7.2 Land Cover

7.2 LAND COVER

7.2.1 Introduction

This chapter provides a brief description of the land cover in the Affected Environment and broader Context Area and identifies the potential conversions as well as acquisitions and/or potential for displacements that would result from the Preferred Alternative. This chapter also includes a review of state and regional plans within the NEC FUTURE Study Area (Study Area) to evaluate the compatibility of the Preferred Alternative with those state and regional efforts.

Land Cover

- Critical in understanding effects on other key resources.
- Identifies acreage of potential acquisitions, which may result in future displacements.
- Types of effects include potential for land cover conversion to a transportation-related land use, or changes to existing land cover that could result in loss or fragmentation of ecological resources; loss of or changes to hydrologic resources; conversion of recreational resources; acquisitions and displacements; and conversion of prime farmlands or timberlands.

Land cover is the observed physical cover on the earth's surface. Land cover was divided into nine categories for the Tier 1 Final Environmental Impact Statement (Tier 1 Final EIS) analysis, and is generally discussed as either developed or undeveloped as described below:

- **Developed** land cover represents constructed materials such as single-family housing units, apartment complexes, and commercial and industrial structures. The categories of developed land include five of the nine land cover categories: Developed, open space; Developed, low intensity; Developed, medium intensity; Developed, high intensity; and Barren Land. Barren Land is included in the developed land cover because it has development potential, and is compatible with transportation use.
- **Undeveloped** land cover represents unbuilt natural areas, which include the following four land cover categories: Open Water, Forest/Shrub, Grassland/Cultivated, and Wetlands.

The land cover analysis identifies the potential number of acres that would be converted to a transportation use, as well as the potential acreages of acquisitions and the potential for displacements that would be required for the Preferred Alternative; however, those displacements would be quantified only as part of a Tier 2 analysis. See Volume 2, Appendix E.02, for more information on the land cover methodology.

7.2.2 Resource Overview

Implementation of the No Action Alternative or Preferred Alternative could result in the conversion or change of an existing land cover type to a different land cover type due to modification of existing rail infrastructure (such as expansion of rail rights-of-way) and/or construction of new rail infrastructure (such as railroad tracks or stations). Within the Study Area, Connecticut and Maryland contain the greatest concentrations of undeveloped land cover. Within the Affected Environment, Connecticut tends to have the largest acreage of the following types of undeveloped land cover: Open Water, Forest/Shrub, and Wetlands; Maryland has the largest acreages of Grassland/Cultivated land cover. This pattern of undeveloped land cover in Connecticut and

Maryland is the same for the Preferred Alternative, primarily where the Representative Route includes new off-corridor segments through undeveloped land cover. (See Section 7.2.3. for full details of land cover within the Affected Environment of the Preferred Alternative.)

For the Preferred Alternative, the majority of land conversions would occur in Maryland and Connecticut. These land conversions are a result of two new segments proposed in the Preferred Alternative. Key findings for the analysis of the No Action Alternative's and Preferred Alternative's effects on land cover are listed below:

- Benefits
  - The goals and objectives identified for the NEC FUTURE program were found to be generally compatible with approximately 50 percent of land use–related planning documents developed by states and metropolitan planning organizations (MPO) identified and reviewed by the FRA for the Study Area in regards to rail transportation, transit-oriented development, and preservation of the built and natural environment.
  - Overall, the Preferred Alternative supports land use–related planning documents for the states and MPOs where the Representative Route of the Preferred Alternative is located.
  - Improvements to the Northeast Corridor (NEC) can influence land development patterns that may limit sprawl by concentrating development around transportation corridors.
- Impacts
  - Land conversions would primarily occur with new off-corridor segments:
    - Maryland and Connecticut would have the highest acreage of land conversions for the Preferred Alternative.
    - When comparing the Preferred Alternative with the Action Alternatives, the Preferred Alternative would have more land conversions than Alternative 2, and less land conversions than Alternative 3.
    - The No Action Alternative primarily comprises improvements on the Existing NEC, thereby minimizing the need for possible land conversions.
  - Land conversions of developed land have the greatest potential to result in acquisitions that result in displacements. For the Preferred Alternative, the greatest conversion of developed land would occur in Connecticut. Of the counties within Connecticut, the greatest conversion of developed land would occur in Fairfield County, associated with the New Rochelle-Greens Farms new segment and improvements to the Existing NEC + Hartford/Springfield Line.
  - Land conversions of undeveloped land have the greatest effect on natural resources. For the Preferred Alternative, the greatest conversion of undeveloped land would occur in Connecticut. Of the counties within Connecticut, the greatest conversion of undeveloped land would occur in New London County, associated with the Old Saybrook-Kenyon new segment and improvements to the Existing NEC + Hartford/Springfield Line.

7.2.3 Affected Environment

Table 7.2-1 shows the number of acres of developed and undeveloped land cover within the Affected Environments of the Existing NEC + Hartford/Springfield Line and the Preferred Alternative. The land cover pattern along the Existing NEC is a mix of developed and undeveloped lands. Developed lands are located within major metropolitan areas such as Washington, D.C., Philadelphia, PA, New York City, NY, and Boston, MA. Developed land also typically occurs near major transportation corridors and facilities connecting these major metropolitan areas. Developed land characteristics along the Existing NEC + Hartford/Springfield Line support densely populated areas with varying degrees of development densities. Characteristics of undeveloped land along the Existing NEC + Hartford/Springfield Line are typical of rural areas and include agricultural lands, low-density housing, and natural areas such as parks, forested land, and water bodies. This land cover pattern is consistent for the Preferred Alternative. Large concentrations of undeveloped land occur in the more rural areas associated with the Preferred Alternative where the Representative Route includes a new right-of-way off the Existing NEC + Hartford/Springfield Line.

Table 7.2-1: Affected Environment: Land Cover

Geography	Land Cover	Existing NEC + Hartford/Springfield Line (Acres)	Preferred Alternative (Acres)
D.C.	Developed	1,300	1,300
	Undeveloped	175	175
MD	Developed	17,190	23,095
	Undeveloped	11,495	17,365
DE	Developed	5,485	6,560
	Undeveloped	1,895	2,330
PA	Developed	13,945	14,275
	Undeveloped	1,580	1,770
NJ	Developed	13,905	14,810
	Undeveloped	4,600	4,830
NY	Developed	8,735	9,985
	Undeveloped	885	1,030
CT	Developed	36,340	42,810
	Undeveloped	17,510	22,920
RI	Developed	8,795	9,425
	Undeveloped	7,240	8,835
MA	Developed	8,925	8,920
	Undeveloped	5,270	5,270
TOTAL		**165,085**	**195,715**

Source: NEC FUTURE team, 2016

7.2.3.1 Existing NEC + Hartford/Springfield Line

Of the states within the Affected Environment of the Existing NEC + Hartford/Springfield Line, Connecticut contains the most acreage of both developed and undeveloped land cover. Forest/Shrub land cover is the most prominent undeveloped land cover in Connecticut.

7.2.3.2 Preferred Alternative

For the Preferred Alternative, Connecticut contains the most acreage of both developed and undeveloped land cover, and Forest/Shrub land cover is the most prominent undeveloped land cover. Within Connecticut, New London County includes the most undeveloped land covers. The Preferred Alternative includes more acres of both developed and undeveloped land cover in New London County due to the Affected Environment of the Old Saybrook-Kenyon new segment.

7.2.4 Environmental Consequences

7.2.4.1 Potential Conversions

Table 7.2-2 shows the potential number of acres of developed and undeveloped land cover by state and for Washington, D.C., that would be converted within the Representative Route of the Preferred Alternative. Potential conversions of Forest/Shrub and Wetlands land cover, identified as undeveloped land cover, include Prime Timberland and Prime Farmland soils, as well as environmentally sensitive aquatic and terrestrial habitats. Conversion of these land cover types would potentially result in deforestation, loss of natural areas/habitat or fragmentation of habitat, dredge and fill of Wetlands, and conversion of agricultural lands to nonagricultural uses. The Preferred Alternative is most compatible with developed land cover, which is inclusive of existing transportation use, such as rail tracks, highways, and other transportation infrastructure. Therefore, within areas of existing transportation use, there would be minimal potential for conversion of developed land cover within the Representative Route. The addition of rail service to areas that are not served by rail or that may have limited service today may induce change and influence land development patterns adjacent to the rail and at new station areas.

Table 7.2-2: Environmental Consequences: Representative Route – Potential Conversions of Developed and Undeveloped Land Cover

Geography	Land Cover	Existing NEC + Hartford/Springfield Line (Acres)	Preferred Alternative (Acres)
D.C.	Developed	75	75
	Undeveloped	0	0
MD	Developed	1,285	2,365
	Undeveloped	260	730
DE	Developed	385	775
	Undeveloped	35	120
PA	Developed	855	835
	Undeveloped	10	20
NJ	Developed	910	1,270
	Undeveloped	100	125
NY	Developed	440	660
	Undeveloped	30	30
CT	Developed	2,275	2,750
	Undeveloped	755	880
RI	Developed	540	585
	Undeveloped	345	515

Table 7.2-2: Environmental Consequences: Representative Route – Potential Conversions of Developed and Undeveloped Land Cover (continued)

Geography	Land Cover	Existing NEC + Hartford/Springfield Line (Acres)	Preferred Alternative (Acres)
MA	Developed	515	540
	Undeveloped	260	285
TOTAL		**9,080**	**12,565**

Source: NEC FUTURE team, 2016
* The Preferred Alternative assumes improvements to the Existing NEC + Hartford/Springfield Line; therefore, the acres of Potential Conversion presented for the Preferred Alternative include the improvements to the Existing NEC + Hartford/Springfield Line and any off-corridor routes associated with the Preferred Alternative.

Elements South of New York City

- **Maryland/Delaware – Bayview to Newport (new segment) –** The Preferred Alternative would include potential conversions of developed and undeveloped land covers in Baltimore, Hartford, and Cecil Counties, MD, and New Castle County, DE. Most of the potential conversions of undeveloped land cover would occur in Cecil County and would include Forest/Shrub, Grassland/Cultivated, and Wetlands between Furnace Bay Golf Course and the community of Elk Mills north of the Pulaski Highway. In these locations, the Representative Route includes new two-track segment adjacent to U.S. Route 40 before continuing north at-grade, on embankment, or aerial structure near I-95, crossing into New Castle County, DE, near State Route 2 (S.R. 2). Many of the potential conversions of developed land cover associated with the Representative Route would occur adjacent to existing freight rail and highway transportation corridors. As such, there would be minimal potential for conversion of developed land cover to a transportation use.
- **Delaware – Wilmington Segment (bypasses Wilmington Station) –** The Preferred Alternative would include potential conversions of developed and undeveloped land covers in New Castle County. Most of the potential conversions of undeveloped land cover in New Castle County would include wetlands south of the Existing NEC along the Christina River, where the new two-track segment shifts south of the Existing NEC and east of I-95 at-grade and on an embankment adjacent to existing freight corridor, and adjacent to I-495, reconnecting with the Existing NEC near Fox Point State Park in Edgemoor. Many of the potential conversions of developed land cover would occur adjacent to existing freight rail and highway transportation corridors. As such, there would be minimal potential for conversion of developed land cover to a transportation use in these locations.
- **Pennsylvania – Philadelphia Segments (new segments) –** The Preferred Alternative would include potential conversions of developed and undeveloped land covers in Delaware and Philadelphia Counties in Pennsylvania. Most of the potential conversions of undeveloped land cover would occur in Philadelphia County and would include wetlands adjacent to S.R. 291 and CSX's Chester Secondary Line, along the John Heinz National Wildlife Refuge. However, an aerial structure is proposed in this area and would minimize land cover conversions along the John Heinz National Wildlife Refuge.

- **New Jersey – New Brunswick to Secaucus (new segment) –** The Preferred Alternative would include potential conversions of developed and undeveloped land covers in Middlesex, Union, Essex, and Hudson Counties in New Jersey. Most of the potential conversions of undeveloped land cover would occur in Middlesex County and would include Forest/Shrub land covers adjacent to Merrill County Park and Colonia Country Club adjacent to the Existing NEC. Most of the potential conversions of developed land cover would occur adjacent to the Existing NEC or adjacent to existing freight rail; therefore, there would be minimal potential for conversion of land cover.
- **New Jersey – Secaucus/Bergen loop (new segment) –** The Preferred Alternative would include potential conversions of developed and undeveloped land covers in Hudson County. Most of the potential conversions of undeveloped land cover associated with this new segment would include Wetlands along the Hackensack River in close proximity to the Existing NEC where the Representative Route includes new tracks at-grade and on an embankment.

Elements North of New York City

- **New York/Connecticut – New Rochelle to Greens Farms (new segment) –** The Preferred Alternative would include potential conversions of developed and undeveloped land covers in Westchester County, NY, and Fairfield County, CT. Most of the potential conversions of undeveloped land cover would occur in Fairfield County and would include Forest/Shrub adjacent to the Existing NEC and along I-95 through the cities of Greenwich, Stamford, and Norwalk, CT.
- **Connecticut/Rhode Island – Old Saybrook-Kenyon (new segment) –** The Preferred Alternative would include potential conversions of developed and undeveloped land covers in Middlesex and New London Counties, CT, and Washington County, RI. Most of the potential conversions of undeveloped land cover would occur in New London County and would include Forest/Shrub adjacent to I-95 across the Thames River in New London through Groton and Stonington where the Representative Route includes embankment and aerial structure.
- **Connecticut/Massachusetts – Hartford/Springfield Line (upgraded track/electrification) –** The Preferred Alternative would include potential conversions of developed and undeveloped land covers in New Haven and Hartford Counties, CT, and Hampden County, MA. Most of the potential conversions of undeveloped land cover would occur in Hartford County and would include Forest/Shrub land covers adjacent to the existing Hartford/Springfield Line.

7.2.4.2 Acquisitions and Displacements

Table 7.2-3 shows the potential acquisitions by land cover type for the Preferred Alternative. Potential displacements have not been individually identified and are not quantified for this Tier 1 Final EIS. The FRA calculated potential acquisitions for the Preferred Alternative using the same method as described in Volume 2, Chapter 7.2.

Table 7.2-3: Environmental Consequences: Preferred Alternative – Representative Route – Potential Acquisitions of Land Cover

Geography	Land Cover	Acres
D.C.	Developed	0
	Undeveloped	0
MD	Developed	1,075
	Undeveloped	480
DE	Developed	240
	Undeveloped	75
PA	Developed	55
	Undeveloped	5
NJ	Developed	335
	Undeveloped	30
NY	Developed	180
	Undeveloped	20
CT	Developed	585
	Undeveloped	270
RI	Developed	50
	Undeveloped	150
MA	Developed	10
	Undeveloped	5
	TOTAL	**3,570**

Source: NEC FUTURE team, 2016

* The Preferred Alternative assumes improvements to the Existing NEC + Hartford/Springfield Line; therefore, the data presented include the Environmental Consequences inclusive of improvements to the Existing NEC + Hartford/Springfield Line and any new route option or off-corridor route associated with the Preferred Alternative.

Elements South of New York City

- **Maryland/Delaware – Bayview to Newport (new segment):** The Preferred Alternative would include potential acquisitions of developed and undeveloped land covers in Baltimore, Hartford, and Cecil Counties, MD, and New Castle County, DE. Most of the potential acquisitions would occur in Cecil County where the Representative Route includes new two-track segment adjacent to U.S. Route 40 before continuing north at-grade, on embankment, or aerial structure near I-95, crossing into New Castle County, DE, near S.R. 2. Many of the potential acquisitions would occur adjacent to existing freight rail and highway transportation corridors.
- **Delaware – Wilmington Segment (bypasses Wilmington Station):** The Preferred Alternative would include potential acquisitions of developed and undeveloped land covers in New Castle County. The most potential for acquisition would include developed land covers, where the new two-track segment shifts south of the Existing NEC and east of I-95 adjacent to existing freight corridor, and adjacent to I-495, reconnecting with the Existing NEC near Fox Point State Park in Edgemoor. Many of the potential acquisitions would occur adjacent to existing freight rail and highway transportation corridors.
- **Pennsylvania – Philadelphia Airport (new segment):** The Preferred Alternative would include potential acquisitions of developed and undeveloped land covers in Delaware and Philadelphia Counties. Most of the potential acquisitions would occur in Philadelphia County and would

include mostly developed land covers where the new two-track segment provides direct service to Philadelphia International Airport in a tunnel, continuing adjacent to existing freight rail, and reconnecting with the Existing NEC near the Schuylkill River and the University City section of Philadelphia.

- **New Jersey – New Brunswick to Secaucus (new segment):** The Preferred Alternative would include potential acquisitions of developed and undeveloped land covers in Middlesex, Union, Essex, and Hudson Counties, NJ. Most of the potential acquisitions would occur in Middlesex County and would include primarily developed land covers where the Representative Route is adjacent to the Existing NEC in short tunnel segments near Metuchen.
- **New Jersey – Secaucus/Bergen loop (new segment):** The Preferred Alternative would include potential acquisitions of developed and undeveloped land covers in Hudson County. Most of the potential acquisitions would include developed land covers along the Hackensack River in close proximity to the Existing NEC.

Elements North of New York City

- **New York/Connecticut – New Rochelle to Greens Farms (new segment):** The Preferred Alternative would include potential acquisition of developed and undeveloped land covers in Westchester County, NY, and Fairfield County, CT. Most of the potential acquisitions would occur in Fairfield County and would include primarily developed land covers where the Representative Route includes new two-track segments adjacent to the Existing NEC and along I-95 through Greenwich, Stamford, and Norwalk, CT. Many of the potential acquisitions would occur adjacent to existing highway transportation corridors.
- **Connecticut/Rhode Island – Old Saybrook-Kenyon (new segment):** The Preferred Alternative would include potential acquisitions of developed and undeveloped land covers in Middlesex and New London Counties in CT, and Washington County, RI. Most potential acquisitions would occur in New London County and would include developed and undeveloped land covers in close proximity to I-95 across the Thames River in New London through Groton and Stonington, CT.
- **Connecticut/Massachusetts – Hartford/Springfield Line (upgraded track/electrification):** The Preferred Alternative would not include potential acquisitions associated with this improvement because the Representative Route coincides with the Existing NEC right-of-way, and there would be minimal potential for acquisitions or displacements within that right-of-way.

7.2.5 Stations

The Preferred Alternative includes continued service to existing stations along the NEC, modifications to existing stations, which may require an increase in the station footprint, and new stations (Table 7.2-4). This table includes new stations and those stations that may require an increase in the station footprint. Furthermore, this table only identifies those stations that could result in changes in undeveloped land cover. As such, not all stations are included Table 7.2-4, such as Washington Union Station, which would be expanded consistent with the Washington Union Master Plan in the Preferred Alternative, but would not modify the station footprint. Chapter 4,

Preferred Alternative, includes a list of all modified or new stations that would be served in the Preferred Alternative.

Table 7.2-4: Environmental Consequences: Preferred Alternative – Modified or New Stations – Potential Conversions of Undeveloped Land Cover

State	County	Station ID	Station Type	Station Name
MD	Anne Arundel	5	Modified	Odenton
	Baltimore City	13	New	Bayview
NJ	Middlesex	62	New	North Brunswick
	Hudson	76	Modified	Secaucus
NY	Bronx	81	New	Co-op City
CT	Fairfield	101	Modified	Greens Farms
	New Haven	189	New	Orange
	New London	124		Mystic / New London H.S.
Hartford/Springfield Line				
CT	New Haven	157	New	North Haven
	Hartford	161		Newington
		187		Enfield

Source: NEC FUTURE team, 2016

There is no potential for conversion of land cover, or acquisition of private or public land at existing stations where no modifications would occur. Potential for land cover conversion or acquisition of private or public land would be minimal at stations where modifications are proposed and there is an increase in the station footprint. The potential for conversion of land cover and acquisition of public or private property is associated with areas where new stations are proposed. Station areas considered for potential conversions and acquisitions could result in future displacements. The numbers of acres of potential acquisition and displacement at station areas are not quantified at this time because part of the station areas are included within the Representative Route and are included in Table 7.2-3. (Appendix EE.02 contains a complete list of all land cover within station footprints by state and county.)

7.2.6 Context Area

For the Preferred Alternative, the Context Area consists of higher percentages of undeveloped land cover than the Affected Environment. This indicates that should the Representative Route shift, there would be a potential to affect a greater share of undeveloped land cover, which could be incompatible with transportation uses and result in more land cover conversions, acquisitions, and displacements.

7.2.7 State and Regional Plan Analysis

The FRA reviewed the existing goals and objectives of land use–related planning documents developed by the states and MPOs within the Study Area to identify compatibility of the Preferred Alternative with these plans. The FRA reviewed planning documents that were current as of 2014; however, the FRA recognizes that planning documents have been updated and approved since that time. As described in Section 7.2.10, subsequent Tier 2 project studies will identify and evaluate compatibility with recent state, regional, MPO, and local planning documents. Planning documents

related to specific transportation modes, such as statewide rail or highway plans were not considered in this analysis since they were considered in the development of the Initial, Preliminary, and Action Alternatives.

Consistent with the NEC FUTURE goals (as identified in Volume 2, Chapter 3) related to passenger rail improvements, environmental sustainability, and economic growth, the FRA identified three land cover–related goals and objectives: improved passenger rail transportation, transit-oriented development, and preservation of the built and natural environment.

For each state and MPO planning document, the FRA determined if the Preferred Alternative supports the stated goals and objectives related to improved passenger rail transportation, transit-oriented development, and preservation of the built and natural environment by qualitatively considering the potential for conversion and acquisition of land cover by the Preferred Alternative.

7.2.7.1 Improved Passenger Rail Transportation

Goals and objectives of state and regional plans within the Study Area that relate to improved passenger rail transportation include those that seek to expand transportation systems that reduce reliance on automobiles; improve passenger rail infrastructure, including stations and vehicles; improve performance and operation of passenger rail; increase accessibility to passenger rail; and expand or improve passenger rail services.

Most, though not all, of the goals and objectives of planning documents considered promote a variety of passenger rail improvements. The state and MPO plans considered overwhelmingly support expanding transportation systems that reduce reliance on automobiles; improving passenger rail infrastructure, including stations and vehicles; improving performance and operation of passenger rail; increasing accessibility to passenger rail; and expanding or improving passenger rail services.

Consistent with the NEC FUTURE Purpose and Need, the Preferred Alternative supports these goals and objectives. The Preferred Alternative improves the Existing NEC + Hartford/Springfield Line and incorporates new segments that, together, expand capacity to grow the role of rail and have the greatest potential for operational benefit. The Preferred Alternative brings the Existing NEC + Hartford/Springfield Line to a state of good repair; maximizes its capacity through alleviation of chokepoints, addition of new tracks and segments at targeted locations; implements service operational efficiencies; removes speed restrictions; reduces trip times; offers frequent metropolitan and enhanced Intercity-Express services; and allows substantial growth for all regional rail markets.

With the Preferred Alternative, the markets served by the Existing NEC + Hartford/Springfield Line expand to include more one-seat ride destinations, new and improved rail-airport connections, fully integrated service to Hartford/Springfield, and increased service to connecting corridors, such as to Richmond, VA, and Harrisburg, PA. The number of trains to NEC markets increases to reasonably accommodate projected future ridership in those areas of the NEC with the greatest demand. The Preferred Alternative includes sufficient capacity to encourage more coordinated and integrated

operations across the NEC. Operational efficiencies include better use of scheduled slots for trains and coordinated transfers between different services and operators.

Washington, D.C., to New York City

Nearly all of the land use–related planning documents from states and MPOs in Washington, D.C., Maryland, Delaware, New Jersey, and New York include goals or objectives related to improved passenger rail transportation. Only the statewide land use–related planning documents in Delaware and New Jersey do specifically identify goals or objectives related to improved passenger rail transportation beyond promoting other transportation options. All planning documents from MPOs include goals or objectives related to improved passenger rail transportation. Generally, the goals or objectives seek to expand transportation systems that reduce reliance on automobiles, improve rail connectivity, eliminate gaps in service, increase accessibility, and provide service for future demand.

The Preferred Alternative supports these goals and objectives. Between Washington, D.C., and New York City, the Preferred Alternative expands the Existing NEC + Hartford/Springfield Line with targeted new two-track infrastructure in close proximity to the Existing NEC + Hartford/Springfield Line to avoid speed and environmental constraints in northern Maryland and Delaware, near Philadelphia, and in New York City. In the New York City area, the improvements facilitate Regional rail through-service between New Jersey and Long Island/Westchester and preserve the future option of adding Intercity service through-service to Long Island.

Connecticut, Rhode Island, Massachusetts

Most, but not all, of the land use–related planning documents from states and MPOs in Connecticut, Rhode Island, and Massachusetts include goals or objectives related to improved passenger rail transportation. The Connecticut State Plan of Conservation and Development does not identify specific goals or objectives related to improved passenger rail transportation; however, it does identify growth management principals to concentrate development around major transportation corridors to support transportation options. The land use–related planning documents from MPOs that do not include specific goals or objectives related to improved passenger rail transportation are not located within the area of the Preferred Alternative's Representative Route. As such, all MPOs that do include the Representative Route of the Preferred Alternative identify relevant goals or objectives.

Generally, the goals or objectives seek to maintain and improve existing passenger rail services, provide multimodal transportation network with improved intermodal connections, preserve existing rail right-of-way for future service, and improve passenger rail operations. Some goals and objectives, including those from the Capitol Region Council of Governments and the Central Connecticut Regional Planning Agency, include goals or objectives to improve service on the Hartford/Springfield Line.

The Preferred Alternative supports these goals and objectives. Between New York City and New Haven, the Preferred Alternative strengthens the Existing NEC + Hartford/Springfield Line with new segments close to the Existing NEC + Hartford/Springfield Line that allow for expansion of both

Intercity and Regional rail service levels and reduce trip time. Between New Haven and Boston, the Preferred Alternative includes upgrade of the Existing NEC shoreline route with a supplemental new segment between Old Saybrook, CT, and Kenyon, RI, and enhanced electrified service along the Hartford/Springfield Line to Hartford, CT, and Springfield, MA, to strengthen service to Central New England.

7.2.7.2 Transit-Oriented Development

Transit-oriented development goals and objectives of state and regional plans within the Study Area are those that place an increased emphasis on passenger rail and transit-supportive land-use decisions; access to existing passenger rail and transit stations; intermodal connections; high-density station area development; and reducing development pressure on important ecological, natural, rural, and open spaces.

Many of the goals and objectives of planning documents considered specifically endorse a variety of transit-oriented development features. The state and MPO plans considered overall seek to develop established neighborhoods with infill development, improve pedestrian access to existing transportation infrastructure, promote multimodal transportation centers, and develop mixed-use communities that can capture future population and employment growth. Several planning documents specifically endorse smart growth strategies like transit-oriented development in the goals or objectives.

The Preferred Alternative includes improvements at existing stations and the development of new stations. This creates intermodal connections by concentrating improvements on urban hub stations well served by transit and by creating convenient airport services with frequent Intercity and regional service. Table 7.2-4 includes a list of all new stations and modifications to existing stations, which may require an increase in the station footprint. Where existing stations are improved in the Preferred Alternative, they increase the number of modal options and rail services clustered at their locations. As such, there is greater potential for station area development in support of transit-oriented development.

The Preferred Alternative supports these transit-oriented development goals and objectives by strengthening urban centers and supporting communities along the Existing NEC + Hartford/Springfield Line with more-frequent, convenient passenger rail service to more places that will be used by more travelers. The Preferred Alternative continues to serve major existing terminals as Hubs and Major Hubs for all passenger rail services, and coordinates schedules to allow for timed transfers at major existing terminals.

Washington, D.C., to New York City

Nearly all of the land use–related planning documents from states and MPOs in Washington, D.C., Maryland, Delaware, New Jersey, and New York include goals or objectives related to transit-oriented development. The Wilmington Metropolitan Area Planning Council 2040 Regional Transportation Plan Update does not identify specific goals or objectives related to transit-oriented development. However, it does identify supporting existing municipalities and communities with greater transportation opportunities and choices, which is relevant to the principals of transit-

oriented development. The land use–related planning documents from MPOs that do not include specific transit-oriented development goals also do not include the Representative Route of the Preferred Alternative. As such, all MPOs that do include the Representative Route of the Preferred Alternative identify relevant goals or objectives.

Overall these plans seek to emphasize transit's role in established neighborhoods; develop transit-oriented and mixed-use communities; enhance established communities; invest in transportation systems that support land use; and develop higher-density land uses where transportation service exists or is feasible in the future.

The Preferred Alternative supports these goals and objectives by focusing improvements to existing stations and developing new Local, Hub, and Major Hub stations along the Existing NEC + Hartford/Springfield Line. Between Washington, D.C., and New York City, the Preferred Alternative increases service to existing stations along the Existing NEC + Hartford/Springfield Line, and at new Local, Hub, and Major Hub stations. These station improvements mostly occur in Baltimore City, Harford, and Cecil Counties in Maryland, and in New York, Bronx, and Westchester Counties in New York. In addition, connecting corridors at Washington, D.C., Philadelphia, and New York extend the passenger rail network and support communities with a greater range of transportation options focused at Washington Union Station, Philadelphia 30th Street Station, and Penn Station New York, respectively.

Connecticut, Rhode Island, Massachusetts

Just over half of the planning documents from states and MPOs in Connecticut, Rhode Island, and Massachusetts include goals or objectives related to transit-oriented development. The Lower Connecticut River Valley Council of Governments (Connecticut River Estuary Regional Planning Agency and Midstate Regional Planning Agency) planning documents did not identify goals or objectives related to transit-oriented development. However, all other MPOs that are located in the area that include the Representative Route of the Preferred Alternative identified goals or objectives related to transit-oriented development. Overall, these plans promote concentrating development around transportation nodes and corridors, residential construction that provides transportation options, and developing in a manner that follows the principals of smart growth and transit-oriented development.

The Preferred Alternative supports these goals and objectives by focusing improvements to existing stations and developing new Local, Hub, and Major Hub stations along the Existing NEC + Hartford/Springfield Line. In Connecticut, Rhode Island, and Massachusetts, the Preferred Alternative increases service to existing stations along the Existing NEC + Hartford/Springfield Line, and new Local, Hub, and Major Hub stations. These station improvements occur mostly in Fairfield, New London, New Haven, and Hartford Counties in Connecticut. In addition, the Hartford/Springfield Line extends the passenger rail network and supports communities with a greater range of transportation options focused at Springfield Union Station.

7.2.7.3 Preservation of the Built and Natural Environment

Preservation of the built and natural environment goals and objectives are those that promote preservation of historic and cultural properties, preservation of open space and green spaces, and protection and enhancement of environmental resources (ecological resources, air quality, water quality, etc.).

The Preferred Alternative supports these goals and objectives related to the preservation of the built and natural environment by providing improvements focused on the Existing NEC + Hartford/Springfield Line and at existing stations that result in greater capacity and maximizes capacity through alleviation of chokepoints, addition of new tracks and segments at targeted locations, and implementation of service operational efficiencies. However, the Preferred Alternative may be less supportive of these goals and objectives where the Preferred Alternative includes new segments off the Existing NEC + Hartford/Springfield Line that would potentially affect cultural and historic resources, parklands resources, or undeveloped land covers. Overall, the preservation of the built and natural environment goals and objectives are locally focused on undeveloped land cover or natural and historic resources. As such, this section considers how the Preferred Alternative supports the preservation of the built and natural environment goals and objectives by state to focus on the footprint-based impacts of the Representative Route of the Preferred Alternative.

Washington, D.C.

All planning documents identified goals or objectives related to preservation of the built or natural environment. The goals and objectives of planning documents seek to preserve and protect the unique historic and cultural resources found throughout Washington, D.C.; meet or exceed air, water, and land quality standards; and protect sensitive environmental, cultural, and historic locations from negative development impacts. The Preferred Alternative supports these goals and objectives by locating improvements along the Existing NEC + Hartford/Springfield Line and within the existing Union Station.

Maryland

All planning documents identified goals or objectives related to preservation of the built or natural environment. Overall, the documents' goals or objectives seek to preserve and protect environmentally sensitive and rural areas, wetlands and waterbodies; historic and cultural resources; open space; green space; and wildlife preserves.

The Preferred Alternative supports these goals and objectives in Prince George's and Anne Arundel Counties, where improvements are focused along the exiting NEC and at existing stations. Where the Representative Route includes new two-track infrastructure beginning in Bayview through Baltimore, Harford, and Cecil Counties, several parks would be affected where there are potential land conversion, acquisition, visual, and noise impacts.

Delaware

All planning documents identified goals or objectives related to preservation of the built or natural environment. Generally, these documents include goals and objectives that promote resource

protections that preserve open space, farmland, rural landscape, natural, historic, and cultural resources. The Metropolitan Transportation Plan: 2040 Update from the Dover/Kent County MPO includes goals and objectives that specifically endorse managing the existing transportation systems to protect and preserve the built and natural environment.

Where the Representative Route of the Preferred Alternative includes new two-track infrastructure in New Castle County near Wilmington, there is potential for conversion and acquisition of wetlands south of the Existing NEC + Hartford/Springfield Line along the Christina River adjacent to existing freight corridor, and adjacent to I-495. There is minimal potential for conversion or acquisition because the new track is adjacent to existing transportation corridors. Therefore, the Preferred Alternative supports the goals and objectives related to preservation of the built and natural environment.

Pennsylvania

Most, but not all of the planning documents in Pennsylvania include goals or objectives related to preservation of the built or natural environment. However, the planning documents from MPOs that include Delaware, Philadelphia, and Bucks Counties (where the Representative Route of the Preferred Alternative is located), all incorporate goals and objectives relevant to the preservation of the built and natural environment. The planning documents that contain goals and objectives related to the preservation of the built or natural environment seek to protect and preserve historic and cultural resources, agricultural and rural landscapes, and water resources.

The Preferred Alternative supports these goals and objectives in Buck's County where improvements are focused along the Existing NEC + Hartford/Springfield Line and at existing stations. Where the Representative Route of the Preferred Alternative includes new two-track infrastructure near Eddystone in Delaware County through Philadelphia County, several parks would be affected where there are potential land conversion, acquisition, visual, and noise impacts. There are potential visual impacts to the John Bartram House—a National Historic Landmark in Philadelphia County—where the Representative Route includes new two-track infrastructure adjacent to existing SEPTA and freight rail corridors. As such, the Preferred Alternative is less supportive of goals and objectives related to preservation of the built and natural environment in Delaware and Philadelphia Counties. However, because many of the improvements, including construction of new rail infrastructure, in Delaware and Philadelphia Counties would occur adjacent to existing transportation corridors, there is minimal potential for the loss of built or natural environmental resources.

New Jersey

All planning documents identified goals or objectives related to the preservation of the built or natural environment. Generally, these documents include goals or objectives that seek to preserve and protect areas with cultural, historic, scenic, and recreational resources; improve water quality; and locate infrastructure improvements to preserve and enhance built and natural environmental resources. The Preferred Alternative supports these goals and objectives by locating improvements along the Existing NEC + Hartford/Springfield Line and within the existing stations through Mercer, Middlesex, Union, and Essex Counties.

In Hudson County, where the Representative Route includes new two-track infrastructure associated with the Bergen Loop near the Secaucus rail station and NJ TRANSIT's Main Line, there is potential for conversion or acquisition of wetlands adjacent to the Hackensack River. However, there is minimal potential for conversion or acquisition because the improvements are focused within the existing NJ TRANSIT transportation corridor. As such, the Preferred Alternative supports the goals and objectives related to the preservation of the built and natural environment in New Jersey.

New York

All planning documents identified goals or objectives related to the preservation of the built or natural environment. The plans promote preservation and protection of the natural environment, such as open space and wetlands. Many of the plans support transportation projects that enhance the built and natural environment by considering the impacts to environmental and cultural resources.

Overall, the Preferred Alternative supports these goals and objectives by focusing improvements along the Existing NEC + Hartford/Springfield Line and existing commuter rail transportation corridors. Where the Representative Route of the Preferred Alternative shifts approximately 300 feet from the Existing NEC + Hartford/Springfield Line in Bronx County, there would be potential conversion and acquisition impacts to undeveloped land. Station improvements are focused at either existing stations or at planned stations, such as Hunts Point, Parkchester, Morris Park, and Co-op City stations, which are planned consistent with the Penn Station Access project (see Volume 2, Appendix B.1, Related Projects List).

Connecticut

Most planning documents in Connecticut identified goals or objectives related to the preservation of the built or natural environment. However, all MPOs and the State Office of Policy and Management identify goals and objectives related to the preservation of the built or natural environment.

The Preferred Alternative supports these goals and objectives in New Haven, Middlesex, and Hartford Counties, where the Representative Route is focused along the Existing NEC + Hartford/Springfield Line. Where the Representative Route includes new two-track infrastructure through coastal Fairfield County, parallel to I-95, to west of Greens Farms rail station, several parks would be affected where there are potential land conversion, acquisition, visual, and noise impacts. Where the Representative Route of the Preferred Alternative includes new two-track infrastructure through New London County crossing the Connecticut River in tunnel under Old Saybrook and Old Lyme and continuing into Rhode Island, several parks would be affected where there are potential land conversion, acquisition, visual, and noise impacts. The Preferred Alternative is less supportive of the goals and objectives related to the preservation of the built or natural environment in Fairfield and New London Counties.

Rhode Island

All planning documents in Rhode Island identify goals or objectives related to the preservation of the built or natural environment. These planning documents include goals or objectives that seek to protect environmental resources, critical natural resources, and shoreline areas, as well as improve air quality. The Rhode Island Long Range Transportation Plan specifically promotes protecting and enhancing the state's environmental resources through well-designed transportation projects.

Overall, the Preferred Alternative supports these goals and objectives by focusing rail improvements along the Existing NEC + Hartford/Springfield Line. Where the Representative Route includes new two-track infrastructure from New London County, CT, into Washington County, RI, several parks would be affected where there are potential land conversion, acquisition, visual, and noise impacts. Station improvements are focused at either existing stations or at planned stations, such as Pawtucket Station, which is planned consistent with the Rhode Island Department of Transportation station improvements for a new regional rail station at Pawtucket/Central Falls (see Volume 2, Appendix B.1, Related Projects List).

Massachusetts

Planning documents from MPOs in Massachusetts include goals or objectives overwhelmingly related to the preservation of the built and natural environment. Only one MPO planning document, which covers Worcester County, does not identify specific goals or objectives related to preservation. However, this county does not contain the Representative Route of the Preferred Alternative. Overall, the planning documents in Massachusetts seek to encourage redevelopment to preserve environmental, natural, and historic resources; protect cultural, open space, farmland, and water resources; limit fragmentation and development of undeveloped land; and improve air and water quality. The Boston Region MPO, Southeastern Regional Planning and Economic Development District, and Northern Middlesex Council of Governments, and other MPOs specifically include using transportation systems to support and enhance these preservation goals and objectives.

Overall, the Preferred Alternative supports these goals and objectives by focusing improvements along the Existing NEC + Hartford/Springfield Line at existing and planned stations. Where the Representative Route includes new two-track infrastructure beginning near Canton Junction Rail Station in Norfolk County, there are potential land conversion and acquisition impacts to undeveloped land covers.

7.2.8 Comparison to the Action Alternatives

Overall, the Preferred Alternative has more acres of potential conversion of land cover than Alternative 2 and less than Alternative 3. However, the Preferred Alternative has fewer acres of potential acquisition than Alternative 2.

Potential Conversion

Between Washington, D.C., and New York City, the Preferred Alternative has more acres of potential conversion of land cover than Alternative 2. This is primarily due to the new two-track infrastructure, associated with Alternative 3, beginning in the Bayview section of Baltimore City,

MD, and continuing through Harford and Cecil Counties to New Castle County, DE, west of Wilmington. The Representative Route of the Preferred Alternative in this location, similar to Alternative 3, goes off the Existing NEC + Hartford/Springfield Line on a new right-of-way, and has the potential for conversion of land cover. As such, potential conversions of developed and undeveloped land cover are greater in Maryland compared to Alternative 2.

North of New York City, the Preferred Alternative has fewer acres of potential conversion of land cover than Alternative 2. This difference is primarily due to the Preferred Alternative not including the New Haven-Hartford-Providence segment associated with Alternative 2, and less potential for land conversion with the Preferred Alternative elements of the Hartford/Springfield Line and the Old Saybrook-Kenyon segment in Connecticut. The New Haven-Hartford-Providence segment of Alternative 2 includes many acres of conversion in Hartford, Tolland, and Windham Counties, CT. However, the Preferred Alternative includes new two-track infrastructure (as associated with Alternative 1) through New London County, crosses the Connecticut River in tunnel under Old Saybrook and Old Lyme, CT, and continues into Rhode Island. This representative route has greater potential for conversion of land cover in New Haven, Middlesex, and New London Counties, CT, than Alternative 2. On a statewide basis, however, the Preferred Alternative has fewer overall acres of potential conversion of undeveloped land cover in Connecticut as compared to Alternative 2.

Potential Acquisitions

Between Washington, D.C., and New York City, the Preferred Alternative has more acres of potential acquisition of land cover than Alternative 2 because of the new two-track infrastructure associated with Alternative 3 from Bayview to west of Wilmington, DE.

North of New York City, the Preferred Alternative has fewer acres of potential acquisition of land cover than Alternative 2 because the New Haven-Hartford-Providence segment is not included. For the Preferred Alternative, there are potential acquisitions in Connecticut because of the Old Saybrook-Kenyon new segment through New Haven, Middlesex, and New London Counties. The Hartford/Springfield Line includes no potential for acquisition because it is an existing passenger rail line similar to the Existing NEC + Hartford/Springfield Line.

7.2.9 Potential Mitigation Strategies

Potential mitigation measures for land cover conversions should include providing buffers or screening between new transportation uses and nearby land cover that may be sensitive to transportation use. Similarly, grade separation of some construction types (e.g., tunnel, aerial structure, and major bridge) will mitigate the conversion of land cover to transportation use by reducing the number of acres of impacts at the surface. Site-specific land cover mitigation measures for loss or fragmentation of habitat, dredge and fill of wetlands, encroachment of floodplains, and conversion of farmland/timberlands are presented in the resource-specific chapters that follow. Site-specific mitigation measures will be determined in consultation with localities during Tier 2 project studies.

Conversion may result in acquisitions or displacements of private or public lands where the Representative Route diverts from the NEC. Developed land cover is more likely to result in displacement, while undeveloped land cover is likely to result in acquisition. Where acquisitions and

displacements of developed or undeveloped land cover would occur, mitigation strategies should include providing relocation assistance and compensation, as appropriate, to affected property owners. Specifically, where displacement of households or businesses would occur, mitigation will include implementation of a relocation program in accordance with the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Relocation Act) as well as any state regulations. The availability of replacement housing in the Study Area will be compared with the housing needs of displaced households, and measures will be proposed to resolve special relocation needs, if any. A similar evaluation will be conducted for business and employment displacements. Mitigation options for displacements will need to document that the market inventory of housing or other facilities (such as commercial space or properties) will be adequate to relocate displaced activities. Measures to reduce or avoid adverse effects during the construction and operational phases of the project will also be identified, as appropriate.

7.2.10 Subsequent Tier 2 Analysis

Subsequent Tier 2 project studies will further define the actual acreage of land cover that would be affected and will address specific effects to properties, zoning regulations, and development. The analysis will further identify and evaluate compatibility with state, regional, MPO, and local planning documents. Tier 2 project analysis will identify acquisitions, temporary easements, and displacements. Furthermore, opportunities to avoid property impacts and the need for acquisition will be further evaluated and include local stakeholder and public involvement. Any required property acquisitions will require compliance with the Uniform Relocation Act.