

A. INTRODUCTION

The proposed Willets Point Development Plan would result in the development of new structures taller than 50 feet, which is the threshold provided in the *City Environmental Quality Review (CEQR) Technical Manual* as requiring an assessment of new shadows and their potential effects on nearby public open spaces and other sunlight-dependent resources. Following CEQR guidelines, a detailed shadows analysis was conducted to determine whether the proposed Plan would result in incremental shadow on any publicly accessible open spaces, important natural features or architectural resources with sunlight-dependent features.

PRINCIPAL CONCLUSIONS

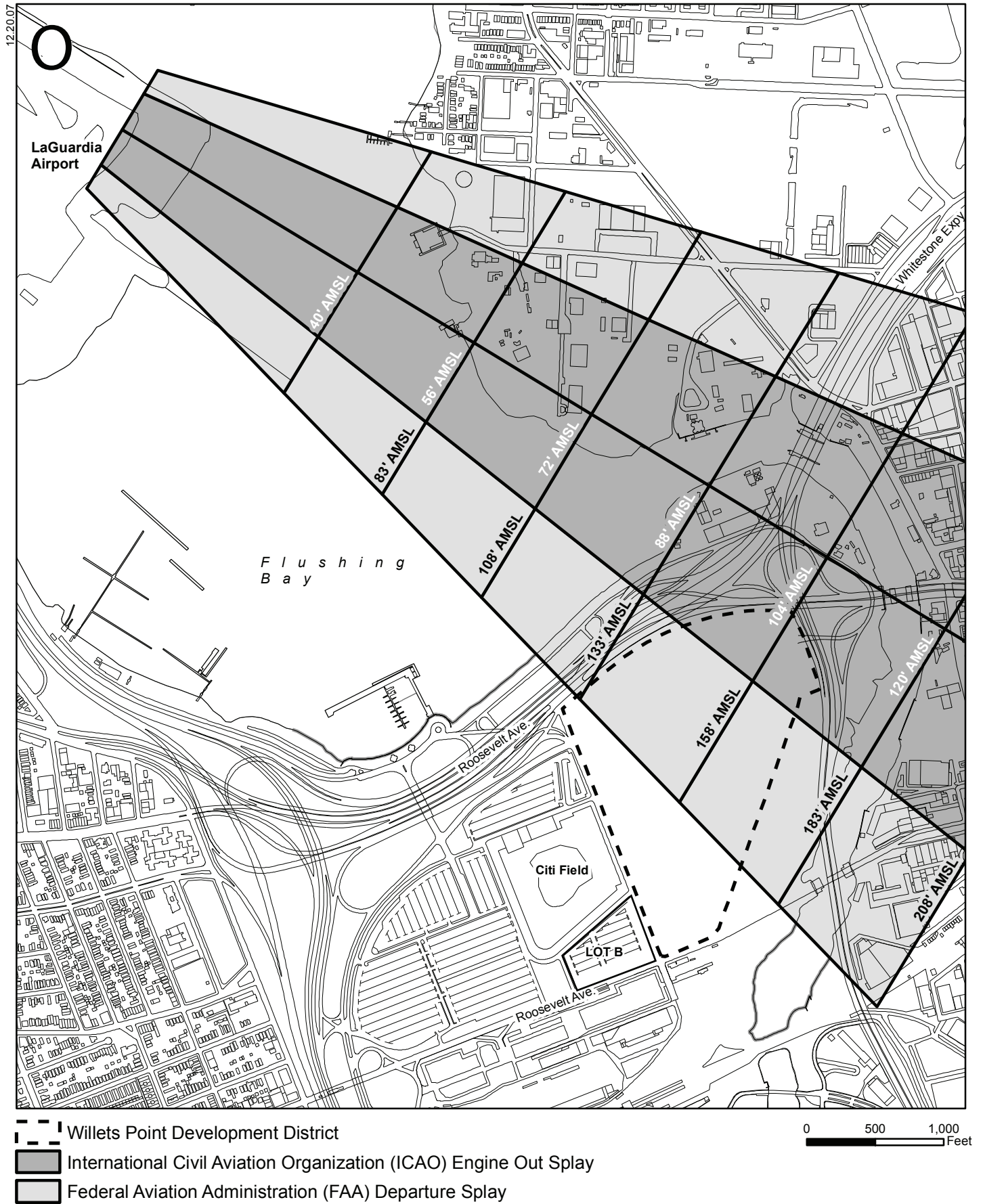
The shadows analysis concluded that while some incremental shadow would be cast onto Flushing Bay, Flushing Bay Promenade, and Flushing River in some seasons, the extent and duration of such incremental shadow would not be large or long enough to cause a significant adverse impact on any of these resources.

As discussed in Chapter 2, “Procedural and Analytical Framework,” it is anticipated that if the proposed redevelopment is approved, additional development would occur on Citi Field parking lot B (Lot B). A shadows screening analysis was performed, and concluded that the potential future development on Lot B would not cause a significant adverse impact on any sun-sensitive resources.

B. METHODOLOGY

Due to its proximity to LaGuardia Airport, the Willets Point Development District is subject to height restrictions established by the Federal Aviation Administration (FAA) and the Port Authority of New York and New Jersey (PANY/NJ). Across a majority of the District, height limits are determined by the distance from LaGuardia Airport (see Figure 7-1). Buildings in the northeastern section of the District are located within the International Civil Aviation Organization (ICAO) Engine Out Splay area and are permitted to rise one vertical foot Above Mean Sea Level (AMSL) for every 40 feet away from the end of the runway. Buildings located in the FAA Departure Splay area farther southwest are permitted to rise one vertical foot AMSL for every 62.5 feet away from the end of the runway. The southwestern portion of the District falls outside of the ICAO and FAA splay areas. Buildings on this portion of the site may be built to a maximum height that is no greater than the new Citi Field stadium, which is approved by the FAA for 218 feet above ground level, or 232 feet AMSL.

Since no developer or specific development plan is in place at this time, the shadows study conservatively analyzed the maximum building heights allowed under the FAA limits throughout the District. In the three-dimensional model used in the analysis, both splay areas that extend through the District were extruded to their maximum heights, each sloping upwards



from northwest to southeast (see Figure 7-2). Buildings in the splay areas along the northern boundary of the District would have a maximum height of between approximately 94 feet AMSL and 133 feet AMSL, while points in the splay areas near the southern boundary may rise as high as approximately 175 feet AMSL. The southwestern portion of the District outside the splay areas was extruded to 232 feet AMSL.

As part of the proposed Plan, up to six feet of fill would be used to grade and raise the District to an elevation of between 14 and 17 feet AMSL. However, the buildings developed as a result of the proposed Plan would not exceed the maximum AMSL height limits described above.

Following the guidelines of the *CEQR Technical Manual*, this analysis considers shadows on four representative days of the year: March 21/September 21, the equinoxes; May 6/August 6, the midpoints between the summer solstice and the equinoxes; June 21, the summer solstice; and December 21, the winter solstice. In identifying potential effects, CEQR focuses on uses and users of open space, including landscaping, vegetation, and other natural resources; and if there are historic resources, features, or details that are both sunlight-dependent and make such resources significant. The CEQR methodology does not generally consider shadows and incremental increases in shadows within 1½ hours of sunrise or sunset.

The *CEQR Technical Manual* identifies the following situations when a proposed project may result in a significant shadows impact:

- 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; and
- Substantial reduction in the usability of the open space.

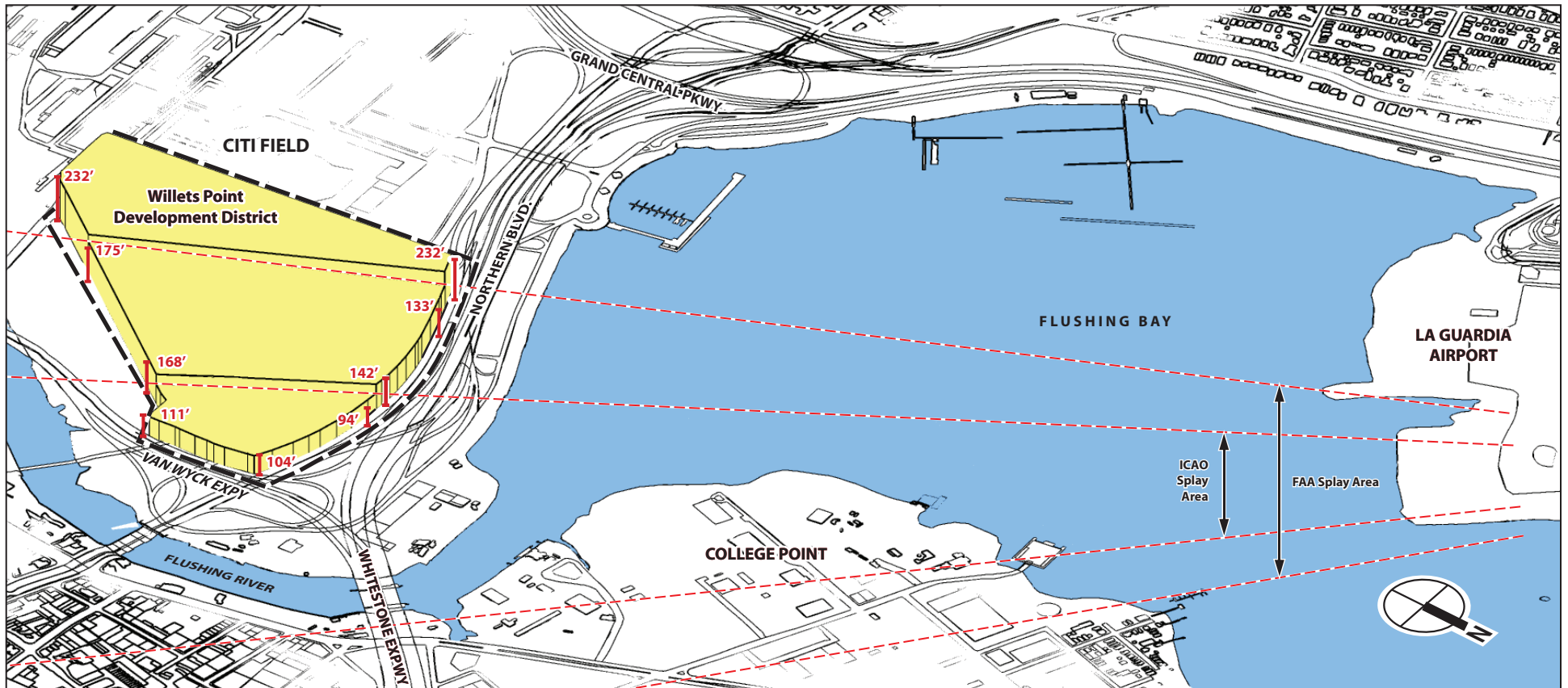
The determination of impact significance is based on an assessment of how a project's incremental shadows specifically affect sun-sensitive features of individual resources. Shadows cast on open spaces that are part of a proposed project or action are not considered impacts of an action because without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

Shadows were modeled using the solar rendering capabilities of MicroStation V8 software.

C. SCREENING

To identify sun-sensitive resources that could potentially be affected as a result of the proposed Plan, a screening analysis was performed. The longest shadow that any structure can cast during the year (except within 1½ hours of sunrise or sunset) is 4.3 times its height. Per FAA height limits, the tallest structures that would be developed under the proposed Plan would be 232 feet AMSL, so the maximum radius that a shadow from the District could reach would be 997.6 feet. Therefore, in coordination with the open space, historic resources, and natural resources analyses, all sun-sensitive resources within this distance of the District were included in the screening analysis.

Following CEQR guidelines, the screening analysis considered four dates during the year that represent the full range of possible shadows: June 21 and December 21, the dates of the shortest and longest shadows of the year, respectively; March 21 (equivalent to September 21, the equinoxes); and May 6 (equivalent to August 6). Using the *CEQR Technical Manual's* table of



NOTE: All heights are above Mean Sea Level (AMSL)

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shadow length factors, angles, and times of day, the maximum extent of Plan-generated shadow was determined. The analysis indicated that incremental shadow from the proposed Plan could fall on portions of three sun-sensitive resources at certain times of day and year: the benches and paved walkway of the Flushing Bay Promenade; Flushing Bay itself; and the Flushing River.

D. RESOURCES OF CONCERN

The District is located along the western shore of **Flushing Bay** and the **Flushing River**. Flushing Bay is a tidal embayment on the south shore of the upper East River. The Flushing River and the smaller Mill Creek are the primary freshwater inputs to the bay. Much of the original bay was filled for the development of LaGuardia Airport. With the exception of a 150-foot-wide artificial navigational channel maintained at a depth of 14.5 feet (4.4 m), water depths within the bay are generally shallower than the adjacent East River, ranging from a few feet near shore to over 15 feet near the bay's confluence with the East River. Flushing Bay's circulation and salinity structure near the East River are largely determined by conditions in the East River and Long Island Sound.

The Flushing Bay Promenade stretches 1.4 miles along the Flushing Bay, to the north of the District. It features drinking fountains, benches, shrubs, and granite hex block pavers.

E. ASSESSMENT OF SHADOWS

PROPOSED PLAN

The extent and duration of the maximum development envelope's incremental shadow on the four analysis days are noted in Table 7-1 and illustrated in Figures 7-3 through 7-8. The figures depict the extent of incremental shadow on the nearby sun-sensitive resources at various times of each relevant analysis day.

Table 7-1
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
Flushing Bay	8:36 AM-9:15 AM Total: 39m	—	—	8:51 AM-11:00 AM Total: 2h 9m
Flushing Bay Promenade	8:36 AM-9:30 AM Total: 54m	7:27 AM-7:35 AM Total: 8m	—	8:51 AM-11:30 AM Total: 2h 39m
Flushing River	5:15 PM-5:29 PM Total: 14m	5:45 PM-6:18 PM Total: 33m	6:00 PM-7:01 PM Total: 1h 1m	—

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.

MARCH 21/SEPTEMBER 21: 8:36 AM—5:29 PM EDT

At the start of the March 21/September 21 analysis day, at 8:36 AM, the maximum development envelope would cast a shadow to the northwest, reaching across a short section of the Flushing Bay Promenade and onto a small area of Flushing Bay. The incremental shadow would travel

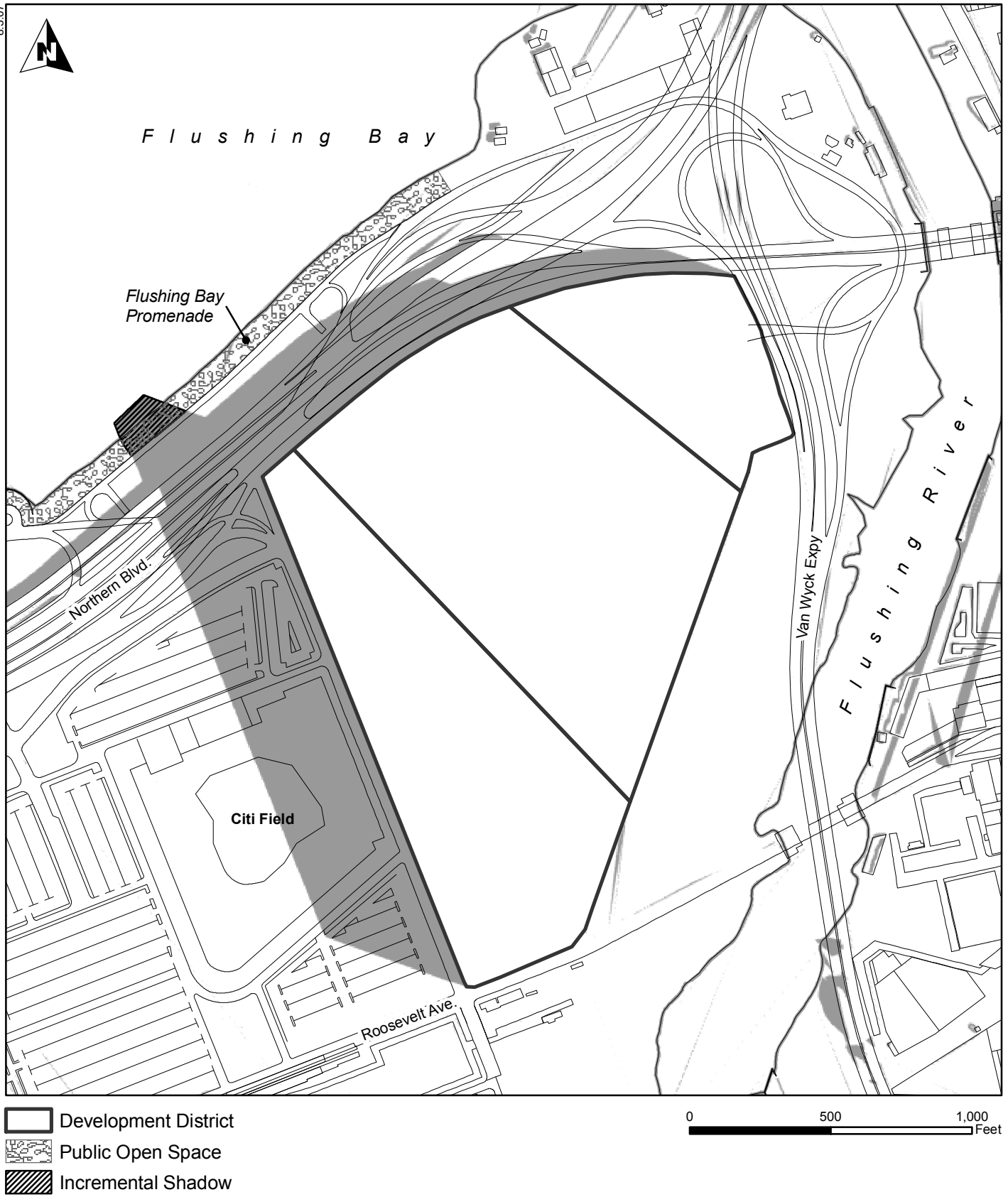


Figure 7-3
Shadows

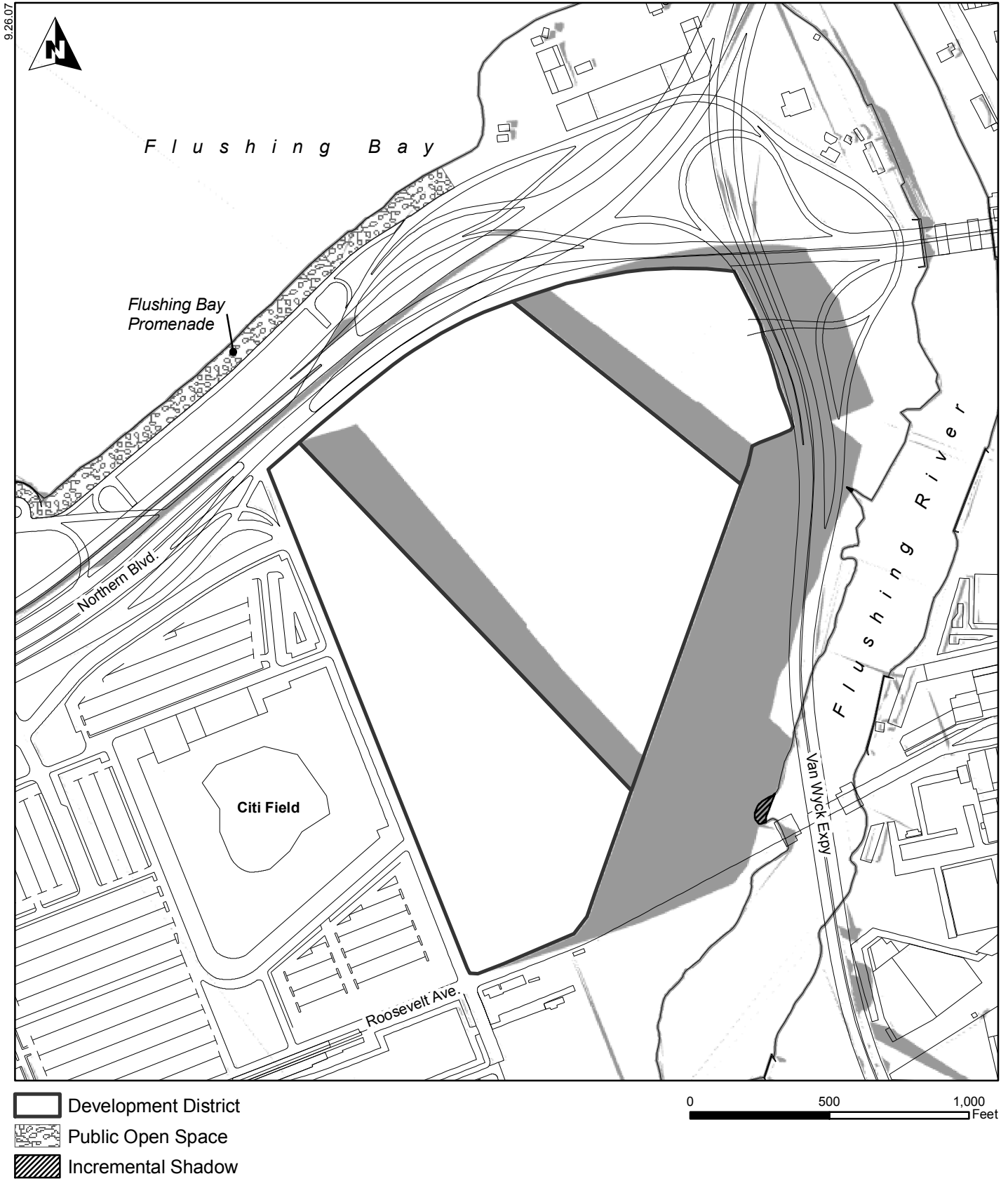


Figure 7-4
Shadows

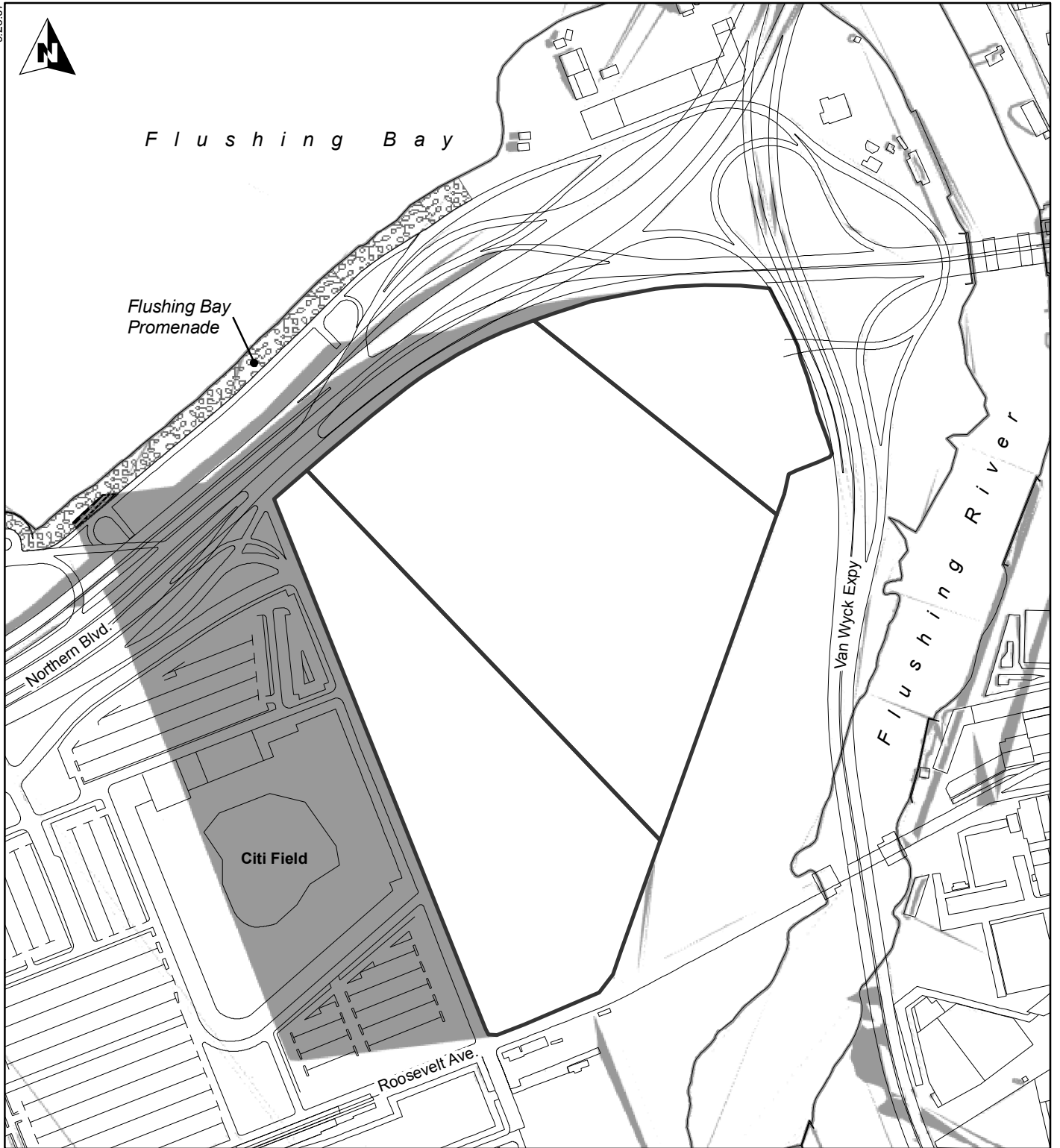
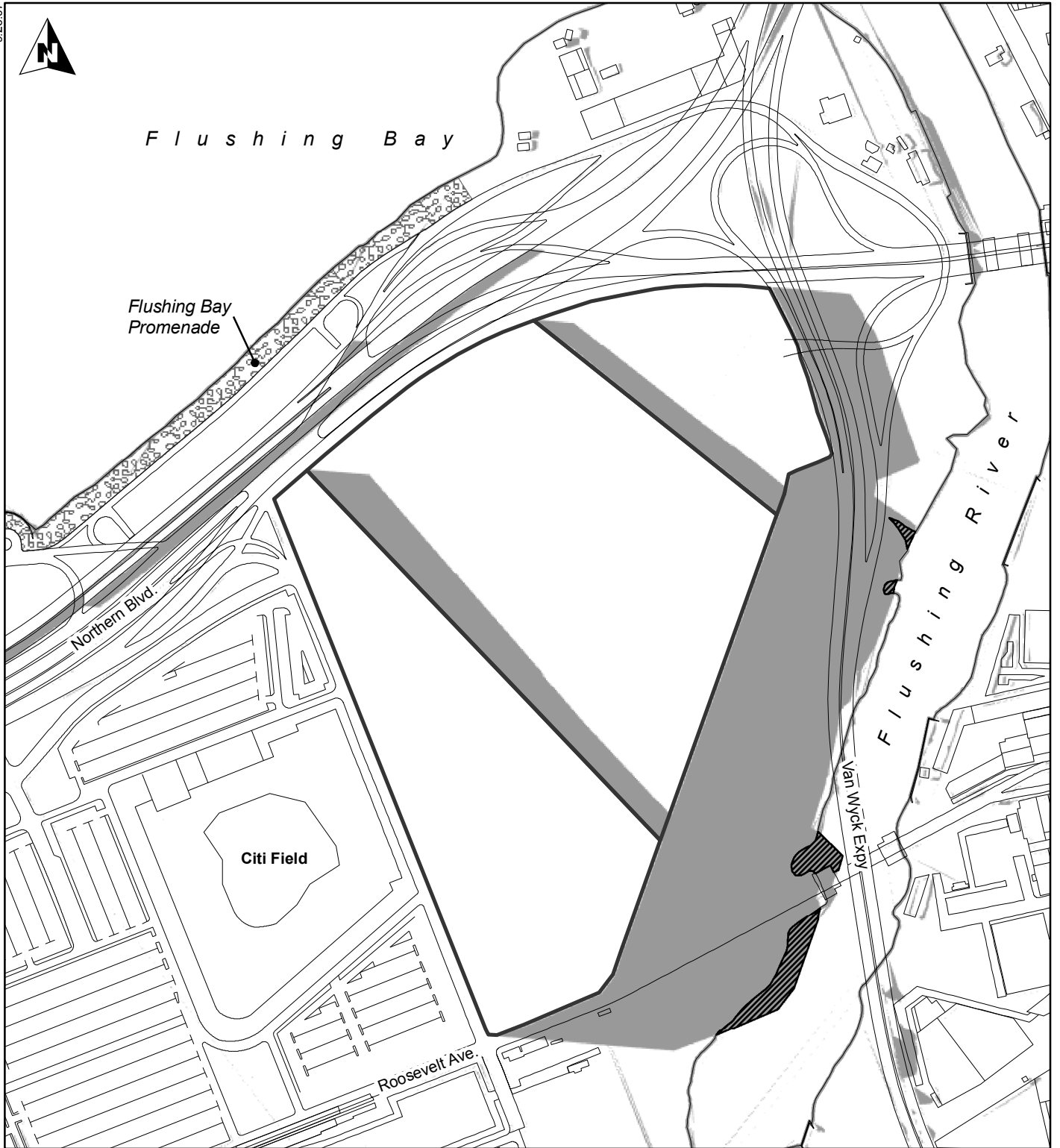


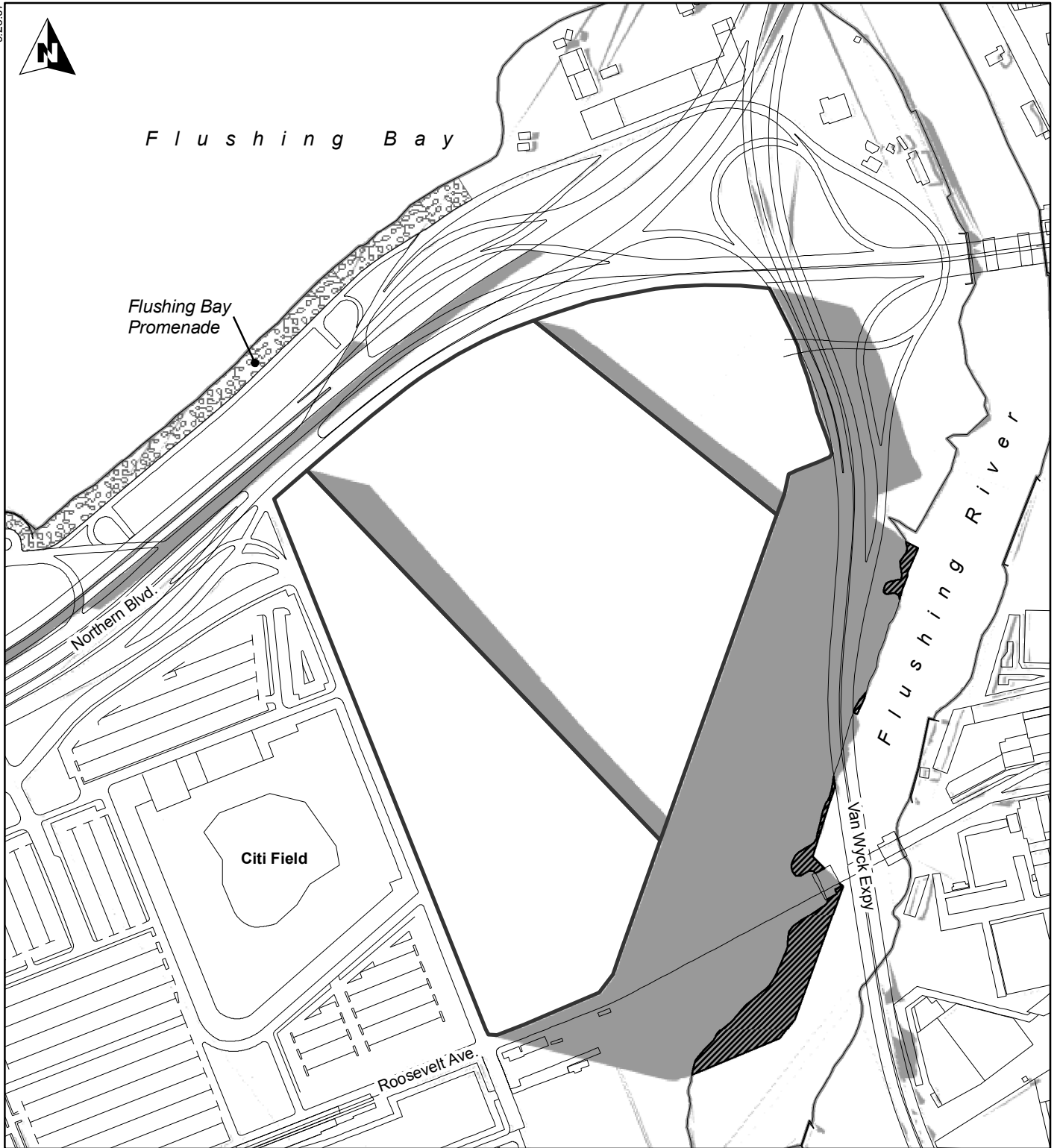
Figure 7-5
Shadows




May 6 / Aug. 6 - 7:30 AM EDT



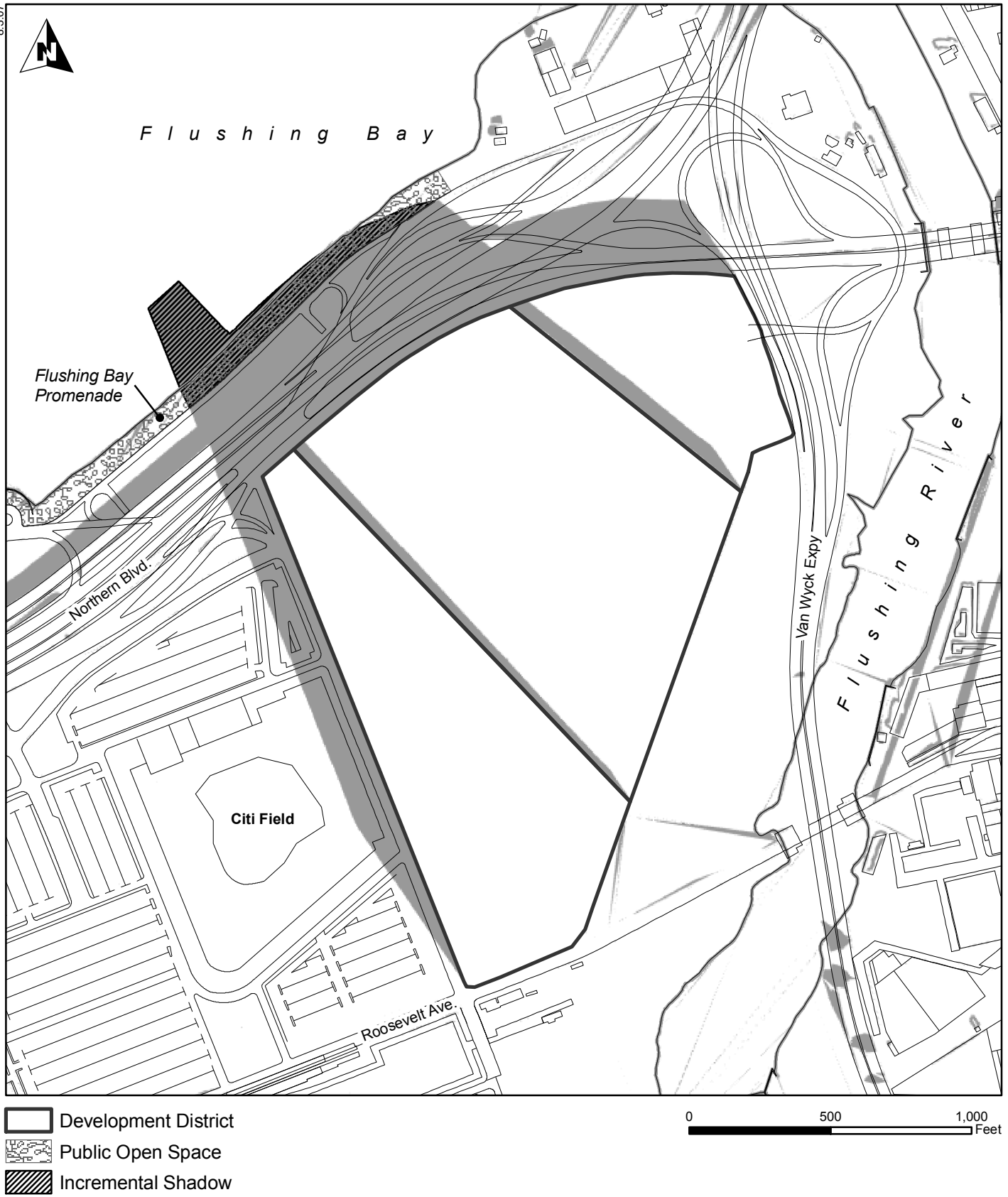
- Development District
- Public Open Space
- Incremental Shadow

0 500 1,000 Feet



-  Development District
-  Public Open Space
-  Incremental Shadow

0 500 1,000 Feet



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eastward opposite the rising sun (see Figure 7-3) and move off the bay 39 minutes later, at 9:15 AM. Thirty minutes later, at 9:45 AM, the incremental shadow would completely exit the Flushing Bay Promenade.

The shadow cast by the maximum development envelope would move eastward during the day, and at 5:15 PM it would reach small inlets on the western shore of the Flushing River (see Figure 7-4). For the remaining 14 minutes of the analysis day, the incremental shadow would cover a small area of the river.

The short durations and small extents of incremental shadow on Flushing Bay and the Flushing River would not significantly affect aquatic resources (plankton, macroalgae, invertebrates, and fish), nor would they significantly affect any recreational boating. Consequently, proposed Plan-generated shadow would not cause significant adverse impacts on these resources. The nearly one hour of incremental shadow on the Flushing Bay Promenade would affect only a small area of the promenade; other areas of the promenade would receive sun during this hour, and the promenade would receive ample sunlight for the remainder of the day. Therefore, no significant adverse impact would occur on the September 21/March 21 analysis day.

MAY 6/AUGUST 6: 7:27 AM—6:18 PM EDT

At the beginning of the late spring and late summer analysis days (May 6/August 6), the maximum development envelope would cast a shadow to the west, onto a small section of the Flushing Bay Promenade (see Figure 7-5). The shadow would not be long enough on this analysis day to reach the bay. The incremental shadow would exit the promenade eight minutes later, at 7:35 AM.

Late in the afternoon, at 5:45 PM, the incremental shadow would move onto small sections of the Flushing River. Over the course of the remaining 33 minutes of the analysis day, the incremental shadow would extend eastward onto the river, but would still comprise a small proportion of the river's overall area (see Figure 7-6).

The short durations and small extents of the incremental shadow on the May 6/August 6 analysis day would not cause any significant adverse impacts.

JUNE 21: 6:57 AM—7:01 PM EDT

The shadow cast by the maximum development envelope would not be long enough to reach Flushing Bay or the Flushing Bay Promenade on the morning of June 21. The shadow would reach the inlets of the Flushing River at 6:00 PM and would extend eastward, increasing in size, until the end of the analysis period at 7:01 PM (see Figure 7-7). The one hour of incremental shadow in the late afternoon on areas of the Flushing River would not adversely affect aquatic resources, nor would it significantly affect any recreational boating.

DECEMBER 21: 8:51 AM—2:53 PM EST

In the winter, shadows are longest but the days are shorter; shadows are cast to the northwest in the morning, move eastward, and at the end the day fall to the northeast. At 8:51 AM, the start of the December 21 analysis day, the maximum development envelope would cast a shadow northwest across a relatively large section of the Flushing Bay Promenade and onto a smaller section of Flushing Bay. The incremental shadow would move quickly eastward and steadily decrease in size (see Figure 7-8). It would exit the bay completely at 11:00 AM, and would exit the promenade at 11:30 AM.

While the proposed Plan would cast incremental shadow on these two resources for more than two hours, large areas of these resources would remain free of incremental shadow during these times, and both resources would receive ample sunlight for the remainder of the analysis day as well. Consequently, no significant adverse impacts would occur.

LOT B

A screening analysis was performed to determine whether additional future development on Citi Field parking lot B could cause any shadow impacts on nearby sun-sensitive resources. Lot B is located outside of the ICAO and FAA splay areas; therefore, as in the analysis of the maximum development envelope in the District, the Lot B screening analysis conservatively considered a maximum building envelope that is no higher than the new Citi Field Stadium, which is approved by the FAA for 218 feet above ground level, or 232 feet AMSL. Based on this height, and using the same methodology described above in Section C, “Screening,” it was determined that any development on Lot B could only cast shadow on a small section of the Flushing River for less than 20 minutes at the end of the June 21 analysis day and less than 15 minutes at the end of the May 6 and August 6 analysis days. It would not cast shadow on the river on the other two analysis days, and would not cast shadow on any other sun-sensitive resource at any time of year. The small extent of additional shadow on the Flushing River would not cause a significant adverse impact.

NO CONVENTION CENTER SCENARIO

The shadows analysis presented above examines the maximum building envelope allowed under the FAA limits across the District. Therefore, the shadow effects would be no different under the No Convention Center Scenario than they would be under the proposed Plan, and no significant adverse impacts would occur.

F. CONCLUSIONS

None of the three resources of concern would receive incremental shadow on all four analysis days. Furthermore, throughout the spring, summer, and fall seasons, incremental shadow would be limited to an hour or less on any given resource and would cover relatively small areas. In the winter, when shadows are longest, over two hours of project-generated shadow would be cast on Flushing Bay and the Flushing Bay Promenade in the morning, but large areas of these resources would remain free of incremental shadow during these times, and would receive sunlight for the remainder of the analysis day. No significant adverse impacts would occur on these resources as a result of the proposed Plan or the No Convention Center Scenario. *