A. INTRODUCTION AND SUMMARY OF FINDINGS

This chapter examines the potential effects of the Proposed Project's operation on ambient air quality—the portions of the atmosphere, external to buildings, to which the general public has access. Impacts from stationary sources (e.g., fossil fuel-fired equipment) and from mobile sources (i.e., traffic generated by the Proposed Project) are considered. The Project Sites will be developed in several phases over approximately 10 years. The potential for the construction of the Proposed Project to result in temporary air quality impacts is discussed in Chapter 15, "Construction."

The newly constructed mixed-use buildings would typically utilize natural gas-fired heating, ventilation, and air conditioning (HVAC) systems. However, the HVAC systems would be capable of utilizing No. 2 Fuel Oil when natural gas service is interrupted by the local utility during times of extreme demand. Therefore, a more detailed, "refined," analysis of pollutant concentrations resulting from the transport of HVAC exhaust, known as a "dispersion analysis," was performed. For the purposes of analyzing the worst-case impacts of the Proposed Project on air quality, this analysis conservatively assumes operation of No. 2 Fuel Oil during short-term periods.

In addition to air quality impacts generated by stationary sources, the Proposed Project would result in project-generated traffic that would affect traffic conditions within the area of the Project Sites (see Chapter 11, "Traffic and Transportation"). The potential for mobile-source air quality impacts from the Proposed Project was analyzed using the screening procedures found in the New York State Department of Transportation's (NYSDOT) *The Environmental Manual (TEM).* The purpose of the screening procedure is to identify whether project-generated traffic has the potential to result in an air quality impact. If the screening procedure finds that there is not a potential for project-generated traffic to have an air quality impact, no further analysis is required, and no significant impact would result. If the screening procedure finds that there is a potential air quality impact, a more detailed, "refined," analysis would be required to determine whether there is an impact.

As discussed below, the Proposed Project would not result in potential significant adverse air quality impacts from stationary sources such as the proposed HVAC systems. Similarly, traffic generated by the Proposed Project did not exceed NYSDOT's screening criteria, indicating that there would not be a significant adverse air quality impact from project-generated traffic.

B. EXISTING CONDITIONS

Air quality is affected by air pollutants produced by both motor vehicles and stationary sources. Emissions from motor vehicles are referred to as mobile source emissions, while emissions from fixed facilities are referred to as stationary source emissions. Emissions from project-generated traffic are also referred to as indirect effects, while stationary sources on the Project Site are considered to be direct effects. 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 U.S. Environmental Protection Agency (EPA) under the Clean Air Act (CAA) and are referred to as "criteria pollutants"; emissions of VOCs, NO_x, and other precursors to criteria pollutants are also regulated by EPA.

As required by the CAA, primary and secondary National Ambient Air Quality Standards (NAAQS) have been established for six major air pollutants: CO, NO_2, ozone, respirable PM (both $PM_{2.5}$ and PM_{10}), SO_2, and lead. The primary standards represent levels that are requisite to protect the public health, allowing an adequate margin of safety. The secondary standards are intended to protect the nation's welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. The primary standards are generally either the same as the secondary standards or more restrictive.

The most recent concentrations of all criteria pollutants at New York State Department of Environment Conservation (NYSDEC) air quality monitoring stations nearest to the Project Site are presented in **Table 12-1**. For most pollutants, the concentrations presented are averaged over three years, to account for anomalies between years. As shown, the recently monitored levels for all pollutants did not exceed the NAAQS with the exception of ozone, which exceeds the NAAQS. Consequently, the EPA classified the Nassau, Rockland, Suffolk, Westchester, and the five New York City counties (NY portion of the New York–Northern New Jersey–Long Island, NY-NJ-CT, NAA) as a "serious" non-attainment area, effective September 23, 2019. This imposed a new deadline for the State to develop an implementation plan to meet ambient concentrations of ozone that fall below the public health thresholds of the NAAQS.

Table 12-1
Representative Monitored Ambient Air Quality Data

Pollutant	Location	Units	Averaging period	Concentration	NAAQS
CO	Botanical Garden (Pfizer Lab), Bronx	ppm	1-hour	1.72(1)	9
			8-hour	1.2(1)	35
SO_2	I.S. 52, Bronx	µg/m^3	1-hour	14.2(2)	196
PM_{10}	I.S. 52, Bronx	µg/m^3	24-hour	35	150
$PM_{2.5}$	Botanical Garden (Pfizer Lab), Bronx	µg/m^3	Annual	7.4(3)	12
			24-hour	19.1(3)	35
NO_2	I.S. 52, Bronx	µg/m^3	Annual	32.8	100
			1-hour	106.4(4)	188
Lead	I.S. 52, Bronx	µg/m^3	3-month	0.0027(5)	0.15
Ozone	White Plains	ppm	8-hour	0.073(6)	0.070

Notes:
(1) The CO concentration for short-term average is the second highest from the most recent year with available data.
(2) The 1-hour value is based on a 3-year average (2018–2020) of the 99th percentile of daily maximum 1-hour average concentrations. EPA replaced the 24-hr and the annual standards with the 1-hour standard.
(3) Annual value is based on a 3-year average (2018–2020) of annual concentrations. The 24-hour value is based on the 3-year average of the 98th percentile of 24-hour average concentrations.
(4) The 1-hour value is based on a 3-year average (2018–2020) of the 98th percentile of daily maximum 1-hour average concentrations.
(5) Based on the highest quarterly average concentration measured in 2020.
(6) Based on the 3-year average (2018–2020) of the fourth highest daily maximum 8-hour average concentrations.
Sources:
New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2020.

C. FUTURE WITHOUT THE PROPOSED PROJECT

In the future without the Proposed Project, air quality conditions on and adjacent to the Project Sites are anticipated to remain similar to the existing conditions.

Pending and approved projects would undergo individual environmental reviews and be approved consistent with New York State and the City of Yonkers environmental review procedures. Therefore, the indirect effect on air quality from the mobile sources associated with the pending and approved projects is not anticipated to significantly affect air quality conditions. As discussed in Chapter 11, “Traffic and Transportation,” traffic conditions in the No Build condition, and their resultant effects on air quality—including both background traffic volume growth as well as traffic volumes generated by the pending and approved projects—have been assessed and were therefore included in NYSDOT’s mobile source screening procedures.

D. FUTURE WITH THE PROPOSED PROJECT

D.1. STATIONARY SOURCES

D.1.a. HVAC Systems

The Proposed Project would include the construction of nine mixed-use buildings on the Project Sites: two towers at the Teutonia Site, two buildings at the North Broadway Site, and five buildings at the Chicken Island Site. The newly constructed buildings would each utilize a dual fuel-fired (i.e., natural gas and

No. 2 Fuel Oil) HVAC system to provide space heating, air conditioning, and domestic hot water. Both the Teutonia and North Broadway Sites would be constructed in two phases (one building per phase), while the Chicken Island Site would be constructed in five phases (also one building per phase).

The potential for adverse air quality impacts from the combustion sources of the nine newly constructed buildings was assessed for each phase of construction. Specifically, a "refined" analysis of pollutant concentrations at nearby receptors resulting from the dispersal of HVAC exhaust, known as a "dispersion analysis," was performed using AERMOD software. 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 and source types and is EPA's preferred regulatory stationary source model. AERMOD calculates pollutant concentrations from simulated sources (e.g., exhaust stacks) based on hourly meteorological data and surface characteristics and accounts for complex interactions between buildings, including downwash and the potential for the exhaust to get "caught" and recirculate around a structure.

Five years of surface meteorological data collected at LaGuardia Airport (2016–2020) and concurrent upper air data collected in Brookhaven, New York were used in the analysis. These are the closest National Weather Service meteorological stations to the Project Site. The stack heights modeled take into account terrain conditions, using United States Geological Survey data. A detailed technical description of the methodology used for the AERMOD analysis, and a discussion of the results are described below:

D.1.a.i *AERMOD Analysis*

A "refined" analysis of pollutant concentrations at nearby receptors resulting from the dispersal of HVAC exhaust, known as a "dispersion analysis," was performed using AERMOD software. 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 and source types. AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatment of the boundary layer theory and understanding of turbulence and dispersion, and includes handling of the plume interaction with terrain. AERMOD is EPA's preferred regulatory stationary source model.

AERMOD calculates pollutant concentrations from simulated sources (e.g., exhaust stacks) based on hourly meteorological data and surface characteristics 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 (i.e., downwash) produced by nearby structures. The analysis of potential impacts from exhaust stacks assumed stack tip downwash, urban dispersion and surface roughness length, and elimination of calms.

AERMOD incorporates the Plume Rise Model Enhancements (PRIME) downwash algorithm, which is designed to predict concentrations in the "cavity region" (i.e., the area around a structure which under certain conditions may affect an exhaust plume, causing a portion of the plume to become entrained in a recirculation region). AERMOD also uses the Building Profile Input Program for PRIME (BPIPPRM) to provide a detailed analysis of downwash influences on a direction-specific basis. BPIPPRM determines the projected building dimensions for modeling with the building downwash algorithm enabled. The modeling of plume downwash accounts for obstructions within a radius equal to five obstruction heights of the stack.

Potential Project-generated 1-hour average NO_2 concentrations, added to the background concentrations in the area, were compared with the NAAQS. Potential 24-hour and annual average incremental concentrations of $PM_{2.5}$ were compared with the $PM_{2.5}$ NAAQS. For the analysis of the 1-hour average NO_2 concentration from the building's heating and hot water systems, AERMOD's Plume Volume Molar Ratio Method (PVMRM) module was used to analyze chemical transformation within the model. PVMRM incorporates hourly background ozone concentrations to estimate NO_x transformation within the source plume. The model applied ozone concentrations measured in 2016–2020 at the nearest available NYSDEC ozone monitoring station—the I.S. 52 monitoring station in the Bronx. An initial NO_2 to NO_x ratio of 10 percent at the source exhaust stack was assumed for boilers, which is considered representative.

Five years of surface meteorological data collected at LaGuardia Airport (2016–2020) and concurrent upper air data collected at Brookhaven, New York were used in the analysis.

D.1.a.ii Emission Rates and Stack Parameters

Specific energy efficiency measures and design elements that may be implemented for the Proposed Project are currently being evaluated. Therefore, the Proposed Project is conservatively assumed to utilize fossil-fuel fired heating and hot water systems, and worst-case exhaust stack locations were modeled. Furthermore, due to utility restrictions the HVAC systems at each site are assumed to be dual-fuel systems that will primarily fire natural gas with No. 2 fuel oil as a backup fuel when natural gas service is interrupted by the local utility.

Annual emission rates for heating and hot water systems were calculated based on fuel consumption estimates, using energy intensity estimates based on type of development and size of the buildings, and applying emission factors for natural gas-fired boilers. Annual NO_2 concentrations from heating and hot water sources were estimated using a NO_2 to NO_x ratio of 0.75. $PM_{2.5}$ emissions include both the filterable and condensable components. The short-term emission rates (1-hour) were calculated by multiplying the heat input of each boiler in million British thermal units per hour (MMBtu/hr) by an AP-42 emission factor for No. 2 fuel oil in units of pounds per million British thermal units (lb/MMBtu). Since the boilers will not operate continuously for a full day, 24-hour $PM_{2.5}$ emissions were calculated by introducing an operational load factor of 70%. The exhaust from the heating and hot water systems is vented through two stacks per tower. Stack heights for each of the 18 stacks can be found in **Table 12-2**. The stack heights include AERMOD's consideration of terrain using United States Geological Survey topographical data.

Table 12-2
Modeled Stack Parameters and Emission Rates

	Chicken Island					Teutonia		North Broadway	
Parameter	**Building 1**	**Building 2**	**Building 3**	**Building 4**	**Building 5**	**Building 1**	**Building 2**	**Building 1**	**Building 2**
Fuel	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
Number of Units	2 Boilers	2 Boilers	2 Boilers	2 Boilers	2 Boilers	2 Boilers	2 Boilers	2 Boilers	2 Boilers
Roof Height (ft)	420	250	420	250	270	435	455	300	300
Modeled Stack Height (ft)	423	253	423	253	273	438	458	303	303
Stack Diameter (ft)(1)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Exhaust Velocity (Natural Gas) (ft/s)(2)	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Exhaust Velocity (Fuel Oil) (ft/s)(2)	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Exhaust Temperature (F)(1)	307.8	307.8	307.8	307.8	307.8	307.8	307.8	307.8	307.8
NO_x 1-Hour Emission Rate (g/s)	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
NO_x Annual Emission Rate (g/s)	0.024	0.020	0.015	0.0077	0.011	0.023	0.015	0.015	0.0097
$PM_{2.5}$ 24-Hour Emission Rate (g/s)	0.0081	0.0081	0.0081	0.0081	0.0081	0.0081	0.0081	0.0081	0.0081
$PM_{2.5}$ Annual Emission Rate (g/s)	0.0018	0.0015	0.0012	0.00058	0.00081	0.0018	0.0012	0.0011	0.00073

Notes:
(1) Stack parameters assumed based on survey of boiler exhaust data performed and provided by New York City Department of Environmental Protection.
(2) The stack exhaust velocity is estimated based on the type of fuel and the estimated boiler capacity.

To calculate exhaust velocity, the fuel consumption of the proposed project was multiplied by EPA's fuel factor for natural gas and No. 2 fuel oil, providing the exhaust flow rate at standard temperature; the flow rate was then corrected for the exhaust temperature, and exhaust velocity was calculated based on the stack diameter. Assumptions for stack diameter and exhaust temperature for the proposed systems were obtained from a survey of boiler exhaust data provided by New York City Department of Environmental Protection and were used to calculate the exhaust velocity.

The emission rates and exhaust stack parameters used in the modeling analyses are presented in **Table 12-2**.

D.1.a.iii *Sensitive Receptor Locations*

The HVAC systems would potentially locate sources of pollutant emissions proximate to nearby elevated sensitive receptors, which are residential buildings with façade balconies (allowing residents to access ambient air adjacent to the building) or school buildings (see **Figure 12-1**). The elevated off-site sensitive receptors included residential buildings that were identified to have façade balconies at 50 and 80 Riverdale Avenue, the Vive School, and Saint Mary's Roman Catholic School.

The minimum distances to a sensitive receptor from potential exhaust locations on the proposed mixed-use buildings are approximately 1,000 feet north northeast of the North Broadway Site and approximately 786 feet east southeast from the Teutonia Site and approximately 1,118 feet west southwest from the Chicken Island Site. To ensure that the modeling effectively captures the maximum potential air quality impacts at sensitive building locations, receptors were placed horizontally at 25-meter (m) intervals in accordance with NYSDEC's Guidelines on Dispersion Modeling Procedures for Air Quality Impact Analysis (DAR-10) and vertically at approximately 3 m intervals along the façades of these buildings.

Elevated sensitive receptors were also placed on all nine mixed-use buildings to predict project-on-project impacts. Receptors were placed on project buildings horizontally at 20 m spacing and vertically at 3 m intervals along the façades of the buildings. The receptor heights include AERMOD's consideration of terrain using United States Geological Survey topographical data.

D.1.a.iv *Receptor Grid Placement*

In accordance with DAR-10, 5,817 ground-level discrete receptors were also placed in a grid surrounding the Project Sites to assess the potential air quality impacts at locations throughout the study area (see **Figure 12-1**). These receptors were spaced as follows:

- 70 m spacing from the Project Sites out to a distance of 1 kilometer (km)
- 100 m spacing from 1 km to 2 km
- 250 m spacing from 2 km to 5 km
- 500 m spacing from 5 km to 10 km

Due to the low exhaust velocity and temperature of the HVAC systems, including receptors at distances further than 10 km is not necessary.

D.1.a.v *Background Concentrations*

The results of the refined dispersion analysis are added to conservative background concentration values based on monitored criteria pollutant concentrations measured in recent years at the nearest NYSDEC air quality monitoring stations. It should be noted that these background concentrations are different from the existing concentrations described in Section B. Specifically, the background concentrations used in the air quality dispersion modeling analysis are more conservative as they are based on the highest values recorded in the past five years, rather than the most recent reported monitored values.

Total 1-hour NO_2 concentrations were determined following the EPA "Tier 3" guidance methodology using conservative background concentrations for each hour of the day and each of the four seasons (seasonal hourly background monitored concentrations). The methodology used to determine the total 1-hour NO_2 concentrations from the Proposed Project was based on adding the monitored background to modeled concentrations, as follows:

- Hourly modeled concentrations from the boilers were first added to the seasonal hourly background monitored concentrations;
- Then the highest combined daily 1-hour NO_2 concentration was determined at each location for each day;
- Then the 98th percentile daily 1-hour maximum concentration for each modeled year was calculated within the AERMOD model at each modeled receptor; and
- Finally, the 98th percentile concentrations were averaged over the latest five years.

The $PM_{2.5}$ 24-hour average background concentration is based on the 98th percentile concentration, averaged over the years 2018–2020.

The concentrations presented in **Table 12-3** are averaged over three years, to account for any anomalies between years.

Table 12-3
Maximum Background Pollutant Concentrations

Pollutant	Average Period	Location	Concentration (µg/m^3)	NAAQS (µg/m^3)
NO_2	1-hour	I.S. 52, Bronx	106.4	188
	Annual		32.8	100
$PM_{2.5}$	24-hour	Botanical Garden, Bronx	19.1	35
	Annual		7.4	12
Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2018–2020.				

D.1.a.vi *Probable Impacts of the Proposed Project*

The results of the AERMOD analysis for NO_2 and $PM_{2.5}$ are presented in **Tables 12-4 and 12-5**. As shown, there are no exceedances of the NO_2 1-hour threshold. In addition, the maximum predicted incremental concentrations of $PM_{2.5}$ are not predicted to exceed the NAAQS.

As shown in **Table 12-4**, the maximum modeled concentrations from the Proposed Project's HVAC systems are well below the NAAQS at ground level—concentration standards designed to protect public health allowing for a margin of safety, including individuals with asthma.

Additionally, potential impacts were evaluated at balconies, which would not result in any significant adverse air quality impacts for new residents. Overall, the Proposed Project's HVAC systems would not result in any significant adverse air quality impacts.

Table 12-4
Maximum Modeled Ground-Level Neighborhood Pollutant Concentrations (µg/m³)

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	NAAQS
NO_2	1-hour	116(1)	N/A	116	188
	Annual	0.70(2)	32.8	33.5	100
$PM_{2.5}$	24-hour	1.04	19.1	20.1	35
	Annual	0.07	7.4	7.47	12

Notes:
N/A – Not Applicable
(1) The 1-hour NO_2 concentration presented represents the maximum multi-year average of the total 98th percentile 1-hour NO_2 concentration predicted at any receptor using seasonal-hourly background concentrations.
(2) Annual NO_2 impacts were estimated using a NO_2 /NO_x ratio of 0.75.

Table 12-5
Maximum Modeled Pollutant Concentrations (µg/m³)

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	NAAQS
NO_2	1-hour	187.7(1)	N/A(1)	187.7(1)	188
	Annual	0.71(2)	32.8	33.5	100
$PM_{2.5}$	24-hour	3.25	19.1	22.4	35
	Annual	0.08	7.4	7.48	12

Notes:
N/A – Not Applicable
(1) The 1-hour NO_2 concentration presented represents the maximum multi-year average of the total 98th percentile 1-hour NO_2 concentrations predicted at any receptor using seasonal-hourly background concentrations.
(2) Annual NO_2 impacts were estimated using a NO_2 /NO_x ratio of 0.75.

D.1.a. Proposed Restrictions

The maximum concentrations of the stationary source analysis are presented in **Table 12-4**. As discussed above, the analysis of the Proposed Project's HVAC systems conservatively assumed worst-case fuel, capacity, and exhaust stack locations. In order to mitigate potential significant air quality impacts from stationary sources based on these conservative assumptions used in the analysis, the analysis assumed building design restrictions to locate exhaust stacks away from potential receptors.

The restrictions would be as follows:

D.1.a.i Chicken Island Building 2

The exhaust stack(s) on Chicken Island Building 2 will be located at least 180 feet from any balconies or publicly accessible outdoor space at a similar elevation to the exhaust stack(s) (between a height of 260 and 280 feet above grade) on the southern façade of Building 1 or the northern façade of Building 3.

D.1.a.ii *Chicken Island Building 4*

The exhaust stack(s) on Chicken Island Building 4 will be located at least 176 feet from any balconies or publicly accessible outdoor space at a similar elevation to the exhaust stack(s) (between a height of 240 and 320 feet above grade) on the southern or western façades of Building 3.

D.1.a.iii *Teutonia South Tower*

The exhaust stack(s) on Teutonia South Tower will be located at least 270 feet from any balconies or publicly accessible outdoor space at a similar elevation to the exhaust stack(s) (between a height of 410 and 435 feet above grade) of the Teutonia North Tower.

D.2. MOBILE SOURCES

An assessment of the potential air quality effects of CO emissions that would result from vehicles coming to and departing from the Project Sites was performed following the procedures outlined in the NYSDOT's The Environmental Manual (*TEM*). The screening procedure includes a series of thresholds against which the project-generated traffic is compared. If the project-generated traffic is below the thresholds, the proposed project would not result in a significant adverse air quality impact. If the screening procedure determines that the project-generated traffic exceeds the thresholds, a more detailed, or "refined," analysis would be required to determine the potential for impacts.

The screening procedure used the traffic analysis results for the 2032 "Build year," as described in Chapter 11, "Traffic and Transportation." As described below, the results of the screening analysis show that none of the intersections analyzed for the Proposed Project would require a refined microscale air quality analysis; therefore, project-generated traffic would not result in a significant air quality impact.

D.2.a. *CO Screening Criteria*

The screening criteria first determine whether the Proposed Project would increase traffic volumes or implement any other changes (e.g., changes in speed, roadway width, sidewalk locations, or traffic signals) to the extent whereby significant increases in air pollutant concentrations could be expected. The following multi-step procedure outlined in the *TEM* was used to determine if there is the potential for CO impacts from the Proposed Project:

- **Level of Service (LOS) Screening:** If the "Build" condition (as defined in Chapter 11, "Traffic and Transportation") LOS of an intersection is A, B, or C, no air quality analysis is required. For intersections operating at LOS D or worse, apply Capture Criteria.
- **Capture Criteria:** If the Build condition LOS of an intersection is at D, E, or F, then the following Capture Criteria should be applied at each intersection to determine if an air quality analysis may be warranted:

- a 10 percent or more reduction in the distance between source and receptor (e.g., street or highway widening); or
- a 10 percent or more increase in traffic volume on affected roadways for the Build year; or
- a 10 percent or more increase in vehicle emissions for the Build year; or
- any increase in the number of queued lanes for the Build year (this applies to intersections); it is not expected that intersections in the Build condition controlled by stop signs would require an air quality analysis; or
- a 20 percent reduction in speed when Build condition average speeds are below 30 mph.

If a project does not meet any of the above criteria, a refined microscale analysis is not required. If a project is located within a half mile of any intersections evaluated in the CO State Implementation Plan Attainment Demonstration, (as identified in the NYSDOT *TEM*'s Chapter 1.1, Table 2, by county), more stringent screening criteria are applied at project-affected intersections. Should any one of the above criteria be met in addition to the LOS screening, then a Volume Threshold Screening analysis is performed, using traffic volume and emission factor data to compare with specific volume thresholds established in the *TEM*.

Both the Capture Criteria and Volume Threshold Screening were developed by NYSDOT to be conservative air quality estimates based on worst-case assumptions. The *TEM* states that if the project-related traffic volumes are below the volume threshold criteria, then a microscale air quality analysis is unnecessary even if the other Capture Criteria are met for an intersection with LOS D or worse, since a violation of the NAAQS would be extremely unlikely.

D.2.b. LOS Screening Analysis

Results of the traffic capacity analysis performed for the 2032 Build year condition, for the AM, PM, and Saturday Midday peak periods identified in Chapter 11, "Traffic and Transportation," were reviewed at each of the Traffic Study Area intersections to determine the potential need for a microscale air quality analysis. The LOS screening criteria were first applied to identify those intersections with approach LOS D or worse. Based on the review of the intersections analyzed, 21 intersections were projected to operate at a LOS D or worse on approaches for the AM, PM, and Saturday Midday peak traffic periods.[1]

D.2.c. Capture Criteria Screening Analysis

Further screening of the 21 intersections identified in the LOS Screening Analysis was conducted using the Capture Criteria. This screening analysis indicated that 15 of the 21 intersections would exceed the Capture Criteria of a 10 percent increase to volumes; therefore, a Volume Threshold Screening analysis was performed for these intersections.

[1] See Table 11-11, within Chapter 11, "Traffic and Transportation."

D.2.d. Volume Threshold Screening Analysis

The Volume Threshold Screening analysis determined that all of the intersections were below the threshold. The westbound approach at the Ashburton Avenue and Yonkers Avenue intersection is projected to have 2,312 vehicles per hour during the PM peak period and would represent the highest hourly volumes. This is well below the Volume Threshold of 4,000 vehicle per hour at any intersection approach. Therefore, detailed mobile source analysis for the Proposed Project was not warranted and traffic from the Proposed Project would not be anticipated to result in a significant adverse air quality impact.

D.3. PARKING FACILITIES

Emissions from vehicles using the parking facilities at the Proposed Project could potentially affect ambient levels of CO at adjacent receptors. An analysis of the emissions from the parking areas and their dispersion in the environment was performed, calculating pollutant levels in the surrounding area. Emissions from vehicles entering, parking, and exiting the garages were estimated using the EPA Motor Vehicle Emissions Simulator (MOVES) mobile source emission model. For arriving and departing vehicles, an average speed of five miles per hour was conservatively assumed for travel within the parking facilities. In addition, all departing vehicles were assumed to idle for one minute before proceeding to the exit. Although detailed design plans for the Proposed Project have not yet been developed, the parking facilities were assumed to operate at a typical minimum airflow of 1.0 cubic foot of air per gross square foot per minute. As such, the analysis of potential air quality impacts in this analysis is conservative.

To determine compliance with the NAAQS, CO concentrations were determined for the maximum 8-hour average period. A persistence factor of 0.70 was used to convert the calculated 1-hour average maximum concentrations to 8-hour averages, accounting for meteorological variability over the average 8-hour period.

To determine pollutant concentrations, potential outlet vent locations were analyzed as a “virtual point source” using the methodology in EPA’s Workbook of Atmospheric Dispersion Estimates, AP-26. This methodology estimates CO concentrations at various distances from a conservative outlet vent location 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. It was assumed for the purpose of this analysis that all levels of the parking facilities would be mechanically ventilated.[2]

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 enter and exit the facility (a morning peak period of 8–9 AM, a midday peak period of 12–1 PM, and an evening peak period of 5–6 PM). Traffic data for the parking garage analysis were derived from the trip generation analysis to determine the number of vehicles operating within the parking garage within the peak hours would be 227, 304, and 295 vehicles per hour for the morning, midday, and evening peak hours, respectively. Additionally, the peak 8-hour average number of vehicles was determined to be 76

[2] Partially open garages are typically analyzed as mechanically ventilated garages. This assumption also produces a conservative analysis of potential impacts.

vehicles per hour. Background street concentrations were added to the modeling results to obtain the total ambient levels for CO.

Exhaust air from the analyzed parking garage for each building was assumed to be vented through a single ground-level outlet for each building with a conservative height of approximately 6 feet. Since there is no specific garage design at this time, the vent face was assumed to discharge at a point closest to the nearest receptors. Based on this methodology, the maximum predicted CO concentrations from the parking area were analyzed. All values are the highest predicted concentrations for any time period analyzed.

The maximum predicted 1-hour and 8-hour average CO concentrations modeled are presented in **Table 12-6**.

Table 12-6
Maximum Parking Garage Concentrations (μg/m³)

Pollutant	Averaging Period	Maximum Modeled Impact	On-Road Contribution	Background	Total Concentration	NAAQS
CO	1-hour	0.59	0.10	2.01	2.69	35
	8-hour	0.11	0.07	1.50	1.68	9

These values are below the respective NAAQS; therefore, no significant adverse impacts are anticipated as a result of emissions from the parking facilities.

E. MITIGATION MEASURES

As described above, the analysis of the Proposed Project's HVAC systems conservatively assumed worst-case fuel, capacity, and exhaust stack locations. In order to mitigate potential significant air quality impacts from stationary sources based on these conservative assumptions used in the analysis, the analysis assumed building design restrictions to locate exhaust stacks away from potential receptors. These measures will be incorporated into the design of the Project. The restrictions would include the following.

- The exhaust stack(s) on Chicken Island Building 2 will be located at least 180 feet from any balconies or publicly accessible outdoor space at a similar elevation to the exhaust stack(s) (between a height of 260 and 280 feet above grade) on the southern façade of Building 1 or the northern façade of Building 3.
- The exhaust stack(s) on Chicken Island Building 4 will be located at least 176 feet from any balconies or publicly accessible outdoor space at a similar elevation to the exhaust stack(s) (between a height of 240 and 320 feet above grade) on the southern or western façades of Building 3.
- The exhaust stack(s) on Teutonia South Tower will be located at least 270 feet from any balconies or publicly accessible outdoor space at a similar elevation to the exhaust stack(s) (between a height of 410 and 435 feet above grade) of the Teutonia North Tower.

While not measures designed to mitigate an impact, it is noted that analysis of the potential impacts to air quality from the Proposed Project's parking garages assumed a typical minimum airflow rate. Therefore, the Proposed Project would be designed to operate at that rate; specifically, the parking garages would be designed to achieve a minimum airflow of 1.0 cubic foot of air per gross square foot per minute. ✷