6.0 Shadows

Introduction

This chapter assesses the potential for the Proposed Actions to result in incremental shadows long enough to reach any nearby publicly accessible open spaces or other sunlight-sensitive resources. Public open spaces, historic resources, and natural resources are all potentially sunlight-sensitive resources, and, thus, this chapter is closely linked to the information presented in other chapters of the environmental impact statement (EIS), particularly **Chapter 5, Open Space**, and **Chapter 7, Historic and Cultural Resources**.

According to the 2021 *City Environmental Quality Review (CEQR) Technical Manual*, a shadows assessment is required if a proposed action would result in structures (or additions to existing structures) of 50 feet in height or greater, or those that would be located adjacent to, or across the street from, a sunlight sensitive resource. As discussed in **Chapter 1, Project Description**, the reasonable worst-case development scenario (RWCDS) for the Proposed Actions identifies 54 projected development sites and 16 potential development sites in the Project Area. The redevelopment of the projected development sites, and the less likely development of the potential development sites is expected to result in new buildings greater than 50 feet in height over the No-Action condition at most development sites. As such, a detailed shadows analysis was prepared to determine the potential for the Proposed Actions to result in significant adverse impacts on sunlight-sensitive resources.

Principal Conclusions

A detailed shadows analysis was conducted and concluded that development resulting from the Proposed Actions would result in significant adverse shadow impacts on two sunlight-sensitive resources. The detailed analysis determined that the projected and potential development sites identified in the RWCDS would result in incremental shadow coverage on a total of fifteen sunlight-sensitive resources, two of which were determined to experience significant adverse impacts—Lefferts Place Block Association Garden and St. Bartholomew's Episcopal Church. The analysis determined that a portion of Lefferts Place Block Association Garden would not receive adequate sunlight during the growing season (at least the six-to-eight-hour minimum specified in the 2021 *CEQR Technical Manual*) as a result of incremental shadow coverage, and vegetation at this resource could be significantly impacted. Additionally, the analysis determined that incremental shadow coverage would result in a

reduction in direct sunlight exposure for sunlight-sensitive features at St. Bartholomew's Episcopal Church, which could affect the public's enjoyment or appreciation of those features.

Methodology

According to the 2021 *CEQR Technical Manual*, the longest shadow a structure will cast in New York City, except for periods close to dawn or dusk, is 4.3 times its height. For projects or actions resulting in structures less than 50 feet tall, a shadow assessment is generally not necessary, unless the site is adjacent to a park, historic resource, or important natural feature (if the feature that makes the structure significant depends on sunlight).

First, a preliminary screening assessment must be conducted to ascertain whether shadows resulting from a project could reach any sunlight-sensitive resource at any time of year. The 2021 *CEQR Technical Manual* defines sunlight-sensitive resources as those resources that depend on sunlight or for which direct sunlight is necessary to maintain the resource's usability or architectural integrity. The following are considered to be sunlight-sensitive resources1:

- *Public open space* (e.g., parks, playgrounds, plazas, schoolyards, greenways, and landscaped medians with seating). Planted areas within unused portions or roadbeds that are part of the Greenstreets program are also considered sunlight-sensitive resources. The use of vegetation in an open space establishes its sensitivity to shadows. This sensitivity is assessed for both (1) warm-weather dependent features, like wading pools and sandboxes, or vegetation that could be affected by loss of sunlight during the growing season (i.e., March through October); and (2) features, such as benches, that could be affected by a loss of winter sunlight. Uses that rely on sunlight include: passive use, such as sitting or sunning; active use, such as playfields or paved courts; and such activities as gardening, or children's wading pools and sprinklers. Vegetation requiring direct sunlight includes the tree canopy, flowering plants, and plots, particularly plots for food production in community gardens. The amount of sunlight typically considered to be the minimum that plantings and vegetation would need is six to eight hours of direct sunlight. However, certain plantings and vegetation can tolerate partial sun, with a reduced minimum requirement of four to six hours of direct sunlight. Examples of areas that can tolerate partial sun are established tree canopies, shrubs or perennials.

- *Features of historic architectural resources that depend on sunlight for their enjoyment by the public.* Only the sunlight-sensitive features of an architectural resource are considered in a shadows analysis. Sunlight-sensitive features include the following: design elements that are part of a recognized architectural style that depends on the contrast between light and dark (e.g., deep recesses or voids, such as open galleries, arcades, recessed balconies, deep window reveals, and prominent rustication);

[1] According to the *CEQR Technical Manual,* city streets, sidewalks, and private open spaces (such as private residential front and back yards, stoops, and vacant lots) are not considered to be sunlight-sensitive resources.

elaborate, highly carved ornamentation; stained glass windows; exterior building materials and color that depend on direct sunlight for visual character (e.g., the polychromy [multicolored] features found on Victorian Gothic Revival or Art Deco facades); historic landscapes, such as scenic landmarks, including vegetation recognized as an historic feature of the landscape; and structural features for which the effect of direct sunlight is described as playing a significant role in the structure's importance as an historic landmark.

- *Natural resources where the introduction of shadows could alter the resource's condition or microclimate.* Such resources could include community gardens, surface water bodies, wetlands, or designated resources, such as coastal fish and wildlife habitats.

The preliminary screening assessment consists of three tiers of analysis. The first tier determines a simple radius around the proposed buildings representing the longest shadow that could be cast. If there are sunlight-sensitive resources within the radius, the analysis proceeds to the second tier, which reduces the area that could be affected by project-generated shadows by accounting for a specific range of angles that can never receive shade in New York City due to the path of the sun in the northern hemisphere. If the second tier of analysis does not eliminate the possibility of new shadows on sunlight-sensitive resources, a third tier of screening analysis further refines the area that could be reached by new shadows by looking at specific representative days of the year and determining the maximum extent of shadow over the course of each representative day.

If the third tier of analysis does not eliminate the possibility of new shadows on sunlight-sensitive resources, a detailed shadow analysis is required to determine the extent and duration of the incremental shadow (i.e. the additional, or new, shadow) resulting from the project. The detailed shadow analysis establishes a baseline condition (the No-Action condition) that is compared to the future condition resulting from the Proposed Actions (the With-Action condition) to illustrate the shadows cast by existing or future buildings and distinguish the additional (incremental) shadows cast by the development of projected and potential development sites. In accordance with the 2021 *CEQR Technical Manual*, shadows on sunlight-sensitive resources of concern were modeled for four representative days of the year. For the New York City area, the months of interest for an open space resource encompass the growing season (i.e., March through October) and one month between November and February representing a cold-weather month (usually December). Representative days for the growing season are generally the March 21 vernal equinox (or the September 21 autumnal equinox, which is approximately the same), the June 21 summer solstice, and a spring or summer day halfway between the summer solstice and equinoxes, such as May 6 or August 6 (which are approximately the same). For the cold-weather months, the December 21 winter solstice is included to demonstrate conditions when open space users rely most heavily on available sunlight warmth. As these months and days are representative of the full range of possible shadows, they are also used for assessing shadows on sunlight-sensitive historic and natural resources. The 2021 *CEQR Technical*

Manual defines the temporal limits of a shadow analysis period to fall from an hour and a half after sunrise to an hour and a half before sunset.

The detailed analysis provides the data needed to assess the shadow impacts. The effects of incremental shadows on the sunlight-sensitive resources are described, and their degree of significance is considered. The result of the analysis and assessment are documented with graphics, a table of incremental shadow durations, and narrative text. As described in the 2021 *CEQR Technical Manual*, an incremental shadow is generally not considered significant when its duration is no longer than ten minutes at any time of year and the resource continues to receive substantial direct sunlight. A significant shadow impact generally occurs when an incremental shadow of ten minutes or longer falls on a sunlight-sensitive resource and results in one of the following:

- *Vegetation:* a substantial reduction in sunlight duration available to sunlight-sensitive features of the resource to less than the time of its minimum sunlight needs (when there would be sufficient sunlight in the future without the project) or a reduction in direct sunlight exposure where the sensitive feature of the resource is already subject to substandard sunlight (i.e., less than the minimum sunlight needs).

- *Historic and cultural resources:* a substantial reduction in sunlight available for the enjoyment or appreciation of the sunlight-sensitive features of an historic or cultural resource.

- *Open space utilization:* a substantial reduction in the usability of open space as a result of increased shadow, including information regarding anticipated new users and the open space's utilization rates throughout the affected time periods.

- *For any sunlight-sensitive feature of a resource:* complete elimination of all direct sunlight on the sunlight-sensitive feature of the resource, when the complete elimination results in substantial effects on the survival, enjoyment, or, in the case of open space or natural resources, the use of the resource.

In general, a significant adverse shadow impact occurs when the incremental shadow added by a proposed project falls on a sunlight-sensitive resource and substantially reduces or completely eliminates direct sunlight exposure, thereby significantly altering the public's use of the resource or threatening the viability of vegetation or other resources.

Preliminary Screening Assessment

First, an assessment of the 54 projected and 16 potential development sites was performed in order to determine which sites required a preliminary screening assessment. As noted above, pursuant to 2021 *CEQR Technical Manual* guidance, only new development or enlargement that would result in an incremental increase of 50 feet or more compared to the No-Action condition require assessment. In addition, any development site adjacent to, or across the street from, a sunlight sensitive resource requires a preliminary screening, regardless of its height.

Table 6-1 summarizes this initial screening. As indicated in the table, new structures of greater than 50 feet in incremental height are anticipated on 48 of the 54 projected development sites and 15 of the 16 potential development sites, and consequently require a preliminary screening assessment. Projected Development Sites 8, 17, 30, 35, 44, and 51 and Potential Development Site C would experience less than 50 feet of incremental height to No-Action conditions and would not be located adjacent to sunlight-sensitive resources, as defined in the 2021 *CEQR Technical Manual*, and therefore, no further analysis was warranted for these sites.

A base map was prepared (see **Figure 6-1**) showing the projected and potential development sites identified for analysis in **Table 6-1** as well as the Project Area, the surrounding street layout, and all sunlight-sensitive resources (publicly-accessible open spaces, architectural resources, natural resources, historic resources, and Greenstreets).

Table 6-1: RWCDS Sites Warranting Preliminary Shadow Analyses

Sites Warranting Preliminary Shadow Analysis		Sites Not Warranting Preliminary Shadow Analysis
Sites with 50-Foot or Greater Height Increment[1]	**Sites with Less than 50-foot Height Increment Adjacent to Sunlight Sensitive Resources**	**Sites with less than 50-Foot Height Increment Not Adjacent to Sunlight Sensitive Resources**
Projected Sites		
1-7, 9-16,18-29, 31-34, 36-43, 45-50,52-55	None	8, 17, 30, 35, 44, 51
Potential Sites		
A-B, D-P	None	C

[1] Based on height increment compared to No-Action RWCDS.

Tier 1 Screening Assessment

According to the 2021 *CEQR Technical Manual*, the longest shadow that a structure will cast in New York City, except for periods close to dawn or dusk, is 4.3 times its height. The maximum shadow radius for each of the 63 development sites warranting a preliminary shadow analysis was determined using each site's maximum zoning envelope. The maximum shadow radius for each development site was merged to form the longest shadow study area (Tier 1 Assessment).

Within this longest shadow study area, there are a number of potentially sunlight-sensitive open spaces. The Tier 1 screening area does not include any natural resources that would be considered sunlight-sensitive resources. Due to the presence of open space and historic resources within the Tier 1 screening area, further screening is warranted in order to determine whether any sunlight-sensitive resources could be affected by project-generated shadows.



Source: NYC DoITT; NYC DCP (PLUTO 2023 v1)

Legend

- Tier I: Longest Shadow Study Area
- Tier II: Area that Cannot be Shaded
- Projected Development Site
- Potential Development Site
- (1) Sunlight Sensitive Open Space Resources (Refer to Table 6-2)
- (9) Sunlight Sensitive Historic Resources (Refer to Table 6-2)

Figure 6-1
Sunlight-Sensitive Open Space and Historic Resources

Tier 2 Screening Assessment

Due to the path of the sun across the sky in the northern hemisphere, no shadow can be cast in a triangular area south of any given project site. In New York City, this area lies between -108 and +108 degrees from true north. The purpose of the Tier 2 screening is to determine whether the sunlight-sensitive resources identified in the Tier 1 screening are located within portions of the longest shadow study area that can receive shade from the projected and potential developments.

Figure 6-1 provides a base map illustrating the results of the Tier 1 and Tier 2 screening assessments (i.e., the portion of the longest shadow study area lying within -108 degrees from true north and +108 degrees from true north as measured from the southernmost portions of the development sites). A total of nine open space resources and six historic and cultural resources were identified as sunlight-sensitive resources that warranted further assessment.[2] A list of all sunlight-sensitive resources that warranted further assessment is provided below in **Table 6-2**.

Table 6-2: Sunlight-Sensitive Resources Warranting Further Analysis Based on Tier 1 and 2 Screening

No.[1]	Sunlight-Sensitive Resources
1	Dean Playground
2	Lowry Triangle
3	Brooklyn's Finest Community Garden
4	Crispus Attacks Playground
5	Lefferts Place Block Association Garden
6	Westbrook Memorial Garden
7	United Herkimer Garden Club
8	Brower Park
9	Atlantic Terminal Playground
100	Temple of Restoration
11	Co-Cathedral of St Joseph/St Teresa of Avila
120	The Church of St. Luke and St. Matthew
13	St. Bartholomew's Protestant Episcopal Church and Rectory
14	Alhambra Apartments
15	Bethel Seventh Day Adventist Church

[1]Numbers are keyed to the resource map provided In Figure 6-1.

Tier 3 Screening Assessment

According to the 2021 *CEQR Technical Manual*, a Tier 3 screening assessment should be performed to determine if, in the absence of intervening buildings, shadows resulting from a proposed action can reach a sunlight-sensitive resource, thereby warranting a detailed shadow analysis. The Tier 3 screening assessment is used to determine if shadows resulting

[2] Although there are several Landmarks Preservation Commission (LPC)-designated and State and National Register of Historic Places (S/NR)-listed historic districts within the Tier II screening area, only structures containing sunlight-sensitive architectural features (as defined by the *2021 CEQR Technical Manual*) were considered sunlight-sensitive historic and cultural resources for the purpose of shadows analysis.

from a proposed action can reach a sunlight-sensitive resource at any time between 1.5 hours after sunrise and 1.5 hours before sunset on representative analysis dates.

As project-generated shadows could reach a number of sunlight-sensitive resources, a Tier 3 assessment was performed using three dimensional (3D) computer mapping software. The 3D model was used to calculate and display project-generated shadows on individual representative analysis dates. The model contained 3D representations of the elements in the base map used in the preceding assessments and a 3D model of the projected and potential developments. At this stage of the assessment, surrounding buildings within the study area were not included in the model so that it may be determined whether project-generated shadows would reach any sunlight-sensitive resources. The Tier 3 analysis showed that each of the sunlight-sensitive resources shown in **Table 6-2,** would receive incremental shadow on at least one analysis day. **Table 6-3** presents a summary of the Tier 3 assessment, showing the nine open spaces and six historic resources that could, in the absence of intervening buildings, receive project-generated shadows, and on which analysis days the new shadows would occur. Further analysis is warranted and is provided below.

Table 6-3: Tier 3 Assessment Results

No. [1]	Name	March 21/Sept. 21 7:36 AM – 4:29 PM	May 6/August 6 6:27 AM – 5:18 PM	June 21 5:57 AM – 6:01 PM	December 21 8:51 AM – 2:53 PM	Number of Analysis Days
Open Space Resources						
1	Dean Playground	YES	YES	YES	YES	4
2	Lowry Triangle	YES	YES	YES	YES	4
3	Brooklyn's Finest Community Garden	NO	NO	NO	YES	1
4	Crispus Attucks Playground	NO	NO	NO	YES	1
5	Lefferts Place Block Association Garden	YES	YES	YES	YES	2
6	Westbrook Memorial Garden	NO	YES	YES	NO	4
7	United Herkimer Garden Club	NO	NO	NO	YES	1
8	Brower Park	YES	YES	YES	YES	4
9	Atlantic Terminal Playground	YES	YES	YES	YES	4
Historic and Cultural Resources						
10	Temple of Restoration: 515 Dean Street	NO	NO	NO	YES	1
11	Co-Cathedral of St Joseph/St Teresa of Avila: 856 Pacific Street	NO	YES	YES	NO	2
12	The Church of St. Luke and St. Matthew: 520 Clinton Avenue	YES	YES	YES	NO	3
13	St. Bartholomew's Protestant Episcopal Church and Rectory: 1227 Pacific Street	YES	YES	YES	YES	4
14	Alhambra Apartments: 475 Nostrand Avenue	YES	YES	YES	YES	4
15	Bethel Seventh Day Adventist Church: 457 Grand Avenue	NO	NO	NO	YES	1

[1] Note: Numbers keyed to Figure 6-1, "Shadows Tier 1 & 2 Screening"

Detailed Analysis of Shadow Impacts

Shadows Analysis

Per 2021 *CEQR Technical Manual* guidance, shadow analyses were performed for the fifteen sunlight-sensitive resources identified above on four representative days of the year: March 21/September 21, the equinoxes; May 6, the midpoint between the summer solstice and the equinox (and equivalent to August 6); June 21, the summer solstice and the longest day of the year; and December 21, the winter solstice and shortest day of the year. These four representative days indicate the range of shadows over the course of the year. The 2021 *CEQR Technical Manual* guidance defines the temporal limits of a shadow analysis period to fall from 1.5 hours after sunrise to 1.5 hours before sunset. As discussed above, the results of the shadows analysis show the incremental difference in shadow impact between the No-Action and With-Action conditions (see **Table 6-4**).

As shown in **Table 6-4**, incremental project-generated shadows would reach all of the fifteen sunlight-sensitive resources identified in the Tier 3 assessment. Increases in shadow coverage would occur at eight resources on March 21/September 21; ten resources on May 6/August 6; ten resources on June 21; and thirteen resources on December 21. **Figures 6-3** through **6-13** provided at the end of this chapter, show representative shadow views for the fifteen sunlight-sensitive resources of concern on each of the four representative analysis days.

Table 6-4: Duration of Shadows on Sunlight Sensitive Resources (Increment Compared to No-Action)

Resource	Analysis Day	March 21/Sept. 21 7:36 AM – 4:29 PM	May 6/ August 6 6:27 AM – 5:18 PM	June 21 5:57 AM – 6:01 PM	December 21 8:51 AM – 2:53 PM
Dean Playground	Shadow enter-exit time	7:36 AM - 4:29 PM	6:27 AM - 12:17 PM	5:57 AM - 12:15 PM	8:51 AM - 2:53 PM
	Incremental shadow duration	8 hours 53 minutes	5 hours 50 minutes	6 hours 18 minutes	6 hours 2 minutes
Lowry Triangle	Shadow enter-exit time	7:36 AM - 10:30 AM, 2:16 PM - 4:29 PM	6:27 AM - 10:10 AM, 2:02 PM - 5:18 PM	5:57 AM - 10:13 AM, 2:10 PM - 6:00 PM	8:51 AM - 9:51 AM
	Incremental shadow duration	5 hours 7 minutes	6 hours 59 minutes	8 hours 7 minutes	1 hour
Brooklyn's Finest Community Garden	Shadow enter-exit time	--	--	--	8:51 AM – 9:51 AM
	Incremental shadow duration	--	--	--	1 hour
Crispus Attucks Playground	Shadow enter-exit time	--	--	--	8:51 AM – 10:38 AM
	Incremental shadow duration	--	--	--	1 hour 47 minutes
Lefferts Place Block Association Garden	Shadow enter-exit time	9:18 AM - 4:29 PM	10:22 AM - 4:22 PM	11:28 AM - 3:48 PM	10:16 AM - 2:53 PM
	Incremental shadow duration	7 hours 11 minutes	6 hours	4 hours 20 minutes	4 hours 37 minutes
Westbrook Memorial Garden	Shadow enter-exit time	--	4:29 PM - 5:18 PM	3:49 PM - 5:55 PM	--
	Incremental shadow duration	--	49 minutes	2 hours 6 minutes	--
United Herkimer Garden Club	Shadow enter-exit time	--	--	--	2:30 PM – 2:53 PM
	Incremental shadow duration	--	--	--	23 minutes
Brower Park	Shadow enter-exit time	2:02 PM - 4:29 PM	2:11 PM - 5:18 PM	2:32 PM - 6:01 PM	1:36 PM - 2:53 PM
	Incremental shadow duration	2 hours 27 minutes	3 hours 7 minutes	3 hours 29 minutes	1 hour 17 minutes
Atlantic Terminal Playground	Shadow enter-exit time	7:36 AM-10:28 AM	6:27 AM-10:38 AM	5:57 AM-10:41 AM	8:51 AM-9:36 AM
	Incremental shadow duration	2 hours 52 minutes	4 hours 11 minutes	4 hours 44 minutes	45 minutes
Temple of Restoration: 515 Dean Street	Shadow enter-exit time	--	--	--	8:51 AM - 10:24 AM
	Incremental shadow duration	--	--	--	1 hour 33 minutes
Co-Cathedral of St. Joseph/St. Teresa of Avila: 856 Pacific Street	Shadow enter-exit time	--	6:27 AM - 6:37 AM	5:57 AM - 6:10 AM	--
	Incremental shadow duration	--	10 minutes	13 minutes	--

The Church of St. Luke and St. Matthew	Shadow enter-exit time	3:58 PM - 4:29 PM	4:40 PM - 5:18 PM	5:12 PM - 5:52 PM	--
	Incremental shadow duration	31 minutes	38 minutes	40 minutes	--
St. Bartholomew's Episcopal Church and Rectory: 1227 Pacific Street	Shadow enter-exit time	12:23 PM - 4:29 PM	12:05 PM - 5:18 PM	12:10 PM - 6:01 PM	12:24 PM - 2:53 PM
	Incremental shadow duration	4 hours 6 minutes	5 hours 13 minutes	5 hours 51 minutes	2 hours 29 minutes
Alhambra Apartments: 475 Nostrand Ave	Shadow enter-exit time	7:36 AM - 10:00 AM	6:27 AM - 9:29 AM	5:57 AM - 9:30 AM	8:51 AM -9:57 AM
	Incremental shadow duration	2 hours 24 minutes	3 hours 2 minutes	3 hours 33 minutes	1 hour 6 minutes
Bethel Seventh Day Adventist Church: 457 Grand Avenue	Shadow enter-exit time	--	--	--	2:01 PM - 2:53 PM
	Incremental shadow duration	--	--	--	52 minutes

Note: All times are Eastern Standard Time; Daylight Savings Time was not accounted for per *CEQR Technical Manual* guidance.

Table indicates the entry and exit times and total duration of incremental shadow for each sunlight-sensitive resource.

Sunlight Sensitive Resources

Dean Playground

Dean Playground is a 1.3-acre park located on Dean Street between 6th Avenue and Carlton Avenue. The playground includes facilities such as basketball and handball courts, a playground, and water features. As shown in **Table 6-4**, incremental shadow coverage would occur on each of the four representative analysis days, ranging from five hours and 50 minutes on the May 6/August 6 analysis day to eight hours and 53 minutes on the March 21/September 21 analysis day.

On the March 21/September 21 analysis day, incremental shadow would be cast for approximately eight hours and 53 minutes (7:36 AM–4:29 PM). Incremental shadows would be cast by Projected Development Site 46 over the northern portion of the playground in the morning. As the afternoon continues, incremental shadow from Projected Development Site 46 would move northeast and exit the resource as incremental shadows from Projected Development Site 47 move north and east. Although the resource would receive incremental shadows throughout the day, shadows from the two projected development sites would cover different portions of the playground at different parts of the day. Therefore, the playground, playing fields, and vegetation and trees would continue to receive six to eight hours of direct sunlight on this analysis day (refer to **Figures 6-2a** to **6-2d**).

On the May 6/August 6 analysis day, incremental shadow would be cast by Projected Development Site 46 from 6:27 AM–12:17 PM (five hours and 50 minutes). During the morning hours, incremental shadow would be cast over the western edge of the playground before moving north and east and exiting the open space in the early afternoon. Although incremental shadow would be cast, these shadows would not be substantial and would move throughout the morning. The playground, playing fields, and vegetation and trees would

continue to receive six to eight hours of direct sunlight on this analysis day (refer to **Figures 6-2e - 6-2g**).

On the June 21 analysis day, incremental shadow would be cast from 5:57 AM–12:15 PM (combined total of six hours 18 minutes). As shown in **Figures 6-2h** to **6-2j**, Dean Playground would be partially cast in shadow from Projected Development Site 46 from 5:57 AM until 12:15 PM (approximately six hours and 18 minutes). Although shadows would cover approximately half of the playground at 7:00 AM, shadows would move quickly north and east, affecting a smaller portion of the playground through the morning and fully exiting at approximately 12:15 PM. The playground, playing fields, and vegetation and trees would continue to receive six to eight hours of direct sunlight on this analysis day.

On the December 21 analysis day, incremental shadow would be cast from 8:51 AM to 2:53 PM (six hours and two minutes) from both Projected Development Sites 46 and 47. Although Site 46 would cast the majority of the incremental shadows at 8:51 AM, the shadow coverage generated by Site 47 would increase as the morning and afternoon progress (refer to **Figures 6-2k** and **6-2l**).

Assessment

As shadows are not static and move from west to east throughout the day, Dean Playground would continue to receive some direct sunlight on all representative analysis days. At no time would the playground be completely cast in shadow. The size and duration of incremental shadow on Dean Playground would allow the playground, playing field, and vegetation within the park to receive at least six to eight hours of direct sunlight, as specified in the *CEQR Technical Manual*. Therefore, Dean Playground would not experience a significant adverse shadow impact due to development resulting from the Proposed Actions.

Lowry Triangle

Lowry Triangle is a 0.11-acre park located at the intersection of Washington Avenue, Underhill Avenue, and Pacific Street. The small park features benches, trees, and a bust of local pastor, Reverend Benjamin James Lowry.[3]

This open space resource would experience incremental shadow coverage during each of the four analysis days (see **Table 6-4**). Incremental shadow duration on these analysis days would range between one hour on the December 21 analysis day (8:51–9:51 AM) and eight hours and 7 minutes on the June 21 analysis day (5:57 AM–10:13 AM and 2:10 PM–6:00 PM).

On the March 21/September 21 analysis day, incremental shadow would be cast on Lowry Triangle from 7:36 AM to 10:30 AM and again from 2:16 PM to 4:29 PM, for a combined total

[3] Additionally, the portion of Underhill Avenue adjacent to the triangle is closed to traffic and features mobile outdoor furniture. However, because the Underhill pedestrian plaza is not listed on the NYC Department of Transportation list of officially recognized open streets, nor does it contain any vegetation or recreational amenities, it was excluded from the shadows analysis.

of five hours and seven minutes. As shown in **Figures 6-3a** and **6-3b**, incremental shadows from Projected Development Site 1 would cover the northern half of the triangle, which consists of the statue, vegetation, and some benches, starting at 7:36 AM. Shadows would move north and east, with the incremental shadows from this site exiting the resource at 10:30 AM. Starting at 2:16 PM, incremental shadows from Potential Development Site C would cover a small sliver of the plaza. In general, incremental shadows generated by new development would be small, and vegetation and benches would continue to receive at least six to eight hours of direct sunlight.

Similarly, on the May 6/August 6 analysis day, incremental shadow would be cast in the morning from 6:27 AM to 10:10 AM and again from 2:02 PM to 5:18 PM, for a total of six hours and 59 minutes. Morning shadows generated by Projected Development Site 1 would move north through the triangle and fully exit at 10:10 AM. At 2:02 PM, minimal shadows generated by Potential Development Site C would move south and west through the triangle before the end of the analysis period at 5:18 PM. All parts of the triangle would receive six to eight hours of direct sunlight (see **Figures 6-3c** and **6-3d**).

On the June 21 analysis day, incremental shadows generated by Projected Development Site 1 would be cast from 5:57 AM to 10:13 AM, and incremental shadows cast from Potential Development Site C would be cast from 2:10 PM to 6:00 PM. Morning shadows would cover a larger portion of the triangle, moving north and east and covering increasingly less area before exiting the resource at 10:13 AM. Similar to the previous two analysis days, incremental afternoon shadows resulting from Potential Development Site C would be smaller, covering a sliver of the triangle that would move south and east throughout the day. All parts of the triangle, including the benches, vegetation, and statue, would receive at least six to eight hours of direct sunlight (refer to **Figures 6-3e** through **6-3g**).

Incremental shadows on the December 21 analysis day would last for approximately one hour from 8:51 AM to 9:51 AM. As shown in **Figure 6-3h**, these incremental shadows would cover only a small portion of the triangle at its northernmost point, where no vegetation or amenities exist.

Assessment

Incremental shadows resulting from the Proposed Actions would occur during two periods, one in the morning and one in the afternoon on the March 21/September 21, May 6/August 6, and June 21 analysis days. Minimal incremental shadows would result on the December 21 analysis day. Generally, vegetation in the triangle would receive more than the minimum six to eight hours of direct sunlight outlined in the 2021 *CEQR Technical Manual*. Although incremental shadows would cover much of the benches within the triangle, the majority of incremental shadows would occur prior to 10:00 AM when usage of the triangle for passive recreational purposes is expected to be low. Therefore, since neither vegetation nor recreational enjoyment of the open space resource would be affected, Lowry Triangle would not experience a significant adverse shadow impact due to development resulting from the Proposed Actions.

Brooklyn's Finest Community Garden

Brooklyn's Finest Community Garden is a 0.05-acre community garden located on Lefferts Place between St. James Place and Grand Avenue. The park includes planting beds and seating.

As shown in **Table 6-4**, the open space resource would receive incremental shadows only on the December 21 analysis day. Incremental shadows would be cast from 8:51 AM to 12:15 PM and again from 1:05 PM to 2:53 PM, for a total of five hours and 12 minutes.

As shown in **Figure 6-4a** through **6-4c**, incremental shadows would first be cast from Potential Development Site D on the southern portion of the resource. By approximately 11:00 AM, the resource would receive incremental shadows from Potential Development Site C, which would move north and east. Incremental shadows in the northern and western portion of the garden cast by Projected Development Site 3 would begin at approximately 1:30 PM before fully exiting the resource at approximately 2:53 PM.

Assessment

Brooklyn's Finest Community Garden would receive incremental shadow from new development introduced by the Proposed Actions only on the December 21 analysis day. These shadows would result from one projected and two potential development sites and would move throughout the day, not settling on one portion of the garden for more than two to three hours. The incremental shadows would occur outside the growing season, when community gardens are open on a very limited basis. Therefore, incremental shadow would not negatively impact vegetation within or utilization of this sunlight-sensitive resource.

Crispus Attucks Playground

Crispus Attucks Playground is a 0.93-acre park on the corner of Classon Avenue and Fulton Street. The resource includes facilities such as basketball and handball courts, a playground, and water features. The park was named after Crispus Attucks, an African American man killed in the Boston Massacre in 1770.

This open space resource would experience incremental shadow coverage only during the December 21 analysis day (see **Table 6-4**). Incremental shadow duration on this analysis day would occur for approximately one hour and 47 minutes between 8:51 AM and 10:38 AM. As shown in **Figures 6-5a** and **6-5b**, incremental shadows would affect a small portion of the playground. Shadows would generally move northwest to southeast, with only the southeast corner of the park covered by incremental shadows before their exit at 10:38 AM.

Assessment

Incremental shadows on this open space resource would occur only in the morning on the December 21 analysis day, outside the growing season and when usage of the park is expected to be low. These shadows would cover only a small portion of the park and would move throughout the morning, covering the playground for only a short period of time.

Therefore, incremental shadows are not expected to affect enjoyment of the amenities or vegetation within Crispus Attucks Playground.

Lefferts Place Block Association Garden

Lefferts Place Block Association Garden is a 0.06-acre community garden located on Lefferts Place between Classon and Franklin Avenues. The garden includes planting beds.

This open space resource would experience incremental shadow coverage during each of the four analysis days (see **Table 6-4**). Incremental shadow duration on these analysis days would range from four hours and 20 minutes on the June 21 analysis day (11:28 AM–3:48 PM) to seven hours and 11 minutes on the March 21/September 21 analysis day (9:18 AM–4:29 PM).

On the March 21/September 21 analysis day, incremental shadows would occur between 9:18 AM and 4:29 PM as a result of Projected Development Site 13 and Potential Development Site G. As shown in **Figures 6-6a** to **6-6d**, incremental shadows would begin in the southwest corner of the garden at the beginning of the analysis period before moving north and east throughout the day. By approximately 12:30 PM, incremental shadows would cover the entirety of the garden. The southern portion of the garden, closest to the With-Action developments, would be covered by incremental shadows for the majority of the day.

On the May 6/August 6 analysis day, incremental shadows would last for approximately six hours, from 10:22 AM to 4:22 PM. Incremental shadows on this analysis day would be confined to the southern half of the sunlight-sensitive resource, with the greatest shadow coverage occurring at approximately 2:00 PM (see **Figures 6-6e** through **6-6g**).

On the June 21 analysis day, incremental shadows would cover the garden from 11:28 AM to 3:48 PM, for a duration of four hours and 20 minutes. Incremental shadows would travel eastward through the sunlight-sensitive resource and would be confined to its southern end (see **Figures 6-6h** and **6-6i**). All parts of the garden would continue to receive the minimum six hours of direct sunlight set forth in the 2021 *CEQR Technical Manual* on the June 21 analysis day.

On the December 21 analysis day, the Lefferts Place Block Association Garden would receive incremental shadows for four hours and 37 minutes (10:16 AM–2:53 PM). As shown in **Figures 6-6j** through **6-6l**, incremental shadows would cover the northern two-thirds of the garden, with maximum shadows occurring at approximately 1:00 PM. On this analysis day, direct sunlight to the garden is already sparse under existing conditions. Therefore, in the future with the Proposed Actions, shadows would be cast on the entirety of the garden for much of the day.

Assessment

Incremental shadows cast on the Lefferts Place Block Association Garden would reduce direct sunlight for an already sunlight-deprived open space resource. With the exception of the June 21 analysis day, both the duration and coverage of shadows on the garden would

be significant, with incremental shadows covering large portions of the resource for hours at a time. Such shadows would be particularly prevalent on the March 21/September 21 analysis day, during which the garden would experience the longest duration (seven hours and 11 minutes) and coverage (100 percent of the garden area at approximately 1:00 PM) of incremental shadows. The March 21/September 21 analysis day is considered within the growing season according to the 2021 *CEQR Technical Manual*, as are May 6/August 6 and June 21.

With the exception of the December 21 analysis day, incremental shadows generated by the Proposed Actions would cover the southern portion of the park for the majority of their duration. Given the close proximity of the garden to neighboring buildings at its northern half, the introduction of shadows to the southern half would result in coverage of the majority of the garden in shadow even during those times when incremental shadows are not at their most significant.

Due to incremental shadow coverage, Lefferts Place Block Association Garden would not receive the minimum of six hours of direct sunlight on the March 21/September 21 and June 21 analysis days, both of which are within the growing season according to the 2021 *CEQR Technical Manual*. Given that the duration and coverage of the incremental shadows on Lefferts Place Block Association Garden may have the potential to affect vegetation as well as the public's enjoyment of this feature, this is being considered a significant adverse shadow impact. As discussed in **Chapter 20, Mitigation**, it has been determined that there are no feasible or practicable mitigation measures that can be implemented to mitigate this impact, and the Proposed Actions' significant adverse shadows impact on the garden therefore remains unmitigated.

Westbrook Memorial Garden

Westbrook Memorial Garden is a 0.12-acre community garden located on Pacific Street between Bedford and Nostrand Avenues. The garden includes planting beds and trees. As shown in **Table 6-4**, incremental shadow coverage would occur on the May 6/August 6 and June 21 analysis days, with 49 minutes and two hours and six minutes of incremental shadows, respectively.

On the May 6/August 6 analysis day, incremental shadows would occur from 4:29 to 5:18 PM, for a duration of 49 minutes. As shown in **Figure 6-7a**, incremental shadows generated by Projected Development Site 20 only affect a small sliver on its western edge of the resource and would only be cast in the late afternoon, starting at 4:29. Thus, vegetation within the resource would receive more than six to eight hours of direct sunlight on this analysis day.

On the June 21 analysis day, the garden would receive two hours and six minutes of incremental shadows (3:49 PM–5:55 PM). Shadows would cover small portions of the resource, moving south and east before exiting entirely at 5:55. Vegetation within the garden would receive more than the minimum six to eight hours of direct sunlight set forth by the *CEQR Technical Manual* (refer to **Figures 6-7b** and **6-7c**).

Assessment

Incremental shadows resulting from development introduced by the Proposed Actions would be limited to only two analysis days and would occur for relatively short durations. These shadows would only affect small sections at any given time, and would occur in the late afternoon, near the end of the analysis period. All planting areas would continue to receive more than six to eight hours of direct sunlight, and therefore Westbrook Memorial Garden would not be adversely affected by shadows resulting from the Proposed Actions.

United Herkimer Garden Club

United Herkimer Garden Club is a 0.05-acre community garden located on Herkimer Street between Bedford Avenue and Nostrand Avenue. The park includes planting beds and seating. Incremental shadows would only occur on the December 21 analysis day for 23 minutes (refer to **Table 6-4**). As shown in **Figure 6-8**, incremental shadows generated by Projected Development Site 19 would be limited to the northwest corner of the garden.

Assessment

As noted above, incremental shadows would occur for a short period of time in a limited section of the garden. Since incremental shadows would only occur on December 21, which is outside the growing season according to the 2021 *CEQR Technical Manual*, vegetation within the garden would not be affected. Additionally, use of community gardens during the winter months tends to be low, meaning that user enjoyment of the garden would not be affected. Therefore, incremental shadow would not negatively impact this sunlight-sensitive resource.

Brower Park

Brower Park is a 7.05-acre park bounded by Kingston Avenue, Park Place, Brooklyn Avenue and St. Marks Avenue. The park includes various recreational amenities, such as basketball and handball courts, a playground, a skate park, and an open lawn. The park is also home to the Brooklyn Children's Museum and a public library.

As shown in **Table 6-4**, Brower Park would receive incremental shadows on all four analysis days. Incremental shadows range from an hour and 17 minutes on the December 21 analysis day to three hours and 29 minutes on the June 21 analysis day.

On the March 21/September 21 analysis day, incremental shadows would be cast on Brower Park from 2:02 PM to 4:29 PM (two hours and 27 minutes). Shadows cast on the park by Projected Development Site 53 would increase throughout the afternoon, moving east and north through the end of the analysis period at 4:29 PM (refer to **Figures 6-9a** and **6-9b**). Incremental shadows on this analysis day, which would occur only in the afternoon, would not be cast on any of the park's recreational amenities, and would instead be limited to areas consisting of walking paths and vegetation. Nevertheless, vegetation would continue to receive six to eight hours of direct sunlight on this analysis day.

Incremental shadows on the May 6/August 6 analysis day would cover Brower Park from 2:11 PM–5:18 PM (three hours and seven minutes). Project-generated shadows would move eastward, with increasing coverage throughout the afternoon. By approximately 4:45 PM, incremental shadows would cover the majority of the basketball courts, with a portion of the playground area receiving shadows starting at around 5:00 PM. However, these recreational amenities as well as vegetation within the park would continue to receive direct sunlight through the majority of the day (refer to **Figures 6-9c** and **6-9d**).

On the June 21 analysis day, Brower Park would receive increment shadows for 3 hours and 29 minutes (2:32 PM–6:01 PM). As shown in **Figures 6-9e** and **6-9f**, incremental shadows would move east and south through the afternoon, covering the entirety of the basketball courts by approximately 5:30 PM. However, the playground would remain largely uncovered, and all vegetation and recreational amenities would continue to receive sunlight through the majority of the day.

On the December 21 analysis day, Brower Park would receive one hour and 17 minutes of incremental shadows (1:36 PM–2:53 PM). Shadows on this analysis day would cover only a small portion in the northwestern corner of the park. None of the recreational amenities would receive incremental shadows on this analysis day (see **Figure 6-9g**).

Assessment

Although Brower Park would receive incremental shadows on all four analysis days, all areas of the park would continue to receive direct sunlight throughout the majority of the day. Incremental shadows on the March 21/September 21 and December 21 analysis days would be limited to a small portion of the park's northwest corner, where no recreational amenities are located.

On the May 6/August 6 and June 21 analysis days, incremental shadows would cover a larger area of the park in parts where more recreational facilities are situated. In particular, incremental shadows would cover the basketball courts, with a majority of the courts receiving coverage by approximately 5:00 PM on both days. However, shadow coverage on both days is only expected to last for a temporary period, with the courts expected to receive incremental shadows for approximately one hour and thirty minutes and two hours on the May 6/August 6 and June 21 analysis days, respectively. The playground is expected to receive even less incremental shadows for a shorter period of time, with only brief (less than one hour), partial coverage expected on the May 6/August 6 and June 21 analysis days. Incremental shadows on active recreational uses during the warmer months surrounding the summer solstice are not expected to significantly affect the usability of the open space, as temperatures and visibility would generally be adequate even without direct sunlight. Furthermore, as shadows are not static and move from west to east throughout the day all of the active uses in the park would continue to receive direct sunlight on all four representative analysis days.

As noted above, vegetation within all parts of the park would continue to receive more than six to eight hours of direct sunlight on all four analysis days. Therefore, as the extent and

duration of the incremental shadows would not significantly alter the public's use of the park or threaten the viability of vegetation or other resources, incremental shadows on Brower Park as a result of the Proposed Actions would not be considered a significant adverse impact, in accordance with 2021 C*EQR Technical Manual* guidance.

Atlantic Terminal Playground

Atlantic Terminal Playground is an approximately 0.75-acre resource on the corner Atlantic Avenue and Carlton Avenue. The resource includes two playground areas and is part of the Atlantic Terminal Houses administered by the New York City Housing Authority (NYCHA). As shown in **Table 6-4**, Atlantic Terminal Playground would experience incremental shadows on all four analysis days. Incremental shadows would range from 45 minutes on the December 21 analysis day to four hours and 44 minutes on the June 21 analysis day.

On the March 21/September 21 analysis day, Atlantic Terminal Playground would receive incremental shadows for two hours and 52 minutes, from 7:36 AM to 10:28 AM. As shown in **Figures 6-10a** and **6-10b**, incremental shadows generated by Projected Development Site 55 would cover nearly the entirety of the southern part of the playground at the start of the analysis period at 7:36 AM, before moving north and east. Shadows would decrease within the sunlight-sensitive resource before fully exiting at approximately 10:28 AM. The playground, as well as vegetation surrounding it, would continue to receive direct sunlight for the majority of the day.

On the May 6/August 6 analysis day, the playground would receive incremental shadows from 6:27 AM to 10:38 AM, for a total of four hours and 11 minutes. As shown **Figures 6-10c** to **6-10d**, the shadows would cover most of the playground in the early morning hours before moving east and exiting the resource at 10:38 AM. Vegetation within the park would continue to receive at least six hours of direct sunlight, as would the recreational equipment, given that incremental shadows would exit the playground area by approximately 9:30 AM.

On the June 21 analysis day, incremental shadows would cover the Atlantic Terminal Playground from 5:57 AM to 10:41 AM, for a duration of four hours and 44 minutes. Incremental shadows would begin in the south of the resource, increasing in coverage before moving east and exiting the area at 10:41 AM. The playground area would continue to receive direct sunlight for the majority of the day, as would vegetation within the resource (see **Figure 6-10e** through **6-10g**).

On the December 21 analysis day, incremental shadows would be cast on Atlantic Terminal Playground for a duration of 45 minutes (8:51 AM–9:36 AM). As shown in **Figure 6-10h**, shadows on this analysis day would be limited to the northeastern corner of the resource. At no time would shadows cover any portion of the playground equipment, and vegetation would continue to receive direct sunlight for at least six hours.

Assessment

Shadows on Atlantic Terminal Playground would be limited in both scope and duration. On all four analysis days, incremental shadows would exit the playground area by mid-morning,

when use of the playground is expected to be low. Generally, the most significant shadows on all four analysis days are expected to occur in the early morning before moving east and exposing the playground to increasing amounts of direct sunlight. Vegetation within the playground would continue to receive more than the minimum six hours of direct sunlight outlined in the 2021 *CEQR Technical Manual* during the plant growing season. Incremental shadows are not expected to affect enjoyment of the playground equipment, as the duration of incremental shadow coverage on equipment is limited and would occur during the early morning hours when usage is expected to be low. Therefore, as the extent and duration of the incremental shadows would not significantly alter the public's use of the park or threaten the viability of vegetation or other resources, incremental shadows on Atlantic Terminal Playground as a result of the Proposed Actions would not be considered a significant adverse impact, in accordance with 2021 C*EQR Technical Manual* guidance.

Temple of Restoration: 515 Dean Street

The Temple of Restoration is located on Dean Street between 6th and Carlton Avenues. The building was built in 1893 and is currently eligible for historic resource designation in the State/National Register of Historic Places (S/NR). The temple is an example of Gothic inspired Romanesque Revival architecture and includes stained glass windows, which are sunlight-sensitive features, on the building's southern, eastern, and western facades.

As shown in **Table 6-4**, Temple of Restoration would only receive shadows on the December 21 analysis day, for a duration of one hour and 33 minutes (8:51 AM–10:24 AM). Shadows generated by Projected Development Site 46 would move eastward as the morning progresses. Although nearly the entirety of the building's roof and southern façade would be shaded at the beginning of the analysis period, the amount of coverage would decrease before fully exiting at 10:24 AM (see **Figure 6-11a**). A detailed view of Temple of Restoration with the location of sunlight sensitive resources on the main façade is provided in **Figure 6-11b**.

Assessment

Duration and coverage of incremental shadows on Temple of Restoration would be limited. Only the sunlight-sensitive stained glass windows on the building's southern façade would receive incremental shadows, and only for a short period of approximately one hour and ten minutes. Incremental shadows would move throughout this period and would only cover the entirety of the stained glass windows for a short period of time (less than 20 minutes). Because incremental shadows would occur only on one analysis day and for a limited duration, the Proposed Actions would not alter the public's enjoyment of the sunlight sensitive resources and would therefore not result in any significant adverse impacts to the Temple of Restoration.

The Co-Cathedral of St. Joseph and St. Teresa of Avila: 856 Pacific Street

The Co-Cathedral of St. Joseph/St. Teresa of Avila is located on Pacific Street between Vanderbilt and Underhill Avenues. The building was built from 1910-1912 and is currently eligible for S/NR historic designation. The church is an example of Italian Renaissance

Revival architecture and has stained glass windows designed by Locke Studio. The sunlight-sensitive stained glass windows are located on all four of the cathedral's facades. There is also an adjacent convent building that does not contain sunlight sensitive features.

As shown in **Table 6-4**, the Co-Cathedral of St. Joseph and St. Teresa of Avila would briefly receive incremental shadows on the May 6/August 6 and June 21 analysis days, with ten minutes and 13 minutes of expected incremental shadows, respectively. Incremental shadows are shown in **Figures 6-12a** and **6-12b**, and a bird's eye aerial view of the cathedral with the location of sunlight sensitive features on the eastern and northern facades is provided in **Figure 6-12c**.

Assessment

Incremental shadows on the Co-Cathedral of St. Joseph and St. Teresa of Avila would be limited in both coverage and duration. Additionally, incremental shadows would only be cast on the church convent, which does not contain any sunlight-sensitive features. Therefore, the Proposed Actions would not result in significant adverse shadow impacts on the Co-Cathedral of St. Joseph and St. Teresa of Avila.

The Church of St. Luke and St. Matthew: 520 Clinton Avenue

The Church of St. Luke and St. Matthew is located on Clinton Avenue between Fulton Street and Atlantic Avenue. The building was built from 1888-1891 and was designated as a New York City Landmark (NYCL) in 1981. The church is an example of Italian Romanesque Revival architecture and includes stained glass windows. The church also features an architecturally significant tower located at the southeastern corner of the building. Sunlight-sensitive stained glass windows are situated on all four of the building's facades.

St. Luke's Protestant Episcopal Church would experience incremental shadows on three of the four analysis days (refer to **Table 6-4**). Duration of incremental shadows would range from 31 minutes on the March 21/September 21 analysis day to 40 minutes on the June 21 analysis day.

On the March 21/September 21 analysis day, the church would receive incremental shadows from 3:58 PM to 4:29 PM, for a duration of 31 minutes. As shown in **Figure 6-13a**, incremental shadows resulting from Projected Development Site 55 would cover portions of the church's roof, moving eastward before finally exiting at 4:29 PM. At no point would sunlight-sensitive stained glass windows be covered in shadow on this analysis day. The location of stained glass windows in St. Matthew and St. Luke is shown in **Figure 6-13d**.

On the May 6/August 6 analysis day, the church would receive incremental shadows for 38 minutes (4:40 PM–5:18 PM). Incremental shadows would only cover small portions of the roof and would not cover any of the sunlight-sensitive resources (see **Figure 6-13b**).

On the June 21 analysis day, incremental shadows would cover portions of the church from 5:12 to 5:52 PM, a duration of 40 minutes. As shown in **Figure 6-13c**, incremental shadows

would cover only a small part of the building's roof and would not cover any part of the church's stained glass windows.

Assessment

Incremental shadows to the church would be limited in both time and duration. As noted above, incremental shadow coverage would be limited to the building's roof, which does not feature any sunlight-sensitive elements. Therefore, the Proposed Actions would not result in significant adverse shadow impacts on the Church of St. Luke and St. Matthew.

St. Bartholomew's Protestant Episcopal Church: 1227 Pacific Street

St. Bartholomew's Protestant Episcopal Church and Rectory is located on Pacific Street between Bedford Avenue and Nostrand Avenue. The church was built between 1886-1890 and was individually registered as a NYCL in 1974 and a U.S. National Historic Landmark in 1980. The church is an example of Romanesque Revival architecture and contains sunlight-sensitive stained glass windows on the building's southern, eastern, and western facades. The sunlight sensitive features in St. Bartholomew's are shown in **Figure 6-14i**.

St. Bartholomew's would receive incremental shadows on all four analysis days (see **Table 6-4**). Incremental shadows range from two hours and 29 minutes on the December 21 analysis day to five hours and 51 minutes on the June 21 analysis day.

On the March 21/September 21 analysis day, St. Bartholomew's would receive incremental shadows for a duration of four hours and six minutes (12:13 PM to 4:29 PM). As shown in **Figures 6-14a** and **6-14b**, incremental shadows from Projected Development Site 20 would cover a small portion of the building's northeastern corner before moving eastward as the afternoon progresses. Generally, incremental shadows on this analysis day would be confined to the building's roof, with the stained glass windows on the building's western façade affected for a duration of approximately 90 minutes starting at 4:00 PM. The stained glass windows would continue to receive direct sunlight for most of the day in the future with the Proposed Actions.

On the May 6/August 6 analysis day, the building would receive incremental shadows from 12:05 to 5:18 PM, for a duration of five hours and 13 minutes. At 12:05 PM, shadows would cover only a small portion of the building, before moving east and south to cover a larger area of the building (see **Figures 6-14c** and **6-14d**). Incremental shadows would enter the sunlight-sensitive western-facing stained glass windows at approximately 2:00 PM and would continue to cover portions of the resources until the end of the analysis period at 5:18 PM.

On the June 21 analysis day, incremental shadows would cover portions of the building for five hours and 51 minutes (12:10 PM–6:01 PM). As shown **Figures 6-14e** through **6-14g**, incremental shadows would increase throughout the afternoon as shadows move east and south across the building. Incremental shadows would enter the west-facing stained glass windows at approximately 1:30 PM and reach their peak at approximately 4:30 PM, before fully exiting the façade at approximately 5:50 PM.

On the December 21 analysis day, incremental shadows would cover portions of St. Bartholomew's from 12:24 PM to 2:53 PM, for a duration of two hours and 29 minutes. Of the four analysis days, incremental shadows would be least significant on December 21st, with only small portions of the northwestern corner of the building affected (see **Figure-14h**).

Assessment

Project-generated shadows are expected to cover portions of the western-facing stained glass windows on three of the four analysis days, excluding the December 21 analysis day. On the March 21 analysis day, these shadows are expected to be minor, occurring on only a small part of the windows for a limited duration of less than one hour.

However, as noted above, shadow coverage of the building's sunlight-sensitive features is expected to be larger and of longer duration on the May 6/August 6 and June 21 analysis days. On these days, incremental shadows would cover portions of the western-facing stained glass windows for at least three and four hours, respectively. Additionally, incremental shadows on these days would cover the majority of the church's stained glass windows for approximately one hour.

As these incremental shadows may have the potential to affect the public's enjoyment of this resource's sunlight-sensitive features, this is being considered a significant adverse shadow impact. As discussed in **Chapter 20, Mitigation**, it has been determined that there are no feasible or practicable mitigation measures that can be implemented to mitigate this impact, and the Proposed Actions' significant adverse shadows impact on St. Bartholomew's Protestant Episcopal Church therefore would remain unmitigated.

Alhambra Apartments: 475 Nostrand Avenue

The Alhambra Apartments, located within the LPC-designated Bedford Historic District, on Nostrand Avenue between Halsey and Macon Streets was designated as a NYCL in 1986. Designed by architect Montrose W. Morris and constructed in 1889-90, the Alhambra Apartments is an outstanding example of turn-of-the-century apartment house design exhibiting both Romanesque Revival and Queen Anne styles featuring patterned brick walls, arched windows, carved brackets, open loggias and arcades, polygonal corner towers, and Mansard roof. The Alhambra Apartments' sunlight-sensitive features consist of the open loggias and arcades on the building's upper floors. On the northern and southern facades, these features are located on the building's fourth floor, with the sunlight-sensitive features on the western-facing façade located on the second, third, and fourth floors. The Alhambra Apartments' sunlight features resources are shown in **Figure 6-15g**.

As noted in **Table 6-4**, the Alhambra Apartments would experience incremental shadows on all four analysis days. Incremental shadow duration ranges from one hour and six minutes on the December 21 analysis day to three hours and 33 minutes on the June 21 analysis day.

On the March 21/September 21 analysis day, incremental shadows from Projected Development Site 54 would cover the Alhambra apartments from 7:36 AM to 10:00 AM, for

a total duration of two hours and 24 minutes. As shown in **Figures 6-15a** and **6-15b**, incremental shadows would move north and east throughout the morning, covering a progressively smaller portion of the building before the complete exit of shadows at approximately 10:00 AM. The sunlight-sensitive loggias and arcades on the upper floors of the building's western façade would be covered by incremental shadows for the majority of this period, although the size of the affected area would decrease as the morning progresses.

On the May 6/August 6 analysis day, the building would receive incremental shadows for a duration of three hours and two minutes (6:27 AM–9:29 AM). Early morning shadows would mostly cover the roof and fourth floor of the building's western façade, before moving east and north until the exit of shadows at 9:29 AM (see **Figure 6-15c**). Incremental shadows on eastern-facing sunlight-sensitive features would cease by approximately 9:00 AM, with upper floors receiving more incremental shadows early in the morning and lower floors receiving more shadows later in the morning.

On the June 21 analysis day, the Alhambra Apartments would receive three hours and 33 minutes of incremental shadows, from 5:57 AM to 9:30 AM. Similar to the previous two analysis days, shadows would mostly cover the roof and upper floors in the morning, affecting a smaller area as shadows move to the north and east. Incremental shadows would be limited to the building's western façade (see **Figure 6-15d**).

On the December 21 analysis day, incremental shadows would last from 8:51 AM to 9:57 AM, for a duration of one hour and six minutes. Of the four analysis days, incremental shadows on this day affect the smallest area of the building and for the shortest time. Nevertheless, portions of the western-facing sunlight sensitive features would be covered for the majority of the incremental shadow duration, although the covered portions would change as shadows move throughout the morning (see **Figures 6-15e** and **6-15f**).

Assessment

Portions of the sunlight-sensitive loggias and arcades on the building's western façade would receive incremental shadows on all four of the analysis days. Generally, the fourth floor of the building is covered earlier in the morning, with the lower floors receiving an increasing share of shadows as they move to the north and east. Generally, the May 6/August 6 and June 21 analysis days represent the most significant of the four analysis days in terms of the duration and area of sunlight-sensitive features covered by incremental shadows, with two to three hours of incremental shadows on those days, respectively.

Incremental shadows to sunlight sensitive features of the Alhambra Apartments would be limited to the building's western façade and would occur for no more than three hours. Additionally, the entire façade would not be totally covered in shadow at any one time, as different parts of the building receive different shadow coverage throughout the morning. Incremental shadows would be limited to the early morning hours, with shadows exiting the building entirely no later than 10:00 AM on each of the four analysis days. For this reason, public views of the sunlight-sensitive architectural features would not be significantly affected,

and no significant adverse shadows impacts to the Alhambra Apartments are expected as a result of the Proposed Actions.

Bethel Seventh Day Adventist Church: 457 Grand Avenue

Bethel Seventh Day Adventist Church is located at the intersection of Grand Avenue and Lefferts Place. It was constructed in 1928 and is within the S/NR-Listed Clinton Hill South Historic District, which was registered in 1986. The church has sunlight-sensitive stained-glass windows on its western-facing facades, as shown in **Figure 6-16b**. As noted in **Table 6-4**, Bethel Seventh Day Adventist Church would only receive incremental shadows on the December 21 analysis day for 52 minutes, from 2:01 PM to 2:53 PM.

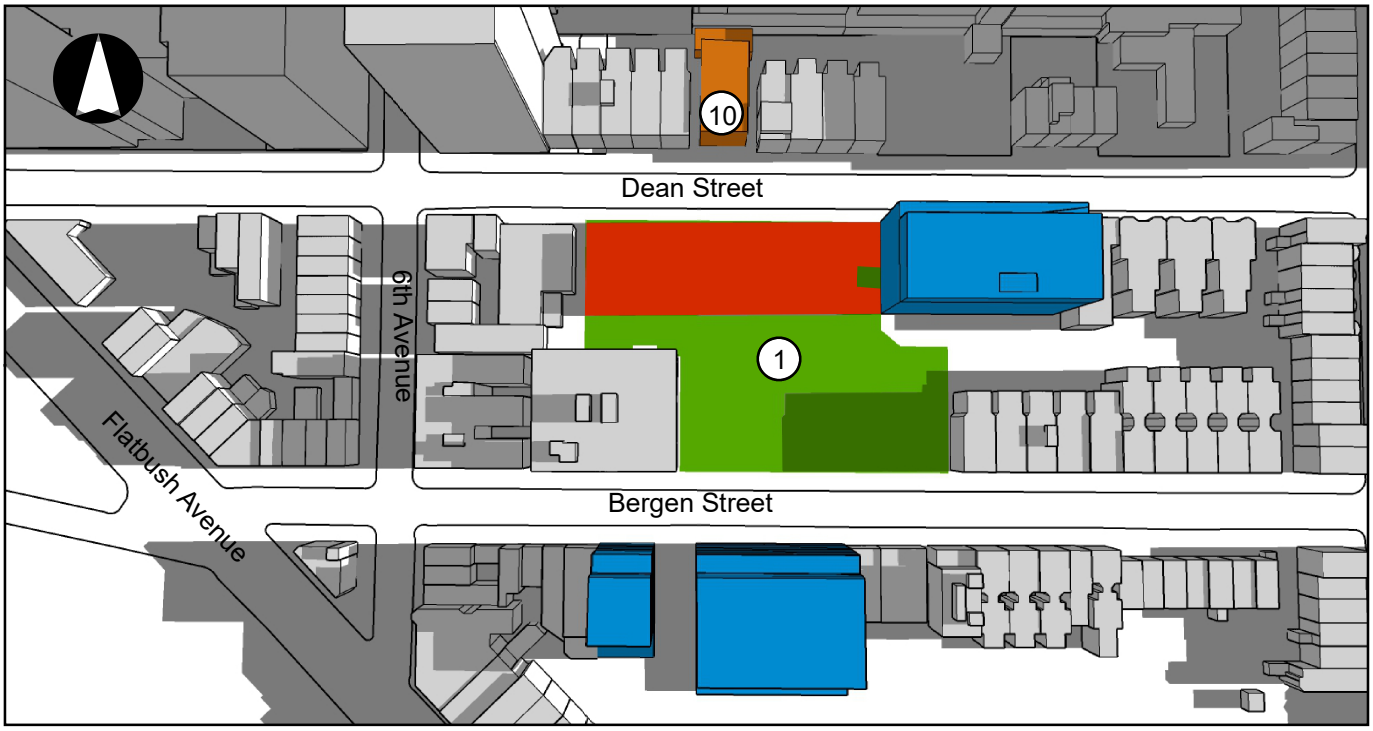
Assessment

Incremental shadows on the church would be limited in both coverage and duration. The sunlight-sensitive features on the building's western façade would receive incremental shadows for a limited time (approximately 22 minutes, from 2:31 PM to 2:53 PM), and only on one of the four analysis days, and therefore the public's enjoyment or appreciation of those features would not be adversely affected. Therefore, the Proposed Actions would not result in significant adverse shadow impacts on Bethel Seventh Day Adventist Church.

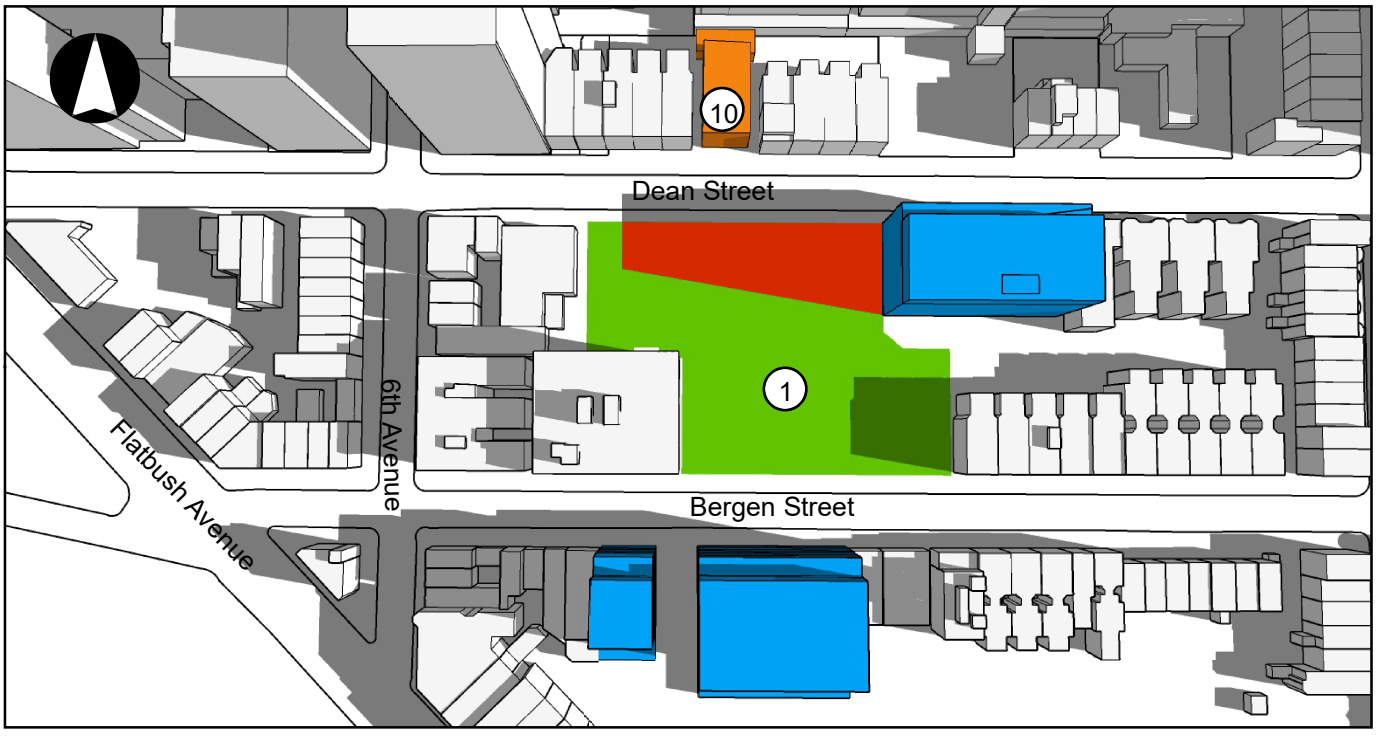
Conclusion

The above shadows analysis determined that development resulting from the Proposed Actions would result in significant adverse shadow impacts on two sunlight-sensitive resources. The detailed analysis determined that the projected and potential development sites identified in the RWCDS would result in incremental shadow coverage on a total of fifteen sunlight-sensitive resources, two of which were determined to experience significant adverse impacts—Lefferts Place Block Association Garden and St. Bartholomew's Episcopal Church. The analysis determined that a portion of Lefferts Place Block Association Garden would not receive adequate sunlight during the growing season (at least the six-to-eight-hour minimum specified in the 2021 *CEQR Technical Manual*) as a result of incremental shadow coverage, and vegetation at this resource could be significantly impacted. Additionally, the analysis determined that incremental shadow coverage would result in a reduction in direct sunlight exposure for sunlight-sensitive features at St. Bartholomew's Episcopal Church, which could affect the public's enjoyment or appreciation of those features.

Dean Playground - March 21st/September 21st



7:36 AM



8:30 AM

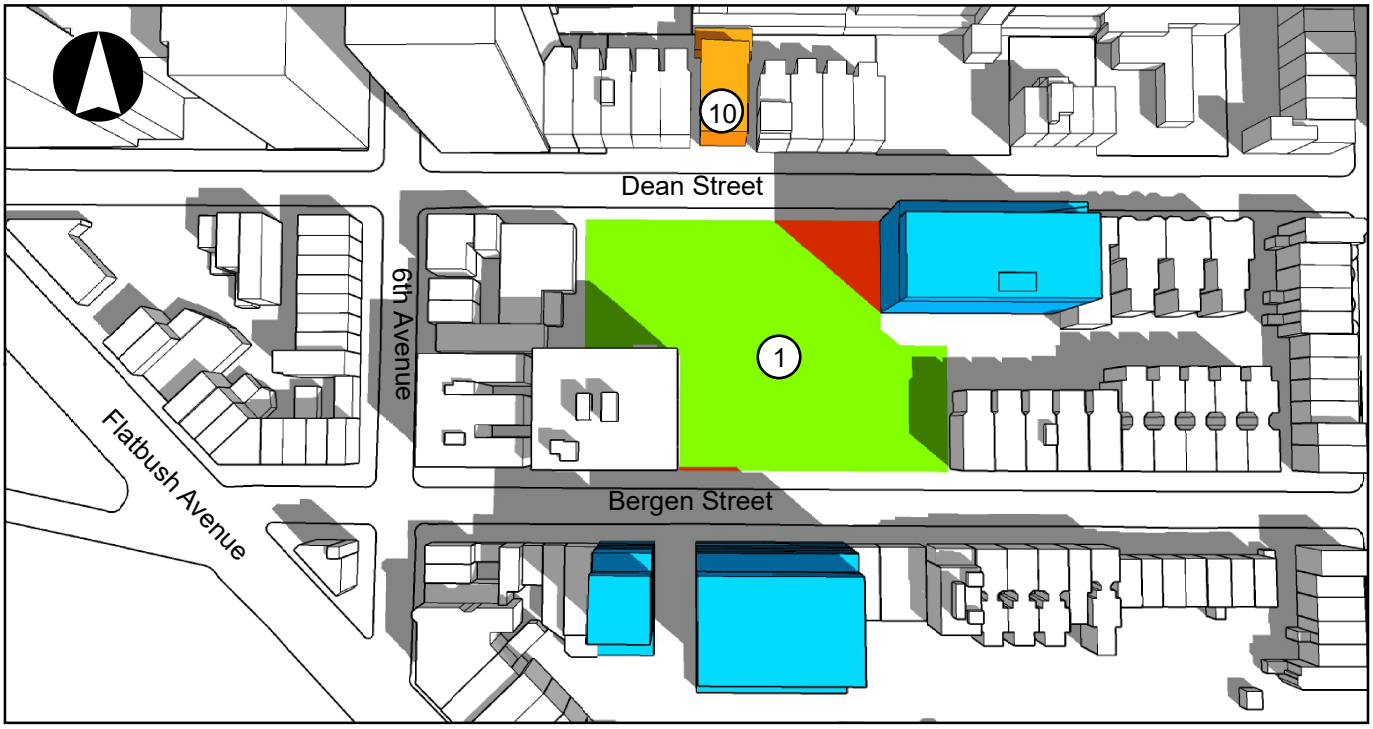
Projected Development Site

10 Temple of Restoration

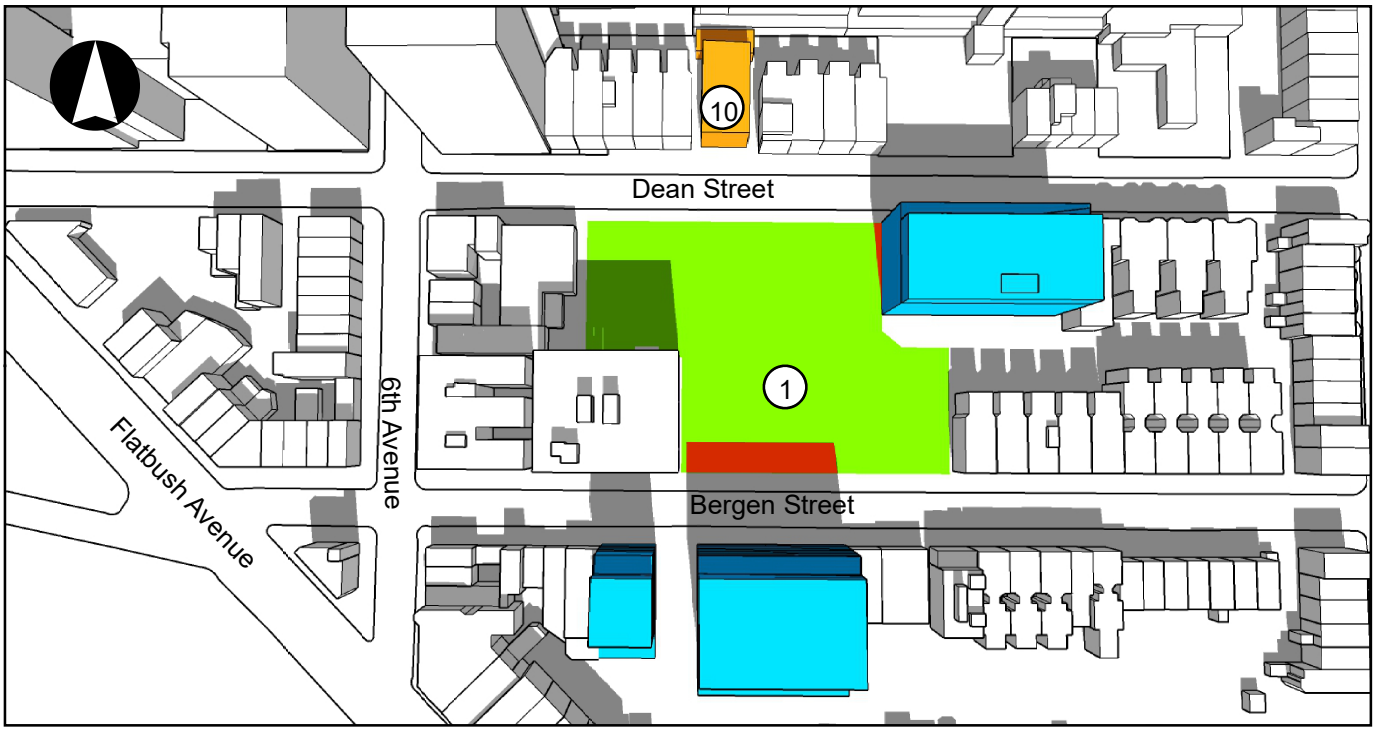
1 Dean Playground

Project-Generated Incremental Shadow

Dean Playground - March 21st/September 21st



10:00 AM



12:30 PM

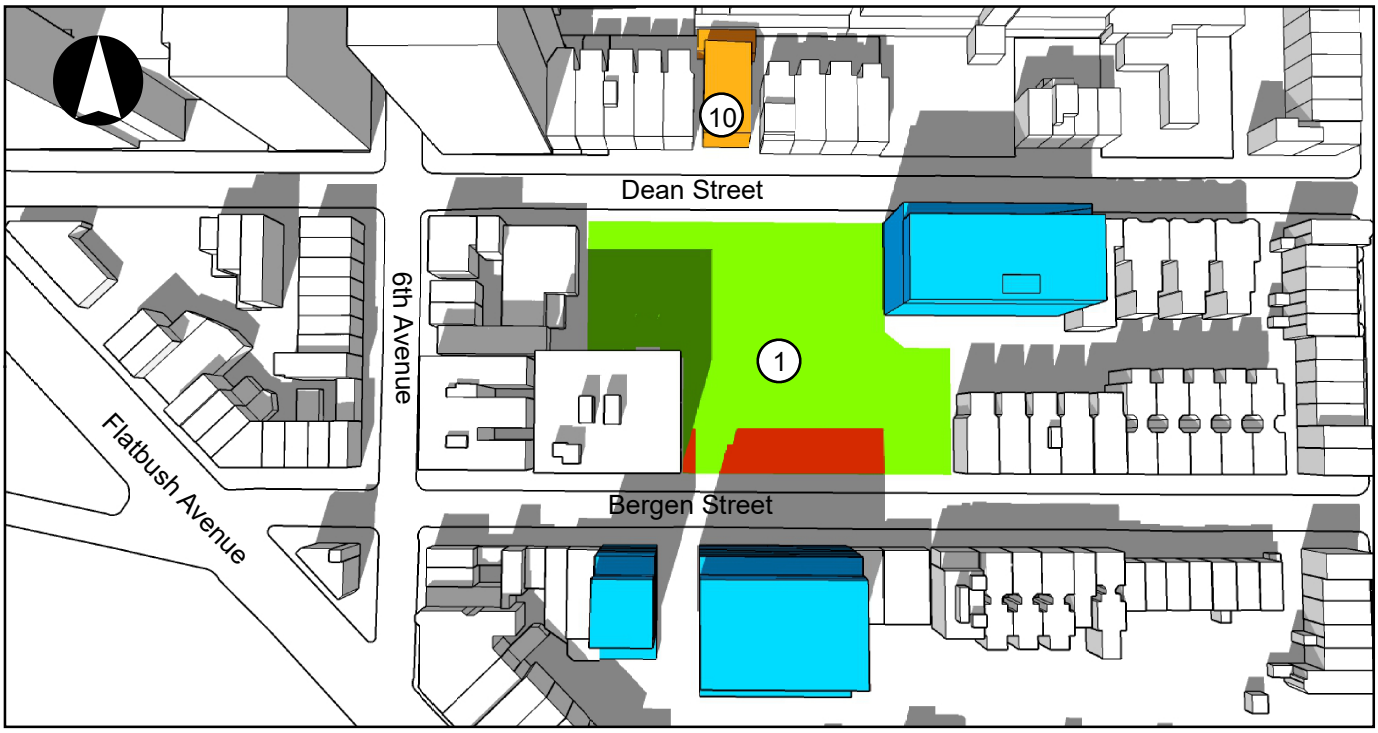
Projected Development Site

10 Temple of Restoration

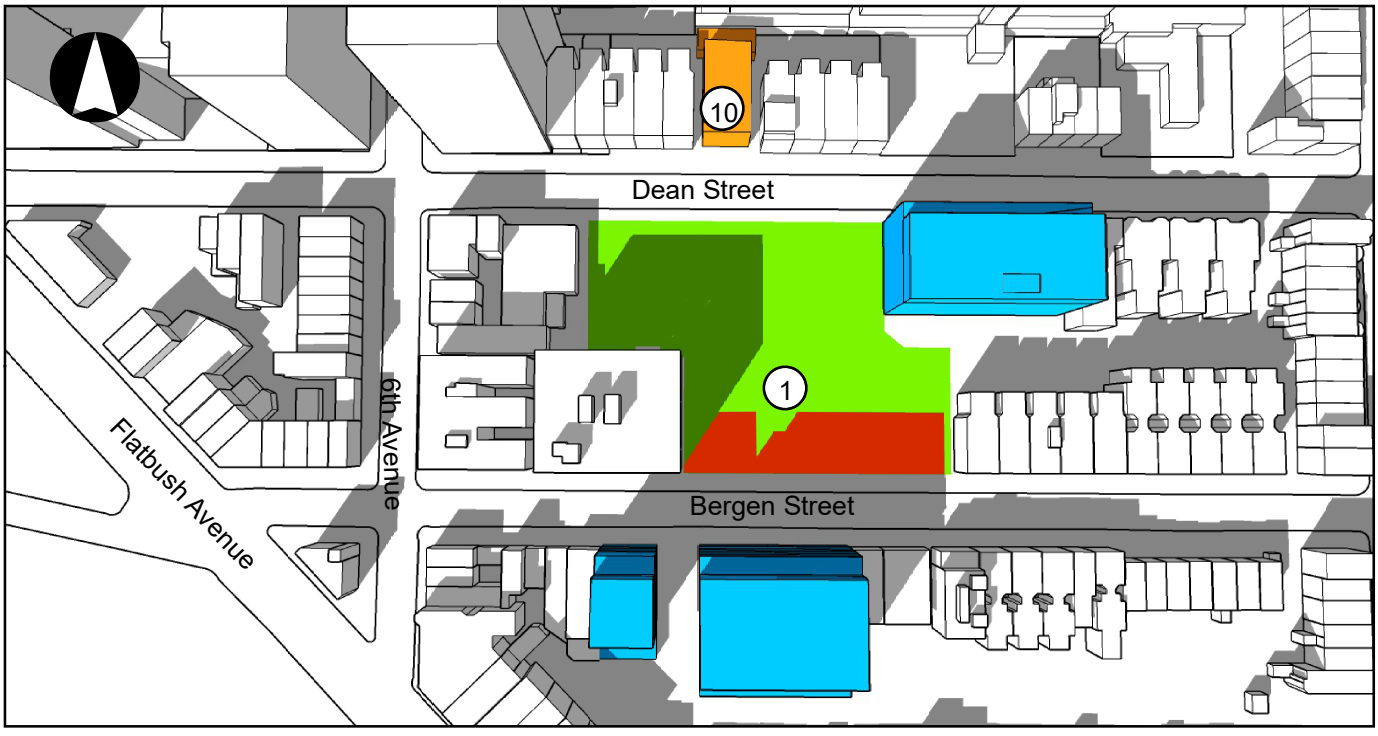
1 Dean Playground

Project-Generated Incremental Shadow

Dean Playground - March 21st/September 21st



1:30 PM



2:30 PM

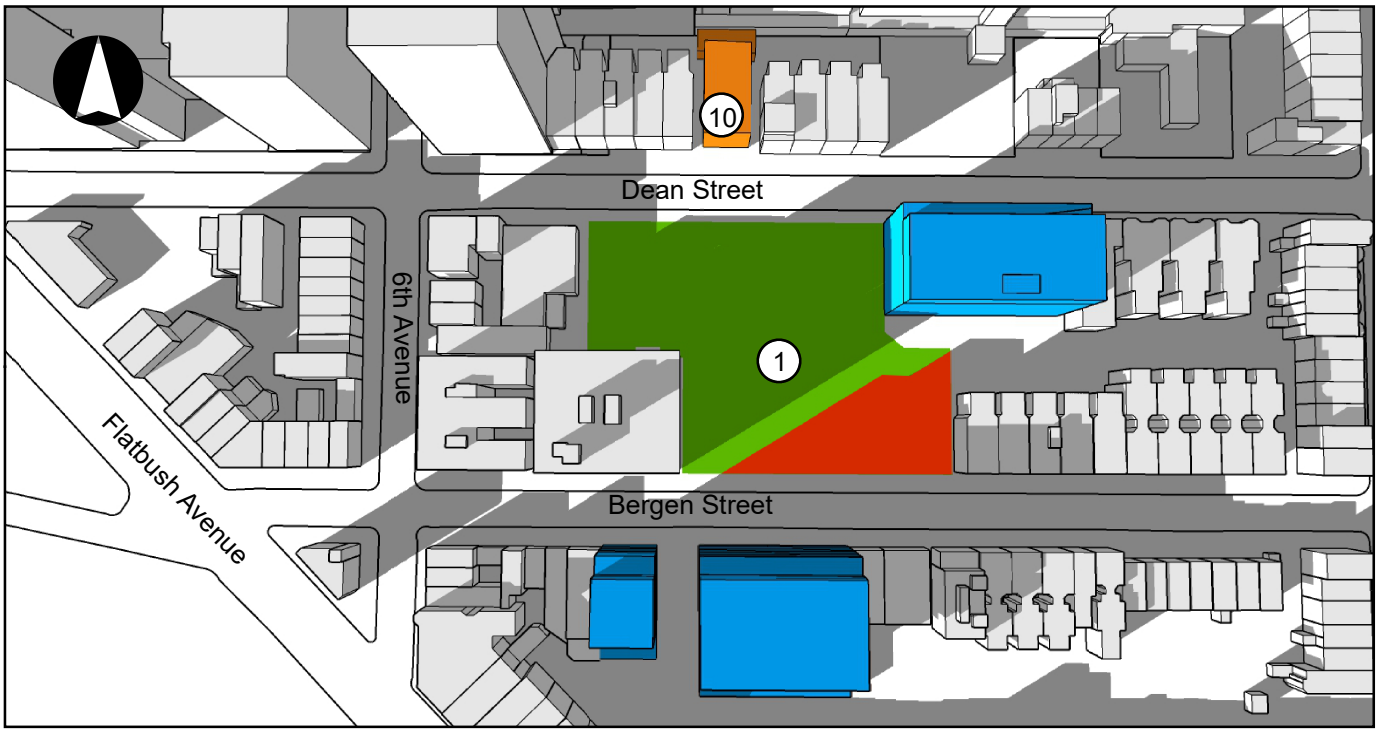
Projected Development Site

10 Temple of Restoration

1 Dean Playground

Project-Generated Incremental Shadow

Dean Playground - March 21st/September 21st



4:29 PM

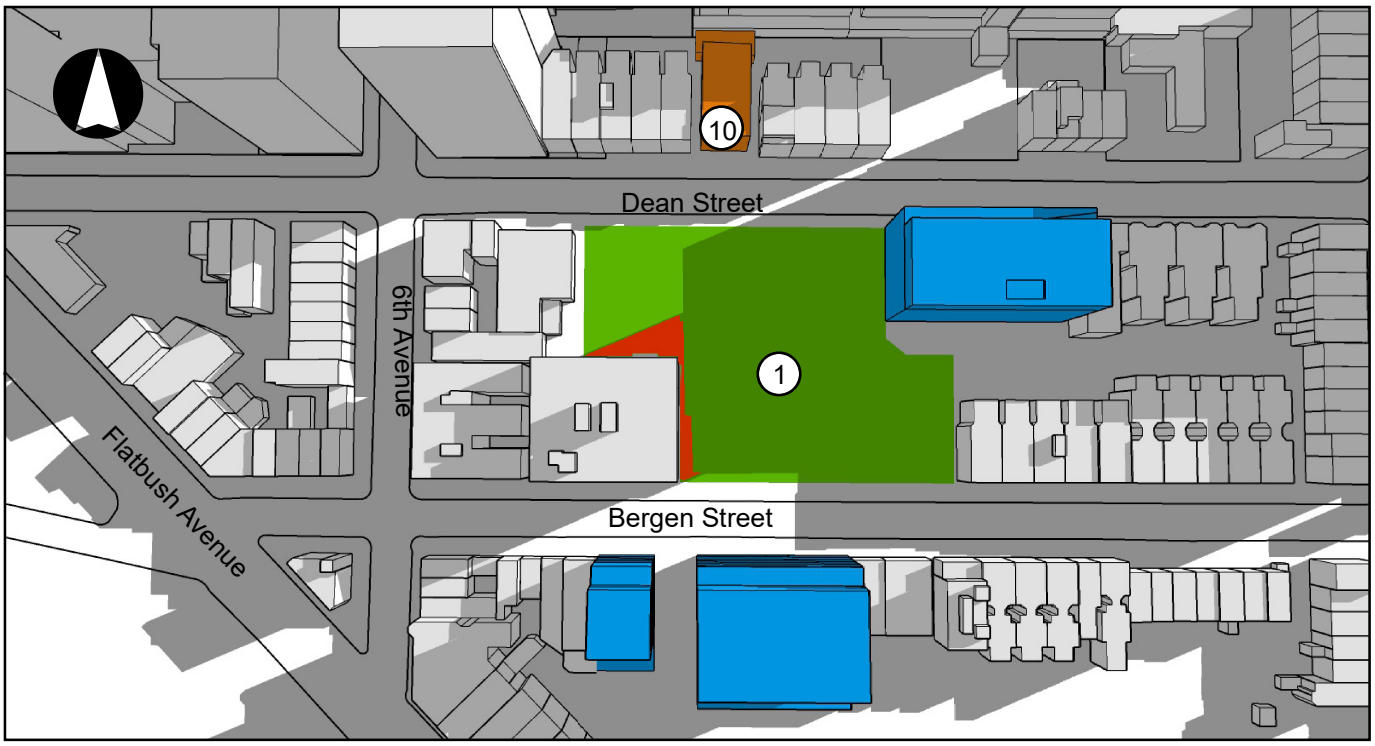
Projected Development Site

10 Temple of Restoration

1 Dean Playground

Project-Generated Incremental Shadow

Dean Playground - May 6th/August 6th



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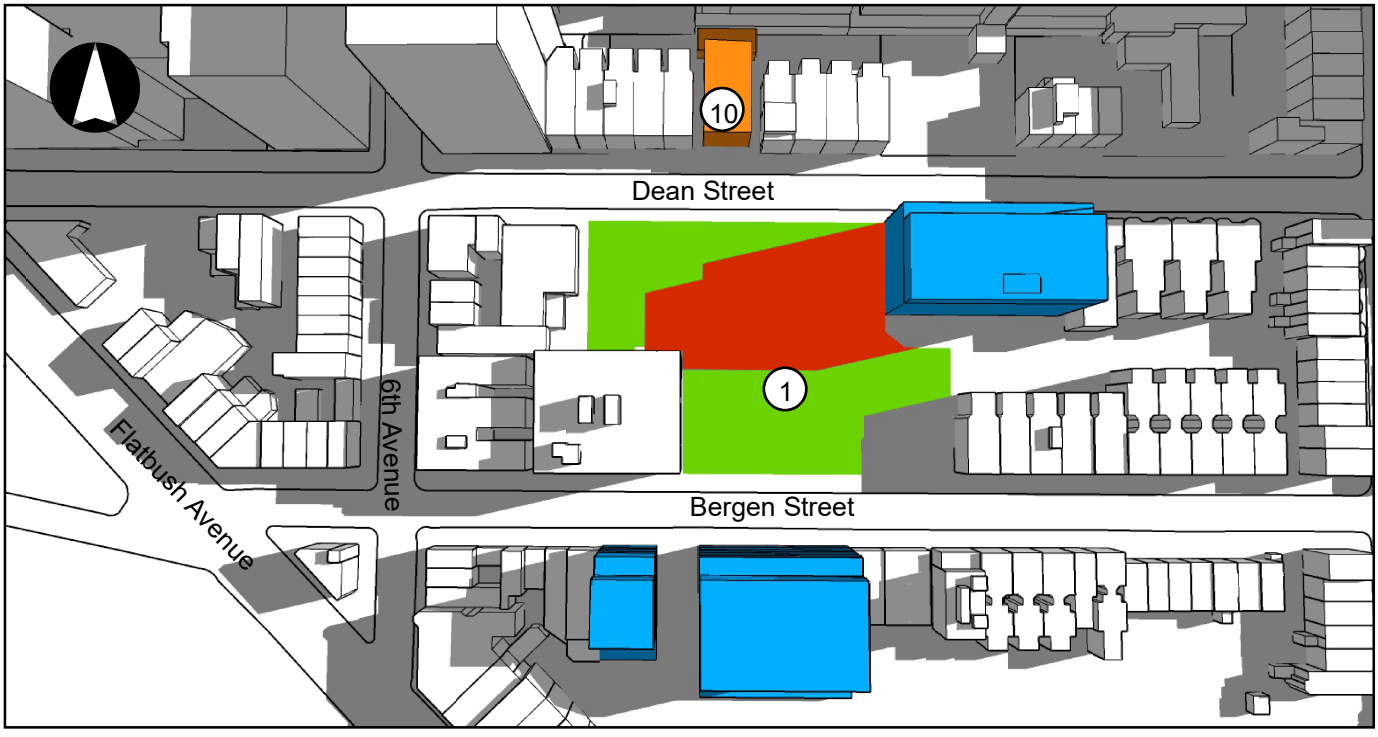


7:30 AM

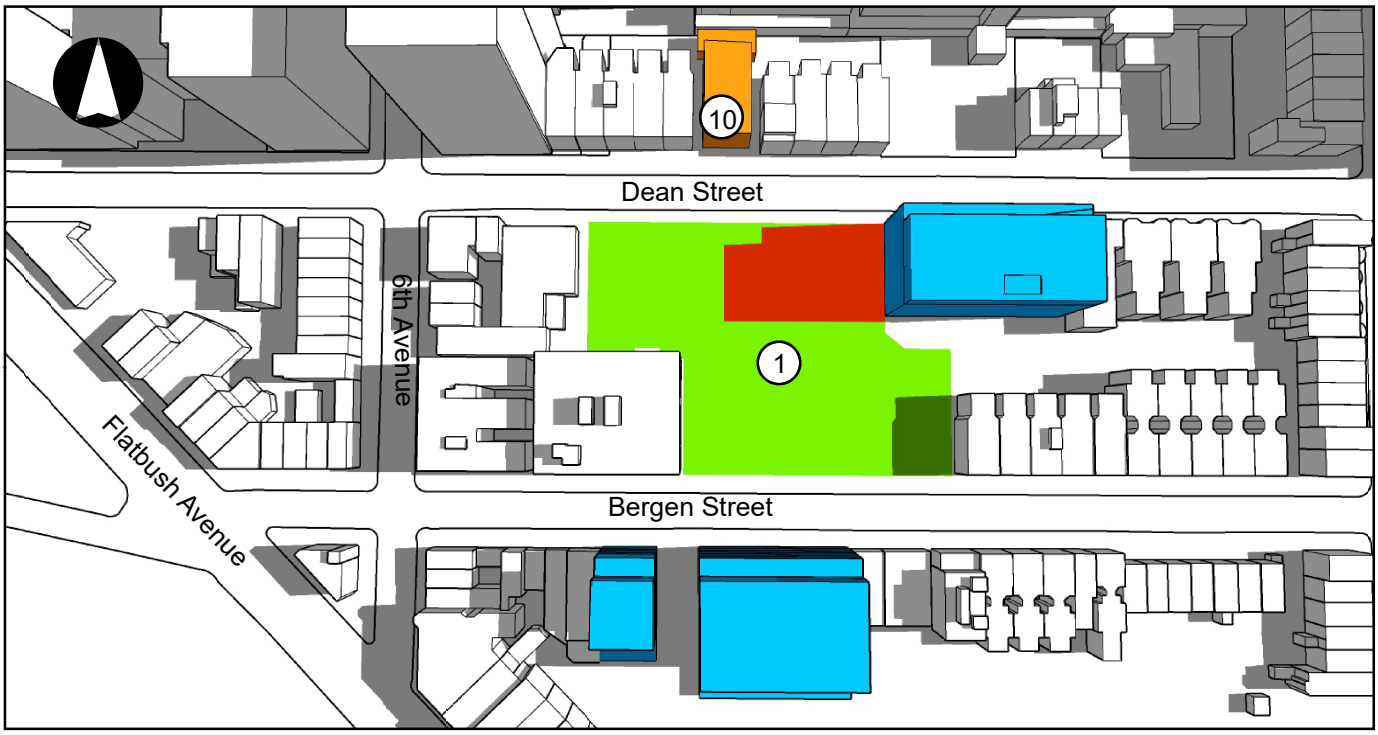
Projected Development Site

10 Temple of Restoration

1 Dean Playground

Project-Generated Incremental Shadow

Dean Playground - May 6th/August 6th



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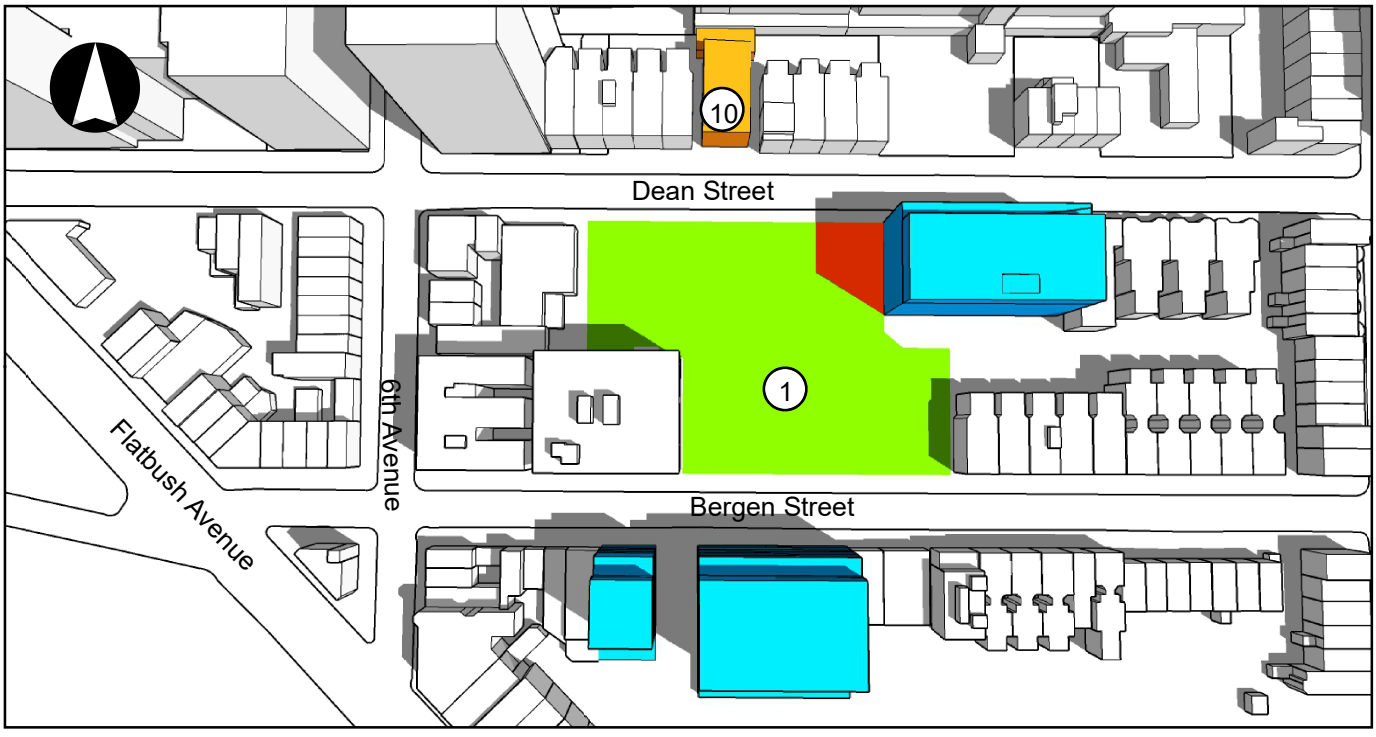

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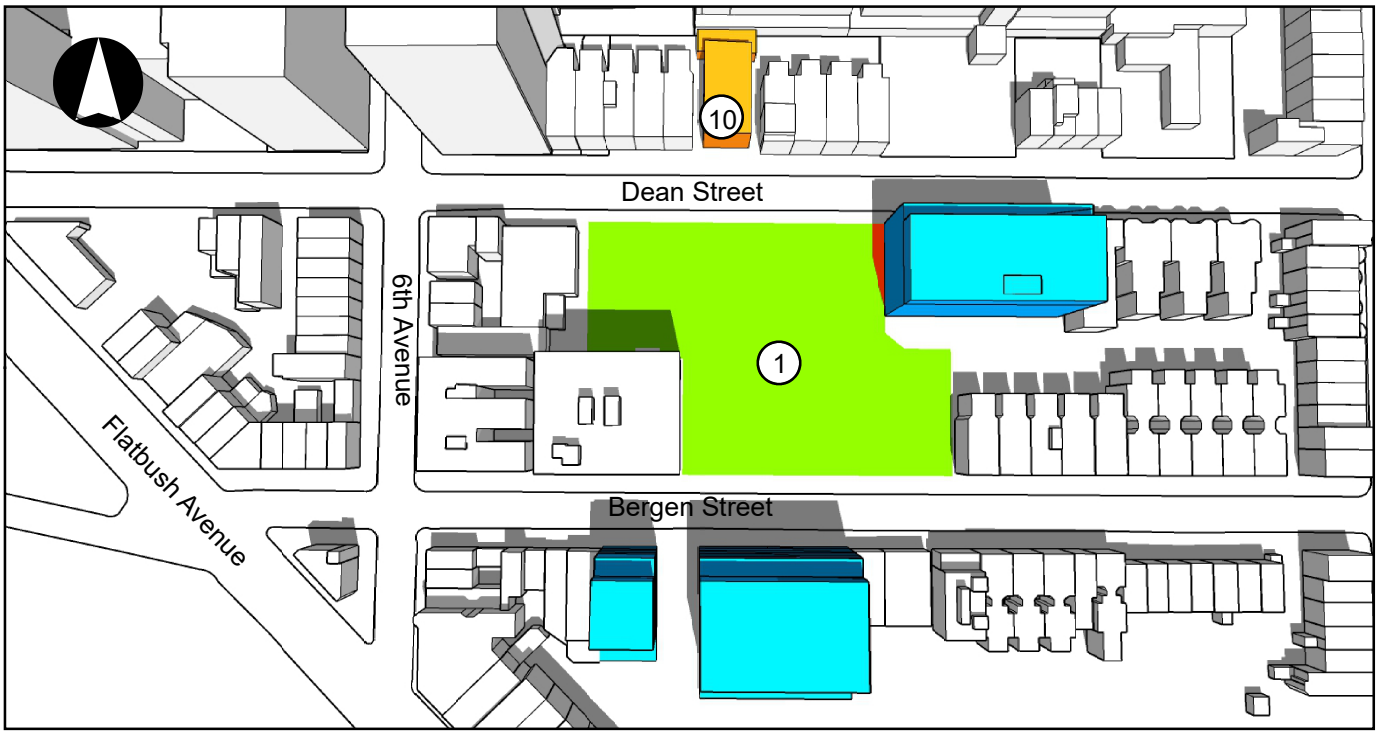
Projected Development Site

10 Temple of Restoration

1 Dean Playground

Project-Generated Incremental Shadow

Dean Playground - May 6th/August 6th



12:00 PM

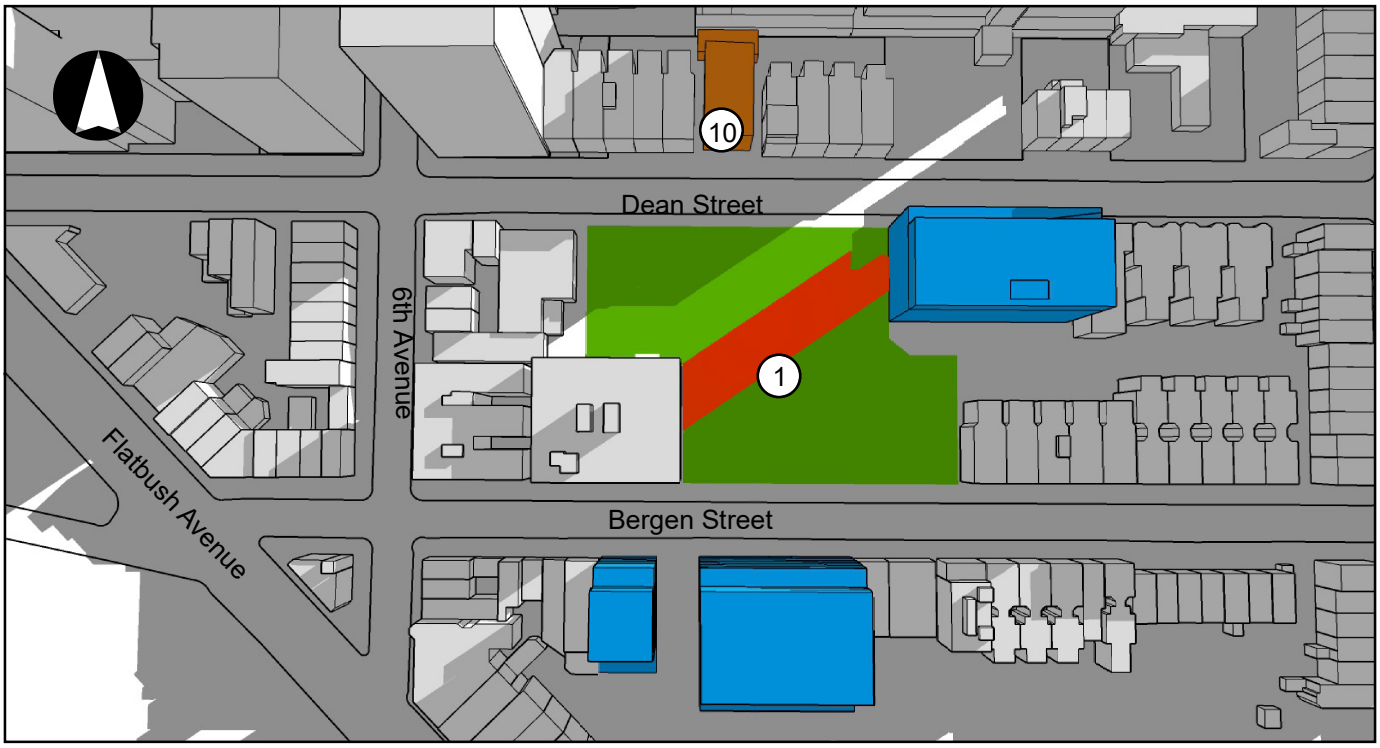
Projected Development Site

10 Temple of Restoration

1 Dean Playground

Project-Generated Incremental Shadow

Dean Playground - June 21st



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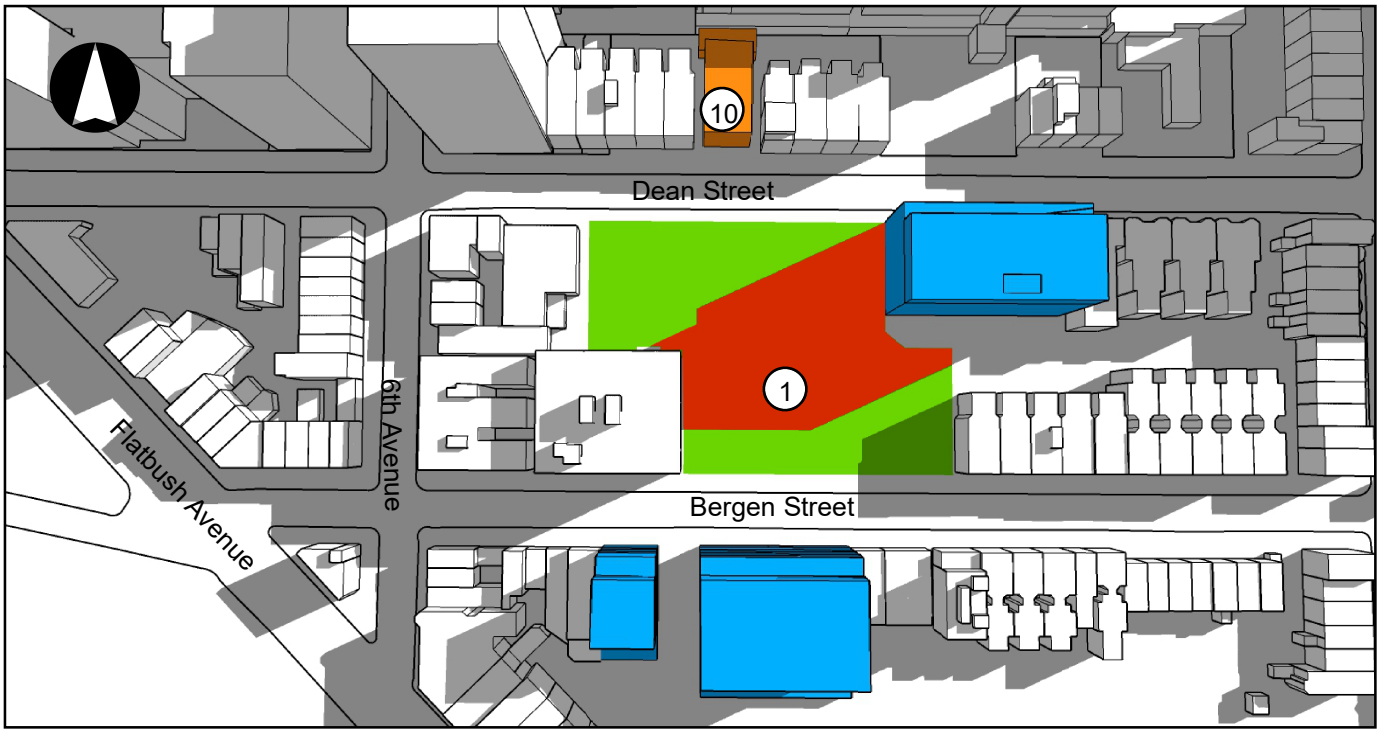

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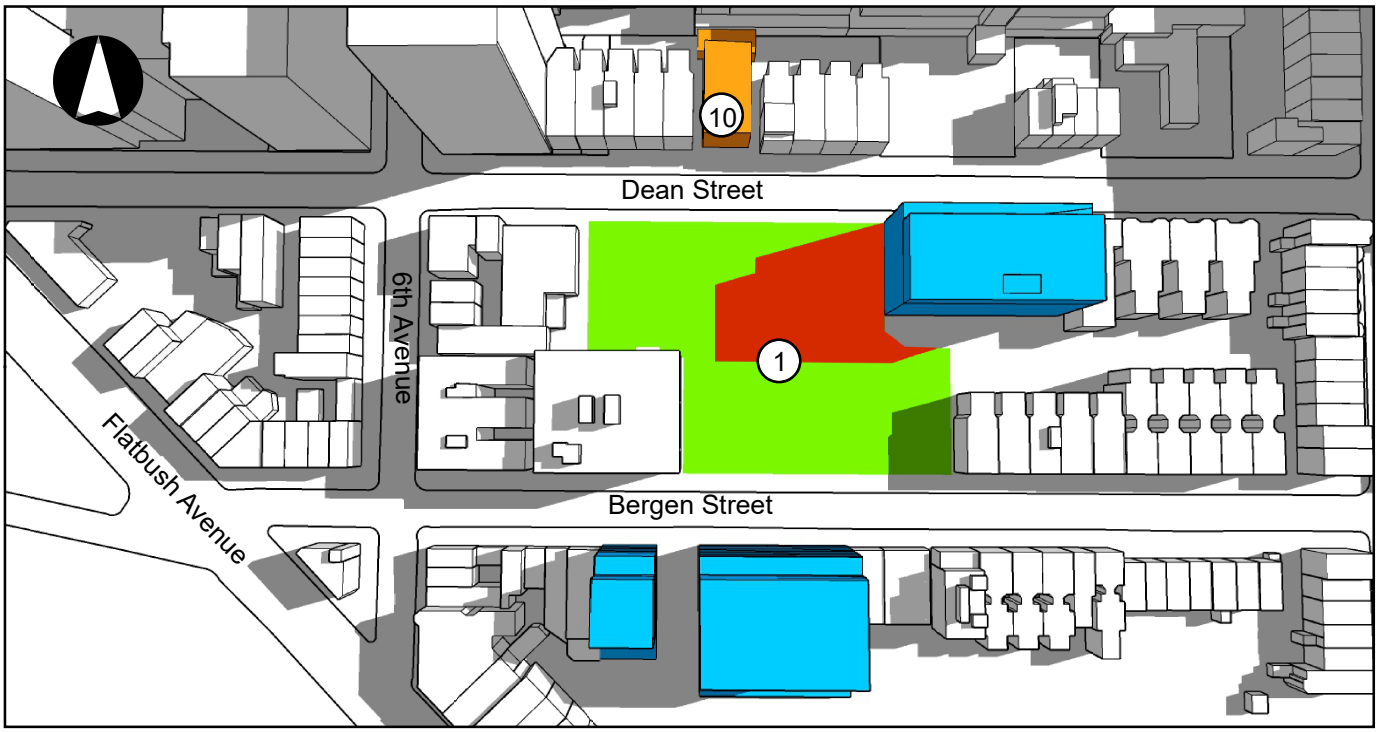
Projected Development Site

Dean Playground

Temple of Restoration

Project-Generated Incremental Shadow

Dean Playground - June 21st



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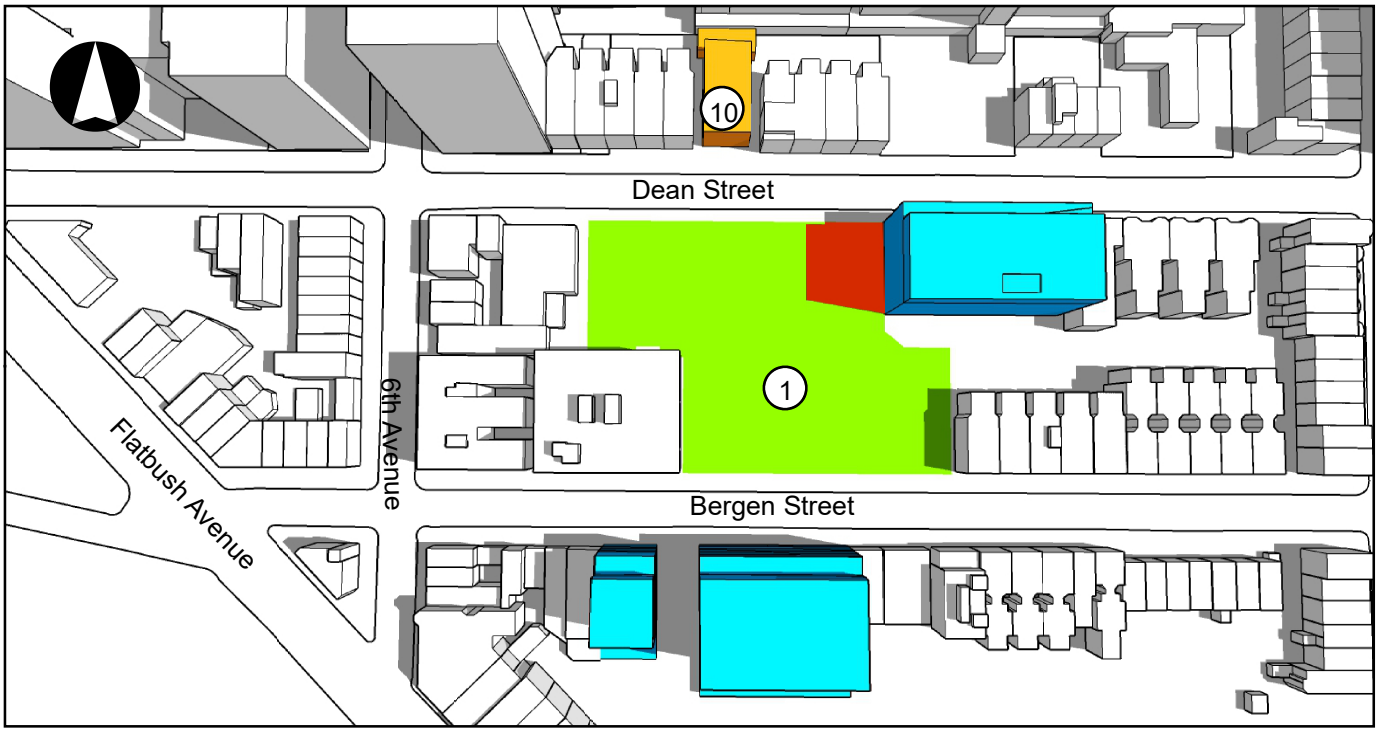

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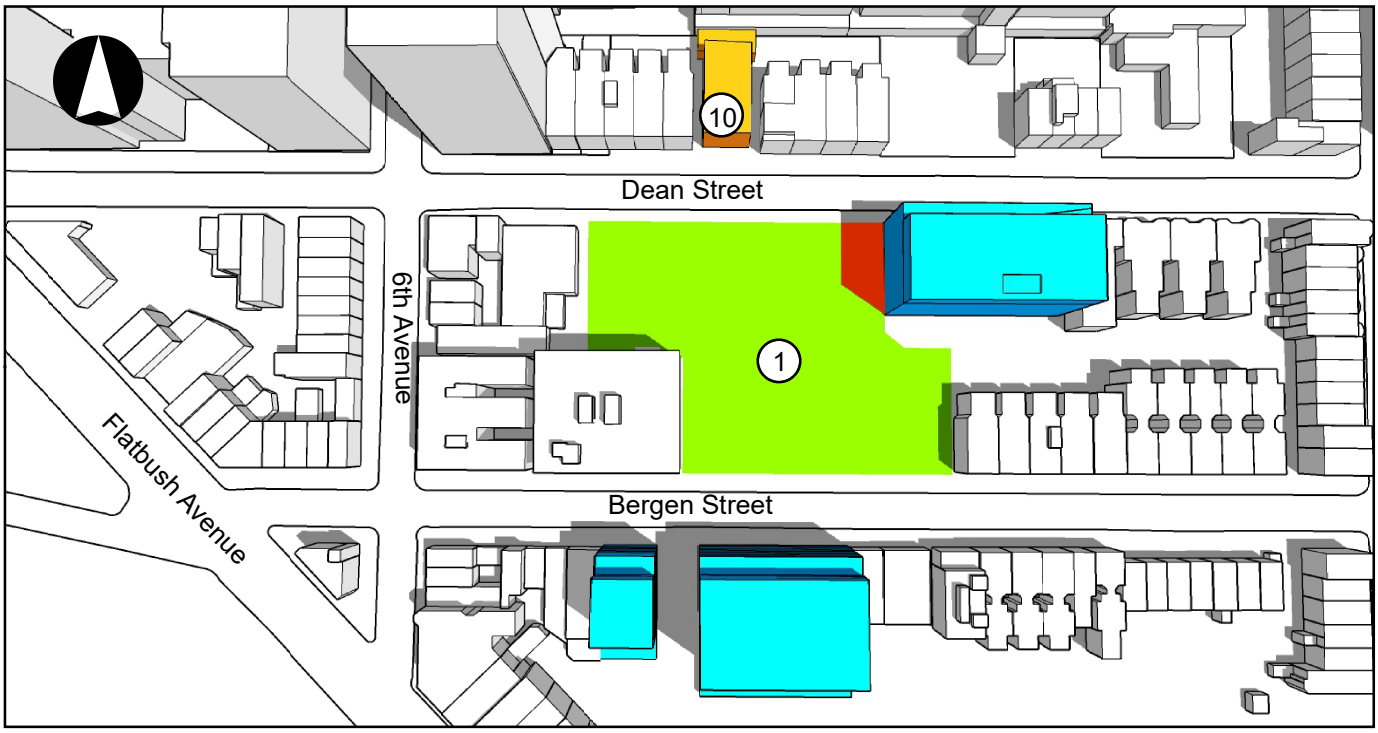
Projected Development Site

10 Temple of Restoration

1 Dean Playground

Project-Generated Incremental Shadow

Dean Playground - June 21st



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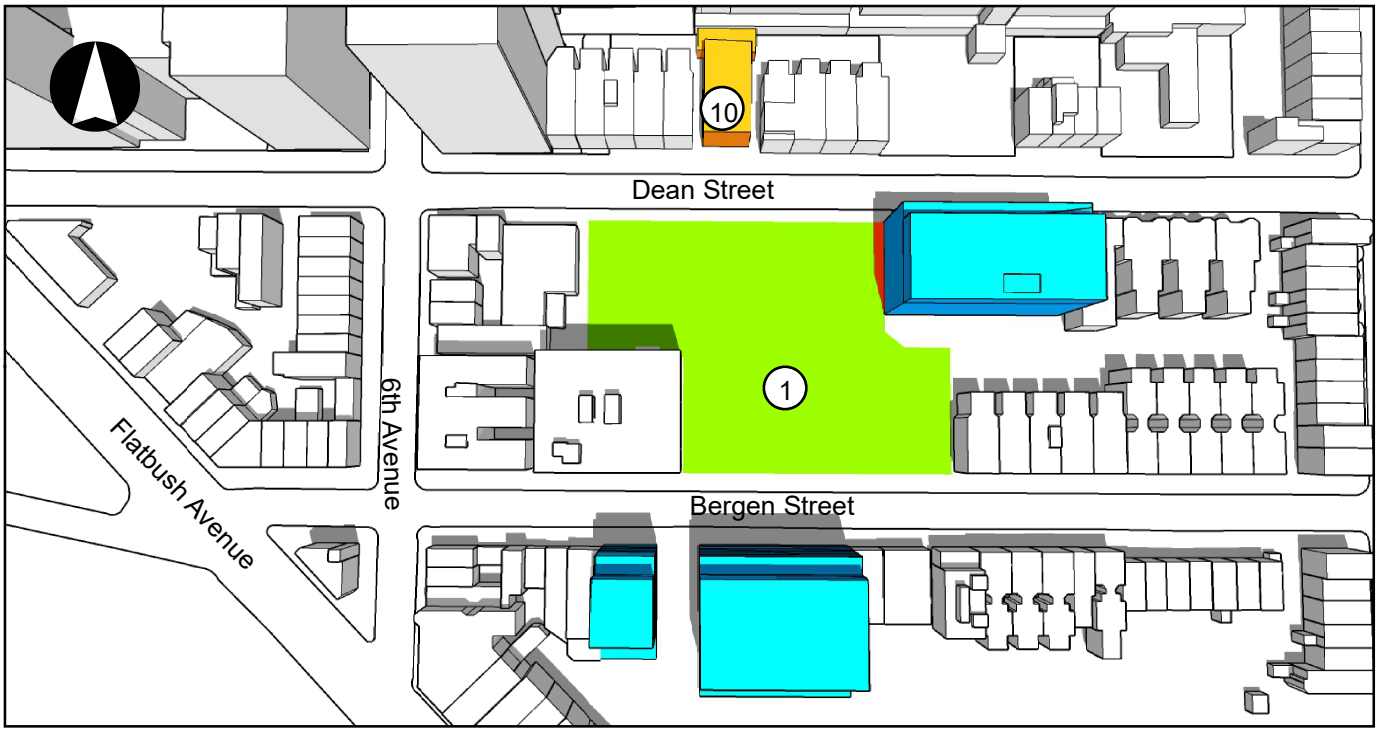


12:00 PM

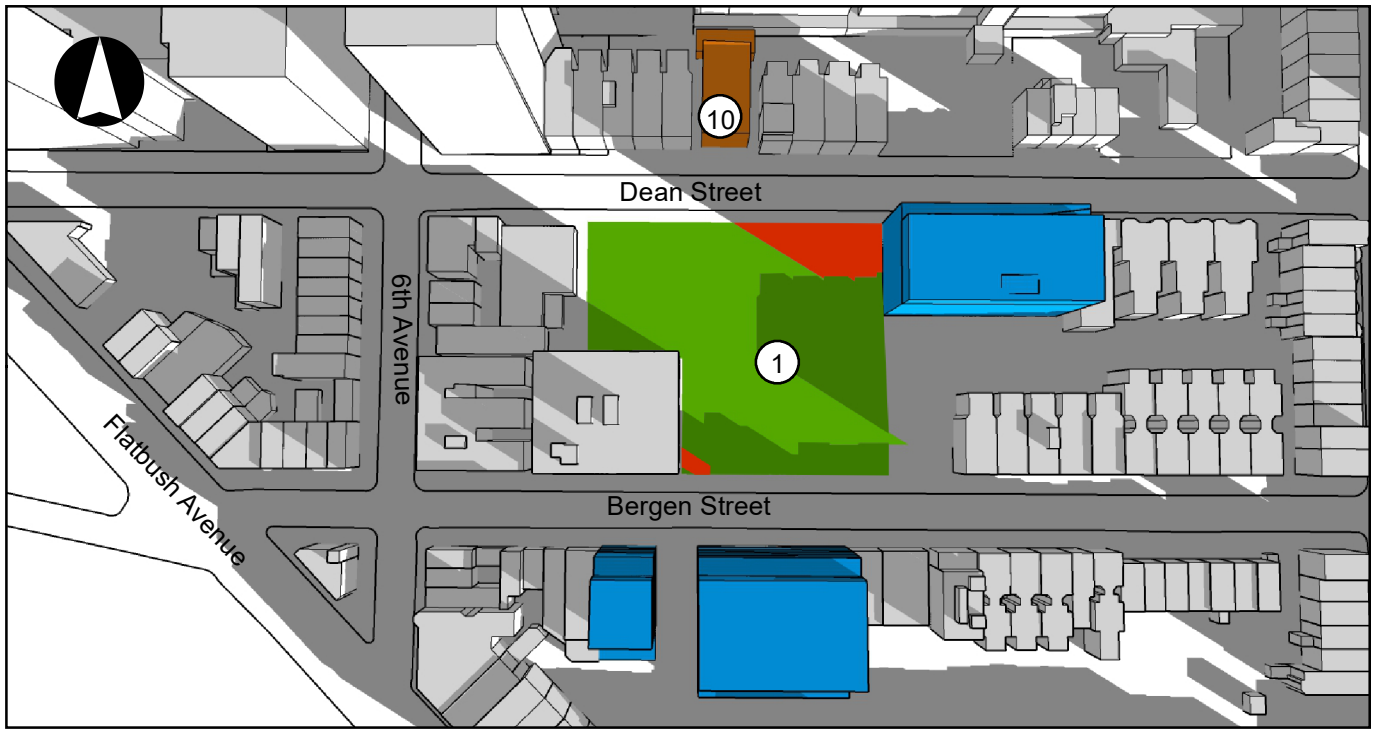
Projected Development Site

10 Temple of Restoration

1 Dean Playground

Project-Generated Incremental Shadow

Dean Playground - December 21st



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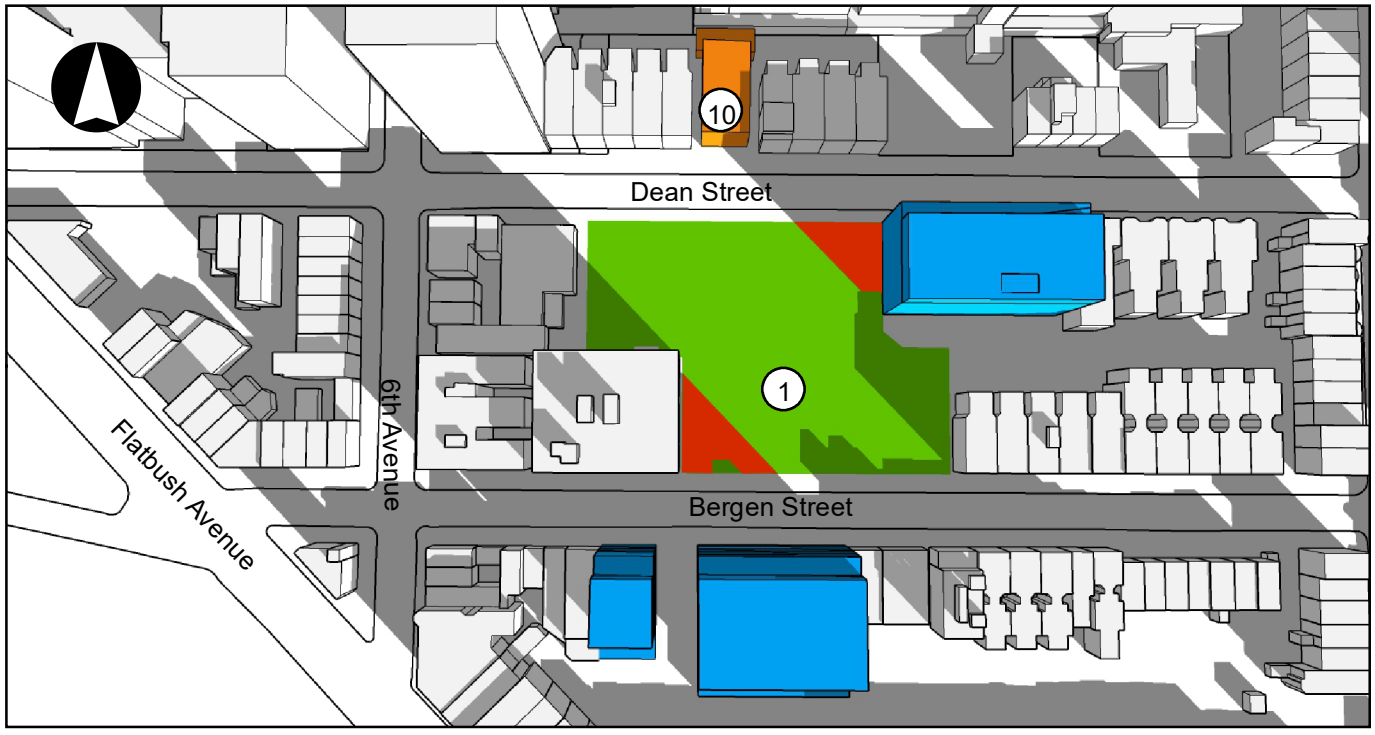


10:00 AM

Projected Development Site

10 Temple of Restoration

1 Dean Playground

Project-Generated Incremental Shadow

Dean Playground - December 21st



11:00 AM



12:00 PM

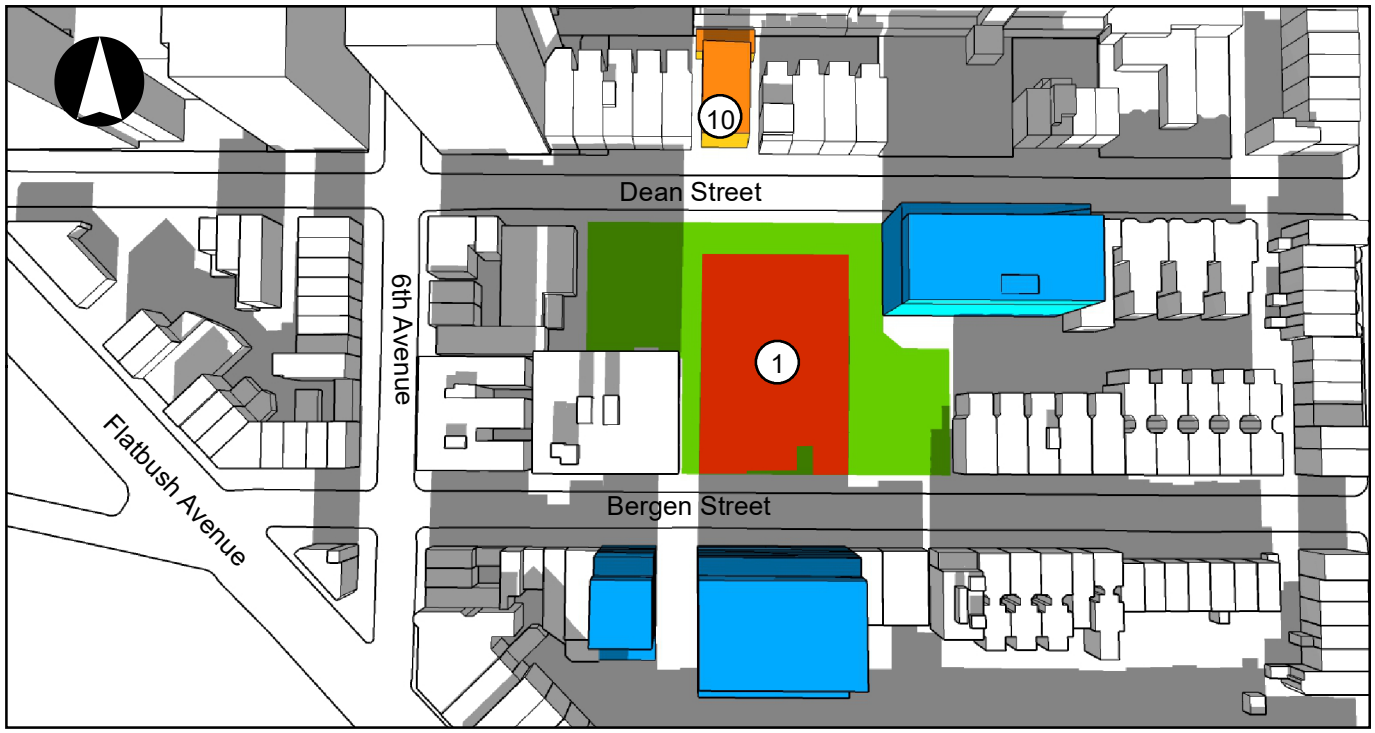
Projected Development Site

10 Temple of Restoration

1 Dean Playground

Project-Generated Incremental Shadow

Dean Playground - December 21st



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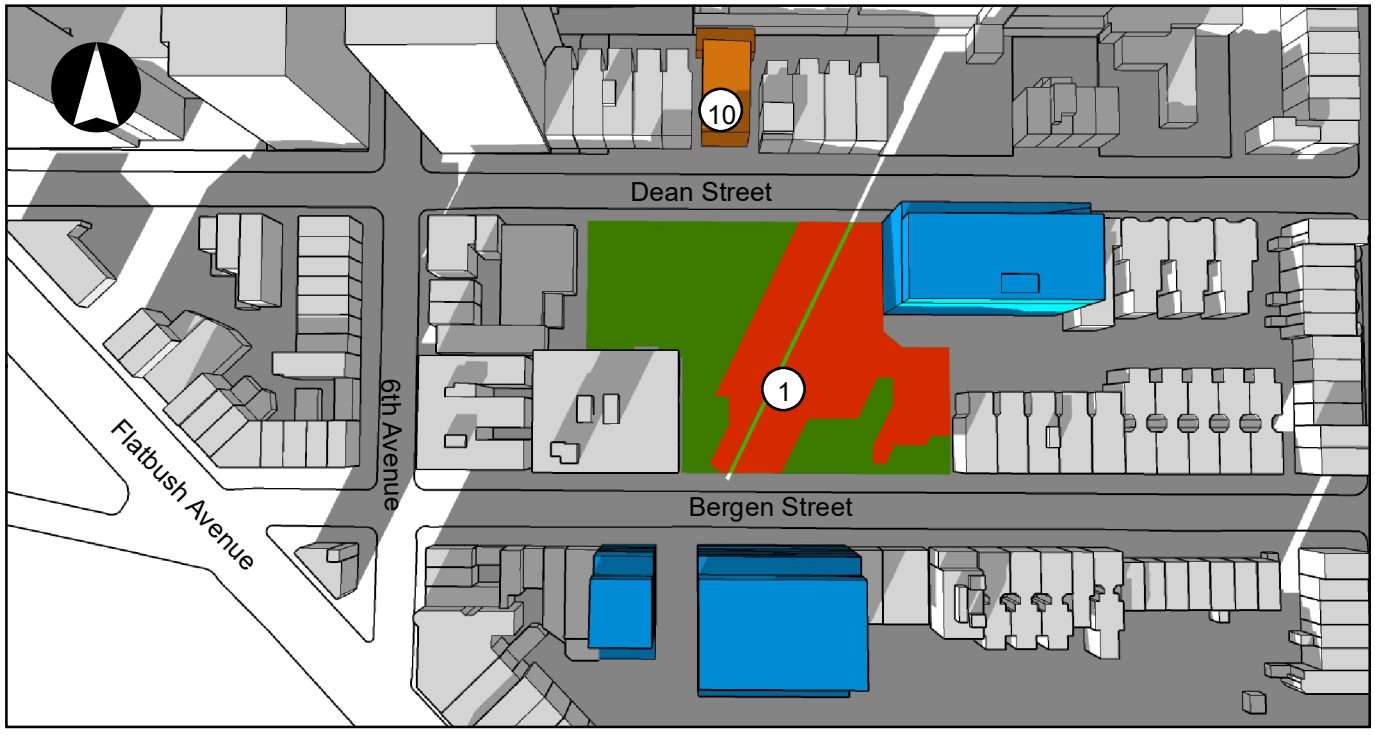


2:53 PM

Projected Development Site

10 Temple of Restoration

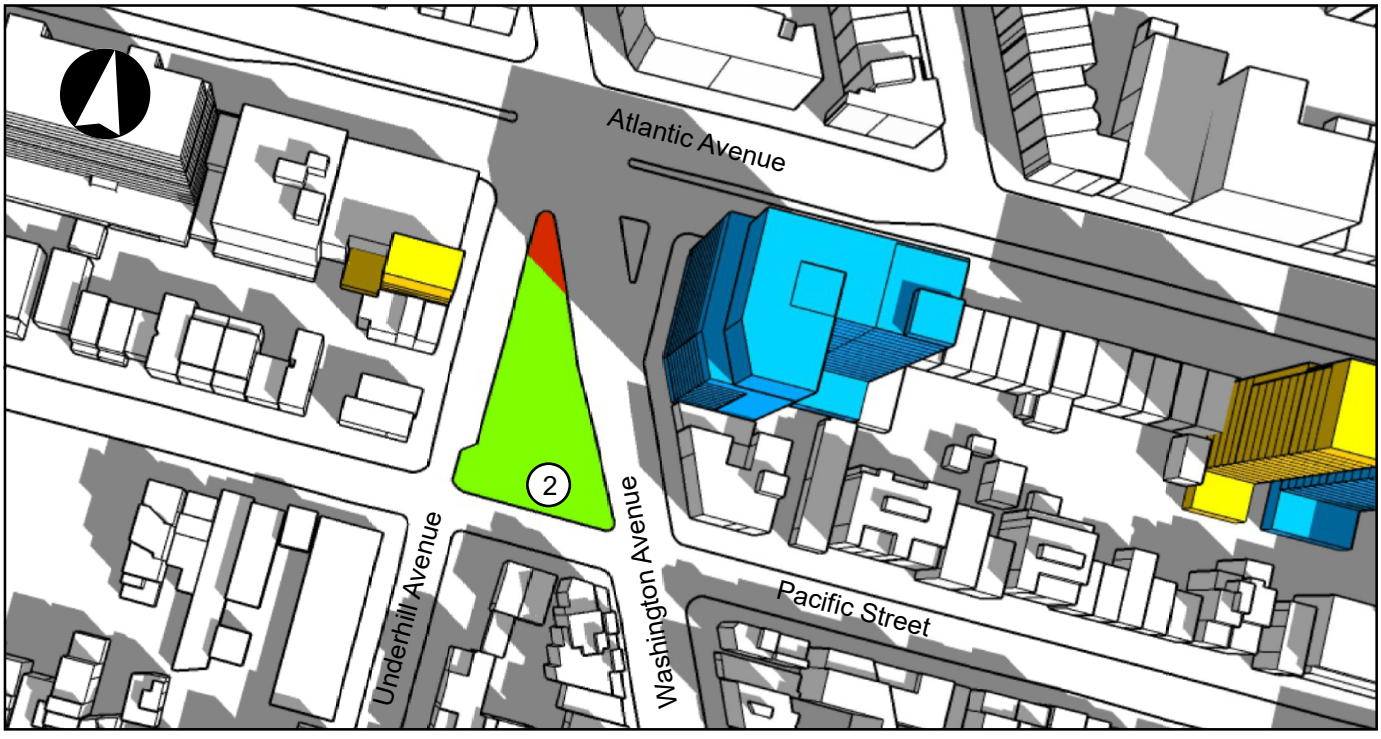
1 Dean Playground

Project-Generated Incremental Shadow

Lowry Triangle - March 21st/September 21st



7:36 AM



10:00 AM

Projected Development Site

Potential Development Site

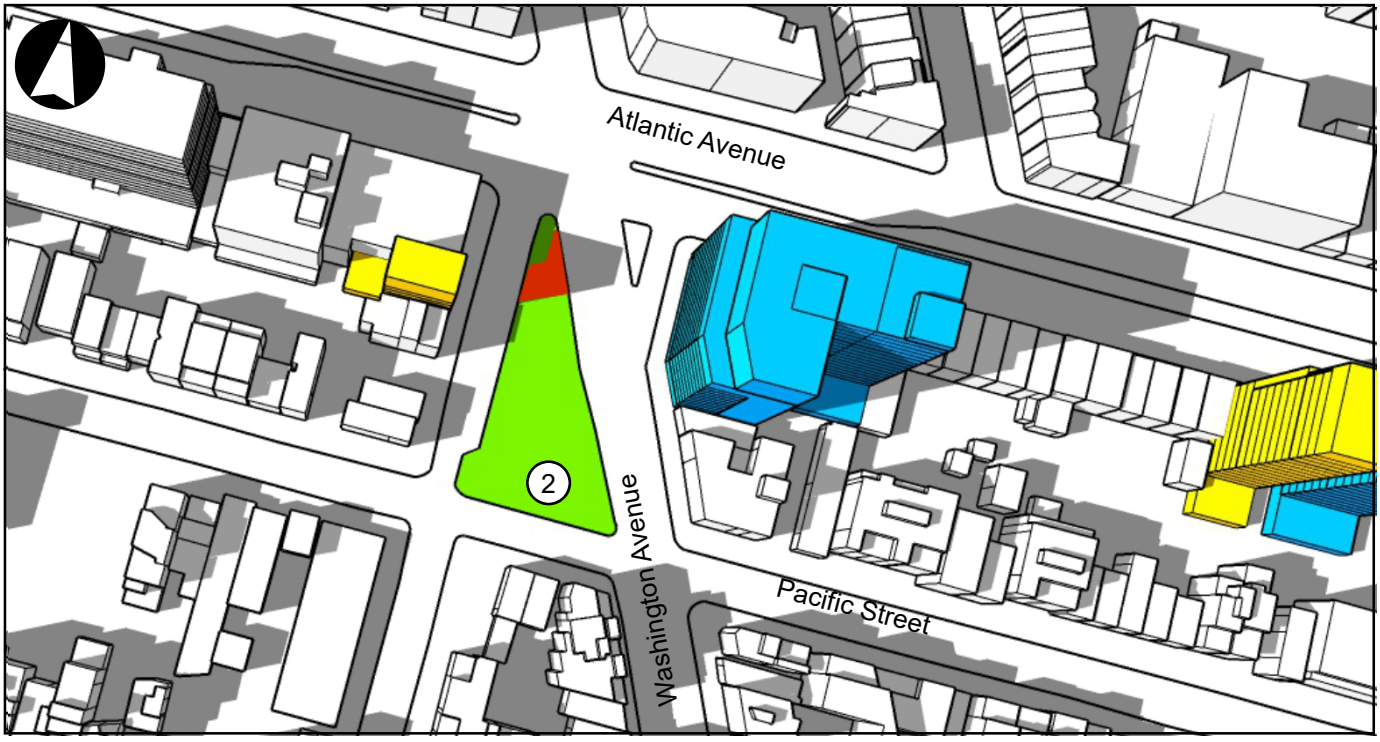
② Lowry Triangle

Project-Generated Incremental Shadow

Lowry Triangle - March 21st/September 21st



2:30 PM



3:30 PM

Projected Development Site

Potential Development Site

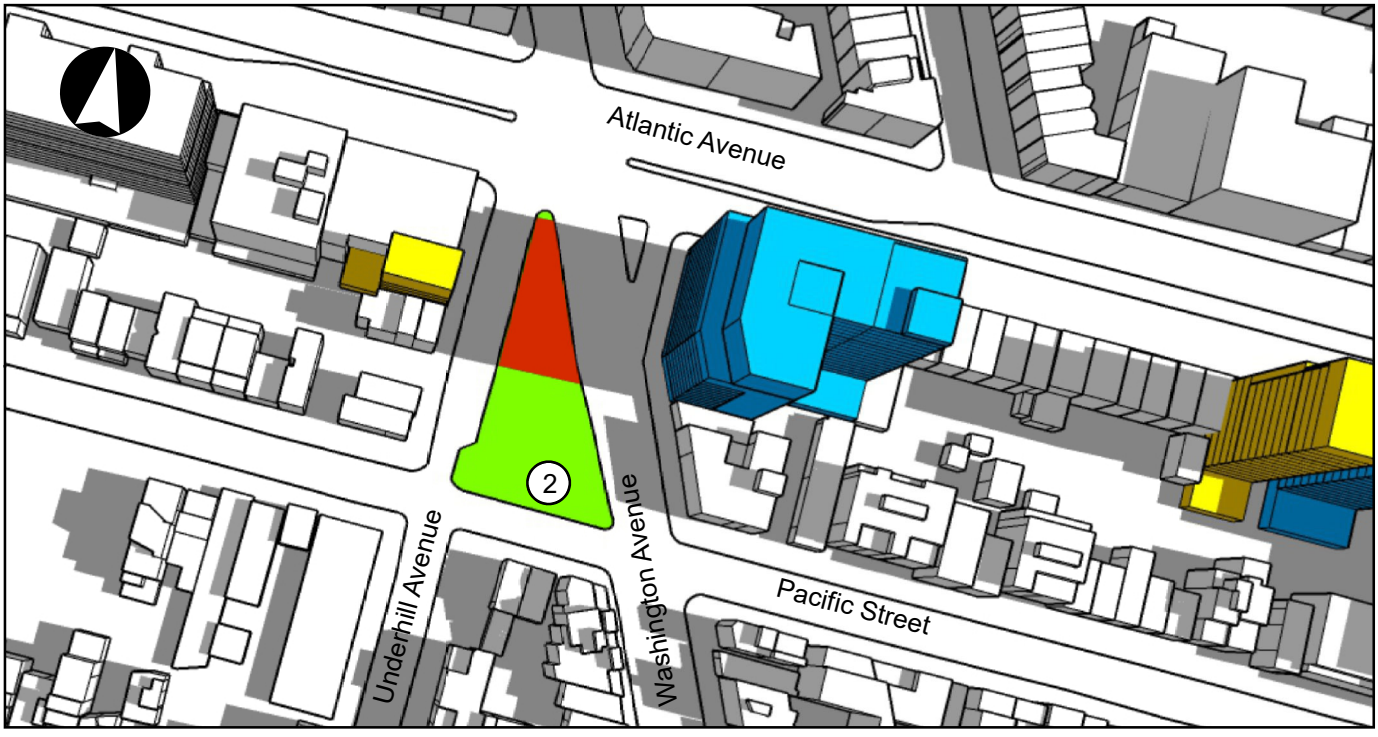
② Lowry Triangle

Project-Generated Incremental Shadow

Lowry Triangle - May 6th/August 6th



6:27 AM



8:30 AM

Projected Development Site

Potential Development Site

② Lowry Triangle

Project-Generated Incremental Shadow

Lowry Triangle - May 6th/August 6 th



3:30 PM



5:18 PM

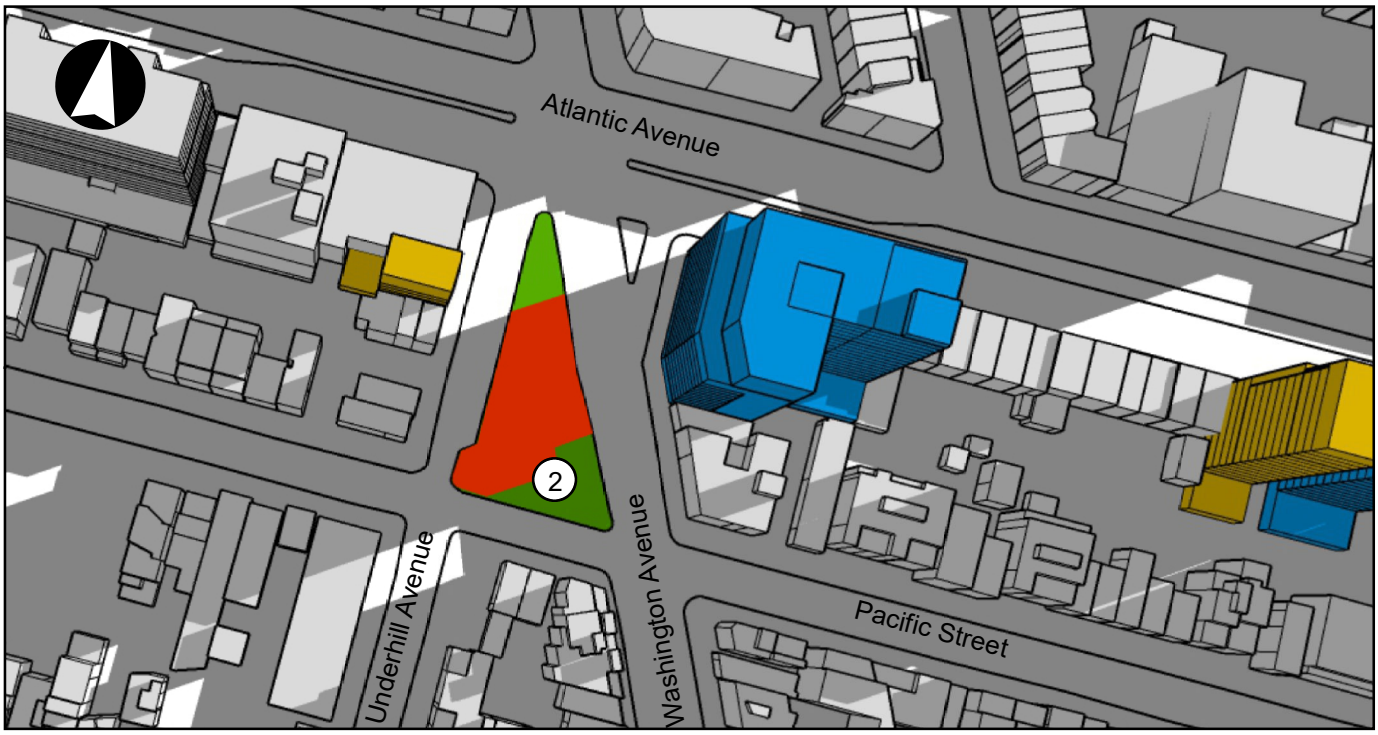
Projected Development Site

Potential Development Site

② Lowry Triangle

Project-Generated Incremental Shadow

Lowry Triangle - June 21st



5:57 AM



8:00 AM

Projected Development Site

Potential Development Site

② Lowry Triangle

Project-Generated Incremental Shadow

Lowry Triangle - June 21st



10:00 AM



2:30 PM

Projected Development Site

Potential Development Site

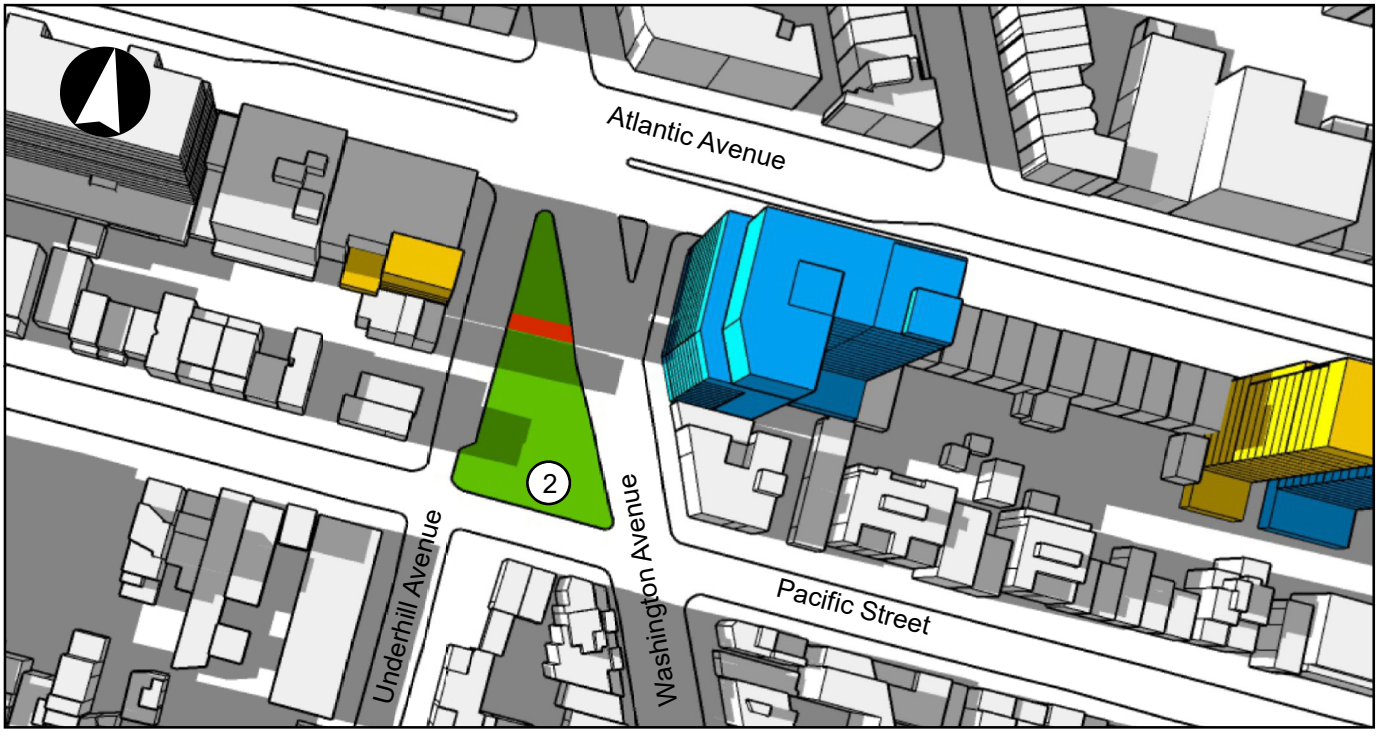
② Lowry Triangle

Project-Generated Incremental Shadow

Lowry Triangle - June 21st



3:30 PM



5:30 PM

Projected Development Site

Potential Development Site

② Lowry Triangle

Project-Generated Incremental Shadow

Lowry Triangle - December 21st



8:51 AM



9:30 AM

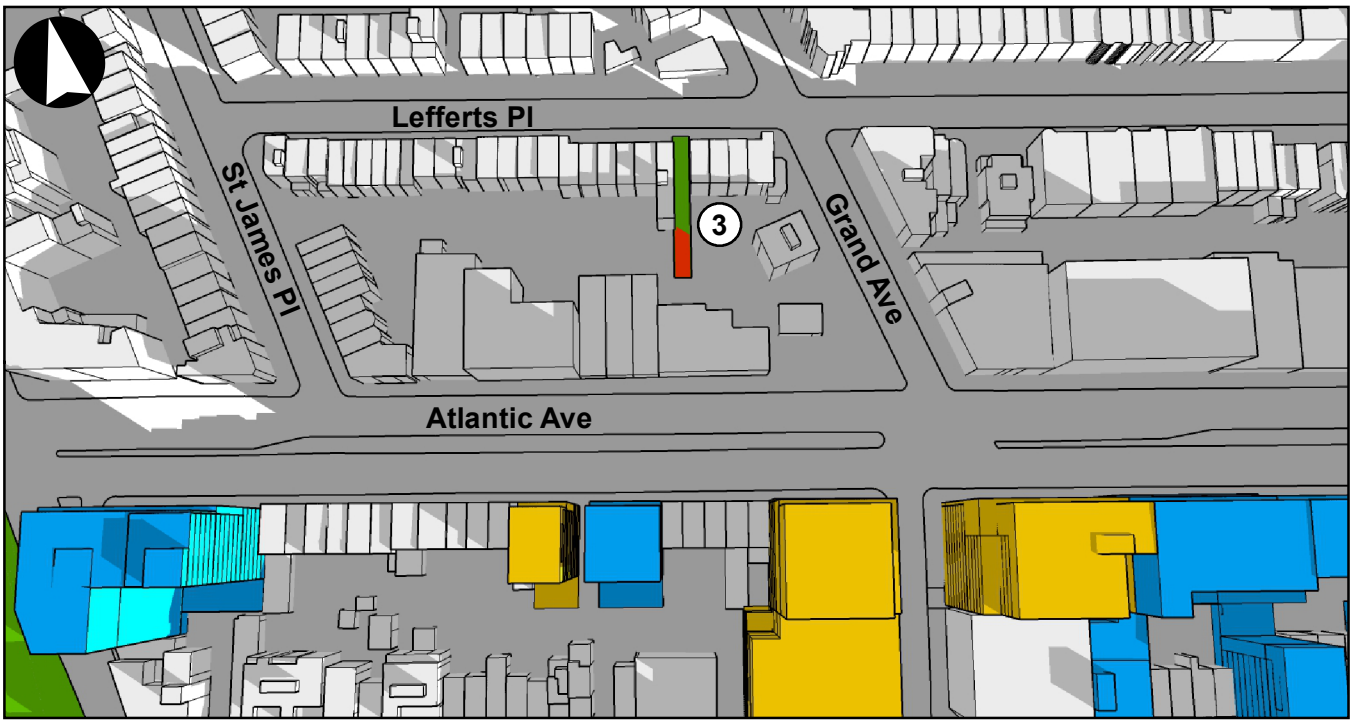
Projected Development Site

Potential Development Site

② Lowry Triangle

Project-Generated Incremental Shadow

Figure 6-4a
Brooklyn's Finest Community Garden - December 21



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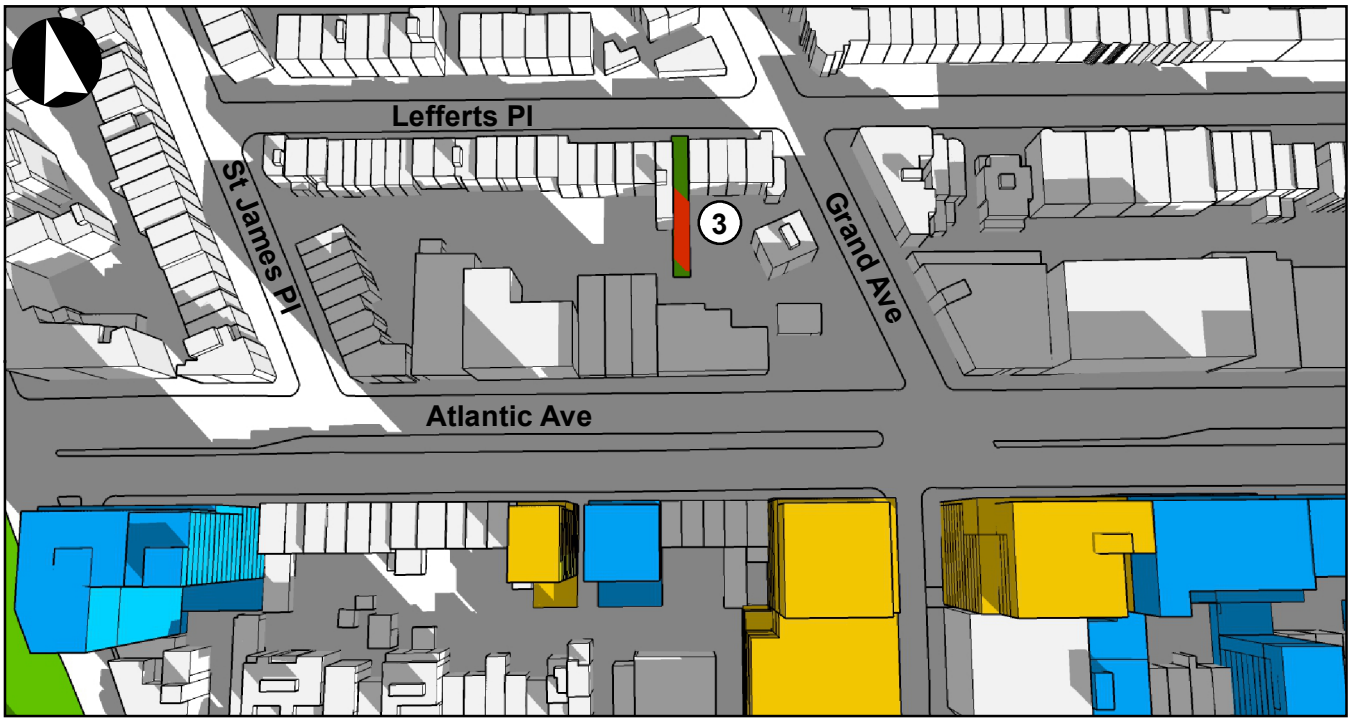

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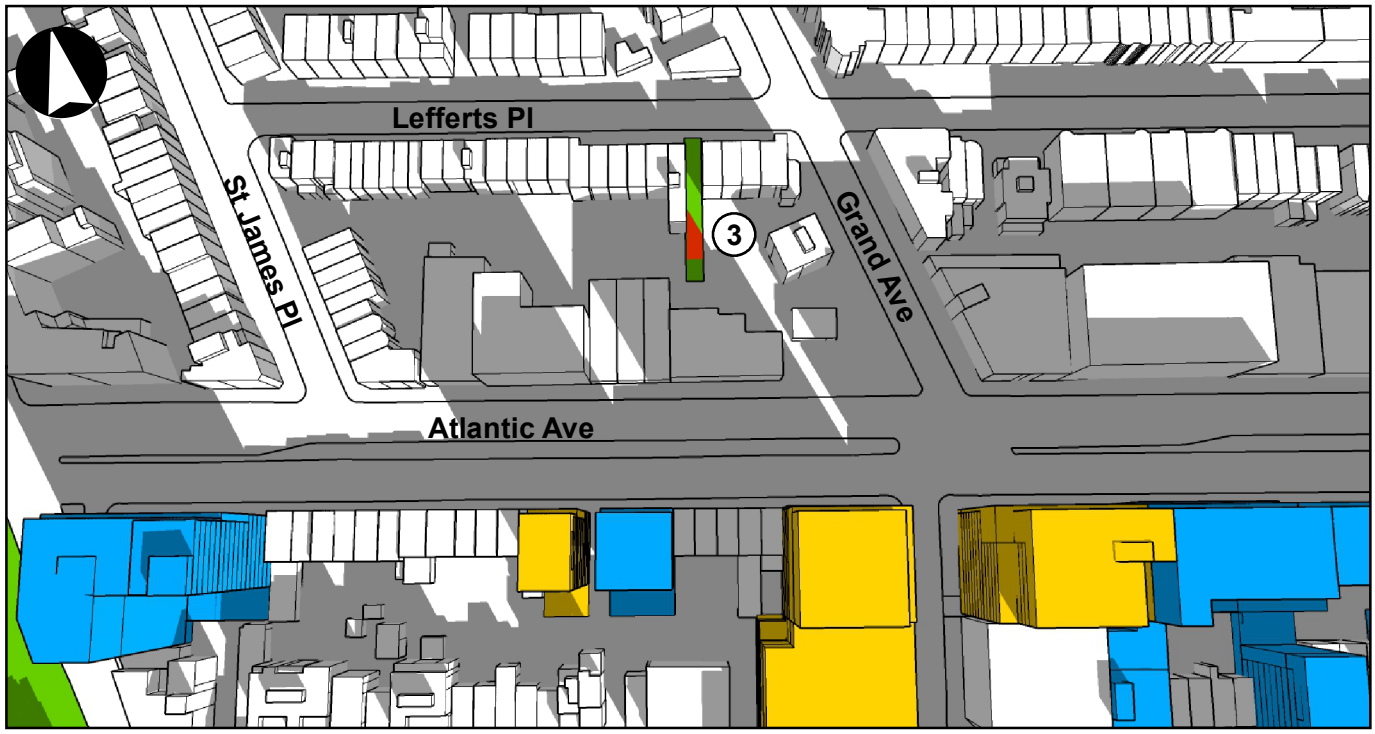
Projected Development Site

Potential Development Site

3 Brooklyn's Finest Community Garden

Project-Generated Incremental Shadow

Figure 6-4b
Brooklyn's Finest Community Garden - December 21



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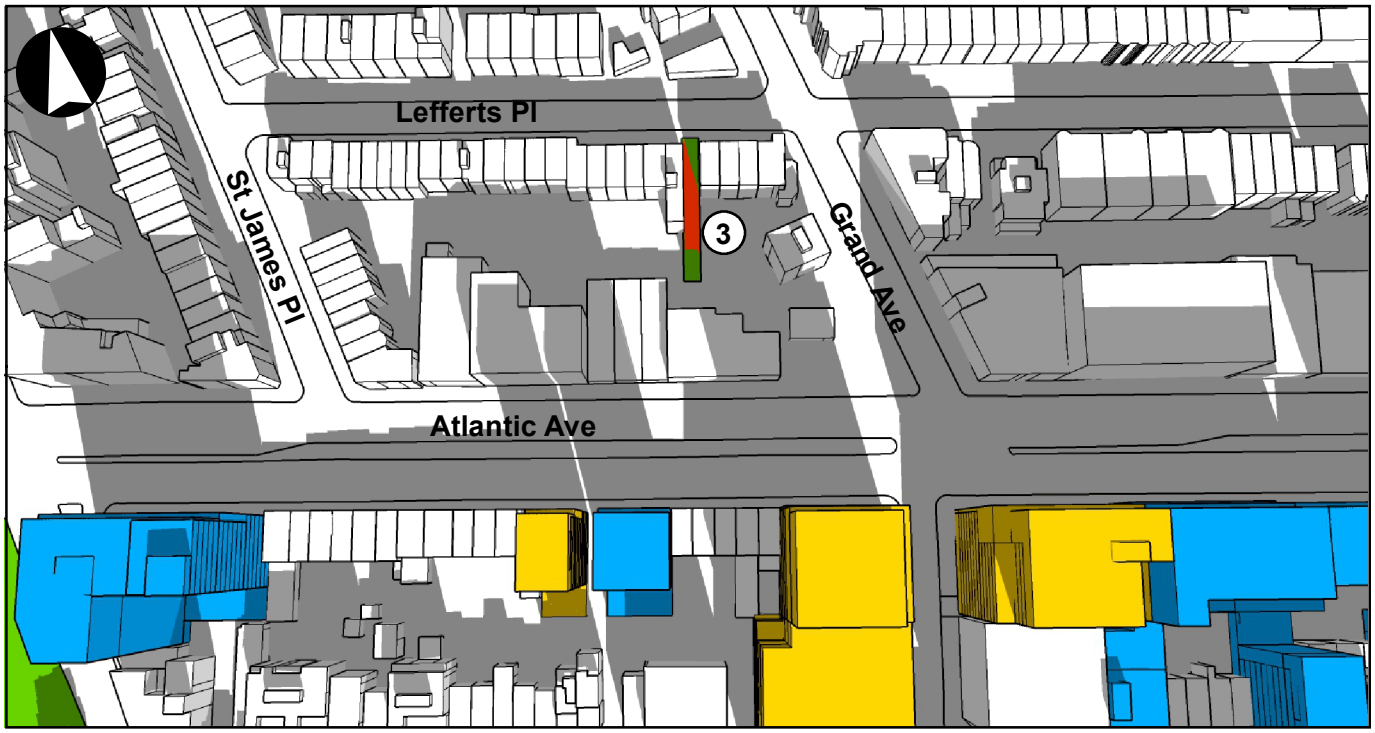


12:00 PM

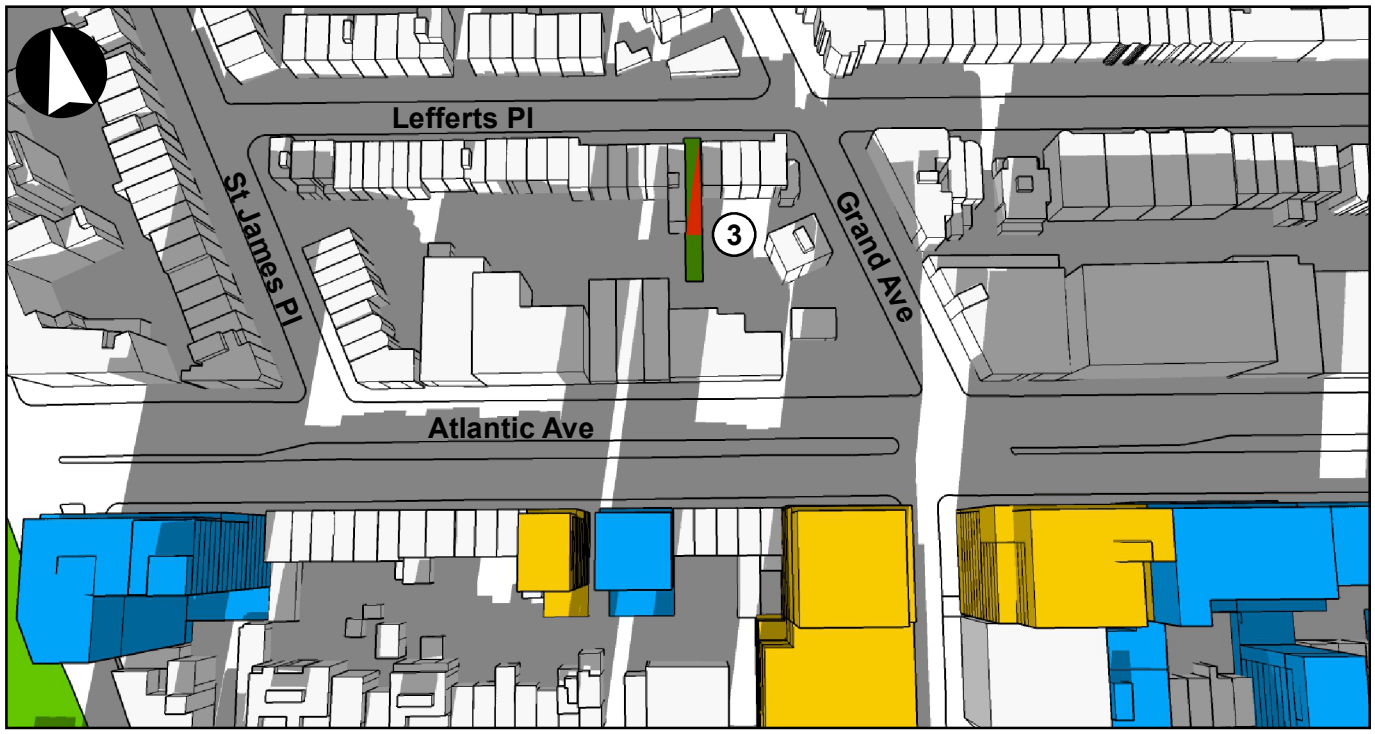
Projected Development Site

Potential Development Site

3 Brooklyn's Finest Community Garden

Project-Generated Incremental Shadow

Figure 6-4c
Brooklyn's Finest Community Garden - December 21



1:30 PM



2:53 PM

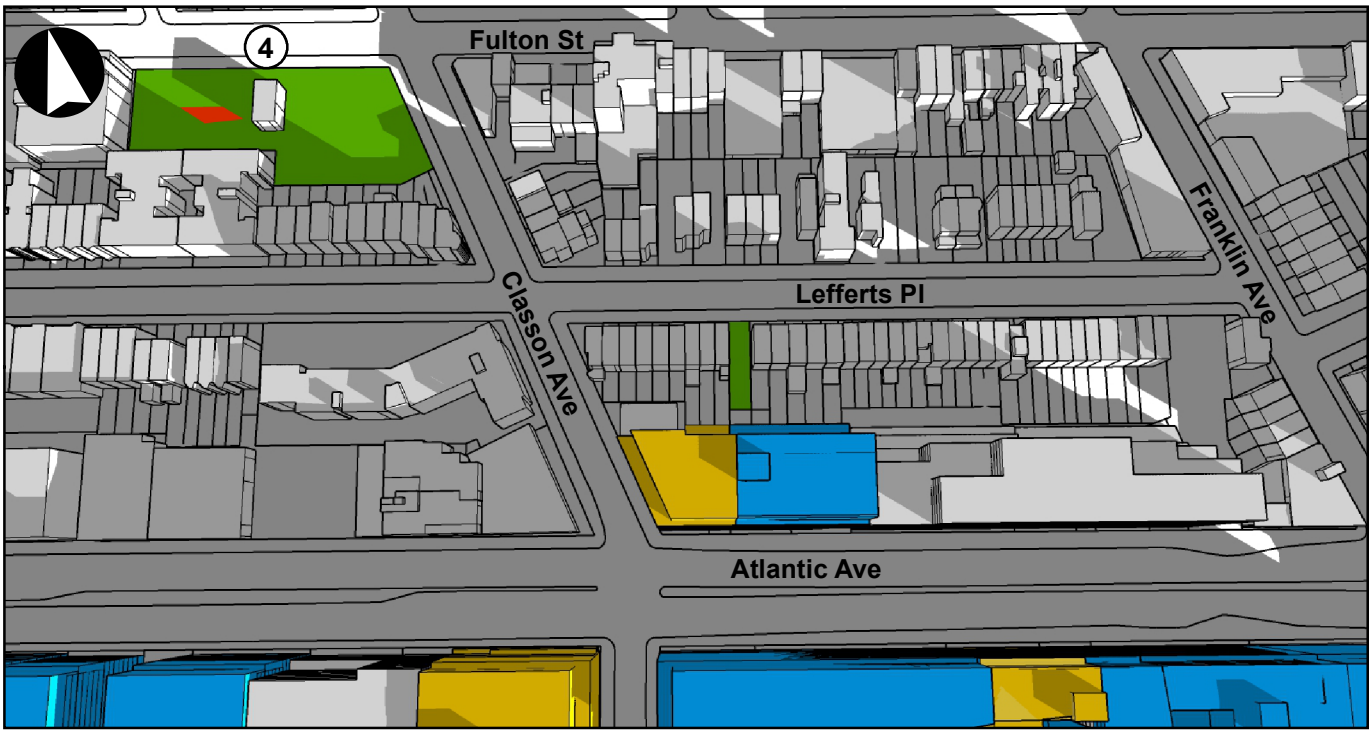
Projected Development Site

Potential Development Site

3 Brooklyn's Finest Community Garden

Project-Generated Incremental Shadow

Crispus Attucks Playground - December 21



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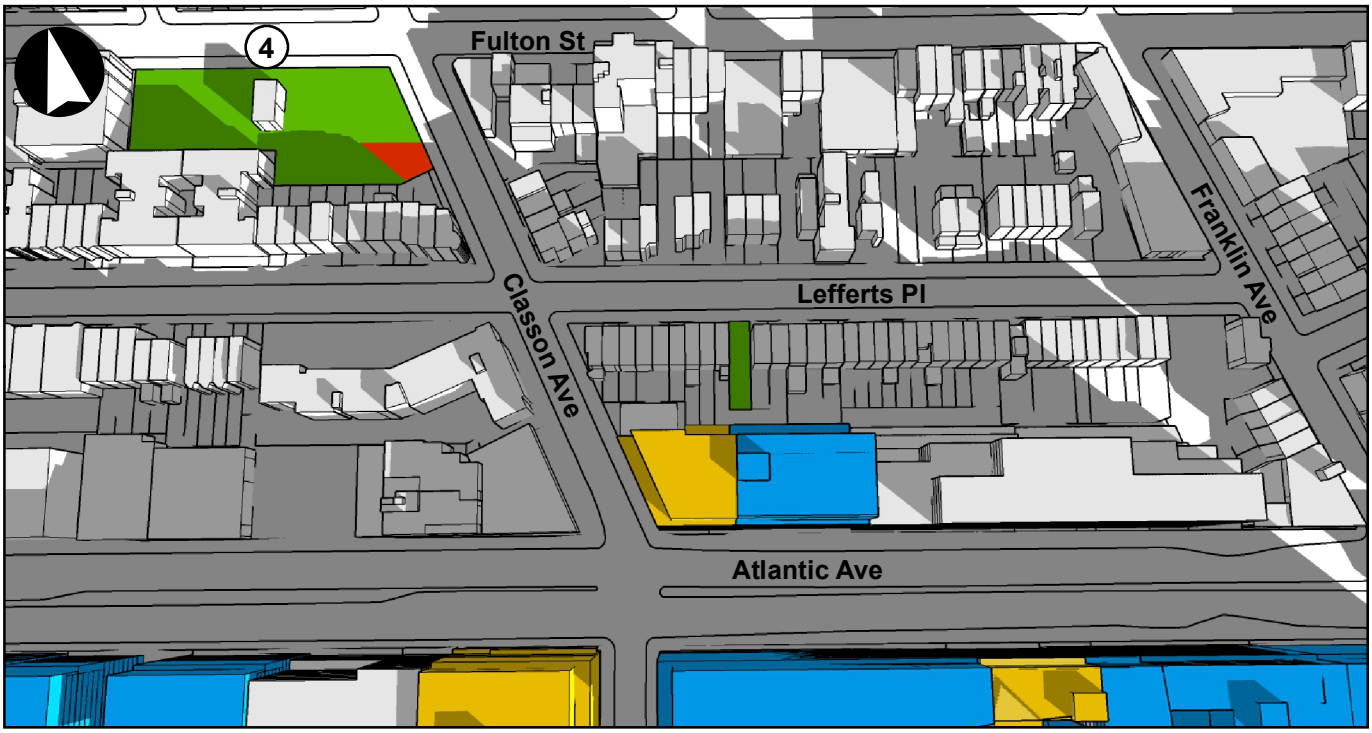


9:30 AM

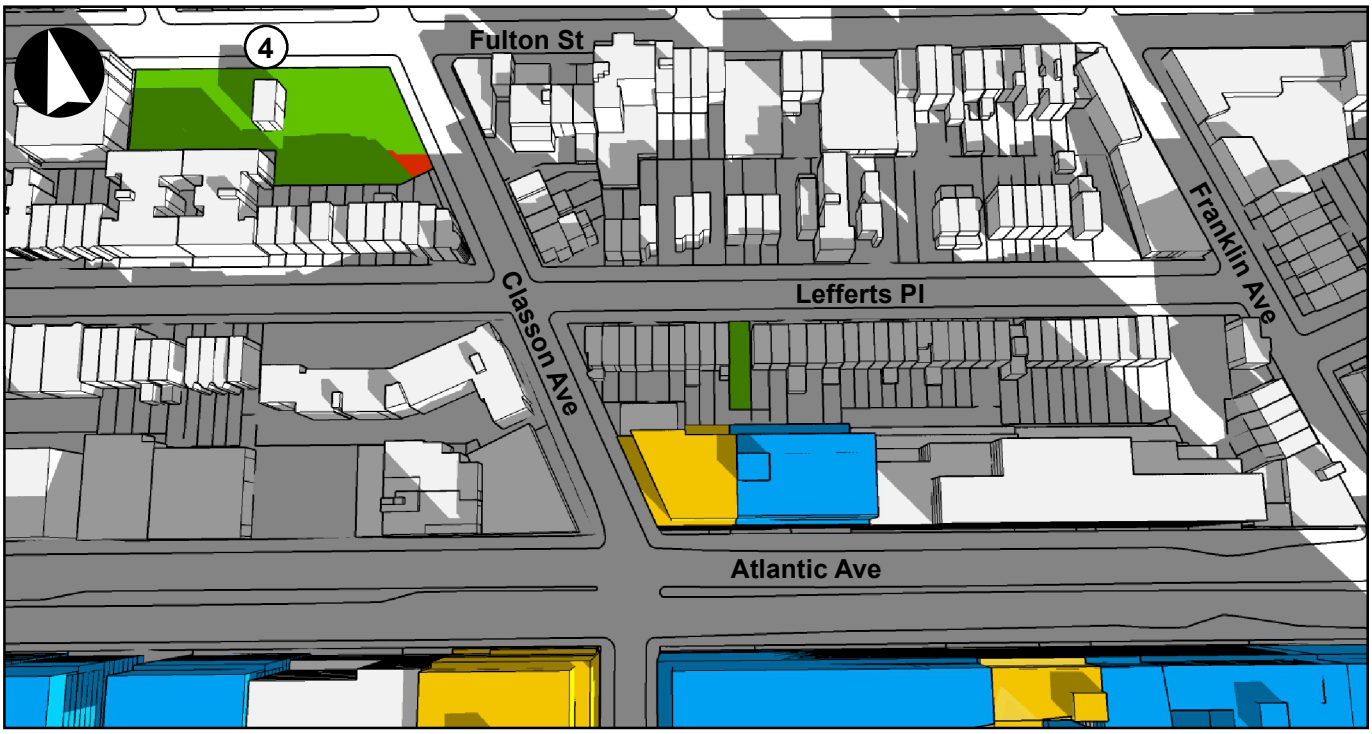
Projected Development Site

Potential Development Site

4 Crispus Attucks Playground

Project-Generated Incremental Shadow

Crispus Attucks Playground - December 21



10:00 AM

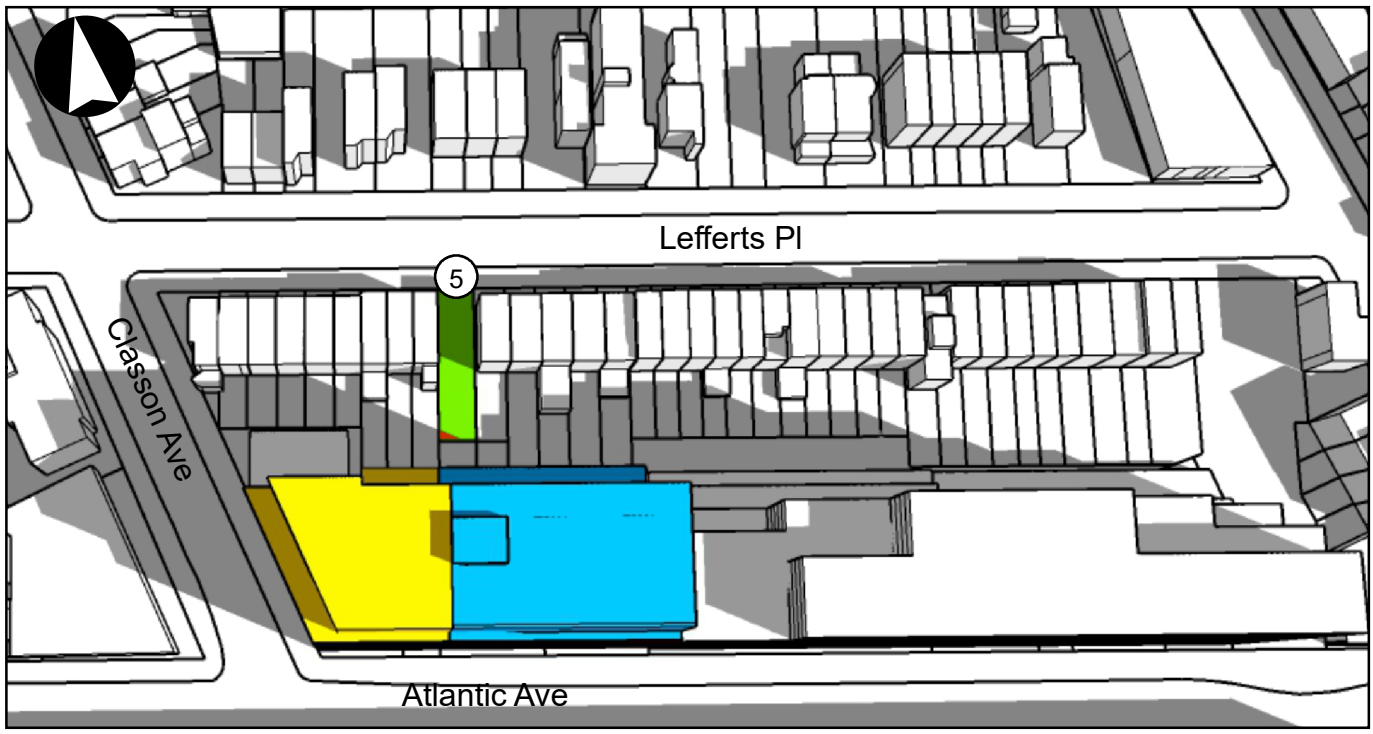
Projected Development Site

Potential Development Site

4 Crispus Attucks Playground

Project-Generated Incremental Shadow

Lefferts Place Block Association Garden-
March 21st/September 21st



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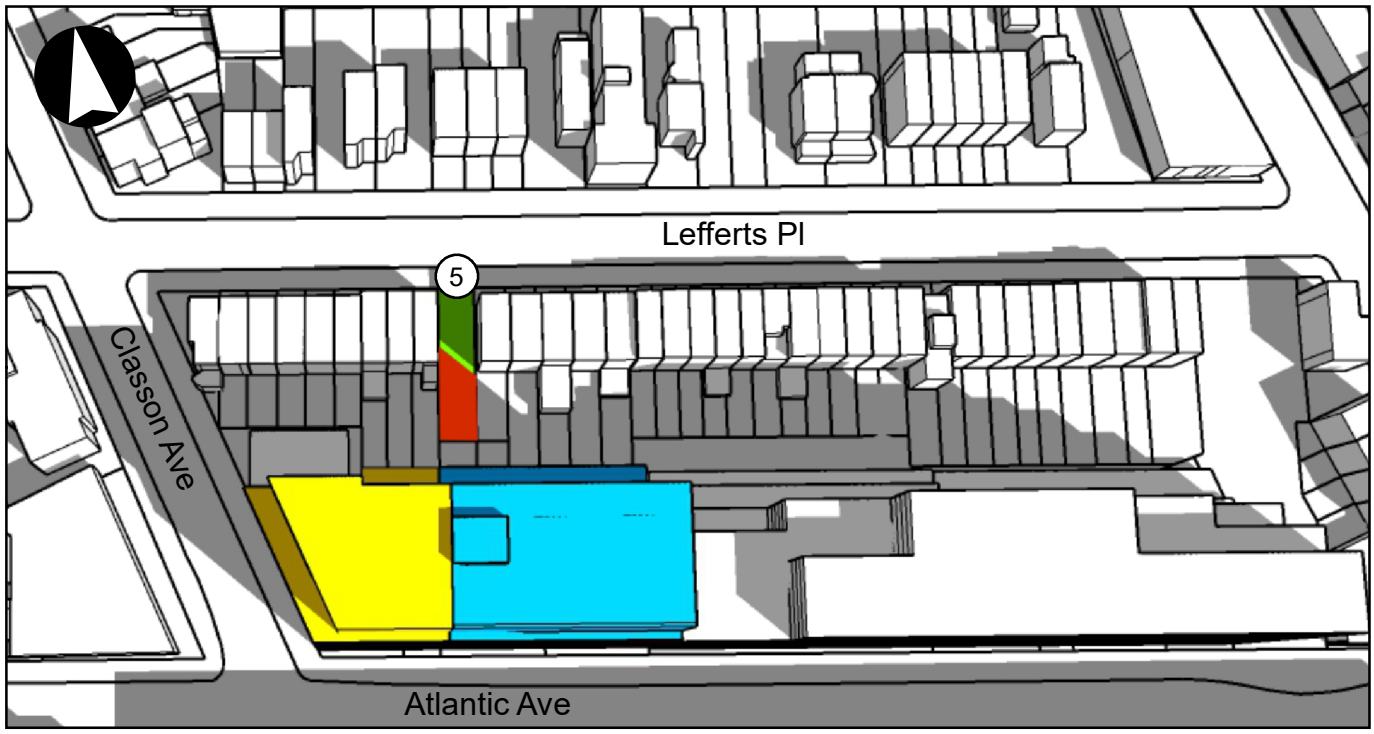


10:30 AM

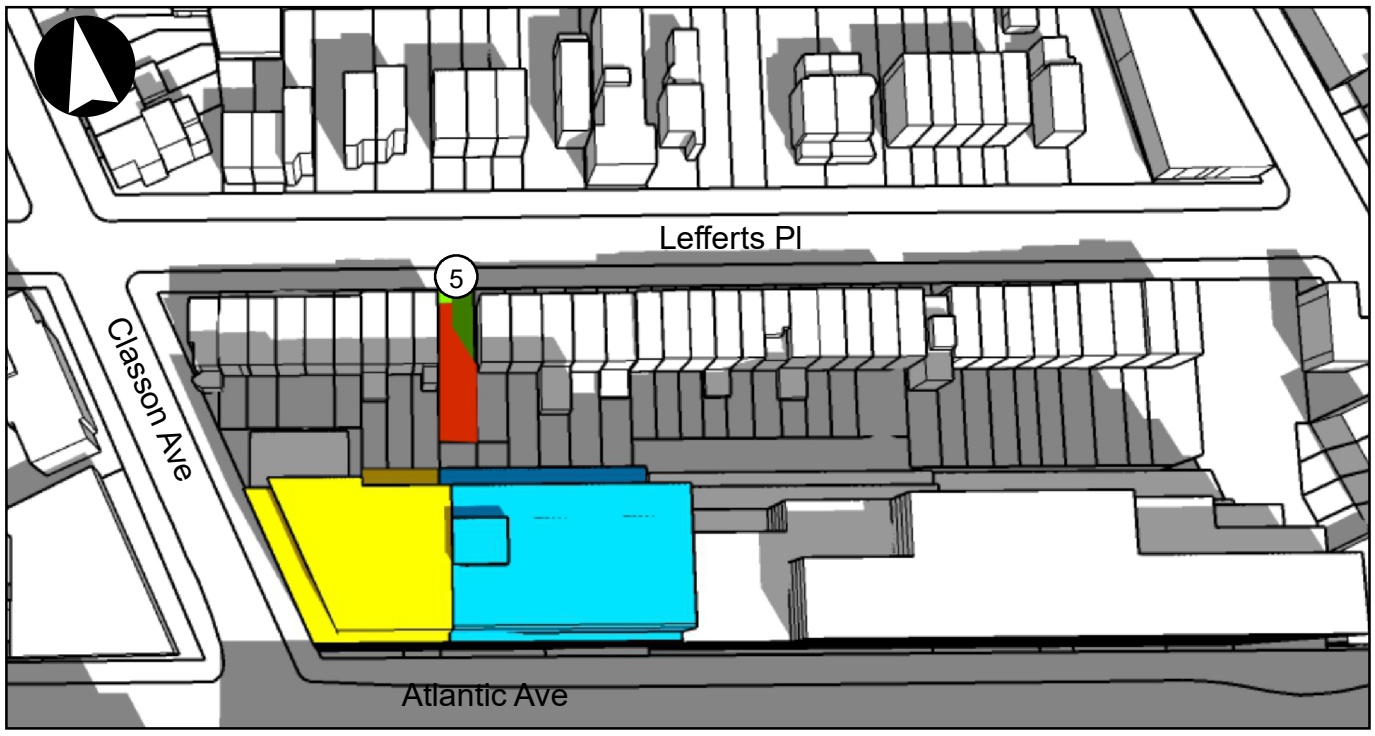
Projected Development Site

Potential Development Site

5 Lefferts Place Block Association Garden

Project-Generated Incremental Shadow

Lefferts Place Block Association Garden-
March 21st/September 21st



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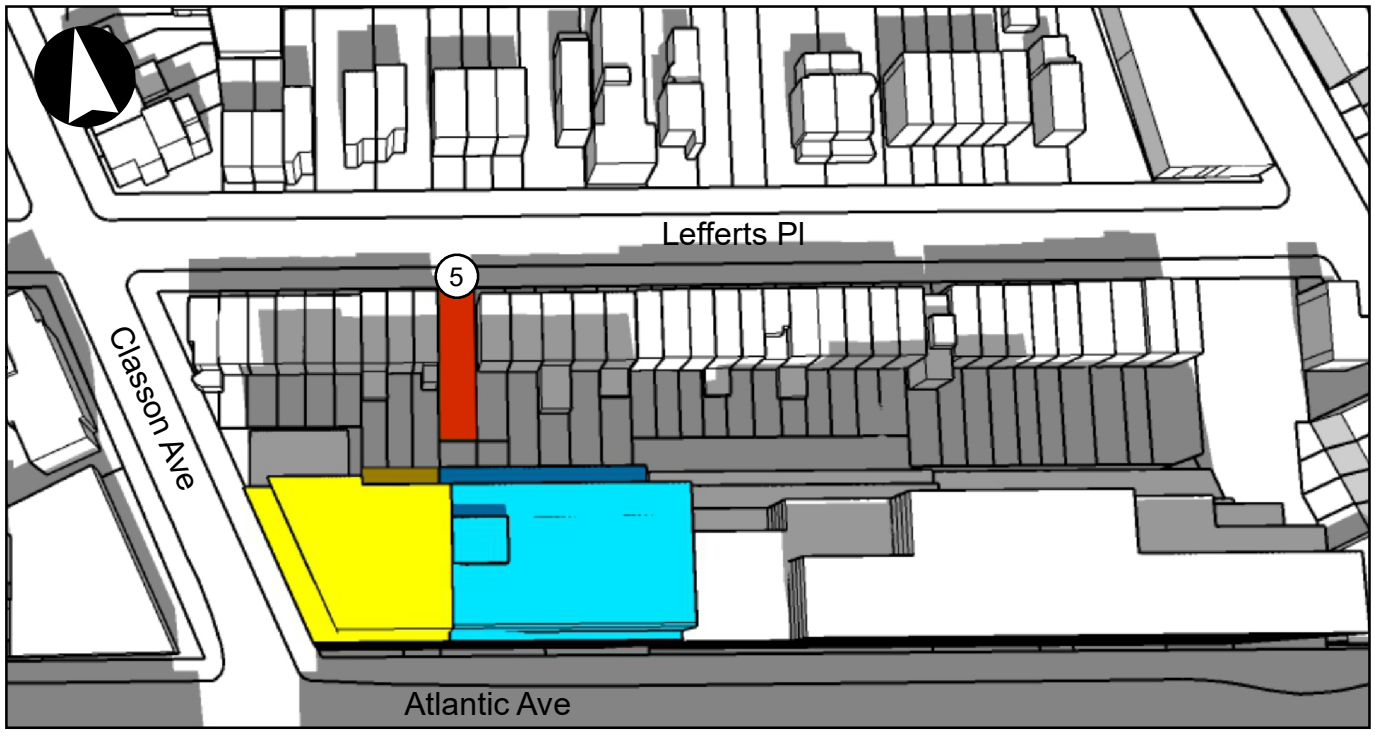

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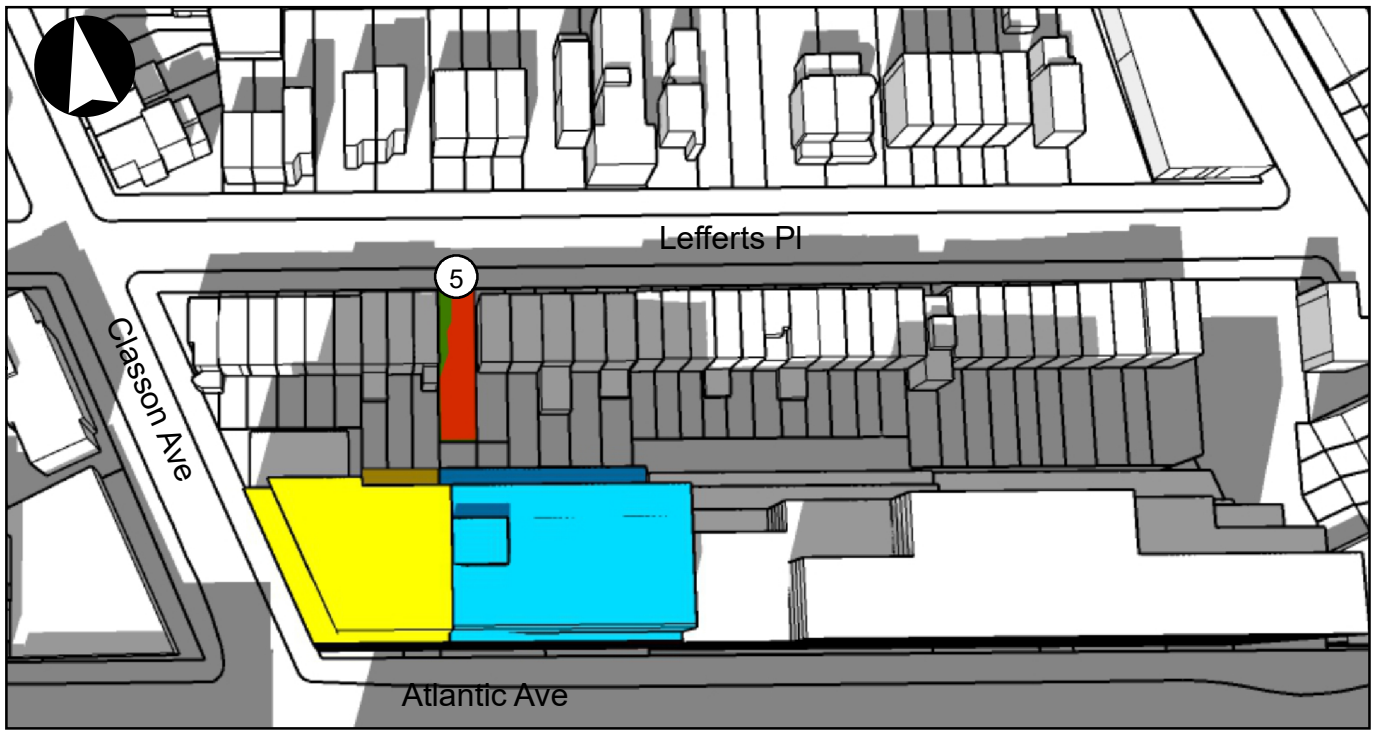
Projected Development Site

Potential Development Site

5 Lefferts Place Block Association Garden

Project-Generated Incremental Shadow

Lefferts Place Block Association Garden-
March 21st/September 21st



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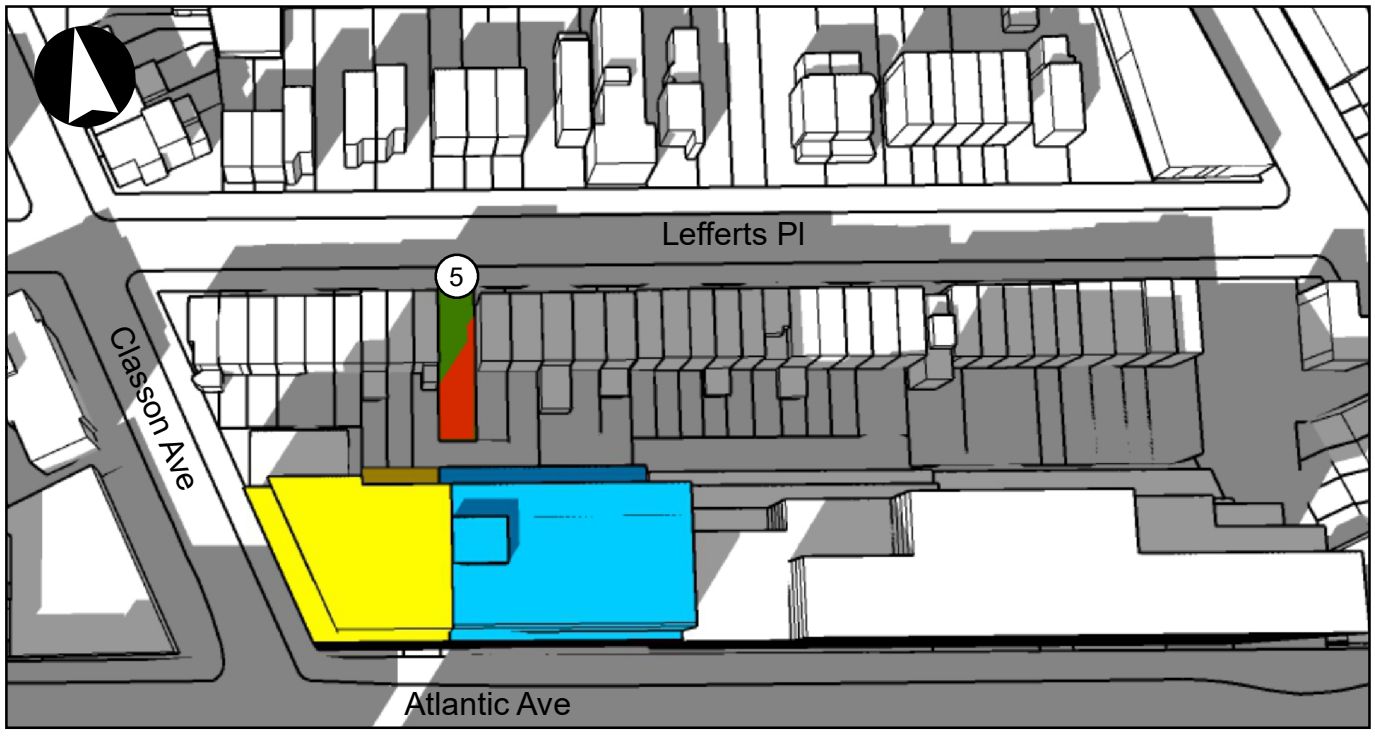


2:30 PM

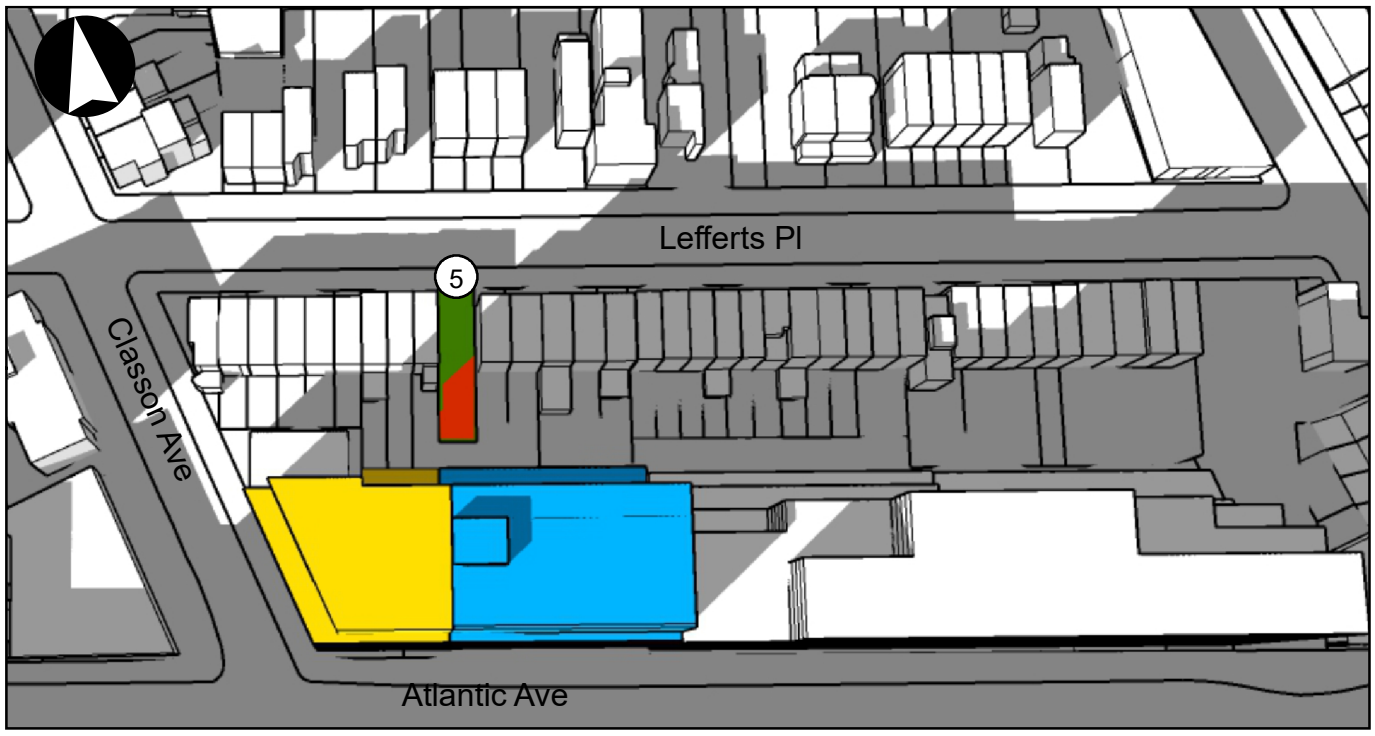
Projected Development Site

Potential Development Site

5 Lefferts Place Block Association Garden

Project-Generated Incremental Shadow

Lefferts Place Block Association Garden-
March 21/September 21



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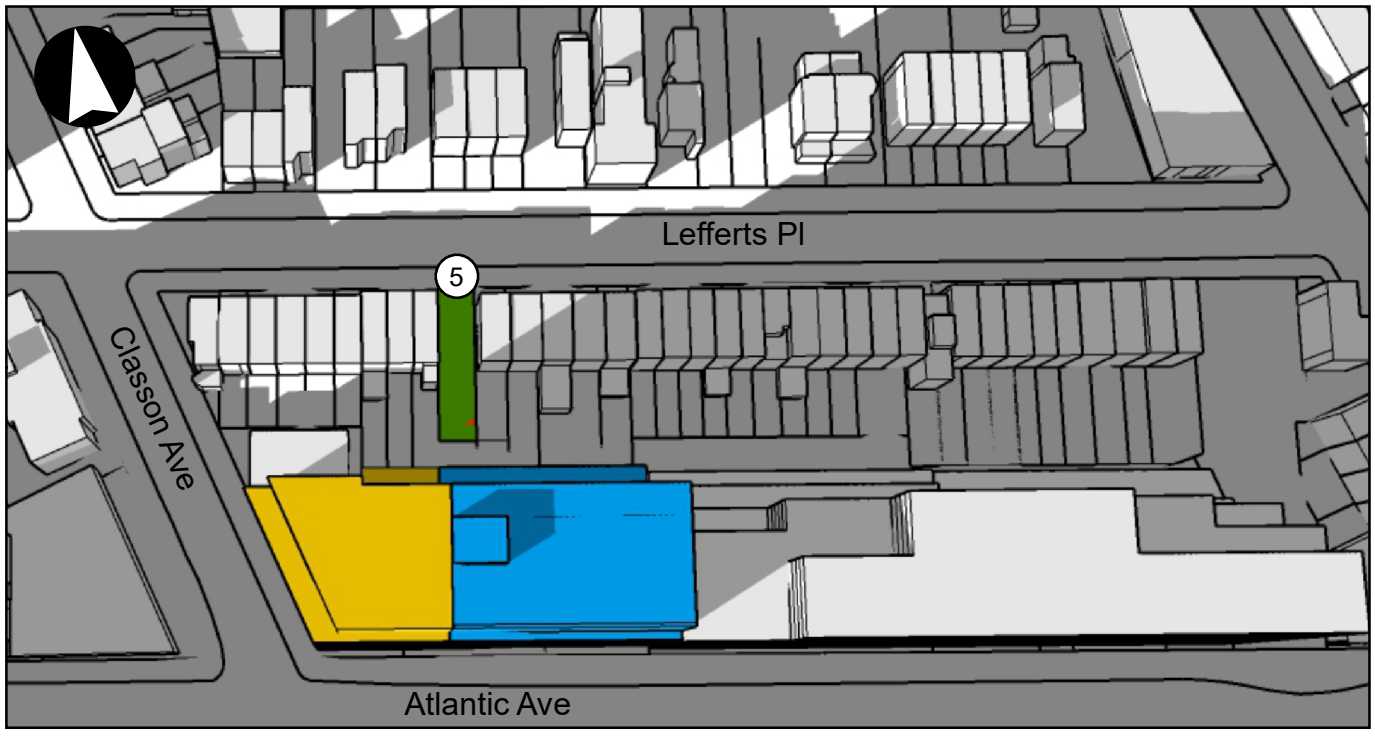


4:29 PM

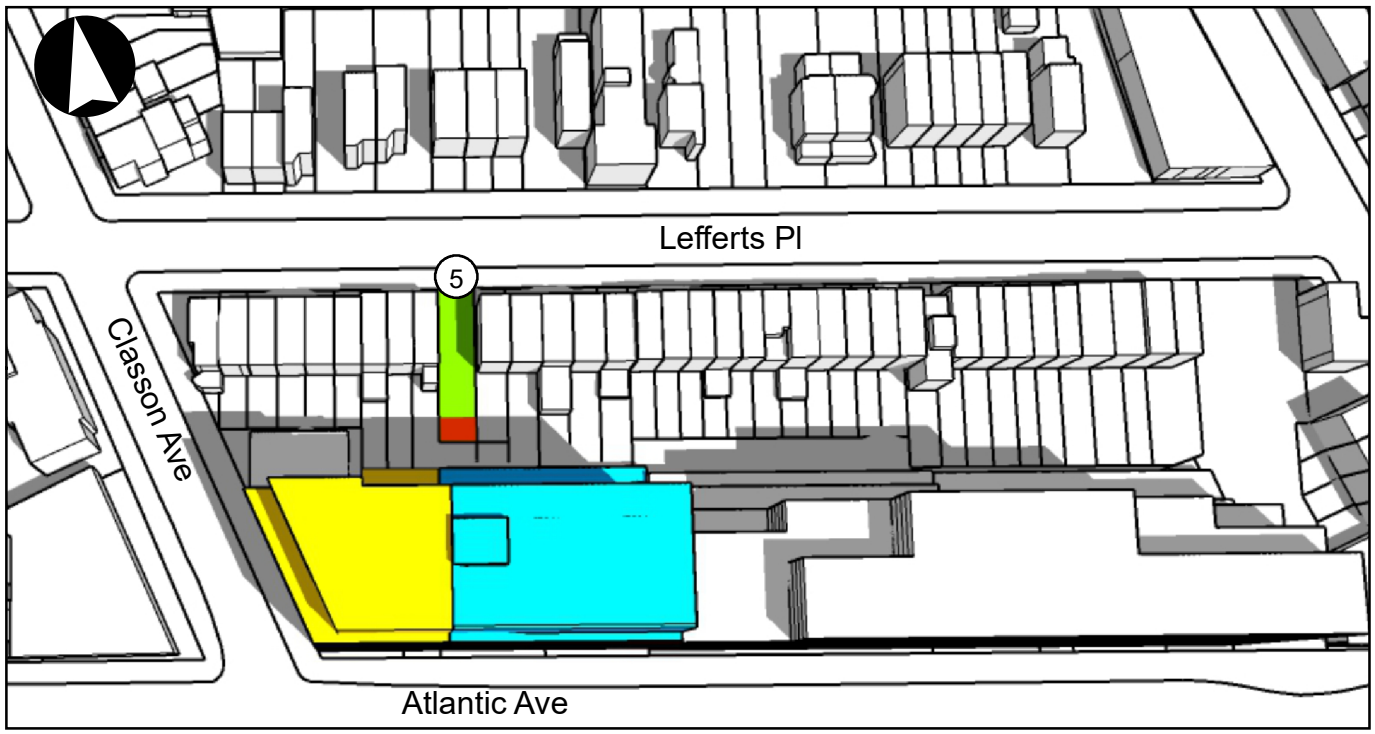
Projected Development Site

Potential Development Site

5 Lefferts Place Block Association Garden

Project-Generated Incremental Shadow

Lefferts Place Block Association Garden-
May 6/August 6



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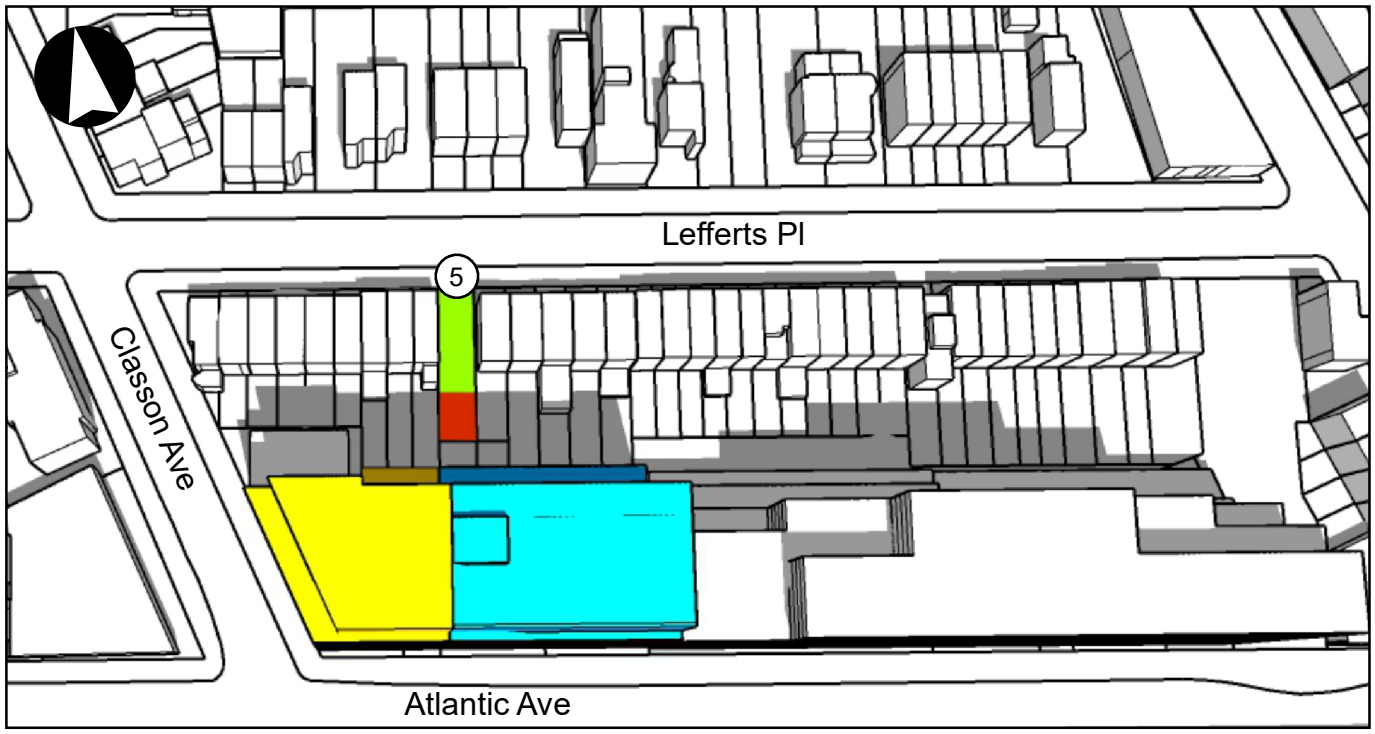


12:00 PM

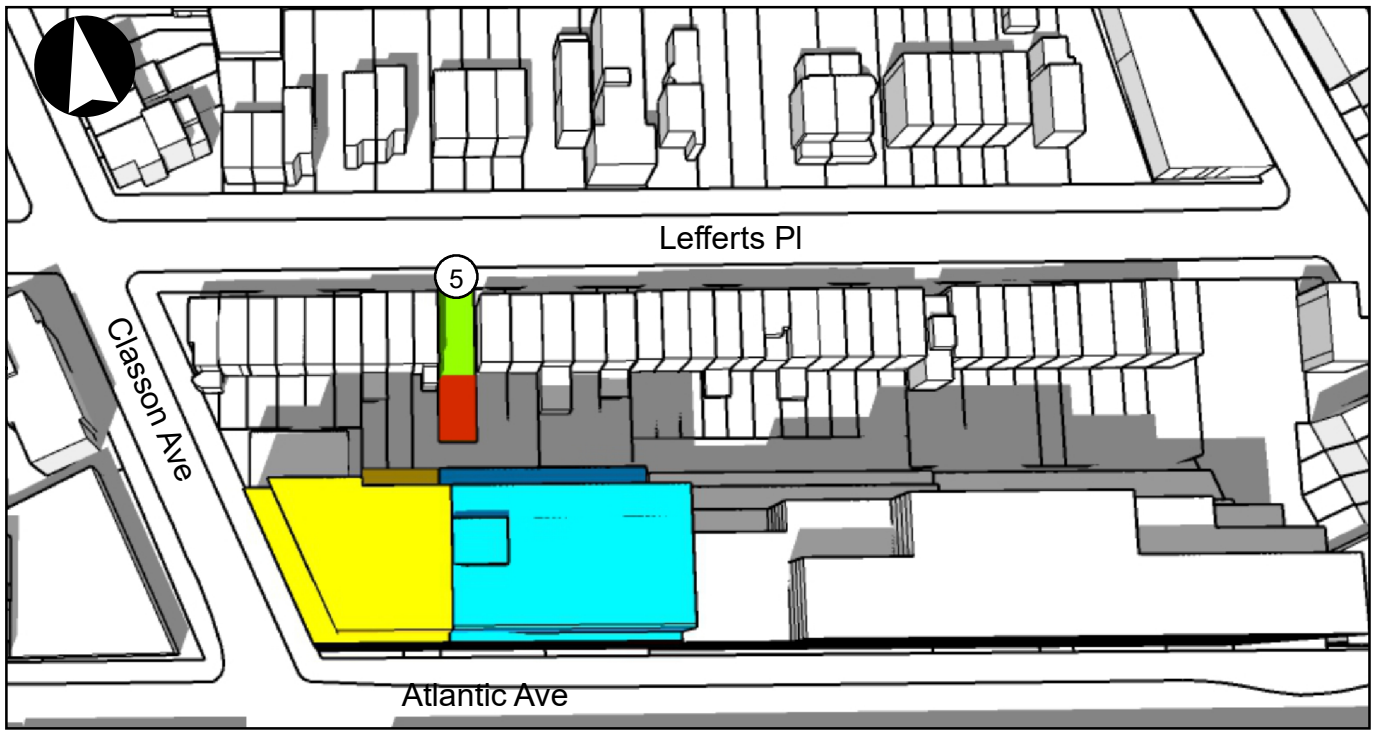
Projected Development Site

Potential Development Site

5 Lefferts Place Block Association Garden

Project-Generated Incremental Shadow

Figure 6-6f
Lefferts Place Block Association Garden-
May 6/August 6



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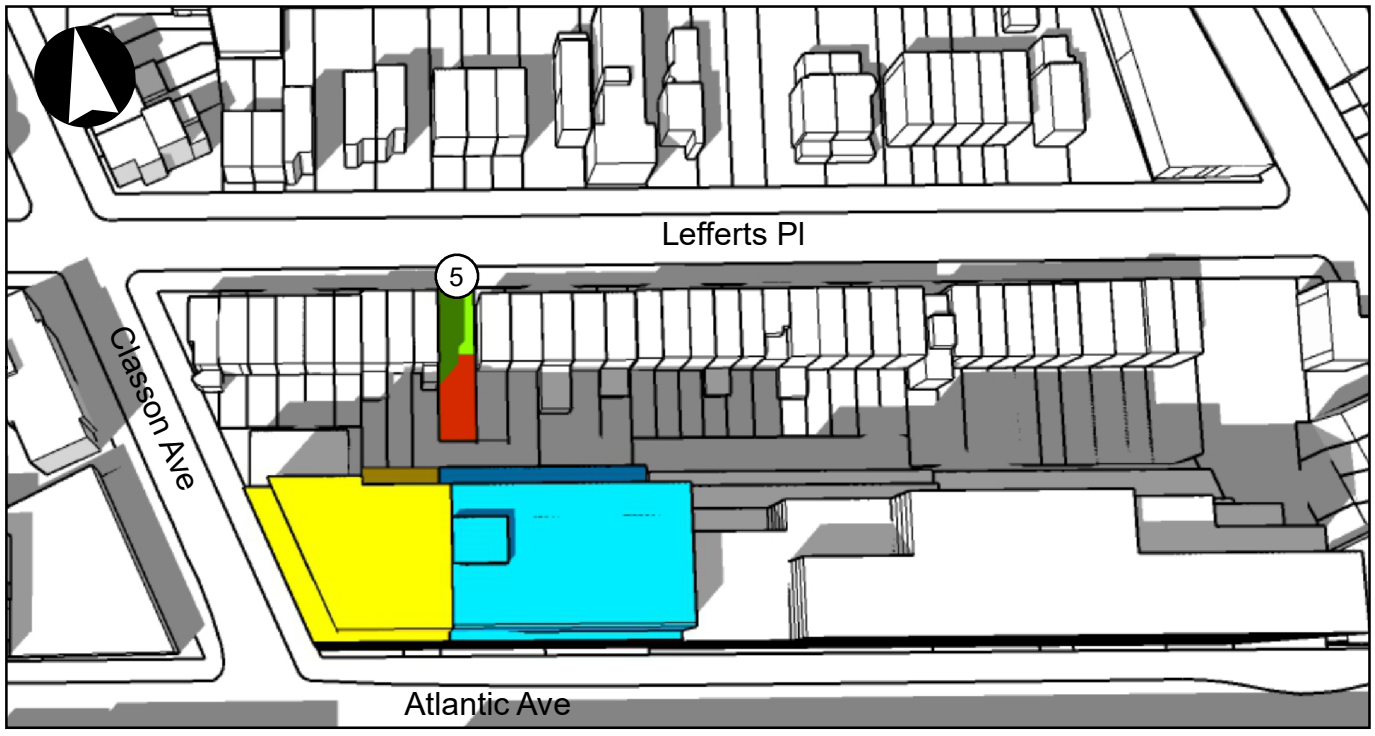

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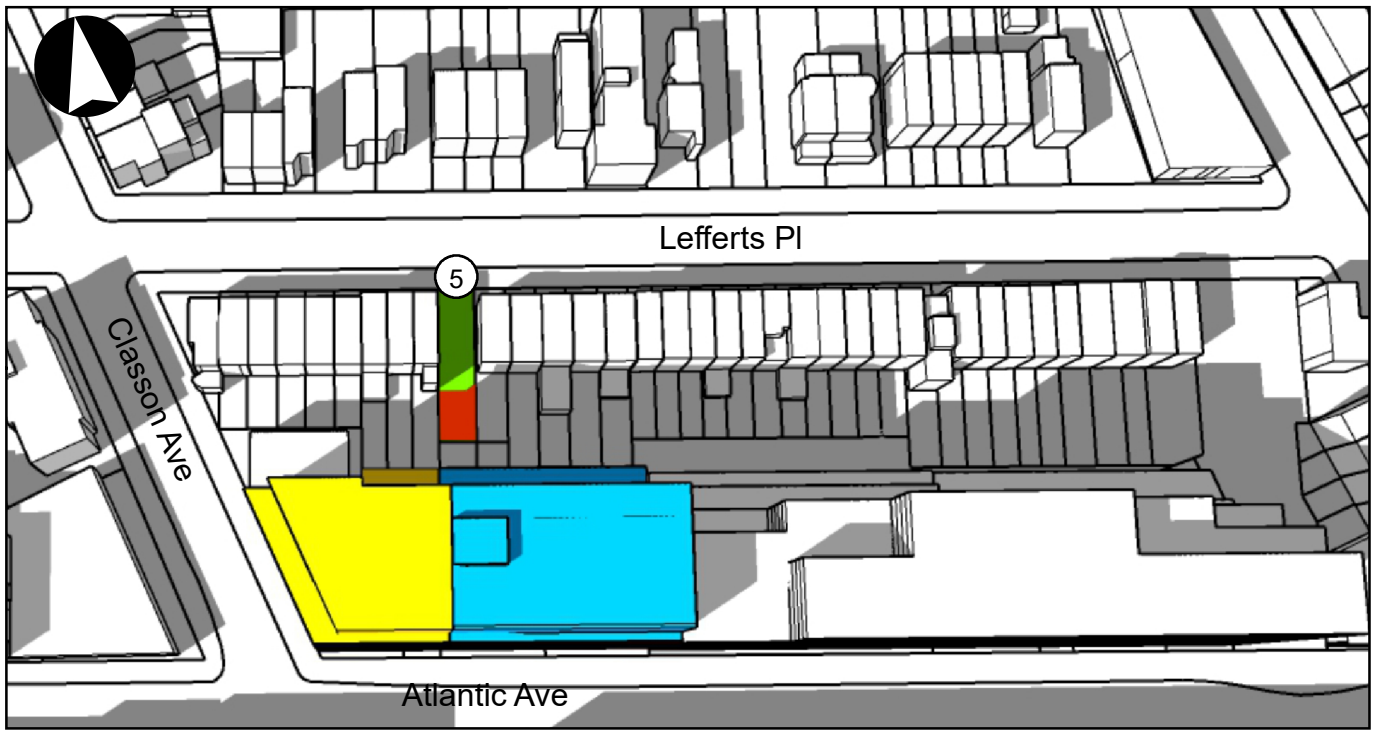
Projected Development Site

Potential Development Site

5 Lefferts Place Block Association Garden

Project-Generated Incremental Shadow

Lefferts Place Block Association Garden-
May 6/August 6



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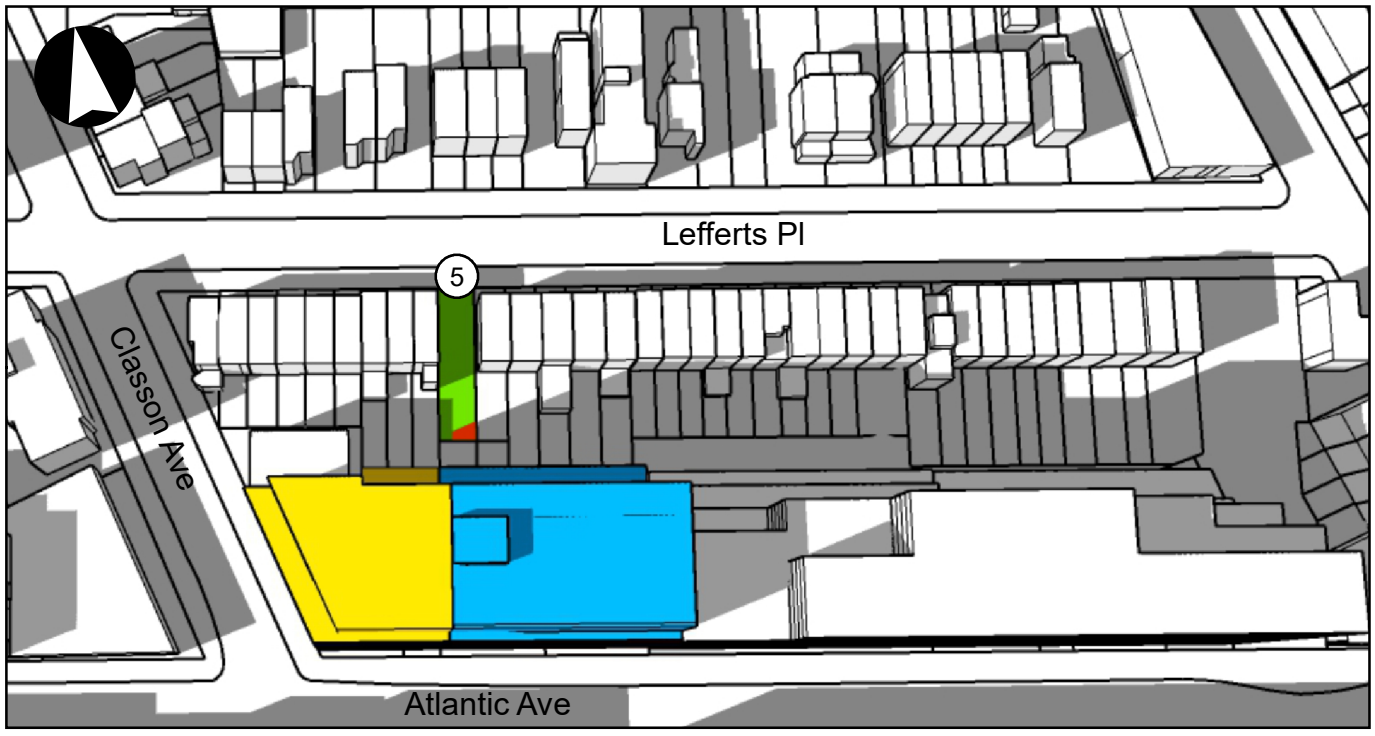


4:00 PM

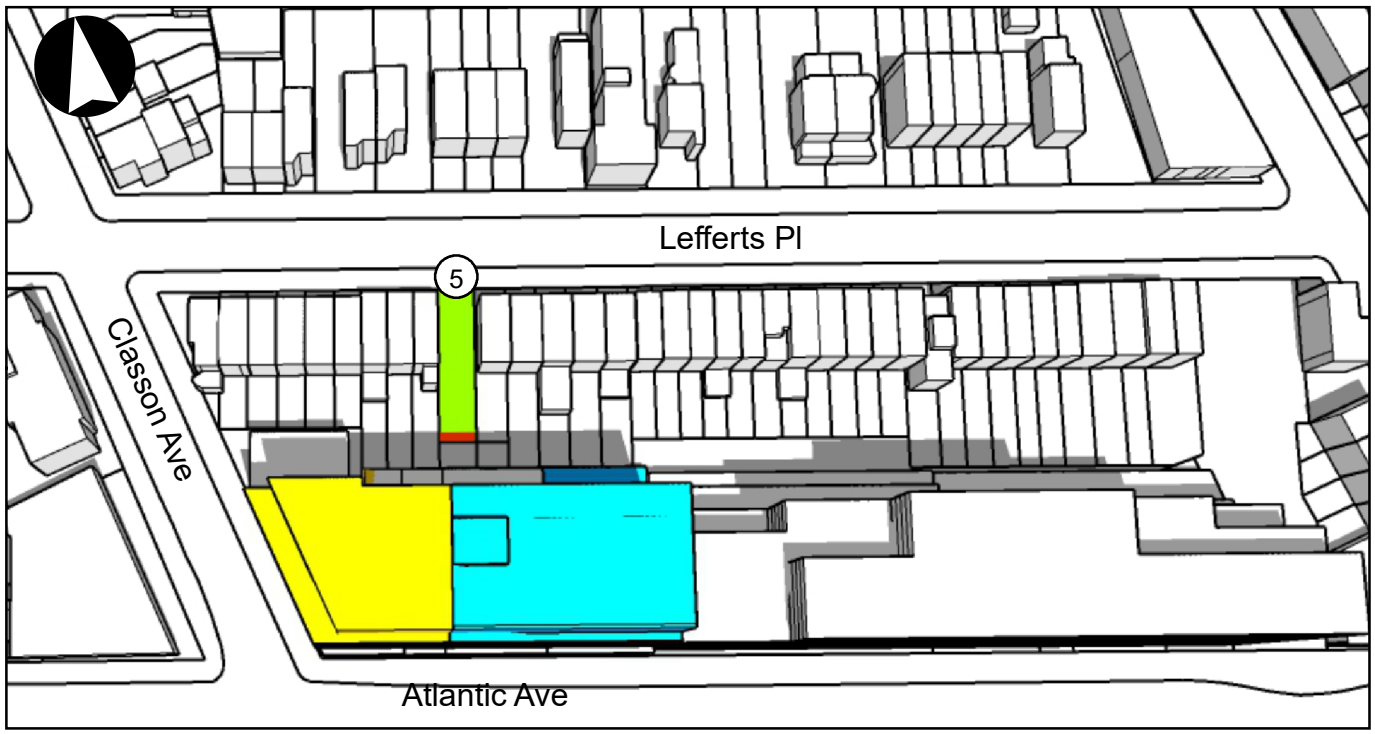
Projected Development Site

Potential Development Site

5 Lefferts Place Block Association Garden

Project-Generated Incremental Shadow

Lefferts Place Block Association Garden-June 21



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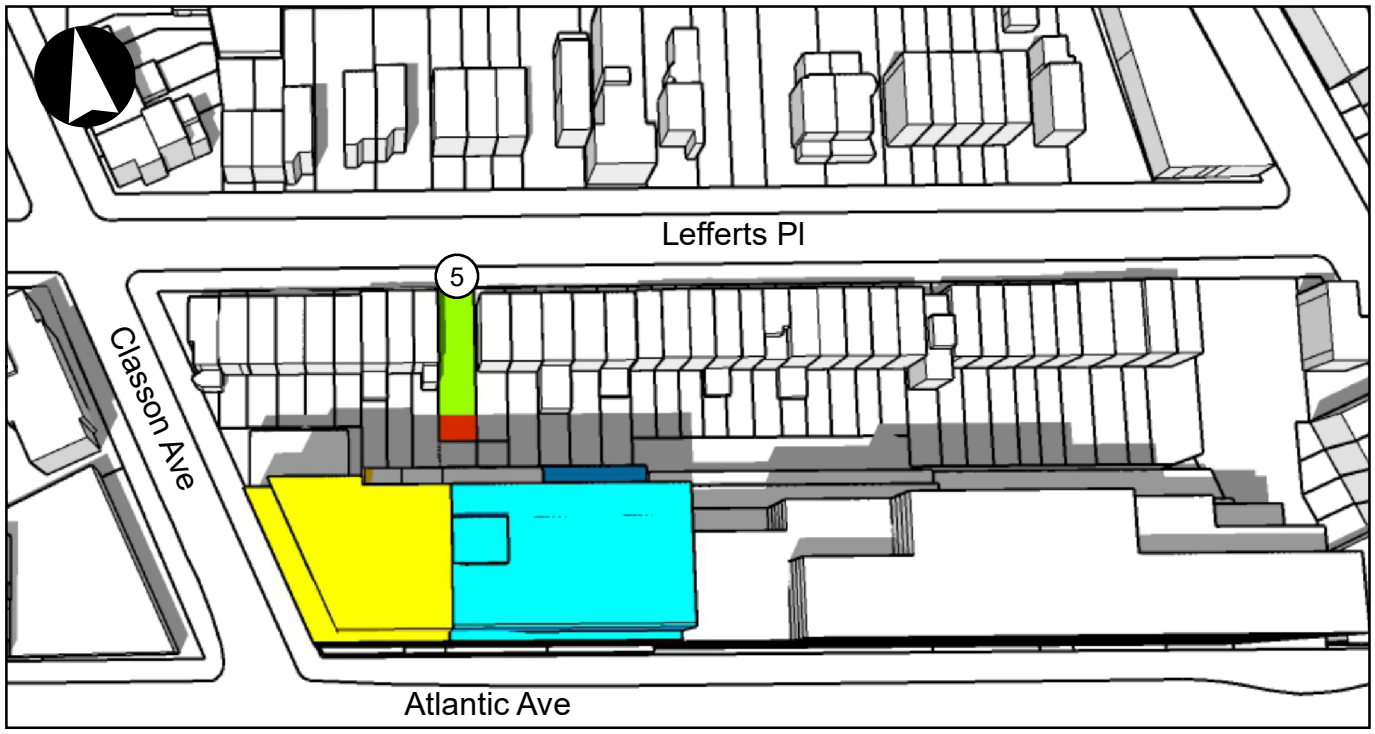

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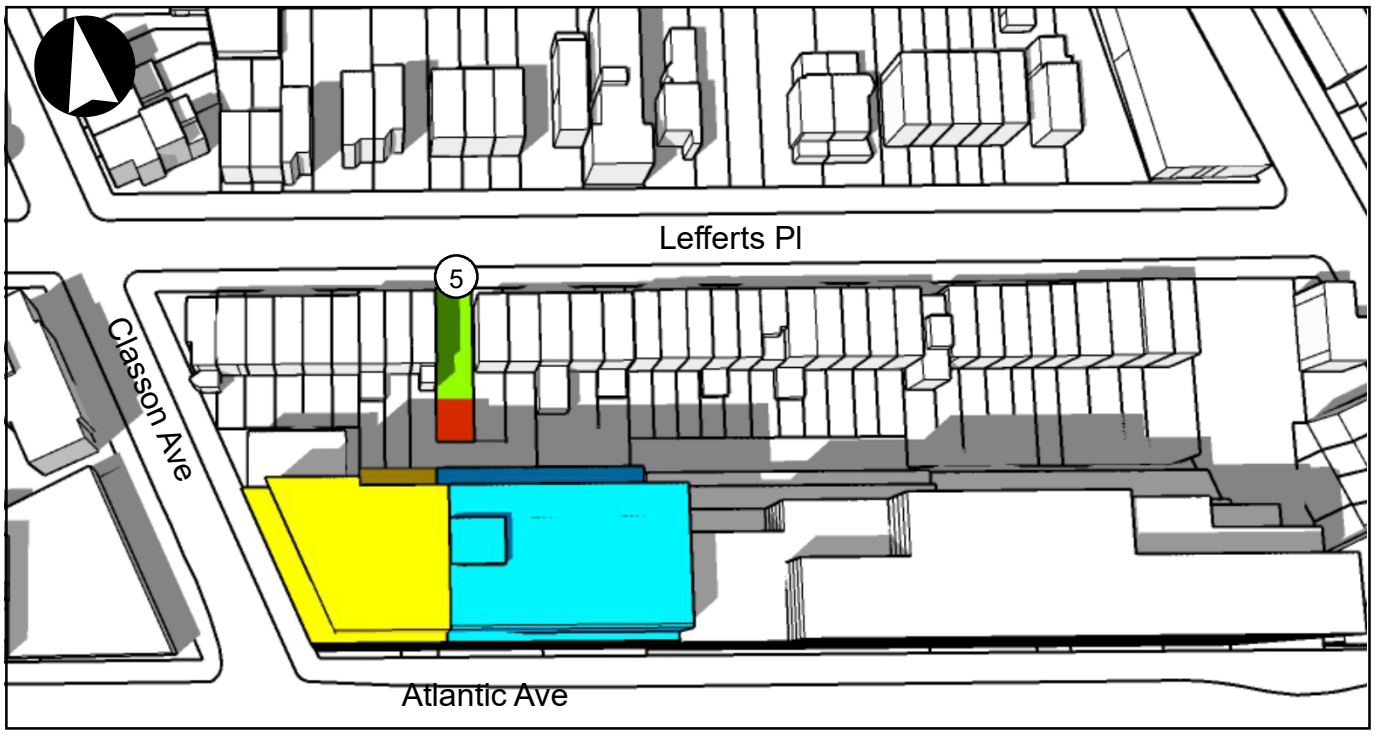
Projected Development Site

Potential Development Site

5 Lefferts Place Block Association Garden

Project-Generated Incremental Shadow

Figure 6-6i
Lefferts Place Block Association Garden-
June 21



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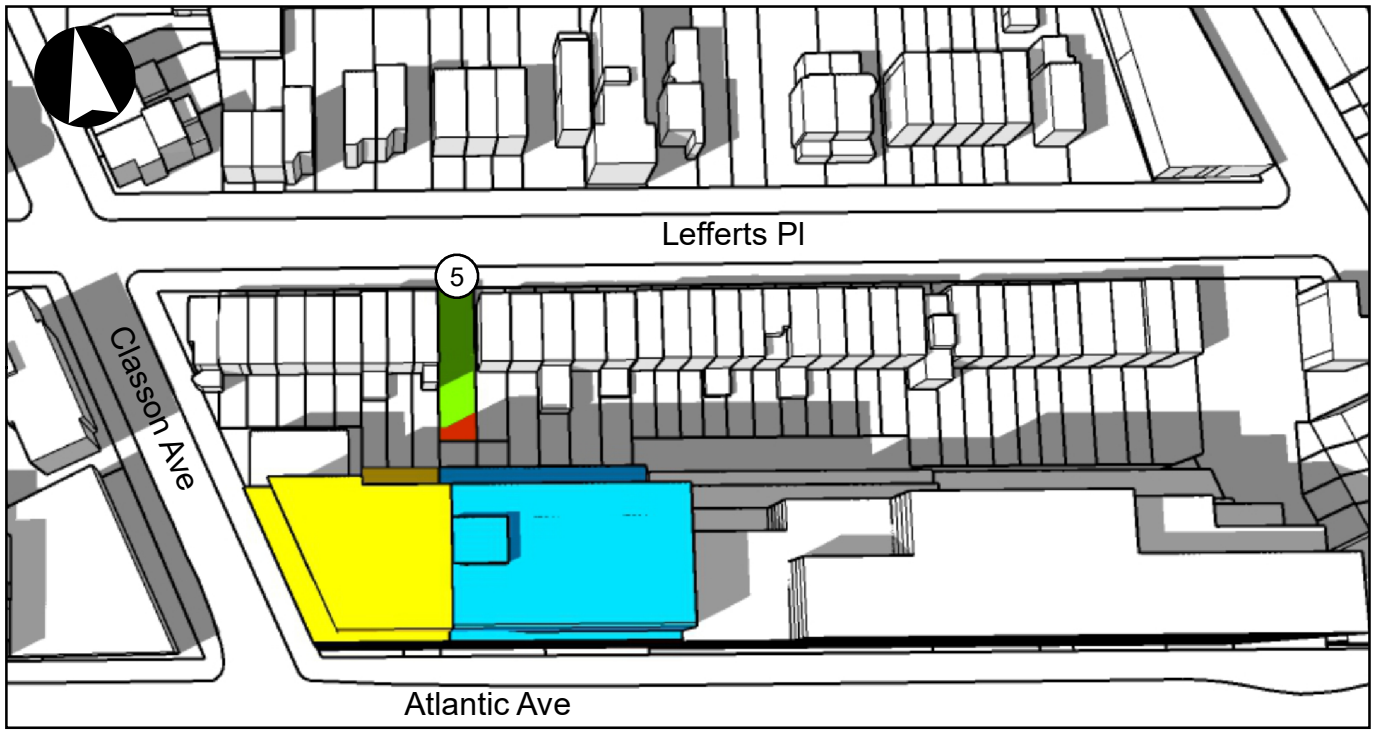


3:00 PM

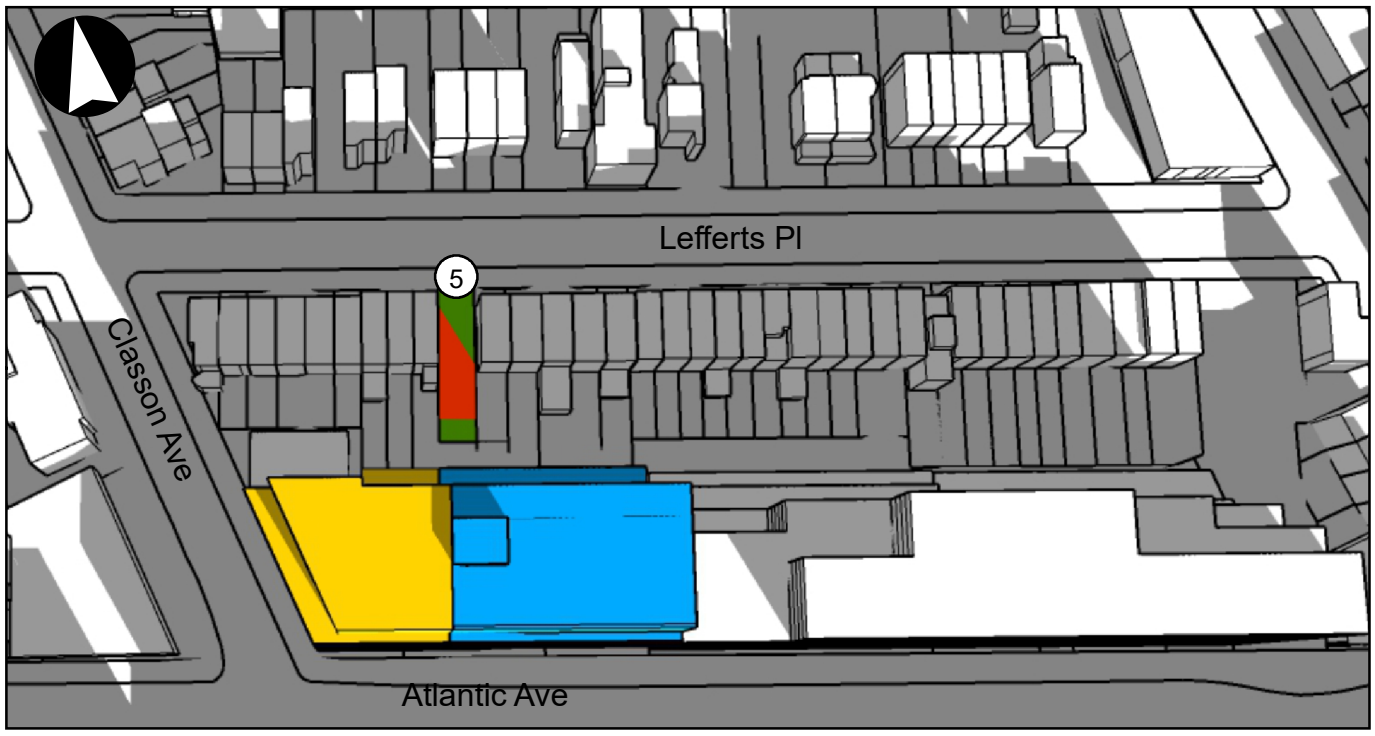
Projected Development Site

Potential Development Site

5 Lefferts Place Block Association Garden

Project-Generated Incremental Shadow

Lefferts Place Block Association Garden-Dec 21



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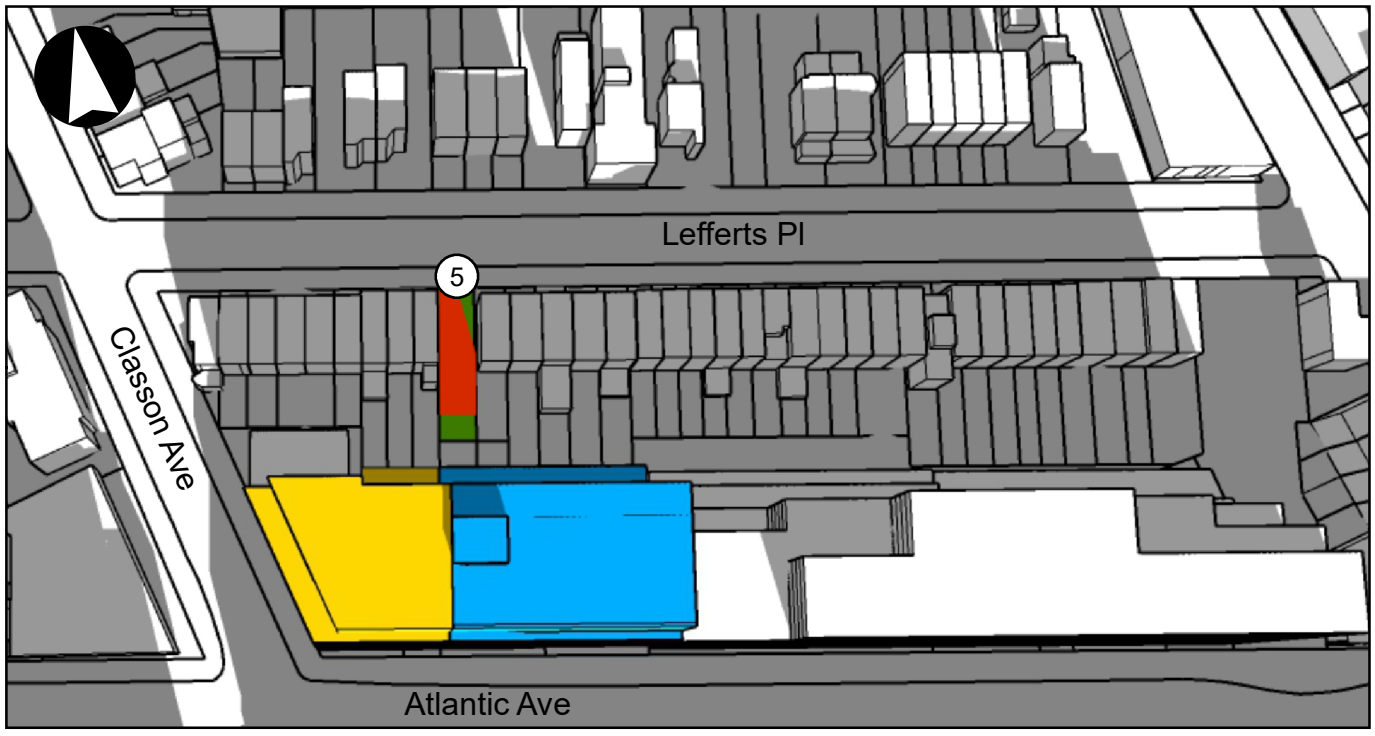


12:00 PM

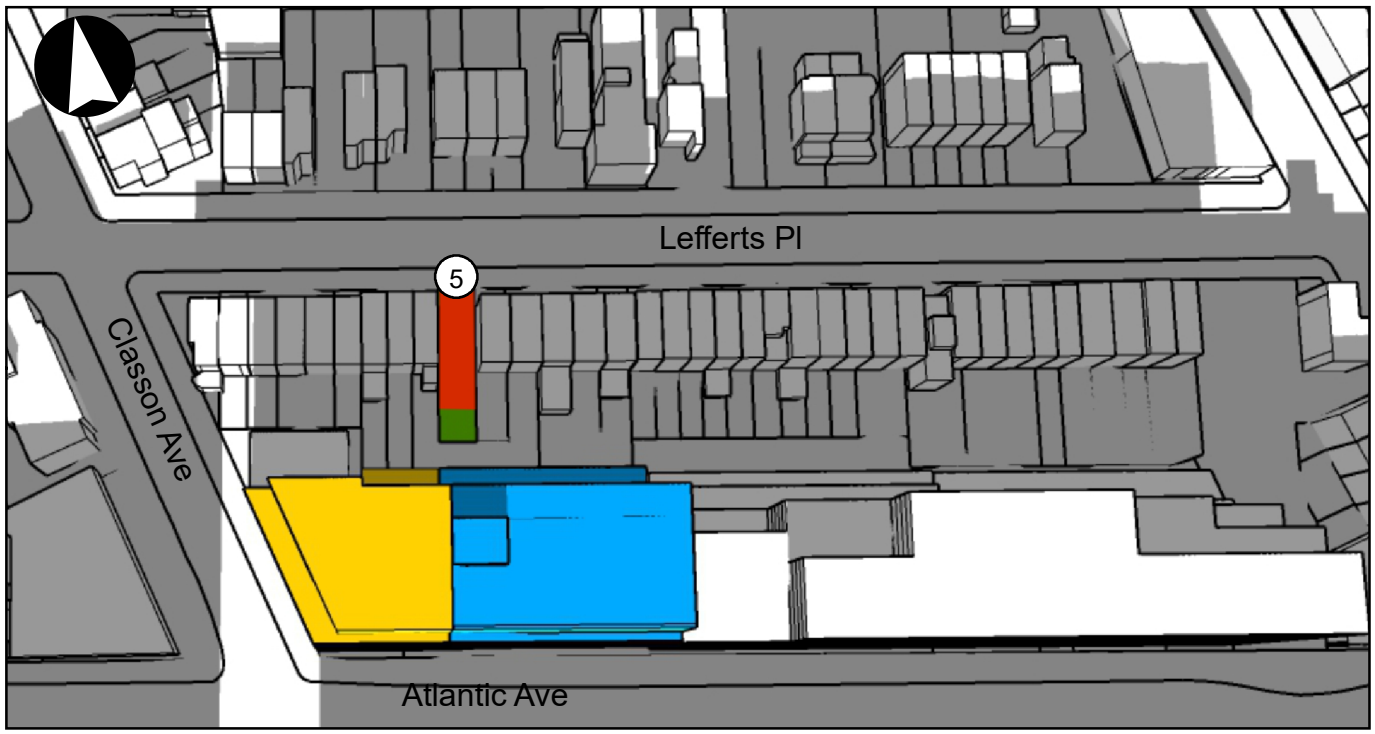
Projected Development Site

Potential Development Site

5 Lefferts Place Block Association Garden

Project-Generated Incremental Shadow

Lefferts Place Block Association Garden-Dec 21



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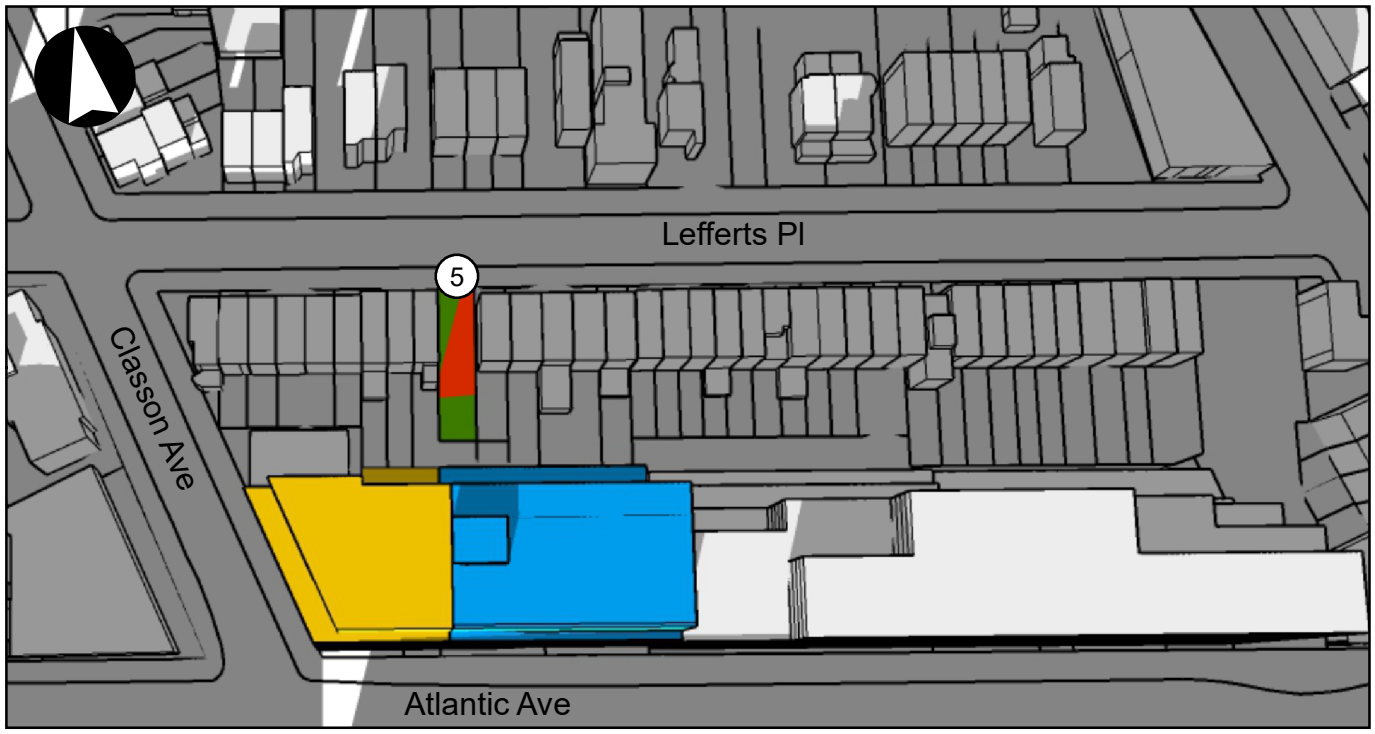


2:00 PM

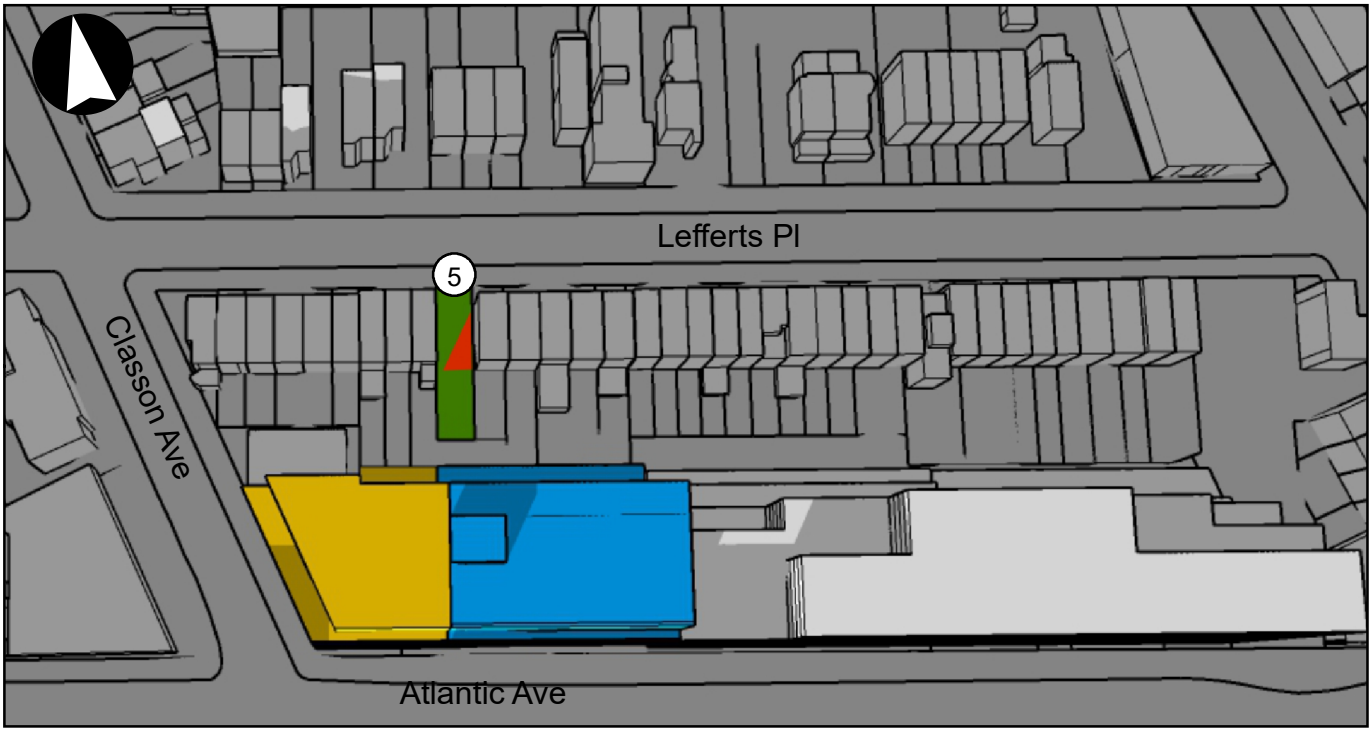
Projected Development Site

Potential Development Site

5 Lefferts Place Block Association Garden

Project-Generated Incremental Shadow

Figure 6-6l
Lefferts Place Block Association Garden-
Dec 21



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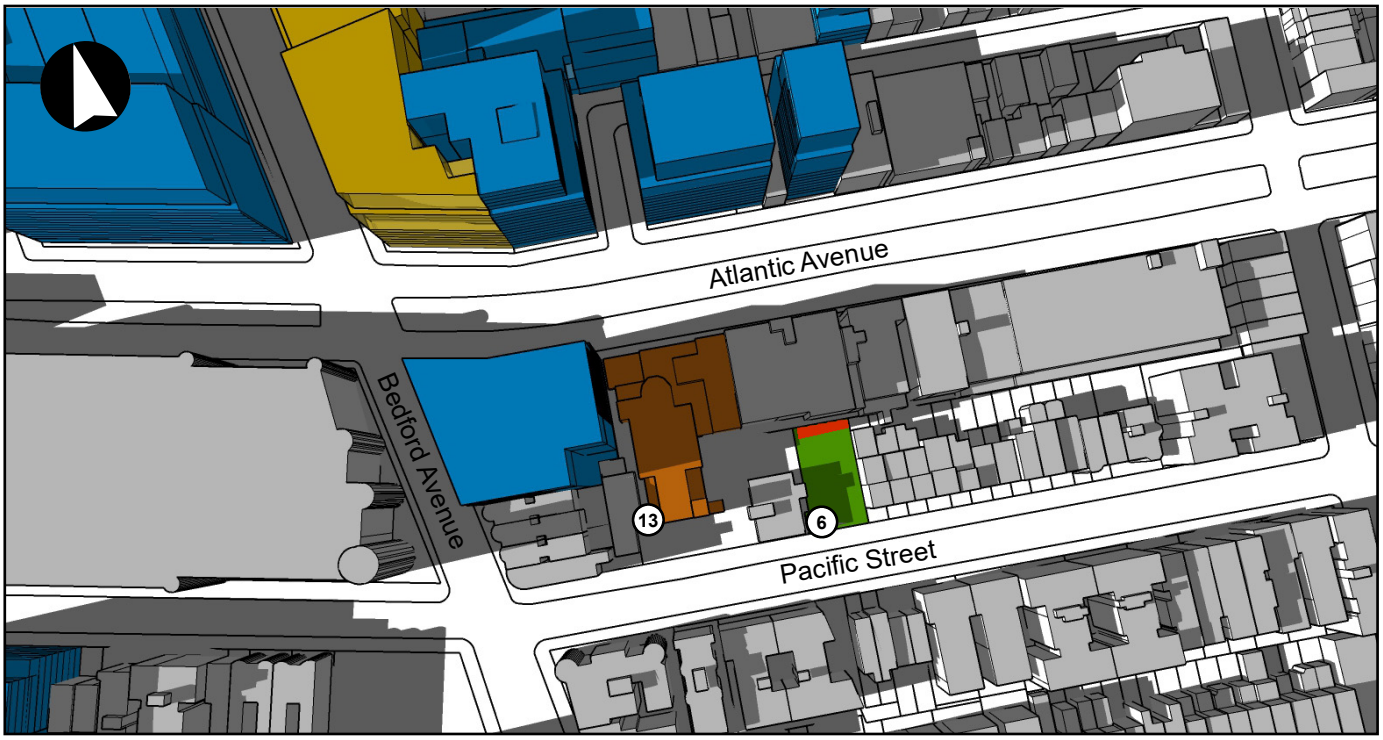
Projected Development Site

Potential Development Site

5 Lefferts Place Block Association Garden

Project-Generated Incremental Shadow

Westbrook Memorial Garden - May 6th/August 6th



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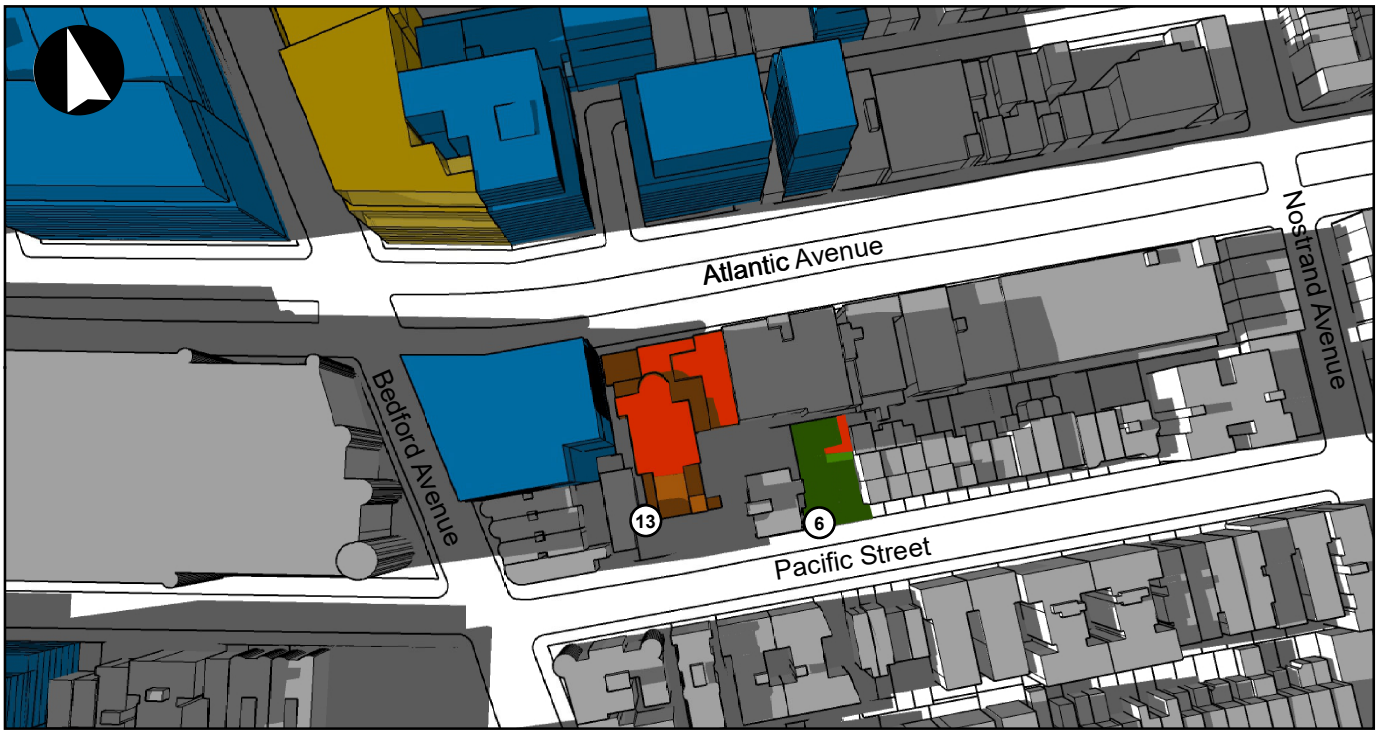


5:18 PM

Projected Development Site

Potential Development Site

6 Westbrook Memorial Garden

13 St. Bartholomew's Protestant Church

Project-Generated Incremental Shadow

Westbrook Memorial Garden - June 21st



4:00 PM



5:00 PM

Projected Development Site

Potential Development Site

6 Westbrook Memorial Garden

13 St. Bartholomew's Protestant Church

Project-Generated Incremental Shadow

Westbrook Memorial Garden and - June 21st



4:00 PM

Projected Development Site

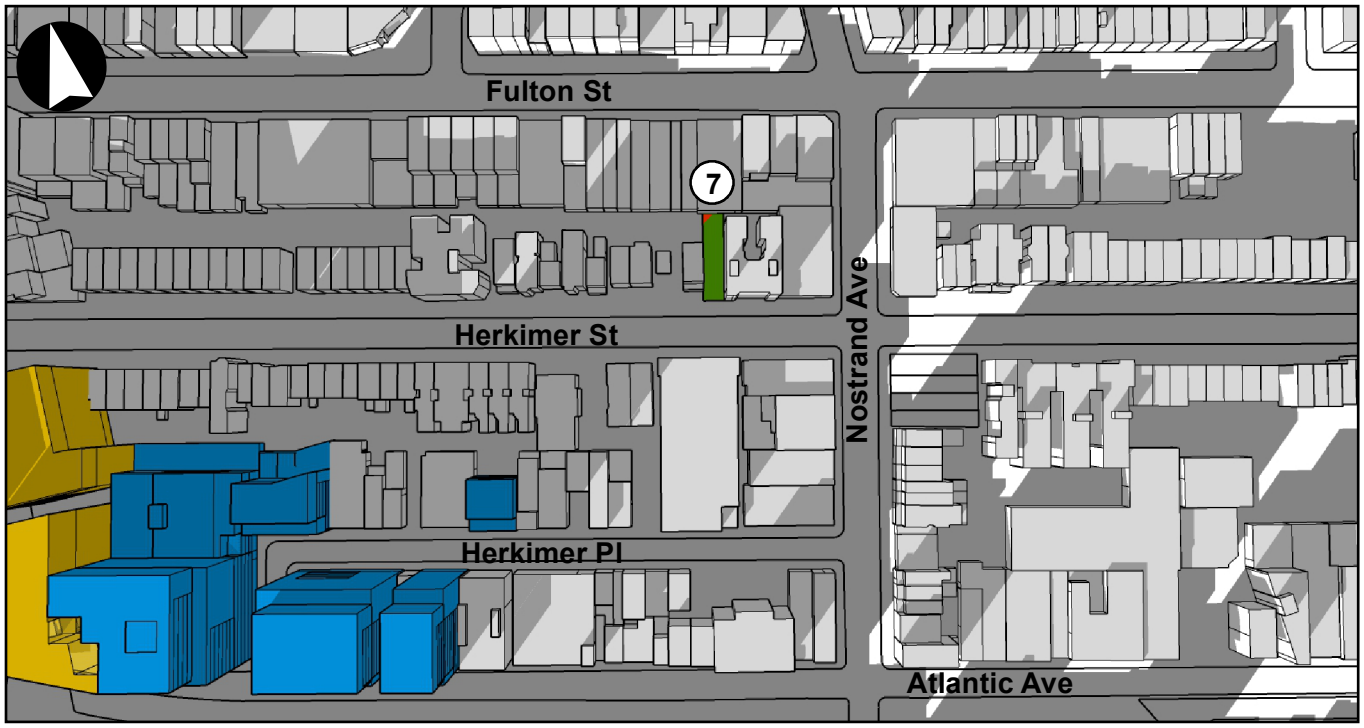
Potential Development Site

6 Westbrook Memorial Garden

13 St. Bartholomew's Protestant Church

Project-Generated Incremental Shadow

Figure 6-8a
United Herkimer Garden Club-
December 21



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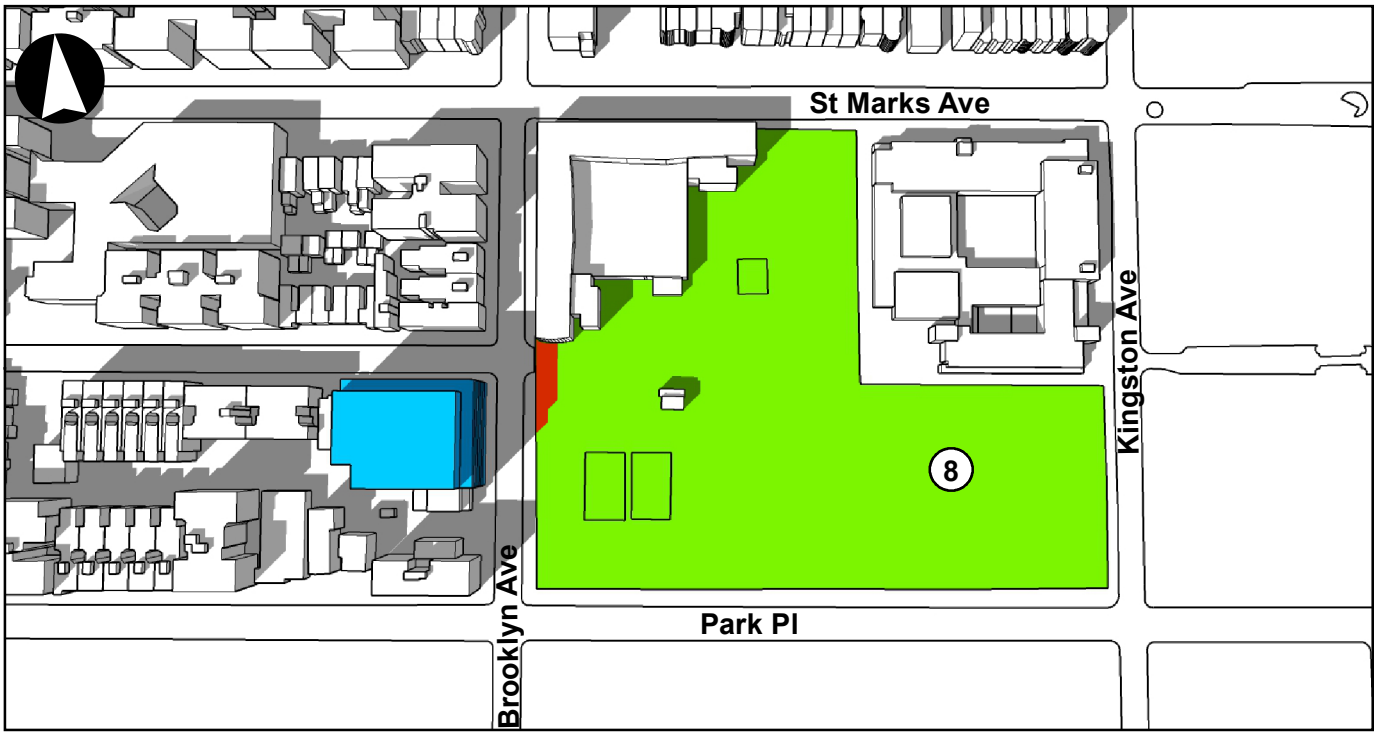
Projected Development Site

Potential Development Site

7 United Herkimer Garden Club

Project-Generated Incremental Shadow

Brower Park - March 21/September 21



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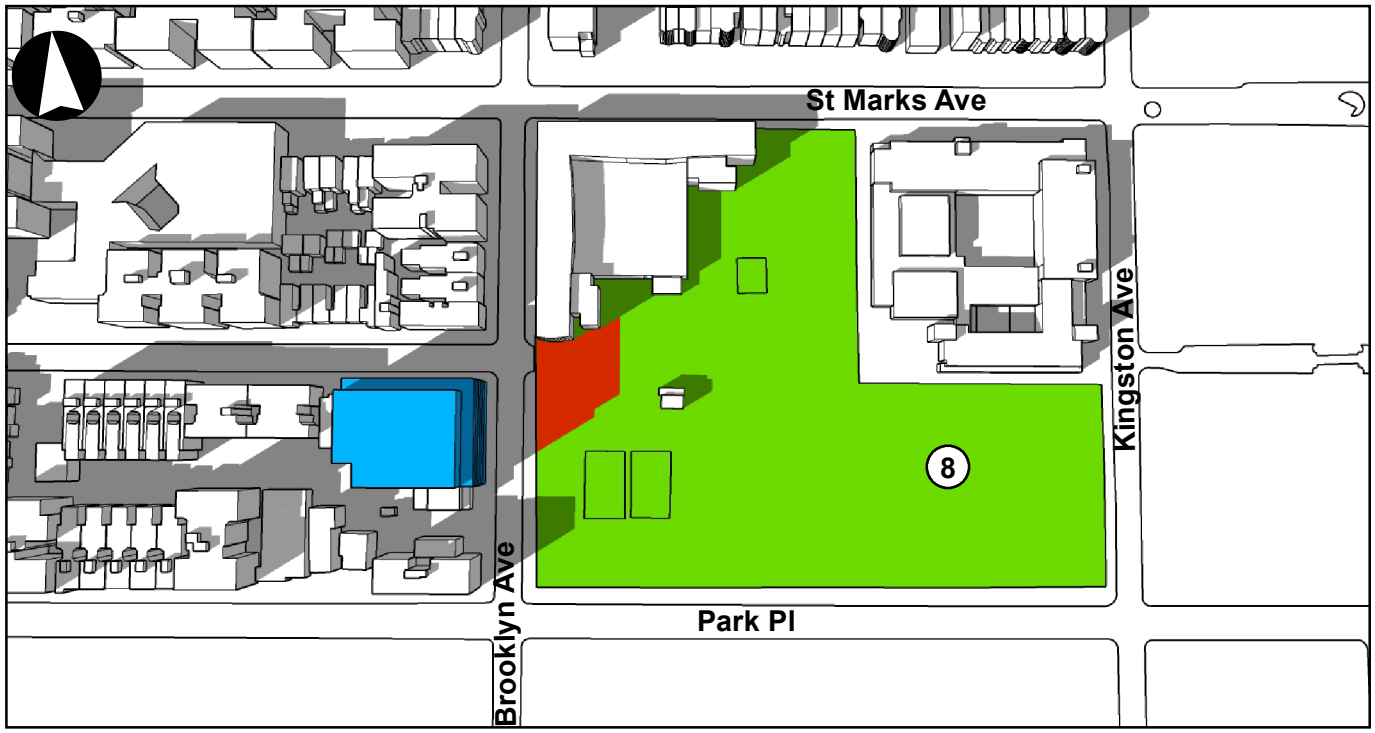

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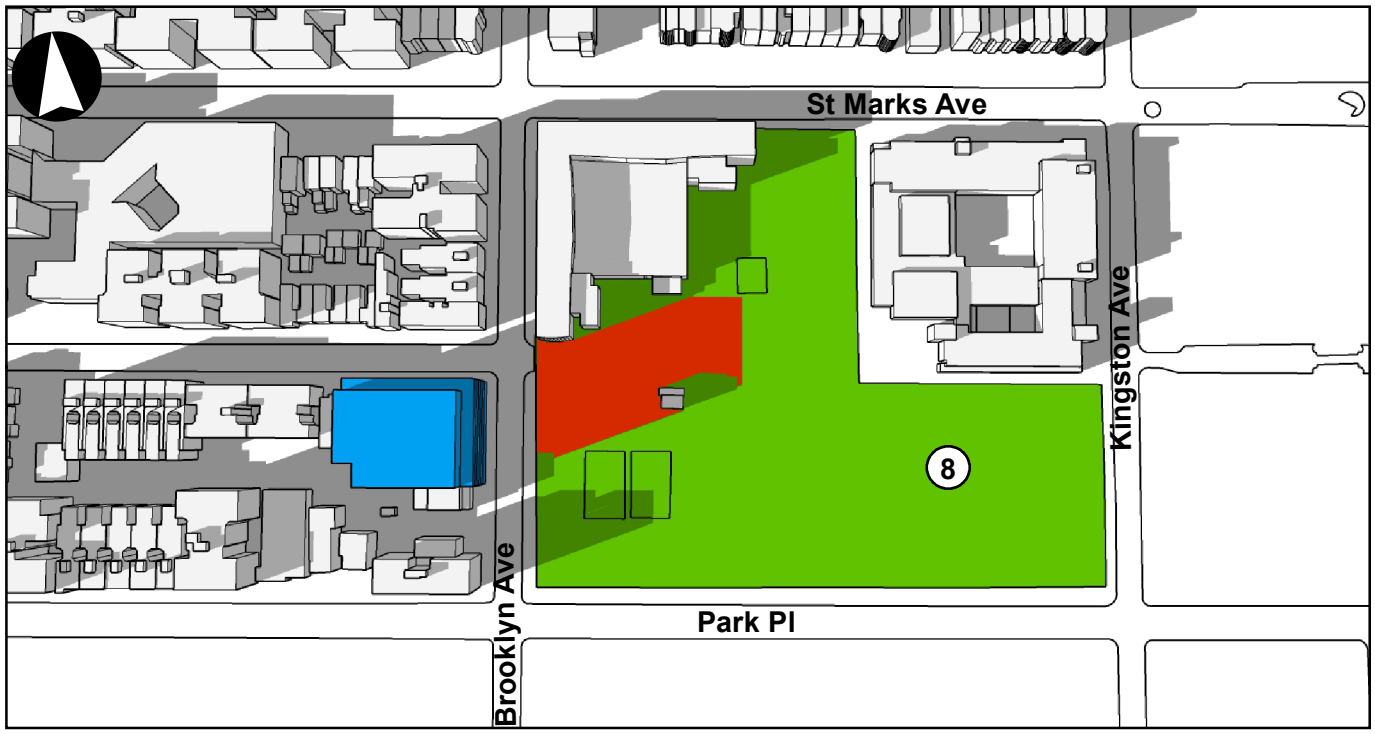
Projected Development Site

Potential Development Site

8 Brower Park

Project-Generated Incremental Shadow

Brower Park - March 21/September 21



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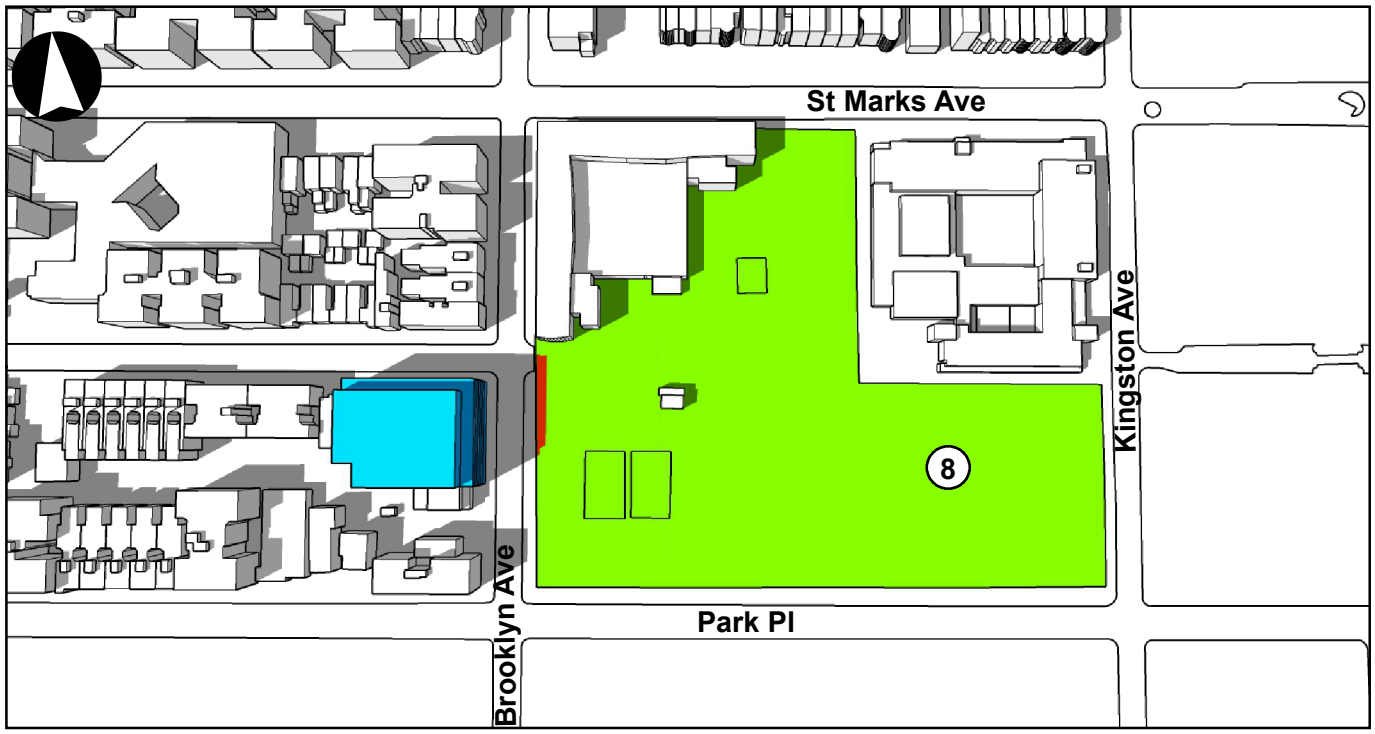
Projected Development Site

Potential Development Site

8 Brower Park

Project-Generated Incremental Shadow

Brower Park - May 6/August 6



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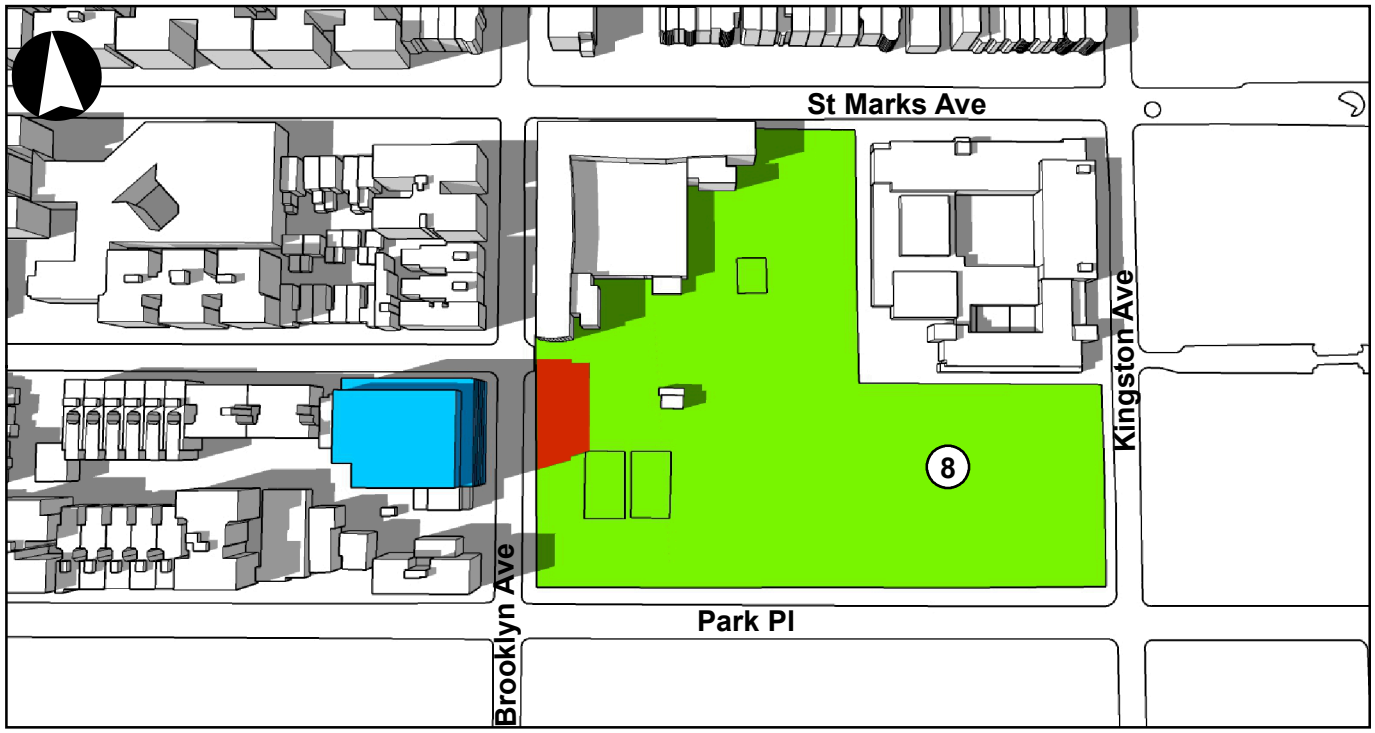

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Projected Development Site

Potential Development Site

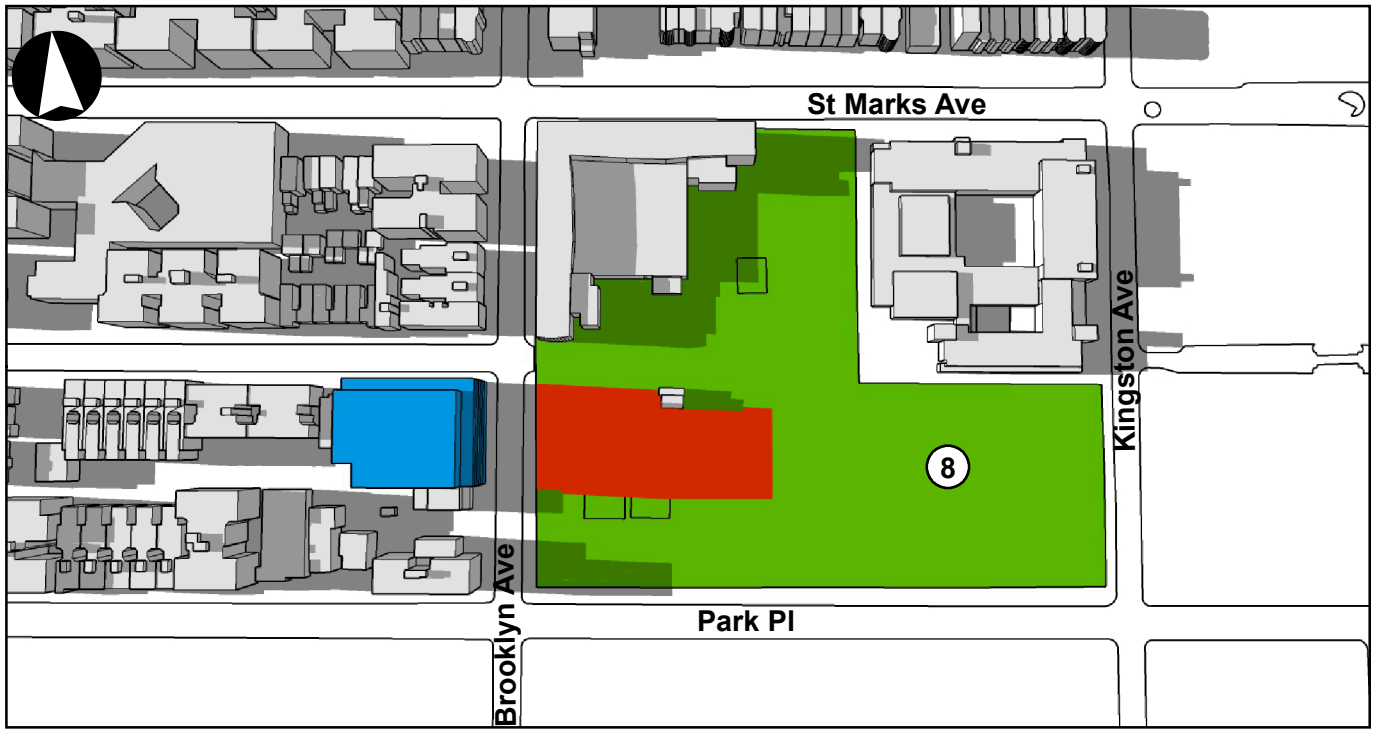
8 Brower Park

Project-Generated Incremental Shadow

Brower Park - May 6/August 6



4:30 PM



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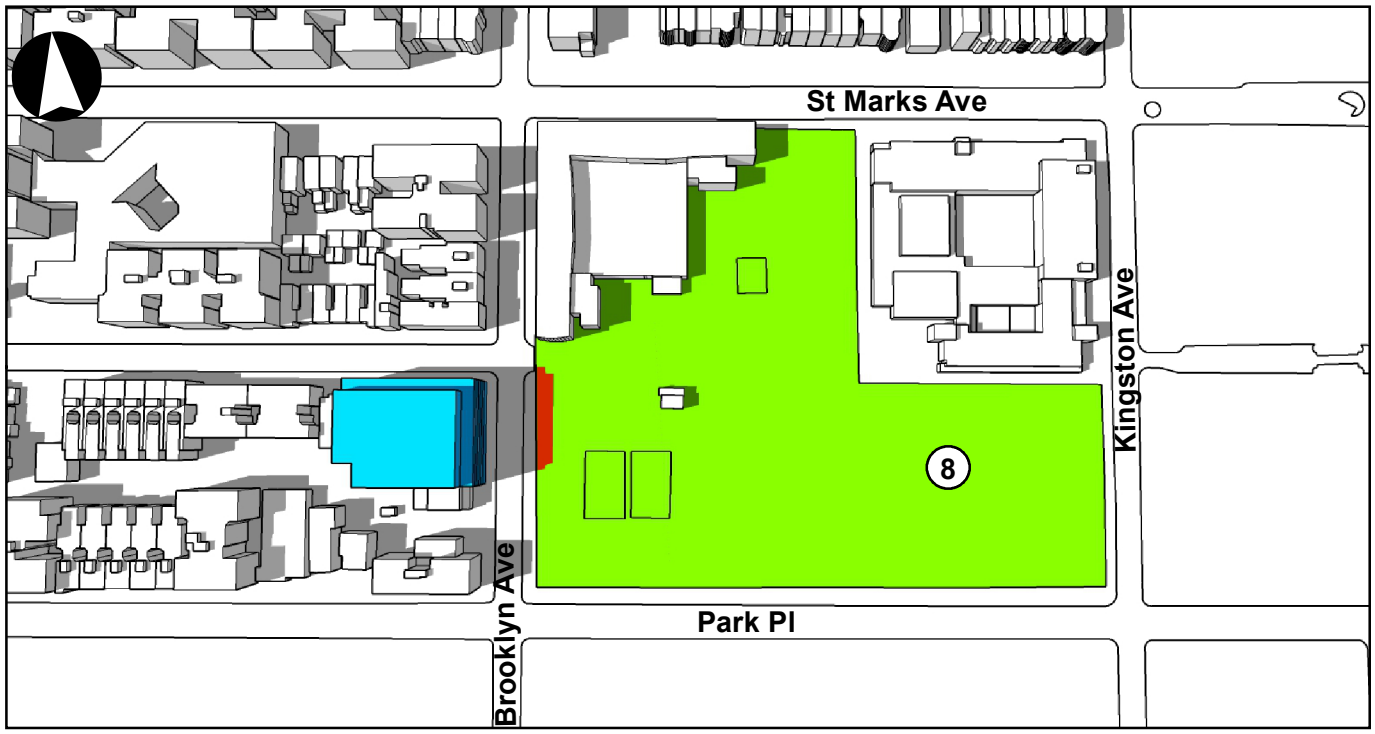
Projected Development Site

Potential Development Site

8 Brower Park

Project-Generated Incremental Shadow



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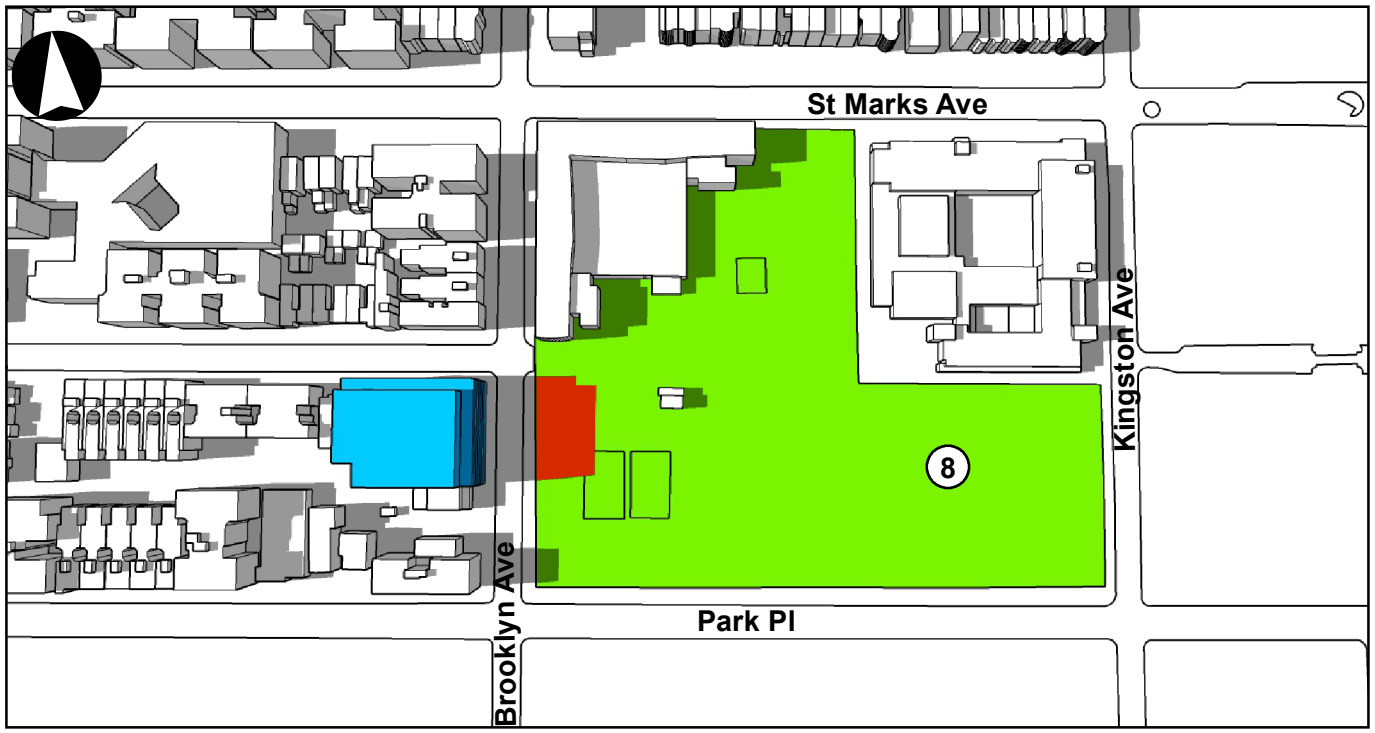

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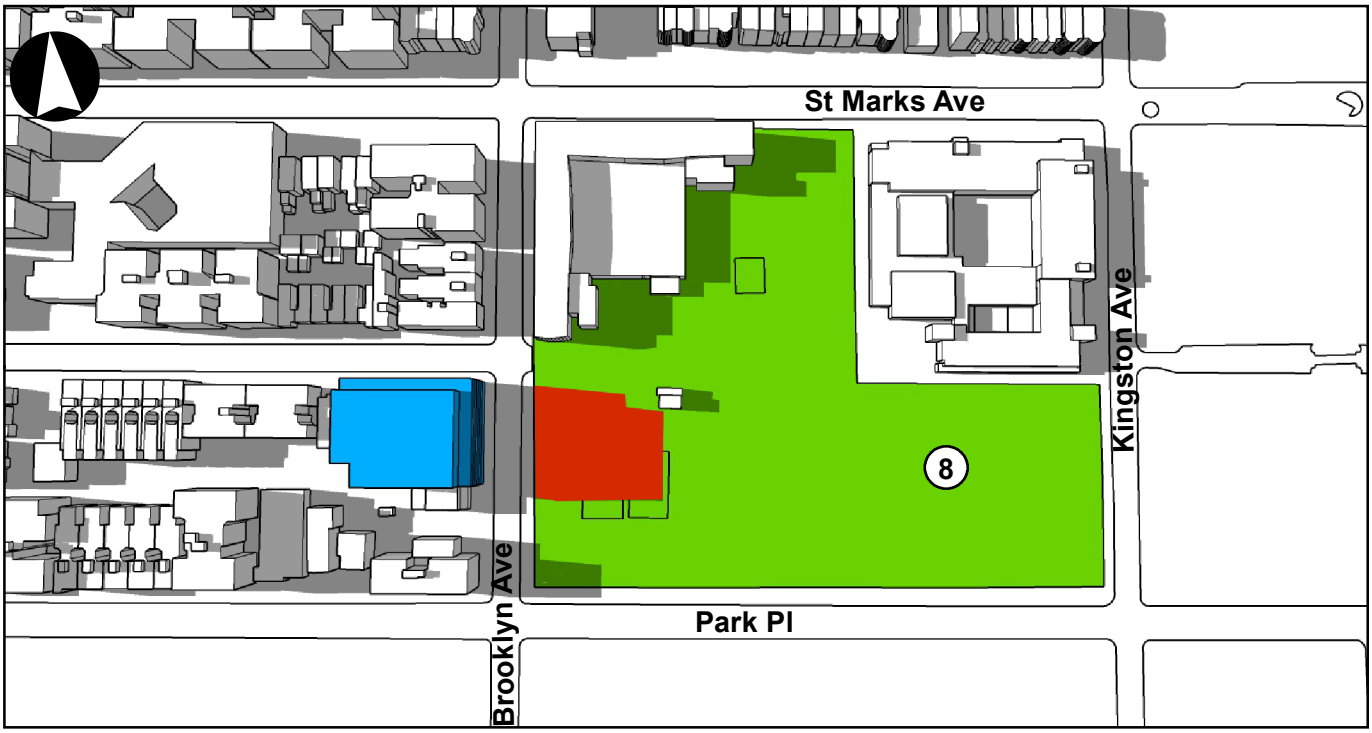
Projected Development Site
Potential Development Site
8 Brower Park
Project-Generated Incremental Shadow



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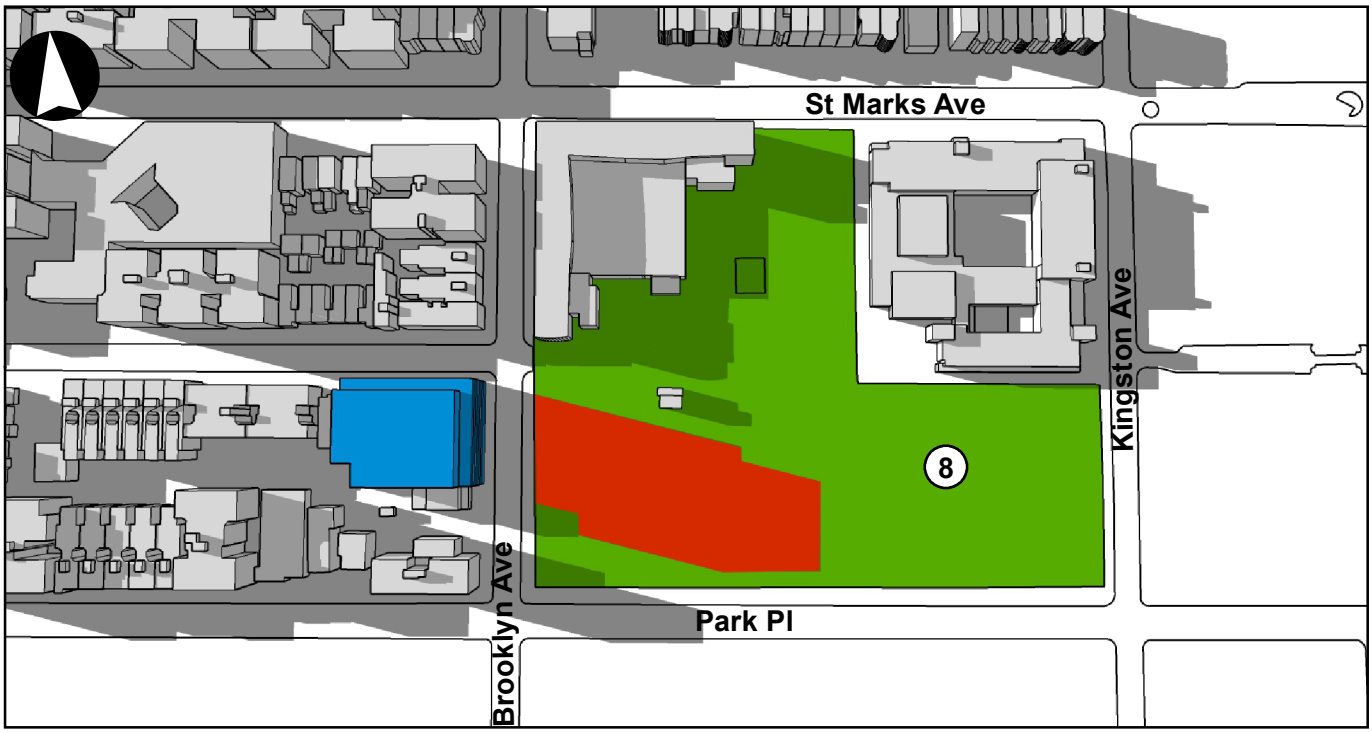

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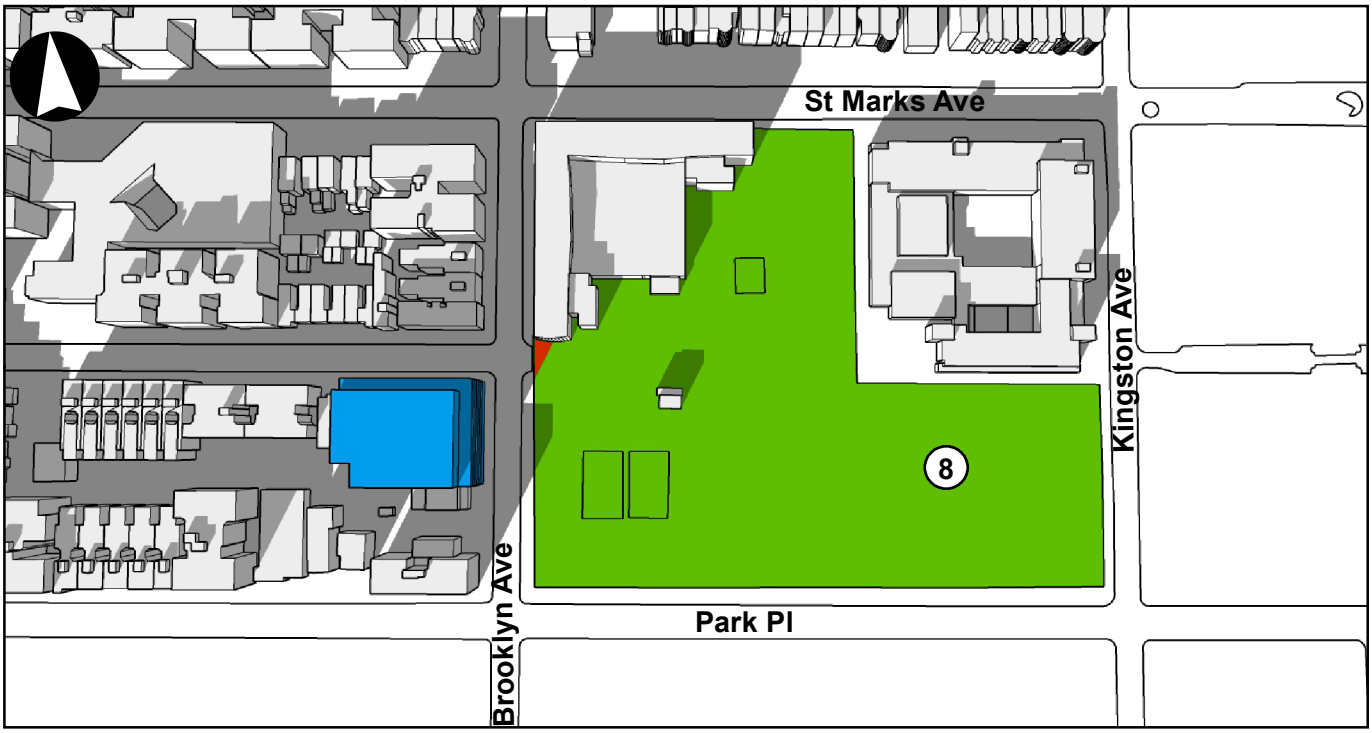
Projected Development Site
Potential Development Site
8 Brower Park
Project-Generated Incremental Shadow



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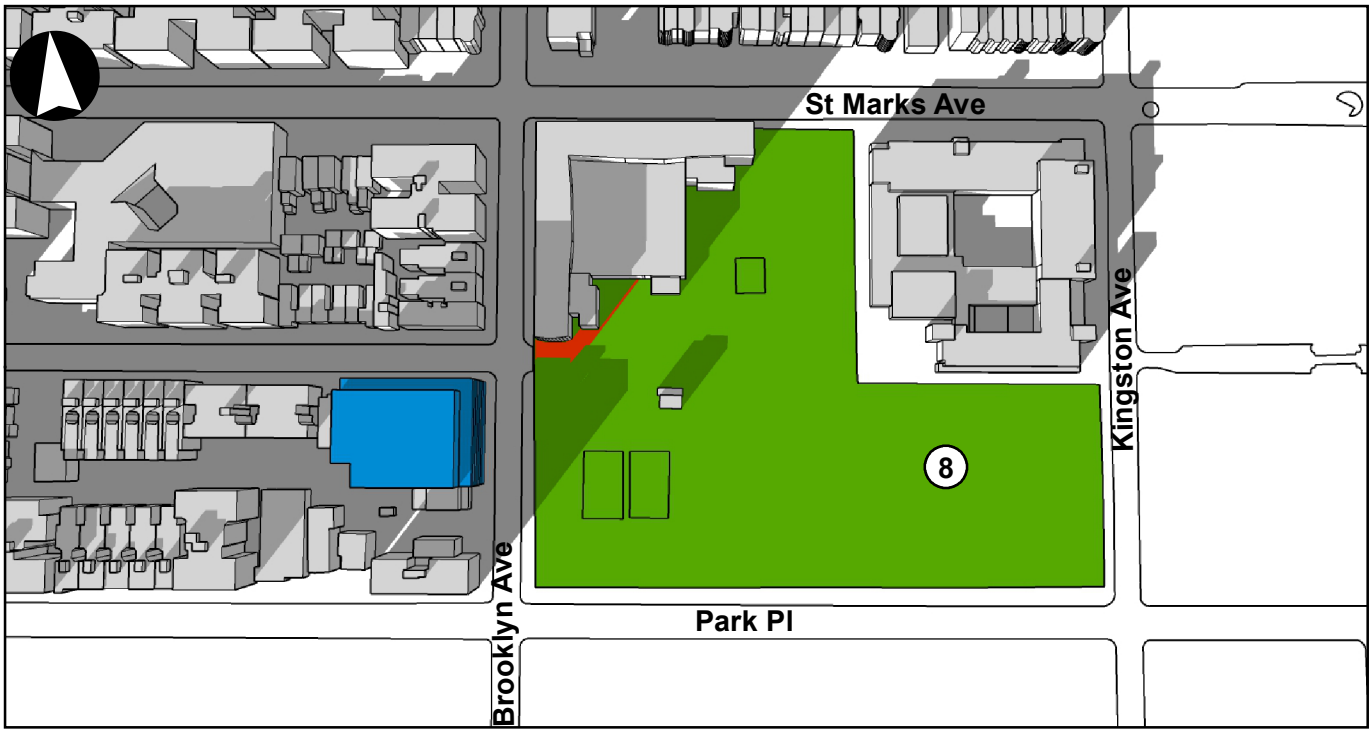

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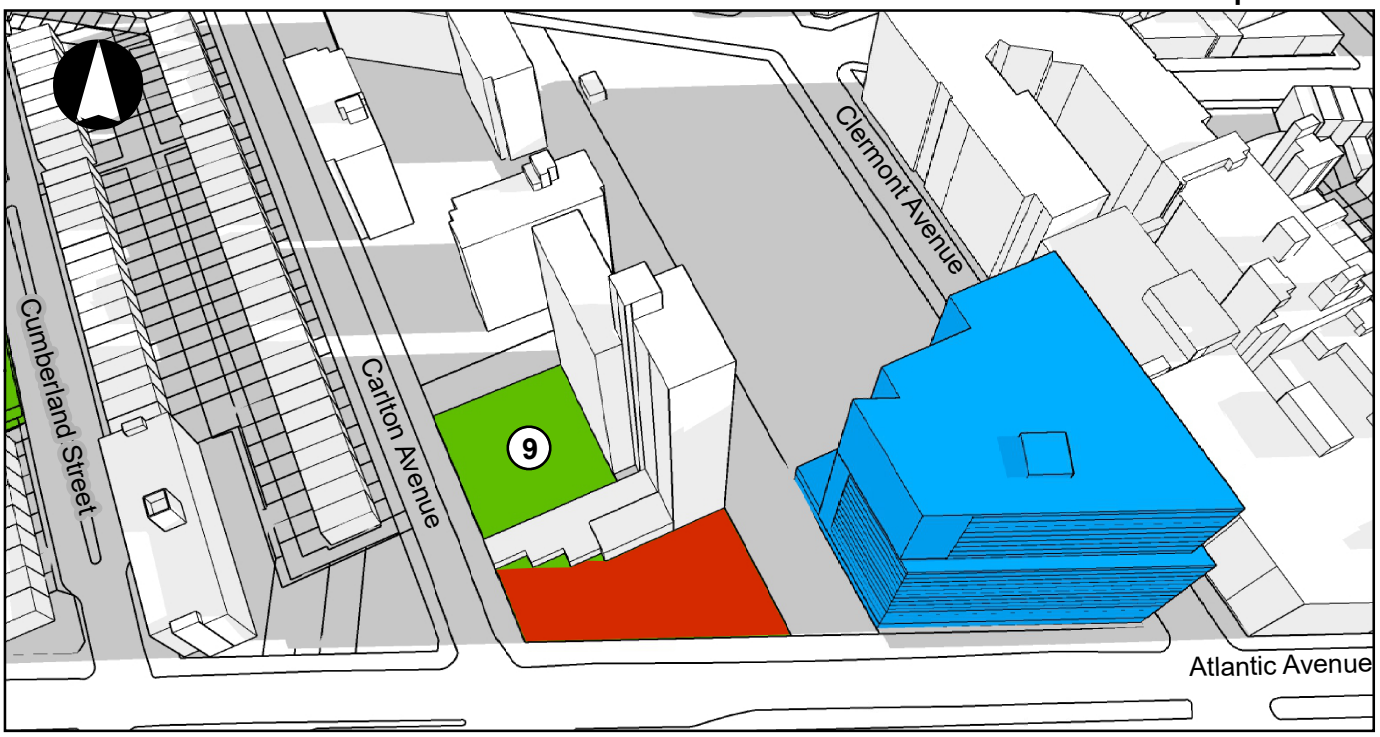
Projected Development Site

Potential Development Site

8 Brower Park

Project-Generated Incremental Shadow

Figure 6-10a
Atlantic Terminal Playground - March 21st/September 21st



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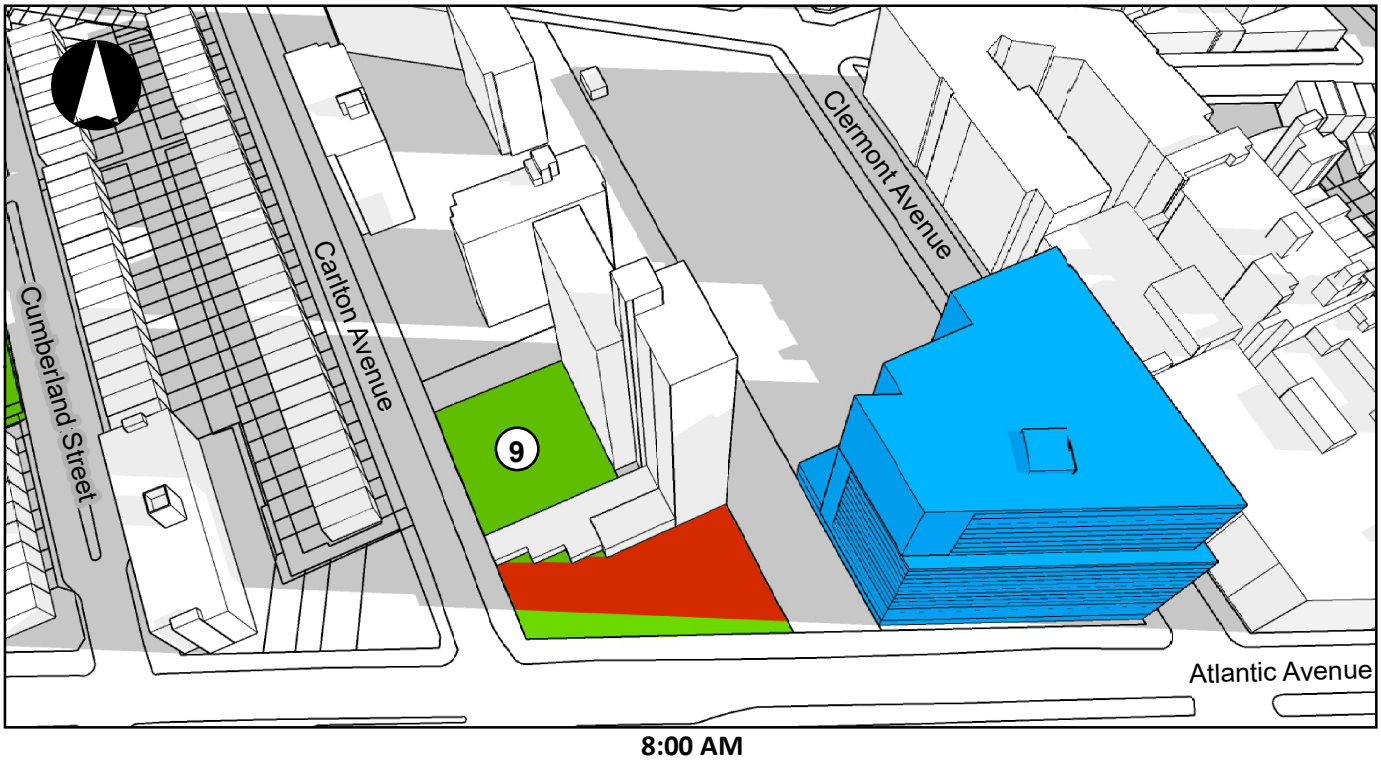

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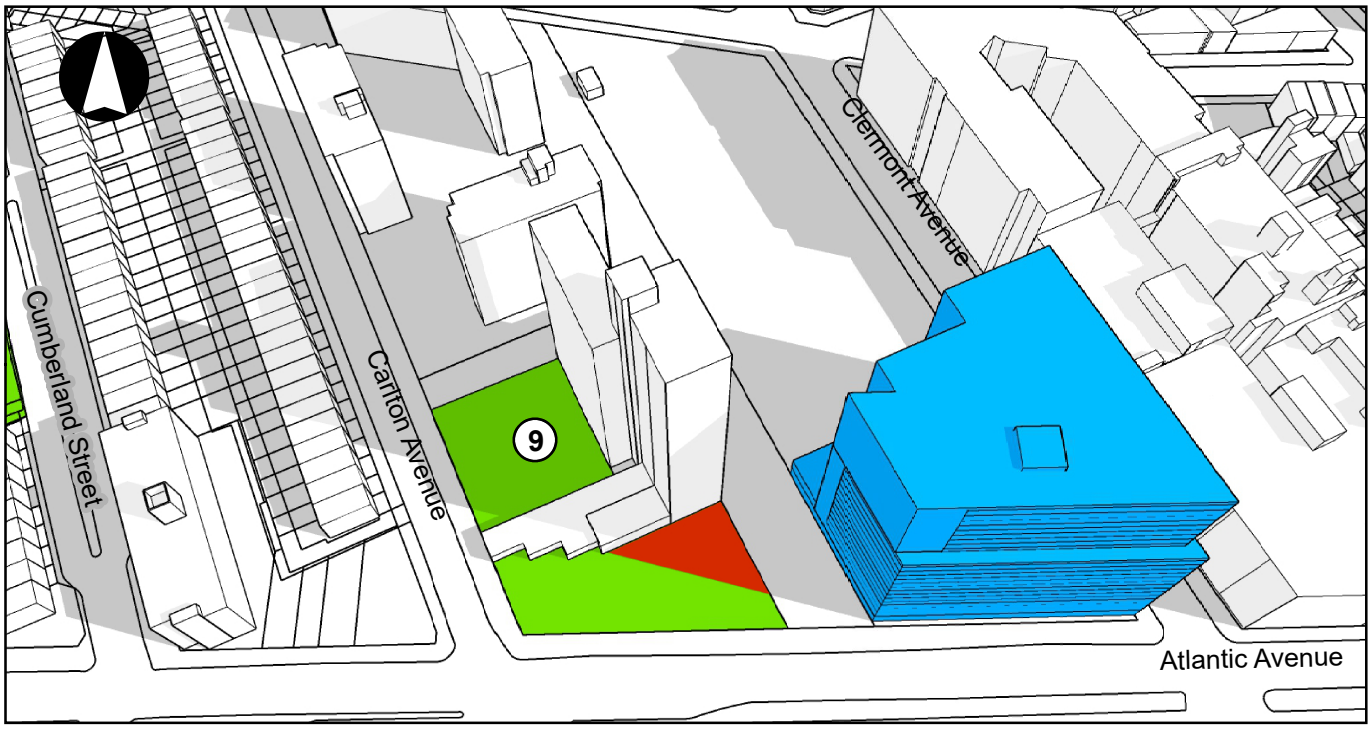
Projected Development Site

Project-Generated Incremental Shadow

9 Atlantic Terminal Playground

Figure 6-10b

Atlantic Terminal Playground - March 21st /September 21st



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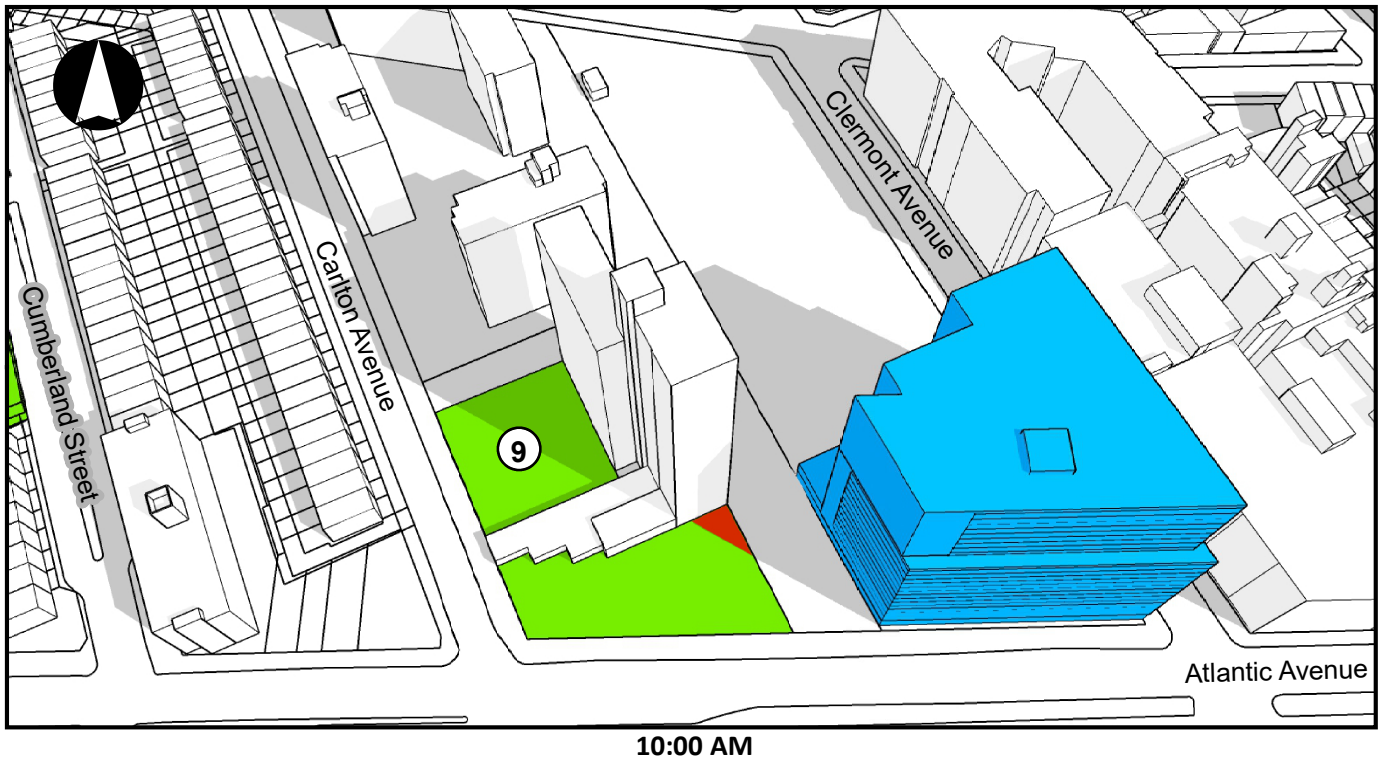

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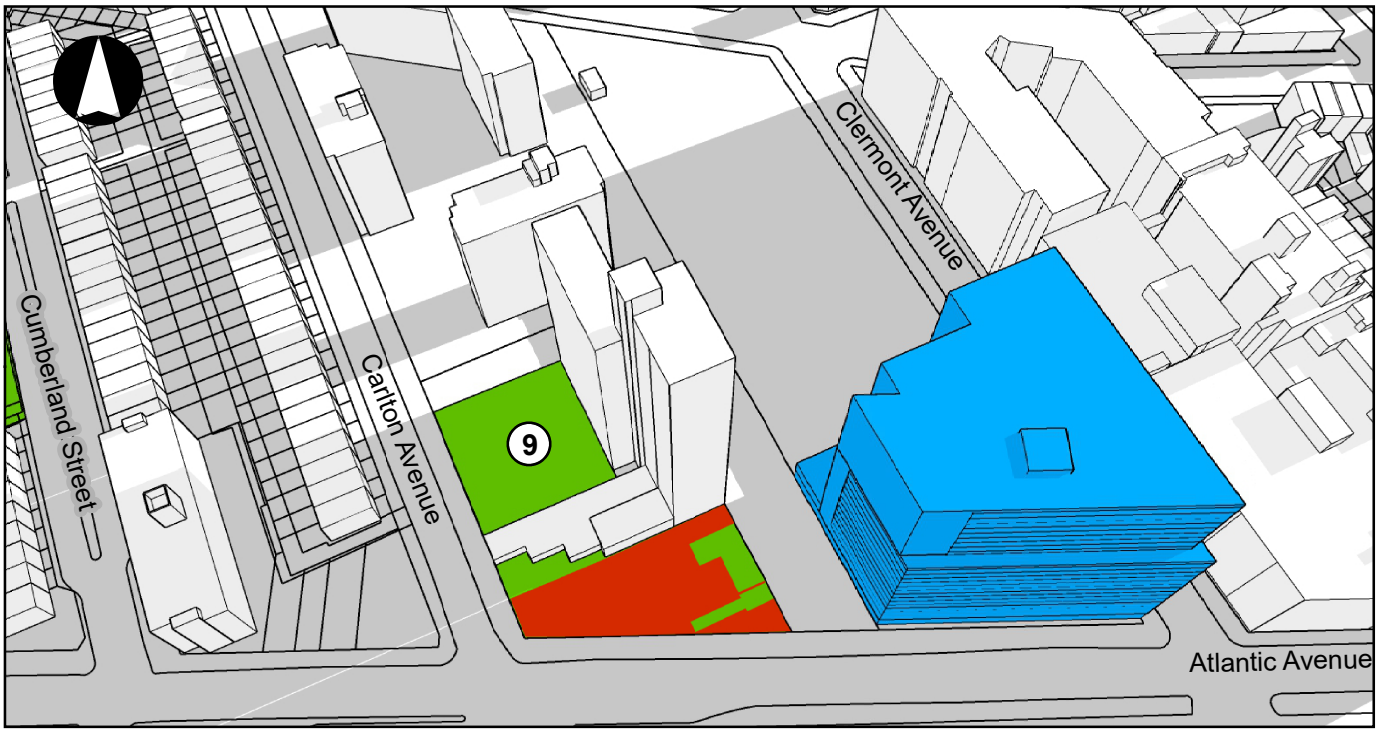
Projected Development Site

Project-Generated Incremental Shadow

9 Atlantic Terminal Playground

Atlantic Terminal Playground - May 6th/August 6th



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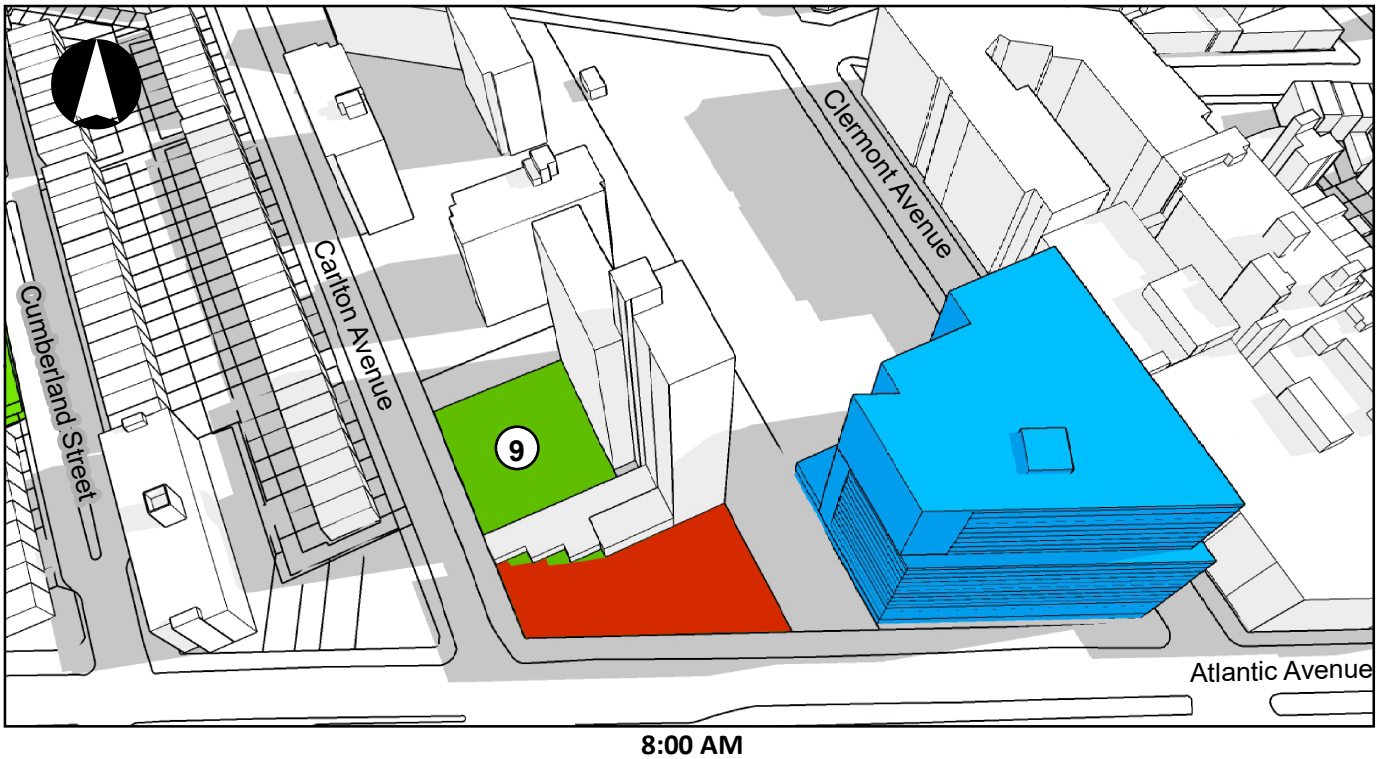

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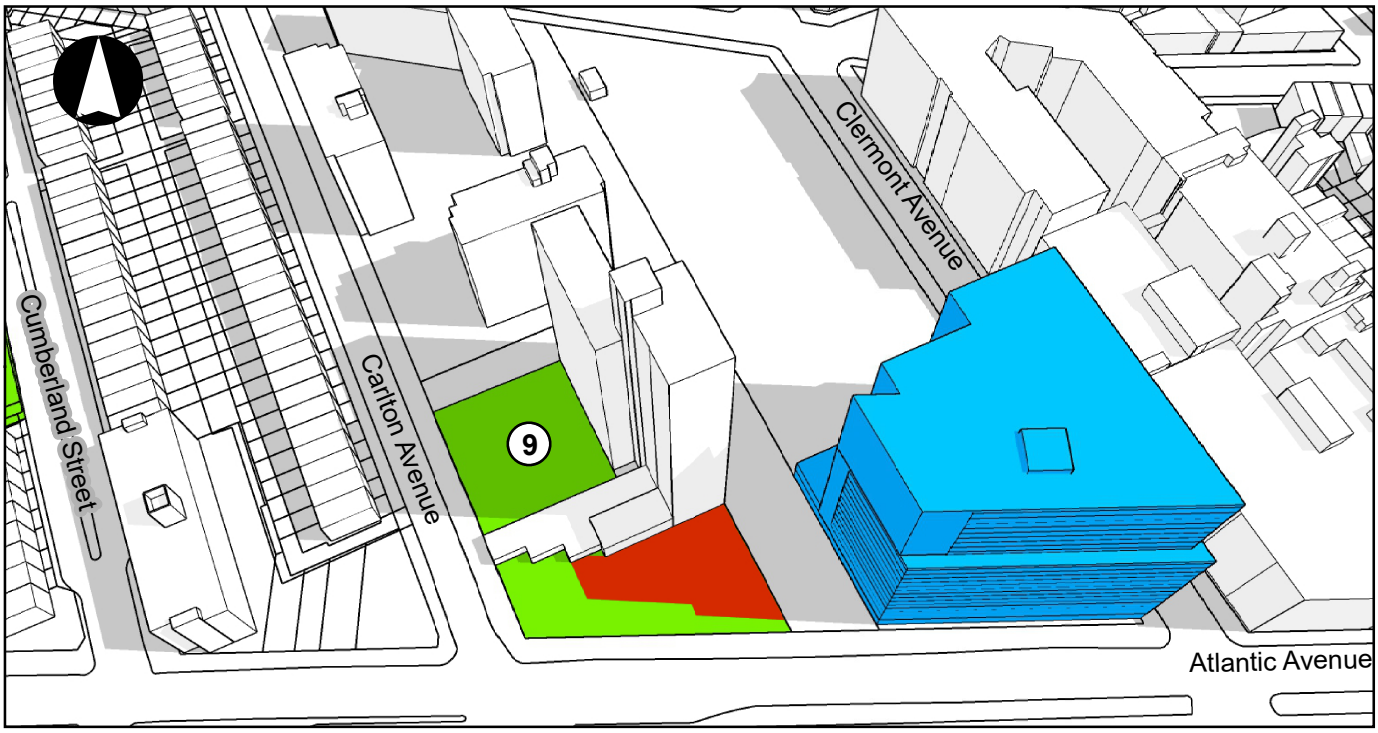
Projected Development Site

Project-Generated Incremental Shadow

9 Atlantic Terminal Playground

Atlantic Terminal Playground - May 6th/August 6th



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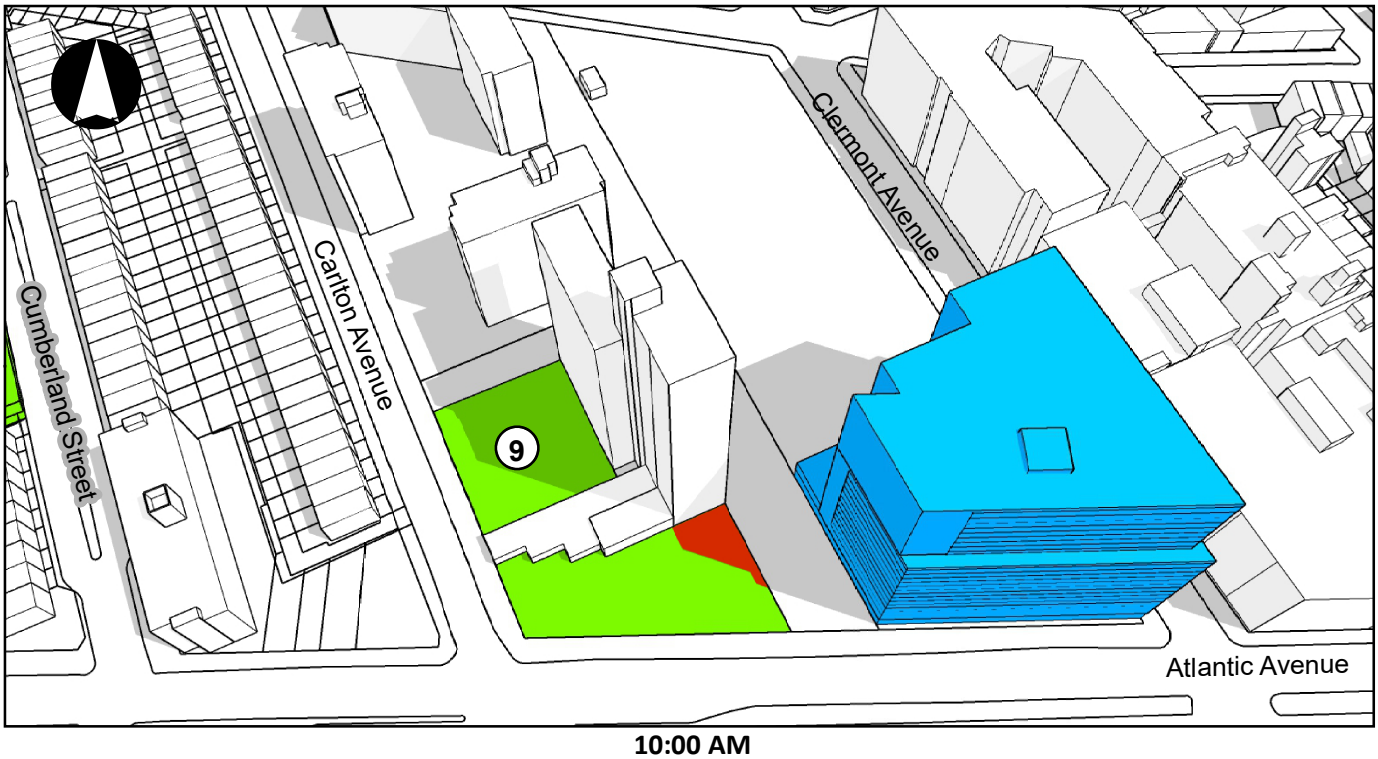

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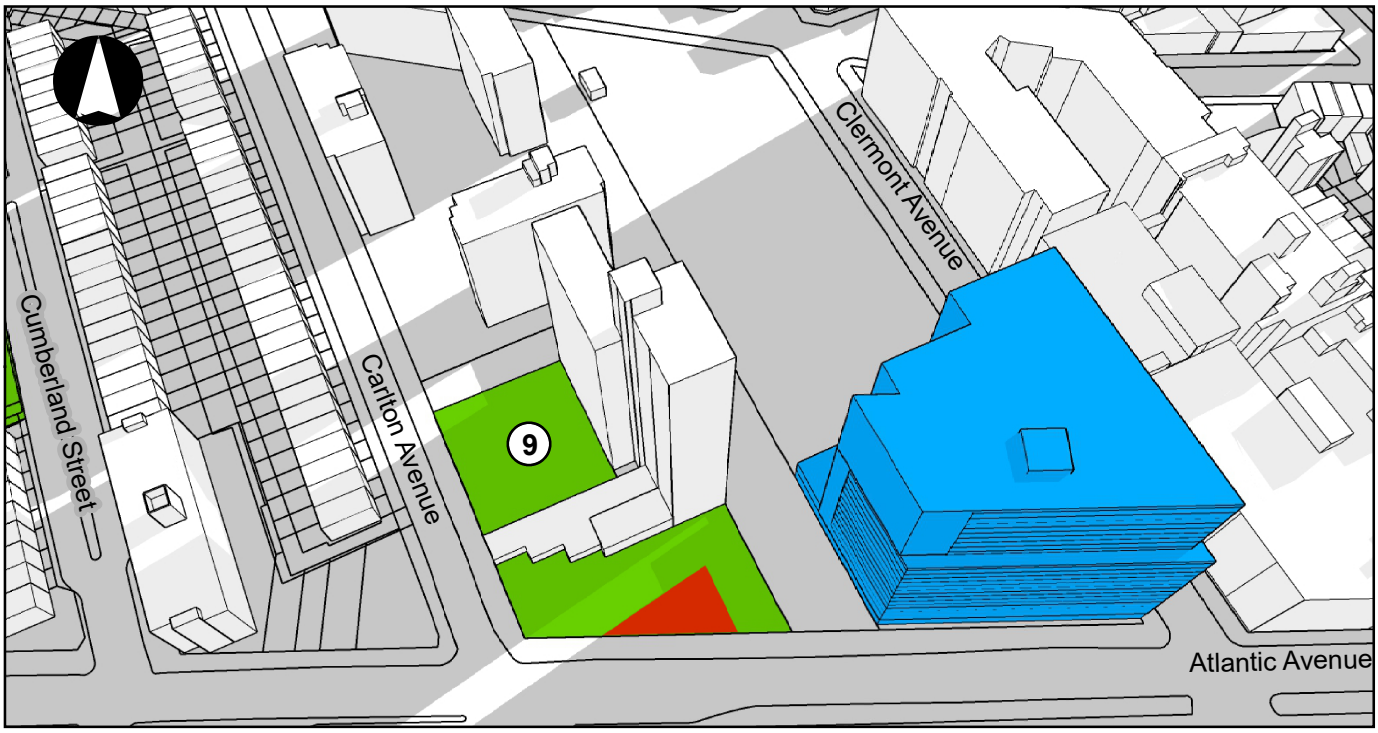
Projected Development Site

Project-Generated Incremental Shadow

9 Atlantic Terminal Playground

Atlantic Terminal Playground - June 21st



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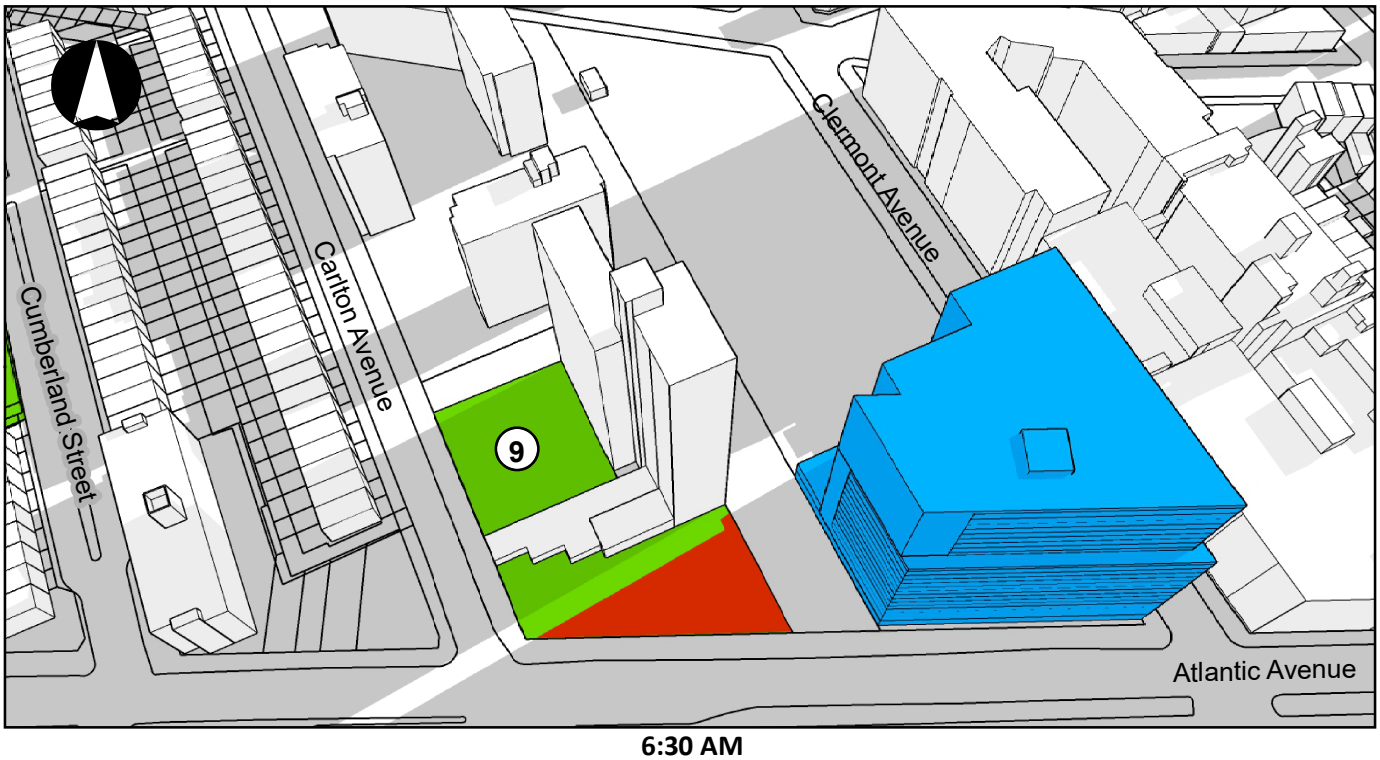

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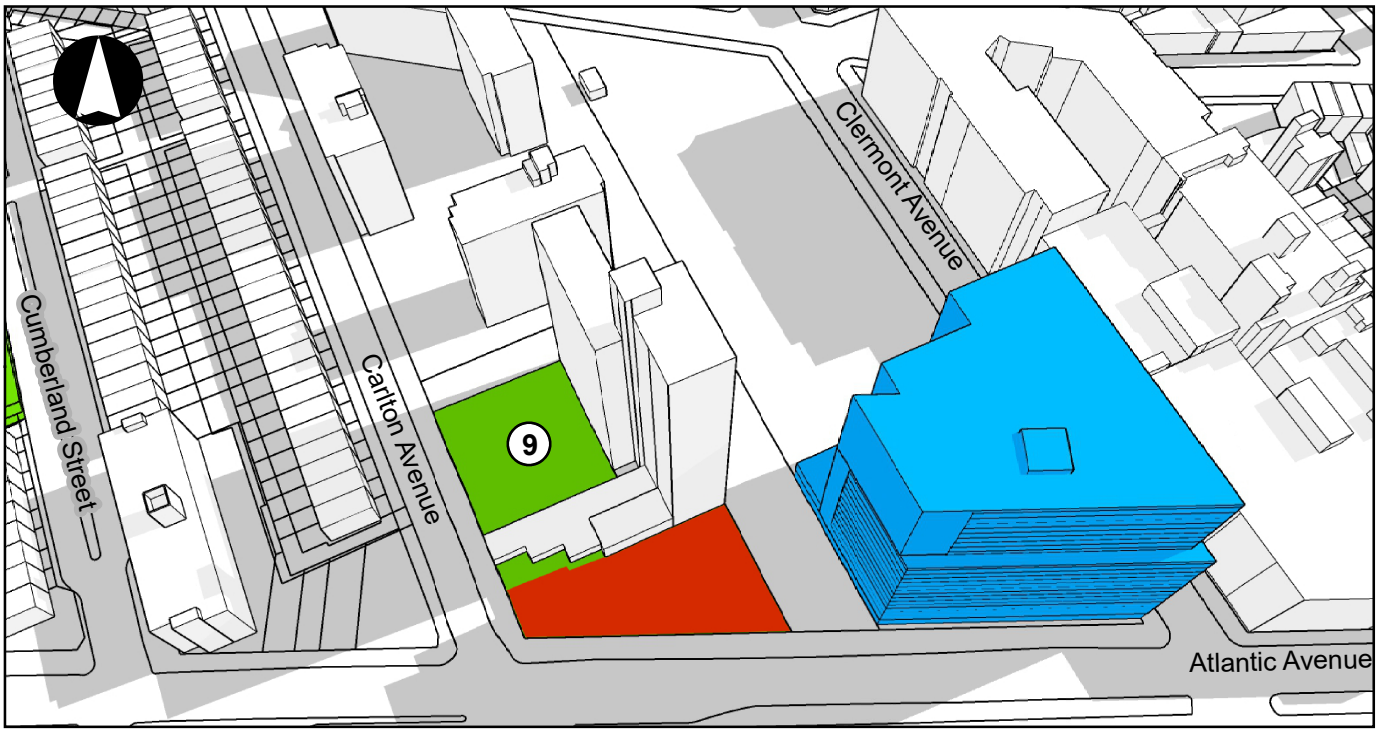
Projected Development Site

Project-Generated Incremental Shadow

9 Atlantic Terminal Playground

Atlantic Terminal Playground - June 21st



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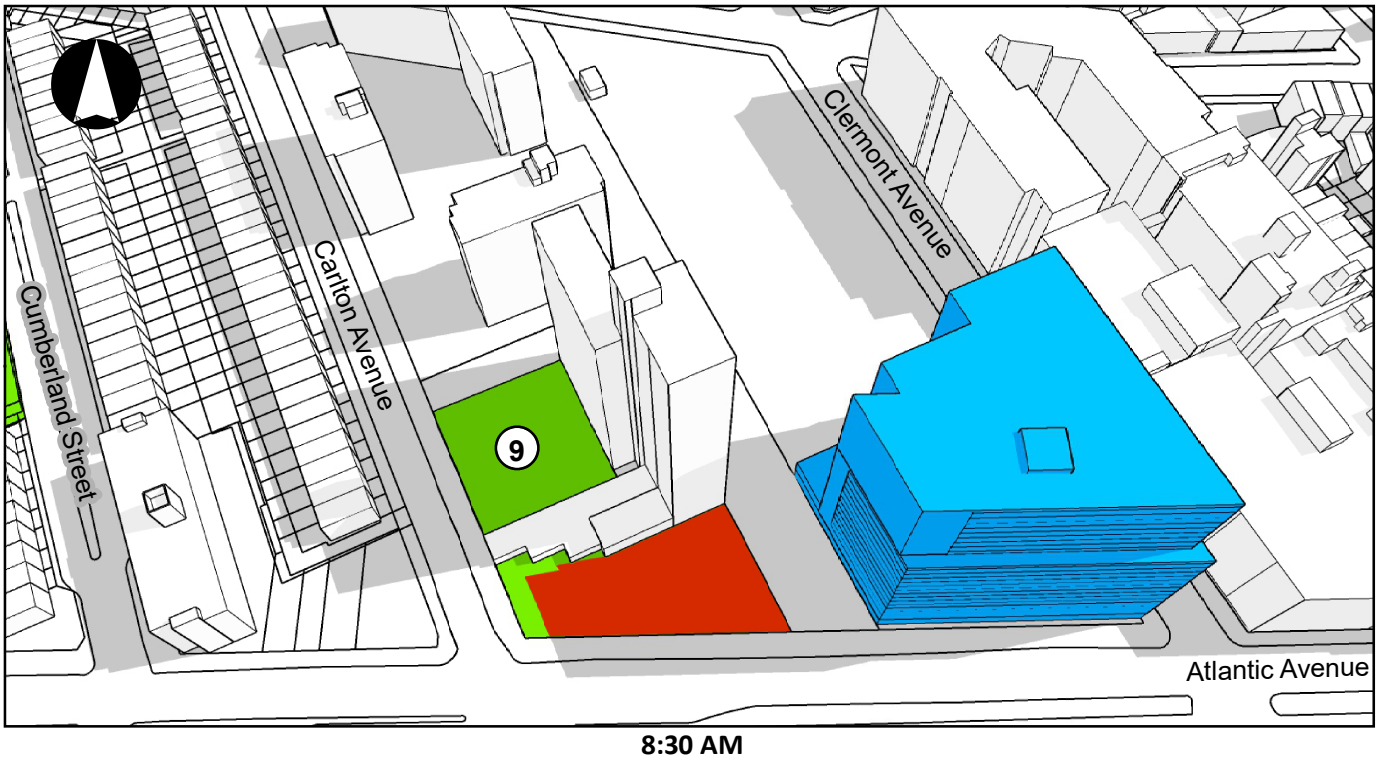

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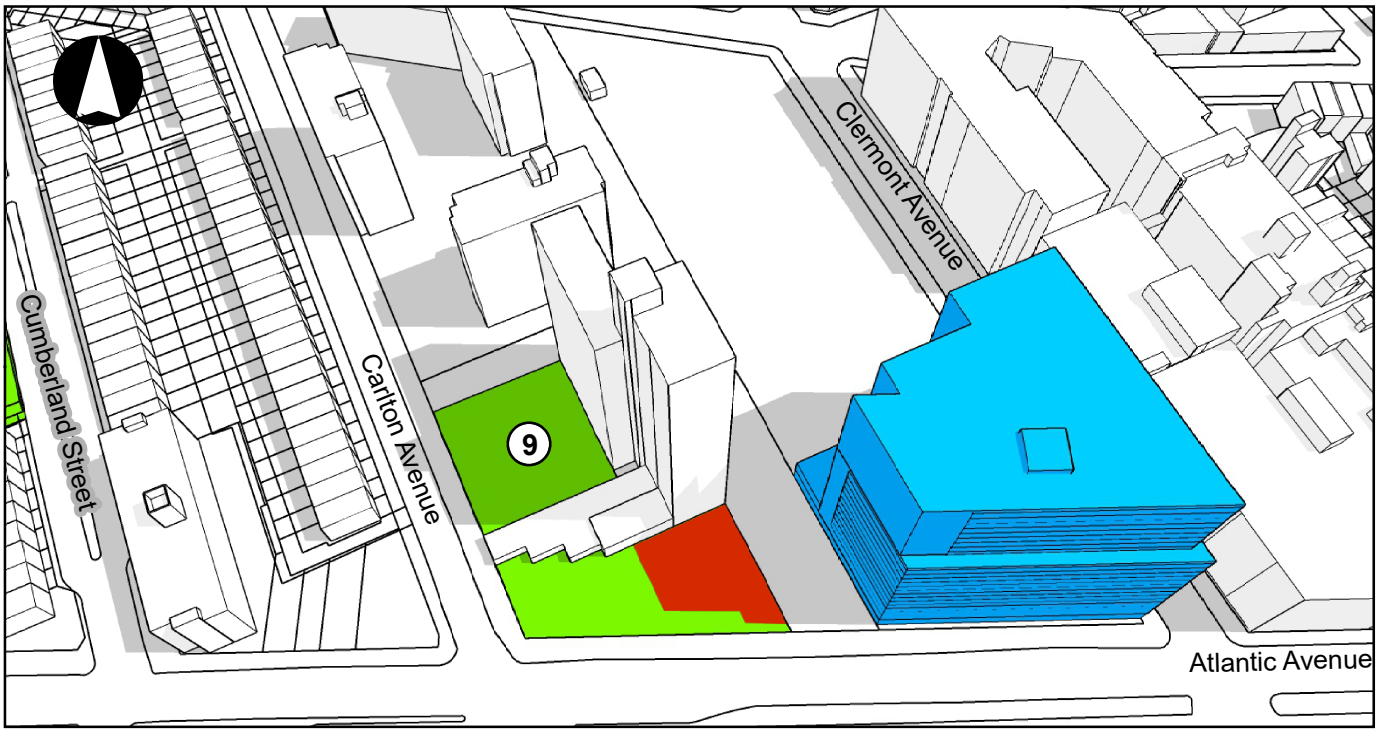
Projected Development Site

Project-Generated Incremental Shadow

9 Atlantic Terminal Playground

Atlantic Terminal Playground - June 21st



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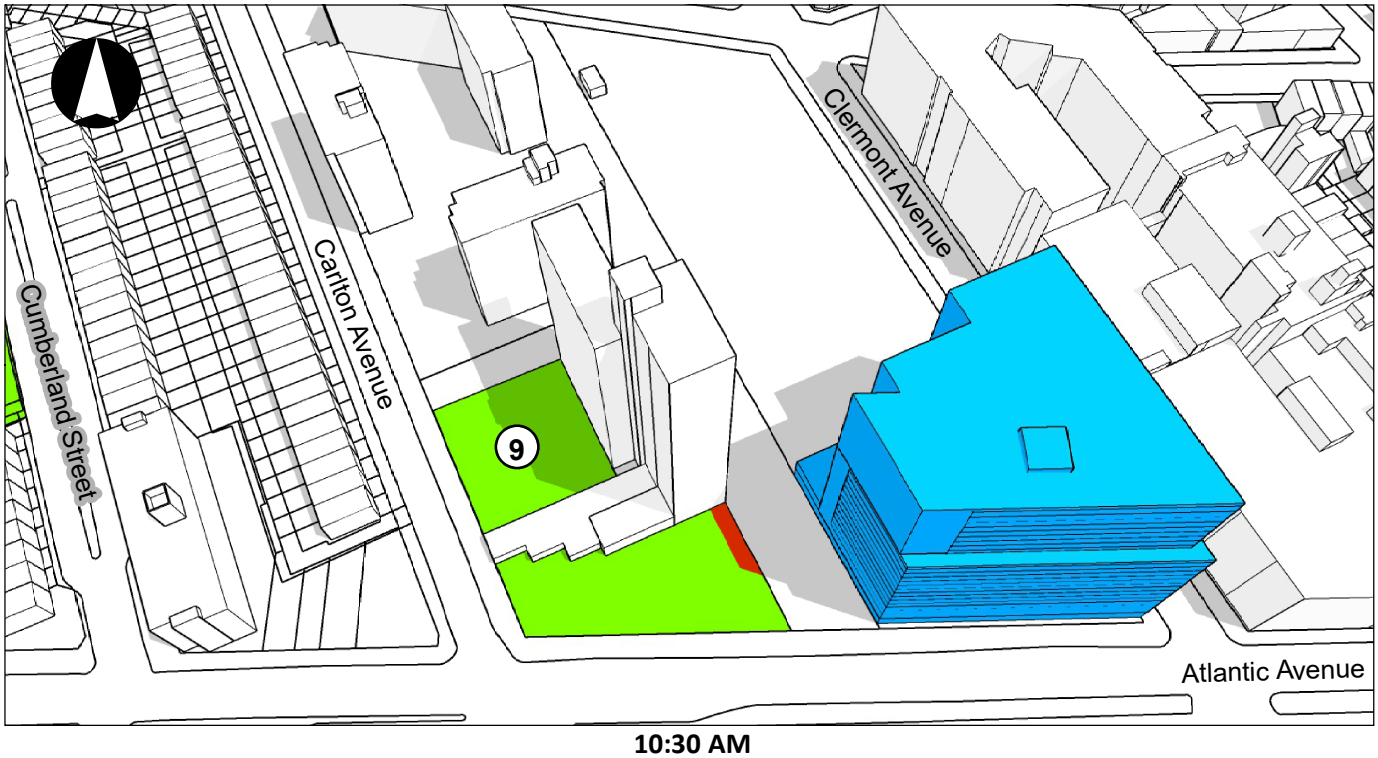

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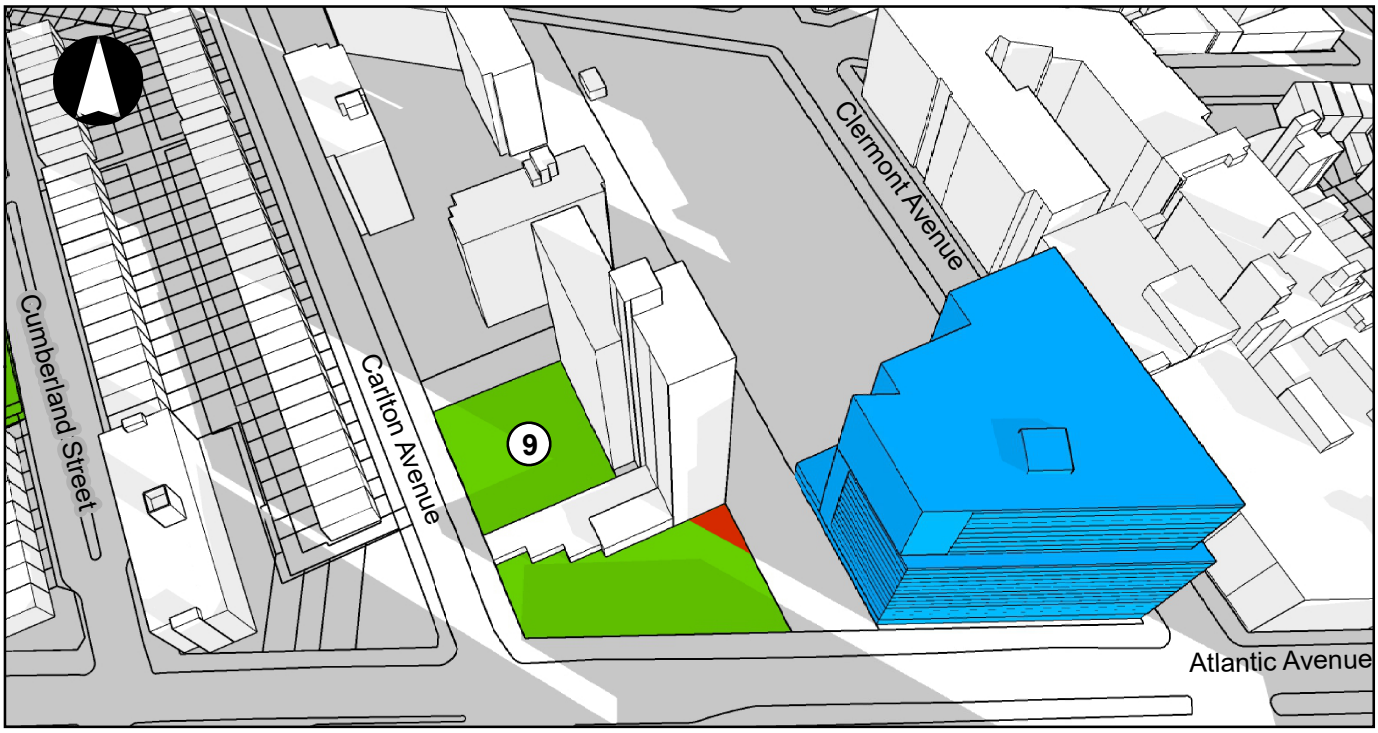
Projected Development Site

Project-Generated Incremental Shadow

9 Atlantic Terminal Playground

Atlantic Terminal Playground - December 21st



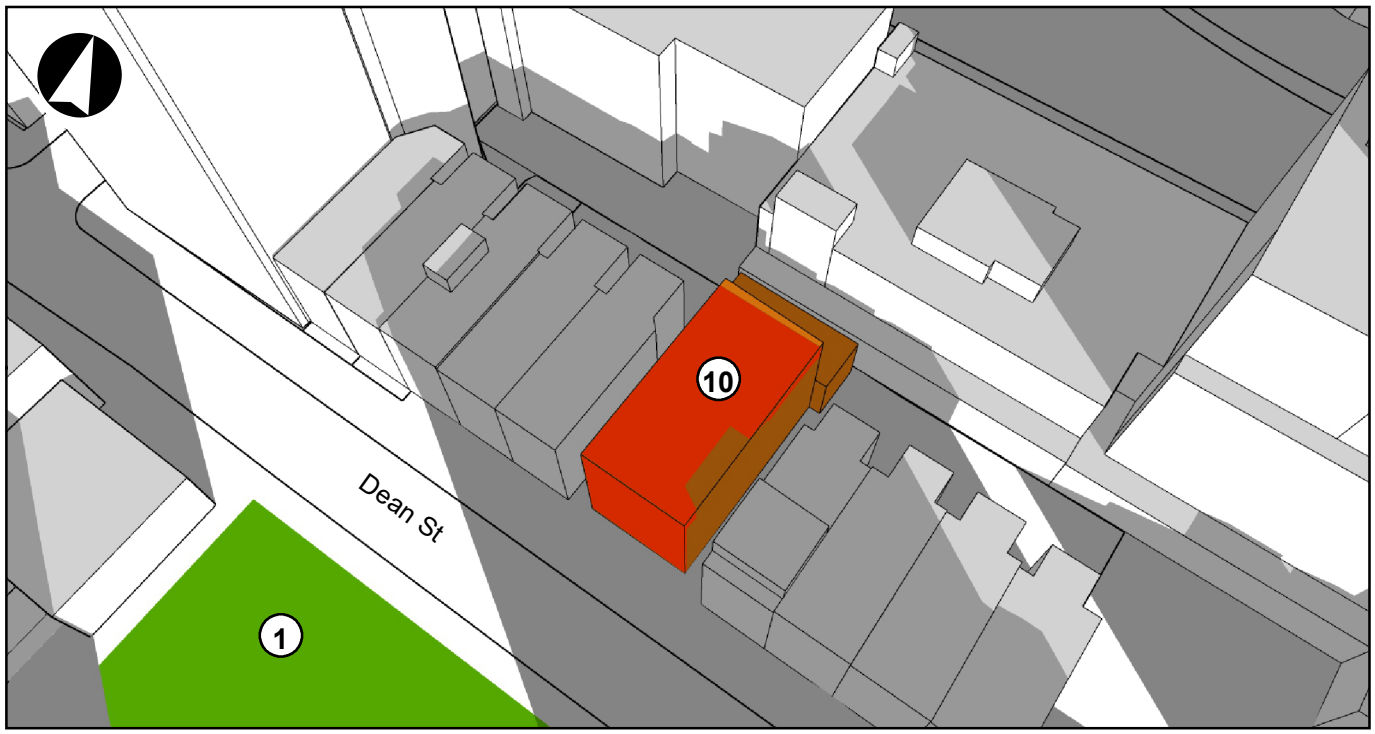
8:51 **AM**

Projected Development Site

Project-Generated Incremental Shadow

9 Atlantic Terminal Playground

Temple of Restoration - December 21st



8:51 AM



10:00 AM

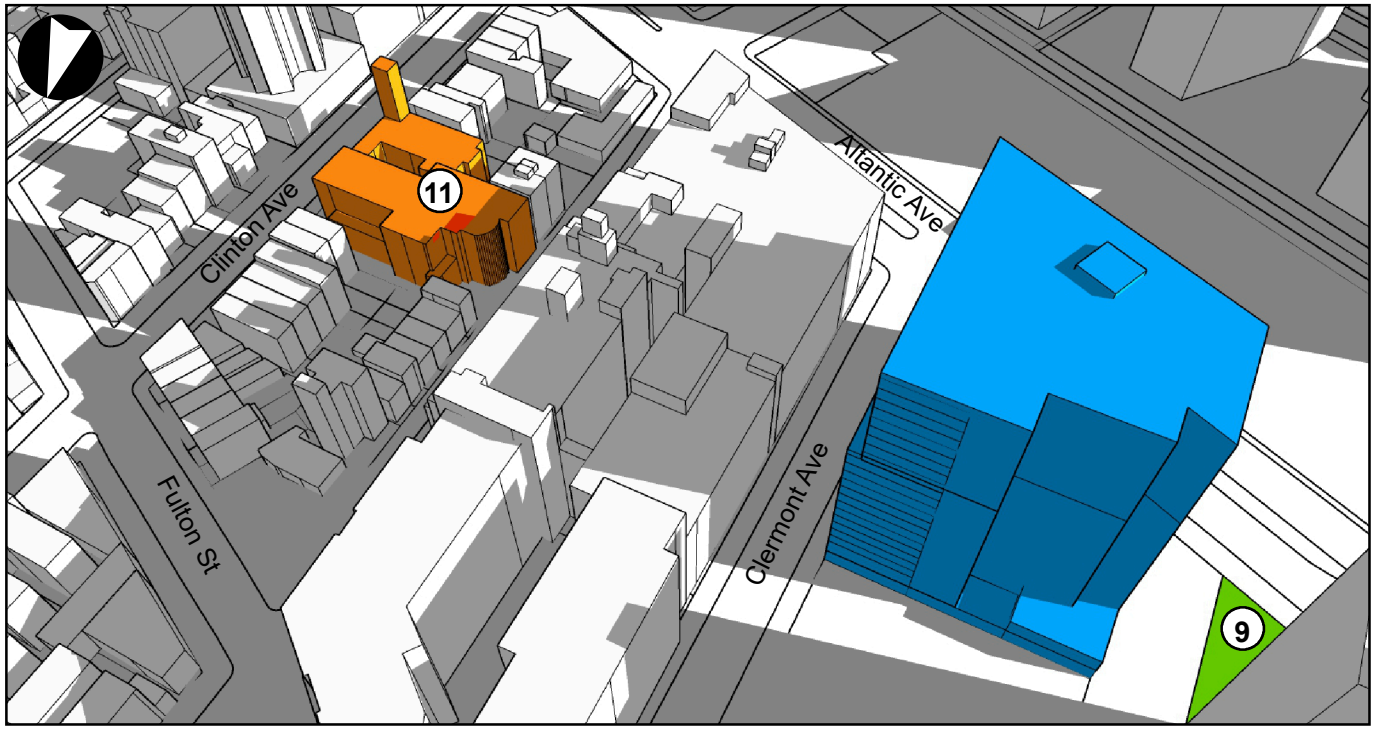
10 Temple of Restoration

1 Dean Playground

Project-Generated Incremental Shadow


Temple of Restoration
Zipcar
Google Earth
Image Landsat / Copernicus
N
30 ft

The Church of St. Luke and St. Matthew - March 21/September 21



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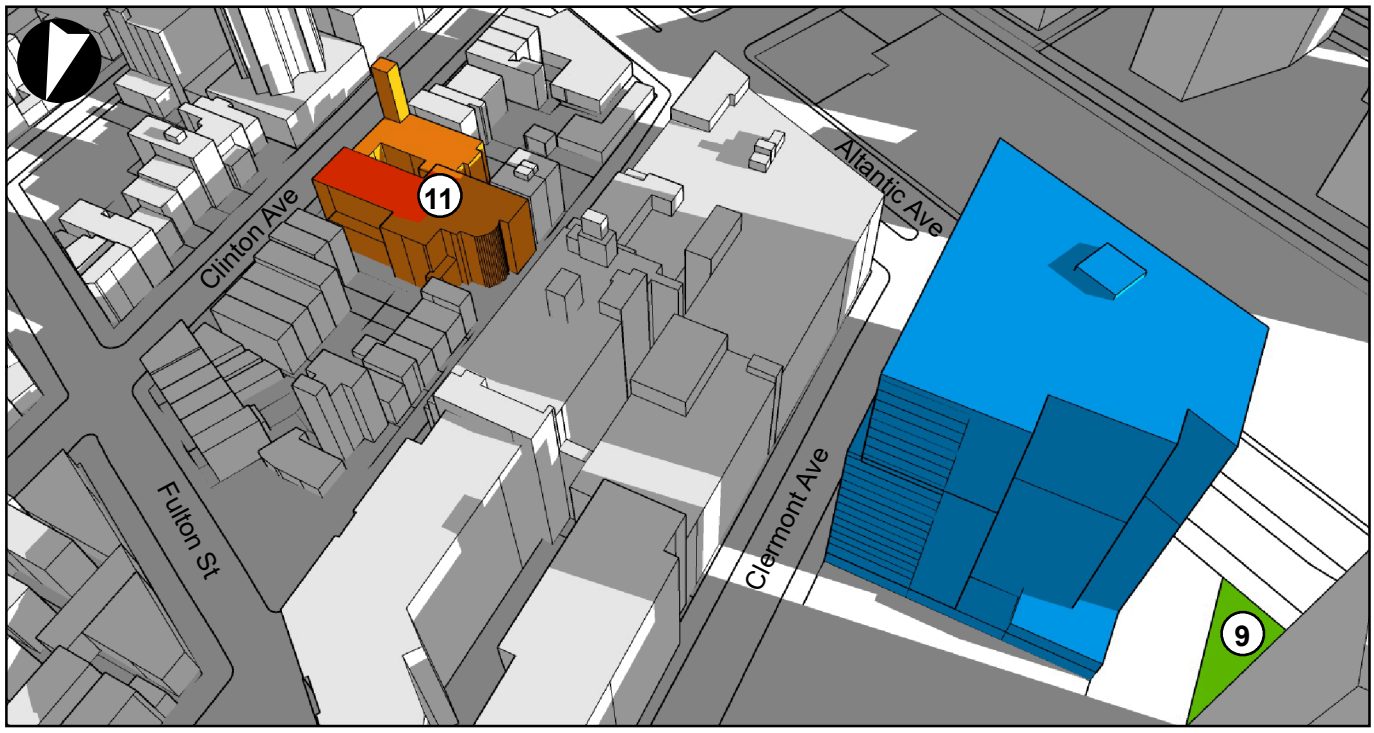


4:29 PM

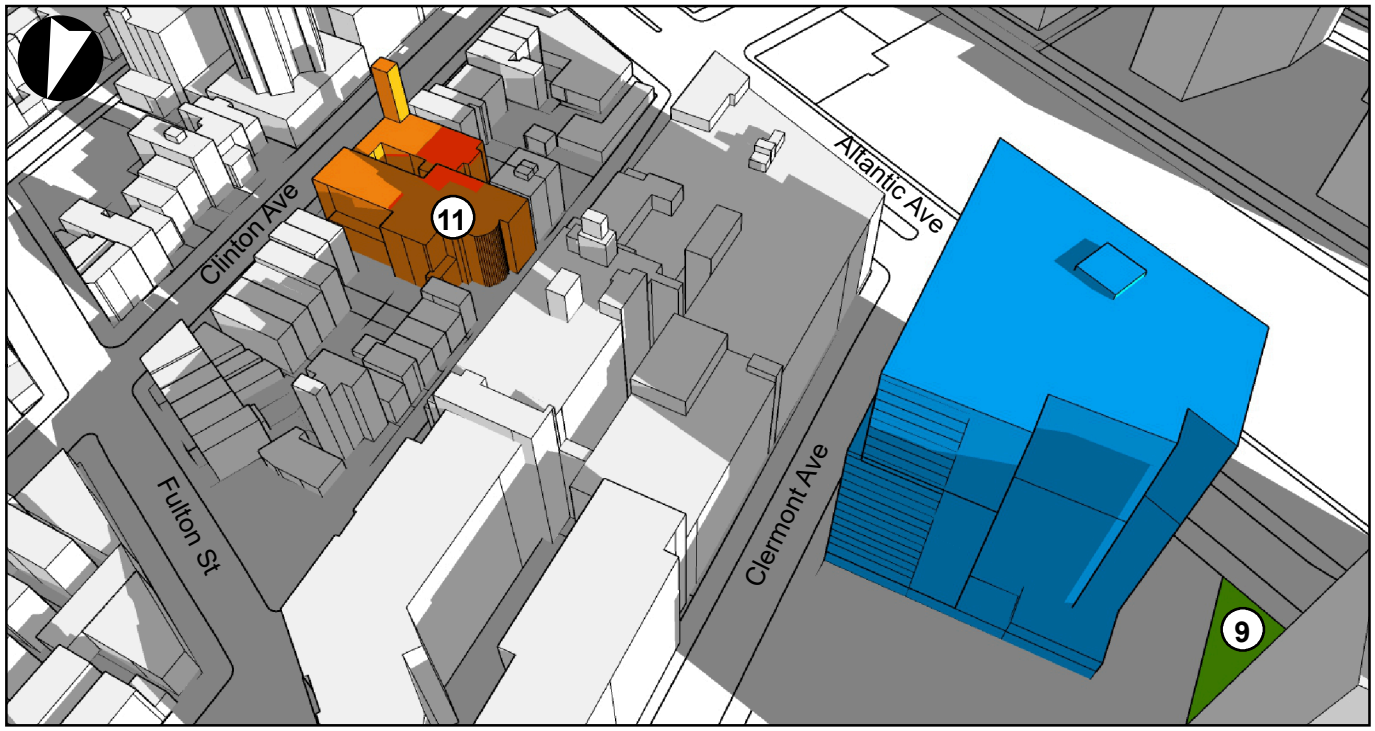
Projected Development Site

9 Atlantic Terminal Playground

11 St. Luke's Protestant Episcopal Church

Project-Generated Incremental Shadow

The Church of St. Luke and St. Matthew - May 6th/August 6th



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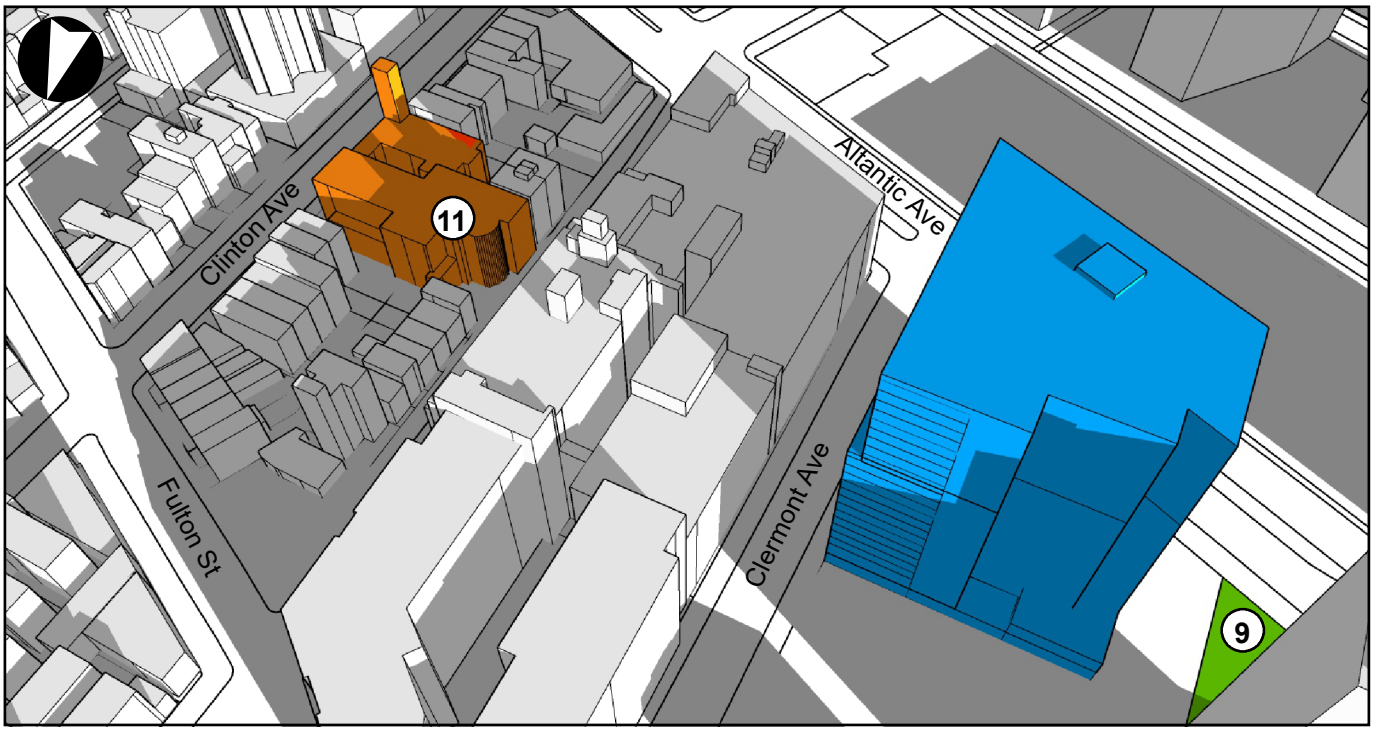
Projected Development Site

9 Atlantic Terminal Playground

11 St. Luke's Protestant Episcopal Church

Project-Generated Incremental Shadow

The Church of St. Luke and St. Matthew - June 21st



5:45 PM

Projected Development Site

11 St. Luke's Protestant Episcopal Church

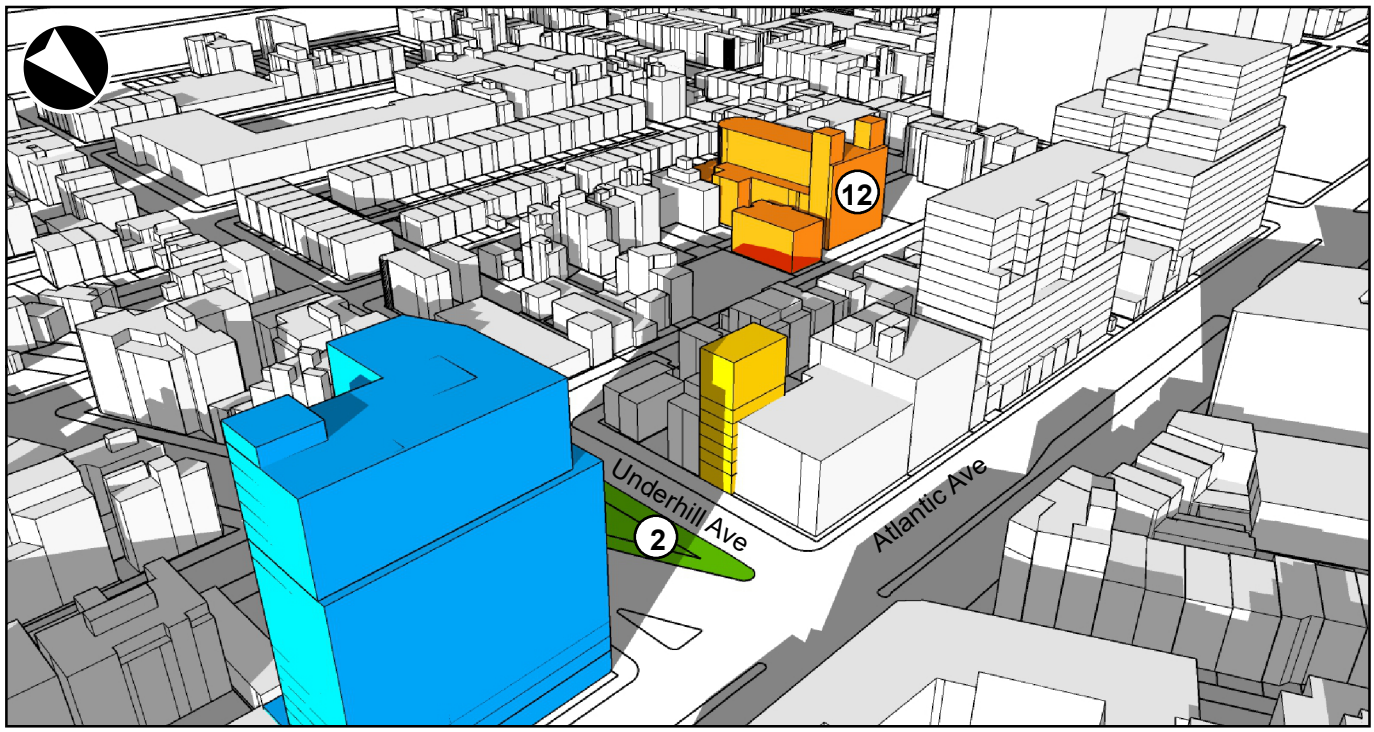
9 Atlantic Terminal Playground

Project-Generated Incremental Shadow



Figure 6-12d
St. Luke's Protestant Episcopal Church - Detailed View

Co-Cathedral of St. Joseph & St Teresa of Avila - May 6/August 6



6:27 AM

Projected Development Site

Potential Development Site

12 Co-Cathedral of St. Joseph & St Teresa of Avila

2 Lowry Triangle

Project-Generated Incremental Shadow

Co-Cathedral of St. Joseph & St Teresa of Avila - June 21



5:57 AM

Projected Development Site

Potential Development Site

12 Co-Cathedral of St. Joseph & St Teresa of Avila

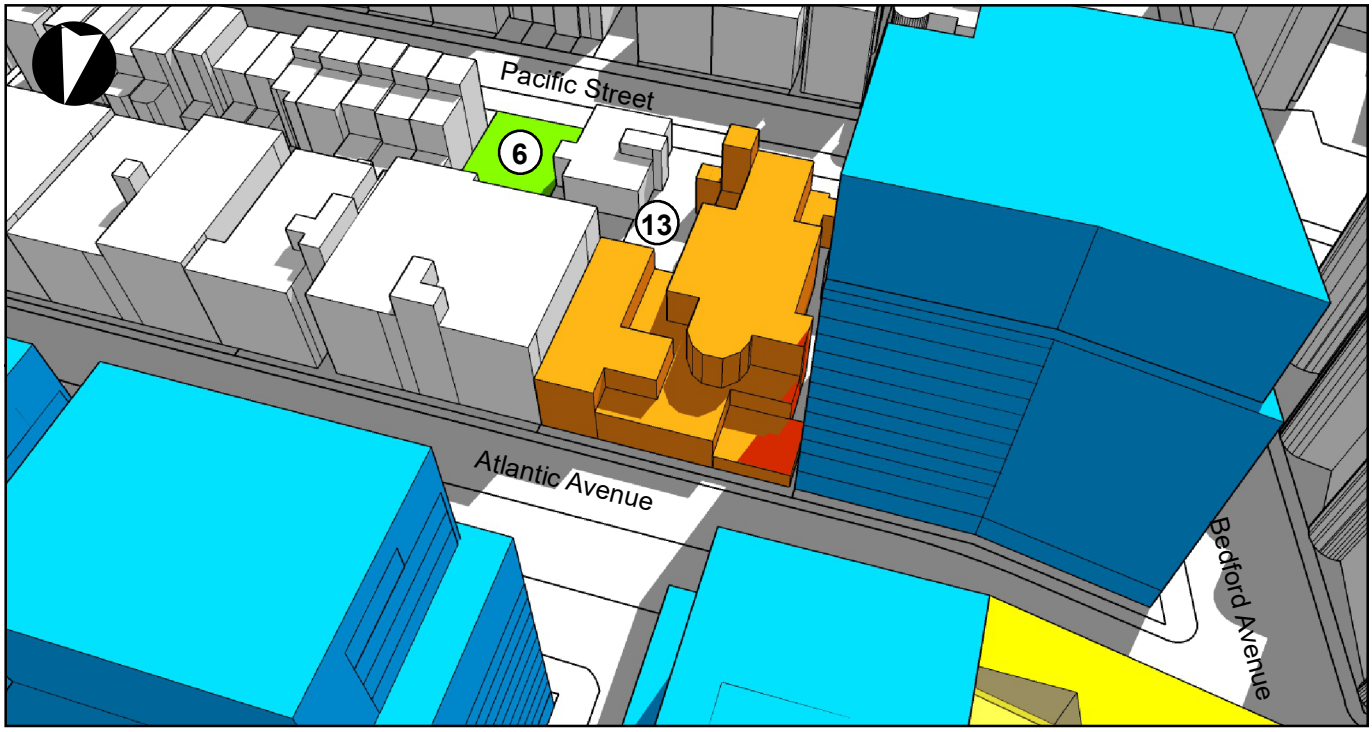
2 Lowry Triangle

Project-Generated Incremental Shadow



Figure 6-13c
Co-Cathedral of St. Joseph and St. Teresa of Avila- Detailed View

Saint Bartholomew's Church - March 21st/September 21st



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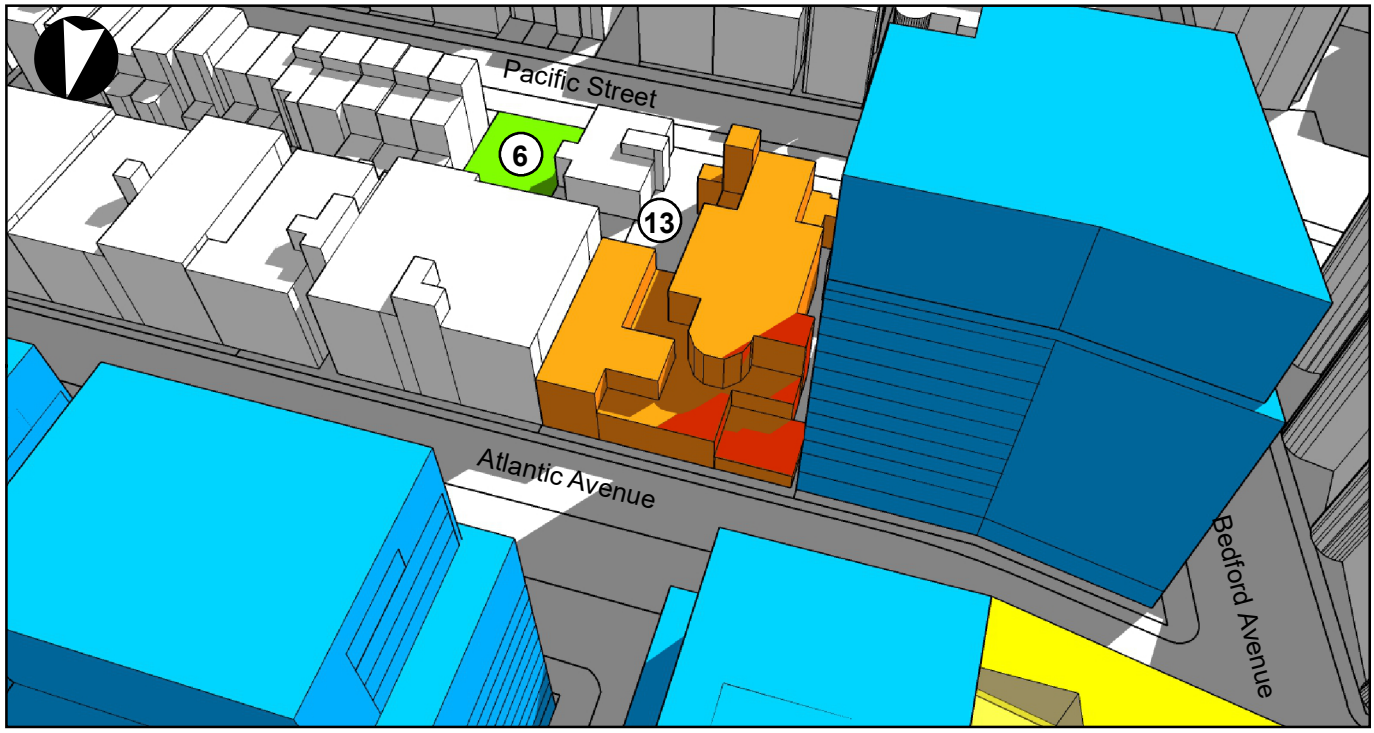


2:00 PM

Projected Development Site

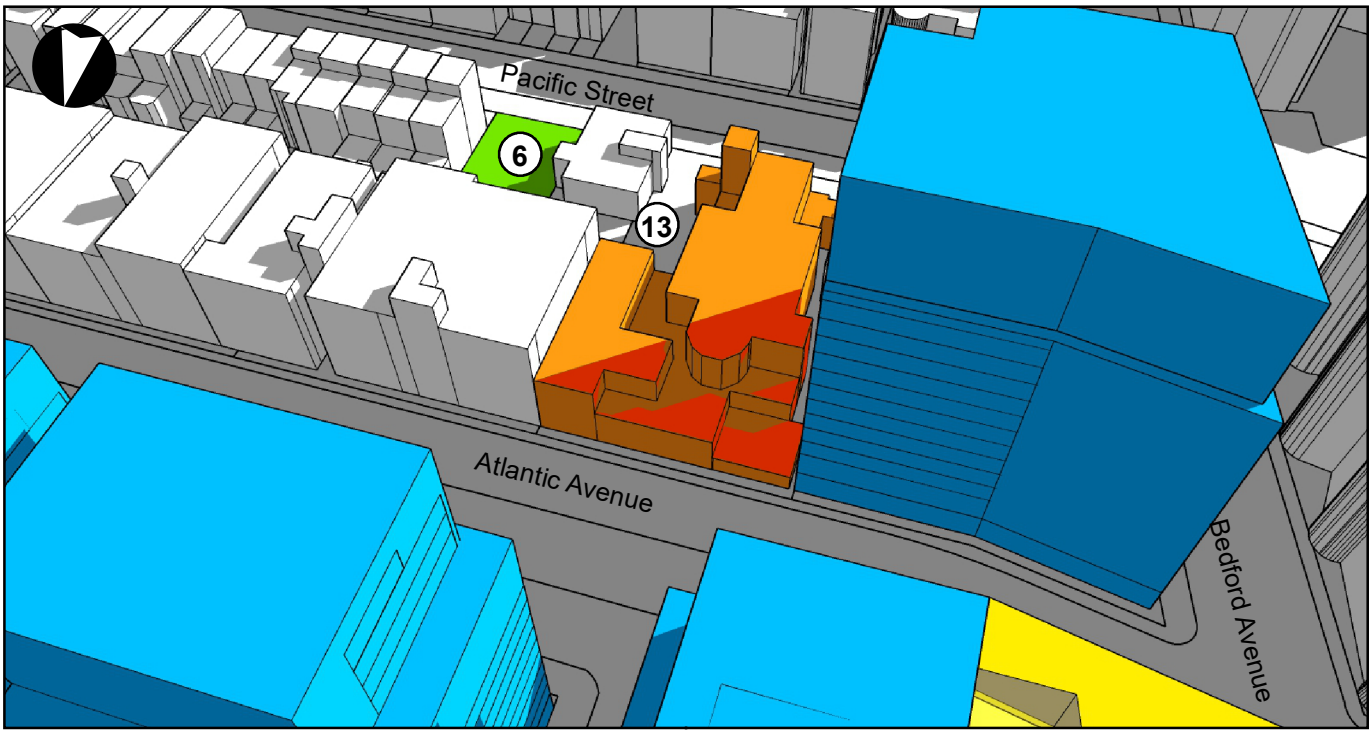
Potential Development Site

13 Saint Bartholomew's Church

6 Westbrook Memorial Garden

Project-Generated Incremental Shadow

Saint Bartholomew's Church - March 21st/September 21st



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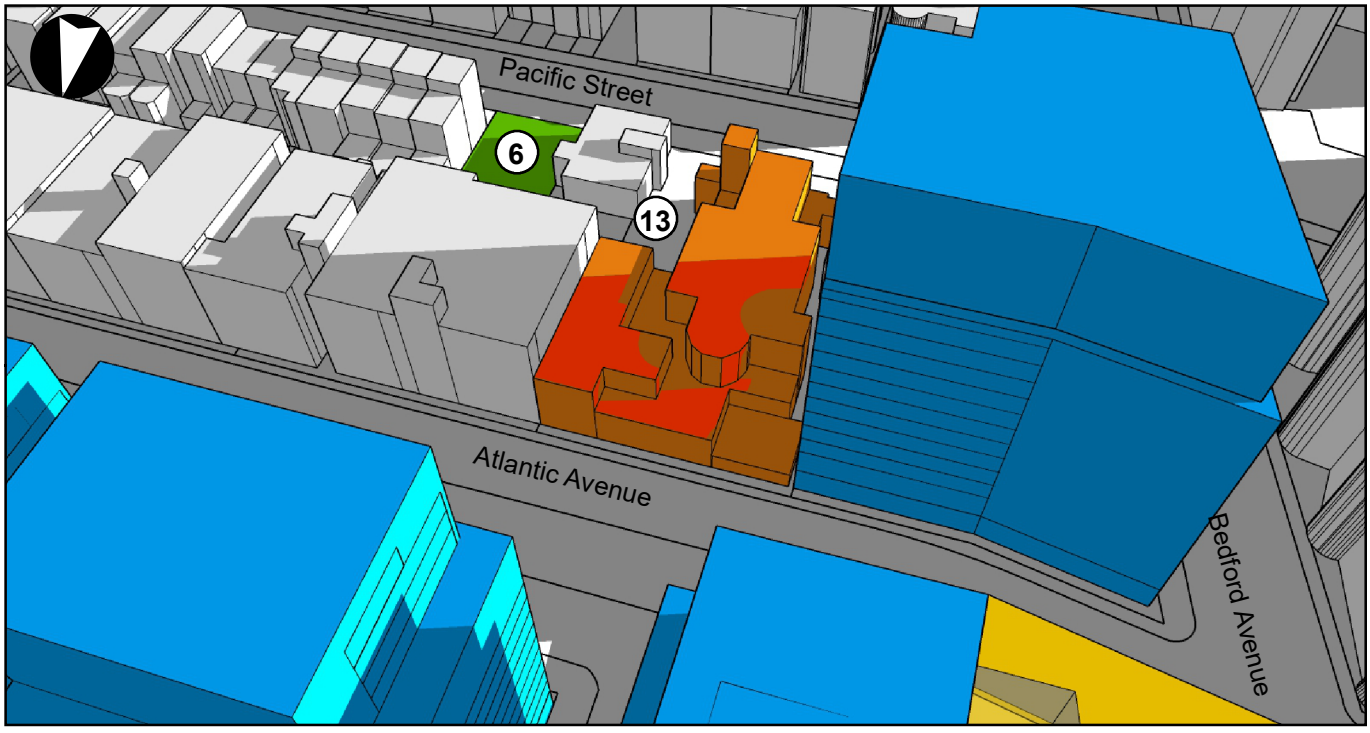


4:29 PM

Projected Development Site

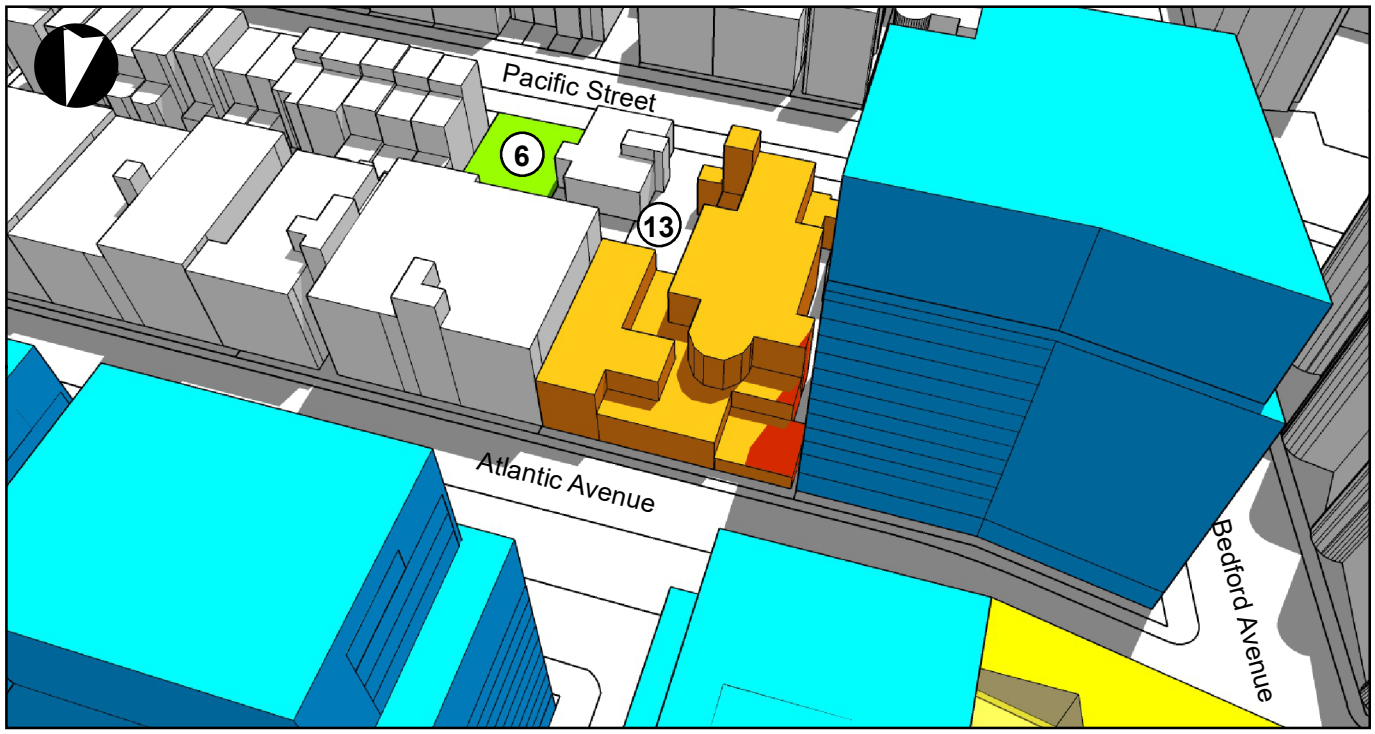
Potential Development Site

13 Saint Bartholomew's Church

6 Westbrook Memorial Garden

Project-Generated Incremental Shadow

Figure 6-14c
Saint Bartholomew's Church - May 6th/August 6th



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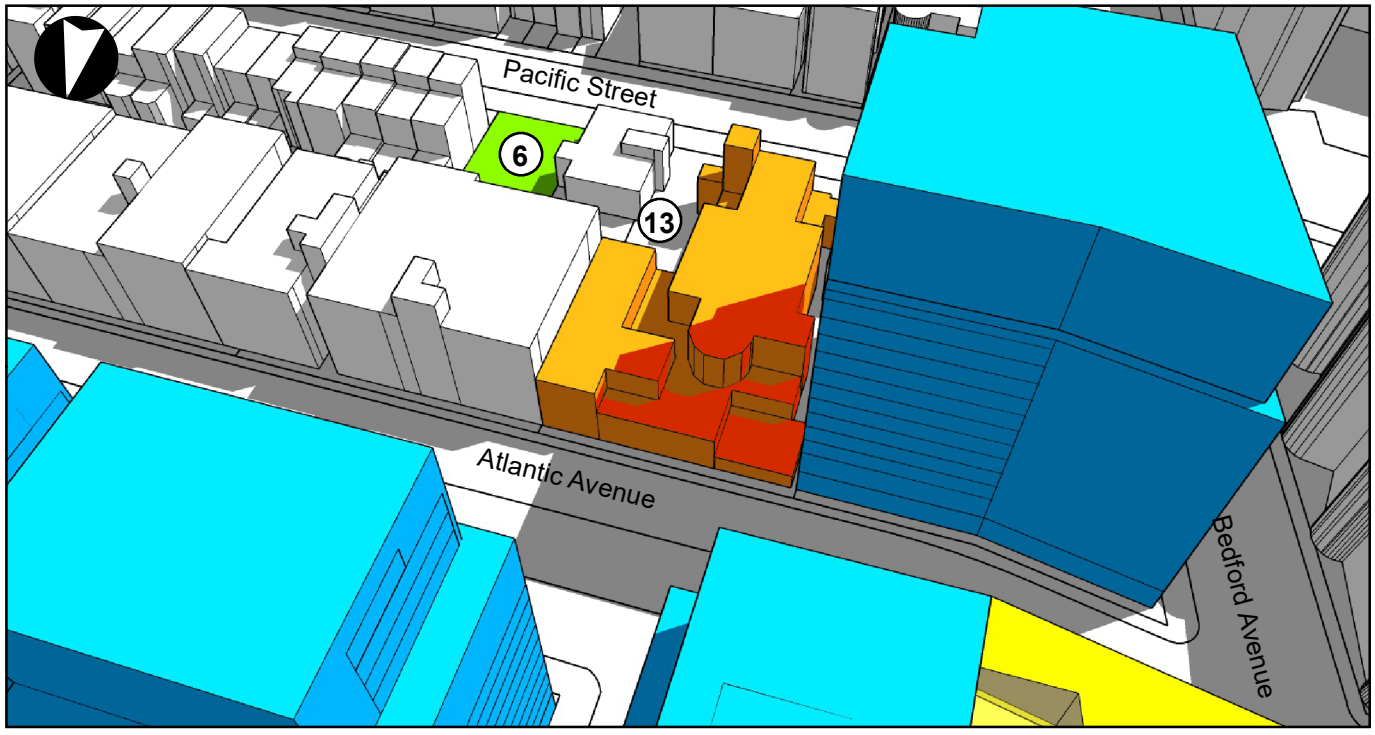
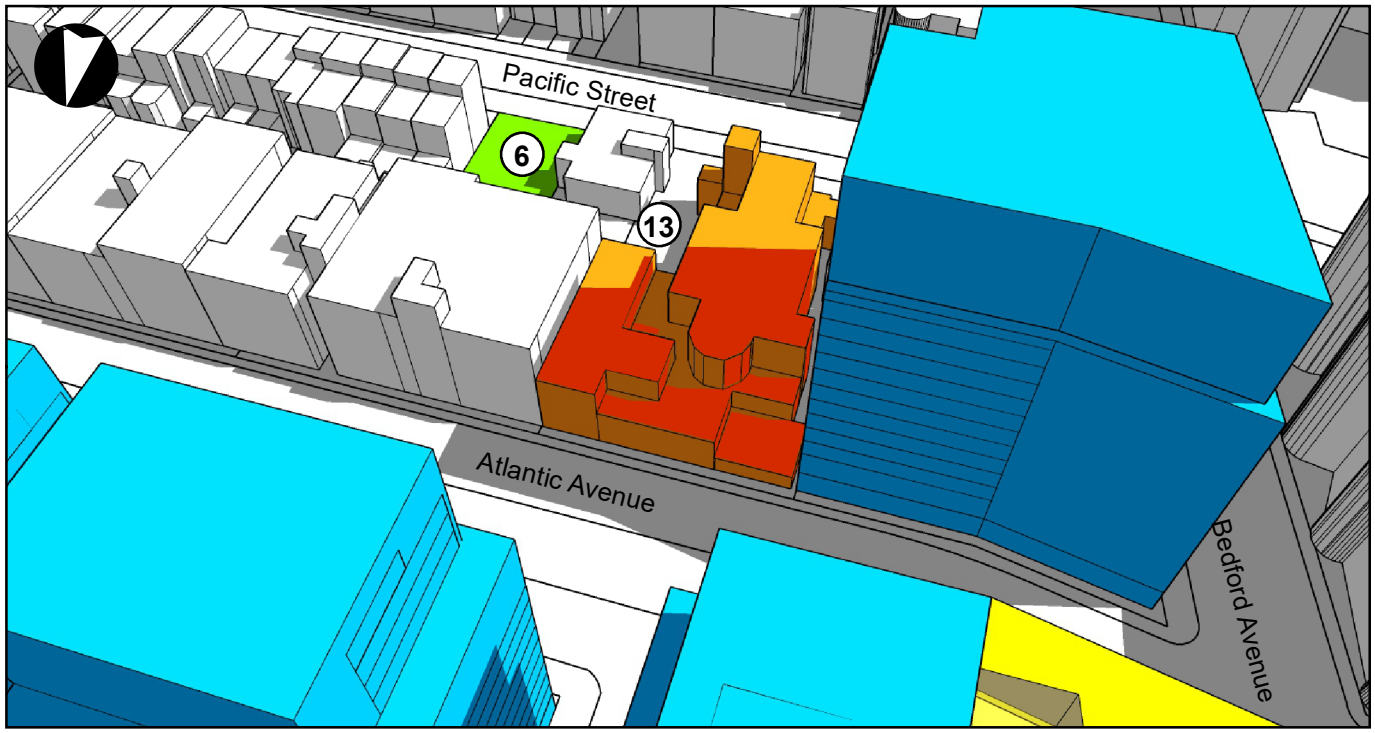


2:00 PM

Projected Development Site
Potential Development Site
13 Saint Bartholomew's Church
6 Westbrook Memorial Garden
Project-Generated Incremental Shadow

Figure 6-14d
Saint Bartholomew's Church - May 6th/August 6th



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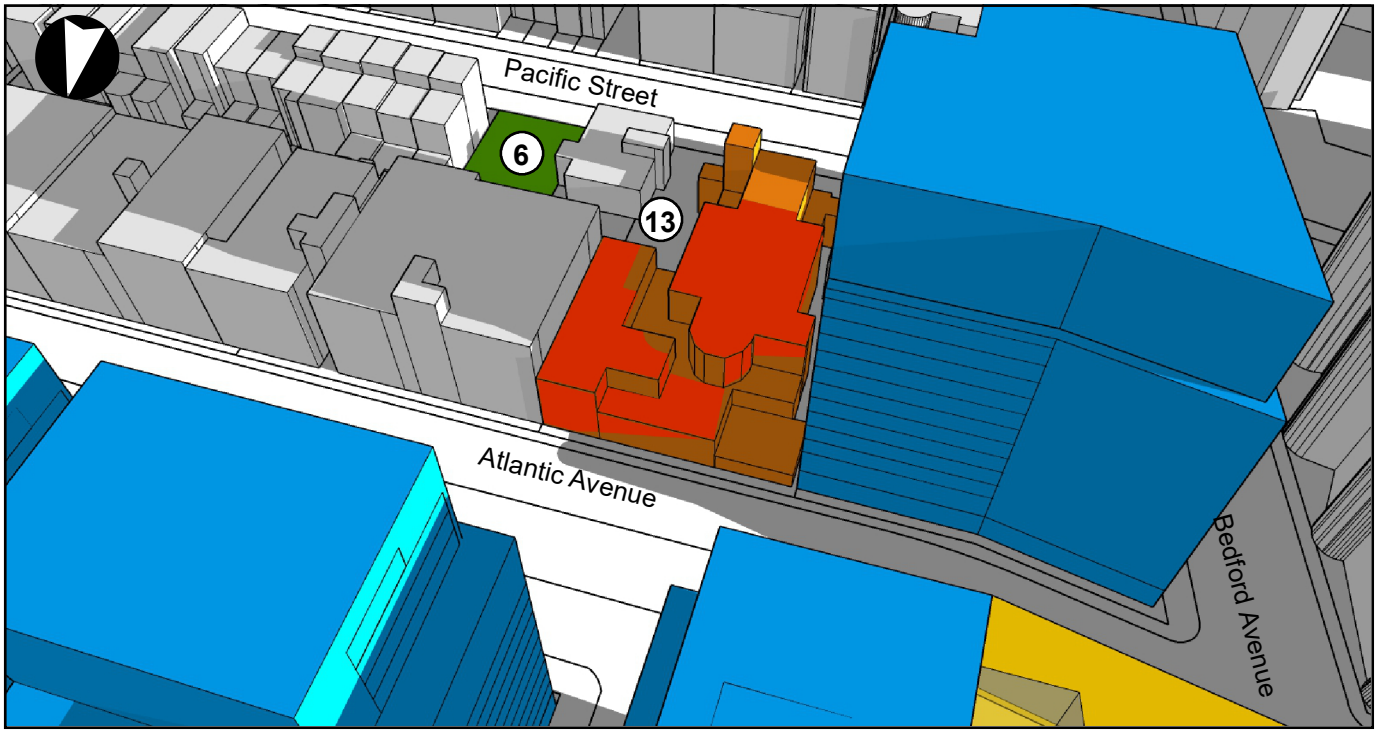
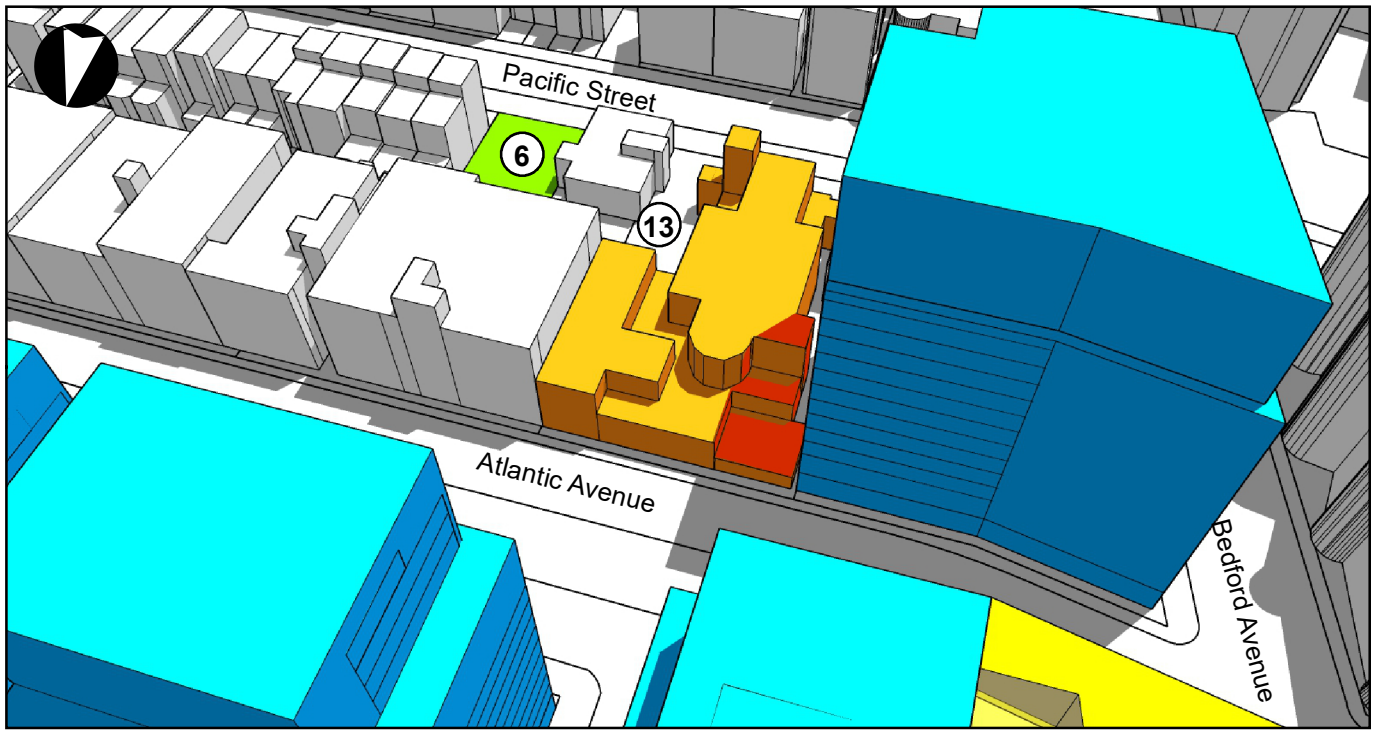


5:18 PM

Projected Development Site
Potential Development Site
13 Saint Bartholomew's Church
6 Westbrook Memorial Garden
Project-Generated Incremental Shadow

Figure 6-14e
Saint Bartholomew's Church - June 21st



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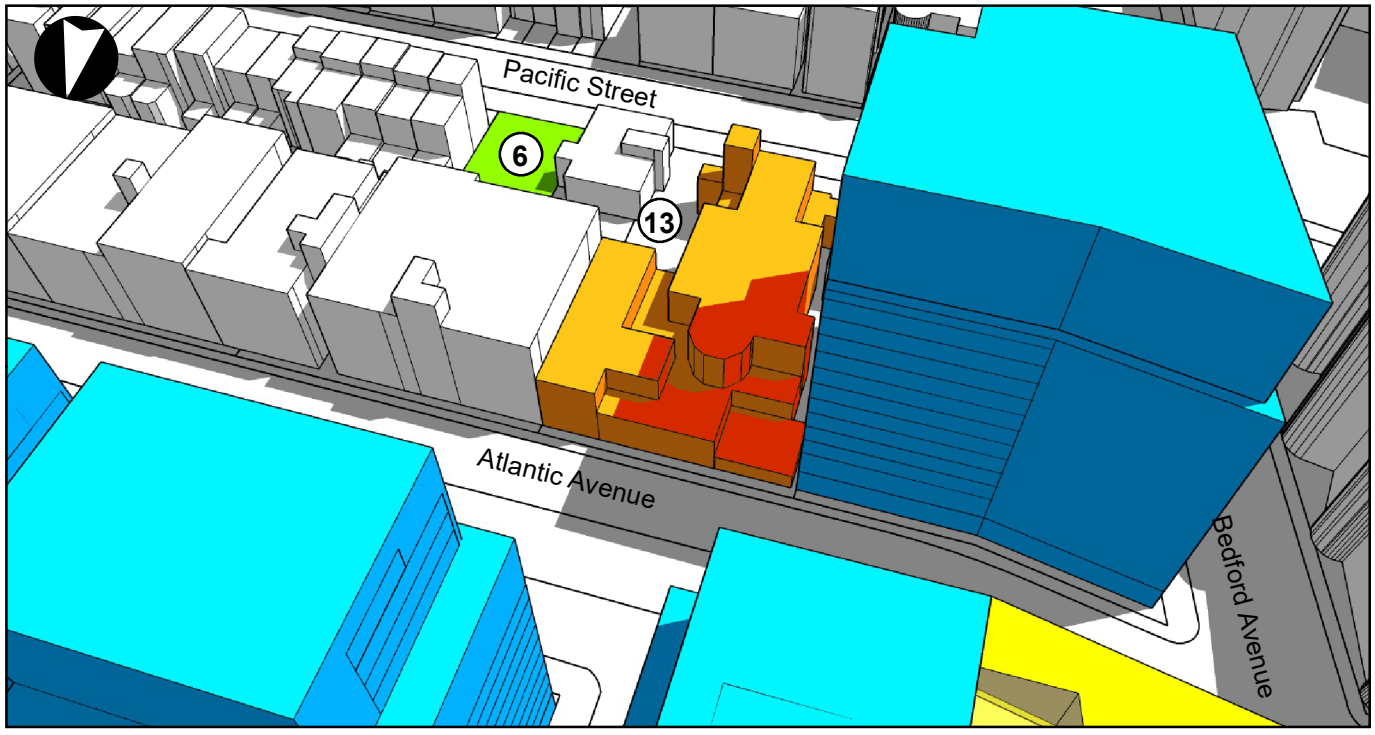


2:00 PM

Projected Development Site

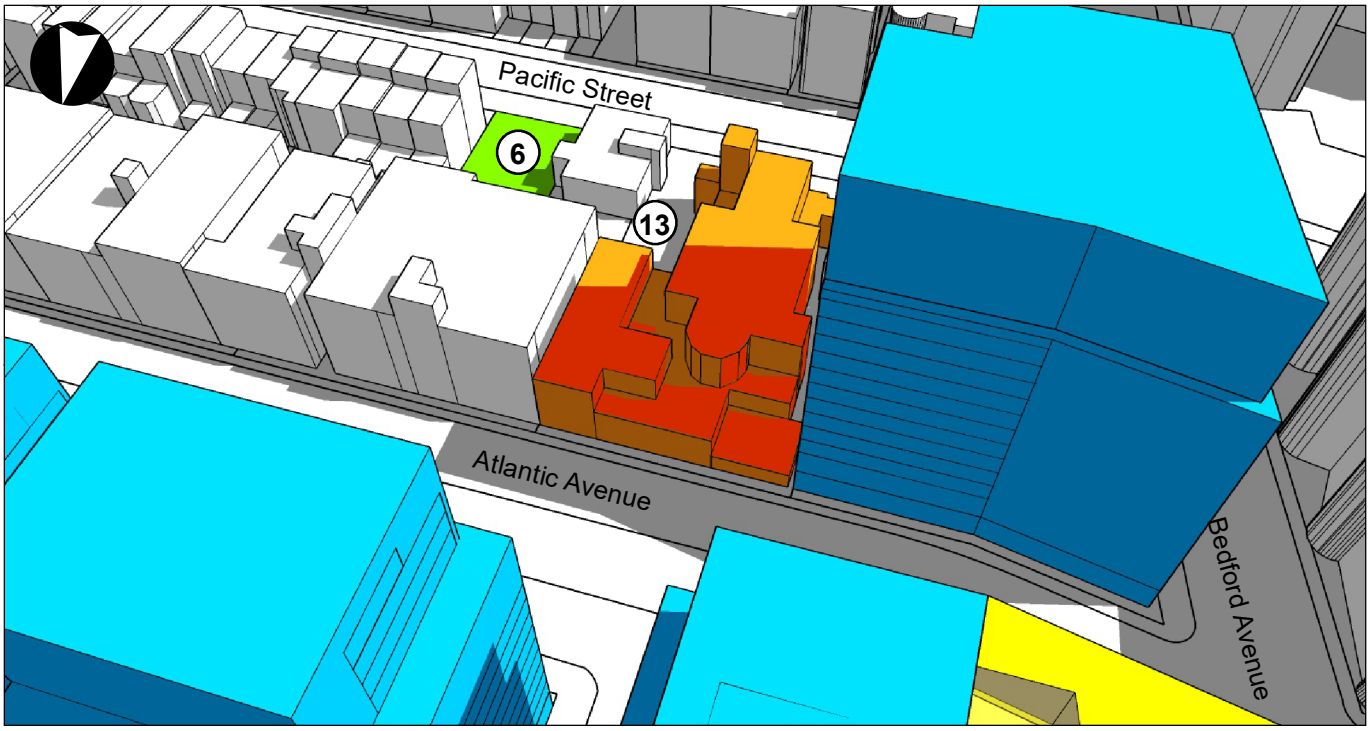
Potential Development Site

13 Saint Bartholomew's Church

6 Westbrook Memorial Garden

Project-Generated Incremental Shadow

Figure 6-14f
Saint Bartholomew's Church - June 21st



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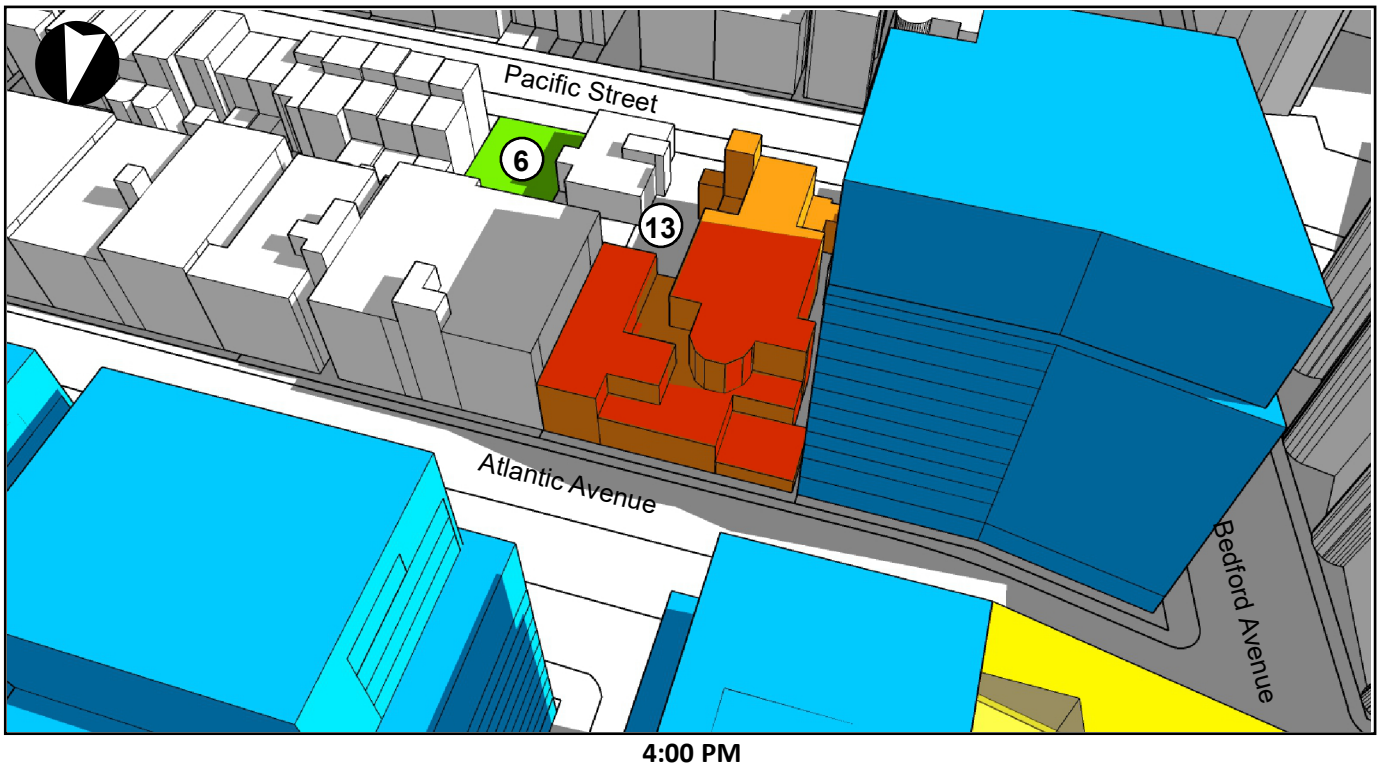


4:00 PM

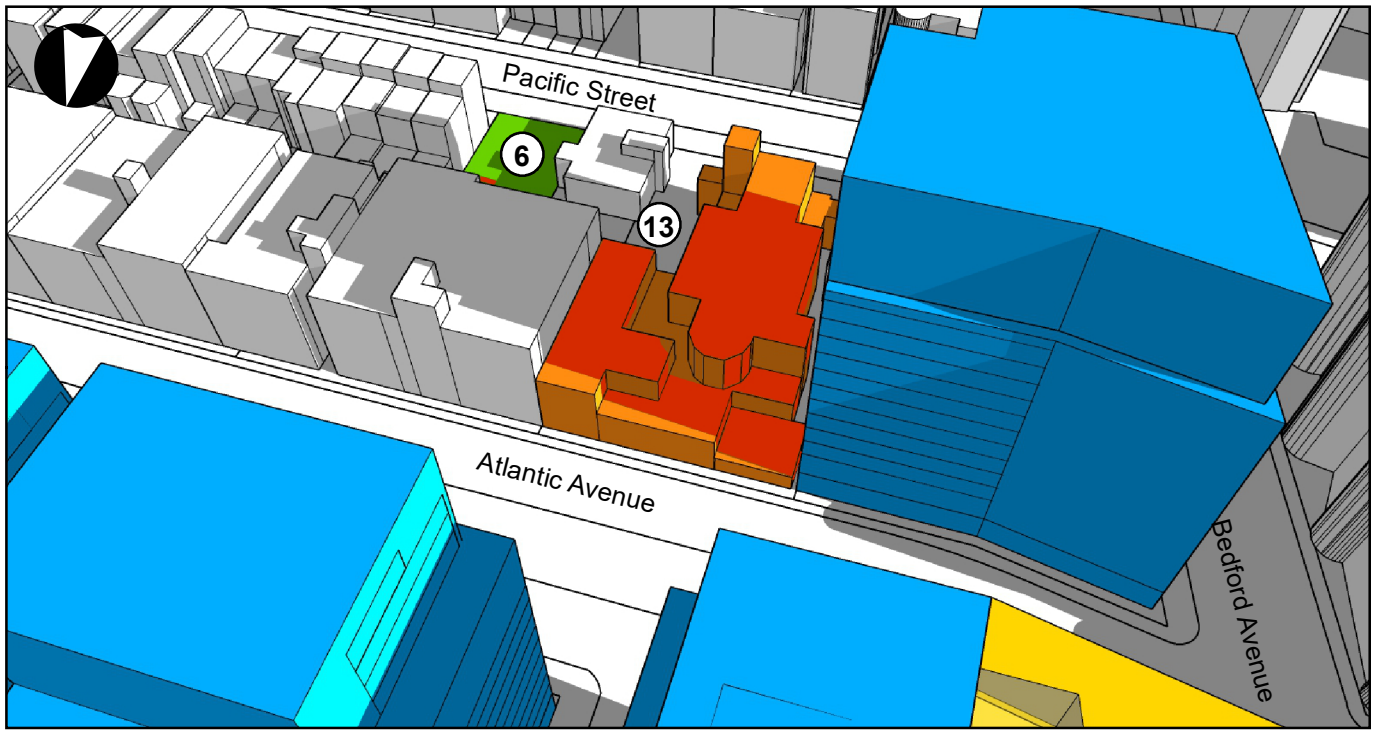
Projected Development Site

Potential Development Site

13 Saint Bartholomew's Church

6 Westbrook Memorial Garden

Project-Generated Incremental Shadow



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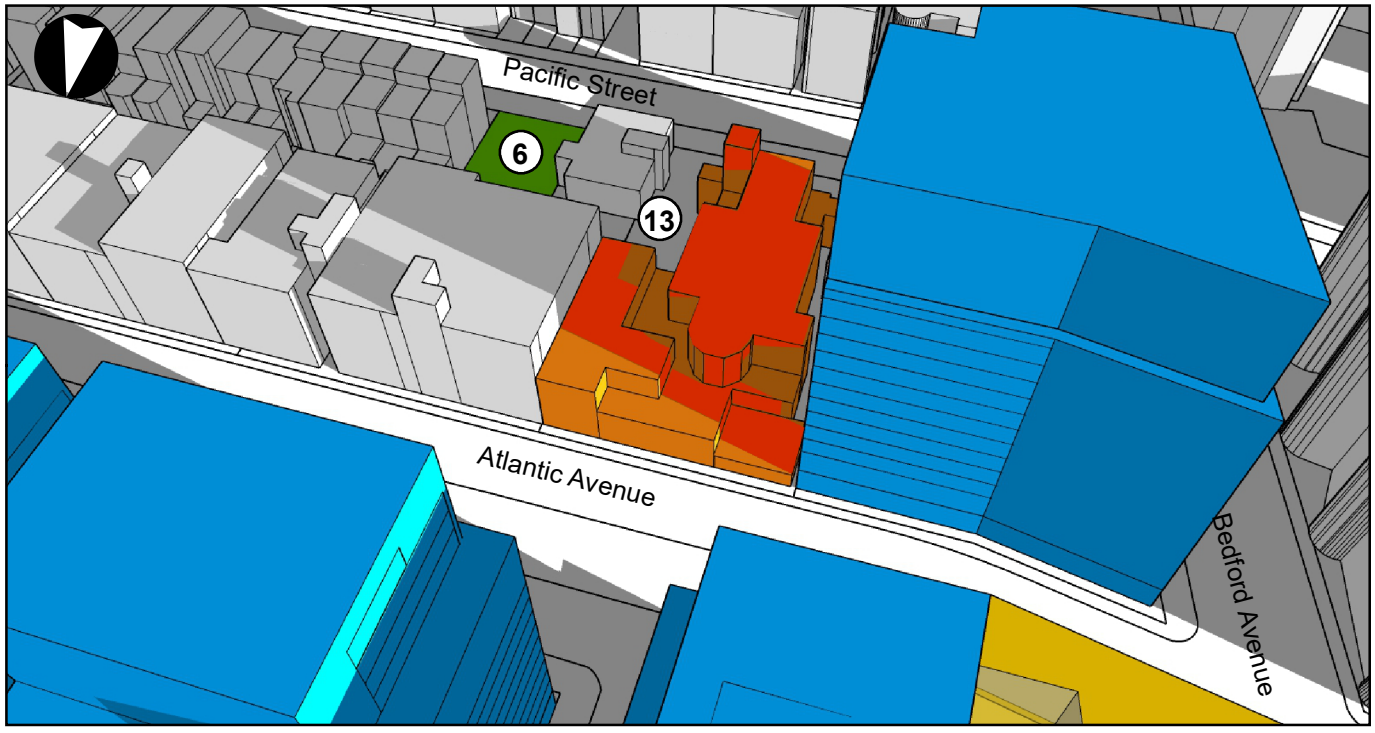

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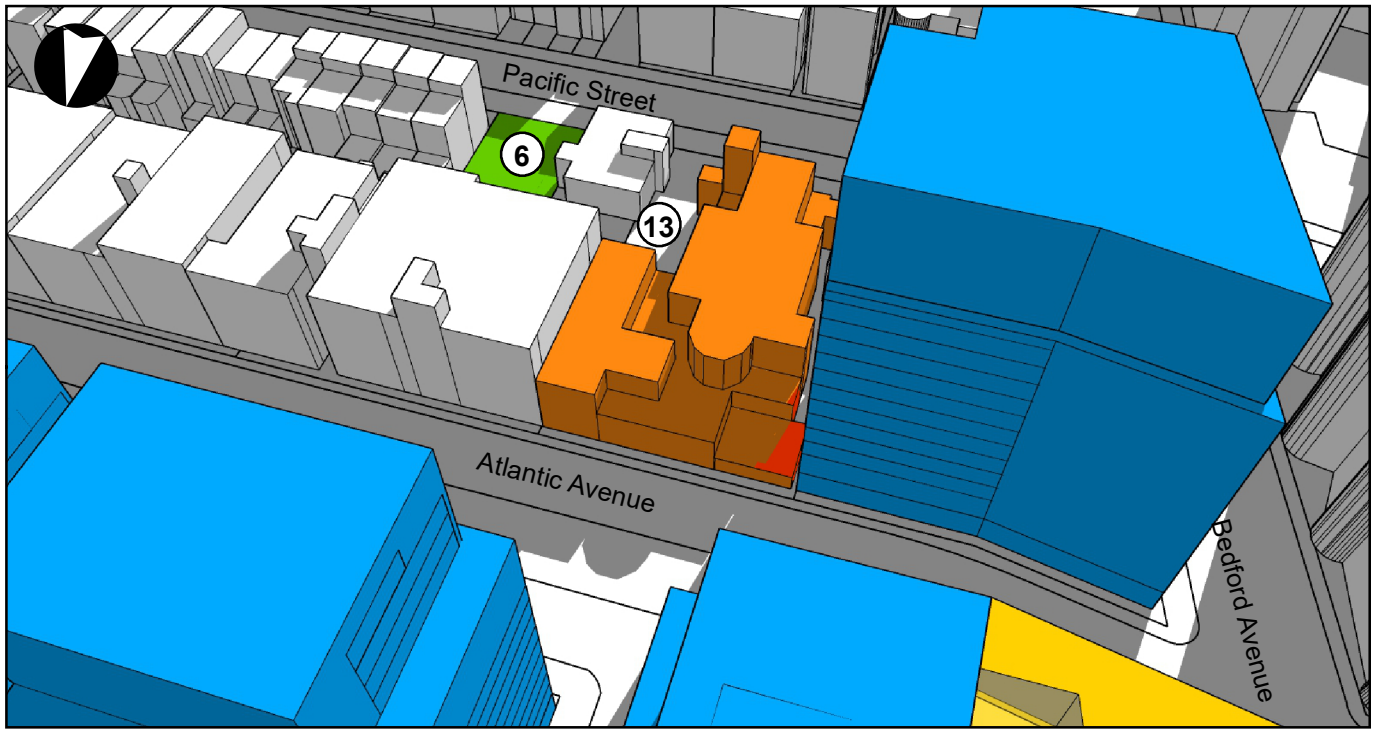
Projected Development Site

Potential Development Site

13 Saint Bartholomew's Church

6 Westbrook Memorial Garden

Project-Generated Incremental Shadow



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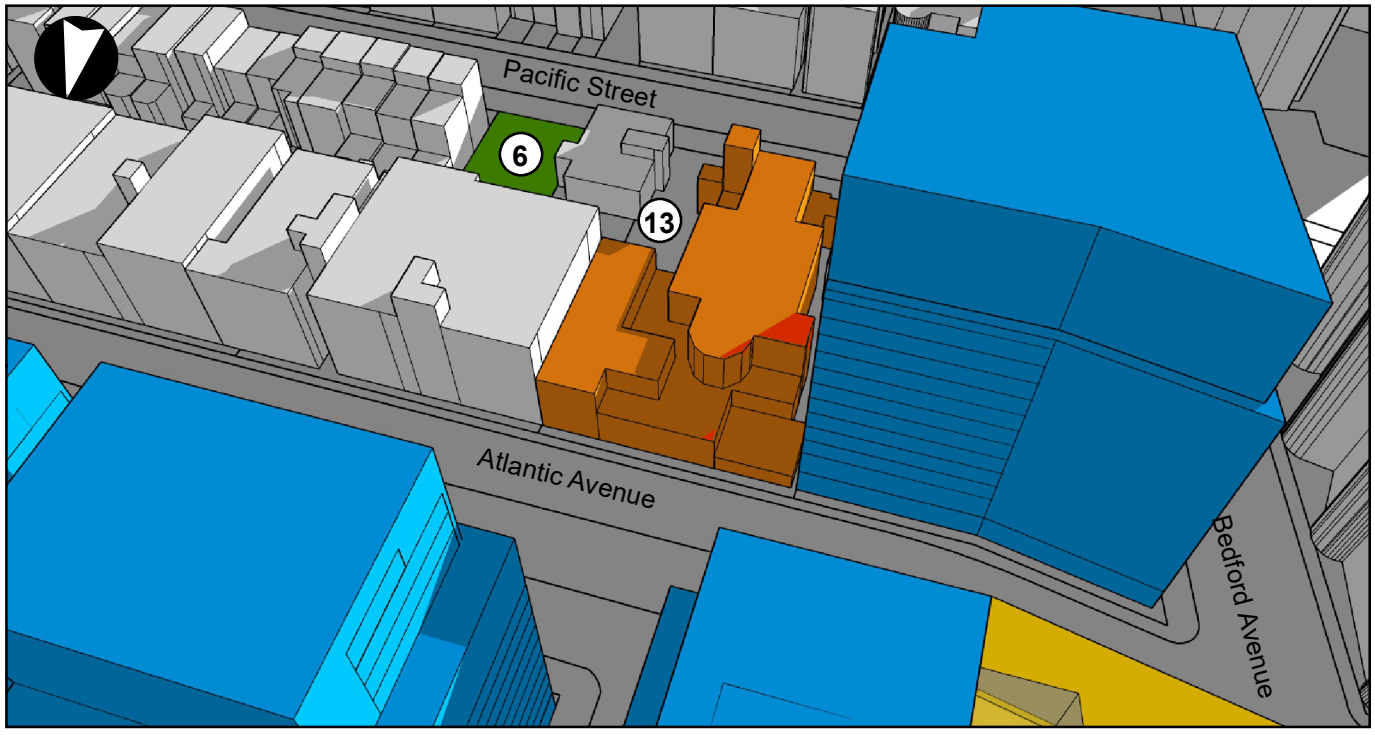


2:53 PM

Projected Development Site

Potential Development Site

13 Saint Bartholomew's Church

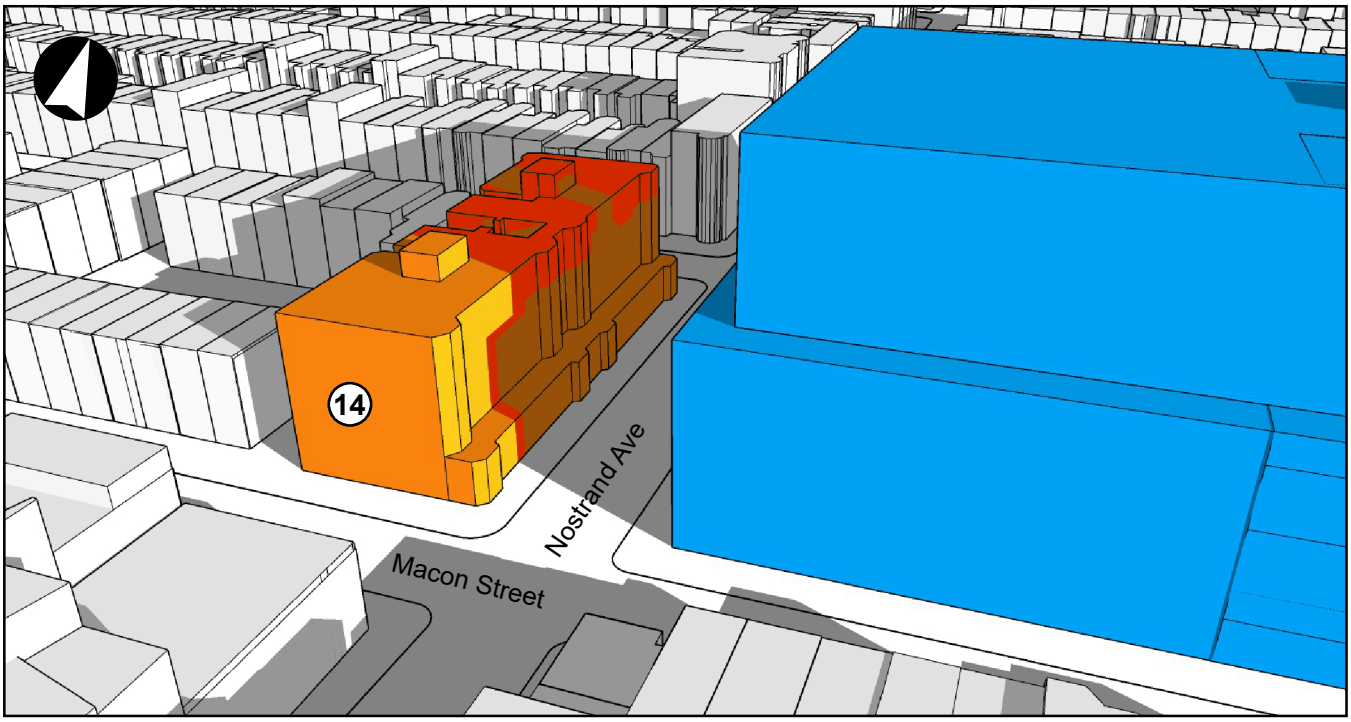
6 Westbrook Memorial Garden

Project-Generated Incremental Shadow



Figure 6-14i
St. Bartholomew's Church - Detailed View

Alhambra Apartments - March 21st/September 21st



7:36 AM



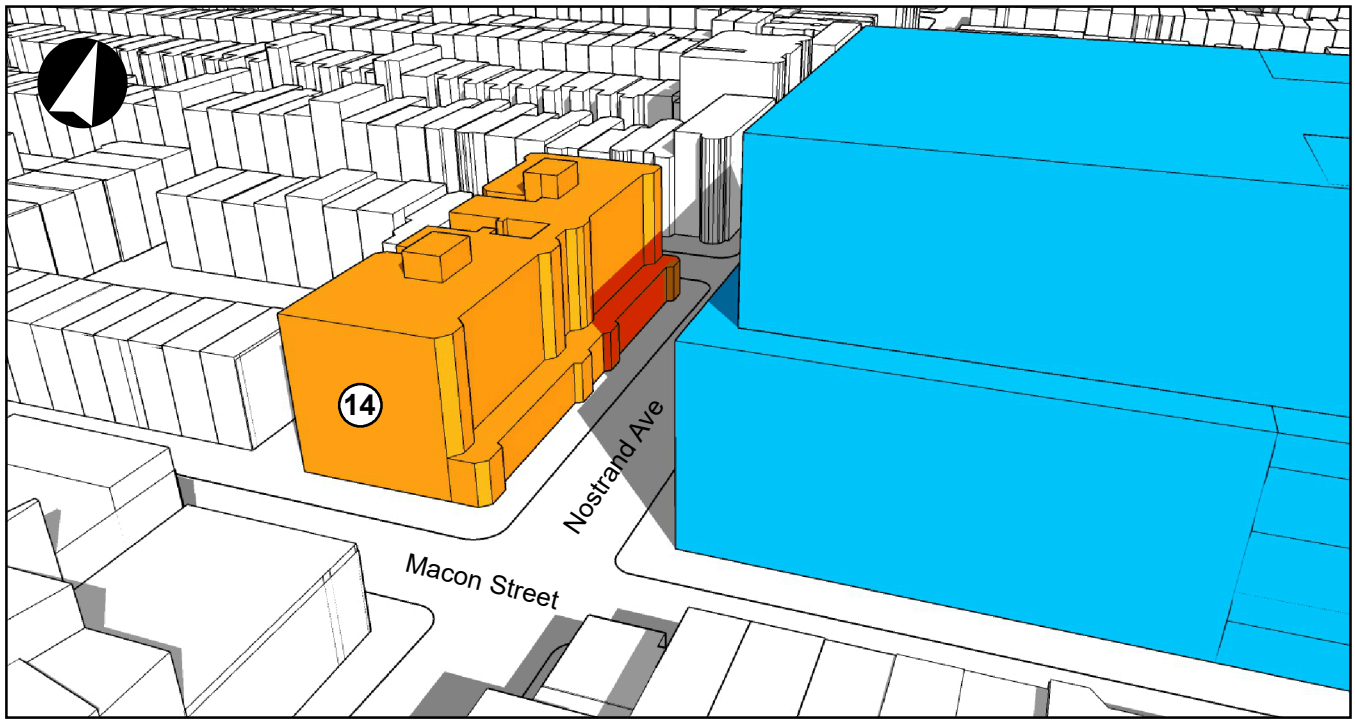
8:30 AM

Projected Development Site

Project-Generated Incremental Shadow

14 Alhambra Apartments

Alhambra Apartments - March 21st/September 21st



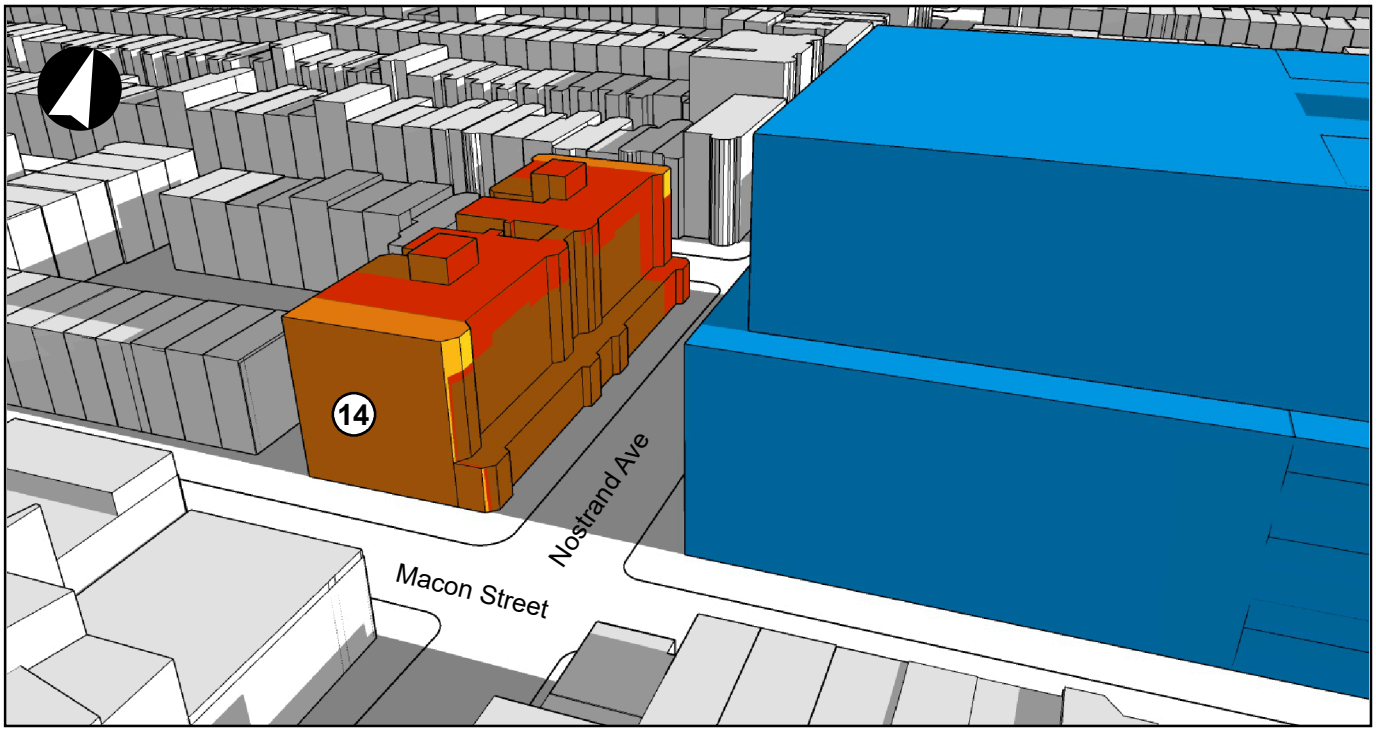
9:30 AM

Projected Development Site

Project-Generated Incremental Shadow

14 Alhambra Apartments

Alhambra Apartments - May 6th/August 6th



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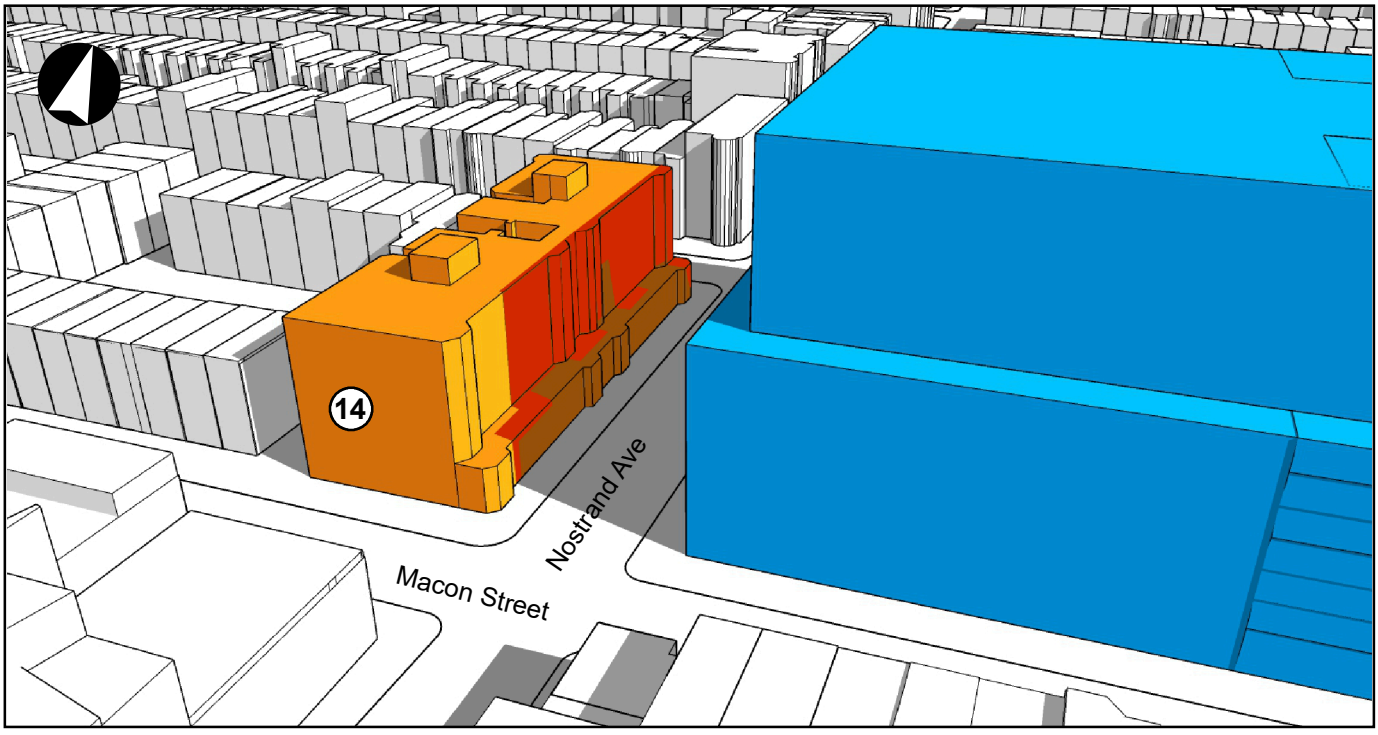
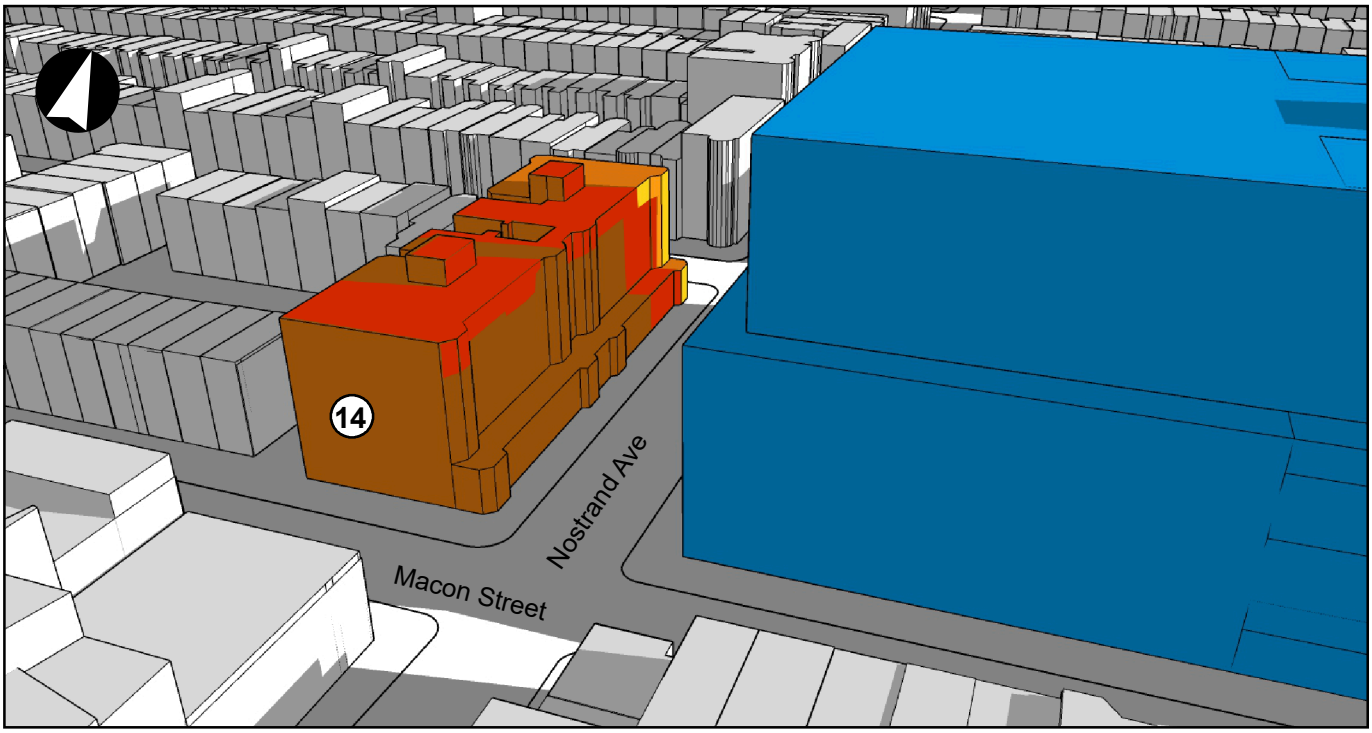


8:00 AM

Projected Development Site

Project-Generated Incremental Shadow

14 Alhambra Apartments



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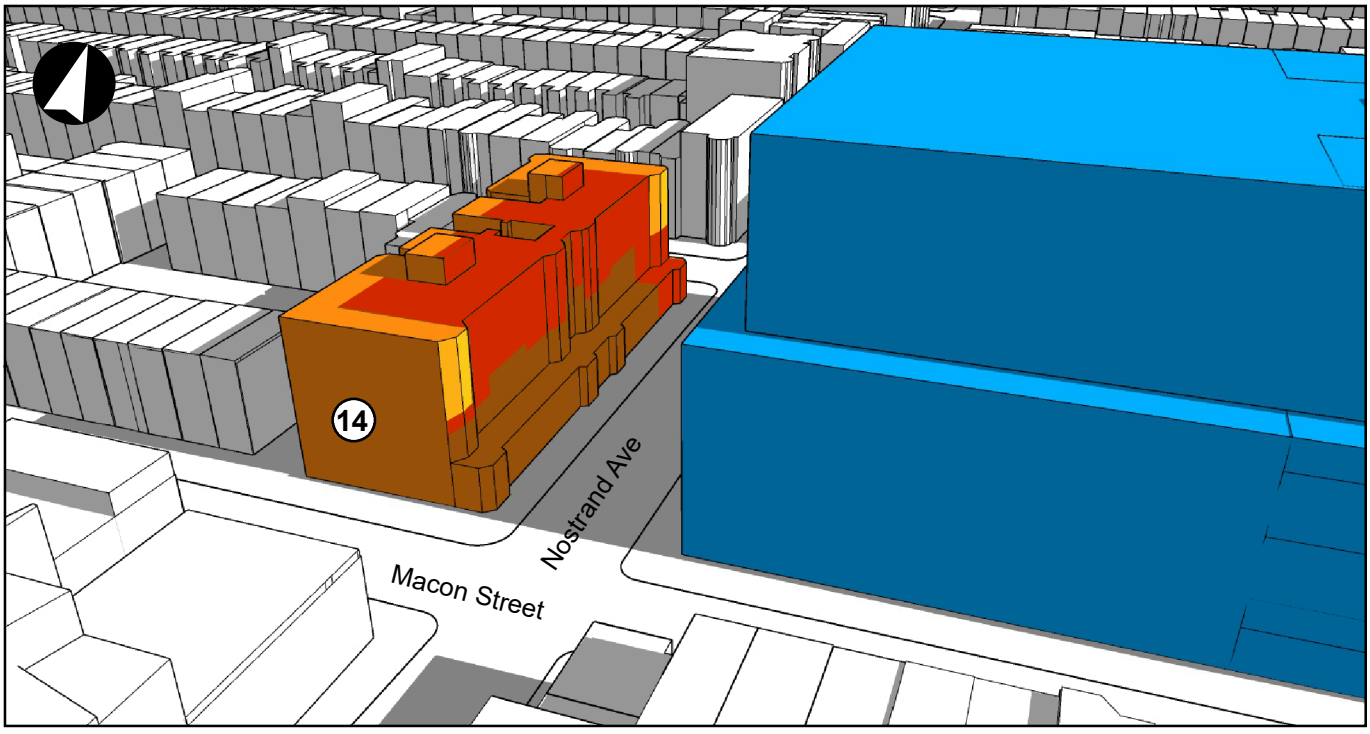


7:00 AM

Projected Development Site

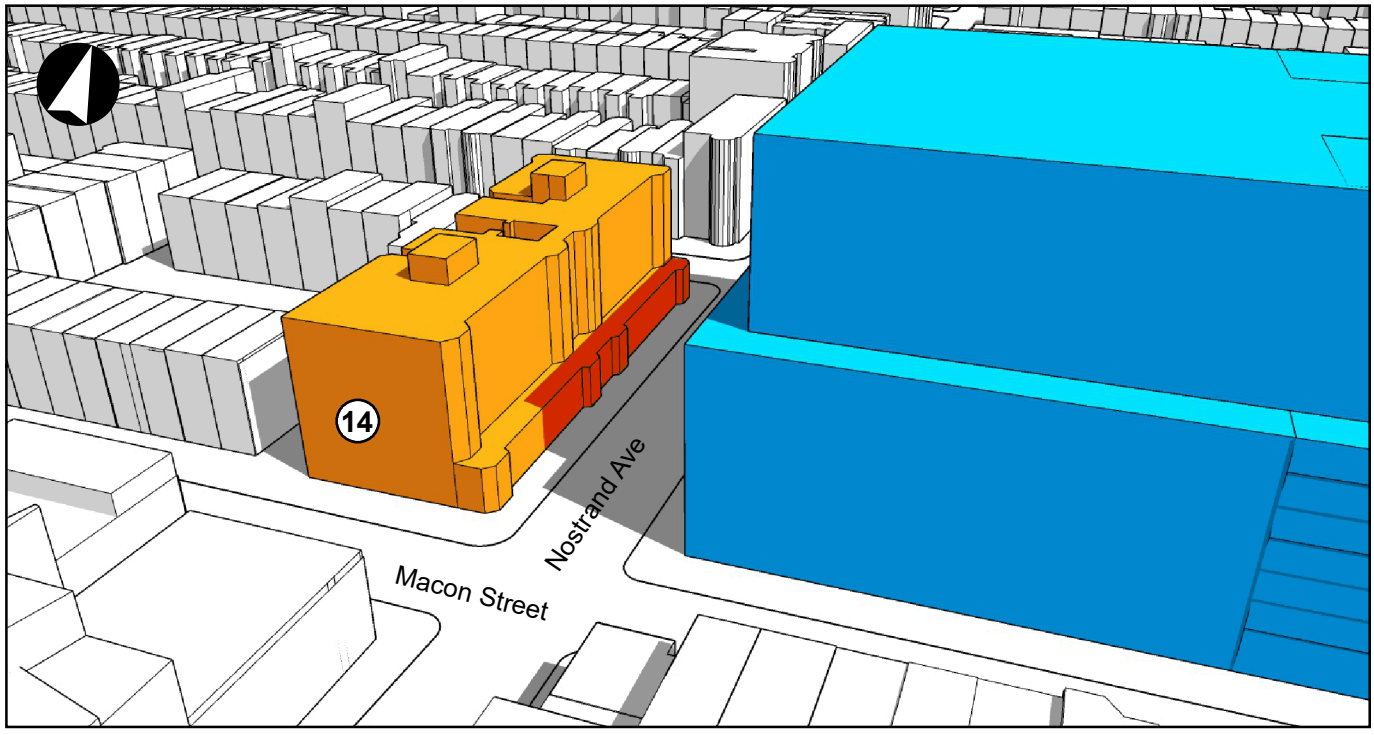
Project-Generated Incremental Shadow

14 Alhambra Apartments

Alhambra Apartments - June 21st



8:00 AM

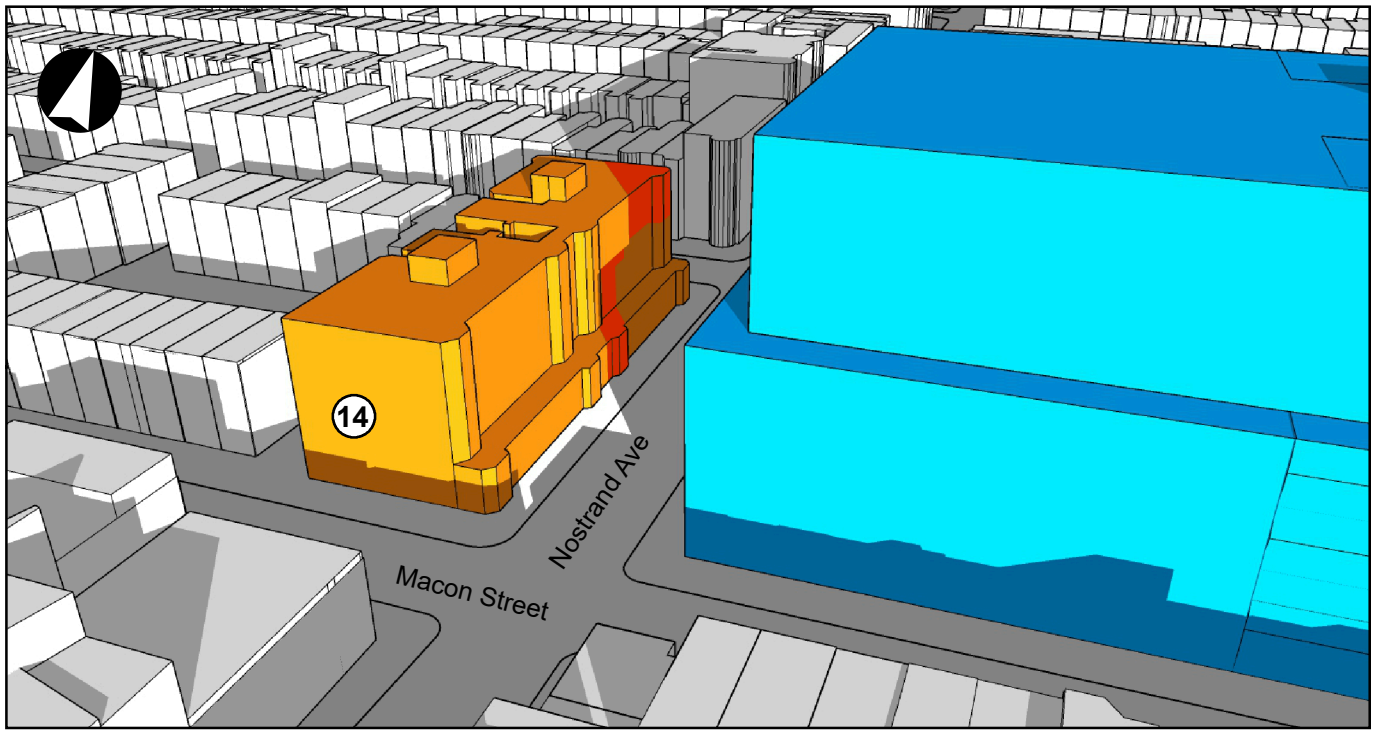


9:00 AM

Projected Development Site

Project-Generated Incremental Shadow

14 Alhambra Apartments



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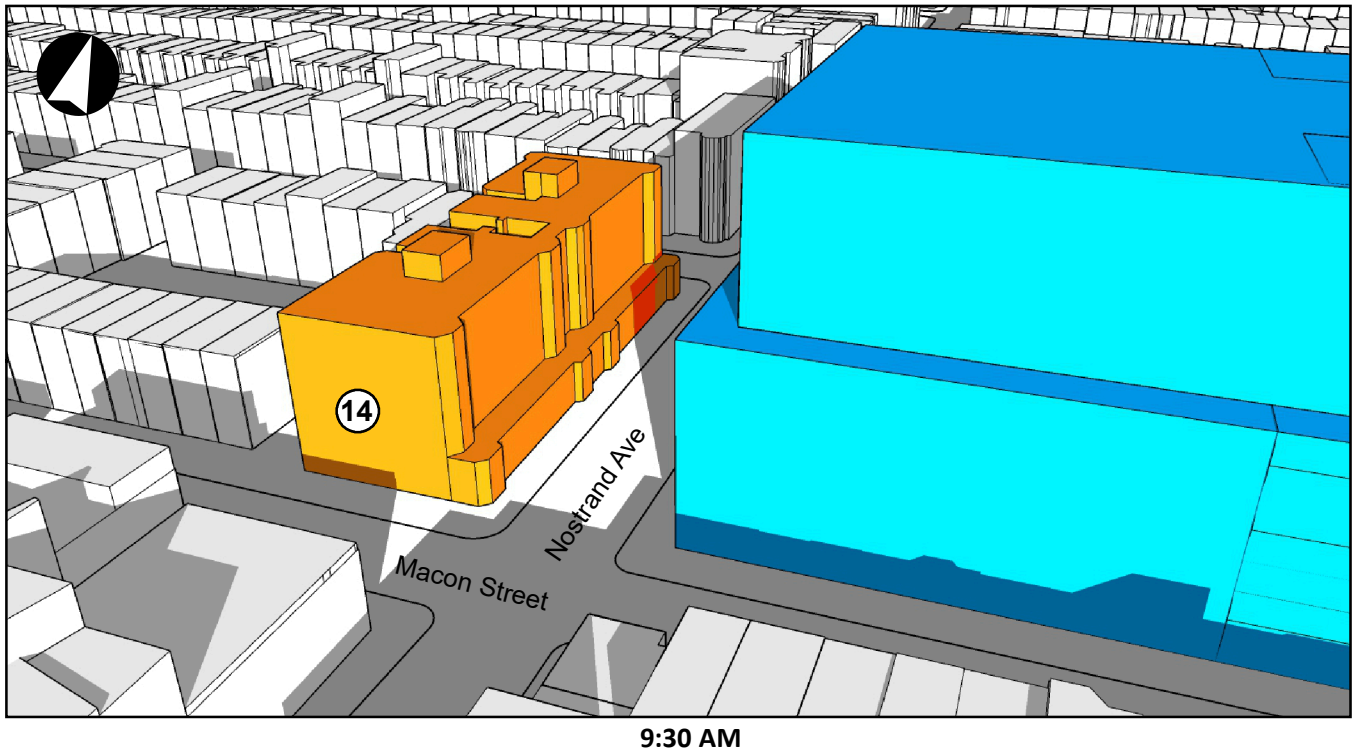


9:30 AM

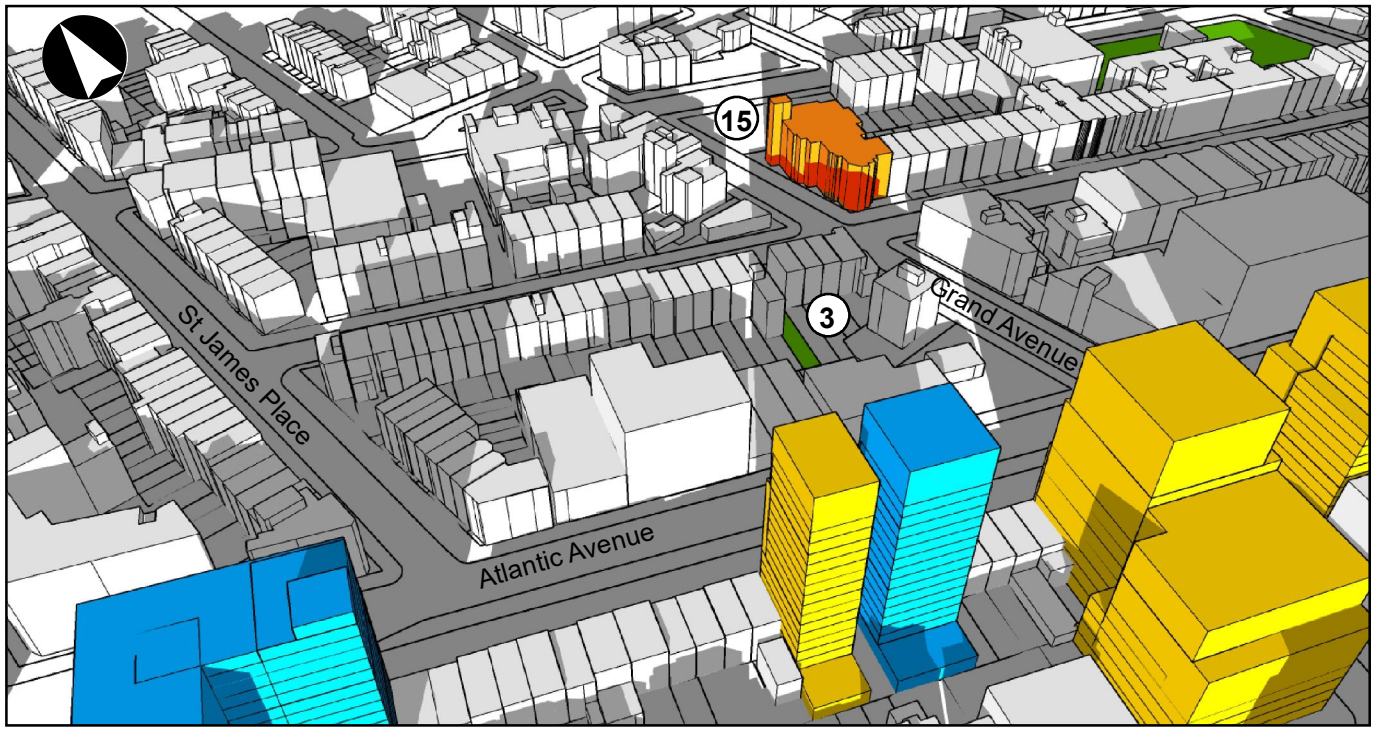
Projected Development Site

Project-Generated Incremental Shadow

14 Alhambra Apartments


ONLY
BUS
ONLY
BUS
Google Earth
Image Landsat / Copernicus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
30 ft

Bethel Seventh Day Adventist Church - December 21st



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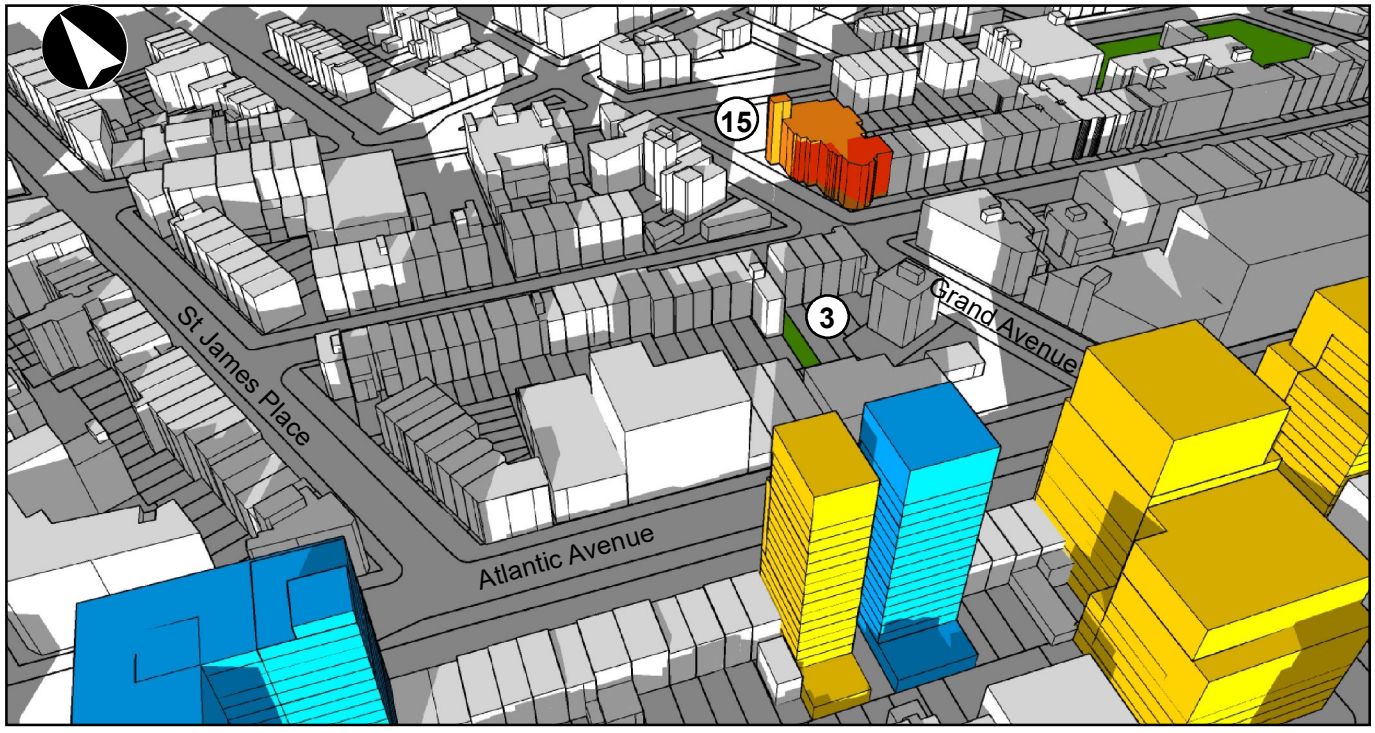

2:53 PM

Projected Development Site

Potential Development Site

15 Bethel Seventh Day Adventist Church

6 Brooklyn's Finest Community Garden

Project-Generated Incremental Shadow



Figure 6-16b
Bethel Seventh Day Adventist Church - Detailed View