A. INTRODUCTION

The Proposed Action would facilitate construction of a 13-story, 120-foot tall (129 feet to top of mechanical bulkhead) mixed-use building (approximately 169,333 square feet). This Proposed Development, which is shown on Figure 9-1, would be located at 404-414 West 155th Street in Manhattan (on Block 2069, Lot 21).

The Proposed Action would alter land uses in the study area and allow residential uses on sites where the existing zoning permits only commercial and industrial uses. Air quality, which is a general term used to describe pollutant levels in the atmosphere, would be affected by these changes. The air quality impacts that are addressed in this analysis of the Proposed Action are:

1. Potential for changes in vehicular travel associated with proposed development activities to result in significant mobile source (vehicular related) air quality impacts;
2. The potential for emissions from the heating, ventilation and air conditioning (HVAC) system of the proposed development site to significantly impact existing land uses;
3. Potential impacts from the exhaust of the proposed parking garage on nearby land uses;
4. The potential for significant air quality impacts from the emissions of "major" existing emission sources (i.e., HVAC systems with 20 or more million Btu/hr heat input) on the proposed residential development; and
5. The potential for significant air quality impacts from air toxic emissions generated by nearby existing industrial sources on the Proposed Development.

Air quality analyses were conducted, following the procedures outlined in the New York City Environmental Quality Review *(CEQR) Technical Manual*, to determine whether the Proposed Action would result in violations of ambient air quality standards or health-related guideline values. The methodologies and procedures utilized in these analyses are described below.

B. POLLUTANTS OF CONCERN

Criteria Pollutants

The following air pollutants have been identified by the U.S. Environmental Protection Agency (EPA) as being of concern nationwide: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone, particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead. National Ambient Air Quality Standards (NAAQS) are concentrations set for each of the criteria pollutants specified by the United States Environmental Protection Agency (USEPA) that have been developed to protect

human health and welfare. New York has adopted the NAAQS as state ambient air quality standards. These standards, together with their health-related averaging periods, are presented in Table 9-1.

TABLE 9-1
Applicable National and State Ambient Air Quality Standards

Pollutant	Averaging Period	National and NY State Standards	
		Primary	Secondary
Ozone	8 Hour	0.075 ppm (147 $\mu g/m^3$)	Same as Primary Standard
Carbon Monoxide	8 Hour	9 ppm (10 mg/m^3)	Same as Primary Standard
	1 Hour	35 ppm (40 mg/m^3)	Same as Primary Standard
Nitrogen Dioxide	Annual Average	0.053 ppm (100 $\mu g/m^3$)	Same as Primary Standard
Sulfur Dioxide	Annual Average	80 $\mu g/m^3$ (0.03 ppm)	-
	24 Hour	365 $\mu g/m^3$ (0.14 ppm)	-
	3 Hour	-	1300 $\mu g/m^3$ (0.5 ppm)
Suspended Particulate Matter (PM_{10})	24 Hour	150 $\mu g/m^3$	Same as Primary Standard
Suspended Fine Particulate Matter ($PM_{2.5}$)	24 Hour	35 $\mu g/m^3$	Same as Primary Standard
	Annual Arithmetic Mean	15 $\mu g/m^3$	Same as Primary Standard
Lead	Calendar Quarter	1.5 $\mu g/m^3$	Same as Primary Standard

Notes: *ppm: parts per million*
$\mu g/m^3$: micrograms per cubic meter
Source: *US Environmental Protection Agency, "National Primary and Secondary Ambient Air Quality Standards." (49 CFR 50). New York State Department of Environmental Conservation.*

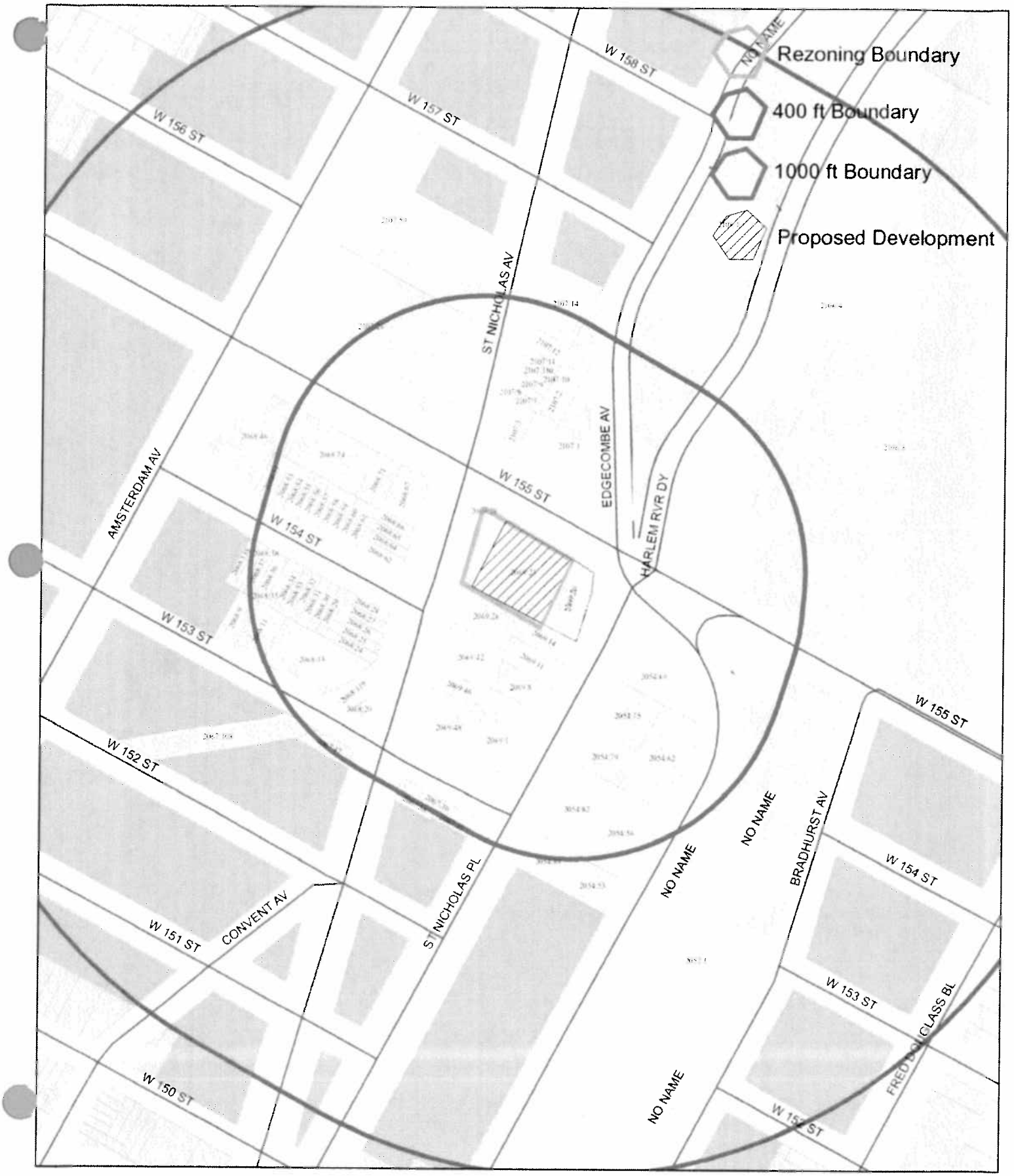
The following air pollutants were considered for analysis:

- CO for localized impacts of action-generated mobile source emissions; and
- SO_2 and NO_2 for impacts of action-related HVAC emissions.

Air Toxic Pollutants

In addition to criteria pollutants, small quantities of a wide range of the non-criteria air pollutants, known as toxic air pollutants, which are emitted from nearby industrial and commercial facilities, are also of concern. These pollutants can be grouped into two categories: carcinogenic air pollutants, and non-carcinogenic air pollutants. These 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.

Figure 9-1
Project Study Area and Block and Lot Numbers



In order to evaluate short-term and annual impacts of carcinogenic and non-carcinogenic toxic air pollutants, the NYSDEC 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 effects on the health of the general public. Based on SGCs and AGCs, USEPA also developed methodologies that can be used to estimate the potential impacts of air toxic pollutants from multiple emission sources. The "Hazard Index Approach" can be used to estimate the potential impacts of non-carcinogenic pollutants. If the combined ratio of estimated pollutant concentrations divided by the respective SGCs or AGCs value for each of the toxic pollutants is found to be less than 1, no significant air quality impacts are predicted to occur. Estimated overall incremental cancer risk should be compared with the one-to-one million threshold established by USEPA to determine if significant air quality impacts from the carcinogenic pollutants are predicted.

C. MOBILE SOURCE ANALYSIS

Intersection Analysis

Localized increases in CO levels may result from increased vehicular traffic volumes and changed traffic patterns in the study area as a consequence of the Proposed Action. According to the *CEQR Technical Manual* screening threshold criteria for this area of the City, if 100 or more action-generated vehicles pass through a signalized intersection in any given peak period, there is a potential for mobile air quality impacts and a detailed analysis is required.

As discussed in the EAS document dated April 2, 2010, the trip generation conducted for the RWCDS associated with the Proposed Action indicates that the number of action-generated vehicles, would be below *CEQR* screening threshold values during both the AM and PM peak periods at any potentially affected intersection. Therefore, no detailed air quality analysis is required and no significant mobile source air quality impacts are expected as a result of the Proposed Action. Moreover, the proposed access easement for NYCDEP would not result in any increase in traffic, as this easement would not alter the operation of the existing NYCDEP facility.

Garage Analysis

An accessory parking below-grade garage, with 114-spaces, is proposed as a part of the Proposed Development. Vehicular emissions would be generated by the vehicles utilizing this facility, and these emissions could affect pollutant level near its exhaust vent(s). To estimate the potential air quality impacts from the emissions of this facility, an analysis was conducted following the CEQR guidelines for a mechanically ventilated, enclosed garage. Parking garage utilization data presented in Attachment B of the AES document dated April 2, 2010 were utilized for this analysis.

Because the garage would be used almost exclusively by gasoline-powered automobiles and not diesel-fueled trucks, CO will be the only pollutant considered for this analysis. Potential PM_{10} and $PM_{2.5}$ impacts were not considered because the concentrations of these pollutants would not be materially affected by the operation of this facility.

Pollutants from the garage were assumed to be exhausted through one garage vent that cause pollutant levels to be elevated near the vent outside of the garage. For concentrations near the garage vent, the CO concentrations predicted within the garage were used to estimate concentrations near the facility. Estimates were performed following guidelines provided in the *CEQR Technical Manual* for a mechanically ventilated, enclosed garage.

CO emission factors under different vehicles operating modes (cold/hot start/idle) for the future 2012 build scenario were estimated using MOBILE 6.2.03. Maximum hourly CO emission rates within the facility were calculated for the PM time period with the maximum number of departing autos in an hour, since departing autos are assumed to be "cold" and arriving cars are assumed to be "hot" ("cold" autos emit CO at considerably higher rates than "hot" autos). Maximum hourly CO emission rates over a consecutive 8-hour period were computed for the 8-hour time period that averages the largest number of departing autos per hour. The maximum emission rate was determined based on the ins/outs for the 8-hour time period and the mean traveling distance within the garage. The analysis assumed that all departing autos would idle for one minute before traveling to the exits of the garage, and all arriving and departing autos would travel at 5 miles per hour within the garage.

Estimates of off-site CO impacts are based on EPA's equation for dispersion of pollutants from a stack. The garage vents are converted into "virtual point sources" and the concentrations within the garage are used to estimate the initial dispersion at the garage vents. The initial horizontal and vertical distributions are assumed to be equal and calculated by setting CO concentration at the exit of the vent equal to the CO level within the facility. Eight-hour CO impacts are estimated at a receptor near the vent (5 feet from the vent, 6 feet below the midpoint height of the vent) and at a receptor across a street on the far sidewalk from the vent (50 feet away, also 6 feet below the vent midpoint). Cumulative CO impacts on the near and far sidewalks adjacent to the garage vent were calculated by adding the impact from the garage exhaust to on-street sources, and background levels (2.9 ppm).

This analysis was conducted for the 2012 analysis year for the PM peak period, when estimated garage emissions would be greatest because exiting vehicles would be operating in the higher-polluting, cold-start mode.

A maximum total 8-hour CO concentration of 4.9 ppm was estimated at a receptor located 5 feet from the vent by adding the estimated garage impact and the background concentration; a maximum total 8-hour CO concentration of 4.8 ppm was estimated at the receptor located 50 feet from the vent by adding the garage impact, street traffic impacts, and the background concentration. The maximum total estimated 8-hour CO concentrations are therefore below the 8-hour CO NAAQS of 9.0 ppm.

The result of this analysis is that emissions from the proposed garage would not cause significant air quality impacts.

D. ANALYSIS OF HEATING SYSTEM EMISSIONS

Emission Sources

Emissions from the HVAC systems of the Proposed Development may affect air quality levels at nearby existing land uses. The impact of these HVAC emissions would be a function of fuel type, stack height, building size (gross floor area), and location of each emission source relative to a sensitive land use. It was conservatively assumed that the building would use fuel oil #2 for its heating demands.

The following information and assumptions were applied:

- The size (gross floor area and height) and location (block and lot number) for the Proposed Development were provided by the architects for the project.
- The size and location of existing buildings were determined using the New York City Open Accessible Space Information System Cooperative (OASIS) data base.

Analyses Conducted

Impacts on Existing Land Uses

A screening level analysis was conducted, using the *CEQR Technical Manual* procedures, to determine the potential impacts of the HVAC emissions of the Proposed Development on the existing sensitive land uses. All nearby existing buildings of similar or greater height were considered as potential sensitive receptor sites. If the distance from the Proposed Development to the nearest building of similar or greater height is less than the threshold distance provided in the *CEQR Technical Manual nomograph*, there is a potential for significant air quality impacts, and a detailed dispersion modeling analysis with the EPA's AERMOD model has to be conducted. Otherwise, the source passes the screening analysis, and no further analysis is required.

The maximum floor area of the Proposed Development was used as input for the screening analysis. It was assumed that the HVAC system of the Proposed Development would utilize a single stack with the height 3 feet above roof height (as per *CEQR Technical Manual* guidance).

To conduct this analysis, a survey of existing land uses within 400 feet of the rezoning area was conducted using the New York City OASIS mapping network system to identify residential land uses and other sensitive receptor sites.

Methodology

The *CEQR Technical Manual* provides a nomographic procedure, based on the square footage and height of each building (provided that buildings are at least 30 feet apart), that was used to determine the threshold distance between each proposed and/or projected non-adjacent development heated by oil or natural gas and a nearby building of similar or greater height. If more than one taller building is located near a shorter building, the potential impacts from the HVAC emissions of the shorter building on the closest taller building were considered.

The following procedures were conducted:

- Figures 3Q-5, 3Q-7 and 3Q-9 of the *CEQR Technical Appendix* were used to determine potential for significant SO_2 (i.e., the critical pollutant for fuel oil) and NO2 (i.e., the critical pollutant for natural gas) impacts.
- The estimated maximum size of the building was plotted on the nomograph against the distance to a potentially affected nearby taller building.
- The threshold distance at which a potentially significant impact is likely to occur was estimated and compared to the actual distance between the shorter building and the nearest taller building.
- If the distance between buildings is greater than the threshold distance indicated on the nomograph, no potentially significant impact is anticipated, and no detailed analysis is conducted.
- If the distance was less than the threshold distance indicated on the nomograph, a potentially significant impact is possible, and a detailed dispersion modeling analysis is conducted.

Impacts from "Major" Existing Emission Sources

Following *CEQR Technical Manual* guidelines, a survey of land uses and building heights was conducted to determine whether there are any existing "major" sources of HVAC emissions (i.e., emissions from boiler facilities with heat inputs 20 million Btu per hour or greater) located within 1,000 feet of the Proposed Development Site. The result of this survey is that one emission source – a 30-story (2,531,677 square foot) building, located on Block 2106, Lot 3 – was identified as a major source requiring analysis.

Results

Impacts on Existing Land Uses

A survey of the land uses surrounding the proposed rezoning area identified two existing residential buildings within 400 feet of the rezoning area that are taller than the Proposed Development. These existing buildings, which are the closest taller buildings to the rezoning area, are:

- A 30-story building located on Block 2106 (Lot 3); and
- A 14-story building located on Block 2054 (Lot 62).

The distance between the Proposed Development and the existing buildings exceeds the estimated screening threshold distance, which is 95 feet for the Proposed Development. The measured distance between Proposed Development and the 30-story building on Block 2106 is approximately 267 feet. Therefore, the potential HVAC emission impacts of the Proposed Development's HVAC emissions on existing land uses are not considered to be significant.

Impacts from "Major" Existing Emission Sources

Following *CEQR Technical Manual* guidelines, an initial screening analysis was conducted using the manual's nomographs to determine whether emissions from the nearby 30-story building would significantly impact the Proposed. The impacts on the Proposed Development would be insignificant because this building is further from the 30-story building than the threshold distance indicated on the nomograph. Therefore, no significant air quality impacts associated with "major' emission sources are predicted.

An additional examination was conducted to determine if there is any "large" combustion emission source (e.g., power plant, co-generation facility, etc.) located within 1,000 feet of the Proposed Development Site. The result of this survey is that no large boiler emission sources are located within 1,000 feet of the Proposed Development and therefore no further analysis is required.

E. HEALTH RISK ASSESSMENT OF TOXIC AIR EMISSIONS FROM EXISTING INDUSTRIAL SOURCES

Introduction

The Proposed Action would allow development of residential uses in an area historically occupied by automotive uses. As such, emissions of toxic pollutants from the operation of existing industrial emission sources might affect proposed residential uses.

An analysis was therefore conducted to determine whether the impacts of these emissions would be significant. Data necessary to perform this analysis, which include facility type, source identification and location, pollutant emission rates, and exhaust stack parameters, were obtained from regulatory agencies (e.g., from existing air permits). All existing industrial facilities located within 400 feet of the rezoning area that are permitted to exhaust toxic pollutants were considered in this analysis.

Data Sources

Information regarding emissions of toxic air pollutants from existing industrial sources was obtained from New York City Clean Air Tracking System database as follows:

- The boundaries of the rezoning area were used to identify the extent of the study area for determining air quality impacts associated with the Proposed Action. All permitted industrial toxic air pollutant emission sources located within a 400-foot radius of the proposed development site were included in this analysis.
- A search was performed to identify NYSDEC Title V permits and permits listed in the EPA Envirofacts database.
- The field survey was conducted to validate the existence of the permitted facilities.
- Air permits for active (currently permitted) industrial facilities within the analysis area that are included in the New York City Department of Environmental Protection (NYCDEP)

Clean Air Tracking System database were acquired and reviewed to obtain pollutant emission rates and stack parameters.

Results

No facilities with active NYCDEP permits were identified within a 400-foot radius of the rezoning area. Therefore, no air toxics analysis is required for the Proposed Action.

F. CONCLUSION

The Proposed Action is not anticipated to result in any significant adverse air quality impacts. The number of vehicle trips generated by the Proposed Development would be below CEQR screening threshold values during both the AM and PM peak periods, and therefore no detailed air quality analysis is required and no significant mobile source air quality impacts are expected as a result of the Proposed Action. In addition, the maximum total estimated 8-hour CO concentrations from the proposed 114-space accessory garage were found to be below (within) the CO NAAQS of 9.0 ppm, and the proposed facility would therefore not cause significant air quality impacts.

Two existing residential buildings were identified within 400 feet of the rezoning area that are taller than the Proposed Development; however, the distance between the Proposed Development and the existing buildings exceeds the estimated screening threshold distances for these buildings, and therefore the potential HVAC emission impacts of the Proposed Development's HVAC emissions on existing land uses are not considered to be significant. One emission source – a 30-story (2,531,677 square foot) building, located on Block 2106, Lot 3 – was identified as a major source within 400 feet of the Proposed Development, however, the impacts on the Proposed Development would be insignificant because it is located further than the threshold distance indicated on the nomograph. Therefore, no significant air quality impacts associated with "major" emission sources are predicted.

No facilities with active NYCDEP permits were identified within a 400-foot radius of the rezoning area, and therefore, no air toxics analysis is required for the Proposed Action.