

This Executive Summary appears in the Access to the Region's Core (ARC) Final Environmental Impact Statement (FEIS) issued on November 7, 2008. The ARC FEIS responds to the comments made during the public comment periods for both the ARC DEIS and the ARC SDEIS and reflects refinements to the project design made since publication of the ARC SDEIS. Changes and additions to the document since publication of the ARC DEIS and ARC SDEIS are indicated by double-underlining. The complete ARC FEIS is available on the ARC website at <http://www.accesstotheregionscore.com> or can be requested by calling 1-877-ARC-0999.

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A. INTRODUCTION

The purpose of the Access to the Region's Core project (ARC) is to increase trans-Hudson commuter rail capacity to accommodate projected ridership growth from rail lines west of the Hudson River; enhance passenger convenience via a one-seat ride; and improve system safety and reliability between Frank R. Lautenberg Station in Secaucus, New Jersey and midtown Manhattan. The Federal Transit Administration (FTA) and NJ TRANSIT propose the ARC project, referred to as the Build Alternative, to meet these project needs through the provision of additional tunnel capacity into midtown Manhattan, increased station capacity in midtown Manhattan, and the use of new dual-power locomotives.

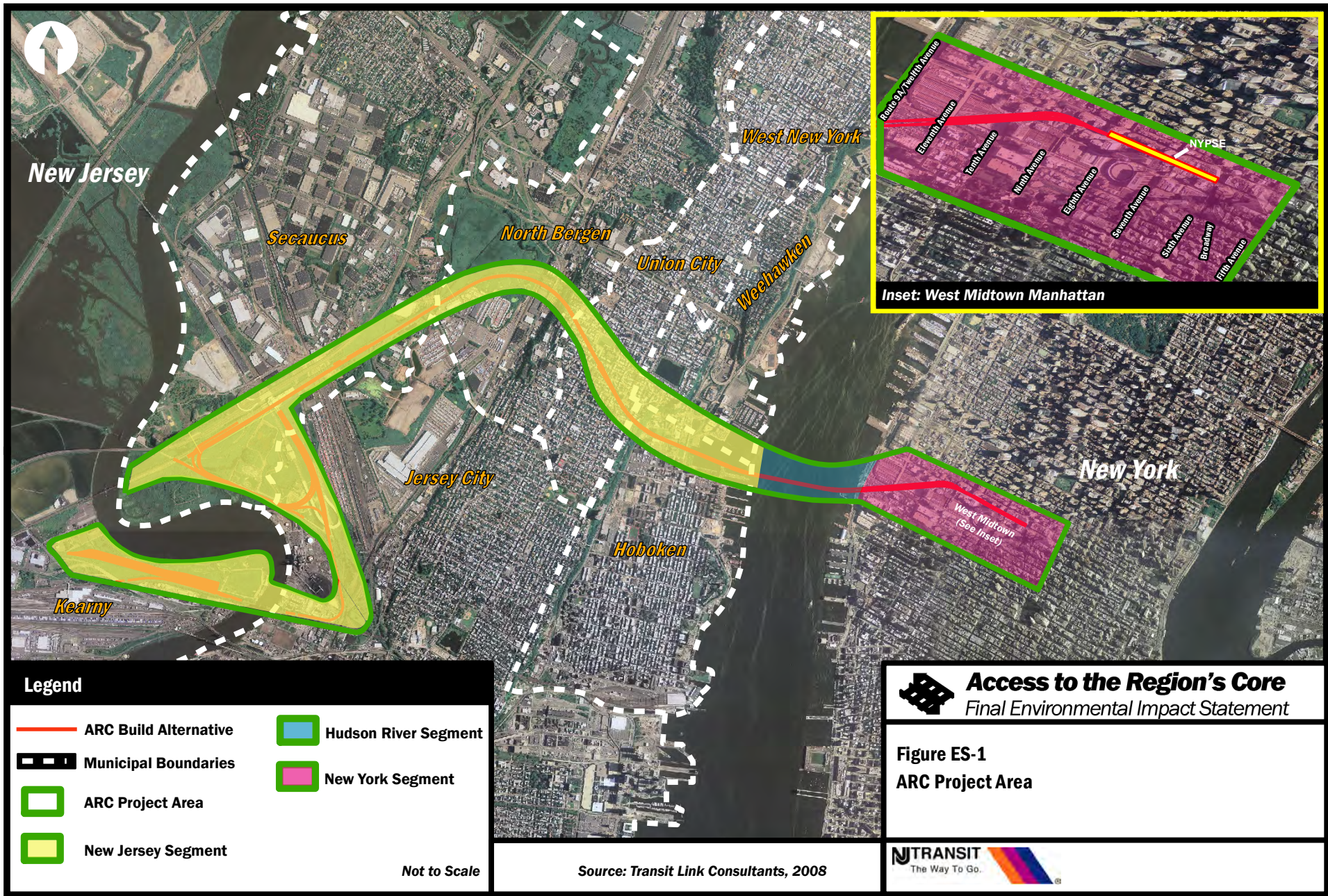
The project area evaluated in the Final Environmental Impact Statement (FEIS) is defined as the area from the Koppers Coke site in Kearny, New Jersey through Frank R. Lautenberg Station in Secaucus, New Jersey to West 34th Street and Fifth Avenue in Manhattan (see **Figure ES-1**). The ARC project area parallels the existing Northeast Corridor (NEC) from just west of Frank R. Lautenberg Station and continues under North Bergen, Jersey City, Union City, Weehawken, and Hoboken in Hudson County, New Jersey and under the Hudson River to Manhattan. The ARC project area encompasses portions of the Main Line and former Boonton Line as they extend south of Frank R. Lautenberg Station, merge to a connection with the Morris and Essex Lines in Jersey City, and continue west across the Hackensack River to the Koppers Coke site.

The project area includes Frank R. Lautenberg Station, through which ten of eleven NJ TRANSIT commuter rail lines that comprise the NJ TRANSIT rail system pass (**Figure ES-2**).




The key infrastructure elements of the FEIS Build Alternative include:

1. A new direct connection at Secaucus between the Main, Bergen County and Pascack Valley lines and the NEC in New Jersey;
2. New track capacity along the NEC between Frank R. Lautenberg Station and the Palisades in New Jersey;
3. Two new single-track tunnels under the Palisades in New Jersey and the Hudson River, with continuation of these two tunnels under the west side of Manhattan;
4. A connection to new station capacity (New York Penn Station Expansion [NYPSE]), under West 34th Street between Eighth and Sixth Avenues, adjacent to Penn Station New York (PSNY);
5. A mid-day storage yard on the Koppers Coke site in Kearny, New Jersey;
6. Five NYPSE station entrances, three Americans with Disabilities Act (ADA) compliant elevator entrances, and one ADA compliant elevator entrance for employee use only; and
7. Two fan plants/construction access shafts in New Jersey and four fan plants/construction access shafts in Manhattan.

These FEIS Build Alternative infrastructure improvements meet the project's service goal to double peak hour service to midtown Manhattan. New dual-power locomotives and added tunnel capacity into midtown Manhattan will create the opportunity to provide one-seat-ride service into Midtown on five existing NJ TRANSIT rail lines that currently operate only diesel service to Newark, Secaucus or Hoboken, New Jersey.



Legend

-  ARC Build Alternative
-  Municipal Boundaries
-  ARC Project Area
-  New Jersey Segment
-  Hudson River Segment
-  New York Segment

Not to Scale

Source: Transit Link Consultants, 2008

Access to the Region's Core
Final Environmental Impact Statement

Figure ES-1
ARC Project Area





The FEIS is based on both the earlier Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS). The FEIS Build Alternative is the result of extensive engineering, environmental assessment and public outreach as described in the DEIS and SDEIS. The major refinements and changes from the DEIS Build Alternative, as described in the SDEIS, included:

- Location of two new tracks along the NEC shifted to the south side of the NEC to reduce construction and operational risks to NEC service;
- Station cavern designed to fit within the West 34th Street right-of-way to eliminate impacts to the properties on the north side of West 34th Street. The cavern depth was increased to allow sufficient rock cover over the cavern;
- Lower level NYPSE tail tracks that extend to the east eliminated due to their proximity to New York City Department of Department of Environmental Protection (NYCDEP) Water Tunnel No. 1.;
- Tunnels profile under the Hudson River and west side of Manhattan lowered to align with the new cavern depth. The deeper tunnels profile also eliminated risks associated with cut-and-cover construction and impacts to the Hudson River, Hudson River Bulkhead, Hudson River Park, Route 9A, and the LIRR Maintenance Shop;
- PSNY Connector eliminated as a result of the deeper tunnels which precluded the construction of a connection to existing PSNY at an acceptable operating grade; and
- The DEIS included six fan plant/construction access shafts in New York; Two New York fan plants were eliminated and the remaining two New York fan plant locations were moved to West 35th (two options) and West 33rd Streets to address concerns with less desirable locations on heavily traveled West 34th Street. Two optional fan plants in New York were also eliminated.

The further refinements to the SDEIS Build Alternative, described in this FEIS, include:

- NYPSE station cavern shifted 70 feet to the west to provide 200 feet of clearance from Water Tunnel No. 1;
- Upper level NYPSE tail tracks would cross over Water Tunnel No. 1 without New York City NYCDEP required clearance and were eliminated; however, an eastern extension could be built after the new Water Tunnel No. 3 becomes operational between 2013 and 2018. A buffer area would be constructed at the eastern edge of the NYPSE cavern so that a future connection could be constructed from the east instead of extending from the west. The operating plan evaluated in both the DEIS and SDEIS did not include the use of any tail tracks, and as such, there would be no operational impacts as a result of their elimination;
- Twelfth Avenue Fan Plant/Construction Access Shaft shifted to reduce footprint on Block 674; and
- Optional 35th Street Fan Plant location at 323 West 34th Street eliminated to avoid impacts to historic Hammerstein Ballroom.

B. STATEMENT OF NEED

As population west of the Hudson River and employment within Manhattan continues to grow, the need for a more extensive and reliable trans-Hudson commuter rail system into Manhattan has become increasingly important. Since the mid-1990s, the number of New Jersey residents working in New York City has grown from 229,800 to 252,300, an increase of nearly 10 percent. This growth has led to substantial increases in Manhattan-bound ridership on the NJ TRANSIT rail system (Chapter 3.1). By 2030, AM peak period travel demand to PSNY is projected to increase from 39,000 to 62,000 passengers without any additional rail capacity. Such demand would create additional crowding and bring the

unimproved system to a virtual halt. Based on crowding and associated delays, rail travel times would continue to increase as dwell times and passenger congestion escalate.

Future needs of midtown Manhattan-bound commuters from west of the Hudson River would strain even further the limited capacity of the existing trans-Hudson River roadway, bus, ferry, and commuter rail network. The major trans-Hudson crossings into Manhattan are either at or approaching capacity, jeopardizing the entire transportation system's reliability.

ARC addresses the following needs within the Frank R. Lautenberg Station-to-midtown Manhattan project area:

- **Increase capacity of the trans-Hudson commuter rail system, which is at capacity during peak travel periods** – Forecasts of service demand into Manhattan from west of the Hudson River suggest that demand for service would more than double by 2030, far exceeding existing available capacity. Capacity constraints at these tunnel ‘choke points’ severely limit NJ TRANSIT’s ability to accommodate existing and projected high frequency commuter rail service demands.
- **Provide new one-seat-ride service to midtown Manhattan from areas not served today** – NJ TRANSIT’s diesel-powered commuter lines do not offer direct one-seat-ride access to midtown Manhattan because only electric-powered trains are permitted to operate in the North River Tunnels into PSNY. Passengers on these rail lines must transfer at Newark Penn Station, Newark Broad Street Station or Frank R. Lautenberg Station for service to PSNY.

These rail services include:

- North Jersey Coast Line Bay Head Service, south of Long Branch
- Montclair-Boonton Line (stations west of Montclair State University Station)
- Pascack Valley Line, including New York MTA Metro-North express service to Rockland County
- Main and Bergen Lines, including New York MTA Metro-North express service on the Port Jervis Line to Orange County
- Raritan Valley Line

These areas do not provide one-seat rides for three reasons: (1) there is no physical connection from the Main/Bergen/Pascack Valley Line; (2) the rail lines are not electrified; and (3) there is no excess commuter rail capacity between Frank R. Lautenberg Station and midtown Manhattan. Several new service proposals are being studied separate from ARC that would need to terminate in Newark or Hoboken without adding new capacity into New York. These projects include: the Northern Branch project located between Tenafly and North Bergen, New Jersey, the Monmouth-Ocean-Middlesex Rail Line, West Trenton Line, West Shore Rail Line, the Lackawanna Cutoff, and Passaic-Bergen Diesel Multiple-Unit (DMU) Project.

New one-seat-ride service will improve access to midtown Manhattan, reduce travel time, and improve comfort and convenience to NJ TRANSIT commuters by eliminating transfers.

- **Provide a new station facility to relieve severely overcrowded and inadequate conditions at Penn Station New York** – PSNY is one of the nation’s oldest and busiest transportation facilities. The condition of the 100-year-old station presents challenges, the most prominent being capacity to accommodate increasing ridership demands, as well as maintaining safety and security. Peak hour and peak period operations at PSNY are constrained by track capacity and train maneuverability limitations. Limited capacity means that no new service could be added without major infrastructure investments. Three commuter rail operators share this 21-track facility, which must accommodate over 1,000 trains each weekday. The future operation of more trains, bi-level coaches and

platform/access improvements would exert more pressure on the antiquated passenger facilities at PSNY, some of which are inherent in the original design and cannot be corrected.

- **Eliminate commuter rail delays caused by unanticipated events or routine maintenance** – Having only two single-track Hudson River tunnels means that any service outage significantly reduces overall system flexibility, reliability and on-time performance.
- **Enhance commuter rail system safety and security** – Projected growth in the number of passengers arriving and departing PSNY requires station tracks, platforms, and vertical circulation systems designed to better accommodate these higher volumes that strain PSNY. On-going maintenance and improvements needed to address fire and life safety issues for the two existing single-track tunnels leading into PSNY require that a single tunnel track be taken out of service, resulting in reduced passenger service or delays.
- **Provide increased rail capacity to meet growth in west-of-Hudson population and jobs in New York City** – Of the more than 500,000 daily commuters to New York City from the suburbs north, east and west of Manhattan, more than 270,000 live west of the Hudson River in New Jersey (Bergen, Passaic, Essex, Hudson, Union, Morris, Warren, Sussex, Hunterdon, Somerset, Middlesex, Monmouth, Ocean, and Mercer counties) and in Orange and Rockland counties in New York. According to the North Jersey Transportation Planning Authority (NJTPA) 2030 Access & Mobility Regional Transportation Plan for Northern New Jersey, regional growth would continue at a steady pace over the next 25 years.
- **Increase capacity of the trans-Hudson transportation system, which is at or near capacity during peak travel periods** - The high volumes of traffic have outstripped crossing capacity, leading to a reduction in travel speeds, increased congestion, chronic delays and expanded peak travel hours.

GOALS AND OBJECTIVES

Five goals have been established that address the transportation system capacity, reliability, connectivity, and economic purposes of ARC. Specific objectives have been identified through dialogue with the public, stakeholders and agencies in support of these goals (see Chapters 12 and 13 or Appendix 12 for a list of public participation stakeholders, Technical Advisory Committee and Regional Citizens Liaison Committee members), to provide the basis for evaluating whether identified alternatives meet the overall purpose and need for the project. The goals and objectives are listed below.

- **Improve Trans-Hudson Mobility**
 - Expand transit capacity to meet current and forecast demand between midtown Manhattan and points in New Jersey and New York
 - Increase transit ridership
 - Extend the reach and improve the connectivity of the region's commuter rail systems
 - Increase direct one-seat-ride opportunities to new markets
 - Improve access, travel time, comfort, convenience, and reliability of the region's commuter rail systems
- **Maintain a Safe, Secure and Reliable Transit System**
- **Utilize, Improve, and Expand the Capacity of the Region's Existing Transit Infrastructure to the Maximum Extent Possible**
 - Maximize the use of and expand the capacity of existing transportation facilities
 - Enhance PSNY network rail and passenger capacity and operating reliability

- Coordinate with other transit providers and ongoing transportation-related studies in the region to achieve efficiencies and synergy
- Implement improvements that optimize the maintainability of the PSNY-related infrastructure to sustain transit operations over the long-term
- **Maintain and Enhance the Economic Viability of the Region**
 - Support transit-oriented land uses that are consistent with New Jersey and New York Smart Growth policies
 - Support the West Midtown residential and commercial development initiatives
 - Ensure accessibility to jobs in Manhattan, New Jersey and New York
 - Improve transit connectivity to support the region’s economic viability and continuing development
- **Preserve and Protect the Environment**
 - Avoid/minimize adverse impact on communities and neighborhoods
 - Preserve and enhance the natural and built environment
 - Improve air quality by providing rail transit alternatives that contribute to reduced vehicle miles traveled and vehicle emissions
 - Work towards achieving compliance with the Clean Air Act

C. PROCESS AND DECISION-MAKING TO DATE

This FEIS was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, 49 USC Sections 501(e), 5323(b) and 5324(b), Section 106 of the National Historic Preservation Act of 1966, the New Jersey Register of Historic Places Act, the New York State Historic Preservation Act of 1980, the New York State Environmental Quality Review Act (SEQRA), the New York City Environmental Quality Review (CEQR) and the Council on Environmental Quality (CEQ) guidelines, which provide for a full and open evaluation of social, economic, and environmental issues and alternatives for the ARC project. The FEIS has also been prepared in support of, and consistent with, the FTA Major Capital Investment analysis process (“New Starts” process), as explained in Chapter 9.

The ARC project arose from a Major Investment Study (MIS) conducted from 1995 to 2003 by FTA, NJ TRANSIT, the Port Authority of New York and New Jersey (PANYNJ), and the Metropolitan Transportation Authority (MTA) to consider options for improving access between midtown Manhattan (the region’s core) and growing populations west of the Hudson River in both New Jersey and New York. The MIS concluded that the best alternatives to consider were those that used the existing New Jersey commuter rail network. The *ARC MIS Summary Report* was issued in 2003.

The MIS findings led to the decision by NJ TRANSIT, in partnership with PANYNJ, to prepare a DEIS to consider alternatives to improve trans-Hudson access and mobility, focusing on a commuter rail solution that terminated at PSNY, and provided not only additional train capacity into midtown, but also new passenger station capacity.

The ARC EIS scoping process identified eight Build Alternatives, identified in the *Appendix 2 Alternatives Development Process Report*. As described in this report, the proposed 34th Street Station alternative was selected for further study.

The NJ TRANSIT Board of Directors, at its July 2005 meeting, selected the Build Alternative as the Locally Preferred Alternative (LPA). Since the Build Alternative would be located within two states, two metropolitan planning organizations (MPO)—the North Jersey Transportation Planning Authority (NJTPA) and the New York Metropolitan Transportation Council (NYMTC)—adopted the Build Alternative as the LPA. NJTPA adopted it on September 12, 2005, and NYMTC adopted it on March 15, 2006. The designation of the LPA by the MPOs is an important step in the development of the project. The MPO members review the details of the project and agree that the project will be included in the MPO's fiscally constrained regional plan and Transportation Improvement Program (TIP). The LPA was subsequently included in fiscally-constrained long-range regional transportation plans for both NYMTC and NJTPA and has been included in NJTPA's TIP.

On February 9, 2007, FTA and NJ TRANSIT issued the ARC DEIS. Public hearings were held in Newark and North Bergen, New Jersey on March 13 and 14, 2007, respectively, and in New York City on March 27, 2007. In addition, public information meetings were held in Rockland and Orange Counties, New York on March 20 and 22, 2007, respectively. The 45-day comment period was extended for 15 days and closed on April 10, 2007.

Based on the comments received at the public hearings, information meetings, and through an extensive public outreach program, NJ TRANSIT refined the Build Alternative. This Refined Build Alternative, as it was referred to in the SDEIS, also had the benefit of incorporating findings from concurrent Preliminary Engineering, such as additional geotechnical information regarding the rock profile under West 34th Street. These refinements, which include the elimination of the connection between the new tunnels and PSNY, avoid, minimize, or mitigate project impacts without sacrificing rail service benefits. While the Refined Build Alternative still allowed 48 TPH into midtown Manhattan, some flexibility was lost with the elimination of the connector to PSNY. These refinements resulted in the need to prepare a SDEIS to give the public an opportunity to review these refinements and provide comments.

The SDEIS was issued on March 14, 2008. This document described the proposed physical and operational refinements to the Refined Build Alternative, environmental impacts and benefits resulting from the refinements, and reasons for the refinements. Public hearings on the SDEIS were held in Newark, New Jersey and New York City on March 31 and April 1, 2008, respectively, and the 45-day SDEIS public comment period closed on April 28, 2008.

This FEIS is an update from the SDEIS of the physical and operational characteristics of the Build Alternative and the resulting environmental benefits, impacts, and mitigation. Additional analyses were also undertaken to comply with New York City agency environmental guidelines. The FEIS presents No Build and Build conditions for a horizon year of 2030. The FEIS 2030 forecast year represents the FTA required 25-year horizon, starting from the year in which the DEIS Build Alternative environmental analysis began.

DEVELOPMENT OF THE BUILD ALTERNATIVE

OVERVIEW

The DEIS Build Alternative included the construction of two new tracks, one on each side of the NEC east of Frank R. Lautenberg Station, tunnels under the Palisades and the Hudson River, a connection to existing PSNY, and new station capacity (NYPSE) under West 34th Street between Eighth and Sixth Avenues (with tail tracks extending to Fifth Avenue) in midtown Manhattan. As a result of public comments, agency coordination, Preliminary Engineering, and additional geotechnical investigations, the DEIS Build Alternative was refined. These refinements, as presented in the SDEIS, included shifting the new tracks in New Jersey to the south side of the NEC, a deeper station cavern under West 34th Street and deeper tunnels profile under the west side of Manhattan and under the Hudson River, and the elimination

of the tunnel connection to existing PSNY. Based on continued project design and public and agency outreach subsequent to the SDEIS, additional design refinements were made and are incorporated into the Build Alternative presented in the FEIS. The FEIS Build Alternative, in response to comments from NYCDEP regarding the proximity of NYPSE to Water Tunnel No. 1, includes a station cavern that is shifted 70 feet further to the west away from Water Tunnel No. 1 and the elimination of tail tracks. Further refinements to the design of the Build Alternative in the FEIS include the location of fan plants, including the elimination of the Optional 35th Street Fan Plant west of Eighth Avenue.

DEIS BUILD ALTERNATIVE

The Build Alternative, as presented in the February 2007 ARC DEIS, included infrastructure improvements to relieve the trans-Hudson commuter rail system's capacity constraints. Key elements of the DEIS Build Alternative were:

1. A new direct connection at Secaucus between the Main, Bergen County and Pascack Valley lines and the NEC;
2. New track capacity along the NEC between Frank R. Lautenberg Station and the Palisades in New Jersey;
3. Two new single-track tunnels under the Palisades in New Jersey and the Hudson River with continuation of these two tunnels under the west side of Manhattan;
4. A connection to existing PSNY tracks;
5. A connection to new station capacity (NYPSE), under West 34th Street between Eighth and Sixth Avenues, adjacent to PSNY;
6. A mid-day storage yard on the Koppers Coke site in Kearny, New Jersey;
7. Six NYPSE station entrances and three optional NYPSE station entrances; and
8. Two fan plant/construction access shafts in New Jersey, six fan plant/construction access shafts in New York, and two optional fan plant/construction access shafts in New York.

As envisioned in the DEIS, the tunnels under the Palisades in New Jersey would be deep enough for bored tunnel construction to minimize surface impacts. Under the Hudson River, the tunnels would begin to rise to connect with the tracks at PSNY. This connection would have required cut-and-cover construction through Hudson River Park and properties on the west side of Manhattan. Two tunnel-grade options, 2% and 3%, were evaluated for the connection to PSNY. The 2% option resulted in greater disruption to the Hudson River bottom, the historic Hudson River Bulkhead and Hudson River Park, but was less desirable operationally.

Comments received from agencies, elected officials and the public during the DEIS circulation period (see Chapter 18) identified three general areas of concern, as well as other areas of concern:

- Service disruptions to NJ TRANSIT and Amtrak passengers during construction of additional track capacity between Frank R. Lautenberg Station and the proposed tunnels portal, as designed to interconnect with existing NEC tracks;
- Impacts to natural and historic resources as a result of the shallow (5 to 25 feet) tunnels under the Hudson River; and
- Impacts to the west side of Manhattan as a result of cut-and-cover construction to build the connection to PSNY and fan plants on both West 34th Street and Eighth Avenue.

SDEIS REFINED BUILD ALTERNATIVE

Subsequent to the DEIS, the Build Alternative was refined through further environmental analysis, design, and agency and community outreach. This analysis was supplemented by additional studies and analyses completed as part of the project's Preliminary Engineering. The findings of the Preliminary Engineering effort that were incorporated into the design of the Refined Build Alternative are documented in FEIS Appendix 2, FEIS Build Alternative Alignment Routing and Station and Ancillary Facility Location Selection.

The design effort was guided by considerations such as constructability, avoidance and minimization of environmental and community impacts, cost, and achievement of the desired 48-trains-per-hour-service objective. These refinements, which would avoid, minimize, or mitigate project impacts without sacrificing project benefits, resulted in the need to prepare a SDEIS.

Of the six elements in the DEIS Build Alternative, five elements were retained and one element, the connection to existing PSNY, was eliminated in the Refined Build Alternative. The Refined Build Alternative also included a change in the alignment along the NEC in New Jersey and a deeper profile for NYPSE in Manhattan.

The ARC SDEIS evaluated a Refined Build Alternative. Key elements of the SDEIS Refined Build Alternative were:

1. A new direct connection at Secaucus between the Main, Bergen County and Pascack Valley lines and the NEC;
2. New track capacity along the NEC between Frank R. Lautenberg Station and the Palisades in New Jersey;
3. Two new single-track tunnels under the Palisades in New Jersey and the Hudson River with continuation of these two tunnels under the west side of Manhattan;
4. A connection to new station capacity (NYPSE), under West 34th Street between Eighth and Sixth Avenues, adjacent to PSNY;
5. A mid-day storage yard on the Koppers Coke site in Kearny, New Jersey;
6. Five NYPSE station entrances, three Americans with Disabilities Act (ADA) compliant elevator entrances, and one ADA compliant elevator entrance for employee use only; and
7. Two fan plant/construction access shafts in New Jersey, four fan plant/construction access shafts in New York, and one optional fan plant/construction access shafts in New York.

Changes to the NYPSE station depth and the elimination of the connection to PSNY were based on a Geotechnical Borings Program conducted during Preliminary Engineering. With regard to the NYPSE station depth and elimination of the PSNY connection, geotechnical investigations indicated that the rock profile, particularly under West 34th Street, was lower than anticipated and was characterized by two locations of former stream beds or ponds, fault zones (fractured rock), and incompetent rock between Eighth and Sixth Avenues. The rock cover above NYPSE would have been shallow and of poor quality. The Preliminary Engineering team and underground peer review experts judged that the minimum rock cover, the station's proximity to existing underground vaults and deep building foundations, and the resulting need for extensive cut-and-cover construction along West 34th Street, would have significant construction and geotechnical risk. Based on these findings, the cavern depth was increased to approximately 90' below street level to allow for sufficient rock cover of adequate quality.

The deeper station design would require a deeper tunnels profile under the Hudson River and west side of Manhattan to align with NYPSE and to avoid impacts to New York City Transit's (NYCT) proposed No.

7 line subway extension. The deeper tunnels under the Hudson River and the west side of Manhattan would avoid risks associated with impacts to the river bottom and west side properties. In addition, the connection to existing PSNY was eliminated because the deeper tunnels profile precluded the construction of an operationally-feasible connection.

FEIS BUILD ALTERNATIVE

All five elements of the SDEIS Refined Build Alternative are retained in the FEIS Build Alternative. However, since the publication of the SDEIS, the advancement of Preliminary Engineering, public outreach and agency concerns have resulted in further refinements to the SDEIS Build Alternative. As a result of on-going coordinating and outreach with NYCDEP, the NYPSE tail tracks were eliminated and the station cavern was shifted to avoid conflicts with New York City Water Tunnel No. 1. During the SDEIS public review, concerns raised with regard to the historic Hammerstein Ballroom, in combination with Preliminary Engineering, led to the elimination of the Optional 35th Street Fan Plant at 323 West 34th Street. A full description of the FEIS Build Alternative is documented in the *FEIS Engineering Report*.

The key infrastructure elements of the FEIS Build Alternative include:

1. A new direct connection at Secaucus between the Main, Bergen County and Pascack Valley lines and the NEC in New Jersey;
2. New track capacity along the NEC between Frank R. Lautenberg Station and the Palisades in New Jersey;
3. Two new single-track tunnels under the Palisades in New Jersey and the Hudson River, with continuation of these two tunnels under the west side of Manhattan;
4. A connection to new station capacity (NYPSE), under West 34th Street between Eighth and Sixth Avenues, adjacent to PSNY;
5. A mid-day storage yard on the Koppers Coke site in Kearny, New Jersey;
6. Five NYPSE station entrances, three Americans with Disabilities Act (ADA) compliant elevator entrances, and one ADA compliant elevator entrance for employee use only; and
7. Two fan plants/construction access shafts in New Jersey and four fan plants/construction access shafts in Manhattan.

D. PROJECT ALTERNATIVES

A No Build Alternative and Build Alternative are addressed in detail in this FEIS (see Chapter 2). A Transportation System Management (TSM) Alternative, including use of buses, ferries and other modes, was identified and eliminated early in the DEIS process, since it did not achieve the goals and objectives of ARC stated above. The alternatives development and screening process is described in FEIS Appendix 2, *Alternatives Development Process Report*.

NO BUILD ALTERNATIVE

The No Build Alternative includes planned improvements in New Jersey and New York for which the need, commitment, financing, and public and political support have been identified, and which could reasonably be expected to be implemented by 2030. The No Build Alternative includes assumptions and conditions regarding future regional transit service, such as NEC off-peak train service, bus operations, rolling stock, and ferry service, as well as anticipated changes in tolls, fares and energy costs. The No Build Alternative includes both committed improvements that have recently been completed or are programmed, such as the Long Island Rail Road's East Side Access project, New York City's Hudson

Yards redevelopment and New York City Transit's Second Avenue Subway project, as well as planned improvements that are included in a fiscally constrained long-range plan for either the New Jersey or New York MPO. The No Build Alternative also includes ongoing improvements by NJ TRANSIT to the existing commuter rail network west of Frank R. Lautenberg Station. These improvements are being advanced independently of implementation of the Build Alternative and are identified in Chapter 2.

The Portal Bridge Capacity Enhancement Project is included in the No Build, and is necessary for the operation of the Build Alternative service plan as described in this FEIS. The Portal Bridge Capacity Enhancement Project is sponsored by NJ TRANSIT with the Federal Railroad Administration (FRA) as the lead federal agency under NEPA. FTA finds the improvements to the Portal Bridge to be a prerequisite to any investment in the construction of the ARC project, and FTA will not issue an ARC Record of Decision (ROD) prior to the issuance of the Portal Bridge ROD. The Portal Bridge Capacity Enhancement Project FEIS was published in October 2008. The Portal Bridge project would begin construction in 2011 and be completed in 2017, in advance of the ARC Build Alternative, which is expected to be completed later in 2017.

FEIS BUILD ALTERNATIVE

The FEIS Build Alternative (referred to as the Build Alternative) includes service improvements throughout the west-of-Hudson area, as well as infrastructure improvements to the existing trans-Hudson commuter rail system necessary to relieve existing and forecast capacity constraints. As described previously, the Build Alternative consists of additional commuter rail tracks and connections on the NEC in New Jersey, new tunnels under the Palisades in New Jersey, the Hudson River and Manhattan, and connections to new station capacity and tracks under West 34th Street between Eighth Avenue and Sixth Avenue in Manhattan. New track connections, new dual-power locomotives and added tunnel capacity into midtown Manhattan would create the opportunity to provide one-seat-ride service into Midtown on five existing NJ TRANSIT rail lines that currently operate only diesel service to Newark, Secaucus or Hoboken, New Jersey.

The Build Alternative includes the following components: service plan, alignment, station, ancillary facilities, rail equipment, and maintenance and storage facilities. Key infrastructure elements are described within each of these components by geographic area. For example, key infrastructure elements, 1) a new direct connection at Secaucus, 2) new track capacity along the NEC, and 3) new tunnels under the Palisades in New Jersey, are described in the *Alignment* section while the new station capacity under West 34th Street is described in the *Station* section. **Table ES-1** provides a summary of these components and a more detailed description by component follows **Table ES-1**.

SERVICE PLAN

The Build Alternative service plan would provide over 1,200 weekday train trips, a 27 percent increase over No Build service levels, and a 70 percent increase over 2005 service levels. The Build Alternative peak hour 2030 service plan includes 48 trains per hour (TPH) in the AM peak hour from New Jersey into Manhattan (44 TPH for NJ TRANSIT and 4 TPH for Amtrak), compared to the No Build condition of 23 TPH (20 TPH for NJ TRANSIT plus 3 TPH for Amtrak). Of these 48 peak hour trains, 23 trains would be routed into existing station tracks at PSNY and 25 trains would be routed to NYPSE.

TABLE ES-1: BUILD ALTERNATIVE CHARACTERISTICS

COMPONENT	BUILD ALTERNATIVE
OPERATIONS	
Peak Hour Service Plan	48 TPH to New York; 23 TPH into PSNY and 25 TPH into NYPSE under West 34 th Street.
First Year of Construction	2009
First Year of Operation	2017
EIS Analysis Year	2030
Construction Cost (Year of Expenditure)	\$7.6 billion
Operations and Maintenance Costs (2007 dollars)	\$99.8 million
ALIGNMENT	
NEC Tracks in Secaucus and North Bergen	Two new tracks south of NEC from Frank R. Lautenberg Station in Secaucus to tunnels portal east of Tonnelle Avenue in North Bergen. Permanent Life Safety Emergency Access Roads constructed adjacent to the two new tracks. Two new tracks extended westward to connect to the proposed Portal Bridge Capacity Enhancement project at the Boonton Line crossing.
	Provision for future universal crossovers between new ARC tracks on south side of NEC and existing NEC Track 2 east of Frank R. Lautenberg Station.
Boonton Line Reconfiguration	Proposed Kearny Rail Yard access tracks aligned over the Norfolk Southern track to operationally separate the services. Construction of two additional tracks south of the existing Boonton Line to relocate and segregate Norfolk Southern functions from NJ TRANSIT infrastructure and operations.
NYS&W/Conrail Crossing	Elevated railroad structure following existing NEC profile (with embankment or structure approach) over NYS&W and Conrail. Location of Palisades tunnels construction access shaft and fan plant east of Tonnelle Avenue.
Hudson River Tunnels	Minimum 50-foot depth to top of tunnels below riverbed.
West Midtown Tunnel/Hudson River Bulkhead	Bored tunnels below the Hudson River Bulkhead, the landside portion of Hudson River Park, and Route 9A, with approximately 125-foot depth to top of tunnels.
Manhattan Tunnels Depth	Bored tunnels from Eleventh Avenue to Sixth Avenue with 100- to 145-foot depth to top of tunnel.
	Alignment crosses below NYCT proposed No. 7 Line subway. Rock separation of 11 feet between the proposed tunnels and the No. 7 Line.
	NYPSE cavern located 200 feet from existing Water Tunnel No. 1.
FRANK R. LAUTENBERG STATION	
Platforms	New island platform and associated expanded station areas on south side for trains using new ARC tunnels between two new south side tracks.

Source: Transit Link Consultants, 2008

TABLE ES-1: BUILD ALTERNATIVE CHARACTERISTICS (CONTINUED)

COMPONENT	BUILD ALTERNATIVE
NEW YORK PENN STATION EXPANSION	
Station Caverns	Three-over-three track/platform single-cavern arrangement between Eighth and Sixth Avenues. Single cavern contained within the public right-of-way of West 34 th Street. Six tracks to be outfitted.
Station Depth	Depth of station mezzanine of 153 feet beneath Seventh Avenue.
Vertical Circulation	Three (3) high-rise escalator banks located exclusively on the south side of station caverns and Sixth Avenue/Broadway, Seventh and Eighth Avenues.
Pedestrian Connections	Pedestrian linkages between NYPSE and the existing subway system, PSNY and street level.
Station Entrances	<p>Five (5) street entrances:</p> <ul style="list-style-type: none"> • Eighth Avenue Southeast –Southeast corner of Eighth Avenue and West 34th Street (460 – 474 Eighth Avenue) • Seventh Avenue Northwest –Northwest corner of Seventh Avenue and West 34th Street (450 Seventh Avenue/201 West 34th Street) • Seventh Avenue Southwest –Southwest corner of Seventh Avenue and West 34th Street (420 Seventh Avenue) • Broadway Northwest –Northwest corner of Broadway and West 34th Street (1313 Broadway) • Broadway Southwest –Southwest corner of Broadway and West 34th Street (1293 Broadway)
ADA Access/ Emergency Personnel Access	<p>Three ADA-compliant separate elevator station entrances:</p> <ul style="list-style-type: none"> • Southeast corner of Eighth Avenue and West 34th Street (West Side One Penn Plaza) • Southwest corner of Seventh Avenue and West 34th Street (East Side One Penn Plaza) • Southwest corner of Broadway and West 34th Street (110 West 34th Street) <p>One personnel-only ADA-compliant elevator station entrance:</p> <ul style="list-style-type: none"> • Mid-block on West 34th Street between Ninth and Eighth Avenues (323 West 34th Street)
Station Program Space (Station Space with No Public Access)	Cavern and mezzanine configuration designed to provide required program space underground for station operations and systems. Amount of station program space to be determined during ongoing Preliminary Engineering.
RAIL STORAGE YARD	
Maintenance and Storage Facilities	Equipment storage at new Kearny Rail Yard exclusively on Koppers Coke site (82 acres).
Morris and Essex Lines Connection	Replacement of historic Koppers Road Bridge. Maintain trackwork connection between M&E Lines and proposed Kearny Rail Yard.
West End Wye	Provide second West End Wye track to support 30 mph operations.

Source: Transit Link Consultants, 2008

TABLE ES-1: BUILD ALTERNATIVE CHARACTERISTICS (CONTINUED)

COMPONENT	BUILD ALTERNATIVE
ANCILLARY FACILITIES	
Tonnelle Avenue Fan Plant	Fan plant/construction access shaft on east side of Tonnelle Avenue in North Bergen.
Hoboken Fan Plant	Fan plant/access shaft in Hoboken 140 feet from nearest receptors.
Manhattan Fan Plants	<p>Four (4) fan plants/construction access shafts:</p> <ul style="list-style-type: none"> • Twelfth Avenue Fan Plant - Northeast corner of West 28th Street and Twelfth Avenue (281-295 Eleventh Avenue). • Dyer Avenue Fan Plant – Northeast corner of West 33rd Street and Dyer Avenue ramps (431 West 33rd Street) • 33rd Street Fan Plant – North side of West 33rd Street just east of Seventh Avenue (137-139 West 33rd Street) • 35th Street Fan Plant – South side of West 35th Street just west of Seventh Avenues (218-222 West 35th Street)
Ventilation Plenums	<p>Two (2) ventilation plenums connecting fan plants to station cavern:</p> <ul style="list-style-type: none"> • West 35th Street – connecting fan plant to west end of cavern • West 33rd Street – connecting fan plant to east end of cavern
Traction Power Substations	<ul style="list-style-type: none"> • Three (3) new traction power facilities: <ul style="list-style-type: none"> – New traction power substation to be located at the portal of the new tunnels, east of Tonnelle Avenue in North Bergen, New Jersey – New Amtrak switching station to be located east of Tonnelle Avenue in North Bergen, New Jersey – New traction power switching station to be located in NYPSE • Upgrades to four (4) Amtrak substations: Kearny Substation No. 41; Hackensack (Tonnelle) Substation No. 42; Penn Station 31st Street Switching Station No. 43A; and Penn Station Seventh Avenue Switching Station No. 43B • In-kind expansion of the electrification of NJ TRANSIT’s M&E Lines at Mason Substation No. 2.
Fan Plant Configuration	Designed to comply with neighborhood character on a site-specific basis.
Station Ventilation/ Cooling Tower	Cooling tower included in West 35 th Street Fan Plant.

Source: Transit Link Consultants, 2008

TABLE ES-1: BUILD ALTERNATIVE CHARACTERISTICS (CONTINUED)

COMPONENT	BUILD ALTERNATIVE										
INFRASTRUCTURE REQUIREMENTS											
Construction Types	<table border="0"> <tr> <td>At-grade</td> <td>1.7 miles</td> </tr> <tr> <td>Aerial Structure</td> <td>1.4 miles</td> </tr> <tr> <td>Embankment</td> <td>1.3 miles</td> </tr> <tr> <td>Retained Cut and Fill</td> <td>1.2 miles</td> </tr> <tr> <td>Tunnel</td> <td>3.7 miles</td> </tr> </table>	At-grade	1.7 miles	Aerial Structure	1.4 miles	Embankment	1.3 miles	Retained Cut and Fill	1.2 miles	Tunnel	3.7 miles
At-grade	1.7 miles										
Aerial Structure	1.4 miles										
Embankment	1.3 miles										
Retained Cut and Fill	1.2 miles										
Tunnel	3.7 miles										
NEC Tracks	New tracks on separate embankments or structures south of existing NEC, east and west of Frank R. Lautenberg Station.										
NYS&W/Conrail Crossing	Construction of new bridge over NYS&W and Conrail tracks.										
Palisades Tunnels Construction Access Shaft	Tunnels under Tonnelle Avenue and open cut to the east, to a construction access shaft east of Tonnelle Avenue (and west of Paterson Plank Road) to commence TBM construction through Palisades. Additional staging area contiguous to the Tonnelle Avenue fan plant, requiring displacement of fast food restaurant and self-storage facility.										
Hudson River Tunnels	Minimum 50-foot depth to top of tunnels below riverbed.										
West Midtown Tunnels/Hudson River Bulkhead	Boring under landside portion of Hudson River Bulkhead, Hudson River Park, and Route 9A to West 34 th Street east to Sixth Avenue. Construction access shaft at Twelfth Avenue between West 29 th and West 28 th Streets to receive Hudson River TBM and to commence Manhattan TBM operations.										
Station Entrances	Cut-and-cover construction on West 34 th Street and adjacent sidewalks at Sixth Avenue/Broadway, Seventh and Eighth Avenues for proposed station entrances and mezzanines.										
Utilities	<p>Utilities relocation. Expected work limited to along Eighth Avenue between West 34th and West 33rd Streets, and along West 34th Street just west of Seventh Avenue and Sixth Avenue.</p> <p>Temporary relocation of storage areas from western part of Con Edison site (Block 674) one block north to a portion of adjacent Block 675</p>										
Excavated Tunnels Material Removal	From construction access shafts (future fan plant sites) in North Bergen, Hoboken, Twelfth Avenue, Dyer Avenue, West 33 rd Street and West 35 th Street sites.										
Haul Routes	I-495, NJ Turnpike, Tonnelle Avenue, JFK Boulevard East, and Route 7 in NJ and Twelfth Avenue and West 33 rd Street, West 35 th Street and Dyer Avenue in Manhattan.										

Source: Transit Link Consultants, 2008

The Build Alternative service plan would introduce one-seat-ride dual-power service to NYPSE on the following NJ TRANSIT rail services that currently require passengers to change trains at Newark Penn Station or Frank R. Lautenberg Station:

- North Jersey Coast Line (NJCL) Bay Head Service, south of Long Branch
- Montclair-Boonton Line, west of Montclair
- Pascack Valley Line, including New York MTA Metro-North Railroad (Metro-North) express service to Rockland County
- Main and Bergen County Lines, including New York MTA Metro-North express service on the Port Jervis Line
- Raritan Valley Line (service currently terminates at Newark Penn Station)

The Build Alternative service plan also includes an increase in peak-period Amtrak service to and from Manhattan from 3 TPH to 4 TPH, which takes into account Amtrak's contractual peak slot allotment, based on an existing agreement between Amtrak and NJ TRANSIT.

BUILD ALTERNATIVE ALIGNMENT

The Build Alternative conceptual alignment is shown on **Figures ES-3** and **ES-4**. The alignment description is presented by geographic segments: New Jersey, Hudson River and New York.

New Jersey

New Track Capacity Along the NEC

Two new tracks would be constructed parallel to and south of the NEC from the proposed Secaucus Connection loop tracks to the new tunnels portal entrance east of Tonnelle Avenue in North Bergen. These two new tracks along the NEC would each be approximately 13,000 feet long. The tracks would be aligned on a combination of viaducts and embankments through the Malanka Landfill in the New Jersey Hackensack Meadowlands District. The two new tracks would be offset from the NEC by 25 to 35 feet to avoid disruption to NEC operations and would be extended westward to connect to the proposed Portal Bridge Capacity Enhancement Project at the Boonton Line crossing. This design would allow for a future track connection to the existing NEC east of Frank R. Lautenberg Station. Permanent Life Safety Emergency Access Roads would be constructed alongside the two new tracks.

Secaucus Connection

For the proposed Secaucus Connection loop tracks alignment, the Main Line tracks south of Frank R. Lautenberg Station would be raised to allow the Secaucus Connection tracks to run at-grade as they would curve to connect to the NEC and new tracks via the former Boonton Line. The connection from the Main, Bergen County and Pascack Valley and Port Jervis lines to the NEC and new ARC tunnels would create a direct, one-seat ride for passengers from Northern New Jersey and Orange and Rockland counties in New York to Midtown. This project element would replace some of the current service at Frank R. Lautenberg Station for the Main, Bergen County, and Pascack Valley lines trains, which is provided at the lower platform level, and from which passengers must transfer to upper level platforms along the NEC for service to PSNY, or to continue south to Hoboken for service to New York via ferries or PATH. The loop tracks would be aligned to the south and east to connect to the two new tracks south of the NEC.

A new island platform and associated expanded areas would be provided at Frank R. Lautenberg Station between the two new south side tracks for intra-state and inter-state passenger travel.



Access to the Region's Core
Final Environmental Impact Statement

Figure ES-3
ARC Build Alternative
Proposed Alignment (NJ)

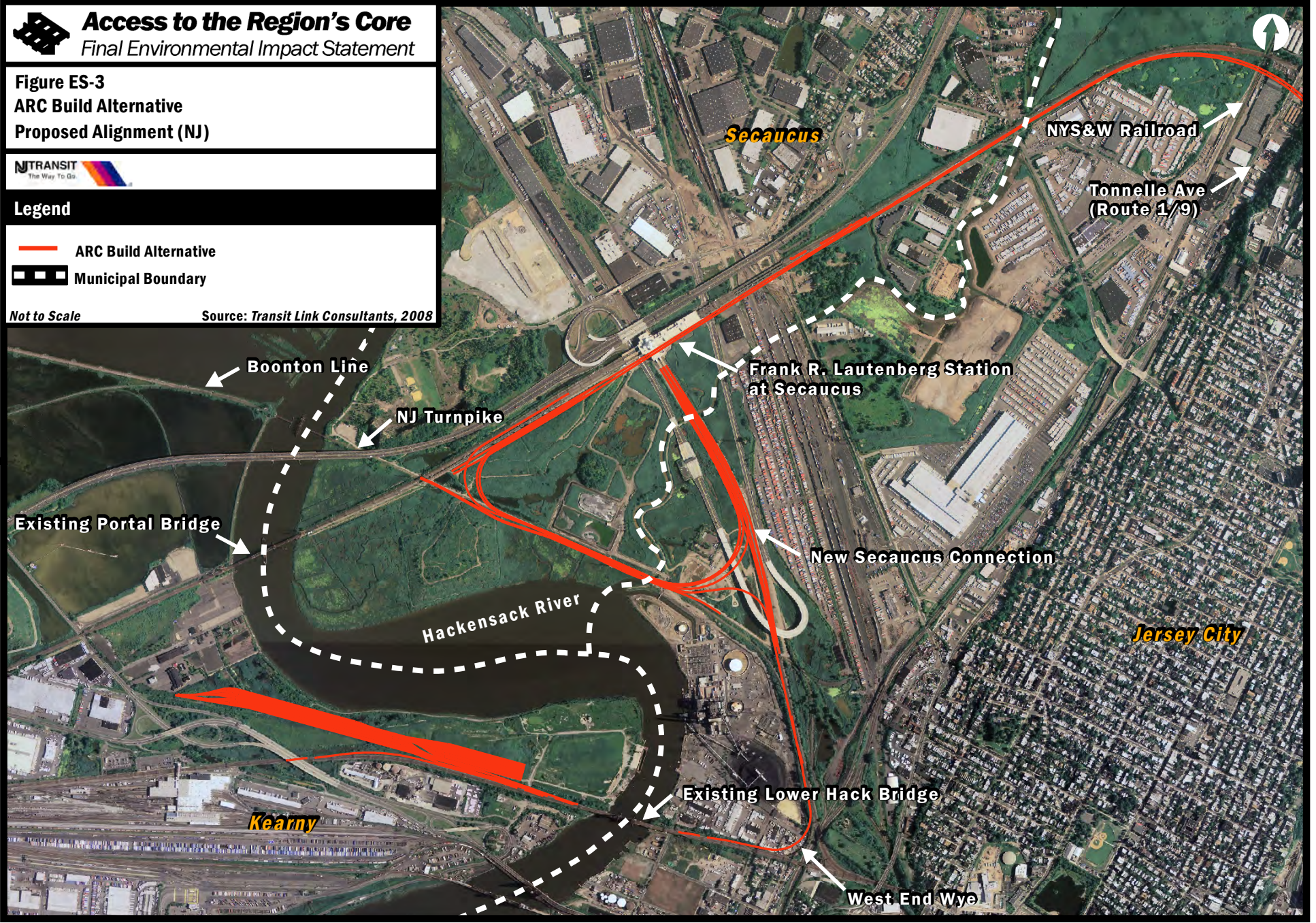


Legend

-  ARC Build Alternative
-  Municipal Boundary

Not to Scale

Source: Transit Link Consultants, 2008





Access to the Region's Core

Final Environmental Impact Statement

Figure ES-4

ARC Build Alternative Proposed Alignment
(Palisades, Hudson River, and New York)

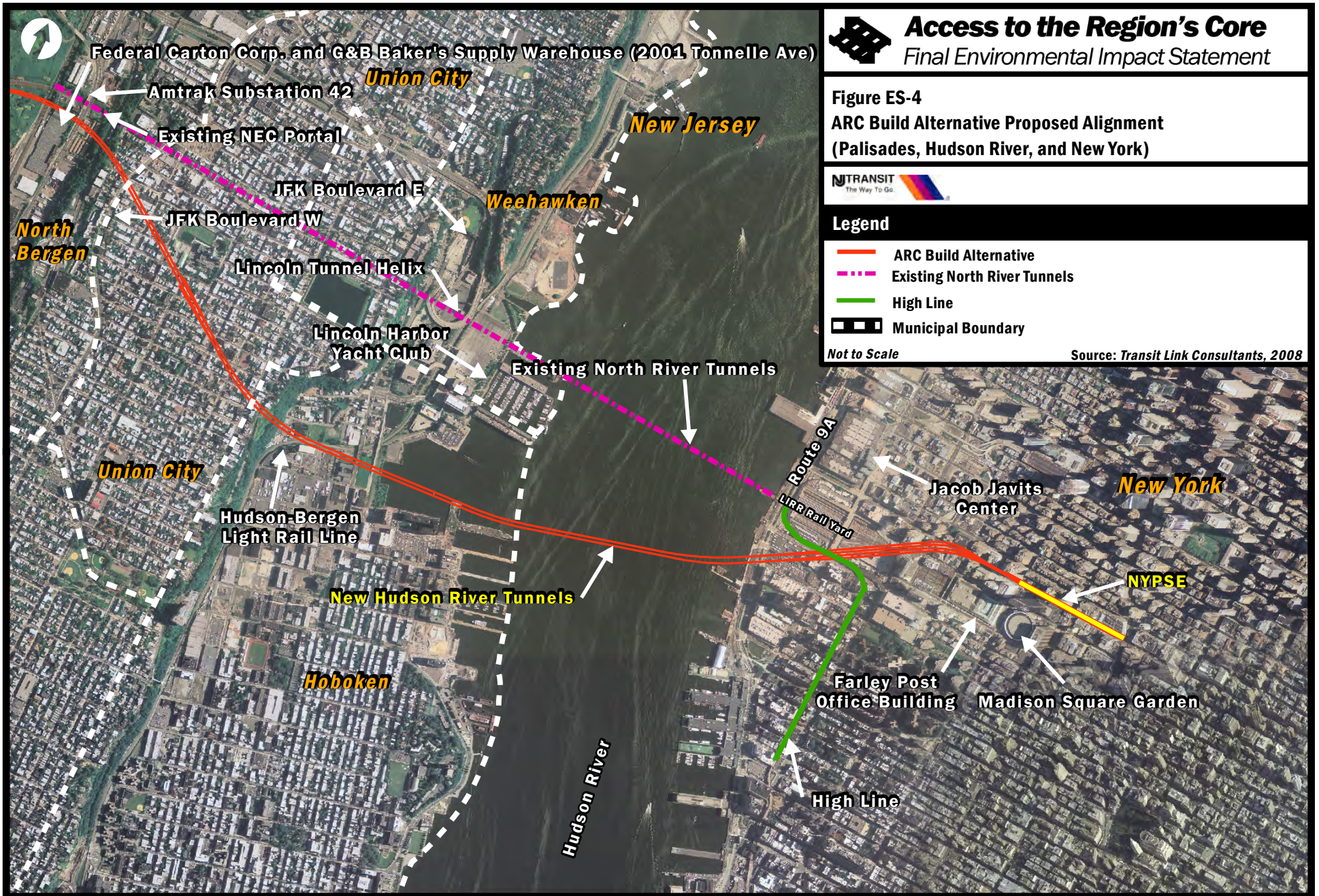


Legend

- ARC Build Alternative
- Existing North River Tunnels
- High Line
- Municipal Boundary

Not to Scale

Source: Transit Link Consultants, 2008



Connection to Kearny Yard

A proposed track connection between the Norfolk Southern (former Boonton Line) and Main Line to the proposed Kearny Rail Yard in Kearny, New Jersey would allow NJ TRANSIT trains to operate without impacting existing Norfolk Southern freight operations. At the West End Wye, where the Main Line tracks and the Morris and Essex Line meet, a higher-speed track connection (30 mph) would be built and combined with the existing slower-speed single track (10 mph) to support train moves to and from the proposed Kearny Rail Yard. The new higher-speed track connection would require demolition of wingwalls and abutments of the historic-eligible James Avenue Bridge in Jersey City as part of construction of a new bridge to carry Build Alternative tracks over the Morris and Essex Lines.

Palisades Tunnels

The two new tracks south of the NEC would be aligned on an elevated structure to cross over the NYS&W and Conrail tracks east of Secaucus Road. The tracks would then be aligned under Tonnelle Avenue in North Bergen to a new tunnels portal and then continuing under the Palisades in North Bergen, Union City and Hoboken. The Palisades is a natural geologic rock formation with an approximate height of 250 feet (in relation to the proposed tunnels elevation) running north-south through New Jersey and New York from just west of the Hudson River and extending to the Hackensack Meadowlands. The portal for the New Jersey tunnels would be located 700 feet east of the NYS&W and Conrail tracks on the east side of Tonnelle Avenue. The two tunnels east of Tonnelle Avenue, through the Palisades to the Hudson River, would each be approximately 1.3 miles in length and aligned at an average depth of 250 feet. For the safety of passengers in the proposed Build Alternative tunnels in New Jersey, the Hudson River and New York, cross-passages between the tunnels would be constructed at approximately 800-foot intervals, with fire doors at each end.

Hudson River

A Tunnel Boring Machine (TBM) would be used to build two single-track tunnels, each 5,540 feet long with an inside diameter of 24 feet 6 inches, under the Hudson River from the western shore line to the eastern shore line. (The overall length of the Hudson River tunnels from the Hoboken construction access shaft to the Twelfth Avenue construction access shaft would be 7,480 feet.) The Build Alternative tunnels would have a minimum of 50 feet of cover between the top of the tunnels and the riverbed. Tunnels grades under the river would range from 0.3 to 0.8 percent.

The top of the Build Alternative tunnels would be 127 feet below grade where they would cross below the historic Hudson River Bulkhead and 31 feet below the timber piles supporting the bulkhead structure. The southernmost of the two Hudson River tunnels of the Build Alternative would pass 17 feet north of Pier 66 and about 95 feet below the riverbed.

New York

The new rail tunnels to NYPSE would be bored, with the top of the uppermost tunnels at depths varying from 100 to 145 feet in Manhattan. The new tunnels would cross below the proposed NYCT No. 7 Line subway extension. The NYPSE design does not preclude future rail extension to the east.

The track connection from the new ARC tunnels to NYPSE has been designed to achieve a 30 mph speed at which trains would approach the station, resulting in optimum station capacity. This configuration would achieve the 48 TPH ARC service goal.

*NEW YORK PENN STATION EXPANSION (NYPSE)**Cavern Configuration*

NYPSE would be configured as a single, 3-track-over-3-track cavern that would fit within the public right-of-way limits of West 34th Street between Eighth and Sixth Avenues. The station would have an upper and lower track level with a mezzanine in between. The NYPSE mezzanine would be at a depth of 153 feet beneath Seventh Avenue. The station would have center-island and side platforms that would accommodate 12-car multiple-unit trainsets or a dual-power locomotive with 11 coaches. The cavern width would be 96 feet. Six station tracks would be utilized to achieve the proposed service plan. There would be two rescue locomotive storage tracks, each providing 120 feet of storage length, one located on the upper level and one on the lower level of the west end of NYPSE. The ability to store rescue locomotives within NYSPE would provide additional operations reliability in the event of equipment failure.

NYPSE Entrances

Five street-level entrances with three sets of high-rise escalators to the NYPSE mezzanine would be provided to meet anticipated passenger demand. The locations for the proposed street entrances could change during design, but would remain at the intersections of Eighth Avenue, Seventh Avenue, and Sixth Avenue/Broadway with West 34th Street.

- Eighth Avenue Southeast: Southeast corner of Eighth Avenue and West 34th Street (460 – 474 Eighth Avenue)
- Seventh Avenue Northwest: Northwest corner of Seventh Avenue and West 34th Street (450 Seventh Avenue/201 West 34th Street)
- Seventh Avenue Southwest: Southwest corner of Seventh Avenue and West 34th Street (420 Seventh Avenue)
- Broadway Northwest: Northwest corner of Broadway and West 34th Street (1313 Broadway)
- Broadway Southwest: Southwest corner of Broadway and West 34th Street (1293 Broadway)

Underground pedestrian connections would be provided to existing PSNY, the NYCT subway stations at Eighth, Seventh and Sixth Avenues and Broadway, and PATH at Sixth Avenue.

Elevator Entrances

The Build Alternative would include three additional locations, distinct from the above-street entrances, for three pairs of elevators to provide for public access to NYPSE, in compliance with the Americans with Disabilities Act (ADA). An additional stairway in each of the elevator bank locations would provide emergency egress and ingress by emergency personnel. The Build Alternative would also include an ADA Access/Emergency Personnel Access elevator entrance for employee use only with two emergency access/egress stairways and one ADA elevator. The addresses for the following elevator entrances could change during design, but would remain in the same general locations:

- Southeast corner of Eighth Avenue and West 34th Street (West Side One Penn Plaza)
- Southwest corner of Seventh Avenue and West 34th Street (East Side One Penn Plaza)
- Southwest corner of Broadway and West 34th Street (110 West 34th Street)
- Employee Only/Emergency Personnel Access entrance – Mid-block on West 34th Street between Ninth and Eighth Avenues (323 West 34th Street)

ANCILLARY FACILITIES

Fan Plants/Construction Access Shafts

During Build Alternative construction, each proposed fan plant site in New Jersey and New York would be used as a shaft for access from the surface to the tunnel caverns. Therefore, depths of excavation for these shafts would vary, depending on the depth of the respective tunnels caverns at that particular location. Existing buildings or structures on these sites would need to be demolished or removed, depending on their location on the site relative to Build Alternative construction requirements. At the Tonnelle Avenue Fan Plant construction site, a public storage facility and restaurant will be demolished. At the Hoboken Fan Plant construction site, three one- or two- story industrial buildings will be demolished. At the Twelfth Avenue Fan Plant construction site, one-story storage sheds will be demolished. At the Dyer Avenue Fan Plant construction site, a parking lot will be demolished. At the 35th Street Fan Plant construction site, a two-story commercial/retail building will be demolished. At the 33rd Street Fan Plant construction site, three one-story eateries will be demolished. Demolition materials from existing structures and excavated tunnels material would be removed from each of the fan plant/construction access shafts.

Once the tunnels are completed, fan plants would be constructed on the shaft sites. The fan plant buildings would be designed to be compatible with surrounding structures. The fan plants would operate during fire emergency situations to control the movement of smoke to facilitate passenger evacuation. Tunnel fan operation may also be required to remove train-generated heat under congested, slow-moving operation during the summer months when temperatures in the tunnels could exceed 115 degrees. Tunnel ventilation fans would also be operated during routine maintenance and testing, approximately once a month. The fan plants serving the station would only operate during a fire emergency and during routine maintenance and testing. The station HVAC fan systems, which will be located at the station mezzanine level, would operate continuously, at a relatively low velocity.

New Jersey

To meet Palisades and Hudson River tunnels ventilation requirements in New Jersey, two fan plants are proposed:

- On the east side of Tonnelle Avenue in North Bergen, 250 feet from the nearest residential neighborhood on Paterson Plank Road.
- In northern Hoboken just north of the Adams Street Water Treatment Facility and the Hudson-Bergen Light Rail Transit (HBLRT) alignment, 140 feet from the nearest residential neighborhood, which is in Weehawken.

New York

To meet Hudson River and Manhattan tunnels ventilation requirements and NYPSE ventilation requirements, four fan plants are proposed:

- Twelfth Avenue Fan Plant: Northeast corner of West 28th Street and Twelfth Avenue (281-295 Eleventh Avenue/Block 674) (tunnels ventilation)
- Dyer Avenue Fan Plant: Northeast corner of West 33rd Street and Dyer Avenue ramps (431 West 33rd Street) (tunnels ventilation)
- 33rd Street Fan Plant: North side of West 33rd Street just east of Seventh Avenue (137-139 West 33rd Street) (NYPSE ventilation)
- 35th Street Fan Plant: South side of West 35th Street just west of Seventh Avenue (218-222 West 35th Street) (NYPSE ventilation)

Drainage

Pumps would be required at low points to remove stormwater entering through the tunnels portals, through seepage in the tunnels liner and at ventilation shafts, and fire-fighting operations. Stormwater would be released to existing waterways after attenuation and application of “Best Management Practice” pollution control measures.

Railroad Systems

The Build Alternative Railroad Systems, which include traction power, communications and signaling, are designed to be operable from either the existing Rail Operation Center (ROC) in New Jersey, or the proposed Station Operation Center (SOC) in NYPSE. Upgrades to the ROC would be included in the Build Alternative to accommodate the expanded networks. One center would be in control of a given system at any one time, though different systems would be operable from different centers (e.g., traction power from ROC and signaling from SOC).

Traction Power

The overhead catenary traction power system (OCS) for the Build Alternative tracks between Frank R. Lautenberg Station and NYPSE would obtain power from Amtrak’s existing 25 Hz power system. The 12kV, 25 Hz system would require three new facilities and four upgrades:

- New traction power substation to be located at the portal of the new tunnels, east of Tonnelle Avenue in North Bergen, New Jersey
- New Amtrak 138 kV, 25 Hz switching station to be located east of Tonnelle Avenue in North Bergen, New Jersey
- New traction power switching station to be located in NYPSE
- Upgrades/modifications to four Amtrak existing substations – Kearny Substation No. 41; Hackensack (Tonnelle) Substation No. 42; Penn Station 31st Street Switching Station No. 43A; and Penn Station Seventh Avenue Switching Station No. 43B

The traction power for the proposed Kearny Rail Yard would require 27.6 kV, 60 Hz as an in-kind expansion of the electrification of NJ TRANSIT’s M&E Lines. Circuit breakers would be added to the existing footprint of Mason Substation No. 2, located across from NJ TRANSIT’s Meadows Maintenance Complex (MMC) along the M&E Lines. Additional aerial lines would run from the Mason substation on existing M&E Line structures to supply power to the proposed Kearny Rail Yard.

Signals

To accommodate the increased train volumes and new infrastructure associated with the Build Alternative, signal systems would be upgraded and expanded. New signals would be provided along each new surface and loop track, through the new tunnels, and to NYPSE. New systems would also be provided within the proposed Kearny Rail Yard.

Communications

The Build Alternative would include communication systems to support NJ TRANSIT communications and operations within the project region. The communication systems would enable train operators to communicate with dispatchers in the new SOC in NYPSE and at the ROC in Kearny. Personnel in the SOC would be able to communicate with NJ TRANSIT Operations, emergency response organizations, and others.

RAIL EQUIPMENT

The Build Alternative fleet requirements compared to the 2030 No Build Alternative include 158 coaches and 18 dual-power locomotives (without spares) or 187 coaches and 22 dual-power locomotives (with spares). The fleet requirements are based on the 48 peak hour trains to Manhattan operating plan, and to meet the 2030 ridership demand.

MAINTENANCE AND STORAGE FACILITIES

The proposed Kearny Rail Yard would require 82 acres of the former Koppers Coke site, an inactive brownfield property. The Koppers Coke site would require from 15-30 feet of fill to raise it to a grade that would allow for connection to the existing M&E tracks. The connection to the yard from the M&E Line would require the replacement of the historic Koppers Road Bridge, a contributing element to the Old Main DL&W Railroad Historic District. The yard design would not preclude the use of the perimeter along the Hackensack River for a bikeway or greenway, developed by others. Portions of the wingwalls and existing abutments of the historic James Avenue Bridge in Jersey City would need to be demolished to cross over the M&E Line for the connection into the proposed Kearny Rail Yard.

Train storage facilities at the proposed Kearny Rail Yard would include the following basic requirements:

- Primary access into the yard from the westbound M&E Line for storage of trainsets returning from NYPSE, with the ability to process an inbound train every three minutes (20 trainsets per peak hour).
- Access into the yard from the eastbound M&E Line (this access would also support inserting a train from the yard onto the M&E Line westbound, including non-revenue movements of trains to/from the adjacent NJ TRANSIT MMC).
- Configured for both electric and dual-power trainsets, equipment stored on the site would be operating in electric mode exclusively.
- Sufficient train storage for 28 trainsets. Conceptual yard design would include up to 20 tracks to provide operating flexibility and additional capacity for spare trains and maintenance equipment. Trainsets could be either 12 Electric Multiple-Unit (EMU) cars or 11 coaches plus a dual-power locomotive. Therefore, conceptual design would provide storage tracks with sufficient length for 12-car trainsets.
- Control Tower
- Train Wash Facility
- Covered service and inspection tracks for compliance with Federal Railroad Administration-required inspections before trains re-enter into service. Heavy repair and routine maintenance would take place at the existing MMC, opposite the M&E Line from the proposed Kearny Rail Yard.
- Welfare facilities for personnel
- Storage for equipment and materials
- Locomotive Fueling Facility, with associated locomotive servicing. Most of the trainsets stored midday would be dual-power locomotive-hauled trains.
- Access roadways and parking
- Stormwater runoff management. Stormwater would be released into the Hackensack River after attenuation and application of “Best Management Practices” treatment, as regulated by NJDEP.

E. CONSTRUCTION METHODS FOR THE BUILD ALTERNATIVE

Construction of the Build Alternative would begin in 2009 and would finish in 2017. The peak construction activity of the Build Alternative alone would be in 2012, while peak cumulative construction activity (Build Alternative plus other nearby construction projects in midtown Manhattan) has been assessed for each year of Build Alternative construction between 2009 and 2017. The rock tunnels in Manhattan and the new NYPSE cavern in Manhattan, including the related railroad systems, comprise the critical path for the project's schedule. The railroad systems construction, testing, and commissioning includes communications, signals, and fan plant control systems.

Construction methods and concepts that would be used to construct the Build Alternative would include the following:

- **Tunnel Boring** is a mechanized method of construction for deep tunnels that employs specialized equipment called tunnel boring machines (TBMs) to cut through rock or soft ground. A rock TBM consists of a rotating head with disk cutters, drive motors, main bearing, power supply, thrusting jacks, and a towed support system for handling various materials including excavated material.

A soft ground TBM consists of a shield that supports the ground and prevents water intrusion. The TBM components include drive motors, main bearing, power supply, thrusting jacks and a towed materials handling support system. At the front end of the shield is an enclosed rotating cutting wheel that seals the tunnel face for stability when in unstable ground. Behind the cutting wheel is a chamber where, depending on the type of the TBM, the excavated soil is mixed with either slurry or water, or biodegradable admixtures. TBM use is precluded in areas proposed for open cut, since insufficient ground cover would be available to prevent cave-ins.

- **Cut-and-cover** is a construction method for shallow tunnels, where a trench is excavated and supported. Once excavated, the final structure is constructed within the trench, the remaining space is backfilled and the surface is restored, as temporary supports are sequentially removed or left in place. Temporary supports for cut-and-cover construction consist typically of vertical walls such as steel soldier piles with timber lagging, slurry walls or sheet piles. Depending on the depth of the excavation and the ground conditions, the vertical walls may need to be internally braced with struts that span horizontally across the excavation or supported with tieback anchors. During construction of cut-and-cover tunnels, street crossings and adjacent areas can be decked to allow unimpeded traffic and use of properties above the cut.
- **Conventional Mining Methods** refer to a variety of non-mechanized mining methods including drill-and-blast, hand excavation, and excavation by roadheader. A road header is a piece of excavating equipment consisting of a boom-mounted cutting head, a loading device usually involving a conveyor, and a crawler traveling track to move the entire machine forward into the rock face.
- **Drill-and-Blast** is an excavation technique consisting of drilling holes in a rock mass in predetermined patterns, loading them with explosives, and using sequentially delayed detonation of those explosives to excavate the rock in a controlled manner referred to as sequential excavation. Controlled blasting minimizes over-break, and reduces noise and ground-borne vibration.
- **New Austrian Tunneling Method (NATM)** (also known as Sequential Excavation Method [SEM]) is a mining technique in which a tunnel is sequentially excavated by conventional means and supported in a controlled manner so that the strength of the ground around a tunnel is deliberately mobilized to contribute to the support of the excavated opening. The initial ground support is a relatively flexible system with load-deformation characteristics appropriate to the ground conditions, and consists typically of shotcrete layers with steel fibers or welded-wire fabric reinforcement, combined with elements that may include rock bolts or dowels, spiling bars and lattice girders. Instrumentation is installed to monitor deformations in the initial support system, as well as to form

the basis of varying the initial support design and the sequence of excavation. The permanent support is usually (but not always) a cast-in-place concrete lining.

- **Raise Boring** is a technique to excavate shafts in rock after tunnels are excavated. The raise-bore drills a pilot hole about 6 to 8 inches in diameter from the surface. Then a boring head mounted at the bottom of the machine is drawn up, excavating from the bottom to the top of the hole. The shaft is then enlarged by drill and blast, using the raise-bore hole to drop excavated materials to the bottom.
- **Viaduct** is a multi-span bridge, constructed either of steel or concrete girders spanning between piers supported on foundations.
- **Embankments** are raised sections of railroad infrastructure above the surrounding grade. They are constructed as linear fills of compacted soil with the tops being wide enough to carry the railroad infrastructure. Embankments have sufficient side slopes to existing grade to support the raised section.
- **Retained Fill** segments of railroad infrastructure are raised sections like embankments, but where space is insufficient for a full side slope and the raised section is supported by retaining walls, which could be constructed as cast-in-place (CIP) concrete or mechanically stabilized earth (MSE) walls.
- **Open Cut** segments of railroad infrastructure are depressed sections where the tracks are below the surrounding grade and where side slopes are provided to support the surrounding grade.
- **Retained Cut** segments of railroad infrastructure are depressed sections like open cuts, but where space is insufficient for full side slopes and the surrounding grade is supported by CIP or MSE retaining walls.
- **Underpinning** is a process in which structural support is added below an existing foundation to permit construction in a space originally occupied by supporting soil or deep foundation elements such as piles for that existing foundation.
- **Dewatering** is a process usually used before underground construction is implemented. The purpose of dewatering a construction site is to provide a working area sufficiently dry to allow construction activities to take place. Dewatering is typically accomplished by pumping groundwater from wells or sumps and conveying to discharge points away from the area to be excavated.
- **Jet Grouting** consists of drilling a hole into the required depth of the soil mass to be treated and then injecting cement grout and optionally air and water in a mixture under high pressure into the ground through the end of the drill string. The drill string is rotated as it is raised to disaggregate the soil mass and mix in the cement grout. Once that grout sets, this process produces a stronger, “solidified” cemented soil.
- **Ground Freezing** is a ground improvement technique that consists of circulating liquid nitrogen through a series of subsurface pipes to convert soil water to ice, creating a strong watertight material. This “frozen” material can then be excavated using conventional mining techniques such as NATM or left in place to support adjoining construction activities or act as a “plug”.

Anticipated major Build Alternative construction activities, with their corresponding methods and expected durations, are summarized in Section 5.1 of the FEIS.

F. PROJECT COSTS AND FINANCE

PROJECT CAPITAL AND OPERATING COSTS

The estimated capital cost for the Build Alternative is \$7.6 billion in the year of expenditure (YOE). This estimate includes construction components, engineering, oversight and management costs, required railroad safety and operational systems, railroad rolling stock, property acquisition, one-time operational startup costs, and mitigation. These costs reflect operational routings, rail equipment requirements, and alignment geometry available at this time, which would be refined in subsequent design phases. The annual operating and maintenance cost for the Build Alternative is estimated to be \$99.8 million in 2007 dollars (see Chapter 10 and Appendix 10).

PROJECT FINANCE

NJ TRANSIT's 20-year capital and operating plans provide sufficient revenue to support the continued state of good repair of the existing transit system and fund operations into the future. Capital funding is projected to come from a 55 percent federal/45 percent local share. New Starts funding would account for 64 percent of the federal share (34 percent of the total). The project has received a New Starts rating of Medium-High. Local share would come primarily from PANYNJ. The incremental annual operating and maintenance cost of the Build Alternative is projected to be funded by fares. By the year 2025, the incremental Build Alternative cost would account for approximately 4 percent of NJ TRANSIT's overall operating budget. As demonstrated in Chapter 10, NJ TRANSIT has the financial capacity to implement the Build Alternative, while maintaining systemwide levels of service, maintenance and replacement.

G. PERMITS AND APPROVALS

Approvals from Federal, State and local agencies in New Jersey and New York will need to be obtained to advance the Final Design and construction of the Build Alternative. Permit coordination has been a major element of the ARC EIS process, and will continue through the design and construction phases. The type of permits anticipated for the Build Alternative will be those for wetlands encroachment (e.g., U.S. Army Corps of Engineers [USACE], and New Jersey Department of Environmental Protection [NJDEP]), concurrence from both New Jersey and New York State Historic Preservation Officers (SHPO) relative to compliance with Section 106 Historic Resource procedures (described in Chapters 6 and 7 and Appendix 6), and concurrence from the U.S. Department of the Interior relative to potential use of Section 4(f) land (described in Appendix 8). An executed Section 106 Programmatic Agreement between NJ TRANSIT, FTA, the Advisory Council on Historic Preservation and New Jersey and New York SHPOs is contained in the FEIS. Permit and approval requirements are further described in Chapter 11 and in Appendix 11.

H. EVALUATION OF BUILD ALTERNATIVE

Table ES-2 summarizes the effectiveness of the Build Alternative in meeting the project's goals and objectives.

TABLE ES-2: SUMMARY OF EFFECTIVENESS OF THE BUILD ALTERNATIVE

Goal/Purpose & Need	Evaluation Measure/Results
<i>IMPROVE TRANS-HUDSON MOBILITY</i>	
<p>TRANSIT CAPACITY Increase capacity of the trans-Hudson commuter rail system, which is at capacity during peak travel periods</p>	<ul style="list-style-type: none"> ◆ <u>Trans-Hudson peak train capacity</u> – AM peak train service would increase from 23 to 48 trains per hour ◆ <u>Peak hour train volume/capacity ratio</u> – Average V/C would decrease 37 percent from 0.95 to 0.60 ◆ <u>Trans-Hudson ridership</u> – Daily rail trips to and from Manhattan would increase 46 percent from 174,000 to 254,190 ◆ <u>Ability to accommodate future services</u> – one-seat-ride service to Manhattan would optimize the attractiveness and benefits of NJ TRANSIT's other rail expansion initiatives
<p>TRANSFERS Provide new one-seat-ride service to midtown Manhattan from areas not served today</p>	<ul style="list-style-type: none"> ◆ <u>Improved connectivity</u> – New one-seat-ride service to Manhattan would be provided on seven NJ TRANSIT lines that currently require passengers to transfer ◆ <u>Number of transfers</u> – Daily passenger transfers (for travel to/from Manhattan) would decrease 97 percent from 32,100 to 1,000
<i>UTILIZE, IMPROVE, AND EXPAND THE CAPACITY OF THE REGION'S EXISTING TRANSIT INFRASTRUCTURE TO THE MAXIMUM EXTENT POSSIBLE</i>	
<p>FACILITY CROWDING Provide a new station facility to relieve severely overcrowded and inadequate conditions at PSNY</p>	<ul style="list-style-type: none"> ◆ <u>Average egress time from PSNY</u> – Average passenger egress time from the platform to the concourse in the AM peak hour would decrease by 25 percent from 80 to 60 seconds ◆ <u>Number passengers arriving into PSNY</u> – Peak hour ridership into existing PSNY would decrease by 37 percent from 27,830 to 17,160
<p>RELIABILITY Eliminate commuter rail delays caused by unanticipated events or routine maintenance</p>	<ul style="list-style-type: none"> ◆ <u>Train schedule recovery for delays</u> – Peak period peak direction schedule recovery would drop from 44% to 11%; Average scheduled time from Newark to Manhattan would decrease by 5 minutes in the peak hour and 3.5 minutes in the off-peak ◆ <u>Tunnel maintenance</u> – Continuous rail service to PSNY would be possible during weekends, since the new tunnels would remain open while the existing tunnels undergo routine maintenance ◆ <u>Re-routing flexibility</u> – The new connection from existing PSNY to the new and existing tunnels would improve system re-routing flexibility
<i>MAINTAIN A SAFE AND SECURE TRANSIT SYSTEM</i>	
<p>SAFETY AND SECURITY Enhance commuter rail system safety and security</p>	<ul style="list-style-type: none"> ◆ <u>Redundancy for maintenance and emergency</u> – The new connection from existing PSNY to the new and existing tunnels would enable responses to emergency situations for Amtrak and NJ TRANSIT ◆ <u>Station evacuation during emergencies</u> – The Build Alternative NYPSE would distribute passengers between it and PSNY, which allows for safer conditions and faster evacuation in case of emergency

Source: Transit Link Consultants, 2008.

TABLE ES-2: SUMMARY OF EFFECTIVENESS OF THE BUILD ALTERNATIVE (CONTINUED)

Goal/Purpose & Need	Evaluation Measure/Results
<i>MAINTAIN AND ENHANCE THE ECONOMIC VIABILITY OF THE REGION</i>	
ECONOMIC GROWTH Provide increased rail capacity to meet growth in west-of-Hudson population and jobs in NYC	<ul style="list-style-type: none"> ◆ <u>Jobs</u> – Permanent increase of 750 direct jobs throughout the region’s businesses ◆ <u>Tax revenue</u> – Permanent increase of \$15.5 million in local, state and federal taxes ◆ <u>Income</u> – Permanent increase of \$46 million in personal income ◆ <u>Business activity</u> – Permanent increase of \$120 million in business activity
<i>PRESERVE AND PROTECT THE ENVIRONMENT</i>	
ROADWAY CONGESTION Increase capacity of the trans-Hudson transportation system, which is at or near capacity during peak travel periods	<ul style="list-style-type: none"> ◆ <u>Auto VMT and VHT</u> – Daily trans-Hudson auto trips would be reduced by 22,100, daily auto VMT would be reduced by 589,600 and daily auto VHT would be reduced by 21,700

Source: Transit Link Consultants, 2008.

The Build Alternative would provide opportunities for certain optimum service enhancements throughout the NJ TRANSIT rail system that would not be possible under the No Build Alternative. These enhancements would be related to the various rail line improvement initiatives that NJ TRANSIT is advancing throughout northern and central New Jersey, which ideally would have their final destination in Manhattan. However, without the added Build Alternative rail capacity between Frank R. Lautenberg Station and midtown Manhattan, these rail line improvements would need to terminate in Hoboken or Newark. Such an arrangement would provide some benefit, but not the one-seat-ride efficiency or additional Build Alternative capacity east of Frank R. Lautenberg Station.

Moreover, not constructing the Build Alternative would result in more indirect commutation for those passengers on the improved NJ TRANSIT lines included in the No Build that would otherwise terminate at Newark or Hoboken. These individuals would need to transfer to other trans-Hudson service, such as PATH, ferries, or New York-bound trains. Such transfers would add time to each of these trips, if the existing NEC trains would continue to experience delays in reaching PSNY. It would also be possible that as conditions worsen, would-be west-of-Hudson commuter rail passengers from New Jersey and Orange and Rockland counties would switch to alternative means of travel, such as autos, ferries or buses. This situation would lengthen their respective trips and increase their energy consumption due to overburdened existing operations at the Lincoln Tunnel, Holland Tunnel and George Washington Bridge. As these alternative means would deteriorate, negative economic impacts would occur throughout the region.

FTA NEW STARTS EVALUATION

The “New Starts” program is the FTA’s primary program for providing financial support to locally-planned, implemented, and operated fixed guideway transit major capital investments. The following project justification criteria are used to evaluate New Starts projects: mobility improvements; environmental benefits; cost effectiveness; operating efficiencies; transit-supportive existing land use, policies and future patterns; and other factors. Local financial commitment for the proposed project is also considered.

FTA reviews project justification and local financial commitment criteria and assigns a rating for each criterion. For some of the project justification criteria, the proposed project is compared against a “baseline alternative”, which consists of improvements to the transit system that are relatively low in cost and represent the “best that can be done” to improve transit without a major capital investment. As such, it is usually different than the baseline (represented by the No Build condition) against which environmental impacts are measured in the NEPA document.

A candidate project is given an overall rating of “High”, “Medium-High”, “Medium”, “Medium-Low” or “Low”, based on ratings assigned by FTA to each of the project justification and local financial commitment criteria described above. These ratings are important, as FTA considers them in its decision to recommend projects for New Starts funding. It is important to note that a “High”, “Medium-High” or “Medium” rating does not automatically translate into a funding recommendation. ARC’s current Overall Rating is Medium-High. Specifics relative to ratings are presented in Chapter 9.

Project evaluation is an on-going process. FTA evaluation and rating occurs annually in support of budget recommendations presented in the Annual Report on New Starts and when projects request FTA approval to enter into Preliminary Engineering or Final Design. Consequently, as proposed New Starts projects proceed through the project development process, information concerning costs, benefits, and impacts is refined and the ratings updated to reflect new information.

I. PUBLIC AND AGENCY OUTREACH AND COMMENTS

Public and agency outreach has been an important part of the EIS process consistent with the requirements of NEPA of 1969, Section 106 of the National Historic Preservation Act of 1966, the New Jersey Register of Historic Places Act, the New York State Historic Preservation Act of 1980, SEQRA, CEQR and CEQ guidelines.

Scoping meetings for the ARC project were held in December 2003. Public Hearings for the DEIS were held in Newark and North Bergen, New Jersey on March 13 and 14, 2007, respectively, and in New York City on March 27, 2007. Public information meetings for the DEIS were held in Rockland and Orange Counties, New York on March 20 and 22, 2007, respectively. Public Hearings for the SDEIS were held in Newark, New Jersey on March 31, 2008 and in New York City on April 1, 2008. Over 600 meetings have been held with elected officials, affected communities, transit passengers, property owners, interest groups, business groups, and transportation and other government agencies, in New Jersey and New York, as described in Chapters 12 and 13. Meetings with the Technical Advisory Committee (TAC) and Regional Citizens Liaison Committee (RCLC) have been convened throughout the EIS process relative to Build Alternative physical, operational and environmental issues. Coordination continues with representatives of affected New Jersey municipalities and New York City agencies, particularly in regard to the Build Alternative alignment and configuration in relation to planned or proposed projects in both states.

This outreach has afforded ample opportunities to: provide project information; identify coordination issues; and obtain input to develop project designs. As a result, the Build Alternative is based on: responsiveness to commuter needs; sensitivity to its surrounding area; improving reliability and redundancy; and being able to gain the support needed for implementation.

Prior to preparing this FEIS, NJ TRANSIT has met with affected municipalities and community boards to discuss issues such as fan plant/construction access shaft locations and construction methodologies, and to seek public input regarding project related issues both related to construction and in the long term. During and subsequent to such meetings, NJ TRANSIT has made efforts to answer questions and refine

mitigation measures with the public's comments in mind. These mitigations are discussed throughout this FEIS and in the previously-released SDEIS.

Several concerns were not incorporated into the Build Alternative. A full response to each of these comments is in Chapter 18. These concerns include:

- The lack of a direct commuter rail connection to east Midtown, in the area of Grand Central Terminal (GCT).
- The lack of a rail connection from the ARC tunnels to PSNY.
- The station depth will lead to increased passenger egress time for passengers on the lines that will use NYPSE.
- The Portal Bridge Capacity Enhancement Project and the Build Alternative should be reviewed in the same EIS process.

J. BENEFITS OF THE BUILD ALTERNATIVE

Long-term benefits of the Build Alternative would result from expanded commuter rail service from New Jersey into Manhattan, incorporating revised operating and service plans with proposed dual-power equipment. Trans-Hudson auto, bus, and ferry trips are projected to decrease, with associated benefits to commuters and regionwide air quality.

Regional economic impacts associated with construction and operation of the Build Alternative were assessed using the R/ECON™ model, an economic input/output model that estimates economic impacts from major capital investments. The model estimated the one-time, non-recurring economic benefits from construction of the Build Alternative, and the recurring economic benefits accruing to the region as a result of annual operation and maintenance of the Build Alternative. Increased jobs and tax revenue during construction and in the long-term would occur with the Build Alternative.

CONSTRUCTION

- Total economic benefits to the tri-state region over the length of the Build Alternative construction and capital investment periods would include: direct, on-site employment of nearly 59,900 jobs and total employment of nearly 98,300 jobs; over \$1.5 billion in local, state and federal taxes; almost \$4 billion in personal income; and over \$9 billion in business activity.

LONG-TERM

- The Build Alternative would enable trains on the Main/Bergen/Pascack Valley and Port Jervis non-electrified lines, which now terminate in Hoboken, to connect to the NEC for direct service into midtown Manhattan. With the implementation of dual-power locomotives, additional non-electrified lines, including the Raritan Valley Line, the North Jersey Coast Line south of Bay Head, and the Montclair-Boonton Line west of Montclair State University would also have direct service to Manhattan. AM peak hour NJ TRANSIT service would increase from 23 trains per hour to 48 trains per hour and commuter rail passenger trips into PSNY and NYPSE would increase by 48 percent (from 27,191 to 40,179). Trips into Newark Penn Station and Hoboken would decrease slightly, given the additional service into midtown Manhattan as some trains are rerouted into New York.
- With the Build Alternative, the number of trans-Hudson bus trips would decrease by four (4) percent compared to the No Build Alternative. Future daily one-way linked bus trips to midtown Manhattan

would decrease from 201,650 to 192,960. Projected daily one-way linked trips on PATH service to midtown Manhattan (2030) with the Build Alternative would decrease from 124,460 to 116,660, compared to the No Build Alternative. Future daily one-way linked ferry trips to midtown Manhattan with the Build Alternative would decrease by 32 percent from 33,470 to 22,700.

- With the Build Alternative, daily demand for trans-Hudson auto (vehicle) trips would decrease by 4.9 percent (31,500 person-trips in 22,000 autos) by 2030 compared to No Build conditions. As a result, there would be fewer auto trips along local routes to commuter rail in the project area.
- With the Build Alternative, proposed operating and service plans that incorporate dual-power equipment would decrease diesel train miles and emissions in New Jersey compared to No Build operations. Projected annual decreases in pollutants would be: 1,558 tons of CO; 15 tons of NO_x; 39 tons of VOC; 3 tons of PM₁₀; and 3 tons of PM_{2.5}. Projected decreases in the number of bus and ferry trips between New Jersey and Manhattan would decrease estimated regional pollutant emissions in Manhattan. Associated decreases in energy consumption with the Build Alternative would reduce greenhouse gas emissions (i.e., CO₂) by 65,794 tons per year.
- Annual, permanent economic benefits accruing to the tri-state region as a result of the annual operation and maintenance of the Build Alternative would include: direct employment of 410 jobs in the transportation and transit services industries, within a total of 752 jobs; almost \$15.5 million in local, state and federal taxes; \$46 million in personal income; and over \$120.1 million in business activity.

K. ENVIRONMENTAL IMPACTS OF THE BUILD ALTERNATIVE

This FEIS identifies environmental impacts and benefits associated with the Build Alternative for a range of issue areas and related resources, both in the short-term during construction (2009–2017) and over the long-term after project service would begin. Construction-related project impacts are summarized below, with further details described in Section 3.6 and Chapter 5. Long-term project impacts are also summarized below with further details described in Chapters 4, 6, 7 and Appendix 8. While certain mitigation measures are summarized in this section, Section H: Environmental Mitigation of the Build Alternative provides a more detailed discussion of mitigation measures.

TRANSPORTATION

For the Build Alternative, construction and long-term impacts on public transportation, station access and parking, roadways, pedestrians and freight were evaluated. Future demand and capacity on public transportation facilities in both New Jersey and New York was evaluated for the Build Alternative compared to the No Build. Services evaluated include NJ TRANSIT commuter rail, Amtrak, bus, NYCT subway, PATH, and ferry. Station access and parking supply and demand were evaluated beyond the project area for NJ TRANSIT commuter rail lines. The impact of the Build Alternative infrastructure on available parking in Manhattan was also evaluated. Changes in truck, bus, auto, and taxi volumes and levels of service (LOS) for the Build Alternative are presented for existing trans-Hudson and Manhattan roadway networks. For freight movement, the characteristics of the existing rail freight services and railroad operators in the project area and the relationship between those services and the Build Alternative construction and long-term operations are discussed.

PUBLIC TRANSPORTATION

In the long-term the Build Alternative would require three (3) additional peak-hour NYCT buses along West 34th Street. The Build Alternative would result in construction impacts to rail service on the NEC, bus traffic on local streets in North Bergen and Hoboken and along West 34th Street in Manhattan, as well

as to NYCT subway stations. Construction-related impacts will be mitigated through implementation of Maintenance and Protection of Traffic (MPT) plans.

Construction

- The Build Alternative would require limited temporary off-peak nighttime and weekend track outages or frequency reductions for NJ TRANSIT and Amtrak services on the NEC and NJ TRANSIT service on the Main/Bergen/Pascack Valley lines in New Jersey. These nighttime and weekend track outages and frequency reductions would be required only when modifications to existing track, signals or equipment would be needed, for example to construct the track connections from the Secaucus Connection tracks to the NEC just south of Frank R. Lautenberg Station. Impacts to NJ TRANSIT and Amtrak passengers will be mitigated by coordinating construction schedules and adjusting train schedules.
- In New Jersey, bus traffic on local streets near construction areas in Hoboken and North Bergen would be temporarily disrupted by the movement of construction equipment and trucks. MPT plans would maintain traffic flow during construction.
- In New York, construction of NYPSE entrances on West 34th Street would require the intermittent closure of the curb bus lane at locations on West 34th Street. These intermittent lane closures would occur during off-peak hours. MPT plans would maintain bus service on West 34th Street throughout the project.
- Build Alternative connections from NYPSE to existing NYCT subway stations would require utility relocations and modifications to existing station access stairs, public areas, and program spaces. Subway service would not be impacted. Station access would be maintained throughout the project, with intermittent closings of individual entrances.

Long-term

- The increase in commuter rail passengers into existing PSNY and NYPSE with the Build Alternative would produce additional transfers to NYCT bus services in the vicinity of PSNY, including the M4, M10/M20, M16/M34 and Q32 lines. With the Build Alternative, the M16/M34 line in the eastbound direction would require an additional three (3) peak hour buses to be provided by MTA in the AM and PM to accommodate approximately 140 NJ TRANSIT passengers.
- The increase in commuter rail passengers into existing PSNY and NYPSE would increase ridership demand for several of the north-south NYCT subway lines that serve PSNY. NYPSE platforms would extend as far east as Sixth Avenue, providing new passenger access to the Broadway (N, Q, R, W) and Sixth Avenue (B, D, F, V) lines. In addition, NYPSE would provide access to the existing 34th Street subway station, which is served by the Eighth Avenue (A, C, E) and Seventh Avenue (1 and 2/3) lines. All but one subway line analyzed, the southbound 2, would remain below capacity in the AM peak hour with the Build Alternative. The southbound 2 would operate above capacity in the AM peak hour, at a V/C ratio of 1.05 upon reaching its peak load point south of the station. However, the southbound 3 would operate at a V/C of 0.88. When aggregating the southbound 2 and the southbound 3, the V/C for the entire express line would operate at a V/C ratio of 0.97. Since passengers forecast to use the southbound 2 subway line could also use the southbound 3 subway line which runs on the same tracks, none of the subway lines would exceed capacity in the segments where passengers to and from NYPSE would concentrate.

STATION ACCESS AND PARKING

In New York, the Build Alternative would result in the permanent loss of 24 off-street parking spaces. In New Jersey, forecast long-term parking shortfalls beyond the project area will be addressed on a case-by-

case basis. In New York, construction of the Build Alternative would result in the temporary loss of less than 40 off-street parking spaces and periodic impacts to pedestrian access to PSNY and NYCT stations.

Construction

- In New York, construction of the ADA Access/Emergency Personnel Access elevator entrance within the western portion of a parking garage located on West 34th Street between Eighth and Ninth Avenues would result in the temporary loss of 24 to 38 off-street parking spaces.

Long-term

- In New Jersey, parking demand along commuter rail lines beyond the project area would result in parking supply shortfalls ranging from 510 spaces on the Inner Pascack Valley Line to 40 spaces on the Gladstone Branch. Parking shortfalls will be addressed on a case-by-case basis with additional parking spaces, new parking lots, and/or improved station access via bus or community shuttle.
- In New York, the Build Alternative includes construction of an ADA Access/Emergency Personnel Access elevator entrance for employee use only on a portion of a site between Eighth and Ninth Avenues and West 34th and West 35th Streets, currently occupied by a 500-space parking garage. Construction of this entrance would displace approximately 24 parking spaces from that garage, out of more than 13,300 parking spaces, housed in 93 lots and garages in the project area.

ROADWAYS

In the long-term, increased taxi and bus trips in New York would impact intersections in the AM and PM peak hours. Changes to signal timing will mitigate the intersection impacts in New York. Construction sites in New Jersey and New York would cause temporary lane closures and generate construction-related traffic. MPT plans will mitigate these construction-related impacts.

Construction

- In New Jersey, Build Alternative construction-related traffic would cause impacts on Tonelle Avenue in North Bergen and in Weehawken near the sites of the tunnel and fan plant construction sites. These traffic impacts will be mitigated with the development of MPT plans.
- In New York, construction activities related to the Manhattan components (tunnels, fan plants, station entrances) of the Build Alternative would cause temporary lane closures and would generate construction traffic. Temporary closure of traffic lanes and sidewalks and loss of parking spaces and curb loading zones would occur at several locations adjacent to project construction sites. Where cut-and-cover construction would be required, excavations will be covered during peak periods to maintain travel lanes.

Long-term

- In New York, the Build Alternative would generate 247 AM peak hour and 211 PM peak hour taxi vehicle trips to existing PSNY and NYPSE. One new taxi stand is proposed for implementation by NYCDOT on the west side of Seventh Avenue between West 33rd and West 34th Streets with the Build Alternative. Five intersections would experience traffic impacts due to taxi and bus trips during the AM peak hour and seven intersections were identified with traffic impacts during the PM peak hour. These impacts will be mitigated with signal timing changes.

PEDESTRIANS

In the long term, some Manhattan sidewalks, street corners, crosswalks, as well as NYCT subway stations, would be impacted by increased pedestrian circulation. Long-term impacts will be mitigated

with the implementation of measures, developed in coordination with NYCDOT, to increase effective sidewalk width and widening crosswalks and street corners, and with NYCT to improve passenger flow within these subway stations. Build Alternative construction-related activities would encroach on four (4) sidewalks. MPT plans will address these construction-related impacts to pedestrians.

Construction

- In New Jersey, temporary minor reconfiguration/detouring of sidewalks in proposed construction areas in North Bergen and Hoboken would occur. No significant impacts that would impede pedestrian movements are projected.
- In New York, the majority of Build Alternative construction would occur underground, and surface work would occur mainly within building lines off-street. However, work on new NYPSE entrances, fan plants/construction access shafts, and other elements would encroach on area sidewalks at 14 locations. Of these encroachments, it is anticipated that segments of three (3) sidewalks would be closed temporarily: on the south side of West 35th Street between Eighth and Seventh Avenues; on the north side of West 33rd Street between Seventh and Sixth Avenues; and on the south side of West 29th Street between Twelfth and Eleventh Avenues. In each of these cases, pedestrians would be diverted to the opposite sidewalk, adding to the volumes on those three sidewalks. Four (4) sidewalks would be impacted as a result of these encroachments or diversions.

Long-term

- In New Jersey, no long-term impacts to pedestrian circulation would occur. Ridership would increase in the project area and beyond the project area at stations along the five NJ TRANSIT lines on which dual-power service would be added. It is anticipated that the effects of this increase would be distributed among stations along these lines.
- In New York, NYPSE would attract additional volumes of pedestrians to particular sidewalks approaching the station. As a result, some sidewalks, street corners, and crosswalks would experience impacts during either the AM or PM peak periods. Mitigation will include increasing effective sidewalk width, and widening crosswalks and street corners.
- NYPSE would be connected through underground passages to subway stations under Eighth Avenue, Seventh Avenue, and the Herald Square subway/PATH station under Broadway and Sixth Avenue. These connections would utilize a combination of existing, new, and reconfigured spaces and vertical circulation elements. Even with the design of new connections, the additional pedestrian activity associated with the Build Alternative would impact stairs at the Eighth Avenue, Seventh Avenue and Herald Square Stations and one control area at Herald Square Station. NJ TRANSIT is working with NYCT to develop and implement mitigation measures to improve passenger flow within these subway stations.

FREIGHT MOVEMENT

No long-term impacts to freight movements are anticipated with the Build Alternative. Limited off-peak construction-related impacts to NYS&W and Conrail freight operations in New Jersey could occur and will be mitigated.

Construction

- The Build Alternative two-track alignment would be carried on an elevated structure over the NYS&W and Conrail freight tracks and would enter the tunnels portal on the east side of Tonnelle Avenue. Limited off-peak construction-related impacts to these freight operations could occur. NJ TRANSIT will work with freight railroads to coordinate and limit these track outages.

Long-term

- No long-term impacts to freight movements are anticipated with the Build Alternative.

LAND USE AND DEMOGRAPHICS

Land use, zoning, and public policy, as well as demographics and socioeconomic conditions, were examined within 250 feet of the NEC and within ¼-mile of Frank R. Lautenberg Station and PSNY. Potential changes to existing land use, zoning, or neighborhood character, access to community facilities, and the Build Alternative's effect on local economic conditions were assessed.

In the long-term, the Build Alternative would require 44 permanent property interests and the loss of approximately 285 jobs and associated tax revenue. Permanent subsurface easements would be required from 263 properties for the Build Alternative. Build Alternative construction would require temporary subsurface and surface easements. Mitigation will be provided for temporary and permanent property impacts. The loss of jobs and taxes would be more than offset by new economic growth generated with the Build Alternative (as further described in Section J, Benefits of the Build Alternative).

CONSTRUCTION

- In North Bergen and Hoboken, New Jersey, permanent property interests (referenced under long-term impacts) would be required for construction purposes, such as construction staging or construction access shafts. In addition, temporary construction easements would be required along the proposed alignment in Secaucus, Jersey City, and North Bergen for the construction of tracks and structures, such as viaducts and retaining walls, as well as temporary construction access roads.
- In Secaucus New Jersey, construction of the proposed Secaucus Connection loop tracks would temporarily disrupt the use of existing access roads to properties within these loop tracks, including PSE&G property and the Jersey City Police Department firing range.
- In New York, temporary surface easements would be required during the construction of fan plants and NYPSE entrances. Three (3) commercial establishments in New York would be displaced for a period of up to seven years for the construction of NYPSE and ADA access elevator entrances. Displacements and relocation of businesses are considered permanent due to the length of construction.

LONG-TERM

- In New Jersey, 18 permanent property interests would be necessary for the construction of tracks, structures, permanent Life Safety Emergency Access Roads, and fan plants. These properties include 31 acres of the Malanka Landfill, vacant lots (some with abandoned buildings), and commercial and industrial properties. Twelve (12) permanent property interests would be required for the construction of the proposed Kearny Rail Yard, which would be located exclusively on a portion of the vacant Koppers Coke site.
- In New York, permanent property interests would be required for a portion of nine (9) properties located on or along West 34th Street for station entrances, ADA access elevator entrances, and the one employee-only ADA entrance. Sixteen (16) commercial businesses are located within these nine (9) properties. A total of five (5) permanent property interests would also be required for the 33rd Street, 35th Street, Dyer Avenue, and Twelfth Avenue Fan Plants.
- A loss of approximately 132 jobs in New Jersey and 151 jobs in New York would occur. The elimination of individual businesses would not have significant community or economic impacts to any particular industry. In addition to job loss, permanent property interests would result in the loss of approximately \$6.6 million and \$9.6 million in municipal tax ratables in New Jersey and New

York, respectively. Total municipal annual property tax losses of \$1.0 million and \$1.1 million in New Jersey and New York, respectively, are anticipated. Jobs and tax growth created by the project would more than offset these losses.

ENVIRONMENTAL JUSTICE

The Build Alternative's impact on environmental justice communities was evaluated consistent with Executive Order 12898, including subsequent federal directives and state requirements. Executive Order 12898 requires that disproportionately high and adverse effects on minority and low-income populations be identified and addressed. A determination of whether the Build Alternative would have disproportionately high and adverse effects on minority and low-income populations was made for transportation and environmental resource areas.

One long-term noise and vibration impact to three (3) residential properties in an environmental justice community in New Jersey was identified, for which mitigation will be implemented based on agreements with the affected parties.

CONSTRUCTION

- In New Jersey and New York, construction-related impacts would not fall disproportionately on low-income and/or minority populations in the project area. Therefore, no environmental justice impacts would occur.
- NJ TRANSIT has implemented a project-wide Mentor-Protégé program to encourage disadvantaged business enterprises (DBE) as well as college and high school student participation in the ARC project.

LONG-TERM

- On Henry Street in Secaucus, New Jersey, the added train service on the NEC in the Build Alternative would cause noise and vibration impacts to minority and low-income persons living in three (3) residential properties north of the NEC. Current Henry Street property owners have been notified of the project. NJ TRANSIT will monitor the noise impact to the three Henry Street residences beginning with the initial operation of service in 2017. On-going coordination with property owners and noise-level monitoring will continue quarterly for the first three years of service and annually for two additional years. Based on the findings of this monitoring, NJ TRANSIT will work with the property owners to implement sound-proofing measures.

VISUAL AND AESTHETIC RESOURCES

Existing features that comprise the project area landscape were evaluated with respect to potential changes in their visual and aesthetic qualities resulting from the Build Alternative. Topographic mapping, sight-line projections, and field investigations were employed to analyze existing resources and the Build Alternative's impacts.

No long-term impacts would occur, as project elements will be designed for site-specific visual/aesthetic compatibility. During construction, temporary visual and aesthetic resource impacts would occur at two (2) surface construction sites in New Jersey and four (4) in New York. Temporary visual and aesthetic impacts would also occur at the sites of six (6) NYPSE entrances, including elevator entrances. Construction-related impacts described below will be mitigated by the use of temporary site barriers.

In New York, CEQR guidelines were used to evaluate the impacts of shadows and effects on urban design. No impacts were identified.

CONSTRUCTION

- In North Bergen, New Jersey, the construction site at Tonnelle Avenue would create temporary aesthetic and visual impacts to nearby residences. These visual impacts would be associated with construction equipment; a tunnel construction access shaft; fan plant construction; temporary and permanent traction power facilities; cut-and-cover construction under Tonnelle Avenue and open cut construction east of Tonnelle Avenue (tunnels portal).
- In New Jersey, construction at the Hoboken Fan Plant/Construction Access Shaft site would cause temporary aesthetic and visual impacts to nearby residences in Weehawken.
- In New York, construction activities associated with tunnel access shafts, laydown areas, fan plants and station entrances would create temporary aesthetic/visual impacts to neighborhoods in the vicinity. These visual impacts would be associated with construction equipment, trucks, fencing or walls at these sites.

LONG-TERM

- In New Jersey and New York, the design of project facilities and components would be compatible with surrounding land uses and would not result in any visual and aesthetic impacts.

AIR QUALITY

Impacts to air quality from USEPA-designated criteria pollutants were assessed for compliance with the USEPA Transportation Conformity Rule (40 CFR 93), consistent with the National Ambient Air Quality Standards (NAAQS) and guidelines established by the NJDEP, New York State Department of Environmental Conservation (NYSDEC), and New York City Department of Environmental Protection (NYCDEP), as well as CEQR. Analyses conducted included diesel locomotive emissions at rail yards, motor vehicle emissions, fan plant emissions, cooling tower vapor plumes, and regional emissions.

In the long-term, the Build Alternative would have no impacts on air quality, and motor vehicle and regionwide emissions are predicted to decrease. Construction of the Build Alternative would result in increased dust and diesel emissions. Appropriate diesel emission, dust, and soil erosion/sediment control plans will be implemented to mitigate these construction impacts to air quality.

CONSTRUCTION

- Air pollutant emissions from the Build Alternative construction would occur as a result of earth excavation and grading, handling and transport of excavated material and debris, operation of heavy-duty diesel and gasoline-powered construction equipment, and operation of heavy-duty diesel trucks to transport excavated tunnels material and deliver construction materials. These impacts will be mitigated with diesel emission, dust, and soil erosion/sediment control plans. FTA has determined that the Build Alternative, as mitigated, would meet all applicable conformity requirements relative to proposed construction, as specified in the USEPA Transportation Conformity Rule (40 CFR 93).

LONG-TERM

- No long-term air quality impacts would result from the Build Alternative. FTA has determined that the Build Alternative would meet all applicable conformity requirements relative to proposed operations, as specified in the USEPA Transportation Conformity Rule (40 CFR 93).

NOISE AND VIBRATION

Analyses of noise and vibration generated from construction of the Build Alternative and from the long-term operations of the Build Alternative have been prepared in accordance with FTA's *Transit Noise and*

Vibration Impact Assessment Guidance Manual (May 2006). More conservative criteria from NJDEP, NYSDEC, other local municipal ordinances, and the New York City Noise Code and CEQR were incorporated where appropriate.

In the long-term, noise and vibration criteria would be exceeded at three (3) residences in Secaucus, New Jersey. Beyond the project area, increased noise levels would exceed criteria at the Bay Head Rail Yard in New Jersey and at the Suffern Rail Yard in New York. These long-term impacts will be mitigated with improvements to the residences, including double-glazing of windows. Construction of the Build Alternative would result in exceedances of the above referenced noise and vibration criteria at fan plant/construction access shaft sites in New Jersey and New York. A wide range of mitigation measures including noise barriers and vibration monitoring are proposed to minimize or eliminate identified impacts.

CONSTRUCTION

- In North Bergen, New Jersey, construction activity at the Tonnelle Avenue Fan Plant/Construction Access Shaft site and demolition of the northernmost portion of G&B Baker's Supply Corporation Building west of Tonnelle Avenue would result in noise impacts at dwelling units on Paterson Plank Road and at the G&B Baker's Supply Corporation Building. These noise impacts will be minimized or mitigated with noise barriers. Vibration levels caused by demolition of the northernmost portion of the G&B Baker's Supply Corporation Building would exceed the building damage criteria for historic buildings. The potential impacts of these vibration levels will be mitigated with pre-construction inspection and vibration monitoring.
- In Hoboken, New Jersey, construction noise impacts would occur from construction activity at the surface of the Hoboken Fan Plant/Construction Access Shaft site. These activities would cause noise impacts at residences on West 18th Street in Weehawken and along Manhattan Avenue in Union City atop the Palisades west of the shaft site. These noise impacts will be minimized or mitigated with noise barriers or site enclosures.
- In New York, construction noise and vibration levels generated at the fan plant/construction access shaft sites (Twelfth Avenue, Dyer Avenue, 33rd Street and 35th Street), NYPSE entrances and ADA Access/Emergency Personnel Access elevator entrances would exceed applicable noise and vibration criteria. Sensitive receptors adjacent to the Dyer Avenue Fan Plant site include Saint Michael's Academy, Convent, and Church and a high-rise residential apartment building. These noise impacts will be mitigated with site enclosures or temporary noise barriers, as well as acoustical noise tent/enclosures for jackhammers.
- Construction of an ADA Access/Emergency Personnel Access elevator entrance for employee-only use within the westernmost portion of a parking garage adjacent to the historic Hammerstein Ballroom/Manhattan Center would cause vibration levels in excess of the damage criterion for historic buildings. Mitigation will include pre-construction inspection and vibration monitoring.

LONG-TERM

- In Secaucus, New Jersey, an increase in the number of trains would cause increased noise levels, resulting in severe impacts to three residential receptors on Henry Street. Noise mitigation measures will include building sound insulation, double-glazed windows, and/or air conditioning. Vibration levels at these residential receptors would exceed the FTA criterion for frequent train events, which could result in rattling of windows or a rumble-type noise. Vibration mitigation measures will include track bed improvements.
- At the Bay Head Rail Yard in New Jersey and at the Suffern Rail Yard in New York, the predicted noise levels from increasing the number of idling train locomotives with the Build Alternative would

exceed their respective state impact criteria. Noise levels at Bay Head would also exceed the FTA moderate noise impact criterion. These impacts will be mitigated with treatments such as building sound insulation, double-glazed windows, and/or air conditioning.

- Two fan plants are proposed for tunnel ventilation in New Jersey and four fan plants are proposed in New York (two for tunnel ventilation and two for ventilation of NYPSE). Ventilation fans operating in a prototypical fan plant without silencers would generate noise levels in excess of the FTA moderate noise impact criterion and the NJDEP and New York City Noise Code limits. These impacts will be mitigated with fan silencers. Impacts associated with the 35th Street Fan Plant chiller units will be mitigated with exhaust silencers and acoustical enclosures.

ECOLOGY

The Build Alternative's impact to existing vegetative communities and wildlife habitats in the project area was assessed. NJDEP Land Use and Land Cover GIS data was combined with a field review to prepare a mapping of the affected project area, generally 250 feet from the centerline of proposed improvements. Inquiries and coordination were carried out with appropriate federal, state, and local agencies.

The Build Alternative would have long-term impacts to approximately 1.9 acres of upland forest, 26.4 to 32.2 acres of wetlands and open waters, and one (1) active osprey nest in New Jersey. Several options for providing compensatory mitigation are currently under consideration and will require approval by USACE and NJDEP, following a review by the Meadowlands Interagency Mitigation Advisory Committee (MIMAC). Construction-related impacts to ecological resources, although temporary in nature (i.e., they would be restored to pre-disturbance conditions at the end of the construction period), are considered permanent because of the extended duration of construction.

CONSTRUCTION

- In New Jersey, construction of new NEC tracks, the proposed Secaucus Connection, and West End Wye improvements in Segment 1 (the Hackensack Meadowlands District [HMD]) would impact 2.9 acres of upland communities, including 0.2 acre of forest, and would result in the temporary disturbance of approximately 7.3 acres of wetland and open water communities. Temporary habitat loss and increased noise and vibration would potentially impact terrestrial wildlife, avian, and fish species that occur in the HMD and utilize habitat in the immediate vicinity of active transportation corridors. Construction impacts to wetlands will be mitigated through the implementation of an approved compensatory wetland mitigation plan. Mitigation for impacts to upland forest will also be provided as required by the NJ No Net Loss Reforestation Act.

LONG-TERM

- In Segment 1 in New Jersey, construction of new NEC tracks, the proposed Kearny Rail Yard, the proposed Secaucus Connection, and modifications to the West End Wye would impact approximately 19.1 to 24.9 acres of wetlands and open waters and approximately 111.5 acres of upland communities, including 1.7 acres of forest. Of the impacted upland communities, 82 acres would be associated with the proposed Kearny Rail Yard. Unavoidable long-term impacts to vegetative communities would represent a potential loss of habitat for wildlife species. Long-term wetland impacts will be mitigated through the implementation of an approved compensatory wetland mitigation plan. Mitigation for impacts to upland forest will also be provided as required by the NJ No Net Loss Reforestation Act.
- Long-term impacts are predicted to the active osprey nest located on a nesting platform in the vicinity of the PSE&G Hudson Generating Station due to the proposed Secaucus Connection. In coordination with NJDEP, new osprey nesting platforms will be erected to mitigate this impact.

- Long-term impacts in Segment 2, located between the HMD's eastern boundary and the Hudson River in New Jersey, would occur to approximately 0.5 acre of upland scrub-shrub vegetation, 0.4 acre of forest, 0.2 acre of upland herbaceous vegetation, and approximately 0.1 acre of palustrine emergent wetland. This wetland impact will be mitigated through the implementation of an approved compensatory wetland mitigation plan. Upland forest mitigation will also be provided as required by the NJ No Net Loss Reforestation Act.

WATER RESOURCES

Surface water and groundwater resources were inventoried and evaluated within the project area, including the Hackensack River and Hudson River. Impacts to water quality, navigation, floodplains, and stormwater management were assessed.

In the long-term, the Build Alternative would create additional water discharges, which will be mitigated with agreed-upon treatment processes. During construction, increased stormwater runoff at construction sites will be mitigated by appropriate management plans. Construction impacts to groundwater from construction activities will be mitigated by adherence to agreed-upon treatment processes and coordination with municipalities. These measures will also mitigate new or increased water discharges to watercourses. The Build Alternative is consistent with New Jersey, New York State, and New York City coastal zone management programs.

CONSTRUCTION

- In New Jersey and New York, creation of staging areas for construction materials and equipment and stockpiles of excavated material create the opportunity for increased volume of stormwater runoff containing suspended solids, chlorides, metals, oil and grease, and bacteria. Furthermore, in New Jersey, creation of the proposed Kearny Rail Yard and construction access roads would cause similar impacts to stormwater. Impacts from increased stormwater runoff volume will be mitigated through the implementation of a Stormwater Pollution Prevention Program (SWPPP) and Best Management Practices (BMP).
- In both states, groundwater quality would be impacted by construction activities through exposure to accidental spills of petroleum and other fluids (e.g., drilling mud), by exposure of subsurface materials to new redox conditions, or by migration of contaminants due to changes in groundwater flow caused by hard fills or surcharging. Groundwater quality impacts will be mitigated by adherence to agreed-upon treatment processes and coordination with municipalities.

LONG-TERM

- In New Jersey, impacts would result from new or increased water discharges to watercourses. These impacts will be mitigated by adherence to agreed-upon treatment processes and coordination with municipalities.
- Permanent embankments supporting the NEC tracks east of Secaucus Road would require relocation of a 0.4-mile reach of an unnamed tributary to Penhorn Creek where the proposed tracks run parallel to the tributary stream. Stream flow will be maintained with a natural in-kind replacement and site revegetation.

PARKLANDS

Existing and future parklands and recreational spaces within 250 feet of proposed Build Alternative improvements were identified using state and municipal planning documents and parkland mapping, and were evaluated for increased noise and vibration; visual quality and aesthetics impacts; air quality

impacts; vehicular and pedestrian traffic, and circulation impacts; and other disturbances that would affect these resources. The applicable legal and regulatory framework within which impacts were assessed included FHWA/FTA procedures, Section 4(f) of the USDOT Act of 1966, the New Jersey Green Acres program, New York State legislative requirements, and CEQR.

The Build Alternative would not encroach on or use any parklands and open space resources during construction or in the long-term except for less than 0.2 acre of the Riverbend Wetland Preserve, which will be mitigated. This impact will be mitigated as part of the approved compensatory wetland mitigation plan discussed under Ecology. Construction of the Build Alternative could impact access to proposed parklands in New Jersey depending on the timing for their implementation. The Build Alternative would create increased traffic near Hudson River Park in Manhattan.

CONSTRUCTION

- In New Jersey, construction of proposed at-grade tracks for the Secaucus Connection would temporarily disrupt access to PSE&G property, through which access to the proposed Little Snake Hill would eventually be provided. This disruption will be mitigated and access will be maintained during construction and in the long-term.
- In New York, construction vehicle traffic could temporarily increase noise at the nearest portions of Hudson River Park due to excavated tunnels material removal at the Twelfth Avenue Construction Access Shaft and materials transport by truck on Twelfth Avenue. These impacts will be mitigated with noise barriers.

LONG-TERM

- For several properties in Secaucus and Hoboken, New Jersey, if Green Acres restrictions are identified, the use of these properties for the project would be subject to the diversion process and would require the approval of property owners, the Commissioner of NJDEP, and the New Jersey State House Commission.

SOILS AND GEOLOGY

Soils and geologic resources in the project area were inventoried and evaluated relative to their physical characteristics and geotechnical capability to accommodate Build Alternative tunnels, structures, embankments, and other project elements. Potential impacts were evaluated with respect to geologic structure and faults, seismicity, slope stability, and unique geologic features, based on available soils and geologic data.

There would be no long-term impacts to soils and geology. Construction-related impacts to soils and geology, as described below, will be minimized during design and mitigated with appropriate construction techniques.

CONSTRUCTION

- In New Jersey, primary construction impacts related to soils and geology due to Build Alternative tunnels construction and other construction activities would be: 1) construction on compressible soils; 2) support of existing structures; 3) potential soil erosion; 4) seismic safety and liquefaction; 5) tunneling through fault zones; 6) vibration and dust from rock excavation; 7) potential slope instability; and 8) dewatering effects.
- In the Hudson River, construction impacts to soils and geology due to tunnels construction and other construction activities would be primarily related to seismic safety.

- In New York, primary construction impacts related to soils and geology due to Build Alternative tunnels construction and other construction activities would be: 1) potential soil erosion; 2) seismic safety; 3) tunneling through fault zones; 4) vibration from rock excavation and effects on other underground structures; 5) dust from rock excavation; 6) disturbance of potentially hazardous minerals; and 7) dewatering effects.

LONG-TERM

- No significant long-term impacts to soils and geology would occur with the Build Alternative.

CONTAMINATED MATERIALS

Build Alternative impacts to contaminated materials were assessed using the results of a Preliminary Environmental Site Assessment (PESA), which determined the likelihood and nature of possible contaminated materials at construction sites. American Society for Testing and Materials (ASTM) Standard E1527-05, NJDEP, NYSDEC, and NYCDEP regulations and requirements were followed.

Sixteen (16) contaminated or potentially contaminated sites in New Jersey would be impacted by the Build Alternative construction and will be mitigated. In New York, contaminated sites disturbance could occur at the Twelfth Avenue and Dyer Avenue Fan Plant/Construction Access Shaft sites, and at the site immediately to the north of the Twelfth Avenue Fan Plant/Construction Access Shaft site (Block 675). Site mitigation during construction, applicable to the impacts described below, will include remediating contaminated soils and/or groundwater and the application of engineering or institutional controls. Long-term measures will be implemented to minimize the contact and migration of contaminants left in place.

CONSTRUCTION

- In New Jersey, impacts at six (6) contaminated or potentially contaminated sites along the NEC would occur from disturbance of contaminated soil, ballast and timber ties and, to a lesser extent, groundwater associated with historic railroad operations, fill material and adjacent industrial, residential and commercial facilities.
- Impacts would also occur from disturbance to: five (5) contaminated or potentially contaminated sites, including the Malanka Landfill, along the Secaucus Connection and reconfigured West End Wye; three (3) contaminated or potentially contaminated sites east of Tonnelle Avenue at the site of the Tonnelle Avenue Fan Plant/Construction Access Shaft; and two (2) contaminated or potentially contaminated sites at the Hoboken Fan Plant/Construction Access Shaft site.
- Construction activities at the site of the proposed Kearny Rail Yard would include the consolidation of excavated tunnels material in two sedimentation (stormwater management) basins to remove free water.
- In New York, impacts from disturbance to contaminated soils and potentially contaminated groundwater would occur at three (3) sites—the Twelfth Avenue and Dyer Avenue Fan Plant/Construction Access Shaft sites, and the 0.9-acre portion of Block 675 immediately to the north of the Twelfth Avenue Fan Plant/Construction Access Shaft site used to relocate Con Edison equipment and operations during shaft operation and fan plant construction.
- In New Jersey and New York, asbestos, PCBs and hazardous materials could potentially be found in structures to be demolished or renovated as part of construction activities, including for fan plants and NYPSE entrances.

LONG-TERM

- In New Jersey and New York, potential migration of disturbed contaminated materials to adjoining sites and the potential for contact of these disturbed materials with humans and wildlife could occur at construction sites in the project area.

SAFETY AND SECURITY

For Build Alternative construction and operation, the safety and security of rail passengers, pedestrians, transit operator personnel, and contractor employees were evaluated in the context of maintaining and protecting existing and proposed commuter rail operations and passenger stations. Relevant evaluation criteria and regulations included federal, state, and local law enforcement and construction codes, OSHA rules and regulations, National Fire Protection Association (NFPA) codes, and FTA and FRA guidelines.

Build Alternative impacts to long-term safety and security would result from increased train service and passengers on the rail system and in the new tunnels, as well as from the operation of dual-powered locomotives (carrying diesel fuel). Construction of the Build Alternative would create potential safety hazards for pedestrians, motorists and construction workers. These long-term and construction-related safety concerns will be mitigated through implementation of appropriate safety plans and measures.

CONSTRUCTION

- In New Jersey and New York, introduction of significant pieces of on-site construction equipment, and trucks hauling excavated material from access shafts on local roads would create potential safety hazards for pedestrians and motorists. In addition, construction workers operating or working in concert with equipment at the various surface construction locations, and underground in tunnel tubes, would also create increased risk to safety and security. Mitigation will include adherence to appropriate safety plans, protecting and securing construction sites, and implementation of MPT plans.

LONG-TERM

- Greater demands on emergency services and threat response capabilities would result from increased train service and frequency, and increased passengers on new tracks, within the proposed Palisades (New Jersey), Hudson River, and Manhattan tunnels, and in NYPSE. Appropriate safety and security plans and procedures will be implemented to mitigate these impacts.
- The operation of diesel fuel-laden equipment within the proposed Palisades, Hudson River, and Manhattan tunnels, and NYPSE would require coordination with local and regional fire departments, local police departments, and emergency medical services.

ENERGY

The Build Alternative's impact on energy use during construction and the increase in consumption of electricity and diesel fuel during its operation was evaluated, including a CEQR-compliant analysis for New York City.

In the long-term, the Build Alternative would increase the overall consumption of electric and diesel-powered energy, including that amount expended by NJ TRANSIT on its system. Construction of the Build Alternative would increase energy consumption through the use of construction equipment, including fuel for vehicles and equipment and electric power for TBMs. Identified construction impacts will be mitigated by rail service or MPT plans designed to minimize delays.

CONSTRUCTION

- In New Jersey, rail service on the NEC and other interconnected rail lines would be affected by construction adjacent to the NEC, which would increase energy consumption during periods of delay. This effect would be minimized by limiting peak-hour construction adjacent to these rights-of-way.
- In New Jersey, the Hudson River and New York, increases in energy consumption would occur during construction of the Build Alternative through the use of construction equipment, including fuel for vehicles and equipment and electric power for TBMs, and impacts to vehicular traffic from construction site operation, lane closures, and detours.

LONG-TERM

- The Build Alternative would increase the overall consumption of electric and diesel-powered energy, including that amount expended by NJ TRANSIT on its system. This increased consumption would be partially offset by decreased fuel consumption due to reduced trans-Hudson auto, bus and ferry usage.

ELECTRIC AND MAGNETIC FIELDS

Electric and magnetic fields (EMF) from TBM operation during construction, and the incremental change in EMF levels generated by current in the catenary/rail structure of the NEC and from electrically-powered rolling stock due to increased Build Alternative rail operations were assessed relative to International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines.

No significant impacts were predicted.

CONSTRUCTION

- No significant temporary increases in EMF levels attributed to TBM operations in Build Alternative construction areas would occur.

LONG-TERM

- EMF levels related to increased Build Alternative service on the NEC and intersecting rail lines would remain well below recognized impact guidelines.

UTILITIES

Utilities, including water, sanitary sewer, fuel, and underground electric lines, cable television, telephone, communications fiber optics, and overhead electric lines, were compiled from existing mapping and coordination with local municipalities and utility companies. Construction-related disruptions to these services will be mitigated. Also evaluated, in accordance with CEQR regulations, were potential impacts on New York City's water supply, sanitary sewage treatment, stormwater management infrastructure, and its municipal solid waste management system.

No adverse impacts to these services were identified.

CONSTRUCTION

- In New Jersey, no service disruptions would occur since affected utilities would either be relocated and reconnected prior to shut off of existing lines, or protected in place.

- In New York, existing utility lines would be relocated and could be temporarily disrupted during construction due to surface or near-surface improvements and tunneling. However, only minor disruption and no discontinuance of utility services would result.
- The westernmost portion of the existing Con Edison Workout Facility between West 28th and West 29th Streets and Eleventh and Twelfth Avenues (Block 674) would be used to construct a permanent fan plant and to operate a construction access shaft. Con Edison vehicles and equipment would be temporarily relocated from Block 674 to a 0.9-acre portion of Block 675 immediately to the north during shaft operation and fan plant construction. Specific construction activities will be coordinated with existing and proposed Con Edison site operations to avoid, minimize or mitigate temporary impacts.

LONG-TERM

- No long-term impacts to utilities or delivery of their services would occur with the Build Alternative.

INDIRECT AND CUMULATIVE EFFECTS

According to Council on Environmental Quality regulations, 'indirect effects' are defined as those effects caused by an action, that occur later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducement and other changes in the pattern of land use, population density or growth rate, and related effects on air quality, water quality and other natural systems. These regulations also define 'cumulative impact' as the impact on the environment that results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person that would undertake such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

CONSTRUCTION

- Transportation, infrastructure, and development projects are proposed in and near the New Jersey and New York project area for the Build Alternative. Several of these could be under construction at the same time as the Build Alternative, and all of these projects would be operational at the same time as the Build Alternative. While the long-term benefits of these projects will be realized over time, their construction impacts, combined with those of the Build Alternative, would generate cumulative impacts. These cumulative effects would increase the intensity and duration of certain construction-related impacts, particularly related to ecology, noise and vibration, traffic circulation, pedestrians, and contaminated materials. To the greatest degree possible, NJ TRANSIT will coordinate with agencies and developers to reduce the cumulative impacts of simultaneous construction.; however, in some cases, it may be impossible to avoid these impacts as developers and agencies strive to complete their projects in a timely and cost-effective manner.
- During Build Alternative construction, NJ TRANSIT and Amtrak rail services on the NEC could experience indirect delays due to construction activities or the movement of equipment and materials. Similarly, indirect impacts would be experienced in areas where construction activities would take place. These indirect delays could include traffic disruption, detours, or delays. Impacts to rail services will be mitigated through coordination of activities during off-peak periods and impacts to roadways through the implementation of MPT plans.
- The de-commissioning and replacement of the Portal Bridge, planned to begin in 2011, would cumulatively contribute to environmental impacts during construction of the proposed Kearny Rail Yard and the Secaucus Connection in New Jersey. These would include cumulative impacts to the

Hackensack River. Best Management Practices (BMPs) for both projects will be coordinated to mitigate these impacts.

LONG-TERM

- In its operational phase, the Build Alternative is expected to have a positive cumulative impact. The various development projects described throughout this FEIS would increase demand for commuter service in New Jersey and New York west of the Hudson River and on the west side of Manhattan, thereby contributing to the goals and objectives of the Build Alternative. Transportation improvements of the Build Alternative planned in New Jersey and New York along five NJ TRANSIT lines and by NJ TRANSIT on the other lines, along with improvements by other agencies, would support access to underserved areas. These transportation projects would ultimately provide access to and within Manhattan, which would benefit the regional transportation system.
- Indirectly, the Build Alternative would improve access to employment opportunities and job retention, community, institutional, educational and recreational facilities within and beyond the project area. The Build Alternative would support proposed transit-oriented development at Frank R. Lautenberg station and other stations beyond the project area in New Jersey and the proposed Hudson Yards development in west Midtown.

ARCHAEOLOGICAL AND HISTORIC RESOURCES

The effects of the project on archaeological and historic resources were assessed in accordance with the National Historic Preservation Act of 1966. Study areas known as Areas of Potential Effect (APE) were identified in consultation with the New Jersey Historic Preservation Office (NJSHPO), the New York State Historic Preservation Office (NYSHPO) and consulting parties. Archaeological and historic resources were identified through field survey and documentary research within each APE in consultation with the SHPOs and the New York City Landmarks Preservation Commission (NYCLPC). Since archaeological and historic resources could be affected by the project, and to meet Section 106 consultation requirements, FTA, the Advisory Council on Historic Preservation (ACHP), NJ TRANSIT, NJSHPO and NYSHPO have executed a Programmatic Agreement (PA). The PA contains measures to minimize harm to archaeological and historic resources and procedures to be carried out in connection with design and construction of the Build Alternative. These measures are specifically related to the construction and long-term effects described below. Both NJSHPO and NYSHPO have indicated in correspondence (June 8, 2006 and June 21, 2006, respectively) and in meetings, that they cannot issue concurrence on Determination of Effects, either adverse or otherwise, because additional design details the Build Alternative would be required. Both SHPOs have agreed in writing at this stage that the PA is the appropriate documentation required to proceed with the completion of the Section 106 process.

ARCHAEOLOGICAL RESOURCES

Seventeen (17) areas of archaeological sensitivity could be disturbed during Build Alternative construction. Measures to minimize impacts to these archaeological resources are identified in the Section 106 Programmatic Agreement.

Construction

- In New Jersey, areas of potential archaeological sensitivity include historic cemeteries in Secaucus, as well as industrial remains, a historic 18th century Weehawken Ferry Slip and Hackensack Plank Road in the vicinity of the Hoboken Fan Plant/Construction Access Shaft site.
- In New York, the area from the Hudson River shoreline to Tenth Avenue was in-filled and piers and wharves might be present. From Tenth Avenue to Fifth Avenue, domestic archaeological remains, such as privies, wells, and building foundations, might be present. Disturbance to these

archaeological resources as a result of Build Alternative fan plant and NYPSE station entrance construction could have adverse effects.

Long-term

- Any potential archaeological resources that would be affected by the Build Alternative would be disturbed during construction. Once the Build Alternative would be operational, no further effects to archaeological resources would occur.

HISTORIC RESOURCES

Temporary indirect effects to 19 historic properties (2 in New Jersey and 17 in New York) could result from increased noise and vibration, dust, construction traffic, and the introduction of visual elements, such as construction equipment, fencing, and shielding adjacent to historic properties. Construction of the Build Alternative would result in permanent direct effects to nine (9) historic properties. Measures to protect these resources are identified in the Section 106 Programmatic Agreement.

Construction

- In New Jersey and New York, temporary indirect effects to 19 historic properties (2 in New Jersey and 17 in New York) could result from increased noise and vibration, dust, construction traffic, and the introduction of visual elements, such as construction equipment, fencing, and shielding adjacent to historic properties.

Long-term

- In New Jersey, permanent direct effects to seven (7) historic properties would occur as a result of the construction of walls, viaducts, underpinning and demolition. These seven (7) historic properties include: New York Susquehanna & Western Railroad Historic District; Old Main Delaware Lackawanna & Western Railroad Historic District; Federal Carton Corporation/G&B Baker's Supply/Grand-City Container Corporation Building; Substation 3 Building (Amtrak Substation 42); Pennsylvania Railroad New York to Pennsylvania Historic District; Substation 4 (Amtrak Substation 41); and Delaware Lackawanna & Western's Boonton Line Historic District.
- In New York, permanent direct effects to two (2) historic properties (including one historic district) due to a fan plant and station entrance would occur. These two (2) historic properties include Nelson Tower and the Garment Center Historic District. See Chapter 7 for more information.
- In New Jersey and New York, the siting of proposed station entrances for NYPSE and proposed fan plants/construction access shafts near 19 historic properties (2 historic properties in New Jersey and 17 historic properties in New York) could create permanent indirect visual/scale (contextual) effects.

SECTION 4(f) RESOURCES

A Section 4(f) Evaluation has been prepared for the project pursuant to Federal regulations contained in 23 CFR 774 that implement 23 U.S.C. 138 and 49 U.S.C. 303, which were originally enacted as Section 4(f) of the Department of Transportation Act of 1966 and are still commonly referred to as "Section 4(f)" and there will be a use to eleven (11) Section 4(f) resources.

A Section 4(f) Evaluation is required for any federally funded transportation project, if the project proposes to use property from: 1) a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance; or 2) a historic site of national, State, or local significance. Historic sites are sites that are listed or eligible for listing on the National Register of Historic Places as defined in 36 CFR Part 800, and through consultation with SHPO and appropriate local officials. Significant

historic sites have been divided into archaeological resources and historic resources. An archaeological resource is considered a historic site only if it warrants preservation in place. A “use” according to Section 4(f) occurs when either one of the two types of land described above is permanently incorporated into a transportation facility; when there is a temporary occupancy of land that is adverse; or when the impacts due to proximity are so severe that there is a constructive use.

- The Build Alternative would result in a Section 4(f) use of eleven (11) Section 4(f) resources, consisting of ten (10) historic resources and one (1) parkland and recreational area. Measures to minimize harm to the use of 10 historic resources were developed in consultation with ACHP, FTA, NJSHPO, NYSHPO and consulting parties as described in the Programmatic Agreement.
- NJ TRANSIT will continue to coordinate implementation of the project with the Hudson River Park Trust (HRPT) through design and construction.
- Eighteen (18) archaeologically sensitive areas were identified in the vicinity of the Build Alternative. Based on available information, it cannot be determined at this time whether any archaeological resources would be encountered within these archaeologically sensitive areas that would warrant preservation in place. Therefore, it is assumed that the Build Alternative would not result in a Section 4(f) use of any archaeological resources. If resources are found and should it be determined that such archaeological resources are eligible for listing on the National Register of Historic Places and warrant preservation in place, NJ TRANSIT and FTA will prepare a separate Section 4(f) Evaluation for each of the resources as applicable.
- The Build Alternative would not result in a use of any publicly-owned Section 4(f) wildlife or waterfowl refuges.

L. ENVIRONMENTAL MITIGATION OF THE BUILD ALTERNATIVE

Measures have been investigated and recommended to mitigate or eliminate Build Alternative impacts. They have also been analyzed as to their respective cost, effectiveness, and public/agency acceptance. These mitigation measures will be incorporated into a Construction Environmental Protection Plan (CEPP), which will be developed as project design progresses. Specific mitigation measures are presented in Chapters 3, 4, 5, 6, 7, and Appendix 8, and are summarized below for construction and long-term impacts.

TRANSPORTATION

PUBLIC TRANSPORTATION

Construction

- NJ TRANSIT will continue to coordinate with Amtrak, through design and construction phases, to minimize service disruptions to Amtrak and NJ TRANSIT rail service in New Jersey. During Final Design of the project, staging plans will be developed in coordination with Amtrak to identify required outages. Agreements between NJ TRANSIT and Amtrak will be prepared, as required, to address construction affecting Amtrak facilities on the NEC.
- NJ TRANSIT will work with local municipalities and Hudson County to develop and implement a Maintenance and Protection of Traffic (MPT) plan to maintain bus service on streets near the Hoboken Fan Plant/Construction Access Shaft and to Frank R. Lautenberg Station. The MPT plan will illustrate detour routes and signing; lane closures for staged construction; placement of temporary traffic control devices; temporary pavement; and temporary pedestrian walkways, where necessary, to maintain bus service.

- NJ TRANSIT will develop and implement an MPT plan in coordination with NYCT and NYCDOT to mitigate impacts to bus service. The MPT plan will require excavations to be covered during peak periods so that all travel lanes on West 34th Street, including the bus lanes, can be maintained. The MPT plan will maintain off-peak bus service on West 34th Street.
- NJ TRANSIT will work with NYCT to maintain station operations and adequate station access and egress throughout construction. Approved signs and notices of street access stair closures will be posted in advance of construction to minimize passenger impacts. NJ TRANSIT and NYCT will maintain access to each subway station, with intermittent closings of individual entrances.

Long-term

- NJ TRANSIT will work with MTA and NYCT to develop a strategy to provide the additional buses required on the M16/M34 line as a result of the Build Alternative.

STATION ACCESS AND PARKING

Construction

- NJ TRANSIT will work the New Jersey Department of Transportation (NJDOT), Hudson County, the Township of Secaucus, and other local municipalities to develop and implement an MPT plan to maintain access to Frank R. Lautenberg Station during construction. The MPT plan, developed during Final Design of the project, will minimize conflicts between roadway vehicles, buses, and construction vehicles on local streets near stations and parking facilities. It will include proposed lane closures, detours, and hours of effect.
- NJ TRANSIT will work with NYCT, LIRR and Amtrak during Final Design of the project to develop a PSNY pedestrian access plan to allow pedestrians and passengers to avoid station areas impacted by construction activities.

Long-term

- To address increased parking demand along commuter rail lines beyond the project area, mitigation measures will include: using the NJ TRANSIT's Station Access Program to evaluate and plan for parking needs; improving transit access to stations through feeder or alternate bus service under NJ TRANSIT's Community Shuttle Bus Service program; and working with communities to design in a manner that encourages alternate transportation opportunities to access stations.

ROADWAYS

Construction

- NJ TRANSIT will work with NJDOT, Hudson County, and local municipalities to develop an MPT plan to implement signal timing changes on Tonnelle Avenue in North Bergen and along 19th Street in Weehawken, and manage lane closures during cut-and-cover construction on Tonnelle Avenue.
- NJ TRANSIT will develop and implement an MPT plan to mitigate traffic impacts and maintain traffic access and circulation during construction. The MPT plan includes measures such as: additional signal timing changes; detouring of traffic to streets on which construction would not be occurring; and adjusting existing travel lane configurations and utilization. Street lane closures will be limited primarily to nighttime periods and weekends, when vehicular volumes would be lower. These traffic mitigation measures have been approved by NYCDOT based on current conditions. NJ TRANSIT will work with NYCDOT to monitor future traffic conditions and make necessary adjustments to the proposed mitigation measures.

Long-term

- NJ TRANSIT will work with NYCDOT to implement identified traffic mitigation measures. Additional traffic impacts will be mitigated by traffic signal timing changes (i.e., reallocating “green time” among approaches to better match intersection approach capacity to traffic demand) and a curb use regulation change to clear the curb lane and increase intersection approach capacity. These mitigation measures have been approved by NYCDOT. Two intersections, at Sixth Avenue/Broadway at West 34th Street (Herald Square) and Twelfth Avenue at West 24th Street, cannot be mitigated through the application of practical mitigation measures because of significant traffic demands on all approaches.

PEDESTRIANSConstruction

- NJ TRANSIT will work with NJDOT, Hudson County, and local municipalities to develop and implement an MPT plan, including protected sidewalk shifts into curbside lanes or sidewalk reconfiguration, to mitigate pedestrian impacts and maintain pedestrian access and circulation in areas adjacent to proposed construction sites.
- NJ TRANSIT will develop and implement an MPT plan, coordinated with NYCDOT and NYPD, and approved by NYCDOT to maintain adequate pedestrian access and circulation during construction. Construction will be scheduled during off-peak hours to the extent possible, although barriers will be in place 24 hours a day. Temporary surfaces will be placed to allow pedestrians to pass during construction. The MPT plan will be prepared in accordance with New York City regulations during Final Design of the project, and an ongoing program of review of pedestrian circulation with NYCDOT will occur during construction.

Long-term

- NJ TRANSIT will work with NYCDOT to implement identified pedestrian mitigation measures. These mitigation measures include increasing effective sidewalk width by removing or relocating newsstands, phone booths and other fixtures, and widening crosswalks and street corners to accommodate project-generated pedestrian volumes. Crosswalks will be widened to meet CEQR standards by replacing the current pavement markings.
- NJ TRANSIT has developed mitigation measures for impacts to passenger flow within NYCT subway stations and will work with NYCT to implement them and identify additional improvements as necessary. A typical approach could include physically widening and/or adding stairs or escalators where feasible or changes to station configuration to direct passengers to less-used elements. These improvements would be funded by NJ TRANSIT.

FREIGHT MOVEMENTConstruction

- NJ TRANSIT will coordinate with NYS&W and Conrail through project Final Design and construction to mitigate impacts to freight operations. Required outages of NYS&W and Conrail freight tracks will be limited to one track at a time. The outages will be coordinated with freight operators and will be sensitive to primary freight rail movement on the affected rail line.

Long-term

- No long-term freight movement impacts are anticipated with the Build Alternative; therefore, no mitigation will be required.

LAND USE AND DEMOGRAPHICS

CONSTRUCTION

- To assure access to properties within the proposed Secaucus Connection during construction, including PSE&G property and the Jersey City Police Department firing range, NJ TRANSIT will relocate the existing grade crossing to clear the main construction area and provide connections to other existing access roads in the area.
- In New Jersey, NJ TRANSIT will adhere to the New Jersey Redevelopment and Housing Law N.J.S.A. 40A:12A. Efforts will be made to relocate affected businesses near their original locations.
- In New York, displacements and relocation will be subject to requirements of the New York State Eminent Domain Procedure Law (the "Eminent Domain Procedure Law"). NJ TRANSIT and PANYNJ will work with property owners to obtain favorable relocation assistance, including relocation of displaced businesses near their original locations.
- Permanent property interests in New Jersey and New York will be subject to the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as codified in Title 42, Section 4601 et seq. of the United States Code, and the applicable implementing regulations set forth in Title 49, Part 24 of the Code of Federal Regulations (collectively, the "Uniform Act") (U.S Code 42 and CFR 49) (see Appendix 4.2 for details). The Uniform Act defines the acquisition and relocation process and benefits for commercial and residential property owners and tenants.

LONG-TERM

- NJ TRANSIT will provide a roadway bridge over the Secaucus Connection loop tracks with connections to existing access roads to assure permanent access to properties within the proposed Secaucus Connection, including PSE&G property and the Jersey City Police Department firing range.
- Permanent property interests in New Jersey and New York will be subject to applicable state and federal policies and regulations, including the Uniform Act, New Jersey Redevelopment and Housing Law, and New York State Eminent Domain Procedure Law.

ENVIRONMENTAL JUSTICE

CONSTRUCTION

- No mitigation will be required because construction-related impacts would not fall disproportionately on low-income and/or minority populations in the project area.

LONG-TERM

- On Henry Street in Secaucus, New Jersey, the added train service on the NEC in the Build Alternative would cause noise and vibration impacts to minority and low-income persons living in three (3) residential properties north of the NEC. Current Henry Street property owners have been notified of the project. NJ TRANSIT will monitor the noise impact to the three Henry Street residences beginning with the initial operation of service in 2017. On-going coordination with property owners and noise-level monitoring will continue quarterly for the first three years of service, and annually for two additional years. Based on the findings of this monitoring, NJ TRANSIT will work with the property owners to implement sound-proofing measures.

VISUAL AND AESTHETIC CONDITIONS

CONSTRUCTION

- In North Bergen, New Jersey, NJ TRANSIT will install a 20-foot-high temporary barrier just west of Paterson Plank Road at the elevation of the dwelling units' lowest floors to reduce visual/aesthetic impacts of construction from the Tonnelle Avenue Fan Plant/Construction Access Shaft. Alternative measures such as site enclosures will be investigated to provide visual mitigation for higher building floors.
- NJ TRANSIT will install a 25-foot-high temporary barrier closest to the Weehawken residences to reduce visual/aesthetic impacts from construction at the Hoboken Construction Access Shaft site.
- To reduce visual/aesthetic impacts at nearest residential, parkland, office and pedestrian areas at construction sites in New York, NJ TRANSIT will install temporary barriers between 15 and 20 feet in height. Alternative measures such as site enclosures will be investigated to provide visual mitigation for higher building floors.

LONG-TERM

- The Build Alternative would not cause any long-term impacts to visual and aesthetic resources because the design of project facilities, including fan plants and station entrances, will be compatible with surrounding land uses.

AIR QUALITY

CONSTRUCTION

- NJ TRANSIT will incorporate Diesel Emission Control measures into construction contracts. These measures will be implemented in consultation with USEPA and state and local agencies in New Jersey and New York.
- NJ TRANSIT will implement a Dust Control Plan and a Soil Erosion and Sediment Control Plan to control dust resulting from construction activities. The plan will detail sources and measures to reduce dust, as well as monitoring and enforcement provisions.

LONG-TERM

- Since no long-term air quality impacts have been predicted for the Build Alternative, no mitigation will be required.

NOISE AND VIBRATION

CONSTRUCTION

- Noise from construction equipment will comply with FTA, NJDEP and NYC noise emission standards. NJ TRANSIT will coordinate construction activities with New Jersey municipalities, New York City, and affected property owners. A noise and vibration complaint procedure will be established to promptly address community concerns and implement additional control methods where necessary.
- For construction sites in New Jersey, NJ TRANSIT will install noise barriers 15 to 25 feet high to comply with FTA guidelines and NJDEP noise criteria. Alternative measures such as site enclosures and acoustical noise tent/enclosures or mufflers for jackhammers or pavement breakers will be investigated to provide additional noise mitigation.

- For construction sites in New York, NJ TRANSIT will install site enclosures or temporary noise barriers at least 15 feet high. Alternative measures such as acoustical noise tent/enclosures or mufflers for jackhammers or pavement breakers will be investigated to provide additional noise mitigation.
- NJ TRANSIT will install temporary plywood panels on the walls of at least the ground and second floors of the parking garage (over any existing openings in the walls) during the construction of the ADA Access/Emergency Personnel Access elevator entrance on West 34th Street between Eighth and Ninth Avenues to minimize noise and vibration to the Hammerstein Ballroom/Manhattan Center.
- Mitigation for noise and vibration impacts to Saint Michael's Academy, Convent, and Church and adjacent apartment buildings associated with the Dyer Avenue Fan Plant construction will include the following: site enclosure or other agreed-upon measures (e.g. acoustical windows); limited queuing of trucks; and coordination of the timing of the noisiest construction activities. A project staff person will be assigned throughout the construction period to coordinate with the community.
- Pre-construction inspections and vibration monitoring will be conducted for historic and non-historic buildings adjacent to Build Alternative construction sites in New Jersey and New York to avoid minor structural damage during construction. To ensure that construction levels for vibration remain below FTA threshold criteria, specifications will be included in the construction contracts for the project. In New York, monitoring related to historic buildings within 90 feet of proposed construction will be part of a Construction Protection Plan (CPP) that will follow established procedures and regulations. Blasting schedules will be provided to residents of Paterson Plank Road dwelling units in North Bergen, New Jersey and affected building owners and occupants in New York, such as the Hammerstein Ballroom/Manhattan Center.

LONG-TERM

- Noise mitigation measures for Henry Street residences in Secaucus, New Jersey will include building sound insulation, double-glazed windows, and/or air conditioning. Vibration mitigation measures for Henry Street residences will include track bed improvements. Final mitigation measures will be selected in consultation with affected residents and property owners during Final Design and construction.
- Noise mitigation for sensitive receptors adjacent to the Bay Head Rail Yard and Suffern Rail Yard will include building sound insulation, double-glazed windows, and/or air conditioning. Final mitigation measures will be selected in consultation with affected residents and property owners during Final Design.
- NJ TRANSIT will install fan silencers for each proposed fan plant to reduce fan noise levels to meet FTA, NJDEP, and New York City noise limits. Noise mitigation for the rooftop cooling towers and chiller units of the 35th Street Fan Plant will include air intakes and exhaust silencers and also will include acoustical enclosures for the chiller units. The specifications for these fan plant components will be determined during Final Design.

ECOLOGY

CONSTRUCTION

- Construction impacts to wetlands of greater than six months in duration would require mitigation at a ratio acceptable to USACE and NJDEP in consultation with MIMAC, and would be dependent upon the mitigation alternative chosen. Construction-related impacts would be temporary in nature and natural communities will be restored to pre-disturbance condition. In Segment 1, about 7.3 acres will be restored on-site in the location of the construction impact. Mitigation for construction impacts to

upland forest will be provided at a 1:1 ratio, as recommended by the United States Fish and Wildlife Service (USFWS) and as required by the NJ No Net Loss Reforestation Act.

LONG-TERM

- Avoidance/minimization measures will continue to be investigated pursuant to Section 404b (1) Guidelines, as the initial step in the mitigation process. Mitigation of unavoidable impacts will require the preparation and submittal of a mitigation plan to MIMAC and approval by USACE and NJDEP. NJ TRANSIT will continue the following activities to mitigate ecological impacts:
 - Coordinate with the MCT on the potential development of a wetland mitigation bank on the Richard P. Kane Tract, including the projected credit availability timeline, as the primary mitigation option.
 - Coordinate with the Meadowlands Conservation Trust (MCT), New Jersey Meadowlands Commission (NJMC), and MIMAC on the potential development of an in-lieu fee program, as a mitigation option.
 - Investigate the feasibility and acceptability of completing project-specific mitigation at Oritani Marsh, portions of the Kane Tract, or another suitable mitigation site within the HMD, as the secondary mitigation option.
- Mitigation for impacts to approximately 1.7 acres of upland forest in Segment 1 will also be provided at a 1:1 ratio as recommended by USFWS and as required by the NJ No Net Loss Reforestation Act.
- Mitigation for the active osprey nesting platform in Segment 1 will include construction of new osprey nesting platforms at a 3:1 ratio, 1,000 feet or more from the site, using NJDEP Division of Fish and Wildlife designs, as recommended by NJDEP.
- In Segment 2, mitigation will be provided for impacts to 0.1 acre of wetlands and 0.4 acre of upland forest. Compensatory wetland mitigation could include: 1) purchasing credits from a federal and state-approved wetland mitigation bank; 2) purchasing credits from an approved in-lieu fee program; 3) the development of an independent wetland mitigation site to satisfy acceptable wetland mitigation ratios; or 4) a combination thereof. Mitigation for impacts to upland forest will be provided at a 1:1 ratio, as recommended by USFWS, and as required by the NJ No Net Loss Reforestation Act.

WATER RESOURCES

CONSTRUCTION

- NJ TRANSIT will mitigate impacts to water quality during construction by: minimizing stormwater flow and treating stormwater as close to the point of origin as possible; minimizing the amount of disturbed ground surface at any time; and seeding and stabilizing disturbed areas immediately upon completion of work.
- NJ TRANSIT will mitigate impacts to groundwater during construction by adherence to a Stormwater Pollution Prevention Program (SWPPP) and to Best Management Practices (BMPs). BMPs consist of measures to trap, treat, and assimilate stormwater runoff, and their use will be stipulated in the SWPPP. The SWPPP will stipulate the use of manufactured treatment devices; the implementation of a soil erosion and sediment control plan; and adherence to proper material handling procedures.
- NJ TRANSIT will mitigate impacts to groundwater during construction by coordinating with municipalities to characterize contaminants in the groundwater and follow agreed-upon treatment and processes.

LONG-TERM

- NJ TRANSIT will characterize contaminants and coordinate with municipal water treatment authorities prior to new or increased water discharges to either watercourses or municipal sewer systems.
- The relocation of a portion of a tributary to Penhorn Creek will consist of in-kind replacement as an open channel with a natural bottom, accomplished through relocation of the stream channel and replanting with indigenous vegetation to maintain stream flow, which would be interrupted by construction of an embankment that would support the two new tracks south of the NEC.

PARKLANDS

CONSTRUCTION

- Access to the proposed Little Snake Hill from the adjacent PSE&G property is anticipated through an easement between PSE&G and Hudson County. The easement would be a third party agreement between PSE&G and Hudson County and NJ TRANSIT would not be a party to the agreement. To assure access to the PSE&G property within the proposed Secaucus Connection during construction, NJ TRANSIT will relocate the existing grade crossing to clear the main construction area and provide a connection to other existing access roads in the area. In the long-term, NJ TRANSIT will provide a bridge over the loop tracks with connections to existing access roads.
- Measures to avoid or minimize impacts to Hudson River Park from construction vehicle traffic, such as noise barriers on the Twelfth Avenue Construction Access Shaft site, will continue to be developed in consultation with HRPT and other New York City and State agencies.

LONG-TERM

- NJ TRANSIT will conduct research with local municipalities to verify if any properties in the New Jersey project area are subject to Green Acres restrictions. The use of Green Acres properties will comply with the diversion process for the New Jersey Green Acres Program (N.J.A.C. 7:36-26.1).

SOILS AND GEOLOGY

CONSTRUCTION

- In New Jersey, appropriate design measures and construction techniques will mitigate potential impacts from: 1) construction on compressible soils; 2) support of existing structures; 3) potential soil erosion; 4) seismic safety and liquefaction; 5) tunneling through fault zones; 6) vibration and dust from rock excavation; 7) potential slope instability; and 8) dewatering effects. These design measures and construction techniques will include:
 - Constructing new embankments and viaducts along the NEC and the Secaucus Connection loop tracks on pile or drilled shaft foundations, or placing soil surcharges to preload compressible soils prior to construction to mitigate potential post-construction settlement of above-grade track improvements.
 - Underpinning or otherwise supporting foundations within the alignment construction zone to mitigate the potential for undermining settlement or structural instability from excavation beneath or adjacent to existing railroad, roadway, or utility structures.
 - Implementing appropriate erosion and sediment control measures in accordance with state and regional regulations.
 - Designing surface and subsurface structures in accordance with project seismic design criteria to resist an appropriate level of shaking, including a maximum design earthquake load.

- Performing appropriate ground stabilization measures, such as grouting, ahead of the TBM face to stabilize the ground and/or control groundwater inflow if faults are encountered during construction of the Palisades tunnels, the Hoboken Fan Plant/Construction Access Shaft, or the western portion of the Hudson River tunnels.
- Adhering to appropriate vibration limits near sensitive structures or environments as necessary, using controlled blasting techniques, and performing vibration monitoring to mitigate vibration impacts from blasting.
- Evaluating during Final Design the stability of rock slopes in the vicinity of the Palisades tunnels portals and the Hoboken Construction Access Shaft to mitigate potential instability of rock slopes due to vibrations or portal excavation.
- Performing ground improvements, underpinning, or providing lateral earth retention, such as slurry walls, to stabilize soils in the vicinity of the Tonnelle Avenue and Hoboken Construction Access Shafts to mitigate ground displacement due to dewatering.
- In the Hudson River, seismic design considerations, including effects of soil behavior, will be incorporated in proposed surface and subsurface structures. Structures will be designed in accordance with project seismic design criteria to resist an appropriate level of shaking, including a maximum design earthquake load.
- In New York, appropriate design measures and construction techniques will mitigate potential impacts from: 1) potential soil erosion; 2) seismic safety; 3) tunneling through fault zones; 4) vibration from rock excavation and effects on other underground structures; 5) dust from rock excavation; 6) disturbance of potentially hazardous minerals; and 7) dewatering effects. These design measures and construction techniques will include:
 - Implementing appropriate erosion and sediment control measures in accordance with state regulations.
 - Designing surface and subsurface structures in accordance with project seismic design criteria to resist an appropriate level of shaking, including a maximum design earthquake load.
 - Performing appropriate ground stabilization measures, such as grouting, ahead of the TBM face to stabilize the ground and/or control groundwater inflow if faults are encountered during construction of the Manhattan tunnels. If faulting or poor quality rock is present at proposed fan plant/construction access shaft sites, pre-excavation ground improvement will be performed, if necessary, to allow excavation in closely fractured or weathered rock.
 - Adhering to appropriate vibration limits near sensitive structures or environments as necessary, using controlled blasting techniques, and performing vibration monitoring to mitigate vibration impacts from blasting.
 - Implementing dust control measures to minimize dust hazards during excavation of the Manhattan tunnels, NYPSE, and the Twelfth Avenue and Dyer Avenue Construction Access Shafts, and during processing and transport of excavated material.
 - Implementing measures to minimize any environmental hazard associated with excavated material removal and processing if serpentinite rock excavated for a portion of the proposed tunnels alignment and/or the Twelfth Avenue Construction Access Shaft would contain potentially hazardous asbestiform minerals.
 - Performing ground improvements, underpinning, or providing lateral earth retention, such as slurry walls, to stabilize soils in the vicinity of the Twelfth Avenue Construction Access Shaft.

LONG-TERM

- No long-term adverse impacts to soils and geology would occur with the Build Alternative; therefore, no mitigation will be required.

CONTAMINATED MATERIALS

CONSTRUCTION

- Sixteen (16) contaminated or potentially contaminated sites in New Jersey identified during the PESA will be impacted and mitigated. Mitigation will include remediating contaminated soils and/or groundwater consistent with federal and state requirements through off-site disposal or treatment, or the use of engineering (e.g., capping) and institutional controls (e.g., deed notices and CEAs) for contaminated soil and/or groundwater. Prior to initiation of construction activities, specific mitigation requirements for these sites will be outlined in a CECF and Remedial Action Work Plans (RAWP) to be reviewed and approved by NJDEP. Site-specific mitigation activities associated with the Malanka Landfill will be conducted by NJ TRANSIT in accordance with an approved Landfill Closure Plan.
- At the site of the proposed Kearny Rail Yard, mitigation activities conducted by NJ TRANSIT during construction will involve the collection and discharge of water generated during the consolidation process and the treatment of wastewater generated from the sedimentation basins.
- Three (3) contaminated or potentially contaminated sites in New York identified during the PESA will be impacted and mitigated. Mitigation will include the excavation and disposal of contaminated soils or reuse off site, or reuse on site under institutional and engineering controls, and dewatering and treatment where contaminated groundwater would be encountered.
- In New Jersey and New York, testing for radon in excavated tunnels material to be used as building foundation fill will be included as a provision of final engineering contract specifications.

LONG-TERM

- In New Jersey and New York, engineering and institutional controls will be maintained by NJ TRANSIT, consistent with federal and state requirements to minimize the contact and migration of contaminants left in place. At the Malanka Landfill site, long-term actions that will be conducted by NJ TRANSIT include groundwater monitoring, maintaining site access control and operations and maintenance of the final landfill cover, groundwater treatment systems, landfill gas venting systems, and drainage systems. At the site of the proposed Kearny Rail Yard, mitigation activities that will be conducted by NJ TRANSIT include: continued inspection and maintenance of the sheet pile barrier wall along the Hackensack River; groundwater monitoring; and monitoring and maintenance associated with any institutional or engineering controls established for the site.

SAFETY AND SECURITY

CONSTRUCTION

- NJ TRANSIT will install fencing and shielding at all construction sites to reduce the vulnerability to trespassing and vandalism and to protect adjacent walkways and streets. Traffic on affected streets adjacent to construction sites will be managed through enactment and enforcement of approved MPT plans that would include signage, lane closures, travel lane shifts, bus stop relocations, and relocated and protected sidewalks and/or bicycle lanes.
- NJ TRANSIT will prepare and implement a safety plan incorporating requirements for the contractor(s) with regard to heavy industrial crane operations.

LONG-TERM

- NJ TRANSIT will continue to develop a Safety and Security Management Plan (SSMP) to define the organization and approach used to address safety and security from Preliminary Engineering through construction. The SSMP will include a Safety and Security Certification Plan (SSCP), the results of the Preliminary Hazard Analysis (PHA) and Threat and Vulnerability Analyses (TVA), and development procedures for the System Security and Emergency Management Preparedness Program Plan (SSEMPPP) prior to initiation of revenue service. The SSEMPPP will identify the organizational structure responsible for emergency response and will contain information on emergency response protocol, security protocol, and evacuation plans and procedures in the event of a fire or security emergency.
- NJ TRANSIT will coordinate with appropriate regional and municipal fire departments, local police departments, and emergency medical services regarding operation of diesel fuel-laden equipment in the proposed Palisades, Hudson River, and Manhattan tunnels, and NYPSE.

ENERGY

CONSTRUCTION

- The NEC and other interconnected rail service plans will be developed to maximize work within and adjacent to the NEC or other rights-of-way during off-peak rail periods, as practicable, to minimize rail service outages or delays. These measures would reduce additional electric and diesel fuel consumption caused by slower rail operating speeds through construction areas.
- Effects on vehicular traffic flow near Build Alternative construction areas will be mitigated by implementation of approved MPT plans to maintain travel lanes, and detour through traffic away from construction activities and equipment to the extent practicable. These measures would reduce additional gasoline consumption caused by slower-moving and idling roadway vehicles.

LONG-TERM

- The increased consumption of electric and diesel-powered energy with the Build Alternative would be partially offset by decreased fuel consumption due to reduced trans-Hudson auto, bus and ferry usage.

ELECTRIC AND MAGNETIC FIELDS

CONSTRUCTION

- No significant temporary increases in EMF levels would occur; therefore, mitigation will not be required.

LONG-TERM

- EMF levels related to the Build Alternative service on the NEC and intersecting rail lines would be well below recognized guidelines; therefore, no mitigation will be required.

UTILITIES

CONSTRUCTION

- In the New Jersey portion of the project area, no utility service disruptions would occur since affected utilities will either be relocated and reconnected prior to shut off of existing lines, or protected in place with a slab or steel casing.

- In New Jersey and New York, NJ TRANSIT will coordinate with affected utility providers throughout final engineering design to identify potential issues and prescribe means to resolve them prior to construction.
- NJ TRANSIT and PANYNJ will continue to coordinate with Con Edison regarding proposed infrastructure construction and operation, and temporary relocation of affected Con Edison equipment and vehicles. Specific construction activities will be coordinated with existing and proposed Con Edison site operations to avoid, minimize or mitigate temporary impacts to these operations and Con Edison's ability to provide utility service to its customers.

LONG-TERM

- Since no long-term utility impacts are predicted, no mitigation is proposed.

INDIRECT AND CUMULATIVE

CONSTRUCTION

- Cumulative construction-related noise impacts in Manhattan will be minimized by coordinating Build Alternative construction activities with other simultaneous construction activities in the project area, and through application of mitigation strategies consistent with the New York City Noise Code, such as erection of temporary noise barriers around construction sites, and use of shields and mufflers for construction equipment.
- Construction and track outages along the NEC and other NJ TRANSIT lines that could be under construction at the same time will be limited to the extent possible to off-peak and weekend periods to minimize delays in rail service during peak commuter hours. Roadway travel lanes will be maintained and conflicts between roadway traffic and construction vehicles will be avoided through implementation of MPT plans.
- Potential negative indirect or cumulative impacts related to contaminated materials will be mitigated by restricting the movement of contaminants from one site to another nearby site, through enactment of Construction Contaminant Management Plans that would include engineering (capping) and institutional controls (deed notices) to address construction-related disturbance to avoid long-term impacts.
- Construction activities on both shores of the Hackensack River during Portal Bridge construction would also potentially contribute to increased stormwater runoff to the river. Such impacts would be temporary, and will be mitigated through implementation of construction and operational Best Management Practices.

LONG-TERM

- NJ TRANSIT will investigate preparing a Wetland Mitigation Plan and approach for both the Build Alternative and the Portal Bridge Capacity Enhancement Project to mitigate impacts within the Hackensack Meadowlands District. NJ TRANSIT will continue its dialogue with MIMAC members and the Meadowlands Conservation Trust in that specific regard.

ARCHAEOLOGICAL RESOURCES AND HISTORIC PROPERTIES

FTA, ACHP, NJ TRANSIT, NJSHPO and NYSHPO have executed a Section 106 Programmatic Agreement (PA) that is contained within the FEIS. The PA identifies measures to be carried out during design and construction of the Build Alternative that minimize harm to historic and archaeological resources.

ARCHAEOLOGICAL RESOURCES

Construction

- NJ TRANSIT will appoint a Cultural Resource Manager to assure that any archaeological resources identified during the course of construction are appropriately evaluated. Efforts will be undertaken to the extent possible to avoid or minimize impacts to any eligible archaeological resources; and any adverse effects that project-associated construction activities might have on eligible archaeological resources are mitigated. The Cultural Resource Manager will be responsible for determining the nature of any discovery during Build Alternative construction throughout the project area, including warranting construction to cease for a certain period of time while further archaeological investigations would continue, to enable evaluation of the potential extent and significance of the find. The Cultural Resource Manager will be a professional archaeologist who meets applicable New Jersey and New York standards and those of the National Park Service (36 CFR 61).

Long-term

- Any potential archaeological resources that would be affected or disturbed by the Build Alternative would occur during construction. Once the Build Alternative would be operational, no further effects to archaeological resources would occur and no mitigation will be required.

HISTORIC PROPERTIES

Construction

- Construction activities will have the potential to result in accidental damage to historic properties in the APE, due to the nearness of historic properties to proposed construction. NJ TRANSIT will set forth standard protection measures to avoid adverse effects on historic properties during construction. In addition, ongoing consultation will continue among NJ TRANSIT, FTA, NJSHPO and NYSHPO and other consulting parties as designs progress. As part of this consultation, Construction Protection Plans will be developed for each major project construction segment once engineering and design advances. The plans will set forth the specific measures to be used, and specifications that will be applied, to protect each of the historic properties that could be affected during construction.

Long-term

- NJ TRANSIT, in consultation with FTA, ACHP, NJSHPO and NYSHPO, will develop design specifications to ensure that any permanent and visible project elements that may be built near a historic property are compatible with the historic and architectural characteristics of the affected property(ies). There is a specific design review process to ensure that this occurs with the participation of FTA, ACHP, NJSHPO and NYSHPO. As design advances, proposed plans will be submitted to NJSHPO and NYSHPO for review at 60 percent and 90 percent completion stages, in advance of any construction that may result in any such effects. (Thirty percent completion stage plans have been submitted to NJSHPO and NYSHPO for review.)

SECTION 4(f) EVALUATION

- Measures to minimize harm for the permanent Section 4(f) use of 10 historic properties are the same as identified above for historic properties.
- Measures to minimize harm for the permanent Section 4(f) use of Hudson River Park will continue to be developed in consultation with the HRPT.