Chapter 8: Open Space and Recreational Resources

8.1 INTRODUCTION

This chapter analyzes the Hudson Tunnel Project's potential effects on publicly accessible parks, open spaces, and recreational resources. For the purposes of this analysis, parks, open space, and recreational facilities include publicly or privately owned land that is publicly accessible for leisure, play, or sport, or serves to protect or enhance the natural environment. This chapter considers the effects to open space and recreational facilities that could occur during the construction of the Preferred Alternative and the permanent effects of the Preferred Alternative once construction is complete.

This chapter contains the following sections:

8.2 ANALYSIS METHODOLOGY

During development of this Environmental Impact Statement (EIS), the Federal Railroad Administration (FRA) and NJ TRANSIT developed methodologies for evaluating the potential effects of the Hudson Tunnel Project in coordination with the Project's Cooperating and Participating Agencies (i.e., agencies with a permitting or review role for the Project). The methodologies used for analysis of open space and recreational resources are summarized in this chapter.

8.2.1 REGULATORY CONTEXT

The FRA's *Procedures for Considering Environmental Impacts*[1] call for evaluation of a project's potential impact on sites devoted to recreational activities, including impacts on non-site-specific activities, such as bicycling, and impacts on non-activity-specific sites such as designated open space.

Parklands are protected under Section 4(f) of the Department of Transportation Act of 1966 (49 USC § 303, as amended), which prohibits the use of land from a publicly owned public park, recreation area, wildlife and/or waterfowl refuge, or any significant historic or archaeological site, as part of a federally funded or approved transportation project, unless certain conditions are met. A Section 4(f) evaluation is provided in Chapter 24, "Draft Section 4(f) Evaluation."

There are similar restrictions on the conversion of land acquired or developed under Section 6(f) of the U.S. Land and Water Conservation Fund Act of 1965 (54 USC § 200301 et seq.) and Section 110 of the Urban Park and Recreation Recovery (UPARR) Act of 1978 (54 USC § 200501 et seq.). However, there are no Section 6(f) or UPARR properties within the Project's study area.

In New Jersey, the New Jersey Department of Environmental Protection (NJDEP) administers the state's Green Acres Program for acquisition and development of parks and natural areas. Once a site has received funding through the program, it may not be disposed of (i.e., sold, donated, exchanged, granted, converted, including by surface or subsurface easements) or diverted to a use other than recreation or conservation without approval by the property owner, NJDEP Commissioner, and the New Jersey State House Commission (NJAC 7:36-25.2). In addition, in municipalities where Green Acres Program funding has been received, any recreation or conservation area or parkland in New Jersey that is encroached on by a project requires approval by NJDEP and the New Jersey State House Commission.

In New York, temporary or long-term use of publicly owned parkland under the jurisdiction of a municipality (i.e., city, county, town, or village) for non-park purposes constitutes alienation, and requires the approval of the New York State Legislature. Parkland "alienation" occurs when a municipality wishes to sell, lease, or discontinue municipal parkland, including subsurface easements beneath parkland. Authorization is required in the form of legislation enacted by the New York State Legislature and approved by the governor. Alienation is not required for State parkland.[2]

Finally, the United States Coast Guard (USCG) will reserve a security zone in all waters within 25 yards of critical Project structures, such as ventilation facilities. At locations where tunnel ventilation facilities are adjacent to parkland, this may require that public access be restricted. However, the Preferred Alternative would not have critical above-ground structures within 25 yards of the water so this does not apply.

8.2.2 ANALYSIS TECHNIQUES

This analysis identifies all publicly accessible open spaces and recreational facilities in the study areas (defined below in Section 8.2.3). For the New Jersey portion of the study area, the inventory of open spaces uses information from the NJDEP Recreation and Open Space Inventory (ROSI) and the State of New Jersey Parcel Database, supplemented by field visits

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1 64 Federal Register 28545, May 26, 1999.

2 New York State Office of Parks, Recreation and Historic Preservation, *Handbook on the Alienation and Conversion of Municipal Parkland in New York*, 2012, p. 20. http://nysparks.com/publications/documents/AlienationHandbook.pdf

conducted in September and October 2016. In New York, the open space inventory uses information from the New York City Department of Parks and Recreation (NYC Parks), Hudson River Park Trust, and Geographic Information Systems (GIS) mapping layers, including GIS data from the New York City Department of City Planning (NYCDCP), supplemented by field visits conducted in November 2016. The analysis also identifies planned future changes to open spaces in the study areas.

This assessment considers the Preferred Alternative's potential effects to open space and recreational facilities, including physical changes resulting from construction of the Preferred Alternative and other activities that might alter the use of an open space so that it no longer serves the same user population, limits public access to an open space, or results in conditions (such as increased noise, air pollutant emissions, odor, or shadows) that would temporarily or permanently affect the usefulness of a public open space.

The analysis of Project components and elements located in New York City complies with the guidance of the 2014 *City Environmental Quality Review (CEQR) Technical Manual*. The *CEQR Technical Manual* was developed by the City of New York specifically for evaluation of the environmental impacts of projects proposed in New York, based on local conditions and issues. These criteria for adverse impacts are well suited for evaluation of effects in New York City and were therefore also used for purposes of NEPA. Under *CEQR Technical Manual* guidelines, environmental review of open spaces typically examines the potential effects of new project-generated shadows on sunlight-sensitive resources, which include publicly accessible open spaces. There is no requirement or guidance for assessing shadows impacts in New Jersey. Consistent with CEQR guidelines, therefore, this chapter includes a discussion of the Project's shadow impacts on nearby park spaces in New York (see Section 8.7.3.2).

8.2.3 STUDY AREAS

The open space assessment considers the area where construction or operation of the Preferred Alternative has the potential to affect open spaces and recreational areas. Based on a consideration of potential impacts of the Preferred Alternative, and consistent with the analysis of land use, zoning, and public policy (see Chapter 6A, "Land Use, Zoning, and Public Policy"), a study area of 500 feet from the Project site was used (see **Figures 8-1 and 8-2**). This study area was adjusted in Weehawken to include the portion of construction truck routes that would use local, non-arterial streets. Consistent with the land use assessment, no study area was included for the rehabilitation work that would occur within the North River Tunnel, since this would occur well below the surface within an existing tunnel and does not have the potential to adversely affect open spaces above. Similarly, once the North River Tunnel has been rehabilitated and trains are operating in the rehabilitated tunnel, there would be no potential for adverse effects to open spaces above, since rail operations would occur below the surface and would not have the potential to affect open spaces above (furthermore, conditions would be similar to existing conditions with respect to rail operations).

8.3 AFFECTED ENVIRONMENT: EXISTING CONDITIONS

8.3.1 NEW JERSEY

Nine parks and recreational resources are located in the New Jersey study area, shown in **Figure 8-1** and listed in **Table 8-1** below. As shown in **Table 8-1**, most of the parks and recreational resources in the New Jersey study area are listed on the NJDEP ROSI, indicating that they were funded through the state's Green Acres Program.

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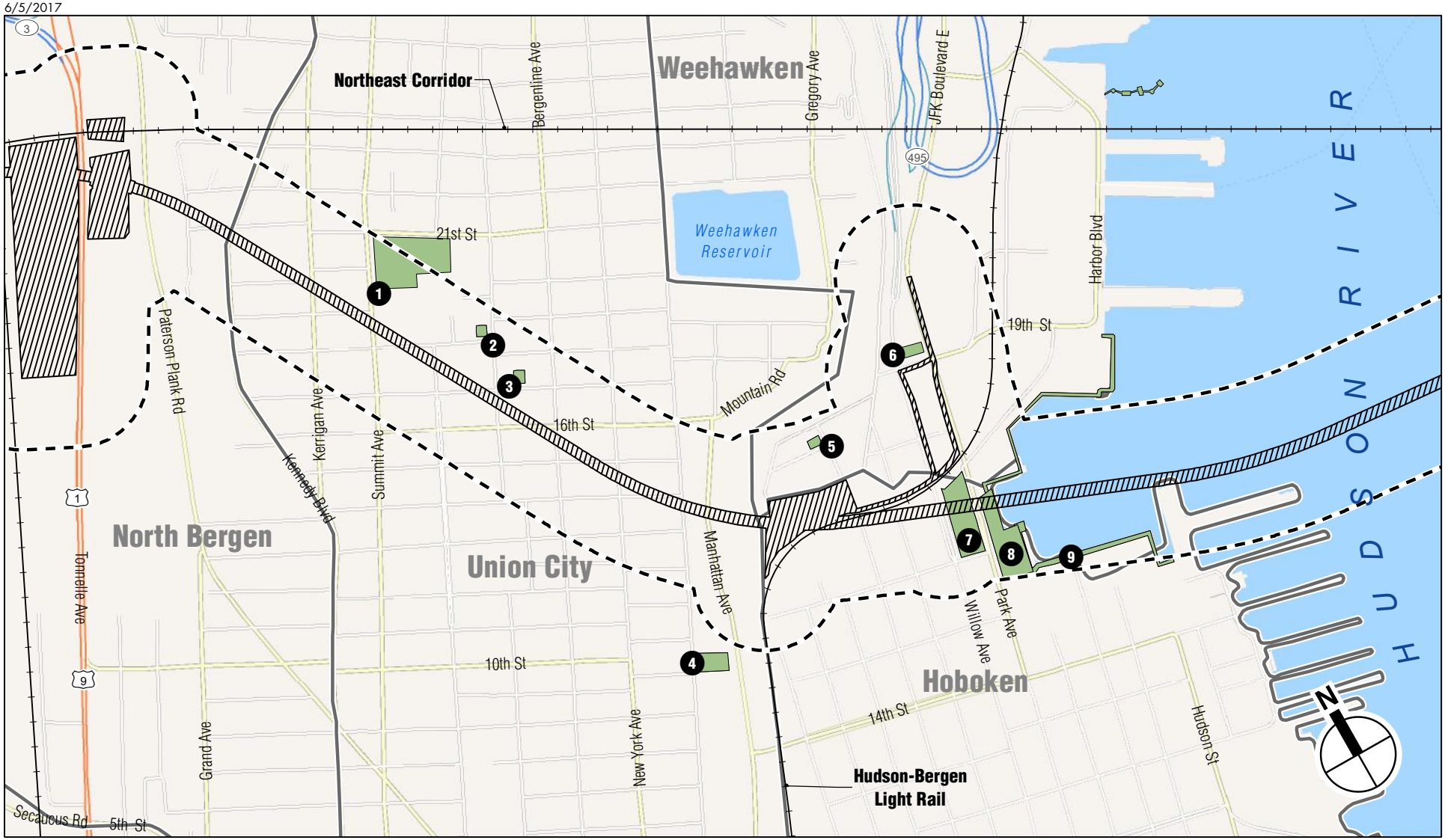


Project Site

Municipal Boundaries

Study Area (500-foot boundary)

Open Space and Outdoor Recreation

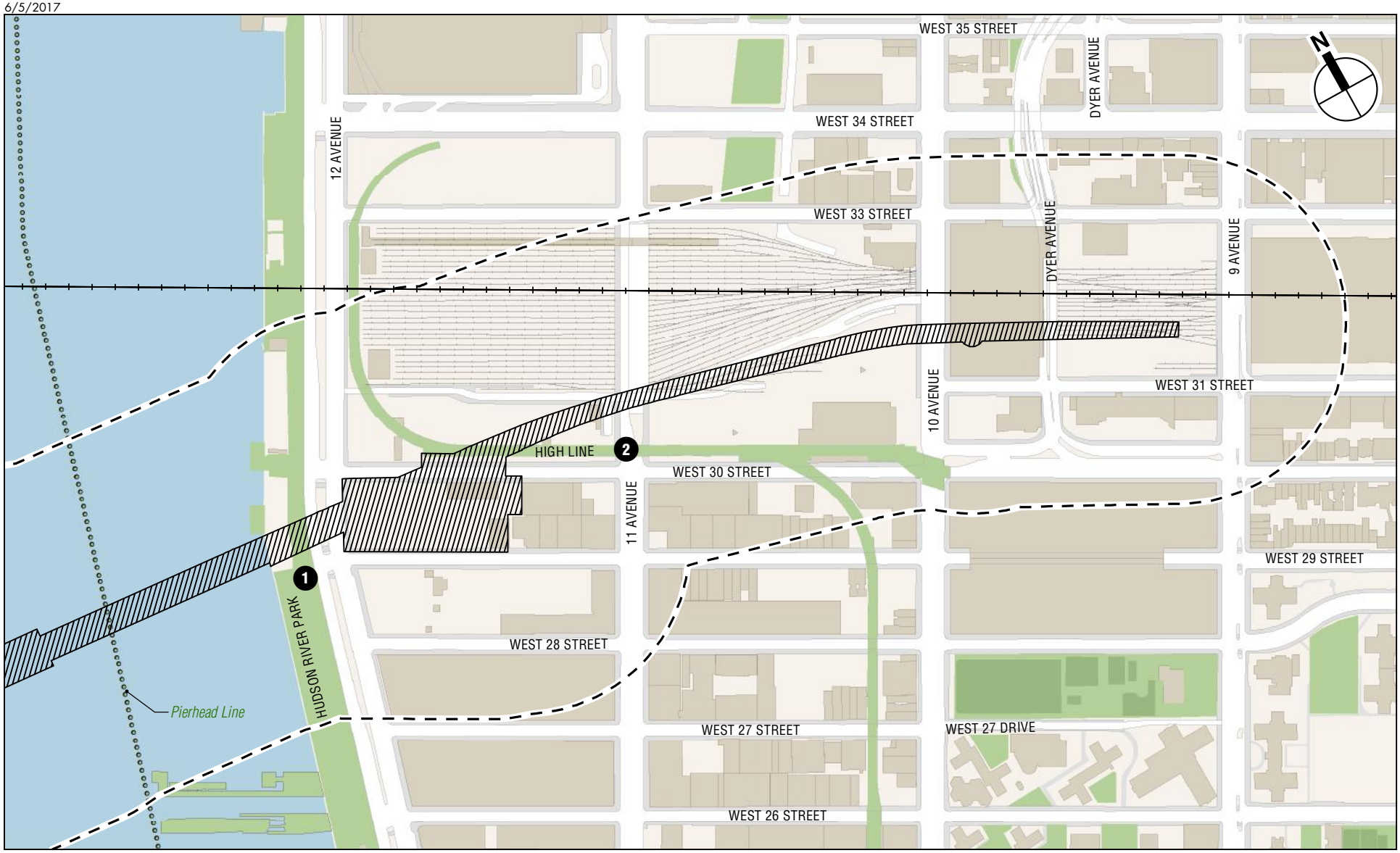
Parks and Recreational Facilities (see Table 8-1)

HUDSON TUNNEL PROJECT

Open Spaces in New Jersey Study Area

Figure 8-1

6/5/2017



Project Site
Study Area (500-foot boundary)
Existing Northeast Corridor
Open Space and Outdoor Recreation (see Table 8-2)
1 *Hudson River Park*
2 *High Line*

0 500 FEET

HUDSON TUNNEL PROJECT

Open Spaces in New York Study Area

Figure 8-2

Table 8-1
Parks and Recreational Facilities in New Jersey Study Area

No.	Park Name and Location	Jurisdiction	Description	Approximate Size
1	Midtown Athletic Complex Jose Marti Freshman Academy 1800 Summit Ave, Union City	Union City Board of Education	Athletic fields for soccer and football, bleachers, athletic facility building; used by leagues and open to the public for recreational use during limited times by permit	3.5 acres
2	Landscaped Area 18th St and West St, Union City	Privately owned	Privately owned landscaped area with path open to the public	0.30 acres
3	Veterans Memorial Park/17th Street Playground* 17th St and West St, Union City	City of Union City	Playground with seating	0.29 acres
4	Firefighters' Memorial Park* 906 Palisade Ave, Union City	City of Union City	Outdoor Olympic-size pool, small children's water park, gazebo, restroom, wide vista toward Manhattan with memorial honoring firefighters who served on 9/11. Park is not open in the winter.	0.45 acres
5	Pizzuta Park* Grand St and Chestnut St, Weehawken	Township of Weehawken	Playground with seating	0.13 acres
6	19th Street Basketball Courts* 19th St at Willow Ave, Weehawken	Township of Weehawken	Handball and basketball courts	0.22 acres
7	1600 Park* 1600 Park Ave, Hoboken	City of Hoboken	Multi-use playing field with baseball, soccer, and lacrosse facilities; also dog run, slide hill, restrooms	2.5 acres
8	Harborside Park/Hoboken Cove Park* 15th St and Park Ave, Hoboken	City of Hoboken	1-acre active park with playground; future improvements planned in additional 3 acres of mapped parkland	1 acre
9	Hudson River Waterfront Walkway*	Adjacent property owners; Hudson River Waterfront Conservancy (non-profit advocacy group) monitors compliance	30-foot-wide waterfront walkway being created along the Hudson River's edge from Bayonne to the George Washington Bridge; part of the East Coast Greenway Trail; fully developed in Project area	18.5 linear miles

Notes: See **Figure 8-1** for locations.
***** Listed on ROSI as park funded through Green Acres Program. www.nj.gov/dep/greenacres/openspace.html.
Source: Approximate size from New Jersey tax assessment database at www.njactb.org.

8.3.1.1 STUDY AREA WEST OF THE PALISADES

No parks or recreational resources are located in the portion of the study area west of the Palisades, including the area along the surface tracks of the Northeast Corridor (NEC) in Secaucus, Jersey City, or North Bergen and the area along Tonnelle Avenue in North Bergen.

8.3.1.2 STUDY AREA ON THE PALISADES

The portion of the study area on the Palisades in Union City includes four open space and recreational resources. The largest of these resources is the Midtown Athletic Complex, a 3.5-acre athletic facility operated by the Union City Board of Education (No. 1 in **Table 8-1** above). This publicly accessible facility is associated with a public school (the José Marti Freshman Academy) and hosts sporting events with playing fields available to the general public during set times by permit. The remaining resources in the Palisades study area are a landscaped area (No. 2 in **Table 8-1**), a small playground (No. 3 in **Table 8-1**), and Firefighters' Memorial Park, a

park along the eastern edge of the Palisades with active recreational features and a viewing area toward the Hudson River and Manhattan (No. 4, in **Table 8-1**). Firefighters' Memorial Park is slightly farther than 500 feet from the Project site's Hoboken fan plant site horizontally and approximately 200 feet higher vertically, but is included in the study area because parkgoers have a direct line of sight to the Hoboken fan plant site from the edge of the park. The park's eastern edge is on a bluff above the land below with wide views of the Hudson River and Manhattan beyond. Views of Hoboken and Weehawken are also available in the foreground below; views to the Hoboken fan plant site are available from the eastern edge of the park behind dense vegetation.

8.3.1.3 STUDY AREA EAST OF THE PALISADES

East of the Palisades, the New Jersey study area includes two recreational resources in the neighborhood near the Hoboken fan plant site: Pizzuta Park, which is a small playground on Grande Street at Chestnut Street within the residential neighborhood known as The Shades, and the 19th Street Basketball Courts, a paved basketball/handball court surrounded on three sides by roadways: Willow Avenue, 19th Street, and Park Avenue/JFK Boulevard East.

The Hoboken portion of the New Jersey study area includes three parks and open spaces near the Hudson River. Two of these, 1600 Park and Harborside/Hoboken Cove Park, have recently been developed across Park Avenue from each other and include a combination of playground areas, landscaping, other active play facilities, and an athletic field. 1600 Park has two components: a slide hill (a constructed hill with a staircase and slide built into it) at its northern end and a playing field for team sports to the south. Across Park Avenue, Harborside/Hoboken Cove Park includes a 1-acre active park space and playground fronting on 15th Street. To the north, approximately 3 acres of Harborside/Hoboken Cove Park is currently undeveloped but planned for future improvement as part of the NJDEP Rebuild By Design project. The Rebuild By Design project proposes to improve this section of Harborside/Hoboken Cove Park with a signature park with playgrounds, lawns, game courts, and a viewing deck (see Section 8.4 below).

In addition, a continuous waterfront walkway runs along the Hoboken and Weehawken riverfront through the study area that is part of the 18.5-mile-long Hudson River Waterfront Walkway being implemented from Bayonne to Fort Lee. Most of the walkway in Weehawken and Hoboken is completed; in the Project area, this linear open space has been completed and runs beside Harborside/Hoboken Cove Park.

8.3.2 HUDSON RIVER

The Hudson River is a recreational resource used by pleasure boaters, including those in motorized and non-motorized boats. It is part of the Hudson River Greenway Water Trail, which includes 256 miles of the Hudson River and its tributaries, and was developed by the Greenway Conservancy, a public benefit corporation that coordinates efforts to promote tourism, strengthen agriculture, and establish a regional Hudson River Valley land and water trail system. The water trail extends from Lake Champlain to Battery Park City in Manhattan. North of New York City, the water trail features kayak and canoe launch points every 10 miles, and campsites every 15 miles. In the vicinity of the Project site, the water trail has boat access points at Pier 84 (44th Street) and Pier 66 (26th Street), part of New York's Hudson River Park (discussed in more detail below in Section 8.3.3). The Hudson River near the Project site is used by recreational boaters, including those operating from the boathouse in Hudson River Park at Pier 66.

In the New York study area, the Hudson River from the shoreline at the Manhattan bulkhead to the pierhead line (approximately 550 feet west of the bulkhead) is part of Hudson River Park. This area is designated as an estuarine sanctuary. Management of the sanctuary is governed in

accordance with the policies and guidance established in the *Hudson River Park Estuarine Sanctuary Management Plan*, which identifies management policies related to resource protection and preservation, public access and recreation, education, and research activities. The preservation objectives focus on controlling the solid waste and water pollution that may result from waterfront activities while improving water quality, aquatics, wildlife habitat, and promoting native species and sustainable design.

8.3.3 NEW YORK

There are two publicly accessible open spaces in the New York study area, Hudson River Park and the High Line (see **Figure 8-2** and **Table 8-2)**. As shown on the figure, both of these parks are linear resources that continue well beyond the study area.

Table 8-2
Parks and Recreational Facilities in New York Study Area

No.	Park Name and Location	Jurisdiction	Description	Approximate Size
1	Hudson River Park	Hudson River Park Trust, a New York State public benefit corporation	4-mile-long waterfront park with bikeway/walkway, esplanade, and landscaped areas	550 acres total; 33 acres in study area
2	High Line	Owned by City of New York and operated by non-profit Friends of the High Line	1.45-mile long walkway and landscaped area on elevated former rail line	2 acres in study area

Note: See **Figure 8-2** for locations.

8.3.3.1 HUDSON RIVER PARK

Hudson River Park is an approximately 550-acre linear waterfront park being developed along New York City's Hudson River waterfront. The park extends approximately four miles, from just north of Chambers Street to West 59th Street, where it connects to Riverside Park South. Hudson River Park is the result of long-term efforts by New York City and New York State to transform the underutilized industrial Hudson River waterfront into a network of open space on upland areas and piers. The park also includes approximately 400 acres of lands under water. The park was established by the Hudson River Park Act of 1998, which identified the boundaries of Hudson River Park, established the Hudson River waters within the park as an estuarine sanctuary, and created the Hudson River Park Trust (HRPT) as a public benefit corporation with the mandate to design, construct, and maintain the park. HRPT is undertaking construction of Hudson River Park incrementally, as funding becomes available, such that the park is now approximately 76 percent complete.

Hudson River Park occupies the area from the pierhead line to the western boundary of Manhattan's waterfront arterial, Route 9A (also known as Twelfth Avenue near the Project site). The Hudson River Park Act establishes the eastern boundary of the park as the western boundary of West Street/Eleventh Avenue/Twelfth Avenue, and when Route 9A is complete, as certified by the commission of the New York State Department of Transportation (NYSDOT), the eastern boundary of the park will be the western boundary of Route 9A. Hudson River Park is being developed in conjunction with the reconstruction of Route 9A into a landscaped urban boulevard, also a long-term project that began construction in 1994. At this time, the commissioner of NYSDOT has not yet certified the long-term reconstruction of Route 9A as complete and therefore the exact location of the boundary between the park and the roadway has not yet been established.

The park includes a waterfront esplanade that runs the length of the park, adjacent to a bikeway that is under the jurisdiction of the New York State Department of Transportation (NYSDOT) as

part of the adjacent Route 9A roadway but is maintained by HRPT. The bikeway is also a component of the Manhattan Waterfront Greenway, an approximately 32-mile-long network of bike paths that circles the island. The bikeway is generally a 16-foot-wide paved route that provides space for non-motorized vehicles (i.e., bicycles, rollererbladers, and skateboarders). Lane markings clearly separate northbound and southbound users. The bikeway is heavily used during weekdays and weekends by recreational riders and commuters, both during the day and at night.

Closer to the water, the park's waterside esplanade provides a safe, segregated alternative for pedestrians and runners, who are not intended users of the bikeway; in places where the permanent walkway has not yet been constructed, an interim walkway provides public access to the waterfront.

In the New York study area, Hudson River Park includes a waterfront esplanade with benches, lawns, and landscaped areas in the area generally between West 26th and 29th Streets, and a plaza with tables and chairs at approximately 29th Street. Near West 26th Street, the park includes two piers, Pier 66A and Pier 66. Pier 66A is the home for two historic ships, the lightship *Frying Pan* and the fireboat *MV John J. Harvey*. Pier 66 has an esplanade extending the length of the pier and a boathouse dedicated to non-motorized recreational boating. The boathouse is operated by New York River Sports, a consortium of several for-profit and non-profit boating organizations that offers kayak trips and lessons, kayak polo games, and outrigger and sailing programs from the boathouse.[3]

The area of the park north of West 29th Street, including the Project site, is not yet completed; plans are dependent on the availability of future funding (see Section 8.4.3 below). Today, this section of the park consists of the bikeway running alongside Route 9A, an interim walkway beside the bikeway, and a commercial heliport that occupies the area west of the walkway to the water's edge within the boundaries of the park. The heliport, the West 30th Street Heliport, is located within the boundaries of the publicly owned park space but is a private commercial business that is not open to the public for recreation. The heliport is located within the boundaries of Hudson River Park along the Project alignment on land that is publicly owned and designated for parkland use. Although within the park boundaries, it is a private commercial operation that is not open to the public for recreation. The heliport has 10 helipads and provides commercial, general aviation, and air taxi services. No tourist flights operate from the West 30th Street Heliport. An amendment to the Hudson River Park Act calls for the relocation of the heliport to a floating structure between West 29th and West 32nd Streets, but the timing of such a relocation is unknown.[4]

In total, approximately 33 acres of the park is located in the New York study area, consisting of approximately 6 acres of land and 27 acres of water or piers.

8.3.3.2 HIGH LINE

The New York study area also includes a portion of the High Line, a 1.45-mile-long linear park being developed on the structure of a former elevated freight rail line. The High Line begins on the south at Gansevoort Street and runs midblock, generally parallel to Tenth Avenue, to West 30th Street, where it turns west and runs parallel to West 30th Street and then curves north and east to bend around the end of the Metropolitan Transportation Authority (MTA) Long Island Rail Road (LIRR) John D. Caemmerer West Side Yard before terminating close to West 34th Street (see **Figure 8-2**). The High Line is owned by the City of New York and maintained, operated,

[3] www.hudsonriverpark.org.

[4] 2013 Amendment to Hudson River Park Act (Chapter 517 of the Laws of 2013), Section 3(m)(v).

and programmed by a non-profit conservancy, Friends of the High Line, in cooperation with NYC Parks.

The High Line consists predominantly of a paved walking area lined with landscaped areas of native plantings evocative of the plants that grew on the abandoned freight right-of-way before it was converted into a park. The entire route is on a steel railroad viaduct approximately 25 to 30 feet above street level that cuts between and through buildings. Access is via staircases and elevators located approximately every few blocks. The High Line is a linear park with a range of different zones that offer a varied experience for visitors, including segments located in narrow corridors between buildings, segments running through buildings, and segments in wide open areas.

As shown in **Figure 8-2**, the High Line's northern segment (near the Project site) runs along Twelfth Avenue and then along the north side of West 30th Street. This part of the High Line is predominantly paved, with limited plantings and some seating areas; an adjacent area of former rail tracks and volunteer vegetation (i.e., vegetation that has not been intentionally planted) between the tracks is intentionally preserved beside the walkway. Since it is currently located higher than the undeveloped Project site on its south and the open rail yard on its north, the High Line today offers wide vistas of Hudson River Park and the Hudson River beyond The walkway near the rail yard north of West 30th Street is an interim walkway pending completion of the Western Rail Yard development, which will integrate the High Line into its open space programming (see Section 8.4.3 below). Larger seating areas are located at wider portions of the High Line along West 30th Street. The area west of Eleventh Avenue is the Pershing Square Beams area, where the concrete deck has been stripped away, exposing the steel framework, which has been turned into a play area. The study area includes three access points to the High Line: an elevator near West 30th Street and Tenth Avenue, a staircase at West 30th Street and Eleventh Avenue, and an accessible entrance on West 34th Street, where the elevated structure slopes down to meet the street level.

8.4 AFFECTED ENVIRONMENT: FUTURE CONDITIONS

This section describes changes to open space resources anticipated or being planned in the Project study area by the analysis year of 2030. This condition is the baseline against which the impacts of both the No Action and Preferred Alternatives are compared.

8.4.1 NEW JERSEY

In the New Jersey study area, NJDEP is proposing improvements at Harborside Park/Cove Park as part of the Rebuild By Design project. As discussed in Chapter 6A, "Land Use, Zoning, and Public Policy," the proposed Rebuild By Design project seeks to reduce frequent flooding in Hoboken due to major storm surges, high tides, and heavy rainfall events. That project proposes numerous green infrastructure elements, such as landscaped berms and levees and bioretention basins, to resist and delay flooding. As part of the Rebuild By Design project, the Harborside Park/Cove Park will be replaced with a new signature park that incorporates "flood resist" structures such as a floodwall. Potential enhancements to the park include playgrounds, lawn areas, game courts, and a viewing deck overlooking Weehawken Cove. [5] In addition, design and landscaping improvements to the Hudson River Walkway are also included in the Rebuild By Design project. Work on the Rebuild By Design project is expected to begin in 2019 and end in 2022.

[5] NJDEP, *Rebuild By Design Hudson River Final Environmental Impact Statement*, June 2017, Chapter 4.8, p. 4-187, available at http://www.nj.gov/dep/floodresilience/rbd-hudsonriver-feis.htm.

In addition, the City of Hoboken is planning additional recreational uses at Hoboken Cove, including a boathouse for kayaking, sailing, and other water uses.

8.4.2 HUDSON RIVER

In the future, recreational use of the Hudson River will continue. Dredging and other activities for maintenance of the channels and near-shore structures will continue. These activities will not adversely affect recreational use of the river.

8.4.3 NEW YORK

In the future, Amtrak will complete the construction of the Hudson Yards Right-of-Way Preservation Project along the southern portion of the West Side Yard, the large LIRR rail storage yard on the blocks between Twelfth and Tenth Avenues from West 30th to West 33rd Street. As discussed in Chapter 4, "Analysis Framework," Section 4.3.3.1, Amtrak is constructing the Hudson Yards Right-of-Way Preservation Project as a separate initiative from the Hudson Tunnel Project to preserve a future location for through rail operations at the West Side Yard, since a large-scale redevelopment, Hudson Yards, is planned on a platform above the West Side Yard. Construction of the segment of the Hudson Yards Right-of-Way Preservation Project that passes beneath the High Line close to West 30th Street will require underpinning the foundations of the High Line to ensure that the park viaduct remains structurally sound.

As discussed in Chapter 6A, "Land Use, Zoning, and Public Policy," substantial new development will occur in the New York study area in the future that will introduce new open space and provide for improvements to existing parks. Above the West Side Yard, the Western Rail Yard and Eastern Rail Yard projects will introduce new open space resources as part of the creation of large-scale developments built on platforms constructed over the railyard. The newly constructed open spaces will include pedestrian paths, plazas, seating areas, lawns, and landscaping totaling approximately 14 acres. Improvements to the High Line will also occur in coordination with the Western Rail Yard development.

In addition, east of Tenth Avenue, another residential development project, Manhattan West, is also being developed on a platform over the tracks below. The Manhattan West project will introduce a central plaza containing an event space as well as pedestrian circulation areas totaling approximately 2 acres.

In addition to the new open spaces introduced by the Western Rail Yard, Eastern Rail Yard, and Manhattan West projects, there will be an addition to the High Line within the New York study area. The only remaining unfinished portion of the High Line is a former rail spur located near the intersection of Tenth Avenue and West 30th Street. This section of the High Line is currently undergoing renovation to incorporate it into the High Line's park area. When completed, improvements to the Tenth Avenue spur will result in approximately 10,000 square feet (0.23 acres) of additional open space area, including an extension of the walkway with seating and landscaping and a piazza spanning Tenth Avenue.

Finally, the New York City Department of City Planning (NYCDCP) is currently evaluating a possible rezoning of the eastern end of the block between West 29th and 30th Streets, Twelfth Avenue, and Eleventh Avenue (Manhattan Block 675, which is the block where the Preferred Alternative's Twelfth Avenue fan plant site is located) to allow high-density mixed-use development near Eleventh Avenue. This proposal is referred to as Block 675 East. If approved, the Block 675 East rezoning will likely result in two new residential towers (with a tower up to 700 feet tall on West 29th Street and a tower approximately 510 feet tall on West 30th Street) with both residential and retail space. As part of the proposal, NYCDCP is evaluating a zoning special permit to allow for the transfer of unused development rights from Hudson River Park to these development sites, which would increase the allowable bulk for the development sites

while providing payments to Hudson River Park. The anticipated funding will allow HRPT to undertake improvements on the segment of the park from West 29th to West 34th Street. Park improvements in this area will require relocation of the West 30th Street Heliport to another suitable location.

8.5 IMPACTS OF NO ACTION ALTERNATIVE

With the No Action Alternative, no new passenger rail tunnel across the Hudson River would be constructed and the North River Tunnel would not be fully rehabilitated. The No Action Alternative assumes that the existing North River Tunnel remains in service, with continued maintenance as necessary to address ongoing deterioration to the extent possible. This alternative would not result in any changes at or near open spaces in the Project study area and therefore would not result in any impacts to open spaces. With the No Action Alternative, the future changes to parks in the open space study area discussed above in Section 8.4 will occur.

8.6 CONSTRUCTION IMPACTS OF THE PREFERRED ALTERNATIVE

8.6.1 OVERVIEW

Potential impacts to parks, open spaces, and recreational resources during construction of the Preferred Alternative are discussed below.

8.6.2 NEW JERSEY

Construction of the Preferred Alternative would not require physical disruption of any parks, open spaces, or recreational resources in the New Jersey study area.

The parks on the Palisades in Union City above the tunnel alignment would be located at least 100 feet above any construction activities for the Preferred Alternative's hard rock tunnel through the Palisades and would be unaffected by construction activities. Moreover, as shown in **Figure 8-1,** the tunnel alignment would not be directly beneath these parks, but slightly to their south (for the Midtown Athletic Complex and 17th Street Playground) or north (for Firefighters' Memorial Park).

Six parks in the New Jersey study area would be located in proximity to the Preferred Alternative's Hoboken construction staging site or local truck routes (see **Figure 8-1**): Firefighters' Memorial Park, Pizzuta Park, the 19th Street Basketball Courts, 1600 Park, Harborside/Hoboken Cove Park, and the Hudson River Waterfront Walkway. At these parks, construction activities at the Hoboken construction staging site would potentially be noticeable, as follows:

- **Firefighters' Memorial Park:** As discussed in Chapter 10, "Visual and Aesthetic Resources," Section 10.6.2, construction staging at the Hoboken staging site may be visible from the edge of this park, which is on a bluff overlooking Hoboken and Weehawken, but in the context of the wide vistas available from this location, the staging site would not be visually intrusive. The park is approximately 500 feet from the Hoboken staging site, the same distance as the noise receptor at 1404 Manhattan Avenue (receptor 2) evaluated in Chapter 12, "Noise and Vibration." Receptor 2 is also on the cliff of the Palisades overlooking the staging site. The noise analysis in Chapter 12, "Noise and Vibration," Section 12.6.2.1.3, concludes that no adverse noise impact would occur at receptor 2, and therefore none would occur at Firefighters' Memorial Park either. Since the construction at

the Hoboken staging site would not result in negative visual effects or disruptive noise at the park, it would not adversely affect recreational uses at the park.

- **Pizzuta Park:** This small playground is within the residential neighborhood near the Hoboken staging site, and is approximately one block (200 feet) from the construction staging site. This park would be separated from the construction area by a block of intervening buildings, which would serve as an effective visual and noise barrier between the park and the construction zone. In addition, as discussed in Chapter 12, "Noise and Vibration," Section 12.6.2.1.3, the Preferred Alternative would include a noise barrier along the northern border of the Hoboken construction staging site, which would effectively buffer the nearby neighborhood from construction noise. With the barrier, adverse noise impacts would not occur to the residences across the street from the staging area; therefore, adverse noise impacts also would not occur to Pizzuta Park, a block farther away. Since the construction at the Hoboken staging site would not result in negative visual effects or disruptive noise at the park, it would not adversely affect recreational uses at the park.
- **19th Street Basketball Courts:** This paved court area fronts on heavily trafficked local streets on three sides, including Willow Avenue, 19th Street, and Park Avenue/JFK Boulevard East. The proposed truck route for construction trucks headed to and from the Hoboken construction staging site would pass the basketball courts on both 19th Street and Park Avenue/JFK Boulevard East. Construction for the Preferred Alternative would add 12 to 24 trucks per hour to these streets for approximately four years. This additional truck traffic would increase noise levels at the park beyond the Federal Transit Administration (FTA) threshold constituting an adverse noise impact (see Chapter 12, "Noise and Vibration," Section 12.6.2.1.3).[6] However, the 19th Street Basketball Courts have active recreational uses, which are normally not noise-sensitive. Moreover, this park is already located at a heavily trafficked intersection, so the additional truck traffic would not change the context or setting of the park. Overall, the additional noise would not disrupt the ability of park users to continue to use this park for active play (basketball and handball).
- **1600 Park:** Construction activities for the Preferred Alternative would occur in close proximity to this park. This would include a construction truck route nearby and pile drilling to support the Willow Avenue viaduct adjacent to the park. At its closest point, the truck route used by construction trucks traveling to and from the Hoboken construction staging site would be located approximately 150 feet from 1600 Park. Trucking activity would be discernible from the northern end of the park (the location of its slide hill), but would not result in noise or visual impacts at the park. In addition, construction activities for the Preferred Alternative would include underpinning of the Willow Avenue viaduct adjacent to this park. The underpinning would include installation of piles, which would be drilled into place rather than driven, to reduce noise levels. As discussed in Chapter 12, "Noise and Vibration," Section 12.6.2.1.3, the pile drilling at the Willow Avenue viaduct would result in noise levels at the park that exceed FTA noise impact thresholds for up to approximately four months, Monday through Friday, 7 AM–10 PM. Given that this park is used for active recreation, which is generally not noise-sensitive, and the relatively short duration of the construction activity, this noise increase would not be an adverse impact. In addition, the construction activity would normally occur only on weekdays, which is typically not the peak period for park use, and the Project Sponsor will coordinate with the City of Hoboken, which

[6] As described in Chapter 12, "Noise and Vibration," the noise analysis for this DEIS was conducted following procedures described in the FTA guidance manual, *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006. The impact thresholds used for the analysis are the thresholds set forth in that document.

is the official with jurisdiction for this park, to coordinate construction activities to avoid disruption to special events in the park.

- **Harborside/Hoboken Cove Park:** Construction activities for the Preferred Alternative would occur in close proximity to this park. This would include a construction truck route approximately 150 feet from the park and pile drilling to support the Willow Avenue viaduct approximately 250 feet from the park. At its closest point (a currently undeveloped stretch of waterfront along Park Avenue that will be developed in the future; the timing for this construction is not known), Harborside/Hoboken Cove Park would be located approximately 150 feet from the truck route used by construction trucks traveling to and from the Hoboken construction staging site. Trucking activity would be discernible from this area of the park, but would not result in noise impacts at the park. Based on the noise analysis presented in Chapter 12, "Noise and Vibration," Section 12.6.2.1.3.1, the truck route would not be close enough to the park to result in noise levels that would exceed the FTA noise impact thresholds at the park. In addition, pile drilling at the Willow Avenue underpinning work area (one block or approximately 250 feet away from the park at its nearest point) would produce noise levels at the park that exceed FTA noise impact thresholds. This would occur for approximately four months, Monday through Friday 7 AM–10 PM. Based on conceptual planning for the Rebuild By Design project, this section of the park will be improved with predominantly active uses in the future. Due to the relatively short duration of the noise exceedance at this future park and its predominantly active planned uses, which are generally not noise-sensitive, this construction noise would not adversely affect recreational use at Harborside/Hoboken Cove Park if the park is completed when construction for the Preferred Alternative occurs (see Chapter 12, "Noise and Vibration," Section 12.6.2.1.3). In addition, the construction activity would normally only occur on weekdays, which is typically not the peak period for park use.
- **Hudson River Waterfront Walkway:** Construction activities for the Preferred Alternative would occur in close proximity to this park. This would include a construction truck route approximately 250 feet from the park at its closest point and pile drilling to support the Willow Avenue viaduct approximately 320 feet from the park. Based on the noise analysis presented in Chapter 12, "Noise and Vibration," Section 12.6.2.1.3.1, the truck route would not be close enough to the park to result in noise levels that would exceed the FTA noise impact thresholds at the park. The pile drilling at Willow Avenue would produce noise levels at the park that exceed FTA noise impact thresholds. This would occur for approximately four months, Monday through Friday, 7 AM–10 PM. Due to the relatively short duration of the noise exceedance at this park and the small section (a few hundred feet) of the 18.5-mile-long walkway affected, the noise impact would not constitute an adverse construction noise impact at this park (see Chapter 12, "Noise and Vibration," Section 12.6.2.1.3). In addition, the construction activity would normally only occur on weekdays, which is typically not the peak period for park use.

In addition, the Preferred Alternative's tunnel alignment would pass directly beneath 1600 Park, Harborside/Hoboken Cove Park, and the Hudson River Waterfront Walkway. Tunneling activities would be approximately 100 feet below the surface in this area. While minor vibration from the tunnel boring machine (TBM) may be discernible for a few days as the TBM passes these parks, this would not be disruptive.

Where the tunnel alignment would pass directly beneath 1600 Park, Harborside Park/Hoboken Cove Park, and the Hudson River Waterfront Walkway, approval of this permanent subsurface easement would be required in accordance with New Jersey's Green Acres Program. This is discussed below in Section 8.7.2.

8.6.3 HUDSON RIVER

Construction of the Preferred Alternative would include in-water construction activities for approximately 15 months. The construction zone would be outside of the pierhead line, which is the boundary of Hudson River Park. As discussed in Chapter 3, "Construction Methods and Activities," Section 3.3.5, the work area within the river would first be enclosed by a cofferdam—a temporary, watertight structure that would isolate the water affected by construction from the surrounding river water. Barges supporting construction equipment would be permanently moored around the cofferdam until the construction in the river is complete. In total, the affected area would be 550 feet long and 120 feet wide, with a buffer zone of 100 feet around the area where barges would be stationed. At its closest point, the barge buffer zone would be 100 feet from the pierhead line, which is the Hudson River Park boundary.

The in-water construction work would occur in three sections to limit the area of the river affected at any one time. In total, in-water construction would last approximately 18 months. Including the buffer zone around the work for barges, the three work zones would be as follows:

- An eastern section approximately 400 feet long (200 feet of ground improvement and 200 feet for barges) by 320 feet wide (120 feet of ground improvement and 200 feet for barges). This section would be in the wing channel approximately 100 feet west of the New York pierhead line. Work here would last approximately 4.5 months.
- A middle section approximately 400 feet long (200 feet of ground improvement and 200 feet for barges) by 320 feet wide (120 feet of ground improvement and 200 feet for barges). This section would be in the wing channel approximately 300 feet west of the New York pierhead line. Work here would last approximately 4.5 months.
- A western section approximately 350 feet long (150 feet of ground improvement and 200 feet for barges) by 320 feet wide (120 feet of ground improvement and 200 feet for barges). This section would be in both the wing channel (50-foot-long ground improvement zone and 100-foot-long barge area) and the main channel (100-foot-long ground improvement zone and 100-foot-long barge area). Work here would last approximately 3.5 months.

Construction for the Preferred Alternative would not affect any other areas of the Hudson River or limit boating activities in any other portion of the river.

Modifications to the river bottom would require a permit from the USACE and must meet conditions imposed by the USACE to protect the navigation channel and maritime safety. The Preferred Alternative would include measures during construction to warn maritime traffic, including recreational boaters, of the construction zone and to ensure the continued safety of boaters. Measures would include notifications to mariners via the USCG, installation of lighting on barges and the cofferdam, and automatic identification system (AIS) transponders affixed to barges and cofferdams to enable electronic locating of the cofferdam and tracking of the barges. These measures will be developed in coordination with the USCG as the design advances. Therefore, there would be minimal, temporary effects on recreational activities on the Hudson River that would not adversely affect the river's quality as a recreational resource during construction.

8.6.4 NEW YORK

Construction activities in New York would result in temporary disruptions at Hudson River Park and the High Line, as discussed below.

8.6.4.1 HUDSON RIVER PARK

Construction activities for the Preferred Alternative would directly affect Hudson River Park. As described in Chapter 3, "Construction Methods and Activities," Section 3.3.6, the tunnel alignment from the New York Hudson River bulkhead to the Twelfth Avenue shaft would be subject to ground freezing with some cement grouting at the bulkhead and other locations. This construction method would allow below-grade tunneling here, which would avoid the potential for construction disruption that would otherwise be associated with cut-and-cover excavation of the tunnel segment from the water's edge to the Twelfth Avenue shaft site.

As described in Chapter 3, "Construction Methods and Activities," Section 3.3.6, ground freezing involves installation of a network of underground pipes and the circulation of a cold liquid (calcium chloride brine) through the pipe network until the ground around the pipes freezes solid. The freeze and grout pipes would be installed in a grid pattern from the surface. Pipes can be installed vertically and diagonally to minimize disturbance at the surface from pipe installation.

The freeze pipes would be installed in limited locations to limit disruption to Hudson River Park and the adjacent bikeway. Ground freezing pipes would be installed predominantly from the eastern sidewalk, eastern parking lane, and median of Route 9A and the West 30th Street Heliport area within Hudson River Park. A narrow area of the Hudson River Park walkway (about half the width of the walkway, an area about 10 feet wide about 150 feet long, or 1,500 square feet) would be used for installation of the freeze pipes. A small area near the walkway could also be affected. The walkway would remain open during this time, with a minimum width of approximately 8 feet through the construction zone.

The bikeway would not be affected by installation of the freeze pipes, except for a potential short-term closure (up to several days) for trenching of freeze pipes across the bikeway; any trench would be immediately decked over and the bikeway reopened. The freeze pipes installed to treat this area would be installed from locations to the east or west of the bikeway at an angle to pass beneath the bikeway.

During the five-month period when the equipment is being installed, the 1,500-square-foot walkway area in Hudson River Park would be closed to the public. Following installation, the freezing and tunneling would occur over an approximately nine-month period, during which the park could remain in normal use. The freeze pipes would be below ground and covered with steel plates so the covered area could be returned to park use, although there could be intermittent closures to access the pipes. Once the tunneling is complete, the same walkway area would be closed for a final four-month period to remove the equipment and restore the areas. Therefore, the total amount of time that the 1,500-square-foot walkway area would be closed would be nine months. The other half of the walkway would remain open.

All of the areas disturbed by the freeze pipe installation would be restored after the freezing operation is completed and the tunnel segment has been excavated throughout this area.

In addition to the ground freezing, below-ground obstructions present in the bikeway would be removed prior to tunneling. Specifically, piles that formerly supported the viaduct that carried the West Side Highway may remain buried in this area, primarily beneath the southbound lanes of Twelfth Avenue and beneath the Route 9A bikeway. The piles would be removed by a pile extractor working from the surface of Twelfth Avenue. An MPT plan would be followed to minimize disruption traffic. Alternatively, the piles could be cut and removed manually from within the tunnel as it is excavated.

During the full 18 months of the ground freezing operation, equipment would be located within the southern end of the West 30th Street Heliport to support the freezing. This construction equipment would be visible to people in nearby areas of Hudson River Park. Construction

barricades would be installed to block views of the construction zone for park users. Following completion of the construction, the Project Sponsor will restore the affected area of Hudson River Park in coordination with HRPT.

As noted earlier in Section 8.4.3, HRPT is planning improvements to the segment of Hudson River Park between West 29th and West 34th Street. The construction activities for the Preferred Alternative that occupy park space could delay construction of park improvements in this section of the park.

In addition to this direct effect to Hudson River Park, construction activities associated with the Preferred Alternative occurring at other nearby locations would result in temporary, minor impacts at the park. This would include the in-water construction that would occur approximately 700 feet from the shoreline for approximately 15 months, construction staging activities on the Twelfth Avenue staging site for approximately seven years, the presence of a construction truck route on Twelfth Avenue for approximately seven years, cut-and-cover construction in West 30th Street for approximately two years, and pile driving in the Twelfth Avenue shaft for approximately five months and in West 30th Street for seven months.

As noted above in Section 8.6.3, measures would be taken during construction to warn maritime traffic, including recreational boaters such as those operating from the boathouse at Pier 66, of the construction zone and to ensure the continued safety of boaters. Additionally, when the Twelfth Avenue shaft site is used as a staging site for surface construction activities, a temporary barrier along the site's western edge would be used to buffer the park from construction noise and views of construction equipment. Taller equipment would be visible above the wall, as would the fan plant structure as it is erected. Overall, construction activities may result in an adverse visual impact but this effect would be temporary.

Construction at the Manhattan waterfront and Twelfth Avenue shaft site would produce noise levels at Hudson River Park that would be noticeable and audible, but would be below the FTA noise impact criteria (see Chapter 12, "Noise and Vibration," Section 12.6.3.1.1). Construction noise at this location would not affect Hudson River Park visitors' ability to utilize or enjoy the park. Moreover, extensive construction has been occurring across Route 9A from the park in many locations, and the park is located on a busy and noisy traffic arterial; therefore, additional construction activities associated with the Preferred Alternative would not change the character or usefulness of the park's recreational resources.

The proposed rezoning of Block 675 would allow for the transfer of unused development rights from Hudson River Park to development sites on that block. Sale of these development rights would fund upgrades at Hudson River Park. Use of portions of Block 675, Lots 1 and 12 for construction staging for the Preferred Alternative could delay future transfer of development rights to those sites, which would delay upgrades to Hudson River Park that would be funded by such transfers.

8.6.4.2 HIGH LINE

No physical disruption to the High Line would occur during construction of the Preferred Alternative. The new tunnel route would pass beneath the High Line within the concrete casing currently being constructed along the south side of the West Side Yard by the Hudson Yards Right-of-Way Preservation Project, a separate project from the Preferred Alternative. All Project-related construction activities beneath the High Line would occur entirely within the concrete tunnel structure.

The Preferred Alternative's construction would include construction activities in close proximity close to the High Line. This would include construction staging activities on the Twelfth Avenue staging site for approximately seven years, the presence of a construction truck route on Twelfth

Avenue for approximately seven years, cut-and-cover construction in West 30th Street for approximately two years, and pile driving in the Twelfth Avenue shaft for approximately five months and in West 30th Street for seven months.

These construction activities would be noticeable at the High Line and could be temporarily disruptive to people on the High Line. In the future, in the same period while the Preferred Alternative is under construction, extensive construction will also be occurring in the surrounding area. With the Preferred Alternative, a noise wall would surround the Twelfth Avenue staging site, which would also serve to block views into the site. Taller equipment would be visible above the wall, as would the fan plant structure as it is erected. People on the High Line would have views over the wall into the site. Overall, construction activities may result in an adverse visual impact but this effect would be temporary.

As discussed in Chapter 12, "Noise and Vibration," Section 12.6.3.1.1, the portion of the High Line that runs along West 30th Street would have noise levels that exceed the FTA noise impact criteria when pile driving is occurring (a total of up to 12 months, including 5 months at the Twelfth Avenue shaft and 7 months during the cut-and-cover work on West 30th Street). During this 12-month period, construction noise would potentially disrupt any passive recreation that occurs on the High Line along its West 30th Street segment, such as at the seating areas. When pile driving is not occurring, construction noise at this location would be audible and noticeable, but it would not exceed the FTA construction noise impact thresholds.

The High Line is a 1.45-mile-long linear park with a range of different zones that offer a varied experience for visitors. While construction activity for the Preferred Alternative would result in noise increase that exceed FTA's noise impact thresholds for up to a year, this would affect only about 800 linear feet of the High Line, leaving the rest of this long park available for recreation without increased noise. In addition, construction would normally not occur on weekends, which is the time when the High Line has the greatest demand. Overall, therefore, construction activities for the Preferred Alternative would not result in an adverse impact on recreational use on the High Line.

The western half of West 30th Street may also be closed to facilitate construction of the Preferred Alternative. This would not affect the access points to the High Line at Tenth and Eleventh Avenues.

8.7 PERMANENT IMPACTS OF THE PREFERRED ALTERNATIVE

8.7.1 OVERVIEW

Once construction of the Preferred Alternative is complete, the parks, recreational resources, and open spaces in the study area would remain unchanged (any areas that would be altered as part of the Preferred Alternative's construction would be restored to their pre-construction condition). The Preferred Alternative's potential effects on those resources are discussed below.

8.7.2 NEW JERSEY

8.7.2.1 EFFECTS ON OPEN SPACE

Operation of Preferred Alternative's new rail tunnel beneath the study area would not affect the public's use and enjoyment of parks in the study area. The new tunnel would be deep below the parks and rail operations would not be discernible.

8.7.2.2 GREEN ACRES PROGRAM APPROVALS

The Preferred Alternative's tunnel alignment would pass directly beneath three open spaces that are part of NJDEP's Green Acres Program: 1600 Park, Harborside/Hoboken Cove Park, and the Hudson River Waterfront Walkway. No surface work would be undertaken at these parks, however, subsurface easements must be obtained from the City of Hoboken for the subsurface tunnel construction, and approval of the subsurface easements must be obtained in accordance with the Green Acres Program.

The Project Sponsor would coordination with the NJDEP Green Acres Program during final design of the Preferred Alternative to initiate the Green Acres Program approval process. After the public has been given the opportunity to comment through a public hearing, Green Acres representatives must make a recommendation to the Commissioner of the NJDEP and the New Jersey State House Commission for their approval of the disposal/diversion of use, including proposed compensation for the easements. The acquisition of the easements would not have an impact on the public's access to or use of these parks.

The NJDEP Commissioner and State House Commission must find that the disposal or diversion of parkland is for a project that would fulfill a compelling public need and yield a significant public benefit. The diversion of parkland must be compensated with eligible replacement land, parkland improvements, or monetary compensation.

Once a site has received funding through the Green Acres Program, it may not be disposed of (i.e., sold, donated, exchanged, granted, converted, including by surface or subsurface easements) or diverted to a use other than recreation or conservation without approval by the property owner, NJDEP Commissioner, and the New Jersey State House Commission.[7] Diversions of parkland from recreational purposes include, but are not limited to, "bridges; through roads or other transportation improvements; rights-of-way; public or private utility or other non-recreation easements (surface or subsurface)."

8.7.2.3 HUDSON RIVER

Once the Preferred Alternative is complete, the new tunnel would not affect recreational activities on the river, as the tunnel would be located underneath the river and there would be no activities that would affect recreational boaters or other recreational users on the river's surface.

8.7.3 NEW YORK

8.7.3.1 EFFECTS ON OPEN SPACE

The Preferred Alternative's Twelfth Avenue fan plant would be located across Twelfth Avenue from Hudson River Park and across West 30th Street from the High Line. This new structure, with a height that may potentially be up to approximately than 150 feet (equivalent to a 15-story building), would change the appearance of the site. However, the area around the Twelfth Avenue fan plant is currently undergoing substantial redevelopment and by 2030, when the Preferred Alternative would be complete, the block where the fan plant site is located (Block 675) will be developed with two tall towers at Eleventh Avenue. On the large blocks to the north between Tenth and Twelfth Avenues, many high-rise buildings and mid- to low-rise buildings will be present. A high-rise commercial building may also be developed on the same lot as the fan plant. Overall, this area of the Far West Side will be transformed into a densely developed neighborhood of large and bulky buildings. The Twelfth Avenue fan plant would be similar in bulk and height to many of the mid-rise buildings that will be present in the surrounding area and

[7] NJAC 7:36-25.2.

much shorter than the high-rise buildings that will be located on the same block and on the blocks to the north.

8.7.3.2 SHADOWS

New York City's *CEQR Technical Manual* calls for analysis of shadows for new structures higher than 50 feet that are being reviewed in the CEQR process, or of any height if adjacent to a sunlight-sensitive resource. As noted above, depending on the final configuration and massing of the Twelfth Avenue fan plant, this building may be up to approximately 150 feet tall.

The CEQR methodology calls for identifying parks, natural resources, and sun-sensitive features of historic resources (such as stained glass windows) that may be affected by shadows from the new building being analyzed and provides a recommended methodology for determining the area where a proposed new building's shadows may fall and for how long they would fall. Therefore, in accordance with New York City CEQR procedures, an analysis was prepared following the guidelines of the 2014 *CEQR Technical Manual* (see **Figures 8-3 through 8-8** and **Appendix 8**).

The analysis begins with a two-step screening evaluation (see **Figure 8-3**):

- Tier 1, in which the longest the longest shadow that a proposed structure could cast is calculated, and, using this length as the radius, a perimeter is drawn around the project site. This perimeter is used to identify whether any open spaces are present in the area where new shadows may be cast.
- Tier 2 identifies the area within the Tier 1 perimeter in which shadows can never be cast be a project, because of the path that the sun travels across the sky in New York City.

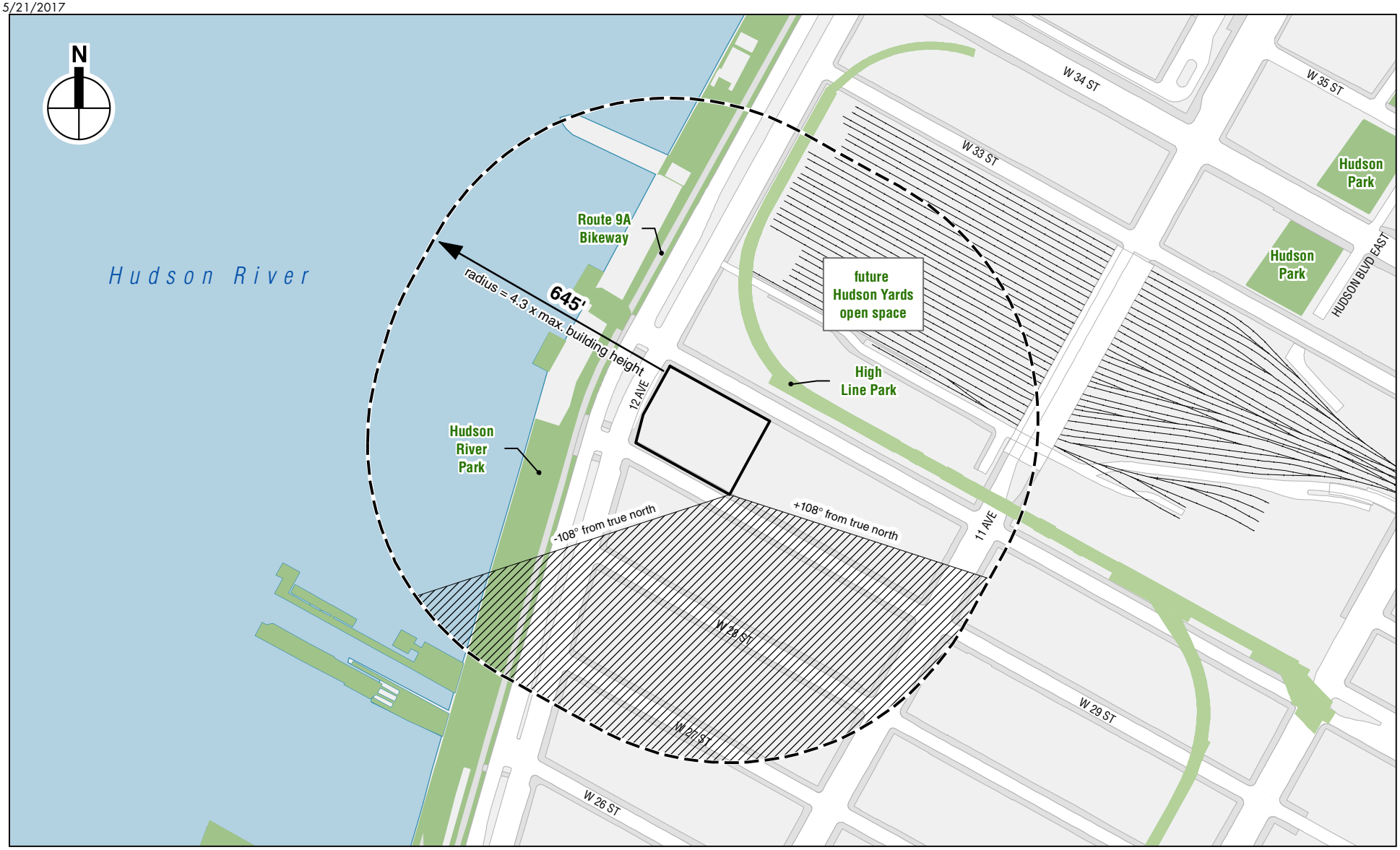
Based on those two steps, a detailed shadow analysis was conducted for the Hudson River Park, the Route 9A bikeway, and the High Line using a three-dimensional model.

Shadows can be cast to the west (in the morning), to the north (in the midday), and to the east (in the late afternoon). For the Preferred Alternative, shadows from the fan plant would fall on Hudson River Park including the waters of the Hudson River, the Route 9A bikeway, and the High Line, since these are located within the area where the Twelfth Avenue fan plant's shadows would be cast. In addition, depending on the final site plan for new development that will be built as part of the Western Rail Yard development north of West 30th Street between Eleventh and Twelfth Avenues, the fan plant may also cast shadows onto new parks within that development, if they are not already shaded by the development's own buildings.

The Twelfth Avenue fan plant site is currently vacant and therefore no shadows fall on the Hudson River Park, Hudson River, the Route 9A bikeway, or the High Line from the site. If the new fan plant is 150 feet tall, these shadows would be cast on these spaces all year long. In the morning, shadows would fall on the river and Hudson River Park, and in the midday and late afternoon, on the High Line. The analysis considered two potential locations for a Twelfth Avenue fan plant: a northwest location, in which the fan plant would be located at the corner of Twelfth Avenue and West 30th Street, and a West 29th Street location, in which the fan plant would be located on West 29th Street east of Twelfth Avenue. While the fan plant ultimately may be in a different location on the block, these two locations represent a range of reasonable worst-case conditions in terms of potential shadows impacts. The analysis also assumed the fan plant is 150 feet tall.

Incremental new shadows from the Twelfth Avenue fan plant would fall on of Hudson River Park, the Hudson River, the Route 9A bikeway, and the High Line in the immediate vicinity of the Project site, but would not change the overall character or recreational quality of these

5/21/2017



Area Containing Potential Locations of Fan Plant Building

Tier 1: Longest Shadow Study Area Boundary

Tier 2: Area South of Site that Could Never be Shaded by Proposed Building

Publicly-Accessible Open Space

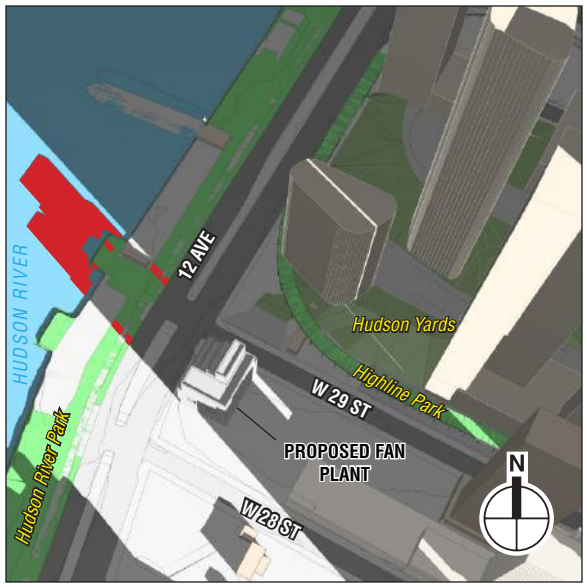
Historic Resources with Sunlight-Sensitive Features (none located in map extent)

HUDSON TUNNEL PROJECT

Shadows - Tier 1 and Tier 2 Assessments

Figure 8-3

6.8.17



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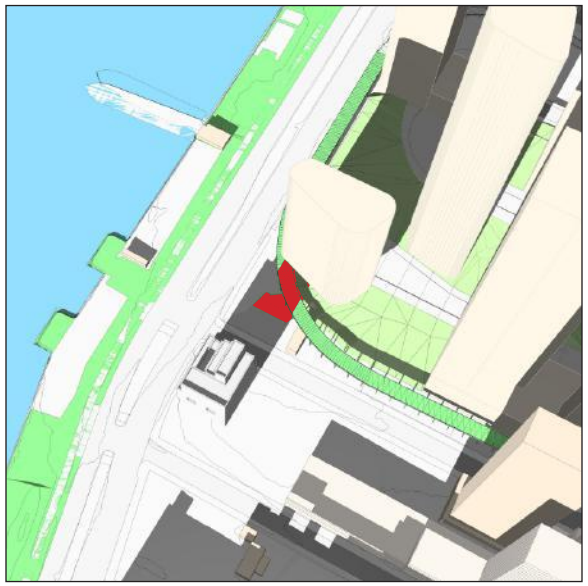

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Incremental Shadow *Publicly Accessible Open Space*

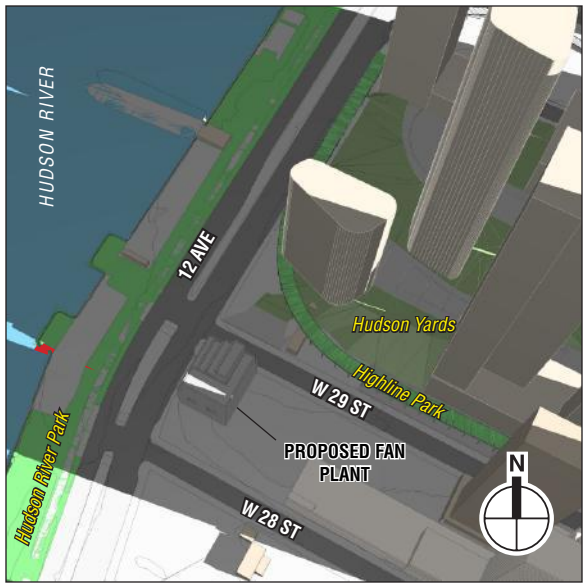
Note: All Times are Eastern Standard Time

HUDSON TUNNEL PROJECT

Northwest Location - December 21

Figure 8-4

6.8.17



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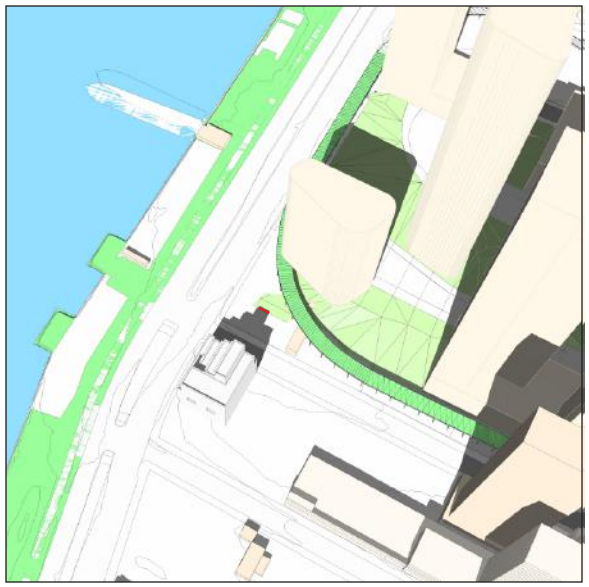

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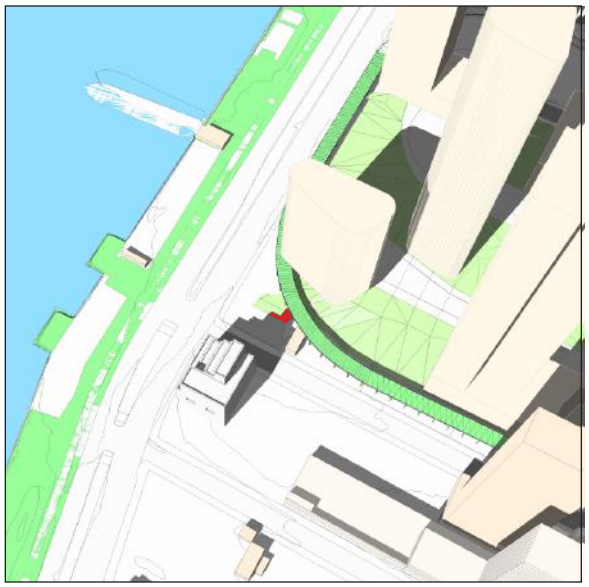

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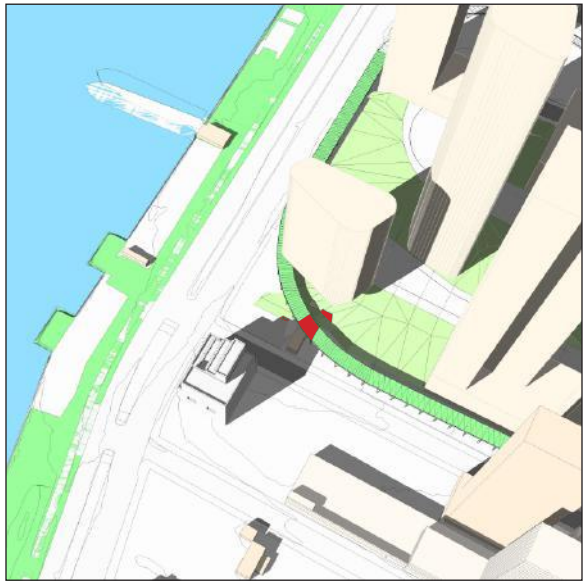

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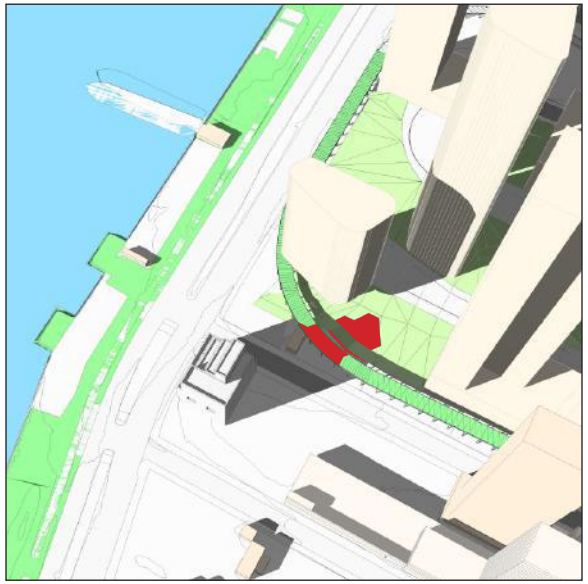

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Incremental Shadow

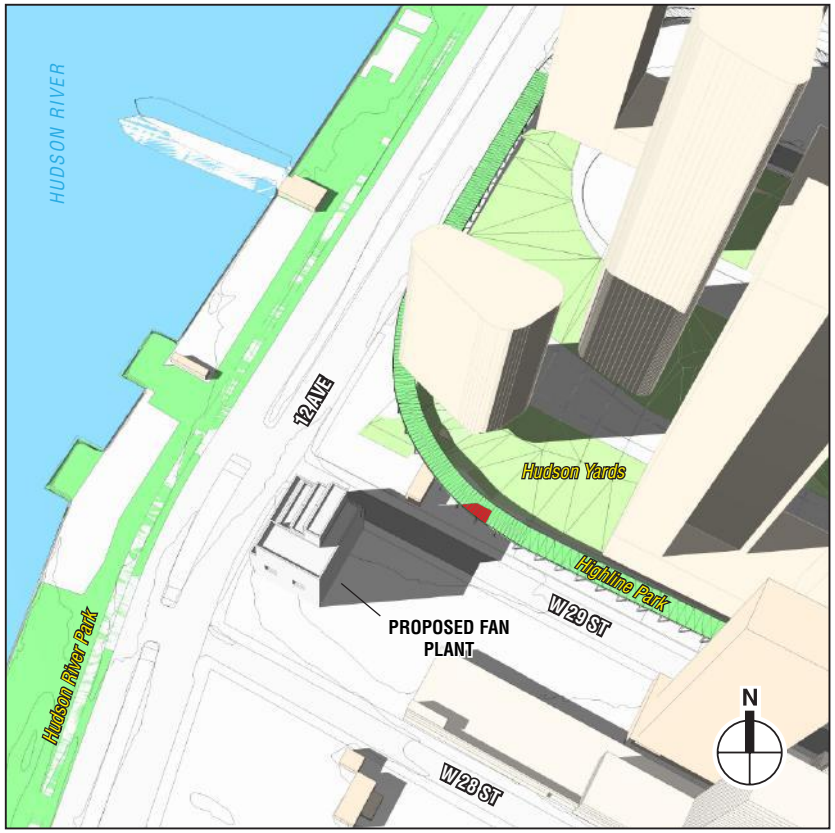
Publicly Accessible Open Space

Note: All Times are Eastern Standard Time

HUDSON TUNNEL PROJECT

Northwest Location -
March 21 / September 21

Figure 8-5



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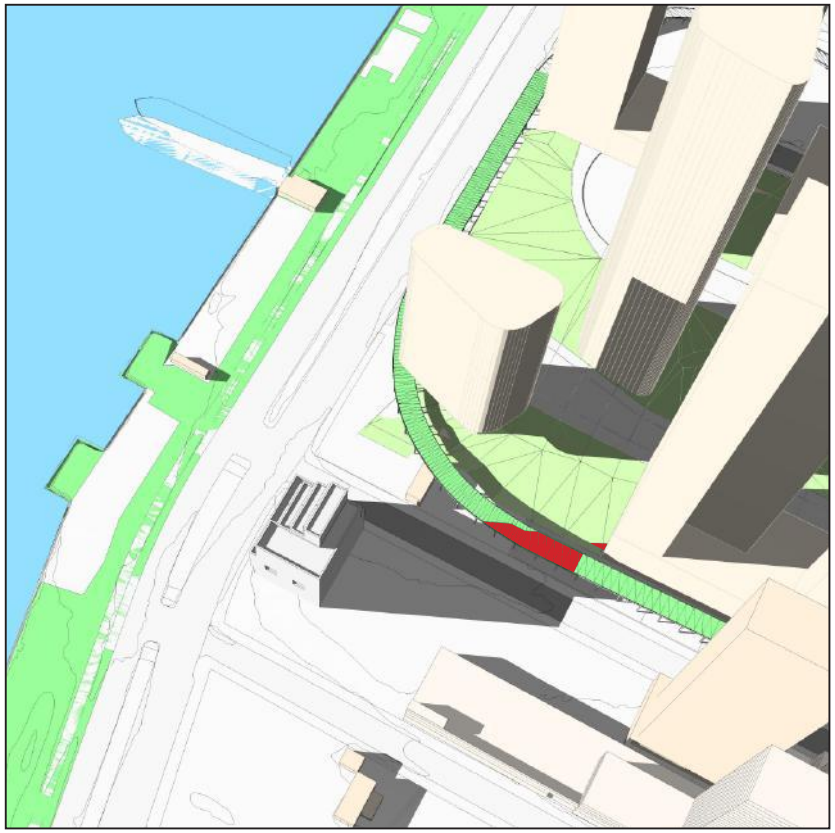

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Incremental Shadow

Publicly Accessible Open Space

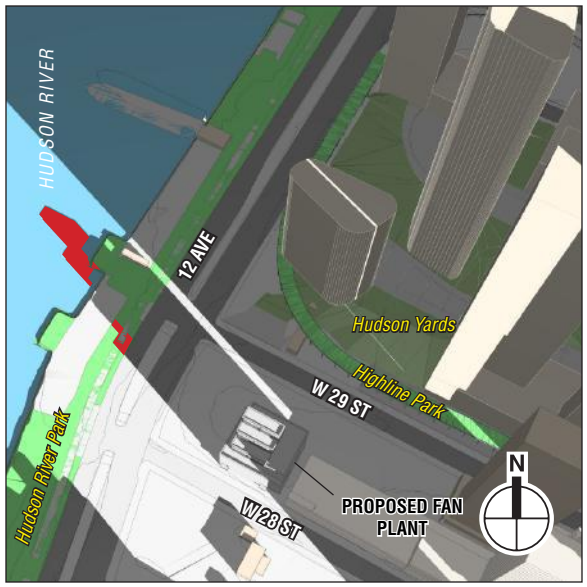
Note: All Times are Eastern Standard Time

HUDSON TUNNEL PROJECT

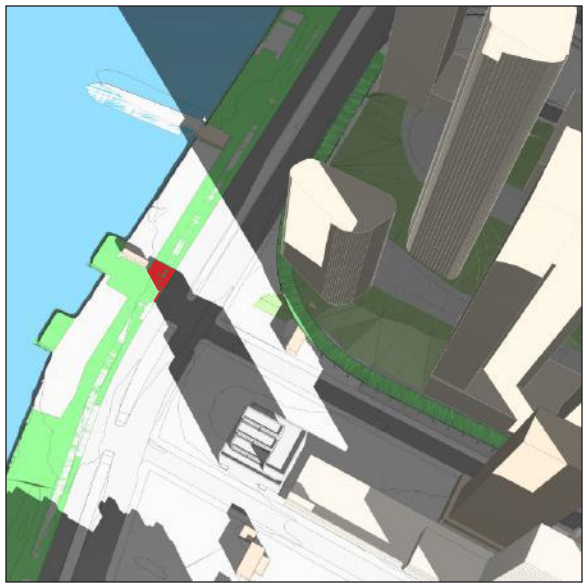
Northwest Location - May 6 / August 6

Figure 8-6

6.8.17



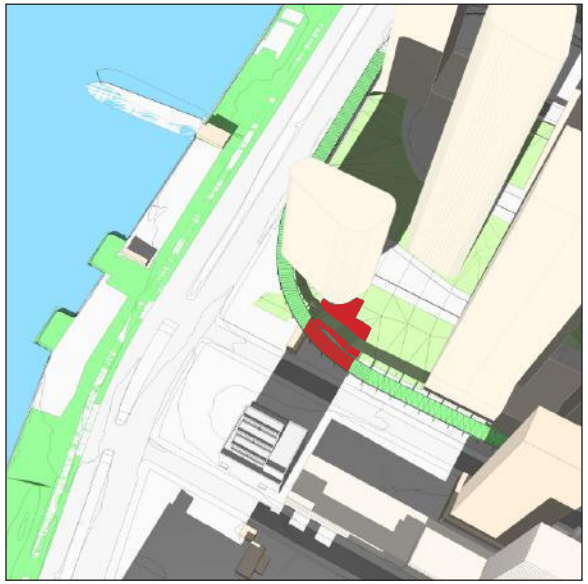
9:00 AM



10:00 AM

12:00 PM

1:00 PM



2:00 PM

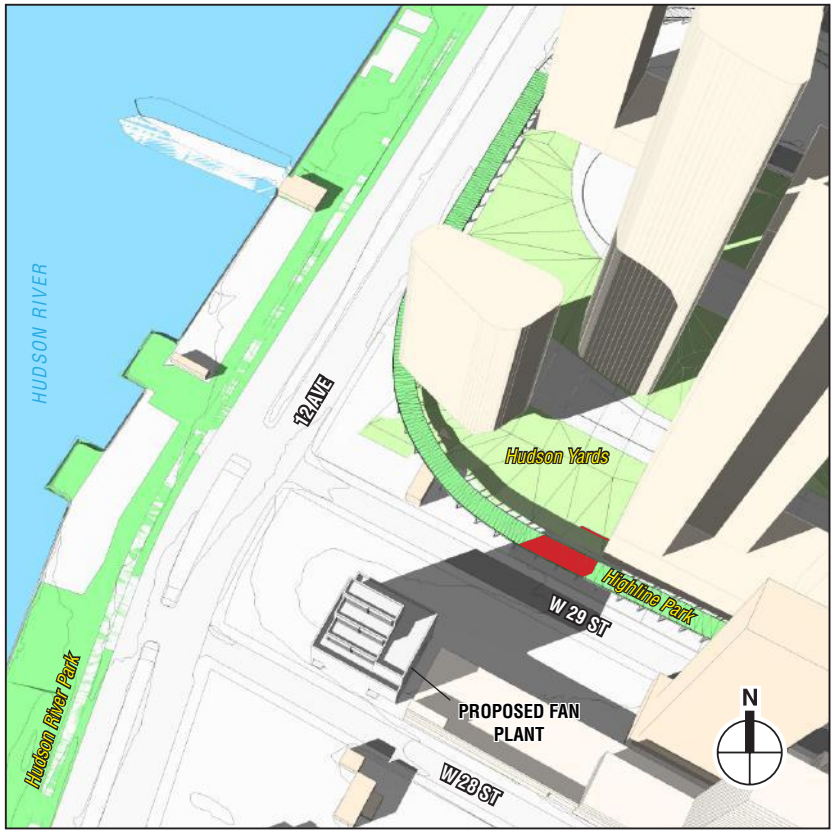
Incremental Shadow *Publicly Accessible Open Space*

Note: All Times are Eastern Standard Time

HUDSON TUNNEL PROJECT

West 29th Street Location - December 21

Figure 8-7



4:00 PM

Incremental Shadow

Publicly Accessible Open Space

Note: All Times are Eastern Standard Time

West 29th Street Location - March 21/ September 21

Figure 8-8

recreational resources. Based on the shadows analysis provided in **Appendix 8** and illustrated in **Figures 8-4 through 8-8**, minor incremental shadows on these parks would be as follows:

- Small incremental shadows would fall on the Hudson River Park walkway, waters of the Hudson River, and Route 9A bikeway on winter and early spring and fall mornings. The shadow would be larger with a fan plant at the northwest location, but in either location the incremental shadows would be relatively small. This area of the park would receive many hours of direct sunlight through the midday and afternoon hours.
- Incremental shadow would move across portions of the High Line for nearly two hours in the fall, winter and early spring, and an hour and a half on the May 6 / August 6 analysis day. The extent of new shadow would be small and it would move over the course of the duration, affecting different plantings and amenities at different times. All the affected areas would receive four hours or more of direct sunlight over the course of the day throughout the growing season, so the health of the plantings would not be significantly affected. Large adjacent areas of the High Line would be in sun at the times when incremental shadow would occur, for users seeking sunlight. Therefore, the new shadow would not cause significant adverse shadow impacts to this resource.

The analysis of historic resources provided in Chapter 9, "Historic and Archaeological Resources," did not identify any historic resources with sunlight-dependent features that may be affected by shadows from the fan plant.

8.7.3.3 APPROVALS

The Preferred Alternative would not require any use of publicly owned parkland under the jurisdiction of the local municipality (i.e., parkland controlled by the City of New York) that would constitute parkland alienation. The tunnel alignment under Hudson River Park may require modification to the Hudson River Park Act, the legislation that created the park, to allow the easement beneath the park.

8.8 MEASURES TO AVOID, MINIMIZE, AND MITIGATE IMPACTS

The Project Sponsor will implement a number of measures to avoid or minimize adverse impacts on nearby open spaces resulting from the Preferred Alternative. These will include the following:

- In Hoboken, the Willow Avenue underpinning will involve drilled pile installation rather than the use of impact pile drivers, reducing construction-period noise levels at 1600 Park, Harborside/Hoboken Cove Park, and Hudson River Waterfront Walkway.
- The Project Sponsor will coordinate with the City of Hoboken to coordinate construction activities to avoid disruption to special events in 1600 Park.
- During the in-water construction for the Project in the Hudson River, measures will be taken during construction to warn maritime traffic, including recreational boaters, of the construction zone and to ensure the continued safety of boaters (e.g., installation of lighting on barges and the cofferdam (see Chapter 3, "Construction Methods and Activities," Section 3.3.5.5, for more details).
- In New York, tunnel excavation from the bulkhead to the Twelfth Avenue shaft site will be conducted below ground, with ground improvement such as ground freezing to prepare the area. This will avoid the need for excavation across Hudson River Park.
- During construction in and under Hudson River Park, a minimum 8-foot-wide segment of the Hudson River Park walkway will be maintained open and the bikeway will remain open (except possibly for short-term trenching for installation of freeze pipes).

- During the ground freezing operation, construction barricades will be installed to block views of the construction zone within the West 30th Street Heliport for park users.
- Following completion of the construction, the Project Sponsor will restore the affected area of Hudson River Park in coordination with HRPT.
- Mitigation measures will be used to reduce noise levels at construction sites, which will also reduce disruption to recreational users at nearby parks, as discussed in Chapter 12, "Noise and Vibration," Section 12.9. ✷