# Chapter 5: Shadows

## A. INTRODUCTION

As described in Chapter 1, "Project Description," the Proposed Actions would facilitate the development of a 16-story state-of-the-art laboratory and office building to replace the existing New York Blood Center (NYBC) building at 310 East 67th Street. The Proposed Project would be approximately 334 feet tall (to the top of the bulkhead and screen wall; approximately 315 feet tall to the top of the roof), more than 200 feet taller than the No Action development that would be built absent the discretionary actions. Therefore, following the guidelines of the 2020 *New York City Environmental Quality Review (CEQR) Technical Manual*, this attachment considers the potential for the Proposed Project to cast new shadows on publicly accessible sunlight-sensitive resources, which include parks, plazas, and other open spaces accessible to the public; historic resources with sunlight-sensitive features, such as stained glass windows; and natural resources that depend on sunlight.

### PRINCIPAL CONCLUSIONS

The Proposed Project would result in three to four hours of new incremental shadows cast on St. Catherine's Park during the afternoons in the spring, summer, and fall, covering large areas of the park at times, thereby causing a significant adverse shadow impact to the use of the park in the late afternoons in those seasons. The park's trees and plantings would continue to receive adequate sunlight over the course of each day throughout New York City's growing season and therefore their health would not be significantly affected by the project-generated shadows. The Proposed Project would also cast new shadows on the park in winter, but these would be limited in extent and duration and would not be significant. In addition, the Proposed Project would cast new shadows on five other nearby sunlight-sensitive resources in one or more seasons, but in those cases the incremental shadow would not be of substantial enough extent or duration to cause significant adverse impacts.

## B. DEFINITIONS AND METHODOLOGY

This analysis has been prepared in accordance with New York City CEQR procedures and follows the guidelines of the *CEQR Technical Manual*.

### DEFINITIONS

**Incremental shadow** is the additional, or new, shadow that a structure resulting from a proposed project would cast on a sunlight-sensitive resource. It should be noted that the shade created by trees and other natural features is not considered to be shadow of concern for the impact analysis, from the perspective of open space users; however, incremental shadow on a tree-shaded environment may create a significant impact as the incremental shadow is not redundant with tree shade, and the tree canopy may be considered a sunlight-sensitive resource.

**Sunlight-sensitive resources** are those that depend on sunlight or for which direct sunlight is necessary to maintain the resource's usability or architectural integrity. Such resources generally include the following:

- *Public open space* such as parks, beaches, playgrounds, plazas, schoolyards (if open to the public during non-school hours), 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.
- *Features of architectural resources that depend on sunlight for their enjoyment by the public.* Only the sunlight-sensitive features need be considered, as opposed to the entire resource. Such sunlight-sensitive features might include design elements that depend on the contrast between light and dark (e.g., recessed balconies, arcades, deep window reveals); elaborate, highly carved ornamentation; stained glass windows; historic landscapes and scenic landmarks; and features for which the effect of direct sunlight is described as playing a significant role in the structure's importance as a 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.

**Non-sunlight-sensitive resources** include the following, for the purposes of CEQR:

- *City streets and sidewalks* (except Greenstreets);
- *Private open space* (e.g., front and back yards, stoops, vacant lots, and any private, non-publicly accessible open space); and
- *Project-generated open space* cannot experience a significant adverse shadow impact from the project, according to CEQR, because without the project the open space would not exist. However, a discussion of how shadows would affect the new space may be warranted.

**A significant adverse shadow impact** occurs when the incremental shadow added by a proposed project falls on a sunlight-sensitive resource and substantially reduces or completely eliminates direct sunlight, thereby significantly altering the public's use of the resource or threatening the viability of vegetation or other resources. Each case must be considered on its own merits based on the extent and duration of new shadow, and an analysis of the resource's sensitivity to reduced sunlight, and seasonal conditions.

## METHODOLOGY

Following the guidelines of the *CEQR Technical Manual*, a preliminary screening assessment must first be conducted to ascertain whether a project's shadow could reach any sunlight-sensitive resources at any time of year. The preliminary screening assessment consists of three tiers of analysis. The first tier determines a simple radius around the Proposed Project 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 project shadow by accounting for the fact that shadows can never be cast between a certain range of angles south of the project site 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 the possibility of new shadows on sunlight-sensitive resources, a third tier of screening analysis further refines the area that could be reached

by project shadow by looking at specific representative days in each season 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. The detailed analysis provides the data needed to assess the shadow impacts. The effects of the new shadows on the sunlight-sensitive resources are described, and their degree of significance is considered. The results of the analysis and assessment are documented with graphics, a table of incremental shadow durations, and narrative text.

## C. PRELIMINARY SCREENING ASSESSMENT

A base map was developed using Geographic Information Systems (GIS)[1] showing the location of the Proposed Project and the surrounding street layout (see **Figure 5-1**). In coordination with the open space, historic and cultural resources, and natural resources assessments presented in other chapters of this EIS, potential sunlight-sensitive resources were identified and shown on the map.

### TIER 1 SCREENING ASSESSMENT

For the Tier 1 assessment, the longest shadow that the Proposed Actions could cast is calculated, and, using this length as the radius, a perimeter is drawn around the Proposed Project. Anything outside this perimeter representing the longest possible shadow could never be affected by project generated shadow, while anything inside the perimeter needs 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 21, the winter solstice, at the start of the analysis day at 8:51 AM, and is equal to 4.3 times the height of the structure.

Therefore, at a maximum height of 334 feet above curb level, including rooftop mechanical structures, the Proposed Project could cast a shadow up to 1,436 feet in length (334 x 4.3). Using this length as the radius, a perimeter was drawn around the project site (see **Figure 5-1**).

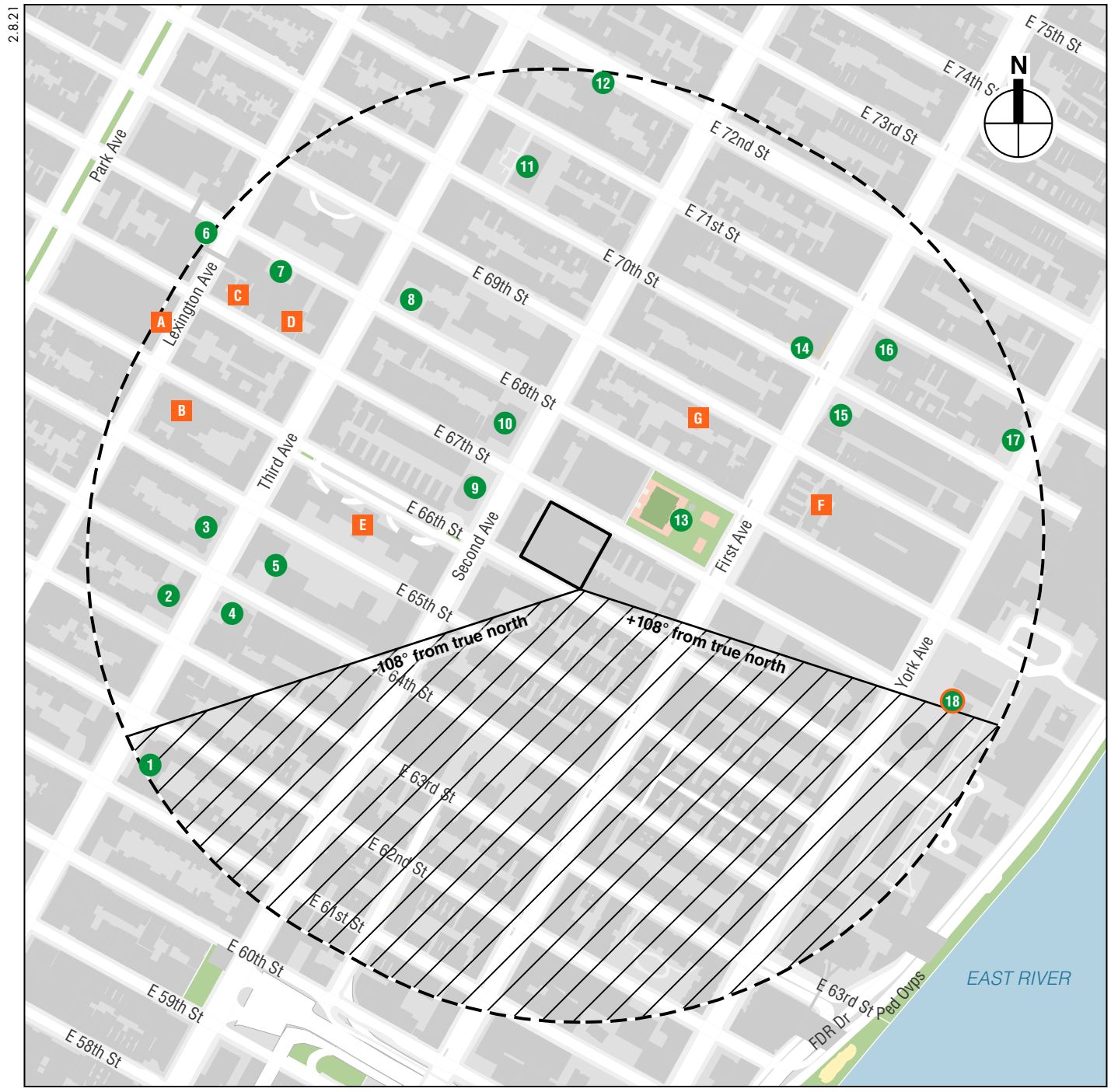
The Tier 1 assessment showed that a number of publicly accessible open spaces and historic resources with sun-sensitive features were located in the longest shadow study area. Therefore, the next tier of assessment was required.

### TIER 2 SCREENING ASSESSMENT

Because of the path that the sun travels across the sky in the northern hemisphere, no shadow can be cast in a triangular area south of any given project site. In New York City this area lies between -108 and +108 degrees from true north. **Figure 5-1** illustrates this triangular area south of the project site. The complementary area to the north within the longest shadow study area represents the remaining area that could potentially experience new project generated shadow.

The Tier 2 assessment concluded that 17 publicly accessible open spaces are located in the remaining longest-shadow study area and require further assessment. Most of the 17 open spaces are privately owned residential and other such spaces that are open to the public. In addition, eight

[1] Software: Esri ArcGIS Pro; Data: New York City Department of Information Technology and Telecommunications (DoITT) and other City agencies, and AKRF site visits.




Tier 1 and Tier 2 Assessments

**NEW YORK BLOOD CENTER—CENTER EAST**

**Figure 5-1**

historic sites with sunlight-dependent features are located in the remaining longest shadow study area and also require further assessment to ascertain whether they could be affected by project-generated shadow.

The 17 publicly accessible open spaces and 8 historic resources requiring further assessment are listed in **Table 5-1**, along with the Tier 3 analysis results.

## Table 5-1
## Tier 3 Assessment

| Map Reference | Name | Sensitive Features/Uses | Dec 21 | Mar 21/ Sep 21 | May 6/ Aug 6 | June 21 |
|---|---|---|---|---|---|---|
| 1 | 200 East 62nd Street | Widened sidewalk, large trees, planters | No | No | No | No |
| 2 | 188 East 64th Street | Planters and trees | No | No | No | No |
| 3 | 160 East 65th Street | Planters and trees | No | No | No | No |
| 4 | 200 East 64th Street | Planters and trees lining street, raised area with planters, seating, tables | No | No | Potential | Potential |
| 5 | 200 East 65th Street | Planters and trees | No | No | Potential | No |
| 6 | 68th Street Hunter College Station | Subway station for 6 Train, seating, widened sidewalks, larger planter with a tree | No | No | No | No |
| 7 | Poses Park | Waiting for confirmation on public accessibility | Potential | No | No | No |
| 8 | 200 East 69th Street | Benches, planters, trees | Potential | No | No | No |
| 9 | 265 East 66th Street | Mature trees, planters, bench | Potential | Potential | Potential | Potential |
| 10 | 254 East 68th Street | Tables, trees, planters | Potential | Potential | No | No |
| 11 | 211 East 70th Street | Benches, trees, planters, sculptures, lawn areas | No | No | No | No |
| 12 | 220 East 72nd Street | Trees and planters | No | No | No | No |
| 13 | St. Catherine's Park | Running track, tennis wall, handball courts, and basketball courts, playground, spray showers, benches, planters, mature trees | Potential | Potential | Potential | Potential |
| 14 | NYCHA Robbins Plaza | Seating and trees | Potential | No | No | No |
| 15 | 400 East 70th Street | Benches, trees, and planters | No | No | No | No |
| 16 | 400 East 71st Street | Planters, mature trees, and seating for restaurants | No | No | No | No |
| 17 | 1321 York Avenue | Seating, trees, and planters | No | No | No | No |
| 18 | Rockefeller University Historic Landscaped Area[2,3] | The campus is a historic landscape that is both S/NR-eligible and NYCL-eligible, including the buildings and modern landscape. | No | No | No | Potential |
| A | Seventh Regiment Armory[1] | Clerestory windows | No | No | No | No |
| B | St. Vincent Ferrer Priory and School[1] | Stained glass windows | No | No | No | No |
| C | 149-151 East 67th Street Building[1] | Decorative façades | No | No | No | No |
| D | Park East Synagogue | Stained glass windows | Potential | No | No | No |
| E | Manhattan House[2] | Balconies and façades around them, garden along the south | No | Potential | Potential | Potential |
| F | The Church of St. Catherine of Siena[2] | Stained glass windows | No | Potential | Potential | No |
| G | First Hungarian Reformed Church of New York City[1] | Stained glass windows | Potential | No | No | No |

**Notes:**
See **Figures 5-2 through 5-5** for corresponding resource locations and shadow sweeps.
In the columns representing the representative analysis dates, "No" means project-generated shadow could not reach the resource, even without accounting for intervening buildings. "Potential" means project-generated shadow could potentially reach the resource on this date and requires further assessment.
[1] S/NR listed
[2] S/NR eligible
[3] Historic resource that contains public open space

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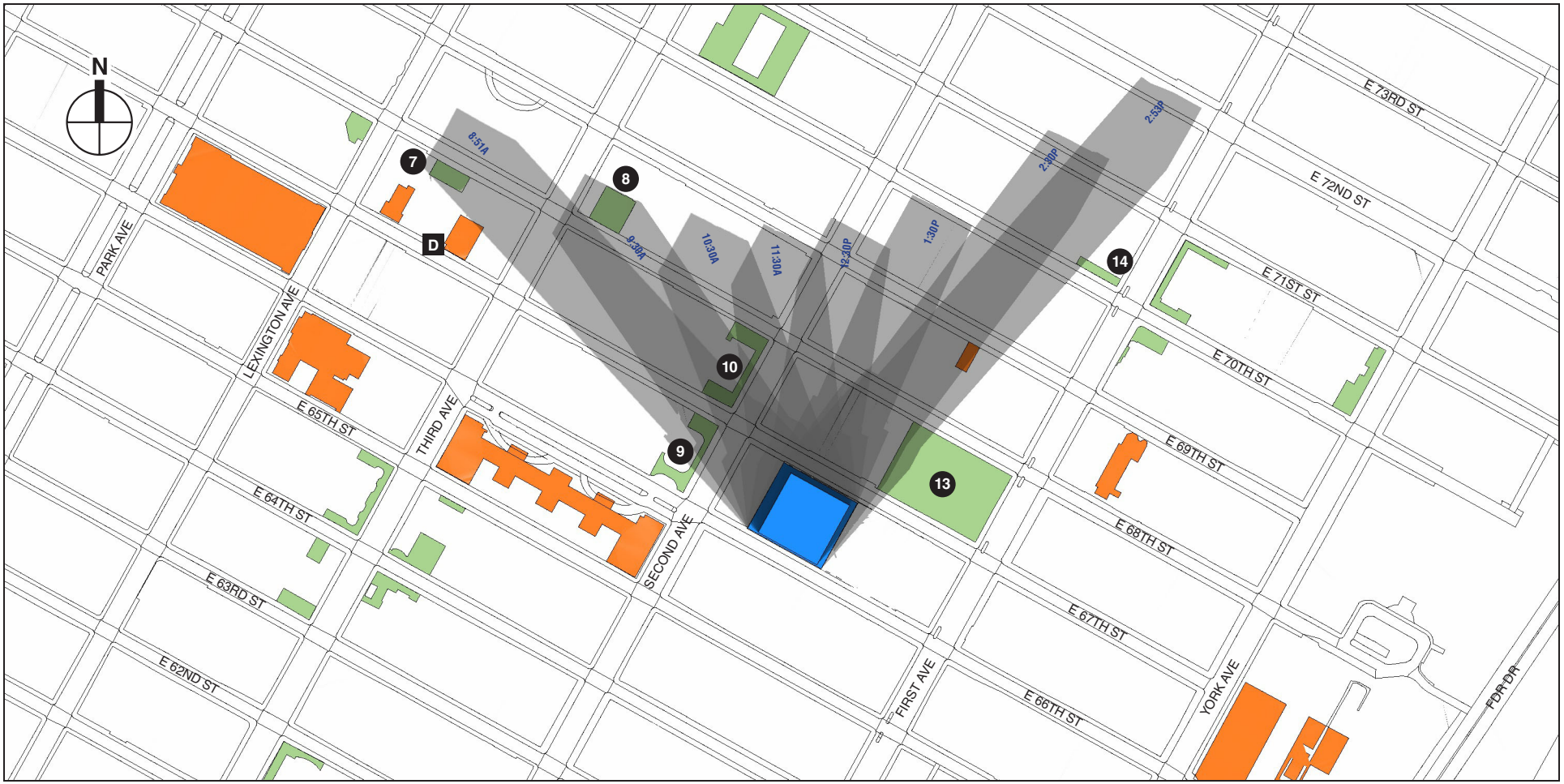


*Proposed Project*

*Publicly Accessible Open Space (see Table 5-1 for number key)*

*Historic Resources with Sunlight-Sensitive Features (see Table 5-1 for letter key)*

This figure illustrates the range of shadows that would occur from the Proposed Development on the analysis day representing the winter. The shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). The Tier 3 assessment does not account for future No Action shadows, and the shadows shown in this figure do not represent incremental shadows. The Tier 3 assessment serves to illustrate the daily path or "sweep" of the proposed building's shadows across the landscape, indicating which resources could potentially be affected on that analysis day, absent intervening buildings, by project-generated shadow. Daylight Saving Time was not used, per *CEQR Technical Manual* guidelines.

Tier 3 Assessment - December 21

**NEW YORK BLOOD CENTER—CENTER EAST**

**Figure 5-2**

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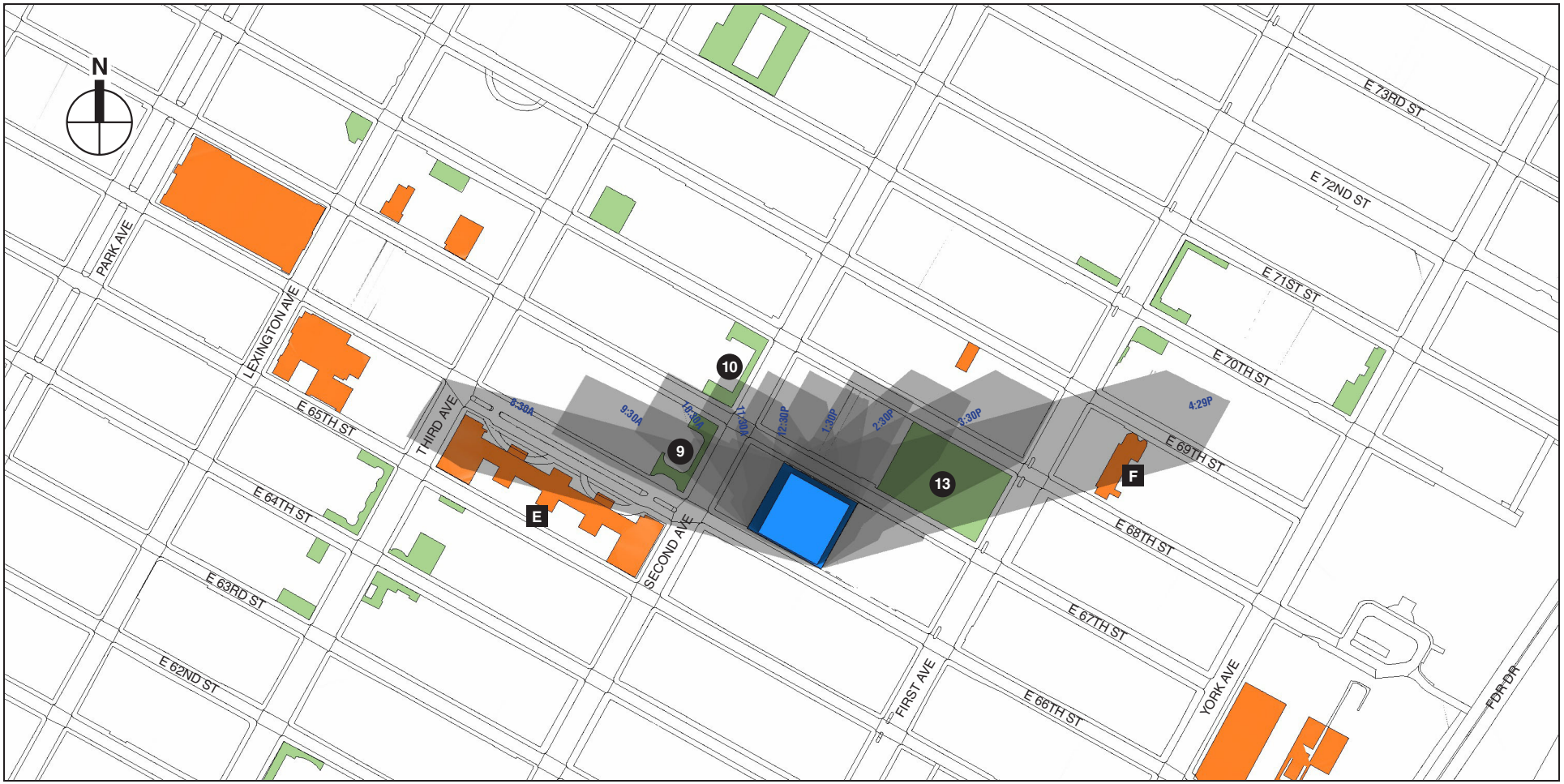



*Proposed Project*

*Publicly Accessible Open Space (see Table 5-1 for number key)*

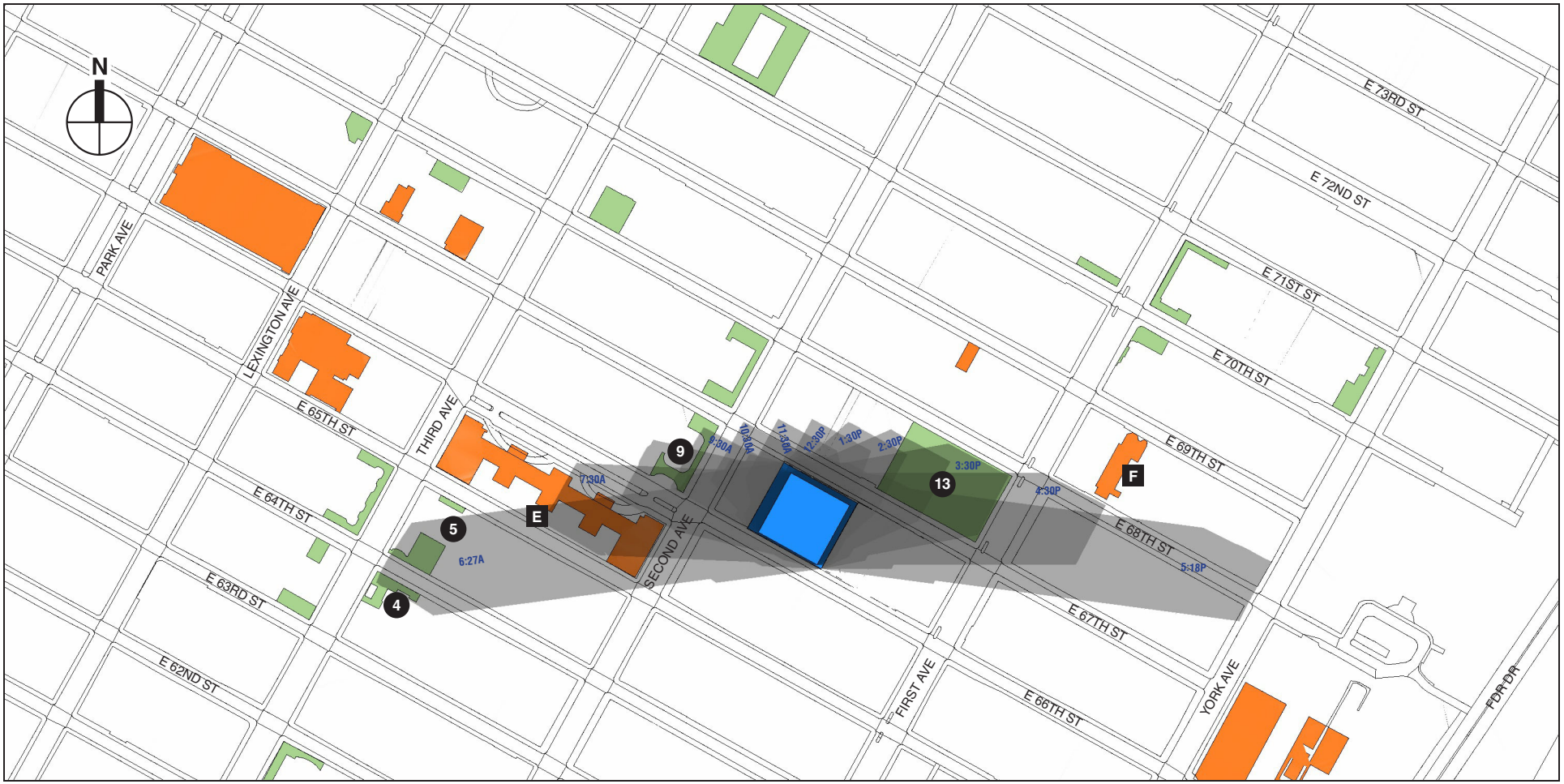
*Historic Resources with Sunlight-Sensitive Features (see Table 5-1 for letter key)*

This figure illustrates the range of shadows that would occur from the Proposed Development on the analysis day representing the early spring and the fall. The shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). The Tier 3 assessment does not account for future No Action shadows, and the shadows shown in this figure do not represent incremental shadows. The Tier 3 assessment serves to illustrate the daily path or "sweep" of the proposed building's shadows across the landscape, indicating which resources could potentially be affected on that analysis day, absent intervening buildings, by project-generated shadow. Daylight Saving Time was not used, per *CEQR Technical Manual* guidelines.

Tier 3 Assessment - March 21 / September 21

**NEW YORK BLOOD CENTER—CENTER EAST**

**Figure 5-3**




*Proposed Project*

*Publicly Accessible Open Space (see Table 5-1 for number key)*

*Historic Resources with Sunlight-Sensitive Features (see Table 5-1 for letter key)*

This figure illustrates the range of shadows that would occur from the Proposed Development on the analysis day representing the spring and summer growing season period. The shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). The Tier 3 assessment does not account for future No Action shadows, and the shadows shown in this figure do not represent incremental shadows. The Tier 3 assessment serves to illustrate the daily path or "sweep" of the proposed building's shadows across the landscape, indicating which resources could potentially be affected on that analysis day, absent intervening buildings, by project-generated shadow. Daylight Saving Time was not used, per *CEQR Technical Manual* guidelines.

Tier 3 Assessment - May 6 / August 6

**NEW YORK BLOOD CENTER—CENTER EAST**

**Figure 5-4**

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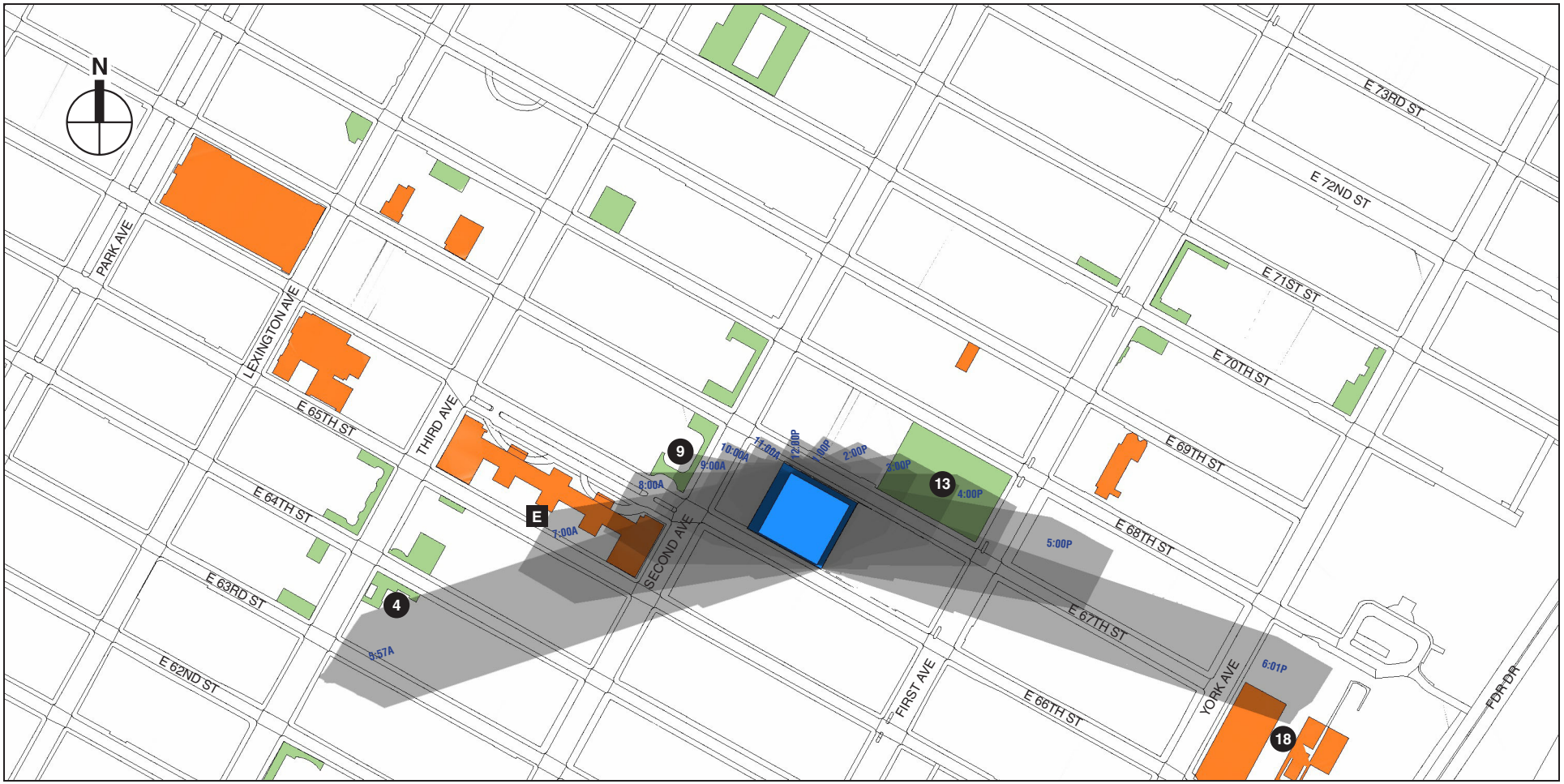



*Proposed Project*

*Publicly Accessible Open Space (see Table 5-1 for number key)*

*Historic Resources with Sunlight-Sensitive Features (see Table 5-1 for letter key)*

This figure illustrates the range of shadows that would occur from the Proposed Development on the analysis day representing summer. The shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). The Tier 3 assessment does not account for future No Action shadows, and the shadows shown in this figure do not represent incremental shadows. The Tier 3 assessment serves to illustrate the daily path or "sweep" of the proposed building's shadows across the landscape, indicating which resources could potentially be affected on that analysis day, absent intervening buildings, by project-generated shadow. Daylight Saving Time was not used, per *CEQR Technical Manual* guidelines.

Tier 3 Assessment - June 21

**NEW YORK BLOOD CENTER—CENTER EAST**

**Figure 5-5**

### TIER 3 SCREENING ASSESSMENT

The direction and length of shadows vary throughout the course of the day and differ depending on the season. In order to determine whether project-generated shadow could fall on a sunlight-sensitive resource, three-dimensional (3D) computer modeling software[2] is used in the Tier 3 assessment to calculate and display the Proposed Project's shadows on individual representative days of the year. A computer model was developed containing 3D representations of the elements in the base map used in the preceding assessments, the topographic information of the study area, and a reasonable worst-case 3D representation of the Proposed Project.

*REPRESENTATIVE DAYS FOR ANALYSIS*

Following the guidance of the *CEQR Technical Manual*, shadows on the summer solstice (June 21), winter solstice (December 21) and spring and fall equinoxes (March 21 and September 21, which are approximately the same in terms of shadow patterns) are modeled, to represent the range of shadows over the course of the year. An additional representative day during the growing season is also modeled, generally the day halfway between the summer solstice and the equinoxes, i.e., May 6 or August 6, which have approximately the same shadow patterns.

*TIMEFRAME WINDOW OF ANALYSIS*

The shadow assessment considers shadows occurring between one-and-a-half hours after sunrise and one-and-a-half hours before sunset. At times earlier or later than this timeframe window of analysis, the sun is down near the horizon and the sun's rays reach the Earth at very tangential angles, diminishing the amount of solar energy and producing shadows that are very long, move fast, and generally blend with shadows from existing structures. Consequently, shadows occurring outside the timeframe window of analysis are not considered significant under CEQR, and their assessment is not required.

*TIER 3 SCREENING ASSESSMENT RESULTS*

**Figures 5-2 to 5-5** illustrate the range of shadows that would occur, in the absence of intervening buildings, from the Proposed Project on the four representative days for analysis. As they move east and clockwise over the landscape, the shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). **Table 5-1** summarizes which analysis day or days each resource could potentially receive project-generated shadow.

The Tier 3 assessment concluded that a detailed analysis was warranted for the resources identified in **Table 5-1** on the relevant analysis days.

## D. DETAILED SHADOW ANALYSIS

The purpose of the detailed analysis is to determine the extent and duration of additional, or incremental, shadows that fall on sunlight-sensitive resources as a result of the Proposed Project, and to assess their potential effects. The 3D model used in the Tier 3 assessment was further developed to include the existing (and future No Action) buildings in the longest shadow study area, so that the baseline shadows can be modeled. The future with the Proposed Actions (the With

[2] Bentley MicroStation

Action condition) and its shadows can then be compared to the baseline shadows to determine the incremental shadows that would result with the Proposed Project.

Following the analysis framework described in Chapter 1, "Project Description," the shadows assessment was performed for the analysis year of 2026, comparing the Proposed Project to the future No Action condition. As noted in the Introduction, absent the Proposed Actions, a 5-story laboratory and medical office building (approximately 75 feet tall to the top of the roof, 95 feet including rooftop bulkheads) would be built as-of-right on the Development Site. This as-of-right development was modeled and added to the 3D model as part of the baseline No Action condition. Future planned developments in the study area were added to the No Action baseline using best-available information from publicly available filings with the Department of Buildings and other sources.

Shadows are in constant movement. The computer simulation software produces an animation showing the movement of shadows over the course of each analysis period. The analysis determines the time when incremental shadow would enter each resource, and the time it would exit. Shadow analyses were performed for each of the representative days and analysis periods indicated in the Tier 3 assessment.

## SUMMARY OF ANALYSIS RESULTS

Of the 13 open space and historic resources that were analyzed, only 5 resources would receive incremental shadows on one or more analysis days. As described in more detail below, St. Catherine's Park would receive substantial new shadows in the spring, summer, and fall, and limited new shadow in winter. Three nearby privately owned public spaces (POPS) would receive incremental shadows in one or more seasons, and one historic resource with sunlight-sensitive features, the north façade of the Manhattan House, would receive incremental shadow on two of the four analysis days.

The other eight resources that were analyzed would not receive any incremental shadows. The Development Site is situated in an area densely developed with tall, often bulky buildings, which substantially limited the size and the reach of incremental shadow. The roof of the Church of St. Catherine of Siena would receive nine minutes of incremental shadow on the March 21/September 21 analysis day, but no stained-glass windows on the west or south façades facing the project would receive incremental shadow, primarily due to the taller existing building west-adjacent to the church.

**Table 5-2** summarizes the entry and exit times and total duration of incremental shadows on each affected sun-sensitive resource. Beginning with **Figure 5-6**, the figures document the results of the analysis by providing graphic representations from the computer animation of times when incremental shadow would fall on a sun-sensitive resource. The figures illustrate the extent of additional, incremental shadow at that moment in time (highlighted in red), and also show existing shadow and remaining areas of sunlight.

2.10.21




200 East 69th Street - December 21 - 9:45 AM




254 East 68th Street - December 21 - 9:00 AM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

Detailed Analysis

**NEW YORK BLOOD CENTER—CENTER EAST**

**Figure 5-6**

**Table 5-2**
**Incremental Shadow Durations**

| Map Reference | Resource | Dec 21 | Mar 21/ Sep 21 | May 6/ Aug 6 | June 21 |
|---|---|---|---|---|---|
| 8 | **200 East 69th Street** | 9:33AM–9:54AM Total: 21min | -- | -- | -- |
| 9 | **265 East 66th Street** | -- | 9:40AM–10:55AM Total: 1hr 15min | 8:10AM–9:55AM Total: 1hr 45min | 7:55AM–9:28AM Total: 1hr 33min |
| 10 | **254 East 68th Street** | 8:51AM–10:07AM Total: 1hr 16min 11:20AM–12:02PM Total: 42min | 9:33AM–11:05AM Total: 1hr 32min | -- | -- |
| 13 | **St. Catherine's Park** | 2:22PM–2:53PM Total: 31min | 1:45PM–4:29PM Total: 3hr 4min | 1:20PM–5:18PM Total: 3hr 58min | 1:15PM–5:20PM Total: 4hrs 5min |
| E | **Manhattan House**[1] | -- | 7:36AM–8:03 AM Total: 27min | 6:27AM–8:20AM Total: 1hr 53min | 5:57AM–8:35AM Total: 2hr 38 min |

**Notes:**
Table indicates entry and exit times and total duration of incremental shadow for each sunlight-sensitive resource.
Daylight saving time is not used—times are Eastern Standard Time, per *CEQR Technical Manual* guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.
[1] S/NR Eligible

## DETERMINATION OF IMPACT SIGNIFICANCE

The determination of significance of shadow impacts on a sunlight-sensitive resource is based on (1) the information resulting from the detailed shadow analysis describing the extent and duration of incremental shadows and (2) an analysis of the resource's sensitivity to reduced sunlight. The goal of the assessment is to determine whether the effects of incremental shadows on a sunlight-sensitive resource are significant under CEQR.

A shadow impact occurs when the incremental shadow from a proposed project falls on a sunlight-sensitive resource or feature and reduces its direct sunlight exposure. Determining whether this impact is significant or not depends on the extent and duration of the incremental shadow and the specific context in which the impact occurs.

Per CEQR, 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 Proposed Actions [the No Action condition]). Generally, 4 to 6 hours a day of sunlight, particularly in the growing season, is a minimum requirement.
- A reduction in direct sunlight exposure where the sensitive feature of the resource is already subject to substandard sunlight (i.e., less than 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 shadows.

*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.

## ASSESSMENT OF SHADOW IMPACTS BY RESOURCE

*200 EAST 69TH STREET (MAP ID 8)*

The plaza at 200 East 69th Street is a POPS with its entrance located on the north side of East 68th Street. The square plaza has large planters in the center and along the east and west sides containing flowers and trees. The planters are lined with granite benches. This plaza would receive 21 minutes of incremental shadow in the morning of the December 21 analysis day only (see **Figure 5-6**). The brief duration and very small extent of new shadow would not be significant.

*265 EAST 66TH STREET (MAP ID 9)*

The plaza at 265 East 66th Street wraps around the residential tower's three street sides. The north side along East 67th Street is elevated several steps above street level, it is mostly open paved space with a few planters. The space along Second Avenue is paved with steps down to an arcade with retail stores. The south side along East 67th Street is also elevated and has several planters with small trees and bushes as well as a bench built into the planter.

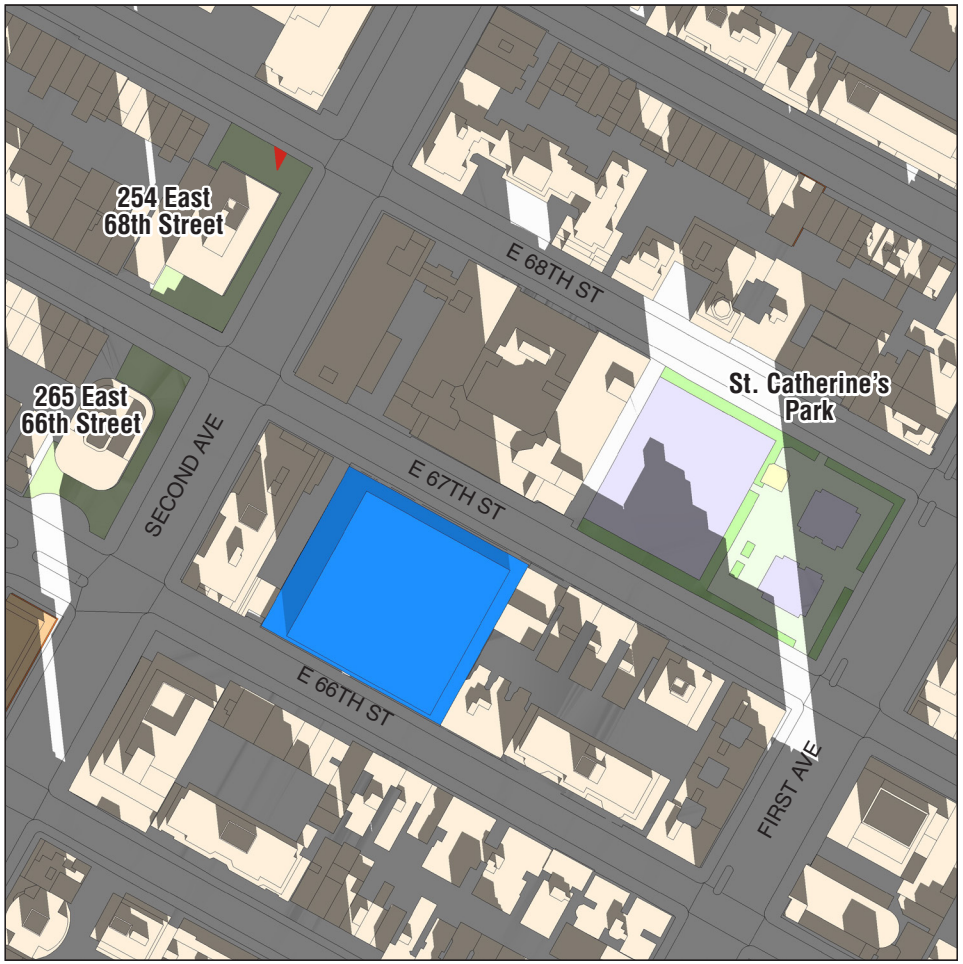
On the March 21/September 21 analysis day, this plaza would receive incremental shadow in the morning for one hour and 35 minutes (see **Figures 5-9 and 5-10**). The small incremental shadow would be limited to the north section of the plaza at which time portions of the south side would remain in sunlight, available for users seeking sun. The incremental shadow would not significantly impact the use or character of this space which is already located in a densely developed area near tall buildings and is in shadow for much of the day.

The plaza would receive incremental shadow starting at 8:10 AM on the May 6/August 6 analysis day. The incremental shadow would last one hour and 45 minutes (see **Figure 5-14**). For the first 40 minutes, the incremental shadow would eliminate the sunlight on the south portion of the plaza while most of the north side would remain in sunlight. For the rest of the duration the incremental shadow becomes smaller, eventually becoming a narrow stripe along the Second Avenue area. For users seeking sun there are always portions of this plaza and the adjacent plaza a block north (254 East 68th Street, described below) that remain in sunlight. All vegetation in the affected by incremental shadow would continue to receive over 6 hours of direct sunlight throughout the day, which according to the *CEQR Technical Manual* is adequate for the health of any species of vegetation. Therefore, the use and character of this space would not be significantly affected.

On the June 21 analysis day, the plaza would receive incremental shadow starting at 7:58 AM. For the first hour, the incremental shadow would be small and limited to the south part of the




254 East 68th Street - December 21 - 10:00 AM




254 East 68th Street - December 21 - 11:30 AM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21




St. Catherine's Park - December 21 - 2:30 PM




St. Catherine's Park - December 21 - 2:45 PM

*Proposed Project*

*Publicly Accessible Open Space*

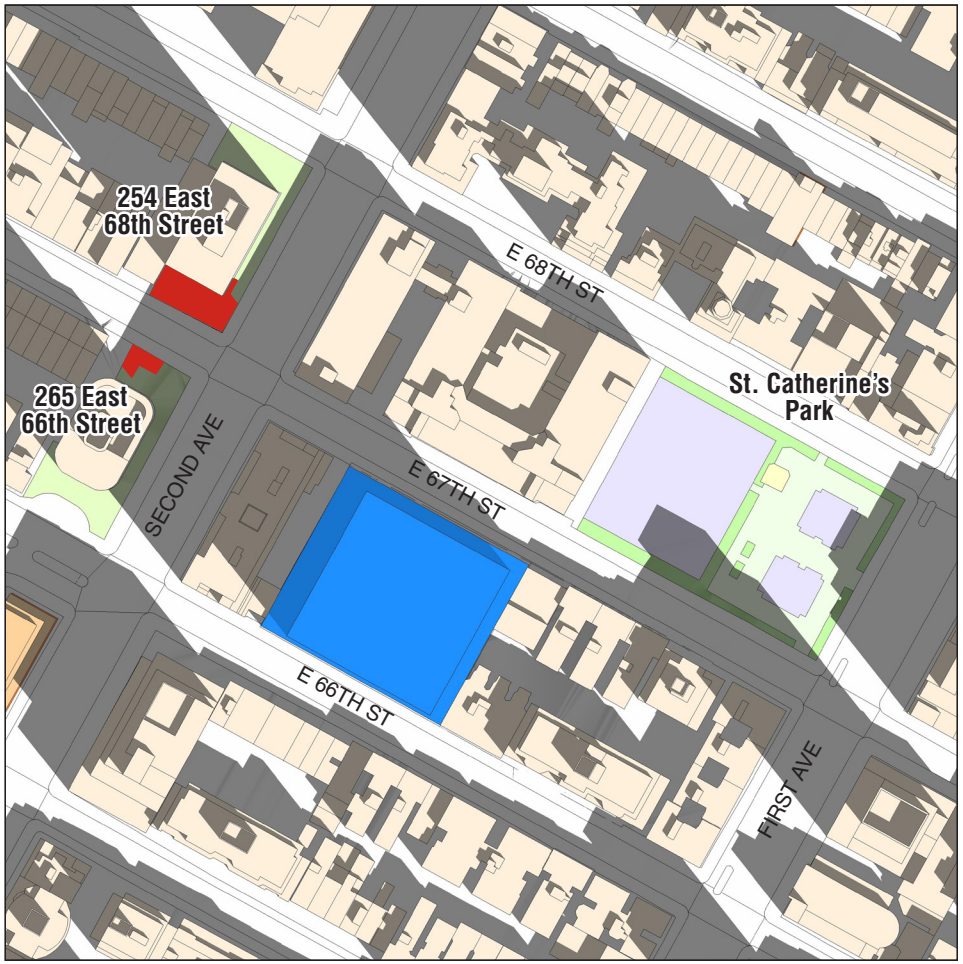
*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21




265 East 66th & 254 East 68th Streets - March 21 / September 21 - 9:45 AM




265 East 66th & 254 East 68th Streets - March 21 / September 21 - 10:15 AM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21




265 East 66th & 254 East 68th Streets - March 21 / September 21 - 10:45 AM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21




St. Catherine's Park - March 21 / September 21 - 2:00 PM




St. Catherine's Park - March 21 / September 21 - 2:30 PM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21




St. Catherine's Park - March 21 / September 21 - 3:00 PM




St. Catherine's Park - March 21 / September 21 - 3:30 PM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

Detailed Analysis

**NEW YORK BLOOD CENTER—CENTER EAST**

**Figure 5-12**

2.10.21




St. Catherine's Park - March 21 / September 21 - 4:00 PM




St. Catherine's Park - March 21 / September 21 - 4:29 PM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21




265 East 66th Street - May 6 / August 6 - 8:30 AM




265 East 66th Street - May 6 / August 6 - 9:30 AM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

plaza, at which time the north part of the plaza would be in direct sunlight (see **Figure 5-18**). The incremental shadow would get smaller and, for the last 20 minutes, new shadow would only reach the area along Second Avenue, which as noted above, this area of the plaza is paved and devoid of any features or amenities, and therefore is minimally sensitive to sun and shadows.

*254 EAST 68TH STREET (MAP ID 10)*

The plaza at 254 East 68th Street wraps around the residential tower's three street sides. The north and south sides along East 68th Street and East 67th Street, have several small planters, benches, and tables. The spaces are bordered by low brick walls containing large planters with trees. The space along Second Avenue is a widened sidewalk with several trees.

Incremental shadow would fall on the space along East 67th Street for the first one hour and 16 minutes of the December 21 analysis day eliminating the small extent of sunlight remaining on the plaza during this time (see **Figures 5-6 and 5-7**). Incremental shadow would return again for 42 minutes from 11:20 AM to 12:02 PM, this time in the space along East 68th Street. Portions of the plaza would remain in sunlight during this time. While there is a long duration of incremental shadow that reduces and eliminates the remaining sun on the plaza, the Proposed Project would not significantly impact the use or character of this space which is already located in a densely developed area near tall buildings and is in shadow for much of the winter morning, when use is likely low due to inclement weather. Furthermore, a portion of the adjacent plaza one block south (265 East 66th Street, see above) would be in sunlight during the early period when sun would be eliminated on this plaza, available for users seeking sunlight. Consequently, the incremental shadow would not significantly impact this space on this analysis day.

On the March 21 / September 21 analysis day incremental shadow would fall on the plaza for one hour and 33 minutes. It would enter the space along south side and increase in extent until 10:15 AM when it would reach the space along Second Avenue (see **Figures 5-9 and 5-10**). The incremental shadow would not significantly impact the use of the space, since the north side would remain in sunlight during the period of incremental shadow.

*ST. CATHERINE'S PARK (MAP ID 13)*

St. Catherine's Park occupies the eastern half of the block bounded by East 67th and 68th Streets and First and Second Avenues. On the west side of the park there are basketball and handball courts, tennis walls, a running track, and a workout station. The east side of the park contains several playground features. Closer to East 67th Street there is a playground for younger children, a fenced in swing area, and spray showers. On the north side closer to 68th Street, there is a larger playground for older children. There are benches, trees, and planted areas throughout the park. All of these features are surrounded by large trees along the perimeter of the entire park. **Figure 5-26** shows a site plan of St. Catherine's Park. Generally speaking, the active uses accommodated in the western half of the park would be less sensitive to shadows, while the seating areas, water feature and other children's play areas, planting beds, and denser tree canopy in the eastern half of the park would be more sensitive to shadows.

**Figure 5-27** shows the tree species and distribution in St. Catherine's Park. The existing tree canopy is mostly mature London Plane trees, as well as one Pin Oak, one Japanese Zelkova, and two Elm Species; all of these species require a minimum of six hours of direct sunlight to thrive. There are also several Kousa Dogwood and Chinese fringetrees throughout the park, which require two to four hours of direct sunlight to thrive. The combination of these trees provides shady conditions at much of the park's ground level, from the perspective of users (see **Figure 5-28**

2.10.21




St. Catherine's Park - May 6 / August 6 - 1:30 PM




St. Catherine's Park - May 6 / August 6 - 2:15 PM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

Detailed Analysis

**NEW YORK BLOOD CENTER—CENTER EAST**

**Figure 5-15**

2.10.21




St. Catherine's Park - May 6 / August 6 - 3:00 PM




St. Catherine's Park - May 6 / August 6 - 3:45 PM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21




St. Catherine's Park - May 6 / August 6 - 4:30 PM




St. Catherine's Park - May 6 / August 6 - 5:15 PM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21




265 East 66th Street - June 21 - 8:15 AM




265 East 66th Streets - June 21 - 9:15 AM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21




St. Catherine's Park - June 21 - 1:15 PM




St. Catherine's Park - June 21 - 2:00 PM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21




St. Catherine's Park - June 21 - 2:45 PM




St. Catherine's Park - June 21 - 3:30 PM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21




St. Catherine's Park - June 21 - 4:15 PM




St. Catherine's Park - June 21 - 5:00 PM

*Proposed Project*

*Publicly Accessible Open Space*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21




Manhattan House - March 21 / September 21 - 7:45 AM

*Proposed Project*

*Sunlight-Sensitve Historic Resource*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21




Manhattan House - May 6 / August 6 - 6:45 AM




Manhattan House - May 6 / August 6 - 7:45 AM

*Proposed Project*

*Sunlight-Sensitve Historic Resource*

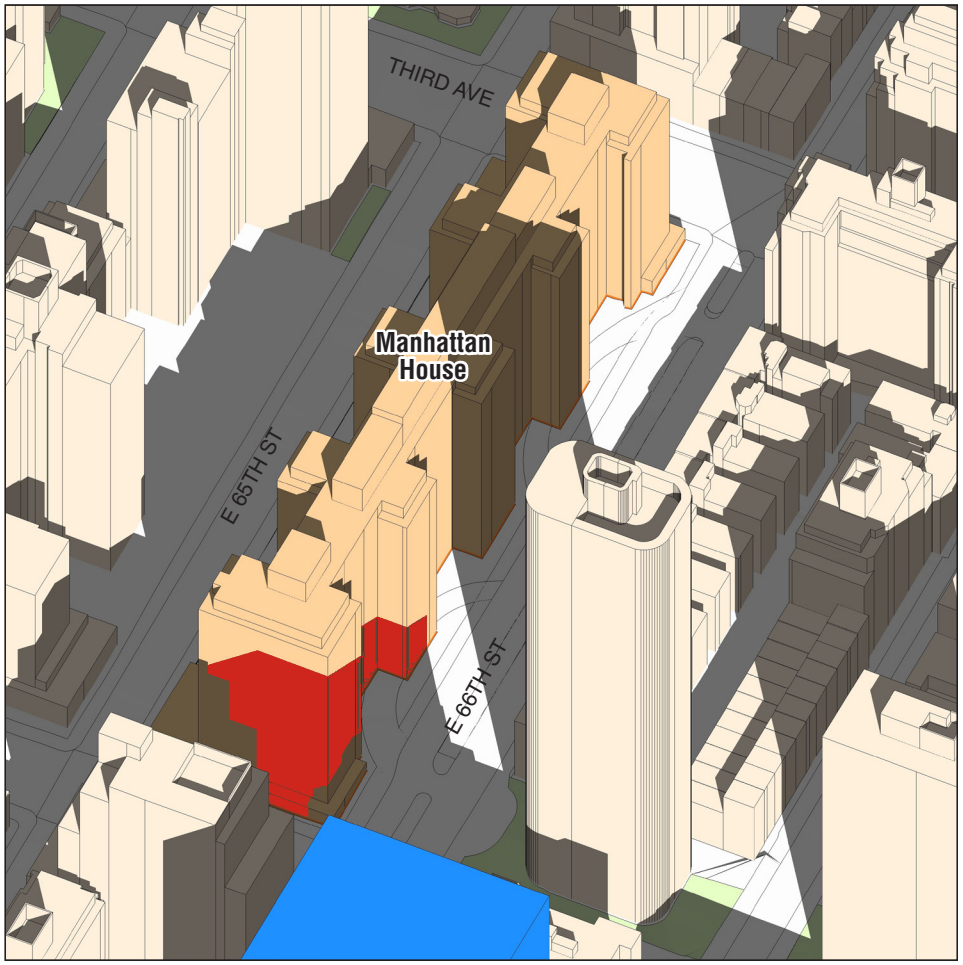
*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21




Manhattan House - June 21 - 6:15 AM




Manhattan House - June 21 - 7:15 AM

*Proposed Project*

*Sunlight-Sensitve Historic Resource*

*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines

2.10.21



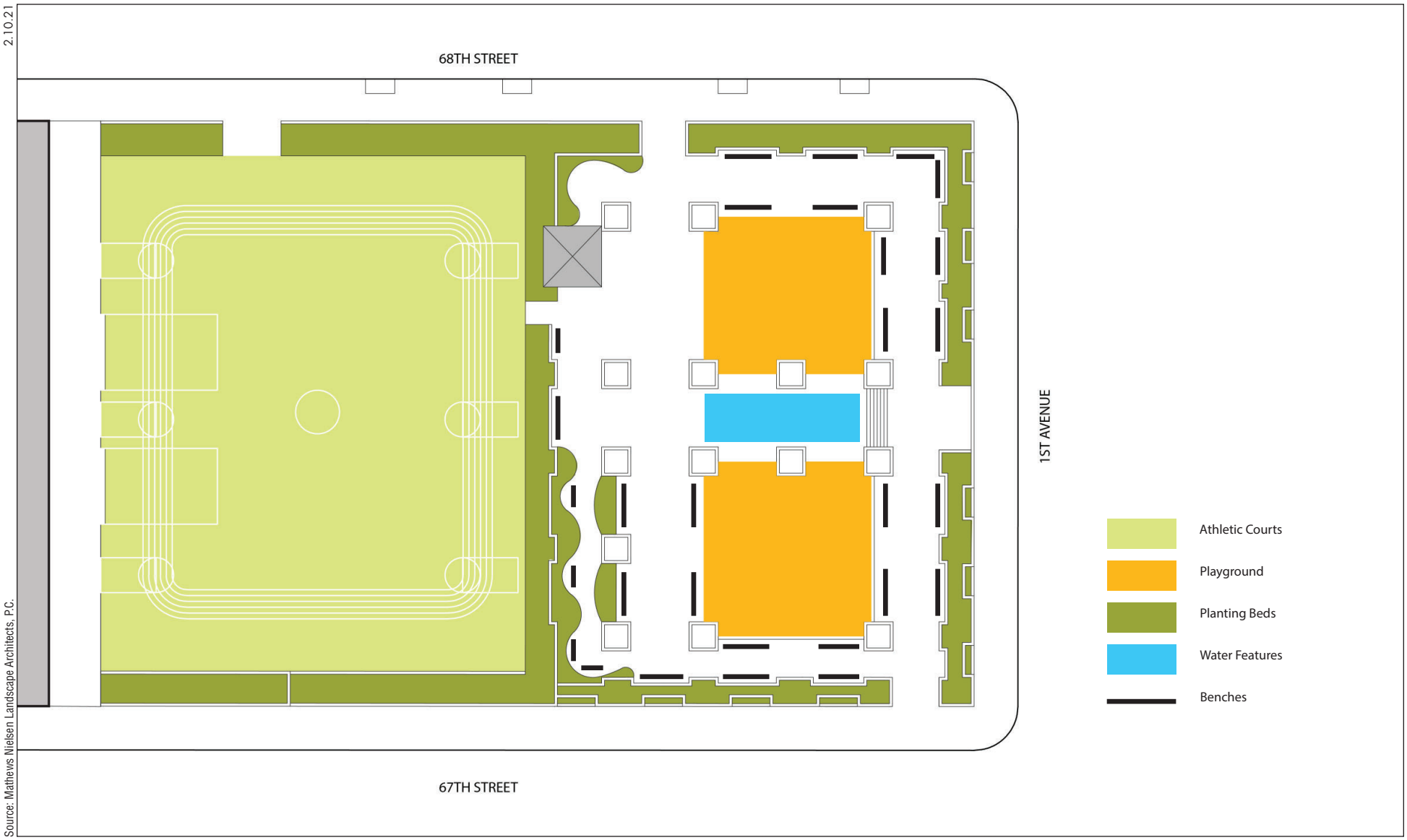

Manhattan House - June 21 - 8:15 AM

*Proposed Project*

*Sunlight-Sensitve Historic Resource*

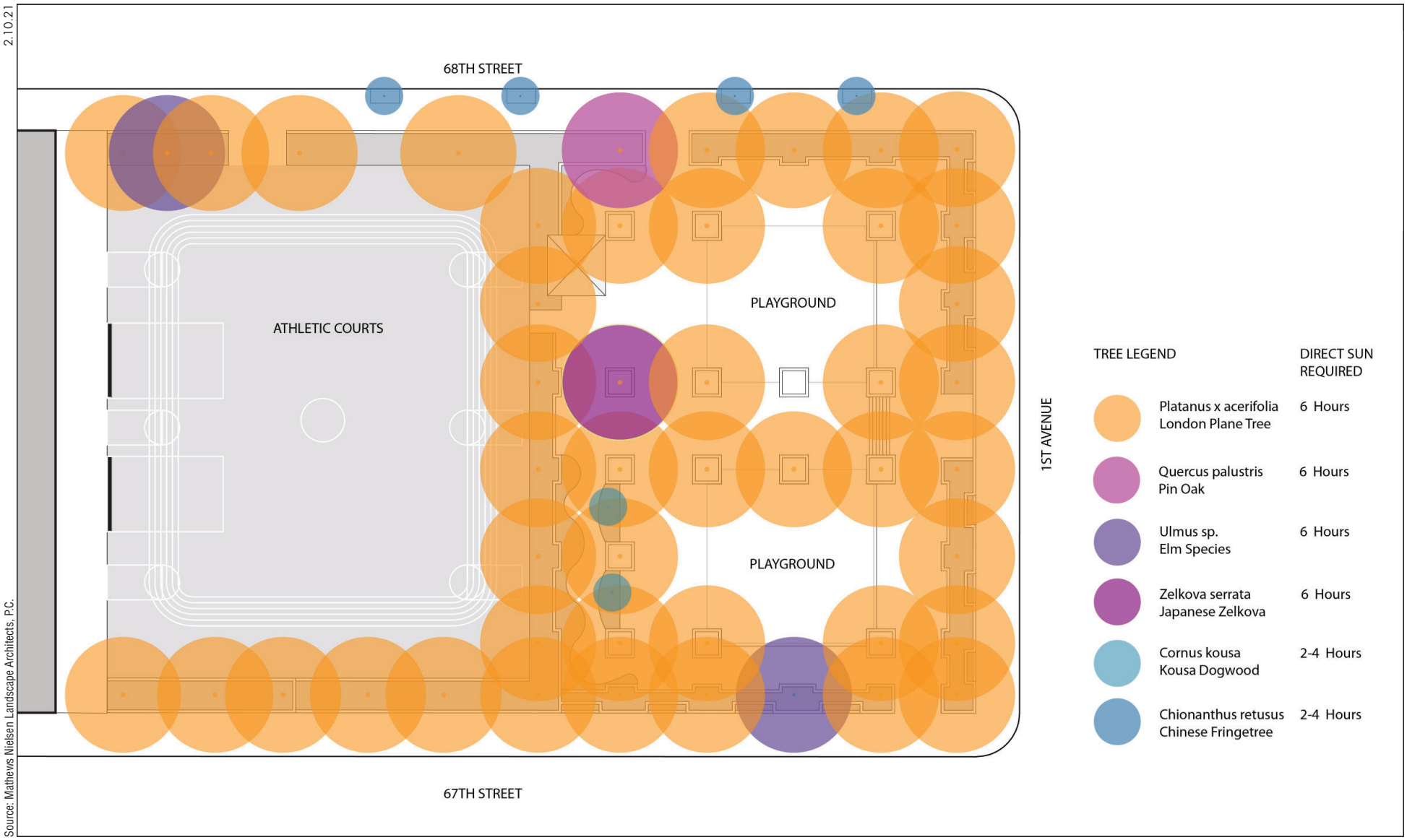
*Incremental Shadow*

NOTES: Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e., baseline shadow from existing and future No Action buildings. Daylight Saving Time not used, per *CEQR Technical Manual* guidelines




St. Catherine's Park–Site Plan

**Figure 5-26**




St. Catherine's Park–Tree Canopy Species and Distribution

2.10.21



Source: https://www.nycgovparks.org/photo_gallery/full_size/9838.jpg



Source: https://www.nycgovparks.org/photo_gallery/full_size/9834.jpg



Source: Mathews Nielsen Landscape Architects, P.C.

St. Catherine's Park–Photographs

**NEW YORK BLOOD CENTER—CENTER EAST**

**Figure 5-28**

showing sunny days in the park during the "leaf-on" months). The existing plantings beds are English Ivy, other groundcovers, and shrubs which thrive in lower light conditions provided by the mature tree canopy.

As noted above in B, "Definitions and Methodology," CEQR methodology defines shadow as resulting from a built structure blocking the sun, and any tree canopy is considered a sunlight-sensitive resource rather than a source of shadow. Therefore, in this analysis, the effects of incremental shadows that fall during the growing or "leaf-on" season onto areas occupied by the park's dense tree canopy are primarily assessed in terms of how they might affect the health of the trees. Beneath the canopy, from the perspective of the park's users during the "leaf-on" months, the effects of the proposed building's new shadow would likely be limited, although not undetectable as small areas of sunlight do typically shine through small gaps in the leafy canopy. The photos in **Figure 5-28** show examples of sun and shading conditions on sunny days in St. Catherine's Park during the leaf-on months.

St. Catherine's Park would receive incremental shadow for the final 31 minutes of the December 21 analysis day, 2:21 PM to 2:53 PM. The incremental shadow would enter in the northwest corner of the park where the courts, running track, and some trees are located (see **Figure 5-8**). The incremental shadow would be short in duration and would remain small in extent, limited to the northwest corner. Therefore, the incremental shadow that could result from the Proposed Project would not adversely impact St. Catherine's Park on this analysis day.

Eastern Standard Time (EST) is used throughout this analysis, as mandated by the *CEQR Technical Manual*. However, in the spring, summer, and fall months discussed below, Daylight Saving Time would be in effect, so given times may also be noted in Eastern Daylight Time, which would be the actual time on the clock in these seasons.

On the March 21/September 21 analysis day, St. Catherine's Park would receive incremental shadow from 1:45 PM (2:45 PM EDT) until the end of the analysis day (see **Figures 5-11 through 5-13**). Incremental shadow would enter along the west side of the park. By 3:15 PM (4:15 PM EDT), the west side of the park, containing the paved ball courts and workout station, would be fully covered in incremental shadow, while most of the eastern half would remain in sun. By 4:00 PM (5:00 PM EDT), incremental shadow would cover most of the eastern half while continuing to eliminate sun on the western half. All sunlight would be eliminated from the park for the last 10 minutes of the analysis day.

Incremental shadow would fall on the park for approximately four hours during the May 6/ August 6 analysis day (see **Figures 5-15 through 5-17**). Starting in the south west corner at 1:20 PM (2:20 PM EDT), the incremental shadow would quickly sweep across the park covering most of the ball courts on the west side by 2:45 PM (3:45 PM EDT). From 3:15 PM to 4:30 PM (4:15 PM to 5:30 PM EDT), most of the park would be in incremental shadow. For the last 48 minutes of the analysis day, 4:30 PM to 5:18 PM (5:30 PM to 6:18 PM EDT), all remaining sunlight would be eliminated from the park.

On the June 21 analysis day, shadow would fall on the park for a total of four hours and five minutes (see **Figures 5-19 through 5-21**). The incremental shadow would start in the west corner of the ball courts at 1:15 PM (2:15 PM EDT). By 4:00 PM (5:00 PM EDT), shadow would cover more than half of the park, including the spray showers, one playground, almost all of the ball courts, and several benches. By 5:00 PM (6:00 PM EDT), the extent of incremental shadow would be limited to the southeast corner of the park, and would remain small for the final hour of the analysis day. The incremental shadow would cover large areas of the park for a couple of hours in

the late afternoon, including the water feature, and, in combination with existing shadows, leave only limited areas of remaining sunlight in the north part of the park.

Regarding the park's trees and plantings, all vegetation would continue to receive a minimum of approximately six hours of sun on the three analysis days representing the growing season, compared with seven to nine hours of sun in the No Action condition. As noted above, six hours of sunlight is adequate for the health of the species of vegetation located in the park. The Proposed Project would therefore not significantly affect the health of the vegetation in St. Catherine's Park.

Regarding the use of the park, incremental shadow would occur through much of the afternoon the in the spring, summer, and fall, and would cover a substantial area for a portion of that duration. During these seasons and at these times the use of the playgrounds and ball courts would likely be high. The western half of the park, containing active uses, would continue to be in sun from mid-morning until approximately 2:00 PM (3:00 PM EDT) in these seasons, and partially in sun for another hour at minimum after that. The eastern half of the park, containing passive uses and children's play areas, would continue to be mostly or entirely in sun from mid-morning until approximately 3:00 PM (4:00 PM EDT) in these seasons. Nevertheless, the incremental shadows in the afternoons would cause a potentially significant impact the use of the park.

*MANHATTAN HOUSE, 200 EAST 66TH STREET (MAP ID E)*

This apartment and retail complex, completed in 1951 and designated as a landmark by New York City Landmarks Preservation Commission in 2007, occupies the full block bounded by East 65th and 66th Streets and Second and Third Avenues. It has deep projecting balconies that create light and shadow on the façades, as noted in the designation report, and a block-long garden in the rear (East 65th Street side), which is not publicly accessible but which nevertheless is integral to the building's architectural significance. Therefore, the façades and rear garden were included in the analysis as sunlight-sensitive features. The analysis showed that the rear garden would never receive incremental shadow, but portions of the north façade would, as described below.

On the March 21/September 21 analysis day, the north façade of Manhattan House would receive incremental shadow for 27 minutes (see **Figure 5-22**). The incremental shadow would start in the early morning at 7:36 AM, covering portions of the façade along East 66th Street. The incremental shadow would quickly move down the façades and exit by 8:03 AM. Portions of the façade would remain in sun throughout the 27-minute duration. Given this fact, and the brevity of the duration, the incremental shadow would not be significant.

On the May 6/August 6 analysis day, the resource would receive incremental shadow for nearly two hours, 6:27 AM to 8:20 AM (see **Figure 5-23**). The incremental shadow would fall on part of the eastern side of the north façade, and other parts of the north façade would remain in sun for passers-by to appreciate. Given the early hour and limited coverage of the incremental shadow, which would leave areas of sun on the façade at all times, the incremental shadow would not be significant.

On the June 21 analysis day, the resource would receive incremental shadow for about two and a half hours, 5:57 AM to 8:35 AM (see **Figures 5-24 and 5-25**). Similar to the May 6/August 6 analysis day, the incremental shadow would fall on part of the eastern side of the north façade, while other parts of the north façade would remain in sun. Given the early hour, and limited coverage of the incremental shadow, the incremental shadow would not be significant, because portions of the façades, with the balconies creating contrasts of light and shadow, would be in sun at any given time, for the appreciation of passers-by.

## E. CONCLUSIONS

As described in detail above, the analysis concluded that the Proposed Project would result in three to four hours of new incremental shadows cast on St. Catherine's Park during the afternoons in the spring, summer, and fall, covering large areas of the park at times, thereby causing a potentially significant adverse impact to the use of the park. The Proposed Project would also cast new shadows on the park in winter, but these would be limited in extent and duration and would not be considered significant. In addition, the Proposed Project would cast new shadows on three nearby POPS, and one historic resource with sunlight-sensitive features, on one or more analysis days, but in those cases, the incremental shadow would not be of substantial enough extent or duration to cause significant impacts. ✷