

## **A. INTRODUCTION**

Shadow is defined in the 2014 *City Environmental Quality Review (CEQR) Technical Manual* as the condition that results when a building or other built structure blocks the sunlight that would otherwise directly reach a certain area, space, or feature. Within urban environments, built structures constantly cast shadows in their immediate vicinity. This chapter focuses on the interaction between proposed new structures and the shadows they may cast on sunlight-sensitive resources of concern, which include publicly accessible open space, sunlight-dependent features of historic resources, and natural areas that depend on sunlight.

Under *CEQR Technical Manual* guidelines, a shadows assessment is required if the proposed project would result in structures 50 feet or greater in height, or of any height if the project site is located adjacent to, or across the street from, a sunlight-sensitive resource. The proposed projects include the development of three buildings all of which are over 700 feet tall, and therefore a shadows assessment is warranted.

## **PRINCIPAL CONCLUSIONS**

The proposed projects would result in a significant adverse shadows impact at two sunlight-sensitive open space resources.

Incremental shadows cast by the proposed projects would reach ~~34-35~~ sunlight-sensitive resources. However, the majority of these new shadows would be limited in extent and duration and would typically only occur during some seasons. Therefore, no significant adverse shadows impacts would occur at 33 of these ~~34-35~~ sunlight-sensitive resources.

Two sunlight-sensitive resources would experience significant adverse shadows impacts: the Cherry Clinton Playground and the Lillian D. Wald Playground. These open space resources contain basketball courts, handball courts, playground/fitness equipment, seating areas, trees, and landscaping.

Project-generated shadows would fall on the Cherry Clinton Playground on the December 21, March 21/September 21 and May 6/August 6 analysis days, beginning in the early afternoon hours and remaining throughout most of the day. The long afternoon duration and large extent of incremental shadow on the Cherry Clinton Playground would significantly affect the user experience on these analysis days, as well as the vegetation on the March 21/September 21 analysis day.

On the March 21/September 21 analysis day, the proposed projects would cast large areas of new shadow on the Lillian D. Wald Playground for an hour, including a 15-minute period when incremental shadow would eliminate virtually all the sun. Smaller incremental shadows would fall on the playground for an additional 50 minutes. Given that weather on March 21/September 21 analysis day can be cool making sunlit areas important to users, and given the large extents



and long duration of the incremental shadow, the incremental shadow from the proposed projects would significantly affect the user experience in the Lillian D. Wald Playground on this analysis day.

~~Potential~~ Mitigation measures for the shadows impacts ~~are being~~have been explored by the applicants in consultation with DCP and NYC Parks, and ~~will be~~have been refined between the DEIS and FEIS. ~~Potential~~ Mitigation measures, as described in Chapter 21, “Mitigation,” include dedicated funding for enhanced maintenance at these two playgrounds to mitigate the significant adverse impact to the users and the trees of the Cherry Clinton Playground, and the users of the Lillian D. Wald Playground.

## 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 on a sunlight-sensitive resource resulting from a proposed project.

**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:

- *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 of such architectural resources 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, 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, if the condition of project-generated open space is included in the qualitative

analysis presented in the Open Space chapter of the EIS, 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.

## **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 building 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.

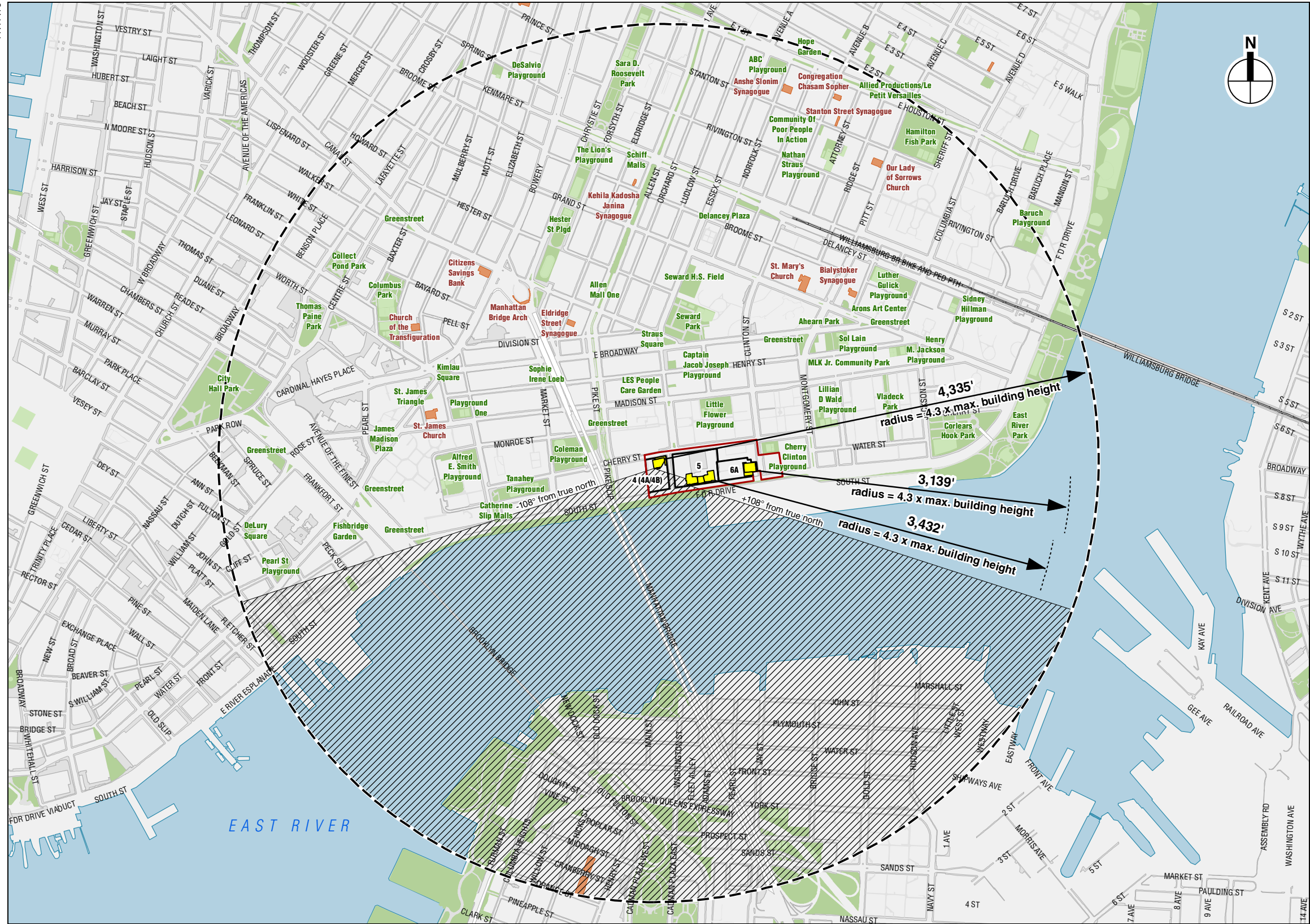
If the third tier of analysis does not eliminate the possibility of new shadows on sunlight-sensitive resources, a detailed shadow analysis is required to determine the extent and duration of the incremental shadow resulting from the project. The detailed analysis provides the data needed to assess the 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)<sup>1</sup> showing the location of the project sites and the surrounding street layout (see **Figure 6-1**). 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.

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<sup>1</sup> Software: Esri ArcGIS 10.3; Data: New York City Department of Information Technology and Telecommunications (DoITT) and other City agencies, and AKRF site visits.



- |   |  |
|---|--|
| Project Sites                           | Publicly Accessible Open Space                                     |
| Boundary of Two Bridges LSRD            | Historic Resource with Sunlight-Sensitive Features                 |
| Proposed Projects - Building Footprints | Tier 1: Combined Longest Shadow Study Area Boundary                |
|   | Area South of Site that Could Never Be Shaded by Proposed Projects |

### TIER 1 SCREENING ASSESSMENT

For the Tier 1 assessment, the longest shadow that the proposed projects could cast is calculated, and, using this length as the radius, a perimeter is drawn around the project sites. 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 approximately 1,008 feet, including rooftop mechanical structures, the proposed building at Site 4 (4A/4B) could cast a shadow up to approximately 4,335 feet in length ( $1,008 \times 4.3$ ). Using this length as the radius, a perimeter was drawn around the proposed tower footprint at Site 4 (4A/4B).

Using the same methodology, at a maximum height of approximately 798 feet, including rooftop mechanical structures, the proposed building at Site 5 could cast a shadow up to approximately 3,432 feet in length ( $798 \times 4.3$ ). Using this length as the radius, a perimeter was drawn around the proposed tower footprints at Site 5.

Similarly, at a maximum height of approximately 730 feet, including rooftop mechanical structures, the proposed building at Site 6A could cast a shadow up to approximately 3,139 feet in length ( $730 \times 4.3$ ). Using this length as the radius, a perimeter was drawn around the proposed tower footprint at Site 6A.

The three perimeters were merged to determine the combined longest shadow study area for the proposed projects (see **Figure 6-1**).

The Tier 1 assessment showed that many publicly accessible open spaces and historic resources with sunlight-sensitive features were located within the longest shadow study area, and 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 6-1** illustrates this triangular area south of the project sites. 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 showed that many publicly accessible open spaces and historic resources with sunlight-sensitive features were located within the longest shadow study area, and the next tier of assessment was required.

### TIER 3 SCREENING ASSESSMENT

The direction and length of shadows vary throughout the course of the day and also differ depending on the season. In order to determine whether project-generated shadow could fall on a sunlight-sensitive resource, three-dimensional computer modeling software<sup>2</sup> is used in the Tier 3

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<sup>2</sup> Bentley MicroStation.

assessment to calculate and display a proposed project's shadows on individual representative days of the year. A computer model was developed containing three-dimensional 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 three-dimensional representation of the proposed projects.

#### *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 until the sun reaches the horizon and sets. 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*

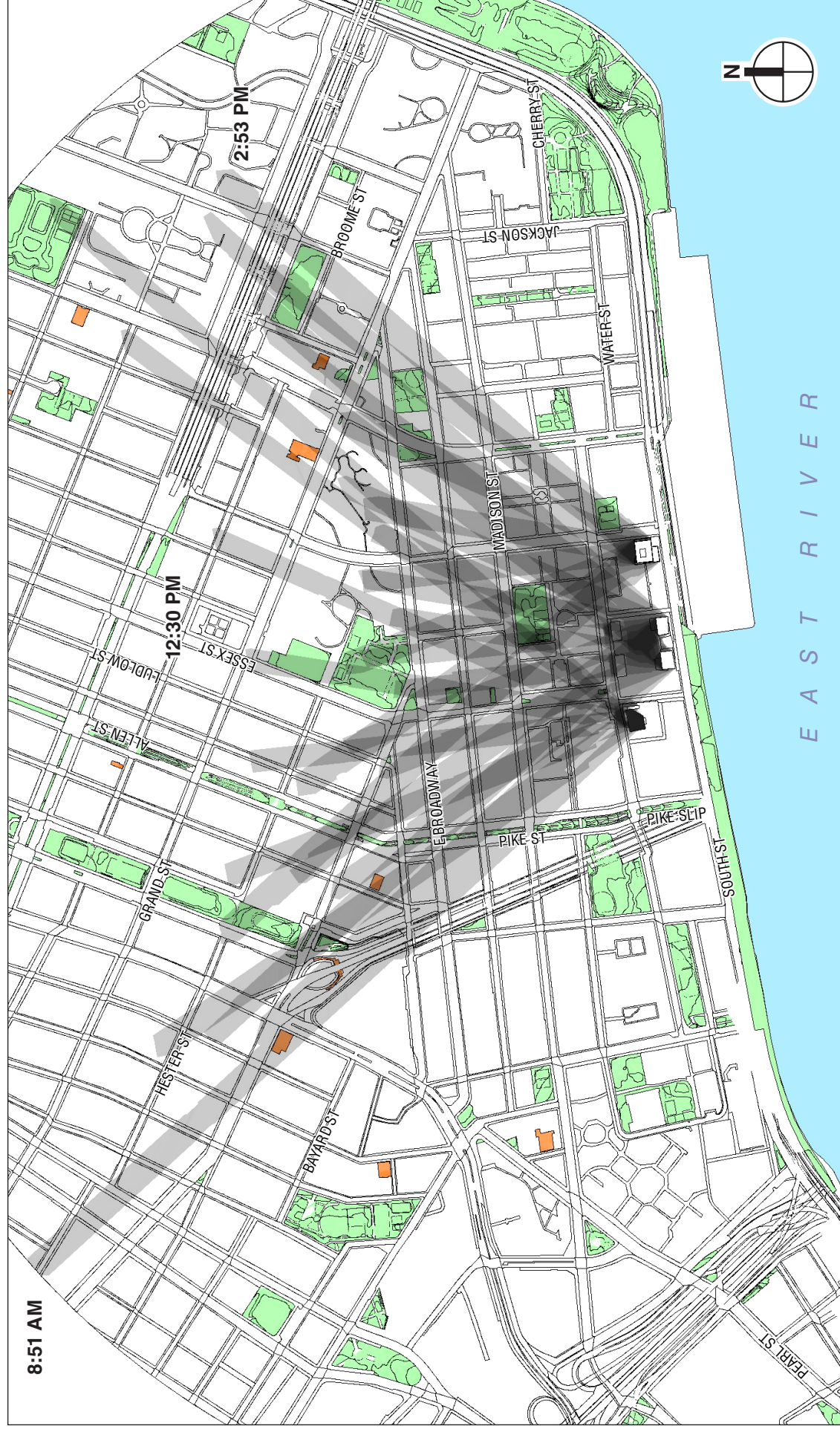
**Figures 6-2 to 6-5** illustrate the range of shadows that would occur (in the absence of existing intervening buildings) from the proposed projects on the four representative days for analysis. As they move east and clockwise over the landscape, the shadows are shown occurring approximately every 60 minutes from the start of the analysis day (one-and-a-half hours after sunrise) to the end of the analysis day (one-and-a-half hours before sunset).

The Tier 3 assessment showed that many of the resources identified in the Tier 1/Tier 2 longest shadow study area would not receive project-generated shadow on any of the four analysis days, including most of the resources located north of Delancey Street and west of Bowery and Park Row. Those resources therefore did not require any further analysis.

The Tier 3 assessment showed that 33 open space resources, five historic resources with sunlight-sensitive features and one natural resource (the East River)—39 resources in all—could potentially, in the absence of intervening buildings, receive project-generated shadow. **Table 6-1** presents a summary of the Tier 3 assessment, listing these 39 remaining sunlight-sensitive resources and the analysis days during which the new shadow could potentially occur.

More detailed analysis was therefore required for the 39 remaining resources. Most of the remaining sunlight-sensitive resources could only receive project-generated shadow on one of the four analysis days. Three open spaces required further analysis on all four analysis days: Cherry Clinton Playground, located to the east across the street from Site 6A and one to two blocks east of the other two project sites; the Pike Street Malls to the west of the project sites; and the Montgomery Street medians to the east, both of which are linear, multi-block landscaped medians along streets oriented north-south. Two open spaces required further analysis on three

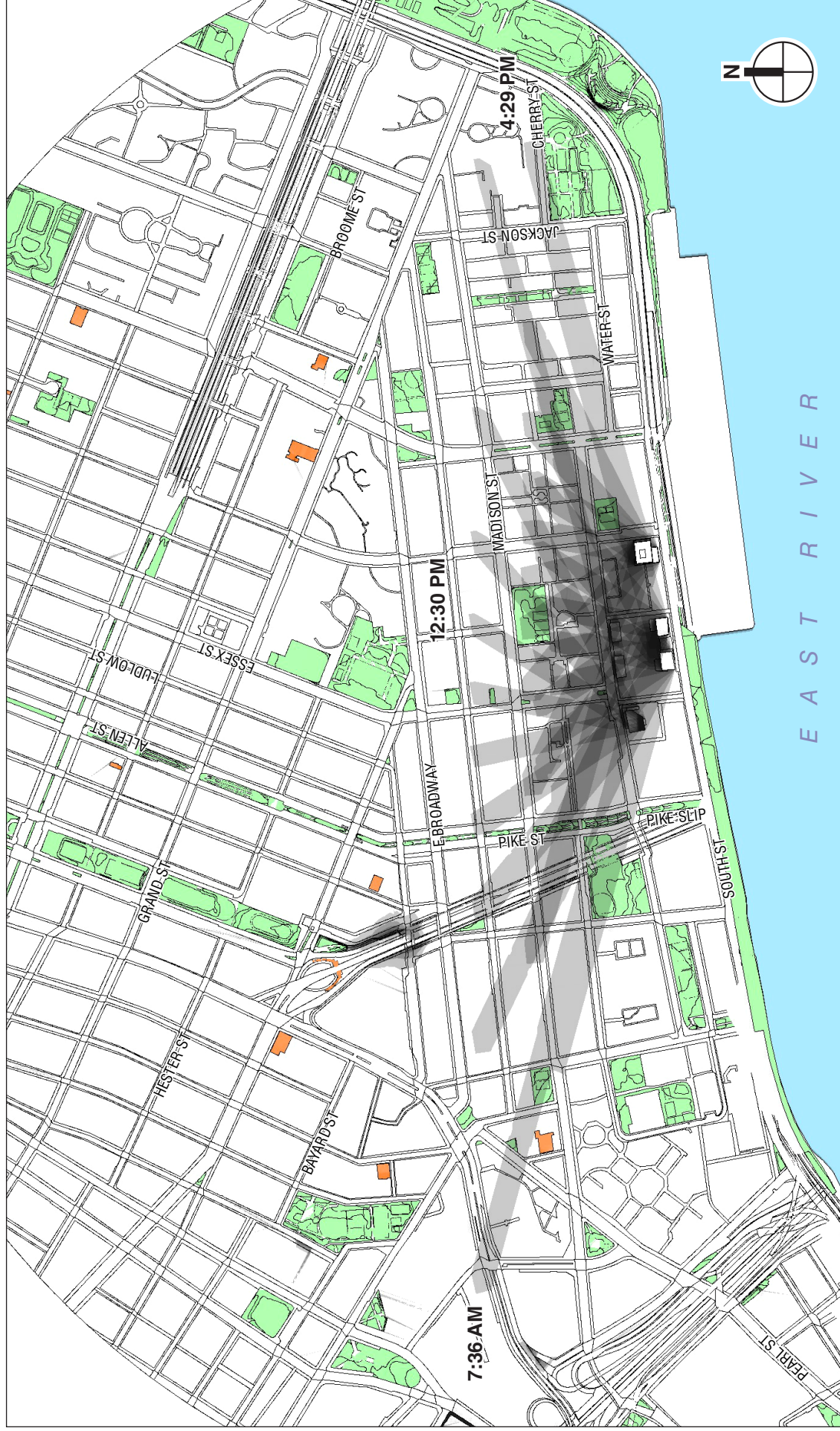




- Publicly Accessible Open Space
- Historic Resource with Sunlight-Sensitive Features

NOTE: See Figure 6-1 for Open Space and Historic Resource Names





- Publicly Accessible Open Space
- Historic Resource with Sunlight-Sensitive Features

NOTE: See Figure 6-1 for Open Space and Historic Resource Names





Publicly Accessible Open Space

Historic Resource with Sunlight-Sensitive Features

NOTE: See Figure 6-1 for Open Space and Historic Resource Names





Publicly Accessible Open Space  
Historic Resource with Sunlight-Sensitive Features  
NOTE: See Figure 6-1 for Open Space and Historic Resource Names

## Two Bridges LSRD

of the four analysis days: Little Flower Playground, approximately two blocks north of the project sites, and Coleman Playground, to the west, under and beyond the Manhattan Bridge.

Five historic resources with sunlight-sensitive features could potentially be reached by project-generated shadow on the winter analysis day but could not be reached on any of the other three analysis days.

In addition, a portion of the East River, a sunlight-sensitive natural resource, is located in the shadow sweep on two of the four analysis days, representing the late spring and summer.

**Table 6-1**  
**Tier 3 Assessment Results**

Name	December 21 8:51 AM–2:53 PM	March 21/Sept. 21 7:36 AM–4:29 PM	May 6/August 6 6:27 AM–5:18 PM	June 21 5:57 AM–6:01 PM	Number of Analysis Days <sup>1</sup>
<b>Publicly Accessible Open Spaces</b>					
Forsyth Plaza	YES	NO	NO	NO	1
Sara Roosevelt Park	YES	NO	NO	NO	1
Pike Street Malls	YES	YES	YES	YES	4
Allen Street Malls	YES	NO	NO	NO	1
Rutgers St Greenstreets Islands (Cherry and Madison Streets)	YES	YES	NO	NO	2
LES People Care Garden	YES	YES	NO	NO	2
Captain Jacob Joseph Playground	YES	NO	NO	NO	1
Straus Square	YES	NO	NO	NO	1
Seward Park	YES	NO	NO	NO	1
Seward High School Field	YES	NO	NO	NO	1
Little Flower Playground	YES	YES	YES	NO	3
Cherry Clinton Playground	YES	YES	YES	YES	4
Greenstreets Triangle, Montgomery St, and East Broadway	YES	NO	NO	NO	1
Martin Luther King Junior Community Park	YES	NO	NO	NO	1
Greenstreets medians on Grand Street	YES	NO	NO	NO	1
Sol Lain Playground	YES	NO	NO	NO	1
Abrons Art Center Plaza	YES	NO	NO	NO	1
Ahearn Park	YES	NO	NO	NO	1
Montgomery Street Greenstreets Medians	YES	YES	YES	YES	4
Luther Gulick Playground	YES	NO	NO	NO	1
Hamilton Fish Park	YES	NO	NO	NO	1
Saint James Triangle	NO	YES	NO	NO	1
Playground One	NO	YES	NO	NO	1
Coleman Playground	NO	YES	YES	YES	3
Sophie Irene Loeb Playground	NO	YES	NO	NO	1
Lillian D. Wald Playground	NO	YES	NO	NO	1
Vladeck Park	NO	YES	NO	NO	1
Corlears Hook Park	NO	YES	NO	NO	1
Catherine Slip Malls	NO	NO	YES	YES	2
Tanahey Playground	NO	NO	YES	YES	2
Alfred E. Smith Playground	NO	NO	YES	YES	2
East River Esplanade/East River Park	NO	NO	YES	NO	1
Greenstreets triangle at Robert F. Wagner Sr. Place and South St.	NO	NO	NO	YES	1
<b>Historic Resources with Sunlight-Sensitive Features</b>					
Citizens Savings Bank	YES	NO	NO	NO	1
Manhattan Bridge Arch and Colonnade	YES	NO	NO	NO	1
Eldridge Street Synagogue	YES	NO	NO	NO	1
Bialystoker Synagogue	YES	NO	NO	NO	1
Saint Mary's Church	YES	NO	NO	NO	1
<b>Sunlight-Sensitive Natural Resources</b>					
East River	NO	NO	YES	YES	2
<b>Notes:</b> This table shows, for each resource, whether it could be potentially shaded, absent intervening buildings, on each of the four analysis days. <sup>1</sup> Indicates the total number of analysis days out of the possible four for which the resource requires analysis.					

## D. DETAILED SHADOW ANALYSIS

The purpose of the detailed analysis is to determine the extent and duration of new incremental shadows that fall on sunlight-sensitive resources as a result of the proposed projects, and to assess their potential effects. A baseline or future No Action condition is established, containing existing buildings and any future developments planned in the area, to illustrate the baseline shadows. The future With Action condition with the proposed projects and their shadows can then be compared to the baseline condition to determine the incremental shadows that would result with the proposed projects.

Three-dimensional representations of the existing buildings in the study area were developed using data obtained from the New York City Department of Information Technology and Telecommunications (NYC DoITT) and photos taken during visits to the project sites, and were added to the three-dimensional model used in the Tier 3 assessment.

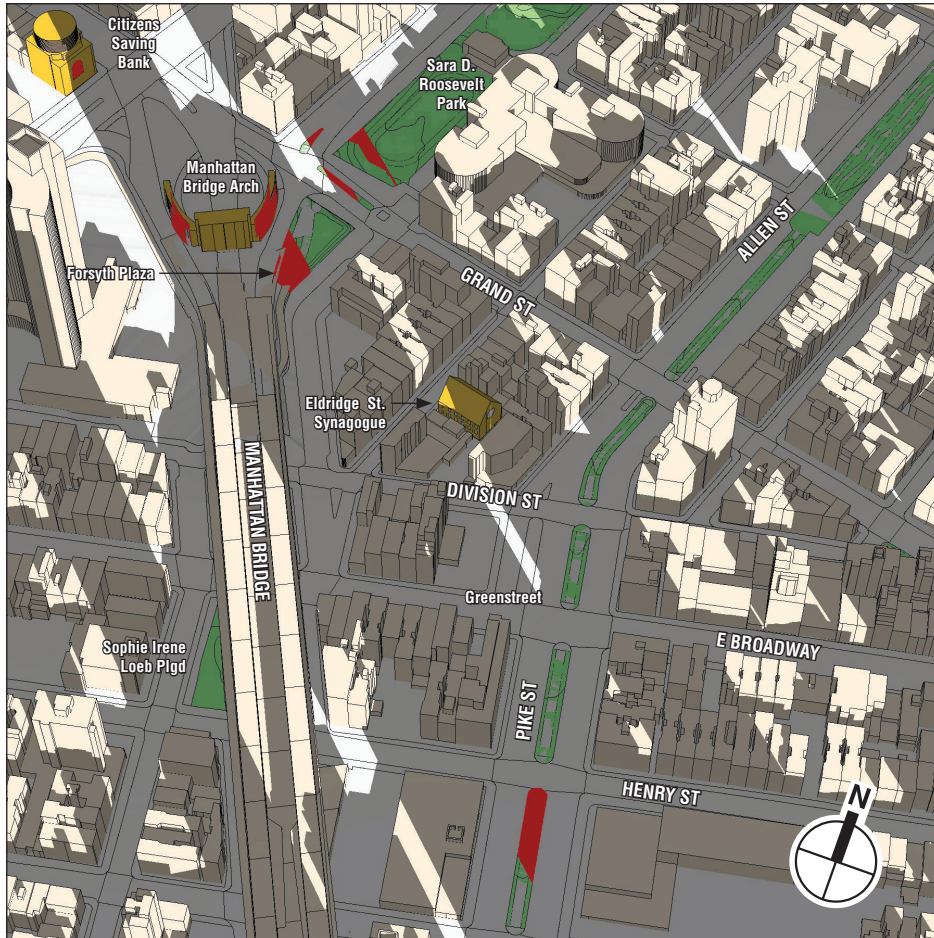
Shadows are in constant movement. The computer simulation software produces an animation showing the movement of shadows over the course of each analysis period. The analysis determines the time when incremental shadow would enter each resource, and the time it would exit.

Following the analysis framework described in Chapter 1, “Project Description,” the shadows assessment was performed for the analysis year of 2021, comparing the proposed projects with the future No Action condition in which the project sites would remain as in the existing condition.

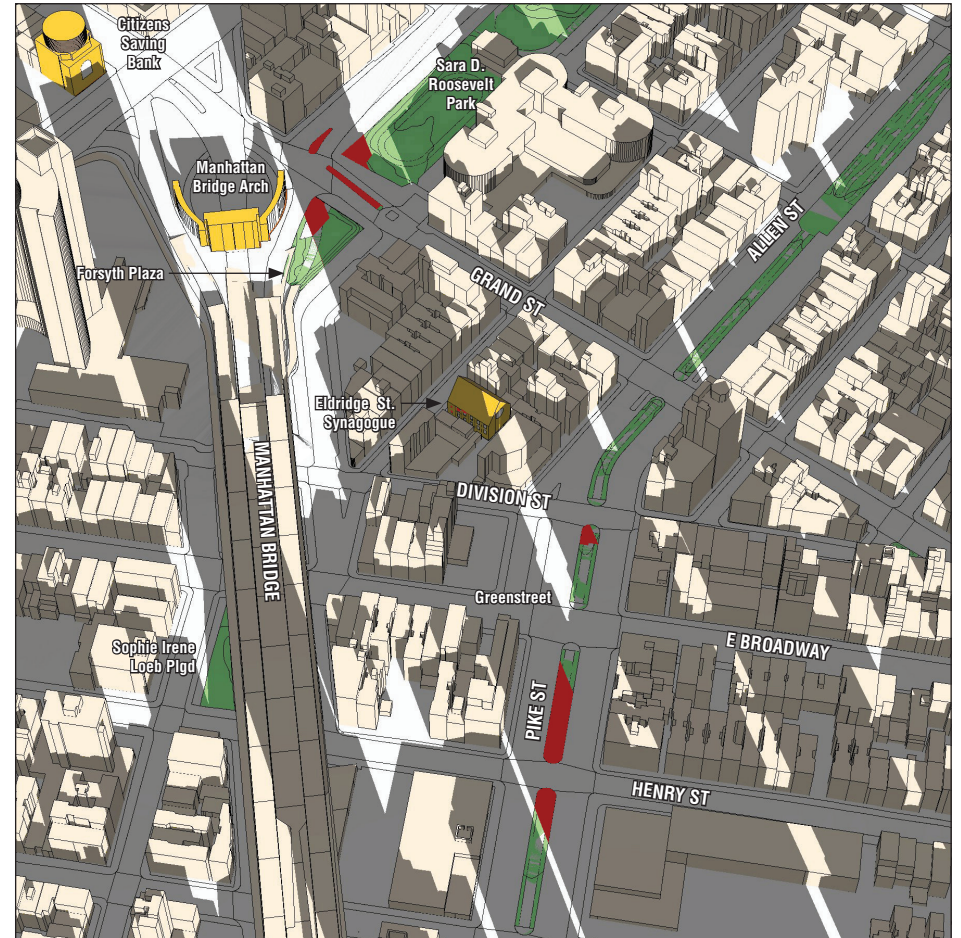
Shadow analyses were performed for each of the representative days and analysis periods indicated in the Tier 3 assessment.

**Table 6-2** summarizes the entry and exit times and total duration of incremental shadows on each affected sunlight-sensitive resource. **Figures 6-6 to 6-40** document the results of the analysis by providing graphic representations from the computer animation of times when incremental shadow would fall on a sunlight-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.





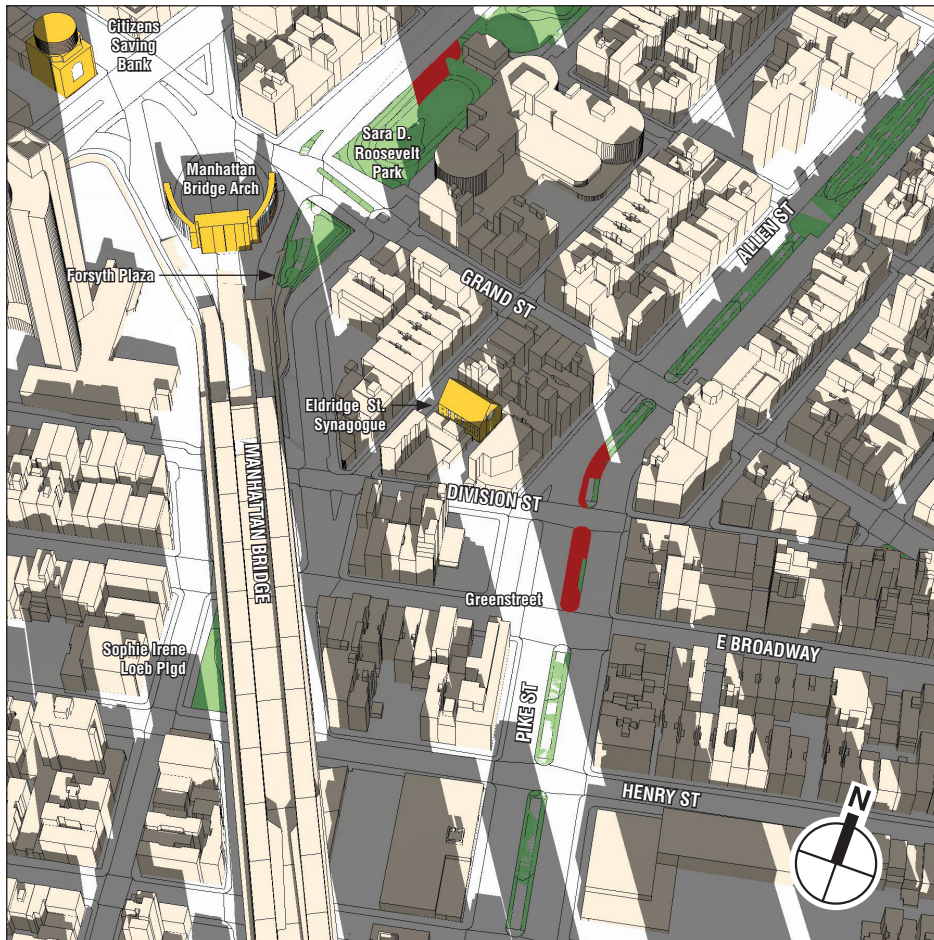
9:00 AM



9:30 AM

- Publicly Accessible Open Space
- Incremental Shadow
- Historic Resource with Sunlight-Sensitive Features





10:00AM






10:30 AM

- Publicly Accessible Open Space
- Incremental Shadow
- Historic Resource with Sunlight-Sensitive Features



11:00AM

-  Publicly Accessible Open Space
-  Incremental Shadow
-  Historic Resource with Sunlight-Sensitive Features



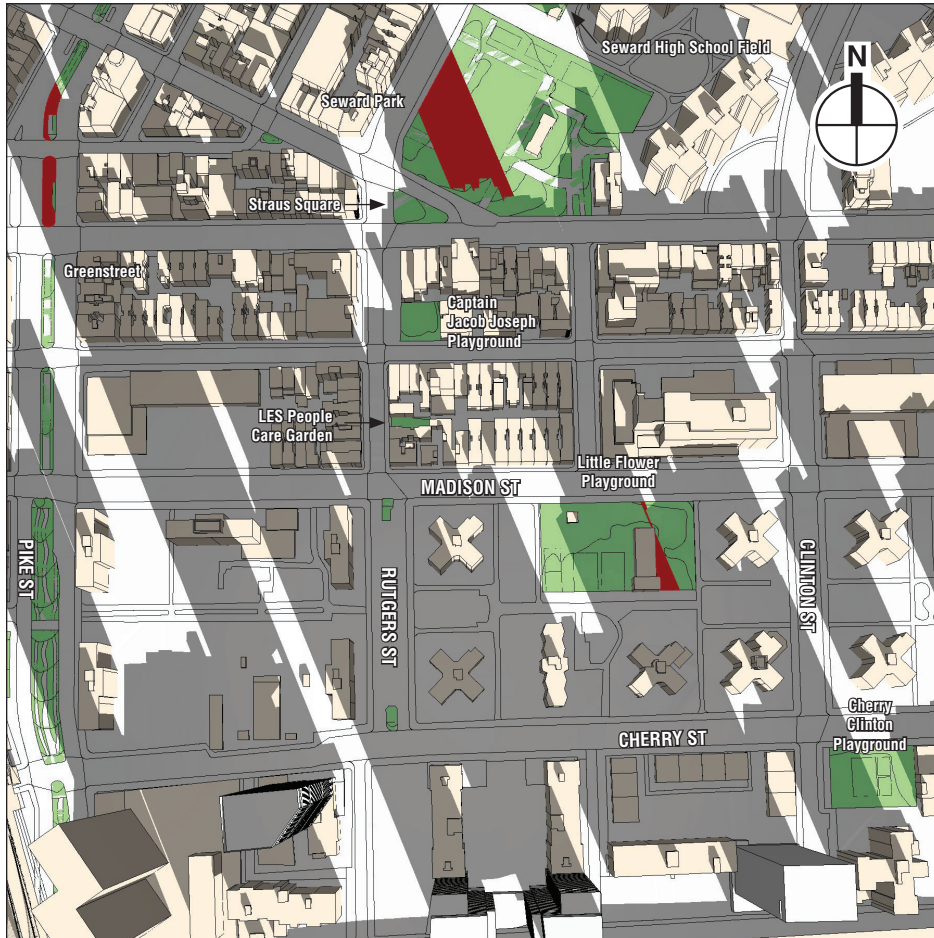


9:00 AM



9:30 AM

 Publicly Accessible Open Space  
 Incremental Shadow



10:00AM

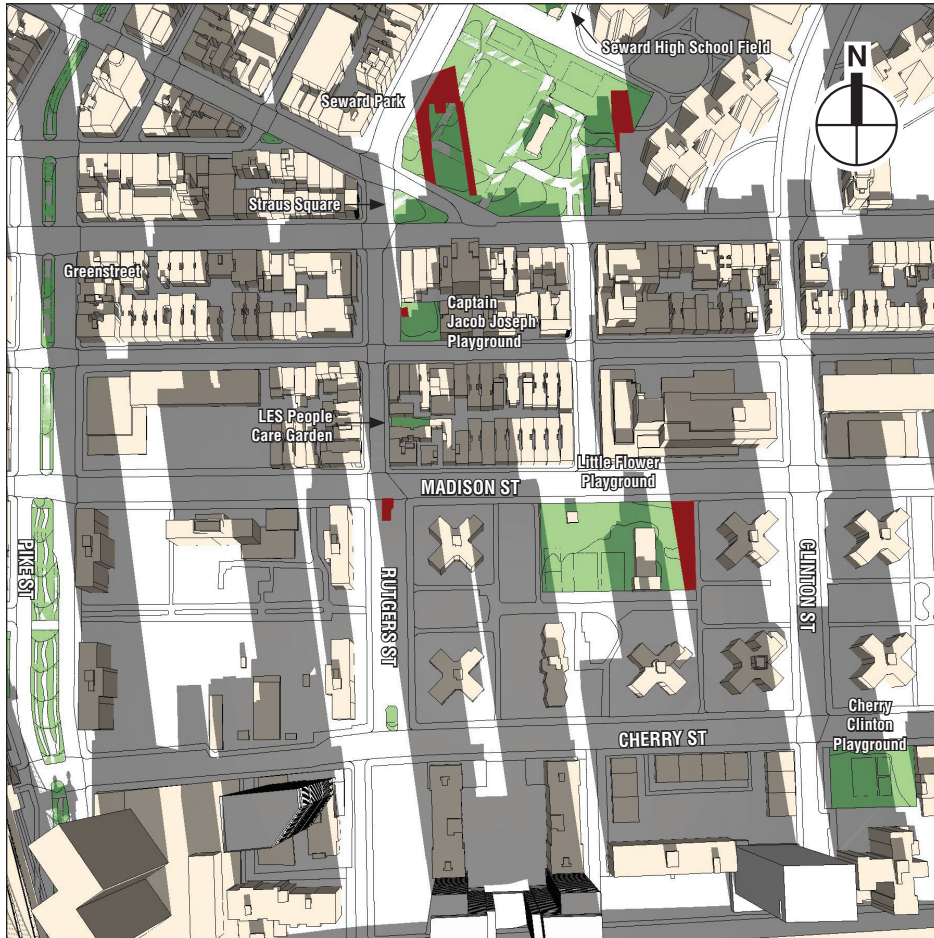


10:30 AM



Detailed Shadow Analysis  
December 21  
Figure 6-10





11:00 AM



11:30 AM



Detailed Shadow Analysis  
December 21  
Figure 6-11



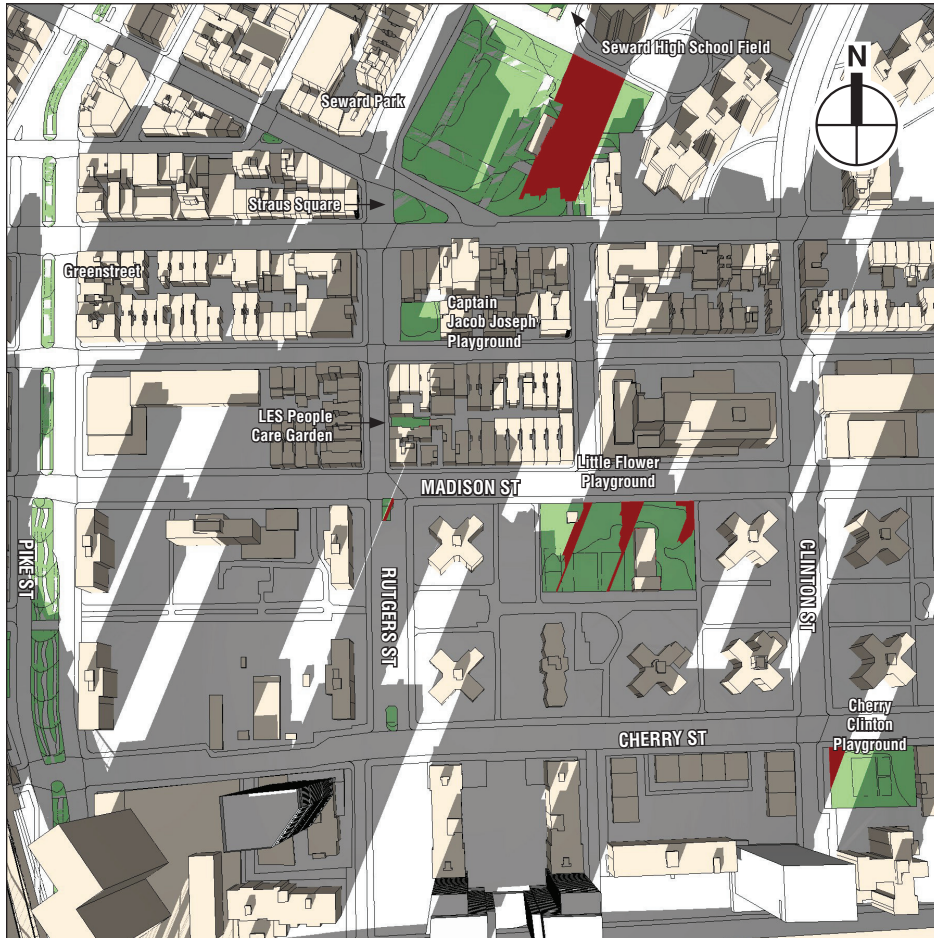
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12:30 PM

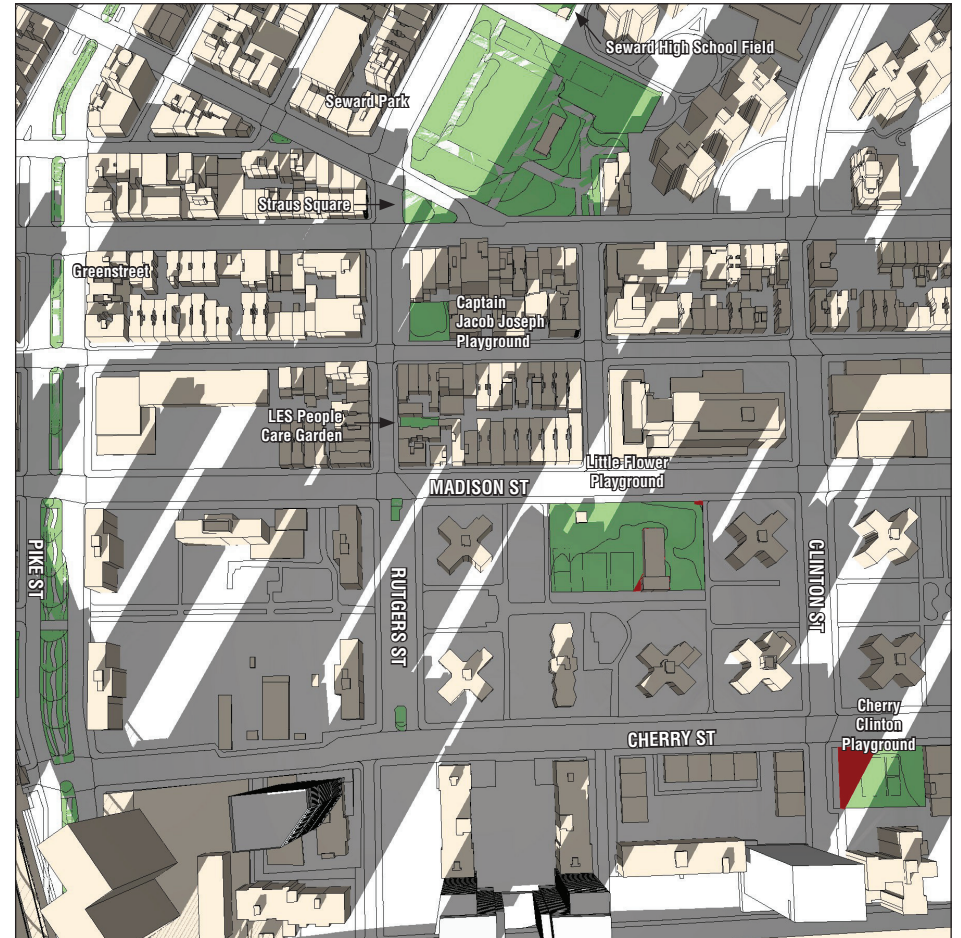






1:00 PM

 Publicly Accessible Open Space  
 Incremental Shadow



1:30 PM

Detailed Shadow Analysis  
 December 21  
**Figure 6-13**

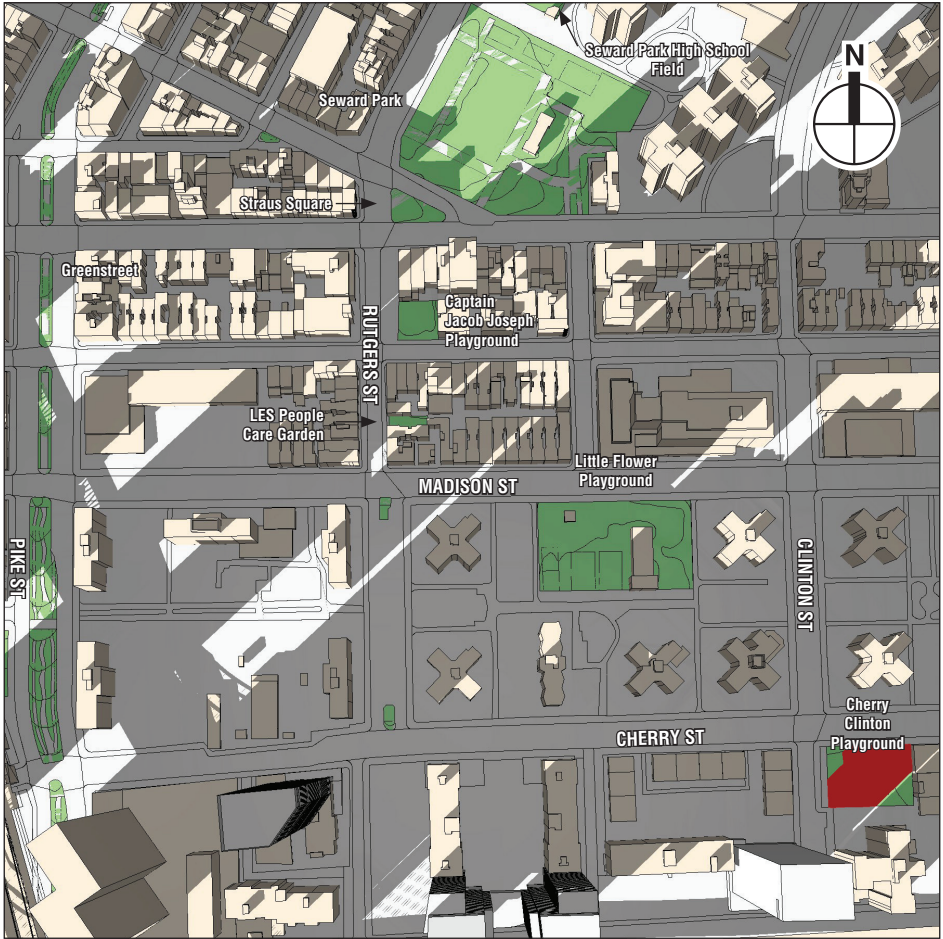


2:00 PM



2:30 PM





2:53 PM







1:30 PM

Publicly Accessible Open Space

Incremental Shadow



2:00 PM

Detailed Shadow Analysis  
December 21  
**Figure 6-16**



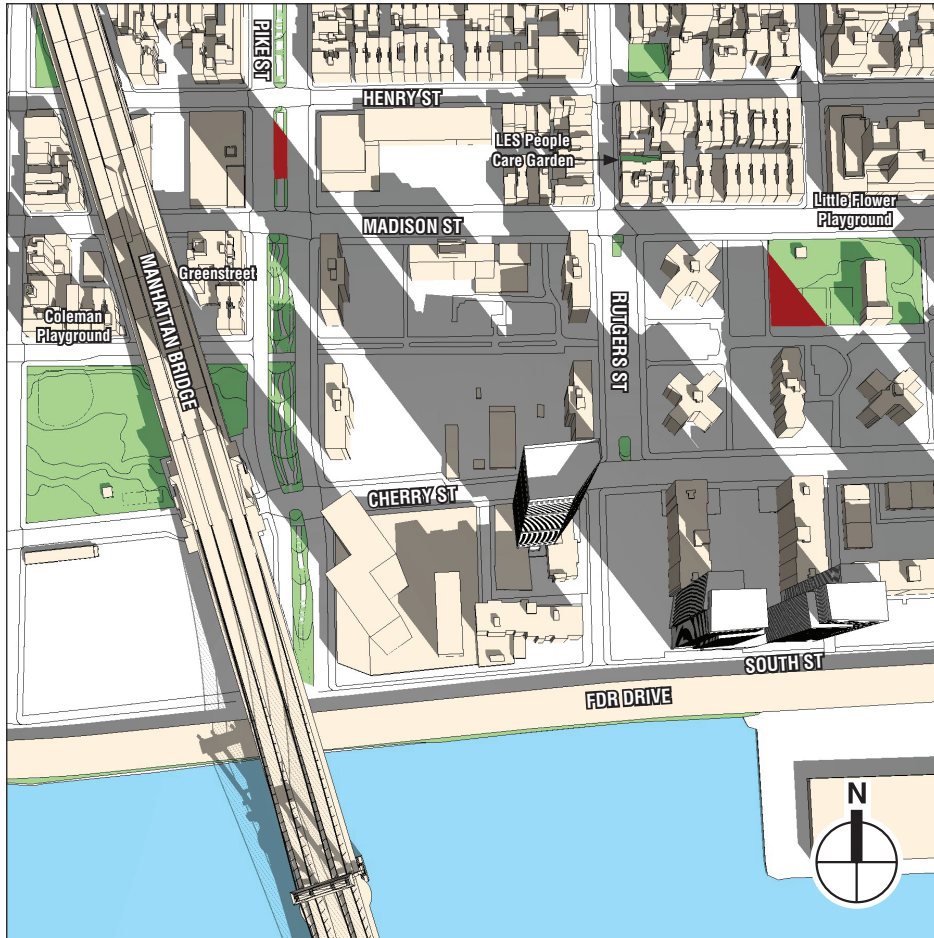
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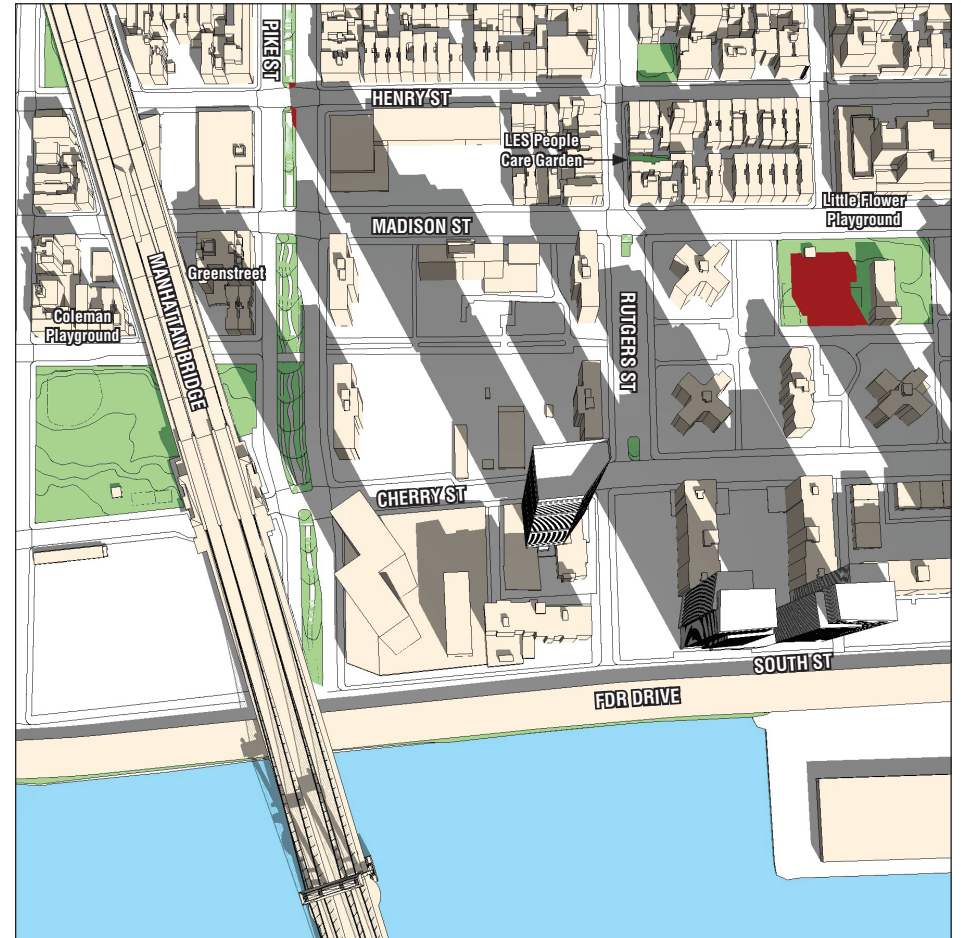
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Detailed Shadow Analysis  
December 21  
Figure 6-17





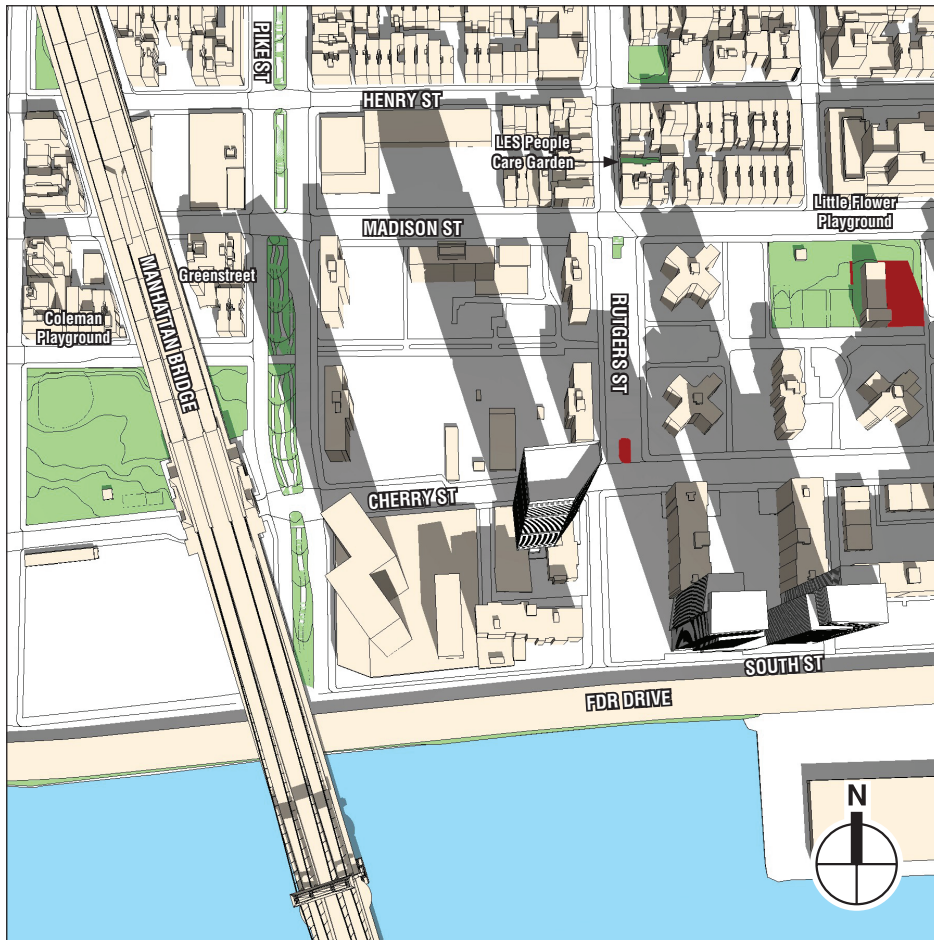
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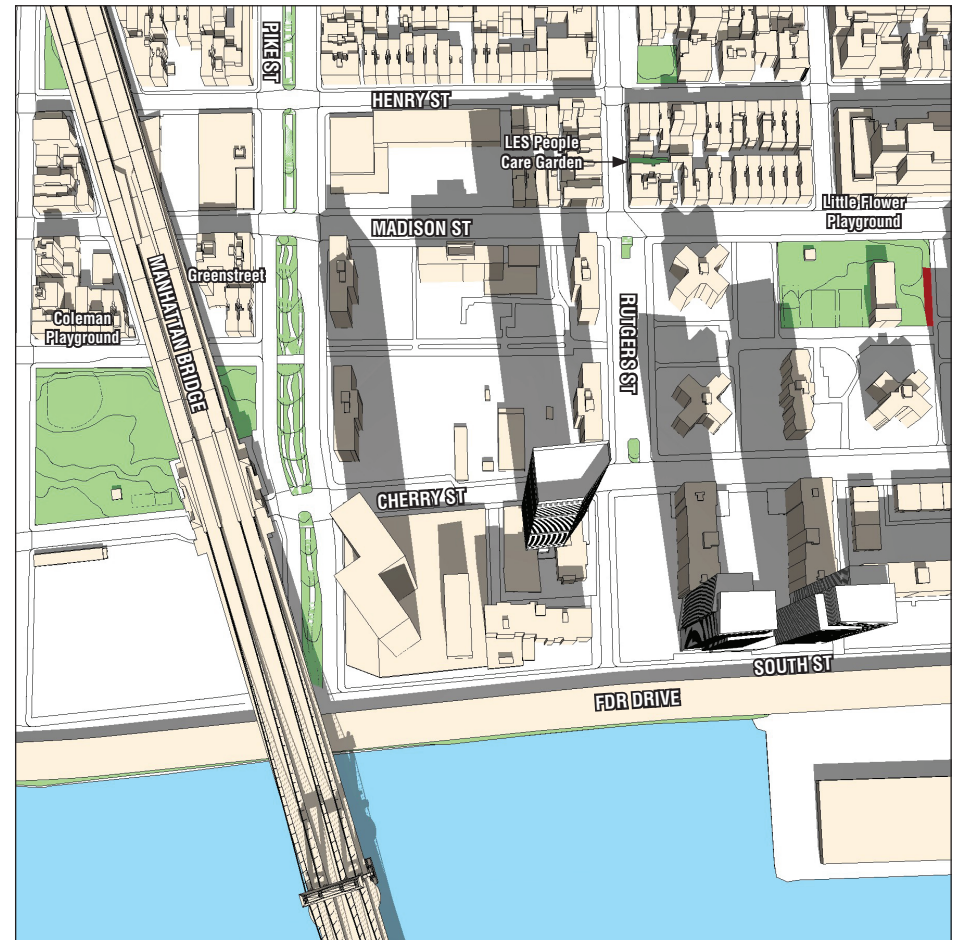
10:30 AM

- Publicly Accessible Open Space
- Incremental Shadow



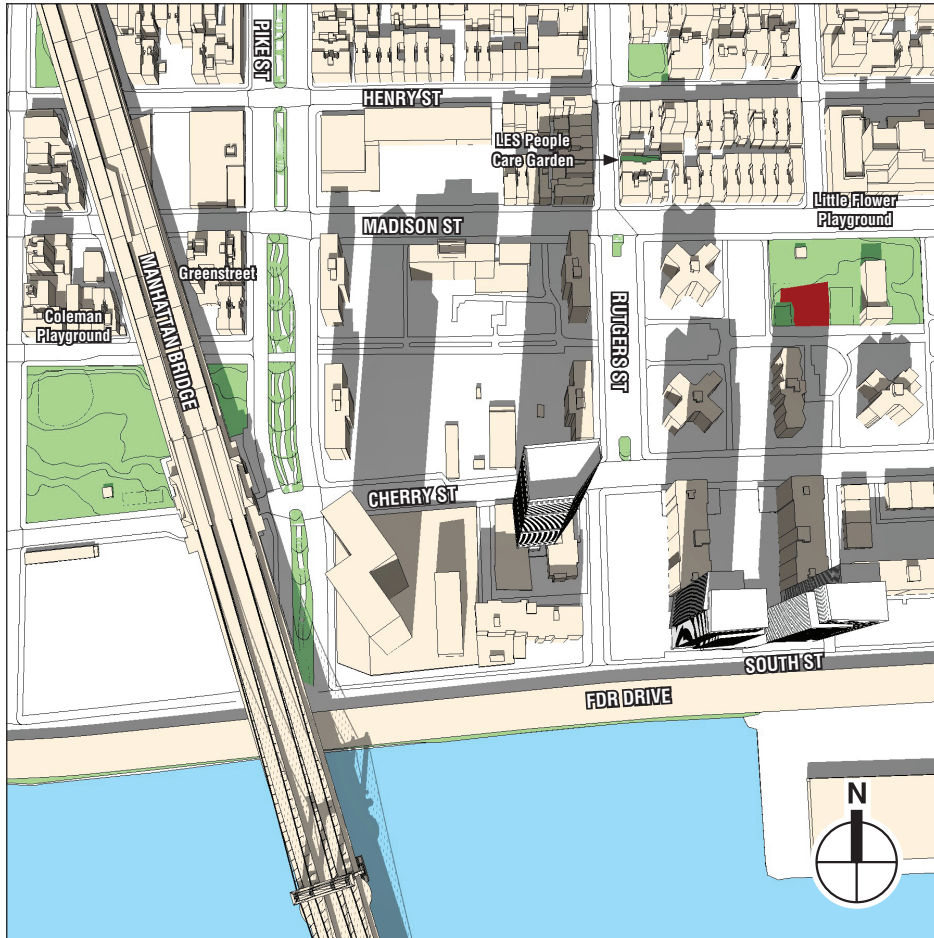


11:00 AM



11:30 AM

- Publicly Accessible Open Space
- Incremental Shadow

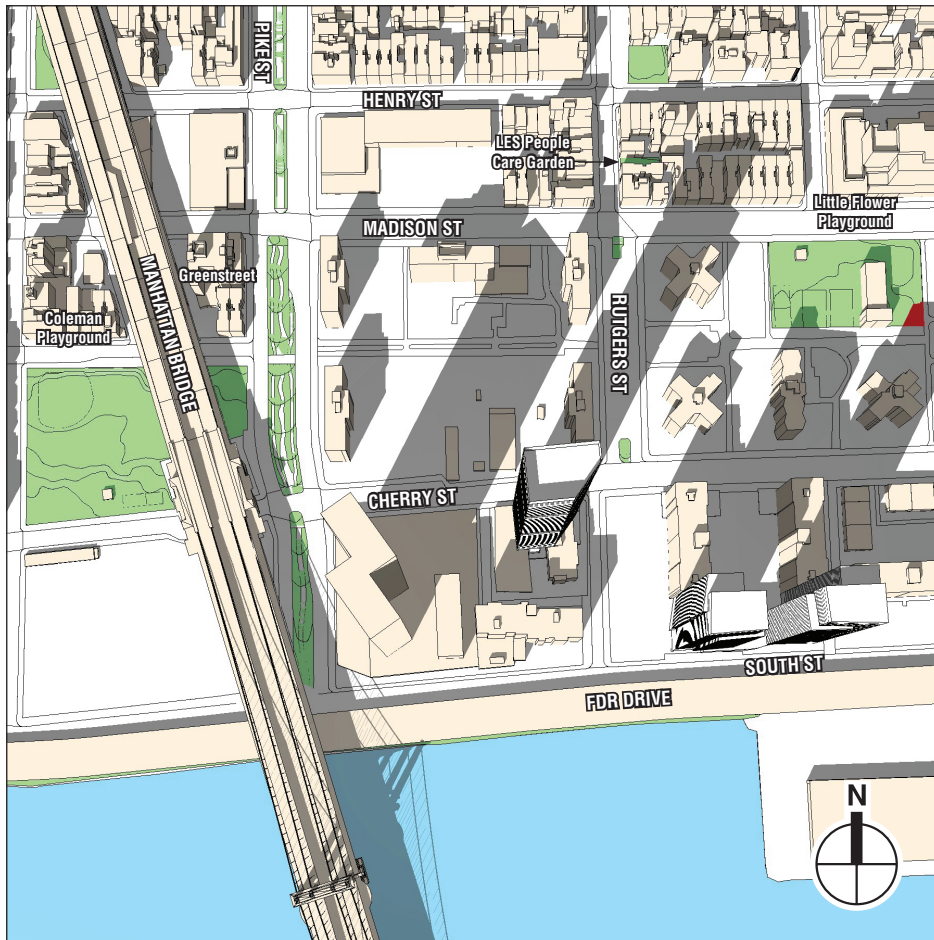


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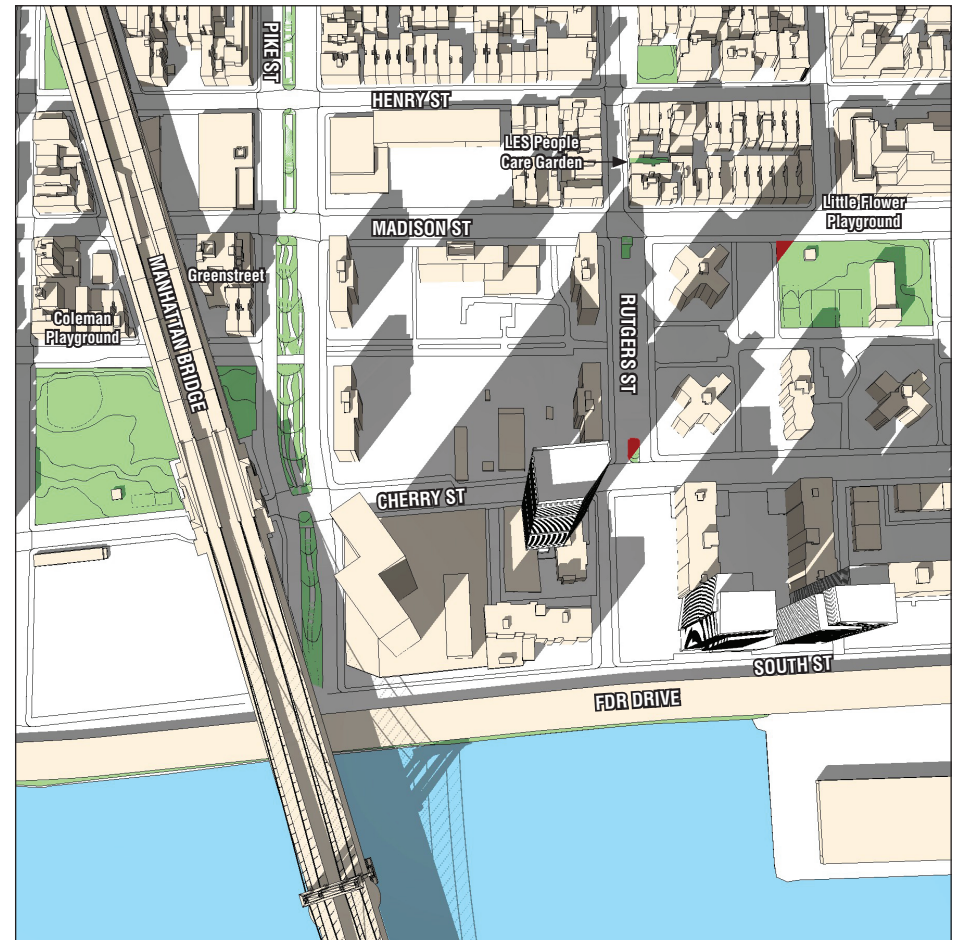


12:30 PM

- Publicly Accessible Open Space
- Incremental Shadow



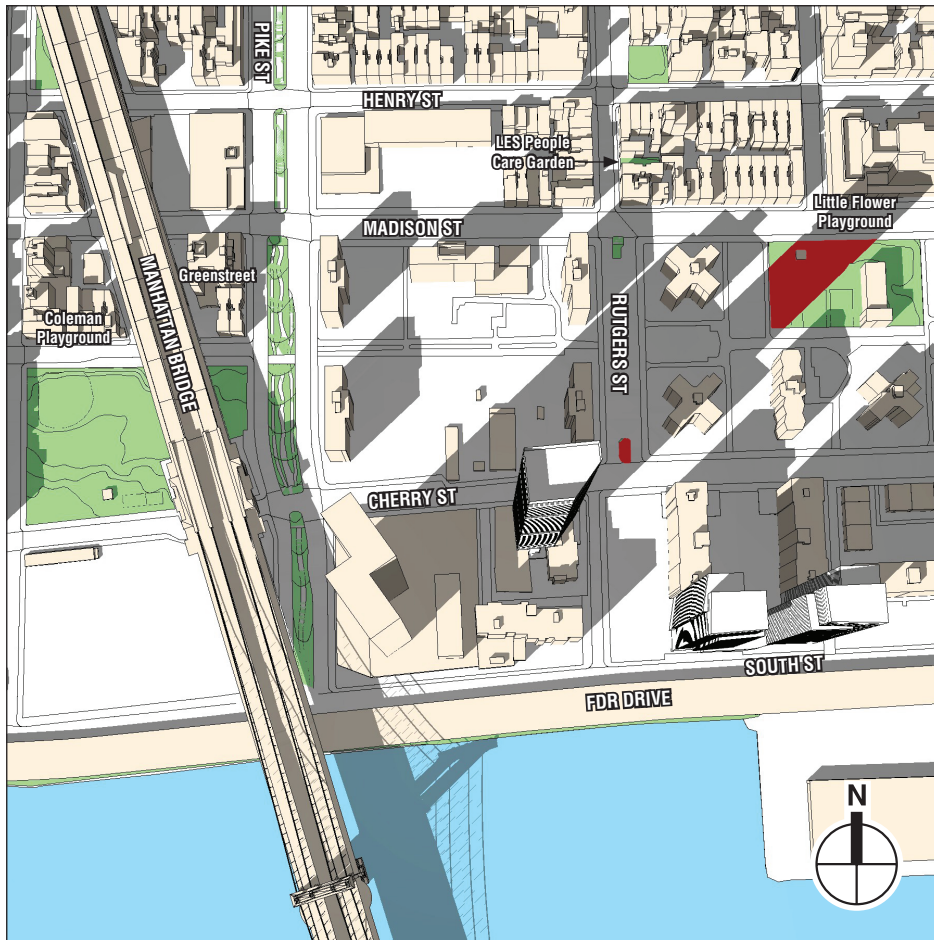
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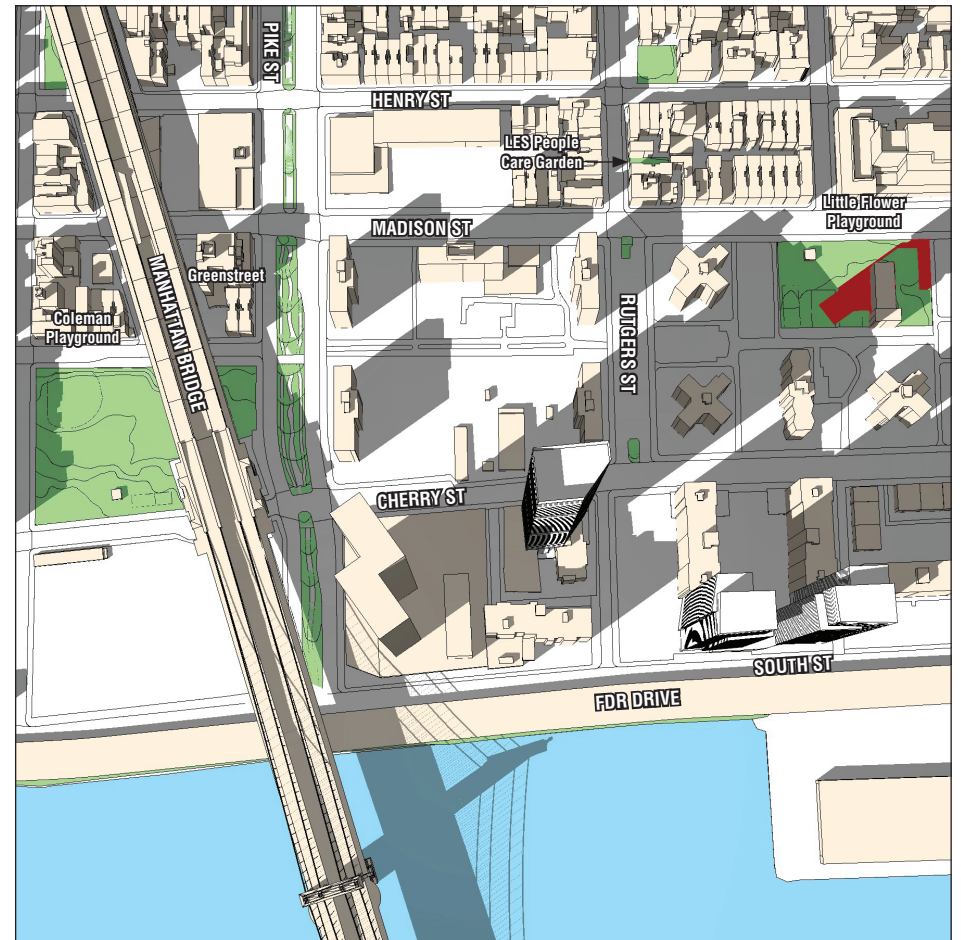
1:30 PM

- Publicly Accessible Open Space
- Incremental Shadow



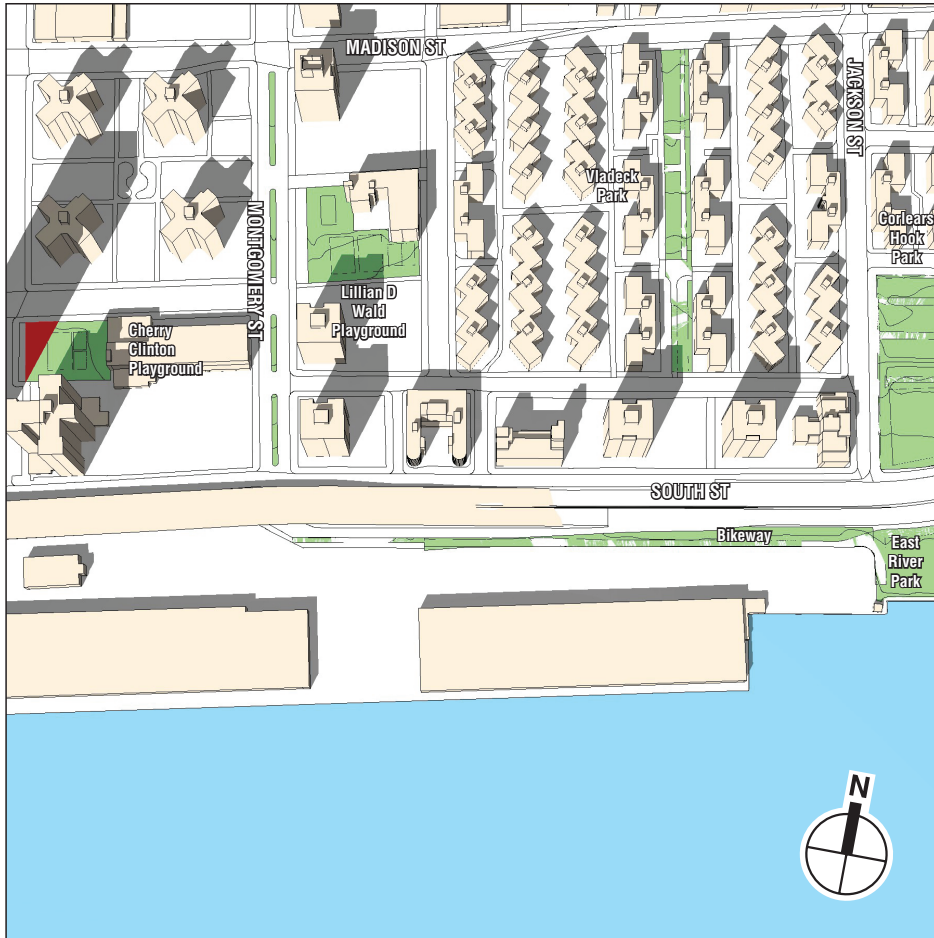


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2:30 PM

- Publicly Accessible Open Space
- Incremental Shadow



1:00 PM

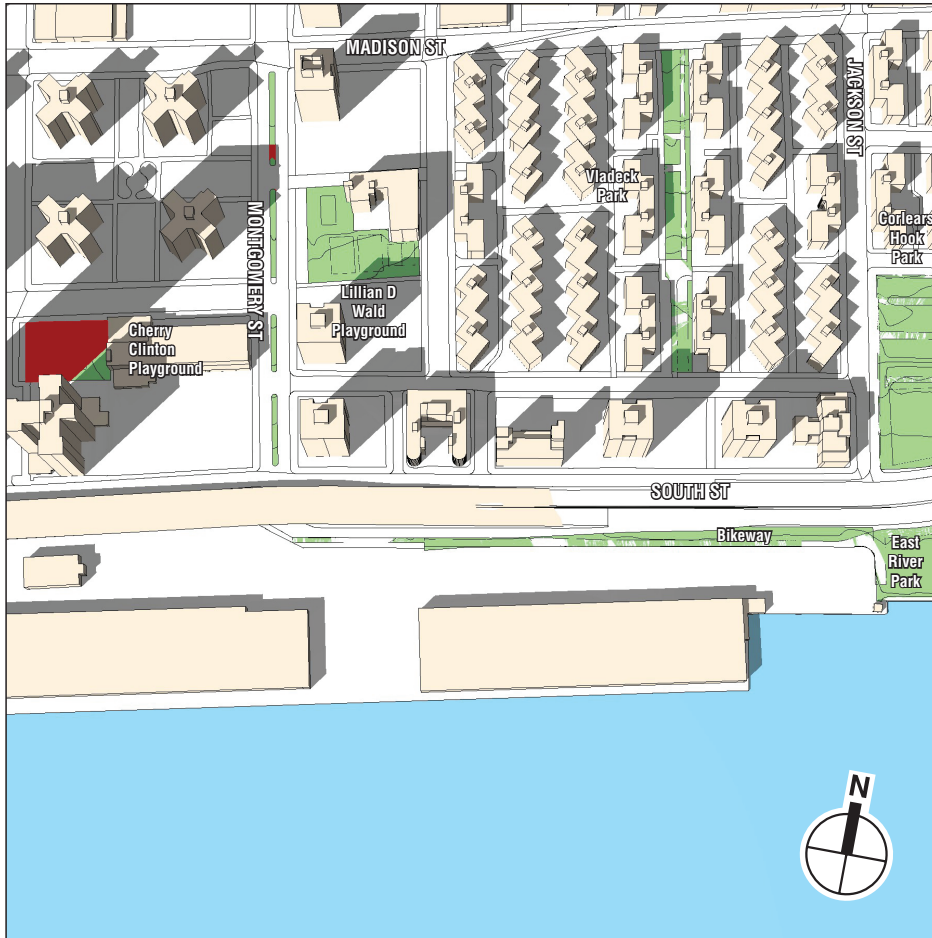
Publicly Accessible Open Space

Incremental Shadow



1:30 PM

Detailed Shadow Analysis  
March 21 / September 21  
**Figure 6-23**



2:00 PM

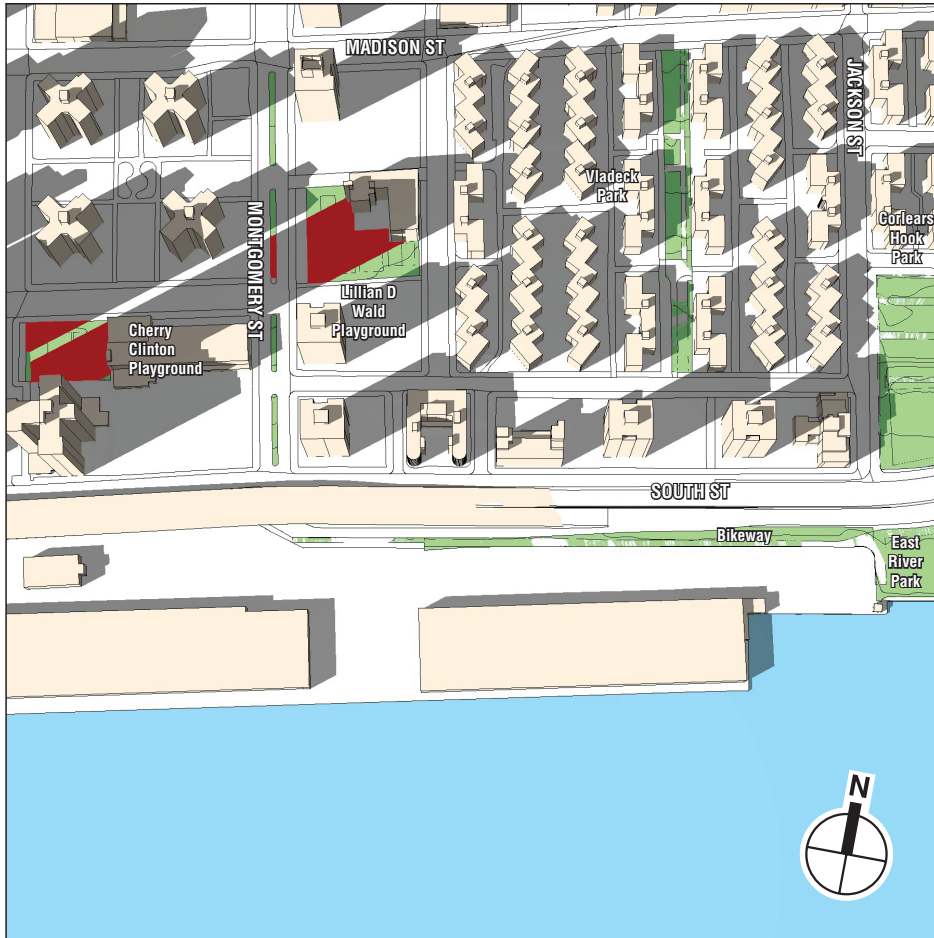
Publicly Accessible Open Space  
 Incremental Shadow



2:30 PM

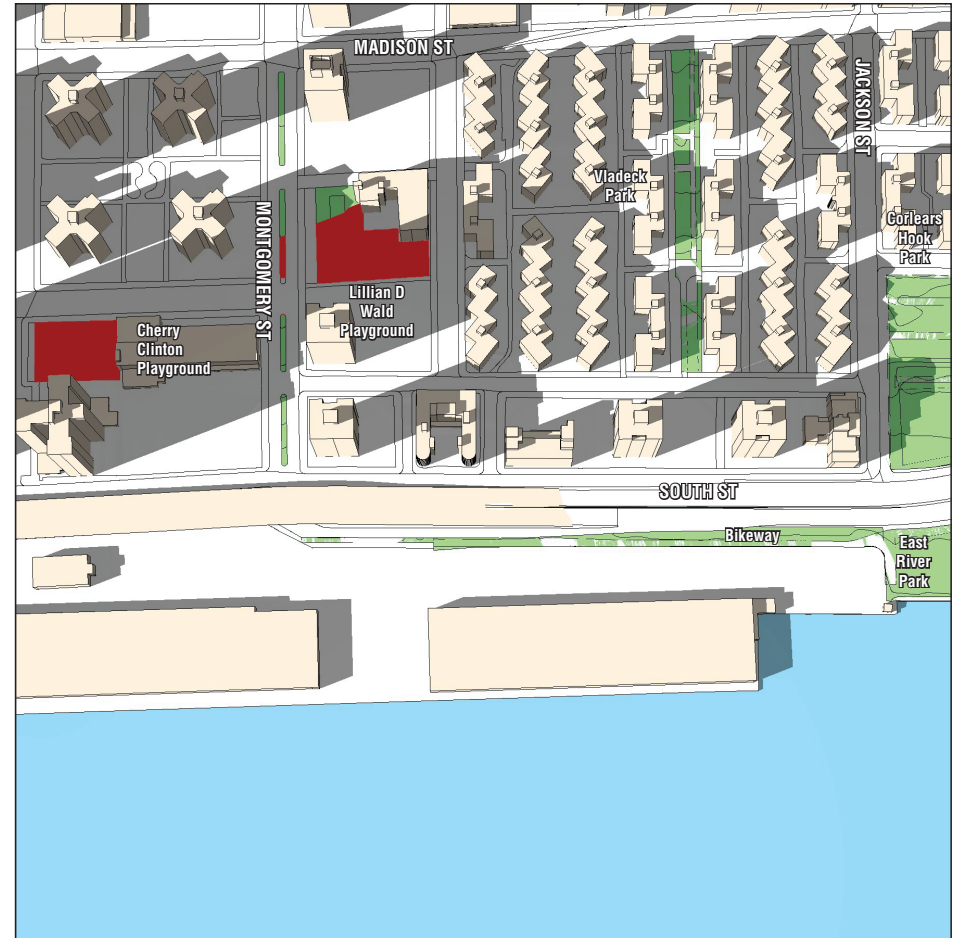
Detailed Shadow Analysis  
 March 21 / September 21  
**Figure 6-24**





3:00 PM

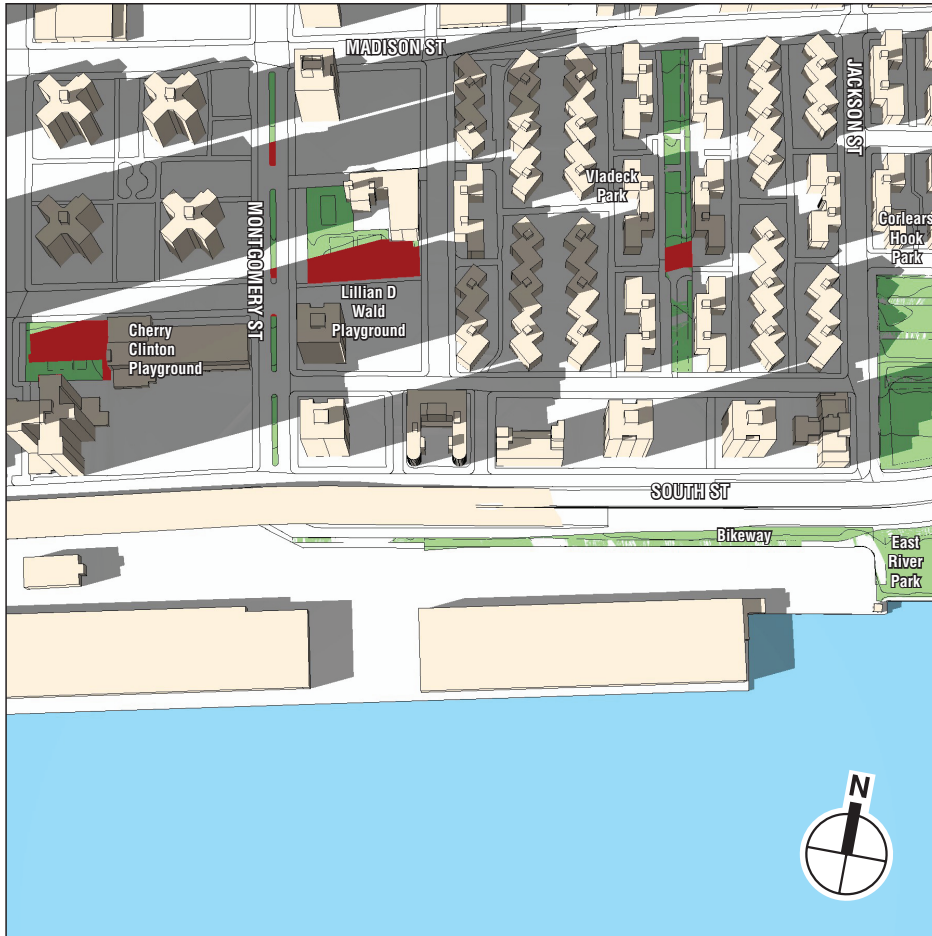
- Publicly Accessible Open Space
- Incremental Shadow



3:30 PM

Detailed Shadow Analysis  
March 21 / September 21  
**Figure 6-25**

6.27.18



4:00 PM

 Publicly Accessible Open Space  
 Incremental Shadow

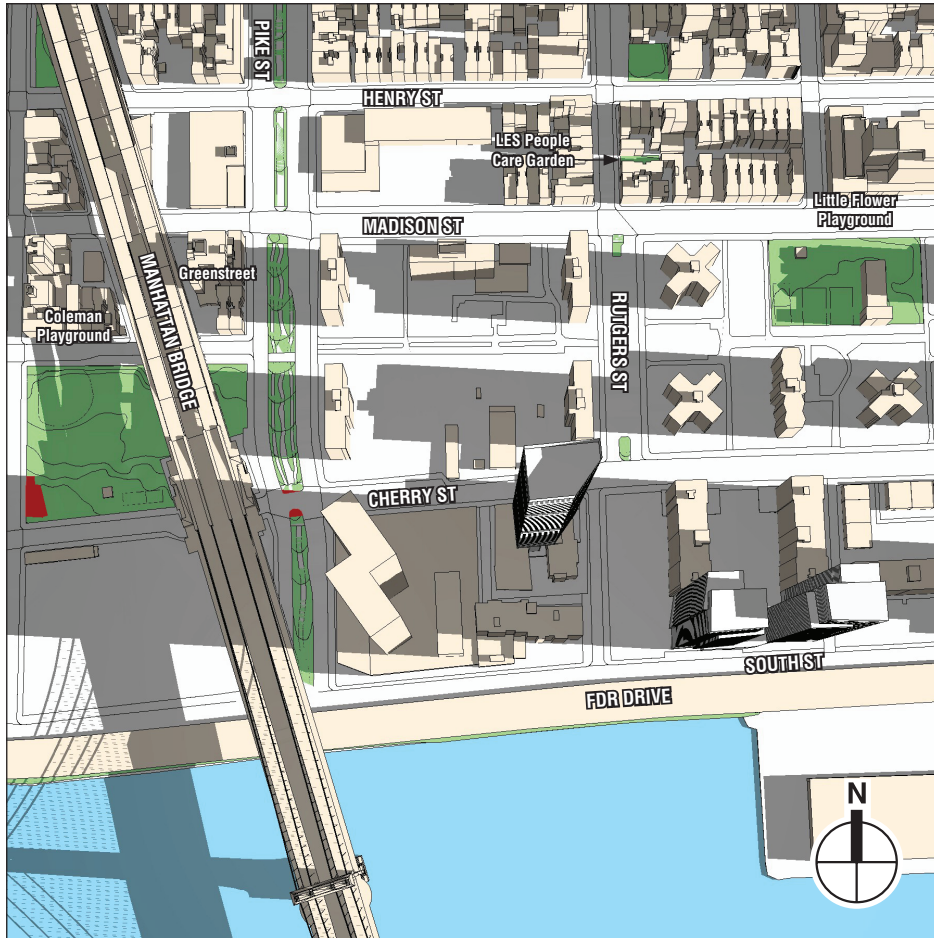
**TWO BRIDGES LSRD**



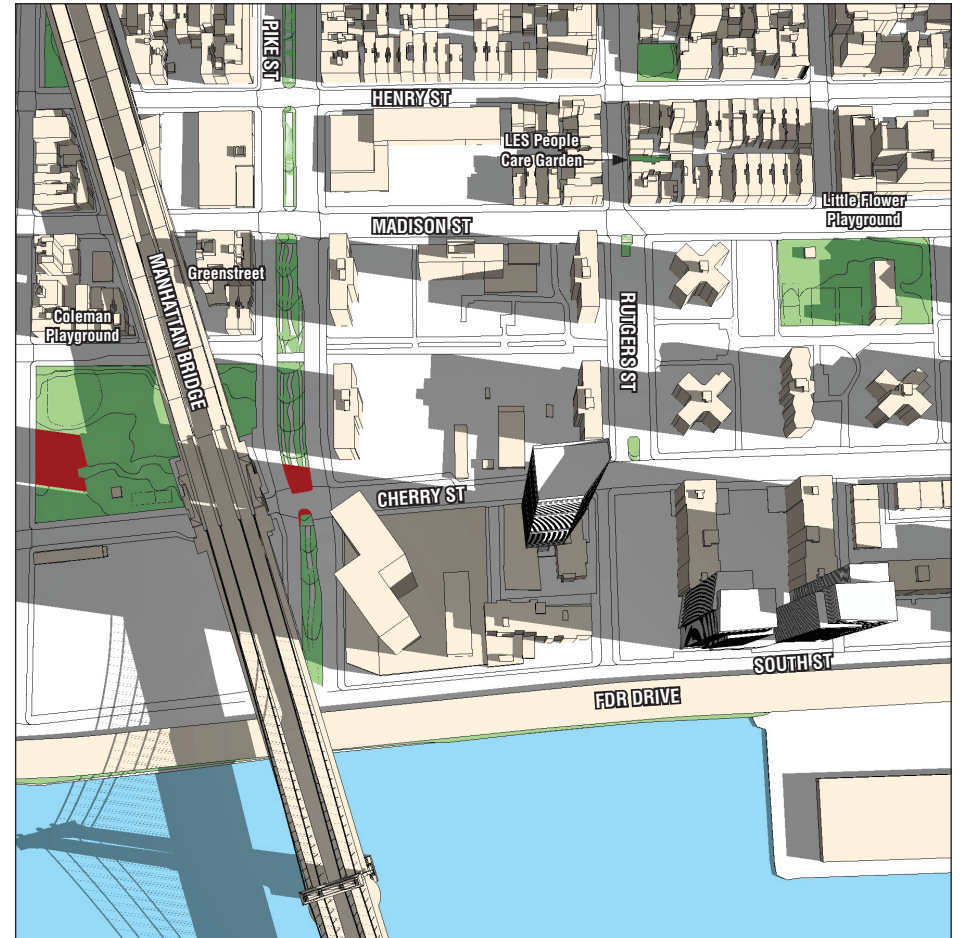
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Detailed Shadow Analysis  
March 21 / September 21  
**Figure 6-26**



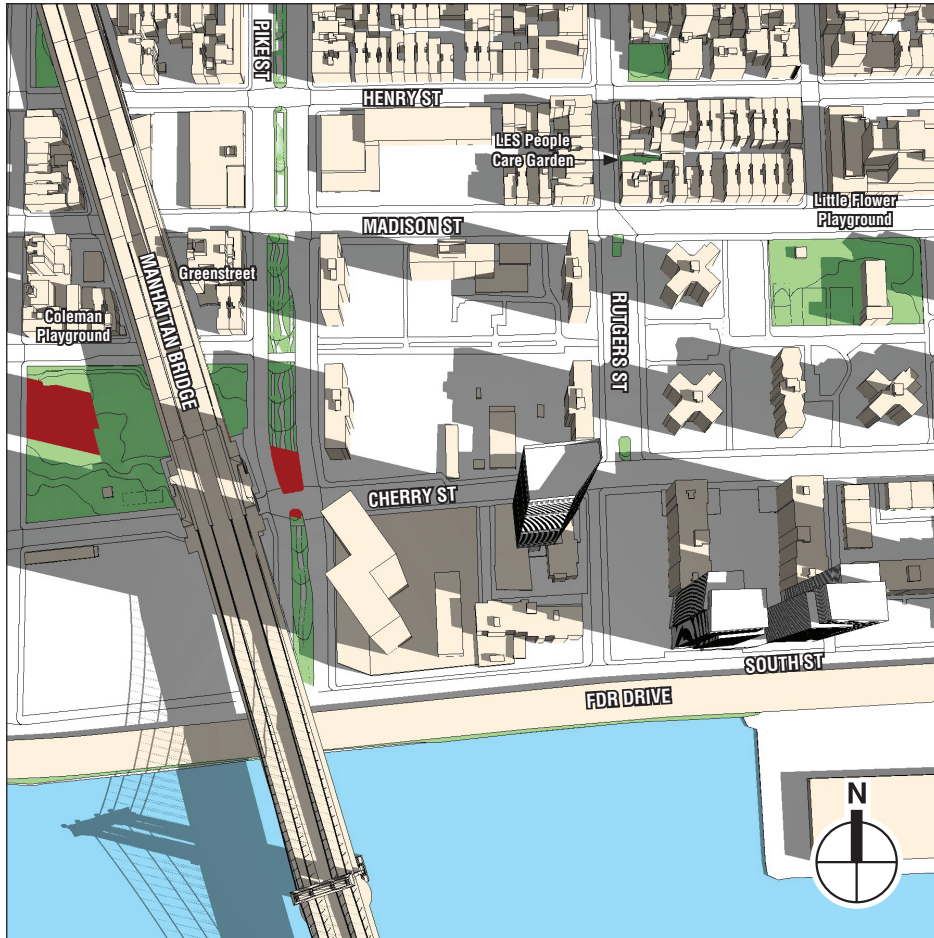


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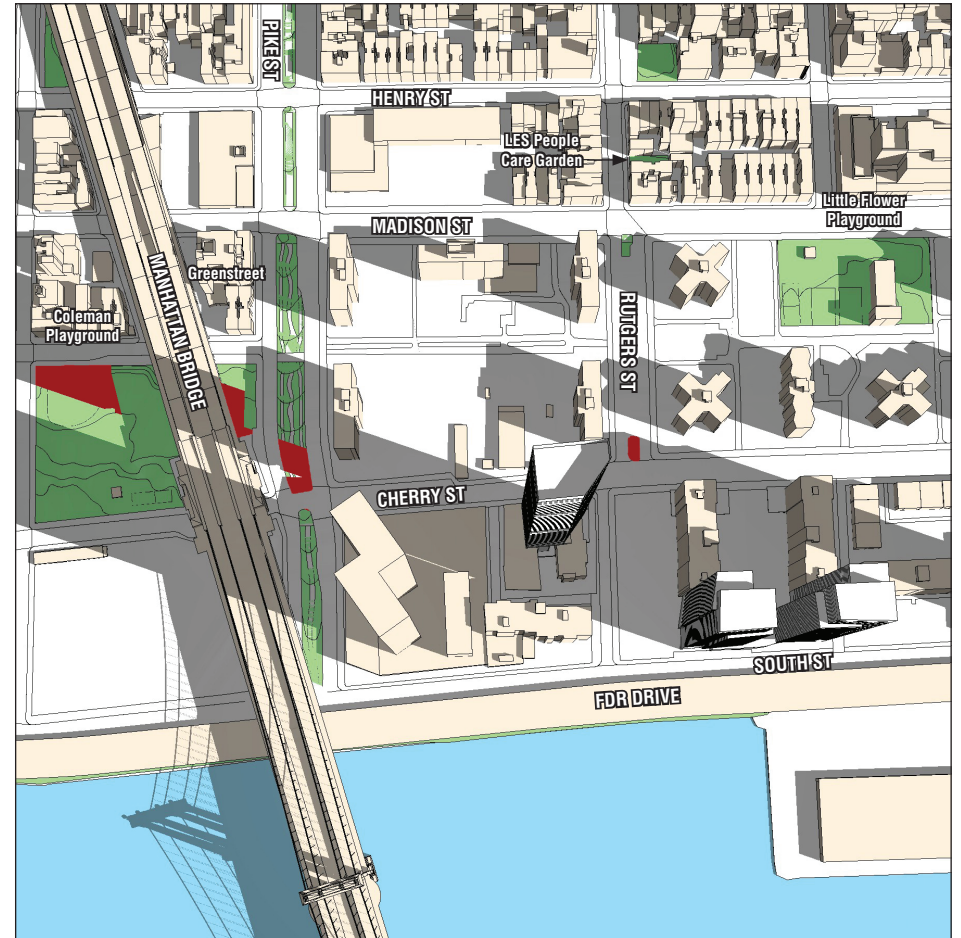


7:30 AM

- Publicly Accessible Open Space
- Incremental Shadow

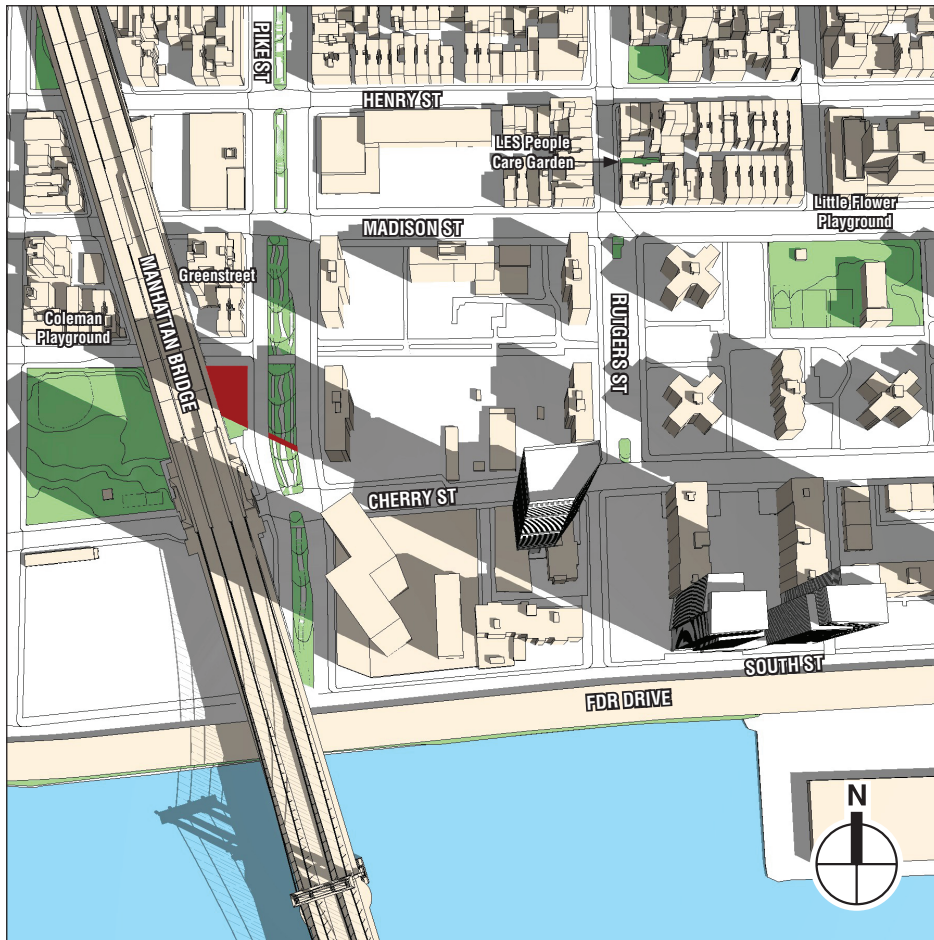


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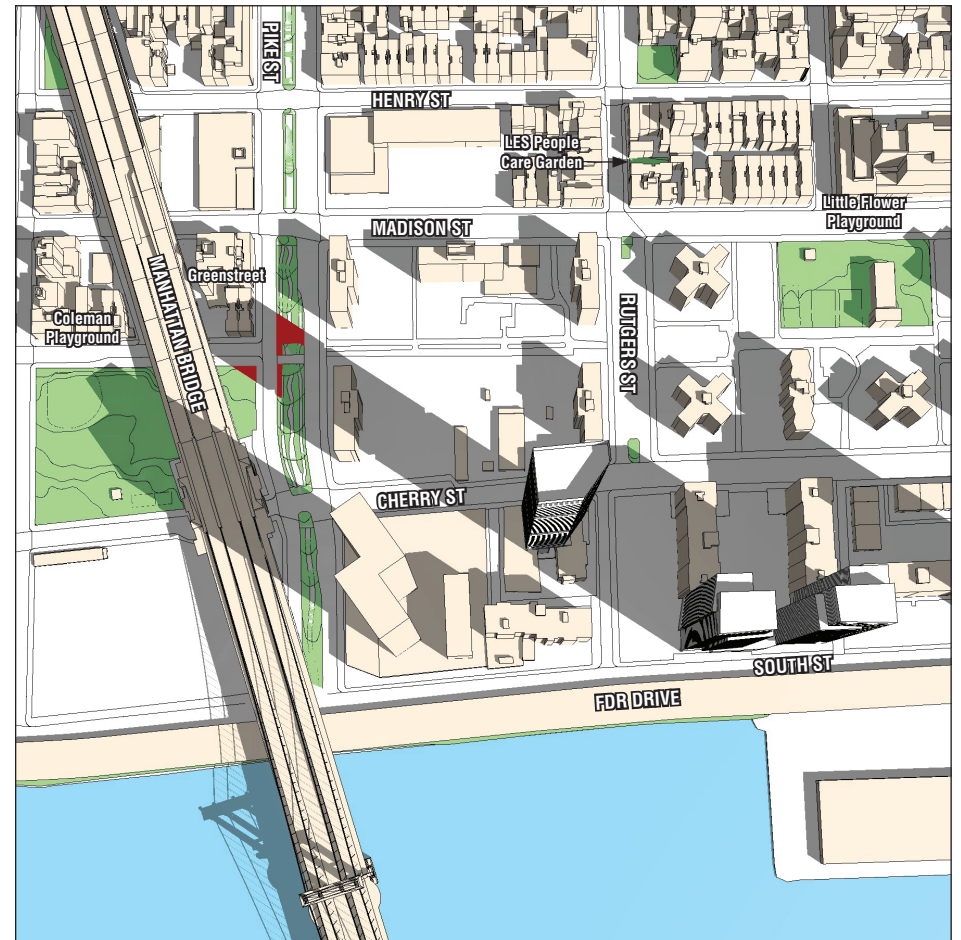


8:30 AM

- Publicly Accessible Open Space
- Incremental Shadow



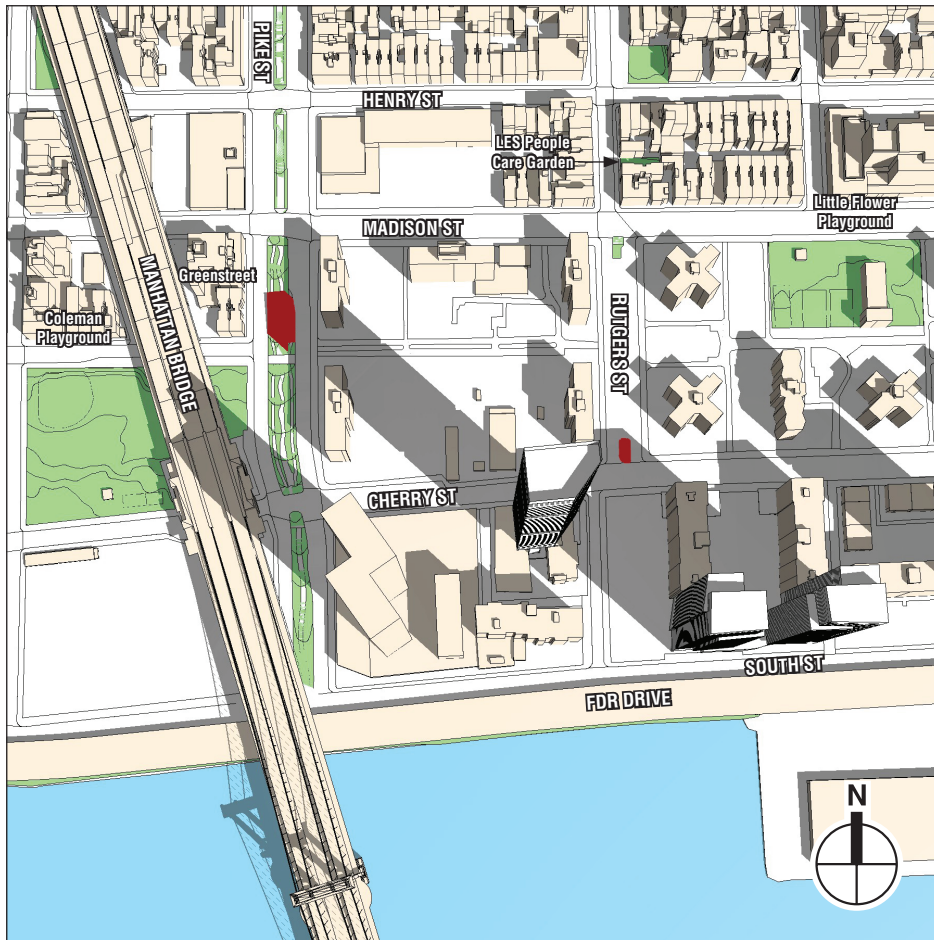
9:00 AM



9:30 AM

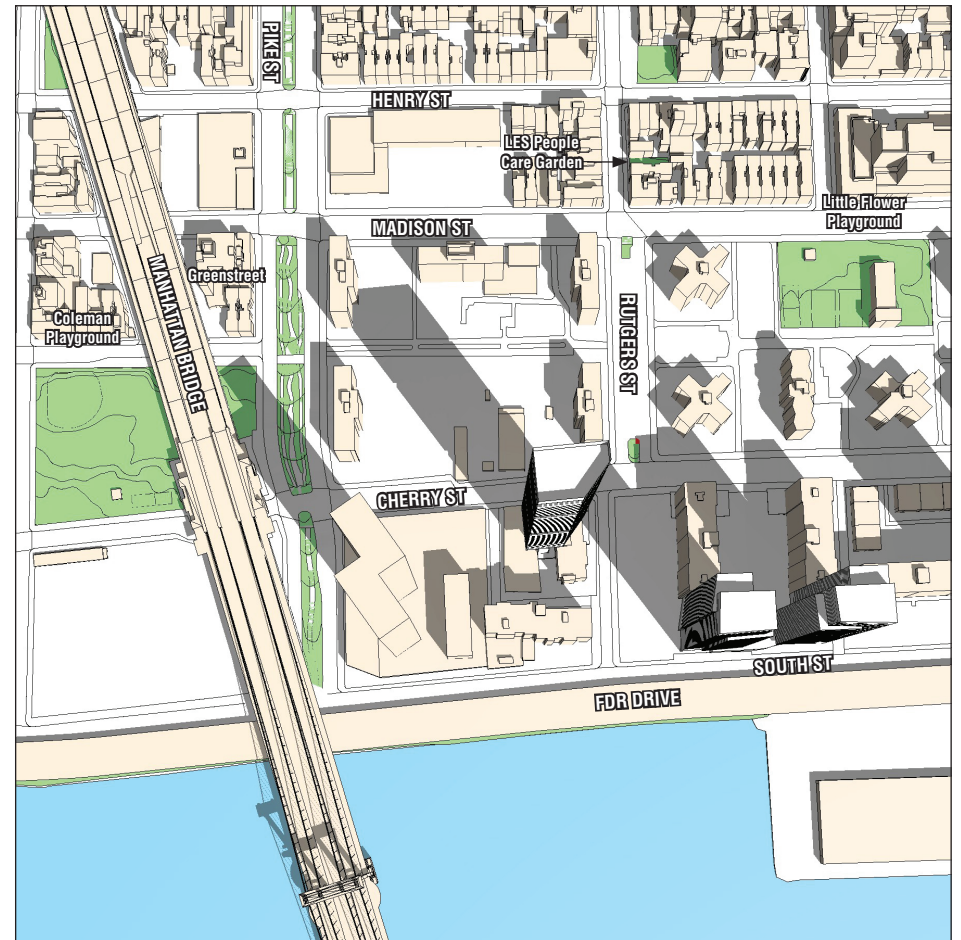
- Publicly Accessible Open Space
- Incremental Shadow





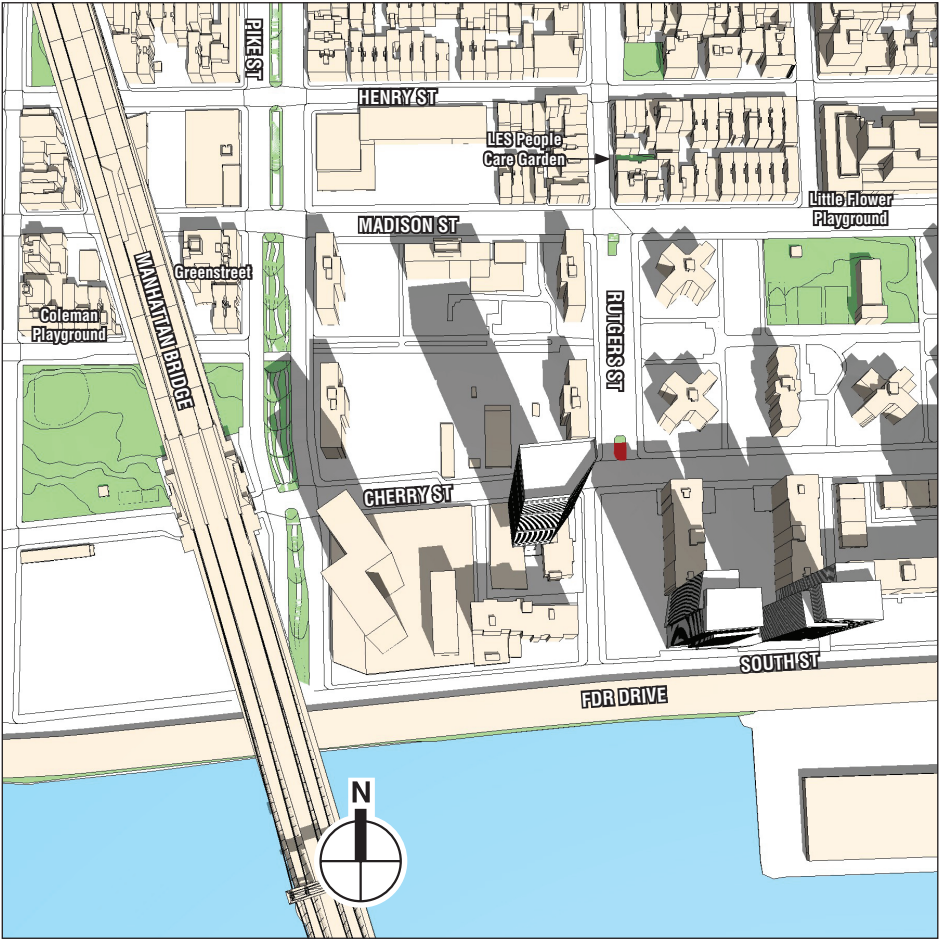
10:00 AM

- Publicly Accessible Open Space
- Incremental Shadow



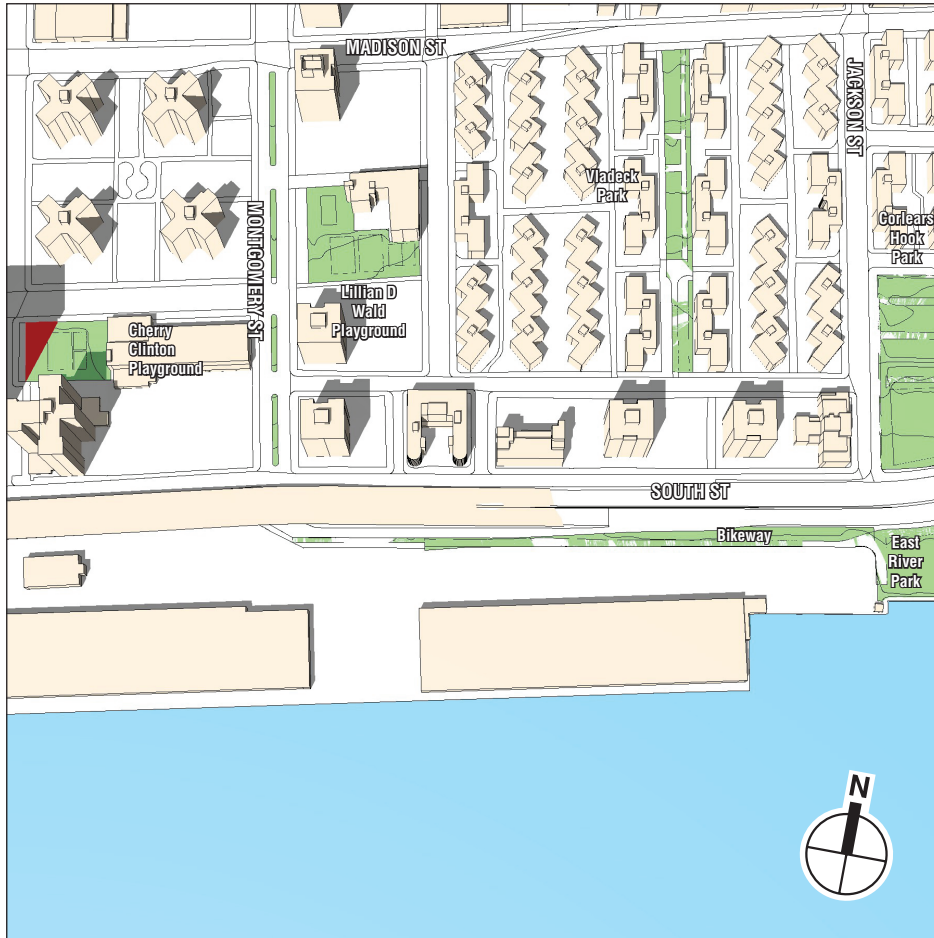
10:30 AM

Detailed Shadow Analysis  
May 6 / August 6  
**Figure 6-30**



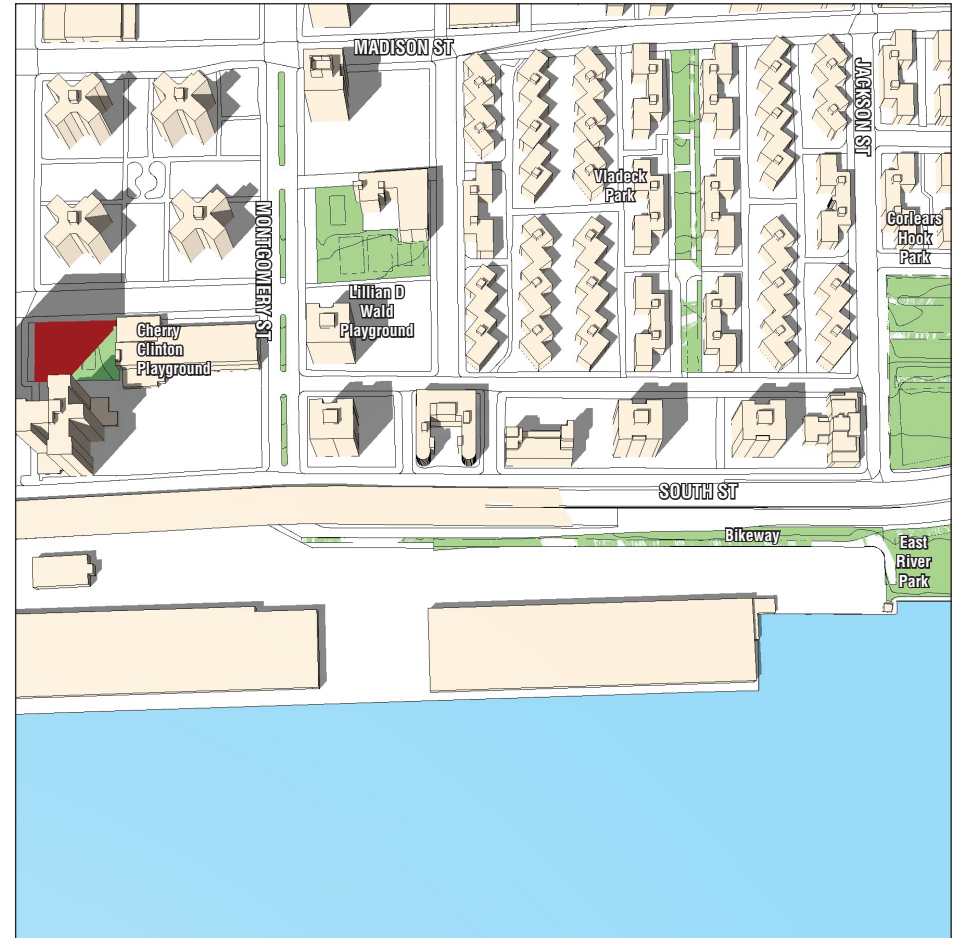
11:00 AM

-  Publicly Accessible Open Space
-  Incremental Shadow



12:30 PM

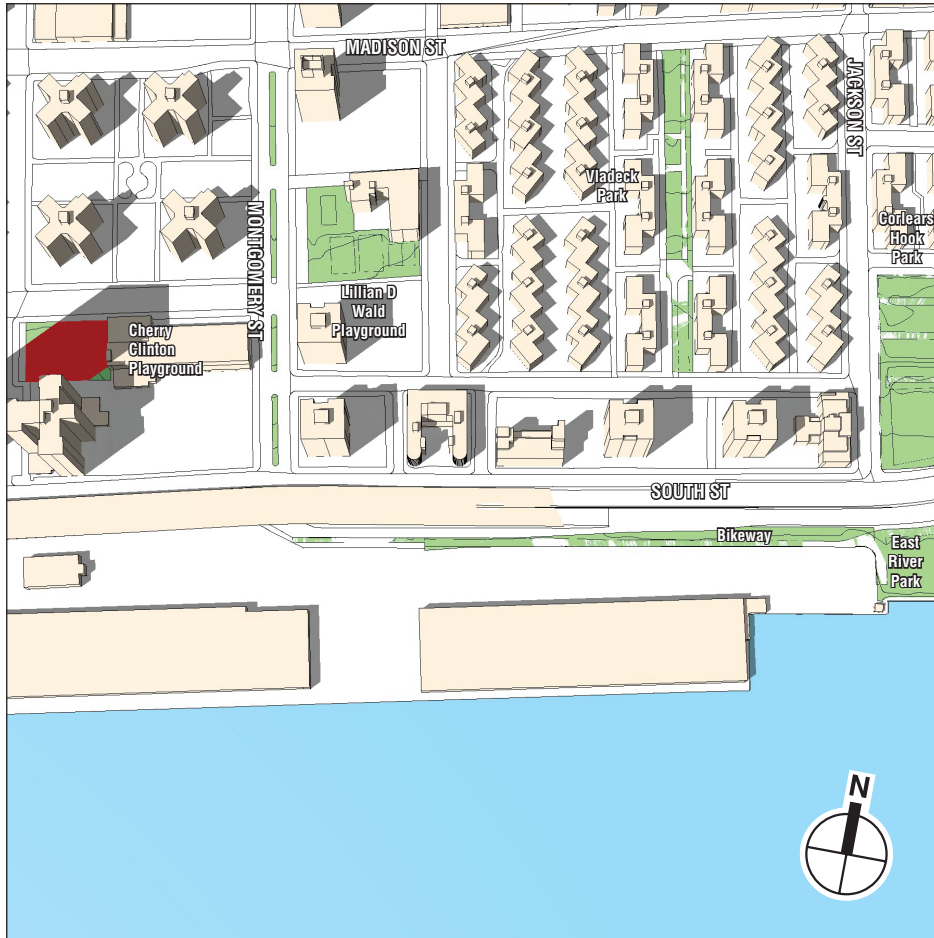
Publicly Accessible Open Space  
Incremental Shadow



1:00 PM

Detailed Shadow Analysis  
May 6 / August 6  
**Figure 6-32**





1:30 PM

Publicly Accessible Open Space  
 Incremental Shadow

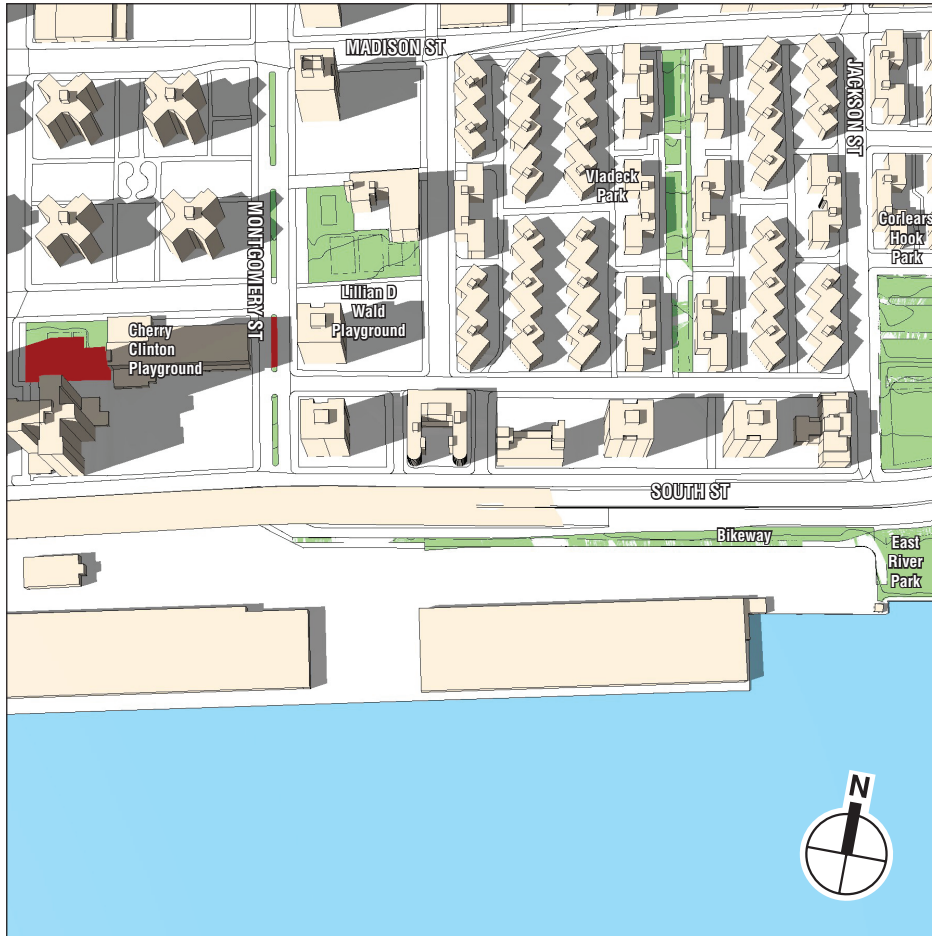
**TWO BRIDGES LSRD**



2:00 PM

Detailed Shadow Analysis  
 May 6 / August 6  
**Figure 6-33**

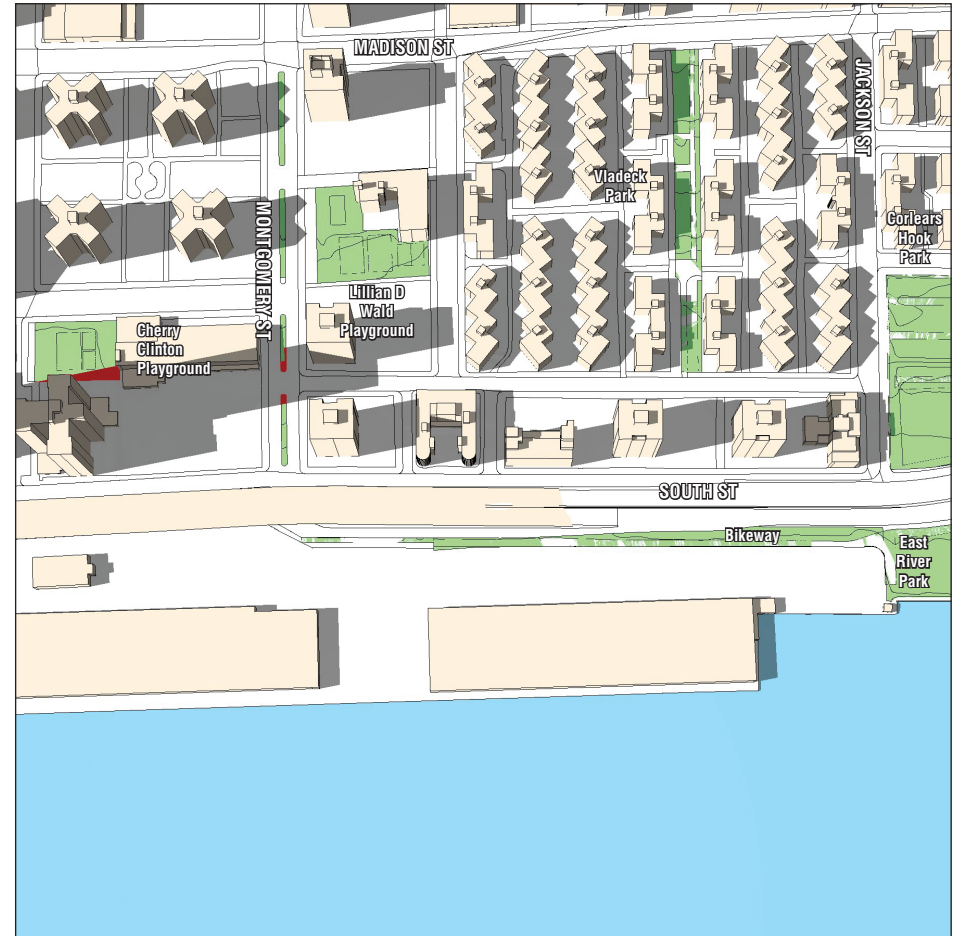
6.27.18



2:30 PM

-  Publicly Accessible Open Space
-  Incremental Shadow

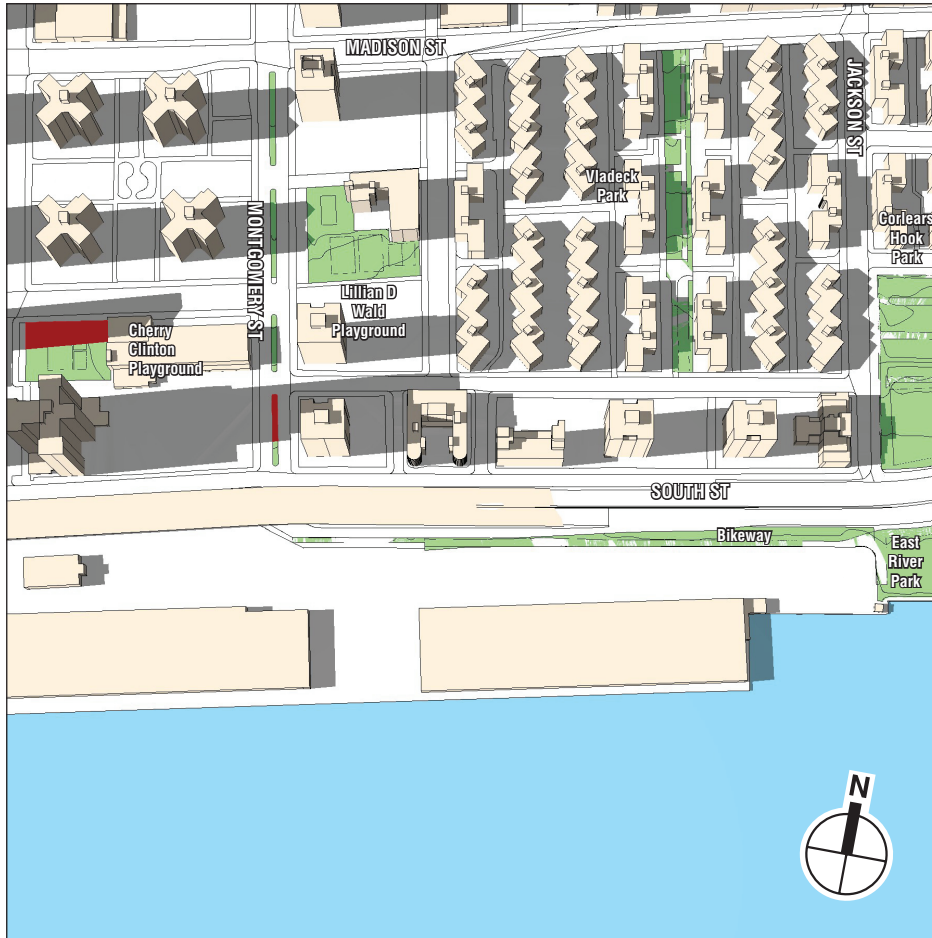
**TWO BRIDGES LSRD**



3:00 PM

Detailed Shadow Analysis  
May 6 / August 6  
**Figure 6-34**

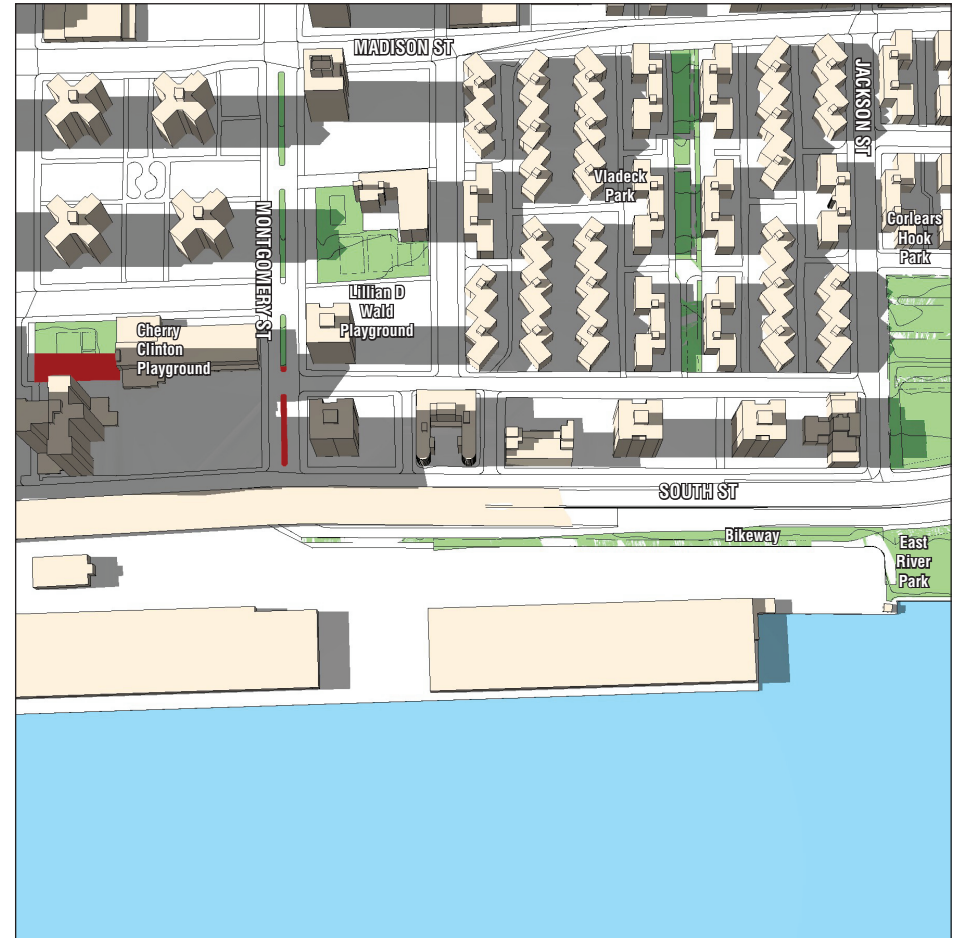




3:30 PM

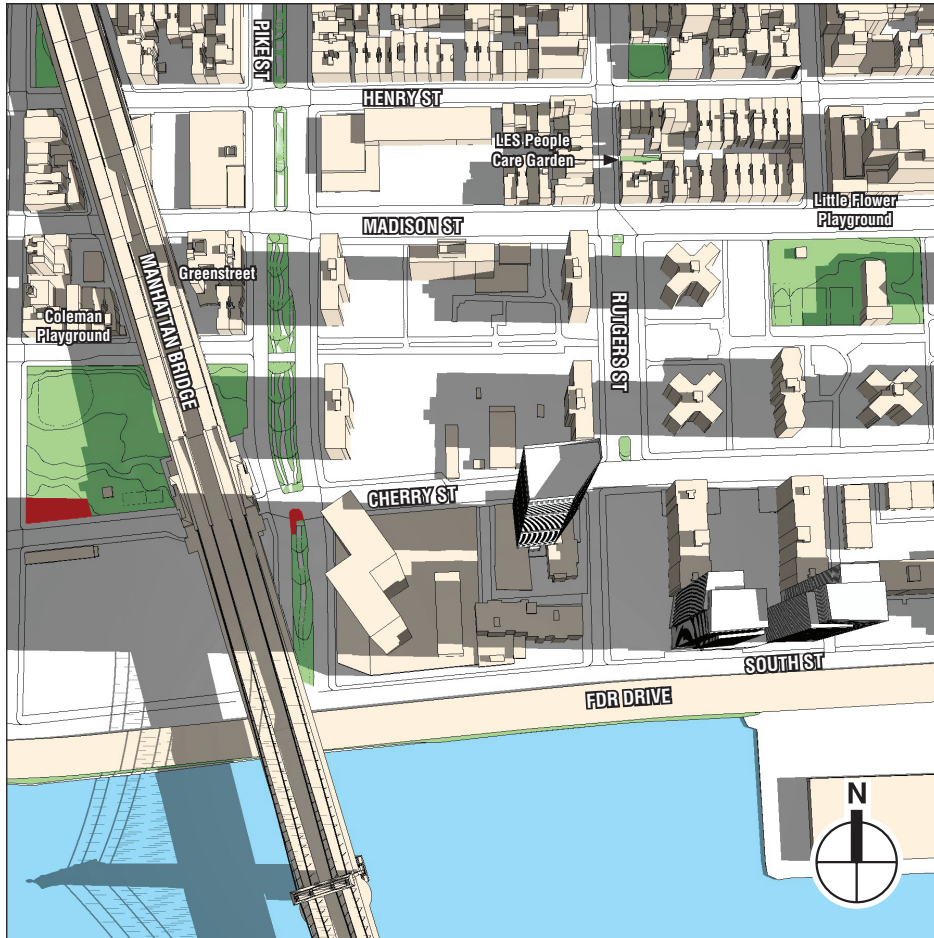
■ Publicly Accessible Open Space  
■ Incremental Shadow

**TWO BRIDGES LSRD**

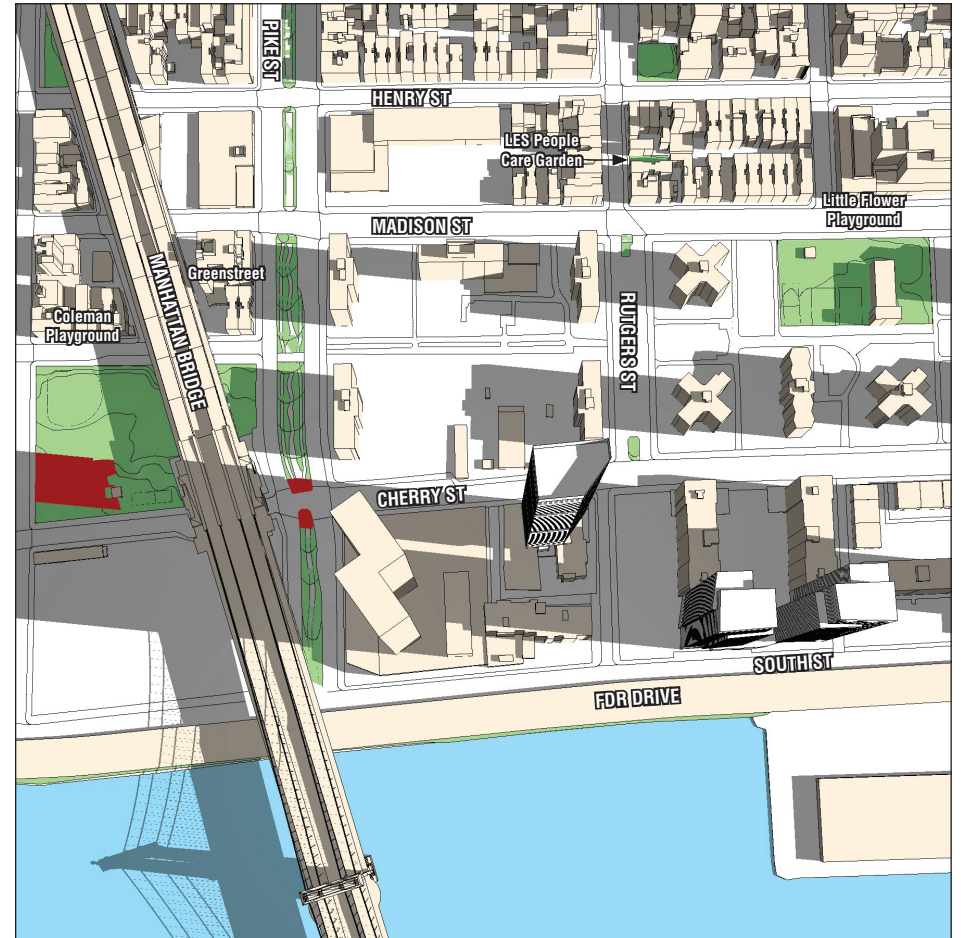


4:00 PM

Detailed Shadow Analysis  
 May 6 / August 6  
**Figure 6-35**

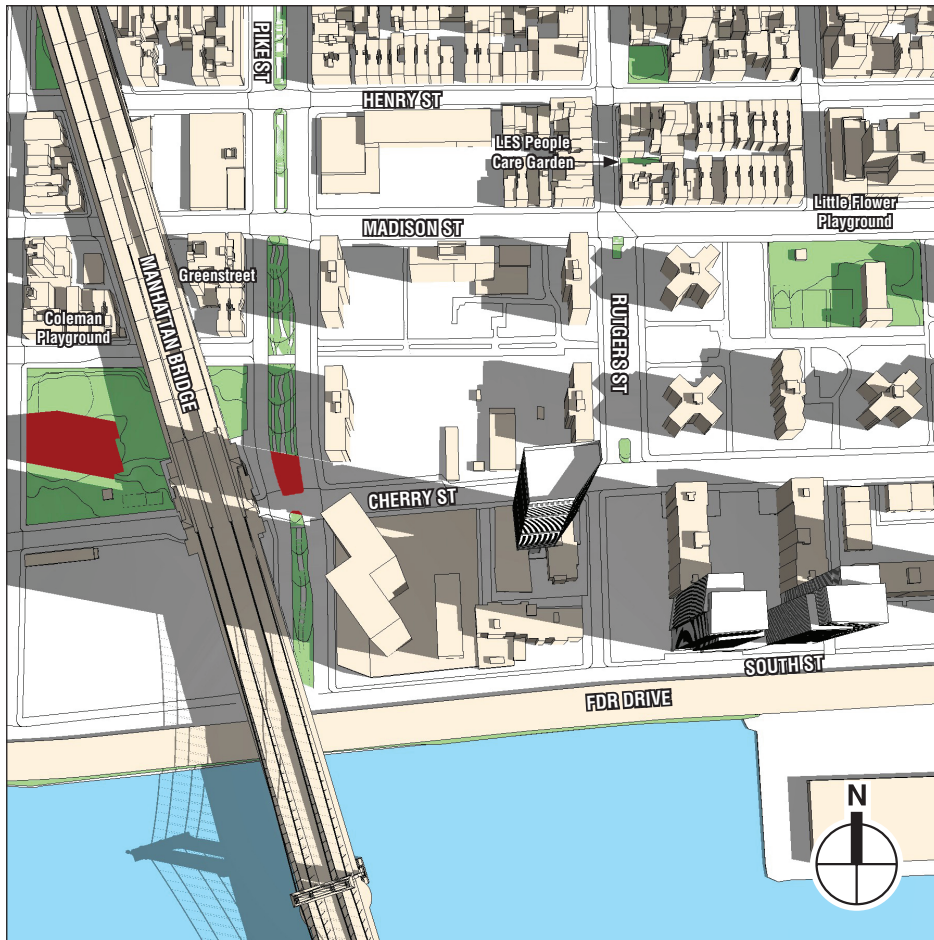


7:30 AM

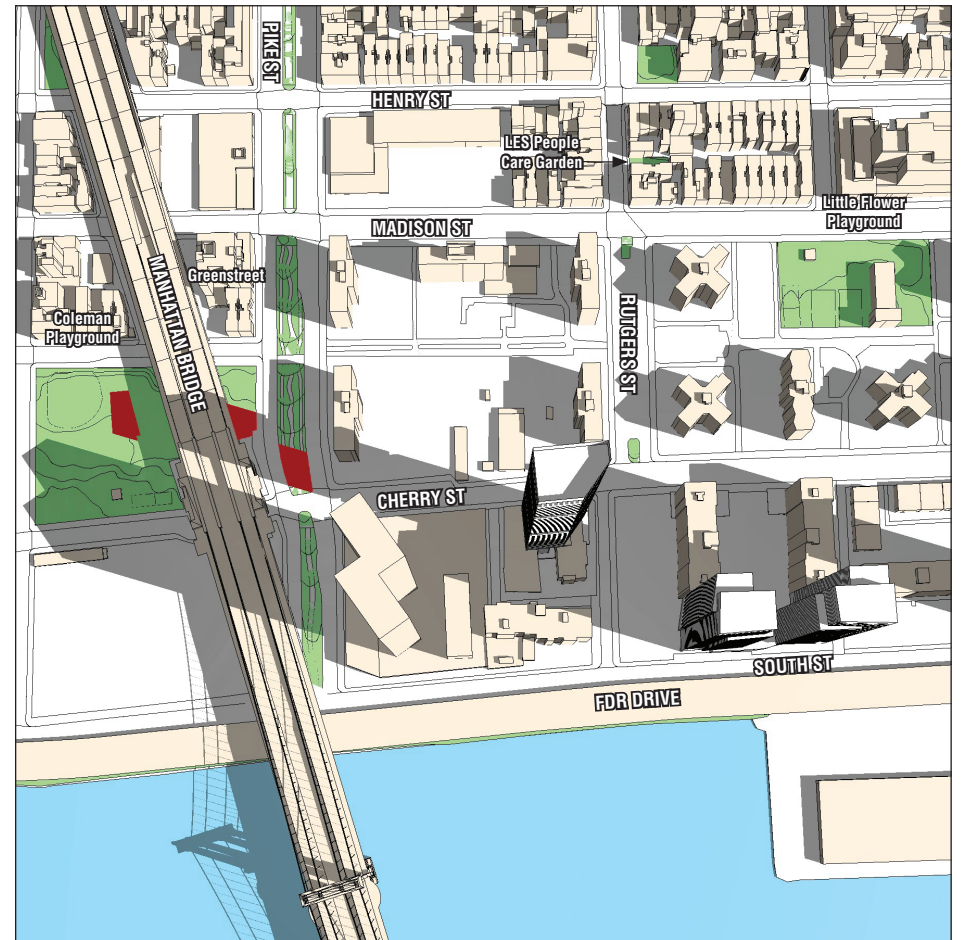


8:00 AM

- Publicly Accessible Open Space
- Incremental Shadow



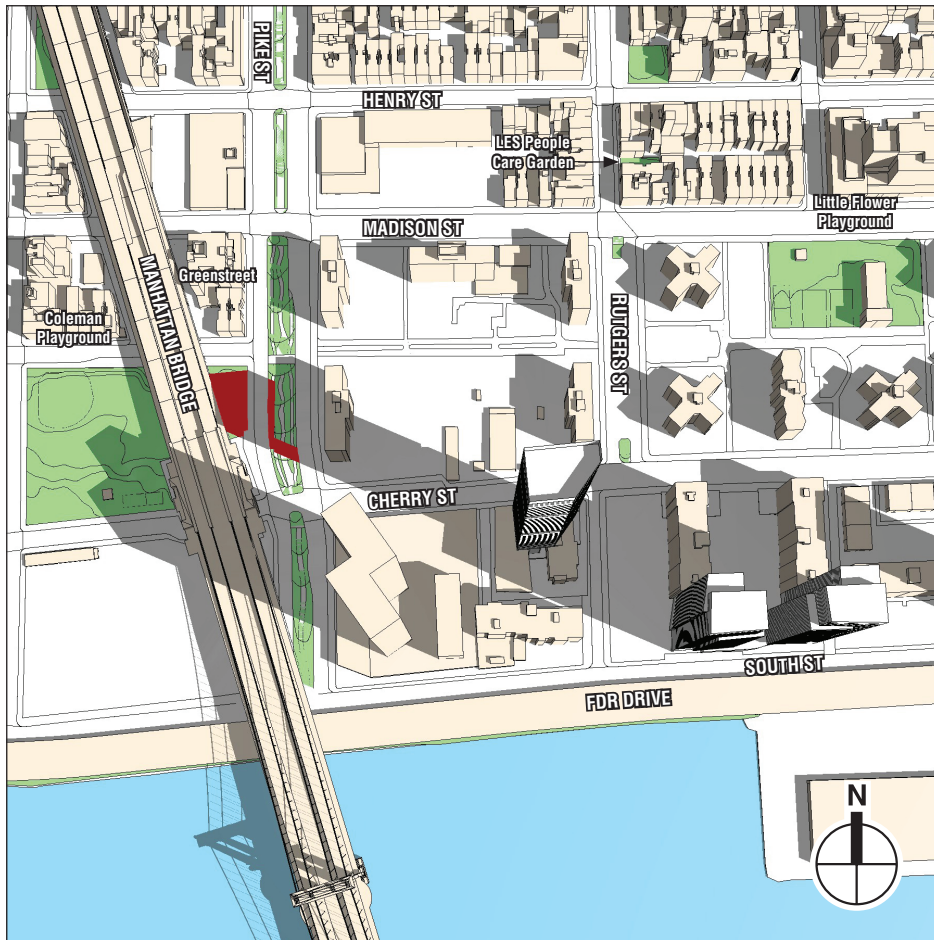
8:30 AM



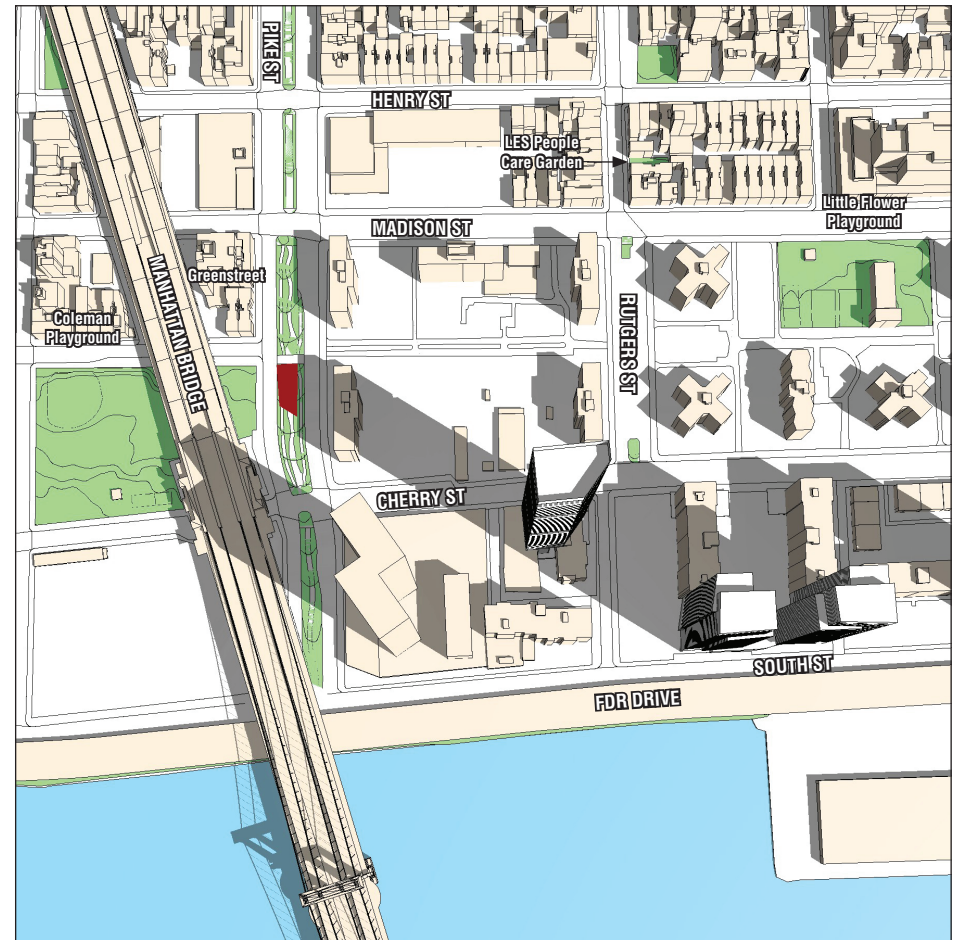
9:00 AM

- Publicly Accessible Open Space
- Incremental Shadow



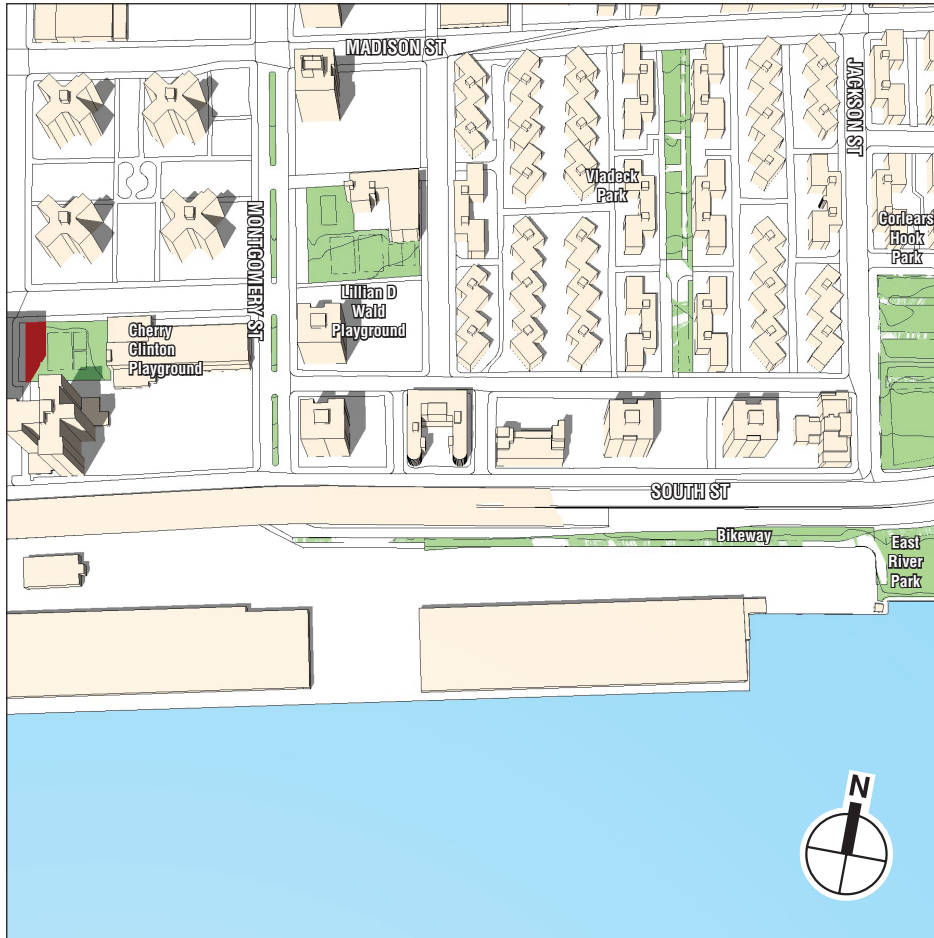


9:30 AM



10:00 AM

- Publicly Accessible Open Space
- Incremental Shadow



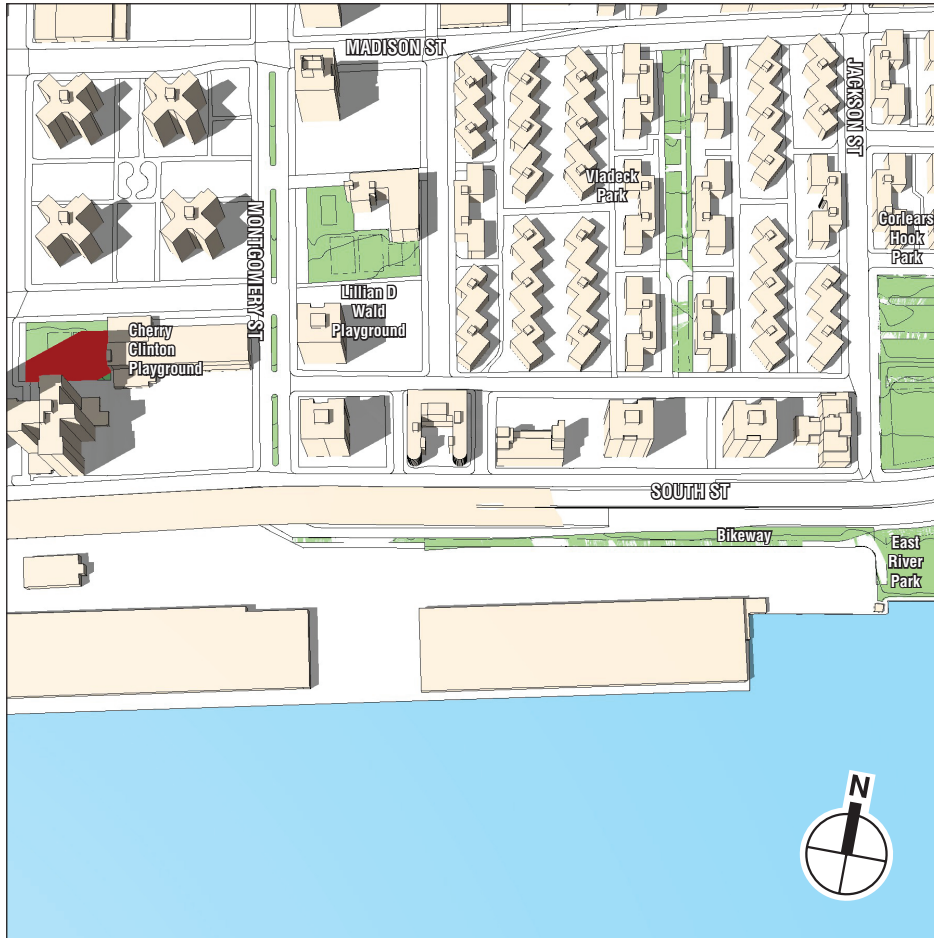
12:30 PM

Publicly Accessible Open Space

Incremental Shadow



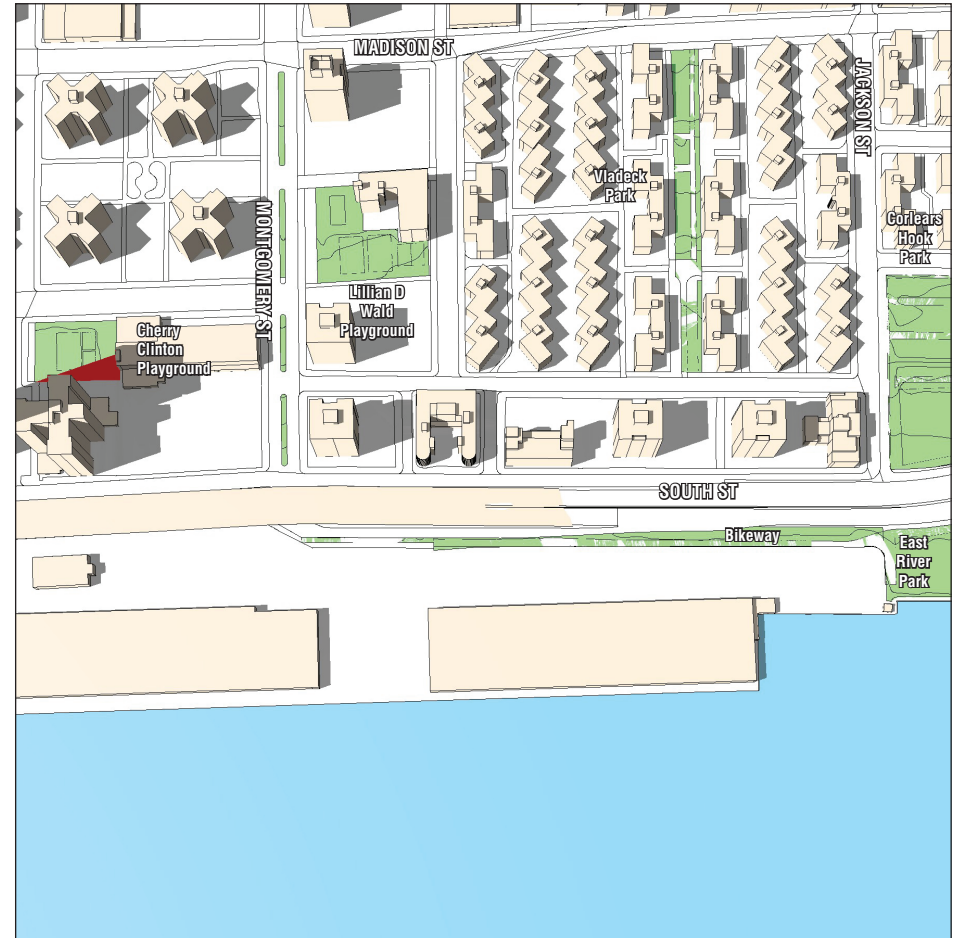
1:00 PM



1:30 PM



TWO BRIDGES LSRD



2:00 PM

Detailed Shadow Analysis  
June 21  
Figure 6-40



Table 6-2

## Incremental Shadow Durations on Sunlight-Sensitive Resources

Analysis day and timeframe window	December 21 8:51 AM–2:53 PM	March 21/Sept. 21 7:36 AM–4:29 PM	May 6/August 6 6:27 AM–5:18 PM	June 21 5:57 AM–6:01 PM
Publicly Accessible Open Spaces				
Forsyth Plaza	8:51 AM–9:30 AM Duration: 39 min	—	—	—
Sara D. Roosevelt Park	9:30 AM–10:20 AM Duration: 50 min	—	—	—
Pike Street Malls	8:51 AM–10:10 AM Duration: 1 hr 19 min	7:36 AM–10:30 AM Duration: 2 hr 54 min	6:27 AM–10:05 AM Duration: 3 hr 38 min	7:05 AM–10:05 AM Duration: 3 hr
Allen Street Malls	9:35 AM–9:45 AM 10:00 AM–10:20 AM 10:40 AM–11:15 AM Duration: 1 hr 5 min	—	—	—
Rutgers Street Greenstreets Islands (Cherry and Madison Streets)	10:25 AM–11:05 AM 12:10 PM–12:20 PM Duration: 50 min	10:45 AM–11:15 AM 12:15 PM–12:45 PM 1:20 PM–2:10 PM Duration: 1 hr 50 min	8:20 AM–8:50 AM 9:55 AM–10:30 AM 10:45 AM–11:15 AM 12:45 PM–1:40 PM Duration: 2 hr 30 min	12:40 PM–1:40 PM Duration: 1 hr
LES People Care Garden	—	12:15 PM–12:30 PM Duration: 15 min	—	—
Captain Jacob Joseph Playground	9:05 AM–9:35 AM 10:30 AM–10:50 AM 11:00 AM–11:30 AM 12:05 PM–12:45 PM Duration: 2 hr	—	—	—
Straus Square	10:35 AM–10:55 AM 11:05 AM–11:25 AM 11:55 AM–12:30 PM Duration: 1 hr 15 min	—	—	—
Seward Park	9:45 AM–1:20 PM Duration: 3 hr 35 min	—	—	—
Seward High School Field	12:15 PM–12:50 PM Duration: 35 min	—	—	—
Little Flower Playground	8:51 AM–11:10 AM 11:25 AM–1:35 PM 2:00 PM–2:45 PM Duration: 5 hr 14 min	9:35 AM–11:30 AM 11:35 AM–1:05 PM 1:30 PM–2:55 PM Duration: 4 hr 50 min	1:15 PM–1:20 PM Duration: 5 min	—
Cherry Clinton Playground	12:40 PM–2:53 PM Duration: 2 hr 13 min	12:40 PM–4:29 PM Duration: 3 hr 49 min	12:20 PM–3:05 PM 3:20 PM–4:15 PM Duration: 3 hr 29-40 min	12:20 PM–2:20 PM 3:20 PM–3:40 PM Duration: 2 hr 20 min
Greenstreets Triangle, Montgomery St & East Broadway	1:10 PM–1:40 PM 2:05–2:53 PM Duration: 1 hr 18 min	—	—	—
Martin Luther King Junior Community Park	1:35 PM–2:05 PM 2:25–2:53 PM Duration: 58 min	—	—	—
Greenstreets Medians on Grand Street	2:00–2:53 PM Duration: 53 min	—	—	—
Sol Lain Playground	2:15–2:53 PM Duration: 53-38 min	—	—	—
Abrons Art Center	1:55 PM–2:10 PM 2:30 PM–2:53 PM Duration: 58 min	—	—	—
Ahearn Park	2:00 PM–2:30 PM 2:45 PM–2:53 PM Duration: 38 min	—	—	—
Montgomery Street Greenstreets Medians	2:00 PM–2:53 PM Duration: 53 min	2:00 PM–4:29 PM Duration: 2 hr 29 min	2:25 PM–4:20 PM Duration: 1 hr 55 min	2:45 PM–4:15 PM Duration: 1 hr 30 min
Luther Gulick Playground	2:15 PM–2:53 PM Duration: 38 min	—	—	—
Hamilton Fish Park	2:50 PM–2:53 PM Duration: 3 min	—	—	—
Playground One	—	7:36 AM–7:45 AM Duration: 9 min	—	—
Coleman Playground	—	7:36 AM–8:15 AM Duration: 39 min	6:55 AM–9:30 AM Duration: 2 hr 35 min	7:20 AM–9:45 AM Duration: 2 hr 25 min

**Table 6-2 (cont'd)**  
**Incremental Shadow Durations on Sunlight-Sensitive Resources**

Analysis day and timeframe window	December 21 8:51 AM–2:53 PM	March 21/Sept. 21 7:36 AM–4:29 PM	May 6/August 6 6:27 AM–5:18 PM	June 21 5:57 AM–6:01 PM
<b>Publicly Accessible Open Spaces</b>				
Lillian D. Wald Playground	—	2:15 PM–4:10 PM Duration: 1 hr 55 min	—	—
Vladek Park	—	3:50 PM–4:29 PM Duration: 39 min	—	—
Corlears Hook Park	—	4:25 PM–4:29 PM Duration: 4 min	—	—
Tanahey Playground	—	—	—	6:20 AM–6:55 AM Duration: 2 hr 35 min
Alfred E. Smith Playground	—	—	6:35 AM–7:25 AM Duration: 50 min	7:00 AM–7:05 AM Duration: 5 min
East River Esplanade/ East River Park	—	—	4:35 PM–5:05 PM Duration: 30 min	—
<b>Historic Resources with Sunlight-Sensitive Features</b>				
Citizens Savings Bank	8:51 AM–9:03 AM Duration: 12 min	—	—	—
Manhattan Bridge Arch and Colonnade	8:51 AM–9:25 AM Duration: 34 min	—	—	—
Eldridge Street Synagogue	9:10 AM–9:45 AM Duration: 35 min	—	—	—
Bialystoker Synagogue	2:25 PM–2:35 PM 2:45 PM–2:53 PM Duration: 18 min	—	—	—
Saint Mary's Church	2:35 PM–2:45 PM Duration: 10 min	—	—	—
<b>Sunlight-Sensitive Natural Resources</b>				
East River	—	≡	4:55 PM–5:18 PM Duration: 23 min	5:57 AM–6:20 AM 5:00 PM–6:01 PM Duration: 1 hr 24 min
<b>Notes:</b> 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 <i>CEQR Technical Manual</i> 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.				

## SHADOWS AND THE FOUR SEASONS

Shadow patterns differ in each season, and their effects on vegetation, open space use and other sensitive receptors can differ as well.

December 21, representing the winter months, does not fall within the growing season. Shadow falling on vegetation in winter is not generally considered to cause a significant adverse impact, according to the *CEQR Technical Manual*. However, winter shadow can adversely affect users of open space who may rely on sunlight for warmth. Shadows are long in the winter, and move faster than in other seasons. In densely developed areas like lower Manhattan, buildings create generally shady conditions throughout the study area, even in the middle of the day, and certainly at the beginning and end of the analysis period.

March is considered the beginning of the growing season in New York City, and September 21, which has the same shadow patterns as March 21, is also within the growing season. Shadows on March 21 and September 21 are of moderate length.

May 6 falls halfway between the March 21 equinox and the June 21 summer solstice. August 6 falls halfway between June 21 and the September 21 equinox, and has the same shadow patterns as May 6. The May 6/August 6 analysis day is representative of the growing season in the city. Shadows on this day are shorter than on the equinoxes, and the length of the day is longer.

June 21 has the longest amount of daylight of the year, with an analysis period of 12 hours. Shadows fall to the southwest early in the morning and to the southeast late in the afternoon, and

shadows at midday on June 21 are shorter than at any other time of year. June 21 is also in the growing season.

### **DETERMINATION OF IMPACT SIGNIFICANCE**

According to the *CEQR Technical Manual*, an incremental shadow is not considered significant when its duration is shorter 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:

#### *FOR 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 No Action condition).
- 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).

#### *FOR SUNLIGHT-SENSITIVE 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.

#### *FOR OPEN SPACE UTILIZATION*

- A substantial reduction in the usability of open space as a result of increased shadows (cross reference with information provided in Chapter 5, “Open Space,” 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.

### **ASSESSMENT OF SHADOW EFFECTS BY RESOURCE**

This section presents a description of the extent and duration of project-generated incremental shadows on each affected resource, by season, and an assessment of the significance of the shadows’ impacts. Per *CEQR Technical Manual* guidelines, impact significance is evaluated based not only on the extent and duration of incremental shadow but also the nature and sensitivity of each individual resource and the specific context in which the impact occurs.

#### *CITIZENS SAVINGS BANK*

The Beaux-Arts Citizens Savings Bank at 58 Bowery is a New York City Landmark and is also within the boundaries of the Bowery Historic District, which is listed on the State and National Registers of Historic Places. It was designed by architect Clarence W. Brazer and completed in 1924. The sunlight-sensitive features of this architectural resource are the large front façade windows which light the banking hall, a publicly accessible space.



On December 21, incremental shadow from Site 4 (4A/4B) would fall on the front façade windows for the first 12 minutes of the analysis day, 8:51 AM to 9:03 AM, eliminating all sunlight for 9 of the 12 minutes (see **Figure 6-6**). The incremental shadow would be too limited in duration to significantly affect this resource on this analysis day.

No incremental shadow would fall on this resource on any other analysis day.

#### *MANHATTAN BRIDGE ARCH AND COLONNADE*

The Manhattan Bridge arch and colonnade—which have been designated as a New York City Landmark and are listed on the State and National Registers of Historic Places—were completed in 1915. For the purpose of a conservative analysis, the colonnade and arch are considered sunlight-sensitive architectural features.

On the December 21 analysis day, incremental shadow would pass across the colonnade and arch for the first 24 minutes of the analysis day. The incremental shadow would fall across most or all of the structure from 8:51 AM to 9:10 AM (see **Figure 6-6**), would cover about half of the structure at 9:15 AM, and would move off this resource entirely at 9:25 AM. The incremental shadow would originate from both the Site 4 (4A/4B) proposed building and the Site 5 proposed building from 8:51 AM until about 9:05 AM, and from the Site 4 (4A/4B) proposed building only from 9:05 AM to 9:25 AM.

The arch and colonnade provide a prominent gateway to and from Manhattan primarily due to their scale, design and material. While the colonnade and arch do benefit somewhat from direct sunlight and the resulting contrast of light and shadow, the 34 minutes of incremental shadow from the proposed projects would not significantly impact the architectural significance or public enjoyment of this resource.

No incremental shadow would fall on this resource on any other analysis day.

#### *ELDRIDGE STREET SYNAGOGUE*

The Eldridge Street Synagogue—a National Historic Landmark, listed on the State and National Registers, and New York City Landmark—is located at 12-16 Eldridge Street. It was designed by architects Peter and Francis William Herter. Completed in 1887, the synagogue was built in the Moorish Revival style, with 70-foot-high vaulted ceiling, stained-glass rose windows, elaborate brass fixtures, and hand-stenciled walls. Currently, it is a museum, for which visitors pay an entrance fee. The sunlight-sensitive features of this resource are the stained glass windows on all sides lighting the main sanctuary. The stained-glass circular window on the rear façade, which faces east toward the project sites, was created by artist Kiki Smith and architect Deborah Gans in 2007, as part of a restoration effort by the Museum. On the south façade, which also faces the project sites, there are two rows of stained glass windows, an upper row and a lower row of six windows each.

On December 21, incremental shadow would fall on portions of the south façade windows between 9:10 AM to 9:45 AM. From 9:10 to 9:25 AM, the incremental shadow would come from the proposed Site 5 building, shading small portions of between one and two windows on the upper row, eliminating all sunlight only for five minutes. From 9:25 AM to 9:45 AM incremental shadow would come from the proposed Site 4 (4A/4B) building, shading portions of between three and four windows including one on the lower row, and thereby eliminating remaining sunlight for 15 minutes of the 20 minute duration (see **Figure 6-6**).

The incremental shadow on this winter analysis day would be limited in both extent and duration, falling on portions of up to four windows out of the 13 that face the project sites over the course of 35 minutes. The limited extent and duration would not be a substantial reduction in sunlight available for the enjoyment of the sanctuary interior by the public, even were the museum to change its hours and open before 9:10 AM. Therefore, project-generated shadow would not significantly affect the public use and enjoyment of this resource.

No incremental shadow would fall on this resource on any other analysis day.

### *FORSYTH PLAZA*

As of September 2017, Forsyth Plaza is nearing completion. A raised, triangular plaza located at the intersection of the Manhattan Bridge approach, Canal and Forsyth Streets, it will include a central open paved plaza with seating and plantings around it.

On December 21, incremental shadow would pass across the plaza from 8:51 AM to 9:30 AM (see **Figure 6-6**). The incremental shadow would eliminate the remaining sun from 8:51 until 9:20 AM. The incremental shadow would come from the proposed Site 5 building until 9:05 AM, and from the proposed Site 4 (4A/4B) building from 9:05 AM to 9:30 AM.

Despite this 30 minute duration in which the remaining sunlight is eliminated, and 40 minute duration overall, the impact would not significantly alter the usage of the plaza, which is anticipated to be light on winter mornings. Furthermore, during the brief, early morning period when incremental shadow would occur, portions of Sara D. Roosevelt Park across Canal Street would be sunlit for any users seeking such space. Forsyth Plaza would be in sun after 9:30 AM and for most of the remaining winter analysis day. Given the limited duration of incremental shadow, the availability of nearby sunlit open space, and the expected light usage of the space on winter mornings, the project-generated shadow would not cause a significant adverse impact to the plaza.

No incremental shadow would fall on this resource on any other analysis day.

### *SARA D. ROOSEVELT PARK*

Sara D. Roosevelt Park is a seven-block-long linear park, extending between Chrystie, Forsyth, Canal, and Houston Streets. It contains a variety of features including playgrounds, seating areas, and turf soccer fields. Most of the southernmost block, between Canal and Hester Streets, is occupied by a turf field and running track. The block north of that, between Hester and Grand Streets, contains playgrounds.

On the December 21 analysis day, shadow from the proposed Site 4 (4A/4B) building would move across portions of the turf field and running track in the southernmost block of the park between 9:30 to 10:05 AM (see **Figures 6-6 and 6-7**), and very small portions of the playground area north of Hester Street from 10:05 to 10:20 AM. The incremental shadow from the proposed projects would never eliminate remaining sunlight from that area of Sara D. Roosevelt Park, and its extent would be limited throughout the affected period.

Given the limited extent and duration of incremental shadow, and the availability of sunlit areas of the park further north as well as in Forsyth Plaza to the south, the project-generated shadow would not cause a significant adverse impact to this resource.

No incremental shadow would fall on this resource on any other analysis day.

### *PIKE STREET MALLS*

These medians extend down the middle of Pike Street between Division Street and South Street. The southernmost two blocks, between South and Monroe Streets, have been extensively renovated and contain landscaping, paths, and seating. From Madison Street north to Division Street, the medians are paved, enclosed with chain-link fence, and contain minimal seating and no landscaping other than occasional small planters.

On December 21, incremental shadow would pass across the three medians between Madison and Division Streets, between 8:51 and 10:10 AM (see **Figures 6-6 and 6-7**). The extent of incremental shadow would be small and would never eliminate all sunlight on the medians, collectively. Therefore, the proposed projects would not cause significant adverse shadow impacts to this resource in winter.

On the March 21/September 21 analysis day, incremental shadow would pass across portions of the Pike Street Malls between Cherry Street and Henry Street from the start of the analysis day at 7:36 AM until 10:30 AM. The incremental shadow would be limited in extent over the course of this entire period, due to the relatively slender width of the proposed buildings' shadows falling from east to west on the linear, north-south-oriented space, and sunlit areas would remain throughout the three-hour duration for users seeking sunlight (see **Figure 6-18**, showing 10:00 and 10:30 AM). Incremental shadow would not fall on any one particular location in the malls for more than approximately one hour, and no planted areas would experience a substantial reduction in sunlight over the course of the day. Therefore, the incremental shadow from the proposed projects would not cause significant adverse shadow impacts to the users or vegetation of this resource on this analysis day.

On the May 6/August 6 analysis day, incremental shadow would move across portions of the malls between Cherry Street and Madison Street from the start of the analysis day at 6:27 AM until 10:05 AM. Similar to the March 21/September 21 analysis day, the extent of incremental shadow would be limited, due to the relatively slender width of the proposed buildings' shadows falling from east to west on the linear, north-south-oriented space, and sunlit areas would remain throughout the duration of the affected period for users seeking sunlight (see **Figures 6-27 to 6-30**). None of the malls' planted areas would experience a substantial reduction in sunlight over the course of the day. Therefore, the incremental shadow from the proposed projects would not cause significant adverse shadow impacts to the users or vegetation of this resource on this analysis day.

On the June 21 analysis day, incremental shadow would move across portions of the malls between Cherry Street and Madison Street from 7:05 AM until 10:05 AM. Similar to the May 6/August 6 analysis day, the extent of incremental shadow would be quite limited throughout the duration of the affected period, and sunlit areas would remain on the malls during the affected period for users seeking sunlight (see **Figures 6-36 to 6-38**). None of the malls' planted areas would experience a substantial reduction in sunlight over the course of the day. Therefore, the incremental shadow from the proposed projects would not cause significant adverse shadow impacts to the users or vegetation of this resource on this analysis day.

### *ALLEN STREET MALLS*

These medians extend up the middle of Allen Street from Division Street north to Houston Street, out of the study area. Similar to the Pike Street Malls north of Madison Street, these



medians are paved, enclosed with chain-link fence, and contain minimal seating and no landscaping other than occasional small planters.

On the December 21 analysis day, incremental shadow from the proposed Site 5 building would fall on a small area of the mall between Division and Canal Streets for 10 minutes, from 9:35 AM to 9:45 AM. Fifteen minutes later, incremental shadow from the proposed Site 4 (4A/4B) building would pass across a portion of the mall between Division and Canal Streets, from 10:00 AM until 10:20 AM (see **Figure 6-7**). After passing through an area of the malls already shaded by existing buildings, shadow from the proposed Site 4 (4A/4B) building would pass across small portions of the malls between Canal and Grand Streets from 10:40 AM to 11:15 AM (see **Figure 6-8**). Throughout the total duration of the affected period, the extent of new shadow would be limited to small areas and would move quickly, not falling on any one location for long. The incremental shadow from the proposed projects would never eliminate all remaining sunlight from the malls. Given these factors, the incremental shadow from the proposed projects would not cause significant adverse impacts to the Allen Street Malls on this analysis day.

No incremental shadow would fall on this resource on any other analysis day.

### *RUTGERS GREENSTREET ISLANDS (CHERRY AND MADISON STREETS)*

There are two small Greenstreets traffic islands in the Rutgers Street roadbed, one at the intersection of Rutgers and Madison Streets and one at the intersection of Rutgers and Cherry Streets. They contain plantings and do not have seating or other usable features, and are essentially a visual resource rather than usable open space.

On the December 21 analysis day, both islands would experience incremental shadow from the proposed Site 5 building: the island at Cherry Street from 10:25 AM to 10:45 AM (see **Figure 6-7**), and the Madison Street island from 10:30 AM to 11:05 AM (see **Figures 6-7 and 6-8**). The Madison Street island also would receive shadow from the proposed Site 4 (4A/4B) building, from 12:10 PM to 12:20 PM. Given these brief durations, the incremental shadow from the proposed projects would not significantly affect this resource on the December 21 analysis day.

On the March 21/September 21 analysis day, the proposed Site 5 building would cast incremental shadow on the Cherry Street island from 10:45 AM to 11:15 AM (see **Figure 6-19**), and on the Madison Street island from 12:15 PM to 12:45 PM (see **Figure 6-20**). The proposed Site 4 (4A/4B) building would cast incremental shadow on the Cherry Street island from 1:20 PM to 2:10 PM (see **Figures 6-21 and 6-22**). The Madison Street island would therefore receive a total of 30 minutes of incremental shadow, and the Cherry Street island would receive a total of approximately 1 hour and 20 minutes of new shadow.

The Rutgers Street traffic islands, like many traffic islands and medians in densely developed areas of the city, get limited direct sunlight under existing (and future No Action) conditions, particularly on the March 21/September 21 analysis day when shadows are longer than at other times in the growing season. Therefore, an additional hour and 20 minutes, or even 30 minutes of new shadow could cause additional stress to the vegetation; however, this island, again like other Greenstreets islands and medians, contains shade-tolerant and hardy plantings in order to thrive in its current environment. Further, at other times in the growing season, as shown below, this resource would continue to receive a minimum of six hours of direct sunlight per day. It is therefore anticipated that up to an hour and 20 minutes of new shadow on the March 21/September 21 analysis day would not cause a significant adverse impact to the Rutgers Street Greenstreet medians.

On the May 6/August 6 analysis day, the Rutgers Street traffic island at Cherry Street would receive incremental shadow from the proposed Site 6A building from 8:20 AM to 8:50 AM (see **Figure 6-28**); from the proposed Site 5 building from 9:55 AM to 10:30 AM (see **Figure 6-30**), and from 10:45 AM to 11:15 AM (see **Figure 6-31**); and from the proposed Site 4 (4A/4B) building from 12:45 PM to 1:40 PM. An additional two and a half hours of shadow could cause additional stress to the vegetation in this island; however, as noted in the preceding section this island, like many other Greenstreets islands in the city, contains shade-tolerant and hardy plantings and survive under existing (and future No Action) conditions with suboptimal sunlight and traffic surrounding it. Further, at other times in the growing season on this analysis day as well as on June 21 (see below), which together represent the critical May through August period of the growing season, this resource would continue to receive a minimum of approximately six hours of direct sunlight per day, which is enough daily sunlight to support even species requiring full sun. Therefore, the incremental shadow from the proposed projects would not cause a significant impact to this resource on this analysis day.

On the June 21 analysis day, the Rutgers Street traffic island at Cherry Street would receive incremental shadow from the proposed Site 4 (4A/4B) building from 12:40 PM to 1:40 PM. This resource would continue to receive a minimum of six hours of direct sunlight on this analysis day, and thus the one hour of incremental shadow from the proposed projects would not cause a significant adverse impact to this resource.

#### *LES PEOPLE CARE GARDEN*

On the December 21 analysis day, this community garden would be in shadow throughout the morning and mid-day from existing buildings immediately adjacent and nearby to the south when project-generated shadow could otherwise fall on it. No incremental shadow would therefore occur on this resource on this analysis day.

On the March 21/September 21 analysis day, a sliver of shadow would fall on the edge of this community garden, at the entrance adjacent to the sidewalk, for 15 minutes, 12:15 to 12:30 PM (see **Figure 6-20**). The very small extent and brief duration of project-generated shadow would not cause a significant adverse impact to this resource.

No incremental shadow would fall on this resource on any other analysis day.

#### *CAPTAIN JACOB JOSEPH PLAYGROUND*

This is a paved and safety-surfaced open space with play equipment and some seating around the perimeter, located at the corner of Henry and Rutgers Streets.

On the December 21 analysis day, the playground is mostly or entirely in shadow throughout the morning from existing adjacent buildings. Incremental shadow from the proposed Site 6A building would remove the remaining small sliver of sunlight on the playground between 9:05 AM and 9:35 AM (see **Figure 6-9**). From 10:30 AM to 10:50 AM incremental shadow from the proposed Site 5 building (east tower) would fall on a small portion of the playground, eliminating the remaining small sliver of sunlight on the playground for 15 minutes of that 20 minute period (see **Figure 6-10**). Again from 11:00 AM to 11:30 AM, shadow from the proposed Site 5 building (west tower) would fall on a small area of the open space (see **Figure 6-11**), eliminating the remaining sunlight for a portion of that period. After noon, the playground would experience more sun under the No Action condition compared with the morning. Incremental shadow from the proposed Site 4 (4A/4B) building would pass across the

playground from 12:05 PM to 12:45 PM, but would only eliminate the remaining sunlight on this resource for a brief five minute portion of the 40 minute duration, at 12:30 PM (see **Figure 6-12**).

On this winter analysis day, usage of the playground would likely be lower than at other times of year. The space is almost entirely in shadow throughout the winter mornings, and the slivers of sunlight that would be eliminated with the proposed projects in the mid to late morning would likely hardly be noticeable and would not substantially alter the user experience. In the afternoon, larger areas on the northern half of the space would be in sun in the No Action condition, and when the shadow from the proposed Site 4 (4A/4B) building would pass across this area over a 40-minute period, some areas of sunlight would remain, except for a five minute period around 12:20 PM. The limited duration and extent of incremental shadow in the afternoon would not significantly impact this playground.

No incremental shadow would fall on this resource on any other analysis day.

### *STRAUS SQUARE*

Straus Square is actually a triangular space, formed by the intersection of East Broadway, Rutgers Street, and Canal Street. The space is entirely paved and contains a stone monument and three trees at the points of the triangle, surrounded by widened sidewalk. There is no seating. Aside from the three trees, this space is minimally sensitive to shadows, and functions more as a visual resource than a usable open space.

On the December 21 analysis day, incremental shadow from the proposed Site 5 building (east tower) would pass across this resource from 10:35 AM to 10:55 AM, eliminating all sunlight for about five minutes at around 10:45 AM. Incremental shadow from the proposed Site 5 building (west tower) then would pass across this resource from 11:05 AM to 11:25 AM. A half hour later, incremental shadow from the proposed Site 4 building would enter and pass across this resource from 11:55 AM to 12:30 PM, eliminating all the sunlight for about 10 minutes (12:05 to 12:15 PM).

Given the limited sensitivity of this resource to shadows due to the lack of active or passive uses as well as the lack of vegetation, and given the transient nature of the incremental shadows that would quickly pass across and leave areas of sunlight at the open space during most of the affected period, the proposed projects would not result in any significant adverse shadow impacts to this resource on the winter analysis day.

No incremental shadow would fall on this resource on any other analysis day.

### *SEWARD PARK*

Seward Park is a three-acre park bounded by Canal, Hester, Essex, and Jefferson Streets. It was renovated in 1999 and contains a central large oval with a spray shower and a marble mosaic map of the surrounding neighborhood, playgrounds, trees, plantings, and benches. The northern half of the park contains paved ball courts. The entire park is densely covered in tree foliage.

Incremental shadow from the proposed Site 6A building would pass through the middle of the park from 9:45 AM to 11:00 AM; incremental shadow from the proposed Site 5 building would pass across the southern portion of the park between 10:40 AM and 12:00 PM; and incremental shadow from the proposed Site 4 (4A/4B) building would pass across the park between 12:00 PM to 1:20 PM (see **Figures 6-10 to 6-13**).



Despite the long duration of incremental shadow on this open space, the proposed buildings' shadows would tend to overlap with existing shadows from intervening buildings, and the remaining project-generated shadow that would reach among, between, and beyond existing shadows onto the park areas would be small for much of the total duration. At certain times, for example at 10:30 AM and at 12:30 PM to 1:00 PM, the incremental shadow would cover up to a quarter of the park area. However, during these times, large areas of the park would remain in sun.

Winter shadows move more quickly than in other seasons, especially slender shadows such as those from the proposed projects. Large areas of the park would remain in sun during the winter analysis day for users seeking sunlight. In winter, vegetation is not sensitive to shadows, and the usage of the park would likely be lower than in other seasons. Given all these factors, the incremental shadow from the proposed projects would not significantly affect the user experience of the park on the winter analysis day.

No incremental shadow would fall on this resource on any other analysis day.

#### *SEWARD HIGH SCHOOL FIELD*

This entirely hard-surface open space just north and adjacent to Seward Park is for active recreation: it contains track, tennis, basketball, and handball facilities. Although this facility is for a public school, it is open to the community every day, according to a posted sign.

On the December 21 analysis day, incremental shadow from the proposed Site 4 (4A/4B) building would pass across the open space between 12:15 PM and 12:50 PM; however, sunlit portions would remain during this brief period, and thus the new shadow would not significantly affect the use of this open space.

No incremental shadow would fall on this resource on any other analysis day.

#### *LITTLE FLOWER PLAYGROUND*

This playground, jointly owned by NYC Parks and NYCHA, is located on the south side of Madison Street at Jefferson Street, and contains play equipment, spray showers, seating areas, handball and basketball courts, and plantings.

On the December 21 analysis day, incremental shadow from the proposed Site 6A building would pass across the playground from 8:51 AM to 11:10 AM, adding only very small areas of new shadow for most of this two hour nineteen minute duration (see **Figures 6-9 to 6-11**). For brief intervals the extent of new shadow would be larger as it falls between existing shadows, for example at 10:30 AM, but sunlit areas would still remain, particularly on the west side of the park. Beginning at 11:25 AM, the proposed Site 5 building would cast incremental shadow on the playground, mostly very small areas but occasionally larger ones and lasting through mid-day (exiting at 1:35 PM) and then returning from 2:00 PM to 2:20 PM in the southeast section of the park, eliminating most of the remaining sunlit area during that time (see **Figures 6-11 to 6-13**). At the northwestern area of the park, shadow from the proposed Site 4 building would enter at 2:05 PM and move toward the center of the park until 2:45 PM, generally covering small areas but removing much of the remaining sun (see **Figure 6-14**).

In summary, areas of incremental shadow would move across the playground intermittently through much of the winter analysis day, adding only small areas of shadow more often than not but occasionally falling across larger areas of the space. Given that usage levels on this winter

analysis day would likely be lower than at other times of year, and given that there would always be some sunlit areas throughout the day, the incremental shadow from the proposed projects would not significantly affect the use of this resource in winter.

On the March 21/September 21 analysis day, incremental shadow from the proposed Site 6A building would enter the southwestern corner of the playground at 9:35 AM and move across the southern half of the park for about two hours until exiting at 11:30 AM, covering at its maximum extent at about 10:30 AM approximately one-third of the park area, but leaving sunlit areas in other parts of the park during this time (see **Figures 6-18 to 6-19**). Incremental shadow from the proposed Site 5 building would similarly pass across the southern part of the park from 11:35 AM to 1:05 PM, leaving large sunlit areas elsewhere in the park (see **Figures 6-20 to 6-21**). Incremental shadow from the proposed Site 4 building would pass across the park from 1:30 PM to 2:55 PM, shading a larger extent (up to a maximum of approximately 40 percent of the park area at around 2:00 PM) but still leaving sunlit areas (see **Figures 6-21 to 6-22**).

Despite the long, nearly five hour duration of incremental shadow passing across the park (approximately 9:30 AM–1:00 PM and 1:30 PM–3:00 PM), the extent of the project generated shadow would be mostly limited to the southern areas of the park and would be somewhat narrow in the east to west dimension due to the slenderness of the proposed towers. Large areas of the playground would remain sunlit during the time when incremental shadow would occur. Consequently, the proposed projects would not cause a significant adverse shadow impact to this playground on this analysis day.

On the May 6/August 6 analysis day, the proposed Site 4 (4A/4B) building would cast incremental shadow on the southwest corner of the playground for approximately five minutes, from 1:15 PM to 1:20 PM. This minimal new shadow would not significantly affect the playground.

No incremental shadow would fall on this resource on the June 21 analysis day.

### *CHERRY CLINTON PLAYGROUND*

This park, renovated in 1993, provides opportunities for active recreation with handball and basketball courts and exercise equipment. Fourteen cherry trees at this site commemorate the history of the neighborhood and the namesake of the playground. Members of the community, including the Two Bridges Tenants Association, have helped to care for the park since its renovation.

On the December 21 analysis day, shadow from the proposed Site 6A building would enter the northwest corner of the open space at 12:40 PM (see **Figure 6-13**). By about 2:00 PM, approximately half of the open space's available sunlight would be in shadow from the proposed Site 6A building, mostly in the seating areas at the open space's west side (see **Figure 6-14**). From 2:00 PM until the end of the analysis day at 2:53 PM, much of the open space would be shaded by the proposed Site 6A building, the southeast corner would be in existing shadows, and only a narrow band of sunlight would remain (see **Figures 6-14 and 6-15**).

The proposed projects would add over two hours of new shadow to the playground. The area of incremental shadow would be small at first, but would spread to cover a larger area of the playground during the final approximately 45 minutes of the analysis day. The shadow from the proposed projects would remove much, though not all, of the remaining sunlight on this resource. Given the substantial extent and duration of new shadow, the incremental shadow would significantly affect the use of this resource space on the winter analysis day. Shadows

would not impact the health of the trees in the playground on this analysis day, which occurs outside the growing season.

On the March 21/September 21 analysis day, incremental shadow from the proposed Site 6A building would enter the northwest corner of the open space at about 12:40 PM. By 1:30 PM, the incremental shadow would cover about half of the open space, and eliminate most of the remaining sunlight (see **Figure 6-23**). The incremental shadow would continue to move east and clockwise, and from 2:00 PM to 2:30 PM, it would cover nearly the entire playground, eliminating all sun for about five to ten minutes during that time (see **Figure 6-24**). At 2:45 PM, additional incremental shadow from the proposed Site 5 building would enter the northwest corner of the playground. At 3:00 PM incremental shadow from the proposed Site 6A building would still cover much of the playground, while incremental shadow from the proposed Site 5 building would cover the northwest section, leaving only a narrow band of sun in the middle (see **Figure 6-25**). From 3:15 PM to 3:50 PM, incremental shadow primarily from the proposed Site 5 building would eliminate the otherwise large areas of remaining sunlight on this resource (see **Figure 6-25**). Incremental shadow from the proposed Site 5 and Site 4 (4A/4B) buildings would continue to fall on the playground until the end of the analysis day at 4:29 PM, at times removing the remaining areas of sunlight (see **Figure 6-26**).

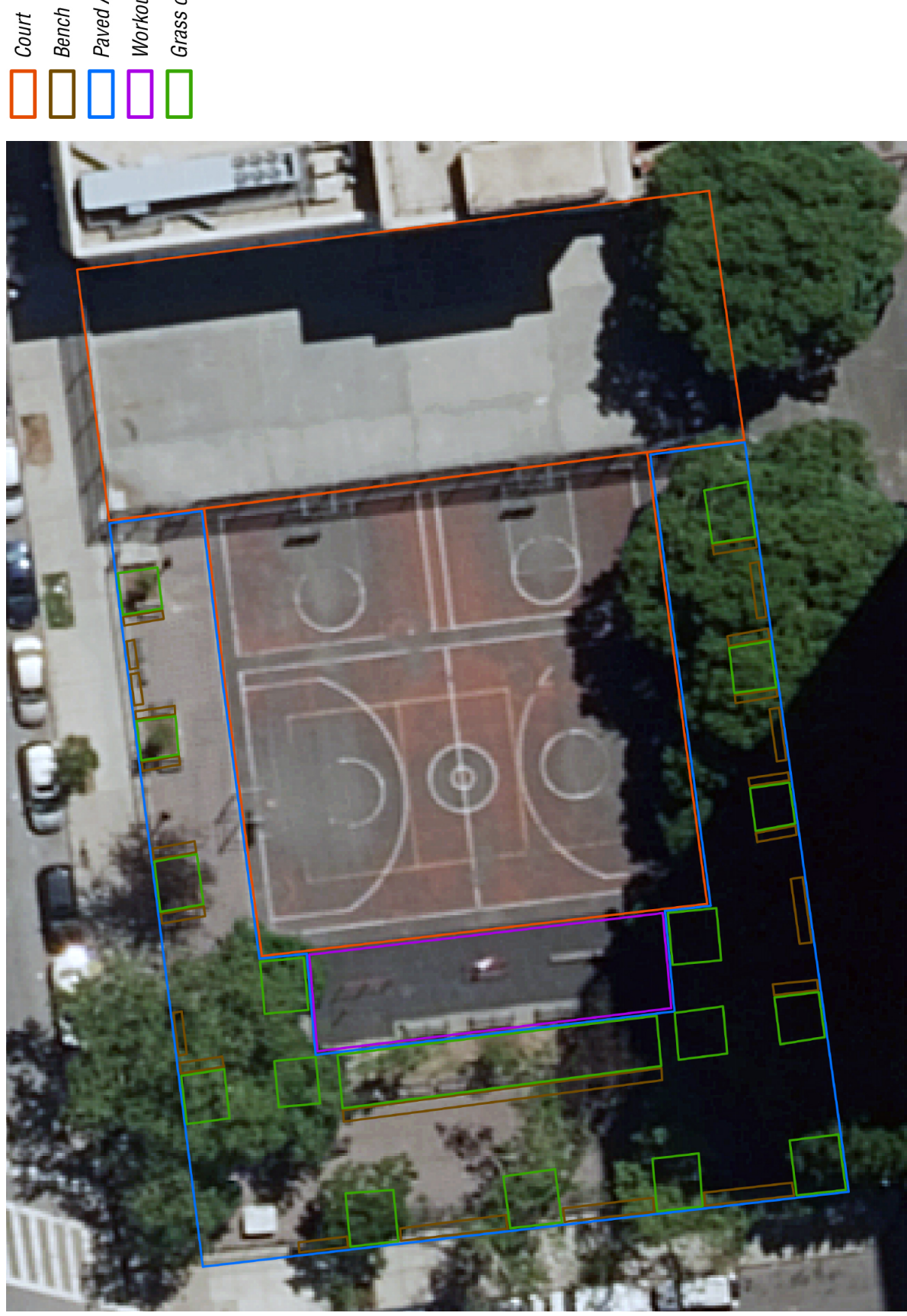
The long afternoon duration and large extent of incremental shadow would significantly affect the user experience of this playground on this analysis day.

Furthermore, with the incremental shadow, nearly the entire playground area would receive less than four hours of direct sunlight over the course of the day, whereas without the proposed projects, these areas would receive more than four hours (albeit not much more in some portions—durations would range between four and seven hours). The *CEQR Technical Manual* advises that a significant adverse impact would generally occur when vegetation would receive less than the four to six hour minimum requirement of direct sunlight as a result of project-generated shadow. Therefore, the health of the trees within the playground property would likely be significantly impacted by the addition of the shadow generated by the proposed projects.

**Figure 6-41** shows the site plan of Cherry Clinton Playground, and Figures 4-42 and 4-43 show photos of its features. **Figure 6-47** shows a larger scale diagram of the playground and the incremental shadows that would fall on it during the afternoon of the March 21/~~August~~ September 21 analysis day.

On the May 6/August 6 analysis day, incremental shadow from the proposed Site 6A building would enter the northwest corner of the open space at about 12:20 PM. By 1:00 PM, the incremental shadow would cover more than half of the open space, and eliminate most of the remaining sunlight (see **Figure 6-32**). From 1:15 PM to 1:30 PM, the incremental shadow would cover nearly the entire playground (see **Figure 6-33**). The incremental shadow would continue to move east and clockwise, and at 2:00 PM, it would cover the southeastern half of the playground, leaving most of the other half in sun (see **Figure 6-33**). Also at 2:00 PM, additional incremental shadow from the proposed Site 5 building would enter the western side of the playground. From 2:00 PM to 2:30 PM, incremental shadow primarily from the proposed Site 5 building would continue to shade large areas of the playground, though some sunlit areas on the north side would remain (see **Figures 6-33 and 6-34**). At 2:45 PM, a little less than half of the space would be in incremental shadow from the proposed buildings, with the rest in sun. Incremental shadow from the proposed Site 5 building would exit completely at 3:05 PM. Incremental shadow from the proposed Site 4 (4A/4B) building would pass north to south across





Site Plan for Cherry Clinton Playground  
**Figure 6-41**





Paved seating area at west side of playground



Basketball courts and exercise equipment at center of playground



Seating area at north side of playground; handball courts at east side of playground in background





Site Plan for Lillian D. Wald Playground  
**Figure 6-44**





Exercise equipment at southwest corner of playground



Volleyball court at north side of playground

Photographs of Lillian D. Wald Playground

**Figure 6-45**



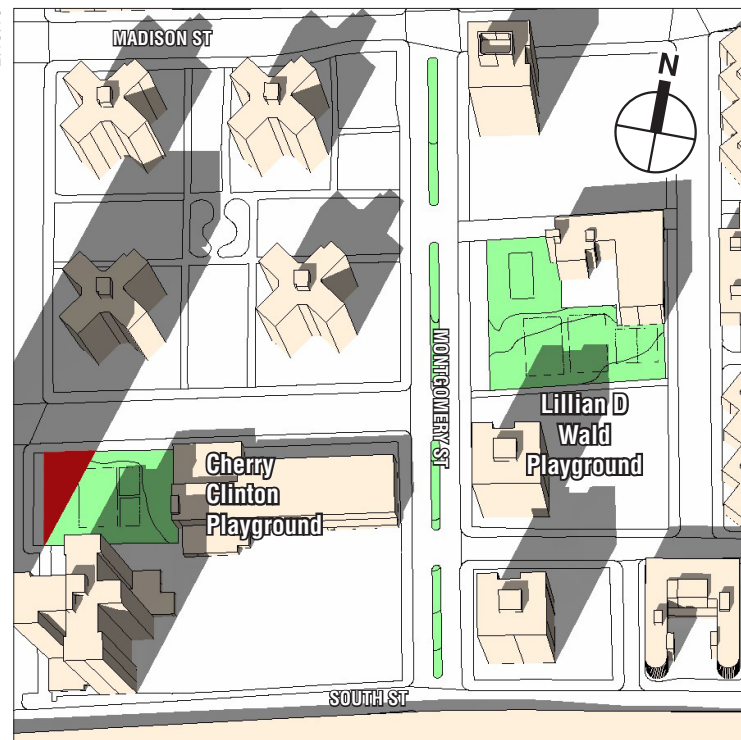


Basketball courts at south side of playground

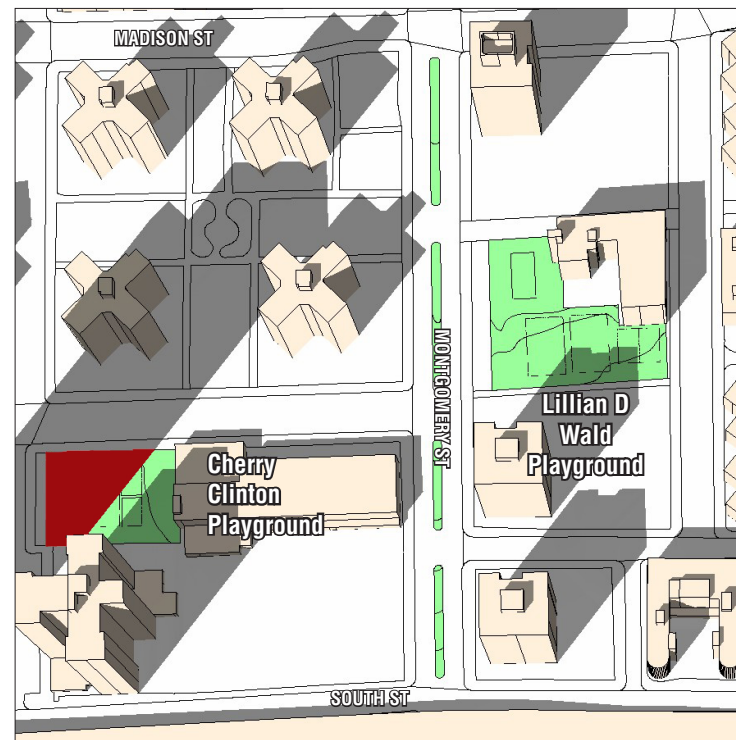


Handball courts at southeast side of playground





1:00 PM



1:30 PM



2:00 PM



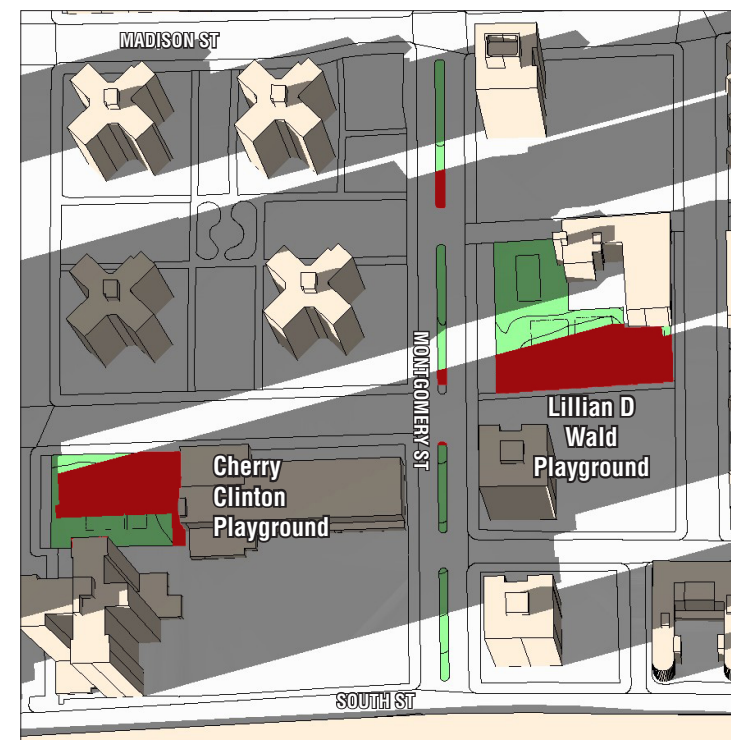
2:30 PM



3:00 PM



3:30 PM



4:00 PM

■ Publicly Accessible Open Space  
■ Incremental Shadow

NOTE: Please refer to Figures 6-41 and 6-44 for playground detail

the playground from 3:20 PM to 4:15 PM, covering nearly the entire space for five to ten minutes around 3:45 PM (see **Figure 6-35**).

The combination of a long afternoon duration and large extent of incremental shadow would significantly affect the user experience of this playground on this analysis day.

The trees within the playground boundary would continue to receive the four to six hours of sunlight identified by the *CEQR Technical Manual* as the minimum requirement for healthy vegetation.

**Figure 6-48** shows a larger scale diagram of the playground and the incremental shadows that would fall on it during the afternoon of the May 6/August 6 analysis day.

On the June 21 analysis day, incremental shadow from the proposed Site 6A building would enter the west side of the playground at 12:20 PM and would move across the space over the course of the next two hours, exiting at 2:20 PM (see **Figures 6-39 and 6-40**). From 1:00 PM to 1:20 PM, the incremental shadow would cover most of the playground, but some sunlit areas would still remain. Before and after this 20-minute period, larger areas of sun would remain in the playground. Incremental shadow from the proposed Site 4 (4A/4B) building would pass across the southwest portion of the space from 3:20 PM to 3:40 PM, with most of the playground remaining in sun.

The incremental shadow on this analysis day would be limited in extent for most of its duration, and areas of the playground would remain in sun throughout the afternoon. Therefore, the proposed projects would not cause a significant adverse shadow impact on this analysis day.

### *GREENSTREETS TRIANGLE ON MONTGOMERY STREET AND EAST BROADWAY*

This large Greenstreets triangle at the intersection of Montgomery Street, East Broadway, and Samuel Dickstein Plaza contains mature trees and plantings and a limited seating area in the center.

On the December 21 analysis day, incremental shadow from the proposed Site 6A building would pass across this resource between 1:10 PM and 1:40 PM, shading the entire resource for approximately 10 minutes during that time (see **Figure 6-16**). From 2:05 PM until 2:53 PM, the end of the analysis day, incremental shadow from the proposed Site 5 building would fall on this resource. From 2:20 PM onward, incremental shadow from the proposed Site 5 building would eliminate the remaining sunlight, although the small seating area would already be in existing shadow at this time and for the rest of the analysis day (see **Figure 6-17**).

The intermittent incremental shadow would not substantially alter the use of the space in winter, when the small seating area would be expected to see only light use and would be in existing shadows after 2:20 PM, when incremental shadow would fall further south on the triangle. Vegetation would not be impacted by project-generated shadows on the winter analysis day.

No incremental shadow would fall on this resource on any other analysis day.

### *MARTIN LUTHER KING JUNIOR COMMUNITY PARK*

This community space, located on the east side of Samuel Dickstein Plaza between East Broadway and Henry Street, contains seating, plantings, a gazebo, and some sculptures/play equipment. It is maintained by the Henry Street Settlement.





12:30 PM



1:00 PM



1:30 PM



2:00 PM



2:30 PM



3:00 PM



3:30 PM



4:00 PM

Publicly Accessible Open Space  
 Incremental Shadow

NOTE: Please refer to Figure 6-41 for playground detail



On the December 21 analysis day, incremental shadow from the proposed Site 6A building would pass across the space from 1:35 PM to 2:05 PM (see **Figure 6-16**), eliminating all sunlight for 15 minutes from 1:40 PM to 1:55 PM. Incremental shadow from the proposed Site 5 building would pass across the space from 2:25 PM to the end of the analysis day at 2:53 PM, eliminating all sunlight for the final 18 minutes of the analysis day (see **Figure 6-17**).

Incremental shadow would fall for a total of an hour on this small community park, and for 33 minutes, the incremental shadow would fall across the entire space, eliminating all the sunlight for that duration. However, usage during the winter is typically low, and therefore the relatively brief and intermittent shadow would not significantly affect the use of this space on this analysis day.

No incremental shadow would fall on this resource on any other analysis day.

#### *GREENSTREETS MEDIANS ON GRAND STREET*

There are three small planted Greenstreets medians in the Grand Street roadbed, one located at Clinton Street, and two adjacent to Ahearn Park at Willett Street. They each contain a tree and flowerbed, and no seating or other features. As such, they are essentially a visual resource rather than usable open space.

On the December 21 analysis day, the medians at Willett Street would receive incremental shadow from 2:00 PM until the end of the analysis day at 2:53 PM, first from the proposed Site 6A building and then from the proposed Site 5 building (see **Figures 6-16 and 6-17**). The new shadow from the proposed projects would not impact the vegetation in the winter, and would not otherwise affect the public's use or enjoyment of the medians.

No incremental shadow would fall on this resource on any other analysis day.

#### *SOL LAIN PLAYGROUND*

This playground, located on East Broadway, Gouverneur, and Henry Streets, is jointly operated by Parks and the DOE, and contains a basketball court, climbing area, slides, swings, and volleyball and baseball playing surfaces.

On December 21, incremental shadow primarily from the proposed Site 6A building and also from the proposed Site 5 building would pass across the space from 2:15 PM to 2:53 PM (see **Figure 6-17**). It would eliminate all, or nearly all, of the remaining sunlight from 2:20 PM to 2:45 PM. However, only small bands and slivers of sunlight would be eliminated, as the playground would be mostly in existing shadows at this time of the winter analysis day.

These small intermittent areas of new shadow would not significantly impact this resource on this analysis day.

No incremental shadow would fall on this resource on any other analysis day.

#### *ABRONS ART CENTER*

The entrance to the Abrons Art Center facility on Grand and Willett Street is a publicly accessible plaza featuring wide steps configured in a semicircle.

On the December 21 analysis day, incremental shadow from the proposed Site 6A building would pass across the plaza from 1:55 PM to 2:10 PM (see **Figure 6-16**). Twenty minutes later, additional incremental shadow from the proposed Site 5 building would pass across the plaza

## Two Bridges LSRD

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from 2:30 PM to 2:53 PM (see **Figure 6-17**). Given the limited duration of new shadow, the generally very small portions of the plaza that would be affected, and the light usage expected on a winter afternoon in a concrete plaza, this total of 38 minutes of incremental shadow would not significantly impact this resource on the winter analysis day.

No incremental shadow would fall on this resource on any other analysis day.

### *AHEARN PARK*

This small triangular park located at the intersection of East Broadway, Grand, and Willett Streets contains an open, paved central area with benches lining the perimeter, and a planted area at the eastern point of the triangle.

On the December 21 analysis day, incremental shadow from the proposed Site 6A building would move across the space from 2:00 PM to 2:30 PM (see **Figures 6-16 and 6-17**), eliminating all sunlight for five minutes from 2:15 PM to 2:20 PM. Additional incremental shadow, from the proposed Site 5 building, would fall on the space beginning at 2:45 PM and eliminating the remaining sunlight for the final approximately five minutes of the analysis day (see **Figure 6-17**).

The intermittent and limited duration of incremental shadow, generally affecting a small area of this resource and occurring late on the winter analysis day when usage is typically light, would not significantly impact this resource.

No incremental shadow would fall on this resource on any other analysis day.

### *MONTGOMERY STREET GREENSTREET MEDIANS*

There are four blocks of Greenstreets traffic medians in the center of the Montgomery Street roadbed between South Street and Madison Street. These contain plantings but no benches or other usable features. As such, they are essentially a visual resource rather than usable open space.

On the December 21 analysis day, incremental shadow from the proposed Site 6A building would fall on a small portion of the northernmost median from 2:00 PM to the end of the analysis day at 2:53 PM (see **Figures 6-16 and 6-17**). The shadow would not impact the vegetation in the winter analysis period.

On the March 21/September 21 analysis day, incremental shadow from all the proposed buildings would fall on limited portions of the medians from 2:00 PM to the end of the analysis day at 4:29 PM (see **Figures 6-24, 6-25, and 6-26**). While the total duration of the shadows would be more than two hours, the extent of incremental shadow would be small and would never eliminate all sunlight on the medians, collectively. Therefore, the incremental shadow would not cause significant adverse shadow impacts to the medians on this analysis day.

On the May 6/August 6 analysis day, incremental shadow from all the proposed buildings would fall on limited portions of the southernmost two medians from 2:25 PM to 4:20 PM (see **Figures 6-34 and 6-35**). While the total duration of the shadows would be nearly two hours, the extent of incremental shadow would be small and would never eliminate all sunlight on the medians, collectively. Therefore, the incremental shadow would not cause significant adverse shadow impacts to the medians on this analysis day.

On the June 21 analysis day, incremental shadow from the proposed Site 6A building would fall on limited portions of the southernmost median from 2:45 PM to 4:15 PM. The extent of incremental shadow would be small and would never eliminate all sunlight on the medians, collectively. Given its limited extent and duration, the incremental shadow would not cause significant adverse shadow impacts to the medians on this analysis day.

#### *BIALYSTOKER SYNAGOGUE*

The Bialystoker Synagogue, located at 7 Willett Street, was built in 1826 as the Willet Street Methodist Episcopal Church and was designed in the late Federal style. It is a New York City Landmark and is listed on the State and National Registers of Historic Places. The building is faced in Manhattan schist from a quarry on nearby Pitt Street. The exterior is marked by three windows over three doors framed with round arches, a low flight of brownstone steps, a low-pitched pedimented roof with a lunette stained-glass window, and a wooden cornice. The building is listed on the State and National Registers (S/NR) of Historic Places. The sunlight-sensitive features of this architectural resource are its stained glass windows.

On the December 21 analysis day, in the late afternoon near the end of the analysis period, the synagogue would be in existing shadow from the Abrams Art Center building to its south, except for its roof and the small semicircular (lunette) window at the top of the west façade. Incremental shadow from the proposed Site 5 building would move across the synagogue and fall on that window between 2:25 PM and 2:35 PM, and between 2:45 PM and 2:53 PM (see **Figure 6-17**).

Although the incremental shadow from the proposed projects would eliminate the remaining direct sunlight on this window for a total of approximately 18 minutes—in two periods, separated by 10 minutes when sun would shine on the window—the affected window is very small and the duration is only 18 minutes and is intermittent. Therefore, the incremental shadow from the proposed projects would not substantially affect the architectural significance or users' enjoyment of this resource.

No incremental shadow would fall on this resource on any other analysis day.

#### *SAINT MARY'S CHURCH*

Completed in 1833 for a parish founded in 1826, the Church of St. Mary at 438 Grand Street is one of the City's oldest Catholic churches. It has been determined eligible for listing on the State and National Registers of Historic Places. The church originally had a Greek Revival façade; however, in 1864, Patrick C. Keely, a prolific architect of ecclesiastical structures, gave the building the current Romanesque façade. The current brick and brownstone façade is arranged with a peaked-roof nave flanked by two corner towers with tall conical roofs. The entrances and windows have wood arches and tracery. The sunlight-sensitive features of this architectural resource are its stained glass windows.

On the December 21 analysis day, incremental shadow the proposed Site 4 (4A/4B) building would fall on the front and west façades of the church for 10 minutes, from 2:35 PM to 2:45 PM. This limited duration of new shadow would not substantially affect the architectural significance or users' enjoyment of this resource on this analysis day.

No incremental shadow would fall on this resource on any other analysis day.



### *LUTHER GULICK PLAYGROUND*

This park, located on the south side of Delancey Street between Willett and Columbia Streets, contains play equipment, a sprinkler system, trees, benches, table tennis, and basketball courts.

On the December 21 analysis day, incremental shadow from the proposed Site 5 and 6A buildings would fall on portions of the park from 2:15 PM to 2:53 PM (see **Figure 6-17**). At this time, near the end of the winter analysis day, most of the park is in existing shadow. The incremental shadow would eliminate remaining shadow for about five minutes during this time; otherwise, some areas of sunlight would remain.

The limited extent and duration of the incremental shadow from the proposed projects would not cause a significant adverse impact to this resource on the winter analysis day.

No incremental shadow would fall on this resource on any other analysis day.

### *HAMILTON FISH PARK*

This large park located at East Houston and Pitt Streets contains a swimming pool, playground and ball courts as well as landscaping and seating.

Incremental shadow would reach a very small portion of this park for the last three minutes of the December 21 analysis day and would not reach on any other analysis day. This minimal new shadow would not impact Hamilton Fish Park.

### *SAINT JAMES TRIANGLE*

This park, located at the intersection of St. James Place, Oliver, Madison, and James Streets contains seating and plantings.

On the March 21/September 21 analysis day, this small park would be in shadow in the morning when project-generated shadow could otherwise fall on it. Therefore, no incremental shadow would fall on this resource on this or any other analysis day.

### *PLAYGROUND ONE*

Incremental shadow from the proposed Site 4 (4A/4B) and Site 5 buildings would fall on this playground for the first nine minutes of the March 21/September 21 analysis day. This minimal duration of new shadow would not cause an adverse impact to this playground. No incremental shadow would fall on this resource on any other analysis day.

### *COLEMAN PLAYGROUND*

Coleman Square Playground is bounded by Cherry, Pike, and Monroe Streets. Part of Coleman Square Playground stands under the Manhattan Bridge. Coleman Square Playground includes play equipment, spray showers, safety surfacing, and a grassy ballfield, all of which are located in the portion west of the Manhattan Bridge. Under and east of the bridge, this resource includes a skate park.

On the March 21/September 21 analysis day, incremental shadow from the proposed Site 4 (4A/4B) and Site 5 buildings would fall on the playground—primarily the skate park area in the northeast portion of the resource—for the first 39 minutes of the analysis day, 7:36 AM to 8:15 AM. The new shadow would overlap with existing shadows, so the area of incremental shadow would be limited in size as well as duration. It would not eliminate the remaining sunlight from

the playground. Therefore, the incremental shadow from the proposed projects would not significantly impact the playground on this analysis day.

On the May 6/August 6 analysis day, incremental shadow from the proposed Site 4 (4A/4B) building would pass across the playground in a clockwise (southwest to northeast) direction between 6:55 AM and 9:30 AM (see **Figures 6-27, 6-28, and 6-29**). It would be small at first, limited to the southwest section, with large areas of the park already shaded by the bridge and intervening buildings. The incremental shadow would move generally south to north across the western third of the park, from 7:00 AM to 8:15 AM, leaving some sunlit areas in the western side, while the eastern two thirds would be mostly in existing shadow. From 8:30 AM to 9:30 AM, the incremental shadow would be limited to the northeastern portion of the playground, mainly covering a large portion of the skate park. Despite the longer duration and larger coverage of the incremental shadow from the proposed Site 4 (4A/4B) building, areas of the park would remain in sun throughout the affected period, and the new shadow would be slender and move fairly quickly as is typical of early morning shadows. The incremental shadow from the proposed projects would therefore not cause a significant adverse impact to this park on this analysis day.

On the June 21 analysis day, the pattern of movement of the incremental shadow from the proposed Site 4 building on the playground would be similar to that of May 6/August 6 (see **Figures 6-36, 6-37, and 6-38**). Beginning at 7:20 AM, the incremental shadow would move onto the southwestern corner of the park. It would move gradually northward and clockwise across the western half of the playground. By 8:30 AM, it would fall across the center of the western half of the park, and would begin moving more east than north. From 9:15 AM to 9:45 AM, the incremental shadow would fall only on the skate park. Similar to the May 6/August 6 analysis day, areas of the park would remain in sun throughout the affected period, and the new shadow would move across different portions of the park space. The incremental shadow from the proposed projects would therefore not cause a significant adverse impact to this park on this analysis day.

No incremental shadow would fall on this resource on the December 21 analysis day.

#### *SOPHIE IRENE LOEB PLAYGROUND*

This small playground would be in existing shadow from the Manhattan Bridge when project-generated shadow could otherwise fall on it on the March 21/September 21 analysis day. No shadow impact would therefore occur on this or any other analysis day.

#### *LILLIAN D. WALD PLAYGROUND*

Located in the center of the block bounded by Cherry, Gouverneur, Monroe, and Montgomery Streets, this playground contains handball, volleyball, and basketball courts, exercise equipment, and benches, and is surrounded by trees, shrubs, and spring bulbs.

On the March 21/September 21 analysis day, incremental shadow from the proposed Site 6A building would enter the northern section of the playground at 2:15 PM, would move clockwise and southeastward (see **Figure 6-24** showing 2:30 PM), and 30 minutes later at 2:50 PM would be shading the northern half of the resource, with much of the other half still in sun. At 3:00 PM, incremental shadow from the proposed Site 6A building would fall across more than half the playground, and by 3:15 PM virtually the entire playground would be in incremental shadow, mostly from the proposed Site 6A building but also from the proposed Site 5 building, which

would shade the northern section of this resource (see **Figure 6-25**). At 3:30 PM, nearly the entire playground would be in incremental shadow from the proposed Site 5 and Site 6A buildings. At 3:45 PM, more than half of the playground would be in incremental shadow from the proposed Site 5 building, and most of the rest would be in shadow from existing buildings. The proposed Site 5 building would continue to cast smaller areas of incremental shadow in the southern part of the playground until 4:10 PM (see **Figure 6-26**).

On this analysis day, the proposed projects would cast large areas of new shadow on the playground for an hour, including a 15-minute period when incremental shadow would eliminate virtually all the sun. Smaller incremental shadows would fall on the playground for an additional 50 minutes. Given that on March 21 and September 21, weather can be cool and sunlit areas can be important to users, and given the large extents and long duration of the incremental shadow, the incremental shadow from the proposed projects would significantly affect the user experience in this park on this analysis day.

**Figure 6-44** shows the site plan of Lillian D. Wald Playground, and **Figures 6-45 and 6-46** show photos of its features. **Figure 6-47** shows a larger scale diagram of the playground and the incremental shadows that would fall on it during the afternoon of the March 21/~~August~~ September 21 analysis day.

No incremental shadow from the proposed projects would occur on this resource on any other analysis day.

### *VLADECK PARK*

This linear park is located at the center of the Vladeck Houses complex, bounded by Madison, Water, Jackson, and Gouverneur Streets. It contains benches along the outer edges of the mall and a playground in the center.

On the March 21/September 21 analysis day, incremental shadow from all the proposed buildings would fall on small portions of the park from 3:50 PM to 4:29 PM (see **Figure 6-26**). Other areas of the park would remain in sun during the affected period. The small extent and limited duration of new shadow would not cause a significant adverse impact to this resource on this analysis day.

No incremental shadow would occur on this resource on any other analysis day.

### *CORLEARS HOOK PARK*

This spacious park, located at the intersection of Jackson and Cherry Streets along the Franklin Delano Roosevelt (FDR) Drive, contains winding paths, ball fields, tennis courts, skateboarding areas, and a performance space.

On the March 21/September 21 analysis day, incremental shadow from the proposed Site 6A building would fall for only four minutes at the end of the analysis day, 4:25 PM to 4:29 PM (see **Figure 6-27**). The size of the incremental shadow would be small and would not eliminate remaining sun on the park. Given the minimal duration and small extent of project-generated shadow, the proposed projects would not cause a significant adverse impact to this resource on this analysis day.

No incremental shadow would occur on this resource on any other analysis day.



### *CATHERINE SLIP MALLS*

Located on Catherine Slip between Cherry and South Streets, this parkland contains landscaping, benches and plantings.

On the May 6/August 6 and June 21 analysis days, these malls would be in existing shadow when project-generated shadow could otherwise fall on them. No shadow impact would therefore occur on these or any other analysis day.

### *TANAHEY PLAYGROUND*

Bounded by Cherry, Water, Market, and Catherine Streets, this playground maintains three distinct sections. The side near Market Slip is a sitting area with benches, game tables, and picnic tables. The other end of the park features play equipment. Three basketball courts and the Reverend Joseph Moffo Rink occupy the middle of the playground.

Early on the June 21 analysis day, a long and very narrow strip of incremental shadow from the proposed Site 4 (4A/4B) building would fall on the playground adjacent to existing shadow from 6:20 AM to 6:55 AM. Given its limited extent and duration, this incremental shadow would not significantly impact the playground on this analysis day.

On the May 6/August 6 analysis day, the playground would be in existing shadow when project-generated shadow could otherwise fall there. No shadow impact would therefore occur on this analysis day.

No incremental shadow would occur on this resource on any other analysis day.

### *ALFRED E. SMITH PLAYGROUND*

Located at the junction of Catherine Slip, Madison, and South Streets, this park contains a synthetic turf field, ball courts, a water area, play equipment with safety surface, and a comfort station

On the May 6/August 6 analysis day, incremental shadow from the proposed Site 4 (4A/4B) building would move across portions of this large park over the course of the first hour of the analysis day, from approximately 6:35 AM to 7:25 AM. The incremental shadow would fall on different small areas intermittently and would not eliminate all the sunlit areas. The limited extent and duration of new shadow would not cause a significant adverse impact to this resource.

On the June 21 analysis day, incremental shadow would fall on the playground for only five minutes, from approximately 7:00 AM to 7:05 AM. Given its minimal duration, this incremental shadow would not impact the playground on this analysis day.

No incremental shadow would occur on this resource on any other analysis day.

### *EAST RIVER ESPLANADE/EAST RIVER PARK*

On the May 6/August 6 analysis day, from 4:35 PM to 5:05 PM, incremental shadow from all of the proposed buildings would pass across a section of the East River Esplanade/East River Bikeway, where it connects to East River Park, adjacent to Pier 42. The new shadow would fall on portions of the bike path and adjacent landscaping for approximately one half-hour, but would not reach East River Park except for a small area for a brief five minutes. The limited extent and duration of new shadow would not cause a significant adverse impact to the esplanade or park.

No incremental shadow would occur on this resource on any other analysis day.

### *EAST RIVER*

On the May 6/August 6 analysis day, incremental shadow from all of the proposed buildings would fall on the surface of the East River southeast of the project sites at 4:55 PM and remain for the final 18 minutes of the analysis day (until 5:18 PM).

On the June 21 analysis day, incremental shadow from the proposed Site 5 and 6A buildings would fall on the river surface southwest of the project sites at the start of the analysis day at 5:57 AM and move clockwise and north until it exited at 6:20 AM. Approaching the end of the analysis day, incremental shadow from all of the proposed buildings would move onto the river surface southeast of the project sites at 5:00 PM and move over the river in a southeastward direction until the end of the analysis day at 6:01 PM.

No incremental shadow would occur on this resource on any other analysis day.

The current flows swiftly in the East River and would move phytoplankton and other natural elements quickly through the shaded areas. Therefore, project-generated shadows would not be expected to affect primary productivity. The areas that receive the longest durations of new shadow would continue to receive many hours of direct sunlight, because there are no intervening structures to the south. Therefore, incremental shadows from the proposed projects would not be likely to significantly affect aquatic resources (plankton or fish) in these areas of the East River. Consequently, project-generated shadows would not cause significant adverse impacts on the East River.

### *GREENSTREETS TRIANGLE AT ROBERT F. WAGNER SR. PLACE AND SOUTH STREET*

This is a large triangular traffic median with vegetation at Robert F. Wagner Sr. Place and South Street.

On the June 21 analysis day, this Greenstreets Triangle would be in existing shadow when project-generated shadow could otherwise fall there. No shadow impact would therefore occur on this or any other analysis day.

## **E. CONCLUSIONS**

Incremental shadow from the proposed projects would be substantial enough in extent and/or duration to significantly affect the use or vegetation of two resources:

- Cherry Clinton Playground in the on the December 21 analysis day (use, but not vegetation), March 21/September 21 analysis day (use and vegetation) and on the May 6/August 6 analysis day (use only); and
- Lillian D. Wald Playground on the March 21/September 21 analysis day (use only).

The Cherry Clinton Playground is approximately 0.48 acres in size, of which 0.41 acres are active space and 0.07 acres are passive open space. As describe above, the open space has paved sitting areas along its west and north sides, and handball and basketball courts and exercise equipment occupy the remainder of the area. Fourteen cherry trees at this site commemorate the history of the neighborhood and the namesake of the playground.

Aside from the cherry trees, there is little vegetation on the site, with the exception of some grass around the line of trees separating the sitting area on the west from the handball and basketball

courts on the east (see **Figures 6-41 through 6-43**). The remainder of the sitting and court areas is paved.

**Figures 6-47 and 6-48** further illustrate the shadows on this open space on the two analysis days for which an impact has been identified.

The Lillian D. Wald Playground is located at the southeast corner of Montgomery and Monroe Streets, adjacent to the University Neighborhood High School. It is approximately 0.68 acres in size, all of which is considered active open space. As described above, this playground contains volleyball courts on its north side, and handball and basketball courts and exercise equipment on its south side. There are benches at the perimeter of both sides of the playground. The playground is bordered by planted areas on its west, south, and north sides; there is also a planting bed separating the volleyball court area from the remainder of the playground, which is at a lower elevation. The planted areas contain trees, shrubs, and spring bulbs (see **Figures 6-44 through 6-46**).

**Figure 6-47** further illustrates the shadows on this open space on the analysis day for which an impact has been identified.

~~Potential~~ Mitigation measures for these significant adverse impacts are described in Chapter 21, “Mitigation,” and include dedicated funding for enhanced maintenance at the Cherry Clinton Playground and the Lillian D. Wald Playground to mitigate the significant adverse impact to the users and the trees of the Cherry Clinton Playground, and the users of the Lillian D. Wald Playground. \*