

A. INTRODUCTION

Following the guidelines of the *City Environmental Quality Review (CEQR) Technical Manual*, a shadows assessment is appropriate when a proposed action would result in new structures that could cast shadows long enough to reach a public open space, a historic resource with a significant sun-sensitive feature, or an important natural feature, such as a water body. The Hunter's Point South rezoning and related actions project location is adjacent to the East River and Newtown Creek, two important natural features, as well as Gantry Plaza State Park, a public open space. Following CEQR guidelines, a detailed shadows analysis was conducted to determine whether the proposed actions would result in incremental shadows on any adjacent or nearby sun-sensitive resources, and to assess the affects of any such incremental shadows.

PRINCIPAL CONCLUSIONS

The shadows analysis concluded that incremental shadows that would be cast by the proposed buildings of the reasonable worst-case development scenario (RWCDS) would not cause any significant adverse impacts to nearby sun-sensitive resources. Incremental shadows would fall on various sections of the East River for up to four hours during mornings throughout the year, but these shadows would not be likely to significantly impact aquatic resources. Incremental shadows would also fall on portions of Gantry Plaza State Park for over five hours during the morning and early afternoon hours of the fall, winter and early spring months, and on Peninsula Park during winter afternoons. While the long duration of incremental shadows could reduce the attractiveness of the park during these seasons for users of its passive recreation facilities, the overall usability of the park would not be significantly reduced. In the late spring and summer months this park would receive ample sunlight, and the proposed actions would not cause a significant adverse impact to the health and viability of its vegetation.

B. METHODOLOGY

To identify potential impacts on sun-sensitive resources, the methodology of the *CEQR Technical Manual* focuses on uses and users of the open space, landscaping and vegetation, and features or details that are both sunlight-dependent and make such resources significant. Based on *CEQR Technical Manual* methodology, this analysis considers shadows on four representative days of the year: March 21 and September 21, the equinoxes; May 6/August 6, the midpoint between the equinoxes and summer solstice; June 21, the summer solstice and the day on which shadows are the shortest; and December 21, the winter solstice.

The CEQR methodology does not consider shadows and incremental increases in shadows within 1½ hours of sunrise or sunset to be considered significant. Therefore, the analysis period is between 1½ hours after sunrise and 1½ hours before sunset.

Hunter's Point South Rezoning and Related Actions DEIS

According to the *CEQR Technical Manual*, a significant shadow impact may occur when there is:

- Substantial reduction in sunlight where a sensitive use is already subject to substandard sunlight (i.e., less than the minimum time necessary for survival);
- Reduction in sunlight available to a sensitive use from more to less than the minimum time necessary for its survival;
- Substantial reduction in sunlight to a sun-sensitive use or feature; or
- Substantial reduction in the usability of the open space.

The determination of impact significance is based on an assessment of how a project's incremental shadows specifically would affect sun-sensitive features of individual resources. Shadows cast on open spaces that are part of a proposed project or action are not considered impacts of an action because without the action, the open space would not exist.

Shadows were modeled using the solar rendering capabilities of MicroStation V8 software. Three-dimensional models of the proposed actions were provided by the project sponsor, while existing conditions were modeled using data provided by New York City Department of Information Technology and Telecommunications, U.S. Geological Survey, Sanborn Map Co., and AKRF, Inc. (see **Figure 6-1**).

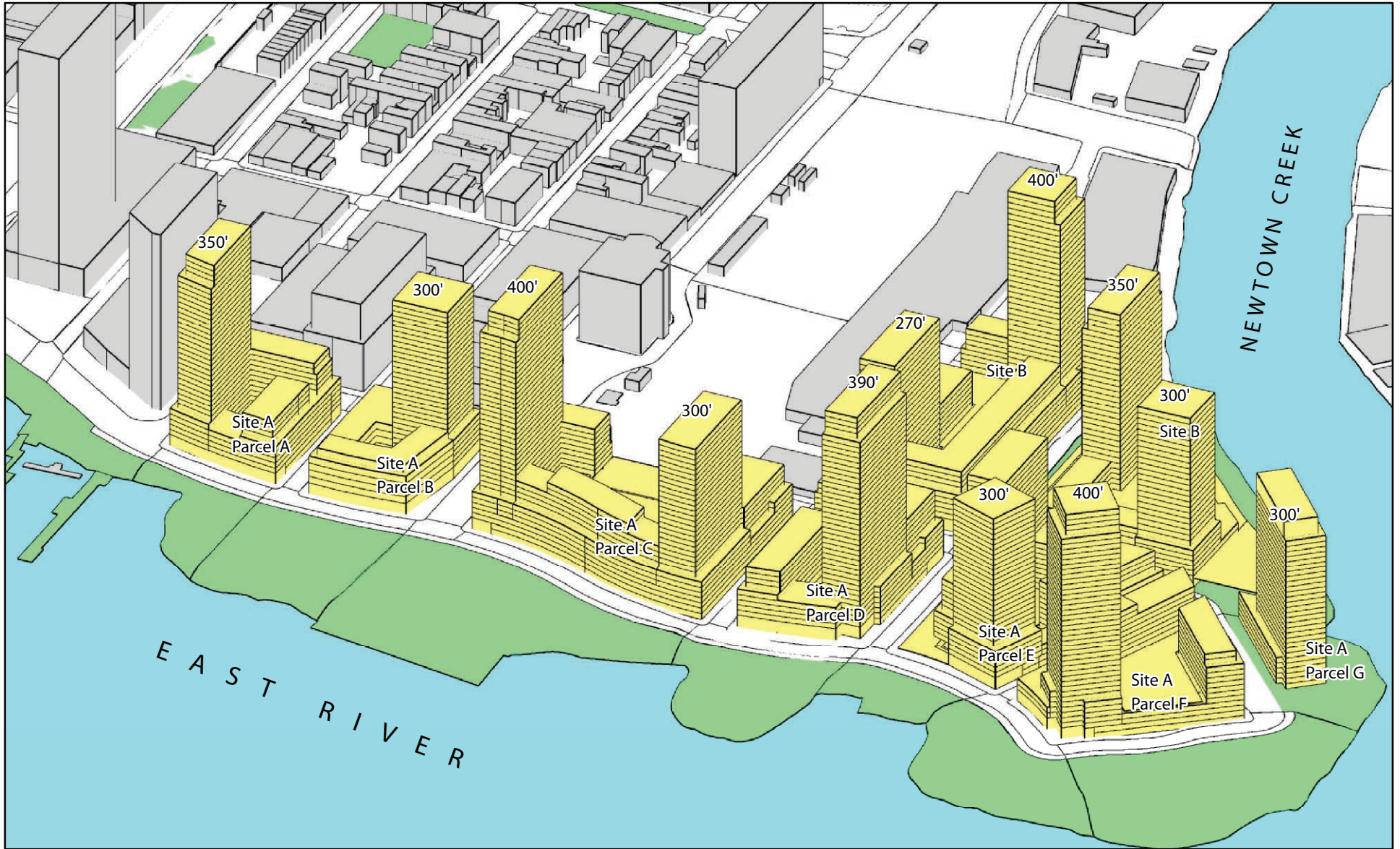
C. SCREENING ANALYSIS

A screening analysis was performed to determine which open spaces, sunlight-sensitive architectural resources, or important natural features could be affected by project shadows at any time of year. Using the heights and forms of the maximum building envelopes of the RWCDs and conservatively accounting for mechanical bulkheads on the proposed towers, the full extent of the area that could be shaded by the RWCDs was calculated for each of the analysis days and delineated on a street map. In coordination with the open space and historic analyses provided in other chapters of this EIS, open spaces and historic resources were denoted on the map. All sun-sensitive resources that fell fully or partially within the perimeter representing the maximum shadow lengths were included in the more detailed analysis below. These are listed in **Table 6-1** and shown in **Figure 6-2**).

Table 6-1
Sunlight-Sensitive Resources
Within the Maximum Shadow Length Area

Map No.*	Resource Name
1	East River
2	Gantry Plaza State Park**
3	Hunters Point Community Park
4	Long Island City Community Garden
5	Andrews Grove
6	Dog Run
7	St. Mary's Roman Catholic Church
8	Vernon Mall
9	Old Hickory Park
10	Newtown Creek

Notes: * Map numbers correspond to Figure 6-2.
** For the purposes of this shadows analysis, the entire waterfront park at Queens West is referred to as Gantry Plaza State Park.

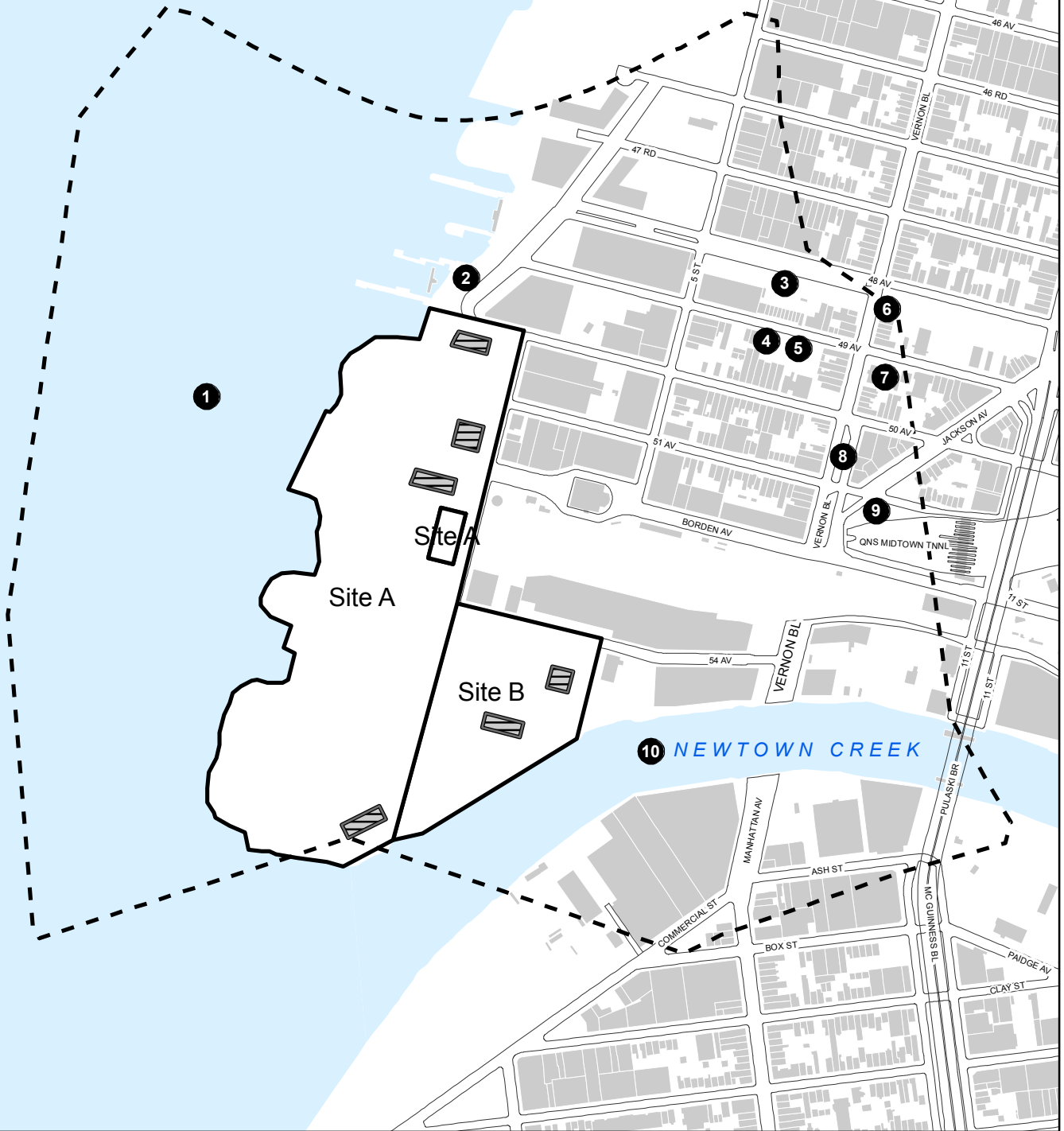






NOTE: Heights show maximum allowed building heights as set forth under the proposed Special Southern Hunter's Point District. The shadows analysis conservatively accounts for additional rooftop mechanical space.

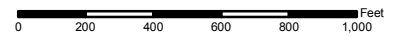
Reasonable Worst Case Development Scenario
Building Heights Analyzed in Shadow Study - View East
Figure 6-1



EAST RIVER



-  Project Location
-  RWCDs Towers Used in Screening Analysis (see Fig. 6-1 for Heights)
-  Perimeter Showing Longest Possible Shadow Length Cast by RWCDs Buildings Throughout Year
-  Sun-Sensitive Resources within Perimeter (see Table 6-1 for Number Key)



D. RESOURCES OF CONCERN FOR DETAILED ANALYSIS

All the open spaces, natural features, and historic resources in **Table 6-1** were included in the three-dimensional solar study conducted for the RWCDs. The detailed analysis showed that six of these resources would not receive any incremental shadows at any time of year from the RWCDs, and need not be discussed further. These six resources—the Long Island City Community Garden, Andrew’s Grove, the dog run at Vernon Boulevard and 48th Avenue, St. Mary’s Church, Vernon Mall, and Old Hickory Park—are all located relatively far to the northeast and east of the project sites, and the analysis showed that portions of these resources that could have been reached by project-generated shadows late in the afternoons on some analysis days are already cast in existing shadows by adjacent intervening structures.

Site A is located along the eastern shore of the **East River**, a tidal strait that connects New York Harbor with the western end of Long Island Sound, and Sites A and B are located along the northern shore of **Newtown Creek**, a tributary of the East River. As described in Chapter 11, “Natural Resources,” the hydrodynamic and estuarine character of these two water bodies, coupled with the numerous municipal and industrial discharges that have occurred in the river and creek over many years, makes these water bodies a physically harsh environment. For this reason, many of the species using the area must be tolerant of highly variable conditions.

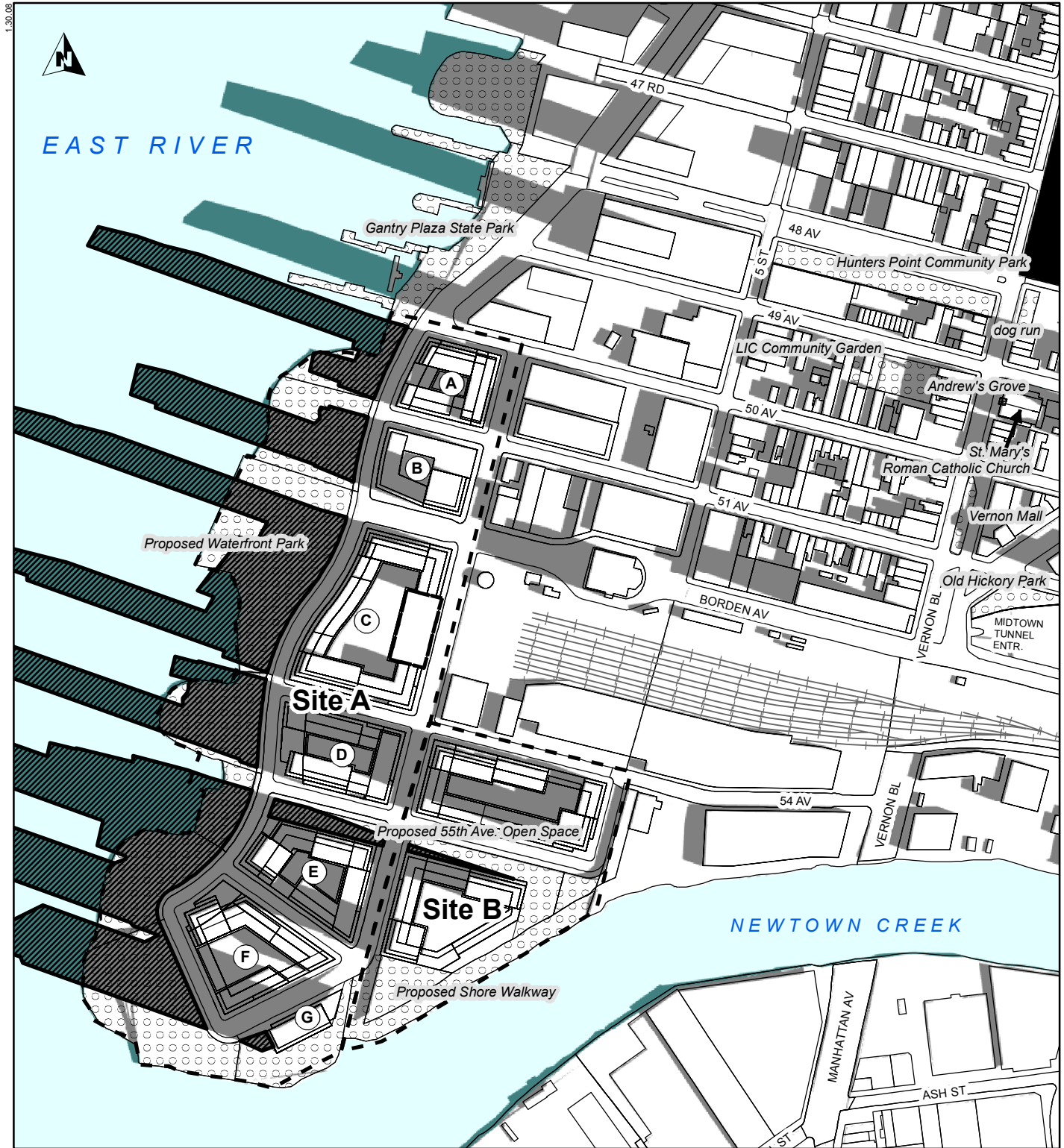
Gantry Plaza State Park is a riverside open space just north of Site A that includes a small playground, seating areas, lawn areas and walking areas, picnic tables, and piers, including a fishing area. For the purposes of this shadows analysis Gantry Plaza State Park includes other adjacent riverside park areas, such as Peninsula Park.






The **Hunters Point Community Park** is located along the south side of 48th Avenue between 5th Street and Vernon Boulevard and consists of sitting areas, basketball and handball courts, and a tot lot.

Additionally, the proposed actions would add approximately 13.4 acres of publicly accessible open space and parkland to the study area. While the open spaces have not yet been designed, the shadow study conservatively assesses the effect of project-generated shadows throughout the four areas that have been designated public open space in the RWCDs: **the waterfront park area along the East River shore of Site A, the 55th Avenue open space on Site A, the 55th Avenue open space on Site B, and the shore walkway along Newtown Creek on Site B.** As mentioned above in section B, “Methodology,” shadows cast on open spaces that are part of a proposed project or action are not considered impacts of an action because without the action, the open space would not exist.

E. ASSESSMENT OF INCREMENTAL SHADOWS

The extent and duration of incremental shadows cast by the proposed buildings of the reasonable worst-case development scenario on the four analysis days are noted in **Table 6-2** and illustrated in **Figures 6-3 through 6-17**. The figures are ordered by analysis day and depict the extent of incremental shadows on the nearby sun-sensitive resources at various times throughout each analysis period. (**Figures 6-3 through 6-6** show the March 21/September 21 analysis day; **Figures 6-7 through 6-10** show the May 6/August 6 analysis day; **Figures 6-11 through 6-14** show the June 21 analysis day; and **Figures 6-15 through 6-17** show the December 21 analysis day.) The extent, duration, and effects of incremental shadows are discussed below by resource.



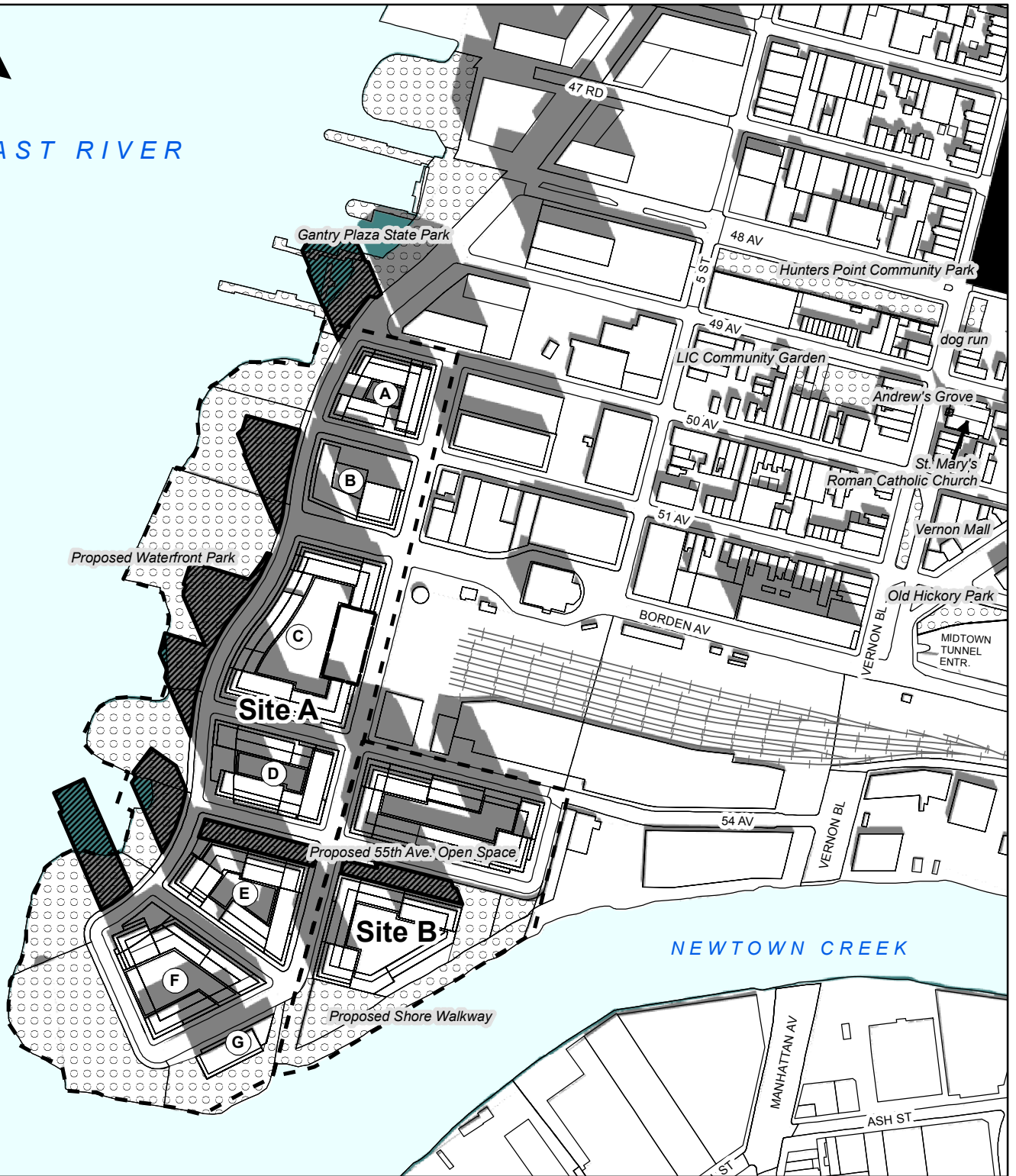
-  Project Location
-  Publicly-Accessible Open Space
-  Incremental Shadow on Sun-Sensitive Resource
-  Parcels
-  Shadow

Shadows
 March 21 / Sept. 21 - 9:00 AM EDT
Figure 6-3

1.30.08



EAST RIVER



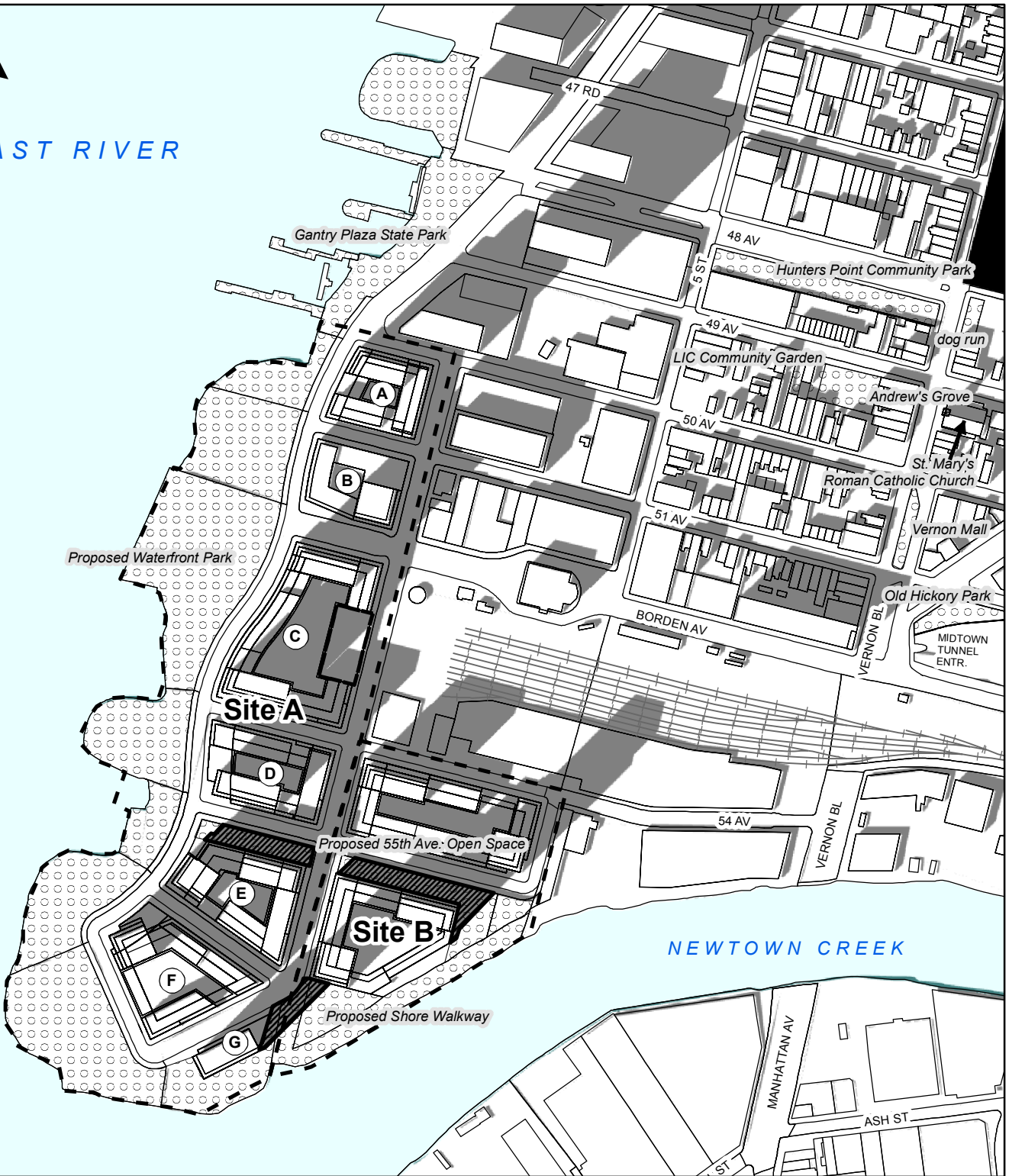
- Project Location
- Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resource
- Parcels
- Shadow



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EAST RIVER








- Project Location
- Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resource
- Parcels
- Shadow

0 200 400 600 800 1,000 Feet



EAST RIVER



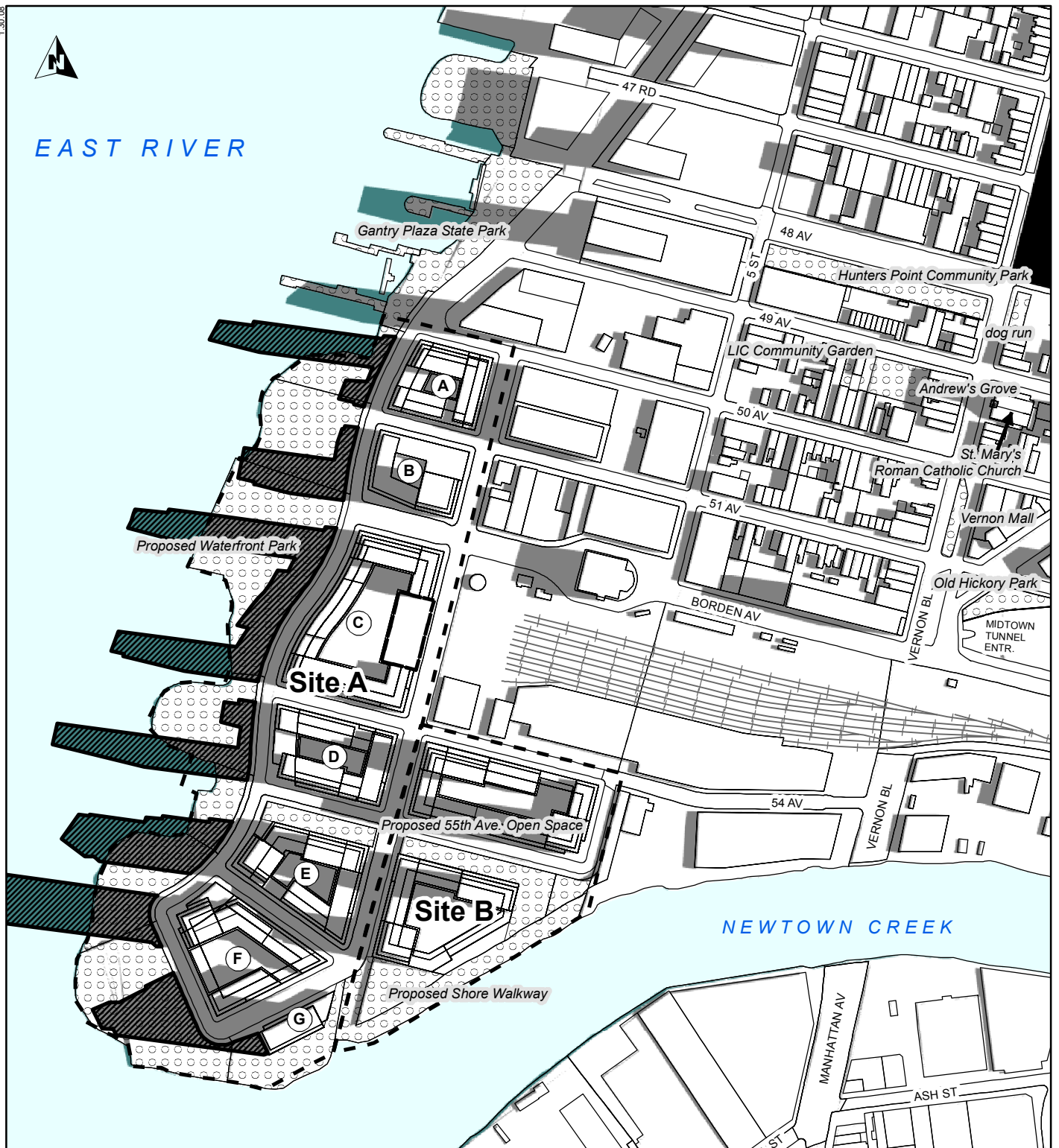
-  Project Location
-  Publicly-Accessible Open Space
-  Incremental Shadow on Sun-Sensitive Resource
-  Parcels
-  Shadow



1.30.08



EAST RIVER

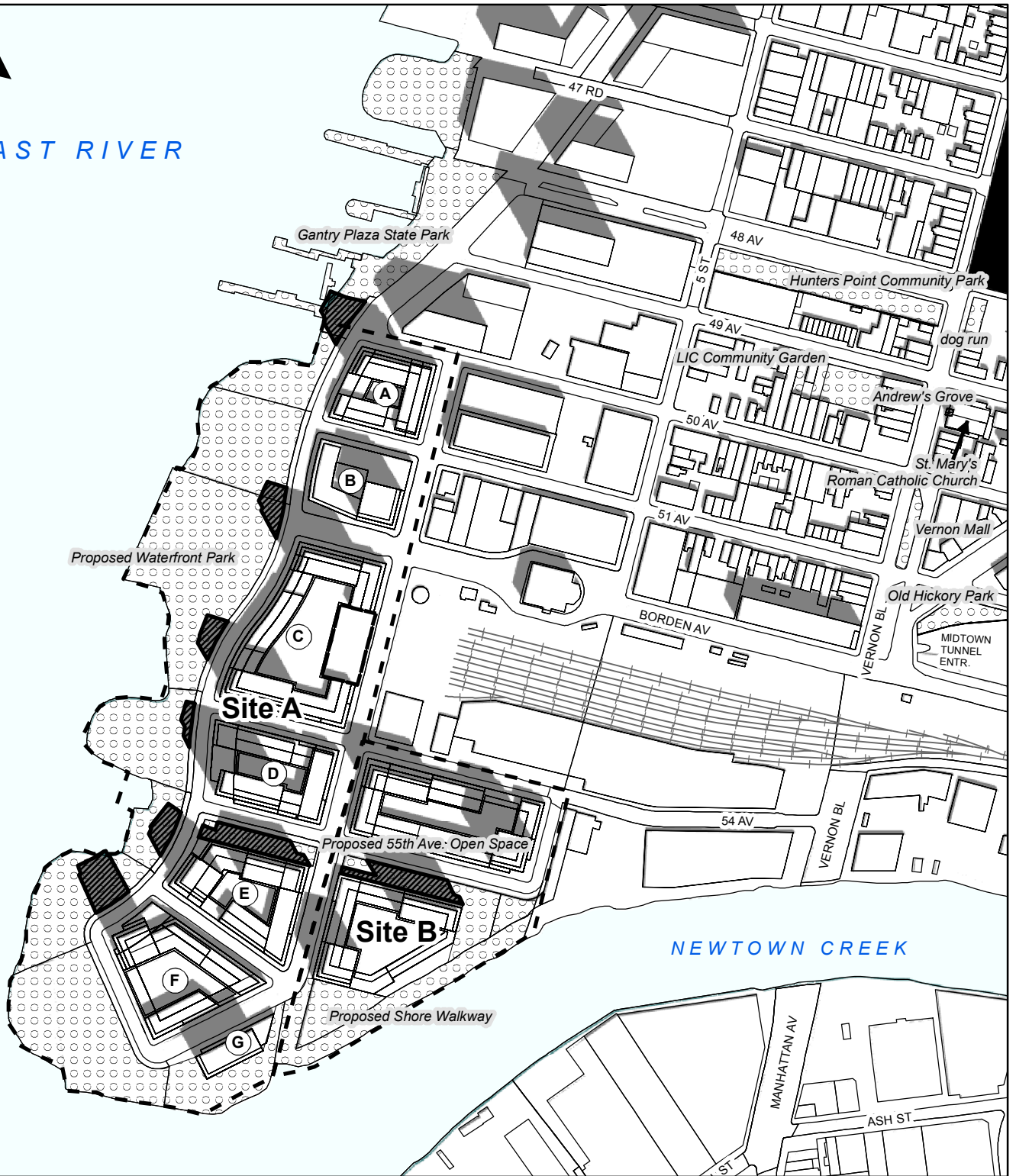


- Project Location
- Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resource
- Parcels
- Shadow





EAST RIVER

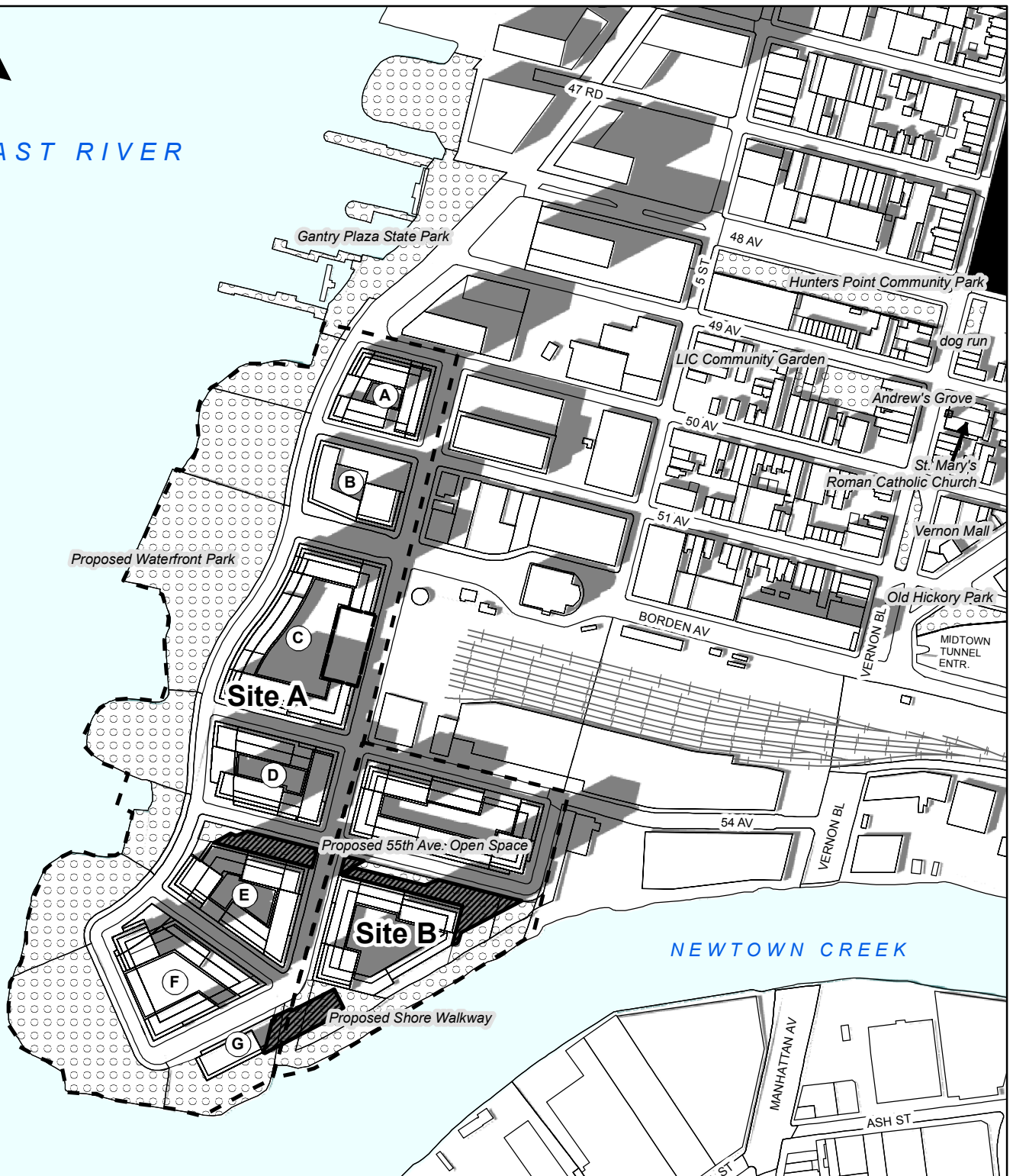







- Project Location
- Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resource
- Parcels
- Shadow





EAST RIVER

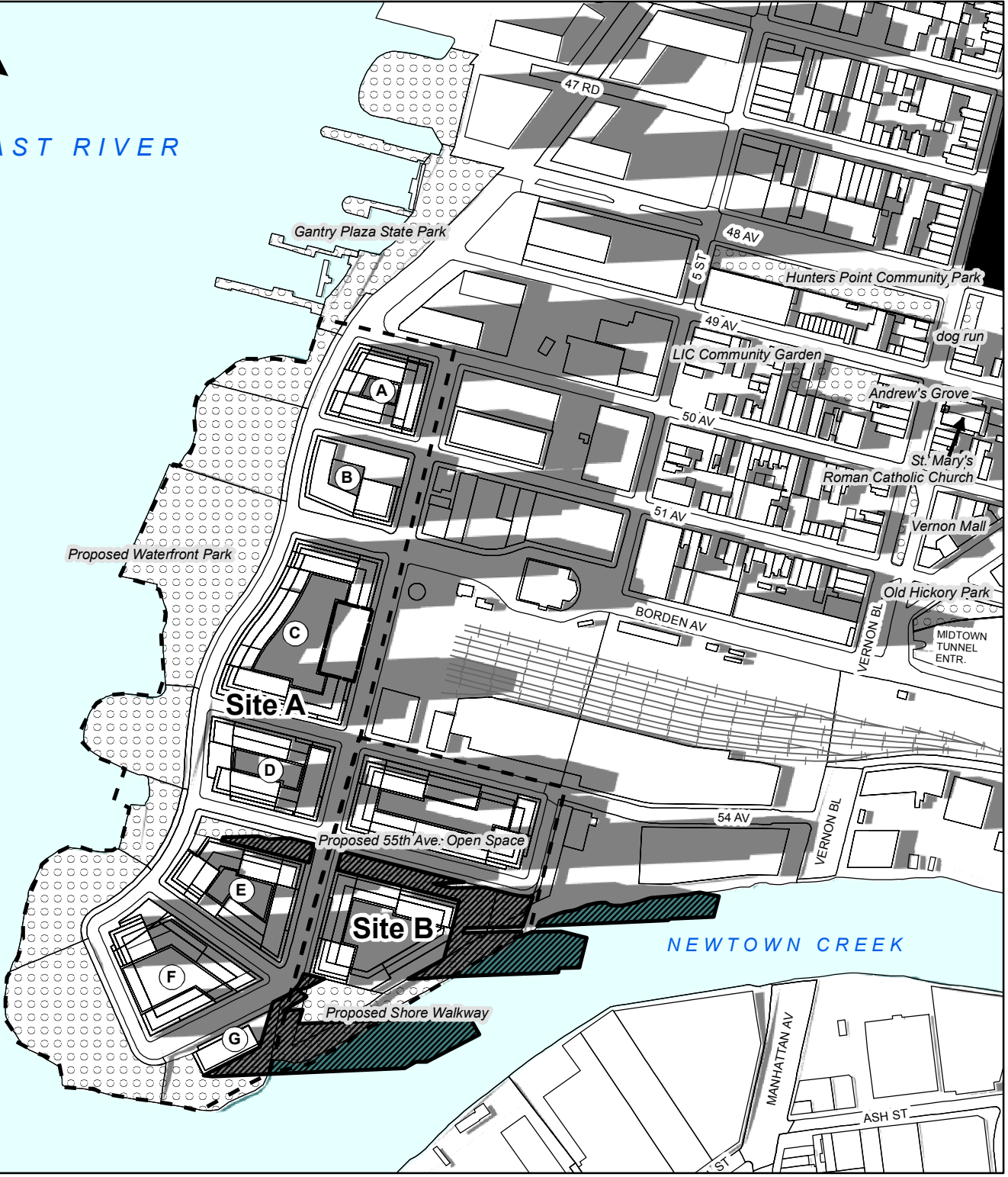


-  Project Location
-  Publicly-Accessible Open Space
-  Incremental Shadow on Sun-Sensitive Resource
-  Parcels
-  Shadow





EAST RIVER








- Project Location
- Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resource
- Parcels
- Shadow





EAST RIVER

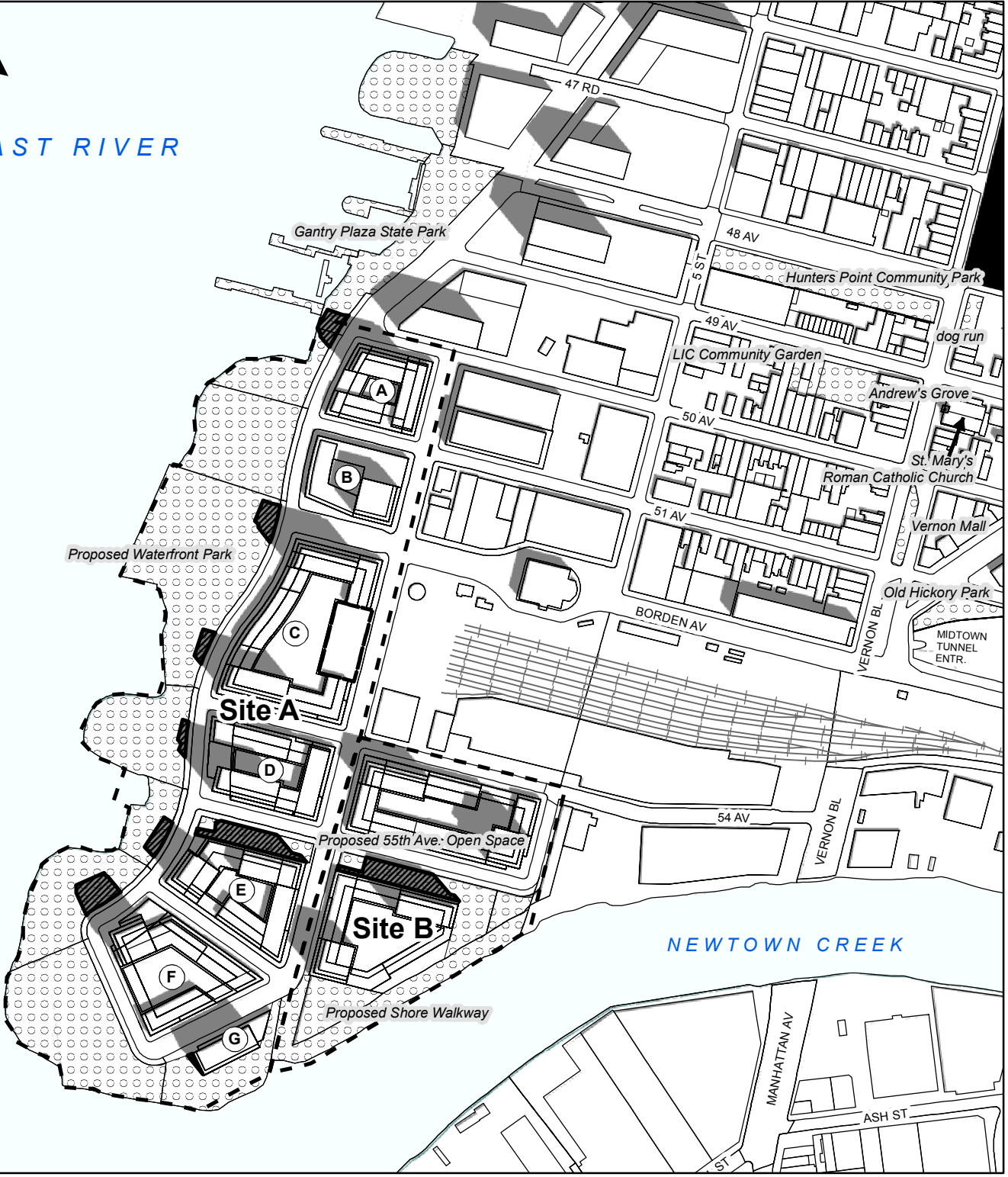


-  Project Location
-  Publicly-Accessible Open Space
-  Incremental Shadow on Sun-Sensitive Resource
-  Parcels
-  Shadow





EAST RIVER



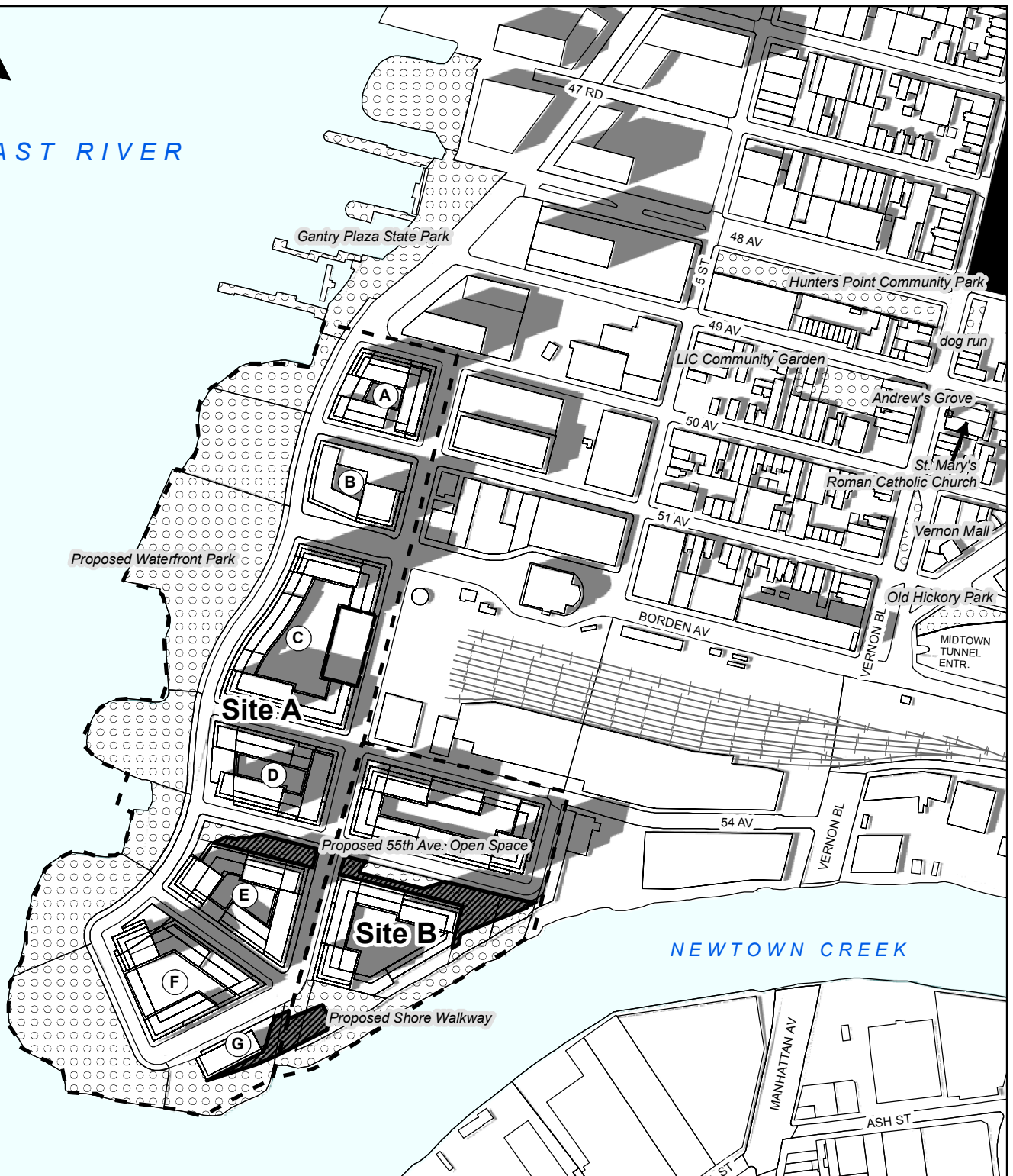
- Project Location
- Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resource
- Parcels
- Shadow






0 200 400 600 800 1,000 Feet

1.30.08



EAST RIVER



-  Project Location
-  Publicly-Accessible Open Space
-  Incremental Shadow on Sun-Sensitive Resource
-  Parcels
-  Shadow



Shadows
 June 21 - 3:15 PM EDT
 Figure 6-13

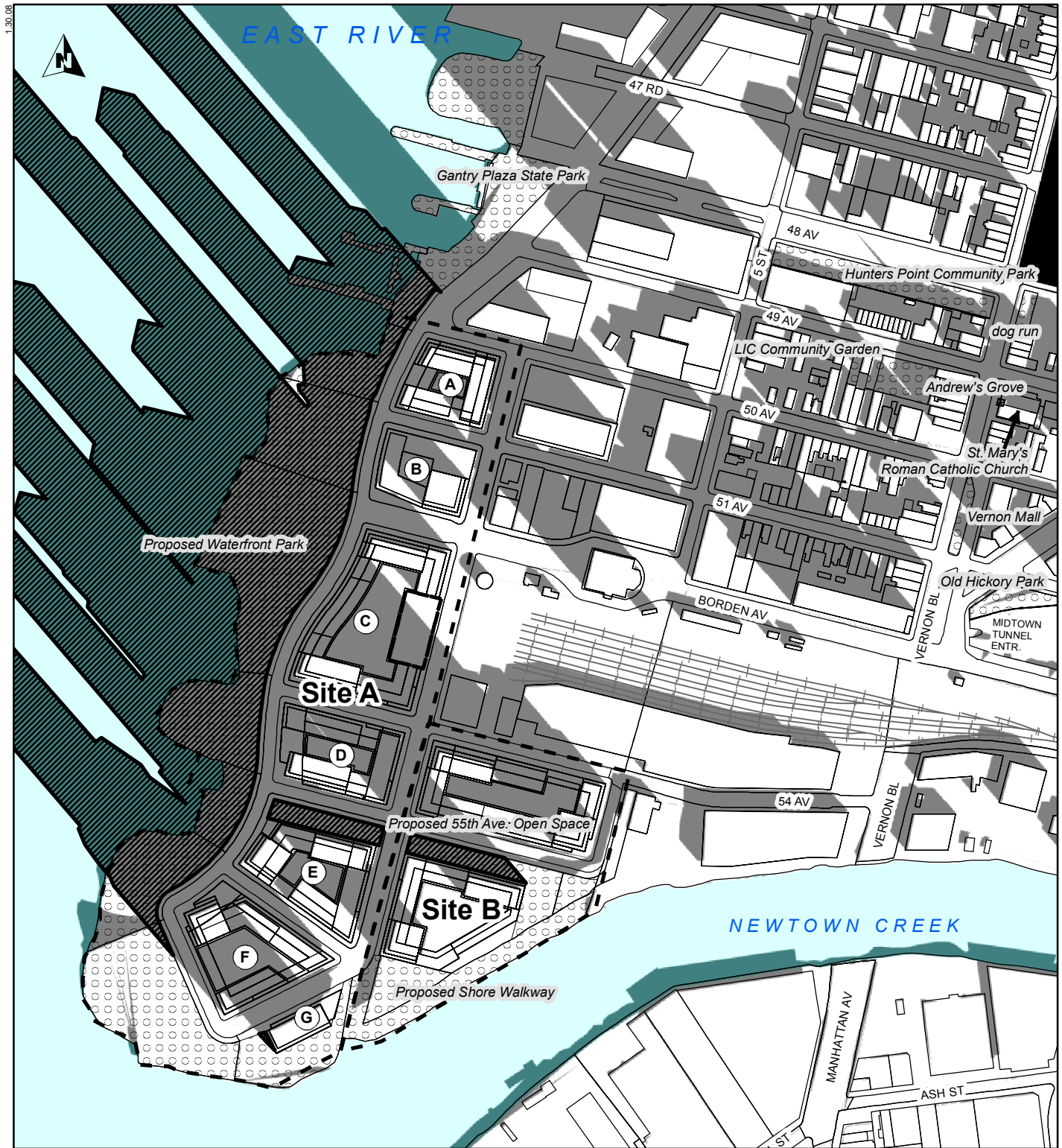







EAST RIVER



- Project Location
- Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resource
- Parcels
- Shadow

0 200 400 600 800 1,000 Feet



-  Project Location
-  Publicly-Accessible Open Space
-  Incremental Shadow on Sun-Sensitive Resource
-  Parcels
-  Shadow

0 200 400 600 800 1,000 Feet



EAST RIVER

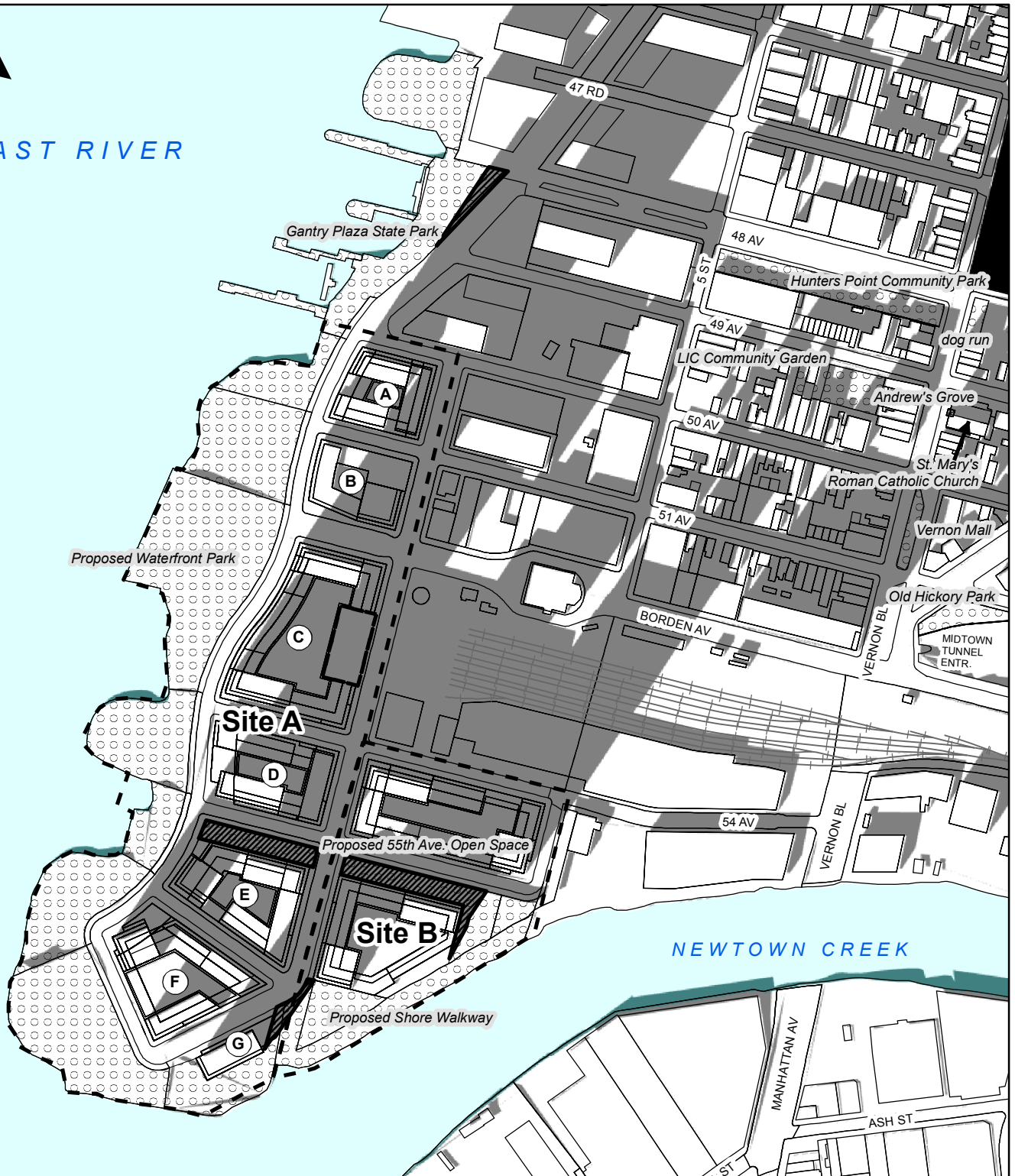


- Project Location
- Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resource
- Parcels
- Shadow





EAST RIVER



- Project Location
- Publicly-Accessible Open Space
- Incremental Shadow on Sun-Sensitive Resource
- Parcels
- Shadow

0 200 400 600 800 1,000 Feet

**Table 6-2
Incremental Shadow Durations**

Resource	March 21 8:36 AM-5:29 PM EDT	May 6 7:27 AM-6:18 PM EDT	June 21 6:57 AM-7:01 PM EDT	December 21 8:51 AM-2:53 PM EST
EXISTING OPEN SPACES				
East River	8:36 AM–1:45 PM Total: 5h 9m	7:27 AM–12:00 PM Total: 4h 33m	6:57 AM–11:45 AM Total: 4h 48m	8:51 AM–1:15 PM Total: 4h 24m
Newtown Creek	5:00 PM–5:29 PM Total: 14m	4:15 PM–6:18 PM Total: 2h 3m	4:15 PM–7:01 PM Total: 2h 46m	—
Gantry Plaza State Park	9:15 AM–2:30 PM Total: 5h 15m	10:00 AM–1:00 PM Total: 3h	10:45 AM–12:30 PM Total: 1h 45m	8:51 AM–2:30 PM Total: 5h 39m
Hunters Point Community Park	5:15 PM–5:29 PM Total: 14m	—	—	—
PROPOSED NEW OPEN SPACES				
Proposed waterfront park (Site A)	8:36 AM–2:30 PM Total: 5h 54m	7:27 AM–1:30 PM Total: 6h 3m	6:57 AM–1:15 PM Total: 6h 18m	8:51 AM–2:00 PM Total: 5h 9m
Proposed 55th Avenue open space (Site A)	8:45 AM–5:29 PM Total: 8h 44m	7:27 AM–8:45 AM 9:45 AM–6:18 PM Total: 9h 51m	6:57 AM–9:15 AM 10:45 AM–6:15 PM Total: 9h 48m	8:51 AM–2:53 PM Total: 6h 2m
Proposed 55th Avenue open space (Site B)	8:45 AM–5:29 PM Total: 8h 44m	7:27 AM–8:45 AM 9:45 AM–6:18 PM Total: 9h 51m	6:57 AM–9:15 AM 10:45 AM–7:01 PM Total: 10h 34m	8:51 AM–2:53 PM Total: 6h 2m
Proposed Shore Public Walkway (Sites A and B)*	3:00 PM–5:29 PM Total: 2h 29m	1:45 PM–6:18 PM Total: 6h 21m	1:45 AM–7:01 PM Total: 7h 49m	1:15 PM–2:53 PM Total: 1h 38m
Notes: EST—Eastern Standard Time EDT—Eastern Daylight Time March 21 is the equivalent of September 21. May 6 is the equivalent of August 6. * The open space area along Newtown Creek, including a portion of the Site A waterfront park, the Shore Public Walkway on Site B, and the supplemental open space on Site B, are collectively considered as the shore walkway in this analysis.				

EAST RIVER

The project sites are located on the eastern shore of the East River where Newtown Creek meets the river. The proposed actions would result in incremental shadows on portions of the East River during the morning hours throughout the year.

Early on the March 21/September 21 analysis day, the proposed buildings would cast long shadows westward across adjacent areas of the river (see **Figure 6-3**). These shadows would move eastward over the course of the morning, shrinking in extent. By noon, incremental shadows would be limited to two small areas of the river next to the shoreline, at Gantry Plaza State Park and the small inlet adjacent to 55th Avenue (see **Figure 6-4**). These shadows would exit the river at 1:45 PM.

On the May 6/August 6, the analysis day is longer and shadows are shorter than in March and September. Long incremental shadows would fall to the southwest on the East River early in the morning. At midmorning these shadows would be somewhat shorter and fall directly to the west

(see **Figure 6-7**). By the late morning incremental shadows would be small and limited to areas of the river next to the shore. The last incremental shadow would move off the river at Gantry Plaza State Park at noon (see **Figure 6-8**).

On the June 21 analysis day, shadows are shortest. Incremental shadows would fall to the southwest onto the river early in the morning, and would shrink and move east by midmorning (see **Figure 6-11**). These shadows would be off the river by about 11:45 AM (see **Figure 6-12**).

On December 21, the shortest day of the year, shadows are longest. The sun's angle is such that very long incremental shadows would fall to the northwest of the project sites at the start of the day (see **Figure 6-15**). These shadows would move quickly eastward and by noon would fall due north across the inlets of the proposed waterfront park and Gantry Plaza State Park (see **Figure 6-16**). Incremental shadows would exit the river at 1:15 PM.

The current flows rather swiftly in the East River and would move phytoplankton and other natural elements quickly through the shaded areas. Therefore, project-generated shadows would not be expected to affect primary productivity. At least one small section of the river next to the shore would receive approximately four hours of incremental shadow on June 21, but most areas of the river would receive much shorter durations as the shadows move eastward during the morning. The areas that receive the longest durations of new shadow on summer mornings would continue to receive more than six hours of sunlight in the afternoon, because there are no intervening structures to the west. Incremental shadows would therefore not be likely to significantly affect aquatic resources (plankton or fish) in the East River. Consequently, project-generated shadows would not cause significant adverse impacts on the East River.

NEWTOWN CREEK

The project sites are located on the north shore of Newtown Creek, where the creek meets the East River. The proposed actions would result in incremental shadows on portions of Newtown Creek south and east of the project sites in the late afternoons of the spring, summer, and fall.

On the March 21/September 21 analysis day, incremental shadows would move onto a section of Newtown Creek along the shoreline next to Site B at 5:00 PM and remain until the end of the analysis period at 5:29 PM (see **Figure 6-6**).

On late spring and summer analysis days (May 6/August 6 and June 21), incremental shadows would move onto the creek at 4:15 PM and lengthen across portions of the creek southeast of the project site until the end of the analysis day (see **Figures 6-10** and **6-14**).

In the winter, shadows cast by the RWCDs would not fall southward enough at the end of the analysis day to reach the creek at all.

Overall, approximately two hours of late-afternoon incremental shadow on portions of Newtown Creek during the spring, summer, and fall analysis periods would not significantly affect aquatic resources there, and would not cause a significant adverse impact.

GANTRY PLAZA STATE PARK

Gantry Plaza State Park is located just north of Site A, and during the fall, winter, and early spring incremental shadows from the RWCDs would move across portions of this park for much of the day. During the late spring and summer months, project-generated shadows covering smaller areas of the park would be limited to about two hours in the middle of the day.

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On the March 21/September 21 analysis day, incremental shadow from the development on Parcel A of Site A would move onto the southernmost pier of the park at 9:15 AM (**Figure 6-3** depicts conditions 15 minutes prior). This shadow would move across this pier and the adjacent tot lot for the rest of the morning; by noon it would be off this pier but would fall on the next pier to the north as well as the adjacent section of the park along the shore (see **Figure 6-4**). This shadow would continue moving east and exit the park at 2:30 PM. No other parcels of the RWCDs would cast incremental shadow on the park on this day, and the entire park would be in sunlight for the remainder of the afternoon.

On the May 6/August 6 analysis day, incremental shadow from development on Parcel A on Site A would move onto a small portion of the tot lot at the south end of the park at 10:00 AM. This shadow would move across the tot lot and adjacent small areas in the south of the park (see **Figure 6-8**) and exit at 1:00 PM. No other incremental shadow would fall on the park this day. Large areas of the park would continue to experience long durations of sunlight over the course of this day.

Similarly to the May 6/August 6 day, on June 21 incremental shadow from Parcel A in Site A would move across small sections at the southern edge of the park, but this shorter shadow would last from 10:45 AM to 12:30 PM (see **Figure 6-12**). Large areas of the park would continue to experience long durations of sunlight over the course of this day.

On the December 21 analysis day, long shadows resulting from the RWCDs would move across portions of Gantry Plaza State Park from the start of the analysis period at 8:51 AM until nearly the end of the analysis day. Shadows from existing buildings also shade portions of this space in the morning and midday. However, before 11:00 AM and especially after 12:45 PM, substantial sections of the park would remain in sun (see **Figure 6-15** and **6-17**). New shadows from the RWCDs would also fall on Peninsula Park during winter afternoons

While the long duration of incremental shadows on December 21 would be likely to reduce the attractiveness of the park at this time of year for users of its passive recreation facilities, the overall usability of the park would not be significantly reduced. In addition, because the health and sustainability of the park's vegetation is not an issue in the winter months, the proposed actions would not cause a significant adverse impact on the park.

HUNTERS POINT COMMUNITY PARK

A small portion of Hunters Point Community Park would receive 14 minutes of incremental shadow at the end of the March 21/September 21 analysis day (see **Figure 6-6**); this park would not receive incremental shadow on any other analysis day. The proposed actions would not cause a significant adverse impact to this park.

PROPOSED OPEN SPACES

The proposed open spaces would not exist in the absence of the proposed actions. Consequently, any shadows that would fall on these open spaces because of the new buildings on the project sites would not be considered to cause a significant adverse impact regardless of their extent or duration. The following section describes the extent, duration, and effects of incremental shadow on the proposed open spaces for purposes of providing information on the character of the proposed open spaces.

PROPOSED WATERFRONT PARK (SITE A)

The proposed waterfront park would run along the entire west side of Site A, on the East River shoreline. (For purposes of this analysis, the portion of the waterfront park along Newtown Creek is considered together with the Shore Public Walkway on Site B, discussed below.) Because of this park's location west of the new buildings, it would receive long durations of incremental shadow in the morning and midday throughout the year.

On the March 21/September 21 analysis day, the park would receive project-generated shadows from the start of the analysis day at 8:36 AM until 2:30 PM. In the late morning about half the park area would be in shade at any given time as the shadows move eastward across the space, and from noon to 2:30 PM less than half of the park would be in shadow (see **Figure 6-4**). Some areas along the eastern edge of the park would experience nearly six hours of shadow on this day. On the May 6/ August 6 analysis day, incremental shadows would last from 7:27 AM until 1:30 PM. However, no particular area of the park would experience more than about three total hours of shadow on this day. On June 21, incremental shadows would last from 6:57 AM to 1:15 PM, but similarly to the May 6/ August 6 day, no single area would receive more than a few hours of shadow. From the middle of the day to the end of the day in the late spring and summer months, which represent the majority of the growing season, much or all of the park would be in sun. On December 21, much of the park would be in project-generated shadows until nearly noon (see **Figures 6-15** and **6-16**); remaining shadows would exit the park completely at 2:00 PM.

PROPOSED 55TH AVENUE OPEN SPACE (SITE A)

This open space would be located on the north side of Parcel E of Site A, along the south side of 55th Avenue. Because it is on the north side of a development parcel, it would be shaded virtually throughout the day in all seasons. In the mornings of the late spring and summer months, substantial portions of this space would receive sunlight for a few hours (see **Figures 6-7** and **6-11**); however, due to long durations and large extents of shadow for much of the year, it is likely that only shade-tolerant species would thrive here.

PROPOSED 55TH AVENUE OPEN SPACE (SITE B)

This open space would be located on the north and east side of the south parcel of Site B. It would constitute a continuation of the proposed 55th Avenue open space on Site A, extending another block east along the south side of 55th Avenue, with an additional triangular area on the east side of the parcel near the shore. Similarly to the Site A portion of this open space, project shadows would fall for most of the day throughout the year. However, because there would not be any development parcels east of the space, much of the space—particularly the triangular portion on the east end—would be sunlit in the mornings in all seasons. Nonetheless, this landscaped area should be planted with shade-tolerant species.

PROPOSED SHORE WALKWAY (SITES A AND B)

This open space would be located along Newtown Creek shoreline in the southern section of Sites A and B. (For purposes of this analysis, the new waterfront park areas along Newtown Creek—including a portion of the waterfront park on Site A and the shore walkway and supplemental open space on Site B—are collectively considered the shore walkway.) Since there would be no structures to its south or east, its entire area would be in sun from the morning to

mid-afternoon throughout the year. In the late afternoons of the spring, summer, and fall months, much of the open space would be shaded by proposed buildings.

CONCLUSIONS

As detailed in this chapter, the proposed actions would result in incremental shadows on four sun-sensitive resources—the East River, Newtown Creek, Gantry Plaza State Park, and Hunters Point Community Park—as well as on the open spaces to be created as part of the proposed actions. However, the proposed actions would not result in any significant adverse shadow impacts. Incremental shadows would fall on various sections of the East River for up to four hours during mornings throughout the year, but these shadows would not be likely to significantly impact aquatic resources. Incremental shadows would also fall on portions of Gantry Plaza State Park for over five hours during the fall, winter and early spring months, and on Peninsula Park during winter afternoons. While the long duration of incremental shadows could reduce the attractiveness of the park during these seasons for users of its passive recreation facilities, the overall usability of the park would not be significantly reduced. In the late spring and summer months this park receives ample sunlight and the proposed actions would not cause a significant adverse impact to the health and viability of its vegetation. The RWCDs would also cast approximately two hours of late-afternoon incremental shadow on portions of Newtown Creek during the spring, summer, and fall analysis periods. This new shadow would not significantly affect aquatic resources there, and would not cause a significant adverse impact. A portion of Hunters Point Community Park would experience 14 minutes of new shadow at the end of the March / September analysis day only; this brief duration of new shadow would not cause a significant adverse impact.

The proposed waterfront park would receive substantial incremental shadow in the mornings throughout the year but would be sunlit during afternoons. The proposed shore walkway would be sunlit during mornings and early afternoons throughout the year but would experience incremental shadows in the late afternoons. The 55th Avenue open space on Site A would be in shadow for much of the day throughout the year, while the 55th Avenue open space on Site B would receive sunlight during the mornings throughout the year. None of the four proposed open spaces would experience a significant adverse impact from project-generated shadows, since they would not exist without the proposed actions. *