

20.1 INTRODUCTION

This chapter of the Environmental Impact Statement (EIS) presents the conclusions of the Federal Railroad Administration (FRA) and the New Jersey Transit Corporation (NJ TRANSIT) with respect to the indirect effects of the Hudson Tunnel Project as well as the Project's cumulative effects when considered in combination with other projects that are currently ongoing or reasonably foreseeable in the Project area. The consideration of cumulative effects in this chapter also includes consideration of the Hudson Tunnel Project's relationship to future proposed long-term plans for increasing rail service capacity on the Northeast Corridor (NEC) between Newark, New Jersey and Penn Station New York (PSNY). The Port Authority of New York and New Jersey (PANYNJ), in its role as Project Sponsor, has accepted and relied on the evaluations and conclusions of this chapter.

This chapter reflects the following changes made since the Draft EIS (DEIS) for the Hudson Tunnel Project:

- The chapter incorporates design modifications related to the permanent features of the Project (e.g., modifications to surface tracks and tunnel alignment) and changes to construction methods and staging.
- The chapter is updated to describe current conditions in the existing and future affected environment and any related updates to the analysis of potential impacts.
- The chapter incorporates the revised conclusions presented in the other chapters of this EIS.
- An expanded discussion of the Project's relationship to future proposed capacity enhancement projects on the NEC is provided.

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20.2 ANALYSIS METHODOLOGY

During development of this EIS, the 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 indirect and cumulative effects are summarized in this chapter.

Following completion of the DEIS) the PANYNJ became the Project Sponsor for the Hudson Tunnel Project (see Chapter 1, "Purpose and Need," Section 1.1.2, for more information). Consistent with the roles and responsibilities defined in Section 1.1.1 of that chapter, as the current Project Sponsor, the PANYNJ will comply with mitigation measures and commitments identified in the Record of Decision (ROD).

20.2.1 REGULATORY CONTEXT

The Council on Environmental Quality's (CEQ) regulations implementing the National Environmental Policy Act (NEPA), set forth in 40 CFR Parts 1500-1508¹, that FRA followed in preparing this EIS require Federal agencies to consider the potential for indirect and cumulative effects from a project.

As defined in the applicable CEQ regulations, indirect effects are those that are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR § 1508.8(b)). By comparison, direct effects are "caused by the action and occur at the same time and place" (40 CFR § 1508.8(a)). Indirect effects can occur in any of the analysis areas evaluated in an EIS, such as changes in land use, economic vitality, neighborhood character, traffic congestion, air quality, noise, vibration, and water and natural resources. For example, transportation projects that provide new service to a neighborhood may result in indirect effects by inducing new growth in that neighborhood, leading to increased rents.

Cumulative impacts result from the incremental consequences of an action when added to other past, present, and reasonably foreseeable future actions (40 CFR § 1508.7). The applicable CEQ regulations state, "Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." The direct effects of an individual action may be negligible, but may contribute to a measurable environmental impact when considered cumulatively with other past, present, and/or future projects.

¹ This EIS was prepared in accordance with CEQ's regulations implementing NEPA (40 CFR Parts 1500-1508) from 1978, as amended in 1986 and 2005. CEQ comprehensively updated its NEPA implementing regulations effective September 14, 2020; the revised regulations apply to any NEPA process begun after that date. For NEPA reviews initiated prior to September 14, 2020, the lead Federal agency may apply the prior regulations. FRA initiated the NEPA process for the Hudson Tunnel Project in 2016 with publication of a Notice of Intent (NOI) in the Federal Register, and is applying the CEQ regulations that were in effect at the time of that NOI.

20.2.2 ANALYSIS TECHNIQUES

The analysis of indirect effects focused on the construction and operational effects of the Preferred Alternative, building on the direct effects assessments presented in all previous chapters of this EIS, to determine whether any of the Preferred Alternative's direct effects have the potential to lead to further, secondary effects. For any potential secondary effects, the analysis used the same methodologies as for analysis of direct effects for the resource area in question, although the study areas and timeframes may be correspondingly larger or longer, respectively. Each of the technical chapters of this EIS includes consideration of potential secondary and indirect effects; this information is summarized below in Section 20.5.

The analysis of cumulative effects considered the incremental effect of the Preferred Alternative's operational and construction-period impacts in conjunction with other local and regional construction projects.

20.2.3 STUDY AREAS

Since the analysis of indirect and cumulative effects builds on the analyses of each technical area presented in the EIS, the study area for this assessment was the same as that used for the relevant technical analyses.

20.3 AFFECTED ENVIRONMENT: EXISTING AND FUTURE CONDITIONS

The affected environment analyzed in this chapter is identical to the affected environment analyzed in the preceding technical analysis chapters. Those analyses addressed direct effects on the affected environment, while this chapter analyzes indirect and cumulative effects on the affected environment.

20.4 INDIRECT AND CUMULATIVE IMPACTS OF NO ACTION ALTERNATIVE

In the No Action Alternative, no new Hudson River rail crossing would be created for the NEC and the existing crossing, the North River Tunnel, would not be rehabilitated. For purposes of analysis in this EIS, FRA and NJ TRANSIT have assumed that the North River Tunnel would remain functional and in operation at least through the EIS analysis year of 2033, given the uncertainty about the timing and extent of any closure of the tunnel, with continued maintenance as necessary to address ongoing deterioration to the extent possible. Since the No Action Alternative is the baseline against which the impacts of the Preferred Alternative are compared in this EIS, this approach allows for a conservative and rigorous analysis of the impacts of the Preferred Alternative.

However, as detailed in Chapter 1, "Purpose and Need," without a full rehabilitation of the North River Tunnel, damage to the tunnel caused by Superstorm Sandy would continue to degrade systems in the tunnel. This deterioration combined with the tunnel's age and intensity of use would likely lead to increasing instability of rail operations in the tunnel, and may lead to its eventual partial or full closure within or beyond the timeframe in which the Preferred Alternative could be completed. Such an outcome would ultimately lead to adverse indirect effects on regional economic conditions in New Jersey, New York, and the cities in the Northeast that currently benefit from Amtrak's intercity rail service and NJ TRANSIT's commuter service. Without proper maintenance of the transportation infrastructure, delays on Amtrak and NJ TRANSIT service for unplanned maintenance and repairs would continue to worsen. As trans-Hudson travel demand



continues to grow, more and more people would be affected as access to work, home, and areas of commerce would be more difficult in New Jersey, New York, and throughout the NEC.

Without full rehabilitation of the North River Tunnel, the increased instability of rail operations and the potential for eventual closure of the tunnel would have wide-ranging impacts on travel in the region and on the region's social, economic, and environmental conditions as a result. Extreme overcrowding and delays in public transportation service would likely occur, and a shift from train to auto travel would result, which would exacerbate already congested conditions on the Hudson River crossings and major roads on both sides of the river and in the region. This would in turn lead to cumulative effects with other projects in the region, particularly those that contribute to congestion and travel delays.

20.5 INDIRECT IMPACTS OF THE PREFERRED ALTERNATIVE

20.5.1 OVERVIEW

Indirect effects are the impacts caused by the Preferred Alternative that would occur later in time or farther removed in distance than direct effects, but are still reasonably foreseeable. Indirect effects are sometimes referred to as induced impacts. Indirect effects may occur, for example, if a project changes the extent, pace, and/or location of development and if this change in turn affects environmental resources.

Chapters 5 through 19 of this EIS assess the potential direct and indirect effects of the Preferred Alternative, as appropriate, for a full range of technical areas. The conclusions of those analyses and any additional indirect effects are summarized below.

Where the language in this EIS refers to actions that will be taken by the Project Sponsor, it will be the lead Federal agency's responsibility to ensure the Project Sponsor carries out the specified activities as they will be described in the ROD.

20.5.2 INDIRECT CONSTRUCTION IMPACTS OF THE PREFERRED ALTERNATIVE

Construction of the Preferred Alternative would result in temporary beneficial and adverse indirect effects during the construction period. In addition to the beneficial direct socioeconomic effects related to construction labor itself and for the production of necessary services and materials, the Preferred Alternative's construction would also result in indirect or secondary economic activity generated as earnings from the Project's direct expenditures are spent throughout the regional economy by construction workers and companies that supply the Project with materials (this is often referred to as the ripple or multiplier effect). This would include local secondary expenditures made by construction workers who frequent local businesses for dining and other goods and services, as well as similar secondary expenditures made by suppliers of materials and equipment for the Preferred Alternative. These benefits are described further in Chapter 7, "Socioeconomic Conditions," Section 7.6.2.

At the same time, however, construction activities at the Preferred Alternative's staging areas on Tonelle Avenue in North Bergen, New Jersey; in Hoboken, New Jersey; and near the Manhattan waterfront would result in direct adverse effects to the surrounding areas related to community disruption, temporary disruptions to businesses near the Project site in the Meadowlands, visual impacts, traffic, noise, and air quality during construction that could in turn temporarily affect development patterns nearby. As described in previous chapters of this EIS, mitigation would be implemented to minimize these effects to the extent practicable.

As discussed in Chapter 6A, "Land Use, Zoning, and Public Policy," construction activities for the Preferred Alternative on the Twelfth Avenue staging area in New York would result in delays for

potential completion of a separate new development on the same site (Block 675 Lot 1). Construction activities on a portion of Lot 12 of Block 675 for the Preferred Alternative could also result in delays to the completion of a potential station for the Fire Department of New York Emergency Medical Services (EMS) or one-story garage on that site. The Preferred Alternative could also delay completion of park improvements in the section of Hudson River Park between West 29th and West 34th Streets, because of the Preferred Alternative's construction activities in the park or by potentially delaying possible funding that would be contributed to the park by a future development on Block 675 Lot 1. Once the construction of the Hudson River Tunnel is complete, these developments could be completed. In the New York study area, extensive development is proposed in the surrounding area, and the addition of another construction site to the multiple sites that will be under construction would not slow or otherwise alter the overall pace of development in the Project area.

The purpose of the Hudson Tunnel Project is to enable rehabilitation of the North River Tunnel without major disruptions to passenger rail service into and out of PSNY. Therefore, construction activities would not adversely affect rail operations on the NEC and no adverse indirect effect from train delays would occur.

20.5.3 INDIRECT PERMANENT IMPACTS OF THE PREFERRED ALTERNATIVE

The Preferred Alternative would preserve the current functionality of the existing NEC Hudson River rail crossing and strengthen the resilience of the NEC. This would be a direct benefit and would also result in indirect benefits related to maintenance of the transportation system on which the region's economy depends. By improving the resiliency of the NEC, the Preferred Alternative would avoid indirect adverse social, economic, and environmental effects associated with the loss of this critical passenger rail connection. In the long term, the Preferred Alternative would effectively reduce energy consumption and air pollutant emissions in comparison to the No Action Alternative by reducing traffic congestion that would certainly occur were there a forced closure of the rail crossing.

The Preferred Alternative would address maintenance and resilience of the NEC Hudson River crossing and would not increase rail capacity. While the Preferred Alternative would increase the number of tracks crossing beneath the Hudson River between New Jersey and PSNY from two to four, no increase in peak-period rail service could occur without implementation of other future initiatives to expand capacity, such as an expansion of PSNY (see discussion below in Section 20.6.4). At completion of the Preferred Alternative, Amtrak and NJ TRANSIT would operate the same number of peak-period trains using the four tracks beneath the Hudson River as in the No Action Alternative, when only two tracks would be available. Since the Preferred Alternative would not increase rail service over that provided in the No Action Alternative, there would be no corresponding potential for secondary impacts related to increased service.

20.6 CUMULATIVE IMPACTS OF THE PREFERRED ALTERNATIVE

20.6.1 OVERVIEW

The applicable CEQ NEPA regulations define cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions." The previous chapters of this EIS analyze the effects of the Preferred Alternative in the context of the affected environment (existing conditions including past and present actions) together with other reasonably foreseeable future

projects that will occur independently as part of the No Action Alternative. In this manner, the EIS accounts for cumulative impacts in each of the resource-specific technical analysis chapters.

By 2033, when the Preferred Alternative would be completed, a number of other, independent initiatives are currently being planned that could affect future conditions in the Project area, if they are implemented. These projects are in various stages of planning: some are funded and approved, while others are in the early planning stages. Some of these are included in this Project's No Action Alternative, while others are in early stages of planning and therefore are not considered part of the No Action Alternative. Given the long timeframe for the analysis of impacts from the Preferred Alternative, this evaluation considers the Preferred Alternative's potential for cumulative impacts with all of these initiatives. The DEIS presented some projects that have since been completed and therefore are now part of the existing affected environment; the EIS is now updated to reflect these conditions. Similarly, FRA and NJ TRANSIT have identified new projects proposed in the Project study areas that will be part of the future affected environment and these are now considered here and in other chapters of this EIS; these projects are identified in Section 4.3.3 of Chapter 4, "Analysis Framework."

This section of Chapter 20 describes future projects being planned or constructed in and near the Project study area that have the potential for overlapping and cumulative effects with the Preferred Alternative. Section 20.6.2 describes rail system improvements in and near PSNY, Section 20.6.3 considers other transportation improvements in and near the Project site, and Section 20.6.4 provides an evaluation of infrastructure and development initiatives. The following section of this chapter, Section 20.8, provides a discussion of the long-term relationship of the Hudson Tunnel Project with future proposed long-term capacity enhancement initiatives for the NEC.

20.6.2 RAIL SYSTEM IMPROVEMENTS NEAR PSNY

A number of future projects are currently being implemented or planned that could affect the PSNY rail complex and rail operations through PSNY if they are implemented. These projects, which are in various stages of planning and are not all fully committed, will occur independently of the Hudson Tunnel Project. They include the following (for a discussion of future proposed long-term initiatives to improve capacity on the NEC, please see Section 20.7):

- **Hudson Yards Right-of-Way Preservation Project:** Amtrak is currently working to complete the third and final segment of a concrete tunnel box in Manhattan from the north side of 30th Street near Twelfth Avenue to the existing PSNY approach tracks at approximately Tenth Avenue. This structure will preserve a future location for rail operations beneath the large-scale redevelopment known as Hudson Yards to be built on a platform above the Metropolitan Transportation Authority (MTA) Long Island Rail Road (LIRR) John D. Caemmerer West Side Yard. Construction is complete on the section of the concrete casing between Tenth and Eleventh Avenues and beneath Eleventh Avenue. The final section from Eleventh Avenue to 30th Street close to Twelfth Avenue is not yet complete. Construction activities for the final section are likely to occur at the same time as construction activities for the Preferred Alternative at the Twelfth Avenue staging site. The Project Sponsor would coordinate with the responsible party for the concrete casing for efficiency and to avoid conflicts or adverse impacts related to simultaneous construction. Once the concrete casing is complete, construction activities for the Hudson Tunnel Project would involve finishing the casing with tracks, communications, signals, and other railroad systems.
- **Western Rail Yard Infrastructure Project:** FRA is the lead Federal agency currently preparing an EIS for the Western Rail Yard Infrastructure project, which consists of the final section of the Hudson Yards Right-of-Way Preservation Project and the platform above the concrete casing and railyard that will support the Hudson Yards development above. The

anticipated completion year for this project is 2026.² Construction activities for the platform and, as noted above, for the final section of the concrete casing, are likely to occur at the same time as construction activities for the Preferred Alternative at the Twelfth Avenue staging site, and would be coordinated for efficiency and to avoid conflicts or adverse impacts related to simultaneous construction.

- **West Side Yard Perimeter Protection Project:** To protect the West Side Yard from future flooding like the flooding that occurred during Superstorm Sandy, LIRR is planning a flood protection project that will include perimeter protection and drainage improvements around the West Side Yard. For perimeter protection, a new, permanent wall is proposed, with additional deployable barriers to be implemented across driveways and access points in advance of storm events. The perimeter protection project will provide critical resilience for all the rail elements within the yard complex, including the North River Tunnel portal and vent shaft and the new portal for the Preferred Alternative's new tunnel. LIRR plans to construct the perimeter protection project in phases beginning in 2022 with estimated completion in 2026. Thus, construction activities for this project would occur at the same time as those for the Preferred Alternative nearby. The Project Sponsor would coordinate with MTA to avoid adverse impacts related to simultaneous construction. Once complete, this flood protection project and the Hudson Tunnel Project would provide a cumulative resiliency benefit for all the rail infrastructure in this area.
- **East River Tunnel Rehabilitation:** To repair damage that occurred to two of the four tubes of the East River Tunnels as a result of flooding during Superstorm Sandy, Amtrak will rehabilitate the affected tubes one tube at a time. This will require service changes for Amtrak, LIRR, and NJ TRANSIT. Amtrak is not planning to rehabilitate the East River Tunnels at the same time as rehabilitation of the North River Tunnel; rather, the East River Tunnels project will be completed while the new Hudson River Tunnel is under construction and rail operations through the North River Tunnel are still in place. This would avoid adverse impacts related to simultaneous construction of the two tunnel rehabilitation projects. Once both projects are complete, they would provide a cumulative resiliency benefit for rail transportation in this section of the NEC, although they would not result in an increase in service.
- **East Side Access and Metro-North Penn Station Access:** MTA is currently completing the East Side Access Project, which will create a new terminal for LIRR at Grand Central Terminal. When that project opens for service in 2022, LIRR will increase its overall service to Manhattan and serve both terminals in Midtown—Grand Central Terminal and PSNY. While service to Midtown will increase overall, LIRR will decrease service to PSNY. Taking advantage of capacity formerly used by LIRR, MTA is planning to add new Metro-North Railroad service to PSNY, a project known as Penn Station Access (like LIRR, Metro-North is an operating agency within MTA). These operational changes within PSNY would not have potential

² On November 20, 2019, the Federal Transit Administration (FTA) approved the request for a Class II Categorical Exclusion (CE) pursuant to 23 CFR § 771.118(d) for construction of Section 3 of the Hudson Yards Concrete Casing Project (final section of the Hudson Yards Right-of-Way Preservation Project). If FRA does not approve the Western Rail Yard Infrastructure Project or if the developer does not advance it, Amtrak may continue to advance the final section of the Hudson Yards Right-of-Way Preservation Project under the CE approved by FTA. On November 14, 2014, FRA issued a Finding of No Significant Impact based on FRA and Amtrak's preparation of a Supplemental Environmental Assessment (EA) in August 2014 to examine the extension of the concrete casing into the Western Rail Yard, extending from underneath the Eleventh Avenue bridge to 30th Street. The portion of the extension underneath the Eleventh Avenue bridge has been completed by Amtrak.



cumulative effects with the Hudson Tunnel Project, since the Hudson Tunnel Project would not result in changes to rail service in PSNY either during construction or upon completion.

When the Preferred Alternative is complete, it would provide redundancy and resiliency on the NEC, providing a substantial benefit to rail passengers. However, the Preferred Alternative would not result in an increase in capacity on the NEC between New Jersey and PSNY, and no increase in service over the No Action Alternative would occur. Therefore, there would be no cumulative effect of increased train service with other rail improvement projects or development projects in the study area (see Section 20.8 for discussion of the relationship of the Hudson Tunnel Project to long-term capacity enhancements on the NEC).

As a resiliency investment in NEC rail infrastructure that is a critical transportation asset of the New York metropolitan region, the Hudson Tunnel Project would improve the resiliency of this infrastructure and of the region as a whole. Several other ongoing and planned projects would also invest in the resiliency of the region's passenger rail infrastructure, including the West Side Yard Perimeter Protection Project, and the East River Tunnel rehabilitation, among others. Together, these projects will provide a cumulative resiliency improvement greater than the sum of the individual parts, which will create a cumulative benefit to the resiliency of this rail infrastructure and the region as a whole.

20.6.3 OTHER TRANSPORTATION IMPROVEMENTS

In addition to the rail improvements described in the previous section, other transportation improvements are planned or proposed in and near the Project study areas that could cumulatively affect the regional transportation network if they are implemented. These include the following:

- **Lincoln Tunnel Helix Replacement Program:** The PANYNJ is planning the Lincoln Tunnel Helix Replacement Program to replace the curved approach ramp between Route 495 and the Lincoln Tunnel in New Jersey. The schedule for this work has not yet been set. Depending on the final construction schedule for this project, this construction activity has the potential to overlap with construction activity for the Preferred Alternative at the Hoboken staging site. In that event, the Project Sponsor for the Hudson Tunnel Project will coordinate with those responsible for the Helix reconstruction to avoid cumulative construction impacts to the extent practicable.
- **Willow Avenue Bridge Rehabilitation:** Hudson County, New Jersey, intends to rehabilitate the Willow Avenue bridge over the HBLR between Hoboken and Weehawken. No information is available on the schedule for this work. Depending on the final construction schedule for this project, this construction activity has the potential to overlap with construction activity for the Preferred Alternative at the Hoboken staging site. In that event, the Project Sponsor for the Hudson Tunnel Project will coordinate with Hudson County to avoid cumulative construction impacts to the extent practicable.
- **Port Authority Bus Terminal (PABT) Replacement:** The PANYNJ is planning to replace the PABT with a new facility that includes space for bus storage and staging, including certain intercity curbside buses that operate in the vicinity of the current terminal; open space/green space; and commercial, retail, and residential development. The initial phases addressing the staging and storage facilities, the main terminal and associated facilities are planned for completion in 2032. The existing bus terminal would continue to operate while the new terminal is under construction. With ongoing bus operations during that project's construction and ongoing rail service during construction activities for the Preferred Alternative, the PABT replacement would not have the potential for cumulative impacts with the Hudson Tunnel Project.
- **West 33rd Street Viaduct:** The City of New York will regrade West 33rd Street between Eleventh and Twelfth Avenues to correspond with the grade of the Hudson Yards

development, which will be on a platform above the West Side Yard. West 33rd Street is not part of the truck routes for construction activities for the Preferred Alternative in New York, so this would not result in cumulative effects with the Preferred Alternative.

FRA and the Project Partners all recognize the need for coordinated planning and execution of regional construction projects. To address this issue, for construction activities in New Jersey, a bi-state multi-agency capital construction and operations working group on construction projects, composed of representatives from the PANYNJ, New Jersey Department of Transportation (NJDOT), and the New Jersey Turnpike Authority, meets quarterly to coordinate construction projects so they avoid or minimize interference (to the extent practicable) with traffic flow on the roadway network and to and from municipalities or industrial complexes. Working group member agencies will continue to work together to ensure transparent sharing of information between agencies and the neighboring communities. The Project Sponsor for the Hudson Tunnel Project will coordinate with these agencies regarding construction activities for the Preferred Alternative.

Similarly, in New York State, a multi-agency capital construction and long-term planning working group composed of representatives from New York State Department of Transportation (NYSDOT), MTA, PANYNJ, New York City Department of Transportation (NYCDOT), New York State Thruway, and the Transportation Operations Coordinating Committee (TRANSCOM), among others, meet on a regular basis to coordinate capital construction and maintenance projects. In New York City, the NYCDOT Office of Construction Mitigation and Coordination (OCMC) performs a similar role, coordinating construction activities that will affect city roadways. The Project Sponsor for the Hudson Tunnel Project will coordinate with these agencies regarding construction activities for the Preferred Alternative.

20.6.4 DEVELOPMENT AND INFRASTRUCTURE PROJECTS

As described in Chapter 6A, “Land Use, Zoning, and Public Policy,” Section 6A.4, a number of development and/or infrastructure projects are planned in the Project area in both New Jersey and New York.

20.6.4.1 NEW JERSEY

In Weehawken, New Jersey, large-scale waterfront redevelopment will continue within the Lincoln Harbor Redevelopment Area just north of Weehawken Cove, where vacant parcels beyond the study area boundaries will be redeveloped with a mix of retail, office, and residential uses similar to other new waterfront properties in Weehawken. Construction activities for Lincoln Harbor have been ongoing for many years and would not occur close to the Project site or potential truck routes in Weehawken; therefore, there is little potential for cumulative impact with the Preferred Alternative.

Also in Weehawken and Hoboken, New Jersey, the New Jersey Department of Environmental Protection (NJDEP) will complete the Rebuild By Design project, an infrastructure initiative to reduce frequent flooding in Hoboken resulting from major storm surges, high tides, and heavy rainfall events. That project will include numerous green infrastructure elements, such as landscaped berms and levees and bioretention basins, to resist and delay flooding. Close to the Project site, the Rebuild by Design Project will include a flood wall along the east side of the HBLR alignment in Weehawken, crossing to the west side of the HBLR just south of 19th Street. NJDEP has received authorization for funding from the U.S. Department of Housing and Urban Development. Work is planned for completion in 2022, although this schedule may be delayed. The final alignment NJDEP selected for the Rebuild by Design Project’s flood wall would occupy some of the area planned for haul route Option 3 for the Hudson Tunnel Project on the west side of the HBLR alignment near 19th Street. The Project Partners are evaluating how to accommodate the presence of the proposed Rebuild By Design floodwall in conjunction with use of haul route



Option 3 and will advance the design for Option 3 to reflect the constraints on available space resulting from the presence of the floodwall in the same area. The Project Sponsor will also coordinate with NJDEP to avoid conflicts to the extent practicable during any overlapping construction activities of the Rebuild By Design Project and the Hudson Tunnel Project in Hoboken and Weehawken.

When construction is complete, the Preferred Alternative would have few visible, above-grade elements in New Jersey: the new surface tracks along the NEC leading into a new tunnel portal near the existing tunnel portal in North Bergen, and a new fan plant in Hoboken. These components of the Preferred Alternative would not have the potential for cumulative effects with other projects nearby. The preceding chapters of this EIS evaluate the effects of these elements of the Preferred Alternative on their setting for a full range of technical issues. In New Jersey, the new surface tracks and tunnel portal would be close to the existing NEC and would not alter the visual or neighborhood character of the nearby areas or result in noise impacts or other adverse impacts. Similarly, the new Hoboken fan plant would not be noticeable beyond the immediate area and would not result in adverse land use, visual, air quality, noise, or any other impacts to the surrounding area.

20.6.4.2 NEW YORK

In Manhattan, several large-scale developments and a number of individual development projects are proposed or under construction on the Project site and within the study area.

North of West 30th Street, three major ongoing or planned redevelopment projects (the Eastern Rail Yard, Western Rail Yard, and Manhattan West, collectively referred to as Hudson Yards) are creating a new high-rise neighborhood built on platforms above the West Side Yard. These projects are collectively referred to as Hudson Yards. While much of the redevelopment between Tenth and Eleventh Avenues (Eastern Rail Yard project) has been completed, one remaining high-rise office building is under construction, to be complete in 2022. The Western Rail Yard component, between Eleventh and Twelfth Avenues, will include eight towers and open space, with a total of approximately 6.2 million square feet of residential, office, retail, and school space. This project has an estimated completion year of 2029, following completion of the Western Rail Yard Infrastructure Project.

Between Eighth and Ninth Avenues, as part of the Moynihan Station Project, the Moynihan Station Development Corporation, a subsidiary of Empire State Development (ESD), is currently developing commercial space in the former James A. Farley Post Office Building, including transit-oriented and destination retail as well as other commercial uses; this development is scheduled for completion in 2026. Farther east and outside the Project study area, ESD is proposing to adopt a General Project Plan to facilitate creation of a large-scale, modern, transit-oriented commercial district centered on PSNY. This project, known as the Empire Station Complex, would result in new commercial buildings on up to eight development sites surrounding Penn Station. In addition to these large public initiatives, a number of smaller development projects are proposed in the Project study area (see Chapter 6A, "Land Use, Zoning, and Public Policy," Section 6A.4.3).

Open space improvements are proposed at the High Line, where a new extension is proposed to extend the elevated High Line park approximately 1,200 feet, from its current terminus at Tenth Avenue and 30th Street to an existing walkway that leads to Moynihan Train Hall. This project would not intersect with the alignment for the Hudson Tunnel Project but would be nearby.

Together, the Manhattan developments will cause substantial cumulative effects in the study area. In the short term, the neighborhood will experience extensive ongoing construction activity, as it has been for the past decade, that will likely continue well beyond the 2033 analysis year, and that will continue to bring with it substantial construction-generated traffic (due both to the presence of construction vehicles on the roadways and to roadway closures resulting from construction

activity), construction noise and vibration, pollutant and greenhouse gas emissions, and the visual disruption associated with construction barriers and roadway and sidewalk closures. The rail improvement projects in the study area would also contribute, to a limited extent, to the construction-period effects in this area. This type of construction activity has been occurring for years in this area, and is being coordinated through OCMC.

However, there is not a potential for cumulative neighborhood-wide effects on air quality or noise as a result of multiple construction projects, since construction impacts are localized and do not accumulate with the noise and air emissions of other projects to result in cumulative impacts. For traffic impacts, FRA and NJ TRANSIT evaluated the combined impacts of construction traffic associated with the Preferred Alternative and a conservative level of background traffic, which also accounts for the cumulative traffic impacts that would occur when multiple projects are under construction at the same time; this analysis concluded that at all but one location, traffic impacts in the New York study area could be fully mitigated, and therefore there would be no cumulative adverse traffic impacts. At one location, the intersection of Tenth Avenue and West 34th Street, an adverse impact on traffic conditions would occur in the evening commuter peak hour that could not be fully mitigated. The Project Sponsor will coordinate with the developers of nearby projects and with the City of New York regarding construction activities in Manhattan, to reduce the potential for conflicts or cumulative adverse effects.

In the long term, development in the Hudson Yards district will continue to substantially change the character of the study area, creating a new neighborhood and bringing a sizeable new population to the area. This will constitute a substantial change in land use and socioeconomic conditions within the district. The visual character of the area will also continue to change dramatically. Because of the prominent position of the Hudson Yards district adjacent to the open expanse of the Hudson River, the increase in scale will be a noticeable change to the visual environment for viewer groups on the Hudson River and in New Jersey, as well as for local viewer groups in Manhattan, particularly those in Hudson River Park and along the High Line. The visual and urban design context of the High Line and Hudson River Park will continue to change substantially, and large new shadows will fall on these open space resources from new mid- and high-rise buildings and skyscrapers constructed in the new Hudson Yards district.

The High Line in particular will undergo a dramatic change of setting at its northern end. When this segment of the park first opened, it ran through an area with older low-rise structures and undeveloped lots, particularly at the Western Rail Yard. The larger scale development projects within the Hudson Yards district will convert this relatively open environment to one of mid- to high-rise buildings and skyscrapers with more limited views and additional shadows will fall on the elevated High Line structure.

When Project construction is complete, the only visible element of the Preferred Alternative in New York would be the new fan plant near Twelfth Avenue in New York (depending on the final configuration, changes to the louvers on the Tenth Avenue façade of 450 West 33rd Street for the new Tenth Avenue fan plant may also be visible). These components of the Preferred Alternative do not have the potential to increase the cumulative effect on the environment when considering the impacts of other projects nearby. The preceding chapters of this EIS evaluate the effects of these elements of the Preferred Alternative on their setting for a full range of resources.

The new Twelfth Avenue fan plant would join the other new high-rise buildings in the neighborhood. As described in Chapter 6A, "Land Use, Zoning, and Public Policy," the fan plant could be developed as an approximately 150-foot-tall freestanding structure or, alternatively, incorporated into a larger building on the site. Regardless of how it is developed, the fan plant would contribute incrementally to the dramatic changes in the scale and use of the Hudson Yards district occurring as part of the No Action Alternative. However, the fan plant would result in a relatively minor increase in the overall height and bulk of a single structure in the new, transformed

Hudson Yards district, and would be in character in terms of bulk and scale with the other developments. Therefore, it would not contribute in a meaningful way to the cumulative changes in the scale, socioeconomic characteristics, and visual character of the area. Similarly, it would not contribute substantially to the cumulative changes in the visual and urban design context or shadow coverage of the High Line and Hudson River Park.

20.7 MEASURES TO AVOID, MINIMIZE, AND MITIGATE IMPACTS

The Project Sponsor will implement a number of measures to avoid, minimize, and mitigate impacts, detailed throughout the previous chapters of this EIS. These measures will also serve to avoid, minimize, and mitigate indirect and cumulative effects. Key measures include the following. The lead Federal agency will be responsible for ensuring that the Project Sponsor implements these measures, which will be identified in the ROD:

- The Project Sponsor, Amtrak, NJ TRANSIT, and MTA will coordinate regarding railroad improvements that will affect PSNY operations and NEC service to minimize disruptions to service.
- The Project Sponsor will coordinate with the responsible party for the Hudson Yards Right-of-Way Preservation Project regarding any overlap between that project and construction of the Preferred Alternative for efficiency and to avoid conflicts or adverse impacts related to simultaneous construction.
- The Project Sponsor will coordinate with MTA regarding construction activities for the West Side Yard Perimeter Protection project to avoid adverse impacts related to simultaneous construction.
- In the event that the Lincoln Tunnel Helix Replacement Program is under way at the same time as construction activities for the Preferred Alternative in New Jersey the Project Sponsor for the Hudson Tunnel Project will coordinate with those responsible for the Helix reconstruction to avoid cumulative construction impacts to the extent practicable.
- If construction activities for the Preferred Alternative in Hoboken and Weehawken would overlap with rehabilitation of the Willow Avenue bridge over the HBLR, the Project Sponsor for the Hudson Tunnel Project will coordinate with Hudson County to avoid cumulative construction impacts to the extent practicable.
- The Project Sponsor will coordinate with the PANYNJ, NJDOT, and the New Jersey Turnpike Authority regarding construction projects in New Jersey and to facilitate transparent sharing of information between agencies and the neighboring communities.
- In New York City, the Project Sponsor for the Hudson Tunnel Project will coordinate with the multi-agency capital construction and long-term planning working group and OCMC regarding construction activities for the Preferred Alternative.
- The Project Sponsor will coordinate with NJDEP to avoid conflicts during any overlapping construction activities of the Rebuild By Design Project and the Hudson Tunnel Project in Hoboken and Weehawken to the extent practicable.
- The Project Sponsor, in cooperation with the other Project Partners, will coordinate with NYCDOP and Manhattan Community Board 4 regarding the visible elements of the Twelfth Avenue fan plant, so that the fan plant is visually compatible with the character of the surrounding area.

20.8 PROJECT'S RELATIONSHIP TO FUTURE PROPOSED CAPACITY ENHANCEMENT PROJECTS

20.8.1 INTRODUCTION

Chapter 1, "Purpose and Need," describes that the purpose of the Hudson Tunnel Project is to preserve the current functionality of Amtrak's NEC service and NJ TRANSIT's commuter rail service between New Jersey and Manhattan by repairing the deteriorating North River Tunnel; and to strengthen the NEC's resiliency to support reliable service by providing redundant capability under the Hudson River for Amtrak and NJ TRANSIT NEC trains between New Jersey and the existing PSNY. These improvements must be achieved while maintaining uninterrupted commuter and intercity rail service and by optimizing the use of existing infrastructure. Because of the importance of the NEC Hudson River crossing to essential commuter and intercity rail service between New Jersey and New York, the Hudson Tunnel Project meets an urgent need and needs to be accomplished as soon as possible.

The Hudson Tunnel Project would double the number of tracks on the NEC between County Road in Secaucus, New Jersey (just east of Frank R. Lautenberg Secaucus Junction Station) and the PSNY approach tracks at approximately Ninth Avenue in Manhattan. With the Preferred Alternative, there would be four tracks through this section of the NEC rather than two. Ultimately, the increase in rail service capacity between Secaucus and PSNY would be one element of a larger program to increase rail service capacity on the NEC between Newark, New Jersey and New York City. However, a number of other substantial infrastructure capacity expansion projects must be completed along this stretch of the NEC before Amtrak and NJ TRANSIT can increase peak-period train frequency anywhere in this area of the NEC. Even with two new tracks beneath the Hudson River resulting from the new Hudson River Tunnel, Amtrak and NJ TRANSIT cannot provide additional peak-hour service to and from PSNY given the current capacity constraints on the NEC between Newark and New York, including at PSNY, and in New Jersey at Harrison, Kearny, and across the Hackensack River.

Thus, while the Hudson Tunnel Project would increase the number of tracks between Secaucus and PSNY, it would not result in an increase in rail service until other improvements occur. A new Hudson River crossing on the NEC is urgently needed to maintain existing service. Therefore, this Project—which would implement full rehabilitation of the existing North River Tunnel while maintaining the existing level of service—is being advanced independently of any initiatives to expand rail service capacity on the NEC. As such, the Hudson Tunnel Project has independent utility as a project to preserve the current functionality of NEC service between New Jersey and PSNY and to strengthen the resiliency of the NEC in this area. Capacity expansion is not part of the purpose and need of the Hudson Tunnel Project.

At the same time, the Project would not preclude other future projects to expand rail service capacity in the area and, once those projects are in place, would be one of the elements that allow Amtrak and NJ TRANSIT to increase train service to meet future demand. These other future projects would be undertaken separately and would be subject to their own environmental reviews and approvals, as appropriate. The following sections of this chapter discuss the larger future program to expand rail service capacity on the NEC and the potential combined effect of that larger program with the Preferred Alternative of the Hudson Tunnel Project.



20.8.2 PLANS TO INCREASE RAIL SERVICE CAPACITY ON THE NEC BETWEEN NEWARK AND PSNY

FRA, Amtrak, NJ TRANSIT, the PANYNJ, and others have been planning for long-term improvements to rail service on the NEC between Newark, New Jersey and New York City through several planning initiatives, including FRA's NEC FUTURE program and the Gateway Program.

20.8.2.1 NEC FUTURE

In 2012, FRA launched NEC FUTURE to consider the role of rail passenger service in the context of current and future transportation demands and to evaluate the appropriate level of capacity improvements to make across the NEC. The intent of the NEC FUTURE program is to help develop a long-term vision and investment program for the NEC. Through NEC FUTURE, FRA evaluated overall capacity improvements and environmental consequences associated with improved NEC rail services, including trans-Hudson service. FRA released the NEC FUTURE Tier 1 Final EIS in December 2016. The Preferred Alternative evaluated in the Tier 1 Final EIS consisted of an investment program that grows the role of rail by identifying numerous upgrades and state-of-good-repair investments along the length of the NEC.

In July 2017, FRA issued the Record of Decision for the NEC FUTURE program, which completed the Tier 1 environmental review process under NEPA. The Record of Decision documents FRA's formal selection of an investment program for the NEC, referred to as the Selected Alternative. The Selected Alternative is a refinement of the Preferred Alternative identified in the Tier 1 Final EIS and represents a vision for the NEC that will serve as a framework to help prioritize, facilitate, and expedite investment in the NEC for the next several decades. It is a corridor-wide commitment to the NEC to bring it to a state of good repair and provide additional capacity and service enhancements to address passenger rail needs for the future. To achieve this vision, the Selected Alternative includes the following four components:

- *Improve Rail Service:* Corridor-wide service and performance objectives for frequency, travel time, design speed, and passenger convenience.
- *Modernize NEC Infrastructure:* Corridor-wide repair, replacement, and rehabilitation of the existing NEC to bring the corridor into a state of good repair and increase reliability.
- *Expand Rail Capacity:* Additional infrastructure between Washington, D.C., and New Haven, Connecticut, and between Providence, Rhode Island, and Boston, Massachusetts, as needed to achieve the service and performance objectives, including investments that add capacity, increase speeds, and eliminate chokepoints.
- *Study New Haven to Providence Capacity:* Planning study in Connecticut and Rhode Island to identify additional on- and off-corridor infrastructure as needed to achieve the service and performance objectives.

20.8.2.2 GATEWAY PROGRAM

The Gateway Program is a comprehensive program of phased strategic rail infrastructure improvements to preserve and improve current services and create new capacity on the NEC. The objective of the Gateway Program is twofold: (1) to update and modernize existing infrastructure and repairs to infrastructure elements that are damaged due to age or events such as Superstorm Sandy, and (2) to increase track, tunnel, bridge, and station capacity, eventually creating four mainline tracks between Newark and PSNY to allow the doubling of passenger trains in this section of the NEC. The individual projects that make up the Gateway Program will advance through planning, environmental review, funding, and construction separately; some of these projects are approved for construction while others are in the planning stages, and one has

initiated construction. In addition to the Hudson Tunnel Project, projects that make up the Gateway Program include the following:

- **Dock Bridge Rehabilitation:** This project includes the rehabilitation of Dock Bridge, a complex of three vertical lift structures over the Passaic River in Newark and Harrison, New Jersey. The project would perform critical maintenance and rehabilitation work to restore the bridge to a state of good repair. This project is in the planning and design stage; environmental review in accordance with NEPA is complete.
- **Harrison Fourth Track:** This project includes the design and construction of approximately 2,000 feet of additional track along the NEC through Harrison, New Jersey. This project is currently in early planning stages, having reached 15 percent design.
- **Sawtooth Bridges Replacement:** Amtrak is proposing to replace these bridges along the NEC between Newark Penn Station and Frank R. Lautenberg Secaucus Junction Station to improve the efficiency and reliability of rail operations throughout this segment of the NEC. This project is in the planning and design stage; environmental review in accordance with NEPA is complete.
- **Portal North Bridge:** Amtrak and NJ TRANSIT will replace this two-track movable bridge across the Hackensack River between Newark Penn Station and Frank R. Lautenberg Secaucus Junction Station with a new high-level, fixed-span bridge, which will address issues of operational reliability at this crossing and will increase rail service capacity across the Hackensack River by approximately 10 percent. Environmental review, final design, and permitting for this bridge are complete and procurement is under way for major construction.
- **Portal South Bridge:** In addition to the new Portal North Bridge, Amtrak and NJ TRANSIT are also proposing a second bridge to carry the NEC over the Hackensack River. Portal South Bridge would provide two additional tracks across the Hackensack River, matching the four-track territories to the east and west, substantially increasing operational capacity along this critical length of the NEC. Environmental review and preliminary design are complete for the Portal South Bridge.
- **Bergen/Secaucus Loop and Secaucus Station modifications:** This project would modify Frank R. Lautenberg Secaucus Junction Station and create a track connection between NJ TRANSIT's Pascack Valley, Main, and Bergen Lines and the NEC, allowing trains on these routes direct access to PSNY in addition to Hoboken. Planning and environmental review have not yet begun for this project.
- **New rail storage yard for NJ TRANSIT coupled with fleet expansion:** To operate substantially greater service on its system, NJ TRANSIT will need to purchase new rail vehicles and construct a new rail storage yard where they can be maintained and stored both overnight and during the midday. NJ TRANSIT is conducting site evaluation, although planning and environmental review have not yet begun for this project.
- **Hudson Yards Right-of-Way Preservation Project:** Amtrak is currently working to complete the third and final segment of a concrete tunnel box in Manhattan from the north side of 30th Street near Twelfth Avenue to the existing PSNY approach tracks at approximately Tenth Avenue. This structure will preserve a future location for rail operations beneath the large-scale redevelopment known as Hudson Yards to be built on a platform above the West Side Yard. Construction is complete on the section of the concrete casing between Tenth and Eleventh Avenues and beneath Eleventh Avenue. The final section from Eleventh Avenue to 30th Street close to Twelfth Avenue is not yet complete. Once the concrete casing is complete, construction activities for the Hudson Tunnel Project would involve finishing the casing with tracks, communications, signals, and other railroad systems.



- **Penn Station New York Station Expansion:** MTA, Amtrak, and NJ TRANSIT are proposing to add new tracks, platforms, and concourse space to PSNY to facilitate an increase in the station's rail service capacity. Prior to the COVID-19 global health crisis, the tracks and platforms at PSNY operated at full capacity in both the morning and evening peak periods with no additional capacity to process trains at the platforms, given the time required for trains to wait at the platform for passengers to board and alight, and to move through the station.

20.8.3 INDIRECT AND CUMULATIVE EFFECTS OF FUTURE TRAIN OPERATIONS

In the future, if other initiatives, such as those envisioned in the NEC FUTURE and Gateway Programs, are implemented and enhanced capacity to provide additional service between Newark Penn Station and PSNY becomes available, the two new tracks under the Hudson River included as part of the Preferred Alternative could be used for that service. Some of the capacity enhancement projects for the NEC between Newark and PSNY are currently in the planning stages, while for other longer term projects, planning has not yet begun. Ultimately, the magnitude of train service increases and the details on where those increases would occur (e.g., how much service increase will occur on the various NJ TRANSIT branches and lines) will depend on the details of the projects, their timing, available funding for new train vehicles and crew, and other factors.

For most of the environmental topics included in this EIS, potential future increase in train volumes on the Project right-of-way between Secaucus, New Jersey and the PSNY approach tracks at A Yard in New York as a result of a potential future increase in rail service capacity together with the new tracks added by the Preferred Alternative would have no impact on the conclusions presented in this EIS for the Hudson Tunnel Project. The NEC is an active and busy rail right-of-way and its continued operation with frequent train service would not change most of the conclusions of this EIS with respect to impacts on the human and natural environment.

Increased train service along the surface alignment of the NEC in the Meadowlands as a result of a potential future increase in rail service capacity would not change the appearance or visual quality of the surrounding environment and would have no effect on the adjacent wetlands, other natural features, or land uses.

East of the Meadowlands, trains would operate in a tunnel deep beneath the surface, where they would be imperceptible and would have no effect at all on the surrounding environment.

The analysis in this EIS demonstrates that operation of trains through the Project site on the NEC would not result in vibration or ground-borne noise impacts at receptors near the existing NEC or near the alignment for the new Hudson River Tunnel. The FTA criteria for impact from ground-borne vibration and noise in FTA's methodology manual, *Transit Noise and Vibration Impact Assessment Manual*, FTA Report No. 0123, September 2018, are based on the maximum levels for a single event. The FTA methodology provides three different impact criteria—one for infrequent events, when there are fewer than 30 vibration events per day, one for occasional events, when there are between 30 and 70 vibration events per day, and one for frequent events, when there are more than 70 vibration events per day. The number of train passbys on the existing NEC currently exceeds the threshold for frequent events and the number of train passbys for the new Hudson River Tunnel with the Preferred Alternative would also exceed that threshold. Using the frequent events impact threshold, each individual train passby would not result in a vibration or ground-borne noise impact. That conclusion would remain true if the number of trains increases through the Project site as a result of a potential future increase in rail service capacity.

An increase in the frequency of trains through the Project site as a result of a potential future increase in rail service capacity would also not affect air quality in the Project area. Trains

operating through the Project site are powered by electricity, and therefore do not emit pollutants. This EIS includes an analysis of the potential air quality impacts at the proposed ventilation facilities (i.e., fan plants) related to train operations that concludes that no adverse air quality effect would occur from operation of the fan plants. The operational characteristics for the fan plants would not change with an increase in train frequency in the tunnel as a result of a potential future increase in rail service capacity.

Increased train frequency through the Project site as a result of a potential future increase in rail service capacity would increase the rail-related noise along the surface alignment, which could result in increased noise levels at nearby residential receptors, including those close to the surface alignment in Secaucus and those close to the existing and new tunnel portal in North Bergen. Depending on the train volumes with a potential increase in rail capacity, this increase in noise has the potential to result in adverse noise impacts on those receptors.

Outside the Project study area, this increased train service would result in beneficial effects throughout the region and potentially along the NEC, including the following:

- Regional economic benefits from improved connectivity.
- Regional economic benefits from more efficient travel.
- Benefits associated with travelers shifting to rail from other transportation modes, including:
 - Reduced congestion on other modes (air and highway);
 - Improved air quality; and
 - Reduced greenhouse gas emissions.

At the same time, increased train service as a result of a potential future increase in rail service capacity could result in localized adverse impacts outside the Project study area where service increases, related to the trains themselves and the additional commuters at train stations. While they are the result of actions not included in the Project, would occur outside the Project study area, and are not related to the Project's purpose and need, these adverse impacts could include the following:

- Noise increases along rail rights-of-way outside the Project study area where train service increases occur.
- Increased diesel emissions along rail rights-of-way where NJ TRANSIT operates diesel service, if the new enhanced service plan increases service in diesel rail territory.
- Additional demand for parking at train stations where service increases that could result in the need for larger parking lots and garages.
- Additional traffic on streets leading to train stations where service increases and related localized air pollutant and noise increases near these streets.

In addition, the increased demand for electricity related to a potential increase in future train service may result in additional air emissions outside of the study area associated with power generation, but that would depend on where and how the power is produced. *