# Chapter 14: Air Quality

## 14.1 Introduction

As described in Chapter 1, "Project Description," the Bronx Metro-North Station Study would consist of a series of land use actions, including zoning map amendments, zoning text amendments (including mapping a special purpose district and designating a Mandatory Inclusionary Housing (MIH) area to ensure affordable housing is part of any future development), and changes to the City Map (collectively, the "Proposed Actions"), that would facilitate the implementation of the multi-year planning process conducted in the Parkchester, Van Nest, and Morris Park neighborhoods in the Bronx in partnership with local stakeholders, City agencies, and the Metropolitan Transportation Authority (MTA).

The Proposed Actions would affect an approximately 26-block area of Parkchester and Van Nest, Bronx, Community Districts 9, 10, and 11, generally bounded by Baker Avenue and Van Nest Avenue to the north, Williamsbridge Road to the east, Tremont Avenue to the south, and Rosedale Avenue to the west and an approximately 46-block area primarily along major corridors — East Tremont Avenue, White Plains Road, Bronxdale Avenue, Eastchester Road, and Stillwell Avenue — near the future Parkchester/Van Nest and Morris Park Metro-North stations in Bronx Community Districts 9, 10 and 11 (the "Affected Area"). The approximately 28-block area closest to the future Parkchester/Van Nest station is generally bounded by Baker Avenue and Van Nest Avenue to the north, Silver Street to the east, East Tremont Avenue to the south, and St. Lawrence Avenue to the west. The approximately 18-block area closest to the future Morris Park station is generally bounded by Pelham Parkway to the north, Marconi Street to the east, Williamsbridge Road to the south, and Tenbroeck Avenue to the west.

The Proposed Actions are intended to leverage new planned Metro-North Railroad service to promote economic growth, facilitate the development of housing, including affordable housing, as well as guide investment in the public realm around stations to improve pedestrian safety and comfort.

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

- The potential for traffic volumes and a redistribution of traffic associated with the Proposed Actions to result in significant adverse mobile source air quality impacts;
- The potential for emissions from the heating, ventilation, and air conditioning (HVAC) systems of projected and potential development sites facilitated by the Proposed Actions to result in stationary source pollutants that would significantly impact existing land uses;
- The potential for emissions from the HVAC systems of projected and potential development sites to result in stationary source pollutants that would significantly impact other projected and potential development sites;

- The potential for emissions from existing stationary sources of pollution from either Major/Large-scale systems or industrial/manufacturing processes to result in significant adverse impacts on the projected and potential development sites.

These air quality analyses are conducted per guidance of the *City Environmental Quality Review* (CEQR) *Technical Manual*, as well as other relevant guidance and protocols provided by New York City Department of Environmental Protection (NYCDEP), and United States Environmental Protection Agency (USEPA). As appropriate, applicable environmental reports, for example, annual emission inventory reports for major sources for nearby facilities have been reviewed. In addition, the air quality characteristics of the Proposed Actions are identified and discussed within the context of the Clean Air Act (CAA) requirements and other applicable state and local air quality standards.

## 14.2 Principal Conclusions

The air quality analysis includes the assessment of emissions from mobile sources, HVAC and hot water systems, industrial sources, existing major or large emission sources, and parking facilities.

The mobile source analyses determined that Proposed Action-generated traffic resulting in concentrations of CO and fine particulate matter less than ten microns in diameter ($PM_{10}$) 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.

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-750) would be mapped in connection with the Proposed Actions to ensure that future developments would not result in any significant adverse air quality impacts from fossil fuel-fired heat and hot water systems emissions.

The analysis of existing light industrial/manufacturing uses in the surrounding study area determined that emissions of air toxic compounds would not result in any potential significant adverse air quality impacts. An analysis of the cumulative health risk impacts of existing industrial sources on projected and potential development sites was also performed. Maximum concentration levels at projected and potential development sites were found to be below the applicable health risk criteria. Large and major emissions sources within 1,000 feet of a projected or potential development site were also analyzed, and the analysis concluded that these sources would not result in significant adverse air quality impacts on any projected or potential development sites.

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

## 14.3 Pollutants of Concern

Ambient air quality is affected by air pollutants produced by both mobile and stationary sources. Emissions from motor vehicles, trains, marine vessels, etc., are referred to as mobile source emissions, while emissions from fixed facilities are referred to as stationary source emissions. Ambient

concentrations of carbon monoxide (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 USEPA under the CAA and are referred to as 'criteria pollutants'; emissions of VOCs, $NO_x$, and other precursors to criteria pollutants are also regulated by the USEPA.

## CARBON MONOXIDE

CO is 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 result in an increase in vehicle trips greater than the *CEQR Technical Manual* screening threshold of 170 trips at certain intersections. Therefore, a mobile source analysis was conducted to evaluate future CO concentrations with and without the Proposed Actions. In addition, the Proposed Actions would include parking facilities at the projected development sites that would increase the capacity more than 85 spaces compared with the No-Action condition. Therefore, an analysis was conducted to evaluate future CO concentrations resulting from the operation of the proposed parking facilities.

## NITROGEN OXIDES, VOCS, AND OZONE

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

The Proposed Actions would not have a significant effect on the overall volume of vehicular travel in the metropolitan area; therefore, no measurable impact on regional $NO_x$ emissions or on ozone levels is

predicted. Therefore, an analysis of emissions of these pollutants from mobile sources related to the Proposed Actions is not warranted.

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 sources, and not a local concern from mobile sources. 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 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 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 and an analysis was conducted to evaluate future PM concentrations with the operation of the parking facilities assumed to be developed with the Proposed Actions.

An assessment of PM emissions from the projected and potential development sites' heat and hot water systems was conducted.

## 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.

An analysis of $SO_2$ was conducted for major and large sources because the use of fuel oil is permitted at these facilities. For the projected and potential development sites, since their heating and hot water systems are expected to use only natural gas and produce negligible $SO_2$ emission, a quantitative analysis of $SO_2$ impact was not warranted.

## NON-CRITERIA POLLUTANTS

In addition to criteria pollutants, a wide range of the non-criteria air pollutants, known as hazardous air pollutants (HAPs), which could be emitted from industrial and commercial facilities, are also of potential concern. These pollutants can be grouped into two categories: carcinogenic air pollutants and noncarcinogenic air pollutants. These two groups include hundreds of pollutants, ranging from high to low toxicity. No federal standards have been promulgated for toxic air pollutants. However, the USEPA and the New York State Department of Environmental Conservation (NYSDEC) have issued guidelines that establish acceptable ambient levels for these pollutants based on human exposure criteria. The NYSDEC guidance document DAR−1 (2021)[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. The USEPA has also developed guidelines for assessing exposure to non-criteria pollutants. These exposure guidelines are used in health risk assessments to determine the potential effects to the public.

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

The Affected Area contains a zoned manufacturing area, some of which would remain once the Proposed Actions are in effect. Therefore, air toxics are potential pollutants of concern.

# 14.4 Air Quality Standards and Guidelines

## NATIONAL AND STATE AIR QUALITY STANDARDS

National and New York State primary and secondary ambient air quality standards are pollutant concentration limits for each of the criteria pollutants specified by the USEPA. The National Ambient Air Quality Standards (NAAQS) for all of the criterial pollutants are listed in Table 14-1, " National Ambient Air Quality Standards (NAAQS)."

The NAAQS for 3-hour $SO_2$ has also been adopted as the ambient air quality standard for New York State but is 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, and 24-hour and annual $SO_2$ which correspond to federal standards that have since been revoked or replaced, and for the noncriteria pollutants fluoride and hydrogen sulfide.

Effective December 2015, the USEPA lowered the 2008 ozone NAAQS from 0.075 parts per million (ppm) to 0.070. The USEPA issued final area designations for the revised standard on April 30, 2018.

**Table 14-1: National Ambient Air Quality Standards (NAAQS)**

| Pollutant | Primary | | Secondary | |
|---|---|---|---|---|
| | ppm | µg/m³ | ppm | µg/m³ |
| **Carbon Monoxide (CO)** | | | | |
| 8-Hour Average | 9 (1) | 10,000 | None | |
| 1-Hour Average | 35 (1) | 40,000 | | |
| **Lead** | | | | |
| Rolling 3-Month Average | 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 (4) | NA | 150 | NA | 150 |
| **Fine Respirable Particulate Matter ($PM_{2.5}$)** | | | | |
| Annual Mean (5) | NA | 12 | NA | 15 |
| 24-Hour Average (6) | NA | 35 | NA | 35 |
| **Sulfur Dioxide ($SO_2$)** | | | | |
| 1-Hour Average (7) | 0.075 | 196 | NA | NA |
| Maximum 3-Hour Average (1) | NA | NA | 0.50 | 1,300 |

**Notes:**
ppm—parts per million (unit of measure for gases only)
µg/m³–micrograms per cubic meter (unit of measure for gases and particles, including lead)
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. Not to be exceeded more than once a year on average over three years.
5. 3-year average of annual mean.
6. Not to be exceeded by the annual 98th percentile when averaged over 3 years.
7. 3-year average of the annual 99th percentile daily maximum 1-hr average concentration.

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

## DETERMINING THE SIGNIFICANCE OF AIR QUALITY IMPACTS

Based on the USEPA CAA, the State Environmental Quality Review Act (SEQRA) regulations, and the guidance of the *CEQR Technical Manual*, predicted criteria pollutant levels that are greater than those represented in Table 14-1, "National Ambient Air Quality Standards," would be considered a potential significant adverse impact. Similarly, for non-criteria pollutants, predicted exceedance of the NYSDEC's DAR-1 guideline concentrations would be considered a potential significant adverse impact.

To ensure that pollutant concentration levels are kept below the NAAQS in attainment areas and that concentrations are not significantly increased in non-attainment areas, threshold levels not to be exceeded have also been defined for criteria 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*

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

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

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

### *$PM_{2.5}$ De Minimis Criteria*

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

- Predicted increase of more than half the difference between the background concentration and the 24-hour NAAQS;
- 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); or
- 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 one-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).

Per the *CEQR Technical Manual* 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*

In order to evaluate short-term and annual impacts of non-carcinogenic toxic air pollutants, NYSDEC has established through their DAR-1 guidance document, short-term guideline concentrations (SGC) and annual guideline concentrations (AGC) for exposure limits. Air toxic concentration values can be found in the NYSDEC DAR-1 AGC/SGC tables; they represent maximum allowable one-hour and annual guideline concentrations, respectively, that are considered acceptable concentrations below which there should be no adverse effects on the health of the general public.

In order to evaluate impacts of non−carcinogenic toxic air emissions, the USEPA developed a methodology called the "Hazard Index Approach." If the combined ratio of pollutant concentration divided by its respective annual exposure threshold for each of the toxic pollutants is found to be less than two, no significant health risks are predicted to occur due to these pollutant releases.

In addition, the USEPA has developed unit risk factors for carcinogenic pollutants. The USEPA 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.

## 14.5 Existing Conditions and Regulatory Setting

### MONITORED DATA

The USEPA and NYSDEC operate a network of monitoring stations throughout New York City to measure ambient air quality with the results published on an annual basis. The most recent USEPA and NYSDEC air monitoring databases identify existing air quality levels for the Affected Area based on data from the monitoring stations nearest the Affected Area. Background air quality levels for the Affected Area are shown in Table 14-2, "Background Pollutant Concentrations." Selected locations represent available background sites nearest to the Affected Area.

**Table 14-2: Background Pollutant Concentrations**

| Pollutant | Location | Units | Period | Concentrations |
|---|---|---|---|---|
| CO | NYBG | ppm | 8-hour | 1.1 |
| | | | 1-hr | 1.6 |
| $SO_2$ | IS 52 | $\mu g/m^{3(1)}$ | 1-hr | 11.2 |
| Respirable Particulates ($PM_{10}$) | IS 52 | $\mu g/m^3$ | 24-hr | 44 |
| Respirable Particulates ($PM_{2.5}$) | NYBG | $\mu g/m^3$ | Annual | 7.0 |
| | | | 24-hr | 19.1 |
| $NO_2$ | IS 52 | $\mu g/m^{3(2)}$ | Annual | 32.8 |
| | | | 1-hr | 80.3 |

**Notes:**
(1) Background pollutant concentrations for $SO_2$ are measured in $\mu g/m^3$, while NAAQS for $SO_2$ presented in Table 14-1, "National Ambient Air Quality Standards," are measured in parts per billion (ppb) for 1-hr levels and parts per million (ppm) for 3-hour (3-hr) levels.
(2) Background pollutant concentrations for $NO_2$ are measured in $\mu g/m^3$, while NAAQS for $NO_2$ presented in Table 14-1, "National Ambient Air Quality Standards," are measured in ppb.

**Source:** NYSDEC, https://www.dec.ny.gov/docs/air_pdf/2021airqualreport.pdf

## REGULATORY SETTING

### *Attainment Status/State Implementation Plan (SIP)*

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 the USEPA, 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, the USEPA re-designated New York City area 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 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. The USEPA lowered the annual average primary standard to 12 $\mu g/m^3$ effective March 2013. The USEPA designated the area as in attainment for the 12 $\mu g/m^3$ NAAQS effective April 15, 2015. The Bronx is designated as an attainment area for $PM_{10}$.

Effective June 15, 2004, USEPA designated all five New York City counties and the counties of Nassau, Rockland, Suffolk, and Westchester as a moderate NAA for the 1997 8-hour average ozone standard. In March 2008, USEPA strengthened the 8–hour ozone standards, but certain "anti-backsliding" requirements remain in areas that were either nonattainment or maintenance areas for the 1997 ozone standard. USEPA 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. On April 11, 2016, USEPA reclassified the area as a "moderate" NAA for $O_3$. On July 19, 2017, NYSDEC announced that the New York metropolitan area (NYMA) was not projected to meet the July 20, 2018 attainment deadline and requested that USEPA reclassify the NYMA to "serious" nonattainment that would impose a new attainment deadline of July 20, 2021 (based on 2018-2020 monitored data). On April 30, 2018 USEPA designated the same area as a moderate NAA for the revised 2015 ozone standard. On November 18, 2018, USEPA proposed reclassifying the NYMA from a "moderate" to a "severe" NAA.

New York City is currently in attainment of the annual-average $NO_2$ standard. The USEPA has designated the entire state of New York as "unclassifiable/attainment" of the 1-hour $NO_2$ standard effective February 29, 2012. Since additional monitoring is required for the 1-hour standard, areas will be reclassified once three years of monitoring data are available.

The USEPA has established a 1-hour $SO_2$ standard, replacing the former 24-hour and annual standards, effective August 23, 2010. The USEPA has designated the entire State of New York as in attainment for this standard.

# 14.6 Methodology for Predicting Pollutant Concentrations

The air quality assessment examines potential significant adverse CO, $NO_2$, $SO_2$, $PM_{10}$ and $PM_{2.5}$ air quality impacts resulting from the implementation of the Proposed Actions. Specific methodology and background information are discussed below.

## 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 the Bronx, New York. Per the guidance of the *CEQR Technical Manual*, in this area of the City, actions that would result in the increment of 170 or more peak-hour vehicle trips at an intersection may cause significant adverse air quality impacts and require a detailed air quality analysis for CO. 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 or its equivalent in vehicle trips. All mobile source analyses are performed for the 2033 future year.

Additional modeling of $PM_{2.5}$ annual impact analysis has been performed using an extended neighborhood-scale analysis procedure to determine the magnitude and extent of neighborhood-scale $PM_{2.5}$ impacts from mobile sources.

## *Vehicular Emissions*

Vehicular CO and PM engine emission factors were computed using the USEPA mobile source emissions model, Motor Vehicle Emission Simulator (MOVES3). 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.[2]

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 (7:30 to 8:30 AM), midday (1:00 to 2:00 PM), evening (4:15 to 5:15 PM) peak periods as well as the Saturday midday peak period (12:15-1:15 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.

## *Dispersion Model*

The CO and PM concentrations due to vehicular emissions adjacent to the analysis sites were predicted using the American Meteorological Society/Environmental Protection Agency Regulated Model (AERMOD) Version 22112.[3] 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,

[2] 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.

[3] 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.

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. AERMOD has been a recommended model for transportation air quality analyses for several years and the USEPA mandated its use for transportation conformity purposes after a three-year transition period.[4] 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.

## *Analysis Year*

The microscale analyses are performed for existing conditions and 2033, 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 14-2, "Background Pollutant Concentrations." Applicable background concentrations are added to the modeling results to obtain the total pollutant concentrations at each receptor site for the analysis year.

[4] USEPA. Revisions to the Guideline on Air Quality Models: Final rule. Federal Register, Vol. 82, No. 10, January 2017.

[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#pmguidance

## *Analysis Sites*

To determine locations at which microscale modeling analysis would be required to estimate CO and PM 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 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 2033, with and without the Proposed Actions, are considered in the selection process.

Three intersections were selected for microscale analysis as following. 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 incremental concentrations.

1. Williamsbridge Road and Eastchester Road for PM and CO analyses;
2. East Tremont Avenue and Castle Hill Avenue for PM and CO analyses; and
3. Eastchester Road and Jarret Place for PM analysis.

In addition to the analysis of intersections where highest potential air quality impact takes place, further analysis including extended roadways in the study area was conducted to determine the magnitude of $PM_{2.5}$ annual concentration increment of a neighborhood-scale to be compared with $PM_{2.5}$ annual impact *de minimis* criteria. The neighborhood-scale analysis included some roadways for which the existing traffic counts are not available and, in that case, traffic volumes and speeds were determined based on the nearest representative roadways with volume and speed information.

## ***Parking Analysis***

The Proposed Actions would include parking facilities to account for the new parking demand. Emissions from vehicles using these parking areas could potentially affect ambient levels of CO and PM in the immediate vicinity in the With-Action condition. The parking garages at Projected Development Site 9 (783 spaces) were analyzed as a prototype given that the site has the maximum overall capacity 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 of one cubic foot per minute of fresh air per gross square foot of garage area, based on New York City Building Code requirements. To determine compliance with the NAAQS, CO concentrations were determined for the maximum eight-hour average period.

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 were derived from the trip generation analysis described in Chapter 13, "Transportation." Background and on-street concentrations were added to the modeling results to obtain the total ambient levels for CO. 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' HVAC systems. In addition, an assessment was conducted to determine the potential for impacts due to light industrial/manufacturing activities within the Affected Area, and from any nearby Major/Large emission sources.

## *Individual HVAC Systems*

A stepped analysis procedure (described below) is used to determine the potential for emissions from the HVAC systems of individual development sites to result in stationary source pollutants that would significantly impact existing land uses (project-on-existing impacts) and other development sites (project-on-project impacts):

1. Impacts would be initially analyzed using the HVAC nomograph screening procedures described in the *CEQR Technical Manual* assuming the use of No. 2 fuel oil.

2. If the nomograph screening result fails with the use of No. 2 fuel oil, HVAC screening procedures will be used assuming a cleaner burning fuel (natural gas), and an air quality (E) designation would be proposed for the site, providing the fuel type restriction that would be required to avoid a significant adverse air quality impact.

3. If the *CEQR Technical Manual* nomograph screening result fails with natural gas, a more detailed analysis will be conducted utilizing the USEPA's AERMOD dispersion model.

4. If the detailed AERMOD analysis result fails with the use of natural gas, additional refined analysis and further stack restrictions (i.e., stack setback, stack height, and/or low $NO_x$ burner) would be

required to avoid a significant adverse air quality impact. An air quality (E) designation would be proposed for the site in the Environmental Impact Statement (EIS), providing the fuel type stack set back distance and stack height restriction.

## *Nomograph Screening Analysis*

The *CEQR Technical Manual* HVAC nomograph screening analysis determines development size threshold below which an action would not result in a significant adverse impact. To evaluate potential for significant adverse impacts, the screening analysis considers fuel type, the maximum development size, and the HVAC systems exhaust stack height. 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 determined by screening, 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 HVAC systems' design is not available, the conservative approach of using the distance from lot line to lot line for receptor and source was used for the screening analysis. The maximum 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.

It is assumed that No. 2 fuel oil or natural gas would be used in the projected and potential development sites' HVAC 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 analysis assuming use of No.2 fuel oil or natural gas, a refined modeling analysis was performed. For refined modeling analysis assuming natural gas, the primary pollutant of concern is $NO_2$ and $PM_{2.5}$.

## *Refined Dispersion Analysis*

Projected and potential development sites that did not pass the screening analysis were further analyzed using a refined dispersion model, the USEPA AERMOD dispersion model. 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 nearby 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 to each other. In these cases, the stack was assumed to be located at an initial distance of ten feet from the nearest receptor.

A refined dispersion modeling analysis was performed for $PM_{2.5}$ and $NO_2$. The analysis was performed using calculated emission rates for natural gas. If a source could not meet the NAAQS or $PM_{2.5}$ *de minimis* criteria using the initial heating and hot water system stack assumptions, further restrictive measures were considered, including use of low $NO_x$ burners, increasing the minimum stack setback distance, increasing the stack height, or a combination of these measures 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. Receptors were placed at elevated locations on all façades and at multiple elevations on buildings, to identify maximum pollutant concentrations.

### *Emission Estimates and Stack Parameters*

Fuel consumption estimates were calculated based on procedures outlined in the *CEQR Technical Manual*. The Air Quality Appendix of the *CEQR Technical Manual* includes building energy consumption factors that can be used to estimate annual fuel consumption based on a development site's total floor area and use. Natural gas consumption factors of 52.8 cubic feet/square feet-year and 45.3 cubic feet/square feet-year were used for residential developments and commercial developments, respectively. Residential fuel consumption factors were used for mixed-use developments as they are more conservative. The development sites' total floor area was based on the RWCDS assumptions. Short-term factors were determined by using peak hourly fuel consumption estimates for heating and hot water systems. Emission factors from the natural gas combustion sections of the USEPA's AP−42 were used to calculate $NO_2$ and $PM_{2.5}$ emission rates for the projected and potential development sites' HVAC systems.

One-hour average $NO_2$ concentration 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 was taken from the NYSDEC IS 52 monitoring station, which is the nearest ozone monitoring station to the Affected Area that has complete five years of hourly data available (2017–2021). 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 with the 1-hour $NO_2$ NAAQS was based on adding the monitored background to modeled concentrations from the proposed sources, 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 $98^{th}$ 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 referenced in the USEPA modeling guidance[6] and is recognized by the City.

### *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 14-2, "Background Pollutant Concentrations"). To develop background levels, concentrations measured at the most representative NYSDEC ambient monitoring station over the latest available three-year period (2019–2021) were used for annual $NO_2$ and $PM_{10}$ background concentrations.

$PM_{2.5}$ 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 19.1 µg/m$^3$ (based on the 2019 to 2021 average of 98th percentile concentrations measured at the NYC Botanical Garden 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 boundaries and RWCDS were reviewed to determine areas where clusters of sites with a high density of development and with similar building heights would be located, as these clusters could result in cumulative impacts on nearby buildings of a similar or greater height. Two clusters were selected for analysis. The development sites associated with each cluster and their location are presented in Table 14-3, "Cluster Analysis Sites," and on Figure 14-1, "HVAC Cluster Locations."

**Table 14-3: Cluster Analysis Sites**

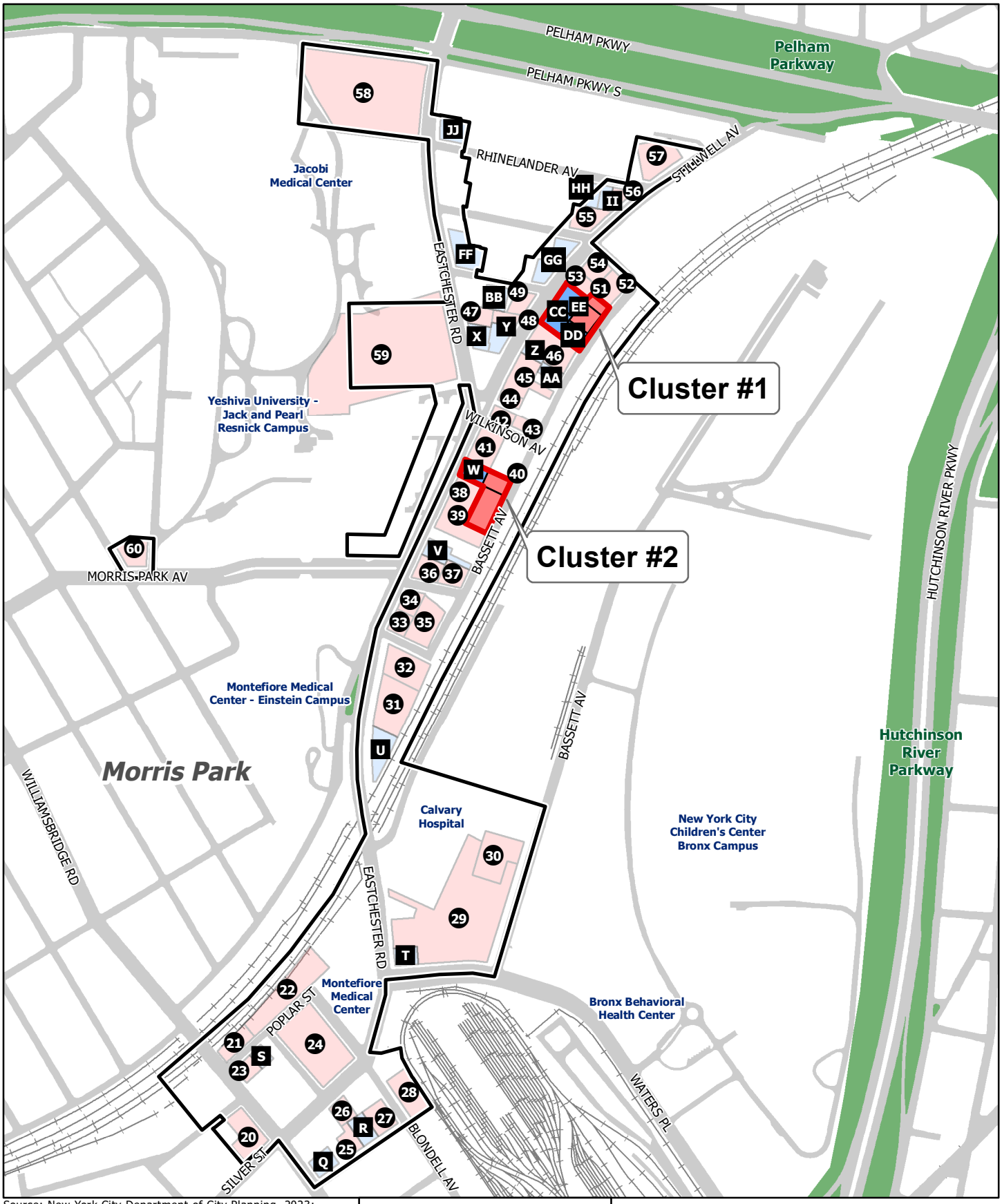
| Analysis Site | Development Sites |
|---|---|
| 1 | Projected Development Sites 50 and 51, and Potential Development Sites CC, DD, and EE |
| 2 | Projected Development Sites 39 and 40, and Potential Development Site W |

**Source:** STV Incorporated, 2024.

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 and potential development sites that 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 14-2, "Background Pollutant Concentrations").

[6] Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-Hour $NO_2$ National Ambient Air Quality Standard, USEPA, March 1, 2011.




Source: New York City Department of City Planning, 2023; STV Incorporated, 2024.

N

0 500 1,000 Feet

Affected Area*

1 Projected Development Site

A Potential Development Site

* Only Morris Park section of Affected Area is shown.

Figure 14-1

**HVAC CLUSTER LOCATIONS**

## *Industrial Sources*

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

A request was made to NYCDEP for information regarding the release of air pollutants from these potential sources within the entire study area.

A field survey was also conducted to identify any other potential industrial sites not included in the original permit request or the permit databases. Overall, two permitted sources were identified and determined to be currently in operation. Information for these two facilities is presented in Table 14-4, "Industrial Sources Within 400 Feet of a Projected or Potential Development Site."

**Table 14-4: Industrial Sources within 400 Feet of a Projected or Potential Development Site**

| Name of Business | Address | Type of Business | Permit No |
|---|---|---|---|
| Bronx Car Salon, Inc | 1558 Stillwell Avenue | Auto Body Shop | PB027311 & PB027411 |
| Casino Towing Service, Inc | 2511 East Tremont Avenue | Auto Paint/Spray Booth | PB028013 |

**Source:** STV Incorporated, 2024.

## ***Refined Dispersion Analysis***

After compiling the information on facilities with manufacturing or process operations in the study area, maximum potential pollutant concentrations from the emission sources were determined using the USEPA AERMOD refined dispersion model. The AERMOD model was run using the same model assumptions and options as described earlier for the refined modeling of heating and hot water systems.

Predicted worst-case impacts on the projected and potential development sites were compared with the SGCs and AGCs recommended in NYSDEC's DAR-1 AGC/SGC tables. These guidelines present the airborne concentrations that 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.

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 NYCDEP permit identified in Table 14-4, "Industrial Sources Within 400 Feet of a Projected or Potential Development Site," were input into the AERMOD dispersion model. The pollutants and emission rates for the permitted facility are presented in Table 14-5, "Modeled Emission Rates of Existing Industrial Sources."

**Table 14-5: Modeled Emission Rates of Existing Industrial Sources**

| Facility | Description of Process | NYCDEP Permit ID | CAS No | Pollutant Name | Hourly Emissions (lb/hr) | Annual Emissions (lb/yr) |
|---|---|---|---|---|---|---|
| Bronx Car Salon, Inc | Auto Body Shop | PB027311 & PB027411 | 123-86-4 | n-butyl acetate | 1.550 | 2,325 |
| | | | 71-36-3 | n-butanol | 0.307 | 460 |
| | | | 1569-02-4 | 1-ethoxypropan-2-ol | 0.099 | 149 |
| | | | 5131-66-8 | 3-butoxypropan-2-o | 0.118 | 177 |
| | | | 1330-20-7 | Xylene | 0.031 | 47 |
| | | | 64742-48-9 | AH (1) | 0.155 | 233 |
| | | | 100-41-4 | Ethylbenzene | 1.550 | 2,325 |
| | | | 7429-90-5 | Aluminum Powder | 0.307 | 460 |
| Casino Towing Service, Inc | Auto Paint/Spray Booth | PB028013 | 67-64-1 | Acetone | 0.3333 | 266.6 |
| | | | 64742-94-5 | APD (2) | 0.0775 | 62.0 |
| | | | 106-98-9 | Butene | 0.0853 | 68.2 |
| | | | 64-17-5 | Ethanol | 0.0233 | 18.6 |
| | | | 763-69-9 | EER(3) | 0.0698 | 55.8 |
| | | | 100-41-4 | Ethylbenzene | 0.0388 | 31.0 |
| | | | 78-93-3 | Methyl Ethyl Ketone | 0.0620 | 49.6 |
| | | | 123-86-4 | N-Butyl Acetate | 0.1240 | 99.2 |
| | | | 8052-41-3 | Stoddard Solvents | 0.0775 | 62.0 |
| | | | 108-88-3 | Toluene | 0.0775 | 62.0 |
| | | | 1330-20-7 | Xylene | 0.0775 | 62.0 |

**Notes:**
(1) aromatic hydrocarbons (Naphtha hydrotreated heavy).
(2) APD = Aromatic Petroleum Distillate
(3) EER = Ethyl 3-Ethoxypropionate

**Source:** STV Incorporated, 2024.

### *Health Risk Assessment*

Potential cumulative impacts were evaluated based on the Hazard Index Approach for noncarcinogenic compounds as described in the NYSDEC DAR-1 guidance document. Hazard quotients are calculated by dividing the maximum modeled concentration of each pollutant by its respective AGC. The quotients are then summed together to calculate a multi-contaminant hazard index for each sensitive receptor. The maximum hazard index indicates the worst-case scenario for potential impacts from non-carcinogenic pollutants. For non-carcinogenic compounds, NYSDEC's DAR-1 considers a cumulative hazard index of less than 2.0 to be acceptable. There were no carcinogenic compounds associated with the identified facility; therefore, no analysis of these compounds was required.

## *Major and Large Sources*

The *CEQR Technical Manual* requires an analysis of projects that may result in a significant adverse impact due to new uses located within 1,000 feet of 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 NYSDEC Title V and State Facility Permit websites.

Two facilities with Title V permits and one facility with a New York State permit have been identified within 1,000 feet of the proposed and potential development sites:

- Parkchester South Condominium (NYSDEC ID 2600500139)
- Albert Einstein College of Medicine (NYSDEC ID 2600500133)
- Jacobi Medical Center (NYSDEC ID 26005-00011)

The AERMOD dispersion model was used in the analysis, with the same meteorological data and background concentrations used for the heating and hot water system analysis. In addition, as described in the methodology for the analysis of stationary sources, total 1-hour $NO_2$ concentrations were determined using the USEPA Tier 3 approach.

The facility emissions are estimated using the information developed for the facilities' air permits and by applying the USEPA's Compilations of Air Pollutant Emission Factors (AP−42)[7] for natural gas−fired or fuel oil boilers. Table 14−6, "Stack Parameters and Emission Rates from Parkchester South Condominium," Table 14-7, "Stack Parameters and Emission Rates from Albert Einstein College of Medicine," and Table 14-8, "Stack Parameters and Emission Rates from Jacobi Medical Center," present the emission rates and stack parameters used in the major source AERMOD analyses.

**Table 14-6: Stack Parameters and Emission Rates from Parkchester South Condominium**

| Parameter | Value |
|---|---|
| Stack Height (ft) (1) | 266 |
| Stack Diameter (ft)(2) | 10 |
| Exhaust Flow Rate (acfm) (3,4) | 138,258 |
| Exhaust Temperature (°K) | 426 |
| Fuel Type | Natural Gas/Fuel Oil |
| $NO_x$ Short Term Emission Rate (g/s) | 8.90 |
| $NO_x$ Annual Emission Rate (g/s) | 2.44 |
| $PM_{2.5}$ Short Term Emission Rate (g/s) | 0.56 |
| $PM_{2.5}$ Annual Emission Rate (g/s) | 0.15 |
| $PM_{10}$ Short Term Emission Rate (g/s) | 0.56 |
| $SO_2$ Short Term Emission Rate (g/s) | 1.63 |

**Notes:**
(1) The stack height is based on the NYSDEC State Facility Permit.
(2) The stack diameter is based on the NYSDEC State Facility Permit.
(3) acfm = actual cubic feet per minute.
(4) The stack exhaust flow rate is based on maximum capacity of boilers.
(5) The stack exhaust temperature is based on the NYSDEC State Facility Permit.

**Source:** STV Incorporated, 2024.

[7] USEPA, Compilations of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors

**Table 14-7: Stack Parameters and Emission Rates from Albert Einstein College of Medicine**

| Parameter | Main Building (four main boilers) | Rhinelander Building | Rousso Building |
|---|---|---|---|
| Stack Height (ft) (1) | 225 | 63 | 63 |
| Stack Diameter (ft)(2) | 12 | 1.7 | 1.7 |
| Exhaust Flow Rate (acfm) (3,4) | 94,597 | 8,732 | 4,366 |
| Exhaust Temperature (°K)(5) | 426 | 426 | 426 |
| Fuel Type | Natural Gas/ Fuel Oil | Natural Gas/ Fuel Oil | Natural Gas/ Fuel Oil |
| $NO_x$ Short Term Emission Rate (g/s) | 6.66 /4.50(6) | 0.204 | 0.102 |
| $NO_x$ Annual Emission Rate (g/s) | 6.66 /4.50(6) | 0.204 | 0.102 |
| $PM_{2.5}$ Short Term Emission Rate (g/s) | 0.71/0.34(6) | 0.016 | 0.008 |
| $PM_{2.5}$ Annual Emission Rate (g/s) | 0.71/0.34(6) | 0.016 | 0.008 |
| $PM_{10}$ Short Term Emission Rate (g/s) | 0.79/0.34(6) | 0.016 | 0.006 |
| $SO_2$ Short Term Emission Rate (g/s) | 0.071 | 0.012 | 0.006 |

**Notes:**
(1) The stack height is based on the NYSDEC State Facility Permit.
(2) The stack diameter is based on the NYSDEC State Facility Permit.
(3) acfm = actual cubic feet per minute.
(4) The stack exhaust flow rate is based on maximum capacity of boilers.
(5) The stack exhaust temperature is based on the NYSDEC State Facility Permit.
(6) 6.66 g/s for winter season, 4.50 for the other seasons for $NO_2$; 0.71 g/s for winter season, 0.34 g/s for other seasons for $PM_{2.5}$; and 0.79 g/s for winter season, 0.34 g/s for other seasons for $PM_{10}$.

**Source:** STV Incorporated, 2024.

**Table 14-8: Stack Parameters and Emission Rates from Jacobi Medical Center**

| Parameter | #5 Building | #6 Building | Staff Building | Store Building | Sterile Building |
|---|---|---|---|---|---|
| Stack Height (ft) (1) | 170 | 146 | 19 | 22 | 146 |
| Stack Diameter (ft)(2) | 4.25 | 2 | 1 | 1 | 0.57 |
| Exhaust Flow Rate (acfm) (3,4) | 31,186 | 10,915 | 1,746 | 4,646 | 10,915 |
| Exhaust Temperature (°K)(5) | 426 | 426 | 426 | 426 | 426 |
| Fuel Type | Natural Gas | Natural Gas/ Fuel Oil | Natural Gas | Natural Gas | Ethylene Oxide |
| $NO_x$ Short Term Emission Rate (g/s) | 0.26 | 2.16 | 0.041 | 0.109 | |
| $NO_x$ Annual Emission Rate (g/s) | 0.26 | 2.16 | 0.041 | 0.109 | |
| $PM_{2.5}$ Short Term Emission Rate (g/s) | 0.02 | 0.19 | 0.031 | 0.008 | |
| $PM_{2.5}$ Annual Emission Rate (g/s) | 0.02 | 0.19 | 0.031 | 0.008 | |
| $PM_{10}$ Short Term Emission Rate (g/s) | 0.02 | 0.27 | 0.031 | 0.008 | |
| $SO_2$ Short Term Emission Rate (g/s) | 0.015 | 0.02 | 0.0002 | 0.0007 | |
| Ethylene Oxide (g/s) (7) | | | | | 0.00055 |

**Notes:**
(1) The stack height is based on the NYSDEC State Facility Permit.
(2) The stack diameter is based on the NYSDEC State Facility Permit.
(3) acfm = actual cubic feet per minute.
(4) The stack exhaust flow rate is based on maximum capacity of boilers.
(5) The stack exhaust temperature is based on the NYSDEC State Facility Permit.
(6) 6.66 g/s for winter season, 4.50 for the other seasons.
(7) Assuming operation hours are eight hours/day for long-term impacts.

**Source:** STV Incorporated, 2024.

# 14.7 The Future without the Proposed Actions (No-Action Condition)

## MOBILE SOURCES

CO concentrations in the 2033 No-Action condition were determined using the methodology previously described. Table 14-9**,** "Maximum Predicted 1-Hour and 8-Hour Average CO No-Action Concentrations," 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 14-9: Maximum Precited 1-Hour and 8-Hour Average CO No-Action Concentrations**

| Analysis Site | Location | 1-Hour Concentration (ppm) | 8-Hour Concentration (ppm) |
|---|---|---|---|
| 1 | Williamsbridge Road & Eastchester Road | 2.0 | 1.2 |
| 2 | East Tremont Avenue & Castle Hill Avenue | 2.8 | 1.4 |
| **Notes:**<br>1-hour standard (NAAQS) is 35 ppm, 8-hour standard (NAAQS) is nine ppm.<br>Concentration includes 8-hours background concentration 1.1 ppm, and 1-hour background concentration 1.6 ppm. | | | |

**Source:** STV Incorporated, 2024.

$PM_{10}$ concentrations in the No-Action condition were determined by using the methodology previously described. Predicted future $PM_{10}$ 24-hour concentrations, including background concentrations, at the analyzed intersections in the No-Action condition are presented in Table 14-10, "Maximum Predicted 24-Hour Average $PM_{10}$ No-Action Concentration." The values shown are the highest predicted concentrations for the receptor locations. As shown in the table, No-Action condition concentrations are predicted to be well below the $PM_{10}$ NAAQS.

**Table 14-10: Maximum Predicted 24-Hour Average $PM_{10}$ No-Action Concentrations ($\mu g/m^3$)**

| Analysis Site | Location | Concentration |
|---|---|---|
| 1 | Williamsbridge Road & Eastchester Road | 74.7 |
| 2 | East Tremont Avenue & Castle Hill Avenue | 100.2 |
| 3 | Eastchester Road & Jarret Place | 59.3 |
| **Notes:**<br>NAAQS—24-hour average 150 $\mu g/m^3$.<br>Concentration includes a background concentration of 44 $\mu g/m^3$. | | |

**Source:** STV Incorporated, 2024.

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

## STATIONARY SOURCES

In the No-Action condition, the identified 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.

# 14.8 The Future with the Proposed Actions (With-Action Condition)

## MOBILE SOURCES

### *Intersection Analysis*

CO concentrations for the 2033 With-Action condition were predicted using the methodology previously described. Table 14-11, "2033 Maximum Predicted CO With-Action Concentrations," shows the future maximum predicted 1-hour and 8-hour average CO concentrations at the study intersection. The values shown are the highest predicted concentrations. 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 14-11: 2033 Maximum Predicted CO With-Action Concentrations (ppm)**

| Analysis Site | Location | Averaging Period | No-Action | With-Action | NAAQS/*de minimis* |
|---|---|---|---|---|---|
| 1 | Williamsbridge Road & Eastchester Road | 1-Hour | 2.0 | 2.2 | 35 |
| | | 8-Hour | 1.2 | 1.3 | 9/4.0 |
| 2 | East Tremont Avenue & Castle Hill Avenue | 1-Hour | 2.8 | 3.9 | 35 |
| | | 8-Hour | 1.4 | 1.5 | 9/4.0 |

**Notes:**
Concentration includes 8-hours background concentration 1.1 ppm, and 1-hour background concentration 1.6 ppm.

**Source:** STV Incorporated, 2024.

$PM_{10}$ concentrations as a result of the Proposed Actions were determined using the methodology previously described and used in the No-Action condition. Table 14-12, "Maximum Predicted 24-Hour Average $PM_{10}$ With-Action Concentrations," presents the predicted $PM_{10}$ 24-hour concentrations at the analyzed intersections in the With-Action condition. The value shown is the highest predicted concentration for the modeled receptor locations and includes background concentration. The results demonstrate that mobile source $PM_{10}$ emissions from the Proposed Project would not result in a significant adverse air quality impact.

**Table 14-12: Maximum Predicted 24-Hour Average $PM_{10}$ With-Action Concentrations (µg/m³)**

| Analysis Site | Location | No-Action | With-Action |
|---|---|---|---|
| 1 | Williamsbridge Road & Eastchester Road | 74.7 | 87.5 |
| 2 | East Tremont Avenue & Castle Hill Avenue | 100.2 | 138.6 |
| 3 | Eastchester Road & Jarret Place | 59.3 | 71.3 |

**Notes:**
NAAQS—24-hour average 150 µg/m³.
Concentration includes a background concentration of 44 µg/m³.
**Source:** STV Incorporated, 2024.

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, "2033 Maximum Predicted 24-Hour Average $PM_{2.5}$ Incremental and Total Concentrations."

**Table 14-13: 2033 Maximum Predicted 24-Hour Average $PM_{2.5}$ Incremental and Total Concentrations (µg/m³)**

| Analysis Site | Location | No-Action | With-Action | Increment | *de minimis*/NAAQS |
|---|---|---|---|---|---|
| 1 | Williamsbridge Road & Eastchester Road | - | - | 3.2 | 8.0 |
| | | 24.4 | 27.7 | | 35 |
| 2 | East Tremont Avenue & Castle Hill Avenue | - | - | 5.8 | 8.0 |
| | | 29.1 | 34.9 | | 35 |
| 3 | Eastchester Road & Jarret Place | - | - | 2.3 | 8.0 |
| | | 22.4 | 24.7 | | 35 |

**Notes:**
$PM_{2.5}$ *de minimis* criterion—24-hour average, not to exceed more than half the difference between the background concentration (19.1 µg/m³) and the 24-hourstandard of 35 µg/m³
**Source:** STV Incorporated, 2024.

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, "2033 Maximum Predicted Annual Average $PM_{2.5}$ Incremental and Total Concentrations."

For intersections at East Tremont Avenue/ Castle Hill Avenue and Eastchester Road/ Jarret Place, the total $PM_{2.5}$ annual concentrations including the background are presented in Table 14-14, "2033 Maximum Predicted Annual Average $PM_{2.5}$ Incremental and Total Concentrations (µg/m3)." The analysis indicated that, $PM_{2.5}$ annual concentration increments at locations surrounding these two intersections exceeded the $PM_{2.5}$ annual *de minimis* criteria. Since the *de minimis* criteria is for neighborhood-scale assessment, further analysis was conducted extending analysis roadways beyond the immediacy of the intersections, to determine annual $PM_{2.5}$ concentration increments at the neighborhood-scale level. The dispersion modeling analysis generated average annual $PM_{2.5}$ concentration at each receptor for the No-Action and With-Action condition, and the neighborhood-scale concentration was determined based on the arithmetic mean value for receptors along the corridors of the analyzed roadways. The incremental annual $PM_{2.5}$ concentration was determined based on the difference between the neighborhood-scale No-Action and With-Action concentrations. The results are presented in Table 14-15, "2033 Predicted Annual Average $PM_{2.5}$ Incremental Concentrations at Extended Neighborhood-Scale(µg/m3)."

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 Project would not result in a significant adverse air quality impact.

**Table 14-14: 2033 Maximum Predicted Annual Average $PM_{2.5}$ Incremental and Total Concentrations (µg/m³)**

| Analysis Site | Location | No-Action | With-Action | Increment | *de minimis*/NAAQS |
|---|---|---|---|---|---|
| 1 | Williamsbridge Road & Eastchester Road | - | - | 0.097 | 0.1 |
| | | 7.413 | 7.510 | | 12 |
| 2 | East Tremont Avenue & Castle Hill Avenue | - | - | 0.176 | 0.1 |
| | | 7.431 | 7.607 | | 12 |
| 3 | Eastchester Road & Jarret Place | - | - | 0.170 | 0.1 |
| | | 7.255 | 7.425 | | 12 |

**Notes:**
$PM_{2.5}$ *de minimis* criterion—annual (neighborhood scale), 0.1 µg/m³.
**Source:** STV Incorporated, 2024.

**Table 14-15: 2033 Predicted Annual Average $PM_{2.5}$ Incremental Concentrations at Extended Neighborhood-Scale(µg/m³)**

| Analysis Site | No-Action | With-Action | Increment | *de minimis*/NAAQS |
|---|---|---|---|---|
| Neighborhood-Scale | 0.145 | 0.236 | 0.091 | 0.1 |

**Notes:**
$PM_{2.5}$ *de minimis* criterion—annual (neighborhood scale), 0.1 µg/m³.
**Source:** STV Incorporated, 2024.

## *Parking Analysis*

Based on the methodology previously described, the maximum predicted CO and PM concentrations from the proposed parking facilities at Projected Development Site 9 were analyzed, assuming a near side sidewalk receptor on the same side of the street as the parking facility, and a far side sidewalk receptor on the opposite side of the street from the parking facility. To be conservative, maximum concentrations from the near side receptor of this facility were added to the far side receptor on Bronxdale Avenue.

The maximum predicted eight-hour average CO concentration for the analyzed parking facilities is 1.2 ppm. This value includes a predicted concentration of 0.07 ppm from emissions within the parking garage, an on-street contribution of 0.02 ppm, and a background level of 1.1 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 are 1.03 µg/m³ and 0.068 µg/m³, respectively. The maximum predicted $PM_{2.5}$ increments are well below the respective $PM_{2.5}$ *de minimis* criteria of 8.0 µg/m³ for the 24-hour average concentration and 0.3 µg/m³ for the annual concentration. Therefore, the proposed parking garages 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.

Since Projected Development Site 9 has six towers, the six towers are assessed as separated projected development sites for HVAC analysis purposes.

Out of the 60 projected and 36 potential development sites, 44 projected and 29 potential development sites failed the screening analysis using No. 2 fuel oil as the fossil fuel source. Of the sites that failed the screening analysis for No. 2 oil, two projected and five potential development sites were found to pass the screening analysis by using natural gas as the fuel source. For the 42 projected and 24 potential development sites that also failed the screening analysis by using natural gas as the fuel source, a refined modeling analysis for the use of natural gas was performed.

### *Refined Dispersion Analysis*

As indicated above, 66 projected and potential development sites (42 projected and 24 potential development sites) required a refined modeling analysis to determine the potential for significant air quality impacts. The results of the refined modeling analysis determined the following:

- If the fuel type is restricted to natural gas only, and low $NO_x$ burners are required to address $NO_2$ emissions, no significant adverse impacts are predicted at one projected development site.
- 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 three of the sites (20 projected and 14 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, and low $NO_x$ burners are required to address $NO_2$ emissions, no significant adverse impacts are predicted at nine of the sites (18 projected and seven 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, and the height of the exhaust stack is increased 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 nine of the sites (three projected and three potential development sites).

Table 14-16 "Heating and Hot Water System Analysis Summary," presents a summary of the analysis results and proposed restrictions, with Table 14-17, "Maximum Modeled Pollutant Concentrations Project-on-Project ($\mu g/m^3$)," present the maximum predicted concentration from the heating and hot water systems of the projected and potential development sites. As shown in the tables, all predicted pollutant concentrations are less than the applicable impact criteria. Therefore, there would be no

potential for significant adverse air quality impacts from the proposed developments' heating and hot water systems.

**Table 14-16: Heating and Hot Water System Analysis Summary**

| Analysis | Projected Development Sites | | Potential Development Sites | |
|---|---|---|---|---|
| | Pass | Fail | Pass | Fail |
| #2 Oil Screening | 21 | 44 | 7 | 29 |
| Sites with requirements | Pass | Fail | Pass | Fail |
| Natural Gas Screening | 2 | 42 | 5 | 24 |
| Natural Gas Refined Analysis | 1 | 41 | 0 | 24 |
| Natural Gas and Stack Setback Requirement | 20 | - | 14 | - |
| Natural Gas, Stack Setback, and Low $NO_x$ Requirement | 18 | - | 7 | - |
| Natural Gas, Stack Setback, Stack Height and Low $NO_x$ Requirement | 3 | - | 3 | - |

**Source:** STV Incorporated, 2024.

**Table 14-17: Maximum Modeled Pollutant Concentrations Project-on-Project (µg/m³)**

| Pollutant | Averaging Period | Maximum Modeled Impact | Background | Total Concentration | Criterion |
|---|---|---|---|---|---|
| $NO_2$ | 1-hour | (1) | - | 178.9 | 188(2) |
| | Annual | 2.4 | 32.8 | 35.2 | 100(2) |
| $PM_{2.5}$ | 24-hour | 5.96 | - | - | 7.7(3) |
| | Annual | 0.26 | - | - | 0.3(3) |

**Notes:**
(1) The 1-hour $NO_2$ concentration presented represents the maximum of the total 98th percentile 1-hour $NO_2$ concentration predicted at any receptor using seasonal-hourly background concentrations.
(2) NAAQS
(3) $PM_{2.5}$ *de minimis* criteria—24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 µg/m³

**Source:** STV Incorporated, 2024.

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-750) would be mapped as part of the Proposed Actions for 44 projected and 29 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.

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

A refined analysis was performed using the AERMOD model. The 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. The analysis was performed using the general assumptions and procedures outlined earlier for individual development sites. Two clusters were identified. The maximum pollutant concentrations predicted by the AERMOD analysis are presented in Table 14-18, "Cumulative Heating and Hot Water System Analysis Maximum Pollutant Concentrations."

**Table 14-18: Cumulative Heating and Hot Water System Analysis Maximum Pollutant Concentrations (µg/m³)**

| Pollutant | Averaging Period | Maximum Modeled Impact | | Background | Total Concentration | | Criterion |
|---|---|---|---|---|---|---|---|
| | | Cluster 1 | Cluster 2 | | Cluster 1 | Cluster 2 | |
| $NO_2$ | 1-hour | (1) | (1) | - | 139.5 | 172.6 | 188(2) |
| | Annual | 0.63 | 1.25 | 32.8 | 33.5 | 34.1 | 100(2) |
| $PM_{2.5}$ | 24-hour | 5.11 | 3.97 | - | - | - | 7.7(3) |
| | Annual | 0.24 | 0.20 | - | - | - | 0.3(3) |

**Notes:**
(1) The 1-hour $NO_2$ concentration presented represents the maximum of the total 98th percentile 1-hour $NO_2$ concentration predicted at any receptor using seasonal-hourly background concentrations.
(2) NAAQS
(3) $PM_{2.5}$ *de minimis* criteria—24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 µg/m³

**Source:** STV Incorporated, 2024.

The projected and potential development sites in Cluster 1 and Cluster 2 would be assigned (E) Designation (E-750) as part of the Proposed Actions for each of these sites.

## *Industrial Sources*

### Analysis of Potential Impacts from Existing Use

As discussed above, a study was conducted to analyze industrial uses within 400 feet of the projected and potential development sites. NYCDEP online Clean Air Tracking System (CATS) database and the NYSDEC map application (DECinfo Locator) were used to identify existing sources of emissions. Two facilities were analyzed. The information from the permits (pollutant emission rates, stack parameters, etc.) were input to the AERMOD dispersion model.

Table 14-19, "Maximum Modeled Impacts on Projected and Potential Development Sites from Auto Body Shop at 1558 Stillwell Avenue," and Table 14-20, "Maximum Modeled Impacts on Projected and Potential Development Sites from Auto Paint/Spray Booth at 2511 East Tremont Avenue," present the maximum predicted pollutant concentrations at the projected and potential development sites using the AERMOD refined dispersion model. As shown in Table 14-19 and Table 14-20, the maximum predicted short-term concentration for each air toxic compound is less than the respective SGC. The maximum annual concentrations are predicted to be below the respective AGCs.

The 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 14-19: Maximum Modeled Impacts on Projected and Potential Development Sites from Auto Body Shop at 1558 Stillwell Avenue**

| Pollutant | CAS Number | AERMOD Model Short-Term Impact (µg/m³) | SGC (µg/m³) | AERMOD Model Annual Impact (µg/m³) | AGC (µg/m³) |
|---|---|---|---|---|---|
| n-butyl acetate | 123-86-4 | 2,788 | 71,300 | 14.56 | 565 |
| n-butanol | 71-36-3 | 552 | N/A | 2.88 | 1,500 |
| Xylene | 1330-20-7 | 178 | 22,000 | 0.93 | 100 |
| AH (1) | 64742-48-9 | 212 | N/A | 1.11 | 900 |
| Ethylbenzene | 100-41-4 | 56 | N/A | 0.29 | 1,000 |
| Aluminum Powder | 7429-90-5 | 279 | N/A | 1.46 | 2.4 |
| **Notes:**<br>(1) aromatic hydrocarbons (Naphtha hydrotreated heavy) | | | | | |

**Source:** STV Incorporated, 2024.

**Table 14-20: Maximum Modeled Impacts on Projected and Potential Development Sites from Auto Paint/Spray Booth at 2511 East Tremont Avenue**

| Pollutant | CAS Number | AERMOD Model Short-Term Impact (µg/m³) | SGC (µg/m³) | AERMOD Model Annual Impact (µg/m³) | AGC (µg/m³) |
|---|---|---|---|---|---|
| Acetone | 67-64-1 | 1052.9 | 180,000 | 32.5 | 30,000 |
| APD (1) | 64742-94-5 | 244.9 | N/A | 7.6 | 100 |
| Butene | 106-98-9 | 269.4 | N/A | 8.3 | 1,400 |
| Ethanol | 64-17-5 | 73.5 | N/A | 2.3 | 45,000 |
| EER (2) | 763-69-9 | 220.4 | 140 | 6.8 | 64 |
| Ethyl Benzene | 100-41-4 | 122.4 | N/A | 3.8 | 1,000 |
| Methyl Ethyl Ketone | 78-93-3 | 195.9 | 13,000 | 6.0 | 5,000 |
| N-Butyl Acetate | 123-86-4 | 391.8 | 71,300 | 12.1 | 565 |
| Stoddard Solvents | 8052-41-3 | 244.9 | N/A | 7.6 | 900 |
| Toluene | 108-88-3 | 244.9 | 37,000 | 7.6 | 5,000 |
| Notes:<br>(1) APD = Aromatic Petroleum Distillate<br>(2) EER = Ethyl 3-Ethoxypropionate | | | | | |

**Source:** STV Incorporated, 2024.

## Health Risk Assessment

Using the predicted concentrations of each pollutant, the maximum hazard index was calculated for each affected projected and potential development site associated with the Proposed Actions (none of the analyzed air toxic compounds were identified as potential carcinogens; therefore, the unit risk analysis was not performed). The hazard index approach was used to determine the effects of multiple non-carcinogenic compounds.

Table 14-21, "Estimated Maximum Hazard Index from Auto Body Shop at 1558 Stillwell Avenue," and Table 14-22, "Estimated Maximum Hazard Index from Auto Paint/Spray Booth at 2511 East Tremont Avenue," present the results of the assessment of cumulative non-carcinogenic effects on the Proposed Actions. As shown in Table 14-20 and Table 14-21, the maximum hazard index at an individual receptor location is less than 2.0, the level currently considered by NYSDEC to be significant. Therefore, based upon the cumulative air toxics analysis, the Proposed Actions would not result in a significant hazard.

**Table 14-21: Estimated Maximum Hazard Index from Auto Body Shop at 1558 Stillwell Avenue**

| Pollutant | CAS Number | AERMOD Model Annual Impact (µg/m³) | AGC (µg/m³) | AERMOD Model Annual Impact (µg/m³) Concentration to AGC Pollutant Ratio |
|---|---|---|---|---|
| n-butyl acetate | 123-86-4 | 14.56 | 565 | 0.02576 |
| n-butanol | 71-36-3 | 2.88 | 1,500 | 0.00192 |
| Xylene | 1330-20-7 | 0.93 | 100 | 0.00932 |
| AH (1) | 64742-48-9 | 1.11 | 900 | 0.00123 |
| Ethylbenzene | 100-41-4 | 0.29 | 1,000 | 0.00029 |
| Aluminum Powder | 7429-90-5 | 1.46 | 2.4 | 0.60648 |
| | | | **Total Hazard Index** | **0.64500** |
| | | | **Hazard Index Threshold Value** | **2.0** |

**Notes:**
(1) aromatic hydrocarbons (Naphtha hydrotreated heavy)

**Source:** STV Incorporated, 2024.

**Table 14-22: Estimated Maximum Hazard Index from Auto Paint/Spray Booth at 2511 East Tremont Avenue**

| Pollutant | CAS Number | AERMOD Model Annual Impact (µg/m³) | AGC (µg/m³) | AERMOD Model Annual Impact (µg/m³) Concentration to AGC Pollutant Ratio |
|---|---|---|---|---|
| Acetone | 67-64-1 | 32.5 | 30,000 | 0.00108 |
| APD (1) | 64742-94-5 | 7.6 | 100 | 0.07553 |
| Butene | 106-98-9 | 8.3 | 1,400 | 0.00593 |
| Ethanol | 64-17-5 | 2.3 | 45,000 | 0.00005 |
| EER (2) | 763-69-9 | 6.8 | 64 | 0.10621 |
| Ethyl Benzene | 100-41-4 | 3.8 | 1,000 | 0.00378 |
| Methyl Ethyl Ketone | 78-93-3 | 6.0 | 5,000 | 0.00121 |
| N-Butyl Acetate | 123-86-4 | 12.1 | 565 | 0.02139 |
| Stoddard Solvents | 8052-41-3 | 7.6 | 900 | 0.00839 |
| Toluene | 108-88-3 | 7.6 | 5,000 | 0.00151 |
| | | | **Total Hazard Index** | **0.30061** |
| | | | **Hazard Index Threshold Value** | **2.0** |

**Notes:**
(1) APD = Aromatic Petroleum Distillate
(2) EER = Ethyl 3-Ethoxypropionate

**Source:** STV Incorporated, 2024.

## *Major and Large Sources*

Potential stationary source impacts on the Proposed Project from the existing large and major sources were determined using the AERMOD model. The maximum estimated annual concentrations of $NO_2$, short-term and annual concentrations of $PM_{2.5}$, short-term concentrations of $PM_{10}$, and short-term concentrations of $SO_2$ from the modeling were added to the background concentrations to estimate total concentrations on the proposed project. Total 1-hour and annual $NO_2$ concentrations were determined following the refined the USEPA "Tier 3" approach described earlier for the heating and hot water system analysis. The results of the AERMOD analyses for the Parkchester Condominium and for the Albert Einstein College of Medicine and Jacobi Medical Center are presented in Table 14-23 and Table 14-24, respectively.

As shown in Table 14-23, "Maximum Modeled Pollutant Concentrations on the Projected and Potential Development Sites (μg/m$^3$) – Parkchester Condominium," and Table 14-24, "Maximum Modeled Pollutant Concentrations on the Projected and Potential Development Sites (μg/m$^3$) – Albert Einstein College of Medicine and Jacobi Medical Center," the predicted pollutant concentrations for all of the pollutant time averaging periods analyzed are below their respective standards. Therefore, no potential for significant adverse air quality impacts to the Proposed Project as a result of the existing large and major sources is predicted.

**Table 14-23: Maximum Modeled Pollutant Concentrations on the Projected and Potential Development Sites (μg/m$^3$) – Parkchester Condominium**

| Pollutant | Averaging Period | Maximum Modeled Impact | Background | Total Concentration | NAAQS/SGC/AGC |
|---|---|---|---|---|---|
| $NO_2$ | 1-hour | (1) | - | 114.5 | 188 |
| | Annual | (1) | - | 74.6 | 100 |
| $PM_{2.5}$ | 24-hour | 5.52 | 19.1 | 24.62 | 35 |
| | Annual | 1.61 | 7 | 8.61 | 12 |
| $PM_{10}$ | 24-hour | 7.07 | 44 | 51.07 | 150 |
| $SO_2$ | 1-hour | 36.79 | 11.19 | 47.98 | 196 |

**Notes:**
(1) The 1-hour $NO_2$ concentration presented represents the maximum of the total 98$^{th}$ percentile 1-hour $NO_2$ concentration predicted at any receptor using seasonal-hourly background concentrations.

**Source:** STV Incorporated, 2024.

**Table 14-24: Maximum Modeled Pollutant Concentrations on the Projected and Potential Development Sites (μg/m$^3$) – Albert Einstein College of Medicine and Jacobi Medical Center**

| Pollutant | Averaging Period | Maximum Modeled Impact | Background | Total Concentration | NAAQS/SGC/AGC |
|---|---|---|---|---|---|
| $NO_2$ | 1-hour | (1) | - | 126.8 | 188 |
| | Annual | (1) | - | 72.7 | 100 |
| $PM_{2.5}$ | 24-hour | 1.37 | 19.1 | 20.47 | 35 |
| | Annual | 0.35 | 7 | 7.35 | 12 |
| $PM_{10}$ | 24-hour | 3.02 | 44 | 47.02 | 150 |
| $SO_2$ | 1-hour | 0.93 | 11.19 | 12.12 | 196 |
| Ethylene Oxide | 1-hour | 0.012 | - | - | 18 |
| | Annual | 1.9E-04 | - | - | 2.0E-04 |

**Notes:**
(1) The 1-hour $NO_2$ concentration presented represents the maximum of the total 98$^{th}$ percentile 1-hour $NO_2$ concentration predicted at any receptor using seasonal-hourly background concentrations.

**Source:** STV Incorporated, 2024.

## *(E) Designation Requirements*

At affected projected and potential development sites, the proposed (E) Designation (E-750) for heating and hot water systems 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 for heating and hot water systems is resented in Appendix G.

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.