4

Shadows

A shadow is defined in the *2020 CEQR Technical Manual* as the condition that results when a building or other built structure blocks the sunlight that would otherwise directly reach a certain area, space, or feature. The purpose of this section is to assess whether new structures may cast shadows on sunlight sensitive publicly accessible resources or other resources of concern such as natural resources, and to assess the significance of their impact.

Introduction

According to the *CEQR Technical Manual*, a shadows assessment is warranted for proposed actions that would result in new structures greater than 50 feet in height or that would be located adjacent to, or across the street from, a sunlight-sensitive resource. Such resources include publicly accessible open spaces, important sunlight-sensitive natural features, or historic resources with sun-sensitive features. 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 exposure, thereby significantly altering the public's use of the resource or threatening the viability of vegetation or other resources.

In the With-Action condition, the proposed actions are expected to facilitate the construction of a building up to approximately 1,050 feet tall[1] (including the bulkhead), an increase in building height over the No-Action Condition of 578 feet. As such, a shadows analysis was prepared to determine the potential for the Proposed Actions to result in significant adverse impacts on sunlight-sensitive resources.

Principal Conclusions

A detailed shadows analysis conducted for the Proposed Project determined that in the With-Action condition, project-generated shadows would reach 15 sunlight sensitive resources. The incremental shadows resulting from the Proposed Project would be limited in extent and duration and would typically only occur in one or two analysis days. The short duration of new incremental shadows that would fall on most affected resources would not substantially reduce the quantity of direct sunlight and would not significantly alter the utilization of the resources or the variety of vegetation supported within. The Proposed Action would not result in significant adverse shadows impacts, and no publicly accessible open spaces or historic resources would experience significant adverse shadow impacts as a result of the Proposed Action.

Methodology

According to the *CEQR Technical Manual*, the longest shadow a structure will cast in New York City, except for periods close to dawn or dusk, is 4.3 times its height. In accordance with the *CEQR Technical Manual*, a preliminary screening assessment is conducted to ascertain whether shadows resulting from a project could reach any sunlight-sensitive resource at any time of year; if the preliminary assessment indicates that, in the absence of intervening buildings, shadows from a project could reach sunlight sensitive resources on any of the representative analysis days, a detailed analysis is typically warranted. The representative analysis days are December 21 (winter solstice), June 21 (summer solstice), March 21/September 21 (vernal/autumnal equinox), and May 6/August 6 (halfway between summer solstice and the equinoxes).

Sunlight-Sensitive Resources

The *CEQR Technical Manual* defines sunlight-sensitive resources as those resources that depend on sunlight or for which direct sunlight is necessary to maintain the resource's usability or architectural integrity. The following are considered to be sunlight sensitive resources: [2]

[1] Although the building as currently designed will only be 1,050 feet tall, a 1,080-foot-tall building with a reasonable worst-case envelope, was analyzed for the chapter to represent the most conservative analysis for shadows. As described in **Chapter 1, Project Description**, since publication of the DEIS, it is proposed that the maximum height of the street wall would be reduced to approximately 295 feet. The analysis for the chapter conservatively assumed the higher street wall height of 321 feet.

[2] According to the *CEQR Technical Manual*, City streets, sidewalks, and private open spaces (such as private residential front and back yards, stoops, and vacant lots) are not considered to be sunlight-sensitive resources in the context of an environmental review.

- Public open space (e.g., parks, beaches, playgrounds, plazas, schoolyards, greenways, and landscaped medians with seating). Planted areas within unused portions of roadbeds that are part of the Greenstreets program are also considered sunlight-sensitive resources. The uses and vegetation in an open space establish its sensitivity to shadows. This sensitivity is assessed for both (1) warm-weather-dependent features like wading pools and sand boxes, or vegetation that could be affected by loss of sunlight during the growing season (i.e., March through October); and (2) features, such as benches, that could be affected by a loss of winter sunlight. Uses that rely on sunlight include: passive use, such as sitting or sunning; active use, such as playfields or paved courts; and such activities as gardening, or children's wading pools and sprinklers. Where lawns are actively used, the turf requires extensive sunlight. Vegetation requiring direct sunlight includes the tree canopy, flowering plants, and plots in community gardens. Generally, four to six hours a day of sunlight, particularly in the growing season, is a minimum requirement.
- Features of historic architectural resources that depend on sunlight for their enjoyment by the public. Only the sunlight-sensitive features are considered, as opposed to the entire architectural resource. Sunlight-sensitive features include the following: design elements that are part of a recognized architectural style that depends on the contrast between light and dark (e.g., deep recesses or voids such as open galleries, arcades, recessed balconies, deep window reveals, and prominent rustication); elaborate, highly carved ornamentation; stained-glass windows; exterior building materials and color that depend on direct sunlight for visual character (e.g., the polychromy (multicolored) features found on Victorian Gothic Revival or Art Deco façades); historic landscapes, such as scenic landmarks including vegetation recognized as an historic feature of the landscape; and structural features for which the effect of direct sunlight is described as playing a significant role in the structure's importance as an 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.

Preliminary Assessment

The preliminary screening assessment consists of three tiers of analysis:

- Tier 1 Screening: 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 the radius, the analysis proceeds to the second tier;
- Tier 2 Screening: The second-tier analysis reduces the area that could be affected by project-generated shadows by accounting for a specific range of angles that can never receive shade in New York City due to the path of the sun in the northern hemisphere. According to the *CEQR Technical Manual*, shadows cannot be cast within New York City within 108 degrees from True North. Topographic lines are included to demonstrate the terrain of the area;

› Tier 3 Screening: 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 new shadows by looking at specific representative days of the year and determining the maximum extent of shadow over the course of each representative day. For the Tier 3 screening, three-dimensional modeling software with the capacity to model shadows is used, and the maximum building envelope that could be achieved as a result of the proposed project is modeled and geo-located within the program. Terrain, which has been included in the Tier 1 and Tier 2 Screenings, is also incorporated into the model to account for how changes in elevation throughout the study area can influence shadows that could be cast by the proposed project. The representative analysis days, as noted above, are December 21 (winter solstice), June 21 (summer solstice), March 21/September 21 (vernal/autumnal equinox), and May 6/August 6 (halfway between summer solstice and the equinoxes). The modeling software is also used to approximate times that shadows cast from the proposed project could enter and exit a resource.[3]

Detailed Assessment

As noted above, if the Tier 3 screening indicates that, in the absence of intervening buildings, shadows from the proposed project would reach a sunlight sensitive resource on any of the representative analysis days, a detailed shadow analysis would be warranted. Because existing buildings (or No-Action buildings) may already cast shadows on a sun-sensitive resource, the proposed project may not result in additional (incremental) shadows upon that resource. The detailed shadow analysis models a baseline condition (future No-Action) that is compared to the future condition resulting from the proposed project (future With-Action) to illustrate the shadows cast by the No-Action development and distinguish the additional (incremental) shadow cast by the project. The detailed shadows analysis uses a combination of Geographic Information Systems (GIS) 3D modeling and modeling in Sketchup, as well as GIS data provided publicly.

Determination of Significance

As described in the *CEQR Technical Manual*, an incremental shadow is generally not considered significant when its duration is no longer than 10 minutes at any time of year and the resource continues to receive substantial direct sunlight. A significant shadow impact generally occurs when an incremental shadow of 10 minutes or longer falls on a sunlight-sensitive resource and results in one of the following:

› Vegetation: a substantial reduction in sunlight available to a sunlight-sensitive feature of the resource to less than the minimum time necessary for its survival (when there was sufficient sunlight in the future without the project), or a reduction in direct sunlight exposure where the sensitive feature of the resource

[3] The *CEQR Technical Manual* defines the temporal limits of a shadow analysis period to fall from an hour and a half after sunrise to an hour and a half before sunset.

is already subject to substandard sunlight (i.e., less than the minimum time necessary for its survival).

- Historic and cultural resources: a substantial reduction in sunlight available for the enjoyment or appreciation of the sunlight-sensitive features of an historic or cultural resource.
- Open space utilization: a substantial reduction in the usability of open space as a result of increased shadow, with consideration given to anticipated new users and the open space's utilization rates throughout the affected time periods as well as to the inventory of available open space resources in the study area.
- For any sunlight-sensitive feature of a resource: complete elimination of all direct sunlight on the sunlight-sensitive feature of the resource, when the complete elimination results in substantial effects on the survival, enjoyment, or, in the case of open space or natural resources, the use of the resource.

In general, a significant adverse shadow impact occurs when the incremental shadow added by a proposed action falls on a sunlight-sensitive resource and substantially reduces or completely eliminates direct sunlight exposure, thereby significantly altering the public's use of the resource or threatening the viability of vegetation or other resources.

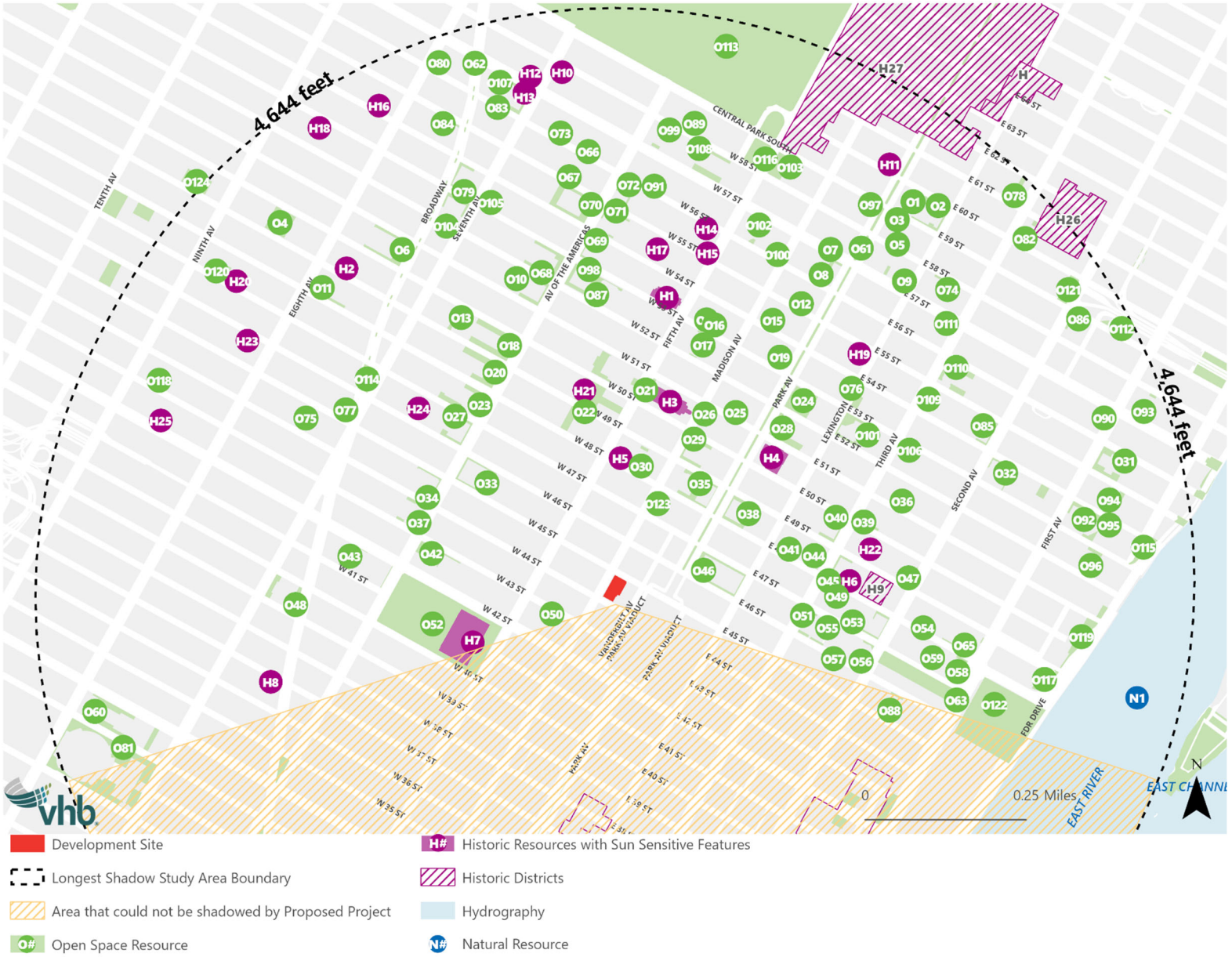
Preliminary Assessment

Tier 1 and 2 Screening

The Proposed Project was analyzed as a 1,050-foot-tall building that would cast a maximum shadow up to 4.3 times as long or 4,644 feet (see **Figure 4-1**). **Figure 4-1** also identifies the location of the historic resources with sunlight-sensitive features, open spaces, and natural resources within the potential shadow sweep. As discussed in **Chapter 6, Historic and Cultural Resources,** historic resources within the maximum shadow radius were first evaluated to determine whether they contained features that depend on sunlight for their enjoyment by the public; those that contain such features were included in the base map. Within the longest shadow study area, 124 open spaces, 27 historic resources, and one natural resource were identified.

Figure 4-1 shows the potential sunlight-sensitive resources identified in the Tier 1 and Tier 2 Screening Assessment, accounting for the area that cannot be shadowed by the Proposed Project.

Figure 4-1 Tier 1 and Tier 2 Screening



Tier 3 Screening Assessment

In accordance with the *CEQR Technical Manual*, a Tier 3 screening assessment was performed because the Tier 1 and Tier 2 assessments identified several sunlight-sensitive resources within ±108 degrees of True North and within the area of the longest shadow that could be cast by the proposed project.

The Tier 3 screening assessment was performed for the four representative days of the year set forth in the *CEQR Technical Manual*: December 21, the winter solstice and shortest day of the year; March 21 / September 21, the equinoxes; May 6/August 6, the midpoints between the summer solstice and the equinoxes; and June 21, the summer solstice and the longest day of the year.[4]

In accordance with the *CEQR Technical Manual*, a model of the building in the With-Action condition was developed in a three-dimensional computer program. The model was geolocated and the surrounding terrain was imported into the model to account for differences in topography. As noted above, the Tier 3 shadow screening shows the shadows that could be cast as a result of the proposed project but does not account for existing buildings which may already cast shadows on the identified resources.

Figure 4-2 to **Figure 4-5** show the Tier 3 screening results, which indicate that on the four analysis days, in the absence of intervening buildings:

- Shadows cast by the Proposed Project could reach 73 total sunlight sensitive resources: 56 open spaces; 8 architectural resources; seven resources that are both an open space and architectural or scenic resource; one natural resource; and one historic district. These resources were then considered further in the detailed analysis (see "Detailed Analysis").
- A number of resources, both open spaces and architectural resources, would fall outside the area of potential shadow because of their location relative to the Project Site:
  - The open space resources that fall outside the area of Tier 3 potential shadow are detailed in **Table 4-1**.
  - Fifteen of the 24 individual historic resources that fall within the Tier 1 and Tier 2 area of potential shadow would fall outside the Tier 3 area of potential shadow (see **Table 4-2**).
  - Of the three historic districts within the Tier 1 and Tier 2 shadow area, two districts would not fall within the Tier 3 shadow area—Treadwell Farm Historic District (H26) and the Upper East Side Historic District (H27)

Figure 4-2 Tier 3 Screening December 21 Analysis Day

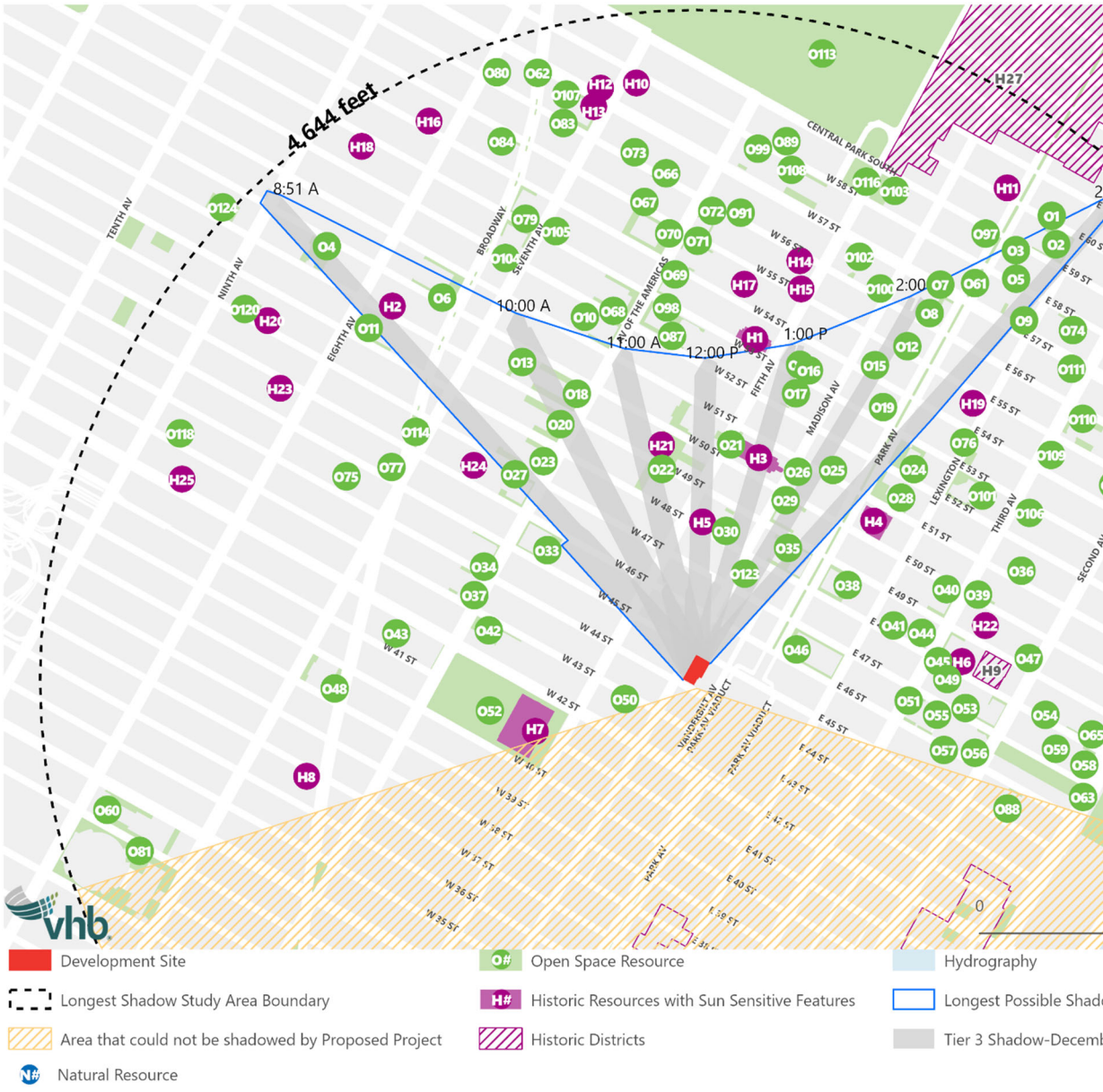


Figure 4-3 Tier 3 Screening March 21 Analysis Day

Figure 4-4 Tier 3 Screening May 6 Analysis Day

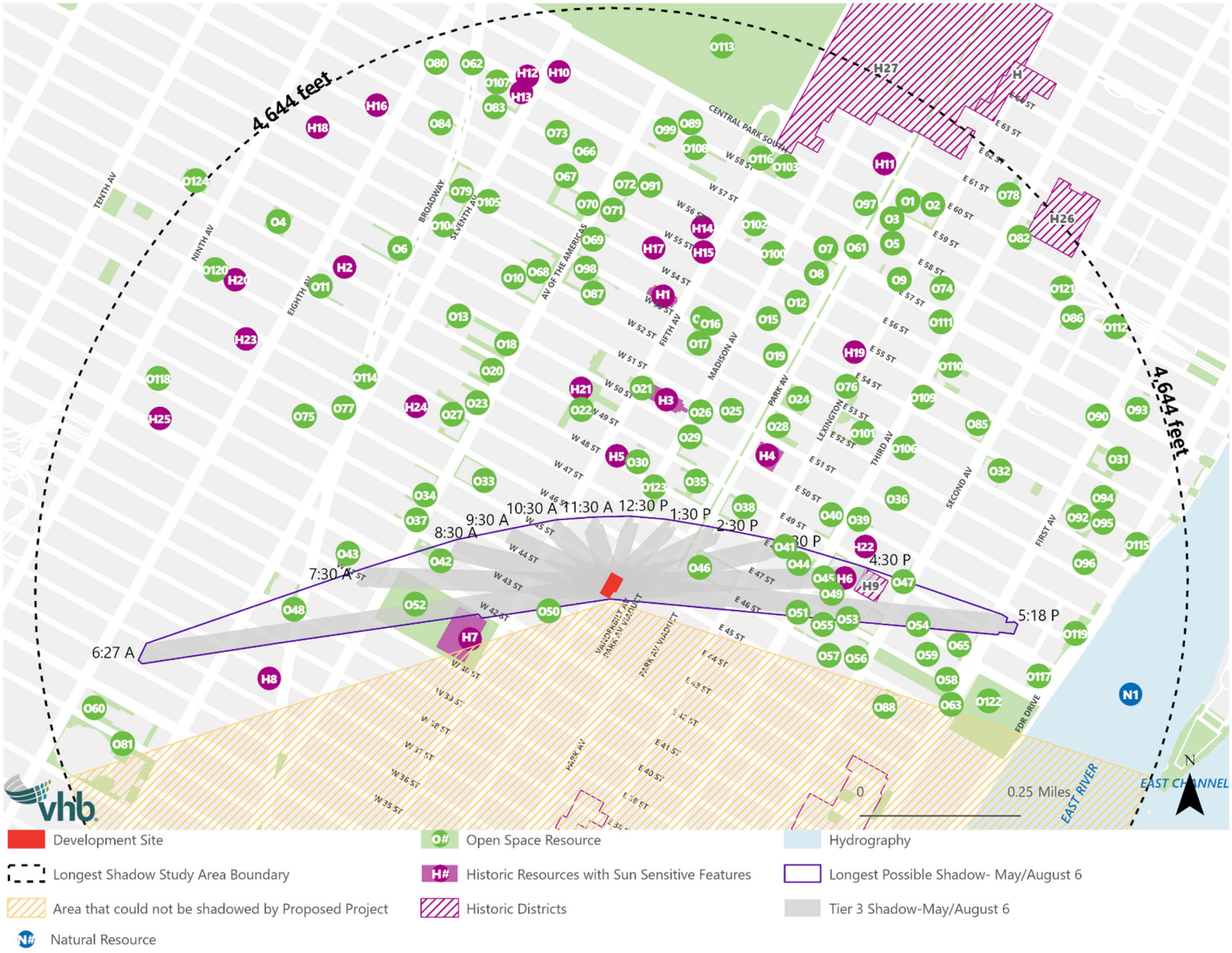


Figure 4-5 Tier 3 Screening June 21 Analysis Day

Table 4-1 Open Spaces Not Affected by Incremental Shadow (Screened at Tier 3)

Map ID #	Name/Location
O42	1114 Sixth Avenue
O43	1095 Sixth Avenue
O65	100 United Nations Plaza
O66	118 West 57th Street
O67	125 West 55th Street
O68	1301 Sixth Avenue
O69	1330 Sixth Avenue
O70	1345 Sixth Avenue
O71	1350 Sixth Avenue
O72	1370 Sixth Avenue
O73	146 West 57th Street
O74	150 East 58th Street
O75	1515 Broadway
O76	153 East 53rd Street
O77	1535 Broadway
O78	167 East 61st Street
O79	1700 Broadway
O80	1755 Broadway
O81	2 Pennsylvania Plaza
O82	200 East 61st Street
O83	211 West 56th Street
O84	230 West 55th Street
O85	245 East 54th Street
O86	300 East 59th Street
O87	31 West 52nd Street
O88	320 East 46th Street
O89	36 Central Park South
O90	360 East 57th Street
O91	40 West 57th Street
O92	400 East 54th Street
O93	410 East 58th Street
O94	415 East 54th Street
O95	420 East 54th Street
O96	429 East 52nd Street
O97	500 Park Avenue
O98	51 West 52nd Street
O99	58 West 58th Street
O100	590 Madison Avenue

Table 4-1 Open Spaces Not Affected by Incremental Shadow (Screened at Tier 3)

Map ID #	Name/Location
O101	599 Lexington Avenue
O102	725 Fifth Avenue
O103	767 Fifth Avenue
O104	810 Seventh Avenue
O105	825 Seventh Avenue
O106	875 Third Avenue
O107	888 Seventh Avenue
O108	9 West 57th Street
O109	909 Third Avenue
O110	919 Third Avenue
O111	950 Third Avenue
O112	14 Honey Locusts Park
O113	Central Park
O114	Father Duffy Square
O115	Five Parks (FDR Drive)
O116	Grand Army Plaza
O117	MacArthur Park
O118	McCaffrey Playground
O119	Peter Detmold Park
O120	Ramon Aponte Park
O121	Tramway Plaza
O124	Gutenberg Playground

Source: New York City Department of Parks and Recreation open space database, NYC Capital Planning Platform POPS map

Table 4-2 Sunlight Sensitive Historic Resources Not Affected by Incremental Shadow (Screened at Tier 3)

Map ID #	Name/Location
H10	Alwyn Court Apartments
H11	Christ Church United Methodist
H12	Osborne Apartments
H13	Rodin Studios
H14	Former Coty Building
H15	Fifth Avenue Presbyterian Church
H16	St. George Tropeoforos Greek Orthodox Church
H17	Rockefeller Apartments
H18	St. Benedict the Moor's Church
H19	Central Synagogue
H20	Actor's Temple
H22	Amster Yard
H23	St. Lukes Lutheran Church
H24	The Free Church of Saint Mary the V
H25	Church of the Holy Apostle/Cross

Source: New York Cultural Resource Information System, New York City Landmarks Preservation Commission map

Detailed Assessment

No-Action Condition

In the future without the Proposed Actions, the Project Site would be redeveloped with a 472-foot-tall building (including the bulkhead) with a floor area ratio (FAR) of 15.

In addition, there are a number of development projects on other sites within the shadows study area that are either planned or currently under construction. These buildings were included in the detailed shadows model using information on their proposed heights, FARs and building footprints.

In the future without the Proposed Actions, one new sunlight-sensitive, publicly accessible open space resource will be added within the defined shadow radius by the 2026 analysis year: the 270 Park Avenue privately-owned public space (POPS). This POPS is projected as a 10,000-square-foot unenclosed space along Madison Avenue with the 270 Park Avenue building cantilevering over the space, covering approximately 60% of the space. However, specific design plans have not yet been released for this space, and to ensure a conservative analysis, the POPS was analyzed as if there were no obstruction from the 270 Park Avenue building. Other new open space resources outlined in **Chapter 3, Open Space**, do not fall within the area of potential shadow.

With-Action Condition

In the future with the Proposed Actions, the Project Site would be developed with a 1,050-foot-tall building (including the bulkhead) with a FAR of 30. It was analyzed as a 1,080-foot-tall building for conservative analysis purposes.

The detailed shadow analysis compares the future condition resulting from the proposed project (future With-Action) to the baseline condition (No-Action condition) to illustrate the shadows cast by existing or future buildings and distinguish the additional (incremental) shadow cast by the project. Any new shadows projected to be cast onto the identified resources from the proposed project are considered "incremental shadows."

Modeling Results

As noted above, based on the Tier 3 screening results, 74 sunlight sensitive resources were identified for detailed analysis. **Table 4-3** provides the modeled incremental shadow entry/exit times for these resources. The start times shown in the tables represent the time that incremental shadow would enter any portion of the open space or sunlight-sensitive feature of the historic resource,[5] and the end time represents the time that the incremental shadows leave the open space or sunlight-sensitive feature of the historic resource.

As shown in **Table 4-3**, 50 of the 65 open spaces within the Tier 3 shadow study area would receive no incremental shadow, and there would be no significant adverse impacts for these resources. Similarly, the detailed analysis concluded that the historic resources within the Tier 3 shadow study area would not receive incremental shadow with the exception of Rockefeller Center/ Plaza (O22/H21) and Bryant Park (O52).

For each resource where an increment was identified, descriptions are provided below and illustrated in **Figure 4-6** through **Figure 4-36**. Each figure illustrates the modeled shadows across the City's buildings, streets, and open spaces on the given analysis day at a given time. Features experiencing shadow are depicted in a darker hue than those experiencing direct sunlight, and incremental shadows are highlighted in a dark blue color.

[5] These include resources with stained-glass windows (Saint Thomas Church (H1), Saint Malachy the Actor's Church (H2), Saint Patrick's Cathedral (H3), Saint Bartholomew's (H4), and the Church of the Holy Innocents (H8) as well as other sunlight sensitive features: leaded-glass windows on the second floor of the Swedish Seamen's Church (H5); glass block, glass bricks, and ribbon windows of the William Lescaze House and Office (H6); and the Fifth Avenue façade of the Stephen A. Schwarzman Building, New York Public Library (H7).

Table 4-3 Detailed Analysis Summary of Incremental Shadow Entry/Exit Times

		Analysis Day and Timeframe			
Map No.	**Resource**	**December 21 8:51A- 02:53 PM**	**March 21/ September 21 7:36A-4:29 PM**	**May 6/Aug 6 6:27A-5:18 PM**	**June 21 5:57A-6:01 PM**
Open Space Resources					
O1	118 East 60th Street	-	-	-	-
O2	750 Lexington Avenue	-	-	-	-
O3	499 Park Avenue	-	-	-	-
O4	One Worldwide Plaza	-	-	-	-
O5	110 East 59th Street	-	-	-	-
O6	1633 Broadway	-	-	-	-
O7	450 Park Avenue	-	-	-	-
O8	432 Park Avenue	-	-	-	-
O9	135 East 57th Street	-	-	-	-
O10	1285 Sixth Avenue	-	-	-	-
O11	235 West 48th Street	-	-	-	-
O12	65 East 55th Street	-	-	-	-
O13	745 Seventh Avenue	-	-	-	-
O14[1]	3 East 53rd Street/ Paley Park	-	-	-	-
O15	535 Madison Avenue	-	-	-	-
O16	520 Madison Avenue	-	-	-	-
O17	10 East 53rd Street	-	-	-	-
O18	1251 Sixth Avenue	9:51A-10:03 AM 12 minutes	-	-	-
O19[2,3]	390 Park Avenue/ Lever House Open Courtyard	-	-	-	-
O20	1221 Sixth Avenue	9:50A-10:03 AM 13 minutes	-	-	-
O21[2,3]	460 Madison Avenue/ St. Patrick's Cathedral Steps	-	-	-	-
O22/H21[2,3]	Rockefeller Plaza	11:21A-11:43 AM 11:50A-12:12 PM 44 minutes	-	-	-
O23	1211 Sixth Avenue	-	-	-	-
O24	375 Park Avenue	-	-	-	-
O25	40 East 52nd Street	-	-	-	-
O26[2,3]	457 Madison Avenue/ Villard Houses Courtyard	-	-	-	-
O27	1185 Sixth Avenue	-	-	-	-
O28	345 Park Avenue	-	-	-	-

Table 4-3 Detailed Analysis Summary of Incremental Shadow Entry/Exit Times

		Analysis Day and Timeframe			
Map No.	**Resource**	**December 21 8:51A- 02:53 PM**	**March 21/ September 21 7:36A-4:29 PM**	**May 6/Aug 6 6:27A-5:18 PM**	**June 21 5:57A-6:01 PM**
O29	437 Madison Avenue	-	-	-	-
O30	12 East 49th Street	-	12:27P-12:35 PM 8 minutes	-	-
O31	400 East 56th Street	-	-	-	-
O32	300 East 54th Street	-	-	-	-
O33	1166 Sixth Avenue	-	8:57A- 9:39 AM 42 minutes	-	-
O34	1155 Sixth Avenue	-	-	-	-
O35	280 Park Avenue	-	-	-	-
O36[2]	217 East 51st Street/Greenacre Park	-	-	-	-
O37	1133 Sixth Avenue	-	8:05A-8:32 AM 27 minutes	-	-
O38	299 Park Avenue	-	-	-	-
O39	825 Third Avenue	-	-	-	-
O40	800 Third Avenue	-	-	-	-
O41	141 East 48th Street	-	-	-	-
O44	780 Third Avenue	-	-	-	-
O45	777 Third Avenue	-	-	-	-
O46	245 Park Avenue	-	-	2:11P-3:33 PM 1 hour 22 minutes	2:07P-3:20 PM 1 hour, 13 minutes
O47	255 East 49th Street	-	-	-	-
O48	1411 Broadway	-	-	-	-
O49	767 Third Avenue	-	-	-	-
O50	6 East 43rd Street	-	-	-	-
O51	747 Third Avenue	-	-	-	5:01P-5:14 PM 13 minutes
O52[2,3]	Bryant Park	-	-	6:27A-6:55 AM 28 minutes	6:25A-7:38 AM 1 hour and 13 minutes
O53	885 Second Avenue	-	-	-	-
O54	309 East 48th Street	-	-	-	-
O55	212 East 47th Street	-	-	-	-
O56	240 East 47th Street	-	-	-	-
O57	234 East 46th Street	-	-	-	-
O58	845 First Avenue	-	-	-	5:27P-5:34 PM 7 minutes

Table 4-3 Detailed Analysis Summary of Incremental Shadow Entry/Exit Times

		Analysis Day and Timeframe			
Map No.	**Resource**	**December 21 8:51A- 02:53 PM**	**March 21/ September 21 7:36A-4:29 PM**	**May 6/Aug 6 6:27A-5:18 PM**	**June 21 5:57A-6:01 PM**
O59	Dag Hammarskjold Plaza	-	-	-	5:26P-5:56 PM 30 minutes
O60	1 Pennsylvania Plaza	-	-	-	-
O61	Park Avenue Malls	-	-	2:00P-2:31 PM 31 minutes	1:52P-2:55 PM 1 hour and 3 minutes
O62	Broadway Greenstreet	-	-	-	-
O63	First Avenue Greenstreet	-	-	-	-
O122	United Nations Sculpture Garden	-	-	-	5:31P-6:01 PM 30 minutes
O123	270 Park Avenue POPS	-	1:12P-1:24 PM 12 minutes	-	-
Historic Resources					
H1	Saint Thomas Church	-	-	-	-
H2	Saint Malachy the Actor's Church	-	-	-	-
H3	Saint Patrick's Cathedral	-	-	-	-
H4	Saint Bartholemew's	-	-	-	-
H5	Swedish Seamen's Church	-	-	-	-
H6	Lescaze House	-	-	-	-
H7	Stephen A. Schwarzmann Building, New York Public Library	-	-	-	-
H8	Church of the Holy Innocents	-	-	-	-
H9	Turtle Bay Gardens Historic District	-	-	-	-
O22/H21	Rockefeller Plaza	See above	-	-	-
Natural Resources					
N1	East River	-	-	-	5:48-6:01 PM 13 minutes

Notes: This table shows, for each resource, the entry and exit times and total duration of incremental shadow for each sunlight sensitive resource. A dash indicates that no incremental shadow would fall on the resource because it is already in shadow from existing or No-Action conditions or because the incremental shadow does not reach it. Daylight savings time is not used, times are Eastern Standard Time per *CEQR Technical Manual* guidelines.

[1] LPC and S/NR eligible historic resource

[2] S/NR Listed,

[3] LPC Designated

O18 – 1251 Sixth Avenue

The 1251 Sixth Avenue is a 0.7 acre POPS that contains a fountain, ledge seating and benches, extended sidewalks, plantings, and subway access. The detailed analysis shows that during one analysis period—the December 21st analysis period—incremental shadow would fall on this resource for a 12-minute period in the morning (from 9:51 AM to 10:03 AM), and completely eliminate sunlight from the resource during this period. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the resource is largely in shadow at this time from other buildings in existing and future no-action conditions. The incremental shadow would be limited to a relatively small portion of the POPS by the entrance along West 49th Street, in an area that contains walkways and planters but no seating. Since December is not considered the growing season, the planters are not sunlight sensitive during this time. Given the very short duration of the projected incremental shadow, and the lack of amenities that are sunlight sensitive during the December analysis day, no significant adverse shadows impacts would occur.

O20 – 1221 Sixth Avenue

The 1221 Sixth Avenue is a 0.7 acre POPS contains benches and movable café seating, trees, walkways and extended sidewalks, and planters. The detailed analysis shows that during one analysis period—the December 21st analysis period—incremental shadow would fall on this resource for a 13-minute period in the morning (from 9:50 AM to 10:03 AM). Direct sunlight would be entirely eliminated from the resource during this period. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the resource is largely in shadow at this time from other buildings in existing and future no-action conditions. The incremental shadow would fall on the northern side of the POPS along West 49th Street in an area mostly comprised of empty plaza space with a few planters. These planters are not sunlight sensitive on this analysis day since December is outside of the growing season. The shadow would be linear and very small in proportion to the larger POPS. Given the very short duration, small area of the projected incremental shadow, and lack amenities that are sunlight sensitive on the December analysis day, no significant adverse shadows impacts would occur.

O22/H21- Rockefeller Center – Rockefeller Plaza

Rockefeller Center is a complex of 19 commercial buildings covering 22 acres between West 48th and 51st Streets and is both an open space (O22) and a historic resource (H21).[6] Its sunlight sensitive features include its open spaces and vegetation located in plaza space totaling 2 acres. Because the December analysis day is outside of the growing season, areas containing vegetation are not considered sunlight sensitive. Therefore, only the public's use and enjoyment of the open spaces is assessed in this section.

[6] Rockefeller Plaza, Rockefeller Center is a New York City Landmark, listed on the State and National Registers of Historic Places, and a National Historic Landmark.

The complex's open space spans portions of three blocks and consists of several distinct components that form a cohesive network of spaces:

- **Rockefeller Plaza.** Rockefeller Plaza, the complex's central gathering space, consists of a pedestrianized street that runs through the complex between West 48th and West 51st Streets, parallel to Fifth and Sixth Avenues. It serves predominantly as pedestrian circulation space and also contains outdoor restaurant seating and areas of temporary benches/seating during warm weather months. Programming of this space changes seasonally.
- **Lower Plaza.** The Lower Plaza is located on the block between West 48th and West 49th Streets at the center of the complex. It is located below ground level and is the site of the iconic seasonal ice-skating rink and *Prometheus* statue.
- **Channel Gardens.** The Channel Gardens, owned and operated by Rockefeller Center, which are located on the block between West 48th Street and West 49th Street, consist of a planted promenade that extends from Fifth Avenue and is the main entrance to Rockefeller Plaza. There is seating around the gardens and walkways that bring pedestrians from Fifth Avenue to the Rockefeller Center retail and Lower Plaza.

The detailed analysis shows that during one analysis period—the December 21st analysis period—incremental shadow would fall on Rockefeller Plaza for a 22-minute period between 11:21 AM and 11:43 AM and then on the Channel Gardens for a 22-minute period between 11:50 AM and 12:12 PM (see **Figure 4-6** to **Figure 4-9)**. No incremental shadow would fall on the Lower Plaza.

As shown in **Figure 4-6** and **Figure 4-7**, incremental shadow would enter a portion of Rockefeller Plaza between West 50th Street and West 51st Street at 11:21 AM. A small portion of this plaza area would remain in sunshine until 11:28 AM, when the shadow increment would completely eliminate sunshine from the resource for the duration of this period (15 minutes). At 11:28 AM the shadow increment extent would be at its largest and cover 4,944 square feet, or approximately 6% of the entire plaza area. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the resource is largely in shadow at this time from other buildings in existing and future no-action conditions. While the shadow increment would eliminate sunshine from this area of Rockefeller Plaza, the duration and area covered are limited and would occur only during one analysis period. In addition, this area provides only pedestrian circulation space and does not provide seating during this season. Therefore, the space is intended as a path for bringing the winter season's visitors to the Lower Plaza and does not contain sunlight sensitive features during this season.

Figure 4-6 O22/H21 – Rockefeller Plaza December 21 - 11:25 AM

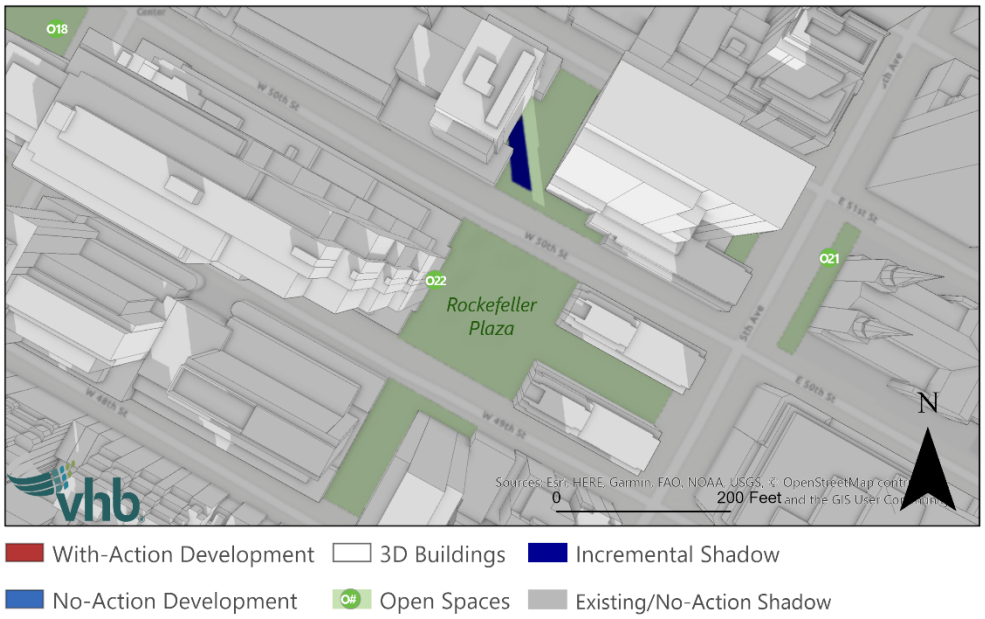
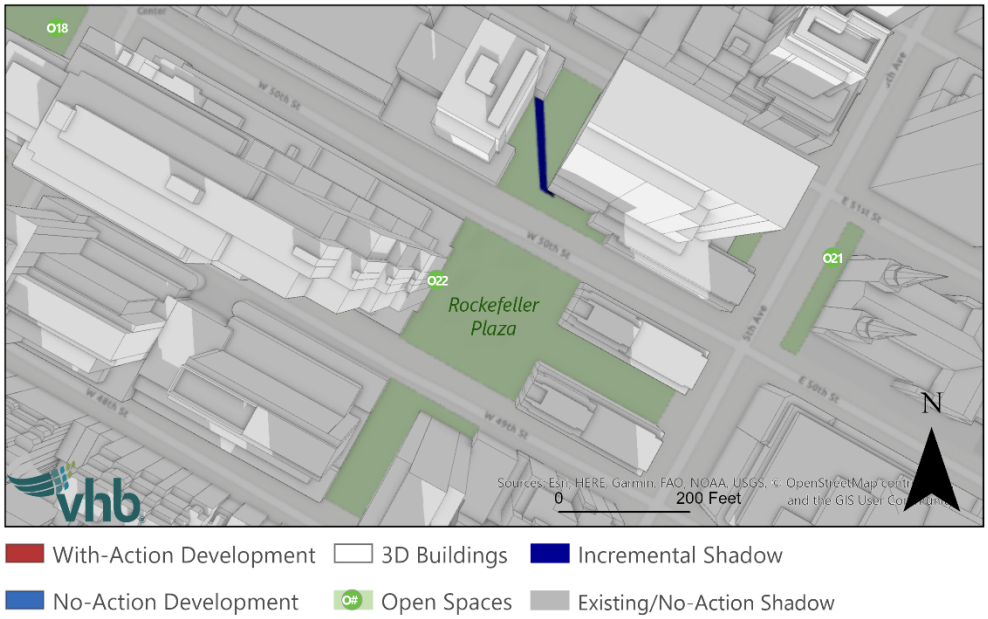


Figure 4-7 O22/H21 – Rockefeller Plaza December 21 - 11:40 AM



For the shadow increment on the Channel Gardens, a shadow increment would fall on a small portion of the gardens near Fifth Avenue for a 22-minute period between 11:50 AM and 12:12 PM (see **Figure 4-8** and **Figure 4-9**). At its greatest extent, the incremental shadow would cover 502 square feet or 0.6% of the overall plaza area. As mentioned above, shadow from the Proposed Development under the No-Action condition would not reach this resource, but the resource is largely in shadow at this time from other buildings in existing and future no-action conditions. Sunlight would be eliminated from the resource for the duration of the increment. This

portion of the Channel Gardens contains some planters, and at times has contained a sculpture, but no seating. Given the short duration of the shadows during the winter season when plantings are dormant, and the lack of seating in the area, the projected incremental shadows are not expected to adversely affect the public's use and enjoyment of this resource or the viability of vegetation.

Overall, new incremental shadows cast on the open spaces at Rockefeller Center as a result of the Proposed Action are not expected to result in significant adverse impacts.

Figure 4-8 O22/H21 – Rockefeller Plaza December 21 - 11:55 AM

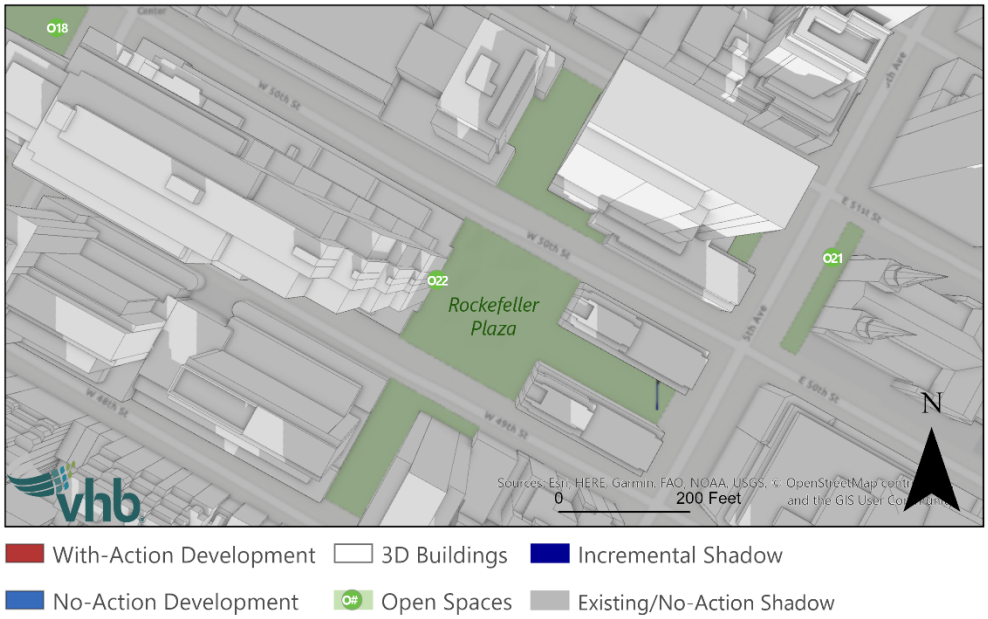
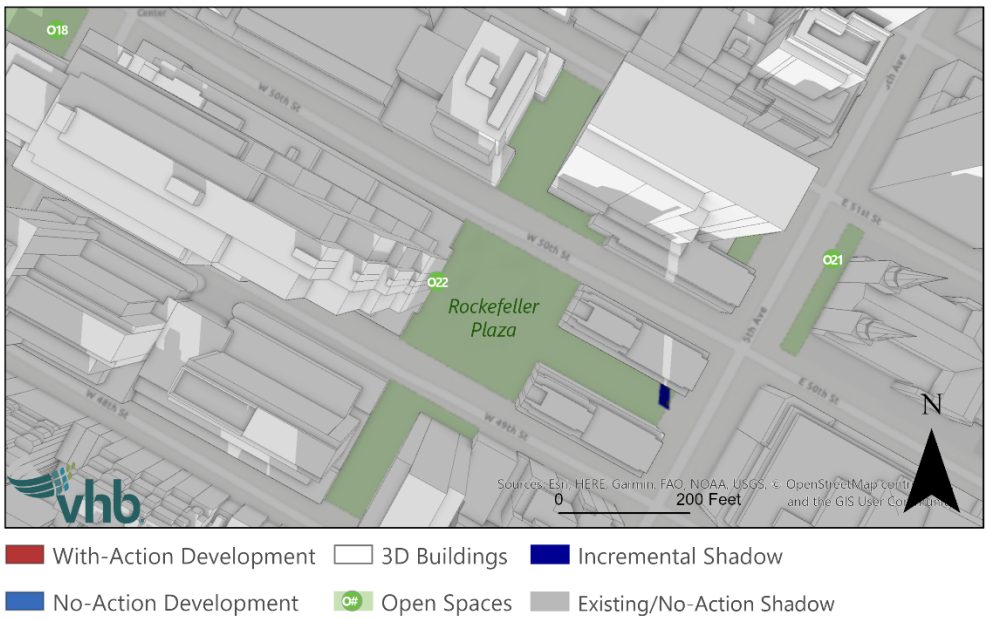


Figure 4-9 O22/H21 – Rockefeller Plaza December 21 - 12:10 PM



O30 – 12 East 49th Street

The POPS at 12 East 49th Street, also known as Tower 49, is 0.3 acres and contains a plaza/arcade, trees, planters, and benches. The detailed analysis shows that during one analysis period—the March/September 21st analysis period—incremental shadow would fall on this resource for an 8-minute period between 12:27 PM and 12:35 PM on the south eastern portion of the POPS along East 48th Street. During these 8 minutes, the incremental shadow would fall in a very small portion of the plaza along East 48th Street, while the majority of the plaza would remain in sun. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the southeastern side of the POPS is partially in shadow at this time from other buildings in existing and future no-action conditions. Based on the very short duration and limited coverage area, no significant adverse shadows impacts would result.

O33 – 1166 Sixth Avenue

The POPS at 1166 Sixth Avenue is 0.6 acres and contains a plaza/arcade, tables and movable chairs, benches, seat walls/ledges, trees, plantings, and a sculpture.

The detailed analysis shows that during one analysis period—the March/September 21st analysis period—incremental shadow would fall on portions of this resource for a 42-minute period between 8:57 AM and 9:39 AM. As shown in **Figure 4-10** to **Figure 4-12**, at the beginning of the coverage period, the shadow increment would cover the extended sidewalk area along 45th Street. At about 9:20, a very small area of the plaza would be in shade; the extent of shadow coverage would increase through the end of the coverage period (see **Figure 4-12**) but would still cover only a small portion of the plaza. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but different areas of the resource are partially in shadow at this time from other buildings in existing and future no-action conditions.

The southern edge of the plaza that would receive incremental shadow has trees planted with shrubs underneath, and the western side has some trees and potted shrubs. Benches are located throughout the plaza. During the time of incremental shadow, portions of the plaza would remain in sun, and the plaza would still receive sunlight from 8:30 AM until 2:30 PM (a duration of six hours) before it is in shadow from the adjacent building. Therefore, the shadows are not expected to be detrimental to the viability of the vegetation in the plaza or the enjoyment of the public. Based on the short duration and low coverage, no significant adverse impacts are anticipated with regard to shadows.

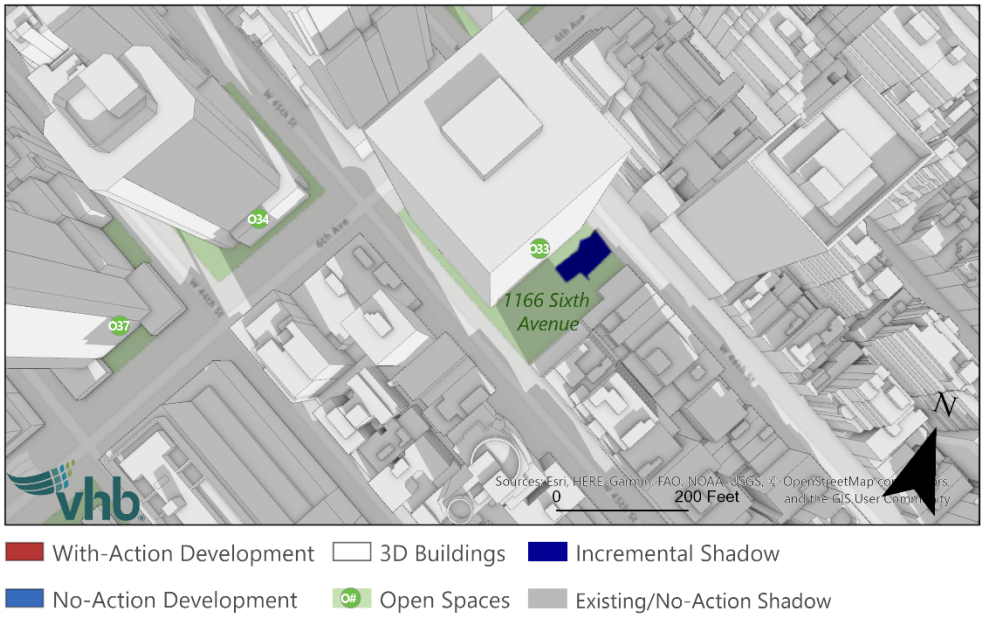
Figure 4-10 O33 – 1166 Sixth Avenue March/September 21 - 9:05 AM

With-Action Development | 3D Buildings | Incremental Shadow
No-Action Development | Open Spaces | Existing/No-Action Shadow

Figure 4-11 O33 – 1166 Sixth Avenue March/September 21 - 9:20 AM

With-Action Development | 3D Buildings | Incremental Shadow
No-Action Development | Open Spaces | Existing/No-Action Shadow

Figure 4-12 O33 – 1166 Sixth Avenue March/September 21 - 9:35 AM

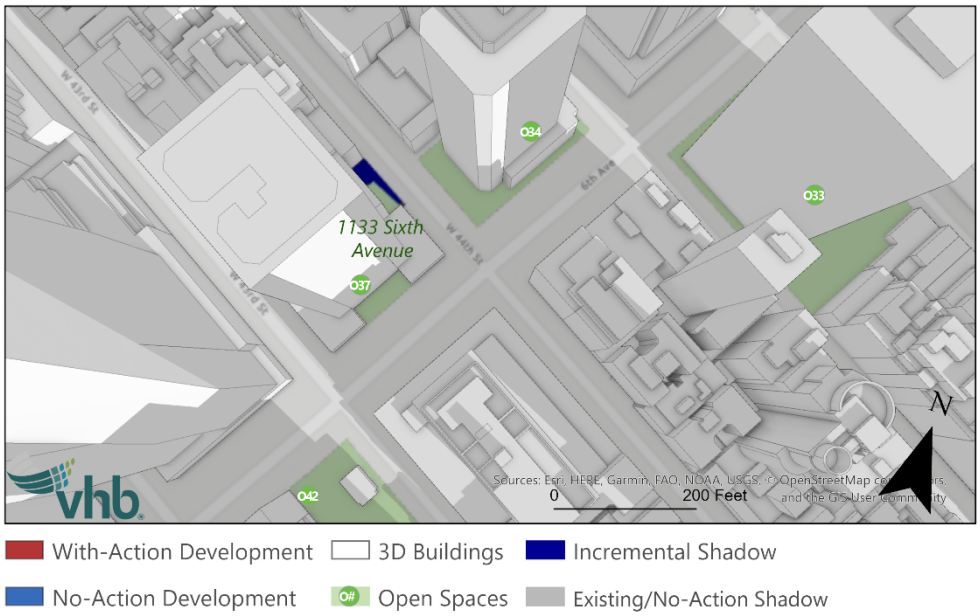


O37 – 1133 Sixth Avenue

The POPS at 1133 Sixth Avenue is 0.1 acres and contains a small area on the east side of the building (fronting Sixth Avenue) that contains a planter surrounded by benches in a plaza. The areas on the north and south sides of the building have no amenities and consist of sidewalk extensions for a building entrance (north side) and area for the building's loading bays.

The detailed analysis shows that during one analysis period—the March/September 21st analysis day—incremental shadow would fall on the north sidewalk area for a 27-minute duration between 8:05 AM and 8:32 AM (see **Figure 4-13**). Sunlight would be completely eliminated from the resource from 8:07 AM to 8:20 AM, when sunlight begins to enter the area on the south side of the resource. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the areas of the resource with amenities, is entirely in shadow at this time from other buildings in existing and future no-action conditions. As discussed above, there are no amenities or plantings in the area of the resource that would receive incremental shadow at this period of time. Therefore, because of the short duration and the lack of amenities in this area, no significant adverse impacts would result with regard to shadows.

Figure 4-13 O37 – 1133 Sixth Avenue March/September 21 - 8:18 AM



O46 – 245 Park Avenue

The POPS at 245 Park Avenue is 0.7 acres and consists of a plaza/arcade. Much of the plaza space is covered by the building overhang, and the majority of the space does not have amenities or plantings, except for the frontage along East 46th and East 47th Streets.

The detailed analysis shows that incremental shadows would reach this plaza on two of the four analysis days: May/August 6th (see **Figure 4-14** through **Figure 4-19**) and June 21st (See **Figure 4-20** through **Figure 4-25**).

Figure 4-14 O46 and O61 – 245 Park Avenue and Park Avenue Malls May/August 6 - 2:15 PM

Figure 4-15 O46 – 245 Park Avenue May/August 6 - 2:30 PM

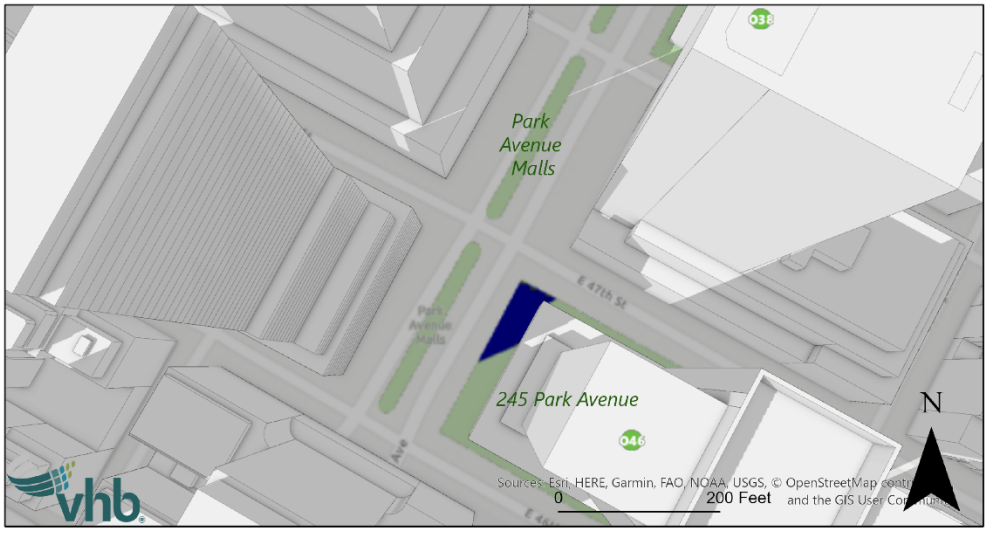


Figure 4-16 O46 – 245 Park Avenue May/August 6 - 2:45 PM

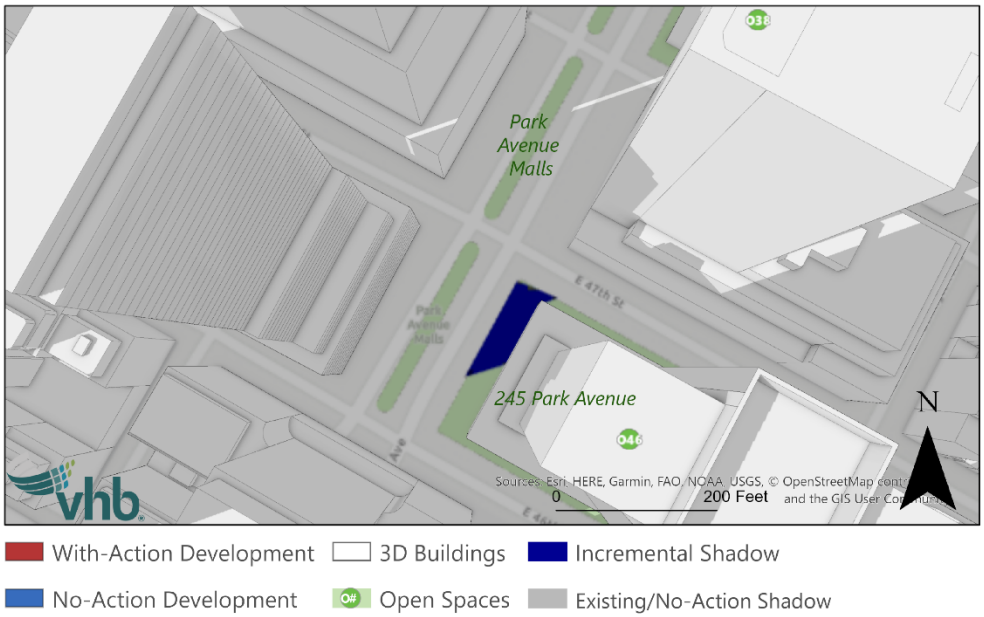


Figure 4-17 O46 – 245 Park Avenue May/August 6 - 3:00 PM

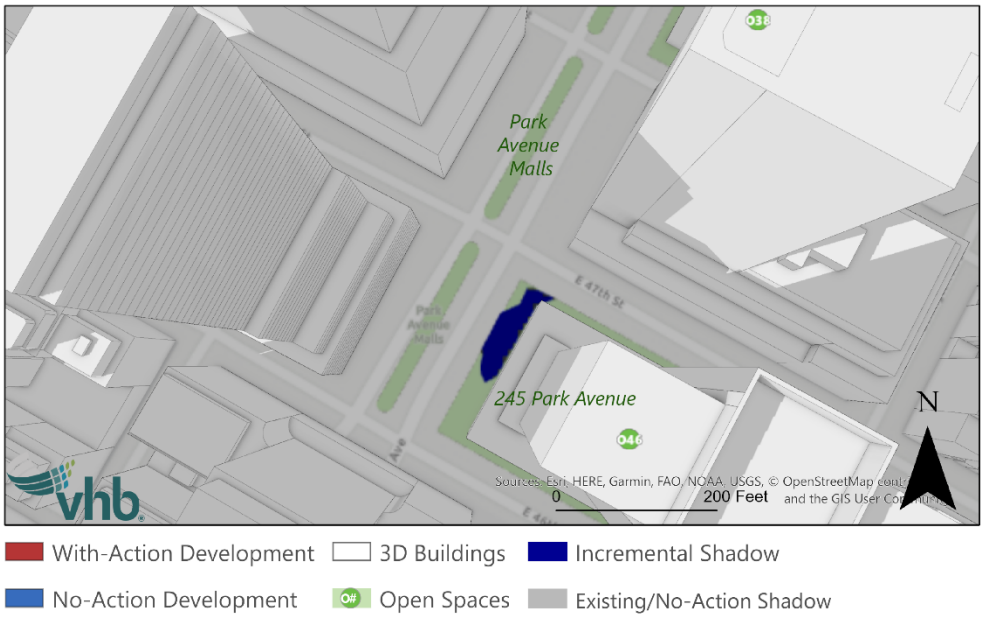


Figure 4-18 O46 – 245 Park Avenue May/August 6 - 3:15 PM

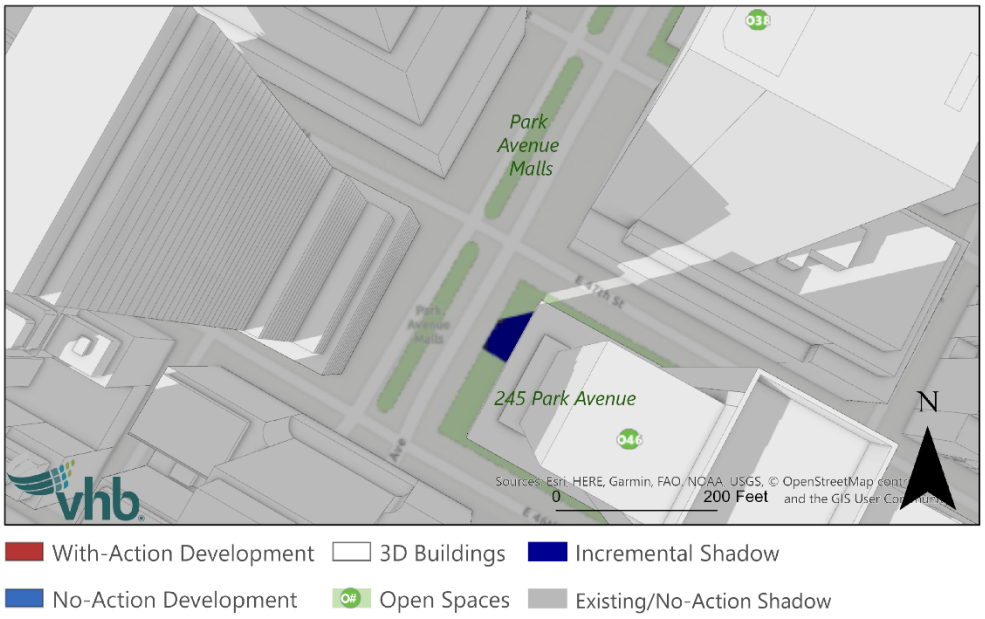


Figure 4-19 O46 – 245 Park Avenue May/August 6 - 3:30 PM

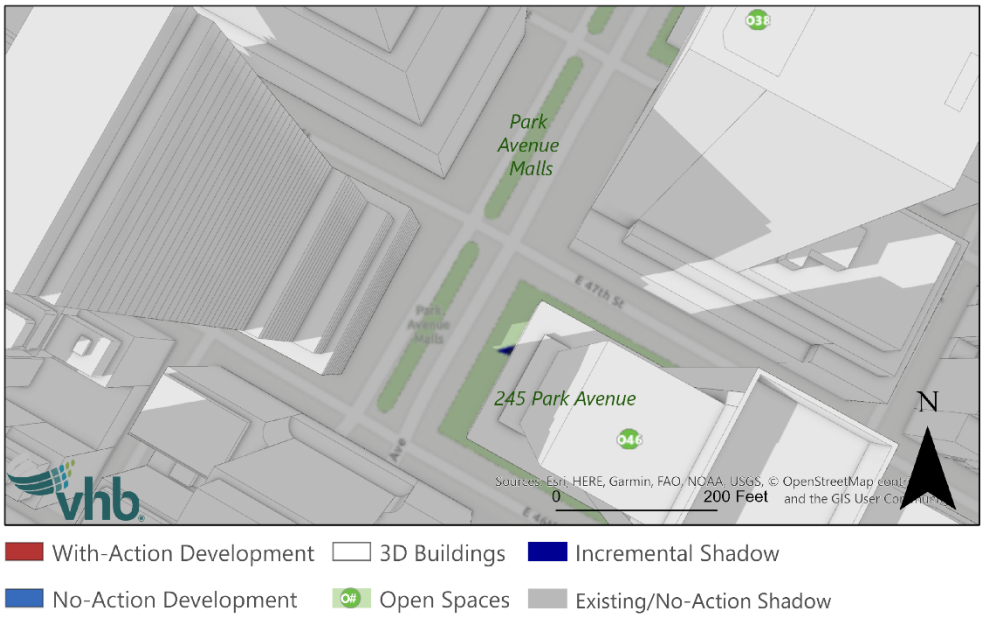


Figure 4-20 O46 and O61 – 245 Park Avenue and Park Avenue Malls June 21 - 1:55 PM

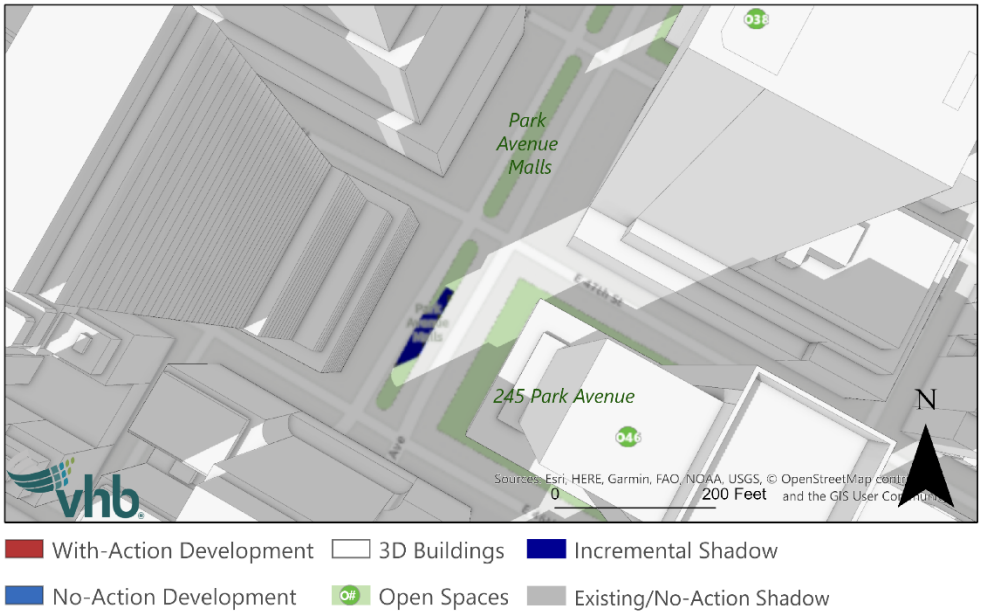


Figure 4-21 O46 and O61 – 245 Park Avenue and Park Avenue Malls June 21 - 2:10 PM

Figure 4-22 O46 and O61 – 245 Park Avenue and Park Avenue Malls June 21 - 2:25 PM

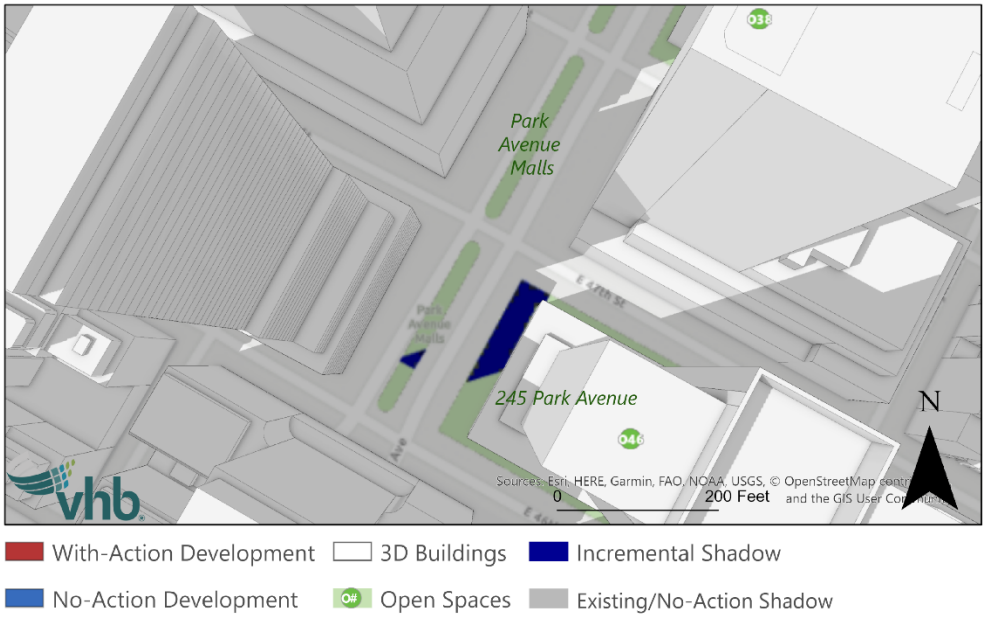


Figure 4-23 O46 and O61 – 245 Park Avenue and Park Avenue Malls June 21 - 2:40 PM

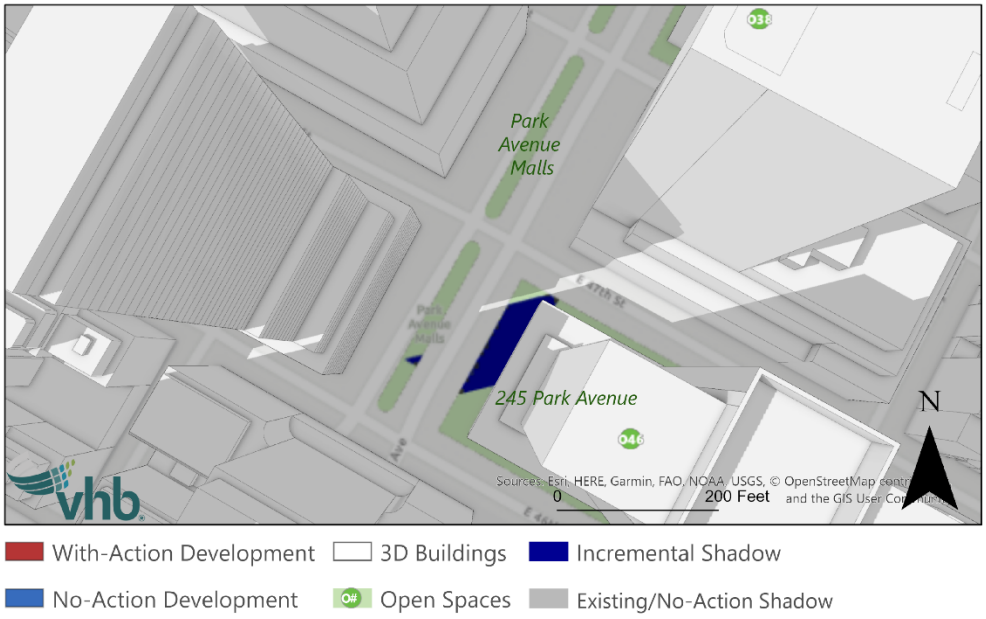


Figure 4-24 O46 and O61 – 245 Park Avenue and Park Avenue Malls June 21 - 2:55 PM

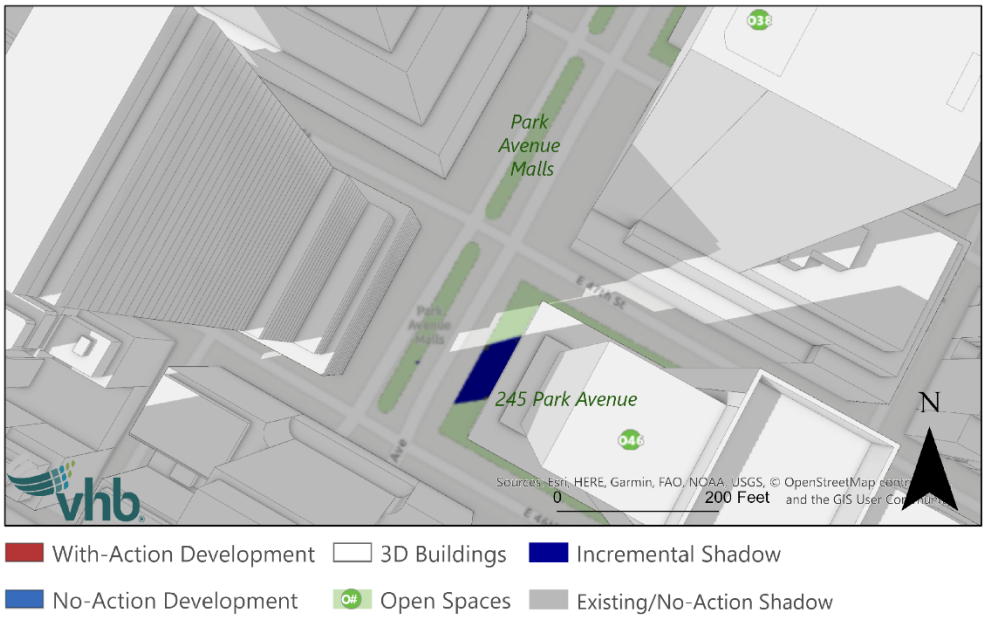
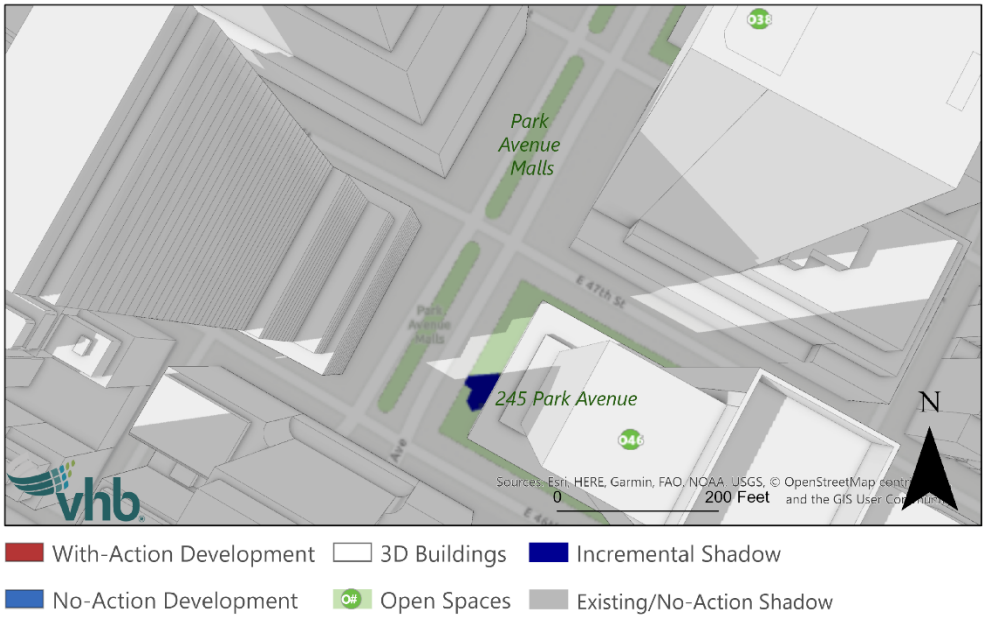


Figure 4-25 O46 – 245 Park Avenue and Park Avenue Malls June 21 - 3:10 PM



On the May/August 6th analysis day, the plaza would experience incremental shadow between 2:11 PM and 3:33 PM (a duration of 1 hour and 22 minutes). At the start of the increment duration, shadow would enter the corner of the plaza at Park Avenue and East 47th Street. Beginning at 2:28 through 3:08 (a 40-minute) duration, the incremental shadow would eliminate the last portion of sunlight on the plaza during this afternoon period. However, the affected portion of the plaza does not contain any amenities such as seating or planters. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the

resource is largely in shadow at this time from other buildings in existing and future no-action conditions.

On the June 21st analysis day, the plaza would receive incremental shadow from 2:07 PM to 3:20 PM (a duration of 1 hour and 13 minutes). During this period, the incremental shadows would remove sunlight from the resource in its entirety for 10 minutes between 2:26 PM and 2:36 PM. During these 10 minutes, the incremental shadow would cover approximately 4,180 square feet or 14% of the plaza. Outside of this 10-minute period, parts of the plaza would remain in sunlight. As described above, the area of the plaza that would experience incremental shadow is used solely for circulation and does not have any amenities such as seating or planters. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the resource is largely in shadow at this time from other buildings in existing and future no-action conditions.

Due to the lack of amenities within this resource and that for the most part, the resource would still receive sunlight during the period of incremental shadow, the incremental shadow on these two analysis days is not expected to affect the public's enjoyment of the space or the viability of plantings in this resource. Therefore, no significant adverse shadows impact would result.

O51 – 747 Third Avenue

The POPS at 747 Third Avenue is 0.1 acres and contains a plaza with fixed tables and chairs, a seat wall, a gazebo, and artwork.

The detailed analysis shows that during one analysis period, the June 21st analysis day, incremental shadow would fall on a small portion of this resource for a 13-minute duration between 5:01 PM and 5:14 PM. Sunlight would be eliminated from this resource entirely from 5:03 PM to 5:14 PM. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the resource is largely in shadow at this time from other buildings in existing and future no-action conditions. The incremental shadow from the Proposed Development would fall on a portion of the plaza that does not contain any seating or amenities. Futhermore, this resource is in full and partial sun from 9:00 AM to 3:00 PM (a duration of 6 hours) earlier in the day. Given the short duration of incremental shadow and lack of amenities in the area receiving incremental shadow, significant adverse impacts to this resource are not expected due to shadows.

O52– Bryant Park

Bryant Park, which is both an open space (O52) and a Scenic Landmark, is a 4.58-acre City-owned park that extends from West 40th Street to West 42nd Street, between Fifth and Sixth Avenues, and is located immediately west of the New York Public Library main branch (Stephen A. Schwarzman Building). The park is characterized by a large central lawn (300 feet long by 215 feet wide), formal pathways, stone balustrades, allées of London Plane trees, and at the west end, an oval plaza containing a black granite ornamental fountain known as the Josephine Shaw Lowell Memorial Fountain. The park is lined with many additional monuments. Amenities include two restaurant pavilions and four concession kiosks, many tables

and movable chairs among plantings, game areas, food vendors, and programming for physical activity, theater and other events. The park opens at 7 AM with closing varying from 7 PM to midnight throughout the year. The large central lawn is converted into a seasonal ice rink in the winter months (December through March).

The detailed analysis shows that incremental shadows would reach this plaza on two of the four analysis days: May/August 6th and June 21st (see **Figure 4-28** through **Figure 4-32**).

May/August 6th

On the May/August 6th analysis day, the incremental shadow would be for a 28-minute duration from 6:27 AM to 6:55 AM before the park is open to the public. Sunlight would be eliminated from the resource entirely for 5 minutes at the beginning of this period, after which sunlight would begin to enter the southwest corner of the park again. At it's largest extent, this incremental shadow would cover 4% of the park area. This area of the park would continue to receive more than 6 hours of direct sunlight over the analysis day. The shadow would be of relatively small extent and short duration. Further, it would not affect the public's enjoyment of the resource, since the park would be closed at this time, nor the viability of vegetation, since the park would continue to receive ample direct sunlight. Therefore, incremental shadows on the May/August 6th analysis day would not constitute an adverse shadows impact on Bryant Park and further analysis is not warranted.

Figure 4-26 O52 – Bryant Park May/August 6 - 6:35 AM

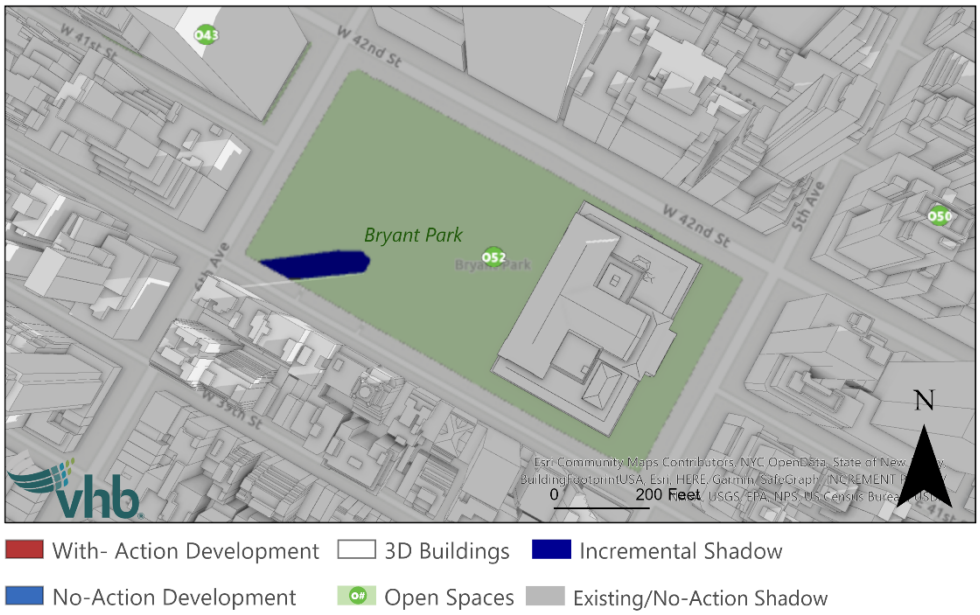
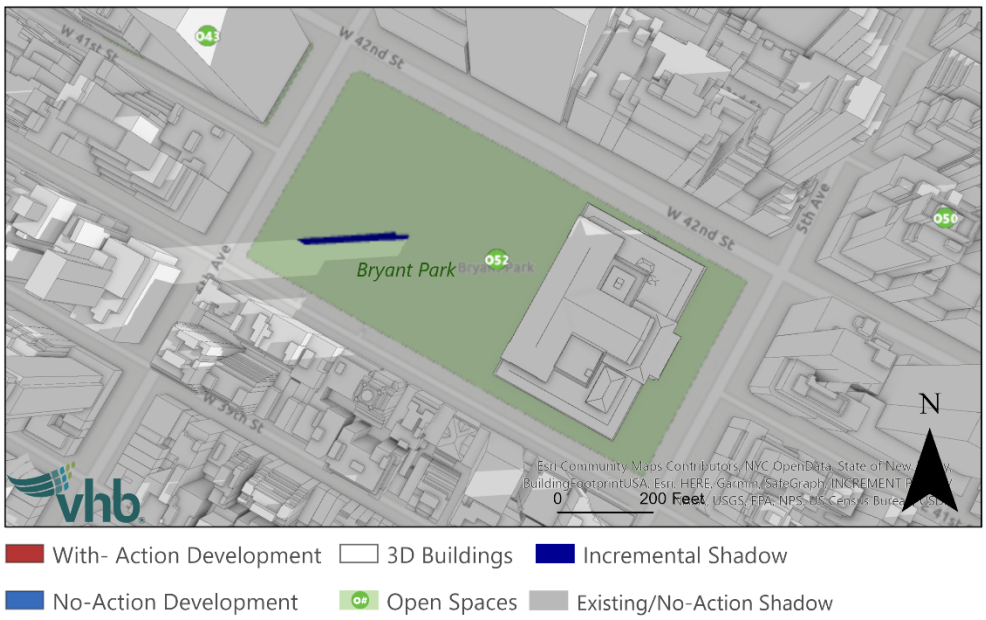


Figure 4-27 O52 – Bryant Park May/August 6 - 6:50 AM



June 21st

On the June 21st analysis day, the park would experience new incremental shadows from 6:25 AM to 7:38 AM, a duration of 1 hour and 13 minutes. Between 6:25 AM, when the incremental shadow would begin, and 6:38 AM, shadow from the Proposed Development would eliminate the small area of sunshine that would otherwise have been on the park (a duration of 13 minutes) (see **Figure 4-28** and **Figure 4-29**). This area, at its greatest extent, would be 5,499 square feet or 3% of the park's area. This increment would occur before the park is open to the public; furthermore, the extent of the area is small. Beginning at about 7:00 AM, incremental shadow would cover some portions of the park before exiting the park at 7:38 AM (see **Figure 4-30** through **Figure 4-32**). During this period of incremental shadow, other portions of the park would be in sunlight. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the resource is partially in shadow at this time from other buildings in existing and future no-action conditions. After this period, the park would continue to receive sun exposure for the majority of the day, including a long period of full sun between approximately 9:00 AM and 2:00 PM (a 5-hour duration) accompanied by periods of partial sun from 7:00 AM to 9:00 AM and 2:00 PM to 5:00 PM. Therefore, the additional 13 minutes of incremental shadow where sunlight is eliminated from the park would not be expected to impact the viability of vegetation in these plantings.

Overall, the incremental shadows would not be expected to result in any significant adverse impacts to either public enjoyment or vegetation growth. The park would experience incremental shadow for 38 minutes while open to the public, during which portions of the park would be in sun. Therefore, due to the presence of sunlight throughout this period and for the rest of the analysis day, the incremental shadows would not adversely affect the public enjoyment of the park. Furthermore, the park

will continue to receive full sunlight for at least 5 hours and be in partial sunlight for another 5 hours of the day, so it is not expected that the shadow increment would impact the viability of the vegetation. Therefore, these shadows would not result in an adverse impact to Bryant Park.

Figure 4-28 O52 – Bryant Park June 21 - 6:30 AM

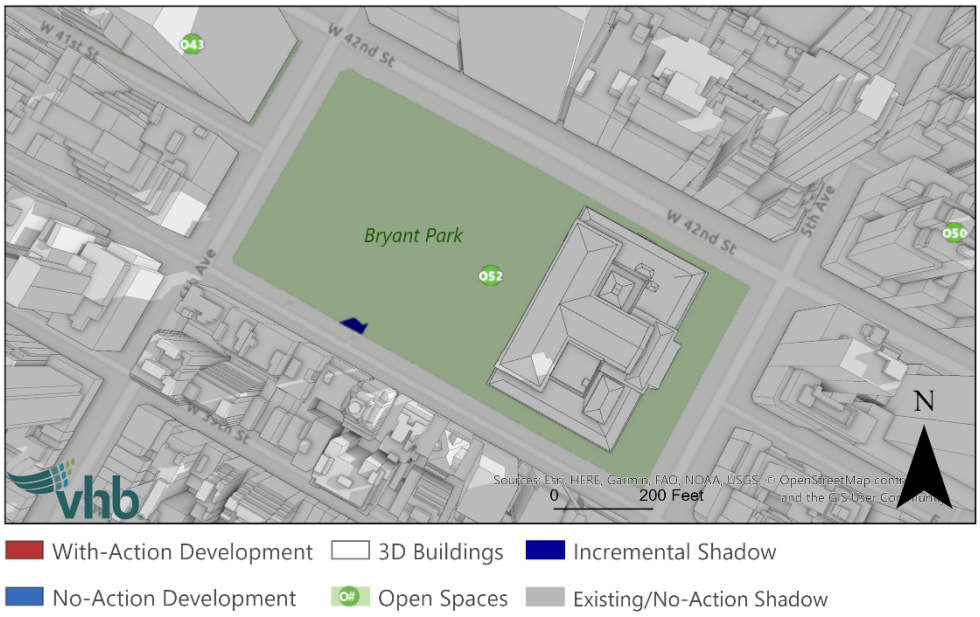


Figure 4-29 O52 – Bryant Park June 21 - 6:45 AM

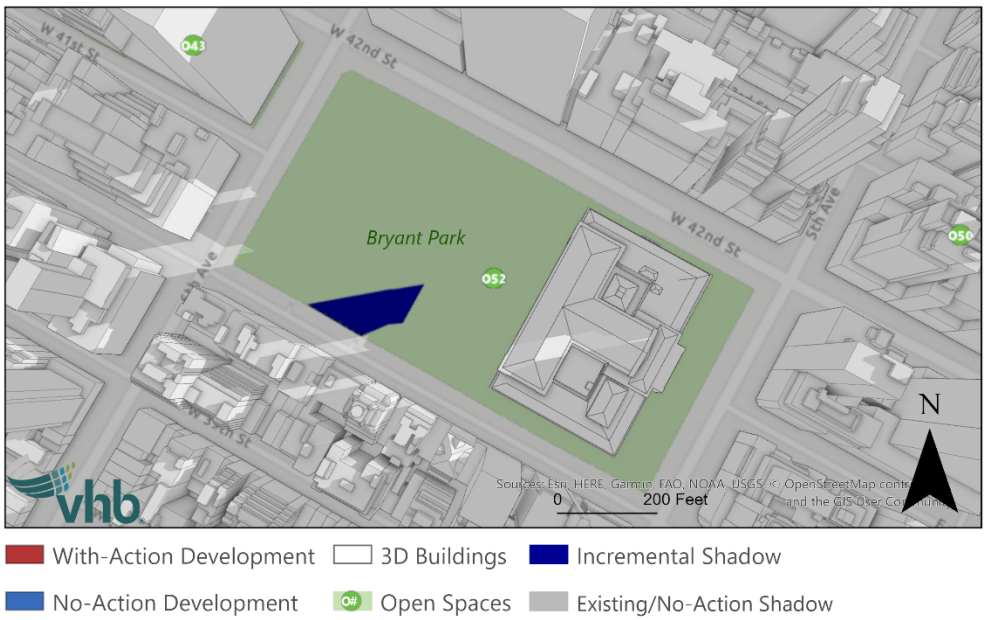


Figure 4-30 O52 – Bryant Park June 21 - 7:00 AM

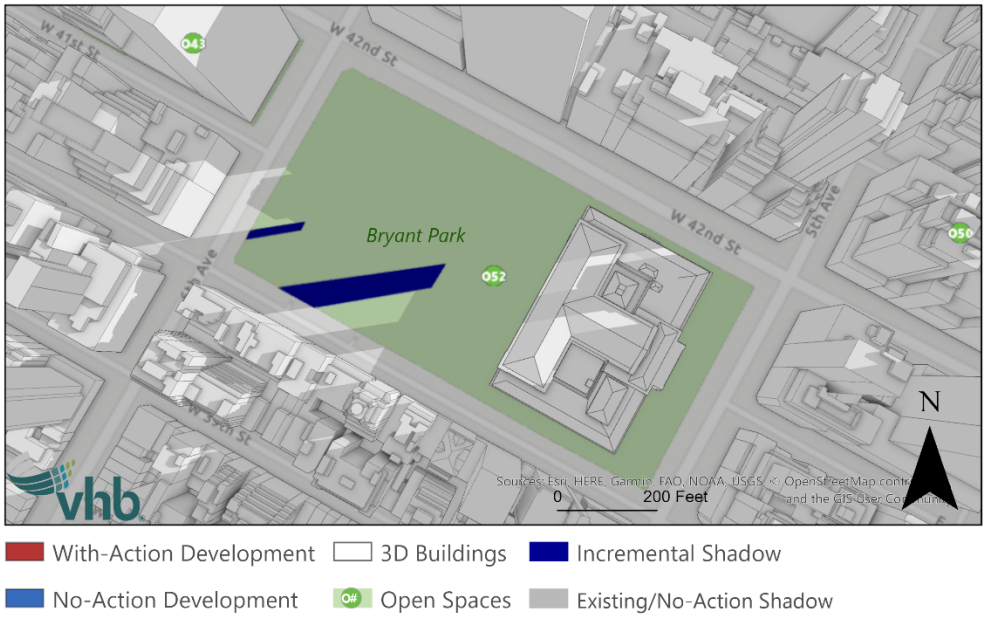


Figure 4-31 O52 – Bryant Park June 21 - 7:15 AM

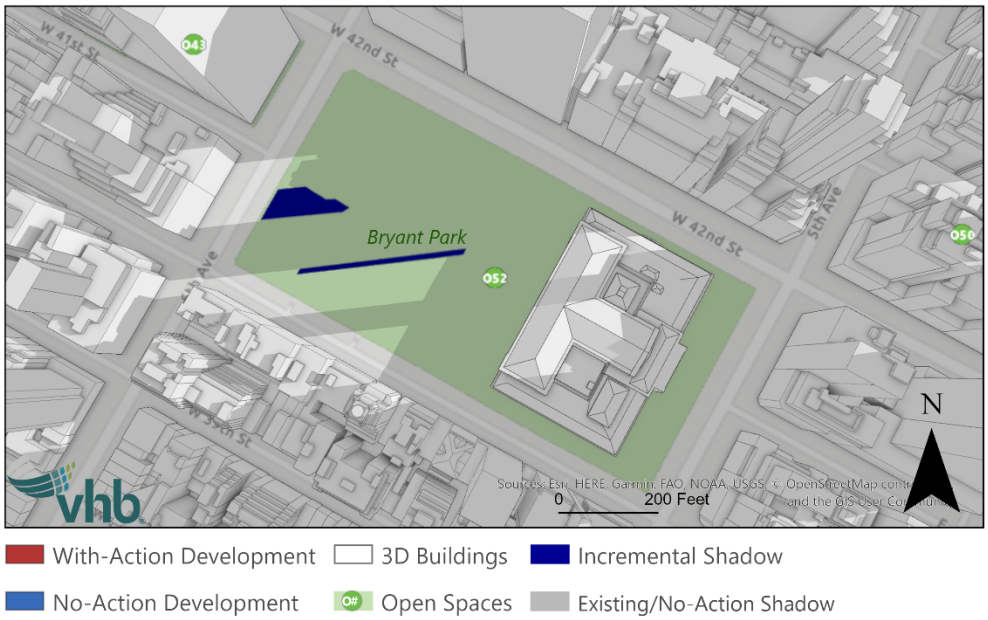
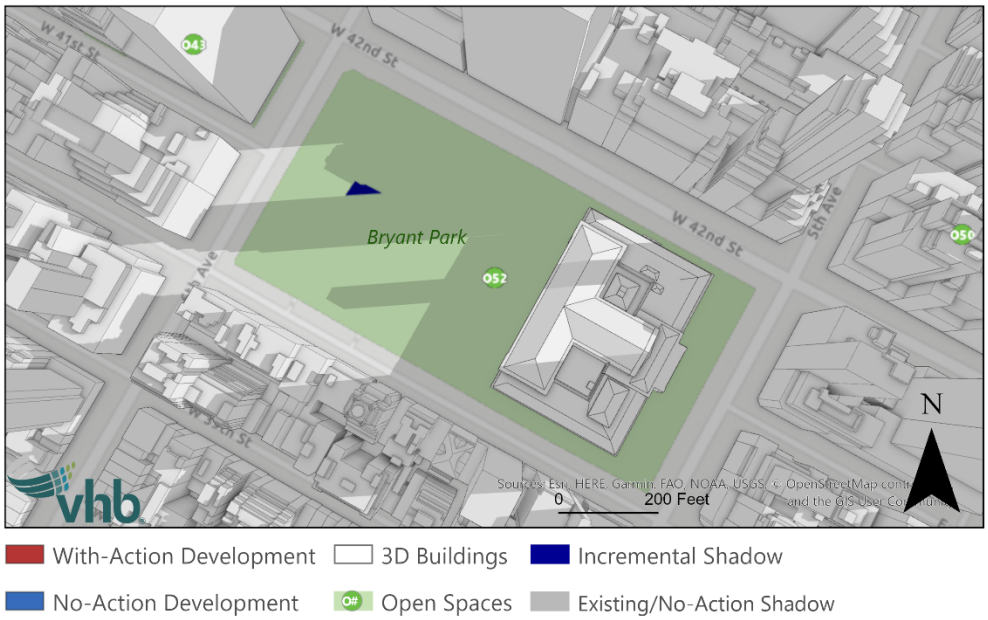


Figure 4-32 O52 – Bryant Park June 21 - 7:30 AM



O58 – 845 First Avenue

The 845 First Avenue is a 0.2 acre POPS that is located along the building frontage of East 47th Street and contains trees and planters surrounded by stone benches.

The detailed analysis shows that during one analysis period, the June 21st analysis day, incremental shadow would fall on this resource for a 7-minute duration between 5:27 PM and 5:34 PM. Sunlight would be eliminated from the resource from 5:29 PM to 5:34 PM due to this incremental shadow. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the resource is largely in shadow at this time from other buildings in existing and future no-action conditions. The resource, being close to the East River, would still receive sunlight before this time period and throughout the day for more than 6 hours. Given the very short duration, this incremental shadow is not expected to affect the enjoyment of the public or vegetative growth, and there would be no significant adverse impact due to shadows.

O59 – Dag Hammarskjold Plaza

Dag Hammarskjold Plaza is a 1.6 acre City-owned, large linear plaza along East 47th Street that contains trees, planters, benches, and wall seating.

The detailed analysis shows that during one analysis period, the June 21st analysis day, incremental shadow would fall on a small area of this resource for a 30-minute duration between 5:26 PM and 5:56 PM (see **Figure 4-33** and **Figure 4-34**). While the incremental shadow would eliminate the small portion of remaining sunlight during this period, the plaza would continue to receive more than 6 hours of sun at other periods throughout the day. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the resource is largely in shadow at this time from other buildings in existing and future no-action conditions.

Further, the area of coverage is limited to a narrow strip of shadow. Because of the limited area of coverage and limited duration during this one analysis period, there would be no significant adverse shadows impacts on this resource.

Figure 4-33 O59 – Dag Hammarskjold Plaza June 21 - 5:30 PM

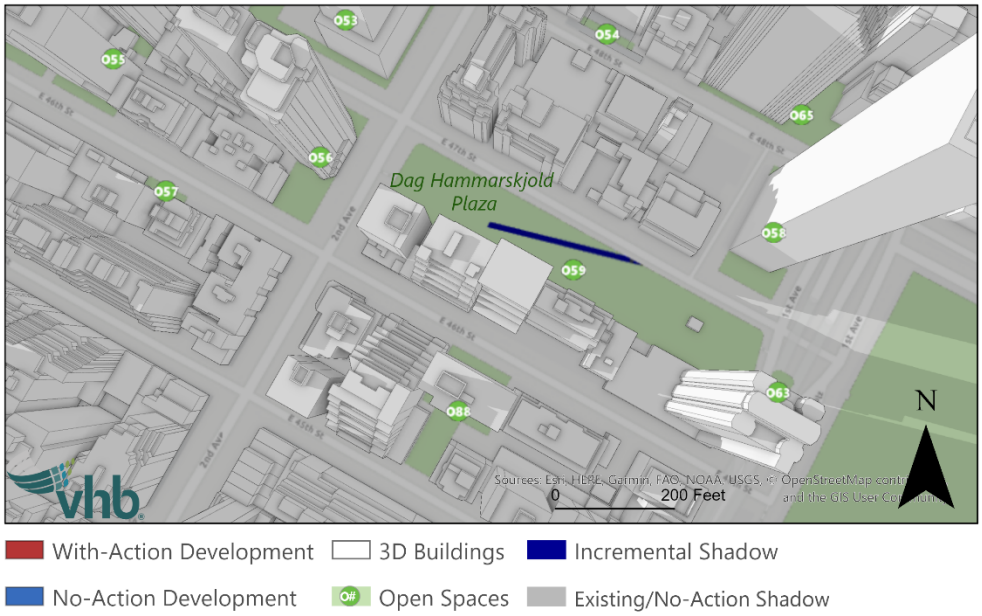
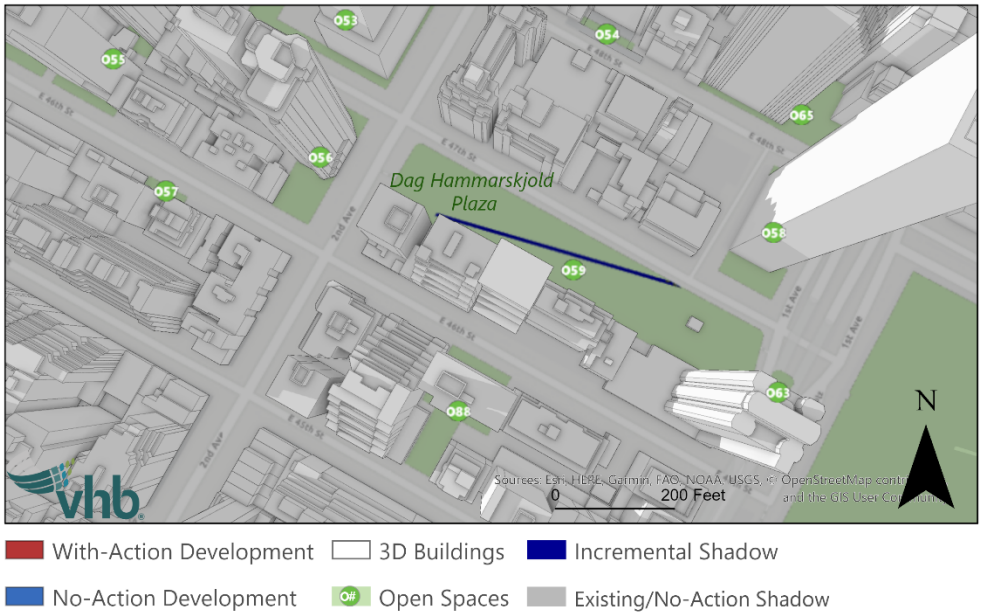


Figure 4-34 O59 – Dag Hammarskjold Plaza June 21 - 5:45 PM



O61 – Park Avenue Malls

The Park Avenue malls consist of a median extending along Park Avenue; they do not contain seating but are filled with planting beds that contain trees, shrubs and flowers and the occasional sculpture. The detailed analysis examined the malls between East 46th Street and East 58th Street as this is the area of Tier 3 shadow.

The detailed analysis shows that incremental shadows would reach the malls on two of the four analysis days: May/August 6th (see **Figure 4-14** through **Figure 4-19**) and June 21st (See **Figure 4-20** through **Figure 4-25**).

As shown in **Figure 4-14**, for the May/August 6th analysis day, incremental shadow would fall on a very small portion of the mall between East 46th and East 47th Streets between 2:00 PM and 2:31 PM (a duration of 31 minutes). Sunlight would be eliminated from this segment of the mall from 2:15 PM to 2:31 PM as a result. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the resource is largely in shadow at this time from other buildings in existing and future no-action conditions. This segment of the mall would receive sun immediately before this time period and earlier on through the day.

As shown in **Figure 4-20** through **Figure 4-24**, on the June 21st analysis day, small portions of the mall segment located between East 46th Street and East 47th Street would experience shadow between 1:52 PM and 2:55 PM (1 hour and 3-minute duration). Sunlight would be eliminated from this segment from 2:02 PM to 2:55 PM. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the resource is largely in shadow at this time from other buildings in existing and future no-action conditions. The larger shadow increment areas would be at the start of the increment period, and the increment would reduce in size until it would cover a very small portion of the mall segment (see **Figure 4-22**). This segment of the mall would receive full and partial sun from 8:00 AM to 1:50 PM (a duration or nearly 6 hours) through the day but would remain in existing shadow after.

Given that the Park Avenue Malls remain largely shaded for much of the day under existing conditions, the existing vegetation has proven to be shade tolerant. Because of the small area of coverage on just one segment of the malls on both the May/August 6th and June 21st analysis days and because the duration is limited, the shadow increment would not result in a significant adverse impact.

O122 – United Nations Sculpture Garden

The United Nations (UN) Sculpture Garden is a 6-acre UN-owned garden located outside of the United Nations Visitor Centre is an open space with sculptures, trees, and landscaping that is open only to official building tours and visitors from 10 AM to 5 PM from May through September.

The detailed analysis shows that incremental shadows would reach this resource on one analysis day, June 21st, for a 30-minute duration between 5:31 PM and 6:01 PM (see **Figure 4-35** and **Figure 4-36**). During this period, sunlight would never be entirely eliminated from the garden. At the start of this time period, incremental shadow would cover a small portion near the northwest corner of the Garden that has trees, benches and walkways before extending across a portion of the garden near the end of the increment. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the resource is largely in shadow at this time from other buildings in existing and future no-action conditions.

The shadow increment would occur after visitor hours at the garden, and the garden would continue to be fully in sunshine throughout the morning and early afternoon,

with shadow from existing buildings starting to enter the garden at around 2:00 PM, meaning the garden would be in full sun for 8 hours before having any shadow intrusion. Therefore, it is not expected that this relatively short shadow duration would have a significant adverse impact visitor's enjoyment of the garden or the viability of the vegetation within the garden, and no significant adverse shadows impacts would result.

Figure 4-35 O122 – United Nations Sculpture Garden June 21 - 5:35 PM

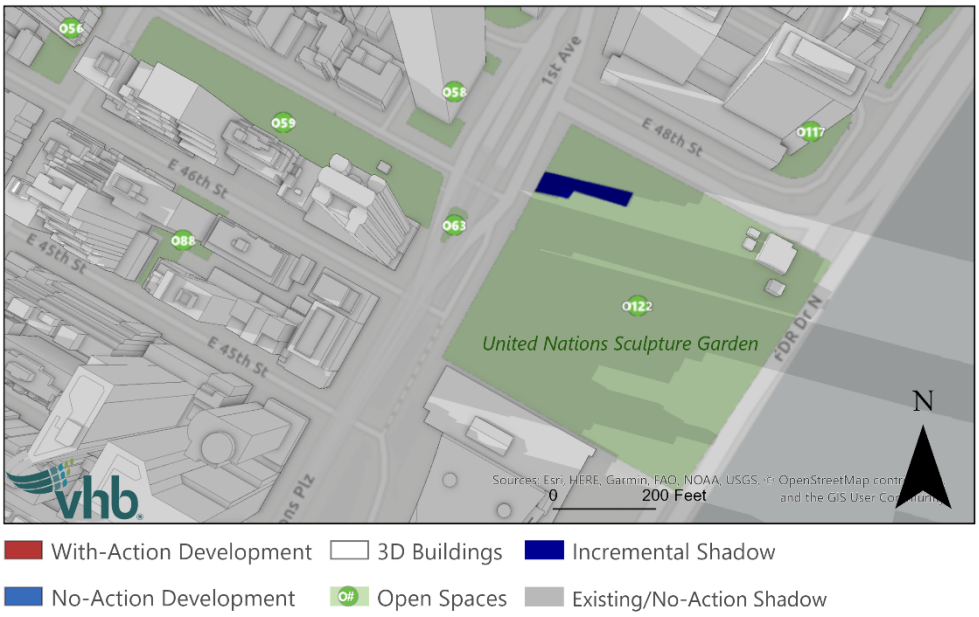
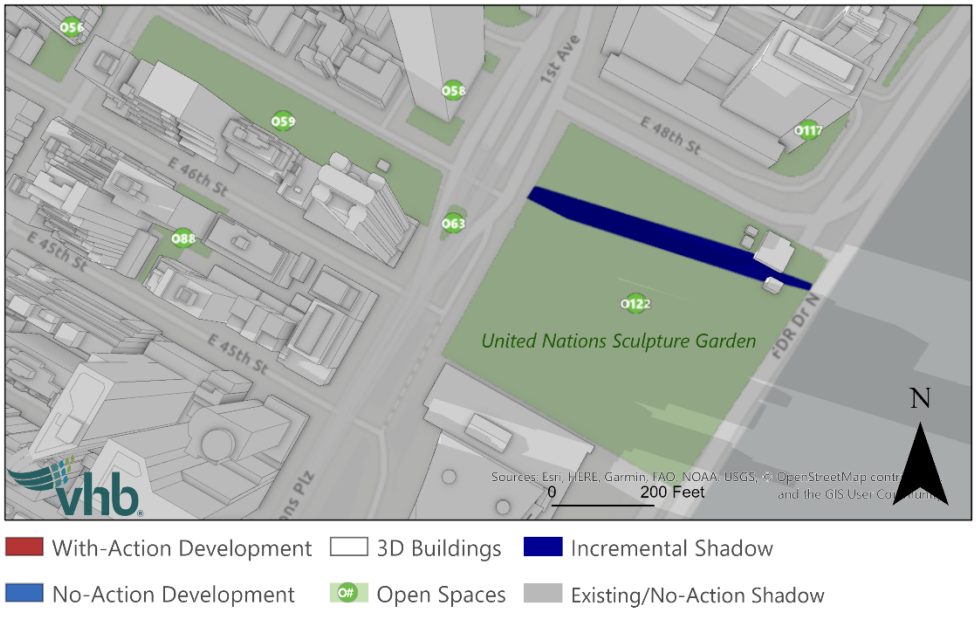


Figure 4-36 O122 – United Nations Sculpture Garden June 21 - 5:50 PM



O123 – 270 Park Avenue POPS

As discussed above, in the No-Action condition, the 270 Park Avenue POPS will be built. It was analyzed conservatively, as described above under the No-Action condition section, without any obstruction by the proposed 270 Park Avenue building although it is expected that the building will cantilever over the space to some degree.

The detailed analysis shows that incremental shadows would reach this resource on one analysis day, March/September 21st, for a 12-minute duration between 1:12 PM and 1:24 PM. Sunlight would be eliminated from the resource for 7 minutes from 1:12 PM to 1:19 PM. Shadow from the Proposed Development under the No-Action condition would not reach this resource, but the resource is largely in shadow at this time from other buildings in existing and future no-action conditions. With this very short shadow duration, and the expectation that some of the POPS will be shaded by the 270 Park Avenue building itself, incremental shadows would not be expected to result in a significant adverse impact.

N1 – East River

The East River, a sunlight sensitive natural resource, would receive incremental shadow on the June 21st analysis day for 13 minutes at the end of the day (5:48 PM – 6:01 PM). The river currents move phytoplankton and other natural elements through shaded area, and fish move through different areas of the river. The brief duration of new shadows would not adversely affect the health of the aquatic habitat, and no significant adverse impact would occur.

Conclusion

In conclusion, the Tier 1 through Tier 3 and detailed shadows analysis conducted for the Proposed Project determined that in the With-Action condition, project-generated incremental shadows would reach 15 sunlight sensitive resources, 14 of which are open spaces and one natural resource. The location of incremental shadows in relation to sunlight sensitive features, the duration of incremental shadows, and sunlight conditions throughout the analysis day were considered in determining significance of the project generated shadows.

Overall, the incremental shadows resulting from the Proposed Project would be limited in extent and duration and would typically only occur in one or two analysis days. The short duration of new incremental shadows that would fall on most affected resources would not substantially reduce the quantity of direct sunlight and would not significantly alter the utilization of the resources or the variety of vegetation supported within. The Proposed Action would not result in significant adverse shadows impacts, and no publicly accessible open spaces or historic resources would experience significant adverse shadow impacts as a result of the Proposed Action.