6 AIR QUALITY

6.1 Introduction

According to *CEQR Technical Manual* (2020) 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. For the Proposed Actions, the Reasonable Worst Case Development Scenario established there would be two projected development sites. Projected Development Site 1 would be developed with three buildings, and Projected Development Site 2 would be developed with one building.

6.2 Principal Conclusions

Absent mitigation, the Proposed Actions would result in a significant adverse air quality impact due to mobile source emissions from traffic. Emissions of $PM_{2.5}$ over annual and 24-hour periods would exceed both National Ambient Air Quality Standards (NAAQS) and CEQR *de minimis* criteria due to a deteriorating traffic conditions at the intersection of St. Marks Place and Hamilton Avenue.

Stationary Sources - HVAC

Because of the varied heights of the proposed buildings and stacks, there is no potential for impacts from cumulative emissions from the buildings. The air quality nomograph screenings show that with natural gas as a fuel source, Building 2's HVAC emissions would not have the potential to result in a significant adverse air quality impact on Building 1. The proposed (E)-Designation would require Building 2 to use natural gas as a fuel source.

With the use of natural gas as a fuel source, Building 3 does not have the potential to result in significant adverse air quality impacts; however, if fuel oil #2 is used a fuel source, the (E)-Designation would require the emissions point to be at least 125 feet from the nearest receptor of similar or greater height to preclude a significant adverse air quality impact. Building 4 on Projected Development Site 2 passed the nomograph screening in both the natural gas and fuel oil #2 scenarios; air quality (E)-Designation will be recorded for this site to specify stack height requirement.

With implementation of the proposed (E)-Designation, the Proposed Actions do not have the potential to result in any significant adverse stationary air quality impacts, and further analysis is not warranted.

Stationary Sources - Large/Major Sources and Industrial Sources

No large or major emissions sources were found within 1,000 feet of the Project Area, and therefore detailed large or major source emissions analysis was not warranted. A review of industrial emissions sources within 400 feet of the Project Area found no City DEP permits for any industrial processes. In addition, the Proposed Actions would not introduce a new industrial source. Therefore, the Proposed Actions do not have the potential to result in a significant adverse industrial source air quality impact.

Mobile Sources - Roadway

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 did warrant analysis for the pollutants $PM_{2.5}$ and PM_{10} because more than 12 heavy-duty diesel vehicle (HDDV)-equivalents would be generated along Hamilton Avenue, a local street that experiences fewer than 5,000 daily traffic trips.

In the With-Action Condition, absent mitigation, there would be an increase in traffic volumes and extensive delays along Hamilton Avenue. The analysis indicates that concentrations of PM_{10} would not exceed 24-hour NAAQS thresholds, however, $PM_{2.5}$ 24-hour and annual concentrations would exceed both the NAAQS and *de minimis* thresholds if the emissions generated during the AM peak hour are assumed over a 24-hour period. Therefore, significant adverse air quality impacts cannot be ruled out, and the Proposed Actions would result in a significant adverse air quality impact from mobile emissions sources. This significant adverse impact would be fully mitigated with the installation of an all-way STOP-control, as described in Chapter 13, “Mitigation.”

Mobile Sources – Parking Garages

The Proposed Actions would introduce new parking facilities in Building 1, Building 3, and Projected Development Site 2. Of these three parking facilities, the parking facility within Building 3 would generate the most peak hour trips. None of the pollutants of concern generated in these parking facilities would exceed the concentrations of NAAQS or *de minimis* thresholds. Therefore, the Proposed Actions would not result in a significant adverse air quality impact from emissions generated in the proposed parking garages.

6.3 Methodology

This air quality analysis follows the guidelines set forth in the *CEQR Technical Manual*. For this project, a preliminary screening in the areas of HVAC, industrial source, and large or major source was warranted.

Stationary Sources

A stationary source preliminary screening was conducted to evaluate the potential for a significant adverse air quality impact from the Proposed Project's heat and hot water system. While the emissions stacks would be sited on the building bulkheads, and the specific stack locations are not yet known. To provide a conservative analysis, this assessment considers the distance between each building's bulkhead and the nearest receptor of similar or greater height. The four buildings on the projected development sites would release emissions at various elevations (greater than 30 feet difference in height between Buildings 2, 3, and Projected Development Site 2), and therefore a cumulative analysis is not warranted.

Consistent with the *CEQR Technical Manual* guidance, the exhaust stack was assumed to be three feet above the roof of the bulkhead because the HVAC systems' design was not available. Consistent with building code, all stacks will be required to be at least 5 feet from the edge of the bulkhead's roof.

The Applicant intends to the develop Projected Development Site 1 with buildings that would use natural gas as a fuel source; however, both No. 2 fuel oil and natural gas were analyzed as potential fuel sources using the nomographs on Figure 17-5 and Figure 17-7 provided in the *CEQR Technical Manual*'s air quality appendix. The analysis considers the potential for project-on-existing, existing-on-project, and project-on-project impacts.

To determine the nearest receptors of similar or greater height, the building roof heights in the New York City Department of Information Technology and Telecommunications' NYC Planimetric Database was reviewed. Building heights were also surveyed using available aerial imagery of the surrounding area. Using the data from the Planimetric Database and available aerial imagery, the certificates of occupancy for the nearest receptors of similar or greater height was reviewed to confirm the building height. This analysis also accounts for the topographic changes within the Study Area.

Industrial Source Analysis

The Proposed Actions would not introduce a new industrial air emissions source. A review of existing permits within 400 feet of the development sites was undertaken. Site reconnaissance did not identify any facilities that have the potential operate without a permit (such as unpermitted spray painting facilities) within 400 feet of the development sites.

Mobile Source Analysis

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 particulate matter (PM) because the Proposed Actions would generate more than 12 heavy duty vehicle-equivalents on a paved road with fewer than 5,000 average daily traffic trips. The Proposed Actions would introduce two parking facilities with a capacity of at least 85 parking spaces, and therefore a parking facilities mobile source analysis was warranted.

For mobile source assessment, vehicular CO and PM engine emission factors were computed using the EPA Motor Vehicle Emission Simulator, or MOVES (version "MOVES2014a"). This emissions simulator calculates engine emission factors for various vehicle types, based on the fuel type, meteorological conditions, vehicle speeds, vehicle age, roadway types, number of starts per day, engine soak time, and various other factors that influence emissions. The inputs and use of MOVES incorporate the most current guidance available from NYSDEC and EPA. This approach follows EPA's guidance to define vehicle "operating mode distributions" on project-level analysis.

Traffic data for the air quality analysis were derived from projected future growth in traffic as specified in Chapter 5, "Transportation." The PM_{10} and $PM_{2.5}$ 24-hour analysis for both parking facility and roadway analyses used the No-Action and With-Action traffic volumes. The intersection of St. Marks Place and Hamilton Avenue was selected as a representative worst-case for project-generated mobile source air quality conditions. This intersection was selected because:

1. Hamilton Avenue between Richmond Terrace and St. Marks 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) than arterial streets and major collector streets in the area such as Richmond Terrace and Stuyvesant Place;
2. The relatively large pedestrian volumes at this intersection during peak hours – including pedestrian traffic generated by nearby Curtis High School – contribute to traffic delays and emissions at this intersection;
3. While the intersection of Hamilton Avenue and Academy Place would experience sizable project-generated traffic volumes along two local streets, traffic egressing the Project Area westbound along Hamilton Avenue would not be subject to a STOP control at this intersection; and
4. The traffic volumes generated by the Proposed Actions would result in a sizable percentage increase of traffic at this intersection.

Background pollutant concentrations were obtained from the nearest monitoring station provided in the New York State Ambient Air Quality Report for 2019 published by the New York State Department of Environmental Conservation (DEC).[1]

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 heating, ventilation, and air conditioning (HVAC) and industrial source preliminary screenings. For large or major sources, a study area of 1,000 feet around the Development Site was established.

[1] New York State Ambient Air Quality Report for 2019, last accessed 6 April 2021. https://www.dec.ny.gov/docs/air_pdf/2019airqualreport.pdf

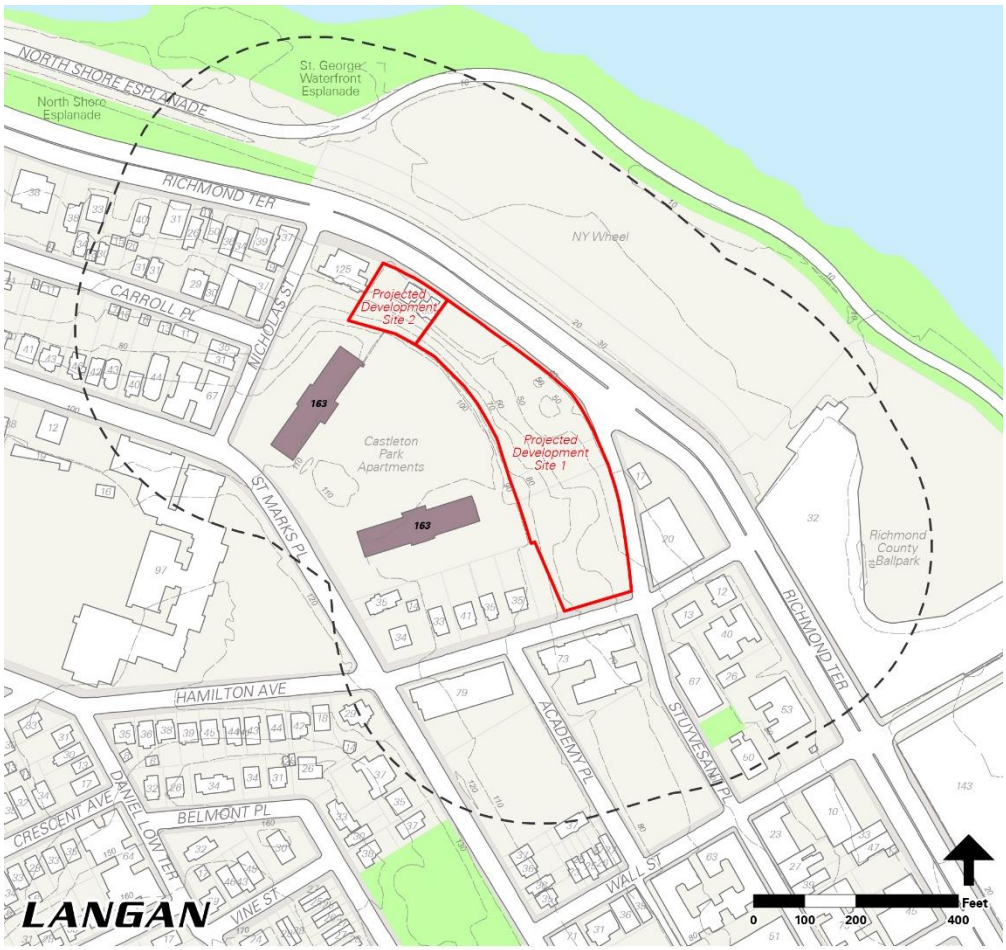
6.4 Assessment

Stationary Sources

HVAC Screening Analysis

The Proposed Actions would facilitate four buildings across the two projected development sites, all of which would be at least 157 feet tall. Building 1 would be the tallest building with a height of 298 feet, including the bulkhead. Including the bulkhead, Building 2 would be 270 feet, Building 3 would 157 feet, and Projected Development Site 2 would be developed to a height of 205 feet. In accordance with Building Code, emissions stacks would be released at least three feet above the bulkhead's roof level, and the stack would be located on the roof of the bulkhead at least 5 feet from the edge of the bulkhead's roof. Figure 6-1 shows the nearest buildings in the Study Area of similar or greater height to each project-generated building; the distance between each building's bulkhead and the nearest receptor of similar or greater height is shown in Table 6-1 along with the floor area that would be serviced by each building's HVAC system (accessory parking areas would not be serviced by HVAC systems).

Figure 6-1: Receptors 400 Feet or Taller Within 400 Feet of Development Sites



Note: Building heights per NYC Planimetric Database and confirmed by certificate of occupancy

Figure 6-2: Nearest Receptors by Building



Elevations ("EL") presented in NAVD88.
Source: FX Collaborative

Table 6-1: Building Roof and Emissions Stack Heights by Development Site

Building	GSF[1]	Bulkhead Height (ft)[2]	Stack Height (ft)[2]	Nearest Receptor(s) of Similar or Greater Height	Nearest Receptor Distance from Bulkhead (ft)
Projected Development Site 1					
1	320,998	298 (El: 355)	301 (El: 358)	N/A	N/A
2	237,042	270 (El: 318)	273 (El: 321)	Building 1	124
3	141,465	157 (El:196)	160 (El: 199)	Building 2 Building 4	106 118
Projected Development Site 2					
4	104,948	205 (El: 244)[3]	208 (El: 247)[3]	Castleton Park Apts – N Tower	113

[1] Excludes parking areas, which would not be serviced by heat and hot water systems.

[2] Height above base plane. Figure 6-2 presents elevations (El) in NAVD88.

[3] Assumed elevation based on base plane of Building 3

Projected Development Site 1 - Building 1

Building 1 would be developed on Lot 100 and would have a bulkhead height of 298 feet and an emissions stack height of 301 feet (elevation of 358 feet). When accounting for topographic changes, the emissions stack on Building 1 would be more than 75 feet in elevation above the highest sensitive receptors (residential units) in the Castleton Park Apartments, the tallest sensitive receptor use within 400 feet. Building 1 therefore has no potential to result in project-on-existing impacts. Building 1's emission point would also be above the roof elevation of the other project-generated buildings, and therefore has no potential to result in project-on-project impacts. Accordingly, emissions from Building 1 has no potential to result in significant adverse air quality impacts on surrounding buildings.

Projected Development Site 1 - Building 2

At its nearest point at or above the emissions height of 273 feet (elevation: 321), Building 2's bulkhead would be 124 feet from the northern façade of Building 1, the nearest receptor of similar or greater height. At a height at or above the 273-foot emissions height from Building 2, Building 1 would have residential units and a rooftop amenity space.

Building 2 would be taller than Building 3 and Building 4, and therefore has no potential to result in significant adverse air quality impacts to these buildings. Building 2 would have an emissions point at an elevation approximately 39 feet above the elevation of the highest residential units in the Castleton Park Apartment towers, and therefore has no potential to result in significant adverse stationary air quality impacts to existing buildings.

Building 2 would contain 237,042 gsf of floor area that would be serviced by heating and cooling system (areas for accessory parking would not be serviced by the heating and cooling system). Nomographs showing the preliminary screening results potential affects from Building 2 on Building 1 under both fuel oil #2 and natural gas fuel sources are shown in Figure 6-3 and Figure 6-4.

Figure 6-3: Building 2 SO_2 Boiler Screen – Residential Fuel Oil #2

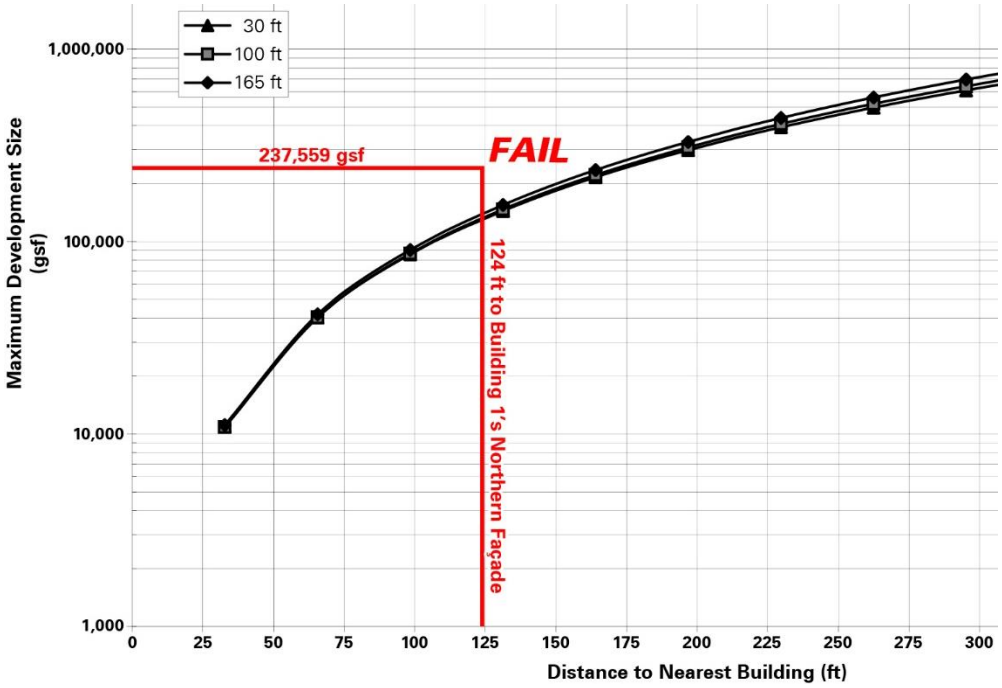
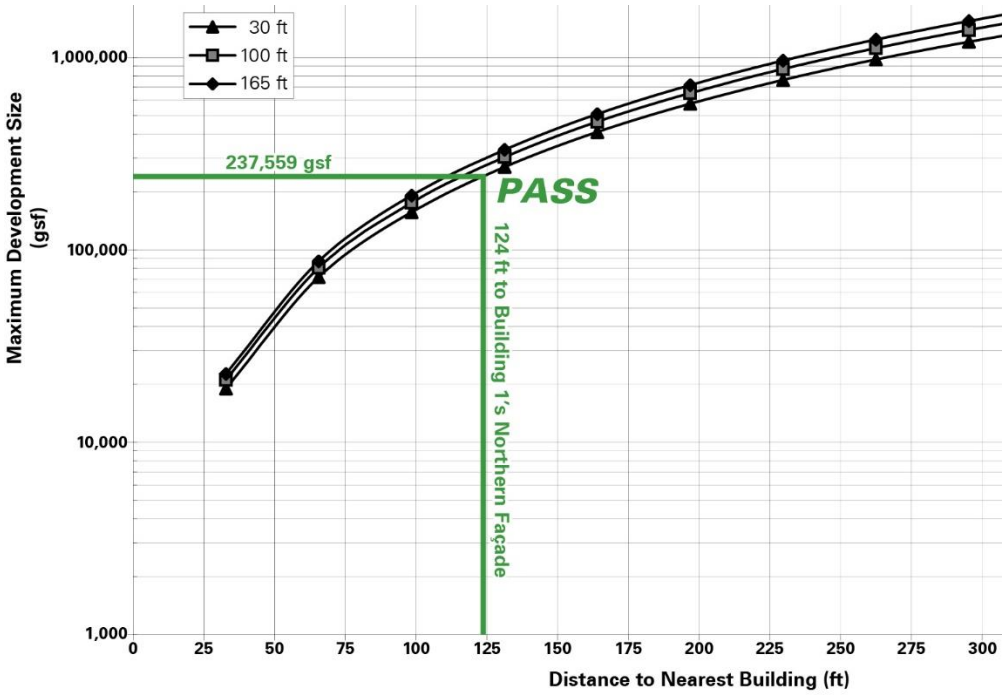


Figure 6-4: Building 2 NO_2 Boiler Screening – Residential Development Natural Gas



The screening shows that with the use of natural gas as a fuel source, Building 2 would pass the nomograph screening provided that natural gas is used as the fuel source. An (E)-Designation requiring natural gas as a fuel source would preclude the potential for significant adverse air quality impacts from emissions from Building 2.

Projected Development Site 1 - Building 3

The nearest receptors at or above Building 3's emissions height of 160 feet would be Building 2 and Building 4. At its nearest point, Building 3's bulkhead would be 106 feet from Building 2, and 118 feet from Building 4. At its furthest point, Building 3's bulkhead would be 175 feet from Building 4's southern façade, and 170 feet from Building 2's northern façade.

The building would have 141,465 gsf of floor area serviced by the building's HVAC system (the accessory parking area would not be services by the HVAC system). The screenings for fuel oil #2 and natural gas fuel sources are provided in Figure 6-5 and Figure 6-6.

Figure 6-5: Building 3 SO_2 Boiler Screen – Residential Fuel Oil #2

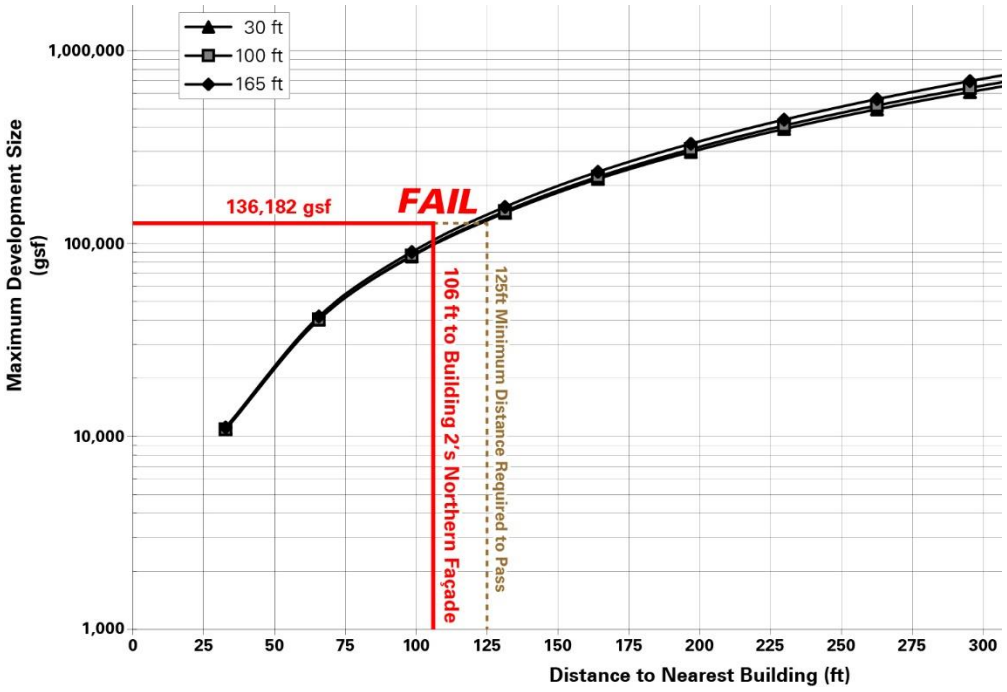
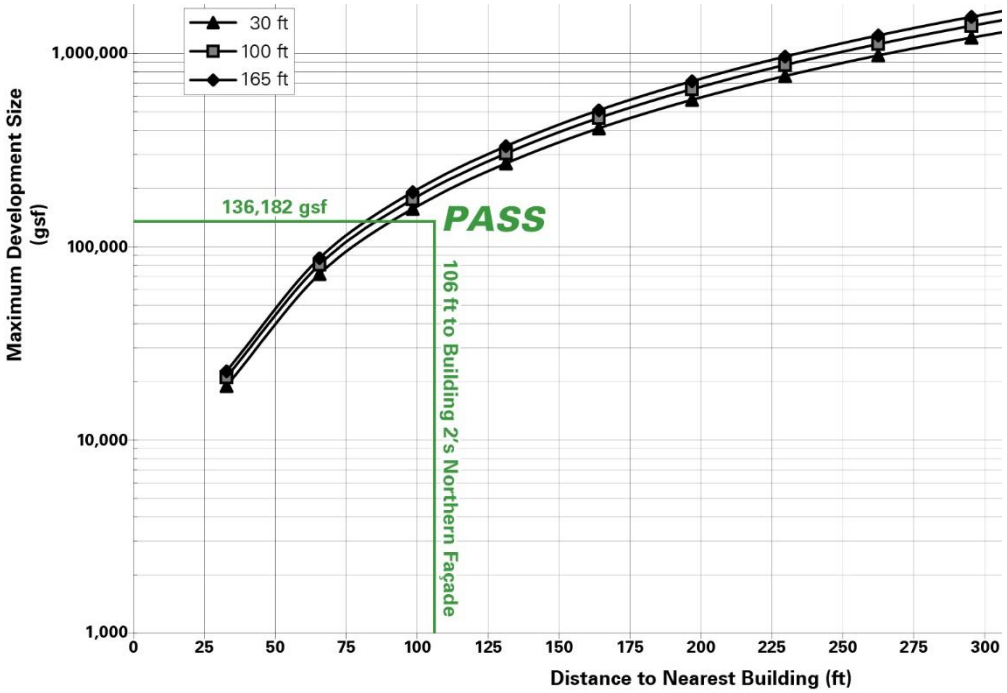


Figure 6-6: Building 3 NO_2 Boiler Screening – Residential Development Natural Gas



The nomograph screenings show that with the use of natural gas as a fuel source, Building 3 would not have the potential to result in a significant adverse stationary air quality impacts. If fuel oil #2 is used, the emissions point would have to be at least 125 feet from Building 2 and Building 4 to pass the screening. A (E)-Designation is therefore proposed that would require natural gas to be used as the fuel source for Building 3's HVAC system, or, if fuel oil #2 is used, that the emissions stack be at least 125 feet from both Building 2 and Building 4.

Projected Development Site 2 - Building 4

In the With-Action Condition, Projected Development Site 2's bulkhead would be developed at a height of 205 feet. At the emissions height, the nearest receptor of similar or greater height would be the north tower of the Castleton Park Apartments.

At its nearest point, Building 4's bulkhead would be 114 feet from the north tower of the Castleton Park Apartments. Building 4 would have 104,948 gsf of floor area, and Figure 6-7 and Figure 6-8 show Building 4 would pass the nomograph screening for both fuel oil #2 and natural gas fuel sources.

Figure 6-7: Building 4 SO_2 Boiler Screen – Residential Fuel Oil #2

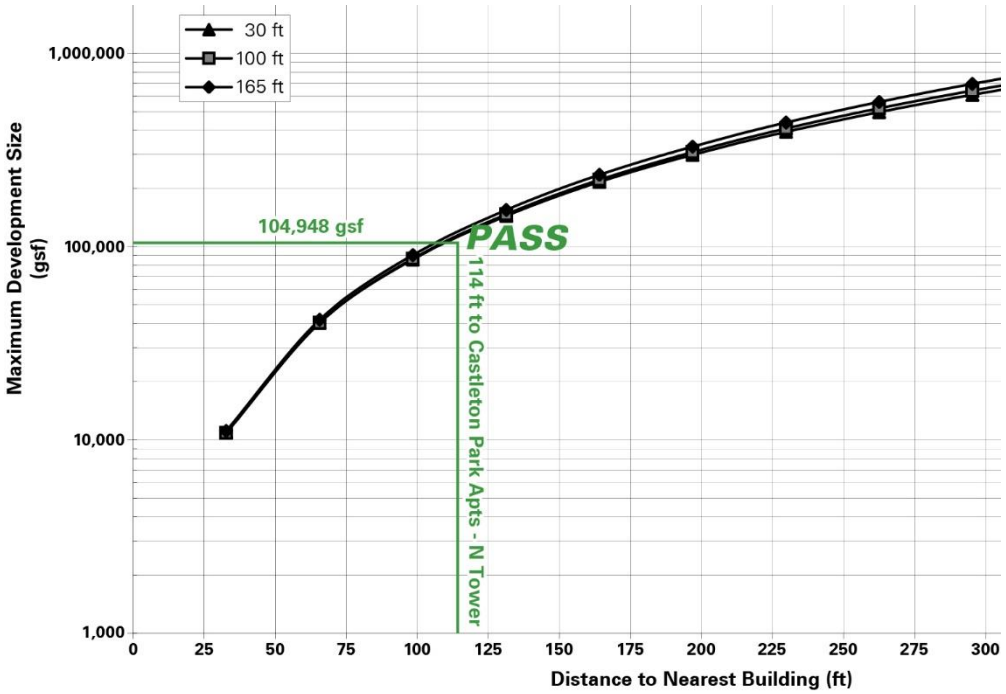
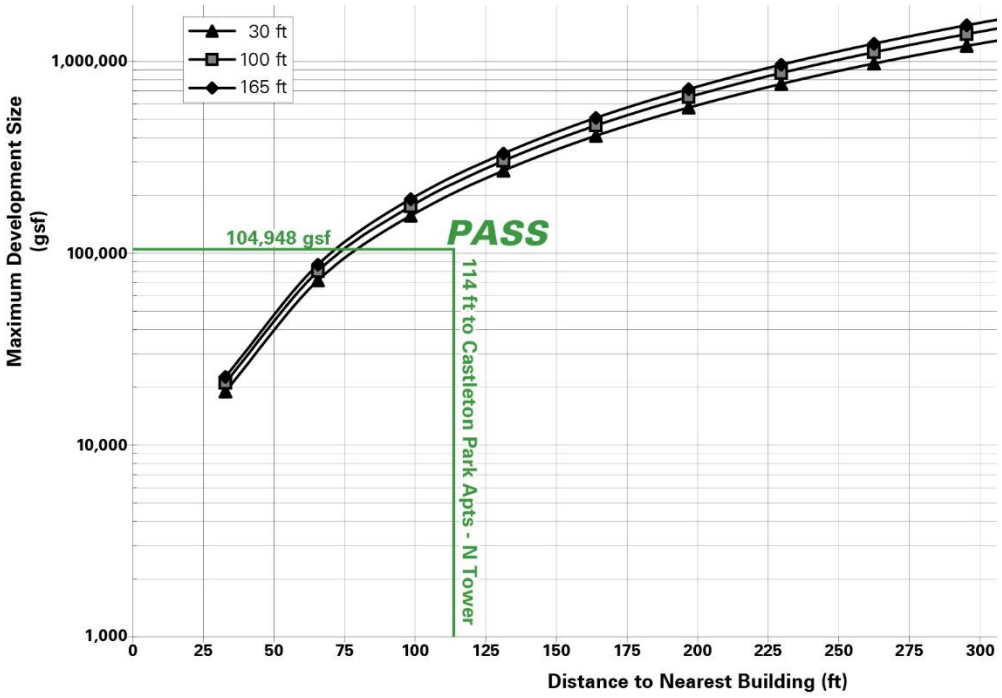


Figure 6-8: Building 4 NO_2 Boiler Screening – Residential Development Natural Gas



Industrial Source Analysis (Air Toxics)

A review of the New York City Department of Environmental Protection (DEP) Clean Air Tracking System (CATS) database indicated there are no sites within 400 feet of the Development Site with current air permits for paint spray booths, woodworking shops, or other manufacturing industrial sources. The review found one permit (GA000495) for a gas station at 78 Richmond Terrace (Block 9, Lot 28) that expired in 2001; this site is improved with the NYPD 120th Precinct and has no potential for the gas station use to be reestablished.

The review of the CATS database found that within 400 feet of the Project Area there are 8 active boiler permits and 6 expired boiler permits. These 14 permits and the expired gas station permit at 78 Richmond Terrace are shown in Table 6-2.

Table 6-2: Clean Air Tracking System (CATS) Search

Bl	Lot	Address	Application	Type	Exp. Date
2	22	155 Richmond Terrace	CR023317	Boiler	3/21/2020
9	1	75 Stuyvesant Place	CR210612	Boiler	9/18/2021
10	19	36 Hamilton Avenue	CA045280	Boiler	7/1/2021
11	20	60 Hamilton Avenue	CA123279	Boiler	7/28/2019
13	8	165 St. Marks Place	CW009116	Boiler	4/5/2021
14	108	232 Richmond Terrace	CA148589	Boiler	5/25/2022
14	96	252 Richmond Terrace	CB233511	Boiler	1/25/2021
15	1	141 St. Marks Place	CA228399	Boiler	12/1/2020
15	1	141 St. Marks Place	CB036411	Boiler	11/9/2020
22	1	105 Hamilton Avenue	CA127190	Boiler	Cancelled
9	22	100 Richmond Terrace	CA165991	Boiler	6/20/1997
9	22	100 Richmond Terrace	CA330294	Boiler	11/28/1997
9	9	51 Stuyvesant Place	CA257498	Boiler	12/30/2013
9	28	78 Richmond Terrace	CA270692	Boiler	4/9/1993
9	28	78 Richmond Terrace	GA000495	Gas Station	1/7/2001

According to the *CEQR Technical Manual*, air quality impact analysis is not warranted for emissions from existing gas stations or from permitted boilers 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 6-2.

Large or Major Sources

A review of existing large and major sources of emissions (i.e., sources having a Title V or State Facility Air Permit) within 1,000 feet of the Development Site was performed using registration lists maintained by NYSDEC and EPA. No large or major sources were identified with Title V or State permits. The nearest large or major source is the Richmond University Medical Center (DEC ID 2-6401-00302), which is more than one mile from the Project Area. Therefore, the Proposed Actions would not result in a significant adverse large or major source air quality impact and further analysis is not warranted.

Mobile Source – Intersection Assessment

An analysis of vehicular roadway emissions at the intersection of St. Marks Place and Hamilton Avenue was performed, calculating pollutant levels of PM_{10} and $PM_{2.5}$ using the methodology set forth in the *CEQR Technical Manual*. The AM peak hour of this intersection was selected for analysis because the incremental increase in traffic volumes in the Study Area are greatest during this peak hour relative to the weekday midday, weekday PM, and Saturday peak hours, and the intersection comprises of two local streets near the Project Area where project-generated traffic would experience significant delays absent mitigation. Emissions from vehicles at the intersection were estimated using the EPA MOVES2014b mobile source emission model. 2025 was selected for the year of analysis. Mobile source running and idling emissions were calculated for PM_{10} and $PM_{2.5}$ for the weekday AM peak hour to provide a conservative estimate of emissions. Results from EPA MOVES 2014b were then used in a CAL3QHCR Tier I analysis to calculate maximum emission concentrations at the intersection. Results from the CAL3QHCR model are shown in Table 6-3.

Table 6-3: Intersection Mobile Source Emissions

Pollutant ($\mu g/m^3$)	Background Concentration[1]	Modeled No-Action	Modeled With-Action	Increment	CEQR *de minimis*	Total With-Action Concentration	NAAQS Concentration
PM_{10} – 24hr	43.00	45.90	60.51	N/A	N/A	103.51	150.00
$PM_{2.5}$ – 24hr	14.50	22.48	45.44	22.96	10.25	59.94	35.00
$PM_{2.5}$ – Annual	6.80	2.19	5.71	3.52	0.10	12.51	12.00

[1] New York State Ambient Air Quality Report for 2019, published by NYSDEC.

In the With-Action Condition, there would be an increase in traffic volumes and extensive delays along Hamilton Avenue. $PM_{2.5}$ 24-hour and annual concentrations would exceed both the NAAQS and *de minimis* thresholds if emissions generated during the AM peak hour are assumed over a 24-hour period. Concentrations of PM_{10} would not exceed the 24-hour NAAQS threshold. Therefore, the Proposed Actions would result in a significant adverse air quality impact from mobile emissions sources at the intersection of St. Marks Place and Hamilton Avenue. In accordance with traffic analysis, mitigation measure of All-Way STOP-Control has been approved by NYC DOT for this intersection. Further air quality analysis has been performed for the future with-action and with mitigation scenario and the analysis indicates no significant adverse air quality impact after the mitigation measure is implemented. The mitigation and the associated mitigated air quality results are discussed in Chapter 13, "Mitigation."

Mobile Source – Garage Assessment

The Proposed Actions would introduce new parking facilities in Building 1, Building 3, and Projected Development Site 2. Of these three parking facilities, the 142-space parking facility within Building 3 would generate the most peak hour trips.

An analysis of the emissions from the garage was performed, calculating pollutant levels in the surrounding area, using the methodology set forth in the *CEQR Technical Manual*. Emissions from vehicles entering, parking, and exiting the garage were estimated using the EPA MOVES2014b mobile source emission model. 2025 was the selected for the year of analysis. County-specific relative humidity data obtained from MOVES2014b was used. Per the *CEQR Technical Manual*, an ambient temperature of 45°F was used for all MOVES modeling events. MOVES modeling was conducted for CO 1-hour, CO 8-hour, PM_{10} and $PM_{2.5}$ and included emissions from starts, idling, and running exhaust. Number of starts were assumed to equal the number of cars exiting in the specified time period. Starting vehicles were assumed to be operating in a "cold-start" mode with a "soak time" of greater than 720 minutes. Idling was assumed to occur for a period of one minute for all cars entering and exiting. Running exhaust was calculated using a link distance equal to two-thirds of the distance to the farthest spot from the entrance/exit and an average speed of 5 mph in the garage.

Near and far receptors to emissions generated from mobile sources in the garage were assumed to be five and fifty feet away from the garage at a pedestrian height of six feet. Because of the garage will feature a natural ventilation design, dispersion of emissions from mobile sources was modeled as an "area source" using techniques and parameters described in AP-26.

Results from the MOVES modeling combined with the background concentrations are shown in Table 6-4.

Table 6-4: Mobile Source Emissions

Pollutant	Background Concentration[1]	Predicted Concentration	CEQR *de minimis*	Total With-Action Concentration	NAAQS Concentration
CO – 1hr (ppm)	2.85	0.18	N/A	3.03	35.00
CO – 8hr (ppm)	1.40	0.16	3.80	1.56	9.00
PM_{10} – 24hr ($\mu g/m^3$)	43.00	0.88	N/A	43.88	150.00
$PM_{2.5}$ – 24hr ($\mu g/m^3$)	14.50	0.88	10.25	15.33	35.00
$PM_{2.5}$ – Annual ($\mu g/m^3$)	6.80	0.27	0.30	7.07	12.00

[1]New York State Ambient Air Quality Report for 2019, published by NYSDEC.

None of the pollutants would exceed the concentrations of NAAQS or *de minimis* thresholds. Therefore, the Proposed Actions would not result in a significant adverse air quality impact in the area of mobile source emissions.

Proposed (E)-Designations

To preclude the potential for project-on-project or project-on-existing air quality impacts from stationary sources, an (E)-Designation for air quality would be assigned to Projected Development Site 1 (Block 13, Lots 82, 92, and 100) for air quality. By placing this (E)-Designation, the potential for a significant adverse air quality impact from the Proposed Actions would be avoided. The New York City Office of Environmental Remediation (OER) would provide regulatory oversight of the environmental investigation and remediation during this process. Building permits cannot be issued by the NYC Department of Buildings without prior OER approval of the investigation and/or remediation pursuant to the provisions of Section 11-15 of the New York City Zoning Resolution (Environmental Requirements).

The requirements of (E)-Designation would be as follows:

Projected Development Site 1

Building 1 (Block 13, Lot 100): 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) stack is located at the highest tier and at least 301 feet above grade to avoid any potential significant adverse air quality impacts.

Building 2 (Block 13, Lot 92): Any new residential and/or commercial development on the above-referenced properties must use natural gas as the type of fuel for the heating, ventilating and air conditioning systems and the hot water system (HVAC) and ensure that the HVAC stack is located at the highest tier and at least 273 feet above grade to avoid any potential significant adverse air quality impacts.

Building 3 (Block 13, Lot 82): Any new residential and/or commercial development on the above-referenced properties must use natural gas as the type of fuel for heating, ventilating and air conditioning systems and the hot water system (HVAC), and ensure that the HVAC stack is located at the highest tier and at least 160 feet above grade to avoid any potential significant adverse air quality impacts.

Projected Development Site 2

Building 4 (Block 13, Lots 68, 71, 73): 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) stack is located at the highest tier and at least 208 feet above grade to avoid any potential significant adverse air quality impacts.

With the proposed (E)-Designations in place, significant adverse stationary source air quality impacts would be precluded.