-one-million excess cancer risk for non-criteria carcinogenic compounds can be used. One pollutant, Cadmium, from a light industrial source identified in **Table 14-7** is classified as carcinogenic according to DAR-1.

F. Methodology for Predicting Pollutant Concentrations

Mobile Sources

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

The Proposed Actions would be located in Manhattan, New York. Per the guidance of the *CEQR Technical Manual*, in this area of the City, actions that would result in the increment of 140 peak hour vehicle trips (north of 30th street) or 170 vehicle peak hour vehicle trips (south of 30th street) at an intersection may cause significant adverse air quality impacts and require a detailed air quality analysis for CO. Also, as described above, the City has developed guidelines for determining potential project related $PM_{2.5}$ impacts. These guidelines are based on the number of project-induced heavy-duty vehicles or their equivalent in vehicle trips. All mobile source analyses are performed for the 2034 future year.

Vehicular Emissions

Vehicular CO and PM engine emission factors were computed using the USEPA mobile source emissions model, Motor Vehicle Emission Simulator (MOVES4). Emissions are supplied for average projected free flow speeds provided by the traffic analysis. Applicable and up to date environmental and vehicular traffic data for MOVES are supplied by NYSDEC to accurately model project conditions. Additional link-based data files requirements for MOVES are compiled by obtaining volume, speed, and traffic distribution data from the traffic analysis.

Appropriate credits are used to accurately reflect the inspection and maintenance program. County−specific hourly temperature and relative humidity data obtained from NYSDEC are used.[3]

Emissions of fugitive dust are estimated using the USEPA's latest Air Pollutant Emission Factor (AP-42) equation for paved roads. Emissions from fugitive dust are dependent upon vehicle weight and the surface silt loading in accordance with the latest NYCDEP guidelines regarding roadway silt loading factors and average fleet vehicle weight. Fugitive road dust is not included in the neighborhood scale $PM_{2.5}$ microscale analyses because NYCDEP considers it to have an insignificant contribution on that scale.

Traffic Data

Traffic data for the intersection analysis were derived from existing traffic counts, projected future growth in traffic, and other information developed as part of the traffic analysis for the Proposed Actions (see Chapter 13, "Transportation"). Traffic data for the future without the Proposed Project (the No-Action condition) and the future with the Proposed Project (the With-Action condition) were used in the respective air quality modeling condition. The weekday morning (8:30 to 9:30 AM), midday (2:00 to 3:00PM), evening (5:30 to 6:30 PM) peak periods as well as the Saturday midday peak period (1:45-2:45 PM) were analyzed.

The peak weekday morning, midday, evening as well as Saturday midday period traffic volumes were used as a baseline for determining off-peak volumes. Off-peak traffic volumes were determined by adjusting the peak period volumes by the 24-hour distributions of actual vehicle counts collected at appropriate locations.

[3] 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.

Dispersion Model

The CO and $PM_{2.5}$ concentrations due to vehicular emissions adjacent to the analysis sites were predicted using the American Meteorological Society/Environmental Protection Agency Regulated Model (AERMOD) Version 23132.[4] 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. Following USEPA guidelines, the analysis was performed using an area source representation of emission sources in order to simulate traffic-related air pollutant dispersion.[5] Hourly traffic volumes and associated emission factors were used to estimate hourly emission rates from each modeled roadway segment and predict traffic-related air pollutant concentrations at receptor locations.

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).

The AERMOD model includes the modeling of hourly concentrations based on hourly traffic data and five years of monitored hourly meteorological data. The data consists of surface data collected at LaGuardia Airport and upper air data collected at Brookhaven, New York for the period 2017–2021. The meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevation over the five-year period. These data are processed using the USEPA AERMET program to develop data in a format which can be readily processed by the AERMOD model. The land uses around the site where meteorological surface data were available were classified using categories defined in digital United States Geological Survey (USGS) maps. Processed data for 2017-2021 were obtained from the NYSDEC.

Analysis Year

The microscale analyses are performed for No-Action and Action conditions in 2034, the year by which the Proposed Actions are likely to be completed. The future analysis is performed for both the No-Action condition and the With-Action condition.

Background Concentrations

To properly represent the total impact of the Proposed Actions in this analysis, it is necessary to consider representative background levels for each of the analyzed pollutants. The background level is the component of the total concentration not accounted for through the microscale modeling analysis. The background values used in the air quality analyses are provided in **Table**

[4] USEPA. *User's Guide for the AMS/USEPA Regulatory Model (AERMOD)*. Office of Air Quality Planning and Standards. USEPA-454/B-19-027. Research Triangle Park, North Carolina. August 2019.
[5] USEPA. *Project-Level Conformity and Hot-Spot Analyses*, available at: https://www.epa.gov/state-and-local-transportation/project-level-conformity-and-hot-spot-analyses

14-2. Applicable background concentrations are added to the modeling results to obtain the total pollutant concentrations at each receptor site for the analysis year.

Table 14-2: Background Concentrations

Pollutant	Location	Averaging Time	Background Concentration
Carbon Monoxide (CO)	CCNY	1-Hour	1.7 ppm
		8-Hour	1.2 ppm
Particulate Matter ($PM_{2.5}$)	IS 45	24-hour	17.6 µg/m^3
		Annual	7.1 µg/m^3

Source: NYSDEC, https://extapps.dec.ny.gov/docs/air_pdf/2022airqualreport.pdf

Analysis Sites

To determine locations at which microscale modeling analysis would be required to estimate CO and $PM_{2.5}$ concentration levels at the most heavily congested intersections in the Affected Area, screening procedures described in the *CEQR Technical Manual* are utilized in order to select the worst-case analysis sites. These procedures include a determination as to whether future traffic volumes from the studied traffic intersections would exceed the *CEQR Technical Manual* CO screening threshold of 140/170 vehicles during peak traffic hours. For PM, the $PM_{2.5}$ screening worksheet referenced in Section 201 of the *CEQR Technical Manual* was used to calculate the number of heavy-duty truck equivalents at each intersection. This worksheet calculates the number of project-generated vehicles based on vehicle classification and roadway classification information. Traffic periods considered in the air quality analysis consist of the weekday AM, midday, PM, and Saturday midday peak hours. Future conditions for the study year 2034, with and without the Proposed Actions, are considered in the selection process.

Two intersections were selected for microscale analysis. These intersections were selected because they have the greatest number of project trip increments and truck-equivalent vehicles per the screening thresholds in the *CEQR Technical Manual* that would result in the highest potential CO and $PM_{2.5}$ incremental concentrations.

1. 7th Avenue and West 29th Street
2. 7th Avenue and West 30th Street

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.

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 for each projected and potential development site. The methodology described in the *CEQR Technical Manual* was used for the analysis, and considered impacts on residential, commercial and community facility uses.

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

Each projected and potential development site (**Figures 14-1** through **14-3**) was evaluated with the nearest existing (project-on-existing) or proposed development (project-on-project) of a similar or greater height analyzed as a potential receptor.

The maximum gross floor area of each projected and potential development site from the Reasonable Worst-Case Development Scenario (RWCDS) was used as input for the screening analysis. 68 projected and potential sites were screened using CEQR procedures. A two-tiered screening approach was applied. First, sites were screened based on distance to lot line of nearby receptors and square footage. For those sites that failed this screening, a stack setback distance was applied, and the sites were screened again. For those sites that failed this second screening, refined modeling was conducted.

As a result of the two-tiered screening, 26 individual sites were analyzed in the refined modeling with AERMOD. The individual sites analyzed, and the corresponding locations, are in **Table 14-3 and Figures 14-1, 14-2** and **14-3** below.

Table 14-3: Addresses of Individual Potential and Projected Development Sites Analyzed using AERMOD (Total 26 Sites)

Site	Development Sites
1	Projected development site at 539 & 543 8th Avenue
8	Projected development site at 356, 358, and 360 7th Avenue
11	Projected development site at 232 W 37th Street
15	Projected development site at 203, 205, & 207 W 38th Street; 526 7th Avenue
18	Projected development site at 552, 556, & 558 7th Avenue
20	Projected development site at 145 & 147 W 24th Street
22	Projected development site at 115 & 117 W 25th Street
31	Projected development site at 341 & 343 7th Avenue; 167 W 29th Street
33	Projected development site at 122 W 30th Street
35	Projected development site at 120 W 31st Street
37	Projected development site at 67 & 69 W 23rd Street
38	Projected development site at 32 W 25th Street
41	Projected development site at 38, 40 & 42 W 28th Street
42	Projected development site at 32, 34, & 36 W 28th Streer
43	Projected development site at 24 & 26 W 28th Street
45	Projected development site at 36 W 29th Street
47	Projected development site at 39, 43, & 45 W 29th Street
48	Projected development site at 1204, 1212, & 1214 Broadway; 28 W 30th Street
49	Projected development site at 3, 9, & 11 W 29th Street; 8, 16 & 18 W 30th Street
51	Projected development site at 27 W 35th Street
53	Projected development site at 32 & 34 W 37th Street
55	Projected development site at 58 & 60 W 38th Street
56	Projected development site at 45 & 47 W 37th Street
C	Potential development site at 240 W 37th Street
F	Potential development site at 11 & 13 W 36th Street
G	Potential development site at 213 & 209 W 40th Street

Figure 14-1 - Individual Potential and Projected Sites Screened (Total 68 Sites)

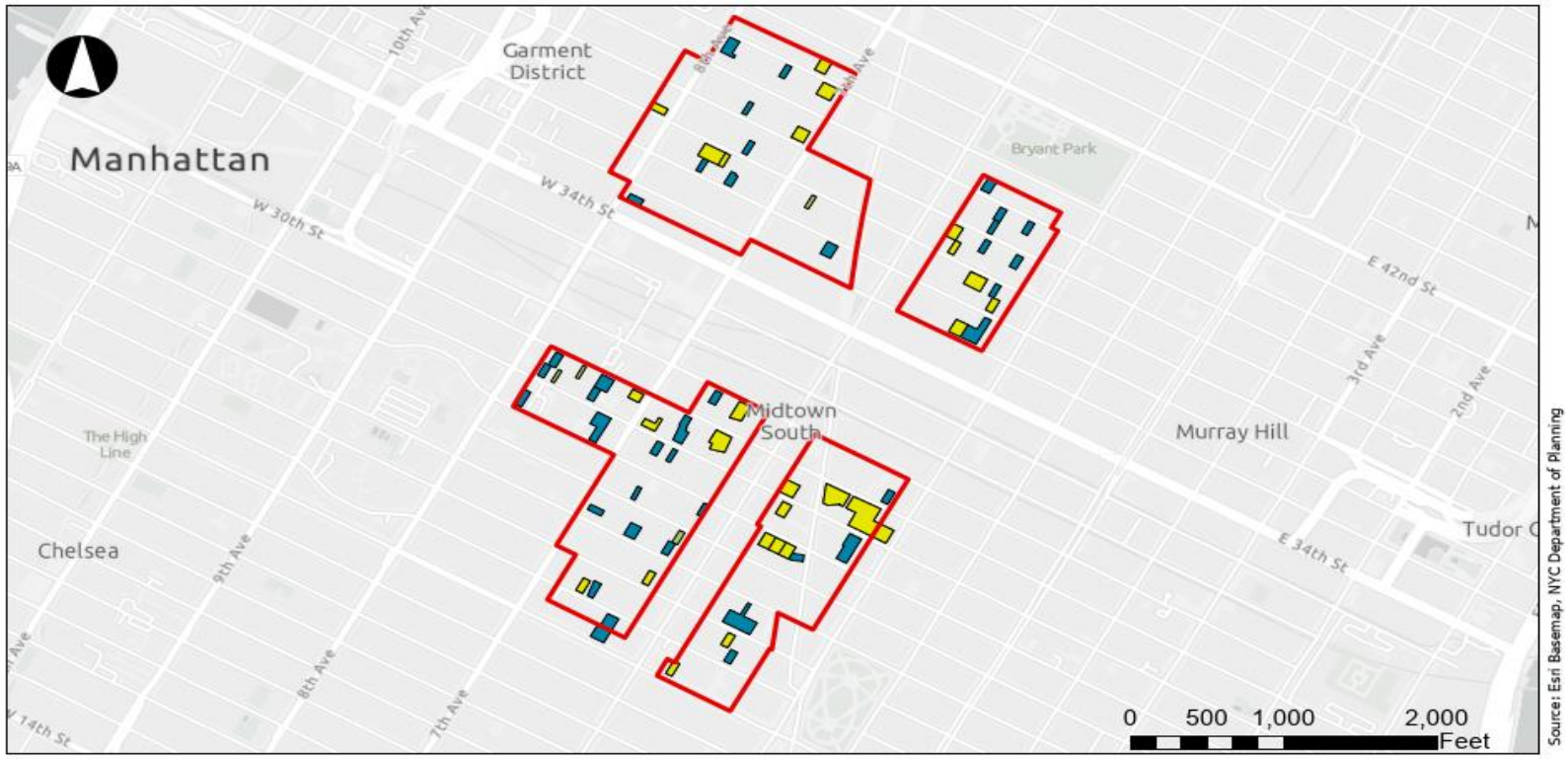


Figure 14-2 - Individual Potential and Projected Sites Screened (North) (Total 28 Sites)

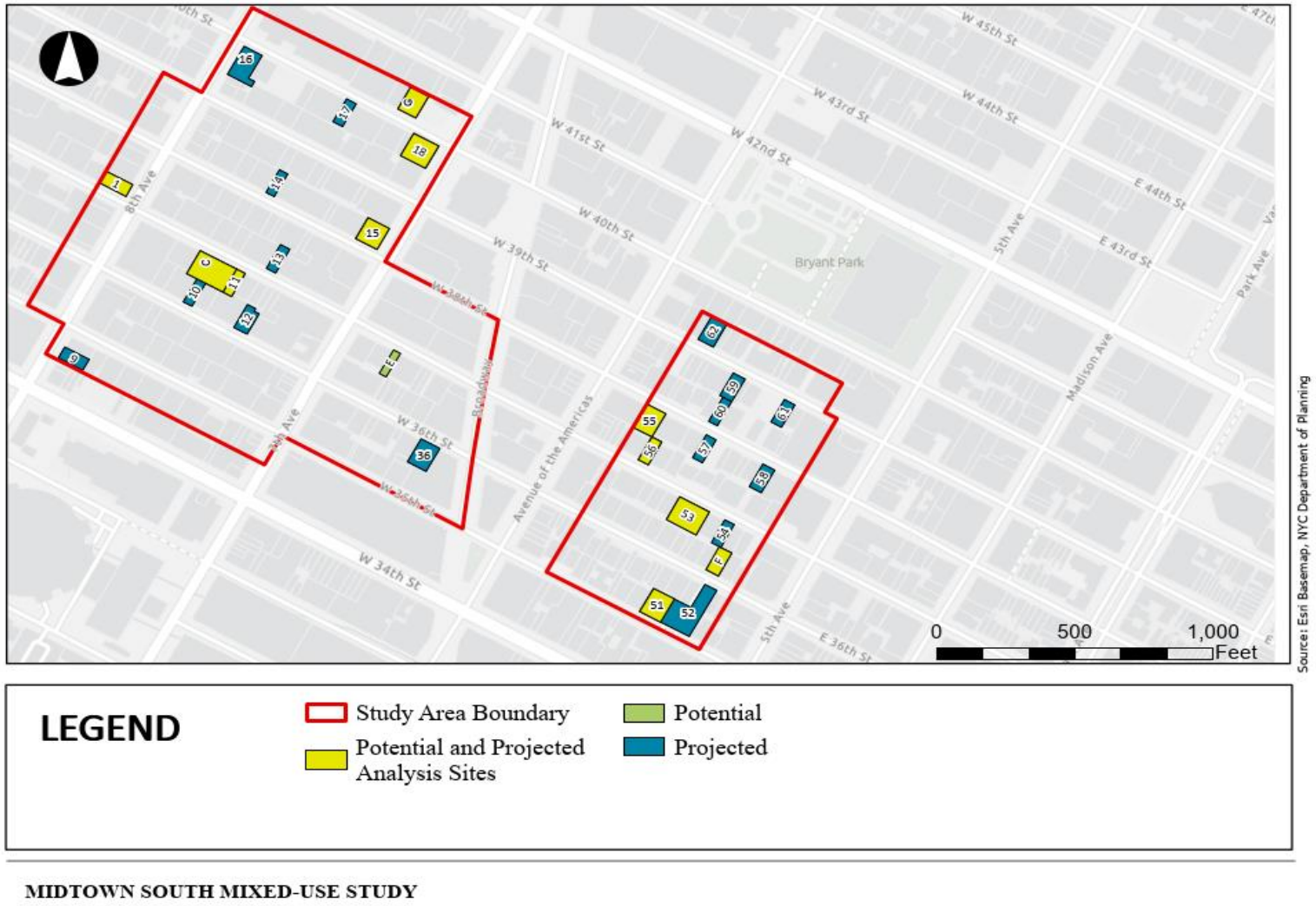


Figure 14-3 - Individual Potential and Projected Sites Screened (South) (Total 40 Sites)



MIDTOWN SOUTH MIXED-USE STUDY

It was assumed that natural gas as the type of fuel would be used in the projected and potential development sites' heat and hot water systems, and that the exhaust stack(s) would be located three feet above roof height (the default assumption in the *CEQR Technical Manual as per GEP*). If the results pass the screening analysis, the projected or potential development site is determined to result in no potential significant adverse air quality impacts using natural gas and an E-designation is placed on these sites. For development sites lower than 7 stories, the use of an electrical heating system was assumed in accordance with City Local Law 154 of 2021. For sources that did not pass the screening analyses using the *CEQR Technical Manual* procedures, a refined modeling analysis was performed. For natural gas, the primary pollutants of concern are NO_2 and $PM_{2.5}$.

Refined Dispersion Analysis

The 26 individual 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. AERMOD (version 23132) 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 calm winds in the meteorological data. 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, since the AERMOD analysis was performed to evaluate potential project-on-project and project-on-existing air quality impacts, the analysis was performed using the AERMOD model without downwash only.

The refined dispersion modeling analysis was performed for $PM_{2.5}$ and NO_2. The analysis was performed using calculated emission rates for natural gas combustion as described below. For sites modeled as electric heat, 50% of the emission rates were used, as the boilers are still assumed to use natural gas.

Emission Estimates and Stack Parameters

Fuel consumption was estimated based on building square footage, building type (residential or commercial) and natural gas intensity factors, as outlined in the Air Quality Appendix of *CEQR Technical Manual*.

Emission factors from EPA's Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources were used with fuel consumption to calculate emission rates for the projected and potential development sites' heat and hot water systems.

One-hour average NO_2 concentration increments associated with the projected and potential development sites' heating and hot water systems were estimated using the AERMOD model's ARM2 module to analyze chemical transformation within the plume. For the NO_2 annual standard, the analysis assumed 100% conversion of NO_x to NO_2 to identify worst-case annual concentrations.

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 14-4**). Concentrations measured at the most representative DEC ambient monitoring station during the most recent three-year period (2020–2022) were used for annual average NO_2, 1-hour NO_2, as well as annual and 24-hour $PM_{2.5}$ background concentrations.

Table 14-4: Maximum Background Pollutant Concentrations

Pollutant	Location	Averaging Period	Concentrations		
			2020[4]	2021[4]	2022
$PM_{2.5}$ ($\mu g/m^3$)	IS-45 [1, 2]	Annual	7.0	7.5	6.9
		24-hour	17.0	20.6	15.2
NO_2 (ppb)	IS-52[1, 3]	Annual	15.22	15.21	15.84
		1-hour	52.7	50.8	56.6

Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2020–2022 and EPA Air Data website (Monitor Values Report | US EPA).

[1] Annual value is based on annual mean concentration for each year.
[2] The 24-hour value is based on the 98th percentile of 24-hour average concentration for each year.
[3] The 1-hour value is based on a three-year average (2020–2022) of the 98th percentile of daily maximum 1-hour average concentrations.
[4] Concentrations may have been affected by lower vehicle related emissions due to COVID-19. NYSDEC has not formally requested exceptional event designation for the data.

$PM_{2.5}$ annual average impacts are assessed on an incremental basis and compared with the $PM_{2.5}$ *de minimis* criteria, without considering the annual background. The $PM_{2.5}$ 24-hour average background concentration of 17.6 $\mu g/m^3$ (based on the 2020 to 2022 average of 98th percentile concentrations measured at the IS 45 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*. The *de minimis* value for 24-hour $PM_{2.5}$ was calculated to be 8.7 $\mu g/m^3$.

Meteorological Data

The meteorological data set consisted of five consecutive years of meteorological data: hourly surface data collected at the LGA Airport National Weather Service Station (2017–2021), and concurrent twice-daily upper air data collected at Brookhaven, New York. The meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevation over the five-year period. These data were processed using the EPA AERMET program to develop data in a format which can be readily processed by the AERMOD model. The land uses around the site where meteorological surface data were available were classified using

categories defined in digital United States Geological Survey (USGS) maps to determine surface parameters used by the AERMET program.

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 air intake vents. Receptors were placed at elevated locations on all façades and at multiple elevations on buildings, to identify maximum pollutant concentrations. Generally, receptors were spaced at approximately 3-meter (10-foot) intervals vertically to represent individual floors of a building, while horizontally, receptor spacing was 8 meters (approximately 26 feet).

Cumulative Impacts from Heat and Hot Water Systems (Clusters)

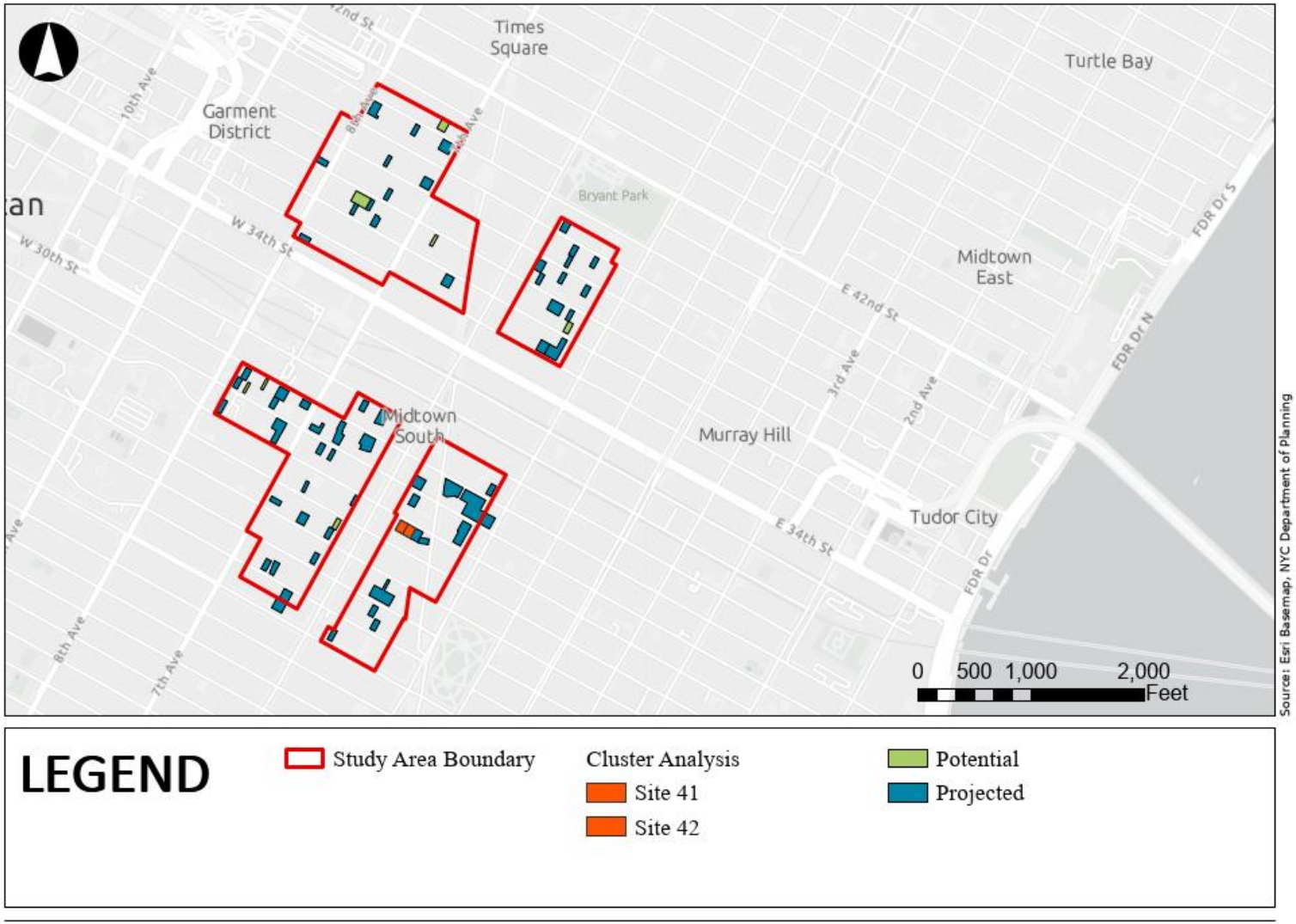
In addition to the individual source analysis, groups or "clusters" of heat and hot water sources from development sites with similar heights and in close proximity were modeled to address the cumulative impacts of multiple sources. The rezoning area and RWCDS were reviewed to determine areas where clusters 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. The selection was done together with DCP.

One cluster was selected for analysis based on height delta, proximity to nearby buildings of similar height, and square footage. The development sites associated with the cluster and their location are presented in **Table 14-5** and **Figure 14-4**.

Table 14-5: Sites included in Clusters

Site	Development Sites
Cluster 1	Projected development sites 41 and 42

Figure 14-4 - Cluster Sites Analyzed



The analysis was performed using the EPA-approved AERMOD model (Version 23132, EPA, 2022). The cluster analysis used the same meteorological data in AERMOD as described earlier for the individual sites.

To estimate the maximum expected pollutant concentration at a given receptor, the calculated impact was added to the background value that accounts for existing pollutant concentrations from other sources in the area (see **Table 14-4**).

Industrial Sources

Analysis of Potential Impacts from Existing Uses

Actions that would result in the development of new, significant industrial sources or new uses that may be adversely affected by airborne emissions from existing or planned industrial sources require an assessment of both criteria and non-criteria pollutant emissions. Therefore, an industrial source screening assessment was performed for the projected and potential development sites based on 2021 CEQR Technical Manual guidance.

The proposed actions would not introduce new industrial sources but would introduce new sensitive receptors within 400 feet of the existing industrial uses. Pollutants emitted from exhaust systems of existing permitted industrial facilities were examined to identify potential significant adverse impacts on the projected and potential development sites. Land use maps were reviewed to identify potential sources of emissions from manufacturing/industrial operations. A preliminary survey was conducted using the New York City Department of Environmental Protection's (NYCDEP's) Clean Air Tracking System to determine if there are any NYCDEP-issued permits for potential sources of air toxics concerns. A request was made to NYCDEP's Bureau of Environmental Compliance to obtain the most current information regarding the release of air pollutants from the existing manufacturing or industrial sources that were identified to have industrial permits within the 400-foot setback of the study area boundary. The air permit data provided was compiled into a database of source locations, air emission rates, and other data pertinent to determining source impacts.

Ten DEP issued air permits were identified within 400 feet of the study area. To determine the operating status of permitted industries, a field survey was conducted on August 5, 2024. Based on further review, two dry cleaning light industrial permits were screened out from analysis. **Table 14-6** provides the details of all small industrial sources identified in the study area.

Table 14-6: Light Industrial Sources in the Study Area

Name of Business	Address	Type of Business	DEP/DCP Air Permit ID	In Operation	Included in Analysis
Ben-Amun Co., Inc.	246 W 38 Street	Manufacturing; Jewelry Polishing Wheels	PA053085	Yes	Yes
Ben-Amun Co., Inc.	246 W 38 Street	Manufacturing; Jewelry (Tin) Metal Melting Pots	PA052985	Yes	Yes
J. Edlin Interiors, Ltd.	122 W 27 Street	Baghouse, Woodworking	PB031910	Yes	Yes
Gurfein Woodwork, Inc.	291 7 Avenue	Cyclone, Woodworking	PB033212	Yes	Yes
Apple Cleaners	149 West 24th Street	Dry Cleaning	PB017212	Yes	No
Ny Penn Plaza Cleaners	160 West 30th Street	Dry Cleaning	PB019200	Yes	No
Tiffany &Amp; Co.	53 W 23 Street	Manufacturing; Jewelry	PW005417	Yes	Yes
Kennedy Fabrications Inc	247 W 37 Street	Manufacturing of Architectural Models	PB013111	Yes (permit expired)	Yes
Fodera Fine Art Conservation	115 W 30 Street	Artistic products paint works (Varnish), Spray booth	PB010707	Yes (permit expired	Yes
Paul Cavazza	256 W 38 Street	Blue Printing	PB061501	Yes (permit expired)	Yes

All pollutants listed in the permits were analyzed. In addition, $PM_{2.5}$ and PM_{10} fractions from total particulate concentrations, as listed in the permits, were derived based on the generic PM fractions for specific operations[6]. Solids from spray booth emissions were considered as particulate matter and total solvent (VOC) emissions were broken down into different types of pollutants, as provided in the permits. **Table 14-7** shows the summary of estimated emission rates from the facility operations. Detailed emission rate calculations are included in Table 2 and Table 3 of Appendix F.

[6] https://www.aqmd.gov/docs/default-source/cega/handbook/localized-significance-thresholds/particulate-matter-(pm)-2.5-significance-thresholds-and-calculation-methodology/final_pm2_5methodology.pdf?sfvrsn=2

Table 14-7: Estimated Emission Rates from Light Industrial Sources

Facility	Description of Process	DEP Permit ID	Pollutant Name	CAS Number	Hourly Average Emissions (g/s)	Annual Average Emissions (g/s)	Toxicity
Ben-Amun Co., Inc.	Jewelry Polishing Wheels	PA053085	Particulates	NY075-00-0	1.68E-04	1.15E-04	-
			Tin	07440-31-5	2.52E-04	5.75E-05	-
			Lead	07439-92-1	1.26E-04	2.88E-05	HAP
			Cadmium	07440-43-9	1.26E-04	2.88E-05	HAP/ Carcinogenic
			Glycerin	00056-81-5	1.26E-04	2.88E-05	-
			Hydrogen Chloride	07647-01-0	1.26E-04	2.88E-05	HAP
			Antimony	07440-36-0	1.26E-04	2.88E-05	HAP
Ben-Amun Co., Inc.	Jewelry (Tin) Metal Melting Pots	PA052985	Particulates	NY075-00-0	0	0	-
J. Edlin Interiors	Wood Working	PB031910	Particulates (PM2.5)	NY075-02-5	1.24E-05	8.49E-06	-
			Particulates (PM10)	NY075-00-5	2.22E-05	1.52E-05	-
Gurfein Woodwork, Inc.	Wood Working	PB033212	Particulates (PM2.5)	NY075-02-5	1.55E-06	6.79E-06	-
			Particulates (PM10)	NY075-00-5	2.78E-06	1.22E-05	-
Tiffany & Amp Co.	Jewelry Manufacturing	PW005417	Particulates*	NY075-00-0	1.26E-05	1.30E-05	-
			Total VOC	NY998-00-0	6.30E-04	2.17E-04	-
			Isopropanol	67-63-0	5.04E-04	1.74E-04	-
			Methanol	67-56-1	1.26E-04	4.35E-05	HAP
			Sodium Bisulfate, anhydrous	7631-90-5	1.26E-05	4.35E-06	-
			Boric Acid	10043-35-3	2.52E-05	8.70E-06	-
Kennedy Fabrications Inc	Manufacturing of Artificial Models	PB013111	Particulates* (PM2.5)	NY075-02-5	2.94E-04	2.01E-04	-
			Particulates* (PM10)	NY075-00-5	3.78E-04	2.59E-04	-
Fodera Fine Art Conservation	Artistic Products Paint Works	PB010707	Total VOC	NY998-00-0	1.93E-02	4.40E-04	-
			Particulates/pigments *	NY075-02-5	4.20E-05	2.88E-06	-
			Turpentine	8006-64-2	1.64E-02	3.74E-04	-
			Butanol	78-92-2	1.26E-03	2.88E-05	-
			Ethanol	64-17-5	5.04E-04	1.15E-05	-
Paul Cavazza	Blue Printing	PB061501	Ammonia solution (Aqua)	01336-21-6	1.26E-05	2.30E-06	-

*Emission rates averaged over 24 hours and 365 days.

Table 17-3 of the 2021 *CEQR Technical Manual* was used to convert the corresponding initial pollutant emissions from the source to dispersed pollutant concentrations. The resulting concentrations of non-criteria pollutants were compared to the NYSDEC DAR-1 Short-term Guideline Concentration (SGC) and Annual Guideline Concentration (AGC) thresholds, the resulting concentrations of particulates were compared to NAAQS. **Table 14-8** shows the analysis results for DEP issued permits within 400 feet. All the pollutants are below the applicable guideline

concentrations except for Cadmium emitting from Ben-Amen CO., Inc., which exceeded the AGC threshold. Therefore, a refined air quality analysis for Cadmium was performed.

Table 14-8: Screening of Pollutants from Light Industrial Sources

Facility	Pollutant Name	CAS Number	Setback Distance (Ft)	Max 1-hr Concentration ($\mu g/m^3$)[1]	Maximum Annual Concentration ($\mu g/m^3$)	SGC/ NAAQS Criteria ($\mu g/m^3$)[2]	AGC/ NAAQS Criteria ($\mu g/m^3$)[2]	Exceed Screening Threshold?
Ben-Amun Co., Inc.	Particulates	NY075-00-0	106	0.64	0.058	35	9	NO
	Tin	07440-31-5	106	2.69	0.029	20	0.24	NO
	Lead	07439-92-1	106	1.35	0.014	N/A	0.038	NO
	Cadmium	**07440-43-9**	**106**	**1.35**	**0.014**	**N/A**	**0.00024**	**YES**
	Glycerin	00056-81-5	106	1.35	0.014	N/A	NA	NO
	Hydrogen Chloride	07647-01-0	106	1.35	0.014	2100	20	NO
	Antimony	07440-36-0	106	1.35	0.014	N/A	1.2	NO
Ben-Amun Co., Inc.	Particulates	NY075-00-0	106	0.000	0.000	35	9	NO
J. Edlin Interiors	Particulates (PM2.5)	NY075-02-5	50	0.243	0.023	35	9	NO
	Particulates (PM10)	NY075-00-5	50	0.436	0.041	150	N/A	NO
Gurfein Woodwork Inc.	Particulates (PM2.5)	NY075-02-5	30	0.059	0.036	35	9	NO
	Particulates (PM10)	NY075-00-5	30	0.106	0.064	150	N/A	NO
Tiffany & Amp Co.	Particulates	NY075-00-0	70	0.107	0.015	35	9	NO
	Total VOC	NY998-00-0	70	16.066	0.248	N/A	N/A	NO
	Isopropanol	67-63-0	70	12.852	0.198	98000	7000	NO
	Methanol	67-56-1	70	3.213	0.005	33000	4000	NO
	Sodium Bisulfate, anhydrous	7631-90-5	70	0.321	0.005	N/A	12	NO
	Boric Acid	10043-35-3	70	0.643	0.010	N/A	4.8	NO
Kennedy Fabrications Inc	Particulates (PM2.5)	NY075-00-5	108	1.079	0.098	35	9	NO
	Particulates (PM10)	NY075-00-5	108	1.387	0.126	150	N/A	NO
Fodera Fine Art Conservation	Total VOC	NY998-00-0	30	2406.777	2.311	N/A	N/A	NO
	Particulates/ pigments	NY075-02-5	30	1.608	0.015	35	9	NO
	Turpentine	8006-64-2	30	2044.974	1.964	N/A	2700	NO
	Butanol	78-92-2	30	157.306	0.151	N/A	710	NO
	Ethanol	64-17-5	30	62.922	0.060	N/A	45000	NO
Paul Cavazza	Ammonia solution (Aqua)	01336-21-6	110	0.125	0.001	2400	500	NO

[1] $PM_{2.5}$ and PM_{10} concentrations are of 24-hour average. [2]N/A denotes pollutant does not have DAR-1 threshold concentration.

Additional Sources (Large and Major 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 comprehensive search was performed to identify New York State Department of Environmental Conservation (DEC) Title V, State Facility permits and permits listed in the EPA Envirofacts database.

Three large sources with DEC state ASF permits and one major source with a Title V permit were identified within 1,000 feet of the study area. The list of large and major sources identified are summarized in **Table 14-9**. Based on further review of large sources, Bank of America was eliminated from further analysis because the demand response generators at the facility operate less than 100 hours in total in accordance with NYCDEP records (PB066807).

Table 14-9: Large and Major Sources within 1000 feet of the Study Area

Name of Business	Address	Type of Business	Source Type	DEP/DCP Air Permit ID	In Operation	Included in Analysis
New York Times Building Condominium	620 Eighth Ave	Generators	Large	2-6205-01696/00001	Yes	Yes
One Penn Plaza LLC	242 W 34th Street	Generators	Large	2-6205-01736/00001	Yes	Yes
Bank of America	1111 6th Ave	Demand Response Generators	Large	2-6202-01788/00001	Yes	No
Mutual Development Houses Inc	315 W 25th Street	Generators, & boilers	Major	Title V, 2-6205-00182/00001	Yes	Yes

Table 14-10 shows the summary of estimated emission rates from large and major sources for the dispersion modeling analysis. Detailed emission rate calculations for New York Times Building Condominium are included in Table 3 of Appendix F. Emission rate calculations are prepared by DCP based on facility permits, facility annual emission statement reports, and facility annual fuel consumption and operation reports.

Table 14-10: Estimated Emission Rates from Large Source and Major Source

Facility	Description of Process	DEP Permit ID	Pollutant Name	CAS Number	Hourly Average Emissions (g/s)*	Annual Average Emissions (g/s)*
New York Times Building Condominium	Two Generators used for Cogeneration	State Facility Permit: 2-6205-01696/00001	NO_2	NY210-00-0	1.63E-01	1.21E-01
			PM2.5	NY075-02-5	1.66-02	1.66-02
One Penn Plaza	Non-emergency Engine	2-6205-01736/00001	NO_2	NY210-00-0	6.20E-01	6.20E-01
			PM2.5	NY075-02-5	7.66E-02	7.66E-02
Mutual Redevelopment Houses Inc.	Engine & Boilers	Title V, 2-6205-00182/00001	NO_2	NY210-00-0	2.87E+00	2.87E+00
			PM2.5	NY075-02-5	2.00E-01	2.00E-01

*Emission rates averaged over 24 hours and 365 days.

A refined air quality analysis was performed for large and major sources using AERMOD dispersion model.

G. The Future without the Proposed Actions (No-Action Condition)

Mobile Sources

CO concentrations in the 2034 No-Action condition were determined using the methodology previously described. **Table 14-11** shows future maximum predicted 8-hour CO concentration, including the background concentration, 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.

Table 14-11: Maximum Predicted 1-Hour and 8-Hour Average CO No-Action Concentrations

Analysis Site	Location	1-Hour Concentration (ppm)	8-Hour Concentration (ppm)
1	7th Avenue and West 30th Street	2.11	1.35
2	7th Avenue and West 29th Street	2.13	1.36

Notes:
1-hour standard (NAAQS) is 35 ppm, 8-hour standard (NAAQS) is nine ppm.
Concentration includes 8-hours background concentration 1.2 ppm, and 1-hour background concentration 1.7 ppm.

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

Stationary Sources

In the No-Action condition, current uses on the projected and potential development sites are assumed to either remain unchanged from existing conditions or become occupied by uses that are as-of-right under existing zoning and reflect current trends that are deemed likely to support more active uses. The Proposed Actions would likely result in more development, and therefore, the emissions from heat and hot water systems associated with the Proposed Actions could cumulatively be greater than the emissions from heat and hot water systems under the No Action condition. Therefore, the No-Action condition for stationary sources was not analyzed.

H. The Future with the Proposed Actions (With-Action Condition)

Mobile Sources

CO concentrations for the 2034 With-Action condition were predicted using the methodology previously described. **Table 14-12** shows the future maximum predicted 1-hour and 8-hour average CO concentrations at the study intersections. The values shown are the highest predicted concentrations including background. The Proposed Actions would not result in any violations of the 1-hour or 8-hour CO standard. In addition, the incremental increases in 8-hour average CO concentrations are small and consequently would not result in a violation of the *CEQR Technical Manual de minimis* CO criteria. Therefore, mobile source CO emissions from the Proposed Actions would not result in a significant adverse air quality impact.

Table 14-12: Maximum Predicted 1-Hour and 8-Hour Average CO With-Action Concentrations (ppm)

Analysis Site	Location	1-Hour Concentration (ppm)	8-Hour Concentration (ppm)
1	7th Avenue and West 30th Street	2.15	1.37
2	7th Avenue and West 29th Street	2.17	1.39

Notes:
1-hour standard (NAAQS) is 35 ppm, 8-hour standard (NAAQS) is nine ppm.
Concentration includes 8-hours background concentration 1.2 ppm, and 1-hour background concentration 1.7 ppm.

Using the methodology previously described, maximum predicted 24-hour $PM_{2.5}$ 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 $PM_{2.5}$ concentrations are presented in **Table 14-13**.

Table 14-13: 2034 Maximum Predicted 24-Hour Average $PM_{2.5}$ Incremental and Total Concentrations ($\mu g/m^3$)

Analysis Site	Location	No Action Total Concentration	With Action Total Concentration	Project Increment	De minimis/ NAAQS
1	7th Avenue and West 30th Street	22.9	23.2	0.3	8.7/35
2	7th Avenue and West 29th Street	22.7	23.0	0.3	8.7/35

Notes: $PM_{2.5}$ *de minimis* criterion—24-hour average, not to exceed more than half the difference between the background concentration (17.6 $\mu g/m^3$) and the 24-hour standard of 35 $\mu g/m^3$

The maximum annual $PM_{2.5}$ concentration increments and total annual $PM_{2.5}$ concentrations including the background at the intersections were calculated to be compared with the NAAQS and *de minimis* criteria. Analysis results are presented in **Table 14-14**.

Table 14-14: 2034 Maximum Predicted Annual Average $PM_{2.5}$ Incremental and Total Concentrations ($\mu g/m^3$)

Analysis Site	Location	No Action Total Concentration	With Action Total Concentration	Project Increment	De minimis/ NAAQS
1	7th Avenue and West 30th Street	7.392	7.416	0.024	0.1/9
2	7th Avenue and West 29th Street	7.426	7.461	0.035	0.1/9

Note: $PM_{2.5}$ *de minimis* criterion—annual (neighborhood scale), 0.1 $\mu g/m^3$.

As shown in the tables, both $PM_{2.5}$ 24-hour and neighborhood-scale annual incremental concentrations are below the 24-hour and annual *de minimis* criterion threshold; therefore, the results demonstrate that mobile source $PM_{2.5}$ emissions from the Proposed Actions would not result in a significant adverse air quality impact.

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 or other proposed buildings. Additional sites were screened out by applying a setback to the screening distance (these sites subsequently require an E-Designation).

A total of 23 projected and 3 potential development sites failed the refined screening analysis using Figure 17-2 from the *CEQR Technical Manual*. Each of these development sites required a refined modeling analysis, using AERMOD, for the use of natural gas.

Refined Dispersion Analysis

As indicated above, 26 projected and potential development sites required a refined modeling analysis to determine the potential for air quality impacts.

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

Table 14-15: Heating and Hot Water System Analysis Summary

Analysis	Projected Development Sites		Potential Development Sites	
	Pass	Fail	Pass	Fail
Natural Gas Screening	14	47	3	4
Natural Gas and Stack Setback Requirement	24	23	1	3
Natural Gas Refined Analysis	0	23	0	3
Natural Gas Stack Location Restriction and Low NOx 30 ppm Requirement	13	0	1	0
Natural Gas Stack Location Restriction and Low NOx 15 ppm Requirement	7	0	2	0
Electric only heat	3	0	0	0

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 system emissions, an (E) Designation (E-830) would be assigned as part of the Proposed Actions for 51 projected and potential development sites (including 47 projected and 4 potential development sites). These designations specify the various restrictions, such as the use of low NO_x burners, electric heat or the distance that the vent stack on the building roof must be from its lot line(s).

Table 14-16: Heating and Hot Water System Analysis – Results for Projected Development Sites

Site	Building Height	Maximum Natural Gas Modeled Concentration (µg/m³)					Requires (E) Designation (Yes/No)
		$PM_{2.5}$ 24-Hour	$PM_{2.5}$ Annual	NO_2 1-Hour[1]	NO_2 Annual[1]	$PM_{2.5}$ 24-Hour/ $PM_{2.5}$ Annual/ NO_2 1-Hour Standard/ NO_2 Annual	
1	215	8.2	0.3	187.1	30.9	8.7/0.3/188/100	Yes - 15 ppm Low NOx burner and restrict stack location to southeast corner of the lot or to the area between 35 feet from the north lot line and 93 ft from the west lot line.
2	415	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
3	345	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with south setback - 68 feet s/o north lot line
4	325	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with west setback - 30 feet w/o east lot line
5	315	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with northwest setback - 95 feet n/o south lot line
6	335	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with southwest setback - 85 feet s/o north lot line and 5 feet n/o south lot line
7	345	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with north setback - 20 feet n/o south lot line
8	215	7.0	0.2	141.0	30.2	8.7/0.3/188/100	Yes - 15 ppm Low NOx burner and ensure stack

Table 14-16: Heating and Hot Water System Analysis – Results for Projected Development Sites

Site	Building Height	Maximum Natural Gas Modeled Concentration (µg/m^3)					Requires (E) Designation (Yes/No)
		$PM_{2.5}$ 24-Hour	$PM_{2.5}$ Annual	NO_2 1-Hour[1]	NO_2 Annual[1]	$PM_{2.5}$ 24-Hour/ $PM_{2.5}$ Annual/ NO_2 1-Hour Standard/ NO_2 Annual	
							height is at least 230 feet. Restrict stack location to at least 56 feet from the south lot line and at least 59 feet from the west lot line.
9	305	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
10	335	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
11	325	1.8	0.1	141.8	30.2	8.7/0.3/188/100	Yes - 30 ppm Low NOx burner and restrict stack location to at least 19 feet from the west lot line
12	315	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with east setback - stack must be at SE corner of lot line
13	345	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
14	325	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
15	275	7.2	0.3	185.9	30.7	8.7/0.3/188/100	Yes - 15 ppm Low NOx burner and restrict stack location to at least 67 feet from the north lot line
16	275	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with south setback - stack must be at SE corner of lot line
17	325	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
18	245	7.5	0.3	145.0	30.2	8.7/0.3/188/100	Yes - Heating must be Electric
19	275	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with south setback - 55 feet s/o north lot line
20	275	7.1	0.3	184.8	30.3	8.7/0.3/188/100	Yes - 15 ppm Low NOx burner and restrict stack location to at least 17 feet from the east lot line
21	335	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with north setback - 25 feet n/o south lot line
22	265	5.4	0.1	167.0	30.2	8.7/0.3/188/100	Yes - 30 ppm Low NOx burner and restrict stack location to at least 54 feet from the south lot line and at least 23 feet from the east lot line
23	255	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
24	N/A	N/A	N/A	N/A	N/A	N/A	Removed from analysis
25	265	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
26	275	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with south setback - 75 feet s/o north lot line, and 5 feet n/o south lot line

Table 14-16: Heating and Hot Water System Analysis – Results for Projected Development Sites

Site	Building Height	Maximum Natural Gas Modeled Concentration (µg/m^3)					Requires (E) Designation (Yes/No)
		$PM_{2.5}$ 24-Hour	$PM_{2.5}$ Annual	NO_2 1-Hour[1]	NO_2 Annual[1]	$PM_{2.5}$ 24-Hour/ $PM_{2.5}$ Annual/ NO_2 1-Hour Standard/ NO_2 Annual	
27	265	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with middle setback - 55 feet s/o of north lot line
28	265	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with middle setback - 10 feet s/o north lot line
29	265	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with middle setback - 10 feet s/o north lot line
30	265	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with middle setback - 10 feet south of the north lot line
31	255	7.5	0.2	171.2	30.4	8.7/0.3/188/100	Yes - Heating must be Electric
32	345	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with middle setback - 40 feet e/o the west lot line
33	435	7.5	0.2	136.4	30.1	8.7/0.3/188/100	Yes - 30 ppm Low NOx burner and restrict stack location to at least 23 feet from the east lot line and at least 101 feet from the north lot line
34	335	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes- Passes with south setback - 22 feet s/o the north lot line
35	355	8.3	0.1	186.9	30.4	8.7/0.3/188/100	Yes - 30 ppm Low NOx burner and restrict stack location to at least 59 feet from the north lot line and at least 13 feet from the west lot line
36	335	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
37	205	5.4	0.2	160.9	30.2	8.7/0.3/188/100	Yes - 15 ppm Low NOx burner and restrict stack location to at least 74 feet from the north lot line and at least 33 feet from the west lot line
38	315	3.4	0.1	187.2	30.2	8.7/0.3/188/100	Yes - 30 ppm Low NOx burner and restrict stack location to at least 24 feet from the east lot line and at least 60 feet from the south lot line
39	335	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
40	475	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
41	325	4.5	0.2	172.6	30.5	8.7/0.3/188/100	Yes - 30 ppm Low NOx burner. Stack must be at least 340 feet high and restrict stack location to at

Table 14-16: Heating and Hot Water System Analysis – Results for Projected Development Sites

Site	Building Height	Maximum Natural Gas Modeled Concentration (µg/m^3)					Requires (E) Designation (Yes/No)
		$PM_{2.5}$ 24-Hour	$PM_{2.5}$ Annual	NO_2 1-Hour[1]	NO_2 Annual[1]	$PM_{2.5}$ 24-Hour/ $PM_{2.5}$ Annual/ NO_2 1-Hour Standard/ NO_2 Annual	
							least 55 feet from the east lot line
42	325	3.5	0.2	155.9	30.9	8.7/0.3/188/100	Yes - Heating must be Electric
43	375	5.7	0.3	178.6	30.7	8.7/0.3/188/100	Yes - 30 ppm Low NOx burner and restrict stack location to at least 38 feet from the west lot line
44	195	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with east setback - 60 feet e/o west lot line
45	325	4.6	0.2	183.2	30.9	8.7/0.3/188/100	Yes - 30 ppm Low NOx burner and restrict stack location to at least 17 feet from the north lot line
46	325	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with south setback - 160 feet s/o the north lot line
47	335	8.1	0.1	180.5	30.9	8.7/0.3/188/100	Yes - 15 ppm Low NOx burner and restrict stack location to at least 91 feet from the east lot line and to at least 80 feet from the north lot line.
48	285	3.6	0.2	187.7	30.2	8.7/0.3/188/100	Yes - 30 ppm Low NOx burner and restrict stack location to at least 88 feet from the west lot line and at least 18 feet from the north lot line
49	455	4.1	0.2	171.0	30.4	8.7/0.3/188/100	Yes - 30 ppm Low NOx burner and restrict stack location to at least 48 feet from the south lot line and at least 254 feet from the east lot line
50	325	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with middle setback - 20 feet n/o the south lot line
51	335	6.8	0.3	187.8	30.6	8.7/0.3/188/100	Yes - 30 ppm Low NOx burner and restrict stack location to at least 68 feet from the east lot line
52	345	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with southwest setback - stack must be in southwest corner of lot
53	325	4.3	0.2	132.9	30.3	8.7/0.3/188/100	Yes - 30 ppm Low NOx burner and restrict stack location to at least 63 feet from the east lot line

Table 14-16: Heating and Hot Water System Analysis – Results for Projected Development Sites

Site	Building Height	Maximum Natural Gas Modeled Concentration (µg/m^3)					Requires (E) Designation (Yes/No)
		$PM_{2.5}$ 24-Hour	$PM_{2.5}$ Annual	NO_2 1-Hour[1]	NO_2 Annual[1]	$PM_{2.5}$ 24-Hour/ $PM_{2.5}$ Annual/ NO_2 1-Hour Standard/ NO_2 Annual	
54	325	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with east setback - 10 feet e/o west lot line
55	345	7.9	0.2	187.7	30.5	8.7/0.3/188/100	Yes - 15 ppm Low NOx burner and restrict stack location to at least 65 feet from the west lot line
56	325	6.9	0.1	187.3	30.7	8.7/0.3/188/100	Yes - 30 ppm Low NOx burner and restrict stack location to the area between 17 feet from the west lot line and 59 feet from the north lot line
57	335	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
58	325	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
59	325	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
60	305	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with middle setback - 20 feet s/o the north lot line
61	325	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with restricted stack height
62	335	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with north setback - 100 feet n/o the south lot line

[1]Results include background concentrations of 100 and 29.8 for NO_2 hourly and annual, respectively.

Table 14-17: **Heating and Hot Water System Analysis – Results for Potential Development Sites**

Site	Building Height	Maximum Natural Gas Modeled Concentration (µg/m^3)					Requires (E) Designation (Yes/No)
		$PM_{2.5}$ 24-Hour	$PM_{2.5}$ Annual	NO_2 1-Hour[1]	NO_2 Annual[1]	$PM_{2.5}$ 24-Hour/ $PM_{2.5}$ Annual/ NO_2 1-Hour Standard/ NO_2 Annual	
A	325	Pass with E	Pass with E	Pass with E	Pass with E	8.7/0.3/188/100	Yes - Passes with east setback - 10 feet e/o west lot line
B	315	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
C	325	4.5	0.1	171.1	30.5	8.7/0.3/188/100	Yes - 15 ppm Low NOx burner and restrict stack location to at least 87 feet from the south lot line and at least 106 ft from the east lot line.
D	335	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
E	345	Pass	Pass	Pass	Pass	8.7/0.3/188/100	No
F	315	4.4	0.2	175.6	30.4	8.7/0.3/188/100	Yes - 30 ppm Low NOx burner and restrict stack location to the area between 21 feet from the west lot line and 66 feet from the north lot line

Table 14-17: **Heating and Hot Water System Analysis – Results for Potential Development Sites**

Site	Building Height	Maximum Natural Gas Modeled Concentration (µg/m^3)					Requires (E) Designation (Yes/No)
		$PM_{2.5}$ 24-Hour	$PM_{2.5}$ Annual	NO_2 1-Hour[1]	NO_2 Annual[1]	$PM_{2.5}$ 24-Hour/ $PM_{2.5}$ Annual/ NO_2 1-Hour Standard/ NO_2 Annual	
G	345	7.1	0.2	168.9	30.5	8.7/0.3/188/100	Yes - 15 ppm Low NOx burner and restrict stack location to at least 61 feet from the east lot line

[1] Results include background concentrations of 100 and 29.8 for NO_2 hourly and annual, respectively.

Cumulative Impacts from Heat and Hot Water Systems (Cluster Analysis)

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. One cluster was identified for refined dispersion analysis using AERMOD. The analysis was performed using the general assumptions and procedures outlined earlier for individual development sites. As shown in **Table 14-18**, the results for the cluster are below the applicable standards.

Table 14-18: Heating and Hot Water System Analysis – Results for Cluster Analysis

Cluster	Cluster Height	Maximum Natural Gas Modeled Concentration (µg/m^3)					Requires (E) Designation (Yes/No)
		$PM_{2.5}$ 24-Hour	$PM_{2.5}$ Annual	NO_2 1-Hour[1]	NO_2 Annual[1]	$PM_{2.5}$ 24-Hour/ $PM_{2.5}$ Annual/ NO_2 1-Hour Standard/ NO_2 Annual	
Projected Sites 41 and 42	325	4.5	0.3	172.6	31.1	8.7/0.3/188/100	Yes – For Site 41, 30 ppm Low NOx burner. Stack must be at least 340 feet high and restrict stack location to at least 55 feet from the east lot line. Site 42 heating must be Electric

[1] Results include background concentrations of 100 and 29.8 for NO_2 hourly and annual, respectively.

Light Industrial Sources

Analysis of Impacts from Existing Light Industrial Sources

Based on the light industrial source screening results, one pollutant, Cadmium, from city DEP permitted facility Ben-Amun Co., Inc., exceeded the Annual Guideline Concentrations (AGC) threshold criteria. Therefore, a refined air quality analysis was completed to further assess the emissions from the industrial operation using AERMOD dispersion modeling with the same meteorological data inputs used for the detailed HVAC analysis. Annual emission rates and stack parameters were adapted from the existing permits. The refined analysis covers the projected and potential development sites that fail to screen out AGC exceedance.

The projected and potential development sites are intended to be multi-story buildings. Therefore, multiple receptors of vertical and horizontal grids were placed along the facades of the buildings up to the respective building heights. A vertical separation of 10 feet and horizontal separation of 26 feet were placed between the receptors to correspond them with each floor of the buildings. A horizontal separation of 10 feet was used for development Site C, which is close to the source emitting Cadmium. The analysis was performed with and without building downwash and with the highest result reported.

The nearest projected and potential development sites to the industrial source emitting Cadmium are Site 14, Site 13, Site 11, Site C, and Site. AERMOD results predicted exceedance of Cadmium DAR-1 AGC threshold on Site C, but not on other sites. **Table 14-19** presents the modeled annual average concentration of Cadmium for Site C. As the modeling results show, the Proposed Actions would have a significant adverse air quality impact due to the exposure of receptors to Cadmium released from an existing industrial source.

Table 14-19: Industrial Source Detailed Analysis Results

Pollutant	CAS #	Projected Site	Avg Annual Concentration ($\mu g/m^3$)	AGC ($\mu g/m^3$)	Exceedance
Cadmium	07440-43-9	Site C	0.00582	0.00024	Yes

Health Risk Assessment

A health risk assessment was conducted for pollutants in accordance with the approach described in the "Determining the Significance of Air Quality Impacts" section of this chapter. Using the predicted concentrations of each pollutant, the maximum hazard index and total cancer risk were calculated for the Proposed Actions. The hazard index approach was used to determine the effects of multiple non-carcinogenic compounds, and the cancer risk factors were used to determine the effects of carcinogenic compounds.

Tables 14-20 and **14-21** present the results of the assessment of cumulative non-carcinogenic and carcinogenic effects on the Proposed Actions, respectively. The maximum hazard index at an individual receptor location is less than DEC's DAR-1 threshold level of 2.0. Therefore, based upon cumulative air toxics analysis, the Proposed Actions would not result in a significant hazard risk.

The DAR-1 AGC standard for Cadmium (0.00024 $\mu g/m^3$) corresponds to a one-in-a million cancer risk. According to DAR-1, the acceptable residual risk range for emissions must be less than 10-in-a-million cancer risk for non-criteria air pollutants identified as carcinogenic. Since Cadmium is the only carcinogen emitted from Ben-Amun Co. Inc., the cancer risk posed by Cadmium represents the total cancer risk resulting from the emissions from Ben-Amen Co. For Cadmium, the upper limit of acceptable cancer risk of 10-in-a-million corresponds to an annual concentration of 0.0024 $\mu g/m^3$.

As such, locations with Cadmium annual average concentrations at or above 0.0024 $\mu g/m^3$ would experience unacceptable cancer risk; locations with cadmium annual concentrations between 0.00024 $\mu g/m^3$ and 0.0024 $\mu g/m^3$ would experience significant air quality impacts based on DAR-1 standards, but not unacceptable cancer risk. According to the cancer risk assessment, modeled

Cadmium emissions from Ben-Amun Co, Inc. exceed the cancer risk threshold. **Table 14-20** shows the total cancer risk assessment.

Table 14-20: Estimated Maximum Hazard Index

Pollutant	CAS Number	Estimated Annual Concentration (μ/m^3)	AGC (μ/m^3)	Pollutant Concentration to AGC Ratio
Lead	07439-92-1	0.014	0.04	0.38
Hydrogen Chloride	07647-01-0	0.014	20.00	0.00
Antimony	07440-36-0	0.014	1.20	0.01
Methanol	67-56-1	0.050	4000	0.00
			Total Hazard Index	0.39
			Hazard Index Threshold Value	**2.0**

Table 14-21: Estimated Maximum Cancer Risk

Pollutant	CAS Number	Estimated Annual Concentration (μ/m^3)	AGC (μ/m^3)	Pollutant Concentration to AGC Ratio
Cadmium	07440-43-9	0.00582	0.00024	24.3
			Total Cancer Risk	24.3
			Cancer Risk Threshold Value	**10.0**

To avoid unacceptable cancer risk caused by ambient Cadmium concentrations at the potential development site C, restrictions to prohibit operable windows or air intakes vents at some façade locations of the development site will be specified via E-Designation (E-810). The more detailed façade locations will be further examined and finalized between the Draft and Final EIS. The general requirement of the restriction would be as follows:

Block 786, Lot 68 (Potential Development Site C):

To preclude the potential for cancer risk impacts from Ben-Amun Co. Inc. located at 246 West 38th Street, if Cadmium emissions continue at this source, any new residential or commercial development on the above-mentioned property shall restrict operable windows or air intake vent(s) at the façade locations to be specified.

Between the DEIS and FEIS, further investigation will be conducted to quantify the emission rate of Cadmium from Ben-Amun Co Inc. Revision to the air quality impact analysis will be conducted if the investigation indicates different Cadmium emission rate compared to what is in the facility's current permit to reevaluate the possible air quality impact.

Light Industrial Use in the Projected and Potential Development Sites

The Proposed Actions would allow for manufacturing and residential uses in the same building. To protect occupants of mixed-use residential and manufacturing buildings and surrounding properties from smoke, dust, other particulate matter, odorous matter, and toxic noxious matter,

any manufacturing uses of these buildings would need to adhere to the performance standards for M1 districts outlined in ZR 42-40 and additional conditions in ZR123-22(b). Manufacturing uses operating on the same story or above residential uses would also need to adhere to the environmental requirements of ZR 32-423, as referenced in ZR 123-31(c)(2) to minimize significant adverse air quality impacts. Therefore, in the case that manufacturing uses would be located at the projected for the potential development sites, they would not result in adverse air quality impact.

Analysis of Impacts from Large/Major Sources

Two large sources, the New York Times Building Condominium and One Penn Plaza, were included in the refined air quality analysis. In addition, one major source, Mutual Redevelopment Houses Inc. was also included in the refined air quality analysis. DCP conducted Refined dispersion modeling internal for these facilities.

Table 14-22 shows the 1-hour and annual modeling results for NO_2 emissions and 24-hour and annual modeling results for $PM_{2.5}$ emissions from large and major sources. Results are compared with the 1-hour NO_2 and annual NO_2 NAAQS criteria, along with 24-hour and annual $PM_{2.5}$ NAAQS criteria.

NO_2 concentrations from New York Times Building Condominium exceed 1-hour NAAQS for Site 17 and Site G at around at multiple facades and different heights. Therefore, the Proposed Actions would have a significant air quality impact due to exposure of receptors to NO_2 emissions from the New York Times Building Condominium generators. Modeling results indicate that NO_2 concentrations at other development sites are below the NAAQS.

Table 14-22: Large and Major Source Detailed Analysis Results

Source	Development Site	Maximum Concentration (μ/m³)				Exceedance
		$PM_{2.5}$ 24-Hour[1]	$PM_{2.5}$ Annual[1]	NO_2 1-Hour[2]	NO_2 Annual[2]	
New York Times Building Condominium	1, 11, 14, 15, 16, 17, 18, G, & C	27.1	8.3	319	36.8	NO_2 1-Hour
One Penn Plaza	4, 5, 6, 7, 8, 9, 10, 11, 12, 34, 35 & C	18.2	7.2	109.5	30.8	None
Mutual Redevelopment Buildings	Sites 2, 3 & 23	18.6	7.2	170.5	32.1	None
NAAQS		35	9	188	100	

[1] Results include 24-hour background of 17.6 μ/m³ and annual background of 7.1 μ/m³ for $PM_{2.5}$.
[2] Results include NO_2 seasonal hourly background concentrations and annual background concentration of 29.8 μ/m³.

To avoid significant adverse impacts from the New York Times Building Condominium's emission source, restrictions to prohibit operable windows or air intakes vents at some façade locations of

projected development site 17 and potential development site G will be specified via E-Designation (E-830). The more detailed façade locations will be further examined and finalized between the Draft and Final EIS. The general requirement of the restriction would be as follows:

Proposed (E) Designation Requirements

Block 789, Lot 60 (Projected Development Site 17):

To preclude the potential for significant adverse air quality impacts from the co-generation system located at 620 Eighth Avenue, any new residential or commercial development on the above-mentioned property shall restrict operable windows or air intake vent(s) at the façade locations to be specified.

Block 1012, Lots 25, 26 (Potential Development Site G):

To preclude the potential for significant adverse air quality impacts from the co-generation system located at 620 Eighth Avenue, any new residential or commercial development on the above-mentioned property shall restrict operable windows or air intake vent(s) at the façade locations to be specified.

With restriction of locations for operable windows and air intakes placed on projected development site 17 and potential development site G, the adverse air quality impact caused by New York Times Condominium co-generation system would be prevented.

Air Quality Impacts at Residential Conversions

For the area modeled for residential conversions, the extent of air quality impacts is unknown because of the non-site-specific nature of DCP's conversion model. Since actual locations of the 1,093,808 gsf RWCDS residential conversion development cannot be identified, location-specific air quality impact analysis is not performed for the residential conversion. As the light industrial source air quality impact analysis and large/major source air quality impact analysis indicate, without mitigation measures, some development sites in the study area would experience significant adverse air quality impact from existing light industrial sources or large/major sources. For residential conversion development sites also in the same area, the possibility of similar air quality impact cannot be precluded.