



TIER 1 FINAL ENVIRONMENTAL IMPACT STATEMENT
VOLUME 1 (PREFERRED ALTERNATIVE)

2. Readers' Guide

Contents

2. READERS' GUIDE	2-1
2.1 HOW TO "USE" VOLUME 1 AND VOLUME 2	2-1
2.2 CONSISTENCY BETWEEN THE TIER 1 DRAFT EIS AND TIER 1 FINAL EIS	2-1
2.2.1 Key Concepts	2-2
2.2.2 Evaluation of the Preferred Alternative	2-6
2.2.3 Tier 1 EIS Terminology	2-6
2.3 CONTENTS OF VOLUME 1	2-8
2.3.1 Main Body	2-8
2.3.2 Appendices	2-9
2.4 CONTENTS OF VOLUME 2	2-10

Figures

FIGURE 2-1: STUDY AREA MAP	2-2
FIGURE 2-2: ILLUSTRATION OF REPRESENTATIVE ROUTE, AFFECTED ENVIRONMENT, AND CONTEXT AREA	2-4

2. Readers' Guide

This Readers' Guide presents guidance on how to “use” this document, defines key concepts and terminology used in the environmental analyses, and provides the overall organization of this Tier 1 Final Environmental Impact Statement (Tier 1 Final EIS).

This Tier 1 Final EIS is presented as two volumes. Volume 1 focuses on the description and analysis of the Preferred Alternative. It also includes a summary of comments received during the public comment period for the Tier 1 Draft EIS and responses to those comments (Chapter 11, Agency and Public Involvement and Appendix JJ). In addition, Volume 1 includes its own set of appendices that support the evaluation of the Preferred Alternative and provides all comments received during the public comment period.

Volume 2 contains the entire Tier 1 Draft EIS, including appendices, updated to reflect changes noted during the public comment period (November 2015 to February 2016). Updates include clarifications, errata-style edits, and specific comments related to information provided in the Tier 1 Draft EIS. The Federal Railroad Administration (FRA) determined that it would be beneficial to provide the revised Tier 1 Draft EIS as part of this Tier 1 Final EIS because the Tier 1 Draft EIS provides valuable information for elements that were included as part of the Action Alternatives, but that were not included in the Preferred Alternative. Such elements may be re-considered in the future under separate planning processes and evaluations.

2.1 HOW TO “USE” VOLUME 1 AND VOLUME 2

Volume 1 of the Tier 1 Final EIS focuses on the Preferred Alternative for NEC FUTURE. It presents the Preferred Alternative, documents the process undertaken by the FRA to identify the Preferred Alternative, along with the analysis of the Preferred Alternative, the comments received on the Tier 1 Draft EIS, and responses to those comments. The comments and responses are presented as part of Volume 1, since they informed the identification of the Preferred Alternative and shaped the additional information or analysis presented for the Tier 1 Final EIS.

Volume 2 of the Tier 1 Final EIS contains the full contents of the Tier 1 Draft EIS, with revisions made to correct identified errors and in response to comments (such as data corrections, and text edits for clarification). For example, if a commenter noted that a number within a table was incorrect in the Tier 1 Draft EIS, the FRA verified the number and updated the number accordingly in that same table in what is now Volume 2 of the Tier 1 Final EIS. Sections 2.3 and 2.4 list the contents for each volume in more detail.

2.2 CONSISTENCY BETWEEN THE TIER 1 DRAFT EIS AND TIER 1 FINAL EIS

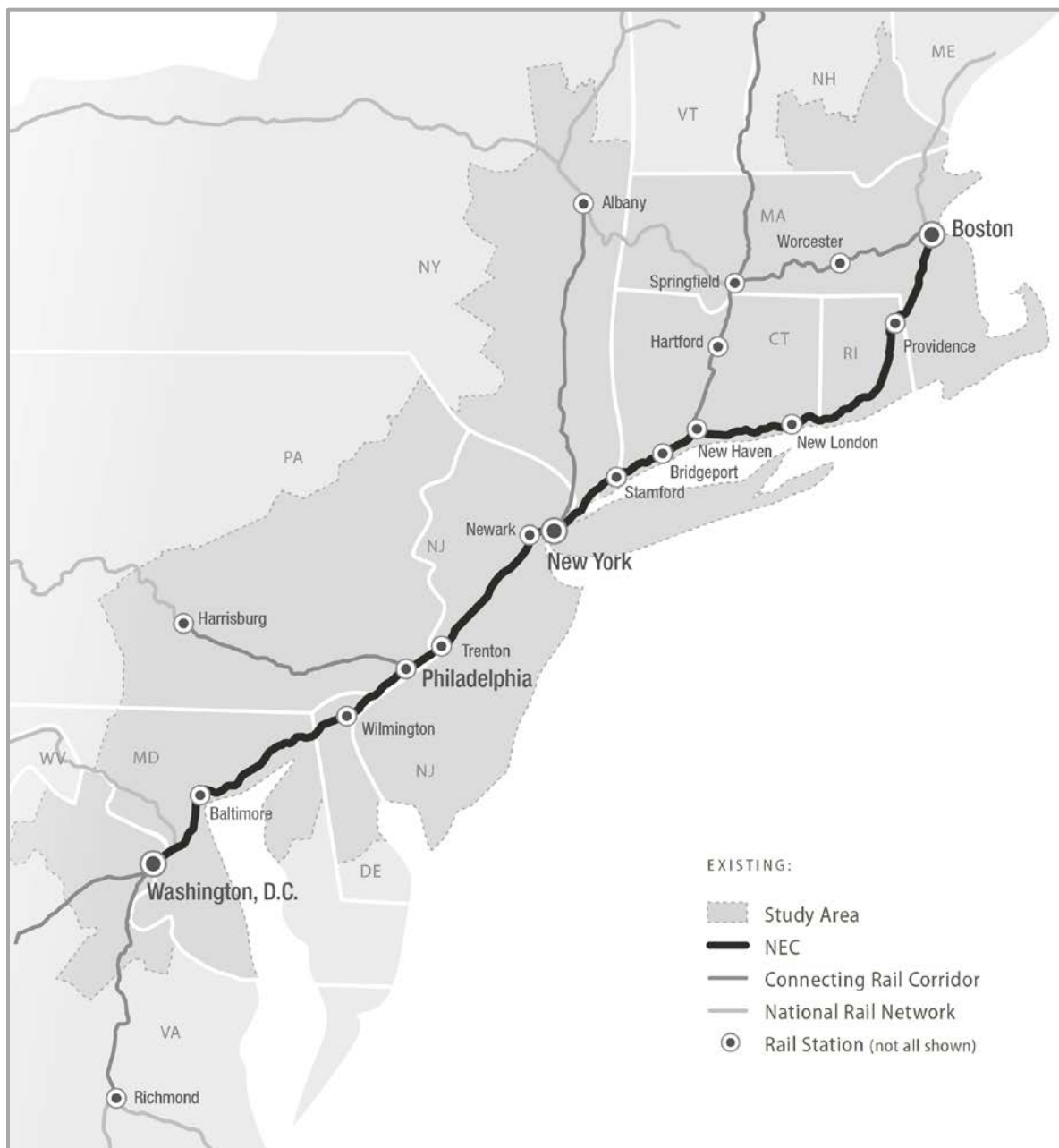
The FRA uses the same key concepts presented in the Tier 1 Draft EIS for the Tier 1 Final EIS to maintain consistency between the evaluation of the Action Alternatives and Preferred Alternative.

2.2.1 Key Concepts

The following key concepts on the level of environmental detail and analysis remain constant between the Tier 1 Draft EIS and Tier 1 Final EIS:

- **Study Area:** The Study Area (Figure 2-1) includes a broad geographic area, stretching 457 miles from Washington, D.C., in the south to Boston, MA, in the north, encompassing 50,000 square miles. The analysis of markets and services connecting to the Northeast Corridor (NEC) considers areas outside of the Study Area, such as Virginia and New Hampshire.

Figure 2-1: Study Area Map



Source: NEC FUTURE team, 2016

- ▶ **Level of Detail:** The level of detail presented is consistent with a tiered environmental review process. See **Data Sources and Geographic Information System Tools** for additional information.
- ▶ **Horizon Year:** The horizon year for the Tier 1 Draft EIS and Final EIS is 2040. As part of a National Environmental Policy Act (NEPA) analysis, a “horizon year” is considered when conducting analysis. The horizon year refers to the future timeframe within which Environmental Consequences associated with the construction and operation of the No Action Alternative and Preferred Alternative will be assessed. The horizon year is considered to be the year through which future population and employment growth as well as travel demand can be reasonably forecasted for the No Action Alternative and Preferred Alternative, though, as with any forecasts, such projections of future population and employment have some degree of uncertainty.
- ▶ **Conceptual Planning and Design:** The FRA used conceptual-level planning and design to support programmatic decision-making. The Tier 1 Draft EIS and Final EIS do not consider specific alignments or service plans but rather evaluate representative routes and service for planning purposes. More-detailed design and environmental analysis will be conducted during Tier 2 project studies to determine specific alignments and service.
- ▶ **Boundaries for Defining Environmental Effects:** The FRA developed geographic boundaries to establish existing conditions and to assess effects of the Action Alternatives evaluated in the Tier 1 Draft EIS. The same assumptions and boundaries apply to the evaluation of the Preferred Alternative in the Tier 1 Final EIS:¹
 - **Existing NEC** refers to the representational footprint for the NEC developed by the FRA for purposes of analysis in the Tier 1 Draft EIS and Tier 1 Final EIS in order to understand the potential effects of the No Action Alternative. It is based on a standardized width of 150 feet, accounting for a four-track right-of-way, and includes tracks, ballast, signals, etc. See Chapter 7, Introduction and Guide to Effects Assessment, for a more detailed discussion on the approach to evaluating the No Action Alternative.
 - **Existing Hartford/Springfield Line** refers to the representational footprint of the rail line between New Haven-Hartford-Springfield. For consistency, the FRA based the footprint of the Existing Hartford/Springfield Line using the same standardized width (150 feet) used to define the footprint of the Existing NEC, accounting for a four-track right-of-way, and inclusive of tracks, ballast, signals, etc.
 - **Representative Route** is the physical footprint of improvements and route, associated with an Action Alternative, including the Preferred Alternative. The dimensions of the Representative Route’s footprint are based on cross sections identifying construction type (e.g., tunnel, viaduct, bridge, embankment, at-grade) that are applied to topography or land use type, stations, supporting facilities, and right-of-way requirements. The footprints associated with the Representative Route range from 150 feet to 300 feet wide because improvements associated with stations and supporting facilities (i.e., tracks, platforms,

¹ The Preferred Alternative repackages physical and service elements of the Action Alternatives presented in the Tier 1 Draft EIS. The Preferred Alternative incorporates new segments proposed with the Action Alternatives and also incorporates the Hartford/Springfield Line.

parking) could flare out beyond the dimensions of the Representative Route. The Representative Route is the basis for the analysis for this Tier 1 EIS. Alternative location options for new segments will be evaluated as part of Tier 2 project studies..

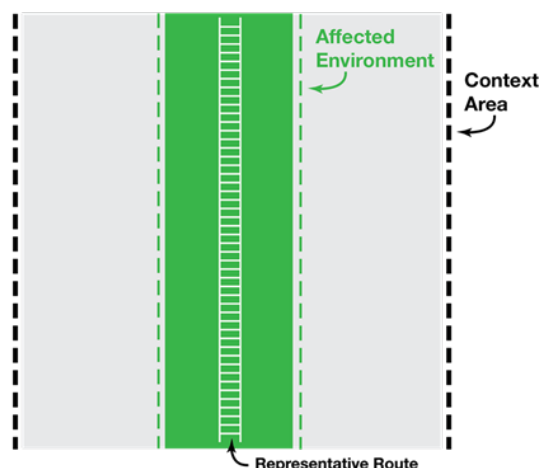
- **Affected Environment** is the geographic area for which the FRA identified existing conditions and Environmental Consequences for the Action Alternatives in the Tier 1 Draft EIS and Final EIS. The width of the Affected Environment varies based on the specific resource, but at a minimum is 2,000 feet wide, centered on the Representative Route. Because the Affected Environment for an alternative is centered on the Representative Route for that alternative, the Affected Environment boundaries are different for each alternative. In some cases, where appropriate to accurately characterize the resource, the Affected Environment encompasses the entire Study Area.
- **Context Area** is a broader geographic area that extends beyond the Affected Environment. This area allowed the FRA to qualitatively evaluate potential shifts in the Representative Route. The FRA defined the Context Area with a standardized 5-mile-wide uniform width, centered on the Representative Route, for all resources. For those resources where the Affected Environment encompasses the entire Study Area, the FRA did not perform Context Area analysis. Because the Context Area for an alternative is centered on the Representative Route for that alternative, the Context Area boundaries are different for each alternative (except where the Context Area includes the entire Study Area).

Figure 2-2 shows the relationship among the Representative Route, Affected Environment, and Context Area. These areas are all within the broader Study Area.

- **Data Sources and Geographic Information System Tools:** The FRA analyzed readily available secondary source data (e.g., geographic information system [GIS]-based, published reports, technical analyses), and did not conduct fieldwork or subsurface testing of any kind as part of this Tier 1 Draft EIS or Final EIS.

The FRA created a GIS database for NEC FUTURE in order to compile, store, and analyze data to use in documenting existing conditions and the assessment of Environmental Consequences.² The FRA carefully reviewed these data to ensure a uniform level of detail, since data were collected from a variety of sources. The FRA incorporated future-year projections and calculations relative to population and employment, travel demand, and related topics developed specifically for NEC FUTURE into the GIS database for use in resource-specific

Figure 2-2: Illustration of Representative Route, Affected Environment, and Context Area



² See Appendix AA, Mapping Atlas of the Preferred Alternative, and Volume 2, Appendix E, Environmental Resource Documentation, for GIS sources.

analyses. This GIS database also included information that the FRA developed to define the characteristics of the Preferred Alternative, such as routes, stations, service types, and frequency. Together, resource-specific data (e.g., land cover, demographics, and ecological resources) and information about the Preferred Alternative are layers in the GIS database. The interaction of these layers defined the Affected Environment and was used to assess Environmental Consequences.

- ▶ **Effects-Assessment:** The FRA used the same effects-assessment methodologies, data sources, and data sets presented in the Tier 1 Draft EIS to evaluate the Preferred Alternative in the Tier 1 Final EIS. To maintain consistency between the Tier 1 Draft EIS and Tier 1 Final EIS, the FRA did not replace the 2012 data sets used for analysis with more current data sets. However, the FRA updated some data calculations between the Tier 1 Draft EIS and Tier 1 Final EIS to respond to comments received during the public comment period and to address inconsistencies or omissions in data. Examples of where FRA updated data calculations include the following:
 - The FRA identified data inconsistencies and omissions in Chapter 7.2, Land Cover, Chapter 7.6, Ecological Resources, Chapter 7.9, Cultural Resources, and Chapter 7.11, Environmental Justice.
 - The FRA adjusted the NEC FUTURE Interregional Model—a ridership forecasting tool used for service planning—based on issues identified during the Tier 1 Draft EIS comment period and a reassessment of the overall model outcomes (see Chapter 5, Transportation, and Appendix BB, Technical Analysis on the Preferred Alternative).
 - The FRA found inconsistencies in the station list (Volume 2, Chapter 4) and has updated the station list for the Preferred Alternative.
- ▶ **Evaluation of the No Action Alternative:** The definition of the No Action Alternative has not changed between the Tier 1 Draft EIS and Tier 1 Final EIS. Similarly, the approach to the analysis of the No Action Alternative has not changed. The No Action Alternative encompasses existing and planned service improvements, as well as modified and new infrastructure. Because the physical limits of the specific improvements that will be made under the No Action Alternative are unknown, the FRA did not assess the footprint-related effects of the No Action Alternative quantitatively. Instead, for the Tier 1 Draft EIS, the FRA developed a representational footprint for the Existing NEC and used that to understand potential environmental consequences to resources that could be physically affected by projects that will be implemented under the No Action Alternative. For the Tier 1 Final EIS, the FRA modified that representational footprint for the No Action Alternative to include the Existing Hartford/Springfield Line; thus, for the Tier 1 Final EIS, a representational footprint for the Existing NEC and Existing Hartford/Springfield Line (Existing NEC + Hartford/Springfield Line) is used to understand potential Environmental Consequences to resources that could be physically affected by projects under the No Action Alternative. As a result, quantities shown for the Existing NEC + Hartford/Springfield Line in the Tier 1 Final EIS differ from the quantities shown for the Existing NEC in the Tier 1 Draft EIS.

Based on planned projects defined under the No Action Alternative, the FRA did quantify service-related effects of the No Action Alternative. For a definition of the No Action Alternative, refer to Chapter 4, Preferred Alternative, and Volume 2, Appendix B. For more

detail on how the FRA evaluated the No Action Alternative, see Chapter 7, Introduction and Guide to Effects Assessment.

2.2.2 Evaluation of the Preferred Alternative

Information presented in the Tier 1 Final EIS evaluates and compares the Preferred Alternative to the No Action Alternative (Volume 1) using the same metrics and resource categories used to compare the other Action Alternatives in the Tier 1 Draft EIS (see Volume 2). The FRA's evaluation of the Preferred Alternative also employed the same key concepts noted in Section 2.2.1 (Representative Route, Affected Environment, etc.). Chapter 4, Preferred Alternative, defines the physical and service elements of the Preferred Alternative.

2.2.3 Tier 1 EIS Terminology

As appropriate, the FRA defines specific terms relevant to the No Action Alternative and Action Alternatives in the relevant chapter or section. The following terms are fundamental to the initial description of the Study Area and its available passenger services:

- ▶ **NEC** (also referred to as the **NEC Spine**) is the existing rail transportation spine of the Northeast region—anchored by Washington Union Station in the south and Boston South Station in the north. **NEC connecting corridors** refer to those rail corridors that connect directly to a station on the NEC. These include (1) corridor service south of Washington Union Station to markets in Virginia (i.e., Lynchburg, Richmond, Newport News, Norfolk) and North Carolina (i.e., Charlotte); (2) Keystone (connects Philadelphia 30th Street Station to Harrisburg Station); (3) Empire (connects Penn Station New York to Niagara Falls Station); and (4) Hartford/Springfield Line (connects New Haven Union Station to Springfield Union Station with connections north and east of Springfield, MA). The **NEC Rail Network** refers to the NEC Spine and its connecting corridors.
- ▶ **Regional** refers to traditional peak or off-peak commuter or regional travel, generally defined by trips that start or end within the same metropolitan area. Regional trips are typically served by **commuter** or **regional railroads** within a metropolitan area or within a state (e.g., Baltimore, MD to Washington, D.C., New Brunswick, NJ to New York City, or Providence to Boston, MA). Throughout the Tier 1 Final EIS, commuter or regional railroads are referred to as **Regional** rail.
- ▶ **Interregional** generally refers to trips that start or end in different metropolitan areas (e.g., Washington, D.C. to New York City, Philadelphia to New York City, or New Haven, CT to Boston, MA). Interregional trips are generally served by **Intercity** railroads (Amtrak), offering services that connect cities or metropolitan areas at speeds and distances greater than that of commuter rail.
- ▶ **Metropolitan** refers to limited-stop, service for longer-distance trips between broad metropolitan areas or trips connecting secondary markets. It is a new service concept that upgrades the level of Intercity-Corridor rail service provided on the NEC, offers frequent service (2–4 trains per hour) to large and mid-size markets and key transfer locations, and stops at more stations than current Intercity service.
- ▶ **Intercity-Express** refers to premium Intercity high-speed rail service offered on the NEC, making limited stops along the NEC serving the largest markets only. Amtrak's Acela Express provides

such service on the NEC between Washington, D.C., and Boston. Intercity-Express service offers the shortest travel times for Intercity trips, with a higher quality of onboard amenities, at a premium price, using state-of-the-art high-speed trainsets.

- ▶ **No Action Alternative** defines conditions that will exist in the 2040 analysis year if the proposed action is not implemented. (Under NEPA, the No Action Alternative is sometimes referred to as the No Build condition.) For NEC FUTURE, the No Action Alternative is a baseline against which the FRA compares the effects of the Preferred Alternative. The No Action Alternative represents the condition of the Northeast region's multimodal transportation system in 2040.
- ▶ **Action Alternatives** refers to the action or build alternatives considered and evaluated in the Tier 1 Draft EIS. The Action Alternatives considered a range of service improvements to both regional and interregional travel and inclusion of new markets. See Volume 2, Chapter 4, Alternatives Considered, for a description of each Action Alternative.
- ▶ **Preferred Alternative** refers to the alternative identified by the FRA after the evaluation of the alternatives in the Tier 1 Draft EIS and public comment period. The Preferred Alternative comprises elements evaluated throughout the alternatives development process for NEC FUTURE. It generally represents the "grow" vision described for Alternative 2 presented in the Tier 1 Draft EIS (see Volume 2, Chapter 4). The Representative Route of the Preferred Alternative includes a combination of the Existing NEC and new segments evaluated as part of the Action Alternatives in the Tier 1 Draft EIS.

The Preferred Alternative includes the following:

- Improvements to the existing NEC; the existing NEC is never abandoned.
 - *Representative Service Plans* developed in coordination with stakeholders for the purposes of analysis.
 - *Representative Routes* connecting geographic markets and providing chokepoint relief and increased capacity along the existing NEC.
-

The Preferred Alternative representative routes and construction characteristics are the basis for the analysis in the NEC FUTURE Tier 1 EIS. They illustrate necessary improvements to achieve the Preferred Alternative service and performance objectives. As part of the Tier 1 process, the FRA has determined the necessity for new segments in particular geographic sections of the NEC in order to meet the Purpose and Need, and has identified a representative route for each potential new segment. The FRA or another federal agency providing funding for a particular project will evaluate specific locations for new segments as part of the Tier 2 project studies, prior to making any decision regarding new segment locations.

The southern terminus of the Preferred Alternative is Washington Union Station in Washington, D.C. Service splits at New Haven, CT, with some service continuing along an improved NEC to South Station in Boston and the remaining service continuing along an electrified Hartford/Springfield Line. Several new segments are provided along the Preferred Alternative to relieve chokepoints and to increase capacity of the existing NEC.

- ▶ **Selected Alternative** refers to an alternative to be selected in the ROD. The Selected Alternative documented in the ROD may or may not be the same as the Preferred Alternative described in this Tier 1 Final EIS. As in any NEPA process, it also is possible that the Record of Decision will result in selection of the No Action Alternative.

Chapter 4, Preferred Alternative, provides a more detailed geographic description of the No Action Alternative and Preferred Alternative.

2.3 CONTENTS OF VOLUME 1

2.3.1 Main Body

Following the **Introduction (Chapter 1)** and the **Readers' Guide (Chapter 2)**, the main body of Volume 1 (Preferred Alternative) includes the following:

- ▶ **Purpose and Need (Chapter 3)** summarizes the Purpose and Need presented in Volume 2, Chapter 3.
- ▶ **Preferred Alternative (Chapter 4)** provides the definition of the Preferred Alternative, including representative service characteristics and a Representative Route. It also presents the rationale for the definition of the Preferred Alternative.
- ▶ **Transportation (Chapter 5)** analyzes regional and local effects of the No Action Alternative and Preferred Alternative on the multimodal transportation network, including changes in mode of travel, volume of travel, and services offered.
- ▶ **Economic Effects and Growth, and Indirect Effects (Chapter 6)** analyzes direct and indirect economic and induced growth effects of the No Action Alternative and Preferred Alternative, including employment, construction activity, monetized total values for transportation effects, and long-term market effects.
- ▶ **Affected Environment, Environmental Consequences, and Mitigation (Chapter 7)** analyzes existing conditions and potential effects of the No Action Alternative and Preferred Alternative on the built and natural environments.
- ▶ **Construction Effects (Chapter 8)** presents an overview of the potential construction activities associated with the Preferred Alternative and related short-term effects associated with those activities.
- ▶ **Evaluation of the Preferred Alternative (Chapter 9)** compares the Preferred Alternative to the No Action Alternative based on a range of metrics to evaluate how well the No Action Alternative and Preferred Alternative perform relative to service, operations, ridership, economic benefits, environmental effects, and other evaluation criteria.
- ▶ **Phasing and Implementation of Alternatives (Chapter 10)** describes the process to work with stakeholders to define the Initial Phase for the Selected Alternative (the alternative ultimately selected by the FRA in the Record of Decision).
- ▶ **Agency and Public Involvement (Chapter 11)** summarizes agency and public involvement activities undertaken since publication of the Tier 1 Draft EIS. This chapter summarizes the public hearings and comments on the Tier 1 Draft EIS.
- ▶ **References (Chapter 12)** lists sources and references for the analysis and documentation presented.
- ▶ **Glossary (Chapter 13)** explains terminology and acronyms used throughout this Tier 1 Final EIS.

- ▶ **List of Preparers (Chapter 14)** identifies persons involved in the analysis and development of this Tier 1 Final EIS.
- ▶ **Index (Chapter 15)** guides the reader in finding specific items within this Tier 1 Final EIS.

2.3.2 Appendices

The appendices presented in Volume 1 are comparable to the supporting documentation presented for Volume 2. For Volume 1, appendices are identifiable by double lettering that match the lettering and organization of the appendices presented with Volume 2. For example, the Mapping Atlas in Volume 2 is identified as Appendix A; for Volume 1 it is identified as Appendix AA. The following appendices provide the detailed technical documentation, calculations, and relevant coordination materials that support the findings presented in Volume 1:

- ▶ **Appendix AA, Mapping Atlas of the Preferred Alternative**, presents maps from south to north and allows the reader to follow the Preferred Alternative along its Representative Route from Washington, D.C., to Boston and from New Haven through Hartford, CT, and to Springfield, MA, in relation to mapped resources. The atlas highlights areas where new infrastructure is proposed for the Preferred Alternative and coincides with the discussed mapped resources (Part 1). It also provides a separate map series that highlights the Representative Route construction types used for analytical purposes (Part 2).
- ▶ **Appendix BB, Technical Analysis on the Preferred Alternative**, provides the documentation that supports the deliberative process to identify the Preferred Alternative as presented in Chapter 4.
- ▶ **Appendix CC, Transportation Effects of the Preferred Alternative**, provides information on the representative stations used in the analysis presented in Chapter 5, Transportation. The analysis of transportation effects relies on the technical analysis of the Preferred Alternative presented in Appendix BB.
- ▶ **Appendix DD, Economic Effects of the Preferred Alternative**, provides the technical data that supports the economic effects and indirect effects analyses presented in Chapter 6.
- ▶ **Appendix EE, Environmental Resource Documentation for the Preferred Alternative**, provides detailed documentation that supports Chapter 7. Each resource presented in Chapter 7 has its own corresponding section within Appendix EE; each of these sections is organized geographically for the existing NEC and Preferred Alternative to provide more-detailed information at the state and county level. Note that Appendix E of Volume 2 contains the original effects-assessment methodologies that describe how effects to the various resources in Chapter 7 were analyzed.
- ▶ **Appendix FF, Agency and Public Involvement**, provides supporting documentation for the agency and public involvement activities and resources described in Chapter 11. Specifically, the appendix includes information pertaining to various stakeholder engagements, briefings, and meetings undertaken since the publication of the Tier 1 Draft EIS, public hearings, and the distribution list for the Tier 1 Draft EIS. Materials produced prior to the Tier 1 Draft EIS are provided in Appendix F of Volume 2.

- ▶ **Appendix GG, Section 106 Documentation**, provides documentation relevant to compliance with Section 106 of the National Historic Preservation Act since the publication of the Tier 1 Draft EIS. Relevant documentation includes a record of the coordination with State Historic Preservation Offices, the Advisory Council on Historic Preservation, and Government-to-Government Tribal coordination. It also provides the executed Programmatic Agreement for NEC FUTURE. Correspondence prior to the Tier 1 Draft EIS is provided in Volume 2, Appendix G.
- ▶ **Appendix HH, Preliminary Section 4(f) and Section 6(f) Resources**, documents the preliminary assessment and evaluation of resources protected under Section 4(f) of the U.S. Department of Transportation Act and Section 6(f) of the Land and Water Conservation Fund Act that were identified within the Affected Environment and that could be affected by the Preferred Alternative. Appendix HH does not represent a Section 4(f) Determination.
- ▶ **Appendix II, Endangered Species Act Correspondence**, provides the correspondence with the U.S. Fish and Wildlife Service and National Marine Fisheries Service related to the Endangered Species Act.
- ▶ **Appendix JJ, Comments and Responses**, provides all of the individual comments received on the Tier 1 Draft EIS and responses to those comments. An index to this appendix is provided in order to locate individual comments submitted by commenters. This appendix is only included in Volume 1.

2.4 CONTENTS OF VOLUME 2

Volume 2 contains all of the chapters and appendices comprising the Tier 1 Draft EIS. The organization of this content has not changed; all chapter headings have been retained. The FRA has updated the content for both the main body and appendices to reflect noted changes resulting from the public comment period.

At the beginning of each chapter and appendix for Volume 2, an errata sheet is included that either identifies the changes that have been made to that chapter or notes that no changes were made.