

17.1 INTRODUCTION

This chapter of the Environmental Impact Statement (EIS) presents the evaluation the Federal Railroad Administration (FRA) and the New Jersey Transit Corporation (NJ TRANSIT) undertook of potential long-term and construction-related impacts to utilities serving the Project area; identifies the existing and planned utility infrastructure and services in the study area; and documents the evaluation of the impacts of the Preferred Alternative on these services and infrastructure during construction and subsequent operation. This chapter also presents the evaluation FRA and NJ TRANSIT conducted of the Preferred Alternative's energy consumption and its effect on area power supply systems during construction and operation. The Port Authority of New York and New Jersey (PANYNJ), in its role as Project Sponsor, has accepted and relied on the evaluations and conclusions of this chapter.

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

- The chapter incorporates design modifications related to the permanent features of the Project (e.g., modifications to surface tracks and tunnel alignment) and changes to construction methods and staging.
- The chapter is updated to describe current conditions in the affected environment.

This chapter contains the following sections:

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17.2 ANALYSIS METHODOLOGY

During development of this EIS, FRA and NJ TRANSIT developed methodologies for evaluating the potential effects of the Hudson Tunnel Project in coordination with the Project's Cooperating and Participating Agencies (i.e., agencies with a permitting or review role for the Project). The methodologies used for analysis of utilities and energy are summarized in this chapter.

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

17.2.1 REGULATORY CONTEXT

The State of New Jersey regulates utilities in the study area through the Board of Public Utility Commissioners, New Jersey Statutes, Title 48, Public Utilities. Hudson County and the Project area municipalities in New Jersey regulate utilities under New Jersey Statutes, Title 40, Municipalities and Counties. Similarly, the New York Public Service Commission regulates utilities in that state¹ under the New York Energy Law.²

17.2.2 ANALYSIS TECHNIQUES

FRA and NJ TRANSIT evaluated the underground and overhead utility lines that either intersect or run parallel to the Project alignment. Utility information was compiled from existing mapping and coordination with local municipalities and utility companies. **Table 17-1** lists the public and private sources of "as-built" drawings of utilities within the study area. The locations of water, sanitary sewer, and fuel lines were identified, along with underground electric lines. Other utilities near or within the study area were identified, including cable television, telephone, communication fiber optics, and overhead electric lines.

FRA and NJ TRANSIT evaluated the existing utility infrastructure and service locations to determine the short-term and long-term impacts from the construction and operation of the Preferred Alternative. These include potential service disruptions during construction and potential demands on supply during construction and operation.

17.2.3 STUDY AREA

The study area for evaluation of utilities consists of the Project site, as defined in Chapter 4, "Analysis Framework," and the immediately adjacent areas.

¹ "Companies Regulated by the Commission." New York Public Service Commission. October 17, 2013.

² The *New York Consolidated Laws* includes a statutory code called the "Energy Law." The New York Energy Law is the statutory, regulatory, and common law of the State of New York concerning the policy, conservation, taxation, and utilities involved in energy, which became effective on July 26, 1976 as Chapter 17-A of the *Consolidated Laws*.

**Table 17-1
Sources of As-Built Utility Information**

Analysis Area	Utility Information Sources
New Jersey	Public Sources
	PANYNJ New Jersey Department of Transportation (NJDOT) Hudson County North Bergen Municipal Utilities Authority Secaucus Municipal Utilities Authority Jersey City Municipal Utility Authority (JCMUA) North Hudson Regional Sewerage Authority
	Private Sources
	United Water Company (Suez North America) Williams Gas Pipeline – Transco Public Service Electric & Gas (PSE&G) Comcast Optimum (subsidiary of Altice USA) Hess Corporation MCI AT&T Verizon Communications
New York City	Public Sources
	PANYNJ New York City Department of Transportation (NYCDOT) New York State Department of Transportation (NYSDOT) New York City Department of Environmental Protection (NYCDEP) – Sewers Department NYCDEP – Water Department New York City Fire Department (FDNY) New York Unified Court System
	Private Sources
	Consolidated Edison (Con Edison) Empire City Subway Company Charter Communications, Inc. (dba, Spectrum) XO Communications Qwest Communications Lightspeed Fiber Network Level 3 Communications Verizon Communications

17.3 AFFECTED ENVIRONMENT: EXISTING CONDITIONS

17.3.1 POWER FOR RAILROAD OPERATIONS

Electric power is currently used by locomotives and trains operating along the Northeast Corridor (NEC) as the primary source of traction power (for propulsion) and for train lighting, climate control and interior power. This electric power is currently provided by Amtrak along the Northeast Corridor (NEC) via a series of substations that transmit the power to trains through an overhead catenary wire system located above the railroad tracks. This power is provided as alternating current (ac), 12 thousand volts (12 kV) at a frequency of 25 cycles per second, or Hertz (25 Hz). Trains obtain the power from the catenary system through an apparatus known as a pantograph,



which is mounted on the top of locomotives or cars. Power is then transferred to electric motors in the locomotives and power cars that power each train. The North River Tunnel also includes a third rail at track level to provide traction power for maintenance and rescue trains in the event that the catenary system is deactivated. The third rail traction power is supplied as direct current (dc). Electric power is provided along the NEC to operate signals along the tracks from wires running from the substation located at Tonnelle Avenue. Amtrak also maintains a 138 kV, 25 Hz transmission system along the NEC on wires located above the catenary system over the tracks to provide power to the substations, which in turn provide power to the catenary systems, signals, and other railroad operations.

Two traction and signal power substations in the Project area support Amtrak's traction and signal power networks: Substation 42, located adjacent to the existing tunnel portal in North Bergen, New Jersey and Substation 43, located at Penn Station New York (PSNY) in New York City. Two 12 kV, 25 Hz insulated power cables, routed through the existing tunnel, connect Substation 42 to Substation 43.

Substation 42 contains power transformers to convert voltage from the 138 kV transmission lines to the appropriate voltage for traction power. Substation 43 is a switching station that connects the 12 kV insulated power cables from Substation 42 to the traction power system inside PSNY. Signal power motor generators provide the 91.6 Hz signal power along this section of the NEC. The substations also contain circuit breakers to control the transfer of the electric power to the catenary and signal systems along the tracks. At Substation 42, where four transformers are located, much of the equipment appears to date from the electrification of the Pennsylvania Railroad in the 1930s and new equipment added during the expansion of the tracks for the Frank R. Lautenberg Secaucus Junction Station construction in the 2000s. Independent of the Preferred Alternative, Amtrak currently has plans to make modifications in and around Substation 42, as described in Section 17.4.

Substation 43 at PSNY contains two separate substations (switching stations): the Seventh Avenue Switching Station and the 31st Street Switching Station. Both substations are located underground and adjacent to PSNY. The 31st Street Switching Station has its own control house.

17.3.2 NEW JERSEY

Utility facilities located within the Project area in New Jersey that have the potential to be affected by the Preferred Alternative are listed in **Table 17-2**.

Table 17-2
Existing Utilities Serving the Project Area, New Jersey

Location	Utility	Owner	Size
Secaucus Road	Electric	PSE&G	(21) 5" conduits
Secaucus Road	Electric – above ground	PSE&G	Wooden pole lines
Secaucus Road	Water	SUEZ ¹	16" and 12" mains
Secaucus Road	Sewer	SMUA ²	12" pipe
Secaucus Road	Gas	PSE&G	16" cast iron main
Secaucus Road	Communication – underground	Comcast	(4) 3" conduits
Secaucus Road	Traffic	Hudson County	(2) 3" conduits
Conrail-NYSW ³ crossing	Electric – underground	NYSW	3" conduit
Conrail-NYSW Crossing	Telephone – underground	NYSW	3" conduit
Conrail-NYSW Crossing	Electric – underground	Conrail	3" conduit
Conrail-NYSW Crossing	Telephone – underground	Conrail	3" conduit
Tonnelle Avenue	Electric – overhead	PSE&G	Cables, poles
Tonnelle Avenue	Gas	PSE&G	24" main
Tonnelle Avenue	Telephone – overhead	Verizon	Cable
Tonnelle Avenue	Cable – overhead	Optimum	Cable
Tonnelle Avenue	Water	SUEZ	8" and 12" mains
Tonnelle Avenue	Sewer	North Bergen MUA ⁴	8" clay pipe
Tonnelle Avenue	ITS	NJDOT	96 strands cable
Hoboken fan plant site	Sewer	NHSA	24" reinforced concrete pipe
Willow Avenue	Gas	PSE&G	4" and 20" mains

Notes:

- ¹ SUEZ North America (formerly United Water).
- ² Secaucus Municipal Utilities Authority.
- ³ New York, Susquehanna & Western Railway.
- ⁴ North Bergen Municipal Utilities Authority.

Source: *Conceptual Engineering Hudson Tunnel Project Utility Impacts*, Gateway Trans-Hudson Partnership, December 2017.

17.3.3 HUDSON RIVER

The private utility companies and public utility agencies that have provided information about existing infrastructure have indicated that these utilities are either contained in existing rail and vehicle tunnel crossings of the Hudson River, or located outside the study area. A 16-inch steel pipeline crosses the Hudson River just south of the Lincoln Tunnel between King's Bluff in Weehawken, New Jersey and the Jacob Javits Convention Center in Manhattan, New York. In addition, a private electric transmission line crosses the Hudson River near West 49th Street, which is owned by New York Power Authority (NYPA).

There is only one designated "Pipeline Area" on the National Oceanic and Atmospheric Administration (NOAA) navigation chart (New York Harbor; #12327). It is located well outside the Project area, in the vicinity of Piers 25-29 near the Battery.

17.3.4 NEW YORK

Utility facilities located in the Project area in New York City that have the potential to be affected by the Preferred Alternative are listed in **Table 17-3**.



Table 17-3

Existing Utilities Serving the Project Area, New York

Location	Utility	Owner	Size
West 30th Street	Electric - underground	Con Edison	(4) 3 1/2" conduits
West 30th Street	Gas	Con Edison	6" cast iron main
West 30th Street	Water	NYCDEP	12" and 20" mains
West 30th Street	Combined sewer	NYCDEP	5'x6', 6'x10' FTRC ¹ boxes
West 30th Street	Storm sewer	NYCDEP	catch basin
West 30th Street	High Voltage Electric	Con Edison	(2) 10" HPP ² pipe
West 30th Street	High Voltage Electric	Con Edison	(2) 5" pipe
Twelfth Avenue (Route 9A)	Sewer interceptor	NYCDEP	8' x 8' pile-supported concrete culvert
Twelfth Avenue	Storm sewer	NYCDEP	(2) 20" pipes
Twelfth Avenue	Electric - underground	Con Edison	(4) 4" conduits
Twelfth Avenue	Storm sewer	NYCDEP	18" pipe
Twelfth Avenue	Water	NYCDEP	16" main
Twelfth Avenue	Telephone	Verizon	(13) 4" conduits
Twelfth Avenue	Gas	Con Edison	8" main
Twelfth Avenue	Sewer	NYCDEP	6'x4' concrete box
Twelfth Avenue	Electric - underground	Con Edison	(4) 4" conduits
Twelfth Avenue	Telephone	Verizon	(2) 3 1/2" conduits
Tenth Avenue	Underground Electric	Con Edison	(3) 3" conduits
Tenth Avenue	Gas	Con Edison	(3) 20" mains
Tenth Avenue	Sewer	NYCDEP	4' x 2' 8" sewer and 30" pipe
Tenth Avenue	Water	NYCDEP	(2) 12" mains
Tenth Avenue	Water	NYCDEP	20" HPFS ³ main
Tenth Avenue	Water	NYCDEP	36" main
Tenth Avenue	Electric - underground	Con Edison	(5) 4" and (4) 5" conduits
Tenth Avenue	Sewer	Amtrak	24" and 6" force mains
Tenth Avenue	Sewer	NYCDEP	2 MH

Notes:

- ¹ Flat top reinforced concrete.
- ² High performance polypropylene.
- ³ High Pressure Fire Service.

Source: *Conceptual Engineering Hudson Tunnel Project Utility Impacts*, Gateway Trans-Hudson Partnership, December 2017.

In addition to the utilities within the Project site, Con Edison's West 28th Street facility occupies an entire city block between West 28th and West 29th Streets between Eleventh and Twelfth Avenues in Manhattan, immediately south of the Project site's Twelfth Avenue staging area and fan plant site. The facility, which includes electrical and natural gas operations, equipment and materials storage space, and parking for 250 Con Edison trucks and other service vehicles, is a critical component of Con Edison's system for the maintenance and repair of its electric and gas distribution infrastructure and for the provision of reliable service in Manhattan. The West 28th Street facility's location and direct access to Twelfth Avenue allows crews to respond quickly to emergencies and other necessary service, repair, and maintenance work throughout Manhattan.

17.4 AFFECTED ENVIRONMENT: FUTURE CONDITIONS

In the future absent the Preferred Alternative, NJ TRANSIT is proposing a new microgrid³ to provide reliable power to support a core segment of NJ TRANSIT's system in the event of power failures (such as occurred during Superstorm Sandy). This project is known as the NJ TRANSITGRID Microgrid Central Facility Project. The new grid will include an electricity generation facility as well as other components required for the power distribution infrastructure, including several substations, various electrical lines, and other elements. The electric generating facility component is proposed on a site in Kearny, New Jersey, west of the study area for the Hudson Tunnel Project. The project will also include new infrastructure to provide traction power (i.e., electricity needed to electrify railroad tracks) to enable trains to operate during widespread power failures on a portion of the NJ TRANSIT and Amtrak systems. Under normal conditions the microgrid will have the capacity to import from and export into the larger commercial grid 24 hours per day, seven days per week.

No other known major utility installations are proposed for the New Jersey, Hudson River, or New York City portion of the study area under future conditions. Modifications to utility facilities needed to accommodate demand from future development and infrastructure projects would be undertaken as necessary. At Substation 42, Amtrak currently has plans that are independent of the Preferred Alternative to add a fifth traction power transformer and to build a new control house⁴ in order to relocate equipment from a deteriorating building. In addition, additional utilities will be installed at the development sites on the block where the Preferred Alternative's Twelfth Avenue staging area and fan plant would be located, the block between West 29th and 30th Streets between Eleventh and Twelfth Avenues (Block 675), as well as elsewhere in the study area to support the ongoing development activity in West Midtown (see Chapter 6A, "Land Use, Zoning, and Public Policy," for a discussion of future development).

17.5 IMPACTS OF NO ACTION ALTERNATIVE

Under the No Action Alternative, the location and use of utility services and facilities would continue as projected. For purposes of analysis in this EIS, FRA and NJ TRANSIT have assumed that the North River Tunnel would remain functional and in operation at least through the EIS analysis year of 2033. Electric power consumption, and use of other utilities that service the existing North River Tunnel (telecommunications and sewers) associated with the continued operation and maintenance of the existing North River Tunnel would continue similar to the existing condition. In addition, in the No Action Alternative, it is possible that eventually the existing North River Tunnel may become unusable, which would decrease the demand for the utilities used for operating and maintaining the tunnel. The No Action Alternative would not affect the location of any utility infrastructure, nor would it affect provision of utility service or capacity.

³ A microgrid, as defined by the U.S. Department of Energy (DOE), is a local energy grid with control capability, which means it can disconnect from the traditional grid and operate autonomously (per DOE web page found at <http://energy.gov/articles/how-microgrids-work>).

⁴ A substation "control house" contains electrical control equipment, including switchboard panels, batteries, battery chargers, supervisory controls, power-line carrier, meters, and relays. A control house provides all weather protection and security for the control equipment.



17.6 CONSTRUCTION IMPACTS OF THE PREFERRED ALTERNATIVE

17.6.1 OVERVIEW

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

In both New Jersey and New York, a number of utilities would be relocated during construction, in advance of other construction activities associated with the Preferred Alternative at any given location. During the final design of the Preferred Alternative, the Project Sponsor will identify the relevant affected utility owners, and develop designs for utility relocations using information from the facility owners, including determinations of the entity that will be responsible for undertaking the relocations, and how the costs for the relocations are allocated.

NYCDEP has defined the requirements associated with construction impacts to their facilities, as follows. The Project Sponsor and NYCDEP will develop an agreement memorializing the responsibilities and liabilities related to NYCDEP infrastructure. This agreement will be executed during final design and will ensure that all NYCDEP utilities affected by construction of the Preferred Alternative will be protected, relocated, repaired, and/or replaced as required and in consultation with NYCDEP, as necessary and practicable.

- NYCDEP utilities affected by construction of the Preferred Alternative must be protected, relocated, repaired, and/or replaced as required by NYCDEP.
- After the new Hudson River Tunnel is constructed, NYCDEP utilities must be fully accessible and restored to their pre-construction sizes and alignments.
- All NYCDEP utilities that are not exposed during construction of the Preferred Alternative but are within the zone of influence for ground movement will require monitoring during construction in accordance with § 76 of NYCDEP Bureau of Water and Sewer Operation's Standard Sewer and Water Main Specifications.⁵
- Preliminary and detailed construction impact assessment reports for all NYCDEP utilities affected by the Preferred Alternative should be submitted to NYCDEP. The detailed construction impact assessment report should include contingency plans during emergency or unforeseen conditions.
- The Project Sponsor will be responsible for maintenance of flow in the NYCDEP infrastructure during construction. All maintenance-of-flow plans should be submitted to the NYCDEP Engineering and Construction unit. The Project Sponsor will be responsible for relocations and maintenance of flow.
- The Project Sponsor will be responsible if NYCDEP is required to engage independent consulting firms to review and analyze the effects of the Preferred Alternative on NYCDEP infrastructure.
- Unlimited constructability access for future NYCDEP infrastructure over the new Hudson River Tunnel shall be provided for future maintenance and construction upgrades.
- The Project Sponsor will be responsible for any deviations from NYCDEP's applicable standards during the design and construction of future utilities and modification of existing infrastructure over the new Hudson River Tunnel.

⁵ https://www1.nyc.gov/assets/ddc/downloads/publications/infrastructure/sewer_and_watermain_std_specs_14-07-01.pdf

- If piles supporting sewers/interceptors are to be removed as a result of the alignment and location of the new tunnel crossing NYCDEP sewers/interceptors, then the supports for the sewers/interceptors will need to rest on top of the new Hudson River Tunnel. NYCDEP anticipates that the tunnel should be designed to take surcharge loads to account for NYCDEP existing infrastructure and future utility upgrades, as it will be cost-prohibitive for NYCDEP to have long-spanned structures crossing over the new tunnel.
- There should be an agreement between the Project Sponsor, Project Partners, and NYCDEP memorializing the responsibilities and liabilities related to NYCDEP infrastructure. This agreement will be executed during final design.

Amtrak and NJ TRANSIT have agreements with utility companies that specify conditions and terms for relocations, and how costs are allocated. If any new agreements are required, they will be identified and executed during the Project's final design. Construction activities, including relocation of utilities, would be coordinated with the various utility companies and agencies to avoid or minimize service disruptions during construction; therefore, there would be little to no impact to the public.

During construction of the Preferred Alternative, there would be increases in energy consumption associated with use of construction equipment, including fuel for vehicles and equipment, and electric power for Tunnel Boring Machines (TBMs). Each of the TBMs needed for mining of the new tunnel would require an estimated 5-6 MW of electric power during their operation (24 hours per day for five days per week for approximately two years). Specifically, the Project design engineers estimate that the TBMs would require an estimated 10 MW of power for tunneling beneath the Palisades (based on dual TBMs operating simultaneously, five days per week, for about one year) and an estimated 12 MW of power for tunneling east of the Hoboken shaft site (based on dual TBMs operating simultaneously, five days per week, for approximately one additional year). Power requirements in Manhattan would be much lower, with the Twelfth Avenue site requiring an estimated 1 MW of power capacity (700-800 kilowatts [kW] estimated demand for the duration of construction activities at that location).

At the existing NEC Substation 42 in North Bergen, the construction of the new circuit breakers that will be added to an expanded concrete pad south of the existing substation to power the two new Hudson River Tunnel tracks have been accounted for in the construction activities and estimates for the Preferred Alternative at the Tonnelle Avenue staging area.

In addition, during construction roadway traffic would be temporarily affected by construction activities (see Chapter 5A, "Traffic and Pedestrians"), which would result in some additional energy demand as a result of having to reroute to avoid construction activities, and increased idling.

As described in Chapter 5B, "Transportation Services," Section 5B.6.2, rail service on the NEC and other interconnected rail lines in New Jersey would be affected by construction adjacent to the NEC, which would cause an increase in energy consumption during periods of delay.

17.6.2 NEW JERSEY

Construction of the Preferred Alternative would affect or have the potential to affect the following utility infrastructure:

- Amtrak's NEC Substation 42 in North Bergen would be modified to include new circuit breakers, signal power transformers, and controls within the existing substation;
- PSE&G's Paterson Plank Road facility on the west side of the Palisades slope houses equipment that may be sensitive to vibration during construction;
- 345 kV and 230 kV at-grade and overhead lines with adjoining transmission towers (owned by PSE&G);



- Storm sewers and underdrains owned by the NJDOT and relevant municipalities;
- Underground and overhead telephone lines owned by various entities; and
- Gas and water lines owned by various entities.

In addition, when the DEIS was published, the tunnel alignment for the Preferred Alternative was proposed along a route that would pass beneath a PSE&G substation and related equipment south of the HBLR right-of-way in Hoboken, requiring ground improvement and extensive foundation support for the affected building to ensure that it remained functional. As the Project design advanced after completion of the DEIS, Amtrak further developed the construction techniques that would be required to protect the PSE&G substation building. Because of the sensitive nature of the building and its deep foundation supports, extensive underpinning would be needed that would be complex, involve risk to the PSE&G operations in and supported by the substation on Clinton Avenue, risk to the Project schedule from potential complications and delays related to the complex underpinning required at the PSE&G facility, time-consuming, and disruptive to the surrounding area. As a result, FRA, NJ TRANSIT, and the other Project Partners, in consultation with PSE&G, determined that the subsurface tunnel alignment for the Preferred Alternative would be shifted northward approximately 30 feet so that the alignment would no longer pass beneath the substation building and no underpinning would be required (note that the new Hoboken fan plant for the Hudson Tunnel Project would not be moved). Nevertheless, because the new subsurface tunnel alignment would still pass near the substation building, the Project Sponsor will conduct vibration monitoring during construction to ensure no damage from construction vibration occurs at the facility (see Chapter 12B, "Vibration," Section 12B.9).

In New Jersey, a number of utilities would be relocated or removed as a result of construction of the Preferred Alternative, including the following:

- At Tonnelle Avenue in North Bergen, PSE&G underground electric conduits, cables, and duct banks would be relocated along the alignment of the Preferred Alternative's new Tonnelle Avenue bridge.
- In the Hoboken/Weehawken area, underground transmission lines would be monitored or relocated.
- At Willow Avenue in Hoboken, PSE&G has a 4-inch gas main and a 20-inch high pressure gas main that is in the vicinity of proposed ground treatments.
- The Secaucus Road PSE&G electric line would be relocated to underground conduit duct banks.
- Wood pole electrical lines near Secaucus Road would require removal/relocation of several poles.
- Some utilities that are no longer in use would be removed, such as an abandoned 24-inch PSE&G gas pipe at Tonnelle Avenue.

For any utilities to be relocated, the Project Sponsor would consult and coordinate with the affected utility owners and operators (e.g., PSE&G). These relocations would be undertaken in accordance with existing relocation agreements or with agreements established for the purposes of this Project, if none exist to cover a needed relocation, and would involve easements where necessary, which would be executed during final design.

Where utilities would be relocated, the new portions of the utility lines would be constructed, and then service would be transferred to the relocated utility facilities. No service disruptions would occur since these affected utilities would either be relocated and reconnected prior to shut off of existing lines, or protected in place with a slab or casing. Approximately 5,500 feet of utility relocations would occur for the Preferred Alternative.

Coordination with affected utility providers would continue throughout final engineering design of the Preferred Alternative to further identify any potential issues and prescribe means to resolve them prior to Preferred Alternative construction. For the portion of the surface alignment that would be on an embankment, utilities would be protected by slabs or by steel casing enclosures. Underground utilities—particularly in the Hoboken area of the tunnel alignment where the tunnel would be located in soil, and most utilities are supported on piles—would either be relocated or monitored to ensure they are not damaged by vibration from construction activities (see Chapter 12B, “Vibration,” Section 12B.9). Utilities located under future viaducts or in conflict with depressed sections and tunnel approaches of rail lines would be relocated. These affected utilities would be disconnected only after new relocated service would be activated. Existing utilities that would remain in place near the Preferred Alternative would be protected in utility sleeves or concrete encasements.

At the Hoboken fan plant, construction activities would include construction of a new substation, transformers, and new feeder lines from the local utility (PSE&G) to the substation and various new rail systems along the surface alignment and through the new tunnels.

For the rehabilitation of the North River Tunnel, temporary power sources for construction, including lighting, ventilation, and life-safety systems, would be provided. New feeder cables providing traction power for the new tracks in the rehabilitated tunnel, as well as new systems to provide signal power to the rehabilitated tunnel, would be constructed. Therefore, there would be no impact on the traction power supply capacity during the North River Tunnel rehabilitation.

During construction of the new tunnel, a temporary substation near the Tonnelle Avenue portal site would provide power to the TBMs. PSE&G, the local utility company, would provide power to the substation. The power required to operate the TBMs is not expected to overburden the capability of PSE&G to provide electrical power to the area. Once construction is completed, the substation would be removed.

17.6.3 HUDSON RIVER

There are no known utilities under the Hudson River that would be impacted by construction of the Hudson River Tunnel or rehabilitation of the North River Tunnel.

17.6.4 NEW YORK

During tunnel construction near the Twelfth Avenue shaft site, several large NYCDEP sewers located in Twelfth Avenue and in West 30th Street would be protected.

There is an existing 8-foot by 8-foot interceptor sewer located beneath Twelfth Avenue, running north to connect to the North River Wastewater Treatment Plant at 137th Street.⁶ This sewer is currently supported by steel piles. Where the Hudson River Tunnel would pass beneath the interceptor sewer, some of those piles would have to be removed. Therefore, the sewer would be underpinned with new steel frames constructed around the new tunnels. Prior to any tunneling work, the Project Sponsor would define the available clearance from the new Hudson River Tunnel to this interceptor, the width of the tunnel, and the number of piles to be underpinned and removed. The underpinning would occur during the ground freezing proposed in that area (see Sections 3.3.6.2 and 3.3.6.4 in Chapter 3, “Construction Methods and Activities.”)

⁶ Interceptor sewers are very large sewers that collect wastewater and stormwater at the end of a network of progressively larger main and trunk sewers, which carry the flows directly to wastewater treatment plants.



Large combined sewer structures are also located within the West 30th Street streetbed.⁷ These are NYCDEP Flat Top Reinforced Concrete (FTRC) combined sewer boxes that are 10-foot by 6-foot and 6-foot by 5-foot. The new tunnel would cross beneath these sewers. To avoid adverse impacts to the operation of these large structures, the combined sewers would be relocated onto the Twelfth Avenue staging area on the south side of West 30th Street until the new tunnel has been excavated beneath 30th Street. After the tunnel is complete, the sewers would be reinstalled in the West 30th Street streetbed. Prior to the relocation, the Project Sponsor would submit hydraulic calculations for the bypass sewers to NYCDEP for approval.

Other utilities in West 30th Street would be maintained in place above the below-ground tunneling.

Where cut-and-cover construction would occur for the Preferred Alternative on Tenth Avenue between West 31st and West 33rd Streets, utilities would be relocated out of the excavation area or supported in place prior to excavation of the street. Utility infrastructure affected by cut-and-cover construction would include gas and electric lines owned by Con Edison, water and sewer lines owned by the City of New York, and telecommunications lines.

No extensive service disruptions would occur since the affected utilities would either be relocated and reconnected prior to shut off of existing lines, or protected in place with a slab or casing. Minimal service disruptions would occur during switch overs from existing to relocated lines. Where utilities would be relocated, the new portions of the utility lines would be constructed and then service would be transferred to the relocated utility facilities in order to minimize the duration of any service disruptions. In coordination with the utility companies, additional methods to minimize service disruptions would be employed as appropriate, including scheduling diversions to avoid periods of peak demand.

The existing NYCDEP 4-foot by 2.75-foot sewer located at Tenth Avenue would be raised and replaced with a 30-inch pipe in accordance with hydraulic calculations that the Project Sponsor would submit to NYCDEP for approval. The two existing 12-inch and one existing 36-inch cast iron water mains located at Tenth Avenue would be offset, suspended, insulated, and replaced with ductile iron pipes during the open excavation work. The two existing 12-inch water mains would be replaced with 20-inch pipe from the 20-inch by 12-inch reducer at West 31st Street to the northern limit of the open cut excavation. Another NYCDEP facility located underneath Tenth Avenue could be affected by tunneling activities. In collaboration with NYCDEP, the Project Sponsor will determine if the facility falls within the zone of influence for ground movement and will require monitoring during construction.

The new fan plants at Tenth and Twelfth Avenues would require the installation of new feeder lines and transformers to meet the power needs of these new facilities. The electrical service for these fan plants would be provided from four feeder lines from the local utility (Con Edison). In addition, the substations in the new fan plants will provide 60 Hz power to the new rail facilities along the surface alignment and through the new tunnels.

As described above in Section 17.3.4, Con Edison's West 28th Street facility is a critical part of the company's electric and gas distribution infrastructure. The construction activities required for the Preferred Alternative at the Twelfth Avenue staging area would be staged so that ingress, egress, and traffic flow would be maintained so that Con Edison's vehicles based at that facility could continue operating efficiently and without any disruption of operations. Construction of the Preferred Alternative would not affect the planned expansion and improvements to Con Edison's 28th Street facility, as they are on a different block that would not be affected by the construction

⁷ New York City's sewer system uses combined sewers to carry wastewater and stormwater together for treatment, or, in the event of heavy rainfall that exceeds the system's capacity, for discharge directly to the nearest water body (in this case, the Hudson River).

of the new Hudson River Tunnel. During final design, the Project Sponsor will develop Maintenance and Protection of Traffic (MPT) plans for all construction locations in consultation with the appropriate local transportation agencies (see Chapter 5A, “Traffic and Pedestrians,” Section 5A.9). MPT plans will ensure the maintenance of travel lanes and provide detours for through traffic away from construction activities and equipment to the extent practicable. The Project Sponsor will prepare all MPT plans for work in New York in accordance with the National Manual of Uniform Traffic Control Devices, in coordination with NYCDOT (for work that could affect local streets) and NYSDOT (for work that could affect Twelfth Avenue, which is New York State Route 9A), to minimize disruptions to traffic flow on streets in New York. In addition, the Project Sponsor will work with Con Edison to ensure that access to the driveway entrance on Twelfth Avenue for the Con Edison site will be maintained. No street, travel lane, or sidewalk closures on West 29th Street are proposed for construction of the Preferred Alternative.

17.7 PERMANENT IMPACTS OF THE PREFERRED ALTERNATIVE

17.7.1 OVERVIEW

Once construction is complete, all utilities in the study area would function as they did before construction, with the necessary relocations having been effected during construction of the Preferred Alternative. There would be no permanent effects on the utilities or on service to their customers.

The new Hudson River Tunnel would include a commercial wireless system, providing passengers with cellular voice and data communications services offered by telecommunication carriers. The tunnel would also include conduits for third-party communication lines.

When the Preferred Alternative is complete, rail operations would not increase over rail service in the No Action Alternative (see Chapter 2, “Project Alternatives and Description of the Preferred Alternative,” Section 2.5.7.2) and therefore, the Preferred Alternative would not result in any significant additional energy consumption from railroad operations within the study area.

17.7.2 NEW JERSEY

The new Hoboken fan plant would house a fully redundant substation—i.e., there would be enough back-up power to ensure continued operation of the fan plant systems if the main system were to fail or needed to be shut down for service. The fan plant substation would have a fully rated Uninterruptible Power Supply (UPS) that would provide emergency power to tunnel lighting and communications systems. The substation would include the necessary transformers and connectors, and would be designed to meet PSE&G requirements for high-tension service. The power required to serve the new fan plant could be accommodated by the existing PSE&G electrical power system.

At the Hoboken fan plant, two 26.4 kV electric feeder lines connected to two transformers would supply power to the plant, while three 13.4 kV feeder lines would run in the new tunnel to interconnect with the Twelfth Avenue and Tenth Avenue fan plants in New York. Appropriate sectionalizing would be provided at each substation to allow isolation of any section of distribution feeder for service and or repair.

A new 6.9 kV signal power line would branch off of the existing railroad at the Allied Interlocking near the western end of the Project site. At the existing NEC Substation 42 in North Bergen, new circuit breakers would be added to an expanded concrete pad at the existing substation to power the two new Hudson River Tunnel tracks. In addition, two new 12 kV, 25 Hz insulated cables would be routed from Substation 42 into the new tunnel to serve Substation 43.



The rehabilitated North River Tunnel would include new feeder cables providing traction power for the new tracks, as well as new systems to provide signal power, which would upgrade and replicate existing systems in the tunnel. The new systems would be designed in accordance with the latest Amtrak standards. There are no changes proposed to the ventilation systems for the North River Tunnel as part of the Preferred Alternative. Therefore, there would be no adverse impacts to the power supply capacity in the study area once the North River Tunnel rehabilitation is completed.

17.7.3 HUDSON RIVER

The traction and signal power for the new Hudson River Tunnel would be provided through an expansion of Amtrak's existing NEC system as described above.

17.7.4 NEW YORK

The Preferred Alternative would have two new fan plants for tunnel ventilation in New York: the Twelfth Avenue fan plant and the Tenth Avenue fan plant. Each of these fan plants would include a fully redundant substation—i.e., there would be enough back-up power to ensure continued operation of the fan plant systems if the main system were to fail or needed to be shut down for service. The substations would meet Con Edison requirements for high-tension service, and would include the necessary transformers and connectors. The fan plant substations would also have a fully rated UPS that would provide emergency power to tunnel lighting and communications systems. Based on feasibility analyses conducted for the Project, the power required to serve the new fan plants is not expected to overburden the capability of Con Edison to provide electrical power to the area.

Electrical service would be provided from four 13.4 kV Con Edison feeder lines for the fan plants in New York. At the existing Substation 43, located at PSNY, new circuit breakers and step-up transformers would be installed near the Seventh Avenue motor-generator house to provide 91.6 Hz signal power.

Stormwater would be pumped from the tunnel via sump pumps in the tunnel's three fan plants and discharged to the local sewer system. The Preferred Alternative would include new permanent dewatering discharge from the new Hudson River Tunnel via the Twelfth Avenue fan plant into the NYCDEP outfall downstream from Regulator N45, requiring a State Pollutant Discharge Elimination System (SPDES) permit from the New York State Department of Environmental Conservation. The recovered water would be treated in accordance with permit requirements prior to being conveyed to the Hudson River.

17.8 MEASURES TO AVOID, MINIMIZE, AND MITIGATE IMPACTS

17.8.1 UTILITIES

No adverse impacts to utilities are anticipated to occur from construction or operation of the Preferred Alternative; therefore, no mitigation is proposed. A variety of avoidance and minimization measures will be implemented and a number of coordination activities will take place. The Project Sponsor will implement these avoidance and minimization measures. The lead Federal agency will be responsible for ensuring that the Project Sponsor implements these avoidance and minimization measures, which will be identified in the ROD.

The Project Sponsor will coordinate construction activities, including relocation of utilities, with the various utility companies and agencies to ensure that service disruptions are avoided, so that there would be no impact to the public. If the need for any short-term service interruptions is

identified during final design, the timing and durations of such temporary service interruptions will be communicated to the public and utility service users well in advance of the service interruptions. During the final design of the Preferred Alternative, designs for utility relocations will be developed using information from the facility owners. In addition, the following will be undertaken:

- The Project Sponsor, in cooperation with the other Project Partners, will coordinate with affected utility providers throughout final engineering design to identify potential issues and prescribe means to resolve them prior to construction.
- The Project Sponsor will coordinate with PSE&G to install appropriate vibration monitoring equipment to monitor vibration at specified infrastructure facilities, including the Hoboken substation, underground transmission lines in the Hoboken/Weehawken area, and at the Paterson Plank Road facilities, to ensure that no damage occurs to these assets as a result of project construction (see also Chapter 12B, "Vibration," Section 12B.9).
- The Project Sponsor, in cooperation with the other Project Partners, and NYCDEP will develop an agreement memorializing the responsibilities and liabilities related to NYCDEP infrastructure. This agreement will be executed during final design and will ensure that all NYCDEP utilities affected by construction of the Preferred Alternative will be protected, relocated, repaired, and/or replaced as required and in consultation with NYCDEP, as necessary and practicable.
- The Project Sponsor, in cooperation with the other Project Partners, and NYCDEP will develop an agreement memorializing the responsibilities and liabilities related to NYCDEP infrastructure. This agreement will be executed during final design.
- The Project Sponsor will determine if the NYCDEP facility within Tenth Avenue is within the zone of influence and requires monitoring in accordance with § 76 of NYCDEP Bureau of Water and Sewer Operation's Standard Sewer and Water Main Specifications.
- Hydraulic calculations and a site connection proposal will be submitted to NYCDEP for approval for the new permanent dewatering discharge from the Hudson River Tunnel via the Twelfth Avenue fan plant into the NYCDEP outfall downstream from Regulator N45. In addition, stormwater would be treated in accordance with requirements of the SPDES permit for this connection prior to being conveyed to the Hudson River.
- The Project Sponsor, in cooperation with the other Project Partners, will implement agreements with utility providers and governmental agencies regarding temporary or permanent relocation of utility transmission lines.
- The Project Sponsor will conduct public outreach in affected areas in New Jersey (Secaucus, North Bergen, Union City, Hoboken, and Weehawken) and coordinate with agencies and private utilities with regard to minor, short duration service interruptions.
- The Project Sponsor will conduct public outreach in New York City and coordinate with agencies and private utilities with regard to minor, short duration service interruptions.

With these avoidance and minimization measures in place, negligible service disruptions to utilities would occur.

17.8.2 ENERGY

The Preferred Alternative would not cause any adverse long-term impacts to energy supply or consumption; therefore, no mitigation for operation of the Preferred Alternative is proposed. The lead Federal agency will be responsible for ensuring that the Project Sponsor implements the following measures, which will be identified in the ROD:

- Mitigation for traffic delays is described in Chapter 5A, "Traffic and Pedestrians." As discussed there, MPT plans will be developed, approved, and implemented 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.

- 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.

With these avoidance and minimization measures in place, energy consumption resulting from construction activities would be minimized. *