



Technical Memorandum

Lead Agency:

Department of City Planning
120 Broadway, 31st Floor
New York, NY 10271

Prepared for:

Bayride Realty LLC

Prepared by:

Equity Environmental Engineering
500 International Drive, Suite 150
Mount Olive, NJ 07828

March 12, 2021

5th Avenue Rezoning

Bay Ridge, Brooklyn NY
Block 6087, Lots 17, 19, 21, 23, 26
through 34, and 129
Brooklyn Community District 10

5th Avenue

Brooklyn, New York 11209

CEQR Reference No: 19DCP128K

ULURP Reference No:

190447 ZMK; 190448 ZRK

5th Avenue Rezoning

CEQR No. 19DCP128K

ULURP No. 190447 ZMK; 190448 ZRK

Technical Memorandum

March 2021

This memorandum summarizes the potential environmental effects of the City Council Modification to the original proposed zoning map amendment and zoning text amendment that was previously analyzed in the September 2020 5th Avenue Rezoning Environmental Assessment Statement (EAS). The Proposed Actions that were analyzed in the EAS and certified by the Department of City Planning were 1) a zoning map amendment to rezone Block 6087, Lots 23, 26, 27, 28, 29, 129, 30, 31, 32, 33, 34, and p/o 1 from the existing C8-2 zoning district to an R7A/C2-4 zoning district and 2) a zoning text amendment to map an area coterminous with the rezoning area as a Mandatory Inclusionary Housing Area (MIH), Options 1 and 2. The Proposed Actions are located within Brooklyn Community District 10, and would introduce mixed-use growth in close proximity to existing residential districts and public transit while rendering conforming the existing residential buildings within the Affected Area. The Proposed Actions would also introduce residential uses to the rezoning area.

The City Council Modification would alter the new zoning district on three of the non-Applicant-owned lots (Block 6087, Lots 32, 33, and 34) from the originally proposed R7A/C2-4 district to an R6A/C2-4 district. The modification would also add the Workforce Option from the MIH options mapped within the area.

The Modification would not affect the Applicant's proposal on Block 6087, Lots 23 and 31.

Block 6087, Lots 32, 33, and 34, identified as Projected Development Site 2 in the EAS, would be affected (zoned R6A instead of R7A)—the maximum permitted FAR would be reduced from 4.60 to 3.60, and the maximum building height would be reduced from 95 feet tall to 85 feet tall. The site consists of 4,525 SF across the 3 separate lots: Lots 32 and 33 are improved with 2-story 1,760 GSF residential buildings; Lot 34 is improved with a 2-story, 2,240 GSF mixed-use building with ground floor commercial use and residential uses on the second floor. The EAS analyzed a Future With-Action Scenario where the lots would combine and be improved with a 9-story, 95-foot-tall, 22,363 GSF (20,815 ZSF) mixed-use building with 3,059 GSF of ground floor commercial uses, 19,304 GSF of residential uses on floors 2 through 9, and 22 dwelling units (4 permanently set aside as affordable). Within an R6A district, however, a reasonable worst-case development on Projected Development Site 2 would be an 8-story, 85-foot-tall, mixed-use building with 16,942 GSF (16,290 ZSF; 3.60 FAR). The building would contain 2,824 GSF of ground floor local retail and 14,118 GSF (13,575 ZSF) of upper floors residential uses, with 16 total dwelling units, 3 of which would be permanently set aside as affordable.

The result of the Modification is 6 fewer dwelling units (1 fewer affordable unit) and a building that is 10 feet shorter than what was analyzed in the EAS. For the technical sections listed below the EAS analysis was more conservative than the new modified scenario because of larger bulk and building height; the addition of the MIH Workforce Option would not impact any CEQR technical area as CEQR analysis assumes 20 percent permanently affordable units.

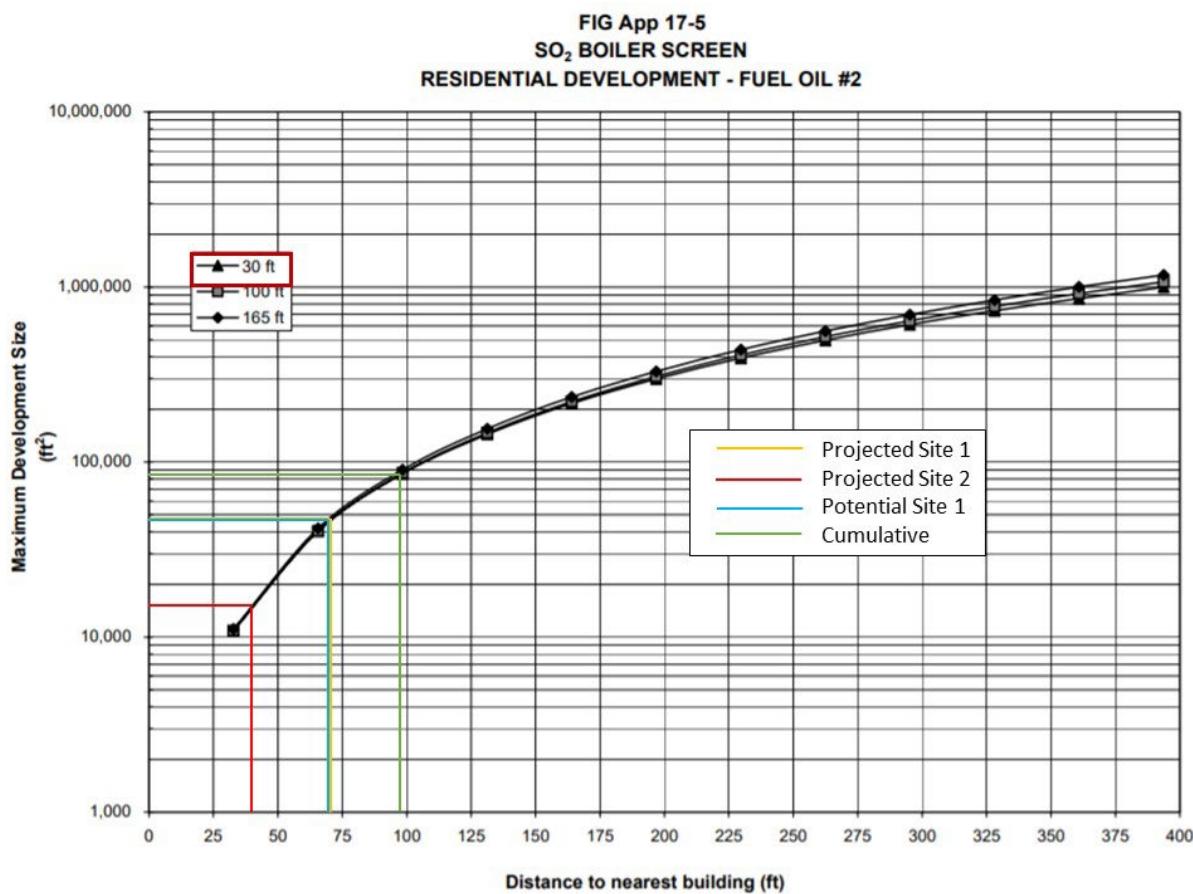
Therefore, the Modification would not affect the analysis or screening included in the EAS for land use, zoning, and public policy; open space; shadows; historic and cultural resources; urban design and visual resources; hazardous materials; noise; neighborhood character; or construction as summarized below.

- **Land Use, Zoning, and Public Policy:** The change from an R7A district to an R6A district on Projected Development Site 2 would not affect land uses, zoning, or applicable public policies on Lots 32, 33, and 34, and would not affect existing or potential land uses, zoning, or public policies within the remainder of the rezoning area.
- **Open Space:** The EAS analyzed open space impacts assuming an additional 137 residents would be added to the project area. The modified scenario would instead add 125 residents to the study area, and therefore there would be no impacts on open space resources within the study area.
- **Shadows:** The modified scenario would reduce the height of the building on Projected Development Site 2 from 95 feet tall to 85 feet tall, thereby reducing the extent of shadows cast by the building from what was originally analyzed in the EAS. Therefore, the modified scenario would not affect shadows.
- **Historic and Cultural Resources:** No impacts were identified in the EAS for historic and cultural resources, and the modified scenario would not alter these findings.
- **Urban Design and Visual Resources:** The modified scenario would reduce permitted bulk and height on Projected Development Site 2, thereby resulting in less potential to obstruct any publicly accessible views to visual resources. The EAS identified no impacts to Urban Design and Visual Resources, and a reduction in bulk and height would not affect this finding.
- **Hazardous Materials:** Changing the zoning designation on Projected Development Site 2 would not affect the analysis or screening included in the EAS as development is still projected to occur and all findings from the EAS are still relevant and accurate.
- **Noise:** Changing the zoning designation on Projected Development Site 2 would not affect the analysis or screening included in the EAS as development of the same uses is still projected to occur and all findings from the EAS are still applicable.
- **Neighborhood Character:** Because reducing the bulk and height of Projected Development Site 2 would not affect the original findings for each of the supplemental analyses provided in the EAS, and no impacts are expected to occur as a result of the Proposed Actions, there would be no significant impacts to any of the constituent elements of neighborhood character, and there would be no combination of moderate effects to several elements that cumulatively may affect neighborhood character.
- **Construction:** The change in zoning districts from R7A to R6A on Projected Development Site 2 would not affect the analysis included in the original EAS as development is still projected on the site. Therefore, the findings and analysis from the EAS are still applicable.

Air Quality

The EAS Screened air quality stationary sources by measuring potential impacts from three buildings, each at 95 feet in height. A new nomograph is warranted as a result of the Modification, as the building height and reduction in square footage for Projected Development 2 could change the screening analysis findings. The nomograph and screening analysis results table below indicate that the reduction in height and gross square footage in the modified scenario would require two project-on-project detailed analysis scenarios. The reduction in building height for Projected Development Site 2 removes the requirement to estimate the impact from Projected Development Site 1 and Potential Development Site 1.

Figure 1: Revised Nomograph Screening



The screening analysis Figure 1 nomograph shows that a detailed analysis would be required for any existing land uses that is 85 feet or taller and at a distance of less than 98 feet from the proposed project. A review of existing land uses in the surrounding area shows that the nearest building of similar or greater height is the 101 feet tall building, located at 371 89 Street (Block 6062, Lot 141), which is 830 feet north of the Project Area.

Table 1 shows the screening analyses framework and results, where “Use AERMOD” indicate that a detailed analysis using AERMOD dispersion analysis is required.

Table 1: Revised Screening Analysis Results

Source Building Site ID	Heated Area (sq. ft.)	Screen Distance (ft.)	Receiving Building (Site ID or Block/Lot)	Receiving Building Distance (ft.)	Pass/ Fail
Project-on-Project					
Projected Development Site 1	48,485	N.A. (<30 ft.)	Potential Development Site 1	0	Use AERMOD
Projected Development Site 2	16,942	N.A. (<30 ft)	Projected Development Site 1	0	Use AERMOD
			Potential Development Site 1	27	Use AERMOD
Potential Development Site 1	48,318	N.A. (<30 ft.)	Projected Development Site 1	0	Use AERMOD
Project-on-Existing and/or Planned Land Uses					
Development Sites (Cumulative)	119,166	112	371 89 Street (Block 6062, Lot 141)	830	Pass

Detailed Analysis

Two dispersion modeling analyses were conducted to estimate the impacts from the buildings’ stacks emissions. Each modeling scenario was the cumulative impact of two anticipated for development buildings on the remaining building. The reduction in height for Projected Development Site 2 has removed the need for analysis of the impact of Projected Development Site 1 and Potential Development Site 1. These analyses were conducted using the latest version of EPA’s AERMOD dispersion model through the Breeze Software user interface. In accordance with CEQR guidance, these analyses were conducted assuming stack tip downwash, elimination of calms, and with and without downwash effect on plume dispersion. Flat terrain was specified for all models.

Greater emissions would result from HVAC systems fueled by oil #2 than from natural gas fueled boilers. Therefore, the boilers were assumed to be fueled by oil #2 for the analysis purpose. Per the *CEQR Technical Manual*, the pollutants of concern for oil #2 fueled boilers are SO₂ and PM_{2.5}. However, NO₂ was also analyzed as a conservative measure. The boilers’ energy intensities were calculated from the annual fuel usage, the developments’ gross floor areas, and the assumption that the developments’ fuel usage would resemble that of residential buildings. Pertinent values were obtained from the *CEQR Technical Manual Appendix* for residential buildings, and the assumption that all fuel would be consumed during the 100-day (or 2,400 hour) heating season. Per the guidance from the Department of City Planning for similar project, SO₂ emission was assumed to be 30 ppm. Table 2 shows the calculated emission rates, both short-term and annual.

Table 2: Estimated Short-term and Annual Emission Rates of Each Building

Site ID	Fuel	Pollutant	Averaging Time	Emission Rate (g/s)
Projected Development Site 1	Fuel Oil #2	NO ₂	1-hour	2.21E-02
			Annual	6.06E-03
		PM _{2.5}	24-hour	2.36E-03
			Annual	6.46E-04
	Fuel Oil #2	SO ₂	1-hour	8.20E-03
			Annual	2.25E-03
Projected Development Site 2	Fuel Oil #2	NO ₂	1-hour	7.73E-03
			Annual	2.12E-03
		PM _{2.5}	24-hour	8.24E-04
			Annual	2.26E-04
	Fuel Oil #2	SO ₂	1-hour	2.87E-03
			Annual	7.85E-04
Potential Development Site 1	Fuel Oil #2	NO ₂	1-hour	2.21E-02
			Annual	6.04E-03
		PM _{2.5}	24-hour	2.35E-03
			Annual	6.44E-04
	Fuel Oil #2	SO ₂	1-hour	8.17E-03
			Annual	2.24E-03

The diameters of the stacks were estimated based on values obtained from the New York City Department of Environmental Protection (DEP) "CA Permit" database for the corresponding boiler size (i.e., rated heat input or million Btu per hour). The stacks exit temperatures were assumed to be 300°F (423°K), which is appropriate for boilers. The stacks exit velocities of Projected Development Site 1 and Potential Development Site 1 were estimated based on values from the DEP "CA Permit." The stack exit velocity of Projected Development Site 2 was calculated according to the EPA Method 19 for both oil #2 and natural gas fueled boilers and the slowest exit velocity used in the modeling. This stack exit velocity was adjusted to exit temperature of 423 K. The New York City Building Code (Building Code) requires that a rooftop stack should be at least 10 feet away from the edge of the roof and at least 3 feet higher than the roofline. These parameters were specified in the AERMOD models. Projected Development 2 was modeled for both scenarios with the stack originally 3 feet above the roof line; however, after extensive runs with no scenarios without exceedances, the stack height was increased to 95 feet. This resulted in emissions being released above the roof line of the adjacent project sites and is reflected in the E-designation.

Stacks of source buildings were situated approximately 10 feet from the receiving building and moved away from the building in 10-foot increments if the impact concentrations resulted in exceedances. Because the meteorology parameters are factors for the model's output, two stacks locations during tier 1 analysis were assumed for the Projected Development Site 1 impact on the Potential Development Site 1 and vice-versa. For the estimated impact to Potential Development Site 1, one stack was placed 10 feet from the northern edge of Potential Development Site 1 on the northern

portion of Projected Development Site 1. The other option for this modeling scenario had the stack located on the southern portion of Projected Development Site 1 approximately 10 feet west of Potential Development Site 1. The maximum concentration of these stack locations' options was used to determine the results. For the estimated impact to Projected Development Site 1, the first stack was located 10 feet from the northern edge of Potential Development Site 1. The other stack was located approximately 10 feet from the western edge of Potential Development Site 1. The maximum concentration of these stack locations' options was used to determine the results.

The buildings were modeled as if they have the same footprint as the lots and rise to their maximum height.

Receptors on the receiving building were placed all around the receiving building envelope, at 10 feet increments around the building. Ground floor receptors were placed at a height of 6 feet, second floor receptors were at 15 feet, and each additional level was 10 feet above the previous. Top receptors were placed at the 3 feet below the maximum height of each building for conservative locations closest to stack emissions of neighboring buildings.

All analyses were run with generic emission rates of 1 gram per second for the 1-hour, 24-hour, and annual averaging times, and maximum output concentrations. The results were multiplied by the calculated emission rates. The independent results of each building impact concentration on another building, for each pollutant and downwash effect scenario, were cumulatively added.

The NO₂ 1-hour models utilized a Tier 1 approach initially, applying an ambient NO_x/NO₂ ratio of 100% to the NO_x estimated concentrations. If the Tier 1 approach resulted in exceedances for NO₂, a Tier II approach would be used. A Tier 2 approach utilizes AERMODS Ambient Ratio Method (ARM2) which incorporates a variable ambient ratio that is a function of model predicted 1-hr NO_x concentration, based on an analysis of hourly ambient NO_x monitoring data from approximately 580 stations over the period 2001-2010.

All analyses were conducted using five consecutive years of meteorological data (2014-2018). Surface data was obtained from LGA Airport and upper air data 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. Meteorological data were combined to develop a 5-year set of meteorological conditions, which was used for the AERMOD modeling runs and Anemometer height of 9.4 meters was specified per Breeze Software.

Results of Dispersion Analyses

Both NO₂ and SO₂ modeled concentrations were added to the background concentrations. A NO₂ 1-hour Tier 2 approached followed if exceedance of the NAAQS was predicted. The reported concentrations are the maximum predicted concentrations of the building wake effects abled/disabled scenarios. The PM_{2.5} 24-hour and annual averaging times modeled concentrations were compared with the NYC Guidelines

threshold criterions. Result of the HVAC Tier 1 dispersion NO₂, PM_{2.5}, and SO₂ analyses are shown in Table 3. Please note that impacts to Potential Development Site 1 concentrations are from the northern stack location for Projected Development Site 1. The southern stack analysis resulted in significant exceedances. The E-designation for the property will reflect this result.

Table 3: The Proposed Project HVAC Tier 1 Dispersion Analysis Results

Pollutant and Averaging Time	Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Background Concentration ($\mu\text{g}/\text{m}^3$)	Evaluated Concentration ($\mu\text{g}/\text{m}^3$)	Threshold Concentration ($\mu\text{g}/\text{m}^3$)	Threshold Standard
Cumulative Impact on Projected Development Site 1					
1-hour NO ₂	178.77	103.6	281.37	188	NAAQS
Annual NO ₂	1.70	26.8	28.5	100	NAAQS
24-hour PM _{2.5}	4.72	N/A	4.72	7.80	<i>de minimis</i>
Annual PM _{2.5}	0.18	N/A	0.18	0.3	<i>de minimis</i>
1-hour SO ₂	66.25	13.5	79.75	196	NAAQS
Annual SO ₂	0.63	1.0	1.63	80	NAAQS
Cumulative Impact on Potential Development Site 1					
1-hour NO ₂	103.65	103.6	207.2	188	NAAQS
Annual NO ₂	1.38	26.8	28.1	100	NAAQS
24-hour PM _{2.5}	4.02	N/A	4.02	7.80	<i>de minimis</i>
Annual PM _{2.5}	0.15	N/A	0.15	0.3	<i>de minimis</i>
1-hour SO ₂	38.41	13.5	51.9	196	NAAQS
Annual SO ₂	0.51	1.0	1.51	80	NAAQS

As seen in Table 3, the SO₂ predicted concentrations are less than the NAAQS and the PM_{2.5} concentrations are less than the *de minimis*. However, the NO₂ 1-hour concentrations are in exceedance of NAAQS. This required a Tier 2 analysis implementing the ARM2 approach for NO_x to NO₂ conversion. The results of the Tier 2 analysis for 1-hour NO₂ concentrations for both modeling scenarios can be found in Table 4.

Table 4: The Proposed Project HVAC Tier 2 Dispersion Analysis Results

Pollutant and Averaging Time	Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Background Concentration ($\mu\text{g}/\text{m}^3$)	Evaluated Concentration ($\mu\text{g}/\text{m}^3$)	Threshold Concentration ($\mu\text{g}/\text{m}^3$)	Threshold Standard
Cumulative Impact on Projected Development Site 1					
1-hour NO_2	75.40	103.6	179.0	188	NAAQS
Cumulative Impact on Potential Development Site 1					
1-hour NO_2	52.39	103.6	156.0	188	NAAQS

The resulting concentrations were below the NO_2 1-hour NAAQS. Therefore, with the E-designations specified below, the Projected Development will not result in any adverse air quality impacts.

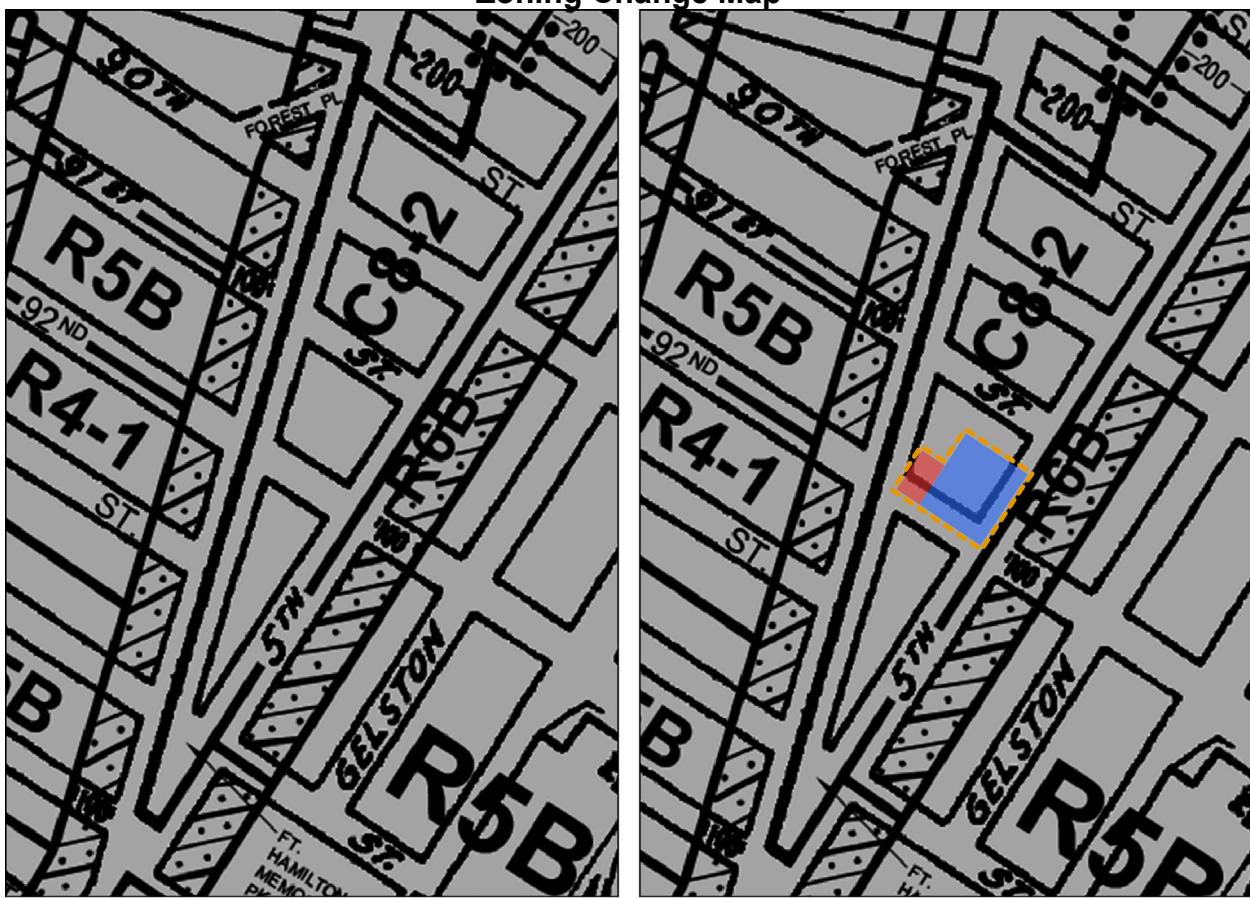
(E) Designation

Block 6087, Lots 23, 31 (Projected Development Site 1): Any new residential or commercial development on the above-referenced property must ensure that the heating, ventilating, air conditioning (HVAC), and hot water system(s) stack is located on lot 23 at the building's highest level, and at a minimum of 98 feet above the grade, and a minimum of 20 feet from lot 26 to avoid any potential significant adverse air quality impacts.

Block 6087, Lots 32, 33, 34 (Projected Development Site 2): Any new residential or commercial development on the above-referenced property must ensure that the heating, ventilating, air conditioning (HVAC), and hot water system(s) stack is located at the building's highest level, at a minimum of 95 feet above the grade to avoid any potential significant adverse air quality impacts.

Block 6087, Lots 26, 27, 28, 29, 30, 129 (Potential Development Site 1): Any new residential or commercial development on the above-referenced property must ensure that the heating, ventilating, air conditioning (HVAC), and hot water system(s) stack is located at the building's highest level, at a minimum of 98 feet above the grade, and at least 75 feet from adjacent lots 31 and 23 to avoid any potential significant adverse air quality impacts.

Zoning Change Map



Current Zoning - C8-2

C1.1 C1.2 C1.3 C1.4 C1.5 C2.1 C2.2 C2.3 C2.4 C2.5
NOTE: Where no dimensions for zoning district boundaries appear on the zoning maps, such dimensions are determined in Article VII, Chapter 6 (Boundaries of District Boundaries) of the Zoning Resolution.

Proposed Zoning - R7A/C2-4 & R6A/C2-4

■ Proposed R7A/C2-4 Zoning District
■ Proposed R6A/C2-4 Zoning District
□ Rezoning Area