High Speed Rail
Empire Corridor

Tier 1 Draft Environmental Impact Statement
Volume 1

New York State
Department of Transportation

U.S. Department of Transportation
Federal Railroad Administration

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High Speed Rail Empire Corridor Program
Tier 1 Draft Environmental Impact Statement

Pursuant to:

National Environmental Policy Act of 1969 (42 USC Section 4321 et seq.)
Federal Railroad Administration, Procedures for Considering Environmental Impacts (64 FR 28545)
New York State Environmental Quality Review Act (6 NYCRR Part 617)

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Abstract: This Tier 1 (Program) EIS describes and summarizes the environmental impacts of proposed system improvements to intercity passenger rail services along the 463-mile Empire Corridor, connecting Pennsylvania Station in New York City with Niagara Falls Station in Niagara Falls, New York. It addresses broad, corridor-level issues associated with higher speed passenger rail service along the Empire Corridor, such as service frequency, service reliability, and trip times, and sets forth a package of follow-on studies, proposals, and projects. Five alternatives are evaluated relative to meeting the project needs of reducing infrastructure constraints and accommodating existing and projected demand in the corridor: the Base, or No Action, Alternative; and four Build alternatives, consisting of two 90 mile per hour (mph) alternatives, and two higher-speed alternatives of 110 mph and 125 mph. Site-specific impacts of the selected program will be determined, and avoidance options and mitigation measures to minimize impacts will be further defined, in Tier 2 evaluations.

Comments on this Tier 1 EIS are due by **March 24, 2014** and should be sent to NYSDOT at the above address. Public hearings will be held. Locations and times will be posted on the project website www.dot.ny.gov/empire-corridor. Notice will be mailed to interested parties and published in newspapers of general circulation.

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High Speed Rail Empire Corridor Program
Tier 1 Draft Environmental Impact Statement

This Tier 1 Draft Environmental Impact Statement (EIS) consists of four volumes:

Volume 1 **Environmental Impact Statement**, which includes:

- Executive Summary
- Chapter 1, Introduction and Purpose and Need
- Chapter 2, Existing Transportation Conditions and Major Markets
- Chapter 3, Alternatives
- Chapter 4, Social, Economic, and Environmental Considerations
- Chapter 5, Financial Capacity
- Chapter 6, Comparison of Alternatives
- Chapter 7, Comments and Coordination
- References, Acronyms, Glossary of Terms, and List of Preparers

Volume 2 **Appendix A - Track Schematics**, ***(On CD-ROM at the back of Volume 1)***

Track schematic (11"x17") plans of the Base Alternative and four Build Alternatives

Volume 3 **Appendices B through H, *(On CD-ROM at the back of Volume 1)***

- Appendix B Ridership and Revenue Forecasting
- Appendix C Alternatives Development and Screening Report
- Appendix D Rail Network Operations Simulation
- Appendix E Committed Highway, Bus, and Airport Improvement Projects
- Appendix F Capital, Operating, and Maintenance Costs Estimating Methodology
- Appendix G Existing Conditions Supporting Documentation
- Appendix H Draft Programmatic Agreement

Volume 4 **Appendices I through J, *(On CD-ROM at the back of Volume 1)***

- Appendix I Agency Correspondence
  - Cooperating Agencies Correspondence
  - Participating Agencies Correspondence
  - Section 106 Correspondence
  - Agency Notification Correspondence
- Appendix J CSXT and NYSDOT Agreements

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Table of Contents

List of Exhibits

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ES Executive Summary

ES-1. Introduction

The Federal Railroad Administration (FRA) and the New York State Department of Transportation (NYSDOT) are preparing a tiered Environmental Impact Statement (EIS) to evaluate proposed system improvements to intercity passenger rail services along the 463-mile Empire Corridor, connecting Pennsylvania (Penn) Station in New York City with Niagara Falls Station, in Niagara Falls, New York.

The Empire Corridor is one of eleven designated high-speed rail corridors nationwide, initially authorized under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and supplemented by the Transportation Equity Act for the 21st Century of 1998 (TEA-21). In December 1998, the U.S. Secretary of Transportation announced the official designation of the TEA-21-authorized Empire Corridor as a high-speed rail corridor. On April 16, 2009, President Obama announced a Vision for High-Speed Rail in America and committed to funding this program through the federal American Recovery and Reinvestment Act of 2009 (ARRA). To achieve this vision, the FRA launched the High-Speed Intercity Passenger Rail (HSIPR) Program in 2009,[1] and Congress funded $8 billion through ARRA. Congress continued to fund annual appropriations totaling $2 billion for fiscal years 2009 and 2010,[2] using the framework developed by the Passenger Rail Investment and Improvement Act of 2008 (PRIAA).[3]

The EIS has been developed in accordance with the National Environmental Policy Act of 1969 (NEPA) and its implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508); FRA's Procedures for Considering Environmental Impacts (64 Federal Register [FR] 28545); and the New York State Environmental Quality Review Act (SEQR) and its implementing regulations (6 New York Codes, Rules and Regulations [NYCRR] Part 617).

FRA and NYSDOT are using a tiered process to complete the environmental review of the High Speed Rail Empire Corridor Program. "Tiering" is a staged environmental review process applied to environmental reviews for complex projects. This initial phase, the Tier 1 EIS, addresses broad corridor-level issues and sets forth a package of follow-on studies, proposals, and projects. Subsequent phases, or tiers, will analyze, at a greater level of detail, site-specific proposals based on the decisions made in Tier 1.

The possibility of instituting high-speed rail along the Empire Corridor has been the focus of studies by NYSDOT and others for more than twenty years. Developments in recent years by FRA and NYSDOT/New York State have advanced rail planning and funding at both the federal and state levels, culminating in this Tier 1 EIS to evaluate high-speed passenger rail service along the Empire Corridor. Each alternative analyzed in the EIS contains the same set of enhancements for the Empire Corridor South (south of Albany/Rensselaer). Those enhancements were developed and

[1]/ The HSIPR program is funded by the American Recovery and Reinvestment Act of 2009 (ARRA) (Public Law 111-5, 123 Stat. 115) and the Transportation, Housing and Urban Development and Related Agencies Appropriations Act for 2010 (Division A of the Consolidated Appropriations Act, 2010 (Pub. L. 111-117)).

[2]/ Additional funds under these original appropriations were redistributed again in 2011, after several states returned the grant monies.

[3]/ The Passenger Rail Investment and Improvement Act of 2008 (PRIIA) (Division B, Title III of Public Law 110-432, 122 Stat. 4907 (October 16, 2008)) authorized the appropriation of funds to establish several new passenger rail grant programs, including capital investment grants to support intercity passenger rail service, high-speed corridor development, and congestion grants. FRA consolidated these and other closely related programs into the High-Speed Intercity Passenger Rail (HSIPR) program.

agreed by the owners and operators of the Empire Corridor South and set forth in the Hudson Line Railroad Corridor Transportation Plan: Final Report (2005). For the Empire Corridor West (west of Albany/Rensselaer), the EIS analyzes new alternative sets of improvements and projects.

CSX Transportation, Inc. (CSXT), a private freight railroad company, owns more than half of the Empire Corridor (Exhibit 2-1). While recognizing the federal NEPA and New York state SEQR legal framework upon which the environmental review process must be based, this Tier 1 Draft EIS has also been developed in consideration of two agreements between NYSDOT and CSXT (dated May 28, 2010), "Framework Agreement Concerning Certain Rights and Responsibilities with Respect to New York High Speed Rail" and "Agreement for Progressing a Tier 1 Environmental Impact Statement" ("Agreements") (attached as Appendix J).

ES-2. What is the High Speed Rail Empire Corridor Program?

The Empire Corridor connects New York City with the largest cities in New York state, extending north through Yonkers and Poughkeepsie, turning west at Albany to extend through Schenectady, Utica, Syracuse, Rochester, and Buffalo, and terminating at Niagara Falls. The Empire Corridor consists of three main sections: Empire Corridor South, Empire Corridor West, and Niagara Branch, as shown in Exhibit ES-1.

- **Empire Corridor South** begins at Penn Station in New York City and extends 142 miles along the east side of the Hudson River, from Manhattan (New York County) through the Bronx (Bronx County), Yonkers and Croton-Harmon (Westchester County), Poughkeepsie and Rhinecliff (Dutchess County), to Albany-Rensselaer Station (Rensselaer County).

- **Empire Corridor West** extends 294 miles west from Albany-Rensselaer Station to just east of the Buffalo-Exchange Street Station, passing through the Mohawk Valley from the Capital District cities of Albany (Albany County) and Schenectady (Schenectady County), through the central-western New York cities of Utica (Oneida County), Syracuse (Onondaga County), and Rochester (Monroe County) in the Finger Lakes District, and Buffalo (Erie County) on Lake Erie. Outside of these metropolitan areas, the railroad also passes through the more rural counties of Montgomery, Herkimer, Madison, Cayuga, Wayne, Monroe, and Genesee.

- The **Niagara Branch** extends 27 miles west, from east of Buffalo-Exchange Street Station to Niagara Falls (Niagara County).

ES-2.1. What is the transportation corridor used for?

The existing Empire Corridor has been a vital transportation route of national significance for almost 200 years. The corridor developed along the historic "Water Level Route" that followed the canal system connecting Lake Erie and the Hudson River to transport goods and services to and from New York City. The Empire Corridor helped to establish New York City as an international trade center, connecting markets in Canada and the Midwest with Albany (providing connections to Montreal and Boston) and New York City. For many decades, the railroad was operated by the New York Central Railroad as a four-track speedway between Albany and Buffalo carrying passenger and freight trains on express and local tracks.

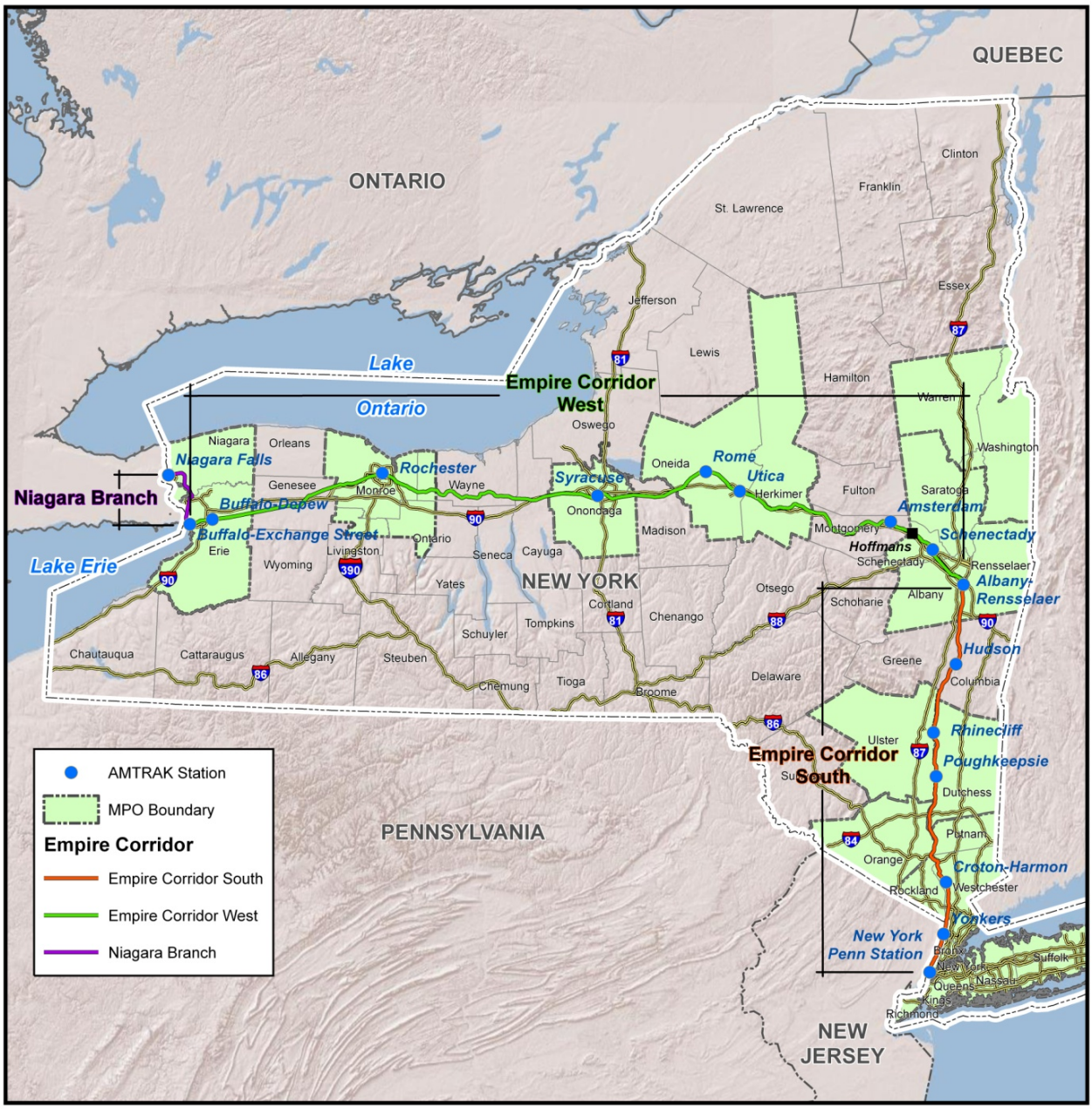


Exhibit ES-1—Program Location Map

The Empire Corridor runs along the population and economic spine of the state, connecting all of New York State's major metropolitan areas. The corridor is essential to New York for its ability to efficiently transport large numbers of passengers and goods annually that would otherwise be transported via highway and air travel corridors. It is distinguished by its diversity of ownership and the mix of passenger and freight usage, as the National Railroad Passenger Corporation's (Amtrak's) Empire Service shares trackage with CSX Transportation, Inc. (CSXT) and the

Metropolitan Transportation Authority's Metro-North Railroad (Metro-North).

Empire Corridor South is dominated by commuter travel and carries a much greater frequency of intercity passenger rail services and only a limited number of freight trains. The Metro-North, the busiest commuter railroad in the United States based on ridership, operates the Hudson Line commuter rail service between Poughkeepsie and Grand Central Terminal, cross-town from Penn Station. Metro-North operates between roughly 50 (weekend) and 77 (weekday) daily roundtrips along the Hudson Line. Amtrak operates thirteen daily roundtrips (weekdays) along Empire Corridor South between Albany-Rensselaer and New York City, with eleven daily roundtrips on the weekends. In addition to Empire Service to Buffalo and points beyond (four daily roundtrips), this section of track also accommodates Amtrak service that extends north of Schenectady Station on the Canadian Pacific Railway to Montreal (Adirondack—one daily roundtrip) and Vermont (Ethan Allen Express—one daily roundtrip). There is also one daily connecting service from Albany-Rensselaer to Boston, Massachusetts.

Passenger service on Empire Corridor South has shared use of the tracks with limited freight operations of approximately four trains a day.

Empire Corridor West is a two-track line that is the busiest freight track in the state, carrying one of the highest volumes on the CSXT system nationwide. This is the only railroad crossing upstate/western New York that can accommodate the maximum freight rail car weight (315,000 pounds). The entire line west of Hoffmans (west of Albany) also has adequate clearance for double-stack intermodal trains. CSXT operates this as a high-volume railroad that is heavily used by 50 to 60 daily freight trains.

Amtrak operates a total of four daily roundtrips along Empire Corridor West. Amtrak operates three daily round trips to Niagara Falls (Empire Service), with one continuing on to Toronto (Maple Leaf Service). The other daily service trip continues from Buffalo-Depew Station to Chicago (Lake Shore Limited).

The **Niagara Branch** is primarily a passenger railroad, since there is a freight bypass route used by CSXT that provides modern clearances for freight service to Niagara Falls. Of the four daily westbound passenger trains operated by Amtrak along Empire Corridor West from Albany to Buffalo, three continue on to Niagara Falls.

ES-2.2. What is the purpose and need for the program?

The purpose of the High Speed Rail Empire Corridor Program is to introduce higher passenger train speeds on the Empire Corridor and to improve reliability, travel times, service frequency, and passenger amenities. By improving passenger rail service along the corridor, the High Speed Rail Empire Corridor Program will attract additional passengers, increase travel choices, and contribute to a balanced, multi-modal transportation system.

The need for the program is that existing Empire Corridor passenger rail service is negatively impacted by inadequate service levels, operational constraints, and delays resulting from pervasive conflicts with freight traffic. As a result, it is not viewed by travelers as a viable, attractive transportation option, particularly to and from points west of Albany-Rensselaer. For example, the trip from Buffalo to New York City can be made in less than two hours by air and under seven hours by car, compared to approximately eight hours by the existing Empire Corridor passenger service

provided by Amtrak.

Despite these constraints and service problems, ridership on the Empire Corridor had increased by 37 percent (387,304 passengers) over 10 years to total more than 1.4 million passengers in 2011. Since 2001, ridership on the Buffalo to Albany portion of the corridor has more than doubled, at the same time freight and commuter rail volumes have grown. Projections through 2035 indicate that freight traffic will continue to increase, and forecasts for the Metro-North Hudson Line through 2020 also indicate projected increases of 28 percent. Congestion is expected to only worsen as demand for intercity passenger, commuter, and freight rail services all continue to grow on these shared-track systems.

Despite the growth in ridership, there is still a need for the program. Existing and forecasted socioeconomic and transportation market conditions in the Empire Corridor indicate an opportunity for an improved Empire Corridor passenger rail service to further grow, offering a viable, alternative mode of intercity travel in the Empire Corridor.

Existing conditions limit Empire Corridor service. Simulated existing (2008, pre-recession) passenger service along Empire Corridor West indicates that passenger train on-time performance (OTP) is less than 48 percent, with an average train speed of approximately 50 miles per hour (mph) and an average train lateness of almost 28 minutes. Simulated existing freight train performance along Empire Corridor West indicates over 38 train minutes of delay per 100 freight train miles operated, indicating congestion ahead, and a high variability in average freight train trip times, indicating service inconsistency.[4]

Current passenger rail service is also infrequent relative to travel demand. For example, there is a strong travel market between New York City and Albany, and passenger rail captures only 11 percent of that travel market. Currently, 13 weekday trips are available, with the earliest Albany arrival time of approximately 9:30 a.m.; this limited service does not accommodate business weekday schedules. Furthermore, although maximum authorized speeds along portions of the Empire Corridor are 79 mph on the Buffalo to Hoffmans (west of Albany) segment and 110 mph on the Hoffmans to New York City segment (refer to Figure ES-1), actual operating speeds along the majority of the rail corridor are considerably lower due to track conditions, alignment, and obsolete or inadequate track and signal systems which constrain capacity and speed.

ES-2.3. What are the goals and objectives of the program?

NYSDOT proposes to undertake the High Speed Rail Empire Corridor Program to improve intercity passenger service in New York State through infrastructure investments and operational improvements, which will enhance the attractiveness of the service to existing and potential riders, increase the market share of intercity passenger rail, and contribute to an overall balanced transportation network. Improvements in service include tangible and measurable gains in operational reliability and travel time reductions of scheduled train trips; an increase in the frequency of train trips; and support of economic development, mobility, and environmental sustainability goals.

NYSDOT has identified the following performance objectives for the High Speed Rail Empire

[4]/ LTK Engineering Services. *Rail Network Operations Simulation Results*. Prepared for New York State Department of Transportation. June 2012. Network simulations for this Tier 1 EIS reflect the rail network along Empire Corridor West. The *Hudson Line Corridor Railroad Transportation Plan*, 2005, includes rail operations network simulation results and proposed actions for Empire Corridor South.

Corridor Program as measurable objectives that directly relate to the program purpose and need to reduce infrastructure constraints to accommodate existing and projected demand:

- Improve system-wide on-time performance (OTP) to at least 90 percent,
- Reduce travel time along all segments of the Empire Corridor,
- Increase the frequency of service (number of daily round trips) along Empire Corridor West beyond the existing four daily round trips,
- Attract additional passengers,
- Reduce automobile trips, thereby reducing highway congestion,
- Minimize interference with freight rail operations.

These six performance objectives are used to evaluate and rank the high-speed rail alternatives developed for the High Speed Rail Empire Corridor Program. The environmental impacts of these alternatives are also considered, as presented in this Tier 1 Draft EIS, and will be an important factor in selecting the alternative to be advanced.

In addition, NYSDOT identified the following transportation-related goals for the program:

- Increase travel choices and improve quality of life by providing additional commuting and travel options for residents and workers,
- Contribute to economic revitalization by accommodating forecasted growth in population and employment and corridor rail freight operations,
- Improve environmental quality by facilitating rail use and reducing reliance on automobile travel, thereby reducing fuel use and greenhouse gas (GHG) emissions.

ES-2.4. Why is this EIS being conducted?

The purpose of this Tier 1 EIS is to address broad, corridor-level issues associated with higher speed passenger rail service along the Empire Corridor and to set forth a package of follow-on (Tier 2) studies, proposals, and projects. The Tier 1 EIS evaluates a range of alternatives to meet the program needs of reducing infrastructure constraints and accommodating existing and projected demand in the Empire Corridor. It identifies broad-based operational changes and investments in infrastructure and rolling stock (locomotives and passenger coaches) necessary to achieve the performance objectives, and estimates the capital and operating costs of the different alternatives. As a result of the Tier 1 EIS, FRA and NYSDOT, in consultation with the Empire Project Advisory Committee, other agencies, and the public, will select an alternative which best meets the program needs.

This Tier 1 EIS accomplishes the following:

- Defines the purpose and need for the proposed action including performance objectives (Chapter 1);
- Documents the need for the proposed action by analyzing existing conditions (Chapter2);

- Develops criteria and screens alternatives to eliminate those that do not meet the purpose and need of the proposed action (Chapter 3);
- Identifies the range of reasonable alternatives to be considered, consistent with the current and planned use of the corridor, existing services within and adjacent to the program area, and other planned improvements (Chapter 3);
- Identifies the general alignments and right-of-way requirements of the reasonable alternatives (Chapter 3);
- Identifies the travel times, service schedule, frequencies, and stations serviced for the reasonable alternatives (Chapter 3);
- Identifies environmental constraints and considerations and performs high-level environmental review and analysis of conceptual alternatives under consideration (Chapter 4);
- Identifies the infrastructure and equipment investment requirements for each of the reasonable alternatives (Chapter 5);
- Establishes the timing and sequencing of individual capital improvements to implement the proposed action (Chapter 5);
- Evaluates the alternatives according to the program purpose and need and impact upon existing freight service, and compares the likely environmental impacts among alternatives (Chapter 6);
- Documents the public outreach and agency coordination process used to solicit input on the alternatives (Chapter 7).

If a Build Alternative is selected at the conclusion of the Tier 1 process, the follow-on Tier 2 NEPA documents will then explore in greater detail the component projects of the selected corridor-level alternative chosen in Tier 1. Tier 2 will include detailed analyses based on refined engineering designs and operational plans. It will identify site-specific environmental consequences, and develop site-specific mitigation measures for the selected alternative. Input from the public and from reviewing agencies will be solicited during both tiers.

ES-3. Alternatives Considered

ES-3.1. Initial alternatives considered

NYSDOT considered alternatives relative to maximum passenger train speeds, service frequencies, and physical improvement projects. Initially, alternatives were developed according to FRA's definitions of high-speed rail and intercity passenger rail service, labeled as Emerging, Regional, and Core Express:

- **Emerging:** Describes relatively frequent service to connect smaller communities, with speeds up to 90 mph, on tracks shared by freight, commuter, and intercity passenger rail;
- **Regional:** Describes relatively frequent service to connect mid-sized urban areas, with speeds between 90 and 125 mph, on tracks that may be shared by freight, commuter, and intercity passenger rail or on tracks dedicated for passenger rail;

- **Core Express:** Describes frequent service to connect large urban areas, with speeds between 125 and 250 mph or more, on tracks dedicated for intercity passenger rail.

NYSDOT developed an initial range of possible alternatives within the framework of these categories and grouped according to six maximum authorized speed (MAS) groups. The six MAS groups are described below:

- Using **79 mph** as the MAS represents what can be done with current track standards and in-cab signaling capacity. The program developed four alternatives in this category, including the Base (or "No Action") Alternative. The alternatives would use current vehicle technology with the possibility of integrated train sets, and would fall into FRA's "Emerging" category.
- Using **90 mph** as the MAS represents the next step up in track standards and in-cab signaling train control. The program developed two alternatives in this category. They would use current vehicle technology with the possibility of integrated train sets, and would fall into FRA's "Regional" category.
- Using **110 mph** as the MAS represents another step up in track standards. The program developed one alternative in this category. It would use current vehicle technology with the possibility of integrated train sets, and would fall into FRA's "Regional" category.
- Using **125 mph** as the MAS represents another step up in track standards and advanced train control. The program developed one alternative in this category. It would be the first speed threshold for electrically powered trains and would fall into FRA's "Core Express" category.
- Using **160 mph** as the MAS represents the practical upper limit of electrified dynamic tilt trains, such as the Amtrak Acela, which provide faster operating speeds on curves. The program developed one alternative in this category, which would fall into FRA's "Core Express" category.
- Using **220 mph** as the MAS represents the practical upper limit of high-speed rail operations seen in France, Germany, Spain, Japan, and China. The program developed one alternative in this category, which would fall into FRA's "Core Express" category.

In addition to applying FRA's high-speed rail service levels, alternatives development also included an evaluation of service frequency, equipment requirements, and previously-identified and potential physical improvements to enhance service. The ten initial alternatives were then screened according to the program purpose and need and associated performance goals and objectives. Applying a consistent set of performance measures based on the program purpose and need and a comparative assessment of the alternatives, certain alternatives were not advanced for further evaluation. These included the lower-speed 79 mph MAS alternatives, and the Very High Speed (VHS) alternatives (160 mph, 220 mph). The 79 mph alternatives were rejected as not providing enough mobility benefit – in terms of speed and travel times - compared to the similar cost 90 mph alternatives. The VHS alternatives were rejected for their extremely high cost – nearly triple the next most costly alternative – the likelihood of significant community and environmental impacts, and significant engineering design difficulties necessary to create a sufficiently straight track alignment to permit these speeds. These considerations are discussed more thoroughly in Section 3.2.2.

The options retained for further evaluation are discussed in the next section.

ES-3.2. Alternatives Advanced

Five alternatives, including the Base Alternative and four Build Alternatives, were advanced for further study and are the focus of this Tier 1 EIS. The Build Alternatives consist of Alternatives 90A, 90B, and 110, located along the existing Empire Corridor, and Alternative 125, which continues existing service on the existing tracks while adding a new, segregated high-speed right-of-way reserved exclusively for passenger trains and paralleling the existing alignment, as shown in Exhibit ES-2.

The following paragraphs describe the five High Speed Rail Empire Corridor Program alternatives. For each, there are a series of capital improvements aimed at improving switching and signalization to increase track capacity, straightening vertical and horizontal curves to permit higher speed, adding passing tracks and/or a fully segregated third track reserved for passenger use, and reducing the number of vehicular grade crossings to meet FRA requirements for higher-speed operation.

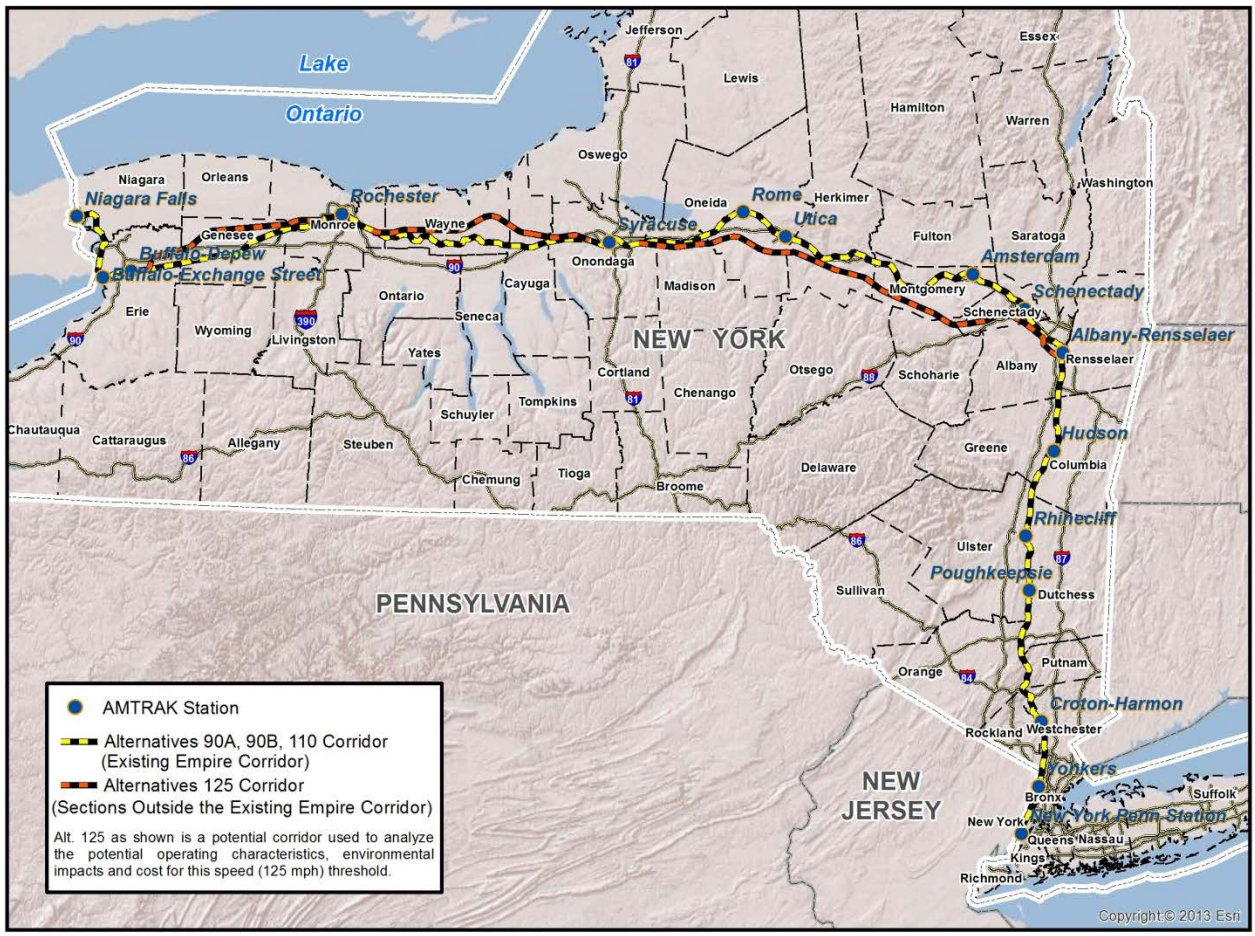


Exhibit ES-2—Corridor Map of the Build Alternatives

In each case, a suite of capital improvements identified in the *Hudson Line Railroad Corridor Transportation Plan* (2005) [5] are included for the Empire Corridor South segment, common to all four Build Alternatives. These improvements are:

- Add second track between MPs 9 to 13 (including Spuyten Duyvil Movable Bridge);
- Add New Tarrytown pocket track to support Metro-North turnbacks without delaying Empire Corridor Service;
- Add new signal system between Croton-Harmon to Poughkeepsie Stations (MPs 32.8 to 75) for additional operating capacity;
- Add third track (MPs 53 to 63) to support Empire Corridor overtakes of Metro-North trains;
- Add new track/siding at Poughkeepsie Station Track 3 to support higher operating speeds for Empire Corridor and Metro-North service;
- Add new Poughkeepsie Yard to eliminate station congestion and crossing conflicts north and south of the station;
- Add New CP82, New CP 99, New CP 136 two-track universal interlockings to support enhanced reliability during maintenance activities;
- Reconfigure Hudson Station to support simultaneous passenger boarding/alighting on both main tracks.

The proposed Albany-Rensselaer Station Fourth-Track Capacity improvements were also included in the Hudson Line Transportation Plan, but would be constructed whether the Empire Corridor program is built or not. Therefore, these improvements are included with the Base Alternative analysis.

Exhibit ES-4, which follows these descriptions, presents a tabular summary of service levels, ridership, and costs for the Base and Build Alternatives.

ES-3.2.1. Base (No Action) Alternative

The Base (No Action) Alternative analysis required by NEPA/SEQR regulations, is carried through the Tier 1 EIS to evaluate the cost and impacts of the program Build Alternatives in relation to the benefits gained by the public. The Base Alternative represents a continuation of existing Amtrak service with some operational and service improvements and consists of eight planned rail improvement projects funded under FRA HSIPR and TIGER grants to address previously identified capacity constraints. These improvements have been previously cleared by FRA in a series of Categorical Exclusions though are considered in this document to the extent they intertwine with the alternatives considered below.

Train frequency would remain unchanged from the existing frequency. The Base Alternative would maintain the existing 13 round trips per day between New York Penn Station and Albany-Rensselaer Station and the four round trips per day between Albany-Rensselaer Station and Buffalo, with three trips continuing to Niagara Falls. The majority of the work would occur within

[5]/ Available at: https://www.dot.ny.gov/content/delivery/Main-Projects/S93751-Home/S93751--Repository/HudsonLineTransportationPlan_Final_Report_2005.pdf.

the existing right-of-way (ROW). Train trips would continue to operate at the existing maximum speed of 79 mph. The average running speed would be 51 mph. Despite projected increases in ridership, train frequency in the Base Alternative would remain unchanged from the existing frequency, and there would be no additional train sets added to the existing inventory. In 2035, 1.6 million riders are projected for the Base Alternative.

The capital cost of the Base Alternative is estimated to be $290 million. The annual operations and maintenance (O&M) cost would be $103 million. With annual revenue estimated at $77 million, the annual deficit would be $26 million. The Base Alternative's estimated operating ratio, or the percent of O&M costs covered by revenue, would be 75 percent. The estimated annual subsidy per rider for the Base Alternative would be $16.25.

ES-3.2.2. Alternative 90A

Alternative 90A would add capacity and station improvements through twenty separate, capital improvement projects. Improvements for Alternative 90A would include 64 miles of new mainline track; and upgrades to 17 grade crossings/warning systems, 74 undergrade bridges, and six stations/facilities. As noted in the previous section, these improvements include elements originally proposed along Empire Corridor South as part of the Hudson Line Transportation Plan. Trains would operate at 90 mph MAS between Schenectady and Buffalo Exchange Street, and would continue to operate at existing speeds between Penn Station and Schenectady and between Buffalo Exchange Street and Niagara Falls. The average running speed in Alternative 90A would increase to 57 mph, 12 percent faster than in the Base Alternative.

Alternative 90A would add three daily round trips between New York City and Albany, for a total of 16 round trips; and it would add four daily round trips between Albany and Niagara Falls, for a total of eight round trips to Buffalo, with seven continuing to Niagara Falls. Schedule enhancements would include express service from New York City to western New York, with station stops in Albany-Rensselaer, Syracuse, Rochester, Buffalo-Depew, Buffalo-Exchange Street, and Niagara Falls. Six train sets would be added. Alternative 90A is projected to increase annual ridership to 2.3 million persons in 2035. This would be a gain of 700,000 persons above the ridership projected in 2035 for the Base Alternative.

The capital cost of Alternative 90A is estimated to be $1.66 billion. The annual O&M cost would be $156 million. With annual revenue estimated at $119 million, the annual deficit would be $37 million. Alternative 90A's estimated operating cost ratio would be 76 percent, slightly more than that of the Base Alternative. The estimated annual subsidy per rider for Alternative 90A would be the highest of the Build Alternatives, but would be slightly lower than that of the Base Alternative, at $16.09.

ES-3.2.3. Alternative 90B

Alternative 90B would include the improvement projects proposed under Alternative 90A. Alternative 90B would add a dedicated third main passenger track for approximately 273 miles between Schenectady and Buffalo-Depew stations. It would also add a fourth passenger track over a combined distance of approximately 39 miles in five separate locations. The third main passenger track would be located 15 feet from the existing mainline, and would generally occupy the portion

of the existing railroad bed that historically contained two additional tracks. The fourth tracks would be located 15 feet north of the dedicated third track and have been designated with a MAS of 90 mph. Alternative 90B improvements again include those Empire Corridor South Hudson Line Transportation Plan elements common among all of the Build Alternatives, noted in the previous section of this Executive Summary.

Additional infrastructure specific to Alternative 90B would include:

- A new signal system to support the 90 mph MAS,
- Bridge modifications,
- Grade crossing modifications,
- Culvert extensions,
- Station improvements, and
- Three grade separated flyovers to carry passenger track passes over the existing freight tracks.

Because it would use dedicated passenger-only tracks, Alternative 90B would have fewer speed restrictions than would Alternative 90A. Under Alternative 90B, several areas along Empire Corridor West would require larger track shifts to obtain an increase in operating speeds due to the existing geometry of the track. Trains would operate at 90 mph MAS between Albany, Buffalo, and Niagara Falls. The average running speed in Alternative 90B would increase to 61 mph, 17 percent faster than the average speed of the Base Alternative, and approximately 7 percent faster than the average speed of Alternative 90A.

Similar to Alternative 90A, Alternative 90B would add four daily round trips between Albany and Niagara Falls for a total of eight daily round trips to Buffalo. Alternative 90B would add an additional round trip between NYC and Albany over Alternative 90A, for a total of 17 round trips along Empire Corridor South. Similar to Alternative 90A, six train sets would be added to increase the frequency of passenger rail service. Unlike Alternative 90A, there would be no express service in Alternative 90B, due to its proposed operating plan. Alternative 90B is projected to increase ridership to 2.6 million persons in 2035. This would be a gain of approximately 300,000 persons above projected ridership for Alternative 90A and a gain of approximately 1 million persons above projected ridership for the Base Alternative.

The capital cost of Alternative 90B is estimated to be $5.58 billion. The annual O&M cost would be $171 million. With annual revenue estimated at $139 million, the annual deficit would be $32 million. Alternative 90B's estimated operating ratio would be 81 percent, higher than both the Base Alternative and Alternative 90A. The estimated annual subsidy per rider for Alternative 90B would be $12.31, approximately 24 percent less than that of the Base Alternative.

ES-3.2.4. Alternative 110

Alternative 110 would include the improvement projects proposed under Alternative 90A and would construct new third and fourth main tracks to support the 110 mph MAS. It would add a dedicated third main passenger track over 273 miles between Schenectady and Buffalo-Depew stations. It would also add a fourth passenger track over 59 miles in six locations. The third main passenger track would be located generally 30 feet from the existing mainline and occupying a portion of the existing railroad bed that historically contained two additional tracks. Due to existing physical conditions that would make it impractical to achieve the 30-foot separation, there

would be sections of third main track located 15 feet from the existing track. In these instances, the MAS would be reduced to 90mph. The fourth tracks would be located between the dedicated third track and the existing track using 15-foot track centers, with a designated MAS of 90 mph. Alternative 110 improvements again include those Empire Corridor South Hudson Line Transportation Plan elements common among all of the Build Alternatives, noted in the previous section of this Executive Summary.

Additional infrastructure specific to Alternative 110 would include:

- A new signal system to support the 110 mph MAS,
- Bridge modifications,
- Grade crossing modifications,
- Culvert extensions,
- Station improvements, and
- Two grade separated flyovers to carry the third main passenger track over freight tracks.

Alternative 110 would provide two grade-separated flyovers. West of Rochester, the dedicated third passenger track would run over the existing Track 2 alignment, and the existing freight tracks would be relocated to the north to maintain the desired track centers. This configuration would also eliminate an expensive grade separated flyover.

The average running speed in Alternative 110 would increase to 63 mph, more than 21 percent faster than that of the Base Alternative, and approximately 3 percent faster than Alternative 90B's average speed.

Alternative 110 would add the same number of trips along the Empire Corridor as proposed for Alternative 90B. Similar to Alternative 90B, Alternative 110 would add four daily round trips between Albany and Niagara Falls, for a total of eight daily round trips to Buffalo, and would add four daily round trips along Empire Corridor South, for a total of 17 round trips. Due to its proposed operating plan, Alternative 110 would not offer express service. Six train sets would be added to increase the frequency of passenger rail service. Alternative 110 is projected to increase ridership to 2.8 million persons in 2035. This would be a gain of approximately 1.2 million persons above projected ridership for the Base Alternative and an increase of 200,000 persons over the projected ridership for Alternative 90B.

The capital cost of Alternative 110 is estimated to be $6.25 billion. The annual O&M cost would be $173 million. With annual revenue estimated at $149 million, the annual deficit would be $24 million, the lowest of all alternatives. Alternative 110's estimated operating ratio would be 86 percent, the highest of all alternatives. The estimated annual subsidy per rider for Alternative 110 would be $8.57, the lowest of all alternatives, and approximately 30 percent less than Alternative 90B, the second lowest alternative. Alternative 110 also would have the lowest annualized O&M cost per rider of all the alternatives.

ES-3.2.5. Alternative 125

Alternative 125 would include improvements for Alternative 90A along Empire Corridor South and the Niagara Branch. Alternative 125 would include station improvements at Syracuse and

Rochester Stations proposed under the Base Alternative. Alternative 125 would continue the current Amtrak service on the existing right-of-way ("Legacy Service").

To achieve the highest speed among the alternatives, however, Alternative 125 would also add a new electrified (with overhead catenary), two-track, grade-separated high-speed rail corridor of 283 miles between Albany/Rensselaer Station and a new Buffalo station. Within the densely-developed areas around Albany, Syracuse, Rochester, and Buffalo, the new corridor would roughly parallel the existing corridor on a combination of new and existing ROW to provide express high-speed service to existing stations in these cities. To achieve the grade separation, it is assumed that a certain amount of elevated sections would be required in these urban areas. Where Alternative 125 extends through Rensselaer and Albany counties along the New York State Thruway and through the downtown areas of Syracuse, Rochester, and Buffalo (approaching Buffalo Exchange Street Station), the tracks would be elevated and Alternative 125 would directly service the existing stations serving these cities. The remainder of the track would be largely at grade through primarily rural or undeveloped lands, and no new stations along the new alignment sections are proposed.

Required infrastructure would include roadbed, track, viaducts and bridges, cuts and embankments, access roads, railroad systems, maintenance facilities, and other support facilities. The average speed along the new corridor's express high-speed service only (including Hudson Line/Empire Corridor South and not including the existing Amtrak service which would be maintained) would be 77 mph, an increase of 51 percent over the Base Alternative and an increase of approximately 22 percent over Alternative 110. This does not account for the slower existing Amtrak service that would be retained on the existing right-of-way. The weighted average speed of both services would be 63 mph. Amsterdam, Schenectady, Rome, Utica, and Niagara Falls passengers (accounting for a small percentage of Empire Corridor passengers) would not receive high-speed dedicated service directly, but would have to transfer at either Albany, Syracuse, Rochester or a new Buffalo station to access the faster train service. For the Empire Corridor West new two-track right-of-way between Albany and Buffalo alone (without consideration of the other, slower services that augment the new 125 mph MAS tracks), the Alternative 125 service would operate at an average speed of 108 mph.

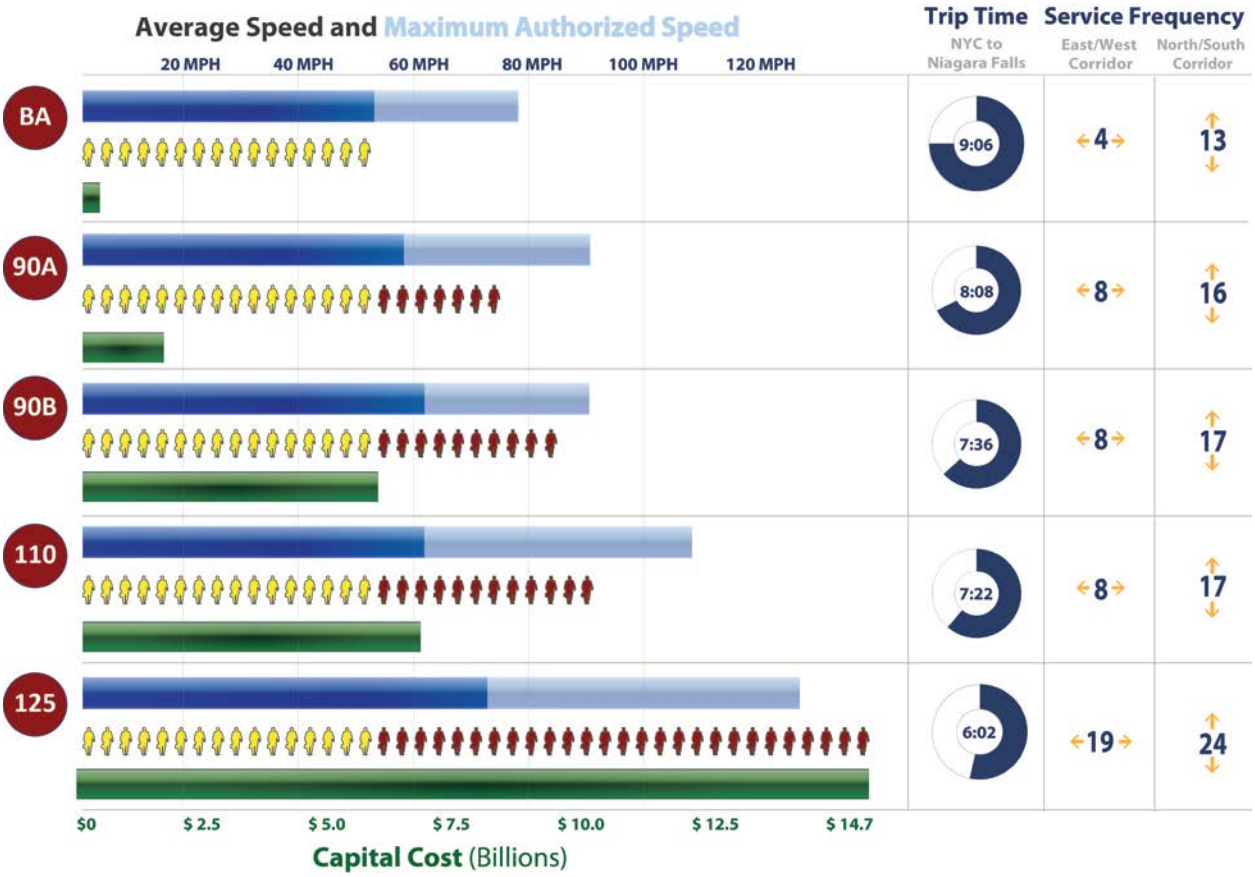
Alternative 125 would provide a total of 19 daily round trips between Albany, Buffalo, of which six would continue on to Niagara Falls. This compares to the existing four daily round trips to Buffalo, of which three continue to Niagara Falls. Four daily round trips would be retained on the existing corridor and 15 daily high-speed express round trips would be added on the new corridor. All of the trips on the new corridor would be express service, with station stops at Albany/Rensselaer, Syracuse, Rochester, and Buffalo. Alternative 125 would add 17 dual mode locomotives to increase the frequency of passenger rail service. Alternative 125 is projected to increase ridership to 4.3 million persons in the year 2035, more than a 50 percent increase over the projected ridership for Alternative 110 and a 169 percent increase over the Base Alternative.

The capital cost of Alternative 125 is estimated to be $14.71 billion. The annual O&M cost would be $304 million. With annual revenue estimated at $245 million, the annual deficit would be $59 million, the highest of all alternatives. Alternative 125's estimated operating ratio would be 81 percent, the same as that of Alternative 90B. The estimated annual subsidy per rider for Alternative 125 would be $13.72, approximately 11 percent more than that of Alternative 90B, the second lowest alternative. Alternative 125 would have the highest annualized O&M cost per rider of all the alternatives.

ES-4. How do the alternatives compare?

Exhibit ES-3 presents a graphic comparison of the five alternatives, and Exhibit ES-4 presents a comparative analysis of service levels, ridership, and costs of the alternatives.

Exhibit ES-3—Comparison of Alternatives



Note: Travel time between NYC and Niagara Falls presented in hours: minutes, based on express service, westbound scheduled times. For Alternative 125, average speed for regional service would be 53 mph, and travel time would be 8:40.

ES-4.1. Meeting the Program's Performance Objectives

Exhibit ES-5 summarizes the effectiveness of the alternatives in meeting the program's performance objectives using the qualitative rating system. The Base Alternative is shown for comparison.

The projects constructed under the **Base Alternative** will represent an improvement over existing conditions. However, when compared to the Build Alternatives, the Base Alternative will not provide service levels sufficient to meet the purpose and need of the High Speed Rail Empire Corridor Program of introducing higher passenger train speeds on the Empire Corridor and improving reliability, travel times, service frequency, and passenger amenities. The following are the key characteristics of the Base Alternative, relative to the High Speed Rail Empire Corridor Program's performance objectives and goals:

Exhibit ES-4—Comparative Analysis of Alternatives

Evaluation Criteria	Alternatives				
	Base	90A	90B	110	125
Service Levels (In round-trips/day)					
NYC to Albany	13	16	17	17	24
Albany to Buffalo	4	8	8	8	15 (express) 4 (regional)
Albany to Niagara Falls	3	7	7	7	6
Average Speed NYC to Niagara Falls (mph)	51	57	61	63	77 (express) 53(regional)
Travel Time: NYC to Niagara Falls (hours: minutes)	9:06	8:08	7:36	7:22	6:02 (express) 8:40 (regional)
Time Savings Compared to Base Alternative	-	58	1:30	1:44	3:04 (express)26 (regional)
On-Time Performance	83.0%	92.4%	95.4%	94.9%	100% (express) 83.0% (regional)
Ridership (Annual One Way)					
Total (2035)	1.6 million	2.3 million	2.6 million	2.8 million	4.3 million
Increase as Compared to Base Alternative	-	0.7 million (44%)	1.0 million (63%)	1.2 million (75%)	2.7 million (169%)
Costs[1]					
Capital Costs (Billions)	$0.290	$1.66	$5.58	$6.25	$14.71
O&M Costs, Annual (Millions)	$103	$156	$171	$173	$304
Revenue, Annual (Millions)	$77	$119	$139	$149	$245
Total Annual [Deficit]/Surplus (Millions)	[$26]	[$37]	[$32]	[$24]	[$59]
Operating Ratio (percent O&M costs covered by revenue)	75%	76%	81%	86%	81%
Cost Effectiveness (Annualized O&M Cost per Rider)	$64.38	$67.83	$65.77	$61.79	$70.70
[Subsidy]/Surplus per Rider (rounded)	[$16]	[$16.]	[$12.]	[$9]	[$14]

[1] Capital Costs are in 2015 dollars

Exhibit ES-5—Effectiveness of Alternatives in Meeting Performance Objectives

Objective/Alternative	Base	90A	90B	110	125[1]
Improve System-Wide On-Time Performance	X	★	★	★	★/X (Express/Regional)
Reduce Travel Time	O	+	+	+	★/+ (Express/Regional)
Increase Service Frequency	X	+	+	+	★/+ (Express/Regional)
Attract Ridership	O	★	★	★	★
Reduce Automobile Trips	O	+	+	+	★
Minimize Impact on Freight Rail Service	O	O	+	+	O

Notes:

[1] Performance on the new express service and the legacy regional service will differ, as explained in Chapter 6.

Rating System: ★ Strongly supports program goals and objectives; **+** Supports program goals and objectives; **O** Neutral regarding program goals or objectives; **X** Contrary to program goals or objectives

- The **Base Alternative** would result in the lowest annual ridership of all the alternatives, at 1.6 million (year 2035). All Build Alternatives would significantly exceed this value.

- The **Base Alternative** would have the slowest average speed (51 mph) and longest trip time of all the alternatives (9 hours: 06 minutes between New York City and Niagara Falls).

- The **Base Alternative** would not result in improved service frequencies. The Base Alternative would not provide any improvement in scheduled service. All other alternatives would increase the number of daily trains operated as compared to the existing service.

- The **Base Alternative** would be the least effective alternative in diverting auto users to passenger rail and improving air quality by reducing vehicular emissions. Auto diversions increase in direct response to increasing average speed and reduced trip times among major origin/destination pairs.

- Delivering only 83 percent OTP, the **Base Alternative** would not meet program service reliability goals of 90 percent OTP. All of the other Build Alternatives would exceed the 90 percent OTP target.

The following summarizes the effectiveness of the **Build Alternatives** in meeting the program's stated goals and performance objectives.

- **Alternative 90A** strongly supports the performance objectives of improving system-wide on-time performance and attracting ridership. Alternative 90A also supports the objectives of reducing travel times, increasing service frequency, and reducing automobile trips. Alternative 90A is neutral with regard to the objective to minimize adverse effects on freight train operations.

- **Alternatives 90B and 110** would both create a segregated rail corridor, by providing exclusive third and fourth tracks for use by passenger trains. These alternatives would both strongly support the goals of improving system-wide on-time performance and attracting ridership. These alternatives would also support the goals of reducing travel times, increasing service frequency, reducing automobile trips, and minimizing impacts on freight rail service.

- Benefits from **Alternatives 90A, 90B, and 110** all are realized soon after initiation of construction; with these benefits increasing steadily throughout the entire term of the program as many important track, signal, yard, and grade-crossing improvements are implemented.

- **Alternatives 90A, 90B, and 110** all would enhance service for each station destination along the Empire Corridor West/Niagara Branch: Albany-Rensselaer, Schenectady, Amsterdam, Utica, Rome, Syracuse, Rochester, Buffalo-Depew, Buffalo Exchange Street and Niagara Falls Stations.

- **Alternative 125** express service strongly supports the program performance objectives of improving system-wide on-time performance, reducing travel times, increasing service frequency, attracting ridership, and reducing automobile trips. The regional service (legacy service) maintained along the existing Empire Corridor for Alternative 125 would support the goals of increasing service frequency and reducing travel time and would be contrary to the goal of improving system-wide on-time performance. Alternative 125 would be neutral in terms of minimizing impact on freight rail service. Alternative 125 would have an extremely high capital and annual operating cost, requiring the highest public subsidies (after the Base Alternative), and has the greatest potential for environmental and community impacts.

- **Alternative 125** would not be completed until 2035, due to the need to construct an entirely new right-of-way through undeveloped areas, so the mobility benefits associated with Alternative 125 would not occur until then. The public would receive no transportation benefits from Alternative 125 until the first major new segment of track – from Albany to Syracuse – is completed, around 2025. Even then, for travelers destined for Rochester or Buffalo/Niagara Falls, true high-speed service would not be available until 2030 or possibly later. During the period of its construction, travelers would continue to receive only the benefits available from the Base Alternative.

- **Alternative 125** does not provide service enhancements to several existing station destinations on the Empire Corridor West including: Schenectady, Amsterdam, Utica, Rome, and Niagara Falls. Benefits at these destinations are limited to the benefits described in the Base Alternative as the existing regional legacy service would still be provided.

ES-4.2. Comparison of Operational Performance and Costs

Selecting a preferred alternative among several options involves weighing and balancing costs and impacts against operational and mobility benefits. Exhibit ES-4 presents a tabular summary of performance measures for each alternative, such as service frequency, average speeds, travel times, time savings, on-time performance, and ridership. This exhibit also presents cost considerations, such as capital and operating/maintenance costs, revenues, deficits, cost-effectiveness, and subsidies, for all five alternatives.

Mobility can be measured in terms of improved passenger and freight movement as expressed by higher speeds and schedule frequency (for rail services), and improved reliability. A significant additional factor in judging relative appeal among the alternatives is how quickly their benefits could be available to travelers: all else being equal, alternatives that yield benefits sooner are preferable. A synopsis of strengths and weaknesses of the alternatives from a cost and operational standpoint is presented in this section. Key findings shown in Exhibit ES-4 include:

- **Alternative 110 produces the greatest transportation benefits at the lowest per-rider cost subsidy; at approximately $9 per trip**, which would be 25 percent less than the next most cost-effective Alternative 90B ($12 per trip) and just over 43 percent less than the Base Alternative value ($16.25 per trip).

- **Alternative 110's relatively high ridership and moderate operating cost produces the highest recovery of costs through ticket sales**, 86 percent, compared to 81 percent for the next best alternatives (Alternatives 90B and 125) and a low of 75 percent for the Base Alternative.

- **Alternative 125 would produce the highest ridership; however, Alternative 125 would relegate travelers from Schenectady, Amsterdam, Utica, and Rome to the use of regional train service on the existing corridor.** Moreover, because of limited train slots over Metro-North south of Poughkeepsie and schedule constraints on the Amtrak Empire Connector between Spuyten-Duyvil and New York City (on which both the high-speed and regional services would operate), there would be little value in transferring between regional and high-speed services at Albany-Rensselaer, Syracuse, Rochester or Buffalo. Therefore, the benefits of Alternative 125 would not be enjoyed by Schenectady, Amsterdam, Utica, and Rome passengers (even with a transfer), while the other Build Alternatives would confer their benefits on the entire rail traveling population.

- **Alternative 125 is the most costly alternative**: at $14.71 billion, it would cost more than twice as much as the next most costly alternative (Alternative 110).

- **The Base Alternative has the lowest capital cost, but results in the fewest transportation benefits**, and fails in significant terms to achieve the program goals.

- **Alternative 125 would take the longest time to confer travel benefits in the Empire Corridor**. Because a new right-of-way must be assembled, acquired, constructed and placed into service, no benefits would be available until the first major Albany-Syracuse segment can be completed, around 2025. Other alternatives begin conferring benefits within 2 to 5 years of the start of construction, likely in the 2015 to 2020 time period, with benefits continually increasing as additional improvements – signals, track, switches, grade crossings and

separations, bridges – are introduced in succeeding construction phases.

- **Alternatives 90B and 110 would provide the best future performance for freight rail operation in the corridor**. The other Build Alternatives would allow freight trains to operate as well as or better than the Base Alternative. Alternatives 90B and 110 would provide segregated tracks and would provide the greatest relief from potential future congestion delay. With Alternatives 90B and 110, freight train delay would decrease and average speeds would increase the most among all alternatives. Average trip times would show the greatest improvement under Alternative 110. Freight train travel time variability, a measure of service reliability, is expected to be similar across all five alternatives.

ES-4.3. Potential Environmental Impacts

This Tier 1 EIS identifies a broad, corridor-level overview of potential environmental impacts of the five program alternatives. Evaluations are based on conceptual designs and Geographic Information System (GIS) and file-based resource mapping, suitable for making corridor-wide, service-level decisions for the Empire Corridor. Upon selection of an alternative at the conclusion of this Tier 1 evaluation, the quantitative extent of impacts will be determined during Tier 2 evaluations and NEPA documentation, as specific projects, e.g., bridges, grade crossings, signal and track improvements, are advanced through design.

Exhibit ES-6 compares the potential impacts of the alternatives using a relative rating system to distinguish the lowest (designated L) to highest (designated H) impact potential among the alternatives. A summary of the findings for all the social, cultural and natural resource categories is discussed in Chapter 4.

Each alternative would affect the societal, cultural and natural environment differently. The Base Alternative would have the lowest potential for impact. Alternative 90A, consisting of 20 projects conducted largely within existing rights-of-way, would also be expected to have minimal impacts. Alternatives 90B would involve work extending outside of the right-of-way, and impacts would be even greater with track construction extending further outside of the right-of-way with Alternative 110. Overall, Alternative 125 has the highest potential for impact of all the alternatives, with construction of a new segregated corridor and sections of elevated tracks where the railroad extends over the existing Empire Corridor. If Alternative 125 is selected for further consideration, design in Tier 2 will be advanced and will consider ways to further avoid and minimize impacts associated with this alternative.

Details of the social, cultural, and natural resource impacts of each alternative are discussed in Chapter 4 of this document, and a brief overview of the environmental impacts of the alternatives is provided in the following section. Exhibit 6-11 provides a more detailed summary on impacts of each alternative on each environmental resource category.

Exhibit ES-6—Comparison of Alternatives in Selected Impact Areas

Alternative/ Impact Area	Base	90A	90B	110	125
Land Use	L	L	M	M	H
Community	L	L	L	M	H
Historic	L	M	H	H	M[1]
Parks	L	L	L	M	H
Visual	L	L	M	M	H
Farmland	L	L	M	M	H
Waterbodies	L	M	M	M	H
Floodplains	L	L	M	M	H
Wetlands	L	L	M	M	H
Wildlife	L	L	M	M	H
Air Quality	L	B	B	B	B
Energy/ Greenhouse Gas	L	B-L	B-L	B-M	B-H
Noise/Vibration	L	M	M	M	H

L Potential for adverse effect is lowest among the alternatives

M Potential for adverse effect is moderate among the alternatives

H Potential for adverse effect is highest among the alternatives

B Long-term Beneficial Impact

[1] The undeveloped nature of the 125 Study Area may contribute to the lack of documented historic resources.

- **Land Use Impacts: Alternative 125 would require the assembly and acquisition of public and private lands along the 280-mile Albany-to-Buffalo corridor**. An estimated two to three thousand acres of land would be needed. Notwithstanding efforts to minimize adverse effects, the construction of an essentially sealed corridor with limited opportunities for crossings could be expected to have an impact on community cohesion and large-scale land uses which may be bisected by the high-speed rail corridor. If Alternative 125 is selected for further consideration, additional location analyses will include avoidance and minimization of property impacts and impacts on sensitive land uses. By comparison, property acquisition requirements of the other alternatives that follow the existing Empire Corridor would be considerably less than that for Alternative 125. Alternative 110 would involve the next greatest property displacements, affecting approximately 53 areas in 8 counties. Alternative 90B would affect approximately 9 areas in 6 counties. Property displacements with the Base and Alternative 90A are anticipated to be minimal.

- **Community and Public Facility Impacts: Alternative 125 has the potential to affect 13 community/publicly used facilities (including cemeteries, privately owned golf courses/golf clubs, and a school ballfield) in 8 counties largely where it extends on new right-of-way**. If Alternative 125 is advanced, additional location analyses will consider ways to avoid or minimize impacts on these publicly accessible facilities. By comparison, Alternative 110 is projected to have potential effects on 4 community facilities (e.g., fire stations, post office) in 1 county; the other alternatives are not expected to have any direct impacts to community facilities.

- **Historic and Archaeological Resource Impacts/Section 4(f) Uses: Alternatives 90B and 110 would have the greatest potential to affect historic and cultural resources**, with 302 to 292 archaeological/architectural resources within the Area of Potential Effect (APE) for both direct and indirect impacts. Alternative 90A is likely to have moderate effects, with 100 resources within the APE. The Base Alternative would likely have only minor effects, with 26 resources within the APE. Alternative 125 would largely maintain elevated tracks within the existing ROW where it overlaps with the existing Empire Corridor. However, Alternative 125 would involve greater impacts than the Base Alternative, potentially affecting 123 resources within the APE, depending on the footprint for elevated structures that will carry the grade-separated tracks over the existing tracks. Alternative 125 will be developed along new right-of-way generally away from population centers where most historic structures are found. Due to the undeveloped nature of the areas bisected by Alternative 125, historic and archaeological resources may not be fully documented. Alternative 125 would also have the greatest potential interaction with and use of tribal land. The Programmatic Agreement (included as Appendix H) addresses the process by which FRA and NYSDOT intend to comply with Section 106 for undertakings occurring on tribal lands or where adverse effects to historic properties of a religious or cultural significance to a tribe occur off tribal land. If this alternative is advanced for further consideration in Tier 2, efforts will be made to avoid impacts on historic resources in locating the new rail corridor.

- **Parks and Recreational Facilities Impacts/Section 4(f) Uses: Alternative 125 has the greatest potential effect on parks and recreational facilities, with 9 such facilities in 5 counties potentially affected (including an Oneida Nation-owned golf course)**. If Alternative 125 is advanced, the additional location analyses in Tier 2 will avoid or minimize impacts on these facilities to the extent practicable. With the possible exception of two crossings of the Mohawk River and Erie Canal for Alternatives 90B and 110, only Alternative 110 would have any other potential effect on recreational facilities, potentially affecting one county park.

- **Visual Impacts: Alternative 125 would have the greatest potential for adverse visual impacts.** Alternative 125 would create a new 100-foot-wide railroad right-of-way that would be electrified (with overhead catenary) in what are today largely open undeveloped and moderately developed areas. Alternative 125 would also create an elevated structure in densely populated urban centers (Syracuse, Rochester, and Buffalo), which would be more visible than the at-grade railroad. Both Alternatives 90B and 110 would involve track construction extending outside of the right-of-way, which could result in additional clearing and property displacements, but which would otherwise result in minor visual effects. The Base Alternative is entirely confined to the existing railroad right-of-way, and is expected to have no such effects.

- **Farmlands Impacts: Alternative 125 would have the most disruptive impact on farmland, potentially bisecting and isolating sections of prime farmlands and "farmlands of statewide significance" in 12 counties**. By comparison, Alternative 110 would affect prime farmlands in at least 4 counties and Alternative 90B in at least 3 counties. Alternative 90A has only minor effects on farmland, potentially affecting agricultural districts in only 1 county. The Base Alternative is confined entirely to the existing railroad right-of-way, and is expected to have no such effects.

- **Impacts on Waterbodies/Rivers: Alternative 125 would have the greatest potential for impacts on waterbodies, potentially affecting 361 such resources along Empire Corridor West**. The Base Alternative would have the least potential for impact on surface water resources, potentially affecting 68 crossings. The other alternatives are anticipated to have moderate potential for impact relative to the other alternatives, with between 107 to 218 surface water crossings potentially affected.

- **Wetlands Impacts: Alternative 125 would have a the greatest potential for impact on wetlands, relative to the other alternatives**, with 177 new wetland crossings Alternatives 110 and 90B would have a moderate potential for impact, potentially affecting 118 to 137 wetland crossings. Alternative 90A and the Base Alternative would have a relatively minor potential for impact, potentially affecting 54 to 84 wetland crossings.

- **Air Quality Impacts. Alternative 125 has the greatest potential benefit to air quality in some regions of the corridor, while it has the potential to adversely affect air quality in other regions of the corridor (the differences between the areas are a consequence of the distribution of on-road versus rail trips).** The other alternatives would result in negligible changes in regional emissions, with the Base Alternative serving as the basis for comparison. While increased rail emissions would not adversely affect local air quality, some very minor local benefits may occur near roadways where trips are reduced. Some increases in pollutant concentrations may occur near rail stations, increasing from Alternative 90A to 90B, 110, and 125, which will be subject to further analysis in Tier 2.

- **Energy and Greenhouse Gases Impacts**: Alternative 125 is likely to require the greatest quantity of energy and materials for construction. Thus, it has the greatest potential to adversely affect net energy and greenhouse gases (accounting for the energy and GHG emissions from construction and reduced on-road emissions). Other alternatives have successively lesser adverse impacts. Alternative 90A would have a potential beneficial impact starting approximately 20 years after construction.

- **Noise/Vibration Impacts: Alternative 125 has the potential for noise impacts in areas where no railroads currently operate**. In this respect, it is the only alternative to introduce railroad noise in areas that are not already experiencing it. With all alternatives, including the Base Alternative, potential noise impacts along the Empire Corridor/Niagara Branch are expected to be moderate to severe in more urbanized areas, between New York City and Schenectady, between Syracuse and Rochester, and between Buffalo and Niagara Falls. Noise impacts are also predicted along the three new alignment segments of Alternative 125. There is also a potential for vibration impacts along new corridor segments.

ES-5. How will impacts be mitigated?

On a broad, corridor-level basis, the Tier 1 EIS discusses strategies to mitigate potential impacts. These strategies will be further delineated during the Tier 2 analyses, which will include thorough inventories of resources to determine effects, and refinements in design to avoid and minimize environmental impacts. Impacts that cannot be avoided will be mitigated to the greatest extent practicable.

Mitigation strategies presented in Chapter 4 of this Tier 1 EIS will be further defined during Tier 2 evaluations. Tier 2 also will include ongoing discussions with federal and state authorities, regional and local governments, and the public to mitigate potential impacts. As needed federal, state and local permits and approvals, which will require best management practices and site-specific mitigation design and post-construction monitoring, will be obtained during final design.

ES-6. How will the program be financed?

Transportation infrastructure and services are typically supported by a combination of capital and operating funding from various sources. For the High Speed Rail Empire Corridor Program, capital funds would be provided primarily by FRA, the Federal Transit Administration (FTA), Federal Highway Administration (FHWA), NYSDOT and, where station upgrades are incorporated into the program, municipal governments and regional transportation authorities.

It is anticipated that FRA funding would be provided under the High-Speed Intercity Passenger Rail Program. For projects to be eligible for FRA funds, they must be advanced through the FRA's process. This Tier 1 Draft EIS satisfies FRA's procedural requirements, including documentation required under NEPA.

Where additional funding may be sought from FTA or other federal grant programs, projects must be included in the Statewide Transportation Improvement Program (STIP). Projects also would be included in the New York State Rail Plan, which outlines all of the state's rail system needs for both passenger and freight service. During Tier 2, financial analysis will be refined for the selected alternative, as cost and revenue estimates are improved and as more detailed engineering and cash flow modeling are performed. As individual projects are advanced and costs are refined, the specific projects of the selected alternative will be incorporated into the New York State Rail Plan and the STIP.

ES-7. What is the program schedule?

The program schedule will vary depending on which alternative is selected. For the Base Alternative, construction is anticipated to start as early as 2013, with a scheduled completion of 2020. The Build Alternatives would be completed in 2035. Improvements in maximum and average speed (benefits) would accrue in steps. For Alternatives 90A, 90B, and 110, approximately 25 percent of the benefit would accrue at the end of each five-year construction interval, with the completion of each new segment of segregated track. While Alternative 125 also would be completed in 2035, due to the extensive new construction, maximum and average speed benefits would not begin accruing until 2025.

ES-8. Who will decide which alternative is selected and how can I be involved in this decision?

NYSDOT and FRA will determine the preferred alternative following extensive public involvement and agency coordination programs. This will include opportunities for comment on the Tier 1 Draft EIS in writing and during public hearings that will be held. The program's public involvement program is a multifaceted program that utilizes several media to engage and inform the public and other key stakeholders. A Public Involvement Plan (PIP) was developed to identify key contacts within targeted audiences, such as government agencies and organizations, public offices, interest groups, civic and business groups, present and potential riders/users, the media and the general public. In addition, the PIP identified NEPA cooperating and participating agencies that were invited to participate in the program. The selection of an alternative at the end of the Tier 1 process will be made by FRA based upon a recommendation from NYSDOT. The FRA's decision will be articulated in a Record of Decision that the FRA will issue.

ES-8.1. Public Outreach Program

The High Speed Rail Empire Corridor Program has solicited early and continuous feedback from the public and from federal, state, regional, and local agencies and stakeholders. The program has encouraged open discussion of program details and issues and provided opportunities for comments and questions. These efforts will continue throughout the environmental review of the program. Public outreach has included:

- Public scoping meetings and open houses,
- Stakeholder coordination and periodic mailings,
- Newsletters and informational materials disseminated at key points during the program development process,
- Media outreach, and
- Program website.

ES-8.2. Agency Coordination

At the onset of the program, appropriate federal, state, regional and local agencies were identified as having a role and/or interest in the program. NYSDOT and FRA submitted more than 37 formal letters of invitation to NEPA cooperating and/or participating agencies. The roles and responsibilities of cooperating and/or participating agencies are established under the environmental review provisions of SEQR and CEQ regulations (40 CFR 1508.5).

NYSDOT has formed a project advisory committee, the Empire Project Advisory Committee (EPAC) to assist NYSDOT and FRA in progressing the environmental process. Additionally, two of the program's key partners, Amtrak and CSXT, were briefed on the status of the alternatives development phase of the program. Amtrak and CSXT will continue to be involved in the High Speed Rail Empire Corridor Program as it proceeds through the Tier 1 EIS process and continues into Tier 2 evaluations. Agency coordination has also included, and will continue to include, consultations with federally recognized tribes and consulting parties pursuant to the National Historic Preservation Act.

ES-9. Who can I contact for more information?

For more information on this Tier 1 EIS and the High Speed Rail Empire Corridor Program, please contact:

- Michelle Fishburne, Federal Railroad Administration
  202- 493-0398 or michelle.fishburne@dot.gov
- David Chan, New York State Department of Transportation
  518-485-1918 or david.chan@dot.ny.gov

1. Introduction and Purpose and Need

1.1. Introduction

The Federal Railroad Administration (FRA) and the New York State Department of Transportation (NYSDOT) are preparing a tiered Environmental Impact Statement (EIS) to evaluate proposed system improvements to intercity passenger rail services along the 463-mile Empire Corridor, connecting Pennsylvania (Penn) Station in New York City with Niagara Falls Station in Niagara Falls, New York (refer to Exhibit 1-1). In April of 2010, NYSDOT received a $1 million grant from FRA to conduct analyses of potential Empire Corridor improvements, including preparation of a Service Development Plan, Tiered EIS, and other necessary studies.[1] In addition, Federal Highway Administration (FHWA) contributed $1.8 million to the Tier 1 EIS preparation, and New York State provided matching funds in the amount of $3.5 million (New York State rail funds).

The Empire Corridor connects New York City with the largest cities in New York State, extending north through Yonkers and Poughkeepsie, and turning west at Albany to extend through Schenectady, Utica, Syracuse, Rochester, Buffalo, and terminating at Niagara Falls. The Empire Corridor consists of three main segments:

- **Empire Corridor South**, extending 142 miles north from Penn Station to just north of Albany-Rensselaer Station;
- **Empire Corridor West**, extending 294 miles west from approximately one mile north of the Albany-Rensselaer Station to just east of the Buffalo-Exchange Street Station; and the
- **Niagara Branch**, extending 27 miles west from a point located just east of Buffalo-Exchange Street Station to Niagara Falls.

The Empire Corridor is one of eleven designated high-speed rail corridors nationwide. Key federal legislation relevant to the development of high-speed passenger rail service on the Empire Corridor includes:

- The **Transportation Equity Act for the 21st Century (TEA-21) (PL 105-178, June 9, 1998)**, supplemented the nationwide list of five high-speed rail corridors authorized under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) (PL 102-240, December 18, 1991).[2] TEA-21 authorized the Empire Corridor, from New York City to Albany to Buffalo, New York, as a high-speed rail corridor. ISTEA defined "high-speed rail corridors" as corridors where trains operating at speeds of 90 miles per hours (mph) could be reasonably expected.
- The **Passenger Rail Investment and Improvement Act of 2008 (PRIIA) (Division B, Title III of Public Law 110-432, 122 Stat. 4907, October 16, 2008)**, as the first passenger rail authorization since 1997, called for significant improvements in the nation's intercity passenger rail, including the development of high-speed rail corridors. This act authorized the

[1]/ FRA Agreement Number FR-IPR-0002-10-01-00, from 05/03/2010 to 05/31/2013.

[2]/ The five high-speed rail corridors authorized under ISTEA were: the Midwest, providing 3 links from Chicago, IL to Detroit, MI and St. Louis, MO and Milwaukee, WI; Florida, linking Miami with Orlando and Tampa; California, linking San Diego and Los Angeles with the San Francisco Bay Area and Sacramento via the San JoaquinValley; Southeast, connecting Charlotte, NC, Richmond, VA and Washington, D.C.; and Pacific Northwest, linking Eugene and Portland, OR with Seattle, WA and Vancouver, British Columbia, Canada.

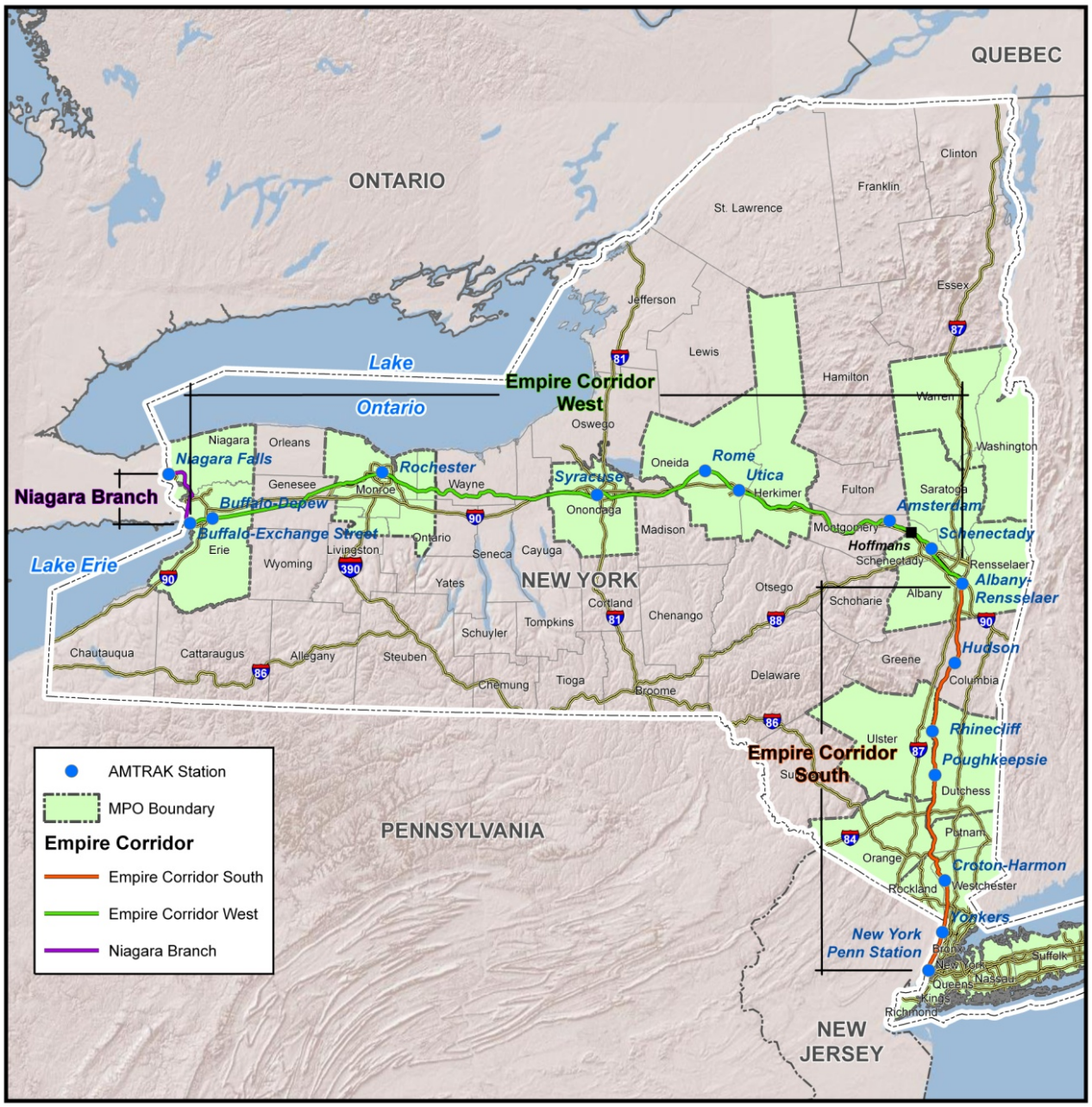


Exhibit 1-1—Program Location Map

appropriation of funds to establish several new passenger rail grant programs, including capital investment grants to support intercity passenger rail service and high-speed corridor development. FRA consolidated these and other closely related programs into the High-Speed Intercity Passenger Rail (HSIPR) Program.

- The **American Recovery and Reinvestment Act (ARRA) of 2009 (PL 111-5) (February 17, 2009)** and the **Transportation, Housing and Urban Development and Related Agencies Appropriations Act for 2010 (Division A of the Consolidated Appropriations Act, 2010**

(PL 111-117)) provided funding for the formation of the federal High-Speed Intercity Passenger Rail program (HSIPR). The Empire Corridor was one of the high-speed rail corridors to receive funding in 2009, 2010, and 2011.

1.1.1. Tiered NEPA EIS

This EIS has been developed in accordance with the National Environmental Policy Act of 1969 (NEPA) and its implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508); FRA's Procedures for Considering Environmental Impacts (64 Federal Register [FR] 28545); and the New York State Environmental Quality Review Act (SEQR) and its implementing regulations (6 New York Codes, Rules and Regulations [NYCRR] Part 617). The FRA and NYSDOT are using a tiered process, as provided for in 40 CFR 1508.28, to complete the environmental review of the program. "Tiering" is a staged environmental review process applied to environmental reviews for complex projects, such as the Empire Corridor Program.

The initial phase ("Tier 1 EIS") of this process addresses broad corridor-level issues and sets forth a package of follow-on studies, proposals, and projects. The Tier 1 EIS evaluates a range of alternatives to meet the program needs of reducing infrastructure constraints and accommodating existing and projected demand. It establishes specific performance objectives for:

- Increasing train frequency and on-time performance (OTP),
- Reducing train travel time and automobile trips along the corridor,
- Attracting additional passengers, and
- Minimizing interference with freight rail operations.

The Tier 1 EIS identifies broad-based operational changes and investments in infrastructure and rolling stock (locomotives and passenger coaches) necessary to achieve those performance objectives. The Tier 1 EIS will result in the following decisions and actions:

- Define the purpose and need for the proposed action including goals and objectives;
- Develop criteria and screen alternatives to eliminate those that do not meet the purpose and need of the proposed action;
- Identify the range of reasonable alternatives to be considered, consistent with the current and planned use of the corridor, existing services within and adjacent to the program area, and other planned improvements;
- Identify the general alignment(s) and general right-of-way requirements of the reasonable alternatives;
- Identify the infrastructure and equipment investment requirements for each of the reasonable alternatives;
- Identify the travel times, service schedule, frequencies, and stations serviced for the reasonable alternative(s);
- Identify environmental constraints and considerations and perform high-level environmental review and evaluation of the reasonable alternatives under consideration;
- Identify, in the Final Tier 1 EIS, a preferred High Speed Rail Empire Corridor Program, including

identification of the required individual capital improvements needed to achieve the program (selected alternative); and

- Select, in the Record of Decision, an Empire Corridor High Speed Rail Empire Corridor Program, including identified individual capital improvements and the timing and sequencing for their implementation.

If a Build Alternative is selected at the conclusion of the Tier 1 process, the Tier 2 NEPA document(s) will then evaluate in greater detail the component projects of the selected Empire Corridor Program alternative chosen in Tier 1. Tier 2 will include detailed analyses based on refined engineering designs and operational plans and will identify site-specific environmental consequences. If avoidance and minimization of impacts cannot be achieved, site-specific mitigation measures for the selected alternative will be developed. Input from the public and from reviewing agencies will be solicited during both tiers.

1.1.2. Corridor and Program History

The Empire Corridor has been a vital rail transportation route of national significance for almost 200 years. This transportation route extends north through the Hudson Valley region and west through the Mohawk Valley region, south of the Adirondacks and north of the Catskills, to Buffalo on Lake Erie. The corridor developed along the historic "Water Level Route" that followed the canal system connecting Lake Erie and the Hudson River to transport goods and services to and from New York City. For many decades, the railroad was operated by the New York Central Railroad as a four-track speedway between Albany and Buffalo, carrying passenger and freight trains along express and local tracks. The Niagara Branch, extending north from Buffalo along Lake Erie, the Niagara River, and into Canada at Niagara Falls, was operated as a two-track shared use corridor. The transportation afforded by the canals and railroads connecting to the Great Lakes helped to establish New York City as an international trade center and the Atlantic port for the Midwest, and to transform Buffalo into the state's second largest city. This network also enabled growth and development of the other major metropolitan areas (including the five other largest cities in the state) along this route.

Use of highways and airports constructed over the last generation has eclipsed rail use in the Empire Corridor for longer distance trips between upstate and western New York to New York City. The construction of the New York State Thruway (Thruway), consisting of Interstate Route 90 from Buffalo to Albany and Interstate Route 87 from Albany to New York City located roughly parallel to the Empire Corridor, has increased the reliance on automotive travel. The area is also serviced by regional airports, providing service from Buffalo, Rochester, Syracuse, Utica, and Albany to New York City. Through the second half of the 20th century, multiple factors, including competition from highways and airports, contributed to the decline of the railroads that led to bankruptcy of most of the railroad companies in New York and the Northeast by the early 1970s. Starting in the 1960s, the New York Central Railroad (later Penn Central and Conrail) removed track infrastructure located along the Empire Corridor to reduce maintenance, operating and real estate property tax costs; creating a two-track system between Albany-Rensselaer Station and Buffalo, and a single track line on portions of the Niagara Branch.

In 1970, the Rail Passenger Service Act established the National Railroad Passenger Corporation (Amtrak) to provide intercity rail service in 46 states and the District of Columbia. Prior to the establishment of Amtrak, intercity passenger rail service was provided by the private railroad

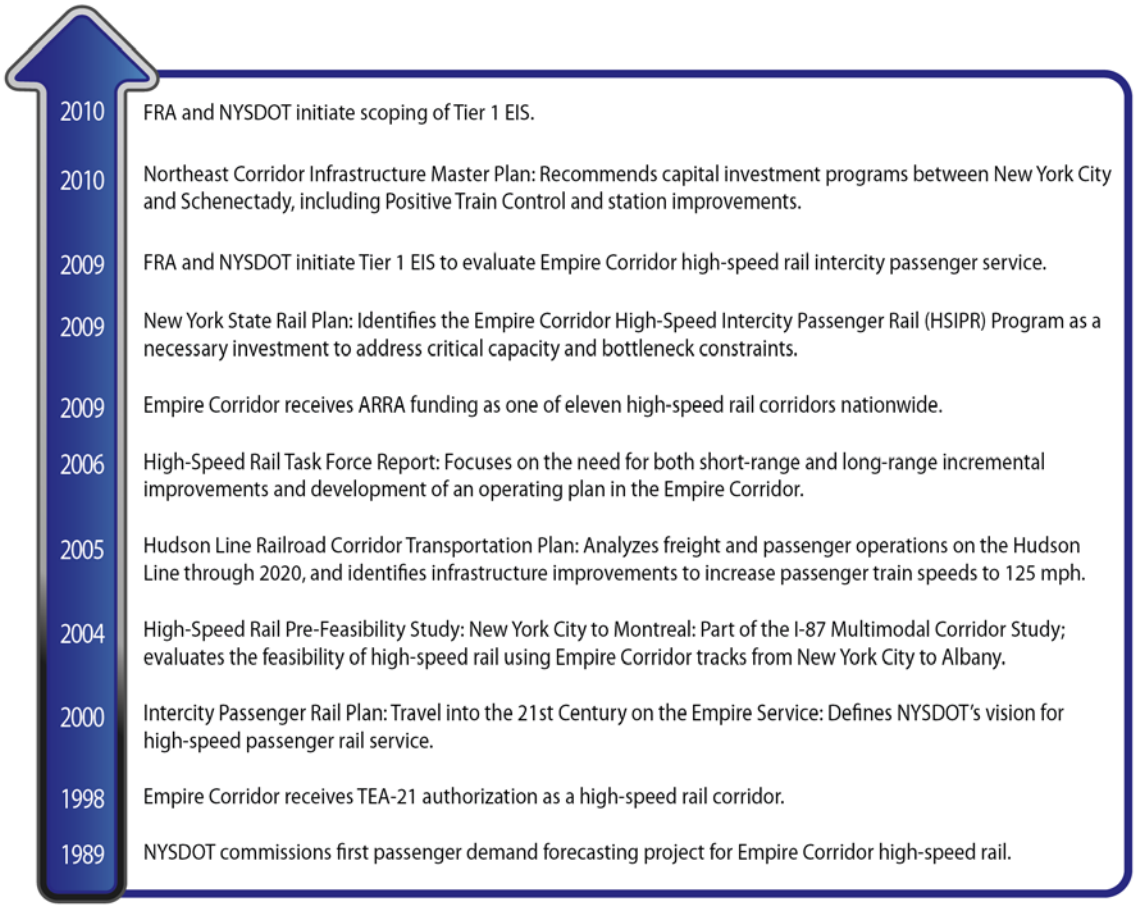
freight companies. Amtrak assumed the common carrier obligations of private railroads in exchange for a right to priority access of their tracks for incremental cost.

The possibility of instituting high-speed rail service along the Empire Corridor has been the focus of studies dating back twenty years. Developments in recent years have advanced rail planning and funding at both the federal and state levels culminating in this Tier 1 EIS program to evaluate high-speed passenger rail service along the Empire Corridor. Exhibit 1-2 presents a timeline of the recent program planning and development milestones for high-speed rail in the Empire Corridor.

1.1.3. CSXT Agreements

CSX Transportation, Inc. (CSXT), a private freight railroad company, owns more than half of the Empire Corridor (Exhibit 2-1). While recognizing the Federal NEPA and New York state SEQR legal framework upon which the environmental review process must be based, this Tier 1 Draft EIS has been developed in consideration of two agreements between NYSDOT and CSXT (dated May 28, 2010), both crafted to preserve the independence and integrity of the EIS process: "Framework Agreement Concerning Certain Rights and Responsibilities with Respect to New York High Speed

Exhibit 1-2—High Speed Rail Empire Corridor Planning Timeline



Rail" and "Agreement for Progressing a Tier 1 Environmental Impact Statement" ("Agreements") (attached as Appendix J).

CSXT has agreed to work with NYSDOT as the EIS is being developed by providing assistance and technical guidance, as well as documents and access to its property, as outlined in the Agreements. CSXT has also agreed to take into consideration the results of the EIS, as well as the views of the FRA, State of New York, Amtrak, the Port of New York/New Jersey and its customers, but at the same time, CSXT has stated that it has the obligation to preserve and grow its freight rail capacity and will maintain sole discretion to decide the safety and use of its property.

The position taken by CSXT and agreed to by NYSDOT in the Agreements will have to be considered in implementation of any selected alternative chosen by NYSDOT and FRA on property owned by CSXT. One principle set forth in the Agreements is that CSXT is entitled to compensation for the use, acquisition or diminishment in value of its property resulting from any project advanced as a result of the EIS. The development of the cost of alternatives must and will include the recognition of this principle, although the negotiation of the actual value of any compensation to CSXT is not part of this Tier 1 EIS, but will be developed if and when necessary as part of Tier 2 program advancement.

For these reasons, independent analysis by CSXT of the impacts to CSXT property will be extremely important and valuable to NYSDOT and FRA as the NEPA process continues. That analysis and the results of public hearings and comment on the Tier 1 Draft EIS will be reflected in the Tier 1 Final EIS.

1.2. Problem Statement

The existing Empire Corridor passenger rail service is negatively impacted by inadequate service levels, operational constraints, and delays resulting from pervasive conflicts with freight traffic. As a result, passenger rail service is not viewed by travelers as a viable, attractive transportation option, particularly to and from points west of Albany-Rensselaer Station.

Existing conditions limit Empire Corridor service. Simulated existing (2008, pre-recession) passenger service along Empire Corridor West indicates that passenger train on-time performance (OTP) is less than 48 percent, with an average train speed of approximately 50 mph and an average train lateness of almost 28 minutes. Simulated existing freight train performance along Empire Corridor West indicates over 38 train minutes of delay per 100 freight train miles operated, indicating congestion ahead, and a high variability in average freight train trip times, indicating service inconsistency.[3] Furthermore, although maximum authorized speeds along portions of the Empire Corridor are 79 mph on the Buffalo to Hoffmans (west of Albany-Rensselaer) segment and 110 mph on the Hoffmans to New York City segment (refer to Exhibit 1-1), actual operating speeds along the majority of the rail corridor are considerably lower due to track conditions, alignment, and obsolete or inadequate track and signal systems which constrain capacity and speed.

Existing passenger rail service is infrequent relative to other available modes of transportation. For example, there is a strong travel market between New York City and Albany, and passenger rail captures only 11 percent of that travel market. Currently, thirteen weekday trips are available, with the earliest Albany-Rensselaer arrival time of approximately 9:30 a.m. This limited service

[3]/ LTK Engineering Services. *Rail Network Operations Simulation Results*. Prepared for NYSDOT. June 2012. Network simulations for this Tier 1 EIS reflect the rail network along Empire Corridor West. The *Hudson Line Railroad Corridor Transportation Plan*, 2005, includes rail operations network simulation results and proposed actions for Empire Corridor South.

does not accommodate business weekday schedules. Additionally, travel by rail between New York City and Buffalo is not a viable option for a business traveler, given the existing frequency of service and travel time. There are only four weekday trips between New York City and Buffalo. Furthermore, the trip from Buffalo to New York City can be made in less than two hours by air and under seven hours by car, compared to approximately eight hours by the existing Empire Corridor passenger service provided by Amtrak.

Despite these constraints and service limitations, ridership is growing. Ridership on the Empire Corridor has increased by 37 percent (387,304 passengers) over the past 10 years, to total more than 1.4 million passengers in 2011. Since 2001, ridership on the Buffalo to Albany-Rensselaer portion of the corridor has more than doubled, at the same time freight and commuter rail volumes have grown. Projections through 2035 indicate that freight traffic will continue to increase. Forecasts for the Metro-North Railroad's Hudson Line through 2020 also indicate projected increases of 28 percent. Congestion is expected to worsen as demand for passenger, commuter, and freight rail grows.

Existing and forecasted socioeconomic and transportation market conditions in the Empire Corridor indicate an opportunity for an improved Empire Corridor passenger rail service to further grow, offering a viable, alternative mode of intercity travel in the Empire Corridor.

1.3. Program Purpose

The purpose of the High Speed Rail Empire Corridor Program is to introduce higher passenger train speeds on the Empire Corridor and improve reliability, travel times, service frequency, and passenger amenities. The High Speed Rail Empire Corridor Program will improve passenger rail service along the corridor and, in so doing, attract additional passengers, increase travel choices, and contribute to a balanced, multi-modal transportation system.

Improved service along the Empire Corridor will better connect the principal population centers of western New York State with Albany and New York City, further enhancing connections to Northeast Corridor passenger rail service (Philadelphia and Washington) and other markets (Midwest and New England), and facilitating international travel to Canada. Its location within one of the most populated regions in the country, and well as its importance to national and international freight traffic, underscores the importance of the Empire Corridor to regional development. Providing time-sensitive and efficient service will, in turn, promote economic vitality, improve quality of life for residents, and reduce automotive travel and emissions.

1.4. Program Needs

This program is being undertaken to meet the following needs: reduce infrastructure constraints and accommodate existing and projected demand.

1.4.1. Reduce Infrastructure Constraints

The Empire Corridor is distinguished by its diversity of private and public ownership and mix of passenger and freight usage (refer to Exhibit 2-1 in Chapter 2). Empire Corridor West is the most

important and heavily used freight route in the state, carrying one of the highest volumes on the CSXT system nationwide. It is the major gateway to Canada; the Midwest; and the Port of New York/New Jersey, the third largest container port in the United States.[4] Metropolitan Transportation Authority's (MTA's) Metro-North Railroad (Metro-North), operating the Hudson Line commuter rail service on the southern half of Empire Corridor South, is the busiest commuter railroad in the country.

Outside of the Northeast Corridor, Amtrak intercity passenger services run almost exclusively on railroads that are owned and controlled by private freight and commuter railroads. This can create delays due to freight and commuter train interferences, track work and slow orders, as well as other factors largely beyond the control of Amtrak. Freight trains generally operate at speeds slower than passenger trains, in accordance with FRA track class operating restrictions (refer to Section 2.4). Slower-moving freight trains have to move to sidings to let passenger trains pass or the faster-moving passenger train has to slow down behind the slower freight train. This does not allow for optimal usage of tracks. Overall, these problems in the Empire Corridor result in over 161,000 minutes of annual delay, according to analysis of data provided to NYSDOT by Amtrak. This represents more than seven hours per day of total train delay to Amtrak trains in the corridor.

Speed restrictions are one of the most common causes of delay along Empire Corridor South between Albany-Rensselaer and Penn Stations. The competing use of the rail system, particularly on the Hudson Line by users with different operating requirements (mix of speeds, loads, and types of equipment) can cause congestion that trickles throughout the system. The Hudson Line has the greatest variety of types of users, and a delay in Albany can cause a train further south to miss its window, creating cascading delays that affect other operators.

Passenger rail service in Empire Corridor West is also frequently delayed as a result of the volume of freight and passenger service that shares the corridor's constrained infrastructure west of Albany-Rensselaer Station. While demand for service on the Empire Corridor has grown, the system is operating as a two-track system west of Schenectady, and is reduced to single-track on the more than 20-mile section between Hoffmans, west of Schenectady, and Albany. The single-track section requires that a train may have to wait at Schenectady Station or Albany-Rensselaer Station for up to 18 minutes if a train is traveling in the opposing direction.[5]

Deferred infrastructure maintenance has resulted in areas of speed restrictions that further reduce capacity, including the Livingston Avenue Bridge between Albany-Rensselaer and Schenectady Stations, where speed is presently restricted to 20 mph. There are several yards and industrial lead tracks that also contribute to congestion and negatively affect travel times and reliability for both freight and passenger rail services. Infrastructure constraints on the Empire Corridor have been extensively documented in a number of planning studies. Key findings

Exhibit 1-3—Livingston Avenue Bridge

[4]/ In 2011, the Port of New York and New Jersey had the third highest cargo volume in the United States, following the Port of Los Angeles, with the highest cargo volume; and the Port of Long Beach, with the second highest cargo volume.

[5]/ High Speed Rail Task Force. Final Report: Connecting New York's Future. January 2006.

are noted as follows:

- *Northeast Corridor Infrastructure Master Plan* (2010) identifies major challenges to the reliability and convenience of both existing and proposed intercity passenger rail service in the Empire Corridor between New York City and Schenectady.[6] Among the challenges identified are numerous chokepoints caused by obsolete or inadequate track and signal systems, which constrain capacity and speed. The Master Plan identifies the single-track sections of the segments between Albany and Schenectady as among the greatest points of conflict for intercity trains operating over the Empire Corridor. It indicates the need for a new Livingston Avenue Bridge and additional track and extended platform and yard facilities in the Albany-Rensselaer Station to alleviate current congestion and accommodate increased service. It also cites the need for improvements on freight-only infrastructure in this area to minimize conflicts between freight and intercity service. The Master Plan identifies capital investment programs by segment along the Empire Corridor from New York City to Schenectady to reduce or eliminate freight/passenger train conflicts, thus improving reliability and convenience of intercity passenger rail service. These improvements were based on specific projects identified in the *Hudson Line Railroad Corridor Transportation Plan* and the *New York State Rail Plan*.[7] The programs identified included the following segments:
    - Empire Connection Improvements
    - Hudson Line Commuter and Intercity Improvements
    - Empire Corridor Improvements
    - Albany-Rensselaer Station and Yard Capacity Improvements
    - Positive Train Control
    - Station Improvements

- The *Hudson Line Railroad Corridor Transportation Plan* (2005),[8] analyzes freight and passenger operations through 2020, and identifies infrastructure improvements to increase passenger train speeds to 125 mph. The plan analyzes the capacity of the system, identifies individual choke points, and cites specific improvements, such as track crossover switches, high-level platforms, and additional areas of track and yard capacity upgrades, to improve the flow of rail traffic.

- The New York State Senate High Speed Rail Task Force Action Program identifies the existing operational constraints on Empire Corridor West in its final report, *Connecting New York's Future* (2006): "*In the Albany to Buffalo Corridor, increasing freight traffic, greater distances and variable operating and track conditions are the major constraints. Over the long term, freight service and a quality passenger service cannot coexist on the same tracks at speeds over 90 mph. Empire Corridor service will not compete successfully with air travel for trips between Buffalo and New York City without a new dedicated passenger rail guideway*."[9]'

[6]/ The NEC Master Plan Working Group. *The Northeast Corridor Infrastructure Master Plan*. May 2010.

[7]/ NYSDOT. *New York State Rail Plan – Strategies for a New Age*. 2009.

[8]/ Systra Engineering. *Hudson Line Railroad Corridor Transportation Plan Final Report (Document No. M40801-11/9518/STU-137).* Prepared for New York State Department of Transportation, November 2005.

[9]/ High Speed Rail Task Force. *Final Report: Connecting New York's Future*. January 2006.

1.4.2. Accommodate Existing and Projected Demand

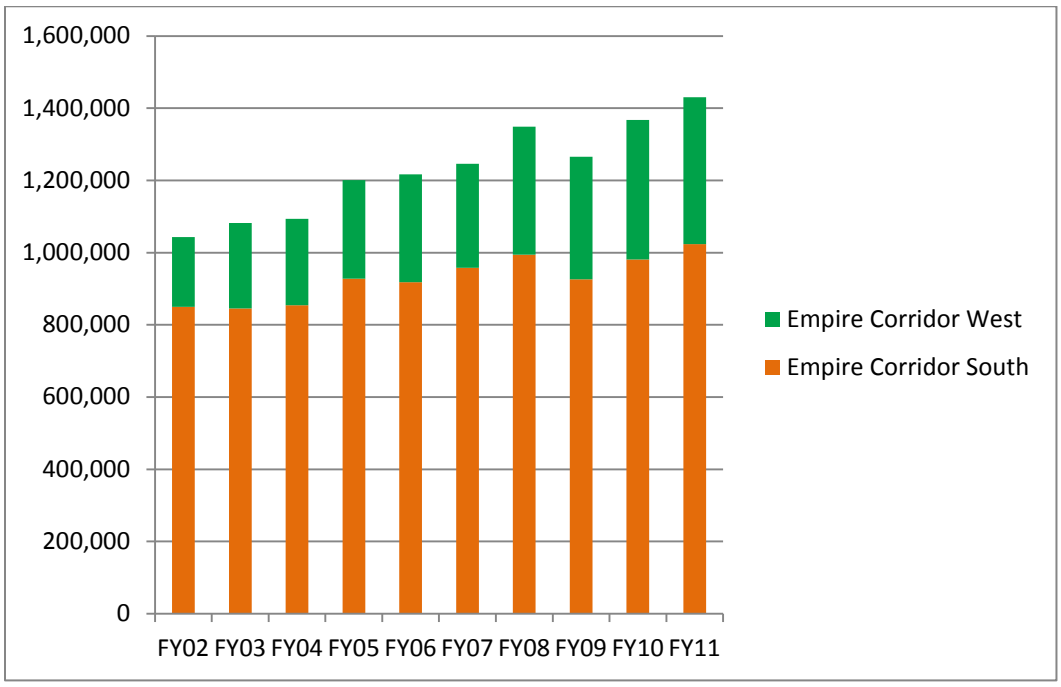
As shown in Exhibit 1-4, Empire Corridor ridership has steadily increased over the past ten years. Rail ridership was approximately 1.4 million person-trips in 2011.[10]

The *New York State Rail Plan* identifies the need to address capacity for projected increases in both the freight and passenger rail markets. The *New York State Rail Plan* notes: *"Amtrak is seeing some of its largest percentage ridership increases along the Buffalo-Albany rail corridor despite the level of freight-related delay. With high gas prices, ridership is expected to keep growing; this increase will create pressure for more reliable service and, eventually, more frequency of passenger trains. At the same time, CSXT is expecting increases in freight rail business."*[11]

The Vision for 2020 in the *New York State Rail Plan* calls for an intercity passenger rail system to transport double the ridership on the rail corridor between New York City and Albany, Albany and Buffalo, and between Albany and Montreal.

Studies forecast growth in both passenger and freight traffic. The *Hudson Line Rail Corridor Transportation Plan* (2005) anticipates that total rail traffic along the Hudson Line commuter rail line will increase by 28 percent by the year 2020.[12] The United States Department of

Exhibit 1-4—Empire Corridor Ridership FY02 to FY11



Source: Amtrak, 2011. Note that Amtrak's fiscal year operates from October 1 to September 30.

[10]/ 2009 is used as the base year for ridership analysis.

[11]/ NYSDOT. *New York State Rail Plan – Strategies for a New Age*. 2009.

[12]/ Systra Engineering. *Hudson Line Rail Corridor Transportation Plan Final Report (Document No. M40801-11/95 18/STU-137)*. Prepared for Amtrak, Canadian Pacific Railway, CSXT, MTA Metro-North Railroad, NYSDOT. November 2005.

Transportation (U.S. DOT) forecasts growth of rail freight traffic by 88 percent by 2035,[13] and cross border rail shipments are expected to triple by 2035.[14] A Niagara Frontier Urban Area Freight Transportation Study estimates a major increase in rail freight shipments, from 47 million tons in 2004 to 93 million tons by 2035.[15] The Association of American Railroads forecasts that freight traffic on the Empire Corridor will increase by 50 percent to 100 percent by 2035.[16] A study of rail freight traffic by the Greater Buffalo-Niagara Regional Transportation Council (GBNRTC) forecasts almost 100 percent (96.7%) growth in rail carload and intermodal traffic between 2004 and 2035.[17] The growth in cross-border rail traffic was estimated by the Niagara Frontier Urban Area Freight Transportation Study to be 183.2 percent between 2006 and 2035.[18]

1.5. Performance Objectives

NYSDOT identified performance objectives for the High Speed Rail Empire Corridor Program as measurable objectives that directly relate to the program purpose and need to reduce infrastructure constraints to accommodate existing and projected demand. These performance objectives include:

- Improve system-wide on-time performance (OTP) to at least 90 percent,
- Reduce travel time along all segments of the Empire Corridor,
- Increase the frequency of service (number of daily round trips) along Empire Corridor West beyond the existing four daily round trips,
- Attract additional passengers,
- Reduce automobile trips, thereby reducing highway congestion,
- Minimize interference with freight rail operations.

These six performance objectives are used to evaluate and rank the high-speed rail alternatives developed for the High Speed Rail Empire Corridor Program. The environmental impacts of these alternatives are also considered, as presented in this Tier 1 Draft EIS, and will be an important factor in selecting the alternative to be advanced.

1.6. Transportation-Related Goals

Broad-based transportation-related goals of the High Speed Rail Empire Corridor Program are described as follows.

[13]/ *U.S. DOT Freight Analysis Framework,* as cited by *New York State Rail Plan* (2009).

[14]/ *Niagara Frontier Urban Area Freight Transportation Study*, as cited by *New York State Rail Plan* (2009).

[15]/ Wilbur Smith Associates. Niagara Frontier Urban Area Freight Transportation Study Final Report, Project No. 06 Freight. Prepared for the GBNRTC, August 2010.

[16]/ Association of American Railroads. *National Rail Freight Infrastructure Capacity and Investment Study* (2007).

[17]/ GBNRTC. *2035 Long-Range Transportation Plan Update*. May 2010. Accessed September 27, 2011.

[18]/ Wilbur Smith Associates. *Niagara Frontier Urban Area Freight Transportation Study, Technical Memorandum No. 3: Freight Transportation Market Profiles, Project No6 Freight*. March 6, 2009.

- **Increase travel choices by providing additional commuting and travel options for residents and workers.** The program will provide increased intercity passenger rail access to major metropolitan areas and will provide additional commuting and other travel options for residents and workers. This improved transportation access will potentially boost both the number of jobs available and the ability of workers (particularly those without alternative means of transportation) to access work locations, thereby expanding available labor markets. The program's proposed rail passenger amenities, including improved station operations, accessibility, and parking, will help to attract additional passengers and will contribute toward expanding travel choices in the Empire Corridor. A U.S. Conference of Mayors' report indicates that the potential travel efficiency gains through high-speed rail can lead to business productivity increases: car and truck travelers will benefit from reduced road congestion; airport users will benefit from reduced airport congestion; and travelers without car access will benefit by traveling to places that were previously unavailable to them.[19] Providing options for travelers and connecting the major metropolitan areas will improve the quality of life for Empire Corridor residents and workers.
- **Contribute to economic revitalization by accommodating forecasted growth in population and employment and corridor rail freight operations.** New York City is the nation's largest economic center, and is one of the three largest economic centers in the world, along with London and Tokyo. Population growth, particularly growth in the New York metropolitan area, has brought corresponding growth in freight movement and commuter rail service levels. The U.S. Conference of Mayors' report projects that economic benefits of New York City to Albany high-speed rail service to the Albany metropolitan area alone would range from $358 million (with 79/90 mph service) to $523 million (with 110 mph service) in business sales for incremental-medium service, and would reach nearly $2.5 billion with 220 mph service.[20] Improving freight rail access in the corridor has national trade and economic implications as well, given the importance of the Buffalo and Niagara crossings, connections to the Port of New Jersey/New York and the Midwest, and freight movement on the line connecting to these markets.
- **Improve environmental quality by facilitating rail use and reducing reliance on automobile travel, thereby reducing fuel use and greenhouse gas (GHG) emissions.** Reducing reliance on automotive travel will provide benefits to air quality and will reduce greenhouse gas emissions. A 2006 study, *High Speed Rail and Greenhouse Gas Emissions,*[21] calculated emissions saved and generated through institution of high-speed rail nationwide. The net reduction in greenhouse gas emissions due to high-speed rail service along the Empire Corridor was estimated to be almost half of one billion pounds annually of carbon dioxide emission. Benefits would accrue from not only diverting passenger trips from other modes, but also by facilitating freight rail use and future growth in rail. For each one percent increase in long-haul freight that changes from truck to rail, fuel savings would be approximately 111 million gallons per year and annual greenhouse gas emissions would fall by 1.2 million tons.

[19]/ Economic Development Research Group, Inc. *The Economic Impact of High Speed Rail and Cities and their Metropolitan Areas.* Prepared by the U.S. Conference of Mayors (undated), released June 2010.
[20]/ Economic Development Research Group, Inc. *The Economic Impact of High Speed Rail and Cities and their Metropolitan Areas.* Prepared for the U.S. Conference of Mayors (undated), released June 2010.
[21]/ Center for Clean Air Policy, Center for Neighborhood Technology. *High Speed Rail and Greenhouse Gas Emissions.* January 2006. Accessed July 8, 2011. < http://www.cnt.org/repository/HighSpeedRailEmissions.pdf>

2. Existing Transportation Conditions and Major Markets

Section 2.1 presents an overview and route description of the existing Empire Corridor rail system. Section 2.2 describes the importance of the Empire Corridor to major markets, including the existing regional transportation market. Section 2.3 describes the linkages of the Empire Corridor to other rail routes. Sections 2.4 through 2.9 present the existing conditions of the Empire Corridor freight and passenger rail service relative to current rail operations, infrastructure, deficiencies, and safety considerations.

2.1. Empire Corridor Rail System

2.1.1. Railroad Ownership

Exhibit 2-1 illustrates track ownership on the Empire Corridor. Amtrak owns, maintains, and dispatches the southernmost 20 miles of track on Empire Corridor South (west side line of former New York Central Railroad), from Penn Station to the Spuyten Duyvil Bridge that spans the Harlem River at the northern tip of Manhattan. Metro-North leases the track[22] along the east side of the Hudson River, from the Spuyten Duyvil Bridge to Poughkeepsie, for its Hudson Line service with responsibility for maintenance and dispatching. With the exception of one short (6.8-mile) segment owned by Amtrak west of the Schenectady Station, located between the station and Hoffmans, CSXT is the owner of the Empire Corridor West rail infrastructure from Poughkeepsie to Niagara Falls. This CSXT corridor comprises the Hudson Subdivision (Poughkeepsie north to Albany-Rensselaer and west to Hoffmans); Selkirk Subdivision (Hoffmans to Amsterdam); Mohawk Subdivision (Amsterdam to Syracuse); Rochester Subdivision (Syracuse to Buffalo); Buffalo Terminal Subdivision in Buffalo; and Niagara Subdivision (Buffalo to Niagara Falls).

In 2012, NYSDOT facilitated a lease agreement between CSXT and Amtrak for portions of the Empire Corridor between Poughkeepsie, Albany-Rensselaer, and Hoffmans, NY. When combined with previous lease agreements for portions of the corridor within this 94-mile segment, Amtrak assumed full responsibility for dispatching and maintenance from the northern boundary of Metro-North control through Albany to Hoffmans, where CSXT's freight-only Selkirk Branch joins the Empire Corridor. The 2012 lease agreement marks the first time in the corridor's history that passenger-only carriers have controlled the entire Empire Corridor from New York to Albany and beyond. CSXT retains responsibility for the operation of freight trains within the territory leased by Amtrak as well as on the Metro-North Hudson Line. West of Hoffmans, CSXT remains responsible for maintenance and dispatching of the Empire Corridor.

North of the Buffalo Terminal Subdivision, CSXT owns the Niagara Subdivision as far as CP-28. In December 2012, Amtrak took over ownership, control, and maintenance of approximately 0.37 mile of former CSXT and Canadian National Railway track from immediately west of CP-28 to the U.S.-Canada international border on the Whirlpool Bridge. The Whirlpool Bridge, a railroad and vehicular passenger bridge located at the international border crossing, is owned and maintained by the Niagara Falls Bridge Commission.

[22] / Midtown TDR Ventures LLC (the company that now owns the assets of the former Penn Central Railroad) owns the right-of-way fee interest.

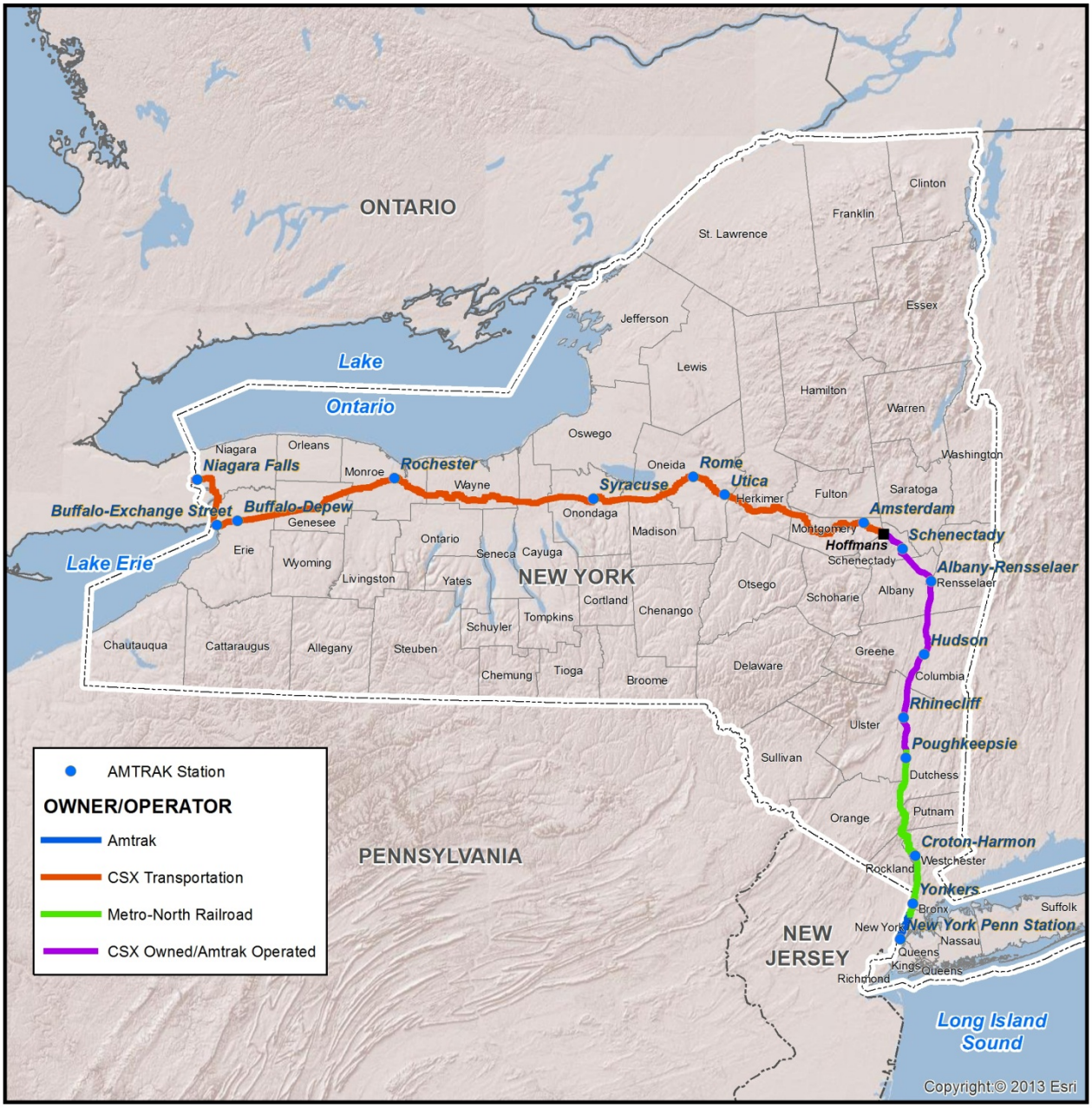


Exhibit 2-1—Empire Corridor Ownership

2.1.2. Route Description

Empire Corridor South (New York City to Albany)

Empire Corridor South extends 142 miles (Mileposts [MPs] 0 to 143[23]) north from Penn Station to

[23] / Mileposts referenced in this EIS are measured south to north using Hudson Line mileposts from Grand Central Terminal. Mileposts referenced extend north to Albany-Rennselaer, then east to west on Empire Corridor West. Although Empire Corridor South extends to

approximately one mile north of Albany-Rensselaer Station in Rensselaer County (refer to Exhibit 2-3). This route continues from Manhattan through the Bronx (Bronx County), Yonkers and Croton-Harmon (Westchester County), Poughkeepsie (Dutchess County), extending to approximately one mile north of Albany-Rensselaer Station (Rensselaer County). The line runs through the Hudson Valley (Westchester, Putnam, Dutchess, Columbia counties, passing close to Rockland, Orange, Ulster, and Greene counties on the opposite side of the Hudson River) north to the Capital District (which includes Rensselaer County).

Metropolitan Transportation Authority's (MTA's) Metro-North Railroad (Metro-North) operates Hudson Line commuter rail service (formerly Hudson River Line and New York Central Railroad) between Poughkeepsie and Grand Central Terminal (GCT) (MPs 0 to 73.5). Empire Corridor South consists of the Empire Connection and the Metro-North/CSXT Hudson Line. The Empire Connection runs from Penn Station, northward along the west side of Manhattan, across the Harlem Ship Canal at Spuyten Duyvil Bridge (refer to Exhibit 2-2), and then joins with Metro-North's Hudson Line, a distance of 10.8 miles.

The Hudson Line is double tracked north of the Croton-Harmon Station at Croton-on-Hudson (Milepost 33.2), with some three-track sections, and is mostly four tracks (two express and two local) and includes an electrified third rail to the south. The southern portion of the Hudson Line begins at interlocking Control Point (CP) 12 on the Hudson Line, where the Empire Connection from Penn Station joins Metro-North's Hudson Line from GCT. The length of the segment is 21.4 miles, ending at Croton-Harmon, MP 33.2.

Exhibit 2-2 - Spuyten Duyvil Bridge over Harlem River

Portions of the Hudson Line have 110 mph passenger train operation and limited freight activity (approximately four trains a day). The Empire Corridor South has a capability of accommodating the second highest rail car weight limit class (286,000 pounds) for freight. Metro-North operates between roughly 50 (weekend) and 77 (weekday) daily roundtrips along the Hudson Line, of which approximately half are express trains servicing Poughkeepsie and half are local trains to Croton-Harmon Station. Amtrak operates thirteen daily roundtrips (weekdays) along the Empire Corridor South between Albany-Rensselaer and New York City, with eleven daily roundtrips on the weekends. In addition to Empire Service to Buffalo and points beyond, this section of track also accommodates Amtrak service that extends north of Schenectady Station on the Canadian Pacific Railway to Montreal (Adirondack—one daily roundtrip) and Vermont (Ethan Allen Express—one daily roundtrip). There is also one daily connecting service from Albany-Rensselaer to Boston, Massachusetts.

With few exceptions, the tracks generally follow the east shoreline of the Hudson River. The northern portion of the Metro-North Hudson Line begins at MP 33.2 at Croton-Harmon Station and ends at MP 73.5 at Poughkeepsie Station. The under running third rail electrification ends at

MP 143, the mileage from Penn Station to MP 143 totals to 142 miles. This is because the mileposts, as designated by the railroads, skip a mile where the Hudson line merges with the Empire Corridor at the Manhattan-Bronx county line near the Spuyten Duyvil Station.

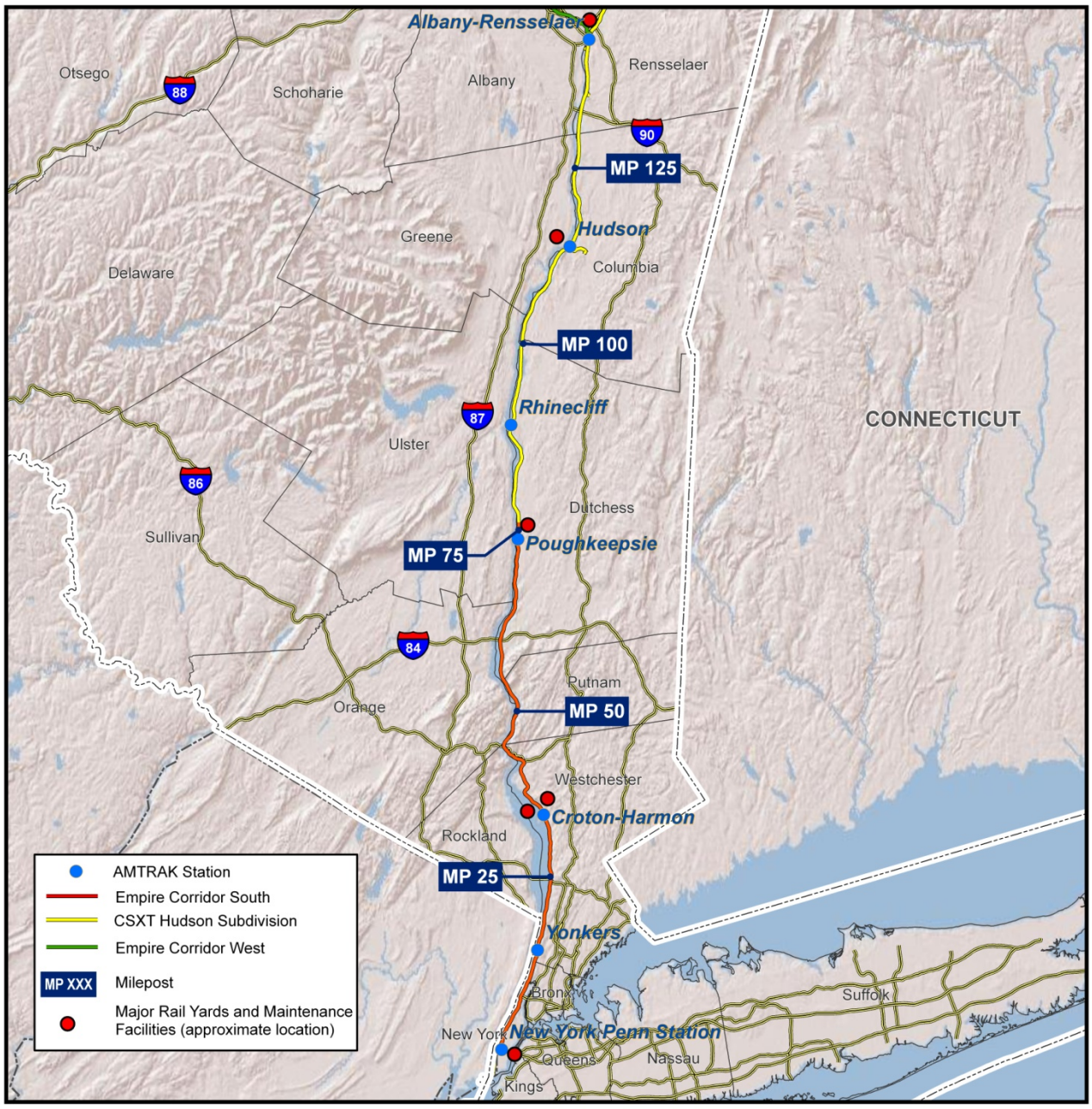


Exhibit 2-3—Empire Corridor South

Croton-Harmon Station and all trains north of that point are operated with conventional diesel electric locomotives. Parts of this segment have sharper curvature than do segments to the south. These curves limit maximum speed to 60 to 70 mph; otherwise, 80 mph is the predominant speed. The northern section above the Hudson Highlands, where the Hudson River and the railroad are significantly straighter, allows for 90 mph operation of passenger trains. Leaving Croton-Harmon Station to the north, Amtrak intercity trains stop only at Poughkeepsie.

The **CSXT Hudson Subdivision** south of Albany-Rensselaer begins at Poughkeepsie Station, MP 73.5, and ends at Albany-Rensselaer Station, MP 142.1. This segment has the highest maximum authorized speeds (MAS) on the Empire Corridor, with speeds of up to 110 mph. The higher speeds are, in large measure, due to generally following the Hudson River, which is comparatively straight relative to segments to the south. The higher speeds also reflect extensive investment by New York State since the 1970s.

Empire Corridor West (Albany to Buffalo)

Empire Corridor West extends 294 miles west (MPs 143 to 437) from approximately one mile north of Albany-Rensselaer Station to just east of the Buffalo-Exchange Street Station (refer to Exhibit 2-4). This section of track passes through the Mohawk Valley from the Capital District cities of Albany (Albany County) and Schenectady (Schenectady County), passing through the central-western New York cities of Utica (Oneida County), Syracuse (Onondaga County) and Rochester (Monroe County) in the Finger Lakes Region, and Buffalo (Erie County) on Lake Erie. Outside of these metropolitan areas, the railroad also passes through the more rural counties of Montgomery, Herkimer, Madison, Cayuga, Wayne, Monroe, and Genesee.

This section of track is a two-track line that is the busiest freight track in the state, carrying one of the highest volumes on the CSXT system nationwide. This is the only railroad crossing upstate/western New York that can accommodate the maximum freight rail car weight (315,000 pounds). The entire line west of Hoffmans (west of Schenectady) also has adequate clearance for double-stack intermodal trains. CSXT operates this as a high-volume railroad that is heavily used by 50 to 60 daily freight trains. The Albany to Hoffmans segment has very light freight traffic due to freight traffic diverting to Selkirk Yard to the south. The existing corridor includes a single-track segment between Albany and Schenectady, and speed restrictions/slow orders due to track conditions, such as the Livingston Avenue Bridge over the Hudson River, where speed is restricted to 20 mph. Current operating speeds of up to 79 miles per hour are permitted by the signal system for this shared use corridor, although actual speeds are considerably lower. Speeds are reduced to 30 mph through the downtown Buffalo area.

Amtrak operates a total of four daily roundtrips along the Empire Corridor West. Of these four trips, one daily service trip continues from Buffalo-Depew Station to Chicago (Lake Shore Limited). Amtrak operates three daily round trips to Niagara Falls (Empire Service), with one continuing on to Toronto (Maple Leaf Service).

CSXT's Hudson Subdivision extends west of Albany, a 27.6-mile-long segment beginning at Albany-Rensselaer Station, MP 142.1, and ending at Hoffmans, MP 169.7, near the border between Glenville and Amsterdam. The segment then joins CSXT's Selkirk Subdivision (the CSXT Chicago Line). At this junction, CSXT's major freight route between Chicago and the New York /New England area enters the Empire Corridor.

Leaving Albany-Rensselaer Station, the Empire Corridor curves sharply west to cross the Hudson River on the Livingston Avenue drawbridge, MP 142.9. The line then skirts the northern edge of downtown Albany, and begins the steepest grade on the Empire Corridor, Albany Hill. The grade reaches a maximum of approximately 1.6 percent for about 1.7 miles, climbing from about 30 feet above sea level at the Hudson River to about 200 feet above sea level.

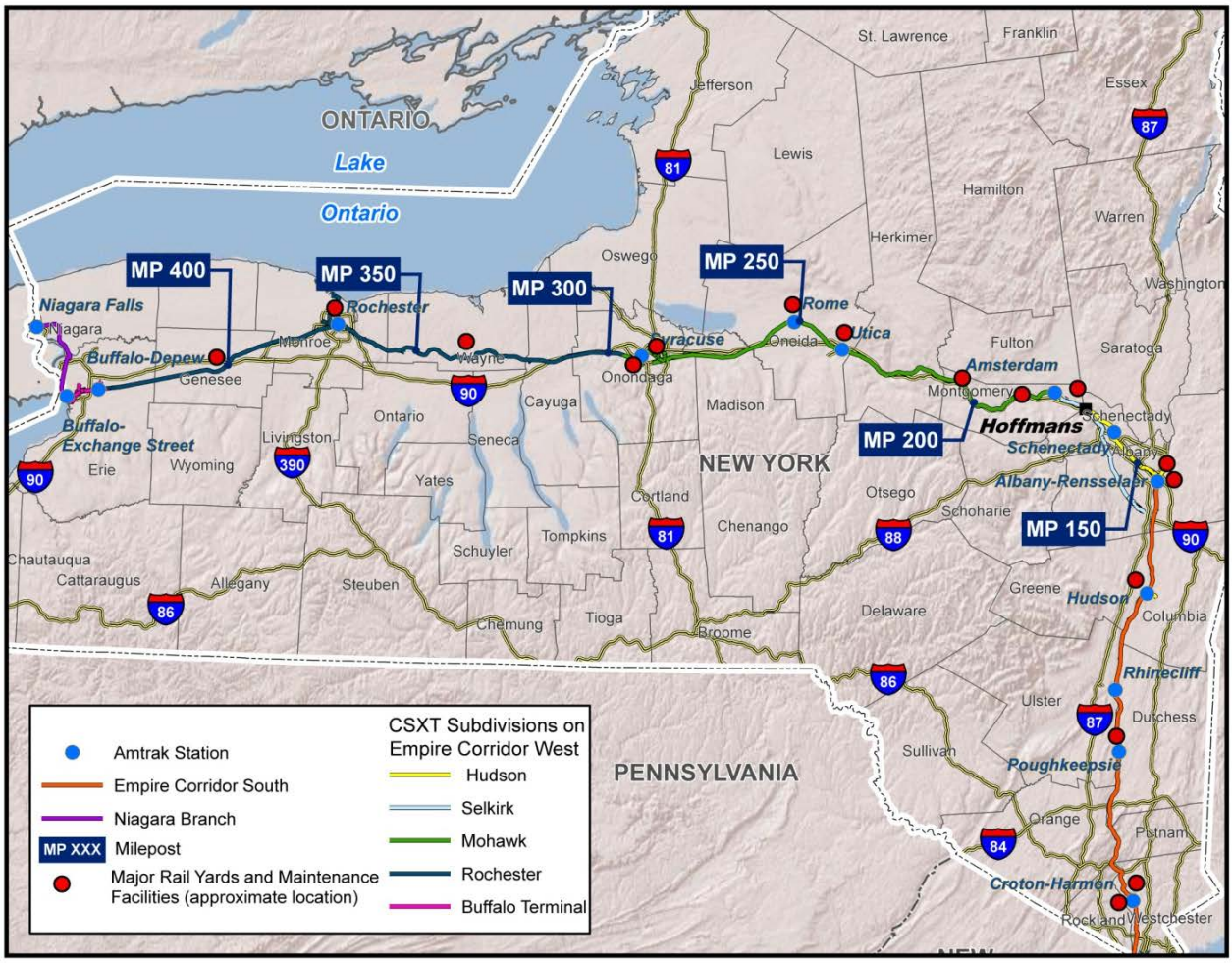


Exhibit 2-4—Empire Corridor West

The segment then passes through Colonie and approaches the outskirts of Schenectady. CSXT's Carman Branch (freight only) begins at MP 156.5 (CP 156), which then diverges and crosses over the Empire Corridor on a bridge.

Leaving Schenectady Station, the Empire Corridor curves west and crosses the Mohawk River on a 725-foot-long double-track bridge. The line skirts the northern edge of Scotia and, at MP 168.3, passes under CSXT's Selkirk Subdivision, which curves west after the bridge to parallel the Empire Corridor between the Mohawk River to the south and the Selkirk Division to the north. The Empire Corridor joins CSXT's Selkirk Subdivision at CP 169 (Hoffmans).

The **CSXT Selkirk and Mohawk Subdivisions** extend 127.1 miles from Hoffmans, MP 169.7, to the end of CSXT's Mohawk Subdivision, west of Syracuse at MP 296.8. Empire Corridor West includes all of the Mohawk Subdivision and a short section of the westerly end of the Selkirk Subdivision. The Selkirk/Mohawk Subdivision dividing line is located at MP 175.5 (CP 175 in Amsterdam), 5.8 miles west of Hoffmans.

The eastern half of this segment closely follows the Mohawk River to Herkimer, where the river turns north to drain part of the Adirondack highlands, resulting in a number of curves that reduces maximum operating speed. West of Herkimer, the railroad follows the New York State Barge Canal. The landscape becomes less hilly approaching Utica and on to Syracuse. The Mohawk Subdivision ends, and the Rochester Subdivision begins, at MP 296.8, about five miles west of Syracuse Station.

The **CSXT Rochester Subdivision** extends 133 miles from the boundary with the Mohawk Subdivisions, west of Syracuse, east to the **Buffalo Terminal Subdivision** at MP 429.8. The short, 7.9-mile Buffalo Terminal Subdivision extends to MP 437.7, at which point the Niagara Subdivision diverges north.

Leaving Syracuse, the railroad alignment heads almost due west, following a broad, level valley generally drained by the Seneca River. This section has minimal curvature and supports a 79 mph maximum speed for passenger trains. Approaching Savannah, the alignment crosses the Erie Canal at MP 319.30, and the extensive Montezuma Marsh, a wide floodplain of the now narrow Seneca River. Due to continual differential settlement of the bridge structure at this site, all trains are limited to 40 mph.

Approaching Clyde at MP 328, the railroad encounters a region of hills. With the alignment designed to avoid some of the pronounced ridges, maximum passenger train speed is reduced to as low as 55 mph at Lock Berlin Curve,[24] MP 332.6, to 334.0. Not until Walworth, at MP 361, is sustained 79 mph passenger train operation possible, for 7.5 miles to the eastern approaches to Rochester.

Similar to the segment through Syracuse, but shorter in overall length, the rail segment through Rochester features significant freight activity, complex track work, junctions, and reduced speeds (as low as 45 mph for passenger trains). West of Rochester at MP 372.2, the railroad encounters little topographical resistance to an almost straight alignment allowing 79 mph passenger train operation into Buffalo. Speeds are reduced to 30 mph through the downtown Buffalo area.

Niagara Branch (Buffalo to Niagara Falls)

The Niagara Branch extends 27 miles west from MP 437.2 (CP 437), located just east of Buffalo-Exchange Street Station, and proceeds generally north to Niagara Falls (refer to Exhibit 2-5). This section of track passes through Erie and Niagara Counties.

The Niagara Branch is primarily a passenger railroad; since there is a freight bypass route used by CSXT that provides modern clearances for freight service to Niagara Falls (refer to Section 2.5). Maximum passenger speeds over this single- and double-track (formerly all double-tracked), shared use corridor range from 40 to 60 mph. Impediments to freight movements include a tunnel with a vertical clearance slightly more than 16 feet, which is inadequate for a number of modern railcars, including double stack containers. The northernmost section of track, owned by Canadian National Railway, crosses into Niagara Falls, Canada at the Whirlpool Bridge. The Whirlpool Bridge accommodates the railroad on the upper level and carries highway traffic on the lower level. This

[24] / Lock Berlin Curve is actually two curves; a reverse curve with some tangent between them. The initial curve outlines an almost a ninety degree angle.

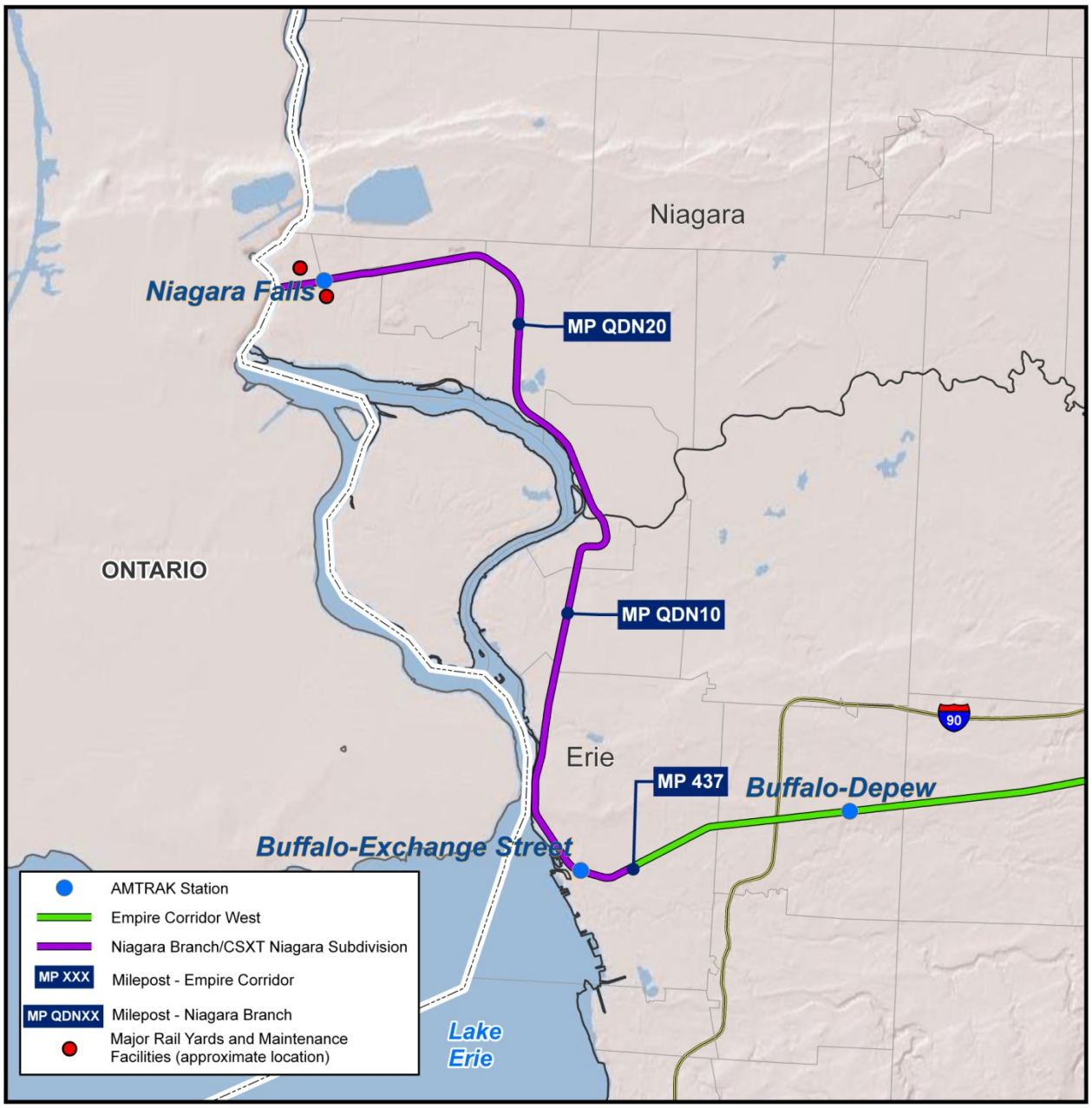


Exhibit 2-5—Niagara Branch

bridge is used only for the Maple Leaf service to Toronto, Canada operated by Amtrak and VIA rail (one daily roundtrip or two passenger trains a day), and future plans are to abandon freight use and maintain passenger rail service.

CP 437 is the dividing point of CSXT's Buffalo Terminal Subdivision, the Niagara Subdivision, the Lake Shore Subdivision and the Belt Subdivision. CSXT's Belt Subdivision joins from the north and provides a high clearance bypass of downtown Buffalo. The Niagara Branch continues straight toward the shore of Lake Erie, curving to the right and continuing 1.9 miles to the Amtrak Exchange

Street Station, which is very close to Buffalo's main business district.

The **CSXT Niagara Subdivision** extends 26.2 miles from a junction of several freight routes in Buffalo, proceeds generally north, through Tonawanda, North Tonawanda to Niagara Falls. Leaving Exchange Street, the Niagara Branch closely parallels Route I-190 along the Niagara River. The right-of-way (ROW) passes through a short tunnel under overhead roadways and is generally confined by many ramps, parallel roadways and I-190 itself. Six miles from its beginning, the track exits the confines of parallel highways at the I-190 and the Scajaquada Expressway (Route 198) interchange. At this location, the Niagara Branch passes junctions with the freight-only Belt Subdivision; most freight trains destined for Niagara Falls rejoin the Empire Corridor at this location.

The Tuscarora Wye connects with the Niagara Branch 4.2 miles south of Niagara Falls. Northbound Amtrak trains terminating in Niagara Falls access the wye to pull forward, then reverse (using the other leg of the wye) to back into Niagara Falls Station. This allows the terminating Amtrak trains to be "turned" without the expense of a yard crew. Southbound Amtrak trains do not use the Tuscarora Wye.

2.2. Major Markets Served by the Empire Corridor

2.2.1. Characteristics of the Major Markets

The Empire Corridor runs through the population and economic spine of New York State, connecting all of its metropolitan areas. Eighty percent of New York State's 19.4 million residents live within 30 miles of the Empire Corridor. According to the 2010 U.S. Census, New York's six largest metropolitan areas (in order, New York City, Buffalo, Rochester, Yonkers, Syracuse, Albany) are located along this corridor. The Empire Corridor includes nine of the top twelve most populous cities (Schenectady, 9th largest city; Utica, 10th largest city; and Niagara Falls, 12th largest city). The convenience of efficient rail travel will contribute to the accessibility of these communities, enhancing their economic and cultural vitality and supporting local and regional economic development efforts.

The total population of the metropolitan statistical areas (MSAs) defined around the eight major cities along the route, which extend out of state and into New Jersey and Pennsylvania, exceeds the state population. The following is a description of the eight MSAs along the route, served by nine Metropolitan Planning Organizations (MPOs).

- **New York-Northern New Jersey-Long Island, NY-NJ-PA MSA**, served by the **New York Metropolitan Transportation Council (NYMTC)** and the **Orange County Transportation Council (OCTC)**. NYMTC is the state-designated MPO for New York City, Long Island and the lower Hudson Valley and is comprised of the following ten counties: New York City, Kings, Bronx, Richmond, Queens, Nassau, Suffolk, Putnam, Rockland, and Westchester. Adjacent to the northwest corner of the NYMTC region, OCTC is the MPO for Orange County.
- **Poughkeepsie-Newburgh-Middletown, NY MSA**, served by the **Poughkeepsie-Dutchess County Transportation Council (PDCTC)**. Bordering the northeast edge of the NYMTC region, PDCTC is composed of Dutchess County.
- **Kingston, NY MSA**, served by the **Ulster County Transportation Council (UCTC)**. UCTC is the

designated MPO for Ulster County.

- **Albany-Schenectady-Troy, NY MSA**, served by the **Capital District Transportation Committee (CDTC)**. CDTC is the designated MPO for the Albany-Schenectady-Troy metropolitan area and is responsible for Albany County, Rensselaer County, Schenectady County, and Saratoga County.
- **Utica-Rome, NY MSA**, served by the **Herkimer-Oneida Counties Transportation Study (HOCTS)**. HOCTS is responsible for the transportation planning in Herkimer and Oneida Counties.
- **Syracuse, NY MSA**, served by the **Syracuse Metropolitan Transportation Council (SMTC)**. SMTC is the state-designated MPO for Onondaga County and small portions of Madison and Oswego Counties.
- **Rochester, NY MSA**, served by the **Genesee Transportation Council (GTC)**. GTC is the MPO responsible for the transportation planning of the Genesee-Finger Lakes Region which includes the following nine counties: Genesee, Livingston, Monroe, Ontario, Orleans, Seneca, Wayne, Wyoming and Yates Counties.
- **Buffalo-Niagara Falls, NY MSA**, served by the **Greater Buffalo-Niagara Regional Transportation Council (GBNRTC)**. GBNRTC is **t**he MPO for Niagara and Erie Counties.

The southern terminus of the Empire Corridor, the New York City metropolitan area, is the nation's largest MSA with an estimated population of just under 19 million. New York City's labor market totaled 4,722,352 in 2009, comprising 43.2 percent of New York State's employment. In 2009, the gross metropolitan product of the New York metropolitan area (New York-Northern New Jersey-Long Island, New York-New Jersey-Pennsylvania MSA) was $1.210 trillion, larger than the combined gross domestic product of Pennsylvania and New Jersey, and larger than all but one state (California).[25]

The nine MPOs along the route account for 88 percent of the state's total population and approximately 89 percent of the state's total employment, and are expected to form the bulk of the high-speed rail ridership market. The population of the nine MPOs is forecast to increase to 19,403,664 by 2035, surpassing the 2010 state population of 19,378,102. The employment for these MPOs is expected to increase 21 percent by 2035, to 11,847,283, thereby continuing to constitute roughly 89 percent of the state's total 2035 projected employment of 13,286,923. Both population and employment are projected to increase through 2035 in Empire Corridor South. In Empire Corridor West, employment is expected to increase through 2035; a slight population decrease in many of the counties, however, is anticipated through 2035.[26]

Exhibit 2-6 and Exhibit 2-7 present the existing and projected population and employment forecasts for the nine MPOs along the corridor compared to statistics for the entire state.

[25]/ Economic Development Research Group, Inc. *The Economic Impact of High Speed Rail and Cities and their Metropolitan Areas.* Prepared for the U.S. Conference of Mayors (undated), released June 2010

[26]/ U.S. Census, 2010 was the source for county population. U.S. Bureau of Economic Analysis was the source for 2009 employment, for all MPOs except for the Syracuse Metropolitan Transportation Council. Woods and Poole Economics, Inc. was used for 2035 county population and employment forecasts.

Exhibit 2-6—Existing and Projected Population for Metropolitan Areas along Empire Corridor

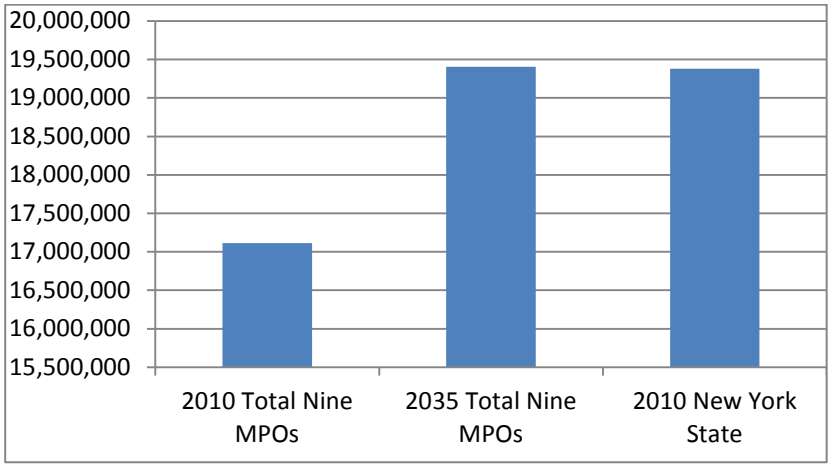
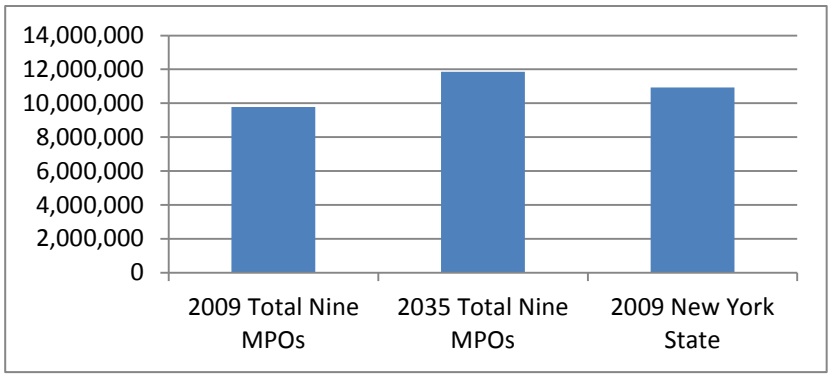


Exhibit 2-7—Existing and Projected Employment for Metropolitan Areas along Empire Corridor



The regional population and employment projections for the Empire Corridor indicate a strong population and employment base, and a correspondingly strong high-speed rail travel market. These projections do not account for major new infrastructure investments, such as improvements to high-speed rail service described in Chapter 3, which could potentially change the population and employment outlook. For example, according to a U.S. Conference of Mayor's Report, which examined the impact of high-speed rail upon the City of Albany, the introduction of high-speed rail along the corridor can contribute substantially to economic growth by driving higher-density, mixed-use development at train stations; expanding visitor markets and generating additional spending; broadening regional labor markets; and supporting the growth of technology clusters.[27]

The Buffalo-Niagara region is an important gateway for international trade. According to the U.S. Bureau of Transportation Statistics, the Buffalo-Niagara region was the third busiest international

[27] / Economic Development Research Group, Inc. *The Economic Impact of High Speed Rail and Cities and their Metropolitan Areas.* Prepared for the U.S. Conference of Mayors (undated), released June 2010.

trade crossing by land in the nation in 2000, behind Texas and Michigan.[28] Of the four international highway bridges located along the Niagara River, only two are used for commercial traffic, and only two of the three rail bridges across the river currently carry trains. According to the New York State Rail Plan (2009), the Buffalo and Niagara crossings into Canada (including highway freight) accounted for 60 percent of imports from Canada through the New York State border crossings (worth an estimated $37.9 billion) and 73.4 percent of U.S. exports (worth an estimated $32.5 billion) in 2005. Of this, rail accounted for 16.6 percent (or $6.3 billion) of imports and 4.7 percent (or $1.5 billion) of exports through the Buffalo and Niagara crossings.[29] A Greater Buffalo-Niagara Regional Transportation Council study of freight estimated that in 2006, $7.1 billion (or 5.1 million tons) of Canadian imports traveled via rail through the Port of Buffalo-Niagara Falls into the U.S., and $1.8 billion of goods were exported in the same year.[30] Approximately one-fourth of the international trade with Canada occurs at the highway border crossings located along the Niagara River. In 2010, the Port of Buffalo-Niagara Falls had the third highest ranking for trade value of rail crossing ports into Canada in the U.S., accounting for $7.2 billion of imports and $2.8 billion of exports.[31]

2.2.2. Transportation Market Study

Cities along the Empire Corridor are serviced by four primary modes of transportation: auto, bus, air, and rail. Exhibit 2-8 shows the relationship of rail stations with bus and airport locations on the Empire Corridor. Section 2.2.2 presents an overview of the alternative transportation modes along the Empire Corridor. It also summarizes the findings of the ridership and revenue market forecast study conducted for this Tier 1 EIS. The study consisted of a comprehensive market and ridership demand assessment to evaluate potential 2035 ridership as a function of travel time by city pair, level of service, reliability, and projected fare structure. Appendix B presents the *Ridership and Revenue Market Forecast for Empire Corridor High Speed Intercity Passenger Rail Tier 1 EIS* (Ridership and Revenue Forecast Study).

Totaling all of the travel corridor origin and destination pairs accessible by train or alternative travel mode, there is a total single passenger, one way trip market of 219.3 million, as shown in Exhibit 2-9. Six cities along the corridor, New York City, Albany, Utica, Syracuse, Rochester, and Buffalo, constitute the 15 major travel markets for Empire Corridor high-speed rail service.[32] As shown on Exhibit 2-10, nearly 20 percent of this ridership, approximately 36.8 million, is accounted for among 15 origin and destination city pairs (or major market pairs) present on the Empire Corridor accessible by train or an alternative travel mode. This 36.8 million person ridership is the total market in which rail competes and from which an improved Empire Corridor rail service could draw additional passengers.

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[28]/ U.S. Bureau of Transportation Statistics, North American Transborder Freight Data, "Top 104 Ports/Districts by Trade Value (U.S. Dollars) (Ranked by Total Trade) for U.S.-Canada Partner Trade by Rail: Buffalo-Niagara Falls, New York." Accessed October 12, 2011.

[29]/ NYSDOT. *New York State Rail Plan – Strategies for a New Age.* 2009.

[30]/ Wilbur Smith Associates. *Niagara Frontier Urban Area Freight Transportation Study, Technical Memorandum No. 5: Economic Impact Analysis, Project No. 06 Freight*. Prepared for the GBNRTC , Updated June 2010.

[31]/ U.S. Bureau of Transportation Statistics, North American Transborder Freight Data, "Top 104 Ports/Districts by Trade Value (U.S. Dollars) (Ranked by Total Trade) for U.S.-Canada Partner Trade by Rail: Buffalo-Niagara Falls, New York." Accessed October 12, 2011. **<http://www.bts.gov/programs/international/transborder/TBDR_QuickSearch.html>**

[32]/ The 15 major travel markets are: New York City (NYC)-Albany; NYC-Utica, NYC-Syracuse, NYC-Rochester, NYC-Buffalo; Albany-Utica; Albany-Syracuse; Albany-Rochester; Albany-Buffalo; Utica-Syracuse; Utica-Rochester; Utica-Buffalo; Syracuse-Rochester; Syracuse-Buffalo, Rochester-Buffalo.

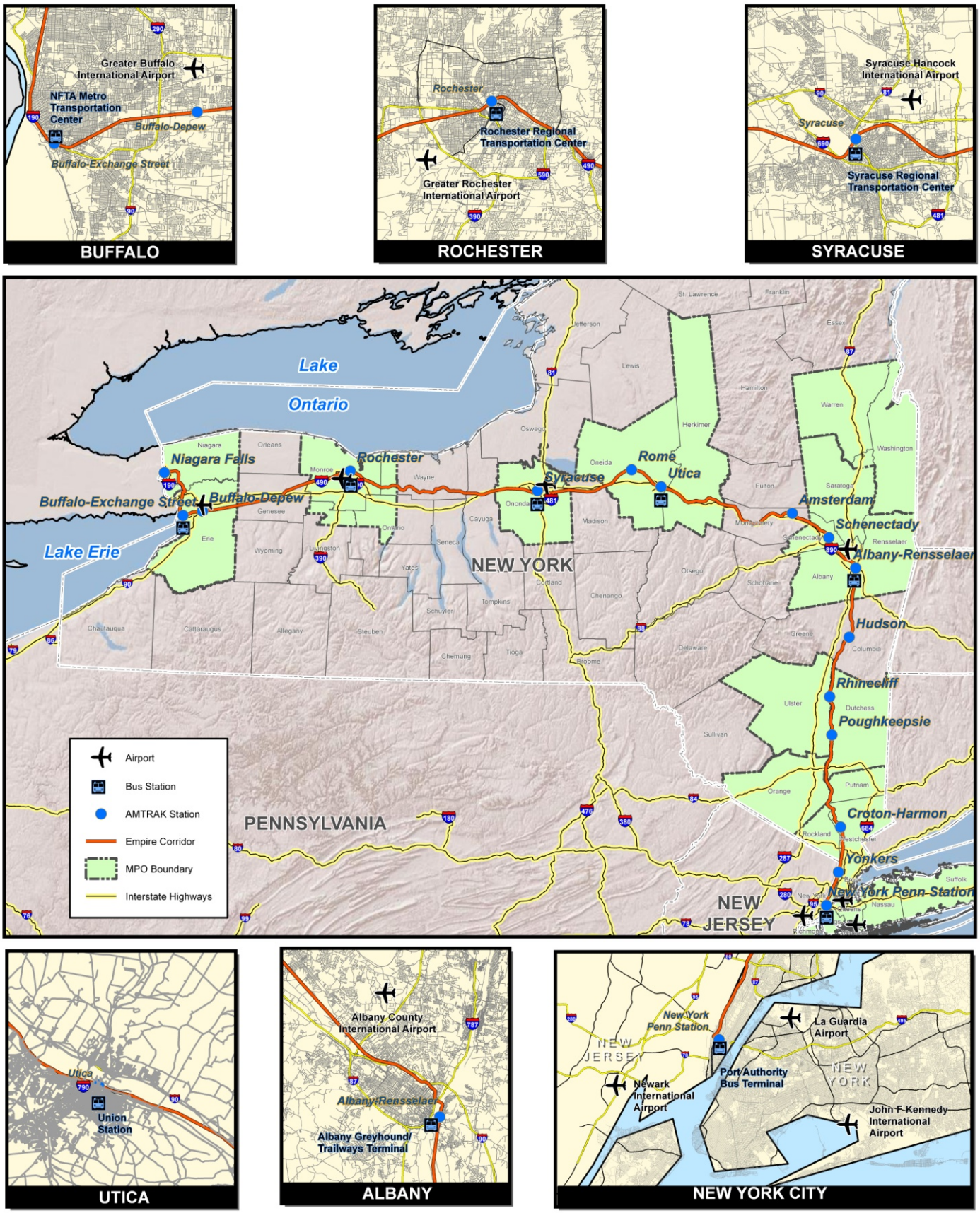

Exhibit 2-8—Empire Corridor Station, Bus and Airport Locations

Exhibit 2-9—Total Single Person Trips per Mode, Entire Corridor, 2009

Auto	210,977,488	96.2
Rail	1,298,706	0.6
Bus	4,593,637	2.1
Air	2,411,033	1.1
Total	219,280,865	100.0

Source: Adirondack Trailways, Amtrak, Bureau of Transportation Statistics, Greyhound, Megabus, Coast USA, NYSDOT, New York State Thruway Authority

Exhibit 2-10—Total Single Person Trips per Mode by Major Markets, 2009

Auto	28,973,182	79
Rail	932,801	3
Bus	4,591,545	12
Air	2,337,800	6
Total	36,835,328	100

Source: Adirondack Trailways, Amtrak, Bureau of Transportation Statistics, Greyhound, Megabus, Coast USA, NYSDOT, New York State Thruway Authority

Automobile Ridership

The primary vehicular corridor running along the Empire Corridor can be broken down into three major segments, all of which are part of the New York State Thruway system: Interstate 87 north from New York City to Albany, approximately 160 miles; Interstate 90 west from Albany to Buffalo, approximately 293 miles; and Interstate 190 from Buffalo to Niagara Falls, approximately 21 miles.

As shown in Exhibit 2-9, more than 96 percent of total Empire Corridor area trips, or approximately 211 million single person trips, are made by auto. For travel between the six major cities (the 15 major market pairs) currently served by rail (or the Thruway exits most closely associated with Amtrak rail stations), the potential auto travel market, with which enhanced rail ridership services would compete, is approximately 29 million trips, or 79 percent of the total potential travel market between the major market cities in 2009.

Given the current modest levels of congestion on most parts of the corridor, auto-travel is the second fastest form of travel under existing conditions for most parts of the corridor, when compared to other modes. Other than air, which does not serve all markets on the corridor, auto has an advantage in travel time in the Empire Corridor versus current bus and rail service. Users are able to leave their origin and arrive at their destination without the transfer of modes required of public transit users who must select a secondary transport mode before arrival to and departure from origin and destination transit facilities.

Key characteristics associated with automobile selection as the preferred mode of travel are travel time and cost, with travel time a product of congestion and distance between origin and destination and an assumed average speed. Automobile travel is relatively inelastic; that is, automobile drivers do not typically switch to public transit without significant gains in travel time or reductions in cost.

Bus Service

Nonstop bus service exists between all the major cities along the corridor, and is provided by three major carriers: Adirondack Trailways (which also includes Pine Hill Trailways and New York Trailways), Greyhound, and Megabus. Adirondack Trailways is the predominant carrier, followed by Greyhound.

Key characteristics associated with bus selection as the preferred mode of travel include frequency of service, fare price, and travel time.[33] Bus travel is the second most popular mode of travel. In 2009, there were nearly 4.6 million bus passenger trips in the Empire Corridor. Bus comprises 2 percent of the travel market of all travel destinations along the entire corridor, and carries 12 percent of all trips between major city pairs located along the corridor (refer to Exhibit 2-9 and Exhibit 2-10). Bus travel is more dominant than rail in terms of ridership, due to the combination of slightly lower fares, better travel time and more regular and reliable service.

Regional express bus service has been a growing mode of travel throughout the Northeast. Current bus service providers in the Empire Corridor offer lower travel costs than those offered by previous bus services or competing Amtrak service. In recent years, bus carriers such as Greyhound and Megabus have focused on providing improved service tailored to business and student markets. This focus by bus carriers will challenge the ability of rail to capture this important "choice rider" category, which seeks not only value but quality as a substitute to automobile travel. Bus service is expected to continue to compete heavily with rail, and may capture a portion of rail's share of the transit market in the corridor if no improvements to rail service are made.

Air Service

The Empire Corridor is served by the following ten commercial service airports: Niagara Falls International, Buffalo-Niagara International, Greater Rochester International, Syracuse-Hancock International, Albany International, Stewart International, Westchester County, LaGuardia, John F. Kennedy (JFK) International, and Newark Liberty International in Newark, NJ. Direct air service is provided to Syracuse, Rochester and Buffalo from the New York metropolitan area by US Airways (LaGuardia), Delta (JFK International), JetBlue (JFK International), and United (Newark Liberty International). All of these airlines, except for JetBlue, also provide direct service to Albany from New York.

Air travel is the third most frequented travel mode along the Empire Corridor, as well as the most expensive form of travel, compared to other modes. In 2009, air travel comprised approximately 1 percent of all trips along the entire corridor (refer to Exhibit 2-9), for a total of approximately 2.4 million trips, and approximately 6 percent of all trips among the six major market areas (refer to Exhibit 2-10), for a total of approximately 2.3 million trips.

[33] / While on-time performance is a key additional characteristic of bus service, these data were not available to access through the private carriers.

Comparative Major Market Travel Market

Automobile travel is the primary mode of travel along the Empire Corridor, and rail ridership has the lowest market share of trips (0.6 percent) compared to other available modes of transportation.

Of the total Empire Corridor major market rail trips in 2009, the most frequented origin and destination city was New York City, with approximately 423,000 trips (refer to Exhibit 2-11). By far, rail's most frequently-traveled city pair in 2009 was New York City-Albany, with approximately 320,000 trips. Capturing only 11 percent of this market, however, rail was the third most popular mode of travel between New York and Albany, exceeding only air. Travel time and cost do not make air travel competitive between New York and Albany. Similarly, rail was not competitive with air travel between New York City and Buffalo, capturing less than 3 percent of the travel market of this city pair, whereas air captured approximately 50 percent of the city pair's travel market in 2009. With 42 percent of the New York City-Buffalo market, bus detracts from rail, when cost, frequency, and reliability, and not time, are the travel priorities.

Exhibit 2-11—Empire Corridor Comparative Travel Market: New York City to Major Markets, 2009

	Albany		Utica		Syracuse		Rochester		Buffalo	
	Total	%	Total	%	Total	%	Total	%	Total	%
Auto	2,019,534	71	134,243	41	3,584	1	25,380	5	45,129	5
Rail	320,155	11	19,858	6	29,787	5	23,427	4	29,881	3
Bus	405,460	14	176,212	53	266,885	47	217,272	38	427,700	42
Air	99,443	4	*	*	262,706	47	298,825	53	507,489	50
Total	2,844,592	100	330,313	100	562,962	100	564,904	100	1,010,199	100

Notes: 1. percentages are approximate and have been rounded. 2. *service not available

Sources: Amtrak, Google, Orbitz, Expedia, Megabus, Greyhound, Adirondack Trailways.

Findings of the Ridership and Revenue Forecast Study

The Empire Corridor is overwhelmingly auto dominated and any small shift from the auto market (in terms of percentage) can bolster the growth of other travel modes. Analysis through 2035 indicates growth in all modes of travel and in the total travel market. An assessment of existing transit services in the Empire Corridor indicates that there is an opportunity for high-speed rail, with an increased service frequency and improved OTP, to capture some of the travel market currently dominated by other modes. The following is a summary of findings of existing transportation modes along the Empire Corridor, and the ability of high-speed rail to capture future ridership. The Ridership and Revenue Forecasting Study (Appendix B) provides detailed findings.

- Every transportation mode is at a disadvantage to auto for travel between Albany and New York City, due to transit linkages, wait time factors, and the need to follow a predetermined schedule. If schedules are convenient and service is reliable, however, rail can be seen as a

competitive travel mode between Albany and New York City from both a cost and convenience standpoint.

- Intercity bus service is expected to continue to compete heavily with rail service. Enhanced service and speed, along with a competitive price from rail, would likely reduce the dominance of bus service on the Empire Corridor.
- An improved high-speed rail, with favorable fares and more competitive travel times and schedule frequency, could be competitive with air travel. Air travel is by far the most expensive form of travel in the Empire Corridor. With trips of shorter distances along the corridor, air travel is inefficient with regard to cost and total travel time. Furthermore, out of the 15 city pairs located within the Empire Corridor, air service is available for only 4 city pairs.
- The bulk of rail ridership would come from longer trips on the corridor; namely from New York City to Syracuse, Rochester, and Buffalo. Currently, auto represents a small amount of the total trips between New York City and the major markets on Empire Corridor West. Rail could draw about half of its forecasted growth in ridership from the air market and approximately 25 percent from bus and auto trips.

In sum, the Ridership and Revenue Forecasting Study indicates that an improved rail service, in terms of improved travel time, frequency of service, and reliability, could capture a significant portion of the air and bus travel markets and some portion of the auto travel market in the Empire Corridor, particularly between New York City and cities in Empire Corridor West. Chapter 3 includes the ridership forecasts for the program alternatives.

2.3. Other Existing Rail Routes

Section 2.3 presents an overview of the additional rail routes in the vicinity of and/or adjoining the Empire Corridor, to provide an understanding of the corridor's linkages to the statewide and regional rail system. Exhibit 2-12 presents additional and adjoining rail corridors.

2.3.1. Additional Rail Routes

The CSXT River Line (also known historically as the West Shore Railroad route) is a single-track freight line that extends along the west side of the Hudson River from New Jersey to Selkirk Yard, south of Albany. The River Line is not a viable alternative to the Empire Corridor, because it is operating at capacity with significant freight volumes, does not provide access to Albany-Rensselaer Station and does not offer a direct connection to Manhattan.

The Southern Tier Route that connects Hoboken, New Jersey with Binghamton, Elmira and Buffalo formerly provided a more direct passenger train route (404 miles) between the New York metropolitan area and Buffalo than the Empire Corridor, but did not serve population centers in Albany, Syracuse, and Rochester. Relatively frequent passenger train service (three round trips per day) existed until the 1960s, but did not continue after the beginning of Amtrak in 1971. New York State has funded investments in the Southern Tier freight service in recent decades and the track remains active, although owned by several different railroads. The Southern Tier Route is not a viable alternative to the Empire Corridor, because it bypasses most of the state population centers.

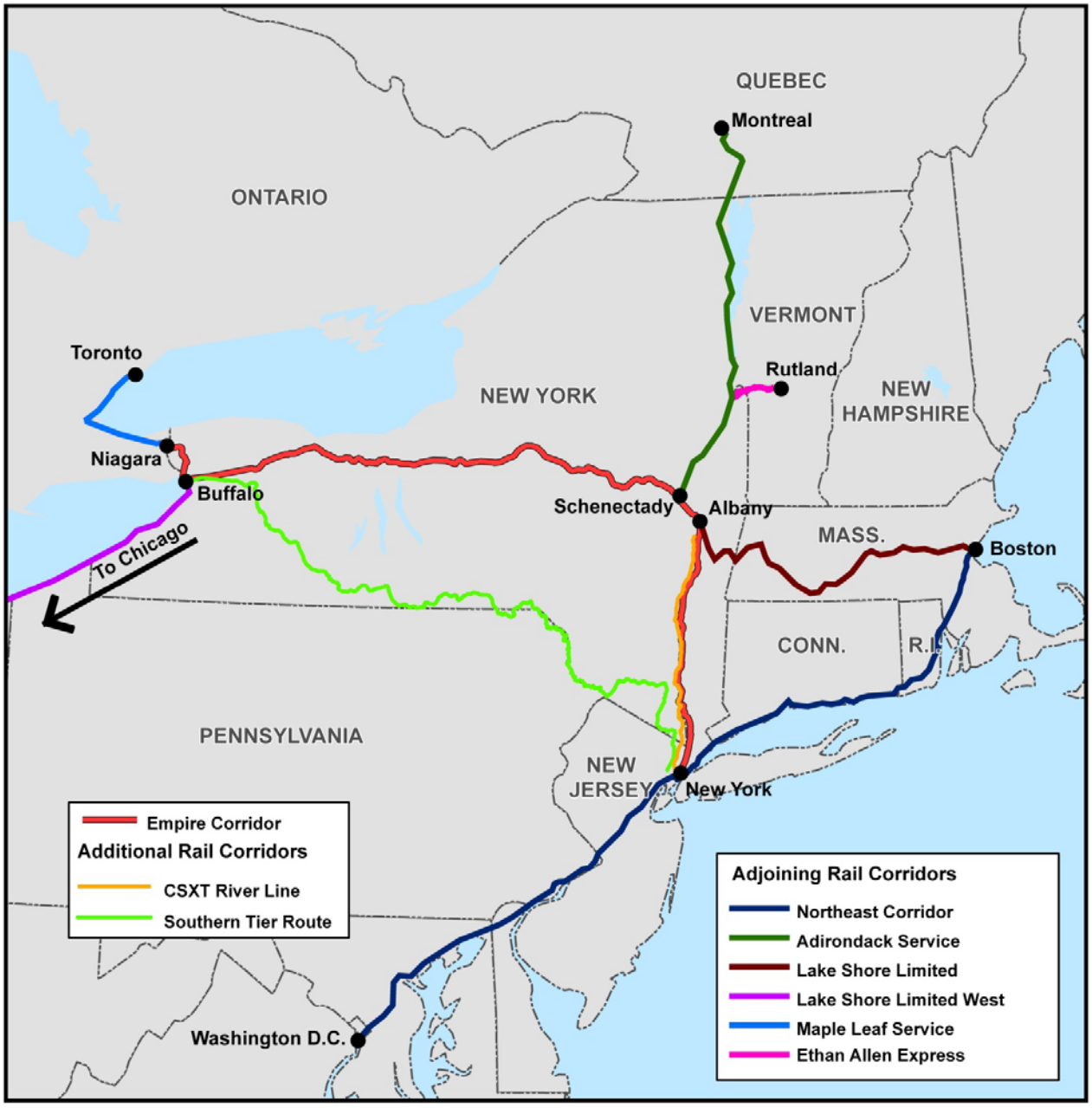

Exhibit 2-12—Additional and Adjoining Rail Corridors

2.3.2. Linkages to Adjoining Rail Corridors

Rail corridors adjoining the Empire Corridor, as shown on Exhibit 2-12, include the following:

- Amtrak Northeast Corridor Acela Service, connecting at Penn Station;
- Adirondack and Ethan Allen Express Services, operating north from Schenectady Station on the

Canadian Pacific Railway and extending to Montreal and Vermont, respectively;

- Lake Shore Limited, connecting Albany-Rensselaer Station and Boston on the east via the former Boston and Albany line;
- Lake Shore Limited West, extending west of Buffalo to Cleveland and Chicago on the CSXT Chicago Line; and
- Maple Leaf Service, operated by VIA Rail Canada (a Canadian government corporation), which continues to Toronto via the Canadian National Railroad Lakeshore Line.

The Amtrak **Northeast Corridor Acela Service and Northeast Regional Services** operate from Penn Station northeast to Boston and south to Washington, D.C. along the most highly developed and heavily traveled passenger rail corridor in the country. The first high-speed rail line in the country, and one of the highest volume rail corridors in the world, the Northeast Corridor serves the densest populations in the Northeast and the nation. It crosses nine states and passes through Baltimore, Wilmington, Philadelphia, Trenton, Newark, New Haven, and Providence. The two high-speed rail corridors (Empire and Northeast Corridors) intersect at Penn Station, the busiest passenger station in the nation, with eight million intercity riders in fiscal year (FY) 2010.

In addition to Amtrak passenger rail service between Boston and Washington, the Northeast Corridor accommodates commuter rail and freight rail uses, including Metro-North and the Long Island Railroad in New York State. As the first rail corridor to implement high-speed rail improvements nationwide and the last to be officially designated as a national high-speed rail corridor (March 2011), more funding and improvements are proposed for the Northeast Corridor as part of a comprehensive program to enhance high-speed rail by FRA, Amtrak, and the states traversed.

The Canadian Pacific Railway (formerly Delaware and Hudson), which extends north of Schenectady Station to Rouses Point, New York and Montreal (one daily roundtrip), accommodates Amtrak **Adirondack Service** that originates from New York City along the Empire Corridor, as well as freight service. Amtrak **Ethan Allen Express service** also operates on Empire Corridor South, diverging at Whitehall, and continuing northeast to Rutland, Vermont (one daily roundtrip). As part of the I-87 Multi-Modal Corridor Study (2004) that analyzed high-speed rail service between New York City and Montreal, capital improvements to the existing freight and passenger line were identified.[34] Outside the portion of the New York City to Montreal route that is shared with the Empire Corridor, this route is not designated by FRA as a high-speed rail corridor. New York State has funded a number of capital improvements on the line, with Canadian Pacific Railway funding an equal or additional amount.

Amtrak's **Lake Shore Limited** service operates from Boston to Chicago, along the former Boston and Albany Line, to join with the Empire Corridor in Albany (one daily connecting service). It also continues west from Buffalo to Chicago (one daily connecting service) on the CSXT Chicago Line. The Boston to Albany route is part of the federally designated Northern New England high-speed rail corridor. The high-speed rail corridor designation includes a branch south from Springfield through Hartford to New Haven, Connecticut, and two other routes from Boston to Portland, Maine and to Montreal via White River Junction, Vermont.

[34] Parsons-Clough Harbour. *I-87 Multimodal Corridor Study: Existing Corridor Conditions and Opportunities*. Prepared for NYSDOT, May 2004.

On the west, the proposed Ohio 3C high-speed rail corridor is part of the Chicago Hub Network, one of the designated high-speed rail corridors nationwide. The 3C corridor includes service from a hub in Cleveland southwest to Columbus and Cincinnati. The Ohio Rail Development Commission and the Ohio Department of Transportation undertook a feasibility study of high-speed rail routes with Cleveland as a hub. Although not part of the national high-speed rail designated corridor, potential high-speed rail routes identified from Cleveland would connect east to Buffalo. The Buffalo to Cleveland route and the connecting proposed high-speed rail route to Chicago follows the western path of the Amtrak **Lake Shore Limited West** service. The FRA awarded the 3C rail corridor a grant funded under the ARRA, but this grant was later withdrawn, when the State of Ohio elected not to advance or implement the high-speed rail improvements.

The **Maple Leaf Service**, an extension of the Empire Service from New York City operated by Amtrak and VIA Rail Canada, continues from Niagara Falls northeast to Toronto (one daily roundtrip). The potential for high-speed rail service to Toronto and Quebec from Buffalo, as an extension of the Buffalo-Niagara Falls route, has been discussed by various agencies, including the Greater Buffalo Niagara Regional Transportation Council and the Canadian government.

2.4. FRA Track Classification and Speed

The track safety standards of the FRA establish nine specific classes of track (Class 1 to Class 9), plus a category known as Excepted Track. The difference between each Class of Track is based on progressively more exacting standards for track structure, geometry, and inspection frequency. Railroads determine the Class of Track to which each segment of track belongs based on business and operational considerations. Once the designation is made, FRA holds railroads accountable for maintaining the track to the corresponding standards for that particular class.

If through regular maintenance and inspection efforts a railroad discovers that a section of its track fails to meet the specified federal standard, the railroad is required to make appropriate repairs to maintain the Class of Track designation, or downgrade the track segment to a lower Class of Track to which the federal standard can be met. Each Class of Track has a corresponding MAS for both freight and passenger trains. The higher the Class of Track, the greater the allowable track speed; correspondingly, as the Class of Track increases, so do the required track safety standards (refer to Exhibit 2-13).

Amtrak maintains most of the Empire Connection to FRA Class 3. Metro-North maintains the segment to the north of the Hudson Line to FRA Class 4, except for a short section near the station and shop facilities at Croton-Harmon, which are maintained to FRA Class 3. The segment of the Hudson Line extending north of Croton-Harmon Station varies from FRA Class 3 to 6. The CSXT Hudson Subdivision south of Albany-Rensselaer Station varies from FRA Class 3 to 6. The CSXT Hudson Subdivision west of Albany-Rensselaer Station varies from FRA Class 1 to 6.

CSXT maintains most of the main line track on the Selkirk and Mohawk Subdivisions to Class 4, except passing through some of the major cities where it is Class 3. CSXT maintains most of the main line track on the CSXT Rochester and Buffalo Terminal Subdivisions to Class 4, except passing through some of the major cities where it is Class 3. CSXT maintains the Niagara Subdivision main

Exhibit 2-13—Maximum Authorized Speed by Class of Track

Class of Track	Maximum Authorized Speed for Freight Trains (mph)	Maximum Authorized Speed for Passenger Trains (mph)[1]
Excepted Track[2]	10	N/A
Class 1	10	15
Class 2	25	30
Class 3	40	60
Class 4	60	80
Class 5	60	90
Class 6	60	110
Class 7	60	125
Class 8	60	160
Class 9	60	220

[1]/ Effective July 11, 2013, Vehicle/Track Interaction Safety Standards Final Rule (March 13, 2013, 78 FR 16052)

[2]/ FRA regulations permit higher freight train speeds for this class of track. However, CSXT limits present and future freight train speeds on the corridor to 60 mph.

Source: FRA Federal Track Safety Standards Fact Sheet

line tracks to FRA Class 3 condition. The controlled siding from CP 25 to Niagara Falls Station is FRA Class 2. Actual operating speeds are restricted in a number of locations due to curvatures, track conditions, and other restrictions. Also refer to Section 2.1.2 for a description of existing train speeds in the Empire Corridor.

Exhibit 2-14 displays the principal Empire Corridor operating segments, the length of the segment, the MAS range for passenger trains, and the average operating speed for passenger trains. The average operating speed reflects the shortest scheduled time for that segment, based on Amtrak timetables.[35] Some trains have longer scheduled times than others for a given segment, based on anticipated operating congestion, construction outages, and historical performance considerations.

The fastest scheduled segment of the corridor is from Rochester to Buffalo-Depew, where trains are scheduled to cover approximately 61 miles in just under an hour, yielding a scheduled operating speed average of 69 mph. The slowest scheduled segment is between Buffalo-Depew and Buffalo-Exchange Street, where the scheduled operating speed average is 34 mph.

Exhibit 2-15 summarizes the current Empire Corridor MAS for passenger trains by segment and speed range. It shows that a relatively small percentage of the overall route (6.7 percent) is capable of supporting 100 or 110 mph passenger train speeds. These locations are limited to portions of Empire Corridor South and Empire Corridor West between Poughkeepsie and Hoffmans. About 20 percent of the corridor is capable of supporting passenger train speeds of 90 mph or greater, and 66 percent of the corridor is capable of supporting passenger train speeds of 75 mph or greater. Only 11 percent of the Empire Corridor has a MAS of less than 60 mph for passenger trains.

[35]/ The average operating speed is based on the best scheduled times in April 18 2011 Amtrak Timetable in either direction, and does not include Albany-Rensselaer dwell

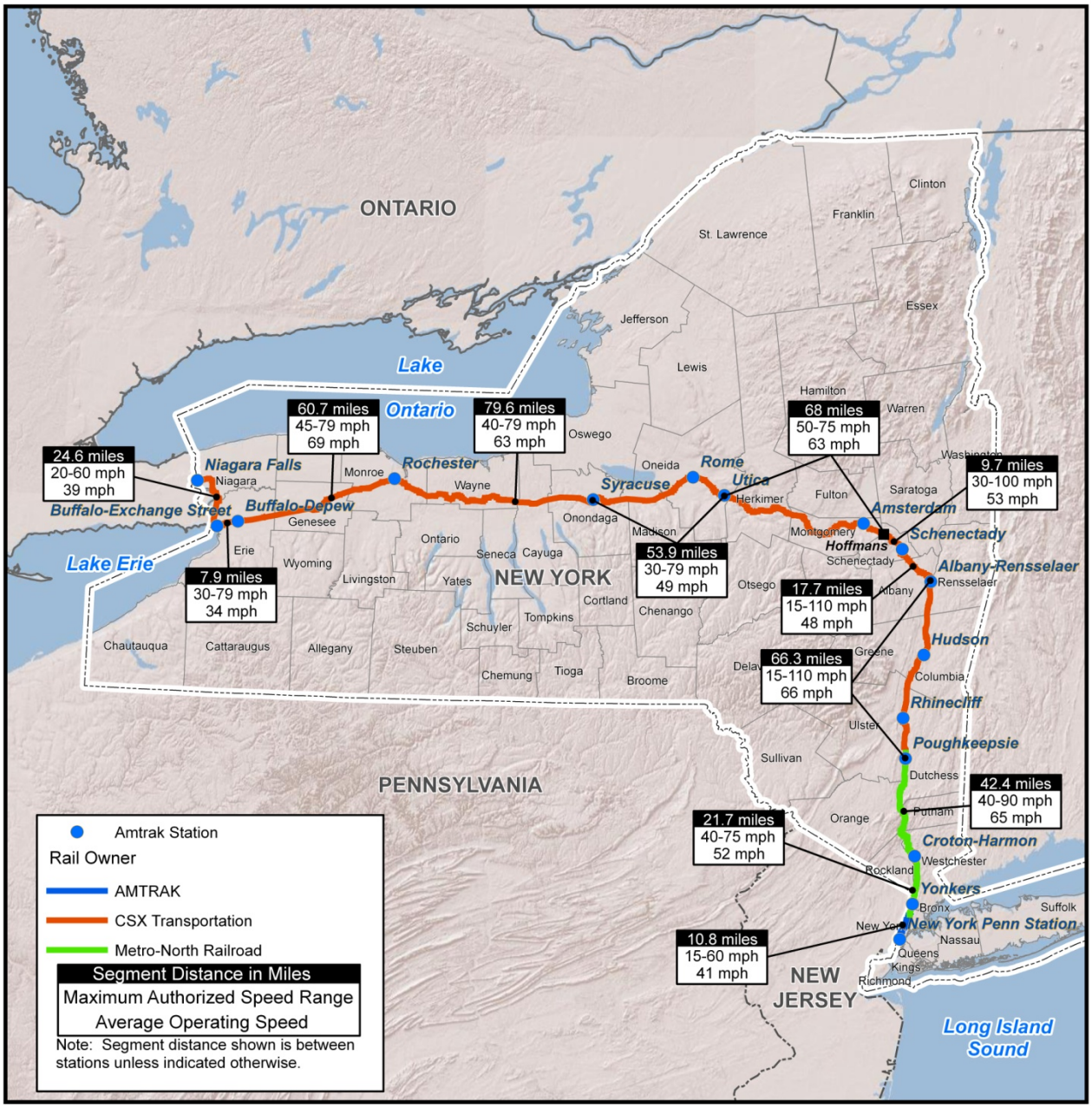

Exhibit 2-14—Empire Corridor Maximum Authorized Speed Ranges and Average Operating Speeds

Exhibit 2-15—Empire Corridor Maximum Authorized Speed by Segment and Speed Range

From	To	Operated By	Miles	Miles at Maximum Authorized Speed					Average Operating Speed mph
				<60 (miles)	60-70 (miles)	75-85 (miles)	90-95 (miles)	100-110 (miles)	
Penn Station	Spuyten Duyvil (CP 12)	Amtrak	10.8	2.9	7.9	--	--	--	41
Spuyten Duyvil (CP 12)	Croton-Harmon (CP 34)	Metro-North	21.7	4.6	6.5	10.6	--	--	52
Croton-Harmon (CP 34)	Poughkeepsie (CP 75)	Metro-North	42.4	6.1	9.4	11.5	15.4	--	65
Poughkeepsie (CP 75)	Albany-Rensselaer	Amtrak	66.3	0.3	--	8.3	41	16.7	66
Albany-Rensselaer	Schenectady	Amtrak	17.7	5.1	--	1.7	3.6	7.3	48
Schenectady	Hoffmans	Amtrak	9.7	0.5	1	--	1.3	6.9	53
Hoffmans	Utica	CSXT	68	2.4	39.8	25.8	--	--	63
Utica	Syracuse	CSXT	53.9	1.8	6	46.1	--	--	49
Syracuse	Rochester	CSXT	79.6	14.3	18.9	46.4	--	--	63
Rochester	Buffalo Depew	CSXT	60.7	1.2	--	59.5	--	--	69
Buffalo Depew	Buffalo Exchange St	CSXT	7.9	2.4	1.8	3.7	--	--	34
Buffalo Exchange St	Niagara Falls	CSXT	24.6	7.1	17.5	--	--	--	39
Total Miles			463.3	48.7	108.8	213.6	61.3	30.9	
Percentage of Total				11%	23%	46%	13%	7%	

2.5. Freight Operations

Empire Corridor West (from Hoffmans) carries 50 to 60 daily freight trains (refer to Exhibit 2-16), one of the highest volumes on the entire CSXT system. CSXT operates upwards of 80 local freight trains per week and close to 450 through freight trains per week along this segment.[36]

This section of track is the only railroad crossing in upstate/western New York that can accommodate the maximum freight rail car weight (315,000 pounds). There is a wide range of freight trains, with the single largest category being intermodal trains that carry double-stack containers to and from East Coast ports. Some intermodal trains also carry "piggyback" highway trailers on flat cars. Other train types include enclosed automobile "racks" from final assembly plants; coal trains for electric generating plants; garbage trains from New York City and other locations; and general merchandise trains carrying lumber, chemicals, grain, fertilizer, plastics, propane, and other commodities.

The busiest segment of the CSXT freight operations (Buffalo-Rochester) handled about 85 million

[36]/ LTK Engineering Services. Rail Network Operations Simulation Results. Prepared for NYSDOT. June 2012.

gross tons (mgt) of freight per year in 1997, increasing to about 110 mgt in 2007.[37] This reflects an annual growth of about 2.5 percent. CSXT's Niagara Branch handles approximately 10 to 20 mgt of freight per year. Although corridor-specific figures are not available, the recent recession severely affected freight traffic. For the CSXT system as a whole, volume tonnage declined by about 17 percent from 2008 to 2009, rebounding by about 9 percent from 2009 to 2010.

Exhibit 2-16—Weekday Train Frequencies on Empire Corridor

Service	Empire Corridor South South of Albany-Rensselaer		Empire Corridor West West of Albany-Rensselaer	
	Outbound (to Albany)	Inbound (to New York City)		
Passenger Rail (Amtrak)	To Albany	From Albany	From Albany	To Albany
	13	13	4 (6 from Schenectady)	4 (6 to Schenectady)
Commuter (Metro-North)	To Poughkeepsie	From Poughkeepsie	N/A	
	28	29		
	Terminating at Croton-Harmon	Originating at Croton-Harmon		
	43	38		
	Total Outbound 78	Total Inbound 76		
Freight (CSXT)	4		50 – 60 (west of Hoffmans)	

Source: Amtrak Empire Service: New York, Albany, and Buffalo, NRPC Form W8 , 4/18/2011; Metro-North Railroad Hudson Line Timetable, effective October 14 through January 3, 2013.

Most freight trains on the Empire Corridor continue west from Buffalo on the CSXT Lake Shore Subdivision/Chicago Line that passes along the south shore of Lake Erie. CSXT interchanges freight with Canadian National Railway and Canadian Pacific Railway in the Buffalo area. Local CSXT freight trains operate to Niagara Falls, serving industries and power plants in that area. Although the CSXT and Canadian National freight networks connect via the Whirlpool Bridge in Niagara Falls, freight trains do not regularly use this routing. On the east, CSXT freight trains diverge from the Empire Corridor at Hoffmans, operating to the large classification (sorting) yard at Selkirk, south of Albany. From Selkirk Yard, the majority of the freight trains operate south via the CSXT River Line (former West Shore Railroad) to New Jersey, while others operate east to connect with the Boston & Albany Line to Springfield, Worcester, and Boston, Massachusetts. A small number of freight trains cross the Hudson River, then access Empire Corridor South at Stuyvesant to travel to Poughkeepsie and the New York City area, where connections are made with the Long Island rail freight network.

The CSXT Buffalo Terminal area, located at the western end of the Empire Corridor, is a major hub for international rail movements and is used by all four major Class I railroads in the eastern U.S. (CSXT, Norfolk Southern, Canadian National, and Canadian Pacific), each with its respective terminal facilities, classification yards, interchange, and mainline tracks. The Empire Corridor only

[37] / Conrail Track Chart, CSXT System Tonnage Chart

accommodates one of these Class I railroads (CSXT), although the Mohawk, Adirondack & Northern Railroad holds trackage rights to operate between Utica and Rome on CSXT tracks.

CSXT has a freight bypass around Rochester to the south, the 23.5-mile-long single track West Shore Subdivision. This bidirectionally-signaled line diverges east of Rochester at MP 359.2 and rejoins the Rochester Subdivision at MP 382.6, west of Rochester. Freight trains not needing to stop at Rochester, such as intermodal, automotive, unit coal, and grain trains, use this slightly shorter, uncongested route on an as-needed basis.

The CSXT River Line, which parallels the Empire Corridor, is used as a freight bypass of Schenectady and Albany and points south. The River Line, a single-track freight line, is used as CSXT's principle intermodal route, along with the Chicago Line (Empire Corridor West), between the Port Authority of New York & New Jersey and Chicago. The "Castleton Cut-off" route that connects the River Line at Selkirk Yard with the Empire Corridor at Stuyvesant and the Boston & Albany Line is the closest freight rail crossing of the Hudson River to New York City, and, at 125 miles north of the city, the closest connection to points west of the river.

Selkirk Yard is the focal point for rail freight service through the Albany-Schenectady area, as well as the operational control point for all CSXT operations in the corridor. Section 2.8.3 provides additional descriptions of other service yards.

Empire Corridor South has a capability of accommodating the second highest rail car weight limit class (286,000 pounds) for freight. CSXT freight traffic on Empire Corridor South is considerably lighter than freight traffic west of Hoffmans. Freight service on the Hudson Line consists of through freight limited to a nighttime window and several locals (four) per day. Freight service on the Hudson Line is constrained by the high volume of Metro-North commuter rail traffic and substandard clearances at bridges over the rail line. Furthermore, as previously noted, much of the freight traffic is routed down CSXT's West Shore Line to northern New Jersey, rather than into New York City, where congestion and a lack of modern freight rail yards hamper deliveries (with the exception of shippers with their own sidings).

2.6. Commuter Rail Operations

The Empire Corridor South is heavily used for commuter rail (refer to Exhibit 2-16). South of Poughkeepsie Station, Metro-North operates Hudson Line commuter service into Grand Central Terminal.

Metro-North has a system-wide on-time performance of 97.5 percent and a growing ridership base. Hudson Line ridership increased an average of 2.3 percent a year, which compares to an average increase of Metro-North ridership system-wide of 1.8 percent a year.[38] Over the last 15 years, Hudson Line commuter rail ridership has increased by roughly 4 million, to 15.7 million annually in 2010. Ridership increased 4 percent to 5 percent annually between 2006 and 2008, dropped 4 percent during 2009, and increased 1 percent in 2010.

Metro-North Hudson Line commuter rail service consists of 78 weekday revenue trains originating from and 76 terminating at Grand Central Terminal (GCT), for a total of 154 trips to and from GCT

[38] / Anders, Marjorie, MTA, "RE: New York State High Speed Rail Project - Metro-North Hudson Line Ridership Information," e-mail/personal communication with Kevin Horgan, HNTB Corporation, October 28, 2011.

each weekday. On weekends, Metro-North operates 50 trips terminating at GCT (with 2 additional trips on Saturdays) and 51 trips originating from GCT, for a total of 101 to 103 trips to and from GCT each day. For weekday and weekend service, the frequency of service at each of the stops along the Hudson Line varies by location. Of the 78 outbound and 76 inbound weekday trains, 28 (outbound) and 29 (inbound) trains serve Poughkeepsie. Most of these trains are express, or limited express trains, with other trains each way operating as local shuttle trains to Croton-Harmon only. Two late night/early morning trains operate as shuttle trains making all stops. On the weekends, service totals 20 trips originating from Poughkeepsie (with an additional two trips on Saturdays) to 21 trips terminating at Poughkeepsie, for a total of 41 to 43 trips to and from Poughkeepsie. On weekends, there are an additional 30 round trips that originate and terminate in Croton-Harmon. On the weekends, shuttle operations, making almost all stops, operate on the late night trains.

2.7. Intercity Passenger Rail Operations

This section describes reliability (on-time-performance ("OTP")), travel times, schedule frequency, and ridership for Amtrak's intercity passenger rail service on the Empire Corridor.

2.7.1. Reliability

Reliability, or OTP, is the consistency of service in terms of both travel times and adherence to published schedules. Inadequate reliability adds to total travel time because passengers are forced to select earlier departure times to allow sufficient time for potential delays. Thus, highly unreliable service is often avoided by schedule-driven business travelers.

With its poor OTP and long travel times, Empire Corridor passenger rail service is currently an unreliable travel option, which renders the competitively-priced service ineffective in terms of serving market needs, and results in a negative impact on ridership. Amtrak has determined that a reasonable OTP would be approximately 90 percent, but in 2009-2010 it was just 77.9 percent for trains operating between Penn Station and Albany-Rensselaer and 61.7 percent for trains operating between Penn Station and Niagara Falls. The 2008 OTP for trains operating between Albany-Rensselaer and Niagara Falls was 47.6 percent.[39] These statistics are based on a lateness threshold of 10 minutes. A train that is 10 minutes late is reported the same as a train that is three hours late, yet the latter has a much more severe impact because it is likely to result in passengers selecting other modes for future travel.

Amtrak routinely collects information on the causes of train delays, which are frequently due to host/owner railroad issues. Exhibit 2-17 summarizes the common causes of delays on each corridor segment. Overall, these problems in the Empire Corridor resulted in more than 161,000 minutes of annual delay, according to analysis of Amtrak data provided to NYSDOT.[40]

Of the 6,805 Empire Corridor trains operating between July 1, 2009 and June 30, 2010, over 10 percent of trains were more than 30 minutes late. Over 4 percent of trains were more than an hour late and over 1 percent of trains were more than two hours late. The average train trip on the

[39]/ LTK Engineering Services. Rail Network Operations Simulation Results. Prepared for NYSDOT. June 2012.

[40]/ Amtrak Conductor Delay Report, July 1, 2009 to June 30, 2010.

Exhibit 2-17—2009-2010 Empire Corridor Delays

Corridor Segment	Delay Source	% of Delay Cause	Common Causes
NYC - Poughkeepsie	Metro-North	75	Commuter train interference
	Amtrak	23	Passenger train interference (Penn Station), passenger loading issues
	Other	2	Weather
Poughkeepsie-Albany-Rensselaer	CSXT	61	Slow orders, communications and signals issues, freight train interference
	Metro-North	11	Poughkeepsie congestion
	Amtrak	26	Passenger train interference, passenger train loading issues, crew-related delays
	Other	2	Weather
Albany-Rensselaer – Niagara Falls	CSXT	73	Freight train interference, slow orders, work zones
	Amtrak	25	Passenger loading issues, crew related delays
	Other	2	Weather, Customs and Immigration

Source: Amtrak Conductor Delay Reports, July 1, 2009 to June 30, 2010

Empire Corridor experienced 35 minutes of delay en route. While some trips recover some of the delay en route, the vast majority do not, leading to poor OTP results.

2.7.2. Travel Times

Travel time is a component of a total trip between origin and destination and is often another determining factor in mode choice. A number of factors affect total trip time, including distance, wait time for a train, OTP and average delay, as well as access and egress. Exhibit 2-18 presents the average one-way scheduled rail travel times in the Empire Corridor and the total one-way rail travel times in the Empire Corridor between major market pairs.

Rail travel from New York City to Albany-Rensselaer Station has a scheduled run time of 2 hours 30 minutes (2:30). The total trip time, which includes access time, wait time, haul time, and egress time, is estimated to be 3 hours 10 minutes (3:10). When considering total travel times, rail trip times are competitive with automobile, bus, and air travel between New York City and Albany.

Rail trip times are considerably slower in the Penn Station to Niagara Falls segment; as a result, rail travel is not competitive with other travel modes. Passenger rail travel time from New York City to Buffalo-Exchange Street is 8 hours and 18 minutes (8:18), with a total trip time (access/egress, wait, and haul time) of approximately 9:50. The long trip-time is a contributing factor in discouraging the use of the rail corridor to travel between key cities such as Buffalo and New York City.

Exhibit 2-18—2010 Total and 2011 Average Scheduled Empire Corridor One-Way Travel Times

Trip Origins	Trip Destinations (hours: minutes)															
	NYC		Albany		Schenectady		Utica		Syracuse		Rochester		Buffalo Exchange Street		Niagara Falls	
	2010 Total	2011 Sche	2010 Total	2011 Sche	2010 Tot	2011 Sche	2010 Total	2011 Sche	2010 Total	2011 Sche	2010 Total	2011 Sche	2010 Total	2011 Sche	2010 Total	2011 Sche
NYC	-	-	3:46	2:29	-	3:07	5:55	4:26	7:09	5:34	8:29	6:56	10:01	8:18	-	9:27
Albany	3:37	2:30	-	-	-	0:37	2:49	1:54	4:03	3:03	5:23	4:24	6:55	5:47	-	6:56
Schenectady	-	3:25	-	0:38	-	-	-	1:19	-	2:28	-	3:49	-	5:12	-	6:21
Utica	5:35	4:43	2:38	1:58	-	1:21	-	-	1:54	1:08	3:14	2:30	4:46	3:52	-	5:01
Syracuse	6:41	5:48	3:44	3:03	-	2:25	1:46	1:04	-	-	2:00	1:21	3:32	2:44	-	3:53
Rochester	8:09	7:19	5:12	4:34	-	3:57	3:14	2:36	2:08	1:31	-	-	2:12	1:22	-	2:31
Buffalo Exchange Street	9:28	8:35	6:31	5:50	-	5:13	4:33	3:52	3:27	2:47	1:59	1:16	-	-	-	1:09
Niagara Falls	-	9:13	-	6:28	-	5:51	-	4:30	-	3:25	-	1:54	-	0:38	-	-

Note: Average of scheduled travel times of trains operating Monday through Friday. Total travel time includes delay.

Source: Average Scheduled Travel Times=Amtrak Empire Service: New York, Albany, and Buffalo, NRPC Form W8 , 4/18/2011
Total travel time=Amtrak Empire Service: New York, Niagara Falls, and Toronto NRPC Form W8 6/21/2010 and estimates of en-route delays plus access/egress

A statistical analysis of May 2008 Empire Corridor operations west of Albany-Rensselaer indicates that the average actual running time was 58 minutes longer than the scheduled running time, with some trains requiring two hours more than the scheduled running time (refer to Appendix D). The current scheduled run times between Albany-Rensselaer and Niagara Falls[41] range from 6:10 to 6:50, reflecting non-competitive average speeds (46 - 52 mph) and significant additional scheduled time to account for rail congestion on the corridor. For example, standard rail industry practice on primarily double-track mainlines calls for a 6 percent schedule margin to provide for reliable service, whereas the trains on the Empire Corridor have excessive scheduled margins ranging from 14 percent to 24 percent.

2.7.3. Schedule Frequency

Schedule frequency represents the range and uniformity of departure times offered in train schedules, and it is a critical determinant of mode utilization. With automobile trips essentially offering unlimited frequency, an attractive rail service must offer a range of departure times throughout the day to provide passengers with multiple choices. It is preferable that rail services operate on "clockface" schedules which offer near-uniform intervals between departures, such as at 10 minutes after each hour. Passengers find these clockface schedules easier to remember and, therefore, particularly attractive.

Empire Corridor Service between New York and Albany-Rensselaer consists of thirteen (13) daily weekday roundtrips (with 11 weekend roundtrips), while service between Albany-Rensselaer and Buffalo-Depew has a frequency of just four (4) roundtrips per day (refer to Exhibit 2-16). Of the

[41]/ April 18,2011 Amtrak public timetable

four daily trains, three of the westbound trains provide service to Niagara Falls, and three of the four eastbound trains provide service from Niagara Falls.

Overall, service is modest, and particularly for Empire Corridor West. The lack of service directly limits the market potential for rail relative to the other transportation modes serving this corridor. Use of rail service between New York City and Buffalo, as well as other cities along Empire Corridor West, is predominantly limited to leisure travel or multi-day business trips.

Despite rail's competitive travel time from New York City to Albany, the first daily train does not arrive in Albany until 9:45 a.m., slightly later than ideal for business travelers. A one-way trip between Albany-Rensselaer Station and Buffalo has a scheduled travel time of approximately five hours or greater. As shown in Exhibit 2-19 and Exhibit 2-20, it is not possible to travel by passenger train from Albany-Rensselaer to Buffalo for a day trip. The earliest daily westbound train arriving in Buffalo-Depew Station from Albany-Rensselaer arrives at 3:10 p.m., while the latest daily eastbound train departing from Buffalo (Exchange Street) departs at 1:13 p.m. The service also does not serve peak direction trips between cities, as there are no scheduled eastbound trains between Buffalo and Albany-Rensselaer that arrive in Albany-Rensselaer before 9 a.m. The limited service between Albany-Rensselaer and Buffalo is insufficient to attract travelers who have other transportation options, such as auto, bus or air, that provide them with greater flexibility in scheduling their travel.

Exhibit 2-19—2011 Daily Westbound Train Schedule: Albany-Rensselaer to Buffalo-Depew

Service Trains	Departure Albany-Rensselaer, NY	Arrival Buffalo-Depew, NY	Scheduled Trip Time (hours: minutes)
63 Maple Leaf	10:03 a.m.	3:10 p.m.	5 :07
281 Empire Service	1:00 p.m.	6:27 p.m.	5:27
283 Empire Service	3:55 p.m.	9:22 p.m.	5:27
49 Lake Shore Limited	7:05 p.m.	11:59 p.m.	4:54

Source: Amtrak Empire Service: New York, Albany, and Buffalo, NRPC Form W8 , 4/18/2011

Exhibit 2-20—2011 Daily Eastbound Train Schedule: Buffalo-Depew to Albany-Rensselaer

Service Trains	Departure Buffalo-Depew, NY	Arrival Albany-Rensselaer, NY	Scheduled Trip Time (hours: minutes)
280 Empire Service	4:34 a.m.	9:50 a.m.	5:16
284 Empire Service	7:59 a.m.	1:55 p.m.	5:56
48 Lake Shore Limited	9:08 a.m.	2:50 p.m.	5:42
64 Maple Leaf	1:13 p.m.	7:00 p.m.	5:47
Notes: Train 280 does not operate on Sunday, and Train 284 does not operate on Saturday, but other trains offer service at or around the same times.			

Source: Amtrak Empire Service: New York, Albany, and Buffalo, NRPC Form W8 , 4/18/2011

2.7.4. Ridership

Rail ridership exceeded 1.26 million in 2000, but decreased to 1.04 million riders in 2002. Part of this decline can be attributed to the introduction of JetBlue air service from Buffalo in 2001. Since that time, however, ridership has increased from 1.08 million riders in 2003, to 1.14 million riders in 2004, up to 1.3 million riders in 2009, and 1.4 million riders in 2011. Most significantly, intercity passenger rail ridership increased 23 percent between Albany-Rensselaer and Niagara Falls from 2007 to 2008, and increased 50 percent from 2003 to 2008.[42]

Exhibit 2-21 presents a summary of rail ridership among the 15 major market pairs in 2009. Rail ridership data were obtained by analyzing the origin-destination data obtained from Amtrak. The data were sorted by station pairs, which provided the ridership between the discreet station pairs and the total boardings at each station.

The greatest number of boardings, 45 percent, involved travel to and from New York City. Albany was the second most popular origin/destination city, with 37 percent of the total market share. The major market share of any one city then declined substantially, with the Buffalo market comprising 6 percent, the next largest major market share. The most frequent market pair, the New York City-Albany market, constituted 34 percent of the entire 2009 rail market. Although the New York City-Buffalo market had the second greatest number of boardings, it totaled only 3 percent of the entire Empire Corridor rail market, as did the New York City to Syracuse market. Along Empire Corridor West, the Albany-Buffalo market comprised only 1 percent of the rail market.

Exhibit 2-21—2009 Major Market to Market Boardings

Trip Origins	Trips Destinations						
	NYC	Albany	Utica	Syracuse	Rochester	Buffalo	Total
NYC	-	320,155	19,858	29,787	23,427	29,881	423,108
Albany	320,155	-	2,082	7,013	8,224	11,133	348,607
Utica	19,858	2,082	-	819	1,421	2,480	26,659
Syracuse	29,787	7,013	819	-	1,794	6,466	45,878
Rochester	23,427	8,224	1,421	1,794	-	1,862	36,728
Buffalo	29,881	11,133	2,480	6,466	1,862	-	51,821
Total	423,108	348,607	26,659	45,878	36,728	51,821	932,801

Source: Amtrak

While trip time and cost are perhaps the most important characteristics when evaluating ridership levels among travel modes, frequency of service and OTP are also critical determinants. For example, service between city pairs along Empire Corridor West have similar distances and travel times, and competitive fares among rail, bus and auto. Between Syracuse and Rochester, where air

[42]/ NYSDOT. *New York State Rail Plan*. 2009.

travel is not available, rail service has a superior travel time and cost as compared to bus service. Rail represents a fraction of travel between Rochester and Syracuse, however (approximately 1,800 rail trips versus more than 92,000 bus trips in 2009). Service frequency and OTP are the major determinants for this city pair; rail service offers only 4 roundtrips between the two cities and an OTP of less than 60 percent, whereas bus service offers 24 trips between Syracuse and Rochester with an approximate 85 percent OTP.

Currently, rail does not capture a significant share of any city pair market along Empire Corridor West due to its significantly less service and its poor OTP. Poor OTP effectively adds to travel time and eliminates business travel, as travelers cannot take a chance on the mode of travel not arriving at their destination around their scheduled time. Empire Corridor West has historically low OTP and very extended average delay times.

2.8. Infrastructure

This section describes the Empire Corridor infrastructure**,** including track and signals, stations and parking, rail yards and maintenance facilities, bridges and tunnels, grade crossings, and rolling stock. Rolling stock consists of the vehicles that move on the railroad, including locomotives and coaches.

2.8.1. Track and Signals

This section describes the existing configuration of the tracks and the type of signal systems along the Empire Corridor. The type of signal system has implications for maximum speed. Section 2.4 provides a description of Maximum Authorized Speeds (MASs), and Exhibit 2-14 and Exhibit 2-15 present MASs and average operating speeds throughout the corridor.

Empire Corridor South

Penn Station and the Empire Connection: At Penn Station, Tracks 5–9 connect both to Amtrak's Sunnyside Yard and the Penn Station support facility to the east, and to the Empire Connection to the west. The first segment of the Empire Connection from Penn Station and curving under the West Side Yard is single track to a point just north of 39th Street, about 0.75 miles from Penn Station. At that location, Empire Interlocking defines the track junction where double track begins to the north. Continuing along the west side of Manhattan, most of the alignment is located within a tunnel, with only a few short openings up to just north of 123rd Street where the tunnel ends, 5 miles from Penn Station (refer to Tunnel description in Section 2.8.4). For a few miles in the Bronx there are only two or three tracks on the Metro-North Hudson Line, with a notable bottleneck of double track at the Marble Hill Cutoff between CP 10 and CP11 on the line from Grand Central Terminal.

Double track ends 9.6 miles from Penn Station at Inwood Interlocking, a short distance south of the swing span rail bridge over the Harlem Ship Canal at Spuyten Duyvil Bridge, 10 miles from Penn Station. The single track continues north, as it enters the Metro-North Hudson Line right-of-way at 10.2 miles from Penn Station. The single-track Empire Connection parallels the three-track Metro-North Hudson Line a short distance north to the interlocking designated as CP12, approximately 10.8 miles from Penn Station. In this 10.8 mile segment, there are 8.9 miles of double track and 1.9 miles of single track.

Trackage at Penn Station is within interlocking limits, with all trains limited to a maximum speed of 15 mph. The track geometry is the limiting factor for speed on this segment of railroad. All other tracks up to CP 12 on the Hudson Line are equipped with Rule 261 bidirectional wayside signaling with cab signaling.

Rule 261 is a reference to an operating rule that denotes that the tracks are signaled for travel in both directions on all tracks. Cab signaling consists of a signal system within the engine control compartment that indicates track occupancy and condition. This allows trains to operate on all tracks in both directions with a constant cab signal indication in the locomotive cab that repeats the indication of the signals on the wayside. Cab signaling allows speeds in excess of 79 mph per FRA regulation.

Hudson Line South: Hudson Line South extends from CP12 to a point about 22 miles to the north at Croton-Harmon Station. At the southern end of this segment, Metro-North has three tracks. Amtrak's Empire Connection from Penn Station, single track at this location, parallels these three tracks for about one half mile north, merging with the Metro-North tracks at CP12. CP12 is a complex interlocking consisting of both left and right hand crossovers, allowing trains to move from one track to the other. It is the junction of the Amtrak Empire Connection and the beginning of four tracks from CP12 north to the end of this segment at Croton-Harmon Station.

South of the Croton-Harmon Station, the Hudson Line is electrified using a third rail system and serves suburban stations located more closely together. Most of the electrified zone has four tracks (though one of the tracks is not electrified in much of this segment), supporting bidirectional express and local operation. In general, the two outside tracks accommodate local service to the stations along the route, while the center tracks serve as express tracks that do not have station platforms except at the major stations. Three of the four main line tracks have under running contact rails (3rd rail). In some locations there is a fifth track used only for freight service to facilitate access to on-line freight consignees and shippers. These tracks, generally parallel to the main line tracks, allow local freight trains to shift freight cars in and out of customer's siding clear of the main tracks.

The Croton-Harmon Station divides the two segments of the Metro-North Hudson Line, with electrification and high density commuter train operation south of Croton-Harmon to GCT.

Hudson Line North: North of Croton-Harmon to Poughkeepsie, the line is mostly double-tracked, with a few three-track areas. Most diesel trains north of Croton-Harmon operate through to GCT, operating express over the electrified portion of the line. There is a mostly freight-only third track between Croton-Harmon Station and Peekskill. There is also a 2.5-mile section of triple track between MP 58.5 (CP 58), just south of Beacon to MP 61.2 (CP 61), that is used as a turnback location for some northbound Metro-North trains. At Poughkeepsie Station, there are five tracks, but only three tracks have direct platform access and are normally used in revenue service.

The signal system in both the Hudson Line South and the Hudson Line North is a centralized traffic control system with wayside signals located only at interlockings (track junctions) and cab signaling located throughout. Metro-North uses different operating rules and signal indications than do Amtrak and CSXT on the bounding segments to the south and north. Empire Corridor train engineers must be qualified in both the Metro-North operating rules and the Northeast Operating Rules Advisory Committee (NORAC) rules used by Amtrak and CSX. Speeds over 79 mph are not possible in this segment due generally to curvature (refer to Section 2.4).

CSXT Hudson Subdivision South of Albany: This entire segment from Poughkeepsie to Albany-Rensselaer is double track for passenger operations. In addition to the endpoint passenger stations, there are intermediate stations at Rhinecliff and Hudson. There are short segments of additional track used for freight service. The signal system is a centralized traffic control system with wayside and cab signaling. Speeds over 79 mph are possible on most of this segment.

Empire Corridor West

CSXT Hudson Subdivision West of Albany-Rensselaer to Hoffmans: The segment is primarily single track, with the exception of two locations: approximately 1.7 miles of double track from Albany-Rensselaer Station through the Livingston Avenue Bridge, to a point on the west side of the Hudson River (with only the single main track normally used by Amtrak trains); and approximately 3.3 miles of double track through Schenectady (CP156 to CP159). NYSDOT currently is pursuing restoration of a second main track from Albany-Rensselaer to Schenectady (incorporating the CP156 to CP159 double track). This segment is equipped with Rule 261 signaling with cab signaling.

CSXT Selkirk and Mohawk Subdivisions, Hoffmans to Syracuse: This segment is double track and signaled for movement in both directions. There are additional tracks at several yards and a number of parallel sidings (controlled sidings), typically two to three miles long connected to the main line at both ends within interlockings. Controlled sidings are located where CSXT has small freight yards and/or access to on-line shippers and consignees that can be serviced clear of the main line. Controlled sidings form three-track mainlines at selected locations. Limited to 30 mph, they are used to move trains around for maintenance on the main line tracks or to "pocket" a freight train to temporarily relieve congestion on the main tracks. Controlled sidings in this segment are located as follows:

- Amsterdam CP 173 to CP 175 10,900 feet long – north side
- Fonda CP 184 to CP 188 16,200 feet long – north side
- St. Johnsville CP 203 to CP 207 18,200 feet long – north side
- Little Falls CP 215 to CP 218 18,200 feet long – north side
- Oneida Yard CP 263 to CP 266 10,700 feet long – south side
- Belle Isle Yard CP 293 to CP 296 15,300 feet long – north side

West of Hoffmans, the Rule 261 bidirectional signaling with centralized traffic control continues, but there is no cab signaling on this segment. The heavy volume of CSXT freight trains accessing the Empire Corridor from Selkirk Yard, therefore, does not need to be equipped with cab signaling. FRA regulations limit maximum speed without cab signaling to 79 mph.

CSXT Rochester and Buffalo Terminal Subdivisions: West of Syracuse, the Empire Corridor continues as double track, signaled for movement in both directions. There are additional tracks at several yards and a number of parallel controlled sidings in this segment, where there is local freight switching of on-line customers. Controlled sidings in this segment are located as follows:

- Savannah CP 320 to CP 323 13,400 feet long – north side
- Lyons Yard CP 334 to CP 335 5,960 feet long – north side
- Rochester CP 367 to CP 373 27,984 feet long – north side
- Chili CP 380 to CP 382 10,100 feet long – north side

- Batavia CP 402 to CP 406 10,100 feet long – north side

The signaling in this segment is identical to that of the Selkirk and Mohawk Subdivisions.

Niagara Branch

CSXT Niagara Subdivision: This segment is a mix of double and single track, with two single-track sections on the south (9.5 miles) and north (5 miles). Single track starts at the beginning of this segment in downtown Buffalo, continuing through Exchange Street to CP 8, for a distance of 7.5 miles. Double track extends (with each track signaled only in one direction) from CP 8 to CP 17, for a distance of 9.7 miles. The line is then single track from CP 17 to CP 22, for a distance of 5.5 miles. There is a section of double track from CP 22 to CP 25 (2.3 miles) for passenger trains that access Niagara Falls Station. From CP 25 north, the station is on a single track controlled siding for a distance of 1.6 miles. In total, the portion of the Niagara Subdivision used by passenger trains has 14.6 miles of single track and 12.0 miles of double track.

The single track main line segments are Rule 261 bidirectional signaling with centralized traffic control but without cab signals. The 9.7-mile double-track section from CP 8 to CP 17 has Rule 261 Automatic Block Signaling, which means that there are signals only in the normal right hand running direction. If a train has to be routed on a track not signaled for its direction of travel, the train requires special clearance from the CSXT dispatcher and must operate at a reduced speed. The short section of double track from CP 22 to CP 25 is governed by Rule 261, signaled for movement in both directions. Speeds up to 79 mph are allowed by FRA in non-cab signaled locations such as this segment. The current maximum speed of 60 mph is dictated by FRA Class 3 Track (60 mph for passenger), signal block spacing, automatic grade crossing warning system start points, and curve restrictions where speeds are less than 60 mph.

2.8.2. Stations and Parking

There are 16 existing stations with Amtrak service located in metropolitan areas along the Empire Corridor, in addition to 24 other stations serviced by Metro-North along the route segment south of Poughkeepsie. Exhibit 2-22 presents the Amtrak stations, and the boardings and alightings occurring at each station, in FY 2010. Empire Corridor stations comprised 98.6 percent of total New York State station usage in FY 2010, which totaled 10,276,419 passengers. (Note that more than 80 percent of passengers in FY 2010 used Penn Station, but not necessarily for Empire Corridor service.)

Most of the passenger stations, including those in Schenectady, Amsterdam, Rochester, Buffalo Depew, Buffalo Exchange Street, and Niagara Falls, are physically obsolete and have experienced deferred maintenance, contributing to the overall perception that passenger rail service along Empire Corridor West is not an attractive, convenient, or reliable travel option. The following is a description of the stations along the Empire Corridor. Parking at each station was estimated based on information provided by the owner, [43] if available, or Amtrak, and/or review of aerial photography (for surface parking). Separate NEPA environmental review has been done or is

[43] / Ownership of station facilities was determined through consulting available sources, including "Great American Stations," available at: http://www.greatamericanstations.com/station-resources/stations_by_state

Exhibit 2-22—2010 Empire Corridor Amtrak Station Boardings and Alightings

Station	Boardings & Alightings FY 2010	Distance between Stops (mi)
Penn Station	8,377,944	-
Yonkers	20,433	14
Croton-Harmon	41,570	18
Poughkeepsie	75,775	41
Rhinecliff	158,534	15
Hudson	150,197	25
Albany-Rensselaer	737,259	28
Schenectady	56,125	18
Amsterdam	9,174	17
Utica	61,108	60
Rome	9,100	14
Syracuse	139,175	40
Rochester	128,935	80
Buffalo Depew	111,513	60
Buffalo Exchange Street	30,171	8
Niagara Falls	27,270	27

Sources: New York State Rail Plan, 2009, page 94; Amtrak Government Affairs, " Amtrak Fact Sheet: Fiscal Year 2010, State of New York." November 2010. Accessed November 3, 2011. <http://www.amtrak.com/pdf/factsheets/NEWYORK10.pdf>

ongoing for station work using federal funding discussed below. Each station project has independently utility from Empire Corridor program and would/will improve passengers experience using the system with or without eventual corridor improvements.

Penn Station in New York City (Exhibit 2-23) is the busiest station in the nation, and is owned by Amtrak. The station features 21 station tracks, 11 platforms, four interlockings, and two passenger concourse levels. Approximately 500,000 passengers a day pass through Penn Station. In addition to Amtrak operations, the station is used by the commuter rail operations of the Long Island Rail Road and the New Jersey Transit Corporation (NJ TRANSIT), both of which share tracks with Amtrak. Together, these three carriers operate over 1,000 weekday trains at Penn Station.

Exhibit 2-23—Pennsylvania Station

The current station site has been in place since 1910, originally designed in the iconic Beaux-Arts style by McKim, Mead, and White. The station was demolished in 1963 and a reconstruction of the station's public areas was completed in 1968, resulting in the current underground station facility. The track level of the station remains substantially as it was constructed in 1910, though some track and platform reconfiguration has taken place since then to accommodate longer commuter rail trains. The station has no public parking facilities, though numerous Manhattan parking facilities are located nearby.

A groundbreaking for Phase I of the Moynihan Station, located across Eighth Avenue from Penn Station in midtown Manhattan, was held on October 18, 2010. The U.S. Department of Transportation is providing $83 million in Transportation Investment Generating Economic Recovery (TIGER) Grants funded through ARRA to increase passenger access, streamline rail operations, and implement other building improvements. Subsequent phases will include a new train hall in the historic Farley Post Office Building, improved passenger connections between Penn Station and Moynihan Station, and the ultimate renovation of Penn Station itself.

Yonkers Station, built in 1911, serves the downtown area of Yonkers via the Metro-North Hudson Line. It is an express station that, in addition to Amtrak Empire Corridor service, serves Metro-North passengers from GCT in Manhattan. It has two high-level island platforms and four tracks. The facility is owned by Metro-North, and parking is owned by the Yonkers Parking Authority. The Beaux-Arts style terminal building was renovated by Metro-North in 2004. The parking lot accommodates 610 spaces that are shared with Metro-North commuters. Yonkers is an inner-ring suburb of New York City, and the station connects the high density inner-ring suburbs to the Empire Corridor, allowing patrons to access Amtrak without having to access New York City.

Croton-Harmon Station, also part of the Metro-North Hudson Line, is the main transfer point for local and express commuter rail service. The station is served by most Amtrak Empire Corridor trains, with only a few express trains skipping the station. There are three center island platforms at the station. The parking facility accommodates 2,000 spaces, which are shared with Metro-North commuters. The station marks the end of the electrified territory from GCT and is the site of major shop facilities for Metro-North. Uses around the station include a rail layover facility on the west side of the tracks. Croton Harmon Station serves a similar purpose as Yonkers Station, except that it is a catchment area for a larger region of outer-ring rural and small town markets.

Poughkeepsie Station, modeled after GCT, is a Beaux-Arts style terminal with an overhead walkway connecting to a parking garage. Poughkeepsie Station and the parking garage are owned by Metro-North. Improvements to this historic station, built in 1918, were made in 2002 and included enhanced connectivity to the city's Main Street and a large commuter parking garage. The station is equipped with a high-level island and a side platform, accessing three tracks. Parking spaces at Poughkeepsie Station total 1,123. These spaces are shared with commuters, so that only a portion may be available for Amtrak patrons, dependent on time of day.

Rhinecliff Station, located in the hamlet of Rhinebeck, serves northern Dutchess County and the Kingston area across the Hudson River. The station experienced the third highest Amtrak boardings/alightings in the state in FY 2010 and is frequented by longer distance commuters using Amtrak service. Owned by Amtrak, with parking owned by Amtrak/CSX, the station has one center island, low-level platform that serves both tracks. There are 183 parking spaces available.

Hudson Station, built in 1874, is the oldest operating passenger rail station in the state of New

York. Owned by Amtrak, with parking owned by Amtrak/City of Hudson, the Hudson Station has two short, low-level platforms, with access to the normally southbound platform requiring passengers to cross the normally northbound track at grade. CSXT enforces a "one train at a time" rule at the station because of the at-grade track crossing, even though there are two physically-separate tracks and platforms. There are 185 parking spaces at the station. Amtrak does not have any plans to expand services or facilities at this time.

Albany-Rensselaer Station, with the second highest boardings/alightings in the state, was the ninth busiest station in the Amtrak system nationally in FY 2010. The station is located in Rensselaer, 1.5 miles from downtown Albany (Exhibit 2-24). Prior to the 1971 advent of Amtrak, intercity passenger trains operated out of the historic Union Station in downtown Albany; however, the use of Union Station was abandoned in 1968 as a cost-cutting move by Penn Central Railroad and the facilities were moved to Rensselaer.

Exhibit 2-24—Albany-Rensselaer Station

The station is a large, newer intermodal facility owned and constructed by the Capital District Transportation Authority (CDTA) in 2002, replacing two terminal buildings constructed in 1968 and 1980. The station has three tracks and two mostly high-level center island platforms. The easterly platform services only one track on the west. The track bay on the east, between platform and station, is currently vacant but was designed to accommodate a planned fourth station track. The station accommodates 1,400 spaces in a parking garage and surface parking immediately adjacent to the station.

Amtrak and NYSDOT completed demolition of the previous terminal facilities in February 2011 to accommodate construction of a fourth track at Albany-Rensselaer Station. The track project will increase station capacity and improve operating flexibility, leading to more efficient passenger boarding and better OTP.

Schenectady Station, constructed in 1979, is located adjacent to (and at a lower level than) the existing rail platform between the two tracks in downtown Schenectady. All Amtrak services stop at this station, including the Adirondack and Ethan Allen trains that diverge onto the adjacent Canadian Pacific main line to the north. The station platform is a single, low island platform about 745 feet long. Amtrak owns the station building and the Schenectady Metroplex Development Authority owns the southern parking lot. There are approximately 158 parking spaces available for Amtrak use. NYSDOT received $18.1 million in federal HSIPR funding toward the construction of a replacement station.

Amsterdam Station, constructed in 1973, is a small, brick shelter owned by Amtrak. The station has a single, low-level side platform located on the Track 1 side and 22 parking spaces. Generally, passenger trains are routed in both directions to Track 1 for boarding. When passenger trains must use Track 2, approaching trains on Track 1 must hold outside of the station because boarding passengers cross Track 1 at grade to access Track 2.

The Boehlert Center at Union Station in Utica is served by Amtrak and the Adirondack Scenic Railroad. All eight daily Amtrak passenger trains stop at Utica. The historic station was originally built in 1914 and renovated in 1978; several phases of improvements are ongoing. Utica Station and the parking area are owned by Oneida County. The station has two low-level platforms; a side platform to Track 2 and a center island platform serving Track 1 and a track used by the Adirondack Scenic Railroad excursion trains. There are approximately 200 parking spaces. The station is located in the Central Business District, near tourist, institutional and business attractions.

Rome Station was constructed in 1914 and renovated in 2004. The station is located in proximity to the canal waterfront, and neighboring commercial districts in downtown Rome. Rome Station is owned by the City of Rome, has a low-level, center island platform, as well as a platform on the side of the station house itself, and 32 parking spaces.

The William F. Walsh Station in Downtown Syracuse is considered a long–distance multi-modal terminal, providing bus connections to intercity operators and the city's CENTRO buses. All eight daily Amtrak trains stop at Syracuse. The station opened in 1999, replacing the Amtrak station previously located in East Syracuse. Syracuse Station has a single, high-level center island platform and 280 parking spaces. There is presently only one track adjacent to the center platform with provision made for a second track between the platform and the station building. The facility, platforms, and parking are owned by Intermodal Transportation Center, Inc. A HSIPR grant of $18.5 million will cover final design and construction to provide congestion relief in the vicinity of Syracuse Station and CSXT's DeWitt freight yard to improve Amtrak service on the Empire Corridor.

Rochester Station was constructed in 1978. All eight daily Amtrak trains stop at Rochester. The station is well-located in the densest portion of downtown Rochester, near educational, tourist, institutional and business uses and attractions. Rochester Station and north parking lot are owned by Amtrak. NYSDOT owns the southern parking lot. The station currently has a single, low-level side platform located on the Track 2 (south) side. Former center island platforms were accessed via a subway and stairs, but this access was filled in and the platforms removed as part of the 1978 project. There are a total of 95 parking spaces. The Rochester Intermodal Station project has received $15 million in federal TIGER funds for final design and construction.

Buffalo-Depew Station, located in Depew, is a relatively small suburban facility constructed in 1979 (Exhibit 2-25). All eight Amtrak intercity passenger trains stop at Buffalo Depew. Buffalo-Depew Station and parking lots are owned by NYSDOT. The station has one low-level side platform located on Track 2 side (south). There are 135 parking spaces in both east and west lots. The station is located outside of the Central Business District and is surrounded by several large industrial and commercial operations. The station is close to the Buffalo Niagara International Airport.

Exhibit 2-25—Buffalo Depew Station

Buffalo-Depew Station has received an HSIPR grant of $770,000 for state-of-good-repair

improvements and Americans with Disabilities (ADA) accessibility. This work was completed in 2013.

Buffalo Exchange Street Station is located within walking distance of central business district destinations and is served by municipal bus. The station was constructed in 1952 and is a small brick structure with a single low-level platform. The City of Buffalo owns the station building and parking lot, with parking for 20 cars. The station is served by the Amtrak Maple Leaf and four daily Niagara Falls trains. The station is not served by the Lake Shore Limited because the station is located on the Niagara Branch, just north of the track split between routes to Chicago and to Toronto.

Niagara Falls Station is a one- and two-story brick building, located at the terminus of the Empire Corridor. It was formerly a freight house built for the Lehigh Valley Railroad in 1959. There is a short segment of high-level platform at one end of the building to the track closest to the building. All other boarding locations are low-level platforms. In addition to accessing one through track (for Maple Leaf service), the station includes two stub-ended tracks where Amtrak trains layover during the overnight hours. Train cleaning and minor maintenance is performed at this location. Owasco River Railway, Inc. owns the facility and parking area. There are 40 parking spaces available. The station includes facilities for Amtrak operating crews and personnel. The current land uses near this station include layover yards, industrial buildings, and underutilized properties near Highway 61 that passes by the station to the west.

State and local governments plan on building a new multi-million dollar intermodal transportation center out of the U.S. Customhouse to replace the current station. This work is to be part of a three phase project titled the Niagara Falls International Railway Station. It calls for the U.S. Customs and Border Protection to share with Amtrak a complex consisting of the old customhouse and modern additions. The project consists of three phases, with a total estimated cost of $44 million. Construction on the project began in August 2010, with funding only for the first two phases. In October 2010, the US Department of Transportation released $16.5 million in funds from the TIGER program for work on the final phase of the International Station project. The new station will be located about two miles north of the present location, closer to the major Niagara Falls tourism destinations.

2.8.3. Rail Yards and Maintenance Facilities

Exhibit 2-4 and Exhibit 2-5 present the approximate locations of major Amtrak, Metro-North, and CSXT rail yards and maintenance facilities located on the Empire Corridor.

Amtrak Facilities

Amtrak operates two major maintenance facilities in New York State: Sunnyside Yard in New York City and Albany-Rensselaer. Sunnyside Yard, located in Queens, is the Penn Station area support facility where Amtrak stores and maintains the rolling stock used in the Empire Corridor services. In addition to servicing Amtrak's conventional trains, Sunnyside also serves as a facility for Acela Express train sets. The Albany-Rensselaer facility, located just north of Albany-Rensselaer Station, serves as the primary maintenance facility for the Empire Corridor. Amtrak maintains a major car and locomotive shop, train storage yard, and maintenance-of-way depot. A smaller facility located in Niagara Falls provides turnaround services to New York-Buffalo-Niagara Falls Empire Service trains. Exhibit 2-26 provides a summary of the rolling stock storage and maintenance facilities for

Amtrak.

Metro-North Facilities

Metro-North maintains large shop facilities at Croton-Harmon Station, the end of electrified train territory. An older shop facility is located just northwest of the station and a new, recently completed shop facility, is located just west of the station. The facility maintains all types of Metro-North equipment, including electric multiple unit rail cars, as well as non-powered coaches, straight diesel electric, and dual mode (electric/diesel electric) locomotives. There are also storage tracks for trains stored overnight and weekends and maintenance of way equipment.

Just north of Poughkeepsie Station, there are two to three tracks located on each side of the main line. These had been used exclusively for freight, but are now used to store and stage Metro-North train sets.

CSXT Facilities

CSXT maintains a 4,000-foot-long, double ended freight yard located about 1.5 miles north of Croton-Harmon Station. The yard is comprised of seventeen to eighteen tracks. It lies between the main line and the Hudson River and is used to sort and store cars destined to and from various freight shippers and consignees along the Hudson Line.

At Hudson Station, there is a small five-track freight yard, other ancillary tracks and a wye that connects to the Claverack Industrial Track, a short branch located to the east to access a cement plant. The plant has recently closed, and the track is out of service.

Dewitt Yard, a major freight classification yard and intermodal facility, is located east of Syracuse (MPs 282.5-286). This facility is almost four miles long and consists of two intermodal facilities, a classification/storage yard for general merchandise freight trains, a block swapping[44] yard closest to the main line, locomotive maintenance facility, and maintenance of way depot. The intermodal facilities at Dewitt perform a "filleting" operation on double stack container trains destined for New

Exhibit 2-26—Summary of Amtrak Rolling Stock Storage and Maintenance Facilities

Name/Location	Primary Function for Empire Corridor	Daily Clean & Service	FRA Inspections	Heavy Repairs
Amtrak Shops Albany-Rensselaer	Maintenance Facility for Empire Corridor	●	●	●
Sunnyside Yard Queens, NYC	Overnight Storage & Servicing, 2 Trains	●		
Station Tracks Niagara Falls	Overnight Storage & Servicing, 2 Trains	●		

[44]/ A block is a group of rail cars all destined to a specific location or yard. A through freight train that is not a unit train typically has several blocks of cars. At Dewitt, the many intermodal trains that run on this line from distant points often add or drop blocks of cars that match the train's destination. Essentially, the trains are swapping blocks with each other – block swapping.

England, due to clearance restrictions on the Boston & Albany Line. On eastbound trains, the top containers are removed to reduce the trains' vertical clearance requirement while containers are added to westbound trains. CSXT and the State of Massachusetts are working together to improve Boston & Albany Line clearances, while, at the same time, relocating most of the Boston area intermodal activity that occurs at Beacon Park to an expanded intermodal facility in Worcester. With these changes, the Dewitt "filleting" operation may not be necessary or considerably reduced.

Other CSXT yards on the CSXT Selkirk and Mohawk Subdivisions are generally small and consist of the following, from east to west:

- Kellogg's Yard, just east of Amsterdam, on the north side of the main line, consists of a 2.5-mile-long siding, two or three short tracks and the Kellogg's Industrial track that diverges north.
- Fonda Yard, on the north side of the main line, consists of a two-mile-long siding and two or three shorter tracks. This used to be the interchange to the Fonda, Johnstown, and Gloversville Railroad, which is now abandoned.
- Saint Johnsville, on the north side of the main line, consists of a 3.6-mile-long siding and one or two short tracks near the town center.
- Little Falls, on the north side of the main line, consists of a 3.1-mile-long siding with several short spurs.
- At Utica, CSXT has ancillary tracks of its own. There are two connections to the Mohawk, Adirondack, and Northern short line, which has taken over most of the remaining track in what was in the past, a major yard, north and east of the station. Just west of the station on the south side of the main line is a small six-track yard and maintenance facility of the New York, Susquehanna, and Western Railroad that diverges south towards Binghamton.
- At Oneida, there is a 2.1-mile siding on the south side of the main line and the remnants of a small yard, mostly removed.
- Small yards and junctions are located east of Syracuse. Belle Isle Yard is on the north side of the main lines and consists of just two to three long tracks. Solvay Yard is south of the main line and consists of 16 tracks that curve away to the south. There are a number of diverging branches, industrial tracks, short line railroads, and a wye where CSXT's Saint Lawrence Subdivision diverges.

The large number of active yards, industrial sidings and junctions that exist from Dewitt Yard through Syracuse (MP 278.2 to MP 296.8) create significant operating congestion. Complex track layouts include yard leads on both ends of Dewitt Yard, various industry sidings on both sides of the main line, interchanges with two shortline carriers, and junctions with several CSXT freight lines just west of Syracuse.

Goodman Yard is located in Rochester, serving as the city's primary freight facility. It is less than one mile long. Goodman Yard consists of 17 double ended tracks; a small, currently inactive intermodal facility, now used as a transflo (bulk commodity transfer) facility, and an open air locomotive maintenance facility. Goodman Yard primarily supports local industry and cars to and from the Charlotte Running Track and short-line Rochester Southern Railroad, both connecting to the Rochester Subdivision just west of Rochester.

The Buffalo Terminal Subdivision includes both a major freight facility, Frontier Yard, and a series

of complex junctions where various rail lines diverge in several directions. Frontier Yard formerly served as a major CSXT classification yard, but since 2009, the work of sorting cars for through trains has been reassigned to Dewitt and facilities in Ohio.

Other CSXT yards located along the CSXT Rochester and Buffalo Terminal Subdivisions are generally small and consist of the following, from east to west:

- Lyons Yard, a small 2,500-foot long yard with eight remaining tracks. Lyons Yard supports local industry and is an interchange point with a Norfolk Southern RR branch.
- Batavia Yard, a small 3,000-foot long yard with a controlled siding and three remaining tracks. Batavia Yard is the interchange point with short line Depew, Lancaster & Western Railroad.

There are several freight yards just off the CSXT Niagara Subdivision. Niagara Yard is a major CSXT freight yard located just south across the tracks from the Niagara Falls Station and extends east from there for over one mile.

There are two stub-ended tracks at Niagara Falls Station designated "the house" and "the middle." Each track can hold one Empire Corridor train set. Minimal servicing such as refueling, cleaning, and minor emergency repairs can be done to Empire Corridor trains between their runs.

2.8.4. Bridges and Tunnels

Bridges

There are more than 300 bridges located along the Empire Corridor, as well as a number of smaller culverts. There are at least 43 bridges located along Empire Corridor South, 249 bridges located along Empire Corridor West, and 41 bridges located along the Niagara Branch. Some of the larger bridges are listed in Exhibit 2-27.

Empire Corridor South

There are three major bridge structures located on the northern half of the corridor, as shown on Exhibit 2-27. There are a large number of small bridges and culverts located on the Hudson Line from Spuyten-Duyvil Bridge to Croton-Harmon Station. Running along the east bank of the Hudson, many small water courses pass under the railroad. There are eight larger structures located on the north end of this segment. There are many small bridges and culverts that drain small water courses into the Hudson River located along the Hudson Line north of Croton-Harmon Station to Poughkeepsie. A few of the bridges are longer and include a small drawbridge.

There are 32 undergrade bridges and 35 culverts located along the CSXT Hudson Subdivision South of Albany segment. Twelve bridges located over waterways are more substantial. There are approximately 26 undergrade bridges and an unknown number of culverts located on the CSXT Hudson Subdivision west of Albany-Rensselaer. Two of the bridges are significant structures and include the Livingston Avenue swing span bridge over the Hudson River. This bridge is in poor condition and programmed to be replaced. The other significant undergrade bridge is located over the Mohawk River in Schenectady.

Exhibit 2-27—Major Bridges along Empire Corridor

Segment	Milepost Location	Description
Empire Connection from Penn Station to Spuyten Duyvil Bridge	MP 5.3	2,040-foot long double track viaduct, short span deck plate girders with ballasted deck, 13 foot track centers. This structure is located against the Henry Hudson Parkway to the west and close to the Riverside Drive viaduct to the east.
	MP 9.2	184-foot long double track bridge over Dyckman Street, consisting of four spans (two short spans over sidewalks and longer spans over roadway), deck plate girder, ballasted deck, 13-foot track centers.
	MP 10.0 Harlem Ship Canal	620-foot long open deck bridge consisting of three 110-foot long, double track, through truss spans and a 290-foot long, double track, cantilevered, through truss swing span. Girder spacing indicates only 12-foot track centers on the bridge; however only a single track on east side at present.
Metro-North Hudson Line from Spuyten-Duyvil to Croton-Harmon	MP 14.9 - Main Street, Yonkers	70-foot through plate girders for 5 tracks, only 4 in use
	MP 15.0 – Dock Street, Yonkers	Variable spans from 44 to 140 feet, as road widens under tracks. Supports four tracks and part of station platforms. Structure type unknown.
	MP 15.1 – Wells Ave., Yonkers	66- to 74-foot total length, multiple short spans. Outside girders are through plate girders, interior support unknown. Supports four tracks plus station platforms.
	MP 15.4 – Ashburton Ave., Yonkers	54-foot through plate girders supporting six tracks. Only five tracks at present, easterly bay is vacant.
	MP 26.9 – Philipse Manor	2 span, 30-foot total, concrete box culvert over waterway, supports four tracks.
	MP 29.6 – Scarborough	3 span structure, total length of 56 feet, unknown structure type. Supports four tracks and northerly side platforms of Scarborough Station over water.
	MP 30.9 – Ossining	40-foot through plate girders over stream. Supports four tracks just north of Ossining Station
	MP 32.7 – Croton River	4 – 100-foot spans. Two center tracks on through truss with 12 foot track centers. Outer two tracks on independent through plate girders.
CSXT Hudson Subdivision from Poughkeepsie to Albany-Rensselaer	MP 85.45 – Vanderburgh Cove	105 feet long – 3 - 35-foot spans, deck plate girder, ballasted deck. Two tracks on structure, at present, bridge was four tracks. Westerly bay removed, easterly bay still in place for railroad maintenance road.
	MP 95.7	Three small bridges along the Tivoli Bay Causeway, from south to north: 65-foot single span, through plate girder, open deck –two tracks only; 65-foot single span, through plate girder, open deck – two tracks only; 110 feet long – 2-55-foot spans, through plate girder, ballasted deck –two tracks only
	MP 97.35	Cruger Island – 80 feet long – 2-40-foot spans, through plate girder, open deck
	MP 87.96	Soldiers Brook – 52-foot single span, through plate girder, ballasted deck
	MP 109.03– Janson Kill	342 feet long – Main center portion of bridge is a 274-foot long four span through plate girder of varying span lengths with a short 44-foot long, 2 span deck plate girder on south approach and a 24-foot single span deck plate girder on north approach. Main bridge is ballasted deck, approach spans are open deck
	MP 115.57 – North Bay	132 feet long, 5-26.5-foot spans (appear to be concrete), newer construction, ballasted deck
	MP 118.30 – Flood Brook	80-foot single span through plate girder, ballasted deck
	MP 118.58 – Stockport Creek	510 feet long, 3-170-foot spans, through truss, open deck
	MP 133.35 – Miitzes Kill	50-foot single span through plate girder, open deck

Exhibit 2-27—Major Bridges along Empire Corridor

Segment	Milepost Location	Description
	MP 133.95– Sampson Creek	30-foot single span through plate girder, ballasted deck
	MP 135.24 – Moordener Kill	62-foot single span through plate girder, open deck. Four bays in place.
	MP 135.82 – Stoney Point	66-foot single span through plate girder, open deck. Two parallel bridges for four tracks, two existing tracks on either side of center girder.
CSXT Hudson Subdivision – West of Albany-Rennselaer	Livingston Avenue Drawbridge over the Hudson River	Overall length of 1,270 feet. The bridge is double track at 13-foot track centers and consists of three, fixed through trusses, several shorter deck plate girders on the east side of the River with a main span consisting of a 262-foot cantilever through truss swing span. This bridge is in poor condition and programmed to be replaced.
	Mohawk River in Schenectady	This bridge is 720 feet long, consisting of 10-72-foot spans of deck plate girders, open deck, double track. Track exists only on the south (upstream) side of the structure.
CSXT Selkirk and Mohawk Subdivisions	MP 209.83 Canada Creek	Two span, dual through truss with two 90-foot spans. The bridges share the center truss so that both are still in place, with the railroad using the southern half of the structure.
	Park Street, MP 291.62	This bridge has been reconstructed and provides only for the two current tracks
	Onondaga Creek, MP 292.18	This bridge has been reconstructed and provides only for the two current tracks
	MP 222.74- Mohawk River (also known as Canada Creek)	This structure consists of 8 - 75-foot deck plate girders, with all four track bays in place and the railroad occupying the two southerly bays
CSXT Rochester Subdivision and Buffalo Terminal Division	North Plymouth Avenue in Rochester	This bridge can only accommodate the three tracks currently on the bridge.
	Seneca River	The largest structures include the 1,775, foot bridge near Savannah over the Montezuma Marsh
	Genesee River	The bridge over the river in Rochester

Empire Corridor West

There are 118 undergrade bridges located along the CSXT Selkirk and Mohawk Subdivisions segment. Most were constructed to accommodate four tracks at 13-foot track centers. There are a few that have been reconstructed and provide only for the two current tracks. Most of the bridges are relatively small. Two of the larger structures are located over Canada Creek. The bridges share the center truss, so that both are still in place, with the railroad using the southern half of the structure. The longest bridge located along the CSXT Selkirk and Mohawk Subdivisions is over the Mohawk River (also known as Canada Creek) at MP 222.74. There are 105 undergrade bridges located along the CSXT Rochester and Buffalo Terminal Subdivisions segment. Most were constructed to accommodate four tracks at 13 foot track centers or less. The largest concentration of undergrade bridges is located in Rochester. The largest structures include the 1,775-foot Seneca River/Montezuma Marsh open deck bridge near Savannah, dating to 1924 and consisting of 89 spans averaging 20 feet in length. Other large structures include the bridge over the Genesee River in Rochester and several single-span through truss bridges.

Niagara Branch

There are 41 undergrade bridges located along the CSXT Niagara Subdivision segment. All bridges have provisions for two or more tracks.

Tunnels

Most of the Empire Corridor tunnels are located in the southern portion of the Empire Corridor (refer to Exhibit 2-28), but tunnels are also located on the Niagara Branch, as shown on Exhibit 2-28.

Exhibit 2-28—Tunnels along Empire Corridor

Segment	Milepost Location	Description
Empire Corridor South	MP 0 to MP 5	Tunnel from Penn Station to 123rd Street, with daylighted sections occurring between the following city streets: 36th – 39th; 43rd – 46th; 48th-49th; 60th-61st
	MP 36.62	Osca Tunnel – 250 feet long
	MP 43.62	Little Tunnel – 75 feet long
	MP 44.40	Middle Tunnel – 300 feet long
	MP 45.07	Route 6 Tunnel – 175 feet long
	MP 50.06	Garrison Tunnel – 450 feet long
	MP 54.52	Breakneck Tunnel – 550 feet long
	MP 91.33	Rhinecliff Tunnel – 230 feet long
Niagara Branch	MP QDN2.1	Two tunnels run under I-190/Route 5 interchange, both 500 feet long
	MP QDN2.2	

2.8.5. Grade Crossings

Grade crossings occur where the tracks cross a road at the same elevation. Grade crossings can present a safety concern due to the potential for collision of a train with a motor vehicle, pedestrian, or bicyclist. Section 2.9 includes a discussion of safety considerations with grade crossings. There are a total of 365 grade crossings located along the Empire Corridor, according to information from New York State Geographic Information System (NYSGIS). Of these, 138 are private crossings and 227 are public crossings.

Empire Corridor South

There are no grade crossings located on the southernmost Empire Connection segment.

There are no public crossings located on the Hudson Line from Spuyten-Duyvil to Croton-Harmon

Station. There are several grade crossings located along the Hudson Line north of Croton-Harmon Station, including both public and private crossings

There are 9 public crossings and 14 private crossings on the CSXT Hudson Subdivision south of Albany. The public crossings all have automatic warning systems, and several of the more active private crossings also have active warning systems.

There are 5 public crossings and 3 private crossings along the CSXT Hudson Subdivision West of Albany-Rensselaer. All public crossings have automatic highway crossing warning systems. The private crossings have only passive warning devices (signage).

Empire Corridor West

There are 18 public crossings and 80 private crossings located along the CSXT Selkirk and Mohawk Subdivisions. All of the public crossings have automatic highway crossing warning systems, as do a few of the more active private crossings. Most of the private crossings have only passive warning systems.

There are 56 public crossings and 40 private crossings in the CSXT Rochester and Buffalo Terminal Subdivisions. All of the public crossings have automatic highway crossing warning systems and a few of the more active private crossings do also. Most of the private crossings have only passive warning systems.

Niagara Branch

There are 12 public crossings and approximately 14 private crossings in the CSXT Niagara Subdivision segment. All of the public crossings have automatic highway crossing warning systems. It appears the private crossings have only passive warning systems.

2.8.6. Rolling Stock

Rolling stock on the Empire Corridor consists of locomotives pulling unpowered coaches. The locomotives operating on the Empire Corridor South are P32AC-DM (Dual Mode) models, which provide for electrified third rail access to Penn Station. Diesel locomotives cannot operate in Penn Station where all tracks are electrified, most with both over running contact rails (third rail) and overhead catenary. Some Empire Corridor West trains change engines in Albany from the dual mode locomotives to P40 or P42 conventional diesel locomotives. All three locomotive types date to the early 1990s and were originally built by General Electric. All are capable of 110 mph operation and regularly achieve this speed in segments of the corridor between Hudson and Schenectady, but a long period of acceleration is required.

The cars are Amfleet I coaches built from 1974 to 1978, with various combinations of coach, café, and business class configurations. Empire Service passenger trains typically consist of one locomotive and five Amfleet coaches. The Lake Shore Limited train is much longer, typically consisting of two locomotives, a baggage car, three sleeping cars, a dining car, and four or more coaches.

Amtrak recently concluded a contract signing with Construcciones y Auxiliar de Ferrocarriles

(CAF), a Spanish rolling stock supplier, to replace the 1940s era sleeper, baggage, and dining cars used on the Lake Shore Limited. No other Empire Corridor rolling stock replacement is currently underway.

NYSDOT is an active participant in the Next Generation Corridor Equipment Pool committee established by Amtrak under the requirements of Section 305 of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA). Specification development has been completed for both the Next Generation locomotives and the single-level coaches to be used on eastern U.S. trains. Future equipment used on the Empire Corridor will meet the 305 specification.

2.9. Safety Considerations

The safety of Empire Corridor passengers is of the utmost importance. Ten years of safety data made available from the FRA Office of Safety Analysis, from January 2002 through December 2011, were analyzed for counties located along the Empire Corridor. Data on injuries and fatalities were provided for train accidents, highway-rail incidents, and other accidents/incidents.[45] The FRA defines accidents/incidents as collisions, derailments, and other events involving the operation of on-track equipment and causing reportable damage above an established threshold; impacts between railroad on-track equipment and highway users at crossings; and all other incidents or exposures that cause a fatality of injury to any person, or an occupational illness to a railroad employee. Accidents and incidents are divided into Train Accidents, Highway-Rail Incidents, and Other, as follows:

- Train accidents are safety-related events involving on-track rail equipment (both standing and moving) that cause monetary damage to the rail equipment and track above a prescribed amount (threshold for 2008 is $8,500);
- Highway-rail grade crossing incidents are any impacts between a rail and highway user (both motor vehicles and other users of the crossing at a designated crossing site, including walkways, sidewalks, etc., associated with the crossing);
- Other incidents are any death, injury, or occupational illness of a railroad employee that are not the result of a "train accident" or "highway-rail incident."[46]

From 2002 to 2011, as shown in Exhibit 2-29, there have been 32 fatalities and 875 injuries in counties along the Empire Corridor. Ninety-eight percent of all accidents/injuries were classified as "Other," or cases in which monetary damage was less than $8,500 or was not classified as a highway-rail incident.

Along the Empire Corridor, there were no train accidents, only highway-rail incidents and other events amounting to less than $8,500. Across the U.S. in 2009, 431 people were killed and 343 were injured while trespassing on railroad ROWs and property.[47] A majority of all fatalities and injuries

[45] / FRA Office of Safety Analysis. "1.07 Ten Year Accident/Incident Overview by Railroad/Region/State/County." Accessed May 22, 2012, <http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/tenyr2a.aspx>

[46] / FRA Office of Safety Analysis. "9.12 Definitions." Accessed May 22, 2012, <http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Definitions.aspx>

[47] / FHWA. "Railway-Highway Grade Crossing Facts and Statistics." Accessed May 22, 2012, <http://safety.fhwa.dot.gov/xings/xing_facts.cfm>

along the Empire Corridor was due to other incidents, including incidents at public crossings and trespassing. Furthermore, most injuries occurred to employees on duty and trespassers, rather than to passengers. New York County accounted for nearly 60 percent of all injuries, 16 percent of fatalities, and a majority of incidents occurred in this densely populated county.

Exhibit 2-29—Ten Year Safety Data in Counties along Empire Corridor, 2002-2011

County (SE to NW)	Total			Train	Highway-Rail Grade Crossing		Other			Public Crossing
	Accidents/ Incidents	Fatalities	Injuries	Accident Injuries	Accidents/ Incidents	Fatalities/ Injuries	Accidents/ Incidents	Fatalities	Injuries	Incidents
New York	535	5	552	4	1		534	5	548	
Bronx	9		11				9		1	
Westchester	34	3	35	3			34	3	32	
Putnam	1		1				1		1	
Dutchess	21	4	19		2	2	19	3	18	
Columbia	14	2	11		2		12	2	11	2
Rensselaer	94	1	93				94	1	93	
Albany	58	3	59				58	3	59	
Schenectady	10	1					10	1	9	
Montgomery	5	1	4		2	1	3		3	1
Herkimer	1		1				1		1	
Oneida	9		12	3			9		9	
Madison										
Onondaga	21	1	21				21	1	21	
Cayuga										
Wayne	2	1	1		1	1	1		1	1
Monroe	17	2	13		2		15	2	13	2
Genesee	3	1	1		2	1	1		1	2
Erie	26	5	21				26	5	21	
Niagara	13	2	11		2	1	11	1	11	2
Total	**873**	**32**	**875**	**10**	**14**	**6**	**859**	**27**	**863**	**10**

Note: No data were available for Madison or Cayuga counties.
Source: FRA Office of Safety Analysis

From 2002 to 2011, there were ten incidents at public grade crossings along the Empire Corridor; seven of these incidents resulted in injuries but no fatalities. Comparatively, in the U.S. in 2009 alone, there were 1,896 incidents at public highway-rail crossings, resulting in 247 deaths and 705 injuries.[48]

According to data published by the National Safety Council, highway travel is 12 to 20 times more likely to result in a fatality than rail travel.[49] To further increase the safety of rail transportation and especially high speed rail, the FRA prepared a High Speed Passenger Rail Safety Strategy in 2012.

[48] / FHWA. "Railway-Highway Grade Crossing Facts and Statistics." Accessed May 22, 2012, <http://safety.fhwa.dot.gov/xings/xing_facts.cfm>

[49] / FRA. "High Speed Passenger Rail Safety Strategy". Accessed May 22, 2012, <http://www.fra.dot.gov/downloads/safety/HSRSafetyStrategy110609.pdf>

Addressing grade crossings, one of the top priorities, the Safety Strategy reinforces current FRA regulations that require the protection of rail movements with full width barriers capable of absorbing the impact of maximum weight highway vehicles where train-operating speeds are between 111 and 125 mph and that require elimination or grade-separation of all crossings where trains travel at speeds above 125 mph (49 CFR 213.347).[50]

The FRA Safety Strategy also includes the following recommendations for high speed passenger rail operations:

- Eliminate all redundant or unnecessary crossings, together with any crossings that cannot be made safe due to crossing geometry or proximity of complex highway intersections.
- Install the most sophisticated traffic control/warning devices compatible with the location (e.g., median barriers, special signage [possible active advanced warning], four-quadrant gates), where train-operating speeds are between 80 and 110 mph.

There are nearly 365 at-grade crossings on the current Empire Corridor centerline. Once a preferred alternative is selected, these at-grade crossings would be either enhanced or eliminated, depending on the final design speed, consistent with the FRA's regulations and guidance.

Further safety prevention techniques that the FRA addresses are positive train control (PTC) and ROW safety, as well as vehicle-track interaction, maintenance, and real-time monitoring.

According to the Rail Safety Improvement Act of 2008 (RSIA), PTC, a system designed to prevent collisions between trains, overspeed derailments, incursions into established work zone, and the movement of a train through an improperly positioned switch, will be required on certain lines of Class 1 freight and passenger rail carriers, including the Empire Corridor trackage of Amtrak, CSXT, and Metro-North, by the end of 2015 (pending legislation would defer implementation in some cases but the outcome of the proposed legislation is uncertain). The FRA is implementing the legislative PTC requirements, including application to dedicated (passenger train only) high-speed rail lines; the RSIA language currently applies only to certain lines of Class 1 carriers and regularly scheduled intercity or commuter passenger operations.

ROW safety measures include prevention of vandalism, launching of objects from overhead bridges or structures into the path of trains, and/or the intrusion of vehicles from adjacent ROW. While these are always important issues, protecting the HSR's ROW from overhead bridges or structures is especially important if all at-grade crossings are eliminated, as objects or even vehicles could fall from the overpasses and land on the tracks. European HSR uses intrusion detection nets (e.g., infrared, microwave, video technology) to communicate any hazards that may be on the tracks at overpass intersections.[51.]

[50] / FRA. "High Speed Passenger Rail Safety Strategy". Accessed May 22, 2012, <http://www.fra.dot.gov/downloads/safety/HSRSafetyStrategy110609.pdf>

[51] / Federal Railroad Administration. "High Speed Passenger Rail Safety Strategy". Accessed May 22, 2012, <http://www.fra.dot.gov/downloads/safety/HSRSafetyStrategy110609.pdf>

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3. Alternatives

This chapter describes program alternatives, including how they were developed, and examines the engineering aspects of all feasible alternatives to address the program purpose, needs, and objectives described in Chapter 1. Alternatives that were considered, but not advanced for further study, are also described along with the reasons for not advancing them.

There are several aspects to each alternative including operational changes, investments in infrastructure, and equipment. The reasonable alternatives advanced for further study are compared in Chapter 6.

The specific **operational and physical elements used to define the alternatives** consist of:

- Maximum authorized speed (MAS);
- Frequency of service;
- Schedule enhancements, including express service;
- Track, bridge, signal and grade crossing improvements;
- Station and facility improvements;
- Equipment (locomotives and coaches);
- Capital costs at a program level; and
- Operations and maintenance costs.

The **performance measures used to gauge how each alternative meets program goals and objectives** include:

- Trip time,
- On-time performance (OTP),
- Ridership, and
- Revenue.

The **improvements needed in infrastructure and train service performance,** include:

- Reduce infrastructure constraints, and
- Accommodate existing and projected demand.

The following **performance objectives** have been identified for the High Speed Rail Empire Corridor Program as measurable objectives that directly relate to the program purpose and need to reduce infrastructure constraints to accommodate existing and projected demand:

- Improve system-wide on-time performance (OTP) to at least 90 percent;
- Reduce travel time along all segments of the Empire Corridor;
- Increase the frequency of service (number of daily round trips) along Empire Corridor West beyond the existing four daily round trips;
- Attract additional passengers;
- Reduce automobile trips, thereby reducing highway congestion;

- Minimize interference with freight rail operations.

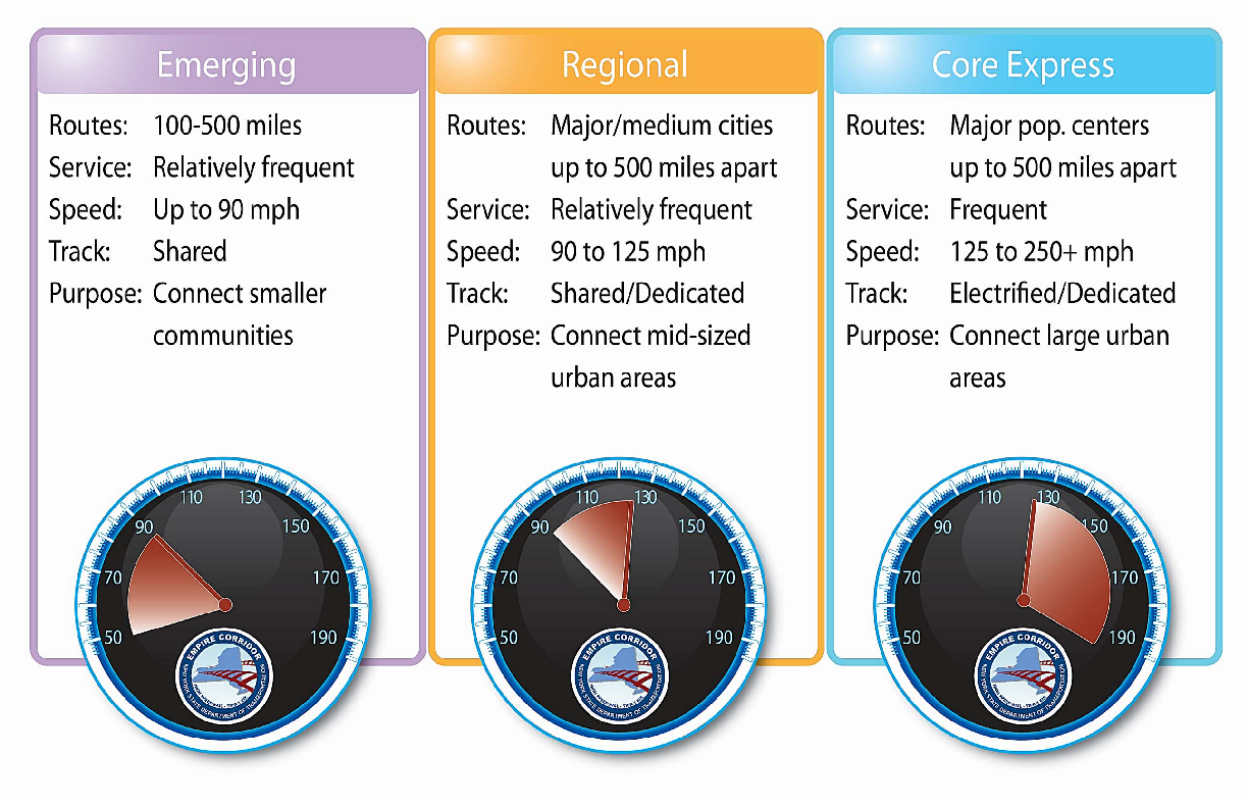
These six performance objectives are used to evaluate and rank how the high-speed rail alternatives meet the goals and objectives for the High Speed Rail Empire Corridor Program. The environmental impacts of these alternatives are also considered, as presented in this Tier 1 Draft EIS, and will be an important factor in selecting the alternative to be advanced.

3.1. Alternatives Development and Screening

The Federal Railroad Administration (FRA) has established three levels of high-speed rail service along with planning guidelines for each: Emerging, Regional and Core Express as shown in Exhibit 3-1.

The **"Emerging"** category is used to describe relatively frequent service used to connect smaller communities, and having speeds up to 90 miles per hour (mph), on tracks shared by freight, commuter, and intercity passenger rail.

Exhibit 3-1—FRA Levels of High-Speed Rail Service



Source: FRA. *Vision for High-Speed Rail in America: High-Speed Rail Strategic Plan.* April 2009.

The **"Regional"** category is used to describe relatively frequent service used to connect mid-sized urban areas, and having speeds between 90 and 125 mph, on tracks that may be shared by freight, commuter, and intercity passenger rail or on tracks dedicated for passenger rail.

The **"Core Express"** category is used to describe frequent service used to connect large urban areas, and having speeds between 125 and 250 mph or more, on tracks dedicated for intercity passenger rail.

Alternatives development for this program initially began with categorizing possible alternatives according to the FRA's levels of high-speed rail service. Using this information, NYSDOT developed an initial range of possible alternatives within the framework of these categories to satisfy the program purpose (refer to Section 1.3). Each service level achieves different goals, provides different top speeds, and requires different kinds and levels of investments. The initial range of possible alternatives developed for this program included six groups organized by the maximum authorized speed associated with each group. The naming convention of the alternatives is based on these groupings according to the maximum authorized speed (MAS) (79 mph, 90 mph, 110 mph, 125 mph, 160 mph, and 220 mph) with variations of the speed-based alternative designated by the letters A, B, and C.

- Using **79 miles per hour** as the maximum authorized speed represents what can be done with current track standards and in-cab signaling capacity. Alternatives in this category that would use current vehicle technology with the possibility of integrated trainsets included several variations on the 79 mph alternative (Base, 79A, 79B, 79C) and would fall into the FRA's "**Emerging**" category.

- Using **90 miles per hour** as the maximum authorized speed represents the next step up in track standards and in-cab signaling train control. Alternatives in this category that would use current vehicle technology with the possibility of integrated trainsets included several variations on the 90 mph alternative (90A and 90B) and would fall into the FRA's "**Regional**" category.

- Using **110 miles per hour** as the maximum authorized speed represents another step up in track standards. Described as the "110 Alternative," this alternative would also use current vehicle technology with the possibility of integrated trainsets and would fall into FRA's "**Regional**" category.

- A **125 miles per hour** alternative would be the first speed threshold for electrically powered trains and represents another step up in track standards and advanced train control. This alternative would fall into FRA's "**Core Express**" category.

- A **160 miles per hour** alternative would represent the practical upper limit of electrified dynamic tilt trains, such as the Amtrak Acela, which provide faster operating speeds on curves. This alternative represents another step up in track standards and advanced train control and would fall into FRA's "**Core Express**" category.

- A **220 miles per hour** alternative represents the practical upper limit of high-speed rail operations seen in France, Germany, Spain, Japan and China and would fall within FRA's "**Core Express**" category.

In addition to maximum authorized speed, alternatives are further described in terms of service schedules, station stops, equipment, and physical improvements.

3.1.1. Service Schedules and Station Stops

Service frequency was the next consideration in developing and defining alternatives. Three service levels were considered:

- The existing four round trips per day between Albany-Rensselaer and Buffalo;
- Increasing the service to 12 round trips per day between Albany-Rensselaer, Buffalo, and Niagara Falls;
- Increasing the service to eight round trips per day between Albany-Rensselaer, Buffalo, and Niagara Falls with express service.

An initial group of alternatives was defined that focused on improving the reliability (on-time performance [OTP]) of the existing four round trips per day service. This approach focused on identifying capital improvements to support an 85 percent to 90 percent OTP level between Albany-Rensselaer, Buffalo, and Niagara Falls, while maintaining the existing four daily round trips service.

A second group of alternatives was defined that increased service levels to 12 round trips per day as well as improved reliability. Preliminary Empire Corridor ridership was estimated in an iterative process based on varied levels of service frequency. Initial ridership forecasts were based on service frequencies between Albany-Rensselaer, Buffalo, and Niagara Falls of 12 round trips per day. This would be a substantial service expansion with estimated gains in ridership of about 65 percent. The ridership gains would be significantly less than the percentage increase in service levels (300%). Therefore, daily service levels of 12 round trips were determined to be very high when compared to the relatively low increase in ridership gained for the projected service increase.

NYSDOT determined that a third group of alternatives with service levels of eight round trips per day as well as improved reliability was a reasonable initial balance between service attractiveness and operating subsidy affordability. This doubling of the existing service would result in ridership gains of approximately 38 percent to 74 percent over the Base Alternative depending on the alternative analyzed. The Base, or "No Action," Alternative represents future conditions assuming currently-planned and approved projects are built, but without implementation of any of the "Build" Alternatives of this High Speed Rail Empire Corridor Program. The Base Alternative is used for comparison to all Build Alternatives.

In addition to determining the appropriate service level (eight round trips per day), the concept of providing express service was also evaluated along the Empire Corridor West during development of the alternatives. Two of the alternatives, Alternatives 90A and 125, would offer some form of express service between New York City and Niagara Falls.

3.1.2. Equipment

The number of new train sets, consisting of locomotive and passenger coaches, which would be required for each alternative, are indicated in the description of each alternative. The Empire Corridor does not support electric propulsion trains north of Croton-Harmon Station. At the same time, trains are required to operate with electric propulsion at Penn Station New York and through the East River Tunnels to the layover/servicing facilities at Sunnyside Yard in Long Island City, Queens. Therefore, the existing Empire Corridor is operated with specialized "dual mode" locomotives that can switch from electric to diesel operation (the present switchover occurs at about 40th Street in Manhattan, just north of Penn Station). The present Amtrak electric operation uses 700 volts (DC) third rail as an energy source at Penn Station and in the East River Tunnels. This third rail configuration is different than that of Metro-North, so Empire Corridor trains are unable to take advantage of the third rail between Spuyten-Duyvil and Croton-Harmon.

In addition to dual mode locomotives, longer-distance Empire Corridor trains (those to/from Montreal, Toronto, and Chicago) utilize conventional diesel locomotives west of Albany. Both the dual mode and conventional diesel locomotives are capable of 110 mph operation, and regularly achieve this speed on portions of the corridor between Hudson and Schenectady, but a long period of acceleration is required. Empire Corridor passenger coaches are single level unpowered coaches of the "Amfleet" type that date from the 1970s. These coaches, including some similar food service/business class cars, are approaching the end of their service life, but funding is not yet in place for their replacement.

3.1.3. Physical Improvements

Each alternative consists of a program of improvements needed to implement the characteristics of the alternative (increased speed, improved reliability, increased capacity to support additional service, and passenger amenities). The types of physical improvements include new sidings, new dedicated passenger track, grade crossing improvements or elimination, advanced train control systems, and station improvements. The specific improvements included in the alternatives are based on an evaluation of potential capital projects developed for each segment of the corridor. Between New York City and Albany-Rensselaer, the section known as Empire Corridor South, improvements were identified in the Hudson Line Railroad Corridor Transportation Plan.[52] A series of improvements were identified in this plan along with a likely year of implementation, based on operational need, capital cost, available funding, and permitting/design status.

In each case, a suite of capital improvements identified in the Hudson Line Transportation Plan are included for the Empire Corridor South segment, common to all Build Alternatives. These improvements are:

- Add second track between MPs 9 to 13 (including Spuyten Duyvil Movable Bridge);
- Add new Tarrytown pocket track to support Metro-North turnbacks without delaying Empire Corridor Service;

[52]/ SYSTRA Engineering. *Hudson Line Railroad Corridor Transportation Plan: Final Report*, (Document No. M40801-11/95 18/STU-137). Prepared for Amtrak, Canadian Pacific Railway, CSXT, MTA Metro-North Railroad, NYSDOT. November 2005.

- Add new signal system between Croton-Harmon and Poughkeepsie Stations (MPs 32.8 to 75) for additional operating capacity;
- Add third track (MP 53 to 63) to support Empire Corridor overtakes of Metro-North trains;
- Add new track/siding at Poughkeepsie Station Track 3 to support higher operating speeds for Empire Corridor and Metro-North service;
- Add new Poughkeepsie yard to eliminate station congestion and crossing conflicts north and south of the station;
- Add New CP82, New CP 99, New CP 136 – two-track universal interlockings to support enhanced reliability during maintenance activities;
- Reconfigure Hudson Station to support simultaneous passenger boarding/alighting on both main tracks.

Within the Base Alternative, the proposed Albany-Rensselaer Station fourth-track capacity improvements were included in the Hudson Line Railroad Corridor Transportation Plan.

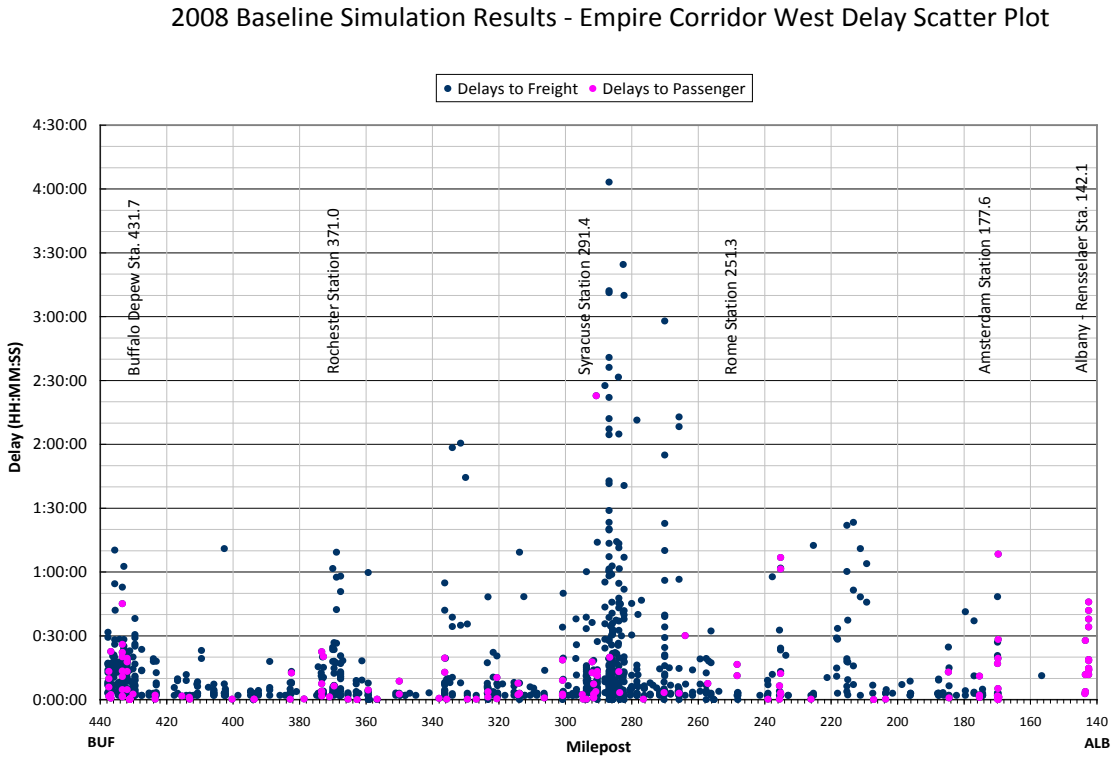
In addition, along Empire Corridor South and the section west of Albany-Rensselaer Station, known as the Empire Corridor West, improvement projects not already included in the Base Alternative were identified. These include projects from:

- NYSDOT HSIPR grant and TIGER grant applications to the FRA,
- The New York State Rail Plan,
- Additional improvements identified during development of this EIS to improve speed and reliability and enhance service.

As with New York City to Albany-Rensselaer projects, these improvements were designated with a likely year of implementation, based on operational need, capital cost, available funding and permitting/design status. Priority was given to projects that provide relief to current delays experienced by passenger and/or freight trains. These delays were identified from the 2008 Empire Corridor baseline simulation model, which has been calibrated against actual operations. 2008 was used as the analysis year because it reflects realistic trends in rail congestion, prior to the economic downturn (and concomitant decline in freight shipping) in 2009.

The scatter plot in Exhibit 3-2 shows locations of delays, along with their magnitude (the vertical axis represents duration of a single delay event, with the top of the chart representing a single delay lasting 4 ½ hours). While passenger train delays (shown in red in the graph) were given highest priority for resolution, freight train delay (shown in blue) mitigation was also pursued. This is because delayed freight trains are likely to cause secondary delays to passenger trains due to congestion and loss of dispatching flexibility.

Exhibit 3-2—Empire Corridor West: 2008 Delays



The general elements of each alternative are summarized in Exhibit 3-3. All alternatives would include projects planned under the Base Alternative (designated BA in Exhibit 3-3).

Exhibit 3-3—General Elements of the Alternatives

Alternative Components	BA	79A	79B	79C	90A	90B	110	125	160	220
Maximum Authorized Speed	79	79	79	79	90	90	110	125	160	220
Base Alternative Projects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
New Sidings		✓	✓	✓	✓	✓	✓			
Station Improvements		✓	✓	✓	✓	✓	✓	✓	✓	✓
New Service			✓	✓	✓	✓	✓	✓	✓	✓
New Dedicated Main Track				✓		✓	✓			
Grade Crossing Improvements				✓	✓	✓	✓			
Advanced Train Control System					✓	✓	✓	✓	✓	✓
Additional Right-of-Way within Existing Corridor						✓	✓			
New Corridor & Right-of-Way/ Electrified								✓	✓	✓
Eliminate Grade Crossings								✓	✓	✓

3.2. Alternatives Considered and Eliminated From Further Study

Once the initial full range of possible alternatives (including maximum authorized speed, service, equipment, and physical improvements) was developed, the alternatives were subsequently screened according to the program purpose and need and associated objectives. NYSDOT applied a consistent set of performance measures (i.e., trip time, reliability, ridership, cost and revenue) to evaluate the range of possible alternatives. Certain alternatives were not advanced, based on an evaluation of these performance measures and comparative costs and environmental impacts. In addition, the performance of alternatives was compared against each other in the screening, and those that were not as effective in meeting the performance objectives were eliminated from further consideration.

The following describes the alternatives considered and eliminated from further study.

3.2.1. 79 mph MAS Alternatives

Two 79 mph Maximum Authorized Speed (MAS) infrastructure alternatives were considered, incorporating various infrastructure improvements and operational enhancements, as alternatives that would maintain the existing FRA class of track/maintenance tolerances in the corridor and constrain associated infrastructure improvements to the existing right-of-way. The infrastructure alternatives focused on existing corridor trackage upgrades were, in turn, associated with two different service delivery levels—existing and an approximate doubling of Albany-Rensselaer to Buffalo service—to form Alternatives 79A and 79B, respectively. Infrastructure improvements would include passing sidings and signal and station improvements.

A third 79 mph MAS alternative, designated Alternative 79C, included a new dedicated single main track with some new dedicated double main track segments for train passing adjacent to the existing Empire Corridor alignment. The principal attribute of all three of the 79 mph alternatives is to provide greater reliability and fewer conflicts with existing and future CSXT freight movements along the Empire Corridor West (service characteristics along the Empire Corridor South between Albany-Rensselaer and New York Penn Station would remain unchanged).

None of the 79 mph alternatives provide a significant operational or cost advantage over the 90 mph alternatives, which are distinguished primarily by track structure improvements to support higher passenger train speeds where feasible within the existing corridor alignment.

Simulations show that the New York to Niagara Falls trip time of Alternatives 79A/B is within 10 minutes (out of a scheduled trip time of over 8 hours) of that of Alternative 90A. Service levels are identical. As a result, ridership projections are essentially the same between these alternatives.

Similarly, Alternative 79C is characterized by essentially similar infrastructure as Alternative 90B, each with a dedicated third track over most of the corridor between Schenectady and Buffalo. Travel time differences between the two alternatives, based on detailed single train simulation, are less than 25 minutes (out of a trip time of more than 7 hours). Ridership projections for these two alternatives show less than 10 percent difference, reflecting identical service delivery and very similar trip times between the two alternatives.

Because there was no substantive and positive differentiator of the 79 mph alternatives, they were not advanced for further consideration, as they did not meet the purpose and need. In each case, the comparable 90 mph alternative showed slightly superior trip time and ridership, resulting in it being retained over its slightly inferior 79 mph counterpart.

3.2.2. Very High Speed (VHS) Alternatives

During the program scoping process in 2010, considerable interest was expressed by the public and other program stakeholders in the potential for higher speed alternatives. These included a 160 mph alternative representing the practical upper limit of electrified dynamic tilt trains, such as the Amtrak Acela; and a 220 mph alternative representing the practical upper limit of high-speed rail operations seen in France, Germany, Spain, Japan, and China. In response to this, a range of higher speed alternatives was carefully examined according to the same metrics as the other alternatives.

The dedicated right-of-way of the very high speed (VHS) alternatives would result in significant travel time savings (5:17 and 4:23 respectively for 160 mph MAS and 220 mph MAS), and commensurately higher estimated ridership (4.06 and 5.12 million respectively for 160 mph MAS and 220 mph MAS).

These gains would come with significant service and economic costs. Attaining average speeds commensurate with the proposed investment would result in the likely diversion of the VHS service from all but four of the existing Empire Corridor West stations (i.e., Albany-Rensselaer, Syracuse, Rochester, and Buffalo Exchange would serve both the VHS and any continued "Legacy" Empire Corridor passenger service). Between Albany-Rensselaer and New York City, there would be an entirely new station and market configuration, with construction of new right-of-way on a viaduct structure aligned with existing highways (assumed to be I-87/NY State Thruway). Physical and environmental characteristics of the existing Empire Corridor South would result in either extraordinary encroachments and impacts or a diversion so far to the east as to fall outside the Empire Corridor as defined. As such, synergies between existing commuter rail and high-speed rail services in the corridor would be lost under these alternatives. It would not be possible to utilize Metro-North to originate at a suburban station and connect to a high-speed rail train.

At a corridor level, alternatives that are on alignments beyond the existing railroad corridor would be expected to have greater impacts to the natural and human environment than alternatives that follow the existing railroad corridor.

Although these alternatives would meet performance objectives, these improvements would come at a cost that is, by any current measure, infeasible at $27 billion (160 mph MAS) and $39 billion (220 mph MAS), calling into question the viability of improvements to the Empire Corridor that would go well above and beyond the current financial constraints. The projected capital cost of these alternatives is 30 to 43 times greater than the Amtrak intercity rail capital program for the entire United States for FY 2011, for example.

For all of these reasons, NYSDOT eliminated the VHS alternatives from further study. More prudent and feasible alternatives exist which confer transportation benefits and that do not have substantial negative cost, property-taking, community, and environmental impacts.

3.2.3. 125 mph MAS Alternative on Existing Empire Corridor

A higher speed alternative, 125 mph MAS, was evaluated west of Schenectady, and consideration was given of running this service on the existing Empire Corridor West. The differences in costs and benefits, between Alternative 125 on the existing Empire Corridor and Alternative 125 on a new corridor, favor the new-corridor alternative. Use of the existing corridor for Alternative 125 would require additional infrastructure over and above the 110 Alternative: dual mode locomotives in electric mode would be operated along an electrified, completely grade-separated corridor that also includes (where possible) additional curve modifications.

Today, portions of the existing corridor geometry can support 125 mph MAS. However, just like the 110 and 90 mph Alternatives, there are portions of the corridor that could not be realigned to support 125 mph, so trains would have to slow down and speed up at each civil speed restriction. That is, the trip time (or average speed) for the new corridor 125 Alternative will be better than the trip time (or average speed) for an existing-corridor 125 Alternative.

NYSDOT has concluded that the incremental costs associated with upgrading the existing corridor from 110 mph MAS to 125 mph MAS are not justified by incremental improvement in trip time. The incremental approach will never achieve trip times close to a new corridor, although this does not include the purported acceleration improvements of electric traction equipment. Grade separating on the existing corridor adjacent to the existing freight tracks would be costly and complicated compared to constructing a new corridor.

3.3. Feasible Alternatives Advanced for Further Study

Five alternatives were advanced for further study:

- **Base Alternative:** consists of eight capital improvement projects that have been funded under FRA HSIPR and TIGER grants, in addition to normal maintenance.
- **Alternative 90A:** consists of 20 additional capital improvement projects previously identified for potential FRA HSIPR and TIGER grant funding. This alternative would provide a MAS of 90 mph and limited express service and also includes the Base Alternative projects.
- **Alternative 90B:** consists of additional areas of third track and fourth track and station improvements to accommodate a MAS of 90 mph. This alternative also incorporates the 20 Alternative 90A improvements, in addition to the eight Base Alternative projects.
- **Alternative 110:** consists of additional areas of third track and fourth track and station improvements to accommodate a MAS of 110 mph. This alternative also incorporates the 20 Alternative 90A improvements, in addition to the eight Base Alternative projects.
- **Alternative 125:** maintains existing Amtrak Empire Service and incorporates express service along a new, electrified, grade-separated corridor, providing a MAS of 125 mph between Albany-Rensselaer and Buffalo Exchange Street. The route overlaps with and serves station tracks at Syracuse and Rochester, incorporating Base Alternative improvements and those Alternative 90A improvements along the Hudson Line and Niagara Branch and the portions of Empire Corridor West that overlap with the new route.

Exhibit 3-4 presents a corridor map of the Build Alternatives, and Exhibit 3-5, Exhibit 3-6, and Exhibit 3-7 summarize the characteristics and improvements for each alternative.

These alternatives incorporate most of the improvements along Empire Corridor South outlined in the Hudson Line Railroad Corridor Transportation Plan, with the exception of the Base Alternative (which only incorporates improvements identified at Albany-Rensselaer Station).

Track centers described in this EIS are based on conceptual-level design. These conceptual-level track centers represent prudent estimates of proposed conditions and have been used to establish this program's potential impacts to adjacent property and environmental resources for each feasible Build Alternative. Specific track center design criteria and actual track centers proposed will be established during detailed design. Specific individual project track center design criteria, including any proposed design exceptions, will be developed considering factors including: the policies of the FRA, design guidelines and criteria of the railroad owners, and avoidance and minimization of impacts to adjacent property and environmental resources.

For the 90 mph and 110 mph Alternatives, the new passenger tracks are located on the north side, when historically the passenger tracks were located to the south of the freight tracks. The primary reason for placing the new passenger tracks on the north side of the ROW is cost. If the new passenger tracks were constructed on the south side, generally on top of the existing two tracks, both the new passenger tracks and most of the two freight tracks would have to be rebuilt. By placing the new passenger tracks to the north, there is very little reconstruction required for the existing tracks, which become the almost exclusive freight tracks. At a cost of about $2.6 million per mile to remove and build two new freight tracks, that additional cost to the program would be significant. The new passenger tracks would also be added in the former location of the historic two-track system.

An offsetting cost of placing the new passenger tracks to the north is the need to construct additional crossovers, flyovers, and interlockings to allow freight trains running on the south side to crossover the new passenger mains to reach freight facilities on the north side. The resulting interconnectivity between the passenger and freight mains has the benefit of facilitating future maintenance operations for both modes and provides bypasses for each in the event of a service interruption such as equipment failure, derailment, etc.

Alternative 125 achieves a MAS of 125 mph by developing a new conceptual corridor alignment that minimizes horizontal curvature and elevation changes. The location of the new corridor was determined based on topography and avoidance of geographic information system (GIS)-mapped constraints, while remaining near the existing railroad corridor and providing connections with the existing Albany-Rensselaer, Syracuse, Rochester, and Buffalo-Exchange Street Stations.

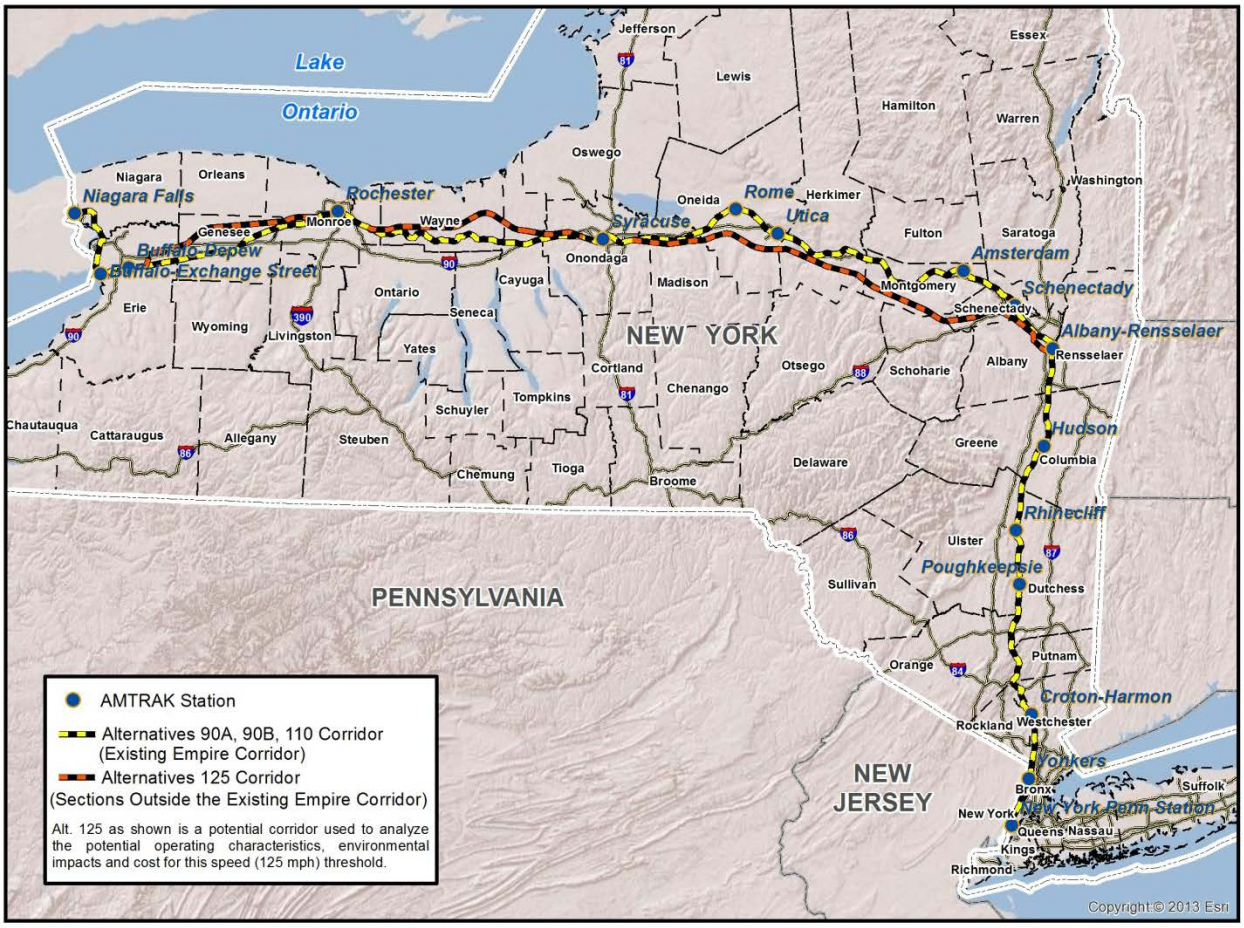


Exhibit 3-4—Corridor Map of the Build Alternatives

Exhibit 3-5—Summary New/Improved Infrastructure needed for Alternatives

Improvement/Addition	Alternative				
	Base	90A	90B	110	125
Miles of new mainline track	36	54			243 double track
Miles of dedicated third track		10	283	283	10
Miles of dedicated fourth track			39	59	
Miles of elevated track					56
Flyovers			3	2	
Bridges (undergrade)	34	74	284(*)	284(*)	74(*)
Station Buildings	2	6	5	5	4
Station Facilities and Trackwork	4	6	11	11	9
Bridges (overhead)			90	90	
Grade crossings	25	17	103	102	17

(*) Totals are for Empire Corridor West only.

Exhibit 3-6—Summary of Track Improvements for Alternatives

Description	Milepost	Base	90A	90B	110	125
Add 4 miles of second track (Spuyten Duyvil and movable bridge)	9 – 13		X	X	X	X
Add 1 mile of new track (Tarrytown Pocket Track)	23.8 - 25		X	X	X	X
Add 10 miles of new third track (Metro-North)	53 - 63.5		X	X	X	X
Replace Livingston Avenue Bridge	143		X	X	X	X
Construct/rehab. 17 miles of second main track (Rensselaer to Schenectady Stations)	143.2 - 160.3	X	X	X	X	X
Add 10 miles of new main track (Selkirk/Mohawk Subdivisions)	169 - 178.5		X	X	X	
Add 273 miles of new third track	159 - 432			X	X	
Add 9 miles of new fourth track (Selkirk/Mohawk Subdivisions)	170 - 179			X		
Add 10 miles of new fourth track (Mohawk Subdivision)	174 - 184				X	
Add 10 miles of new fourth track (Mohawk Subdivision)	204 - 214			X		
Add 11 miles of new fourth track (Mohawk Subdivision)	218 - 229				X	
Add 4 miles of new fourth track (Mohawk Subdivision)	235 - 239			X	X	
Add 13 miles of new fourth track (Mohawk Subdivision)	246 - 259				X	
Add 8 miles of new fourth track (Rochester Subdivision)	301 - 309			X		
Add 10 miles of new fourth track (Rochester Subdivision)	310 - 320				X	
Add 1 mile of new fourth track (Rochester Subdivision)	373 - 374.3			X	X	
Add 9 miles of new third track & signal system (Rochester Subdivision)	373 - 382		X	X	X	
Add 11 miles of new third track & signal system (Rochester Subdivision)	382 - 393		X	X	X	
Add 8 miles of new fourth track (Rochester Subdivision)	375 - 383			X		
Add 11 miles of new fourth track (Rochester Subdivision)	388 - 399				X	
Grade Separated Flyover (Mohawk Subdivision)	279			X	X	
Grade Separated Flyover (Rochester Subdivision)	366			X	X	
Grade Separated Flyover (Rochester Subdivision)	427			X		
Double Track - Add 5 miles of second track (Niagara Subdivision)	QDN2 to QDN7			X		
Double track - Add 6 miles of second track (Niagara Subdivision)	QDN17 - QDN22.8		X	X	X	X
Upgrade 3 miles of existing track (Niagara Subdivision)	QDN25 - QDN28		X	X	X	X
20 miles of elevated Corridor between Albany and Schenectady	QH142 - QH162					X
106 miles of double track on new alignment	QH162 - QH268					X
15 miles of elevated corridor through and outside of Syracuse	QH268 - QH283					X
62 miles of double track on new alignment	QH283 – QH345					X
16 miles of elevated corridor through and outside of Rochester	QH345 - QH361					X
48 miles of double track on new alignment	QH361 – QH409					X
11 miles of track improvements at grade on existing alignment	QH409 – QH420					X
5 miles of elevated corridor in and east of Buffalo	QH420 - QH425					X

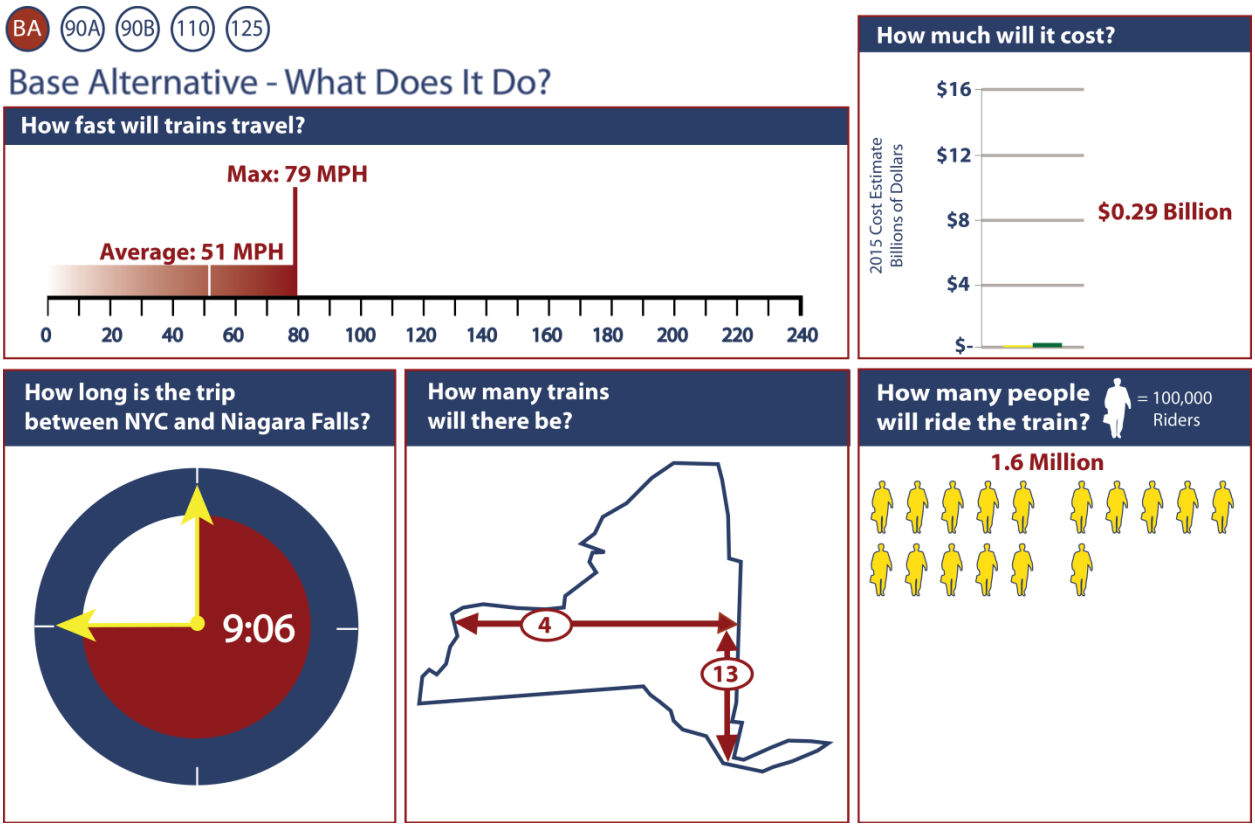
Exhibit 3-7—Summary of Station Improvements for Alternatives

Station & Improvements		MP	Alternative				
			Base	90A	90B	110	125
Rhinecliff	New high-level platform & canopy	89.2		X	X	X	X
Hudson	Reconfigure for simultaneous train stops on Tracks 1 and 2	114.5		X	X	X	X
	New Ferry Street Bridge/platform improvements			X	X	X	X
Albany-Rensselaer	New center island platform	142.1					X
	Extension of platform & canopy		X	X	X	X	X
	New 4th track		X	X	X	X	X
	New connecting tracks						X
Schenectady	New station building	159.8	X	X	X	X	X
	New stairs & elevators to platforms		X	X	X	X	X
	ADA compliant platforms		X	X	X	X	X
	Weather protected connector corridor		X	X	X	X	X
	New 3rd track				X	X	
Amsterdam	New station building	177.6		X	X	X	
	ADA compliant counter, restrooms, ramps, elevators			X	X	X	
	New high-level platform			X	X	X	
	Overhead pedestrian bridge				X	X	
	New 3rd track			X	X	X	
	New 4th track				X	X	
Utica	New center island platform	237.5			X	X	
	Overhead pedestrian bridge				X	X	
	New 3rd & 4th tracks				X	X	
Rome	New side platform	251.3			X		
	New center island platform					X	
	Overhead pedestrian bridge					X	
	New 3rd track				X	X	
	New 4th track					X	
Syracuse	New center island platform	291.4					X
	Modify existing side platform				X	X	
	Overhead pedestrian bridge						X
	New 2nd track			X	X	X	X
	New 3rd track			X	X	X	X
	Modify interlockings & one new interlocking			X	X	X	
	Upgrade existing 3rd track and signalization		X				
	Upgrade existing 3rd track as fourth track			X	X	X	
	Add crossovers & reconfigure signals			X	X	X	
	Rehab/replace Park Street Bridge			X	X	X	X
Rochester	New station building	371	X	X	X	X	X
	New high-level, center island platform		X	X	X	X	X
	Overhead pedestrian bridge		X	X	X	X	X
	New 3rd & 4th tracks		X	X	X	X	X
	New interlockings		X	X	X	X	
Buffalo-Depew	New station building	431.7		X	X	X	
	New high-level center island platform with canopy			X	X	X	
	ADA compliant platform, ticket counter, restrooms, ramps, railings			X	X	X	
	New 3rd track			X	X	X	X
	New 4th track				X	X	X
Buffalo Exchange Street	Relocated, new station building	QDN 1.9					X
	ADA compliant connections to existing facilities						X
	New center island platform at new location						X
	New 3rd & 4th tracks at new location and connecting tracks						X
Niagara Falls	Relocated, new station building	QDN 28.2	X	X	X	X	X
	US Customs Border Protection (CBP) inspection facilities		X	X	X	X	X
	Covered high-level platform		X	X	X	X	X
	Upgrade existing track		X	X	X	X	X

3.3.1. Base Alternative

The Base Alternative is carried through the Tier 1 EIS as the basis to evaluate the cost and impacts of the program's Build Alternatives in relation to the benefits gained by the public. The Base Alternative consists of eight limited rail improvement projects currently planned and funded to address previously identified capacity constraints. Train frequency will remain unchanged from the existing frequency. The key features of the Base Alternative are illustrated in Exhibit 3-8.

Exhibit 3-8—Base Alternative – Key Features



Note: Travel time between NYC and Niagara Falls presented in hours: minutes, based on westbound scheduled times.

The Base Alternative represents the future condition of the transportation network given committed rail, highway, bus, and airport improvement projects that are within the intercity travel market study area; i.e., the general geographic area served by the Empire Corridor.

Sources of information used to develop the year 2035 Base Alternative include the following:

- New York State Department of Transportation, Statewide Transportation Improvement Program (STIP);
- Metropolitan Planning Organization (MPO), financially constrained Long Range Transportation Improvement Plans (LRTPs) and Transportation Improvement Plans (TIPs);
- Federal Aviation Administration (FAA) Terminal Area Forecast Summary, Fiscal Years 2010 – 2030;
- Various Airport Master Plans.

Planned improvements to the highway infrastructure (automobile and bus modes), airport infrastructure, and rail infrastructure were accounted for in forecasts of market demand and ridership as part of the Base Alternative (see Appendix E). The following is a description of planned improvements for passenger rail and freight rail service.

Physical Improvements

The Base Alternative represents a continuation of existing Amtrak service with some operational and service improvements. Such improvements will consist of new rail vehicles, maintenance, rehabilitation and improvement to track capacity, signal work, highway-rail crossings, and passenger stations. Despite increasing ridership, the Base Alternative makes no provision for any improvement of rail service beyond what is already being operated and programmed by Amtrak, Metro-North, and/or NYSDOT. It assumes the continued operation of four daily round-trips of conventional speed Amtrak passenger service between Penn Station, New York City, and Niagara Falls on the Metro-North and CSXT owned alignment. Exhibit 3-5, Exhibit 3-6, and Exhibit 3-7 summarize the characteristics and improvements proposed for the Base Alternative.

NYSDOT, Amtrak, Metro-North, and others currently have planned improvements to the New York State Empire Service that will improve freight and Amtrak operations at several locations. Eight currently planned projects, briefly described in Exhibit 3-9 and shown in Exhibit 3-10, form the Base Alternative passenger rail improvement projects. These projects are all being advanced independently and have received environmental clearances under the National Environmental Policy Act. FRA has awarded NYSDOT High-Speed Intercity Passenger Rail grants in the corridor, in addition to TIGER grants. The HSIPR grants awarded for Empire Service include partial funding towards this Tier 1 EIS and these projects that comprise the Base Alternative. These eight interrelated projects will provide final design and construction of:

- Enhancements to stations in Albany-Rensselaer, Schenectady, Syracuse, Rochester, and Niagara Falls;
- New tracks signaling, and communications;
- Interlockings; and
- Warning devices at grade crossings.

Exhibit 3-9—Base Alternative Passenger Rail Improvement Projects

Project Name (Milepost)	ARRA Grant Application	Project Description	Project Status (January 2013)
Hudson Subdivision Signal Reliability (MP 75.8 to 140)	ES-3	Replace old signal poles (for electric power to signals and communication lines) with underground cable between Poughkeepsie and Rensselaer Station.	In construction
Highway-Rail Grade Crossings Safety Improvements CSXT Hudson Line (MP 75.8 to 140)	ES-1	Design and install grade crossing active warning device, roadway approach and/or pedestrian improvements to accommodate improved passenger rail operations between Poughkeepsie and Albany-Rensselaer.	In design
Albany-Rensselaer Station Fourth Track Capacity Improvements (MP 141 to 143)	ES-9	Add fourth track and extend platform to increase station capacity, operating speeds, train frequency, routing, and reduce delays.	In construction
Albany-Schenectady Double Track (MP 143.2 to 160.3)	ES-10	Design, construct and rehabilitate a second main track between the Rensselaer and Schenectady stations to increase capacity, reduce bottleneck, and improve operations in congested single track segment.	In construction
Schenectady Station Renovation / Platform Improvements (MP 159.8)	EW-01	Complete station reconstruction, ADA-compliant platform and station access, viaduct repairs and parking improvements.	In design
Syracuse Track Configuration and Signal Improvements (MP 287 to 291)	EW-6	Upgrade existing third track to reduce congestion, delays and interference between passenger and freight trains.	In design
Rochester Station Redevelopment / Operating Improvements (MP 368 to 373)	EW-19	New station building New high-level center island platforms, tracks/siding/interlocking to improve train operation efficiency, reduce congestion and improve passenger safety.	In design
Niagara Falls Station – New Intermodal Transportation Center (MP QDN28.2)	EW-13	New station with improved location in downtown Niagara Falls, function, operation, connectivity, border security, less delays.	In construction

Source: NYSDOT ARRA Grant Applications: ES = Empire Corridor South; EW = Empire Corridor West

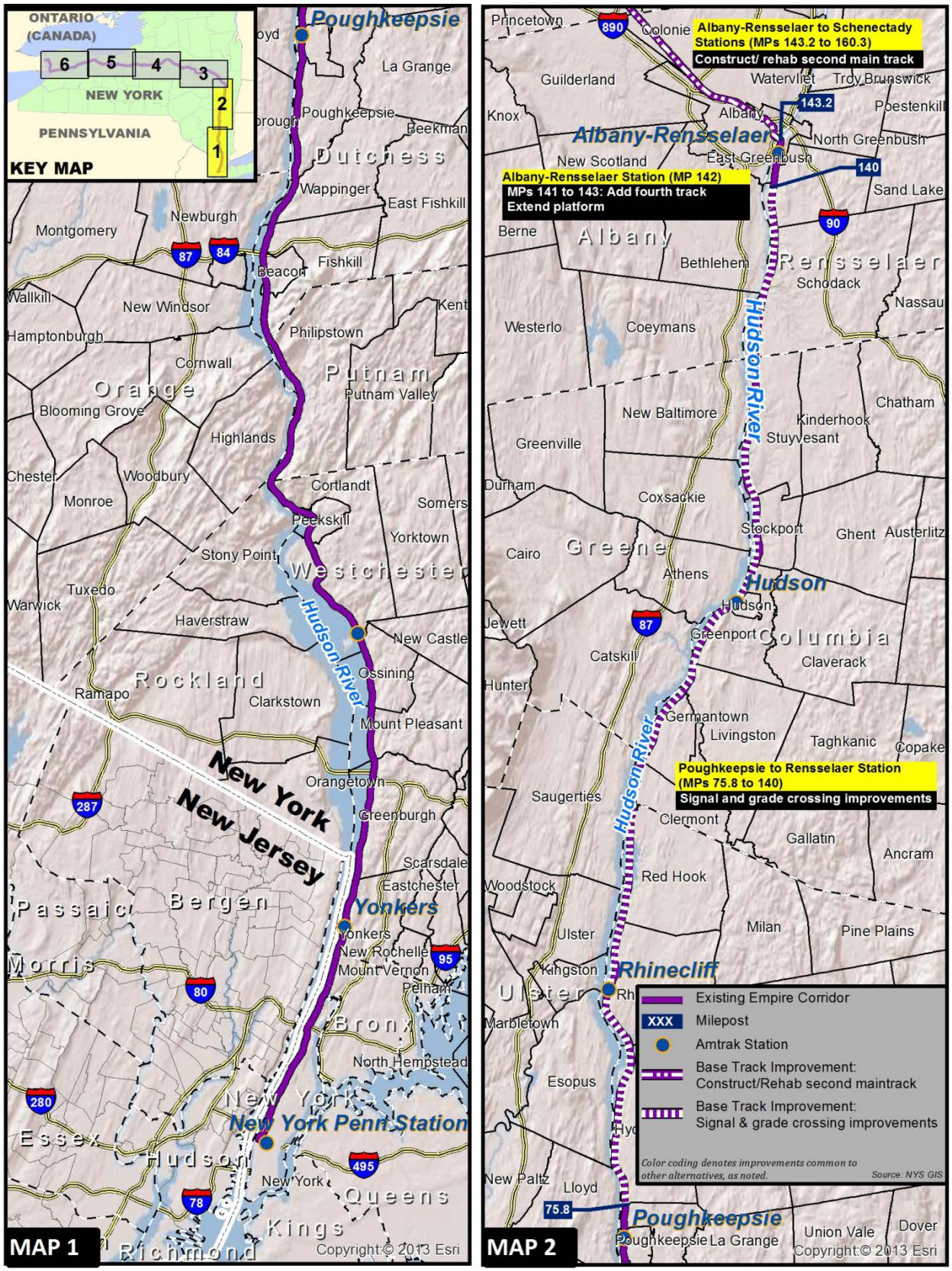


Exhibit 3-10—Base Alternative

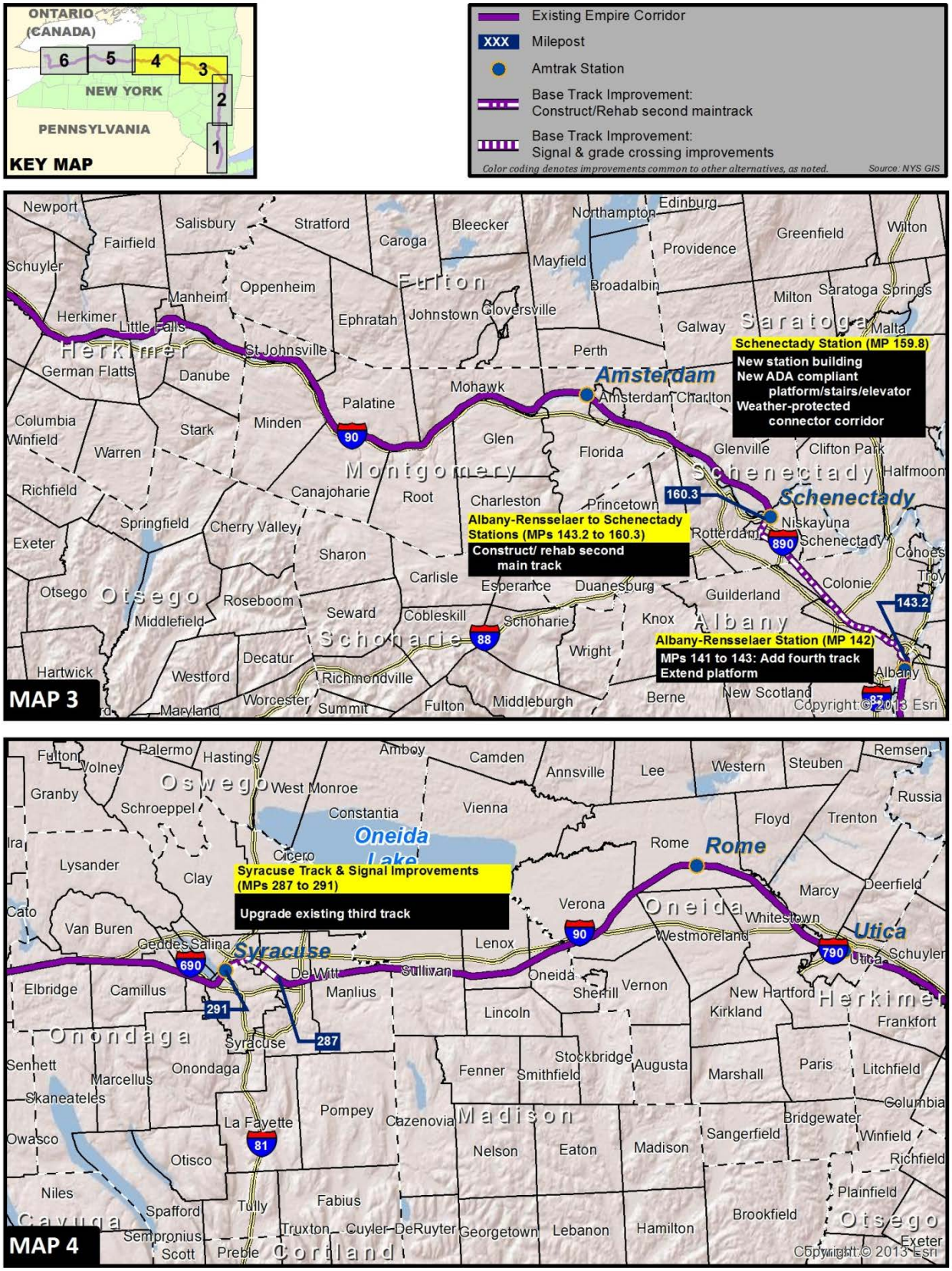


Exhibit 3-10—Base Alternative (Maps 3 and 4)

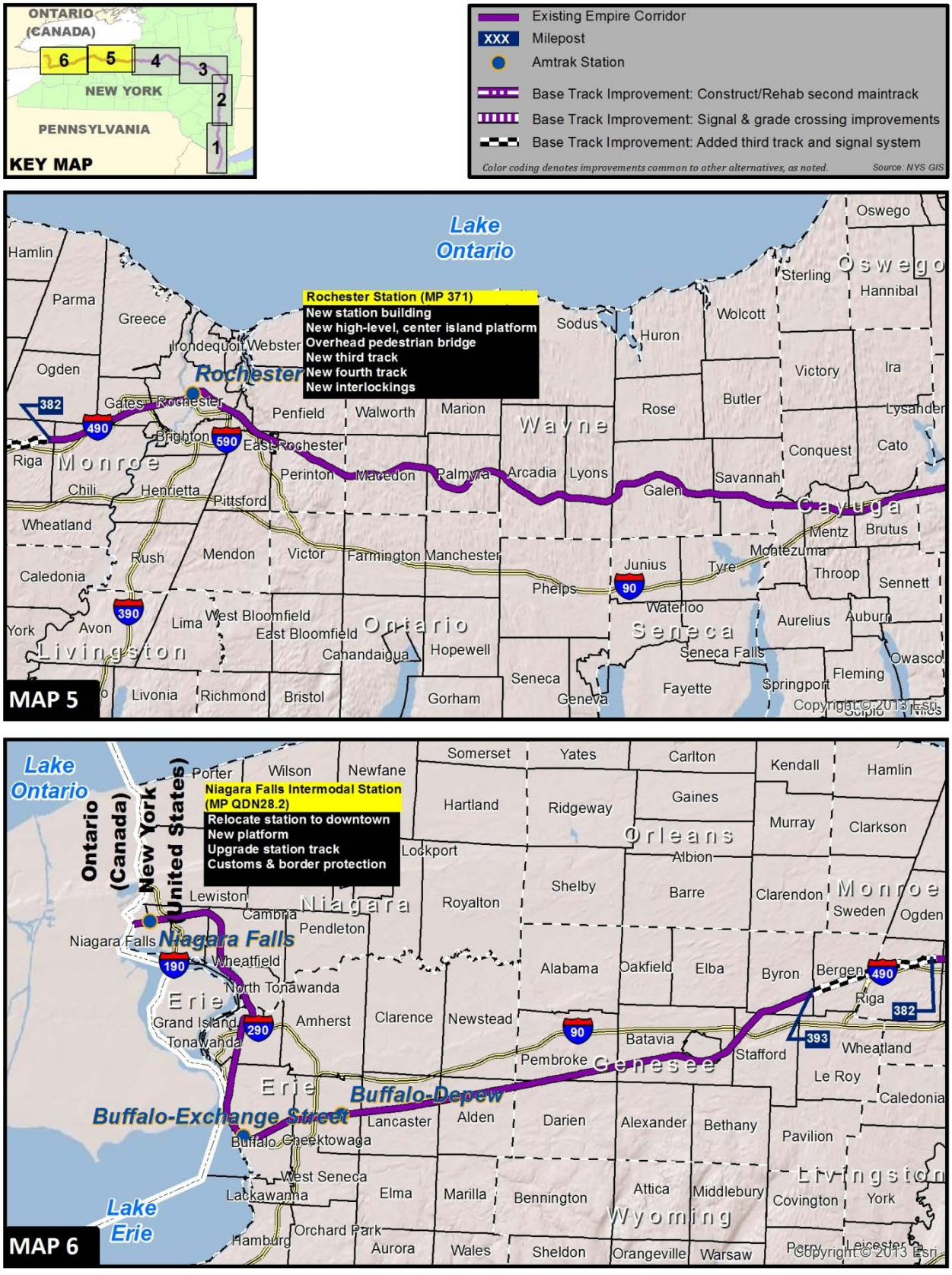


Exhibit 3-10—Base Alternative (Maps 5 and 6)

Under the Base Alternative, maintenance and rehabilitation of the existing freight rail system will continue. Rehabilitation will consist of improvements to track capacity, signalization, and highway-rail crossing improvements. Variations in times of departure and arrival, as well as train sizes and performance, are much greater in freight services than in passenger services. Freight service schedules and train sizes/performance for the program area are generally kept confidential by the operators, due to the competitive nature of freight railroading. Therefore, the unpredictable nature of freight service and the projections of increased freight traffic support the projections of decreasing efficiency in the existing program area. Increasing this efficiency may be accomplished by reestablishing track in the program area where the track has been removed or by building new alignment track and by coordinating the schedules of both freight and passenger trains diverted to the reestablished and/or new alignment tracks.

Service Frequency Enhancement

The Base Alternative will maintain the existing 13 round trips per day between New York Penn Station and Albany-Rensselaer Station and the four round trips per day between Albany-Rensselaer Station and Buffalo, with three trips continuing to Niagara Falls.

Schedule Enhancement: Express Service and Station Stops

The Base Alternative will not add express service nor change the existing station stops made.

Equipment

The Base Alternative will not add new equipment.

Capital Costs

The estimated capital cost of the Base Alternative is $290 million.

Trip Time

With the Base Alternative, trip time between New York Penn Station and Niagara Falls, based on westbound scheduled times, will be 9 hours and 6 minutes (9:06).

On-Time Performance

The OTP for the Base Alternative along the Empire Corridor West will be 83 percent in the year 2035.

Ridership

Ridership for the Base Alternative is projected to be 1.6 million persons in the year 2035.

Revenue

Annual revenue to the Base Alternative is projected to be $77 million.

Operations & Maintenance Costs

Operations and maintenance costs for the Base Alternative are estimated at approximately $103 million per year.

Safety

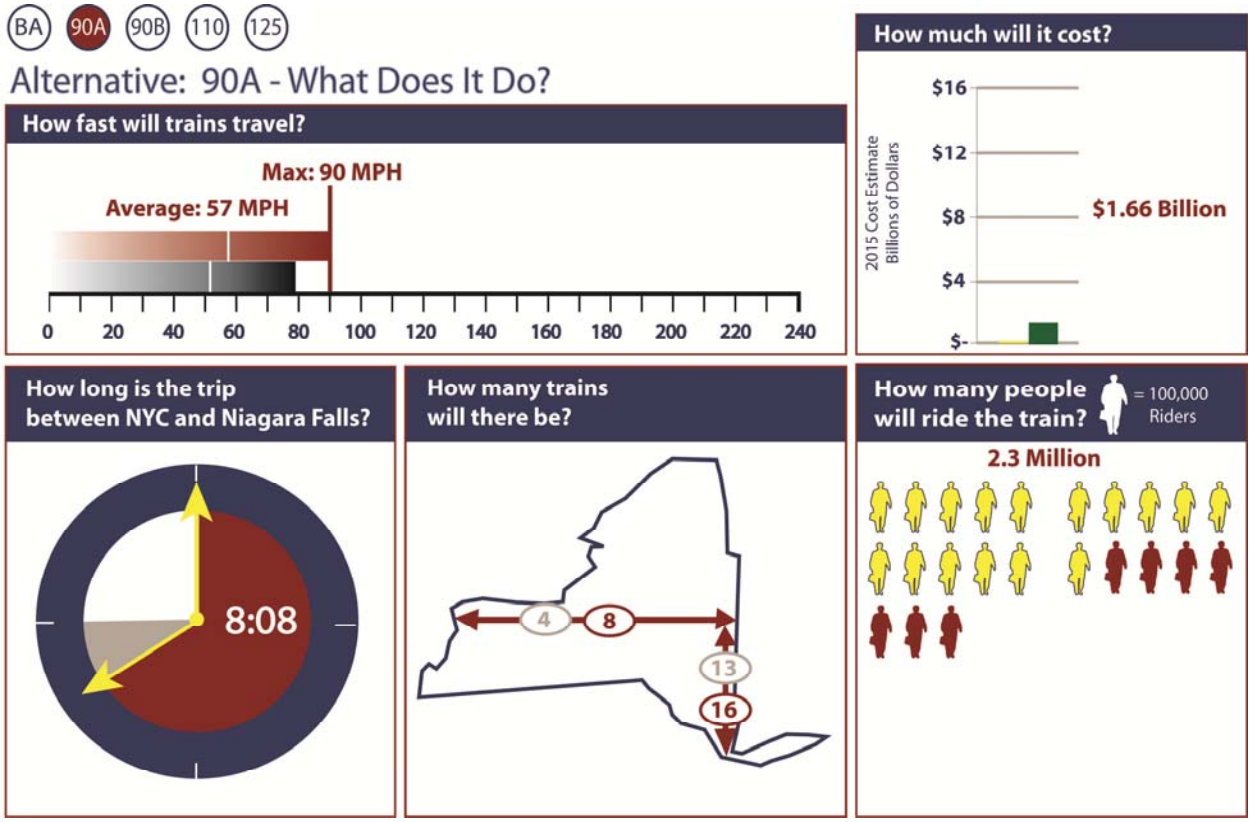
The improvements included in the Base Alternative will result in an overall increase in safety for the traveling public due to the safety-enhancing projects proposed with this alternative. The increase in train ridership over existing conditions will translate to a decrease in highway traffic volumes. With fewer cars on the road this will, in turn, naturally result in fewer traffic accidents and other safety gains. Although there will be additional rail tracks built at some grade crossings, no new grade crossings will be added. Since the frequency of accidents, injuries, and deaths involving trains, especially with modern safety features at railroad grade crossings, is much lower than the frequency of accidents on highways, the overall number of accidents, injuries, and deaths will decrease due to the shift in travel from passenger cars to rail.

3.3.2. Alternative 90A

Alternative 90A, one of the two 90 mph alternatives, would use 90 miles per hour as the maximum authorized speed. Alternative 90A would include constructing new track in designated locations to meet higher track standards than those currently in use on the Empire Corridor, with in-cab signaling train control. This alternative would use current vehicle technology with the possibility of integrated trainsets. Alternative 90A would fall into the FRA's "Regional" category.[53] Alternative 90A would add capacity and station improvements that consist of 20 separate, identified capital improvement projects, which are listed in Exhibit 3-12 in the "Physical Improvements" section. Alternative 90A improves service with the purchase of new train sets that would be used to increase the Empire Service to 16 daily round trip trains operating between New York City and Albany-Rensselaer Station and to eight daily round trips between Albany-Rensselaer Station and Buffalo, with seven continuing on to Niagara Falls. The key features of Alternative 90A are illustrated in Exhibit 3-11.

[53] FRA. *Vision for High-Speed Rail in America: High-Speed Rail Strategic Plan*. April 2009.

Exhibit 3-11—Alternative 90A – Key Features



Note: Travel time between NYC and Niagara Falls presented in hours: minutes, based on westbound scheduled times.

Physical Improvements

Alternative 90A would consist of 20 additional capacity and station improvement projects, in addition to the eight projects proposed under the Base Alternative. The assumption in this Tier 1 report is that the new train sets and equipment added in Alternative 90A would be staged and maintained at existing locations and/or facilities along the corridor and/or at spaces gained with the addition of these 20 projects comprising Alternative 90A. Exhibit 3-5, Exhibit 3-6, and Exhibit 3-7 summarize the characteristics and improvements proposed for Alternative 90A.

The 20 capital improvement projects included in Alternative 90A are summarized in Exhibit 3-12 and are shown in Exhibit 3-13.

Exhibit 3-12—Alternative 90A Rail Improvement Projects

Project Name (Milepost)	Project ID	Project Description
Amtrak West Side Connection Spuyten Duyvil Second Track (MPs 9 to 13)	SRP-1	Increase capacity by adding a second track.
Metro-North – Tarrytown Pocket Track / Interlocking (MPs 23.8 to 25.0)	SRP-2	Increase capacity by adding a new track to improve speed, travel time, OTP, safety and reduce delay. Allows for increased future frequency.
Metro-North New Signal System (CP 33 to CP 75) (MPs 32.8 to 75.8)	ES-12	Signal system improvements to provide operating benefits in capacity, reliability and schedule recovery.
Metro-North – New Third Track (CP 53 to CP 63) (MPs 53 to 63.5)	SRP-3	Increase capacity, reduce delay and improve schedule and operational reliability by providing the capability for freight trains to meet/pass.
Metro-North Poughkeepsie Yard / Storage Facility Track / Signals (CP 71 to CP 75) (MPs 71 to 75.8)	ES-13	New track/siding and yard will help improve speed, travel time, OTP and safety and reduce delay. Allows for increased future frequency.
Rhinecliff Station Improvements (MP 89.2)	SRP-11	Improve reliability by adding high-level platforms to cut station dwell time in half.
Hudson Line Reliability Improvements New Control Points (CP 82, CP 99, CP 136) (MPs 82 to 136)	ES-05	Improve reliability by reducing spacing of interlockings, improving dispatching options to meet or pass trains, which will decrease delays.
Hudson Line Reliability Improvements Rock Slope Stabilization (10) (MPs 105.3 to 130)	ES-04	Improve reliability by removing / stabilizing rock slopes at 10 locations (5 locations between, MPs 105.3-106, one location at MP 119.5, and 4 locations at MPs 128.1-130), upgrading slide detector fences to improve safety, and reduce delays.
Hudson Station / Track Geometry Improvements (MPs 114.5 to 115)	ES-14	Improve reliability through track realignment / new Ferry St. bridge, which will improve speed and safety for station access, ADA-compliant platform; eliminate delays by supporting two trains serving the station at the same time.
Livingston Avenue Bridge (LAB) Replacement Project (MPs 143)	ES-15	Replace deficient moveable bridge to improve safety / reliability, travel time, remove speed / weight restrictions, increase capacity.
Mohawk Subdivision – New Main Track (CP 169 to CP 179) (MPs 169 to 178.5)	EW-14a	Increase capacity by adding a dedicated 110 mph passenger track to increase frequencies and provide additional capacity / reliability.
Mohawk Subdivision Congestion Relief (CP 175, CP 239 & CP248) (MPs175 to 294)	EW-05	Improve travel times, operational capacity and safety by upgrading automatic block signals, control points and interlocking.
Amsterdam Station Improvements (MP 177.6)	EIS-1	Improve reliability by constructing a new station with high level / double edge platform. Improve train operations and reduce dwell time.
Belle Isle Capacity Improvements (CP 290 to CP 293) Syracuse Station - Track Improvements (MPs 290 to 294)	EIS-6	Increase capacity by providing additional freight train queuing capability and ability for freight trains to operate between DeWitt and Belle Isle Pocket Yard without occupying existing main line. Add second station track at Syracuse Station and reconfigure signals at the station including one new

Exhibit 3-12—Alternative 90A Rail Improvement Projects

Project Name (Milepost)	Project ID	Project Description
		interlocking.
Rochester Subdivision Reliability Third Main Track (CP 373 to CP 382) (MPs 373 to 382)	EW-16	Increase capacity with third main track and signal system to improve speed, frequency, safety and reliability.
Rochester Subdivision Third Main Track (MP 382 to 393)	EW-20	New third main track and signal system to improve speed, frequency, and reliability.
Buffalo Depew Station Improvements (MPs 429.5 to 432.5)	EIS-10	Improve reliability by constructing new station with high level / double edge platform. Improve train operations and reduce dwell time.
Niagara Subdivision Double Track (CP 17 to CP 22) (MPs QDN17 to QDN23.8)	EW-17	Improve capacity by adding a second track.
Niagara Falls Maintenance Facility / Yard Improvements (MP QDN27)	EW-18	Improve reliability by adding storage tracks and a maintenance building to provide shore power, potable water, inspection, cleaning and light repair capabilities. Decreases time to prepare for AM departures and eliminates delays from frozen equipment. Increases layover capacity.
Niagara Falls Track Improvements (MPs QDN25 to QDN28)	EIS-12	Improve capacity and reliability by upgrading an existing track

ES = Empire Corridor South; EW = Empire Corridor West; SRP = State Rail Plan; EIS – Tier 1 Environmental Impact Statement

Physical improvements would range from:

- Constructing new trackwork,
- Reconfiguring, realigning and/or removing trackwork,
- Shifting track to improve clearances,
- Rehabilitating trackwork,
- Improving signalization,
- Installing new interlockings,
- Reconfiguring removing or relocating interlockings,
- Upgrading to higher speed turnouts,
- Widening and/or rehabilitating the roadbed and bridges,
- Improving stations and station platforms,
- Improving at yards and maintenance facilities,
- Installing pocket track,
- Eliminating or improving grade crossings, and
- Constructing civil support projects such as rock slope and right-of-way stabilization.

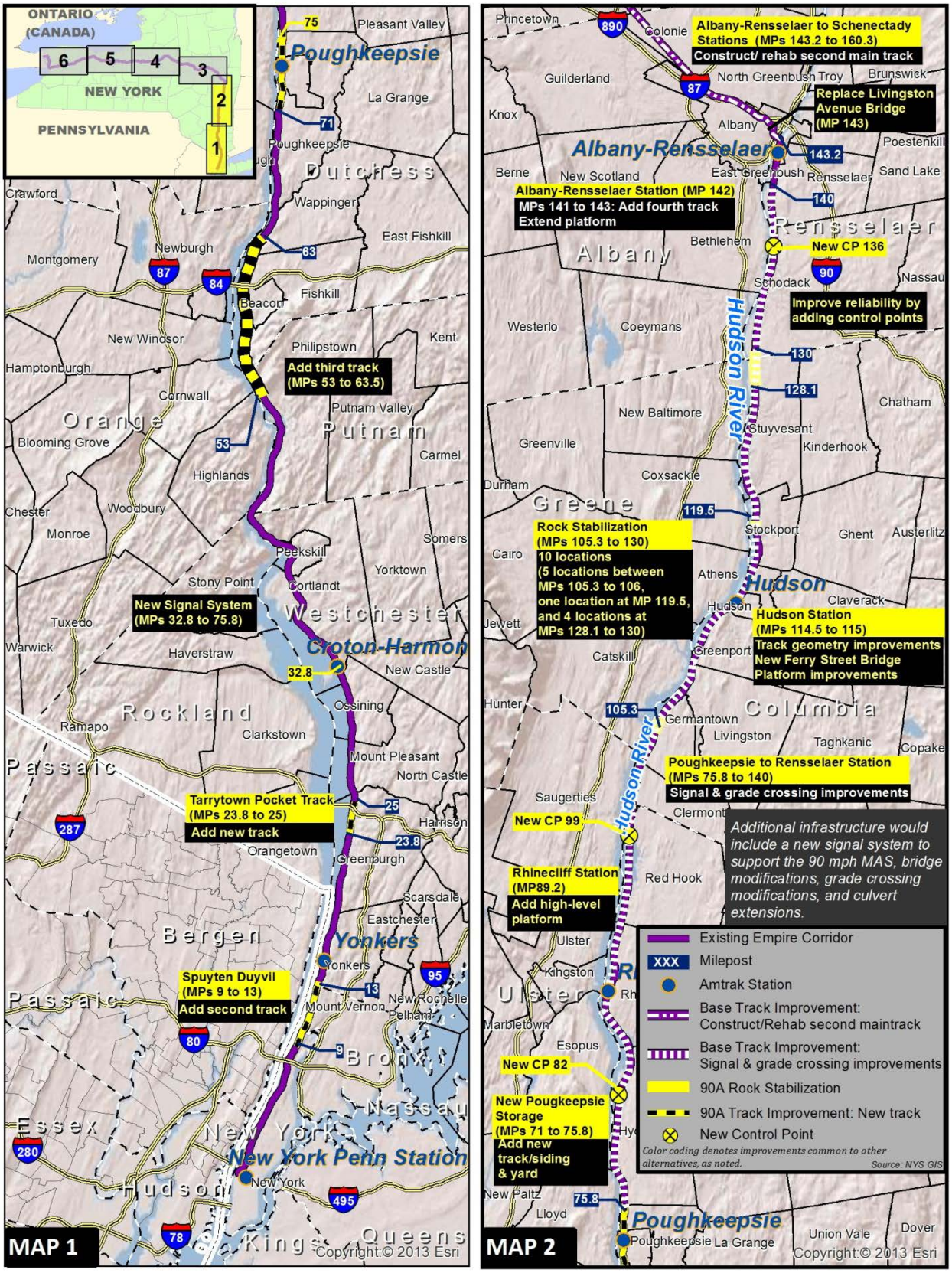


Exhibit 3-13—Alternative 90A

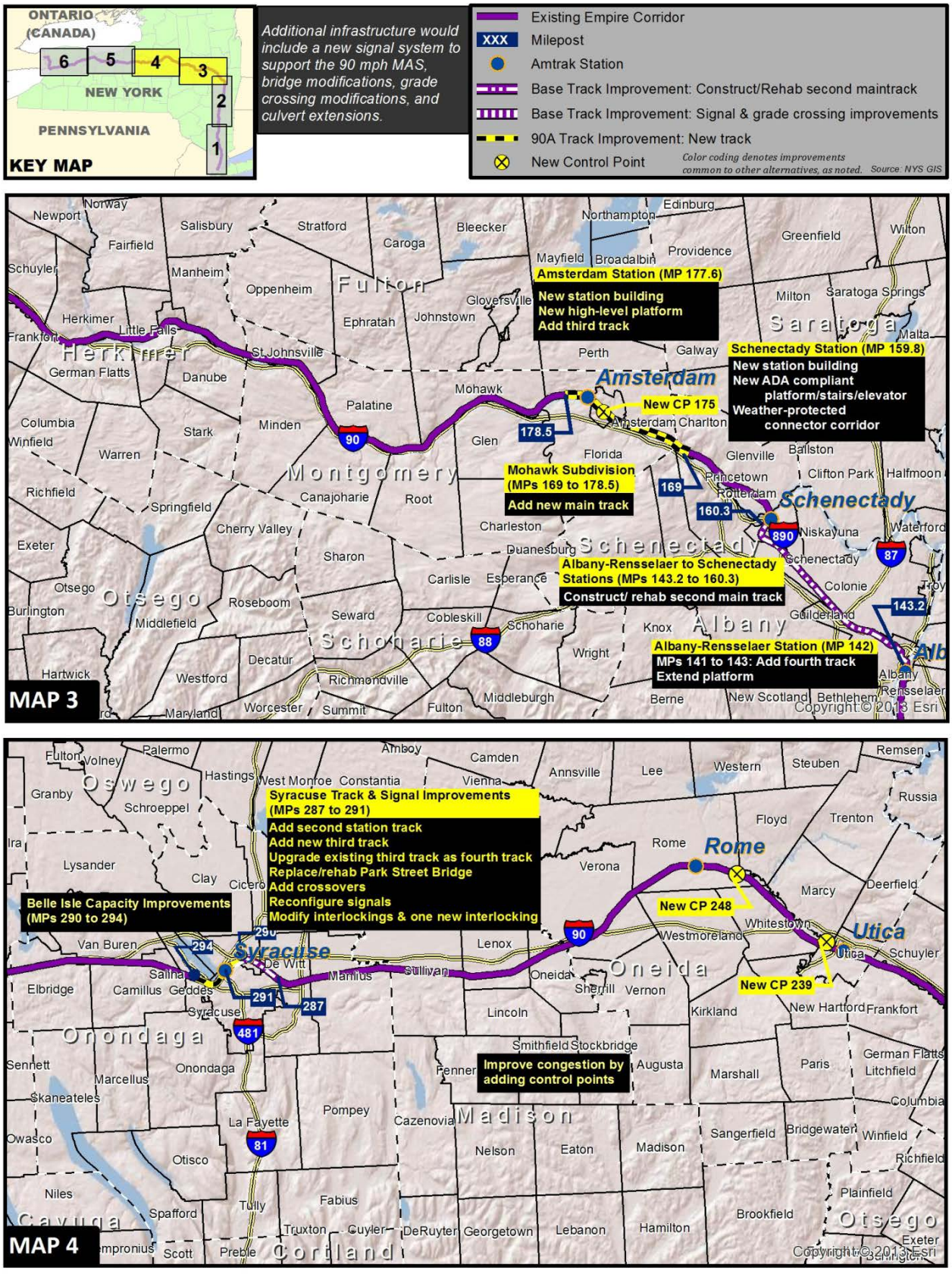


Exhibit 3-13—Alternative 90A (Maps 3 and 4)

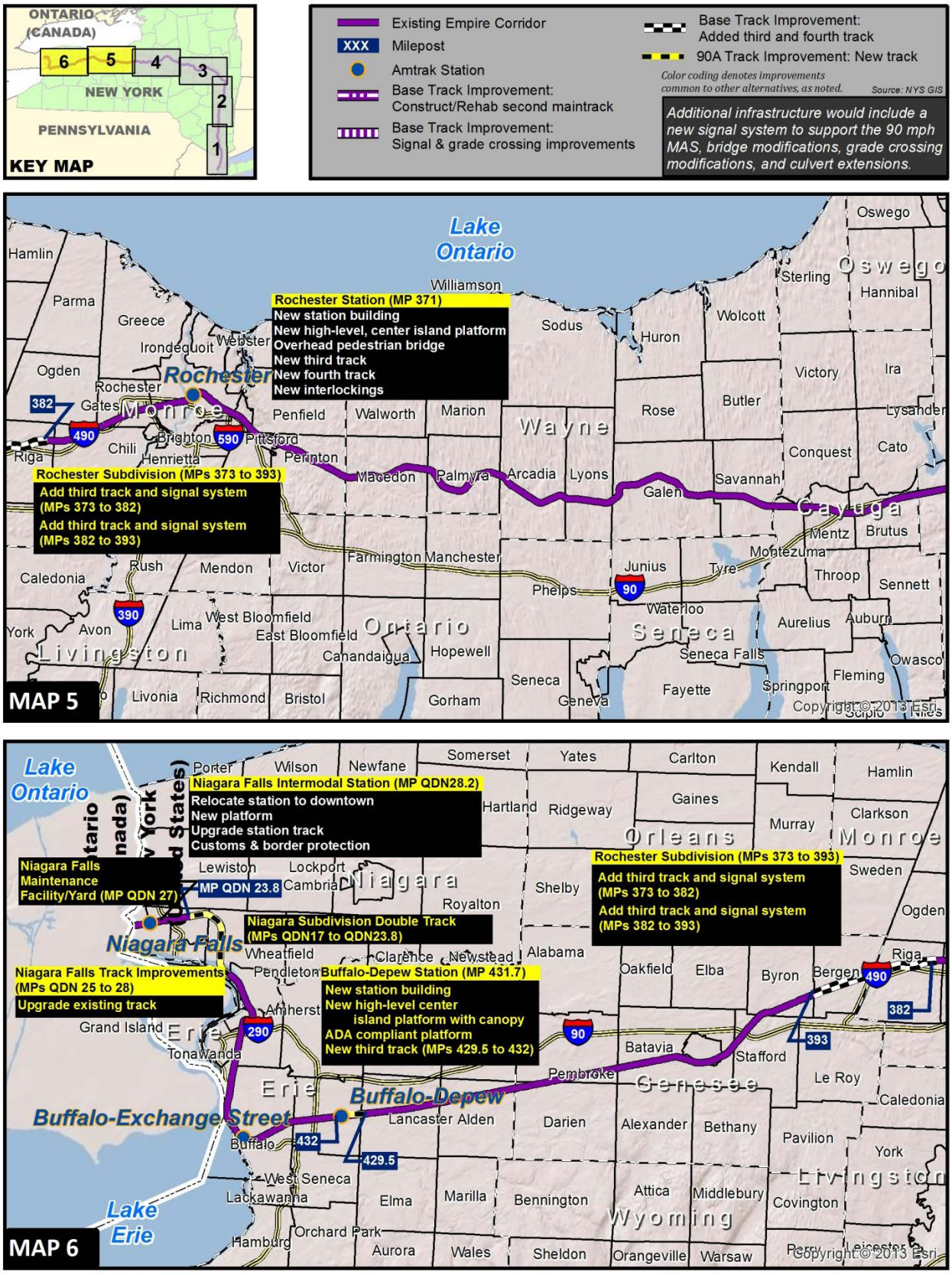


Exhibit 3-13—Alternative 90A (Maps 5 and 6)

All physical improvements would be constructed within the existing ROW. No curves would be physically changed to increase speeds within the corridor. All improvements would be evaluated in greater detail as part of any future Tier 2 NEPA documentation.

With Alternative 90A, Amtrak service would continue to operate within the existing railroad right-of-way, primarily along the same tracks on which it presently operates and in a few limited segments on new alignments. Based on the conceptual-level design, new mainline tracks would be spaced at 15-foot centers on tangent alignments and increased for curvature. Since some existing multiple track segments where the alternative would add a track or two are at less than 15 feet (at 13 or 14 feet centers), increasing the distance between track centers to 15 feet or more may necessitate track shifts and/or isolated minor widening.

On the Hudson Line, number 32.7 turnouts would be used, where possible, to allow passenger trains to operate up to 80 mph through the diverging side of a turnout and through crossovers. This would improve run times by allowing the trains to remain at 79 mph MAS without having to decelerate and accelerate, approaching and leaving, slower speed turnouts (i.e.: to 45 mph through a number 20, or to 60 mph through a number 26.5).

Empire Corridor South

On the Empire Corridor South between New York City and Albany-Rensselaer, Alternative 90A includes the majority of the projects that were identified in the Hudson Line study. The Hudson Line projects are included because they provide benefits to reduce delay or improve reliability within the Hudson Subdivision. Those projects from the Hudson Line study not included in Alternative 90A either do not provide significant benefits or would be deferred to be constructed in later years. Only one project from the Hudson Line study is not included in either the Base Alternative or Alternative 90A:

- Stuyvesant Third Track and Interlocking Improvements (Project ES-06; Hudson Subdivision Reliability Third Main Track).

Alternative 90A improvements on the Empire Corridor South would include Project SRP-1 to reestablish a second track between CP 10 and CP 12 (across the Spuyten Duyvil). Alternative 90A would add a third main track at the following two locations:

- **CP 53 to CP 63** – Project SRP-3 would add a new third main track from CP 53 (south of Cold Spring Station) to CP 63 (north of New Hamburg Station) incorporating existing third track between, and modifying, CP 58 and CP 61 (at, and north of, Beacon Station); and

- **CP 71 to CP 75** – Project ES-13 would reconfigure three mainline tracks, north of Poughkeepsie Station to CP 75 (to expand the yard) and extend a third track a mile south to CP 71.

Alternative 90A would provide various other capacity improvements, reconfiguring the mainline and expanding yards to accommodate train operations and facilities at the following locations:

- **CP 24 to CP 25** – Project SRP-2 (mainline and yard improvements south of Tarrytown Station),
- **CP 33 to CP 75** – Project ES-12 (signal system improvements from Croton-Harmon Station to Poughkeepsie Station),

- **CP 71 to CP 75** – Project ES-13 (mainline and yard improvements at Poughkeepsie Station), and
- **CP 114 to CP 115** – Project ES-14 (mainline and other improvements at Hudson Station).

Facility enhancements such as track reconfigurations and platform additions would be provided at Rhinecliff, Hudson, Amsterdam, Syracuse, and Buffalo-Depew Stations, in addition to improvements from the Base Alternative at Albany-Rensselaer, Schenectady, Rochester, and Niagara Falls Stations (see Exhibit 3-7).

Empire Corridor West

On the Empire Corridor West, Alternative 90A would add significant features that include extending a new mainline third track at the following four locations:

- **CP 169 to CP 179** – Project EW-14a, capacity improvements west of Schenectady at "Hoffmans", just east of the junction with the Selkirk Branch in Glenville, to just west of Amsterdam Station; and, along the way, incorporating the existing siding at Kellogg IT (CP 173 to CP 175);
- **CP 290 to CP 293** – Project EIS-6, Belle Isle capacity improvements at Syracuse Station;
- **CP 373 to CP 382** – Project EW-16, capacity improvements from just east of the Buffalo Wye to east of Route 259 (CP 373 to CP 380); incorporating existing track east of Route 259 to the West Shore connection (CP 380 to CP 382); and
- **CP 382 to CP 393** – Project EW-20 of Alternative 90A from the West Shore connection to eight miles east of Batavia Yard (CP 382 to CP 393).

These extensions would incorporate several Base Alternative and new capital projects within Alternative 90A, including upgrades of several segments of existing track for continuity along the way.

On the Niagara Branch, Alternative 90A would provide a second main track at the following location:

- **CP 17 to CP 22** – Project EW-17 would extend a second track between CP 17 (MP QDN17) and CP 22 (to MP QDN 23.8 at Tuscarora Road), connecting both leads of the "Lockport Subdivision Tuscarora Wye."

Alternative 90A would provide new station buildings and/or station facility enhancements at five station locations, where items such as new track, crossovers and grade crossings, and ADA safety improvements, high-level platforms, and in some cases, a completely new station would be constructed.

New station buildings would be constructed at Amsterdam and Buffalo-Depew in addition to the new station buildings at Schenectady, Rochester and Niagara Falls from the Base Alternative.

Maximum Authorized Speed (MAS)

The MAS for Alternative 90A would be 90 mph. The average running speed with Alternative 90A would increase to 57 mph, six miles per hour faster than in the Base Alternative. Amtrak passenger train speeds, both slower and faster, and limited locations along the corridor would remain unchanged in Alternative 90A. The MAS along the entire Empire Corridor is indicated on the "Alternative 90A Track Schematics," Drawings 90A-1 to 90A-17 (refer to Appendix A).

With Alternative 90A along the Empire Corridor South, the MAS for Amtrak trains traveling north of Poughkeepsie (MP 74) to Hoffmans (at CP 169 near MP 170) would remain mostly at 75 to 95 mph with some exceptions. Relatively long stretches having higher MAS of 100 mph and 110 mph would remain at the following locations:

- 110 mph would remain along two segments: between the Stuyvesant IT (MP 125), just east of the Shodack SD connection, and Albany-Rensselaer (MP 142);
- 110 mph east of Schenectady between MP 149, west of the West Albany Yard, and the Carman IT at CP 156 (MP 156); and
- 100 mph would remain for most of the way west of Schenectady Station between MP 161 and Hoffmans at CP 169 (near MP 170).

Slower MAS would remain at the following locations along the Empire Corridor South:

- 50 mph at Hudson (MP 114),
- 30 to 75 mph approaching Albany-Rensselaer Station and the West Albany Yard (MP 141 to MP 145), and
- 30 to 70 mph at Schenectady Station (MP 159 to MP 161).

With Alternative 90A along the Empire Corridor West, the MAS for passenger trains traveling west of Hoffmans at CP 169 (near MP 170) to west of Frontier Yard (MP 435), west of Buffalo-Depew Station would remain mostly at 70 and 79 mph with many short segments having slower speeds. Slower MAS would remain at the locations on the Empire Corridor West listed in Exhibit 3-14.

Exhibit 3-14—Alternative 90A – Slower MAS

MP	Location	Description
193	Fonda	50 mph west of Amsterdam at for a mile at MP 183, just east of Fonda Yard, and at "Big Nose" curve
199	Canajoharie	60 mph at CP 198, just west of Route 10
217	Little Falls	55 mph at Borroughs Team Track (between CP 215 and CP 218)
237	Utica	60 mph at Utica Station
285 - 287	Dewitt	40 mph at DeWitt Yard
287 - 294	Syracuse	55 and 60 mph passing Syracuse Station (CP 293)
320	Savannah	40 mph at the "Floating Bridge" over the Seneca River
333 – 340	Lyons	55 to 70 mph passing Lyons Yard and approaching the Ontario Midland Railroad connection west of the yard
350 – 360	Macedon	65 mph for mile-long segments west of CP 349, and just west of the West Shore connection at CP 359
369 – 372	Rochester	55 to 45 mph passing Rochester Yard and Rochester Station
375	Rochester	45 mph at CP 375, just west of the Buffalo Wye
435 - QDN28	Buffalo Exchange Street & Niagara Falls	40 and 60 mph west of Frontier Yard to Niagara Falls on the Niagara Branch

Service Frequency Enhancement

Alternative 90A would increase the frequency of Amtrak Empire Service. Amtrak service between New York City and Albany-Rensselaer Station would increase to 16 daily round trips, adding three trains, a 23 percent gain above the current 13 trips in the Base Alternative. Service between Albany-Rensselaer Station and Buffalo would increase to eight daily round trips, with seven continuing on to Niagara Falls, roughly doubling the current four-trip service to Buffalo in the Base Alternative.

Schedule Enhancement: Express Service and Station Stops

The improvements in Alternative 90A would add express service to the Amtrak Empire Service. Four new round trips would operate as an express service with station stops in Niagara Falls, Buffalo-Exchange Street, Buffalo-Depew, Rochester, Syracuse, Albany-Rensselaer and New York City (Penn Station).

Equipment

Alternative 90A would add six train sets to increase the frequency of Amtrak service.

Capital Costs

The estimated capital cost of Alternative 90A (projected to the 2015 program year) is $1.66 billion. The major cost components in Alternative 90A are the 33 capital improvement projects – the eight projects listed under the Base Alternative and the 25 additional capital improvement projects. The cost includes $60 million for Positive Train Control (PTC) and $208 million for additional train sets and equipment to increase the frequency of Amtrak rail service.

Trip Time

In Alternative 90A, the trip time between New York City and Niagara Falls, based on westbound scheduled times, would be 8 hours and 8 minutes (8:08). This would be 58 minutes shorter than the 9 hour and 6 minute (9:06) trip in the Base Alternative.

On-Time Performance

The OTP for Alternative 90A along the Empire Corridor West would be 92.4 percent in the year 2035.

Ridership

Alternative 90A is projected to increase annual ridership to 2.3 million persons in the year 2035. This would be a gain of 700,000 above the 1.6 million persons projected in 2035 for the Base Alternative.

Revenue

Annual revenue for Alternative 90A is projected to be $119 million.

Operations & Maintenance Costs

Operations and maintenance costs for Alternative 90A are estimated at approximately $156 million per year.

Safety

The improvements included in Alternative 90A would result in an overall increase in safety for the traveling public. The increase in train ridership would translate to a decrease in highway traffic volume. With fewer cars on the road this would, in turn, naturally result in fewer traffic accidents and other safety gains. Although there would be additional rail tracks built at some grade crossings, no new grade crossings would be added. Since the frequency of accidents, injuries, and deaths involving trains, especially with modern safety features at railroad grade crossings, is much lower than the frequency of accidents on highways, the overall number of accidents, injuries, and deaths would decrease due to the shift in travel from passenger cars to rail.

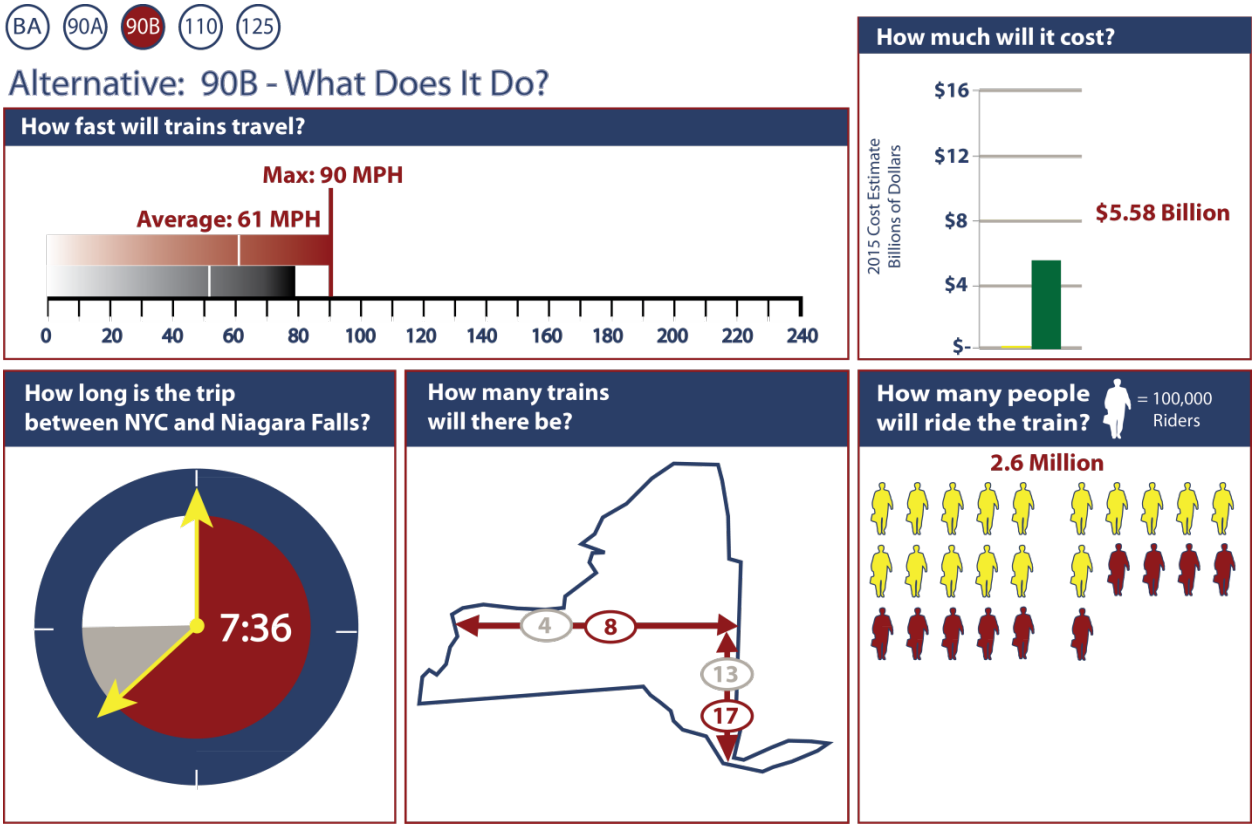
3.3.3. Alternative 90B

Alternative 90B, one of the two 90 mph alternatives, uses 90 miles per hour as the maximum authorized speed, and consists of constructing new third and fourth mainline track and a new signal system to support the 90 mph speed. This alternative would use current vehicle technology with the possibility of integrated trainsets. Alternative 90B would fall into the FRA's "Regional" category. Alternative 90B would improve service with the purchase of new train sets that would be used to increase the Empire Service to 17 daily round trip trains operating between New York City and Albany-Rensselaer and to eight daily round trips between Albany-Rensselaer and Buffalo, of which seven continue on to Niagara Falls. The key features of Alternative 90B are illustrated in Exhibit 3-15.

Physical Improvements

Alternative 90B would add a dedicated third main passenger track for approximately 273 miles between Schenectady (MP 159) and Buffalo-Depew (MP 432) (see Exhibit 3-16). It would also add a fourth passenger track over a combined distance of approximately 39 miles in five separate

Exhibit 3-15—Alternative 90B – Key Features



Note: Travel time between NYC and Niagara Falls presented in hours: minutes, based on westbound scheduled times.

locations (MP 170-179, MP 204-214, MP 235-239, MP 301-309, MP 375-383). Based on the conceptual-level design, the third main passenger track would be located on the north side of the existing tracks, 15 feet from the existing mainline, and would generally occupy the portion of the existing railroad bed that historically contained two additional tracks. The fourth tracks would be located 15 feet further north of the dedicated third track and have been designated with a MAS of 90 mph. Alternative 90B would also add double track to the Niagara Branch between MPs QDN 2 and 7, west and north of the Buffalo Exchange Street Station.

Additional infrastructure would include:

- A new signal system to support the 90 mph MAS;
- Bridge modifications;
- Grade crossing modifications;
- Culvert extensions;
- Station improvements; and
- Three grade separated flyovers (MP 279, MP 366, and MP 427) where the third main passenger track passes over the existing freight tracks on an elevated structure, eliminating any potential conflicts with freight train movements.

Grade crossing modifications would be required to accommodate new tracks. Upgrades to existing grade crossing warning devices would be determined in subsequent design phases and in any Tier 2 documents.

Locations for potential maintenance service roads have been identified along the entire corridor between MP 159 and MP 432. Service roads provide necessary access to the railroad infrastructure for routine inspections, regular maintenance, and emergency situations. The specific need, size, and location of the service roads will be determined in subsequent design phases and Tier 2 studies. Some level of property acquisition would be required over substantial portions of Alternative 90B, not only for service road construction, but to accommodate the geometry and track centers of the third and fourth main tracks.

Empire Corridor South

The improvements proposed with Alternative 90A on the Empire Corridor South also would be included in Alternative 90B. The additional improvements provided with Alternative 90B would all be located on the Empire Corridor West.

Empire Corridor West

Exhibit 3-5, Exhibit 3-6, and Exhibit 3-7 summarize the characteristics and improvements proposed for Alternative 90B, which also include improvements proposed for Alternative 90A. For descriptive purposes, the major physical improvement features of Alternative 90B are presented in two segments along the Empire Corridor West. The first segment is between Schenectady and Syracuse (MPs 159-292), and the second is between Syracuse and Buffalo-Depew (MPs 292-432). Syracuse Station is the approximate center of the third track segment (133 miles from Schenectady to Syracuse and 140 miles from Syracuse to Buffalo-Depew).

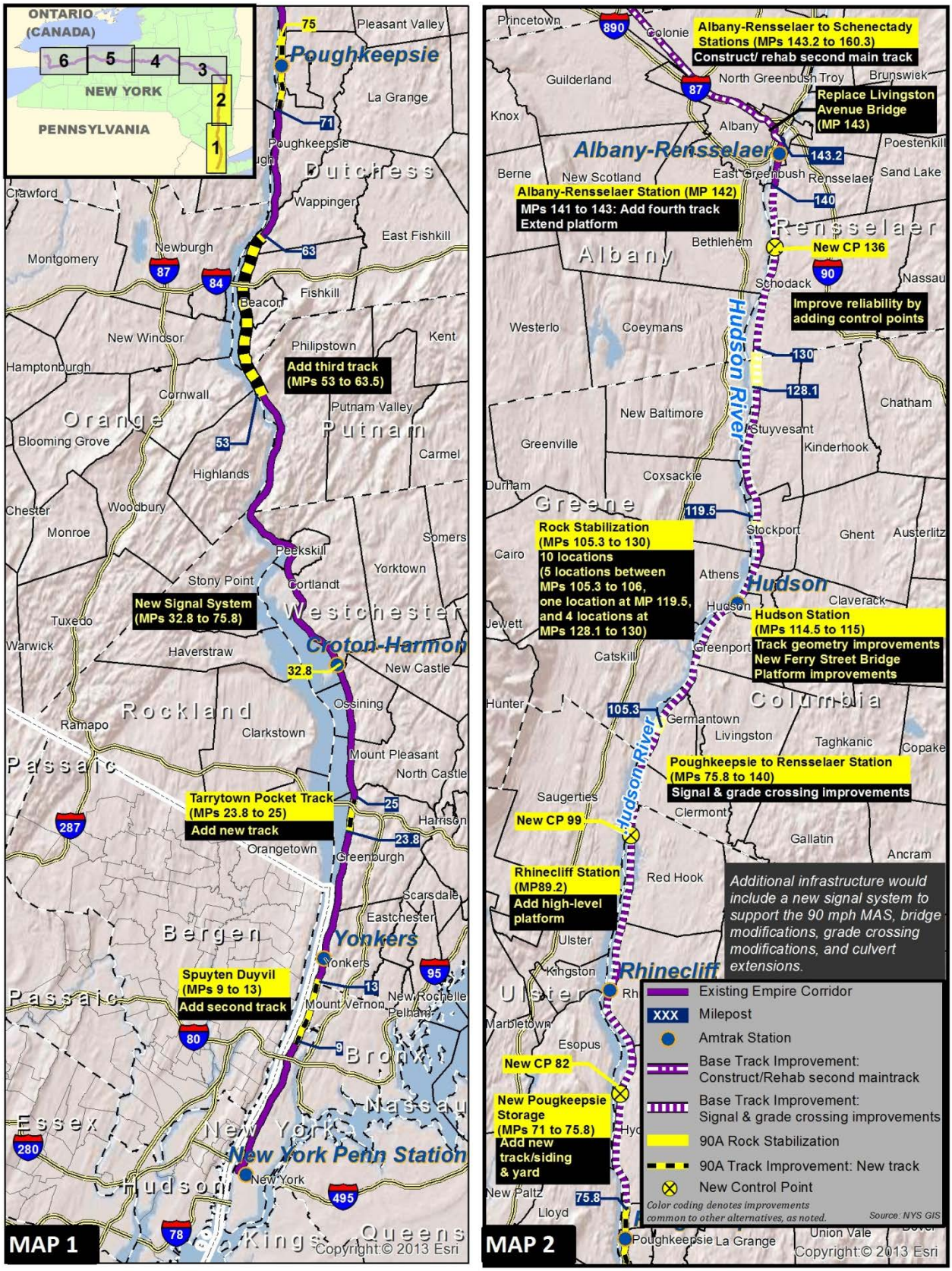


Exhibit 3-16—Alternative 90B

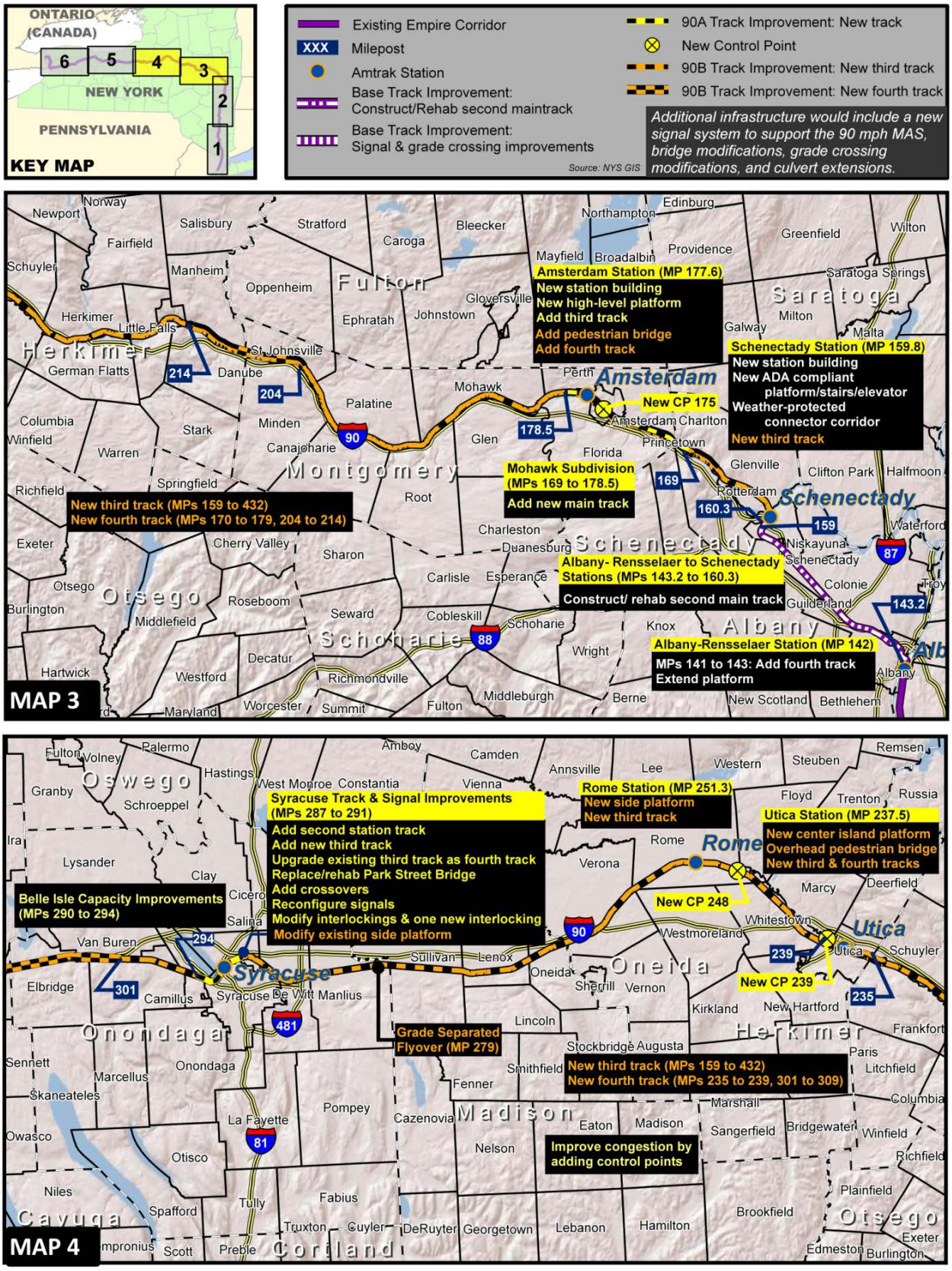


Exhibit 3-16—Alternative 90B (Maps 3 and 4)

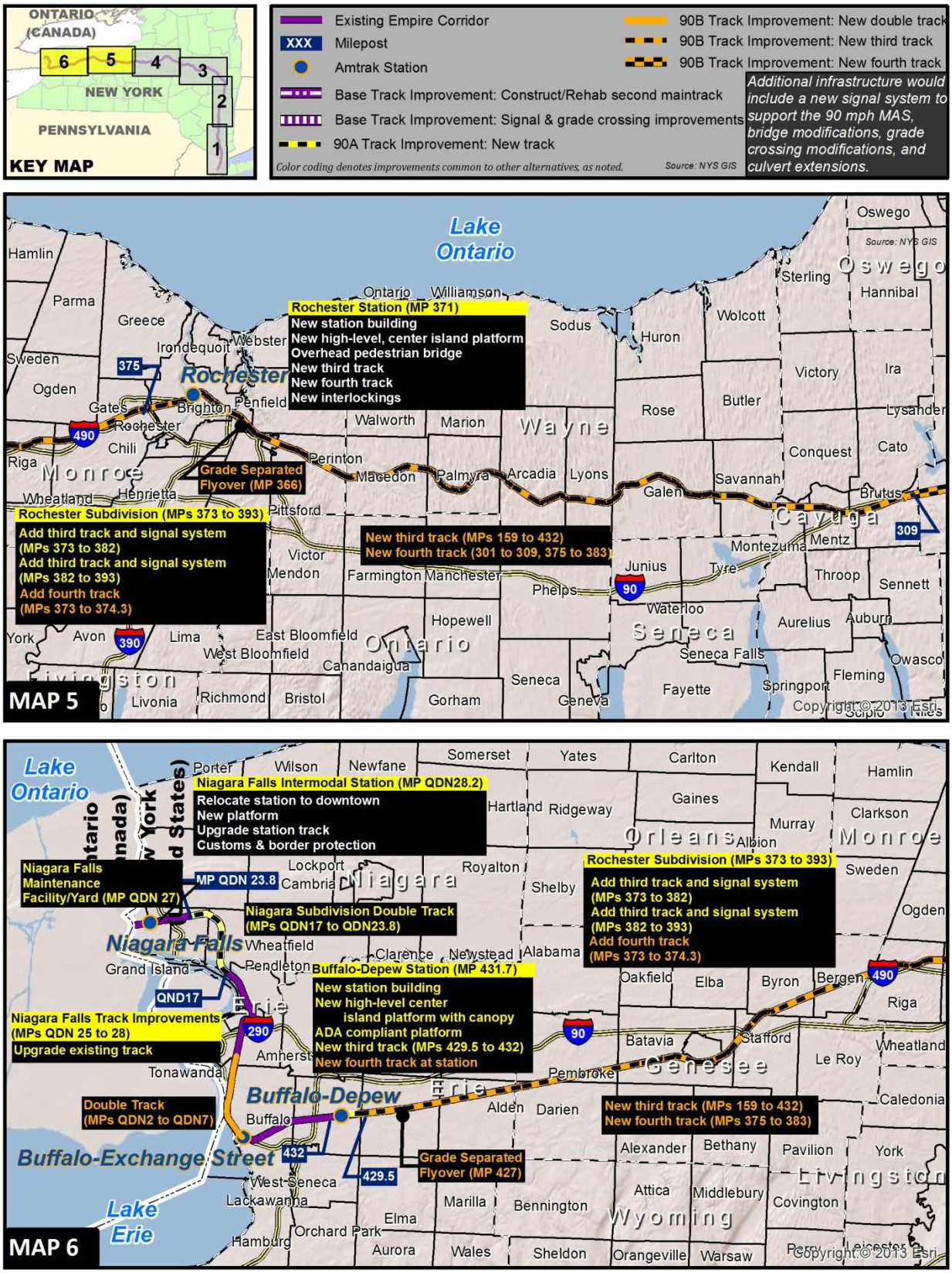


Exhibit 3-16—Alternative 90B (Maps 5 and 6)

Schenectady to Syracuse (MP 159-292)

Within this segment, Alternative 90B would provide the major improvements shown in Exhibit 3-5, Exhibit 3-6, and Exhibit 3-7, based on the conceptual design developed for this EIS.

Several areas would require larger track shifts to obtain an increase in operating speeds due to the existing geometry of the track: MP 168.3, MP 192.6, MP 198.5, MP 199.4, and MP 205.6.

Station improvements would be made at the following existing stations:

- **Schenectady Station** – As proposed for the Base Alternative, new station building, stairs and elevators to platforms, ADA compliant platform, and weather-protected corridor would be provided, and a new third track would be added with Alternative 90B.

- **Amsterdam Station** – As proposed for Alternative 90A, a new station building, ADA compliant counter, restrooms, ramps, elevators would be provided, with a new high-level platform and new third track, but Alternative 90B would also add an overhead pedestrian bridge and new fourth track.

- **Utica Station** - New center island platform, overhead pedestrian bridge, and new third and fourth track would be provided.

- **Rome Station** – New side platform and new third track would be provided.

- **Syracuse Station** – As proposed for the Base Alternative, upgrades to the existing third track would be provided. As proposed for Alternative 90A, new second and third tracks, modified and one new interlocking, and added crossovers and reconfigured signals would be provided, in addition to rehabilitation/replacement of the Park Street Bridge. Alternative 90B would also modify the existing side platform.

Alternative 90B also would require realignment of several existing roadways that are adjacent to the railroad right-of-way over a total length of approximately four miles. Roadway realignments would be required along approximately 3.5 miles of Route 5 and other roadways that closely parallel the railroad between Schenectady County and Onondaga County. Most of these realignments would be minor and as little as approximately ten feet horizontally. Other roadway realignments would be more substantial, could range in excess of 50 feet horizontally, and could potentially involve property acquisition for the roadway relocation. Coordination with local authorities and FHWA, as appropriate, will occur in individual project planning and Tier 2 efforts.

Potential property acquisitions that could require acquisition of a structure in addition to open land include: MP 168.33 (Glenville, Schenectady County), MP 210.8 (Manheim, Herkimer County), MP 215.6 (Little Falls, Herkimer County), MP 237.7 (Utica, Oneida County), and MP 286.4 (De Witt, Onondaga County).

Syracuse to Buffalo-Depew (MP 292-432)

Within this segment, Alternative 90B would provide the major improvements shown in Exhibit 3-5, Exhibit 3-6, and Exhibit 3-7, based on the conceptual design developed for this EIS.

No major track realignment areas would be needed to obtain an increase in operating speed.

Station improvement would be made at the following existing stations:

- **Rochester Station** – As proposed with the Base Alternative and Alternative 90A, new third and fourth tracks and interlockings will be provided, along with a new station building, new high-level center island platform, and overhead pedestrian bridge.

- **Buffalo-Depew Station** – As proposed with Alternative 90A, a new station building, high level center island platform and ADA compliant platform, ticket counter, restrooms, ramps, and railings, along with a new third track would be provided. Alternative 90B would also add a new fourth track.

Realignment of several existing roadways that are adjacent to the railroad right-of-way would be required over a total length of approximately four tenths of one mile in Onondaga and Cayuga Counties. These realignments would be minor and as little as approximately ten feet horizontally.

Potential property acquisitions that could require acquisition of a structure in addition to open land include: MP 341.1 (Arcadia, Wayne County) and MP 377.6 (Gates, Monroe County).

Maximum Authorized Speed

Alternative 90B would provide for an MAS of 90 mph between Albany, Buffalo and Niagara Falls.

Service Frequency Enhancement

Alternative 90B would increase the frequency of Amtrak Empire Service. Amtrak service between New York City, and Albany-Rensselaer would increase to 17 daily round trips, adding four trains, a 30 percent gain above the current 13 trips in the Base Alternative. Service between Albany and Buffalo would increase to eight daily round trips, seven of which continue on to Niagara Falls, doubling the current four-trip service to Buffalo in the Base Alternative.

Schedule Enhancement: Express Service and Station Stops

No express service is proposed for Alternative 90B.

Equipment

Alternative 90B would add six train sets to increase the frequency of Amtrak service.

Capital Costs

The estimated capital cost of Alternative 90B is $5.58 billion.

Trip Time

With Alternative 90B, the trip time between New York City and Niagara Falls, based on westbound scheduled times, would be 7 hours and 36 minutes (7:36). This would be 32 minutes less than Alternative 90A's trip time and one hour and 30 minutes (1:30) less than the Base Alternative's trip time.

On-Time Performance

The OTP for Alternative 90B along the Empire Corridor West would be 95.4 percent in the year 2035.

Ridership

Alternative 90B is projected to increase ridership to 2.6 million persons in the year 2035. This would be a gain of approximately 300,000 persons above projected ridership for Alternative 90A and a gain of approximately one million persons above projected ridership for the Base Alternative in 2035.

Revenue

Annual revenue for Alternative 90B is projected to be $139 million.

Operations & Maintenance Costs

Operations and maintenance costs for Alternative 90B are estimated at approximately $171 million per year.

Safety

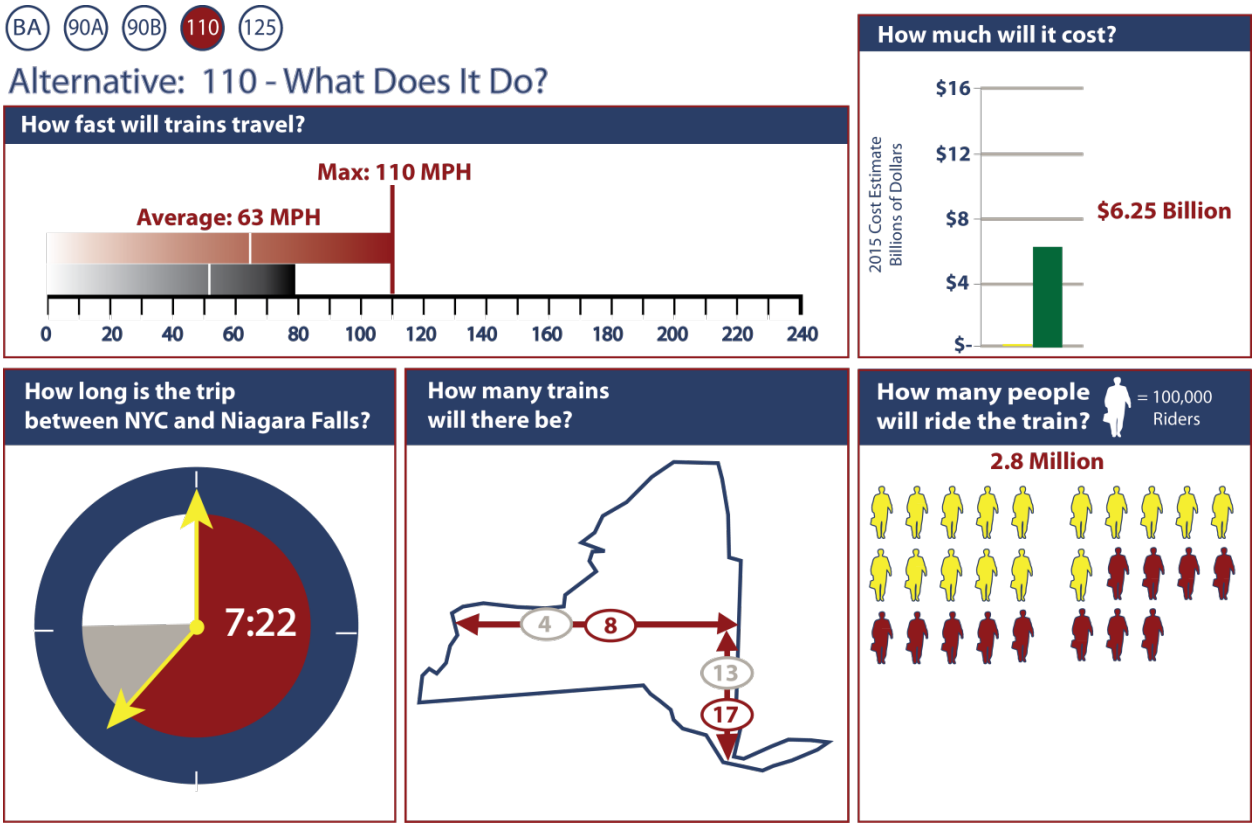
The improvements included in Alternative 90B would result in an overall increase in safety for the traveling public. The increase in train ridership would translate to a decrease in highway traffic volume. With fewer cars on the road this would, in turn, naturally result in fewer traffic accidents and other safety gains. Although there would be additional rail tracks built at some grade crossings, no new grade crossings would be added. Since the frequency of accidents, injuries, and deaths involving trains, especially with modern safety features at railroad grade crossings, is much lower than the frequency of accidents on highways, the overall number of accidents, injuries, and deaths would decrease due to the shift in travel from passenger cars to rail.

3.3.4. Alternative 110

Alternative 110 uses 110 miles per hour as the maximum authorized speed and would construct new third and fourth main track and a new signal system to support the 110 mph speed. This alternative would use current vehicle technology with the possibility of integrated trainsets. Alternative 110 would fall into the FRA's "Regional" category.

Alternative 110 would improve service with the purchase of new train sets that would be used to increase the Empire Service to 17 daily round trip trains operating between New York City and Albany-Rensselaer. Eight daily round trips would be made between Albany and Buffalo, of which seven continue on to Niagara Falls. The key features of Alternative 110 are illustrated in Exhibit 3-17.

Exhibit 3-17—Alternative 110 – Key Features



Note: Travel time between NYC and Niagara Falls presented in hours: minutes, based on westbound scheduled times.

Physical Improvements

Alternative 110 would add a dedicated third main passenger track between Schenectady (MP 159) and Buffalo-Depew (MP 432) (see Exhibit 3-18). It would also add a fourth passenger track in six locations (MP 174-184, MP 218-229, MP 235-239, MP 246-259, MP 310-320, and MP 388-399). Based on the conceptual-level design, the third main passenger track would be located on the north side of the existing tracks between MPs 159 and 366 and on the south side from MPs 366 to 432, generally 30 feet from the existing mainline and occupying a portion of the existing railroad bed that historically contained two additional tracks. Due to existing physical conditions that would

make it impractical to achieve the 30-foot separation, there would be sections of third main track located 15 feet from the existing track. In these instances, the MAS would be reduced to 90mph. The fourth tracks would be located between the dedicated third track and the existing track using 15-foot track centers, with a designated MAS of 90 mph.

Additional infrastructure would include:

- A new signal system to support the 110 mph MAS;
- Bridge modifications;
- Grade crossing modifications;
- Culvert extensions;
- Station improvements; and
- Two grade separated flyovers (MPs 279 and MP 366) where the third main passenger track passes over the existing freight tracks on an elevated structure, eliminating any potential conflicts with freight train movements.

Grade crossing modifications would be required to accommodate new tracks. Upgrades to existing grade crossing warning devices would be determined in subsequent design phases and in any Tier 2 documents.

Alternative 110 would provide two grade-separated flyovers, and it would be considerably different than Alternative 90B west of the Rochester Station. West of Rochester, Alternative 110 alignment would continue on the south side of the corridor. The dedicated third passenger track would run over the existing Track 2 alignment, and the existing freight tracks would be relocated to the north to maintain the desired track centers. This configuration would also eliminate an expensive grade separated flyover.

Locations for potential maintenance service roads have been identified along the entire corridor between MP 159 and MP 432. The specific need, size, and location of the service roads would be determined in subsequent design phases and Tier 2 studies. Some level of property acquisition would be required over substantial portions of Alternative 110, not only for service road construction, but to accommodate the geometry and track centers of the third and fourth main tracks.

Empire Corridor South

The improvements proposed with Alternative 90A on the Empire Corridor South also would be included in Alternative 110. The additional improvements provided with Alternative 110 would all be located on the Empire Corridor West.

Empire Corridor West

Exhibit 3-5, Exhibit 3-6, and Exhibit 3-7 summarize the characteristics and improvements proposed for Alternative 110, which also include improvements proposed for Alternative 90A. For descriptive purposes, the major physical improvement features of Alternative 110 are presented in

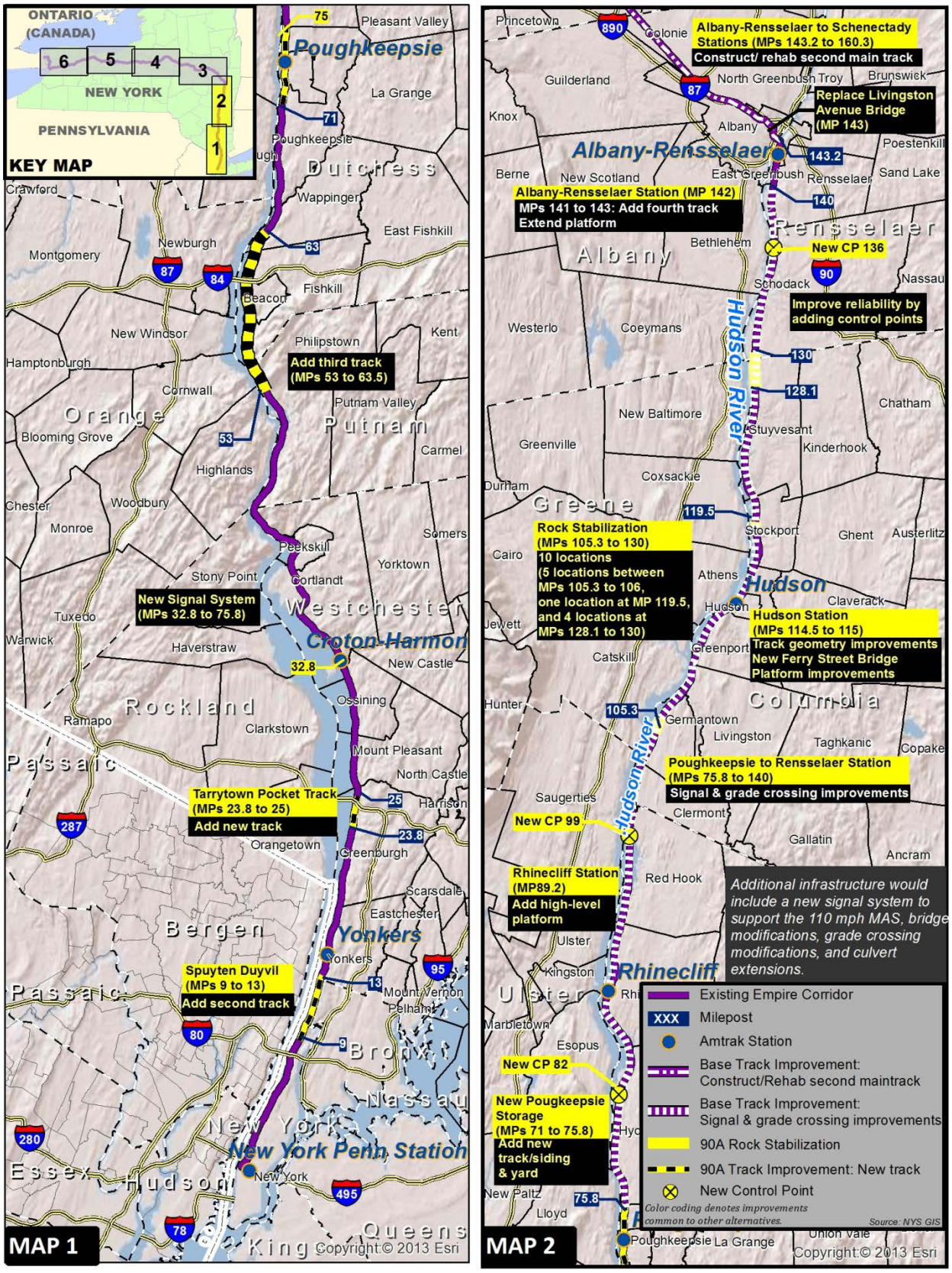


Exhibit 3-18—Alternative 110

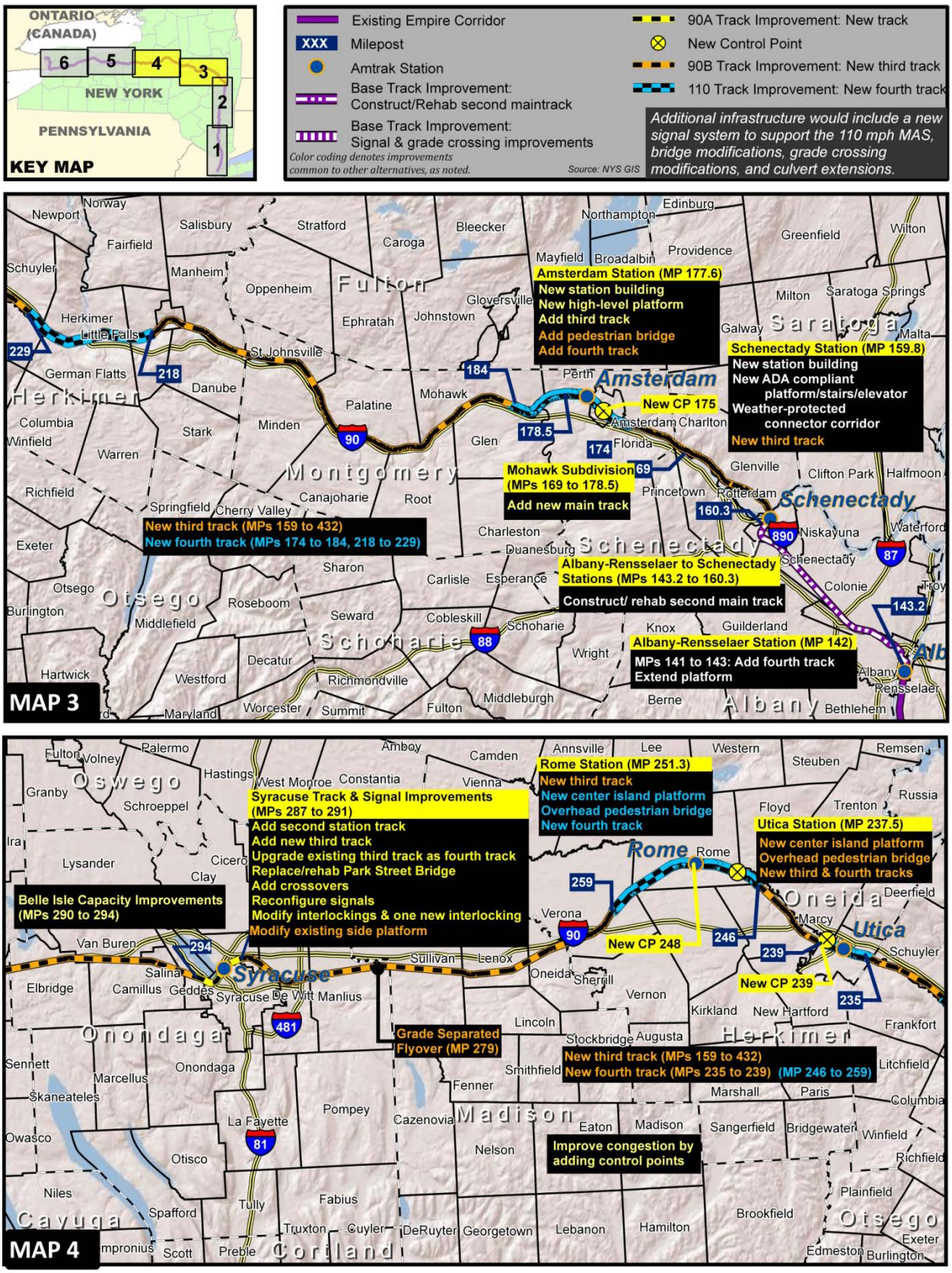


Exhibit 3-18—Alternative 110 (Maps 3 and 4)

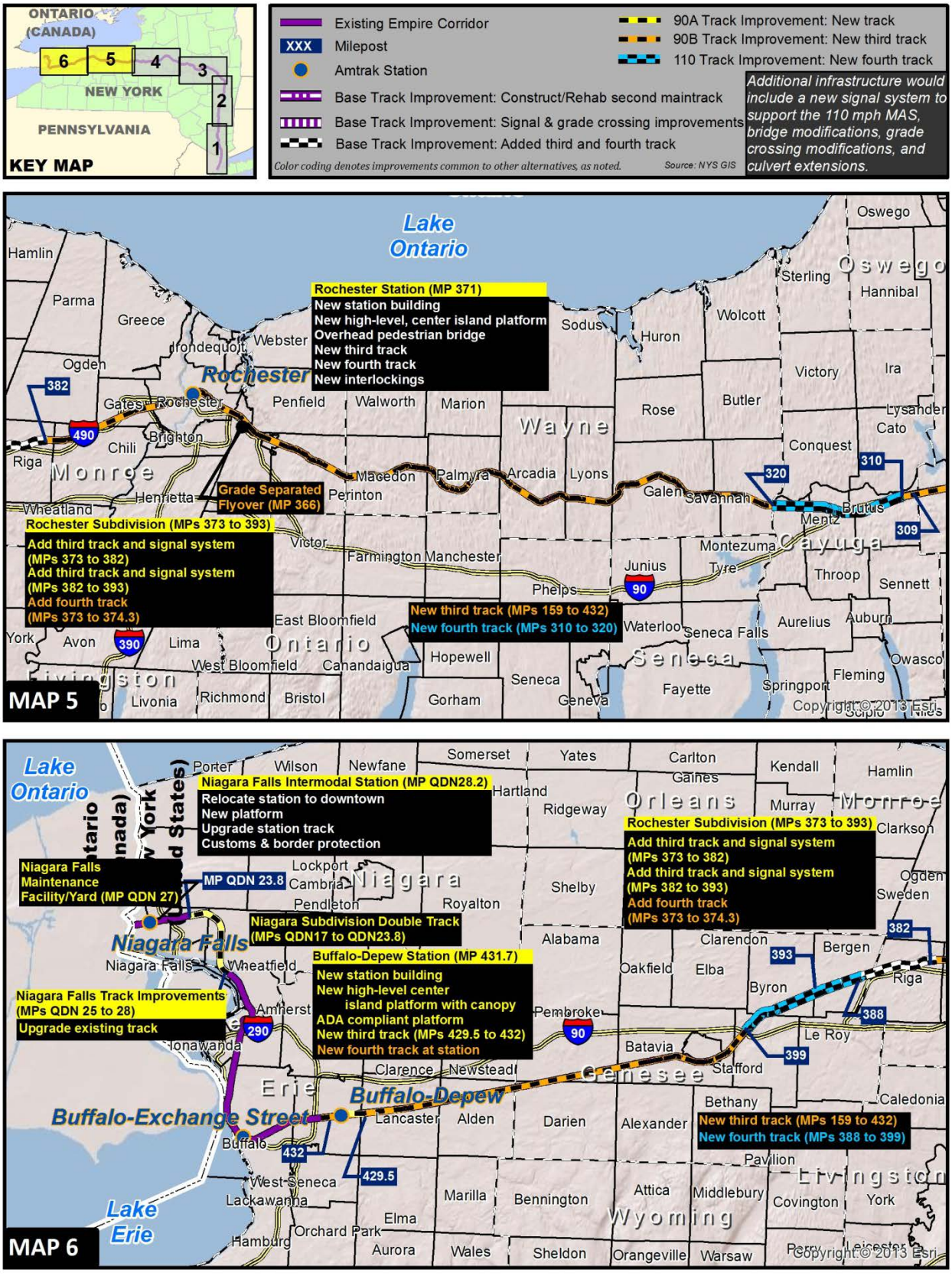


Exhibit 3-18—Alternative 110 (Maps 5 and 6)

two segments along the corridor. The first segment is between Schenectady and Syracuse (MPs 159-292), and the second is between Syracuse and Buffalo-Depew (MPs 292-432). Syracuse Station is the approximate center of the third track segment (133 miles from Schenectady to Syracuse and 140 miles from Syracuse to Buffalo-Depew).

Schenectady to Syracuse (MP 159-292)

Several areas would require larger track shifts to obtain an increase in operating speeds due to the existing geometry of the track: MP 168.4, MP 182.0, MP 192.7, MP 198.3, MP 199.3, MP 205.5, MP 211.6, and MP 221.8.

Station improvements would be made at the following existing stations:

- **Schenectady Station** – As proposed for the Base Alternative, new station building at the existing station, stairs and elevators to platforms, ADA compliant platform, and weather-protected corridor would be provided, and a new third track would be added as with Alternative 90B.

- **Amsterdam Station** – As proposed for Alternative 90A, a new station building at or near the existing Amtrak station, ADA compliant counter, restrooms, ramps, elevators would be provided, with a new high-level platform and new third track, and as with Alternative 90B an overhead pedestrian bridge and new fourth track would be added.

- **Utica Station** – As proposed for Alternative 90B, a new center island platform, overhead pedestrian bridge, and new third and fourth track would be provided.

- **Rome Station** – As proposed for Alternative 90B, a new third track would be provided, and a new fourth track, new center island platform, and overhead pedestrian bridge would be added under Alternative 110.

- **Syracuse Station** – As proposed for the Base Alternative, upgrades to the existing third track would be provided. As proposed for Alternative 90A, new second and third tracks, modified and one new interlocking, and added crossovers and reconfigured signals would be provided, in addition to rehabilitation/replacement of the Park Street Bridge. As proposed for Alternative 90B, a modified existing side platform would be provided.

Alternative 110 also would require realignment of several existing roadways that are adjacent to the railroad right-of-way over a total length of approximately seven miles. The roadway realignments would be required where Route 5 and other roadways closely adjoin the railroad in the section between Schenectady and Onondaga counties. Most of these realignments would be minor and as little as approximately ten feet horizontally. Other roadway realignments would be more substantial, could range in excess of 50 feet horizontally, and could potentially involve property acquisition for the roadway relocation. Coordination with local authorities and FHWA, as appropriate, will occur in individual project planning and Tier 2 efforts.

Potential property acquisitions that could require acquisition of a structure in addition to open land include the following locations: MP 168.3 (Glenville, Schenectady County), MP 184.6 (Mohawk, Montgomery County), MP 186.3 (Mohawk, Montgomery County), MP 191.7 (Mohawk, Montgomery County), MP 198.1 (Palatine, Montgomery County), MP 200.6 (Palatine, Montgomery County), MP

207.5 (St. Johnsville, Montgomery County), MP 210.8 (Manheim, Herkimer County), MP 215.1 (Manheim, Herkimer County), MP 226.9 (Herkimer, Herkimer County), MP 228.0 (Schuyler, Herkimer County), MP 230.8 (Schuyler, Herkimer County), MP 237.2 (Utica, Oneida County), and MP 286.4 (De Witt, Onondaga County).

Syracuse to Buffalo-Depew (MP 292-432)

One area would require larger track shifts to obtain an increase in operating speeds due to the existing geometry of the track, MP 355.2.

Station improvements would be made at the following existing stations:

- **Rochester Station** – As proposed with the Base Alternative, new third and fourth tracks and interlockings will be provided, along with a new station building, new high-level center island platform, and overhead pedestrian bridge.

- **Buffalo-Depew Station** – As proposed with Alternative 90A, a new station building, high level center island platform and ADA compliant platform, ticket counter, restrooms, ramps, and railings, along with new third track, would be provided. As proposed with Alternative 90B, a new fourth track would be provided.

Alternative 110 also would require realignment of several existing roadways in Onondaga and Cayuga counties that are adjacent to the railroad right-of-way over a total length of approximately four tenths of one mile. These realignments would be minor and as little as approximately ten feet horizontally.

Potential property acquisitions that could require acquisition of a structure in addition to open land include: MP 341.1 (Arcadia, Wayne County), MP 361.4 (Perinton, Monroe County), MP 377.7 (Gates, Monroe County), and MP 389.1 (Bergen, Genesee County).

Maximum Authorized Speed

Alternative 110 would provide for an MAS of 110 mph between Albany, Buffalo and Niagara Falls.

Service Frequency Enhancement

Alternative 110 would increase the frequency of Amtrak Empire Service. Amtrak service between New York City and Albany would increase to 17 daily round trips, adding four trains, a 30 percent gain above the current 13 trips in the Base Alternative. Service between Albany and Buffalo would increase to eight daily round trips, of which seven would continue on to Niagara Falls, doubling the current four-trip service to Buffalo in the Base Alternative.

Schedule Enhancement: Express Service and Station Stops

No express service is proposed for Alternative 110.

Equipment

Alternative 110 would add six train sets to increase the frequency of passenger rail service.

Capital Costs

The estimated capital cost of Alternative 110 is $6.25 billion.

Trip Time

With Alternative 110, the trip time between New York City and Niagara Falls, based on westbound scheduled times, would be 7 hours and 22 minutes (7:22). This would be one hour and 44 minutes (1:44) less than the Base Alternative's trip time.

On-Time Performance

The OTP for Alternative 110 along the Empire Corridor West would be 94.9 percent in the year 2035.

Ridership

Alternative 110 is projected to increase ridership to 2.8 million persons in the year 2035. This would be a gain of approximately 1.2 million persons above projected ridership for the Base Alternative in 2035.

Revenue

Annual revenue for Alternative 110 is projected to be $149 million.

Operation & Maintenance Costs

Operations and maintenance costs for Alternative 110 are estimated at approximately $173 million per year.

Safety

The improvements included in Alternative 110 would result in an overall increase in safety for the traveling public. The increase in train ridership would translate to a decrease in highway traffic volume. With fewer cars on the road this would, in turn, naturally result in fewer traffic accidents and other safety gains. Although there would be additional rail tracks built at some grade crossings, no new grade crossings would be added. Since the frequency of accidents, injuries, and deaths involving trains, especially with modern safety features at railroad grade crossings, is much lower than the frequency of accidents on highways, the overall number of accidents, injuries, and deaths would decrease due to the shift in travel from passenger cars to rail.

3.3.5. Alternative 125

Alternative 125 uses 125 miles per hour as the maximum authorized speed and would be the first speed threshold for electrically powered trains. Alternative 125 would construct an entirely new two-track grade-separated electrified corridor (with overhead catenary wire for power delivery to the trains) between Albany and Buffalo dedicated to high-speed passenger rail service and would fall into FRA's "Core Express" category. The route corridor is approximately 283 miles in length from Albany/Rensselaer Station to Buffalo Exchange Street Station.

The current Empire Corridor use of dual mode (electric and diesel) locomotives would continue in Alternative 125, although the electric propulsion type (AC) would differ from that used at present (DC) on the tracks surrounding Penn Station New York. Trains would operate in diesel mode on the existing Hudson Line Corridor between Albany/Rensselaer Station and a point just north of Penn Station New York, where they would switch over to the existing AC-powered overhead catenary for operation to the station and servicing facility.

Within the densely-developed areas around Albany, Syracuse, Rochester, and Buffalo, the new corridor would roughly parallel the existing corridor on a combination of new and existing right-of-way to provide express service (15 round trips) to existing stations in these cities. The existing four daily round trips to Buffalo (of which three continue on to Niagara Falls) would be maintained on the existing right-of-way. Between Albany and Buffalo, the new corridor would follow an alignment designed to balance the competing demands of operating speed, cost and environmental impacts.

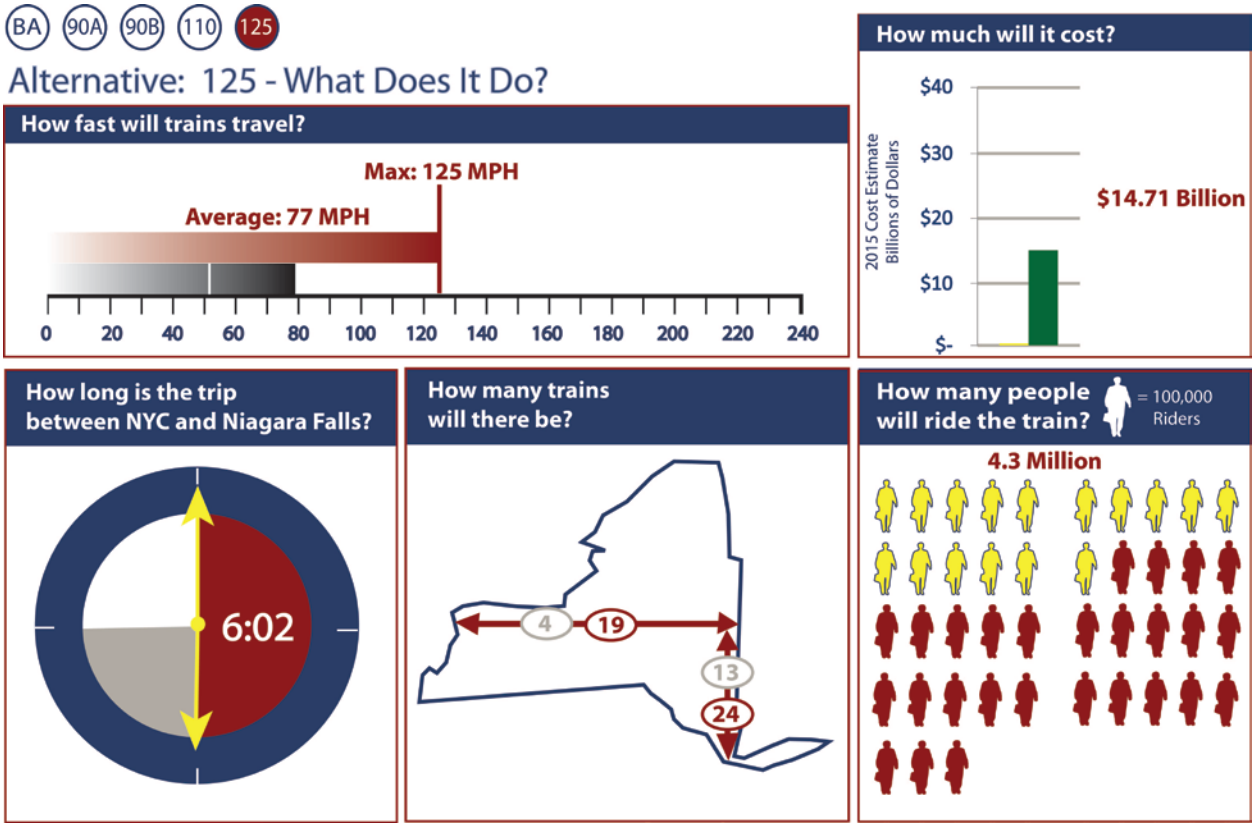
The key features of Alternative 125 are illustrated in Exhibit 3-19. The travel times assume that one station in a new central location would be provided in Buffalo. For the purposes of this Draft EIS, the existing Buffalo-Depew and Exchange Street stations are assumed to be in place (although the Alternative 125 express service would bypass Buffalo-Depew Station). Station sites would be further defined in Tier 2. The average speeds reflect the 125 mph express service speeds (including Hudson Line/Empire Corridor South) and do not include speeds for the existing Amtrak service that would also be maintained. The weighted average speed of both services would be 63 mph, but only Schenectady, Amsterdam, Rome, and Utica passengers (a small percentage of Empire Corridor passengers) will not experience high-speed dedicated service. Required infrastructure includes roadbed, track, viaducts and bridges, cuts and embankments, access roads, railroad systems, maintenance facilities, and other support facilities. Exhibit 3-5, Exhibit 3-6, and Exhibit 3-7 summarize the characteristics and improvements proposed for Alternative 125, which also include improvements proposed for Alternative 90A that extend along the Hudson Line or Niagara Branch.

Physical Improvements

Empire Corridor South

The improvements proposed with Alternative 90A on the Empire Corridor South also would be included in Alternative 125. Due to the developed nature of the corridor along the Hudson Line, it is assumed that the maximum speeds along this section would be 110 mph and that the improvements proposed are the same as for Alternative 90A, 90B, and 110. The additional improvements provided with Alternative 125 would all be in the Empire Corridor West segment.

Exhibit 3-19—Alternative 125 – Key Features

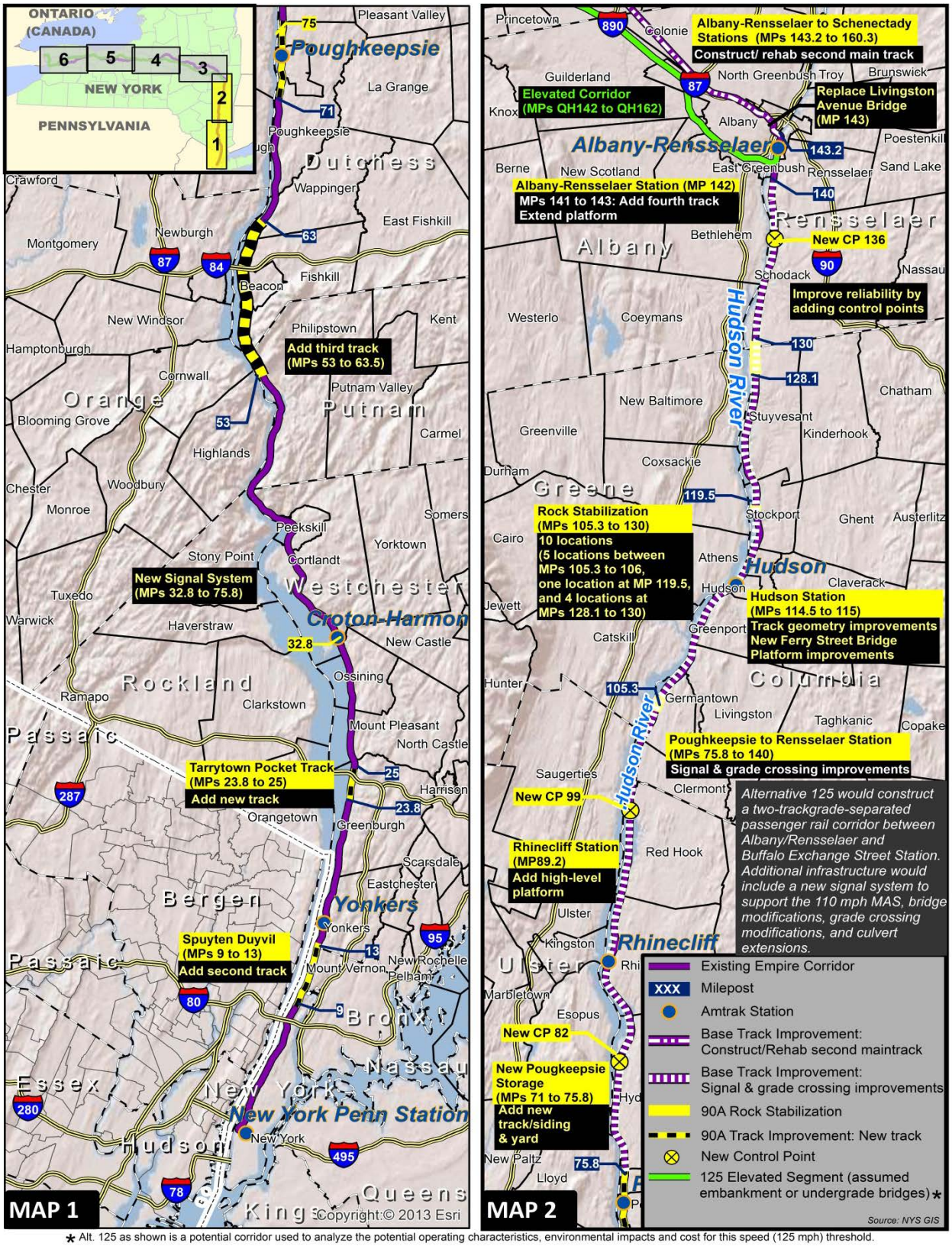


Note: Travel time between NYC and Niagara Falls presented in hours: minutes, based on express service, westbound scheduled times. The average speed for the "Regional Service" (or existing Amtrak service) that would be maintained on the existing Empire Corridor would be 53 mph, with a weighted average of 63 mph for both services. Travel time for regional service would be 8:40.

Empire Corridor West

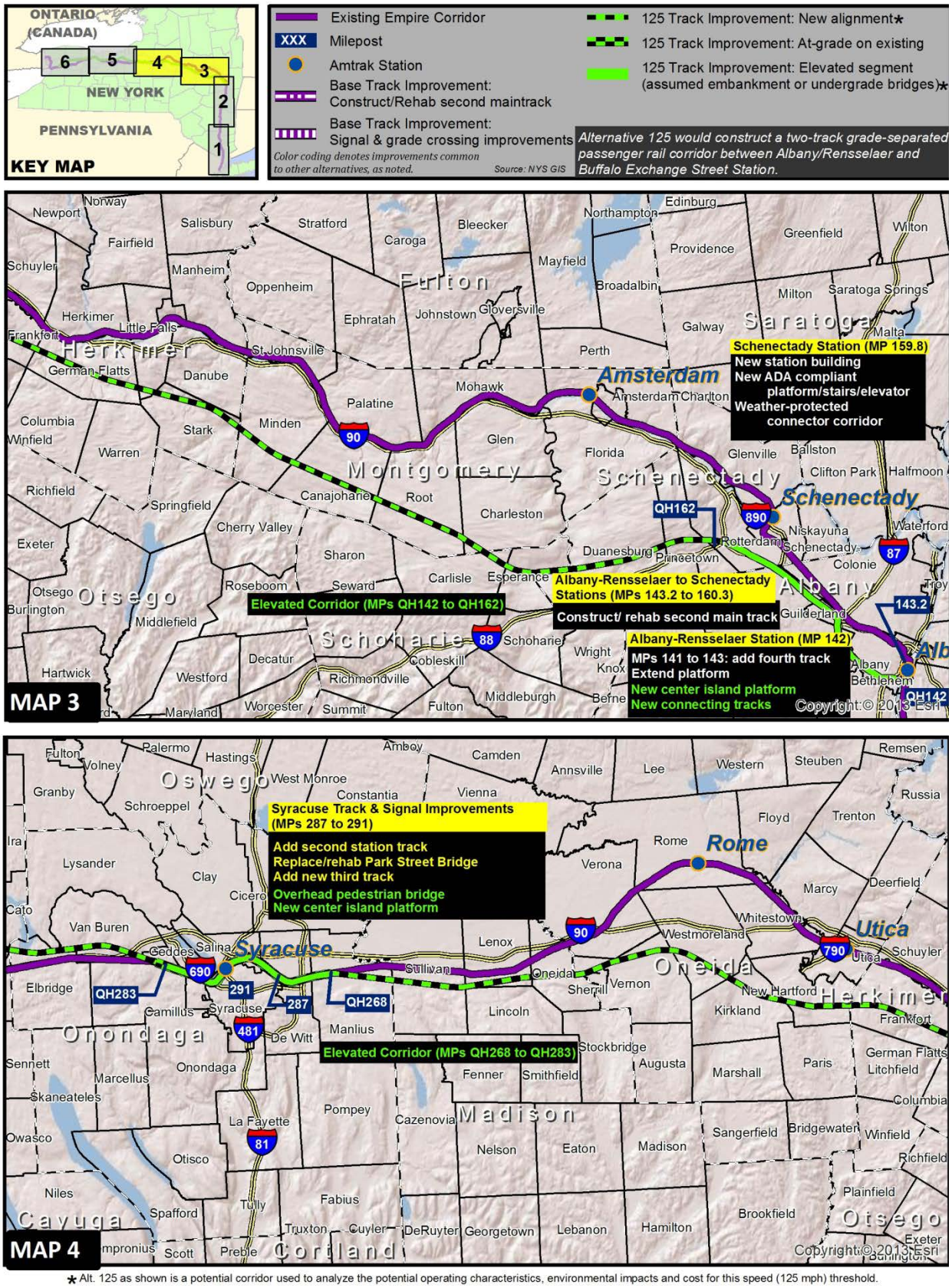
Approximately 83 percent of Alternative 125 would be along new electrified corridor (with overhead catenary) between Buffalo and Albany (see Exhibit 3-20). Exhibit 3-21 summarizes the existing and new corridor lengths for Alternative 125. Alternative 125 extends north to Albany-Rensselaer Station, then doubles back to a new river crossing across the Hudson River, following the New York State Thruway (I-87/I-90) and largely bypassing the cities of Albany and Schenectady. Alternative 125 would also include new right-of-way on a more direct route between Rensselaer County and a point five miles east of the Buffalo-Depew Station, merging back with the Empire Corridor over two 15-mile and 16-mile segments centered on Syracuse and Rochester, respectively. Alternative 125 would involve construction of a total of 236 miles of double track on new corridor alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. The alignment would be located within the existing Empire Corridor right-of-way through the cities of Syracuse, Rochester, and Buffalo.

Alternative 125 concept is a new grade separated (from highway and other railroads) corridor for the exclusive use of high-speed passenger trains. To achieve the grade separation, it is assumed



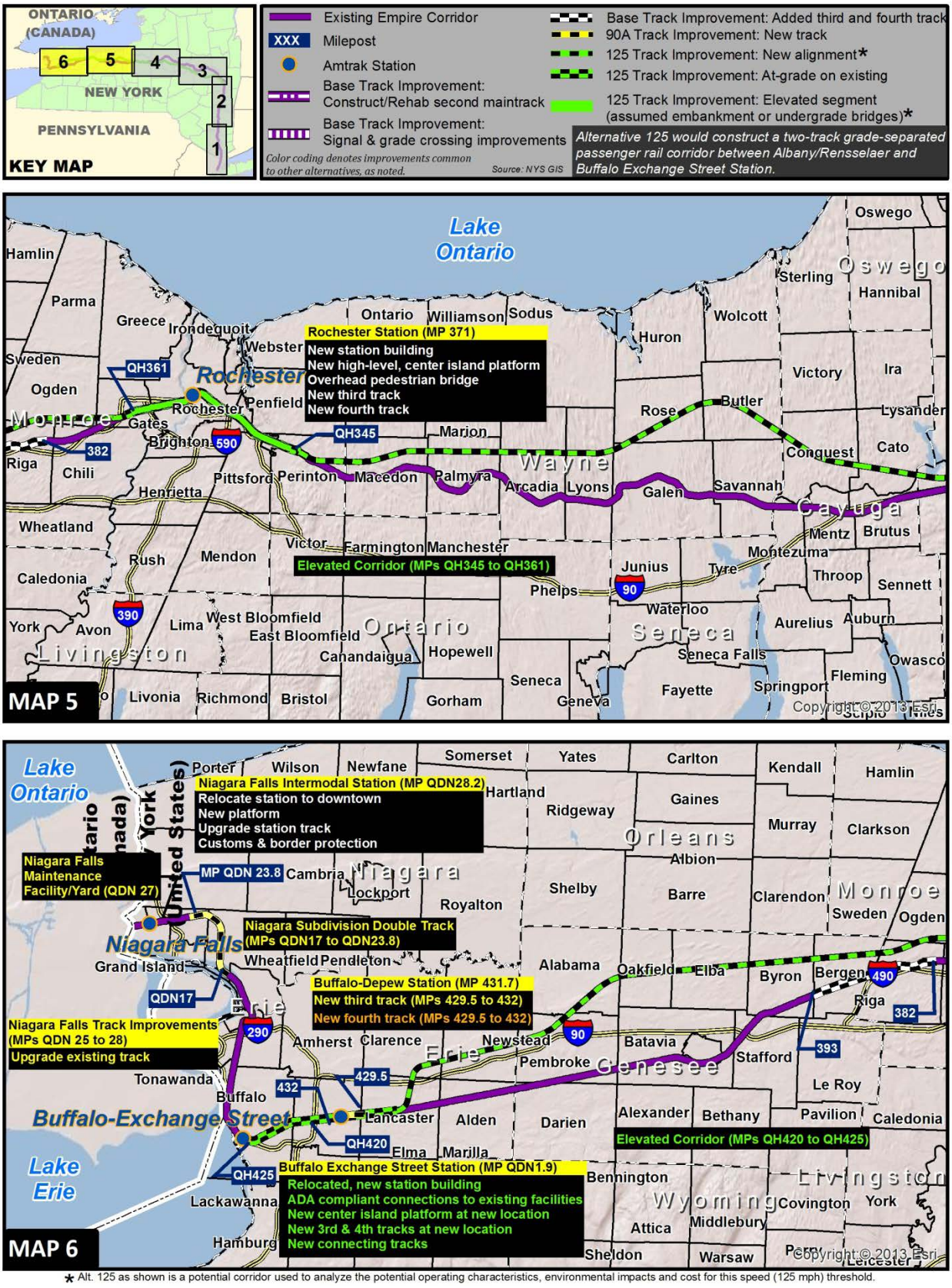
* Alt. 125 as shown is a potential corridor used to analyze the potential operating characteristics, environmental impacts and cost for this speed (125 mph) threshold.

Exhibit 3-20—Alternative 125



★ Alt. 125 as shown is a potential corridor used to analyze the potential operating characteristics, environmental impacts and cost for this speed (125 mph) threshold.

Exhibit 3-20—Alternative 125 (Maps 3 and 4)



* Alt. 125 as shown is a potential corridor used to analyze the potential operating characteristics, environmental impacts and cost for this speed (125 mph) threshold.

Exhibit 3-20—Alternative 125 (Maps 5 and 6)

Exhibit 3-21—Alternative 125 – Existing and New Corridor Mileage and Elevated Tracks

	Total Route Length (Miles)	Along "New" Corridor (Miles)	Along Existing Empire Corridor (Miles)
Buffalo to Albany:	**283**	**236**	**47**
Buffalo to Rochester	70	48	22
Elevated Track	11		11
Rochester to Syracuse	77	62	15
Elevated Track	15		15
Syracuse to Albany	136	126	10
Elevated Track	30		30

that a certain amount of viaduct is required in the urban areas. Where Alternative 125 extends through Rensselaer and Albany Counties along the New York State Thruway and through the downtown areas of Syracuse, Rochester, and Buffalo (approaching Buffalo Exchange Street Station), the tracks would be elevated, and Alternative 125 would directly service the existing stations serving these cities. The remainder of the track would be largely at grade through primarily rural or undeveloped lands, and no new stations along the new alignment sections are proposed.

It is assumed that grade separation will be achieved by elevating the tracks above the existing grade on a combination embankment and elevated structures. The structurally elevated structures are assumed to be supported by columns or viaduct. A total of 56 miles of elevated track is assumed to be required based on Tier 1 analysis, although further design and definition would be part of Tier 2 assessments.

For the purposes of evaluating potential impacts, operating characteristics, and costs of Alternative 125, a potential corridor on new right-of-way was identified between the sections of the route where it would follow the existing Empire Corridor to connect with existing stations at Albany-Rensselaer, Syracuse, Rochester, and Buffalo. This corridor was located using available Geographic Information System (GIS) mapping of environmental constraints, topography, and aerial photography. If Alternative 125 is selected for further consideration in Tier 2, this corridor location would be further refined to avoid community and environmental resources to a greater extent.

Alternative 125 extends north to Albany-Rensselaer Station, then doubles back to a new river crossing across the Hudson River, following the New York State Thruway (I-87/I-90) and largely bypassing the cities of Albany and Schenectady. Alternative 125 would also include new right-of-way on a more direct route between Rensselaer County and a point five miles east of the Buffalo-Depew Station, merging back with the Empire Corridor over two 15-mile and 16-mile segments centered on Syracuse and Rochester, respectively. Alternative 125 would involve construction of a total of 236 miles of double-track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. The alignment would be located within the existing Empire Corridor right-of-way through the cities of Syracuse, Rochester, and Buffalo.

Alternative 125 concept is a new grade separated (from highway and other railroads) corridor for the exclusive use of high-speed passenger trains. To achieve the grade separation, it is assumed that a certain amount of viaduct is required in the urban areas. Where Alternative 125 extends through Rensselaer and Albany Counties along the New York State Thruway and through the downtown areas of Syracuse, Rochester, and Buffalo (approaching Buffalo Exchange Street Station), the tracks would be elevated and Alternative 125 would directly service the existing stations serving these cities. The remainder of the track would be largely at grade through primarily rural or undeveloped lands, and no new stations along the new alignment sections are proposed.

It is assumed that grade separation will be achieved by elevating the tracks above the existing grade on a combination embankment and elevated structures. The elevated structures are assumed to be supported by columns or viaduct. A total of 57 miles of elevated track is assumed to be required based on Tier 1 analysis, although further design and definition would be part of Tier 2 assessments.

Alternative 125 incorporates the improvements proposed for Alternative 90A, 90B, and 110 along Empire Corridor South. However, along Empire Corridor West, existing Empire Service to all existing stations will be maintained, but express service along Alternative 125 would only service Albany-Rensselaer, Syracuse, Rochester, and Buffalo Exchange Street stations. Not all of the station improvements proposed for Alternatives 90B and 110 would be implemented on stations bypassed by the express service. The station improvements that would be provided along Empire Corridor West for Alternative 125 are described below, and Exhibit 3-22 shows the Alternative 90A improvements that would be included in Alternative 125.

- **Schenectady Station** – This station would be bypassed by Alternative 125 express service, although existing service would be maintained. As proposed for the Base, new station building, stairs and elevators to platforms, ADA compliant platform, and weather-protected corridor would be provided.

- **Amsterdam Station** – This station would be bypassed by Alternative 125 express service, although existing service would be maintained. No improvements are proposed for Amsterdam Station, which would be reconstructed under Alternatives 90A, 90B, and 110.

- **Utica and Rome Stations** – These stations would be bypassed by Alternative 125 express service, although existing service would be maintained. No improvements are proposed for Alternative 125 at Utica and Rome stations, which would be provided with new platform, tracks, and overhead pedestrian bridge for Alternatives 90A, 90B, and 110.

- **Syracuse Station** – As proposed for Alternative 90A, new second and third tracks would be provided, in addition to rehabilitation/replacement of the Park Street Bridge. Alternative 125 would add a new center island platform and an overhead pedestrian bridge.

- **Rochester Station** – As proposed with the Base Alternative, new third and fourth tracks, new station building, new high-level center island platform, and an overhead pedestrian bridge would also be provided under Alternative 125.

Exhibit 3-22—Alternative 90A Rail Improvements included in Alternative 125

Project Name (Milepost)	Project ID	Project Description	"Necessary" for 125 Project
Amtrak West Side Connection Spuyten Duyvil Second Track (MPs 9 to 13)	SRP-1	Increase capacity by adding a second track.	Yes
Metro-North – Tarrytown Pocket Track / Interlocking (MPs 23.8 to 25.0)	SRP-2	Increase capacity by adding a new track to improve speed, travel time, OTP, safety and reduce delay. Allows for increased future frequency.	Yes
Metro-North New Signal System (CP 33 to CP 75) (MPs 32.8 to 75.8)	ES-12	Signal system improvements to provide operating benefits in capacity, reliability and schedule recovery.	Yes
Metro-North – New Third Track (CP 53 to CP 63) (MPs 53 to 63.5)	SRP-3	Increase capacity, reduce delay and improve schedule and operational reliability by providing the capability for freight trains to meet/pass.	Yes
Metro-North Poughkeepsie Yard / Storage Facility Track / Signals (CP 71 to CP 75) (MPs 71 to 75.8)	ES-13	New track/siding and yard will help improve speed, travel time, OTP and safety and reduce delay. Allows for increased future frequency.	Yes
Rhinecliff Station Improvements (MP 89.2)	SRP-11	Improve reliability by adding high-level platforms to cut station dwell time in half.	Yes
Hudson Line Reliability Improvements New Control Points (CP 82, CP 99, CP 136) (MPs 82 to 136)	ES-05	Improve reliability by reducing spacing of interlockings, improving dispatching options to meet or pass trains, which will decrease delays.	Yes
Hudson Line Reliability Improvements Rock Slope Stabilization (10) (MPs 105.3 to 130)	ES-04	Improve reliability by removing / stabilizing rock slopes at 10 locations (5 locations between, MPs 105.3-106, one location at MP 119.5, and 4 locations at MPs 128.1-130), upgrading slide detector fences to improve safety, and reduce delays.	Yes
Hudson Station / Track Geometry Improvements (MPs 114.5 to 115)	ES-14	Improve reliability through track realignment / new Ferry St. bridge, which will improve speed and safety for station access, ADA-compliant platform; eliminate delays by supporting two trains serving the station at the same time.	Yes
Livingston Avenue Bridge (LAB) Replacement Project (MPs 143)	ES-15	Replace deficient moveable bridge to improve safety / reliability, travel time, remove speed / weight restrictions, increase capacity.	Yes
Mohawk Subdivision – New Main Track (CP 169 to CP 179) (MPs 169 to 178.5)	EW-14a	Increase capacity by adding a dedicated 110 mph passenger track to increase frequencies and provide additional capacity / reliability.	No

Exhibit 3-22—Alternative 90A Rail Improvements included in Alternative 125

Project Name (Milepost)	Project ID	Project Description	"Necessary" for 125 Project
Mohawk Subdivision Congestion Relief (CP 175, CP 239 & CP248) (MPs175 to 294)	EW-05	Improve travel times, operational capacity and safety by upgrading automatic block signals, control points and interlocking.	No
Amsterdam Station Improvements (MP 177.6)	EIS-1	Improve reliability by constructing a new station with high level / double edge platform. Improve train operations and reduce dwell time.	No
Belle Isle Capacity Improvements (CP 290 to CP 293) Syracuse Station - Track Improvements (MPs 290 to 294)	EIS-6	Increase capacity by providing additional freight train queuing capability and ability for freight trains to operate between DeWitt and Belle Isle Pocket Yard without occupying existing main line. Add second station track at Syracuse Station and reconfigure signals at the station including one new interlocking.	No Station work is required for 125 but would be different work than described here
Rochester Subdivision Reliability Third Main Track (CP 373 to CP 382) (MPs 373 to 382)	EW-16	Increase capacity with third main track and signal system to improve speed, frequency, safety and reliability.	Station work is required for 125 but would be different work than described here
Rochester Subdivision Third Main Track (MP 382 to 393)	EW-20	New third main track and signal system to improve speed, frequency, and reliability.	No
Buffalo Depew Station Improvements (MPs 429.5 to 432.5)	EIS-10	Improve reliability by constructing new station with high level / double edge platform. Improve train operations and reduce dwell time.	No
Niagara Subdivision Double Track (CP 17 to CP 22) (MPs QDN17 to QDN23.8)	EW-17	Improve capacity by adding a second track.	Yes
Niagara Falls Maintenance Facility / Yard Improvements (MP QDN27)	EW-18	Improve reliability by adding storage tracks and a maintenance building to provide shore power, potable water, inspection, cleaning and light repair capabilities. Decreases time to prepare for AM departures and eliminates delays from frozen equipment. Increases layover capacity.	Yes
Niagara Falls Track Improvements (MPs QDN25 to QDN28)	EIS-12	Improve capacity and reliability by upgrading an existing track	Yes

ES = Empire Corridor South; EW = Empire Corridor West; SRP = State Rail Plan; EIS – Tier 1 Environmental Impact Statement

- **Buffalo-Depew Station** – This station would be bypassed by Alternative 125 express service, although existing service would be maintained. As proposed with Alternative 90A, new third track would be provided and as proposed with Alternative 90B, new fourth track would be provided.

- **Buffalo Exchange Street Station** – Buffalo Exchange Street station will be relocated and a new station building provided for Alternative 125. In addition, ADA compliant connections to existing facilities, a new center island platform at a new location, and new third and fourth tracks and connecting tracks would be provided.

Maximum Authorized Speed

Alternative 125 would provide for an MAS of 125 mph between Albany/Rensselaer and Buffalo.

Service Frequency Enhancements

Alternative 125 would provide for a total of 19 daily round trips between Albany-Rensselaer Station and Buffalo, compared to the existing four daily round trips to Buffalo, of which six would continue to Niagara Falls. Four daily round trips would be retained on the existing corridor (of which three continue to Niagara Falls) and 15 daily round trips that will run express between major cities (Albany-Rensselaer, Syracuse, Rochester, and Buffalo) would be added on the new corridor.

Service Enhancements

The Alternative 125 corridor includes two intermediate stops between Albany-Rensselaer and Buffalo at Syracuse and Rochester. Distances between stops would range from 135 miles between Albany/Rensselaer and Syracuse, to 70 miles between Syracuse and Rochester, and between Rochester and Buffalo.

Equipment

Alternative 125 would add 17 dual mode locomotive-powered trainsets to increase the frequency of passenger rail service. All Empire Corridor Alternatives require continued use of dual mode locomotives. Alternative 125 will use a different type of dual mode locomotive, similar to those recently introduced on the NJ TRANSIT and AMT (Montreal) commuter rail networks. Rather than 700 volts (DC) third rail power, Alternative 125 will use a diesel/AC overhead contact wire dual mode capability. The overhead wire is presently energized at 25 hertz (Hz) 11 kilovolts (kV) within the Penn Station/East River Tunnel area and assumed to be energized at the more modern standard of 60 Hz 25 kV in the proposed electrified segment of the alternative. As with the NJ TRANSIT operation, the Alternative 125 dual mode locomotives would be capable of operating with either of the AC frequency/voltage combinations.

Capital Costs

The estimated capital cost of Alternative 125 is $14.71 billion.

Trip Time

With Alternative 125, the trip time between New York City and Niagara Falls, based on westbound scheduled times, would be 6 hours and 2 minutes (6:02). This would be 3 hours and 4 minutes (3:04) less than the Base Alternative's trip time.

On-Time Performance

The OTP for Alternative 125 along the Empire Corridor West would be 100 percent in the year 2035. This reflects a virtual 100 percent OTP on the new Alternative 125 corridor and an 83 percent OTP on the existing (regional) corridor.

Ridership

Alternative 125 is projected to increase ridership to 4.3 million persons in the year 2035. This would be almost 169 percent more than the projected ridership for the Base Alternative.

Revenue

Annual revenue to Alternative 125 is projected to be $245 million.

Operations & Maintenance Costs

Operations and maintenance costs for Alternative 125 are estimated at approximately $304 million per year.

Safety

As a sealed corridor with all grade-separated crossings, travel safety would be maximized with Alternative 125. The increase in train ridership would translate to a decrease in highway traffic volume. With fewer cars on the road this would, in turn, naturally result in fewer traffic accidents and other safety gains. Although there would be additional train frequency, the frequency of accidents, injuries, and deaths involving trains, is much lower than the frequency of accidents on highways, therefore the overall number of accidents, injuries, and deaths would decrease due to the shift in travel from passenger cars to rail.

4. Social, Economic, and Environmental Considerations

4.1. Introduction

This chapter describes existing social, economic, and environmental conditions in the study area and describes the potential for impacts for alternatives under consideration (including the Base Alternative, Alternatives 90A, 90B, 110, and 125). The impacts assessment performed is largely a qualitative assessment based on the Tier 1 concepts developed. This analysis in Tier 1 will be further refined in Tier 2, after an alternative has been selected. (Although the singular term "analysis" is used throughout this chapter, it is understood there likely will be several Tier 2 analyses, including those within future EISs, Environmental Assessments (EAs), or Categorical Exclusions (CEs) as appropriate, for individual projects within the Empire Corridor Program.) The Tier 2 analysis is described in the "Future Analysis" sections. Potential mitigation measures to be identified in Tier 2 are also addressed in this chapter. A map of the program corridor is shown in Exhibit 4-1.

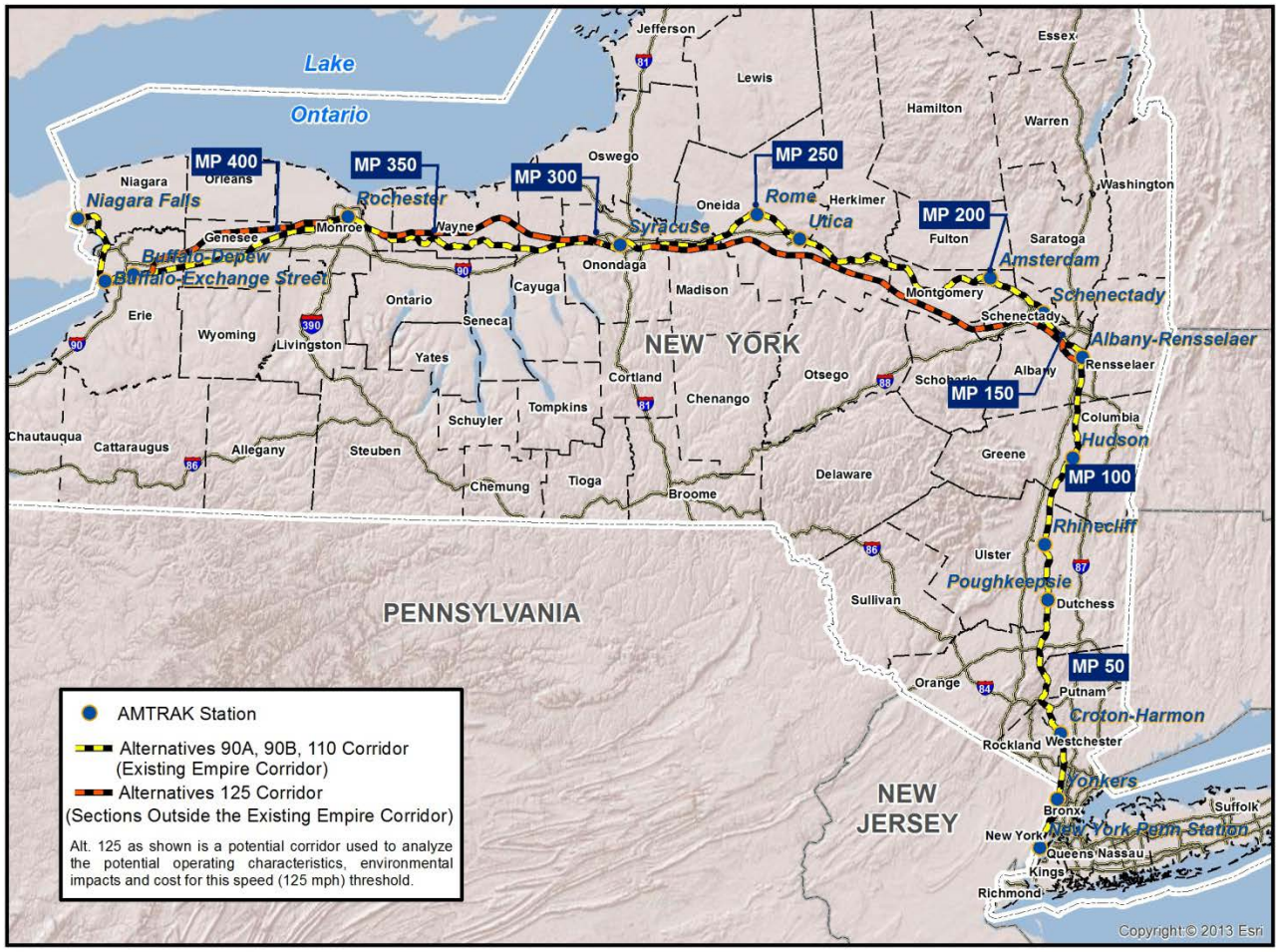


Exhibit 4-1—Corridor Map of the Build Alternatives

This chapter characterizes the affected environment within study areas that have been identified for each alternative under consideration. The discussion on the existing environment describes existing conditions associated with the natural environment, land features, air quality, noise, visual conditions, and cultural and community resources within the Empire Corridor program area. The study areas for the High Speed Rail Empire Corridor Program Draft EIS are defined as follows:

- The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor and Niagara Branch.[54,55]

- The 125 Study Area is used for analysis of Alternative 125, which follows portions of the existing Empire Corridor and also bypasses the railroad along new alignment, and is 450 miles long.[56]

Specific study areas for the natural and physical environment, and cultural resources vary from 600 feet to a mile in width depending on the resource, and are centered about the existing or prospective rail line centerlines. Specific study areas for the human environment, noise, and air quality are generally more expansive, and are defined by regions of influence in which a resource may potentially have program-related impacts. Regions of influence for human resources account for factors such as community sizes, geographical and political boundaries, and census boundaries. These human resources include social and economic factors, community resources, and land use planning. Specific study areas are further discussed in the methodology subsection of each particular impact area, and a detailed description of existing conditions, including maps, is presented in Appendix G.

4.2. Land Use

4.2.1. Regulatory Context

The Federal Railroad Administration's *Procedures for Considering Environmental Impacts* (Federal Register, Vol. 64, No. 101, May 26, 1999) requires consideration of potential environmental impacts on existing and future land use. The NYSDOT Project Development Manual also requires consideration of potential impacts on land use and local master plans and private development plans.

4.2.2. Methodology

Existing land uses were characterized for study areas within 300 feet of the corridor centerline for all alternatives. Land uses were identified using U.S. Geological Survey land use land cover Geographic Information System (GIS) mapping. Land uses were characterized by county and for

[54]/ The 90/110 Study Area (existing Empire Corridor) includes an approximate 1-mile extension of the Niagara Branch, terminating at the new Niagara Falls Intermodal Facility.

[55]/ Mileposts for the existing Empire Corridor, as designated by the railroads, skip a mile where the Hudson Line, originating at Grand Central Station, merges with the Empire Corridor at the Manhattan-Bronx county line near Spuyten Duyvil Station.

[56]/ Mileposts for the 125 Study Area, beginning at Albany-Rensselaer Station and proceeding west to Buffalo, are referenced with the designation QH preceding the number. Mileposts for the Niagara Branch are referenced with the designation QDN preceding the number.

the nine major cities within the study area. Land uses surrounding the sixteen existing Amtrak station sites were also identified through review of Google aerial photography and mapping.

Future land use plans were accounted for using regional level consistency reviews of existing Long-Range Transportation Plans and Comprehensive Plans at the Metropolitan Planning Organization (MPO) or county level. This plan review included the major metropolitan areas along the study area. Major initiatives for local planning and future private development within major business districts are addressed in general terms (given the size and scope of the program) in Appendix G under Section 3.3, "Business Districts."

4.2.3. Existing Conditions

The 600-foot wide study area for Alternatives 90 and 110 consist of twenty counties and intersects 97 cities/towns and 45 villages. The 600-foot wide study area for Alternative 125 includes portions of twenty-one counties, 92 cities/towns, and 24 villages. There are eight major metropolitan areas that are within the catchment area of nine MPOs, as described in Section 2.2.1. The land uses in the study area are described below from south to north (New York City to Rensselaer County) and east to west (Albany County to Buffalo/Niagara Falls) and are shown in Exhibit G-1 of Appendix G, Land Cover Map (Sheets 1 through 3). Appendix G presents a detailed overview of the land uses in each county, which are summarized in Exhibit 4-2 and Exhibit 4-3, as well as the major cities and station sites.

Empire Corridor South

The Empire Corridor South segment, from New York City to Rensselaer, extends 142 miles and in many locations closely follows the east bank of the Hudson River. The most urbanized segment of the study area extends roughly 10 miles through New York City from Pennsylvania Station (southern terminus of the Empire Corridor) in Manhattan to the northern border of the City of Yonkers in **Westchester County**, as shown in the land use totals in Exhibit 4-2. In New York City, the county boundaries coincide with the boroughs. The study area extends through **Manhattan (New York County)** and the **Bronx (Bronx County)**. The Hudson Valley Region north from New York City includes **Westchester, Putnam, Dutchess, and Columbia Counties**, which extend along the east side of the Hudson River and become less urbanized to the north, as shown in Exhibit 4-2. The Capital District includes **Rensselaer County** on the northern end of this program segment. The location of the rail line in close proximity to the river's edge in many locations is reflected by the predominance of surface waters, wetlands, and undeveloped forest area in many locations where the river bank is undeveloped or consists of parkland.

Empire Corridor West/Niagara Branch: 90/110 Study Area

The 322-mile-long Empire Corridor West/Niagara Branch, with the exception of the metropolitan areas within and surrounding the major cities, has a rural agricultural character, as shown in the land use totals in Exhibit 4-2. This route extends through the Capital District (**Albany and Schenectady Counties**); the rural **counties of Montgomery, Herkimer, Oneida**; the Central New York Region (the **counties of Madison, Cayuga, and Onondaga**); the Finger Lakes Region (**Onondaga, Cayuga, Wayne, and Monroe Counties**), and the Buffalo-Niagara Region (**Erie and Niagara Counties**). As shown in Exhibit 4-2, the urbanized areas are concentrated around the

Exhibit 4-2—Land Use/Land Cover in the 90/110 Study Area (in acres)

	Residential	Commercial Services	Industrial	Transportation/ Utilities	Industrial and Commercial	Mixed Urban Land	Agricultural	Rangeland	Forest Land	Surface Water	Wetlands	Barren Land	**Totals**
New York	19	91	14	135	0	453	0	0	0	4	0	0	716
Bronx	33	14	0	3	0	43	0	0	0	97	0	0	190
Westchester	369	118	344	180	0	231	0	0	225	821	0	0	2,288
Putnam	6	5	0	0	0	0	0	0	216	417	34	0	678
Dutchess	125	32	137	60	42	101	125	0	1,252	1,290	107	44	3,315
Columbia	346	55	0	0	0	0	417	0	1,067	104	31	125	2,145
Rensselaer	196	39	33	29	0	0	276	0	346	51	0	0	970
Albany	52	72	219	83	33	24	2	0	327	12	0	31	855
Schenectady	333	46	80	86	0	39	147	0	311	11	0	12	1,065
Schoharie	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Montgomery	288	225	0	179	0	112	962	174	852	44	0	97	2,933
Herkimer	63	316	0	33	0	26	584	143	530	126	0	17	1,838
Oneida	135	149	46	204	0	0	832	221	171	0	323	0	2,081
Madison	32	42	0	0	0	11	263	110	504	0	21	26	1,009
Onondaga	63	156	333	299	0	292	343	0	569	18	164	38	2,275
Cayuga	0	0	0	23	0	0	641	0	106	9	54	0	833
Wayne	9	54	36	0	0	4	1,638	0	658	0	284	16	2,699
Monroe	226	342	257	145	20	159	833	0	142	0	92	33	2,249
Genesee	113	18	29	5	0	34	1,818	0	78	15	65	1	2,176
Erie	424	317	550	136	0	90	630	0	146	0	28	22	2,343
Niagara	126	70	29	117	95	92	479	0	0	0	0	41	1,049
Totals	2,958	2,161	2,107	1,717	190	1,711	9,990	648	7,500	3,019	1,203	503	33,707

Source: The United States Geological Survey (USGS) National Mapping Program.

cities of Albany (Albany County), Schenectady (Schenectady County), Utica (Oneida County), Syracuse (Onondaga County), Rochester (Monroe County), Buffalo (Erie County), and Niagara Falls (Niagara County).

Empire Corridor West/Niagara Branch: 125 Study Area

The 125 Study Area, extending 308 miles from the Rensselaer County line to Niagara Falls, takes a more direct route than Empire Corridor West through rural and agricultural areas between Rensselaer County and Buffalo. The 125 Study Area bypasses several of the major metropolitan areas and existing stations along the Empire Corridor West, with the exception of two 16-mile sections roughly centered on the Syracuse and Rochester metropolitan areas. The more rural nature of the corridor is evident in the land use totals shown in Exhibit 4-3.

Exhibit 4-3—Land Use/Land Cover in the 125 Study Area (in acres)

	Residential	Commercial Services	Industrial	Transportation/ Utilities	Industrial and Commercial	Mixed Urban Land	Agricultural	Rangeland	Forest Land	Surface Water	Wetlands	Barren Land	**Totals**
New York	19	91	14	135	0	453	0	0	0	4	0	0	716
Bronx	33	14	0	3	0	43	0	0	0	97	0	0	190
Westchester	369	118	344	180	0	231	0	0	225	821	0	0	2,288
Putnam	6	5	0	0	0	0	0	0	216	417	34	0	678
Dutchess	125	32	137	60	42	101	125	0	1,252	1,290	107	44	3,315
Columbia	346	55	0	0	0	0	417	0	1,067	104	31	125	2,145
Rensselaer	179	22	17	29	0	0	276	0	346	47	0	0	916
Albany	99	20	37	675	0	0	19	0	123	12	0	34	1,019
Schenectady	83	47	0	127	0	18	632	8	332	0	0	0	1,247
Schoharie	0	0	0	0	0	53	214	0	188	0	0	0	455
Montgomery	0	0	0	0	0	0	1,094	0	383	0	68	0	1,545
Herkimer	27	0	0	0	0	31	788	32	969	0	0	0	1,847
Oneida	67	5	0	6	0	27	923	0	501	0	75	0	1,604
Madison	25	15	0	0	0	25	684	53	244	0	0	16	1,062
Onondaga	54	156	354	306	0	306	811	0	787	22	252	37	3,085
Cayuga	0	0	0	23	0	1	1,177	0	300	15	121	0	1,637
Wayne	28	54	36	0	0	37	3,501	0	1,206	0	400	16	5,278
Monroe	368	342	266	147	21	179	1,409	0	342	0	92	33	3,199
Genesee	113	18	29	5	0	34	3,640	0	201	15	251	32	4,338
Erie	459	324	550	142	0	104	1,165	0	283	24	65	71	3,187
Niagara	125	70	29	117	95	92	479	0	0	0	0	41	1,048
Totals	2,525	1,388	1,813	1,955	158	1,735	17,354	93	8,965	2,868	1,496	449	40,799

Source: The United States Geological Survey (USGS) National Mapping Program.

Consistency with Regional/Local Plans

A review of existing comprehensive plans and long-range transportation plans prepared by state, county and local governmental agencies was conducted for their consistency with the proposed high-speed rail improvements program planned for the Empire Corridor. Many of these plans indicate support for improved use and access to rail service including the introduction of high-speed rail, improvements to the rail corridor, and revitalizing station areas and fostering transportation-friendly land uses. In some cases, these plans advocate the relocation of existing rail facilities to a more accessible location.

Other common rail transportation objectives cited in the plans that support the development of high-speed rail include the following:

- Strengthen alternative modes of transportation,
- Improve intercity passenger rail service,
- Improve on-time performance for intercity passenger rail service,

- Expand ridership for intercity passenger rail service,
- Multi-modal transportation connections, and
- Economic development.

Exhibit G-2 in Appendix G identifies those state, Metropolitan Planning Organization (MPO), county and city plans that were reviewed and addresses the extent to which transit improvements and the introduction of high-speed rail are referenced. The two state rail/multimodal plans endorse and program improvements for improved intercity passenger rail and high-speed rail improvements in the Empire Corridor. Although many, but not all of the plans, specifically reference support for high-speed rail or Empire Corridor improvements, the MPO, county, and city plans reviewed overwhelmingly support improvements in intercity passenger rail service, and generally endorse improvements in transit and/or station access.

4.2.4. Environmental Consequences

This section describes potential land use impacts of the alternatives, based on review of aerial photography and GIS land use mapping. Review of aerial mapping and plans indicates that the Base Alternative and Alternative 90A would have no direct impacts to properties outside of the right-of-way. These alternatives would largely involve work within the right-of-way, with tracks being added in the location of the former track beds or existing access roads. Alternative 90B would involve greater property impacts in isolated areas, with addition of third track and limited areas of fourth track. The proposed work for these alternatives will include the addition of track, as well as maintenance service roads in selected areas. Alternative 110 would have isolated impacts to properties in more locations, with construction of third and fourth tracks extending further outside of the right-of-way in more locations. The third tracks would be offset 30 feet, and 20 additional miles of fourth track would be added. Alternative 125 would involve greater impacts to existing land use as it extends 236 miles as a sealed corridor on new alignment through primarily rural areas. Exhibit 4-2 and Exhibit 4-3 provide acreages of types of affected land use within the 90/110 and 125 study areas. This assessment is based on Tier 1 concepts and mapping and will be further refined in Tier 2 as the project development process is further advanced. Tier 2 will involve efforts to avoid property encroachments as design is advanced.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured against and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure. Because proposed work with this alternative is anticipated to be located entirely within the right-of-way, no direct land use impacts are anticipated.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, signalization, in addition to improvements proposed under the Base Alternative previously described. It is anticipated that work could be contained within the right-of-way, and no direct land use impacts are anticipated.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, are proposed, and no additional land use impacts are anticipated to occur.

Empire Corridor West/Niagara Branch

Alternative 90B would directly affect properties in nine areas in six counties, as described below. The proposed third track and maintenance service road at the connection to the Selkirk Branch at MP 168.3 in Schenectady County may impact the edges of agricultural/industrial property adjacent to Route 5. The proposed improvements may pass through the wooded edges of this area, although no impacts to buildings are anticipated.

Just west of Amsterdam Station in Montgomery County, the third track and maintenance access road may impact wooded property that houses utility structures between the Mohawk River and Route 5 at approximate MP 177.7. No buildings or aboveground structures will be impacted with Alternative 90B at this location. Continuing west, just beyond this area at approximate MP 177.8, the third track and maintenance access road would encroach upon Route 5 where the land between the Mohawk River and Route 5 narrows, potentially impacting the roadway alignment. This realignment may impact an adjoining street to the north in a residential neighborhood. At MP 192.3, the maintenance access road and track may extend into the wooded edge of a residential property and to the west would cross and realign Route 5 where the railroad and road are near the river, affecting wooded property. Near MP 200.7, the new maintenance access road and new passenger track and associated right-of-way may be close enough to affect industrial buildings.

In Herkimer County, the maintenance service road adjacent to the new third and fourth track may impact a farm building at approximate MP 210.8 on land closely adjoining both the railroad and Route 5 to the north.

In Wayne County, the addition of a maintenance surface road may impact an industrial building structure at approximate MP 341.1, west of Route 88, where a new track siding is proposed.

Just west of Interstate 390 in Monroe County, at approximate MP 374.7, the proposed third track and maintenance access road extends beyond the right-of-way and may impact industrial property to the north.

In Erie County, the addition of a fourth track to the south of the existing track at Buffalo-Depew Station (MPs 431 to 432) will impact the existing station building as well as additional industrial land west of the station to where the proposed third track meets the proposed No. 20 turnout.

The double track along the Niagara Branch between QDN MPs 2 to 7 is anticipated to be performed within the right-of-way and is not expected to result in land use impacts.

Alternative 110

Alternative 110 would directly affect approximately 53 areas in eight counties, which are described in the following section. With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, are proposed and no additional land use impacts are anticipated to occur.

Empire Corridor West/Niagara Branch

With Alternative 110, the proposed third track alignment from MP 164.5 to MP 165.4 in Schenectady County may impact a residential building and property and other undeveloped lands currently landlocked between the railroad and Barhydt Road and will also cross each end of Barhydt Road. Where the realigned third track would merge with the existing railroad at approximate MP 165.2, it would cross front yards and driveways of several residential properties at the intersection of Barhydt Road and Rector Road. The proposed third track and maintenance service road at the connection to the Selkirk Branch at MP 168.3 in Schenectady County may impact paved and unpaved parking/storage areas and the wooded edge of agricultural industrial property adjacent to Route 5.

In Montgomery County, the addition of a maintenance service road and additional passenger tracks or freight tracks may require realignments of Route 5 and other adjoining roadways. Realignments of Route 5 for the maintenance service road and proposed third track may impact residential properties at MP 172.6 and on Chapman Drive north of Route 5 (MP 173.6). Construction of the maintenance service road, third track, and an additional fourth track may require realignment of Route 5/Route 67 less than a mile east of the Amsterdam Station, impacting several businesses and residences. At MP 178.5, realignment of Route 5 may affect several residential, commercial, and other properties adjoining Route 5, including Old Fort Johnson, a historic site, and a fire station. At MP 179.8, realignment of Route 5 could affect the wooded edges of a private country club property, and will also affect frontages north of the highway including residences at the following locations: MPs 185, 187.3, 189, 196.4, and 196.9. The construction of the third and fourth tracks and a maintenance service road from approximate MP 181.5 to MP 182.3 in Montgomery County may impact undeveloped forested land at the edge of agricultural fields. Realignment of County Highway 26/Mohawk Drive to accommodate the service road and two additional passenger tracks may affect silos and the edges of properties near MP 183.2.

At MP 184.5, the maintenance access road and relocated freight track would affect a building adjoining the tracks, south of Route 5. Beginning within the village of Fonda (Town of Mohawk),

from MP 185.9 and continuing west for three blocks to beyond the village boundaries to MP 187.8, this same type of work outside the right-of-way may impact a number of closely spaced buildings/properties, including several community facilities and businesses (gas station and other automotive services, restaurants, and stores), and residential properties in addition to roadway impacts. At the western end of the village, at approximate MP 186.7, the maintenance service road may impact Route 5 where it curves close to the railroad. The maintenance access road and relocated freight track may impact adjoining property for an automotive services facility just west of this, at MP186.8.

To the west, in Montgomery County, the proposed work areas north of the track that might extend outside of the right-of-way would largely impact undeveloped or agricultural lands landlocked between the railroad and Route 5. At MP 191.7, one or more buildings may be impacted by the maintenance service road. From MP 192.5 to MP 192.8, the proposed third track and the service access road extends into the wooded portion of a residential property and may affect Route 5 at the curve where the land narrows at the Mohawk River. The relocation of Route 5 may indirectly impact farmland at this and other areas of Montgomery and Herkimer Counties although in most locations, no buildings impacts are anticipated. However, at MP 196.7, the relocation of Route 5 may impact farmland property and buildings on the opposite side of the roadway. The construction of the service access road and the proposed third track extends beyond the right-of-way at approximate MP 197.7, near a commercial/garage building in the village of Palatine Bridge (across Bridge Street from the Palatine Bridge Village Offices), and MP 198, which may affect a structure on the back of a property. The construction of the third track and a maintenance service road from MP 198.2 to MP 198.6 may impact wooded property closely adjoining buildings on the same access drive as the historic Frey House. South of the village of Nelliston in the Town of Palatine, where the railroad closely adjoins the Mohawk River, the service access road and the proposed third track may impact an industrial structure at MP 200.6. Between MPs 205.4 to 206 in Montgomery County (Town of St. Johnsville), track realignment of the new/relocated freight tracks and the third track veers off the existing corridor and may impact primarily wooded lands bordering agricultural fields.

In Herkimer County, the third track and maintenance service road may impact wooded lands bordering agricultural fields between MPs 210 to 213. A farm structure at MP 210.8 that is closely bracketed by the railroad and Route 5 to the north may be impacted. West of MP 215 to the county line at approximate MP 235, there are many areas where the maintenance service road and in some locations, the proposed third track, may extend outside of the right-of-way. Between MPs 226.4 and 227, the construction access road and third and fourth tracks may impact the back side of several properties that front on Route 5, including residences and several industrial or commercial uses. At MP 228, a retail building closely bracketed by the railroad and Route 5 may be affected by the service road. Several residences may also be displaced at MP 230.9, and a realignment of Route 5 between MPs 230.4 and 230.8 may affect several residential frontages.

Just east of Utica Station in Oneida County, the proposed third track may impact a building at approximate MP 237.3. In Monroe County, the proposed third track and service access road may impact several buildings where construction extends beyond the right-of-way. These potential building impacts are at approximate MPs 360.6 and 361.2. In Genesee County, the proposed third track may impact a building at approximate MP 402.4. The existing Amtrak Buffalo-Depew Station will also be impacted with the construction of the new third track.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch.

Empire Corridor South

No new improvements, beyond what is proposed for Alternative 90A, would be proposed for Alternative 125 along the majority of Empire Corridor South. However, roughly one mile of the proposed 125 mph track would extend south from Albany-Rensselaer Station to cross the Hudson River, but this is located within undeveloped and partially cleared land.

Empire Corridor West/Niagara Branch

Alternative 125 would involve construction of a total of 236 miles of track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. Alternative 125 also would include new right-of-way in most areas, but would merge back with the Empire Corridor over two 15- and 16-mile segments centered on Syracuse and Rochester, respectively. Alternative 125 would require acquisition of two to three thousand acres of land for creation of a sealed corridor between Albany and Buffalo. The potential impacts associated with the potential corridor that was identified during Tier 1 are addressed in the following section. If Alternative 125 is advanced for further consideration during Tier 2, efforts to further minimize community impacts and landtakings would be made as the design is further refined.

This route covers 126 miles on new alignment between Rensselaer County and a point 8.5 miles east of Syracuse Station. Alternative 125 extends through urban areas in Albany and Schenectady Counties over a distance of 20 miles, following the New York State Thruway (I-87/I-90) over most of this distance. In Albany County, as Alternative 125 crosses through industrial land, adjoining but not displacing, storage tanks, then follows the New York State Thruway at the outskirts of the City of Albany, land use impacts and displacements would be minimized through Albany County.

Passing west into Schenectady County, Alternative 125 continues to follow the New York State Thruway through more urbanized areas in Rotterdam, crossing through several residential neighborhoods where it deviates from the Thruway. The remainder of Alternative 125 extends through primarily undeveloped or very sparsely developed areas that consist primarily of forested and agricultural lands. Where Alternative 125 parallels U.S. Route 20 to the south, properties (primarily residential) fronting on the highway may be affected.

In the east end of Schoharie County, where Alternative 125 passes through more developed areas in the village of Esperance, it may involve displacements primarily of residences where it extends south of Route 20. Where Alternative 125 crosses U.S. Route 20 and Route 30A/162 in the Hamlet of Sloansville, it may displace residences or businesses along these highways. The remainder of Alternative 125 in Schoharie County crosses through primarily undeveloped and sparsely developed land that consist primarily of agricultural and forestland.

In Montgomery County, Alternative 125 crosses through predominantly forested and agricultural land. Although there may be displacements where Alternative 125 crosses roads, property

displacements would be minimized by the sparsely developed nature of the county. Alternative 125 crosses through a country club.

In Herkimer County, Alternative 125 crosses through predominantly forested and agricultural lands. Alternative 125 would also have the potential for displacements where it crosses roadways, on which development is generally more closely clustered than for Montgomery County along sections of highways, such as Route 168 and Route 28, and County Road 125. In particular, Alternative 125 passes through more urbanized areas within the Town of German Flatts, south of the village of Herkimer, between Routes 51 and County Road 14. This section would involve crossing three residential streets, and displacements are minimized by crossing a public golf course in this area. The remainder of the county along Alternative 125 is sparsely developed.

In Oneida County, Alternative 125 crosses through predominantly agricultural land or undeveloped or forested lands. Alternative 125 extends through the southern outskirts of the Town of New Hartford, a suburb of the City of the Utica to the north, and passes north of the Village of Clinton. Alternative 125 crosses through two golf courses on either side of Route 5. To the west, it extends through Oneida Indian Nation-owned lands, including the northernmost portion of the Atunyote Golf Course and several other agricultural/undeveloped lands. In response to a request from the Oneida Nation to acquire these lands, the U.S. Bureau of Indian Affairs prepared Draft and Final Environmental Impact Statements addressing placing the lands into federal trust on behalf of Oneida Nation. A Record of Decision on the EIS was prepared in May 2008. Alternative 125 extends south of the Oneida Nation facilities along the New York State Thruway that include the Turning Stone Resort and Casino. If Alternative 125 is advanced into Tier 2, efforts will be made to avoid impacts on the Atunyote Golf Course and other Oneida Nation-owned parcels. Alternative 125 continues west through predominantly rural agricultural lands, passing between the villages of Oneida Castle and Sherrill where it crosses Route 5 at the west end of the county.

Through the eastern half of Madison County, Alternative 125 parallels Route 5 to the south, but is far enough south to avoid many of the properties fronting on the highway. Alternative 125 extends through the outskirts of the City of Oneida, on the east end of Madison County, and south of the village of Canastota in the middle of the county. In Madison County, Alternative 125 crosses through predominantly rural agricultural and forestland. Where it crosses roadways, there is the potential for displacements of residential and commercial properties.

In Onondaga County, Alternative 125 would merge with the existing Empire Corridor. Where it extends 16 miles through urban areas in and surrounding the City of Syracuse, it follows the existing railroad. Depending on the design of the elevated railroad structure over the existing railroad, there may be right-of-way impacts, the extent of which would be determined in Tier 2. Outside of the Syracuse urban area, Alternative 125 diverges from the existing Empire Corridor and continues on a new alignment 61 miles west to a point 11 miles east of Rochester Station. Alternative 125 extends through predominantly rural agricultural lands in Onondaga County outside of the Syracuse urban area, but may involve displacements where it crosses roadways. In Cayuga and Wayne Counties, Alternative 125 extends north of the existing railroad through predominantly rural agricultural or forested lands, but where it crosses roadways, it may displace properties. In Wayne County, Alternative 125 would impact a private campground at MP QH322. To the west, this alternative would also pass through a trailer park at MP QH341 and may also impact businesses along this section of Route 31F.

In Monroe County, Alternative 125 extends parallel to Route 31F, extending through residential neighborhoods that become more dense approaching the City of Rochester. Alternative 125 merges

with the existing Empire Corridor along 16 miles in and surrounding the City of Rochester. Depending on the design of the elevated railroad structure over the existing railroad, there may be right-of-way impacts, the extent of which would be determined in Tier 2. Alternative 125 diverges from the existing Empire Corridor again 5.5 miles west of Rochester Station to continue on new alignment 52 miles west to Buffalo. West of where Alternative 125 diverges from Empire Corridor, outside of the City of Rochester, it extends north of a commercial/industrial area, where it may displace one building. To the west, Alternative 125 extends through rural agricultural or forested areas through the remainder of Monroe County and in Genesee County, where it may displace properties where it crosses roadways. Alternative 125 would displace a portion of a large commercial farm operation on County Road 9 (Albion Road) and would extend through portions of a sand and gravel operation on County Road 26 (Ledge Road).

In Erie County, Alternative 125 would continue through rural agricultural lands, but also extends through more densely developed area, including a mobile home park, and business/industrial areas. This alternative may affect one or more industrial buildings/properties, before merging with Empire Corridor on the outskirts of Buffalo. Depending on the design of the elevated railroad structure over the existing railroad extending to the Buffalo Exchange Street Station, there may be right-of-way impacts, the extent of which would be determined in Tier 2.

4.2.5. Potential Mitigation Strategies

During Tier 2, refinements in design will include efforts to avoid and minimize impacts on adjoining buildings and properties. For instance, if Alternative 125 is advanced for further consideration, efforts will be made in Tier 2 to avoid impacts on Oneida Nation-owned properties and other affected properties used by the community or for recreation, as well as residences and other land uses. If it is not possible to avoid property impacts, mitigation measures will include providing relocation assistance and compensation, as appropriate, to affected property owners, in conformance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 et seq.). This law requires that fair and equitable assistance be provided to those persons displaced by federal or federally funded actions.

Other potential mitigation measures include considering regional and local plans for transit connections and site development and consulting with regional and local officials in the siting and design of passenger facilities and amenities.

4.2.6. Future Analysis

During Tier 2, the property and right-of-way mapping will be refined, and the extent of property acquisitions and building impacts will be defined. Efforts will be made to refine the design to avoid property takings and impacts on neighborhoods, parks and recreation areas, community facilities, residences, and other environmentally sensitive land uses (e.g., Oneida Nation-owned properties) to the extent practicable. In areas where impacts are anticipated, local plans and zoning will be considered. Additional research will be performed regarding planned development in the vicinity of the station sites. Consistency with local plans and zoning will be addressed, and effects on land use patterns will be assessed as part of the Tier 2 evaluations. The effects on businesses and neighborhoods/community cohesion will be assessed as part of these evaluations. If necessary, relocation studies and relocation assistance and outreach will be provided to affected property

owners.

4.3. Regional Population and Employment, and Business Districts

4.3.1. Regulatory Context

The Federal Railroad Administration's *Procedures for Considering Environmental Impacts* (Federal Register, Vol. 64, No. 101, May 26, 1999) requires consideration of both beneficial and adverse impacts of program alternatives on the socioeconomic environment, including demographic shifts and impacts on commerce, metropolitan areas, and business districts. The NYSDOT Project Development Manual also requires consideration of potential impacts on neighborhoods and communities, regional and local economies, and business districts in the evaluation of program alternatives.

4.3.2. Methodology

The Tier 1 socioeconomic analysis examined population and employment trends for twenty-five counties that transect or adjoin the program corridor, comparing existing conditions to future (2035) projections. Although the ridership and market assessments for transportation analysis focused on the major metropolitan market areas (defined by the nine Metropolitan Planning Organization (MPO) areas serving urbanized areas within eight Metropolitan Statistical Areas (MSA)), the study area for environmental assessments was based on county level data. The MPOs and MSAs define a broader area extending outside counties (and even states) immediately adjoining the existing rail lines, and not all counties along the tracks are within the nine MPOs/eight MSAs.

A comparison was made between existing 2010 and projected 2035 population to identify changes in demographics along the corridor. Existing county population statistics were obtained from the 2010 U.S. Census Bureau Decennial Census. Future county population projections were obtained from Woods & Poole Economics, Inc.[57] to provide uniform county-level projections over the statewide study area that traverses multiple regional planning areas. These projected figures do not take into account any changes in public policy and infrastructure investments, such as High-Speed Rail Empire Corridor, which could potentially change the population and employment outlook particularly for the western corridor. Existing population data was also compiled for the year 2010, using U.S. Census data for the nine major cities along the corridor, including New York City, Yonkers, Poughkeepsie, Albany, Schenectady, Utica, Syracuse, Rochester and Buffalo that form the core of the eight metropolitan regions or MSAs, and for the MSAs themselves (see Section 2.2.1, "Characteristics of the Major Markets"). Historical growth of these cities was also gauged by using 2006 U.S. Census data obtained from the American Community Survey.

[57]/ Woods & Poole Economics, Inc. is an independent firm that specializes in long-term county economic and demographic projections, based on comprehensive historical county database and the integrated nature of the projection model. County projections are updated annually and utilize county models that take into account specific local conditions based on historical data from 1969 to 2008 (1969 to 2009 for population). One key aspect of Woods & Poole projections is that the economies of counties are linked together: projected economic conditions in one county are reflected in the projected economic conditions in other counties. The accuracy of Woods & Poole's projections has been comparable to the accuracy of other regional forecasting programs, including the Department of Commerce Bureau of Economic Analysis (BEA) and Census Bureau projections over comparable forecast horizons.

This analysis also considered labor statistics including county employment trends, unemployment (2010) and local business activity within the study corridor. Existing employment data (2009) for each county was obtained from the U.S. Department of Commerce, Bureau of Economic Analysis (BEA), as these represent a complete measure of part-time and full-time employment. Future 2035 employment forecasts were obtained from Woods & Poole Economics, Inc., that was factored based on the BEA existing employment figures. Employment data obtained from these sources account for wage and salary workers, proprietors or business owners (farm and non-farm), private household employees, and miscellaneous workers. BEA employment data are based on an establishment survey in which employers are asked the number of full- and part-time workers at a given establishment. Unemployment statistics for 2010 were obtained from the U.S. Bureau of Labor, Local Area Unemployment Statistics. The socioeconomic profile identifies key labor markets areas that may become more accessible as a result of the program.

The analysis provides a discussion of the potential effects of the program alternatives on the socioeconomic environment within the more populated and urban areas as noted. While the assessment is qualitative in nature, it focuses on general socioeconomic effects that could occur along the corridor. Any future Tier 2 analyses would include a more detailed examination of potential impacts of the selected alternative, including a detailed evaluation of means to avoid or minimize impacts through design and mitigation strategies to offset remaining unavoidable impacts.

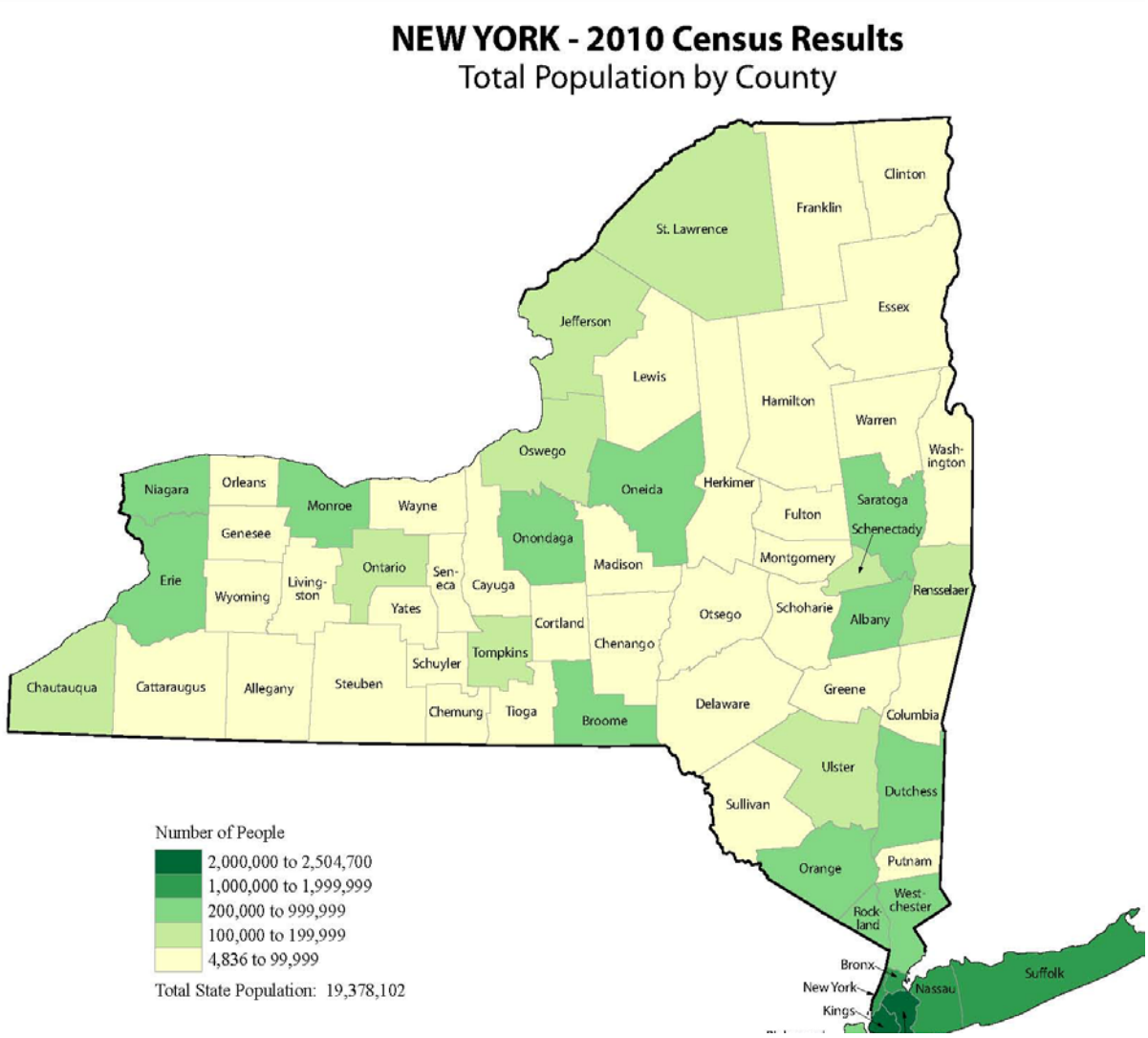
4.3.3. Existing Conditions

Population

Overview

This section will describe the socioeconomic conditions, trends at the county and city levels for the years 2009/2010 and 2035. The study area covers a twenty–five county area representing a population of 8,951,525 in 2010 (refer to Exhibit 4-4 and Exhibit 4-5). This is approximately 46 percent of New York's 2010 estimated population of 19,378,102 persons. As discussed in Section 2.2.1, "Characteristics of the Major Markets," estimated ridership for the program would extend over a wider region that includes entire metropolitan areas (served by the Metropolitan Planning Organizations). It is projected that the study corridor will realize an 8.0 percent gain in population by the year 2035 or an increase of 716,890 persons.

The eleven most populous counties along the 142-miles of the Empire Corridor South from Manhattan (New York County) to Rensselaer County contain 61.0 percent of the 90/110 and 125 Study Area population. The fourteen counties in the less populated and predominantly rural areas along the Empire Corridor West/Niagara Branch extending 322 miles from Albany County west to Niagara Falls (Niagara County) comprise 39.1 percent of the study area population. Empire Corridor South has twice the population in an area roughly half the size as Empire Corridor West/Niagara Branch. A detailed county by county description of population statistics is presented in Appendix G.2.



Source: U.S. Census, 2010 Census Redistricting Data Summary File

Exhibit 4-4—2010 County Population

Exhibit 4-5—2010 and 2035 Population for Counties in the Study Area

County	2010 Population	2035 Population	Change in No. of Persons	% Change
New York	1,585,873	1,700,678	114,805	7.24%
Bronx	1,385,108	1,610,926	225,818	16.30%
Westchester	949,113	1,052,815	103,702	10.93%
Rockland	311,687	359,957	48,270	15.49%
Putnam	99,710	141,646	41,936	42.06%
Orange	372,813	512,458	139,645	37.46%
Dutchess	297,488	358,964	61,476	20.67%
Ulster	182,493	218,775	36,282	19.88%
Columbia	63,096	67,724	4,628	7.33%
Greene	49,221	53,027	3,806	7.73%
Rensselaer	159,429	158,383	-1,046	-0.66%
Albany	304,204	288,503	-15,701	-5.16%
Schenectady	154,727	149,352	-5,375	-3.47%
Schoharie	32,749	34,793	2044	6.24%
Montgomery	50,219	46,379	-3,840	-7.65%
Herkimer	64,519	61,942	-2,577	-3.99%
Oneida	234,878	222,788	-12,090	-5.15%
Madison	73,442	72,721	-721	-0.98%
Onondaga	467,026	450,453	-16,573	-3.55%
Cayuga	80,026	81,368	1,342	1.68%
Wayne	93,772	97,899	4,127	4.40%
Monroe	744,344	740,760	-3,584	-0.48%
Genesee	60,079	57,516	-2,563	-4.27%
Erie	919,040	912,661	-6,379	-0.69%
Niagara	216,469	215,927	-542	-0.25%
Total	**8,951,525**	**9,668,415**	**716,890**	**8.01%**

Source: 2010 population data obtained from the U.S. Census Bureau Decennial Census
2035 population projections prepared by Woods and Poole Economics, Inc.

Empire Corridor South

The counties of **New York, Bronx, Westchester, Rockland, Putnam, Orange, Dutchess, Ulster, Columbia, Greene, and Rensselaer**, comprise the more urbanized and populous segment of the Empire Corridor. These counties had a 2010 population of 5,456,031 persons, comprising almost 2/3 of the study area population. The total population is projected to grow by 779,322 persons or 14.3 percent by the year 2035. Exhibit 4-5 compares the 2010 and 2035 populations by county for the entire Empire Corridor.

Empire Corridor West/Niagara Branch

The population in the fourteen counties (**Albany, Schenectady, Schoharie, Montgomery, Herkimer, Oneida, Madison, Onondaga, Cayuga, Wayne, Monroe, Genesee, Erie and Niagara**) along Empire Corridor West/Niagara Branch totaled 3,495,494 persons in 2010. In contrast to the counties to the south, this region is forecasted to experience a loss in population, totaling 62,432 persons (or -1.79) by 2035. This decline follows historic population losses precipitated by the decline of the region's core manufacturing and industrial base. Schoharie County is projected to experience the largest future percentage increases in population in 2035, with a projected growth of 6.24 percent.

Major Cities

As discussed in the previous section, the principal cities located along the Empire Corridor include New York City, Yonkers, Poughkeepsie, Albany, Schenectady, Utica, Syracuse, Rochester, and Buffalo. Each of these urban centers has a 2010 population over 50,000, with the exception of Poughkeepsie (32,738), as noted in Exhibit 4-6 below. The City of Poughkeepsie was included as the geographic and to a large degree, transportation and institutional center of the Hudson Valley Region. New York City, Yonkers, and Buffalo were the cities that experienced a loss in population between 2006 and 2010. New York City lost 39,293 persons over this 4-year period, compared to a loss of 1,876 persons in Yonkers and 14,749 persons in Buffalo. The remaining cities experienced increases in population that ranged from 2,442 (Rochester) to 4,575 (Schenectady) from 2006 to 2010. Additional description of the major cities is contained in the Business District discussion.

Exhibit 4-6—Population of Major Cities in the Study Area

City	2006 Population	2010 Population	2006 to 2010 Change	
			No. of Persons	Percentage
New York City	8,214,426	8,175,133	-39,293	-0.48%
Yonkers city, Westchester County	197,852	195,976	-1,876	-0.95%
Poughkeepsie city, Dutchess County	30,050	32,736	2,686	8.94%
Albany city, Albany County	93,963	97,856	3,893	4.14%
Schenectady city, Schenectady County	61,560	66,135	4,575	7.43%
Utica city, Oneida County	59,082	62,235	3,153	5.34%
Syracuse city, Onondaga County	140,658	145,170	4,512	3.21%
Rochester city, Monroe County	208,123	210,565	2,442	1.17%
Buffalo city, Erie County	276,059	261,310	-14,749	-5.34%

Source: US Census Bureau, Population Estimates Program

Employment

Overview

The study area comprised 59.3 percent of the total state employment of 10,929,753 in 2009, the third largest state labor market in the country. Employment in the twenty-five study area counties

totaled 6,481,775 in 2009, and this estimate only includes two of the five counties of New York City. The majority of jobs were located in the eleven counties along Empire Corridor South, which accounted for 67.8 percent of the study area employment. The fourteen counties along Empire Corridor West/Niagara Branch provided 32.2 percent of study area employment in 2009. Appendix G.3 describes employment and forecasted trends by county for the study area. Exhibit 4-7 shows existing (2009) and future (2035) employment as well as 2010 annual average unemployment rates for each county.

Exhibit 4-7—2009 and 2035 Employment and 2010 Unemployment Rates for Study Area Counties

County	2009 Employment	2035 Employment	2009-2035 Change		2010 Annual Average Unemployment Rate
			No. of Jobs	Percentage	
New York	2,748,224	3,011,516	263,292	9.58%	8.0%
Bronx	345,884	465,307	119,423	34.53%	12.8%
Westchester	569,421	710,052	140,631	24.70%	7.2%
Rockland	151,645	188,895	37,250	24.56%	7.1%
Putnam	40,457	49,249	8,792	21.73%	6.9%
Orange	179,885	237,400	57,515	31.97%	8.3%
Dutchess	150,159	192,940	42,781	28.49%	7.9%
Ulster	85,720	112,913	27,193	31.72%	8.2%
Columbia	31,784	41,869	10,085	31.73%	7.6%
Greene	20,558	27,268	6,710	32.64%	8.6%
Rensselaer	71,143	96,338	25,195	35.41%	7.8%
Albany	271,960	330,785	58,825	21.63%	7.2%
Schenectady	74,671	84,890	10,219	13.69%	7.7%
Schoharie	12,720	16,643	3,923	30.84%	9.4%
Montgomery	22,857	29,158	6,301	27.57%	9.8%
Herkimer	24,627	27,669	3,042	12.35%	8.4%
Oneida	134,560	188,186	53,626	39.85%	7.8%
Madison	30,936	37,879	6,943	22.44%	8.4%
Onondaga	301,733	362,124	60,391	20.01%	8.0%
Cayuga	36,333	42,302	5,969	16.43%	8.3%
Wayne	37,227	42,897	5,670	15.23%	8.8%
Monroe	468,811	596,481	127,670	27.23%	8.0%
Genesee	30,643	35,210	4,567	14.90%	7.6%
Erie	552,085	634,748	82,663	14.97%	8.2%
Niagara	87,732	98,693	10,961	12.49%	9.1%
Total	**6,481,775**	**7,661,412**	**1,179,637**	**18%**	**8.2%**

Source: U.S. Department of Commerce, Bureau of Economic Analysis (2009), Woods and Poole Economics, Inc. (2035 projections), Annual 2010 Unemployment rates: Bureau of Labor Statistics, "Labor Force Data by County," ftp://ftp.bls.gov/pub/special.requests/la/laucnty10.txt>, accessed June 2, 2011.

Empire Corridor South

The eleven counties along Empire Corridor South accounted for the majority of study area employment and provided 4,394,880 jobs in 2009. This labor market is projected to increase by 16.8 percent by 2035, with an increase projected of 738,867 jobs.

The two study area counties within New York City, **New York (Manhattan Borough) and Bronx Counties** accounted for almost half (47.7%) of 2009 study area employment, and this does not account for employment within the remainder of New York City. This labor market is projected to expand by 382,715 jobs (12.4%) by 2035. 2010 average annual employment stood at 8.0 percent in Manhattan, and Bronx County had the highest unemployment rate in the study area (12.8%).

Westchester County was the second largest labor market, outside of Manhattan, comprising 569,421 jobs in 2009. This job base is projected to expand to 24.7 percent by 2035 (140,631 jobs). 2010 average annual unemployment rate in Westchester County stood at 7.2 percent.

The remaining five counties close to New York City similarly provided a significant job base, with the smallest number of jobs provided in **Putnam County** (40,457 jobs in 2009). These five counties accounted for 607,866 jobs in 2009, or 9.4 percent of study area employment. This job base is projected to expand by 28.5 percent (an increase of 173,531 jobs) by 2035. These five counties had an average annual unemployment rate of 7.7 percent in 2010.

Empire Corridor West/Niagara Branch

The fourteen counties along Empire Corridor West/Niagara Branch accounted for 2,086,895 jobs in 2009. This labor market is forecasted to expand by 21.1 percent by 2035, with a projected increase of 440,770 jobs by 2035.

Erie County had the largest employment base in 2009, with 552,085 jobs, followed by **Monroe County** (468,811 jobs), **Onondaga County** (301,733 jobs), **Oneida County** (134,560 jobs) and **Niagara County** (87,732 jobs). Together, these five counties accounted for 23.9 percent of the study area employment in 2009, and are forecasted to grow by 24.5 percent (or 1,880,332 jobs) by 2035. The 2010 unemployment rate was highest in the western counties. Niagara County had the highest unemployment rate (9.1%), and the remaining counties had unemployment rates that ranged from 7.8 percent (Oneida County) to 8.2 percent (Erie County).

Business Districts

The eight major business districts along the study area are described below, and more information on these districts and planned or recent developments is also included in Appendix G.3.3. All of these business districts are located directly along the Empire Corridor for the 90/110 Study Area, and all but Schenectady and Utica are located directly along the 125 Study Area. However, under Alternative 125, the existing Amtrak service provided to all of these cities would remain the same.

New York City

New York City is the financial capital of the country, and along with London and Tokyo regarded as a global financial center. Midtown Manhattan is the largest central business district in the U.S., and Lower Manhattan is the third largest. If the two study area counties, New York County (Manhattan) and Bronx County, were cities, they would each rank among the top 10 cities nationwide in terms of population.

New York City is the center of one of the most populous metropolitan areas in the world. New York City is the center of the New York-Northern New Jersey-Long Island, New York-New Jersey-Pennsylvania Metropolitan Statistical Area (MSA), which had a population of 18,897,109 in the 2010 U.S. Census. In 2007 to 2009, the gross metropolitan product of the New York metropolitan area (New York-Northern New Jersey-Long Island, New York-New Jersey-Pennsylvania MSA) was 1.210 trillion dollars, larger than the combined gross domestic product of Pennsylvania and New Jersey, and larger than all but one state (California)[58]. Based on commuting patterns, a wider region is defined by the U.S. Census Bureau as the New York-Newark-Bridgeport, New York-New Jersey-Connecticut-Pennsylvania Combined Statistical Area. One of every fifteen Americans lives within this wider region.

New York City's labor market totaled 4,722,352 in 2009, comprising 43.2 percent of New York State's employment. The city is critical to the state's economic vitality and is a driver of the national economy. In terms of economic recovery from the current recession, the State of New York had the second highest percentage increase of any state in the country in gross domestic product from 2009 to 2010 (5.1% increase).

Yonkers

Yonkers is part of the New York City metropolitan area and is the fourth largest city in the state. It is the largest city in Westchester County and is situated within 12 miles of midtown Manhattan and approximately 10 miles from the Westchester County seat in White Plains. The city borders are Bronx County on the south and the Hudson River on the west, the Bronx River on the east and the Town of Greenburg to the north. The Yonkers central business district serves a largely local population with major retail activity and anchors, similar to the retail mall complexes in nearby White Plains. The downtown waterfront that has historically played an important role in the city's economy, and the city is embarking on an ambitious, mixed-use waterfront revitalization program.

Poughkeepsie

Poughkeepsie is the seat of Dutchess County and the de facto center of the Hudson Valley. It is located midway between New York City and Albany, and is the largest principal city of the Poughkeepsie-Newburgh-Middletown Metropolitan Statistical Area, which encompasses all of Dutchess and Orange Counties. According to the U.S. Bureau of Economic Analysis, this metropolitan statistical area had a per capita income of $39,070 and a gross domestic product of 21.499 billion dollars in 2009. Poughkeepsie is the mid-Hudson Valley's regional governmental,

[58]/ Global Insight, *U.S. Metro Economies: GMP—The Engines of America's Growth, Gross Metropolitan Product with Housing Update.* Prepared for the U.S. Conference of Mayors and the Council for the New American City, June 2008; Updated using U.S. Bureau of Economic Analysis, "Gross Domestic Product by State/Metropolitan Area." Accessed June 17, 2011. <http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=1>, <http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=2>.

educational, and cultural center. Poughkeepsie has become a civic center for federal, state, and county, government offices, and private industry includes a major campus of IBM.

Albany/Schenectady within the Capital District

The City of Albany is the State Capital and is the seat of Albany County. Albany is the heart of the Capital District that includes the neighboring City of Schenectady. The City of Schenectady is the seat for Schenectady County. Both cities are part of the Albany-Schenectady-Troy Metropolitan Statistical Area, which had a total 2010 population of 870,716, the fourth largest in the state. According to the BEA, this MSA region had a per capita income in 2009 of $42,206, ranking 50th in the nation, and with gross domestic product of $39.597 billion. Based on commuting patterns, Albany and Schenectady are part of a larger area defined by the federal government as the Albany-Schenectady-Amsterdam, New York Combined Statistical Area. In terms of population, the cities of Albany and Schenectady were the 6th and 9th largest in the state, respectively.

Albany and Schenectady have been a center for higher education as well as government and healthcare, for over a century, and the economies of both cities has historically been dependent on these three sectors.

Utica

Utica is the seat of Oneida County and, along with the neighboring City of Rome, is the principal urban centers of the Utica-Rome Metropolitan Statistical Area. In 2010, the population of the Utica-Rome Metropolitan Statistical Area was 299,397. In 2009, according to the BEA, the per capita income of the Utica-Rome Metropolitan Statistical Area was $33,269, and the gross domestic product was $8.801 billion.

Syracuse

Syracuse is the seat of Onondaga County and the fifth largest city in the state. It is the center of the Syracuse Metropolitan Statistical Area, which had a population in 2010 of 662,577, and is part of a larger Syracuse-Auburn, New York Combined Statistical Area. According to the BEA, in 2009 the Syracuse MSA had a per capita income of $36,833 and a gross domestic product of $26.352 billion.

Syracuse is the economic and educational hub of Central New York. It has access to major convention sites in the downtown convention center complex and, west of the city, the Empire Expo Center (site of the annual Great New York State Fair). It is also home to Syracuse University, a major research institution; the State University of New York Upstate Medical University; the State University of New York College of Environmental Science and Forestry; and other smaller colleges and universities.

Rochester

Rochester is the third largest city and the second largest regional economy in New York. Rochester is the county seat for Monroe County. The 2010 population of the Rochester MSA was 1,054,323. In 2009, according to the BEA, the Rochester Metropolitan Statistical Area had a per capita income of $39,036, and a gross domestic product of $43,517 billion. Based on commuting patterns, a larger area has been defined by the federal government as the Rochester-Batavia-Seneca Falls, New York

Combined Statistical Area.

Rochester is an international center for higher learning and medical/technological development. It is the home of the University of Rochester, Rochester Institute of Technology, as well as companies such as Eastman Kodak, Bausch and Lomb, and Xerox.

Buffalo

Buffalo is the second most populous city in the state and the seat of Erie County. It is located on the eastern shore of Lake Erie and at the head of the Niagara River. It is the principal city of the Buffalo-Niagara Falls Metropolitan Statistical Area, which had a 2010 population of 1,135,509. In 2009, according to the BEA, the per capita income of the Buffalo-Niagara Falls MSA was $37,469, and the gross domestic product was $43.157 billion. A larger area, the Buffalo-Niagara-Cattaraugus Combined Statistical Area has also been defined by the federal government. In 2009, Buffalo was the third largest economy in the state, close behind Rochester.

4.3.4. Environmental Consequences

Base Alternative

Population

The Base Alternative represents the baseline condition against which the alternatives are measured against and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and provide a program of eight improvements in track and station infrastructure.

With the Base Alternative, population will continue to grow at least as fast as projected in the study area counties. It is projected that the study corridor will realize an 8.0 percent gain in population from 2010 to 2035, or an increase of 716,890 persons. In the year 2035, population along the eleven Empire Corridor South counties is projected to increase by 779,322 persons or 14.3 percent, while the population within the fourteen counties along the Empire Corridor West/Niagara Branch study area is projected to decline by 62,432 persons or 1.7 percent.

Improvements to intercity passenger service that result in increases in ridership and improve mobility and travel choices may, in turn influence the attractiveness of the area for businesses and residents. This in turn could result in increases in population. With the Base Alternative, this effect, if discernible, will be a minimal increase.

Employment and Businesses

With the Base Alternative (consisting of a program of eight improvements), weekday service frequencies will be maintained. The Base Alternative will involve construction restricted to the right-of-way, and no direct business displacements are anticipated. With this alternative, employment and business activity will continue to grow as projected, with a total increase of 18 percent, or 1.18 million jobs from 2009 to 2035. The eleven counties along Empire Corridor South, accounting for the majority (67.8%) of study area employment is projected to increase by 16.8 percent from 2009 to 2035, with an increase projected of 738,867 jobs. For the fourteen counties

along Empire Corridor West/Niagara Branch, the labor market is forecasted to expand by 21.1 percent from 2009 to 2035, with a projected increase of 440,770 jobs by 2035.

Alternative 90A

Population

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with additional capacity (third track) in selected areas.

Improvements in service frequencies and travel times would result in increases in ridership. Improved mobility and travel choices could make the program area more attractive to businesses and residents. This may translate into increases in population that would be greater than those experienced with the Base Alternative.

Employment and Businesses

Alternative 90A would involve construction confined to the existing right-of-way, and no direct business displacements would occur. The increased frequency of service and improved travel times with Alternative 90A would result in increases in ridership and could make the program area more attractive to both employers and employees. This would represent a positive effect for businesses, both from the perspective of potential clients and business and improving accessibility and convenience for workers. Any corresponding improvements in freight traffic would benefit businesses that rely on freight for their operations. This may result in increases in employment and business activity that would be greater than the increases experienced under the Base Alternative, particularly in the area of the station sites.

Alternative 90B

Population

Alternative 90B would match the improved frequency of service provided with Alternative 90A (and would include the 90A improvements) and would provide further reductions in travel time, with a dedicated third track and sections of fourth track provided between Schenectady and Buffalo. Double track along five miles of the Niagara Branch is also proposed.

Alternative 90B would involve isolated right-of-way impacts in limited areas in six counties, with some potential to affect businesses. The acreage of commercial land within the 90/110 Study Area is shown in Exhibit 4-2. Improved intercity passenger rail service, with more frequent trips and faster service, would improve mobility and travel choices, making the program area potentially more attractive to businesses and residents. This could result in increases in population that would be greater than for Alternative 90A. This effect may be more pronounced in the vicinity of the station sites. These increases in ridership and the additional mobility benefit afforded cities and bedroom communities west of Albany may offset to some degree the projected decreases in population that are forecasted to occur by 2035 within counties along the Empire Corridor West/Niagara Branch.

Employment and Businesses

Alternative 90B would provide further reductions in travel time and increases in ridership, compared with Alternative 90A. Faster travel times and more frequent service would better serve businesses and could potentially result in greater increases in employment and business activity than for Alternative 90A. Better segregation of passenger service and freight service between Schenectady and Buffalo, and any corresponding improvements in freight traffic, could provide more benefits to those businesses that rely on freight traffic. Alternative 90B is anticipated to potentially result in increases in business activity that would be greater than that for Alternative 90A, particularly in the vicinity of the station sites.

Alternative 110

Population

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times and ridership, with exclusive third track between Schenectady and Buffalo and additional infrastructure improvements to accommodate higher speeds.

The improved frequency and travel times of intercity passenger rail service would provide increases in mobility and travel choices, making the program area potentially more attractive to businesses and residents. This could result in increases in population, which would be greater than for Alternative 90B, and this effect may be more pronounced in the vicinity of the station sites.

Employment and Businesses

Alternative 110 would involve greater property impacts (with potential direct impacts on 53 areas in eight counties) than Alternative 90B, increasing the potential for direct impacts on businesses. The acreage of commercial land within the 90/110 Study Area is presented in Exhibit 4-2. Alternative 110 would provide further improvements in travel times and ridership, which could potentially benefit both businesses, and provide more convenient access for prospective clients and employees. This could result in increases in employment and business activity that would be greater than for Alternative 90B, particularly in the vicinity of station sites. Better segregation of passenger service and freight service between Schenectady and Buffalo, and corresponding improvements in freight movements, could benefit businesses that rely on freight traffic.

Alternative 125

Population

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. This new alignment would bypass stations at Schenectady, Amsterdam, Rome, and Utica.

This alternative would result in the greatest improvements to service in areas west of Albany. Improving the frequency and travel times of intercity passenger rail service, particularly west of Albany, would increase mobility and travel choices for businesses and residents, making the

program area potentially more attractive as a bedroom community. This alternative would have the greatest potential to result in increases in population within the program area of all the alternatives under consideration, and this effect may be more pronounced in the area of the station sites served.

Employment and Businesses

Of the alternatives under consideration, Alternative 125 would involve the greatest potential for business displacements and direct impacts, since it would involve construction of 236 miles of a new sealed corridor requiring acquisition of two to three thousand acres of land. However, the conceptual location of the new corridor in primarily undeveloped rural lands between the major urban centers would minimize the likelihood of business displacements. The acreage of commercial land within the 125 Study Area is shown in Exhibit 4-3. If Alternative 125 is advanced for further consideration during Tier 2, efforts to further minimize business displacements and direct impacts would be made as the design is further refined.

At the same time, this alternative may represent the largest benefit to businesses, employment, and business activity, although this effect may be more pronounced in the stations that experience improved service with Alternative 125 (Albany-Rensselaer, Syracuse, Rochester, Buffalo [Buffalo-Depew and Buffalo Exchange Street], Niagara Falls stations as well as stations along Empire Corridor South). Alternative 125 provides the fastest travel times of the alternatives under consideration, and at the same time, provides more frequent service. Alternative 125 provides exclusive, grade-separated tracks between Albany-Rensselaer and Buffalo-Depew stations, which bypass several of the station sites along the existing Empire Corridor (Schenectady, Amsterdam, Rome, and Utica). With this alternative, existing service to Amtrak passenger stations currently served along the Empire Corridor will be maintained, so no adverse impacts to these business districts from loss of business generated by patrons will occur.

4.3.5. Potential Mitigation Strategies

Mitigation strategies will depend on the extent of program impacts to neighborhoods and businesses and potential effects on communities along the prospective route (e.g., displacements, noise impacts). The mitigation considered will depend on the extent of impacts associated with alternatives selected for advancement in Tier 2. Alternative 125 will require more mitigation than lower speed alternatives that follow the existing Empire Corridor (Alternatives 90A, 90B, and 110), as it may involve the greatest increases in population and employment, as well as mitigation for displacements along the new Rensselaer to Buffalo route bypassing major sections of the Empire Corridor.

Mitigation measures can range from site-specific mitigation to general program-wide measures. Mitigation strategies will be developed in consultation with the affected communities, including discussion of station access, pedestrian accommodations, and connections to existing transit and highways. Potential site-specific mitigation strategies might include improved grade crossing protection, accommodation of pedestrian access at crossings and at station sites, mitigation/relocation of affected residences and businesses, and installation of noise barriers.

4.3.6. Future Analysis

The effects of the selected program alternative will be further evaluated in Tier 2. The effect of improved service on ridership and potentially indirect effects on population and employment, and businesses would be evaluated further in Tier 2. The ridership projections will be refined, as well as the design and mapping showing the proposed rights-of-way limits. The extent of analysis required will depend on the alternative selected, but additional analysis of site-specific effects on affected communities and businesses will be performed. As these effects will be greater for alternatives that deviate from the existing Empire Corridor, the analysis required will also be greater for these alternatives (Alternatives 110 and 125).

The need for the following evaluations will be determined in Tier 2 depending upon which alternative is selected for further review:

- Effects of property displacements and business impacts of these displacements and relocation studies;
- Effects on community cohesion for displacements within residential neighborhoods;
- Effect of population and employment changes and growth, and corresponding demands for housing (and potentially Transit Oriented Development); and
- The effects on station and pedestrian access and vehicular traffic circulation on roadway networks around passenger rail stations.

The mitigation measures for potential effects will also be identified during Tier 2 review .

4.4. Environmental Justice and Title VI

4.4.1. Regulatory Context

Environmental justice refers to social equity in sharing the benefits and burdens of a project or program. Title VI, enacted as part of the U.S. Civil Rights Act of 1964 (42 U.S.C 2000d) prohibits discrimination on the bases of race, color, or national origin in federally assisted programs or activities. In addition, Title II of the U.S. Americans with Disabilities Act (42 U.S.C. 12101) and Section 504 of the U.S. Rehabilitation Act of 1973 (29 U.S.C. 794) prohibit discrimination on the basis of disability in all public transportation. Executive Order (EO) 12898, "*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*," requires each federal agency to identify and address, as appropriate, "*disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations*."[59]

The United States Department of Transportation (U.S. DOT) issued Order 5610.2(a) to address environmental justice for minority and low-income populations.[60] The Council on Environmental

[59]/ Executive Order 12898. "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Federal Register, Volume 59, No. 32, February 11, 1994.

[60]/ U.S. Department of Transportation, 2012. U.S. DOT Order 5610.2(a), "Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Federal Register, Volume 77, No. 99, May 10, 2012.

Quality (CEQ) provides policy guidance in implementing NEPA[61] that defines minority and low-income populations as either:

- The minority or low-income population of the affected area exceeds 50 percent.
- The population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis.

The New York State Department of Environmental Conservation (NYSDEC) Commissioner's Policy 29, Environmental Justice and Permitting, provides guidance on incorporating environmental justice concerns into environmental reviews and projects subject to the State Environmental Quality Review Act (SEQR), where NYSDEC has a lead agency role.[62] While NYSDEC is not a lead agency for the program, this guidance provides useful background information for an environmental justice analysis.

NYSDEC's Environmental Justice Policy defines a minority community as a contiguous area with multiple census block groups, having a minority population equal to or greater than 51.1 percent of the total population in an urban area and 33.8 percent of the total population in a rural area. NYSDEC's Environmental Justice Policy defines a low-income community as one where the low-income population (i.e., persons living below the poverty threshold) is equal to or greater than 23.59 percent of the total population.

4.4.2. Methodology

Minority and low-income information were collected and presented by county, the geographic unit used to map minority and low-income populations for this study. To supplement the county-wide data, minority and low-income populations for the nine major cities along the corridor (as described in Section 4.4.1) were collected. These major centers include the cities of New York City, Yonkers, Poughkeepsie, Albany, Schenectady, Utica, Syracuse, Rochester, and Buffalo. The minority populations were characterized using 2010 U.S. Census data for race. Minority population includes persons who are American Indian and Alaska Native, Asian, black or African American, Hispanic or Latino, Native Hawaiian, and other Pacific Islander. Low-income populations were identified using the U.S. Census American Community Survey 5-Year Estimates (2005-2009) data for persons living below the poverty level.

These statistics were compared to statewide averages and federal (CEQ) and state (NYSDEC) environmental justice criteria. The NYSDEC criteria for race are different for urban and rural areas. The counties in both the 90/110 and the 125 Study Areas were considered to be urban areas, as defined by U.S. Census 2000 urban area boundaries, with the exception of Putnam, Schoharie, Montgomery, Madison, Cayuga, Wayne, and Genesee Counties.

Once the environmental justice populations were identified, a Tier 1 assessment of

[61]/ National Environmental Policy Act, 1969. "Title II, Council on Environmental Quality." Amended, January 1, 1970, July 3, 1975, August 9, 1975 and September 13, 1982.
[62]/ NYSDEC, 2003. "Commissioner Policy 29, Environmental Justice and Permitting." New York State Department of Environmental Conservation, March 19, 2003.

disproportionate impacts was completed for each of the alternatives. Within the Tier 2 assessment, census block group data will be used to identify minority and low income populations within the study area. This level of data may identify additional environmental justice communities not identified in Tier 1, which uses county level data.

4.4.3. Existing Conditions

Overview

The environmental justice study area consists of 20 counties for the 90/110 Study Area and 21 counties for the 125 Study Area. There are at least eight major metropolitan areas. The minority and low-income populations for the study area are shown in Exhibit 4-8. Overall, the State of New York has a minority population of 34.3 percent and a low-income population of 13.8 percent. The NYSDEC criteria for environmental justice include a minority population equal to or greater than 51.1 percent in urban areas. This was considered to be the threshold for a potential environmental justice area for most of the study area counties except for seven rural counties (Putnam, Schoharie, Montgomery, Madison, Cayuga, Wayne, and Genesee Counties), where 33.8 percent was used as the threshold for minority populations. The NYSDEC criteria for low-income population are 23.59 percent. These are the benchmarks that were used to define environmental justice populations.

In general, the New York metropolitan area, and in particular, Bronx County had the highest statistics for minorities and low-income populations. However, although both Manhattan and the Bronx had populations greater than the statewide average, only the Bronx exceeded the NYSDEC criteria.

Generally, as the rail corridor moves north out of New York City and Bronx County, statistics for counties to the north are lower than statewide averages. Although the counties with metropolitan areas had generally higher minority populations, and low-income populations are generally higher west of Albany; only three other counties, Montgomery, Oneida, and Erie Counties, exceeded the statewide averages and only for low-income populations. The environmental justice statistics were generally higher in the cities than for the counties along the rail corridor, as shown in Exhibit 4-8.

The statistics for minority and low-income populations in each county are further discussed in Appendix G.4 for the Empire Corridor South from New York City to Rensselaer County; and Empire Corridor West/Niagara Branch (both 90/110 and 125 Study Areas) from Albany County to Buffalo/Niagara Falls.

4.4.4. Environmental Consequences

Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental justice efforts focus on improving the environment in communities, specifically minority and low-income communities, and addressing disproportionate adverse environmental impacts that may exist in those communities.

Disproportionately high and adverse effects are defined as either of the following:

Exhibit 4-8—Minority and Low-income Population Percentages by County/Major City Along the Empire Corridor Study Area

County	Major City	Percent Minority[1]	Percent Low-income[2,3]
New York		42.6	17.3
Bronx		***72.1***	***27.9***
	New York City[6]	***56.0***	19.1
Westchester		31.9	7.9
	Yonkers	44.2	13.8
Putnam[4]		9.3	6.6
Dutchess		19.9	8.0
	Poughkeepsie	49.1	***23.9***
Columbia		9.4	9.5
Rensselaer		12.5	11.1
Albany		21.8	12.4
	Albany	43.0	***25.3***
Schenectady		20.4	10.8
	Schenectady	38.6	20.6
Schoharie [4,5]		3.7	11.0
Montgomery[4]		9.4	15.4
Herkimer		3.4	12.0
Oneida		12.9	14.5
	Utica	31.0	***29.0***
Madison[4]		5.0	9.7
Onondaga		18.9	13.2
	Syracuse	44.0	***31.1***
Cayuga[4]		7.5	12.4
Wayne[4]		7.1	11.0
Monroe		23.9	13.1
	Rochester	***56.3***	***30.4***
Genesee[4]		7.1	11.1
Erie		20.0	13.9
	Buffalo	49.6	***29.6***
Niagara		11.5	12.3
State of New York		34.3	13.8
NYSDEC		**51.1/33.8**	**23.59**

[1]/ NYSDEC's Environmental Justice Policy (Commissioner's Policy 29, "Environmental Justice and Permitting," NYSDEC Policy, Issuing Authority: Commissioner Erin M. Crotty, Date Issued: 3/19/03) defines a minority community as a contiguous area with multiple census block groups, having a minority population equal to or greater than 51.1 percent of the total population in an urban area and 33.8 percent of the total population in a rural area.

[2]/ Percent of ***individuals*** living below the poverty level

[3]/ NYSDEC's Environmental Justice Policy defines a low-income community as one where the low-income population (i.e., persons living below the poverty threshold) is equal to or greater than 23.59 percent of the total population.

[4]/ Considered a rural county based on U.S. Census Bureau urban area 2010 boundaries.

[5]/Only for the 125 Study Area.

[6]/ New York City also includes three other counties/boroughs besides New York (Manhattan) and Bronx.

Bold and italicize indicates communities that exceed the minority or low-income community thresholds

Source: Census, 2010a and Census, 2010b (2005-2009 American Community Survey 5-Year Estimates)

- An impact that is predominantly borne by minority or low-income households,
- An impact that would be experienced by these populations in a way that is appreciably more severe or greater in magnitude than would be experienced by non-minority or non-low-income populations.

At the county level, all alternatives are unlikely to result in disproportionately high and adverse impacts to minority and low-income communities. As part of Tier 2 analysis, a more detailed and refined study will be completed to document the presence of low-income and minority communities, and then to evaluate if there would be disproportionately high and adverse site-specific effects on those communities. There are planned track improvements and upgrades proposed for all project alternatives in more urban locations. These include the cities of New York, Yonkers, Poughkeepsie, Albany, Schenectady, Utica, Syracuse, Rochester and Buffalo. Of these nine urban areas, all but Yonkers and Schenectady contain either a minority or low-income population (or both) above the NYSDEC criterion. Proposed work in these areas would not likely result in disproportionately high and adverse impacts to these minority and/or low income communities since work would primarily be within the current right-of-way. In addition, all of the alternatives would provide increased transit options that would provide a benefit for the minority and low-income communities.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and provide a program of eight improvements in track and station infrastructure.

With the Base Alternative, it is unlikely that there will be a disproportionately high and adverse impact to minority or low-income communities. For this Tier 1 analysis, minority and low-income populations were addressed at the county level. Of the counties in the Empire Corridor study area, only Bronx County exceeded NYSDEC environmental justice thresholds of greater than 51.1 percent of the population for minority communities and greater than 23.59 percent of the population for low income communities. Currently, the Base Alternative does not include improvement projects within Bronx County; therefore, at the county level it is unlikely that there will be disproportionate impacts to low-income and minority communities. At the city level, one improvement project associated with the Base Alternative (EW-6) will include Syracuse track improvements and signal upgrades within the eastern portion of the City of Syracuse (MPs 278 to 291). The addition of an extra track and signal improvement work will occur primarily in the existing right-of-way, and it is unlikely that these improvements will have a disproportionately high and adverse impact to the low-income community within the City of Syracuse. Additionally, upgrades to the Rochester Station (EW-19) will occur in an area where NYSDEC environmental justice thresholds are exceeded; however, these improvements will ultimately provide a benefit to these communities and disproportionately high and adverse impacts to minority or low-income communities will be unlikely through the station upgrade.

Since there are fewer improvements in the Base Alternative compared with the various build alternatives there will also be fewer benefits in terms of increased service and reliability to the low-income and minority communities.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with additional capacity (third track) in selected areas. It is unlikely that there would be a disproportionately high and adverse impact to minority or low-income communities at the county-level. As mentioned above, Bronx County exceeded NYSDEC environmental justice criterion; however second track improvements proposed for Bronx County under Alternative 90A (MPs 9 to 13) would occur within the current right-of-way and would be unlikely to have a disproportionately high and adverse impact to minority and low-income communities in this area.

Proposed signal upgrades, station improvements and areas of extra track proposed along the corridor for Alternative 90A would occur within the major urban areas of Poughkeepsie, Albany, Syracuse and Rochester. Minority and/or low-income populations that exceed the NYSDEC criterion are located in these improvement areas; however, Alternative 90A improvements (including signal upgrades and extra track) are anticipated to be contained within the existing right-of-way. Therefore, property impacts are not anticipated, and disproportionately high and adverse impacts to minority or low-income communities would be unlikely. Station improvements at the Syracuse and Buffalo-Depew stations also are anticipated to be contained within the right-of-way, but would involve larger construction impacts (e.g., temporary noise increases); however, upgrades to the stations and increased trip frequency would ultimately provide a benefit to these communities and disproportionately high and adverse impacts to minority or low-income communities would be unlikely.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A (and would include the 90A improvements) and would provide further reductions in travel time, with a dedicated third track and sections of fourth track provided between Schenectady and Buffalo. Doubletracking along five miles of the Niagara Branch is also proposed. It is unlikely that there would be disproportionately high and adverse impacts to minority or low-income communities at the county-level for these improvements.

The majority of the Empire Corridor West/Niagara Branch passes through rural land; however, there are planned third and fourth track improvements that would occur in more urban locations. These include the cities of Schenectady, Utica, Syracuse, Rochester and Buffalo. Minority and/or low-income communities that exceed the NYSDEC criterion are located in the cities of Utica, Syracuse, Rochester and Buffalo; however third and fourth track would generally be added within the existing right-of-way and would be unlikely to have disproportionately high and adverse impacts to minority or low-income communities. Upgrades to the stations in Utica and Syracuse and increased trip frequency would ultimately provide a benefit to these communities and disproportionately high and adverse impacts to minority or low-income communities would be unlikely through station upgrades.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with exclusive third track between Schenectady and Buffalo and additional infrastructure improvements to accommodate

higher speeds. With Alternative 110, the addition of third and fourth track and maintenance service roads will involve right-of-way impacts in more locations than for Alternative 90B. However, it is unlikely that there would be disproportionately high and adverse impacts to minority or low-income communities, since the majority of these displacements would occur in rural or relatively low-density population areas where environmental justice communities have not been identified. However, in the cities of Utica, Syracuse, Rochester, and Buffalo, there are limited residential takings anticipated, and minimal impacts are anticipated to environmental justice communities. Rochester has minority and low-income communities that exceed the NYSDEC criterion, and Utica, Syracuse, and Buffalo have low-income populations that exceed the NYSDEC criterion and elevated minority populations; however third and fourth track would generally be added within in the existing right-of-way in these cities. These cities, which each have a station site, are anticipated to receive disproportionate economic and transportation benefits from improved travel times with Alternative 110.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo.

The majority of Alternative 125 on new alignment along the Empire Corridor West would pass through rural and agricultural land, which would have low potential for impacts on environmental justice populations. There are planned third and fourth track improvements on elevated structure that would occur in more urban locations including the cities of Syracuse, Rochester and Buffalo. Rochester has minority and low-income communities that exceed the NYSDEC criterion, and Syracuse and Buffalo have low-income populations that exceed the NYSDEC criterion and elevated minority populations; however third and fourth track would generally be added within in the existing right-of-way in these cities. The elevated tracks could have visual impacts in the counties of Rensselaer and Albany where it extends along the New York State Thruway and the communities of Syracuse, Rochester, and Buffalo, and there is a potential for right-of-way impacts where the tracks are elevated in these urban areas. In Tier 2, should this alternative be advanced for further consideration, a more detailed assessment will be performed using census block level information to identify potential environmental justice populations and refine the design/relocate the alignment to avoid or minimize potential impacts.

Increased trip frequency would ultimately provide a benefit to these communities and disproportionately high and adverse impacts to minority or low-income communities would be unlikely from the construction of Alternative 125.

The exclusive two-track high-speed corridor for Alternative 125 would bypass the cities of Albany and Utica, which have low-income populations that exceed the NYSDEC criterion, although existing Empire Amtrak service would be maintained to stations in these cities. Existing Amtrak passenger service to all existing station stops along the Empire Corridor West/Niagara Branch (including the stations bypassed by Alternative 125) would be maintained under Alternative 125, so these population centers would continue to be serviced.

4.4.5. Potential Mitigation Strategies

Disproportionately high and adverse impacts from the alternatives to low-income or minority populations are not anticipated at the county level and in the nine major cities of New York, Yonkers, Poughkeepsie, Albany, Schenectady, Utica, Syracuse, Rochester and Buffalo. Therefore, no mitigation is anticipated at this time. As part of Tier 2 analysis, more detailed and refined study will be completed to document the presence of low-income and minority communities, and then to evaluate if there would be disproportionately high and adverse site-specific effects on those communities. Public outreach efforts, which include outreach to potential low-income and minority population neighborhoods, would continue as design of the selected alternative is developed during the Tier 2 analysis.

4.4.6. Future Analysis

As mentioned above, during the Tier 2 analysis, a more detailed and refined study will be completed to more specifically document the presence of low-income and minority communities, and then to evaluate if there would be disproportionately high and adverse effects on those communities. Within the Tier 2 assessment, census block group data will be used to identify minority and low income populations within the study area as outlined in NYSDOT and NYSDEC guidance. This level of data may identify additional environmental justice communities not identified in the Tier 1 analysis, which uses county level data. The most recent 2010 U.S. Census block group data will be used to map the low-income and minority populations along the alternatives and proposed improvement areas.

Information on potential minority and low-income communities will be gathered from on-the-ground public outreach activities such as listening sessions, small community meetings and one-on-one conversations with public officials that will allow NYSDOT to better understand the demographics of the communities. This public outreach will also allow for a better understanding of issues and concerns environmental justice communities may have. This information will allow the team to refine the low-income and minority maps to better document the locations and characteristics of these communities and understand issues of concern. To evaluate if there would be disproportionately high and adverse effects on these communities, Tier 2 studies would involve a quantitative analysis for parameters that have the potential to affect these communities, such as:

- Right-of-way (number of acquisitions in low-income or minority communities versus in the general reference population),
- Noise and vibration (number of noise and vibration impacts in low-income or minority community versus in the general reference population),
- Parks and recreation (number of impacts to park and recreation facilities in low-income and minority communities versus in the general reference population), and
- Other applicable parameters that may directly or indirectly affect identified environmental justice communities.

Permitting by the NYSDEC through Commissioner's Policy 29 for environmental justice may be

required depending on the results of the Tier 2 analysis.[63] This policy provides guidance for incorporating environmental justice concerns into the NYSDEC environmental permit review process for individual projects in the program. Incorporation of environmental justice into the environmental permit for a project could include:

- Where a potential environmental justice area is identified during Tier 2 studies, the NYSDEC Division of Environmental Permits shall provide the applicant with relevant information on environmental justice.
- Public participation in the NYSDEC environmental permit review process would require implementing a public participation plan prior to application submission and continue the plan throughout the application process.
- Where a potential environmental justice area is identified during Tier 2 studies, a full environmental assessment form shall be completed for those actions classified as Unlisted in 6 NYCRR Part 617 and meeting the applicability requirements of Commissioner's Policy 29.
- If the project involves more than one agency, the NYSDEC shall coordinate the review of the action with the other involved state and local agencies.
- Consistent with existing regulations, any adverse environmental impact related to environmental justice must be avoided or minimized to the greatest extent practicable.

4.5. Community and Public Facilities

4.5.1. Regulatory Context

The Federal Railroad Administration's Procedures for Considering Environmental Impacts (Federal Register, Vol. 64, No. 101, May 26, 1999), states that "*the following aspects of potential environmental impact should be considered:…solid waste disposal…impacts on the socioeconomic environment, including…the potential for community disruption…and impacts on local government service…Public health; Public safety…*".

4.5.2. Methodology

Community and public facilities were identified for study areas within 1,000 feet of the centerline for all alternatives, based on review of available mapping and information. This inventory identified facilities that provide services to the public and gathering places and cultural centers such as museums and arenas. Data was collected on schools, colleges, fire stations, police stations, medical facilities (hospitals, emergency services, and medical offices), post offices, libraries, and churches. Also identified were public facilities, such as military facilities; government offices; Departments of Public Works/maintenance; sewer, solid waste, landfill, and recycling/transfer facilities; prisons; airports; cemeteries; and tourist information centers.

Information was obtained from the New York State Geographic Information Systems Clearinghouse on federal and state non-recreation property, schools and colleges, government offices, libraries, points of interest, and tourist information centers. A review of Google aerial photography and maps was performed to identify other community and public facilities within the 2,000-foot-wide study

[63] / NYSDEC. "Commissioner Policy 29, Environmental Justice and Permitting." March 19, 2003.

area for both corridors. This review included publicly accessible facilities, such as golf courses or golf clubs that are privately owned, but are either open to the public or used for recreation by members.

4.5.3. Existing Conditions

There were a total of 224 community and public facilities located within 1,000 feet of the centerline for the 90/110 Study Area. Of these, approximately 81 community and public facilities are located along Empire Corridor South (142 miles in length), and 141 are located along Empire Corridor West/Niagara Branch (322 miles in length). For the 125 Study Area, there were 161 community and public facilities located within 1,000 feet of the corridor centerline. Of the facilities in the 125 Study Area, approximately 80 are located along Empire Corridor South and 81 are located along Empire Corridor West. Community facilities are summarized in Exhibit 4-9 and Exhibit 4-10 and are described in Appendix G.5, and shown in Exhibit G-3 of this section.

Exhibit 4-9—Educational, Emergency/Medical, Government, and Religious Facilities in the Study Area

Counties	School, College		Fire, Police		Medical		Post Office		Library		Church		Govt. Office	
	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area
New York	18	18			2	2	1	1	1	1				
Bronx	1	1			1	1								
Westchester	7	7	1	1	4	4	2	2	3	3			2	2
Putnam			1	1							1	1		
Dutchess	4	4	1	1	4	4	1	1	1	1				
Columbia							1	1						
Rensselaer							3	3	2	1	3	3	2	2
Albany	2			1		1	1					1	1	
Schenectady	1						1		1				2	
Schoharie		1						1						1
Montgomery			3		2		3		3		5		6	
Herkimer					2		1				2			
Oneida														
Madison		1	1			1			2		1	1		
Onondaga	2	1	1				3	2	2	1	2	1	1	1
Cayuga		1												
Wayne	2		2				1			1	1		1	
Monroe	3	3					1	1	1	1	3	3	1	1
Genesee							2		2		3		2	
Erie	3	3	1		1		1		1	1			3	4
Niagara	2	2	1	1							1	1	2	2
TOTAL	45	42	12	5	16	13	22	12	19	10	22	11	23	13

Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 1,000 feet of the corridor centerline.

Exhibit 4-10—Military, Cultural, DPW/Solid Waste, Correctional, Airport, and Cemetery Facilities in the Study Area

Counties	Military		Cultural, Museum		DPW Solid Waste Sewer		Correctional Institution		Airport		Cemetery		Total ALL Facilities	
	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area
New York			1	1									23	23
Bronx													2	2
Westchester	1	1	2	2			1	1					23	23
Putnam	1	1											3	3
Dutchess			1	1	4	4							16	16
Columbia			2	2							1	1	4	4
Rensselaer													10	9
Albany		1	1	5	1								6	9
Schenectady	1		1	1							1	2	8	3
Schoharie													0	3
Montgomery			3	1	2					1	3		30	2
Herkimer				1							2		7	1
Oneida			2	1	1		1						4	1
Madison			1									2	5	5
Onondaga			2	3					1	2	3	2	17	13
Cayuga			1								1		2	1
Wayne			1								1		9	1
Monroe			4	5	1	1							14	15
Genesee			1										10	0
Erie			2	5			3		1		4	5	20	18
Niagara	1	1							1	1	1	1	9	9
TOTAL	4	4	25	28	9	5	5	1	3	4	17	13	224	161

Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 1,000 feet of the corridor centerline.

4.5.4. Environmental Consequences

The sections below describe impacts to community and public facilities, including cultural sites. However, review of aerial mapping indicates that the Base Alternative and Alternatives 90A and 90B would have minimal impacts to community and public facilities. These alternatives would largely involve work within the right-of-way, with tracks being added in the location of the former track beds or existing access roads. For Alternative 110, greater impacts to community facilities will occur, and Alternative 125 has the greatest potential to affect public and cultural facilities. The proposed work will include the addition of track, as well as maintenance service roads in selected areas.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure.

Because proposed work with this alternative is anticipated to be located entirely within the right-of-way, no land acquisitions are anticipated, and therefore no impacts to community facilities are anticipated.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, signalization, in addition to improvements proposed under the Base Alternative previously described. It is anticipated that work could be contained within the right-of-way, and no impacts on community facilities are anticipated.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, is proposed, and no impacts on community facilities are anticipated to occur.

Empire Corridor West/Niagara Branch

Improvements for Alternative 90B would start at MP 159.5 in the City of Schenectady and would extend west from here. At MP 160, the proposed siding and crossover would be adjacent to the New York State Department of Transportation Region One office and the Empire State College of the State University of New York, but would not extend outside of the right-of-way at this location. At MP 168, Vedder Cemetery is mapped just north of the railroad. Although Alternative 90B extends outside of the right-of-way to the west of this point to connect to the Selkirk Branch, the proposed third track and maintenance service road is within the right-of-way immediately adjacent to the cemetery.

Work that may extend outside of the right-of-way may occur at Amsterdam Station and at MPs 179, 192, and 200 in Montgomery County. Proposed track and station improvements at Amsterdam Station and trackwork at MP 179 are not located close enough to impact community facilities. At MP 192, track realignment at a curve and a maintenance service road near MP 200 would extend outside of the right-of-way, but would not affect community facilities.

Construction of a fourth track and maintenance service road in Herkimer County near the Montgomery County Line (MPs 210.5 to 214.8) would not involve impacts to community facilities.

Work that may extend outside of the right-of-way between MPs 234 to 238 around the Utica Station in Oneida County and around the Syracuse Station (MPs 291 to 292, as addressed under Alternative 90A) will be located within an urban area and will not affect community facilities. New passenger tracks will be added south of the tracks in the areas adjoining Alliance Stadium, a minor league baseball stadium in Syracuse, but will not directly affect the facility. In Wayne County, the addition of a maintenance service road may involve right-of-way impacts near MP 341, but this is not in the vicinity of community facilities. In Monroe County, the addition of a fourth track around the Rochester Station could also involve right-of-way impacts (MPs 371 to 376 and MPs 378.2 to 378.6, and MPs 379.15 to 379.6), this work will extend in the vicinity of facilities such as Frontier Field, a minor league baseball stadium, but will not directly affect community facilities.

The addition of a fourth track at Buffalo-Depew Station (MPs 431 to 432) would be located entirely within an urban area and will not affect community facilities. The double track along the Niagara Branch between MPs QDN 2 and QDN 7, also within an urban area, is anticipated to be contained within the right-of-way.

There are also locations where relocations of adjoining roadways may result in indirect impacts to community facilities, but these locations would be better defined in Tier 2.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, is proposed, and impacts to community and public facilities impacts are not anticipated to occur.

Empire Corridor West/Niagara Branch

With Alternative 110, trackwork would start at MP 159 and would extend west from here. At MP 160, the proposed siding and crossover would be adjacent to the New York State Department of Transportation Region One office and the Empire State College of the State University of New York, but would not extend outside of the right-of-way at this location. Track realignments outside of the right-of-way would be required near MP 165 in Schenectady County. However, the proposed realignment will not directly impact community facilities at this location.

At MP 168, Vedder Cemetery is mapped just north of the railroad. Although Alternative 110 extends outside of the right-of-way to the west of this point to connect to the Selkirk Branch, the proposed third track and maintenance service road is within the right-of-way immediately adjacent

to the cemetery.

At MP 178.5 in Montgomery County, the realignment of Route 5 may be necessary to accommodate the third and fourth track and maintenance service road on the north side of the existing railroad. This realignment of the roadway may affect several properties fronting on Route 5 and adjoining streets (Mergner Road and Fort Johnson Avenue), including Old Fort Johnson, a historic site, and the Fort Johnson Fire Station. West of MP 186 in the village of Fonda, there is a post office building and the Fonda Municipal Building/Fire House that may be impacted by the construction of the new/relocated freight track and the maintenance service road.

In Onondaga County, the 110 Alternative passes close to a cemetery between MPs 289.8 and 290; however, no impacts to the cemetery are anticipated as all work within this area is contained within the rail right-of-way. New passenger tracks will be added south of the tracks in the areas adjoining Alliance Stadium, a minor league baseball stadium in Syracuse, but will not directly affect the facility as the work will be contained within the right-of-way.

In Monroe County, Alternative 110 passes close to the Rochester Medical Museum and Archives complex within the City of Rochester at MP 368.2, but no impacts to this facility are anticipated as all work is contained within the railway right-of-way. At approximate MP 371.8, Alternative 110 passes very close to the Frontier Field minor league baseball stadium, but no impacts are anticipated since all work is contained within the right-of-way at this facility as well.

In Genesee County, Alternative 110 passes close to the Christian Missionary Academy between MPs 400.5 and 401.5. In Erie County, Alternative 110 passes by three correctional institutions between MPs 422 and 423. At MP 425, the alternative passes close to the Buffalo-Lancaster Airport. Although these facilities are in close proximity to the railroad, no direct impacts to these facilities are anticipated.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch.

Empire Corridor South

No new improvements, beyond what is proposed for Alternative 90A, would be proposed for Alternative 125 along the majority of Empire Corridor South. However, roughly one mile of the proposed 125 mph track would extend south from Albany-Rensselaer Station to cross the Hudson River. No impacts to community facilities are anticipated within this one mile stretch of the corridor.

Empire Corridor West/Niagara Branch

Alternative 125 would involve construction of a total of 236 miles of track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. Alternative 125 also would include new right-of-way in most areas, but would merge back with the

Empire Corridor over two 15- and 16-mile segments centered on Syracuse and Rochester, respectively.

This route covers 126 miles on new alignment between Rensselaer County and a point 8.5 miles east of Syracuse Station. Alternative 125 extends through urban areas in Albany and Schenectady Counties over a distance of 20 miles, following the New York State Thruway (I-87/I-90) over most of this distance. For the majority of this stretch of dedicated passenger rail corridor, no impacts to community facilities are anticipated as the proposed rail is located within the NYS Thruway right-of-way. However, there are several impacts to community facilities anticipated in this section as noted below.

In Schenectady County, Whispering Pines Golf Course at MP QH158 may be impacted by Alternative 125. Just before MP QH161, Alternative 125 passes through Holy Cross Cemetery and just south of St. Cyril Cemetery. There would be potential impacts to Holy Cross Cemetery, and potential impacts to St. Cyril Cemetery may also occur for Alternative 125.

In Montgomery County, Alternative 125 passes through, and would impact, the Canajoharie Country Club at MP QH194. At MP QH198, it passes close to Hickory Acres Airport, but no impacts to this facility are anticipated.

In Herkimer County, Alternative 125 crosses Doty's Golf Course just west of MP QH218 between Forge Hill Drive (MP QH218.2) and County Road 14 (MP QH218.7) in the Town of German Flatts.

Just after crossing the Seneca Turnpike in Oneida County, Alternative 125 crosses through the northern corner of the Skenandoa Golf Club between MPs QH237.6 and QH237 and extends through the southwest corner of Westmoreland Golf Course between MPs QH238.7 and QH238.9 in the Town of Westmoreland.

In Madison County, Alternative 125 extends within close proximity to water supply facilities for the City of Oneida. Alternative 125 passes through Lenox Rural Cemetery just west of MP QH256, which would be impacted by this alternative. At approximate MP QH262.5, this alternative passes through a ballfield at the Bolivar Road School within the Town of Sullivan.

In Onondaga County, the alignment merges with the existing Empire Corridor. Just before the merge, between MPs QH267 and QH268, Alternative 125 may impact the Old Oak Golf Club within the Town of Manlius as the rail passes just north of the golf course. Alternative 125 extends through 16 miles of urban area surrounding the City of Syracuse. Depending on the design of the elevated railroad structure over the existing railroad, there may be right-of-way impacts, the extent of which would be determined in Tier 2. Just before Alternative 125 diverges from the existing Empire Corridor again, the rail passes near Most Holy Rosary Cemetery, but since this is on the existing Empire Corridor and within the existing right-of-way, no impacts to the cemetery are anticipated.

At MP QH284, Alternative 125 diverges from the existing Empire Corridor and continues on a new alignment 61 miles west to a point 11 miles east of Rochester Station in Monroe County. Alternative 125 passes directly through and would impact Camillus Airport between MPs QH284.5 and QH285 in Onondaga County. Alternative 125 passes directly north of the tourist information center and rest stop on the New York State Thruway (I-90), but no impacts to this facility are anticipated.

In Monroe County, near the border with Wayne County at MP QH343, Alternative 125 would pass through the southwest corner of Perinton Golf and Country Club at Macedon Center Road and may impact this facility. Alternative 125 merges with the existing Empire Corridor at MP QH346, continuing on the existing corridor through areas outside of Rochester and through the downtown area. Depending on the design of the elevated railroad structure over the existing railroad, there may be right-of-way impacts, the extent of which would be determined in Tier 2. Alternative 125 diverges again at MP QH361, 5.5 miles west of Rochester Station, to continue on new alignment 52 miles west to Buffalo in Erie County.

In Erie County, Alternative 125 passes through Clarence Fillmore Cemetery just beyond MP QH408. Just past MP QH413, as the new rail corridor rejoins the Empire Corridor, Alternative 125 passes the Walden Golf Driving Range to the north, but no impacts to this facility are anticipated. Depending on the design of the elevated railroad structure over the existing railroad extending to the Buffalo Exchange Street Station, there may be right-of-way impacts, the extent of which would be determined in Tier 2.

In Niagara County, Alternative 125 passes along the northeast edge of the Niagara International Airport between MPs QDN21 and QDN23. Between MPs QDN23 and QDN25, Alternative 125 passes near Niagara Town Hall, Niagara Town Court, Niagara Active Hose Company House, and the Niagara Presbyterian Church; however, impacts to these facilities, including the airport, are not anticipated.

4.5.5. Potential Mitigation Strategies

During Tier 2, the design will be refined to avoid or minimize impacts on community facilities to the extent feasible Consultation with local officials and property owners will be performed and if appropriate, relocation planning and assistance will be provided during Tier 2. Other considerations will include the visual and noise impacts on adjoining or affected community facilities, and further assessments of these impacts will also be advanced in Tier 2.

4.5.6. Future Analysis

The Tier 2 assessments will include a thorough inventory of community facilities that may be affected, including water supplies, municipal buildings, offices, schools, libraries, and other cultural institutions. Detailed property mapping and information on ownership and the extent of public use of community facilities in the vicinity of the program will be obtained. Consultation with public officials and property owners/officials with jurisdiction will be performed regarding potential impacts and mitigation measures. If appropriate, relocation planning and studies will be performed as part of Tier 2, and relocation assistance provided in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 et seq.).

4.6. Surface Waterbodies and Watercourses

4.6.1. Regulatory Context

The U.S. Clean Water Act (1972 amendments to the Federal Water Pollution Control Act) is the cornerstone of surface water quality protection in the United States and provides for the regulation of the discharge of pollutants from point sources to waters of the U.S.[64]

Section 303(d) of the U.S. Clean Water Act requires states, as part of required periodic assessment and reporting, to identify Impaired Waters, where specific designated uses are not fully supported. For these Impaired Waters, states must consider the development of a Total Maximum Daily Load (TMDL) or other strategy to reduce the input of the specific pollutant(s). The New York State Section 303(d) List of Impaired TMDL Waters identifies those waters that do not support appropriate uses and details the type, cause/pollutant, source, and class of impairment.[65]

Section 402 of the Clean Water Act also established the National Pollutant Discharge Elimination System (NPDES) permit program. Under this program, the U.S. Environmental Protection Agency (U.S. EPA) has regulatory authority over point source discharges on a sector-wide basis to protect water quality of the receiving waters and can designate permitting authority to the states. Point sources are discrete conveyances such as pipes or man-made ditches.

Article 17 of the New York State Environmental Conservation Law (ECL) entitled "Water Pollution Control" was enacted to protect water resources and authorized creation of the State Pollutant Discharge Elimination System (SPDES) program.[66] The program is designed to eliminate the pollution of New York waters and to maintain the highest quality of water possible.

The New York State Department of Environmental Conservation (NYSDEC) also sets water quality standards for surface waters as part of its Protection of Waters Regulatory Program (Environmental Conservation Law, Article 15). All waters of the state are provided a class and standard designation that denotes their existing or best uses for freshwaters (classes A, B, C, and D) and saline or marine waters (classes SA, SB, SC, I, and SD).[67] In general, these ranking are assigned as follows:

- The classification AA or A is assigned to waters used as a source of drinking water.
- Classification B indicates a best usage for swimming and other contact recreation, but not for drinking water.
- Classification C is for waters supporting fisheries and suitable for non - contact activities.
- The lowest classification and standard is D.

[64]/ Clean Water Act of 1972, 33 U.S.C. 1251 et seq. (2002). Retrieved from <**http://epw.senate.gov/water.pdf**>

[65]/ The most recent list is the Final New York State 2010 Section 303(d) List which was approved in June 2010. The list can be accessed on the New York State Department of Environmental Conservation (NYSDEC) website. The FINAL New York State 2010 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy, <**http://www.dec.ny.gov/docs/water_pdf/303dlistfinal10.pdf>**

[66]/ New York ECL – Article 17, Title 8 – "State Pollutant Discharge Elimination System", Accessed September 15, 2011, < http://www.dec.ny.gov/permits/6308.html>

[67]/ NYSDEC, "ECL §3-0301 and §24-1301, Chapter X-Division of Water, Part 701 Classifications-Surface Waters and Groundwaters." Accessed April 18, 2011. <http://www.dec.ny.gov/regs/4592.html>

Additional classifications of "T" or "TS" denotes if a water body has sufficient amounts of dissolved oxygen to support trout and trout spawning. Small ponds and lakes with a surface area of 10 acres or less, located within the course of a stream, are considered to be part of a stream and are subject to regulation under the stream protection category of Protection of Waters. The letter classifications and their best uses are described in Exhibit 4-11.

Protected streams are streams and small water bodies along streams that are designated as C(T) (trout supporting waters) or higher (i.e., C(TS), B, or A) and are subject to the stream protection provisions of the NYSDEC Protection of Waters regulations. New York City also implements a Long-term Watershed Protection program under the ECL, Article 15.[68]

In addition to the above regulations, the New York State Department of Transportation (NYSDOT) Environmental Manual (TEM), Chapter 4 Water and Ecology, provides guidance for NYSDOT's procedures regarding water and water quality for NYSDOT transportation projects.[69]

Exhibit 4-11—NYSDEC Surface Water Quality Classifications

Water Quality Class	Designated Uses
Marine Water Designations	
SA	The best usages of these waters are shellfishing for market purposes, primary and secondary contact recreation and fishing. These waters shall be suitable for fish, shellfish, and wildlife propagation and survival.
SB	The best usages of these waters are primary and secondary contact recreation and fishing. These waters shall be suitable for fish, shellfish, and wildlife propagation and survival.
I	The best usages of these waters are secondary contact recreation and fishing. These waters shall be suitable for fish, shellfish, and wildlife propagation and survival.
SC	The best usage for these waters is fishing. These waters shall be suitable for fish, shellfish, and wildlife propagation and survival. The water quality is suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.
Surface Water Designations	
A-S	The best usages for these waters are: source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The water quality is suitable for fish propagation and survival. This classification is for international boundary waters.
A	The best usages for these waters are the same as for Class/Standard A-S.
B	The best usages for these waters are for primary and secondary contact recreation and fishing. The water quality is suitable for fish propagation and survival.
C	The best usage for these waters is fishing. Water quality is suitable for fish propagation and survival. The water quality is suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.
C(t)	The best usage for these waters is fishing. The water quality is suitable for trout propagation and survival. Water quality is suitable for primary and secondary contact recreation, although other factors may list the use for these purposes.
C(ts)	The best usage for these waters is the same as for Class C(t) and is also suitable for trout spawning.

[68]/ NYSDEC, "Protection of Waters Program, ECL, Article 15, Implementing Regulations, 6 NYCRR PART 608." Accessed September 15, 2011. < http://www.dec.ny.gov/permits/6042.html>

[69]/ NYSDOT, "Environmental Procedures Manual, Chapter 4-Water and Ecology", Accessed September 15, 2011 < **https://www.dot.ny.gov/divisions/engineering/environmental-analysis/manuals-and-guidance/epm/chapter-4**>

4.6.2. Methodology

Surface water crossings of all alternatives were identified using existing mapping collected from federal and state agencies. Geographic Information System (GIS) data and other available information were compiled from the United States Geological Survey, the New York State GIS Clearinghouse, and the New York State Department of Environmental Conservation. Data sets used included NYSGIS hydrography, NYSDEC water quality classifications, and NYSDEC water inventory/priority waterbodies (impaired waters) list. Crossings were listed by approximate milepost for each alternative (Appendix G). Alternative improvements based on mileposts were then used to tally the total potential crossings of surface waters for each alternative.

4.6.3. Existing Conditions

Overview

Watersheds

New York State consists of 17 major drainage basins.[70] The six basins located in the water resources study area of the Empire Corridor are the Lower Hudson River Basin, Mohawk River Basin, Oswego/Finger Lakes Basin, Lake Ontario Tributaries Basin, Genesee River Basin, and the Niagara River/Lake Erie Basin.

The Lower Hudson River watershed is 12,800 square miles in size and is primarily located within New York State, with small portions in New Jersey, Connecticut, Massachusetts and Vermont. Approximately 32 percent (roughly 17.06 square miles) of the existing Empire Corridor (90/110 Study Area) and 37 percent (roughly 18.82 square miles) of the 125 Study Area are located in the Lower Hudson River watershed. This watershed encompasses the study area in New York, Bronx, Westchester, Putnam, Dutchess, Columbia, Rensselaer and parts of Albany Counties.

The Mohawk River watershed is located entirely within New York State and consists of 3,460 square miles. Approximately 22 percent (roughly 11.37 square miles) of the existing Empire Corridor (90/110 Study Area) and 17 percent (roughly 8.52 square miles) of the 125 Study Area are located in the Mohawk River watershed. This watershed covers the study area in Albany, Schenectady, Montgomery, Herkimer and parts of Oneida Counties.

The Oswego River/ Finger Lakes watershed is one of the state's largest watersheds, consisting of 5,070 square miles entirely within the state. Approximately 23 percent (roughly 12.03 square miles) of the existing Empire Corridor (90/110 Study Area) and 21 percent (roughly 10.62 square miles) of the 125 Study Area are located in the Oswego/Finger Lakes watershed. This watershed encompasses the study area in Oneida, Madison, Onondaga, Cayuga and Wayne Counties.

The Lake Ontario and Minor Tributaries watershed is approximately 2,460 square miles within New York State. Approximately 3 percent (roughly 1.57 square miles) of the existing Empire Corridor (90/110 Study Area) and 7 percent (roughly 3.56 square miles) of the 125 Study Area are located in the Lake Ontario and Minor Tributaries watershed, and is found only in the eastern part

[70] NYSDEC, *Watersheds, Lakes, Rivers.* Accessed April 18, 2011. <http://www.dec.ny.gov/lands/26561.html>

of Monroe County in the Empire Corridor study area.

The upper 15 miles of the Genesee River watershed are located in the Allegheny Plateau in northern Pennsylvania; however, the majority of the watershed (2,373 square miles) is located in New York State. Approximately 6 percent (roughly 3.46 square miles) of the existing Empire Corridor (90/110 Study Area) and 6 percent (roughly 3.17 square miles) of the 125 Study Area are located in the Genesee River Watershed. This watershed encompasses the study area in the western part of Monroe County and eastern part of Genesee County.

The westernmost watershed in the Empire Corridor is the Niagara River/Lake Erie watershed. The Niagara River drains an area of more than 265,000 square miles of the north-central United States and south-central Canada. The drainage area outside of New York State includes four of the five Great Lakes. The size of this watershed within New York State is approximately 2,280 square miles, and approximately 14 percent (roughly 7.28 square miles) of the existing Empire Corridor (90/110 Study Area) and 12 percent (roughly 6.37 square miles) of the 125 Study Area are located in the Niagara River/Lake Erie watershed. This watershed encompasses the western part of Genesee County and Erie and Niagara Counties in the Empire Corridor study area.

New York State Canal System

The 294-mile section of Empire Corridor West/Niagara Branch (90/110 Study Area) between Albany (Albany County) and Buffalo (Erie County) crosses, closely adjoins, or follows the New York State Canal System in a number of locations. The Erie Canal was originally constructed in the early 1800's to transport goods from Lake Erie to the Hudson River. This system was constructed and enlarged over time to accommodate larger barges, with the most recent improvements made in the early 1900's. The modern-day New York State Canal System links the Hudson River, the Finger Lakes, Lake Champlain, Lake Ontario, and the Niagara River with communities throughout the state. There are four canals that make up the New York State Canal System (formerly called the New York State Barge Canal):

- The **Erie Canal** (the main canal between Hudson River and Lake Erie/Niagara River that flows through Oneida Lake and Onondaga Lake),
- The **Champlain Canal** (which follows and then extends north from the Hudson River to Lake Champlain on the New York-Vermont border),
- The **Cayuga-Seneca Canal** (which extends south to Cayuga Lake and Seneca Lake), and
- The **Oswego Canal** (a branch extending north Erie Canal north of Syracuse to Lake Ontario).

The railroad crosses the Erie Canal several times along the Empire Corridor West. The easternmost crossing occurs west of the Schenectady Station (MP 160), and the canal continues to meander along the railroad until just past the Rome Station (MP 252), where it leaves the railroad and heads northeast to Oneida Lake. Along this section, the canal is also part of the Mohawk River as it passes through the counties of Schenectady, Montgomery, and Herkimer, where the canal splits off and continues to follow the tracks west through Oneida County. The Erie Canal crosses the railroad again at roughly MP 319.5 (as part of the Seneca River) in Cayuga County, before heading south to Cayuga Lake. The canal borders the railroad in Wayne County, east of the Town of Clyde (MP 327), and meanders north and south of the railroad through Wayne and Monroe Counties before heading north away from the railroad until it crosses the railroad for the final time in the Town of

Tonawanda (MP QDN13.5).

Remnants of the Old Erie Canal, which was bypassed by the construction of the New York Canal System, remain in portions of the study area in Madison and Onondaga Counties. The Old Erie Canal parallels the tracks through the eastern half of Madison County, before crossing the railroad at MP 272 and crosses the railroad again in Onondaga County at MPs 302.5 to 303.

Surface Waterway Crossings

The 464-mile section of the existing Empire Corridor (90/110 Study Area) crosses a total of 287 tributaries and waterways along its length, including the Harlem River, Hudson River, Mohawk River, Erie Canal, Genesee River, and Seneca River and tributaries to these rivers. The 450-mile 125 Study Area crosses a total of 378 tributaries and waterways. Of these crossings, 105-106 are located along Empire Corridor South, south of and including Rensselaer County to Manhattan.

Exhibit 4-12 shows the number of waterbodies crossed in each county for both corridors and the number that are considered to be an impaired/priority waterway (under Section 303(d) of the U.S. Clean Water Act) and those that are classified as protected streams (designated as C(T) (trout supporting waters) or higher (i.e., C(TS), B, or A) under the NYSDEC Protection of Waters

Exhibit 4-12—Empire Corridor Surface Waterway Crossings in the Study Area

County	Number of Surface Waterway Crossings		Number of Impaired (303d)/ Priority Water		Number of Protected Waters	
	90/110 Study Area	125 Study Area	90/110 Study Area	125 Study Area	90/110 Study Area	125 Study Area
New York	1	1	1	1	0	0
Bronx	0	0	0	0	0	0
Westchester	23	23	11	11	18	18
Putnam	12	12	9	9	11	11
Dutchess	38	38	28	28	34	34
Columbia	22	22	19	19	14	14
Rensselaer	10	9	7	6	0	0
Albany	4	3	3	2	2	2
Schenectady	9	18	9	15	2	3
Schoharie	0	9	0	9	0	0
Montgomery	35	21	35	21	10	1
Herkimer	19	39	19	37	4	15
Oneida	12	18	12	18	4	7
Madison	11	20	11	20	4	5
Onondaga	16	20	13	15	4	5
Cayuga	5	15	5	12	0	1
Wayne	18	43	18	42	5	3
Monroe	19	23	18	18	6	9
Genesee	17	25	16	22	4	1
Erie	7	10	6	6	3	2
Niagara	9	9	8	8	0	0

Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 300 feet of the program centerline

Source: NY GIS Clearinghouse, 2011; NYSDEC GIS Data, 2011

regulations. There are a total of 248 impaired/priority waterways along the 90/110 Study Area, compared to 319 impaired/priority waterways along the 125 Study Area. Of these, 74 to 75 are along Empire Corridor South. There are 125 protected waters along the 90/110 Study Area, and 131 protected waters along the 125 Study Area. Of these, 77 are along the Empire Corridor South.

Exhibits G-4, G-5, and G-6 in Appendix G presents a detailed listing of the waterways crossed in each county and their classification as an impaired/priority waterway or as a protected waterway. These exhibits also list the 303(d) segments impaired by pollutants related to construction, as specified in the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-0-10-001), January 29, 2010, and pollutants of concern for municipal separate storm sewer systems (MS4s), as specified in the SPDES General Permit for Stormwater Discharges from MS4s (Permit No. GP-0-10-002), October 14, 2011. The watersheds and waterbodies crossed and their classifications (as impaired priority water or protected water) in each county for each program corridor are described in detail in Appendix G.6.

4.6.4. Environmental Consequences

The sections below describe impacts of program alternatives to surface waters. Direct impacts would generally occur in areas where the surface water underlies, or is located immediately adjacent to the proposed track activities. Proposed activities that would have a higher potential to directly impact existing surface water resources may include the construction of new tracks immediately adjacent or over waterways, bridge construction and/or culvert improvements, rock slope stabilization adjacent to waterways, and embankment improvements. In general, actions that would constitute direct impacts include the destruction or alteration of all or part of the surface water through diversion, channelization, embankments construction, dredging, filling, or other direct modifications of the waterway. In addition, direct impacts include the deterioration of the surface water quality through the direct discharge of pollutants and/or sediment to the waterway during construction (i.e., releases from equipment, sediment runoff) and/or operational activities (i.e., increased train traffic could generate additional surface and air particulates, which could settle in surface waters).

The Base Alternative and Alternative 90A would have the least impacts to surface waters because of fewer proposed improvement areas occurring over, or adjacent to, waterways. In addition, these alternatives would involve work largely within the right-of-way, with tracks being added in the location of the former track beds or existing access roads. Alternatives 90B and 110 would have greater potential to impact surface waters and water quality in more locations than the Base Alternative or Alternative 90A, especially where new third and fourth track construction would occur over, or adjacent to, waterways. Alternative 125 would involve the greatest impacts to surface waters and water quality as it extends primarily on new alignment throughout the Empire Corridor West/Niagara Branch.

This preliminary assessment is based on Tier 1 concepts and mapping and would be further refined in Tier 2 as the project development process is further advanced, and efforts to avoid surface water alterations would be made as design is advanced. The sections below identify the areas where improvements or new track will be constructed in, or adjacent to, surface waters. There would be potential impacts, as described above, at all crossings; however, the specifics of impacts will be documented as part of the Tier 2 analysis.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure. Improvements from this alternative will have approximately 68 surface water crossings.

Empire Corridor South

The Base Alternative includes signal and grade-crossing improvements along the 64 miles of Empire Corridor South (MPs 75.8 to 140) north of Poughkeepsie to just south of Albany-Rensselaer Station. The alignment in this segment will have approximately 51 water crossings and will be within, or adjacent to, the Hudson River for the majority of the proposed improvement areas. Signal improvements will not likely impact surface waters in these areas; however, any drainage reconfigurations or increase in impervious surfaces at the grade crossing improvements could have the potential to change water quality within the area.

The Base Alternative will also involve the addition of a fourth track and platform extension at Rensselaer Station near the Albany county line (MPs 141 to 143). These improvements will cross three waterways, and depending on design, could have the potential to change water quality within the area.

Empire Corridor West/Niagara Branch

There are several projects for the Base Alternative in the Empire Corridor West/Niagara Branch. The Base Alternative will involve 17 miles of second track between the Albany-Rensselaer and Schenectady Stations, as well as reconstruction of the Schenectady Station. The affected portions of Albany and Schenectady Counties will cross approximately 10 streams. Therefore, depending on design, these improvements could have the potential to impact surface waters and water quality. The proposed Syracuse track configuration and signal improvements area (MPs 287 to 291) will cross approximately two waterways. The Base Alternative also includes Rochester Station track and platform improvements (MPs 368 to 373), which will cross two surface waters including the Genesee River. Therefore, depending on design, these improvements could have the potential to impact surface waters and water quality.

Proposed improvements for the new Niagara Falls Intermodal Transportation Center will not take place over any waterways, and will not likely involve impacts to surface waters and/or water quality in this area.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, and signalization, in addition to improvements proposed under the Base Alternative previously described. Improvements from this alternative would have approximately 107 surface water crossings.

Empire Corridor South

Alternative 90A would include construction of four miles of second track through urbanized areas of Manhattan (MPs 9 to 13), and 1.4 miles (MPs 23.8 to 25.2) of new track, extending under the Tappan Zee Bridge, for the Tarrytown Pocket Track/Interlocking. Both projects would occur over waterways associated with the tributaries of the Hudson River, including the Harlem River at MP 10. In addition, the rail line would be located directly adjacent to the Hudson River in these improvement areas. Therefore, depending on design, these improvements could have the potential to impact surface waters and water quality.

With Alternative 90A, there would be signal improvements proposed along 43 miles (MPs 32.8 and 75.8). In addition, along this section there would be 10 miles of new third track (MPs 53 to 63) and there would be improvements at the Poughkeepsie Yard/Storage Facility (MPs 71 to 75.8). North of Poughkeepsie and south of Albany-Rensselaer Station (MPs 75.8 to 140), proposed improvements would also include rock slope stabilization (MPs 105 to 130) and three new control points (CP 82, CP 99, and CP 136), as well as station improvements at Rhinecliff Station (high-level platforms) and Hudson Station (new Ferry Street Bridge and track realignments). In addition, the rail line would be located directly adjacent to the Hudson River in these improvement areas. Therefore, depending on design, these improvements could have the potential to impact surface waters and water quality. Impacts to surface waters and water quality would be more likely in areas where there would be new track construction.

Empire Corridor West/Niagara Branch

Alternative 90A would also include replacement of the Livingston Avenue Bridge, which would pass over the Hudson River at the Rensselaer/Albany County Line; therefore, work on this bridge could have the potential to impact surface water and water quality associated with the Hudson River. With Alternative 90A, track improvements would include 10 miles of third track between MPs 169 and 179, and Amsterdam Station improvements along the west end of this segment. This entire 10-mile segment would closely adjoin the banks of the Mohawk River and would cross approximately nine waterways. Although impacts in these areas could be contained within the current right-of-way, there would still be potential for minimal impact of surface waters and water quality.

West of MP 175, work extending west to MP 295 would consist of upgrading interlocking, automatic block signals, and control points. Alternative 90A would also include Syracuse Station track improvements (MPs 290 to 294) within this improvement segment. The alignment would continue to closely adjoin the banks of the Mohawk River and Erie Canal through MP 253. In addition to three crossings already included in the 10 miles of third track improvements mentioned above, the alignment would cross approximately 27 waterways between MPs 175 and 295. Although work would consist of upgrading signals, control points and interlocking, and this work would be performed within the current right-of-way, it could minimally impact surface waters and water quality within improvement areas.

Alternative 90A would include third track improvements along nine miles (MPs 373 to 382) west of Rochester station. Alternative 90A would also include the addition of a third track along 11 miles (MPs 382 to 393) in western Monroe and eastern Genesee Counties. Together, these improvements would cross approximately 16 streams. Depending on design, the proposed third track

improvements west of the Rochester Station, these track improvements west of the station could have the potential to impact surface waters and water quality.

Station improvements at the Buffalo-Depew Station (MPs 429.5 to 432.5) would not cross any waterways, and would be anticipated to have no impact on surface waters or water quality. However, the proposed double track (MPs QDN17 to QDN23.2) and Niagara Falls track improvements (MPs QDN25 to QDN28) could have the potential to impact surface waters and water quality associated with seven waterway crossings.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed. Improvements from this alternative would have approximately 219 surface water crossings.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, would be proposed and additional surface waters impacts would not be anticipated to occur.

Empire Corridor West/Niagara Branch

Alternative 90B would include replacement of the Livingston Avenue Bridge, which would pass over the Hudson River at the Rensselaer/Albany County Line; therefore, work on this bridge could have the potential to impact surface water and water quality associated with the Hudson River. Third and fourth track improvements for Alternative 90B would start at MP 160 in the City of Schenectady, and extend west to MP 430, east of Buffalo and would have the potential to impact surface waters and water quality associated with approximately 164 waterways. In Schenectady County, additional track and improvements to the Schenectady Station included in Alternative 90B would cross approximately eight waterways. The Mohawk River, which would cross the alignment at MP 160, would closely adjoin the rail line from approximately MP 166 to the county line (MP 169.5). Other major waterways include Collins Creek, Washout Creek, Verf Kill, and Chaughtanoonda Creek. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track, station improvements, and increased train traffic.

The railroad would continue to adjoin the north bank of the Mohawk River/Erie Canal through all of Montgomery County, largely remaining within 50 to 1,000 feet of the river/canal. In addition, there would be approximately 35 waterway crossings, primarily over tributaries of the Mohawk River including Compaanen Kill, Cranes Hollow Creek, Degraff Creek, North Chuctanunda Creek, McQueen Creek, Danascara Creek, Cayadetta Creek, Briggs Run, Knauderack Creek, Caroga Creek, Mother Creek, Timmerman Creek, Zimmerman Creek and Crum Creek. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track, improvements to the Amsterdam Station, and increased train traffic.

The railroad would continue to adjoin the north bank of the Mohawk River/Erie Canal through all of Herkimer County. In addition, there would be approximately 19 waterway crossings, primarily over tributaries of the Mohawk River including East Canada Creek, Beaver Brook, West Canada Creek, Bridenbecker Creek and Ferguson Creek. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track and increased train traffic.

Alternative 90B would extend through Oneida County, paralleling the Erie Canal/Mohawk River between Utica and Rome before diverging west to flow into Oneida Lake. New track would cross approximately 12 waterways in this county. Improvements to the Utica and Rome Stations would also be included with Alternative 90B. In addition to the Mohawk River, Alternative 90B would cross Sauquoit Creek, Oriskany Creek, Mud Creek, and Stony Creek. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track, improvements to two stations, and increased train traffic.

In Madison County, Alternative 90B new track would cross 11 waterways. Entering the county, the alternative would cross Oneida Creek and continue west crossing drainages such as Cowaselon Creek, Dutch Settlement Creek, the Old Erie Canal/Owlville Creek, Canaseraga Creek and Chittenango Creek. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track and increased train traffic.

There would be 16 waterway crossings that the proposed new track of Alternative 90B would traverse in Onondaga County. The alignment would enter the eastern portion of the county and cross Pools Brook. It would then continue west crossing drainages such Lake Brook, Limestone Creek, Butternut Creek, the South Branch Ley Creek, the Barge Canal, the southern shores of Onondaga Lake, Geddes Brook, Nine Mile Creek, White Bottom Creek, Carpenters Brook, and Skaneateles Creek. Improvements to the Syracuse Station would also be included with Alternative 90B. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track, Syracuse Station improvements, and increased train traffic.

In Cayuga County, Alternative 90B new track would cross approximately five waterways including Putnam and Spring Brooks, Owasco Outlet, Swamp Brook, and the Seneca River. There would be approximately 18 water crossings in Wayne County including drainages such as Black Creek, the Erie Canal, Ganargua Creek, Red Creek, and several unnamed tributaries to these water features. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track and increased train traffic.

New track proposed with Alternative 90B would cross 19 waterway crossings in Monroe County, including drainages such as Thomas Creek, Irondequoit Creek, Allen Creek, the Genesee River, the Erie Canal, Little Black Creek and Black Creek. Improvements to the Rochester Station would also be included with Alternative 90B. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track, Syracuse Station improvements, and increased train traffic.

Alternative 90B would cross approximately 17 waterways in Genesee County. The new track would traverse drainages such as Black Creek and its tributaries, Tonawanda Creek, and Murder Creek

and its tributaries. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track and increased train traffic.

Alternative 90B third track improvements would cross three surface waters including Ellicott Creek (MP 422.5) in Erie County. The double track along the Niagara Branch between MPs QDN 2 and 7 would extend in proximity to the waterfront along Lake Erie and the Black Rock Canal along the Niagara River and would cross Scajaquada Creek. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track and increased train traffic. No other impacts other than described in Alternative 90A would be anticipated for the remainder of Erie or Niagara Counties.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations.

Improvements from this alternative would have approximately 218 surface water crossings.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, is proposed and additional surface waters impacts would not be anticipated to occur.

Empire Corridor West/Niagara Branch

With Alternative 110, track realignments and third and fourth track improvements would traverse the same surface water features as described in Alternatives 90A and 90B with the exception of the crossing in Erie County of Scajaquada Creek (MP QDN6). No double track is proposed in that area for Alternative 110. No other impacts other than those described above for Alternatives 90A and 90B would be anticipated for Alternative 110.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch.

Empire Corridor South

No new improvements, beyond what is proposed for Alternative 90A, would be proposed for Alternative 125 along the majority of Empire Corridor South. However, roughly one mile of the proposed 125 mph track would extend south from Albany-Rensselaer Station to cross the Hudson

River. Depending on design of the new bridge for this crossing, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of the bridge.

Empire Corridor West/Niagara Branch

Alternative 125 would involve construction of a total of 236 miles of track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo.

After crossing the Hudson River, Alternative 125 would extend through Albany and Schenectady Counties over a distance of 20 miles, primarily following the New York State Thruway (I-87/I-90) over most of this distance. In Albany County, Alternative 125 would cross three waterways: the Hudson River, and two crossings at Krum Kill. In addition to these crossings, there would also be one crossing in Albany County associated with Alternative 90A improvements of the Livingston Avenue Bridge over the Hudson River. In Schenectady and Schoharie Counties, Alternative 125 would cross approximately 27 water features, including drainages such as Bonny Brook, Schoharie Creek and Fly Creek. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track and increased train traffic. In addition in Schenectady County, Alternative 90A improvements would also occur under Alternative 125 and include one surface water crossing.

Alternative 125 would extend through Montgomery County, where there are approximately 21 waterway crossings, including Fly Creek, Flat Creek, Canajoharie Creek, and numerous unnamed tributaries. Alternative 90A improvements that would also occur under Alternative 125 would include 28 surface water crossings in Montgomery County. In Herkimer County, Alternative 125 would cross approximately 39 waterways including drainages such as Otsquago Creek, Ohisha Creek, Fulmer Creek, Steele Creek, and an unnamed tributary to Moyer Creek. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track and increased train traffic.

In Oneida County, Alternative 125 would extend through primarily rural properties and cross approximately 18 mapped waterways. These include Palmer Creek, Sauquoit Creek, Sherman Brook, Oriskany Creek, Dean's Creek and Sconondoa Creek. Alternative 125 would also extend through primarily rural properties in Madison County and would cross approximately 20 waterways including Oneida Creek, Cowelson Creek, Canastota Creek, Owlville Creek and its tributaries, Canaseraga Creek, and Chittenango Creek. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track and increased train traffic.

In Onondaga County, Alternative 125 would merge with the existing Empire Corridor just before the City of Syracuse and would continue over the existing railroad on an elevated structure. Alternative 125 would extend through 16 miles of the city before diverging from the existing Empire Corridor and would continue on a new alignment for the remainder of the county. There would be approximately 20 water crossings in this county, six of which would be along the existing railroad through Syracuse. The alignment would cross drainages such as Pools Brook, the Old Erie Canal, Lake Brook, Limestone Creek, Butternut Creek, South Branch Ley Creek, the Barge Canal and south shores of Onondaga Lake, Geddes Brook, Nine Mile Creek, Dead Man Creek and the Seneca River. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track and increased train

traffic.

In Cayuga County, Alternative 125 would cross 15 waterways, including the Seneca River and its tributaries, Muskrat Creek and Spring Lake Outlet. In Wayne County, Alternative 125 would cross approximately 43 waterways including the drainages of Butler Creek, Wolcott Creek, Black Creek, Sodus Creek, Red Creek, and numerous unnamed tributaries of the above-mentioned streams. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track and increased train traffic.

In Monroe County Alternative 125 would merge with the existing Empire Corridor through the City of Rochester and would continue over the existing railroad on an elevated structure, diverging again 5.5 miles west of Rochester Station to continue on new alignment through the remainder of the county. Alternative 125 would cross 23 waterways, seven of which would be along the existing railroad through Rochester. Crossing would include the drainages of Thomas Creek and several of its tributaries, Irondequoit Creek, Allen Creek, the Genesee River, the Erie Canal and Little Black Creek. Improvements to the Rochester Station would also be included with Alternative 125. Alternative 90A improvements that would also occur under Alternative 125 would include 14 surface water crossings in Monroe County.

In Genesee County, Alternative 125 would extend through primarily rural properties and would cross approximately 25 mapped waterways. The alignment would cross Black Creek and its tributaries, unnamed tributaries to Spring Creek, Oak Orchard Creek and its tributaries, Tonawanda Creek, and Murder Creek and its tributaries. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track and increased train traffic. Alternative 90A improvements that would also occur under Alternative 125 would include two surface water crossings in Genesee County.

New track proposed for Alternative 125 would cross six waterways in Erie County including Ransom Creek and Ellicott Creek. Depending on design, there would be potential to directly or indirectly impact these surface water features and their water quality from the construction of new track and increased train traffic. No other impacts other than described in Alternative 90A would be anticipated for the remainder of Erie or Niagara Counties.

4.6.5. Potential Mitigation Strategies

During Tier 2, refinements in design and mapping will be performed and the project development will incorporate avoidance and minimization of impact to surface waters and water quality to the extent practicable. The Tier 1 design has already incorporated minimization to some extent through use of retaining walls, such as adjacent to proposed flyovers, and track realignments to minimize encroachment on adjoining streams and properties. However, the design will be further advanced and defined in Tier 2. In Tier 2, means of avoiding and minimizing waterway impacts through shifts in location of tracks and other facilities and use of design measures such as retaining walls or steeper slopes will be further evaluated and identified. Other potential mitigation to be considered will include permanent Best Management Practices (BMPs), such as stormwater treatment or detention/retention facilities or drainage channels/facilities where appropriate to improve stormwater management/flow and water quality.

In accordance with the NYSDEC State Pollutant Discharge Elimination System (SPDES) General

Permit for Stormwater Discharges from Construction Activity (Permit No. GP-0-10-001, effective January 29, 2010), construction projects that disturb more than an acre of land and that involve a stormwater discharge to surface waters of the United States, either indirectly through stormwater sewers or directly to waterways must prepare Stormwater Pollution Prevention Plans (SWPPPs). This plan will also meet the requirements set forth by the New York City Department of Environmental Protection (NYCDEP).

All NYSDOT projects that fall below SPDES thresholds are required to prepare erosion and sediment control plans. Application of BMPs identified in the SWPPPs or Erosion and Sediment Control (ESC) Plans will reduce the amount of erosion and sedimentation resulting from construction activities. Temporary and permanent construction BMPs, such as seed, mulch, embankment protectors, grade techniques, inlet protection, silt fences, development of a Spill Prevention Control Plan (SPCC), Stormwater Management Plans (SWMPs) and vehicle tracking prevention will be used as appropriate. The design of permanent and temporary BMPs to improve the quality of stormwater runoff will be developed and designed in accordance with NYSDOT and NYSDEC criteria.

4.6.6. Future Analysis

During the Tier 2 assessments, program impact assessment based on design and site-specific mapping will occur to better define the extent of work and type of activities potentially affecting surface waters. The locations of protected streams and impaired (303(d))/priority waters that may require special consideration will also be better defined and mapped, particularly for those waterways impaired by pollutants related to construction or pollutants of concern for MS4s, as identified in the SPDES general permits.

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater discharges from certain construction activities are unlawful unless they are authorized by a National Pollutant Discharge Elimination System ("NPDES") permit or by a state permit program. New York's SPDES is a NPDES-approved program with permits issued in accordance with the Environmental Conservation Law ("ECL"). This general permit ("permit") is issued pursuant to Article 17, Titles 7, 8 and Article 70 of the ECL. An owner or operator may obtain coverage under this permit by submitting a Notice of Intent ("NOI") to the Department. Projects that are ineligible for coverage under the general permit include projects with:

- Discharges from construction activities that adversely affect a listed, or proposed to be listed, endangered or threatened species, or its critical habitat;
- Discharges that either cause or contribute to a violation of water quality standards adopted pursuant to the ECL and its accompanying regulations;
- Construction activities for linear transportation projects and linear utility projects that:
  - are tributary to waters of the state classified as AA or AA-s; and
  - disturb two or more acres of land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey for the County in which the disturbance will occur.

Therefore, during the Tier 2 design and assessment, the SPDES permitting requirements will need

to be reviewed with respect to the proposed activities, in coordination with NYSDEC and the U.S. EPA. In general, NYSDOT construction projects should not result in or contribute to an exceedance of state water quality standards. For example, 6 NYCRR Part 703, Water Quality Regulations, contains water quality standards regarding turbidity that are of particular relevance to NYSDOT construction projects. The potential for impacts will be evaluated in accordance with NYSDOT Environmental Procedures Manual, Chapter 4.5, "Water Quality Standards and Assessment Methodologies."

A joint permit application with the U.S. Army Corps of Engineers and NYSDEC will be prepared and filed to obtain Section 10 (U.S. Rivers and Harbors Act) and Section 401 Water Quality Certification and Section 404 Wetland Permit (U.S. Clean Water Act) and a NYS Protection of Waters permit, as applicable. The NYSDEC/NYSDOT Memorandum of Understanding (MOU) could apply to this program relative to ECL Article 15 (Protection of Waters); the MOU states that NYSDOT does not need to obtain an individual Protection of Waters Permit, provided that NYSDOT conducts its environmental screening and NYSDEC consultation in accordance with the MOU.

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4.7. Wild, Scenic, and Recreational Rivers

4.7.1. Regulatory Context

The National Wild and Scenic Rivers System was created by Congress in 1968 to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.[71] Rivers may be designated by Congress or, if certain requirements are met, the Secretary of the Interior. Each river is administered by either a federal or state agency. Designated segments need not include the entire river and may include tributaries. For federally administered rivers, the designated boundaries generally average one-quarter mile on either bank in the lower 48 states and one-half mile on rivers outside national parks in Alaska in order to protect river-related values.

Rivers are classified as wild, scenic, or recreational and described below.

- **Wild river areas:** Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
- **Scenic river areas:** Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
- **Recreational river areas:** Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

The National Park Service (NPS) also publishes a Nationwide Rivers Inventory (NRI) list. The NRI list consists of some 2,400 miles of Inventory Rivers in New York State that are potentially eligible for inclusion in the National System and would also require a permit if impacted by a project.

[71]/ Wild and Scenic Rivers Act (16 U.S.C. 1271-1287) -- Public Law 90-542, approved October 2, 1968, (82 Stat. 906)

Under a 1979 Presidential Directive, and related Council on Environmental Quality (CEQ) procedures, all federal agencies must seek to avoid or mitigate actions that would adversely affect one or more NRI segments. [72]

In addition to the federal regulations above, the New York State Wild, Scenic and Recreational Rivers Act protects those rivers of the state that possess outstanding scenic, ecological, recreational, historic, and scientific values. These attributes may include value derived from fish and wildlife and botanical resources, aesthetic quality, archaeological significance and other cultural and historic features.

State policy is to preserve designated rivers in a free flowing condition, protecting them from improvident development and use. This policy is intended to preserve the enjoyment and benefits derived from these rivers for present and future generations.[73]

4.7.2. Methodology

National and State Wild, Scenic and Recreational rivers for study areas within 300 feet of the centerline for all alternatives were identified using existing mapping collected from federal and state agencies. National Wild and Scenic Rivers were identified using Geographic Information System (GIS) data provided by the U.S. Forest Service. The river segments listed on the Nationwide Rivers Inventory were compared to the list of crossing waterways developed based on existing surface water mapping to identify the potential for impacts, which would be further researched as part of Tier 2. Existing surface water mapping was compared to the list of state-designated segments to identify state Wild, Scenic, and Recreational Rivers.[74]

4.7.3. Existing Conditions

Empire Corridor South

The Empire Corridor South segment, from New York City to Rensselaer, extends 142 miles and in many locations closely follows the east bank of the Hudson River. There are numerous water resources in the Empire Corridor South segment, primarily dominated by the Lower Hudson River. The entire corridor in this segment is located in the Lower Hudson River Watershed. There are no mapped National Wild or Scenic Rivers in the Empire Corridor South segment. However, three segments of the Hudson River are listed on the Nationwide Rivers Inventory. The southernmost listed segment in Columbia, Dutchess, and Ulster Counties extends five miles north of Barrytown (near MP 95) to south of Malden-on-Hudson. There are two listed segments in Greene and Columbia Counties: a 4-mile segment extending north of Hudson (near MP 114.5) to south of Coxsackie and a 5-mile segment extending north of Coxsackie Island to above New Baltimore (near MP 128).

The Hudson River is listed as a State Wild River for approximately 10.5 miles from the confluence of the Cedar River to the confluence with the Boreas River. However, this river segment is more than

[72] / National Park Service, 2011. "National Center for Recreation and Conservation, Nationwide Rivers Inventory", <http://www.nps.gov/ncrc/programs/rtca/nri/index.html>, website accessed February 2012.
[73] / Article 15 Title 27, ECL- Implementing Regulations- 6 NYCRR PART 666.
[74] / NYSDEC, "Wild, Scenic, and Recreational Rivers." Accessed October 3, 2011. <http://www.dec.ny.gov/lands/32739.html>

seven miles away from the program area.

Empire Corridor West/Niagara Branch

The 322-mile long Empire Corridor West/Niagara Branch passes through six watersheds in the study area. They are the Lower Hudson River Basin, Mohawk River Basin, Oswego/Finger Lakes Basin, Lake Ontario Tributaries Basin, Genesee River Basin, and the Niagara River/Lake Erie Basin. There are no mapped National Wild or Scenic Rivers in the Empire Corridor South segment. However, there are several segments listed on the Nationwide Rivers Inventory: an 8-mile section of the Mohawk River in Oneida that terminates to the north near the Empire Corridor (near MP 250) in Stanwix and the Black Creek (MP 386) that crosses the Empire Corridor in Monroe County and Genesee County (MP 396.5).

West Canada Creek is classified as a State Recreational River in Herkimer County, but it is more than 7 miles away from the program area.

4.7.4. Environmental Consequences

No currently designated National or State Wild, Scenic or Recreational Rivers were identified in the program study area. Therefore, none of the alternatives would have the potential to impact known designated National or State Wild, Scenic or Recreational Rivers. However, there are river segments in the study area listed on the Nationwide Rivers Inventory (NRI). Three different segments of the Hudson River in Dutchess, Ulster, Columbia, and Greene Counties are listed on the NRI in areas adjoining work proposed under the Base, 90A, 110, and 125 Alternatives. No direct impacts on the river in these areas are anticipated.

Near Stanwix in Rome, a NRI-listed segment of the Mohawk River extends in close proximity (within 300 feet) to the Empire Corridor West where 13 miles of fourth track will be added with Alternative 110. No direct impacts on the Mohawk River is anticipated in this area.

The Black Creek, listed on the NRI, crosses the Empire Corridor at MP 386 in Monroe County, where 11 miles of third track would be added under Alternatives 90A, 90B, and 110. The Black Creek also crosses the Empire Corridor at MP 396.5, where 11 miles of fourth track would be added under Alternative 110. Although the additional tracks would be added in the location of former tracks, there is the potential for impact at both crossings of Black Creek.

When an alternative is selected and designs are developed in Tier 2, site-specific evaluations of the potential impacts on river segments listed on the Nationwide Rivers Inventory would be performed.

4.7.5. Potential Mitigation Strategies

During the Tier 2 analysis, refinements in design and mapping will be performed and the development of project improvements will incorporate avoidance and minimization of impacts to potential or designated National Wild, Scenic, and Recreational rivers. Since there would be no anticipated impacts to designated National or State Wild, Scenic or Recreational Rivers, mitigation

is not anticipated at this time. However, as discussed in the following section, additional research will be performed regarding potential impacts on the rivers listed on the Nationwide Rivers Inventory, and appropriate mitigation measures will be identified in Tier 2.

4.7.6. Future Analysis

All work within in National or State Wild, Scenic or Recreational Rivers would require permitting through the National Wild and Scenic Rivers Act or the state Wild, Scenic and Recreational Rivers Act. There are three lists that will need to be re-consulted during the Tier 2 analysis for any change in status to National or State Wild, Scenic or Recreational Rivers. First, the Tier 2 analysis should check updates of the National Wild and Scenic Rivers list. The Tier 2 analysis should check updates to the state list published by the NYSDEC.

Lastly, the National Park Service (NPS) also publishes a Nationwide Rivers Inventory (NRI) list that will need to be consulted. The NRI list consists of some 2,400 miles of Inventory Rivers in New York State that are potentially eligible for inclusion in the National System and would also require a permit if impacted by a project. The Tier 2 assessment will also incorporate a thorough review of crossings of rivers listed on the Nationwide Rivers Inventory.

A presidential directive requires each federal agency, as part of its normal planning and environmental review processes, to take care to avoid or mitigate adverse effects on rivers identified in the Nationwide Rivers Inventory compiled by the National Park Service. Furthermore, all agencies are required to consult with the National Park Service prior to taking actions, which could effectively foreclose wild, scenic or recreational status for rivers on the inventory. If work is proposed that could alter or affect a river on the Nationwide Rivers Inventory, the following steps may be required in Tier 2:

- Determine whether the proposed action could affect an Inventory river and identify and analyze the environmental effects of their actions;
- Determine whether the proposed action could have an adverse effect on the natural, cultural and recreational values of the Inventory river segment;
- Consult with agencies with jurisdiction by law or special expertise (in this case, the National Park Service (NPS));
- Develop and study alternatives;
- Determine whether the proposed action could foreclose options to classify any portion of the Inventory segment as wild, scenic, or recreation river areas;
- Incorporate avoidance/mitigation measures into the proposed action to maximum extent feasible within the agency's authority and use all practicable means and measures to preserve important historic, cultural, and natural aspects of our national heritage.

4.8. Navigable Waters

4.8.1. Regulatory Context

Federal jurisdiction over navigable waters was established through the U.S. Rivers and Harbors Act. The U.S. General Bridge Act of 1946 delegated authority to the U.S. Coast Guard over regulation of construction of bridges (established under Section 9 of the U.S. Rivers and Harbors Act[75]) in or over waters determined to be navigable by that agency.[76] Section 10 of the U.S. Rivers and Harbors Act Act grants the U.S. Army Corps of Engineers regulatory authority over work in, over, or under navigable waters, including wharfs, piers, and structures (excluding bridges and structures permitted by the USCG), and work such as dredging or disposal of dredged material, or excavation, filling, or other modifications to navigable waters.[77]

Under the state definition, navigable waters include lakes, rivers and other waterways and water bodies on which water vessels with a capacity of one or more persons are operated or can be operated.[78] The New York State Department of Environmental Conservation (NYSDEC) requires a Protection Of Waters Permit for excavating or placing fill in navigable waters of the state, below the mean high water level, including adjacent and contiguous marshes and wetlands. NYSDOT is not required to obtain Article 15 Protection of Waters permits, but is required to coordinate activities regulated by Article 15 with NYSDEC as per the "Memorandum of Understanding Between the New York State Department of Transportation and the New York State Department of Environmental Conservation Regarding ECL Articles 15 and 24." The MOU states that NYSDOT does not need to obtain an individual Protection of Waters Permit, provided that NYSDOT conducts its environmental screening and NYSDEC consultation in accordance with the MOU.

Under state law, New York State also owns the land beneath large rivers and lakes, and the underwater holdings are managed by the New York State Office of General Services. Work within underwater lands may require approvals or easements for their use. In addition, the New York State Canal Corporation manages lands under and along the states canals and canalized rivers, including the Erie Canal, and has regulatory jurisdiction over activities in and along these waterways.

4.8.2. Methodology

Navigable waters for study areas within 300 feet of the corridor centerline for all alternatives were identified using the published list of navigable waterways in the state from the U.S. Army Corps of Engineers.[79] In addition, the U.S. Coast Guard was consulted with regards to existing bridge permits over navigable waters within the study area. The U.S. Coast Guard, First Coast Guard District, in correspondence dated July 7, 2011, provided copies of bridge permits for five bridges along the Empire Corridor South, and the published list of navigable waterways for the Ninth (Buffalo) Coast

[75]/ Section 9 of The Rivers and Harbors Appropriation Act of 1899 (33 U.S.C. 403; Chapter 425, March 3, 1899; 30 Stat. 1151)
[76]/ The General Bridge Act of 1946, 33 U.S.C. 525-533 and 33 U.S.C. 499.
[77]/ Section 10 of The Rivers and Harbors Appropriation Act of 1899 (33 U.S.C. 403; Chapter 425, March 3, 1899; 30 Stat. 1151)
[78]/ NYSDEC, "Excavation or Placement of Fill in Navigable Waters." Accessed September 29, 2011. < http://www.dec.ny.gov/permits/6548.html>
[79]/ U.S. Army Corps of Engineers. "Navigable Waterways in Buffalo District Where Department of the Army Permits are Required, State of New York State." Accessed September 9, 2011. <http://www.lrb.usace.army.mil/regulatory/waterway_ny.pdf>

Guard District was also consulted.[80] These various sources were used to identify navigable waters under federal jurisdiction crossed by or within 300 feet of the centerline of program alternatives.

4.8.3. Existing Conditions

Federally regulated navigable waterways are generally defined as waters that provide a channel for commerce and transportation of people and goods. The Empire Corridor extends through New York State from New York City to Niagara Falls and crosses or parallels numerous waterways within the State that are considered by the U.S. ACE and U.S. Coast Guard to be navigable for all or part of their length. Navigable waterways in New York State primarily include rivers, streams, lakes and canals. Exhibit 4-13 lists the navigable waters within the 600-foot wide study area identified from published lists and bridge permits provided by the USCG, and Appendix G.7 describes navigable waterways in each program segment.

Along the 90/110 Study area, the rail corridor crosses 19 navigable waterways, and along the 125 Study Area, the rail corridor would cross 12 navigable waterways. In many cases, these crossings are of the same waterbody, for instance, there are multiple crossings of the Erie Canal. In other instances, the rail corridor closely parallels navigable waterways, without crossing (such as the Hudson River along many segments of Empire Corridor South or the Erie Canal along portions of Empire Corridor West).

4.8.4. Environmental Consequences

All alternatives have the potential to impact navigable waters as a result of construction in and around navigable waters. At this Tier 1 level, specific impacts are not known, but could include permanent impacts such as excavation for bridge piers and abutments, placement of fill and or riprap below the mean high water level or temporary construction impacts such as construction of access roads or staging for pier construction or placement of spans. Improvements for the Base Alternative and Alternative 125 have the least potential to impact the navigable waters. Alternatives 90B and 110 cross a greater number of navigable waterways and have the greatest potential for impacts to navigable waterways.

The sections below identify the areas where improvements and or new track will be constructed over navigable waters. There would be potential impacts, as described above, at all crossings; however, the specifics of impacts will be documented as part of the Tier 2 analysis.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured and it incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure.

[80] U.S. Coast Guard. "Ninth Coast Guard District Federally Navigable Waters by State," updated March 2010. Accessed September 9, 2011. <http://www.uscg.mil/d9/D9Legal/water/new_york.pdf>

Exhibit 4-13—Navigable Waters in the Study Area

County	River/Stream Crossing (Appx. Milepost)[1]	Name	River/Stream Crossing (Appx. Milepost)[1]	Name
	90/110 Study Area		125 Study Area	
New York	10	Harlem River (Spuyten Duyvil Railroad Bridge) Hudson River	10	Harlem River (Spuyten Duyvil Railroad Bridge) Hudson River
Bronx		Hudson River		Hudson River
Westchester	32.5-33 42	Croton Bay (Metro-North Railroad Bridge) Peekskill Bay (Metro-North Railroad Bridge) Hudson River	32.5-33 42	Croton Bay (Metro-North Railroad Bridge) Peekskill Bay (Metro-North Railroad Bridge) Hudson River
Putnam		Hudson River		Hudson River
Dutchess	65	Wappinger Creek (New Hamburg Railroad Bridge) Hudson River	65	Wappinger Creek (New Hamburg Railroad Bridge) Hudson River
Columbia		Hudson River		Hudson River
Rensselaer		Hudson River		Hudson River
Albany	143	Hudson River (Livingston Avenue Railroad Bridge)	QH143.5	Hudson River
Schenectady	160	Mohawk River/ Erie Canal	None	NA
Schoharie	NA	NA	None	NA
Montgomery		Mohawk River/Erie Canal	None	NA
Herkimer	 230-231.5 234	Mohawk River/Erie Canal Erie Canal Mohawk River	None	NA
Oneida	248.5	Mohawk River Erie Canal	None	NA
Madison	None	NA	None	NA
Onondaga	292	Barge Canal Onondaga Lake	QH278.5	Barge Canal Onondaga Lake
Cayuga	None	NA	None	NA
Wayne	328-330 335, 339.5	Clyde River/Erie Canal Erie Canal	None	NA
Monroe	371.5 374.5	Genesee River Erie Canal	QH356.75 QH359	Genesee River Erie Canal
Genesee	None	NA	None	NA
Erie	422.5, QDN12.5 QDN6	Ellicott Creek Lake Erie Scajaquada Creek	QH411.5 QDN12.5 QDN6	Ellicott Creek Ellicott Creek Lake Erie Scajaquada Creek
Niagara	QDN13.5	Tonawanda Creek/Erie Canal	QDN13.5	Tonawanda Creek/Erie Canal

Notes:
1 Milepost shown if stream/water body crosses the railroad. If not shown, water bodies are within the 300-foot buffer, but do not cross the railroad.
NA Not Applicable
The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 300 feet of the corridor centerline.

Source: U.S. Army Corps of Engineers, 2011; U.S. Coast Guard, 2011

Empire Corridor South

The Base Alternative will include signal and grade crossing improvements along the 64 miles of Empire Corridor South (MPs 75.8 to 140) north of Poughkeepsie to just south of the Albany-Rensselaer Station. The corridor closely adjoins the Hudson River (a navigable water) along this

section of rail line; however, improvements will occur within the current right-of-way and impacts to the Hudson River will not be anticipated.

The Base Alternative will also involve the addition of a fourth track and platform extension at Rensselaer Station near the Albany county line (MPs 141 to 143). This improvement will not occur over navigable waters; therefore, impacts will not be anticipated. As the alignment crosses into Albany County, it will pass over the Hudson River across the Livingston Avenue Railroad Bridge.

Empire Corridor West/Niagara Branch

The Base Alternative will involve 17 miles of second track between the Albany-Rensselaer and Schenectady stations, as well as reconstruction of the Schenectady Station. There are two navigable waterways within this section of improvements. Reconstruction and track realignment at the Schenectady Station will occur over the Mohawk River. Work within the Mohawk River could have impacts on this waterways.

The proposed Syracuse track configuration and signal improvements area (MPs 287 to 291) will not cross any navigable waters and therefore will not be anticipated to impact this resource. Rochester Station track and platform improvements (MPs 368 to 373) will include a crossing of the Genesee River (MP 371.5). Improvements and construction activities at this crossing could result in permanent and temporary waterway impacts. Proposed improvements for the new Niagara Falls Intermodal Transportation Center will be located within an urban area and will not involve impacts to navigable waters.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvement projects to track, station, and signalization, in addition to improvements proposed under the Base Alternative.

Empire Corridor South

Alternative 90A would include construction of four miles of second track through urbanized areas of Manhattan (MPs 9 to 13), and 1.4 miles (MPs 23.8 to 25.2) of new track, extending under the Tappan Zee Bridge, for the Tarrytown Pocket Track/Interlocking. The addition of a second track over the Harlem River at the Spuyten Duyvil Railroad Bridge (MP 10) for the above improvements could have waterway impacts. The alignment in these improvement areas would also closely adjoin the Hudson River; however, work would likely remain within the existing right-of-way and would be unlikely to impact the Hudson River waterway.

With Alternative 90A, signal improvements proposed along 43 miles (MPs 32.8 to 75.8) would cross the Hudson River at two U.S. Coast Guard permitted bridges: one over Croton Bay (MPs 32.5 to 33) and the other over Peekskill Bay (MP 42). Even though work on the bridges would be minimal and likely contained within the existing right-of-way, it could have waterway impacts. In addition, the alignment in these improvement areas also closely adjoins the Hudson River; however, work would likely remain within the existing right-of-way and would be unlikely to impact the Hudson River waterway. The 10 miles of new third track (MPs 53 to 63) and improvements at the Poughkeepsie Yard/Storage Facility (MPs 71 to 75.8) would be unlikely to

impact navigable waters.

North of Poughkeepsie and south of Albany-Rensselaer Station (MPs 75.8 to 140), proposed improvements would include rock slope stabilization (MPs 105 to 130), three new control points (CP 82, CP 99, and CP 136), as well as station improvements at Rhinecliff Station (high-level platforms) and Hudson Station (new Ferry Street Bridge and track realignments). It is anticipated that these improvements would occur largely within the right-of-way and impacts to navigable waters would not be anticipated. Alternative 90A also includes replacement of the Livingston Avenue Bridge, which would pass over the Hudson River and has been permitted by the U.S. Coast Guard. Improvements and replacement activities could result in permanent and temporary waterway impacts, depending on the design.

Empire Corridor West/Niagara Branch

With Alternative 90A, track improvements would include 10 miles of third track between MPs 169 and 179 and Amsterdam Station improvements along the west end of this segment. This entire 10 mile segment would closely adjoin the banks of the Mohawk River; however, impacts in these areas would be contained within the current right-of-way, and there would be little potential to impact the Mohawk River.

Upgrades to interlockings and automatic block signals would also occur at three control points in the Cities of Amsterdam, Utica, and Rome (CP 175, CP 239, and CP 248, respectively) and Amsterdam Station improvements (MP 177.6). The control points and station improvements would be located within the boundaries of the principal aquifer, which would generally underlie the Mohawk River. These improvements would occur close to the banks of the Mohawk River; however, impacts in these areas would be contained within the current right-of-way, and there would be little potential to impact the Mohawk River. Alternative 90A would also include Syracuse track improvements of upgrading interlocking, automatic block signals, and control points and track improvements at the Syracuse Station (MPs 290 to 294). These improvements would involve the crossing of the Erie Canal and could also result in permanent and temporary impacts.

Rochester third track improvements along nine miles (MPs 373 to 382), west of the Rochester Station, would involve a crossing of the Erie Canal (MP 374.5). Improvements and construction activities at this crossing could result in permanent and temporary waterway impacts. Alternative 90A also would include the addition of a third track along 11 miles (MPs 382 to 393) in western Monroe and eastern Genesee Counties, which would not be anticipated to impact navigable waters.

Station improvements at the Buffalo-Depew Station (MPs 429.5 to 432.5) and the proposed double track (MPs QDN17 to QDN23.2) would not cross navigable waters.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

Empire Corridor South

No additional work within the Empire Corridor South, other than that described above for Alternative 90A, is proposed.

Empire Corridor West/Niagara Branch

Third and fourth track improvements for Alternative 90B would start at MP 160 in the City of Schenectady, and extend west to MP 430, east of Buffalo. Third track improvements would include the crossing of five navigable waters at 11 crossings. Areas of fourth track improvements would not cross navigable waters. Third track improvements over the Mohawk River would occur in three counties: Schenectady (MP 160), Herkimer (MP 234), and Oneida (MP 248.5), and could result in permanent and temporary impacts. Third track improvements over the Erie Canal would also occur in three counties: Herkimer (MPs 231.5), Wayne (MPs 328 to 330, 335, 339.5), and Monroe (MP 374.5), and could also result in permanent and temporary impacts.

Alternative 90B would also have third track improvements at crossings of the Barge Canal in Syracuse (MP 292), the Genesee River in Rochester (MP 371.5) and Ellicott Creek, just east of Buffalo-Depew (MP 422.2). Improvements at these three crossings could result in permanent and temporary impacts.

There would also be locations where relocations of adjoining roadways may result in impacts to navigable waters, but these specific locations would be defined in the Tier 2 analysis.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations.

Empire Corridor South

No additional work within Empire Corridor South, other than that described above for Alternative 90A, is proposed.

Empire Corridor West/Niagara Branch

Third and fourth track improvements for Alternative 110 would start at MP 160 in the City of Schenectady, and extend west to MP 430, east of Buffalo. Third and fourth track improvements would impact five navigable waters at 11 crossings in Schenectady, Herkimer, Oneida, Onondaga, Wayne, Monroe, and Erie Counties. These are the same crossings as described in Alternatives 90A and 90B. No other impacts other than those described above for Alternatives 90A and 90B would be anticipated.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch.

Empire Corridor South

No new improvements, beyond what is proposed for Alternative 90A, would be proposed for Alternative 125 along the majority of Empire Corridor South. However, roughly one mile of the proposed 125 mph track would extend south from Albany-Rensselaer Station to cross the Hudson River (MP 143.4). Proposed improvements would cross the Hudson River and construction of a new bridge over the Hudson River would also result in temporary and permanent impacts and would require permitting by the U.S. Army Corps of Engineers.

Empire Corridor West/Niagara Branch

Alternative 125 would involve construction of a total of 236 miles of track on new alignment. The new alignment would cross the Barge Canal (MP QH278.5) in Syracuse, as well as the Genesee River (MP QH356.75) and the Erie Canal (MP QH359) near Rochester. Track improvements at these crossings could result in permanent and temporary impacts as described above, and may require clearance and permitting by the U.S. Army Corps of Engineers. In addition to the above three crossings, Alternative 125 would also cross Ellicott Creek (MP QH411.5) before converging with the existing Empire Corridor east of Buffalo. Work over or within Ellicott Creek could result in permanent and temporary impacts as described above, and may require clearance and permitting by the U.S. Army Corps of Engineers.

4.8.5. Potential Mitigation Strategies

During the Tier 2 analysis, refinements in design and mapping will be performed and the project development will incorporate avoidance and minimization of impacts to navigable waters. Project design changes to avoid or minimize impacts may include adjusting pier and riprap locations outside of the ordinary high water mark. project design will be refined to minimize obstructions to navigation and the need for fill and dredging activities.

A U.S. Coast Guard bridge permit and approvals from the U.S. Army Corps of Engineers may be required for improvements and construction over navigable waters, and early coordination with these agencies will facilitate the permitting process. In addition, design of new bridges and bridge improvements over navigable waters will include initiation of coordination with the NYSDEC. For work within the canals, coordination will also be performed with the New York State Canal Corporation. The local harbormasters will also be consulted regarding the proposed designs and construction plans.

The need for subsurface cables and the required depth of emplacement and the requirements for removal of existing bridge footings and subsurface cables will be determined in coordination with the regulatory agencies. Time-of-year work restrictions for bridge construction affecting navigation will be determined in consultation with these agencies. Plans for fendering and other

features affecting navigation will be developed in consultation with the agencies with jurisdiction. For new movable bridges, considerations during design may include potential for contamination from lubricants and fuels stored on the bridge and whether special measures or plans (e.g., Spill Response Plans or Environmental Operation and Maintenance Manuals) are required to prevent contamination during operation.

4.8.6. Future Analysis

During the Tier 2 analysis, further coordination will be performed to identify navigable waters in the study and issues of concern for the U.S. Coast Guard and the U.S. Army Corps of Engineers. Information available on the location and depths of the navigation channels will be researched and obtained. Depending on the type of improvements proposed, detailed cross-sections of bridges may be developed to fully understand the potential impacts to the crossings. Depending on the type and extent of improvements proposed at bridge crossings, additional research on the type and heights of navigational vessels may be required for new bridge construction, as part of a bridge type study. Research on peak navigation seasons may be required for any navigational closures. Coordination with the U.S. Coast Guard, the U.S. Army Corps of Engineers, and NYSDEC will be completed during the design of new or rehabilitated/reconstructed bridges and development of plans for placement of any associated submarine cables and other structures within navigable waterways.

If required, a U.S. Coast Guard Section 9 Bridge permit will be prepared and submitted to the USCG. In addition, a joint permit application will be prepared and submitted, if required, to the U.S. Army Corps of Engineers for excavation and fill in navigable waters and Section 10 approvals (under the U.S. Clean Waters Act) and to NYSDEC. A Protection of Waters Permit is required by NYSDEC for excavating or placing fill in navigable waters of the state, below the mean high water level, including adjacent and contiguous marshes and wetlands. Therefore, early design coordination with NYSDEC will also be needed. Work within the New York State Canal System will require consultation with, and required approvals from, the New York State Canal Corporation. During construction affecting navigable waters and canals, construction approvals may be required from the USCG and the New York State Canal Corporation that might include consideration of navigation seasons and closures. In addition, work within waterbodies owned by the state may require easements or approvals from the New York State Office of General Services.

4.9. Floodplains

4.9.1. Regulatory Context

Floodplains are the lands on either side of a stream that are inundated when the capacity of the stream channel is exceeded. The National Flood Insurance Program (NFIP) was established pursuant to the National Flood Insurance Act of 1968 (amended)[81] and the Flood Disaster Protection Act of 1973 (as amended)[82], to encourage sound floodplain management programs at the state and local levels. To provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Emergency Management Agency (FEMA) as the base

[81]/ National Flood Insurance Act of 1968. 42 U.S.C.4001 et seq. (1968).
[82]/ Flood Disaster Act of 1973 [42 U.S.C.4001 et seq.] (amended).

flood for floodplain management and flood insurance purposes.

Executive Order (EO) 11988, Floodplain Management[83] (1977) directs federal agencies to "provide leadership and take action to reduce the risk of flood loss, to minimize the impacts of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains." In addition, the U.S. DOT Order 5650.2 describes policies and procedures for "*ensuring that proper consideration is given to avoidance and mitigation of adverse floodplain impacts in agency actions, planning programs and budget requests*."[84] The FEMA Regulations contain the basic policies and procedures of FEMA in regulating floodplain management and to analyze, identify, and map floodplains for flood insurance purposes.[85]

FRA Procedures for Considering Environmental Impacts states that each project shall determine whether any of the alternatives would affect a base floodplain. If one or more alternatives would affect a base floodplain, the Draft EIS shall discuss: any risk associated with each such alternative; the impacts on natural and beneficial floodplain values; the degree to which the alternative supports incompatible development in the base floodplain; and the adequacy of the methods proposed to minimize harm. In the final EIS, this discussion should concentrate on the proposed action and a finding that the proposed impact encroachment is the only practicable alternative.[86]

Generally, these regulations are enforced at the local level by local governments, with assistance from the New York State Department of Environmental Conservation (NYSDEC). In New York State, local communities that participate in the NFIP regulate development in Special Flood Hazard Areas. An exception is development funded and undertaken by the state or federal government, which is regulated by the responsible agency, subject to technical assistance by the NYSDEC and the FEMA. Nearly all New York communities, defined as a town, city or village, participate in the NFIP. Each participating community in the state has a designated floodplain administrator, usually the building inspector or code enforcement official.[87,88]

4.9.2. Methodology

Flood-prone areas were identified using GIS mapping of 100-year floodplain areas identified by FEMA for study areas within 300-feet of the corridor centerline for all alternatives. Floodplains are associated with all of the major drainageways and streams that cross the railroad and stations. A floodplain is the area that is inundated with water during a flood. A 100-year flood is calculated to be the level of flood water that has a one percent (%) chance of being equaled or exceeded in any single year. A floodplain is composed of two parts: the floodway and the floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order that the 100-year flood is carried without increasing the water surface elevation by more than one foot. The floodway fringe area is the outer portion of the floodplain

[83]/ Executive Order 11988, "Floodplain Management," President of the United States, 1977.
[84]/ US Department of Transportation Order 5650.2, "Floodplain Management and Protection," April 23, 1979.
[85]/ Code of Federal Regulations (CFR), Title 44 – Emergency Management and Assistance, Chapter I – FEMA.
[86]/ Federal Railroad Administration (FRA) Procedures for Considering Environmental Impacts 65 Final Rule (FR) 28545 Floodplains subsection 14 (n)(8).
[87]/ New York State Department of Environmental Conservation. "Floodplain Construction Requirements in New York State." September, 2007, Accessed April 19, 2011. <http://www.dec.ny.gov/docs/water_pdf/floodplainconstruction.pdf>
[88]/ 6 New York Codes, Rules and Regulations (NYCRR) Part 502, Floodplain Management Criteria for State Projects (authority Environmental Conservation Law [ECL] section 1-0101, 3-0301 and Article 36).

beyond the floodway. Changes in the floodway such as adding fill material, constructing buildings or bridges, or limiting the natural conveyance of floodwaters can cause a rise in the 100-year water surface and can subsequently impact properties not previously affected by a 100-year storm event.

GIS mapping was obtained from NYS GIS, and was based on FEMA Flood Insurance Rate Maps (FIRMs). Areas of 100-year floodplains within the 600-foot wide study area were calculated. GIS mapping of FEMA floodplains was not available for New York, Bronx, Putnam, Schenectady, Montgomery, and Wayne Counties.

4.9.3. Existing Conditions

The discussion below summarizes 100-year floodplains within the 300-foot Empire Corridor buffer. The study area is divided into two sections: the Empire Corridor South segment from New York City to Rensselaer County and the Empire Corridor West/Niagara Branch segment from Albany County to end of the line in Niagara Falls. The 90/110 Study Area follows the existing rail corridor. Alternative 125 Study Area follows an alternative, but more direct route through Empire Corridor West/Niagara Branch.

There are approximately 8,000 acres of mapped 100-year floodplains in the 90/110 Study Area and approximately 5,900 acres of mapped 100-year floodplains in the 125 Study Area from New York City to Niagara Falls. Within the 90/110 Study Area, 55.7 percent of the mapped 100-year floodplains are located within Empire Corridor South, and 44.3 percent are within Empire Corridor West/Niagara Branch. Within the 125 Study Area, 75.4 percent of the mapped 100-year floodplains are located in Empire Corridor South and 24.6 percent are located in Empire Corridor West/Niagara Branch. Exhibit 4-14 below summarizes mapped 100-year floodplains within the study area and a description of floodplains in each county is presented in Appendix G.8.

4.9.4. Environmental Consequences

The sections below describe encroachments on mapped areas of 100-year floodplains. The installation of tracks on existing former rail embankments, signals, and other ancillary facilities would in many instances involve minimal impacts or changes to ground surface elevations, although installation of new railroad embankments may have a greater effect on surface topography. Work for new bridge construction within a regulatory floodway may have a greater effect on flood elevations. In general, any new embankment material or structures, such as bridges, placed within a floodway may alter the 100-year floodplain limits. Changes to existing drainage structures, such as culverts through the embankment, or addition of new waterway crossings/culverts may change the hydraulic capacity, which could affect peak flow rates upstream and downstream of the crossing and which could also affect the 100-year surface water elevations.

It is assumed for this evaluation that all new structures, embankments, filling, paving, or other modifications to open channels in floodways would be considered a floodplain encroachment. Encroachments to the floodplain would not necessarily result in a rise to the 100-year surface water elevation.

Review of GIS mapping indicates that the Base Alternative and Alternative 90A would have the least impacts to the 100-year floodplain. These alternatives would largely involve work within the right-

Exhibit 4-14—Mapped FEMA 100-year Floodplains in the Study Area

County	Acres of 100-Year Floodplains[3]	
	90/110 Study Area	125 Study Area
New York[1]	ND	ND
Bronx[1]	ND	ND
Westchester	703	703
Putnam[1]	ND	ND
Dutchess	1,766	1,766
Columbia	1,244	1,244
Rensselaer	751	752
Albany	90	43
Schenectady[1]	ND	ND
Schoarie[1]	0	ND
Montgomery[2]	ND (8)	ND
Herkimer	904	45
Oneida	780	81
Madison	226	110
Onondaga	712	547
Cayuga	316	45
Wayne[1]	ND	ND
Monroe	237	296
Genesee	234	247
Erie	15	20
Niagara	22	22
TOTAL	**8,008**	**5,921**

Notes
1 No GIS data available from FEMA
2 No GIS data available from FEMA. Acreages are a result of adjacent County overlap.
3 Numbers have been rounded to the nearest acre.
ND=No Data
The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 300 feet of the corridor centerline.

Source: Federal Emergency Management Agency, Flood Insurance Rate Maps, 2010.

of-way, with tracks being added in the location of the former track beds or existing access roads. Alternatives 90B and 110 would have potential impacts on the 100-year floodplain in more locations than the Base and 90A Alternatives, especially where new third and fourth track construction would occur within a floodway. Alternative 125 would involve the greatest impacts on the 100-year floodplain as it would extend on a new alignment. This preliminary assessment is based on Tier 1 concepts and mapping and would be further refined in Tier 2 as the project development process is further advanced, and efforts to avoid floodplain alterations would be made as design is advanced.

The sections below identify the areas where improvements or new track would be constructed in, or adjacent to, mapped 100-year floodplains. However, the specific project impacts on 100-year flood elevations will be documented as part of the Tier 2 analysis.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure.

Empire Corridor South

The Base Alternative includes signal and grade crossing improvements along the 64 miles of Empire Corridor South (MPs 75.8 to 140) north of Poughkeepsie to just south of Albany-Rensselaer Station. The majority of the alignment in this segment is within or adjacent to floodplains associated with the Hudson River. Signal improvements will not likely result in fill placement in floodplains; however any culvert or drainage reconfigurations or increase in impervious surfaces at the grade crossing improvements could have the potential to affect the flooding characteristics of the site.

The Base Alternative will also involve the addition of a fourth track and platform extension at Albany-Rensselaer Station near the Albany county line (MPs 141 to 143), which is located within floodplains associated with Mill Creek and the Hudson River. The extent of fill placement within floodplains will depend on the design.

Empire Corridor West/Niagara Branch

The Base Alternative will involve 17 miles of second track between the Albany-Rensselaer and Schenectady stations, as well as reconstruction of the Schenectady Station. The affected portions of Albany and Schenectady Counties cross several streams and associated floodplains and depending on design, could affect flooding characteristics of the sites. These improvements will encroach on floodplains associated with the Hudson River (MP 143), Patroons Creek (MP 144), Rensselaer Lake (MP 149), Lisha Kill (MP 153.5) and the Mohawk River (MP 160.5).

Parts of the proposed Syracuse track configuration and signal improvements area (MPs 278 to 291) also cross floodplains of several waterways. These improvements will encroach on floodplains associated with Chittenango Creek, Limestone Creek, Ley Creek, and unnamed tributaries to these drainages.

The Base Alternative includes Rochester Station track and platform improvements (MPs 368 to 373). The proposed track improvements for the Rochester Station could also have the potential to impact floodplains associated with the Genesee River (MP 371.5).

Proposed improvements for the new Niagara Falls Intermodal Transportation Center will be located within an urban area and will not involve impacts to mapped floodplains.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, and signalization, in addition to improvements proposed under the Base Alternative previously described.

Empire Corridor South

Alternative 90A would include construction of four miles of second track through urbanized areas of Manhattan (MPs 9 to 13), and 1.4 miles (MPs 23.8 to 25.2) of new track, extending under the Tappan Zee Bridge, for the Tarrytown Pocket Track/Interlocking. Both projects would encroach on floodplains associated with the Hudson River and minor tributaries, such as the Harlem River at MP 10. Therefore, depending on design, these improvements could affect the flooding characteristics of these sites.

With Alternative 90A, signal improvements proposed along 43 miles (MPs 32.8 and 75.8) would extend through floodplain areas (primarily associated with the Hudson River and its tributaries to the east). However, work could be contained within the right-of-way and minimal impacts to floodplains are expected from the signal improvements. Along this section, portions of the 10 miles of new third track (MPs 53 to 63) and improvements at the Poughkeepsie Yard/Storage Facility (MPs 71 to 75.8) would be located within, and could affect characteristics of, mapped floodplains associated with the Hudson River and its tributaries such as Breakneck Brook, Catskill Aqueduct, Cascade Brook, Gordons Brook and Fishkill Creek.

North of Poughkeepsie and south of Albany-Rensselaer Station (MPs 75.8 to 140), proposed improvements would include rock slope stabilization (MPs 105 to 130) and three new control points (CP 82, CP 99, and CP 136), as well as station improvements at Rhinecliff Station (high-level platforms) and Hudson Station (new Ferry Street Bridge and track realignments). Much of the railroad alignment in this area would pass through Hudson River floodplains and floodplains of tributaries east of the Hudson River, but some of these improvements that are at-grade may have a minimal impact on flooding characteristics. Alternative 90A would also include replacement of the Livingston Avenue Bridge, which would pass over the Hudson River and its floodplain at the Rensselaer/Albany County Line. Depending on the design of the bridge, this hydraulic opening may be affected.

Empire Corridor West/Niagara Branch

With Alternative 90A, track improvements would include 10 miles of third track between MPs 169 and 179, and Amsterdam Station improvements along the west end of this segment. This entire 10 mile segment would closely adjoin the banks of the Mohawk River; however, digital FEMA data was not available for Schenectady and Montgomery Counties. It would be likely that floodplains associated with the Mohawk River and its tributaries would be located along the alignment. Although impacts in these areas may be contained within the current right-of-way, there would still be potential for minimal encroachment on floodplains in these areas.

West of MP 175, work extending west to MP 295 consists of upgrading interlocking, automatic block signals, and control points. The railroad alignment would continue to closely adjoin the banks of the Mohawk River and Erie Canal through MP 253. Floodplains associated with the

Mohawk River and the Erie Canal, as well as numerous tributaries would be located along the track. From MPs 253 to 295, the alignment would cross numerous water features and their associated floodplains. Since this work would be performed within the current right-of-way, it would be unlikely to impact the floodplain through this segment.

Alternative 90A includes Syracuse Station track improvements (MPs 290 to 294). In the area of the Syracuse Station track improvements, the alternative would pass through floodplains associated with Ley Creek (MP 287), the Barge Canal and Onondaga Lake (MPs 292.5 to 292.75).

Rochester third track improvements are proposed along nine miles (MPs 373 to 382) west of Rochester Station. These third track improvements along the nine miles west of the Rochester Station could have the potential to impact floodplains associated with the Erie Canal (MP 374.5) and Little Black Creek (MPs 377.5 to 378.5).

Alternative 90A would also include the addition of a third track along 11 miles (MPs 382 to 393) in western Monroe and eastern Genesee Counties. The addition of this track will encroach on floodplains associated with Little Black Creek, Robins Brook and Black Creek.

Station improvements at the Buffalo-Depew Station (MPs 429.5 to 432.5) would not be located within or adjacent to floodplains. The proposed double track (MPs QDN17 to QDN23.2) could have the potential to impact floodplains associated with Bergholtz Creek (MP QDN20) and Cayuga Creek (MP QDN21.5), depending on design.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, is proposed and no additional floodplains impact is anticipated.

Empire Corridor West/Niagara Branch

Third and fourth track improvements for Alternative 90B start at MP 160 in the City of Schenectady and extend west to MP 430, east of Buffalo, and would have the potential to impact floodplains of numerous waterways. In Schenectady County, Alternative 90B would cross approximately eight water features; however digital floodplain data was not available for this county. It is likely that floodplains exist along these waterways, especially along the Mohawk River, which crosses the alignment at MP 160 and closely adjoins the rail line from approximately MP 166 to the county line (MP 169.5). There would be potential to directly or indirectly impact floodplains in these areas from the construction of new track.

The railroad would continue to adjoin the north bank of the Mohawk River/Erie Canal through all

of Montgomery County, largely remaining within 50 to 1,000 feet of the river/canal. In addition, there would be approximately 35 waterway crossings, primarily over tributaries of the Mohawk River. Again, digital floodplain data was not available for this county. It is likely that floodplains do exist along these waterways, especially along the Mohawk River, and both third and fourth track improvements in this county would have the potential to impact floodplains in these areas.

The railroad would continue to adjoin the north bank of the Mohawk River/Erie Canal through all of Herkimer County, largely remaining within or adjacent to the mapped floodplains of the Mohawk River and Erie Canal. In addition, Alternative 90B would cross the floodplains of East Canada Creek (MP 210) and West Canada Creek (MP 223).

Alternative 90B would extend through Oneida County, paralleling the Erie Canal/Mohawk River between Utica and Rome and remaining within or adjacent to its floodplain, before diverging west to flow into Oneida Lake. The alternative would cross approximately 12 waterways in this county. In addition to the Mohawk River/Erie Canal floodplain (roughly between MPs 254 and 264), Alternative 90B would cross floodplains associated with Sauquoit Creek (MP 240.5), Oriskany Creek (MP 244.5), Mud Creek (MPs 256 to 256.5) and Stony Creek (MP 261) and enter the floodplain of Oneida Creek at the county line (MP 264).

In Madison County, Alternative 90B would cross 11 waterways and would cross seven mapped floodplain areas associated with these crossings. Entering the county, the alternative would be located within the floodplain of Oneida Creek (MP 264) and then would pass floodplains associated with Cowaselon Creek (MP 266), Dutch Settlement Creek (MPs 268 to 268.5), the Old Erie Canal/Owlville Creek (MP 272), Canaseraga Creek (MPs 272.5 to 273.75), Chittenango Creek (MPs 276 to 277) and Pools Brook (MP 278).

There are 16 waterway crossings and 10 floodplain areas that Alternative 90B would traverse in Onondaga County. The alignment would enter the eastern portion of the county within the floodplain of Pools Brook (MP 278.5). It would then pass through floodplains associated with Lake Brook and Limestone Creek (MPs 280 to 283.5), Butternut Creek (MP 285), Ley Creek (MP 287), the Barge Canal and Onondaga Lake (MPs 292.5 to 292.75), Geddes Brook (MPs 294.75 to 295.75), Nine Mile Creek (MPs 296.5 to 296.75), White Bottom Creek (MPs 302.5 to 303.5), Carpenters Brook (MP 305.5), and Skaneateles Creek (MPs 307 to 309 at the county line).

In Cayuga County, Alternative 90B would enter the county and would remain within or adjacent to floodplains associated with Skaneateles Creek (MPs 309 to 311.5). The railroad alignment would then pass through floodplains associated with Putnam and Spring Bring (MPs 311.75 to 312.5), Owasco Outlet (MPs 315.5 and 315.75), and Swamp Brook (MPs 316.25 to 316.5). The alignment would be in, or adjacent to, floodplains associated with the Seneca River from MP 318 to the county line (MP 320).

There would be approximately 18 waterway crossings in Wayne County. Digital floodplain data was not available for this county. It would be likely that floodplains exist along these waterways, especially along Black Creek, the Erie Canal, Ganargua Creek, Red Creek and numerous unnamed tributaries to these water features that cross the alternative. Therefore, both third and fourth track improvements in this county could have the potential to impact floodplains in these areas.

Alternative 90B would be in or adjacent to seven floodplain areas associated with 19 waterway crossings in Monroe County. The railroad alignment would be within, or adjacent to, floodplains associated with Thomas Creek for roughly 2.5 miles in eastern Monroe County (MPs 359 to 361.5).

It would also traverse floodplains associated with Irondequoit Creek (MP 363), Allen Creek (MP 365.5), the Genesee River (MP 371.5), the Erie Canal (MP 374.5), Little Black Creek (MPs 377.5 to 378.5) and Black Creek (MP 386).

There would be approximately 17 waterway crossings in Genesee County and numerous floodplain areas that Alternative 90B would cross. The alignment would traverse floodplains associated with Black Creek and its tributaries (MPs 389 and 396.5). It would then be within, or adjacent to, floodplains associated with Tonawanda Creek (MPs 402.5 to 404.5) and several crossings of floodplains associated with Murder Creek and its tributaries (MPs 411.75 to 412.25, 413.75 to 414.25 and 417.5).

Alternative 90B third track improvements would only traverse two floodplain areas associated with Ellicott Creek (MP 422.5) and Scajaquada Creek (MP QDN 6.3) in Erie County.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, would occur and additional floodplain impacts would not be anticipated.

Empire Corridor West/Niagara Branch

With Alternative 110, track realignments and third and fourth track improvements would traverse the same floodplain areas as described in Alternatives 90A and 90B (with the exception of Scajaquada Creek [MP QDN6.3] in Erie County), but may have greater impacts as the tracks are further offset from the existing tracks. No other floodplain encroachments other than those described above for Alternatives 90A and 90B would be anticipated for Alternative 110.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch.

Empire Corridor South

No new improvements, beyond what is proposed for Alternative 90A, would be proposed for Alternative 125 along the majority of Empire Corridor South. However, roughly one mile of the proposed 125 mph track would extend south from Albany-Rensselaer Station to cross the Hudson

River. Proposed improvements would have the potential to encroach on floodplains associated with Mill Creek and the Hudson River over this one-mile segment.

Empire Corridor West/Niagara Branch

Alternative 125 would involve construction of a total of 236 miles of track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. After crossing the Hudson River, Alternative 125 would extend through Albany and Schenectady Counties over a distance of 20 miles, primarily following the New York State Thruway (I-87/I-90) over most of this distance. In Albany County, Alternative 125 would have the potential to impact floodplains associated with the Hudson River (MPs QH143 to QH144) and Krum Kill (MP QH147.75). In Schenectady and Schoharie Counties, Alternative 125 would cross approximately 27 water features; however, digital floodplain data was not available for these counties. It is likely that floodplains exist along these waterways, and construction of Alternative 125 would have the potential to impact these floodplains. In addition, impacts to floodplains from Alternative 90A would also occur in Schenectady County as part of Alternative 125.

Alternative 125 would extend through Montgomery County, where there are approximately 21 waterway crossings, including Fly Creek, Flat Creek, Canajoharie Creek and numerous unnamed tributaries. Again, digital floodplain data was not available for these counties. It is likely that floodplains exist along these waterways, and construction of Alternative 125 would have the potential to encroach on these floodplains. In addition, impacts to floodplains from Alternative 90A would also occur in Montgomery County as part of Alternative 125.

In Herkimer County, Alternative 125 would cross approximately 39 waterways and floodplains associated with Otsquago Creek (MP QH202.5), Ohisha Creek (MP QH206.5), Fulmer Creek (MP QH212), Steele Creek (MP QH218) and an unnamed tributary to Moyer Creek (MP QH221.5). The new alignment would have the potential to impact all floodplains it crosses in this county.

In Oneida County, Alternative 125 would extend through primarily rural areas and would cross approximately 18 mapped waterways, including floodplains associated with Palmer Creek (MP QH229.5), Sauquoit Creek (MP QH230.25), Sherman Brook and Oriskany Creek (MPs QH235.5 to QH236), Dean's Creek (MP QH240), and Sconondoa Creek (MP QH248). Alternative 125 would enter the floodplain of Oneida Creek as it crosses into Madison County. These floodplains would have the potential to be impacted by new crossings for the construction of Alternative 125.

In Madison County, Alternative 125 would extend through primarily rural areas and would cross floodplains associated with Oneida Creek (MP QH249.5), Cowelson Creek (MP QH253), an unnamed tributary to the Erie Canal (MP QH253.5), Canastota Creek, Owlville Creek and its tributaries (MPs QH257.75 and QH258.25), Canaseraga Creek (MP QH260), and Chittenango Creek MP QH262.25). All floodplains associated with these crossings would have the potential to be impacted by construction of Alternative 125.

In Onondaga County, Alternative 125 would merge with the existing Empire Corridor just before the City of Syracuse. Alternative 125 would extend through 16 miles of the city before diverging from the existing Empire Corridor and would continue on a new alignment for the remainder of the county. There would be approximately 20 waterway crossings in this county. The alignment would cross floodplains associated with Pools Brook (MP QH264.75) and would be within, or adjacent to, floodplains associated with Lake Brook and Limestone Creek for approximately two miles (MPs

QH266.25 to QH268.25) just before rejoining the existing Empire Corridor. The alternative would then cross floodplains associated with Butternut Creek (MP QH270.5) and Ley Creek (MP QH272.75) in East Syracuse, before crossing floodplains associated with the Barge Canal and Onondaga Lake for roughly two miles (MPs QH276.5 to QH279.5) through the City of Syracuse. Just east of Syracuse, the alignment would be in, or adjacent to, floodplains associated with Geddes Brook and Nine Mile Creek for roughly two-and-a-half miles (MPs QH281.75 to QH284) before splitting from the exiting Empire Corridor. The alignment would pass through areas of floodplains associated with Dead Man Creek (MP QH289.75), the Seneca River and Cross Lake (MP QH292), in the western portion of the county. Much of the alignment in this county would be new construction and therefore would have the potential to impact the floodplains crossed.

In Cayuga County, Alternative 125 would cross three floodplain areas associated with the Seneca River (MP QH295.75), Muskrat Creek (MP QH297.5) and a tributary of the Seneca River (MP QH304). All floodplains associated with these crossings could have the potential to be impacted by new construction of Alternative 125. In Wayne County, Alternative 125 would cross approximately 43 waterways. Digital floodplain data was not available for Wayne County; however, it is likely that floodplains would exist along the 43 waterways, and construction of Alternative 125 would have the potential to impact these floodplains.

In Monroe County, Alternative 125 would merge with the existing Empire Corridor through the City of Rochester, diverging again 5.5 miles west of Rochester Station to continue on a new alignment through the remainder of the county. Alternative 125 would cross floodplains associated with Thomas Creek and several of its tributaries (MPs QH343.5 and QH345.5 to QH346.5), Irondequoit Creek (MP QH347.5), Allen Creek (MP QH350.25), the Genesee River (MP QH356.25) and the Erie Canal (MP QH359). Also, just after the alignment diverges from the existing Empire Corridor east of Rochester, Alternative 125 would pass in and out of the Little Black Creek floodplain for approximately four miles (MPs QH361.5 to QH365.5). These floodplains could have the potential to be impacted by new construction of Alternative 125. In addition, impacts to floodplains from Alternative 90A would also occur in Monroe County as part of Alternative 125.

In Genesee County, Alternative 125 would extend through primarily rural areas and cross approximately 25 mapped waterways. The alignment would cross floodplains associated with Black Creek and its tributaries (MPs QH372.25, QH373.25, QH374.25 and QH375.75 to QH377), unnamed tributaries to Spring Creek (MPs QH382 to QH383), Oak Orchard Creek and its tributaries (MPs QH383.5, QH385, QH385.5, QH386 and QH388), Tonawanda Creek (MP QH397.5) and Murder Creek and its tributaries (MPs QH400.5 to QH401.25). These floodplains could have the potential to be impacted by new crossings for construction of Alternative 125. In addition, impacts to floodplains from Alternative 90A would also occur in Genesee County as part of Alternative 125.

Alternative 125 would cross floodplains associated with Ellicott Creek (MP QH411.5) in Erie County. Construction of Alternative 125 could have the potential to impact this floodplain. No impacts to floodplains would occur from Alternative 125 in Niagara County other than those described in Alternative 90A.

4.9.5. Potential Mitigation Strategies

During Tier 2, refinements in design and mapping will be performed and the project development will incorporate avoidance and minimization of floodplain impacts to the extent practicable.

Hydraulic analysis may be required to demonstrate the effects the design will have on mapped floodplains, and to determine mitigation appropriate for any effects on flood elevations. For new or modified bridges or culverts, mitigation might include improving hydraulic openings to accommodate passage of flood flows. Other types of mitigation that might be considered include minimizing encroachments in floodway areas and floodway fringe areas or providing compensatory flood storage in other areas.

In general, the authority for requiring a hydraulic analysis to satisfy the "no-rise" criteria stems from 44 CFR 60.3(d)(3), which states that where a regulatory floodway has been designated the community shall: "*Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practices that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge*." [89] Specific state authority to require a "no-rise" analysis (for state-owned and state-funded projects, only) stems from 6 NYCRR 502.4(b). Local authority stems from Article 36 of the Environmental Conservation Law (ECL), as well as various provisions in the applicable local law for flood damage prevention, which are based on FEMA minimum standards, and require technical evaluations for "no-rise" and "no adverse effect." While a hydraulic analysis is considered an option for satisfying the "no adverse effects" criteria for proposed development solely in the floodway fringe, it may be unreasonable to require such an analysis for anything but a large development with a large quantity of fill.[90] Therefore, it is important that that during the Tier 2 design and analysis, consultation be performed with NYSDEC and FEMA regarding the approach for floodplain evaluations.

If required by the NYSDEC or FEMA, a Conditional Letter of Map Revision (CLOMR) will be prepared to request a modification of the floodplain and floodplain maps to mitigate for increases in flood elevations. Proposed modifications to floodplains will be submitted to FEMA for approval of a CLOMR prior to construction. Where the floodplain elevations and limits are changed by the program, it will be necessary to file a Letter of Map Revision (LOMR) with FEMA after construction is complete so that the FIRMs can be updated.

4.9.6. Future Analysis

During the Tier 2 assessments, refinements to the impact assessment based on design and site-specific mapping, and updated floodplain maps available will be obtained. For counties in this Tier 1 analysis where flood maps were not available, the Tier 2 analysis will include coordination with FEMA and NYSDEC to identify floodplains in those areas. In instances where digital floodplain mapping was not available, digitizing of floodplain maps may be required.

According to NYSDEC, there is a two-tiered system of technical evaluation for proposed development in the floodplain. For streams with detailed studies, the 100-year floodplain has been divided into two zones, the floodway and the floodway fringe. The floodway is that area that must be kept open to convey flood waters downstream. The floodway fringe is that area that can be

[89]/ NYSDEC, 2012. Floodplain Development and Floodway Guidance. NYSDOT, <http://www.dec.ny.gov/lands/24281.html>, accessed March 2012.

[90]/ NYSDEC, 2012. Floodplain Construction Requirements in New York State. NYSDOT, <http://www.dec.ny.gov/lands/40576.html>, accessed March 2012.

developed in accordance with FEMA standards.[91] All proposed floodplain development must meet the "no adverse affect" criteria, while proposed floodway development must also meet the "no-rise" criteria. [92]

Any proposed development within the floodway requires a hydraulic analysis to demonstrate "no-rise." "No-rise" is defined as a 0.00-feet difference in the computed base flood elevations (BFE's) at each modeled cross-section. Ultimately, it is the responsibility of the local Floodplain Administrator (FPA) to determine what form of technical evaluation is acceptable. [93] In addition, pursuant to 6 NYCRR Part 501, NYSDEC may require a permit for any regulated activity on flood control lands under the jurisdiction of NYSDEC.[94]

As mentioned above, any changes or modifications to floodplain levels will be submitted to FEMA in accordance with 44 CFR, Emergency Management and Assistance. When a program will change the flood level, FEMA maps must be changed to reflect the new flood hazard. As mentioned above, proposed modifications to floodplains will be submitted to FEMA for approval of a CLOMR prior to construction and where the floodplain elevations and limits are changed by the program, it will be necessary to file a LOMR with FEMA after construction is complete so that the Flood Insurance Rate Maps (FIRMs) can be updated.

This process includes the following:

- Complete application and letter of request for conditional approval of a change in the FIRM or a CLOMR;
- An evaluation of alternatives which, if carried out, would not result in an increase in the base flood elevation more than allowed, along with documentation as to why these alternatives are not feasible;
- Public notification in the form of documentation of individual legal notice to all affected property owners (anyone affected by the increased flood elevations, within and outside of the community) explaining the impact of the proposed action on their properties;
- Concurrence, in writing, from the chief executive officer of any other communities affected by the proposed actions;
- Certification that no structures are located in areas that would be affected by the increased base flood elevation (unless they have been purchased for relocation or demolition); and,
- A request for revision of base flood elevation determinations in accordance with the provisions of 44 CFR 65.6 of the FEMA regulations.

[91]/ NYSDEC, 2012. Floodplain Development and Floodway Guidance. NYSDOT, <http://www.dec.ny.gov/lands/24281.htmll>, website accessed March 2012.

[92]/ NYSDEC, 2012. Floodplain Development and Floodway Guidance. NYSDOT, <http://www.dec.ny.gov/lands/24281.htmll>, website accessed March 2012.

[93]/ NYSDEC, 2012. Floodplain Development and Floodway Guidance. NYSDOT, <http://www.dec.ny.gov/lands/24281.htmll>, website accessed March 2012.

[94]/ NYSDEC, 2012. Part 501: Use of Flood Control Lands. NYSDEC, <http://www.dec.ny.gov/regs/4472.html>, website accessed March 2012.

4.10. Wetlands

Wetlands are important biological resources that perform multiple functions, including groundwater recharge, flood flow attenuation, erosion control, and water quality improvement. They also provide habitat for many plants and animals, including threatened and endangered species. Wetlands are commonly found at the edges of creek beds and the shorelines of ponds, lakes and oceans, but can also be formed by moisture trapped in depressional areas or a naturally high groundwater table.

4.10.1. Regulatory Context

Federal agencies are required to avoid and minimize wetland impacts to the extent possible per Executive Order (EO) 11990, and the U.S. ACE has jurisdictional responsibilities under Section 404 of the U.S. Clean Water Act. Many wetlands and other aquatic features are considered "waters of the U.S.," and these "jurisdictional" areas are protected under Section 404. Wetlands are defined under the U.S. Clean Water Act (CWA)[95] as, "*Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas*."[96]

The national standard for wetland classification is the U.S. Fish and Wildlife Classification System, which is used in the mapping of wetlands and deepwater habitats performed for the National Wetlands Inventory (NWI)[97]. The five major wetland and deepwater systems are marine, estuarine, riverine, palustrine (non-tidal freshwater or salinities less than 0.5 parts per thousand), and lacustrine.

In New York State, two types of wetlands are the focus of protection: tidal and freshwater. The New York State Tidal Wetlands Act has been enacted for the preservation and protection of tidal wetlands, located at the critical interface between land and tidal waters. Tidal wetland classifications found in the study area are presented in Exhibit 4-15. The New York State Freshwater Wetlands Act regulates wetlands according to four classes of wetlands (Classes I through IV), with Class I wetlands having the highest value. Under both sets of regulations, adjacent areas, or the buffer zone around wetlands, are defined and regulated.[98] Under the tidal wetland regulations, adjacent areas are defined as areas not included in any of the defined tidal wetland categories (refer to Exhibit 4-15 for study area categories) that are generally not inundated by tidal waters and that extend 300 feet landward of the most landward tidal wetlands boundary or to an elevation of ten feet.

[95] / As defined by the U.S. ACE (Title 33 CFR 328.3, 1986) and the U.S. EPA (40 CFR 230.3, 1980).

[96] / Environmental Laboratory. *Corps of Engineers Wetland Delineation Manual Technical Report Y-87-1.* Prepared for the U.S. ACE, Washington, D.C. Final Report. January, 1987.

[97] / Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. *Classification of Wetlands and Deepwater Habitats of the United States.* U.S., Fish and Wildlife Service (FWS), FWS/OBS-79/31, 1979.

[98] / NYSDEC "Part 661: Tidal Wetlands-Land Use Regulations - Page 1." Accessed November, 2011. < http://www.dec.ny.gov/regs/13337.html>

Exhibit 4-15—NYSDEC Tidal Wetland Classifications in the Study Area

Tidal Wetland Class	Description
Open Water (OW)-	Open water areas
Coastal Shoals, Bars and Mudflats (SM)	The tidal wetland zone that at high tide is covered by saline or fresh tidal waters, at low tide is exposed or is covered by water to a maximum depth of approximately one foot, and is not vegetated.
Vegetated Coastal Shoals, Bars and Mudflats (SV)	The tidal wetland zone that at high tide is covered by saline or fresh tidal waters, at low tide is exposed or is covered by water to a maximum depth of approximately one foot, and is vegetated.
Broad-Leaf Vegetation (BV)	The vegetated tidal wetlands zone that includes all lands that generally receive daily flushing from fresh tidal water. This area is generally lower than the graminoid vegetation area and is characterized by broad leaf emergent vegetation such as spatterdock*, Nuphar sp*., pickerelweed (*Pontederia cordata)* and arrowleaf*, (Peltandra virginica*) among others.
Graminoid Vegetation (GV)	The vegetated tidal wetlands zone that includes all lands that receive at least periodic flushing from fresh water. This area is generally higher than the broad leaf vegetation area. The lower elevated portions of this area may receive daily flushing and the higher elevations periodic flushing from storm tides. It is characterized by graminoid vegetation such as cattail (*Typha angustifolia)*, bulrushes, (*Scirpus spp*.) and wild rice, *Zizania aquatica*.
Swamp Shrub (SS)	Includes all land that receives periodic inundation from tidal fresh waters and is characterized by shrubs such as alder (*Alnus spp*.), buttonbush (*Cepahalanus occidentalis*) bog rosemary (*Andromeda glaucophylla*), dogwoods (*Cornus spp.*) and leatherleaf (*Chamaedaphne calyculata*).
Swamp Tree (ST)	Includes all land that receives periodic inundation from tidal fresh waters and is characterized by trees such as red maple (*Acer rubrum*), willows (*Salix spp.*) and black ash (*Fraxinus nigra*).

To be protected under the New York State Freshwater Wetlands Act, a wetland must be 12.4 acres (five hectares or larger). Wetlands smaller than this may be protected if they are considered of unusual local importance. Around every wetland is an "adjacent area" of 100 feet that is also regulated to provide protection for the wetland[99]. The four freshwater classifications are described in Exhibit 4-16.

4.10.2. Methodology

Federal and state tidal and freshwater wetlands within 300 feet of the corridor centerline (study area) for each corridor were mapped and characterized. Available GIS mapping from the U.S. Fish and Wildlife Service National Wetlands Inventory and the NYSDEC Hudson River tidal wetlands and freshwater wetlands were compiled for the 600-foot-wide study area. The three wetland layers were overlaid to create the wetland totals shown in Exhibit 4-17.

The digital data for the National Wetlands Inventory was not available for Montgomery, Herkimer, Oneida, and Madison Counties.

Exhibit 4-17 displays the study area wetlands and also accounts for the overlaps in the various federal and state wetland layers. Electronic mapping available from NYSDEC included delineation of tidal wetland adjacent areas, so these areas were also tabulated in Exhibit 4-17.

[99]/ NYSDEC, 1997. Freshwater Wetlands Act, Article 24, Title 23 of Article 71 of the ECL, May 1997.

Exhibit 4-16—NYSDEC Freshwater Wetland Classifications[100]

Freshwater Wetland Class	Description
Class I	If it has any one of following seven characteristics: (1) kettlehole bog, (2) resident habitat for endangered or threatened animal species or (3) supports other animal species unusual for the state or region or (4) contains endangered or threatened plant species, (5) provides protection to developed area from significant flood damage, or (6) tributary to surface water or aquifer used for public water supply, or (7) contains four or more Class II characteristics.
Class II	If it has any one of following seventeen characteristics: (1) emergent marsh covered in which cover type is less than two-thirds purple loosestrife and/or reed (phragmites), (2) contains two or more wetland structural groups, (3) contiguous to a tidal wetland, (4) associated with permanent open water outside the wetland, (5) adjacent or contiguous to streams classified C(t) or higher under article 15 of the environmental conservation law, (6) traditional migration habitat of an endangered or threatened animal species, (7) resident habitat of an animal species vulnerable in the state, (8) contains a plant species vulnerable in the state, (9) supports an animal species in abundance or diversity unusual for the county in which it is found, (10) has demonstrable archaeological or paleontological significance as a wetland, (11) contains, is part of, owes its existence to, or is ecologically associated with, an unusual geological feature, which is an excellent representation of its type, (12) provide protection from significant flood damage to lightly developed area, an area used for growing crops for harvest, or an area planned for development by a local planning authority, (13) hydraulically connected to an aquifer identified by a government agency as a potentially useful water supply, (14) acts in a tertiary treatment capacity for a sewage disposal system, (15) within an urbanized area, (16) one of the three largest wetlands within a city, town, or New York City borough, or (17) within a publicly owned recreation area.
Class III	If it has any one of following fifteen characteristics: (1) emergent marsh in which purple loosestrife and/or reed (phragmites) constitutes two-thirds or more of the cover type, (2) deciduous swamp, (3) shrub swamp, (4) consists of floating and/or submergent vegetation, (5) consists of wetland open water, (6) contains an island with an area or height above the wetland adequate to provide one or more of the benefits described in section 664.6(b)(6);(7) has a total alkalinity of at least 50 parts per million, (8) is adjacent to fertile upland, (9) resident habitat of an animal species vulnerable in the major region of the state in which it is found, or it is traditional migration habitat of an animal species vulnerable in the state or in the major region in which it is found, (10) contains a plant species vulnerable in the major region, (11) part of a surface water system with permanent open water and it receives significant pollution of a type amenable to amelioration by wetlands, (12) visible from an interstate highway, a parkway, a designated scenic highway, or a passenger railroad and serves a valuable aesthetic or open space function, (13) one of the three largest wetlands of the same covertype within a town, (14) in a town in which wetland acreage is less than one percent of the total acreage or (15) is on publicly owned land that is open to the public.
Class IV	If it does not have any of the characteristics listed as criteria for Class I, II or III wetlands. Class IV wetlands will include wet meadows and coniferous swamps, which lack other characteristics justifying a higher classification.

4.10.3. Existing Conditions

There are approximately 7,683 acres of mapped NWI and NYSDEC wetlands in the 90/110 Study Area. There are approximately 6,103 acres of mapped NWI and NYSDEC wetlands in the 125 Study Area. The deepwater and wetlands mapped in the National Wetlands Inventory (NWI) in the Empire Corridor Study area are classified by the U.S. Fish and Wildlife Service into the following eight groups:

[100] / NYSDEC, "Environmental Conservation Law §3-0301 and §24-1301, Chapter X-Division of Water, Part 664 Freshwater Wetlands Maps and Classification." Accessed April 18, 2011. <http://www.dec.ny.gov/regs/4612.html#13474>

Exhibit 4-17—Summary of Federal and State Wetlands in the Study Area

County	Acres of Wetlands														Total	
	NWI		NWI and NYSDEC Freshwater Wetlands		NWI and NYSDEC Tidal Wetlands		NWI, NYSDEC Freshwater and Tidal Wetlands		NYSDEC Freshwater		NYSDEC Tidal Wetlands		NYSDEC Tidal and Freshwater Wetlands			
	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area	90/ 110 Study Area	125 Study Area
New York	106	106	0	0	0	0	0	0	0	0	0	0	0	0	106	106
Bronx	133	133	0	0	0	0	0	0	0	0	0	0	0	0	133	133
Westchester	328	328	0	0	347	347	10	10	0	0	84	84	1	1	770	770
Putnam	0	0	0	0	197	197	39	39	0	0	46	46	3	3	285	285
Dutchess	0	0	0	0	1,018	1,018	185	185	0	0	108	108	6	6	1,317	1,317
Columbia	0	0	0	0	449	449	427	427	0	0	62	62	28	28	966	966
Rensselaer	0	0	0	0	66	63	76	76	0	0	13	13	10	10	165	162
Albany	70	3	27	0	6	6	0	0	26	0	1	0	0	0	130	9
Schenectady	59	44	19	0	0	0	0	0	25	0	0	0	0	0	103	44
Schoharie[1]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Montgomery[1]	34	36	9	0	0	0	0	0	297	108	0	0	0	0	340	144
Herkimer[1]	3	20	0	0	0	0	0	0	47	9	0	0	0	0	50	29
Oneida[1]	0	0	0	0	0	0	0	0	593	190	0	0	0	0	593	190
Madison[1]	0	0	0	0	0	0	0	0	88	11	0	0	0	0	88	11
Onondaga	135	80	183	98	0	0	0	0	237	283	0	0	0	0	555	461
Cayuga	68	45	111	85	0	0	0	0	42	27	0	0	0	0	221	157
Wayne	287	107	474	190	0	0	0	0	140	38	0	0	0	0	901	335
Monroe	134	126	131	106	0	0	0	0	43	21	0	0	0	0	308	253
Genesee	240	226	117	182	0	0	0	0	52	12	0	0	0	0	409	420
Erie	144	151	25	83	0	0	0	0	10	13	0	0	0	0	179	247
Niagara	64	64	0	0	0	0	0	0	0	0	0	0	0	0	64	64
Total	**1,805**	**1,469**	**1,096**	**744**	**2,083**	**2,080**	**737**	**737**	**1,600**	**712**	**314**	**313**	**48**	**48**	**7,683**	**6,103**

[1] / National Wetlands Inventory Digital data not complete. Totals are likely higher.

Adjacent Area Tidal wetland buffer classification are not included in the totals

Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 300 feet of the corridor centerline.

- **Estuarine Deepwater** (specific classes of estuarine subtidal unconsolidated bottom), comprising 24 percent of NWI wetlands along the 90/110 Study Area and 27 percent along the 125 Study Area, occurs in New York, Bronx, Westchester, Dutchess, Putnam Counties;

- **Estuarine Wetlands** (specific classes of estuarine intertidal unconsolidated shore/emergent) comprising 2 percent of NWI wetlands along both the existing Empire Corridor (90/110 Study Area) and the 125 Study Area, occurs in Westchester, Dutchess, and Putnam Counties;
- **Riverine** (associated with rivers, including riverine intertidal upper/lower perennial and two occurrences of riverine intermittent), comprising 24 percent of NWI wetlands along the existing Empire Corridor (90/110 Study Area) and 25 percent along the 125 Study Area, occurs in Westchester, Dutchess, Columbia, Rensselaer, Albany, Schenectady, Montgomery, Herkimer, Onondaga, Cayuga, Wayne, Monroe, Genesee, Erie, and Niagara Counties;
- **Freshwater (or Palustrine) Emergent Wetlands**, comprising 12 percent of NWI wetlands along the existing Empire Corridor (90/110 Study Area) and 8 percent along the 125 Study Area, occurs in Westchester, Putnam, Dutchess, Columbia, Rensselaer, Albany, Schenectady, Herkimer, Onondaga, Cayuga, Wayne, Monroe, Genesee, Erie, and Niagara Counties;
- **Freshwater Forested/Shrub Wetland** (including specific classes of palustrine scrub shrub/forested), comprising 32 percent of NWI wetlands along the existing Empire Corridor (90/110 Study Area) and 33 percent along the 125 Study Area, occurs in Westchester, Putnam, Dutchess, Columbia, Rensselaer, Albany, Schenectady, Montgomery, Herkimer, Onondaga, Cayuga, Wayne, Monroe, Genesee, Erie, and Niagara Counties;
- **Freshwater Pond** (specific classes largely of palustrine unconsolidated bottom), comprising 3 percent of NWI wetlands along both the existing Empire Corridor (90/110 Study Area) and the 125 Study Area, occurs in Putnam, Dutchess, Columbia, Rensselaer, Albany, Schenectady, Montgomery, Onondaga, Cayuga, Wayne, Monroe, Genesee, Erie, and Niagara Counties; with several occurrences of palustrine aquatic bottom in Wayne, Genesee, and Niagara Counties;
- **Lakes** (larger than ponds, specific classes of lacustrine limnetic/littoral unconsolidated bottom), comprising 3 percent of NWI wetlands along the existing Empire Corridor (90/110 Study Area) and 2 percent along the 125 Study Area, occurs in Dutchess, Albany, Schenectady, Montgomery, Onondaga, Cayuga, Wayne, Monroe, Genesee, and Erie Counties.

State-regulated wetlands in the study area include: 1) Tidal wetlands, which are found around New York City and up the Hudson River, and 2) Freshwater wetlands which are found on river and lakes across the state.

The NYSDEC tidal wetland categories mapped in the Empire Corridor include open water (71% of tidal wetlands); broad-leaf vegetation (7%); graminoid vegetation (14%); coastal shoals, bars, and mudflats (1%); vegetated coastal shoals, bars, and mudflats (1%); swamp shrub (1%); and swamp tree (5%). The tidal wetland percentages for the 90/110 and the 125 Study Areas are the same, although the mapped Adjacent Areas to Tidal Wetlands differ. The 90/110 Study Area had approximately 5,585 acres of mapped Adjacent Areas to Tidal Wetlands. The 125 Study Area had less mapped Adjacent Areas to Tidal Wetlands at 5,459 acres.

In the existing Empire Corridor (90/110 Study area), NYSDEC freshwater wetlands include the highest value wetlands, Class I, which comprises 40 percent of total NYSDEC freshwater wetlands. Class II wetlands comprises 55 percent of NYSDEC freshwater wetlands in the study area, compared to Class III (3%), and Class IV (2%) of total freshwater wetlands in the study area counties.

In the 125 Study Area, NYSDEC freshwater wetlands include the highest value wetlands, Class I, which comprises 55 percent of total NYSDEC freshwater wetlands. Class II wetlands comprises 32

percent of NYSDEC freshwater wetlands in the study area, compared to Class III (13%), and Class IV (less than 1%) of total freshwater wetlands in the study area counties.

A detailed discussion by county of the existing federal and state wetlands along the 90/110 Study Area and the 125 Study Area is presented in Appendix G.9.

4.10.4. Environmental Consequences

This Tier 1 preliminary assessment describes potential impacts to mapped areas of National Wetlands Inventory (NWI) and New York State Department of Environmental Conservation (NYSDEC) State Regulated Wetlands. Although NWI and NYSDEC wetlands are sometimes mapped as overlapping the existing mainline track bed, it is unlikely that wetlands would be found within the railbed; however, there would be potential for wetlands to occur within the existing right-of-way. Therefore, work conducted within and beyond the right-of-way may have the potential to impact wetlands.

Work activities such as track widening for new track, road realignment, station improvements, culvert widening, and other ground disturbance have the potential to affect wetlands through impacts such as dredging or filling. Direct impacts can be temporary or permanent. Temporary impacts may include temporary placement of fill material into wetlands or other water features, the removal of vegetation from areas that would be later re-graded and re-seeded, temporary loss of aquatic habitat, and disturbance and displacement of wildlife during construction. These impacts would be associated with construction activities such as temporary staging areas and construction access roads.

In addition to temporary and permanent direct impacts, indirect impacts to wetlands, waterways, and riparian buffers are those that are caused by the proposed action but occur later in time, but are reasonably foreseeable. An example of an indirect impact would be a wetland whose hydrologic regime is altered from the fill of an adjacent wetland.

The Base, 90A, and 90B Alternatives would involve work largely within the right-of-way, with tracks being added in the location of the former track beds or existing access roads, and minimal impacts to wetlands would be anticipated. Alternative 110 may have more impacts to wetlands than the Base Alternative or Alternatives 90A and 90B because proposed work would involve activities further from the current mainline track. Alternative 125 would involve even greater impacts to wetlands as it would be located on new alignment through primarily undeveloped and rural areas.

The sections below identify the areas where improvements or new track would be constructed in or adjacent to mapped wetlands. There would be potential impacts, both direct and indirect, as described above; however, the specifics of impacts will be documented as part of the Tier 2 analysis.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track

and station infrastructure.

Empire Corridor South

The Base Alternative will include signal and grade crossing improvements along the 64 miles of Empire Corridor South (ES-3 and ES-1, MPs 75.8 to 140) north of Poughkeepsie to just south of Albany-Rensselaer Station. The proposed work areas will cross approximately 77 mapped NWI and NYSDEC wetlands. Most of these wetlands are classified through these mapping systems as tidal and are likely associated with the Hudson River. Crossings are generally small areas of overlap connected to larger adjacent mapped areas. In addition to the numerous small crossings, there are several areas of larger wetland systems that the alignment will cross. These will include an area around Stockport Creek (MPs 117.5 to 118.5) and Mill Creek (MPs 125 to 127). Proposed work will primarily involve signal upgrades and work in the existing rail bed; therefore, it is unlikely that impacts will occur to wetlands along this segment from signal upgrades. There could be minimal impact to wetlands at grade-crossings if work will involve widening roads into wetland areas. In addition, construction of at-grade crossings where wetlands are present will have the potential to temporarily impact wetlands; however, temporary construction disturbance will be minimal if proper BMPs were to be used.

The Base Alternative will also involve the addition of a fourth track and platform extension at the Rensselaer Station near the Albany county line (ES-9, MPs 141 to 143). A wetland feature associated with Mill Creek is mapped between MPs 141 and 142 and is crossed by the tracks. Depending on design, work proposed at this crossing will have the potential to impact this feature.

Empire Corridor West/Niagara Branch

The Base Alternative will involve 17 miles of second track between the Albany-Rensselaer and Schenectady stations (ES-10, MPs 143 to 160), as well as reconstruction of the Schenectady Station (EW-01, MP 159.8). There are approximately five mapped wetland areas that cross this stretch of tracks, including a crossing of the Hudson River and wetlands associated with Lisha Kill and its tributaries between MPs 153 and 155. All these features will have the potential to be impacted by work involving ground disturbance within these features.

Track improvements in Syracuse (EW-6, MPs 287 to 291) will not cross any mapped wetland areas and will not likely involve impacts to wetlands. The Rochester Station track and platform improvements (EW-19, MPs 368 to 373) will cross mapped wetlands along the Genesee River (MP 371.5). This work will have the potential to directly or indirectly impact wetlands through dredging, filling or construction activities at this crossing. Proposed improvements for the new Niagara Falls Intermodal Transportation Center (EW-13) will be located within an urban area and will not likely involve impacts to wetlands.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, and signalization, in addition to improvements proposed under the Base Alternative previously described. New tracks proposed under this alternative would not extend more than 15 feet laterally from the current mainline tracks. Although some of this work would be conducted within the existing right-of-way,

ground disturbance in proposed work areas that overlap mapped wetlands, either inside or outside the existing right-of-way, could cause wetland impacts through dredging, filling or other disturbance.

Empire Corridor South

Alternative 90A would include construction of four miles of second track through urbanized areas of Manhattan (SRP-1, MPs 9 to 13) and 1.4 miles of new track extending under the Tappan Zee Bridge (SRP-2, 23.8-25.2). The Hudson River is adjacent to the rail line throughout these proposed improvement areas. One mapped NWI and NYSDEC wetlands associated with the Hudson River and the Harlem River confluence would be located in the proposed work area. Additional track construction over the Harlem River (MP 10) could have the potential to temporarily or permanently impact mapped wetlands at this location. Improvements under the Tappan Zee Bridge would be within the current right-of-way and impacts to wetlands would be unlikely.

With Alternative 90A, signal improvements proposed along 43 miles (MPs 32.8 and 75.8) would cross mapped NWI and NYSDEC wetlands approximately 30 times. Crossings are generally small areas of overlap connected to larger adjacent mapped areas associated with the Hudson River and its tributaries to the east. Proposed work would primarily involve signal upgrades within the existing rail bed; therefore, it is unlikely that impacts would occur to wetlands for these improvements.

New third track in Dutchess County (SRP-3, MPs 53 to 63) would cross wetlands associated with Breakneck Brook (MP 54) and, depending on construction design, a cove at the confluence of Fishkill Creek and the Hudson River (MPs 57.5 to 57.75). In addition, improvements at the Poughkeepsie Yard/Storage Facility (MPs 71 to 75.8) would cross Sunfish Cove and its associated wetlands. Ground disturbance in the above-mentioned work areas that overlap wetlands could cause impacts through dredging, filling or other disturbance.

North of Poughkeepsie and south of Albany-Rensselaer Station, improvements proposed would include rock slope stabilization (ES-04, five locations between MPs 105.3 to 130, one location at MP 119, and 4 locations at MPs 128.1-130), three new control points (ES-05, MPs 82, 99 and 136), and station improvements at Rhinecliff Station (high-level platforms) (SRP-11, MP 89.2) and Hudson Station (new Ferry Street Bridge, new platform, and track realignments, ES-14, MPS 114.5-115). The alignment would cross mapped wetland areas approximately 7 times for the above-mentioned improvements. It is anticipated that the new control points and station improvements would occur largely within the right-of-way or current station footprint, and would not likely involve impacts to wetlands. Depending on design of rock slope stabilization, there could be the potential to permanently and temporarily impact wetlands and waters associated with the Hudson River and its tributaries through dredging, filling or other construction impacts.

Alternative 90A would include the replacement of the Livingston Avenue Bridge over the Hudson River (ES-15, MP 143). Depending on design, construction (such as new abutments, bridge piers, rip-rap placement, dredging or filling) over and within the Hudson River could have the potential to temporarily or permanently impact mapped wetlands at this location.

Empire Corridor West/Niagara Branch

Track improvements along the Empire Corridor West/Niagara Branch would include 10 miles of third track between MPs 169 and 179 (EW-14a) and Amsterdam Station improvements along the west end of this segment (EIS-1, MP 177.6). Wetlands generally associated with the Mohawk River are mapped as abutting the right-of-way on its southern edge for a majority of the proposed work areas along this 10 mile segment and cross the alignment three times around MP 178. Although this work would be conducted within the existing right-of-way, ground disturbance and construction in proposed work areas that overlap wetland areas could cause wetland impacts through dredging or filling activities. Updates to three control points (EW-05, MPs 175, 239 and 248) would not cross any wetlands and would not likely involve impacts to wetlands.

Alternative 90A would include Syracuse Station track improvements (EIS-6, MPs 290 to 294), and third track improvements along 11 miles (EW-16, MPs 373 to 382) west of the Rochester station. Work for the Syracuse Station would be adjacent to mapped wetlands associated with Ley Creek and Onondaga Lake and would also include crossings of two mapped wetlands: one associated with the Barge Canal and one associated with Onondaga Lake. West of the Rochester Station, proposed improvements would cross two mapped NWI and NYSDEC wetlands associated with the Erie Canal (MP 374.5), and a tributary of Black Creek (MP 379.5). Therefore, reconstruction of the Syracuse Station and third track improvements west of Rochester would have the potential to directly or indirectly impact wetlands through dredging, filling, or construction activities at these crossings.

The addition of a third track is proposed along 11 miles located largely west of the designated urban area around Rochester (EW-20, MPs 382 to 393). Mapped wetland areas, primarily associated with Black Creek and its tributaries, would be crossed approximately four times at these proposed work locations. Although this work would be conducted within the existing right-of-way, ground disturbance and construction in proposed work areas that overlap wetland areas could cause wetland impacts through dredging or filling activities.

One small mapped wetland area would be crossed at the proposed work area of station improvements of the Buffalo-Depew Station (EIS-10, MPs 429 to 433). In addition, along the proposed double tracking work area (EW-17, MPs QDN17 to QDN23.2 along the Niagara Branch, work would cross three mapped wetland area associated with Bergholtz and Cayuga Creeks. Work conducted within these mapped wetland areas described above would have the potential to directly or indirectly impact the wetland through dredging, filling or construction activities. Niagara Falls Maintenance Facility and track improvements (EW-18 and EIS-12, MPs 25 to 28) would not cross any mapped wetlands areas and would not likely involve impacts to wetlands.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed. Road realignment, access road construction, and culvert improvements are also proposed under Alternative 90B within and outside of the right-of-way, although the location of this proposed work would be further refined in the Tier 2 process.

Empire Corridor South

No additional work within Empire Corridor South, other than for Alternative 90A, is proposed, and there would be no potential for additional impacts to wetlands in this area for Alternative 90B.

Empire Corridor West/Niagara Branch

NWI and NYSDEC have mapped several wetland features within the proposed work areas of third and fourth track installation associated with Alternative 90B, both within and outside of the current right-of-way. There would be approximately 118 locations where new third or fourth track would cross mapped wetland areas and dredging or filling activities from construction of new track could cause wetland impacts. In addition, construction where wetlands are present would have the potential to temporarily impact wetlands through staging and storage of equipment. These areas are further described below.

In Schenectady County, new track proposed for Alternative 90B would cross three mapped wetlands associated with the Hudson River (MP 160.5), an unnamed tributary (MP 162.75) and a small wetland area associated with Verf Kill near the western end of the county (MP 167.75).

Proposed third and fourth track for Alternative 90B would cross approximately 15 mapped wetland areas in Montgomery County. Alternative 90B would closely follow the northern banks of the Mohawk River through Montgomery County, and all the mapped wetlands areas are associated with the Mohawk River or its tributaries to the north. Most of the wetlands that would be crossed by the third or fourth track improvements are small individual areas; however there are several areas where multiple crossings are part of a larger complex of wetlands (MPs 177.5 to 178.75, 188.75 to 189.5 and 193 to 194). Proposed third track would only cross one mapped wetland in Herkimer County associated with the Mohawk River/Erie Canal (MPs 232 to 232.5). There would likely be more wetlands in this area; however, NWI digital data was not available for this county.

There would be approximately 18 crossings of wetlands in Oneida County with the addition of new track for Alternative 90B. In the eastern half of the county, the majority of wetlands are associated with the Mohawk River and Erie Canal. These include numerous small crossings of larger complexes north and south of the proposed alignment. After passing Rome the proposed alternative would move south of the Mohawk River/Erie Canal and would cross numerous wetlands associated with Mud Creek (MPs 256 to 257.5), Stony Creek (MP 261) and tributaries of these creeks. In Madison County, proposed new track would only cross two mapped wetland areas. One small area associated with and unnamed pond (MP 266) and one associated with Chittenango Creek (MP 276.5).

In Onondaga County, new track associated with Alternative 90B would cross approximately 20 mapped wetland areas. Around Onondaga Lake, Alternative 90B would cross several small wetland areas associated with the Old Barge Canal and the lake (MPs 291 to 293), before heading further west and crossing numerous small wetland areas associated with Nine Mile Creek, Dead Man Creek and other tributaries. Several crossings within larger complexes are associated with White Bottom Creek and the Erie Canal (MPs 301.5 to 304) and Carpenters Brook and the Old Erie Canal (MPs 305 to 307.5).

In Cayuga County, new track from Alternative 90B would cross wetlands approximately seven times. Most of these are small individual wetlands associated with Putnam Brook, Spring Brook

and Swamp Brook; however, the alignment would cross a larger complex associated with the Seneca River and Hog Island Wildlife Management in the western portion of the county (MPs 318 to 320). Alternative 90B would cross mapped wetlands approximately 19 times in Wayne County. The majority of these crossings would be over small wetlands associated with the Erie Canal, Black Creek, Clyde River, Ganargua Creek and Red Creek and their tributaries.

Alternative 90B would cross mapped wetlands approximately 12 times in Monroe County. In the eastern portion of the county, the alignment would cross just one wetland area associated with Irondequoit Creek (MP 362.75). In the western half of the county, Alternative 90B would cross several small wetland areas as well as wetlands associated with the Genesee River, the Erie Canal and Black Creek.

In Genesee County, new track for Alternative 90B would cross mapped wetlands areas approximately 16 times. The alignment would cross several small wetland areas as well as small areas associated with Robins Brook, Black Creek, Tonawanda Creek, Bowen Creek and Murder Creek. In addition, Alternative 90B would cross mapped wetlands several times through a larger complex associated with a tributary of Murder Creek (MPs 409 to 412.5).

New track for Alternative 90B would cross mapped wetlands approximately five times in Erie County. Most of these crossings would be over small wetland areas (MPs 418.5 to 418.75, 421.75, 427 to 428.5 and 429.75). One crossing would be over wetlands associated with Ellicott Creek (MP 422.25).

Among the rail stations where improvements are proposed, Schenectady, Utica, and Rome stations are located in urban areas and there are no wetlands mapped adjacent to them. A NYSDEC wetland is mapped as abutting the right-of-way on its southern edge to the northwest of the Amsterdam Station, and a NYSDEC wetland is mapped as abutting the Syracuse Station. Depending on design, these wetlands features would have the potential to be directly or indirectly impacted by any dredging or filling associated with proposed work under Alternative 90B.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations. Road realignment, access road construction, and culvert improvements are also proposed under Alternative 110 within and outside of the right-of-way, although the location of this proposed work would be further refined in the Tier 2 process.

Empire Corridor South

No additional work within Empire Corridor South, other than for Alternative 90A, is proposed, and there would be no potential for additional impacts to wetlands in this area for Alternative 110.

Empire Corridor West/Niagara Branch

NWI and NYSDEC have mapped several wetland features within the proposed work areas of third and fourth track installation associated with Alternative 110, both within and outside of the current right-of-way. Dredging or filling activities in these areas could cause wetland impacts. In addition, construction where wetlands are present would have the potential to temporarily impact wetlands through staging and storage of equipment.

Since the third track would be situated farther from the existing tracks than Alternative 90B to accommodate 110 mph MAS, there would be slightly more wetland crossings (137) than identified in Alternative 90B; however, all crossings would be associated with the same waterways and systems identified in the 90B. Alternative 110 would cross the same number of mapped wetlands in Montgomery, Herkimer, Onondaga and Erie Counties as the 90B, and there would be no additional impacts (as identified at the Tier 1 level) to wetlands in these counties for Alternative 110.

In Schenectady County, Alternative 110 would cross only two mapped wetland areas. Proposed new track of Alternative 110 would cross mapped wetlands approximately 26 times in Oneida County, three times in Madison County, nine times in Cayuga County, 21 times in Wayne County, 17 times in Monroe County and 18 times in Genesee County.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch.

Areas that are mapped as wetlands within the proposed Alternative 125 corridor could be impacted directly by new crossings for construction of rail infrastructure. Wetlands outside of the proposed Alternative 125 corridor could be indirectly impacted by modifications of local hydrology through installation of new tracks. Impacts would be more likely to occur than with the Base, 90A, 90B, and 110 Alternatives.

Empire Corridor South

No new improvements, beyond what is proposed for Alternative 90A, would be proposed for Alternative 125 along the majority of Empire Corridor South. However, roughly one mile of the proposed 125 mph track would extend south from Albany-Rensselaer Station to cross the Hudson River. This work would have the potential to impact areas of wetlands associated with this portion of the Hudson River. Depending on design, wetlands could be impacted at this location as a result of activities such as ground disturbance, dredging or filling of the wetlands.

Empire Corridor West/Niagara Branch

Alternative 125 would involve construction of a total of 236 miles of track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. Alternative 125 also would include new right-of-way in most areas, but would merge back with the

Empire Corridor over two 15- and 16-mile segments centered on Syracuse and Rochester, respectively.

Installation of the new tracks proposed for the Alternative 125 would have the potential to impact a number of wetlands mapped by both NWI and NYSDEC, and more wetlands overall than Alternatives 90A, 90B, or 110 alone. In addition to wetlands that could be impacted by implementation of the Base Alternative, all of the wetlands mapped as falling within the proposed alignment could be impacted by Alternative 125. There would be approximately 177 locations where new track would cross mapped wetland areas. These areas are further described below.

In Schenectady County, Alternative 125 would cross three larger mapped wetlands that have developed along the New York State Thruway between MPs QH158.5 and QH160.5. With the exception of small wetlands around MP QH163.8, MPs QH171 to QH172 and MP QH173.5, no other mapped wetlands would be crossed by the 125 Study Area in the county. In Schoharie County, Alternative 125 would not cross any mapped wetlands; however, the alignment would closely adjoin the northern banks of Schoharie Creek (MPs QH174 to QH176) as well as several tributaries of Schoharie Creek, and it is likely that there would be wetlands in these areas.

In Montgomery County, there would be one crossing of a larger wetland mapped between MPs QH181 and QH183.5 associated with Fly Creek, and smaller crossings of wetlands associated with tributaries of the Mohawk River between MPs QH194.5-QH196 and at the county line (MP QH202). In Herkimer County, there would be several small crossings of small wetlands at roughly MPs QH203.5, QH212.75, QH213.25, and QH225.

Alternative 125 would have approximately nine crossings of larger interconnected wetlands associated with Deans Creek, Beaver Meadow Creek and other tributaries between MPs QH240 and QH247 in Oneida County. After crossing Oneida Creek at the eastern Madison County border, the Alternative 125 would cross two small wetland areas (MPs QH249.5 and QH249.75). There would be no other wetland crossings in Madison County.

In Onondaga County, the 125 Study Area crosses approximately 20 mapped wetland areas. In the eastern portion of the county, there is a large wetland system between the Old Erie Canal and Chittenango Creek (MPs QH264.75 to QH271) that Alternative 125 would cross numerous times. Around Onondaga Lake, Alternative 125 would cross wetlands associated with the Old Barge Canal and the lake (MP QH278.5), before heading further west and crossing numerous small wetlands associated with Nine Mile Creek, Dead Man Creek, Cross Lake, Seneca River and other tributaries (MPs QH283.75 to QH295).

Alternative 125 would cross approximately 16 individual wetlands associated with roughly 11 wetland systems in Cayuga County. Most of these systems are associated with tributaries of the Seneca River, including Muskrat Creek and the Howland Island Wildlife Management Area on the west end of the county.

In Wayne County, wetlands are more pervasive, where there would be approximately 47 crossings of mapped wetland areas under Alternative 125. The majority of these crossings would be over small wetlands associated with tributaries of the Erie Canal, Black Creek, Clyde River, Ganargua Creek and Red Creek. In Monroe County, Alternative 125 would cross approximately 23 mapped wetlands. In the eastern portion of the county, the alignment would cross several small wetlands associated with Thomas Creek and its tributaries (MPs QH342 to QH346.5). It would then cross wetlands associated with Irondequoit Creek (MP QH347.5), the Genesee River (MP QH356), the

Erie Canal (MP QH359) and a large system of wetlands associated with Little Black Creek and its tributaries (MPs QH360 to QH367.5).

Alternative 125 would cross approximately 27 mapped wetlands in Genesee County. In the eastern portion of the county, the alignment would cross several areas of wetlands associated with Black Creek and Bergen Swamp (MPs QH373 to QH378). Bergen Swamp in Genesee County is one of the largest mapped wetlands that fall within the proposed Alternative 125 alignment. The alignment would then cross isolated wetlands areas associated with Oak Orchard Creek, Murder Creek, Tonawanda Creek and tributaries through the rest of the county.

There would be approximately 15 wetland crossings in Erie County. There is a larger wetland system associated with Ransom Creek (MPs QH406.5 to QH409); however, most of the crossings in Erie County are small and do not appear to be associated with major waterways.

As mentioned previously, the areas above that are mapped as wetlands within the proposed Alternative 125 corridor could be impacted directly by new crossings for construction of rail infrastructure. Impacts such as dredging or filling of wetlands or hydrologic modifications could negatively affect wetlands in the proposed alignment corridor. Wetlands outside of the proposed Alternative 125 corridor could be indirectly impacted by modifications of local hydrology through installation of new tracks.

4.10.5. Potential Mitigation Strategies

Under the Section 404 of the CWA, impacts to waters of the U.S., including wetlands and open water features, must be avoided, minimized, or mitigated (in order of preference) to ensure that there is no net loss of functions and values of jurisdictional wetlands (33 United States Code 1251 et seq.). To the extent practicable, future planning and design will incorporate avoidance and minimization of impacts to known wetland areas. This assessment will be performed at all locations, but special attention will be focused on ecologically significant areas (for instance, the Montezuma Marshes National Wildlife Refuge/Northern Montezuma Wildlife Management Area and Albany Pine Bush Preserve) and other federally and state-protected wildlife management areas. Means of avoiding and minimizing impacts in these sensitive locations will be identified. Where avoidance and minimization would not be practicable, mitigation for impacts to wetlands could be achieved through the use of temporary and permanent Best Management Practices (BMPs).

Temporary BMPs would include implementing measures specified in the Stormwater Pollution Prevention Plan or Erosion and Sedimentation Control Plan. Temporary BMPs could include, but are not limited to:

- Covering areas of temporary construction disturbance with geotextile, straw, soil, or construction matting prior to use;
- Placing orange temporary fences and sediment-control measures to protect existing wetlands that are outside the planned area of disturbance;
- Coordinating with the local jurisdiction for the location and design of stormwater ponds;
- Implementing the use of berms, brush barriers, check dams, erosion control blankets, filter strips, sandbag barriers, sediment basins, silt fences, straw-bale barriers, surface roughening, or

diversion channels to reduce erosion and sedimentation during all phases of construction;

- When practicable, constructing in waterways during low-flow or dry periods;
- Diverting flowing water around active construction areas;
- Not storing fill material in wetlands or open water features;
- Not allowing staging equipment, storing materials, chemical use (e.g., soil stabilizers, dust inhibitors, and fertilizers), or equipment refueling within 50 feet of wetlands or open water features;
- Designing any new or modified bridges to minimize direct discharge of stormwater runoff into wetlands; and
- Incorporating measures to prevent spread or propagation of invasive species.

Depending on the extent of impacts for the selected alternative, if an individual permit is required, findings and evaluations under Section 404(b)(1) Guidelines will be performed in Tier 2. Under the Section 404(b)(1) Guidelines, four requirements must be met in order for the Corps to issue a permit:

- There must be no practicable alternative to the proposed discharge, which would have less adverse impact on the aquatic ecosystem;
- The project cannot be permitted if there is a violation of other laws (e.g., violation of applicable state water quality standard or toxic effluent standard or jeopardizes continued existence of federally listed species or critical habitats);
- The project must not cause a significant degradation of the waters of the U.S.; and
- The project must include appropriate and practicable steps to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

Impacted wetlands and open water features will be mitigated in accordance with current U.S. Army Corp of Engineers and state jurisdictional mitigation policies. The U.S. ACE generally requires compensatory mitigation on a site-specific basis for impacts to wetland functions and values. A detail of the steps required for compensatory mitigation planning is described in the Final Rule on Compensatory Mitigation for Losses of Aquatic Resources, which is jointly published by the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers (73 FR 19594).

More specific regional guidance is offered by the U.S. ACE New York District and NYSDOT. According to the January 2005 Public Notice[101] on wetland mitigation, the New York District requires that a mitigation planning document includes the following elements:

- Mitigation justification,
- Mitigation goals and objectives,
- Performance standards,
- Mitigation site selection,

[101]/ USACE, New York District. "Public Notice Announcing the Compensatory Mitigation Guidelines and Mitigation Checklist For Review of Mitigation Plans For the U.S. ACE, New York District." January 10, 2005. Accessed March 2011. Available: <http://www.nan.usace.army.mil/business/buslinks/regulat/index.php?compensatory>

- Baseline information,
- Mitigation work plan,
- Stream mitigation (if applicable),
- Site protection and financial assurances,
- Monitoring plan and report, and
- Maintenance and adaptive management.

The NYSDOT further specifies the need for additional content:

- Need and benefits of the project,
- Nature of wetland impacts,
- Avoidance and/or minimization efforts,
- Wetlands functions and values replacement,
- Water regime establishment,
- Vegetation reestablishment,
- Constraints and limitations of the potential site, and
- Demonstration of compliance with state and federal guidelines.[102]

The NYSDEC requires mitigation of impacts to protected wetlands through in-kind (acre-for-acre) replacement or replacement of wetland functions and values. Mitigation plans to compensate for impacts to NYSDEC protected wetlands are developed on a case-by-case basis, depending on the type of wetlands that would be impacted.[103] A mitigation plan would be developed in coordination with the U.S. ACE and other appropriate agencies during a wetland permitting process, if needed.

Strategies to offset impacts to wetlands would include on-site or off-site restoration, creation, or enhancement of wetlands within the same watershed as any impacted wetlands.

4.10.6. Future Analysis

Tier 2 assessments will refine the impact assessment based on advanced design and site-specific mapping and delineation of existing mapped and newly identified wetlands. Wetland boundaries mapped through NWI and NYSDEC must be verified using more refined wetland delineation techniques, usually including a formal delineation according to the U.S. ACE 1987 Manual and its supplements. A wetland delineation must then be submitted to the U.S. ACE and NYSDEC to gain verification of their jurisdiction over wetlands within a proposed project area. Further assessments will include identification of ecologically significant locations, such as Montezuma Marshes National Wildlife Refuge/Northern Montezuma Wildlife Management Area, Albany Pine Bush Preserve, and other federally and state-designated wildlife management areas. This assessment will include further evaluation of avoidance, minimization, or mitigation measures and identification of design refinements needed in these locations.

In most instances, any activity that proposes dredging, filling, or other modification to areas designated as wetlands is prohibited or would require a permit from federal and state regulatory

[102]/ NYSDOT. Environmental Procedures Manual. Attachment 4.A.T Wetlands Alternatives Analysis and Mitigation Report Format and Contents. Accessed March 2012. < https://www.dot.ny.gov/divisions/engineering/environmental-analysis/manuals-and-guidance/epm/repository/4atattac.pdf>

[103]/ NYSDEC. "Freshwater Wetlands Permit Program: Application Procedures." Accessed March 2012. <http://www.dec.ny.gov/permits/6277.html>

agencies. A permit under Section 404 of the U.S. Clean Water Act, administered by the U.S. ACE, would be necessary to authorize direct impacts (discharge of dredged or fill material) to waters of the U.S., including wetlands. Under Section 10 of the U.S. Rivers and Harbors Act, work in, over, or under navigable waters also requires permit authorization from the U.S. ACE. Under the Section 404/10 permit program, the U.S. ACE issues two types of permits: individual and general permits.

General permits are issued for categories of projects that are presumed to have similar effects and not more than minimal impacts on the aquatic environment. General permits can be issued on a nationwide or regional basis. Nationwide permits (NWPs) include a series of existing permits covering specific situations with limited types and quantities of impacts, which is less than ½ acre of non-tidal wetland impacts for certain categories of projects. For instance, Nationwide Permit 14 for Linear Transportation project authorizes projects (excluding train stations and parking lots and other non-linear projects) that do not exceed 1/3 acre of tidal wetland impact and ½ acre of impact to jurisdictional non-tidal wetlands. Individual permits are used for impacts exceeding the regulatory thresholds created for each specific category of NWP. Individual permits are more complicated and include a public review period. Impacts would require mitigation that would be outlined in the permit. The type of U.S. ACE (Nationwide or Individual) permit will be determined after design of the selected alternative is further advanced and impacts are known.

The NYSDEC also administers permits for regulated activities that would affect protected tidal and freshwater wetlands under the state's Environmental Conservation Law Article 24 (freshwater wetlands) and Article 25 (tidal wetlands). As part of the permitting process, the extent of protected wetlands must be delineated, mapped and verified through wetland delineation protocols established by the U.S. ACE and NYSDEC. Permit applications must propose mitigation measures to offset any impacts to wetland resources. Program-wide and area-specific mitigation strategies can be developed with the resource agencies through the permit review process.

The NYSDEC wetland programmatic general permits include authorizations for transportation facilities based on the type of activities being performed. These include:

- Wetland Permit 96-03 for Utility Line Installation or Repair;
- Permit 96-04 for Rehabilitation or Replacement of Existing Transportation Facilities; and
- Permit 96-05 for Clearing, Grubbing, Grading, and Minor Fills Associated with Survey and/or Exploratory Activities.

The applicability of these general permits shall be determined, and a Notice of Intent from NYSDOT to NYSDEC would be required prior to work conducted under these general permits. Under ECL Article 24 (freshwater wetlands), NYSDOT General Permit (GP-0-11-002) authorizes NYSDOT to conduct the following activities within NYSDEC-regulated freshwater wetlands:

- Bank and channel stabilization for transportation-related construction activities,
- Permanent and temporary placement of earth fill when such fill is related to the rehabilitation or replacement of an existing transportation facility,
- Installation or repair of utility lines when associated with transportation-related construction activities,

- Rehabilitation or in-kind and in-place replacement of existing transportation facilities.

4.11. Coastal Resources

4.11.1. Regulatory Context

The New York State Division of Coastal Resources, within the Department of State, implements the Federal Coastal Zone Management Act,[104] as well as the state's Waterfront Revitalization of Coastal Areas and Inland Waterways Act.[105] New York is unique in that its coastal zone management program, mandated under federal law, includes both marine and freshwater areas including the Hudson River and Great Lakes regions. The defined coastal zone includes the Hudson River south of the Troy Dam and Lake Erie and Lake Ontario.

Designated inland waterways are also included under the state Waterfront Revitalization program. Designated inland waterway are major lakes, rivers, and streams designated by the State Legislature as significant because of value as natural, scenic, recreational, historic, and/or economic resources. Any municipality adjacent to a Designated Inland Waterway is eligible for funding from the state for a broad range of projects through the Environmental Protection Fund Local Waterfront Revitalization Program. Under the state program, the municipalities can enact Local Waterfront Revitalization Plans, and the regulatory protections to the waterway would be implemented through these plans. In coastal areas, municipalities can implement LWRPs and also Harbor Management Plans to aid in the planning and regulation of water use activity in intensely used waterfront areas. Projects within designated coastal zone or communities with approved Local Waterfront Revitalization Programs must be consistent with coastal policies.

The state coastal program also designates for protection designated scenic areas and habitats. The state Coastal Atlas identifies the coastal boundary, as well as Scenic Areas of Statewide Significance (SASS) and Significant Coastal Fish and Wildlife Habitats (SCFWH). SASS designation protects scenic landscapes through review of projects requiring federal or state actions, including direct actions, permits, or funding. Similarly, projects affecting SCFWH must address consistency with applicable coastal policies in the federal/state consistency review process.

The protections for coastal areas in New York State include federal protections for coastal barriers. The Coastal Barrier Resources Act[106] established the John H. Chafee Coastal Barrier Resources System to promote more appropriate use and conservation of coastal barriers along the Atlantic, Gulf, and Great Lakes coastlines. "Coastal barriers" are defined as bay barriers, barrier islands, and other geological features composed of sediment that protect landward aquatic habitats from direct wind and waves.

The state legislature has also designated for protection Coastal Erosion Hazard Areas that include NYSDEC-designated/mapped areas along the shorelines of Lake Erie and Lake Ontario, the Atlantic Ocean and Long Island Sound[107]. The New York State Department of Environmental Conservation (NYSDEC) created the Coastal Erosion Control Permit Program to make sure that construction and

[104] / U.S. Coastal Zone Management Act of 1972 (16 U.S.C. 1451 et seq.) as amended through Public Law No. 109-58, the Energy Policy Act of 2005.
[105] / NYS Waterfront Revitalization of Coastal Areas and Inland Waterways, Article 42: (910-923), s. 910 et seq.
[106] / U.S. Coastal Barrier Resources Act of 1982, Public Law 106-67 (16 U.S.C. 3501-3510), 1982.
[107] / Coastal Erosion Hazard Areas, Article 34, ECL, and Coastal Erosion Management Regulations, 6 NYCRR Part 505.

other activities on specified coastal hazard areas meet the standards for permit issuance.

Federal and state protections and designations for the Hudson River Estuary are also provided under federal and state law. The Hudson River National Estuarine Research Reserve was established as part of the National Estuary Research Reserve System in 1982. The National Estuarine Research Reserve System (NERRS) was created by the Coastal Zone Management Act (CZMA) of 1972, as amended, 16 U.S.C. 1461, to augment the Federal Coastal Zone Management (CZM) Program. The reserve system is a network of protected areas established to promote informed management of the Nation's estuaries and coastal habitats. The reserve system currently consists of 27 reserves in 22 states and territories, protecting over one million acres of estuarine lands and waters. The Hudson River Estuary Management Act, enacted by the New York State Legislature (Environmental Conservation Law, Section 11-0306) established the state program, the Hudson River Estuary Management Program.

4.11.2. Methodology

The available GIS mapping delineating the state coastal boundary, Scenic Areas of Statewide Significance, and Significant Coastal Fish and Wildlife Habitats were obtained for study areas within ½ mile of the corridor centerline for all alternatives, and information available from the New York State Division of Coastal Resources website was consulted on these protected SASSs[108] and SCFWHs[109]. The lists from the NYS Division of Coastal Resources website of coastal waterways and designated inland waterways [110] and municipalities that have enacted Local Waterfront Revitalization Plans[111] were also consulted.

Information on the locations of the federally protected John H. Chafee Coastal Barrier Resources System was obtained from the U.S. Fish and Wildlife website.[112] Staff from the NYSDEC Coastal Erosion Control permit program were consulted to identify designated coastal erosion hazard areas in the study area counties. Information on the Hudson River National Estuarine Reserve was obtained from the NYSDEC[113,114] website.

4.11.3. Existing Conditions

Coastal Zone

New York State's coastal zone includes the Hudson River Valley, which extends 150 miles from New York City into upstate New York, and the Great Lakes-St. Lawrence River region, a vast, freshwater

[108] / NYS Division of Coastal Resources, "Scenic Areas of Statewide Significance," Accessed January 5, 2012. <http://nyswaterfronts.com/waterfront_developed_SASS.asp>
[109] / NYS Division of Coastal Resources, "Significant Coastal Fish and Wildlife Habitats," Accessed January 5, 2012. <http://www.nyswaterfronts.com/waterfront_natural_narratives.asp>
[110] / "Environmental Protection Fund Local Waterfront Revitalization Program: List of Coastal Waterbodies and Designated Inland Waterways," Accessed January 3, 2012. <http://www.nyswaterfronts.com/downloads/pdfs/Waterways%20List_07-10.pdf>
[111] / "NYS Coastal Management Program: List of Approved Coastal Local Waterfront Revitalization Programs (LWRPs) December 2010," Accessed January 4, 2012. <http://www.nyswaterfronts.com/LWRP_Status.asp>
[112] / "Official Coastal Barrier Resources Systems Maps," Accessed September 8, 2011. <http://www.fws.gov/CBRA/Maps/index.html>
[113] / NYSDEC, "Hudson River National Estuarine Research Reserve," Accessed January 9, 2012. <http://www.dec.ny.gov/lands/4915.html>
[114] / NYSDEC, "Hudson River Estuary Action Agenda," Accessed January 9, 2012. <http://www.dec.ny.gov/lands/5104.html>

non-tidal coastal systems. Designated coastal waterways include the Hudson River, Harlem River, Lake Erie, and the Niagara River.

The Empire Corridor South between New York City (Milepost 1) to Rensselaer/Albany Counties (Mileposts 143-144) is entirely within the coastal zone. The Great Lakes coastal zone includes Irondequoit Bay and Creek, a tributary to Lake Ontario, in Monroe County, which crosses the Empire Corridor West in East Rochester/Perinton (Milepost 363).

The Niagara Branch crosses the coastal zone at several locations. It extends into the coastal zone along the Lake Erie waterfront area in Buffalo (between Mileposts QDN 2 and 4) in Erie County and at the Scajaquada Creek, a tributary of the Niagara River, in Buffalo (Milepost 6.3). The Niagara Branch crosses the coastal zone at the Erie Canal crossing at Tonawanda/North Tonawanda (Milepost 13.5) and extends close to the coastal zone along the Niagara River extending north to Milepost 17.5. The end of the Niagara Branch extends into the coastal zone at the Niagara River in Niagara Falls (Milepost QDN 28).

The coastal zone and coastal resources are identical for the 90/110 and the 125 Study Areas , as the corridors merge in these three coastal areas: Hudson River, Great Lakes/Irondequoit Bay and Creek, and Lake Erie/Niagara River. The communities with Local Waterfront Revitalization Programs are largely the same for the alternatives, with the exception of a few communities.

Coastal Barrier Resource System

The Coastal Barrier Resources System (CBRS) includes portions of the Great Lakes in Cayuga, Monroe, and Erie Counties. However, the designated CBRS is outside of the study area.

Coastal Erosion Hazard Areas

The state has designated coastal erosion hazard areas in five communities in Erie County and two communities in Niagara County. All of these municipalities and designated coastal erosion hazard areas are outside of the study area.

Hudson River Estuary

Four distinct tidal wetland sites on the Hudson River Estuary were designated the Hudson River National Estuarine Research Reserve in 1982, as field laboratories for estuarine research, stewardship and education. The reserve is operated as a partnership between New York State and the National Oceanic and Atmospheric Administration (NOAA) and relates to federally-designated and state-protected sites along 100 miles of the estuary. The reserve is a federal-state partnership program that relates to four federally-designated and state-protected sites along 100 miles of Hudson River Estuary: Piermont Marsh and Iona Island (both located west of the Hudson River), Tivoli Bays, and Stockport Flats.

Inland Designated Waterways

The inland designated waterways in the study area include the Mohawk River, Onondaga Lake, Genesee River, and Tonawanda Creek. However this designation does not in itself confer protection to the waterway unless the communities have enacted Local Waterfront Revitalization Plans.

Local Waterfront Revitalization Plans

Under the Local Waterfront Revitalization Program (LWRP), communities along the designated coastal waterbodies and these inland designated waterways can enact Local Waterfront Revitalization Plans. Along the Empire Corridor South, there are 19 communities within a half mile of the corridor centerline on the east side of the Hudson River that are covered by LWRPs. There are three communities on the west side of the Hudson River that fall within a half mile of the Empire Corridor South corridor centerline that have enacted LWRPs. There are 8 communities within a half mile of the 90/110 and the 125 Study Areas between Albany Empire Corridor West/Niagara Branch corridor centerline that have enacted LWRPs. In addition to the eight individual communities with LWRP's in the Empire Corridor West/Niagara Branch section, there are two regional LWRP's that involve multiple communities within the watershed. This includes the *Mohawk River Waterfront revitalization Plan for Schenectady County* and the *Mid-Montgomery County LWRP,* which includes several other municipalities along the Mohawk River. Exhibit 4-18 lists by county those communities that have enacted Local Waterfront Revitalization Plans. With the exception of Amsterdam and North Greenbush, all the communities listed as having LWRPs are within a half mile of the corridor centerline for both the 90/110 and the 125 Study Areas. The City of Amsterdam and the Town of North Greenbush are within a half mile of the 90/110 Study Area only; not the 125 Study Area.

Scenic Areas of Statewide Significance

The coastal zone along the Empire Corridor South also includes six state-designated Scenic Areas of Statewide Significance. The Hudson River Valley coastal region includes six areas in Columbia, Greene, Dutchess and Ulster Counties, which were designated in 1993 as Scenic Areas of Statewide Significance. The areas in both the Hudson Valley and East End encompass unique, highly scenic landscapes accessible to the public and recognized for their outstanding quality.

The six SASSs in the study area are described below:

- **The Hudson Highlands Scenic Area of Statewide Significance (SASS)** encompasses a 20-mile stretch of the Hudson River and its shorelands and varies in width from approximately 1 to 6 miles. The SASS includes the east and west shorelands of the river, extending from Newburgh on the north to Peekskill on the south. The Hudson River has carved a spectacular gorge through the Hudson Highlands. The present shoreline configuration includes steep cliffs, bluffs, and gently sloping banks. Railroads hug the shoreline of the Hudson River and roads follow the hillside contours and inland valleys. There are two military sites within the SASS, the undeveloped parts of the Camp Smith Military Reservation and the West Point Military Academy, both with extensive areas of open space. The present-day land use pattern of the Hudson Highlands is dominated by state parkland, preserving much of the open space of the SASS.

- **The Estates District SASS** is located approximately 12 miles north of the Hudson Highlands SASS and 3 miles south of the Catskill-Olana SASS. The SASS extends approximately 27 miles to south of the Franklin D. Roosevelt Home National Historic Site. As its name implies, the Estates District SASS is dominated by over twenty major and numerous minor historic estates and the Hudson River toward which they are oriented. The landform consists of rolling topography behind steep bluffs, which drop 150 feet to the Hudson River. The shoreline of the Hudson is characterized by coves, marshes and scattered islands along the eastern shore. When seen from

Exhibit 4-18—Local Waterfront Revitalization Programs in the Study Area (for 90/110 and 125 Study Areas unless otherwise noted)

Coastal Management Program Regions	County	LWRP Municipalities	Distance from rail centerline (within 1/2 mile)	Comments
New York City	New York	New York City (C)		
Hudson River	Westchester	Dobbs Ferry (V)		
	Westchester	Sleepy Hollow (V)		
	Westchester	Ossining (V)		
	Westchester	Croton-on-Hudson (V)		
	Westchester	Peekskill (C)		
	Rockland	Stony Point (T)	1,100 feet	Opposite side of river; northern end
	Orange	Newburgh (C)	1,700 feet	Opposite side of river
	Dutchess	Beacon (C)		
	Dutchess	Poughkeepsie)T)		
	Dutchess	Rhinebeck (T)		
	Dutchess	Red Hook (T)		
	Dutchess	Tivoli (V)		within the Town of Redhook
	Ulster	Lloyd (T)	900 feet	Opposite side of river
	Ulster	Esopus (T)	1,000 feet	Opposite side of river
	Ulster	Kingston (C)	1,400 feet	Opposite side of river
	Ulster	Saugerties (V)	1,000 feet	Opposite side of river
	Greene	Athens (C)	400 feet	Opposite side of river
	Rensselaer	Schodack (T)		
	Rensselaer	Castleton (V)		within Town of Schodack - same LWRP
	Rensselaer	Rensselaer (C)		
	Rensselaer	*North Greenbush (T)	2,500 feet	East of Albany
	Albany	Albany (C)		
Inland Waterways	Schenectady	Glenville(T); Niskayuna(T); Rotterdam(T); Scotia(V); Schenectady(C)		
	Montgomery	*Amsterdam (C)		
	Montgomery	Glen(T); Fultonville(V); Mohawk(T0; Fonda(V)		
	Herkimer	Little Falls (C)		
	Monroe	Pittsford (T)		
Western Lake Ontario Niagara R. & Lake Erie	Monroe	Penfield (T)		
	Monroe	Rochester (C)		
	Erie	Tonawanda (C)		
	Niagara	North Tonawanda (C)		

C = City; T = Town; V = Village; */ Communities within 1/2 mile of the 90/110 Study Area only
Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within ½ mile of the corridor centerline.

Source: NYSDOS Division of Coastal Resources. "New York State Coastal Management Program," Accessed January 11, 2012. <http://nyswaterfronts.com/LWRP_Status.asp>

a distance, however, the east bank shoreline appears unbroken because railroad causeways bridge the natural indentations and transform the east bank into a single fluid line.

- **The Esopus/Lloyd SASS** encompasses a 17-mile stretch of the Hudson River and its western shorelands and varies significantly in width from 0.75 to 2 miles. The SASS extends from its northern boundary, which runs from south of the hamlet of Port Ewen, extending through Poughkeepsie to its southern boundary in the hamlet of Milton. The SASS includes the Hudson River from the mean high tide line on the eastern shore, for much of its length sharing a common boundary with the Estates District SASS on the eastern shorelands of the Hudson River. The SASS is dominated by a long stretch of bluffs along the Hudson River shorelands.

- **The Ulster North SASS** encompasses a 10-mile stretch of the Hudson River and its western shorelands and varies from 1.25 miles to 2.5 miles in width. The SASS extends from its northern boundary at the Ulster/Greene County line to its southern boundary at Ulster Landing Park. The SASS includes the Hudson River from the mean high tide line on the eastern shore for all of its length, sharing a common boundary with the Estates District SASS on the eastern shorelands of the Hudson River. It is characterized by a gently rolling upland landscape set above a steep bluff reaching elevations of 150 feet.

- **The Catskill-Olana Scenic Area of Statewide Significance (SASS)** consists of a portion of the Hudson River and its shorelands, an area approximately 5½ miles long and three miles wide. Its northern boundary incorporates Catskill, Rogers Island, and Greenport and extends south to Germantown. The area is known as the home of two major artists of the Hudson River School of Painting, Thomas Cole and Frederic Church. Thomas Cole, considered the father of the Hudson River School, America's first landscape painting movement, established his home and studio in Catskill. Frederic Church was Thomas Cole's only student. The promontory on the east shore is where Church constructed his estate, Olana. Catskill-Olana SASS exhibits an unusual variety of landforms including floodplains and steep ravines that rise 250 feet above; forested bluffs along the Hudson River; plateaus and rolling farmland south of Catskill Village and the promontory of Church's Hill. A variety of water features is present, the Hudson River and its coves, channels and inlets being the most prominent.

- **The Columbia-Greene North Scenic Area of Statewide Significance (SASS)** is located roughly 3 miles north of the Catskill-Olana SASS. This SASS extends about 15 miles along the Hudson River from the vicinity of Schodack Landing in southern Rensselaer County and Coeymans hamlet in southern Albany County southward to Greenport, just north of the City of Hudson in Columbia. The scenic area's east and west boundaries generally follow the state coastal boundary with some variations. The SASS constitutes a predominantly rural area of low bluffs and ravines, flanked on the west shore by narrow alluvial plains and on the east shore, by a broader plateau. It is a quiet, pastoral area of working farms and river landings, which has changed little since the 19th century.

Significant Coastal Fish and Wildlife Habitats

The coastal zone along the study area includes 31 Significant Coastal Fish and Wildlife Habitats (SCFWH) as shown in Exhibit 4-19. These SCFWH areas include areas within the Hudson River National Estuarine Reserve (Tivoli Bays, Iona Islands), a National Natural Landmark (Iona Islands on the west side of the Hudson River), and other federal and state parklands. Of these areas, all but three are located along the Hudson River.

The Tivoli Bays is designated by NYSDEC as a Natural Heritage Area in New York State. The Tivoli Bays is also included in the Mid-Hudson Historic Shorelands Scenic District designated under Article 49 of the Environmental Conservation Law.

4.11.4. Environmental Consequences

The sections below describe impacts to coastal resources, including the coastal zone, Significant Coastal Fish and Wildlife Habitats, and Scenic Areas of Statewide Significance. The protections to Inland Designated Waterways are implemented through Local Waterfront Revitalization Plans in the communities shown in Exhibit 4-18, so work proposed in these communities will need to be consistent with the local plans.

Coastal impacts are addressed for the Base Alternative and Alternatives 90A, 90B, 110, and 125, and the greatest potential for impacts is centered on the Hudson River. This preliminary assessment is based on Tier 1 concepts and mapping and will be further refined in Tier 2 as the project development process is further advanced, and efforts to avoid farmland encroachments will be made as design is advanced.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure.

Empire Corridor South

The Base Alternative includes signal and grade crossing improvements along the 64 miles of Empire Corridor South (MPs 75.8 to 140) north of Poughkeepsie to just south of Albany-Rensselaer Station. This area is situated entirely within the coastal boundary for the Hudson River. There are a number of Significant Fish and Coastal Wildlife Habitats along this section. This area closely borders (within 300 feet of), to the west, the **Poughkeepsie Deepwater Habitat SCFWH** between MPs 76 and 79 and extends east inland of the **Kingston Deepwater Habitat SCFWH**, as close as 300 feet, between MPs 82 and 89. This section extends through the **Vanderburgh Cove and Shallows SCFWH** between MPs 85 and 87, where the railroad is located on a causeway over embayments along the Hudson River. Between MPs 95.3 and 98.3, the railroad extends through the **North and South Tivoli Bays SCFWH**, which is one of four tidal wetland sites federally designated and state-protected as part of the **Hudson River National Estuarine Research Reserve**, a federal-state partnership program that provides field laboratories for estuarine research, stewardship and education. Between MPs 99 and 100, the railroad closely borders on the **Esopus Estuary SCFWH**, extending within 100 feet over a distance of 700 feet. Between MPs 100.5 to 105.3, the railroad adjoins the eastern side of the **Germantown-Clermont Flats SCFWH**. At MP 108, the railroad closely borders the **Roeliff Jansen Kill SCFWH** to the east. Between MPs 110.25 and 113, the railroad extends along the east side of the **Rogers Island SCFWH**. Between MPs 115 and 122, the railroad extends through or closely borders the **Stockport Creek and Flats SCFWH**, which is part of the Hudson River National Estuarine Research Reserve. Between MPs 125.5 and 127, the

Exhibit 4-19—Significant Coastal Fish and Wildlife Habitats within 1/2 Mile

County	Significant Coastal Fish and Wildlife Habitat	SCFWH Acreage	Significance Value
New York, Bronx, Westchester	Lower Hudson Reach	4,001	130
Westchester	Croton River and Bay	662	25
Westchester, Rockland	Haverstraw Bay	1,093	166
Rockland	Iona Island Marsh	12	71
Westchester, Rockland, Orange, Putnam	Hudson River Mile 44-56	2,997	148
Putnam	Constitution Marsh	425	69
Dutchess	Fishkill Creek	178	80
	North and South Tivoli Bays	1,202	162
	Vanderburg Cove and Shallows	517	20
	Wappinger Creek	163	54
Dutchess, Ulster	Poughkeepsie Deepwater Habitat	2,384	110
	Esopus Estuary	378	98
	Kingston Deep Water Habitat	834	110
	The Flats	258	118
Ulster	Rondout Creek	6	70
Columbia	Germantown - Clermont Flats	989	121
	Mill Creek Wetlands	280	53
	Roeliff Jansen Kill	31	46
	Rogers Island	653	104
	Stockport Creek and Flats	2,000	115
Greene	Catskill Creek	18	54
	Coxsackie Creek	29	26
	Coxsackie Island Backwater	14	35
	Ramshorn Marsh	186	133
	Vosburg Swamp and Middle Ground Flats	526	57
Columbia, Greene, Rensselaer	Schodack and Houghtaling Islands and Schodack Creek	1,826	77
Rensselaer	Papscane Marsh and Creek	711	48
Albany	Shad and Schermerhorn Islands	379	22
Monroe	Irondequoit Bay and Creek	18	80
Erie	Times Beach Diked Disposal Site	26	30
Niagara	Lower Niagara River Rapids	2	73

Source: NYSDOS Division of Coastal Resources. "Significant Coastal Fish and Wildlife Habitat," Accessed January 15, 2012. <http://nyswaterfronts.com/waterfront_natural_narratives.asp>

railroad extends through the **Mill Creek Wetlands SCFWH**. Between MPs 127 and 133.3, the railroad adjoins the east side of the **Schodack and Houghtaling Islands and Schodack Creek SCFWH**. The railroad passes through or adjacent to **Pascane Marsh and Creek SCFWH** between MPs 135.2 and 139.3. The signal and grade crossing improvements are anticipated to be conducted within the right-of-way, and impacts to these SCFWHs are not anticipated.

The signal and grade crossing improvements extend through the **Estates District SASS**, which extends to the mean high tide line on the eastern shore of the Hudson River between MPs 76.5 and 103.5. The district borders the adjoining **Esopus-Lloyd SASS** (MPs 70 to 87.5) and **Ulster-North SASS** (MPs 95 to 103.5) to the west and including the river. Between MPs 115.3 and 131.5, the railroad extends through the **Columbia-Green North SASS**. The railroad passes through the **Catskill-Olana SASS** between MPs 87 and 112. The work within or adjoining these SASSs will not involve substantial impacts outside of the right-of-way and will not result in appreciable changes in visual quality, and no impacts to the scenic qualities of the SASSs are anticipated.

The Base Alternative will also involve the addition of a fourth track and platform extension at Rensselaer Station near the Albany county line (MPs 141 to 143), which is located largely along the coastal boundary. Since this work will be confined to the right-of-way and will not involve impacts to SCFWHs or SASSs, no coastal impacts are anticipated.

Empire Corridor West/Niagara Branch

The Base Alternative will involve 17 miles of second track between the Albany-Rensselaer and Schenectady stations, as well as reconstruction of the Schenectady Station. Only a portion of this area (between MPs 142 and 143.5) is situated within or along the coastal boundary, and no impacts to SCFWHs or SASSs will occur. Therefore, this work, which will be confined to the right-of-way, will not have coastal impacts.

The proposed Syracuse track configuration and signal improvements and Rochester Station track and platform improvements (MPs 368 to 373) are located outside of the coastal zone.

Proposed improvements for the new Niagara Falls Intermodal Transportation Center extend within the coastal zone. However, the work will be conducted within the right-of-way and will not be located within SCFWHs or SASSs and is not anticipated to involve coastal impacts.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, signalization, in addition to improvements proposed under the Base Alternative previously described.

Empire Corridor South

Alternative 90A includes construction of four miles of second track through urbanized areas of Manhattan (MPs 9 to 13). The **Lower Hudson Reach SCFWH** adjoins the railroad where it closely borders the Hudson River between MPs 1 to 17, but the second track would be located within the right-of-way, and this work is not anticipated to involve coastal impacts. Alternative 90A also includes 1.4 miles of new track (MPs 23.8 to 25.2), extending under the Tappan Zee Bridge, for the Tarrytown Pocket Track/Interlocking. This work would not affect SCFWHs or SASSs and would be within the right-of-way, and is not anticipated to involve coastal impacts.

With Alternative 90A, signal improvements proposed along 43 miles (MPs 32.8 and 75.8) extend through urban areas (Westchester and Dutchess Counties). Along this section, 10 miles of new third track (MPs 53 to 63) and improvements at the Poughkeepsie Yard/Storage Facility (MPs 71 to

75.8) are also proposed in Dutchess County. The **Croton River and Bay SCFWH** adjoins or crosses the railroad between MPs 31 to 33.5, and the **Haverstraw Bay SCFWH** adjoins the railroad between MPs 34 and 37. The railroad extends adjacent to or through the **Hudson River Mile 44 to 56 SCFWH** between MPs 42.5 and 54.5. The railroad adjoins the **Constitution Marsh SCFWH**, on the west, between MPs 50.5 to 52.3. The railroad extends through or adjoins the **Fishkill Creek SCFWH** between MPs 57.3 and 57.7. The railroad adjoins or extends through the **Wappinger Creek SCFWH** between MPs 63.8 and 65. The **Poughkeepsie Deepwater Habitat** extends within 200 feet west of the railroad between MPs 67.5 and 79.4. New third track 53 to 53.2 and from 53.5 to 54.5 will adjoin the east side of the **Hudson River Mile 44-56 SCFWH**, but since work would be contained within the right-of-way, impacts to this area are not anticipated. The remaining SCFWHs would not be affected by Alternative 90A improvements, which would be confined to the right-of-way.

The railroad extends through the **Vanderburg Cove and Shallows SCFWH** between MPs 85 and 87. However, no work is proposed in this area, the Rhinecliff Station improvements are located two miles to the north (MP 89.2). Between MPs 95.3 and 98.3, the railroad extends through the **North and South Tivoli Bays SCFWH**, which is one of four tidal wetland sites federally designated and state-protected as part of the **Hudson River National Estuarine Research Reserve**. Alternative 90A does not involve work at these locations, so no impacts would occur at these SCFWHs. Between MPs 99 and 100, the railroad closely borders on the **Esopus Estuary SCFWH**, extending within 100 feet over a distance of 700 feet. This is in the vicinity of the proposed crossover (CP99 at MPs 98.4 to 98.94) but this work would not extend outside of the right-of-way and is not anticipated to affect the Esopus Estuary SCFWH.

Rock slope stabilization is proposed at 10 locations between MPs 105.3 to 106 (5 locations), MP 119.5 (one location), and MPs 128.1-130 (4 locations). Hudson Station improvements are proposed at MPs 113.5 to 115. These improvements will not affect SCFWHs.

Between MPs 100.5 to 105.3, the railroad adjoins the eastern side of the **Germantown-Clermont Flats SCFWH**, and rock slope stabilization proposed at five locations from MPs 105.3 to 106 would occur within the right-of-way and is not anticipated to impact coastal impacts. At MP 108, the railroad closely borders the **Roeliff Jansen Kill SCFWH** to the east, and work for Alternative 90A is not anticipated at this location.

The railroad extends through the **Hudson Highlands SASS** between MPs 40.5 to 57.8. The signal improvements and addition of a third track (between MPs 53 and 58) would not affect the visual quality of this SASS.

This area extends through the **Estates District SASS**, which extends to the mean high tide line on the eastern shore of the Hudson River between MPs 76.5 and 103.5. The district borders the adjoining **Esopus-Lloyd SASS** (MPs 70 to 87.5) and **Ulster-North SASS** (MPs 95 to 103.5) to the west and including the river. The railroad passes through the **Catskill-Olana SASS** between MPs 87 and 112. Improvements at the Poughkeepsie Yard/Storage Facility (MPs 71 to 75.8) and Rhinecliff Station (MP 89.2), and Hudson Line Reliability Improvements at CPs 82 and 99 (MPs 82 and 99) would extend within the southern SASSs, but should not change the visual quality of these areas.

Between MPs 115.3 and 131.5, the railroad extends through the **Columbia-Green North SASS.** Rock slope stabilization proposed at MP 119.5 (one location) and MPs 128.1 to 130 (4 locations) would extend within this SASS, but would not change the scenic quality of the area.

No work is proposed in the immediate vicinity of the **Mill Creek Wetlands SCFWH** (MPs 125.5 to 127).

A new crossover, CP 136, is proposed at MP 136, and this work would extend within the **Papscane Marsh and Creek SCFWH** (MPs 135 to 139.3), but is not anticipated to impact the SCFWH.

The replacement of the Livingston Avenue Bridge (MPs 143.2 to 144) will occur within the coastal zone, but will not affect SCFWHs or SASSs. The disturbance to the coastal zone will be temporary in nature and represents a replacement of an existing structure.

Empire Corridor West/Niagara Branch

Other improvement proposed with Alternative 90A include approximately 10 miles of third track between MPs 169 and 178.5; Amsterdam Station improvements along the west end of this segment; and upgrades to interlockings and automatic block signals at three control points (CP 175, CP 239, and CP 248). Alternative 90A also includes Syracuse Station track improvements (MPs 290 to 294), third track improvements along 11 miles (MPs 373 to 382) west of the station, the addition of a third track along 11 miles located largely west of the urban area around Rochester and extending into Genesee County, and Buffalo-Depew Station improvements. These Alternative 90A improvements are located outside of the coastal zone.

The proposed double track along the Niagara Branch (at MP QDN17) and the new Niagara Falls Intermodal Facility (at MP QDN28) intersect the coastal boundary along the Niagara River. These improvements would be located within the right-of-way and would not involve substantial coastal impacts.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, are proposed, and coastal zone impacts are not anticipated to occur as this work is expected to be confined to the right-of-way.

Empire Corridor West/Niagara Branch

Alternative 90A improvements include the Livingston Avenue Bridge replacement and the double track along the Niagara Branch and new Niagara Falls Intermodal Facility, which will both extend within the coastal zone. These impacts are anticipated to be temporary in nature.

Improvements for Alternative 90B are located outside of the coastal zone, with the exception of two track improvements along the Irondequoit Creek and the Niagara River. Track improvements for

relocated freight track would extend over the **Irondequoit Creek** at MP 362.92. The coastal zone at this crossing includes the **Irondequoit Bay and Creek SCFWH**, and modification or replacement would be required to the existing bridge structure. Work to modify or construct a new bridge over the waterway to accommodate the additional track would be temporary in nature, and since the bridge would span the waterway, no impacts to the coastal zone or coastal habitat area are anticipated.

The proposed double track along the Niagara Branch (at MPs QDN2 to QDN7) intersects the coastal boundary along the Niagara River. These improvements would be located within the right-of-way and would not involve substantial coastal impacts.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, are proposed, and coastal zone impacts are not anticipated to occur as this work is expected to be confined to the right-of-way.

Empire Corridor West/Niagara Branch

With Alternative 110, impacts to the coastal zone would be the same as for Alternative 90B.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 also would include new right-of-way in most areas, but would merge back with the Empire Corridor over two 15- and 16-mile segments centered on Syracuse and Rochester, respectively. Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch.

Empire Corridor South

No additional work, other than that proposed for Alternative 90A, are proposed for Alternative 125 along the majority of Empire Corridor South, and coastal zone impacts are not anticipated to occur as this work is expected to be confined to the right-of-way. However, roughly one mile of the proposed 125 mph track would extend south from Albany-Rensselaer Station to cross the Hudson River at a new bridge to be constructed within the coastal zone. This will not affect SCFWHs or SASSs, but would involve work within the coastal waterway for a new bridge.

Empire Corridor West/Niagara Branch

Alternative 125 would involve construction of a total of 236 miles of track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. This route rejoins the Empire Corridor through Syracuse and Rochester, including the section of track east of Rochester where the Empire Corridor West crosses the coastal zone at **Irondequoit Creek** (MP 362.92). Impacts to this coastal area would be the same as for Alternatives 90B and 110.

Alternative 125 also includes improvements proposed under Alternative 90A, which include double track along the Niagara Branch and a new Niagara Falls Intermodal Facility that will extend within the coastal zone along the Niagara River.

4.11.5. Potential Mitigation Strategies

In Tier 2, early consultation will be performed with NYSDOS and the affected municipalities to review the proposed action and its consistency with state coastal policies. A determination that the program is consistent with coastal policies enacted under the Federal Coastal Zone Management Act and the New York State Waterfront Revitalization of Coastal Areas and Inland Waterways Law will be made as part of Tier 2. The proposed action will need to be consistent with state coastal policies and with approved Local Waterfront Revitalization Plans (LWRPs) in affected municipalities. If a municipality identifies a conflict between the proposed action and its LWRP, consultation will be performed with the municipality to resolve the issue.

In Tier 2, Coastal Special Management Areas (characterized for the entire study area in Section 4.11.3, "Existing Conditions") will be reviewed within the defined program area to identify the following:

- Regional Coastal Management Programs area,
- Local Waterfront Revitalization Programs area,
- Significant Coastal Fish and Wildlife Habitats,
- Scenic Areas of Statewide Significance,
- Harbor Management Plans.

Measures to avoid or minimize impacts on coastal resources and Coastal Special Management Areas will be identified in Tier 2.

Coastal consistency reviews will be performed to determine how the program complies with federal, state, regional, and local coastal policies, and appropriate mitigation measures will be identified based on these reviews. Mitigation strategies may include permanent measures, such as providing permanent compensation for visual or coastal impacts or temporary construction measures, such as time of year fisheries restrictions for silt-producing work within coastal waters or restrictions to avoid navigational impacts. Mitigation measures during construction operations include minimizing damage by debris, sedimentation, and other foreign materials being carried into the coastal waters. Areas of exposed soil would be minimized, and erosion and sediment control items should be implemented as part of Stormwater Pollution Prevention Plans and Erosion and Sediment Control Plans. Consultation with the NYSDOS and entities with LWRP or Harbor Management Plans will be performed regarding mitigation measures proposed.

4.11.6. Future Analysis

As discussed above, Tier 2 will identify potential impacts to Coastal Special Management Areas and will include early consultation with NYSDOT and municipalities to identify consistency with coastal policies and issues of concern. In order to determine state consistency with coastal policies, a State Coastal Assessment Form under Part 600 of Title 19 of the NYCRR will be completed and submitted to NYSDOS to assist in making a determination of significance under SEQR.

Federal consistency review will involve submitting Federal Aid Notification letter to NYSDOS and completing the Federal Consistency Assessment Form, including documenting consistency with state coastal policies and LWRPs (submitting copies of correspondence with/from the LWRP). For the purposes of U.S. Army Corps of Engineers permitting, if the program involves a Nationwide Permit, the consistency with coastal policies of the Nationwide Permit will need to be reviewed. If an individual U.S. ACE or USCG permit is required, a Federal Consistency Assessment Form would be submitted, along with a completed joint U.S. ACE/NYSDEC Permit Application and/or USCG Bridge Permit application and NEPA documentation, and all information and data necessary to assess the effects of the proposed activity on and its consistency with the Coastal Management Program.

Documentation will also be submitted to potentially affected local municipalities with LWRPs addressing consistency with the LWRPs.

4.12. Aquifers

4.12.1. Regulatory Context

Federal protection of critical groundwater supplies is provided by the sole source aquifer program. The United States Environmental Protection Agency (U.S. EPA) defines a sole source aquifer as an aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas may have no alternative drinking water source(s) that could physically, legally and economically supply all those who depend on the aquifer for drinking water. There are two types of "sole source aquifers" (SSAs) designated sole or principal source aquifers.[115]

New York State also has a sole source aquifer protection program.[116] The purpose and goals of this program are to provide funds for the implementation of groundwater protection plans and protect water quality in designated “special groundwater protection areas.” The program establishes a process for nominating and designating special groundwater protection areas within federally designated sole source aquifer areas contained within counties having a population of one million or more people.

In order to enhance protection of aquifers that are most productive and most vulnerable, the New York State Department of Environmental Conservation (NYSDEC), in cooperation with the United States Geological Survey (USGS), has mapped eighteen primary aquifers throughout the state. Primary aquifers are defined as "*highly productive aquifers presently utilized as sources of water*

[115] / U.S. EPA Sole Source Aquifer Protection Program (under 1974 Safe Drinking Water Act, Section 1424(e) and 1986 amendments to the Act)
[116] / New York Environmental Conservation - Article 55 Sole Source Aquifer Protection

supply by major municipal water supply systems." The New York State Department of Environmental Conservation (NYSDEC) believes that all of the primary aquifers in New York State would qualify for designation as federally protected sole source aquifers.[117]

Principal aquifers are "*aquifers known to be highly productive or whose geology suggests abundant potential water supply, but that are not intensively used as sources of water supply by major municipal systems at the present time*."[118]

4.12.2. Methodology

Groundwater resources for study areas within 300 feet of the corridor centerline for all alternatives were mapped using available GIS information. The New York State Department of Environmental Conservation (NYSDEC), in cooperation with the United States Geological Survey (USGS), has mapped primary aquifers (1:24,000 scale) and is in the process of identifying principal aquifers, or the remainder of the unconsolidated aquifers in New York that are generally capable of providing 10 to 100 or more gallons per minute at 1:24,000 scale.

Due to the large number of aquifers in New York State, the federal-state cooperative mapping program must continue for some time before all principal aquifers have been mapped. In the meantime, for those areas not mapped the NYSDEC Division of Water refers to a series of USGS maps titled "Unconsolidated Aquifers in Upstate New York", to show potential areas of principal aquifers (1:250,000 scale). Areas mapped as "Unconfined Aquifer 10 to 100 gallons per minute" or "Unconfined Aquifer more than 100 gallons per minute" are generally considered to be principal aquifers unless contradictory site specific information is made available to the NYSDEC.[3]

GIS information obtained includes U.S. EPA sole source aquifers, NYSDEC/USGS primary aquifers (1:24,000 scale), and NYSDEC/USGS unconsolidated aquifers (at 1:250,000 scale) to identify and map principal aquifers within the 300-foot buffer.

4.12.3. Existing Conditions

The Empire Corridor 90/110 Study Area passes over 2.03 square miles of one SSA: the Schenectady-Niskayuna Aquifer within the 600-foot wide study area. It is approximately 20 miles long and underlies approximately 30 square miles in the lower and easternmost part of the Mohawk River Basin, with a small overlap into the Lower Hudson River Basin. The 125 Study Area also passes over the same SSA; however, it only passes over 0.06 square mile of it.

Under the state sole source aquifer program, a process for nominating and designating special groundwater protection areas within sole source aquifers has been established. Nine special groundwater protection areas, all outside the study area counties, have been designated.

The state has identified eighteen primary aquifers across the state. The 90/110 Study Area passes over a combined 4.75 square miles of five of these primary aquifers: the Croton-Ossining, Schenectady, Baldwinsville, Irondognessee and Batvia aquifers. The 125 Study Area passes over a

[117] / NYSDEC, Sole Source Aquifers, Accessed, October, 20, 2011 <http://www.dec.ny.gov/lands/36151.html>
[118] / NYSDEC, *Primary and Principal Aquifers*, Accessed April 20, 2011 <http://www.dec.ny.gov/lands/36119.html>

combined 2.67 square miles of three of these primary aquifers: the Croton-Ossining, Baldwinsville and Irondognessee. Principal aquifers also underlie both study areas. There are approximately 15.32 square miles of principal aquifers underlying the 90/110 Study Area and 7.03 square miles underlying the 125 Study Area.

Exhibit 4-20 presents the aquifer areas by county, and Appendix G.10 describes the aquifers in each county.

4.12.4. Environmental Consequences

This section below describes anticipated direct and indirect impacts of program alternatives on groundwater resources. The proposed addition of third and fourth tracks, particularly in areas where the railbed is already in place would have minimal or no direct impacts on the underlying aquifers or the quantity of groundwater recharge. The addition of ballast for the new tracks would be considered pervious to infiltrating stormwaters. There may be a slightly increased potential for contaminants reaching the underlying aquifer with increased train traffic on the new tracks, however this would be considered to be a minimal effect. Any proposed structures that would require substantial excavations would have a higher potential to directly impact existing groundwater resources. These actions may include construction of new stations, extension of platforms, bridge construction, and other similar activities.

In general, actions that would constitute impacts on groundwater would include deep excavations that may intersect the groundwater table and/or any increase in impervious surfaces (construction of foundations, placement of compacted fill or impervious pavement), which could reduce infiltration rates of recharge efficiency. Actions that may result in the release of contaminants as a result of construction or operation may also affect the underlying aquifers and potentially drinking water supplies.

This preliminary assessment is based on Tier 1 concepts and is designed to identify areas where there would be potential impacts, as described above, to Sole Source Aquifers (SSAs), Primary, and Principal Aquifers as a result of the proposed improvements. Specific details on impacts and general mitigation plans will be included as the project development process is further advanced in the Tier 2 analysis.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure.

Empire Corridor South

The Base Alternative will include signal and grade-crossing improvements along the 64 miles of Empire Corridor South (MPs 75.8 to 140) north of Poughkeepsie to just south of Albany-Rensselaer Station. In New York and Bronx Counties, the rail alignment study area will not pass over any U.S. EPA regulated SSAs or any primary or principal aquifers of New York State. In Westchester County,

Exhibit 4-20—Federal Sole Source and State Primary/Principal Aquifers in the Study Area

County	Aquifer Area within 600-foot wide Study Area (Square Miles)					
	Sole-Source (Schenectady-Niskayuna)		Primary Aquifers (Aquifer Name)		Principal Aquifers	
	90/110 Study Area	125 Study Area	90/110 Study Area	125 Study Area	90/110 Study Area	125 Study Area
New York	-	-	-	-	-	-
Bronx	-	-	-	-	-	-
Westchester	-	-	0.26 (Croton-Ossining)	0.26 (Croton-Ossining)	0.03	0.03
Putnam	-	-	-	-	0.09	0.09
Dutchess	-	-	-	-	0.03	0.03
Columbia	-	-	-	-	0.41	0.41
Rensselaer	-	-	-	-	0.80	0.83
Albany	0.43	0.06	-	-	0.93	1.23
Schenectady	1.60	-	1.29 (Schenect-ady)	-	0.30	0.59
Schoharie	-	-	-	-	-	0.33
Montgomery	-	-	-	-	4.47	0.41
Herkimer	-	-	-	-	2.70	0.73
Oneida	-	-	-	-	1.83	0.47
Madison	-	-	-	-	-	0.10
Onondaga	-	-	1.95 (Baldwins-ville)	1.52 (Baldwins-ville)	0.20	0.02
Cayuga	-	-	-	-	0.71	0.23
Wayne	-	-	-	0.02 (Irondon-genessee)	2.41	0.84
Monroe	-	-	0.88 (Irondon-genessee)	0.87 (Irondon-genessee)	0.37	0.29
Genesee	-	-	0.37 (Batvia)	-	-	0.12
Erie	-	-	-	-	0.04	0.28
Niagara	-	-	-	-	-	-
TOTAL	**2.03**	**0.06**	**4.75**	**2.67**	**15.32**	**7.03**

Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 300 feet of the corridor centerline.

Sources: 1) U.S. EPA, Sole_Source_Aquifers.shp, 2011; 2) NYSDEC, *primary_aquifers.shp*, 2011; 3) NYSDEC, Unconsolidated Aquifers at 1:250,000, 2011; 4) New York State Division of Water, *Water Wells.shp*, 2011

the rail alignment study area will cross over both primary and principal aquifers of New York State; however, since the proposed improvements will not include construction or excavation activities in these areas, direct and indirect impacts to nearby aquifers will not be anticipated.

The section of track with proposed signal and grade-crossing improvements will extend through the remaining counties in the Empire Corridor South (Putnam, Dutchess, Columbia and Rensselaer). These improvements will not occur over U.S. EPA regulated SSAs or New York State Primary aquifers; however, small segments of principal aquifers will be present in all four counties. Proposed improvements will include replacing old signal poles with underground cable between Poughkeepsie and Rensselaer Station and installing grade crossing active warning devices, and roadway approach and/or pedestrian improvements to accommodate improved passenger rail operations between Poughkeepsie and Albany. Improvements will primarily occur within the existing right-of-way, and will not likely include a change to the existing water quality and impervious surfaces; therefore, there will be minimal direct and/or indirect impacts to the nearby principal aquifers.

The Base Alternative will also involve the addition of a fourth track and platform extension at Rensselaer Station near the Albany county line (MPs 141 to 143). New York State principal aquifers associated with the Hudson River will underlie portions of this proposed improvement area.
Adding rail ties and even ballast for additional track will involve minimal impacts to underlying aquifers. Although, the station platform extension in this area will have the potential to increase impervious surfaces, this will have a minimal impact on aquifer recharge, given the size of the contributing watershed.

Empire Corridor West/Niagara Branch

The Base Alternative will involve 17 miles of second track between the Albany-Rensselaer and Schenectady stations (MPs 143 to 160), as well as reconstruction of the Schenectady Station (MP159). The proposed additional track will extend over three aquifer types in Albany and Schenectady Counties, including:

- The principal aquifers in the majority of Albany County and southern portion of Schenectady County,
- The Schenectady-Niskayuna SSA from approximately MP 151 until roughly the Schenectady County boundary, and
- The Schenectady Primary Aquifer from approximately MP 158 until roughly the Schenectady County boundary.

Adding rail ties and even ballast will involve minimal impacts to underlying aquifers; therefore, the proposed improvements will have minimal direct and/or indirect impacts to principal aquifers, the Schenectady-Niskayuna SSA, and the Schenectady Primary Aquifer.

Most of the proposed track configuration and signal improvements in and around the City of Syracuse (MPs 278 to 291) will be located to the east of the Baldwinsville Primary Aquifer (located in Onondaga County), with the exception of the milepost MP 291, where the alignment will cross the aquifer. Work in this area will include upgrading the existing third track, add crossovers and reconfigure signals at Syracuse Station to reduce congestion, delays and interference between passenger and freight trains. Improvements will primarily occur within the existing right-of-way, and will likely not include a change to the existing water quality and impervious surfaces; therefore, the proposed improvements will have minimal direct and/or indirect impacts to the Baldwinsville Primary Aquifer.

The improvements in the City of Rochester at and surrounding the Rochester Station will not be located over an aquifer; therefore, impacts will not be anticipated in this area.

Proposed improvements for the new Niagara Falls Intermodal Transportation Center will not be located within any identified aquifers; therefore, impacts from the proposed station construction will not be anticipated.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, and signalization, in addition to improvements proposed under the Base Alternative previously described.

Empire Corridor South

Alternative 90A would include construction of four miles of second track through areas of Manhattan and Bronx Counties (MPs 9 to 13). In addition, 1.4 miles of new track would be constructed in Westchester County, extending under the Tappan Zee Bridge, for the Tarrytown Pocket Track/Interlocking (MPs 23 to 25). The proposed improvements in these areas would not pass over any identified aquifers; therefore, impacts from the proposed additional track would not be anticipated.

With Alternative 90A, signal improvements proposed along 43 miles (MPs 32.8 and 75.8) would extend through Westchester (northernmost portion), Putnam, and Dutchess Counties. Proposed improvements would pass over the Croton-Ossining Primary Aquifer (MPs 32 to 35), as well as principal aquifers located north of Peekskill in Westchester County (MPs 41 to 43), south of Cold Spring in Putnam County (MPs 51 to 52), and south of New Hamburg in Dutchess County (MP 65). Improvements would primarily occur within the existing right-of-way, and would likely not include a change to the existing water quality and impervious surfaces; therefore, the proposed signal improvements would have minimal direct and/or indirect impacts to the identified aquifers in these areas.

In addition, 10 miles of new third track (MPs 53 to 63) and improvements at the Poughkeepsie Yard/Storage Facility (MPs 71 to 75.8) would be located within urban areas in Dutchess County. The proposed improvements in these areas would not pass over any identified aquifers; therefore, impacts from the proposed additional track would not be anticipated.

North of Poughkeepsie and south of Albany-Rensselaer Station (MPs 75.8 to 140), proposed improvements would include rock slope stabilization (MPs 105 to 130) and three new control points (CP 82, CP 99, and CP 136), as well as station improvements at Rhinecliff Station (MP 89) and Hudson Station (MP 113). New York State principal aquifers would underlie three small areas along this segment of track (near MPs 108, 111, and 135). The area underlying the Hudson River is designated as a New York State principal aquifer, and portions of the track would pass over, or would be located immediately adjacent to, the aquifer. These improvements would occur largely within the right-of-way and would not include substantial impacts outside the right-of-way. Although proposed improvements such as rock slope stabilization may potentially increase impervious surfaces, depending on the design, this would have minimal or no impacts on underlying aquifers.

In addition, Alternative 90A would include the replacement of the Livingston Avenue Bridge, which would extend over the Hudson River between the cities of Rensselaer and Albany. The area underlying the Hudson River is designated as a New York State principal aquifer. Depending on the construction and excavation depths and the design of the proposed bridge replacement, associated construction activities in this area would have the potential to directly and/or indirectly impact the aquifer, but these impacts would be temporary in nature.

Empire Corridor West/Niagara Branch

With Alternative 90A, track improvements would include approximately 10 miles of third track between MPs 169 and 178.5, and Amsterdam Station improvements along the west end of this segment. MP 169 is located on the westernmost edge of the Schenectady Primary Aquifer; the remainder of the segment, including the Amsterdam Station, would be generally located within a principal aquifer that generally underlies the Mohawk River. Adding rail ties and ballast for the new track would involve minimal impacts to underlying aquifers; therefore, the proposed improvements would have minimal direct and/or indirect impacts to the above-mentioned primary and principal aquifers.

Upgrades to interlockings and automatic block signals would also occur at three control points in the Cities of Amsterdam, Utica, and Rome (CP 175, CP 239, and CP 248, respectively). The control points would be located within the boundaries of the principal aquifer, which would generally underlie the Mohawk River. Proposed improvements would primarily occur within the existing right-of-way, and would not likely include a change to the existing water quality and impervious surfaces.

Alternative 90A would include Syracuse Station track improvements (MPs 290 to 294), Rochester Station track and platform improvements (MPs 368 to 373), and third track improvements along 11 miles (MPs 373 to 382) west of the station. Where the railroad enters the City of Syracuse, it would pass over the Baldwinsville Primary Aquifer. Adding rail ties and even ballast for the new track would involve minimal impacts to underlying aquifers. Depending on the construction and excavation depths associated with the proposed station and platform improvements, station improvements could have the potential to minimally impact the Baldwinsville Primary Aquifer. The improvements in the City of Rochester west of the station, including the addition of a third track along 11 miles located largely west of the City of Rochester (MPs 382 to 393) and extending into Genesee County would not be located over an aquifer; therefore, impacts would not be anticipated in this area.

Alternative 90A would include station improvements at the Buffalo-Depew Station (MPs 429 to 432), double track along the Niagara Branch (MPs QDN17 to QDN23), and improvements to the Niagara Falls Maintenance facility (including additional storage tracks and construction of a new maintenance building). The proposed improvements in these areas would not pass over any identified aquifers; therefore, impacts from the proposed additional track would not be anticipated.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles)

between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

Adding rail ties and ballast for the additional track would involve minimal impacts to underlying aquifers. In addition, improvements would primarily occur within the existing right-of-way, and would not likely include a change to the existing water quality and impervious surfaces; therefore, minimal impacts to aquifers would be anticipated. The sections below describe areas where proposed third and fourth track improvements would be located above an aquifer, and, the construction of the tracks and possibly also pervious rail beds would involve minimal impacts to any aquifers in these areas.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, is proposed. With the exception of the impacts to aquifers discussed above, no other impacts would be anticipated.

Empire Corridor West/Niagara Branch

In Schenectady County, the proposed new track construction would occur between MP 159 and MP 167, extending from the City of Schenectady to the west. In addition, proposed improvements would occur at the Schenectady Station (MP 159), and a larger track shift, which may require property acquisition, is proposed for the westernmost part of the county (MP 168). All of the proposed improvements would occur above two aquifer types: the Schenectady-Niskayuna SSA and the Schenectady Primary Aquifer.

Within Montgomery, Herkimer and Oneida Counties, there would be new track additions throughout the county. In addition, proposed station improvements would occur at the Amsterdam Station. The majority of the alignment in these counties would be underlain or immediately adjacent to principal aquifers that generally underlie the Mohawk River.

In Madison County the proposed new track construction would not pass over any aquifers. Therefore, impacts from the proposed additional track to any nearby aquifers would not be anticipated.

Within Onondaga County the proposed new track construction and proposed improvements at the Syracuse Station (MPs 290 to 294) would occur in areas underlain by the Baldwinsville Primary Aquifer (MPs 290 to 307) and principal aquifers (MPs 307 to 309).

In Cayuga and Wayne Counties, the proposed new track construction would pass over areas underlain by principal aquifers on the eastern portion of Cayuga County (MPs 309 to 315) and principal aquifers associated with the Ganargua Creek and nearby tributaries to the Erie Canal (MPs 332 to 337 and 340 to 357) in Wayne County.

Within Monroe County, the proposed new track construction would extend through areas underlain by the Irondongenessee Primary Aquifer on the eastern portion of the county (scattered in and around MPs 358 to 367). In addition, principal aquifers would underlay the alignment on the eastern portion of the county (MPs 357 to 360). Improvements at the Rochester Station (MPs 368 to 373), would occur to the west of the identified aquifers; therefore, no impacts would be

anticipated in this area.

In Genesee County, the proposed new track construction would extend through areas underlain by the Batvia Primary Aquifer (MPs 401 to 405); no other aquifers underlay the alignment in this county.

In Erie County, the proposed third track construction along Empire Corridor West and the double tracking along the Niagara Branch (between MPs QDN2 and QDN7) would not be underlain by a principal aquifer and impacts would not be anticipated. As discussed in Alternative 90A, no other impacts to aquifers are anticipated in Erie and Niagara Counties.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations.

As for the 90B Alternative, adding rail ties and even ballast for the additional track would involve minimal impacts to underlying aquifers. In addition, improvements would primarily occur within the existing right-of-way, and would not likely include a change to the existing water quality and impervious surfaces; therefore, minimal impacts to aquifers would be anticipated.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, is proposed and additional impacts to underlying aquifers and/or adjoining surface water features would not be anticipated to occur.

Empire Corridor West/Niagara Branch

With Alternative 110, track realignments and third and fourth track improvements would traverse the aquifer and surface water features as described in Alternatives 90A and 90B. No other impacts other than those described above for Alternatives 90A and 90B would be anticipated for Alternative 110.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch.

Empire Corridor South

No new improvements, beyond what is proposed for Alternative 90A, would be proposed for Alternative 125 along the majority of Empire Corridor South. However, roughly one mile of the proposed 125 mph track would extend south from Albany-Rensselaer Station to cross the Hudson River. The area underlying the Hudson River is designated as a New York State principal aquifer; therefore, depending on the construction and excavation depths, construction activities in this area may have the potential to temporarily impact the aquifer.

Empire Corridor West/Niagara Branch

Alternative 125 would involve construction of a total of 236 miles of track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. Alternative 125 also would include new right-of-way in most areas, but would merge back with the Empire Corridor over two 15- and 16-mile segments centered on Syracuse and Rochester, respectively.

Construction of a new rail corridor could require more excavations and drainage alterations and therefore would involve a higher potential to directly impact existing groundwater resources than the other alternatives. These actions may include new bridge construction; therefore, there would be the potential for construction of bridge foundations to temporarily or possibly even permanently impact aquifers from the construction of Alternative 125. The sections below describe areas where the proposed railroad alignment would be located above an aquifer, and therefore have the potential to impact these aquifers.

This route covers 126 miles on new alignment between Rensselaer County and a point 8.5 miles east of Syracuse Station. Alternative 125 would extend through Albany and Schenectady Counties over a distance of 20 miles, following the New York State Thruway (I-87/I-90) over most of this distance. This segment of the alignment would extend over New York State principal aquifers (approximately MPs QH147 to QH162) and the Schenectady-Niskayuna Sole Source Aquifer (approximately MPs QH152 to QH153).

In Schoharie and Montgomery Counties, the alignment would extend over New York State principal aquifers (approximately MPs QH173 to QH177 and MPs QH180 to QH185).

In Herkimer and Oneida Counties, Alternative 125 would extend over New York State principal aquifers in several small segments of the alignment (approximately MPs QH202, QH204, QH212, QH215, QH217 to QH220, QH224 to QH226, QH228 to QH230, QH235 to QH236, QH240 to QH241, and QH249 to QH250). In Madison County, the proposed track would extend over a New York State principal aquifer on the easternmost portion of the county (MP QH250).

In Onondaga County, the alignment would merge with the existing Empire Corridor through the City of Syracuse; any proposed improvements in this area would have the same impacts as stated in the 90A/90B/110 Alternatives. Alternative 125 would extend off the existing Empire Corridor on the western city limits and passes over several segments of the Baldwinsville Primary Aquifer (MPs QH285 to QH294). The alignment would then extend through Cayuga County, where only small portions (MPs QH304, QH305, and QH306) overlay New York State principal aquifers.

In Wayne County, Alternative 125 would extend across several small segments of New York State

principal aquifers primarily along the eastern portion of the county (MPs QH313 to QH315, QH316, QH317.5, QH322, QH323, QH324.5, QH325.5, QH327, QH328.5, QH331.5, QH332.5, QH336 to QH337, QH340 to QH341, and QH342). The Ironodgenesee Primary Aquifer is located at the western county boundary (MP QH342). As the alignment extends through Monroe County, it would pass over the Ironodgenesee Primary Aquifer (MPs QH342 to QH345) until merging with the existing Empire Corridor east of the City of Rochester. The alignment would remain on the existing Empire Corridor to the east of the city; no other aquifers would be encountered in the remainder of Monroe County.

In Genesee County, with the exception of a small segment of New York State principal aquifer (approximately MP QH399), the Alternative 125 alignment would not pass over any aquifers. In Erie County, the alignment would extend over small segregated areas (MPs QH408 and QH409) underlain by New York State principal aquifers. The alignment would then merge with the existing Empire Corridor; no other aquifers would be encountered in either Erie or Niagara Counties.

4.12.5. Potential Mitigation Strategies

During the Tier 2 analysis, program designs will be developed and site-specific mapping prepared in order to better assess site-specific impacts of any proposed improvements. To the extent practicable, project development and design will incorporate measures to minimize and/or avoid impacts to water quality and recharge of underlying aquifers. To comply with State water quality standards (i.e., 6 NYCRR Part 703), NYSDOT will identify and incorporate, as appropriate, Stormwater Pollution Prevention Plans (SWPPPs) prepared in accordance with the NYSDEC State Pollutant Discharge Elimination System (SPDES) permit program or Erosion and Sediment Control (ESC) Plans. These plans would address stormwater management and appropriate Best Management Practices (BMPs) into the design of the program. The SPDES construction stormwater general permit program, discussed in Section 4.6, the "Surface Waterbodies and Watercourses," may authorize all discharges of stormwater from construction activity to surface waters of the state and groundwaters for sites disturbing an acre or more of land. Application of BMPs as defined in the SWPPPs or ESC plans will reduce the amount of erosion and sedimentation resulting from construction activities. BMPs could include centralized refueling, storing absorbent material and booms on-site, and locating portable fuel tanks in upland sites on a low permeability substrate.

4.12.6. Future Analysis

During the Tier 2 analysis, program impact assessments based on design and site-specific mapping will be prepared. Projects must meet existing federal requirements regarding Sole Source Aquifers as well as state requirements regarding primary and principal aquifers. If a project is federally funded and will impact a Sole Source Aquifer, federal review and/or approval is required pursuant to Section 1424(e) of the U.S. Safe Drinking Water Act. A Section 1424(e) review is required for federally funded projects in Sole Source Aquifer Areas that may have the potential to create a significant hazard to public health, defined by the U.S. EPA as:

- Exceeding any National Drinking Water Standards at any point where the water may be used for drinking purposes, or
- Otherwise threaten public health.

In making this determination, the following factors, at a minimum, are considered by the U.S. EPA:

- The toxicity of the contaminants involved,
- The volume of contaminants that may enter the aquifer, and
- The physical and chemical hydrogeological characteristics of the aquifer and its attenuation capability.

For the Section 1424(e) review, NYSDOT may be required to prepare a Groundwater Assessment Report, which would be included in the Tier 2 Draft Design Approval Document and program NEPA document(s).

To comply with state law, the NYSDOT must document whether a project would adversely affect a NYSDEC designated primary aquifer, principal aquifer, or drinking water supply sources (e.g., reservoirs, wells, etc.,). Tier 2 will include additional research to identify and document water supplies potentially affected by a project. If a project is not in a NYSDEC designated aquifer but it is within 650 feet of public (municipal) or private drinking water supply sources, feasible modifications to the project that will avoid, minimize or mitigate adverse impacts to the water sources will be evaluated and, if possible, incorporated. If a municipal source is involved, the NYSDOT must coordinate with the affected municipality and the state/local Health Department to discuss any 1) findings (project has or does not have the potential to affect water quality), and 2) appropriate actions, if needed.

In Tier 2, NYSDOT will need to assess, and briefly describe, in the Groundwater Assessment Report, potential positive and negative program impacts to the primary aquifer, principal aquifer, or nearby water sources (e.g., wells). This assessment will evaluate and incorporate modifications to the program that will avoid, minimize or mitigate adverse impacts to the aquifer or drinking water supply sources. NYSDOT should circulate the "Groundwater Assessment Report" to federal transportation agencies funding the program and the U.S. EPA as part of the Tier 2 NEPA review. If a municipal source is involved, NYSDOT may need to coordinate with the affected municipality and the local/state health department.

4.13. General Ecology and Wildlife Resources

4.13.1. Regulatory Context

Wildlife and aquatic habitats are protected under several regulatory programs at the federal and state level. The U.S. Endangered Species Act prohibits the “take” of any plant or animal species listed as endangered or threatened under this act, or their designated critical habitat. Section 7 of the Act requires consultation for actions that may affect listed species or their designated habitats with the U.S. Fish and Wildlife Service (U.S. FWS) (for freshwater and wildlife) and National Marine Fisheries Service (NMFS) (for marine and anadromous species).[119]

State protection of listed species is provided under New York State Environmental Conservation Law (ECL) Title 5-11-0535 Endangered and Threatened Species and Title 15-9-1503 Removal of Protected Plants and corresponding regulations.[120] These state endangered and species protections prohibit the “take” of any plant or animal species listed as endangered, threatened, rare or

[119] / United States Endangered Species Act (16 United States Code [U.S.C.] 1531-1543).
[120] / 6 NYCRR Part 182 (Environmental Conservation Law—Endangered and Threatened Species) and Part 193 (Protected Native Plants)

exploitably vulnerable under these regulations. State regulations also established the Natural Heritage Areas Program in 2002 in order to conserve and manage rare plants and wildlife and significant natural communities on state-owned lands.

Provisions in the U.S. Magnuson-Stevens Fisheries Conservation and Management Act require the NMFS to identify and protect important habitats of federally managed marine and anadromous fish species, or Essential Fish Habitat (EFH). Federal agencies that fund, permit, or undertake activities that may adversely affect EFH are required to consult with the NMFS regarding the potential effects of their actions on EFH.

The ecological and environmental inventory and evaluation considered the impacts of program activities on the environment and are consistent with the approach to environmental impact assessments as described in the Council on Environmental Quality (CEQ) report, *Incorporating Biodiversity Considerations into Environmental Impact Analysis under the National Environmental Policy Act (NEPA)* and Federal Railroad Administration (FRA) Procedures for Considering Environmental Impacts (65 Federal Register [FR] 28545).

This ecological assessment also was performed in accordance with the New York State Department of Transportation (NYSDOT) The Environmental Manual (TEM) provides guidance and restrictions for planning and designing applicable highway projects.

The United States Department of the Interior, National Park Service (NPS) designates certain privately- and publicly-held lands across the country as National Natural Landmarks (NNL). This designation is based on the lands' unique or rare ecological characteristics. Although there are no specific federal or state regulations for NNLs, governing regulations for the NNL Program state that any federal project that is subject to NEPA, "*…should consider the existence and location of designated national natural landmarks…in assessing the effects of their activities on the environment under section 102(2)(c) of the National Environmental Policy Act*." (16 U.S.C. 1a–5, 461 et seq., 463, 1908).[121]

Protection of migratory birds is also provided under U.S. FWS Migratory Bird Treaty Act of 1918, which prohibits, unless permitted by regulations, the "take" of any migratory bird[122]. The Federal Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) provides for the protection of bald and golden eagles. Birds are also protected under state legislation.

State legislation establishing the Bird Conservation Area (BCA) program was enacted on September 5, 1997 to safeguard and enhance populations of native wild birds and habitats that birds are dependent upon on state-owned lands and waters. According to ECL §11-2001, a site must meet one or more of the following criteria to be designated as a Bird Conservation Area: waterfowl concentration site, pelagic seabird site, shorebird concentration site, wading bird concentration site, migratory concentration site, diverse species concentration site, individual species concentration site, species at risk site, and bird research site (see BCA Criteria).

[121] / "National Natural Landmarks Program." *Federal Register* 64 (May 12, 1999) p. 25717.
[122] / Migratory Bird Treaty Act of 1918 (MBTA), (16 U.S.C. 703–712).

4.13.2. Methodology

Information on ecological habitat and endangered and threatened species for study areas within a half-mile of the corridor centerline for all alternatives was obtained from the U.S. FWS, the NYSDEC, and the New York Natural Heritage Program. Information from the U.S. FWS on federal listing status and occurrences by county was consulted. The National Marine Fisheries Habitat Conservation Division for the Northeastern U.S. *Guide to Essential Fish Habitat Designations* and *Guide to Essential Fish Habitat Descriptions* for the Hudson River was consulted to identify EFH. GIS information obtained included NYSDEC mapping of ecological zones and New York Natural Heritage Program mapping of occurrences of listed species. Digital data from NYSDEC consulted included mapping of significant natural communities.[123] NYSDEC GIS mapping for designated bird conservation areas was also consulted.

4.13.3. Existing Conditions

The following sections address ecological zones in the one-mile wide study area for the Empire Corridor (90/110 Study Area) and the 125 Study Area. The documented occurrences and likelihood of occurrences for federally and state-endangered/threatened species in each study area is presented, along with documented occurrences of NYNHP-designated Natural Heritage Areas and significant natural communities within a half- mile of the corridor centerlines. The Essential Fish Habitats protected under the U.S. Magnuson-Stevens Fisheries Conservation and Management Act, state-protected Bird Conservation Areas on public lands, and other ecologically significant areas (such as National Natural Landmarks) within a half- mile of the corridor centerline are also covered.

Ecological Zones

Along the 464-mile Empire Corridor 90/110 Study Area and the 450-mile 125 Study Area, the corridor centerlines transition through areas of urban, suburban, and rural habitats. Five ecological zones (Zones, B, C, D, F, and H), as documented by the NYSDEC, are identified within each corridor study area (refer to Exhibit 4-21). The topography ranges from low-elevation floodplains to steep hills, and vegetation is generally considered part of the north hardwood vegetation zone.[124]

The ecological zones are described below:

- **Zone B—Great Lakes Plain(major habitat):** This ecozone along Empire Corridor West and Niagara Branch comprises almost half of the study area. The two subzones are:
    - **Drumlin:** This zone is situated in the elm-red-maple northern hardwood natural vegetation zone. Structurally, it is a plateau with horizontal rock formations. The Drumlin subgroup has elongated hills that formed from glacial deposits. This ecological subzone comprises 15 percent of the 90/110 Study Area and 23 percent of the 125 Study Area.

[123] / NYSDEC, GeoData Inventory: <http://www.dec.ny.gov/geodata/>.

[124] / NYSDEC, "EcoZones," Accessed June 2011. <http://www.nysgis.state.ny.us/gisdata/inventories/details.cfm?DSID=1131>.

Exhibit 4-21—New York State Ecological Zones Located Within the Study Area

Zone	Habitat		Location	Acres in Study Area	
	Major	Minor		90/110 Study Area	125 Study Area
Zone B	Great Lakes Plain	Drumlin	Monroe	3,353	3,130
			Wayne	23,732	22,386
			Cayuga	7,344	7,087
			Onondaga	9,403	9,550
		Erie-Ontario Plain	Niagara	8,534	8,534
			Erie	19,870	21,524
			Genesee	19,204	19,025
			Monroe	16,432	15,773
			Wayne	0	307
			Onondaga	10,548	10,634
			Madison	9,009	9,311
			Oneida	11,348	11,283
Zone C	Mohawk Valley	Mohawk Valley	Oneida	6,900	2,871
			Herkimer	16,172	16,211
			Montgomery	25,696	13,618
			Schoharie	0	3,664
			Schenectady	3,928	7,670
Zone D	Hudson Valley	Central Hudson	Schenectady	5,546	3,670
			Albany	8,491	9,834
			Rensselaer	7,558	7,199
			Columbia	15,716	15,716
			Greene	2,792	2,792
			Dutchess	25,045	25,045
			Ulster	3,282	3,282
			Orange	234	234
Zone F	Hudson Highlands	Hudson Highlands	Dutchess	877	877
			Orange	1,410	1,410
			Putnam	4,629	4,629
			Rockland	559	559
			Westchester	1,433	1,433
Zone H	Manhattan Hills	Manhattan Hills	Rockland	48	48
			Westchester	18,036	18,036
			Bronx	878	878
			New York	4,195	4,195

Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within a half-mile of the corridor centerline.

Source: NYSDEC, 2011.

  - **Erie Ontario Plain:** This zone is situated in the elm-red-maple northern hardwood natural vegetation zone. Only about one-fifth of the land is forested. Structurally, it is a plateau with horizontal rock formations. This ecological subzone comprises 33 percent of the 90/110 Study Area and 26 percent of the 125 Study Area.

- **Zone C—Mohawk Valley (major/minor habitat):** The Mohawk Valley is in the northern hardwood natural vegetation zone. Nearly all the forest is on farms. Terrain consists of either rolling plains with gentle slopes, or hills with moderate slopes. This ecozone west of and including Schenectady County comprises 18 percent of the 90/110 Study Area and 16 percent of the 125 Study Area.

- **Zone D—Hudson Valley (major habitat), Central Hudson (minor habitat):** The Hudson Valley is part of the oak-northern hardwood natural vegetation zone. Pitch pines and scrub oaks are found in the sand plains in the Albany vicinity. A complex of hills and terraces are underlain with highly folded sedimentary rock. This ecozone that extends from Orange and Dutchess Counties north to Albany and Schenectady Counties comprises 24 percent of both the 90/110 and 125 Study Areas .

- **Zone F—Hudson Highlands (major/minor habitat):** This zone is in the oak natural vegetation zone. Young stands of pioneer hardwoods and oaks are most common. This zone is continuous with the New Jersey Highlands to the south. The terrain is rolling to steep and is rough and stony. This ecozone, from Westchester County north, comprises 3 percent of the study area.

- **Zone H—Manhattan Hills (major/minor habitat):** The Manhattan Hills are considered part of the oak and the oak-northern hardwood natural vegetation zones. Pioneer hardwoods and oaks are most common. The terrain is rolling to hilly. This ecozone, which includes the metropolitan New York area, comprises 8 percent of the study area.

Threatened and Endangered Species

Upon consultation with the resource agencies, it was documented that 102 plant and wildlife species listed as federally and/or state-endangered or threatened are known to occur in the vicinity of the Empire Corridor (90/110 Study Area) and 119 species in the vicinity of the 125 Study Area. Exhibit G-19 and G-20 of Appendix G presents the list of federally and state-endangered and threatened species documented or suspected to potentially occur within the one-mile-wide study area for both the 90/110 mph and the 125 mph study areas. The species protective status and county of known occurrence for both study areas are included in Exhibit 4-22 and Exhibit 4-23, along with a summary of the number of species occurrences by county.

Of the 102 species in the Empire Corridor (90/110 Study Area), one is a mammal, three are fish species, nine are birds, six are reptiles, three are invertebrates, two are mollusks, and the vast majority (78) are plants. There are 12 federally listed endangered or threatened species, and 90 state-listed species.

Of the 119 species in the 125 Study Area, one is a mammal, three are fish species, nine are birds, six are reptiles, three are invertebrates, two are mollusks, and the remainder (95) are plants. There are 12 federally listed endangered or threatened species, and 107 state-listed species.

Exhibit 4-22—Federally and State Endangered-Threatened Species Occurrences in the 90/110 Study Area

County	Federal Status		State Status	
	Endangered	Threatened	Endangered	Threatened
New York	2	0	4	0
Bronx	2	0	2	4
Westchester	3	1	14	6
Rockland	3	2	5	4
Putnam	3	1	8	9
Orange	4	2	8	4
Dutchess	4	1	13	15
Ulster	3	3	10	5
Columbia	3	1	6	10
Greene	3	0	6	6
Rensselaer	3	0	4	2
Albany	4	1	10	9
Schenectady	2	0	3	1
Montgomery	0	0	0	1
Herkimer	0	0	0	0
Oneida	1	0	4	5
Madison	1	2	2	3
Onondaga	1	4	6	5
Cayuga	1	1	4	3
Wayne	1	2	6	6
Monroe	0	1	4	3
Genesee	0	3	3	4
Erie	0	0	2	5
Niagara	0	1	1	4

Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The study area width is defined as being within a half-mile of the corridor centerline.

Sources: U.S.FWS, 2011; NYSDEC, 2011

There are five federally endangered species in the study area: shortnose sturgeon (*Acipenser brevirostrum*), Atlantic sturgeon (*Acipenser oxyrhynchus*), Indiana bat (*Myotis sodalis*), dwarf wedge-mussel (*Alasmidonta heterodon*), and Karner blue (*Lycaeides melissa samuelis*). The Hudson River provides habitat for federally protected species in all Empire Corridor South counties between New York and Albany. The New York Bight Distinct Population Segment of Atlantic sturgeon was listed under the U.S. Endangered Species Act on February 6, 2012[125] and is also documented in the Hudson River. According to the NYSDEC website, in New York, Atlantic sturgeon is generally found in the deeper portions of the Hudson River. While occasionally found as far upriver as Albany, young fish are rarely seen upstream of Hudson in Columbia County.[126]

[125] / National Marine Fisheries Service, "Endangered and Threatened Wildlife and Plants; Threatened and Endangered Status for Distinct Population Segments of Atlantic Sturgeon in the Northeast Region., Federal Register/Vol. 77, No. 24, 50 CFR Parts 223 and 224. February 6, 2012.

[126] / NYSDEC, "New York Sturgeon," Accessed October 27, 2011. < http://www.dec.ny.gov/animals/7025.html >

Exhibit 4-23—Federally and State Endangered-Threatened Species Occurrences in the 125 Study Area

County	Federal Status		State Status	
	Endangered	Threatened	Endangered	Threatened
New York	2	0	4	0
Bronx	2	0	2	4
Westchester	3	1	14	6
Rockland	3	2	5	4
Putnam	3	1	8	9
Orange	4	2	8	4
Dutchess	4	1	13	14
Ulster	3	3	10	5
Columbia	3	1	6	10
Greene	3	0	6	6
Rensselaer	3	0	4	2
Albany	4	1	10	13
Schenectady	2	0	3	0
Schoharie	1	0	1	0
Montgomery	0	0	0	0
Herkimer	0	0	1	0
Oneida	1	0	4	2
Madison	1	2	2	6
Onondaga	1	4	6	5
Cayuga	1	1	7	4
Wayne	1	2	5	6
Monroe	0	1	5	3
Genesee	0	3	10	12
Erie	0	0	2	5
Niagara	0	1	1	3

Note: The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within a half-mile of the corridor centerline.

Sources: U.S.FWS, 2011; NYSDEC, 2011

An assessment of each species' potential to occur in each study area is included in Exhibit G-19 and G-20 of Appendix G. Exhibit 4-22 and Exhibit 4-23 below summarizes the numbers of endangered and threatened species occurrences within a half-mile of the corridor centerline. This assessment was based on the habitat, range, ecological requirements and the date and quality of the occurrence record for each species known to occur in the vicinity of the Empire Corridor study areas. The following criteria were used to determine whether a resource has a high, moderate, low, or unlikely potential for occurrence in the study areas.

- **High (H):** Suitable habitat for listed resource is present in the study area and a resource occurrence has been recorded in the study area after 1980. The resource has a high probability of being found on the site.
- **Moderate (M):** Suitable habitat occurs within the study area and/or a resource occurrence has been recorded in the study area before 1980 and/or a resource occurrence has been recorded near, but not within the study area. The resource has a moderate probability of being found on

the site. If existing data proved inadequate to assess species' potential for occurrence in the study area, the potential was considered Moderate by default.

- **Low (L):** Suitable habitat is present, or marginal habitat is present in the study area, and/or the study area is not within the resources' historic range, and/or there are no documented occurrences of the resource within or near the study area. The resource has a low probability of being found on the site.

- **Unlikely (U):** Suitable habitat is not found in the study area, the study area is not within the historic or current range of the resource, or there are no documented occurrences of the resource within or near the study area. It is unlikely that the resource would be found on the site.

Based on these criteria, a total of 67 species are considered to have a high or moderate potential for occurrence in the Empire Corridor (90/110 Study Area). This includes eight birds, three fish, two invertebrates, one mammal, 49 vascular plants and four reptile species.

Of the species with a high to moderate potential for occurrence in the Empire Corridor (90/110 Study Area), five are federally listed, with four endangered and one threatened species. The species with a moderate to high likelihood of occurrence include 62 state-listed species, 21 of which are endangered and 41 are threatened.

A total of 77 species are considered to have a high or moderate potential for occurrence in the 125 Study Area. This includes eight bird, three fish, two insect, one mammal, 59 vascular plant, four reptile species. Of the species with a high to moderate potential for occurrence in the 125 Study Area, five are federally listed, with four endangered and one threatened species. The species with a moderate to high likelihood of occurrence include 72 state-listed species, 28 of which are endangered and 44 are threatened.

Sixteen species were ranked as unlikely to occur in the Empire Corridor (90/110 Study Area), and 20 were ranked as unlikely to occur in the 125 Study Area. The species ranked as unlikely to occur may include a federally listed species that occurs in the same county, but which is not documented or expected to occur in the study area. Conversely, state records at one point in time may have indicated an occurrence, whereas the updated records may indicate the species is extirpated or the quality of the NYNHP record is poor and more current records from other sources indicate the species is unlikely to occur.

Essential Fish Habitat

The National Marine Fisheries Service (NMFS) has designated thirteen species of fish as Essential Fish Habitat (EFH) in the study area. Exhibit 4-24 shows species for which EFH has been designated by the NMFS and the life stage that has the potential to be found in the study area. The EFH occurrence analysis compared the associated species' life stage, water depth and salinity requirements to those ecological parameters within the Hudson River.

EFH species in the study area from New York to Greene Counties, in decreasing order of county occurrences, include summer flounder (*Paralicthys dentatus*), red hake (*Urophycis chuss*), winter flounder (*Pseudopleur onectes americanus*), windowpane flounder (*Scopthalmus aquosus*), Atlantic sea herring (*Clupea harengus*), bluefish (*Pomatomus saltatrix*), black sea bass (*Centropristus*

Exhibit 4-24—Essential Fish Habitat in the Study Area

EFH Species/Stages	County of Potential Occurrence*									
Common Name *Scientific Name* Life Stage	New York	Bronx	West-chester	Rockland	Putnam	Orange	Dutchess	Ulster	Columbia	Greene
Red Hake *Urophycis chuss*	LJA	LJA	LJA	LJA	LJA	LJA				
Winter Flounder *Pseudopleuronectes Americanus*	ELJASa	ELJASa	ELJASa	ELJASa	ELJASa	ELJASa				
Window-pane Flounder *Scopthalmus aquosus*	ELJASa	ELJASa	ELJASa	ELJASa	ELJASa	ELJASa				
Atlantic Sea Herring *Clupea harengus*	LJA	LJA	LJA	LJA	LJA	LJA				
Bluefish *Pomatomus saltatrix*	JA	JA	JA	JA	JA	JA				
Atlantic butterfish *Peprilus triacanthus*	JA	JA	LJA	LJA						
Atlantic mackerel *Scomber scombrus*	JA	JA								
Summer flounder *Paralicthys dentatus*	LJA	LJA	LJA	LJA	LJA	LJA	L	L	L	L
Scup *Stenotomus chrysops*	ELJA	ELJA								
Black sea bass *Centropristus striata*	JA	JA	JA	JA	JA	JA				
King mackerel *Scomberomorous cavalla*	ELJA	ELJA								
Spanish mackerel *Scoberomorous maculatus*	ELJA									
Cobia *Rachycentron canadu*	ELJA	ELJA								

Note: Life stages are: E = eggs, L = larvae, J = juveniles, A = Adults, Sa = spawning adults

striata), Atlantic butterfish (*Peprilus triacanthus*), Atlantic mackerel (*Scomber scombrus*), scup (*Stenotomus chrysops*), king mackerel (*Scomberomorus cavalla*), cobia (*Rachycentron canadum*), and Spanish mackerel (*Scomberomorus maculates*).

Natural Heritage Areas/Significant Natural Communities

The only designated Natural Heritage Areas in the study area is the Tivoli Bays. In 2007, the Tivoli Bays was designated by NYSDEC as the first Natural Heritage Area in New York State[127]. The

[127] / NOAA, *Hudson River National Estuarine Research Reserve: Revised Management Plan, 2009-2014.* Accessed January 12, 2011. <http://www.dec.ny.gov/docs/remediation_hudson_pdf/hrnerrmpall.pdf>

designation of the Tivoli Bays Natural Heritage Area made the protection of rare plants, fauna, and natural habitats a key management priority of the site.

The NYNHP maintains a comprehensive database on the status and location of natural communities in New York State. The NYNHP considers "significant" natural communities to be those that are rare in New York State or that are "outstanding" examples of more common communities. Presently, 174 natural community types are monitored throughout the state. Of these, 103 communities are located in the existing Empire Corridor (90/110 Study Area) and 107 communities are located in the 125 Study Area. Significant natural communities identified this way are not afforded state or federal legal protective status, but they are addressed in the analyses due to their important role in statewide ecological conservation. Exhibit 4-25 shows the known distribution of significant natural communities located in the vicinity of the study area.

Bird Conservation Areas

There are six bird conservation areas located in both study areas. Iona Island/Doodletown bird conservation area is located in Bear Mountain State Park along the western side of the Hudson River in Rockland County. The 1,500 acres of tidally-influenced wetlands and adjacent uplands are managed by the Palisades Park Commission. Constitution Marsh is a 270-acre tidal marsh, owned by NYSDEC and Office of Parks, Recreation, and Historic Preservation and has been managed by the National Audubon Society as a wildlife sanctuary since 1970.[128] It is located in Putnam County on the east shore of the Hudson River. Tivoli Bay, part of the NYSDEC Tivoli Bay State Unique Area, extends for two miles along the east shore of the Hudson River between the Villages of Tivoli and Barrytown, in Dutchess County.[129] Schodack Island State Park is located just off the eastern shore of the Hudson River in Rensselaer County. Approximately seven miles of Hudson River and Schodack Creek shoreline bound the 1,052-acre site, which is part of the New York State Park System managed by the NYSDEC.[130] Approximately 1,514 acres of the Albany Pine Bush Preserve (described below) are designated as a bird conservation area. The Montezuma Wetlands Complex bird conservation area consists of 7,500 acres within a larger complex of state, federal and privately-owned lands that offer high-quality wetland and upland habitat in Wayne County and Cayuga County.[131]

Other Conservation and Ecologically Significant Areas

Other ecological habitats include Significant Coastal Fish and Wildlife Habitats designated under the state coastal program, Critical Environmental Areas designated for protection under the State Environmental Quality Review Act, and publicly owned and non-profit parks. Under the U.S. Coastal Zone Management Act, the State of New York has established a state coastal program. As part of the state's coastal program, 31 Significant Coastal Fish and Wildlife Habitats within a half-mile of the corridor centerline have been designated for protection. These designated areas are addressed in Section 4.11.

The State Environmental Quality Review Act also provides for designation of Critical Environmental

[128] / National Audubon Society. "Constitution Marsh Audubon Center & Sanctuary," Accessed June 2011. <http://www.constitutionmarsh.org>

[129] / NYSDEC. "DEC Lands," Accessed June 2011. <http://www.dec.ny.gov/lands/4915.html>

[130] / NYSDEC, "New York State Parks," Accessed June 2011. <http://nysparks.state.ny.us/parks/146/details.aspx.>

[131] / NYSDEC, "DEC Lands, " Accessed June 2011. < http://www.dec.ny.gov/lands/25341.html>

Exhibit 4-25—Significant Natural Communities in the Study Area

County	Number of Communities	Types of Significant Natural Communities
Westchester	6	Brackish intertidal mudflats, chestnut oak forest, oak tulip tree forest, rocky summit grassland, Appalachian oak hickory forest, brackish tidal marsh.
Rockland	2	Brackish intertidal mudflats, brackish tidal marsh.
Putnam	10	chestnut oak forest, pitch pine-oak heath rocky summit (three locations), red cedar rocky summit, Appalachian oak hickory forest, oak tulip tree forest, brackish intertidal mudflats, brackish tidal marsh, chestnut oak forest
Orange	2	Brackish tidal marsh, brackish intertidal mudflats.
Dutchess	28	Freshwater tidal swamp (four locations), freshwater tidal marsh (six locations), hemlock northern hardwood forest, freshwater intertidal mudflats (four locations), freshwater intertidal shore (two locations), brackish intertidal mudflats, brackish tidal marsh, hemlock northern hardwood forest, limestone woodland, oak tulip tree forest, red cedar rocky summit, chestnut oak forest, pitch pine-oak heath rocky summit, red cedar rocky summit, Appalachian oak hickory forest, oak tulip tree forest.
Ulster	4	Freshwater intertidal shore, freshwater tidal swamp, freshwater intertidal mudflats, freshwater tidal marsh.
Columbia	22	Freshwater intertidal shore, calcareous cliff community, freshwater tidal swamp (three locations), freshwater tidal marsh (nine locations), freshwater intertidal shore, freshwater intertidal mudflats (six locations), floodplain forest.
Greene	11	Freshwater tidal marsh (five locations), floodplain forest, freshwater intertidal mudflats (two locations), freshwater tidal swamp, freshwater tidal creek (two locations).
Rensselaer	2	Floodplain forest, freshwater tidal marsh.
Albany	5	Freshwater tidal marsh, pine barrens vernal pool (two locations), pitch pine-scrub oak barrens, pitch pine-oak forest.
Montgomery	2	Calcareous cliff community, calcareous talus slope woodland.
Herkimer	1	Floodplain forest.
Onondaga	1	Inland salt pond.
Cayuga	2	Floodplain forest[1], Rich graminoid fen[2].
Genesee	4	Silver-maple ash swamp[2], Rich graminoid fen[2], Northern white cedar swamp[2], Marl fen[2].
Wayne	3	Floodplain forest (two locations), silver maple-ash swamp.
Erie	1	Rich graminoid fen.
Niagara	2	Calcareous talus slope woodland, calcareous cliff community.

[1]Occurs only in the Empire Corridor 90/110 study area.
[2]Occurs only in the Empire Corridor 125 study area.
Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within a half-mile of the corridor centerline.

Source: New York Natural Heritage Program, NYSDEC. February 2011 and January 2012. Biodiversity Databases, Element Occurrence Record Digital Data Set. Albany, New York

Areas, including those that are ecologically significant. The five SEQR Critical Environmental Areas within the study area are addressed in Section 4.14.

Section 4(f) of the U.S. Department of Transportation (U.S. DOT) Act (49 U.S.C. 303(c)) of 1969, as amended, provides protection of publicly owned wildlife refuges, parks, and recreation areas. Habitat areas within the study area that are protected under Section 4(f) include a National Wildlife Refuge, state Wildlife Management Areas and Unique Areas and preserves, and state, county, municipal, and non-profit conservation areas and parks. These areas are identified and addressed in Section 4.16 ("Parks and Recreational Areas").

In addition to the above areas, the **Albany Pine Bush Preserve** as defined in ECL Article 46 is identified under the Parks and Recreation section, but is a known area of conservation concern. This area's ecological significance, location within the Empire Corridor study areas, and legal protection, is of particular note.

In 1988, the New York State Legislature created the Albany Pine Bush Preserve (Preserve) and Commission under ECL Article 46 to manage and protect the endangered natural communities and species of the Albany Pine Bush. Located in the heart of the Capital District Region, the Albany Pine Bush represents one of the best remaining examples of an inland pine barrens ecosystem in the world. It is a sand plain with a diverse plant and animal community, including 20 rare species and two rare natural communities. The ownership of the lands within the preserve is a mosaic of public and private holdings. Public lands within the preserve are owned by NYSDEC and the New York Office of Parks, Recreation and Historic Preservation; the remainder is privately held. All lands within the preserve are managed under 6 NYCRR Part 648, which restricts any use of the preserve that does not comply with the management plan outlined in that regulation.

There are approximately 3,631 acres of the preserve located in Albany County within the one-mile-wide existing Empire Corridor (90/110 Study Area); there are approximately 3,984 acres of the preserve within the 125 Study Area. The two Empire Corridor study areas both cross the preserve roughly between the northeastern edge of the City of Albany to the county line with Schenectady.

There are two properties with National Natural Landmark status within a half-mile of the Empire Corridor (90/110 Study Area) corridor centerline, including **Iona Island** in Rockland County (described above) and **Moss Island** in Herkimer County. Approximately 252 acres of state-owned Iona Island is a designated NNL based on the island's estuarine habitat and presence of rare plants. The state-owned Moss Island in the Mohawk River is considered to have excellent examples of glacially-influenced hydrology and geology.

In addition to the Iona Island NNL mentioned above, **Hart's Woods** in Monroe County and **Bergen Swamp** in Genesee County are NNLs within the 125 Study Area. Hart's Woods, also known as Beechwood Park, is owned by the Town of Perinton in Monroe County. The NNL designation for Hart's Woods is based on the presence of remnant stands of original beech-maple forests. Bergen Swamp and other lands privately held by the Bergen Swamp Preservation Society (BSPS) encompass approximately 3,000 acres in northeastern Genesee County. The BSPS land is actively managed for ecological preservation, education, and science and the property supports a number of known populations of threatened and endangered plant and wildlife species.[132]

[132] / Bergen Swamp Preservation Society. Website homepage. Website accessed January 2012. Available: <http://www.bergenswamp.org/>

4.13.4. Environmental Consequences

The sections below identify elements of each alternative that have the potential to impact ecological resources, including threatened and endangered plants and animals, avian species protected under the Migratory Bird Treaty Act (MBTA), Essential Fish Habitat (EFH), National Natural Landmarks (NNL), bird conservation areas, significant natural communities, and other ecologically significant areas. Actions associated with each alternative such as direct disturbance of terrestrial habitat, waterway crossings, increased frequency of train trips, and higher operating speeds would all have the potential to impact plant or wildlife species or natural habitats. This preliminary assessment of potential impacts to native habitats and both protected and common plant and wildlife species is based on Tier 1 concepts and mapping and will be further refined in Tier 2. As the project development process advances, efforts to avoid impacts to ecological resources will be made when designs are further developed.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure. Work associated with this alternative will not likely result in impacts caused by habitat fragmentation.

Empire Corridor South

The Base Alternative will include signal and grade crossing improvements along the 64 miles of Empire Corridor South (ES-3 and ES-1, MPs 75.8 to 140) north of Poughkeepsie to just south of Albany-Rensselaer Station. These work areas will be adjacent to the Hudson River in many locations, and there are two bird conservation areas and several records of sensitive ecological resources with the potential to occur within a half-mile of the corridor centerline along this portion of the tracks. Some sensitive species have been documented to occur adjacent to the rail right-of-way and the rail tracks pass directly through some areas identified as significant natural communities. The proposed work will occur within the existing rail beds; however, since the proposed activities will involve minimal ground disturbance, direct impacts to ecological resources will not be anticipated.

The Base Alternative will also involve the addition of a fourth track and platform extension at the Rensselaer Station near the Albany county line (ES-9, MPs 141 to 143), which is located entirely within an urban area and will not involve impacts to ecological resources.

Empire Corridor West/Niagara Branch

The Base Alternative will involve 17 miles of second track between the Albany-Rensselaer and Schenectady stations (ES-10, MPs 141 to 160), as well as reconstruction of the Schenectady Station (EW-01, MP 159.8). There are protected species and significant natural communities with a high or moderate potential to occur in the half-mile buffer associated with this portion of the tracks. Additionally, the Albany Pine Bush Preserve, a bird conservation area and home to several threatened and endangered species, is located next to the tracks within this portion of the alignment. If work in this area includes disturbance of vegetation or encroachment beyond the

existing tracks, these resources in particular will have the potential to be impacted.

Track improvements in Syracuse (EW-6, MPs 287 to 291), Rochester Station track and platform improvements (EW-19, MPs 368 to 373) and improvements for the new Niagara Falls Intermodal Transportation Center (EW-13, MP QDN28.2) are proposed on the Empire Corridor West and Niagara Branch. Although there are several records of sensitive resources within a half-mile of the corridor centerline in the vicinity of this proposed work, the work will not likely involve impacts to ecological resources because the work will be located within the existing rail beds or in an urban area.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, and signalization, in addition to improvements proposed under the Base Alternative previously described. Alternative 90A would also result in an increase of five trips per day.

New tracks proposed under this alternative would not extend more than 15 feet laterally from the current mainline tracks. As such, habitat fragmentation is not anticipated since work would be conducted within the right-of-way. Additional station improvements proposed under this alternative would be located within existing building and track infrastructure and would not likely impact ecological resources.

Empire Corridor South

Alternative 90A would include construction of four miles of second track through urbanized areas of Manhattan (SRP-1, MPs 9 to 13), and 1.4 miles of new track extending under the Tappan Zee Bridge (SRP-2) for the Tarrytown Pocket Track/Interlocking. There are several records of sensitive species and Essential Fish Habitat within a half-mile of the corridor centerline in the vicinity of these proposed work locations, primarily occurring in the Hudson River. Construction could affect aquatic species if construction work is conducted within or indirectly affects the Hudson River.

Ten miles of new third track (SRP-3, MPs 53 to 63) would be installed within or adjacent to a bird conservation area and areas of known occurrences of significant natural communities and protected plant and wildlife populations. Improvements at the Poughkeepsie Yard/Storage Facility (ES-13, MPs 71 to 75.8) and rock slope stabilization north of the Poughkeepsie station (ES-04, five locations between MPs 105.3 to 130, one location at MP 119, and 4 locations at MPs 128.1-130) would include work in areas where there is a moderate to high potential for protected species and significant natural communities to occur within a half-mile of the corridor centerline. In addition, rock slope stabilization near MP 130 would include work near the Shodack Island bird conservation area. Work in the above-mentioned areas that may involve tree clearing or disturbance of terrestrial or aquatic habitats may impact nesting bird habitat, protected species or significant natural communities, and any work conducted over or directly adjacent to the Hudson River would have the potential to impact aquatic resources. However, work in these areas would occur within the existing right-of-way thereby minimizing the potential for ecological impacts.

Alternative 90A would include the replacement of the Livingston Avenue Bridge (ES-15) over the Hudson River. There are records of protected resources at this location, and work there would have the potential to impact EFH, protected aquatic species, or other aquatic habitat through

temporary or permanent direct habitat disturbance.

Empire Corridor West/Niagara Branch

Track improvements along the Empire Corridor West/Niagara Branch would include 10 miles of third track between MPs 169 and 179 (EW-14a), and Amsterdam Station improvements along the west end of this segment (EIS-1, MP 177.6). Additionally, installation of a third track and access road at approximately MP 167 would pass through an area that is currently vegetated. There are no known populations of protected resources with a high or moderate potential for occurrence within a half-mile of the corridor centerline along this stretch of tracks. However, any vegetation removal would have the potential to impact terrestrial habitat, such as nesting birds. Updates to three control points (EW-05, MPs 175, 239 and 248) would not likely impact ecological resources because work would be performed in existing right-of-way thereby minimizing the potential for ecological impacts.

Alternative 90A would include Syracuse Station track improvements (EIS-6, MPs 290 to 294), addition of a third track along 11 miles located largely west of the designated urban area around Rochester (EW-20, MPs 382 to 393), and third track improvements along 11 miles (EW-16, MPs 373 to 382) west of the station. These are primarily urban areas and there is one known occurrence of a sensitive resource within a half-mile of the corridor centerline at the proposed work location. Therefore, impacts to this sensitive resource would be unlikely.

Station improvements at the Buffalo-Depew Station (EIS-10, MPs 429 to 433) would involve potential disturbance to vegetated areas within the current station footprint. Although there are no known occurrences of protected plant, wildlife or habitats in these areas, this work could impact nesting birds through the removal of vegetation. Double track (EW-17, MPs QDN17 to QDN23.2) along the Niagara Branch and Niagara Falls Maintenance Facility and track improvements (EW-18 and EIS-12, MPs 25 to 28) would not involve work outside of the existing right-of-way and therefore impacts to ecological resources would be unlikely.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

Due to the increase in track construction outside of the right-of-way for Alternative 90B, habitat encroachment would be more likely to occur with Alternative 90B than for Alternative 90A. As with Alternative 90A, an increase in service trips would occur. There are also a higher number of protected resources with a moderate or high potential for occurrence within a half-mile of the areas where new track and roads are proposed, and therefore Alternative 90B would have a higher potential to impact protected species and habitats, compared to Alternative 90A. Additional station improvements proposed under this alternative would be located within existing building and track infrastructure and would not likely impact ecological resources.

Empire Corridor South

No additional work within Empire Corridor South, other than for Alternative 90A, is proposed, and there would be no potential for additional impacts to ecological resources in this area for Alternative 90B.

Empire Corridor West/Niagara Branch

In areas identified for a dedicated fourth track and possible access roads (MPs 170 to 179, 204 to 216, 235 to 239, 301 to 309, and 375 to 383), Moss Island, a National Natural Landmark (NNL) and one record of a protected resource with a high potential for occurrence is located within a half-mile of the corridor centerline.

A dedicated third track is proposed between MP 159 in Schenectady County to MP 432 in Erie County. In addition to the resources identified in track segments involving work for a fourth track, there are approximately 63 species with a high or moderate potential to occur within a half-mile of the corridor centerline. Furthermore, Montezuma Marsh (a NNL and bird conservation area), and nine significant natural communities occur between MP 159 and MP 432. Work within these portions of the Empire Corridor could directly or indirectly impact these ecological resources through actions that could result in habitat conversion or habitat disturbance.

Areas proposed for road realignment or property acquisition at MP 192 would be within less than a half-mile of known occurrences of sensitive resources, and thus would have the potential to impact these resources through habitat disturbance. Other areas proposed for road realignment or property acquisition under this alternative would not be in the vicinity of sensitive resource occurrences, however any vegetation removal has the potential to impact habitat for wildlife such as birds.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations.

Due to an increase in MAS and an even greater increase in track realignments outside of the right-of-way proposed with Alternative 110, impacts such as habitat encroachment would be more likely to occur than with Alternatives 90B. The total number of sensitive resources identified as potentially occurring within a half-mile of the proposed physical improvement areas for Alternative 110 would be the same as for Alternative 90B. Alternative 110 would have a higher likelihood of impacts to ecological resources than Alternatives 90B due to the increase in work outside of the right-of-way and existing track bed.

Empire Corridor South

No additional work within Empire Corridor South, other than for Alternative 90A, is proposed, and there would be no potential for additional impacts to ecological resources in this area for

Alternative 110.

Empire Corridor West/Niagara Branch

In areas identified for a dedicated fourth track under Alternative 110 (MPs 174 to 184, 218 to 229, 235 to 239, 249 to 259, 310 to 320, and 388 to 399), there are two records of sensitive natural communities and five records of protected species with a moderate or high potential for occurrence within a half-mile of the corridor centerline. Within the stretch of tracks identified for a dedicated third track (MP 159 and MP 432) there are an additional 58 species with a high or moderate potential to occur within a half-mile of the corridor centerline. In addition, Moss Island (a NNL) and Montezuma Marsh (a NNL and bird conservation area), and seven significant natural communities occur within this stretch of tracks. Therefore, construction activities associated with the addition of third and fourth track that would result in vegetation clearing or habitat disturbance would have the potential to impact ecological resources.

Of the five stations proposed for upgrades, there is only one record of a sensitive resource within a half-mile of the proposed work areas at the Syracuse station. It would be unlikely that station improvements at this location would result in impacts to sensitive resources unless project designs extend beyond the existing developed lands. There would be 14 locations where realignment of adjoining roadways could result in impacts to ecological resources, but these locations would be better defined in a Tier 2 assessment.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch.

Ecological resources could be impacted directly by new construction or improvements to existing infrastructure and habitat fragmentation or indirectly through increases in travel speeds and train frequency throughout the Alternative 125 corridor. Impacts would be more likely to occur than with Alternatives 90B, 110, or 90A alone. The total number of protected habitats and sensitive resources identified as having a high to moderate potential for occurrence within a half-mile of the proposed alignment for Alternative 125 is greater than the other alternatives.

Empire Corridor South

No new improvements, beyond what is proposed for Alternative 90A, would be proposed for Alternative 125 along the majority of Empire Corridor South. However, roughly one mile of the proposed 125 mph track would extend south from Albany-Rensselaer Station to cross the Hudson River. This work would have the potential to impact ecological resources such as aquatic species and Essential Fish Habitat in this portion of the Hudson River with construction of a new river bridge.

Empire Corridor West/Niagara Branch

Alternative 125 would involve construction of a total of 236 miles of track on a new alignment. Installation of the tracks proposed for the new alignment would have the potential to impact terrestrial and aquatic habitats. In addition to the ecological resources that may be impacted by implementation of the Base Alternative, Alternative 125 could directly or indirectly affect all of the bird conservation areas, NNLs, sensitive natural communities, and protected species identified in the "Existing Conditions" for the 125 Study Area. The impacts could be through habitat conversion and habitat fragmentation.

4.13.5. Potential Mitigation Strategies

To the extent practicable, future planning and designs will incorporate avoidance and minimization of impacts to known ecological resources. Where avoidance and minimization are not practicable, mitigation for impacts to ecological resources can be achieved through a number of approaches. Strategies to offset impacts to both common and protected ecological resources may include:

- Utilization of construction timing windows to avoid disturbance to nesting birds or certain seasonal processes;
- Implementation of construction Best Management Practices;
- Construction of safe wildlife crossings and fencing; or
- Preservation, restoration or rehabilitation of on- or off-site lands.

For any program element that would require an incidental take permit from a resource agency (described below), mitigation measures to offset any impacts or take must be developed in a mitigation plan. Program-wide and species- or habitat-specific mitigation strategies can be developed with the resource agencies through the permit review process, and mitigation activities can often be combined for multiple species.

4.13.6. Future Analysis

Tier 2 assessments will refine the impact assessment based on design and site-specific mapping and delineation of existing and required areas of potential impact. In most instances, any activity that proposes disturbance or "take" of a protected species or habitat is prohibited by the laws and regulations described in Section 4.13.1 above or would require consultation with resource agencies. Consultation may be required with the U.S.FWS under Section 7 of the federal Endangered Species Act, with the NYSDEC through Environmental Conservation Law (ECL) Article 9 (for plants) or Article 11 (for fish and wildlife), or with the National Marine Fisheries Service (NMFS) under Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act for potential impacts to EFH.

As part of the permitting process, a clearly-defined project description and an inventory of protected resources and their habitat that occur or have the potential to occur within the project boundaries must be compiled. If required, species surveys would be focused on areas where a potential for impact has been identified

For NYSDOT actions involving state listed species, an assessment must first be conducted by NYSDOT to determine whether the action has the potential to result in "take" of the listed species. This determination is based on results of the resource inventories, whether a protected resource has been documented or has the potential to occur in the project area, and the specific elements of a proposed project. If the assessment shows that there may be or is likely to be a take as a result of the action, consultation with the NYSDEC must follow. The NYSDEC would review the project and establish whether an incidental take permit must be issued before commencing work. Issuance of an incidental take permit by the NYSDEC is contingent on development of an Endangered and Threatened Species Mitigation Plan. If no incidental take permit is required based on NYSDEC consultation, this finding must be documented before the project can proceed.[133]

For NYSDOT actions involving federally-listed species, a project must undergo informal or formal consultation with the U.S.FWS or NMFS (for anadromous or marine species) through the federal agency acting as the lead agency for the project. To begin informal consultation, a site assessment of the project's action area must be conducted to establish whether suitable habitat is present for listed species. If no suitable habitat is found, these findings must be submitted to the FRA for concurrence. If suitable habitat is found, an assessment of whether the action might have a direct, indirect or cumulative adverse effect on protected species must be completed by NYSDOT. If no adverse effect would occur, these findings must be submitted to the U.S.FWS or NMFS by the FHWA for concurrence.

If it is found that an adverse effect may occur, formal consultation must be initiated by the FRA with the U.S.FWS or NMFS. The U.S.FWS or NMFS must prepare a Biological Opinion, stating whether the project would put the continued existence of any listed species or EFH in jeopardy. If jeopardy is considered likely and unavoidable, the project must be subsequently exempted or it cannot proceed. If jeopardy is not considered likely or if it is avoidable, then the U.S.FWS or NMFS would issue an Incidental Take Statement, with any conditions of approval or mitigation measures, and the project may commence.

If an adverse effect may occur to Essential Fish Habitat protected under the U.S. Magnuson-Stevens Fishery Conservation and Management Act, a written EFH Assessment must be prepared describing the effects of the project on EFH and identifying proposed mitigation measures. This EFH Assessment would be prepared and submitted to NMFS.

In addition to an analysis of potential impacts to protected resources, an analysis of impacts to common ecological resources would be required. Potential impacts such as habitat fragmentation, wildlife collisions, wildlife fatalities, habitat conversion or degradation, species aversion to the rail corridor, and impacts on wildlife corridors must be addressed and quantified where applicable. If impacts are anticipated, mitigation measures to offset these impacts must be developed.

[133]/ NYSDOT 2010. The Environmental Manual. Section 4.4.9.3 Threatened and Endangered Species. Accessed March 2012. Available: <https://www.dot.ny.gov/divisions/engineering/environmental-analysis/manuals-and-guidance/epm>

4.14. Critical Environmental Areas under the State Environmental Quality Review Act

4.14.1. Regulatory Context

Critical Environmental Areas (CEAs) are designated for protection through the State Environmental Quality Review Act (SEQR) regulations (6 NYCRR 617.14(g)). Under the New York State Environmental Quality Act, state and local agencies may designate specific geographic areas within their boundaries as "Critical Environmental Areas" (CEAs). In order obtain this designation; the area must have one or more of the following exceptional or unique characteristics:

- A benefit or threat to human health;
- A natural setting (e.g., fish and wildlife habitat, forest and vegetation, open space, and areas of important aesthetic or scenic quality);
- Agricultural, social, cultural, historic, archaeological, recreational, or educational values; or
- An inherent ecological, geological or hydrological sensitivity to change that may be adversely affected by any change.

Following designation, the potential impact of any action on the environmental characteristics of the CEA is a relevant area of environmental concern and must be evaluated in the determination of significance prepared pursuant to Section 617.7 of SEQR.

4.14.2. Methodology

The NYSDEC Division of Environmental Permits was consulted regarding the presence and location of SEQR-designated Critical Areas within a half-mile of the corridor centerline (study area). Correspondence from the NYSDEC was received on May 2, 2011 regarding mapping of SEQR critical areas.[134] Correspondence from the NYSDEC was received on January 12, 2012 regarding future updates to the CEAs, which will be published on the NYSDEC website in February 2012.[135] In addition, the list of SEQR Critical Areas and maps available from the NYSDEC website was consulted.[136]

4.14.3. Existing Conditions

Within a half-mile of the corridor centerline for both the 90/110 and the 125 Study Areas, there are three CEAs in Westchester County, three in Dutchess County, three in Monroe County and four in Erie County. Within the Empire Corridor 90/110 Study Area only, there is one CEA in

[134] / David Rebecca, NYSDEC, "Re: Empire Corridor High Speed Rail," e-mail/personal communication with Karen Kays, Pinyon Environmental, Inc., May 2, 2011.
[135] / David Rebecca, NYSDEC, "Re: Empire Corridor High Speed Rail data set," e-mail/personal communication with Rosie Wilson, Pinyon Environmental, Inc., January 12, 2011.
[136] / NYSDEC. "Critical Environmental Areas," website accessed June 2011. <http://www.dec.ny.gov/permits/6184.html.>

Schenectady County, and one in Onondaga County. These areas are described in Exhibit 4-26. Several of the Critical Environmental Areas overlap or coincide with protected publicly parklands in Dutchess and Westchester Counties.

In Dutchess County, two of the CEAs overlap with the Margaret Norrie State Park in Dutchess County (Indian Kill CEA) and NYSDEC lands for the Crum Creek Waterway Access (Hogback Hill). In Westchester County, the Croton Point Park is included in both the Croton Point Park CEA and the "County and State Park Lands" CEA, which also includes Montrose Point State Forest, Oscawana County Park, Rockwood Hall State Park (part of the adjoining Rockefeller State Park Preserve),

Rockefeller State Park Preserve itself, and Lenoir Preserve County Park. The Hudson River CEA encompasses much of the waterfront areas along the Hudson River in Westchester County. Public parks and recreation areas are addressed in Section 4.16.

Exhibit 4-26—Critical Environmental Areas Designated under SEQR in half-mile Study Area

County	Critical Environmental Area	Designation Date	Designating Agency	Reason
Erie	Freshwater Wetlands within Town	9-29-79		None given
	Reinstein Woods – 269 acre Nature Preserve with 400' wide peripheral buffer	7-27-88		None Given
	John Stiglmeier	9-27-91		Preserve wildlife and green area
	Cayuga Creek to 100 year floodplain	9-27-91		Preserve wildlife and green area
Monroe	Land within 100 feet of Genesee River Barge Canal, Lake Ontario or River Gorge (except in manufacturing industrial zone)	3-14-86	City of Rochester	None given.
	Cobbs Hill			
	Three smaller CEAs are within the study area *			
Onondaga	Portions of Nine-Mile Creek within Town[1]	9-4-96	Town of Camillus	None given.
Schenectady	Aquifer Area Overlay Zone[1]	4-5-85	Town of Rotterdam	Conserve, improve, protect natural resources.
Dutchess	Hogback Hill	6-7-09	Town of Hyde Park	Sensitivity to change & habitat and species protection.
	Indian Kill			
	Vanderburgh Cove			
Westchester	Croton Point Park	1-31-90	County of Westchester	Exceptional or unique character.
	County and State Park Lands			
	Hudson River			

*the CEAs in Monroe County also include areas zoned as "open space," lands with slopes greater than 15 percent, heavily wooded land, and drainage systems designated on official street map.
[1] CEA located only in Empire Corridor 90/110 study area.

The CEAs in Monroe County also include areas zoned as "open space," lands with slopes greater than 15 percent, heavily wooded land, and drainage systems designated on official street map.

4.14.4. Environmental Consequences

The sections below identify elements of each alternative that would have the potential to impact the environmental characteristics of Critical Environmental Areas (CEAs) designated under the New York State Environmental Quality Review (SEQR) Act. This preliminary assessment of potential impacts to CEAs is based on Tier 1 concepts and mapping and will be further refined in Tier 2 as the project development process advances. This assessment focuses on work proposed under each alternative that would occur in the vicinity of a designated CEA; work proposed elsewhere is not addressed. There are total of 17 CEAs in the vicinity of the proposed program alternatives: three in Westchester County, three in Dutchess County, one in Schenectady County, one in Onondaga County, five in Monroe County, and four in Erie County.

The type and degree of potential impacts to CEAs depends on the relationship between the project designs and the specific resources that are protected under each CEA designation. In many instances, the reason for CEA designation and/or the physical boundaries of CEAs are not clearly defined. However, most of the CEAs whose designation and boundaries are clearly defined are separated from the rail corridor by urban lands and would not likely be impacted by proposed work. For those CEAs whose designation or boundaries were not readily available under this Tier 1 assessment, further investigation would be necessary to assess impacts as part of Tier 2 evaluations.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure.

Empire Corridor South

The Base Alternative will include signal and grade crossing improvements along the 64 miles of Empire Corridor South (MPs 75.8 to 140) north of Poughkeepsie to just south of Albany-Rensselaer Station. The Town of Hyde Park has designated three CEAs that will be located in the vicinity of these proposed improvements in Dutchess County. The "Hogback Hill," "Indian Kill," and "Vanderburgh Cove" CEAs were each designated based on their "sensitivity to change and habitat and species protection." The "Hogback Hill" CEA is set back more than 1,000 feet from the rail right-of-way, and impacts will not be anticipated. At approximately MP 83 and MP 85 in Dutchess County, the existing rail corridor passes through the "Indian Kill" and "Vanderburgh Cove" CEAs, respectively. However, direct impacts will be unlikely since signal work will primarily be within the existing right-of-way and will be unlikely to affect the habitat of these CEAs.

Empire Corridor West/Niagara Branch

The Base Alternative will involve 17 miles of second track between the Albany-Rensselaer and Schenectady stations, as well as reconstruction of the Schenectady Station. The "Aquifer Overlay Zone" CEA is located in Schenectady County, and was designated by the Town of Rotterdam as a CEA "to conserve, improve, and protect natural resources." This CEA will be in close proximity to, but does not overlap, the proposed second track or Schenectady Station work areas. The Base Alternative work will not likely impact this "Aquifer Overlay Zone" CEA as the proposed work will be contained in the existing right-of-way and the Schenectady Station footprint and will be unlikely to alter the designated qualities of the CEA.

The Base Alternative will also include track configuration and signal improvements in and around the City of Syracuse (MPs 287 to 291) and Rochester Station track and platform improvements (MPs 368 to 373). Improvements in and around the City of Syracuse will not be located within or adjacent to a designated CEA. In Monroe County, the City of Rochester has several designated CEAs that are located in the vicinity of the proposed improvements. The "Cobbs Hill" CEA is located several thousand feet to the south of the rail right-of-way and separated from the corridor by urban lands. In addition, proposed improvements under the Base Alternative will not occur in the vicinity of areas meeting the City of Rochester CEA definition of "Areas zoned 'open space.'"

Work within the Base Alternative will occur in the vicinity of two locations that meet the definition of the "Land within 100 feet of the Genesee River Barge Canal, Lake Ontario or River Gorge except in manufacturing industrial zone" CEA in the City of Rochester. In addition, work could occur in "Lands with slopes greater than 15 percent," "Heavily wooded land," and "Drainage systems designated on official street map" designated CEAs; however, the physical boundaries and precise locations are not known for these CEAs. Work proposed in the above-mentioned locations will occur within the existing rail right-of-way and will involve the installation of a new third track and upgrades to signal systems. The reasons for designating these lands as CEAs are unknown; however, direct impacts will be unlikely at these locations since work will be contained within the right-of-way.

Alternative 90A

In addition to improvements proposed under the Base Alternative previously described, Alternative 90A would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, and signalization within Empire Corridor South and Empire Corridor West/Niagara Branch. Alternative 90A also includes an increase in trip frequency along the entire corridor, however, this increase is not expected to affect the CEAs along the corridor.

Empire Corridor South

Alternative 90A would include construction of 1.4 miles of new track, extending under the Tappan Zee Bridge, for the Tarrytown Pocket Track/Interlocking and signal improvements proposed along 43 miles (MPs 32.8 and 75.8). Both of these projects would occur in the vicinity of the "Hudson River" CEA, designated to extend along the entire length of the Hudson River within Westchester County, from approximately MP 14 to MP 45. Additionally, the "County and State Park Lands" CEA includes lands that intersect or run adjacent to the rail right-of-way at MP 17 (Untermyer Park), MP 26 (Kingsland Point County Park and Devries Park), MP 27 (Peabody Field), MP 28 (Rockwood Hall State Park) and MP 37 (Oscawana County Park), although the only changes at most these locations

would be the additional train trips. The "Croton Point Park" CEA intersects the rail right-of-way at approximately MP 33. All of the CEAs in the vicinity of the proposed program in Westchester County were designated by Westchester County based on their "exceptional or unique character." Direct impacts would not be anticipated to the "Hudson River" and "County and State Park Lands" CEAs since work would occur primarily within the existing right-of-way and would only extend north from MP 33, and would be unlikely to change the unique character of these CEAs. Along this section, 10 miles of new third track (MPs 53 to 63) and improvements at the Poughkeepsie Yard/Storage Facility (MPs 71 to 75.8) will not affect CEAs.

North of Poughkeepsie and south of Albany-Rensselaer Station (MPs 75.8 to 140), proposed improvements in close proximity to CEAs include rock slope stabilization (MPs 105 to 130) and three new control points (CP 82, CP 99, and CP 136). As mentioned in the Base Alternative, the "Indian Kill" and "Vanderburgh Cove" CEAs (MPs 83 and 85) in Dutchess County were each designated based on their "sensitivity to change and habitat and species protection," and these CEAs overlap work for Alternative 90A. Since work will be confined to the right-of-way, no changes to these CEAs are anticipated.

Empire Corridor West/Niagara Branch

As mentioned in the Base Alternative, the "Aquifer Overlay Zone" CEA in Schenectady County is designated "to conserve, improve, and protect natural resources." There would be no proposed construction work for Alternative 90A in this CEA.

With Alternative 90A, track improvements would include approximately 10 miles of third track between MPs 169 and 178.5, and Amsterdam Station improvements along the west end of this segment. Additionally, upgrades to interlockings and automatic block signals at three control points (CP 175, CP 239, and CP 248) are proposed. These improvements would not occur in the vicinity of or impact CEA areas.

Alternative 90A would include Syracuse Station track improvements (MPs 290 to 294), third track improvements along 11 miles (MPs 373 to 382) west of the Rochester Station, and the addition of a third track along 11 miles located largely west of the City of Rochester (MPs 382 to 393).

In Onondaga County, a CEA is designated by the Town of Camillus as "Portions of Nine Mile Creek" at approximately MP 297. There is no reason given for the designation of this CEA. There would be no proposed construction work for Alternative 90A in this CEA, and, no reason is known for the CEA designation.

As mentioned in the Base Alternative, there are several designated CEAs that are located in the vicinity of proposed improvements and increased train frequency in Monroe County: "Land within 100 feet of the Genesee River Barge Canal, Lake Ontario or River Gorge except in manufacturing industrial zone," "Lands with slopes greater than 15 percent," "Heavily wooded land," and "Drainage systems designated on official street map." In addition, proposed improvements under Alternative 90A would occur in the vicinity of an area meeting the City of Rochester CEA definition of "Areas zoned 'open space'" at the western city limit. Proposed construction work for Alternative 90A (MPs 373 to 393) would be within the existing right-of-way and would be unlikely to directly impact these CEAs. At this time, no reason is known for the CEA designations.

Station improvements at the Buffalo-Depew Station (MPs 429.5 to 432.5) would occur in the

general vicinity of three CEAs designated by the Town of Cheektowaga. These CEAs are "Freshwater Wetlands within Town," "Reinstein Woods," and "John Stiglmeier Park," CEAs. "John Stiglmeier Park" is designated to "preserve wildlife and green areas," but there is no reason given for the designation of the other two CEAs in the county. All three of the Town of Cheektowaga CEAs are no closer than 3,000 feet from the rail right-of-way at MP 433 and are separated from the railroad by urban lands. Although some work outside of the existing right-of-way at MP 433, these CEAs would not likely be impacted due to their distance from the proposed work.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

Empire Corridor South

No additional work is proposed within Empire Corridor South, other than that proposed for Alternative 90A, and additional CEA impacts would not be anticipated.

Empire Corridor West/Niagara Branch

Third and fourth track improvements for Alternative 90B would start at MP 160 in the City of Schenectady and would extend west to MP 430, east of Buffalo. Alternative 90B would also include an increase in trip frequency along the entire Empire Corridor West/Niagara Branch (from four trains to eight trains daily), and five station improvements. Third and fourth track improvements and increased train frequency would occur in the vicinity of the same CEAs in Schenectady, Onondaga, Monroe and Erie Counties as mentioned in Alternative 90A. The majority of these CEAs would not cross the proposed improvements; however, the program area would pass directly through "Portions of Nine Mile Creek" and "Land within 100 feet of the Genesee River Barge Canal, Lake Ontario or River Gorge except in manufacturing industrial zone". Work in these areas would occur within the existing right-of-way and would be unlikely to impact these CEAs.

Areas where third or fourth track would be located outside the existing right-of-way would not be located in designated CEAs. Therefore, no additional impacts to CEAs, other than described in Alternative 90A, within Alternative 90B Empire Corridor West/Niagara branch, would be anticipated from work that would occur within or outside of the existing right-of-way.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations.

Empire Corridor South

No additional work is proposed within Empire Corridor South, other than that proposed for Alternative 90A, and additional CEA impacts would not be anticipated.

Empire Corridor West/Niagara Branch

Third and fourth track improvements for Alternative 110 would start at MP 160 in the City of Schenectady and would extend west to MP 430, east of Buffalo. Alternative 110 would also include an increase in trip frequency along the entire Empire Corridor West/Niagara Branch (from four trains to eight trains daily), and five station improvements. Third and fourth track improvements and increased train frequency would occur in the vicinity of the same CEAs in Schenectady, Onondaga, Monroe and Erie Counties as mentioned in Alternative 90B. The majority of these CEAs would not cross the proposed improvements; however, the program area would pass directly through "Portions of Nine Mile Creek" and "Land within 100 feet of the Genesee River Barge Canal, Lake Ontario or River Gorge except in manufacturing industrial zone". Work in these areas would occur within the existing right-of-way and would be unlikely to impact these CEAs.

Alternative 125

Alternative 125 would involve construction of a total of 236 miles of track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. Alternative 125 also would include new right-of-way in most areas, but would merge back with the Empire Corridor over two 15- and 16-mile segments centered on Syracuse and Rochester, respectively.

Empire Corridor South

No additional work is proposed within Empire Corridor South, other than that proposed for the Alternative 90A, and additional CEA impacts would not be anticipated.

Empire Corridor West/Niagara Branch

The new Alternative 125 track alignment would fall within the vicinity of the Town of Rotterdam's "Aquifer Area Overlay Zone" CEA. However, the CEA and proposed track alignment would be approximately a half-mile away from each other and would be separated by urban lands. No impacts to this CEA would be anticipated. All portions of the Alternative 125 track alignment that would not overlap with Alternatives 90A, 90B and 110 would not be in the vicinity of any designated CEA, and therefore no additional impacts would be anticipated.

4.14.5. Potential Mitigation Strategies

During Tier 2, refinements in design and mapping will be performed and the project development will incorporate avoidance and minimization of CEA impacts to the extent practicable. NYSDOT would need to comply with the New York State Environmental Quality Review Act for any potential impacts to environmental characteristics of a CEA.

Coordination with the designating agencies of the CEAs and the NYSDEC would confirm boundaries and reasons for designation. If avoidance is not possible, measures to minimize or reduce the impacts should be evaluated. The mitigation that is appropriate for each CEA affected may depend on the reason for designation, e.g., a site that is designated for avoidance as a threat as an inactive hazardous waste site might involve drainage improvements and the mitigation may be markedly different from an ecologically significant site. Potential CEA mitigation measures that can be developed in coordination with the state agencies and landowners can include avoidance and minimization in the design phase, installation of wildlife crossings, and implementation of construction Best Management Practices. Improving or optimizing area drainage may also avoid, minimize, or mitigate impacts to CEAs.

4.14.6. Future Analysis

Tier 2 assessments will refine the impact assessment based on design and site-specific mapping and delineation of existing and required work areas. If impacts to the designated environmental characteristics of CEAs will be anticipated in Tier 2, alternative actions, locations, and designs will need to be further explored as part of Tier 2 design.

For CEAs in, or substantially contiguous to, proposed work, outreach to the agency or agencies that made the CEA designation may be performed, as appropriate, to understand why the CEA was designated and its characteristics. An understanding of why an area became a CEA will facilitate a determination of whether the proposed action will have a significant adverse environmental impact. For instance, a CEA designated because of a threat would be something that the municipality or agency would want the public to be aware of so that harm to public health or safety or inappropriate use of the affected area could be avoided. Examples might be:

- An inactive hazardous waste site
- A steep slope area with the potential for landslides
- A high river bank or cliff area with dangerously high erosion potential or
- An area that is often prone to dangerous flash floods.

In accordance with the State Environmental Quality Review Act, the potential impact of any Type I or Unlisted Action on the environmental characteristics of the CEA is a relevant area of environmental concern and must be evaluated in the determination of significance prepared pursuant to Section 617.7 of SEQR. This determination would be made as part of the Tier 2 NEPA/SEQR documentation.

4.15. Historic and Cultural Resources

4.15.1. Regulatory Context

This evaluation of historic resources has been performed in accordance with NEPA and Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) and associated implementing regulations in 36 CFR Part 800.

Section 106 of NHPA mandates that federal agencies consider the effect of their actions on historic

properties, defined as "*any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NR) [or the State Register of Historic Places (SR)]; such term includes artifacts, records, and remains that are related to such a district, site, building, structure, or object*." The NHPA also includes specific guidelines for the treatment of National Historic Landmarks (NHLs). NHLs are properties of national significance designated by the United States Department of Interior because they possess exceptional historic value. The NHPA mandates additional protection of NHLs by requiring that federal agencies undertake planning and actions as necessary to minimize harm when considering undertakings that may directly and adversely affect NHLs.

Historic properties are also protected by Section 4(f) of the Department of Transportation Act of 1966. Section 4(f) prohibits actions by the Secretary of Transportation that require "use" of a historic property that is listed or eligible for inclusion in the National Register, unless a determination is made that there is no feasible and prudent alternative to the use of such land, and all possible planning has been undertaken to minimize harm to the 4(f) property. If a use of a Section 4(f) park or recreation property is determined to occur, a Section 4(f) Evaluation will be prepared and circulated as part of Tier 2 environmental documentation.

The New York State Historic Preservation Act of 1980 (SHPA) requires that state agencies consider the effect of their actions on properties listed or determined eligible for listing on the New York State Register of Historic Places. Separate review under the SHPA is not required when NHPA applies.

In the State of New York a "town" or "city" is the major division of each county, excluding the five counties or "boroughs" that comprise New York City. The cities/towns, as well as the villages, located in the program's areas of potential effect (APE) (see description below under Methodology) for historic and cultural resources are included in Exhibit G-15 in Appendix G.

4.15.2. Methodology

Tiered Approach and Programmatic Agreement

As previously noted, the Empire Corridor Program sponsors (FRA and NYSDOT) are addressing consideration of potential environmental impacts of the program in accordance with the requirements of NEPA and NHPA using a tiered process, as provided for in 40 CFR 1508.28. A phased process also may be used for Section 106 compliance where alternatives under consideration consist of corridors or large land areas, as outlined in 36 CFR 800.4(b)(2) and 800.5(a)(3). Determinations of eligibility and effect may be deferred to Tier 2 of the process under the terms of a Programmatic Agreement (PA) executed in accordance with 36 CFR 800.14(b). This Tier 1 EIS addresses broad corridor-level issues and proposals of the program and identifies the likely presence of historic properties in the Area of Potential Effect (APE) for the five alternatives, as part of the initial phase of the tiered process. Program sponsors will prepare site-specific environmental documentation for component projects in subsequent phases or tiers of the program in accordance with NEPA and NHPA. The PA, addressed later in this section, provides a mechanism and framework for meeting NHPA compliance obligations in the Tier 2 phase of the program.

Area of Potential Effect

Section 106 of the NHPA requires federal agencies to take into account the potential effects of their actions on historic properties. An adverse effect under Section 106 is defined in 36 CFR 800.5(a)(1), and

> *[I]s found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.*

A required step in the Section 106 process is determining the APE, which is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if such properties exist."(36 CFR 800.16[d]). The APE is influenced by the scale and nature of an undertaking.

Potential adverse effects on historic architectural resources can include both direct physical effects—demolition, alteration, or damage from construction—and indirect effects, such as the introduction of visual, audible, or atmospheric elements that may alter the characteristics of the historic property that qualify it for inclusion in the National Register in a manner that would diminish the integrity of the property's significant historic features. Archaeological resources are potentially affected by direct impacts from construction activity resulting in disturbance to the ground such as excavation, grading, pile-driving, cutting and filling, and staging.

The APE for each of the alternatives for the Empire Corridor Program has been delineated to indicate the area in which the proposed program could cause potential direct effects and the area in which the proposed program could cause indirect effects. Because the program is currently in the first phase of the tiered environmental review process and the proposed program alternatives are at an early design stage, the APEs presented in this Tier 1 EIS for each alternative are reasonable approximations of the areas in which direct and indirect effects could occur as a result of the broad categories of construction activities proposed as part of each alternative. The categories of construction activities include construction of track, modification of track and related infrastructure, service road construction or realignment, and station construction or alteration. As described in the PA (see Appendix H), if modifications to the APEs for component projects are required as part of the Tier 2 analysis, FRA and NYSDOT would alter the APE as appropriate in consultation with consulting federally recognized tribes and any consulting parties.

The purpose of developing a conceptual "alignment" for Alternative 125 in the Tier 1 EIS is to provide a basis for comparison of corridor-level performance, cost, and the impact potential of a new corridor alternative versus existing corridor alternatives (i.e., Alternatives 90A, 90B, and 110). The intended purpose of this Tier 1 EIS is to make broad-corridor level decisions with regard to parameters such as operating speed/travel times, service frequency, and infrastructure requirements. The purpose of the Tier 1 EIS does not include studying alternative alignments to achieve the 125 miles per hour speed, nor does it include selecting a specific alignment. All alternatives except Alternative 125 would follow the existing Empire Corridor alignment along both

the Empire Corridor South and Empire Corridor West. To achieve the higher speed of Alternative 125, much of this alternative along the Empire Corridor West would be on a new corridor outside of the existing Empire Corridor alignment. Because portions of Alternative 125 would not be located within the existing rail corridor, one representative "alignment" was developed for Alternative 125 at a conceptual level. It is intended to be one of several possible alignments that could be developed and studied in the future if Alternative 125 is the selected alternative at the conclusion of this Tier 1 environmental review process.

Direct APE

Direct effects may include physical damage or destruction of a resource or its setting. The portion of the APE for the program alternatives in which there is the potential for the proposed program to cause direct effects includes all locations that could be subject to direct ground-disturbing activities.

For the purposes of this Tier 1 EIS, the APE for potential direct effects has been delineated to extend 100 feet in both directions from the centerline of the existing railroad tracks to encompass all locations where project construction activities could occur. Where the centerlines of the high-speed alternative (90 mile per hour [mph], 110 mph, and 125 Alternatives) alignments would differ from the existing centerline, the direct APE extends 100 feet in both directions from the centerline of those alignments. It should be noted that areas where the centerlines of the 90 mph and 110 mph alternatives differ from that of the existing alignment are limited, and the alignments never diverge by more than approximately 150 feet. As described above, an inventory of all previously-identified resources within the direct APE has been compiled and is presented below.

Indirect APE

Potential indirect effects include isolation of a property from its surrounding environment, or the introduction of visual, audible, or atmospheric (e.g., pollutants) elements that are out of character with a property or that alter its historic setting and context. The APE for potential indirect effects was developed to encompass potential indirect effects that could be reasonably foreseen at the Tier 1 level resulting from the proposed project, such as construction of or modifications to track and related infrastructure, service roads, and stations.

For the purposes of this Tier 1 EIS, the APE for indirect effects has been delineated to extend 600 feet in both directions from the centerline of the existing railroad tracks. As in the direct APE, where the centerline of the high-speed (90 mph, 110 mph, and 125 mph APEs) alignments would differ from the existing centerline, the indirect APE extends 600 feet in both directions from the centerline of those alignments. As stated above, it should be noted that areas where the centerlines of the 90 mph and 110 mph APEs differ from that of the existing alignment are limited and the alignments never diverge by more than approximately 150 feet. The 600-foot APE was developed in consultation with SHPO and federally recognized tribes to encompass potential indirect effects that could be reasonably foreseen at the Tier 1 level resulting from construction activities associated with the proposed program, as described above. It should be noted that Alternative 125 is the only alternative that would incorporate overhead catenary systems, which could be visible from longer distances in some areas. If Alternative 125 is advanced for further study at the Tier 2 level, the APE would be reassessed and expanded if necessary to adequately consider the potential for indirect effects. [137]

[137]/ Although FTA noise standards set a standard screening distance of 750' (unobstructed) and (375' obstructed) for noise analyses, preliminary noise analyses completed as part of this Tier 1 DEIS indicate that the area in which there is the potential for the proposed

As described above, an inventory of all architectural resources within the indirect APE has been compiled and is presented in Appendix G.

Inventory of Archaeological Sites and Architectural Resources

When the Section 106 identification and evaluation process is being conducted in a phased manner, as described in 36 CFR 800.4(b)(2), the final identification and evaluation of historic properties may be deferred to future stages of the program if the protocol for the process is established in a PA or Memorandum of Agreement. In accordance with this guidance, this Tier 1 EIS focuses on identifying the "likely presence" of historic properties in the APE for each alternative by identifying previously designated architectural resources and previously identified archaeological sites (36 CFR 800.4[b][2]). Based on the files of the New York State Historic Preservation Office (SHPO) and the New York State Museum (NYSM), program sponsors compiled an inventory of all architectural resources, including buildings, sites, objects, and structures, and previously-identified archaeological sites in the direct and indirect APEs for the 90/110 Alternative and the 125 Alternative (see Chapter 3, "Alternatives" for a detailed description of each alternative). In addition to SHPO and NYSM sites, the Oneida Nation, a federally recognized tribe, provided information on archaeological sites known to the Oneida Nation, as described below under "Tribal Coordination and consulting parties." The sites identified by the Oneida Nation, located in Oneida and Madison Counties, have been added to the project mapping and inventories of known archaeological sites.

Consistent with 36 CFR 800.4(b)(2), once the previously-identified archaeological sites and architectural resources within the APEs for each alternative were identified, the potential effects of the program on those sites and resources were assessed. As described above, effects on architectural resources can be either direct or indirect. Effects on archaeological sites are direct only. Illustrative program elements that could result in potential indirect effects include changes to the context or setting of a historic property due to the construction of a permanent feature, such as new or reconfigured railroad infrastructure, or demolition. In addition, Section 106 requires consideration of reasonably foreseeable effects that may occur later in time, be further removed in distance, or be cumulative.

Potential architectural resources (architectural resources that appear to meet the State/National Register eligibility criteria, but which have not been previously evaluated) within the APEs have not been identified as part of this Tier 1 document. As described in the Draft PA (Appendix H), identification of potential, but not previously identified by the SHPO or NYSM, architectural resources in the APEs would be undertaken as part of the Tier 2 analysis for this program.

No detailed archaeological documentary studies or archaeological field investigations (Phase I archaeological studies) have been prepared as part of the Tier 1 analysis to determine the presence of archaeological sites in the direct APE. As described above, previously-identified archaeological sites have been mapped and inventoried to serve as a preliminary indicator of potential archaeological sensitivity. As described in the Draft PA, in order to identify archaeological resources that could be affected by the program, archaeological documentary studies and field

program alternatives (with the exception of Alternative 125) to result in noise impacts is substantially smaller than the areas delineated as the APEs for direct and indirect effects. In the case of Alternative 125, the potential for noise impacts is expected to vary by location. If Alternative 125 is advanced for analysis at the Tier 2 level, the adequacy of the indirect APE to account for potential effects due to noise and other factors would be reassessed and the APE would be expanded where necessary. Procedures for delineating APEs for project components advanced to the Tier 2 level are described in detail in the Draft Programmatic Agreement.

investigations (as appropriate) will be carried out as part of the Tier 2 analysis.

Tribal Coordination and Consulting Parties

Pursuant to 36 CFR 800.3(f)(2), the lead federal agency, FRA, in consultation with NYSDOT and SHPO, identified federally recognized tribal nations for outreach under Section 106 of NHPA. The tribal nations were identified on the basis of previously identified geographic areas of interest for Section 106 consultation commonly used by NYSDOT and SHPO. Tribal status and contact information on file with the U.S. Bureau of Indian Affairs was also consulted as part of the identification process. On May 3, 2011, FRA sent letters to the following federally recognized tribal nations inviting them to participate in Section 106 consultation: Cayuga Nation, Seneca Nation of Indians; Tonawanda Seneca Nation; Onondaga Nation; Oneida Indian Nation; Tuscarora Indian Nation; Stockbridge-Munsee Community Band of the Mohican Nation; Delaware Nation; the Shinnecock Nation; St. Regis Mohawk Tribe; and the Seneca-Cayuga Tribe of Oklahoma. In addition, FRA sent letters to the non-federally-recognized Mohawk Nation Council of Chiefs and the New York State-recognized Unkechaug Nation. Replies were received from the Mohican Nation, the Oneida Nation, and the Seneca Nation. All of these tribal nations expressed their interest in the program and their desire to participate in consultation on the program in accordance with Section 106 of NHPA.

On May 4, 2012**,** NYSDOT invited all of the federally-recognized tribes listed above (and one additional federally-recognized tribe: the Delaware Tribe of Indians) to an information-gathering meeting in Rochester, NY, on May 30, 2012. At the meeting, the program sponsors presented an overview of the program, the proposed Section 106 methodology and the preliminary program APE, and took comments from the tribal nations.

At the request of several of the tribes that participated in the May 30, 2012 meeting, maps of the alternative alignments showing the approximate locations of previously identified archaeological sites were sent to the tribal nations.

On November 21, 2012, NYSDOT on behalf of FRA sent letters to each of the tribal nations and SHPO describing and illustrating the boundaries of the proposed APE for their review and comment. In a letter to FRA and NYSDOT dated December 14, 2012, the Oneida Nation provided comments on the proposed program and requested a meeting to discuss the proposed program. In a letter dated February 1, 2013, NYSDOT provided clarification regarding points of concern raised in the Oneida Nation comments. The Oneida Nation replied to NYSDOT in a letter dated February 11, 2013, expressing their satisfaction with the response. In a separate letter dated February 19, 2013, FRA responded to the Oneida Nation's initial letter. FRA also arranged a meeting with the Oneida Nation on April 18, 2013 that was attended by representatives of NYSDOT. At this meeting, representatives of the Oneida Nation provided information regarding the approximate locations of five archaeological sites in the program alternative APEs that are known to the Oneida Nation and are considered distinct from the archaeological sites on file at NYSM and SHPO. FRA and NYSDOT agreed to add this information to program mapping and analysis with the understanding that all appropriate measures would be taken to protect the confidentiality of the information.

In addition to consultation with federally-recognized tribes, FRA and NYSDOT have engaged in a parallel process of coordination with consulting parties in accordance with 36 CFR 800.2(c)(3) through (5) and 800.3(f). Potential consulting parties for the Tier 1 process were identified by FRA and NYSDOT in consultation with SHPO based on the parties demonstrated interest in broad,

corridor-wide, or regional-level aspects of the proposed undertaking. The list of potential consulting parties include the Advisory Council on Historic Preservation, SHPO, the Mohawk Nation Council of Chiefs, the Unkechaug Nation, the Preservation League of New York State, the Hudson River Valley Greenway, the Erie Canal National Heritage Corridor, Preservation Buffalo Niagara, the Landmark Society of Western New York, and the Preservation Association of Western New York. A total of three parties responded expressing interest in participating as consulting parties: the Preservation League of New York State; the National Park Service Erie Canal National Heritage Corridor; and Preservation Buffalo Niagara. FRA subsequently approved the consulting party status of these three entities.

On May 2, 2013, FRA and NYSDOT held a meeting to provide project information to the consulting parties and give them an opportunity to provide comments. Representatives from the Preservation League of New York State and the Erie Canal National Heritage Corridor attended. Also on May 2, 2013, the team met with SHPO to discuss the Draft Programmatic Agreement. In June 2013, SHPO provided a letter of concurrence on the APE maps and methodologies and provided comment on the Draft Programmatic Agreement.

The Programmatic Agreement (included as Appendix H) addresses the process by which FRA and NYSDOT intend to comply with Section 106 for undertakings occurring on tribal lands or where adverse effects to historic properties of a religious or cultural significance to a tribe occur off tribal land. On July 26 2013**,** the Draft Programmatic Agreement was transmitted to the federally recognized tribes and consulting parties for review and comment. The deadline for comment was listed as August 27, 2013. In a letter dated September 20, 2013, the Preservation League of New York State provided comments. In a letter dated August 13, 2013, FRA received a letter from the Oneida Indian Nation requesting a 30-day extension to provide comments on the Draft Programmatic Agreement. This was granted by the FRA. In advance of the extended deadline for comments, a teleconference meeting was held on September 17, 2013 with FRA, NYSDOT, and the Oneida Indian Nation. As a result of this meeting, FRA revised the Draft Programmatic Agreement and transmitted it to the Oneida Indian Nation on September 26, 2013. FRA coordinated with Oneida Nation in developing the Draft PA, included in Appendix H.

Public Outreach

Public Outreach is being undertaken in accordance with NEPA, NHPA, and other applicable legislation and as described in the Public Involvement Plan and Agency Coordination Document for this program (draft prepared by FRA and NYSDOT, September 2010).[138]

4.15.3. Existing Conditions

Historic Context

It is beyond the scope of this Tier 1 analysis to present a thorough and comprehensive history of the geology, precontact period, and historic period in New York State. However, as described in 36 CFR 800.4(b)(2) and 800.5(a)(3), where alternatives consist of large corridors of land and a phased approach to resource identification and evaluation is being taken, the process should assess the

[138] Available at: https://www.dot.ny.gov/content/delivery/Main-Projects/S93751-Home/S93751--Repository/ECHSR_Public_Involvement_Plan_Draft_20110131.pdf

likely presence of historic properties based on background research and consultation. Information collected as part of Tier 1 analysis may be used to evaluate the significance of historic properties identified in later phases of the program. Therefore, a brief overview of precontact period conditions and relevant historic period themes, in particular transportation networks pertinent to the program corridor vicinity, are presented below to provide a basic background for the "Existing Conditions" presented later in this chapter and to identify broad topics for further research as part of the Tier 2 analysis.

Precontact Period

For the purposes of this report, the term "precontact" is used to describe the period prior to the use of formal written records. In the western hemisphere, the precontact period also refers to the time before European exploration and settlement of the New World. Archaeologists and historians gain their knowledge and understanding of precontact Native Americans in New York State from ethnographic reports, artifact collections, archaeological investigations, and oral tradition. Artifacts dating to the precontact period potentially found from ground disturbance as a result of the proposed program could include the remains of milling equipment, stone axes, adzes, arrowheads, and clay pottery vessels. Appendix G.11.1 contains a detailed historic context and description of the precontact periods.

Historic Period

The earliest transportation networks in the State of New York consisted of waterways and Native American trails. The Hudson River was a natural highway for the region, and in the 1620s the Dutch built Fort Orange at the mouth of its principal tributary, the Mohawk River. Trading posts were defined between these two points. Canals and railroads dominated transportation development in the first half of the 19th century and were an important means of getting goods to market and a major factor in the value of land in different parts of the state. The Erie Canal, completed in 1825, spurred the westward migration of American settlers, opened the only trade route west of the Appalachians, and secured New York as the preeminent commercial city in the United States.[139] As a result of the increase in trade and traffic, the cities of Albany, Syracuse, Rochester, and Buffalo were formed. During the same period, the first railroad company in New York State, the Mohawk and Hudson, began operation between Albany and Schenectady in 1831.[140] The success of this railroad sparked a rail boom. Money flowed into lines that linked other Erie Canal towns, and within a decade through service was available from Albany to Buffalo.[141] During the Civil War, the Mississippi River was closed to commercial traffic. As a result, passengers and freight increased on established east-west railroads, such as the Erie and New York Central. The Erie Railroad became the first through line to the Midwest and Great Lakes in 1861, with financial control of lines to Buffalo and Chicago.[142]

[139]/ New York State Canal Corporation. Unlock the Legend of The New York State Canal System." Pamphlet. 1999.

[140]/ Ellis, Edward Robb. *The Epic of New York City.* New York: Old Town Books. 1966, 259.

[141]/ Burrows, Edwin G. and Mike Wallace. *Gotham, A History of New York City to 1898*. New York: Oxford University Press. 1999, 564.

[142]/ A.G. Lichtenstein & Associates, Inc. "New Jersey Historic Bridge Survey." 1994, 26.

Archaeology

As described above, information concerning the location and character of previously-identified archaeological sites in the direct APEs was collected through a review of the site files of SHPO and NYSM. Additional information regarding archaeological sites in Oneida and Madison Counties was provided by the Oneida Nation. Exhibit G-10 of Appendix G identifies the number and type of sites in each county in the direct APEs for the 90/110 Alternative and the 125 Alternative.

90/110 Alternative APE

A total of 166 previously-identified archaeological sites have been identified within the direct APE for the 90/110 Alternative that extends along the Empire Corridor South/West and the Niagara Branch. Of these sites, 47 are SHPO archaeological sites,117 are NYSM sites (13 point sites and 104 polygon sites[143]), and two are sites identified by the Oneida Nation (Sites 1 and 2). There are a total of 36 burial/habitation sites.

125 Alternative APE

A total of 126 previously-identified archaeological sites have been identified within the direct APE for the 125 Alternative that extends along the Empire Corridor South/West and the Niagara Branch. Of these, 27 are SHPO archaeological sites, 96 are NYSM sites (8 point sites and 88 polygon sites), and three are sites identified by the Oneida Nation (Sites 3 through 5). There are a total of 27 burial/habitation sites.

Architectural Resources

Previously-identified architectural resources located within the direct APE for the 90/110 Alternative and the 125 Alternative are summarized in Exhibit 4-27 and Appendix G, respectively. The NHLs, State and National Register (S/NR)-listed and eligible historic districts are noted in the text below. Detailed tables listing the S/NR-listed and eligible individual resources are provided in Exhibit G-12 and G-13 in Appendix G. The approximate locations of these resources are illustrated on Exhibit G-14. The previously identified architectural resources within the indirect APEs are summarized in Appendix G.

Direct APE: 90/110 Alternative

A total of 79 previously-identified architectural resources are located in the direct APE for the 90/110 Alternative that extends along the Empire Corridor South/West and the Niagara Branch. These resources are summarized by county in Exhibit 4-27. Of the 79 architectural resources, two resources are NHLs: Fort Klock in St. Johnsville, Montgomery Country and the Hudson River Historic District in Dutchess and Columbia Counties. Fort Klock was designated a National Historic Landmark District by the U.S. Secretary of the Interior in 1973. Fort Klock, a fortified stone homestead built in 1750, is part of a 30-acre complex that includes the historic homestead, a renovated Colonial Dutch Barn, blacksmith shop, and 19th century schoolhouse. The Hudson River National Historic Landmark District was designated by the U.S. Secretary of the Interior in 1990.

[143]/ As delineated by NYSM, NYSM polygon sites represent the approximate extent of archaeological sites believed to occupy large areas, and NYSM point sites represent identified locations of archaeological sites whose boundaries may not have been clearly defined.

Exhibit 4-27 – Architectural Resources within the Direct APE for each Alternative

County	NHL		S/NR-Listed Resources - individual		S/NR-Listed Resources - districts		S/NR-Listed Resources Total		S/NR-Eligible Resources- individual		S/NR-Eligible Resources - districts		S/NR-Eligible Resources Total		**Total Resources**	
	90/110	125	90/110	125	90/110	125	90/110	125	90/110	125	90/110	125	90/110	125	90/110	125
New York			4	4			4	4	3	3			3	3	7	7
Bronx			1	1			1	1					0	0	1	1
Westchester			11	11			11	11	3	3	1	1	4	4	15	15
Putnam			3	3	2	2	5	5					0	0	5	5
Dutchess			12	12	2	2	14	14	1	2			1	1	15	16
Columbia			2	2	2	2	4	4					0	0	4	4
Greene							0	0					0	0	0	0
Rensselaer			1	1	1	1	2	2	2	1			2	1	4	3
Albany					1		1	0	2				2	0	3	0
Schenectady				1	1		1	1					0	0	1	1
Montgomery	1		4		1		5	0	5				5	0	10	0
Herkimer							0	0	1		1		2	0	2	0
Oneida			1				1	0	1				1	0	2	0
Madison				1			0	1	1				0	0	0	1
Onondaga							0	0					0	0	0	0
Cayuga							0	0					0	0	0	0
Wayne							0	0					0	0	0	0
Monroe					1	1	1	1	2	1	1		2	1	3	2
Genesee					1		1	0					0	0	1	0
Erie			1	2			1	2			1	1	1	1	2	3
Niagara			1	1			1	1					0	0	1	1
Multiple Counties	1	1					0	0			1	1	1	1	1	1
TOTALS	2	1	41	39	12	8	53	47	20	10	4	3	24	13	79	61

Notes: Counties are listed from south to north, then east to west.
The 90/110 APE is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment.
The 125 APE is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long.

The 32-square-mile district stretches from Germantown in Columbia County to Hyde Park in Dutchess County. It includes over 40 riverfront estates, two villages, four hamlets, and significant designed landscapes and farmlands.

There are 53 S/NR-listed resources within the direct APE. Of these, 41 are individually listed while 12 are historic districts. The 53 individually listed resources are identified in Exhibit G-12 in Appendix G.

It should be noted that approximately 350 bridges meeting the 50 year age criterion for S/NR eligibility are located within the existing railroad alignment and thus within the direct APE. Any bridges 50 years old or older would also be evaluated for potential S/NR eligibility as part of the Tier 2 analysis. In order to evaluate the significance of these bridges, an architectural historian would conduct a field visit and would perform documentary research. The NYSDOT's Contextual Study of New York State's pre-1961 Bridges (November 1999) and Evaluation of National Register

Eligibility (January 2002) would be consulted among other documentary sources. Bridges not previously evaluated by the NYSDOT Contextual Study would be evaluated as part of the Tier 2 analysis.

Direct APE: 125 Alternative

A total of 61 previously-identified architectural resources are located in the direct APE for the 125 Alternative that extends along the Empire Corridor South/West and the Niagara Branch. These resources are summarized by county in Exhibit 4-27. Of the 61, one is an NHL: the Hudson River Historic District in Dutchess and Columbia Counties (described above).

There are 47 S/NR-listed resources within the direct APE. Of these, 39 are individually-listed and eight are historic districts. The 39 individually-listed resources are identified in Exhibit G-12 in Appendix G.

4.15.4. Potential Adverse Effects

As described above under "Existing Conditions," previously-identified archaeological sites and architectural resources within the direct and indirect APEs have been inventoried and mapped. Because the design of program improvements has not progressed to a point sufficient to enable site-specific analyses of potential adverse effects, specific potential effects to architectural and archaeological resources will not be provided as part of this Tier 1 Assessment. An analysis of the program alternatives' potential to result in direct and indirect effects to specific architectural and archaeological resources will be conducted during the Tier 2 level analysis, as described above in the "Methodology" section and summarized below under "Future Analysis." As previously noted, potential adverse effects on architectural resources include direct physical effects that alter the characteristics of the historic property in a manner that would diminish the integrity of the property's significant historic features. For example, program activities that would result in direct effects would include the demolition of a train station either listed or determined to be eligible for listing on the NR. Potential direct effects would also result from altering a train station in such a way as to remove the character-defining features that qualify it for listing on the NR. Similarly, direct effects on archaeological resources could result from construction activity to install new track, platforms, or grade crossings. Potential indirect effects on architectural resources include installation of new signal systems or overheard bridges, which could constitute a visual intrusion that would diminish the property's integrity, thereby adversely affecting its historic significance and hence its eligibility for listing on the NR. To the extent that the scope and activities of the various alternatives and their potential impacts can be identified at the present time, this information is provided below. Note that potential impacts were identified only for areas within the APE for each alternative where work is proposed. A comparison of the number of resources that could be affected by the Base Alternative, Alternative 90A, Alternative 90B, Alternative 110, and Alternative 125 is provided in Exhibit 4-28 and summarized below.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured against and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements

Exhibit 4-28—Comparison of Potential Impacts to Archaeological Sites and Architectural Resources, by Alternative

RESOURCE TYPE	NUMBER OF RESOURCES														
	Base Alternative			90A			90B			110			125		
	D	I	TOTAL	D	I	TOTAL	D	I	TOTAL	D	I	TOTAL	D	I	TOTAL
Archaeological Sites	N/A	N/A	**3**	30	N/A	**30**	87	N/A	**109**	83	N/A	**105**	35	N/A	**57**
NHLs	N/A	N/A	**0**	1	N/A	**1**	1	N/A	**2**	1	N/A	**2**	1	N/A	**2**
S/NR-listed Historic Districts	N/A	6	**7**	5	4	**9**	4	7	**20**	4	7	**20**	0	0	**9**
S/NR-listed Individual Resources	N/A	7	**7**	11	29	**40**	4	29	**71**	4	26	**68**	3	3	**44**
S/NR-eligible Historic Districts	N/A	3	**4**	N/A	3	**3**	2	11	**13**	2	10	**12**	0	0	**0**
S/NR-eligible Individual Resources	N/A	10	**10**	1	16	**17**	8	70	**87**	8	68	**85**	0	2	**11**
TOTAL	0	26	**26**	48	52	**100**	106	117	**302***	103	214	**292***	39	5	**123***

Note: Resources that fall within the direct APE (D) are also located within the boundaries of the (I) indirect APE, as indicated in the Total column.
*The following resources identified in Alternative 90A for the Empire Corridor South are included in the total resource count for Alternatives 90B, 110, and 125: 22 archaeological sites; 1 NHL; 9 S/NR-listed Historic Districts; 38 S/NR-listed Individual resources; and 9 S/NR-eligible Individual resources.

in track and station infrastructure.

Categorical Exclusions for eight projects in the Base Alternative are complete and have identified no adverse direct, physical or contextual impacts to archaeological sites or architectural resources in the direct APE. The CEs were reviewed to determine the potential for cultural resource effects, and, in addition, the historic assessment performed for this Tier 1 Draft EIS included research on documented cultural resources within the program's APE. However, 26 architectural resources located in the indirect APE have been identified for this analysis, and potential impacts to these resources will be assessed as part of the Tier 2 analysis. As described above, the identification of potential architectural resources in the APEs will be undertaken as part of the Tier 2 analyses for this program, and impacts will be assessed for any resources determined to be S/NR-eligible.

Direct APE: Archaeological Sites/Architectural Resources

In a letter dated August 14, 2007, SHPO determined that the proposed reconstruction of the Schenectady Station will not result in adverse impacts on archaeological and architectural resources. Additionally, in a letter dated April 27, 2007, SHPO determined that the new Niagara Falls Station will not have adverse archaeological impacts. In a letter dated May 17, 2013, SHPO determined that the Rochester Station redevelopment will not result in adverse impacts on archaeological and architectural resources.

Indirect APE: Architectural Resources

A total of 26 previously-identified architectural resources are located in the indirect APE for the Base Alternative. These include:

- **Monroe County** – *S/NR-listed Historic District*: East Avenue Historic District (MP 368-370); St. Paul-North Water Streets Historic District (MP 371); State Street Historic District (MP 371); Bridge Square Historic District (MP 372); and Madison Square-West Main Street Historic District (MP 372); *S/NR-listed Individual*: German United Evangelical Church Complex (MP 371); Leopold Street Shule (MP 370.5); Brick Presbyterian Church Complex (MP 371); Federal Building (MP 371); Andrews Street Bridge (MP 371); Washington Street Rowhouses (MP 372); *S/NR-eligible Historic District*: Public Market Historic District (MP 370); Prince Alexander Historic District (MP 370); Birch Crescent Historic District (MP 379); *S/NR-eligible Individual*: 1290, 1255-1257, 1239, 1320 University Avenue (MP 368.5); J. Hunderford Smith building (MP 369.5); Otis Lumber Co. (MP 369.5); Rochester Public Market (MP 370); Schwalb Coal & Oil Co. (MP 370.5); and Taylor Instrument Co. (MP 373) (**23 total**)

- **Schenectady County** – *S/NR-listed Historic District*: Stockade Historic District (MP 160) (**1 total**)

- **Niagara County** – *S/NR-listed Individual*: Custom House (MP QDN28); S/NR-eligible Individual: 947 Ontario Avenue (MP QDN28) (**2 total**)

An analysis of the potential for these Base Alternative projects to result in adverse impacts to the identified architectural resources will be conducted during the Tier 2 level analysis as described in the "Methodology" section and summarized below in "Future Analysis."

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, signalization, in addition to improvements proposed under the Base Alternative previously described. As with the Base Alternative, work proposed for the Alternative 90A is expected to occur within the existing right-of way. Categorical Exclusions for three of the projects in the 90A Alternative have been prepared and have identified no adverse impacts to architectural resources or archaeological resources in the direct APE for those specific projects. Exhibit 4-28 provides a summary of the total number of previously-identified archaeological sites and architectural resources located in the APEs for the Alternative 90A.

Direct APE: Archaeological Sites

There are 30 previously-identified archaeological sites located in the direct APE for Alternative 90A that could experience direct, physical impacts due to construction-related activities, including 11 burial/habitation sites. These include:

- **New York County** (Manhattan) – N (H, M) [144] site; N (R) site (**2 total**)

[144] /Native American Sites (N): (B) Burial; (C) Camp site/Tool Production/ Workshop; (H) Habitation/Village/Hamlet; (M) Midden; (O) Other; (P) Petroglyph/Pictograph; (Q) Quarry; (R) Rockshelter; (S) Stray Finds/"Traces of Occupation"; (T) Trail; (U)

- **Bronx County** – N (M) site (**1 total**)
- **Westchester County** – N (S) site; two N (U) sites; N (M) site; N (C) site; and three N (H, B) sites (**8 total**)
- **Putnam County** – N (S) site; N (B) site (**2 total**)
- **Dutchess County** – two N (H) sites; N (C, B) site; two N (S) sites; N (Q) site (MP 65); two N (U) sites; and N (C, B) site (**9 total**)
- **Montgomery County** – N (U) site; X site; N (B) site; and N (T) site (**4 total**)
- **Onondaga County** – N (C, H) site; N (S) site; N (H) site; and N (U) site (**4 total**)

As part of the Tier 2 analysis, field investigations would be conducted in those areas of the direct APE that have been identified as potentially archaeologically sensitive, in order to determine the presence or absence of potentially S/NR-eligible archaeological resources and thus any potential impacts to archaeological resources.

Direct APE: Architectural Resources

There are a total of 18 previously-identified architectural resources located in the direct APE for Alternative 90A that could experience direct, adverse impacts due to construction-related activities. These are:

- **Westchester County** – Lyndhurst (S/NR-listed Individual) (MP 24); and Garrison Landing Historic District (S/NR-listed Historic District) (MP 50) (**2 total**)
- **Putnam County** – Cold Spring Historic District (S/NR-listed Historic District) (MP 52.5); *S/NR-listed Individual*: U.S. Military Academy (MP 51); and West Point Foundry (MP 52) (**3 total**)
- **Dutchess County** – *S/NR-listed Historic District*: Wheeler Historic District (MP 64); Stone Street Historic District (MP 65); *S/NR-listed Individual*: National Biscuit Company Carton-Making and Printing Plant (MP 59); Mount Gulian (MP 61.5); Carman, Cornelius House (MP 62); Collyer, Capt. Moses W. House (MP 62); Poughkeepsie Railroad Bridge (MP 74); Poughkeepsie Railroad Station (MP 74); and Innis Dye Works (MP 74) (**9 total**)
- **Dutchess/ Columbia Counties** – Hudson River Historic District (NHL) (MP 82-102) (**1 total**)
- **Rensselaer County** – Schodack Landing Historic District (S/NR-listed Historic District); Livingston Avenue Bridge (S/NR-eligible Individual) (MP 143) (**2 total**)
- **Montgomery County** – Dove Creek Culvert (S/NR-eligible Individual) (MP 177.5) (**1 total**)

As in the Base Alternative, work proposed for Alternative 90A is expected to occur within the existing right-of way. However, these resources are located within 100 feet of work proposed in the right-of-way. Therefore, construction-related activities could result in adverse impacts to these resources. A field survey would be conducted as part of the Tier 2 analysis in order to determine potential adverse impacts to these resources and to identify potential architectural resources in the direct APE. Impacts would be assessed for any resources determined to be S/NR-eligible.

Unspecified/Unknown; Historic-Period Sites (H): (B) Burial/Cemetery; (D) Domestic; (F) Transportation/Infrastructure/Utilities; (I) Industrial or Commercial Deposits; (M) Maritime; (O) Other; (U) Unspecified/Unknown; (X): Unknown whether Precontact or Historic Period.

Indirect APE: Architectural Resources

There are 51 architectural resources located in the indirect APE for the 90A Alternative. These include:

- **New York County** (Manhattan) – Fort Tryon Park and the Cloisters (S/NR-listed Individual) (MP 9) (**1 total**)
- **Bronx County** – *S/NR-listed Individual*: Wave Hill (MP 13); Colgate Robert House (MP 13); and the William E. Dodge House (MP 12) (**3 total**)
- **Westchester County** – *S/NR-listed Individual*: Croton North Railroad Station (MP 34); Standard House (MP 41); Peekskill Freight Depot (MP 41); Bear Mountain Bridge and Tollhouse (MP 45); *S/NR-eligible Individual*: Tarrytown Railroad Station (MP 25); Riverside Hose Company (MP 25); and a resource located on the southeast corner of Central Avenue and North Water Street (MP 41.5) (**7 total**)
- **Putnam County** – *S/NR-listed Individual*: Wilson House (MP 49.5); Rock Lawn and Carriage House; and Eagle's Nest (MP 51) (**3 total**)
- **Dutchess County** – *S/NR-listed Historic District*: Main Street Historic District (MP 65); Union Street Historic District (MP 73.5); Mill Street-North Clover Street Historic District; *S/NR-listed Individual*: Shay's Warehouse and Stable (MP 65); Shay, William Double House (MP65); Zion Memorial Chapel (MP 65); Brower, Abraham House (MP 65); Brower, Adolph House (MP 65); Bannerman's Island Arsenal (MP 55.5); Chelsea Grammar School (MP 62); Church of the Holy Comforter (MP 73.5); Pelton Mill (MP 74); Old St. Peter's Roman Catholic Church and Rectory (MP 74); Hoffman House (MP 74); Roosevelt Point Cottage and Boathouse (MP 76); Rhinecliff Hotel (MP 89); O'Brien General Store and Post Office (MP 89); Riverside Methodist Church and Parsonage (MP 89); *S/NR-eligible Individual*: Metro-North Railroad Bridge (MP 58); Mid-Hudson Bridge (MP 73); Johnson Plumbing Complex (MP 73); and Cornell Boathouse (MP 74.5) (**22 total**)
- **Columbia County** – Hudson Historic District (MP 114.5) (S/NR-listed Historic District); *S/NR-listed Individual*: Wiswall, Oliver House (MP 113.8); Requa House (MP 129); and Hudson and Boston Railroad Shop (MP 114.5) (S/NR-eligible Individual) (**4 total**)
- **Montgomery County** – *S/NR-eligible Historic District*: Amsterdam East Main Street Historic District (MP 176); New York Canal System Historic District (MP 159-358.5); *S/NR-eligible Individual*: Guy Park Manor (MP 176.5); 6-8 Voorhees Street (MP 175.5); 366, 399, 401 West Main Street (MP 176.5); Guy Park (MP 177); resource on West Main Street (MP 177); and World War I Memorial (MP 177.5) (**10 total**)
- **Onondaga County** – New York State Fairgrounds Historic District (MP 294) (S/NR-eligible Historic District) (**1 total**)

Although adverse indirect, contextual effects to resources within the indirect APE are not anticipated, a field survey would be conducted as part of the Tier 2 analysis to determine potential adverse effects to these resources and to identify potential architectural resources in the APE. Indirect effects would be assessed for any resources determined to be S/NR-eligible.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

The work for this alternative also would include a new signal system to support the 90 mile an hour speed, new grade crossings, double track along the Niagara Branch, and new undergrade and overhead bridges. Improvements would be made at seven existing stations along Empire Corridor West.

The projects proposed for Alternative 90A in the direct and indirect APEs for Empire Corridor South (MP 1 to MP 143) also would be included in Alternative 90B. The discussion of potential impacts presented above under Alternative 90A is not reiterated in the impacts analysis for Alternative 90B. However, the number of archaeological sites and architectural resources identified in the direct and indirect APEs for the Empire Corridor South portion of Alternative 90A has been included in the total number of resources for Alternative 90B shown in Exhibit 4-28.

Direct APE: Archaeological Sites

There are 87 previously identified archaeological sites located in the direct APE for Alternative 90B (see Exhibit 4-28) that could experience direct, physical impacts due to construction-related activities, including 17 burial/habitation sites. These are:

- **Schenectady County** – N (B) site; two N (U) sites; X site; N (S) site; N (C) site; N (H) site; and two H (U) sites (**9 total**)
- **Montgomery County** – seven N (U) sites; nine X sites; two N (C) sites; two H (U) sites; H (I) site; three N (P) sites; seven N (H) sites; two N (B) sites; N (S) site; three N (T) sites; two N (S) sites; and N (B, H) site (**39 total**)
- **Herkimer County** – X site; N (U) site; H (M) site; N (H) site; and four N (S, T) sites (**8 total**)
- **Oneida County** – three N (C) sites; and N (B) site; and Sites 1 and 2 identified by the Oneida Nation (**6 total**)
- **Onondaga County** – N (H) site ; N (C, H) site; four N (S) sites; N (U) site; H (I) site; N (C) site; and H (U) site (**10 total**)
- **Cayuga County** – N (U) site (**1 total**)
- **Wayne County** – N (S) site (**1 total**)
- **Monroe County** – N (B) site; N (U) site; N (T, S) site; N (C) site; and N (S) site (**5 total**)
- **Genesee County** – two N (T) sites; two N (C, S) sites; N (S) site; and H (D) site (**6 total**)
- **Erie County** – N (U) site; and N (C) site (**2 total**)

As part of the Tier 2 analysis, field investigations would be conducted in those areas of the direct APE that have been identified as potentially archaeologically sensitive, in order to determine the presence or absence of potentially S/NR-eligible archaeological sites and thus any potential impacts to archaeological resources.

Direct APE: Architectural Resources

Work proposed for Alternative 90B—which mainly consists of the construction of new track and new access road work— could have adverse impacts on architectural resources located within the direct APE due to construction-related activities. Exhibit 4-28 provides a summary of the total number of architectural resources located in the direct APE for Alternative 90B.

Only one of the seven existing stations where improvements are proposed for this alternative has been identified as a known architectural resource: Utica Station, located in Oneida County, which is discussed below. As part of the Tier 2 analysis, the other six stations, including Schenectady Station, Amsterdam Station, Rome Station, Syracuse Station, Rochester Station, and Buffalo-Depew Station, would be evaluated for their potential eligibility for listing on the State/National Registers, and impacts would be evaluated for any other stations identified as eligible for S/NR listing. Union Station in Utica (referred to within this EIS as the Utica Station) is S/NR-listed. Proposed work at this station includes the construction of a new center island platform and overhead pedestrian bridge; work in the station area also would include new siding, new passenger and freight track, removal of existing track, and new turnouts. This work could have potential adverse impacts on the station.

There are 19 architectural resources located in the direct APE for Alternative 90B that could experience direct, adverse impacts due to construction-related activities. These include:

- **Schenectady County** – Stockade Historic District (S/NR-listed Historic District) (MP 160) (**1 total**)
- **Schenectady/Montgomery/Madison/Monroe Counties** – New York Canal System Historic District (S/NR-eligible Historic District) (MPs 160, 177, 191, 201, 330, 332.5, and 358.5). The non-contiguous historic district includes several resources located along the railroad corridor, such as a railroad bridge over Erie Boulevard in Schenectady (MP 160), Lock E-13 in the Town of Root, Montgomery County (MP 191), and a moveable dam and lock in the Town of Palatine, Montgomery County (MP 201) (**1 total**)
- **Montgomery County** – Fort Klock (NHL) (MP 205); Nelliston Historic District (S/NR-listed Historic District) (MP 201); *S/NR-listed Individual*: Guy Park (MP 177); Montgomery County Farm (MP 193-194); Palatine Bridge Freight House (MP 197.8); *S/NR-eligible Individual*: Property at the northwest corner of Ann and Main Streets, Amsterdam (MP 177.5); Dove Creek Culvert that runs beneath the right-of-way near Steadwell Avenue in the Town of Amsterdam (MP 177.5); H.D.F. Veeder House (MP 188); hexagonal limestone well shelter (MP 198); and the Palatine Bridge cut limestone retaining wall and bridge abutment (MP 198) (**10 total**)
- **Herkimer County** – Little Fall Historic District (S/NR-eligible Historic District) (**1 total**)
- **Oneida County** – Union Station, Utica (S/NR-listed Individual) (MP 237.5); and a railroad station building in the village of Oriskany (S/NR-eligible Individual (MP 244.5) (**2 total**)
- **Monroe County** – Brown's Race Historic District (S/NR-listed Historic District) (MP 370); *S/NR-eligible Individual*: Coldwater Station (MP 378); and 60 South Main Street (MP 386) (**3 total)**
- **Genesee County** – Lake Street Historic District (S/NR-listed Historic District) (MP 389) (**1 total**)

A field survey would be conducted as part of the Tier 2 analysis in order to determine potential adverse impacts to these resources and to identify potential architectural resources in the APE. Impacts would be assessed for any resources determined to be S/NR-eligible.

The exact area of the proposed property acquisitions at MPs 168.3, 210.8, 215.6, 237.7, 286.4, 341.1, 377.6 has not yet been determined. It is assumed for the purposes of this analysis that the property to be acquired would be directly adjacent to the existing right-of-way. There are no previously-identified architectural resources located in close proximity to these mile markers, with one exception: MP 237.7, which is in close proximity to Union Station in Utica (discussed above). There could be additional adverse impacts to potential architectural resources as a result of the property acquisitions proposed for Alternative 90B. As part of the Tier 2 analysis, properties proposed to be acquired would be surveyed to identify any potential architectural resources. Impacts would be assessed for any resources identified as eligible for listing on the State/National Registers.

It should be noted that there are a number of rail bridges located within the right-of-way, which could be adversely affected by work proposed for this alternative. These bridges would be identified and evaluated for their potential eligibility for S/NR listing in the Tier 2 level analysis. Impacts would be evaluated for any bridges determined to be eligible for S/NR listing.

Indirect APE: Architectural Resources

There are 116 architectural resources located in the indirect APE for Alternative 90B. Exhibit 4-28 provides a summary of the total number of resources located in the indirect APE for this alternative. These include:

- **Schenectady County** – Union Street Historic District (S/NR-listed Historic District) (MP 159.8); *S/NR-listed Individual*: Central Fire Station (MP 159.5); Proctor, F.F. Theater and Arcade (MP 159.5); and Swart House and Tavern (MP 167.5) (**4 total**)
- **Montgomery County** – *S/NR-listed Individual*: Fort Johnson (MP 179); New Courthouse – Fonda (MP 186.5); Wagner, Webster House (MP 198); Frey House (MP 198.2); Nellis Tavern (MP 205.5); *S/NR-eligible Historic District*: Amsterdam East Main Street Historic District (MP 175.8); and Fonda Fairgrounds and Speedway Historic District (MP 186); and *S/NR-eligible Individual*: 6-8 Voorhees Street (MP 175); 366, 399, 401 West Main Street (MP 176.5); World War I Memorial (MP 177.8); 2, 3, 4, 9, 11, 19, 23, 25, 27, 29, 31, and 37 East Main Street (MP 186); 4, 6, 8, 10, 12, 14-16, 18, 22, 26, 30, 32, 34, 40, 42, 46, and 56 West Main Street (MP 186); 1 Cayadutta Street; Lock E-14 and Lock House; and the Nelson and Reese House (including cemetery and barn foundations) (MP 207) (**43 total**)
- **Herkimer County** – *S/NR-listed Individual*: Herkimer House (MP 214); U.S. Post Office – Little Falls (MP 216.5); Herkimer County Trust Company building (MP 216.5); Palatine German Frame House (Wilder House) (MP 227); and *S/NR-eligible Individual*: 591 East John Street (MP 216.5); 401, 403, 407 South Ann Street (MP 216.5); Fleet Bank (MP 216.5); Snyder Apartments (MP 216.5); 48-54 West Main Street (MP 216.5); 24, 25, 55, 56 West Mill (MP 216.5); 151 Elizabeth Street (MP 217); and 338 West Main Street (MP 217) (**17 total**)
- **Oneida County** – Lower Genesee Historic District (S/NR-eligible Historic District) (MP 237.5); *S/NR-eligible Individual*: Foster Brothers Manufacturing Company (MP 237); Hieber, John C. and Company building (MP 237.5); Utica Daily Press building (MP 237.5); Hurd & Fitzgerald

building (MP 237.5); and Byington Mill (Frisbie & Stansfield Knitting Company) (MP 237.5) (**7 total**)

- **Madison County** – South Peterboro Street Commercial Historic District (S/NR-listed Historic District); and *S/NR-listed Individual*: U.S. Post Office – Canastota (MP 270); United Church of Canastota (MP 270); 203 South Main Street (MP 270); Canastota Public Library (MP 270); 115 South Main Street (MP 270); 223 James Street (MP 270); Alvord House (289.5); and East Palmyra Presbyterian Church (MP 344.5) (**7 total**)
- **Onondaga County** – Alvord House (S/NR-listed Individual (MP 289.5); and New York State Fairgrounds Historic District (S/NR-eligible Historic District (MP 294) (**2 total**)
- **Wayne County** – East Palmyra Presbyterian Church (S/NR-listed Individual) (MP 344.5); and Village of Clyde Historic District (S/NR-eligible Historic District (MP 328.5) (**2 total**)
- **Monroe County** – *S/NR-listed Historic District*: East Avenue Historic District (MP 368-370); St. Paul-North Water Streets Historic District (MP 371); State Street Historic District (MP 371); Bridge Square Historic District (MP 372); Madison Square-West Main Street Historic District (MP 372); *S/NR-listed Individual*: Leopold Street Shule (MP 370.5); German United Evangelical Church Complex (MP 371); Andrews Street Bridge (MP 371); Federal Building (MP 371); Brick Presbyterian Church (371); Washington Street Rowhouses (MP 372); *S/NR-eligible Historic District*: Birch Crescent Historic District (MP 379); Prince Alexander Historic District (MP 370); Public Market Historic District (MP 370); and *S/NR-eligible Individual*: Foster Armstrong Piano Warehouse (MP 364); 1290, 1255-1257, 1239, 1320 University Avenue (MP 368.5); J. Hunderford Smith Company building (MP 369.5); Otis Lumber Company building (MP 369.5); Rochester Public Market (MP 370); Schwalb Coal & Oil Company (MP 370.5); Taylor Instrument Company (MP 373); Building C2 (H.F. Snyder & Son) (MP 386); and Building Z (former Richmond Residence) (MP 386) (**26 total**)
- **Genesee County** – Village of Bergen Historic District (S/NR-eligible Historic District) (MP 389); and 20 North Lake Street (S/NR-eligible Individual) (MP 389) (**2 total**)
- **Erie County** – *S/NR-listed Individual*: Buffalo Gas Light Company Works (MP 2.8); Delaware Park-Front Park System (MP 4); *S/NR-eligible Historic District*: Wende Correctional Facility (MP 422); Joseph Ellicot Downtown Historic District; *S/NR-eligible Individual*: 1032 Niagara Street (MP 5); 1073 Niagara Street (MP 5) (**6 total**)

Although direct, adverse impacts to architectural resources due to construction-related activities are not anticipated for resources located within the indirect APE, it is possible that this alternative could have indirect, contextual impacts to these resources. An analysis of potential adverse impacts, including visual or contextual impacts, to architectural resources located in the indirect APE for Alternative 90B would be conducted during the Tier 2 level analysis. A field survey would be conducted as part of the Tier 2 analysis in order to determine potential adverse impacts to these resources and to identify potential architectural resources in the APE. Impacts would be assessed for any resources determined to be S/NR-eligible.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative

110 would also add 59 miles of fourth track in six locations. As with Alternative 90B, Alternative 110 also would include a new signal system to support the 110 mile an hour speed, new grade crossings, and new undergrade and overhead bridges, and the same improvements would be made at seven existing stations along Empire Corridor West. Exhibit 4-28 provides a summary of the total number of archaeological sites and architectural resources located in the APEs for Alternative 110.

As with Alternative 90B, the projects proposed for Alternative 90A in the direct and indirect APEs for Empire Corridor South (MP 1 to MP 143) also would be included in Alternative 110. The discussion of potential impacts presented above under Alternative 90A is not reiterated in the impacts analysis for Alternative 110. However, the number of archaeological sites and architectural resources identified in the direct and indirect APEs for the Empire Corridor South portion of Alternative 90A has been included in the total number of resources for Alternative 110 shown in Exhibit 4-28.

Direct APE: Archaeological Sites

A majority of the previously-identified archaeological sites that have the potential to be adversely impacted by the Alternative 110 are the same as those that could be adversely impacted by the similar projects proposed for Alternative 90B, including 18 burial/habitation sites. There are three exceptions:

- Two N (U) sites located in the direct APE for Alternative 90B in Schenectady County are not located in the direct APE for Alternative 110.
- One N (S) site located in the direct APE for Alternative 90B in Montgomery County would not be located in the direct APE for Alternative 110. One N (H) site in Montgomery County located in the direct APE for Alternative 110 is not located in the direct APE for Alternative 90B.

As part of the Tier 2 analysis, field investigations would be conducted in those areas of the direct APE that have been identified as potentially archaeologically sensitive, in order to determine the presence or absence of potentially S/NR-eligible archaeological sites and thus any potential impacts to archaeological resources.

Direct APE: Architectural Resources

The number of NHLs, S/NR-listed Historic Districts, S/NR-listed Individual resources, S/NR-eligible Historic Districts, and S/NR-eligible Individual resources located in the direct APE for Alternative 110 are the same as the number of resources located in the direct APE for Alternative 90B. Therefore, the number of previously identified architectural resources that could experience adverse, direct impacts due to construction-related activities in Alternative 110 is the same as those for Alternative 90B.

As with Alternative 90B, there are seven existing stations along Empire Corridor West where improvements are proposed for Alternative 110—one of which has been identified as a known architectural resource: Utica Station, located in Oneida County. The other six stations where improvements are proposed would be evaluated for their potential eligibility for listing on the State/National Registers, then impacts would be assessed for any stations identified as eligible for S/NR listing. Additionally, as with Alternative 90B, there are a number of rail bridges located

within the right-of-way, which could be adversely impacted by work proposed for this alternative. As part of the level Tier 2 analysis, these bridges would be identified and evaluated for their potential eligibility for listing on the State/National Registers, then adverse impacts would be assessed for any bridges determined to be S/NR-eligible.

Certain elements of Alternative 110, including the proposed realignment of sections of Route 5, could potentially impact residential and commercial buildings outside the right-of-way at the following locations: MPs 164.5-165.4; 172.6; 173.6; 183.2; 184.5; 185; 186.8; 187.3; 189; 191.7; 192.5-192.8; 196.4; 196.7; 196.9; 198; 200.6; 210.8; 226.4-227; 228; 230.4-230.9; 360.6; 361.2; and 402.4. Although there are no previously identified architectural resources within close proximity to these locations, as part of the level Tier 2 analysis, the potentially affected properties would be surveyed to identify any potential architectural resources that may eligible for listing on the State/National Registers.

The exact area of the proposed property acquisitions at MPs 168.3, 184.6, 186.3, 191.7, 198.1, 200.6, 207.5, 210.8, 215.1, 226.9, 228.0, 230.8, 237.2, 286.4, 341.1, 361.4, 377.6, and 389.1 has not yet been determined. It is assumed for the purposes of this analysis that the property to be acquired would be directly adjacent to the existing right-of-way. Although there are no previously identified architectural resources located in close proximity to these mile markers, there could be adverse impacts to potential architectural resources as a result of the property acquisitions proposed for Alternative 110. As part of the Tier 2 analysis, properties proposed to be acquired would be surveyed to identify any potential architectural resources. Impacts would then be assessed for any resources identified as eligible for S/NR listing.

Indirect APE: Architectural Resources

As with the direct APE, the number of NHLs, S/NR-listed Historic Districts, S/NR-listed Individual resources, S/NR-eligible Historic Districts, and S/NR-eligible Individual resources located in the indirect APE for Alternative 110 are the same as the number of resources located in the indirect APE for Alternative 90B, with the addition of the Walrath-Van Horne House (MP 201.5), an S/NR-listed individual resource in Montgomery County. Although direct, adverse impacts to these architectural resources due to construction-related activities are not anticipated for resources located within the indirect APE, it is possible that this alternative could have indirect, contextual effects to these resources. An analysis of potential adverse indirect impacts, including visual or contextual impacts, to architectural resources located in the indirect APE for Alternative 110 would be conducted during the Tier 2 analysis. A field survey would be conducted as part of the Tier 2 analysis in order to determine potential adverse impacts to these resources and to identify potential architectural resources in the APE. Impacts would be assessed for any resources determined to be S/NR-eligible.

Alternative 125

Alternative 125 would use 125 miles per hour as the MAS and would be the first speed threshold for electrically powered trains. Alternative 125 would construct a two-track, grade-separated corridor dedicated to high speed passenger service approximately 283 miles in length from Albany/Rensselaer Station to Buffalo Exchange Street Station. Trains would operate on the existing Hudson Line Corridor from New York Penn Station to Albany/Rensselaer Station. The new corridor would parallel the existing corridor on a combination of new and existing right-of-way to serve existing stations in Albany, Syracuse, Rochester, and Buffalo. Required infrastructure would include

roadbed, track, viaducts, bridges, cuts, embankments, access roads, railroad systems, maintenance facilities and other support facilities.

The projects proposed for Alternative 90A in the direct and indirect APEs for Empire Corridor South (MP 1 to MP 143) and the Niagara Branch also would be included in Alternative 125. The discussion of potential impacts presented under Alternative 90A is not reiterated in the impacts analysis for Alternative 125. However, the number of archaeological sites and architectural resources identified in the direct and indirect APEs for the Empire Corridor South portion of Alternative 90A has been included in the total number of resources for Alternative 125 shown in Exhibit 4-28. The Programmatic Agreement (included as Appendix H) addresses the process by which FRA and NYSDOT intend to comply with Section 106 for undertakings occurring on tribal lands or where adverse effects to historic properties of a religious or cultural significance to a tribe occur off tribal land.

Direct APE: Archaeological Resources

There are 35 previously identified archaeological sites located in the direct APE of proposed new track for Alternative 125 (see Exhibit 4-28) that could experience direct, physical impacts due to construction-related activities, including six burial/habitation sites. These are:

- **Albany County** – two N (C) sites; and H (I) site (**3 total**)
- **Schenectady County** –N (C) site (**1 total**)
- **Schoharie County** – N (U) site (**1 total**)
- **Montgomery County** –N (S), H (U) site; H (U) site (**2 total**)
- **Herkimer County** – H (B) site (**1 total**)
- **Oneida County** – N (C) sites; N (B) site; N (H) site; and Site 3 identified by the Oneida Nation (**4 total**)
- **Madison County** – two N (S) sites; N (C) site; and Sites 4 and 5 identified by the Oneida Nation (**5 total**)
- **Onondaga County** – two N (H) sites ; two N (S) sites; two H (D) sites; and N (C) site (**7 total**)
- **Cayuga County** – N (B); and N (S) site (**2 total**)
- **Wayne County** – N (S) site; and N (C) site (**2 total**)
- **Genesee County** – two N (C) sites; and N (S) site (**3 total**)
- **Erie County** – two N (C) sites; N (C, S) site; and N (S) site (**4 total**)

As part of the Tier 2 analysis, field investigations would be conducted in those areas of the direct APE that have been identified as potentially archaeologically sensitive, in order to determine the presence or absence of potentially S/NR-eligible archaeological sites and thus any potential impacts to archaeological resources.

Direct APE: Architectural Resources

Work proposed for the Alternative 125—which mainly consists of the construction of new track—could have adverse impacts on architectural resources located within the direct APE due to

construction-related activities. Exhibit 4-28 provides a summary of the total number of architectural resources located in the direct APE for Alternative 125.

There are three architectural resources located in the direct APE for Alternative 125 that could experience direct, adverse impacts due to construction-related activities. These include:

- **Schenectady County** – Liddle, Robert Farmhouse (S/NR-listed Individual) (MP 167) (**1 total**)
- **Madison County –** Deferriere House (S/NR-listed Individual) (MP 252.8) (**1 total**)
- **Erie County** – Hull, Warren House (S/NR-listed Individual) (MP 411) (**1 total**)

A field survey would be conducted as part of the Tier 2 analysis in order to determine potential adverse impacts to these resources and to identify potential architectural resources in the APE. Impacts would be assessed for any resources determined to be S/NR-eligible.

Indirect APE: Architectural Resources

There are five architectural resources located in the indirect APE for the Alternative 125. Exhibit 4-28 provides a summary of the total number of resources located in the indirect APE for this alternative. These include:

- **Albany County** – Nut Grove (S/NR-listed Individual) (MP 144); and 924 New Scotland Road (S/NR-eligible Individual) (MP 147) (**2 total**)
- **Schenectady County** – *S/NR-listed Individual*: Reformed Presbyterian Church Parsonage (MP 169); and Halladay House (MP 172); and US 20 between Knight and Mudge Roads (S/NR-eligible Individual) (MP 170.5) (**3 total**)

Although direct, adverse impacts to architectural resources due to construction-related activities are not anticipated for resources located within the indirect APE, it is possible that this alternative could have indirect, contextual impacts to these resources. An analysis of potential adverse impacts, including visual or contextual impacts, to architectural resources located in the indirect APE for Alternative 125 would be conducted during the Tier 2 level analysis. A field survey would be conducted as part of the Tier 2 analysis in order to determine potential adverse impacts to these resources and to identify potential architectural resources in the APE. Impacts would be assessed for any resources determined to be S/NR-eligible.

4.15.5. Potential Mitigation Strategies

A draft Programmatic Agreement has been prepared for this program (see Appendix H), which identifies a methodology for the Section 106 process implemented for component projects advanced at the Tier 2 level. The PA would be signed by the FRA as lead federal agency, NYSDOT, and the SHPO. Participating federally recognized tribes and consulting parties would be invited to sign the PA as concurring parties. The Advisory Council for Historic Preservation (ACHP) declined to participate in the development of the PA via e-mail dated July 20, 2012. However, ACHP may choose to participate in the consultation when there are substantial impacts to historic properties, when a case presents important questions of policy or interpretation, when there is a potential for procedural problems, or when there are issues of concern to Indian tribes. ACHP must be invited to

participate when the federal agency sponsoring a project wants the Council's involvement and when the project would have an adverse effect on a NHL. Execution of the PA and implementation of the terms therein satisfies the requirement of Section 106 that the Council be given a reasonable opportunity to comment on the Tier 1 undertaking, and demonstrates that the federal agency has taken into account the effects of the action.

For archaeological resources, mitigation measures that may be identified for component projects at the Tier 2 level may include Phase III data recovery, documentation, geoarchaeological survey, preparation and implementation of archaeological protection plans, and/or preparation of public education materials.

For architectural resources, possible mitigation measures include:

- The preservation or relocation of historic buildings;
- Documentation of resources following Historic American Buildings Survey (HABS)/Historic American Engineering Record (HAER) standards;
- Production of educational materials interpreting the history and significance of affected resources for use by local libraries, historical societies, and educational institutions; and
- Installation of signage interpreting the history and significance of affected resources along the proposed rail corridor, or planting vegetation or creating noise barriers along the proposed rail corridor.

Furthermore, in order to avoid inadvertent damage to historic resources located in close proximity to possible project construction, all appropriate resources would be included in a Construction Protection Plan (CPP). The CPP would identify the historic resources to be included in the plan. It would also set for the specific measures to be used and specifications that would be applied to protect these resources during the construction period.

If unavoidable potential direct and/or indirect adverse effects are identified during the Tier 2 analysis, more detailed and specific measures to minimize and/or mitigate these effects would be defined and implemented in consultation with SHPO, involved THPOs and/or Tribal Organizations, ACHP (if appropriate), and any involved consulting parties, as described in the draft PA and noted under Section 4.15.6, "Programmatic Agreement and Future Analysis."

4.15.6. Programmatic Agreement and Future Analysis

As described in the "Methodology" section, the environmental compliance for this program is being conducted using a phased approach as outlined in 36 CFR 800.4(b)(2) and 800.5(a)(3). Determinations of eligibility and effect under Section 106 of NHPA may be deferred to Tier 2 of the process under the terms of a PA executed in accordance with 36 CFR 800.14(b). A draft PA, included as Appendix H, provides a mechanism and framework for meeting NHPA compliance obligations in the Tier 2 phase of the program. The draft PA identifies a protocol for preparing site-specific environmental documentation for component projects, as appropriate, in subsequent phases or tiers of the program in accordance with NEPA and NHPA. The PA sets forth guidelines for the following procedures at the Tier 2 level: consultation with SHPO, federally recognized tribes, other consulting parties; delineation of APEs and identification and evaluation of historic properties; assessment of adverse effects; and resolution of adverse effects. The PA also provides a

list of property types exempt from review as historic properties and a list of routine maintenance activities that would be exempt from the Section 106 methodology outlined in the PA.

As component projects are progressed to the Tier 2 level, APEs for each component project would be developed in consultation with SHPO, federally recognized tribes and consulting parties, as appropriate to reflect the effects of each Tier 2 project. More detailed existing conditions data collection and effects assessments, the protocol for which is outlined in detail in the draft PA, would be conducted as part of the Tier 2 analysis. Existing conditions data presented in this Tier 1 document would be revised and/or expanded upon as appropriate to account for all historic properties in the APEs of component projects assessed at the Tier 2 level. In regard to archaeological resources, archaeological documentary studies and field investigations (where appropriate) would be conducted in sensitive portions of the direct APEs to determine the presence or absence of S/NR-eligible archaeological resources. If S/NR-eligible archaeological resources are identified in the direct APEs that could be affected by a proposed project, additional investigations (such as Phase II field surveys) would be undertaken to determine the physical extents and significance (S/NR eligibility) of archaeological sites.

For architectural resources, additional existing conditions data that would be collected as part of the Tier 2 analysis would include the identification of architectural resources that meet the S/NR criteria but had not been previously determined S/NR-eligible. The bridges and railroad facilities located within the direct APEs also would be evaluated for S/NR-eligibility as part of the Tier 2 analysis. In order to evaluate the significance of these resources, an architectural historian would conduct a field visit, and would prepare documentation in the form of a Cultural Resources Survey (CRS) Report. The content, methodology, level of effort, and documentation requirements for historic property evaluations in the CRS shall be conducted in accordance with State Education Department (SED) Work Scope Standards, which incorporate the standards of the New York Archaeological Council (NYAC). Based on this documentation, FRA would make determinations of eligibility in consultation with SHPO.

Once the additional data collection for existing conditions in the APEs has been completed, the effect of project alternatives on historic properties will be evaluated. The Advisory Council's Criteria of Adverse Effect (36 CFR 800.5[a][1]) will be applied to determine effects on the historic properties. In general, an adverse effect occurs when a proposed project may cause a change in the characteristics of a property that qualify it for inclusion in the National Register. The proposed project's adverse effects will be identified in coordination with ACHP, SHPO, and participating federally recognized tribes and consulting parties. The lead agency will issue an Effect Finding in accordance with 36 CFR 800.11(e).

If the analysis concludes that a proposed project would have an adverse effect, measures to avoid, minimize, or mitigate adverse effects will be identified. This mitigation most likely will be implemented through project-level Memorandum(a) of Agreement (MOA). A PA differs from an MOA in that MOAs are used to resolve known and definable adverse effects on historic properties, whereas PAs are used when the effects of an undertaking are not fully known. All appropriate coordination with ACHP, SHPO, and applicable THPOs, tribal organizations, and consulting parties, would be undertaken as part of this process in compliance with Section 106. Guidelines for MOAs prepared as part of component projects at the Tier 2 level are provided in the Draft PA.

As noted above in "Regulatory Context," in addition to Section 106, the effects of the undertaking on historic properties will also be considered under Section 110 of NHPA and Section 4(f) as part of a separate future analysis. Section 110 of NHPA mandates additional protection of NHLs by requiring

that federal agencies undertake planning and actions as necessary to minimize harm when considering undertakings that may directly and adversely affect NHLs. Section 4(f) prohibits actions by the Secretary of Transportation that require "use" of a historic property that is listed in or eligible for inclusion in the National Register, unless a determination is made that there is no feasible and prudent alternative to the use of such land, and all possible planning has been undertaken to minimize harm to the 4(f) property.

4.16. Parks and Recreational Areas

4.16.1. Regulatory Context

Federal protection of parklands is provided under Section 4(f) of the U.S. Department of Transportation Act (for federally funded transportation projects) and under Section 6(f) of the U.S. Land and Water Conservation Fund (LWCF) Act (for LWCF-funded parks). Section 4.23 also addresses potential Section 4(f)/Section 6(f) resources and evaluations needed in Tier 2.

Section 4(f) of the U.S. DOT Act (49 U.S.C. 303(c)) of 1969, as amended, states that the Secretary of the U.S. DOT shall not approve any program or project that requires the "use" of any land from a public park, recreation area, wildlife and waterfowl refuge, or historic site, unless there is no feasible and prudent alternative, and such project or program includes all possible planning to minimize harm.

Under Section 6(f) of the U.S. Land and Water Conservation Fund (LWCF) Act, the United States Department of the Interior (DOI) provides funding for state, county, and local efforts to advance public recreation. Once LWCF funds are utilized for a particular recreation project, conversion of that park facility for any non-recreational purpose is prohibited unless alternatives are assessed and steps are taken to identify, evaluate, and supply replacement parkland. In addition, the Secretary of Interior must grant prior approval for the conversion and replacement parkland.

Section 6(f) applies to parklands on which Land and Water Conservation Funding has been expended. The Land and Water Conservation Fund Act states that: "*No property acquired or developed with assistance under this section shall, without the approval of the Secretary, be converted to other than public outdoor recreation uses. The Secretary shall approve such conversion only if he finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as he deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location (Sec. 6 [16 U.S.C. 4601-8] (e) (3))*." If a conversion of Section 6(f) parks or lands may occur, a Section 6(f) Evaluation will be prepared and circulated as part of Tier 2.

New York State places similar restrictions on all municipal parklands, which cannot be converted to a non-park use without prior approval from the New York State Legislature (referred to in New York as parkland alienation). The legal basis for the need for "parkland alienation" legislation is not found in statute, but has been established in common law through the New York State courts under the "public trust doctrine." When a municipality accepts federal or state funding for the acquisition or improvement of parklands, additional restrictions apply to the sale, lease, exchange, or use for non-park purposes.

4.16.2. Methodology

Parks and recreation areas for study areas within 1,000 feet of the corridor centerline for all alternatives were identified using existing mapping collected from federal and state agencies. Federal, state, county, and municipal parks and recreation areas were located using Geographic Information System (GIS) mapping obtained from the New York State GIS Clearinghouse, New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP), and the New York State Department of Environmental Conservation (NYSDEC). The GIS mapping obtained of federal and state parks and recreation areas included National Memorials, National Wildlife Refuges, and National and State Historic Sites, and these sites were included as publicly accessible recreation destinations. Information from the National Park Service (NPS) staff was obtained on locations of NPS properties, including National Natural Landmarks,[145] National Memorials, and National Monuments.[146] The NPS website was consulted to identify and locate these NPS properties, National Heritage Areas and county-by-county Land and Water Conservation Fund park grants. Information obtained from the GIS mapping included locations of state heritage areas, state forests and preserves, state campgrounds, boat launches, and NYSDEC roads, trails, and snowmobile trails. GIS mapping collected from the NYSOPRHP included LWCF funded municipal parks. Aerial photography and Google street mapping were reviewed to supplement existing maps and identify other parks and recreation areas within 1000 feet of the corridor centerline for both the 90/110 and the 125 Study Areas. Publicly owned recreation areas were defined to include publicly owned golf courses (but not "public" golf courses that are open to the public, but privately owned). This section also addresses tribally owned recreational facilities.

4.16.3. Existing Conditions

Overview

The existing parks and recreation areas in the study area are concentrated in two main areas: the Hudson River Valley and the New York State Barge Canal system within the Mohawk River Valley.

- The program corridor extends along the east bank of the **Hudson River** between New York City and Albany a distance of 142 miles. The Hudson River Valley in the program area has a concentration of national, state, county, and municipal parks and recreation areas due to its location and scenic views, as well as the concentration of population centers that developed along the river. The area also has a rich cultural and economic heritage and hosts a number of historic districts and sites. The Hudson Valley also was the location of the estates of many wealthy New York industrialists, such as John D. Rockefeller and Frederick William Vanderbilt, and of nationally important individuals such as Franklin Roosevelt, a descendant of one of the early Dutch families in the region. The national and state historic sites are important recreational tourism destinations.
- The **New York State Canal System** is a navigable 524-mile inland waterway that crosses upstate New York. The **New York State Barge Canals,** owned by the New York State Canal Corporation (a subsidiary of the New York State Thruway Authority) provide recreational

[145]/ Deb DeQuinzio, National Natural Landmarks Program, National Park Service Northeast Region, "Moss Island," E-mail/personal communication to Addie Kim, HNTB Corporation, March 22, 2011.
[146]/ Duncan Hay, National Park Service, Northeast Region, "NYSDOT & FRA Compliance (NEPA), E-mail/personal communication to Addie Kim, HNTB Corporation, March 25, 2001.

opportunities for water-based navigation and trail users. The **New York State Canalway Trail System** is comprised of a network of more than 260 miles of existing multi-use, recreational trails across upstate New York. Major segments are adjacent to the waterways of the New York State Canal System or follow remnants of the historic original canals of the early 1800s that preceded today's working Canal System. The Canalway Trail System is comprised of four major segments: the 100-mile **Erie Canal Heritage Trail** in Western New York; the 36-mile **Old Erie Canal State Park Trail** in Central New York; the 60-mile **Mohawk-Hudson Bikeway** in the eastern Capital Region. Portions of this canal system are nationally or state-designated heritage areas, parks, and trails.

The national, state, county, and municipal parks and recreation areas and federally and state-designated heritage and historic sites that are also important tourism destinations are described in the following sections.

National Parks and Recreation Areas

There are several types of federally designated parks or recreation areas in the study area, including National Heritage Areas, a National Memorial, a National Natural Landmark, a National Wildlife Refuge, and National Historic Sites. National Historic Landmarks and National Register Historic Districts and sites in the program area are addressed under Section 4.15.3.

- **National Heritage Areas:** Congress established National Heritage Areas to promote historic preservation and an appreciation of the history and heritage of the designated site. National Heritage Areas are not federally owned or managed, but are administered by state or local governments or non-profit or private corporations, with the National Park Service providing an advisory role. The Empire Corridor traverses through three National Heritage Areas:
  - **Hudson River Valley National Heritage Area:** The Hudson River Valley National Heritage Area was designated by Congress in 1996 and extends from New York City north to Albany, along the Empire Corridor South. The heritage of the region dates back to the Revolutionary War, with several National Historic Landmarks and historic districts, estates of well-known historical figures, scenic parks, and gardens.
  - **Erie Canalway National Heritage Area:** The Erie Canalway National Heritage Area includes the Erie Canal system (Erie, Champlain, Oswego, and Cayuga-Seneca Canals) that extends through upstate New York, along most of the central and eastern portions of the Empire Corridor West. The New York State Canal System is the most commercially enduring and historically significant canal way in the United States. This waterway played a key role in turning New York City into our country's most important center for commerce, industry, and finance.
  - **Niagara Falls National Heritage Area:** Designated by Congress in 2008, the Niagara Falls National Heritage Area stretches from the western boundary of Wheatfield, New York to the mouth of the Niagara River on Lake Ontario, including the community of Niagara Falls at the western end of the Niagara Branch. The region is home to dramatic natural features, rich cultural traditions, and nationally significant historical sites.
- **National Memorial:** National Memorials are places designated by the U.S. Congress for protection as a memorial to a historic person or event. Twenty-eight National Memorials in the

Nation are owned and administered by the National Park Service and five more are administered by other organizations but are considered affiliated areas.

The only National Memorial within 1,000 feet of the corridor centerline is the **General Grant National Memorial**, also known as Grant's Tomb, the largest tomb in North America. The site is located within Riverside Park overlooking the Hudson River in Manhattan (Milepost 5). Grant's Tomb (as it is commonly called) is not only the final resting place of Grant and his wife but commemorates the 18th president and general that presided over the Union victory in the Civil War. The site is part of the system of National Parks of New York Harbor.

- **National Natural Landmark:** The National Registry of Natural Landmarks includes nationally significant geological and biological features. Only one-half of the National Natural Landmarks nationwide are administered solely by public agencies, and nearly one-third are owned entirely by private parties. Because many natural landmarks are privately owned and/or not managed for public access, owner permission must be obtained prior to visitation. Designation in no way infers any right of public access.

  The only site within 1,000 feet of the corridor centerline is **Moss Island**, near Milepost 216 and Lock 17 on the Erie Canal in Little Falls, Herkimer County. Moss Island is part of an uplifted fault block of ancient crystalline rock. It contains the best exposure of glacial age potholes eroded by meltwater floods in the eastern United States. It was designated in 1976 and is owned by the state.

- **National Wildlife Refuge:** The National Wildlife Refuge System, managed by the U.S. Fish and Wildlife Service, is the nation's system of public lands and waters set aside to conserve fish, wildlife and plants. Recreational wildlife-dependent uses permitted on some refuges include hunting and fishing, wildlife observation, photography, environmental education, and interpretation.

  The only national wildlife refuge within 1,000 feet of the corridor centerline is the **Montezuma National Wildlife Refuge** (the Approved Acquisition Area for the refuge is located between Mileposts 323 to 326) in Wayne County. The area known as the Montezuma Marshes once drew thousands of waterfowl making their annual fall migration. In 1938, the Montezuma NWR was formed to restore the wetland habitat with impoundments created by development of the Erie Canal, smaller feeder canals, and agricultural development. Today, the refuge consists of 10,000 acres, and accommodates recreational uses, including hunting that is restricted (on designated days only upon reservation to a limited number of individuals and groups).

- **National Historic Sites:** Two National Historic Sites along the banks of the Hudson River in Hyde Park, Dutchess County are within the 1,000 foot buffer area. These sites are open to the public and are nationally important recreational tourism destinations:

  - **Vanderbilt Mansion National Historic Site:** The 50-room Classical-style mansion on 212 acres (near Milepost 80) was built in 1898. It was constructed by Frederick William Vanderbilt, a grandson of "Commodore" Cornelius Vanderbilt – the shipping and railroad magnate and richest man in America during his lifetime. Landscaped grounds feature a formal terraced garden, expansive lawns, carriage roads, and a three-mile-long riverside hiking trail.

  - **Home of Franklin D. Roosevelt National Historic Site:** This site covering approximately 800 acres (at Mileposts 77-78) was the birthplace, lifelong home, and burial place of Franklin Delano Roosevelt, America's 32nd President. The site includes 384.3 acres owned

by the federal government, and 415.7 acres that are non-federal.[147] It was purchased by Roosevelt's father in 1867, and, by 1915, Franklin and his mother, Sara, had undertaken extensive renovations that included the addition of two large wings. The grounds that feature flower gardens, outbuildings, and miles of walking trails. The Rose Garden contains the graves of Franklin and Eleanor Roosevelt.

Exhibit 4-29 summarizes the publicly owned acreage within the National Memorial, the National Natural Landmark, the National Wildlife Refuge, the National Historic Sites, and the federal preserves within 1,000 feet of the corridor centerline for the 90/110 and the 125 Study Areas. These are all potential Section 4(f) and Section 6(f) resources.

Exhibit 4-29—National Memorials, National Natural Landmarks, National Wildlife Refuges, and National Historic Sites and Preserves within Study Area

Name	County	Acreage within 2,000-foot-wide study area		Potential Section 4(f)	Potential Section 6(f)
		90/110 Study Area	125 Study Area		
General Grant National Memorial	New York	0.8	0.8	X	X
Federal Land within Hudson Highlands State Park	Putnam	0.4	0.4	X	X
Vanderbilt Mansion National Historic Site	Dutchess	143	143	X	X
Franklin D Roosevelt Home National Historic Site	Dutchess	82	82	X	X
Federal Land within Schodack Island State Park	Greene	24	24	X	X
Moss Island National Natural Landmark	Herkimer	15		X	X
Montezuma National Wildlife Refuge	Wayne	1 (556*)		X	X
Hart's Woods	Monroe		**	X	X
Bergen Swamp	Genesee		***	X	X

*/ One acre of the Montezuma National Wildlife Refuge is in the study area, 556 acres of the Approved Acquisition Area for the refuge is in the study area.
**/ Total acreage for Hart's Woods is 10 acres, a portion of which is in the study area.
***/ Total acreage for Bergen Swamp is 2,000 acres, a portion of which is in the study area.
Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 1,000 feet of the corridor centerline.

Source: National Park Service, U.S. Fish and Wildlife Service, New York State GIS Clearinghouse

[147]/ National Park Service. "The National Parks: Index 2009-2011, Part 2, Listing of National Park System Areas by State." Accessed March 28, 2011. <http://www.nps.gov/history/history/online_books/nps/nps/part2.htm>.

State Parks and Recreation Areas

New York State has multiple programs for land conservation and preservation on property that is managed and/or owned by the state. The state has designated state parks, areas of cultural and historic significance (state/urban heritage areas), state historic parks, and state historic sites that are administered by the New York State Office of Parks, Recreation, and Historic Preservation. New York state forests (including multiple use areas, unique areas, and state nature and historic preserves) and state-owned Wildlife Management Areas are administered by the New York State Department of Environmental Conservation.

- **New York State Heritage Areas System (formerly known as the Urban Cultural Park System)** is a state-local partnership established to preserve and develop areas that have special significance to New York State. The purpose of the program is to develop, preserve, and promote the state's cultural and natural resources as an expression of the state's heritage. Established in 1982 as joint venture between the New York State Office of Parks, Recreation and Historic Preservation and 22 historically significant communities, the UCP Program incorporates Regional Heritage Corridors/Areas and Urban Heritage Areas in communities ranging in size from sprawling New York City to charming small-towns.

  There are two regional heritage corridors, the **Western Erie Canal Heritage Corridor** and the **Mohawk Valley Heritage Corridor** along the program area. There are six smaller Urban Heritage Areas within 1,000 feet of the corridor centerline:

  - **Harbor Park Heritage Area (Bronx County)**
  - **Ossining Heritage Area (Westchester County)**
  - **Albany Heritage Area (Albany and Rensselaer)**
  - **Schenectady Heritage Area (Schenectady County)**
  - **Rochester-High Falls Heritage Area (Monroe County)**
  - **Niagara Falls Underground Railroad Heritage Area (Niagara)**

- The **State Parks System** managed by the New York State Office of Parks, Recreation, and Historic Preservation includes state parks, state historic parks and state historic sites that are open to the public as tourist attractions. State parks include the **Old Erie Canal State Park** in Onondaga County (Mileposts 278.3 to 279), Madison County (Mileposts 266.5 to 272), and Oneida County. This is a 36-mile stretch of the 363-mile Old Erie Canal, which has been designated a National Recreational Trail by the National Parks Service. This and other state parks, state historic parks, and historic sites within 1,000 feet of the corridor centerline for both the 90/110 and the 125 Study Areas are listed in Exhibit 4-30, along with their potential Section 4(f)/Section 6(f) status.
- **State Forests** in New York State encompass many legally defined classifications of lands outside the Forest Preserve of Adirondack and Catskill Parks that include land parcels acquired under several Bond Acts. State Forests are under the administration of the New York Department of Environmental Conservation Division of Lands and Forests and include four land classifications, but only two types: **Unique Areas** and **state nature and historic preserves** are present within the study area. **Unique Areas** are defined as parcels of land owned by the state that were acquired due to its special natural beauty, wilderness character, or for its geological, ecological or historical significance for the state nature and historical preserve, and may include lands within a forest preserve county outside the Adirondack and Catskill Parks. The NYSDEC state forests preserves and unique areas within 1,000 feet of the corridor

Exhibit 4-30—NYSOPRHP State Parks, State Park Preserves, State Historic Sites

Facility Name	Facility Type	County/City	Acreage in Study Area		Potential Section 4(f)	Potential Section 6(f)
			90/110	125		
Hudson River Park	State Park	Manhattan	0.1	0.1	X	
Riverbank State Park	State Park	New York	26	26	X	X
Philipse Manor Hall	State Historic Site	Westchester	0.3	0.3	X	
Old Croton Aqueduct	State Historic Park	Westchester	18	18	X	X
Rockefeller State Park Preserve	State Park	Westchester	153	153	X	
Hudson Highlands State Park	State Park Preserve	Westchester	204	204	X	
Hudson Highlands State Park	State Park Preserve	Putnam	322	322	X	
Hudson Highlands State Park	State Park Preserve	Dutchess	398	398	X	
underwater State Park	State Park	Putnam	19	19	X	
Walkway over the Hudson State Park	State Park	Dutchess	0.3	0.3	X	
Quiet Cove Riverfront Park	Other	Dutchess	32	32	X	
Margaret Lewis Norrie State Park	State Park	Dutchess	234	234	X	X
Staatsburgh State Historic Site	State Historic Site	Dutchess	1	1	X	X
Ogden Mills and Ruth Livingston Mills Memorial State Park	State Park	Dutchess	224	224	X	X
Clermont State Historic Site	State Historic Site	Dutchess	0.1	0.1	X	
Clermont State Historic Site	State Historic Site	Columbia	152	152	X	
Olana State Historic Site	State Historic Site	Columbia	74	74	X	
Conservation Easement (adjoining Olana site)	State Historic Site	Columbia	103	103	X	
Building envelope (adjoining Olana site)	Conservation easement	Columbia	7	7	X	
Hudson River Islands State Park	State Park	Columbia	11	11	X	
Schodack Island State Park(undeveloped)	State Park	Columbia	14	14	X	X
Schodack Island State Park(undeveloped)	State Park	Greene	9	9	X	X
Schodack Island State Park(undeveloped)	State Park	Rensselaer	185	185	X	X
Lock 9 State Canal Park	Canal Park	Schenectady	16	0	X	X
Guy Park	State Historic Site	Montgomery	2	0	X	
Schoharie Crossing	State Historic Site	Montgomery	18	0	X	X
Herkimer Home	State Historic Site	Herkimer	33	0	X	
Oriskany Battlefield	State Historic Site	Oneida	5	0	X	X
Old Erie Canal State Historic Park	State Historic Park	Madison	185	45	X	X
Old Erie Canal State Historic Park	State Historic Park	Onondaga	94	12	X	X
State Fairgrounds	State Recreation Area	Onondaga	85	85	X	
State Park at the Fair	Other	Onondaga	1	0.7	X	
Whirlpool State Park	State Park	Niagara	6	6	X	X

Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 1,000 feet of the corridor centerline.

Source: New York Office of Parks, Recreation, and Historic Preservation and NYS GIS Clearinghouse

centerline for both the 90/110 and the 125 Study Areas are shown in Exhibit 4-31, one of which has received Section 6(f) funding .

- **Wildlife Management Areas (WMAs)** are lands owned by New York State under the control and management of the New York State Department of Environmental Conservation's Division of Fish, Wildlife and Marine Resources. These lands have been acquired primarily for the production and use of wildlife. However, while fishing, hunting and trapping are the most widely practiced activities on many WMAs, they are not limited to these activities. Most WMAs

Exhibit 4-31—New York State DEC Lands

Facility Name	County/City	Acreage within 2,000-ft.-wide Study Area		Potential Section 4(f)	Potential Section 6(f)
		90/110 Study Area	125 Study Area		
Tivoli Bay Wildlife Management Area	Dutchess	412	412	X	X
Middle Ground Flats Unique Area	Greene	9.0	9.1	X	
Middle Ground Flats Unique Area	Columbia	1.3	1.3	X	
Hudson River at Germantown	Columbia	*	*	X	
Stockport Flats Tidal Wetland	Columbia	31	31	X	
Rogers Island Wildlife Management Area	Columbia	90	90	X	
Hudson State Boat Launch	Columbia	0.2	0.2	X	
Stockport Flats Wildlife Management Area	Columbia	230	230	X	
Nutton Hook Tidal Wetland	Columbia	292	292	X	
Albany Pine Bush State Unique Area	Albany	138	124	X	X
Nelliston Boat Launch Site	Montgomery	*		X	
Plantation Island Wildlife Management Area (Lock 18 WMA)	Herkimer	50		X	
Oriskany Flats Wildlife Management Area	Oneida	265		X	
Rome State Wildlife Management Area	Oneida	269		X	
Carpenter's Creek Fisherman's Access	Onondaga	0.4		X	
Northern Montezuma Wildlife Management Area	Cayuga	75		X	
Northern Montezuma Wildlife Management Area	Wayne	184		X	
Tillman Road Wildlife Management Area	Erie		20	X	

*Site is a boat launch , acreage is not available
Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 1,000 feet of the corridor centerline.

Source: New York State GIS Clearinghouse, New York State Department of Environmental Conservation

also provide good opportunities for hiking, cross-country skiing, birdwatching, or quiet enjoyment of nature. The WMAs within 1,000 feet of the corridor centerline for both the 90/110 and the 125 Study Areas are shown in Exhibit 4-31, one of which has received Section 6(f) funding.

County/Municipal Parks and Recreation Areas

There are roughly 100 county, municipal and non-profit parks identified within the study area. Twelve county-owned parks were identified within 1,000 feet of the corridor centerline of the 90/110 Study Area, of which two have received federal Land and Water Conservation Funding, as shown in Exhibit 4-32. Four of the county parks are located in Westchester County. Within the 125 Study Area, only eight county owned parks were identified within 1,000 feet of the corridor centerline, one of which is not within the 90/110 Study Area.

Ninety-four municipal parks were identified within 1,000 feet of the corridor centerline of the 90/110 Study Area, and of these, 27 have received Land and Water Conservation Funds. Within the 125 Study Area, eighty-four parks were identified within 1,000 feet of the corridor centerline, of which twenty-two have received Land and Water Conservation Funds. More than half of these municipal parks are located in the more densely populated counties closer to New York City. Fifty parks (including one non-profit park) are located in New York, Bronx, Westchester, and Dutchess Counties.

Exhibit 4-32—County Parks within 1,000 feet of the Corridor Centerline

Park	County	Study Area Acreage		Potential Section 4(f)	Potential Section 6(f)
		90/110 Study Area	125 Study Area		
Lenoir Preserve (County Park)	Westchester	9	9	X	
Kingsland Point County Park	Westchester	16	16	X	
Croton Point County Park	Westchester	11	11	X	
Oscawana County Park (undeveloped)	Westchester	80	80	X	
Bowdoin County Park	Dutchess	105	105	X	X
Papscanee Island County Nature Preserve	Rensselaer	169	169	X	
Bergen Park	Montgomery	2.4*		X	
Onondaga Lake County Park	Onondaga	24	24	X	X
Black Brook County Park	Wayne	17		X	
Blue Cut County Nature Center	Wayne	20		X	
Swift Landing County Park	Wayne	23		X	
Churchville County Park	Monroe		72	X	X
DeWitt County Recreational Facility	Genesee	116		X	

*/ Bergen Park is approximately 2.4 acres and the entire park is within the 90/110 Study Area.

Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 1,000 feet of the corridor centerline.

Source: New York State GIS Clearinghouse, LWCF website: <http://waso-lwcf.ncrc.nps.gov/public/index.cfm>

Exhibit 4-33—Number of Municipal and Non-Profit Parks with 1,000 feet of the Corridor Centerline

County	Municipal Parks within 1,000 feet		Potential Section 6(f) Parks		Potential Section 4(f) Parks		Nonprofit
	90/110 Study Area	125 Study Area	90/110 Study Area	125 Study Area	90/110 Study Area	125 Study Area	
New York	12	12	5	5	12	12	
Bronx	4	4	1	1	4	4	
Westchester	20	20	6	6	20	20	1
Putnam	0	0	0	0	0	0	
Dutchess	12	12	3	3	12	12	
Columbia	1	1	0	0	1	1	1
Rensselaer	0	0	0	0	0	0	
Albany	7	8	2	1	7	8	
Schenectady	6	0	1	0	6	0	
Schoharie	0	0	0	0	0	0	
Montgomery	3	0	1	0	3	0	
Herkimer	2	1	1	0	2	1	
Oneida	0	1	0	0	0	2	1
Madison	1	0	1	0	1	0	
Onondaga	2	2	1	1	2	2	
Cayuga	0	0	0	0	0	0	
Wayne	1	0	0	0	1	0	
Monroe	7	9	2	2	7	9	
Genesee	3	0	0	0	3	0	
Erie	6	7	2	2	6	7	
Niagara	7	7	1	1	7	7	
TOTAL	94	84	27	22	94	84	3

Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 1,000 feet of the corridor centerline.

Source: New York State GIS Clearinghouse, New York State Office of Park, Recreation, and Historic Preservation, and National Park Service LWCF website: < **http://waso-lwcf.ncrc.nps.gov/public/index.cfm**>

4.16.4. Environmental Consequences

The sections below describe impacts to parks and recreational resources. Review of aerial mapping indicates that the Base Alternative and Alternatives 90A and 90B would have minimal impacts to parklands and little or no impacts to parklands outside of the right-of-way. These alternatives would largely involve work within the right-of-way, with tracks being added in the location of the former track beds or existing access roads. The proposed work will include the addition of track, as well as maintenance service roads in selected areas. This preliminary assessment is based on Tier 1 concepts and mapping and will be further refined in Tier 2 as the project development process is further advanced, and efforts to avoid parkland encroachments will be made as design is advanced.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured against and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure. Because proposed work with this alternative is anticipated to be located entirely within the right-of-way, no land acquisitions are anticipated, no impacts to parklands are anticipated.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, signalization, in addition to improvements proposed under the Base Alternative previously described. It is anticipated that work could be contained within the right-of-way, and no impacts on parklands are anticipated.

In Niagara County, Alternative 90A passes near two municipal parks, Gratwick Riverside Park from MPs QDN16 to QDN17, and Marios Park at MP QDN19; however, no impacts to these parks are anticipated since all work is within the existing rail right-of-way at these locations.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, is proposed, and parkland impacts are not anticipated to occur.

Empire Corridor West/Niagara Branch

Improvements for Alternative 90B start at MP 160 in the City of Schenectady, which is within an urban area that extends west to MP 168. With Alternative 90B, trackwork would start at MP 160 and extend west from here, crossing over the Mohawk River/Erie Canal on an existing bridge. In the City of Schenectady, Front Street Park and Pool adjoins the south side of the railroad on the south river bank, and the Glenville Bike Trail extends under the bridge on the north river bank, but impacts to the park and trail are not anticipated. The potential for impacts to this area would be evaluated once more detailed designs are advanced in Tier 2. Further set back on the southwest side are Riverside Park in Schenectady and Collins Park and Lake in Scotia. At MP 167, the railroad extends north of the Lock 9 Canal Park, which is on the opposite (southwest side) of Route 5, but will not impact the park.

Work that may extend outside of the right-of-way may occur at Amsterdam Station and at MPs 179,

192, and 200 in Montgomery County. Proposed track and station improvements at Amsterdam Station and trackwork at MP 179 are located in the vicinity of the Erie Canal, but should not affect the canal. At MP 192, track realignment at a curve and a maintenance service road near MP 200 would extend outside of the right-of-way, but would not affect parks or recreation facilities.

Construction of a fourth track and maintenance service road in Herkimer County near the Montgomery County line (MPs 210.5 to 214.8) would not involve impacts to parklands.

Work that may extend outside of the right-of-way between MPs 234 to 238 around the Utica Station in Oneida County and around the Syracuse Station (MPs291 to 292, as addressed under Alternative 90A) will be located within an urban area and will not affect parklands. New passenger track and a maintenance service road will be added in the areas north of the tracks adjoining Onondaga Lake County Park, but are not anticipated to affect parklands. In Wayne County, the addition of a maintenance service road may involve right-of-way impacts near MP 341, but this is not in the vicinity of parklands. In Monroe County, the addition of a fourth track around the Rochester Station could also involve right-of-way impacts (MPs 371 to 376 and MPs 378.2 to 378.6, and MPs 379.15 to 379.6). This work will extend in the vicinity of facilities such as Upper Falls Park in the City of Rochester and will cross the Erie Canal and the Erie Canalway Heritage Trail at MP 374.5, but are not anticipated to directly affect parklands. The potential for impacts at the canal crossing will be evaluated as designs are advanced in Tier 2.

The addition of a fourth track at Buffalo-Depew Station (MPs 431 to 432) would be located entirely within an urban area and will not affect parklands. Double track along the Niagara Branch between MPs QDN2 and QDN7 would extend in proximity to Front Park and La Salle Park in Buffalo, but no impacts outside the right-of-way are anticipated that could affect these parklands.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, are proposed, and additional parkland impacts are not anticipated to occur.

Empire Corridor West/Niagara Branch

With Alternative 110, trackwork would start at MP 159 and extend west from here, crossing over the Mohawk River/Erie Canal on an existing bridge. In the City of Schenectady, Front Street Park and Pool adjoins the south side of the railroad on the south river bank, and the Glenville Bike Trail extends under the bridge on the north river bank, but impacts to the park and trail are not anticipated. The potential for impacts to this area would be evaluated once more detailed designs are advanced in Tier 2. Further set back on the southwest side are Riverside Park in Schenectady and Collins Park and Lake in Scotia. At MP 167, the railroad extends north of the Lock 9 Canal Park,

which is on the opposite (southwest side) of Route 5, but will not impact the park.

Work that may extend outside of the right-of-way may occur at Amsterdam Station and at other locations in Montgomery County. Proposed track and station improvements at Amsterdam Station and trackwork at MP 179 are located in the vicinity of the Erie Canal, but should not affect the canal. However, the proposed track, but would not affect parks or recreation facilities.

Construction of a fourth track and maintenance service road in Herkimer County near the Montgomery County line (MPs 210.5 to 214.8) would not involve impacts to parklands.

Work may extend outside of the right-of-way around the Utica Station in Oneida County and around the Syracuse Station, but will be located within urban areas and will not affect parklands. New passenger track and a maintenance service road will be added in the areas north of the tracks adjoining Onondaga Lake County Park, but are not anticipated to affect parklands. In Monroe County, the addition of a fourth track around the Rochester Station could also involve right-of-way impacts. This work will extend in the vicinity of facilities such as Upper Falls Park in the City of Rochester and will cross the Erie Canal and the Erie Canalway Heritage Trail at MP 374.5, but are not anticipated to directly affect parklands. The potential for impacts at the canal crossing will be evaluated as designs are advanced in Tier 2.

In Genesee County, Alternative 110 may impact a county park at MP 402. The proposed track alignment passes through the Dewitt County Recreational Facility in the Town of Batavia.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch. Alternative 90A would largely be situated within the right-of-way and therefore would not involve substantial parkland impacts.

Empire Corridor South

No new improvements, beyond what is proposed for Alternative 90A, would be proposed for Alternative 125 along the majority of Empire Corridor South. However, roughly one mile of the proposed 125 mph track would extend south from Albany-Rensselaer Station to cross the Hudson River. Since there are no parklands within this one-mile section of rail corridor, there are no additional impacts to parklands within Empire Corridor South.

Empire Corridor West/Niagara Branch

Alternative 125 would involve construction of a total of 236 miles of track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. Alternative 125 also would include new right-of-way in most areas, but would merge back with the Empire Corridor over two 15- and 16-mile segments centered on Syracuse and Rochester, respectively. This route covers 126 miles on new alignment between Rensselaer County and a point 8.5 miles east of Syracuse Station. Alternative 125 extends through urban areas in Albany and

Schenectady Counties over a distance of 20 miles, following the New York State Thruway (I-87/I-90) over most of this distance.

Capital Hills Public Golf Course in Albany County is located immediately south of Alternative 125 where it extends through the median of the New York State Thruway between MPs QH146 and QH147, but no impacts to the golf course are anticipated. At MP QH152, the New York State Thruway and Alternative 125 enter the Albany Pine Bush Preserve. At MP QH153, Alternative 125 transitions off of the Thruway median and may impact the Albany Pine Bush Preserve at this location. At MP QH155, Alternative 125 may impact Fusco Town Park located directly to the south of the Thruway and the rail corridor. Direct impacts to parklands in Schenectady County are not anticipated for Alternative 125.

In Herkimer County, between MPs QH217 and QH218, Alternative 125 passes through a wooded area in Russell Park within the Town of German Flatts.

In Oneida County, Alternative 125 passes just south of Washington Mills Athletic Park located west of Route 5 at MP QH230. This facility is approximately 250 feet from the new rail and no impacts to this park are anticipated with this alternative. Between MPs QH244 and QH245, Alternative 125 also passes through Atunyote Golf Club, owned by the Oneida Nation, within the Town of Vernon. If Alternative 125 is advanced to Tier 2, design will be refined to minimize or avoid impacts on the Oneida Nation recreational use.

Alternative 125 crosses Erie Canal State Park at three locations before meeting up with the existing rail corridor at MP 283 (just before MP QH269 in the 125 Study Area). The three Erie Canal State Park crossings are located between MPs QH260 and QH261; between MPs QH262 and QH263, both in Madison County; and between MPs QH265 and QH266 in Onondaga County.

In Onondaga County, the alignment merges with the existing Empire Corridor. Just before the merge, Alternative 125 crosses South Main Street in the village of Minoa and comes within a block of Lewis Park although no impacts to the park are anticipated. Alternative 125 extends through 16 miles of urban area surrounding the City of Syracuse. Just west of the Syracuse station at MP QH278.5, Alternative 125 passes by Onondaga Lake County Park. The tracks would be on elevated structure above the existing tracks at this location, so right-of-way should be minimized. Before the alignment diverges from the existing Empire Corridor, Alternative 125 passes by the State Fairgrounds between MPs QH281 and QH282. No impacts to these parklands are anticipated since work within these areas is limited to the right-of-way.

At MP QH284, Alternative 125 diverges from the existing Empire Corridor and continues on a new alignment 61 miles west to a point 11 miles east of Rochester Station in Monroe County. There are no impacts to parklands anticipated within these 61 miles of Alternative 125.

In Monroe County, Alternative 125 passes just south of Beechwoods Park at MP QH344 but no impacts to the park are anticipated. Alternative 125 rejoins the existing Empire Corridor at MP QH346, diverging again at MP QH361, 5.5 miles west of Rochester Station, to continue on new alignment 52 miles west to Buffalo in Erie County. In Monroe County, close to the Genesee border, Alternative 125 passes near Churchville County Park at MP QH371. No additional impacts to parklands are anticipated for the remainder of the 125 Study Area from MP QH371 to where it merges back to the existing corridor at MP QH413 in Erie County. No impacts to parklands are anticipated to the end of the Empire Corridor West section at the Buffalo-Exchange Street station.

In Erie County, just past MP QH408, Alternative 125 passes near Clarence Town Park, which may be impacted by this alternative. Between MPs QH408 and QH409, this alternative passes through the Tillman Road Swamp State Wildlife Management Area that may be impacted.

4.16.5. Potential Mitigation Strategies

Mitigation for impacts on parklands and recreation areas will include avoiding and minimizing impacts to the extent practicable. Compliance with the requirements of Section 4(f) of the U.S. Department of Transportation Act requires that alternatives that avoid or minimize impacts be evaluated, and, if impacts are proposed, mitigation measures be developed, in consultation with officials with jurisdiction. If parklands that have received Land and Water Conservation Fund Act grants will be converted, Section 6(f) requires that recreation property of equal fair market value and usefulness be provided as compensation.

Mitigation measures may include permanent measures, such as providing trail connections or compensatory parkland, or construction mitigation, such as maintaining trail or park access during construction or using time-of-year restrictions on construction work. Other considerations will include ameliorating potential visual and noise impacts on adjoining parks or recreation areas, and further assessments of these impacts and mitigation measures will also be advanced in Tier 2.

4.16.6. Future Analysis

The Tier 2 assessments will include a thorough inventory of publicly owned parks and recreation facilities, as well as non-profit parklands that may be potentially affected. Detailed property mapping and information on the extent of public access, use and ownership for parks and recreation areas will be obtained. Consultation with public officials and property owners/officials with jurisdiction will be performed regarding the use of the parks/recreation areas and potential impacts and mitigation measures. For potential parkland impacts, the applicability of Section 4(f) of the U.S. Department of Transportation Act, Section 6(f) of the U.S. Land and Water Conservation Act, and New York State parkland alienation requirements will be determined (see Section 4.23 addressing potential Section 4(f)/Section 6(f) resources). Officials with jurisdiction will be identified and consulted for potential Section 4(f) parklands to determine the potential applicability of Section 4(f). Those parklands for which Land and Water Conservation funds were expended will also be identified.

The extent of impact and use of Section 4(f) properties will be determined, , including the extent to which a "constructive use", "temporary occupancy" of the property, or "de minimus impact" may occur, and potential impacts on Section 4(f) properties will be assessed. If a use of a Section 4(f) park or recreation property is determined to occur, a Section 4(f) Evaluation will be prepared and circulated as part of Tier 2. Further discussion of Section 4(f)/Section 6(f) evaluations is presented in Section 4.23, "Section 4(f)/Section 6(f)."

If a conversion of Section 6(f) parks or lands may occur, a Section 6(f) Evaluation will be prepared and circulated as part of Tier 2.

New York State places similar restrictions on all municipal parklands, which cannot be converted to a non-park use without prior approval from the New York State Legislature (referred to in New

York as parkland alienation). Further research will be performed to identify municipal parklands, and if a conversion may occur, requirements for legislative approval for parkland alienation will be identified as part of Tier 2.

4.17. Visual Resources

4.17.1. Regulatory Context

The FRA Procedures for Considering Environmental Impacts states that evaluation of environmental impacts should include a consideration of aesthetics and design quality. Under the topic of aesthetic environment and scenic resources, the FRA NEPA guidance states that: "*The EIS should identify any significant changes likely to occur in the natural landscape and in the developed environment.*"

4.17.2. Methodology

The assessment considers the visual impacts of high-speed rail trains for all viewer groups, including adjacent land users (views of the project) as well as high-speed train users (views from the train). The visual assessment has been developed through the use of readily available Geographic Information System (GIS) data sets and aerial imagery. Field visits have not been conducted to verify the data for the Tier 1 EIS due to the length of the corridor and numerous areas where there will be no change to the existing condition. The visual analysis considered views of and from the railroad.

The visual characteristics of the existing view from and to the railroad, such as elevated structures, water crossings, and presence of trees and vegetated buffers and urban development, are identified. In addition, the assessment identifies those viewsheds for affected groups who would be sensitive to visual changes, such as residents, park users, and travelers along the major interstates crossing the proposed facility. The "Existing Conditions" section identifies sensitive receptors in the program area and characterizes the area in terms of built environment and natural environment. For the 125 Study Area, since the exact alignment would be further refined and defined in Tier 2, a more generalized assessment of viewsheds to and from the railroad was performed.

4.17.3. Existing Conditions

Views of and views from the program area were considered, although in many rural locations (particularly along Empire Corridor West) the railroad itself is not visible or a prominent visual element unless it follows highways, waterways, or other vantage points where there are adjoining uses.

There are a number of designated scenic areas along the railroad where the railroad extends along the Hudson River, Erie Canal/Mohawk Valley, and Lake Erie/Niagara River. Key scenic areas include:

- Six **Scenic Areas of Statewide Significance** (Hudson Highlands, Estates District, Esopus/Lloyd, Ulster North, Catskill-Olana, Columbia-Greene North SASSs) in the study area are designated under the state's coastal program, as described under Section 4.11, "Coastal Resources."
- Three **National Heritage Areas** (Hudson River, Erie Canalway, and Niagara Falls), and numerous **federal and state parks and wildlife refuges** (described in Section 4.16, "Parks and Recreational Areas").
- The **Hudson River** has been designated as an **American Heritage River**, one of fourteen in the country, due to its rich history and substantial environmental recovery. The rail line between New York City and Albany generally parallels the Hudson River, in many areas within 300 feet of the river's edge. The Hudson River is also designated by the state[148] as a Hudson River Greenway Water Trail, and the Designated Hudson River Valley Greenway Trails is a system of park trails and also includes New York State Bike Route 9.
- The **Mid-Hudson Historic Shorelands Scenic District** designated under Article 49 of the Environmental Conservation Law extends between Hyde Park (MP 80) and Germantown (MP 140).
- The **Mohawk Towpath Scenic Byway**, a National Scenic Byway that follows the Erie Canal in a portion of Schenectady County, extends parallel and close to the Empire Corridor over a small portion of the corridor (0.2 mile) in the City of Schenectady.
- The **Revolutionary Trail**, a New York State designated **scenic byway**, generally parallels the rail corridor from the village of Scotia in Schenectady County to the City of Rome in Oneida County.
- The **U.S. Route 20 Scenic Byway**, a New York State designated scenic byway, generally parallels a roughly 8.5-mile section of the 125 Study Area, where the scenic route originates in Duanesburg and extends west 108 miles.
- The **Great Lakes Seaway Trail, a National Scenic Byway**, is in the vicinity of the rail corridor as it extends from Buffalo north through Tonawanda to Niagara Falls.

Empire Corridor South

Views of the Railroad

The most prominent visual element within the seven counties along the Empire Corridor South is the Hudson River to the west of the tracks. The tracks generally follow the eastern shoreline of the Hudson River, although views of the river are cut off through some of the towns, industrial areas, and natural points of land, it visually unifies the 142-mile corridor. Views of the railroad in most locations along the Empire Corridor South where it follows the eastern bank of the Hudson River are more prominent from bridges and other points on the river, as the railroad forms an integral linear element of the landscape where it borders along the river's edge. The railroad is prominently visible along the west river bank from major bridges, including:

- The Tappan Zee Bridge (I-287),
- The Newburgh-Beacon Bridge (I-84),

[148] *Hudson River Valley Greenway Act of 1991*. New York State Legislature. Revised July 2007. Accessed May 10, 2012. <http://www.hudsongreenway.ny.gov/Libraries/PDFs/GreenwayAct_Legislation_revised_as_of_July_2007_2011.sflb.ashx>

- The Bear Mountain Bridge (U.S. Routes 202/6),
- The Mid-Hudson Bridge (U.S. Route 44 and State Route 55),
- The Kingston-Rhinecliff-Bridge (State Route 199),
- The Rip Van Winkle Bridge (State Route 23),
- The Castleton Bridge (Berkshire Connector of the New York State Thruway), and
- A major pedestrian bridge at the Walkway over the Hudson (a former rail bridge).

The railroad itself is a particularly prominent visual element in the landscape where it crosses waterways on bridge structures and causeways. The Spuyten-Duyvil Bridge swing span bridge over the Harlem River, the rail bridges over Croton Bay and Peekskill Bay, the New Hamburg Railroad Bridge over the Wappinger Creek, and the Livingston Avenue swing span over the Hudson River are several of the notable and largest bridge crossings along the Empire Corridor South.

Because of the extensive width of the Hudson River along the railroad, where it extends along the riverbank, the railroad is most visible from the opposite river bank when trains are passing. Where the railroad extends inland, it is visible only from adjoining roadways and developments. Even in some of the more densely populated areas, such as New York City, the views of the railroad can be obscured by its location in tunnels, its location in cuts, or by vegetation particularly where the railroad extends along the river's edge.

Views from the Railroad

The detailed county by county description of views from the railroad is presented in Appendix G.12.

Empire Corridor West/Niagara Branch (90/110 Study Area/125 Study Area)

Views of the Railroad

The predominant landscape types along the majority of Empire Corridor West are farmlands and forestland. The views of the railroad in the thirteen or fourteen counties along the Empire Corridor West/Niagara Branch (for both the 90/110 Study Area and the 125 Study Area) are limited to some degree since this area, outside the cities and towns along the corridors, is predominantly rural agricultural.

Vantage points of the railroad are limited to adjoining roads or developments. Outside of urbanized areas, the railroad is visible where it parallels or crosses portions of the New York State Canal System and the New York State Thruway (I-90). The canals and/or thruway parallels or crosses the Empire Corridor West through portions of Albany County, Schenectady County, Montgomery County, Herkimer County, Utica County, Onondaga County, and Cayuga County. The canals also parallel or cross the railroad several times in Wayne and Monroe Counties. Route 5 also parallels or crosses the railroad in portions of Albany, Schenectady, Montgomery, and Herkimer Counties and becomes Route 49 in Oneida County. In many locations, even where the railroad adjoins these features, existing views of the railroad tracks from adjoining roadways, canals, and development are obscured by vegetation. The majority of the landscape is relatively flat, particularly in rural agricultural areas, and the railroad tracks may only be visible when trains are passing, particularly in areas where vegetation screens the right-of-way from view.

In Erie and Niagara Counties, the railroad extends close to Lake Erie and Niagara River, and is an integral element of the waterfront in these locations.

Several of the notable bridges where the railroad is more visible include the Mohawk River in Schenectady, Barge Canal along the south side (outlet to) Onondaga Lake, and the bridge over Canada Creek, the bridge over the Montezuma Marshes near Savannah, and the Genesee River Bridge in Rochester. Where these bridges are in remote locations (Montezuma Marshes) or are constructed at close to the existing grade, they may not necessarily be a prominent visual element of the landscape to users. However, even where views of the railroad are obscured from view by vegetation, the tracks are visible at overpassing roadway bridges, and the rail bridges are visible at underpassing roadways.

Views from the Railroad: 90/110 Study Area

The detailed county by county description of views from the railroad is presented in Appendix G.12.

Views from the Railroad: 125 Study Area

The detailed county by county description of views from the railroad is presented in Appendix G.12.

4.17.4. Environmental Consequences

Visual impacts will be minimal under the Base Alternative and Alternatives 90A and 90B. These alternatives would largely involve work within the right-of-way, with tracks being added in the location of the former track beds or existing access roads. The proposed work will include the addition of track, as well as maintenance service roads in selected areas. Alternative 110 will involve a greater degree of visual impacts extending outside of the right-of-way, and Alternative 125 would involve the greatest visual impacts, with a new, grade-separated, electrified corridor (with overhead catenary) between Albany-Rensselaer Station and Buffalo. This preliminary assessment is based on Tier 1 concepts and mapping and will be further refined in Tier 2 as the project development process is further advanced, and efforts to avoid and mitigate visual impacts will be made as design is advanced.

Base Alternative

The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure.

Because proposed work with this alternative is anticipated to be located entirely within the right-of-way, no substantial changes to views from or to the railroad are anticipated. With the proposed track and signal improvements, the appearance of railroad facilities will not substantially change, and views from the railroad should not change. There are five Scenic Areas of Statewide Significance in the vicinity of Base Alternative improvements. As described in detail under Section 4.11.4 ("Coastal Resources"), no changes in the visual quality of these SASSs will occur as a result of the Base Alternative.

The station building improvements at the Schenectady, Rochester, and Niagara Falls stations will improve the appearance of these outdated facilities, and the Niagara Falls Intermodal Station will also be relocated from an industrial area to the former custom house in downtown Niagara Falls at

the Canadian border, approximately one mile to the west. This will represent a visual improvement for passengers, tourists, and residents.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, signalization, in addition to improvements proposed under the Base Alternative previously described.

It is anticipated that work could be contained within the right-of-way, and, for the most part, for track and signal improvements, no significant changes in the visual appearance of railroad facilities, or views from the railroad, are anticipated. There are six Scenic Areas of Statewide Significance in the vicinity of Alternative 90A improvements. As described in detail under Section 4.11.4 ("Coastal Resources"), no changes in the visual quality of these SASSs would occur as a result of Alternative 90A.

New station buildings would be constructed at Amsterdam and Buffalo-Depew stations. These station improvements proposed under Alternative 90A are anticipated to improve the appearance of these antiquated, outdated facilities. Replacement of the Livingston Avenue Bridge may also change the appearance of this crossing.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, is proposed, and visual impacts are not anticipated to occur.

Empire Corridor West/Niagara Branch

The additional track improvements would involve a nominal change in the appearance of the railroad, where areas of third and fourth track are proposed to be added, as an additional third or fourth track will likely not be highly visible. In many locations, the tracks are not visible from adjoining properties or vantage points, unless the trains are running on them, or the right-of-way is screened by vegetation, buildings, or slopes. The views from the tracks should not change markedly with the proposed improvements. However, the additional tracks may involve clearing of forest, or property changes/impacts, which may change views to and from the tracks. There would also be more frequent service than for the Base Alternative (although the same frequency of service as Alternative 90A), and trains running on the new tracks would be closer to adjoining properties. Also, modifications to some bridges may be required, which could involve nominal changes in the appearance of the affected crossings.

The Revolutionary Trail Scenic Byway (Route 5/29) extends alongside the length of the Empire

Corridor and the Mohawk River/Erie Canal from Route 5 in Schenectady County to Herkimer, then follows Route 5S and the Erie Canal to Utica and continues northwest along Route 49 and the Erie Canal to Rome in Oneida County. Portions of Route 5 would need to be relocated, however, the scenic qualities of the byway would not be affected by Alternative 90B.

Alternative 90B proposes three flyovers along the corridor, at MP 279, MP 366, and MP 427. The first flyover (MP 279) would extend through lightly forested and rural agricultural land, with scattered residences set back at least 500 feet and an at-grade road crossing set back 700 feet. Currently it is not known how tall or extensive the flyovers will be, but this would introduce a new visual element that may not be visible from the closest houses, depending on the lateral and vertical extent of the structure.

The second flyover (MP 366) is surrounded by lightly forested land, with residential areas just a few hundred feet southwest of the existing railroad and parkland to the north. This flyover will be situated north of the I-490 & 441 interchange. Depending on the height of the flyover, the flyover may be visible from residential areas and the adjoining parkland, and would introduce a new visual element that would be more prominent than the at-grade railroad.

Only the 90B Alternative will have a flyover at MP 427, one mile west of the Buffalo-Lancaster Airport. The views from the railroad would primarily be open fields and industrial uses, such as manufacturing and distribution plants. This would introduce a new visual element, but the affected area is primarily industrial or undeveloped. The railroad is set back approximately 1,000 feet from Walden Avenue, to the north, thereby limiting views from residential properties. Double track along the Niagara Branch between MPs QDN2 and QDN7 is proposed, but is anticipated to be contained within the right-of-way in this heavily urbanized area.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, are proposed, and additional parkland impacts are not anticipated to occur.

Empire Corridor West/Niagara Branch

Similar to Alternative 90B, the additional track improvements would involve a nominal change in the appearance of the railroad, where areas of third and fourth track are proposed to be added, as an additional third or fourth track will likely not be highly visible. In many locations, the tracks are not visible from adjoining properties or vantage points, unless the trains are running on them, or the right-of-way is screened by vegetation, buildings, or slopes. The views from the tracks should not change markedly with the proposed improvements. However, the additional tracks may involve clearing of forest, or property changes/impacts, which may change views to and from the

tracks. Compared to Alternative 90A, Alternative 110 would involve third tracks that would be offset an additional 15 feet from the existing tracks, for a total offset of 30 feet, so Alternative 110 may involve additional clearing and property impacts and may be more visible than Alternative 90B. There would also be more frequent service than for the Base Alternative (although the same frequency of service as Alternative 90B) and trains running on the new tracks would be closer to adjoining properties. Alternative 110 would also involve a greater length of fourth track, compared to Alternative 90A. In addition, Alternative 110 would involve more modifications to some bridges than Alternative 90A, which could involve nominal changes in the appearance of the affected crossings.

The Revolutionary Trail Scenic Byway (Route 5/29) extends alongside the length of the Empire Corridor and the Mohawk River/Erie Canal from Route 5 in Schenectady County to Herkimer, then follows Route 5S and the Erie Canal to Utica and continues northwest along Route 49 and the Erie Canal to Rome in Oneida County. Portions of Route 5 would need to be relocated, however, the scenic qualities of the byway would not be affected by Alternative 90B.

Alternative 110 proposes two flyovers along the corridor, at MP 279 and MP 366 (same as the ones proposed in 90B). The first flyover (MP 279) would extend through lightly forested and rural agricultural land, with scattered residences set back at least 500 feet and an at-grade road crossing set back 700 feet. Currently it is not known how tall or extensive the flyovers will be, but this would introduce a new visual element that may not be visible from the closest houses, depending on the lateral and vertical extent of the structure.

The second flyover (MP 366) is surrounded by lightly forested land, with residential areas just a few hundred feet southwest of the existing railroad and parkland to the north. This flyover will be situated north of the I-490 & 441 interchange. Depending on the height of the flyover, the flyover may be visible from residential areas and the adjoining parkland, and would introduce a new visual element that would be more prominent than the at-grade railroad.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch.

Empire Corridor South

No new improvements, beyond what is proposed for Alternative 90A, would be proposed for Alternative 125 along the majority of Empire Corridor South. However, roughly one mile of the proposed 125 mph track would extend south from Albany-Rensselaer Station to cross the Hudson River. This would introduce a new visual element and a new crossing of the Hudson River, but the area affected is primarily industrial or undeveloped.

Empire Corridor West/Niagara Branch

Alternative 125 would involve construction of a total of 236 miles of track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo.

Alternative 125 also would include new right-of-way in most areas, but would merge back with the Empire Corridor over two 15- and 16-mile segments centered on Syracuse and Rochester, respectively, and along the section approaching Buffalo Exchange Street. In these sections, the track would be elevated. Alternative 125 will be an electrified corridor between Albany and Buffalo, with overhead catenary, which may be more visible from adjoining properties and roads.

This route covers 126 miles on new alignment between Rensselaer County and a point 8.5 miles east of Syracuse Station. Alternative 125 extends through urban areas in Albany and Schenectady Counties over a distance of 20 miles, following the New York State Thruway (I-87/I-90) over most of this distance. Along five areas of Alternative 125, covering a total of 66 miles, it is assumed that grade separation will be achieved by elevating the tracks above the existing grade on a combination of embankment and elevated structures. For estimating purposes, it is assumed that 37.5 miles of viaduct structure will be required to achieve grade separation. Included in the five areas is a stretch of corridor that will likely have grade separated structures to traverse the local terrain, but it is not yet known where, only that they will exist. These elevated portions of the corridor would likely represent new visual elements that would be more prominent to adjoining uses.

Alternative 125 would introduce a new visual element where the route would extend on a new alignment. In these locations, it would have a more substantial visual effect than Alternatives 90B and 110, which would involve improvements to the existing railroad. However, the majority of the areas traversed are rural and agricultural, and the views of the new facility would be limited largely to adjoining properties or crossroads, which are described under "Existing Conditions" (see Appendix G.12). As is the case for the existing railroad, views of and from the tracks may be screened to some degree by trees and vegetated buffers. Although the tracks themselves may not be visible from adjoining properties, depending on the degree of screening and slopes and adjoining development, unless trains are running on the tracks, the overhead catenary may be more visually prominent.

As described under "Existing Conditions," the new alignment for the Alternative 125 would involve far fewer crossings of interstate highways and the New York State Barge Canal System or urban areas than the existing railroad. New bridges that may be required to carry the railroad over/under roadways may be more prominent visually, and new bridges over rivers/canals would introduce a new river crossing that may be more visible than the tracks at-grade.

Alternative 125 mph would cross and extend alongside an 8.5-mile section of the U.S. Route 20 Scenic Byway, a National Scenic Byway, in Schenectady and Schoharie Counties. This would introduce a new visual element to the byway, but would affect a very small proportion of the entire 108-mile driving route.

The five general locations where elevated sections would be required for Alternative 125, are described in the following section. Where the alignment rejoins the Empire Corridor, most of the areas consist of more densely populated and urban areas, and Alternative 125 would be elevated above the existing tracks. Overhead catenary along this electrified corridor will be particularly visible in these sections.

The easternmost elevated section along the Alternative 125 extends between the City of Rensselaer (MP QH142) and MP QH162 in Schenectady County. Along this 20 mile section, it is assumed that grade separation will be achieved by elevating the tracks above the existing grade on a combination of embankment and elevated structures. For estimating purposes, it is assumed that ten miles of viaduct structure will be required to achieve grade separation. These viaduct sections are assumed

to be about 20 feet above existing grade. The heights of the non-structurally elevated sections are currently unknown, but the elevated section will be more visible from adjoining areas. In Rensselaer County (MPs QH42 to QH143), Alternative 125 would follow along the existing corridor centerline, but would be elevated. The elevated section along this mile would extend adjacent to residential and industrial uses, and Alternative 125 would cross industrial lands, where it extends towards the Hudson River on a new alignment. In Albany County (MPs QH143 to QH157), Alternative 125 would extend through industrialized waterfront, then would follow interstate highways between MP QH144, at the I-787 convergence with the New York State Thruway (I-87) (to MP QH145), and QH157 at the Schenectady county line.

The elevated section of Alternative 125 will introduce a new visual element, however, most of the section extends along the median of the New York State Thruway (I-90/I-87), which is buffered by trees and has a wide median and right-of-way through the majority of this area. The last five miles extend into Schenectady County and outside the highway right-of-way, extending alongside I-90 to just west of the I-90 and I-88 interchange. Over the last three miles, the railroad will cross over and extend outside of the Thruway right-of-way, crossing through or adjacent to several residential neighborhoods, but also extending through undeveloped or commercial land uses.

Between Schenectady County (MP 165) and Syracuse, because of grade differences of the terrain, intermittent viaduct or elevated structures may be required, although these have not been identified in Tier 1. Since these structures are to span over local terrain, it is likely that they will not be in urban areas and are likely to be in more undeveloped or even industrial and residential areas. They will present a new visual element that would be more visible, but specific locations would be identified as part of any Tier 2 analysis.

The third elevated section is between MPs QH268 to QH288 in Onondaga County and primarily runs along the existing Empire Corridor, where it extends through the City of Syracuse. This entire distance will likely be completely grade separated on viaduct or column structures, with 10 miles of elevated sections assumed on either side of the Syracuse Station. The railroad extends through rural agricultural and residential areas outside of the city and extends through increasingly urbanized and industrial/commercial areas in and around the City of Syracuse. The views along this section are largely residential and commercial, and would likely be more visible from the grade separated corridor than the current at-grade centerline. This would introduce a new visual element that would be more prominent in this urban area.

The fourth elevated section is where Alternative 125 rejoins the Empire Corridor and extends through the City of Rochester in Monroe County between MPs QH345 to QH361. Approximately ten miles around the Rochester station-stop were assumed to be completely grade separated on viaduct or column structures, about 20 feet above existing grade. The other six miles were assumed to be on embankment, the heights of which are currently unknown. The elevated section starts where Alternative 125 rejoins the Empire Corridor (90/110 Study Area) at MP QH345.25 near the Fairport Village line. This elevated section would extend through increasingly urban areas entering the City of Rochester, where the viewshed is dominated by built up areas, and the railroad adjoins parking lots, businesses, industries with limited or no screening by trees. Alternative 125 will be more visible on the elevated tracks than the existing at-grade corridor, but adjoining areas are predominantly commercial or industrial uses or institutional uses.

The fifth elevated section is between MPs QH420 to QH425, entirely along the last five miles of the Empire Corridor where it approaches the Buffalo Exchange Street Station. This section will be elevated on completely grade separated viaduct or column structures and will introduce a new

visual element that will be more visible than the current at-grade railroad. This section extends through heavily urbanized, industrialized areas (including the Frontier railyard and the Buffalo Terminal) that include higher density neighborhoods. In the downtown area, this elevated section would extend between commercial buildings on Exchange Street, to the north, and the elevated Niagara Thruway (I-190) structure, on the south. In this area, the elevated structure would mirror the adjoining Thruway bridge and would be less prominent.

4.17.5. Potential Mitigation Strategies

The visual impacts of the program can be minimized through design of more visually prominent facilities, such as stations and bridges, to improve the aesthetic characteristics. In the area of canal crossings and historic parks, design of bridge abutments, retaining walls, and other structures can consider aesthetic treatments to be consistent with the park environs and setting. Use of vegetated buffers can effectively screen the rail facilities from adjoining areas where there is adequate room for plantings. Consultation with agencies with jurisdiction over the canals and parks would be performed, as appropriate, to obtain input into the development of improvement project design concepts.

4.17.6. Future Analysis

The Tier 2 analysis will consider the visual impact and characteristics in the planning and design of the facilities proposed. The focus would be on design of above ground facilities, which would be more visually prominent, such as elevated sections, flyovers, stations, and bridges, and areas of visual sensitivity, such as canal crossings, designated scenic areas and parks. The extent of impacts in designated scenic areas, such as the Hudson River Scenic Areas of Statewide Significance designated under the state coastal program, the Mid-Hudson Historic Shorelands Scenic District, and other scenic resources, such as designated scenic byways, will be determined based on the designs developed in Tier 2. Means of avoiding and minimizing visual impacts will be identified as part of this assessment, in consultation with agencies with jurisdiction.

The visual assessment would be a component of required environmental documentation and permits, such as a visual assessment of impacts on Scenic Areas of Statewide Significance as part of any required application for Coastal Zone Management Consistency (CZM) Certification. The CZM policies that apply to scenic resources are:

- **Policy 24:** Prevent impairment of scenic resources of statewide significance;
- **Policy 25:** Protect, restore or enhance natural and man-made resources, which are not identified as being of statewide significance, but that contribute to the overall scenic quality of the coastal area.

If work is performed in the Hudson River SASS's, any required CZM consistency determination would address the program's consistency with the above coastal policies.

4.18. Farmlands

4.18.1. Regulatory Context

Farmland protection is provided by the Federal Farmland Protection Policy Act (FPPA). For the purpose of FPPA, farmland includes prime farmland and land of statewide importance. Protected farmland under FPPA is defined based on soil types and does not have to be currently used for cropland, but excludes urbanized areas.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods.

Farmland of statewide importance is land other than prime farmland but that is also highly productive. This is land, in addition to prime farmland, that is of statewide importance for the production of food, feed, fiber, forage, and oil seed crops. Generally, additional farmlands of statewide importance include those that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as prime farmland if conditions are favorable.

The State of New York farmland protection program includes the Agricultural District Law (Agriculture and Markets Law- Article 25-AA enacted in 1971) that had resulted in the creation of 341 agricultural districts containing approximately 21,500 farms (covering about 30% of the state) by April 2002. Land owners of large farms can apply for preferential tax treatment and protections as an agricultural district, as long as the district contains at least 500 acres within the county or the applicant(s) own at least 10 percent of the land to be included in the district. This protection also mandates that state agencies and local governments and public benefit corporations avoid or minimize impacts on farmland operations within agricultural districts for projects that may involve farmland acquisition or publicly funded construction.

4.18.2. Methodology

Actively farmed areas were identified through review of the U.S. Department of Agriculture 2009 croplands and aerial photography. Federally protected prime farmland and farmland of statewide importance for study areas within 300 feet of the corridor centerline for all alternatives were characterized using available soil survey mapping.

Prime farmland and farmland of statewide importance were initially identified through review of soil survey mapping prepared by the Natural Resources Conservation Service, and the 2010 Census-defined urbanized areas were overlaid with this to exclude urbanized areas. The definition of farmland under the Federal Farmland Protection Policy regulations (7 CFR 658.2) states that *"'Farmland' does not include land already in or committed to urban development or water storage. Farmland 'already in' urban development or water storage includes all such land with a density of 30 structures per 40-acre area. Farmland already in urban development also includes lands identified as 'urbanized area' (UA) on the Census Bureau Map, or as urban area mapped with a 'tint overprint' on*

the USGS topographical maps, or as 'urban-built-up' on the USDA Important Farmland Maps."

The state-designated Agricultural Districts were identified using information obtained from the New York State Department of Agriculture and Markets and the New York State GIS Clearinghouse. The districts for study areas within 300 feet of the corridor centerline for all alternatives were characterized, without consideration given to whether these districts were within Census-defined urban areas.

Impact assessment focused on areas where design located tracks or maintenance service roads outside of the right-of-way, and aerial photos and protected farmland mapping were reviewed to identify potential farmland impacts in these locations.

4.18.3. Existing Conditions

Within the 90/110 Study Area, twenty counties contain approximately 4,015 acres of prime farmland within 300 feet of the corridor centerline, excluding urbanized areas (as defined by the 2010 U.S. Census), as shown in Exhibit 4-34 and illustrated in Exhibit G-16 of Appendix G.13, which describes existing conditions for farmlands in more detail. An additional 1,984 acres of prime farmland, if drained and 2,040 acres of farmland of statewide importance are located in the non-urbanized portion of the study area. Approximately 3,668 acres of farmland within state-designated Agricultural Districts are located within 300 feet of the corridor centerline. The majority of farmland within the study area, approximately 90 percent of prime farmland and 90 percent of Agricultural Districts, are located along primarily rural areas along the Empire Corridor West and Niagara Branch west of (and including) Albany.

Within the 125 Study Area, there are twenty-one counties with approximately 5,544 acres of prime farmland within 300 feet of the corridor centerline. An additional 3,377 acres of prime farmland, if drained, and 3,470 acres of farmland of statewide importance are located in the non-urbanized portion of the study area. Approximately 8,164 acres of farmland within state-designated Agricultural District are located within 300 feet of the corridor centerline. The majority of farmland within the 125 mph study area, approximately 93 percent of prime farmland and 95 percent of Agricultural Districts, are located along primarily rural areas along the Empire Corridor West and Niagara Branch west of (and including) Albany. Farmlands for both the 90/110 and the 125 Study Areas are described in the following sections.

Empire Corridor South

The Empire Corridor South extending north from (and including) New York through the Hudson Valley to Rensselaer County includes three urbanized counties. All of the Build Alternatives follow the existing Empire Corridor South for the majority of its length, deviating only in Rensselaer County, where Alternative 125 splits off 1.6 miles south of where the existing Empire Corridor turns to the west. The study area within the seven counties of Empire Corridor South contains 405 acres of prime farmland (31 additional acres of prime farmland if drained), 393 acres of farmland of statewide importance, and 387 acres of Agricultural Districts.

Empire Corridor West/Niagara Branch: 90/110 Study Area

The Empire Corridor West and Niagara Branch extending west of (and including) Albany to Niagara Falls includes large tracts of agricultural land within the 600-foot-wide study area. The study area in the thirteen counties contains a total of 3,610 acres of prime farmland, an additional 1,952 acres of prime farmland if drained, and 1,647 acres of farmland of statewide importance. Approximately 3,280 acres of the study area between (and including) Albany County and Niagara County are within state-designated Agricultural Districts.

Exhibit 4-34—Federally and State-Designated Farmlands in the 90/110 and 125 Study Areas

Counties	Prime farmland soils (acres)		Prime farmland, if drained (acres)		Farmland of Statewide Importance (acres)		Agricultural Districts (acres)	
	90/110 mph	125 mph	90/110 mph	125 mph	90/110 mph	125 mph	90/110 mph	125 mph
New York	0	0	0	0	0	0	0	0
Bronx	0	0	0	0	0	0	0	0
Westchester	59	59	2	2	40	40	0	0
Putnam	9	9	1	1	1	1	0	0
Dutchess	120	120	21	21	233	233	113	113
Columbia	69	69	7	7	102	102	148	148
Rensselaer	148	148	0	0	17	17	126	126
Albany	8	64	0	0	26	89	0	0
Schenectady	163	56	0	403	39	263	12	159
Schoharie		132		104		79		25
Montgomery	484	56	6	770	88	488	610	1,078
Herkimer	328	216	4	286	19	460	159	82
Oneida	295	827	270	357	87	111	24	374
Madison	133	244	193	60	154	335	132	366
Onondaga	351	473	256	140	169	319	39	464
Cayuga	266	362	24	90	284	160	223	806
Wayne	609	1,246	138	298	268	271	1,004	2,214
Monroe	155	215	214	76	33	43	118	267
Genesee	755	1,002	463	427	338	369	650	1,476
Erie	60	243	332	283	133	80	225	384
Niagara	3	3	52	52	9	9	84	84
TOTAL	**3,295**	**4,522**	**1,686**	**3,017**	**1,679**	**2,993**	**3,667**	**8,164**

Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 300 feet of the corridor centerline.

Source: Natural Resources Conservation Service, New York Department of Agriculture and Markets, New York State GIS Clearinghouse

Empire Corridor West/Niagara Branch: 125 Study Area

The 125 Study Area follows a more direct route between Rensselaer and Buffalo, which bypasses several of the major metropolitan areas and stations sites (Schenectady, Amsterdam, Utica, and Rome) along the Empire Corridor West and extends through more rural and agricultural areas. Within the 600-foot wide study area of the 125 Study Area in the Empire Corridor West/Niagara Branch, there are fourteen counties containing a total of 5,139 acres of prime farmland, an additional 3,346 acres of prime farmland if drained, and 3,076 acres of farmland of statewide importance. Approximately 7,779 acres of the study area between (and including) Albany County and Niagara County are within state-designated Agricultural Districts.

4.18.4. Environmental Consequences

The sections below describe impacts to mapped areas of prime farmland soils (including soils of statewide importance) and state-designated Agricultural Districts. However, review of aerial mapping indicates that the Base Alternative and Alternatives 90A and 90B would have minimal impacts to actively farmed areas and little or no impacts to active farms outside of the right-of-way. These alternatives would largely involve work within the right-of-way, with tracks being added in the location of the former track beds or existing access roads. The proposed work will include the addition of track, as well as maintenance service roads in selected areas. Alternative 110 may have isolated impacts to actively farmlands in one or more locations. Alternative 125 would involve greater impacts to farmland as it extends on new alignment through primarily rural areas. This preliminary assessment is based on Tier 1 concepts and mapping and will be further refined in Tier 2 as the project development process is further advanced, and efforts to avoid farmland encroachments will be made as improvement project designs are advanced.

Base Alternative

The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure.

Empire Corridor South

The Base Alternative includes signal and grade crossing improvements along the 64 miles of Empire Corridor South (MPs 75.8 to 140) north of Poughkeepsie to just south of Albany-Rensselaer Station. In addition, this section of track crosses through urban areas not subject to protection as prime farmland in portions of Dutchess and Columbia Counties and a large part of Rensselaer County. Agricultural districts and areas of prime farmland are located proximal to the existing rail through this section, but this work will not involve substantial impacts outside of the right-of-way, and no impacts are anticipated.

The Base Alternative will also involve the addition of a fourth track and platform extension at Rensselaer Station near the Albany county line (MPs 141 to 143), which is located entirely within an urban area and will not involve impacts to prime farmland or Agricultural Districts.

Empire Corridor West/Niagara Branch

The Base Alternative will involve 17 miles of second track between the Albany-Rensselaer and Schenectady stations, as well as reconstruction of the Schenectady Station. The affected portions of Albany and Schenectady Counties are designated as urban areas, and there are no Agricultural Districts along this portion of the railroad.

Most of the proposed Syracuse track configuration and signal improvements are also located within urban areas, with the exception of four miles of third track in the easternmost part of Onondaga County and extending into Madison County. Work outside the right-of-way in this area for improvements has the potential to affect prime farmland, however there no Agricultural Districts along this segment. The work could largely be contained within the former track bed and the existing right-of-way.

Rochester Station track and platform improvements (MPs 368 to 373) are entirely within designated urban areas and do not adjoin Agricultural Districts. This Base Alternative improvement will not impact protected farmland. Proposed improvements for the new Niagara Falls Intermodal Transportation Center will also be located within an urban area and will not impact protected farmland.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, signalization, in addition to improvements proposed under the Base Alternative previously described.

Empire Corridor South

Alternative 90A includes construction of 4 miles of second track through urbanized areas of Manhattan (MPs 9 to 13), and 1.4 miles of new track, extending under the Tappan Zee Bridge, for the Tarrytown Pocket Track/Interlocking. Both of these are located within designated urban areas and would not impact protected farmland.

With Alternative 90A, signal improvements proposed along 43 miles (MPs 32.8 and 75.8) extend through urban areas (Westchester and Dutchess Counties) or limited areas of prime farmland (Putnam County). There is only one location close to an Agricultural District, but work could be contained within the right-of-way and no protected farmland impacts are expected. Along this section, 10 miles of new third track (MPs 53 to 63) and improvements at the Poughkeepsie Yard/Storage Facility (MPs 71 to 75.8) would be located within urban areas in Dutchess County.

North of Poughkeepsie and south of Albany-Rensselaer Station (MPs 75.8 to 140), proposed improvements would include rock slope stabilization (MPs 105 to 130) and three new control points (CP 82, CP 99, and CP 136), as well as station improvements at Rhinecliff Station (high-level platforms) and Hudson Station (new Ferry Street Bridge and track realignments). It is anticipated that these improvements could occur largely within the right-of-way and would not impact protected farmland (as discussed under the Base Alternative). Alternative 90A includes replacement of the Livingston Avenue Bridge, which is in an urban area on both sides of the Albany County Line and would not impact protected farmland.

Empire Corridor West/Niagara Branch

With Alternative 90A, track improvements include approximately 10 miles of third track between MPs 169 and 178.5, and Amsterdam Station improvements along the west end of this segment. The western five miles of this segment extends through a designated urban area. The remaining five miles in eastern Montgomery County and extending into Schenectady County includes areas of prime farmland and extends close to Agricultural Districts in a few locations. However, this work could be contained within the existing right-of-way. Upgrades to interlockings and automatic block signals at three control points (CP 175, CP 239, and CP 248) will not affect prime farmlands or Agricultural Districts, as these are all located within urban areas.

Alternative 90A includes Syracuse Station track improvements (MPs 290 to 294) and third track improvements along 11 miles (MPs 373 to 382) west of the station. These work areas in Syracuse and Rochester are entirely within designated urban areas and do not adjoin Agricultural Districts. These Alternative 90A improvements would not impact protected farmland. Further to the west, the addition of a third track along 11 miles located largely west of the designated urban area around Rochester, and work outside of the right-of-way may affect prime farmlands and Agricultural Districts. However, it is anticipated that the majority of the work could be located within the right-of-way.

Station improvements at the Buffalo-Depew Station would be located within an urban area, and no Agricultural Districts are located in this area. Although the proposed double track (MPs QDN17 to QDN23.2) along the Niagara Branch is located within an urban area, work outside the right-of-way in this area may affect Agricultural Districts.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, is proposed, and farmland impacts are not anticipated to occur.

Empire Corridor West/Niagara Branch

Improvements for Alternative 90B start at MP 160 in the City of Schenectady, which is within an urban area that extends west to MP 168. The third track at the connection to the Selkirk Branch at MP 168.3 in Schenectady County may affect mapped areas of prime farmlands and borders on urban area, south of the railroad. There are no Agricultural Districts that would be affected.

Work that may extend outside of the right-of-way may occur at Amsterdam Station and at MPs 179, 192, and 200 in Montgomery County. Proposed track and station improvements at Amsterdam Station and trackwork at MP 179 are located within urban areas. A maintenance service road near

MP 200 is also situated within a designated urban area. At MP 192, track realignment at a curve would extend outside of the right-of-way, but this is outside (but close to) prime farmlands and an Agricultural District.

Construction of a fourth track and maintenance service road may affect a few prime farmlands in Herkimer County near the Montgomery County Line (MPs 210.5 to 214.8). A maintenance service road in this area (MPs 214.25 and 214. 75) may affect an Agricultural District.

Work that may extend outside of the right-of-way between MPs 234 to 238 around the Utica Station in Oneida County and around the Syracuse Station (MPs291 to 292, as addressed under Alternative 90A) will be located within an urban area and will not affect prime farmlands or Agricultural Districts. In Wayne County, the addition of a maintenance service road may involve right-of-way impacts near MP 341, but this is in an urban area and will not affect Agricultural Districts. In Monroe County, the addition of a fourth track around the Rochester Station could also involve right-of-way impacts (MPs 371 to 376 and MPs 378.2-378.6, and MPs 379.15-379.6), but this area is entirely within an urban area and will not involve protected farmland impacts.

In Genesee County, the addition of a third track and maintenance service road (MPs 397 to 397.5) may occur in close proximity to or may encroach on actively farmed fields that are part of an Agricultural District.

The addition of a fourth track at Buffalo-Depew Station (MPs 431 to 432) and double track along the Niagara Branch (MPs QDN2 to QDN7) would be located entirely within an urban area and will not affect protected farmlands.

There are also locations where relocations of adjoining roadways may result in indirect impacts to farmlands, but these locations would be better defined in Tier 2.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations.

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, is proposed, and farmland impacts are not anticipated to occur.

Empire Corridor West/Niagara Branch

With Alternative 110, track realignments outside of the right-of-way would be required near MP 165 in Schenectady County, but this would be located within an urban area and would not impact protected farmland. The connection of the third track to Selkirk Branch at MP 168 may affect mapped areas of prime farmlands and borders on an urban area, south of the railroad. There are no Agricultural Districts that would be affected.

Work extending outside of the right-of-way for construction of the third and fourth tracks and a maintenance service road at MP 182 in Montgomery County may affect prime farmlands and Agricultural Districts. West of the urban area around Fonda (west of MP 186.85) to MP 189.5, work outside of the right-of-way (maintenance service road and relocated freight track west to turnout at MP 187.8 and third track west of this point) may involve impacts to protected farmland and Agricultural Districts. However, most of the prime farmlands along this section are situated on the opposite (south) side of the tracks. Realignment of the third track at MP 192.5 and a maintenance service road (MPs 194 to 197) may affect prime farmland and Agricultural Districts. Relocation of Route 5, which closely borders this section of the Empire Corridor West, may indirectly affect farmland areas in this and other areas of Montgomery and Herkimer Counties. A maintenance service road that may extend outside of the right-of-way in certain areas between MPs 197 and 201 and track realignments at MPs 198 and 199.3 are situated within a designated urban area. However, the track realignment at MP 199.3 may affect Agricultural Districts. Track realignment of the new/relocated freight tracks and the third track at MPs 205 and 206 may impact prime farmlands and Agricultural Districts in Montgomery County.

In Herkimer County, the third track and maintenance service road may also affect prime farmlands at MPs 208.3 to 208.5 and between MPs 210 to 213. There are no Agricultural Districts in these areas that would be affected. West of MP 215, the remainder of the tracks in Herkimer County is located within an urban area. In this section, there are areas where the maintenance service road and in some locations, the proposed third track, may extend outside of the right-of-way (MP 215.5, where fourth track will be added, impacts could occur at MPs 218.5 to 219, MP 222, MPs 226.4 to 228, and MPs 229 to 229.8). There are no Agricultural Districts along most of these areas, with the exception of the westernmost area. A maintenance service road in this last section (MPs 229 to 229.8) that may extend along the edge of and outside the right-of-way may affect an Agricultural District and actively farmed fields. A maintenance service road and the proposed third track between MPs 230.4 to 230.9 may involve property takings and relocation of Route 5, indirectly or directly affecting an Agricultural District. Between MPs 231 and 235.3, near the Oneida County line, the addition of a maintenance road and the third track may cross out of the right-of-way in a number of locations, potentially affecting Agricultural Districts.

In Oneida County, the addition of a third and fourth track and relocated freight track may extend outside of the right-of-way in the section between the county line and Utica Station, but this is within an urban area, and no Agricultural Districts abut the railroad.

In Wayne County, the addition of a third track and maintenance service road may involve right-of-way impacts near MP 341, but this is in an urban area and will not affect Agricultural Districts.

In Genesee County, the new/relocated freight mains north of the existing railroad and a maintenance service road may potentially affect farmlands. Prime farmlands, active farmfields, and structures, and Agricultural Districts may potentially be affected in the area between MPs 389 and 395.

The proposed work in the vicinity of passenger stations at Rome, Syracuse, Rochester, and Buffalo-Depew and addition of tracks near these sites are situated within urban areas and will not affect farmlands.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 will be a "sealed" corridor with minimal crossings and therefore there may be potential accessibility impacts to active farming operations. Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch. Alternative 90A would be situated within the right-of-way and also would involve work within urban areas in many locations, and therefore is not anticipated to impact farmland.

Empire Corridor South

No new improvements, beyond what is proposed for Alternative 90A, would be proposed for Alternative 125 along the majority of Empire Corridor South. However, roughly one mile of the proposed 125 mph track would extend south from Albany-Rensselaer Station to cross the Hudson River, but this is located entirely within designated urban area and would not impact farmland.

Empire Corridor West/Niagara Branch

Alternative 125 would involve construction of a total of 236 miles of track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. Alternative 125 also would include new right-of-way in most areas, but would merge back with the Empire Corridor over two 15- and 16-mile segments centered on Syracuse and Rochester, respectively. This route covers 126 miles on new alignment between Rensselaer County and a point 8.5 miles east of Syracuse Station. Alternative 125 extends through urban areas in Albany and Schenectady Counties over a distance of 20 miles, following the New York State Thruway (I-87/I-90) over most of this distance. As the area is urban, there are no prime farmlands in this section, although the corridor extends close to or through Agricultural Districts in two isolated locations.

West of the urban area, Alternative 125 extends through or close to eight Agricultural Districts in Schenectady County and one in Schoharie County. Alternative 125 in this area passes through farmlands of statewide significance, and prime farmlands are more limited and dispersed.

Alternative 125 extends through Montgomery County, where Agricultural Districts cover most of the county along the corridor. The distribution of farmlands of statewide importance is much more dispersed, and there are limited occurrences of prime farmlands along the corridor in the county.

In Herkimer County, Alternative 125 crosses only three Agricultural Districts, as well as two urban areas (over a distance of roughly 4 miles) surrounding Herkimer and Utica on the west. The distribution of farmlands of statewide importance is dispersed, with even fewer occurrences of prime farmland along the corridor.

In Oneida County, Alternative 125 extends through roughly 11 miles of urban area surrounding Utica and Oneida on the west. Outside this urban area, Alternative 125 crosses prime farmland in a number of locations in the county. Alternative 125 also extends through 16 agricultural districts.

In Madison County, Alternative 125 extends through roughly 8 miles of urban area surrounding Oneida and Canastota. Outside the urban area, the corridor crosses through prime farmlands and

farmlands of statewide significance in this county. This alternative also crosses five larger Agricultural Districts, which encompass roughly 4 miles of the corridor.

In Onondaga County, the alignment merges with the existing Empire Corridor. Alternative 125 extends through 16 miles of urban area surrounding the City of Syracuse. Outside of the urban area, Alternative 125 diverges from the existing Empire Corridor and continues on a new alignment 61 miles west to a point 11 miles east of Rochester Station. West of the Syracuse urban area, Alternative 125 passes through areas of prime farmland. Alternative 125 also crosses or adjoins at least 13 Agricultural Districts in the county,

In Cayuga and Wayne Counties, Agricultural Districts extend along almost the entire length of Alternative 125. Two large Agricultural Districts, and one or two smaller districts, cover the entire length of the corridor of Cayuga County. At least 47 Agricultural Districts coincide with the corridor in Wayne County. The corridor also passes through areas of prime farmlands in both counties, although the western 2.5 miles in Wayne County extends through an urban area.

Alternative 125 extends almost entirely through urban areas in Monroe County (along 16 miles surrounding in the City of Rochester), where it merges with the existing Empire Corridor, diverging again 5.5 miles west of Rochester Station to continue on new alignment 52 miles west to Buffalo. West of the urban area, Alternative 125 passes through farmland on the remaining three miles on the west end of the county, passing through three Agricultural Districts and areas of prime farmland

Alternative 125 extends through or adjacent to at least 25 Agricultural Districts and areas of prime farmland in Genesee County. In Erie County, Alternative 125 extends through one large Agricultural District that covers much of the 6 miles before the corridor enters the urban area.

Alternative 125 continues 5.5 miles past the eastern edge of the urban area to merges back with the existing Empire Corridor/Niagara Branch. This urban area continues along the remainder of the corridor through Buffalo and Niagara Falls, so no farmland impacts are anticipated along this segment of the program.

4.18.5. Potential Mitigation Strategies

During Tier 2, refinements in design and mapping will be performed and the project development will incorporate avoidance and minimization of farmland impacts to the extent practicable. This will include avoidance of active farms, prime farmlands, and parcels included within Agricultural Districts to the extent practicable. The lower speed alternatives (Base and Alternatives 90A and 90B) and those located along the existing Empire Corridor (Base, Alternatives 90A, 90B, and 110) will result in lesser or no impacts on active farmlands. If Alternative 125 is selected, further design refinements will need to include avoidance and minimization during Tier 2.

NYSDOT will need to comply with the Federal Farmland Policy Protection Act for acquisition of prime farmlands. Compliance with the State Agriculture and Markets law for work affecting a designated Agricultural District will also be required. The U.S. Department of Agriculture (USDA) and the New York State Department of Agriculture and Markets will be consulted regarding farmland impacts and mitigation strategies that are appropriate.

Potential farmland mitigation measures that can be developed in coordination with the federal/state agencies and landowners can include measures such as avoidance and minimization through design measures, such as use of steeper slopes, minimizing embankments, or relocating structures. Other potential mitigation measures that might be considered include installation of cattle (or other) animal crossings, improvements to an existing or creation of new farmland access road for farm equipment and vehicles, planting of windbreaks to protect crops from wind damage, reconfiguring any affected subsurface drainage or irrigation systems or otherwise improving drainage, and staging activities to occur at the end of harvest. Farmland conversion mitigation can include creating conservation easements on alternative farmland parcels or paying a fee to protect farmland.

4.18.6. Future Analysis

Tier 2 assessments will refine the impact assessment based on design and site-specific mapping and delineation of existing and required rights-of-way. If significant conversions of prime farmland and impacts on state Agricultural Districts are anticipated in Tier 2, alternatives actions, locations, and designs will need to be further explored as part of Tier 2 design. If avoidance is not possible, measures to minimize or reduce the impacts should be evaluated, as discussed above.

If conversions of prime farmlands are anticipated to occur, in accordance with the Federal Farmland Protection Policy Act (FPPA), a Farmland Conversion Rating Impact Rating will be prepared and submitted to the USDA Natural Resources Conservation Service (NRCS). This will also require consultation with the State NRCS FPPA contact and a review of alternative actions that do not require farmland acquisition. Avoidance measures and appropriate mitigation would be determined in consultation with the agencies.

During Tier 2, right-of-way mapping will be refined, and the respective county planning offices will be consulted to determine if land was added to an Agricultural District that is not included on the mapping. The Agriculture and Market Law, Article 25-AA, requires prior notice to the Commissioner of Agriculture and Markets for right-of-way acquisitions in an Agricultural District. The State Agriculture and Markets Law requires a Notice of Intent be prepared for acquisition of land in excess of 1 acre of actively operated farm in a designated Agricultural District or in excess of 10 acres from within any one district. If required, a Preliminary and Final Notice of Intent (PNOI and FNOI) will be filed with the New York State Commissioner of Agriculture and Markets and the County Agriculture and Farmland Protection Board(s). The FNOI includes a report justifying the proposed action including an evaluation of alternatives that would not require action within the Agricultural District. The Notice of Intent must address the anticipated short-term and long-term agricultural impacts of a project, including acreages and farms/districts affected, and mitigation measures proposed. After the FNOI is accepted by the NYS Agriculture and Markets, a certification by the Regional Director is required, certifying that NYSDOT has met the requirements of State Agriculture and Market Law, Section 305(4) and to the maximum extent practicable, adverse agricultural impacts revealed in the FNOI will be avoided, minimized and mitigated. The Notice of Intent process will be completed prior to right-of-way acquisition.

4.19. Air Quality

By potentially altering the modal distribution of inter-city travel within New York State, the proposed action may affect ambient air quality throughout the program study area. Direct effects result from program sources, such as emissions from locomotives along the corridor, while indirect effects are a result of emissions generated by non-program sources, such as vehicles traveling to stations and reduced auto travel in the region. When combined, the net change in emissions due to a large program such as the proposed action can also impact area-wide emissions, affecting air quality in one or more areas. Since the current analysis is part of a Tier 1 EIS, detailed site-specific information (e.g. local traffic conditions at stations) is not available at this time; therefore, local (microscale) air quality analyses are limited to screening for potential local impacts from locomotive emissions (worst case of all alternatives was analyzed), and a qualitative discussion of on-road microscale impacts. The net change in area-wide (mesoscale) emissions is analyzed in this chapter for each alternative, and evaluated for potential adverse and/or beneficial impacts on air quality.

4.19.1. Regulatory Context

Pollutants for Analysis

Emissions from motor vehicles and locomotives result from combustion of fuels—on-road vehicles are predominantly gasoline- and diesel-powered, and locomotives are almost entirely diesel-powered, other than electric locomotives.

Carbon monoxide (CO), particulate matter (PM), volatile organic compounds (VOC), and nitrogen oxides (nitric oxide, NO, and nitrogen dioxide, NO_2, collectively referred to as NO_x) are all emitted from the combustion of both gasoline and diesel. However, CO emissions are predominantly from gasoline combustion while NO_x and PM emissions are predominantly from diesel combustion. Fine PM is also formed when emissions of NO_x, sulfur oxides (SO_x, which includes sulfur dioxide (SO_2) and other sulfur oxides), ammonia, organic compounds, and other gases react or condense in the atmosphere. Ozone is formed in the atmosphere by complex photochemical processes that include NO_x and VOC. Since CO, VOC, PM, and NO_x have all been identified as pollutants of concern for public health under the U.S. Clean Air Act (CAA), referred to as "criteria pollutants" (see more below), and are emitted from both on-road and locomotive engines, they have all been included in the mesoscale analysis presented below.

Overall, the significant reduction in CO emissions from motor vehicles due to federal regulations over the past few decades have been very successful, and CO concentrations are generally not of concern in New York State, although regulations are maintained to ensure continued compliance. Although CO does not have an area-wide impact, mesoscale CO emissions were nonetheless analyzed to gauge the overall impact of the program on CO emissions.

In addition to being a precursor to the formation of ozone, NO_2 (one component of NO_x) is also a regulated pollutant. Since NO_2 is mostly formed from the transformation of NO in the atmosphere, it has mostly been of concern further downwind from large stationary point sources, and not a local concern from mobile sources. (NO_x emissions from fuel combustion consist of approximately 90 percent NO and 10 percent NO_2 at the source.) However, with the promulgation of the 2010 1-hour

average standard for NO_2, local sources such as vehicular and locomotive emissions may become of greater concern for this pollutant.

As described below, PM is regulated in two size categories: particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}, which includes $PM_{2.5}$). $PM_{2.5}$ has the ability to reach the lower regions of the respiratory tract, delivering with it other compounds that adsorb to the surfaces of the particles, and is also extremely persistent in the atmosphere. $PM_{2.5}$ is mainly derived from combustion material that has volatilized and then condensed to form primary PM (often soon after the release from a source exhaust) or from precursor gases reacting in the atmosphere to form secondary PM. Diesel-powered engines are a significant source of respirable PM, most of which is $PM_{2.5}$.

Emissions of SO_2—also a criteria pollutant under the CAA—are currently associated mainly with stationary sources, and sources utilizing non-road diesel such as diesel trains, marine engines, and non-road vehicles (e.g., construction engines). On-road diesel vehicles currently contribute very little to SO_2 emissions since the sulfur content of on-road diesel fuel, which is federally regulated, is extremely low. Similarly, non-road diesel federal regulations are being phased in by 2012 (with minor exceptions as late as 2015) requiring the phase out of sulfur in diesel for all uses. Therefore, SO_2 from transportation sources in general will not be an issue of concern beginning in the near future. Similarly, lead in gasoline has been banned under the CAA, and therefore, lead is not a pollutant of concern for the program. Therefore, SO_2 and lead have not been included in this analysis.

In addition to the criteria pollutants discussed above, non-criteria pollutants may be of concern. These pollutants are sometimes referred to as Hazardous Air Pollutants (HAPs), and as Mobile Source Air Toxics (MSATs) in the on-road context. Some HAPs emitted from vehicles, such as benzene and toluene, are controlled by fuel and tailpipe emissions regulations. Although HAPs are not generally of concern on an area-wide basis, the area-wide (mesoscale) analysis includes an estimate of the net change in emissions of the most important HAPs.

National and State Air Quality Standards

As required by the CAA, primary and secondary National Ambient Air Quality Standards (NAAQS) have been established for six major air pollutants: CO, NO_2, ozone, respirable PM (both $PM_{2.5}$ and PM_{10}), SO_2, and lead. The primary standards represent levels that are requisite to protect the public health, allowing an adequate margin of safety. The secondary standards are intended to protect the nation's welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. The NAAQS are presented in Exhibit 4-35. The NAAQS for CO, annual NO_2, and SO_2 have also been adopted as the ambient air quality standards for New York State, but are defined on a running 12-month basis rather than for calendar years only.

Federal ambient air quality standards do not exist for HAP's; however, the New York State Department of Environmental Conservation (NYSDEC) has issued standards for certain non-criteria compounds, including beryllium, gaseous fluorides, and hydrogen sulfide. NYSDEC has also developed guideline concentrations for numerous non-criteria pollutants. The NYSDEC guidance document DAR-1 (October 2010) contains a compilation of annual and short term (1-hour) guideline concentrations for these compounds. The NYSDEC guidance thresholds represent ambient levels that are considered safe for public exposure. The U.S. EPA has also developed

Exhibit 4-35—National Ambient Air Quality Standards

Pollutant	Primary		Secondary	
	ppm	µg/m^3	ppm	µg/m^3
Carbon Monoxide (CO)				
8-Hour Average (1)	9	10,000	None	
1-Hour Average (1)	35	40,000		
Lead				
Rolling 3-Month Average	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)				
1-Hour Average (2)	0.100	189	None	
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average (3,4)	0.075	150	0.075	150
Respirable Particulate Matter (PM_{10})				
24-Hour Average (1)	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Annual Mean(5)	NA	12	NA	15
24-Hour Average (6)	NA	35	NA	35
Sulfur Dioxide (SO_2)				
1-Hour Average(7)	0.075	196	NA	NA
Maximum 3-Hour Average (1)	NA	NA	0.50	1,300

Notes:
ppm – parts per million (unit of measure for gases only)
µg/m^3 – micrograms per cubic meter (unit of measure for gases and particles, including lead)
NA – not applicable
All annual periods refer to calendar year.
Standards are defined in ppm. Approximately equivalent concentrations in µg/m^3 are presented.

(1) Not to be exceeded more than once a year.
(2) 3-year average of the annual 98th percentile daily maximum 1-hr average concentration. Effective April 12, 2010.
(3) 3-year average of the annual fourth highest daily maximum 8-hr average concentration.
(4) The U.S. EPA has proposed lowering the primary standard further to within the range 0.060-0.070 ppm, and adding a secondary standard measured as a cumulative concentration within the range of 7 to 15 ppm-hours aimed mainly at protecting sensitive vegetation. A final decision regarding this standard has been postponed but is expected to occur in 2013.
(5) 3-year average of annual mean. U.S. EPA has lowered the primary standard from 15 µg/m^3, effective March 2013.
(6) Not to be exceeded by the annual 98th percentile when averaged over 3 years.
(7) 3-year average of the annual 99th percentile daily maximum 1-hr average concentration. Replaced the previous annual- and 24 hour-average standards, effective August 23, 2010.

Source: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards.

guidelines for assessing exposure to non-criteria pollutants. These exposure guidelines are used in health risk assessments to determine the potential effects to the public.

NAAQS Attainment Status and State Implementation Plans

The CAA, as amended in 1990, defines non-attainment areas as geographic regions that have been designated as not meeting one or more of the NAAQS. When an area is designated as non-attainment by the U.S. EPA, the state is required to develop and implement a State Implementation Plan (SIP), which delineates how a state plans to achieve air quality that meets the NAAQS under the deadlines established by the CAA, followed by a plan for maintaining attainment status once the area is in attainment. The various non-attainment and maintenance areas in the program study area are summarized in Exhibit 4-36 and presented in Exhibit 4-37, and their status is reviewed in this section below.

Nassau, Rockland, Suffolk, Westchester, Lower Orange County Metropolitan Area (LOCMA), and the five New York City counties (the New York-New Jersey-Long Island Nonattainment Area, New York portion) had been designated as a severe non-attainment area for ozone (1-hour average standard, 0.12 ppm). In November 1998, New York State submitted its *Phase II Alternative Attainment Demonstration for Ozone*, which was finalized and approved by the U.S. EPA effective March 6, 2002, addressing attainment of the 1-hour ozone NAAQS by 2007. Although revoked by the U.S. EPA (effective 2005), some provisions of the 1-hour standard remained in place for 8-hour non-attainment areas (see below). On December 7, 2009, the U.S. EPA determined that the Poughkeepsie non-attainment area (Dutchess, Orange, Ulster, and Putnam counties) has attained the 1-hour standard. On June 18, 2012, the U.S. EPA determined that the New York-New Jersey-Long Island Nonattainment Area has attained the standard. Although not yet a redesignation to attainment status, this determination removes further requirements under the 1-hour standard.

Effective June 15, 2004, the U.S. EPA designated Nassau, Rockland, Suffolk, Westchester, and the five New York City Counties (the New York-New Jersey-Long Island non-attainment area, New York portion) as moderate non-attainment for the 1997 8-hour average ozone standard (LOCMA was moved to the Poughkeepsie moderate non-attainment area for 8-hour ozone). On February 8, 2008, NYSDEC submitted final revisions to the SIP to the U.S. EPA to address the 1997 8-hour ozone standard. On December 7, 2009, the U.S. EPA determined that the Poughkeepsie non-attainment area has attained the 1997 8-hour standard. On June 18, 2012, the U.S. EPA determined that this area has attained the 1997 8-hour ozone NAAQS (0.08 ppm). Although not yet a redesignation to attainment status, this determination removes further requirements under the 8-hour standard.

In March 2008 the U.S. EPA strengthened the 8–hour ozone standards. U.S. EPA designated the New York portion of the New York–Northern New Jersey–Long Island, NY-NJ-CT non-attainment area (NAA) as a marginal NAA for the 2008 ozone NAAQS, effective July 20, 2012. SIPs will be due in 2015.

Manhattan has been designated as a moderate non-attainment area for PM_{10}. On January 30, 2013, New York State requested that U.S. EPA approve its withdrawal of the 1995 SIP and redesignation request for the 1987 PM_{10} NAAQS, and that U.S. EPA make a clean data finding instead, based on data monitored from 2009-2011 indicating PM_{10} concentrations well below the 1987 NAAQS.

Although not yet a redesignation to attainment status, if approved, this determination would remove further requirements for related SIP submissions.

Exhibit 4-36—Non-Attainment Areas in the Study Area

Pollutant	Non-Attainment Area	Severity	Counties
Ozone	Albany-Schenectady-Troy, NY	Marginal Subpart 2 (1997 standard)	Albany Greene Montgomery Rensselaer Saratoga Schenectady Schoharie
	New York-N. New Jersey-Long Island, NY-NJ-CT	Marginal	Bronx Kings Nassau New York Queens Richmond Rockland Suffolk Westchester
	Poughkeepsie, NY	Moderate Subpart 2 (1997 standard)	Orange Dutchess Putnam
	Rochester, NY	Marginal Subpart 2 (1997 standard)	Genesee Livingston Monroe Ontario Orleans Wayne
	Buffalo-Niagara Falls, NY	Moderate Subpart 2 (1997 standard)	Erie Niagara
CO	New York-N. New Jersey-Long Island, NY-NJ-CT	Maintenance (moderate)	Bronx Kings Nassau New York Queens Richmond Westchester
	Syracuse, NY	Maintenance (moderate)	Onondaga
PM_{10}	New York Co, NY	Moderate	New York
$PM_{2.5}$	New York-N. New Jersey-Long Island, NY-NJ-CT	Non-Attainment	Bronx Kings Nassau New York Queens Richmond Rockland Suffolk Westchester Orange

Source: U.S. EPA, Greenbook, http://www.epa.gov/oar/oaqps/greenbk/, accessed October 2013.

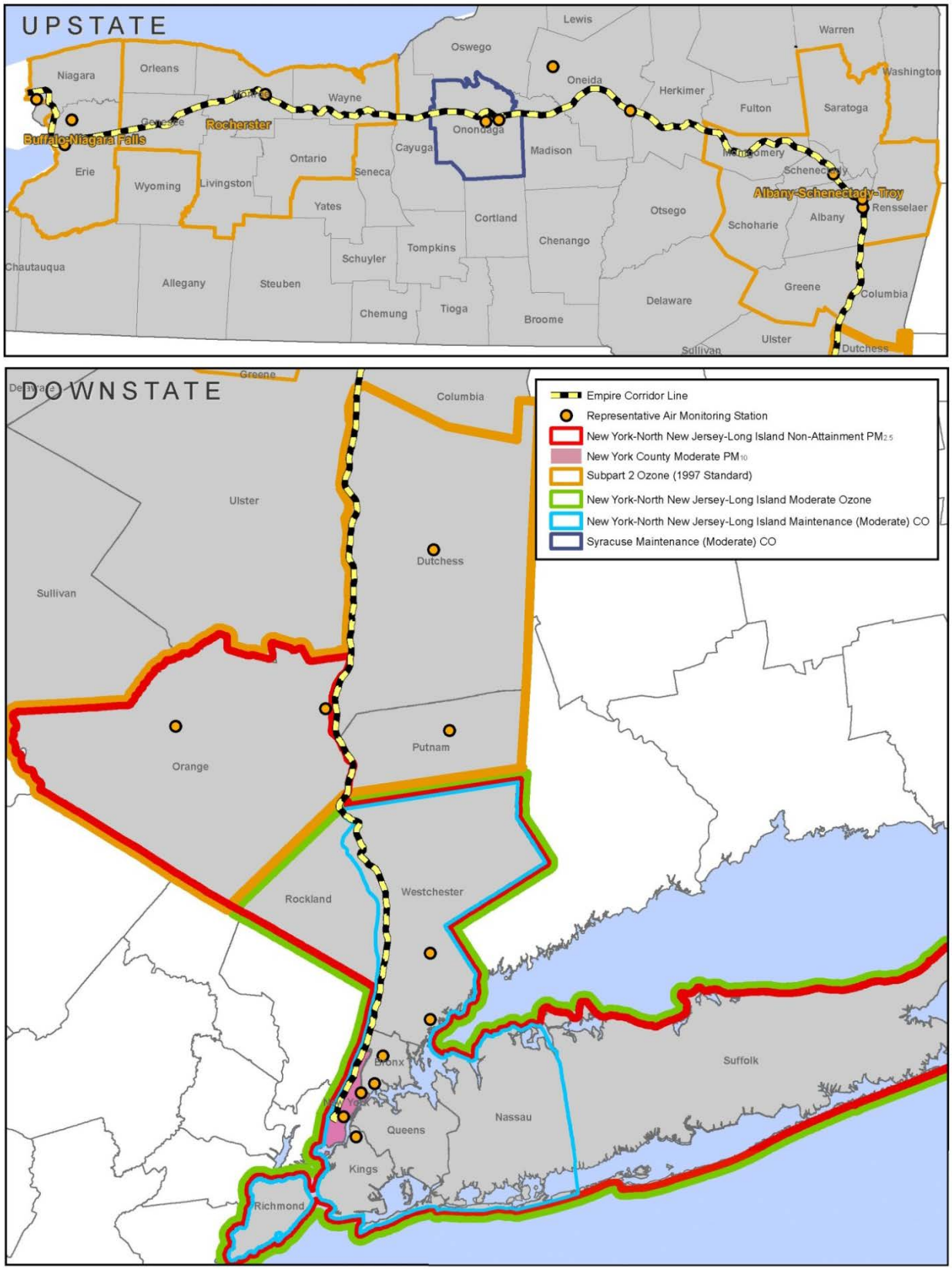

Exhibit 4-37—Non-Attainment Areas and Maintenance Areas in the Study Area

The five New York City counties and Nassau, Suffolk, Rockland, Westchester, and Orange Counties are a $PM_{2.5}$ non-attainment area due to exceedance of the annual average standard. Based on recent monitoring data (2006-2011), annual average concentrations of $PM_{2.5}$ in New York City no longer exceed the annual standard. The U.S. EPA has determined that the area has attained the 1997 annual $PM_{2.5}$ NAAQS, effective December 15, 2010. Although not yet a redesignation to attainment status, this determination removes further requirements for related SIP submissions. New York State submitted a redesignation request and maintenance plan to U.S. EPA in February 2013. U.S. EPA has recently lowered the annual average primary standard to 12 $\mu g/m^3$. U.S. EPA will make initial attainment designations by December 2014. Based on analysis of 2009-2011 monitoring data, it is possible that the region will be in attainment for the new standard.

The U.S. EPA has revised the 24-hour average $PM_{2.5}$ standard. The New York City Metropolitan Area is designated as non-attainment with the 2006 24-hour $PM_{2.5}$ NAAQS. The non-attainment area includes the same 10-county area originally designated as non-attainment with the 1997 annual $PM_{2.5}$ NAAQS. Based on recent monitoring data (2007-2011), 24-hour average concentrations of $PM_{2.5}$ in this area no longer exceed the standard. New York has submitted a "Clean Data" request to the U.S. EPA. Although not yet a redesignation to attainment status, this determination removes further requirements for related SIP submissions. New York State submitted a redesignation request and maintenance plan to U.S. EPA in February 2013.

All areas in New York State are currently in attainment of the annual-average NO_2 standard. The U.S. EPA has recently promulgated a new 1-hour NO_2 standard. Based on data from existing monitoring stations, the U.S. EPA has designated the entire State of New York as "unclassifiable/attainment" effective February 29, 2012. However, since additional monitoring is required for the 1-hour standard, areas will be reclassified once three years of monitoring data are available (2016 or 2017).

Based on the available monitoring data, all areas in New York State currently meet the new 1-hour SO_2 standard. Additional monitoring will be required. The U.S. EPA plans to make final attainment designations in June 2013. SIPs for non-attainment areas will be due by June 2015.

In 2002, the U.S. EPA re-designated New York City as in attainment for CO. Under the resulting maintenance plan, New York City is committed to implementing site-specific control measures throughout the city to reduce CO levels, should unanticipated localized growth result in elevated CO levels during the maintenance period. The Syracuse area (Onondaga County) is also a maintenance area for CO, after attaining the standard in 1993; the area will soon complete its second 10-year maintenance plan and go into official attainment status sometime in late 2013 or early 2014.

Conformity with State Implementation Plans

The conformity requirements of the CAA and regulations promulgated thereunder (conformity requirements) limit the ability of federal agencies to assist, fund, permit, and approve projects in non-attainment areas that do not conform to the applicable SIP. When subject to this regulation, the lead agency is responsible for demonstrating conformity for its proposed action. Conformity determinations for federal actions other than those related to transportation plans, programs, and projects that are developed, funded, or approved under title 23 U.S.C. or the Federal Transit Act (49 U.S.C. 1601 et seq.) must be made according to the requirements of 40 CFR 93, Subpart B (federal general conformity regulations).

The general conformity regulations apply to those federal actions in non-attainment or maintenance areas where the action's direct and indirect emissions have the potential to emit one or more of the six criteria pollutants at rates equal to or exceeding the prescribed rates.

General conformity De Minimis Threshold Levels for various non-attainment areas and maintenance areas intersecting the program study area are presented in Exhibit 4-38.

Exhibit 4-38—General Conformity Threshold Levels

Non-Attainment Area and Pollutants	Tons/year
Ozone, other non-attainment areas inside an ozone transport region–	
VOC	50
NO_x	100
CO, maintenance areas	100
PM_{10}, Moderate non-attainment areas	100
$PM_{2.5}$, any non-attainment area	
Direct emissions	100
SO_2	100
NO_X	100

Sources: 40 CFR 93.153(b)

The general conformity requirements do not apply to federal actions that:

- Do not satisfy either one of the above conditions (where the action's direct and indirect emissions have the potential to emit one or more of the six criteria pollutants at rates equal to or exceeding the threshold levels above within a non-attainment or maintenance area);
- Occur in an attainment area;
- Are related to transportation plans, programs, and projects developed, funded, or approved under Title 23 U.S.C. or the Federal Transit Act (49 U.S.C. 1601); or
- Qualify for exemptions established at 40 CFR 93.153.

The regulation assumes that a proposed federal action whose criteria pollutant emissions have already been included in the local SIP's attainment or maintenance demonstrations conforms to the SIP.

The program's effect on emissions within the relevant nonattainment areas and applicability of the conformity regulations for operational emissions have been evaluated as part of the regional (mesoscale) emissions analysis. If the project is not included in the State Implementation Plan, an applicability analysis to determine if a general conformity analysis is required will be undertaken in the future as part of the Tier 2 analysis.

4.19.2. Methodology

Existing Conditions

Existing conditions, presented as context for the analyses, are presented based on existing ambient air quality information collected by NYSDEC. Details are provided in Section 4.19.3, "Existing Conditions."

Local (Microscale) Analysis

On a local scale, the potential effect of the program on air quality is limited to increases in locomotive emissions, and both increases and decreases in on-road emissions. Decreases in on-road emissions could have a beneficial impact on local air quality if large numbers of vehicle trips are shifted to rail, occurring along roadways where those trips would otherwise occur. Since the details of that shift are not known at this time, this potential benefit has not been analyzed; however, a more meaningful analysis of the region-wide benefits of this mode shift is included in the regional analysis. Similarly, the details of increased vehicle trips to and from rail stations are not known at this time. Since these trips may have the potential to adversely affect air quality, this effect will be analyzed in subsequent environmental analyses. Therefore, the remainder of this section focuses on the potential local effect associated with increases in locomotive emissions.

In order to assess the need for local air quality analysis, a screening analysis was first performed with the objective of identifying any potential for significant impacts on air quality resulting from rail operations, including all program alternatives (including the Base Alternative). A simplified pollutant dispersion model was created, using AERSCREEN[149]—U.S. EPA's recommended screening-level air quality model based on the AMS/EPA Regulatory Model Improvement Committee Model (AERMOD). The model produces estimates of worst-case 1-hour concentrations for a single source, without the need for hourly meteorological data, and also includes conversion factors to estimate worst-case 3-hour, 8-hour, 24-hour, and annual concentrations. AERSCREEN is intended to produce concentration estimates that are equal to or greater than the estimates produced by AERMOD with a fully developed set of meteorological and terrain data. The modeling followed the general procedures outlined in the Guideline on Air Quality Models (referred to as Appendix W).[150] The model was run for both rural and urban conditions.

The dispersion analysis was based on the total locomotive emissions associated with the full implementation of the program, in 2035, assuming the highest number of daily trips from any alternative—17 and 8 round-trips per day on the southern and western portions of the corridor, respectively. Since the increment is the same on both legs, and the total is almost double on the Empire Corridor South, the analysis focuses on the worst case—the Empire Corridor South. All locomotives associated with program would be newly manufactured model-year 2015 at the earliest, and would therefore be U.S. EPA Tier 4 certified (Tier 4 is the lowest emissions certification available to date, with considerably lower PM and NO_x emissions as compared to lower-tier locomotives). U.S. EPA's in-use Tier 4 locomotive emissions factors were used to calculate emissions.[151] Annual NO_x concentrations were conservatively assessed assuming that 75 percent of

[149]/ U.S. EPA, AERSCREEN User's Guide, EPA-454/B-11-001, March 2011, <http://www.epa.gov/ttn/scram/dispersion_screening.htm#aerscreen>.

[150]/ U.S. EPA, 40 CFR Part 51, Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions, November 9, 2005,<http://www.epa.gov/scram001/guidance/guide/appw_05.pdf >

[151]/ U.S. EPA OTAQ, Emission Factors for Locomotives, EPA-420-F-09-025, April 2009.

all NO_x is converted to NO_2 (Appendix W Tier 2 method); this assumption may overestimate NO_2 concentrations by a factor of 6 or more, in addition to the high level of conservatism built in to the screening procedure, because the maximum concentrations predicted are immediately adjacent to the source, and would therefore not have time to be converted from NO to NO_2 (roughly 90 percent of NO_x emitted from diesel engines is in the form on NO).

Emissions estimates assumed the highest emissions, under two scenarios:

- **Line-Haul**—Emissions along the track, assumes locomotives operating at 100 percent load; and
- **Station**—Emissions immediately adjacent to the station, nearest to the locomotive stopping point. Assumes deceleration into and acceleration out of the station, in addition to idle emissions.

The results of the dispersion analysis are discussed in the context of background concentrations and the NAAQS.

Regional (Mesoscale) Analysis

Criteria Pollutants

The regional (mesoscale) emissions analysis estimates the net change in emissions associated with the program, including the change in both on-road and locomotive emissions. The analysis does not include the vehicle miles traveled (VMT) decrease associated with trips that may be reduced but that do not use the New York State Thruway system. Since these trips would likely not increase rail trips, the analysis is somewhat conservative (i.e., shows lower reductions and higher net emissions).

The locomotive emission factors used are described in the local (microscale) analysis section above. Power input was estimated using LTK Engineering Services' TrainOps simulation model. The model includes proposed grades, curves, station locations, speed restrictions and switch-related diverging movements specific to the proposed program alternatives. Emissions were then calculated for each non-attainment area by multiplying the total power input in horsepower-hour (hp-hr) within the area by the locomotive emission factor for each pollutant.

On-road emission factors in grams per mile were obtained from the New York State Department of Transportation's Environmental Procedures Manual,[152] applying the factors for 2035, based on the representative speeds for each roadway class in each county from New York State Department of Environmental Protection's speed analysis prepared for the 2003 SIP motor vehicle emissions budget update.[153] Total vehicle miles-traveled (VMT) were estimated for each county and roadway class using the Cube Voyager model—an intercity travel demand model studying the mode share of travel (primary auto, bus, air, and rail) along the Empire Corridor. The mode share is driven primarily by a combination of the total travel time and the associated costs. The VMT were then multiplied by the corresponding emission factor and summed for each non-attainment area.

[152]/ NYSDOT, The Environmental Manual, <https://www.dot.ny.gov/divisions/engineering/environmental-analysis/manuals-and-guidance/epm?nd=nysdot>, accessed February 2012.

[153]/ NYSDEC, Motor Vehicle Emissions Budget Update, June 2003, Attachment 17, "Speed Tables".

Hazardous Air Pollutants

The U.S. Clean Air Act Amendments of 1990 listed 188 Hazardous Air Pollutants (HAPs) and addressed the need to control toxic emissions from transportation. EPA's 2007 Mobile Source Air Toxics (MSAT) rule identified a subset of seven HAPs as having significant contributions from mobile sources: benzene, 1,3-butadiene, formaldehyde, acrolein, naphthalene, polycyclic organic matter, and diesel particulate matter (DPM). The Federal Highway Administration (FHWA) also considers these the priority MSATs for analysis.[154] MSATs were assessed, using criteria in the Interim Guidance on Air Toxic Analysis in NEPA Documents, issued February 2006 by FHWA and the September 2009 update. Based on the FHWA guidance, the proposed alternatives do not require a detailed quantitative analysis. Nonetheless, in accordance with the program scope, an estimate of the net change in statewide MSAT emissions was prepared.

Since detailed MSAT emission factors for vehicles and locomotives were not available, emissions were estimated based on the ratio of the emissions of each pollutant to NO_x emissions from light duty gasoline vehicles and locomotives in New York State. Emissions data for New York State in 2008 for both sources were obtained from EPA's National Emissions Inventory.[155] The ratio of NO_x to each MSAT pollutant was calculated, and then multiplied by the projected statewide NO_x emission calculated using the above criteria pollutant methodology. Since these ratios are based on statewide locomotive emissions and on 2008 data, they do not reflect Tier 4 locomotives and future (2035) vehicle emissions, and therefore overestimate the emissions benefits (see discussion with results).

4.19.3. Existing Conditions

The most recent concentrations of all criteria pollutants measured at ambient air quality monitoring stations in areas near the Empire Corridor at the nearest stations available in the various regions are presented in Exhibit 4-39. HAP concentrations in ambient air are not routinely monitored, and existing data is largely relevant only to highly localized sources, and, therefore, is not presented here.

4.19.4. Environmental Consequences

Local (Microscale)

Screening Results

The results of the screening analysis, representing the effect of locomotive emissions along the track and at stations, is presented in Exhibit 4-40, and includes both urban and rural dispersion and background concentrations, and are presented separately for the western and the southern sections. As described above, this analysis includes many layers of conservative assumptions, resulting in high-end estimate of potential concentrations. The resulting concentrations are lower than the NAAQS for both annual-average NO_2 and $PM_{2.5}$—the two critical pollutants for this analysis, indicating that operations of the proposed alternatives would not result in a significant adverse impact with respect to these standards. Since particulate matter emitted from locomotives

[154]/ FHWA, Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents (HEPN-10), September 20, 2009.
[155]/ U.S. EPA, 2008 NEI, <http://www.epa.gov/ttn/chief/net/2008inventory.html>, accessed 3/7/2012.

Exhibit 4-39—Air Pollutant Concentrations along the Program Corridor (2011)

Ozone (ppm)		8-Hour
	NAAQS	*0.075*
Albany-Schenectady-Troy, NY	Loudonville, Albany	0.067
	Schenectady, Schenectady	0.065
New York-N. New Jersey-Long Island, NY-NJ-CT—NY Portion	I.S. 52, Bronx	0.072
	White Plains, Westchester	0.075
Poughkeepsie, NY	Millbrook, Dutchess	0.072
	Mt. Ninham, Putnam	0.071
Rochester, NY	Rochester, Monroe	0.072
Buffalo-Niagara Falls, NY	Amherst, Erie	0.065
Syracuse, NY	East Syracuse, Onondaga	0.069
Utica-Rome, NY	Camden, Oneida	0.067

CO (ppm)		1-Hour	8-Hour
	NAAQS	*35*	*9*
Albany-Schenectady-Troy, NY	Loudonville, Albany	1.2	0.8
	Schenectady, Schenectady	2.3	1.4
New York, NY	Botanical Garden, Bronx	3.0	1.7
Rochester, NY	Rochester, Monroe	1.1	0.9
Buffalo-Niagara Falls, NY	Buffalo, Erie	1.6	1.3
	Niagara Falls, Niagara	1.9	1.8
Syracuse, NY	Syracuse, Onondaga	2.0	1.4

Particulate Matter ($\mu g/m^3$)		PM_{10} 24-Hour	$PM_{2.5}$ 24-hour	$PM_{2.5}$ Annual
	NAAQS	*150*	*35*	*15*
Albany-Schenectady-Troy, NY	Albany, Albany	NA	23.3	8.3
New York-N. New Jersey-Long Island, NY-NJ-CT—NY Portion	Madison Ave, New York	52 [1]	NA	NA
	JHS 45, New York	NA	26.4	10.3
	I.S. 52, Bronx	35 [1]	28.6 [1]	10.9 [1]
	Mamaroneck, Westchester	NA	25.5 [1]	9.1
Poughkeepsie, NY	Newburgh, Orange	NA	22.6	8.2
Rochester, NY	Rochester, Monroe	26	23.6	8.4
Buffalo-Niagara Falls, NY	Buffalo, Erie	NA	25.6	9.7
	Niagara Falls, Niagara	32	22.1	8.4
Syracuse, NY	East Syracuse, Onondaga	NA	22.6	7.8
Utica-Rome, NY	Utica, Oneida	NA	23.6	8.0

(table continues)

Exhibit 4-39 (cont'd)—Air Pollutant Concentrations along Proposed Program Alignment (2011)

SO_2 (ppb)		1-Hour	3-Hour
	NAAQS	*75*	*500*
Albany-Schenectady-Troy, NY	Loudonville, Albany	15.8	14.5
	Schenectady, Schenectady	18.2	12.2
New York, NY	I.S. 52, Bronx	50.8	39.2
Poughkeepsie, NY	Mt. Ninham, Putnam	12.8	11.7
Rochester, NY	Rochester, Monroe	23.7	15.6
Buffalo-Niagara Falls, NY	Buffalo, Erie	19.1	18.2
	Niagara Falls, Niagara	16.6	11.9
Syracuse, NY	East Syracuse, Onondaga	10.9	8.3
NO_2 (ppb)		1-Hour	Annual
	NAAQS	*100*	*53*
New York, NY	I.S. 52, Bronx	65.6	20.86
Rochester, NY	Rochester, Monroe	40.6 [2]	NA
Buffalo-Niagara Falls, NY	Buffalo, Erie	62.9	13.00 [1]
Lead ($\mu g/m^3$)		3-month average	
	NAAQS	*0.15*	
New York, NY	JHS 126, Brooklyn	0.008	
Poughkeepsie, NY	Scotchtown, Orange	0.010	
Rochester, NY	Rochester, Monroe	0.002	

Notes:

1. Data from 2010. Data not available for 2011.
2. 2011 data only; 3 years of data are not yet available.

NA Not Available

Concentrations are presented in the statistical form defined in the NAAQS: Short-term average PM_{10}, CO, and SO_2 3-hour concentrations are the second-highest of the year. SO_2 1-hour is the 3-year average of the annual 99th percentile daily maximum 1-hour average concentration. NO_2 1-hour is the 3-year average of the annual 98th percentile daily maximum 1-hour average concentration. $PM_{2.5}$ annual concentrations are the average of 2009-2011,and the 24-hour average concentration is the average of the annual 98th percentiles in 2009-2011. 8-hour average ozone concentrations are the average of the 4th highest-daily values from 2009-2011.

Source: *NYSDEC, New York State Ambient Air Quality Data for 2011.*

is almost entirely $PM_{2.5}$ (and that was the assumption made for the analysis), and since the PM_{10} standard is higher, with relatively lower background levels, locomotive operations would also not be expected to result in a significant adverse impact on PM_{10} concentrations.

1-Hour NO_2 National Ambient Air Quality Standard

The U.S. EPA recently established a new 1-hour average NO_2 standard of 100 parts per billion (ppb), effective April 12, 2010, in addition to the current annual standard. The statistical form is the 3-year average of the 98th percentile of daily maximum 1-hour average concentrations in a year. The U.S. EPA is considering the need for changes to the secondary NO_2 standard under a separate review.

By promulgating the 1-hour NO_2 standard, the U.S. EPA has initiated a process under the CAA that

Exhibit 4-40—Screening Level Worst-Case Concentrations from Locomotive Operations (µg/m^3)

	NO_2	$PM_{2.5}$	
	Annual	24-hour	Annual
Albany—New York City, Rural Dispersion			
Station	31.2	3.12	0.62
Line-Haul	36.6	0.73	0.73
Background	24.5	23.3	9.7
Total Station	**55.8**	**26.42**	**10.32**
Total Line-Haul	**61.1**	**24.03**	**10.43**
NAAQS	*188*	*35*	*15*
Niagara—Buffalo, Rural Dispersion			
Station	13.2	1.32	0.26
Line-Haul	7.6	0.31	0.73
Background	24.5	23.3	9.7
Total Station	**37.7**	**24.62**	**9.96**
Total Line-Haul	**32.2**	**23.61**	**10.43**
NAAQS	*188*	*35*	*15*
Albany—New York City, Urban Dispersion			
Station	2.0	0.20	0.04
Line-Haul	7.0	0.31	0.73
Background	39.4	28.6	10.9
Total Station	**41.3**	**28.80**	**10.94**
Total Line-Haul	**46.3**	**28.91**	**11.63**
NAAQS	*188*	*35*	*15*
Niagara—Buffalo, Urban Dispersion			
Station	0.8	0.08	0.02
Line-Haul	2.9	0.06	0.73
Background	39.4	28.6	10.9
Total Station	**40.2**	**28.68**	**10.92**
Total Line-Haul	**42.3**	**28.66**	**11.63**
NAAQS	*188*	*35*	*15*

will ultimately result in the adoption of strategies designed to attain and maintain ambient NO_2 concentrations at levels below the standard. This process will first involve installation of additional ambient NO_2 monitoring stations near roadways. With respect to those areas that are identified as in non-attainment, states will be required to develop SIPs designed to meet the standard by specified time frames. The U.S. EPA and the states also can be expected to issue new regulations and guidance that will address methodologies and criteria for performing assessments of 1-hour NO_2 concentrations from program-level emission sources and for evaluating their impacts. This

information is not currently available. Therefore, although the U.S. EPA has promulgated the 1-hour standard, it has yet to be fully implemented.

Uncertainty exists as to 1-hour NO_2 background concentrations at ground level, especially near roadways, since these concentrations have not been measured within the current monitoring network. In addition, there are no clear methods to predict the rate of transformation of NO to NO_2 at ground-level given the level of existing data and models. The U.S. EPA, in promulgating the standard, has expressed specific concern regarding mobile source impacts, and estimated that ambient concentrations of NO_2 adjacent to roadways could be 30 to 100 percent higher than the concentrations measured at community scale (rooftop) monitoring stations.[156] Similar concerns may exist regarding areas adjacent to railways.

Therefore, predicted impacts cannot be based on comparison with the new 1-hour NO_2 NAAQS since total 98th percentile values, including local area roadway contributions, cannot be estimated. In addition, methods for accurately predicting 1-hour NO_2 concentrations from railways have not been developed. Given the scale of the NO_x emissions associated with the locomotives, exceedances of the 1-hour NO_2 standard resulting from locomotive operations cannot be ruled out; however, as discussed above, locomotives rated Tier 4 would be used, achieving the lowest practicable NO_x emissions.

Regional (Mesoscale)

The total net change in criteria pollutant emissions from Alternatives 90A, 90B, 110, and 125, applicable to each non-attainment area, are presented in Exhibit 4-41, Exhibit 4-42, Exhibit 4-43, and Exhibit 4-44, respectively. Although the changes are small in the regional context, the net result is a reduction in all pollutants other than NO_x. The minor increase in NO_x emissions is lower than the *de minimis* levels defined in the conformity regulations and would, therefore, be presumed to conform to the applicable SIPs, and would not require a conformity determination. Reduction in emissions would conform to all SIPs and maintenance plans by definition, and would result in a small net air quality benefit on a regional scale. Overall, the minor increase in NO_x and decrease in VOC offset each other (both are ozone precursors, and the effect of VOC is somewhat smaller than NO_x in most regions), leading to a very minor overall change in air quality.

To present these emission changes in context, the emissions were compared with the emissions projected to occur in each non-attainment area in 2035 from the on-road sector.[157,158,159] The projected increase in NO_x emissions and decrease in VOC emissions represent less than 0.3 percent of emissions in each non-attainment area (varies by region and alternative). Changes in all pollutants in the New York Metropolitan Area are projected to be approximately 0.02 percent or less, and changes in CO in the Syracuse area would be less than 0.2 percent. Under Alternative 125 the VOC benefits are somewhat higher, mostly in the Rochester and Buffalo-Niagara Falls non-attainment areas, and NO_x shows a benefit in those areas but shows a larger increase in the Poughkeepsie area. Changes in particulate matter would be negligible. Overall, in all cases these changes range from very small to negligible.

[156]/ U.S. EPA, Final Regulatory Impact Analysis for the NO_2 National Ambient Air Quality Standards (NAAQS), January 2010.

[157]/ NYMTC/OCTC, Final Transportation/Air Quality Conformity Determination for the Orange County Portion of the NY-NJ-CT $PM_{2.5}$ Non-Attainment Area, May 12, 2010.

[158]/ PDCTC, Air Quality Conformity Determination Statement for the Poughkeepsie Ozone Non-attainment Area, May 12, 2010.

[159]/ For the Syracuse, Albany, Rochester, and Buffalo areas, future inventories or budgets were not available. The estimate is based on the ratio of 2008 NO_x emissions in each region (or CO for Syracuse) to the emissions in the NYMA, from the EPA National Emissions Inventory.

Exhibit 4-41—Criteria Pollutant Emissions Net Reduction, 2035, Alternative 90A (tons per year)

Non-Attainment Area	NO_x	VOC	CO	PM_{10}	$PM_{2.5}$
Albany-Schenectady-Troy, NY (ozone)	-6.2	3.6	NA	NA	NA
Rochester, NY (ozone)	-4.7	4.3	NA	NA	NA
Buffalo-Niagara Falls, NY (ozone)	-1.5	1.6	NA	NA	NA
Poughkeepsie, NY (ozone)	-1.1	1.8	NA	NA	NA
New York-N. New Jersey-Long Island, NY-NJ-CT (ozone, CO, $PM_{2.5}$)	-0.7	2.3	62	NA	0.25
Syracuse, NY (CO)	NA	NA	35	NA	NA
New York Co, NY (PM_{10})	NA	NA	NA	0.00	NA

Notes:
NA=Not Applicable. Data presented address only pollutants relevant to each non-attainment area.
Negative numbers represent a net increase.

Exhibit 4-42—Criteria Pollutant Emissions Net Reduction, 2035, Alternative 90B (tons per year)

Non-Attainment Area	NO_x	VOC	CO	PM_{10}	$PM_{2.5}$
Albany-Schenectady-Troy, NY (ozone)	-8.0	4.0	NA	NA	NA
Rochester, NY (ozone)	-3.1	5.0	NA	NA	NA
Buffalo-Niagara Falls, NY (ozone)	-1.2	1.8	NA	NA	NA
Poughkeepsie, NY (ozone)	-2.6	1.8	NA	NA	NA
New York-N. New Jersey-Long Island, NY-NJ-CT (ozone, CO, $PM_{2.5}$)	-1.5	2.3	61	NA	0.24
Syracuse, NY (CO)	NA	NA	44	NA	NA
New York Co, NY (PM_{10})	NA	NA	NA	0.00	NA

Notes:
NA=Not Applicable. Data presented address only pollutants relevant to each non-attainment area.
Negative numbers represent a net increase.

Exhibit 4-43—Criteria Pollutant Emissions Net Reduction, 2035, Alternative 110 (tons per year)

Non-Attainment Area	NO_x	VOC	CO	PM_{10}	$PM_{2.5}$
Albany-Schenectady-Troy, NY (ozone)	-9.0	4.3	NA	NA	NA
Rochester, NY (ozone)	-4.1	5.3	NA	NA	NA
Buffalo-Niagara Falls, NY (ozone)	-1.4	1.9	NA	NA	NA
Poughkeepsie, NY (ozone)	-2.6	1.8	NA	NA	NA
New York-N. New Jersey-Long Island, NY-NJ-CT (ozone, CO, $PM_{2.5}$)	-1.5	2.3	61	NA	0.24
Syracuse, NY (CO)	NA	NA	48	NA	NA
New York Co, NY (PM_{10})	NA	NA	NA	0.00	NA

Notes:
NA=Not Applicable. Data presented address only pollutants relevant to each non-attainment area.
Negative numbers represent a net increase.

The net statewide reduction in MSAT emissions is presented in Exhibit 4-45. Since the estimate is based on 2008 data and represents a mix for all locomotive types, this analysis does not capture the benefits of the Tier 4 locomotives, but also does not capture the benefits of future cleaner light duty gasoline vehicles. U.S. EPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades in three ways: (1) by lowering the benzene content in gasoline; (2) by reducing exhaust emissions from passenger vehicles operated at cold temperatures; and (3) by reducing emissions that evaporate from, and permeate through, portable fuel containers. Federal regulations are also severely reducing the diesel emissions from both on-road and non-road vehicles, and diesel PM is therefore also expected to diminish over time. In general, the benefits are expected to be much lower than presented here (possibly on the order of 60 percent).

Note that these reductions do not necessarily translate into health or environmental benefits, which would depend on local concentrations at specific locations, rather than statewide emissions. Along roadways, if there would be any noticeable change it would be a reduction, on the order of the local VMT reduction; along rail lines, if there were to be any noticeable change it would not occur along the electrified portion of Alternative 125. A more detailed analysis of local effects may be undertaken during subsequent environmental analysis.

Exhibit 4-44—Criteria Pollutant Emissions Net Reduction, 2035, Alternative 125 (tons per year)

Non-Attainment Area	NO_x	VOC	CO	PM_{10}	$PM_{2.5}$
Albany-Schenectady-Troy, NY (ozone)	-9.3	7.3	NA	NA	NA
Rochester, NY (ozone)	6.7	8.7	NA	NA	NA
Buffalo-Niagara Falls, NY (ozone)	2.0	2.8	NA	NA	NA
Poughkeepsie, NY (ozone)	-9.6	1.7	NA	NA	NA
New York-N. New Jersey-Long Island, NY-NJ-CT (ozone, CO, $PM_{2.5}$)	-7.1	2.1	55	NA	0.16
Syracuse, NY (CO)	NA	NA	100	NA	NA
New York Co, NY (PM_{10})	NA	NA	NA	-0.02	NA

Notes:
NA=Not Applicable. Data presented address only pollutants relevant to each non-attainment area.
Negative numbers represent a net increase.

Exhibit 4-45—State-Wide Hazardous Air Pollutant Emissions (net reduction ton/year)

Pollutant	Alternative			
	90A	90B	110	125*
1,3-Butadiene	0.069	0.079	0.084	0.133
Acrolein	0.005	0.006	0.006	0.010
Formaldehyde	0.125	0.150	0.151	0.243
Benzene	0.602	0.681	0.728	1.152
Naphthalene	0.009	0.011	0.011	0.018
Polycyclic organic matter / hydrocarbons	0.0004	0.0007	0.0005	0.0008

Notes:
* Net emissions do not include increased electricity consumption. No data is available to describe where electricity would come from and what the HAP emissions would be from each source.

4.19.5. Potential Mitigation Strategies

This Tier 1 analysis focused on net regional (mesoscale) emissions and on potential increases in concentrations along rail lines. In both cases, no potential significant adverse air quality impacts were found, and therefore, no mitigation will be required. If future analyses of local on-road and locomotive emission identify potential impacts, appropriate site-specific mitigation will be investigated.

4.19.6. Future Analysis

Tier 2 analysis will include the potential air quality implications of local traffic to and from stations, and of locomotives and other sources operating in rail yards and other locations other than the line-haul analyzed here for Tier 1. Potential construction impacts will also be analyzed. If the project is not included in the State Implementation Plan, an applicability analysis will be performed to determine if a general conformity analysis is required. In addition, should in line-haul operations change substantially, microscale line-haul and mesoscale emissions likely would be investigated.

4.20. Energy and Climate Change

Potential effects of global climate change on the program alternatives and potential effects of the program alternatives on energy consumption and greenhouse gas (GHG) emissions are assessed in this section. The potential effect on the program alternatives due to changes in sea level and storm surges resulting from global climate change is discussed first. This is followed by an assessment of potential energy use and GHG emissions resulting from the program's construction and operation. Available scientific, technical, and policy studies and information were reviewed and relevant information is presented.

The energy and GHG analysis was prepared in accordance with the *Draft Air Quality, Energy and Greenhouse Gas Emission Analysis Procedures for Plans and TIPs and Draft Energy and Greenhouse Gas Emission Analysis Procedures for Projects*, February 12, 2003, and subsequent guidance and methods provided by NYSDOT. In addition to the NYSDOT methodology, the general approach follows the New York State Department of Environmental Conservation (NYSDEC) policy document entitled *Assessing Energy Use and Greenhouse Gas Emissions in Environmental Impact Statements*, July 15, 2009 (NYSDEC policy). The Council on Environmental Quality's (CEQ) draft guidance entitled *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions*, February 18, 2010, was consulted as well.

The global climate is changing as a result of increased concentrations of GHGs in the atmosphere, associated with anthropogenic (from human sources) emissions. GHGs emitted from anthropogenic sources include primarily emissions from combustion of fossil fuels, as well as various other processes. Atmospheric concentrations of GHGs are increasing because the chemical removal processes are limited, and the rate of emission exceeds the rate of the natural removal processes. The increase in GHG concentrations, since the beginning of the industrial age, has led to a measurable warming of the Earth's atmosphere, surface, and oceans, which, in turn, has and will

result in myriad of complex climatic changes that will vary by geographic location, substantially affecting human and natural systems.

While the contribution of any single program to climate change is infinitesimal, the combined GHG emissions from all human activity have a severe adverse impact on global climate. The nature of the impact dictates that all sectors address GHG emissions by identifying GHG sources and practicable means to reduce them. Therefore, this chapter does not identify specific contributions of the proposed program to climate impacts, but rather addresses the changes in GHG emissions associated with each of the program alternatives as compared to the Base Alternative.

4.20.1. Regulatory Context

Pollutants of Concern

GHGs are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit infrared radiation (heat) emitted by the Earth's surface, the atmosphere, and clouds. This property causes the general warming of the Earth's atmosphere, or the "greenhouse effect." Water vapor, carbon dioxide (CO_2), nitrous oxide, methane, and ozone are the primary greenhouse gases in the Earth's atmosphere.

There are also a number of entirely human-made GHGs—mainly halocarbons and other chlorine- and bromine-containing substances—which also damage the stratospheric ozone layer (contributing to the "ozone hole"). Since these compounds are being replaced and phased out due to the 1987 Montreal Protocol and are not associated with most projects, there is generally no need to address them in program-related GHG assessments. Although ozone is considered to be the third most important greenhouse gas, after CO_2 and methane, it does not need to be assessed as such at the program level since it is a rapidly reacting chemical and efforts are ongoing to reduce ozone concentrations as a criteria pollutant (see Section 4.19, "Air Quality"). Similarly, water vapor is of great importance to global climate change, but is not directly of concern as an emitted GHG since the negligible quantities emitted from anthropogenic sources are not of concern.

Carbon dioxide (CO_2) is the primary pollutant of concern from anthropogenic sources. Although not the GHG with the strongest effect per molecule, CO_2 is by far the most abundant and, therefore, the most influential GHG. CO_2 is emitted from any combustion process (both natural and anthropogenic), from some industrial processes such as the manufacture of cement, mineral production, metal production, and the use of petroleum-based products, from volcanic eruptions, and from the decay of organic matter. CO_2 is removed ("sequestered") from the lower atmosphere by natural processes such as photosynthesis and uptake by the oceans. CO_2 is included in any analysis of GHG emissions.

Methane and nitrous oxide (N_2O) also play an important role since they have limited removal processes and a relatively high impact on global climate change as compared to an equal quantity of CO_2. Emissions of these compounds, therefore, are included in GHG emissions analyses as appropriate.

The NYSDEC and CEQ guidance list six GHGs that could potentially be included in the scope of an EIS: CO_2, N_2O, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (also known as "Kyoto gases"). This analysis focuses mostly on CO_2, N_2O, and methane resulting from combustion sources such as locomotives and vehicles, as well as sources associated with

production of construction materials. There are no significant direct or indirect sources of HFCs, PFCs, or SF_6 associated with the proposed program.

To present a complete inventory of all GHGs, component emissions are added together and presented as CO_2 equivalent (CO_2e)—a unit representing the quantity of each GHG weighted by its effectiveness using CO_2 as a reference. This is achieved by multiplying the quantity of each GHG emitted by a factor called global warming potential (GWP). GWPs account for the lifetime and the radiative forcing of each chemical over a period of 100 years (e.g., CO_2 has a much shorter atmospheric lifetime than SF_6, and therefore has a much lower GWP). The GWPs for the main GHGs discussed here are presented in Exhibit 4-46.

Exhibit 4-46—Global Warming Potential (GWP) for Major GHGs

Greenhouse Gas	100-year Horizon GWP
Carbon Dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous Oxide (N_2O)	298
Hydrofluorocarbons (HFCs)	124 to 14,800
Perfluorocarbons (PFCs)	7,390 to 12,200
Sulfur Hexafluoride (SF_6)	22,800

Source: IPCC, Climate Change 2007—The Physical Science Basis, Contribution of Working Group I to the Fourth Assessment Report, Table 2-14, 2007.

Policy, Regulations, Standards, and Benchmarks

As a result of the understanding that human activity resulting in GHG emissions has the potential to substantially impact the earth's climate which in turn would affect human and natural systems in a variety of ways, the vast majority of which are expected to be negative, countries around the world have undertaken efforts to reduce emissions by implementing both global and local measures addressing energy consumption and production, land use, and other sectors. Although the U.S. has not ratified the international agreements, which set emissions targets for GHGs, in a step toward the development of national climate change regulation, the U.S. has agreed that deep cuts are necessary and has agreed to take action to meet this objective, with a stated goal of reducing emissions to 17 percent lower than 2005 levels by 2020 and to 83 percent lower than 2005 levels by 2050 (pending legislation) via the Copenhagen Accord.[160][161] Without legislation focused on this goal, the U.S. EPA is required to regulate GHG under the U.S. Clean Air Act, and has already begun preparing regulations. The U.S. EPA has established various voluntary programs to reduce emissions and increase energy efficiency and has recently embarked on regulatory initiatives related to GHG emissions. In 2011, total U.S. greenhouse gas emissions were 6,702.3 teragrams (Tg), or million metric tons, of CO_2e. Total U.S.

[160] / UNFCCC Conference of the Parties, Copenhagen Accord, March 30, 2010.
[161] / Todd Stern, U.S. Special Envoy for Climate Change, letter to Mr. Yvo de Boer, UNFCCC, January 28, 2010.

emissions have increased by 8.4 percent from 1990 to 2011, and emissions decreased from 2010 to 2011 by 1.6 percent (108.0 Tg CO_2e).[162]

The most recent renewable fuel standards regulations (February 2010) require 12.95 billion gallons of renewable fuels to be produced in 2010, increasing annually up to 36.0 billion gallons in 2022. The renewable fuel standards regulations also set volume standards for specific categories of renewable fuels including cellulosic, biomass-based diesel, and total advanced renewable fuels, and specify lifecycle GHG reduction thresholds ranging from 20 percent for renewable fuel to 60 percent for cellulosic biofuel (as compared to the baseline gasoline or diesel replaced).

In March 2009, the U.S.DOT set combined corporate average fuel economy (CAFE) standards for light duty vehicles for the 2011 model year. In June 2009, the U.S. EPA granted California a previously denied waiver to regulate vehicular GHG emissions, allowing 19 other states (representing 40 percent of the light-duty vehicle market, including New York) to adopt the California mobile source GHG emissions standards. In April 2010, the U.S. EPA and the U.S. DOT established the first GHG emission standards and more stringent CAFE standards for model year 2012 through 2016 light-duty vehicles. The agencies also proposed the first-ever program to reduce GHG emissions and improve fuel efficiency of medium- and heavy-duty vehicles, such as large pickup trucks and vans, semi-trucks, and vocational vehicles. These regulations will all serve to reduce vehicular GHG emissions over time.

There are also regional, state, and local efforts to reduce GHG emissions. In 2009, Governor Paterson issued Executive Order No. 24, establishing a goal of reducing GHG emissions in New York by 80 percent, compared to 1990 levels, by 2050, and creating a Climate Action Council tasked with preparing a climate action plan outlining the policies required to attain the GHG reduction goal—that effort is currently under way, and an interim draft plan has been published.[163]

The 2009 New York State Energy Plan[164] outlines the state's energy goals and provides strategies and recommendations for meeting those goals. The state's goals include, among other measures, reducing vehicle miles traveled by expanding alternative transportation options.

Many local governments worldwide, including many in New York State, are also adopting goals and policies related to climate change. Cities and towns participating in these initiatives set GHG emissions reduction targets, prepare climate action plans defining how they will attain these targets, and ultimately create policies aimed at achieving the reduction targets. Such policies would be strengthened by increased passenger rail service.

A number of benchmarks for energy efficiency and green building design have also been developed. For example, NYSDOT'S GreenLITES Project Design Certification Program is a self-certification rating system for enhancing the environmental performance of transportation projects. Many of the GreenLITES concepts and credits may be applicable to railroad and facilities construction, including credits addressing energy and materials. With respect to buildings and facilities, the United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) system is a benchmark for the design, construction, and operation of high performance green buildings that

[162] / The decrease from 2010 to 2011 was due to a decrease in the carbon intensity of fuels consumed to generate electricity due to a decrease in coal consumption, with increased natural gas consumption and a significant increase in hydropower used. Additionally, relatively mild winter conditions, especially in the South Atlantic Region of the United States where electricity is an important heating fuel, resulted in an overall decrease in electricity demand in most sectors. Since 1990, U.S. emissions have increased at an average annual rate of 0.4 percent.

[163] / New York State Climate Action Council. *New York State Climate Action Plan Development Process*. December 7, 2009. <http://www.nyclimatechange.us/>.

[164] / New York State, *2009 New York State Energy Plan*, December 2009.

includes energy efficiency components. U.S. EPA's Energy Star is a voluntary labeling program designed to identify and promote the construction of new energy efficient buildings, facilities, and homes and the purchase of energy efficient appliances, heating and cooling systems, office equipment, lighting, home electronics, and building envelopes.

Currently, there are no standards or regulations applicable to GHG emission levels or impacts from actions subject to environmental review under NEPA or SEQR. Accordingly, the potential effects of the proposed program have been evaluated in the context of their consistency with the objectives stated in federal and state policies. Potential GHG emissions from the proposed program are assessed and disclosed, and the feasibility and practicability of various measures available for reducing GHG emissions are discussed.

4.20.2. Methodology

Potential Impacts of Climate Change

The analysis of impacts of climate change on the proposed program focuses on potential changes in sea level and storm surge particularly as they relate to the Hudson River. Existing scientific studies and information available from New York State sources were reviewed, and relevant information is presented. Due to the uncertain nature of predictions for future climate change impacts on the Hudson River, a range of possible effects is presented. Although changes in precipitation may occur in future years, affecting flood levels in other areas, the level of detail and certainty regarding those types of effects is currently insufficient for planning purposes.

Greenhouse Gas Emissions

Extent of Analysis

Since the impact of GHGs emitted in the troposphere is generally the same regardless of where they are emitted, the analysis of GHGs addresses emissions resulting from the proposed program, regardless of their location. Direct emissions include emissions from sources located on-site, such as construction equipment during the construction period and locomotive emissions during long-term operation of the program. Indirect emissions include emissions from, vehicle trips associated with the program (both increased and reduced) and emissions associated with electricity consumption. In addition, there are emissions preceding and following the proposed program, referred to as upstream and downstream emissions, such as emissions associated with the transport and production of fuels and construction materials, and emissions associated with disposal of materials after their use. The GHG analysis addresses both direct and indirect emissions, and, where practicable and significant, upstream and downstream emissions as well, including fuel and materials production.

Time Scales for Analysis

Operational emissions are presented for a single year, 2035, which would be representative of a reasonable worst-case scenario. Operational emissions may be lower in more distant years if the carbon content of fuels improve (or is replaced by electric power) and later if locomotives are replaced with more efficient models or rebuilt; the reduction in vehicular emissions may also be reduced in far-future years as vehicular emissions and fuels also improve; however, the analysis

represents the net reasonable worst-case scenario for the year 2035 based on the best projections available. Emissions related to construction activity and embodied materials would occur over a period prior to and during construction, and are presented both as total emissions and annualized over an estimated 80-year lifetime of the proposed program.

Emission Calculations

The GHG emissions analysis includes the following sources:

- Locomotives fuel consumption,
- On-road fuel consumption,
- Electricity use (rail only),
- Fuel use for construction material delivery, and
- Building materials production.

Some additional emissions associated with stations and other operations would occur, but are not included at this time since detailed data is not yet available.

Annual emissions that would occur as a result of program operation were conservatively calculated based on the 2035 ridership scenario, representing the maximum emissions associated with the proposed program at full operation. Indirect emissions associated with employee trips and deliveries associated with operations were not included. Although some increase in these emissions would be expected, details are not available at this time, and these contributions would likely be minor.

A minimal change in the amount of solid waste would be generated as a result of the proposed program. Therefore emissions from solid waste decomposition were not included.

Generally, the elimination of vegetation on a site would accelerate the release of CO_2 sequestered in any vegetation found on the site back to the atmosphere. This would mostly be relevant only for the 125 mph alternative, where a new alignment is expected. For other alternatives, it is unknown at this time if any tree removal would be required. However, detailed information on this is not available at this time, and therefore sequestration has not been included in this analysis.

The methodology used to calculate the GHG emissions from each included source is provided below.

Locomotive and On-Road Fuel Consumption

Emissions associated with the locomotive operations and on-road vehicle trips were calculated using the methods in NYSDOT's MOVES Roadway and Rail Energy and Greenhouse Gas Analysis Extension (MOVES-RREGGAE). This program enables analysis of rail operations and on-road trips, using EPA's MOVES-HVI model for on-road emissions and the analysis procedures in NYSDOT's *Draft Energy Analysis Guidelines for Project-Level Analysis*, November 25, 2003 (NYSDOT guidance).

The locomotive emissions were refined outside of the model to account for the fact that operation on the line is not represented by the national averages used in MOVES-RREGGAE for Amtrak service, and since more detailed data was available. Fuel consumption was estimated using LTK Engineering Services' TrainOps simulation model. The model includes proposed grades, curves,

station locations, speed restrictions and switch-related diverging movements specific to the proposed program alternatives. Locomotive emissions were calculated by multiplying the fuel consumption by emission and energy factors for diesel fuel, assuming 10.15 kilograms of CO_2 per gallon of diesel and 138,756 British thermal units (Btu) per gallon of diesel.[165] These were adjusted to account for well-to-pump emissions by the same ratio used for all diesel, consistent with the method used throughout the analysis.

Electricity Use

Electricity consumption for the electrified portion of the line (Albany to Buffalo) under the 125 Alternative was estimated using the TrainOps simulation model. The electricity consumption was estimated to be 258,198 kilowatt-hours per day, and would be constant throughout the year. This includes system losses within the Amtrak system, but does not include any incremental electricity use for facilities or stations, which is unknown at this time.

GHG emissions associated with the electricity were estimated based on the above consumption rate and a factor of 686.7 pounds CO_2e per megawatt-hour of electricity delivered.[166] This represents the latest intensity of electricity production for upstate New York. The emissions intensity of future electricity production is expected to be lower due to various current and future policies aimed at increasing the production of electricity from renewable resources and improved energy efficiency in the utility sector. Therefore, this estimate represents a conservatively high estimate of emissions associated with the operation of electric locomotives.

Construction and Materials

The procedures in MOVES-RREGGAE for rail construction were used to calculate estimated GHG emissions associated with direct construction emissions. In addition, the "Roadway Construction," module was used for roadway construction segments associated with the construction, and for elements such as bridge construction not included in the "Railway Construction" module. Emissions associated with materials were calculated as part of the analysis (the methodology for estimating "placement energy" is based on energy estimated for materials, as detailed in the NYSDOT guidance—both were included here).

4.20.3. Existing Conditions

Consistent with the NYSDOT guidance, GHG analyses are not prepared for existing conditions. In the existing condition, passenger and freight railway operations and maintenance use fuel and occasionally materials, resulting in some energy use and GHG emissions and offsetting energy use and GHG emissions from on-road operations.

[165] / EIA, Fuel Emission Coefficients, Table 2: Carbon Dioxide Emission Factors for Transportation Fuels, <http://205.254.135.7/oiaf/1605/coefficients.html#tbl2>, updated January 31, 2011.

[166] / U.S. EPA, eGRID1010 Version 1.1, Year 2007 Summary Tables, <http://www.epa.gov/cleanenergy/energy-resources/egrid>.

4.20.4. Environmental Consequences

Potential Impacts of Climate Change

The analysis of impacts of climate change on the program focuses on potential changes in sea level in the context of flooding. Existing scientific studies and information available from New York City and State sources were reviewed, and relevant information is presented. Due to the uncertain nature of predictions for future climate change impacts, a range of possible effects is presented. While future changes in other climate parameters such as temperature, storm frequency, and precipitation may have some effect on rail operations, the projections for these parameters are much less certain at this time and are therefore not addressed here.

The New York State Sea Level Rise Task Force has adopted projected sea level rise estimates based on the best available science.[167] In the lower Hudson Valley, sea levels are likely to increase by 12 to 23 inches by the end of the century, with possible increase up to 55 inches in the event of rapid ice melt, and in the Mid-Hudson Valley, sea levels are likely to increase by 8 to 18 inches by the end of the century, with possible increase up to 50 inches in the event of rapid ice melt. In general, the probability of sea levels increasing is characterized as "extremely likely," but there is high uncertainty regarding the probability of a rapid ice melt scenario. Intense hurricanes are characterized as 'more likely than not' to increase in intensity and/or frequency, and the likelihood of changes in other large storms ("Nor'easters") are characterized as unknown. Therefore, the projections for future 1-in-100 coastal storm surge levels for the area include only sea level rise at this time and do not account for changes in storm frequency. Based on the above data, it is reasonable to assume that sea level and floodplains would rise by up to 2.0 feet by the end of the century, with a smaller chance of increases up to 4.5 feet. Note that in light of more recent scientific analyses, as reported by the Intergovernmental Panel on Climate Change and as reviewed by the New York City Panel on Climate Change, it is more likely that sea level will rise by a higher level, and that the 4.5 feet sea level rise mentioned above would now be near the high end scenario (it is no longer seen as a separate 'rapid ice melt scenario'). The best available data would be reviewed when planning to specific elevations occurs.

Most of the rail line from New York City to Albany runs along the eastern shore of the Hudson Estuary, much of that within current floodplains or immediately adjacent to the 1-in-100 floodplain (the area with a flooding probability of 1-in-100 in any given year). Some of these areas are already vulnerable to flooding in the current condition, and by the end of the century, all areas along the shore would be within the 1-in-100 floodplain.

The current program does not propose rebuilding this existing rail line, but rather adjusting and upgrading various small sections along the existing line, and therefore, cannot accomplish major changes such as raising the elevation of the track or relocating track to areas outside of the future floodplain. However, NYSDOT will coordinate with state and federal agencies regarding potential actions for adapting to future climate conditions in order to avoid repeated construction work. Potential mitigation strategies to address sea level rise/flooding are addressed under Section 4.20.5.

[167] / New York State Sea Level Rise Task Force, Report to the Legislature, December 31, 2010.

Greenhouse Gas Emissions

Alternative 90A

The estimated increase in energy use and ensuing GHG emissions associated with Alternative 90A are presented in Exhibit 4-47.

Alternative 90B

The estimated increase in energy use and ensuing GHG emissions associated with Alternative 90B are presented in Exhibit 4-48.

Exhibit 4-47—Net Energy Use and GHG Emissions as Compared with Base Alternative, Alternative 90A

	Energy Use (million Btu)	GHG Emissions (metric tons CO_2e)
Rail Operation (per year)	335,567	24,641
Rail Maintenance (per year)	47,827	3,501
On-Road Maintenance (per year)	-22,348	-1,636
On-Road Operation (per year)	-684,691	-54,230
Net (per year)	***-323,645***	***-27,724***
Construction (total)	7,496,478	548,762
Offset Period (years)	**23**	**20**

Notes:
Negative numbers indicate reduction as compared to Base Alternative.
Includes well-to-pump emissions for both on-road and rail components.

Exhibit 4-48—Net Energy Use and GHG Emissions as Compared with Base Alternative, Alternative 90B

	Energy Use (million Btu)	GHG Emissions (metric tons CO_2e)
Rail Operation (per year)	357,886	26,280
Rail Maintenance (per year)	47,827	3,501
On-Road Maintenance (per year)	-25,241	-1,848
On-Road Operation (per year)	-771,699	-61,121
Net (per year)	***-391,227***	***-33,188***
Construction (total)	21,104,757	1,544,912
Offset Period (years)	**54**	**47**

Notes:
Negative numbers indicate reduction as compared to Base Alternative.
Includes well-to-pump emissions for both on-road and rail components.

Alternative 110

The estimated increase in energy use and ensuing GHG emissions associated with Alternative 110 are presented in Exhibit 4-49.

Alternative 125

The estimated increase in energy use and ensuing GHG emissions associated with Alternative 125 are presented in Exhibit 4-50.

Exhibit 4-49—Net Energy Use and GHG Emissions as Compared with Base Alternative, Alternative 110

	Energy Use (million Btu)	GHG Emissions (metric tons CO_2e)
Rail Operation (per year)	404,035	29,669
Rail Maintenance (per year)	47,827	3,501
On-Road Maintenance (per year)	-26,962	-1,974
On-Road Operation (per year)	-823,256	-65,204
Net (per year)	***-398,355***	***-34,008***
Construction (total)	36,468,799	2,669,614
Offset Period (years)	**92**	**78**

Notes:
Negative numbers indicate reduction as compared to Base Alternative.
Includes well-to-pump emissions for both on-road and rail components.

Exhibit 4-50—Net Energy Use and GHG Emissions as Compared with Base Alternative, Alternative 125

	Energy Use (million Btu)	GHG Emissions (metric tons CO_2e)
Rail Operation (per year)	635,672	52,398
Rail Maintenance (per year)	133,071	9,741
On-Road Maintenance (per year)	-42,464	-3,109
On-Road Operation (per year)	-1,290,655	-102,221
Net (per year)	***-564,376***	***-43,191***
Construction (total)	178,996,609	13,103,131
Offset Period (years)	**317**	**303**

Notes:
Negative numbers indicate reduction as compared to Base Alternative.
Includes well-to-pump emissions for both on-road and rail components.

Discussion

For the non-electric alternatives, rail energy and emissions slightly increase from Alternative 90A to Alternative 90B to Alternative 110 due to the slight increase in train trips and the increased acceleration and deceleration for the 110 Alternative in locations where the track is not capable of supporting the 110-miles per hour speed. Alternative 125 would have substantially more rail energy and emissions associated with added train trips, including both diesel and indirect electricity emissions. The benefits from removing vehicle trips from the road trend in the opposite direction with ridership and the ensuing energy and emissions benefits increase from Alternative 90A to Alternative 90B to Alternative 110, and are substantially higher for Alternative 125. The net annual operational benefits range from approximately 323 to nearly 564 billion Btu per year and 28,000 to 43,000 metric tons CO_2e per year. This is roughly equivalent to eliminating the emissions associated with the energy and electricity consumption of 2,500 to 4,200 average U.S. single family homes every year.[168]

The total potential annual operational emissions savings, the initial investment of energy and associated emissions from construction activity and the production and delivery of materials used for construction, and the net energy and emissions payback period are presented in Exhibit 4-47 through Exhibit 4-50, above. Alternative 90A has the smallest annual benefit but would also require the shortest period to offset the emissions, 20 years, while Alternative 125 with the largest annual benefit would require the longest period to offset those emissions—317 years. The differences between the alternatives are mostly based on the construction emissions since the ridership differences are comparatively small. Given the potential for other future changes aimed at reducing the footprint of energy use such as renewable electricity and fuels, it is unlikely that the construction emissions from Alternatives 90B, 110, or 125 would ever actually be offset, given potential future changes in on-road technology. Regardless, from a global climate perspective, if it did require 50 years or more to payback the emissions, no real benefit would be shown this century, which is the main focus of current climate analyses.

For a discussion of potential measures aimed at reducing both construction and operation emissions, which may be investigated in order to reduce GHG emissions, see the discussion of potential mitigation strategies below. Note that the method for estimating the construction emissions has a large level of uncertainty associated with it, and it has been suggested that this method substantially overestimates the impact of construction.[169] If, for example, this conservative estimate is overestimated by a factor of five, the time required to offset construction emissions could range from 4 to 60 years, which may be considered a reasonable payback period.

4.20.5. Potential Mitigation Strategies

Greenhouse Gas Emissions

Since global climate change is caused cumulatively by world-wide activity, the impact of a specific program on climate change cannot be determined. Therefore, the approach applied here for evaluating the potential impact of the program is to identify the program's potential GHG emissions, and to evaluate whether it incorporates cost-effective energy efficiency and renewable energy

[168]/ Based on U.S. EPA's GHG Equivalencies Calculator, <http://www.epa.gov/cleanenergy/energy-resources/calculator.html>.
[169]/ U.S. Congress—Congressional Budget Office, Urban Transportation and Energy: The Potential Savings of Different Modes, December 1977.

measures into its design, construction, and operation to the maximum extent practicable, consistent with social, economic and other essential considerations. By doing so, the program would demonstrate consistency with state and local policies.

Since this is a Tier 1 EIS, the details of design, construction, and operation are not yet fully available. Therefore, this section identifies potential measures for inclusion, which would reduce the program's energy and GHG footprint if implemented. These measures will be further investigated, and if found to be practicable, incorporated in the program's design and operation.

Operational:

- **Shift Locomotives to Biodiesel Fuel**—Options to use biodiesel for the locomotives will be investigated, including blends of B20 and B100 (20 percent biodiesel with 80 percent standard diesel, or pure biodiesel). B20 can be used with current technology while B100 may require some adjustments or new engines. The use of B20 would reduce GHG emissions by 10 percent, and B100 would reduce GHG emissions by 70 percent, reducing operational emissions by 2,300 to 3,000 metric tons CO_2e annually (varies by alternative).
- **Electrification**—The benefits of shifting rail operations along the entire line to electricity have not been quantified at this time. Benefits would increase over the years as the New York grid shifts to increasingly higher fractions of renewable power sources (the New York grid currently includes relatively large fractions of nuclear and hydro power, which result in very little GHG emissions).
- **Sustainable Station Design and Construction**—Although station energy use was not included in this analysis, new stations would be designed in accordance with the requirement of Executive Order 111, "Green and Clean" State Buildings and Vehicles Guidelines (NYSERDA, 2004), outperforming state energy code by 20 percent.

Construction:

- **Use of Local, Renewable, Recycled Materials**—75 percent of the construction emissions were estimated to come from the extraction, production, transport, and disposal of construction materials. Although precise details are not known at this time, the reduction in these emissions can be substantial if local, renewable, and recycled materials are used. The largest contributors are cement and steel. If emissions associated with material can be cut in half (existing strategies demonstrate that this is possible), the emissions payback period could be reduced by nearly 40 percent, resulting in payback periods of 12, 29, 49, 190 years for Alternative 90A, 90B, 110, and 125, respectively.
- **Biodiesel for Construction Engines**—Biodiesel blends would be used in construction engines to the extent practicable.
- **Replanting Trees**—Although not quantified here, any trees that need to be removed for construction would be replaced with a larger number of trees, replacing the trees in kind or more on a tree-mass basis.

Potential Impacts of Global Climate Change

Examples of mitigation measures that have been employed in other areas to respond to potential impacts of sea-level rise include installing flood barriers, raising mechanical and electrical equipment, waterproofing, installation of pumps, and locating or relocating facilities such as rail yards outside of low-lying floodprone areas.

Since the rail line along the eastern shore of the Hudson would need to be moved or elevated in the future to accommodate increased flooding due to sea level rise, NYSDOT will coordinate with state and federal agencies regarding potential measures for adapting to future climate conditions in order to avoid repeated construction work. Mitigation measures instituted by Metro-North along the Hudson Line in response to flooding during recent storm events include elevating power supply components, raising critical substation equipment at key locations, and making power equipment watertight where possible. Mitigation being investigated by Metro-North will also explore ways to make signal and communication equipment watertight and elevate signal boxes and other on-ground signal equipment to minimize susceptibility to flooding. Future installation of water level monitoring and alarm devices at critical locations like power substations, yards, and stations will provide Metro-North management with the information to facilitate power shutoffs and avoid equipment damage and risks to customer and employee safety. MTA is also planning to purchase a rail vacuum machine, which are rail-mounted machines with digging arms and vacuum pumps, to reduce track flooding.

Along the Mohawk River portion of the Erie Canal, which closely parallels portions of the Empire Corridor West, certain components of the water control structures along the historic canal system cannot be removed prior to a major flood event. The New York State Canal Corporation is planning to modify the water control structures by installing movable dams to remove the hydraulic obstructions at lower dams. These types of mitigation measures, including those proposed by other entities, will be further investigated and addressed in future design phases as part of Tier 2.

4.20.6. Future Analysis

In the Tier 2 analysis, per NYSDEC Policy, "*Guide for Assessing Energy Use and Greenhouse Gas Emissions in an Environmental Impact Statement*," (issued July 15, 2009) detailed GHG reduction measures may be reviewed and evaluated for applicability and practicability, and incorporated in the program as appropriate. The benefits of measures will be quantified if practicable. If substantial changes in design occur, the overall GHG emissions will be reevaluated as well, and further refined if possible.

4.21. Noise and Vibration

The proposed program alternatives could alter rail operations (i.e. speed, frequency, alignment) in the corridor, which would affect noise and vibration levels at sensitive locations in proximity to the rail right-of-way. This chapter assesses the potential for adverse impacts due to changes in rail operations along the Empire Corridor between New York City and Niagara Falls.

4.21.1. Regulatory Context

Noise

A noise assessment was conducted using the methodology set forth in both the FRA guideline document, *High Speed Ground Transportation Noise and Vibration Impact Assessment*[170] for the high-speed rail noise/vibration analyses and the Federal Transit Administration's (FTA) guidance manual, *Transit Noise and Vibration Impact Assessment*[171] for the Amtrak, CSXT, and the Metro-North noise/vibration analyses.

Both FRA and FTA guidance manuals define noise criteria based on the specific type of land use that would be affected, with explicit operational noise impact criteria for three land use categories. These impact criteria are based on either peak 1-hour equivalent noise level ($L_{eq(1h)}$) or 24-hour day-night equivalent noise level (L_{dn}) values. The hourly equivalent sound level is the level of a steady sound that has the equivalent sound energy as does a time-varying sound over a peak 1-hour period. A day-night equivalent sound level is a 24-hour average adjusted for average-day sound source operations. In the case of rail noise, a single operation is equivalent to a single vehicle pass-by. The adjustment includes a 10 decibel penalty for vehicle pass-bys occurring between 11 p.m. and 7 a.m.

Exhibit 4-51 describes the land use categories defined in the FRA and FTA reports, and provides noise metrics used for determining operational noise impacts. Land uses that are noise-sensitive, but where people do not sleep, are described in Exhibit 4-51, Categories 1 and 3. These require examination using the 1-hour L_{eq} descriptor for the noisiest peak hour. Category 2, which includes residences, hospitals, and other locations where nighttime sensitivity to noise is very important, requires examination using the 24-hour L_{dn} descriptor.

Exhibit 4-51 expresses the criteria in terms of the increase in total or cumulative noise that can occur in the overall noise environment before impact occurs. The impact criteria are keyed to the noise level generated by the program (called "program noise exposure") in locations of varying existing noise levels. Two types of impacts—moderate and severe—are defined for each land use category, depending on existing noise levels. Thus, where existing noise levels are 40 dBA, as in Land Use Categories 1 and 2, the respective L_{eq} and L_{dn} noise exposure from the program would create moderate impacts if they were above approximately 50 dBA, and would create severe impacts if they were above approximately 55 dBA. For category 3, a project noise exposure level above approximately 55 dBA would be considered a moderate impact, and above approximately 60 dBA would be considered a severe impact. A noise level change that a significant percentage of people would find annoying is described as severe. A change in noise level that is noticeable to most people but would not necessarily result in strong adverse reactions from the community is described as moderate.

Vibration

The FRA/FTA criteria for environmental impact from ground-borne vibration and noise are based on the maximum levels for a single event. The impact criteria as defined in the FRA/FTA guidance manual are shown in Exhibit 4-52. The criteria for acceptable ground-borne vibration are expressed in terms of root

170/ U.S. Department of Transportation, *High Speed Ground Transportation Noise and Vibration Impact Assessment*, Federal Railroad Administration, Office of Railroad Development, Washington, D.C., September 1998.
171/ U.S. Department of Transportation, *Transit Noise and Vibration Impact Assessment*, FTA Report FTA-VA-90-1003-06, Federal Transit Administration, Washington, D.C., May 2006.

mean square [rms] velocity levels in decibels and the criteria for acceptable ground-borne noise are expressed in terms of A-weighted sound level.

The limits are specified for the three land use categories defined below:

- **Vibration Category 1: High Sensitivity**—This category includes buildings where it is essential that ambient vibration be kept very low for the operations within the building, which may be well below levels associated with human annoyance. Typical land uses are vibration-sensitive research and manufacturing, hospitals, and university research operations.

Exhibit 4-51—FRA's and FTA's Land Use Category and Metrics for Train Noise Criteria

Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor $L_{eq(h)}$*	Tracts of land where quiet is an essential element in the intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use. Also included are recording studios and concert halls.
2	Outdoor L_{dn}	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels, where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor $L_{eq(h)}$*	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches, where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Places for study or meditation associated with cemeteries, monuments, museums, campgrounds and recreational facilities can also be considered to be in this category. Certain historical sites and parks are also included.
Note: * L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity.		

Exhibit 4-52—Ground-Borne Vibration (GBV) and Ground-Borne Noise (GBN) Impact Criteria

Land Use Category	GBV Impact Levels (VdB re 1 micro-inch/sec)			GBN Impact Levels (dB re 20 micro Pascals)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations	65 VdB[4]	65 VdB[4]	65 VdB[4]	N/A[4]	N/A[4]	N/A[4]
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

Notes:
1 "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.
2 "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.
3 "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail systems.
4 This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

- **Vibration Category 2: Residential**—This category covers all residential land uses and any buildings where people sleep, such as hotels and hospitals. No differentiation is made between different types of residential areas. This is primarily because ground-borne vibration and noise are experienced indoors and building occupants have practically no means to reduce their exposure. Even in a noisy urban area, the bedrooms often will be quiet in buildings that have effective noise insulation and tightly closed windows. Hence, an occupant of a bedroom in a noisy urban area is likely to be just as sensitive to ground-borne noise and vibration as someone in a quiet suburban area.
- **Vibration Category 3: Institutional**—This category includes schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment, but still have the potential for activity interference.

4.21.2. Methodology

Noise

The analysis of airborne noise was performed using procedures set forth in the FRA and FTA guidance manuals. Following the methodologies set forth in this document, airborne noise impacts should be analyzed using a three-step process that consists of a screening procedure, a general noise assessment, and a detailed noise analysis. The screening procedure is performed first to determine whether any noise-sensitive receptors are within distances where impacts are likely to occur. If the screening reveals that there are noise-sensitive receptors in locations where impacts are likely to occur, then a general noise assessment is performed to determine locations where noise impacts could occur. If this general assessment indicates that a potential for noise impact does exist, then a detailed noise analysis may be necessary. The detailed analysis methodology is used to predict impacts and evaluate the effectiveness of mitigation with greater precision than can be achieved with the general noise assessment. This level of analysis would typically be conducted for a project-level or Tier 2 EIS.

- **Step 1—NOISE SCREENING:** The methodology begins with a noise screening to determine whether any noise-sensitive receptors are within a distance where an impact is likely to occur. According to the FTA screening methodology, potential impacts may occur if noise receptors are within 750 feet from the track centerline for unobstructed sensitive receptors, or 375 feet from the track centerline for obstructed sensitive receptors. According to the FRA screening methodology, potential impacts may occur if noise receptors are within 900 feet from the track centerline for quiet suburban land uses, or 450 feet from the track centerline for urban land uses. Based upon the screening procedure result, there were noise sensitive receptors within these distances along the corridor, and therefore, a General Noise Assessment was performed to determine the potential for adverse effects at specific distances from the right-of-way.
- **Step 2—GENERAL NOISE ASSESSMENT:** The general noise assessment methodology consists of determining a project noise exposure at 50 feet from the centerline of track, and comparing the calculated levels with the criteria based on land use categories. The calculations to predict the noise levels from the increased train speed and change in the alignment along the rail line branch take into account: the type of trains and type of locomotives, number of trains and number of locomotives on each train, the speed of the trains, characteristics of the track, and the time of day. For the high-speed train rail noise assessment, the general noise assessment methodology is presented in Chapter 4.2 of the FRA Manual. For the Amtrak, CSXT, and the

Metro-North assessment, the general noise assessment methodology is presented in Chapter 5 of the FTA Manual.

- **Step 3—DETAILED NOISE Analysis:** A detailed noise assessment is beyond the scope and detail that will be provided in the Tier 1 assessment and provides the highest degree of accuracy using site-specific information. The detailed noise analysis utilizes additional information not included in the General Noise Assessment, including topographic information. Noise impacts identified in the detailed noise analysis often require detailed evaluation of mitigation measures. As discussed above, the detailed noise assessment would be conducted in any Tier 2 EIS/EA or project-level environmental document if the results of the General Noise Assessment indicate that a selected alternative would potentially result in an adverse impact.

Vibration

The vibration analysis for the program alternatives was performed using the procedures described in the FRA/FTA guidance manuals. To examine potential impacts during operation, the guidance documents (similar to the approach for assessing noise) lay out a three-step approach for the analysis of vibration and ground-borne noise: a screening procedure, a general assessment methodology, and a detailed analysis methodology. The screening procedure is used to determine whether any noise-sensitive receptors are within distances where impacts are likely to occur; the general assessment methodology is used to determine locations or rail segments where there is the potential for impacts; and the detailed analysis methodology is used to predict impacts and evaluate the effectiveness of mitigation with greater precision than can be achieved with the general assessment, which would typically be conducted for a project-level or Tier 2 EIS.

4.21.3. Existing Conditions

The program corridor of the alignment currently experiences Amtrak service and CSXT freight service throughout much of the program corridor, and Metro-North Railroad (MNR) commuter rail service operates between New York City and Poughkeepsie. The corridor was divided into the following segments: New York City to Croton; Croton to Poughkeepsie; Poughkeepsie to Albany; Albany to Schenectady; Schenectady to Hoffmans; Hoffmans to Utica; Utica to Syracuse; Syracuse to Rochester; Rochester to Buffalo;and Buffalo to Niagara Falls. Based on information provided by the land use assessment (see Section 4.2, "Land Use"), and aerial photographs, various noise sensitive land uses (i.e., residential, commercial, industrial, institution, open space, etc.) are located in the vicinity of the corridor. Train movement on each segment is described below.

New York City to Croton

This segment is located between New York City (Grand Central Terminal in Manhattan) and Croton Harmon. The existing line operators include Amtrak, CSX, and MNR. There are approximately 169 trains operating per day and 42 trains per night. For the purposes of the noise and vibration impact assessment, the maximum speed is 75 mph.

Croton to Poughkeepsie

This segment is located between Croton and Poughkeepsie. The existing line operators include Amtrak, CSX, and MNR. There are approximately 239 trains operated per day and 70 trains per night. For the purposes of the noise and vibration impact assessment, the maximum speed is 90 mph.

Poughkeepsie to Albany

This segment is located between Poughkeepsie and Albany. The existing line operators include Amtrak and CSX. There are approximately 24 trains operating per day and 8 trains per night. For the purposes of the noise and vibration impact assessment, the maximum speed is 110 mph.

Albany to Schenectady

This segment is located between Albany and Schenectady. The existing line operators include Amtrak and CSX. There are approximately 14 trains operating per day and there is no train source at night. For the purposes of the noise and vibration impact assessment, the maximum speed is 110 mph.

Schenectady to Hoffmans

This segment is located between Schenectady and Hoffmans. The existing line operators include Amtrak and CSX. There are approximately 12 trains operating per day, and there is no train source at night. For the purposes of the noise and vibration impact assessment, the maximum speed is 110 mph.

Hoffmans to Utica

This segment is located between Hoffmans and Utica. The existing line operators include Amtrak and CSX. There are approximately 35 trains operating per day and 26 trains per night. For the purposes of the noise and vibration impact assessment, the maximum speed is 79 mph.

Utica to Syracuse

This segment is located between Utica and Syracuse. The existing line operators include Amtrak and CSX. There are approximately 44 trains operating per day and 30 trains per night. For the purposes of the noise and vibration impact assessment, the maximum speed is 79 mph.

Syracuse to Rochester

This segment is located between Syracuse and Rochester. The existing line operators include Amtrak and CSX. There are approximately 43 trains operating per day and 33 trains per night. For the purposes of the noise and vibration impact assessment, the maximum speed is 79 mph.

Rochester to Buffalo

This segment is located between Rochester and Buffalo. The existing line operators include Amtrak and CSX. There are approximately 51 trains operating per day and 48 trains per night. For the purposes of the noise and vibration impact assessment, the maximum speed is 79 mph.

Buffalo to Niagara Falls

This segment is located between Buffalo and Niagara Falls. The existing line operators include Amtrak and CSX. There are approximately 10 trains operating per day and 16 trains per night. For the purposes of the noise and vibration impact assessment, the maximum speed is 60 mph.

For sensitive receptors located between 30 and 120 feet from the track centerline, the predicted existing day-night equivalent noise level (Ldn) would range from 65 dBA to 70 dBA Ldn for the overall program corridor. Exhibit 4-53 summarizes the existing train movements and predicted existing noise levels on the entire corridor.

Exhibit 4-53—Existing Empire Corridor Train Movements and Noise Levels

Segment Number	Segment Description	Operator	Number of Trains			Number of Cars per Train	Number of Locomotives per Train	Max Speed (mph)	Existing Noise, Ldn*
			Peak Hour	10pm-7am	7am-10pm				
1	New York City to Croton	Amtrak	3	24	2	5	1	75	65-70
		CSX	0	2	4	60	3	40	
		MNR-electric	12	92	22	8	0	75	
		MNR-diesel	7	51	14	6	1	75	
2	Croton to Poughkeepsie	Amtrak	1	23	3	5	1	90	65-70
		CSX	0	2	4	60	3	50	
		MNR-diesel	8	45	21	6	1	90	
3	Poughkeepsie to Albany	Amtrak	3	22	4	5	1	110	65-70
		CSX	1	2	4	60	3	50	
4	Albany to Schenectady	Amtrak	2	12	0	6	1	110	65-70
		CSX	1	2	0	20	1	50	
5	Schenectady to Hoffmans	Amtrak	2	8	0	6	1	100	65-70
		CSX	0	4	0	30	2	50	
6	Hoffmans to Utica	Amtrak	1	8	0	6	1	79	65-70
		CSX	10	27	26	80	3	60	
7	Utica to Syracuse	Amtrak	1	8	0	6	1	79	65-70
		CSX	12	36	30	80	3	60	
8	Syracuse to Rochester	Amtrak	2	6	2	6	1	79	65-70
		CSX	14	37	31	80	3	60	
9	Rochester to Buffalo	Amtrak	1	6	2	6	1	79	65-70
		CSX	21	45	46	80	3	60	
10	Buffalo to Niagara Falls	Amtrak	1	3	3	6	1	60	65-70
		CSX	5	7	13	80	3	40	

Note: The information on existing train movements in this table is based on data from LTK Engineering Services on February 7, 2012.
* Estimated existing noise levels (L_{dn}) were predicted based on Table 5-7 of the FTA Manual.

4.21.4. Environmental Consequences

Noise

Using the methodology described previously, the noise analysis for the Tier I EIS consists of a noise screening procedure and a general noise assessment to determine potential impacts in the vicinity of the corridor. Potential noise impacts with the proposed Empire Corridor program were evaluated along the entire track segments. Based upon the screening results, there are sensitive receptors within 750 feet from the track centerline for unobstructed sensitive receptors and 375 feet from the track centerline for obstructed sensitive receptors. Consequently, the general noise assessment was performed using procedures set forth in the FRA and the FTA guidance manuals. The general noise assessment methodology consists of determining the project noise exposure at 50 feet from the centerline of track and comparing the calculated levels with allowable levels based on land use categories shown in Table 3-1 in the FRA and the FTA guidance manuals.

Train Input

For the purposes of understanding noise sources along the corridor, both Existing and Alternatives (i.e., base, 90A, 90B, 110, and 125) train data were collected and used as train input data for noise calculations. The existing and alternatives train movements on the entire corridor are listed in Exhibit 4-54.

Base Alternative

Under the Base Alternative, the calculations to predict the noise levels from the increased train activity along the corridor take into account the number of trains and number of locomotives on each train, the speed of the trains, and time of day. Exhibit 4-55 shows the results of the general noise assessment. At sensitive receptors at a distance of 50 feet from the track centerline, the general noise assessment concludes that the potential for noise impacts will occur from Segment 1 through Segment 4 (from New York City through Schenectady), Segment 8 (Syracuse to Rochester), and Segment 10 (Buffalo to Niagara Falls). The methodology for impact assessment is based on the change in noise levels from existing to future conditions, and the Base Alternative reflects the adverse effects of currently known future changes in rail use, including future projected increases in freight traffic and Metro-North commuter rail traffic. Consequently, these results indicate that a detailed noise analysis is necessary to determine whether noise levels will exceed the applicable impact criteria.

Alternative 90A

Under the Alternative 90A, the calculations to predict the noise levels from the increased train activity along the corridor take into account the number of trains and number of locomotives on each train, the speed of the trains, and time of day. Exhibit 4-55 shows the results of the general noise assessment. At sensitive receptors at a distance of 50 feet from the track centerline, the general noise assessment concludes that the potential for noise impacts would occur from Segment 1 through Segment 4 (from New York City through Schenectady), Segment 8 (Syracuse to Rochester), and Segment 10 (Buffalo to Niagara Falls). Consequently, these results indicate that a detailed noise analysis is necessary to determine whether noise levels would exceed the applicable

Exhibit 4-54—Existing and Alternative Train Movements

Segment Number	Segment Description	Operator	Number of Trains						Max Speed (mph)
			Existing	Base	90A	90B	110	125	
1	New York City to Croton	Amtrak	26	26	34	34	34	48	75
		CP	0	6	6	6	6	6	40
		CSX	6	13	13	13	13	13	40
		MNR-Electric	114	102	102	102	102	102	75
		MNR-Diesel	65	75	75	75	75	75	90
2	Croton to Poughkeepsie	Amtrak	26	26	34	34	34	48	90
		CP	0	6	6	6	6	6	50
		CSX	6	13	13	13	13	13	50
		MNR-Diesel	66	76	76	76	76	76	90
3	Poughkeepsie to Albany	Amtrak	26	26	34	34	34	48	110
		CP	0	9	9	9	9	9	50
		CSX	6	10	10	10	10	10	50
4	Albany to Schenectady	Amtrak	12	12	14	14	14	12	110
		CP	0	6	6	6	6	6	50
		CSX	2	4	4	4	4	4	50
5	Schenectady to Hoffmans	Amtrak	8	8	14	14	14	8	110
		CSX	4	2	2	2	2	2	50
6	Hoffmans to Utica	Amtrak	8	8	14	14	14	8	110
		CSX	53	55	55	55	55	55	60
7	Utica to Syracuse	Amtrak	8	8	14	14	14	8	110
		CSX	66	70	70	70	70	70	60
8	Syracuse-Rochester	Amtrak	8	8	14	14	14	8	90
		CSX	68	75	75	75	75	75	60
9	Rochester-Buffalo	Amtrak	8	8	14	14	14	8	90
		CSX	91	86	86	86	86	86	60
10	Buffalo-Niagara Falls	Amtrak	6	6	12	12	12	12	60
		CSX	20	37	37	37	37	37	40
11*	Albany-Syracuse	HST	0	0	0	0	0	30	125
12*	Syracuse-Rochester	HST	0	0	0	0	0	30	125
13*	Rochester-Buffalo	HST	0	0	0	0	0	30	125

Note: The information on existing train movements in this table is based on data from LTK Engineering Services on February 7, 2012

* A two-track grade-separated corridor dedicated to high speed passenger service approximately 280 miles from Albany/Rensselaer station to Buffalo Exchange Street station.

HST=high-speed train

impact criteria. However, with Alternative 90A, no increase from the Base Alternative (Future No Action) Alternative is estimated to occur between New York City and Schenectady, and the increase in projected noise level over the Base Alternative between Hoffmans and Rochester would be imperceptible (0 to 2 dBA).

Exhibit 4-55—General Noise Assessment Results at 50 feet for Program Alternatives

Segment Number	Segment	Existing Noise, Ldn (dBA)	Alternatives Noise, Ldn (dBA)					Program Ldn(dBA) Criteria		Impact
			Base	90A	90B	110	125	Impact	Severe Impact	
1	New York City to Croton	70	73	73	73	73	74	64	69	Severe
2	Croton to Poughkeepsie	70	74	74	74	74	74	64	69	Severe
3	Poughkeepsie to Albany	70	73	73	73	73	73	64	69	Severe
4	Albany to Schenectady	70	71	71	71	71	71	64	69	Severe
5	Schenectady to Hoffmans	70	NC*	58	57	58	NC*	64	69	None
6	Hoffmans to Utica	70	61	63	63	63	61	64	69	None
7	Utica to Syracuse	70	61	63	63	63	61	64	69	None
8	Syracuse to Rochester	70	64	65	65	65	64	64	69	Moderate
9	Rochester to Buffalo	70	NC*	61	61	62	NC*	64	69	None
10	Buffalo to Niagara Falls	70	72	72	72	72	72	64	69	Severe

Note: Estimated existing noise levels (L_{dn}) were predicted based on Table 5-7 of the FTA Manual.
* NC: Program noise level remain "No Change" because of no increment on train movements from existing to future conditions.

Alternative 90B

Under the Alternative 90B, the calculations to predict the noise levels from the increased train activity along the corridor take into account the number of trains and number of locomotives on each train, the speed of the trains, and time of day. Exhibit 4-55 shows the results of the general noise assessment. At sensitive receptors at a distance of 50 feet from the track centerline, the general noise assessment concludes that the potential for noise impacts would occur from Segment 1 through Segment 4 (from New York City through Schenectady), Segment 8 (Syracuse to Rochester), and Segment 10 (Buffalo to Niagara Falls). Consequently, these results indicate that a detailed noise analysis is necessary to determine whether noise levels would exceed the applicable impact criteria. However, with Alternative 90B, no increase from the Base Alternative (Future No Action) Alternative is estimated to occur between New York City and Schenectady, and the increase in projected noise level over the Base Alternative between Hoffmans and Rochester would be imperceptible (0 to 2 dBA).

Alternative 110

Under the Alternative 110, the calculations to predict the noise levels from the increased train activity along the corridor take into account the number of trains and number of locomotives on each train, the speed of the trains, and time of day. Exhibit 4-55 shows the results of the general noise assessment. At sensitive receptors at a distance of 50 feet from the track centerline, the general noise assessment concludes that the potential for noise impacts would occur from Segment 1 through Segment 4 (from New York City through Schenectady), Segment 8 (Syracuse to Rochester), and Segment 10 (Buffalo to Niagara Falls). Consequently, these results indicate that a detailed noise analysis is necessary to determine whether noise levels would exceed the applicable impact criteria. However, with Alternative 110, no increase from the Base Alternative (Future No Action) Alternative is estimated to occur between New York City and Schenectady, and the increase

in projected noise level over the Base Alternative between Hoffmans and Rochester would be imperceptible (0 to 2 dBA).

Alternative 125

Alternative 125 would construct a two-track grade-separated corridor dedicated to high speed passenger service approximately 280 miles from Albany/Rensselaer station to Buffalo Exchange Street station. Trains would operate on the existing Hudson Line Corridor from New York Penn station to Albany/Rensselaer station. Within the densely-developed areas around Albany, Syracuse, Rochester and Buffalo, the new corridor would parallel the existing corridor on a combination of new and existing right-of-way to serve existing stations in these cities. Elevated tracks would be used within each of the station-stop cities on this section.

The calculations to predict the noise levels from the increased train activity along the corridor take into account the numbers of trains and locomotives on each train, the speed of the trains, and time of day. The assessment was based upon the new corridor track conditions (i.e., existing right-of-way segment, new at-grade segment, and new elevated segment). The assessment results are shown as follows

Existing Right-of-Way Segment

Exhibit 4-55 shows the results of the general noise assessment. At sensitive receptors at a distance of 50 feet from the track centerline, the general noise assessment concludes that the potential for noise impacts would occur from Segment 1 through Segment 4 (from New York City through Schenectady), Segment 8 (Syracuse to Rochester), and Segment 10 (Rochester to Niagara Falls). Following the FTA's methodology, these results indicate that a detailed noise analysis is necessary to determine whether noise levels would exceed the applicable impact criteria. However, with Alternative 125, no increase from the Base (Future No Action) Alternative is estimated to occur along Empire Corridor, along which existing (Regional) service will be maintained, with the exception of a projected 1 dBA increase along the segment between New York City and Croton. Increases of 3 dBA are considered to be imperceptible.

New at-grade segment

Exhibit 4-56 shows the results of the general noise assessment. At sensitive receptors at a distance of 50 feet from the track centerline, the general noise assessment concludes that the potential for noise impacts would occur from Segment 11 through Segment 13 (from Albany through Buffalo). These results indicate that a detailed noise analysis is necessary to determine whether noise levels would exceed the applicable impact criteria.

New elevated segment

Exhibit 4-57 shows the results of the general noise assessment. At sensitive receptors at a distance of 50 feet from the track centerline, the general noise assessment concludes that the potential for noise impacts would occur for four new elevated segments (i.e., Albany, Syracuse, Rochester, and Buffalo). These results indicate that a detailed noise analysis is necessary to determine whether noise levels would exceed the applicable impact criteria.

Exhibit 4-56—General Noise Assessment Results at 50 feet for Alternative 125 New at-grade Segment

Segment Number	Segment Description	Existing Noise, Ldn	Program Noise, Ldn	Program Ldn Criteria		Impact
				Impact	Severe Impact	
11	Albany to Syracuse	45	64	52	59	Severe
12	Syracuse to Rochester	45	64	52	59	Severe
13	Rochester to Buffalo	45	66	52	59	Severe
Note: Estimated existing noise levels (L_{dn}) were predicted based on Table 4-5 of the FRA Manual.						

Exhibit 4-57—General Noise Assessment Results at 50 feet for New Elevated Segment

Segment Number	Segment Description	Existing Noise, Ldn	Program Noise, Ldn	Program Ldn Criteria		Impact
				Impact	Severe Impact	
11	Albany	70	73	64	69	Severe
12	Syracuse	70	68	64	69	Moderate
13	Rochester	70	69	64	69	Severe
14	Buffalo	70	73	64	69	Severe
Note: Estimated existing noise levels (L_{dn}) were predicted based on Table 4-5 of the FRA Manual.						

Warning Horn Noise

Potential noise impacts due to the corridor rail-road crossing with horns were evaluated along the entire corridor track segments that would be affected by the proposed new service. According to the FTA screening methodology, potential impacts may occur if noise receptors are within 1,600 feet and 1,200 feet from the right-of-way for obstructed conditions and unobstructed conditions, respectively. Based upon the screening procedure results, there are noise receptors within these distances along the corridor, and therefore, a General Noise Assessment would be necessary as part of any Tier 2 study to determine the potential for adverse effects at specific distances from the right-of-way.

Vibration

Potential vibration impacts were evaluated along the entire corridor track segments that would be affected by the proposed new service. Potential impacts may occur if vibration receptors are within 220 and 160 feet from the right-of-way for residential uses and institutional uses, respectively. Based upon the screening procedure results, there are vibration receptors within these distances along the corridor segments, and therefore, a General Noise Assessment would be necessary in any Tier 2 document to determine the potential for adverse effects at specific distances from the new corridor segments.

4.21.5. Potential Mitigation Strategies

Noise

The general noise assessment presented in Section 4.21.4 shows that the program would have the potential for moderate noise impacts on the segment of Syracuse to Rochester, and severe noise impacts on the segments of New York City to Croton, Croton to Poughkeepsie, Poughkeepsie to Albany, Albany to Schenectady, Buffalo to Niagara Falls, Albany to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. Between Tier 1 and Tier 2, specific impact information on these segments will be explored to: (1) determine noise impact distances from the centerline of tracks, (2) determine any sensitive noise receivers located within the impacted distances, and (3) determine where a more comprehensive analysis would be needed.

For Tier 2 studies, more comprehensive analyses will provide prediction of impacts with a greater degree of precision and the assessment of the effectiveness of mitigation, similar to the general assessment results in the prediction of impacts. More detailed preliminary engineering design and operational data will be available and can be incorporated into the impact analysis. Data used for the detail noise analysis is more accurate, detailed and specific than the data used for the general noise assessment. In addition, as part of the Tier 2 studies, mitigation options would be explored. These mitigation options would typically fall into three categories: noise source mitigation measures; path control measures; and receptor control measures. Source control measures may include:

- Vehicle and equipment noise specifications;
- Operational restrictions;
- Resilient or damped wheel treatments;
- Vehicle skirts, uncap absorption;
- Spin-slide control measures;
- Wheel truing;
- Rail grinding;
- Turn radii greater than 1000 feet;
- Rail lubrication on sharp curves; and
- Movable-point frogs.

Path controls measures may include:

- Sound barriers,
- Alteration of horizontal and vertical alignments,
- Acquisition of buffer zones,
- Ballast on at-grade and/or aerial guideways, and
- Resilient tract support.

Receiver control measures may include:

- Acquisition of property rights for construction of sound barriers,
- Building insulation, and
- Alternative building ventilation.

Vibration

For vibration, a detailed vibration analysis will be prepared as part of the Tier 2 studies. This detailed analysis will also utilize detailed preliminary engineering design and operational data, and include an assessment of potential mitigation measures. Mitigation measures to be examined may include:

- Planning and design of special trackwork;
- Vehicle specifications; and
- Special track support systems (i.e., resilient fasteners, ballast mats, resiliently supported ties, floating slabs, and other marginal treatments), and trenches.

4.21.6. Future Analysis

Tier 2 noise and vibration impact assessments will apply the detailed analysis methodology described in the FRA and FTA guidance manuals. Tier 2 assessments would utilize detailed preliminary engineering design and operational data, and include identification of potential mitigation measures.

4.22. Contaminated and Hazardous Materials

Transportation projects that include the purchase of new right-of-way, excavation, and/or structure demolition or modification have the potential to encounter hazardous materials. The presence or release of hazardous materials on construction sites can expose workers, residents and ecosystems to contaminants that may compromise their health. In addition, the identification of hazardous materials during construction can lead to project delays and can be costly.

4.22.1. Regulatory Context

The use, storage, transportation and disposal of contaminated and hazardous materials are regulated at the federal level by the United States Environmental Protection Agency (U.S. EPA). At the state level, many of the environmental regulations are enforced by the New York State Department of Environmental Conservation (NYSDEC).

The U.S. Resource Conservation and Recovery Act (RCRA) of 1976 gives the U.S. EPA the authority to regulate hazardous waste from the "cradle-to-grave."[172] This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also sets forth a framework for the management of non-hazardous solid wastes. In New York, the NYSDEC is authorized to implement the RCRA program in lieu of the U.S. EPA. NYSDEC issues the permits, conducts inspections, signs consent orders, and gathers and processes data.

[172] / United States Environmental Protection Agency, "Summary of the Resource Conservation and Recovery Act." Accessed April 19, 2011. <http://www.epa.gov/lawsregs/laws/rcra.html>.

The Comprehensive Environmental Resource Conservation and Liability Act of 1980 (CERCLA), commonly known as Superfund, created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. The law authorized the U.S. EPA to identify parties responsible for contamination of sites and compel the parties to clean up the sites.[173]

In 1984, Congress added Subtitle 1 to RCRA requiring the U.S. EPA to regulate underground storage tanks (USTs). The 1986 amendments to RCRA enabled the U.S. EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.[174]

In 1988, the U.S. EPA issued federal UST regulations laying out a comprehensive program for the monitoring and upgrading of USTs in the nation.[175,176]

The storage of petroleum products in New York State is governed under three main laws.[177,178] The laws apply both to USTs and Aboveground Storage Tanks (ASTs), or groupings of such tanks with a combined storage capacity of more than 1,100 gallons. The New York State Substances Hazardous or Acutely Hazardous to Public Health, Safety or the Environment Chemical law requires the NYSDEC to regulate all substances covered by CERCLA, the Federal Insecticide, Fungicide and Rodenticide Act,[179] and the Toxic Substances Control Act.[180] NYSDEC may also regulate other chemicals known to be hazardous.[181] The sale, storage and handling of hazardous substances are regulated by the New York State Chemical Bulk Storage regulations.[182]

Major oil storage facilities (MOSF) are regulated by the New York State Navigation Law Oil Spill Prevention, Control and Compensation Act of 1977.[183] This law and regulations (6 NYCRR Parts 610 and 611)[184] regulates all oil terminals and transport vessels operating in the waters of the State, which have a storage capacity of 400,000 gallons or more (or MOSFs).

[173]/ Comprehensive Environmental Resource Conservation and Liability Act, 42 United States Code, Chapter 103, 1980.
[174]/ Resource Conservation and Recovery Act, 42 United States Code, Section 6901, 1976.
[175]/ Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (UST), 40 Code of Federal Regulations, Part 280, 1988.
[176]/ Approval of State Underground Storage Tank Programs, 40 Code of Federal Regulations, Part 281, 1988.
[177]/ Water Pollution Control, New York Environmental Conservation Law, Article 17, Title 10, 2012.
[178]/ Petroleum Bulk Storage, 6 New York Codes, Rules and Regulations, Parts 612 to 614.
[179]/ Federal Insecticide, Fungicide and Rodenticide Act, 7 United States Code, Section 136, 1947.
[180]/ Toxic Substances Control Act, 15 United States Code, Section 2601, 1976.
[181]/ Substances Hazardous or Acutely Hazardous to Public Health, Safety or the Environment, New York Environmental Conservation Law, Article 37, Title 10, 2012.
[182]/ Chemical Bulk Storage, 6 New York Codes, Rules and Regulations, Parts 595 to 599.
[183]/ New York State Navigation Law Oil Spill Prevention, Control and Compensation Act, New York Environmental Conservation Law, Article 12, 1977.
[184]/ New York State Department of Environmental Conservation, "Regulation of Major Oil Storage Facilities." Accessed April 19, 2011. <http://www.dec.ny.gov/chemical/2644.html>.

4.22.2. Methodology

Areas of known releases were identified within a half-mile of the corridor centerline (program study area) using available federal and state databases. The following Geographic Information System (GIS) data layers were reviewed as part of this analysis.

- **Superfund CERCLIS (Comprehensive Environmental Response, Compensation, and Liability Information System)** is the tracking database authorized under the Superfund Amendment and Reauthorization Act (SARA) of 1986. Superfund is the common name for CERCLA, the federal law designated to clean up sites contaminated with hazardous substances. The database contains information on hazardous waste sites including an inventory of sites, planned and actual site activities, and financial information.
- The **National Priorities List (NPL)** is the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The Superfund cleanup process involves the steps taken to assess sites, place them on the National Priorities List (NPL), and establish and implement appropriate cleanup plans. The NPL is intended primarily to guide the U.S. EPA in determining which sites warrant further investigation under the Superfund cleanup program.[185]
- **RCRA Info** databases track both Treatment, Storage, and Disposal facilities and Large Quantity Generators. RCRA Subtitle C established regulations and procedures for the generation, transportation, storage, and disposal of hazardous waste, thus, tracking waste for its entire existence (cradle to grave).
- **Toxic Release Inventory System (TRIS)** is a national database that tracks reported toxic chemical use (over 300 toxic chemicals listed), storage and/or permitted release to the environment (air, water or land). TRIS was created under authority of Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 and the Pollution Prevention Act (PPA) of 1990.[186]
- The **New York State Chemical Bulk Storage (CBS)** and the **NYS Petroleum Bulk Storage (PBS)** programs are regulated by the NYSDEC under the Hazardous Substance Bulk Storage Program.
- **MOSF** database tracks terminals or vessels with a capacity of 400,000 gallons or more.

4.22.3. Existing Conditions

Over 6,400 hazardous materials sites were identified within a half-mile of the corridor centerline (90/110 Study Area) and approximately 5,500 sites were identified within the 125 Study Area, as shown in Exhibit 4-58. Of these, more than half (approximately 3,750) were identified in Manhattan. Appendix G.14 presents a county by county discussion of identified hazardous materials sites.

[185] / United States Environmental Protection Agency. "National Priorities List." Accessed September 26, 2011. <http://www.epa.gov/superfund/sites/npl>.

[186] / United States Environmental Protection Agency, "Toxic Release Inventory Program." Accessed April 19, 2011. <**http://www.epa.gov/tri**>.

Exhibit 4-58—Summary of Contaminated and Hazardous Materials Sites within the Study Area

County	NPL		Superfund		RCRA		TRIS		CBS		PBS		MOSF		Total	
	90/ 110 mph	125 mph	90/ 110 mph	125 mph	90/ 110 mph	125 mph	90/ 110 mph	125 mph	90/ 110 mph	125 mph	90/ 110 mph	125 mph	90/ 110 mph	125 mph	90/ 110 mph	125 mph
New York	0	0	0	0	64	64	6	6	11	11	3,667	3,667	0	0	3,748	3,748
Bronx	0	0	0	0	1	1	0	0	0	0	115	115	0	0	116	116
Westchester	0	0	1	1	16	16	15	15	12	12	3	3	5	5	52	52
Putnam	1	1	1	1	0	0	0	0	0	0	12	12	0	0	14	14
Dutchess	0	0	1	1	5	5	5	5	5	5	87	87	3	3	106	106
Columbia	0	0	0	0	0	0	2	2	0	0	11	11	0	0	13	13
Rensselaer	0	0	2	2	9	9	10	10	10	10	51	47	9	8	91	86
Albany	1	0	1	0	13	10	9	2	9	4	155	51	0	1	188	68
Schenectady	0	0	0	0	1	0	3	2	2	0	106	34	2	0	114	36
Schoharie	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Montgomery	0	0	1	0	10	0	4	2	5	0	119	1	0	0	139	3
Herkimer	0	0	0	0	7	0	6	0	4	1	110	3	0	0	127	4
Oneida	1	0	3	2	11	3	12	2	8	2	244	20	2	0	281	29
Madison	0	0	0	0	0	0	2	3	4	3	12	23	0	0	18	29
Onondaga	0	0	2	2	17	17	23	22	17	17	178	180	1	1	238	239
Cayuga	0	0	0	0	1	0	0	0	1	0	9	1	0	0	11	1
Wayne	0	0	0	1	7	0	8	1	5	0	59	23	1	0	80	25
Monroe	0	0	6	6	41	38	43	42	17	16	265	262	1	1	373	365
Genesee	0	0	0	0	2	0	6	0	8	0	148	21	0	0	164	21
Erie	0	0	10	10	35	35	54	53	13	14	334	322	1	1	447	435
Niagara	2	2	5	5	8	8	12	12	7	7	56	56	1	1	91	91
Total	**5**	**3**	**33**	**31**	**248**	**206**	**220**	**179**	**138**	**102**	**5,741**	**4940**	**26**	**21**	**6,411**	**5,482**

Note 1:NPL – National Priority List, RCRA – Resource Conservation and Recovery Act, TRIS – Toxic Release Inventory System, CBS – Chemical Bulk Storage, PBS – Petroleum Bulk Storage, MOSF – Major Oil Storage Facility

Note 2: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within a half-mile of the corridor centerline.

Source: NYS GIS Clearinghouse, New York State Department of Environmental Conservation.
NYSDEC. Accessed November 7, 2011. <**http://www.dec.ny.gov/geodata/DiscoveryServlet**>.
U.S. EPA. Accessed November 7, 2011. <**http://www.epa.gov/enviro/geo_data.html**>.

4.22.4. Environmental Consequences

Impacts as a result of the presence of contaminated and hazardous materials can include a variety of concerns. The acquisition of property can result in NYSDOT incurring liability, since the property owner is responsible for any contamination discovered after property acquisition. The presence of contaminated soil or groundwater can result in serious delays as a result of costly site investigations and remedial actions. Excavation activities to substantial depths in areas with

contamination can result in high disposal costs from large volumes of soil. Deeper excavations increase the likelihood of encountering contaminated groundwater, which can also be costly to treat and dispose. Furthermore, the presence or release of contaminated materials can expose workers, residents within the community, and the surrounding environment to contaminants that could impose negative health effects.

In addition to contamination from mapped hazardous materials facilities outside of the existing right-of-way, contamination is known to occur along railroad corridors as a result of industrial uses along the railroad corridor that rely on freight movements for shipping and deliveries. Most railroad corridors also have residual contamination from a variety of sources with contaminants ranging from metals, hazardous materials and petroleum products, and asbestos.

Improvement project specifics (i.e., excavation depths, construction plans, etc.) have not yet been provided; therefore, the degree of likelihood to encounter impacts from contamination is generally based on the discussion above.

Review of available records indicates that the Base Alternative and Alternative 90A would incur the least amount of impacts as a result of the presence of contaminated materials. These alternatives would largely involve station improvements and work within the right-of-way, with tracks being added in the location of the former track beds or existing access roads. A moderate amount of impacts would occur as a result of the presence of contamination within the existing railroad right-of-way and nearby mapped sites. Alternatives 90B and 110 would have a greater potential to encounter contaminated materials than the Base and 90A alternatives, especially where new third and fourth track construction would occur within highly developed urbanized areas and would require subsurface work. Alternative 125 would include all the improvements considered under Alternative 90A and would also include the extension of 236 miles of new track and alignment. The new rail alignment would extend through a variety of rural, suburban, and urban areas and would require numerous property acquisitions; increasing NYSDOT's risk; however, in many suburban and rural areas these risks may be lower.

This preliminary assessment is based on Tier 1 concepts and is designed to identify areas with the likelihood to incur impacts as a result of contaminated and hazardous materials sites in the vicinity of the proposed improvements. Specific details and general mitigation plans will be included as the project development process is further advanced in the Tier 2 analysis.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured against and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure.

Because proposed work with this alternative is anticipated to be located entirely within the right-of-way, no land acquisitions are anticipated, minimizing the potential for liability since NYSDOT will not acquire additional property. In general, signal and grade crossing work will have a low potential for encountering contaminated materials. The track improvements will be completed within the existing right-of-way. However, any subsurface work activities (e.g. excavation, trenching etc.) may have the potential to encounter contaminated materials that could require

special handling and disposal requirements. Station improvements may entail a greater potential for subsurface excavations that could encounter contaminated soils and groundwater.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, signalization, in addition to improvements proposed under the Base Alternative previously described. It is anticipated that work could be contained within the right-of-way, and no land acquisitions are anticipated; therefore impacts would be similar to those described in 90A with the potential for encountering contaminated materials increasing with subsurface work.

In addition, Alternative 90A would include replacement of the Livingston Avenue Bridge, which extends over the Hudson River between the urbanized cities of Rensselaer and Albany (Rensselaer and Albany Counties, respectively). The replacement of the bridge would include extensive subsurface activities (i.e. installation of footings and piers) and therefore the potential to encounter contaminated soils and groundwater would be high. In addition, given the presence of the Hudson River polychlorinated biphenyl (PCB) site, there would be a higher likelihood that PCB-impacted sediment and surface water will be encountered during bridge construction activities.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

In general, impacts would be similar to those described above under Alternative 90A except that the subsurface activities would increase the likelihood of encountering contaminated soils and ground water as a result of additional infrastructure improvements including grade crossing modifications, new grade separated flyovers, culvert extensions and new cut areas.

There would be seven locations where new right-of-way would need to be acquired (MPs 168.3, 210.8, 215.6, 237.7, 286.4, 341.1 and 377.6). The acquisition of property would include a potential liability for NYSDOT if the properties currently or historically use, store or dispose of hazardous materials or petroleum products. Property acquisition would also include the acquisition of two current structures, which would require asbestos, lead and hazardous material surveys prior to demolition activities.

The three grade separated flyovers would be located at MPs 279, 366, and 427. The flyover at MP 279 would be located in a more rural area, and no mapped hazardous materials facilities are in the vicinity of the alignment. Flyovers at MPs 366 and 427 are located in more urban areas of Rochester and Buffalo, and there would be mapped PBS facilities located in the vicinity of the improvements. These structures would have a higher likelihood to encounter contaminated soil and groundwater as a result of caisson and abutment construction.

Alternative 90B would also include station improvements at the Schenectady, Amsterdam, Utica, Rome, Syracuse, Rochester and Buffalo-Depew stations. Station improvements may entail a greater potential for subsurface excavations that could encounter contaminated soils and groundwater.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations. In general, impacts would be similar to those described above under Alternative 90B.

Similar to the Alternative 90B, the majority of work for Alternative 110 would be completed within the existing right-of-way. There would be 18 locations where new right-of-way would need to be acquired (MPs 168.3, 184.6, 186.3, 191.7, 198.1, 200.6, 207.5, 210.8, 215.1, 226.9, 228.0, 230.8, 237.2, 286.4, 341.1, 361.4, 377.7 and 389.1). As with Alternative 90B, the acquisition of property would include a potential liability for NYSDOT if the properties currently or historically used, stored or disposed of hazardous materials or petroleum products. Property acquisition would also include the acquisition of two current structures, which would require asbestos, lead and hazardous material surveys prior to demolition activities.

Two grade separated flyovers would be located at MPs 279 and 366. As with Alternative 90B, the flyover at MP 279 would be located in a more rural area, and no mapped hazardous materials facilities are in the vicinity of the alignment. The flyover at MP 366 is located in the more urban area of Rochester, and there would be mapped PBS facilities located in the vicinity of the improvements. These structures would have a higher likelihood to encounter contaminated soil and groundwater as a result of caisson and abutment construction.

As with Alternative 90B, Alternative 110 would also include station improvements at the Schenectady, Amsterdam, Utica, Rome, Syracuse, Rochester and Buffalo-Depew stations. Station improvements may entail a greater potential for subsurface excavations that could encounter contaminated soils and groundwater.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch.

Alternative 125 would involve construction of a total of 236 miles of track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. Alternative 125 also would include new right-of-way in most areas, but would merge back with the Empire Corridor over two 15- and 16-mile segments centered on Syracuse and Rochester, respectively. The alignment would be located within the existing Empire Corridor right-of-way through the cities of Syracuse and Rochester. Required infrastructure would include roadbed, track, viaducts and bridges, cuts and embankments, access roads, railroad systems, maintenance facilities and other support facilities.

Alternative 125 would generally parallel the New York State Thruway through the cities of Albany and Schenectady. After leaving the City of Schenectady, the alignment would generally cut across rural lands before reconnecting with the existing Empire Corridor through Syracuse. After leaving the City of Syracuse, the alignment would again pass through rural lands before reconnecting with the existing Empire Corridor through Rochester. Leaving the City of Rochester, the alignment would again cut across rural lands before reconnecting with the existing Empire Corridor just east of Buffalo. Mapped hazardous materials facilities would be located sporadically in the vicinity of the new alignment throughout the rural land, with more densely mapped hazardous materials facilities located in Albany and Schenectady. Construction of new track and alignment would have the potential to encounter contaminated soils and/or groundwater since subsurface work would be more likely for this new alignment than for additional track within the existing railroad right-of-way. Through the cities of Syracuse and Rochester, Alternative 125 would be within the existing Empire Corridor right-of-way; however, there would be numerous mapped hazardous materials facilities adjacent to the alignment in Syracuse, and there would be potential to encounter contaminated materials with the construction of new track depending on requirements for subsurface activities.

Since Alternative 125 would involve 236 miles of construction of new right-of-way, there would be numerous property acquisitions for the alignment. The acquisition of property would include a potential liability for NYSDOT if the properties currently or historically use, store or dispose of hazardous materials or petroleum products. In addition, property acquisition would also include the acquisition of numerous structures, which would require asbestos, lead and hazardous material surveys prior to demolition activities.

4.22.5. Potential Mitigation Strategies

Mitigation strategies will focus on methods to avoid or minimize conflicts with contaminated materials, in addition to completing Phase I and II Environmental Site Assessments (ESAs). Phase I and Phase II ESAs evaluate environmental issues and risks associated with a site, particularly prior to purchase. A Phase I ESA consists of a review of regulatory records and historic information (e.g., maps, local government records); completion of a site visit; and conducting interviews with owners, occupants, and local government officials. This information is compiled and reviewed to determine the presence of any on- or off-site sources of contamination that may impact the site, classified as Recognized Environmental Conditions (RECs). The Phase II ESA includes field sampling laboratory testing to evaluate the extents and severity of the issues.

Site-specific Health and Safety Plans and Materials Management Plans will be developed to address contaminated soil and groundwater. If buildings will be demolished, an Asbestos Abatement Plan and a Lead-Based Paint Assessment Plan will be developed to document methodologies for completing the surveys.

4.22.6. Future Analysis

The Tier 2 analysis will document the presence and extent of contaminated sites in more detail. This will allow NYSDOT to understand potential conflicts and refine the design to minimize conflicts such as reducing the amount of soil or groundwater that would need to be disposed of. The first

step would be to investigate previous activities and current site uses, following the guidelines of an ASTM-compliant Phase I ESA. This would include the review of aerial photographs, historical (Sanborn) maps, database reports, site visits, and other historical sources. Based on the results of the Phase I ESA, further investigations (limited subsurface reports and Phase II ESAs) including the collection of surficial and subsurface soil samples and groundwater samples may be required to delineate the horizontal and vertical extents of contamination in problem areas.

The program will have the potential to encounter asbestos containing materials (ACMs) and lead based paint associated with several structures located on land that would need to be acquired for new right-of-way or bridges that would need to be enhanced or demolished. Pursuant to 29 CFR 1926.1101 and 40 CFR Part 61 Subpart M requirements, asbestos abatement will be performed by a New York State Department of Labor (NYSDOL) licensed handling company using NYSDOL certified supervisor(s) and handlers. Prior project notification will be required for U.S. Environmental Protection Agency and NYSDOL. Independent compliance air monitoring will be required as specified in 12 NYCRR Part 56. In addition, pursuant to 6 NYCRR Part 360 and 364, friable ACM waste will be transported by a permitted hauler and disposed in an approved asbestos waste facility. Non-friable ACM will be disposed of at an approved disposal site. Lead paint removal of any significant amount will require compliance with hazardous waste and air quality requirements (see Section 4.19, "Air Quality").

Pursuant to 6 NYCRR Parts 360, 364 requirements and Spill Technology and Remediation Series (STARS) memo #1: Petroleum Contaminated Soil Guidance Policy, soils and other materials contaminated with petroleum products (at non-hazardous waste levels) will be identified and disposed of as industrial solid waste at permitted facilities or as per NYSDEC agreed method. Storage prior to disposal will not exceed 60 days unless approved by NYSDEC. Quantities greater than 500 pounds will be transported by a licensed waste hauler.

If a project will generate more than 100 kilograms per month (kg./mo.) of hazardous waste, the project will obtain a U.S. EPA identification number, properly label, store, and inspect containers of hazardous waste, dispose of waste within designated time frames (i.e., 90 days) and complete annual generator reports if it exceeds hazardous waste generation of 1,000 kg./mo., per 6 NYCRR Part 372 and 373-3.9 and 373-1.1(d)(1)iii or iv requirements. Pursuant to 6 NYCRR Parts 370-374 and 49 CFR 172-173, hazardous waste will be transported by licensed waste transporters. The project will also sign and distribute a manifest to track the hazardous waste disposal and confirm that the designated disposal facility is authorized and has capacity to accept the waste.

Pursuant to 6 NYCRR Part 596, 612 and 613 requirements, the project will also register with NYSDEC any stationary petroleum tanks exceeding 1,100 gallons in total at a facility and any chemical. Registration will be valid until tanks are permanently closed (i.e., removed during construction) unless waived by NYSDEC. The project will notify NYSDEC Spills Unit upon discovery of any releases from tanks and/or 30 days in advance of permanent tank closure and pay appropriate storage fees to NYSDEC.

4.23. Section 4(f)/Section 6(f)

4.23.1. Regulatory Context

This section addresses Section 4(f) and Section 6(f) protections and the preliminary assessments of potential Section 4(f)/Section 6(f) resources performed as part of this Tier 1 Draft EIS. Federal protection of publicly owned parkland and historic sites is provided under Section 4(f) of the U.S. Department of Transportation Act (for federally funded transportation projects), and parklands are also protected under Section 6(f) of the U.S. Land and Water Conservation Fund (LWCF) Act (for LWCF-funded parks).

Once an alternative is selected, FRA will determine the need for additional Section 4(f) and/ or Section 6(f) evaluation, as appropriate. for individual improvement projects.

Section 4(f)

Section 4(f) of the U.S. DOT Act (49 U.S.C. 303(c)) of 1969, as amended, states that the Secretary of the U.S. DOT shall not approve any program or project that requires the "use" of any land from a public park, recreation area, wildlife and waterfowl refuge, or historic site, unless there is no feasible and prudent alternative, and such project or program includes all possible planning to minimize harm.

Under Section 4(f), there are three types of transportation uses that may occur:

- **Permanent Use:** Land is permanently incorporated into the transportation facility through outright purchase of the land or through acquisition of sufficient property interests (such as obtaining a permanent easement).
- **Temporary Use:** Temporary occupancy of land creates an adverse effect for the purposes of Section 4(f), including right-of-entry, project construction, temporary easement, or other temporary arrangement involving Section 4(f) property. Temporary occupancy will not constitute a Section 4(f) use if all of the following conditions are met:
    - Duration must be temporary (shorter than construction duration) and there should be no change in ownership of the land;
    - Scope of the work (nature and magnitude of the change to the Section 4(f) property) must be minimal;
    - There are no anticipated permanent adverse physical impacts, nor interference with protected activities, features, or attributes of the property on a temporary or permanent basis;
    - The property must be fully restored and returned to pre-construction conditions;
    - There must be documented agreement of the officials with jurisdiction over the Section 4(f) resource of the above conditions.
- **Constructive Use:** In the absence of a permanent or temporary use, a constructive use occurs when the proximity impacts on a Section 4(f) property are so severe that the activities, features, or attributes of the Section 4(f) resource that qualify it for protection are substantially impaired.

Section 4(f) also considers the "use" from indirect impacts (i.e., effects on context, setting, or access).

Amendments to Section 4(f) under the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) established procedures for *de minimis* impact determinations, when the transportation use does not adversely affect the activities, features, or attributes that qualify the resource for Section 4(f) protection. These procedures include affording an opportunity for public review and comment and receiving written concurrence from the officials with jurisdiction over the property.

Section 6(f)

Under Section 6(f) of the U.S. Land and Water Conservation Fund (LWCF) Act, the United States Department of the Interior (DOI) provides funding for state, county, and local efforts to advance public recreation. Once LWCF funds are utilized to acquire or develop, either partially or wholly a particular recreation project, conversion of that park facility for any non-recreational purpose is prohibited unless alternatives are assessed and steps are taken to identify, evaluate, and supply replacement parkland. In addition, the Secretary of Interior must grant prior approval for the conversion and replacement parkland. The replacement property must have equal fair market value as the converted property and must be at least as useful and of similar location as the converted property.

If a Section 6(f) property has been identified near, adjacent to, or within a project area, the decision must be made as to whether or not there will be a conversion or a change in use of the property. A conversion occurs when the use of a Section 6(f) site is changed for longer than six consecutive months to something other than what was funded, regardless of whether the change is temporary or permanent.

If there is a partial conversion or use of the Section 6(f) property, an evaluation of the remaining Section 6(f) property should be conducted to determine whether there has been a change to its usefulness as a viable public outdoor recreation area. If the conversion is approved by the National Park Service and it is determined that the remaining property is altered to the point in which the usefulness has diminished, further evaluation and coordination should take place to establish whether the remaining land should be replaced as well.

A conversion could also occur when a project would occur on the same property where the Section 6(f) resource is located, and would not directly affect the Section 6(f) resource, but would affect access to or other reasonable use of the Section 6(f) resource on the site for more than six months.

4.23.2. Methodology

Parks and recreation areas for study areas within 1,000 feet of the corridor centerline for all alternatives were identified using existing mapping collected from federal and state agencies, including the New York State GIS Clearinghouse, NYSOPRHP, and NYSDEC, as well as review of aerial photography and Google street mapping, as presented in Section 4.16. The GIS mapping obtained of federal and state parks and recreation areas included National Wildlife Refuges, and National and State Historic Sites, and these sites were included as publicly accessible recreation

destinations. Information from the National Park Service (NPS) staff was obtained on locations of NPS properties, including National Natural Landmarks,[187] National Memorials, and National Monuments.[188] The NPS website was consulted to identify and locate county-by-county Land and Water Conservation Fund park grants, and NYSGIS mapping of LWCF-funded municipal parks was obtained. Information obtained from NYSOPRHP on LWCF-funded state parks was also obtained. Publicly owned recreation areas were defined to include publicly owned golf courses (but not "public" golf courses that are open to the public, but privately owned). This section also addresses tribally owned recreational facilities.

For the purposes of this Tier 1 EIS, the Area of Potential Effect (APE) for potential direct effects on historic architectural sites and archaeological sites has been delineated to extend within 100 feet from the centerline of the existing railroad tracks and within 100 feet from each alternative to encompass all locations where project construction activities could occur, as described in more detail in Section 4.15. For the purposes of this Tier 1 EIS, the APE for indirect effects on historic architectural sites has been delineated to extend 600 feet in both directions from the centerline of the existing railroad tracks and from each alternative. The 600-foot APE was developed in consultation with SHPO and federally recognized tribes to encompass potential indirect effects that could be reasonably foreseen at the Tier 1 level resulting from construction activities associated with the proposed program, as described above. It should be noted that Alternative 125 is the only alternative that would incorporate overhead catenary systems, which could be visible from longer distances in some areas. If Alternative 125 is advanced for further study at the Tier 2 level, the APE would be reassessed and expanded if necessary to adequately consider the potential for indirect effects..[189] An inventory of all architectural resources within the indirect APE has been compiled and is presented in Appendix G.

When the Section 106 identification and evaluation process is being conducted in a phased manner, as described in 36 CFR 800.4(b)(2), the final identification and evaluation of historic properties may be deferred to future stages of the program if the protocol for the process is established in a Programmatic Agreement or Memorandum of Agreement. In accordance with this guidance, this Tier 1 EIS focuses on identifying the "likely presence" of historic properties in the APE for each alternative by identifying previously designated architectural resources and previously identified archaeological sites. Based on the files of the New York State Historic Preservation Office (SHPO) and the New York State Museum (NYSM), program sponsors compiled an inventory of all architectural resources, including buildings, sites, objects, and structures, and previously-identified archaeological sites in the direct and indirect APEs for the 90/110 Alternative and the 125 Alternative (see Chapter 3 "Alternatives" for a detailed description of each alternative). In addition to SHPO and NYSM sites, the Oneida Nation, a federally recognized tribe, provided information on archaeological sites known to the Oneida Nation. The sites identified by the Oneida Nation, located in Oneida and Madison Counties, have been added to the project mapping and inventories of known

[187]/ Deb DeQuinzio, National Natural Landmarks Program, National Park Service Northeast Region, "Moss Island," E-mail/personal communication to Addie Kim, HNTB Corporation, March 22, 2011.
[188]/ Duncan Hay, National Park Service, Northeast Region, "NYSDOT & FRA Compliance (NEPA), E-mail/personal communication to Addie Kim, HNTB Corporation, March 25, 2001.
[189]/ Although FTA noise standards set a standard screening distance of 750' (unobstructed) and (375' obstructed) for noise analyses, preliminary noise analyses completed as part of this Tier 1 DEIS indicate that the area in which there is the potential for the proposed program alternatives (with the exception of Alternative 125) to result in noise impacts is substantially smaller than the areas delineated as the APEs for direct and indirect effects. In the case of Alternative 125, the potential for noise impacts is expected to vary by location. If Alternative 125 is advanced for analysis at the Tier 2 level, the adequacy of the indirect APE to account for potential effects due to noise and other factors would be reassessed and the APE would be expanded where necessary. Procedures for delineating APEs for project components advanced to the Tier 2 level are described in detail in the Draft Programmatic Agreement.

archaeological sites.

Consistent with 36 CFR 800.4(b)(2), once the previously-identified archaeological sites and architectural resources within the APEs for each alternative were identified, the potential effects of the program on those sites and resources were assessed. As described above, effects on architectural resources can be either direct or indirect; and effects on archaeological sites are direct only. Illustrative program elements that could result in potential indirect effects include changes to the context or setting of a historic property due to the construction of a permanent feature, such as new or reconfigured railroad infrastructure, or demolition. In addition, Section 106 requires consideration of reasonably foreseeable effects that may occur later in time, be further removed in distance, or be cumulative.

Potential architectural resources (architectural resources that appear to meet the State/National Register eligibility criteria, but which have not been previously evaluated) within the APEs have not been identified as part of this Tier 1 document. As described in the Draft Programmatic Agreement (PA) (refer to Appendix H), identification of potential architectural resources in the APEs would be undertaken as part of the Tier 2 analysis for this program.

No detailed archaeological documentary studies or archaeological field investigations (Phase I archaeological studies) have been prepared as part of the Tier 1 analysis to determine the presence of archaeological sites in the direct APE. As described above, previously-identified archaeological sites have been mapped and inventoried to serve as a preliminary indicator of potential archaeological sensitivity. As described in the Draft PA, in order to identify archaeological resources that could be affected by the program, archaeological documentary studies and field investigations (as appropriate) will be carried out as part of the Tier 2 analysis.

The purpose of developing a conceptual "alignment" for Alternative 125 in the Tier 1 EIS is to provide a basis for comparison of corridor-level performance, cost, and impact potential of a new corridor alternative versus existing corridor alternatives (i.e. Alternatives 90A, 90B, and 110). The intended purpose of this Tier 1 EIS is to make broad-corridor level decisions with regard to parameters such as operating speed/travel times, service frequency, and infrastructure requirements. The purpose of the Tier 1 EIS does not include studying alternative alignments to achieve the 125 miles per hour speed, nor does it include selecting a specific alignment. All alternatives except Alternative 125 would follow the existing Empire Corridor alignment along both the Empire Corridor South and Empire Corridor West. To achieve the higher speed of Alternative 125, much of this alternative along the Empire Corridor West would be on a new corridor outside of the existing Empire Corridor alignment. Because portions of Alternative 125 would not be located within the existing rail corridor, one representative "alignment" was developed for Alternative 125 at a conceptual level. It is intended to be one of several possible alignments that could be developed and studied in the future if Alternative 125 is the selected alternative at the conclusion of this Tier 1 EIS.

4.23.3. Existing Conditions

Parks and Recreational Areas

Overview

The existing parks and recreation areas in the study area are concentrated in two main areas: the Hudson River Valley and the New York State Barge Canal system within the Mohawk River Valley.

- The program corridor extends along the east bank of the **Hudson River** between New York City and Albany a distance of 142 miles. The Hudson River Valley in the program area has a concentration of national, state, county, and municipal parks and recreation areas due to its location and scenic views, as well as the concentration of population centers that developed along the river. The area also has a rich cultural and economic heritage and hosts a number of historic districts and sites. The Hudson Valley also was the location of the estates of many wealthy New York industrialists, such as John D. Rockefeller and Frederick William Vanderbilt, and of nationally important individuals such as Franklin Roosevelt, a descendant of one of the early Dutch families in the region. The national and state historic sites are important recreational tourism destinations.
- The **New York State Canal System** is a navigable 524-mile inland waterway that crosses upstate New York. The **New York State Barge Canals,** owned by the New York State Canal Corporation (a subsidiary of the New York State Thruway Authority) provide recreational opportunities for water-based navigation and trail users. The **New York State Canalway Trail System** is comprised of a network of more than 260 miles of existing multi-use, recreational trails across upstate New York. Major segments are adjacent to the waterways of the New York State Canal System or follow remnants of the historic original canals of the early 1800s that preceded today's working Canal System. The Canalway Trail System is comprised of four major segments: the 100-mile **Erie Canal Heritage Trail** in Western New York; the 36-mile **Old Erie Canal State Park Trail** in Central New York; the 60-mile **Mohawk-Hudson Bikeway** in the eastern Capital Region. Portions of this canal system are nationally or state-designated heritage areas, parks, and trails.

The national, state, county, and municipal parks and recreation areas and federally and state-designated heritage and historic sites that are also important tourism destinations are described in the following sections.

National Parks and Recreation Areas

There are several types of federally designated parks or recreation areas in the study area, including a National Memorial, a National Natural Landmark, a National Wildlife Refuge, and National Historic Sites, as described in more detail in Section 4.16.3. National Historic Landmarks and National Register Historic Districts and sites in the program area are addressed under Section 4.15.3. Exhibit 4-59 summarizes the publicly owned acreage within the National Memorial, the National Natural Landmark, the National Wildlife Refuge, the National Historic Sites, and the federal preserves within 1,000 feet of the corridor centerline for the 90/110 and the 125 Study Areas.

State Parks and Recreation Areas

New York State has multiple programs for land conservation and preservation on property that is managed and/or owned by the state. The state has designated state parks, state historic parks, and state historic sites that are administered by the New York State Office of Parks, Recreation, and Historic Preservation. New York state forests (including multiple use areas, unique areas, and state nature and historic preserves) and state-owned Wildlife Management Areas are administered by the New York State Department of Environmental Conservation.

- The **State Parks System** managed by the New York State Office of Parks, Recreation, and Historic Preservation includes state parks, state historic parks and state historic sites that are open to the public as tourist attractions. State parks include the **Old Erie Canal State Park** in Onondaga County (Mileposts 278.3 to 279), Madison County (Mileposts 266.5 to 272), and Oneida County. This is a 36-mile stretch of the 363-mile Old Erie Canal, which has been designated a National Recreational Trail by the National Parks Service. This and other state parks, state historic parks, and historic sites within 1,000 feet of the corridor centerline for both the 90/110 and the 125 Study Areas are listed in Exhibit 4-60, along with Section 4(f)/Section 6(f) protection status.
- **State Forests** in New York State encompass many legally defined classifications of lands outside the Forest Preserve of Adirondack and Catskill Parks that include land parcels acquired

Exhibit 4-59—National Memorials, National Natural Landmarks, National Wildlife Refuges, and National Historic Sites and Preserves within Study Area

Name	County	Acreage within 2,000-foot-wide study area		Potential Section 4(f)	Potential Section 6(f)
		90/110 Study Area	125 Study Area		
General Grant National Memorial	New York	0.8	0.8	X	X
Federal Land within Hudson Highlands State Park	Putnam	0.4	0.4	X	X
Vanderbilt Mansion National Historic Site	Dutchess	143	143	X	X
Franklin D Roosevelt Home National Historic Site	Dutchess	82	82	X	X
Federal Land within Schodack Island State Park	Greene	24	24	X	X
Moss Island National Natural Landmark	Herkimer	15		X	X
Montezuma National Wildlife Refuge	Wayne	1 (556*)		X	X
Hart's Woods	Monroe		**	X	X
Bergen Swamp	Genesee		***	X	X

*/ One acre of the Montezuma National Wildlife Refuge is in the study area, 556 acres of the Approved Acquisition Area for the refuge is in the study area.
**/ Total acreage for Hart's Woods is 10 acres, a portion of which is in the study area.
***/ Total acreage for Bergen Swamp is 2,000 acres, a portion of which is in the study area.
Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 1,000 feet of the corridor centerline.
Source: National Park Service, U.S. Fish and Wildlife Service, New York State GIS Clearinghouse

Exhibit 4-60—NYSOPRHP State Parks, State Park Preserves, State Historic Sites

Facility Name	Facility Type	County/City	Acreage in Study Area		Potential Section 4(f)	Potential Section 6(f)
			90/110	125		
Hudson River Park	State Park	Manhattan	0.1	0.1	X	
Riverbank State Park	State Park	New York	26	26	X	X
Philipse Manor Hall	State Historic Site	Westchester	0.3	0.3	X	
Old Croton Aqueduct	State Historic Park	Westchester	18	18	X	X
Rockefeller State Park Preserve	State Park	Westchester	153	153	X	
Hudson Highlands State Park	State Park Preserve	Westchester	204	204	X	
Hudson Highlands State Park	State Park Preserve	Putnam	322	322	X	
Hudson Highlands State Park	State Park Preserve	Dutchess	398	398	X	
underwater State Park	State Park	Putnam	19	19	X	
Walkway over the Hudson State Park	State Park	Dutchess	0.3	0.3	X	
Quiet Cove Riverfront Park	Other	Dutchess	32	32	X	
Margaret Lewis Norrie State Park	State Park	Dutchess	234	234	X	X
Staatsburgh State Historic Site	State Historic Site	Dutchess	1	1	X	X
Ogden Mills and Ruth Livingston Mills Memorial State Park	State Park	Dutchess	224	224	X	X
Clermont State Historic Site	State Historic Site	Dutchess	0.1	0.1	X	
Clermont State Historic Site	State Historic Site	Columbia	152	152	X	
Olana State Historic Site	State Historic Site	Columbia	74	74	X	
Conservation Easement (adjoining Olana site)	State Historic Site	Columbia	103	103	X	
Building envelope (adjoining Olana site)	Conservation easement	Columbia	7	7	X	
Hudson River Islands State Park	State Park	Columbia	11	11	X	
Schodack Island State Park(undeveloped)	State Park	Columbia	14	14	X	X
Schodack Island State Park(undeveloped)	State Park	Greene	9	9	X	X
Schodack Island State Park(undeveloped)	State Park	Rensselaer	185	185	X	X
Lock 9 State Canal Park	Canal Park	Schenectady	16	0	X	X
Guy Park	State Historic Site	Montgomery	2	0	X	
Schoharie Crossing	State Historic Site	Montgomery	18	0	X	X
Herkimer Home	State Historic Site	Herkimer	33	0	X	
Oriskany Battlefield	State Historic Site	Oneida	5	0	X	X
Old Erie Canal State Historic Park	State Historic Park	Madison	185	45	X	X
Old Erie Canal State Historic Park	State Historic Park	Onondaga	94	12	X	X
State Fairgrounds	State Recreation Area	Onondaga	85	85	X	
State Park at the Fair	Other	Onondaga	1	0.7	X	
Whirlpool State Park	State Park	Niagara	6	6	X	X

Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 1,000 feet of the corridor centerline.

Source: New York Office of Parks, Recreation, and Historic Preservation and NYS GIS Clearinghouse

under several Bond Acts. State Forests are under the administration of the New York Department of Environmental Conservation Division of Lands and Forests and include four land classifications, but only two types: **Unique Areas** and **state nature and historic preserves** are present within the study area. **Unique Areas** are defined as parcels of land owned by the state that were acquired due to its special natural beauty, wilderness character, or for its geological, ecological or historical significance for the state nature and historical preserve, and may include lands within a forest preserve county outside the Adirondack and Catskill Parks. The NYSDEC state forests preserves and unique areas within 1,000 feet of the corridor centerline for both the 90/110 and the 125 Study Areas are shown in Exhibit 4-61, one of which has received Section 6(f) funding.

Exhibit 4-61—New York State DEC Lands

Facility Name	County/City	Acreage within 2,000-ft.-wide Study Area		Potential Section 4(f)	Potential Section 6(f)
		90/110 Study Area	125 Study Area		
Tivoli Bay Wildlife Management Area	Dutchess	412	412	X	X
Middle Ground Flats Unique Area	Greene	9.0	9.1	X	
Middle Ground Flats Unique Area	Columbia	1.3	1.3	X	
Hudson River at Germantown	Columbia	*	*	X	
Stockport Flats Tidal Wetland	Columbia	31	31	X	
Rogers Island Wildlife Management Area	Columbia	90	90	X	
Hudson State Boat Launch	Columbia	0.2	0.2	X	
Stockport Flats Wildlife Management Area	Columbia	230	230	X	
Nutton Hook Tidal Wetland	Columbia	292	292	X	
Albany Pine Bush State Unique Area	Albany	138	124	X	X
Nelliston Boat Launch Site	Montgomery	*		X	
Plantation Island Wildlife Management Area (Lock 18 WMA)	Herkimer	50		X	
Oriskany Flats Wildlife Management Area	Oneida	265		X	
Rome State Wildlife Management Area	Oneida	269		X	
Carpenter's Creek Fisherman's Access	Onondaga	0.4		X	
Northern Montezuma Wildlife Management Area	Cayuga	75		X	
Northern Montezuma Wildlife Management Area	Wayne	184		X	
Tillman Road Wildlife Management Area	Erie		20	X	

*Site is a boat launch , acreage is not available
Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 1,000 feet of the corridor centerline.

Source: New York State GIS Clearinghouse, New York State Department of Environmental Conservation

- **Wildlife Management Areas (WMAs)** are lands owned by New York State under the control and management of the New York State Department of Environmental Conservation's Division of Fish, Wildlife and Marine Resources. These lands have been acquired primarily for the production and use of wildlife. However, while fishing, hunting and trapping are the most widely practiced activities on many WMAs, they are not limited to these activities. Most WMAs also provide good opportunities for hiking, cross-country skiing, birdwatching, or quiet enjoyment of nature. The WMAs within 1,000 feet of the corridor centerline for both the 90/110 and the 125 Study Areas are shown in Exhibit 4-61, one of which has received Section 6(f) funding.

County/Municipal Parks and Recreation Areas

There are roughly 100 county, municipal and non-profit parks identified within the study area. Twelve county-owned parks were identified within 1,000 feet of the corridor centerline of the 90/110 Study Area, of which two have received federal Land and Water Conservation Funding, as shown in Exhibit 4-62. Four of the county parks are located in Westchester County. Within the 125 Study Area, only eight county owned parks were identified within 1,000 feet of the corridor centerline, one of which is not within the 90/110 Study Area.

Exhibit 4-62—County Parks within 1,000 feet of the Corridor Centerline

Park	County	Study Area Acreage		Potential Section 4(f)	Potential Section 6(f)
		90/110 Study Area	125 Study Area		
Lenoir Preserve (County Park)	Westchester	9	9	X	
Kingsland Point County Park	Westchester	16	16	X	
Croton Point County Park	Westchester	11	11	X	
Oscawana County Park (undeveloped)	Westchester	80	80	X	
Bowdoin County Park	Dutchess	105	105	X	X
Papscanee Island County Nature Preserve	Rensselaer	169	169	X	
Bergen Park	Montgomery	2.4*		X	
Onondaga Lake County Park	Onondaga	24	24	X	X
Black Brook County Park	Wayne	17		X	
Blue Cut County Nature Center	Wayne	20		X	
Swift Landing County Park	Wayne	23		X	
Churchville County Park	Monroe		72	X	X
DeWitt County Recreational Facility	Genesee	116		X	

*/ Bergen Park is approximately 2.4 acres and the entire park is within the 90/110 Study Area.

Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 1,000 feet of the corridor centerline.

Source: New York State GIS Clearinghouse, LWCF website: <http://waso-lwcf.ncrc.nps.gov/public/index.cfm>

Ninety-four municipal parks were identified within 1,000 feet of the corridor centerline of the 90/110 Study Area, and of these, 27 have received Land and Water Conservation Funds. Within the 125 Study Area, eighty-four parks were identified within 1,000 feet of the corridor centerline, of which twenty-two have received Land and Water Conservation Funds (see Exhibit 4-63). More than half of these municipal parks are located in the more densely populated counties closer to New York City. Fifty parks (including one non-profit park) are located in New York, Bronx, Westchester, and Dutchess Counties.

Exhibit 4-63—Number of Municipal and Non-Profit Parks with 1,000 feet of the Corridor Centerline

County	Municipal Parks within 1,000 feet		Potential Section 6(f) Parks		Potential Section 4(f) Parks		Nonprofit
	90/110 Study Area	125 Study Area	90/110 Study Area	125 Study Area	90/110 Study Area	125 Study Area	
New York	12	12	5	5	12	12	
Bronx	4	4	1	1	4	4	
Westchester	20	20	6	6	20	20	1
Putnam	0	0	0	0	0	0	
Dutchess	12	12	3	3	12	12	
Columbia	1	1	0	0	1	1	1
Rensselaer	0	0	0	0	0	0	
Albany	7	8	2	1	7	8	
Schenectady	6	0	1	0	6	0	
Schoharie	0	0	0	0	0	0	
Montgomery	3	0	1	0	3	0	
Herkimer	2	1	1	0	2	1	
Oneida	0	1	0	0	0	2	1
Madison	1	0	1	0	1	0	
Onondaga	2	2	1	1	2	2	
Cayuga	0	0	0	0	0	0	
Wayne	1	0	0	0	1	0	
Monroe	7	9	2	2	7	9	
Genesee	3	0	0	0	3	0	
Erie	6	7	2	2	6	7	
Niagara	7	7	1	1	7	7	
TOTAL	94	84	27	22	94	84	3

Note: The 90/110 Study Area is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment. The 125 Study Area is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long. The study area width is defined as being within 1,000 feet of the corridor centerline.

Source: New York State GIS Clearinghouse, New York State Office of Park, Recreation, and Historic Preservation, and National Park Service LWCF website: < **http://waso-lwcf.ncrc.nps.gov/public/index.cfm**>

Historic and Cultural Resources

Archaeology

As described above, information concerning the location and character of previously-identified archaeological sites in the direct APEs was collected through a review of the site files of SHPO and NYSM. Additional information regarding archaeological sites in Oneida and Madison Counties was provided by the Oneida Nation. Exhibit G-10 of Appendix G identifies the number and type of sites in each county in the direct APEs for the 90/110 Alternative and the 125 Alternative.

90/110 Alternative APE

A total of 166 previously-identified archaeological sites have been identified within the direct APE for the 90/110 Alternative that extends along the Empire Corridor South/West and the Niagara Branch. Of these sites, 47 are SHPO archaeological sites, 117 are NYSM sites (13 point sites and 104 polygon sites[190]), and two are sites identified by the Oneida Nation (Sites 1 and 2). There are a total of 36 burial/habitation sites.

125 Alternative APE

A total of 126 previously-identified archaeological sites have been identified within the direct APE for the 125 Alternative that extends along the Empire Corridor South/West and the Niagara Branch. Of these, 27 are SHPO archaeological sites, 96 are NYSM sites (8 point sites and 88 polygon sites), and three are sites identified by the Oneida Nation (Sites 3 through 5). There are a total of 27 burial/habitation sites.

Historic Architectural Resources

Previously-identified historic architectural resources located within the direct APE for the 90/110 Alternative and the 125 Alternative are summarized in Exhibit 4-64 and Appendix G, respectively. The NHLs, State and National Register (S/NR)-listed and eligible historic districts are noted in the text below. Detailed tables listing the S/NR-listed and eligible individual resources are provided in Exhibits G-12 and G-13 in Appendix G. The approximate locations of these resources are illustrated on Exhibit G-14. The previously identified architectural resources within the indirect APEs are summarized in Appendix G.

Direct APE: 90/110 Alternative

A total of 79 previously-identified historic architectural resources are located in the direct APE for the 90/110 Alternative that extends along the Empire Corridor South/West and the Niagara Branch. These resources are summarized by county in Exhibit 4-64. Of the 79 architectural resources, two resources are NHLs: Fort Klock in St. Johnsville, Montgomery Country and the Hudson River Historic District in Dutchess and Columbia Counties. Fort Klock was designated a National Historic Landmark District by the U.S. Secretary of the Interior in 1973. Fort Klock, a

[190]/ As delineated by NYSM, NYSM polygon sites represent the approximate extent of archaeological sites believed to occupy large areas, and NYSM point sites represent identified locations of archaeological sites whose boundaries may not have been clearly defined.

fortified stone homestead built in 1750, is part of a 30-acre complex that includes the historic homestead, a renovated Colonial Dutch Barn, blacksmith shop, and 19th century schoolhouse. The Hudson River National Historic Landmark District was designated by the U.S. Secretary of the Interior in 1990. The 32-square-mile district stretches from Germantown in Columbia County to Hyde Park in Dutchess County. It includes over 40 riverfront estates, two villages, four hamlets, and significant designed landscapes and farmlands.

There are 53 S/NR-listed resources within the direct APE. Of these, 41 are individually listed while 12 are historic districts. The 53 individually listed resources are identified in Exhibit G-12 in Appendix G.

It should be noted that approximately 350 bridges meeting the 50 year age criterion for S/NR eligibility are located within the existing railroad alignment and thus within the direct APE. Any bridges 50 years old or older would also be evaluated for potential S/NR eligibility as part of the

Exhibit 4-64—Historic Architectural Resources within the Direct APE for each Alternative

County	NHL		S/NR-Listed Resources - individual		S/NR-Listed Resources - districts		S/NR-Listed Resources Total		S/NR-Eligible Resources-individual		S/NR-Eligible Resources - districts		S/NR-Eligible Resources Total		**Total Resources**	
	90/110	125	90/110	125	90/110	125	90/110	125	90/110	125	90/110	125	90/110	125	90/110	125
New York			4	4			4	4	3	3			3	3	7	7
Bronx			1	1			1	1					0	0	1	1
Westchester			11	11			11	11	3	3	1	1	4	4	15	15
Putnam			3	3	2	2	5	5					0	0	5	5
Dutchess			12	12	2	2	14	14	1	2			1	1	15	16
Columbia			2	2	2	2	4	4					0	0	4	4
Greene							0	0					0	0	0	0
Rensselaer			1	1	1	1	2	2	2	1			2	1	4	3
Albany					1		1	0	2				2	0	3	0
Schenectady				1	1		1	1					0	0	1	1
Montgomery	1		4		1		5	0	5				5	0	10	0
Herkimer							0	0	1		1		2	0	2	0
Oneida			1				1	0	1				1	0	2	0
Madison				1			0	1	1				0	0	0	1
Onondaga							0	0					0	0	0	0
Cayuga							0	0					0	0	0	0
Wayne							0	0					0	0	0	0
Monroe					1	1	1	1	2	1	1		2	1	3	2
Genesee					1		1	0					0	0	1	0
Erie			1	2			1	2			1	1	1	1	2	3
Niagara			1	1			1	1					0	0	1	1
Multiple Counties	1	1					0	0			1	1	1	1	1	1
TOTALS	2	1	41	39	12	8	53	47	20	10	4	3	24	13	79	61

Notes: Counties are listed from south to north, then east to west.
The 90/110 APE is used for analysis of Alternatives 90A, 90B, and 110 and consists of the existing 464-mile long Empire Corridor alignment.
The 125 APE is used for analysis of Alternative 125 and consists of portions of the existing Empire Corridor and new alignment and is 450 miles long.

Tier 2 analysis. In order to evaluate the significance of these bridges, an architectural historian would conduct a field visit and would perform documentary research. The NYSDOT's Contextual Study of New York State's pre-1961 Bridges (November 1999) and Evaluation of National Register Eligibility (January 2002) would be consulted among other documentary sources. Bridges not previously evaluated by the NYSDOT Contextual Study would be evaluated as part of the Tier 2 analysis.

Direct APE: 125 Alternative

A total of 61 previously-identified architectural resources are located in the direct APE for the 125 Alternative that extends along the Empire Corridor South/West and the Niagara Branch. These resources are summarized by county in Exhibit 4-64. Of the 61, one is an NHL: the Hudson River Historic District in Dutchess and Columbia Counties (described above).

There are 47 S/NR-listed resources within the direct APE. Of these, 39 are individually-listed and eight are historic districts. The 39 individually-listed resources are identified in Exhibit G-12 in Appendix G.

4.23.4. Environmental Consequences

The sections below describe impacts to parks and recreational resources and historic and archaeological resources that may potentially be subject to protection under Section 4(f), as well as parklands subject to protection under Section 6(f). Review of aerial mapping indicates that the Base Alternative and Alternatives 90A and 90B would have minimal impacts to parklands and little or no impacts to parklands outside of the right-of-way. These alternatives would largely involve work within the right-of-way, with tracks being added in the location of the former track beds or existing access roads. The proposed work will include the addition of track, as well as maintenance service roads in selected areas. This preliminary assessment is based on Tier 1 concepts and mapping and will be further refined in Tier 2 as the project development process is further advanced, and efforts to avoid parkland encroachments will be made as design is advanced.

As described above under "Existing Conditions," previously-identified archaeological sites and historic architectural resources within the direct and indirect APEs have been inventoried and mapped. Because improvement project design has not progressed to a point sufficient to enable site-specific analyses of potential adverse effects, specific potential effects to architectural and archaeological resources will not be provided as part of this Tier 1 Assessment. An analysis of the program alternatives' potential to result in direct and indirect effects to specific architectural and archaeological resources would be conducted during the Tier 2 level analysis, as described above in the "Methodology" section and summarized below under "Future Analysis." As previously noted, potential adverse effects on architectural resources include direct physical effects that alter the characteristics of the historic property in a manner that would diminish the integrity of the property's significant historic features. Program activities that would result in direct effects would include the demolition of a train station either listed or determined to be eligible for listing on the NR. Potential direct effects would also result from altering a train station in such a way as to remove the character-defining features that qualify it for listing on the NR. Similarly, direct effects on archaeological resources could result from construction activity to install new track, platforms, or grade crossings. Potential indirect effects on architectural resources include installation of new

signal systems or overheard bridges, which could constitute a visual intrusion that would diminish the property's integrity, thereby adversely affecting its historic significance and hence its eligibility for listing on the NR. To the extent that the scope and activities of the various alternatives and their potential impacts can be identified at the present time, this information is provided below. Note that potential impacts were identified only for areas within the APE for each alternative where work is proposed. A comparison of the number of resources that could be affected by the Base Alternative, Alternative 90A, Alternative 90B, Alternative 110, and Alternative 125 is provided in Exhibit 4-65 and summarized below.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured against and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure.

Parks and Recreational Areas

Because proposed work with this alternative is anticipated to be located entirely within the right-of-way, no land acquisitions are anticipated, no impacts to parklands are anticipated.

Exhibit 4-65—Comparison of Potential Impacts to Archaeological Sites and Architectural Resources, by Alternative

RESOURCE TYPE	NUMBER OF RESOURCES														
	Base Alternative			90A			90B			110			125		
	D	I	TOTAL	D	I	TOTAL	D	I	TOTAL	D	I	TOTAL	D	I	TOTAL
Archaeological Sites	N/A	N/A	**3**	30	N/A	**30**	87	N/A	**109**	83	N/A	**105**	35	N/A	**57**
NHLs	N/A	N/A	**0**	1	N/A	**1**	1	N/A	**2**	1	N/A	**2**	1	N/A	**2**
S/NR-listed Historic Districts	N/A	6	**7**	5	4	**9**	4	7	**20**	4	7	**20**	0	0	**9**
S/NR-listed Individual Resources	N/A	7	**7**	11	29	**40**	4	29	**71**	4	26	**68**	3	3	**44**
S/NR-eligible Historic Districts	N/A	3	**4**	N/A	3	**3**	2	11	**13**	2	10	**12**	0	0	**0**
S/NR-eligible Individual Resources	N/A	10	**10**	1	16	**17**	8	70	**87**	8	68	**85**	0	2	**11**
TOTAL	0	26	**26**	48	52	**100**	106	117	**302***	103	214	**292***	39	5	**123***

Note: Resources that fall within the direct APE (D) are also located within the boundaries of the (I) indirect APE, as indicated in the Total column.
*The following resources identified in Alternative 90A for the Empire Corridor South are included in the total resource count for Alternatives 90B, 110, and 125: 22 archaeological sites; 1 NHL; 9 S/NR-listed Historic Districts; 35 S/NR-listed Individual resources; and 9 S/NR-eligible Individual resources.

Historic and Cultural Resources

Categorical Exclusions for eight projects in the Base Alternative are complete and have identified no adverse direct, physical or contextual impacts to archaeological sites or architectural resources in the direct APE. The CEs were reviewed to determine the potential for cultural resource effects, and, in addition, the historic assessment performed for this Tier 1 Draft EIS included research on documented cultural resources within the program's APE. However, 26 architectural resources located in the indirect APE have been identified for this analysis, and potential impacts to these resources will be assessed as part of the Tier 2 analysis. As described above, the identification of potential architectural resources in the APEs will be undertaken as part of the Tier 2 analysis for this program, and impacts will be assessed for any resources determined to be S/NR-eligible.

Direct APE: Historic Architectural Resources

In a letter dated August 14, 2007, SHPO determined that the proposed reconstruction of the Schenectady Station will not result in adverse impacts on archaeological and architectural resources. Additionally, in a letter dated April 27, 2007, SHPO determined that the new Niagara Falls Station will not have adverse archaeological impacts. In a letter dated May 17, 2013, SHPO determined that the Rochester Station Redevelopment will not result in adverse impacts on archaeological and architectural resources.

Indirect APE: Historic Architectural Resources

A total of 26 previously-identified architectural resources are located in the indirect APE for the Base Alternative. These include:

- **Monroe County** – *S/NR-listed Historic District*: East Avenue Historic District (MP 368-370); St. Paul-North Water Streets Historic District (MP 371); State Street Historic District (MP 371); Bridge Square Historic District (MP 372); and Madison Square-West Main Street Historic District (MP 372); *S/NR-listed Individual*: German United Evangelical Church Complex (MP 371); Leopold Street Shule (MP 370.5); Brick Presbyterian Church Complex (MP 371); Federal Building (MP 371); Andrews Street Bridge (MP 371); Washington Street Rowhouses (MP 372); *S/NR-eligible Historic District*: Public Market Historic District (MP 370); Prince Alexander Historic District (MP 370); Birch Crescent Historic District (MP 379); *S/NR-eligible Individual*: 1290, 1255-1257, 1239, 1320 University Avenue (MP 368.5); J. Hunderford Smith building (MP 369.5); Otis Lumber Co. (MP 369.5); Rochester Public Market (MP 370); Schwalb Coal & Oil Co. (MP 370.5); and Taylor Instrument Co. (MP 373) (**23 total**)

- **Schenectady County** – *S/NR-listed Historic District*: Stockade Historic District (MP 160) (**1 total**)

- **Niagara County** – *S/NR-listed Individual*: Custom House (MP QDN28); S/NR-eligible Individual: 947 Ontario Avenue (MP QDN28) (**2 total**)

An analysis of the potential for these Base Alternative projects to result in adverse impacts to the identified architectural resources will be conducted during the Tier 2 level analysis as described in the "Methodology" section and summarized below in "Future Analysis."

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, signalization, in addition to improvements proposed under the Base Alternative previously described.

Parks and Recreational Areas

It is anticipated that work could be contained within the right-of-way, and no impacts on parklands are anticipated.

In Niagara County, Alternative 90A passes near two municipal parks, Gratwick Riverside Park from MPs QDN16 to QDN17, and Marios Park at MP QDN19; however, no impacts to these parks are anticipated since all work is within the existing rail right-of-way at these locations.

Historic and Cultural Resources

As with the Base Alternative, work proposed for the Alternative 90A is expected to occur within the existing right-of way. Categorical Exclusions for three of the projects in the 90A Alternative have been prepared and have identified no adverse impacts to architectural resources or archaeological resources in the direct APE for those specific projects. Exhibit 4-65 provides a summary of the total number of previously-identified archaeological sites and architectural resources located in the APEs for the Alternative 90A.

Direct APE: Archaeological Sites

There are 30 previously-identified archaeological sites located in the direct APE for Alternative 90A that could experience direct, physical impacts due to construction-related activities, including 11 burial/habitation sites. These include:

- **New York County** (Manhattan) – N (H, M)[191] site; N (R) site (**2 total**)
- **Bronx County** – N (M) site (**1 total**)
- **Westchester County** – N (S) site; two N (U) sites; N (M) site; N (C) site; and three N (H, B) sites (**8 total**)
- **Putnam County** – N (S) site; N (B) site (**2 total**)
- **Dutchess County** – two N (H) sites; N (C, B) site; two N (S) sites; N (Q) site (MP 65); two N (U) sites; and N (C, B) site (**9 total**)
- **Montgomery County** – N (U) site; X site; N (B) site; and N (T) site (**4 total**)
- **Onondaga County** – N (C, H) site; N (S) site; N (H) site; and N (U) site (**4 total**)

As part of the Tier 2 analysis, field investigations would be conducted in those areas of the direct APE that have been identified as potentially archaeologically sensitive, in order to determine the

[191]/ Native American Sites (N): (B) Burial; (C) Camp site/Tool Production/ Workshop; (H) Habitation/Village/Hamlet; (M) Midden; (O) Other; (P) Petroglyph/Pictograph; (Q) Quarry; (R) Rockshelter; (S) Stray Finds/"Traces of Occupation"; (T) Trail; (U) Unspecified/Unknown; Historic-Period Sites (H): (B) Burial/Cemetery; (D) Domestic; (F) Transportation/Infrastructure/Utilities; (I) Industrial or Commercial Deposits; (M) Maritime; (O) Other; (U) Unspecified/Unknown; (X): Unknown whether Precontact or Historic Period.

presence or absence of potentially S/NR-eligible archaeological resources and thus any potential impacts to archaeological resources.

Direct APE: Historic Architectural Resources

There are a total of 18 previously-identified historic architectural resources located in the direct APE for Alternative 90A that could experience direct, adverse impacts due to construction-related activities. These are:

- **Westchester County** – Lyndhurst (S/NR-listed Individual) (MP 24); and Garrison Landing Historic District (S/NR-listed Historic District) (MP 50) (**2 total**)
- **Putnam County** – Cold Spring Historic District (S/NR-listed Historic District) (MP 52.5); *S/NR-listed Individual*: U.S. Military Academy (MP 51); and West Point Foundry (MP 52) (**3 total**)
- **Dutchess County** – *S/NR-listed Historic District*: Wheeler Historic District (MP 64); Stone Street Historic District (MP 65); *S/NR-listed Individual*: National Biscuit Company Carton-Making and Printing Plant (MP 59); Mount Gulian (MP 61.5); Carman, Cornelius House (MP 62); Collyer, Capt. Moses W. House (MP 62); Poughkeepsie Railroad Bridge (MP 74); Poughkeepsie Railroad Station (MP 74); and Innis Dye Works (MP 74) (**9 total**)
- **Dutchess/ Columbia Counties** – Hudson River Historic District (NHL) (MP 82-102) (**1 total**)
- **Rensselaer County** – Schodack Landing Historic District (S/NR-listed Historic District); Livingston Avenue Bridge (S/NR-eligible Individual) (MP 143) (**2 total**)
- **Montgomery County** – Dove Creek Culvert (S/NR-eligible Individual) (MP 177.5) (**1 total**)

As in the Base Alternative, work proposed for Alternative 90A is expected to occur within the existing right-of way. However, these resources are located within 100 feet of work proposed in the right-of-way. Therefore, construction-related activities could result in adverse impacts to these resources. A field survey would be conducted as part of the Tier 2 analysis in order to determine potential adverse impacts to these resources and to identify potential architectural resources in the direct APE. Impacts would be assessed for any resources determined to be S/NR-eligible.

Indirect APE: Architectural Resources

There are 51 architectural resources located in the indirect APE for the 90A Alternative. These include:

- **New York County** (Manhattan) – Fort Tryon Park and the Cloisters (S/NR-listed Individual) (MP 9) (**1 total**)
- **Bronx County** – *S/NR-listed Individual*: Wave Hill (MP 13); Colgate Robert House (MP 13); and the William E. Dodge House (MP 12) (**3 total**)
- **Westchester County** – *S/NR-listed Individual*: Croton North Railroad Station (MP 34); Standard House (MP 41); Peekskill Freight Depot (MP 41); Bear Mountain Bridge and Tollhouse (MP 45); *S/NR-eligible Individual*: Tarrytown Railroad Station (MP 25); Riverside Hose Company (MP 25); and a resource located on the southeast corner of Central Avenue and North Water Street (MP 41.5) (**7 total**)

- **Putnam County** – *S/NR-listed Individual*: Wilson House (MP 49.5); Rock Lawn and Carriage House; and Eagle's Nest (MP 51) (**3 total**)
- **Dutchess County** – *S/NR-listed Historic District*: Main Street Historic District (MP 65); Union Street Historic District (MP 73.5); Mill Street-North Clover Street Historic District; *S/NR-listed Individual*: Shay's Warehouse and Stable (MP 65); Shay, William Double House (MP65); Zion Memorial Chapel (MP 65); Brower, Abraham House (MP 65); Brower, Adolph House (MP 65); Bannerman's Island Arsenal (MP 55.5); Chelsea Grammar School (MP 62); Church of the Holy Comforter (MP 73.5); Pelton Mill (MP 74); Old St. Peter's Roman Catholic Church and Rectory (MP 74); Hoffman House (MP 74); Roosevelt Point Cottage and Boathouse (MP 76); Rhinecliff Hotel (MP 89); O'Brien General Store and Post Office (MP 89); Riverside Methodist Church and Parsonage (MP 89); *S/NR-eligible Individual*: Metro-North Railroad Bridge (MP 58); Mid-Hudson Bridge (MP 73); Johnson Plumbing Complex (MP 73); and Cornell Boathouse (MP 74.5) (**22 total**)
- **Columbia County** – Hudson Historic District (MP 114.5) (S/NR-listed Historic District); *S/NR-listed Individual*: Wiswall, Oliver House (MP 113.8); Requa House (MP 129); and Hudson and Boston Railroad Shop (MP 114.5) (**4 total**)
- **Montgomery County** – *S/NR-eligible Historic District*: Amsterdam East Main Street Historic District (MP 176); New York Canal System Historic District (MP 159-358.5); *S/NR-eligible Individual*: Guy Park Manor (MP 176.5); 6-8 Voorhees Street (MP 175.5); 366, 399, 401 West Main Street (MP 176.5); Guy Park (MP 177); resource on West Main Street (MP 177); and World War I Memorial (MP 177.5) (**10 total**)
- **Onondaga County** – New York State Fairgrounds Historic District (MP 294) (S/NR-eligible Historic District) (**1 total**)

Although adverse indirect, contextual effects to resources within the indirect APE are not anticipated, a field survey would be conducted as part of the Tier 2 analysis to determine potential adverse effects to these resources and to identify potential architectural resources in the APE. Indirect effects would be assessed for any resources determined to be S/NR-eligible.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A and would include the 90A improvements. Alternative 90B would provide further reductions in travel time, by adding 273 miles of dedicated third track and sections of fourth track (totaling 39 miles) between Schenectady and Buffalo. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

The work for this alternative also would include a new signal system to support the 90 mile an hour speed, new grade crossings, and new undergrade and overhead bridges. Improvements would be made at seven existing stations along Empire Corridor West.

The projects proposed for Alternative 90A in the direct and indirect APEs for Empire Corridor South (MP 1 to MP 143) also would be included in Alternative 90B. The discussion of potential impacts presented above under Alternative 90A is not reiterated in the impacts analysis for Alternative 90B. However, the number of archaeological sites and architectural resources identified in the direct and indirect APEs for the Empire Corridor South portion of Alternative 90A has been included in the total number of resources for Alternative 90B shown in Exhibit 4-64.

Parks and Recreational Areas

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, is proposed, and parkland impacts are not anticipated to occur.

Empire Corridor West/Niagara Branch

Improvements for Alternative 90B start at MP 160 in the City of Schenectady, which is within an urban area that extends west to MP 168. With Alternative 90B, trackwork would start at MP 160 and extend west from here, crossing over the Mohawk River/Erie Canal on an existing bridge. In the City of Schenectady, Front Street Park and Pool adjoins the south side of the railroad on the south river bank, and the Glenville Bike Trail, a Section 6(f) funded facility, extends under the bridge on the north river bank, but impacts to the park and trail are not anticipated. The potential for impacts to this area would be evaluated once more detailed designs are advanced in Tier 2. Further set back on the southwest side are Riverside Park in Schenectady and Collins Park and Lake in Scotia. At MP 167, the railroad extends north of the Lock 9 Canal Park, which is on the opposite (southwest side) of Route 5, but will not impact the park.

Work that may extend outside of the right-of-way may occur at Amsterdam Station and at MPs 179, 192, and 200 in Montgomery County. Proposed track and station improvements at Amsterdam Station and trackwork at MP 179 are located in the vicinity of the Erie Canal, but should not affect the canal. At MP 192, track realignment at a curve and a maintenance service road near MP 200 would extend outside of the right-of-way, but would not affect parks or recreation facilities.

Construction of a fourth track and maintenance service road in Herkimer County near the Montgomery County line (MPs 210.5 to 214.8) would not involve impacts to parklands.

Work that may extend outside of the right-of-way between MPs 234 to 238 around the Utica Station in Oneida County and around the Syracuse Station (MPs 291 to 292, as addressed under Alternative 90A) will be located within an urban area and will not affect parklands. New passenger track and a maintenance service road will be added in the areas north of the tracks adjoining Onondaga Lake County Park, a Section 6(f) park, but are not anticipated to affect parklands. In Wayne County, the addition of a maintenance service road may involve right-of-way impacts near MP 341, but this is not in the vicinity of parklands. In Monroe County, the addition of a fourth track around the Rochester Station could also involve right-of-way impacts (MPs 371 to 376 and MPs 378.2 to 378.6, and MPs 379.15 to 379.6). This work will extend in the vicinity of facilities such as Upper Falls Park, a Section 6(f) park, in the City of Rochester and will cross the Erie Canal and the Erie Canalway Heritage Trail at MP 374.5, but are not anticipated to directly affect parklands. The potential for impacts at the canal crossing will be evaluated as designs are advanced in Tier 2.

The addition of a fourth track at Buffalo-Depew Station (MPs 431 to 432) would be located entirely within an urban area and will not affect parklands. Double track along the Niagara Branch between MPs QDN2 and QDN7 would extend in proximity to Front Park and La Salle Park in Buffalo, but no impacts outside the right-of-way are anticipated that could affect these parklands.

Historic and Cultural Resources

Direct APE: Archaeological Sites

There are 87 previously identified archaeological sites located in the direct APE for Alternative 90B (see Exhibit 4-65) that could experience direct, physical impacts due to construction-related activities, including 17 burial/habitation sites. These are:

- **Schenectady County** – N (B) site; two N (U) sites; X site; N (S) site; N (C) site; N (H) site; and two H (U) sites (**9 total**)
- **Montgomery County** – seven N (U) sites; nine X sites; two N (C) sites; two H (U) sites; H (I) site; three N (P) sites; seven N (H) sites; two N (B) sites; N (S) site; three N (T) sites; two N (S) sites; and N (B, H) site (**39 total**)
- **Herkimer County** – X site; N (U) site; H (M) site; N (H) site; and four N (S, T) sites (**8 total**)
- **Oneida County** – three N (C) sites; and N (B) site; and Sites 1 and 2 identified by the Oneida Nation (**6 total**)
- **Onondaga County** – N (H) site ; N (C, H) site; four N (S) sites; N (U) site; H (I) site; N (C) site; and H (U) site (**10 total**)
- **Cayuga County** – N (U) site (**1 total**)
- **Wayne County** – N (S) site (**1 total**)
- **Monroe County** – N (B) site; N (U) site; N (T, S) site; N (C) site; and N (S) site (**5 total**)
- **Genesee County** – two N (T) sites; two N (C, S) sites; N (S) site; and H (D) site (**6 total**)
- **Erie County** – N (U) site; and N (C) site (**2 total**)

As part of the Tier 2 analysis, field investigations would be conducted in those areas of the direct APE that have been identified as potentially archaeologically sensitive, in order to determine the presence or absence of potentially S/NR-eligible archaeological sites and thus any potential impacts to archaeological resources.

Direct APE: Historic Architectural Resources

Work proposed for Alternative 90B—which mainly consists of the construction of new track and new access road work— could have adverse impacts on architectural resources located within the direct APE due to construction-related activities. Exhibit 4-65 provides a summary of the total number of architectural resources located in the direct APE for Alternative 90B.

Only one of the seven existing stations where improvements are proposed for this alternative has been identified as a known architectural resource: Utica Station, located in Oneida County, which is discussed below. As part of the Tier 2 analysis, the other six stations, including Schenectady Station, Amsterdam Station, Rome Station, Syracuse Station, Rochester Station, and Buffalo-Depew Station, would be evaluated for their potential eligibility for listing on the State/National Registers, and impacts would be evaluated for any other stations identified as eligible for S/NR listing. Union Station in Utica (referred to within this EIS as the Utica Station) is S/NR-listed. Proposed work at this station includes the construction of a new center island platform and overhead pedestrian bridge; work in the station area also would include new siding, new passenger and freight track, removal of existing track, and new turnouts. This work could have potential adverse impacts on the station.

There are 19 architectural resources located in the direct APE for Alternative 90B that could experience direct, adverse impacts due to construction-related activities. These include:

- **Schenectady County** – Stockade Historic District (S/NR-listed Historic District) (MP 160) (**1 total**)
- **Schenectady/Montgomery/Madison/Monroe Counties** – New York Canal System Historic District (S/NR-eligible Historic District) (MPs 160, 177, 191, 201, 330, 332.5, and 358.5). The non-contiguous historic district includes several resources located along the railroad corridor, such as a railroad bridge over Erie Boulevard in Schenectady (MP 160), Lock E-13 in the Town of Root, Montgomery County (MP 191), and a moveable dam and lock in the Town of Palatine, Montgomery County (MP 201) (**1 total**)
- **Montgomery County** – Fort Klock (NHL) (MP 205); Nelliston Historic District (S/NR-listed Historic District) (MP 201); *S/NR-listed Individual*: Guy Park (MP 177); Montgomery County Farm (MP 193-194); Palatine Bridge Freight House (MP 197.8); *S/NR-eligible Individual*: Property at the northwest corner of Ann and Main Streets, Amsterdam (MP 177.5); Dove Creek Culvert that runs beneath the right-of-way near Steadwell Avenue in the Town of Amsterdam (MP 177.5); H.D.F. Veeder House (MP 188); hexagonal limestone well shelter (MP 198); and the Palatine Bridge cut limestone retaining wall and bridge abutment (MP 198) (**10 total**)
- **Herkimer County** – Little Fall Historic District (S/NR-eligible Historic District) (**1 total**)
- **Oneida County** – Union Station, Utica (S/NR-listed Individual) (MP 237.5); and a railroad station building in the village of Oriskany (S/NR-eligible Individual (MP 244.5) (**2 total**)
- **Monroe County** – Brown's Race Historic District (S/NR-listed Historic District) (MP 370); *S/NR-eligible Individual*: Coldwater Station (MP 378); and 60 South Main Street (MP 386) (**3 total)**
- **Genesee County** – Lake Street Historic District (S/NR-listed Historic District) (MP 389) (**1 total**)

A field survey would be conducted as part of the Tier 2 analysis in order to determine potential adverse impacts to these resources and to identify potential architectural resources in the APE. Impacts would be assessed for any resources determined to be S/NR-eligible.

The exact area of the proposed property acquisitions at MPs 168.3, 210.8, 215.6, 237.7, 286.4, 341.1, 377.6 has not yet been determined. It is assumed for the purposes of this analysis that the property to be acquired would be directly adjacent to the existing right-of-way. There are no previously-identified architectural resources located in close proximity to these mile markers, with one exception: MP 237.7, which is in close proximity to Union Station in Utica (discussed above). There could be additional adverse impacts to potential architectural resources as a result of the property acquisitions proposed for Alternative 90B. As part of the Tier 2 analysis, properties proposed to be acquired would be surveyed to identify any potential architectural resources. Impacts would be assessed for any resources identified as eligible for listing on the State/National Registers.

It should be noted that there are a number of rail bridges located within the right-of-way, which could be adversely affected by work proposed for this alternative. These bridges would be identified and evaluated for their potential eligibility for listing on the S/NR listing in the Tier 2 level analysis. Impacts would be evaluated for any bridges determined to be eligible for S/NR listing.

Indirect APE: Historic Architectural Resources

There are 116 architectural resources located in the indirect APE for Alternative 90B. Exhibit 4-65 provides a summary of the total number of resources located in the indirect APE for this alternative. These include:

- **Schenectady County** – Union Street Historic District (S/NR-listed Historic District) (MP 159.8); *S/NR-listed Individual*: Central Fire Station (MP 159.5); Proctor, F.F. Theater and Arcade (MP 159.5); and Swart House and Tavern (MP 167.5) (**4 total**)
- **Montgomery County** – *S/NR-listed Individual*: Fort Johnson (MP 179); New Courthouse – Fonda (MP 186.5); Wagner, Webster House (MP 198); Frey House (MP 198.2); Nellis Tavern (MP 205.5); *S/NR-eligible Historic District*: Amsterdam East Main Street Historic District (MP 175.8); and Fonda Fairgrounds and Speedway Historic District (MP 186); and *S/NR-eligible Individual*: 6-8 Voorhees Street (MP 175); 366, 399, 401 West Main Street (MP 176.5); World War I Memorial (MP 177.8); 2, 3, 4, 9, 11, 19, 23, 25, 27, 29, 31, and 37 East Main Street (MP 186); 4, 6, 8, 10, 12, 14-16, 18, 22, 26, 30, 32, 34, 40, 42, 46, and 56 West Main Street (MP 186); 1 Cayadutta Street; Lock E-14 and Lock House; and the Nelson and Reese House (including cemetery and barn foundations) (MP 207) (**43 total**)
- **Herkimer County** – *S/NR-listed Individual*: Herkimer House (MP 214); U.S. Post Office – Little Falls (MP 216.5); Herkimer County Trust Company building (MP 216.5); Palatine German Frame House (Wilder House) (MP 227); and *S/NR-eligible Individual*: 591 East John Street (MP 216.5); 401, 403, 407 South Ann Street (MP 216.5); Fleet Bank (MP 216.5); Snyder Apartments (MP 216.5); 48-54 West Main Street (MP 216.5); 24, 25, 55, 56 West Mill (MP 216.5); 151 Elizabeth Street (MP 217); and 338 West Main Street (MP 217) (**17 total**)
- **Oneida County** – Lower Genesee Historic District (S/NR-eligible Historic District) (MP 237.5); *S/NR-eligible Individual*: Foster Brothers Manufacturing Company (MP 237); Hieber, John C. and Company building (MP 237.5); Utica Daily Press building (MP 237.5); Hurd & Fitzgerald building (MP 237.5); and Byington Mill (Frisbie & Stansfield Knitting Company) (MP 237.5) (**7 total**)
- **Madison County** – South Peterboro Street Commercial Historic District (S/NR-listed Historic District); and *S/NR-listed Individual*: U.S. Post Office – Canastota (MP 270); United Church of Canastota (MP 270); 203 South Main Street (MP 270); Canastota Public Library (MP 270); 115 South Main Street (MP 270); 223 James Street (MP 270); Alvord House (289.5); and East Palmyra Presbyterian Church (MP 344.5) (**7 total**)
- **Onondaga County** – Alvord House (S/NR-listed Individual (MP 289.5); and New York State Fairgrounds Historic District (S/NR-eligible Historic District (MP 294) (**2 total**)
- **Wayne County** – East Palmyra Presbyterian Church (S/NR-listed Individual) (MP 344.5); and Village of Clyde Historic District (S/NR-eligible Historic District (MP 328.5) (**2 total**)
- **Monroe County** – *S/NR-listed Historic District*: East Avenue Historic District (MP 368-370); St. Paul-North Water Streets Historic District (MP 371); State Street Historic District (MP 371); Bridge Square Historic District (MP 372); Madison Square-West Main Street Historic District (MP 372); *S/NR-listed Individual*: Leopold Street Shule (MP 370.5); German United Evangelical Church Complex (MP 371); Andrews Street Bridge (MP 371); Federal Building (MP 371); Brick Presbyterian Church (371); Washington Street Rowhouses (MP 372); *S/NR-eligible Historic District*: Birch Crescent Historic District (MP 379); Prince Alexander Historic District (MP 370);

Public Market Historic District (MP 370); and *S/NR-eligible Individual*: Foster Armstrong Piano Warehouse (MP 364); 1290, 1255-1257, 1239, 1320 University Avenue (MP 368.5); J. Hunderford Smith Company building (MP 369.5); Otis Lumber Company building (MP 369.5); Rochester Public Market (MP 370); Schwalb Coal & Oil Company (MP 370.5); Taylor Instrument Company (MP 373); Building C2 (H.F. Snyder & Son) (MP 386); and Building Z (former Richmond Residence) (MP 386) (**26 total**)

- **Genesee County** – Village of Bergen Historic District (S/NR-eligible Historic District) (MP 389); and 20 North Lake Street (S/NR-eligible Individual) (MP 389) (**2 total**)
- **Erie County** – *S/NR-listed Individual*: Buffalo Gas Light Company Works (MP 2.8); Delaware Park-Front Park System (MP 4); *S/NR-eligible Historic District*: Wende Correctional Facility (MP 422); Joseph Ellicot Downtown Historic District; *S/NR-eligible Individual*: 1032 Niagara Street (MP 5); 1073 Niagara Street (MP 5) (**6 total**)

Although direct, adverse impacts to architectural resources due to construction-related activities are not anticipated for resources located within the indirect APE, it is possible that this alternative could have indirect, contextual impacts to these resources. An analysis of potential adverse impacts, including visual or contextual impacts, to architectural resources located in the indirect APE for Alternative 90B would be conducted during the Tier 2 level analysis. A field survey would be conducted as part of the Tier 2 analysis in order to determine potential adverse impacts to these resources and to identify potential architectural resources in the APE. Impacts would be assessed for any resources determined to be S/NR-eligible.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations.

As with Alternative 90B, Alternative 110 also would include a new signal system to support the 110 mile an hour speed, new grade crossings, and new undergrade and overhead bridges, and the same improvements would be made at seven existing stations along Empire Corridor West.

Parks and Recreational Areas

Empire Corridor South

No additional work within Empire Corridor South, other than that proposed for Alternative 90A, are proposed, and additional parkland impacts are not anticipated to occur.

Empire Corridor West/Niagara Branch

With Alternative 110, trackwork would start at MP 159 and extend west from here, crossing over the Mohawk River/Erie Canal on an existing bridge. In the City of Schenectady, Front Street Park and Pool adjoins the south side of the railroad on the south river bank, and the Glenville Bike Trail, a Section 6(f) funded facility, extends under the bridge on the north river bank, but impacts to the

park and trail are not anticipated. The potential for impacts to this area would be evaluated once more detailed designs are advanced in Tier 2. Further set back on the southwest side are Riverside Park in Schenectady and Collins Park and Lake in Scotia. At MP 167, the railroad extends north of the Lock 9 Canal Park, a Section 6(f) park, which is on the opposite (southwest side) of Route 5, but will not impact the park.

Work that may extend outside of the right-of-way may occur at Amsterdam Station and at other locations in Montgomery County. Proposed track and station improvements at Amsterdam Station and trackwork at MP 179 are located in the vicinity of the Erie Canal, but should not affect the canal. However, the proposed track, but would not affect parks or recreation facilities.

Construction of a fourth track and maintenance service road in Herkimer County near the Montgomery County line (MPs 210.5 to 214.8) would not involve impacts to parklands.

Work that may extend outside of the right-of-way around the Utica Station in Oneida County and around the Syracuse Station, but will be located within urban areas and will not affect parklands. New passenger track and a maintenance service road will be added in the areas north of the tracks adjoining Onondaga Lake County Park, a Section 6(f) park, but are not anticipated to affect parklands. In Monroe County, the addition of a fourth track around the Rochester Station could also involve right-of-way impacts. This work will extend in the vicinity of facilities such as Upper Falls Park, a Section 6(f) park, in the City of Rochester and will cross the Erie Canal and the Erie Canalway Heritage Trail at MP 374.5, but are not anticipated to directly affect parklands. The potential for impacts at the canal crossing will be evaluated as designs are advanced in Tier 2.

In Genesee County, Alternative 110 may impact a county park at MP 402. The proposed track alignment passes through the Dewitt County Recreational Facility in the Town of Batavia.

Historic and Cultural Resources

Exhibit 4-65 provides a summary of the total number of archaeological sites and architectural resources located in the APEs for Alternative 110.

As with Alternative 90B, the projects proposed for Alternative 90A in the direct and indirect APEs for Empire Corridor South (MP 1 to MP 143) also would be included in Alternative 110. The discussion of potential impacts presented above under Alternative 90A is not reiterated in the impacts analysis for Alternative 110. However, the number of archaeological sites and architectural resources identified in the direct and indirect APEs for the Empire Corridor South portion of Alternative 90A has been included in the total number of resources for Alternative 110 shown in Exhibit 4-65.

Direct APE: Archaeological Sites

A majority of the previously-identified archaeological sites that have the potential to be adversely impacted by the Alternative 110 are the same as those that could be adversely impacted by the similar projects proposed for Alternative 90B, including 18 burial/habitation sites. There are three exceptions:

- Two N (U) sites located in the direct APE for Alternative 90B in Schenectady County are not located in the direct APE for Alternative 110.
- One N (S) site located in the direct APE for Alternative 90B in Montgomery County would not be located in the direct APE for Alternative 110. One N (H) site in Montgomery County located in the direct APE for Alternative 110 is not located in the direct APE for Alternative 90B.

As part of the Tier 2 analysis, field investigations would be conducted in those areas of the direct APE that have been identified as potentially archaeologically sensitive, in order to determine the presence or absence of potentially S/NR-eligible archaeological sites and thus any potential impacts to archaeological resources.

Direct APE: Historic Architectural Resources

The number of NHLs, S/NR-listed Historic Districts, S/NR-listed Individual resources, S/NR-eligible Historic Districts, and S/NR-eligible Individual resources located in the direct APE for Alternative 110 are the same as the number of resources located in the direct APE for Alternative 90B. Therefore, the number of previously identified architectural resources that could experience adverse, direct impacts due to construction-related activities in Alternative 110 is the same as those for Alternative 90B.

As with Alternative 90B, there are seven existing stations along Empire Corridor West where improvements are proposed for Alternative 110—one of which has been identified as a known architectural resource: Utica Station, located in Oneida County. The other six stations where improvements are proposed would be evaluated for their potential eligibility for listing on the State/National Registers, then impacts would be assessed for any stations identified as eligible for S/NR listing. Additionally, as with Alternative 90B, there are a number of rail bridges located within the right-of-way, which could be adversely impacted by work proposed for this alternative. As part of the level Tier 2 analysis, these bridges would be identified and evaluated for their potential eligibility for S/NR listing, then adverse impacts would be assessed for any bridges determined to be S/NR-eligible.

Certain elements of Alternative 110, including the proposed realignment of sections of Route 5, could potentially impact residential and commercial buildings outside the right-of-way at the following locations: MPs 164.5-165.4; 172.6; 173.6; 183.2; 184.5; 185; 186.8; 187.3; 189; 191.7; 192.5-192.8; 196.4; 196.7; 196.9; 198; 200.6; 210.8; 226.4-227; 228; 230.4-230.9; 360.6; 361.2; and 402.4. Although there are no previously identified architectural resources within close proximity to these locations, as part of the level Tier 2 analysis, the potentially affected properties would be surveyed to identify any potential architectural resources that may eligible for listing on the State/National Registers.

The exact area of the proposed property acquisitions at MPs 168.3, 184.6, 186.3, 191.7, 198.1, 200.6, 207.5, 210.8, 215.1, 226.9, 228.0, 230.8, 237.2, 286.4, 341.1, 361.4, 377.6, and 389.1 has not yet been determined. It is assumed for the purposes of this analysis that the property to be acquired would be directly adjacent to the existing right-of-way. Although there are no previously identified architectural resources located in close proximity to these mile markers, there could be adverse impacts to potential architectural resources as a result of the property acquisitions proposed for Alternative 110. As part of the Tier 2 analysis, properties proposed to be acquired would be

surveyed to identify any potential architectural resources. Impacts would then be assessed for any resources identified as eligible for S/NR listing.

Indirect APE: Architectural Resources

As with the direct APE, the number of NHLs, S/NR-listed Historic Districts, S/NR-listed Individual resources, S/NR-eligible Historic Districts, and S/NR-eligible Individual resources located in the indirect APE for Alternative 110 are the same as the number of resources located in the indirect APE for Alternative 90B, with the addition of the Walrath-Van Horne House (MP 201.5), an S/NR-listed individual resource in Montgomery County. Although direct, adverse impacts to these architectural resources due to construction-related activities are not anticipated for resources located within the indirect APE, it is possible that this alternative could have indirect, contextual effects to these resources. An analysis of potential adverse indirect impacts, including visual or contextual impacts, to architectural resources located in the indirect APE for Alternative 110 would be conducted during the Tier 2 analysis. A field survey would be conducted as part of the Tier 2 analysis in order to determine potential adverse impacts to these resources and to identify potential architectural resources in the APE. Impacts would be assessed for any resources determined to be S/NR-eligible.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks approximately 283 miles in length on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 would use 125 miles per hour as the MAS and would be the first speed threshold for electrically powered trains. Trains would operate on the existing Hudson Line Corridor from New York Penn Station to Albany/Rensselaer Station. The new corridor would parallel the existing corridor on a combination of new and existing right-of-way to serve existing stations in Albany, Syracuse, Rochester, and Buffalo. Required infrastructure would include roadbed, track, viaducts, bridges, cuts, embankments, access roads, railroad systems, maintenance facilities and other support facilities.

Parks and Recreational Areas

Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch. Alternative 90A would largely be situated within the right-of-way and therefore would not involve substantial parkland impacts.

Empire Corridor South

No new improvements, beyond what is proposed for Alternative 90A, would be proposed for Alternative 125 along the majority of Empire Corridor South. However, roughly one mile of the proposed 125 mph track would extend south from Albany-Rensselaer Station to cross the Hudson River. Since there are no parklands within this one-mile section of rail corridor, there are no additional impacts to parklands within Empire Corridor South.

Empire Corridor West/Niagara Branch

Alternative 125 would involve construction of a total of 236 miles of track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. Alternative 125 also would include new right-of-way in most areas, but would merge back with the Empire Corridor over two 15- and 16-mile segments centered on Syracuse and Rochester, respectively. This route covers 126 miles on new alignment between Rensselaer County and a point 8.5 miles east of Syracuse Station. Alternative 125 extends through urban areas in Albany and Schenectady Counties over a distance of 20 miles, following the New York State Thruway (I-87/I-90) over most of this distance.

Capital Hills Public Golf Course in Albany County is located immediately south of Alternative 125 where it extends through the median of the New York State Thruway between MPs QH146 and QH147, but no impacts to the golf course are anticipated. At MP QH152, the New York State Thruway and Alternative 125 enter the Albany Pine Bush Preserve. At MP QH153, Alternative 125 transitions off of the thruway median and may impact the Albany Pine Bush Preserve at this location, which is a Section 6(f)-funded park. At MP QH155, Alternative 125 may impact Fusco Town Park located directly to the south of the Thruway and the rail corridor. Direct impacts to parklands in Schenectady County are not anticipated for Alternative 125.

In Herkimer County, between MPs QH217 and QH218, Alternative 125 passes through a wooded area in Russell Park within the Town of German Flatts.

In Oneida County, Alternative 125 passes just south of Washington Mills Athletic Park located west of Route 5 at MP QH230. This facility is approximately 250 feet from the new rail and no impacts to this park are anticipated with this alternative. Between MPs QH244 and QH245, Alternative 125 also passes through Atunyote Golf Club, owned by the Oneida Nation, within the Town of Vernon. If Alternative 125 is advanced to Tier 2, design will be refined to minimize or avoid impacts on the Oneida Nation recreational use.

Alternative 125 crosses Erie Canal State Park at three locations before meeting up with the existing rail corridor at MP 283 (just before MP QH269 in the 125 Study Area). The three Erie Canal State Park crossings are located between MPs QH260 and QH261; between MPs QH262 and QH263, both in Madison County; and between MPs QH265 and QH266 in Onondaga County. Old Erie Canal State Historic Park has received Section 6(f) funding.

In Onondaga County, the alignment merges with the existing Empire Corridor. Just before the merge, Alternative 125 crosses South Main Street in the village of Minoa and comes within a block of Lewis Park although no impacts to the park are anticipated. Alternative 125 extends through 16 miles of urban area surrounding the City of Syracuse. Just west of the Syracuse station at MP QH278.5, Alternative 125 passes by Onondaga Lake County Park, a Section 6(f) park. The tracks would be on elevated structure above the existing tracks at this location, so right-of-way should be minimized. Before the alignment diverges from the existing Empire Corridor, Alternative 125 passes by the State Fairgrounds between MPs QH281 and QH282. No impacts to these parklands are anticipated since work within these areas is limited to the right-of-way.

At MP QH284, Alternative 125 diverges from the existing Empire Corridor and continues on a new alignment 61 miles west to a point 11 miles east of Rochester Station in Monroe county. There are no impacts to parklands anticipated within these 61 miles of the Alternative 125.

In Monroe County, Alternative 125 passes just south of Beechwoods Park at MP QH344 but no impacts to the park are anticipated. Alternative 125 rejoins the existing Empire Corridor at MP QH346, diverging again at MP QH361, 5.5 miles west of Rochester Station, to continue on new alignment 52 miles west to Buffalo in Erie County. In Monroe County, close to the Genesee border, Alternative 125 passes near Churchville County Park, a Section 6(f)-funded park, at MP QH371. No additional impacts to parklands are anticipated for the remainder of the 125 Study Area from MP QH371 to where it merges back to the existing corridor at MP QH413 in Erie County. No impacts to parklands are anticipated to the end of the Empire Corridor West section at the Buffalo-Exchange Street station.

In Erie County, just past MP QH408, Alternative 125 passes near Clarence Town Park, which may be impacted by this alternative. Between MPs QH408 and QH409, this alternative passes through the Tillman Road Swamp State Wildlife Management Area that may be impacted.

Historic and Cultural Resources

The projects proposed for Alternative 90A in the direct and indirect APEs for Empire Corridor South (MP 1 to MP 143) and the Niagara Branch also would be included in Alternative 125. The discussion of potential impacts presented under Alternative 90A is not reiterated in the impacts analysis for Alternative 125. However, the number of archaeological sites and architectural resources identified in the direct and indirect APEs for the Empire Corridor South portion of Alternative 90A has been included in the total number of resources for Alternative 125 shown in Exhibit 4-65. The Programmatic Agreement (included as Appendix H) addresses the process by which FRA and NYSDOT intend to comply with Section 106 for undertakings occurring on tribal lands or where adverse effects to historic properties of a religious or cultural significance to a tribe occur off tribal land.

Direct APE: Archaeological Resources

There are 32 previously identified archaeological sites located in the direct APE of proposed new track for Alternative 125 (see Exhibit 4-65) that could experience direct, physical impacts due to construction-related activities, including six burial/habitation sites. These are:

- **Albany County** – two N (C) sites; and H (I) site (**3 total**)
- **Schenectady County** –N (C) site (**1 total**)
- **Schoharie County** – N (U) site (**1 total**)
- **Montgomery County** –N (S), H (U) site; H (U) site (**2 total**)
- **Herkimer County** – H (B) site (**1 total**)
- **Oneida County** – N (C) sites; N (B) site; N (H) site; and Site 3 identified by the Oneida Nation (**4 total**)**Madison County** – two N (S) sites; N (C) site; and Sites 4 and 5 identified by the Oneida Nation (**5 total**)
- **Onondaga County** – two N (H) sites ; two N (S) sites; two H (D) sites; and N (C) site (**7 total**)
- **Cayuga County** – N (B); and N (S) site (**2 total**)
- **Wayne County** – N (S) site; and N (C) site (**2 total**)
- **Genesee County** – two N (C) sites; and N (S) site (**3 total**)

- **Erie County** – two N (C) sites; N (C, S) site; and N (S) site (**4 total**)

As part of the Tier 2 analysis, field investigations would be conducted in those areas of the direct APE that have been identified as potentially archaeologically sensitive, in order to determine the presence or absence of potentially S/NR-eligible archaeological sites and thus any potential impacts to archaeological resources.

Direct APE: Historic Architectural Resources

Work proposed for the Alternative 125—which mainly consists of the construction of new track—could have adverse impacts on architectural resources located within the direct APE due to construction-related activities. Exhibit 4-65 provides a summary of the total number of architectural resources located in the direct APE for Alternative 125.

There are three architectural resources located in the direct APE for Alternative 125 that could experience direct, adverse impacts due to construction-related activities. These include:

- **Schenectady County** – Liddle, Robert Farmhouse (S/NR-listed Individual) (MP 167) (**1 total**)
- **Madison County –** Deferriere House (S/NR-listed Individual) (MP 252.8) (**1 total**)
- **Erie County** – Hull, Warren House (S/NR-listed Individual) (MP 411) (**1 total**)

A field survey would be conducted as part of the Tier 2 analysis in order to determine potential adverse impacts to these resources and to identify potential architectural resources in the APE. Impacts would be assessed for any resources determined to be S/NR-eligible.

Indirect APE: Architectural Resources

There are five architectural resources located in the indirect APE for the Alternative 125. Exhibit 4-65 provides a summary of the total number of resources located in the indirect APE for this alternative. These include:

- **Albany County** – Nut Grove (S/NR-listed Individual) (MP 144); and 924 New Scotland Road (S/NR-eligible Individual) (MP 147) (**2 total**)
- **Schenectady County** – *S/NR-listed Individual*: Reformed Presbyterian Church Parsonage (MP 169); and Halladay House (MP 172); and US 20 between Knight and Mudge Roads (S/NR-eligible Individual) (MP 170.5) (**3 total**)

Although direct, adverse impacts to architectural resources due to construction-related activities are not anticipated for resources located within the indirect APE, it is possible that this alternative could have indirect, contextual impacts to these resources. An analysis of potential adverse impacts, including visual or contextual impacts, to architectural resources located in the indirect APE for Alternative 125 would be conducted during the Tier 2 level analysis. A field survey would be conducted as part of the Tier 2 analysis in order to determine potential adverse impacts to these resources and to identify potential architectural resources in the APE. Impacts would be assessed for any resources determined to be S/NR-eligible.

4.23.5. Potential Mitigation Strategies

Parks and Recreational Areas

Mitigation for impacts on parklands and recreation areas will include avoiding and minimizing impacts to the extent practicable. Compliance with the requirements of Section 4(f) of the U.S. Department of Transportation Act requires that alternatives that avoid or minimize impacts be evaluated, and, if impacts are proposed, mitigation measures be developed, in consultation with officials with jurisdiction. If parklands that have received Land and Water Conservation Fund Act grants will be converted, Section 6(f) requires that recreation property of equal fair market value and usefulness be provided as compensation.

Mitigation measures may include permanent measures, such as providing trail connections or compensatory parkland, or construction mitigation, such as maintaining trail or park access during construction or using time-of-year restrictions on construction work. Other considerations will include ameliorating potential visual and noise impacts on adjoining parks or recreation areas, and further assessments of these impacts and mitigation measures will also be advanced in Tier 2.

Historic and Cultural Resources

A draft Programmatic Agreement has been prepared for this program (see Appendix H), which identifies a methodology for Section 106 process implemented for component projects advanced at the Tier 2 level. The PA would be signed by the FRA as lead federal agency, NYSDOT, and the SHPO. Participating federally recognized tribes and consulting parties would be invited to sign the PA as concurring parties. The Advisory Council for Historic Preservation (ACHP) declined to participate in the development of the PA via e-mail dated July 20, 2012. However, ACHP may choose to participate in the consultation when there are substantial impacts to historic properties, when a case presents important questions of policy or interpretation, when there is a potential for procedural problems, or when there are issues of concern to Indian tribes. ACHP must be invited to participate when the federal agency sponsoring a project wants the Council's involvement and when the project would have an adverse effect on a NHL. Execution of the PA and implementation of the terms therein satisfies the requirement of Section 106 that the Council be given a reasonable opportunity to comment on the Tier 1 undertaking, and demonstrates that the federal agency has taken into account the effects of the action.

For archaeological resources, mitigation measures that may be identified for component projects at the Tier 2 level may include Phase III data recovery, documentation, geoarchaeological survey, preparation and implementation of archaeological protection plans, and/or preparation of public education materials.

For architectural resources, possible mitigation measures include:

- The preservation or relocation of historic buildings;
- Documentation of resources following Historic American Buildings Survey (HABS)/Historic American Engineering Record (HAER) standards;
- Production of educational materials interpreting the history and significance of affected resources for use by local libraries, historical societies, and educational institutions; and

- Installation of signage interpreting the history and significance of affected resources along the proposed rail corridor, or planting vegetation or creating noise barriers along the proposed rail corridor.

Furthermore, in order to avoid inadvertent damage to historic resources located in close proximity to possible project construction, all appropriate resources would be included in a Construction Protection Plan (CPP). The CPP would identify the historic resources to be included in the plan. It would also set for the specific measures to be used and specifications that would be applied to protect these resources during the construction period.

If unavoidable potential direct and/or indirect adverse effects are identified during the Tier 2 analysis, more detailed and specific measures to minimize and/or mitigate these effects would be defined and implemented in consultation with SHPO, involved THPOs and/or Tribal Organizations, ACHP (if appropriate), and any involved consulting parties, as described in the draft PA and noted under 4.23.6, "Future Analysis."

4.23.6. Future Analysis

Parks and Recreational Areas

Once an alternative has been selected, the Tier 2 assessments will include a thorough inventory of publicly owned parks and recreation facilities, as well as non-profit parklands that may be potentially affected. Detailed property mapping and information on the extent of public access, use and ownership for parks and recreation areas will be obtained. Consultation with public officials and property owners/officials with jurisdiction will be performed regarding the use of the parks/recreation areas and potential impacts and mitigation measures. For potential parkland impacts, the applicability of Section 4(f) of the U.S. Department of Transportation Act and Section 6(f) of the U.S. Land and Water Conservation Act will be determined. Officials with jurisdiction will be identified and consulted for potential Section 4(f) parklands to determine the potential applicability of Section 4(f). Those parklands for which Land and Water Conservation funds were expended will also be identified.

Section 4(f) of the U.S. Department of Transportation Act applies to two categories of resources: 1) publicly owned public parks, recreation areas, and wildlife or waterfowl refuges; and 2) significant historic sites, regardless of whether they are publicly or privately owned. Section 4(f) has prohibited the U.S. DOT from approving the "use" of Section 4(f) properties unless U.S. DOT makes two findings: 1) that there is no feasible and prudent alternative that avoids the use of Section 4(f) properties, and 2) that the project incorporates all possible planning to minimize the harm that results from the use of those resources. Avoidance and minimization measures will be evaluated in Tier 2, and if it is not possible to eliminate impacts on Section 4(f) resources, appropriate mitigation measures will be identified. The process for evaluations of historic properties are discussed further in the following section.

Section 4(f) requires the U.S. DOT to seek comments from the U.S. Department of the Interior (and in some cases other agencies) before making these findings. The extent of impact and use of Section 4(f) properties will be determined, and potential impacts on Section 4(f) properties will be assessed. If a use of a Section 4(f) park or recreation property is determined to occur, a Section 4(f) Evaluation will be prepared and circulated as part of Tier 2.

Section 6(f) applies to parklands on which Land and Water Conservation Funding has been expended. If a Section 6(f) conversion may occur, then a Section 6(f) Evaluation must be prepared as part of Tier 2 and approved by the National Park Service. The Section 6(f) Evaluation must evaluate all practical alternatives to converting the Section 6(f) property and demonstrate that there are no feasible means of avoiding the conversion. If a conversion will occur, the Section 6(f) Evaluation must identify replacement property to be acquired of reasonably equivalent usefulness and location and of at least equal fair market value to the converted property.

Historic and Cultural Resources

As described in the "Methodology" section, the environmental compliance for this program is being conducted using a phased approach as outlined in 36 CFR 800.4(b)(2) and 800.5(a)(3). Determinations of eligibility and effect under Section 106 of NHPA may be deferred to Tier 2 of the process under the terms of a Programmatic Agreement (PA) executed in accordance with 36 CFR 800.14(b). A draft PA, included as Appendix H, provides a mechanism and framework for meeting NHPA compliance obligations in the Tier 2 phase of the program. The draft PA identifies a protocol for preparing site-specific environmental documentation for component projects, as appropriate, in subsequent phases or tiers of the program in accordance with NEPA and NHPA. The PA sets forth guidelines for the following procedures at the Tier 2 level: consultation with SHPO, federally recognized tribes, other consulting parties; delineation of APEs and identification and evaluation of historic properties; assessment of adverse effects; and resolution of adverse effects. The PA also provides a list of property types exempt from review as historic properties and a list of routine maintenance activities that would be exempt from the Section 106 methodology outlined in the PA.

As component projects are progressed to the Tier 2 level, APEs for each component project would be developed in consultation with SHPO, federally recognized tribes and consulting parties, as appropriate to reflect the effects of each Tier 2 project. More detailed existing conditions data collection and effects assessments, the protocol for which is outlined in detail in the draft PA, would be conducted as part of the Tier 2 analysis. Existing conditions data presented in this Tier 1 document would be revised and/or expanded upon as appropriate to account for all historic properties in the APEs of component projects assessed at the Tier 2 level. In regard to archaeological resources, archaeological documentary studies and field investigations (where appropriate) would be conducted in sensitive portions of the direct APEs to determine the presence or absence of S/NR-eligible archaeological resources. If S/NR-eligible archaeological resources are identified in the direct APEs that could be affected by the proposed project, additional investigations (such as Phase II field surveys) would be undertaken to determine the physical extents and significance (S/NR eligibility) of archaeological sites.

For architectural resources, additional existing conditions data that would be collected as part of the Tier 2 analysis would include the identification of architectural resources that meet the S/NR criteria but had not been previously determined S/NR-eligible. The bridges and railroad facilities located within the direct APEs also would be evaluated for S/NR-eligibility as part of the Tier 2 analysis. In order to evaluate the significance of these resources, an architectural historian would conduct a field visit and prepare documentation in the form of a Cultural Resources Survey (CRS) Report. The content, methodology, level of effort, and documentation requirements for historic property evaluations in the CRS shall be conducted in accordance with State Education Department (SED) Work Scope Standards, which incorporate the standards of the New York Archaeological Council (NYAC). Based on this documentation, FRA would make determinations of eligibility in

consultation with SHPO.

Once the additional data collection for existing conditions in the APEs has been completed, the effect of project alternatives on historic properties will be evaluated. The Advisory Council's Criteria of Adverse Effect (36 CFR 800.5[a][1]) will be applied to determine effects on the historic properties. In general, an adverse effect occurs when a proposed project may cause a change in the characteristics of a property that qualify it for inclusion in the National Register. The proposed project's adverse effects will be identified in coordination with ACHP, SHPO, participating federally recognized tribes, and consulting parties. The lead agency will issue an Effect Finding in accordance with 36 CFR 800.11(e).

If the analysis concludes that a proposed project would have an adverse effect, measures to avoid, minimize, or mitigate adverse effects will be identified. This mitigation most likely will be implemented through project-level Memorandum(a) of Agreement (MOA). A PA differs from an MOA in that MOAs are used to resolve known and definable adverse effects on historic properties, whereas PAs are used when the effects of an undertaking are not fully known. All appropriate coordination with ACHP, SHPO, and applicable THPOs, tribal organizations, and consulting parties, would be undertaken as part of this process in compliance with Section 106. Guidelines for MOAs prepared as part of component projects at the Tier 2 level are provided in the Draft PA.

As noted above in "Regulatory Context," in addition to Section 106, the effects of the undertaking on historic properties will also be considered under Section 110 of NHPA and Section 4(f) as part of a separate future analysis. Section 110 of NHPA mandates additional protection of NHLs by requiring that federal agencies undertake planning and actions as necessary to minimize harm when considering undertakings that may directly and adversely affect NHLs. Section 4(f) prohibits actions by the Secretary of Transportation that require "use" of a historic property that is listed in or eligible for inclusion in the National Register, unless a determination is made that there is no feasible and prudent alternative to the use of such land, and all possible planning has been undertaken to minimize harm to the 4(f) property.

4.24. Indirect and Cumulative Impacts

Indirect and cumulative impacts include reasonably foreseeable actions and proposed and planned actions. This Tier 1 evaluation presents a generalized assessment of these impacts based on Tier 1 concepts that would be further refined in the Tier 2, once the scope and timing of improvement projects are better defined.

4.24.1. Regulatory Context

The National Environmental Policy Act regulations promulgated by the Council of Environmental Quality define both indirect effects and cumulative impacts,[192] as follows:

> "*Indirect) effects, are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other*

[192] / Council of Environmental Quality Regulations for Implementing NEPA, 40 CFR 1508.7 and 1508.8, December 21, 1984.

effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."

"Cumulative impact" is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

4.24.2. Methodology

For the Tier 1 analysis, the indirect impacts were qualitatively addressed for the program on a generalized basis. This cumulative impact assessment involved researching projects listed on New York State Rail Plan, the NYSDOT *Statewide Transportation Improvement Program for Federal Fiscal Years 2011 – 2014* for the different planning regions in the study area. The projects that were in the vicinity of the study area and are in the planning phases but are projected to be built in the same timeframe as the Tier 2 program were considered in the analysis.

4.24.3. Considerations for Impact Assessment

The considerations for the cumulatives and indirect impact assessment are described below:

Indirect Impacts

The types of indirect environmental impacts that can occur as a result of induced development or changes are described below:

- **Traffic and Transportation:** Increased traffic can occur if secondary development is induced as a result of the program.
- **Land Use:** Changes in land uses or land use patterns can arise if secondary development occurs as a result of the program, potentially causing an increase in property values or the intensity or patterns of land use development.
- **Employment, Population, and Businesses:** Indirect impacts resulting from improvements in passenger rail service have the potential to affect changes in socioeconomic conditions, such as employment and population, and can positively affect business sales and revenues.
- **Environmental Justice and Community Facilities:** Secondary development has the potential to affect communities and environmental justice populations through changes in development patterns, traffic, or property values.
- **Coastal/Water Resources and Floodplains:** Secondary development can result in direct or indirect effects on surface waters, aquifers, floodplains, and wetlands, although the extent of this conversion depends on the siting and location of development and regulatory mechanism to minimize/mitigate any fills.

- **Ecology and SEQR Critical Areas:** Secondary development has the potential to directly or indirectly affect aquatic and wildlife habitats and critical areas protected under SEQR, although the extent of this effect is dependent on the siting, location, and nature of the development and measures to minimize/mitigation any effects.
- **Cultural Resources, Parks, Visual Resources:** Secondary development may have the potential to affect historic or archaeological sites, parks, or scenic landscapes, although any impacts would likely be required to be mitigated, including potential provision of historic mitigation and additional parklands or other amenities.
- **Farmlands:** Secondary development has the potential to affect actively farmed lands and prime farmland soils or soils of statewide importance.
- **Air Quality, Noise, Energy/Climate Change:** Increased traffic from secondary development has the potential to increase noise and emissions of air pollutants, which can affect energy use and climate change.
- **Contaminated and Hazardous Materials:** Secondary development has the potential to affect either existing contaminated or hazardous materials sites or the generation of contaminated/hazardous materials.

Cumulative Impacts

A review of the New York State Department of Transportation Improvement Program and the New York State Thruway Authority improvements program was performed to identify projects in the vicinity of the Empire Corridor that may involve capacity improvements (see Exhibit 4-66). The projects identified included the following:

- Moynihan Station Redevelopment/Improvements, Manhattan (New York County), New York City;
- Route 17 Upgrade to I-86: Exit 130A to 131;
- Tappan Zee Bridge Replacement, Tarrytown (Westchester County) and Nyack (Rockland County);
- New York State Thruway (I-87) Reconstruction and Mobility Improvement Project between Interchanges 23 (I-787) and 24 (I-90), City of Albany (Albany County);
- Improve I-87 (Adirondack Northway) Access to Wolf Road/Airport Area by Reconstructing Exit 4 or by Constructing a New Interchange, Town of Colonie (Albany County);
- I-390 Interchange Improvements at I-490 (Part 1 of 3) Reconstruction, Town of Gates (Monroe County);
- Peace Bridge Plaza and Connecting Roadway System, City of Buffalo (Erie County);
- Highway Widening of East Robinson/North French from Route 62 to Sweet Home Road (Route 952T), Town of Amherst (Erie County);
- Highway Widening of Route 62 from Krueger Road to North Tonawanda line, Town of Wheatfield (Niagara County);
- New Highway Construction, John B. Daly Boulevard Extension from Niagara Street to Pine Avenue, City of Niagara Falls (Niagara County).

Exhibit 4-66—Projects in the Vicinity of the Empire Corridor

Other Transportation Projects and Location	Project Description	Implementation
Moynihan Station Redevelopment/ Improvements Manhattan, New York County – Pennsylvania Station	Phase 1: • Two new entrances through the Farley building • Extension of the West End Concourse to serve eight additional tracks • Doubling of concourse width • New stairs, escalators, and elevators from the platforms up to the station to meet ADA requirements • Est. $150 million	Phase 1: • Begin October 2012 • Complete in 2016
Route 17 Upgrade to I-86 Woodbury, Orange County – Route 17 Exit 130 to 131A.	• 7 miles west of MP 44 on existing Empire Corridor • Add ramp from Route 32 SB to Route 17 EB • Est. $50.4 million	Currently in development. Construction Summer 2017 through Summer 2018
Tappan Zee Bridge Replacement Tarrytown and Nyack, Westchester/ Rockland Counties.	• Crosses Hudson River and Empire Corridor near MP 24.5 • New bridge, over three miles long, to accommodate transit services in the future (both dedicated bus lanes and eventual commuter rail) • Est. $3.5 to $5 billion.	3 to 5.5 years of construction. Est. opening, 2017
I-87 Reconstruction & Mobility Improvement Project between Interchanges 23 and 24 Albany County –	• One to four miles south of existing Empire Corridor between MP 141 and MP 149 • Reconstruction of 7 existing miles along I-87 • Third travel lane NB and SB • Est. $99.7 million, funded through toll revenues	Construction began March 2011. Expected completion Fall 2013
Improve I-87 (Adirondack Northway) Exit 4 Reconstruction or New Interchange Colonie, Albany County – Access to Wolf Road/Airport Area.	• Three miles north of MP 147 on existing Empire Corridor • Improve access to Albany International Airport • Repair/Replace Exit 4 bridge to address conditions and operational problems • Est. $29 to $41.2 million	Phase 1: • Final plans Winter 2012/13 • Begin construction Spring 2013 • end construction Fall 2014
I-390 Interchange Improvements at I-490 Gates, Monroe County –	• One mile north of MP 375 on existing Empire Corridor • Improve rush hour traffic flow & reducing congestion at Route 390 SB ramp to I-490 EX and the I-490 WB ramp to Route 390 NB • Improve traffic flow at Lyell Avenue Interchange and make necessary repairs to bridge over Route 390	Currently in design phase. Construction to begin summer 2014
Peace Bridge Plaza and Connecting Roadway System Buffalo, Erie County –	• MP QDN4.5 on Niagara Branch • Expand current plaza from 17 acres to 25 acres • Est. $85 million	Peace Bridge Capacity Expansion project funded through 2030
Highway Widening of East Robinson/North French Amherst, Erie County – Route 62 to Sweet Home Road (Route 95T).	• Three miles east of MP QDN14 on Niagara Branch • 1 mile expansion and improvement of East Robinson/North French Road	Five year TIP funding 2007 through 2012
Highway Widening of Route 62 Wheatfield, Niagara County – Krueger Road to North Tonawanda line,	• 2.5 miles east of MP QDN18.5 on Niagara Branch • 1.3 mile widening/expansion of Route 62	TIP 2008 through 2012
John B. Daly Boulevard Extension Niagara Falls, Niagara County –	• One mile south of MP QDN28 on Niagara Branch • New highway extending 0.4 miles north along 8th St. between Niagara St. & Pine Avenue • Est. $4.7 million	TIP 2010 through 2015

Of these improvements, the improvements that may have more of a regional effect include the Moynihan Station redevelopment, which may have the potential for secondary development impacts in downtown Manhattan. Interchange improvements proposed and highway widening can create the potential for more traffic, and this could create cumulative and secondary development impacts in the area of the improvements. In Westchester County, the Tappan Zee Bridge may have the potential to influence developments, but mainly concentrated in the vicinity of the crossing at Tarrytown, New York and Nyack, Rockland County. New York State Thruway Improvements that will add a travel lane in each direction and other interstate interchanges improvements on the Adirondack Northway and at I-390 and I-490 would have a potentially greater impact on regional access and secondary development at the interchanges. The Peace Bridge Plaza and Connecting Roadway System will also have more of a regional impact in the mobility of goods and people, particularly if the planned replacement of the Peace Bridge provides a larger capacity crossing when it is eventually constructed.

4.24.4. Environmental Consequences

Cumulative impacts accounts for the total impact on the environment of incremental actions over time. The suite of railroad improvements along the Empire Corridor that are either proposed or are in the planning stages (e.g., station, track, and signal improvements along the Empire Corridor) have largely been incorporated into the program alternatives as part of the Base or 90A Alternatives that are carried through to Alternatives 90B, 110, and 125 to varying degrees. Therefore, the cumulative impacts of these rail improvements are considered as part of the impact assessment performed in the previous chapters. Exhibit 4-66 presents other improvements that may also have an effect on the cumulative environmental impact, although these are localized in the immediate area of the proposed improvements (e.g., Tappan Zee Bridge impacts may be concentrated in Westchester and Rockland Counties). Many of these improvements are minor highway widenings or access/interchange improvements that do not extend more than a mile or so in length and therefore would have a very localized effect, if any.

Indirect impacts include impacts associated with developments that would occur later in time that may be potentially induced by the program. This type of secondary development would be most likely centered on the existing passenger stations. The improvements in rail service may enhance the attractiveness of the area for businesses and residents, thereby potentially encouraging secondary development. Although this effect may be widespread along the rail corridor, its effects may be most pronounced in the vicinity of the existing station sites. However, since, for the most part, the stations will not be relocated, the potential for secondary development would be smaller than if a new station were constructed or an existing station were to be relocated. Moreover, the potential for development is influenced by factors that include local zoning, market forces, adequate infrastructure and transportation access, and extent of existing development and availability of land for redevelopment/development. Even though secondary development (or redevelopment in urban areas around many of the stations) may not occur if passenger rail service improvements are implemented, it is anticipated that there is an increased potential for more indirect economic effects (increase in property values, increased business sales, and even increase in jobs) to occur with improvements in passenger rail service.

Base Alternative

The Base Alternative represents the baseline condition against which the alternatives are measured and incorporates improvements that have already been programmed. The Base Alternative will maintain weekday service frequencies and will provide a program of eight improvements in track and station infrastructure. This includes signal and grade crossing improvements and Rensselaer Station fourth track improvements along 66 miles of Empire Corridor South, and 21 miles of additional track improvements in Albany, Schenectady, Syracuse, and Rochester, with station improvements in Schenectady, Rochester, and Niagara Falls.

The station improvements have the greatest potential to increase economic benefits to these two downtown areas, although the track improvements proposed will benefit freight movements (thereby offering indirect economic benefits to the industries served) as well as passenger rail service. With the Base Alternative, the potential for secondary development is relatively low. However, of the proposed improvements, the relocation of the Niagara Falls Station from an industrial site outside the downtown area to the former custom house building in downtown Niagara Falls has the greatest potential to improve the vitality of the downtown business district. Upgrades to the Schenectady and Rochester Stations also has a greater potential to support businesses in downtown Schenectady and Rochester than the other improvements proposed under the Base Alternative.

However, this alternative has the lowest potential for secondary development and the ensuing environmental impacts (traffic, land use, community, wetlands, parklands, air quality, noise, etc.) of the alternatives under consideration, particularly since both are existing station sites, and the Schenectady Station will not be relocated. Moreover, since both of the station sites are located in heavily urbanized areas, the potential for impacts to undeveloped lands, farmlands, and natural resources, such as wetlands, endangered species habitats, and farmlands impacts are also lower. Any secondary development in these urban locations is likely to involve redevelopment of existing developed sites. Although secondary development or redevelopment and changes in land use may not occur under the Base Alternative, the Base Alternative may produce more indirect economic effects (increase in property values, increased business sales, increase in jobs) for the downtown areas.

Alternative 90A

With Alternative 90A, Empire Service would provide increased frequency of service as well as improved travel times, with a program of 20 improvements in track, station, signalization, in addition to improvements proposed under the Base Alternative previously described. Alternative 90A would include 15.4 miles of new track in Manhattan, at the Tappan Zee Bridge, and in Putnam and Dutchess Counties; signal improvements along 43 miles south of and including Poughkeepsie, improvements to the Poughkeepsie Yard/Storage Facility; and rock slope stabilization along 25 miles and three new control points north of Poughkeepsie and south of Albany-Rensselaer Station. Alternative 90A would also include station improvements at Rhinecliff Station, Hudson Station, Buffalo-Depew Station and replacement of the Livingston Avenue Bridge. Along Empire Corridor West/Niagara Branch, Alternative 90A would include 52 miles of track improvements in Montgomery County (Amsterdam Station), Syracuse, Rochester, and along the Niagara Branch as well as upgrades to interlockings/automatic block signals at three new control points. It is anticipated that work could be contained within the right-of-way, and no land acquisitions are anticipated.

The station improvements have the greatest potential to increase economic benefits to these cities, although the track improvements proposed will benefit freight movements (thereby offering indirect economic benefits to the industries served) as well as passenger rail service. Secondary impacts would be similar to those described for the Base Alternative, with the highest potential for benefits and secondary development anticipated with new station buildings to be constructed at Amsterdam and Buffalo-Depew Stations. There may be more potential for secondary development in the City of Buffalo, as this station is more centrally located to business or industrial districts and is also a larger city. However, the Buffalo-Depew Station is located within an industrial area and physically isolated from nearby commercial activity. The existing Amsterdam Station is located on the western outskirts of the City of Amsterdam, and land use patterns include established residential neighborhoods. with limited commercial development or zones scattered in the surrounding area and somewhat removed from the existing station. If the new station buildings for Buffalo-Depew and Amsterdam are relocated closer to established commercial activity centers, there would be an increased potential for secondary development. The station building improvements at Schenectady, Rochester, and Niagara Falls would also occur under the Base Alternative, as described above.

However, similar to the Base Alternative, this alternative has relatively low potential for secondary development and the ensuing environmental impacts (traffic, land use, community, wetlands, parklands, air quality, noise, etc.), given the type and degree of development around the existing station sites and the nature and limited scope of the proposed improvements. Moreover, since two of the station sites are located in heavily urbanized areas, the potential for impacts to undeveloped lands, farmlands, and natural resources, such as wetlands, endangered species habitats, and farmlands impacts are also lower. Any secondary development in these urban locations is likely to involve redevelopment of existing developed sites. Although secondary development or redevelopment and changes in land use may not occur under the Alternative 90A, this alternative may produce greater indirect economic effects (increase in property values, increased business sales, increase in jobs) for the downtown areas served than the Base Alternative.

Alternative 90B

Alternative 90B would match the improved frequency of service provided with Alternative 90A (and would include the 90A improvements) and would provide further reductions in travel time, with a dedicated third track and sections of fourth track provided between Schenectady and Buffalo. The third track would extend 273 miles, generally on the north side of the existing tracks, in the location of the former two-track rail bed. In addition, 39 miles of fourth track, in five locations, would also be added on the north side. The new tracks would be offset 15 feet from the existing railroad and from each other. Double track along five miles of the Niagara Branch is also proposed.

Alternative 90B would involve the same station improvements as the Base and 90A Alternatives, with station building improvements at Schenectady, Niagara Falls, Amsterdam, Rochester, and Buffalo-Depew Stations, as described in the previous sections. With the proposed improvements in passenger rail service, this alternative would have a greater potential than the Base/90A Alternatives to increase economic benefits to cities primarily at the station sites, although the track improvements proposed will benefit freight movements (thereby offering indirect economic benefits to the industries served) as well as passenger rail service. The highest potential for secondary development may occur at Niagara Falls, with relocation of the station, and major cities

in Schenectady, Rochester, and Buffalo where station improvements are proposed, as well as other urban centers with station sites. This effect may be more pronounced in the cities where express service will be provided: Niagara Falls, Buffalo-Exchange Street, Buffalo-Depew, Rochester, Syracuse, Albany-Rensselaer and New York City (Penn Station).

This alternative would have a somewhat greater potential for secondary development than the Base/90A Alternatives due to improved passenger rail service. However the potential for any environmental impacts (traffic, land use, community, wetlands, parklands, air quality, noise, etc.) is limited to some extent by the heavily urbanized areas around many of the existing stations, which would limit the potential for impacts to undeveloped lands, farmlands, and natural resources, such as wetlands, endangered species habitats, and farmlands impacts. Any secondary development in these urban locations is likely to involve redevelopment of existing developed sites. Although secondary development or redevelopment and changes in land use may not occur under Alternative 90B, this alternative may produce greater indirect economic effects (increase in property values, increased business sales, increase in jobs) for the downtown areas served than would the Base/90A Alternatives.

Alternative 110

With Alternative 110, Empire Service would match the increased frequency of service for Alternative 90B and would provide further improvements in travel times, with 273 miles of exclusive third track between Schenectady and Buffalo. This track would be further offset 30 feet, and additional infrastructure improvements included, to accommodate higher speeds. Alternative 110 would also add 59 miles of fourth track in six locations. In general, impacts would be similar to those described above under Alternative 90B.

Alternative 110 would involve the same station improvements as the Base and 90A Alternatives, with station building improvements at Schenectady, Niagara Falls, Amsterdam, Rochester, and Buffalo-Depew Stations, as described in the previous sections. With the added improvements in passenger rail service, this alternative would have a greater potential than the Base/90A/90B Alternatives to increase economic benefits to cities primarily at the station sites, although the track improvements proposed will benefit freight movements (thereby offering indirect economic benefits to the industries served) as well as passenger rail service. The highest potential for secondary development may occur at urban centers with station sites, given the availability of urban land to accommodate new development or redevelopment of existing developed sites. This effect may be more pronounced in the cities where express service will be provided: Niagara Falls, Buffalo-Exchange Street, Buffalo-Depew, Rochester, Syracuse, Albany-Rensselaer and New York City (Penn Station). However, if the factors are in place to support new development at less urban station sites (availability of land, zoning, infrastructure, market forces, etc.), there is a somewhat greater potential for larger changes in land use should redevelopment occur at more remotely located stations.

This alternative would have a somewhat greater potential for secondary development than the Base/90A/90B Alternatives due to the additional improvements in passenger rail service. However the potential for any environmental impacts (traffic, land use, community, wetlands, parklands, air quality, noise, etc.) is limited to some extent by the heavily urbanized areas around many of the existing stations, which would limit the potential for impacts to undeveloped lands, farmlands, and natural resources, such as wetlands, endangered species habitats, and farmlands impacts. Any secondary development in these urban locations is likely to involve redevelopment of existing

developed sites. Although secondary development or redevelopment and changes in land use may not occur under Alternative 110, this alternative may produce more indirect economic effects (increase in property values, increased business sales, increase in jobs) for the downtown areas than would the Base/90A/90B Alternatives.

Alternative 125

Alternative 125 would maintain existing service on Empire Corridor West and would provide more frequent service (compared to the other alternatives) on exclusive, grade-separated tracks on new alignment in most areas between Albany-Rensselaer and Buffalo. Alternative 125 would include Alternative 90A improvements along the Hudson Line and Niagara Branch.

Alternative 125 would involve construction of a total of 236 miles of track on new alignment along three different segments: Rensselaer to Syracuse, Syracuse to Rochester, and Rochester to Buffalo. Alternative 125 also would include new right-of-way in most areas, but would merge back with the Empire Corridor over two 15- and 16-mile segments centered on Syracuse and Rochester, respectively.

Alternative 125 would involve a new station building in Rochester, but bypasses the Amsterdam and Buffalo-Depew Stations, so no improvements are proposed at these stations (beyond track improvements), which would be rebuilt under Alternatives 90B/110. Alternative 125 would involve express service that would stop at Albany-Rensselaer, Syracuse, Rochester, and Buffalo Exchange Street stations, while also maintaining existing Empire Corridor service. As with the Base Alternatives, station building improvements at Schenectady, Rochester, and Niagara Falls would still be proposed, as described in the previous sections. With the added improvements in passenger rail service, this alternative would have the greatest potential to increase economic benefits to cities primarily at the station sites, although the track improvements proposed will benefit freight movements (thereby offering indirect economic benefits to the industries served) as well as passenger rail service. The highest potential for secondary development may occur at urban centers with station sites, given the availability of urban land to accommodate new development or redevelopment of existing developed sites. However, if the factors are in place to support new development at less urban station sites (availability of land, zoning, infrastructure, market forces, etc.), there is a somewhat greater potential for larger changes in land use should redevelopment occur at more remotely located stations.

Although the 125 Study Area involves new construction along 236 miles, no new stations would be constructed on the new alignment, so secondary development impacts along the new right-of-way are not anticipated. However, of the alternatives under consideration, this alternative would have the greatest potential for secondary development because of the improvements in passenger rail service and travel times/ridership. However, the potential for any environmental impacts (traffic, land use, community, wetlands, parklands, air quality, noise, etc.) is limited to some extent by the heavily urbanized areas around many of the existing stations. The urbanized character around the stations served by Alternative 125 would limit the potential for impacts to undeveloped lands, farmlands, and natural resources, such as wetlands, endangered species habitats, and farmlands impacts. Any secondary development in these urban locations is likely to involve redevelopment of existing developed sites. Although secondary development or redevelopment and changes in land use may not occur under Alternative 90B, this alternative may produce the greatest indirect economic effects (increase in property values, increased business sales, increase in jobs) for the downtown areas served.

4.24.5. Potential Mitigation Strategies

Mitigation strategies will be considered during Tier 2 that may include consultation with local and regional planning officials regarding local plans and zoning and discussing status of implementation strategies to support Transit Oriented Development (TOD). In Tier 2, further research to be performed in the vicinity of station sites could include zoning and the extent of planning to support TOD in the vicinity of station sites. The final siting of stations, including the potential to relocate some stations to sites with more potential for positive secondary development impacts, could consider these factors to further economic development and consistency with regional and local plans.

4.24.6. Future Analysis

The Tier 2 analysis will further evaluate the potential for secondary development and cumulative impacts. The status of projects that could result in cumulative impacts will be reevaluated to assess cumulative impacts, and the final siting of station sites will consider local zoning and plans for Transit-Oriented Development. The existing land uses and zoning in the vicinity of station sites and consistency with Master Plans will be identified in the vicinity of existing and proposed stations. Regional and local planning officials will be consulted regarding station plans, and the secondary development potential of the program will be reevaluated in the context of current market forces and existing/proposed developments and land uses in the vicinity of the stations.

4.25. Construction

The potential construction effects of the program include interruptions in service, potential traffic impacts for bridgework, temporary dust emissions, temporary increases in noise, and disturbances to property and natural and water resources.

It is anticipated that, to the extent possible, work would be staged during night-time, weekends, or off-peak hours to minimize service outages and disruptions to the traveling public. Any interruptions in service will be closely coordinated with the affected transportation agencies and freight companies and users and the traveling public and advertised as appropriate.

Trackwork (replacement of ties, etc.) would largely be sited within the existing rail right-of-way using rail-mounted equipment, which should not involve large quantities of earthwork. In some cases, station construction, addition of additional third and fourth track rail embankments and maintenance access roads, bridgework, and construction of flyovers and elevated structures may involve earthwork and clearing. Operation of construction vehicles and equipment has the potential to create dust when earth moving or clearing is required. These vehicles and construction activities also have the potential to emit increased levels of noise that might disturb any adjoining sensitive land uses, such as residential neighborhoods.

The construction of the program may require temporary use of adjoining parcels of land for staging and storage of construction equipment and materials, if the available right-of-way is not sufficient. The need for temporary construction easements and permanent easements on adjoining properties

will be determined, and any required permits for work affecting public lands will be identified.

Earth-disturbing construction adjacent to water resources and wetlands has the potential to temporarily disturb soils and create siltation in adjoining waterways, which could then indirectly affect aquatic habitats and water quality. Use of cofferdamming and silt curtains will be examined as part of the final design, and bridgework will need to consider sensitive times of year when construction may need to be avoided of minimized to avoid impacts on navigation and spawning of protected species. For work in affected waterways, these sensitive construction windows will be closely coordinated with the U.S. Coast Guard and other regulatory and resource agencies with jurisdiction.

Use of construction equipment in the vicinity of waterways, sensitive water supplies, and aquatic/wildlife habitats will include appropriate safeguards. For instance, spill prevention measures may include use of buffers around protected resources to minimize the possibility of contamination from accidental spills or incidents and appropriate restrictions on locating (or use of secondary containment for) storage of fuels and other potential contaminants. In protected habitats, worker training and education may be warranted to facilitate sightings and protection of rare species.

For work in the vicinity of parks, consultation would be performed with park officials for work that may disturb access to trails and canals regarding time-of-year and detours, if necessary. Similarly , work affecting agricultural farmfields and uses will be closely coordinated with the property owners to minimize the extent of impacts on agricultural operations and yields.

Typical construction mitigation measures to be employed would include:

- Use of dust control measures, such as water sprays;
- Cleaning of tires of construction trucks prior to leaving the construction site;
- Limiting noisy activities near residential neighborhoods to daytime and weekday hours to the extent possible;
- Use of mufflers on construction vehicles;
- Use of stormwater controls and implementing either Erosion and Sediment Control Plans (disturbing less than an acre) or a Stormwater Pollution Prevention Plan (for sites disturbing an acre or more of land); and
- Temporary and permanent construction BMPs, such as seed, mulch, embankment protectors, grade techniques, inlet protection, silt fences, development of a Spill Prevention Control Plan (SPCC), Stormwater Management Plans (SWMPs) and vehicle tracking prevention will be used as appropriate.

Specific potential mitigation measures to be considered during construction are addressed under respective sections of this chapter, including surface waters, wetlands, and aquifers.

During Tier 2, the duration of construction will be better defined, and the extent of temporary construction impacts and appropriate mitigation measures will be identified During the final design phases for improvement projects, the sequence and extent of construction will be identified, and staging plans developed.

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5. Financial Capacity

5.1. Introduction

Transportation infrastructure and services are typically supported by a combination of capital and operating funding from various sources. These funding sources may have conditions and restrictions as to how they may be applied to New York's HSIPR program, and these restrictions can have significant implications for the affordability and the feasibility of the High Speed Rail Empire Corridor Program's alternatives. Matching the particular requirements and restrictions among federal, state, municipal and private funding sources with the costs of each alternative helps determine the time frame over which the alternative could be implemented.

In general, public transportation systems are built and equipped using capital funding from various sources, and are operated day-to-day using operating funds. These two categories of funding – and the sources for these funds – are described in Sections 5.3 and 5.4.

Chapter 5 describes the costs, ridership and ticket revenues, subsidy requirements, and sources of funding support that are available to advance the High Speed Rail Empire Corridor Program. After the selection of a preferred alternative, a Service Development Plan will be developed. It will include detailed operating plans as well as a capital program, including costs and projected fiscal construction years. This chapter presents information that will be considered and incorporated into the Service Development Plan. Appendix B presents additional information on how the ridership forecasts were developed, and Appendix F presents additional information on how cost estimates were developed.

5.2. Cost and Revenue Methodology

The capital and operating costs and operating revenues anticipated for each alternative are based upon uniform ridership forecasting and costing methodologies, to ensure consistency. Based on proposed operating plans (service frequency and trip time) for each alternative, the ridership was forecast and operating costs generated. Track alignments, signal system configuration, number and length of passing sidings, and rolling stock requirements were defined in sufficient detail for a Tier 1 analysis to permit reasonable capital construction cost estimates, and to establish the feasibility of proposed train operating plans, service frequency, stopping patterns and express/local/regional service overlays.

Standard practice for quantifying and comparing costs of different investment programs that transpire over different time frames is to schedule all the future improvements based on the likely time of their implementation and then inflate the current cost of each element to its anticipated implementation year. These future costs are then discounted back to the target comparison year using net present value analysis techniques so that they are comparable in constant-dollar terms. For example, if a locomotive is to be purchased in 2020, but the analysis target comparison year is 2015, the current (2012) cost of a locomotive would be inflated to 2020, and the resulting value then discounted back to 2015 using an approved discount rate. Discount rates address a combination of inflation and the "opportunity cost" of using the funding for the subject project rather than for some other purpose (which might give greater or lesser returns). Discount rates typically range between 6 percent and 10 percent, depending on a wide variety of factors. Following this procedure enables the comparison in a specific analysis year (in the above case,

2015) of various future investments with varying implementation dates. Projected investments of the Empire Corridor Program would span from 2015 to 2035.

For a Tier 1 investigation, the cost and timing for the specific investments are estimated in general terms. Therefore, the Tier 1 analysis is focused on the year 2015 as the point for comparison across alternatives. The present (2011) costs of elements, such as track, coaches, locomotives, bridge construction, etc., are inflated to 2015 costs at a uniform inflation rate of 3.5 percent. While the exact costs or future year of implementation are not precisely known for each alternative, the common treatment of all cost elements across all categories, as if occurring in 2015, allows reasonable comparisons among alternatives.

5.2.1. Capital Cost Estimating Methodology

Capital cost estimates for the alternatives used industry standards for all major components. Infrastructure capital costs were determined on a unit basis. Construction costs for each alternative were derived by multiplying the quantity of each major item by the unit cost for that item, based on standard values or the most recent costs, with appropriate regional adjustments applied as necessary. Land costs were developed for urban, suburban and rural property. Train and maintenance staffing costs were based on current Amtrak values, projected to the target analysis year. Use of these common factors allows meaningful comparisons among the alternatives in terms of their likely future ridership potential and their capital and operating costs and revenues.

Rolling Stock

The method by which costs for rolling stock were developed is described in Appendix F. In brief, equipment costs are a function of the operating plan intended for each alternative, that is, the number of train sets to be operated along the route, and the number of locomotives and passenger coaches to be needed for each alternative, including spare trains to substitute for trains scheduled for maintenance.

Track and Infrastructure

Track and signal system installation costs were based on standard unit values used throughout the railroad industry. Track installation costs are typically recognized on a cost-per-mile basis. Infrastructure costs, for bridges, culverts, grade separations, and retaining walls, involved gross cost estimates based on current experience. Bridge costs were estimated based on length of span and width, culvert costs were estimated based on diameter and length under the ROW, and retaining wall costs were estimated based on volume of concrete required.

Overhead Catenary Infrastructure

For overhead catenary system, a per-mile installation cost was used. Catenary system costs also include electric power source, substations on a one per-twenty-five-mile unit of length of the corridor, and associated support equipment."

Signals

Since signal systems must be linked via cable along the ROW to communicate with trains and the various interlockings and crossovers, a per-mile installation cost was used. Signal system costs include electric power for signals, control houses, switches, and associated support equipment such as snow melters, and installation.

Maintenance Facilities

Maintenance and repair shops were estimated on a cost-per-square-foot basis for industrial or commercial buildings (depending upon scale), adjusted for the additional costs for structural support sufficient to house heavy locomotives, and for the cost of typical rail maintenance equipment (cranes, tables, lifts, etc.) that must be used to fit out such facilities.

Stations

Station costs were estimated on the basis of approximate square footage, at typical commercial construction cost values, adjusted regionally. At this Tier 1 level of analysis, all alternatives were assumed to require the same station improvements, carrying identical costs for this element.

Property Acquisition

Both Alternatives 110 and 125 would involve more substantial property acquisitions, which would be greatest for Alternative 125.[193] (Alternative 90B also involves property acquisition on a much reduced scale than what is required for the additional track and right-of-way to be constructed as part of these higher speed alternatives.) Alternative 110 would require additional land to augment the existing ROW on the south side for an extra track. Alternative 125 would require property acquisition for a new ROW at some distance from the existing alignment.

Since the exact position and routing of additional trackage necessary to improve curves to allow higher speed is not yet known for either alternative, it was difficult to estimate property acquisition costs for these higher speed alternatives. Property acquisition was therefore estimated based on apparent need to modify curves, add parallel main-line or passing tracks, install additional grade separations to meet safety requirements, or expand yards. Three indices of cost were then applied: prime city, suburban, and rural. Costs for each index were based on recent property values along the corridor. No correction was made for inflation to 2015, as the current real estate market cannot be reliably predicted on the basis of standard inflation drivers.

Upon completion of Tier 1, and as the program moves into the next phase of work, more precise information will be developed, associated with the specific track, bridge, yard, station, and signal system construction projects. Additionally, a Service Development Plan will be developed for the preferred alternative. The Service Development Plan will include detailed operating plans, and increasingly precise capital construction costs and project schedules from which annual cash requirements for both capital and operating funds can be determined.

As set forth in the Agreements in Appendix J between CSXT and NYSDOT, CSXT is entitled to compensation for the use, acquisition, or diminishment in value of its property resulting from any

[193]/ Alternative 90 requires some property, but on a smaller scale than either of the higher speed alignments.

project advanced as a result of the EIS. The development of the cost of alternatives must and will include the recognition of this principle, although the negotiation of the actual value of any compensation to CSXT is not part of this Tier 1 EIS, but will be developed if and when necessary during detailed analysis (Tier 2).

5.2.2. Operating and Maintenance (O&M) Cost Estimating Methodology

Operating and maintenance (O&M) costs for Empire Corridor high speed intercity rail services were based on unit costs for a variety of elements including but not limited to:

- Number of train crews needed to operate the prescribed number of trains – based on typical, industry standards;
- The number and size of train cleaning crews – based on hourly pay rate plus fringe and overhead costs;
- Track and signal system maintenance costs – based on annualized cost/track-mile, an industry standard, adjusted by region;
- Propulsion costs – based on locomotive mileage standards (gallons/mile or gallons/hour) at pre-determined speeds, typical cost of fuel, projected to the target analysis year, based on accepted industry methods;
- Janitorial and landscaping services – estimate of annual contract values and number of locations;
- Dispatching functions for trains, personnel, equipment.

By applying industry standard costs for labor hours, fuels, maintenance tools and supplies, rents, and general custodial and cleaning contracts, an approximate operating cost could be estimated for each alternative. These costs were compared among the alternatives to better understand how the different elements of each alternative affect annual operating costs.

Estimates of future annual operating and maintenance (O&M) costs for the proposed passenger rail system improvements and for the existing system were based on Amtrak accounting conventions, developed in response to the state-supported service provisions of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA). Costs were initially derived for 2014, which is the first year for which PRIIA-mandated state operating cost payments are required (see Appendix F). These costs were then increased to account for the effects of inflation between 2014 and 2015, to permit their comparison with 2015 forecast revenues, and the derivation of 2015 subsidies for the alternatives. Annual operating expenses for the alternatives were based on the forecast of scheduled trains, train miles operated and per-train-mile O&M costs (for rolling stock), and per-track-mile infrastructure maintenance costs, acknowledging the anticipated increased costs for track and bridge maintenance due to greater wear from higher-speed operation. The methodologies by which operating costs were derived for the High Speed Rail Empire Corridor Program alternatives are detailed in Appendix F.

For all Build Alternatives except for Alternative 125, detailed operating plans require six additional train sets, each containing one diesel locomotive and five passenger coaches (including a 20 percent

spare factor). Alternative 125 would involve electrification of the ROW west of Albany up to a proposed new Buffalo station, and its operating plan calls for 17 additional train sets, each containing one dual mode locomotive and five coaches (including a 20 percent spare factor). Each alternative involves an operating schedule necessary to permit sufficient service to attract the forecast ridership, as described in Chapter 3. The proposed train schedules were proposed based on the following:

- The number of trains that could be accommodated on the corridor under the Base (No Action) Alternative and proposed higher-speed alternatives without creating unacceptable conflicts with freight operations;
- A level of service sufficient to produce the forecast ridership, while also achieving the MAS and required average speed for each alternative.

5.2.3. Revenue Estimating Methodology

Annual ticket revenues are estimated based on ridership between station pairs, multiplied by the current Amtrak fare for travel between those pairs, assigned to the 2035 target year. This approach is consistent with the computation of the O&M costs for each alternative, which are also presented in near-current (2015) dollars.

5.2.4. Deficit/Subsidy Estimating Methodology

Few public transportation services earn enough money in fare and non-fare revenue to cover their entire annual O&M cost. Most transportation services require subsidy from government to balance their annual operating budgets. The operating deficits projected in this Tier 1 EIS are simply the difference between the estimated O&M costs and the estimated ticket revenues. Although ticket revenues are normally supplemented by lease, concession, rent, and advertising revenues ("non-ticket" revenues), these additional revenue streams are generally small compared with ticket revenues paid by passengers; therefore, ticket revenues alone are sufficient to give a reasonable picture of the scale of subsidy likely required for each alternative.

At the Tier 1 level of analysis, where increased train speed and shorter travel times would be the project benefits resulting in increased ridership, other factors that might influence travelers' mode choices – higher or lower gasoline prices, tolls, air fares, bus fares, etc. – were held constant at their 2015 values and applied to the 2035 analysis year. By holding all 2015 cost relationships constant, the effect of speed and time on ridership can be observed alone, independent of any other factors.

5.3. Capital Funding Needs, Requirements and Sources

In the public transportation sector, where the majority of costs are funded by federal, state, and local governments, capital funding is defined as sources provided to agencies for the purchase of assets with significant useful life, generally greater than five years. Assets, such as buildings, rail yards and track, signal systems, bridges and culverts, real property, rolling stock, and long-life maintenance equipment (cranes, drop tables, turntables, wheel true installations, fork lifts, etc.), are

generally considered to have useful lives over five years, and are therefore purchased with capital funds.

As the costs of rail infrastructure and equipment are substantial, major capital improvements are undertaken by the host Class 1 railroads, federal agencies, states, and major municipalities (and occasionally other private sector participants, typically for location-specific improvements). Federal capital grants for passenger rail systems typically require a local match of a minimum of 10 percent to 20 percent of the value of the purchase, and sometimes more, with the amount depending upon the apparent public benefit of the project and other factors. To qualify for federal capital funding, and in accordance with federal grant requirements, a state or municipal sponsor – NYSDOT or the individual municipalities along the route in the case of the High Speed Rail Empire Corridor Program – must contribute capital funds as well, in partnership with the federal agency funding the improvement.

For the High Speed Rail Empire Corridor Program, capital funds would be provided primarily by FRA, the Federal Transit Administration (FTA), and NYSDOT. Where station upgrades are incorporated into the project, municipal governments and regional transportation authorities would provide capital funds, as well. Capital funds would be used for the following:

- Purchase of property and equipment, such as locomotives and passenger coaches, or "rolling stock;"
- Upgrade and construction of facilities, such as stations, maintenance facilities at rail yards, rail yard expansions;
- Improvement or expansion of railway infrastructure, such as track, signals, switches, bridge structures;
- Acquisition of additional ROW, as required to add tracks or expand yards, or to straighten curves to allow higher speed operation; and
- Repayment of debt service and/or lease payments on long-term equipment purchases or construction costs, where private sector investors have participated on a lease or debt basis. (Note that lease payments used to retire debt for rail construction or rolling stock are typically funded as capital costs during the lease term.)

5.3.1. The Capital Plan

The primary source of high-speed rail funding is anticipated to be FRA, using PRIIA and successor authorizations. For projects to be eligible for FRA funds, they must be advanced through the grant process, as described in Section 5.3.2. Projects are included in the New York State Rail Plan, which outlines all of the state's rail system needs for both passenger and freight service. NYSDOT also includes rail projects on its Statewide Transportation Improvement Program (STIP) for informational purposes. The STIP is a four-year forecast of capital needs across all federally-funded transportation services. The STIP is updated by NYSDOT every two years and projects five years ahead as improvements from prior year plans are completed and new elements are identified for future implementation. Where additional funding may be sought from FTA or other federal grant programs, a project must be represented in the STIP.

5.3.2. Capital Funding Programs

The federal government has enacted laws and provided grant funding opportunities that have enabled states to invest in passenger rail service, particularly higher-speed operations. The Empire Corridor was initially designated for investment by U.S. DOT in the 1990s:

- **High-Speed Rail Corridor Designations:** Section 1010 of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA, P.L. 102-240) directed the U.S. Secretary of Transportation to designate not more than five "high-speed" corridors where trains operating at speeds of 90 mph could be reasonably expected. Section 1103(c) of the Transportation Equity Act for the 21st Century (TEA 21, P.L. 105-178) directed the U.S. Secretary of Transportation to designate six additional corridors named in the law or based on criteria described in the law, for a total of 11 corridors.

- **Empire Corridor Designation:** The 463-mile Empire Corridor from New York City-to-Albany-to-Buffalo was designated by the U.S. Secretary of Transportation as a High-Speed Rail Corridor on October 20, 1992.

Federal Capital Funding Programs

The federal funding programs supporting intercity/high-speed passenger rail, and associated commuter rail projects are summarized below:

- **FY 2008 Appropriations Act: Capital Assistance to States – Intercity Passenger Rail Service:** The FY 2008 U.S. Department of Transportation (U.S. DOT) Appropriations Act (P.L. 110-161) established a new pilot program for joint federal-state intercity passenger rail capital investment. Under this program, $30 million in federal funding was made available to states on a competitive basis to fund up to 50 percent of the capital cost of improving intercity passenger rail service. Up to 10 percent of the $30 million was available for rail corridor planning grants.

- **Passenger Rail Investment and Improvement Act of 2008**: PRIIA (P.L. 110-432) authorized a high-speed grant program for FY 2009 through FY 2013 to improve intercity passenger rail service, operations, and facilities. PRIIA also directed the U.S. Secretary of Transportation to develop a long-range national rail plan that is consistent with approved state rail plans and the rail needs of the nation. This directive resulted in the publication of the *Preliminary National Rail Plan* in October, 2009. PRIIA established three new competitive grant programs for funding intercity rail capital improvements:

    - **Intercity Passenger Rail Service Corridor Capital Assistance Program:** Section 301 of PRIIA established grants for capital improvements to benefit all types of intercity passenger rail service, including the capital costs of facilities, infrastructure, and equipment necessary to provide or improve intercity passenger rail transportation. Eligible applicants included states (including the District of Columbia), groups of states, interstate compacts, and public intercity passenger rail agencies.
    - **High-Speed Rail Corridor Development:** Similar to Section 301, Section 501 of PRIIA restricted eligibility for grants to the U.S. Department of Transportation (U.S. DOT) - designated high-speed rail corridors (including the Empire Corridor). Grants could be used for acquiring, constructing, or improving rail structures and equipment. High-speed

rail was defined as passenger rail services that may reasonably be expected to reach speeds of at least 110 mph. Section 501 broadened Section 301 to include Amtrak as well.

- **Congestion Grants:** Section 302 of PRIIA authorized grants to states or to Amtrak (in cooperation with states) for facilities, infrastructure, and equipment for high-priority rail corridor projects to reduce congestion or facilitate ridership growth in intercity rail passenger transportation.

- **FY 2008 Appropriations Act: Capital Assistance to States – Intercity Passenger Rail Service:** The FY 2008 U.S. Department of Transportation (U.S. DOT) Appropriations Act (P.L. 110-161) established a new pilot program for joint federal-state intercity passenger rail capital investment. Under this program, $30 million in federal funding was made available to states on a competitive basis to fund up to 50 percent of the capital cost of improving intercity passenger rail service. Up to 10 percent of the $30 million was available for rail corridor planning grants.

- **American Recovery and Reinvestment Act of 2009:** The American Recovery and Reinvestment Act of 2009 (ARRA, P.L. 111-5), enacted on February 17, 2009, appropriated a total of $787 billion, including $8 billion specifically for the grant programs established by PRIIA and $1.3 billion for Amtrak capital grants. ARRA sought from states "shovel ready" transportation projects, among them programs and projects to advance high-speed rail. The appropriation references the authorities included in Sections 301, 302, and 501 of PRIIA, but states that the federal share of costs may be up to 100 percent.

- **A Vision for High-Speed Rail:** On April 16, 2009, the President announced a new vision for developing high-speed rail in America to develop a national network of high-speed rail corridors in collaboration with states, railroads, and other key stakeholders. The U.S. DOT issued a *High-Speed Rail Strategic Plan* in April, 2009. On June 23, 2009, the FRA issued interim program guidance (74 CFR 29900) establishing the selection process, priorities, and evaluation criteria for grants made under financial assistance appropriated under ARRA: approximately $1.9 million in unobligated FY 2008 U.S. DOT appropriations (P.L. 110-161) funding and $90 million for intercity passenger rail grants in the FY 2009 U.S. DOT appropriations (P.L. 111-8) funding. FRA combined the three PRIIA grant programs into the HSIPR Program.

  - **State of New York HSIPR Awards:** On January 28, 2010, the first grant selections for the HSIPR program were announced. The State of New York has successfully competed for a total of $151 million in ARRA high-speed rail funding.

- **FY 2009 U.S. DOT Appropriations Act:** An additional $90 million was appropriated as part of the FY 2009 U.S. DOT Appropriations Act (P.L. 111-8), similar to the FY 2008 Capital Assistance to states' grants. Following awards made by U.S. DOT under the solicitation issued in June 2009, $65 million of the original $90 million of FY 2009 Appropriations Act funds remained unused. On April 1, 2010, U.S. DOT issued notice of funding availability for these FY 2009 U.S. DOT Appropriations Act funds, to be used for construction projects with a 50 percent non-federal match.

- **FY 2010 Transportation, Housing and Urban Development and Related Agencies Appropriations Act:** Division A of the Consolidated Appropriations Act, 2010 (PL 111-117) appropriated a total of $2.5 billion for the HSIPR program. Of that amount, $50 million was made available by the U.S. DOT for planning projects, including multi-state proposals, with a 20 percent non-federal match. In June 2010, the U.S. DOT announced funding availability of $2.37 billion in FY 2010 appropriations funding for final design/construction and/or preliminary

engineering/NEPA projects for individual projects or corridor programs with a 20 percent non-federal match. Remaining FY 2010 U.S. DOT appropriations were allocated to the HSIPR program for administration and research.

  - **State of New York Awards:** The State of New York successfully competed for $28.5 million in FY 2010 transportation appropriations funds.

- **Redistribution of ARRA Funds:** On December 9, 2010, the U.S. DOT announced a redistribution of some ARRA funds to other corridors after the incoming governors of Wisconsin and Ohio indicated that they would not move forward with $703 million designated for Wisconsin and $400 million designated for Ohio high-speed rail projects. In 2011, Florida cancelled its high-speed rail project, and approximately $2.3 billion was redistributed among New York and other states; New York State received an additional $354.4 million, plus $7.3 million in supporting funding. Thus, from all sources, New York has received $558 million in federal funds and $110 million in state funding for New York State passenger rail, including projects on the Empire Corridor.

President Obama's proposed budget for FY 2014 includes $6.4 billion to support passenger and freight rail projects across the country, under a new coordinated program called the National High-Performance Rail System (NHPRS). Over the next five years, the President's total request for the NHPRS is $40 billion, of which $13 billion would support existing services, and $27 billion would be invested in improving and enhancing the Nation's rail network.

State Capital Funding Programs

Section 14-d of the New York State Transportation Law authorizes the Commissioner to enter into contracts for the purpose of maintaining and improving rail transportation service. New York State has participated in capital funding for intercity rail services through a number of grant and bond programs, as follows:

- **Rail Service Preservation Program**: This $100 million, multi-year freight and passenger rail program was established in FY 2005-06 by the State Legislature, with portions of the funding being appropriated on an annual basis; some of these funds have been made available.

- **Transportation Capital Bonds:** New York State voters approved a *Rebuild and Renew New York Transportation Bond Act of 2005,* providing $2.9 billion for transportation funding, of which $27 million was allocated each year for rail and port projects. The Empire Corridor work is supported in part with a portion of these bond funds.

The New York State FY 2012 budget includes $26.6 million for passenger and freight rail projects. Of this total, $16.6 million will be used to subsidize Amtrak services, leaving $10 million to be divided between freight rail and high-speed passenger rail improvements. In addition, the Legislature and Governor agreed to a Memorandum of Understanding (MOU) that will direct NYSDOT to develop a two-year capital plan for FY 2013 and FY 2014. The MOU defines a program of infrastructure capital projects covering all modes under NYSDOT jurisdiction, at a level $100 million over the levels originally proposed in the Governor's 2012-13 Executive Budget. Rail freight projects will be eligible for funding under a second round of Regional Economic Council Program funding.

5.3.3. Program Capital Funding Financial Roles

Federal Railroad Administration (FRA)

FRA is charged with promulgating and enforcing rail safety regulations, administering railroad assistance programs, and conducting research and development in support of improved railroad safety and national rail transportation policy. More recently, in addition to its responsibility for regulating rail operating protocols, FRA has received Congressional authorization and funding to distribute funds in support of high-speed passenger and freight rail operations. In this capacity, FRA is responsible for implementing and ensuring compliance with PRIIA, which provides the regulatory framework by which this funding is to be distributed to states and railroad operators.

With HSIPR, FRA established a sequence of activities that facilitates the evaluation of various high-speed rail proposals across the nation. The first level of effort – Tier 1 – requires the identification and conceptualization of alternatives for implementing high-speed rail improvements in a defined corridor, the creation of a practical framework for evaluation and comparison among these alternatives, and the selection of a preferred alternative to be advanced for detailed analysis. The next phase (Tier 2) requires that applicants develop details about the specific project elements proposed for investment, such as bridges, new track segments, grade separations, new stations, etc., and completion of detailed environmental review, to ensure that individual investments will not have unacceptable impacts. Upon receipt of NEPA clearance via Records of Decision (RODs), Categorical Exclusions (CEs), or Findings of No Significant Impact (FONSIs), and completion of preliminary engineering, these individual elements become eligible for FRA funding for final design, property acquisition, and construction.

NYSDOT is following the HSIPR process for this High Speed Rail Empire Corridor Program, and this Tier 1 Draft EIS in part satisfies FRA's procedural requirements for service development programs and corridor investment plans.

New York State Department of Transportation (NYSDOT)

NYSDOT is responsible for coordinating and developing comprehensive transportation policy for the state; coordinating and assisting in the development and operation of transportation facilities and services for highways, railroads, mass transit systems, ports, waterways and aviation facilities; and formulating and maintaining a long-range, comprehensive statewide master plan for the balanced development of public and private commuter and general transportation facilities.

NYSDOT also administers a public safety program for railroads and motor carriers engaged in intrastate commerce; and provides oversight in matters relative to the safe operation of bus lines, commuter railroads and subway systems that are publicly subsidized.

Section 14-d(2)(d) of the State Transportation law authorizes the Commissioner to "*utilize federal monies*" to improve rail transportation service or rail transportation facilities. NYSDOT can also spend non-federal funds which are appropriated to the agency for this service and facilities. Pursuant to Section 209 of PRIIA, the states in which Amtrak operates intercity passenger rail services for the benefit of the states, must work with Amtrak to establish a basis for allocating both direct and a portion of general operating and maintenance costs to each state in proportion to the service Amtrak provides. Effective April 2012, this element of PRIIA obligates NYSDOT to budget for and subsidize some portions of the Empire Service that were heretofore paid by Amtrak

directly. Conversely, this regulation may vary the amount that NYSDOT has been paying Amtrak to operate the Empire Service, based on an allocation formula selected and implemented by the Surface Transportation Board.

Amtrak

As the passenger rail service provider and the owner of many of the stations on the Empire Corridor, Amtrak may contribute financially to high-speed passenger rail operations. Participation could involve providing train service; covering operating deficits; participating in funding capital improvements; or providing construction, maintenance, or dispatching resources along the ROW. This participation could be in part a function of Amtrak's annual budget and past practices regarding cost sharing, property and operating agreements with NYSDOT and CSXT. Future cost sharing arrangements would be governed by Section 209 of PRIIA, as previously discussed.

CSX Transportation, Inc.

CSXT, as the host railroad, owns 85 percent of the 463-mile Empire Corridor ROW from Poughkeepsie to Buffalo and Niagara Falls. Where CSXT owns the ROW, the company would, through its labor agreements, be involved in program construction and construction oversight. However, for the section of railroad from Poughkeepsie to Hoffmans, where Amtrak has entered into a lease agreement with CSXT, Amtrak, and NYSDOT will be responsible for program construction and oversight.

CSXT would be involved in the High Speed Rail Empire Corridor Program as necessary to ensure that construction projects along that portion of the corridor over which it operates would be implemented without adverse effects on its freight operations. CSXT is also a member of the program steering committee, the Empire Project Advisory Committee (EPAC) and, in that capacity, is providing technical and operational input and reviewing analyses and findings to ensure that its operating needs are addressed.

Metro-North Railroad

Metro-North, the host railroad and owner of the 61-mile Empire Corridor South segment between Spuyten Duyvil and a point just beyond Poughkeepsie station, would be involved in the High Speed Rail Empire Corridor Program as necessary to ensure that construction projects located along that portion of the corridor over which it operates would be implemented without adverse effects on its daily commuter rail services. Metro-North also could participate in funding capital improvements along its section of the corridor. Where Metro-North is responsible for the ROW, it would, through its labor agreements, be involved in program construction and construction oversight. Metro-North is also a member of the EPAC and, in that capacity, is providing technical and operational input and reviewing findings to ensure that its operating needs are addressed. Finally, it is likely that along portions of the Empire Corridor South over which it operates, Metro-North will participate in specific improvements that were a product of the Hudson Line Railroad Corridor Transportation Plan.

Regional Transportation Authorities and Municipalities

Transportation funding and services are frequently coordinated at the sub-regional and municipal level by regional transportation authorities (RTAs). The RTAs are active partners in project studies, advocacy and implementation, and frequently partner with NYSDOT on projects that will affect their jurisdictions. For the High Speed Rail Empire Corridor Program, the following RTAs are involved:

- Niagara Frontier Transportation Authority (Niagara Falls & Buffalo),
- Rochester-Genesee Regional Transportation Authority,
- Central New York Regional Transportation Authority,
- Capital District Transportation Authority.

These organizations could be involved in capital funding for station upgrades and/or parking improvements at stations. As federal funds provided to states and municipalities for rail system improvements are likely to require local match, in addition to state matching funds, some of the match could be provided by the state, municipality, or RTA.

Private/Public Partnerships

Private/public partnerships are often employed to gain coordinated benefits for complex and costly transportation projects. Private sector financing is often used for those elements of a project which are likely to generate a defined revenue stream that can be dedicated to debt repayment. In the case of the High Speed Rail Empire Corridor Program, private sector participation could involve station rehabilitation or replacement, where food concessions and rental payments from tenants create a revenue stream for debt repayment. There are also provisions within the tax law that permit the acceleration of depreciation on hard assets – in this case, locomotives and coaches – such that private financing may be available to acquire the rolling stock and lease it to the operator/owner (whether that be NYSDOT or Amtrak), where the lease payments, combined with the tax advantage, provide the profit necessary to justify the initial private sector involvement.

5.4. Operations and Maintenance Funding Requirements and Sources

Operating funds are used to pay the day-to-day costs of operating a transportation service. Labor costs include salaries, plus benefits. Fuel and utility costs cover vehicle propulsion, either combustion fuels or electric power, and heating, lighting, air conditioning, phones, and data network fees. Custodial and janitorial fees include cleaners, custodians, trash removal, recycling apparatus and hauling agreements, rent, license and permit renewal fees (except where these are incurred in support of a capital project, on a one-time basis), gardeners and landscapers, and professional services (legal, accounting, etc.). Repair costs include the costs for facility and equipment upkeep and minor component replacement. Major component campaigns, as in the replacement of brakes across an entire fleet on a programmed basis, are typically funded out of capital sources.

As previously indicated in Section 5.2.2, operating costs are generally covered by a combination of ticket revenue and other non-ticket revenue sources. By comparing the operating costs with the annual anticipated revenues from both ticket and non-ticket revenues, the annual operating

subsidy that the service will require is derived. These operating subsidies are typically provided by state or municipal governments.

Most public transportation in the U.S. requires subsidy; ticket revenues are rarely sufficient to cover the full cost of the service. Metro-North receives operating subsidies from the New York Metropolitan Transportation Authority (MTA). In New York, Amtrak receives operating subsidies from the U.S. DOT and NYSDOT. Except for payments to Amtrak, the federal government terminated its operating subsidy program in the 1970s.

Operating subsidies are generally likely to be available for the High Speed Rail Empire Corridor Program as follows:

- **Federal Operating Assistance:** Amtrak receives federal operating funds. Following implementation of PRIIA Section 209 on October 1, 2013, however, use of these funds will be limited to the Northeast Corridor and long distance services. The Lake Shore Limited, which operates over the corridor en route to Chicago, will receive continuing federal operating support. The balance of the corridor operating subsidies will need to derive from state and local sources.

- **State Operating Assistance:** NYSDOT works collaboratively with Amtrak on a number of projects. NYSDOT has led the effort to transform the 94-mile-long Hudson Line from Schenectady to Poughkeepsie, currently a CSXT-freight controlled line, to an Amtrak-controlled line. Additionally, NYSDOT has entered into a long-term agreement with Amtrak on further developing the Hudson Line for passenger rail use, providing operating subsidies and other funding when necessary and available, thus ensuring Amtrak's continuing control over maintenance, operations, and dispatching.

- **Section 209 of PRIIA** establishes that Amtrak's operating losses be covered through a combination of ticket revenue and state support. Historically, New York State has provided support to the Adirondack Service, and with the implementation of PRIIA 209, NYSDOT will provide financial support to the Empire Service, effective October 1, 2013. Although this new law creates new funding responsibilities for NYSDOT, it represents an opportunity for the state to have even greater control over the Amtrak service. Through the Hudson Line lease and the implementation of PRIIA 209, NYSDOT and Amtrak have developed a strong collaborative relationship that will be strengthened with the implementation of any of the Build Alternatives.

- **Regional Transportation Authorities or Municipal Operating Assistance**: Some costs associated with operation of stations or parking areas at stations could be assumed by municipalities or RTAs, as previously discussed in Section 5.3.3.

5.5. Financial Performance of Alternatives

Tier 1 concept level design and operations of the High Speed Rail Empire Corridor Program alternatives required the consideration of several operating scenarios and associated capital improvements. The goal of each scenario was to minimize passenger and freight train schedule conflicts, address critical congestion and delay locations, and sequence investments to yield continual improvement in corridor train service without unacceptably interfering with existing service. These operating scenarios considered the following:

- Upgrade tracks, signals, switch and interlockings, and communication systems to gain speed and reliability;
- Provide sufficient additional track to segregate to the greatest degree practical passenger from freight services; and
- Reduce the number of at-grade crossings or provide controls to restrict vehicle interference with train operations and satisfy FRA safety requirements associated with higher-speed train operation.

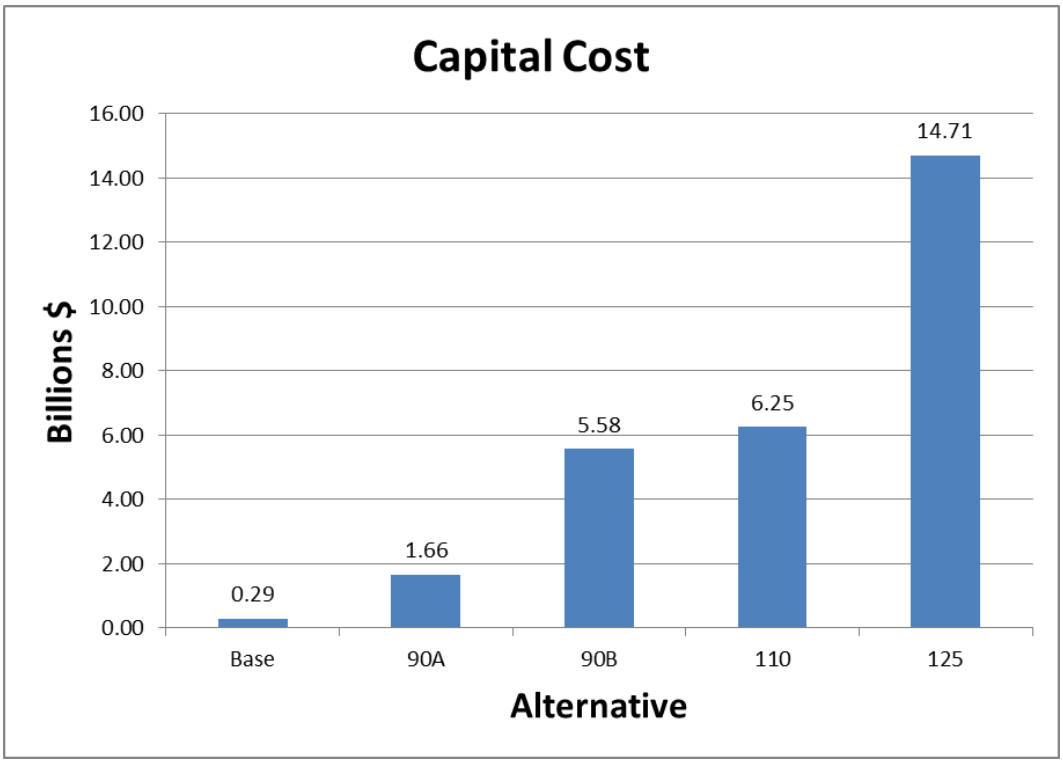
For Alternative 90A, the investment primarily would involve improving existing track and signal systems to gain speed and reliability. For Alternatives 90B, 110 and 125, the reduction in conflicts between freight and passenger trains would be achieved through the construction of longer passing sidings and/or new dedicated passenger track, allowing one train to bypass the other without delay to either.

While Empire Corridor South currently experiences relatively few conflicts between passenger and freight services, Empire Corridor West has significant freight and passenger train route sharing, with concomitant impacts on passenger service speed and reliability. For the western segment, Alternatives 90B, 110, and 125 would achieve greater or total separation of freight trains and passenger trains by using a new dedicated passenger track in the existing corridor (Alternatives 90B and 110) or by purchasing and constructing an entirely new, straighter and flatter, fully electrified ROW (Alternative 125). The Base Alternative and Alternative 90A would involve additional passing sidings and switches to permit passenger trains to pass freight trains, but would not involve an entirely new, segregated high-speed passenger rail track parallel to the existing mixed freight and passenger service tracks now shared by both operations. South of Albany, the High Speed Rail Empire Corridor Program would modify existing tracks, eliminate minor conflicts through some track improvements and better signaling, and construct other upgrades to improve already good (110 mph) speed performance between New York and Albany. In its entirety, the Empire Corridor would realize the following improvements:

- South of Albany, create track connections, modify interlockings, and make additional operational improvements that would result in segments of track where freight and passenger train conflicts would be better managed without slowing passenger service;
- West of Albany, eliminate selected grade crossings to enable higher speeds while meeting FRA safety requirements;
- West of Albany, add double track segments (including property acquisition to permit expanded right-of-way) and some selected "fourth track" passing sidings to eliminate freight and passenger train conflicts; and
- Over the entire route, schedule the added, higher-speed services to avoid conflicts with freight operations.

The various improvements proposed under each alternative would impose very different capital costs, ranging from $290 million for the Base Alternative to $14.71 billion for Alternative 125. Exhibit 5-1 shows these values graphically.

Exhibit 5-1—Capital Costs



5.5.1. Capacity of Empire Corridor Service to Absorb Infrastructure Improvements

There is a limit as to how much interference operating rail services can absorb before train schedules are adversely affected due to slow-orders at work sites, or the requirement to manage two-way traffic on a single track, while the other track (or passing siding) is improved. In the case of the High Speed Rail Empire Corridor Program, the potential for adverse effect would likely be most pronounced for Alternative 90A, in which additional parallel track and passing sidings, and associated switches and turnouts to and from the main freight line, would be constructed in close proximity to operating trains. Because the improvements proposed under Alternative 90A also would occur under Alternatives 90B and 110, operating rail service under those alternatives also would be affected by proposed infrastructure improvements. The improvements proposed for Alternative 90A along Empire Corridor South and Niagara Branch would occur in Alternative 125. Alternative 125, with a new, separate corridor, would therefore present the least impact to the existing Empire Service.

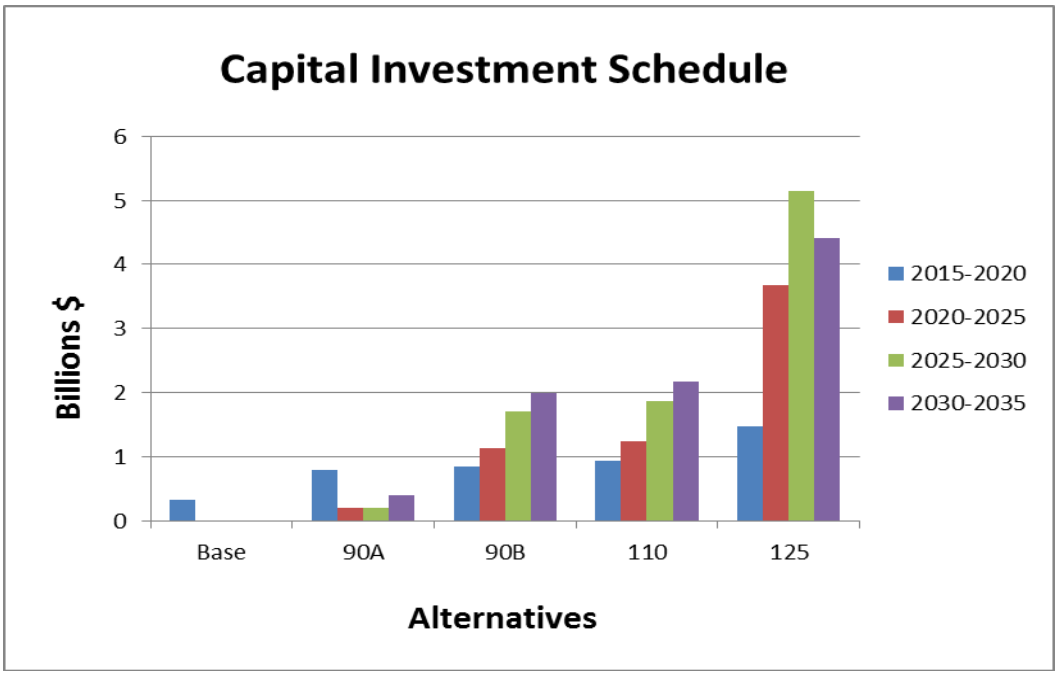
Specific corridor construction impacts upon train service operations will be further defined in Tier 2 as detailed engineering is advanced on a preferred alternative. During Tier 2, the rate at which capital funding will be provided and the ability of existing train operations to absorb the effects of nearby construction will be more precisely assessed.

5.5.2. Sequence of Capital Investments

Depending upon the alternative selected, the High Speed Rail Empire Corridor Program would result in continuing investment over most or all of the 20-year program life, from 2015 through 2035. The existing rail corridor would remain in service as the improvements are made. The program improvements would be constructed in a sequence that minimizes interference with daily service, as a result, service improvements would occur and the benefits would be realized incrementally over the entire implementation time frame.

Exhibit 5-2 presents a proposed schedule of capital investments for each alternative. Capital costs are shown in 2015 dollars to enable comparison of total cost and overall benefit among alternatives. In subsequent phases of program evaluation (Tier 2), costs will be forecast with greater precision, based on the sequence of proposed improvements, which in turn will depend upon the level of available funding.

Exhibit 5-2—Capital Expense Sequence for High-Speed Rail Alternatives



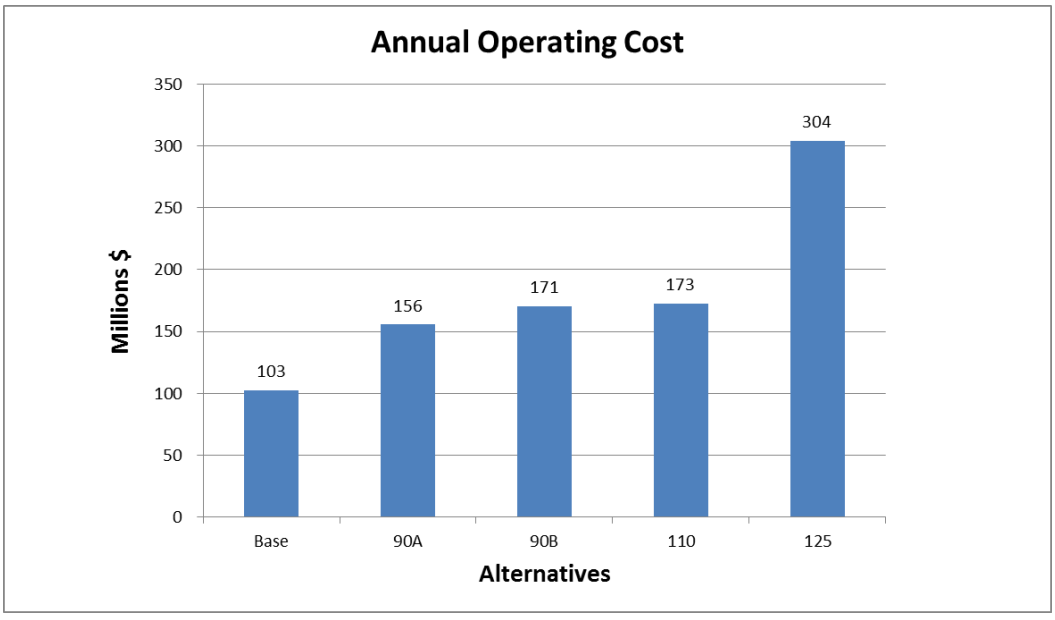
5.5.3. Estimates of Annual Operating and Maintenance Costs, Ridership and Revenues

Operating and Maintenance Responsibilities and Costs

Amtrak is responsible for operation of intercity passenger rail service along the entire Empire Corridor. Amtrak and CSXT currently share maintenance responsibilities between Poughkeepsie and Hoffmans. Recently, Amtrak and CSXT signed an agreement, which would transfer these CSXT maintenance and dispatching responsibilities to Amtrak. This agreement has been submitted to NYSDOT for approval. CSXT maintains responsibility for maintenance and dispatching on the portion of the corridor it owns between Hoffmans and Niagara Falls, and Amtrak continues these responsibilities on the portion of the corridor it owns between Penn Station and Spuyten Duyvil. Metro-North is responsible for ownership, maintenance, and dispatching along the corridor between Spuyten Duyvil and Poughkeepsie.

Exhibit 5-3 indicates the total annual operating cost for each Build Alternative as compared to the Base Alternative. Projected operating costs are based on existing Amtrak operating procedures and crew assignment protocols. The Base Alternative would include the existing four daily round-trips between Albany and Niagara Falls; the higher-speed alternatives would presume a doubling, from four to eight daily round trips. For Alternative 125, there would be almost five times the service (from four to 19 daily round trips) provided by the Base Alternative. The costs are shown in constant 2015 dollars to allow comparison across the alternatives.

Exhibit 5-3—Estimated Annual Operating and Maintenance Costs



The higher operating costs for Alternatives 90B and 110 relative to Alternative 90A would be due to the addition of a dedicated passenger-only mainline track for the 294-mile-long Empire Corridor West. In comparison, Alternative 90A would implement only selected passing sidings to permit more fluid corridor dispatching. Alternative 125 would have the highest O&M costs, reflecting higher track maintenance standards and the costs of maintaining electric power distribution infrastructure (overhead catenary, substations, protection) for the dedicated high-speed track.

Ridership

Both operating costs and ticket revenues are driven by the number of passengers carried, which determines the required number of trains, and, in turn, the number of crews, cleaning and maintenance staff, etc. Forecasting ridership for transportation services is a complex statistical process, which predicts travelers' future behavior, based on analysis of past behavior in similar circumstances. The forecasting methodology employed for this Tier 1 EIS presumes that travelers:

1. Determine trips by the most appealing travel mode available for each journey;

2. Choose among the various available options based on (in generally descending order): cost and time, reliability, convenience (accessibility), comfort, and amenity;

3. Consider the difficulty of accessing the transport service in choosing how to travel (e.g., traffic congestion to a station, lack of parking, long walks to get to bus or train platforms); and

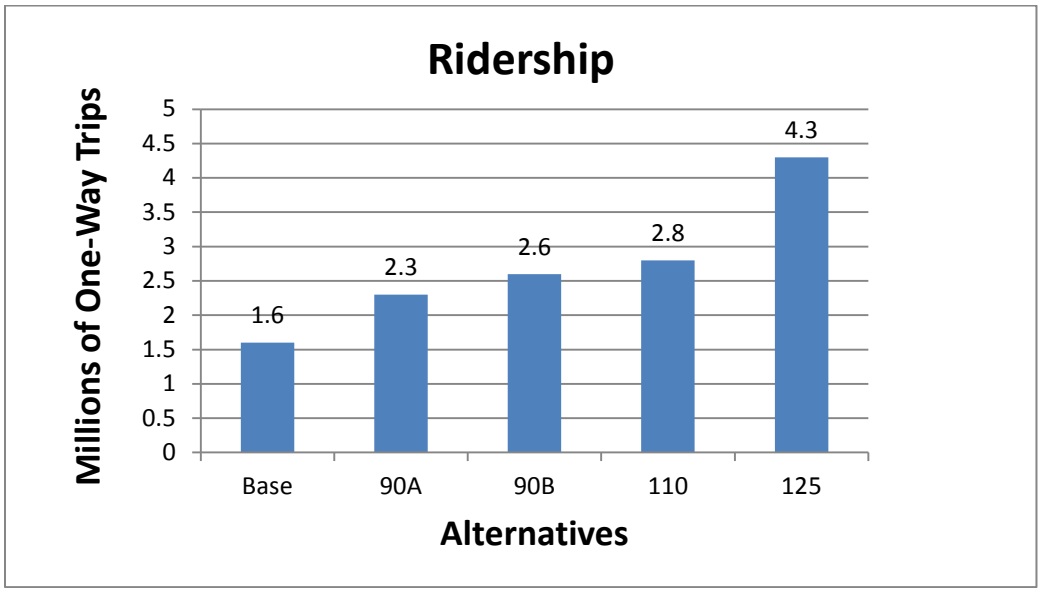
4. Act rationally – that is, in every case, they use the least costly or most efficient travel product (in terms of the above features) available.

Given the above "drivers" of travel mode choice (bus, car, plane, train, bicycle, walking), a computer model was used that recognizes the comparative speed, cost, accessibility, etc. of the travel modes between trip origins and destinations. For this program, the model assigned every trip in New York State that both begins and ends within the Empire Corridor. The model placed the Empire Corridor train service in competition with automobile, bus, and airplane travel modes. Assessing comparative cost, time, convenience, etc., the model forecast for the various alternatives the number of people that would elect to ride the train over automobile, bus, or airplane.

Ridership forecasts are a function of market size and frequency of train service, as well as speed, cost, and convenience (e.g., number of transfers required, ease of access to stations). While more frequent service might attract more riders, there is a point of diminishing returns, as the capital and operating costs of the additional train sets grow beyond the value of the additional ridership the increased service may attract. The alternatives were therefore structured to maximize ridership at practical levels of investment in rolling stock and maintenance costs, given likely federal and state funding over the program's implementation period. Refer to Appendix B, *Ridership and Revenue Forecasting Report for the High Speed Rail Empire Corridor Program*, for additional details regarding the ridership forecasting methodology.

Exhibit 5-4 presents the 2035 annual ridership forecasts for the Empire Corridor under the five alternatives.

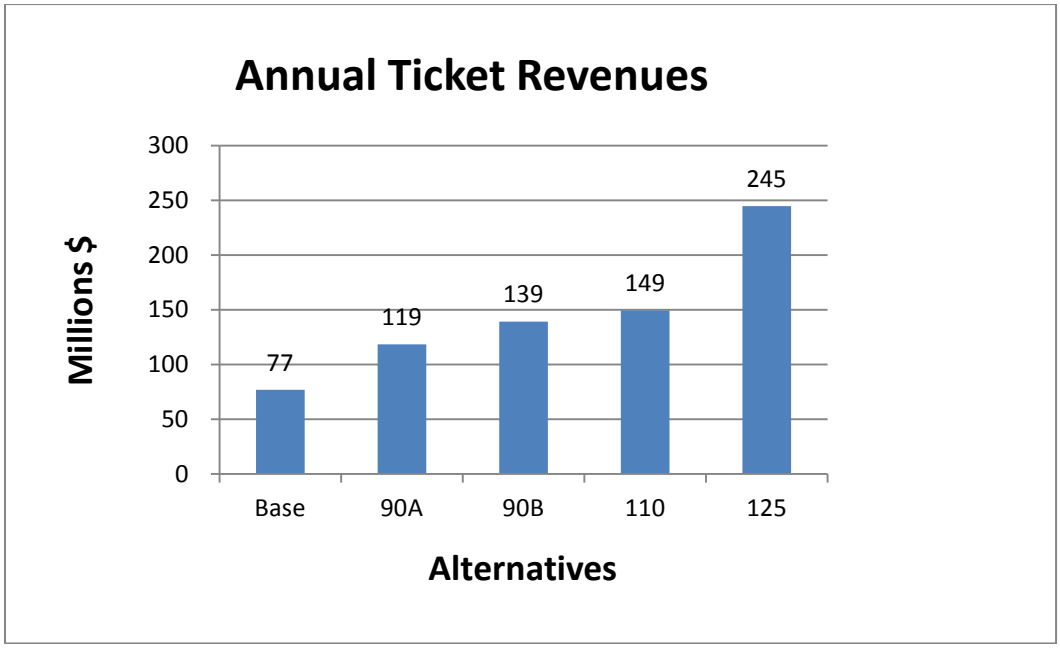
Exhibit 5-4—2035 Ridership Forecasts



Operating Revenue

Annual operating revenue forecasts are based on ridership forecasts between station pairs, multiplied by the current Amtrak travel fare between those pairs, assigned to the target comparison year. This allows comparison among the alternatives in terms of capital investments, annual O&M costs, and anticipated gross annual revenue and resulting required subsidy all in 2015 dollars. Exhibit 5-5 presents the estimated range of annual operating revenue in 2015 dollars for the five alternatives.

Exhibit 5-5—Estimated Annual Operating Ticket Revenue

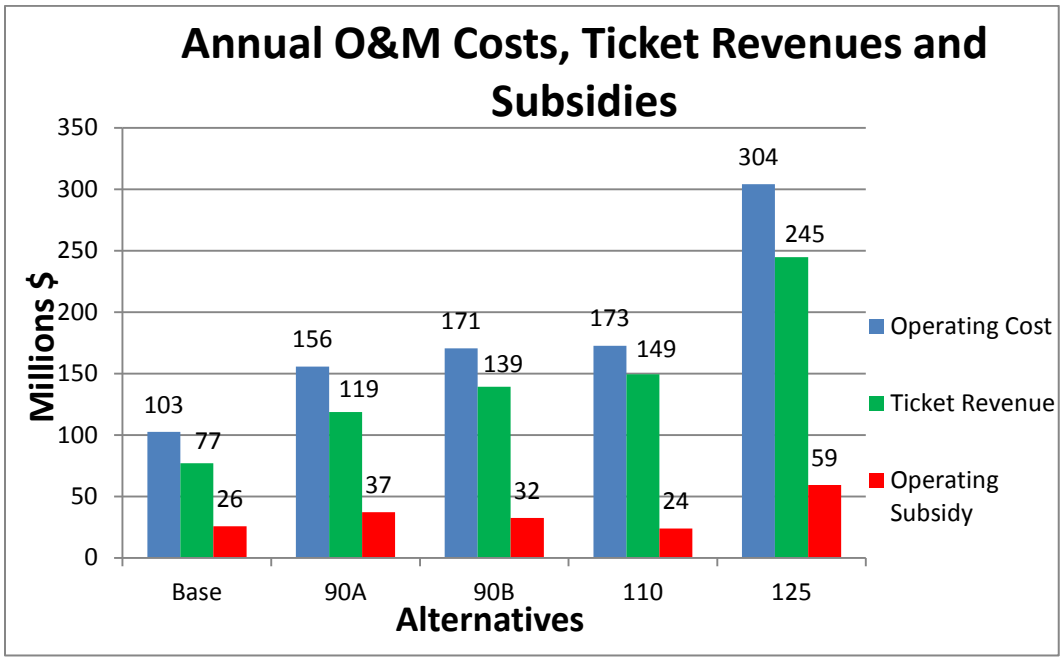


Annual Operating Deficits

Exhibit 5-6 summarizes the annual operating deficits for the five alternatives. These deficits account for the difference between total operating costs and combined anticipated ticket revenues. Non-ticket revenues derived from advertising, station concessions and leases, and utility leases along the ROW, while salutatory and contributory to the program, do not generally produce sufficient additional income that would alter the operating deficit. These additional revenues would likely be similar across all alternatives.

Exhibit 5-6 indicates that deficits, and corresponding subsidies, would be lowest for Alternative 110 and greatest for Alternative 125. In general, while faster trains incur lower labor costs, as hourly wage train crews spend fewer hours on each run, propulsion costs are higher at high speeds, as are the costs of track maintenance, since high speed operations cause greater track wear. In addition, the greater number of daily trains intended to be operated under Alternative 125 would lead to higher crew and equipment maintenance costs.

Exhibit 5-6—Estimated Annual Operating Subsidy

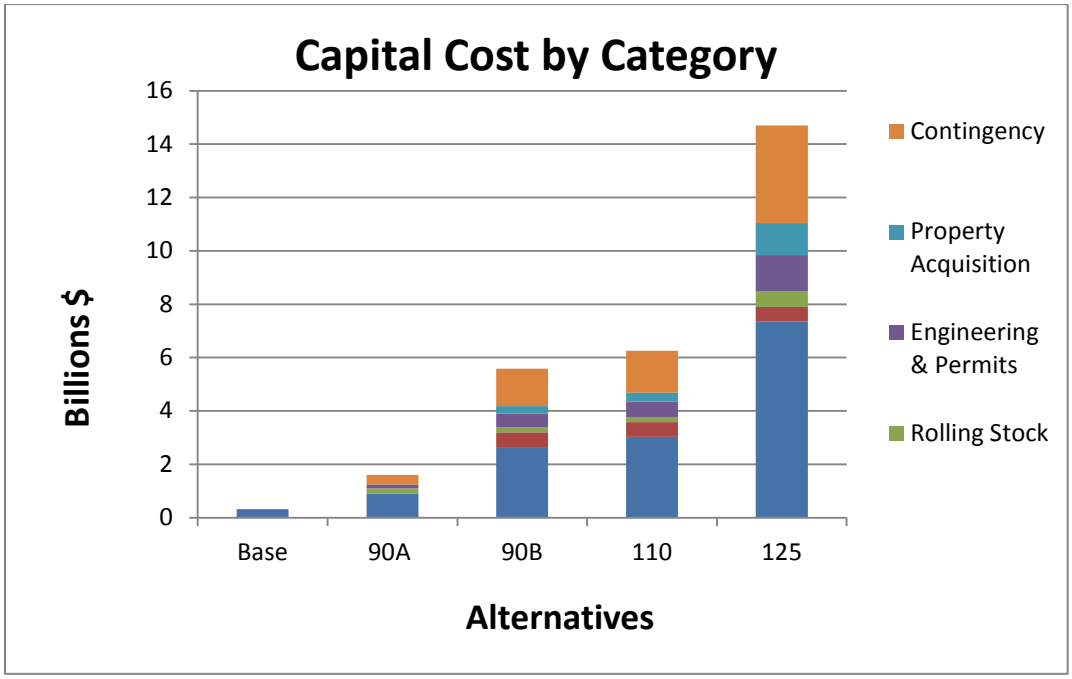


5.5.4. Financial Profiles of Alternatives

Exhibit 5-7 shows projected Tier 1 capital costs for the five alternative, divided by category: rolling stock purchases; planning, engineering design, and permitting; property acquisition costs; infrastructure construction costs; and Empire Corridor South improvement costs. Capital cost estimates also include a 35 percent contingency factor to account for uncertainties at the Tier 1 program level of analysis for infrastructure improvements. As there are fewer uncertainties in rolling stock costs, equipment cost estimates include only a 5 percent contingency factor.

The capital costs for the five alternatives would range from $290 million for the Base Alternative, to $14.71 billion for Alternative 125. While the analysis shows all costs in 2015 dollars, actual investments would be made gradually over the 20-year project life. A staged implementation approach is based on two factors: first, federal and state governments have limited financial capacity in any single year; second, existing rail operations can only support a limited amount of infrastructure renewal or new construction along the ROW before construction activities interfere with daily service.

Exhibit 5-7—Capital Costs by Spending Category



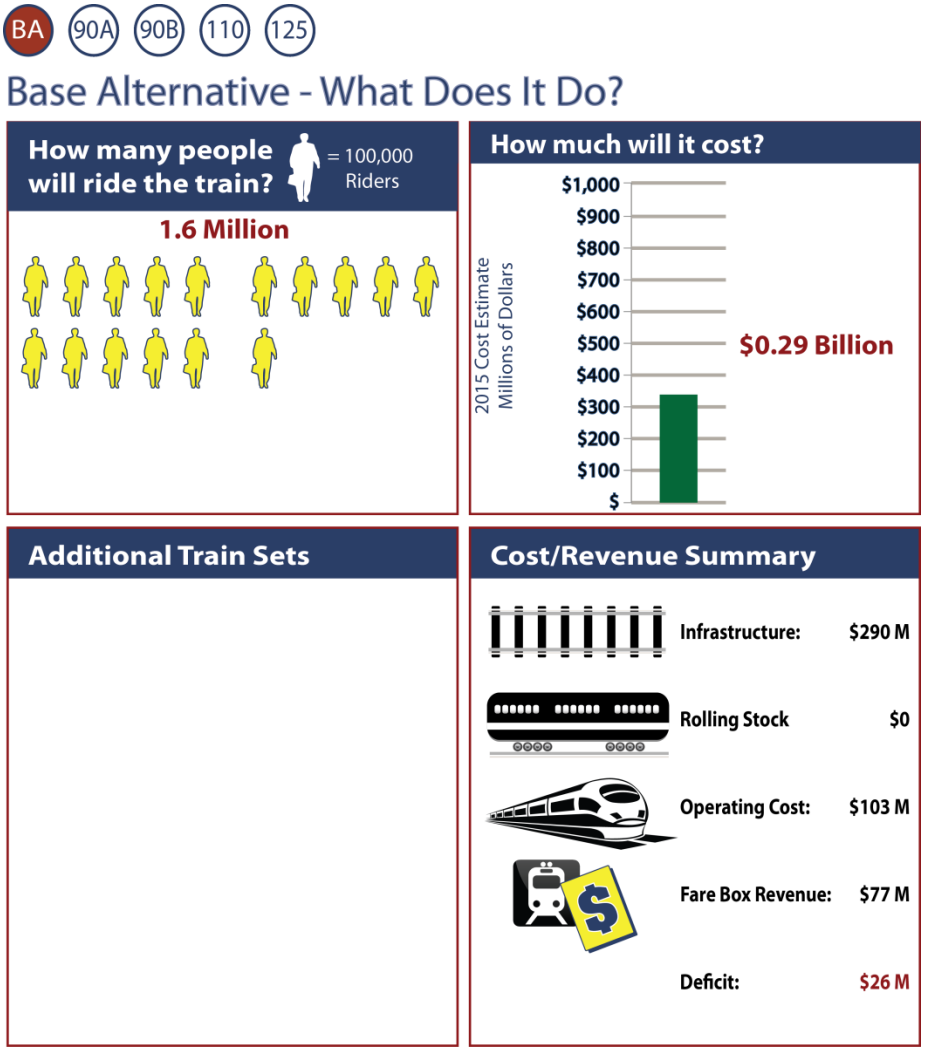
The anticipated financial performance of each of the five alternatives is as follows.

Base Alternative

The Base Alternative would be comprised of previously funded infrastructure upgrades west of Albany and key congestion relief projects south of Albany. Because much of the Base Alternative work is already in the final stages of NEPA documentation or final design, construction could begin as early as 2013, and would be completed prior to 2020. The Base Alternative would maintain the existing four round trips between Albany and Buffalo, and 13 round trips between New York City and Albany. Because there would be no change from the current operation, no additional rolling stock would be required to implement the Base Alternative. Operating costs would continue as they are currently incurred by Amtrak, approximately $103 million annually. Ridership is forecast to be 1.6 million in 2035, generating ticket revenue of $77 million, and resulting in a deficit of $26 million. Infrastructure costs to implement the Base Alternative would be $290 million; no new property would be required.

The Base Alternative would be completed by 2020, and its benefits (reduced congestion) would accrue gradually over the five-year construction period, with gradual improvements in reliability (on-time performance) and some modest increases in average speed.

Exhibit 5-8—Characteristics of Base Alternative

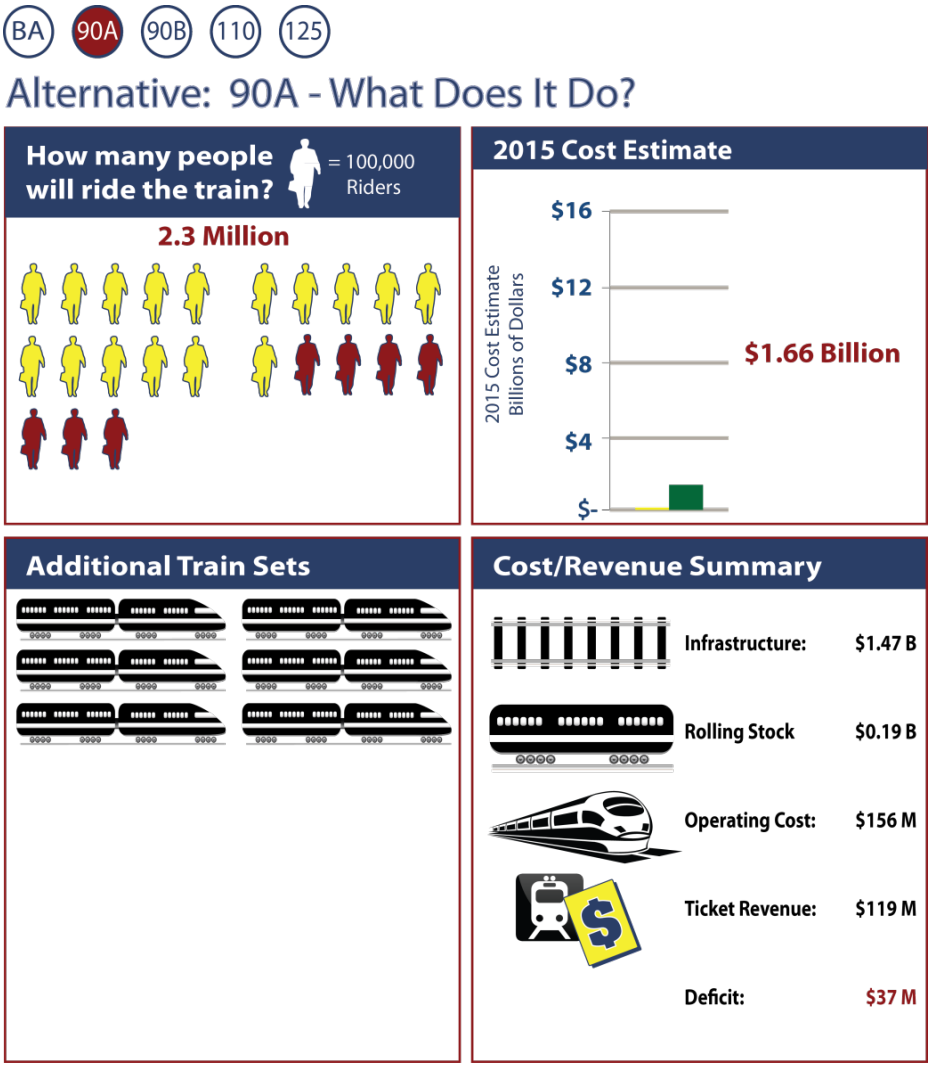


Alternative 90A

Alternative 90A would include considerably more infrastructure improvements beyond those programmed in the Base Alternative. It also would provide for an increase in train service from four to eight daily round trips between Albany and Buffalo, and from 13 to 16 daily round trips between New York City and Albany. The additional service would require purchase of six additional train sets, each with a locomotive and five passenger coaches, to supplement the existing fleet. The acquisition of additional rolling stock would add $0.19 billion in capital costs. Alternative 90A would include $1.46 billion in infrastructure costs for additional passing track and various signal, grade crossing and switch improvements to reduce freight/passenger train conflicts,

increase permissible speeds through curves, improve system reliability, and secure the highest possible speed profile for the existing alignment. In total, capital costs would reach $1.66 billion for Alternative 90A; no property would be required. The required additional train maintenance and additional service would increase operating costs to $156 million. Based on shorter travel times due to increased speed, ridership would grow to 2.3 million annual passengers by 2035. Ticket revenue would be $119 million, resulting in a deficit of $37 million, annually.

Exhibit 5-9—Characteristics of Alternative 90A

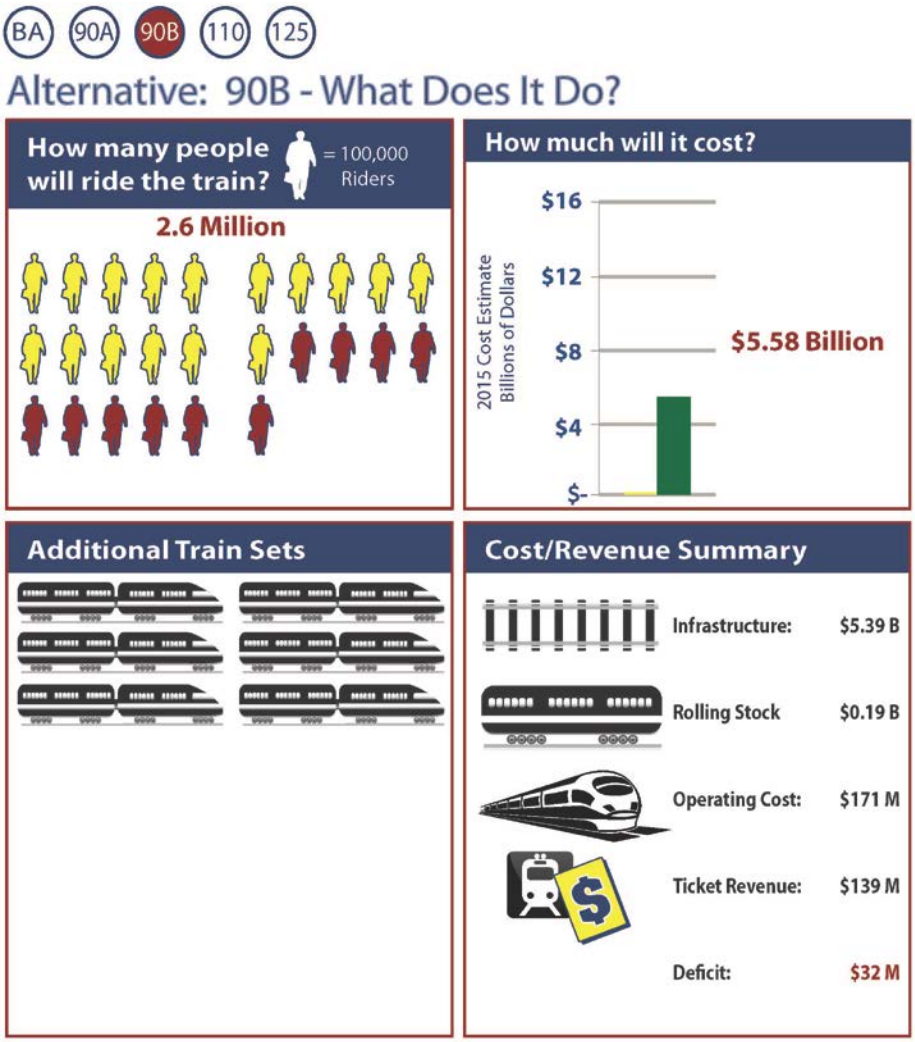


Alternative 90A would be completed by 2035, and its benefits would accrue in steps, with approximately 25 percent of the maximum and average speed benefit accruing at the end of each five-year interval, with the completion of each segment of segregated track.

Alternative 90B

Alternative 90B would add one additional round trip between New York City and Albany over Alternative 90A, for a total of eight round trips between Albany and Buffalo, and 17 round trips between New York City and Albany. The increase in service would be accomplished with the same fleet as required for Alternative 90A, involving six additional train sets and rolling stock costs of $0.19 billion. The central aspect of Alternative 90B would involve the provision of a third track west of Albany, to be constructed within the existing CSXT ROW, giving significant separation between freight and passenger traffic. With the additional property required to grade separate the ROW and to reduce or eliminate curves to permit higher maximum speeds, infrastructure costs would be $5.39 billion. The total capital cost for Alternative 90B would be $5.58 billion in 2015 dollars. Operating costs would rise to $171 million, accounting for the additional daily round trip (compared to the Alternative 90A). Ridership is forecast at 2.6 million, generating ticket revenues of $139 million, and resulting in a deficit of $32 million.

Exhibit 5-10—Characteristics of Alternative 90B

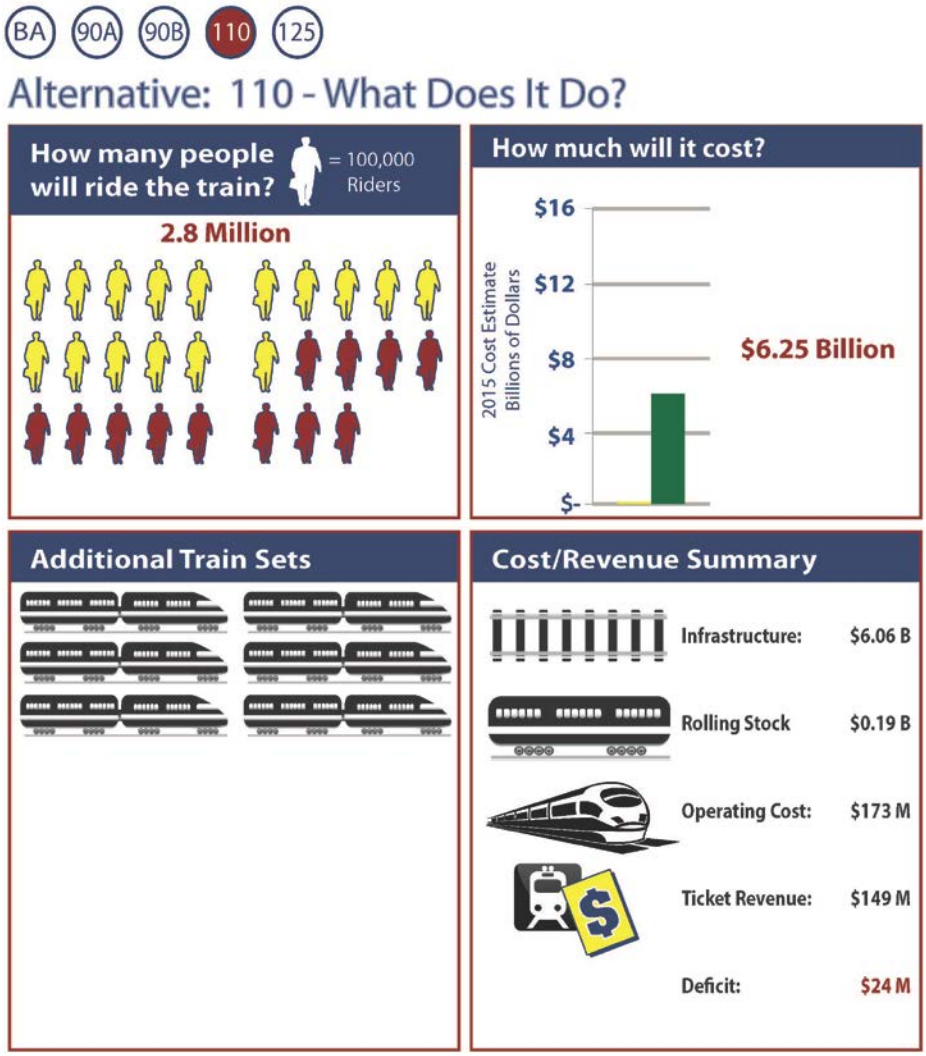


Alternative 90B is projected to be completed by 2035, and its maximum and average speed benefits would accrue in steps, with approximately 25 percent of the benefit accruing at the end of each five-year interval, with the completion of each new segment of dedicated track.

Alternative 110

Alternative 110 would involve slightly more new track west of Albany; the higher speed of Alternative 110 would require more property acquisition to support straighter track, more grade separations and flatter terrain. The number of trips would be unchanged from that of Alternative 90B. While rolling stock costs would remain at six additional sets and $0.19 billion, increasingly stringent track standards for the higher speed would involve $6.06 billion in additional infrastructure, resulting in total capital costs of $6.25 billion. Operating costs would increase only

Exhibit 5-11—Characteristics of Alternative 110



slightly, to $173 million. Ridership would grow to 2.8 million in response to the higher speed, generating ticket revenues of $149 million, and producing the smallest annual deficit among the five alternatives, $24 million.

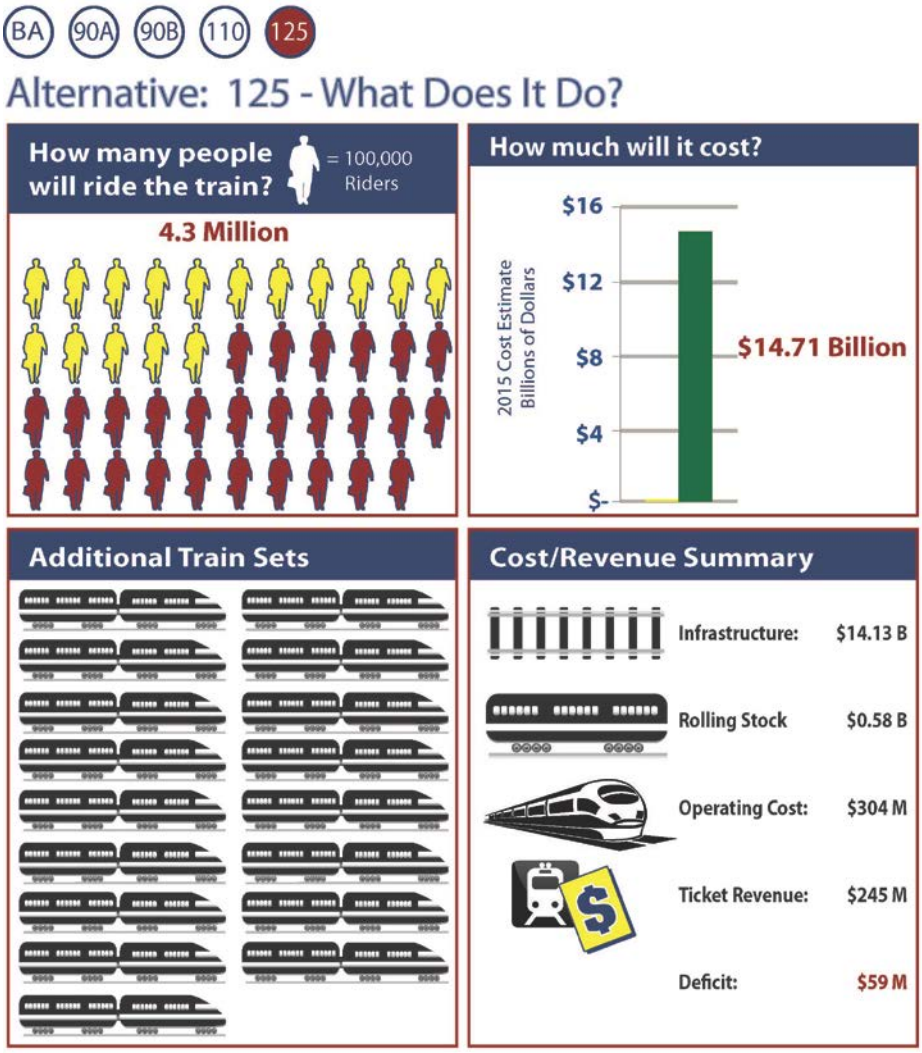
Alternative 110 is projected to be completed by 2035, and its maximum and average speed benefits would be achieved in steps, with approximately 25 percent of the benefit accruing at the end of each five-year interval, with the completion of each new segment of segregated track.

Alternative 125

Alternative 125 would retain the existing "legacy" regional service on existing CSXT tracks, while also constructing a new, entirely separate ROW at a significant distance from the existing Empire Corridor on which to introduce limited stop 125 mph service. The new ROW would be fully grade separated, and straighter and flatter than that of any other alternative. The higher speed of operation, and consequently shorter trip times between endpoints, would allow the operation of 19 daily round trips between Albany and Buffalo; New York City-to-Albany trips would increase to 24 daily. This increased service frequency, and the electrified ROW would require more and different equipment: "dual mode" diesel and electric locomotives in place of diesel-only locomotives. Alternative 125 would have a substantial increase in fleet size: 17 additional train sets would be required. The dual mode locomotive fleet would have substantial costs, $0.58 billion; and a new, fully segregated ROW would require an infrastructure investment of $14.13 billion, for a total capital cost of $14.71 billion. The increase in average speeds, combined with increased service frequency on both segments and high-speed express service between major stops, would attract the highest additional ridership, forecast at 4.3 million, and generating revenues of $245 million annually. Operating costs for this increased level of service would be the highest of all the alternatives, at $304 million, producing an annual deficit of $59 million.

Alternative 125 would be completed by 2035. Its reliance on an entirely new ROW between Albany and Syracuse, however, would not be completed until the tenth year, indicating that the first 50 percent of service benefits would not accrue until 2025. The next 25 percent service benefit would accrue about five years later, with completion of the new ROW to Rochester; and the remaining 25 percent benefit would accrue at the twentieth year, as the new corridor would reach Buffalo.

Exhibit 5-12—Characteristics of Alternative 125



5.6. Summary of Capital, Operating and Maintenance Costs, Revenues and Subsidies for Empire Corridor Alternatives

Exhibit 5-13 summarizes the capital and operating costs and revenues for each alternative to facilitate comparison.

Exhibit 5-13—Summary of Costs and Revenues for High Speed Rail Empire Corridor Alternatives

Alternative / Metric	Base	90A	90B	110	125
Capital Costs*					
Additional train sets	0	6	6	6	17**
Equipment Cost	$0.00	$0.19	$0.19	$0.19	$0.58
Infrastructure Cost	$0.29	$1.47	$5.39	$6.06	$14.13
Total Capital Cost	$0.29	$1.66	$5.58	$6.25	$14.71
Operating & Maintenance Costs					
O&M Cost (millions, 2015)	$103	$156	$171	$173	$304
Revenue (millions)	$77	$119	$139	$149	$245
Surplus/(Deficit)	($26)	($37)	($32)	($24)	($59)
Benefits					
2035 Ridership (millions annual one-way trips)	1.6	2.3	2.6	2.8	4.3
Ridership Gain vs. Base		0.7	1.0	1.2	2.7
Average Speed	51	57	61	63	77
Time, NYC – Niagara Falls (hours: minutes)	9:06	8:08	7:36	7:22	6:02
Time Improvement vs. Base (hours: minutes)	n/a	58	1:30	1:44	3:04
Round Trips Albany – Buffalo	4	8	8	8	19
Round Trips Albany – Niagara Falls	3	7	7	7	6
Round Trips NYC – Albany	13	16	17	17	24

*Costs in billions of 2015 year US dollars except where noted.
**Dual Mode locomotives required for Alternative 125

5.7. Funding Assumptions, Risks and Requirements

For the High Speed Rail Empire Corridor Program, it is assumed that a combination of federal high-speed rail funds and state and local revenue sources would be used for various infrastructure improvements and/or equipment purchases, as appropriate to funding source requirements and restrictions. Some of these funding sources would require local match. It is assumed that the state's participation through some combination of local investments in stations or parking, the dedication of state bond funds, or direct subsidies from state general revenues could satisfy the local match requirements. At the Tier 1 level of analysis, and given the uncertainties associated with current high-speed rail funding, the rate at which federal funding will be provided for the program over the 20-year implementation period can only be estimated in broad terms, based on historical multi-year averages, adjusted for inflation.

All capital costs are shown as if they would be received in 2015. This allows for an appraisal of the relative capital costs of the program alternatives in total value, without regard for the rate at which funding would be available for the different alternatives.

5.7.1. Financial Capacity Analysis

NYSDOT's financial capacity to undertake major passenger rail improvement projects is constrained by limited resources and competing needs. Other NYSDOT major passenger rail improvement initiatives underway include participation in a wide range of capital investments required to maintain and improve rail transportation services in New York City and its Long Island and northern suburbs, as well as bus and rail rolling stock needs for other transit properties in the state's smaller municipalities. NYSDOT is also involved in improving statewide freight rail services, in partnership with private freight rail owners. To a great degree, NYSDOT's capacity to advance high-speed rail improvements will depend on dedicated local funding sources and federal support.

5.7.2. Risk and Uncertainty and Risk Mitigation Strategies

Due to limitations associated with current funding sources, general budget pressures, and the need for continued maintenance of existing infrastructure, the pace of program implementation is difficult to project. Absent significant federal funding, NYSDOT currently has limited capacity to undertake major long-term investments in high-speed passenger rail projects. Moderate incremental investments are feasible within the context of existing and anticipated future funding. This Tier 1 financial analysis assumes substantial federal participation in the construction of any of the Build Alternatives. Furthermore, the federal programs outlined in Section 5.3.2 are primarily discretionary grants for capital improvements and related environmental and engineering studies, for which there is significant national competition.

NYSDOT has a history of providing operating support for inter-city and commuter rail transit, although there is no companion federal operating program. The financial analysis provided in Chapter 5 has defined a likely financial plan based on historic and potential future national funding trends. There are several operating and capital risks associated with the High Speed Rail Empire Corridor Program that would have to be addressed in formulating a detailed financial plan, however. Some additional fiscal capacity-related risks to NYSDOT and Amtrak are present as well. These risks are noted and described in the following subsections.

5.7.3. Capital Cost Risks

There remain considerable uncertainties in the capital cost estimates for the High Speed Rail Empire Corridor Program, due to the limitations noted earlier in this chapter. This uncertainty is not unusual at the Tier 1 conceptual planning level for a program of this magnitude. More refined cost estimates will be prepared for the Service Development Plan, and again during Tier 2, when the specific infrastructure improvements of the selected program alternative are advanced through detailed design. Exhibit 5-14 summarizes capital cost risks and Tier1–level mitigation strategies for the High Speed Rail Empire Corridor Program.

At the Tier 1 planning level, it is difficult to anticipate and mitigate for these and other potential

risks and uncertainties. During Tier 2, NYSDOT will further develop planning, analysis, and engineering design data for these alternatives. NYSDOT also will conduct a public review process to generate support for a preferred alternative. The High Speed Rail Empire Corridor Program will then be positioned to compete effectively for federal, state, and private sector funding with which to initiate implementation.

5.7.4. Operating Cost Risks

As previously discussed, changes in fare structure affect ridership, with a resulting impact on fare revenue and cost recovery. Ridership affects service levels, which in turn affect maintenance and operating costs. Ridership and revenue are sensitive to on-time performance and to fare levels, which in turn affect the revenue forecasts and the operating ratio (the ratio of operating costs covered by fare revenues). Therefore, if the overall quality, speed, reliability, and availability of the new service would not meet customer demand, ridership could be lower than forecast, producing higher operating deficits and requiring additional state subsidies. Conversely, if the overall quality, speed, reliability, and availability of the new service would meet customer demand, ridership could be higher than forecast, resulting in lower operating deficits and requiring less state subsidies.

Exhibit 5-14—Summary of Tier 1 Capital Costs Risks and Mitigation

Risk	Mitigation
Negotiations with railroads. No provision is included for costs arising from negotiations with operating railroads regarding their potential contribution to capital, or potential costs involved in protecting freight crossings (necessary to permit high-speed passenger service) or the use of ROW based on sharing agreements.	*The uncertainty associated with costs of CSXT participation is reasonably accommodated in the broad 35% construction contingency factor.*
Property costs. ROW acquisition costs are difficult to estimate in an uncertain commercial and residential real-estate market.	*As corridors are more precisely defined during Tier 2 work, it will be possible to sharpen the estimate for required property for the selected alternative.*
Broad unit costs (per ton, per cubic yard, per linear foot, etc.) have been applied for key elements rather than estimates based upon specific designs.	*During Tier 2 work on the selected alternative, as design detail is refined, costs specific to each element of infrastructure improvement will be more precisely defined.*
Mitigation costs. No allowances have been provided for utilities, wetlands mitigation, and preservation of historic structures, potential hazardous materials or other special site conditions.	*These uncertainties have been addressed to a considerable degree: the 35% contingency factor is applied to property acquisition as well as to construction; the engineering design/permitting cost category has been applied at 15%, rather than a more conservative 10-12% as is normally the case in standard construction. As the design becomes more refined, mitigation costs will be better defined and may be either more or less than the costs as accounted for in this Tier 1 analysis.*
Inflation rate. The rate of inflation is uncertain; moreover, inflation as represented in the consumer price index is not always representative of inflation for heavy construction or, more specifically, heavy rail construction, which tends to depend on competitive world-wide demand for concrete and steel at the time a project is designed and ready to bid.	*Application of a 35% contingency factor for both construction and property acquisition addresses this concern to a degree. It is virtually impossible, however, to forecast these factors beyond a 5-10 year time frame, so a 20-year program schedule is necessarily burdened with some additional risk.*
Financial market. Financial risks and interest rates may increase as capital markets respond to changes in the financial market and global economy. To the extent that project elements are funded by CSXT or through private-public partnerships involving debt, costs of debt service can vary dramatically.	*Government typically reserves low-interest debt programs through its economic development function. Where commercial debt becomes too costly, Government can sometimes guarantee debt, and thereby reduce its risk and associated costs, so that the debt-service costs can be maintained within reasonable ranges commensurate with these initial cost estimates.*
Federal participation. The level of federal participation may be lower than estimated.	*Because the High Speed Rail Empire Corridor Program constitutes a large number of individual infrastructure improvements, should federal funding be insufficient, the program could be implemented more slowly and over a longer time period, still delivering steady improvement in corridor rail service.*
Local participation. The level of local funding commitment may be lower than estimated.	*With sufficient public support, through referendum or bonding, it may be possible for NYSDOT to dedicate funding to the program to immunize it from the ebb and flow of local tax revenues and annual budgeting and legislative appropriations.*

6. Comparison of Alternatives

6.1. Introduction

This chapter summarizes and compares the five alternatives considered in this Tier 1 Draft EIS and evaluates the alternatives' benefits, costs, and environmental and social impacts against the program's purpose and need.

Following completion of the Tier 1 review process, NYSDOT will advance a selected alternative toward implementation. The selected alternative likely advanced by NYSDOT as a program of projects and Tier 2 environmental reviews will include more detailed analyses and design to identify site-specific environmental consequences, implementation plans, and mitigation measures.

6.2. Goals and Objectives

NYSDOT developed program performance objectives and transportation-related goals based on the program purpose to improve rail service and on the program needs to reduce infrastructure constraints that impede service and to accommodate passenger and freight traffic demand.

The environmental impacts of these alternatives are also considered in this Tier 1 Draft EIS (in Chapter 4) and summarized below.

6.2.1. Performance Objectives

The following six performance objectives are used to evaluate and rank the high-speed rail alternatives developed for the High Speed Empire Corridor Program.

- Improve system-wide on-time performance (OTP) to at least 90 percent;
- Reduce travel time along all segments of the Empire Corridor;
- Increase the frequency of service (number of daily round trips) along Empire Corridor West beyond the existing four daily round trips;
- Attract additional passengers;
- Reduce automobile trips, thereby reducing highway congestion; and
- Minimize passenger rail interference with freight rail operations.

6.2.2. Transportation-Related Goals

The following transportation-related goals were considered important to the high-speed rail alternatives developed for the High Speed Rail Empire Corridor Program. The environmental impacts of these alternatives are also considered, as presented in this Tier 1 Draft EIS, and are important factors in selecting the alternative to be advanced.

- Increase travel choices and improve quality of life by providing additional commuting and

travel options for residents and workers;

- Contribute to economic revitalization by accommodating forecasted growth in population and employment and corridor rail freight operations; and
- Improve environmental quality by facilitating rail use and reducing reliance on automobile travel, thereby reducing fuel use and greenhouse gas (GHG) emissions.

6.3. Alternatives Assessment

This section presents a comparative assessment of the five program alternatives advanced for study in this Tier 1 Draft EIS: Base Alternative, Alternative 90A, Alternative 90B, Alternative 110, and Alternative 125. The purpose of the comparative analysis is to highlight the advantages and disadvantages of the alternatives, and to identify important distinctions among them.

6.3.1. Base Alternative Performance

The Base Alternative, or "No Action" Alternative, is carried through the Tier 1 EIS as the basis for evaluating and comparing the costs and impacts of the program alternatives in relation to the benefits gained by the public. The Base Alternative's specific elements represent a series of rail improvement projects that address previously identified capacity and speed constraints hindering the Empire Corridor rail service. The Base Alternative's projects would occur whether or not improvements in the four "Build" alternatives discussed in this Tier 1 EIS are advanced. Additionally, NEPA reviews have been completed for the Base Alternative associated projects, such that they are now programmed in the Statewide Transportation Improvement Program (STIP) and the New York State Rail Plan, and are being advanced.

The projects constructed under the Base Alternative will represent an improvement over existing conditions. However, when compared to the Build Alternatives, the Base Alternative will not provide service levels sufficient to meet the purpose and need of the High Speed Rail Empire Corridor Program of introducing higher passenger train speeds on the Empire Corridor and improving reliability, travel times, service frequency, and passenger amenities. The following are the key characteristics of the Base Alternative, relative to this Empire Corridor program's performance objectives and goals:

- **The Base Alternative would result in the lowest annual ridership of all the alternatives**, at 1.6 million (year 2035). All Build Alternatives significantly exceed this value.
- **The Base Alternative would have the slowest average speed** (51 mph) and longest trip time of all the alternatives (9 hours and 6 minutes between New York City and Niagara Falls).
- **The Base Alternative would not result in improved service frequencies.** The Base Alternative does not provide any improvement in scheduled service. All other alternatives offer increases in the number of daily trains operated as compared to the existing service.
- **The Base Alternative would be the least effective alternative in diverting auto users to passenger rail** and improving air quality by reducing vehicular emissions. Auto diversions

increase in direct response to increasing average speed and reduced trip times among major origin/destination pairs.

- **Delivering only 83 percent on-time performance, the Base Alternative would not meet program service reliability goals of 90 percent OTP.** All of the other Build Alternatives would exceed the 90 percent OTP target.

6.3.2. Build Alternatives Performance

This section summarizes the effectiveness of the Build Alternatives in meeting the Empire Corridor program's stated goals and performance objectives. Exhibit 6-1 presents the qualitative rating system used to compare the Build Alternatives. Exhibit 6-2 summarizes the effectiveness of the alternatives in meeting the program's performance objectives using the qualitative rating system. The Base Alternative is shown for comparison.

Exhibit 6-1—Alternative Rating Symbols

Symbol	Rating
★	Strongly supports program performance objectives
+	Supports program performance objectives
O	Neutral regarding program performance objectives
X	Contrary to program performance objectives

Exhibit 6-2—Effectiveness of Alternatives in Meeting Performance Objectives

Performance Objectives	Base	90A	90B	110	125[1]
Improve System-Wide On-Time Performance	X	★	★	★	★/X (Express/Regional)
Reduce Travel Time	O	+	+	+	★/ + (Express/Regional)
Increase Service Frequency	X	+	+	+	★/+ (Express/Regional)
Attract Ridership	O	★	★	★	★
Reduce Automobile Trips	O	+	+	+	★
Minimize Impact on Freight Rail Service	O	O	+	+	O

Notes:
[1] Performance on the new express service and the legacy regional service will differ, as explained in the following subsections.

The findings regarding the performance of the Base and Build Alternatives reveal that:

- **Alternative 90A** strongly supports the performance objectives of improving system-wide on-time performance and attracting ridership. Alternative 90A also supports the objectives of reducing travel times, increasing service frequency, and reducing automobile trips. Alternative 90A is neutral with regard to the objective to minimize adverse effects on freight train operations.

- **Alternatives 90B and 110** would both create a segregated rail corridor, by providing exclusive third and fourth tracks for use by passenger trains. These alternatives would both strongly support the goals of improving system-wide on-time performance and attracting ridership. These alternatives would also support the goals of reducing travel times, increasing service frequency, reducing automobile trips, and minimizing impacts on freight rail service.

- Benefits from **Alternatives 90A, 90B, and 110** all are realized soon after initiation of construction; with these benefits increasing steadily throughout the entire term of the program as many important track, signal, yard, and grade-crossing improvements are implemented.

- **Alternatives 90A, 90B, and 110** all would enhance service for each station destination along the Empire Corridor West/Niagara Branch: Albany-Rensselaer, Schenectady, Amsterdam, Utica, Rome, Syracuse, Rochester, Buffalo-Depew, Buffalo Exchange Street, and Niagara Falls Stations.

- **Alternative 125** express service strongly supports the program performance objectives of improving system-wide on-time performance, reducing travel times, increasing service frequency, attracting ridership, and reducing automobile trips. The regional service (legacy service) maintained along the existing Empire Corridor for Alternative 125 would support the goals of increasing service frequency and reducing travel time and would be contrary to the goal of improving system-wide on-time performance. Alternative 125 would be neutral in terms of minimizing impact on freight rail service. Alternative 125 would have an extremely high capital and annual operating cost, requiring the highest public subsidies (after the Base Alternative), and has the greatest potential for environmental and community impacts.

- **Alternative 125** would not be completed until 2035, due to the need to construct an entirely new right-of-way through undeveloped areas, so the mobility benefits associated with Alternative 125 would not occur until then. The public would receive no transportation benefits from Alternative 125 until the first major new segment of track – from Albany to Syracuse – is completed, around 2025. Even then, for travelers destined for Rochester or Buffalo/Niagara Falls, true high-speed service would not be available until 2030 or possibly later. During the period of its construction, travelers would continue to receive only the benefits available from the Base Alternative.

- **Alternative 125** does not provide service enhancements to several existing station destinations on the Empire Corridor West including: Schenectady, Amsterdam, Utica, Rome, and Niagara Falls. Benefits at these destinations are limited to the benefits described in the Base Alternative as the existing regional legacy service would still be provided.

Additional details on this evaluation are presented in the following subsections.

Improve System-Wide On-Time Performance

In 2008, Amtrak trains were operating at an annual on-time performance (OTP) of approximately 84 percent between New York City and Albany, and 57 percent between Albany and Niagara Falls, with an average OTP between New York City and Buffalo of 77 percent. In 2011, Amtrak reported a much higher level of reliability of approximately 90 percent of trains being on-time at all destinations. The reasons for the improvement in OTP include the completion of major track rebuilding projects along the length of the Empire Corridor, which took place between 2008 and 2010. By 2011, these projects were substantially complete and track outages related to construction were less frequent. Most importantly, freight train volumes and lengths declined significantly between 2008 and 2011, due to national and global economic conditions. With fewer freight trains on the line, passenger trains were less likely to be delayed. This benefit to passenger trains is likely to be temporary, as freight train frequency and length are both increasing with the economic recovery. Exhibit 6-3 presents the estimated OTP for each alternative.

Exhibit 6-3—Estimated On-Time Performance, Albany – Niagara Falls, 2035

Alternative	Passenger Train OTP Percentage[1]	Qualitative Ranking
Base	83.0	X
90A	92.4	★
90B	95.4	★
110	94.9	★
125 Express 125 Regional	100/83.0	★/X (Express/Regional)

Notes:

[1] Based on 10 minute lateness threshold, measured at terminal endpoints.

★ Strongly supports program goals and objectives

+ Supports program goals and objectives

O Neutral regarding program goals or objectives

X Contrary to program goals or objectives

All of the program Build Alternatives sustain or exceed this 90 percent OTP value, even as both freight and passenger traffic grows over the forecasted time frame. Only the Base Alternative fails to meet this objective. Computer simulation results for the Empire Corridor West indicate that all four Build Alternatives would satisfy the 90 percent minimum OTP goal, as defined in the program purpose and need. As Amtrak's 2008 base numbers indicate, OTP south of Albany has been historically much better than OTP west of Albany, because of low freight traffic on Empire Corridor South.

The 2035 Base Alternative has a projected OTP of 83 percent, while Alternative 90A has a projected OTP of 92.4 percent. Alternatives 90B and 110 have similar projected OTPs, ranging from 94.9 percent to 95.4 percent. Alternative 125, which would run predominantly on new dedicated

passenger rail ROW between Albany and Buffalo, is projected to have the best average OTP for destinations it serves including Albany-Rensselaer, Syracuse, Rochester, and Buffalo, at 100 percent, while the legacy regional service continuing to serve destinations including Schenectady, Amsterdam, Utica, Rome, and Niagara Falls would continue to experience conflicts with freight operations in the Albany-Buffalo corridor, therefore remaining at the same OTP levels as the Base Alternative, 83 percent.

Reduce Travel Time Along all Segments of the Empire Corridor

The travel times between origins and destinations on the Empire Corridor associated with each alternative were evaluated using a track and signal system computer simulation model. Simulated train runs were scheduled to avoid freight operations on shared tracks by the careful timing of passenger train arrivals at bypass tracks, located to permit high-speed passenger trains to pass slower freight trains. For Alternatives 90B and 110, a second main track was added over longer segments between Albany and Buffalo to increase passenger track capacity to some of the existing single-track sections to minimize the amount of track sharing and to further increase average speed. Exhibit 6-4 presents the estimated travel time for all alternatives.

Exhibit 6-4—Estimated Travel Times of the Alternatives, 2035

Alternative	Travel Time NYC – Niagara Falls	Estimated Time Savings	Percentage Time Savings over Base	Qualitative Ranking
Base	9:06	--	--	O
90A	8:08	58	11%	+
90B	7:36	1:30	16%	+
110	7:22	1:44	19%	+
125 Express 125 Regional	6:02 8:40	3:04 26	34% 5%	★ +

Notes: Times presented in hours: minutes, based on westbound scheduled times

★ Strongly supports program goals and objectives

\+ Supports program goals and objectives

O Neutral regarding program goals or objectives

X Contrary to program goals or objectives

With respect to the Base, each of the Build Alternatives would result in a travel time savings of about 13 minutes between New York and Albany (Empire Corridor South). The Base travel time between these two points is the same as today because there are no committed capital improvements between New York and Albany that allow scheduled travel time reductions. Alternative 90A would produce an overall corridor travel time savings of 58 minutes between New

York City and Niagara Falls compared to the Base Alternative. The time savings between New York City and Albany remains constant for Alternative 90A (and each of the Build Alternatives) at about 13 minutes. Alternatives 90B and 110 would produce larger time savings of one and one-half hours or more (1:30 and 1:44, respectively) compared to the Base Alternative. Most of this time savings would occur on the segment between Albany and Buffalo, although time saving percentages in Exhibit 6-4 reflect the entire trip travel time.

The Alternative 125 express service on new corridor, including a transfer at Buffalo to regional or shuttle service on the existing Empire Corridor for the final leg of the trip, would provide a significant improvement of the average travel time between New York City and Niagara Falls from 9 hours and six minutes (9:06) under the Base Alternative to 6 hours and 2 minutes (6:02), shortening the trip by just over three hours for passengers traveling between New York City and Niagara Falls. For Alternative 125, however, the New York-Niagara Falls legacy regional service (serving all intermediate stations, including Schenectady, Amsterdam, Utica, and Rome) would experience modest improvements in travel time over the Base Alternative, due to improvements along Empire Corridor South and Niagara Branch. Travelers from New York using legacy service to non-express-stop cities would experience shorter travel times (about 13 minutes faster) and faster speeds than those available under the Base Alternative.[194]

The alternatives differ in terms of the range of train-by-train trip time improvements on the Empire Corridor. For the Base, 90B, 110, and 125 (both express and regional) Alternatives, most train trips have the same scheduled travel time over the course of the day. Alternative 90A differs in that it provides some limited stops service with faster trip times (3 round trips New York – Niagara Falls with one additional round trip Albany – Niagara Falls). Exhibit 6-4 presents average travel times between New York City and Niagara Falls. The trip times of Alternative 90A range from 7:50 to 8:30, with the overall average (Exhibit 6-4) of 8:08.

Increase Frequency of Service along Empire Corridor West

Currently, there are four daily round trips provided between New York City and Niagara Falls. Eighty percent of New York State's 19.4 million residents live within 30 miles of the Empire Corridor. The convenience of reliable and frequent rail travel would contribute to the accessibility of communities along and near the corridor, enhancing their economic and cultural vitality and supporting local and regional economic development efforts. The proposed schedule enhancement for each alternative, including frequency of service and availability of express service trips, is presented in Exhibit 6-5.

Each of the Build Alternatives would enhance the service schedule that would be provided with the Base Alternative, which would continue to provide the same service as the existing Empire Service. Alternatives 90A and 125 would both offer some forms of express service, while Alternative 125 would also retain the existing regional service and service levels on the existing corridor. The average speeds and trip times achieved under Alternatives 90B and 110 are sufficiently improved such that all stops can be made.

[194] /Due to the need to schedule regional services on the existing corridor to minimize conflicts with freight train services, it was not possible to design the Alternative 125 service to provide efficient "meets" between regional and express trains traveling the new 125 mph corridor at Albany, Rochester, Syracuse or Buffalo. Therefore, travelers on regional trains to/from Rome, Utica or Schenectady would not realize significant time savings by transferring at these "express" stations.

Exhibit 6-5—Schedule Enhancement by Alternative

Alternative	Frequency of Service		Available Express Service Trips (Included in total Albany – Buffalo trips)	Qualitative Ranking
	NYC – Albany	Albany – Buffalo		
Base	13	4	0	X
90A	16	8	4	+
90B	17	8	0	+
110	17	8	0	+
125 Express	-	15	15	★
125 Regional	24	4	0	+

★ Strongly supports program goals and objectives

\+ Supports program goals and objectives

O Neutral regarding program goals or objectives

X Contrary to program goals or objectives

Alternative 90A would increase service between New York City and Albany to 16 round trips per day, a 23 percent gain above the current 13 trips in the Base Alternative. Service between Albany-Rensselaer Station and Buffalo would increase to 8 daily round trips, roughly doubling the current 4-trip service to Buffalo in the Base Alternative. With Alternatives 90B and 110, the frequency of service between New York City and Albany would increase to 17 round trips a day, representing a 30 percent gain as compared to the Base Alternative, and service between Albany and Buffalo, would double (to 8 round trips daily). With Alternative 125, service between New York City and Albany would increase to 24 round trips a day, an approximate 85 percent increase in service, and service between Albany and Buffalo would increase to 19 daily round trips, nearly four times the number of trips under the Base Alternative. Of those 19 daily trips, 15 would be added to the new 125 mph alignment, reconnecting with the existing alignment at Albany, Syracuse, Rochester, and Buffalo stations. As noted earlier, for Alternative 125, the existing 4 regional trains would continue on the existing alignment, serving all of the intermediate stations including Schenectady, Amsterdam, Utica, and Rome.

Increase Ridership

Over 1.4 million passengers rode on the Empire Corridor in FY 2011. Although rail ridership has grown in recent years, passenger rail has the lowest market share of trips when compared to other available modes of transportation (automobile, bus and air). Automobile travel, particularly on I-87/I-90 (the New York State Thruway), comprises the majority of trips (roughly 211 million single-person trips in 2009). The ridership for each alternative is shown in Exhibit 6-6.

Exhibit 6-6—Ridership by Alternative, 2035

Alternative	Total	Percentage Increase from Base	Qualitative Ranking
Base	1.6 million	-	O
90A	2.3 million	44%	★
90B	2.6 million	63%	★
110	2.8 million	75%	★
125	4.3 million	169%	★

★ Strongly supports program goals and objectives

\+ Supports program goals and objectives

O Neutral regarding program goals or objectives

X Contrary to program goals or objectives

With the Base Alternative, ridership is projected to increase by 16 percent compared to 2009 levels, with proportionally greater ridership gains anticipated with Alternatives 90B, 110, and 125. The largest increase in ridership would be achieved under Alternative 125, with a 270 percent increase in ridership, to a 2035 projected ridership of 4.3 million. However, given the lengthy timeline to implement Alternative 125, the benefit of this ridership gain will be significantly delayed, compared to the other alternatives. All of the alternatives support the program need to attract ridership, with the four Build Alternatives strongly supporting the program need.

The majority of ridership gains would occur in the New York City to Empire Corridor West markets, particularly between Albany and Buffalo/Niagara Falls. These increases reflect the relatively pronounced response of travelers to the significantly increased service levels and reductions in travel time between New York City and Empire Corridor West markets. New York City to Albany rail ridership would increase modestly over current levels, reflecting the already robust ridership and more frequent service.

Reduce Automobile Trips

Experience demonstrates the relatively inelasticity of automobile travel; that is, auto drivers do not typically switch to public transit without significant gains in travel time or reductions in cost. As travelers' predominant concern is time, meaningful reductions in automobile travel are forecast due to the improved rail travel time resulting from higher average speeds (refer to Exhibit 6-4), increased flexibility in service (refer to Exhibit 6-5), and increased reliability of service (refer to Exhibit 6-3). The anticipated diversion of automobile travelers to rail from the Base Alternative, and corresponding reduction in automobile trips, is shown in Exhibit 6-7.

Exhibit 6-7—Annual Reduction in Auto Trips, 2035, Compared to Base Alternative

Alternatives	Diversion from Highways (one-way trips)		Qualitative Ranking[2]
	Autos	One-Way Person Trips[1]	
Base	---	---	O
90A	84,209	126,313	+
90B	139,519	209,279	+
110	177,603	266,404	+
125	485,078	727,616	★

Notes:

[1] estimated at 1.5 passengers/car

[2] based on 2035 estimate of total trips

★ Strongly supports program goals and objectives

+ Supports program goals and objectives

O Neutral regarding program goals or objectives

X Contrary to program goals or objectives

Reducing automobile trips may also reduce congestion along the New York State Thruway and other major highways. Each of the Build Alternatives would support the program's transportation-related goals of increasing travel choices, contributing to economic revitalization by accommodating population and employment growth forecasts, and improving air quality through the introduction of high-speed rail along the Empire Corridor.

Minimize Impact on Freight Rail Operations

Freight movements on Empire Corridor west, from Selkirk Yard in the Albany area to Buffalo, have historically been an impediment to the reliable operation of passenger rail services, and conversely, passenger service can also affect freight movements. Exhibit 6-8 presents an evaluation of the alternatives relative to their influence on freight travel times. The table shows that even with increased freight and passenger volumes, delays for freight services are generally held at or improved over current levels.

The freight train operations with the Build Alternatives would operate the same as or better than the Base Alternative. Alternatives 90B and 110 would perform the best of the Build Alternatives with respect to impact upon future freight train operations. With Alternative 90B, freight train delay-minutes would decrease the most among all alternatives, improving 10 percent over the Base Alternative and 6 percent over Alternative 110, the second best Build Alternative. Among all alternatives, Alternative 90B would have the highest average freight train speed. Average freight trip times would show the greatest improvement under Alternative 110.

Exhibit 6-8—Impact on Freight Train Operations, 2035

Alternative	Delay-Minutes per 100 Train Miles Operated (minutes: seconds)	Average Speed with Dwell (mph)	Trip Times, Selkirk Yard to Buffalo (hours: minutes)	Trip Time Variability (hours: minutes)	Qualitative Ranking
Base*	36:19	30.3	8:14	1:37	O
90A	42:06	29.4	8:23	2:04	O
90B	32:47	31.1	8:09	1:51	+
110	34:57	30.8	8:04	1:39	+
125	36:19	30.3	8:14	1:37	O

* The freight operating statistics for the Base Alternative include the delay reduction, average speed improvement, and trip time benefits of the Rochester third track improvements, an 11-mile project that no longer has committed capital funding. Therefore it is anticipated that freight performance measures for the Base Alternative will be worse than shown. Preliminary testing indicates that eliminating this physical improvement from the Base Alternative but retaining it in all other alternatives (consistent with their definition in the EIS) results in 90A, 90B and 110 Alternative freight operating statistics that are superior to the Base. The freight operating statistics for the 125 Alternative are the same as those for the Base.

★ Strongly supports program goals and objectives

+ Supports program goals and objectives

O Neutral regarding program goals or objectives

X Contrary to program goals or objectives

Exhibit 6-8 also gives data on trip time variability, which is best explained by example. A train that is routinely 10 minutes late has very low trip time variability, while a train that may be on time one day and two hours late on another has very great trip time variability. Using this factor, it can be seen that the Base Alternative (as well as Alternative 125) would have the lowest trip time variability of all alternatives. Only a modest increase in trip time variability is projected for Alternative 110, while Alternatives 90A and 90B would have the highest trip time variability of the alternatives. Alternative 110 would have the most favorable combination of trip time and trip time variability of the alternatives.

6.3.3. Comparison of Operational Performance and Costs

Selecting a preferred alternative among several options involves weighing and balancing costs and impacts against operational and mobility benefits. Exhibit 6-9 presents a tabular summary of performance measures for each alternative, such as service frequency, average speeds, travel times, time savings, on-time performance, and ridership. This exhibit also presents cost considerations, such as capital and operating/maintenance costs, revenues, deficits, cost-effectiveness, and subsidies, for all five alternatives.

Mobility can be measured in terms of improved passenger and freight movement as expressed by

higher speeds and schedule frequency (for rail services), and improved reliability. A significant additional factor in judging relative appeal among the alternatives is how quickly their benefits could be available to travelers: all else being equal, alternatives that yield benefits sooner are preferable. A synopsis of strengths and weaknesses of the alternatives from a cost and operational standpoint is presented in this section. Key findings shown in Exhibit 6-9 include:

- **Alternative 110 produces the greatest transportation benefits at the lowest per-rider cost subsidy; at approximately $9 per trip**, which would be 25 percent less than the next most cost-effective Alternative 90B ($12 per trip) and just over 43 percent less than the Base Alternative value ($16.25 per trip).

- **Alternative 110's relatively high ridership and moderate operating cost produces the highest recovery of costs through ticket sales**, 86 percent, compared to 81 percent for the next best alternatives (Alternatives 90B and 125) and a low of 75 percent for the Base Alternative.

- **Alternative 125 would produce the highest ridership; however, Alternative 125 would relegate travelers from Schenectady, Amsterdam, Utica, and Rome to the use of regional train service on the existing corridor.** Moreover, because of limited train slots over Metro-North south of Poughkeepsie and schedule constraints on the Amtrak Empire Connector between Spuyten-Duyvil and New York City (on which both the high-speed and regional services would operate), there would be little value in transferring between regional and high-speed services at Albany-Rensselaer, Syracuse, Rochester or Buffalo. Therefore, the benefits of Alternative 125 would not be enjoyed by Schenectady, Amsterdam, Utica, and Rome passengers (even with a transfer), while the other Build Alternatives would confer their benefits on the entire rail traveling population.

- **Alternative 125 is the most costly alternative:** at $14.71 billion, it would cost more than twice as much as the next most costly alternative (Alternative 110).

- **The Base Alternative has the lowest capital cost, but results in the fewest transportation benefits**, and fails in significant terms to achieve the program goals.

- **Alternative 125 would take the longest time to confer travel benefits in the Empire Corridor.** Because a new right-of-way must be assembled, acquired, constructed, and placed into service, no benefits would be available until the first major Albany-Syracuse segment can be completed, around 2025. Other alternatives begin conferring benefits within 2 to 5 years of the start of construction, likely in the 2015 to 2020 time period, with benefits continually increasing as additional improvements – signals, track, switches, grade crossings, and separations, bridges – are introduced in succeeding construction phases.

- **Alternatives 90B and 110 would provide the best future performance for freight rail operation in the corridor**. The other Build Alternatives would allow freight trains to operate as well as or better than the Base Alternative. Alternatives 90B and 110 would provide segregated tracks and would provide the greatest relief from potential future congestion delay. With Alternatives 90B and 110, freight train delay would decrease and average speeds would increase the most among all alternatives. Average trip times would show the greatest improvement under Alternative 110. Freight train travel time variability, a measure of service reliability, is expected to be similar across all five alternatives.

Exhibit 6-9—Comparative Analysis of Alternatives

Evaluation Criteria	Alternatives				
	Base	90A	90B	110	125
Service Levels (In round-trips/day)					
Frequency of Service NYC to Albany	13	16	17	17	24
Frequency of Service Albany to Buffalo	4	8	8	8	15 (express) 4 (regional)
Frequency of Service Albany to Niagara Falls	3	7	7	7	6
Average Speed NYC to Niagara Falls (mph)	51	57	61	63	77 (express) 53(regional)
Travel Time: (hrs.:min.) NYC to Niagara Falls	9:06	8:08	7:36	7:22	6:02 (express) 8:40 (regional)
Time Savings: Compared to Base Alternative (hrs.: min.)	-	58	1:30	1:44	3:04 (express) 26 (regional)
On-Time Performance	83.0%	92.4%	95.4%	94.9%	100% (express) 83.0% (regional)
Ridership (Annual One Way)					
Total (2035)	1.6 million	2.3 million	2.6 million	2.8 million	4.3 million
Increase as Compared to Base Alternative	-	0.7 million (44%)	1.0 million (63%)	1.2 million (75%)	2.7 million (169%)
Costs[1]					
Capital Costs (Billions)	$0.290	$1.66	$5.58	$6.25	$14.71
O&M Costs, Annual (Millions)	$103	$156	$171	$173	$304
Revenue, Annual (Millions)	$77	$119	$139	$149	$245
Total [Deficit]/Surplus (Millions)	[$26]	[$37]	[$32]	[$24]	[$59]
Operating Ratio (percent O&M costs covered by revenue)	75%	76%	81%	86%	81%
Cost Effectiveness (Annualized O&M Cost per Rider)	$64.38	$67.83	$65.77	$61.79	$70.70
[Subsidy]/Surplus per Rider (rounded)	[$16]	[$16]	[$12]	[$9]	[$14]

*Capital Costs are in 2015 dollars

6.4. Summary of Environmental Impacts

This section summarizes the potential impacts of the five alternatives on social, cultural, and environmental resources, and highlights key distinctions among them. Evaluations are based on conceptual designs and Geographic Information System (GIS) and file-based resource mapping, suitable for making corridor-wide, service-level determinations for the Empire Corridor. Upon

selection of an alternative at the conclusion of this Tier 1 evaluation, the quantitative extent of impacts will be determined during Tier 2 evaluations and NEPA documentation, as specific projects, e.g., bridges, grade crossings, signal and track improvements, are advanced through design. Mitigation strategies presented in Chapter 4 of this Tier 1 EIS will also be further defined during Tier 2 evaluations.

Exhibit 6-10 compares the potential impacts of the alternatives using a relative rating system to distinguish the lowest (designated L) to highest (designated H) impact potential among the alternatives. A summary of the findings for all the social, cultural and natural resource categories discussed in Chapter 4 of this document is presented in Exhibit 6-11, at the end of this chapter.

Each alternative would affect the societal, cultural and natural environment differently. The Base Alternative would have the lowest potential for impact. Alternative 90A, consisting of 20 projects conducted largely within existing rights-of-way, would also be expected to have minimal impacts.

Exhibit 6-10—Comparison of Alternatives in Selected Impact Areas

Alternative/ Impact Area	Base	90A	90B	110	125
Land Use	L	L	M	M	H
Community	L	L	L	M	H
Historic	L	M	H	H	M[1]
Parks	L	L	L	M	H
Visual	L	L	M	M	H
Farmland	L	L	M	M	H
Waterbodies	L	M	M	M	H
Floodplains	L	L	M	M	H
Wetlands	L	L	M	M	H
Wildlife	L	L	M	M	H
Air Quality	L	B	B	B	B
Energy/ Greenhouse Gas	L	B-L	B-L	B-M	B-H
Noise/Vibration	L	M	M	M	H

L Potential for adverse effect is lowest among the alternatives

M Potential for adverse effect is moderate among the alternatives

H Potential for adverse effect is highest among the alternatives

B Long-term beneficial impact

[1] The undeveloped nature of the 125 Study Area may contribute to the lack of documented historic resources.

Alternatives 90B would involve work extending outside of the right-of-way, and impacts would be even greater with track construction extending further outside of the right-of-way with Alternative 110. Overall, Alternative 125 has the highest potential for impact of all the alternatives, with construction of a new segregated corridor and sections of elevated tracks where the railroad extends over the existing Empire Corridor. If Alternative 125 is selected for further consideration, design in Tier 2 will be advanced and will consider ways to further avoid and minimize impacts associated with this alternative.

Details of the social, cultural, and natural resource impacts of each alternative are discussed in Chapter 4 of this document, and a brief overview of the environmental impacts of the alternatives is provided below. Exhibit 6-11 provides a more detailed summary on impacts of each alternative on each environmental resource category.

- **Land Use Impacts: Alternative 125 would require the assembly and acquisition of public and private lands along the 280-mile Albany-to-Buffalo corridor**. An estimated two to three thousand acres of land would be needed. Notwithstanding efforts to minimize adverse effects, the construction of an essentially sealed corridor with limited opportunities for crossings could be expected to have an impact on community cohesion and large-scale land uses which may be bisected by the high-speed rail corridor. If Alternative 125 is selected for further consideration, additional location analyses will include avoidance and minimization of property impacts and impacts on sensitive land uses. By comparison, property acquisition requirements of the other alternatives that follow the existing Empire Corridor would be considerably less than that for Alternative 125. Alternative 110 would involve the next greatest property displacements, affecting approximately 53 areas in 8 counties. Alternative 90B would affect approximately 9 areas in 6 counties. Property displacements with the Base and Alternative 90A are anticipated to be minimal.

- **Community and Public Facility Impacts: Alternative 125 has the potential to affect 13 community/publicly used facilities (including cemeteries, privately owned golf courses/golf clubs, and a school ballfield) in 8 counties largely where it extends on new right-of-way**. If Alternative 125 is advanced, additional location analyses will consider ways to avoid or minimize impacts on these publicly accessible facilities. By comparison, Alternative 110 is projected to have potential effects on 4 community facilities (e.g., fire stations, post office) in 1 county; the other alternatives are not expected to have any direct impacts to community facilities.

- **Historic and Archaeological Resource Impacts/Section 4(f) Uses: Alternatives 90B and 110 would have the greatest potential to affect historic and cultural resources**, with 302 to 292 archaeological/architectural resources within the Area of Potential Effect (APE) for both direct and indirect impacts. Alternative 90A is likely to have moderate effects, with 100 resources within the APE. The Base Alternative would likely have only minor effects, with 26 resources within the APE. Alternative 125 would largely maintain elevated tracks within the existing ROW where it overlaps with the existing Empire Corridor. However, Alternative 125 would involve greater impacts than the Base Alternative, potentially affecting 123 resources within the APE, depending on the footprint for elevated structures that will carry the grade-separated tracks over the existing tracks. Alternative 125 will be developed along new right-of-way generally away from population centers where most historic structures are found. Due to the undeveloped nature of the areas traversed by Alternative 125, historic and archaeological resources may not be fully documented. Alternative 125 would also have the greatest potential

interaction with and use of tribal land. The Programmatic Agreement (included as Appendix H) addresses the process by which FRA and NYSDOT intend to comply with Section 106 for undertakings occurring on tribal lands or where adverse effects to historic properties of a religious or cultural significance to a tribe occur off tribal land. If this alternative is advanced for further consideration in Tier 2, efforts will be made to avoid impacts on historic resources in locating the new rail corridor.

- **Parks and Recreational Facilities Impacts/Section 4(f) Uses: Alternative 125 has the greatest potential effect on parks and recreational facilities, with 9 such facilities in 5 counties potentially affected (including an Oneida Nation-owned golf course)**. If Alternative 125 is advanced, the additional location analyses in Tier 2 will avoid or minimize impacts on these facilities to the extent practicable. With the possible exception of two crossings of the Mohawk River and Erie Canal for Alternatives 90B and 110, only Alternative 110 would have any other potential effect on recreational facilities, potentially affecting one county park.

- **Visual Impacts: Alternative 125 would have the greatest potential for adverse visual impacts.** Alternative 125 would create a new 100-foot-wide railroad right-of-way that would be electrified (with overhead catenary) in what are today largely open undeveloped and moderately developed areas. Alternative 125 would also create an elevated structure in densely populated urban centers (Syracuse, Rochester, and Buffalo), which would be more visible than the at-grade railroad. Both Alternatives 90B and 110 would involve track construction extending outside of the right-of-way, which could result in additional clearing and property displacements, but which would otherwise result in minor visual effects. The Base Alternative is entirely confined to the existing railroad right-of-way, and is expected to have no such effects.

- **Farmlands Impacts: Alternative 125 would have the most disruptive impact on farmland, potentially bisecting and isolating sections of prime farmlands and "farmlands of statewide significance" in 12 counties**. By comparison, Alternative 110 would affect prime farmlands in at least 4 counties and Alternative 90B in at least 3 counties. Alternative 90A has only minor effects on farmland, potentially affecting agricultural districts in only 1 county. The Base Alternative is confined entirely to the existing railroad right-of-way and is expected to have no such effects.

- **Impacts on Waterbodies/Rivers: Alternative 125 would have the greatest potential for impacts on waterbodies, potentially affecting 361 such resources along Empire Corridor West**. The Base Alternative would have the least potential for impact on surface water resources, potentially affecting 68 crossings. The other alternatives are anticipated to have moderate potential for impact relative to the other alternatives, with between 107 to 218 surface water crossings potentially affected.

- **Wetlands Impacts: Alternative 125 would have a the greatest potential for impact on wetlands, relative to the other alternatives**, with 177 new wetland crossings. Alternatives 110 and 90B would have a moderate potential for impact, potentially affecting 118 to 137 wetland crossings. Alternative 90A and the Base Alternative would have a relatively minor potential for impact, potentially affecting 54 to 84 wetland crossings, respectively.

- **Air Quality Impacts: Alternative 125 has the greatest potential benefit to air quality in some regions of the corridor, while it has the potential to adversely affect air quality in other regions of the corridor (the differences between the areas are a consequence of the distribution of on-road versus rail trips).** The other alternatives would result in negligible changes in regional emissions, with the Base Alternative serving as the basis for comparison. While increased rail emissions would not adversely affect local air quality, some very minor local benefits may occur near roadways where trips are reduced. Some increases in pollutant concentrations may occur near rail stations, increasing from Alternative 90A to 90B, 110, and 125, which will be subject to further analysis in Tier 2.

- **Energy and Greenhouse Gases Impacts:** Alternative 125 is likely to require the greatest quantity of energy and materials for construction. Thus, it has the greatest potential to adversely affect net energy and greenhouse gases (accounting for the energy and GHG emissions from construction and reduced on-road emissions). Other alternatives have successively lesser adverse impacts. Alternative 90A would have a potential beneficial impact starting approximately 20 years after construction.

- **Noise/Vibration Impacts:** Alternative 125 has the potential for noise impacts in areas where no railroads currently operate. In this respect, it is the only alternative to introduce railroad noise in areas that are not already experiencing it. With all alternatives, including the Base Alternative, potential noise impacts along the Empire Corridor/Niagara Branch are expected to be moderate to severe in more urbanized areas, between New York City and Schenectady, between Syracuse and Rochester, and between Buffalo and Niagara Falls. Noise impacts are also predicted along the three new alignment segments of Alternative 125. There is also a potential for vibration impacts along new corridor segments.

6.5. Identification of a Preferred Alternative/Selection of a Final Alternative

All reasonable alternatives are under consideration. NYSDOT and FRA will identify a preferred alternative after fully evaluating and considering the alternatives' impacts, comments on the Draft Environmental Impact Statement, and comments from the public hearing.

After public review of and comment on the Tier I Draft EIS, NYSDOT and FRA will review and consider the public comments. NYSDOT will make a recommendation regarding selection of the preferred alternative to FRA based on all of the information contained within the Tier I Draft EIS and the public comments. The preferred alternative will be identified in the Final EIS. After issuance of the Final EIS and the 30 day wait period, FRA will issue a Record of Decision (ROD) naming the selected alternative.

Exhibit 6-11—Tier 1 Environmental Impact Assessment by Alternative

Area of Evaluation	Alternatives				
	Base	90A	90B	110	125
Land Use	No impacts.	No impacts.	EC South: No impacts. EC West: Potential for 9 areas of land use impact in 6 counties.	EC South: No impacts. EC West: Potential for 53 areas of land use impact in 8 counties.	Existing Alignment: No impacts. New Alignment: Potential for 1 land use conversion required in EC South. Potential for extensive land use conversions of two to three thousand acres, including acquisition of structures, in 14 counties in EC West.
Regional Population, Employment and Business Districts	Little or no effect on population, employment and business activity.	Potential for minor increases in population, employment and business activity over the Base Alternative associated with passenger and freight service improvements.	Potential for greater increases in population, employment and business activity over Alternative 90A, especially in vicinity of station sites.	Potential for greater increases in population, employment and business activity over Alternative 90B, especially in vicinity of station sites.	Potential for greatest increases in population, employment and business activity over all other alternatives, especially in vicinity of Albany-Rensselaer, Syracuse, Rochester and Buffalo stations, and some stations in EC South. Because existing service with stops in Schenectady, Amsterdam, Utica, and Rome would be retained, little or no effect on regional population, employment and business districts would be expected.
Environmental Justice **(Analysis at county and major city levels)**	Disproportionate adverse impacts unlikely.	Disproportionate adverse impacts unlikely. Long term benefit to urban areas anticipated.	Disproportionate adverse impacts unlikely. Long term benefit to urban areas anticipated.	Disproportionate adverse impacts unlikely. Long term benefit to urban areas anticipated.	Existing Alignment: Disproportionate adverse impacts unlikely. New Alignment: Disproportionate adverse impacts unlikely. Long term benefit to urban areas anticipated.
Community and Public Facilities	No impacts.	No impacts.	No impacts.	EC South: No impacts. EC West: Potential for impacts to 4	Existing Alignment: No impacts. New Alignment: No impacts in EC South.

Exhibit 6-11—Tier 1 Environmental Impact Assessment by Alternative

Area of Evaluation	Alternatives				
	Base	90A	90B	110	125
				facilities in 1 county.	Potential for impacts to 13 facilities in 8 counties in EC West.
Historic and Cultural Resources/ Section 4(f) **(Analysis of previously-identified resources)**	Potential for impacts on 26 archaeological and architectural resources within the direct/indirect Area of Potential Effect (APE).	Potential for impacts to 100 resources located in direct/indirect APE.	Potential for impacts to 302 resources located in direct/indirect APE.[2]	Potential for impacts to 292 resources located in direct/indirect APE.[2]	New Alignment: Potential for impacts to 123 resources located in direct/indirect APE.[195]
Parks and Recreational Areas/Section 4(f)	No impacts.	No impacts.	Potential for impacts at crossings of the Mohawk River and Erie Canal will be evaluated in Tier 2.	EC South: No impacts. EC West: Potential for impacts at crossings of the Mohawk River and Erie Canal will be evaluated in Tier 2. Potential for impacts to 1 county park.	Existing Alignment: No impacts. New Alignment: No impacts in EC South. Potential for impacts to 9 parks in 5 counties in EC West.
Visual Resources	No impacts.	No impacts.	Potential for impacts associated with some forest clearing, land conversions, bridge modifications, proximity to adjoining properties.	Potential for impacts associated with some forest clearing, land conversions, bridge modifications, proximity to adjoining properties.	Existing Alignment: No impacts. New Alignment: Potential for impacts associated with new visual element, including new river/canal crossings, forest clearings, elevated track sections, and overhead catenaries. Potential for impacts associated with new corridor, including forest clearing, land conversions, proximity to adjoining properties.
Farmlands	No impacts.	EC South: No impacts. EC West: Potential for impacts to Agricultural	EC South: No impacts. EC West: Potential for impacts to prime farmlands/	EC South: No impacts. EC West: Potential for impacts to prime farmlands/	Existing Alignment: No impacts. New Alignment: No impacts in EC South. Potential for

[195] / This is in addition to Alternative 90A impacts along Empire Corridor South and Niagara Branch.

Exhibit 6-11—Tier 1 Environmental Impact Assessment by Alternative

Area of Evaluation	Alternatives				
	Base	90A	90B	110	125
		Districts in 1 county.	Agricultural Districts in at least 3 counties.[196]	Agricultural Districts in 4 counties.[196]	impacts to multiple prime farmlands, farmlands of statewide significance and Agricultural Districts in 12 counties in EC West.[197]
Surface Waterbodies and Watercourses	Approximately 68 existing surface water crossings could be modified.	Approximately 107 existing surface water crossings could occur.	Approximately 219 existing surface water crossings could occur.	Approximately 218 existing surface water crossings could occur.	New Alignment: Approximately 248 new surface water crossings on new alignment and 113 crossings on existing rail (361 total) could occur.
Designated Wild, Scenic and Recreational Rivers	Three segments of the Hudson River are listed on the Nationwide Rivers Inventory (NRI), but no impacts are anticipated.	Three segments of the Hudson River are listed on the NRI, but no impacts are anticipated. A NRI-listed segment of the Black Creek crosses where a third track will be added, with potential for impact.	Three segments of the Hudson River are listed on the NRI, but no impacts are anticipated. A NRI-listed segment of the Black Creek crosses where a third track will be added, with potential for impact.	Three segments of the Hudson River are listed on the NRI, but no impacts are anticipated. Two NRI-listed segments of the Black Creek crosses where a third and fourth track will be added, with potential for impact.	Three segments of the Hudson River are listed on the NRI, but no impacts are anticipated.
Navigable Waters	EC South: No impacts. EC West: 2 existing crossings over navigable waters could be modified, with potential for impacts.	EC South: 4 existing crossings over navigable waters could be modified, with potential for impacts. EC West: 1 existing crossing over a navigable water could be modified, with potential for impacts.	EC South: 4 existing crossings over navigable waters could be modified, with potential for impacts. EC West: 11 existing crossings over navigable waters could be modified, with potential for impacts.	EC South: 4 existing crossings over navigable waters could be modified, with potential for impacts. EC West: 11 existing crossings over navigable waters could be modified, with potential for impacts.	New Alignment: new Hudson River crossing over navigable waters would occur in EC South, with potential for impacts. 4 new crossings over navigable waters would occur in EC West, with potential for impacts.
Floodplains	EC South: Minimal potential for impacts. EC West: Potential for impacts to 11 areas.	EC South: Potential for impacts to flood prone areas. EC West: Potential for floodplain impacts in 7 counties.	EC South: Potential for impacts to flood prone areas. EC West: Potential for floodplain in 11 counties.	EC South: Potential for impacts to flood prone areas. EC West: Potential for floodplain impacts in 11 counties, including more encroachment than Alternative 90B.	New Alignment: Potential for impacts to flood prone areas in EC South. Potential for floodplain impacts in 11 counties and additional unmapped areas in 3 counties in EC West.

[196]/ This is in addition to Alternative 90A impacts.
[197]/ This is in addition to Alternative 90A impacts along Empire Corridor South and Niagara Branch.

Exhibit 6-11—Tier 1 Environmental Impact Assessment by Alternative

Area of Evaluation	Alternatives				
	Base	90A	90B	110	125
Wetlands	EC South: Potential for impacts involving 78 existing crossings. EC West: Potential for impacts involving 6 crossings.	EC South: Potential for impacts involving 39 new and existing crossings. EC West: Potential for impacts involving 15 existing crossings.	EC South: Potential for impacts involving 39 new and existing crossings. EC West: Potential for impacts involving track addition at 118 crossings.	EC South: Potential for impacts involving 39 new and existing crossings. EC West: Potential for impacts involving track addition at 137 crossings.	New Alignment: Potential for impacts involving 177 new crossings.
Coastal Resources	EC South: Work will occur within the coastal zone. Of the six SASSs and 11 SCFWHs, no impacts are anticipated. EC West: Limited work within coastal zone.	EC South: Work will occur within the coastal zone. Potential for impacts in EC South associated with new bridge construction in coastal zone. Of the six SASSs and 11 SCFWHs, no impacts are anticipated. EC West: Limited work within coastal zone.	EC South: Work will occur within the coastal zone. Potential for impacts in EC South associated with new bridge construction in coastal zone. Of the six SASSs and 11 SCFWHs, no impacts are anticipated. EC West: Bridgework has potential to affect one coastal area and SCFWH.	EC South: Work will occur within the coastal zone. Potential for impacts in EC South associated with new bridge construction in coastal zone. Of the six SASSs and 11 SCFWHs, no impacts are anticipated. EC West: Bridgework has potential to affect one coastal area and SCFWH.	Existing Alignment: No impacts. New Alignment: Potential for impacts in EC South associated with new bridge construction in coastal zone. EC West: Bridgework has potential to affect one coastal area and SCFWH.
Aquifers	No impacts.	EC South: No impacts. EC West: Potential for minimal impacts to primary aquifer depending upon construction and excavation depths.	EC South: No impacts. EC West: Potential for impacts to primary and/or principal aquifers underlying 9 counties.	EC South: No impacts. EC West: Potential for impacts to primary and/or principal aquifers underlying 9 counties.	Existing Alignment: No impacts. New Alignment: Potential for impacts to principal aquifer in EC South depending on new bridge construction and excavation depths. Potential for impacts in EC West to primary and/or principal aquifers underlying 13 counties.
General Ecology and Wildlife Resources/ Threatened and Endangered Species	EC South: No impacts. EC West: Potential for impacts to 1 conservation area and protected resources/species.	EC South: Potential for impacts to essential fish habitat (EFH), aquatic species and habitat associated with Livingston Avenue Bridge replacement. EC West: Potential for impacts at 2	EC South: Potential for impacts to EFH, aquatic species and habitat associated with Livingston Avenue Bridge replacement. EC West: Potential for impacts at 7+ locations, including national natural	EC South: Potential for impacts to EFH, aquatic species and habitat associated with Livingston Avenue Bridge replacement. EC West: Potential for impacts at 21+ locations, including 2 NNLs, bird	New Alignment: Potential for impacts to EFH in EC South. Potential for impacts to 118 species, 107 significant natural communities, 6 bird conservation areas, and 2 NNLs in EC West associated with habitat

Exhibit 6-11—Tier 1 Environmental Impact Assessment by Alternative

Area of Evaluation	Alternatives				
	Base	90A	90B	110	125
		locations associated with vegetation removal.	landmark (NNL)/ bird conservation area, 9 significant natural communities, 64+ protected resources/species.	conservation area, 7 significant natural communities, 64+ protected resources/ species.	conversion and fragmentation.
Critical Environmental Areas	No impacts anticipated.	No impacts anticipated.	No impacts anticipated.	No impacts anticipated.	Existing Alignment: No impacts anticipated. New Alignment: No impacts anticipated.
Air Quality	Baseline condition.	Potential for reduction in all pollutants other than NO_x. The minor increase in NO_x would conform to regulations.	Potential for greater reduction in all pollutants other than NO_x over Alternative 90A. The minor increase in NO_x would conform to regulations.	Potential for greater reduction in all pollutants other than NO_x over Alternative 90B. The minor increase in NO_x would conform to regulations.	Existing Alignment: No effect. New Alignment: Potential for greater reduction in all pollutants other than NO_x over Alternative 110. The minor increase in NO_x would conform to regulations.
Energy and Climate Change	Baseline condition.	Potential for net decrease in annual energy use and greenhouse gas (GHG) emissions over Base Alternative.	Potential for greater decrease in annual energy use and GHG emissions over Alternative 90A by approximately 20%. Requires smallest quantity of energy and materials for construction, resulting in net gain in short term (20 years).	Potential for greater decrease in annual energy use and GHG emissions over Alternative 90B by approximately 2%. Requires second largest quantity of energy and materials for construction, resulting in net gain in short term.	Potential for greater decrease over 110 in annual energy use (by 42%) and GHG emissions (by 27%). Requires greatest quantity of energy and materials for construction, with largest net gain.
Noise and Vibration	Potential noise impacts in more urbanized areas, between New York City and Schenectady, between Syracuse and Rochester, and between Buffalo and Niagara Falls. Potential for vibration impacts along new corridor segments.	Potential noise impacts in more urbanized areas, between New York City and Schenectady, between Syracuse and Rochester, and between Buffalo and Niagara Falls Potential for vibration impacts along new corridor segments.	Potential noise impacts in more urbanized areas, between New York City and Schenectady, between Syracuse and Rochester, and between Buffalo and Niagara Falls Potential for vibration impacts along new corridor segments.	Potential noise impacts in more urbanized areas, between New York City and Schenectady, between Syracuse and Rochester, and between Buffalo and Niagara Falls Potential for vibration impacts along new corridor segments.	Existing Alignment: Potential noise impacts in more urbanized areas, between New York City and Schenectady, between Syracuse and Rochester, and between Buffalo and Niagara Falls New Alignment: Potential for noise impacts on new alignment segments and elevated

Exhibit 6-11—Tier 1 Environmental Impact Assessment by Alternative

Area of Evaluation	Alternatives				
	Base	90A	90B	110	125
					sections. Potential for vibration impacts along length of new alignment.
Contaminated and Hazardous Materials	No impacts anticipated for track improvements. Potential for impacts associated with station improvements.	No impacts anticipated for track improvements. Potential for impacts associated with station improvements and bridge replacement.	No impacts anticipated for track improvements. Potential for impacts associated with station improvements, bridge replacement, new ROW in 7 locations, and new structures in urban areas.	No impacts anticipated for track improvements. Potential for impacts associated with station improvements, bridge replacement, new ROW in 18 locations, and new and existing structures in urban areas.	Existing Alignment: No impacts anticipated for track improvements. Potential for impact associated with station improvements. New Alignment: Potential for impacts associated with new bridge construction in EC South and extensive property acquisitions in EC West, including numerous structures.

Notes: 1. EC South – Empire Corridor South; EC West – Empire Corridor West
2. The potential areas of impact described in this Tier 1 EIS are preliminary and are based on GIS resource data. The actual extent of impact will be determined during Tier 2, following more detailed investigation and design.

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7. Comments and Coordination

7.1. Introduction

This chapter provides an overview of the public involvement and agency coordination activities that have been completed to date as well as the process in which all activities have been carried out. Also covered in this chapter are the anticipated future public involvement and agency coordination activities that are planned during completion of the High Speed Rail Empire Corridor Program Tier 1 Environmental Impact Statement (EIS).

The public involvement and agency coordination task of the program is charged with inviting participation by, and coordinating with, the appropriate federals, state, and local agencies as well as the public in an effort to engage and inform these stakeholders throughout the environmental review process. The purpose of the public involvement program is to educate stakeholders about the program and the process in which the program is being undertaken, and to serve as a communication conduit for the exchange of information on program issues and concerns. The public involvement program is designed to be an inclusive and transparent process that adheres to the requirements of the National Environmental Policy Act (NEPA).

The program's public involvement program is a multifaceted program that utilizes several mediums to engage and inform the public and other key stakeholders. NYSDOT developed a Public Involvement Plan (PIP) for the program, and it outlines the public involvement program and identifies key contacts from targeted groups such as government agencies and organizations, public offices, non-government organizations, special interest groups, civic and business groups, present and potential riders/users, the media and the general public. In addition, the PIP identified NEPA cooperating and participating agencies (refer to Exhibit 7-6) that were invited for involvement in the program. The PIP also outlines how public involvement activities will be linked to key program milestones and identifies the mediums to be used in engaging program stakeholders.

The public involvement activities outlined in the PIP and carried out at key program milestones have been planned and developed in close collaboration with program partners including staff from the lead agencies as well as input from cooperating and participating agencies.

7.2. Program Identifier

At the program's commencement, a logo was developed to give the program a unique and consistent identity. The program logo (refer to Exhibit 7-1) has been prominently featured on all forms of program communication with the public and at public meetings. The program logo incorporates the official program name along with the name of the program sponsor, the New York State Department of Transportation.

Exhibit 7-1—Program Logo

7.3. Public Outreach

7.3.1. Stakeholder Mailing List

A stakeholder mailing list has been developed and maintained in a database created for the program. The stakeholder database includes contact information of all interested stakeholders as well as representatives from all the agencies and organizations involved in the program. The stakeholder database is updated on an ongoing basis as the program progresses and as additional interested parties request to be added to the mailing list. Currently, the stakeholder database contains approximately 500 contacts.

7.3.2. Media Outreach

The program includes a media outreach plan which includes preparing press releases, meeting notice ads and general program related outreach releases for dissemination by local media channels in each of the six major population centers along the program corridor. In addition, press briefings have occurred prior to each of the public scoping meetings in an effort to promote public awareness of the program and encourage public participation and input. The press briefings also provided the media with the opportunity to interview members of the program team.

7.3.3. Newsletters

Since the onset of the program, NYSDOT has produced and distributed three informational newsletters to stakeholders at key program milestones. The first newsletter provided a general overview of the program's purpose and advertised the public scoping meetings in an effort to promote attendance at the scoping meetings. The second newsletter provided an overview of the comments received at the public scoping meetings and throughout the duration of the scoping period and presented initial analysis and findings from the scoping period. The third newsletter provided an overview of the alternatives development and screening process and identified the alternatives being advanced for detailed evaluation. Program newsletters are distributed to all contacts listed in the stakeholder mailing list and uploaded to the program website.

7.3.4. Program Website

The program website (refer to Exhibit 7-2) was developed at the onset of the program to provide interested parties continuous access to information about the program. The website is accessed on NYSDOTs website at: **https://www.dot.ny.gov/empire-corridor**. Throughout the course of the program, interested parties have been encouraged to visit the program website to learn more about the program and receive the latest information and updates.

Exhibit 7-2—Program Web Site Home Page

The program website includes a general overview of the program, the process in which the program is being carried out, and an explanation of the program's purpose and need and goals and objectives. The website contains several links where interested parties can learn more about the program by reading the latest issue of the program newsletter, reviewing an online briefing about the program and the alternatives under analysis, watching an informational video about the program and exploring the interactive alternatives table which is an innovative web-based public outreach tool that was developed to store and display all the latest program related information in an easy to use and engaging format. The program website also contains information pertaining to schedule, upcoming and past public outreach activities, and frequently asked questions about the program. In addition, several program reports and documents as well as past issues of the program newsletter have been archived on the website and are available for download. The program website also has a page dedicated to informing interested parties how they may contact a member of the program team, submit a comment or question and sign up on the program mailing list to receive upcoming program information.

The public involvement materials posted on the program website were specifically developed to engage and inform as many stakeholders and members of the public as possible, given that the Empire Corridor stretches across New York State - a distance of 463 miles. The website allows for stakeholders to receive the latest program related information even if they are unable to travel to attend a live meeting in person. The website received over 3,000 unique hits within the first couple months of being launched. To date, the website has been viewed by nearly 9,000 unique visitors.

7.4. Public Scoping Process

7.4.1. Public Scoping Meetings

Given the length of the Empire Corridor, six public scoping meetings were held in major population centers located along the corridor. As shown in Exhibit 7-3, scoping meetings were held in the following cities: New York City, Albany, Utica, Syracuse, Rochester and Buffalo.

The public scoping meetings were conducted in an open house format from 5:30-7:30 p.m. at each location. Attendees were asked to sign-in and were handed a copy of the program newsletter and a comment form and encouraged to view an informational video on the program which played on a continuous loop. At the end of the video, attendees were encouraged to view easel mounted display boards that presented program information and to interact with members of the program team. Meeting attendees were encouraged to fill out a comment card and leave it in one of the many drop boxes located at each public meeting.

The public scoping meetings were advertised to the general public in accordance with the program's media outreach plan. Meeting notice ads and press releases were produced and sent to various media outlets in each of the six locations along the length of the corridor where public scoping meetings were held.

In addition to the six public scoping meetings held in different and geographically disbursed cities located along the Empire Corridor, an online scoping briefing was created and posted on the program website for the benefit of interested parties that were unable to attend a public scoping meeting in person. The online scoping briefing contained the same information presented at the public scoping meetings in a downloadable electronic format. The online scoping briefing was a

Exhibit 7-3—Scoping Meetings

Meeting Date	Meeting Location	Estimated Attendance
Tuesday, October 19, 2010	Connecticut Street Armory 184 Connecticut Street Buffalo, New York 14213	81
Wednesday, October 20, 2010	Empire Expo Center (Syracuse Fairgrounds) 581 Fair Boulevard Syracuse, New York 13209	28
Tuesday, October 26, 2010	Sand Creek Middle School 329 Sand Creek Road Albany, New York 12205	86
Wednesday, October 27, 2010	Moynihan Station 380 West 33rd Street New York, New York 10001	34
Tuesday, November 9, 2010	Hotel Utica 102 Lafayette Street Utica, New York 13502	23
Wednesday, November 10, 2010	Monroe Community College 1000 East Henrietta Road Rochester, New York 14623	87
	TOTAL:	339

very successful public outreach tool that was visited by 231 unique individuals during the scoping period.

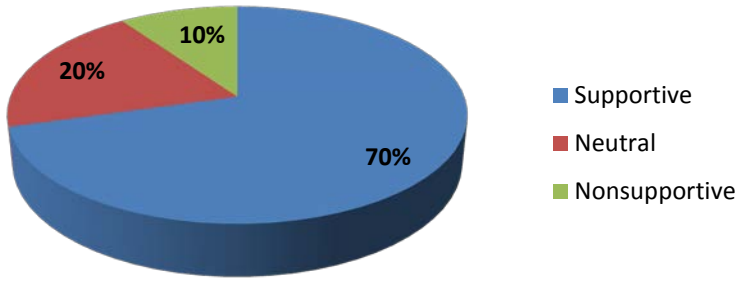
During the program scoping process in 2010, considerable interest was expressed by the public and other program stakeholders in the potential for higher speed alternatives. These included a 160 mph alternative representing the practical upper limit of electrified dynamic tilt trains, such as the Amtrak Acela; and a 220 mph alternative representing the practical upper limit of high-speed rail operations seen in France, Germany, Spain, Japan, and China. In response to this, a range of higher speed alternatives was examined according to the same metrics as the other alternatives.

7.4.2. Public Scoping Comments

The public scoping meetings held during the fall of 2010 solicited a total of 102 public comments that were collected and recorded during the scoping period. Several options for submitting comments were available to the public, which included: direct submission at the public scoping meetings, standard mail, e-mail, through the program website and via telephone.

Based on the public comments received during the scoping period, the majority (70%) of commenters expressed support for the program, as illustrated in Exhibit 7-4.

Exhibit 7-4—Nature of Public Comments

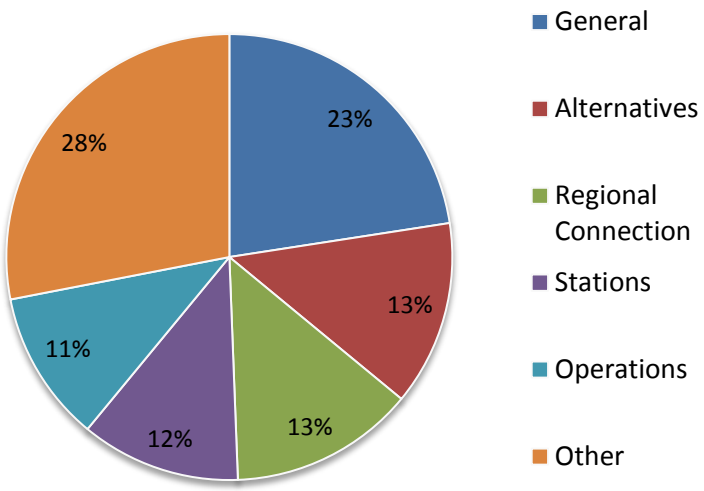


The public comments received at the public scoping meetings as well as from email, standard mail and phone, were documented and categorized to provide a general summary of the comments received during the public scoping process. The comments were grouped into 12 different categories based on the subject of the comment. The 12 categories include: general, alternatives, regional connections, stations, operations, alignment, speed, intermodal, vehicles, scoping meetings, safety and ridership. It is important to note that a comment made by one individual may be broken out into multiple categories; numerous comments addressed more than one subject category. Exhibit 7-5 illustrates the breakdown of comments received by category from public scoping efforts conducted throughout the entire corridor.

The majority of comments received were categorized as the following: general, alternatives, regional connection, stations and operations. The remaining comment categories of alignment, speed, intermodal, vehicles, scoping meetings, safety and ridership accounted for a much lower percentage of comments received from public outreach efforts and thus were combined to form the "other" category in Exhibit 7-5, for the purpose of clarity. The "other" category accounts for 28 percent of comments received from the public scoping process throughout the entire corridor. The general comment category is the single largest category of comments received from public outreach efforts at 23 percent. Comments categorized as general do not pertain to any of the other comment categories and are broad in nature. An example of a general comment may include a personal position statement regarding the program such as an individual's declaration of support toward the program's goals and objectives.

The alternatives and regional connection comment categories accounted for the second largest categories of comments received with each representing 13 percent of the total at the corridor level. In general, these comments were in regard to proposed alignment alternatives or the desire for increased regional connections. The stations category represented the next largest category of comments followed by operations at 12 and 11 percent respectively. The majority of these comments highlighted the desire for local station improvements with multimodal linkages.

Exhibit 7-5—Summary of Public Comments by Category



The public scoping period was successful at soliciting public comments. Public comments have been and will continue to be collected, recorded and considered throughout the duration of the Tier 1 EIS.

7.5. Stakeholder Coordination

7.5.1. Agency Coordination

At the onset of the program, the appropriate federal, state, regional and local agencies were identified as having a role and/or interest in the program. More than 37 formal letters of invitation were sent by NYSDOT and FRA to agencies identified as NEPA cooperating and/or participating agencies. The role and responsibilities of cooperating and/or participating Agencies are set forth under the environmental review provisions of Section 6002 of SAFETEA-LU, the New York State Environmental Quality Review Act (SEQR) and the Council on Environmental Quality (CEQ) regulations (40 CFR 1508.5). Given the magnitude and complexity of the program, the lead agencies, FRA and NYSDOT, are using a tiered process, as provided for in 40 CFR 1508.28, in completing of the environmental review of the program. The initial phase of the program, Tier 1, addresses broad service-level issues and proposals for improving intercity passenger rail service along the corridor.

The role of the cooperating agencies is outlined by CEQ 40 CFR 1508.5 whereby a cooperating agency is any federal agency, other than a lead agency, that has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposed project or project alternative. A state or local agency of similar qualifications or, when the effects are on lands of tribal interest, a Native American tribe, may, by agreement with the lead agencies, also become a

cooperating agency. The responsibilities of cooperating agencies include providing input throughout the entire duration of the program, participating in meetings, reviewing and providing comments on program progress and reviewing and commenting on the Tier 1 Draft EIS and the Tier 1 Final EIS. The actions proposed by the program may require a permit or approval from a cooperating agency. Cooperating agencies are also participating agencies, and all references to participating agencies include cooperating agencies.

The role of participating agencies, a federal, state, tribal or local government agency that may have an interest in the program, includes participation in the NEPA process, providing input throughout the entire duration of the program and identifying any issues or concerns regarding the program. According to Section 6002 of SAFETEA-LU, participating agencies are responsible to identify, as early as practicable, any issues of concern regarding the program's potential impacts. The program may impact resources that participating agencies are involved in managing. Exhibit 7-6 lists the cooperating and participating agencies invited to be involved in the program.

The roles and responsibilities of cooperating and participating agencies are similar, but cooperating agencies have a higher degree of authority, responsibility, and involvement in the environmental review process. A distinguishing feature of a cooperating agency is that the CEQ regulations (40 CFR Section 1501.6) permit a cooperating agency to "*assume on request of the lead agency responsibility for developing information and preparing environmental analyses including portions of the environmental impact statement concerning which the cooperating agency has special expertise*." An additional distinction is that, pursuant to 40 CFR 1506.3, "*a cooperating agency may adopt without recirculation the environmental impact statement of a lead agency when, after an independent review of the statement, the cooperating agency concludes that its comments and suggestions have been satisfied*." This provision is particularly important to permitting agencies, such as the U.S. Army Corps of Engineers, who, as cooperating agencies, routinely adopt U.S. DOT environmental documents."

7.5.2. Empire Project Advisory Committee (EPAC)

NYSDOT formed a project advisory committee, the Empire Project Advisory Committee (EPAC) to help shape and guide decision making throughout the environmental review process. The purpose of the EPAC is to create a forum to hold meetings with representatives from key agencies, statewide government organizations, major railroads, metropolitan planning organizations and other key stakeholders. An invitation letter was sent to key stakeholders identified as having a potential interest or role in the program. The letter formally invited involvement in the program, membership in the program's advisory committee and attendance at the first agency scoping meeting. The EPAC also serves as a communication conduit whereby members can share the program's progress with their constituents. Presently, the EPAC is comprised of 47 unique agencies as listed in Exhibit 7-7.

To date, four EPAC meetings have been held in an effort to seek input and feedback as the program progresses through the environmental review process. The first EPAC meeting presented an overview of the program along with the program's goals and objectives. The meeting was held on October 18, 2010 at the Capital District Transportation Committee (CDTC) Office in Albany, New York with approximately 40 persons in attendance. The second EPAC meeting presented preliminary findings and gathered input from EPAC members and addressed questions and

Exhibit 7-6—Agency Engagement

Agency	Reason for Involvement	Responsibility
Amtrak – National Railroad Passenger Corporation	Operates passenger service along the Empire Corridor	Invited Cooperating
United States (U.S.) Fish & Wildlife Service	Consultation regarding effects on aquatic and terrestrial wildlife as well as coordination with threatened and endangered species under Section 7 of the U.S. Endangered Species Act	Invited Cooperating
U.S. Environmental Protection Agency, Region II	Regulatory concerns include General Conformity under the U.S. Clean Air Act and Section 404 of the U.S. Clean Water Act	Accepted Cooperating
Federal Highway Administration	Oversight of the Federal Highway system in the U.S.	Accepted Cooperating
Federal Transit Administration	Oversight of passenger railroads in the U.S.	Accepted Cooperating
U.S. Army Corps of Engineers	Permitting responsibility under Section 404 of the U.S. Clean Water Act and permitting responsibility under Section 10 of the U.S. Rivers and Harbors Act	Invited Cooperating
National Marine Fisheries Service	Consultation regarding proposed alternatives relative to ecological effects on coastal waters	Invited Cooperating
U.S. Coast Guard	Permitting administration of Section 9 of the U.S. Rivers and Harbors Act	Accepted Cooperating
New York State (NYS) Department of Environmental Conservation	Permitting responsibility under Section 401 Water Quality Certification, and the State's Article 24 Freshwater Wetlands regulatory program and Article 15 Protection of Waters regulatory program	Invited Cooperating
NYS Department of State	Consistency with the State's Coastal Zone Management Plan	Invited Cooperating
NYS Office of Parks, Recreation & Historic Preservation	Oversight office for resources including Section 4(f) and Section 106 resources	Accepted Cooperating
National Park Service	Responsible for oversight of National Parks	Invited Cooperating
NYS Historic Preservation Office	Coordinating effects determination for Section 106 of the National Historic Preservation Act	Invited Cooperating
Federal Emergency Management Agency	Consultation regarding floodplains and modifications to existing floodplains	Invited Participating
Metro-North Railroad	Major railroad owner/operator in the Empire Corridor	Invited Participating
NYS Canal Corporation	Responsible for the operation of the canal system	Invited Participating

Exhibit 7-6—Agency Engagement

Agency	Reason for Involvement	Responsibility
Capital District Transportation Committee	Transportation planning organization for the Albany-Schenectady-Troy metropolitan area	Accepted Participating
Genesee Transportation Council	Transportation planning organization for the Genesee-Finger Lakes Region	Accepted Participating
Greater Buffalo-Niagara Regional Transportation Council	Transportation planning organization for the Erie and Niagara counties	Invited Participating
Herkimer-Oneida Counties Transportation Study	Transportation planning organization for the Herkimer and Oneida counties	Invited Participating
Orange County Transportation Council	Transportation planning organization for Orange County	Invited Participating
New York Metropolitan Transportation Council	Transportation planning organization for New York City, Long Island and the lower Hudson Valley	Invited Participating
Poughkeepsie-Dutchess County Transportation Council	Transportation planning organization for Dutchess County	Invited Participating
Syracuse Metropolitan Transportation Council	Transportation planning organization for Onondaga County and small portions of Madison and Oswego Counties	Invited Participating
Ulster County Transportation Council	Transportation planning organization for the Kingston Urbanized area as well as a portion of the Poughkeepsie-Newburgh Urbanized Transportation Management Area	Invited Participating
Capital District Transportation Authority (CDTA)	Responsible for transportation connections in the Albany-Schenectady-Troy metropolitan area	Accepted Participating
Metropolitan Transportation Authority (MTA)	Responsible for transportation connections in the New York City, Long Island and lower Hudson Valley	Invited Participating
Niagara Frontier Transportation Authority (NFTA)	Responsible for transportation connections in the Buffalo Niagara region	Invited Participating
Central New York Regional Transportation Authority (CENTRO)	Responsible for transportation connections in the central New York community	Invited Participating
Rochester Genesee Regional Transportation Authority (RGRTA)	Responsible for transportation connections in Monroe, Genesee, Livingston, Orleans, Wayne, Wyoming and Seneca Counties	Invited Participating
Erie County Department of Environment and Planning	Responsible for environmental oversight in Erie County	Accepted Participating
NYC Mayor's Office of Environmental Coordination	Responsible for environmental oversight in New York City	Invited Participating
NYC Parks and Recreation	Responsible for parks and recreation areas in New York City	Invited Participating
NYC Department of Environmental Protection	Responsible for environmental oversight in New York City	Invited Participating

Exhibit 7-7—EPAC Member Agencies

TYPE OF AGENCY	AGENCY
Federal Agencies	• Federal Railroad Administration • Federal Highway Administration • United States Environmental Protection Agency • U.S. Army Corps of Engineers • Federal Transit Administration • National Park Service • National Marine Fisheries Service • US Fish & Wildlife Service • US Department of Interior • US Coast Guard • Federal Emergency Management Agency
State Agencies	• NYS Department of Transportation • NYS Department of Environmental Conservation • NYS Department of State • NYS Empire State Development Corporation • NYS Office of Parks, Recreation & Historic Preservation • State of New York, Office of the Governor • NYS Thruway Authority • NYS Canal Corporation • NYS Historic Preservation Office
Local Agencies	• Erie County Department of Environmental Planning • New York City Mayors Office of Environmental Coordination • New York City Department of Parks and Recreation • NYC Department of Environmental Protection
Transportation Agencies/MPOs	• NYS Metropolitan Planning Organizations • Metropolitan Transportation Authority • Capital District Transportation Committee • Genesee Transportation Council • Greater Buffalo-Niagara Regional Transportation Council • Herkimer-Oneida Counties Transportation Study • Orange County Transportation Council • New York Metropolitan Transportation Council • Poughkeepsie-Dutchess County Transportation Council • Syracuse Metropolitan Transportation Council • Ulster County Transportation Council • Capital District Transportation Authority • Niagara Frontier Transportation Authority • Rochester Genesee Regional Transportation Authority • Central New York Regional Transportation Authority
Railroads	• CSX Transportation, Inc. • Amtrak (National Railroad Passenger Corporation • Metro-North Railroad • Canadian Pacific Railroad • Finger Lakes Railroad
Rail Transportation Groups	• High Speed Rail Coalition • Empire State Passenger Association • Railroads of New York

comments. The second EPAC meeting was held on March 21, 2011 at the NYSDOT Main Office in Albany, New York. Approximately 30 EPAC members participated in the second meeting. The third EPAC meeting was held on March 8, 2012 at the NYSDOT main office in Albany, New York. Approximately 37 EPAC members participated in the third meeting which provided the advisory committee with an update on the program's progress including an overview of the alternatives development and screening process. The fourth EPAC meeting was held on March 4, 2013. The focus of this meeting was on the alternatives evaluations and the economic benefits of the program. All four EPAC meetings included a webinar option for EPAC members to participate in the meeting remotely if they were unable to travel to attend the meetings in person.

7.5.3. Program Partners Involvement

In addition to the EPAC, the program team has provided two of the program's key partners, the National Railroad Passenger Corporation - Amtrak and CSX Transportation, Inc. (CSXT) with briefings on the status of the alternatives development phase of the program. These briefings provided both Amtrak and CSXT with an opportunity to individually view a presentation on the range of alternatives under consideration and provide feedback. Feedback from these key program partners is being taken into consideration as the program progresses.

7.5.4. Consultation with Federally Recognized Tribes and Consulting Parties Pursuant to the National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) mandates that federal agencies consider the effect of their actions on any properties listed on or determined eligible for listing on the National Register of Historic Places (NR) and afford the federal Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings. Section 101(d)(6)(B) of the NHPA requires the lead federal agency to consult with any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to historic properties that may be affected by the undertaking. The lead federal agency shall ensure that consultation in the Section 106 process provides the Indian tribe or Native Hawaiian organization a reasonable opportunity to identify its concerns about historic properties, advise on the identification and evaluation of properties, including those of traditional religious and cultural importance, articulate its views on the undertaking's effects on such properties, and participate in the resolution of adverse effects. Section 106 also requires consultation with consulting parties, which in addition to SHPO, ACHP, and federally recognized Indian tribes/Tribal Historic Preservation Officers (THPOs) or Native Hawaiian organizations, includes local governments, and other individuals and organizations with a demonstrated interest in the program, whose participation is subject to approval by the responsible federal agency, as described in 36 CFR 800.2. The lead federal agency, in consultation with the State Historic Preservation Office (SHPO) and appropriate consulting parties, must determine whether a proposed action would have any adverse effects on the characteristics of a property that qualify it for the NR.

Federally Recognized Tribes

Pursuant to 36 CFR 800.3(f)(2), the lead federal agency, FRA, in consultation with NYSDOT and SHPO, identified federally recognized tribes for outreach under Section 106 of NHPA. The tribes were identified on the basis of previously identified geographic areas of interest for Section 106 consultation commonly used by NYSDOT and SHPO. Tribal status and contact information on file with the Bureau of Indian Affairs was also consulted as part of the identification process. On May 3, 2011, FRA sent letters to the following federally recognized tribes inviting them to participate in Section 106 consultation:

- Cayuga Nation,
- Seneca Nation of Indians,
- Tonawanda Seneca Nation,
- Onondaga Nation,
- Oneida Indian Nation,
- Tuscarora Indian Nation,
- Stockbridge-Munsee Community Band of the Mohican Nation,
- Delaware Nation,
- Shinnecock Nation,
- St. Regis Mohawk Tribe,
- Seneca-Cayuga Tribe of Oklahoma.

Replies were received from the Mohican Nation, the Oneida Nation, and the Seneca Nation. All of these tribal nations expressed their interest in the program and their desire to participate in consultation on the program in accordance with Section 106 of NHPA.

On May 4, 2012**,** NYSDOT invited all of the federally-recognized tribes listed above (and one additional federally-recognized tribe: the Delaware Tribe of Indians) to an information-gathering meeting in Rochester, New York, on May 30, 2012. At the meeting, the program sponsors presented an overview of the program, the proposed Section 106 methodology and the preliminary program APE, and took comments from the tribes. At the request of several of the tribes that participated in the May 30, 2012 meeting, maps of the alternative alignments showing the approximate locations of previously identified archaeological sites were sent to the tribes. On November 21, 2012, NYSDOT on behalf of FRA sent letters to each of the tribes and SHPO describing and illustrating the boundaries of the proposed APE for their review and comment. In response to comments provided by the Oneida Nation to FRA and NYSDOT in a letter dated December 14, 2012, FRA and NYSDOT engaged in additional correspondence and a face-to-face meeting (April 18, 2013) with the Oneida Nation.

On May 2, 2013, FRA and NYSDOT held a meeting to provide project information to the federally-recognized tribes and give them an opportunity to provide comments. On July 26 2013**,** the Draft Programmatic Agreement was transmitted to the federally recognized tribes and consulting parties for review and comment. The deadline for comment was listed as August 27, 2013. In a letter dated August 13, 2013, FRA received a letter from the Oneida Indian Nation requesting a 30-day extension to provide comments on the Draft Programmatic Agreement. This was granted by the FRA. In advance of the extended deadline for comments, a teleconference meeting was held on September 17, 2013 with FRA, NYSDOT, and the Oneida Indian Nation. As a result of this meeting, FRA revised the Draft Programmatic Agreement and transmitted it to the Oneida Indian Nation on September 26, 2013. FRA coordinated with Oneida Nation in developing the Draft PA, included in

Appendix H.

Other Consulting Parties

In addition to consultation with federally-recognized tribal nations, FRA and NYSDOT have engaged in a parallel process of coordination with consulting parties in accordance with 36 CFR 800.2(c)(3) through (5) and 800.3(f). Potential consulting parties for the Tier 1 process were identified by FRA and NYSDOT in consultation with SHPO based on the parties demonstrated interest in broad, corridor-wide, or regional-level aspects of the proposed undertaking. In addition to the SHPO and ACHP, the list of potential consulting parties included the following non-federally recognized tribes and state or region-wide preservation organizations:

- Mohawk Nation Council of Chiefs,
- Unkechaug Nation,
- Preservation League of New York State,
- Hudson River Valley Greenway,
- Erie Canal National Heritage Corridor,
- Preservation Buffalo Niagara,
- Landmark Society of Western New York,
- Preservation Association of Western New York.

A total of three parties responded expressing interest in participating as consulting parties: the Preservation League of New York State; the National Park Service Erie Canal National Heritage Corridor; and Preservation Buffalo Niagara. FRA subsequently approved the consulting party status of these three entities. On May 2, 2013, FRA and NYSDOT held a meeting to provide program information to the consulting parties and give them an opportunity to provide comments. Representatives from the Preservation League of New York State and the Erie Canal National Heritage Corridor attended. In June 2013, the Draft Programmatic Agreement was transmitted to the consulting parties for review and comment. The deadline for comment was listed as August 27, 2013. In a letter dated September 20, 2013, the Preservation League of New York State provided comments.

7.5.5. Future Public Involvement and Agency Coordination Activities

During the public comment period for this Tier 1 Draft EIS, public hearings will be held to provide the public with an opportunity to comment on the program through formal testimony and written comment. The public comments collected and recorded at the public hearings and during the public comment period will be considered in selection of a preferred alternative and in preparation of the Tier 1 Final EIS.

The cooperating agencies have been provided with the opportunity to review and comment on the Tier 1 Draft EIS. Coordination with the cooperating and participating agencies as well as with the EPAC will continue through completion of the Tier 1 Final EIS.

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Acronyms

AC	—	Alternating Current
ACHP	—	Advisory Council on Historic Preservation
ACMs	—	Asbestos Containing Materials
ADA	—	Americans with Disabilities Act
Amtrak	—	National Railroad Passenger Corporation
APE	—	Area of Potential Effect
ARRA	—	American Recovery and Reinvestment Act of 2009
AST	—	Aboveground Storage Tanks
ASTM	—	American Society for Testing and Materials
BA	—	Base Alternative
BCA	—	Bird Conservation Area
BEA	—	Bureau of Economic Analysis
BMPs	—	Best Management Practices
BSPS	—	Bergen Swamp Preservation Society
CAA	—	U.S. Clean Air Act
CAAA	—	Clean Air Act Amendments
CAFE	—	Combined Corporate Average Fuel Economy
CBRS	—	Coastal Barrier Resources System
CBS	—	NYS Chemical Bulk Storage System
CDTA	—	Capital District Transportation Authority
CDTC	—	Capital District Transportation Committee
CE	—	Categorical Exclusion
CEA	—	Critical Environmental Areas
CENTRO	—	Central New York Regional Transportation Authority
CEQ	—	Council on Environmental Quality
CERCLA	—	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	—	Comprehensive Environmental Response, Compensation, and Liability Information Systems (also known as Superfund)
CFR	—	Code of Federal Regulations
CLG	—	Certified Local Government
CLOMR	—	Conditional Letter of Map Revision
CO	—	Carbon monoxide
CO_2	—	Carbon dioxide
CO_2e	—	Carbon dioxide equivalent

CP	—	Control Point
CPP	—	Construction Protection Plan
CSXT	—	CSX Transportation, Inc.
CWA	—	U.S. Clean Water Act
CZM	—	Coastal Zone Management
CZMA	—	Coastal Zone Management Act
dB	—	Decibel
dBA	—	A-weighted decibels
DC	—	Direct Current
DOI	—	U.S. Department of the Interior
DPM	—	Diesel Particulate Matter
DPW	—	Department of Public Works
EA	—	Environmental Assessment
ECL	—	Environmental Conservation Law
EFH	—	Essential Fish Habitat
EIS	—	Environmental Impact Statement
EO	—	Executive Order
EPAC	—	Empire Project Advisory Committee
EPCRA	—	Emergency Planning and Community Right-to-Know Act of 1986
ESA	—	Environmental Site Assessment
ESC	—	Erosion and Sediment Control Plan
ESPA	—	Empire State Passenger Association
FAA	—	Federal Aviation Administration
FE	—	Federal Endangered Species
FEMA	—	Federal Emergency Management Agency
FHWA	—	Federal Highway Administration
FIRM	—	Flood Insurance Rate Map
FNOI	—	Final Notice of Intent
FPA	—	Floodplain Administrator
FPPA	—	Farmland Protection Policy Act of 1981
FR	—	Federal Register
FRA	—	Federal Railroad Administration
FT	—	Federal Threatened Species
FTA	—	Federal Transit Administration
FY	—	Fiscal Year
GBNRTC	—	Greater Buffalo-Niagara Regional Transportation Council

GCT	—	Grand Central Terminal
GE	—	General Electric Company
GHG	—	Greenhouse Gas
GIS	—	Geographic Information System
GTC	—	Genesee Transportation Council
GWP	—	Global Warming Potential
HABS	—	Historic American Buildings Survey
HAER	—	Historic American Engineering Record
HAPs	—	Hazardous Pollutants
HFC	—	Hydrofluorocarbons
HOCTS	—	Herkimer-Oneida Counties Transportation Study
HSIPR	—	High Speed Intercity Passenger Rail
HSR	—	High Speed Rail
HST	—	High Speed Train
Hz	—	Hertz
ISTEA	—	Intermodal Surface Transportation Efficiency Act
kV	—	Kilovolts
LEED	—	Leadership in Energy and Environmental Design
$L_{eq\ (h)}$	—	Hourly equivalent noise level (typically the worst-case, peak hour noise level)
LOCMA	—	Lower Orange County Metropolitan Area
LOMR	—	Letter of Map Revision
LRTP	—	Long Range Transportation Improvement Plan
LWCF	—	United States Land and Water Conservation Fund Act
LWRP	—	Local Waterfront Revitalization Plan
MAS	—	Maximum Authorized Speed
mgt	—	Million Gross Tons
MMPs	—	Materials Management Plans
MNR	—	Metro-North Railroad
MOSF	—	Major Oil Storage Facility
MOA	—	Memorandum of Agreement
MOU	—	Memorandum of Understanding
MP	—	Milepost
MPO	—	Metropolitan Planning Organization
mph	—	Miles per Hour
MSA	—	Metropolitan Statistical Area

MSAT — Mobile Source Air Toxics
MS4 — Municipal Separate Storm Sewer
MTA — Metropolitan Transportation Authority
MTC — New York Metropolitan Transportation Council
NAA — Non-Attainment Area
NAAQS — National Ambient Air Quality Standards
NEPA — National Environmental Policy Act of 1969
NERRS — National Estuarine Research Reserve System
NFIP — National Flood Insurance Program
NFTA — Niagara Frontier Transportation Authority
NHL — National Historic Landmark
NHPA — National Historic Preservation Act
NJ — New Jersey
NMFS — National Marine Fisheries Service
NNL — National Natural Landmark
NO — Nitric Oxide
NO_2 — Nitrogen Dioxide
NOAA — National Oceanic and Atmospheric Administration
NOI — Notice of Intent
NORAC — Northeast Operating Rules Advisory Committee
NO_x — Nitrogen Oxides
NPDES — National Pollutant Discharge Elimination System
NPS — National Park Service
NR — National Register of Historic Places
NRCS — Natural Resources Conservation Service
NRI — Nationwide Rivers Inventory
NWI — National Wetlands Inventory
NWP — Nationwide Permit
NWR — National Wildlife Refuge
NYAC — New York Archaeological Council
NYC — New York City
NYCRR — New York Code of Rules and Regulations
NYMA — New York Metropolitan Area
NYMTC — New York Metropolitan Transportation Council
NYNHP — New York Natural Heritage Program
NYS — New York State

NYSDEC	—	New York State Department of Environmental Conservation
NYSDOL	—	New York State Department of Labor
NYSDOS	—	New York State Department of State
NYSDOT	—	New York State Department of Transportation
NYSESD	—	New York State Empire State Development Corporation
NYSGIS	—	New York State Geographic Information System
NYSM	—	New York State Museum
NYSMPO	—	New York State Metropolitan Planning Organizations
NYSOPRHP	—	New York State Office of Parks, Recreation, and Historic Preservation
O&M	—	Operating and Maintenance
OCTC	—	Orange County Transportation Council
OMB	—	United States Office of Management and Budget
OTP	—	On-time performance
PA	—	Programmatic Agreement
PBS	—	New York State Petroleum Bulk Storage
PCB	—	Polychlorinated Biphenyl
PDCTC	—	Poughkeepsie-Dutchess County Transportation Council
PFC	—	Perfluorocarbons
PIP	—	Public Involvement Plan
PM	—	Particulate Matter
$PM_{2.5}$	—	Particulate Matter under 2.5 microns in size
PM_{10}	—	Particulate Matter under 10 microns in size
PPA	—	Pollution Prevention Act of 1990
ppm	—	Parts per Million
PRIIA	—	Passenger Rail Investment and Improvement Act of 2008
PTC	—	Positive Train Control
QDN	—	Milepost designation, Niagara Branch
QH	—	Milepost designation, 125 high speed corridor, Empire Corridor West
RCRA	—	U.S. Resource Conservation and Recovery Act
RCRIS	—	Resource Conservation and Recovery Information System
RGRTA	—	Rochester Genesee Regional Transportation Authority
ROD	—	Record of Decision
RONY	—	Railroads of New York
ROW	—	Right-of-Way
RSIA	—	U.S. Rail Safety Improvement Act of 2008
RTA	—	Regional Transportation Authority

SAFETEA-LU	—	U.S. Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SASS	—	Scenic Areas of Statewide Significance
SCFWH	—	Significant Coastal Fish and Wildlife Habitats
SE	—	State Endangered Species
SED	—	New York State Education Department
SEQR	—	New York State Environmental Quality Review Act
SF_6	—	Sulfur Hexafluoride
SHPA	—	New York State Historic Preservation Act of 1980
SHPO	—	State Historic Preservation Officer
SIP	—	State Implementation Plan
SMTC	—	Syracuse Metropolitan Transportation Council
S/NR	—	State/National Register of Historic Places
SO_2	—	Sulfur Dioxide
SPCC	—	Spill Prevention Control Plan
SPDES	—	State Pollutant Discharge Elimination System
SR	—	State Register of Historic Places
SSA	—	Sole Source Aquifer
ST	—	State Threatened Species
STB	—	Surface Transportation Board
STIP	—	Statewide Transportation Improvement Program
SWMP	—	Stormwater Management Plan
SWPPP	—	Stormwater Pollution Prevention Plan
TAP	—	Toxic Air Pollutant
TEA-21	—	Transportation Equity Act for the 21st Century
TEM	—	NYSDOT Environmental Manual
Tg CO_2e	—	Teragrams of Carbon Dioxide Equivalent
THPO	—	Tribal Historic Preservation Officer
TIGER	—	Transportation Investment Generating Economic Recovery
TIP	—	Transportation Improvement Program
TMDL	—	Total Maximum Daily Load
TOD	—	Transit Oriented Development
TRIS	—	Toxic Release Inventory System
UCTC	—	Ulster County Transportation Council
U.S.	—	United States
U.S. ACE	—	United States Army Corp of Engineers

U.S.C.	—	United States Code
USCG	—	United States Coast Guard
USDA	—	United States Department of Agriculture
U.S. DOT	—	United States Department of Transportation
U.S. EPA	—	United States Environmental Protection Agency
U.S. FWS	—	United States Fish and Wildlife Service
USGBC	—	United States Green Building Council
USGS	—	United States Geological Survey
UST	—	Underground Storage Tank
VHS	—	Very High Speed
VMT	—	Vehicle Miles Traveled
VOC	—	Volatile Organic Compound
WMA	—	Wildlife Management Area

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Glossary of Terms

100-Year Floodplain – The portion of the floodplain submerged by the statistical flood event with a 1 percent probability of occurring in any year.

Alightings – The number of passengers leaving a passenger vehicle at a station.

Aquifer – Rock or sediment that is saturated with water and sufficiently permeable to transmit economically significant quantities of water to wells and springs.

American Recovery and Reinvestment Act of 2009 (ARRA) – The American Recovery and Reinvestment Act of 2009 (ARRA, P.L. 111-5), enacted on February 17, 2009, appropriated a total of $787 billion, including $8 billion specifically for HSIPR and $1.3 billion for Amtrak capital grants. ARRA sought from states "shovel ready" transportation projects, among them programs and projects to advance high-speed rail.

Archaeological resources – Materials and objects that remain below the ground surface as evidence of the life and culture of historic, prehistoric, or ancient people, such as artifacts, structures, or settlements. Resources of concern are located in areas known or suspected to contain subsurface artifacts of pre-European or post-European settlement populations. Areas of expected moderate to high archaeological sensitivity according to various factors including present and past topography, exposure, slope, distance to water, and availability of food.

At-grade – The intersection of two roads, or a road and a railway, that cross at the same elevation.

Attainment area – A geographic area in which levels of a criteria air pollutant meet the health-based primary standard (National Ambient Air Quality Standard) for the pollutant. Attainment areas are defined using federal pollutant limits set by the U.S. Environmental Protection Agency.

Automatic Block Signaling (ABS) – A block system that consists of a series of signals that divides a railway line into a series of blocks and then functions to control the movement of trains between them through automatic signals. ABS operation is designed to allow trains operating in the same direction to follow each other in a safe manner with greatly reduced risk of rear end collision while reducing costs and increasing capacity from previous manual block systems that require human operators.

Best Management Practice (BMP) – A structural and/or management practice employed before, during and after construction to protect receiving water quality. These practices either provide techniques to reduce soil erosion or remove sediment and pollutants from surface runoff.

Biodiversity – The diversity of genes, species, and ecosystems. This term includes the entire hierarchy of ecological organization, and encompasses regional ecosystem diversity (landscape diversity), local ecosystem diversity (community diversity), species diversity, and genetic diversity within populations of a species.

Boardings – The number of passengers entering a passenger vehicle at a station.

Cab Signaling – A system of signaling devices located in a train operator's compartment or cab, indicating a condition affecting the movement of a train or engine and used in conjunction with interlocking signals and either in conjunction with or in lieu of wayside block signals.

Canadian Pacific Railway – A major freight rail carrier that operates in New York State, and is the host railroad for Amtrak trains between Schenectady and Rouses Point.

Car Mile – A single vehicle, such as a railroad car, moved one mile (also see "Train Mile").

Carbon Dioxide – Carbon dioxide (CO_2) is the primary greenhouse gas (GHG) pollutant of concern from anthropogenic (man-made) sources. Although not the GHG with the strongest effect per molecule, CO_2 is by far the most abundant and, therefore, the most influential GHG. CO_2 is emitted from any combustion process (both natural and anthropogenic), from some industrial processes such as the manufacture of cement, mineral production, metal production, and the use of petroleum-based products, from volcanic eruptions, and from the decay of organic matter. CO_2 is removed ("sequestered") from the lower atmosphere by natural processes such as photosynthesis and uptake by the oceans. CO_2 is included in any analysis of GHG emissions.

Carbon Dioxide Equivalent (CO_2e) – To present a complete inventory of all GHGs, component emissions are added together and presented as CO_2 equivalent (CO_2e)—a unit representing the quantity of each GHG weighted by its effectiveness using CO_2 as a reference. This is achieved by multiplying the quantity of each GHG emitted by a factor called global warming potential (GWP). GWPs account for the lifetime and the radiative forcing of each chemical over a period of 100 years (e.g., CO_2 has a much shorter atmospheric lifetime than SF_6, and therefore has a much lower GWP).

Carbon Monoxide (CO) – A colorless, odorless, tasteless gas formed in large part by incomplete combustion of fuel. Full combustion activities (i.e. transportation, industrial processes, space heating, etc.) are the major sources of CO.

Center Island Platform – A passenger platform located between two tracks so that it can serve them both.

Centerline – The midpoint in a cross-sectional view of a right-of-way, roadway, or railroad track, see also "Track Centers, Distance Between."

Class I Railroad – The Surface Transportation Board (STB) defines a Class I railroad in the United States as "having annual carrier operating revenues of $250 million or more" after adjusting for inflation using a Railroad Freight Price Index developed by the Bureau of Labor Statistics (BLS). According to the Association of American Railroads (AAR), Class I railroads had minimum carrier operating revenues of $378.8 million (USD) in 2009. Smaller railroads are assigned to Class II or III.

Classification Yard – A rail terminal facility, usually consisting of a system of turnouts (which see) and parallel tracks, used for sorting freight cars by destination and for assembling trains.

Combined Statistical Area (CSA) – A grouping of adjacent metropolitan and/or micropolitan statistical areas (MSAs) in the United States and Puerto Rico. The United States Office of Management and Budget (OMB) defines combined statistical areas based on social and economic ties measured by commuting patterns between adjacent MSAs. The areas that combine retain their own designations as metropolitan or micropolitan statistical areas within the larger combined statistical area. The primary distinguishing factor between a CSA and an MSA is that the social and economic ties between the individual MSAs within a CSA are at lower levels than between the counties within an MSA.

Coniferous – Any of various mostly needle-leaved or scale-leaved, chiefly evergreen, cone-bearing gymnospermous trees or shrubs such as pines, spruces, and firs.

Container on Flat Car – A form of intermodal freight transportation (which see) in which freight containers are carried on railroad cars equipped for that purpose; may be arranged to handle a single level of containers or double-stacked containers (see "Double-Stack Car").

Control Point – An interlocking, or the location of a track signal or other marker, the indications of which dispatchers can specify when controlling trains.

Cooperating Agency – Any federal, state or local agency, other than a lead agency, that has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposed project or project alternative.

Critical Environmental Area (CEA) – An area designated as a CEA under the New York State Environmental Quality Act by state and local agencies must have one or more of the following exceptional or unique characteristics: 1) A benefit or threat to human health; 2) A natural setting; 3) Agricultural, social, cultural, historic, archaeological, recreational, or educational values; or 4) An inherent ecological, geological or hydrological sensitivity to change that may be adversely affected by any change.

CSX Transportation, Inc. (CSXT) – A major rail freight carrier with largest market share in New York State, and host railroad for Amtrak trains between Poughkeepsie and Niagara Falls.

Daily Trains per Route – The number of trains traversing a defined railroad line or section of line during a specified 24-hour period.

dBA – An abbreviation for A-weighted decibel. The decibel is a unit used to describe sound pressure levels on a logarithmic scale. For community noise impact assessment, an A-weighted frequency filter is used to approximate the way humans hear sound.

Deciduous – Refers to woody vegetation, such as oak or maple trees, that shed their leaves after the growing season.

Double-Stack Car – A railroad freight car that provides a frame in which a freight container can be placed and secured, with provisions and clearances to allow a second container to be placed and secured on top of the first container.

Draft Environmental Impact Statement (Draft EIS) – The document prepared by the Federal Railroad Administration (FRA) in accordance with the National Environmental Policy Act (NEPA) regulations. These regulations require that the EIS evaluate all reasonable alternatives considered, discuss the reasons that alternatives have been eliminated from detailed study, summarize the studies, reviews, consultations, and coordination required by environmental laws and Executive Orders.

Dual Mode Locomotive – Railroad locomotive that can switch from electric to diesel operation for power generation.

Empire Project Advisory Committee (EPAC) – Advisory Committee consisting of representatives from key federal/state agencies, key railroads, and statewide organizations representing regional governments.

Endangered Species – Any species which is in danger of extinction throughout all or a significant portion of its range.

Environmental Justice – Executive Order 12898 requires each federal agency to "make achieving environmental justice part of its mission by identifying and addressing… disproportionately high and adverse human health or environmental impacts on minority populations and low-income populations."

Essential Fish Habitat (EFH) – Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity**,** as defined by the regional Fishery Management Council.

Farmland of Statewide Importance – Land other than prime farmland but that is also highly productive. This is land, in addition to prime farmland, that is of statewide importance for the production of food, feed, fiber, forage, and oil seed crops.

Farmland Protection Policy Act (FPPA) – A statute enacted in 1981 by the United States Congress to ensure that significant agricultural lands are protected from conversion to non-agricultural uses. For highway projects receiving federal aid, the regulations promulgated under the FPPA (7 CFR Part 658, 1984) require a state highway authority (NYSDOT) to coordinate with the USDA Natural Resources Conservation Service. The FPPA regulates four types of farmland soils; prime farmland, unique farmland, farmland of state-wide importance, and farmland of local importance.

Farmland Soils – Soils suited to producing crops; those with soil quality, growing season and moisture supply needed to produce a sustainable yield when treated and managed using acceptable methods. Specifically, farmland soils are those soil types designated by the Natural Resources Conservation Service (NRCS) in accordance with the Farmland Protection Policy Act (FPPA) of 1981 and the implementing regulations of the United States Department of Agriculture (USDA).

Federal Emergency Management Agency (FEMA) – A federal agency that regulates federal actions in floodplains.

Federal Highway Administration (FHWA) – The branch of the U.S. Department of Transportation responsible for administering the funding of federal-aid highway projects.

Federal Railroad Administration (FRA) – The FRA was created by the Department of Transportation Act of 1966 (49 U.S.C. 103, Section 3(e)(1)). The purpose of the FRA is to: promulgate and enforce rail safety regulations; administer railroad assistance programs; conduct research and development in support of improved railroad safety and national rail transportation policy; provide for the rehabilitation of Northeast Corridor rail passenger service; and consolidate government support of rail transportation activities.

Final Environmental Impact Statement (Final EIS) – The document prepared after circulation of a draft EIS and consideration of comments received. FRA NEPA regulations require that the FEIS identify a preferred alternative, evaluate all reasonable alternatives considered, discuss and respond to substantive comments on the draft EIS, summarize public involvement, and describe the mitigation measures that will be incorporated into the proposed action.

Floodplain – The level area adjoining a river channel that is inundated during periods of high flow.

Freight Train Mile – A freight train operating one mile (also see "Train Mile").

Geographic Information System (GIS) – A computer-based application used to perform spatial analysis.

Grade – The slope of a railway or road along the direction of travel, normally characterized by the vertical rise per unit of longitudinal distance.

Grade Crossing – A crossing or intersection of highways, railroad tracks, other guideways, or pedestrian walks, or combinations of these at the same level or grade.

Grade separation – The intersection of two roads, or a road and a railway, that cross at different elevations. One roadway passes above or under the other roadway with an overpass or underpass structure.

Greenhouse Gas (GHG) Emissions – Any or all of several gases that negatively affect ambient air quality when released into the atmosphere as part of the exhaust gases and smoke thrown off by internal combustion engines used to propel transportation vehicles. Water vapor, carbon dioxide (CO_2), nitrous oxide, methane, and ozone are the primary greenhouse gases in the Earth's atmosphere.

Gross Domestic Product (GDP) – Gross Domestic Product is one of the major economic indices of the socio-economic development of a region. GDP is equal to the total of added values in the

regional economic industries, estimated as a difference between production and intermediate consumption.

Gross Tons – The total weight of a vehicle and the lading, if any, that it is carrying, i.e., the sum of Tare Weight and Revenue Tons (which see).

Gross Tons per Year – The total weight of lading and vehicles carried over a roadway or railroad line of track during a one-year period.

Groundwater Protection Areas – Areas of land designated by water resource agencies through which rainwater or snowmelt percolates to replenish the underlying aquifer in the area of a public well. These areas require special protection because they directly affect the quality and safety of the public drinking water supply.

High-Level Platform – A passenger station platform whose surface is at the same elevation above the rail as the floor of conventional railroad passenger cars, typically 51 inches, to enable stepless boarding and alighting in conformance with ADA requirements.

High Speed Intercity Passenger Rail (HSIPR) Program – The Federal Railroad Administration (FRA) launched the HSIPR Program in June 2009. The HSIPR Program supports a series of strategic transportation goals: building a foundation for economic competitiveness; ensuring safe and efficient transportation choices; promoting energy efficiency and environmental quality; and supporting interconnected livable communities. In the long-term, HSIPR Program funding is intended to build an efficient, high-speed passenger rail network connecting major population centers 100 to 600 miles apart. In the near-term, the program will aid in economic recovery efforts and lay the foundation for this high-speed passenger rail network through planning studies and targeted investments in existing intercity passenger rail infrastructure, equipment, and intermodal connections.

Historic resources – Properties, structures and districts that are listed in or have been determined to be eligible for listing in the National Register of Historic Places.

Interlocking – In rail systems, an arrangement of switch, lock, and signal devices that is located where rail tracks cross, join and/or separate. The devices are interconnected in such a way that their movements must succeed each other in a predetermined order, thereby preventing opposing or conflicting train movements.

Intermodal Freight Transportation – Goods that are loaded into a highway trailer or container, then shipped from origin to destination by moving the trailer or container via some combination of road, rail marine and/or (rarely) air transport.

Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) – The Intermodal Surface Transportation Efficiency Act of 1991 (Public Law 102-240; ISTEA, pronounced *Ice-Tea*) is a United States federal law that posed a major change to transportation planning and policy, as the first U.S. federal legislation on the subject in the post-Interstate Highway System era. It presented an overall intermodal approach to highway and transit funding with collaborative planning requirements, giving significant additional powers to metropolitan planning organizations. Signed into law on December 18, 1991 by President George H. W. Bush, it expired in 1997. It was preceded by the Surface Transportation and Uniform Relocation Assistance Act of 1987 and followed by the Transportation Equity Act for the 21st Century (TEA-21) and most recently in 2005, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)

Interstate – A limited access highway that is part of the National System of Interstate and Defense Highways ("Interstate Highway System").

Interstate Highway System – The network of Interstate Highways established by the Federal-Aid Highway Act of 1956. The statute established a 41,000-mile network of controlled-access highways (expanded to 42,000 miles by legislation in 1968) intended to connect all metropolitan areas with populations greater than 50,000 and all state capitals.

Land and Water Conservation Fund – A system for funding Federal, State and local parks and conservation areas, created by the Land and Water Conservation Fund Act of 1964.

Magnuson-Stevens Fisheries Conservation and Management Act – Legislation (16 U.S.C. 1855(b)) governing all fisheries resources within 320 kilometers (200 miles) of the U.S. coast that established regional Fishery Management Councils and required the preparation of Fisheries Management Plans.

Main Track – A principal track over which all or most of a railroad line's train traffic moves. Depending on traffic volume, railroad lines may have a single main track, or two or multiple main tracks.

Maintenance of way – The upkeep and repair of a railroad's fixed property (such as tracks and bridges); the process of maintaining railroad roadbed (such as rail, ties, ballast, bridges, etc.).

Maximum Authorized Speed (MAS) – The top speed (mph) at which trains are allowed to operate in a particular section of track; generally specified in the employees' timetable.

Meet – An operating event wherein two trains, one running in each direction, pass each other; can occur without restriction on a line with two or more main tracks, but must occur at a passing siding on a line with a single main track.

Metro North Railroad (Metro-North) – The unit of the New York Metropolitan Transportation Authority that operates commuter rail lines serving Grand Central Terminal. Metro-North is the host railroad for Amtrak trains between Spuyten Duyvil and Poughkeepsie.

Metropolitan Statistical Area (MSA) – As defined by the United States Office of Management and Budget, a MSA includes at least one city with 50,000 or more inhabitants, or an urbanized area (of at least 50,000 inhabitants), and a total metropolitan population of at least 100,000. Each MSA has its own metropolitan planning organization as decreed by federal law.

Mitigation – Actions that avoid, minimize, or compensate for potential adverse impacts.

Multi-modal – The act of providing alternative modes or choices of transportation service, such as automobile, bus, rail, taxi, etc.

National Ambient Air Quality Standards (NAAQS) – The prescribed level of pollutants in the outside air that cannot be exceeded during a specified time in a specified geographic area.

National Environmental Policy Act of 1969, as amended (NEPA) – The federal legislation that requires an interdisciplinary approach in planning and decision-making for federal-aid actions. The Act includes requirements for the contents of environmental impact statements that are to accompany every recommendation for major federal actions significantly affecting the quality of the human environment. The interdisciplinary study approach includes the analysis of potential impacts to the natural, social and economic environment.

National Heritage Area – Established by Congress to promote historic preservation and an appreciation of the history and heritage of designated sites. National Heritage Areas are administered by state or local governments or non-profit or private corporations and are not federally owned and managed.

National Historic Landmark (NHL) – A historic building, site, structure, object, or district that represents an outstanding aspect of American history and culture.

National Historic Site – Usually, a national historic site contains a single historical feature that was directly associated with a person or family of historical significance. These areas may also be associated with specific historic periods that are important in American history.

National Memorial – A place designated by the U.S. Congress for protection as a memorial to a historic person or event.

National Natural Landmark (NNL) – The National Registry of Natural Landmarks includes nationally significant geological and biological features.

National Priority List (NPL) – The "Superfund" statute (42 U.S.C. Sect. 9601) requires the EPA to establish a National Priorities List of sites which are to be given top priority consideration for removal of hazardous substances and remedial action.

National Register of Historic Places – A list of structures, sites and districts of national historical significance as determined by the Advisory Council on Historic Preservation under the National Historic Preservation Act.

National Wetlands Inventory (NWI) – A program administered by the U.S. Fish and Wildlife Service for mapping and classifying wetland resources in the United States.

National Wildlife Refuge – The National Wildlife Refuge System, managed by the U.S. Fish and Wildlife Service, is the nation's system of public lands and waters set aside to conserve fish, wildlife and plants.

Natural Resources Conservation Service (NRCS) – Formerly the Soil Conservation Service, NRCS is a unit within the United State Department of Agriculture that is responsible for administering the Farmland Protection Policy Act.

Nitrogen Oxides (NO_x) – Nitric oxide (NO) and Nitrogen dioxide (NO_2) are collectively referred to as oxides of nitrogen (NOx). NO forms during high temperature combustion processes. NO2 forms when NO further reacts in the atmosphere. NOx reacts with the sunlight to form ozone, a colorless gas associated with smog or haze conditions. Ozone is a pollutant regulated by the Clean Air Act Amendments of 1990.

Noise receptor – Locations that may be affected by noise: sensitive receptors include residences, parks, schools, churches, libraries, hotels, and other public buildings.

Non-Attainment Area – A geographic area in which levels of a criteria air pollutant fail to meet the health-based primary standard (National Ambient Air Quality Standard) for the pollutant. Non-Attainment areas are defined using federal pollutant limits set by the U.S. Environmental Protection Agency.

On-Time Performance – Arrival time of a public transportation vehicle at an intermediate or final destination station at the time designated in the operating timetable for that event. For contract enforcement purposes, usually taken to mean arrival at the trip's final destination station at or no more than a specified number of minutes after the published arrival time.

Overhead Bridges – With reference to the railroad tracks, overhead bridges are bridges that carry another feature, such as a road, over the referenced tracks.

Overtake – An operating event wherein a faster train passes a slower train running in the same direction; can occur between appropriately placed crossovers on a line with two or more main tracks, but must occur at a passing siding on a line with a single main track.

Ozone – A gas which is a variety of oxygen. Ozone is a pollutant regulated by the Clean Air Act Amendments of 1990. Ground-level ozone is the main component of smog. Ozone is not directly emitted by motor vehicles, but is formed when oxides of nitrogen react with sunlight.

Participating Agency – A federal, state, tribal, or local government agency that may have an interest in the project.

Passenger Mile (PM) – A basic unit of productivity defined as one passenger riding one mile.

Passenger Miles Traveled (PMT) – PMT is a measure of passenger demand and trip length. One passenger traveling one mile constitutes one passenger-mile. One passenger riding ten miles = 10 PMT; 50 passengers each riding 100 miles = 5,000 PMT.

Passenger Rail Investment and Improvement Act of 2008 (PRIIA) – PRIIA was enacted in 2008 as Public Law 110-432. PRIIA authorized a high-speed grant program for FY 2009 through FY 2013 to improve intercity passenger rail service, operations and facilities. PRIIA also directed the U.S. Secretary of Transportation to develop a long-range national rail plan that is consistent with approved State rail plans and the rail plans of the nation.

Passing Track – A track adjacent to a main or secondary track used primarily for trains to execute meet or overtake movements.

Peak hour – The hour of the day when traffic volume on a given roadway is highest. A separate peak hour can be defined for morning and evening periods. On a public transportation facility, peak hour usually refers to the most heavily patronized hour of the operating day.

Pervious Surface – Relating to hydrology, a surface through which precipitation can penetrate into the ground, reducing direct runoff or perching (as compared to an impervious surface where no precipitation is able to penetrate into the ground, thereby making it necessary to collect more runoff into drainage systems). Some newer road surfacing mixes are designed to be pervious.

Positive Train Control (PTC) – A system that prevents train accidents due to operator errors. PTC consists of locomotive-borne electronic equipment linked to central office dispatching systems via wireless data networks. If a train operator exceeds his/her movement authority, the train is sent a wireless signal and is automatically stopped.

Prime Farmland – As defined by the USDA, land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses.

Prime Farmland Soil – Soil map units that are designated by the Natural Resources Conservation Service as having the properties needed to produce sustained high yield crops when managed with modern farming techniques.

Protected Stream – A stream or small water body along a stream that has a water quality classification of C(T) (trout supporting waters) or higher and is subjected to the stream protection provisions of the NYSDEC Protection of Waters regulations.

Record of Decision (ROD) – The document, prepared by the Federal Highway Administration or Federal Railroad Administration, that presents the basis for the Federal agency action, summarizes any mitigation measures to be incorporated, and documents any required Section 4(f) approvals. No Federal agency action may be undertaken until a Record of Decision has been signed. A Record of Decision is prepared no sooner than 30 days after the public release of the FEIS.

Revenue Tons – The portion a total vehicle weight represented by the weight of the lading the vehicle is carrying.

Ridership – The number of passengers using a vehicle (e.g., a train) or group of scheduled vehicles (e.g., several trains providing a complete schedule such as the *Empire Service*); may be measured for various units of time: per hour, day, week, month or year, depending on the intended use of the data.

Rolling Stock – The wheeled vehicles, both powered and unpowered, collectively used on a railway, including locomotives, passenger coaches, freight wagons and guard's vans.

Section 106 of the Historic Preservation Act (Section 106) – The National Historic Preservation Act of 1966 (16 U.S.C. 470f), Section 106, requires Federal agencies to take into account the effects of their undertakings on properties included in or eligible for inclusion in the National Register of Historic Places and to afford the Advisory Council on Historic Preservation the opportunity to comment on such undertakings.

Section 4(f) of the U.S. Department of Transportation Act of 1966 (49 U.S.C., Section 303) (Section 4(f)) – Legislation protecting publicly owned parks, public recreation areas, historic properties or wildlife and waterfowl refuges. The statute states that no Department of Transportation project may use land from these areas unless there is demonstrated to be no prudent and feasible alternative to using the land, and the project includes all possible planning to minimize harm resulting from the use.

Section 404 of the U.S. Clean Water Act (Section 404) – The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 401 et seq.) is the enabling legislation for protection of waters of the United States by the Army Corps of Engineers and the U.S. Environmental Protection Agency.

Section 6(f) of the U.S. Land and Water Conservation Fund Act (Section 6(f)) – Legislation that provides for the public purchase and preservation of tracts of land.

Service Road – A roadway, often a minimally graded and improved single lane, providing access to rubber-tired maintenance of way vehicles along a length of otherwise inaccessible railroad line.

Service Yard – A rail terminal facility, usually consisting of system of turnouts (which see) and parallel tracks, as well as driveways placed between the tracks for rubber-tired maintenance vehicles; used to store passenger trains between revenue runs, restock their supplies, and perform cleaning and other light servicing tasks.

Side Platform – A passenger platform located to the outside of the tracks, and normally serving only the track immediately adjacent to the platform.

Siding – A track adjacent to a main or secondary track, for meeting, passing, or storing cars or trains.

Significant Wildlife Habitat – Wildlife habitats, including deer wintering yards, waterfowl and wading bird habitat, seabird nesting habitat, and significant vernal pools, that are protected under 38 M.R.S.A. § 480-B.

Sole Source Aquifer (SSA) – An aquifer designated by EPA as the "sole or principal source" of drinking water for a given aquifer service area; that is, an aquifer that is needed to supply 50% or more of the drinking water for that area and for which there are no reasonably available alternative sources should the aquifer become contaminated.

Stakeholder – All parties with a vested interest in the project. Such parties include the general public, federal and state agencies, Amtrak, CSX, Metro-North Railroad and other railroads, transportation agencies/metropolitan planning organizations, elected officials, corridor municipalities, business and interested non-governmental organizations.

State Environmental Quality Review Act (SEQR) – A project review process that requires the sponsoring or approving governmental body to identify and mitigate the significant environmental impacts of the activity it is proposing or permitting.

State Implementation Plan (SIP) – A plan created under The 1990 Clean Air Act Amendments (CAAA) that establishes emission reduction requirements for ozone and carbon monoxide non-

attainment areas. Proposed projects must demonstrate that the impacts of their emissions are consistent with the appropriate SIP.

Stormwater Pollution Prevention Plan (SWPPP) – A plan required for major construction projects under the EPA's National Pollutant Discharge Elimination System (NPDES) general permit for construction activities. The SWPPP is required to address measures to prevent erosion, sedimentation, and other potential discharges of pollutants to water bodies and wetlands.

Study Area – The area within and surrounding the project corridor that was studied for the purposes of determining project-related impacts to resources resulting from implementing any of the studied alternatives. The study area is centered about the existing or prospective rail line centerlines and varies from 300 feet to ½ mile in width, depending on the resource. The study area follows the existing railroad corridor for the 90 mph and 110 mph alternatives; while for the 125 mph alternative, the prospective railroad corridor follows a markedly different alignment through the Empire Corridor West.

Teragrams of Carbon Dioxide Equivalent – Equivalent to one million metric tons of carbon dioxide equivalent, unit used in greenhouse gas analysis.

Terminal Facility – The station, platforms and associated tracks, and Service Facility (which see) provided at or in the vicinity of the end station on a railroad or other public transportation route.

Threatened Species – Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Tiering – Staged environmental review process applied to the environmental review of complex projects.

Tier 1 EIS – Intent in the Tier 1 EIS is to make corridor-level decisions regarding the level of intercity passenger rail service provided in the corridor and evaluate and identify conceptual alternatives to be further considered in the Tier 2 NEPA document(s).

Tier 2 – The Tier 2 NEPA document(s) would explore in greater detail the component projects of the preferred corridor-level alternatives chosen in Tier 1. Tier 2 would include analysis based on engineering designs, identification of site-specific environmental consequences, and development of site-specific mitigation measures for the preferred alternative.

Tonnage – Weight, as measured in short tons (1 short ton = 2,000 pounds).

Track Centers, Distance Between – Measured distance in feet or meters between the centerlines of two adjacent and parallel railroad tracks.

Train Mile – A consist of a locomotive with or without coupled railroad cars moved together one train mile. A train of one locomotive and five cars moved one mile will generate one train mile, one locomotive mile, five car miles, and six vehicle miles (also see "Car Mile").

Transportation Equity Act for the 21st Century (TEA-21) – The Transportation Equity Act for the 21st Century was enacted June 9, 1998 as Public Law 105-178. TEA-21 authorizes the Federal surface transportation programs for highways, highway safety, and transit (including intercity rail passenger projects) for the 6-year period 1998-2003. The TEA 21 Restoration Act, enacted July 22, 1998, provided technical corrections to the original law.

Transportation Improvement Program (TIP) – A staged multiyear program of transportation projects funded by the Federal Highway Administration and Federal Transit Administration.

Travel Time – The elapsed time for a passenger or a vehicle to move between two defined points; an "origin" and a "destination." May be broken down into sub-units describing portions of a trip, e.g.:

- Trains: Running times between each pair of passenger stations.
- Passengers: Sub-parts of an origin-to-destination trip, e.g.: Origin Access Time (origin to bus stop); Feeder (bus to railroad station); Line Haul (train to destination city); Destination Access (walk or taxi or bus from railroad station to destination).

Turnout – A track switch allowing movement of a railroad train from one track to another.

Undergrade Bridges – With reference to the railroad tracks, undergrade bridges are bridges that carry the referenced tracks over another feature such as a road, water bodies, other railroad tracks, etc.

Unit Train – A railroad freight train of uniform consistency that remains coupled, and that transports a single commodity directly from producer to a specific destination and that, after unloading, returns to the point of origin ready for another load.

United States Army Corps of Engineers (U.S. ACE) – A federal agency that administers Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act; its regulatory programs address wetlands and waterways protection.

United States Department of Agriculture (USDA) – A federal agency responsible for administering programs that address farming issues

United States Environmental Protection Agency (U.S. EPA) – A federal agency responsible for administering programs that address environmental issues.

United States Fish and Wildlife Service (U.S. FWS) – A federal agency responsible for addressing the protection of fish and wildlife including rare, threatened, or endangered species. The USFWS plays an advisory role in the Section 404 regulatory program administered by the U.S. Army Corps of Engineers.

United States Geological Survey (USGS) – A scientific agency of the United States Government tasked with studying the landscape of the United States, its natural resources, and the natural hazards that threaten it. The USGS is a fact-finding research organization with no regulatory responsibility.

Vehicle miles traveled) – The number of vehicle miles of travel (VMT) is an indicator of the travel levels on the roadway system by motor vehicles. VMT is estimated for the given time period. This estimate is based upon traffic volume counts and roadway length.

Vernal pool – A naturally occurring temporary pool of surface water that provides breeding habitat for certain amphibian and invertebrate species.

Volatile Organic Compounds (VOCs) – Colorless gaseous compounds originating, in part, from the evaporation and incomplete combustion of fuels. In the presence of sunlight VOCs react to form ozone, a pollutant regulated by the Clean Air Act Amendments.

Watershed – A region or area that contains all land ultimately draining to a water course, body of water, or aquifer.

Wetland – Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wildlife Management Area (WMA) – Lands owned by New York State under the control and management of the New York State Department of Environmental Conservation's Division of Fish, Wildlife and Marine Resources. These lands have been acquired primarily for the production and

use of wildlife although most WMA's also provide good opportunities for hiking, cross-country skiing, bird watching, or quiet enjoyment of nature.

Wild and Scenic River – A river or river segment, designated by the National Park Service, because of the outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values (16 U.S.C. 1271-1287).

List of Preparers

HNTB, Lead Consultant

Jim Cartin –Senior Project Manager, Public Involvement and Agency Coordination

Bachelors, Industrial Management. Over 40 years of experience in rail passenger, freight and intermodal program development, finance strategies, capital program, railroad negotiations and agency coordination.

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Bachelors, Environmental Science. More than 8 years experience in NEPA documentation, transportation, environmental planning and permitting.

Jillian Mauer, Environmental Scientist –Contaminated and Hazardous Materials

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