

## A. INTRODUCTION

Under *City Environmental Quality Review (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. Sunlight-sensitive resources of concern include public open space, sunlight-dependent features of historic architectural resources, and natural resources that depend on sunlight. Since the proposed Lambert Houses project would include new buildings taller than 50 feet, and since there are sunlight-sensitive resources adjacent to the Development Site, a detailed shadow study was conducted

The shadow study concluded that new project-generated shadows would be cast on several nearby resources of concern. River Park, adjacent to Parcels 1, 3 and 5 of the Development Site, would receive approximately six hours of new shadows in the mid-day and afternoons of the fall, winter and early spring, and the use of the park during these times could consequently be significantly impacted. In the late spring and summer, new shadows on River Park would be more limited in duration and extent but would still be substantial in the final hour of the analysis day and would cause significant adverse impacts in those seasons.

The east façade windows of the Beck Memorial Presbyterian Church, adjacent to Parcel 3, would receive between two and a quarter and four and a half hours of incremental shadow in the mornings, depending on the season. At times, the new shadow would eliminate the remaining sunlight from the east windows of the church. Therefore, given the substantial extent and duration of incremental shadows, the proposed project could cause significant adverse shadow impacts to the windows, if they are uncovered by shutters and viewable from within a public space in the church interior. As described in detail below, the building is currently closed and no information is currently available regarding plans to re-open the church or make building repairs in the near future or by the 2029 build year for the proposed project.

Several other resources of concern would receive new project-generated shadow, but these shadows would not result in any significant adverse impacts.

## B. DEFINITIONS AND METHODOLOGY

This analysis has been prepared in accordance with the guidelines of the *CEQR Technical Manual*.

### DEFINITIONS

**Incremental shadow** is the additional, or new, shadow that a structure resulting from a proposed project would cast on a sunlight-sensitive resource.

**Sunlight-sensitive resources** are those resources 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* (e.g., parks, beaches, playgrounds, plazas, schoolyards, greenways, landscaped medians with seating). Planted areas within unused portions of roadbeds that are part of the Greenstreets program are also considered sunlight-sensitive resources.
- *Features of architectural resources that depend on sunlight for their enjoyment by the public.* Only the sunlight-sensitive features need be considered, as opposed to the entire resource. Such sunlight-sensitive features might include: design elements that depend on the contrast between light and dark (e.g., recessed balconies, arcades, deep window reveals); elaborate, highly carved ornamentation; stained glass windows; historic landscapes and scenic landmarks; and features for which the effect of direct sunlight is described as playing a significant role in the structure's importance as a historic landmark.
- *Natural resources* where the introduction of shadows could alter the resource's condition or microclimate. Such resources could include surface water bodies, wetlands, or designated resources such as coastal fish and wildlife habitats.

**Non-sunlight-sensitive resources** include, 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);
- *Project-generated open space* cannot experience a significant adverse shadow impact from the project, according to CEQR, because without the project the open space would not exist. However, a qualitative discussion of shadows on the project-generated publicly accessible open space should be included in the analysis.

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 accounts for existing shadows cast by intervening and surrounding buildings, and 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 proposed project and the surrounding street layout (see **Figure 6-1**). In coordination with the open space, historic resources and natural resources assessments presented in other chapters of this Environmental Impact Statement (EIS), potential sunlight-sensitive resources were identified and shown on the map, including planned open spaces anticipated to be fully developed by the 2029 analysis year.

### **TIER 1 SCREENING 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.

The proposed project comprises multiple buildings ranging in maximum height from eight stories, on the south side of Parcel 3 (on the north side of East 179th Street), to 18 stories on the north side of Parcel 3 (on the south side of East 180th Street). In order to ensure a conservative analysis, the maximum height of the tallest proposed building was used for the entire Development Site comprising the four parcels.

At a maximum height of 195 feet above curb level, including a 15-foot rooftop mechanical bulkhead, the proposed project could cast a shadow up to 839 feet in length ( $195 \times 4.3$ ). Using this length as the radius, a perimeter was drawn around the entire Development Site (see **Figure 6-1**). Since a number of sun-sensitive resources lay within the perimeter or longest shadow study area, the next tier of screening assessment was conducted.

### **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 Development Site. The complementing area to the north within the longest shadow study area represents the remaining area that could potentially experience new project generated shadow.

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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.





Five publicly accessible open space resources are located within the remaining longest shadow study area. Three historic resources with sunlight-dependent features are also located in the remaining study area. In addition, the Bronx River, an important natural resource, flows through the study area. Therefore the next tier of assessment was conducted for these resources.

### **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 (3D) computer mapping software<sup>2</sup> is used in the Tier 3 assessment to calculate and display the proposed project's shadows on individual representative days of the year. A computer model was developed containing 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 project.

#### *REPRESENTATIVE DAYS FOR ANALYSIS*

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

#### *TIMEFRAME WINDOW OF ANALYSIS*

The shadow assessment considers shadows occurring between one and a half hours after sunrise and one and a half hours before sunset. At times earlier or later than this timeframe window of analysis, the sun is down near the horizon and the sun's rays reach the Earth at very tangential angles, diminishing the amount of solar energy and producing shadows that are very long, move fast, and generally blend with shadows from existing structures 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 and 6-3** illustrate the range of shadows that would occur, in the absence of intervening buildings, from the proposed development 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 assessment showed that new shadow could potentially reach portions of River Park, West Farms Rapids Park, and the West Farms Square seating area on all four analysis days. New shadow could also potentially reach the River Garden on three of the four analysis days (in the spring, summer and fall) and Vidalia Park on the winter and March/September analysis days.

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<sup>2</sup> MicroStation V8i (SELECTSeries 3)



December 21



March 21 / Sept. 21

Proposed Buildings

Historic Landscape or Publicly-Accessible Open Space (see Figure 6-1)

Historic Building with Sunlight-Sensitive Features (see Figure 6-1)

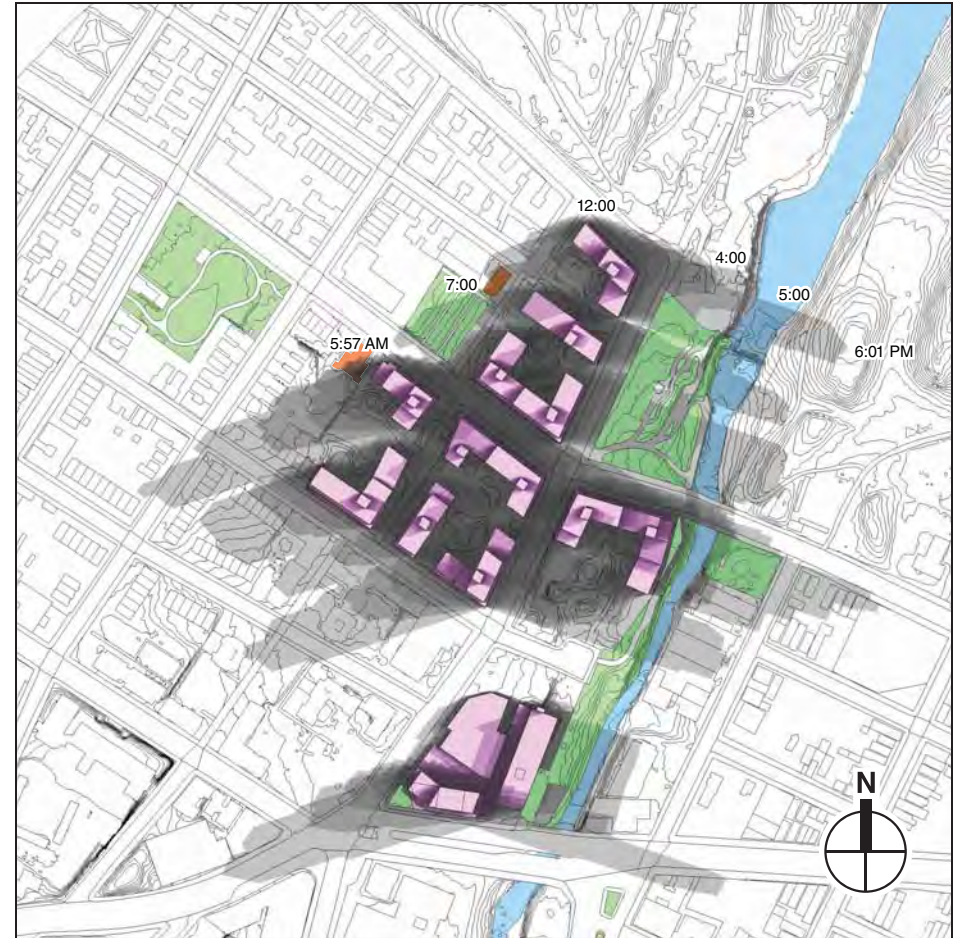
Shadow

This figure illustrates the range of shadows that would occur, absent intervening structures, from the proposed buildings on the winter solstice and spring/fall equinox analysis days. 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 serves to illustrate the daily path or "sweep" of the proposed building's shadows across the landscape, indicating which resources could potentially be affected on that analysis day, absent intervening buildings, by project-generated shadow. Daylight Saving Time was not used, per *CEQR Technical Manual* guidelines.

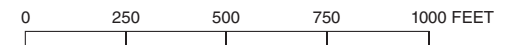




May 6 / August 6



June 21



- Proposed Buildings*
- Historic Landscape or Publicly-Accessible Open Space (see Figure 6-1)*
- Historic Building with Sunlight-Sensitive Features (see Figure 6-1)*
- Shadow*

This figure illustrates the range of shadows that would occur, absent intervening structures, from the proposed buildings on the summer solstice and May 6 / August 6 analysis days. 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 serves to illustrate the daily path or "sweep" of the proposed building's shadows across the landscape, indicating which resources could potentially be affected on that analysis day, absent intervening buildings, by project-generated shadow. Daylight Saving Time was not used, per *CEQR Technical Manual* guidelines.

New shadow could also potentially reach portions of the West Farms Soldiers' Cemetery, the shuttered windows on the east façade of Beck Memorial Presbyterian Church, and the windows on the east façade of the New Tabernacle Baptist Church on all four analysis days, and the window on the front (north) façade of the New Tabernacle Baptist Church on two or possibly three analysis days (in the late spring and summer and possibly early spring and fall).

New shadow would also reach a small portion of the Bronx Zoo within Bronx Park. This area is walled/fenced and not accessible to the public unless an entrance fee is paid. Therefore, per *CEQR Technical Manual* guidelines the zoo is not a resource of concern for analysis. However, any new shadows falling on portions of the zoo will be qualitatively disclosed and assessed.

The proposed redevelopment would also include new open space. According to *CEQR Technical Manual* guidelines, project-generated open space cannot experience a significant adverse impact, because without the project the open space would not exist. However, the project-generated open space is included in the qualitative analysis in Chapter 5, "Open Space," and therefore a qualitative discussion of how shadows might affect them is included here.

A more detailed analysis was required to determine the potential extent, duration and effects of any new shadows on these resources.

## **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 project, 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 project and its shadows, can then be compared to the baseline condition to determine the incremental shadows that would result with the proposed project.

Three-dimensional representations of the existing buildings in the study area were developed using data obtained from NYC DoITT and photos taken during project site visits, and were added to the three-dimensional model used in the Tier 3 assessment. **Figure 6-4** shows a view of the computer model used in the analysis.

Following the analysis framework described in Chapter 1, "Project Description," the shadows assessment was performed for the analysis year of 2029, comparing the proposed development with the future No Action condition in which the site would remain as in the existing condition (see **Figure 6-4**).

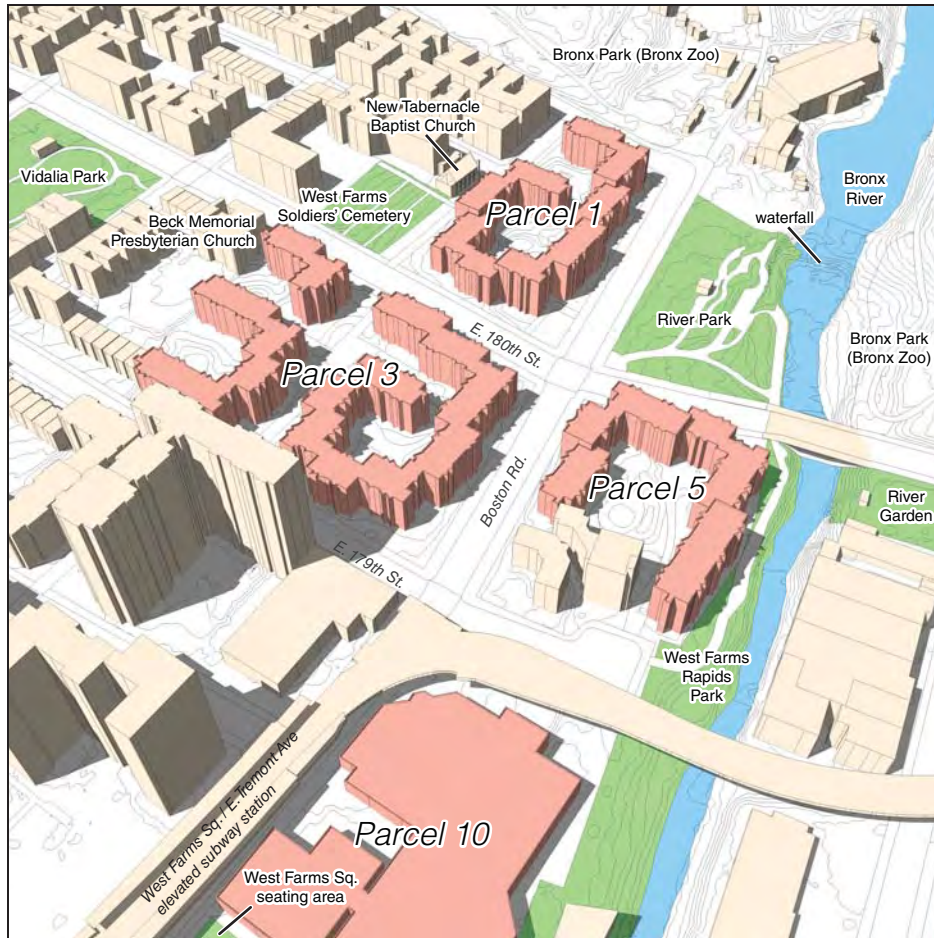
## **RESOURCES OF CONCERN**

### *PUBLICLY ACCESSIBLE OPEN SPACES*

**Vidalia Park**, bounded by East 179th and 180th Streets and Vyse and Daly Avenues (streets whose names combined give the park its name) offers both passive and active amenities, including play equipment, handball courts, and basketball courts in the northwest section, a large open lawn area in the center, benches and pathways. The Krystal Community Garden is located within the park on its east side along Vyse Avenue.

There is a small plaza (referred to in this document as the **West Farms Square seating area**) at the northeast corner of the intersection of East Tremont Avenue and Boston Road. The staircase leading up to the elevated West Farms Sq - E Tremont Av subway station is there, as are bus





No Action



Proposed

 Publicly-Accessible Open Space or Historic Landscape

stops on both the East Tremont Avenue and Boston Road sides. The plaza is paved throughout but contains several trees in pits. There is seating available on four benches, and a few large boulders. In the future No Action condition, this plaza would remain as it currently exists. However with the proposed project, it is anticipated that the proposed building footprint on Parcel 10 would extend onto the eastern and northern portions of the plaza, containing the boulders and most of the trees. This analysis conservatively assumes that the western portion of the plaza would continue to have seating amenities.

**River Park** is located in the southernmost portion of Bronx Park directly north and east across the street from the Development Site. It is a heavily used riverfront open space offering scenic views and walkways along the Bronx River, play equipment, seating, and barbecue areas.

**West Farms Rapids Park** is expected to be completed by 2029. Located along the Bronx River between East 180th Street and East Tremont Avenue, this segment of the greenway will provide approximately 1.40 acres, of which 0.98 acres are expected to be active and 0.42 acres are expected to be passive. The Bronx River (West Farms) Park will offer a greenway, plantings, seating, and a canoe launch.

The **River Garden** is located directly east across the Bronx River from Parcel 5, on East 180th Street. This community garden offers passive recreational open space opportunities for locals to sit, garden, and barbecue.

### *HISTORIC RESOURCES WITH SUNLIGHT-DEPENDENT FEATURES*

**Beck Memorial Presbyterian Church** is located at 980 East 180th Street, adjacent to and west of Parcel 3. It has been determined eligible for listing on the National Register of Historic Places. Site visits in late 2015 and early 2016 found the structure to be boarded up with plywood and locked, and all its windows sheathed in metal. Additional research found that services are no longer held in the building; that the building has been boarded up and locked for at least four years; and that the windows were covered up because of the building's generally unsafe condition. No information is currently available regarding plans to re-open or make building repairs in the near future or by the 2029 build year for the project. Nevertheless, in order to ensure the most conservative analysis possible, the church was included in the analysis in the event that it re-opens in the future.

The **West Farms Soldiers Cemetery**, also known as the Old West Farms Soldier Cemetery, is a New York City Landmark property and eligible for listing on the State and National Registers of Historic Places (S/NR). However, it is not publicly accessible. Further, there is nothing in the 1967 New York City Landmarks Preservation Commission designation report specifically identifying sunlight, the vegetation, trees, landscaping or any other sunlight-sensitive features as contributing factors to the property's historic significance. Therefore, for these reasons this property does not meet the definition of a sunlight-sensitive historic resource according to the *CEQR Technical Manual*. However, it will be included in this study for informational purposes since it is directly north and west of the Development Site.

The cemetery is the oldest public veterans' burial ground in the Bronx. Among shade trees with a wire-fenced enclosure, the remains of 40 veterans of four wars (The War of 1812, the Civil War, the Spanish-American War, and World War I) lie beneath well-marked stones. West Farms Cemetery was founded in 1815 on land purchased the year before by John Butler, who had plots laid out for a private burial ground. The Butler family retained control of the cemetery until 1954, when the City assumed possession on a "quit claim" deed. The burial ground has been maintained by a Civil War Memorial committee since then.

The **New Tabernacle Baptist Church**, formerly the Swedish Evangelical Emmanuel Church and rectory at 992 East 181st Street, is not a City Landmark but is S/NR eligible. In terms of sunlight-sensitive features, the upper portion of the front (north) façade has a Tudor-arched stained-glass window with tracery. The east façade has several stained glass windows facing the Development Site. The west façade faces away from the project and its stained glass windows would not be affected by any project-generated shadow.

#### *SUNLIGHT-SENSITIVE NATURAL RESOURCES*

The portion of the **Bronx River** located within the shadow study area is mapped by New York State Department of Environmental Conservation (NYSDEC) as a class B stream, which indicates its best usage for swimming and other contact recreation, but not for drinking water. The Bronx River flows approximately 24 miles through Westchester and Bronx Counties until it empties into the East River.

#### **ANALYSIS RESULTS BY SEASON**

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

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

**Table 6-1** summarizes the entry and exit times and total duration of incremental shadows on each affected sun-sensitive resource. **Figures 6-5 to 6-55** document the results of the analysis by providing graphic representations from the computer animation of times when incremental shadow would fall on a sun-sensitive resource. The figures illustrate the extent of additional, incremental shadow at that moment in time, highlighted in red, and also show existing shadow and remaining areas of sunlight. **Figures 6-56 to 6-74** show a larger scale, more detailed view of shadows on River Park and its interior features.

#### *DECEMBER 21 (FIGURES 6-5 THROUGH 6-14)*

December 21, representing the winter months, does not fall within New York's growing season, according to the *CEQR Technical Manual*. Shadow falling on vegetation in winter is not generally considered to cause a significant adverse impact. However, winter shadow can adversely impact users of open space who may rely on sunlight for warmth.

Incremental shadow from Parcel 3 would fall on the northeast corner of **Vidalia Park** for the first 14 minutes of the analysis day. Vidalia Park would not receive any other project-generated shadow on this analysis day.

A small, 100 square foot portion of the **West Farms Square seating area** would receive incremental shadow for nearly the entire analysis day. Almost all of the plaza would remain in sun during this time.

From 8:51 AM to 10:00 AM incremental shadow from Parcel 3 would fall on the large window on the east façade of **Beck Memorial Presbyterian Church**, eliminating all the direct sun from for much of that period (8:51 AM to 9:30 AM). Shadows would move eastward and from 10:10 AM to 11:15 AM incremental shadow would fall on the more northern of the two smaller windows facing Parcel 3, eliminating remaining sun for all but five or ten minutes of that period.



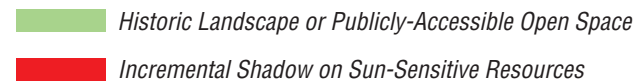
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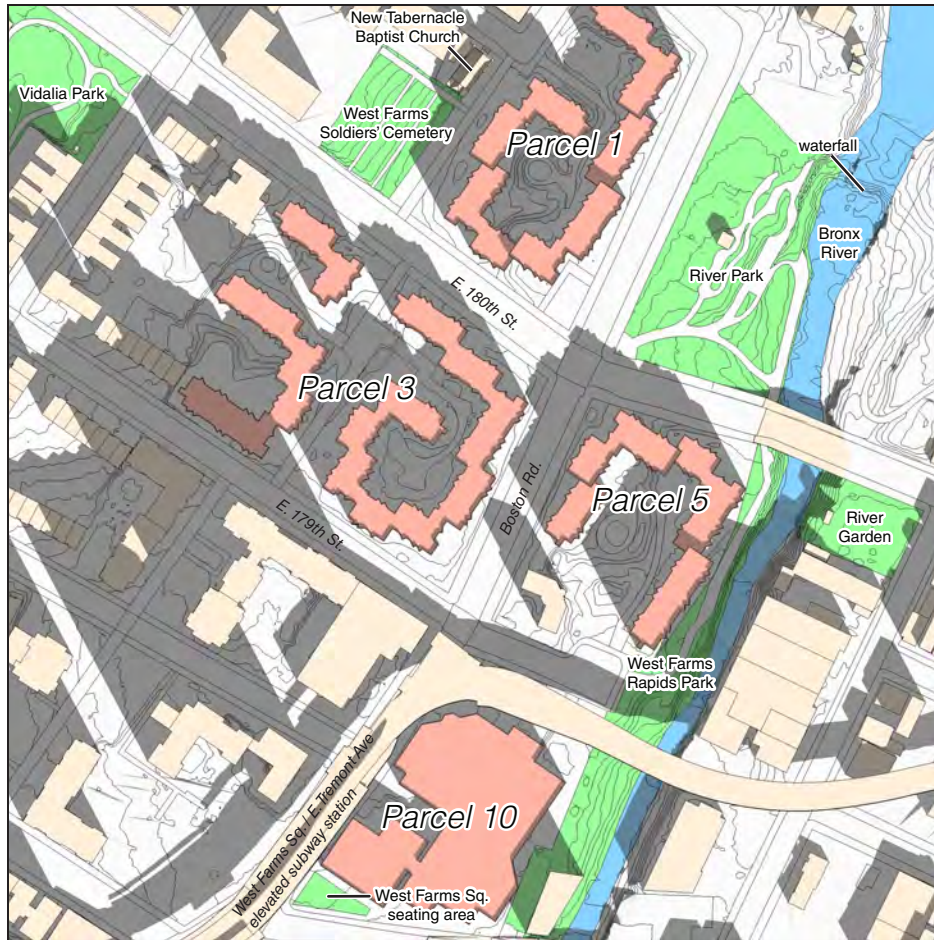
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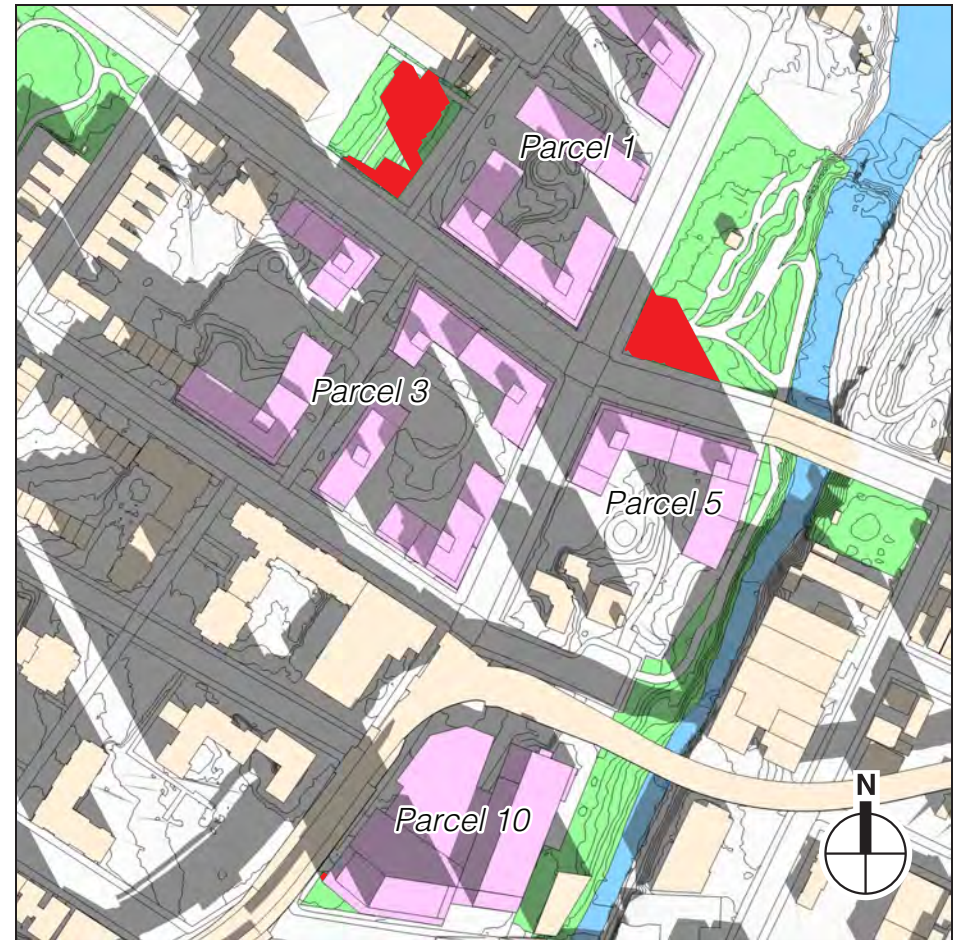
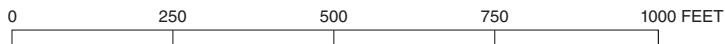
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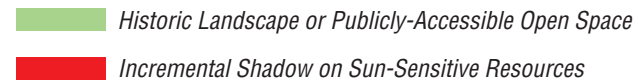




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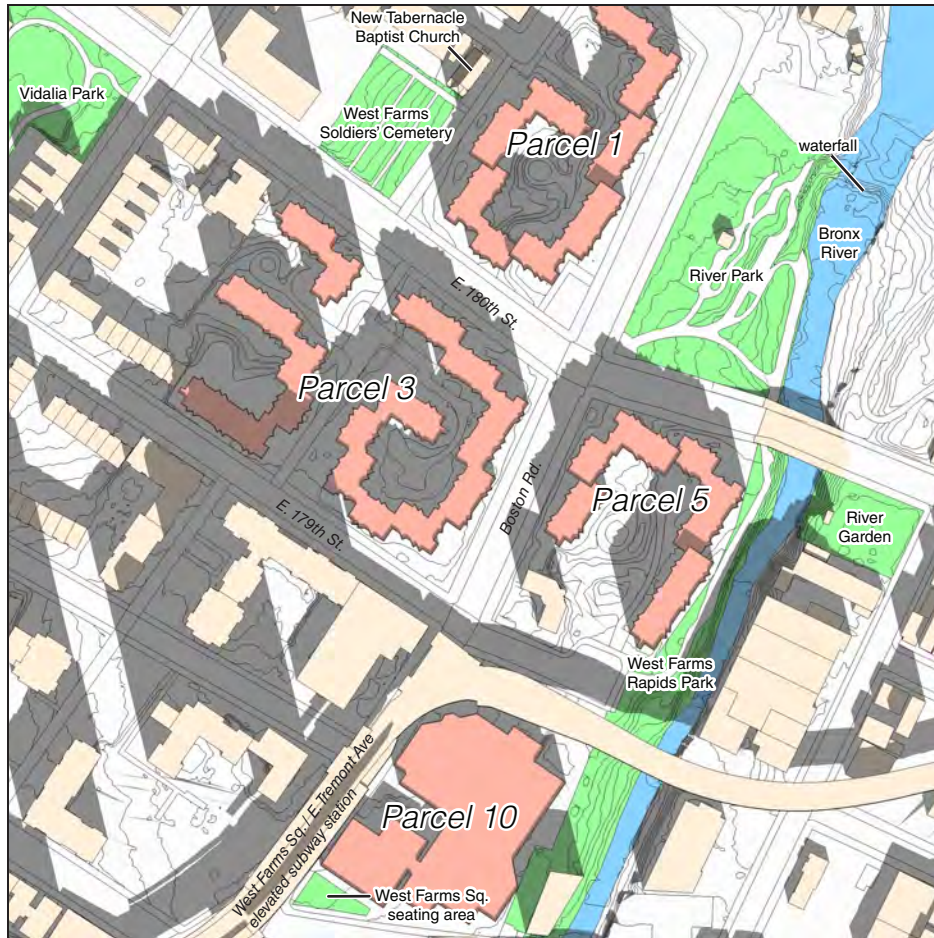


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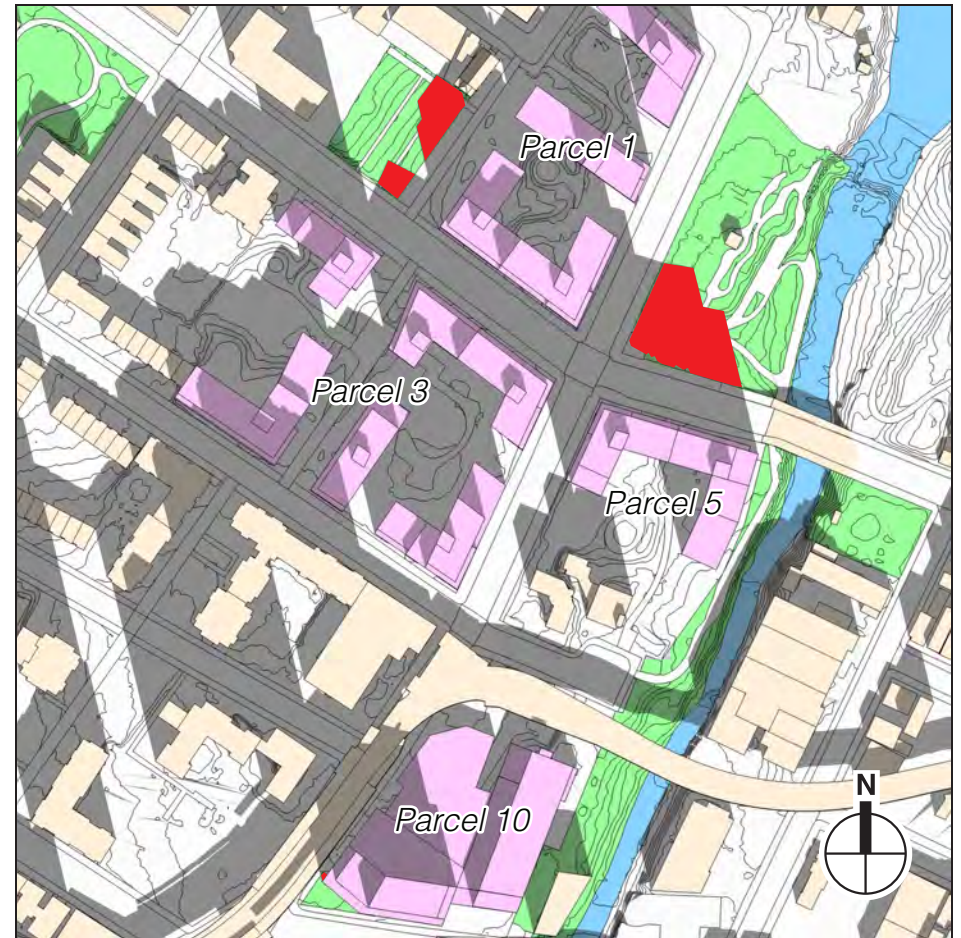
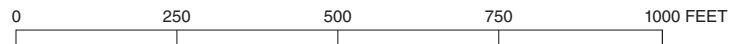




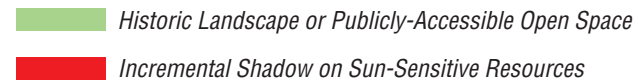
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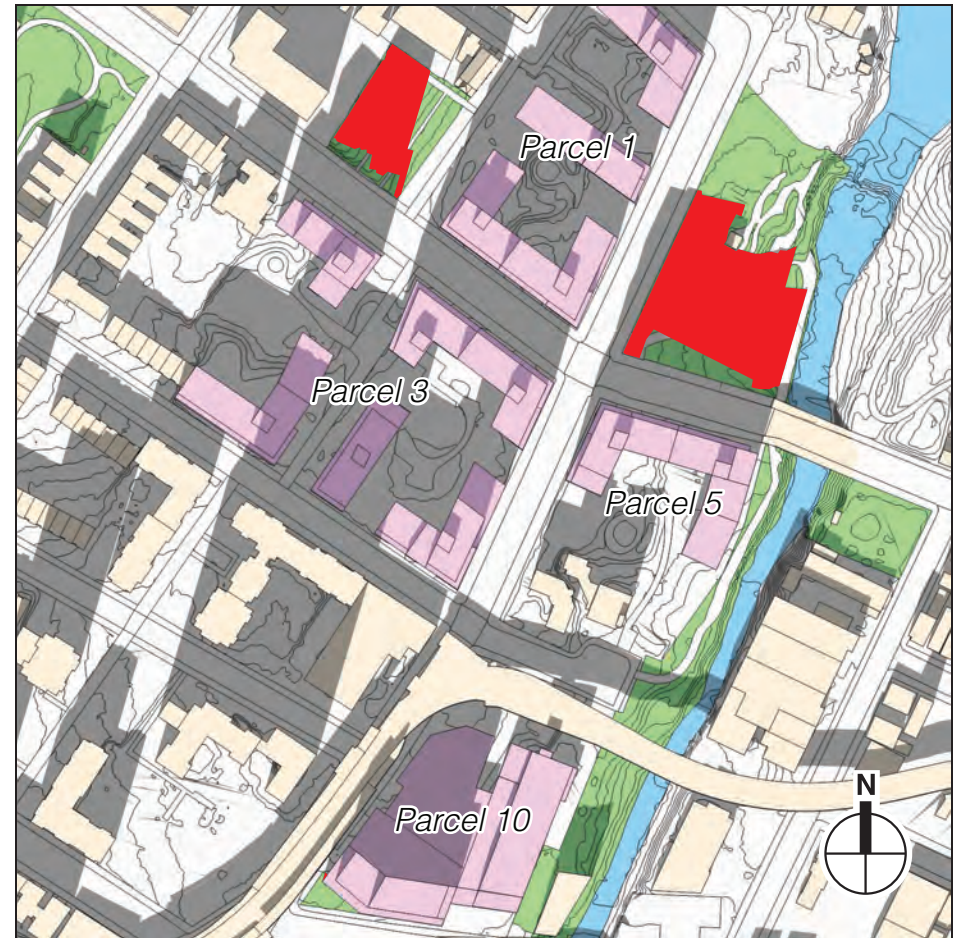
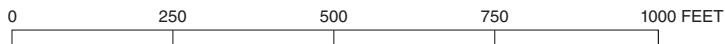
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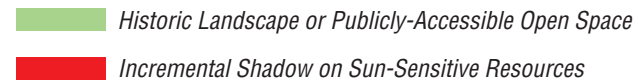




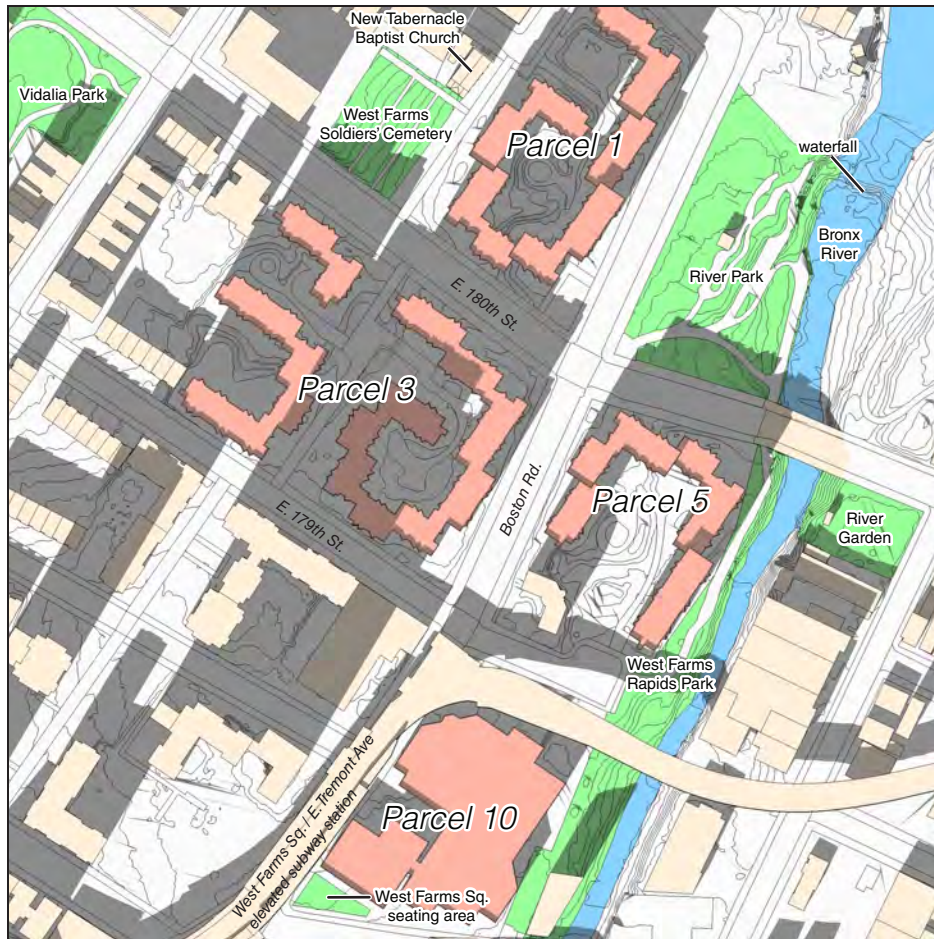
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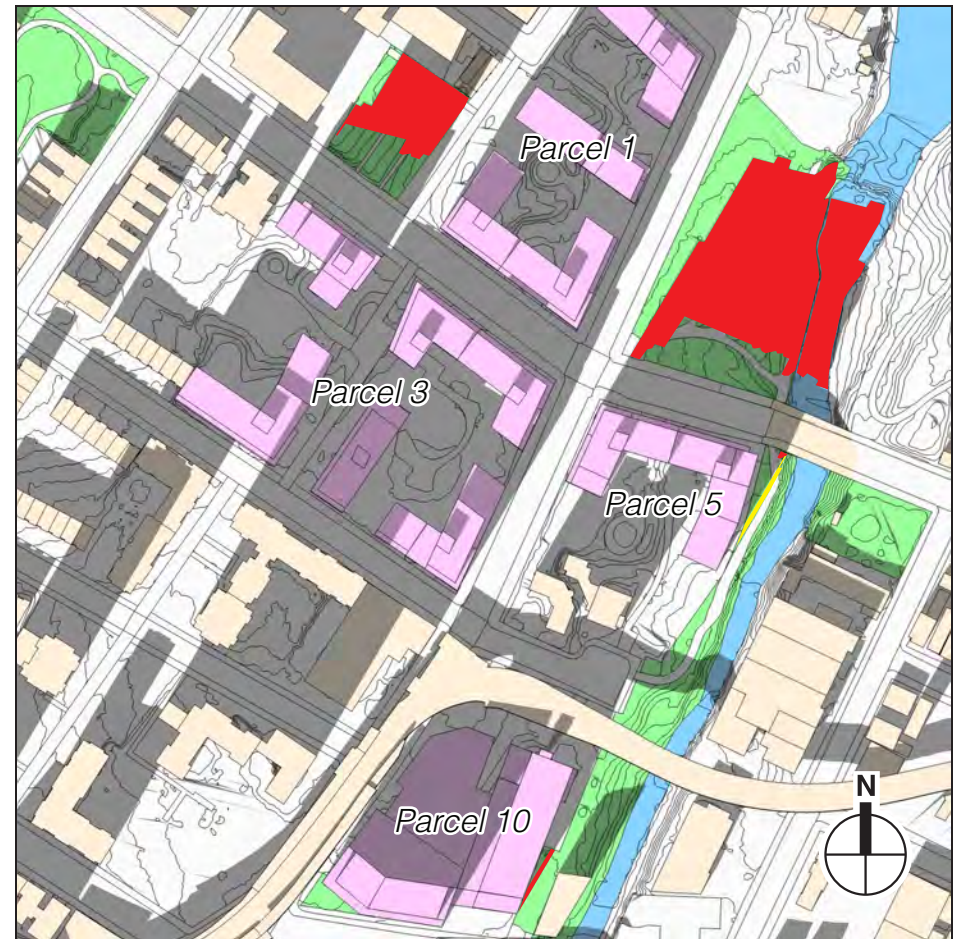
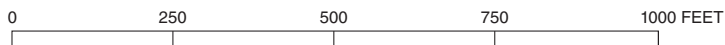
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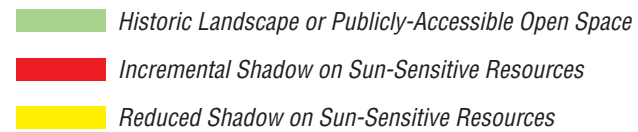




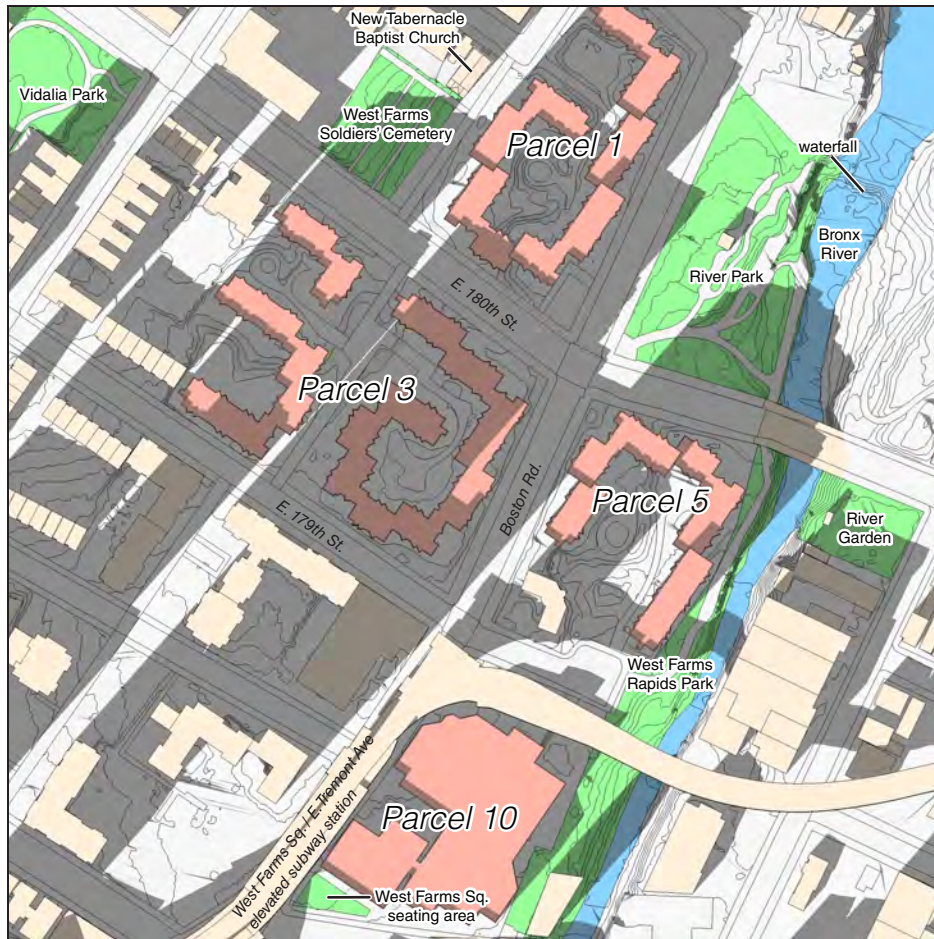
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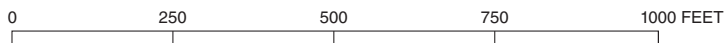
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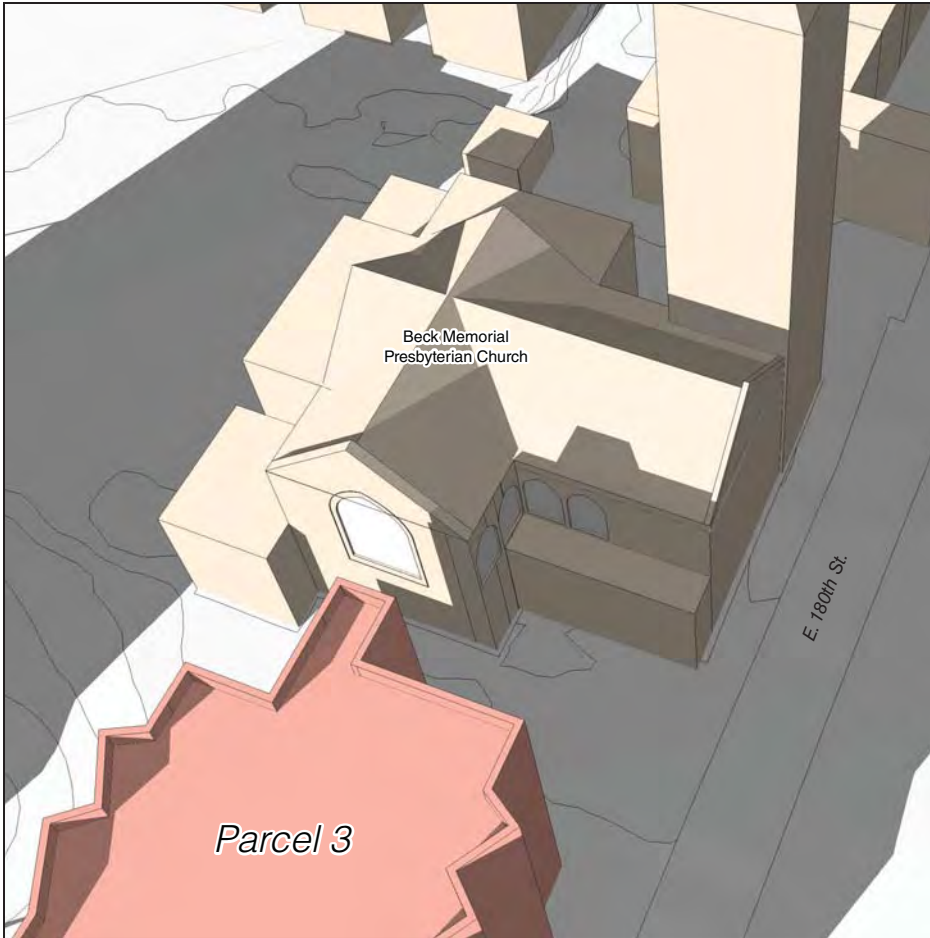


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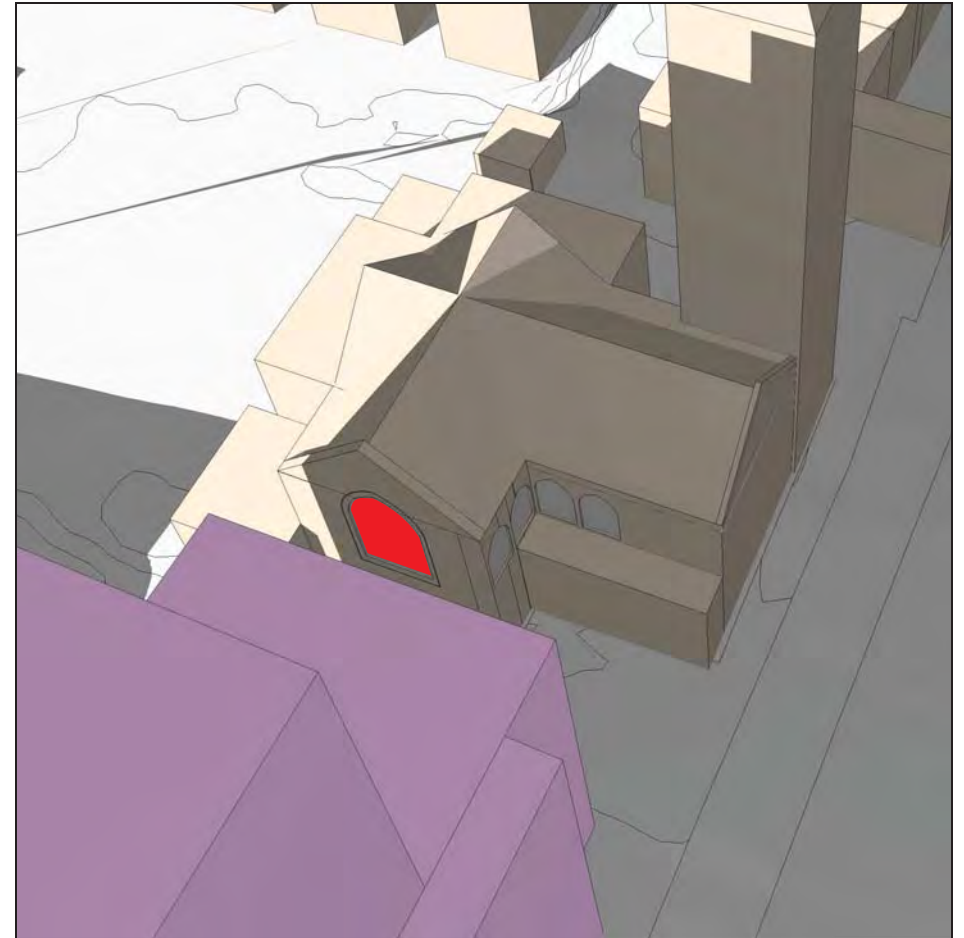


Proposed

- Historic Landscape or Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resources
- Reduced Shadow on Sun-Sensitive Resources



No Action

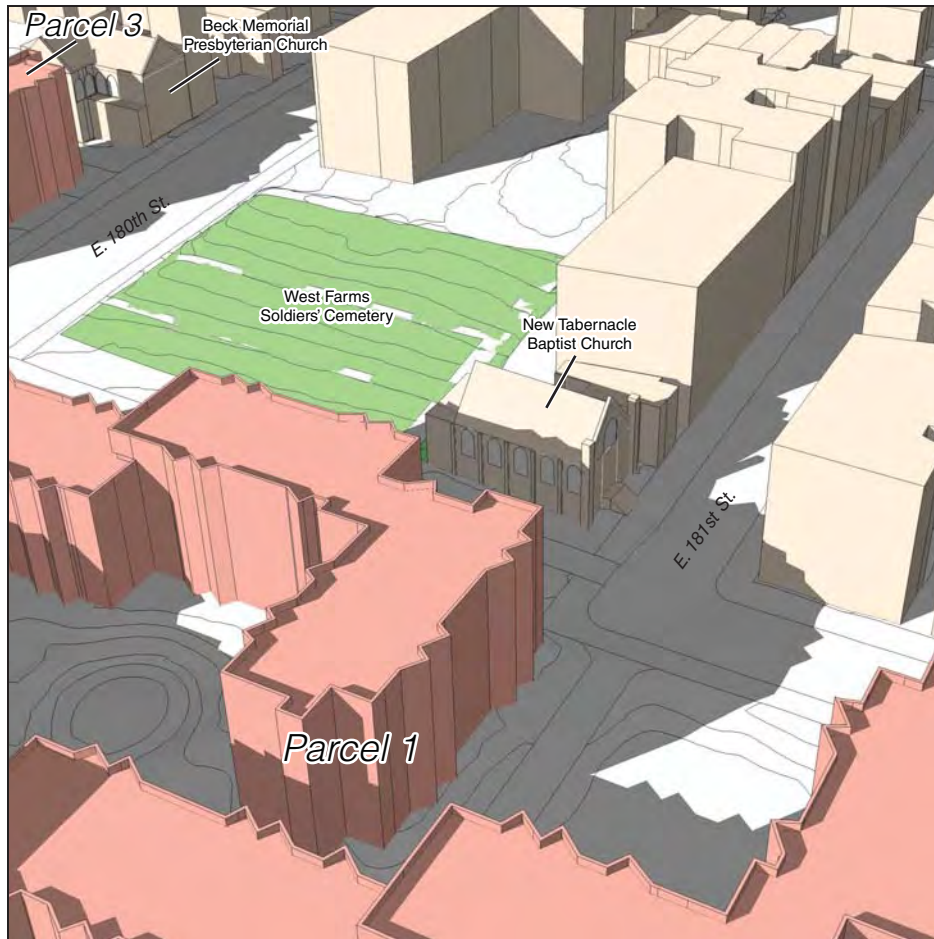


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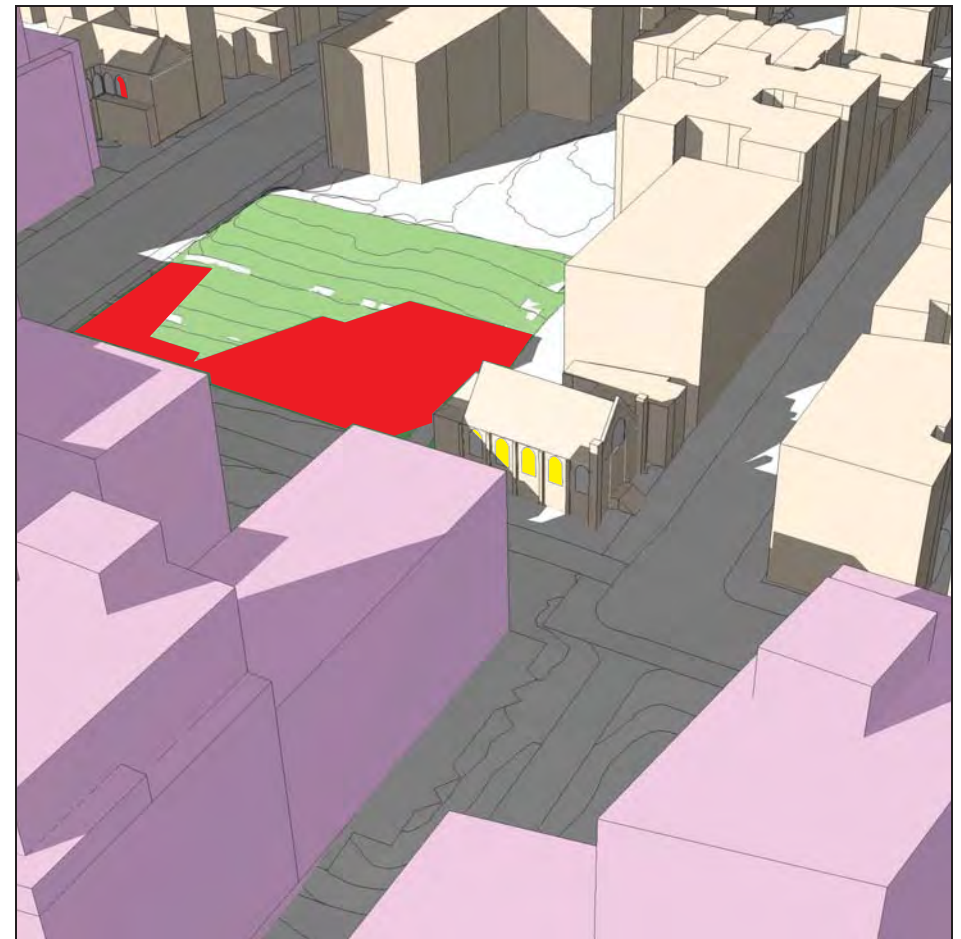
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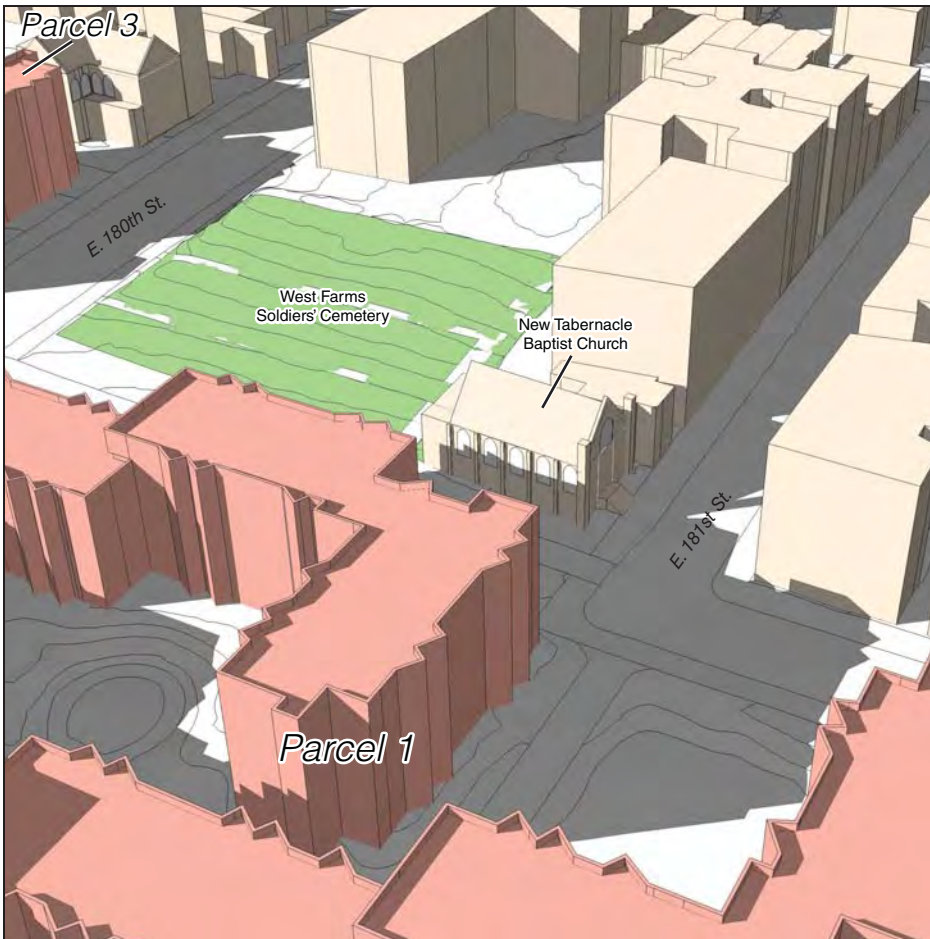
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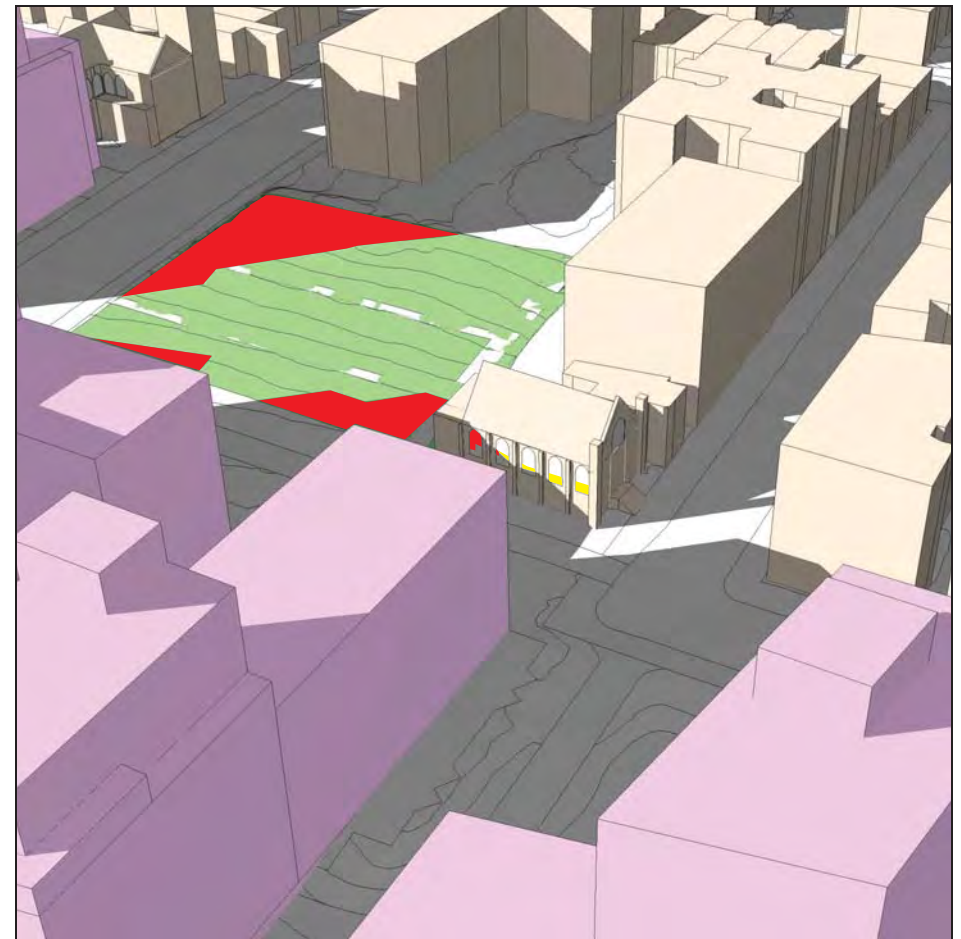
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 Reduced Shadow on Sun-Sensitive Resources


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No Action



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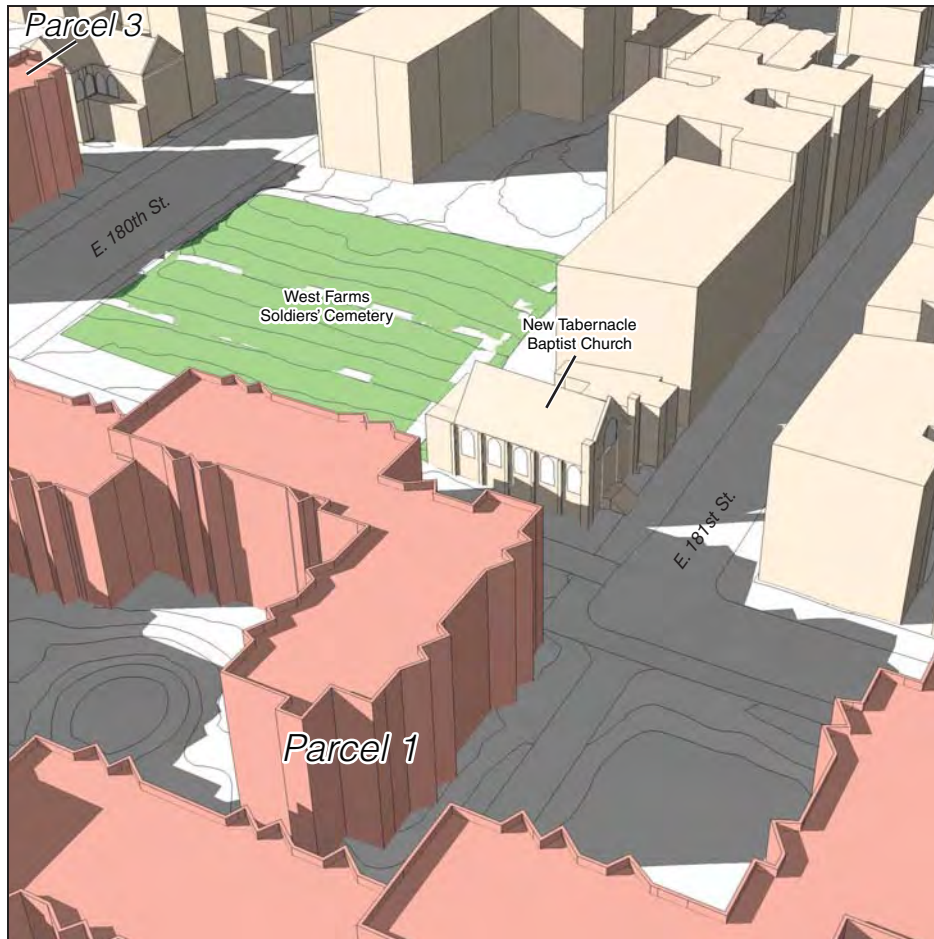
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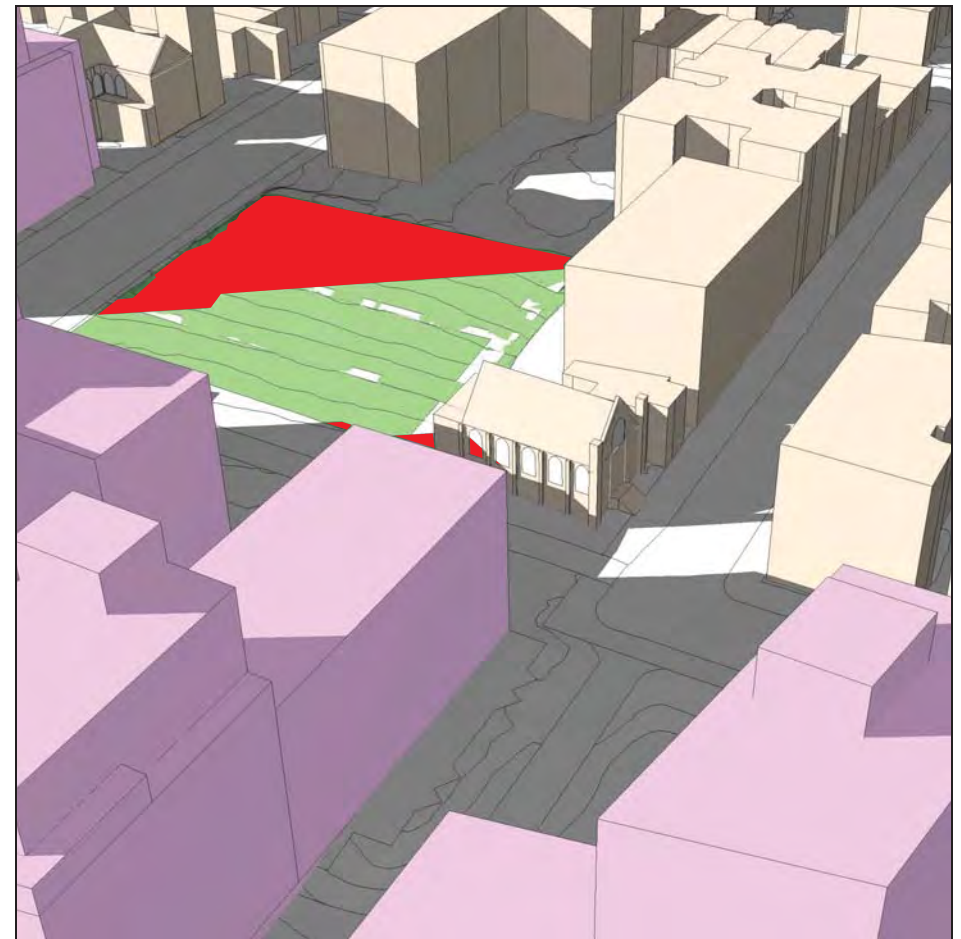
 *Reduced Shadow on Sun-Sensitive Resources*





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No Action



Proposed

-  *Historic Landscape or Publicly-Accessible Open Space*
-  *Incremental Shadow on Sun-Sensitive Resources*

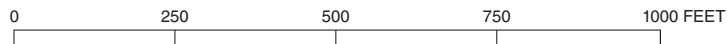





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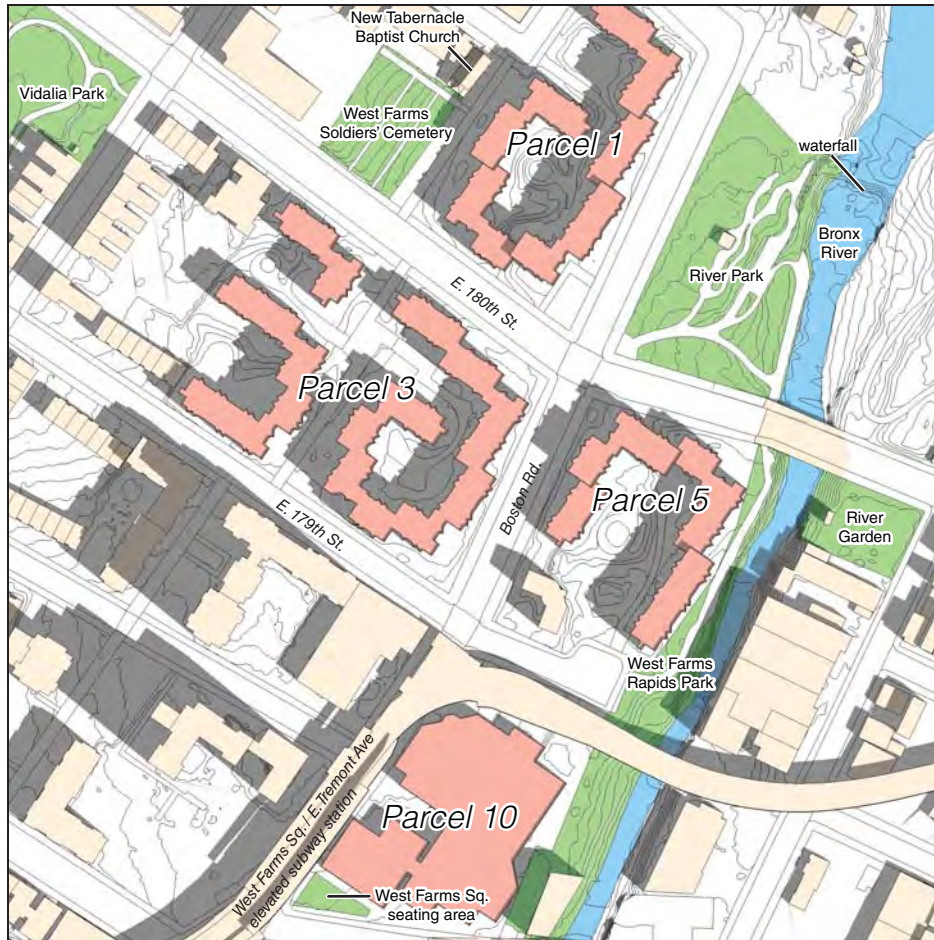
 Historic Landscape or Publicly-Accessible Open Space

 Incremental Shadow on Sun-Sensitive Resources

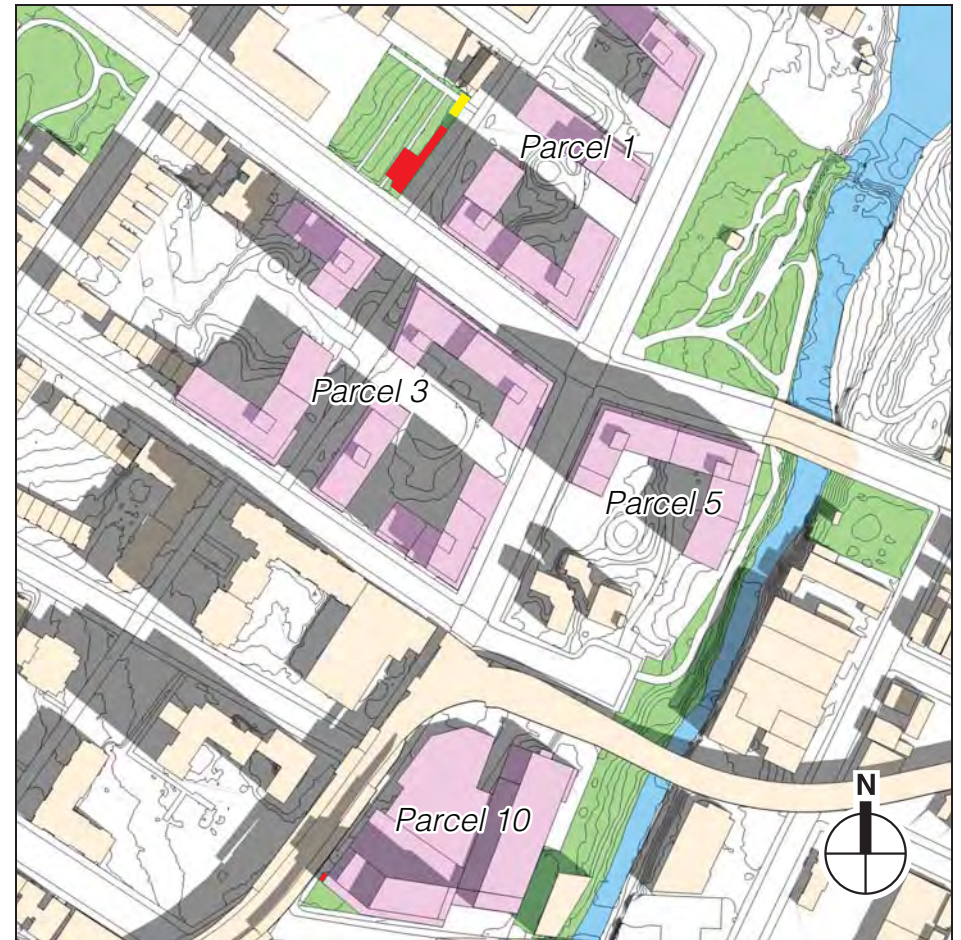
 Reduced Shadow on Sun-Sensitive Resources

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.





No Action



Proposed

Historic Landscape or Publicly-Accessible Open Space

Incremental Shadow on Sun-Sensitive Resources

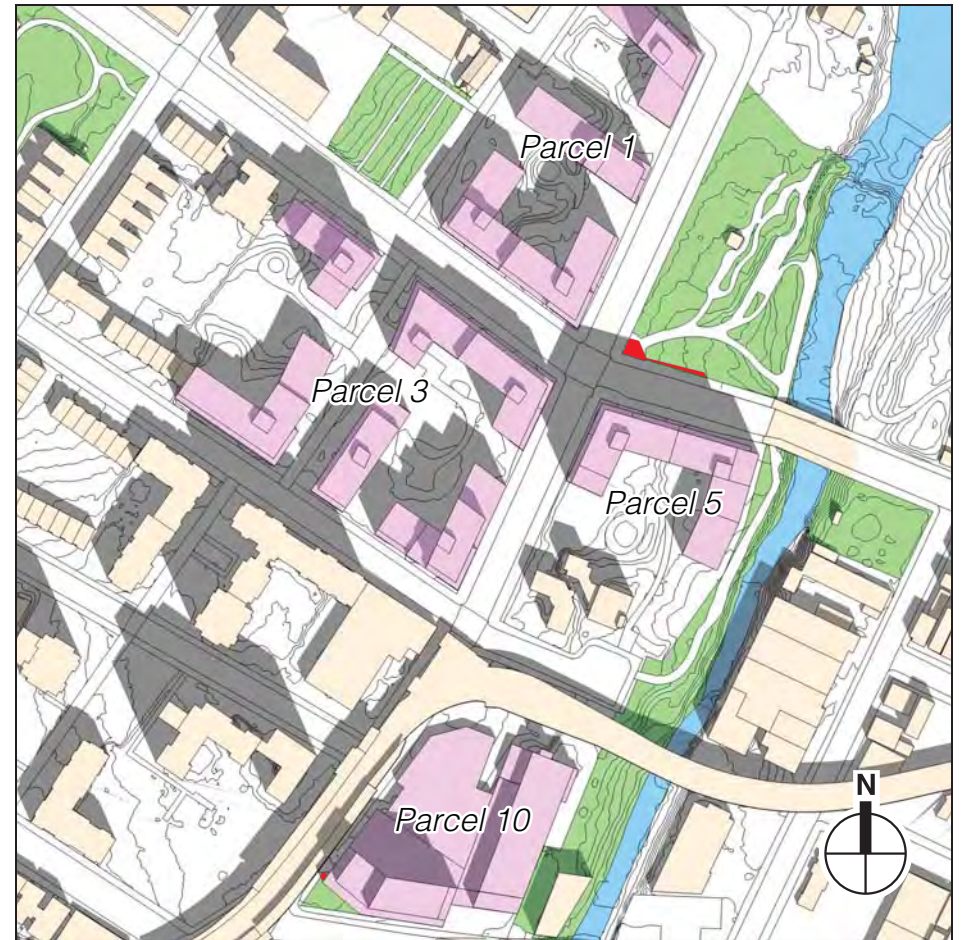
Reduced Shadow on Sun-Sensitive Resources

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.

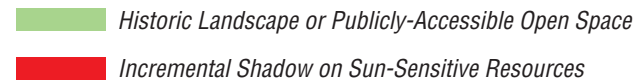
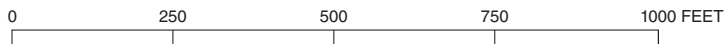




No Action



Proposed

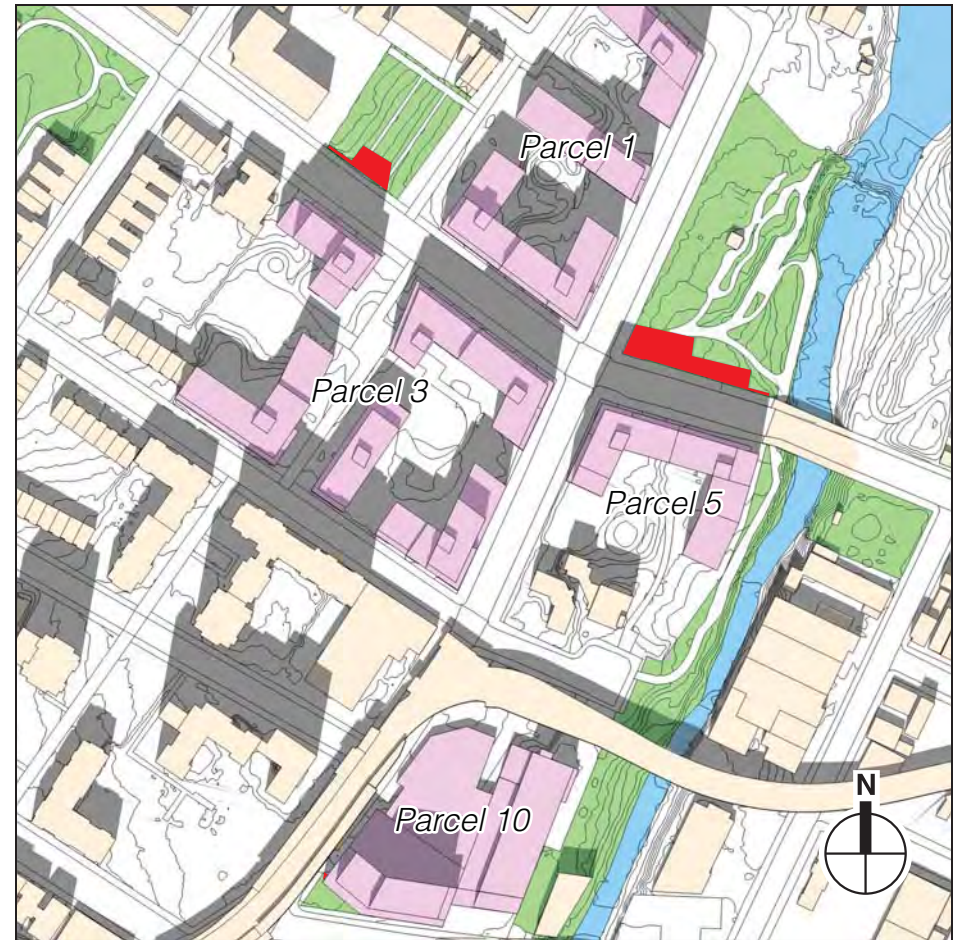


Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently in effect for the March/September, May/August and June analysis periods, add one hour to the given times to determine the actual clock time.

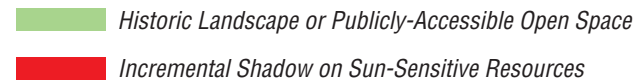
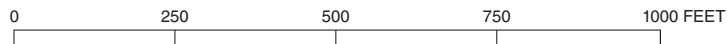




No Action

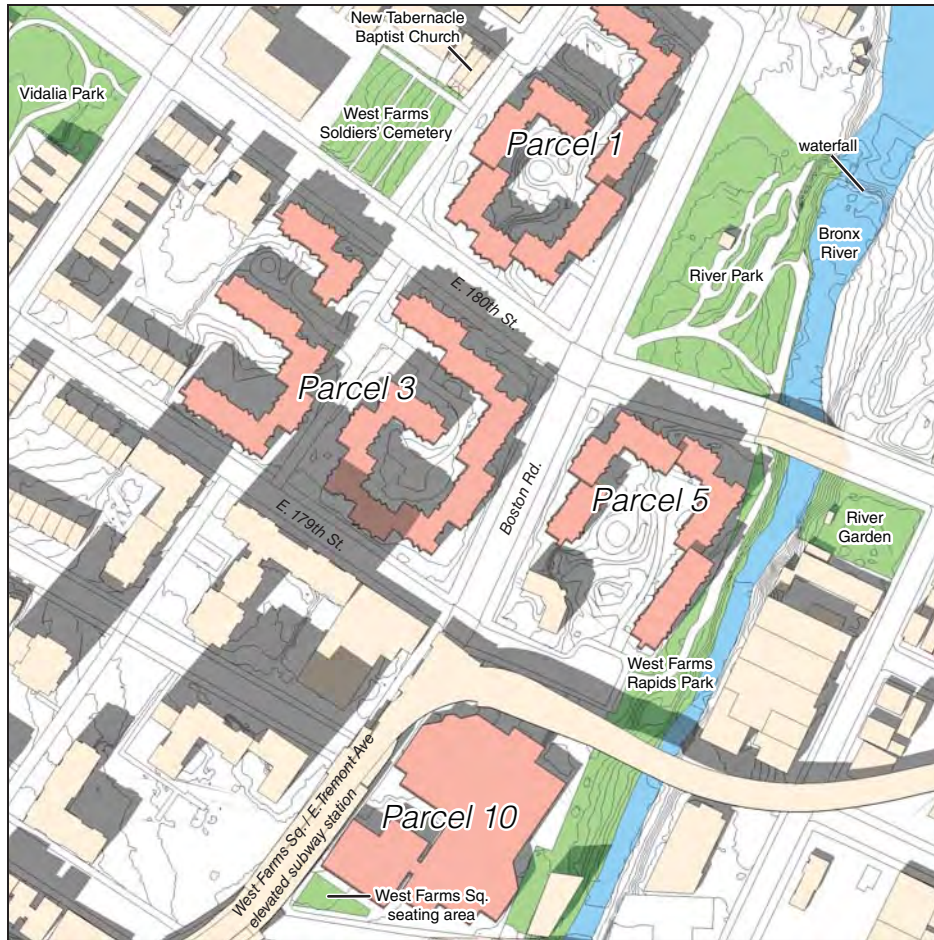


Proposed

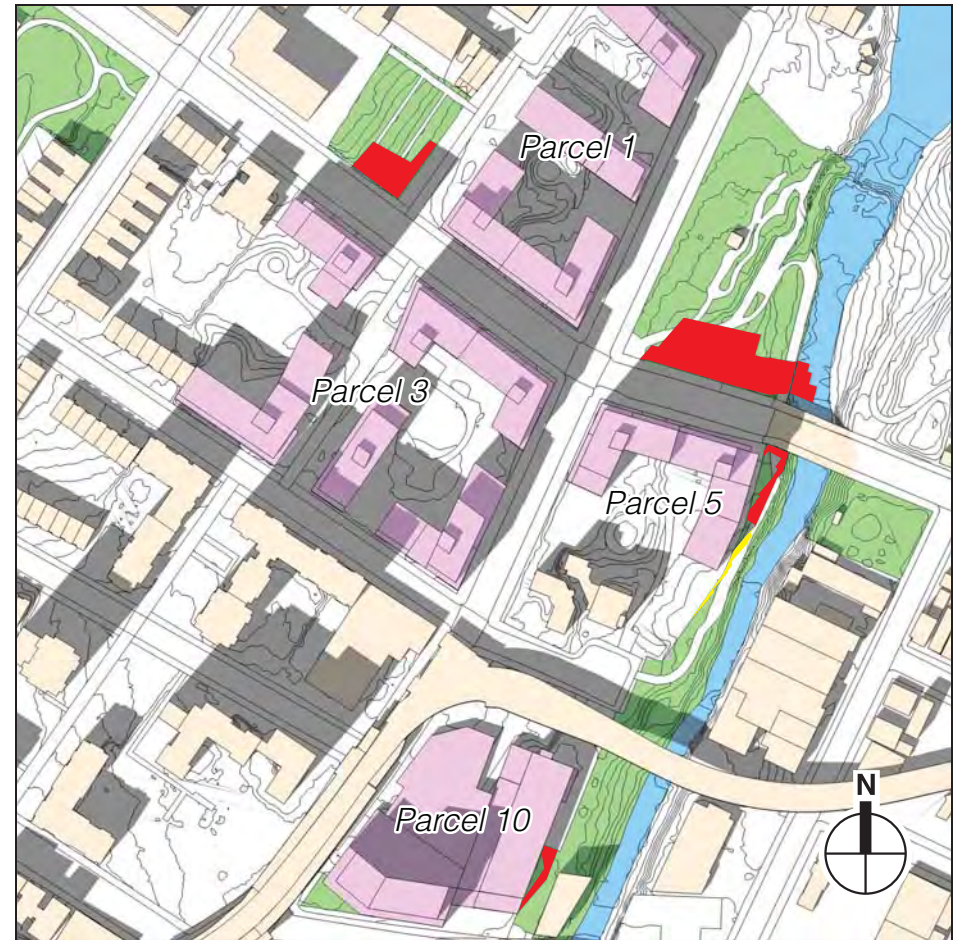


Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently in effect for the March/September, May/August and June analysis periods, add one hour to the given times to determine the actual clock time.





No Action



Proposed

Historic Landscape or Publicly-Accessible Open Space

Incremental Shadow on Sun-Sensitive Resources

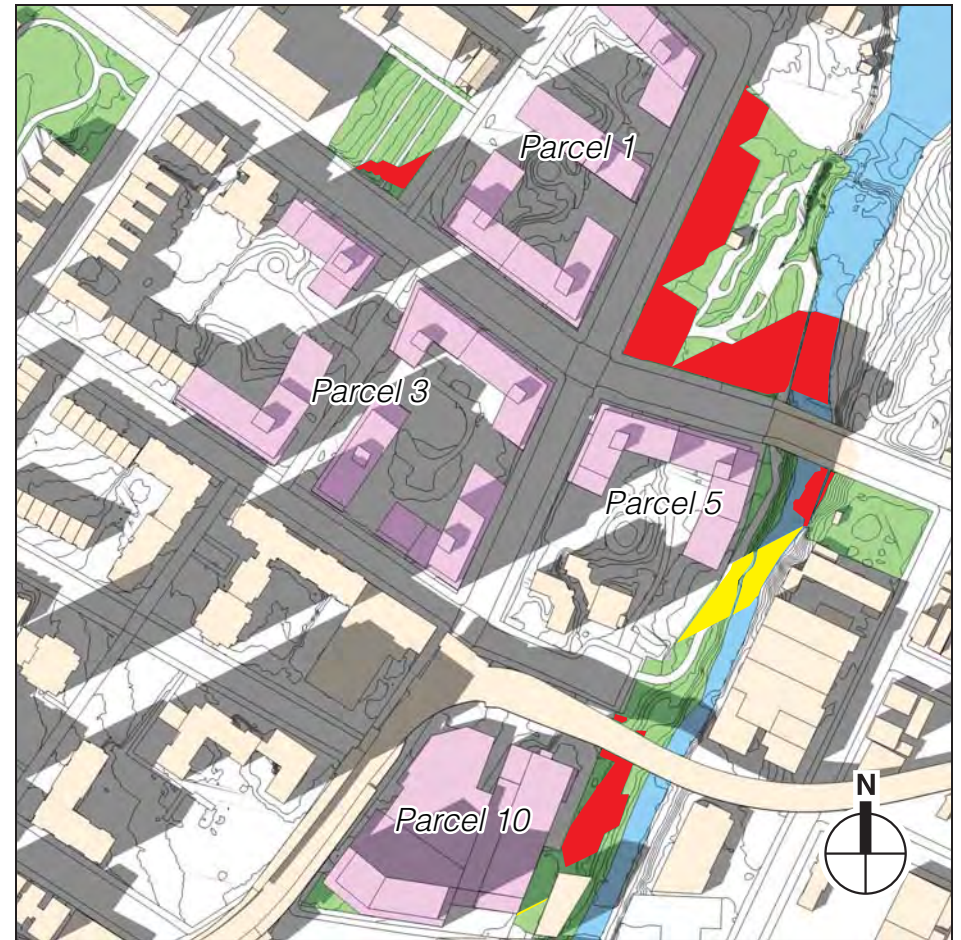
Reduced Shadow on Sun-Sensitive Resources

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.

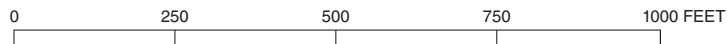




No Action



Proposed



- Historic Landscape or Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resources
- Reduced Shadow on Sun-Sensitive Resources

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.





No Action



Proposed

- Historic Landscape or Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resources
- Reduced Shadow on Sun-Sensitive Resources

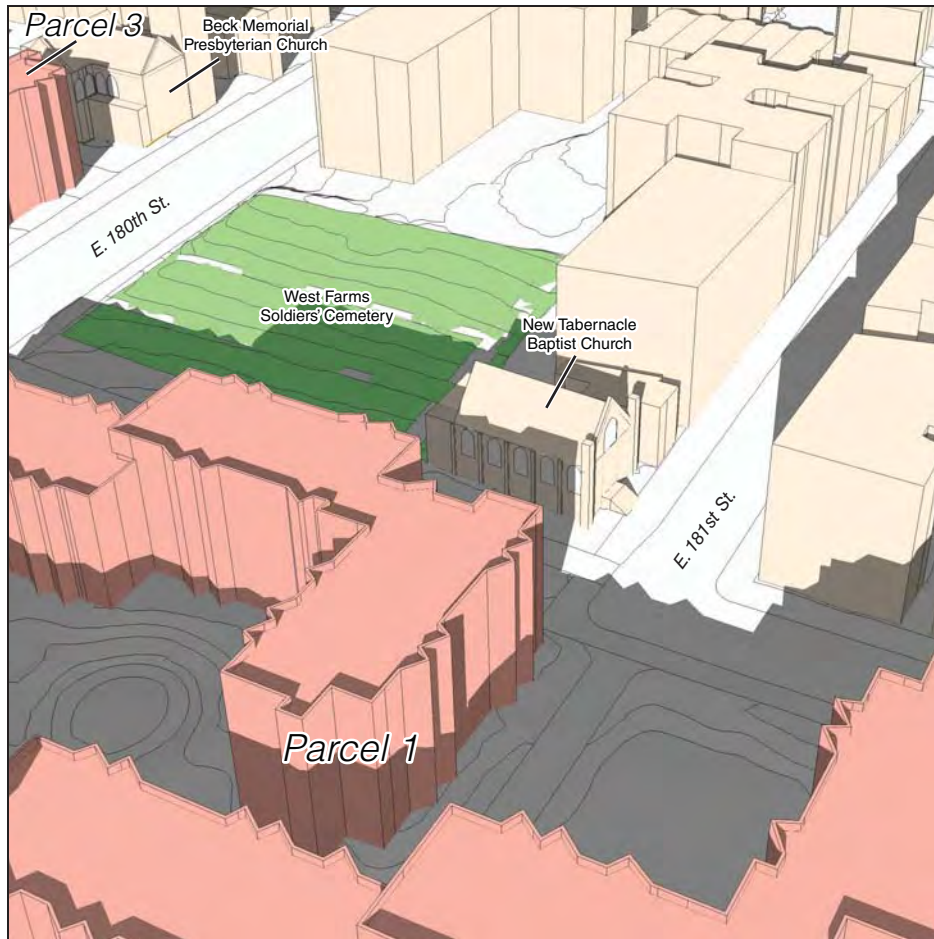
Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently in effect for the March/September, May/August and June analysis periods, add one hour to the given times to determine the actual clock time.

**March 21 / Sept. 21 - 4:29 PM**

Figure 6-21




1.27.16



No Action



Proposed

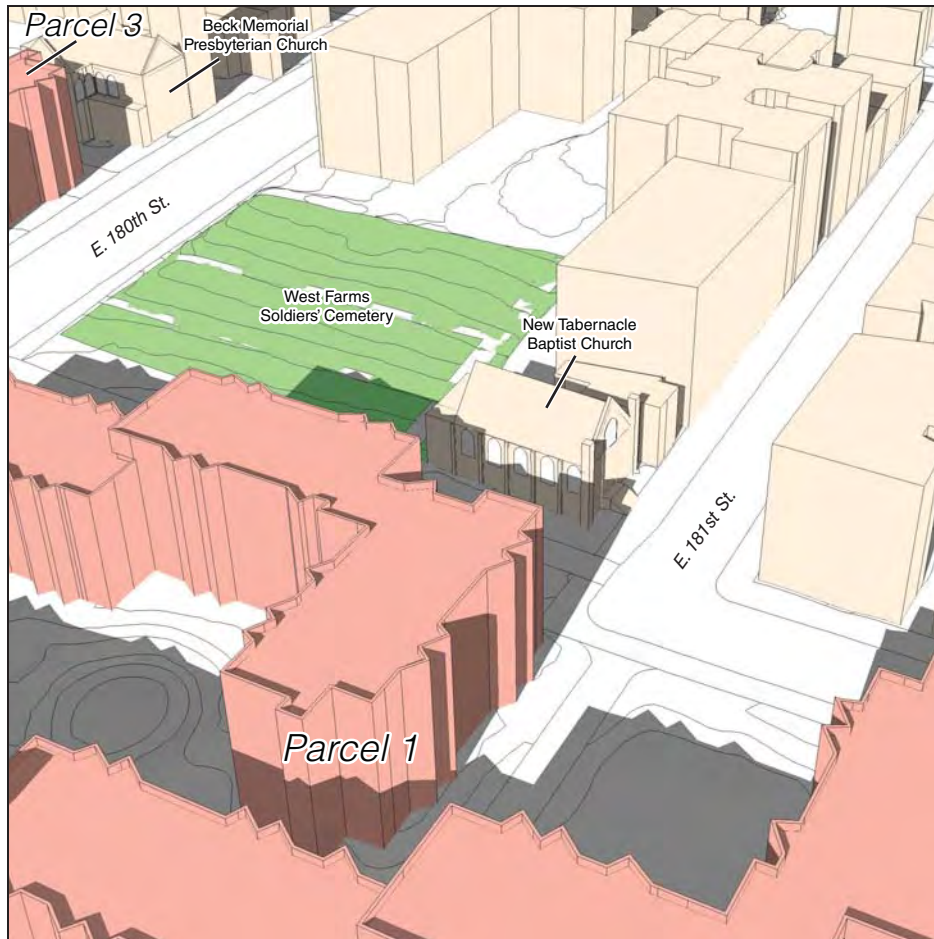
 *Historic Landscape or Publicly-Accessible Open Space*

 *Incremental Shadow on Sun-Sensitive Resources*

 *Reduced Shadow on Sun-Sensitive Resources*

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently in effect for the March/September, May/August and June analysis periods, add one hour to the given times to determine the actual clock time.


1.27.16



No Action



Proposed

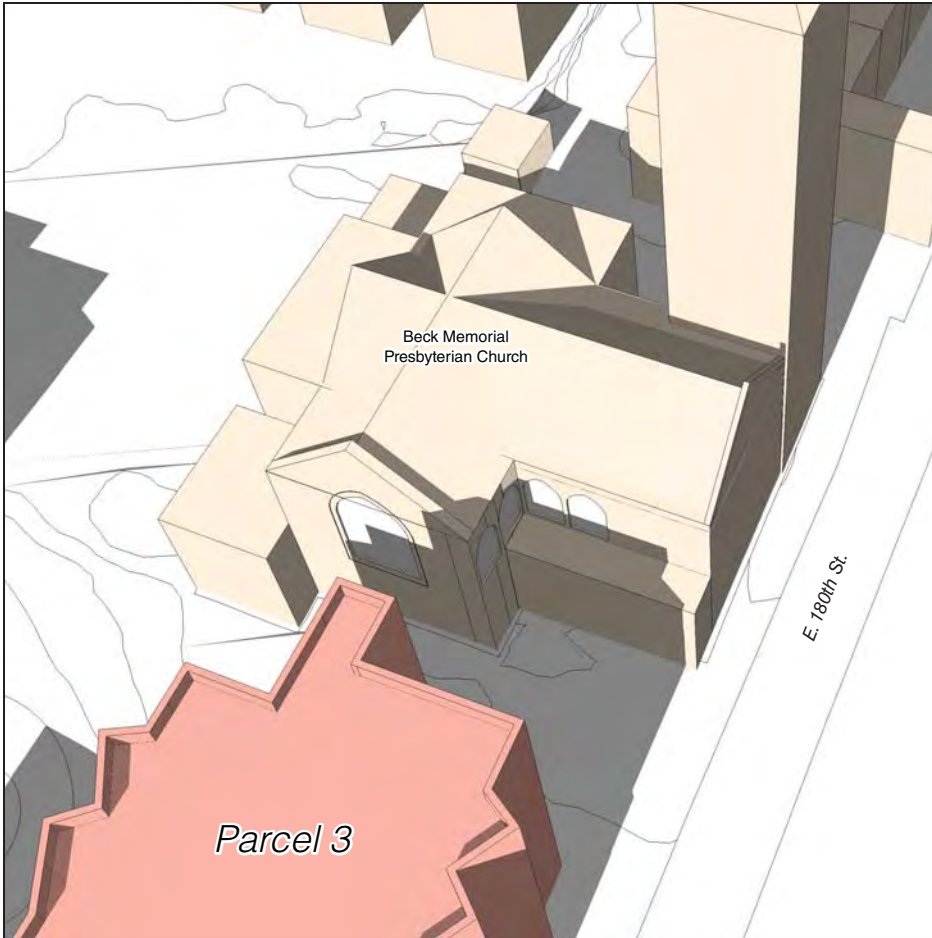
 Historic Landscape or Publicly-Accessible Open Space

 Incremental Shadow on Sun-Sensitive Resources

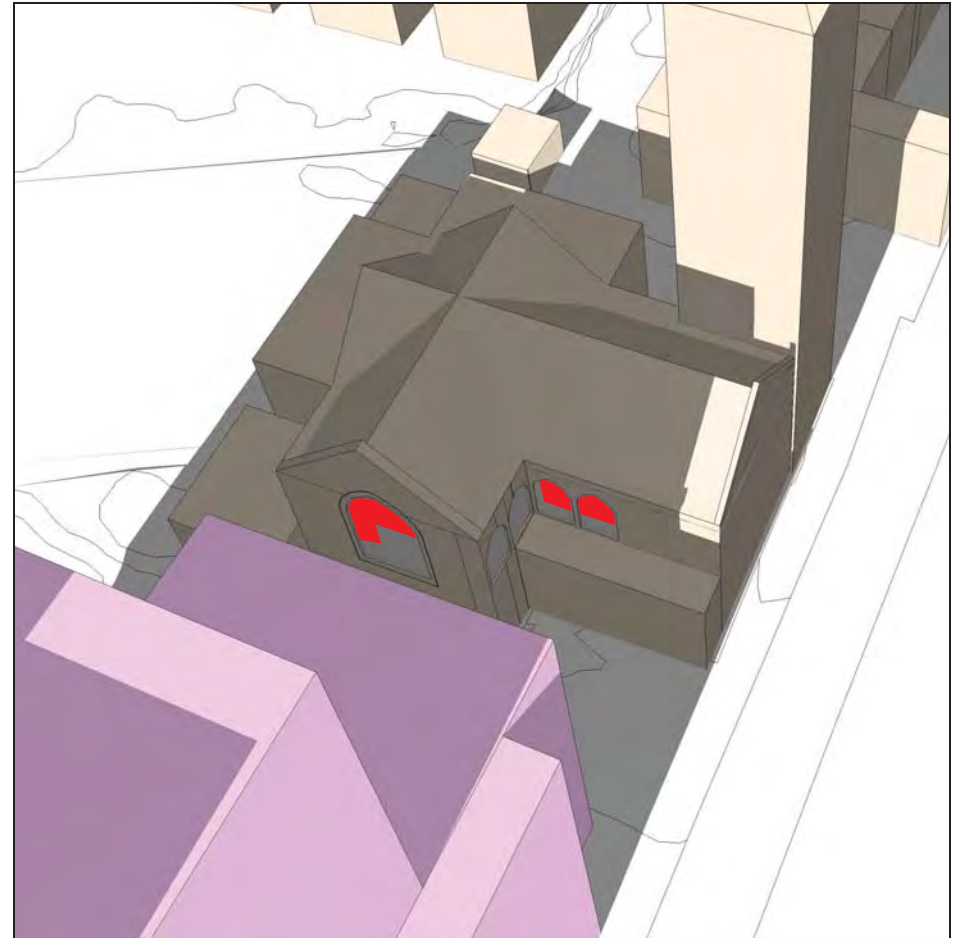
 Reduced Shadow on Sun-Sensitive Resources

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.





No Action



Proposed

Incremental Shadow on Sun-Sensitive Resources


1.27.16



No Action



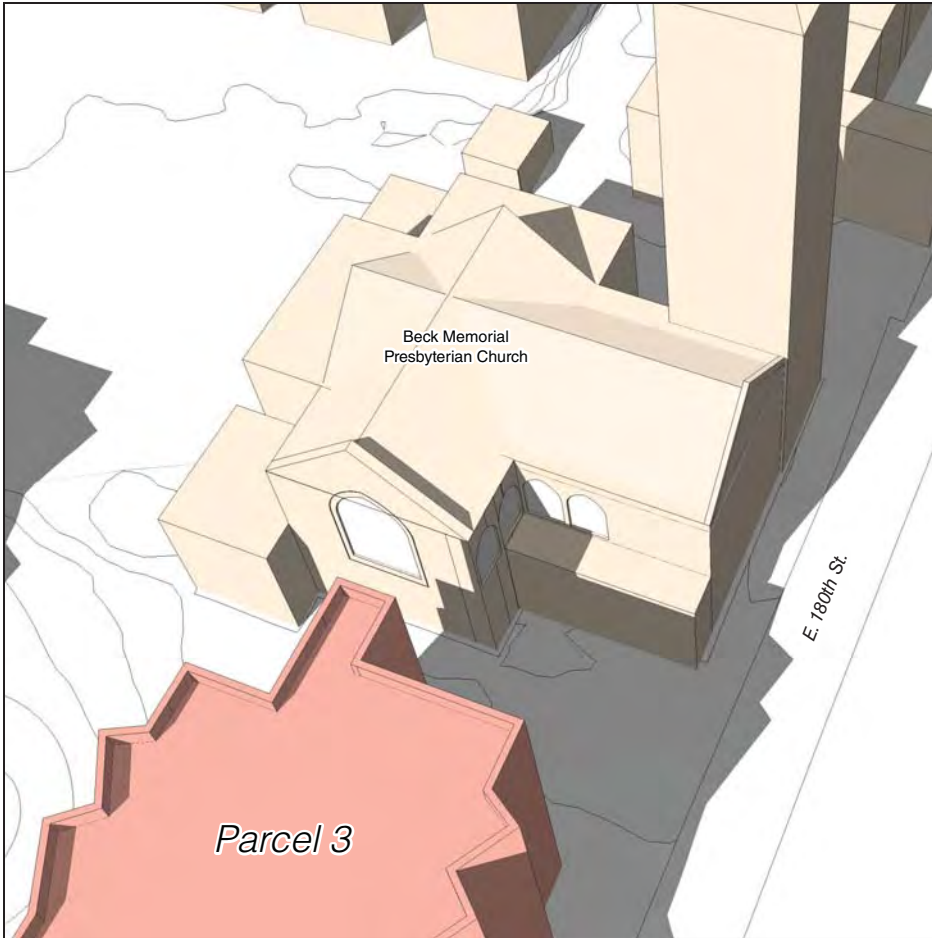
Proposed

 *Historic Landscape or Publicly-Accessible Open Space*

 *Incremental Shadow on Sun-Sensitive Resources*

 *Reduced Shadow on Sun-Sensitive Resources*

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.



No Action



Proposed

*Incremental Shadow on Sun-Sensitive Resources*

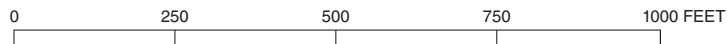




No Action



Proposed



- Historic Landscape or Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resources
- Reduced Shadow on Sun-Sensitive Resources

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.





No Action

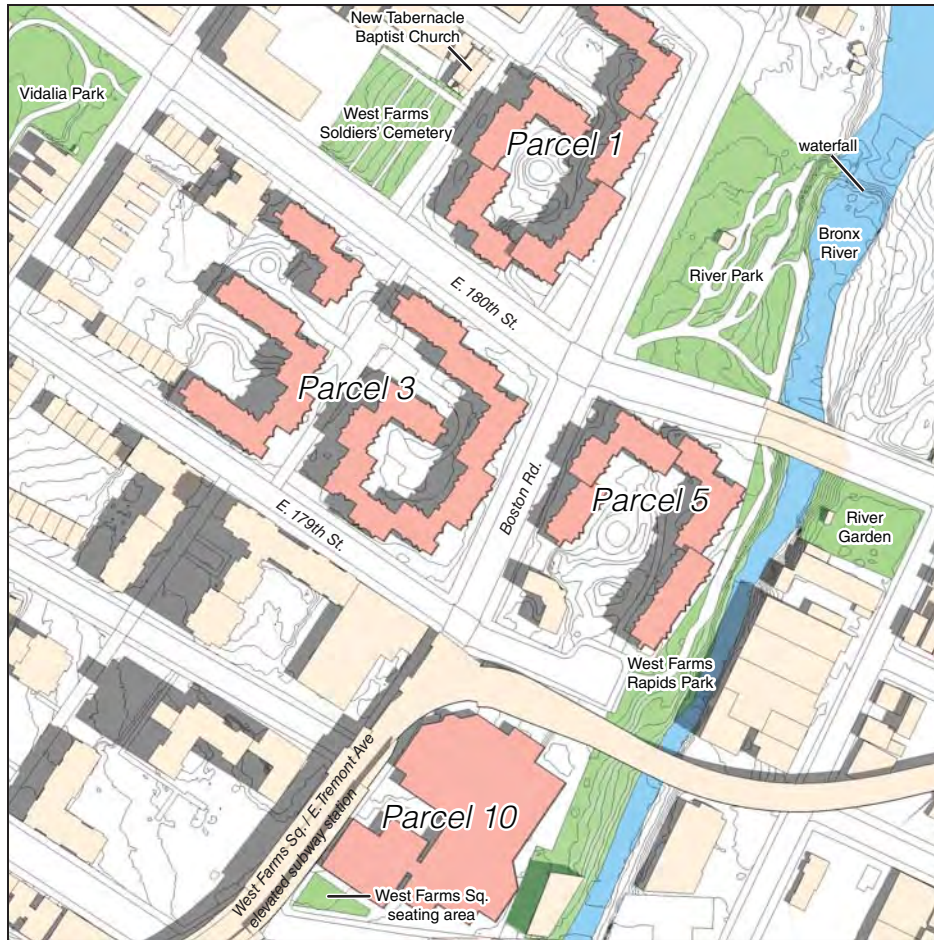


Proposed

- Historic Landscape or Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resources
- Reduced Shadow on Sun-Sensitive Resources

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.

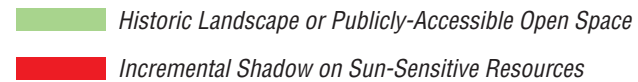




No Action

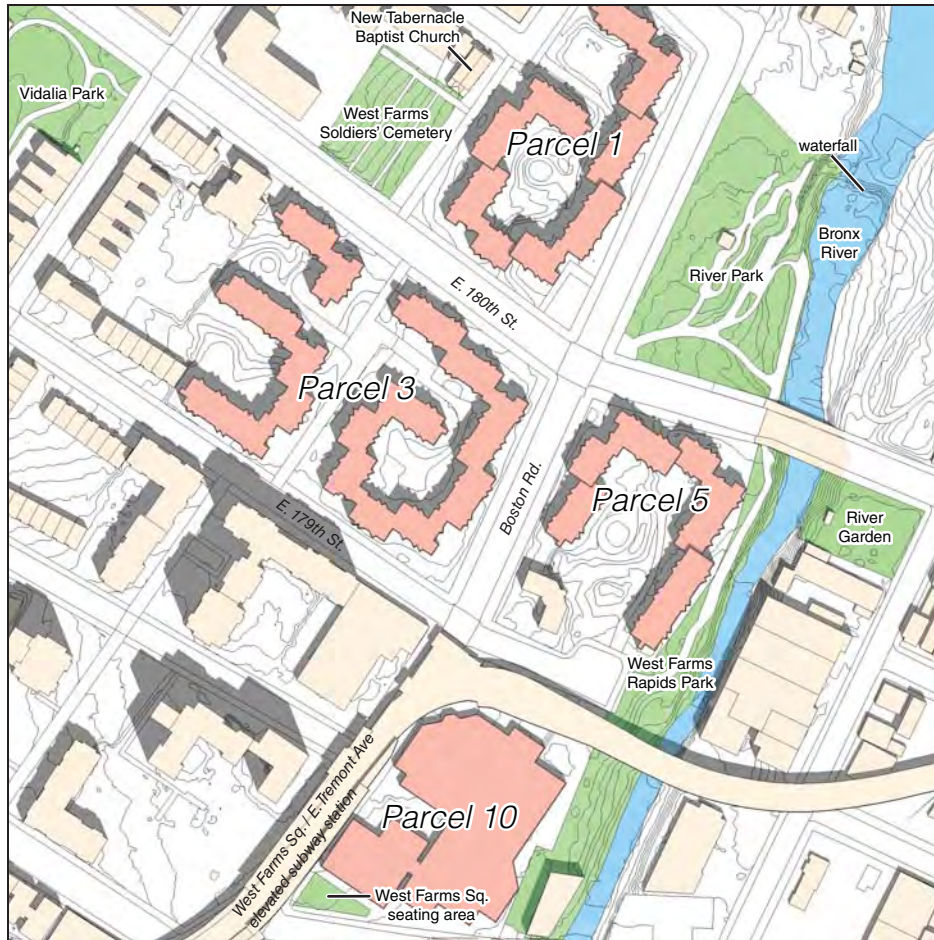


Proposed

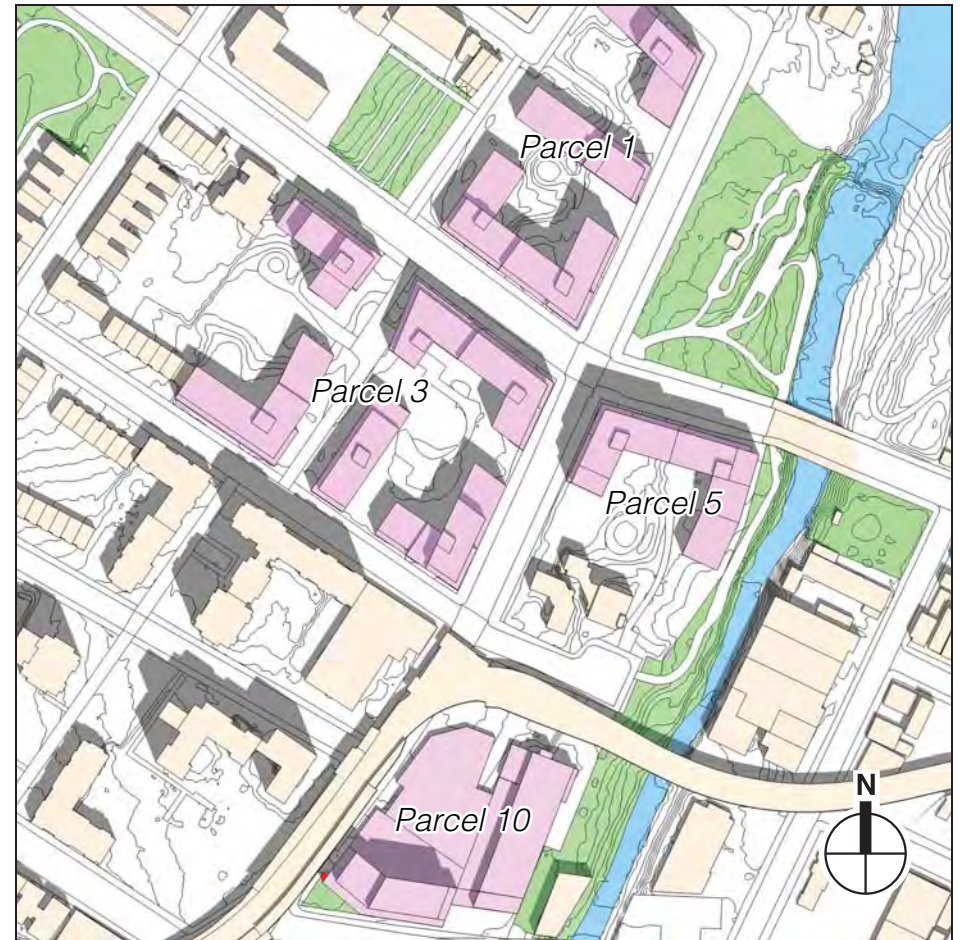


Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently in effect for the March/September, May/August and June analysis periods, add one hour to the given times to determine the actual clock time.

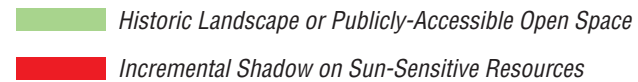




No Action

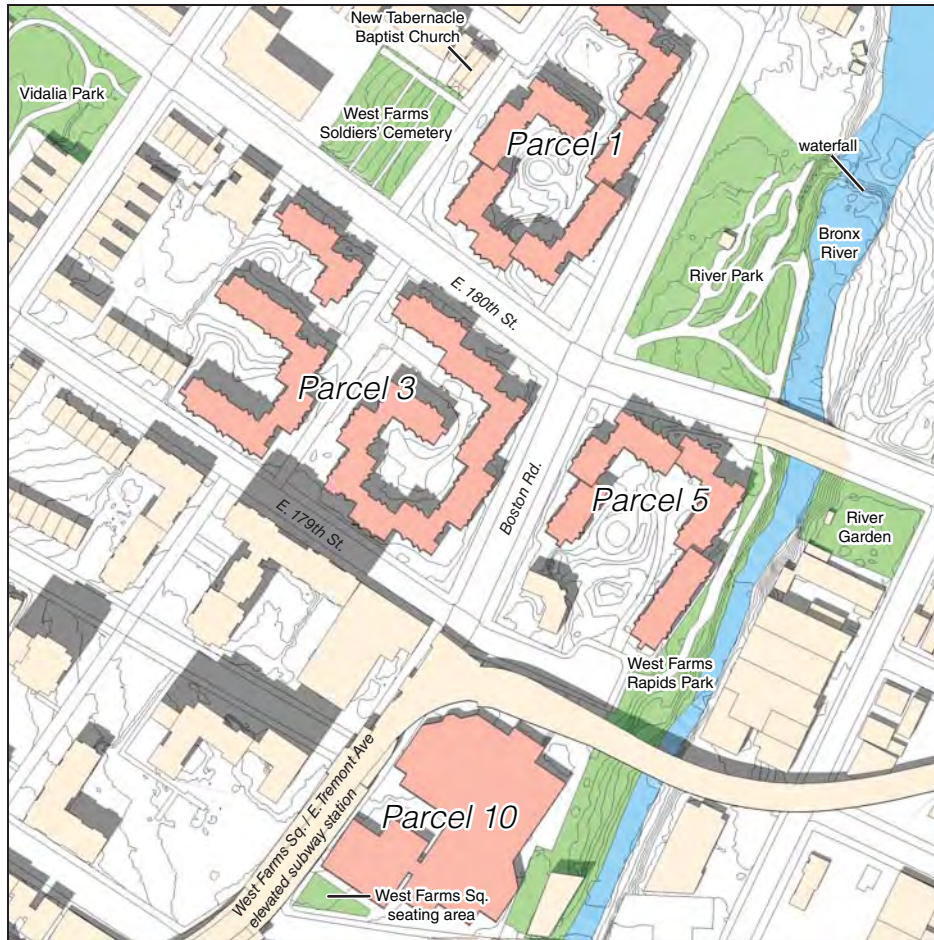


Proposed

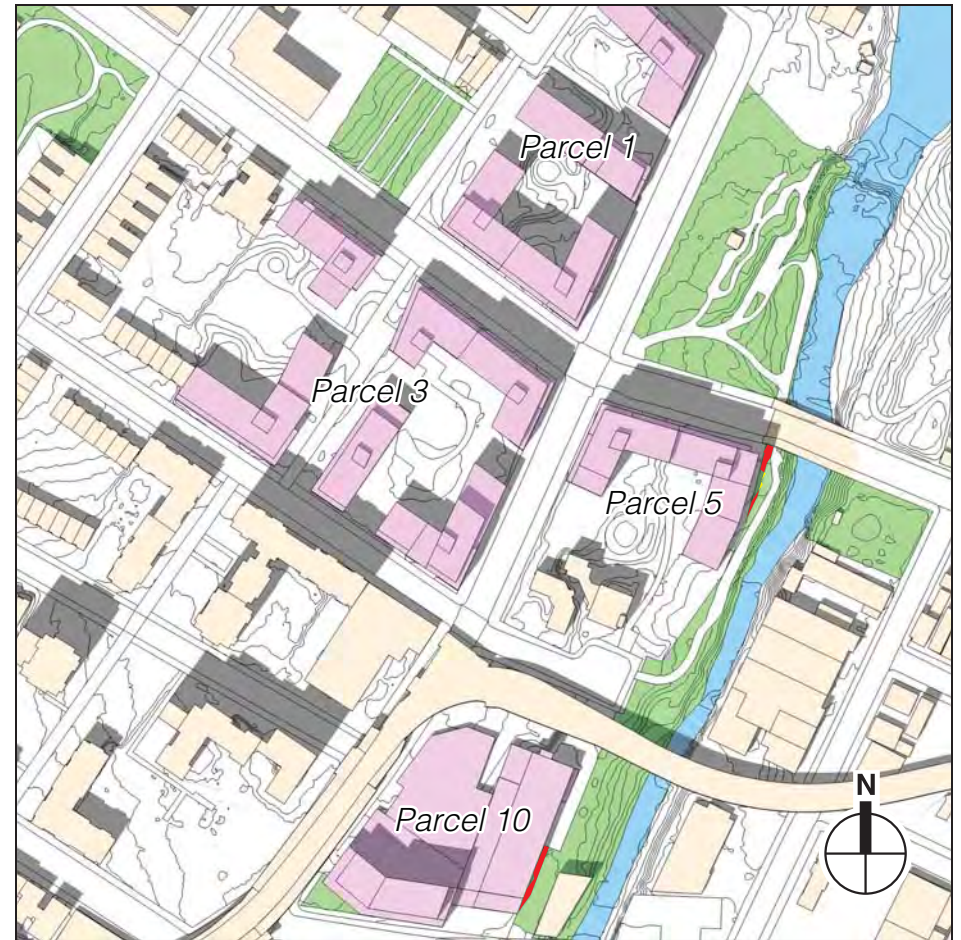


Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently in effect for the March/September, May/August and June analysis periods, add one hour to the given times to determine the actual clock time.





No Action



Proposed

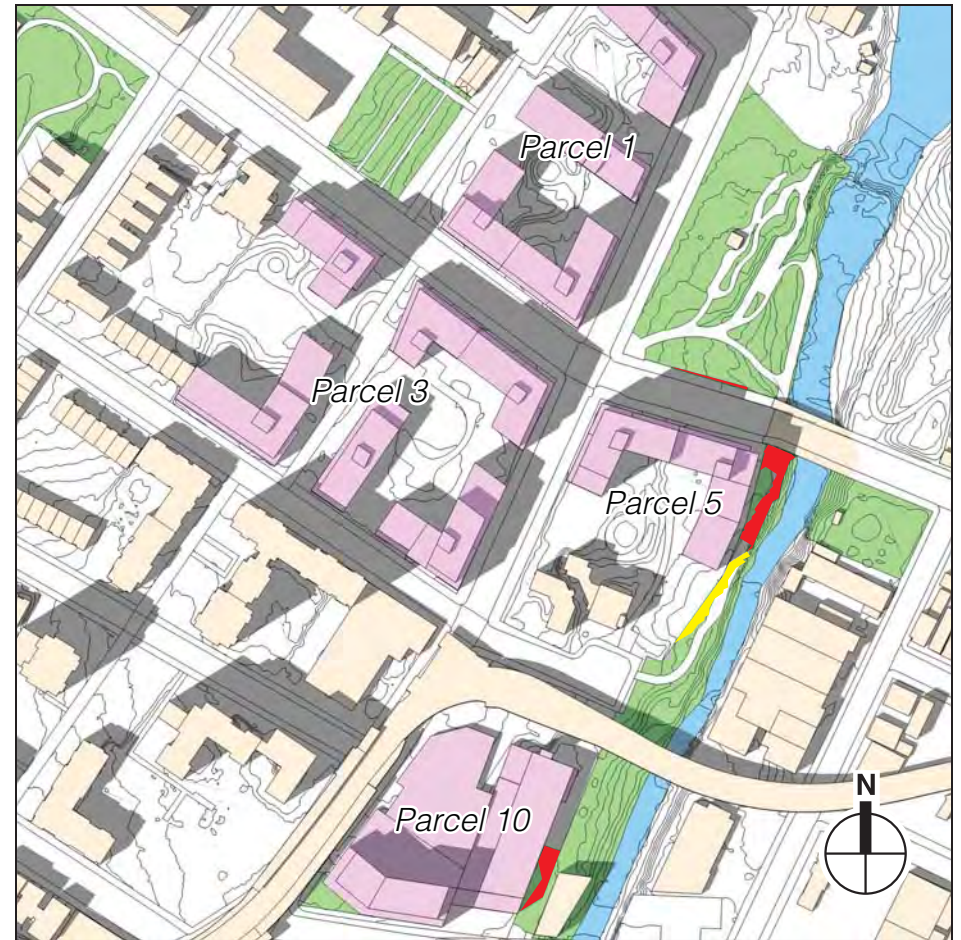
- Historic Landscape or Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resources
- Reduced Shadow on Sun-Sensitive Resources

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.





No Action



Proposed

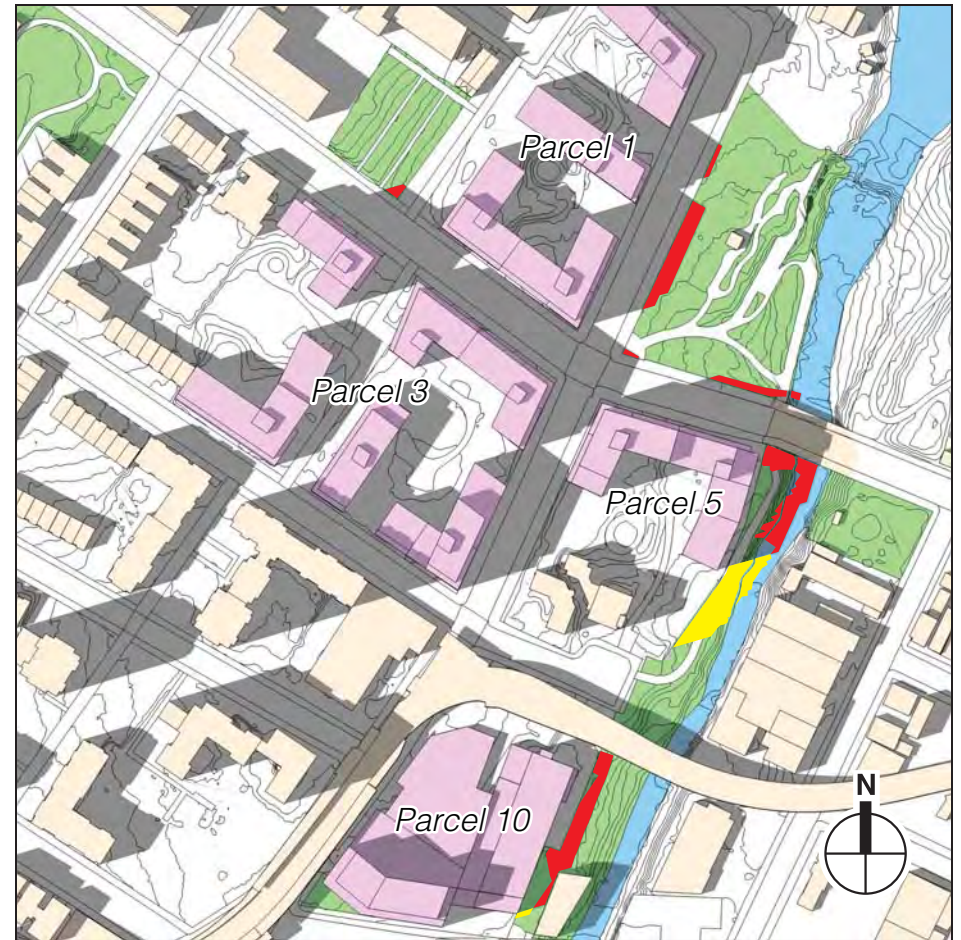
- Historic Landscape or Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resources
- Reduced Shadow on Sun-Sensitive Resources

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.






No Action



Proposed

 Historic Landscape or Publicly-Accessible Open Space

 Incremental Shadow on Sun-Sensitive Resources

 Reduced Shadow on Sun-Sensitive Resources

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.

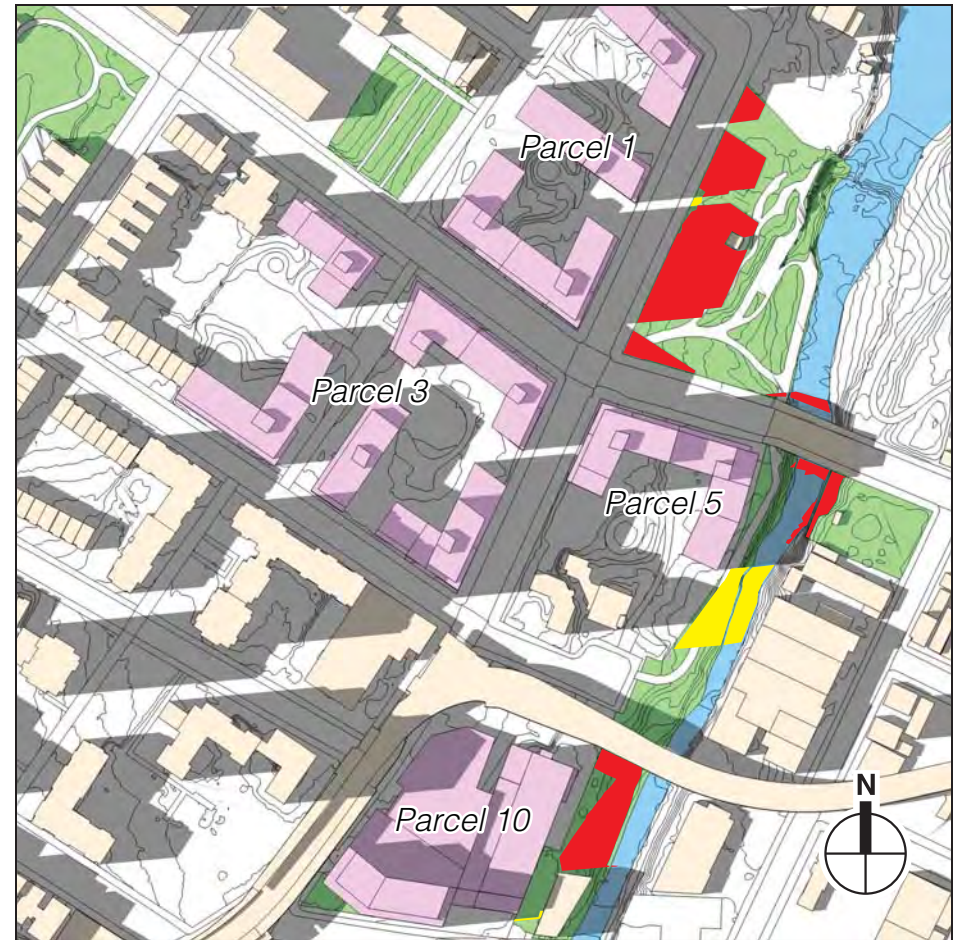
**May 6 / August 6 - 3:00 PM**

Figure 6-33

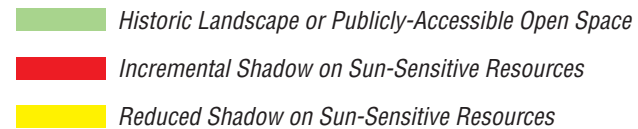




No Action



Proposed



Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.

May 6 / August 6 - 4:00 PM

Figure 6-34





No Action



Proposed

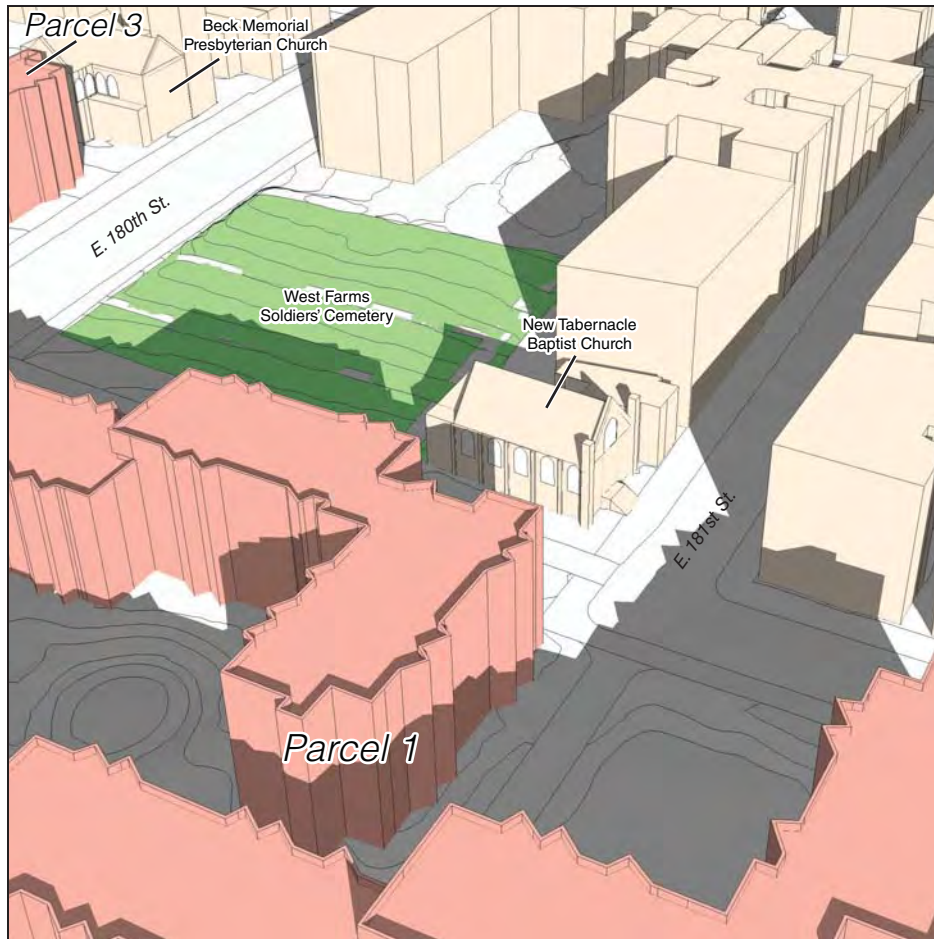
- Historic Landscape or Publicly-Accessible Open Space*
- Incremental Shadow on Sun-Sensitive Resources*
- Reduced Shadow on Sun-Sensitive Resources*

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.

**May 6 / August 6 - 5:00 PM**  
Figure 6-35




1.27.16



No Action



Proposed

 *Historic Landscape or Publicly-Accessible Open Space*

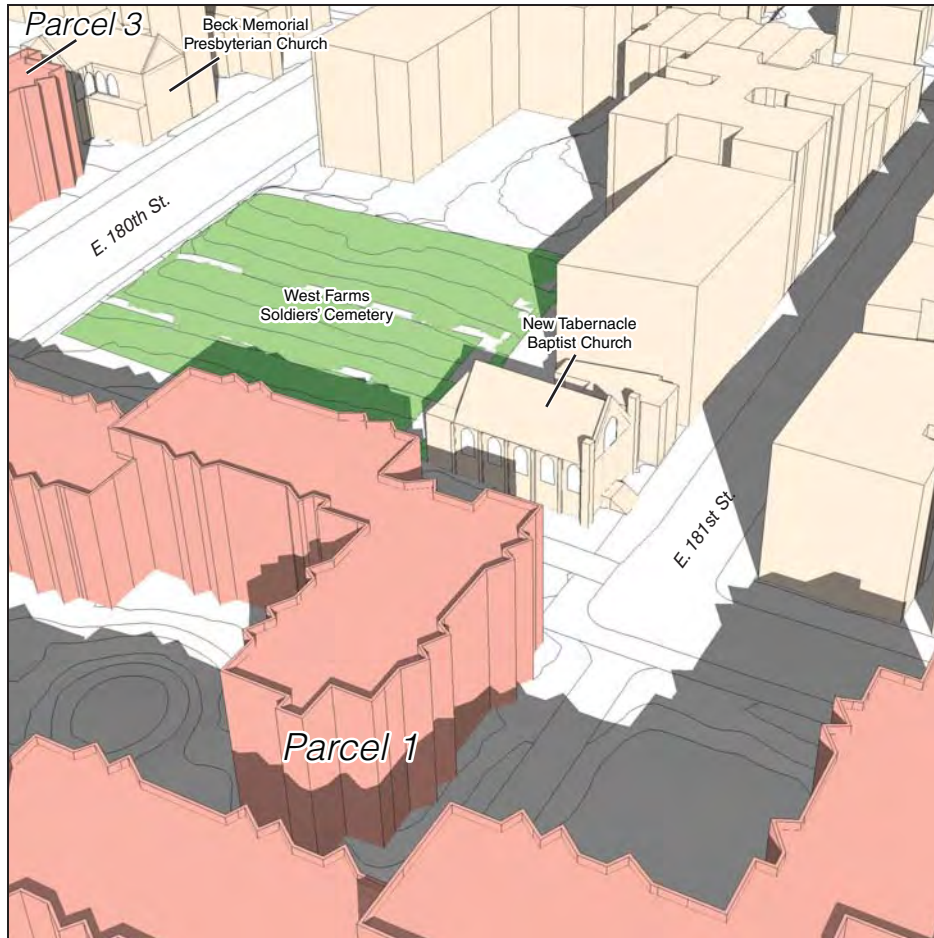
 *Incremental Shadow on Sun-Sensitive Resources*

 *Reduced Shadow on Sun-Sensitive Resources*

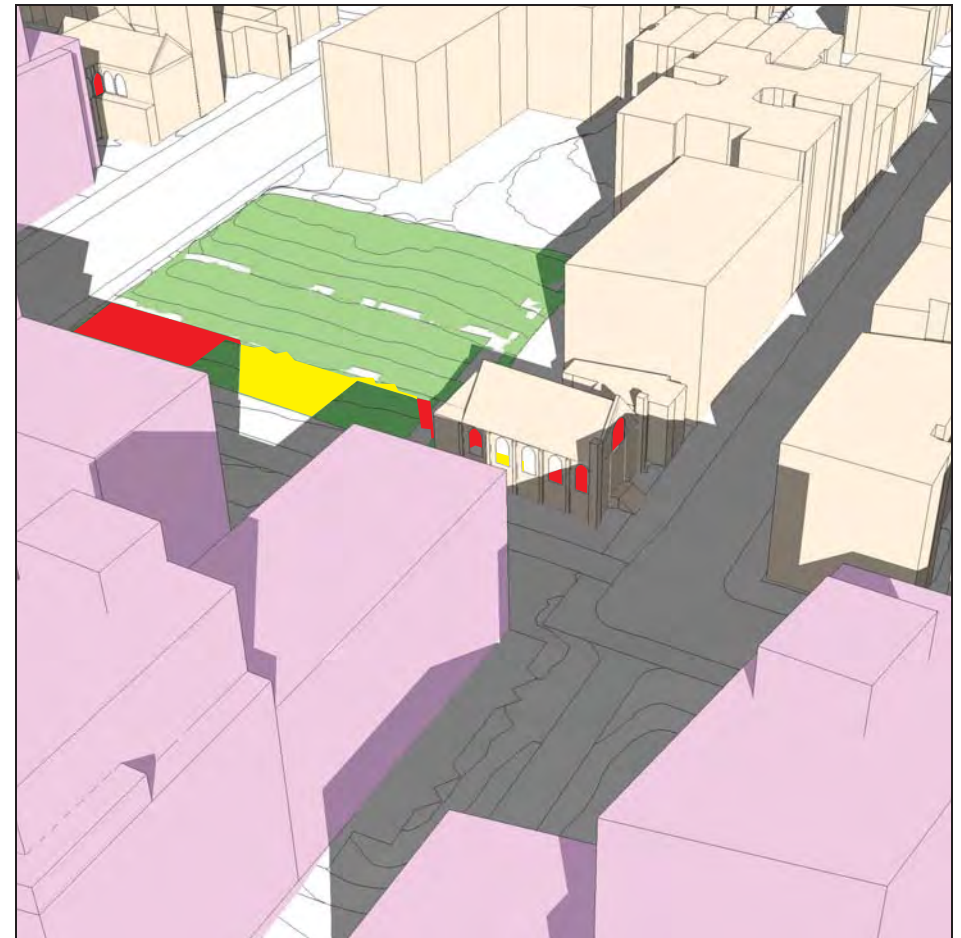
Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently in effect for the March/September, May/August and June analysis periods, add one hour to the given times to determine the actual clock time.




1.27.16



No Action



Proposed

 *Historic Landscape or Publicly-Accessible Open Space*

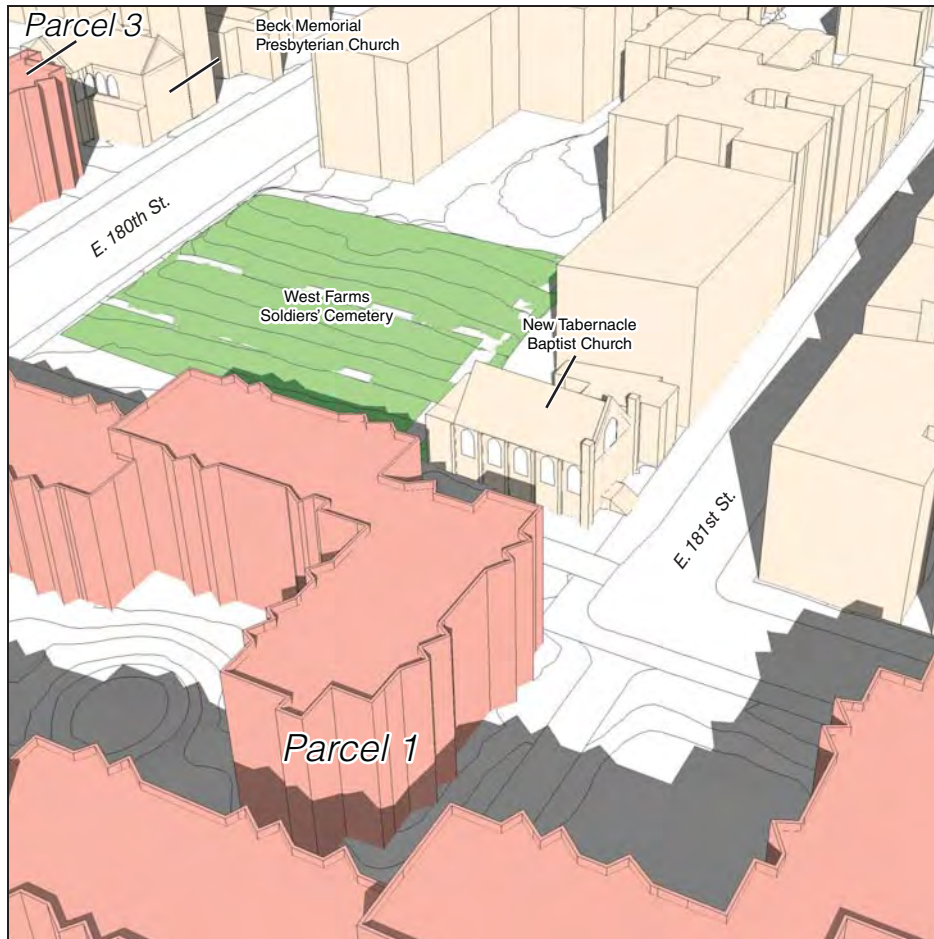
 *Incremental Shadow on Sun-Sensitive Resources*

 *Reduced Shadow on Sun-Sensitive Resources*

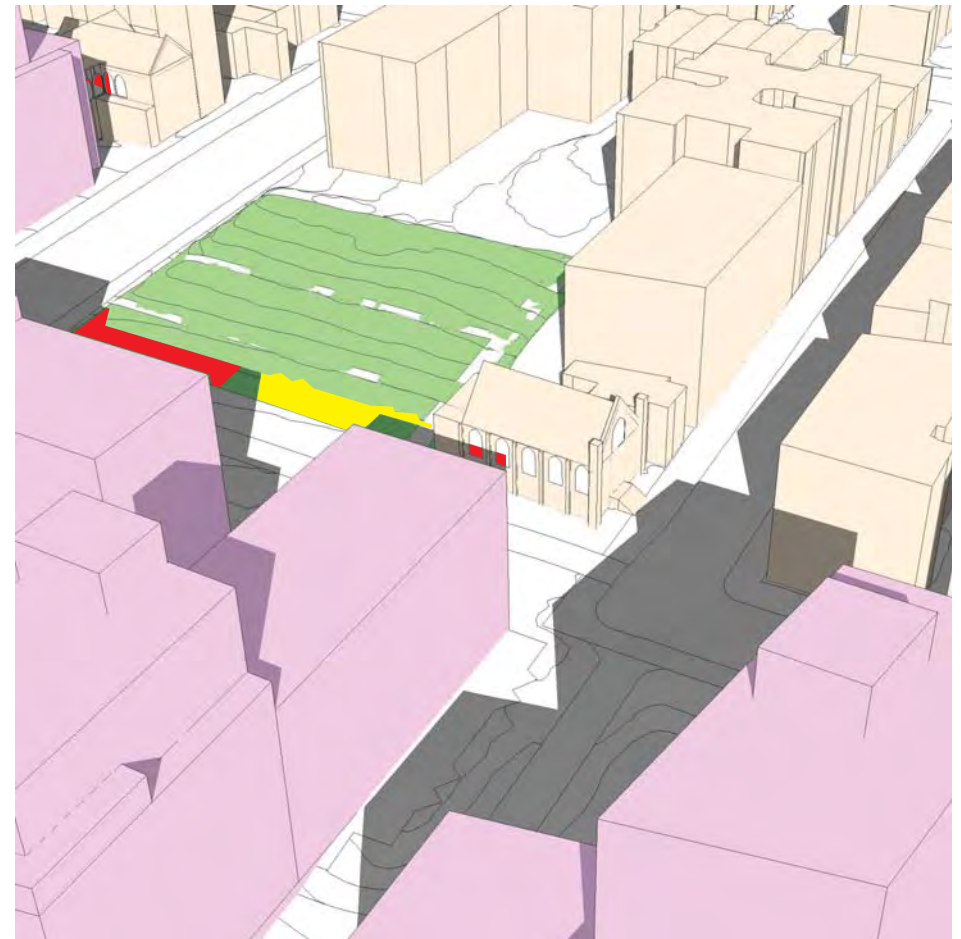
Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently in effect for the March/September, May/August and June analysis periods, add one hour to the given times to determine the actual clock time.




1.27.16



No Action



Proposed

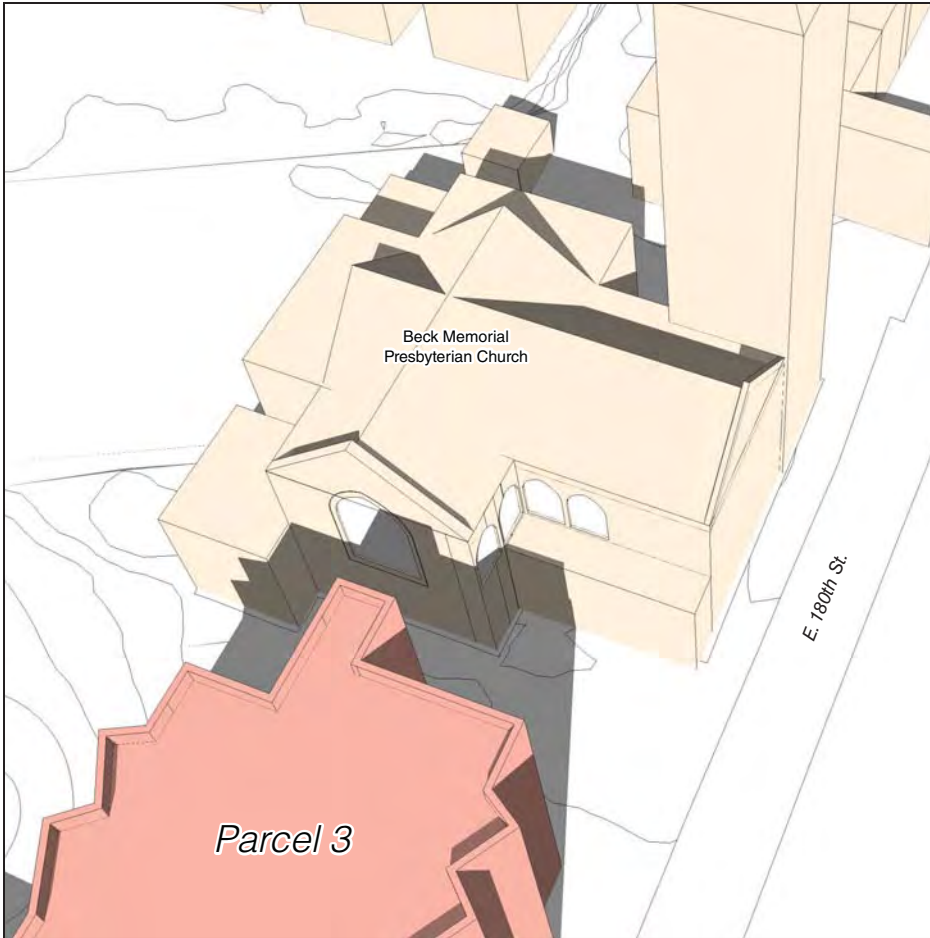
 *Historic Landscape or Publicly-Accessible Open Space*

 *Incremental Shadow on Sun-Sensitive Resources*

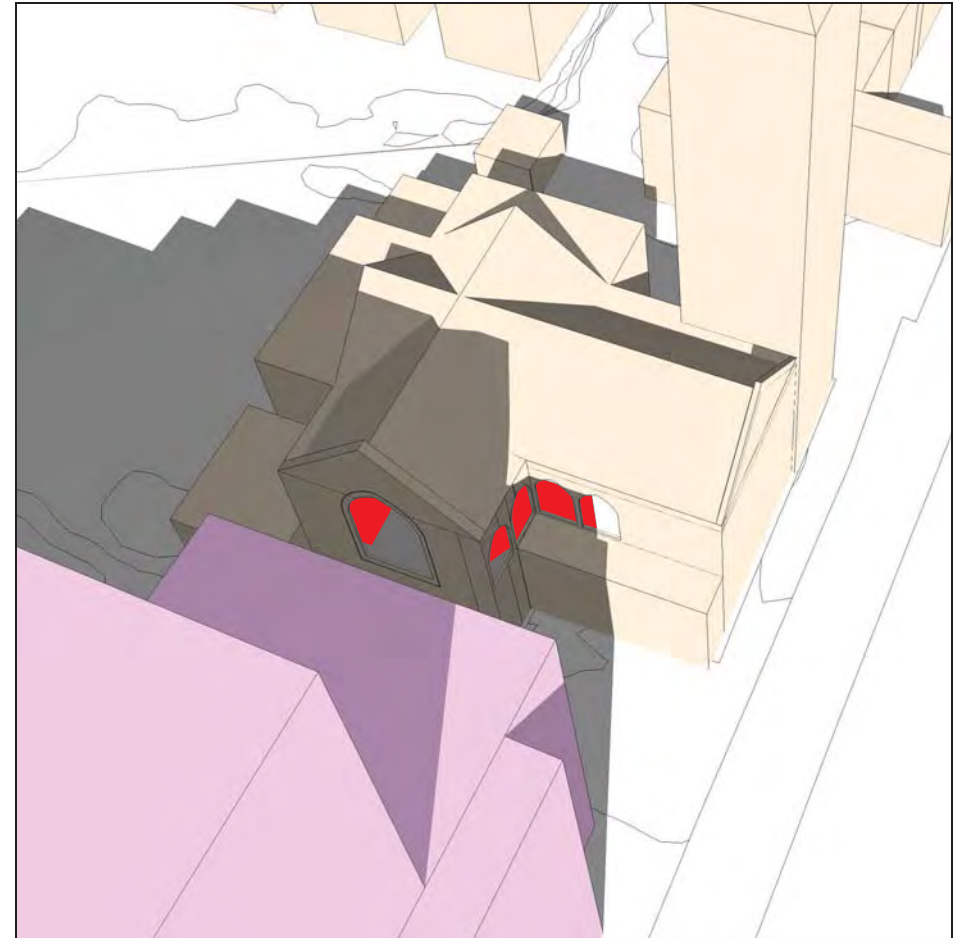
 *Reduced Shadow on Sun-Sensitive Resources*

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.





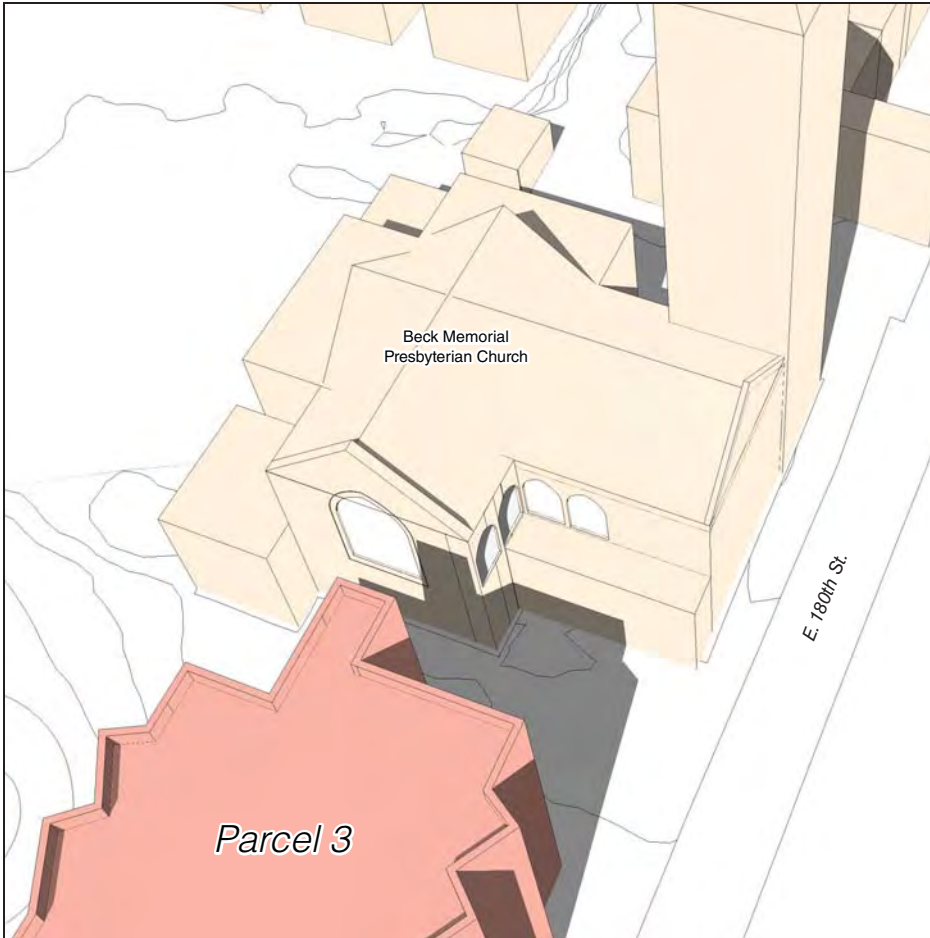
No Action



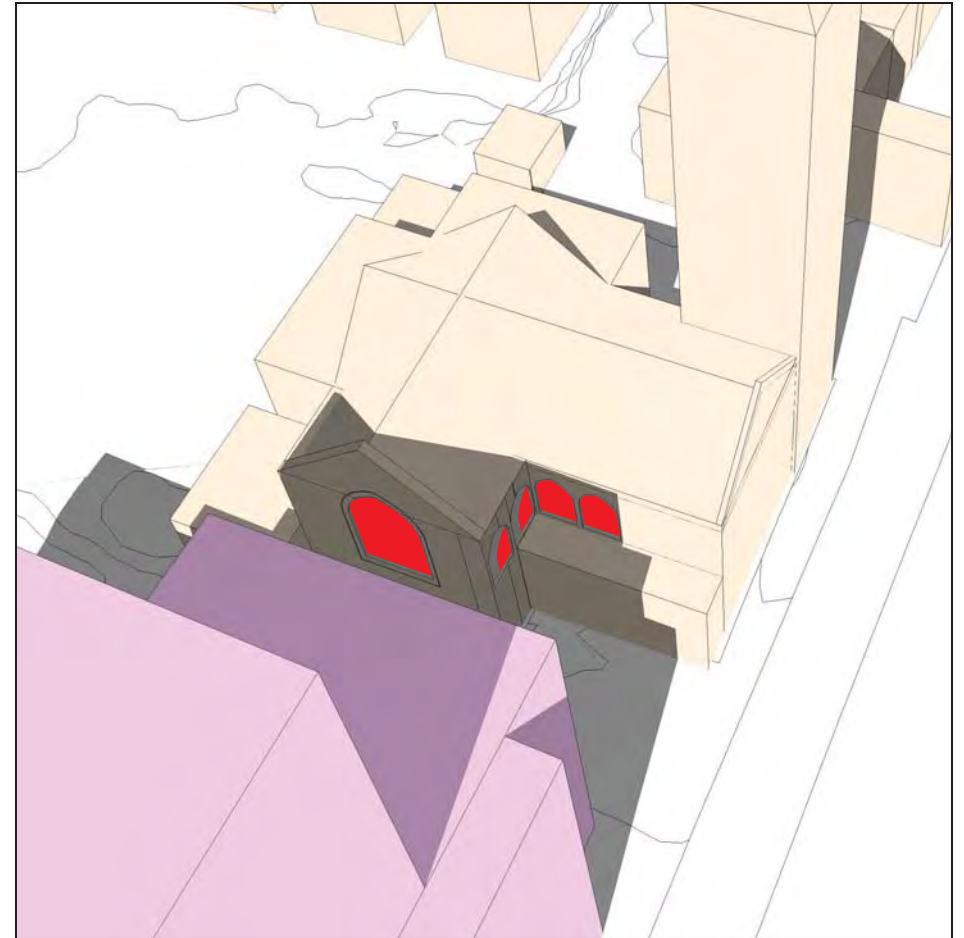
Proposed

Incremental Shadow on Sun-Sensitive Resources





No Action

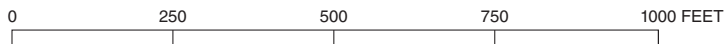


Proposed


*Incremental Shadow on Sun-Sensitive Resources*



No Action



Proposed

 Historic Landscape or Publicly-Accessible Open Space

 Incremental Shadow on Sun-Sensitive Resources

 Reduced Shadow on Sun-Sensitive Resources

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.

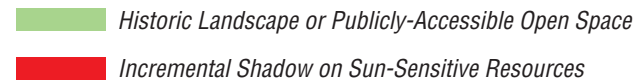




No Action

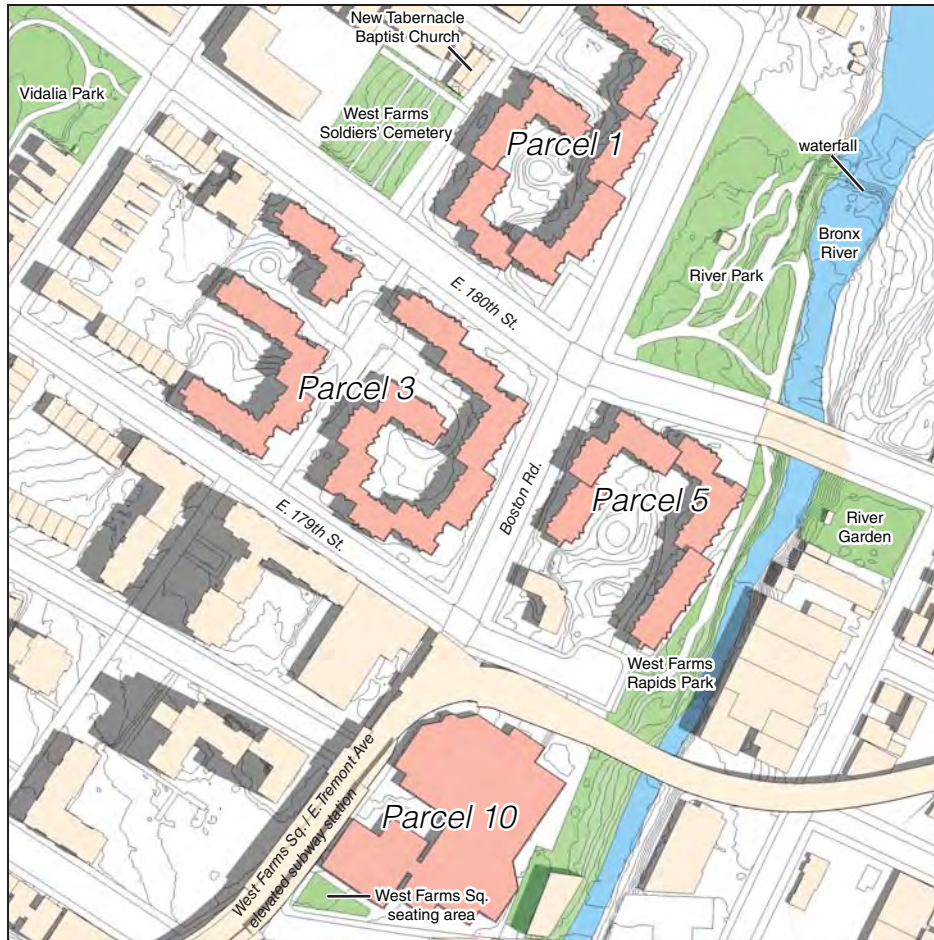


Proposed

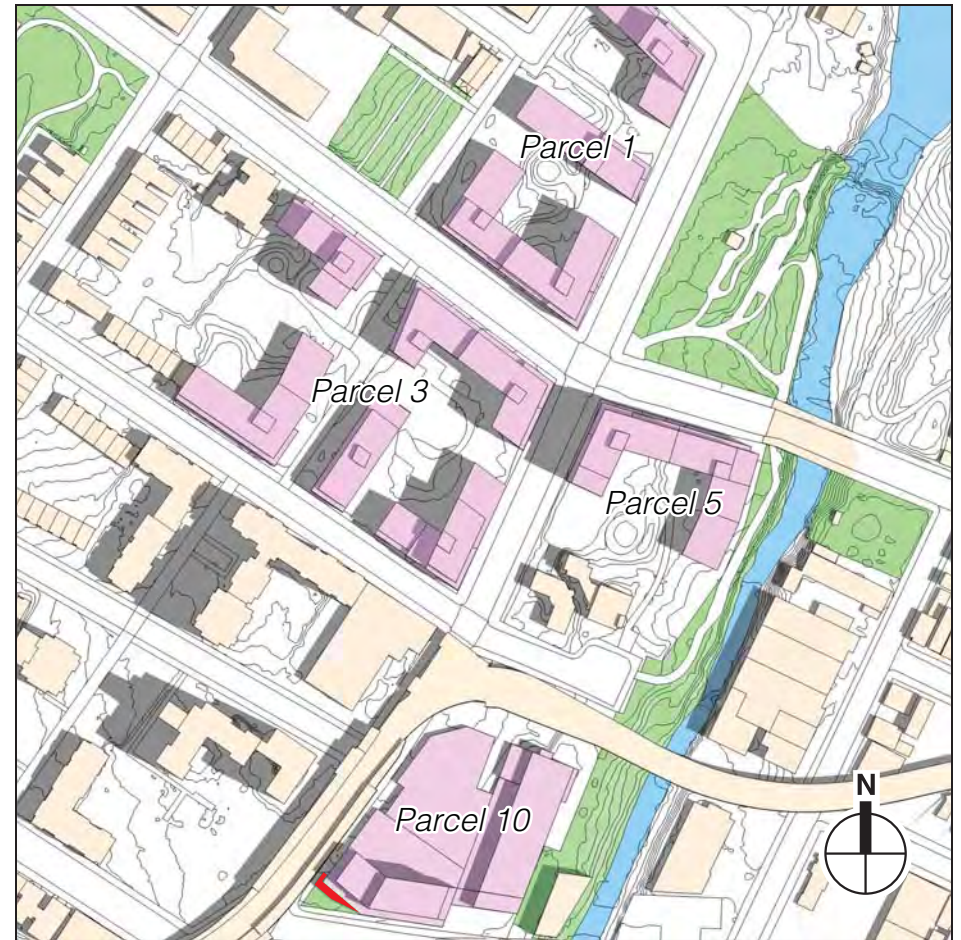


Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently in effect for the March/September, May/August and June analysis periods, add one hour to the given times to determine the actual clock time.

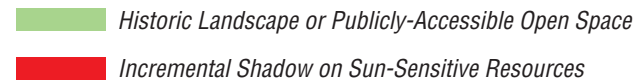




No Action

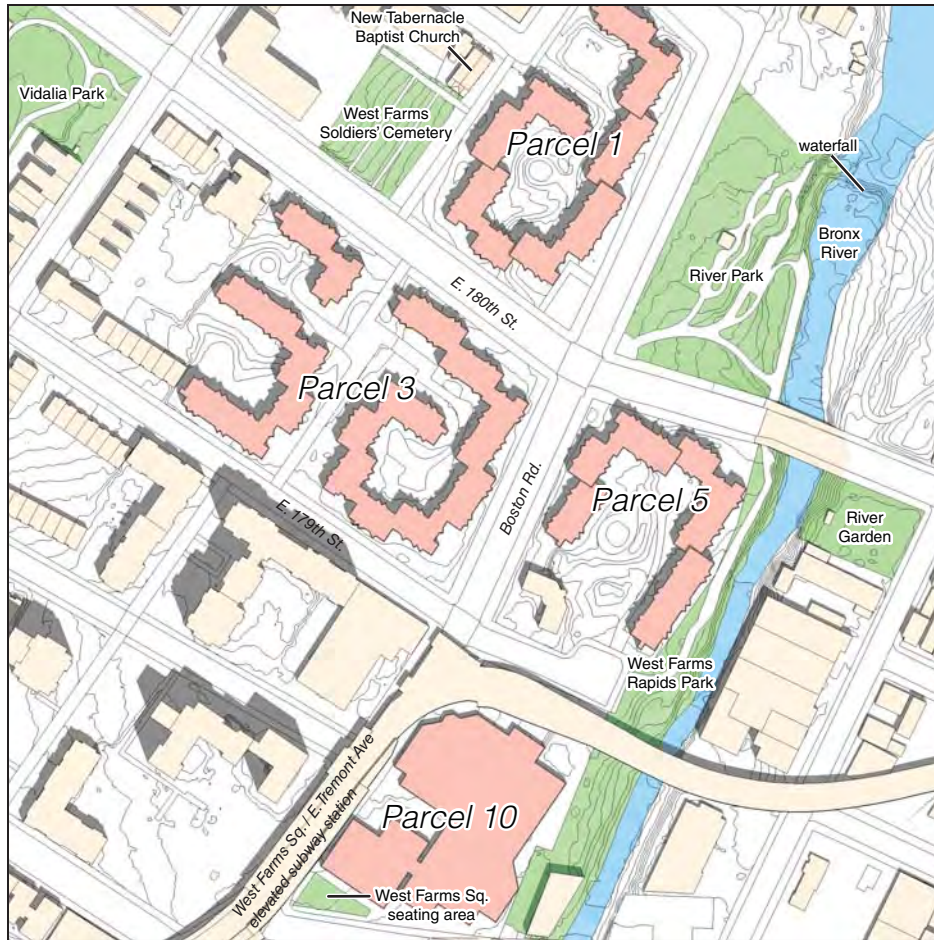


Proposed

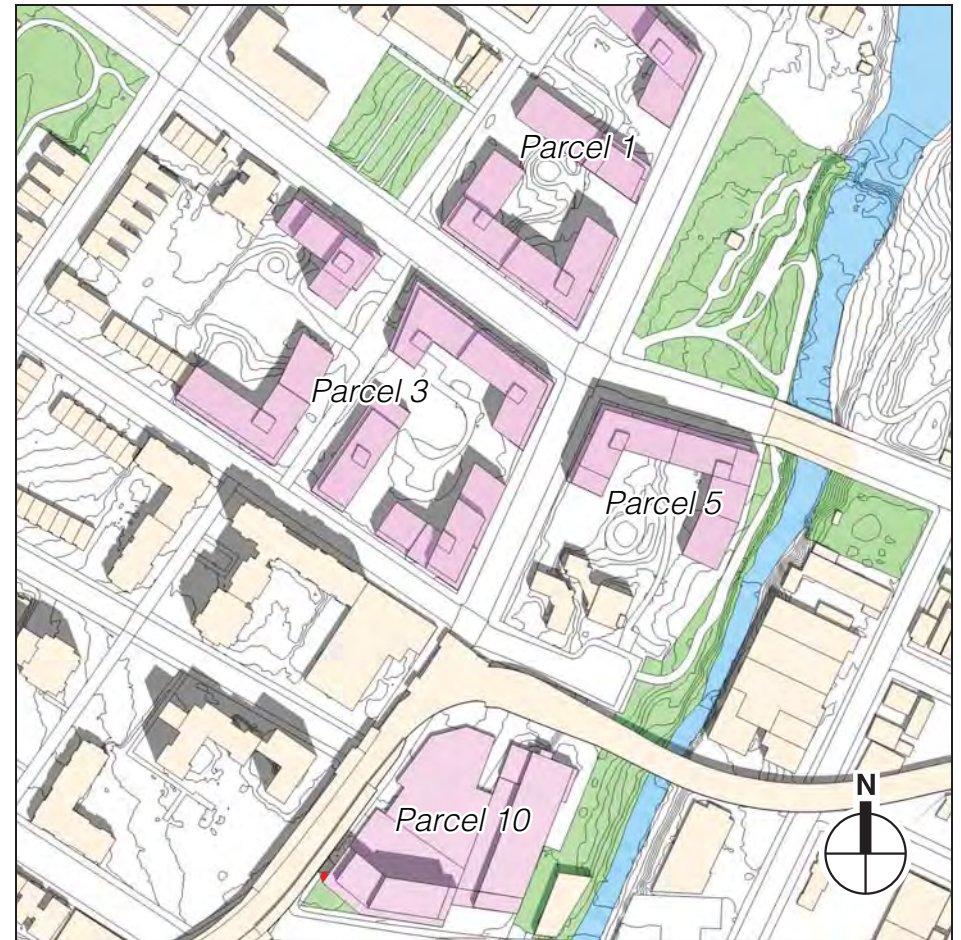


Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently in effect for the March/September, May/August and June analysis periods, add one hour to the given times to determine the actual clock time.

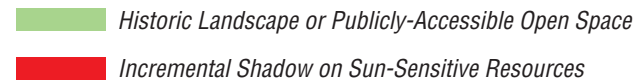




No Action

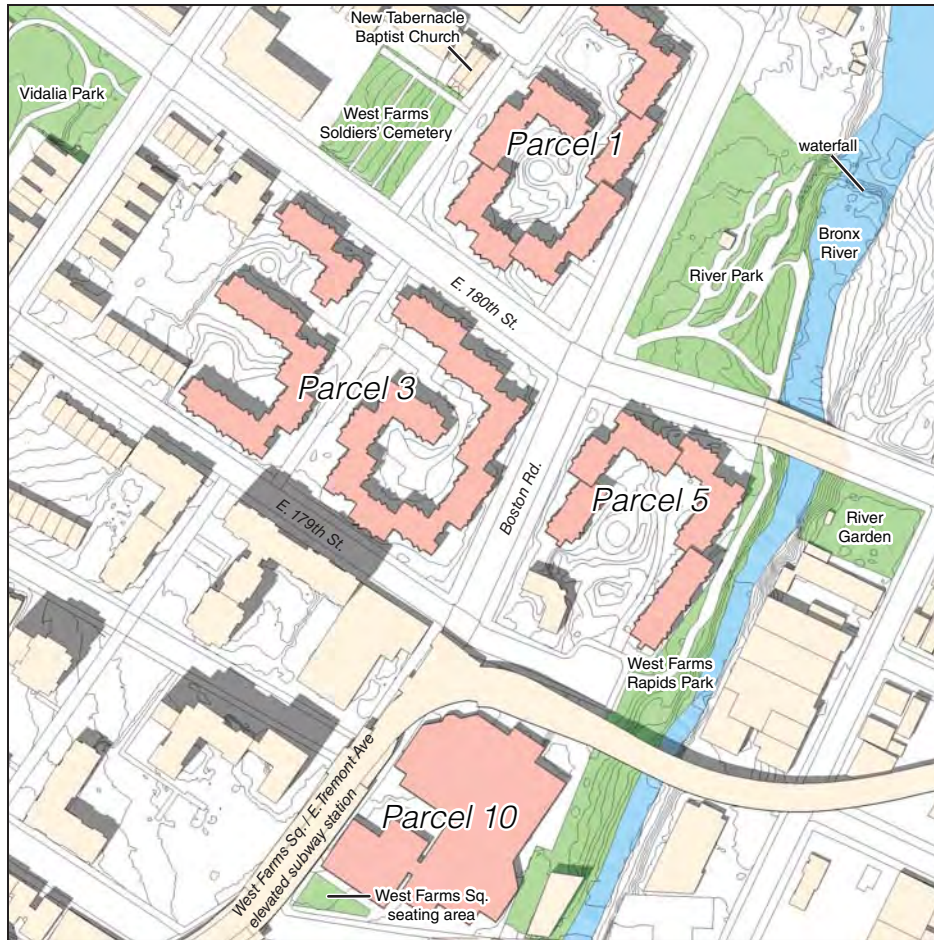


Proposed

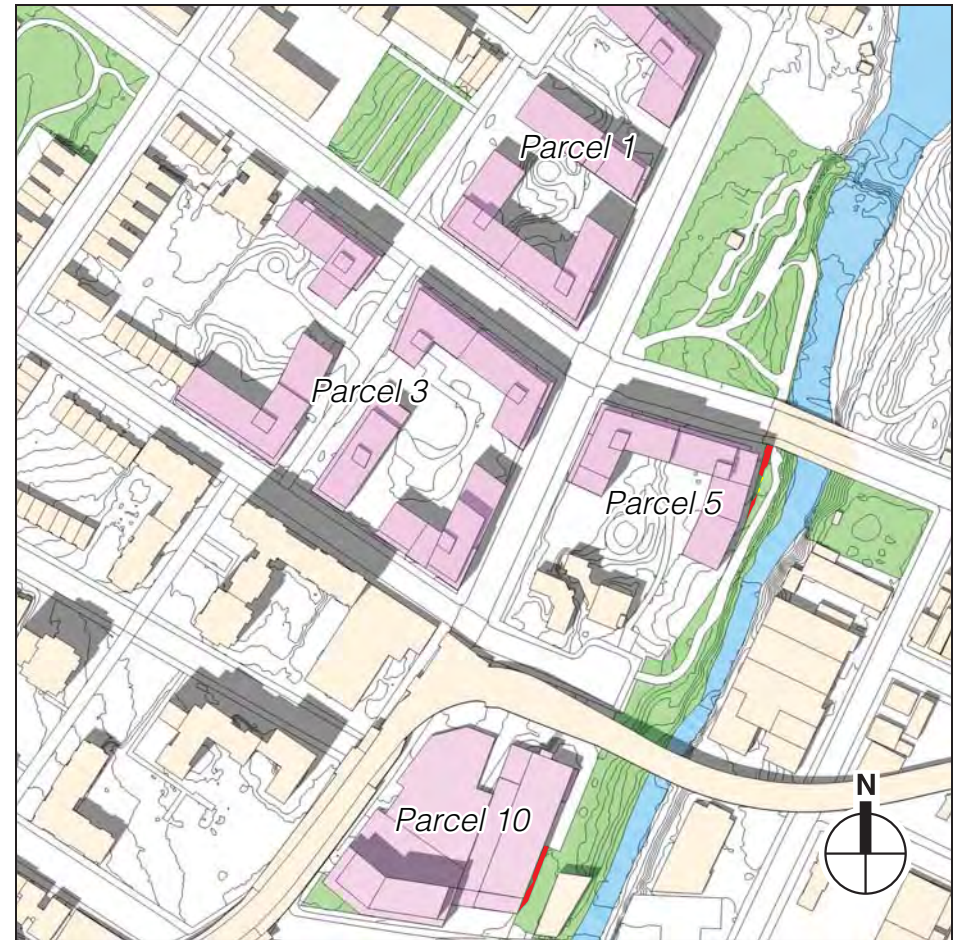


Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently in effect for the March/September, May/August and June analysis periods, add one hour to the given times to determine the actual clock time.

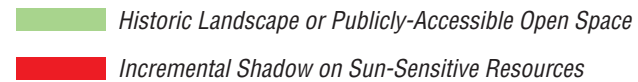




No Action



Proposed

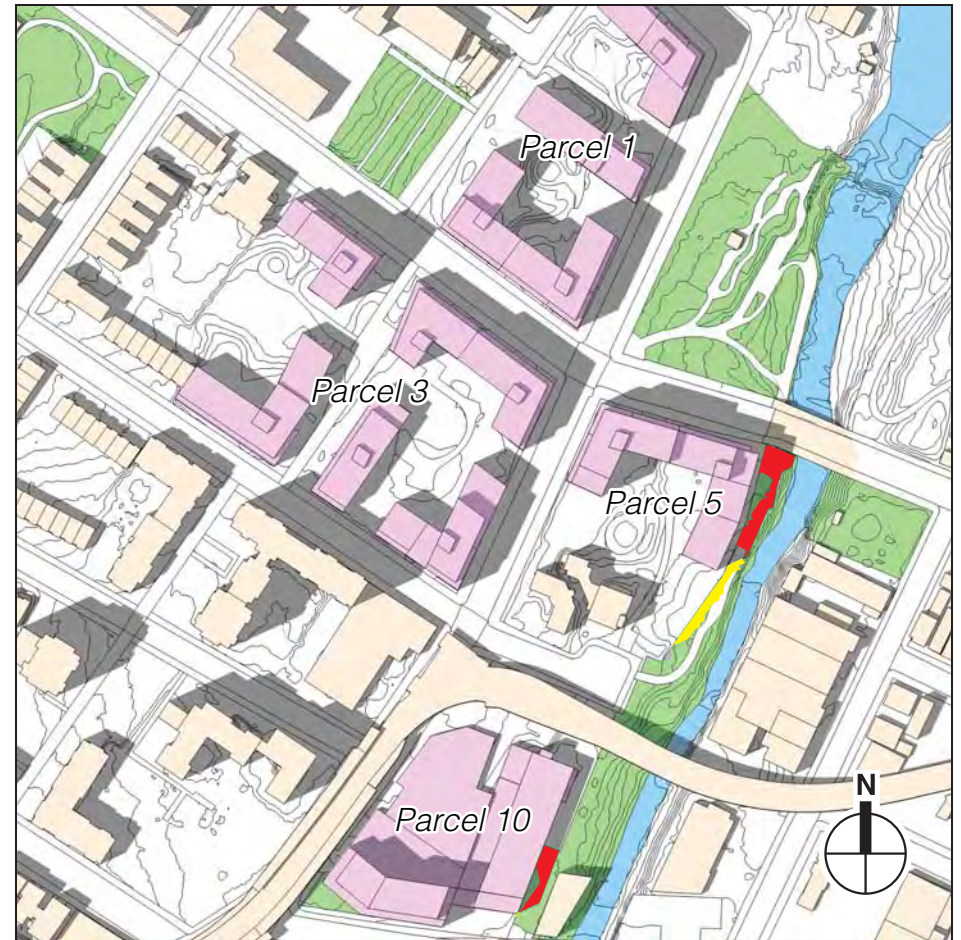


Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently in effect for the March/September, May/August and June analysis periods, add one hour to the given times to determine the actual clock time.





No Action



Proposed

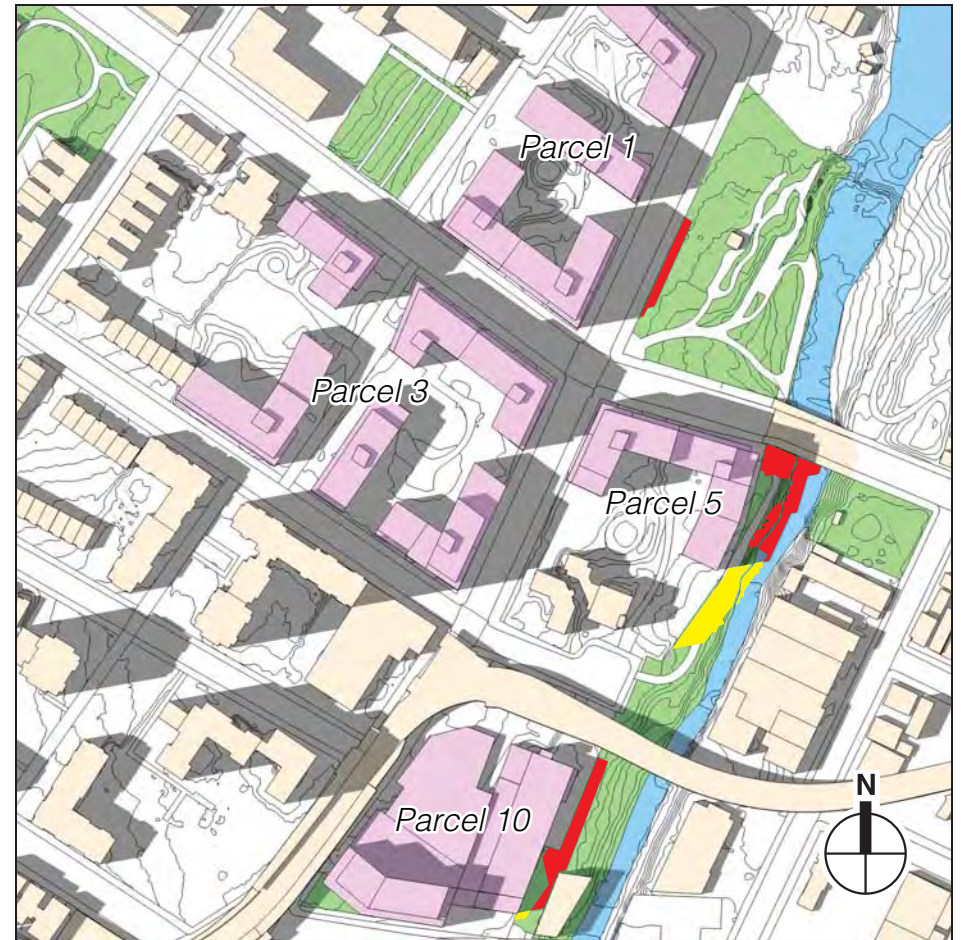
- Historic Landscape or Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resources
- Reduced Shadow on Sun-Sensitive Resources

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.





No Action



Proposed

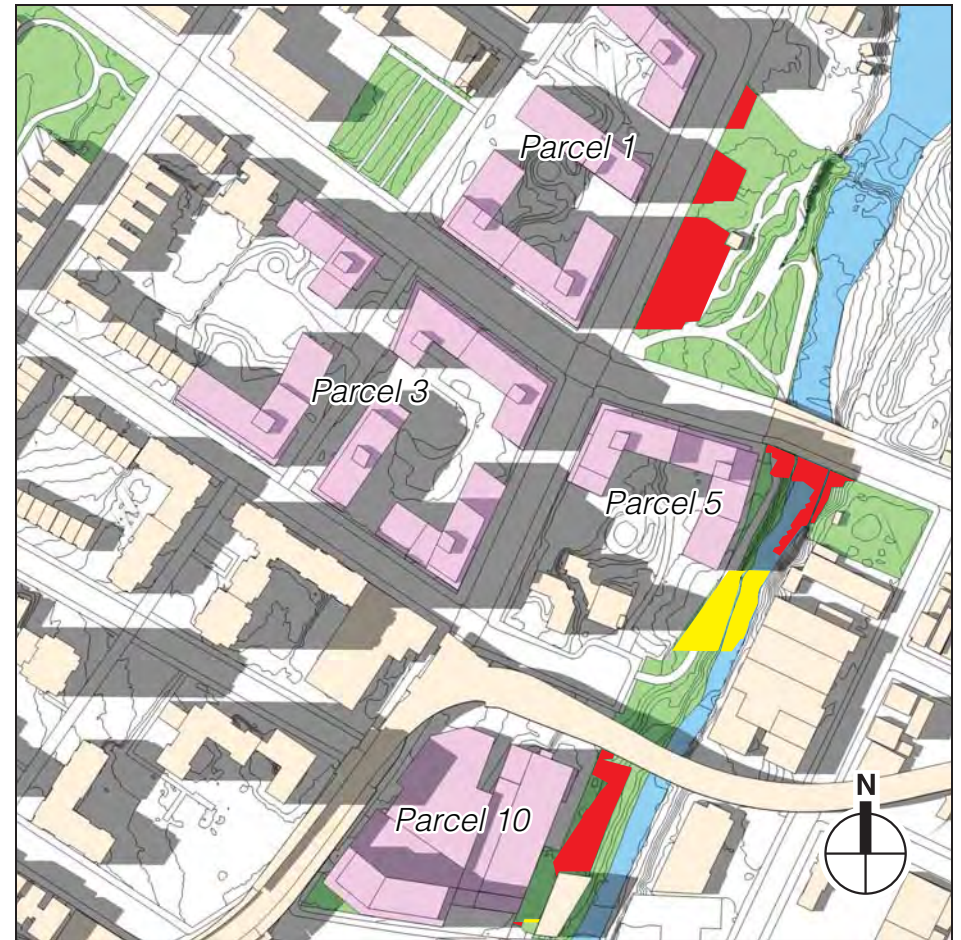
- Historic Landscape or Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resources
- Reduced Shadow on Sun-Sensitive Resources

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.

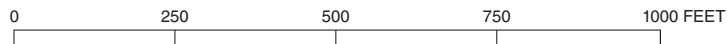




No Action



Proposed



- Historic Landscape or Publicly-Accessible Open Space*
- Incremental Shadow on Sun-Sensitive Resources*
- Reduced Shadow on Sun-Sensitive Resources*

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.





No Action



Proposed

- Historic Landscape or Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resources
- Reduced Shadow on Sun-Sensitive Resources

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.

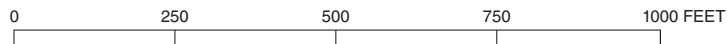




No Action



Proposed



- Historic Landscape or Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resources
- Reduced Shadow on Sun-Sensitive Resources

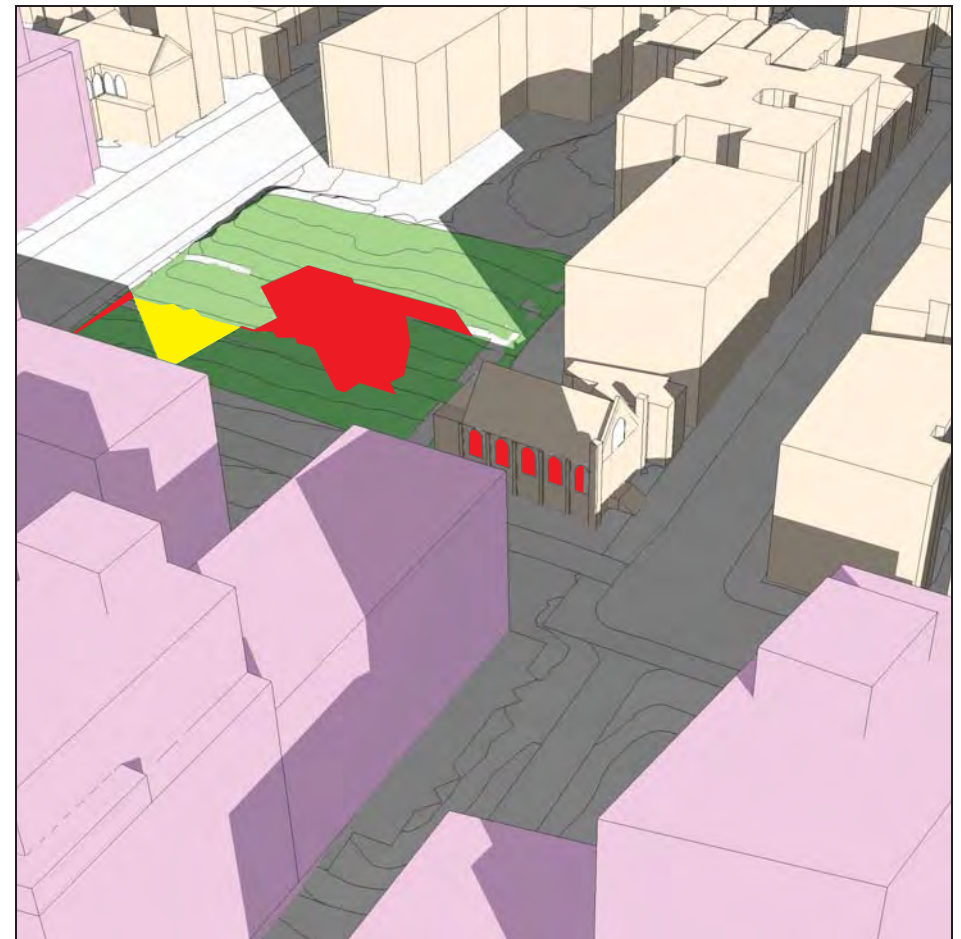
Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently in effect for the March/September, May/August and June analysis periods, add one hour to the given times to determine the actual clock time.




1.27.16



No Action



Proposed

 *Historic Landscape or Publicly-Accessible Open Space*

 *Incremental Shadow on Sun-Sensitive Resources*

 *Reduced Shadow on Sun-Sensitive Resources*

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.

**June 21 - View Southwest - 6:15 AM**

Figure 6-51






No Action



Proposed

 *Historic Landscape or Publicly-Accessible Open Space*

 *Incremental Shadow on Sun-Sensitive Resources*

 *Reduced Shadow on Sun-Sensitive Resources*

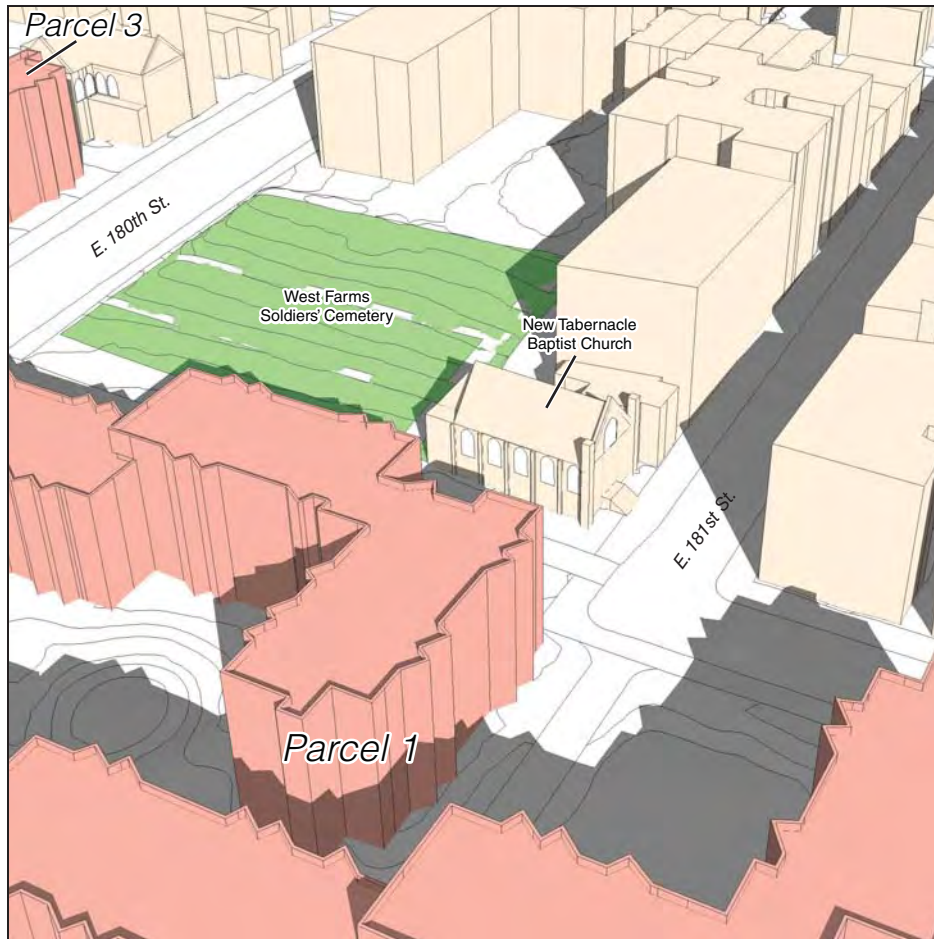
Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently in effect for the March/September, May/August and June analysis periods, add one hour to the given times to determine the actual clock time.

**June 21 - View Southwest - 6:45 AM**

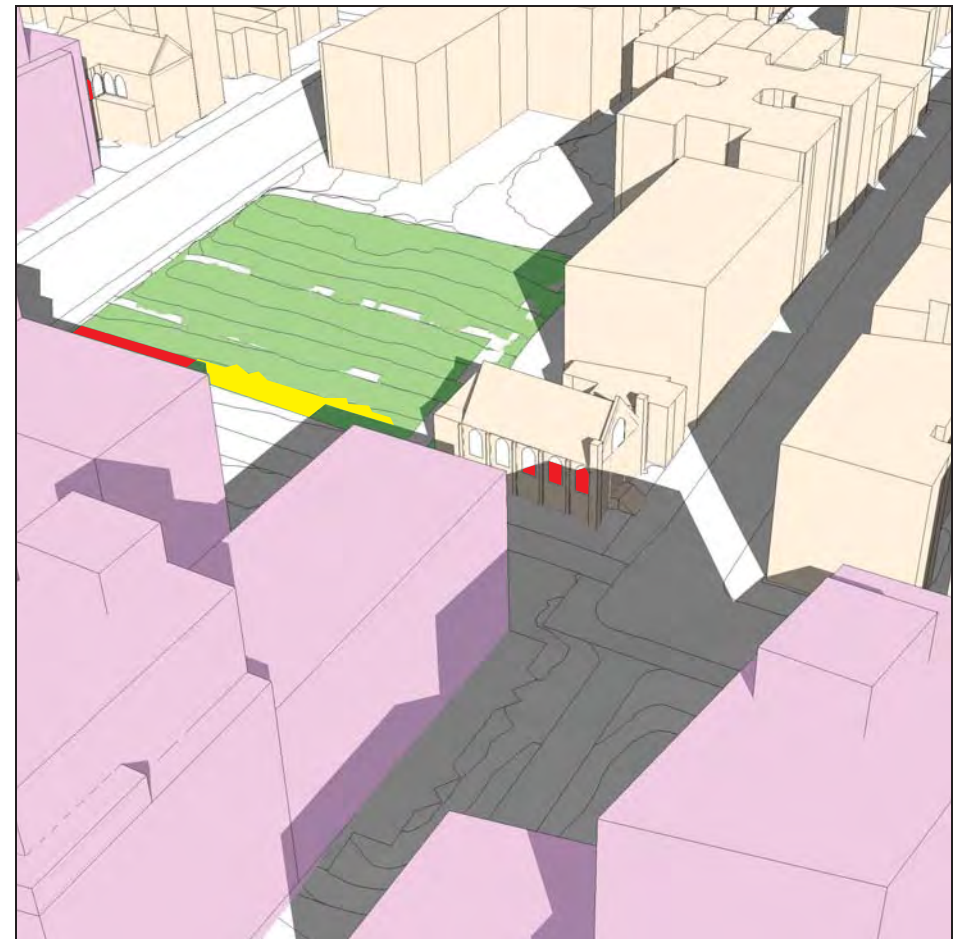
Figure 6-52




1.27.16



No Action



Proposed

 *Historic Landscape or Publicly-Accessible Open Space*

 *Incremental Shadow on Sun-Sensitive Resources*

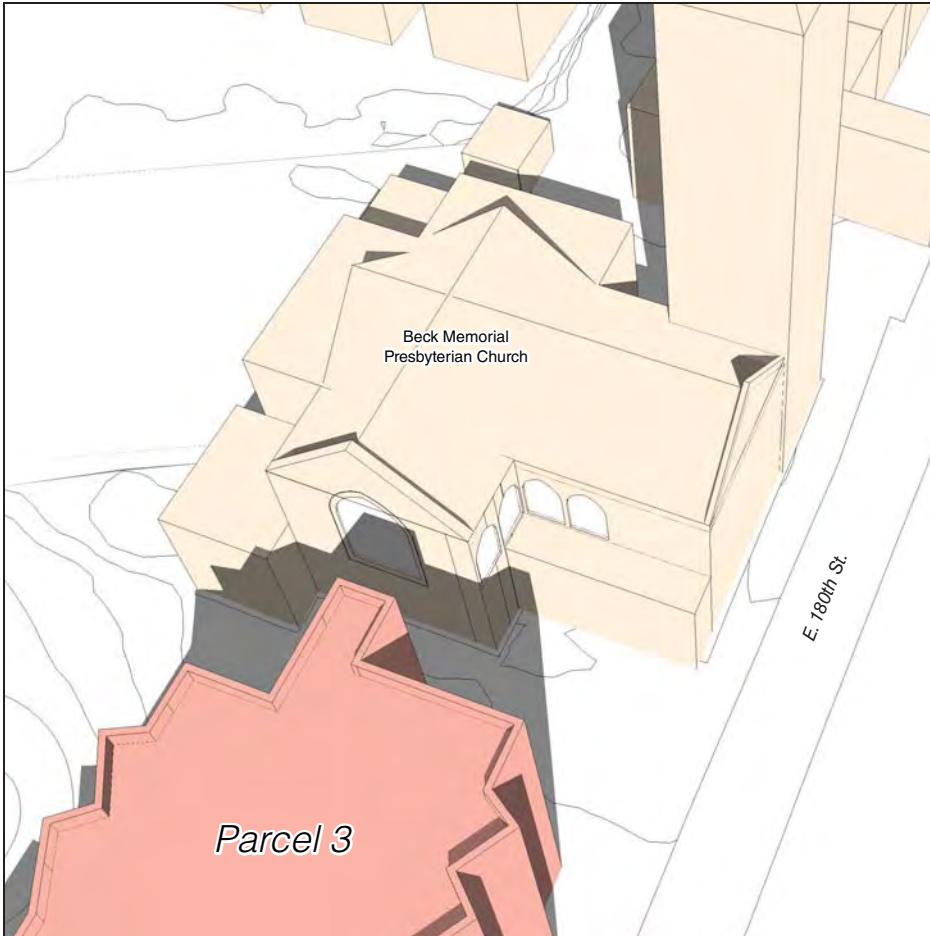
 *Reduced Shadow on Sun-Sensitive Resources*

Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is currently 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.

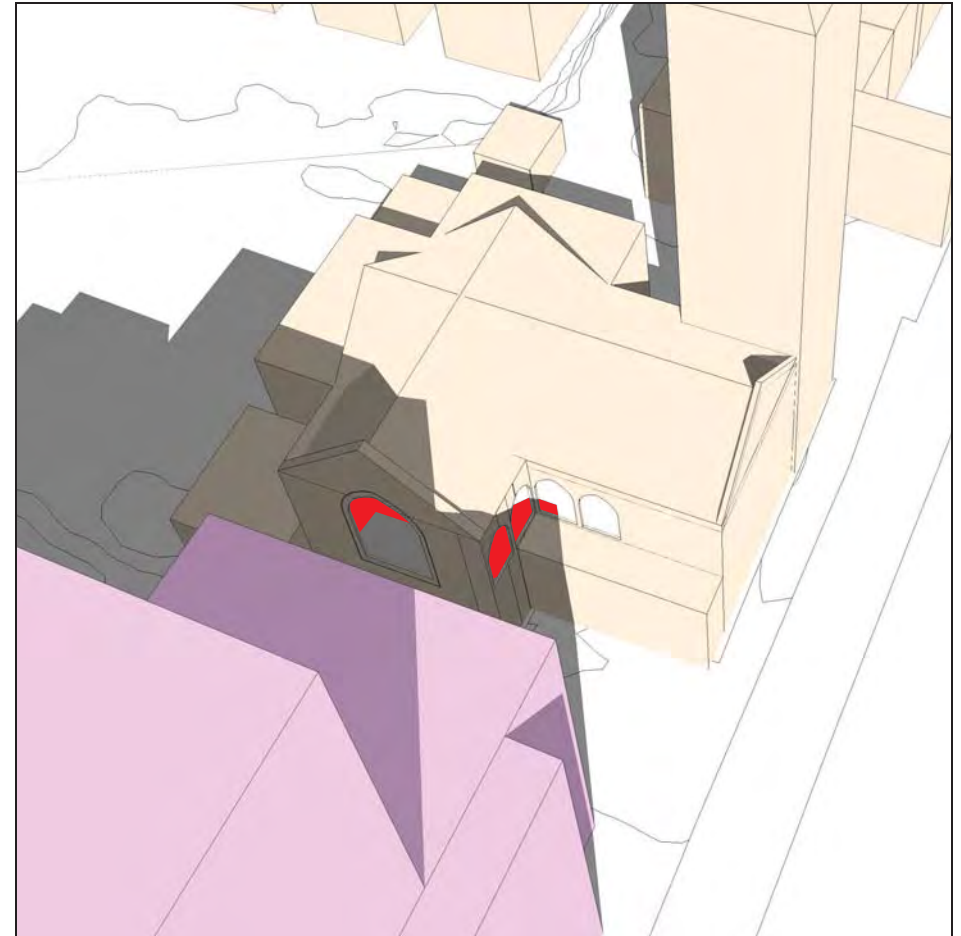
**June 21 - View Southwest - 7:15 AM**

Figure 6-53





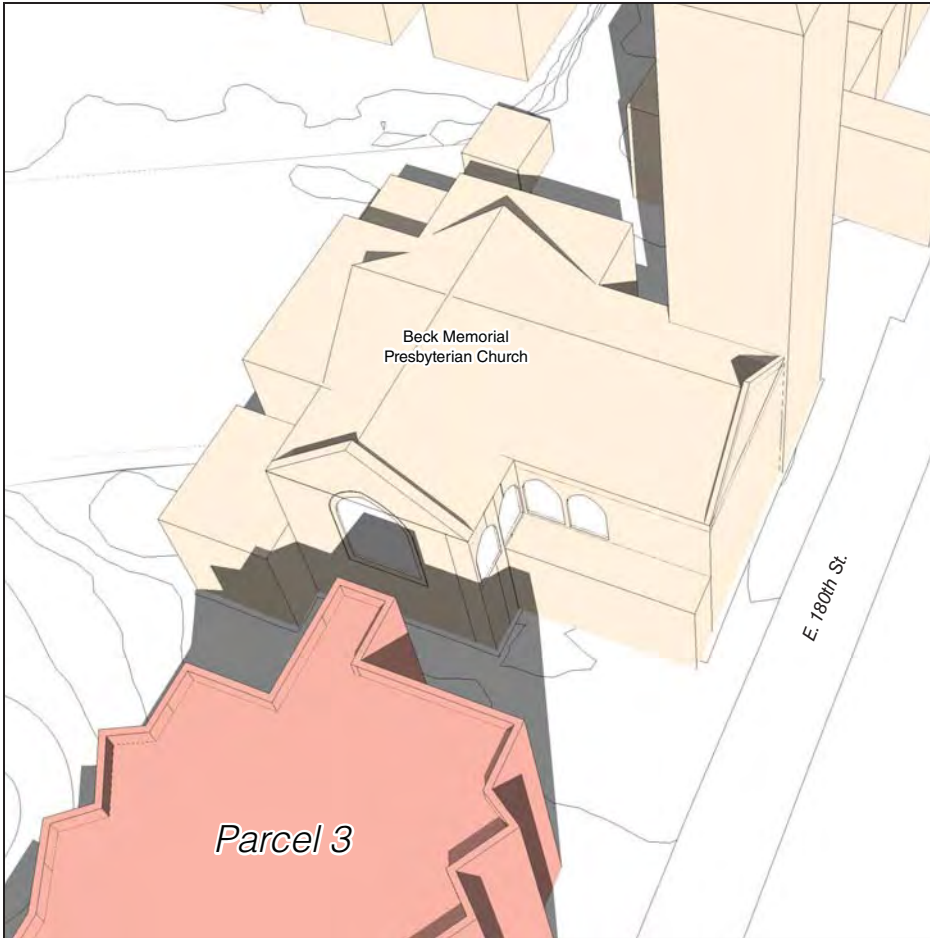
No Action



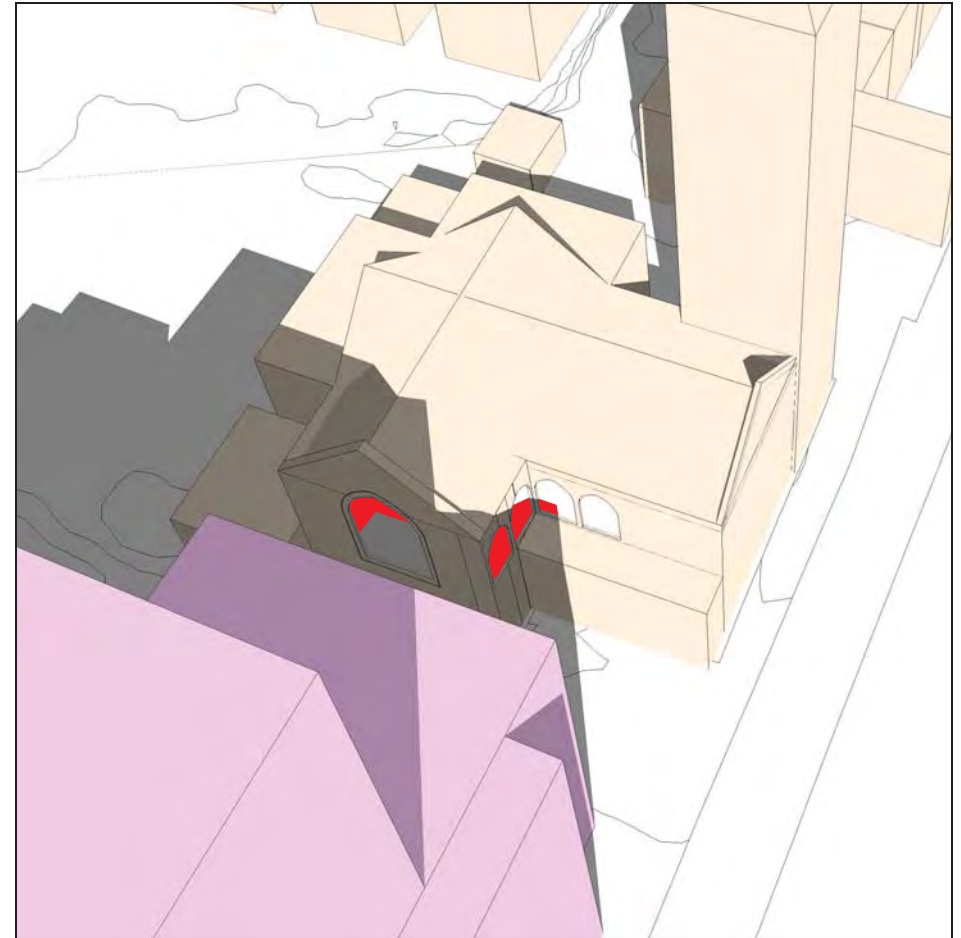
Proposed

Incremental Shadow on Sun-Sensitive Resources





No Action



Proposed

 *Incremental Shadow on Sun-Sensitive Resources*



**Table 6-1**  
**Incremental Shadow Durations**

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>OPEN SPACES</b>				
Vidalia Park	8:51AM - 9:05 AM Total: 14 min	—	—	—
West Farms Sq. seating area	8:51AM - 2:20 PM Total: 5 hr 29 min	7:36 AM – 1:40 PM Total: 6 hr 4 min	6:27 AM – 12:45 PM Total: 6 hr 18 min	6:25 AM – 12:45 PM Total: 6 hr 20 min
River Park	8:51 AM - 2:53 PM Total: 6 hr 2 min	10:40 AM - 4:29 PM 5 hr 49 min	2:00 PM – 5:18 PM Total: 3 hr 18 min  <i>Reduced:</i> 4:00 PM – 5:18 PM Total: 1 hr 18 min	2:55 PM – 6:01 PM Total: 3 hr 6 min  <i>Reduced:</i> 4:15 PM – 6:01 PM Total: 1 hr 46 min
West Farms Rapids Park	1:45 PM – 2:53 PM Total: 1 hr 8 min  <i>Reduced:</i> 1:15 PM – 2:53 PM Total: 1 hr 38 min	1:15 PM – 4:29 PM Total: 3 hr 14 min  <i>Reduced:</i> 1:00 PM – 4:29 PM Total: 3 hr 29 min	12:50 PM – 4:00 PM Total: 3 hr 10 min  <i>Reduced:</i> 12:40 PM – 5:18 PM Total: 4 hr 38 min	12:50 PM – 6:01 PM Total: 5 hr 11 min  <i>Reduced:</i> 12:40 PM – 5:35 PM Total: 4 hr 55 min
River Garden	—	3:30 PM – 4:29 PM Total: 59 min	3:30 PM – 5:18 PM Total: 1 hr 48 min	3:30 PM – 6:01 PM Total: 2 hr 33 min
<b>HISTORIC RESOURCES</b>				
Beck Memorial Presbyterian Church – east façade	8:51 AM – 10:00 AM 10:10 AM – 11:15 AM Total: 2 hr 14 min	7:36 AM – 7:55 AM 8:20 AM – 10:15 AM Total: 2 hr 49 min	6:27 AM – 10:50 AM Total: 4 hr 23 min	5:57 AM – 6:05 AM 6:45 AM – 10:25 AM Total: 3 hr 48 min
West Farms Soldiers Cemetery	8:51 AM - 2:53 PM Total: 6 hr 2 min	7:36 AM – 10:30 AM 11:30 AM – 4:29 PM Total: 7 hr 53 min  <i>Reduced:</i> 7:36 AM – 10:15 AM Total: 2 hr 39 min	6:27 AM – 9:00 AM 1:10 PM – 1:35 PM 2:15 PM – 3:30 PM Total: 4 hr 13 min  <i>Reduced:</i> 6:27 AM – 8:30 AM Total: 2 hr 3 min	5:57 AM – 7:35 AM 8:10 PM – 8:25 PM Total: 1 hr 53 min  <i>Reduced:</i> 6:05 AM – 8:00 AM Total: 1 hr 55 min
New Tabernacle Baptist Church – east facade	11:30 AM – 12:30 PM Total: 1 hr  <i>Reduced:</i> 8:51 AM – 9:00 PM 9:55 AM – 12:00 PM Total: 2 hr 14 min	8:15 AM – 9:35 AM Total: 1 hr 20 min  <i>Reduced:</i> 7:36 AM – 10:00 AM Total: 2 hr 24 min	6:27 AM – 8:00 AM Total: 1 hr 33 min  <i>Reduced:</i> 7:00 AM – 7:25 AM Total: 25 min	5:57 AM – 7:25 AM Total: 1 hr 28 min
New Tabernacle Baptist Church – north facade	—	—	6:27 AM – 7:20 AM Total: 53 min	6:40 AM – 6:55 AM Total: 15 min
<b>NATURAL FEATURES</b>				
Bronx River	1:20 PM – 2:53 PM Total: 1 hr 33 min  <i>Reduced:</i> 2:30 PM – 2:53 PM Total: 23 min	1:30 PM – 4:29 PM Total: 2 hr 59 min  <i>Reduced:</i> 2:45 PM – 4:29 PM Total: 1 hr 44 min	2:30 PM – 5:18 PM Total: 2 hr 48 min  <i>Reduced:</i> 2:30 PM – 5:18 PM Total: 2 hr 48 min	2:30 PM – 6:01 PM Total: 3 hr 31 min  <i>Reduced:</i> 2:30 PM – 6:01 PM Total: 3 hr 31 min
<b>Notes:</b> Table indicates entry and exit times and total duration of incremental shadow for each sunlight-sensitive resource. “Reduced” durations refer to shadow that the No Action buildings would cast, which would not be cast by the proposed buildings. Daylight saving time is not used—times are Eastern Standard Time, per <i>CEQR Technical Manual</i> guidelines. However, as Eastern Daylight Time is currently 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.				



Project-generated shadow would fall on **River Park** throughout the winter analysis day. Incremental shadow from Parcel 5 would fall on a small area in the southwest corner of the park beginning at 8:51 AM. Moving eastward, by 11:00 AM a larger part of the park would be in incremental shadow, roughly the southwestern quarter. Shadows would continue to move eastward and by 1:00 PM approximately the southern half of the park would be in shadow, mostly incremental shadow from Parcel 5. At 1:30 the southern two-thirds would be in shadow, mostly incremental from Parcel 5. At 2:00 PM most of the park would continue to be in shadow, much of it incremental, while the far western and northern areas would be in sun. By 2:30 Parcel 5's shadow would fall on the eastern half of the park while the western half would be mostly in sun, with small shadows from Parcel 3 beginning to enter the western edges. At 2:53 PM, the end of the winter analysis day, the park would be in incremental and existing shadow with an area on the north side remaining in sun.

On Parcel 5, the proposed building would be taller than the existing/No Action building at that location, but its footprint would be smaller. The existing/No Action building extends further south on both the west and east sides of the block and particularly on the east side along **West Farms Rapids Park**. Beginning at 1:15 PM, shadow from the No Action building would move onto the northwest edge of West Farms Rapids Park, whereas with the proposed building, the shadow would enter that same area of the park 10 minutes later. As shadows moved east, there would continue to be a reduced area of shadow with the proposed project. Between 1:45 PM and 2:10 PM, the taller proposed building would also cast small areas of incremental shadow in addition to the areas of reduced shadow from the longer No Action building. After 2:15 PM only areas of reduced shadow would occur in the northern part of the park with the proposed project. On Parcel 10, the proposed building would be taller than the existing/No Action building at that location and its footprint would be approximately the same size. Incremental shadow from Parcel 10 would move onto an adjacent portion of West Farms Rapids Park at 1:45 PM, but would be very small. It would continue to fall there but would remain very small until 2:30 PM. From 2:30 PM until 2:53 PM larger areas of the southern part of the park would be in incremental shadow from Parcel 10 but areas of sunlight would remain until the end of the analysis period.

Incremental shadow would fall on large areas of **West Farms Soldiers Cemetery** for much of the winter analysis day, although the new shadow would never eliminate all remaining sunlight. The new shadow would come from Parcel 1 in the morning from the start of the analysis day until 12:20 PM, and from Parcel 3 throughout the day. Incremental shadow from Parcel 3 would be limited to the southern areas of the cemetery in the morning and mid-day, and the central and northern areas in the afternoon.

In the No Action condition, the east façade windows of the **New Tabernacle Baptist Church** would be entirely in shadow from the start of the analysis day until about 11:00 AM. However, with the proposed project, sunlight would reach one or more of those windows (through a gap between proposed buildings that does not exist in the existing building configuration) from 8:51 AM to 9:00 AM and from 9:55 AM until about noon. From 11:30 AM to 12:00 PM there would be areas of both reduced and additional shadow on the east façade windows, due to differences in the proposed vs. No Action building configurations. From noon to 12:30 PM there would be a small area of incremental shadow on one to two windows. Later in the afternoon the sun is too far west in the sky to shine or cast shadows on the east façade of the church.

Incremental shadow from Parcel 5 would fall on a portion of the **Bronx River** between East 180th Street and the waterfall beginning at 1:20 PM. The incremental shadow would move



northeast and extend onto and above the waterfall from 2:10 PM until the end of the analysis day at 2:53 PM. There would also be an area of reduced shadow with the proposed project on the river directly east of Parcel 5 from 2:30 PM to 2:53 PM, and incremental shadow from Parcel 10 from 2:45 PM to 2:53 PM.

### *MARCH 21/SEPTEMBER 21 (FIGURES 6-15 THROUGH 6-26)*

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.

The proposed building on Parcel 10 would shade most of the **West Farms Square seating area** for the first couple of hours of the analysis day. By 9:30 AM the majority of the plaza would be in sun and the extent of incremental shadow would be reduced to the northernmost corner of the plaza. The small path of incremental shadow would slowly continue to move off the plaza and would exit completely at 1:40 PM, leaving the plaza entirely in sun until late afternoon.

Incremental shadow would fall on the more northern of the two smaller windows on **Beck Memorial Presbyterian Church's** east façade from 7:36 AM to 7:55 AM, eliminating the remaining sun from the east façade during that 20 minute period. Then, after a brief period when all the windows would be in shadow in the No Action condition, incremental shadow would remove all remaining sun from the east façade windows from 8:20 AM to 10:15 AM. Incremental shadow would then begin to move off the church windows, but would remain on portions of them until 10:50 AM.

**River Park** would experience incremental shadow from late morning until the end of the analysis day. Incremental shadow from Parcel 5, directly south of the park, would pass across the southern part of the park beginning at 10:40 AM. The park would be entirely in sun before that time, and the northern and central areas would remain in sun through the middle of the day until late afternoon. Beginning at 2:45 PM incremental shadows from Parcels 1 and 3 to the west and southwest would move onto the western part of the park and extend eastward until 4:29 PM, the end of the analysis day, when they would cover most of the park.

With the proposed project, the northern half of **West Farms Rapids Park** would experience reduced shadow from the adjacent Parcel 5 from 1:00 PM to 1:15 PM, and both incremental and reduced shadow from 1:15 PM until 3:00 PM, after which it would experience only reduced shadow again. The central area of West Farms Rapids Park would be mostly in sun throughout the day except for shadow from the existing elevated subway bridge over the Bronx River. However there would be a small area of incremental shadow from Parcel 10 for the final hour of the analysis day, from 3:30 PM to 4:29 PM, just north of the subway bridge. South of the bridge, Parcel 10 would begin casting a very small area of new shadow at 1:15 PM. The area of incremental shadow would gradually grow larger, and by 3:30 PM would shade nearly half the portion of the park south of the subway bridge. From 3:30 PM to 4:29 PM the area of incremental shadow on this part of the park would decrease as existing/No Action shadows spread across the park. An area in the southernmost part would remain in sun until the end of the analysis day.

Incremental shadow from Parcel 5 would fall on the **River Garden** for the final hour of the analysis day. However the new shadow would not fall on the garden space proper until the final 15 minutes of the day—From 3:30 PM until 4:15 PM it would fall only on the landscaped area and path situated between the garden and the river.



In the morning as shadow from Parcel 1 passed across **West Farms Soldiers Cemetery**, there would be areas of both incremental and reduced shadow with the proposed project, compared to the No Action. Overall there would be a slight net increase in extent and duration of incremental shadow (by 15 minutes) between the start of the analysis day and 10:30 AM. Incremental shadow from Parcel 3 would pass across the southern and southeast area of the cemetery from 11:30 AM until the end of the analysis day at 4:29 AM.

In both the No Action and the proposed condition, the east façade windows of the **New Tabernacle Baptist Church** would be partially in sun and partially in shadow from Parcel 1 from 7:36 AM until 10:00 AM, and then wholly in sun from 10:00 AM until mid-afternoon, when the sun passes to far west to shine or cast shadow on the church's east façade. During the morning period until 10:00 AM there would be less shadow on the windows with the proposed than with the No Action buildings.

The proposed project on Parcel 5 would cast an area of incremental shadow on the **Bronx River** just north of the East 180th Street bridge, but not far enough north to reach the waterfall, from 1:30 PM until the end of the analysis day. There would also be an area of reduced shadow from Parcel 5 from 2:45 PM to the end of the analysis day, compared to the No Action condition. Further south on the river, the proposed project at Parcel 10 would cast an area of incremental shadow on the river surface from 3:15 PM to 4:29 PM.

#### *MAY 6/AUGUST 6 (FIGURES 6-27 THROUGH 6-40)*

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.

The proposed building on Parcel 10 would shade the entire **West Farms Square seating area** from the start of the analysis day at 6:27 AM until 8:15 AM. The incremental shadow would continue to move clockwise and by 9:30 AM half the space would be in sun, the other half in incremental shadow. The space would be increasingly in sun through the late morning with incremental shadow contained to a small patch adjacent to the proposed building.

Incremental shadow would fall on the east façade windows of **Beck Memorial Presbyterian Church** from 6:27 AM until 10:50 AM. For most of this four-hour and twenty minute period, new shadow would remove much but not all direct sun from the windows. However, it would remove all direct sun from the windows for about 10 minutes around 9:30 AM.

The entirety of **River Park** would be in sun from the start of the analysis day until 2:00 PM when shadow from Parcel 5 would move onto the southern edge. This incremental shadow would remain very small throughout the afternoon. At 2:45 PM shadow from Parcel 1 would enter the western edge, joined 15 minutes later by incremental shadow from Parcel 3. The extent of incremental shadow would begin to grow larger after 3:30 PM, primarily from Parcel 1. At 4:00 PM more than half of the park would remain in sun, with incremental shadows shading areas of the western half. For the final hour of the analysis day, ending at 5:18 PM, much of the park would be in a combination of existing and incremental shadow but areas of sun would remain. There would also be small areas of reduced shadow from 4:00 PM to 5:18 PM.

In the afternoon, the No Action buildings on Parcel 5 would cast shadows on the northern part of **West Farms Rapids Park** from 12:40 PM until the end of the analysis day at 5:18 PM. Small at first, these shadows would shade most of the northern part of the park by 3:00 PM, and would

continue to do so until 5:18 PM. With the proposed buildings on Parcel 5 there would be comparatively less shadow on this area of the park due to the smaller footprint. Shadow from the proposed building on Parcel 10 would move on to an adjacent portion of the park at about 1:00 PM. This new shadow would remain small at first, but by 4:00 PM would shade a large area of the southern part of the park. It would grow smaller after this point, continuing to fall on the park but shrinking until the end of the analysis day at 5:18 PM.

Incremental shadow from Parcel 5 would fall on the landscaped area with footpath between the **River Garden** and the river beginning at 3:30 PM. At 4:00 PM the incremental shadow would extent further east but still be limited to the footpath area west of the garden. By 4:30 PM the incremental shadow would extend onto the western edges of the Garden area proper, and would continue to fall on portions of the Garden until 5:18 PM.

There would be areas of incremental and reduced shadow on the east side of **West Farms Soldiers Cemetery** from 6:27 AM until 8:30 AM, and incremental shadow only from 8:30 AM to 9:00 AM. In the afternoon there would be very small areas of incremental shadow in the southeast part of the cemetery between 1:10 PM and 1:35 PM, and between 2:15 PM and 3:30 PM.

There would be incremental shadow from Parcel 1 on both the north and east façade windows of the **New Tabernacle Baptist Church** beginning at 6:27 AM, eliminating all the sunlight until 6:55 AM. But shadows move quickly early in the morning and by 7:25 AM the shadow would be completely off the north façade window and four of the five east façade windows. Incremental shadow would move across the rear one to two windows of the east façade from 7:30 AM to 8:00 AM and then exit. There would also be some areas of reduced shadow on one or two of the east façade windows between 7:00 AM and 7:25 AM.

Incremental shadow from the proposed project on Parcel 5 would move onto a portion of the **Bronx River** just south of the East 180th Street bridge beginning at 2:30 PM. Further south on the river there would also be an area of reduced shadow beginning at 2:30 PM. There would continue to be areas of new and reduced shadow with the proposed project until the end of the analysis day at 5:18.

### *JUNE 21 (FIGURES 6-41 THROUGH 6-55)*

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.

The **West Farms Square seating area** would be entirely in shadow in the No Action condition from 5:57 AM until 6:25 AM. From 6:25 AM the proposed building on Parcel 10 would shade the space, eliminating all sunlight until 8:35 AM. The incremental shadow would continue moving clockwise through the morning, shading part of the space. By 10:30 AM all but the northernmost corner of the space would be in sun. . The remaining incremental shadow would slowly shrink in size and exit completely at about 12:45 PM. The space would remain entirely in sun until about 2:00 PM and would remain partially in sun until about 4:00 PM.

Incremental shadow would eliminate the remaining sun on the large window on the east façade of **Beck Memorial Presbyterian Church** briefly from 5:57 AM to 6:05 AM. From 6:45 AM to 10:25 AM, incremental shadow would fall on the large window and one or more of the smaller



ones, eliminating all the direct sun on the large window for much of the period (6:45 AM to 9:30 AM).

**River Park** would remain in entirely in sun throughout the morning and into the mid-afternoon. At 2:55 PM incremental shadow from Parcel 1 would move onto the western edges of the park. These shadows would extend eastward and clockwise for the rest of the afternoon. By 5:00 PM they would reach all the way across the park to the river, but the sun would continue to reach portions of the park in between and around the Parcel 1 buildings. Even at the end of the analysis day at 6:01 PM some areas of the park would remain in sun. Between 4:15 PM and the end of the day there would also be narrow areas of reduced shadow, where gaps between the proposed buildings allow sun to shine through, where the continuous north-south massing of the existing buildings would not.

With the proposed project there would be both incremental shadow and reduced shadow on **West Farms Rapids Park** from the adjacent Parcel 5 and Parcel 10 developments in the afternoon beginning at approximately 12:45 PM. There would be roughly equal-sized areas of incremental and reduced shadow until about 3:00 PM in the northern half of the park from Parcel 5, and only incremental shadow, albeit small in extent, in the southern part from Parcel 10. There would be less shadow from 3:00 PM until about 5:30 PM in the northern part with the proposed project, compared with the No Action condition, while the proposed building on Parcel 10 would shade a larger area south of the subway bridge. From 5:30 PM until 6:01 PM there would be roughly equal areas of incremental and reduced shadow.

The proposed development on Parcel 5 would cast new shadow on the **River Garden** from 3:30 PM until the end of the analysis day at 6:01 PM. From 3:30 PM until 4:15 PM the new shadow would be limited to the landscaped area with footpath west of the garden proper. At 4:15 the incremental shadow would extend further east, onto the northwest corner of the Garden area proper. At 5:00 PM most of the Garden area would still be in sunlight. However, by 5:30 most would be in incremental shadow and for the final 11 minutes of the analysis day, 5:50 PM to 6:01 PM, the incremental shadow would eliminate the remaining sunlight from the garden.

There would be areas of incremental and reduced shadow on the east side of **West Farms Soldiers Cemetery** for a little less than two hours early in the morning. The incremental shadow would be gone by 8:30 AM and the cemetery would be entirely or mostly in sun for the rest of the day.

There would be incremental shadow from Parcel 1 on the east façade windows of the **New Tabernacle Baptist Church** early in the morning, from 5:57 AM to 7:25 AM. The new shadow would eliminate all the sunlight on the east façade windows until just before 7:00 AM. Sun would illuminate the entire north façade window during this time except between 6:40 AM and 6:55 AM when part of it, but never all of it, would be in incremental shadow. After 7:25 AM all the east and north façade windows would continue to be entirely in sun for the rest of the morning.

Similarly to the May 6/August 6 analysis day, incremental shadow from the proposed project on Parcel 5 would move onto a portion of the **Bronx River** just south of the East 180th Street bridge beginning at 2:30 PM, while further south on the river there would also be an area of reduced shadow beginning at 2:30 PM. There would continue to be areas of new and reduced shadow with the proposed project until the end of the analysis day at 5:18.

## E. CONCLUSIONS BY RESOURCE

### VIDALIA PARK

A portion of Vidalia Park would receive 14 minutes of new shadow on winter mornings, and no new shadow in any other season. The limited extent and duration of incremental shadow would not cause a significant adverse impact.

### WEST FARMS SQUARE SEATING AREA

The seating area that would remain at this location with the proposed project would receive new shadows from the proposed development on Parcel 10 on all four analysis days. The space has no trees or other vegetation, so only the use of the seating would be a concern for new shadows. The new shadow would be small in winter. In the spring, summer and fall, the space would be all or mostly in incremental shadow early in the morning, partially in sun through the mid to late morning, and totally in sun for part of the day. Sunlit seating would therefore continue to be available at times other than early morning, and therefore the new shadows would not significantly impact the use of the space.

### RIVER PARK

In December, incremental shadows would be small at the start of the analysis day, and would grow larger over the course of the morning, falling across roughly the southwestern quarter by 11:00 AM (see **Figures 6-56 to 6-58**). However, three-quarters of the park would still be in sun, including all the playground areas. There would be large areas of incremental shadow from around noon until the end of the analysis day at 2:53 PM (see **Figures 6-59 to 6-61**). However, there would continue to be areas of sun in the northern part of the park. Since December does not fall within the growing season in New York City, shadows on vegetation would not be a concern. Regarding impacts to users, it is likely that barbecuing activities, playground use and passive sitting, walking and river viewing, which together make up all the uses within this park, would be quite light in the winter. Of these uses, the playground area is probably the most likely to see use in the winter on days when the weather is not too cold, and the playground area in the northern part of the park and would continue to receive sunlight for most of the analysis day. However, overall, large areas of the park would be in shadow, mostly project-generated, particularly during the afternoon, and on sunny winter days this could significantly impact users' experience in the park, both visually and in terms of warmth.

On the March 21 and September 21 analysis day, the park would continue to be in sun throughout the morning and mid-day. By 2:00 PM the southern fourth or fifth would be in incremental shadow, covering a portion of the lawn area with picnic tables used for barbecuing, but the remaining three-quarters to four-fifths of the park would be in sun, including some of the picnic areas in the south (see **Figure 6-64**). Only for the final hour or so of the analysis day, from 3:30 PM to 4:29 PM, would large areas of the park be in shadow, mostly incremental (see **Figures 6-65 and 6-66**). All areas of the park, even in the southwest corner, would continue to receive a minimum of four hours of direct sunlight, and most areas would get substantially more, so that all vegetation would continue to receive adequate direct sunlight. However, in the early spring and the fall, park users, particularly those engaged in passive activities like sitting or barbecuing, tend to take advantage of the sun for warmth on cooler afternoons. Therefore, the long duration of new shadows and the large extent of new shadows over the final hour or so of





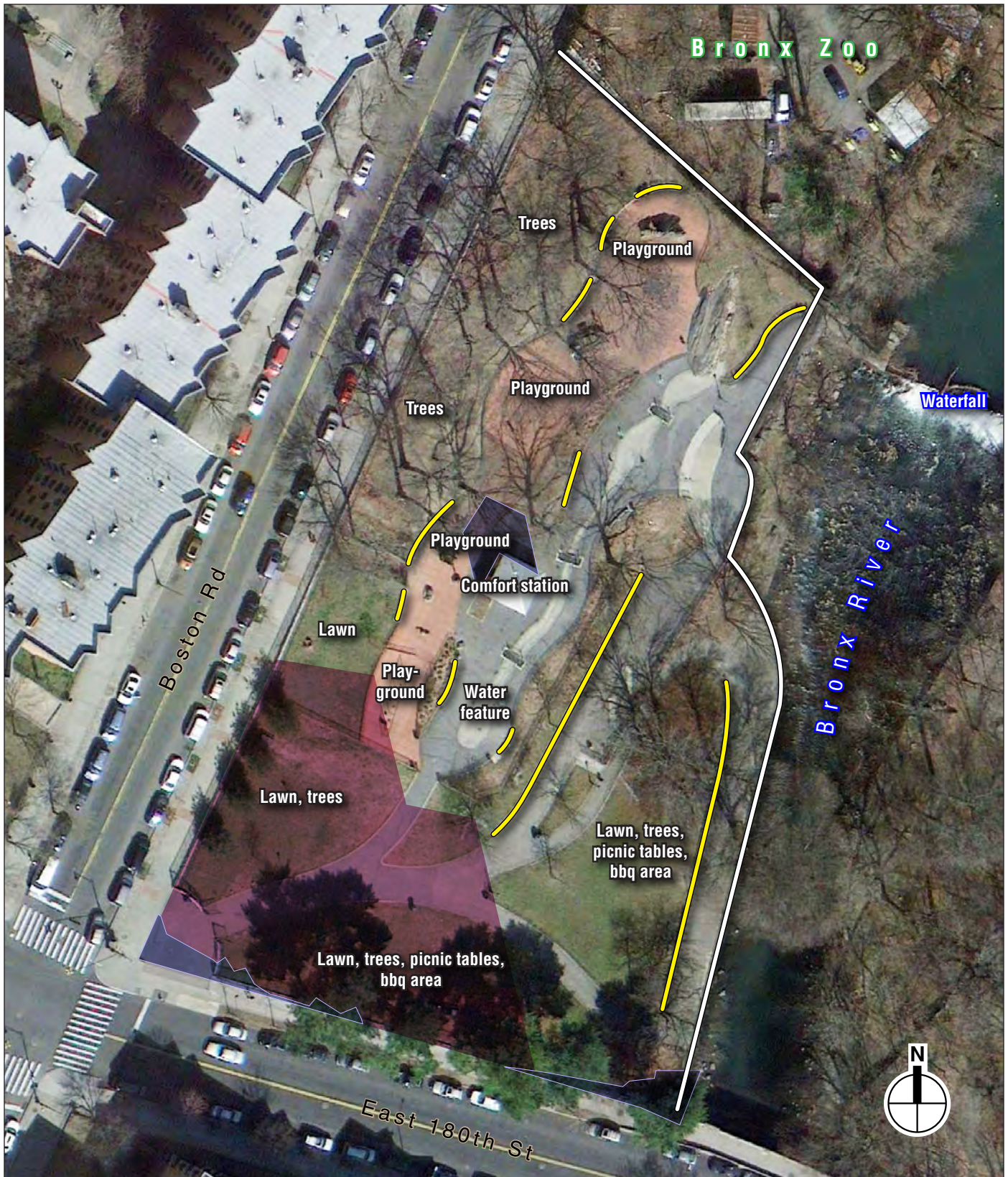
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-  Park boundary
-  Existing Shadow
-  Incremental Shadow on Sun-Sensitive Resources








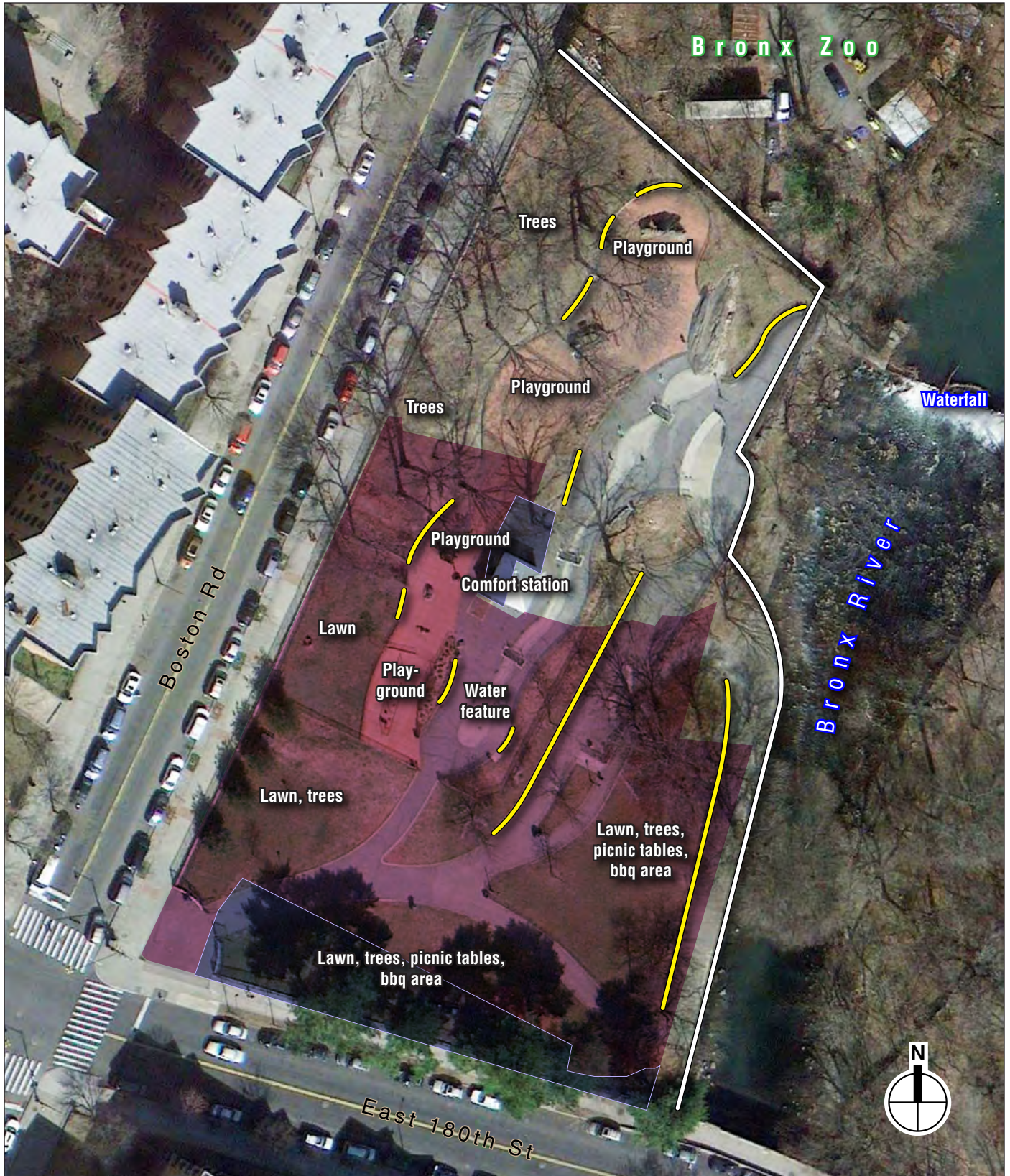
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-  Existing Shadow
-  Incremental Shadow on Sun-Sensitive Resources





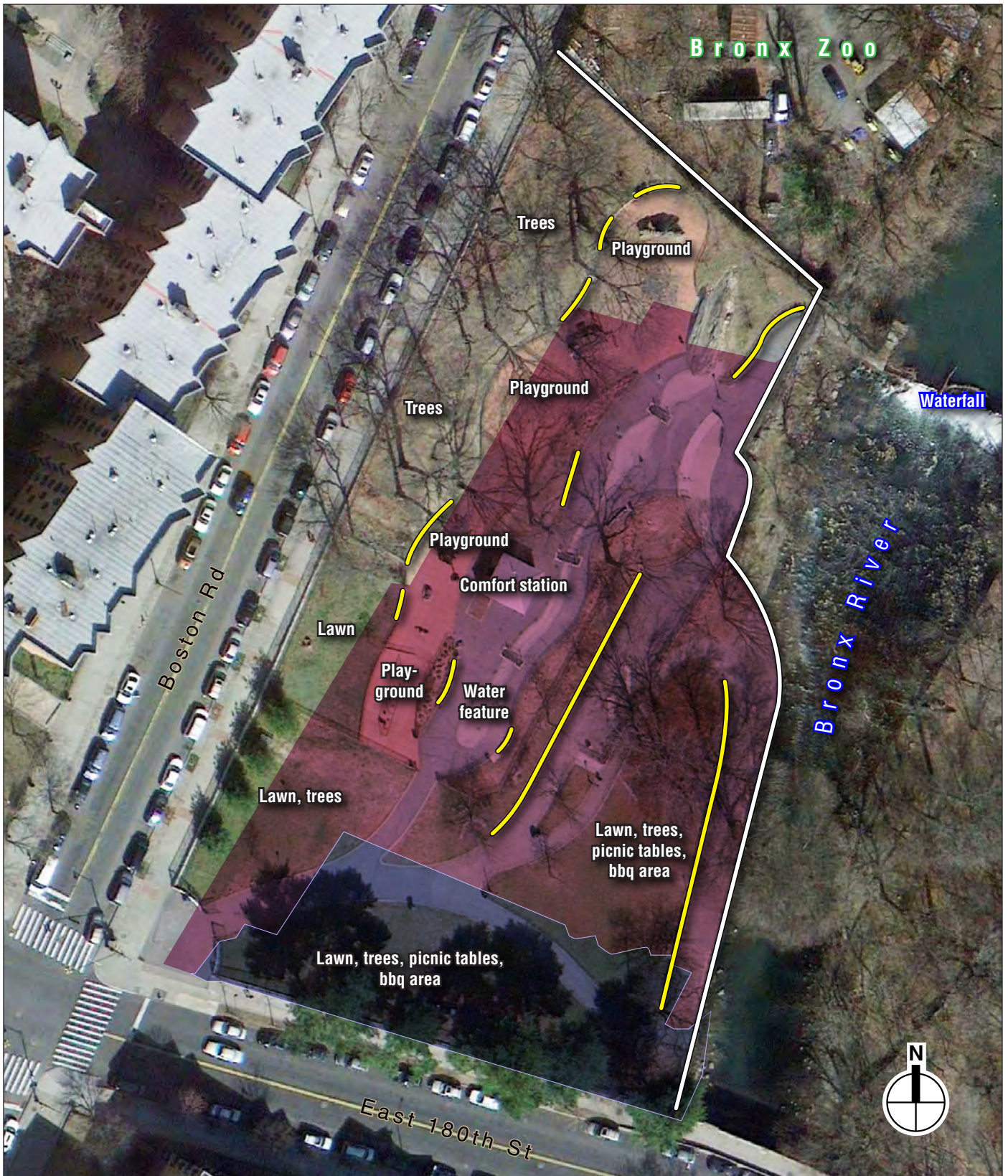
-  Benches  
 Park boundary  
 Existing Shadow  
 Incremental Shadow on Sun-Sensitive Resources





-  Benches
-  Park boundary
-  Existing Shadow
-  Incremental Shadow on Sun-Sensitive Resources





Benches



Park boundary

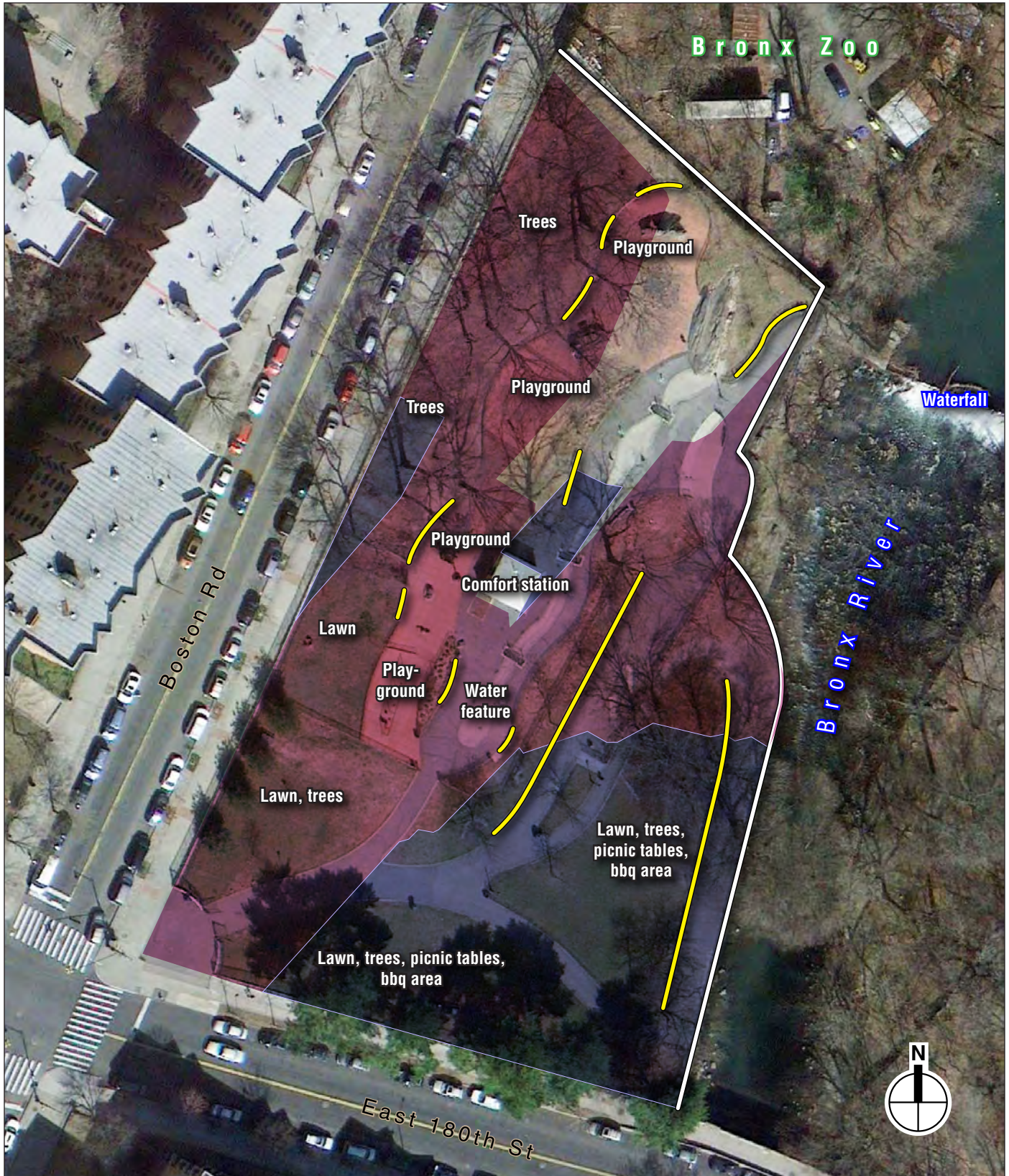


Existing Shadow



Incremental Shadow on Sun-Sensitive Resources





-  Benches
-  Park boundary
-  Existing Shadow
-  Incremental Shadow on Sun-Sensitive Resources









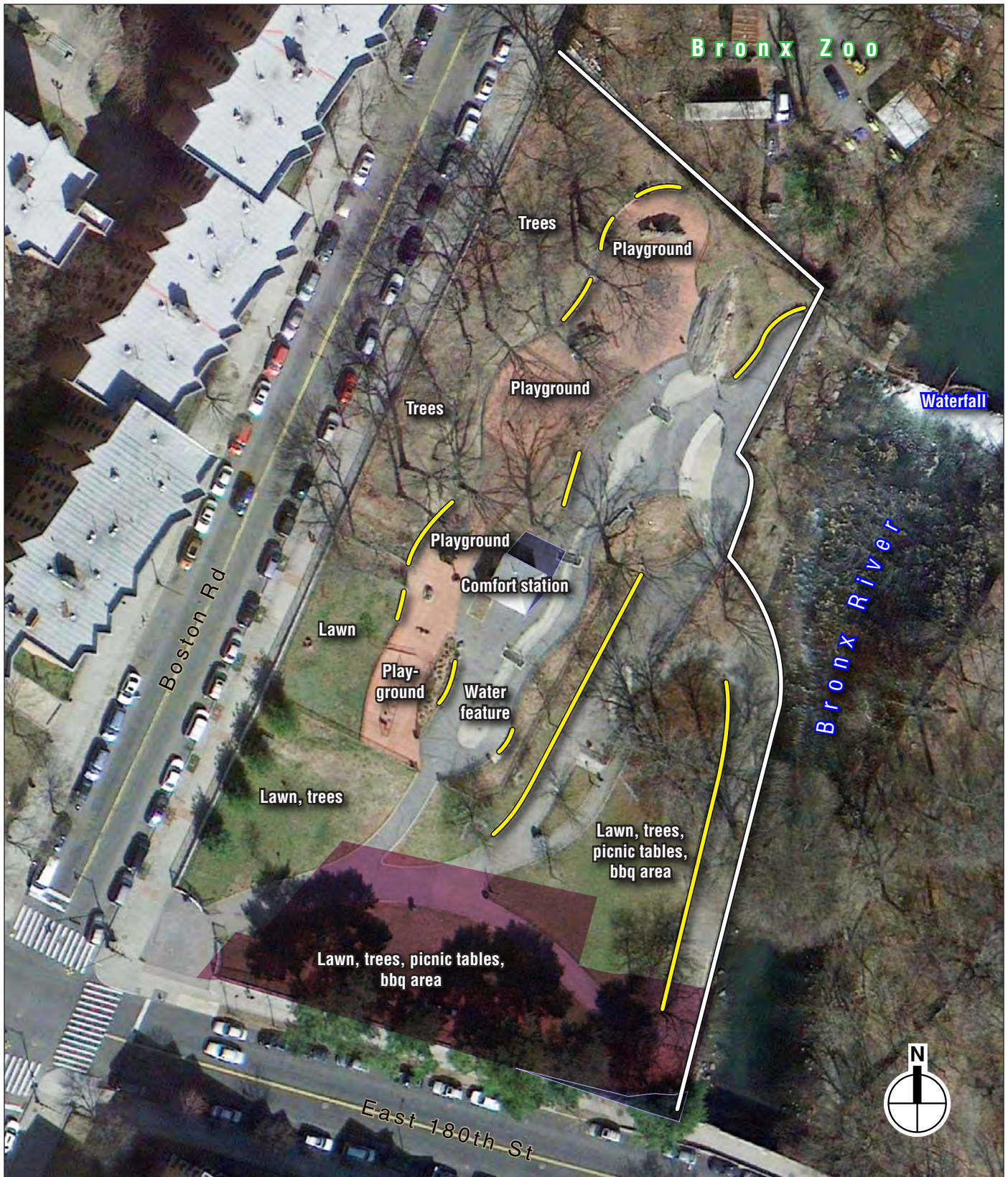
-  Benches
-  Park boundary
-  Existing Shadow
-  Incremental Shadow on Sun-Sensitive Resources





-  Benches
-  Park boundary
-  Existing Shadow
-  Incremental Shadow on Sun-Sensitive Resources





Benches



Park boundary

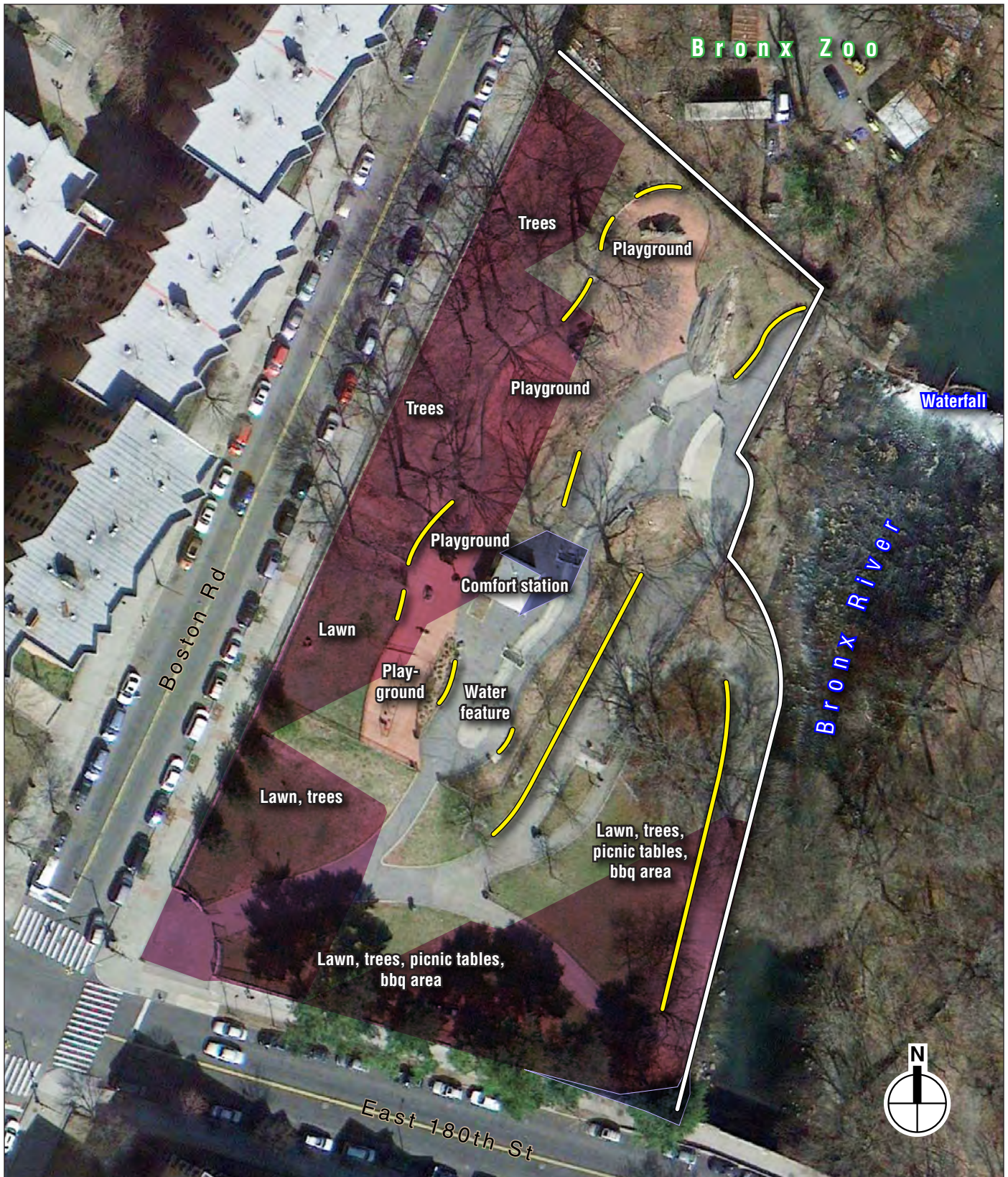


Existing Shadow



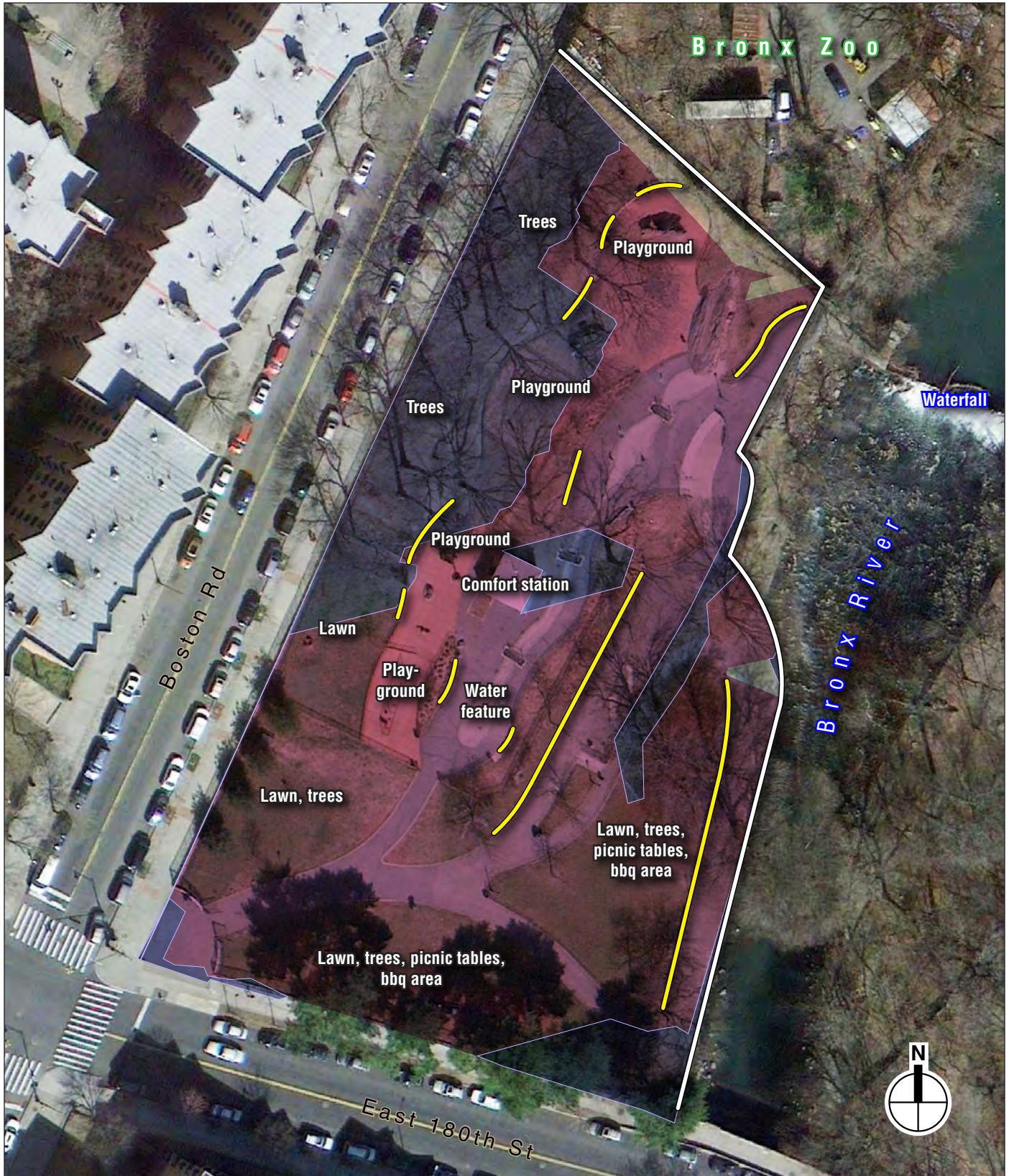
Incremental Shadow on Sun-Sensitive Resources





-  Benches
-  Park boundary
-  Existing Shadow
-  Incremental Shadow on Sun-Sensitive Resources





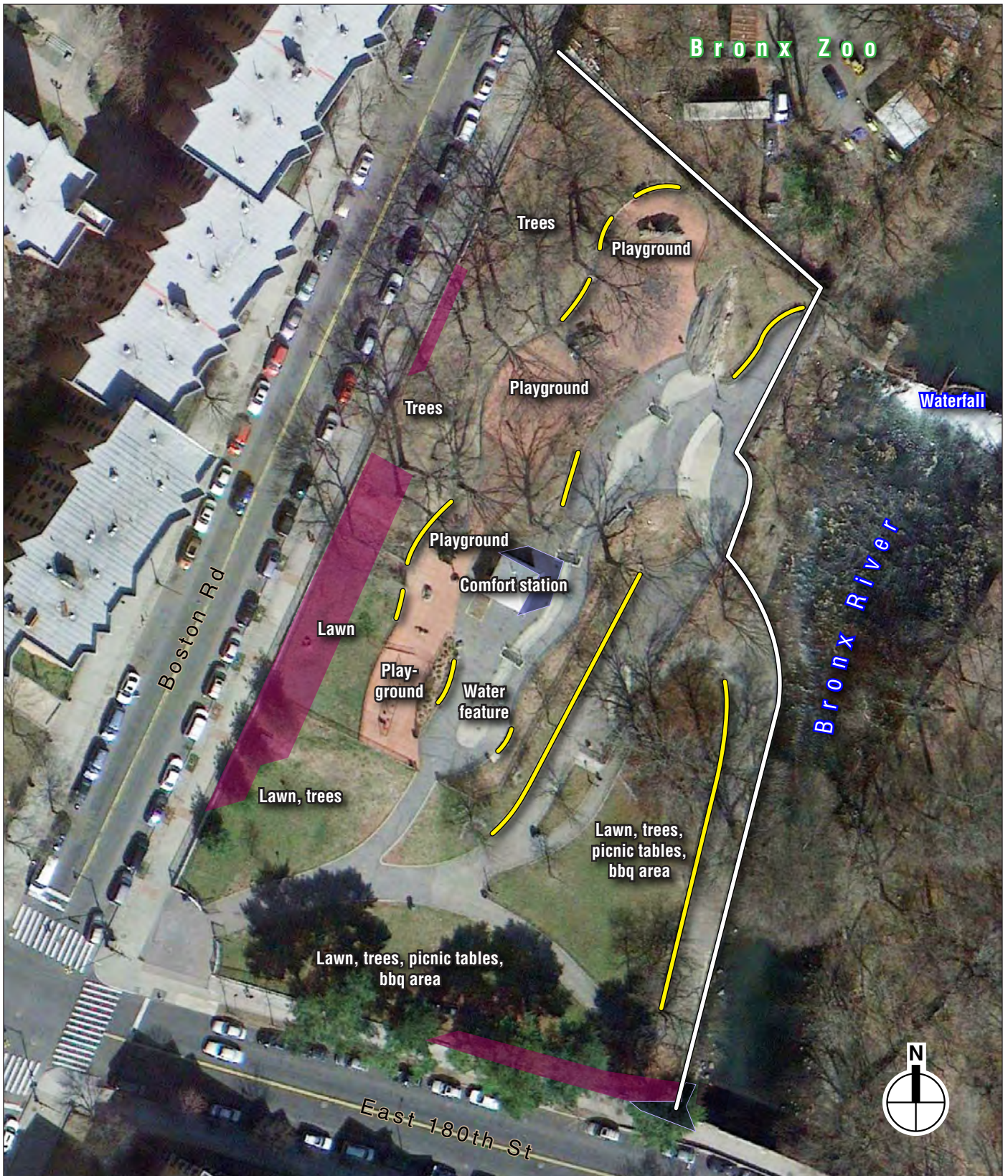
-  Benches
-  Park boundary
-  Existing Shadow
-  Incremental Shadow on Sun-Sensitive Resources





-  Benches
-  Park boundary
-  Existing Shadow
-  Incremental Shadow on Sun-Sensitive Resources





-  Benches
-  Park boundary
-  Existing Shadow
-  Incremental Shadow on Sun-Sensitive Resources



the afternoon would likely cause significant adverse impacts to users' experience in the park at these times.

In the late spring and summer analysis days, all the areas of the park would continue to receive a minimum of four to six hours of direct sunlight, and most of the park would receive substantially more. Shadows from Parcel 1 to the west would only begin to shade the park toward the late afternoon. Even at 4:00 PM (5:00 PM Daylight Saving Time) on both the May 6/August 6 and June 21 analysis days, more than half the park would remain in sun, including the picnic and barbecuing areas (see **Figures 6-69 and 6-72**). However, in the final hour of the late spring and summer days large areas of the park would be in shadow, much of it cast by the proposed project, causing significant impacts to users' experience during those times.

### **WEST FARMS RAPIDS PARK**

There would be less shadow on this park with the proposed project than with the No Action condition on three of the four analysis days: in the winter, spring, fall and late summer. On the summer solstice analysis day, there would be a little more shadow with the proposed project than with the No Action condition, occurring primarily in the southern part of the park in the late afternoon. Given the overall decrease in shadow throughout the year, the proposed project would not cause significant adverse shadow impacts to this park.

### **RIVER GARDEN**

The garden would receive plenty of direct sunlight throughout the growing season, due to the lack of tall buildings to its east, south and west. It would receive some incremental shadows near the end of the analysis day in the spring, summer and fall but the limited extent and duration would not result in significant adverse impacts.

### **WEST FARMS SOLDIERS CEMETERY**

As noted above in the "Resources of Concern" section, this resource was included only for informational purposes, to disclose the project-generated shadow that would occur. Because it is not publicly accessible and none of its contributing features were described as sunlight-sensitive in its designation report, it is not technically a resource of concern under CEQR.

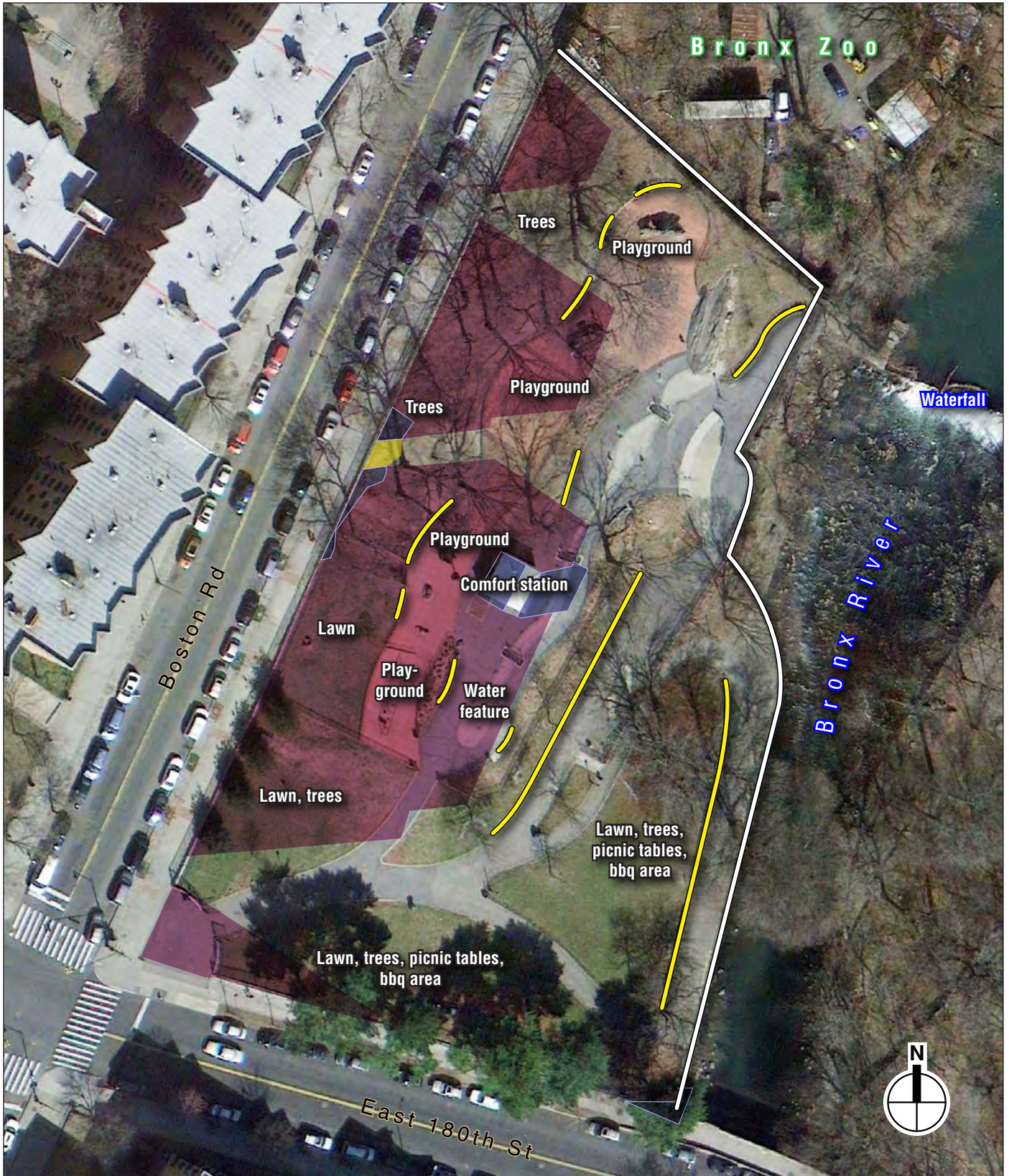
### **BECK MEMORIAL PRESBYTERIAN CHURCH**

The east façade windows of the church would receive between two and a quarter and four and a half hours of incremental shadow in the mornings, depending on the season. At times, the new shadow would eliminate the remaining sunlight from the east windows of the church. Therefore, given the substantial extent and duration of incremental shadows, the project could cause significant adverse shadow impacts to the windows, if they are uncovered by shutters and viewable from within a public space in the church interior. As noted above, no information is currently available regarding plans to re-open the church or make building repairs in the near future or by the 2029 build year for the proposed project.

### **NEW TABERNACLE BAPTIST CHURCH**

In the winter and early spring and fall, the east façade windows would receive less shadow with the proposed project than they would in the No Action condition.





Benches



Park boundary



Incremental Shadow on Sun-Sensitive Resources

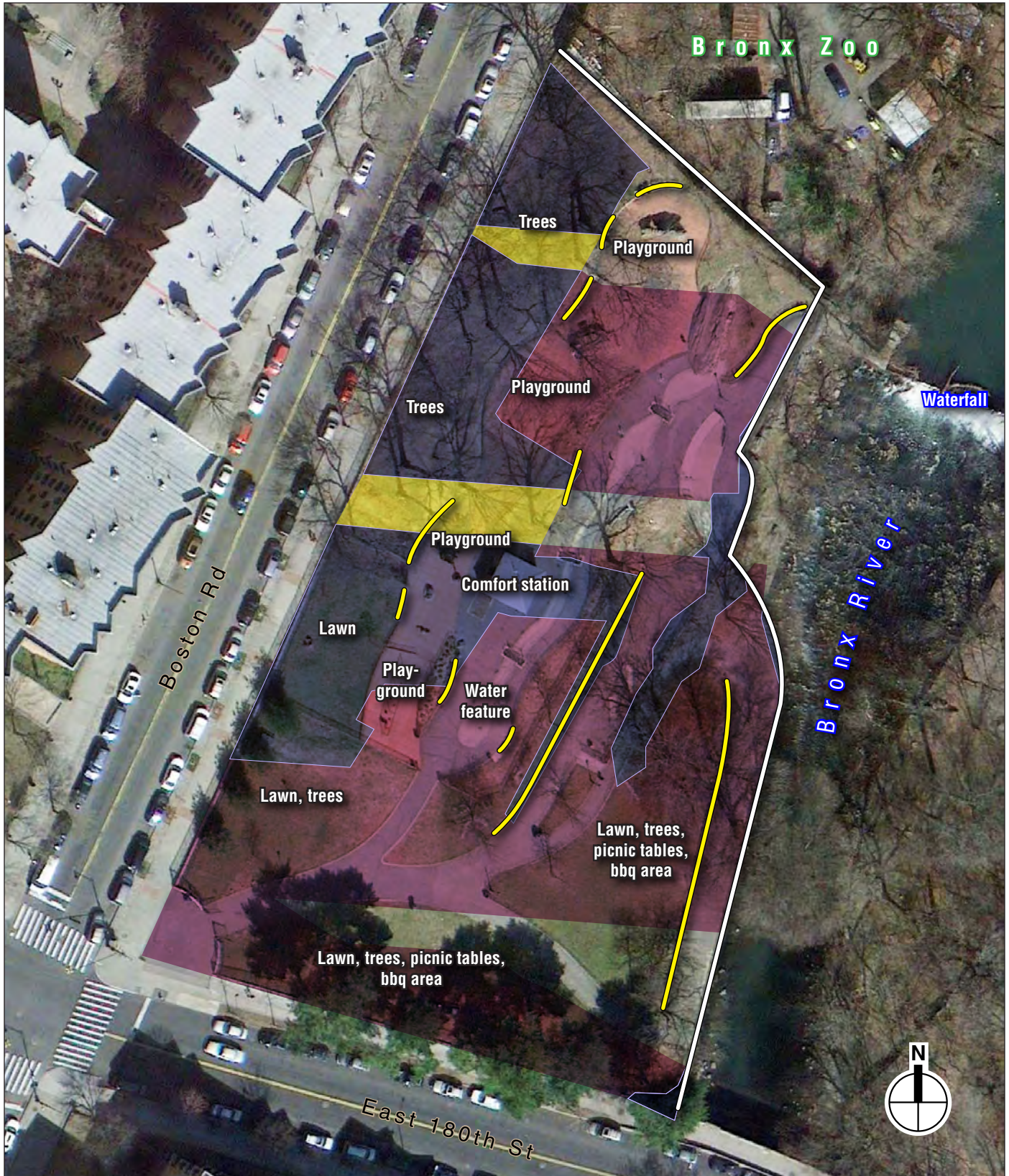


Reduced Shadow on Sun-Sensitive Resources



Existing Shadow





-  Benches
-  Park boundary
-  Incremental Shadow on Sun-Sensitive Resources
-  Reduced Shadow on Sun-Sensitive Resources
-  Existing Shadow

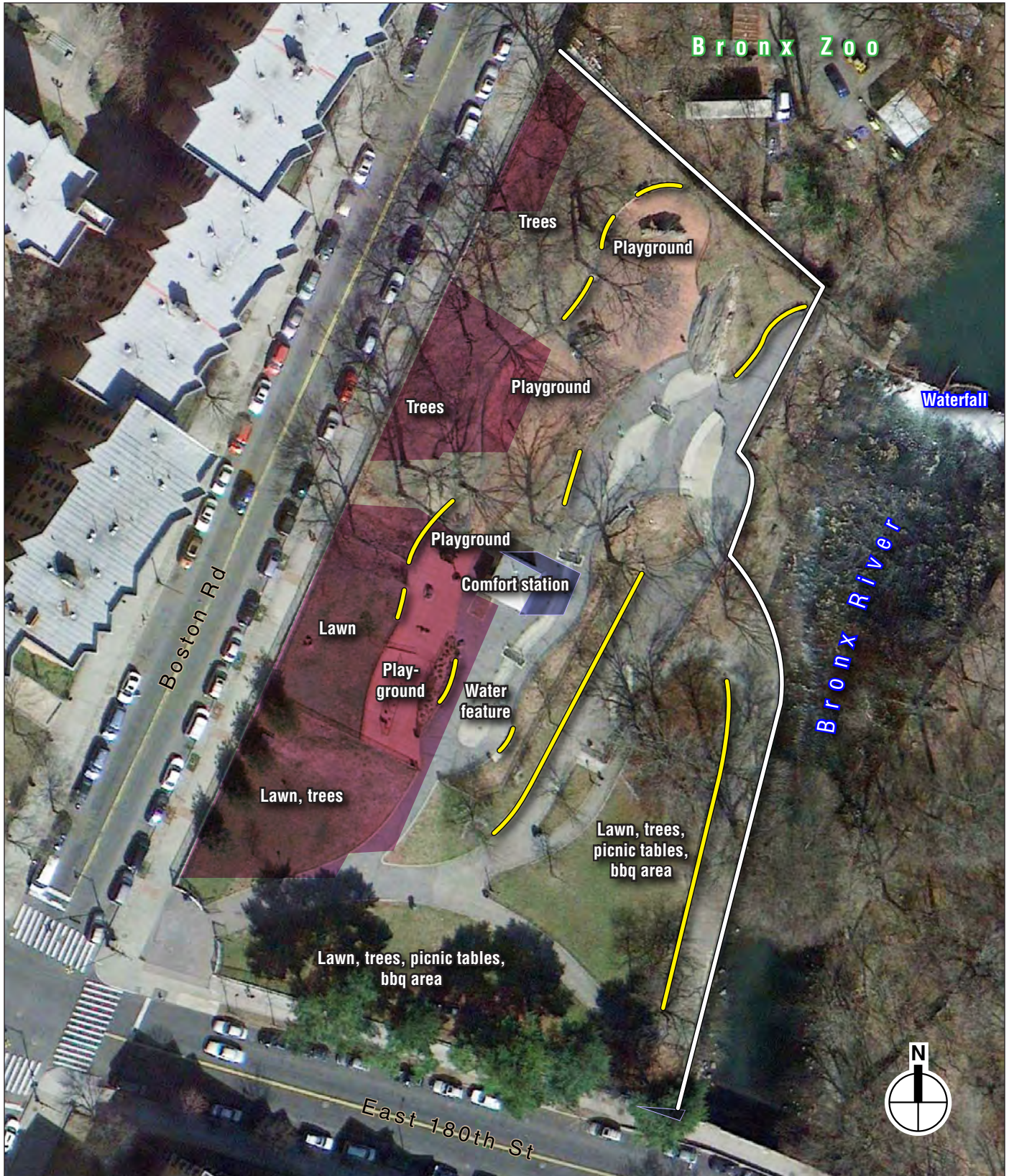
May 6 / August 6 - 5:00 PM  
Figure 6-70





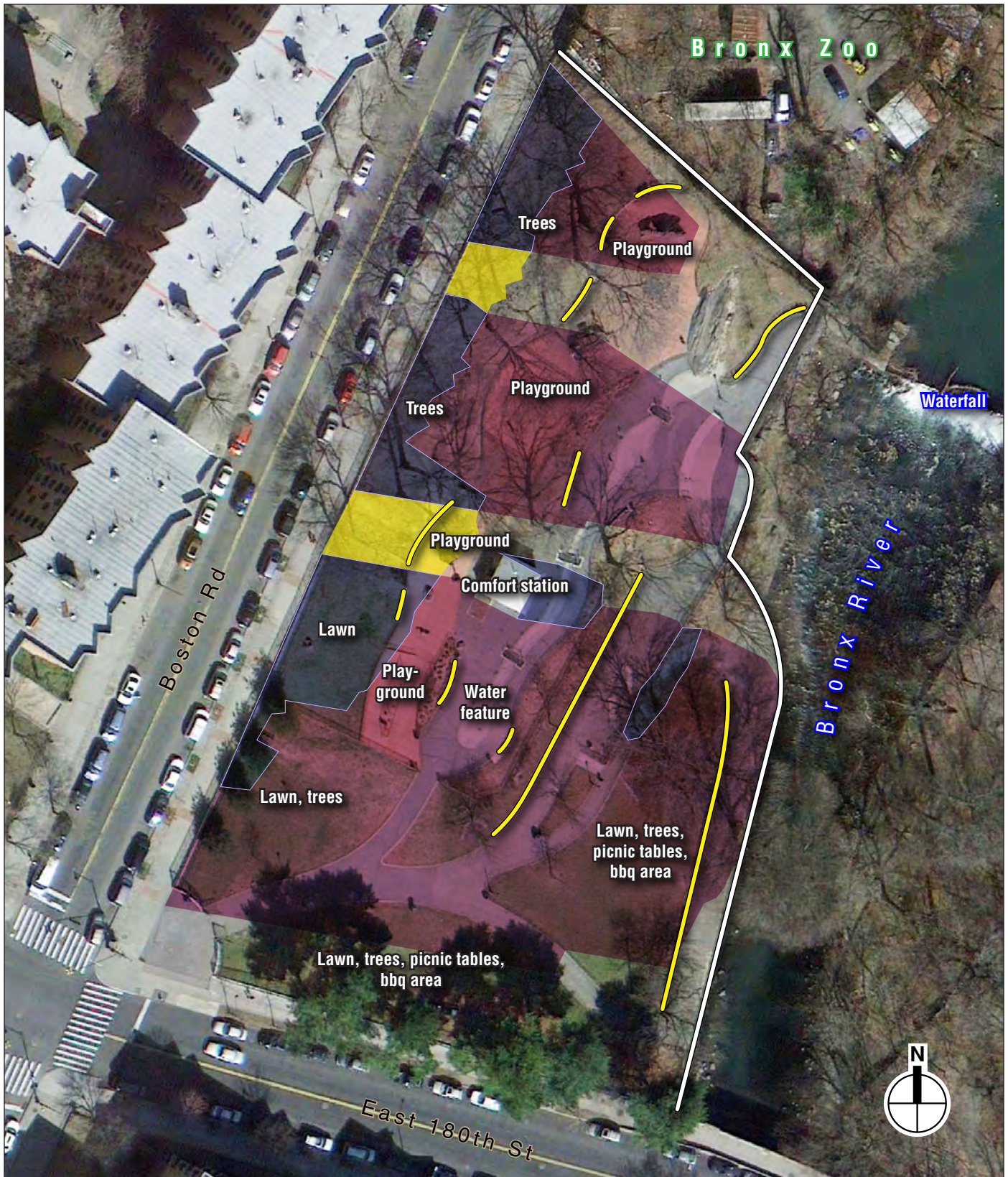
-  Benches
-  Park boundary
-  Existing Shadow
-  Incremental Shadow on Sun-Sensitive Resources





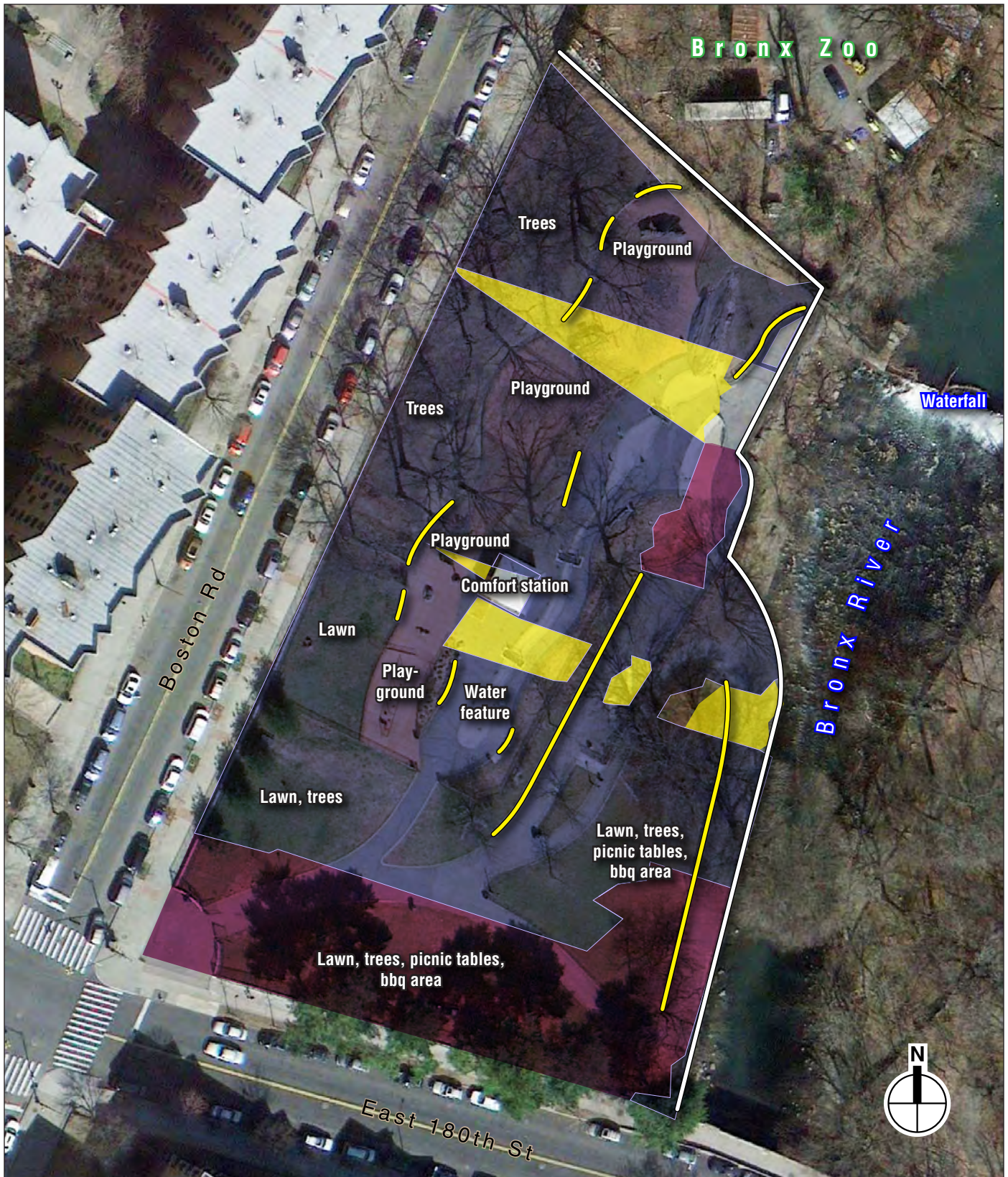
-  Benches
-  Park boundary
-  Existing Shadow
-  Incremental Shadow on Sun-Sensitive Resources





-  Benches
-  Park boundary
-  Incremental Shadow on Sun-Sensitive Resources
-  Reduced Shadow on Sun-Sensitive Resources
-  Existing Shadow





-  Benches
-  Park boundary
-  Incremental Shadow on Sun-Sensitive Resources
-  Reduced Shadow on Sun-Sensitive Resources
-  Existing Shadow



In the late spring and summer, there would be more shadow with the proposed project than in the No Action condition. But the new shadow would be brief and would occur early in the morning. There would be a period when the incremental shadow would eliminate all the direct sunlight from the east façade windows but this would occur before 7:00 AM (8:00 AM Daylight Saving Time), and there would be no incremental shadow whatsoever after 8:00 AM (9:00 AM Daylight Saving Time). Therefore, given the limited extent and duration of incremental shadow, and the very early time of day when it would occur, the proposed project would not cause significant adverse shadow impacts to this historic resource.

### **BRONX RIVER**

Areas of the river would receive incremental shadows in all seasons. The new shadow would be very brief in winter. In spring, summer and fall there would be areas of new shadow and also other areas of reduced shadow, compared with the No Action condition; the latter would occur primarily east of Parcel 5, adjacent to West Farms Rapids Park. The most incremental shadow would occur in the late spring and summer, when up to three and a half hours of new shadow would fall on portions of the river, although not all on any one location, since the shadows would move during that period.

The current flows swiftly in the Bronx 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 tall structures to the east and south. Incremental shadows would therefore not be likely to significantly affect aquatic resources (plankton or fish) in these areas of the river. Consequently, project-generated shadows would not cause significant adverse impacts on the Bronx River.

### **F. DISCLOSURE OF NEW SHADOWS ON THE BRONX ZOO**

As noted above in the preliminary Tier 3 screening assessment, new shadows would be able to reach small portions of the Bronx Zoo. In the winter, some new shadows from the proposed redevelopment on the northern part of Parcel 1 would pass across the adjacent portion of the zoo to the north across Bronx Park South from about 10:00 AM until the end of the analysis day. The new shadow would move across landscaped/wooded areas adjacent to Bronx Park South, and the mostly paved Asia Plaza, Shuttle Station East and Asia Parking areas. It would not reach the African Plains enclosure nor the Jungle World building. The extent of incremental shadow would be small, relative to the extent of these areas.

In the early spring and the fall, shadows are shorter but extend further to the west at the start of the day and east and the end of the day. New shadows would, similar to the winter analysis day, pass across landscaped/wooded areas of the zoo adjacent to Bronx Park South and the Asia Gate, and in the late afternoon pass across a portion of the Jungle World building, which is an interior exhibit.

In the late spring and summer, when shadows are shortest and extend furthest southwest and southeast, new shadows would not reach the area of the zoo to the north across Bronx Park South. In the late afternoon new shadow would fall to the east on the mostly paved/structured area between the Jungle World building and River Park.



## **G. DISCLOSURE OF NEW SHADOWS ON PROJECT OPEN SPACE**

As noted in the preliminary screening assessment above, the proposed redevelopment would include new open space. Per *CEQR Technical Manual* guidelines, project-generated open space cannot experience a significant adverse impact, because without the project the open space would not exist. However, the project-generated open space is included in the qualitative analysis in Chapter 5, “Open Space,” and therefore a qualitative discussion of how shadows might affect them is included here.

On Parcels 1, 3 and 5, new open space would be enclosed in courtyards surrounded by the proposed new buildings, which would be available to all building residents. The Development Site open spaces are expected to be landscaped with a mix of shrubs and trees; it is anticipated that lawn and seating areas would be provided as well as children’s play equipment. One proposed new building on Parcel 10 would also provide approximately 12,655 square feet of open space for residents on its rooftop.

In the winter, the project open spaces On Parcels 1, 3 and 10 would be largely in shadow for most of the day, although small pockets of sun would fall here and there at times. On Parcel 5, the open space would be partially in sun and partially in shade throughout the day, because the space would be less enclosed to the south than the spaces on the other two parcels.

In the spring and fall, the spaces would be partially in sun and partially in shade over the course of the day. The shadiest space overall would be the one in the southern half of Parcel 1. The sunniest would be the Parcel 5 space which would be more than half in sun throughout the day until late afternoon.

In the summer all the project open spaces would be mostly in sun throughout much of the day.

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