5. Shadows

5.1 INTRODUCTION

This chapter examines whether the Proposed Action would cast new shadows on any sunlight-sensitive resources and assesses the possible impacts of any such new shadows. 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 this environmental impact statement (EIS), particularly Chapter 4, "Open Space," and Chapter 6, "Historic and Cultural Resources."

According to the *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 proposed rezoning area contains 19 projected development sites and 20 potential development sites. The redevelopment of the projected development sites, and the less likely redevelopment of the potential development sites, would result in new buildings greater than 50 feet in height. A detailed shadows analysis was prepared to determine the potential of the Proposed Action to result in significant adverse impacts on sunlight-sensitive resources.

5.2 PRINCIPAL CONCLUSIONS

The redevelopment of the 19 projected development sites and the less likely redevelopment of the 20 potential development sites would cast new shadows at times throughout the year on several open spaces and sunlight-sensitive features of historic architectural resources. In most cases, incremental shadows resulting from the Proposed Action would not be considered significant, as the East Midtown area is densely developed with many mid- and high-rise buildings that already cast shadows on the majority of the area's sunlight-sensitive resources under existing conditions. The detailed shadows analysis in this chapter identifies significant adverse impacts on three architectural resources with sunlight-sensitive features.

The sunlight-sensitive stained-glass windows of St. Bartholomew's Church and Community House would experience significant adverse shadows impacts on the May 6th and June 21st analysis days. Since the stained-glass windows are all experienced within a single large interior space, as opposed to multiple spaces where each individual space experiences only a portion of the windows, the assessment of the potential impact caused by the incremental shadows considered the cumulative effect on all of the windows together. On the May 6th analysis day, between 8:02 a.m. and 8:40 a.m., the effect of the incremental shadows—cast by Projected Development Site 12 and Potential Development Site 14 on the

building's northern and southern façades, respectively—would be to completely eliminate all direct sunlight on the building's stained-glass windows. Incremental shadows from these sites would also affect stained-glass windows between 3:05 p.m. to 3:15 p.m. The incremental shadows that would be cast on these two analysis days would result in a reduction in sunlight available for the enjoyment or appreciation of the building's stained-glass windows, and thus the incremental shadows are being considered significant adverse shadows impacts.

The stained-glass windows of the Lady Chapel of St. Patrick's Cathedral, which is experienced as a distinct space within the Cathedral, would experience significant adverse shadows impacts on the March 21st analysis day. During this analysis day, Projected Development Site 12 would remove sunlight from the windows on the southern and eastern façades starting at 10:07 a.m. until 10:58 a.m., thereby removing all remaining sunlight for this period. Lady Chapel would continue to experience sunlight at other times of the day—from 11:58 a.m. to 1:24 p.m., and from 1:28 p.m. to 2:40 p.m.; a total two hours and thirty eight minutes. Given that the incremental shadow from Projected Development Site 12 would eliminate remaining sunlight on the resource during the morning, and that the incremental shadow would remove nearly a quarter of the sunlight on this analysis day as a whole, this incremental shadow would be considered a significant adverse impact.

The stained-glass windows of the Christ Church United Methodist building would experience a significant adverse shadows impact on the December 21st analysis day. During this analysis day, the incremental shadow would be cast by Projected Development Site 18 on the eastern façade of Christ Church United Methodist for approximately 21 minutes from 12:59 p.m. to 1:20 p.m., covering the stained-glass windows along the building's Park Avenue frontage. Between 1:04 p.m. and 1:18 p.m., all of the building's stained-glass windows would be completely covered by shadow. Since the incremental shadow would completely eliminate all direct sunlight on the sunlight-sensitive features of this resource, albeit for a brief duration of approximately 14 minutes, it could have the potential to affect the public's enjoyment of these features. The limited duration of the incremental shadow is considered substantial in this case because in the No-Action condition the building's sunlight-sensitive features would only be exposed to sunlight for approximately 53 minutes, from 12:55 p.m. to 1:48 p.m.; thus the incremental shadow would result in a substantial reduction of available sunlight. As such, the incremental shadow is being considered a significant adverse shadows impact.

5.3 METHODOLOGY

According to the *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 new shadows resulting from a project or action could reach any sunlight-sensitive resource at any time of year. The *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 resources:

- *Public open space* (e.g., parks, beaches, playgrounds, plazas, schoolyards, greenways, and landscaped medians with seating). Planted areas within unused portions of roadbeds that are part of the Greenstreets program are also considered sunlight-sensitive resources. The uses and vegetation in an open space establish its sensitivity to shadows. This sensitivity is assessed for both (1) warm-weather-dependent features like wading pools and sand boxes, 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. Where lawns are actively used, the turf requires extensive sunlight. Vegetation requiring direct sunlight includes the tree canopy, flowering plants, and plots in community gardens. Generally, four to six hours a day of sunlight, particularly in the growing season, is a minimum requirement.
- *Features of historic architectural resources that depend on sunlight for their enjoyment by the public*. Only the sunlight-sensitive features are considered, as opposed to the entire architectural resource. 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); 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 façades); 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 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 this radius, the analysis proceeds to the second tier, which reduces the area that could be affected by new shadows by accounting for the fact that shadows can never be cast between a certain range of angles south of the proposed buildings due to the path of the sun through the sky at the latitude of New York City. If the second tier of analysis does not eliminate that 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 resulting from the project or action. Based on the results of the screening assessment conducted for the Proposed Action, a detailed shadows analysis was warranted. To carry out the detailed shadow analysis, 3D Studio Max Auto Desk version 2012 was used, as was a combination of data sources, including New York City Geographic Information Systems (GIS) data and the United States Geological Survey (USGS).

In accordance with the *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 (usually December) representing a cold-weather month. Representative days for the growing season are generally the March 21st vernal equinox (or the September 21st autumnal equinox, which is approximately the same), the June 21st summer solstice, and a spring or summer day halfway between the summer solstice and equinoxes such as May 6th or August 6th (which are approximately the same). For the cold-weather months, the December 21st winter solstice is usually included to demonstrate conditions when open space users rely most heavily on available sunlight for warmth. As representative of the full range of possible shadows, these months and days are also used for assessing shadows on historic or natural sunlight-sensitive resources. The *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 shadows analysis provided in this chapter includes a description of the effects of incremental shadows on sunlight-sensitive resources within the maximum shadow radius, and determines whether those effects constitute significant adverse impacts under CEQR.

As described in the *CEQR Technical Manual*, an incremental shadow is generally not considered significant when its duration is no longer than 10 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 10 minutes or longer falls on a sunlight-sensitive resource and results in one of the following:

- Vegetation: a substantial reduction in sunlight available to a sunlight-sensitive feature of the resource to less than the minimum time necessary for its survival (when there was 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 time necessary for its survival).
- 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 action 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.

5.4 PRELIMINARY SCREENING ASSESSMENT

5.4.1 Tier 1 and Tier 2 Screening Assessment

The proposed rezoning area, including projected and potential development sites, is mapped in Figure 5-1. In concert with resources considered in Chapter 4, "Open Space," and Chapter 6, "Historic and Cultural Resources," sunlight-sensitive resources were identified and also mapped in Figure 5-1.

A Tier 1 assessment was conducted for the 39 projected and potential development sites. For the Tier 1 assessment, the longest shadow that the maximum zoning envelope on each of the development sites could cast was calculated, and using this length as the radius, a perimeter was drawn around each site. Anything outside this perimeter representing the longest possible shadow could never be affected by project-generated shadow, while anything inside the perimeter would need additional assessment.

According to the *CEQR Technical Manual*, the longest shadow that a structure can cast at the latitude of New York City occurs on December 21st, the winter solstice, at the start of the analysis day at 8:51 a.m., and is equal to 4.3 times the height of the structure.

Using GIS, a perimeter was generated around each development site by multiplying 4.3 times the maximum height of the projected and potential developments, representing each site's longest shadow study area. The individual perimeters were merged into one overall perimeter around the Reasonable Worst Case Development Scenario (RWCDS), representing the longest shadow study area; anything outside this perimeter could never be affected by shadows resulting from the Proposed Action (Figure 5-1). Since a number of sunlight-sensitive resources are located within the combined perimeter, a Tier 2 screening assessment was conducted.

As a result of the path that the sun travels in the northern hemisphere, no shadow can be cast in a triangular area south of any given development site. In New York City, this area lies between -108 degrees and 108 degrees from true north. Figure 5-1 illustrates this triangular area; the radius was adjusted to exclude the triangular area of the southernmost RWCDS sites. The complementing area to the north within the combined longest shadow study area represents the remaining area that could potentially experience new shadows resulting from the Proposed Action.

5.4.2 Tier 3 Screening Assessment

According to the *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. However, given the presence and proximity of several sunlight-sensitive resources within the defined shadow radius (Figure 5-1), it was apparent that shadows from the projected and potential development sites would reach several resources on at least one of the representative analysis days. As such, this intermediate step in the assessment (Tier 3) was skipped, and a detailed shadow analysis was conducted, as detailed in Sections 5.6 and 5.7.

5.5 RESOURCES OF CONCERN

In coordination with the analyses in Chapter 4, "Open Space", and Chapter 6, "Historic and Cultural Resources," all publicly accessible open space resources and sunlight-sensitive historic architectural resources within the maximum shadow radius were screened as part of the shadow assessment. However, only those resources that would be affected by incremental shadows cast by a projected or potential development site were included in the detailed analysis.

5.5.1 Open Space Resources

As illustrated in Figure 5-1 and listed in Table 5-1, there are 42 existing open space resources within the maximum shadow radius for the Proposed Action that would be affected by incremental shadows. There are also four open space resources that would be created in the No-Action condition, and one open space resource that would created in the With-Action condition, within the maximum shadow radius that

would be affected by incremental shadows. As listed in Table 5-2, many open space resources within the maximum shadow radius would not be affected by incremental shadows, either because of their location relative to the projected and potential development sites or because they are indoors or otherwise covered from direct sunlight exposure.

5.5.2 Historic Resources

As discussed in Section 5.3, historic architectural resources within the maximum shadow radius were first evaluated to determine whether they contained features that depend on sunlight for their enjoyment by the public. All sunlight-sensitive historic resources within the maximum shadow radius are included in Figure 5-1. As part of the assessment, the location of the resource in relation to projected and potential development sites was also evaluated; for example, it was noted that only those façades of a resource that face a projected or potential development site could be covered by incremental shadows due to the Proposed Action. Those sunlight-sensitive historic resources that would be affected by incremental shadows are listed in Table 5-3, while those that would not be affected by incremental shadows are listed in Table 5-4.

5.6 DETAILED SHADOW ANALYSIS

5.6.1 The Future without the Proposed Action (No-Action)

In the future without the Proposed Action, it is expected that the proposed rezoning area would experience limited overall growth, much of it being in non-office uses including hotels and residential buildings. As described in Chapter 2, "Land Use, Zoning, and Public Policy," 17 development projects within the proposed rezoning area would be completed in the future without the Proposed Action. Ten of these developments would occur on projected development sites identified in the RWCDS. Development expected to occur on the projected development sites in the No-Action condition would range in height from 240 to 500 feet tall. In addition, there are seven development projects on other sites within the proposed rezoning area that are either planned or currently under construction, which would range in height from 85 to 1,400 feet tall.

In the future without the Proposed Action, five new sunlight-sensitive, publicly accessible open space resources would be added within the defined shadow radius by the 2033 analysis year. Two New York City Department of Transportation open space projects are within the defined shadow radius, as described below:

- A 0.37-acre plaza on both sides of Park Avenue between East 41st and East 42nd Streets, which would be created as part of the NYC Plaza Program, an initiative to transform underused streets into vibrant, social public spaces (#105 in Figure 5-1). This permanent year-round public plaza would be known as

Pershing Square Plaza, taking the same name as the existing seasonal plaza that occupies only the west side of Park Avenue between East 41st and East 42nd Streets.

- A 0.28-acre plaza on Vanderbilt Avenue between East 42nd and East 43rd Streets (#104 in Figure 5-1). This planned plaza would comprise a 60-foot-wide by 200-foot-long area along Vanderbilt Avenue that will be closed to vehicular traffic and dedicated to pedestrian use.

Additionally, the New York City Department of Parks and Recreation would create a new open space resource—the Outer Detour Roadway (ODR) esplanade—along the East River within the defined shadow radius. The ODR esplanade would be located 30 feet off the bulkhead, would be 40 feet wide, and would be accessed via a 12-foot access path at East 48th Street.

Furthermore, two planned private developments would provide on-site, publicly accessible plazas within the defined shadow radius, as follows:

- A mixed commercial/residential development at 7-11 East 51st Street/12-16 East 52nd Street (#100 in Figure 5-1) would include a 0.07-acre plaza.
- A mixed commercial/residential development at 40-50 East 57th Street/434 Park Avenue (#99 in Figure 5-1) would include a 0.14-acre plaza.

5.6.2 The Future with the Proposed Action (With-Action)

As described in Chapter 1, "Project Description," the RWCDS under the Proposed Action includes development on 19 projected development sites and 20 potential development sites. As noted in Tables 5-1 and 5-3 and discussed in the following sections, the projected and potential developments resulting from the Proposed Action would cast incremental shadows on several sunlight-sensitive open spaces and historic resources in one or more of the analysis periods. An assessment of potential impacts due to incremental shadows on each of the identified resources of concern is provided below. Tables 5-5 through 5-8 contain summary information regarding enter and exit times and estimated durations of the incremental shadows. The start times shown in the tables represent the time that the incremental shadows first hit any portion of the open space or sunlight-sensitive feature of the historic resource of concern, and the end time represents the time that the incremental shadows leave that element completely. As shown in Tables 5-5 through 5-8, a sunlight-sensitive resource can be affected by incremental shadows from more than one site, yielding multiple entries and exits. All times referenced in this section are Eastern Standard Time (EST); daylight savings time is not considered. To complement the information contained in Tables 5-5 through 5-8, Figures 5-2 through 5-5 depict the incremental shadows as cast on the affected sunlight-sensitive resources.

5.7 ASSESSMENT

5.7.1 Open Spaces

5.7.1.1 Existing Open Space Resources

11: 135 East 57th Street

An incremental shadow resulting from the Proposed Action would reach this plaza on the May 6th analysis day. On the March 21st analysis day, new shadows would be cast across this resource in the No-Action condition, but there would be no incremental shadows resulting from the Proposed Action. On the May 6th analysis day, a small sliver of an incremental shadow would be cast along the southern side of the plaza for a duration of 29 minutes, covering a small portion of a planter and seating ledge. The plaza would continue to receive approximately 6 hours of direct sunlight exposure on this analysis day, which is sufficient to allow for vegetation growth. Additionally, the incremental shadow is not expected to affect passive recreational use because of its small extent and relatively short duration. Therefore, the incremental shadow is not expected to create adverse impacts on this plaza.

16: 450 Park Avenue

This open space resource would experience an incremental shadow on the March 21st analysis day for a duration of 27 minutes. The incremental shadow would enter the plaza from the west at 1:00 p.m. and would travel east, intermittently covering planters and a seating wall, before exiting at 1:27 p.m. Under existing conditions, the majority of this resource is covered in shadows on this analysis day and does not receive the minimum required 4–6 hours of sunlight to allow for vegetation growth; as such, the planters in this plaza are assumed to be well suited for shaded areas. The duration of this incremental shadow is relatively brief and is not expected to reduce the usability of this resource. Therefore, no significant adverse impacts are anticipated.

21: Park Avenue Tower, 65 East 55th Street

The incremental shadows resulting from the Proposed Action would reach the Park Avenue Tower Plaza on three of the four analysis days; there would be no incremental shadows on the December 21st analysis day. On the March 21st analysis day, small incremental shadows would enter the center of the plaza at 10:21 a.m. and travel east for 1 hour and 29 minutes, covering the planters with seating on the western and eastern ends of the plaza before exiting the site at 11:50 a.m. The incremental shadows would be small in extent and would be cast before the peak period of utilization, which generally corresponds to the hours between noon and 2:00 p.m. for passive open space resources in commercial areas. Additionally, there would continue to be intermittent periods of sunlight exposure while the incremental shadows would be cast on the plaza. As such, there is no expected impact on the usability of this resource. Under existing conditions, the plaza receives less than 4–6 hours of direct sunlight exposure during this analysis day, so it is assumed that the planters are shade tolerant. This is relevant for the May 6th and June 21st analysis days, which are also within the growing season for vegetation.

On the May 6th and June 21st analysis days, incremental shadows would enter the site on the planters with seating in the southwest corner and travel east across the plaza for durations of 2 hours and 28 minutes and 2 hours and 13 minutes, respectively. The incremental shadows, despite their relatively large extent, would not be expected to substantially affect utilization of the plaza, as the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months. Therefore, no adverse impacts to passive recreation or vegetation growth at this plaza are expected as a result of the Proposed Action.

22: 919 Third Avenue

This open space resource would experience incremental shadows on the June 21st and December 21st analysis days. On the June 21st analysis day, two incremental shadows would be cast along the northern section of this resource on East 56th Street, sweeping across planters during the late afternoon for a combined duration of 52 minutes. These planters would continue to receive between 4 and 6 hours of direct sunlight exposure on this analysis day, and thus there would be no impact to vegetation growth. On the December 21st analysis day, an incremental shadow would be cast along the western section of the plaza on Third Avenue between 2:30 p.m. and 2:42 p.m. for a brief duration of 12 minutes. Although planters would be covered by the incremental shadows, the December 21st analysis day is outside the growing season for vegetation. There is no seating at this plaza, and passive recreation use is not expected to be affected by the incremental shadows on either analysis day. Therefore, the incremental shadows are not anticipated to result in any significant adverse impacts to this open space resource.

24: 535 Madison Avenue

This open space resource would experience incremental shadows on the May 6th and June 21st analysis days. On the May 6th analysis day, the incremental shadow would be a tiny sliver cast for 49 minutes on the northwest corner of the resource where there are a few planters with seating ledges. During this period, the other areas of the plaza with trees, additional planters with seating ledges, tables, and movable chairs, would continue to receive sunlight. During the June 21st analysis day, an incremental shadow would be cast on the resource for 1 hour and 41 minutes, entering from the west and traveling north across the site, intermittently covering planters and seating ledges, before exiting the plaza. On both of these analysis days, the incremental shadows would occur in the morning before 11:00 a.m., prior to the peak period of utilization, which is generally between noon and 2:00 p.m. for passive open space resources in commercial areas. Furthermore, the majority of the space would remain unaffected, so users of the open space resource could continue to use the tables and movable chairs in non-shaded areas. Furthermore, the planters located at this plaza are assumed to be well suited for partially shaded areas, as the plaza receives less than 4–6 hours of direct sunlight exposure during these analysis days under existing conditions. For these reasons, it is not expected that incremental shadows cast by the Proposed Action would cause a significant adverse shadow impact to the plaza at 535 Madison Avenue.

27: 520 Madison Avenue

This plaza would experience incremental shadows during the March 21st, May 6th, and June 21st analysis days, with durations of 21 minutes, 1 hour and 5 minutes, and 1 hour and 43 minutes, respectively. On all three analysis days, the incremental shadows would be cast in the early morning, between 7:41 a.m. and 9:23 a.m., when the utilization of the plaza is not expected to be at its peak. Additionally, the incremental shadows on all three analysis days would be cast along the northern and eastern sections of the plaza, where there are a few plantings; all of the tables and movable chairs are located in the southwest section of the plaza, which would be unaffected by the incremental shadows. Under existing conditions on all three analysis days, this plaza in covered in shadow for most of the day and does not receive the minimum required 4–6 hours of sunlight to allow for vegetation growth. For this reason, the vegetation on this plaza is assumed to be shade tolerant. Therefore, no impacts to either passive recreation use or vegetation growth are expected due to the incremental shadows.

29: Citigroup Center, 153 East 53rd Street

Incremental shadows with durations of more than 10 minutes are cast on this resource during the March 21st and December 21st analysis days; a very small incremental shadow would be cast on this resource for 6 minutes during the May 6th analysis day, but this is not considered significant because its duration is less than 10 minutes. On the March 21st analysis day, an incremental shadow would enter the resource from the south at 9:41 a.m. and travel north, covering a seat wall and some vegetation for a duration of 28 minutes; another incremental shadow would enter the resource from the west at 10:47 a.m. and travel east, covering some seating and trees in the sunken plaza for a duration of 39 minutes. The trees receive less than 4–6 hours of sunlight during this analysis day in existing conditions, so it is assumed that they are shade tolerant. Additionally, the incremental shadows would be cast in the morning, before the peak hours of usage, which are generally between noon and 2:00 p.m. for passive open space resources in commercial areas. On the December 21st analysis day, two incremental shadows with durations of 19 minutes and 20 minutes would be cast across this resource, but would not be expected to substantially affect utilization of the space because of their small extent and brief duration. Therefore, incremental shadows are not anticipated to result in significant adverse impacts to this resource.

34: HarperCollins Publishers, 10 East 53rd Street

Incremental shadows would be cast on this plaza only during the March 21st analysis day. Under existing conditions, the majority of this resource is covered by shadows during most of this analysis day. Incremental shadows would cover the southern section of the plaza, which does not offer any open space features, for 51 minutes from 9:22 a.m. to 10:13 a.m. The incremental shadows would not be expected to reduce the usability of this passive open space because they would be cast in mid-morning, when public plazas are typically less utilized, and there is no seating in this area of the plaza. Therefore, the incremental shadows resulting from the Proposed Action are not expected to result in a significant adverse impact to this open space resource.

36: Seagram Building, 375 Park Avenue

The incremental shadows resulting from the Proposed Action would reach this resource on all four analysis days. On the March 21st analysis day, three incremental shadows would be cast across this resource, at times covering trees, water features, and the seat wall/ledges at this plaza, for a collective duration of 2 hours and 17 minutes. On this analysis day, the plaza receives less than 4–6 hours of direct sunlight exposure, and thus the trees located on the southern and northern portions of the plaza are assumed to be shade tolerant. Additionally, there would be no incremental shadows cast on this resource between noon and 2:00 p.m., when utilization would be expected to be at its peak for this passive open space; the plaza would continue to receive direct sunlight exposure during the peak hours and throughout the duration of the incremental shadows. Therefore, the incremental shadows would not be expected to adversely affect the growth of vegetation or utilization of this plaza.

On the May 6th and June 21st analysis days, incremental shadows would enter the plaza from the west at 1:46 p.m., traveling east and covering the seat walls and water features for durations of 2 hours and 8 minutes and 2 hours and 21 minutes, respectively. The incremental shadows would be cast towards the end of the peak hours of utilization of this resource, and other sections of the plaza would continue to have direct sunlight exposure during this time, so usability of the plaza is not expected to be affected. Additionally, the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months.

On the December 21st analysis day, an incremental shadow with a duration of 19 minutes would cause the entire plaza to be in shade during that time, but it is not expected to adversely affect utilization because it would be cast after the peak period of use and because it would have a limited extent and a brief duration. Therefore, no significant adverse shadows impacts on this resource are anticipated to result from the Proposed Action.

37: 599 Lexington Avenue

This public plaza would experience incremental shadows on all four analysis days. On the March 21st analysis day, incremental shadows would be cast on the northern portion of this resource for 1 hour and 3 minutes, then in the southern portion for 1 hour and 11 minutes, and finally in the western portion for 41 minutes. These incremental shadows would cover trees along the perimeter of the plaza. Under existing conditions, this resource receives less than 4–6 hours of direct sunlight exposure on this analysis day, and thus the trees and planters at this resource are assumed to be well suited for shaded areas. On all four analysis days, incremental shadows would not reach the seating ledge, which is already mostly covered by shadows under existing conditions. As such, the incremental shadows, despite their extended duration, are not expected to affect the usability of this resource. Therefore, no significant adverse impacts on this plaza are anticipated due to incremental shadows.

38: 875 Third Avenue

Incremental shadows would reach this plaza on three of the analysis days; there would be no incremental shadows on the December 21st analysis day. During the March 21st, May 6th, and June 21st analysis days, incremental shadows would enter the plaza from the west on Third Avenue and travel east—for durations of 54 minutes, 1 hour and 19 minutes, and 2 hours and 27 minutes, respectively—before exiting on the south side of East 53rd Street. The incremental shadows would sweep across the planter that has a seating ledge along the frontage of Third Avenue, but would not affect the publicly accessible tables and movable chairs located at this plaza, and there would be no anticipated affects to the usability of this passive open space resource. During the March 21st analysis day, when the usability of seating areas is reliant upon exposure to sunlight, the incremental shadow would occur after the peak period, so utilization is not likely to be affected. On all three analysis days, the planter that would be covered by the incremental shadow receives less than 4–6 hours of direct sunlight exposure under existing conditions, and thus the vegetation is assumed to shade tolerant. As such, the incremental shadows are not expected to create any significant adverse impacts to this plaza.

41: 40 East 52nd Street

The incremental shadows resulting from the Proposed Action would only reach this resource on the June 21st analysis day. The incremental shadow would have a short duration of 14 minutes and would cover an extremely small area of this plaza, along on the northwest corner where there is no seating or vegetation. Therefore, the incremental shadows would not be expected to adversely affect the usability of this resource or vegetation growth.

42: 345 Park Avenue

Incremental shadows would be cast on this plaza on all four analysis days. During the March 21st analysis day, one incremental shadow would travel north across the resource, and two incremental shadows would travel east across the resource, for durations of 39 minutes, 56 minutes, and 26 minutes, respectively. The affected areas include seat walls/ledges and trees. This is not anticipated to result in a substantial reduction in the usability of the resource, as other portions of the plaza with these same features would simultaneously have direct sunlight exposure, with the exception of an approximately 21-minute period when the incremental shadows would cause the entire resource to be in shade, but this would occur after the peak period of utilization. Additionally, the vegetation receives less than 4–6 hours of sunlight exposure during this analysis day in existing conditions, so it is assumed that it is shade tolerant.

During the May 6th and June 21st analysis days, incremental shadows would only cover a portion of the plaza, and there are no expected effects to the utilization of the plaza and its seating areas, which are not reliant upon exposure to sunlight in the warm-weather months. During the December 21st analysis day, when the majority of the plaza is already covered in shadows under existing conditions, one incremental shadow would be cast for a brief duration of 30 minutes; it would be limited in extent and would not be

cast during the peak period of utilization. Therefore, incremental shadows cast by the Proposed Action would not be expected to cause significant adverse impacts to the plaza at 245 Park Avenue.

43: Greenacre Park, 217 East 51st Street

This park would experience incremental shadows during the May 6th and June 21st analysis days. On the May 6th analysis day, the incremental shadow would enter the southern portion of the park, which contains trees, planters, and benches, at 3:38 p.m., and would exit the eastern edge at 4:23 p.m. On the June 21st analysis day, multiple incremental shadows would be cast along the southern portion of the park for a combined duration of 48 minutes in the late afternoon. On both of these analysis days, which fall within the growing season for vegetation, there would continue to be sufficient sunlight of 4 to 6 hours to allow for vegetation growth. Additionally, the incremental shadows would not be expected to substantially affect utilization of the plaza, as the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months. Therefore, the new incremental shadows cast by the Proposed Action on Greenacre Park would not result in a significant adverse impact to this resource.

44: St. Patrick's Cathedral, 460 Madison Avenue

The open space resource at St. Patrick's Cathedral would experience incremental shadows on the March 21st, May 6th, and June 21st analysis days. On the March 21st analysis day, two incremental shadows with a combined duration of 1 hour and 53 minutes would enter the site at 9:15 a.m. from the southwest and travel northeast, intermittently covering a portion of the steps along Fifth Avenue and the landscaped areas along Madison Avenue and East 50th and East 51st Streets. The incremental shadows are not expected to affect the usability of the plaza along the Fifth Avenue frontage of the building, as the shadows would quickly sweep across the southwest portion of the plaza, covering the steps for only a brief period in the early morning. Furthermore, under existing conditions on this analysis day, the open space resource receives less than 4–6 hours of direct sunlight exposure, and thus it is assumed that the vegetation on this site is shade tolerant. Therefore, the incremental shadows during the mornings of the May 6th and June 21st analysis days—with durations of 55 minutes and 1 hour and 40 minutes, respectively, sweeping across the landscaped areas east and north of the building—would similarly not have an adverse effect on the vegetation. The plaza portion of the open space resource would be unaffected by the incremental shadows on the May 6th and June 21st analysis days. As such, the incremental shadows resulting from the Proposed Action are not expected to have any significant adverse impacts on the open space resource at St. Patrick's Cathedral.

45: New York Palace Hotel, 457 Madison Avenue

Incremental shadows with durations of longer than 10 minutes would be cast on this resource only on the December 21st analysis day. On the December 21st analysis day, a small incremental shadow would enter the western portion of the courtyard at 2:07 p.m. and would exit 19 minutes later, at 2:26 p.m. Since the incremental shadow would have a very small extent and a brief duration, utilization of this open space resource would not be expected to be affected. An incremental shadow would be cast on this resource for

4 minutes during the March 21st analysis day, but this is not considered significant because its duration is less than 10 minutes. Additionally, the courtyard remains shaded for the majority of the March 21st analysis day under existing conditions, so it is assumed that plantings within this courtyard are shade-tolerant. Therefore, the incremental shadows would not be expected to adversely affect passive recreational use or vegetation growth.

47: Rockefeller Plaza, West 48th Street to West 51st Street, between Fifth and Sixth Avenues

This public plaza would experience incremental shadows during the March 21st and December 21st analysis days. On the March 21st analysis day, one incremental shadow would enter the plaza at 8:09 a.m. on the planters and the pedestrian area that abuts West 51st Street, while the second shadow would enter at 8:14 a.m. south of the first shadow, in a different section of the plaza with no vegetation or seating. These shadows would cover a small area of the plaza for a combined duration of only 16 minutes. Additionally, the incremental shadows would occur in the early morning, when public plazas are typically not heavily utilized, and the latest shadow would exit the plaza at 8:25 a.m. This expansive plaza receives several hours of sunlight under existing conditions on this analysis day, but all sections of the plaza receive less than 4–6 hours of direct sunlight exposure, and thus it is assumed that the vegetation is shade tolerant. As such, the incremental shadows are not expected to create significant adverse impacts on this analysis day.

On the December 21st analysis day, one incremental shadow would be cast for less than an hour in the late morning on a small section of the plaza between West 50th and West 51st Streets, sweeping across a circular seating area with planters; a second incremental shadow would last for 27 minutes in the early afternoon, covering a portion of the plaza's walkway leading from Fifth Avenue. The majority of the plaza is already covered in shadow for the duration of this analysis day under existing conditions, and the incremental shadows are limited in extent, thus they are not expected to substantially reduce usability of the plaza. Therefore, no significant adverse shadows impacts are anticipated.

48: Wells Fargo Building, 437 Madison Avenue

The incremental shadows resulting from the Proposed Action would reach this resource on all four analysis days. As shown in Table 5-5, there would be two incremental shadows for a cumulative duration of 1 hour and 47 minutes on the March 21st analysis day; an incremental shadow for a duration of 1 hour and 37 minutes on the May 6th analysis day; an incremental shadow for a duration of 2 hours and 23 minutes on the June 21st analysis day; and an incremental shadow for a duration of 25 minutes on the December 21st analysis day. During these analysis days, the incremental shadows would intermittently cover the seat walls/ledges on both the northern and southern sides of the plaza, as well as the plantings on the northern side of the plaza. On the March 21st and December 21st analysis days, the incremental shadows would also cover the western side of the plaza, which has seat walls/ledges. Since the resource receives less than 4–6 hours of direct sunlight exposure during the March 21st and May 6th analysis days under existing conditions, it is assumed that the plantings on the northern side of the plaza are shade

tolerant. Furthermore, the incremental shadows are not expected to affect usability of this plaza. Although the seat walls/ledges on the northern and southern sides of the plaza would be intermittently covered by incremental shadows during the May 6th and June 21st analysis days, the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months. Additionally, although the western side of the plaza would be briefly covered by incremental shadows during the March 21st and December 21st analysis days, the seat walls/ledges would continue to be exposed to sunlight during part of the peak period of utilization, between noon and 2:00 p.m., as they would under the No-Action condition. Therefore, the incremental shadows that would result from the Proposed Action would not significantly affect this resource.

49: 800 Third Avenue

This public plaza would experience incremental shadows during three of the four analysis days; no incremental shadow would be cast on the May 6th analysis day. On the March 21st, June 21st, and December 21st analysis days, the incremental shadows—with durations of 57 minutes, 1 hour and 3 minutes, and 40 minutes, respectively—would be cast only on the southern and eastern portions of this plaza, where there are no open space features. The planters with seating ledges are located on the northern side of the plaza, which would be unaffected by the incremental shadows. Therefore, the incremental shadows are not expected to reduce vegetation growth or usability of this plaza, and there would be no significant adverse impacts.

51: Sterling Plaza, 255 East 49th Street

The incremental shadows resulting from the Proposed Action would reach this resource on the May 6th analysis day. Incremental shadows would be cast on this resource for 12 minutes in the late afternoon—from 4:12 p.m. to 4:24 p.m.—on a very small area of the plaza where there is no seating. Additionally, on this analysis day, the tree canopy at this plaza would continue to have exposure to sufficient sunlight (i.e., 4–6 hours) to allow for vegetation growth. Therefore, the incremental shadows cast by the Proposed Action are not likely to adversely affect vegetation growth or the utilization of this resource.

52: Tower 49, 12 East 49th Street

As shown in Table 5-5, this resource would experience incremental shadows from the projected and potential development sites on the March 21st, May 6th, and June 21st analysis days. On the March 21st analysis day, the majority of the site is already covered in existing shadow, and additional shadows would be cast in the No-Action condition along the southern portion of the plaza. Two very small incremental shadows due to the Proposed Action would also be cast along the southern portion of the plaza, for a combined duration of 42 minutes. There are no open space features along the southern portion of the plaza, and thus the incremental shadows would not affect vegetation growth or usability of the resource.

On the May 6th analysis day, an incremental shadow would be cast along the northern portion of the plaza—covering a number of trees, planters, seat walls/ledges, and benches—for a duration of 36 minutes,

beginning at 8:27 a.m. The plaza receives less than 4–6 hours of direct sunlight exposure under existing conditions on this analysis day, and thus it is assumed that the trees and plantings are shade tolerant. Additionally, the incremental shadow is not expected to affect the usability of the plaza because other areas with similar features would remain unaffected, and the early morning hours are not within the peak period of usage for passive open space resources in commercial areas. This also applies for the June 21st analysis day, when there would be a small incremental shadow along the northern portion of the plaza for a duration of 27 minutes, beginning at 8:58 a.m. Another incremental shadow would be cast at 12:44 p.m. on the May 6th analysis day, but would last for less than 10 minutes, so it is not considered to be significant. Therefore, the incremental shadows resulting from the Proposed Action are not expected to cause any significant adverse impacts to this open space resource.

53: 280 Park Avenue

The incremental shadows resulting from the Proposed Action would reach this resource on three of the four analysis days; no incremental shadow would be cast on the December 21st analysis day. On the March 21st analysis day, four incremental shadows would sweep across the open space resource, including both the northern and southern sides of the plaza, for a cumulative duration of 53 minutes. The incremental shadows would intermittently cover planters with seating ledges, as well as tables and movable chairs. Under existing conditions on this analysis day, this resource receives less than 4–6 hours of direct sunlight exposure, and thus the planters at this resource are assumed to be well suited for shaded areas. The incremental shadow that would be cast between 1:27 p.m. and 1:45 p.m., which is during the peak hours of usage for passive open space resources in commercial areas, would not cover any open space features, and thus it is not expected to affect usability of the plaza. Similarly, the incremental shadows on the May 6th analysis day would not cover any open space features. On the June 21st analysis day, two incremental shadows with a cumulative duration of 2 hours and 9 minutes would be cast on this plaza and would occasionally cover the open space features mentioned above. However, these incremental shadows would not occur during the peak hours of usage, and the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months. Therefore, no adverse impacts to this open space resource are anticipated as a result of the incremental shadows.

54: 299 Park Avenue

This public plaza would experience incremental shadows during three of the four analysis days; no incremental shadow would be cast on the December 21st analysis day. On the March 21st analysis day, this resource would be affected by two incremental shadows with a combined duration of 2 hours and 32 minutes. Along the southern and western portions of the plaza, several planters—some of which with seating ledges—would be covered by these incremental shadows. Under existing conditions on this analysis day, this resource receives less than 4–6 hours of direct sunlight exposure, and thus the planters are assumed to be well suited for shaded areas. Additionally, there would be no incremental shadows cast between noon and 2:00 p.m., which generally corresponds to the peak hours of usage for passive open space resources in commercial areas, and the areas covered by the incremental shadows would experience

direct sunlight exposure during portions of the peak period. On the May 6th and June 21st analysis days, the plaza would experience 3 hours and 15 minutes and 1 hour and 31 minutes of incremental shadows, respectively, which would intermittently cover the planters with seating ledges along the northern and southern sections of the plaza; however, the incremental shadows would not be expected to substantially affect utilization of the plaza, as the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months. Therefore, the incremental shadows are not expected to adversely affect either vegetation growth or usability of this plaza.

55: Cosmopolitan Condominiums, 141 East 48th Street

The incremental shadows resulting from the Proposed Action would reach this open space resource on three of the four analysis days; no incremental shadow would be cast on the December 21st analysis day. On the March 21st analysis day, a small incremental shadow would cover several planters with seating ledges in this plaza for a duration of 33 minutes. Under existing conditions, this resource receives less than 4–6 hours of direct sunlight exposure, and thus the plantings are assumed to be well suited for shaded areas. Additionally, most of the space, including the seating ledge, is covered by shadows for the majority of the day under existing conditions, and thus the incremental shadows, which are limited in extent, are not expected to affect utilization of the resource. On the May 6th and June 21st analysis days, the cumulative incremental shadows of 1 hour and 26 minutes and 2 hours and 48 minutes, respectively, are not anticipated to substantially reduce utilization of the resource; despite the extended duration of the incremental shadows, the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months. Therefore, no significant adverse impacts on this plaza are anticipated due to incremental shadows.

56: 780 Third Avenue

This plaza would experience incremental shadows on all four analysis days. On the March 6th analysis day, a small incremental shadow would be cast over the northeast corner of the plaza for 34 minutes, briefly covering a small portion of the seat wall along East 49th Street for less than 10 minutes, which is not significant. On both the May 6th and June 21st analysis days, incremental shadows would pass over the southeastern portion of the plaza where there are no publicly accessible seating options; the duration of the incremental shadows would be 2 hours and 4 minutes and 1 hour and 13 minutes, respectively. The incremental shadows would not affect the usability of this passive open space resource, and there is no vegetation at this plaza.

During the December 21st analysis day, incremental shadows with a combined duration of 1 hour and 1 minute would be cast along the Third Avenue section of the plaza, where there are no open space features, and would extend into the East 49th Street section of the plaza to a limited extent, briefly covering a small portion of the seat wall. Under existing conditions on this analysis day, the available seating options would be covered in shadow for much of the day, and the incremental shadow, which would only partially

reach the easternmost portion of the seat wall, is not expected to substantially reduce the usability of this passive open space resource. As such, no adverse shadows impacts are anticipated.

57: 777 Third Avenue

This open space resource would experience intermittent incremental shadows resulting from the Proposed Action on all four analysis days, although incremental shadows on the December 21st analysis day would be cast for a duration of only 5 minutes, which is not significant. During the March 21st analysis day, incremental shadows would be cast over the northwest section of the plaza, which has a triangular patch of trees and shrubs, for a duration of 1 hour and 15 minutes, from 2:15 p.m. to 3:30 p.m. Under existing conditions on this analysis day, the plaza receives less than 4–6 hours of direct sunlight exposure, and thus it is assumed that vegetation at this plaza is shade tolerant. Although there is seating in the affected section of the plaza, it is suspended from and covered by the building overhang, and thus the incremental shadows would have no effect on the seating.

On the May 6th and June 21st analysis days, incremental shadows would be cast along the western and southern sections of the plaza for durations of 1 hour and 50 minutes and 1 hour and 54 minutes, respectively, at times covering planters and benches located on Third Avenue. The incremental shadows cast during these analysis days would not be expected to reduce the utilization of the open space resource, as the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months. Therefore, no adverse shadows impacts are anticipated at this plaza.

61: 1 Dag Hammarskjold Plaza, 885 Second Avenue

This public plaza would experience a very small incremental shadow during the March 21st analysis day for a duration of approximately 40 minutes, from 2:32 p.m. to 3:12 p.m. Some plantings on the northern side of the plaza in the rear of the building would be briefly covered as the incremental shadow passes through the site, but the plantings would continue to receive 4–6 hours of direct sunlight exposure on this analysis day, and thus the incremental shadow would not inhibit vegetation growth. The incremental shadow would be of limited extent and would not reduce the usability of this plaza, and all of the seating areas would remain unaffected. Therefore, the incremental shadow would not result in any significant adverse impacts to this plaza.

64: 245 Park Avenue

This public plaza would experience incremental shadows during three of the four analysis days; no incremental shadow would be cast on the December 21st analysis day. Despite the extended durations of the incremental shadows on the March 21st, May 6th, and June 21st analysis days—corresponding to 2 hours and 4 minutes, 3 hours and 54 minutes, and 6 hours and 35 minutes, respectively—they are not likely to result in any significant adverse impacts. Much of the plaza space is covered by the building overhang, and the majority of the space does not have any open space features. The limited planters and wall seating are located along the building's frontage on East 46th and East 47th Streets, and these areas are

already covered in shade for most of the day under existing conditions during all three of the analysis days; therefore, the planters are assumed to be shade tolerant, and the incremental shadows, which would be limited in extent, would not be anticipated to affect usability of the resource. Therefore, incremental shadows cast by the Proposed Action are not expected to result in a significant adverse impact to the plaza at 245 Park Avenue.

65: 747 Third Avenue

The incremental shadows resulting from the Proposed Action would reach this resource on all four analysis days. On the March 21st analysis day, an incremental shadow would enter the plaza from the southwest at 10:10 a.m., traveling northeast for 1 hour and 40 minutes—intermittently covering trees and seats—before exiting at 11:50 a.m.; two very small incremental shadows would be cast on the western portions of the plaza along Third Avenue, passing over a bench, for a combined duration of 1 hour and 18 minutes in the early afternoon. The incremental shadows would have no effect on the utilization of the bench on Third Avenue, as well as the benches on East 46th and East 47th Streets near the intersection with Third Avenue, as they are already covered by canopies. The seats that are located further east along the East 46th Street frontage would be covered by incremental shadows for about 30 minutes in the late morning, but this would be before the peak period of usage, which is generally between noon and 2:00 p.m. for passive open space resources in commercial areas. Furthermore, under existing conditions on this analysis day, the plaza receives less than 4–6 hours of direct sunlight exposure, and thus the trees that are located at this plaza are assumed to be shade tolerant. As a result, the incremental shadows cast during the growing season—encompassing the March 21st, May 6th, and June 21st analysis days—are not expected to adversely affect vegetation growth. No adverse impacts due to the incremental shadows are expected on the March 21st analysis day.

On both the May 6th and June 21st analysis days, multiple incremental shadows would be cast across the western and southern sections of this plaza, with combined durations of 4 hours and 34 minutes and 3 hours and 42 minutes, respectively. The incremental shadows on both analysis days would cover the entire southern section of the plaza along East 46th Street in the late morning and a portion of the southern and western sections during the peak period of use between noon and 2:00 p.m.; there would continue to be seats that receive direct sunlight exposure. The incremental shadows are not expected to substantially reduce the usability of the plaza on either analysis day, as the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months, and thus no adverse impacts are anticipated.

During the December 21st analysis day, a very small incremental shadow would be cast along the western side of the plaza, passing over a bench that is already covered by a canopy, for a brief duration of 15 minutes, from 1:55 p.m. to 2:10 p.m. This incremental shadow, with its small extent and brief duration, would have no effects on the usability of the plaza. Overall, during the four analysis days, the incremental

shadows that would result from the Proposed Action would not create any significant adverse impacts on this open space resource.

66: 212 East 47th Street

This plaza would experience incremental shadows on three of the analysis days; there would no incremental shadows on the December 21st analysis day. During the March 21st, May 6th, and June 21st analysis days, incremental shadows would enter the southern section of the plaza on East 46th Street from the west, traveling east for durations of 2 hours and 13 minutes, 2 hours and 48 minutes, and 2 hours and 29 minutes, respectively, before exiting the site; the northern section of the plaza on East 47th Street would be unaffected by incremental shadows on all three analysis days. The southern section of the plaza that would be covered by incremental shadows has a few planters with spiked railings, rendering the ledges unfit to serve as a seating area. Under existing conditions, the plaza receives less than 4–6 hours of direct sunlight exposure on all three analysis days, and thus it is assumed that the planters are well suited for shaded areas. Therefore, the incremental shadows are not expected to create any significant adverse impacts on this open space resource.

67: Dag Hammarskjold Tower, 240 East 47th Street

This public plaza would experience incremental shadows during the May 6th and June 21st analysis days. On the May 6th analysis day, a very small incremental shadow would be cast on the southeast corner of the plaza for 16 minutes, from 3:18 p.m. to 3:34 p.m., passing over some trees and plantings. On the June 21st analysis day, a very small incremental shadow would be cast over the northeast corner of the plaza for a duration of 45 minutes, from 3:38 p.m. to 4:23 p.m. On both analysis days, there would continue to be sufficient sunlight (i.e., between 4 and 6 hours) to allow for vegetation growth. The seating areas in the center of the plaza would be unaffected by incremental shadows on both analysis days. Therefore, the incremental shadows resulting from the Proposed Action would not be expected to affect vegetation growth or usability of this plaza, and there would be no adverse impacts.

69: Dag Hammarskjold Plaza, 833 First Avenue

The incremental shadows resulting from the Proposed Action would reach this resource during the May 6th and June 21st analysis days. On the May 6th analysis day, the western corner of the plaza would be affected by incremental shadows for a duration of 41 minutes in the late afternoon, from 4:12 p.m. to 4:53 p.m. The incremental shadows would cover the steel lattice dome at this plaza, but would not cover any sunlight-sensitive features, and thus no adverse affects to the usability of the plaza are anticipated.

On the June 21st analysis day, incremental shadows would enter the western section of the plaza at 3:40 p.m. and travel east for a duration of 2 hours and 18 minutes, before exiting at 5:58 p.m. The incremental shadows would pass over the steel lattice dome as well as benches on the northern side of the plaza, but they are not expected to reduce the utilization of the plaza. These incremental shadows would be cast late in the day, after the peak hours of usage, and the usability of seating areas is not reliant upon

exposure to sunlight in the warm-weather months. Therefore, no adverse shadows impacts are anticipated at this plaza.

70: 1166 Sixth Avenue

This plaza would experience incremental shadow resulting from the Proposed Action only on the March 21st analysis day. The small incremental shadow would cover movable chairs on the western side of the plaza for a duration of 23 minutes, from 8:24 a.m. to 8:47 a.m., which would not be expected to reduce the usability of the plaza, as it would be cast for a limited duration in the early morning before the peak hours of utilization. Therefore, the incremental shadow would not be expected to result in a significant adverse impact.

72: Two Grand Central Tower, 140 East 45th Street

This plaza would experience incremental shadows during the March 21st, May 6th, and June 21st analysis days. On the March 21st analysis day, the incremental shadows would be cast along the southern portion of this open space resource, which contains planters, for approximately 28 minutes, from 10:14 a.m. to 10:42 a.m. Under existing conditions on this analysis day, the majority of this resource is covered in shadows and receives less than 4–6 hours of direct sunlight exposure; therefore, the planters are assumed to be well suited for shaded areas. The incremental shadows that would be cast on the May 6th and June 21st analysis days—for durations of 36 minutes and 51 minutes, respectively—would not cover any sunlight-sensitive features. Therefore, the incremental shadows are not expected to result in a significant adverse impact on this plaza.

75: International Plaza, 303 East 43rd Street

This plaza would only experience incremental shadows on the June 21st analysis day. During this analysis day, two incremental shadows with a combined duration of 1 hour and 38 minutes would sweep across the plaza from west to east, intermittently covering planters and seating. The plaza would still receive approximately 4 hours of direct sunlight exposure on this analysis day, which is sufficient for vegetation growth, and the incremental shadows are not expected to substantially reduce the usability of this passive open space resource. Therefore, no significant adverse impacts are anticipated.

76: Grace Plaza, 1114 Sixth Avenue

This plaza would only experience intermittent incremental shadow resulting from the Proposed Action on the March 21st analysis day. The incremental shadow would cover a small area of the plaza, sweeping from south to north for two brief periods in the early morning—from 7:27 a.m. to 7:44 a.m., for approximately 17 minutes; and from 8:04 a.m. to 8:26 a.m., for approximately 22 minutes. The incremental shadows would intermittently cover planters with seating ledges as well as tables with movable chairs. This open space resource remains shaded for the majority of this analysis day under existing conditions, receiving less than 4–6 hours of direct sunlight exposure, and thus it is assumed that vegetation within this plaza is shade tolerant. Additionally, the limited extent and duration of the incremental shadow cast on this open space resource in the early morning hours—before the peak period

of utilization—would not be expected to adversely affect passive recreational use. Therefore, no adverse shadows impacts are anticipated.

81: Bryant Park, Sixth Avenue from West 40th Street to West 42nd Street

This open space resource would experience incremental shadows on all four analysis days during the early morning hours. On the March 21st analysis day, the incremental shadows would enter from the west at 7:27 a.m. and travel northeast before exiting the park at 10:03 a.m., lasting for 2 hours and 36 minutes. The incremental shadows would intermittently cover the chess area, the fountain terrace, portions of the Great Lawn, and areas with planters and tables with movable chairs. On the May 6th analysis day, the incremental shadows would enter the park from the southwest at 6:18 a.m. and travel northeast for approximately 1 hour and 32 minutes, exiting the park at 7:50 a.m. These incremental shadows would pass over the same areas of the park as during the March 21st analysis day, with the exception of the fountain terrace area, which would not be affected. On the June 21st analysis day, the incremental shadows would enter the park from the south at 6:24 a.m. and travel north for approximately 1 hour and 20 minutes, passing over areas with planters, tables and movable chairs, and portions of the Great Lawn before exiting the park at 7:44 a.m. On all three of these analysis days that collectively encompass the growing season for vegetation, the park would continue to experience approximately 6 hours of direct sunlight exposure, and thus the incremental shadows would not be expected to result in any significant adverse impacts to vegetation growth. Additionally, since the incremental shadows would be cast in the early morning hours, no adverse impacts to passive recreation use are anticipated.

On the December 21st analysis day, the incremental shadows would enter the northwest section of the park at 8:49 a.m. and travel east for approximately 50 minutes, briefly covering some planters and tables with movable chairs before exiting the park at 9:39 a.m. Since the incremental shadows would have a small extent and a brief duration in the early morning hours on this analysis day, they are not expected to reduce the usability of this open space resource, and this date is not within the growing season for vegetation. Therefore, no significant adverse shadows impacts are anticipated at Bryant Park.

82: New York Public Library, Fifth Avenue at 42nd Street

The plaza and terrace at the New York Public Library would experience incremental shadows during the March 21st, May 6th, and June 21st analysis days. On each of these analysis days, there would be multiple instances of incremental shadow during the timeframe window of analysis. On the March 21st analysis day, a small incremental shadow—supplementing a shadow that would be created in the No-Action condition—would be cast for 18 minutes, from 7:58 a.m. to 8:16 a.m., along the northern portion of this open space resource on West 42nd Street, which is lined with plantings. Additional incremental shadows would be cast for 2 hours and 24 minutes, between 9:15 a.m. and 11:39 a.m., along the Fifth Avenue Terrace, which includes plantings and tables with movable chairs. The incremental shadows are not expected to substantially reduce the usability of this open space resource, as they would all dissipate before noon, and the terrace would continue to receive direct sunlight exposure in the early afternoon when

utilization is expected to be at its peak. Additionally, under existing conditions on this analysis day, the open space resource receives less than 4–6 hours of direct sunlight exposure, and thus it is assumed that the plantings are shade tolerant. Therefore, the incremental shadows are not expected to adversely affect vegetation growth, which is also relevant for the May 6th and June 21st analysis days. Furthermore, during the May 6th and June 21st analysis days, the incremental shadows with combined durations of 2 hours and 50 minutes and 2 hours and 13 minutes, respectively, would not be expected to reduce utilization of the plaza and terrace because the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months. As a result, the incremental shadows resulting from the Proposed Action are not anticipated to create any significant adverse impacts on this open space resource.

86: 101 Park Avenue

This open space resource would experience incremental shadows on all four analysis days. On the March 21st analysis day, a very small incremental shadow would enter the southern section of the plaza at 8:47 a.m., covering some steps that serve as informal seats, and would travel north for 34 minutes before exiting at 9:21 a.m. Another very small incremental shadow would emerge at 12:45 p.m. and travel east for 26 minutes until it exits at 1:11 p.m., covering a portion of a planter with a seating ledge; seven minutes later, a small sliver of an incremental shadow would enter the southwestern section of the plaza and travel east for 2 hours and 31 minutes, intermittently covering steps that serve as informal seats before exiting at 3:49 p.m. The incremental shadows would be of limited extent and would not be expected to reduce the usability of this plaza, which comprises a variety of informal seating types around its expansive perimeter, including ledges and steps. Under existing conditions on this analysis day, this plaza receives less than 4–6 hours of direct sunlight exposure, and thus the planters are assumed to be shade tolerant. As a result, the incremental shadows cast during the growing season—encompassing the March 21st, May 6th, and June 21st analysis days—are not expected to adversely affect vegetation growth.

During the May 6th and June 21st analysis days, the incremental shadows would have a large extent, periodically covering almost half of the plaza, including steps and planters with seating ledges, and would also have long durations of 6 hours and 25 minutes and 4 hours and 48 minutes, respectively. However, the incremental shadows would not be expected to reduce the usability of the plaza, and the vegetation is assumed to be shade tolerant. Informal seating options are available all throughout the perimeter of the plaza, and there would continue to be areas that receive direct sunlight exposure. Additionally, the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months, and thus no effects are anticipated to the utilization of the plaza.

On the December 21st analysis day, there would be a small sliver of an incremental shadow that would enter the plaza from the west at 1:50 p.m. and travel east for 1 hour and 3 minutes before exiting at 2:53 p.m. The incremental shadow would pass over the planters with seating ledges along Park Avenue and East 40th Street, but utilization of the plaza is unlikely to be affected, as the incremental shadow would

be extremely small in extent. Therefore, the incremental shadows would not be expected to result in a significant adverse impact on any of the analysis days.

87: Grand Central Plaza

This open space resource would experience a very small incremental shadow on the June 21st analysis day. The small sliver of an incremental shadow would sweep across the southeast corner of the landscaped terrace for a brief duration of 17 minutes, from 4:55 p.m. to 5:12 p.m., passing over a planter. The open space resource would continue to receive approximately 6 hours of direct sunlight exposure on this analysis day, and thus the incremental shadow would have no affect on vegetation growth. Furthermore, passive recreation use would be unaffected by the incremental shadows, and thus no significant adverse shadows impacts are anticipated.

108: 1095 Sixth Avenue

This plaza would only experience a brief duration of incremental shadow on the May 6th analysis day. The incremental shadow would cover a portion of the northern section of the plaza for approximately 20 minutes, from 6:18 a.m. to 6:38 a.m., passing over planters and a bench. Under existing conditions on this analysis day, the plaza receives less than 4–6 hours of direct sunlight exposure, and thus it is assumed that the planters are shade tolerant. Furthermore, since the incremental shadows would be cast during the early morning hours, utilization of the open space resource would not be affected. Therefore, no significant adverse shadows impacts on this resource are anticipated.

110: Park Avenue Malls, Park Avenue median between East 34th and East 39th Streets, and between East 46th and East 65th Streets

The Park Avenue Malls north of East 46th Street would experience incremental shadows on all four analysis days; the portion of the open space resource between East 34th and East 39th Streets would not experience incremental shadows on any of the four analysis days. On each analysis day, the incremental shadows would be cast intermittently throughout much of the day, covering very small portions of the vast Park Avenue Malls—comprising a landscaped median with various types of vegetation—for limited durations. No individual section of the malls would be cast in incremental shadow for the entire shadow duration. The following information, also within Table 5-5, identifies the incremental shadows with the greatest extent and duration on each analysis day, all of which would enter from the west and travel east before exiting the open space resource. On the March 21st analysis day, this incremental shadow would have a duration of 1 hour and 2 minutes, entering at 1:46 pm and exiting at 2:48 pm. On the May 6th analysis day, this incremental shadow would have a duration of 1 hour and 40 minutes, entering at 1:20 pm and exiting at 3:00 pm. On the June 21st analysis day, this incremental shadow would have a duration of 3 hours and 4 minutes, entering at 1:15 pm and exiting at 4:19 pm, and on the December 21st analysis day, this incremental shadow would have a duration of 24 minutes, entering at 2:05 pm and exiting at 2:29 pm. During all four analysis days, this resource remains largely shaded for much of the day under existing conditions, and receives less than 4–6 hours of direct sunlight exposure. Therefore, it is assumed that the

existing vegetation within the Park Avenue Malls is shade tolerant. Additionally, since this resource does not provide usable open space for passive recreation, the incremental shadows would not affect utilization of the resource. As a result, the incremental shadows would not be expected to result in a significant adverse impact.

5.7.1.2 No-Action Open Space Resources

99: 40-50 East 57th Street/434 Park Avenue

This plaza, which will be completed with or without the Proposed Action by the 2033 analysis year, would experience incremental shadows on the March 21st, May 6th, and June 21st analysis days, for cumulative durations of 29 minutes, 56 minutes, and 1 hour and 27 minutes, respectively. During the March 21st and June 21st analysis days, the incremental shadows would enter the plaza from the west and travel east before exiting the site; during the May 6th analysis day, the incremental shadow would enter the plaza from the south and travel northeast before exiting the site. There would be a large No-Action shadow cast on the March 21st analysis day, but the incremental shadow resulting from the Proposed Action would be small. It is not known what, if any, open space features will be included in this plaza, but no significant adverse shadows impacts are anticipated. Under existing conditions, the location of the plaza receives less than 4–6 hours of direct sunlight exposure during the growing season, which encompasses all three analysis days for which there would be incremental shadows at this plaza, and thus it is anticipated that any vegetation at the plaza would be shade tolerant. Additionally, given the small extent of the incremental shadows, it is not likely that they would result in any adverse effects to the usability of the resource. Therefore, no significant adverse shadows impacts are anticipated.

104: Vanderbilt Avenue between East 42nd and East 43rd Streets

This plaza would experience incremental shadows on the March 21st, May 6th, and June 21st analysis days. On each of these analysis days, the incremental shadow would supplement new shadows that would be cast in the No-Action condition. On the March 21st analysis day, the incremental shadow would enter the plaza from the west at 10:05 a.m., traveling northeast for 1 hour and 17 minutes before exiting at 11:22 a.m. On the May 6th analysis day, the incremental shadow would enter the plaza from the north at 1:06 p.m. and exit 54 minutes later, at 2:00 p.m. On the June 21st analysis day, the incremental shadow would enter the plaza from the northwest at 12:51 p.m., traveling southeast for 1 hour and 10 minutes before exiting at 2:01 p.m. It is not known what, if any, open space features will be included in this plaza, but no significant adverse shadows impacts are anticipated. Under existing conditions, the location of the plaza—due to its proximity to a number of tall buildings—receives less than 4–6 hours of direct sunlight exposure during the growing season, which encompasses all three analysis days for which there would be incremental shadows at this plaza, and thus it is anticipated that any vegetation at the plaza would be shade tolerant. Furthermore, since the location of the plaza is already mostly covered in existing shadows on these analysis days, the incremental shadows, which would be small in extent, are not anticipated to substantially reduce usability of the resource. Therefore, no significant adverse impacts are anticipated.

105: Pershing Square Plaza, Park Avenue between East 41st and East 42nd Streets

This plaza, which will be created as part of the NYC Plaza Program and will comprise both sides of Park Avenue between East 41st and East 42nd Streets, would experience intermittent incremental shadows resulting from the Proposed Action on all four of the analysis days. On the March 21st analysis day, the incremental shadow would enter the plaza from the south at 9:26 a.m., traveling northeast for 1 hour and 14 minutes before exiting at 10:40 a.m.; another incremental shadow would be cast at 11:51 a.m. and would travel north for 1 hour and 16 minutes before exiting at 1:07 p.m. On the May 6th analysis day, several small incremental shadows would be cast on the plaza for 1 hour and 51 minutes, the first of which would enter the plaza at 10:19 a.m., and the final shadow would exit at 12:10 p.m. On the June 21st analysis day, an incremental shadow would enter the plaza from the west at 10:13 a.m. and travel northeast for 1 hour and 59 minutes before exiting at 12:12 p.m.; another small sliver of an incremental shadow would enter the plaza at 2:52 p.m. and exit 1 hour and 8 minutes later, at 4:00 p.m. On the December 21st analysis day, an incremental shadow would enter the plaza from the west at 12:43 p.m., travel east for 27 minutes, and then exit the western portion of the plaza at 1:10 p.m.; the incremental shadow would then enter the eastern portion of the plaza from the west at 1:24 p.m. and exit 21 minutes later, at 1:45 p.m.. During all four analysis days, the areas of incremental shadow would be small relative to the overall space, and it is not expected that the incremental shadow would significantly affect utilization of this open space resource. Under existing conditions during the growing season, the location of the plaza—due to its proximity to a number of tall buildings—receives less than 4–6 hours of direct sunlight exposure, and thus it is assumed that any vegetation contained within this plaza will be well-suited for partially-shaded areas. Therefore, the incremental shadows would not be expected to result in a significant adverse impact.

113: Outer Detour Roadway (ODR) Esplanade

This open space resource has not yet been designed, and since its precise location and features are not known, it is not possible to conduct a detailed analysis of potential shadow impacts on this resource. As such, the shadow effects on this resource were assessed at a conceptual level based on its expected location and dimensions along the East River. The results of this analysis indicated that incremental shadows resulting from the Proposed Action could reach a small portion of the esplanade on the May 6th analysis day; there would be no incremental shadows on this resource on the other analysis days. On the May 6th analysis day, incremental shadows could reach the esplanade from approximately 5:12 p.m. to 5:22 p.m., remaining in the resource for approximately 10 minutes. Since the incremental shadows would have a limited extent and short duration, the Proposed Action would not be expected to have a significant adverse shadow impact on the ODR esplanade. Moreover, the shadow modeling for this resource did not incorporate all of the existing built features in the vicinity of this resource, such as the elevation of the FDR Drive roadway and the decking that extends over a portion of the roadway, both of which are at a higher elevation than the proposed ODR esplanade and would therefore be expected to further reduce the size and duration of the Proposed Action's incremental shadows.

5.7.1.3 With-Action Open Space Resources

107: Portions of Vanderbilt Avenue between East 44th and East 47th Streets

This multi-block plaza, which would be completed in the future with the Proposed Action, would experience incremental shadows on the March 21st, May 6th, and June 21st analysis days. On the March 21st analysis day, a number of small incremental shadows would be cast intermittently for a brief duration of 43 minutes in the early morning, from 7:52 a.m. to 8:35 a.m.; in the early afternoon, an incremental shadow would enter from the west at 1:25 p.m. and travel east for 1 hour and 10 minutes, exiting the plaza at 2:35 p.m. On the May 6th analysis day, a small sliver of an incremental shadow would enter the plaza from the north at 11:45 a.m. and exit 19 minutes later, at 12:04 p.m.; a larger incremental shadow would enter from the west at 12:48 p.m., traveling east for 1 hour and 50 minutes before exiting at 2:38 p.m. On the June 21st analysis day, one small incremental shadow would be cast from 6:55 a.m. to 7:29 p.m. for 34 minutes; another small incremental shadow would be cast for 34 minutes, from 11:33 a.m. to 12:07 p.m., while a larger incremental shadow would enter from the west at 12:43 p.m. and travel east for 2 hours and 6 minutes, exiting at 2:49 p.m. According to the *CEQR Technical Manual*, shadows on project-generated open space are not considered significant under CEQR; therefore, the assessment of the shadows cast on this future plaza, which would be completed in the With-Action condition, is only included for informational purposes.

5.7.2 Historic Resources

1H – Grand Central Terminal

As shown in Table 5-8, incremental shadows resulting from the Proposed Action would reach the sunlight-sensitive exterior windows of this historic architectural resource on all four analysis days, with cumulative durations ranging from 53 minutes to 3 hours and 7 minutes.

On the March 21 analysis day, three instances of incremental shadow, with a combined duration of 3 hours and 4 minutes, would be cast on the building's sunlight-sensitive exterior windows. One incremental shadow from Potential Development Site 9 would be cast on the sunlight-sensitive windows on the southern façade along East 42nd Street at 10:43 a.m. partially covering two windows on the southern façade as it travels eastward, and would then exit at 12:17 p.m. During this time, other windows on the southern façade would continue to experience sunlight. The incremental shadow from Potential Development Site 9 would then re-emerge on the sunlight-sensitive windows on the eastern façade at 12:56 p.m., covering all three large main windows on the façade from 1:16 to 1:22 p.m., and exiting at 1:22 p.m. In the afternoon on this analysis day, an incremental shadow from Projected Site 4 would sweep over the sunlight-sensitive windows on the western façade along Vanderbilt Avenue from 2:30 p.m. to 3:32 p.m. During this sweep, the incremental shadow would wholly or partially cover at most two of the three main windows along the western façade at any one time, while the other main window, and other windows on the façade, would continue to experience a mix of sunlight and No-Action shadow. In

addition, despite the extended combined duration of these incremental shadows, there would continue to be sunlight-sensitive windows on multiple façades of the building that would be fully exposed to direct sunlight for the duration of the incremental shadows. Therefore, the incremental shadows would not substantially reduce the available sunlight, and thus they would not constitute significant adverse impacts.

Similarly, on the May 6 analysis day, multiple instances of incremental shadow from Projected Development Site 4, Potential Development Site 2 and Potential Development Site 9, with a combined duration of 3 hours and 7 minutes, would sweep over the sunlight-sensitive windows on the building's southern, eastern, and western façades. At no time would these incremental shadows eliminate sunlight to all of the windows on any one of the three façades as they sweep across the building. Therefore, they would not be considered significant adverse impacts because of their small extent and limited effects on the availability of sunlight.

On the June 21 analysis day, an incremental shadow from Projected Development Site 4 would start to sweep across the sunlight-sensitive windows on the building's western façade starting at 1:15 p.m., traveling south and east for a duration of 1 hour and 34 minutes before exiting at 2:49 p.m. Although each of the three main windows on the western façade would be covered by the incremental shadow at a different time as the incremental shadow sweeps across the façade during this duration, the effect would not be a substantial reduction in direct sunlight exposure. In the No-Action condition, these windows on the western façade would begin to be covered by shadows at 1:54 p.m., and thus the incremental shadows would only minimally change the onset time of shadows hitting the façade. Additionally, as on the March 21st analysis day, there would continue to be sunlight-sensitive windows on multiple façades of the building that would be exposed to direct sunlight during the duration of the incremental shadows. Therefore, the incremental shadows would not be considered significant adverse impacts.

On the December 21 analysis day, a narrow incremental shadow would sweep across the southern façade of the building, wholly or partially covering individual sunlight-sensitive windows between 12:35 p.m. and 1:28 p.m. as it travels eastward. In the No-Action condition on this analysis day, these sunlight-sensitive façades do not receive substantial exposure to sunlight throughout the day, and the incremental shadow resulting from the Proposed Action would not entirely cover any individual window for more than 10 minutes, while the other windows would continue to receive sunlight during the sweep.

In addition, the analysis looked separately at the five interior Lunette windows on the southern façade of the Main Concourse. The five windows are not viewable from the exterior but are located just above the entablature at the springing of the vaulted ceiling, and are lit by sunlight which comes through a lowered portion of the ceiling between Vanderbilt Hall and the Main Concourse. The windows are only affected by incremental shadow on the March 21 analysis day. Incremental shadow from Potential Site 9 would hit the westernmost window at 11:44 am and by 11:49 am would cover the westernmost two windows, while two of the other three windows would continue to receive full sunlight (the easternmost window is

continually covered by No-Action shadows during the time period). The incremental shadow would continue to quickly sweep across the windows such that portions of the three westernmost windows would be covered by 11:55, with the fourth window continuing to receive full sunlight. By 12:10 pm, this would change and three middle windows would be covered by a mix of incremental and No-Action shadows, and the westernmost window would now receive full sunlight. By 12:16 pm, the incremental shadow would move off the second westernmost window, and would have fully left it by 12:24 pm. By 12:38, the incremental shadow from Potential Development Site 9 would no longer cover any of the windows either partially or fully. Given the fast-moving nature of the incremental shadow across the five windows, and the fact that at no point would all of the windows be affected by the incremental shadows, the incremental shadows would not be considered a significant adverse impact.

As such, no significant adverse shadows impacts to the sunlight-sensitive windows of Grand Central Terminal are anticipated with the Proposed Action.

2H – St. Bartholomew's Church and Community House

The sunlight-sensitive stained-glass windows of this historic architectural resource would experience incremental shadows on all four analysis days, with durations ranging from 5 minutes to 2 hours and 50 minutes. On both the March 21st and December 21st analysis days, an incremental shadow with an extremely brief duration would be cast on the stained-glass windows along the western façade of the building. The respective durations of the incremental shadows on the March 21st and December 21st analysis days would be 5 minutes and 14 minutes. In the No-Action condition on both analysis days, the sunlight-sensitive features receive little direct sunlight exposure, and the very limited duration of the incremental shadows would not substantially reduce the available sunlight. Therefore, the incremental shadows would not result in significant adverse impacts on the March 21st or December 21st analysis days.

On the May 6th analysis day, there would be two periods of incremental shadow, one in the early morning and another in the afternoon, for a combined duration of 2 hours and 50 minutes. Incremental shadow would first be cast in the early morning by Potential Development Site 14 for a duration of 38 minutes on the westernmost stained-glass windows on the building's northern façade. For the duration of the incremental shadow, which would be cast between 8:02 a.m. and 8:40 a.m., all of the building's other stained-glass windows—on the western, southern, and northern façades—would be completely covered in No-Action shadow. At 8:02 a.m., incremental shadow would enter the stained-glass window that is closest to Park Avenue on the northern façade, traveling east and sweeping across a total of three stained-glass windows. By 8:11 a.m., the three stained-glass windows would be completely covered by incremental shadow, which would begin to dissipate by 8:25 a.m. before exiting the sunlight-sensitive features at 8:40 a.m. After the incremental shadow would exit the affected windows on the northern façade, the windows would be covered by No-Action shadow for about 9 minutes until 8:49 a.m., at which time the windows would be exposed to limited direct sunlight until approximately 9:34 a.m. The northern façade would be cast in No-Action shadow for the rest of the analysis day.

Between 12:46 p.m. and 2:02 p.m. on the May 6th analysis day, the entire western and southern façades would be exposed to sunlight; at 2:02 p.m., an incremental shadow—cast by Projected Development Site 12—would enter the western façade from the north. The incremental shadow would first sweep south across the western façade, covering all five of the stained-glass windows on this façade by 2:09 p.m., while the southern façade would continue to experience direct sunlight. While continuing to cover the western façade, the incremental shadow would enter the southern façade from the west at 2:22 p.m.; it would travel east across the southern façade, growing in size and covering all of the stained-glass windows on this façade—in addition to those on the western façade—by 3:05 p.m. By 3:16 p.m., while continuing to cover the southern façade, the incremental shadow would begin to move off the western façade, exiting the southernmost stained-glass window of that façade at 3:25 p.m., at which time the façade would be covered in No-Action shadow, which would continue for the remainder of the analysis day. Also at 3:25 p.m., the incremental shadow would begin to move off the southern façade, exiting the easternmost stained-glass window of that façade by 4:14 p.m. No-Action shadow would cover the building for the remainder of the analysis day.

Overall, on the May 6th analysis day, incremental shadow would have the following effects:

- All sunlight-sensitive stained-glass windows would be covered in shadow between 8:02 a.m. and 8:40 a.m., whereas, in the No-Action condition, the three westernmost windows on the northern façade would experience sunlight exposure during this period;
- The stained-glass windows on the western façade would be covered in shadow by 2:09 p.m. for the remainder of the analysis day, whereas, in the No-Action condition, the windows would receive sunlight until 3:25 p.m.; and
- All stained-glass windows would be covered in shadow by 3:05 p.m. for the remainder of the analysis day, whereas, in the No-Action condition, the windows on the southern façade would receive sunlight until 4:14 p.m. No-Action shadows would begin to affect some of the windows starting at 3:25.

Since the stained-glass windows are all experienced within a single large interior space, as opposed to multiple spaces where each individual space includes only a portion of the windows, the assessment of the potential impact caused by the incremental shadows considers the cumulative effect on all of the windows together. Therefore, although the stained-glass windows on the western façade would be covered in shadow by 2:09 p.m. for the remainder of the analysis day, the windows on the southern façade would continue to receive sunlight until 3:05 p.m., and thus the single large interior space would continue to experience sunlight until 3:05 p.m. However, between 8:02 a.m. and 8:40 a.m., and again between 3:05 p.m. and 4:14 p.m., the effect of the incremental shadows would be to completely eliminate all direct sunlight on the building's stained-glass windows, with the potential to affect the public's enjoyment of these features (Figure 5-5). No-Action shadows begin to affect some of the windows starting at 3:25. Therefore, the incremental shadows that would be cast by Projected Development Site 12 and Potential

Development Site 14 on the May 6th analysis day are being considered significant adverse shadows impacts.

On the June 21st analysis day, as with the May 6th analysis day, there would be two periods of incremental shadow, one in the early morning and another in the afternoon; the incremental shadows would have a combined duration of 2 hours and 11 minutes. Incremental shadow would first be cast in the early morning for a duration of 17 minutes on portions of three stained-glass windows in the center of the northern façade, entering at 8:20 a.m. and moving quickly from east to west before exiting at 8:37 a.m. Most of the building's stained-glass windows would be covered in No-Action shadow for the duration of the incremental shadow, and as a result of the incremental shadow, all of the building's stained-glass windows would be completely covered in shadow for a very brief period of 9 minutes between 8:20 a.m. and 8:29 a.m. However, this is not considered significant because the duration is less than 10 minutes. By 8:29 a.m., the westernmost stained-glass windows on the northern façade would begin to receive sunlight exposure, which would continue until approximately 10:09 a.m., at which time the façade would be covered in No-Action shadow, which would remain for the rest of the analysis day.

Between 12:43 p.m. and 2:01 p.m. on the June 21st analysis day, the entire western and southern façades would be exposed to sunlight; at 2:01 p.m., an incremental shadow—cast by Projected Development Site 12—would enter the western façade from the west, covering all of the stained-glass windows on this façade while the southern façade would continue to experience direct sunlight. While continuing to cover the western façade, the incremental shadow would enter the southern façade from the west at 2:03 p.m.; it would travel east across the southern façade, growing in size and covering all of the stained-glass windows on this façade—in addition to those on the western façade—by 2:40 p.m. By 3:01 p.m., while continuing to cover the southern façade, the incremental shadow would begin to move off the western façade, exiting the southernmost stained-glass window of that façade at 3:16 p.m., at which time the façade would experience 5 minutes of direct sunlight before being covered in No-Action shadow, which would continue for the remainder of the analysis day. At 3:23 p.m., the incremental shadow would begin to move off the southern façade, exiting the easternmost stained-glass window of that façade by 3:55 p.m. No-Action shadow would cover the building for the remainder of the analysis day.

Overall, on the June 21st analysis day, incremental shadow would have the following effects:

- All sunlight-sensitive stained-glass windows would be covered in shadow between 8:20 a.m. and 8:29 a.m., whereas, in the No-Action condition, portions of three windows in the center of the northern façade would experience sunlight exposure during this period;
- The stained-glass windows on the western façade would be completely covered in shadow between 2:01 p.m. and 2:59 p.m., whereas, in the No-Action condition, the windows would receive direct sunlight exposure during this period; and

- Stained-glass windows would be mostly covered in shadow by 3:23 p.m. for the remainder of the analysis day, whereas, in the No-Action condition, the windows on the southern façade would receive sunlight until 3:55 p.m.

As discussed in the context of the May 6th analysis day, since the sunlight-sensitive stained-glass windows are all experienced within a single large interior space, as opposed to multiple spaces where each individual space experiences only a portion of the windows, the assessment of the potential impact caused by the incremental shadows considers the cumulative effect on all of the windows together. Therefore, as mentioned previously, the incremental shadow that would be cast in the morning on the June 21st analysis day is not considered significant because the effect of completely eliminating sunlight exposure to the single large interior space would be limited to a duration of less than 10 minutes. Furthermore, although the stained-glass windows on the western façade would be covered in shadow by 2:01 p.m. for the remainder of the analysis day, the windows on the southern façade would continue to receive sunlight until 3:23 p.m., and thus the single large interior space would continue to experience sunlight until 3:23 p.m. However, between 3:23 p.m. and 3:55 p.m., the effect of the incremental shadows would be to completely eliminate all direct sunlight on the building's stained-glass windows, with the potential to affect the public's enjoyment of these features (Figure 5-5). As a result, the incremental shadow that would be cast by Projected Development Site 12 on the June 21st analysis day is being considered a significant adverse shadows impact.

4H – St. Patrick's Cathedral

As shown in Table 5-8, incremental shadows resulting from the Proposed Action would reach the sunlight-sensitive stained-glass windows of this historic architectural resource on all four analysis days, with durations ranging from 11 minutes to 2 hours and 10 minutes. The first analysis below considers the effects of the incremental shadows on the stained glass windows of the Cathedral, taken as a whole. A second analysis is also included below which separately considers the incremental shadows on the Lady Chapel, which is experienced as a distinct space within the Cathedral.

The Cathedral

On the March 21st analysis day, incremental shadows would enter a few of the stained-glass windows on the building's southern façade at 9:26 a.m. and sweep across a few of the stained-glass windows on the building's eastern façade, before exiting the sunlight-sensitive features at 10:58 a.m., 1 hour and 32 minutes later. Despite the relatively long duration of the incremental shadows, they would not cause a substantial reduction in sunlight exposure, as they would only intermittently pass over a few of the numerous stained-glass windows located around the perimeter of the building, and others would continue to receive sunlight during this time period. Therefore, the incremental shadows on the March 21st analysis day would not constitute a significant shadow impact. Furthermore, the incremental shadows on the December 21st analysis day would similarly not cause a significant adverse impact; the incremental

shadow would have a very brief duration of only 11 minutes and would be very small in extent, only entering the corner of one stained-glass window on the building's eastern façade.

On the May 6th analysis day, incremental shadow would be cast on stained-glass windows on the eastern and northern façades of St. Patrick's Cathedral for a total duration of 1 hour and 34 minutes. At 7:09 a.m., as sunlight would continue to be exposed on the stained-glass windows along the western section of the building's northern façade, incremental shadow would enter the southernmost stained-glass window on the eastern façade. The incremental shadow would travel north, first entering the stained-glass windows on the eastern section of the northern façade at 7:11 a.m. and then those on the northern section of the eastern façade at 7:16 a.m. By 7:49 a.m., as the incremental shadow would continue traveling north, it would begin to sweep across several stained-glass windows on the western section of the northern façade, in addition to those on the eastern section of that façade. At 8:05 a.m., the incremental shadow would begin to move off the northern façade and would exit the last stained-glass window at 8:43 a.m., replaced by sunlight. Throughout the duration of the incremental shadow, there would continue to be multiple stained-glass windows on the western section of the northern façade that would receive direct sunlight (Figure 5-5). Under an approach which considers the cumulative effects of incremental shadows on all of the windows in St. Patrick's Cathedral together, while the incremental shadow would have a relatively long duration of 1 hour and 34 minutes, and would at times have a large extent as it would sweep across a number of stained-glass windows, at no time would the incremental shadow completely eliminate all direct sunlight on the building's stained-glass windows. As such, the incremental shadow would not cause a substantial reduction in sunlight available for the enjoyment of the building's sunlight-sensitive features, and thus the incremental shadow would not result in a significant adverse impact.

On the June 21st analysis day, as with the May 6th analysis day, incremental shadow would be cast on sunlight-sensitive stained-glass windows on the building's eastern and northern façades; the total duration of incremental shadow would be 2 hours and 10 minutes. At 6:48 a.m., incremental shadow would enter the stained-glass window on the second story of the building's eastern façade. The incremental shadow would travel north, covering the window at 6:55 a.m., at which time all of the building's other stained-glass windows would be covered in No-Action shadow; however, by 6:57 a.m., the northernmost stained-glass windows on the eastern façade would begin to experience direct sunlight. The incremental shadow would continue traveling north, growing in size as it sweeps across the eastern half of the building, at times covering the stained-glass windows on both the eastern façade and the eastern section of the northern façade; the western section of the northern façade would remain unaffected by the incremental shadow, and would continue to receive direct sunlight (Figure 5-5). By 8:10 a.m., the incremental shadow would begin to move off the building and would exit the stained-glass windows on the northern façade at 8:58 a.m., replaced by sunlight. Under an approach which considers the cumulative effects of the incremental shadows on all of the windows in St. Patrick's Cathedral together, while the incremental shadow would have a relatively long duration of 2 hours and 10 minutes, and would at times have a large

extent as it would sweep across a number of stained-glass windows, the incremental shadow would only eliminate all direct sunlight on the building's stained-glass windows for a very brief period of 2 minutes between 6:55 a.m. and 6:57 a.m. This is not considered significant because the effect of completely eliminating sunlight exposure to the windows of the Cathedral would be limited to a duration of less than 10 minutes. As such, the incremental shadow would not cause a substantial reduction in sunlight available for the enjoyment of the building's sunlight-sensitive features, and thus the incremental shadow would not result in a significant adverse impact.

Lady Chapel

On the March 21st analysis day, in the No-Action condition, sunlight begins to hit one of the southern windows of Lady Chapel at 9:58 a.m. By 10:01 a.m., one of the windows would experience full sunlight. By 10:18 a.m., the two windows on the southern façade and the closest window on the eastern façade experience full sunlight, and by 10:30 a.m., the two southern windows and the three windows of the eastern façade experience full sunlight. Beginning at 10:30 a.m., No-Action shadow begins to sweep across the southern and eastern façades such that as of 10:45 a.m., the two southern windows are in shadow while the three eastern façade windows continue to experience sunlight. By 10:58 a.m., all the windows on the southern and eastern façades are again in No-Action shadow. During this period, the two windows on the northern façade of Lady Chapel experience No-Action shadow from other buildings or the Cathedral itself.

Under the Proposed Action, on the March 21st analysis day, Projected Development Site 12 would remove sunlight from the windows on the southern and eastern façades starting at 10:07 a.m. until 10:58 a.m., thereby removing all remaining sunlight for this period. Lady Chapel would continue to experience sunlight at other times of the day—from 11:58 a.m. to 1:24 p.m., and from 1:28 p.m. to 2:40 p.m., a total two hours and thirty eight minutes. Given that the incremental shadow from Projected Development Site 12 would eliminate remaining sunlight on Lady Chapel windows during the morning, and that the incremental shadow would remove nearly a quarter of the sunlight on this analysis day as a whole, this incremental shadow would be considered a significant adverse impact.

On the May 6th analysis day, in the No-Action condition, sunlight begins to hit one of the northern windows of Lady Chapel at 7:31 a.m. By 7:45 a.m., the two northern windows are in sunlight. This sunlight sweeps quickly across the windows. By 7:52 a.m., only one of the northern windows would experience sunlight, and by 8:00 a.m., both northern windows would again be in No-Action shadow. During this period, all other windows on the other façades of Lady Chapel would experience No-Action shadows from other buildings or the Cathedral itself.

Under the Proposed Action, on the May 6th analysis day, Potential Development Site 6 would remove sunlight from the two windows on the northern façade during the period from 7:31 a.m. to 8:00 a.m., thereby removing all remaining sunlight for this period. The Lady Chapel would continue to experience

sunlight at other times of the day—from 10:50 a.m. to 1:33 p.m., and from 3:27 p.m. to 4:45 p.m., a total of four hours and one minute. Given that with the incremental shadow that there would remain substantial periods of sunlight in the morning, and that the incremental shadows would remove only a small portion (11 percent) of the time the Lady Chapel receives sunlight on this analysis day as a whole, this incremental shadow would not be considered a significant adverse impact.

On the June 21st analysis day, in the No-Action condition, sunlight begins to hit one of the northern windows on the Lady Chapel at 7:45 a.m., and by 7:59 a.m. the two northern windows and the closest eastern window receive sunlight. Starting at 8:10 a.m., No-Action shadow would begin to sweep across the northern façade so that both northern windows and the closest eastern window would be in shadow again by 8:44 a.m. During this period, all other windows on Lady Chapel would experience No-Action shadows from other buildings or the Cathedral itself.

Under the Proposed Action, on the June 21st analysis day, Potential Development Site 6 would remove sunlight from the northern and one of the eastern windows of Lady Chapel during the period from 7:45 a.m. to 8:44 a.m., thereby removing all remaining sunlight for this period. The Lady Chapel would continue to experience sunlight at other times of the day—from 10:25 a.m. to 1:27 p.m., and from 2:55 a.m. to 4:37 p.m., a total of four hours and 44 minutes. Given that with the incremental shadow there would remain substantial periods of sunlight in the morning, and that the incremental shadows would remove only a relatively small portion (17 percent) of the time the Lady Chapel receives sunlight on this analysis day, this shadow would not be considered a significant adverse impact.

There would be no incremental shadows on the Lady Chapel on the December 21st analysis day.

7H – Swedish Seamen's Church

As shown in Table 5-8, an incremental shadow resulting from the Proposed Action would reach the sunlight-sensitive leaded-glass windows on the second floor of this architectural resource only on the March 21st analysis day. At 12:41 p.m., a very small sliver of an incremental shadow would enter the westernmost leaded-glass window from the west and would grow in size as it quickly moves east before exiting the last window 17 minutes later, at 12:58 p.m. For most of this analysis day, the leaded-glass windows are covered in No-Action shadow; the incremental shadow would be limited in extent and would quickly sweep across the sunlight-sensitive windows, which would not result in a substantial reduction in available sunlight. As such, the incremental shadow resulting from the Proposed Action would not constitute a significant adverse impact.

8H – Central Synagogue

An incremental shadow resulting from the Proposed Action would reach the stained-glass windows of this historic architectural resource only on the December 21st analysis day for a brief duration of 11 minutes. The incremental shadow would be cast on a portion of the stained-glass windows along the eastern façade of the building on Lexington Avenue in the early afternoon, entering at 1:14 p.m. and

exiting at 1:25 p.m. The limited extent and duration of the incremental shadow would not substantially reduce the available sunlight. Therefore, the incremental shadow would not result in a significant adverse impact.

9H – Christ Church United Methodist

The sunlight-sensitive stained-glass windows of this architectural resource would experience an incremental shadow only on the December 21st analysis day for a duration of approximately 21 minutes. At 12:59 p.m., incremental shadow cast by Projected Development Site 18 would enter the stained-glass windows on the eastern façade of Christ Church United Methodist. The incremental shadow would travel north, and by 1:04 p.m., it would cover all of the stained-glass windows on the eastern façade; the stained-glass windows on the southern façade would be completely covered by No-Action shadow. Between 1:04 p.m. and 1:15 p.m., the incremental shadow would continue traveling north, sweeping across the eastern façade; it would then begin to travel east. By 1:20 p.m., the incremental shadow would exit the stained-glass windows, and the entire façade would be exposed to sunlight. At 1:48 p.m., No-Action shadow would cover the entire building, which would continue for the remainder of the analysis day.

As a result of the incremental shadow, the stained-glass windows on the eastern façade would be completely covered between 1:04 p.m. and 1:18 p.m., whereas, in the No-Action condition, these windows would be exposed to sunlight during this time period. For the entire day on the December 21st analysis day, the stained-glass windows on the southern façade would be covered in No-Action shadow, and would thus not be exposed to any sunlight. Therefore, between 1:04 p.m. and 1:18 p.m., all of the building's stained-glass windows would be completely covered by shadow (Figure 5-5). Since the incremental shadow would completely eliminate all direct sunlight on the sunlight-sensitive features of this resource, albeit for a brief duration of approximately 14 minutes, it could have the potential to affect the public's enjoyment of these features. The limited duration of the incremental shadow is considered substantial in this case because in the No-Action condition, the building's sunlight-sensitive features would only be exposed to sunlight for approximately 53 minutes, from 12:55 p.m. to 1:48 p.m., and thus the incremental shadow would result in a substantial reduction of available sunlight. Consequently, the incremental shadow that would be cast by Projected Development Site 18 on the December 21st analysis day is being considered a significant adverse shadows impact.

10H – Lescaze Building

As shown in Table 5-8, an incremental shadow resulting from the Proposed Action would reach the sunlight-sensitive glass block, glass bricks, and ribbon windows of this historic architectural resource only on the June 21st analysis day. The incremental shadow would be cast on the northern portion of the sunlight-sensitive feature on the southern façade of the building on East 48th Street in the late afternoon, entering at 5:02 p.m. and exiting at 5:10 p.m. Since this incremental shadow would have a duration of less than 10 minutes, and the sunlight-sensitive features would continue to receive substantial direct sunlight on this analysis day, the incremental shadow is not considered significant under CEQR.

11H – Chanin Building

As shown in Table 5-8, incremental shadows resulting from the Proposed Action would reach the sunlight-sensitive façades of this historic architectural resource—comprising terra cotta art and a massive band of bas relief designs—on the March 21st, May 6th, and June 21st analysis days, with durations ranging from 35 minutes to 1 hour and 57 minutes. On the March 21st analysis day, incremental shadow would enter the northern section of the building's eastern façade at 7:41 a.m. and would travel north, entering the eastern section of the northern façade at 7:56 a.m. By 8:03 a.m., the incremental shadow would cover all of the sunlight-sensitive features of the northern façade; all of the sunlight-sensitive features of the eastern façade would be covered by a combination of No-Action and incremental shadows. The incremental shadow would continue to sweep across the entire northern façade until 8:14 a.m., at which time it would begin to move off the façade. It would exit the northern façade at 8:16 a.m., and the façade would then receive direct sunlight exposure for approximately 30 minutes before being covered by No-Action shadow. Overall, the incremental shadow would only eliminate all direct sunlight on the building's sunlight-sensitive features for a brief period of 10 minutes between 8:03 a.m. and 8:13 a.m., which would not cause a substantial reduction in sunlight available for the enjoyment of the features. Therefore, the incremental shadow on the March 21st analysis day would not result in a significant adverse impact.

On the May 6th and June 21st analysis days, incremental shadows would be cast along the sunlight-sensitive southern façade of the Chanin Building in the late morning and early afternoon, with durations of 1 hour and 1 hour and 57 minutes, respectively. As shown in Figure 5-5, although portions of the southern façade would be cast in incremental shadow on both analysis days, other portions of the southern façade, as well as the entire eastern façade, would continue to receive substantial sunlight during the durations of the incremental shadows. Therefore, on these two analysis days, the incremental shadows would not substantially reduce the sunlight available for the enjoyment or appreciation of the sunlight-sensitive features of this historic architectural resource. As such, the incremental shadows would not result in a significant adverse shadows impact.

12H – Beaux-Arts Apartments

As shown in Table 5-8, the projected and potential development sites would cast incremental shadows on the sunlight-sensitive southern façade of the Beaux-Arts Apartments—comprising a composition of light and dark brick—during the late afternoon on the March 21st, May 6th, and June 21st analysis days. On the March 21st analysis day, very small and intermittent incremental shadows would sweep across the top of the building's southern façade, entering from the west and traveling east for a combined duration of 47 minutes before exiting the sunlight-sensitive feature. The incremental shadow would not substantially reduce the feature's exposure to sunlight, as its extent would be extremely small in relation to the size of the façade. On the May 6th and June 21st analysis days, incremental shadows would cover several upper stories of the building's sunlight-sensitive southern façade, traveling from west to east for durations of 1 hour and 48 minutes and 49 minutes, respectively. Although portions of the building's sunlight-sensitive façade would be cast in incremental shadows for periods in the late afternoon during these two analysis

days, the façade would continue to experience direct sunlight exposure for several hours on both days, and thus the incremental shadows would not result in a substantial reduction in sunlight available for the enjoyment of the sunlight-sensitive feature. As such, no significant adverse shadows impacts to the Beaux-Arts Apartments are anticipated with the Proposed Action.

FIGURE 5-1: OPEN SPACES AND HISTORIC RESOURCES WITHIN MAXIMUM SHADOW RADIUS (TIERS 1 AND 2)

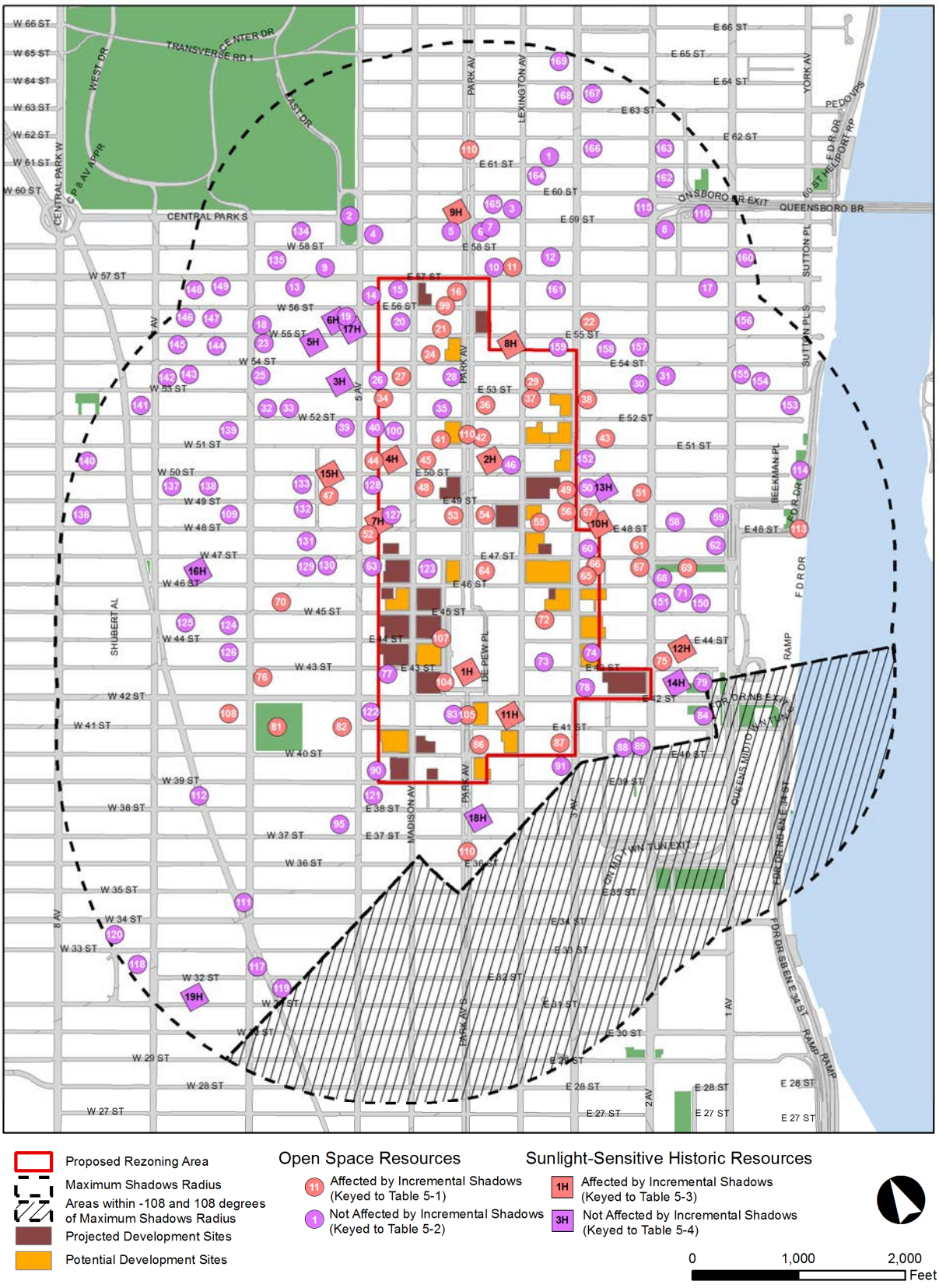


TABLE 5-1: RESOURCES OF CONCERN WITHIN DEFINED SHADOW RADIUS – OPEN SPACES AFFECTED BY INCREMENTAL SHADOWS

Map ID #	Name/Location	Description	Hours of Access	Condition	Utilization
11	135 East 57th Street	Plaza, benches, seat wall / ledges, lighting	8am - sunset	Fair / partially under construction	Low
16	450 Park Avenue	Plaza, planters, benches, garbage cans, gates	24 hours/day	Good	Low
21	Park Avenue Tower, 65 East 55th Street	Plaza, planters with seating ledges, garbage cans	24 hours/day	Excellent	Low
22	919 Third Avenue	Plaza, planters, seat wall, lighting, garbage cans	24 hours/day	Good	Low
24	535 Madison Avenue	Plaza/arcade, tables and movable chairs, trees, planters with seating ledges	24 hours/day	Excellent	Low
27	520 Madison Avenue	Plaza, trees, tables and movable chairs	24 hours/day	Good	Low
29	Citigroup Center, 153 East 53rd Street	Indoor plaza with planters, tables and movable chairs, garbage cans, lighting, heat, piano, wifi; outdoor plaza with trees, planters, garbage cans, water feature, vendors, lighting	7am-11pm, closed for events (Indoor plaza); 24 hours/day (Outdoor plaza)	Excellent	Heavy
34	HarperCollins Publishers, 10 East 53rd Street	Plaza/arcade with planters; through-block connection to 52nd Street with retail, seat wall / ledges	24 hours/day	Excellent	Low
36	Seagram Building, 375 Park Avenue	Plaza, seat wall / ledges, sculpture, water feature	24 hours/day	Excellent	Low
37	599 Lexington Avenue	Plaza, planters, benches, lighting	24 hours/day	Good	Low
38	875 Third Avenue	Indoor plaza with planters, tables and movable chairs, garbage cans, lighting, heat, food court, bathrooms; outdoor plaza/arcade with tables and movable chairs, planters with seating ledges	Mon-Sat, 7am-11pm / Sun and holidays, 11am-7pm (Indoor plaza); 24 hours/day (Outdoor plaza/arcade)	Excellent	Moderate
41	40 East 52nd Street	Plaza, seat wall / ledges, planters, sculptures, garbage cans, lighting	24 hours/day	Excellent	Low

TABLE 5-1: RESOURCES OF CONCERN WITHIN DEFINED SHADOW RADIUS – OPEN SPACES AFFECTED BY INCREMENTAL SHADOWS (CONTINUED)

Map ID #	Name/Location	Description	Hours of Access	Condition	Utilization
42	345 Park Avenue	Plaza, trees, planters with seating ledges, benches, seat wall / ledges, sculpture	24 hours/day	Good	Low
43	Greenacre Park, 217 East 51st Street	Vest-pocket park, sculptures, trees, plantings, gazebo, tables and movables chairs, marble benches, waterfall	Dawn to dusk	Excellent	Low
44	St. Patrick's Cathedral, 460 Madison Avenue	Plaza, steps	24 hours/day	Good / construction above	Moderate
45	New York Palace Hotel, 457 Madison Avenue	Courtyard, plantings	24 hours/day	Good / construction above	Low
47/15H	Rockefeller Plaza, 48th Street to 51st Street, between Fifth and Sixth Avenues	Plaza, trees, plantings, through-block connections, garbage cans, ice skating rink (seasonal), retail frontage	24 hours/day (plaza); 7am - midnight (ice skating rink, seasonal)	Excellent	Heavy
48	Wells Fargo Building, 437 Madison Avenue	Plaza/arcade, seat wall / ledges, seating steps, lighting	24 hours/day	Fair	Low
49	800 Third Avenue	Plaza/arcade, trees, planters with seating ledges, garbage cans, bicycle racks	24 hours/day	Good	Low
51	Sterling Plaza, 255 East 49th Street	Plaza, trees, planters with seating ledges, benches, seat wall / ledges, lighting, sculpture, bicycle racks	24 hours/day	Good	Moderate
52	Tower 49, 12 East 49th Street	Plaza/arcade, trees, planters, marble benches, seat wall / ledges	24 hours/day	Excellent	Low
53	280 Park Avenue	Plaza, trees, planters with seating ledges, tables and movable chairs, lighting	24 hours/day	Good	Low
54	299 Park Avenue	Plaza/arcade, trees, planters, benches, garbage cans	24 hours/day	Good	Low

TABLE 5-1: RESOURCES OF CONCERN WITHIN DEFINED SHADOW RADIUS – OPEN SPACES AFFECTED BY INCREMENTAL SHADOWS (CONTINUED)

Map ID #	Name/Location	Description	Hours of Access	Condition	Utilization
55	Cosmopolitan Condominiums, 141 East 48th Street	Plaza, trees, planters with seating ledges, seat wall / ledges	24 hours/day	Good	Low
56	780 Third Avenue	Plaza, seat wall / ledges, lighting, food trucks	24 hours/day	Good	Moderate
57	777 Third Avenue	Plaza/arcade, benches, seating swing, trees, planters	24 hours/day	Good	Moderate
61	1 Dag Hammarskjold Plaza, 885 Second Avenue	Plaza, trees, planters, benches, seat wall / ledges, garbage cans	24 hours/day	Good	Low
64	245 Park Avenue	Plaza/arcade	24 hours/day	Good	Low
65	747 Third Avenue	Plaza, tables and fixed chairs, seat wall / ledges, lighting, gazebo, artwork	24 hours/day	Good	Low
66	212 East 47th Street	Plaza, benches, lighting, garbage cans	24 hours/day	Excellent	Heavy
67	Dag Hammarskjold Tower, 240 East 47th Street	Plaza, trees, planters with seating ledges, benches, lighting, garbage cans, water feature	24 hours/day	Good	Low
69	Dag Hammarskjold Plaza, 833 First Avenue	Plaza, trees, garden, benches, lighting, garbage cans, sculptures, steel lattice dome	24 hours/day	Good	Low
70	1166 Sixth Avenue	Plaza/arcade, tables and movable chairs, benches, seat walls / ledges, garbage cans, lamps, trees, plantings, sculpture, through-block connection between 45th and 46th Streets	24 hours/day	Excellent	Low
72	Two Grand Central Tower, 140 East 45th Street	Plaza/arcade, planters, garbage cans	24 hours/day	Under construction(1)	N/A
75	International Plaza, 303 East 43rd Street	Plaza, trees, planters, seats, garbage cans	24 hours/day	Under construction(1)	N/A
76	Grace Plaza, 1114 Sixth Avenue	Plaza/arcade, trees, plantings, tables and movable chairs, benches, garbage cans, water fountain, food vendor	24 hours/day	Good	Low

TABLE 5-1: RESOURCES OF CONCERN WITHIN DEFINED SHADOW RADIUS – OPEN SPACES AFFECTED BY INCREMENTAL SHADOWS (CONTINUED)

Map ID #	Name/Location	Description	Hours of Access	Condition	Utilization
81	Bryant Park, Sixth Avenue from West 40th Street to West 42nd Street	tables and movable chairs, benches, lighting, trees, monuments / fountains, drinking fountain, garbage cans, vendors, carrousel, game area, petanque courts, ping pong area, reading area, piano, ice rink (seasonal), subway access	opens at 7am daily; closing time varies with month, ranging from 7pm to midnight	Excellent	Moderate
82	New York Public Library, Fifth Avenue at 42nd Street	Plaza/terrace, tables and movable chairs, seating steps, statues, trees, plantings	24 hours/day	Excellent	Moderate
86	101 Park Avenue	Plaza/arcade, plantings, seat wall / ledges, seating steps	24 hours/day	Excellent	Low
87	Grand Central Plaza, 622 Third Avenue	Outdoor plaza with trees, planters with seating ledges, benches, seat wall / ledges, garbage cans; indoor arcade with benches, seat wall / ledges, lighting, heating; landscaped terrace with trees, planters with seating ledges, benches, tables and movable chairs, lattice, garbage cans	24 hours/day (outdoor plaza); weekdays 7am-8pm / weekends 9am-6pm (indoor arcade); varies by season (landscaped terrace)	Excellent / partially under construction	Moderate
99	40-50 East 57th Street/434 Park Avenue	No-Action plaza	24 hours/day	N/A(2)	N/A(2)
104	Vanderbilt Avenue between East 42nd and East 43rd Streets	No-Action plaza	24 hours/day	N/A(2)	N/A(2)
105	Pershing Square Plaza, Park Avenue between East 41st and East 42nd Streets	No-Action plaza	24 hours/day	N/A(2)	N/A(2)
107	Portions of Vanderbilt Avenue between East 44th and East 47th Streets	With-Action plaza	24 hours/day	N/A(2)	N/A(2)
108	1095 Sixth Avenue	Outdoor plaza with trees, planters with seating ledges, benches, tables and movable chairs, seat wall / ledges, garbage cans	24 hours/day	Excellent	Moderate
110	Park Avenue Malls	Landscaped median	24 hours/day	Excellent	N/A(3)

Sources: New York City Department of Parks and Recreation open space database; *Privately Owned Public Spaces: The New York City Experience* (2000); Parsons Brinckerhoff field surveys, conducted October and November 2012.

(1) Open space resources that are listed as "Under construction" are not currently accessible to the public, and thus there is no current utilization.
(2) Open space resources that would be created in the future either without or with the Proposed Action do not have a current condition or utilization.
(3) The Park Avenue Malls do not comprise usable open space. Therefore, there is no utilization of this open space resource.

TABLE 5-2: RESOURCES OF CONCERN WITHIN DEFINED SHADOW RADIUS – OPEN SPACES NOT AFFECTED BY INCREMENTAL SHADOWS

Map ID#	Name/Address
1	Trump Plaza, 167 East 61st Street
2	Central Park/Grand Army Plaza, Central Park South to 65th Street
3	International Plaza, 750 Lexington Avenue
4	General Motors Building, 767 Fifth Avenue
5	500 Park Tower, 500 Park Avenue
6	499 Park Avenue
7	110 East 59th Street
8	The Landmark, 300 East 59th Street
9	Solow Building, 9 West 57th Street
10	The Galleria, 115 East 57th Street
12	Architects and Designers Building, 150 East 58th Street
13	40 West 57th Street
14	Trump Tower, 725 Fifth Avenue
15	590 Madison Avenue
17	The Morrison, 360 East 57th Street
18	1370 Sixth Avenue
19	712 Fifth Avenue
20	Sony Plaza, 550 Madison Avenue
23	1350 Sixth Avenue
25	1330 Sixth Avenue
26	Paley Park, 3 East 53rd Street
28	Lever House, 390 Park Avenue
30	The Brevard, 245 East 54th Street
31	Connaught Tower, 300 East 54th Street
32	CBS, 51 West 52nd Street
33	Morgan Stanley Smith Barney, 31 West 52nd Street
35	Park Avenue Plaza, 55 East 52nd Street
39	650 Fifth Avenue
40	The Olympic Tower, 645 Fifth Avenue
46	560 Lexington Avenue
50	Crystal Pavilion, 805 Third Avenue
58	Libya House, 309 East 48th Street
59	100 United Nations Plaza/871 United Nations Plaza
60	767 Third Avenue
62	Trump World Tower, 845 First Avenue
63	575 Fifth Avenue
68	Dag Hammarskjold Plaza, 866 Second Avenue
71	Belmont Public Plaza, 320 East 46th Street
73	425 Lexington Avenue
74	685 Third Avenue
77	Emigrant Savings Bank, 6 East 43rd Street

TABLE 5-2: RESOURCES OF CONCERN WITHIN DEFINED SHADOW RADIUS – OPEN SPACES NOT AFFECTED BY INCREMENTAL SHADOWS (CONTINUED)

Map ID#	Name/Address
78	201 East 42nd Street
79	Tudor City Greens (1 of 2), Tudor City Place, East 42nd Street to East 43rd Street
83	Sculpture Court at Phillip Morris International, 120 Park Avenue
84	Tudor City Greens (2 of 2), Tudor City Place, East 41st Street to East 42nd Street
88	The Vanderbilt, 235 East 40th Street
89	Archstone, 245 East 40th Street
90	445 Fifth Avenue
91	600 Third Avenue
95	420 Fifth Avenue
100	7-11 East 51st Street/12-16 East 52nd Street (No-Action open space resource)
109	1221 Sixth Avenue
111	Herald Square, Broadway to Sixth Avenue, between West 34th and West 35th Streets
112	Green Light for Midtown - Herald Square Plaza, Broadway between 34th and 42nd Streets
114	Peter Detmold Park, FDR Drive between East 49th and East 51st Streets
115	Tramway Plaza, Second Avenue between East 59th and East 60th Streets
116	14 Honey Locusts Park, East 59th Street between First and Second Avenues
117	Greeley Square Park, Broadway to Sixth Avenue, between West 32nd and West 34th Streets
118	2 Pennsylvania Plaza
119	1250 Broadway
120	1 Pennsylvania Plaza
121	425 Fifth Avenue
122	489 Fifth Avenue
123	383 Madison Avenue
124	1155 Sixth Avenue
125	125 West 44th Street
126	1133 Sixth Avenue
127	12 East 49th Street
128	611 Fifth Avenue
129	114 West 47th Street
130	1185 Sixth Avenue
131	1211 Sixth Avenue
132	McGraw-Hill, 1221 Sixth Avenue
133	1251 Sixth Avenue
134	36 Central Park South
135	58 West 58th Street
136	235 West 48th Street
137	745 Seventh Avenue
138	1251 Sixth Avenue
139	1285 Sixth Avenue
140	1663 Broadway
141	810 Seventh Avenue

TABLE 5-2: RESOURCES OF CONCERN WITHIN DEFINED SHADOW RADIUS – OPEN SPACES NOT AFFECTED BY INCREMENTAL SHADOWS (CONTINUED)

Map ID#	Name/Address
142	825 Seventh Avenue
143	1325 Sixth Avenue
144	1345 Sixth Avenue
145	151 West 54th Street
146	156 West 56th Street
147	125 West 55th Street
148	Metropolitan Tower, 146 West 57th Street
149	Le Parker Meridien, 118 West 57th Street
150	Lausanne, 333 East 45th Street
151	301 East 45th Street
152	825 Third Avenue
153	Rivercourt, 429 East 52nd Street
154	Rivertower, 420 East 54th Street
155	Revere, 400 East 54th Street
156	400 East 56th Street
157	245 East 54th Street
158	909 Third Avenue
159	900 Third Avenue
160	410 East 58th Street
161	950 Third Avenue
162	303 East 60th Street
163	300 East 62nd Street
164	200 East 61st Street
165	118 East 60th Street
166	200 East 62nd Street
167	200 East 64th Street
168	188 East 64th Street
169	160 East 65th Street

Sources: New York City Department of Parks and Recreation open space database; *Privately Owned Public Spaces: The New York City Experience* (2000); Parsons Brinckerhoff field surveys, conducted October and November 2012.

TABLE 5-3: RESOURCES OF CONCERN WITHIN DEFINED SHADOW RADIUS – SUNLIGHT-SENSITIVE HISTORIC RESOURCES AFFECTED BY INCREMENTAL SHADOWS

Map ID#	Resource Name	Address/Location	Sunlight-Sensitive Features
1H	Grand Central Terminal	77 East 42nd Street	Windows of the Main Concourse
2H	St. Bartholomew's Church and Community House	321 Park Avenue	Stained-glass windows
4H	St. Patrick's Cathedral	631 Fifth Avenue	Stained-glass windows
7H	Swedish Seamen's Church	5 East 48th Street	Leaded-glass windows on the second floor
8H	Central Synagogue	652 Lexington Avenue	Stained-glass windows
9H	Christ Church United Methodist	520 Park Avenue	Stained-glass windows
10H	William Lescaze House and Office	211 East 48th Street	Glass block, glass bricks, and ribbon windows
11H	Chanin Building	374 Lexington Avenue, 122 East 42nd Street	Terra cotta art; massive band of bas relief designs
12H	Beaux-Arts Apartments	307,310 East 44th Street	Composition in light and dark brick
15H/ 47	Rockefeller Center: Rockefeller Plaza	48th Street to 51st Street, between Fifth and Sixth Avenues	Seating areas; vegetation

TABLE 5-4: RESOURCES OF CONCERN WITHIN DEFINED SHADOW RADIUS – SUNLIGHT-SENSITIVE HISTORIC RESOURCES NOT AFFECTED BY INCREMENTAL SHADOWS

Map ID#	Resource Name	Address/Location	Sunlight-Sensitive Features
3H	St. Thomas' Church and Parish House	678 Fifth Avenue	Stained-glass windows
5H	Rockefeller Apartments	17 West 54th Street	Turreted windows
6H	Former Coty Building	712 Fifth Avenue	Decorative glass windows
13H	Amster Yard	211-13 East 49th Street	Vegetation in the landscaped garden
14H	Ford Foundation	303 East 42nd Street	Glass-walled and sky-lit atrium
16H	The Free Church of Saint Mary The Virgin	143 West 46th Street	Stained-glass windows
17H	Fifth Avenue Presbyterian Church	7 West 55th Street	Stained-glass windows
18H	Church of Our Savior	59 Park Avenue	Stained-glass windows
19H	Church of St. Francis of Assisi	135 West 31st Street	Stained-glass windows

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES

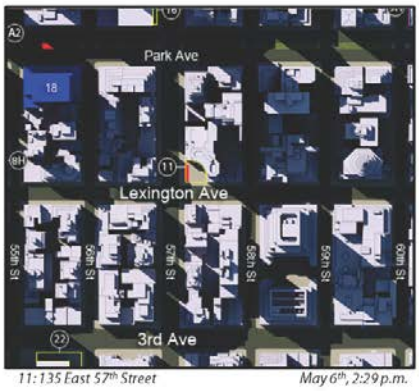


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

16: 450 Park Avenue *March 21st, 1:11 p.m.*

Projected Development Site
Potential Development Site
Open Space Resource
Historic Resource
With-Action Incremental Shadow
No-Action Incremental Shadow

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

21: Park Avenue Tower *March 21st, 11:15 a.m.*

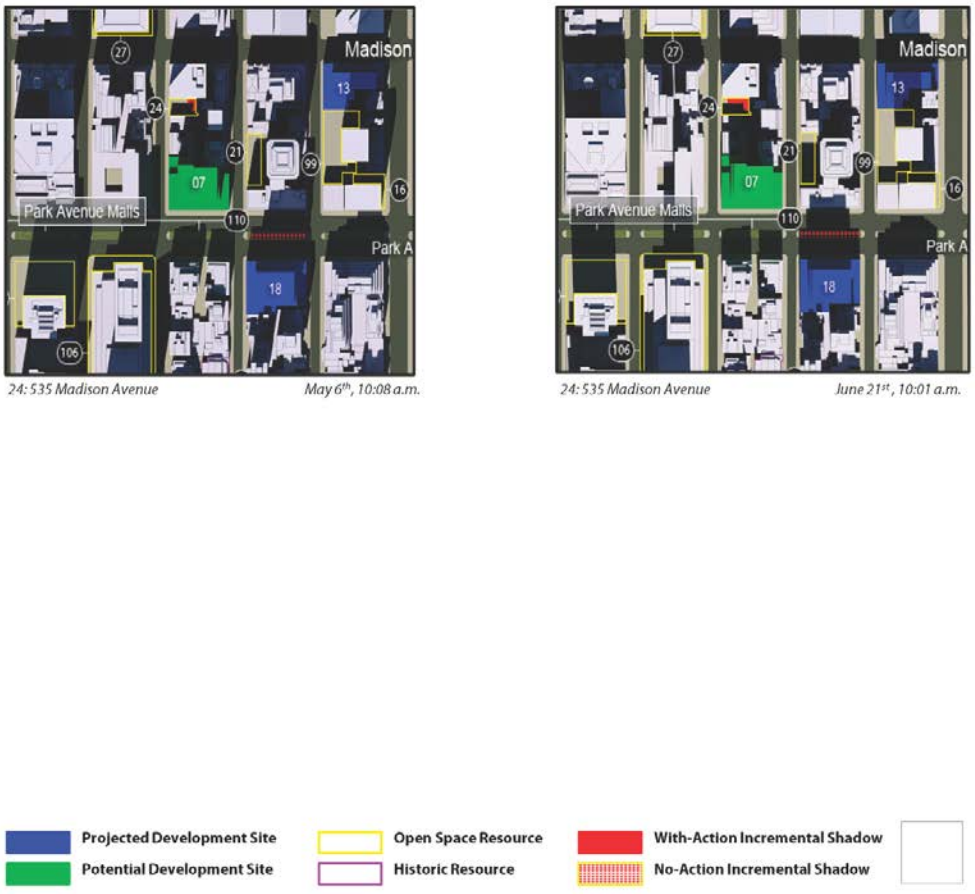
21: Park Avenue Tower *May 26th, 11:30 a.m.*

21: Park Avenue Tower *June 21st, 11:58 a.m.*

Projected Development Site
Potential Development Site
Open Space Resource
Historic Resource
With-Action Incremental Shadow
No-Action Incremental Shadow

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)



24: 535 Madison Avenue *May 6th, 10:08 a.m.*

24: 535 Madison Avenue *June 21st, 10:01 a.m.*

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

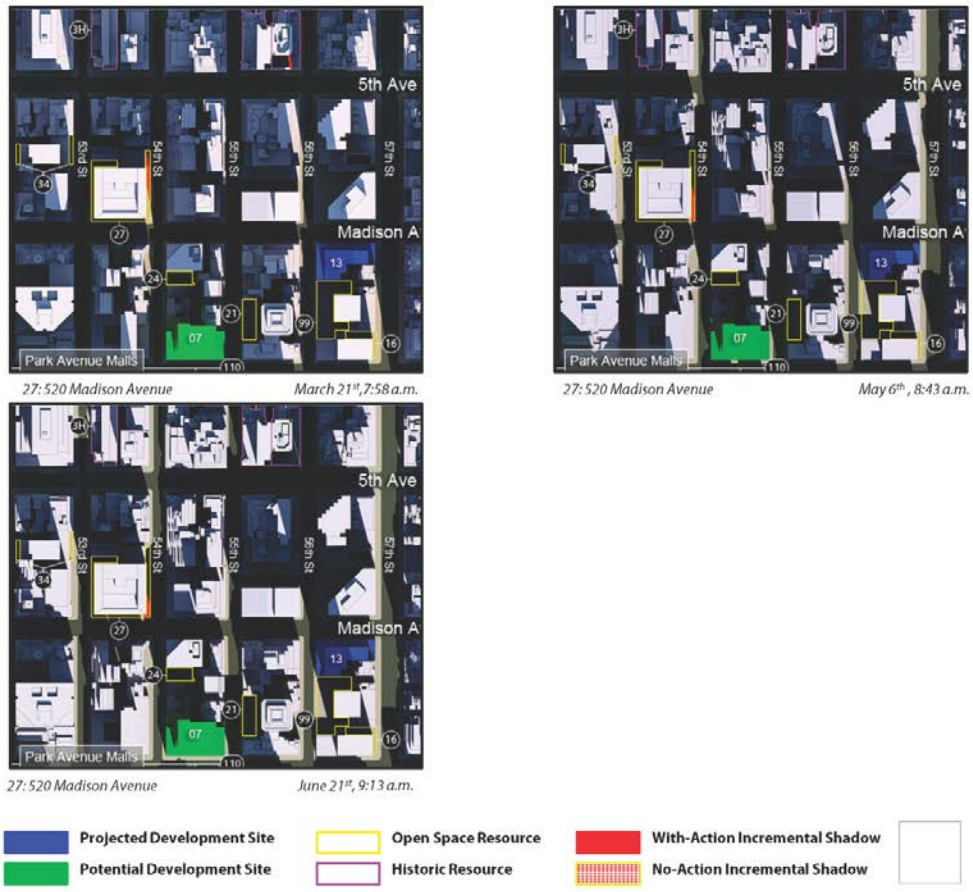


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

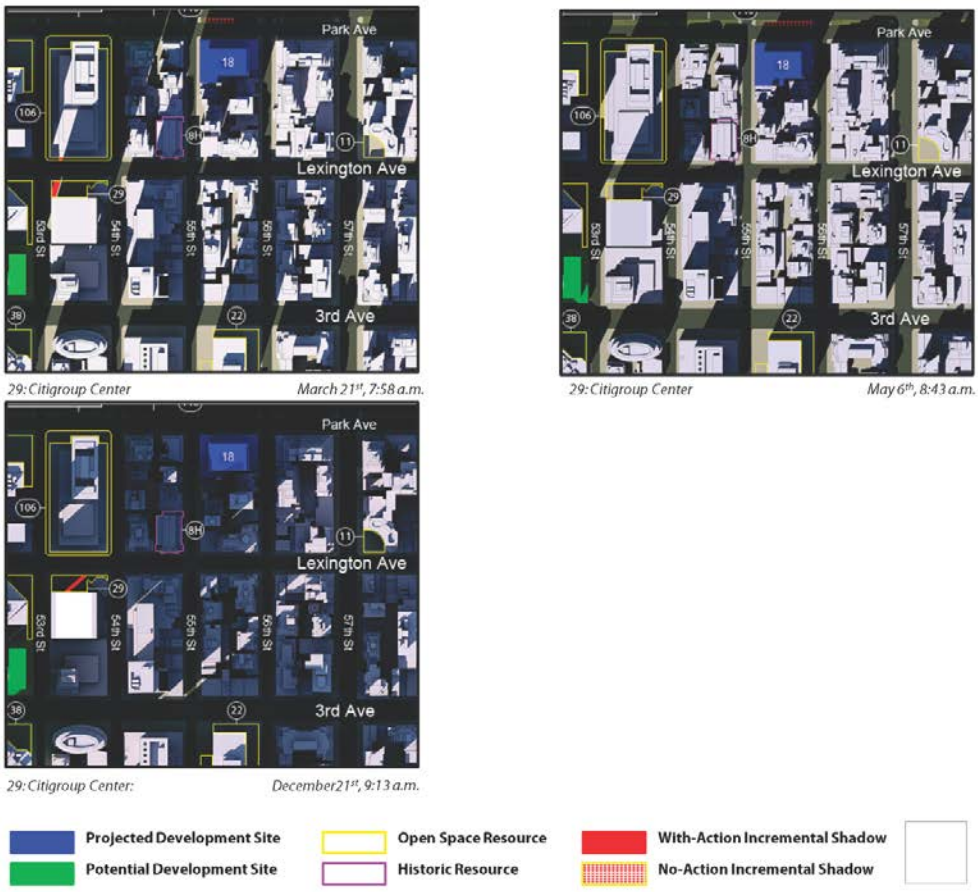


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

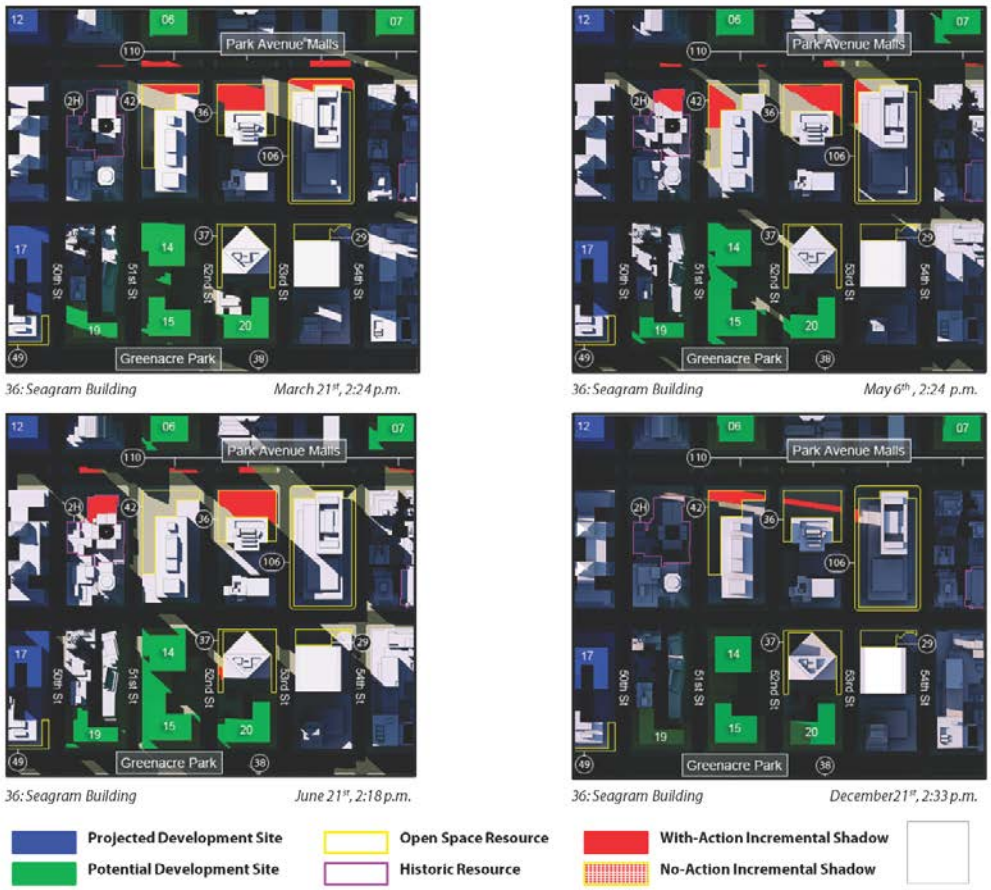


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

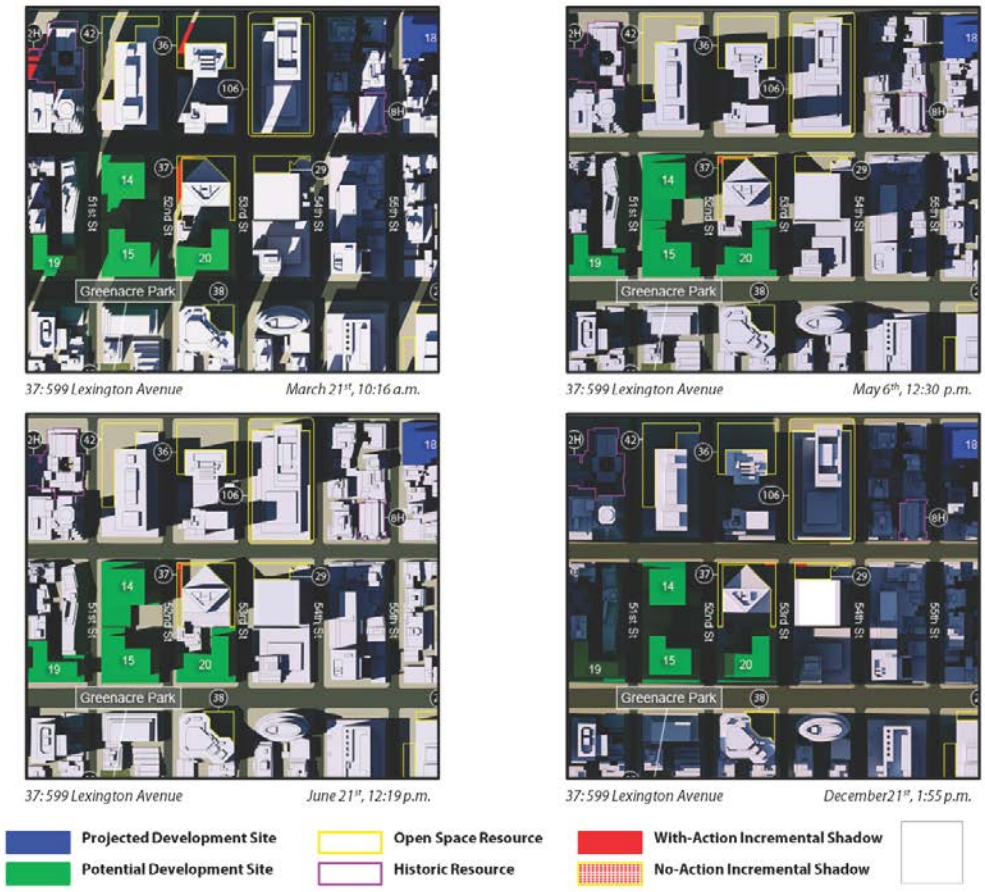


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

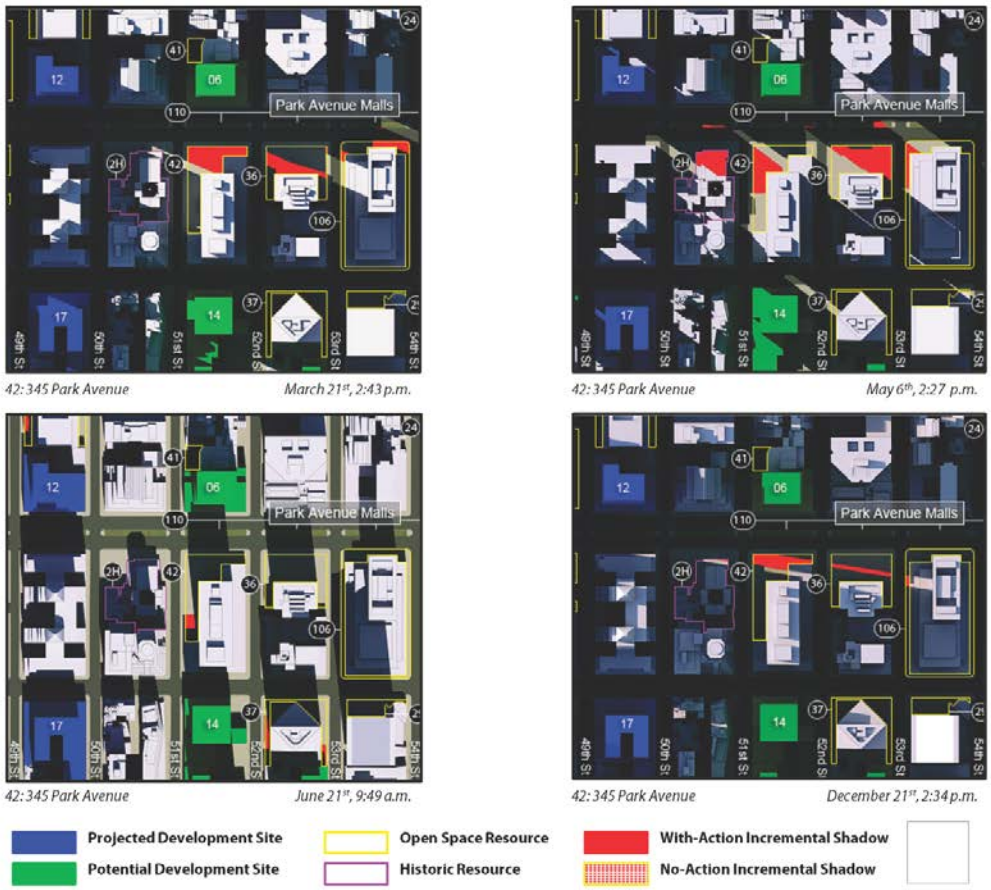
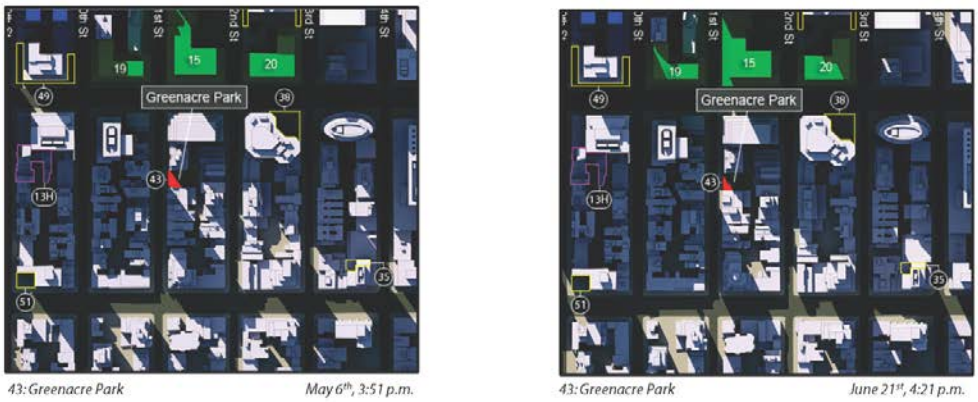


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)



43: Greenacre Park *May 6th, 3:51 p.m.*

43: Greenacre Park *June 21st, 4:21 p.m.*

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

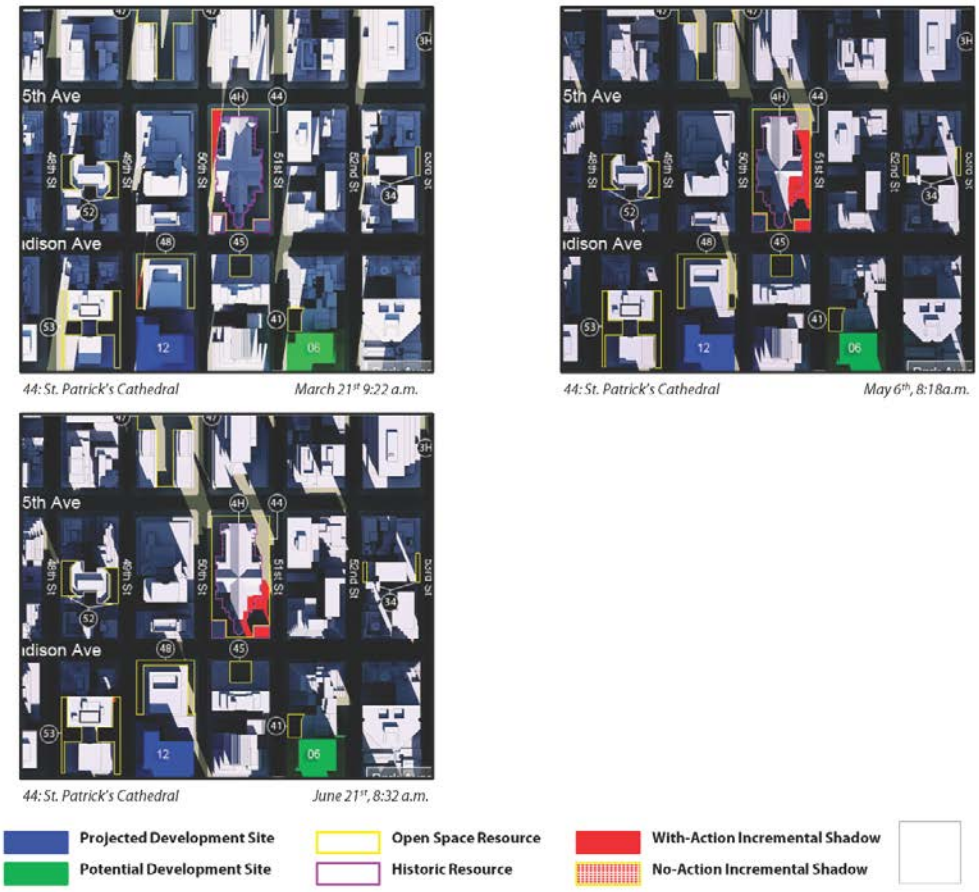
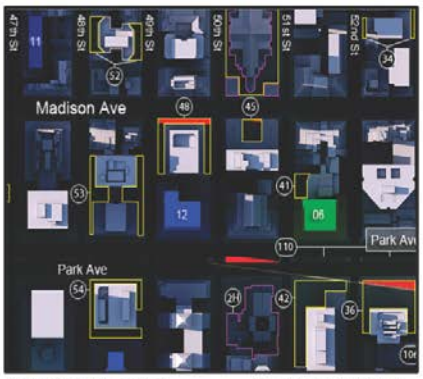


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

45: New York Palace Hotel *March 21st, 11:40 a.m.*



45: New York Palace Hotel *December 21st, 2:22 p.m.*

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

47: Rockefeller Plaza *March 21st, 8:16 a.m.*

47: Rockefeller Plaza *December 21st, 11:15 a.m.*

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

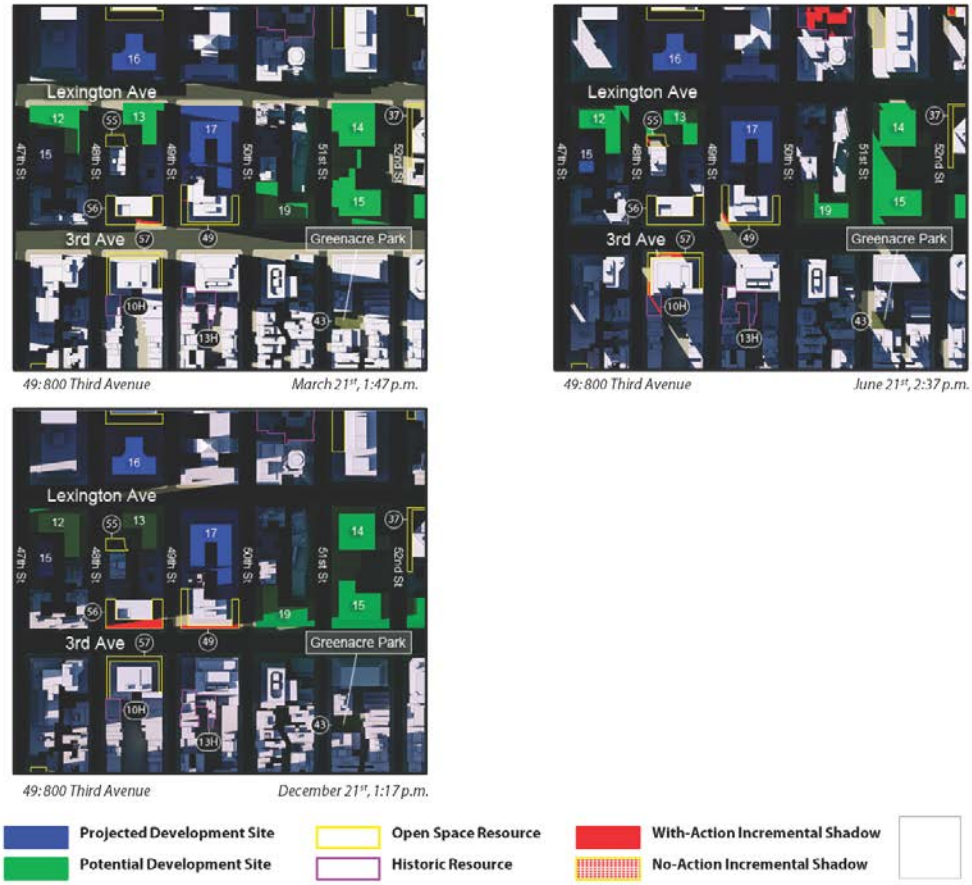


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

51: Sterling Plaza *May 6th, 4:14 p.m.*

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

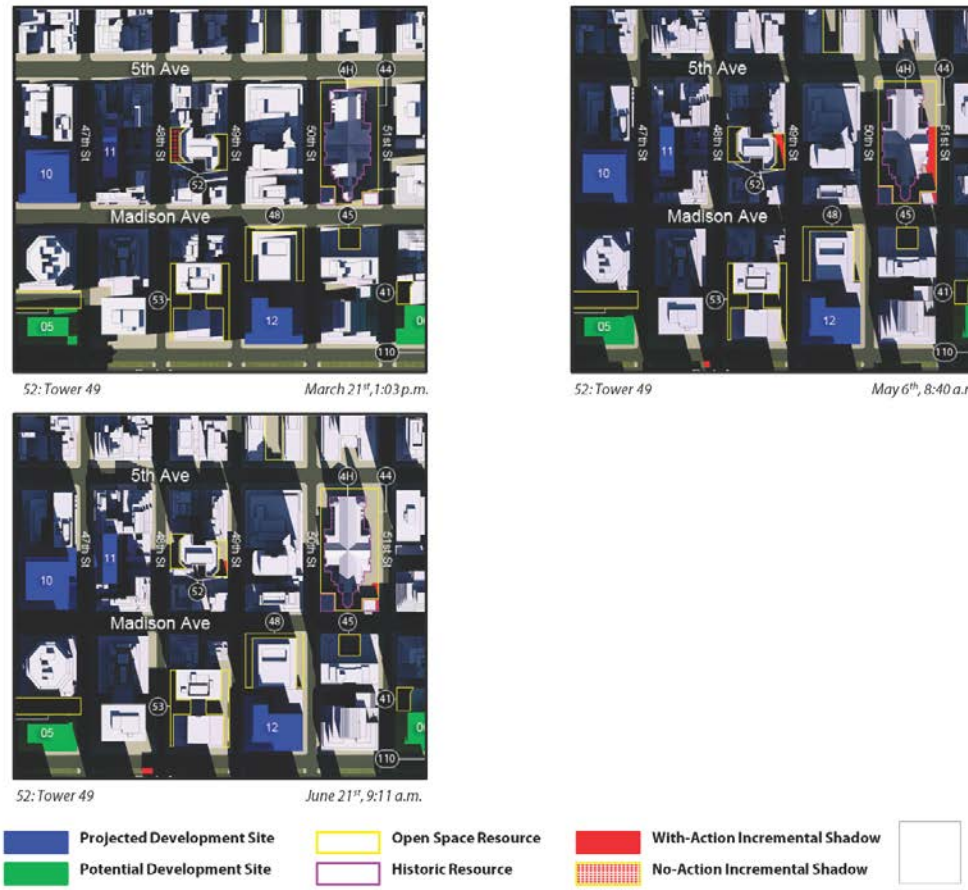


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

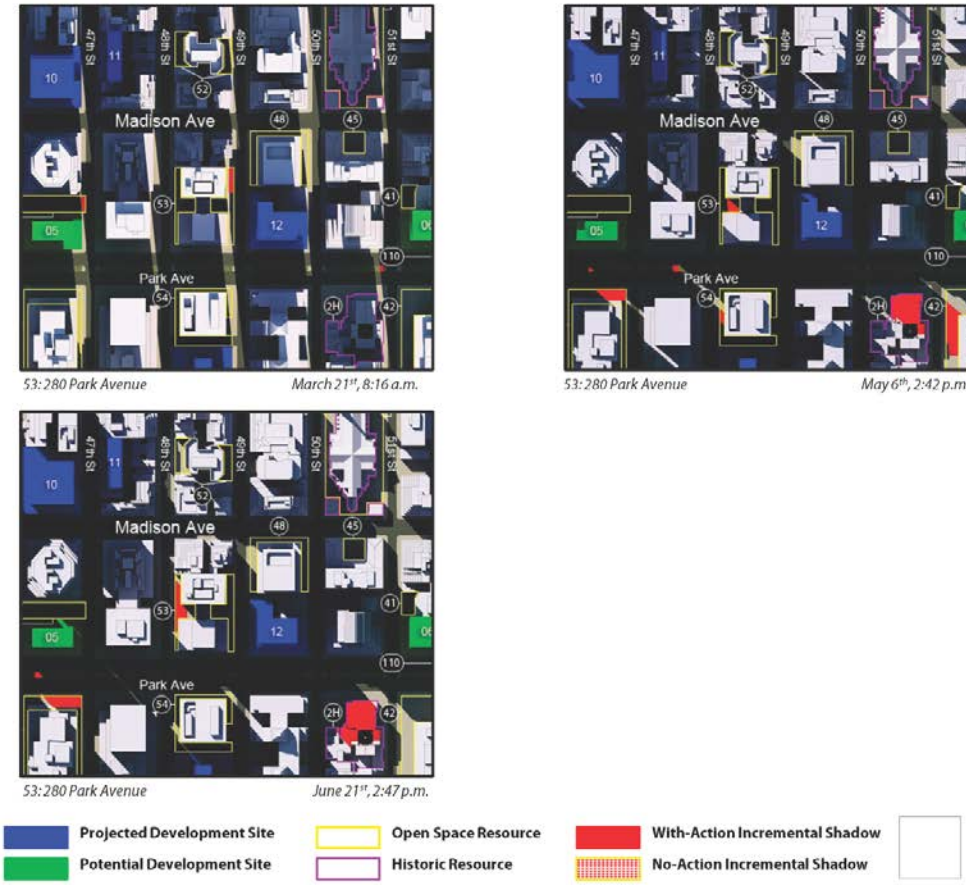
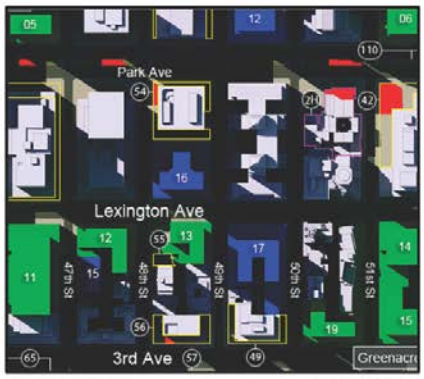
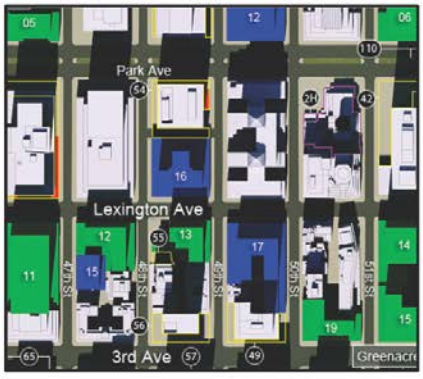


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

54: 299 Park Avenue *March 21st, 9:43 a.m.*



54: 299 Park Avenue *May 6th, 2:13 p.m.*



54: 299 Park Avenue *June 21st, 9:57 a.m.*

Projected Development Site
Potential Development Site
Open Space Resource
Historic Resource
With-Action Incremental Shadow
No-Action Incremental Shadow

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

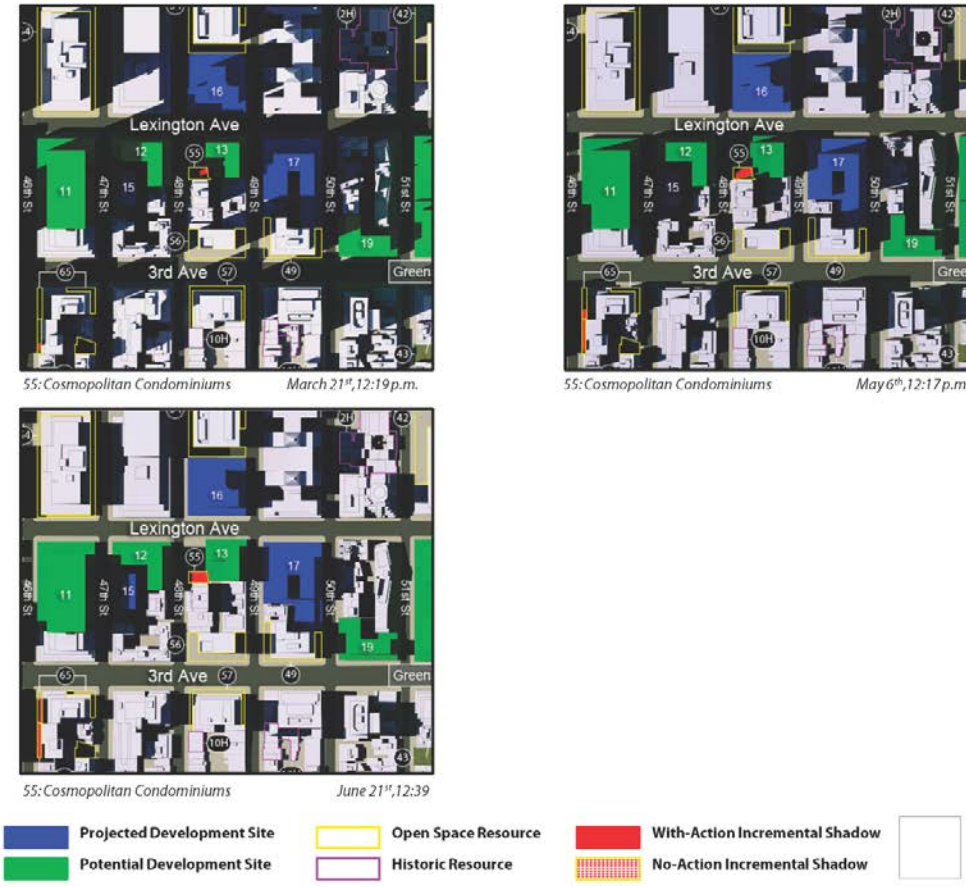


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

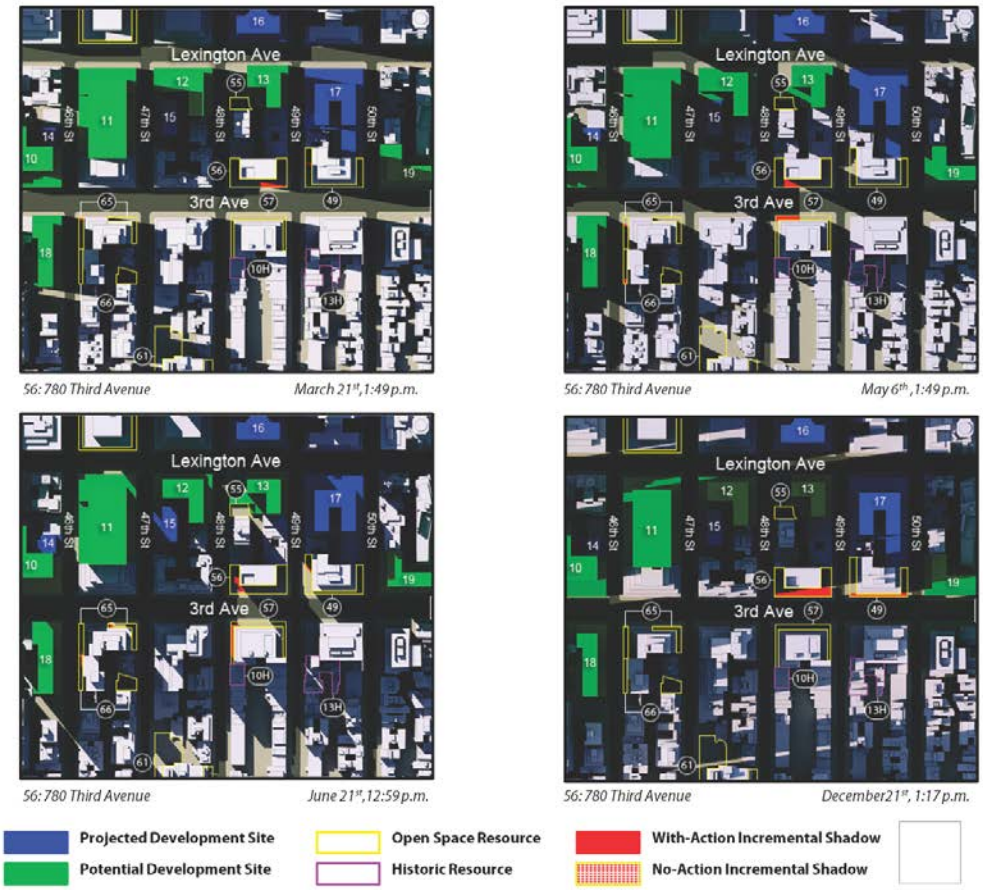


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

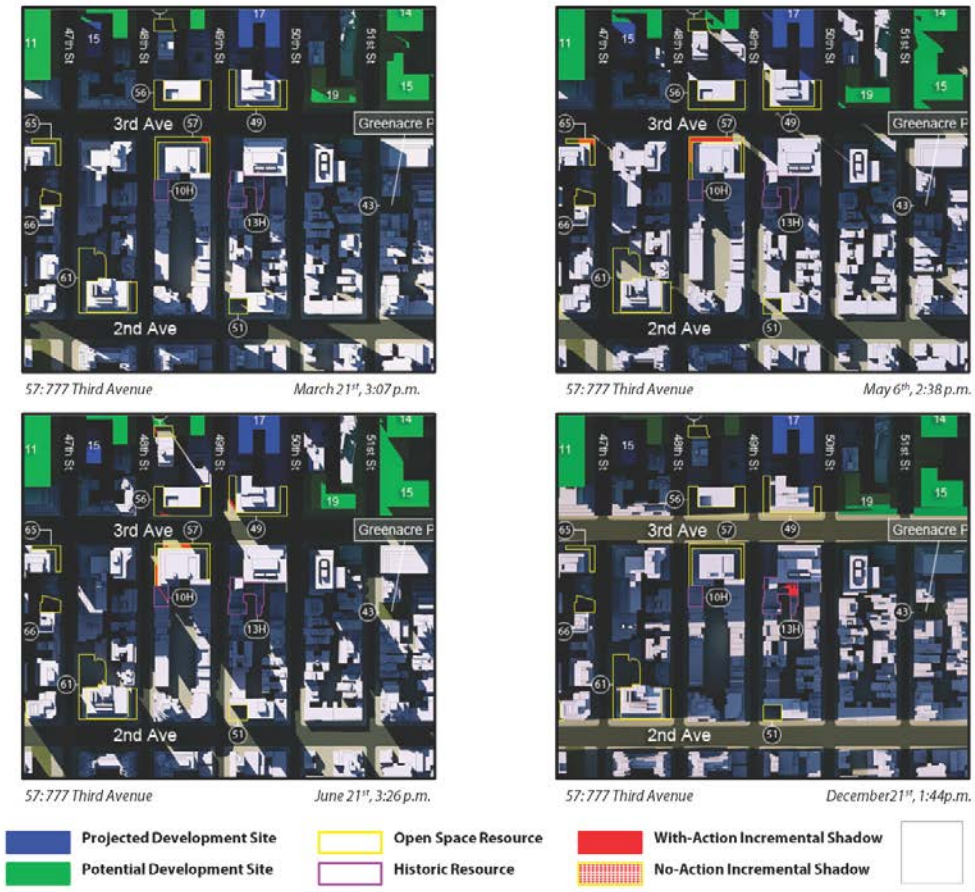


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

61: 885 Second Avenue *March 21st, 2:44 p.m.*

Projected Development Site
Potential Development Site
Open Space Resource
Historic Resource
With-Action Incremental Shadow
No-Action Incremental Shadow

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

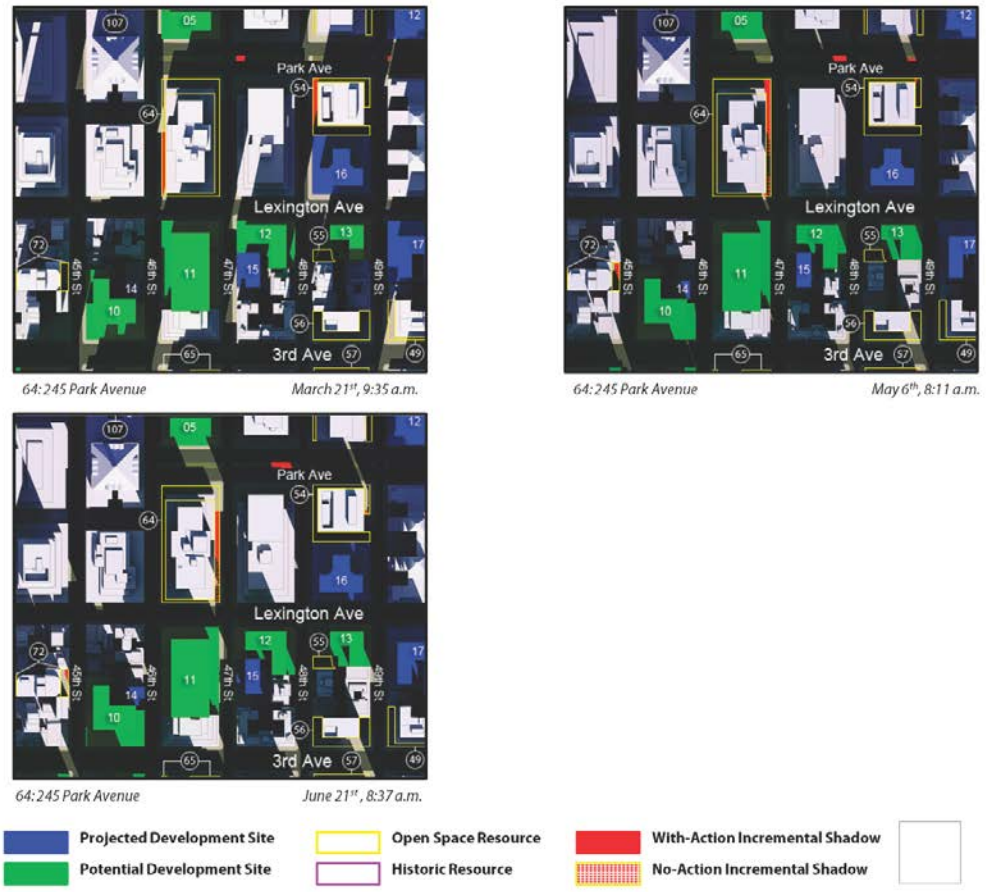


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

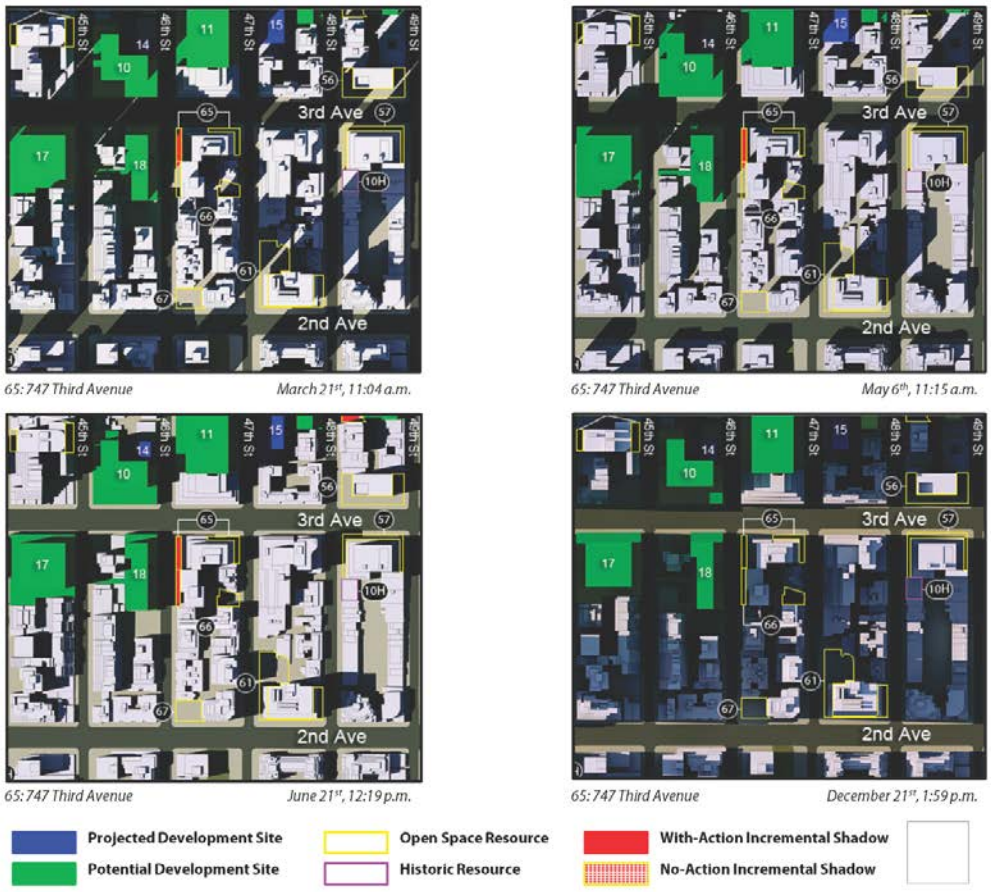


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

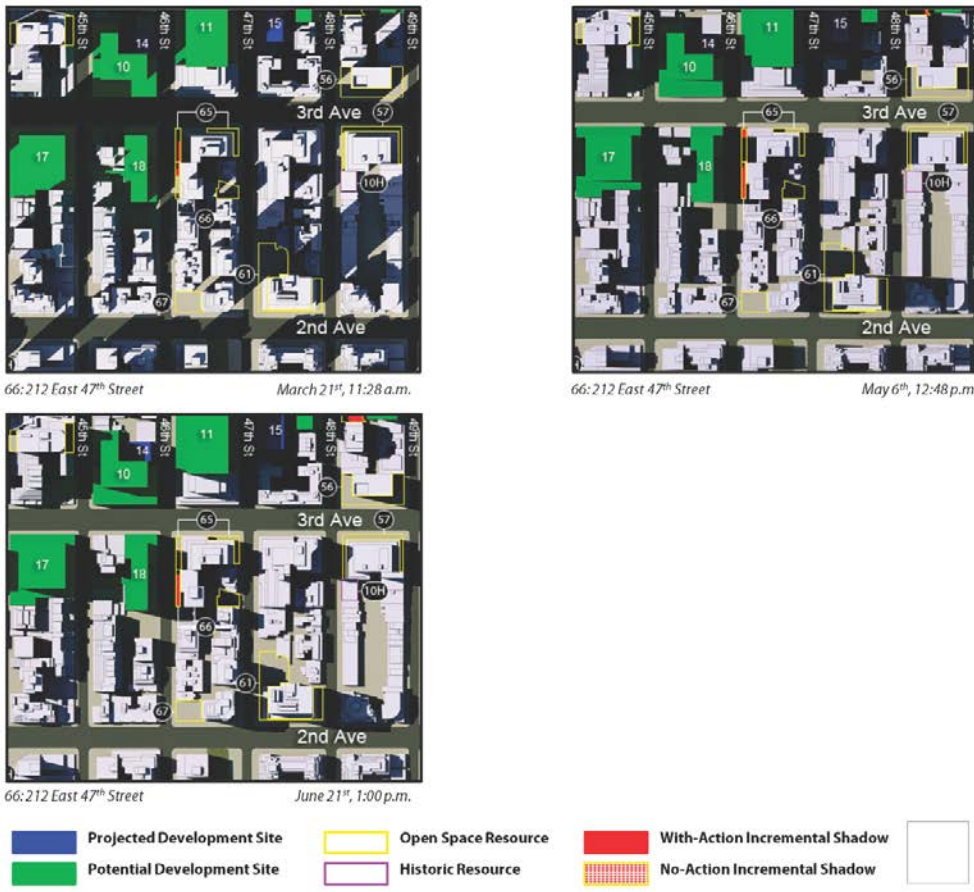


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

67: 240 East 47th Street *May 6th, 3:25 p.m.*

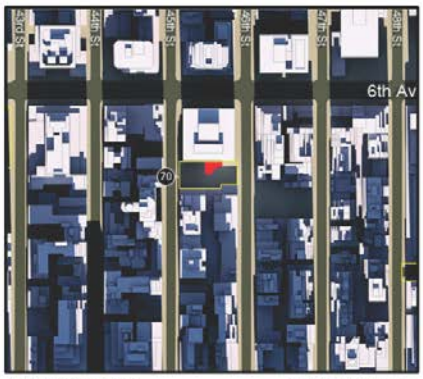
67: 240 East 47th Street *June 21st, 3:50 p.m.*

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

69: Dag Hammarskjold Plaza *May 6th, 4:36 p.m.*

69: Dag Hammarskjold Plaza *June 21st, 5:05 p.m.*

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)



70: 1166 Sixth Avenue *March 21st, 8:38 a.m.*

Projected Development Site
Potential Development Site
Open Space Resource
Historic Resource
With-Action Incremental Shadow
No-Action Incremental Shadow

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

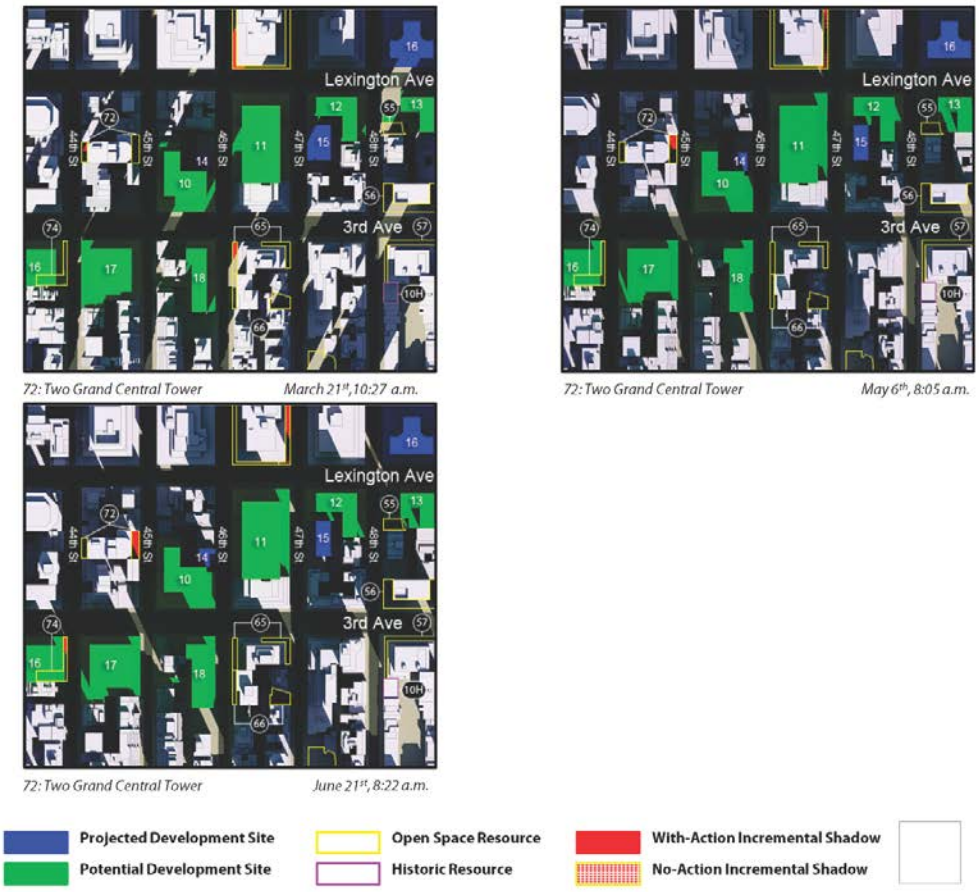
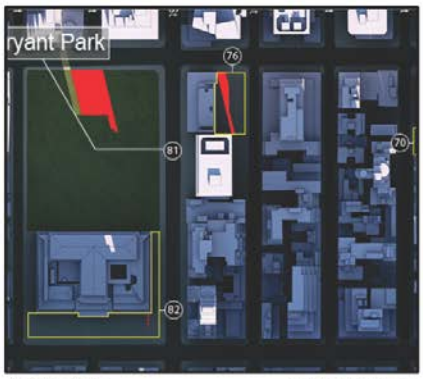


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

75: International Plaza *June 21st, 2:20 p.m.*

Projected Development Site
Potential Development Site
Open Space Resource
Historic Resource
With-Action Incremental Shadow
No-Action Incremental Shadow

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)



76: Grace Plaza *March 21st, 7:36 a.m.*

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

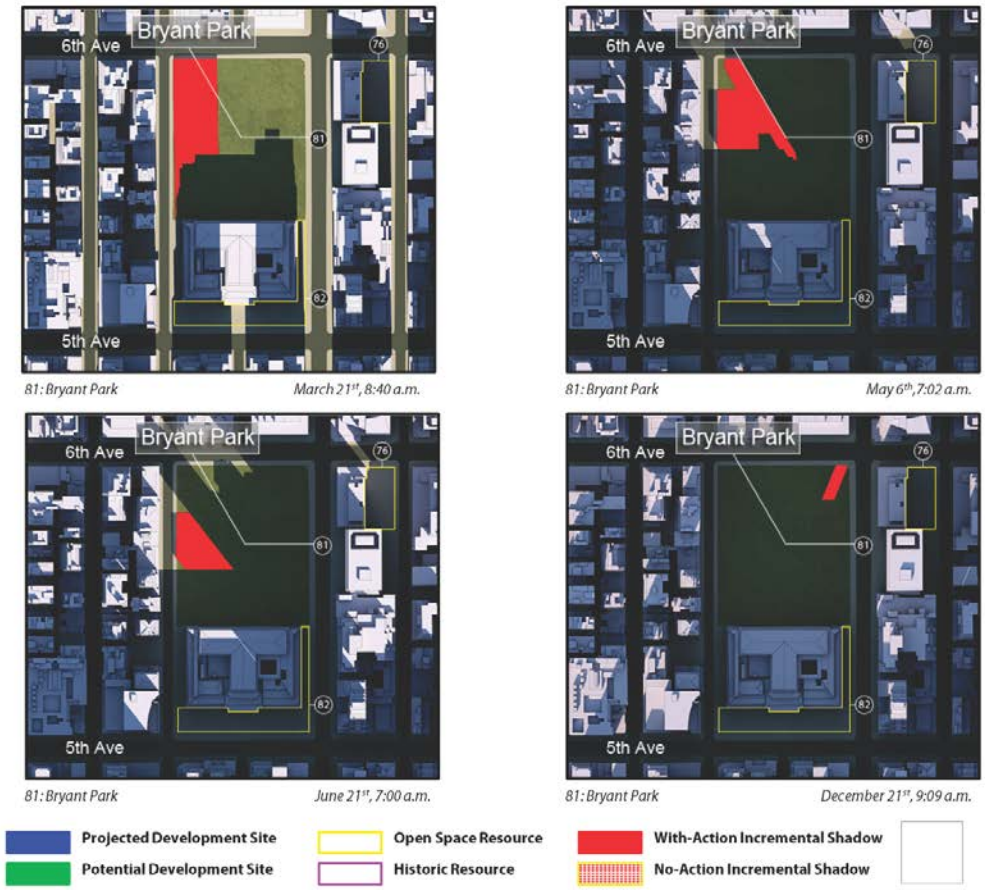


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

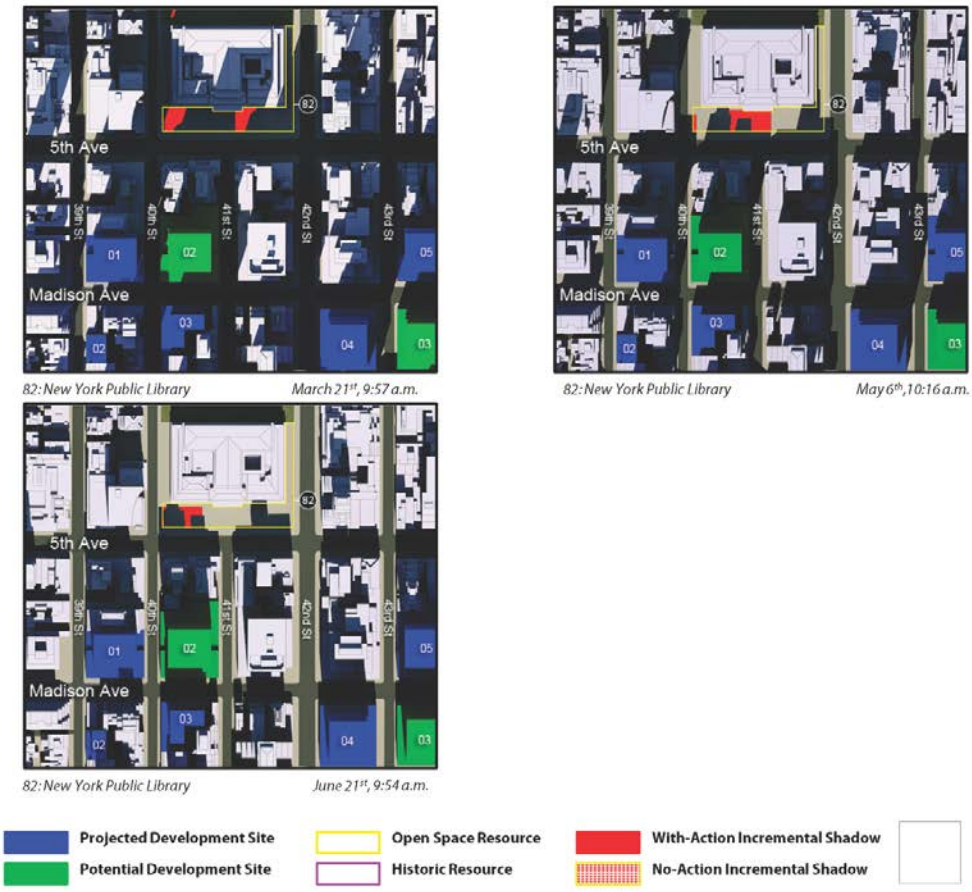


FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

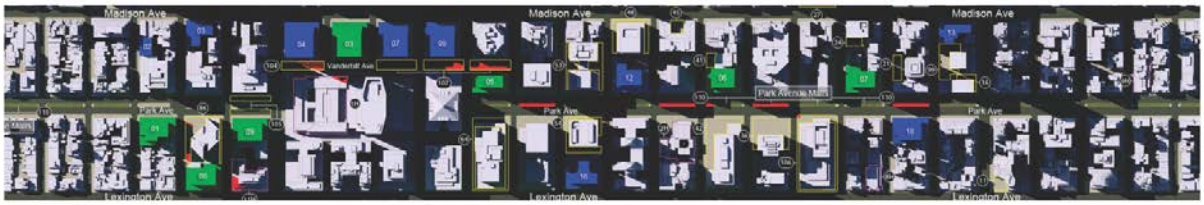
FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

108: 1095 Sixth Avenue *May 6th, 6:18 a.m.*

Projected Development Site
Potential Development Site
Open Space Resource
Historic Resource
With-Action Incremental Shadow
No-Action Incremental Shadow

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

110: Park Avenue Malls *March 21st, 1:58 p.m.*



110: Park Avenue Malls *May 6th, 1:44 p.m.*

FIGURE 5-2: INCREMENTAL SHADOWS ON EXISTING OPEN SPACES (CONTINUED)

110: Park Avenue Malls *June 21st, 1:49 p.m.*

110: Park Avenue Malls *December 21st, 2:13 p.m.*

FIGURE 5-3: INCREMENTAL SHADOWS ON NO-ACTION OPEN SPACES

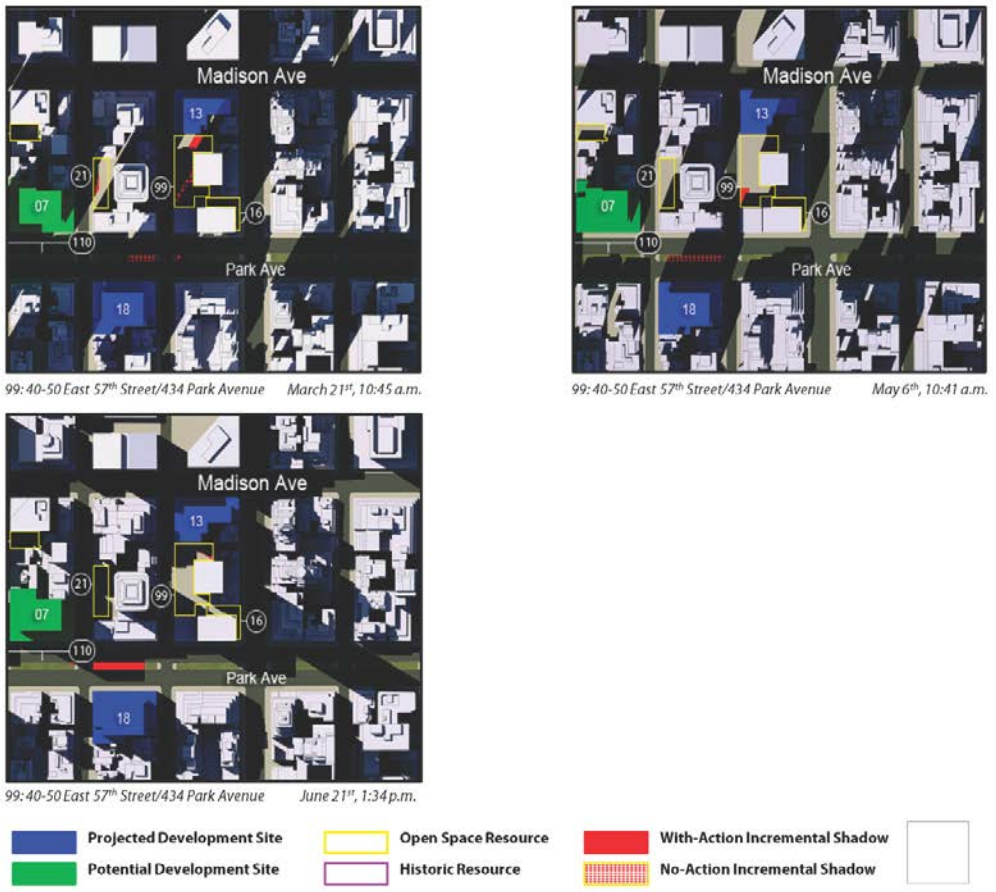


FIGURE 5-3: INCREMENTAL SHADOWS ON NO-ACTION OPEN SPACES (CONTINUED)

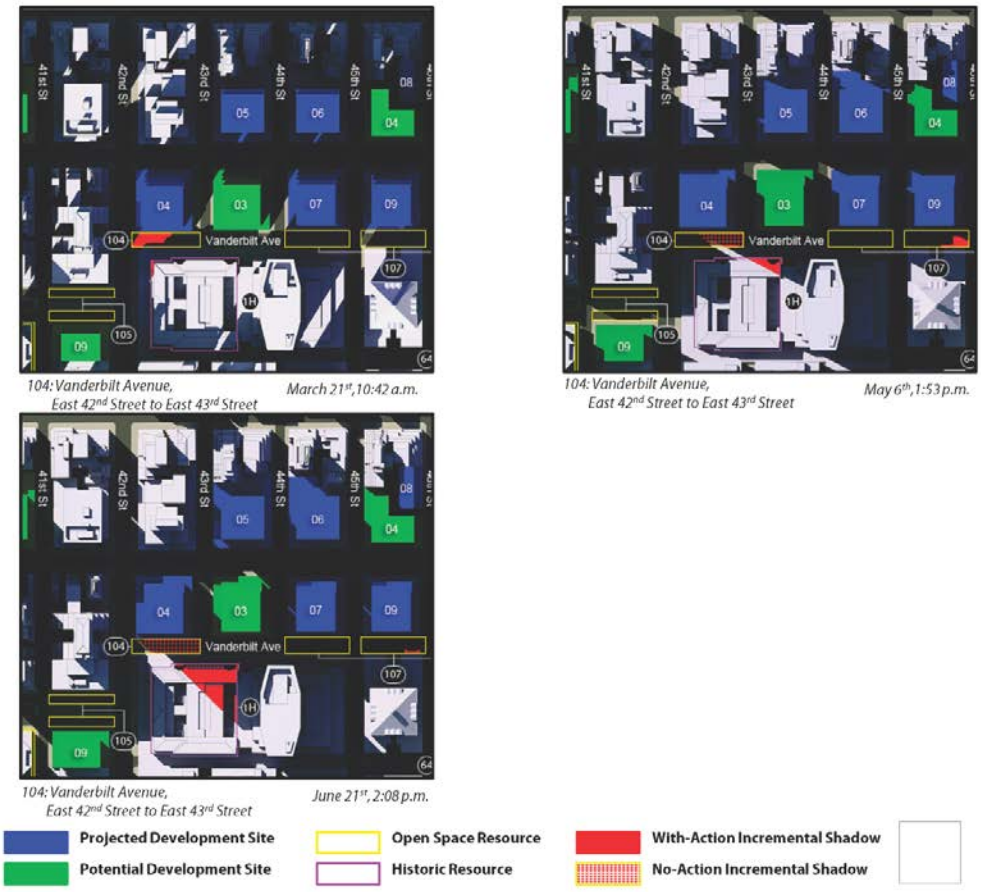


FIGURE 5-3: INCREMENTAL SHADOWS ON NO-ACTION OPEN SPACES (CONTINUED)

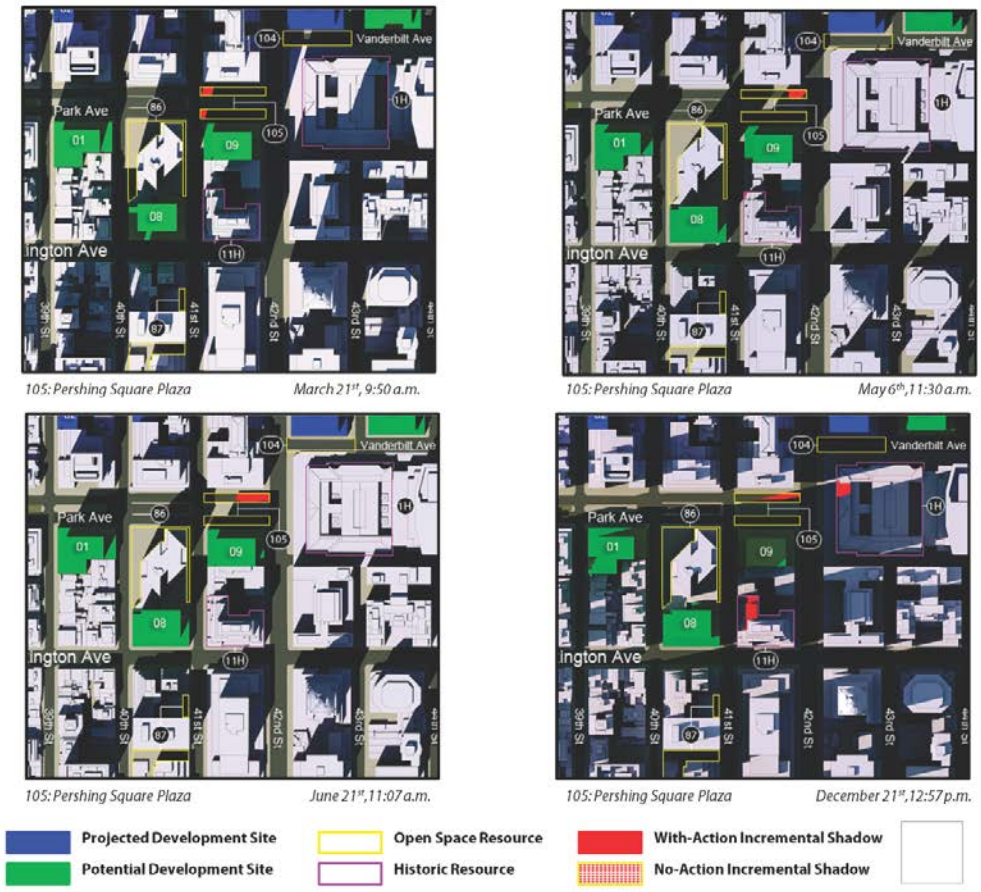


FIGURE 5-4: INCREMENTAL SHADOWS ON WITH-ACTION OPEN SPACES

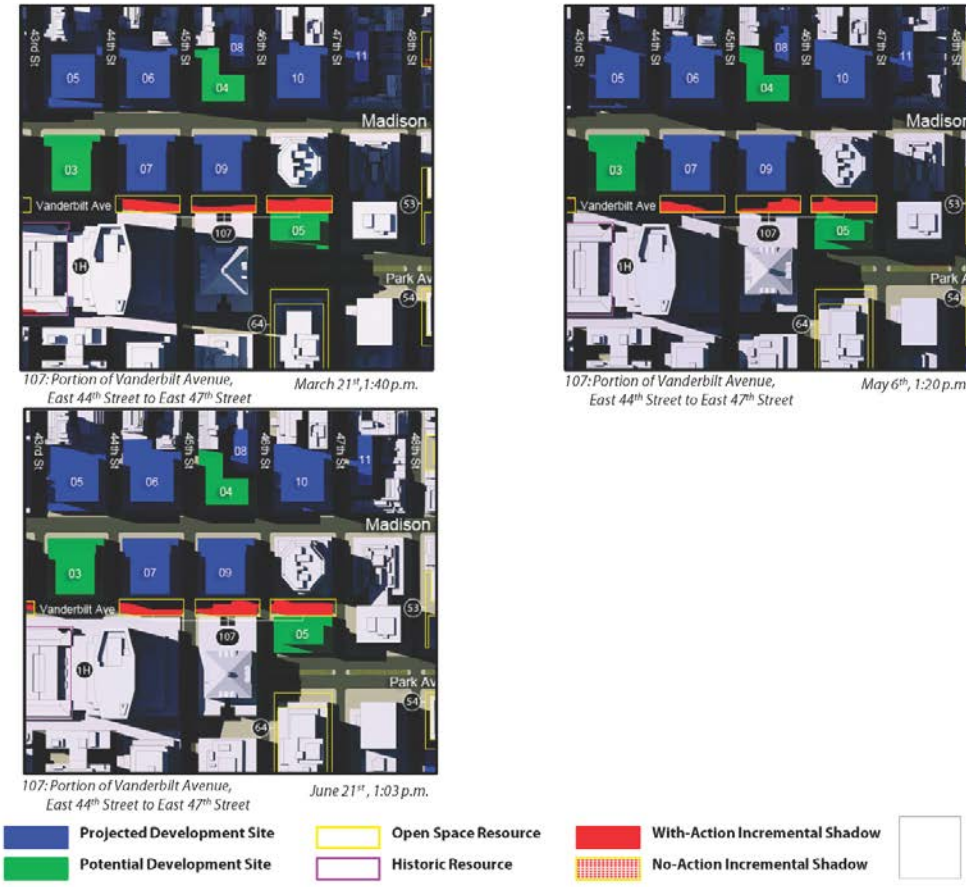


FIGURE 5-5: INCREMENTAL SHADOWS ON SUNLIGHT-SENSITIVE FEATURES OF HISTORIC ARCHITECTURAL RESOURCES

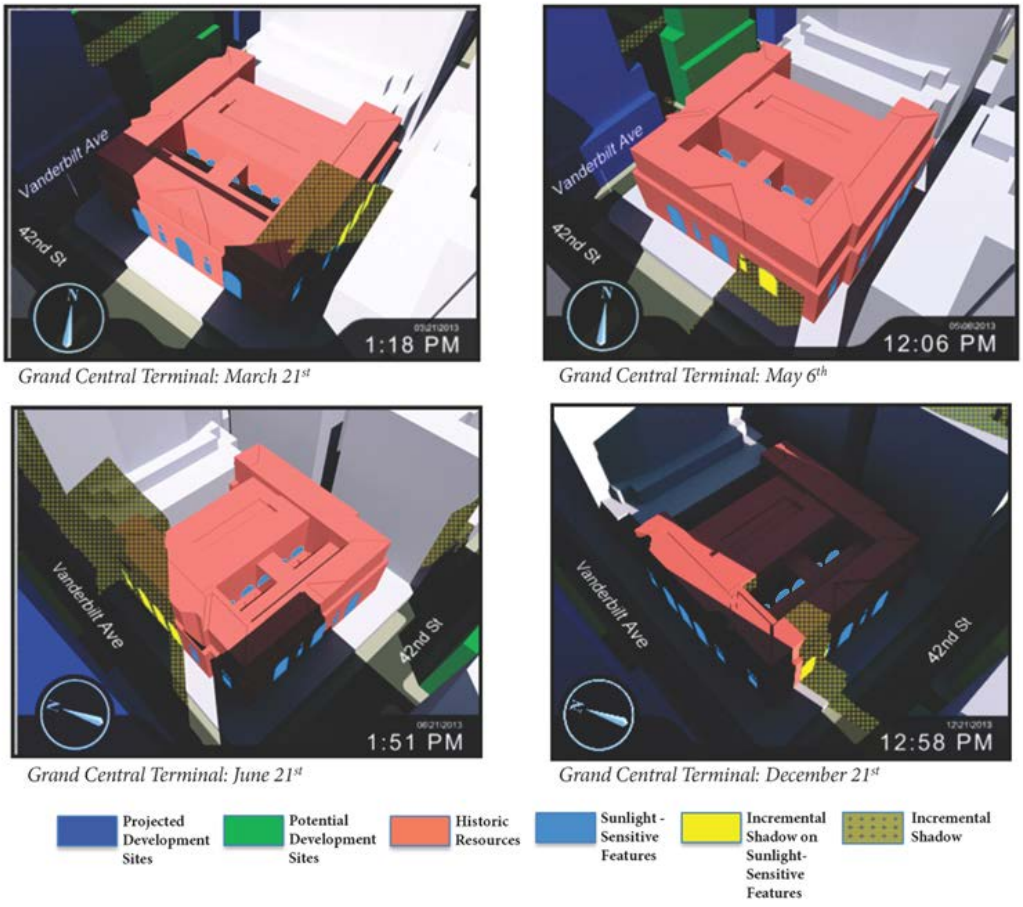


FIGURE 5-5: INCREMENTAL SHADOWS ON SUNLIGHT-SENSITIVE FEATURES OF HISTORIC ARCHITECTURAL RESOURCES (CONTINUED)

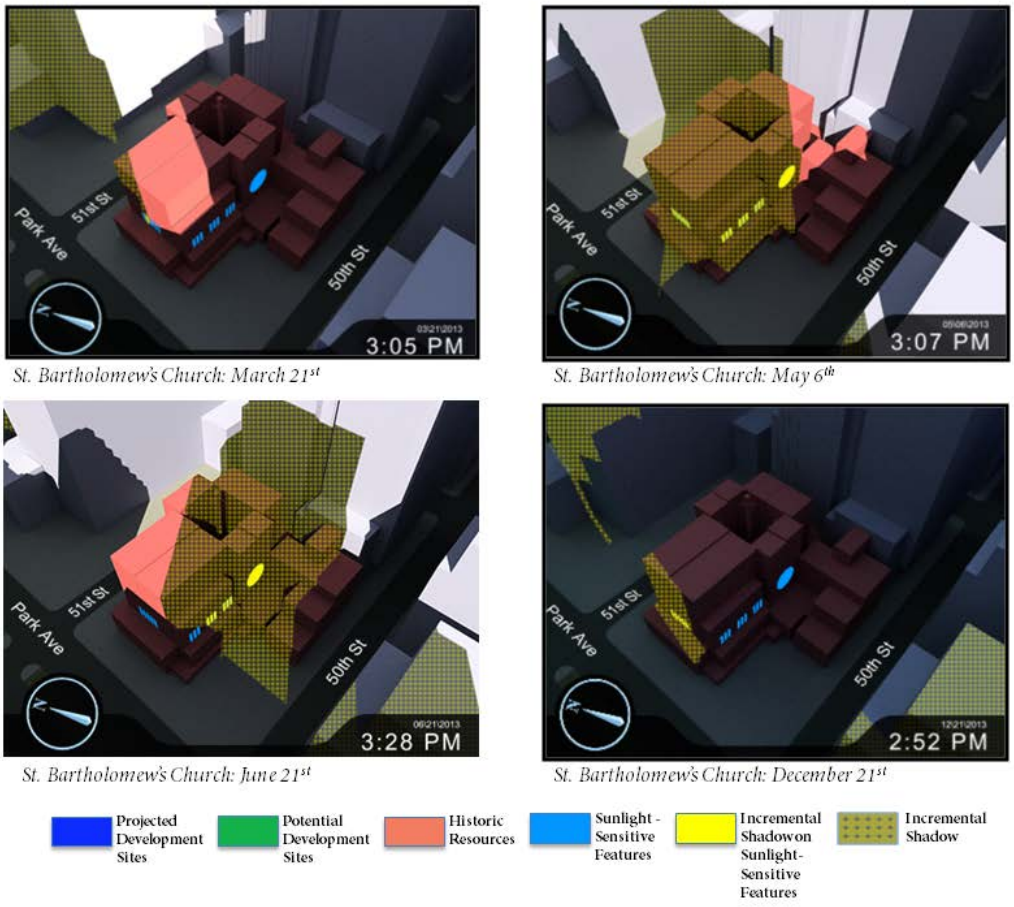
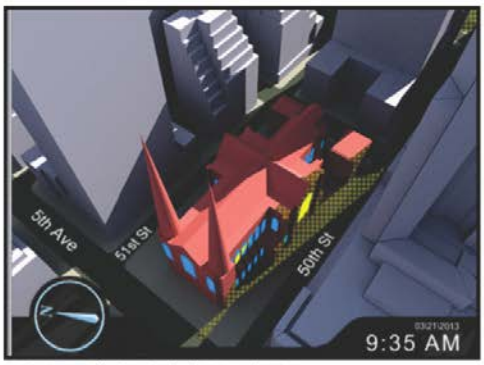
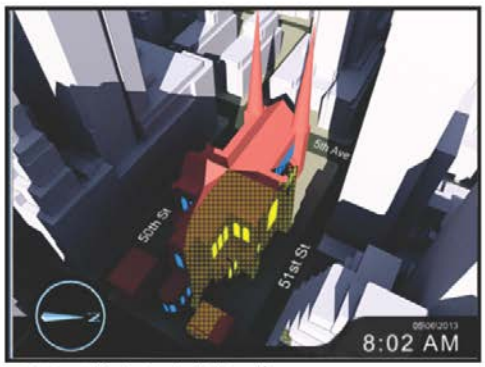


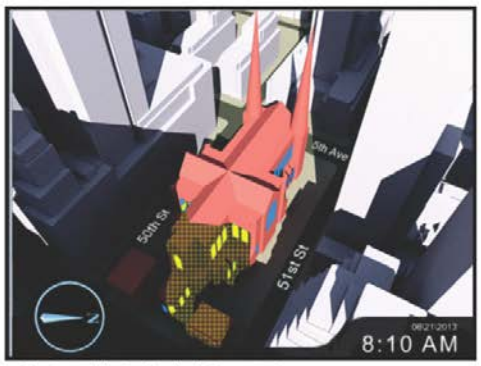
FIGURE 5-5: INCREMENTAL SHADOWS ON SUNLIGHT-SENSITIVE FEATURES OF HISTORIC ARCHITECTURAL RESOURCES (CONTINUED)



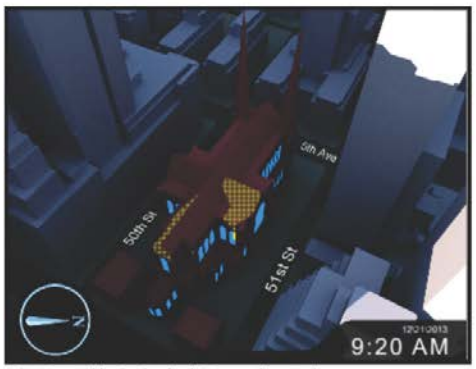
St. Patrick's Cathedral: March 21st



St. Patrick's Cathedral: May 6th

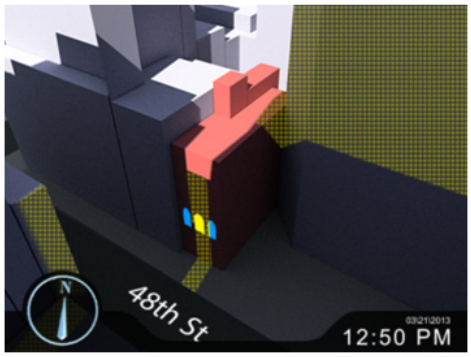


St. Patrick's Cathedral: June 21st



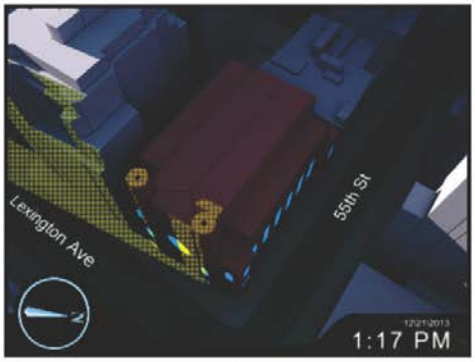
St. Patrick's Cathedral: December 21st

FIGURE 5-5: INCREMENTAL SHADOWS ON SUNLIGHT-SENSITIVE FEATURES OF HISTORIC ARCHITECTURAL RESOURCES (CONTINUED)



Swedish Seamen's Church: March 21st

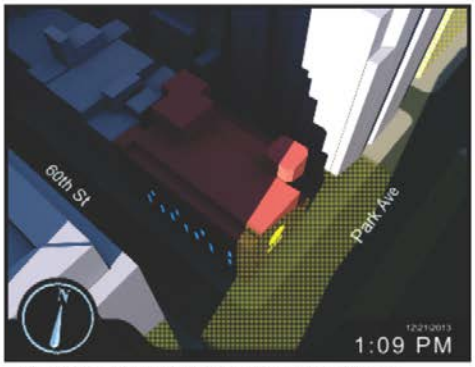
FIGURE 5-5: INCREMENTAL SHADOWS ON SUNLIGHT-SENSITIVE FEATURES OF HISTORIC ARCHITECTURAL RESOURCES (CONTINUED)



Central Synagogue: December 21st

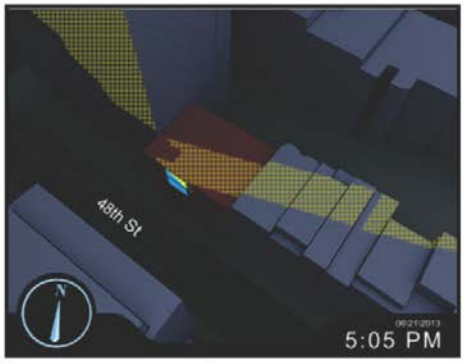
Projected Development Sites
Potential Development Sites
Historic Resources
Sunlight - Sensitive Features
Incremental Shadow on Sunlight-Sensitive Features
Incremental Shadow

FIGURE 5-5: INCREMENTAL SHADOWS ON SUNLIGHT-SENSITIVE FEATURES OF HISTORIC ARCHITECTURAL RESOURCES (CONTINUED)



Christ Church United Methodist: December 21st

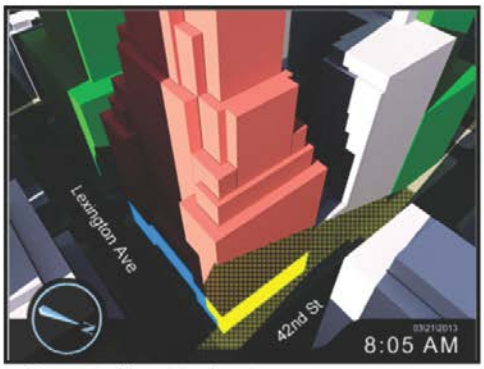
FIGURE 5-5: INCREMENTAL SHADOWS ON SUNLIGHT-SENSITIVE FEATURES OF HISTORIC ARCHITECTURAL RESOURCES (CONTINUED)



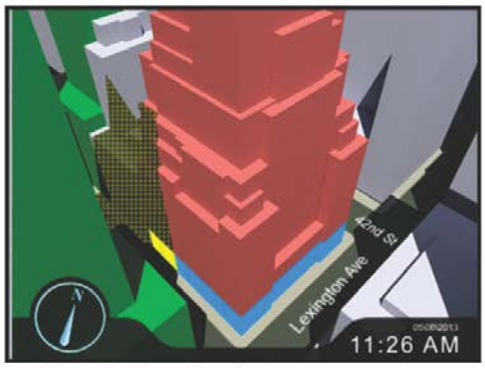
Lescaze House: June 21st

Projected Development Sites
Potential Development Sites
Historic Resources
Sunlight - Sensitive Features
Incremental Shadow on Sunlight-Sensitive Features
Incremental Shadow

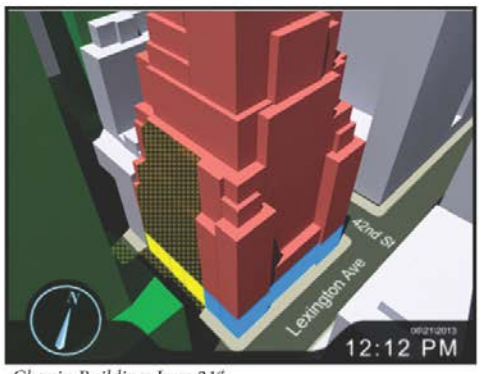
FIGURE 5-5: INCREMENTAL SHADOWS ON SUNLIGHT-SENSITIVE FEATURES OF HISTORIC ARCHITECTURAL RESOURCES (CONTINUED)



Chanin Building: March 21st



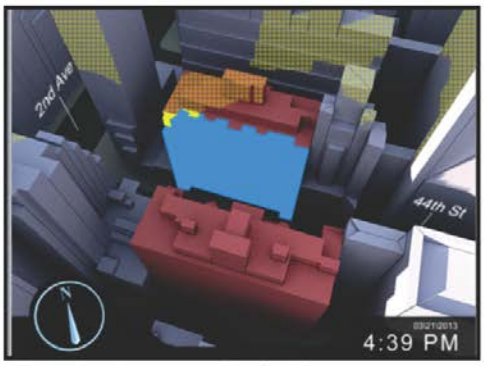
Chanin Building: May 6th



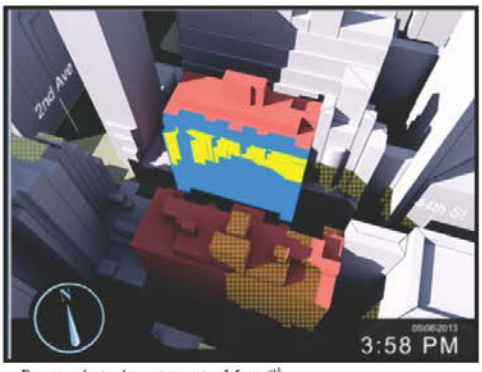
Chanin Building: June 21st

Projected Development Sites
Potential Development Sites
Historic Resources
Sunlight - Sensitive Features
Incremental Shadow on Sunlight-Sensitive Features
Incremental Shadow

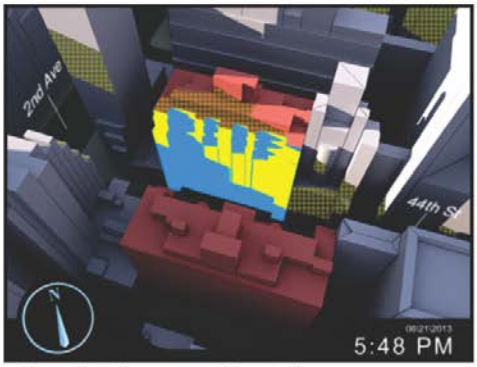
FIGURE 5-5: INCREMENTAL SHADOWS ON SUNLIGHT-SENSITIVE FEATURES OF HISTORIC ARCHITECTURAL RESOURCES (CONTINUED)



Beaux-Arts Apartments: March 21st



Beaux-Arts Apartments: May 6th



Beaux-Arts Apartments : June 21st

TABLE 5-5: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – EXISTING OPEN SPACES

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
11	**135 East 57th Street**				
	Shadow enter-exit time	No New Shadow	2:22 p.m. – 2:51 p.m.	No New Shadow	No New Shadow
	Incremental shadow duration		0 hrs. 29 mins.		
16	**450 Park Avenue**				
	Shadow enter-exit time	1:00 p.m. – 1:27 p.m.	No New Shadow	No New Shadow	No New Shadow
	Incremental shadow duration	0 hrs. 27 mins.			
21	**Park Avenue Tower, 65 East 55th Street**				
	Shadow enter-exit time	10:21 a.m. – 11:50 a.m.	10:54 a.m. – 1:22 p.m.	9:35 a.m. – 9:49 a.m. 11:16 a.m. – 1:15 p.m.	No New Shadow
	Incremental shadow duration	1 hr. 29 mins.	2 hrs. 28 mins.	2 hrs. 13 mins.	
22	**919 Third Avenue**				
	Shadow enter-exit time	No New Shadow	No New Shadow	5:02 p.m. – 5:52 p.m. 5:56 p.m. – 5:58 p.m.	2:30 p.m. – 2:42 p.m.
	Incremental shadow duration			0 hrs. 52 mins.	0 hrs. 12 mins
24	**535 Madison Avenue**				
	Shadow enter-exit time	No New Shadow	9:45 a.m. – 10:34 a.m.	9:18 a.m. – 10:59 a.m.	No New Shadow
	Incremental shadow duration		0 hrs. 49 mins	1 hr. 41 mins.	

TABLE 5-5: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – EXISTING OPEN SPACES (CONTINUED)

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
	520 Madison Avenue				
27	Shadow enter-exit time	7:50 a.m. – 8:11 a.m.	7:51 a.m. – 8:56 a.m.	7:41 a.m. – 9:23 a.m.	No New Shadow
	Incremental shadow duration	0 hrs. 21 mins.	1 hr. 5 mins.	1 hr. 42 mins.	
	Citigroup Center, 153 East 53rd Street				
29	Shadow enter-exit time	9:41 a.m. – 10:09 a.m.	10:43 a.m. – 10:49 a.m.	No New Shadow	10:49 a.m. – 11:08 a.m.
		10:47 a.m. – 11:26 a.m.			1:45 p.m. – 2:05 p.m.
	Incremental shadow duration	1 hr. 7 mins.	0 hrs. 6 mins.		0 hrs. 39 mins.
	Harper Collins Publishers, 10 East 53rd Street				
34	Shadow enter-exit time	9:22 a.m. – 10:13 a.m.	No New Shadow	No New Shadow	No New Shadow
	Incremental shadow duration	0 hrs. 51 mins.			
	Seagram Building, 375 Park Avenue				
36	Shadow enter-exit time	9:32 a.m. – 10:42 a.m.	1:46 p.m. – 3:54 p.m.	1:46 p.m. – 4:07 p.m.	2:19 p.m. – 2:38 p.m.
		2:08 p.m. – 3:03 p.m.			
		3:07 p.m. – 3:19 p.m.			
	Incremental shadow duration	2 hrs. 17 mins.	2 hrs. 8 mins.	2 hrs. 21 mins.	0 hrs. 19 mins.

TABLE 5-5: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – EXISTING OPEN SPACES (CONTINUED)

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
	599 Lexington Avenue				
37	Shadow enter-exit time	7:52 a.m. – 8:55 a.m.	8:29 a.m. – 10:07 a.m.	9:01 a.m. – 10:55 a.m.	1:47 p.m. – 2:04 p.m.
		9:45 a.m. – 10:56 a.m.	10:37 a.m. – 2:09 p.m.	11:24 a.m. – 3:30 p.m.	
		12:50 p.m. – 1:31 p.m.			
	Incremental shadow duration	2 hrs. 55 mins.	5 hrs. 10 mins.	6 hrs. 0 mins.	0 hrs. 17 mins.
	875 Third Avenue				
38	Shadow enter-exit time	2:15 p.m. – 3:09 p.m.	1:42 p.m. – 3:01 p.m.	1:42 p.m. – 4:09 p.m.	No New Shadow
	Incremental shadow duration	0 hrs. 54 mins.	1 hr. 19 mins.	2 hrs. 27 mins.	
	40 East 52nd Street				
41	Shadow enter-exit time	No New Shadow	No New Shadow	10:38 a.m. – 10:52 a.m.	No New Shadow
	Incremental shadow duration			0 hrs. 14 mins.	
	345 Park Avenue				
42	Shadow enter-exit time	8:20 a.m. – 8:59 a.m.	8:56 a.m. – 9:50 a.m.	9:15 a.m. – 10:16 a.m.	2:23 p.m. – 2:53 p.m.
		2:11 p.m. – 3:07 p.m.	1:44 p.m. – 3:50 p.m.	2:37 p.m. – 3:32 p.m.	
		3:29 p.m. – 3:55 p.m.			
	Incremental shadow duration	2 hrs. 1 min.	3 hrs. 0 mins.	1 hr. 56 mins.	0 hrs. 30 mins.

TABLE 5-5: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – EXISTING OPEN SPACES (CONTINUED)

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
	Greenacre Park, 217 East 51st Street				
43	Shadow enter-exit time	No New Shadow	3:38 p.m. – 4:23 p.m.	4:04 p.m. – 4:43 p.m. 5:07 p.m. – 5:16 p.m.	No New Shadow
	Incremental shadow duration		0 hrs. 45 mins.	0 hrs. 48 mins.	
	St. Patrick's Cathedral, 460 Madison Avenue				
44	Shadow enter-exit time	9:15 a.m. – 9:57 a.m. 10:01 a.m. – 11:12 a.m.	7:58 a.m. – 8:53 a.m.	7:26 a.m. – 7:56 a.m. 8:05 a.m. – 9:15 a.m.	No New Shadow
	Incremental shadow duration	1 hr. 53 mins.	0 hrs. 55 mins.	1 hr. 40 mins.	
	New York Palace Hotel, 457 Madison Avenue				
45	Shadow enter-exit time	11:37 a.m. – 11:41 a.m.	No New Shadow	No New Shadow	2:07 p.m. – 2:26 p.m.
	Incremental shadow duration	0 hrs. 4 mins.			0 hrs. 19 mins.
	Rockefeller Plaza, 48th Street to 51st Street, between Fifth and Sixth Avenues				
47	Shadow enter-exit time	8:09 a.m. – 8:25 a.m.	No New Shadow	No New Shadow	10:45 a.m. – 11:43 a.m. 11:50 a.m. – 12:17 p.m.
	Incremental shadow duration	0 hrs. 16 mins.			1 hr. 25 mins.

TABLE 5-5: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – EXISTING OPEN SPACES (CONTINUED)

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
	Wells Fargo Building, 437 Madison Avenue				
48	Shadow enter-exit time	8:40 a.m. – 9:26 a.m. 1:49 p.m. – 2:50 p.m.	9:05 a.m. – 10:42 a.m.	9:27 a.m. – 11:50 a.m.	2:10 p.m. – 2:35 p.m.
	Incremental shadow duration	1 hr 47 mins.	1 hr. 37 mins.	2 hrs. 23 mins.	0 hrs. 25 mins.
	800 Third Avenue				
49	Shadow enter-exit time	1:25 p.m. – 2:22 p.m.	No New Shadow	2:37 p.m. – 3:40 p.m.	12:13 p.m. – 12:24 p.m. 12:53 p.m. – 1:22 p.m.
	Incremental shadow duration	0 hrs. 57 mins.		1 hr. 3 mins.	0 hrs. 40 mins.
	Sterling Plaza, 255 East 49th Street				
51	Shadow enter-exit time	No New Shadow	4:12 p.m. – 4:24 p.m.	No New Shadow	No New Shadow
	Incremental shadow duration		0 hrs. 12 mins.		
	Tower 49, 12 East 49th Street				
52	Shadow enter-exit time	11:46 a.m. – 12:21 p.m. 1:00 p.m. – 1:07 p.m.	8:27 a.m. – 9:03 a.m. 12:44 p.m. – 12:53 p.m.	8:58 a.m. – 9:25 a.m.	No New Shadow
	Incremental shadow duration	0 hrs. 42 mins.	0 hrs. 45 mins.	0 hrs. 27 mins.	

TABLE 5-5: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – EXISTING OPEN SPACES (CONTINUED)

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
	280 Park Avenue				
53	Shadow enter-exit time	8:03 a.m. – 8:19 a.m.	2:00 p.m. – 3:43 p.m.	8:32 a.m. – 8:58 a.m.	No New Shadow
		8:33 a.m. – 8:39 a.m.		2:08 p.m. – 3:51 p.m.	
		8:51 a.m. – 9:04 a.m.			
		1:27 p.m. – 1:45 p.m.			
	Incremental shadow duration	0 hrs. 53 mins.	1 hr. 43 mins.	2 hrs. 9 mins.	
	299 Park Avenue				
54	Shadow enter-exit time	9:22 a.m. – 10:39 a.m.	8:07 a.m. – 8:49 a.m.	8:34 a.m. – 8:44 a.m.	No New Shadow
		2:09 p.m. – 3:24 p.m.	9:01 a.m. – 9:31 a.m.	8:49 a.m. – 9:12 a.m.	
			9:41 a.m. – 10:21 a.m.	9:20 a.m. – 10:04 a.m.	
			1:55 p.m. – 3:01 p.m.	5:05 p.m. – 5:19 p.m.	
			4:12 p.m. – 4:29 p.m.		
	Incremental shadow duration	2 hrs. 32 mins.	3 hrs. 15 mins.	1 hr. 31 mins.	

TABLE 5-5: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – EXISTING OPEN SPACES (CONTINUED)

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
	Cosmopolitan Condominiums, 141 East 48th Street				
55	Shadow enter-exit time	12:08 p.m. – 12:41 p.m.	11:46 a.m. – 1:12 p.m.	11:53 a.m. – 2:11 p.m. 3:23 p.m. – 3:53 p.m.	No New Shadow
	Incremental shadow duration	0 hrs. 33 mins.	1 hr. 26 mins.	2 hrs. 48 mins.	
	780 Third Avenue				
56	Shadow enter-exit time	1:46 p.m. – 2:20 p.m.	1:02 p.m. – 3:06 p.m.	2:15 p.m. – 3:28 p.m.	12:07 p.m. – 12:24 p.m. 12:40 p.m. – 1:24 p.m.
	Incremental shadow duration	0 hrs. 34 mins.	2 hrs. 4 mins.	1 hr. 13 mins.	1 hr 1 min.
	777 Third Avenue				
57	Shadow enter-exit time	2:15 p.m. – 3:30 p.m.	1:44 p.m. – 3:34 p.m.	2:20 p.m. – 4:14 p.m.	1:43 p.m. – 1:48 p.m.
	Incremental shadow duration	1 hr. 15 mins.	1 hr. 50 mins.	1 hr. 54 mins.	0 hrs. 5 mins.
	1 Dag Hammarskjold Plaza, 885 Second Avenue				
61	Shadow enter-exit time	2:32 p.m. – 3:12 p.m.	No New Shadow	No New Shadow	No New Shadow
	Incremental shadow duration	0 hrs. 40 mins.			

TABLE 5-5: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – EXISTING OPEN SPACES (CONTINUED)

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
	245 Park Avenue				
64	Shadow enter-exit time	9:22 a.m. – 11:19 a.m.	7:16 a.m. – 8:48 a.m.	7:24 a.m. – 9:59 a.m.	No New Shadow
		3:05 p.m. – 3:12 p.m.	9:07 a.m. – 9:28 a.m.	10:18 a.m. – 11:44 a.m.	
			2:15 p.m. – 4:16 p.m.	2:18 p.m. – 4:52 p.m.	
	Incremental shadow duration	2 hrs. 4 mins.	3 hrs. 54 mins.	6 hrs. 35 mins.	
	747 Third Avenue				
65	Shadow enter-exit time	10:10 a.m. – 11:50 a.m.	10:37 a.m. – 3:11 p.m.	11:24 a.m. – 3:06 p.m.	1:55 p.m. – 2:10 p.m.
		1:03 p.m. – 1:15 p.m.			
		1:27 p.m. – 2:33 p.m.			
	Incremental shadow duration	2 hrs. 58 mins.	4 hrs. 34 mins.	3 hrs. 42 mins.	0 hrs. 15 mins.
	212 East 47th Street				
66	Shadow enter-exit time	10:58 a.m. – 1:11 p.m.	11:12 a.m. – 2:00 p.m.	11:31 a.m. – 2:20 p.m.	No New Shadow
	Incremental shadow duration	2 hrs. 13 mins.	2 hrs. 48 mins.	2 hrs. 49 mins.	
	Dag Hammarskjold Tower, 240 East 47th Street				
67	Shadow enter-exit time	No New Shadow	3:18 p.m. – 3:34 p.m.	3:38 p.m. – 4:23 p.m.	No New Shadow
	Incremental shadow duration		0 hrs. 16 mins.	0 hrs. 45 mins.	

TABLE 5-5: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – EXISTING OPEN SPACES (CONTINUED)

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
	Dag Hammarskjold Plaza, 833 First Avenue				
69	Shadow enter-exit time	No New Shadow	4:12 p.m. – 4:53 p.m.	3:40 p.m. – 5:58 p.m.	No New Shadow
	Incremental shadow duration		0 hrs. 41 mins.	2 hrs. 18 mins.	
	212 East 47th Street				
70	Shadow enter-exit time	8:24 a.m. – 8:47 a.m.	No New Shadow	No New Shadow	No New Shadow
	Incremental shadow duration	0 hrs. 23 mins.			
	Two Grand Central Tower, 140 East 45th Street				
72	Shadow enter-exit time	10:14 a.m. – 10:42 a.m.	7:45 a.m. – 8:21 a.m.	7:51 a.m. – 8:42 a.m.	No New Shadow
	Incremental shadow duration	0 hrs. 28 mins.	0 hrs. 36 mins.	0 hrs. 51 mins.	
	International Plaza, 303 East 43rd Street				
75	Shadow enter-exit time	No New Shadow	No New Shadow	2:01 p.m. – 2:53 p.m. 4:21 p.m. – 5:07 p.m.	No New Shadow
	Incremental shadow duration			1 hr. 38 mins.	

TABLE 5-5: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – EXISTING OPEN SPACES (CONTINUED)

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
	Grace Plaza, 1114 Sixth Avenue				
76	Shadow enter-exit time	7:27 a.m. – 7:44 a.m. 8:04 a.m. – 8:26 a.m.	No New Shadow	No New Shadow	No New Shadow
	Incremental shadow duration	0 hrs. 39 mins			
	Bryant Park, Sixth Avenue from West 40th Street to West 42nd Street				
81	Shadow enter-exit time	7:27 a.m. – 10:03 a.m.	6:18 a.m. – 7:50 a.m.	6:24 a.m. – 7:44 a.m.	8:49 a.m. – 9:39 a.m.
	Incremental shadow duration	2 hrs. 36 mins.	1 hr. 32 mins.	1 hr. 20 mins.	0 hrs. 50 mins.
	New York Public Library, Fifth Avenue at 42nd Street				
82	Shadow enter-exit time	7:34 a.m. – 8:16 a.m. 9:15 a.m. – 11:39 a.m.	7:51 a.m. – 10:41 a.m.	7:46 a.m. – 8:05 a.m. 8:25 a.m. – 8:49 a.m. 8:50 a.m. – 10:20 a.m.	No New Shadow
	Incremental shadow duration	3 hrs. 6 mins.	2 hrs. 50 mins.	2 hrs. 13 mins.	

TABLE 5-5: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – EXISTING OPEN SPACES (CONTINUED)

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
	101 Park Avenue				
86	Shadow enter-exit time	8:47 a.m. – 9:21 a.m. 12:45 p.m. – 1:11 p.m. 1:18 p.m. – 3:49 p.m.	8:45 a.m. – 3:10 p.m.	9:08 a.m. – 10:25 a.m. 10:28 a.m. – 10:47 a.m. 11:38 a.m. – 2:40 p.m.	1:50 p.m. – 2:53 p.m.
	Incremental shadow duration	3 hrs. 31 mins.	6 hrs. 25 mins.	4 hrs. 38 mins.	1 hr. 3 mins.
	Grand Central Plaza, 622 Third Avenue				
87	Shadow enter-exit time	No New Shadow	No New Shadow	4:55 p.m. – 5:12 p.m.	No New Shadow
	Incremental shadow duration			0 mins. 17 mins.	
	1095 Sixth Avenue				
108	Shadow enter-exit time	No New Shadow	6:18 a.m. – 6:38 a.m.	No New Shadow	No New Shadow
	Incremental shadow duration		0 hrs. 20 mins.		
	Park Avenue Malls				
110	Shadow enter-exit time	1:46 p.m. – 2:48 p.m.	1:20 p.m. – 3:00 p.m.	1:15 p.m. – 4:19 p.m.	2:05 p.m. – 2:29 p.m.
	Incremental shadow duration	1 hr. 2 mins.	1 hr. 40 mins.	3 hrs. 4 mins.	0 hrs. 24 mins.

Note: Daylight savings time not used.

TABLE 5-6: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – NO-ACTION OPEN SPACES

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
99	**40-50 East 57th Street/434 Park Avenue**				
	Shadow enter-exit time	10:36 a.m. – 10:54 a.m.	10:28 a.m. – 11:01 a.m.	12:46 p.m. – 2:13 p.m.	No New Shadow
		12:28 p.m. – 12:39 p.m.	12:55 p.m. – 1:08 p.m.		
	Incremental shadow duration	0 hrs. 29 mins.	0 hrs. 56 mins.	1 hr. 27 mins.	
104	**Vanderbilt Avenue between East 42nd and East 43rd Streets**				
	Shadow enter-exit time	10:05 a.m. – 11:22 a.m.	1:06 p.m. – 2:00 p.m.	12:51 p.m. – 2:01 p.m.	No New Shadow
	Incremental shadow duration	1 hr. 17 mins.	0 hrs. 54 mins.	1 hr. 10 mins.	
105	**Pershing Square Plaza, Park Avenue between East 41st and East 42nd Streets**				
	Shadow enter-exit time	9:26 a.m. – 10:40 a.m.	10:19 a.m. – 12:10 p.m.	10:13 a.m. – 12:12 p.m.	12:43 p.m. – 1:10 p.m.
		11:51 a.m. – 1:07 p.m.		2:52 p.m. – 4:00 p.m.	1:24 p.m. – 1:45 p.m.
	Incremental shadow duration	2 hrs. 30 mins.	1 hr. 51 mins.	3 hrs. 7 mins.	0 hrs. 48 mins.
113	**Outer Detour Roadway (ODR) Esplanade**				
	Shadow enter-exit time	No New Shadow	5:12 p.m. – 5:22 p.m.	No New Shadow	No New Shadow
	Incremental shadow duration		0 hrs. 10 mins.		

Note: Daylight savings time not used.

TABLE 5-7: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – WITH-ACTION OPEN SPACES

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
	Portions of Vanderbilt Avenue between East 44th and East 47th Streets				
107	Shadow enter-exit time	7:52 a.m. – 8:35 a.m.		6:55 a.m. – 7:29 a.m.	No New Shadow
		1:25 p.m. – 2:35 p.m.	11:45 a.m. – 12:04 p.m.	11:33 a.m. – 12:07 p.m.	
			12:48 p.m. – 2:38 p.m.	12:43 p.m. – 2:49 p.m.	
	Incremental shadow duration	1 hr. 53 mins.	2 hrs. 9 mins.	3 hrs. 14 mins.	

Note: Daylight savings time not used.

TABLE 5-8: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – SUNLIGHT-SENSITIVE HISTORIC RESOURCES

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
1H	**Grand Central Terminal, 77 East 42nd Street**				
	Shadow enter-exit time	10:43 a.m. –12:17 p.m. 12:56 p.m. – 1:22 p.m. 2:30 p.m. – 3:32 pm	11:46 a.m. –12:46 p.m. 1:29 p.m. – 3:36 p.m.	1:15 p.m. – 2:49 p.m.	12:35 p.m. – 1:28 p.m.
	Incremental shadow duration	3 hrs. 4 mins.	3 hrs. 7 mins.	1 hr. 34 mins.	0 hrs. 53 mins.
2H	**St. Bartholomew's Church and Community House, 321 Park Avenue**				
	Shadow enter-exit time	3:03 p.m. – 3:08 p.m.	8:02 a.m. – 8:40 a.m. 2:02 p.m. – 4:14 p.m.	8:20 a.m. – 8:37 a.m. 2:01 p.m. – 3:55 p.m.	2:43 p.m. – 2:57 p.m.
	Incremental shadow duration	0 hrs. 5 mins.	2 hrs. 50 mins.	2 hrs. 11 mins.	0 hrs. 14 mins.
4H	**St. Patrick's Cathedral, 631 Fifth Avenue**				
	Shadow enter-exit time	9:26 a.m. – 10:58 a.m.	7:09 a.m. – 8:43 a.m.	6:48 a.m. – 8:58 a.m.	9:19 a.m. – 9:30 a.m.
	Incremental shadow duration	1 hr. 32 mins.	1 hr. 34 mins.	2 hrs. 10 mins.	0 hrs. 11 mins.
8H	**Central Synagogue, 652 Lexington Avenue**				
	Shadow enter-exit time	No New Shadow	No New Shadow	No New Shadow	1:14 p.m. – 1:25 p.m.
	Incremental shadow duration				0 hrs. 11 mins.
7H	**Swedish Seamen's Church, 5 East 48th Street**				
	Shadow enter-exit time	12:41 p.m. – 12:58 p.m.	No New Shadow	No New Shadow	No New Shadow
	Incremental shadow duration	0 hrs. 17 mins.			
9H	**Christ Church United Methodist, 520 Park Avenue**				
	Shadow enter-exit time	No New Shadow	No New Shadow	No New Shadow	12:59 p.m. – 1:20 p.m.
	Incremental shadow duration				0 hrs. 21 mins.
10H	**William Lescaze House and Office, 211 East 48th Street**				
	Shadow enter-exit time	No New Shadow	No New Shadow	5:02 p.m. – 5:10 p.m.	No New Shadow
	Incremental shadow duration			0 hrs. 8 mins.	

TABLE 5-8: INCREMENTAL SHADOW DURATION ON RESOURCES OF CONCERN – SUNLIGHT-SENSITIVE HISTORIC RESOURCES (CONTINUED)

Site No.	Resource	ANALYSIS DAY			
		March 21/September 21 Time Frame Window 7:27 a.m. – 4:37 p.m.	**May 6/August 6 Time Frame Window 6:18 a.m. – 5:25 p.m.**	**June 21 Time Frame Window 5:55 a.m. – 5:58 p.m.**	**December 21 Time Frame Window 8:47 a.m. – 3:00 p.m.**
	Chanin Building, 374 Lexington Avenue/122 East 42nd Street				
11H	Shadow enter-exit time	7:41 a.m. – 8:16 a.m.	11:01 a.m. – 12:01 p.m.	11:16 a.m. – 1:13 p.m.	No New Shadow
	Incremental shadow duration	0 hrs. 35 mins.	1 hr. 0 mins.	1 hr. 57 mins.	
	Beaux-Arts Apartments, 307-310 East 44th Street				
12H	Shadow enter-exit time	3:16 p.m. – 3:25 p.m. 3:27 p.m. – 3:41 p.m. 4:15 p.m. – 4:39 p.m.	3:00 p.m. – 4:38 p.m.	5:22 p.m. – 6:01p.m.	No New Shadow
	Incremental shadow duration	0 hrs. 47 mins.	1 hr. 48 mins.	0 hrs. 49 mins.	

Note: Daylight savings time not used.