13 AIR QUALITY

13.1 Introduction

Per 2021 *CEQR Technical Manual* guidelines, an air quality analysis is conducted to assess the effect of a proposed action on ambient air quality (i.e., the quality of the surrounding air), or effects on a proposed project because of ambient air quality. Air quality can be affected by mobile sources (such as pollutants produced by motor vehicles) and by stationary sources (such as pollutants produced by fixed facilities). An air quality assessment is carried out when actions have the potential to result in either significant adverse mobile source or stationary source air quality impacts.

This section evaluates the potential for significant adverse air quality impacts that may result from the Proposed Actions. The Proposed Actions, including rezoning the property for residential use, would facilitate the development of 304 dwelling units (DUs) and up to 5,000 gross square feet (gsf) of retail on Projected Development Site 1, and up to 666 DUs and 16,229 gsf of retail on Projected Development Site 2. The Applicant is proposing that all new DUs on the Applicant-owned sites be affordable DUs. Additionally, 1.38 acres of project-generated open space would be developed along the Bronx River across Projected Developments 1 and 2.

13.2 Principal Conclusions

The Proposed Actions would not result in a significant adverse air quality impacts. The Proposed Actions would enable the development of up to four 225-foot-tall (240-foot-tall including mechanical bulkheads) buildings in the Proposed Rezoning Area. Because the Proposed Actions would facilitate four buildings of similar height, detailed air quality modeling was warranted to determine whether the HVAC systems of the proposed and potential development sites have the potential to exceed CEQR impact criteria. The Proposed Actions also warranted detailed air quality modeling of emissions from a nearby autobody that conducts spray-painting, and a detailed assessment of mobile source emissions from project-generated traffic.

Stationary Sources – HVAC

The project-generated buildings would be the tallest buildings within 400 feet of the Proposed Rezoning Area and there is no potential for project-on-existing air quality impacts. The use of electric- or steam-powered heat and hot water systems is proposed for Projected Development Site 1 and Projected Development Site 2. This commitment to electric or steam power would be specified in an E-Designation mapped at Projected Development Sites 1 and 2. Potential Development Site A may also use electric- or steam-powered heat and hot water systems; however, because Potential Development Site A is not owned by the Applicant, a detailed project-on-project air quality assessment was completed assuming natural gas-fired heat and hot water systems would be used in this building. The detailed analysis found that emissions from natural gas-powered heat and hot water systems at Potential Development Site A would not have the potential to result in significant adverse impacts. An E-Designation would require the emissions stack to be placed at the highest tier. With the proposed E-Designations in place, there is no potential for significant adverse air quality impacts from project-generated HVAC and hot water systems.

Stationary Sources – Large/Major Sources and Industrial Sources

There are no registered industrial sources within 400 feet, or large/major sources within 1,000 feet, of the development sites. However, on Block 3017 Lot 28 which abuts Projected Development Site 2 to the south, an unregistered autobody spray-painting facility (HMT Auto Repair) was identified that warranted detailed modeling of industrial emissions. The facility exhausts to the rear of the building, at a height approximately 5 feet above street level and at least 32 feet from Projected Development Site 2. Detailed modeling of this facility indicated that its emissions would not result in concentrations of air pollutants above CEQR impact criteria at the façades of the project-generated buildings.

Mobile Sources – Roadway and Parking Garage

The Proposed Actions would not generate 170 or more incremental passenger car equivalent trips during any peak hour at any intersection, and therefore do not warrant an analysis of CO emissions. The Proposed Actions warranted analysis for the pollutants particulate matter $(PM)_{2.5}$ and PM_{10} because more than 12 heavy-duty diesel vehicle (HDDV)-equivalents would be generated along Edgewater Road, a local street that experiences fewer than 5,000 daily traffic trips.

Emissions from vehicular traffic are a function of vehicle composition (trucks, passenger cars, buses, etc.), delay times, and volumes. As described in Chapter 12, “Transportation,” in the With-Action – absent any mitigation measures – an increase in traffic volumes would result in increased traffic delays at nearby intersections.

A CEQR Tier I mobile source analysis assumes that the emissions generated by the traffic volumes and delays during the worst-case peak hour – the AM peak hour for this project – would be emitted over 24-hour and annual periods. The Tier I analysis completed in AERMOD was unable to rule out the potential for the Proposed Actions to result in significant adverse air quality impacts from project-generated $PM_{2.5}$ and PM_{10} emissions, and refined analysis was warranted.

A refined Tier I analysis was conducted for 24-hour $PM_{2.5}$, annual $PM_{2.5}$, and 24-hour PM_{10}. This refined analysis applied emission factors specific to each peak hour traffic period [i.e., AM, midday (MD), PM, overnight (ON), and Saturday (SAT)] to its respective peak hour traffic volume. The peak-hour traffic emission factors were broken down into the following periods:

- 05:00-10:00 – AM
- 10:00-15:00 (3:00PM) – MD
- 15:00-21:00 (9:00PM)– PM
- 21:00-05:00 – ON

The refined Tier I analysis found that concentrations of $PM_{2.5}$ and PM_{10} would not exceed the National Ambient Air Quality Standards (NAAQS) or *de minimis* thresholds; therefore, the Proposed Actions would not result in significant adverse air quality impacts from mobile sources.

13.3 Methodology

This air quality analysis follows the guidelines set forth in the *CEQR Technical Manual*. The analysis generally considers the likely project-generated emissions, and whether these emissions would exceed CEQR impact criteria. The analysis also considers whether emissions from existing industrial or large/major source facilities would result in concentrations of air pollutants that would exceed the thresholds of the NAAQS for criteria pollutants and NYS DAR-1 guideline thresholds for non-criteria (air toxics) pollutants.

Stationary Sources

Projects may result in stationary air quality impacts if they: create new stationary sources of pollutants such as the emissions stacks from industrial plants, hospitals or large institutions; create new uses near existing or planned emissions stacks; or introduce structures near emissions stacks that changes the dispersion of emissions and may affect surrounding uses. Projects that could result in potentially significant adverse stationary source impacts include:

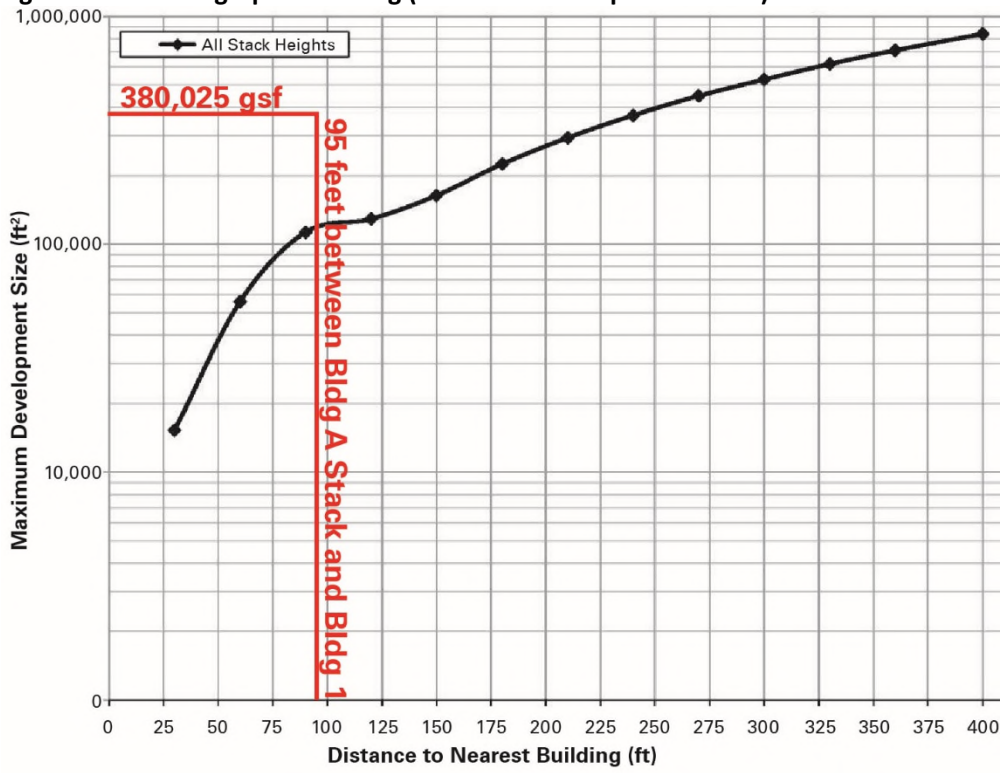
- Projects that would use fossil fuels;
- Projects that would create major or large emission sources such as solid/medical waste incinerators, asphalt and concrete plants, or power generating plants;
- Projects that would result in new uses such as a school, hospital, park or residences near a large or major emissions source;
- Projects that would include medical, chemical, or research labs;
- Projects that would result in new uses being located near medical, chemical or research labs;
- Projects that would include the operation of manufacturing or processing facilities;
- Projects that would result in new uses sensitive to air quality conditions (“receptors”), especially schools, hospitals, parks or residences, within 400 feet of manufacturing or processing facilities;

- Projects that would result in potentially significant odors;
- Projects that would result in new uses near odor-producing facilities;
- Projects that would create "non-point" sources, such as unpaved surfaces and storage piles that could result in fugitive dust; or
- Projects that would result in new uses near non-point sources.

The Proposed Actions would facilitate four buildings across the three development sites, all of which would be 240 feet tall (225 feet plus 15-foot-tall mechanical bulkheads). The four buildings would be the tallest buildings within the Study Area, and would not have the potential to result in project-on-existing impacts. The Applicant intends to use electric- or steam-powered heat and hot water systems for Projected Development Sites 1 and 2. The intention to use electric- or steam-powered heat and hot water systems would be memorialized in an E-Designation mapped on the development sites.

The Applicant does not own Potential Development Site A, and the heating and hot water systems were conservatively assumed to be powered by natural gas for this building. At its closest point, the tower component of Building A (on Potential Development Site A) would be 85 feet from the façade of Building 1, and 135 feet from Building 2. Per Building Code, heating and hot water emissions stacks must be placed at least 10 feet from the roof's edge. When accounting for this setback, the stack on Potential Development Site A would 95 feet from Building A – the nearest sensitive receptor – at its closest point. Figure 13-1 shows emissions form Potential Development Site A would fail the nomograph screening; therefore, a detailed air quality analysis of project-generated stationary sources from this site was warranted.

Figure 13-1: Nomograph Screening (Potential Development Site A)



Detailed Analysis

As described above, the Applicant is proposing to use electric- or steam-powered heat and hot water systems for Projected Development Sites 1 and 2, a commitment that would be memorialized through an E-Designation. Therefore, detailed stationary analysis was warranted only for project-generated emissions associated with the natural gas-powered heat and hot water systems in Building A on Potential Development Site A.

Per CEQR guidance, analyses were conducted assuming stack tip downwash, urban dispersion surface roughness length, elimination of calms, with and without the downwash effect. Receptors were modeled along the facades of Building 1 of Projected Development Site 1, and Building 2 and Building 3 of Projected Development Site 2, and Potential Development Site A at 10-foot increments vertically and 25-foot increments horizontally. The maximum resulting concentrations reported by the AERMOD modeling program were compared to CEQR *de minimis* criteria. These resulting concentrations were then added to background concentrations to obtain the projected worst-case cumulative pollutant levels at the proposed receptors and compared to the National Ambient Air Quality Standards (NAAQS).

Pollutants of Concern

The primary pollutants of concern for natural gas-fired heat and hot water systems are particulate matter with diameters less than 2.5 microns ($PM_{2.5}$) and nitrogen dioxide (NO_2).

Emission Data and Stack Parameters

As described above, emission rates were calculated using U.S. Department of Energy fuel consumption rates and EPA AP-42 emission factors. The following stack parameters were used per the New York City Department of Environmental Protection (NYCDEP) Boiler Database Review provided by Department of City Planning via email on March 14, 2023:

- Estimated Boiler Capacity: 7 million British Thermal Units per hour (MMBTU/hr)
- Exhaust velocity at all loads: 6.9 meter/sec
- Inner stack diameter: 0.46 meters
- Stack exhaust temperature: 426 °K
- Stack height: 3 feet above mechanical bulkhead level, which was assumed to be 10 feet above the roof

Emissions of NO_2 and $PM_{2.5}$ were estimated based on the data in Table 13-1 and Table 13-2.

Table 13-1: Estimated Annual Gas Consumption for Projected Development Site A

Development Site (Building)	Floor Area (gsf)	Natural Gas Consumption 1,000 BTU/gsf	Annual Consumption BTU/yr	Annual Consumption Scf/yr[2]	Annual Consumption MMSCF/yr
A (A)	352,915	49.1	17,328,126,500	16,988,359	16.99

1. Natural Gas Consumption from U.S. Energy Information Administration Table CE1.2 Summary annual household site consumption and expenditures in the Northeast - totals and intensities, 2015 for "Apartments in buildings with 5 or more units"
2. Conversion from BTU/yr to SCF/yr assumes a natural gas heating value of 1,020 BTU/SCF

Table 13-2: Estimated Emission Rates for Projected Development Site A

Pollutant	Emission Factor	Units	Source	Potential Emissions lb/yr	Potential Emissions g/s
NOx	100	lb/MMSCF	U.S EPA AP-42 Table 1.4-1	1,698.84	0.089
PM_{10}	7.6	lb/MMSCF	U.S EPA AP-42 Table 1.4-2	96.83	0.005
$PM_{2.5}$	7.6	lb/MMSCF	U.S EPA AP-42 Table 1.4-2	96.83	0.005

Air Dispersion Modeling Methodology

The latest version of EPA's AERMOD dispersion model (version 21112) was used for this analysis. Per CEQR guidance, analyses were conducted assuming stack tip downwash, urban dispersion surface roughness length, elimination of calms, with and without the downwash effect. AERMOD's Building Profile Input Program (BPIP) algorithm was used to account for downwash effect. Both with- and without-downwash results are reported.

Background Concentrations

The background concentrations used in the air quality analysis are based on concentrations recorded at a monitoring station representative of the county or from the nearest available monitoring station and in the statistical format of the NAAQS, as provided in the *CEQR Technical Manual*. For this project, the nearest monitoring station is IS-52 and IS-74 in the Bronx. IS-52 provides representative background concentrations for NO_2 and IS-74 provides representative background concentrations for $PM_{2.5}$. The background concentrations used are shown in Table 13-3.

Table 13-3: Background Concentrations Recorded at IS-52 and IS-74, The Bronx

Pollutant	Averaging Period	Calculation Method	Background Level (µg/m³)	NAAQS (µg/m³)
$PM_{2.5}$	24-hour	3-year average of 98th percentile for 2019, 2020 and 2021	18.9	35
	Annual	3-year average of annual mean for 2019, 2020 and 2021	6.7	12
NO_2	1-hour	3-year average of 98th percentile for 2019, 2020 and 2021	77.46	188
	Annual	3-year average of annual mean for 2019, 2020 and 2021	28.59	100

Source: *Ambient Air Quality Report 2021* published by DEC.

Methods to Estimate NO_2 Concentrations

AERMOD can produce detailed output data that can be analyzed at the hourly level required for the form of the one-hour standards. EPA has also developed guidance to estimate the NO_2/NO_x conversion ratio, applicable to heating and hot water systems, as discussed further below. The one-hour NO_2 concentration associated with the project's emissions were estimated using AERMOD model's Tier 2 option. The default ARM2 ratios of 0.5 for minimum NO_2/NO_X and 0.9 for maximum NO_2/NO_X were used.

Meteorological Data

All analyses were conducted using the latest five consecutive years of (2017-2021) pre-processed AERMOD ready met data provided by DEC. Surface data was obtained from LaGuardia Airport, and upper air data was obtained from Brookhaven station, New York.

These meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevations over the 5-year period.

Stack Locations

Stacks representing HVAC equipment were conservatively placed on each of the two towers, as the locations shown in Figure 13-2.

Figure 13-2: Projected Development Site A HVAC Stack Locations



+ HVAC Stack

Receptors Considered

Discrete receptors (i.e., locations where concentrations are calculated) were modeled along the façade of each building to represent potentially sensitive locations such as operable windows and intake vents. Rows of receptors were spaced in approximately 25-foot horizontal intervals, and at 10-foot vertical intervals.

Industrial Source Analysis

Projects may result in industrial source air quality impacts if the project would result in the development of significant industrial emissions sources or new uses within 400 feet of existing industrial emissions sources. These emissions sources require as assessment of both criteria and non-criteria pollutant emissions. Projects that discharge malodorous

pollutants may also result in significant impacts. The Proposed Actions would not introduce a new industrial air emissions source.

A review of the New York City Department of Environmental Protection (DEP) Clean Air Tracking System (CATS) database is necessary to identify potential industrial source emissions within 400 feet of a project-generated receptor. The CATS database review is supplemented with a site visit to identify industrial sites that may operate without an emissions permit.

A review of existing permits within 400 feet of the development sites did not identify any industrial facilities within 400 feet of the development sites that warrant detailed analysis. Permits issued to sites within 400 feet of the development sites are shown in Table 13-4. Per the *CEQR Technical Manual*, air quality impact analysis is not warranted for emissions from permitted boilers and engines/generators that are not major or large sources. As such, no further analysis is performed for the sources associated with the above permits presented in Table 13-4.

However, site reconnaissance identified an autobody repair shop, HMT Auto Repair that conducts spray-painting at 1476 Sheridan Boulevard (Block 3017 Lot 28), which abuts Projected Development Site 2 to the south.

Table 13-4: Clean Air Tracking System (CATS) Search

BI	Lot	Address	Application	Type	Exp. Date
3007	8	1434 Longfellow Ave	PR009420	Engine/Generator	3/5/2023
3008	1	1001 Jennings St	CB288201	Boiler	12/24/2022

A site visit conducted on 23 November 2021 confirmed this facility undertakes automotive-related spray painting. A representative at the facility noted the autobody shop largely does “touch ups,” and that the shop will paint a full car approximately twice per month. The facility is ventilated by an exhaust located at the rear of the building, approximately 5 feet above the shop’s floor level. The exhaust is located approximately 32 feet from the proposed eastern façade of the Building 3 on Projected Development Site 2, as shown in Figure 13-3 and Photograph 13-1. The proximity of the unregistered spray-painting booth to the Rezoning Area warrants further analysis.

Figure 13-3: Location of Exhaust from Unregistered Industrial Facility



Source: Zoning and Land Use Map (ZoLa) maintained by DCP.

Photograph 13-1: Exhaust Location at HMT Auto Repair



The unregistered facility has not been issued CATS permits. In the absence of permits, the pollutants of concern emitted and their emission rates are unreported. To estimate the pollutant toxicities and quantities emitted, the analysis in this Environmental Impact Statement (EIS) relies on other completed environmental reviews in New York City that analyzed unregistered facilities similar to that identified within 400 feet of the Proposed Rezoning Area. The emissions and emissions rates were then modeled in the latest version of EPA's AERMOD dispersion model (version 21112). Per CEQR guidance, analyses were conducted assuming stack tip downwash, urban dispersion surface roughness length, elimination of calms, with and without the downwash effect. Receptors were modeled in the location of Building 3 – the building that would be closest to the industrial emissions source – at 10-foot vertical increments and 25-foot horizontal increments. The maximum resulting concentrations projected by the AERMOD modeling program were reported. These resulting concentrations were then added to background concentrations to obtain the projected worst-case cumulative pollutant levels at the proposed receptors. The pollutant levels were then compared to CEQR *de minimis* criteria and the National Ambient Air Quality Standards (NAAQS) to determine if mitigation is required.

Pollutants of Concern

Toxic Air Pollutants

Two factors are critical in estimating the potential impacts of the air emissions – pollutant toxicities and quantities emitted. Emissions from the equipment and operations at 1476 Sheridan Boulevard were estimated based on a representative facility identified in the *139-01 Northern Boulevard Environmental Assessment Statement* (CEQR No. 07DCP029Q – aka the "Solow Report"), which was also used in the *1220 Avenue P Rezoning EAS* (CEQR No. 19DCP109K).

Table 13-5 identifies the 12 pollutants included in the analysis. While no federal standards have been promulgated for toxic air pollutants, the Division of Air Recourses (DAR) at NYSDEC has issued guidance (DAR-1) that outlines the procedure for evaluating the emissions of the criteria and non-criteria (toxic) pollutants from process operations in New York State. DAR-1 establishes acceptable ambient levels for these pollutants based on human exposure criteria.

Table 13-5: Typical Composition of VOC Emissions from Auto Spray Paint Booths

		Rust-Oleum	Sherwin William Paints		Composition Used
		Primer	Twilight Blue	Black Sunfire	in This Analysis
Chemical Name	CAS #	Weight % Less Than	% by Weight		
1,2,4-Trimethylbenzene	95-63-6				
Acetone*	67-64-1	10	42	43	43
Naphtha Light Aliphatic	64742-89-8	10			10
Naphtha Heavy Aromatic	64742-94-5	5			5
Ethanol	64-17-5		1	2	2
Ethyl 3-Ethoxyproprioante	763-69-9		9	9	9
Ethylbenzene	100-41-4	5			5
Methyl Ethyl Ketone	78-93-3		8	7	8
Butyl Acetate	123-86-4	5			5
Stoddard Solvents	8052-41-3	10			10
Toluene	108-88-3	10	9	8	10
Xylene	1330-20-7	10			10

To evaluate short-term and annual impacts of toxic air pollutants, DAR-1 has established short-term guideline concentrations (SGCs) and annual guideline concentrations (AGCs) for exposure limits. These are maximum allowable 1-hour and annual guideline concentrations, respectively, that are considered acceptable concentrations below which there should be no adverse health effects. The latest DAR-1 was published in February 2021 and some of the chemicals listed in Table 13-5 have been removed. The SGCs and AGCs associated with the chemicals have been updated. This assessment is based on the latest version of the DAR-1.

Based on SGCs and AGCs, NYSDEC has developed methodologies that can be used to estimate the potential impacts of air toxic pollutants from single or multiple emission sources. If the concentration of any pollutant exceeds its applicable guideline value (either SGC or AGC), a more detailed analysis would be required. Otherwise, no further analysis is warranted. In this analysis, the results with each pollutant's respective SGC and AGC were compared to determine whether the emissions generated from the industrial source has any potential to result in significant adverse air quality impacts at the project-generated receptors.

To identify the health risk from inhaling air contaminants, the numerical risk or calculated risk must be determined. Risks that are calculated after air pollution control is applied are known as residual risk. The goal for the acceptable residual risk demonstration is to have the ambient air concentrations for all the air contaminants emitted from the process emission source be less than their respective AGC/SGCs. Residual risk can be expressed as the excess cancer risk, defined as a one-in-a-million chance, for people exposed to a carcinogen or as the hazard index (HI) for people exposed to non-carcinogens. For a cumulative annual cancer risk assessment, the cancer risk predicted for each individual air contaminant is added up to estimate the cumulative risk. This screening-level assessment for carcinogens is based on the individual contaminants in the mixture being additive. For a non-cancer health risk assessment, exposure lasting months, years, or a lifetime is established on an emission source or emission point basis. The risk is characterized as the sum of hazard quotients (HQ) of all non-carcinogenic air pollutants.

The acceptable residual risk management range for process emission source's and/or emission point's must be less than 10-in-a-million cancer risk for those non-criteria air contaminants identified as carcinogens or less than a HI of 2 for non-carcinogen non-criteria air contaminants. In the case where an air contaminant has both carcinogenic and noncarcinogenic health effects, the air contaminant was evaluated for the potential carcinogenic risk only, as the published AGC is typically based on cancer risk.

Criteria Air Pollutants

The current edition (February 2021) of the DAR-1 separates criteria pollutants (i.e., pollutants for which national ambient air quality standards (NAAQS) have been established) specifically, particulate matter smaller than 2.5 microns ($PM_{2.5}$) and nitrogen dioxide (NO2), from the list of toxic pollutants, even though criteria pollutants are also toxic based on health implications. This edition no longer includes short-term (1-hour SGC) and annual (AGC) guideline values for $PM_{2.5}$ or NO2, because exposure guidelines are established in the NAAQS. As per the DAR-1 guidance, federal standards for PM2.5 and NO_2 are not considered SGC or AGC, and are only included in the DAR-1 to facilitate screening or regulatory analysis. Following this revision of DAR-1 and guidance, the cumulative short-term and annual $PM_{2.5}$ emission concentrations from all evaluated emission points were compared to the 24-hour NAAQS of 35 ug/m^3 and the annual NAAQS of 12 ug/m^3.

Emission Data

As mentioned above, emission rates for toxic air pollutants and criteria pollutants were estimated based on a representative facility in the *139-01 Northern Boulevard Environmental Assessment Statement* (CEQR No. 07DCP029Q – the "Solow Report") and the *1220 Avenue P Rezoning* (CEQR No. 19DCP109K). The HMT Auto Repair facility has the potential to emit toxic air pollutants and $PM_{2.5}$ from the spray-painting activities. Therefore, this assessment evaluated the potential impacts of toxic air pollutants and $PM_{2.5}$.

Based on the *Solow Report* and the *1220 Avenue P Rezoning EAS*, the following assumptions are used to determine pollutant emission rates per DCP recommendations.

- Autobody paint spray booths typically operate from four to eight hours per day and 200 to 250 days per year. Four hours per day was used as a conservative assumption for predicting short-term (one-hour average) emission rate.
- Auto paint composition includes solids and volatile organic compounds (VOCs). A gallon of auto paint could weigh from 6 to 15 pounds (lbs), depending on the ingredients. In this assessment, a 10-lb average weight was used.
- Table 13-6 shows the percentages by weight of various VOCs (mostly solvents) found in representative auto spray primers and paints. The percentages were obtained from Material Safety Data Sheets (MSDS) for one representative primer and two representative auto paints by major manufacturers. Some compounds are found in both primer and paint, while others are found only in one or the other. Acetone accounts for the largest percentage of the emissions (up to 43%), while the remaining compounds account for 1 to 11 percent of the paints and primers. As a conservative measure, the highest percentage shown for the VOC in Table 13-7 was used resulting in highest potential emissions of individual pollutants presented in Table 13-6.

- In estimating PM emission rate, it is assumed that the paint booth would use an average of two quarts of auto paint per day, or 0.50 gallons (see Solow Report). Each gallon of paint weighs 10 lbs with 50 percent of solids. Thus, this paint booth consumes 2.5 lbs of solids daily (0.5 x 10 x 0.5). The amount of solids (i.e., $PM_{2.5}$) emitted into the air depends on the transfer efficiency of the paint gun. EPA's AP-42, Section 4.2.2.8, discusses evaporation losses for automobile and light duty truck surface coating operations. Per AP-42, the average transfer efficiency of solvent borne spray is 40 percent, which means that 60 percent are likely emitted into the air. Although current technology may achieve a higher transfer efficiency of 80 percent or more with the use of high-pressure paint guns, the value of 40 percent transfer efficiency was used for this analysis as a conservative assumption. Therefore, 60 percent of solids, or 1.5 lbs per day, are emitted into the air (0.6 x 2.5). Per AP-42, Appendix B.1, 46.7 percent of total solids were assumed to be PM_{10}, and 28.6 percent of total solids were assumed as $PM_{2.5}$.

Table 13-6: Toxic Air Pollutant Emission Rates

		Emission Rates		DAR-1	DAR-1
CAS Number	Pollutant Name	Hourly g/sec	Annual g/sec	SGC ug/m³	AGC ug/m³
67-64-1	Acetone	4.20E-02	4.02E-05	180,000	30,000
64742-89-8	Naphtha Light Aliphatic	9.77E-03	9.35E-06	-	3,200
64742-94-5	Naphtha Heavy Aromatic	4.88E-03	4.67E-06	-	100
64-17-5	Ethanol	1.07E-02	1.03E-05	-	45,000
763-69-9	Ethyl 3-Ethoxyproprioanate	1.95E-03	1.87E-06	140	64
100-41-4	Ethylbenzene	8.97E-03	8.41E-06	-	1,000
78-93-3	Methyl Ethyl Ketone	4.88E-03	4.67E-06	13,000	5,000
123-86-4	Butyl Acetate	4.88E-03	4.67E-06	71,300	565
8052-41-3	Stoddard Solvents	7.81E-03	7.48E-06	-	900
108-88-3	Toluene	9.77E-03	9.35E-06	37,000	5,000
1330-20-7	Xylenes	1.07E-02	1.03E-05	22,000	100

Source: *1220 Avenue P Rezoning EAS* Estimated Emission Rates

Table 13-7: Criteria Pollutant Emission Rates

		Emission Rate		*CEQR de minimis*		NAAQS		
CAS Number	Pollutant Name	Hourly g/sec	Annual g/sec	24-hr ug/m³	Annual ug/m³	1-hr ug/m³	24-hr ug/m³	Annual ug/m³
NY075-00-5	PM_{10}	2.88E-04	2.67E-05	-	-	-	150	-
NY075-02-5	$PM_{2.5}$	4.71E-04	4.37E-05	8.05	0.3	-	35	12

Source: *1220 Avenue P Rezoning EAS* Estimated Emission Rates

Air Dispersion Modeling Methodology

As a first step in toxic air pollutant analysis, the *CEQR Technical Manual* recommends conducting a screening analysis using the pre-tabulated values from Table 17-3 of the *CEQR Technical Manual*, which are based on a generic emission rate of 1 gram per second. If the corresponding results show an exceedance of either the AGC or SGC, further analysis

is warranted using EPA AERMOD. Based on the preliminary screening assuming a distance of approximately 30 feet, the estimated concentration of Ethyl 3-Ethoxyproprioanate does not screen out and further analysis is warranted.

AERMOD modeling was based on a generic rate of 1 gram per second and predicted 1-hour and annual concentrations associated with an emission rate of 1 g/sec were multiplied by the actual emission rate of each toxic pollutant to arrive at the actual 1-hour and annual pollutant concentrations.

Background Concentrations

The background concentrations used in the air quality analysis are based on concentrations recorded at a monitoring station representative of the county or from the nearest available monitoring station and in the statistical format of the NAAQS, as provided in the *CEQR Technical Manual*. For this project, the nearest monitoring station is 74 in the Bronx. This station provides representative background concentrations for $PM_{2.5}$. The background concentrations used are shown in Table 13-8.

Table 13-8: Background Concentrations (µg/m³) Recorded at IS 74, The Bronx

Pollutant	Averaging Period	Calculation Method	Background Level (µg/m³)	NAAQS (µg/m³)
$PM_{2.5}$	24-hour	3-year average of 98th percentile for 2019, 2020 and 2021	18.9	35
	Annual	3-year average of annual mean for 2019, 2020 and 2021	6.7	12

Meteorological Data

All analyses were conducted using the latest five consecutive years of (2017-2021) pre-processed AERMOD ready met data provided by DEC. Surface data was obtained from LaGuardia Airport, and upper air data was obtained from Brookhaven station, New York. These meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevations over the 5-year period.

Stack Locations

The exhaust location at 1476 Sheridan Boulevard was modeled at a location approximately 5 feet above street level at the rear façade of the building to match existing conditions (see Photograph 1). Coordinates were approximated using Google Earth. The exhaust is approximately 32 feet from the proposed location of Building 3 on Projected Development Site 2 (see Figure 13-3).

Receptors Considered

The receptor network consisted of receptors located at spaced intervals along the sides of the Buildings 2 and 3 on Projected Development Site 2 from the ground floor to the upper level, and pedestrian-height receptors representing sidewalks. Receptors were placed in 25-foot increments horizontally and 10-foot increments vertically, up to the bulkhead of the building.

Large/Major Sources

Major sources are defined as facilities that have a Title V air permits and large sources are defined as facilities that require air quality State Facility Permits. For projects that would not introduce these facilities, the *CEQR Technical Manual* recommends a study area radius of 1,000 feet around project-generated receptors. No large or major sources are within 1,000 feet of the Proposed Rezoning Area, and therefore no further analysis is warranted of large or major sources.

Mobile Source Analysis

Projects may result in significant mobile source air quality impacts when they increase or cause a redistribution of traffic. Projects can also increase mobile source air quality impacts when they add additional mobile source pollutants such as diesel trains, helicopters, or boats, or add new sensitive uses near significant mobile sources such as roadways, garages or parking lots. Projects that could have significant mobile source air quality impacts could include:

- Projects that place operable windows near large roadways;
- Projects that create a fully or partially covered roadway;
- Projects that would generate 170 or more peak hour incremental auto traffic trips at a single intersection;
- Projects that would generate 12 or more peak hour heavy duty diesel vehicle (HDDV) equivalent traffic trips on a paved local street that experiences fewer than 5,000 daily traffic trips;
- Projects that would result in new sensitive uses such as a school, hospital, park or residence adjacent to large parking garages or parking facility exhaust vents;
- Projects that result in parking facilities and require a special permit from the City Planning Commission (CPC); or
- Projects that would result in a sizable number of other mobile sources of pollution such as a heliport, new railroad terminal, or trucking.

The Proposed Actions would not generate 170 or more incremental trips at an intersection during peak hours, and roadway assessment for CO was not warranted. Intersection assessment was warranted for PM because the Proposed Actions would generate more than 12 HDDV equivalent traffic trips on Edgewater Road, which is a paved local street with fewer than 5,000 average daily traffic trips. The Proposed Actions would also introduce a 100-space parking facility; therefore, a parking facility mobile source analysis was warranted.

For the mobile source assessment, vehicular PM engine emission factors were computed using the EPA Motor Vehicle Emission Simulator, or MOVES (version "MOVES3.0"). This emissions simulator calculates engine emission factors for various vehicle types, based on the fuel type, meteorological conditions, vehicle speeds, vehicle age, roadway types, and various other factors that influence emissions. The inputs and use of MOVES incorporate the most current guidance available from the New York State Department of Environmental Conservation (NYSDEC) and the Environmental Protection Agency (EPA). This approach follows EPA's guidance to define vehicle "operating mode distributions" on project-level analysis.

Traffic data for the air quality analysis was derived from projected No-Action and With-Action traffic volumes and composition as specified in Chapter 12, "Transportation." The intersection analyses for $PM_{2.5}$ and PM_{10} used the No-Action and With-Action traffic volumes.

A conservative tiered approach was used to assess mobile source emissions. For each tiered analysis, the resulting pollutant levels at the receptors were added to background concentrations to obtain the projected cumulative pollutant levels. The resulting pollutant levels were compared to CEQR *de minimis* and NAAQS impact thresholds. Background pollutant concentrations were obtained from the nearest monitoring station provided in the *New York State Ambient Air Quality Report for 2020* published by the NYSDEC.[1]

Refined Analysis ($PM_{2.5}$ Annual and PM_{10} 24-hour)

A refined analysis was completed for annual emissions of $PM_{2.5}$ and 24-hour emissions of PM_{10}, which applied emission factors specific to each peak traffic period (AM, MD, PM, ON, and SAT) to its respective peak hour traffic volume. The Saturday peak-hour emission factors were conservatively assumed for the weekend (i.e., Saturday and Sunday). Emission rates were calculated using MOVES for each of the five peak periods. These emission rates were applied across the respective time ranges or "periods" in the air quality dispersion model (e.g., the AM emission rate was applied to hours 05:00 through 10:00) by using variable emission rate tables as discussed in the section below.

Refined Analysis ($PM_{2.5}$ 24-hour)

A refined analysis was also completed for 24-hour emissions of $PM_{2.5}$, which applied peak hour traffic volume emission factors from the peak periods listed above (AM, MD, PM, ON, and SAT) to 24-hour traffic volumes for weekdays, Saturday, and Sunday. For example, the emission factor calculated for the AM peak hour (hour 07:00-08:00) was applied to each hourly traffic count in the corresponding period (i.e., the AM peak hour emission factor was applied to hours 05:00 to 10:00, the PM peak hour emission factor was applied to hours 15:00 to 21:00, etc.). The Saturday peak-hour emission factor was conservatively applied to 24-hour traffic volumes for Sunday.

Table 13-9 below provides a visual representation of the 24-hour emission factor used for each analysis.

Table 13-9: Analyses Peak Hour Emission Factors by 24-Hour Time Period

Day	Traffic Volumes Analyzed Across 24 Hrs	Peak Hour Emission Factor by 24-Hour Time Period																							
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Refined $PM_{2.5}$ Annual and PM_{10} 24-hr																										
Weekdays	AM/MD/PM/ON Peak Hrs	ON					AM					MD					PM						ON			
Weekend	SAT Peak Hour	SAT																								
Refined $PM_{2.5}$ 24-hr																										
Weekdays	Hourly Volumes	ON					AM					MD					PM						ON			
Saturday	Hourly Volumes	SAT																								
Sunday	Hourly Volumes	SAT																								

MD: Midday; ON: Overnight; SAT: Saturday

[1] New York State Ambient Air Quality Report for 2020, last accessed 17 November 2022. https://www.dec.ny.gov/docs/air_pdf/2020airqualreport.pdf

Based on the latest EPA *Guideline on Air Quality Models* (i.e., Appendix W Final Rule), AERMOD was used for the roadway air dispersion modeling analysis to predict ambient concentrations of $PM_{2.5}$ and PM_{10} at nearby sensitive receptors. The modeling assumptions shown in Table 13-10 were used.

Table 13-10: AERMOD Air Quality Dispersion Modeling Assumptions

Data Type	Input Value	Notes
Pollutant	$PM_{2.5}$ (24-hr, Annual); PM_{10} (24-hr)	--
Source	LINE	The intersection of Edgewater Road and Sheridan Boulevard at Jennings Street and intersection of Edgewater Road and Sheridan Boulevard at E 172nd Street are modeled as line sources.
Width of Source	3.3 m	(per lane)
Initial Vertical Dimension	2.6 m (LDV); 6.8 m (HDV)	The combined initial vertical dimension are estimated using an emissions-weighted average (i.e., average of LDV and HDV contribution). Weighted averages were calculated using vehicle population percentages.
Initial Vertical Dispersion Coefficient	1.2 m (LDV); 3.2 m (HDV)	Initial vertical dimension divided by 2.15.
Release Height	1.3 m (LDV); 3.4 m (HDV)	Initial vertical dimension multiplied by 0.5.
Emission Rate	MOVES-based emission rates (g/s)	Emission factors from AP-42 are used for road dust.
Urban/Rural	Urban	--
Receptors	25-ft intervals along roads	One row of receptors around the project following the boundaries of the project area at the nearest parallel sidewalk (i.e., roads/intersections).
	1.8 m flagpole height	Multiple flagpole heights from the construction analysis are used for nearby multi-story buildings.
Met Data	Most recent 5 years (2017-2021)	LaGuardia Airport / Brookhaven

Emission rates calculated using MOVES were converted from grams per hour to grams per second (g/s), and then input into each link in AERMOD. To differentiate the hourly emission factors throughout the 24-hour periods during weekdays and weekends for the refined analyses, variable emission rates were used in AERMOD.

Variable emission rates were calculated using the AM peak hour as the "baseline" and was applied to determine the ratio for all other hourly emission factors. The AM peak-hour emission rates were input for each corresponding link and the variable emissions table reflected the AM peak hour as a 1.0 ratio for hour 07:00-08:00 – the worst-case peak hour for this project. All other hourly variable emission rates were calculated by dividing the specific hourly emission rate by the AM peak-hour emission rate. For example, if the emission rate for hour 16:00-17:00 was 5 g/s and the emission rate for the AM peak hour was 10 g/s, the variable emission rate for hour 16:00-17:00 would be 0.5. Each line source in AERMOD was grouped by link and a variable emission rate table was generated for each link.

Study Areas

The first step to perform an air quality analysis is to determine the appropriate study area. For this project, a 400-foot study area around the development sites was established for the industrial source preliminary screenings. For large or major sources, a study area of 1,000 feet around the Development Site was established.

For the mobile source analysis, the intersections of Edgewater Road and Sheridan Boulevard at Jennings Street and at 172nd Street were selected as a representative worst-case for project-generated mobile emissions. These intersections were selected because:

- Edgewater Road is classified by the New York State Department of Transportation as a local street, and would be expected to have slower moving traffic (and therefore greater emissions);
- Both the No-Action and With-Action conditions are projected to generate significant delays on Edgewater Road, causing PM_{10} and $PM_{2.5}$ emissions from idling cars;
- These intersections are partially within the Proposed Rezoning Area, where new residential uses would be developed; and
- The proximity to the proposed parking facility.

13.4 Assessment

Stationary Sources

Results

The AERMOD results in Table 13-11 show the worst-case concentrations at the Project Site.

Table 13-11: Air Quality Dispersion Modeling Results

Pollutant	Downwash	Averaging Period	Maximum Downstream Concentration (ug/m³)	CEQR *De Minimis* (ug/m³)	Background Concentration (ug/m³)	Total Concentration (ug/m³)	NAAQS Primary (ug/m³)	NAAQS Secondary (ug/m³)
NO_2	With Downwash	1-hr	96.66	--	77.46	174.12	188	--
		Annual	1.12	--	28.59	29.71	100	100
$PM_{2.5}$		24-hour	1.76	8.05	18.90	20.66	35	35
		Annual	0.09	0.3	6.70	6.79	12	15
NO_2	Without Downwash	1-hr	22.26	--	77.46	99.72	188	--
		Annual	0.73	--	28.59	29.33	100	100
$PM_{2.5}$		24-hour	0.45	8.05	18.90	19.35	35	35
		Annual	0.02	0.3	6.70	6.72	12	15

The results show that the pollutants of concern would not exceed the NAAQS for criteria air pollutants or the de minimis threshold for $PM_{2.5}$ during worst-case conditions; accordingly, there would be no significant adverse air quality impacts at the Project Site from natural gas-fired HVAC equipment installed on Projected Development Site A.

Industrial Source Analysis (Air Toxics) Results

The AERMOD results in Table 13-12 and Table 13-13 show the worst-case concentrations at the Project Site.

Table 13-12: Predicted Maximum Toxic Air Pollutant Concentrations at the Project Site

CAS Number	Pollutant Name	Maximum Modeled Concentration		DAR-1 SGC	DAR-1 AGC
		Hourly ug/m³	Annual ug/m³	ug/m³	ug/m³
With Downwash					
67-64-1	Acetone	1,923.35	0.05554	180,000	30,000
64742-89-8	Naphtha Light Aliphatic	447.41	0.01292	-	3,200
64742-94-5	Naphtha Heavy Aromatic	223.47	0.00645	-	100
64-17-5	Ethanol	490.00	0.01423	-	45,000
763-69-9	Ethyl 3-Ethoxyproprioanate	89.30	0.00258	140	64
100-41-4	Ethylbenzene	410.77	0.01162	-	1,000
78-93-3	Methyl Ethyl Ketone	223.47	0.00645	13,000	5,000
123-86-4	Butyl Acetate	223.47	0.00645	71,300	565
8052-41-3	Stoddard Solvents	357.65	0.01033	-	900
108-88-3	Toluene	447.41	0.01292	37,000	5,000
1330-20-7	Xylenes	490.00	0.01423	22,000	100
Without Downwash					
67-64-1	Acetone	1,923.37	0.05480	180,000	30,000
64742-89-8	Naphtha Light Aliphatic	447.41	0.01275	-	3,200
64742-94-5	Naphtha Heavy Aromatic	223.48	0.00637	-	100
64-17-5	Ethanol	490.00	0.01404	-	45,000
763-69-9	Ethyl 3-Ethoxyproprioanate	89.30	0.00255	140	64
100-41-4	Ethylbenzene	410.78	0.01147	-	1,000
78-93-3	Methyl Ethyl Ketone	223.48	0.00637	13,000	5,000
123-86-4	Butyl Acetate	223.48	0.00637	71,300	565
8052-41-3	Stoddard Solvents	357.65	0.01020	-	900
108-88-3	Toluene	447.41	0.01275	37,000	5,000
1330-20-7	Xylenes	490.00	0.01404	22,000	100

[a] Maximum modeled concentration for all pollutants.

Table 13-13: Predicted Maximum $PM_{2.5}$ Concentrations at the Project Site

Pollutant	Averaging Period	Max. Modeled Concentration (µg/m³)[a]	Max. Concentration with Background (µg/m³)	NAAQS (µg/m³)	CEQR *De Minimis* (µg/m³)
With Downwash					
$PM_{2.5}$	24-hour	4.88	23.78	35.00	8.05
	Annual	0.06	6.76	12.00	0.3
Without Downwash					
$PM_{2.5}$	24-hour	2.60	21.58	35.00	8.05
	Annual	0.06	6.76	12.00	0.3

The results show that the pollutants of concern would not exceed the SGC and AGC for toxic air pollutants and would not exceed the NAAQS for criteria air pollutants during worst-case conditions; accordingly, there would be no significant adverse air quality impacts at the Project Site from existing industrial sources. The cancer risk and HI were

assessed for carcinogens and non-carcinogens respectively. The cumulative inhalation cancer risk is less than the 10 in a million acceptable risk and the cumulative HI is less than the standard of two.

Mobile Source – Intersection Assessment

Refined Analysis

A refined analysis was conducted for $PM_{2.5}$ and PM_{10}. Results from the refined analysis of 24-hour and annual emissions of $PM_{2.5}$ and 24-hour emissions of PM_{10} are shown in Table 13-14.

Table 13-14: Refined Mobile Source Intersection Analysis

Pollutant (µg/m³)	Background Concentration[1]	Modeled No-Action	Modeled With-Action	Increment	CEQR *de minimis*	Total With-Action Concentration	NAAQS Concentration
PM_{10} – 24hr	44.00	57.70	57.78	N/A	N/A	101.78	150
$PM_{2.5}$ – 24hr	18.9	11.35	11.53	0.18	8.05	30.43	35
$PM_{2.5}$ – Annual	6.7	1.13	1.14	0.01	0.1	7.84	12

[1] New York State Ambient Air Quality Report for 2020, published by NYSDEC.

The results of the refined analysis show that both $PM_{2.5}$ and PM_{10} emissions would be below the NAAQS and *de minimis* thresholds. Accordingly, the Proposed Actions would not result in significant adverse air quality impacts from mobile sources, and further analysis is not warranted.

Proposed E-Designations

An E-Designation for air quality would be assigned to Projected Development Site 1, Building 1; Potential Development Site A, Building A; and Projected Development Site 2, Buildings 2 and 3. The E-Designation would specify the use of electric- or steam-powered heat and hot water systems in new buildings within the Proposed Rezoning Area. It is expected that electric systems will be widely used by the project Build Year to comply with Intro 2317-2021, which is recently adopted City Council legislation that will require new buildings seven stories or greater to use electric- or steam-powered heating and hot water systems beginning in 2027.

By placing this E-Designation, the potential for significant adverse air quality impacts from the Proposed Actions would be avoided because the NYC Office of Environmental Remediation (OER) would provide E-Designation oversight following land use approvals. Building permits cannot be issued by the NYC Department of Buildings without prior OER approval that the intent of the E-Designation has been met pursuant to the provisions of Section 11-15 of the New York City Zoning Resolution.

The requirements of E-Designation would be as follows:

Projected Development Site 1

Building 1 (Block 3017, Lot 74): Any new residential and/or commercial development on the above-referenced properties must ensure that the heating, ventilating and air conditioning systems and the hot water system (HVAC) will be powered by electricity or steam.

Potential Development Site A

Building A (Block 3017, Lots 60, 65, and 68): Any new residential and/or commercial development on the above-referenced properties must ensure that the heating, ventilating and air conditioning systems and the hot water system (HVAC) will be powered by natural gas and that the emissions stack releases at a height of at least 238 feet.

Projected Development Site 2

Building 2 and Building 3 (Block 3017, Lot 29): Any new residential and/or commercial development on the above-referenced properties must ensure that the heating, ventilating and air conditioning systems and the hot water system (HVAC) will be powered by electricity or steam.

With the proposed E-Designations in place, significant adverse air quality impacts from stationary sources would be precluded.