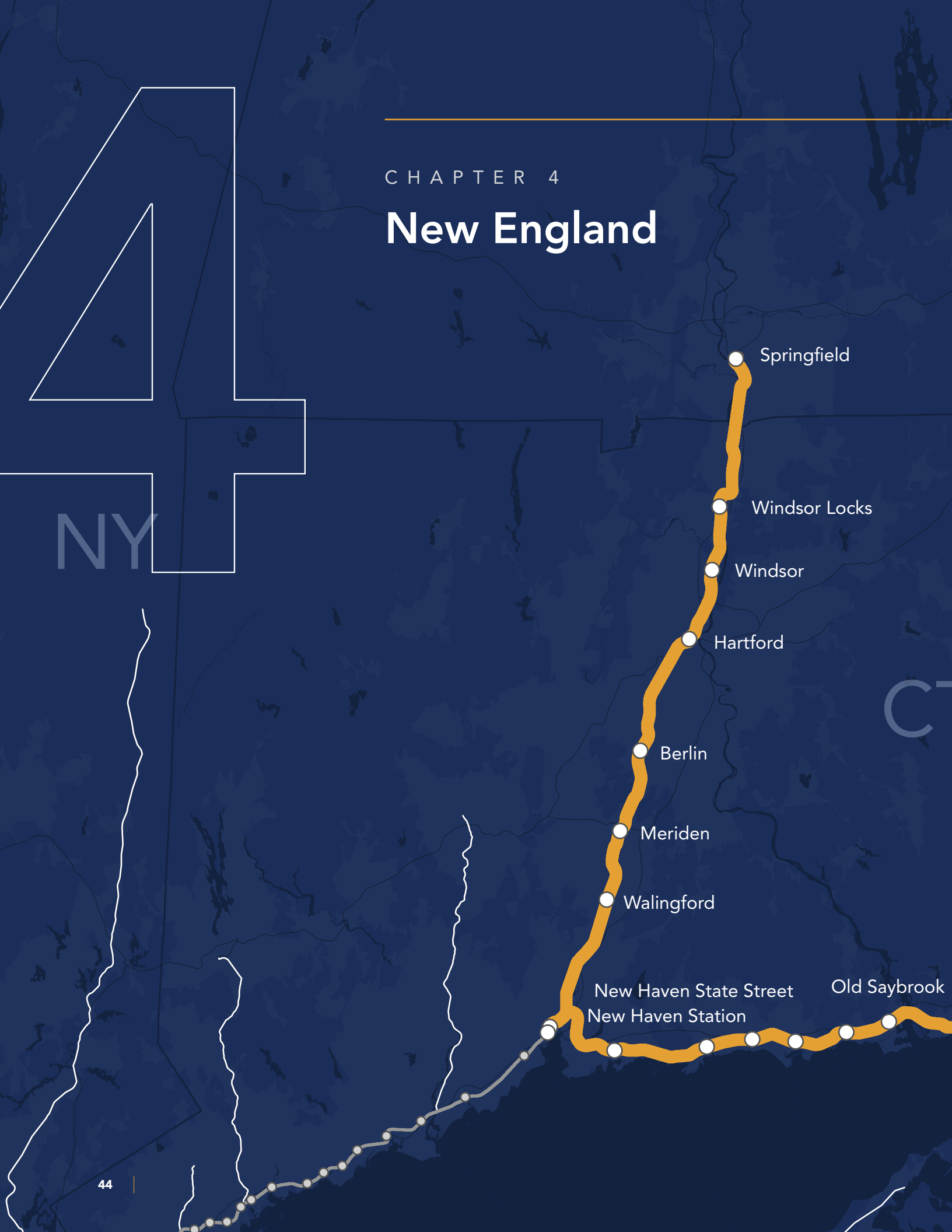
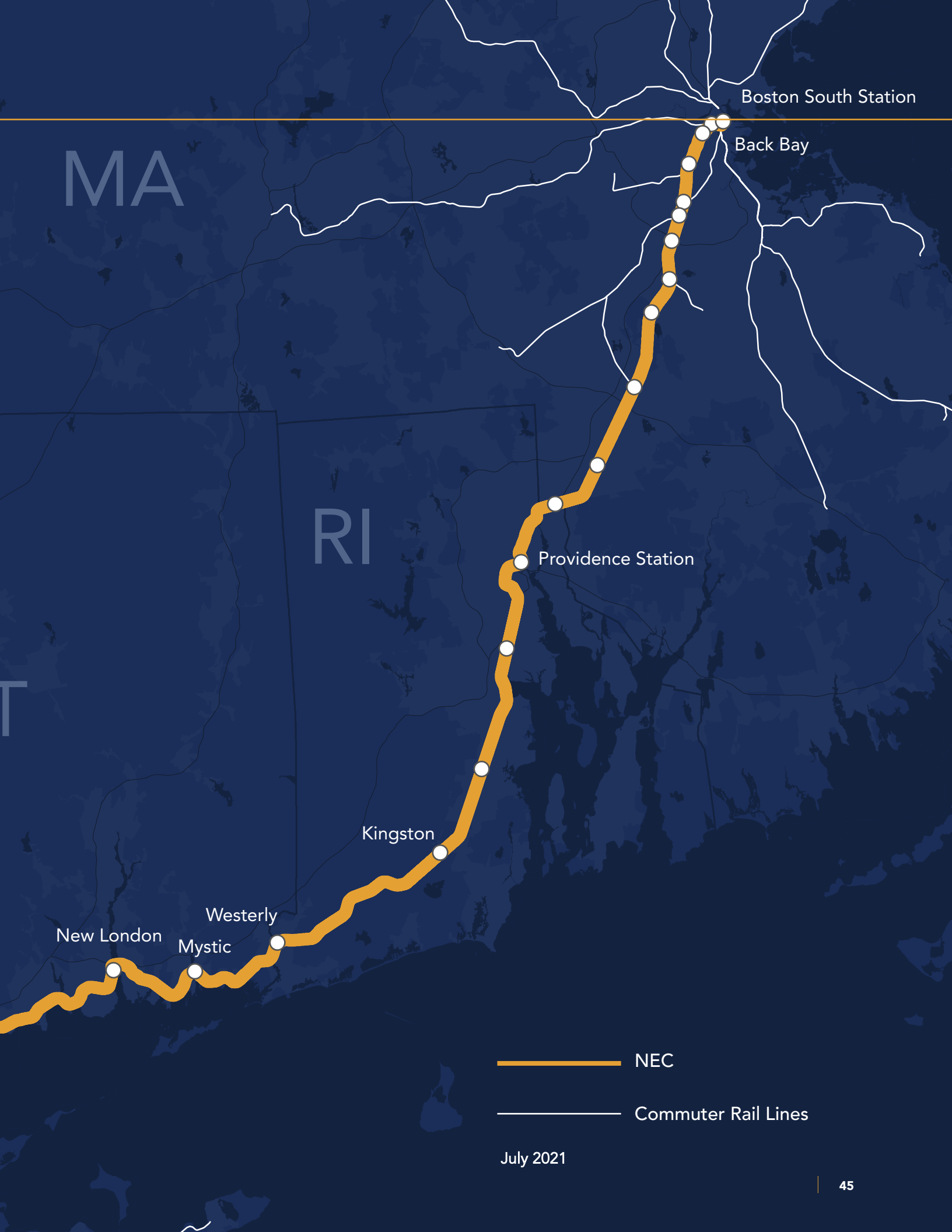
CHAPTER 4

New England




Boston South Station
Back Bay
MA
RI
Providence Station
Kingston
Westerly
New London
Mystic
NEC
Commuter Rail Lines
July 2021

MBTA train entering Providence Station (RI)

Overview

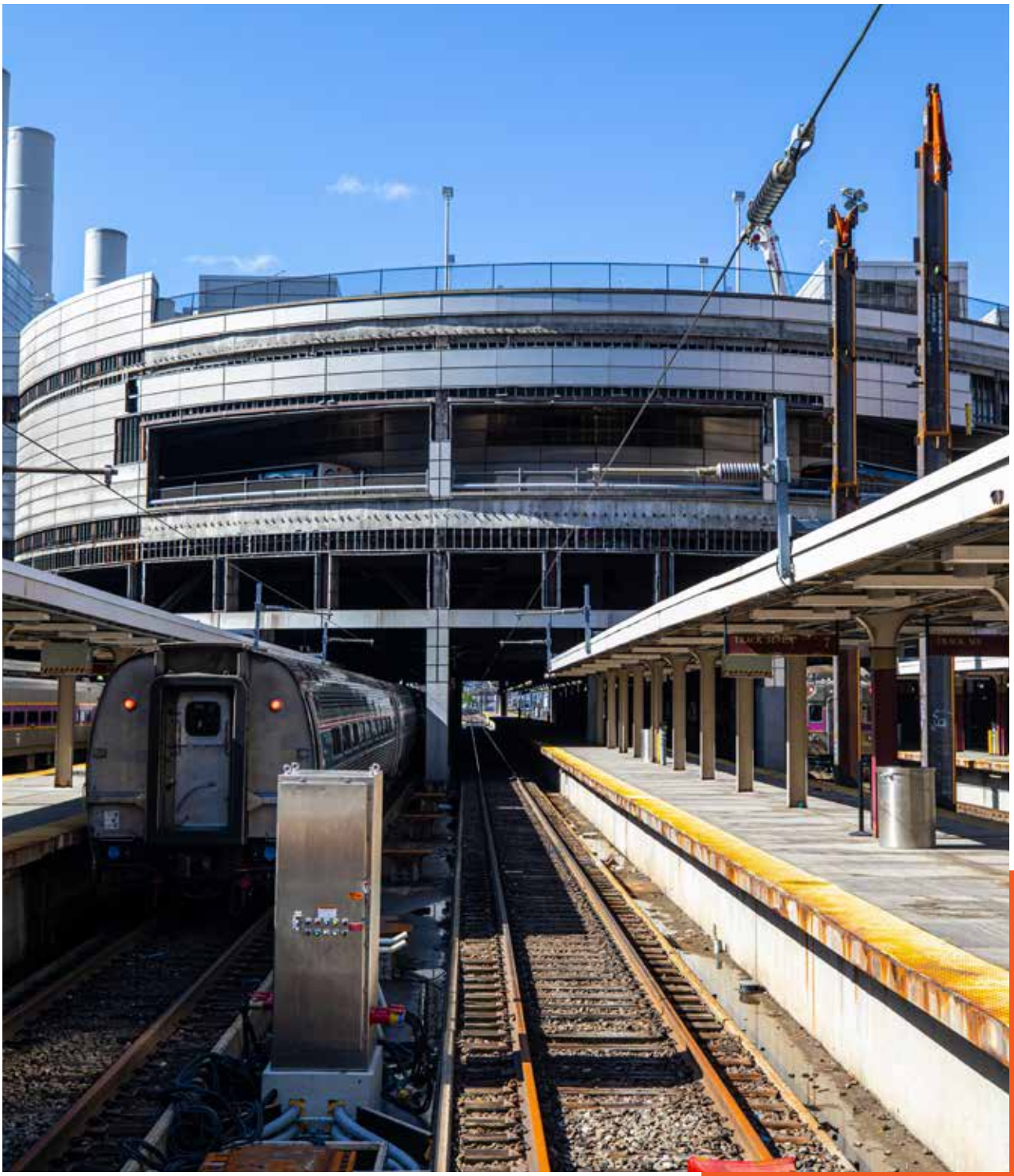
The New England (NE) territory is the northernmost territory of the NEC, stretching between Boston, MA and New Haven, CT. It also includes the Hartford Line from New Haven, CT to Springfield, MA. Boston's South Station is the northern terminus of the NEC. The station serves over 60,000 trips per day and is a key intermodal hub connecting Amtrak, Massachusetts Bay Transportation Authority (MBTA) commuter rail and MBTA rapid transit, and regional bus services in the nearby South Station Bus Terminal Building.[27]

The portion of the NEC main line spanning from Boston South Station to the Massachusetts/ Rhode Island border (Attleboro line) is owned and managed by the state of Massachusetts, with projects coordinated by MBTA and Amtrak. The NEC between the MA/RI border and New Haven, CT is owned and managed by Amtrak with projects coordinated by Amtrak, RIDOT, CTDOT, and MBTA. This section includes Shore Line East (SLE) with commuter services operated by CT*rail*. The connecting corridor between Springfield, MA and New Haven, CT is owned and managed by Amtrak, with projects coordinated by CTDOT and Amtrak. This section includes the Hartford Line with services operated by CT*rail*.

A CT*rail* Hartford Line train at Berlin Station following the ribbon cutting ceremony (CT)

The NE territory, the longest of the five at 156 miles, is challenged by lower capacity infrastructure than the other four territories. With the exception of a short three-track segment near Boston, the entire NE territory is limited to two tracks or, in the case of two Hartford Line locations, a single track. This reduces operating flexibility and reliability when compared with the long four-track sections of the other four NEC territories. NE has very few locations where faster trains can overtake slower trains without blocking all traffic traveling in the opposing direction.

The implementation of the C35 plan in NE will provide C35's only new intercity service stop on the NEC: Amtrak service to Rhode Island's TF Green Airport. C35 will convert commuter rail service between Boston, Providence, and points west from diesel trains to high-performance electric trains, reducing commute times by up to 16 minutes. An additional third track at Route 128 Station will enhance reliability while relieving one of the critical rail chokepoints in NE.



NEC outside of Boston South Station (MA)

NE Project Highlights

The NE territory is the northern anchor of the NEC and connects points south with the metropolitan areas of Boston, MA; Providence, RI; and Hartford, CT. The Boston-Cambridge-Newton metro region is home to almost 5 million residents, over 2.5 million jobs, and draws over 21 million tourist trips per year.[28] Farther south, the Providence-Warwick area has over 1.6 million residents and over 500,000 jobs, many of which are concentrated in the education and health services industries.[29] In Connecticut, the Hartford-East Hartford-Middletown area, with over 1.2 million residents and over 500,000 jobs, is recognized for its established insurance economy and emerging technology and advanced manufacturing industries.[30]

NE Special Project Highlights

- **Massachusetts Third Track (Readville to Canton):** This project supports additional service in the NE territory by adding a third track between Readville and Canton Junction stations. Eliminating the two-track configuration in the area will mitigate an existing capacity bottleneck for Amtrak and MBTA services.
- **Pawtucket/Central Falls Station:** The new Pawtucket/Central Falls Station will provide communities located between Providence, RI and Attleboro, MA with access to commuter rail service. This station will provide relief to overcrowded stations in Providence and South Attleboro, while attracting new riders from adjacent residential redevelopment areas that will take advantage of proximity to transit for access to jobs, educational opportunities, and medical options in Boston, MA and Providence, RI.
- **Fitter Interlocking:** This project will include the construction of a new universal interlocking on SLE in Clinton, CT that will divide a 16-mile interlocking-to-interlocking segment (Guilford and View Interlockings) into two shorter segments, improving reliability by allowing single track operation over shorter segments during maintenance with less operational disruption.
- **SLE Grade Crossing Elimination Projects:** Four of the eleven remaining grade crossings on the NEC will be eliminated, minimizing the risk of train-vehicle collisions and delays caused by grade crossing warning device malfunctions.
- **New Haven to Providence Capacity Planning Study:** Study of investment options to improve capacity and service performance between New Haven, CT and Providence, RI.

Figure 4-1: NE Special Project Groups and Benefits

NE Special Project Groups

(See Appendix for full list of projects)

1. Boston
2. Canton
3. Attleboro
4. South Attleboro
5. Pawtucket
6. Mystic
7. New London
8. Brook
9. Fitter
10. Hartford
11. NE Planning
12. Warwick
13. MBTA Yards
14. Shore Line East
15. Boston-Canton

NE 2035 Benefits

More Frequent Service

- 89% increase in MBTA commuter rail service
- Doubling of SLE and CT*rail* Hartford Line service in peak and off-peak

New Services

- New MBTA service between Pawtucket/ Central Falls and Boston, MA
- One-seat ride service from Hartford and New London to NYC
- New Amtrak service to T.F. Green Airport

Faster Service

- 16 minute faster commuter service between Boston and Wickford Junction
- Amtrak travelers will save 28 minutes between Boston and NYC

Source: C35 Analysis, 2021

NE Capital Renewal Highlights

The capital renewal programs in the NE territory are largely focused on track (turnouts), structures (signal bridges and culverts), electric power supply (transmission wire), communications, and signals (automatic block signaling (ABS) and interlockings). C35 capital renewal programs include replacement of 100 percent of interlockings and 40 undergrade bridges.

Figure 4-2: NE Estimated Assets Replaced in Territory

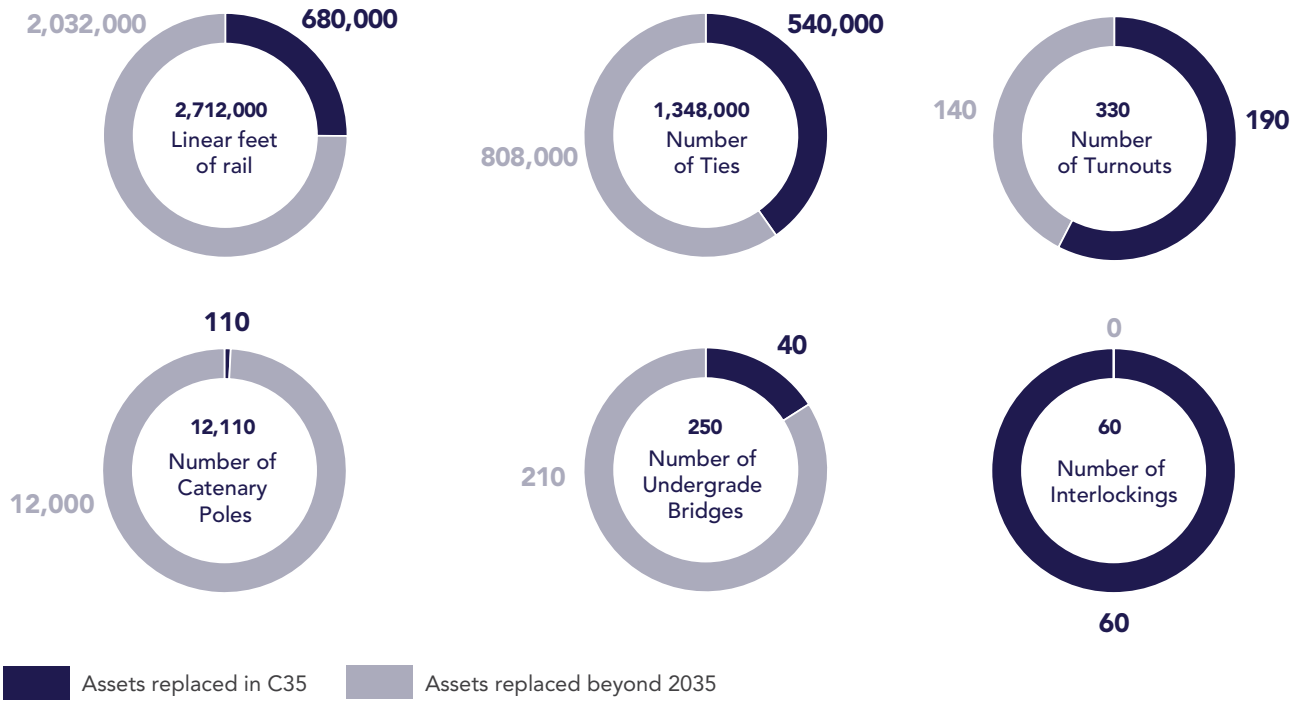
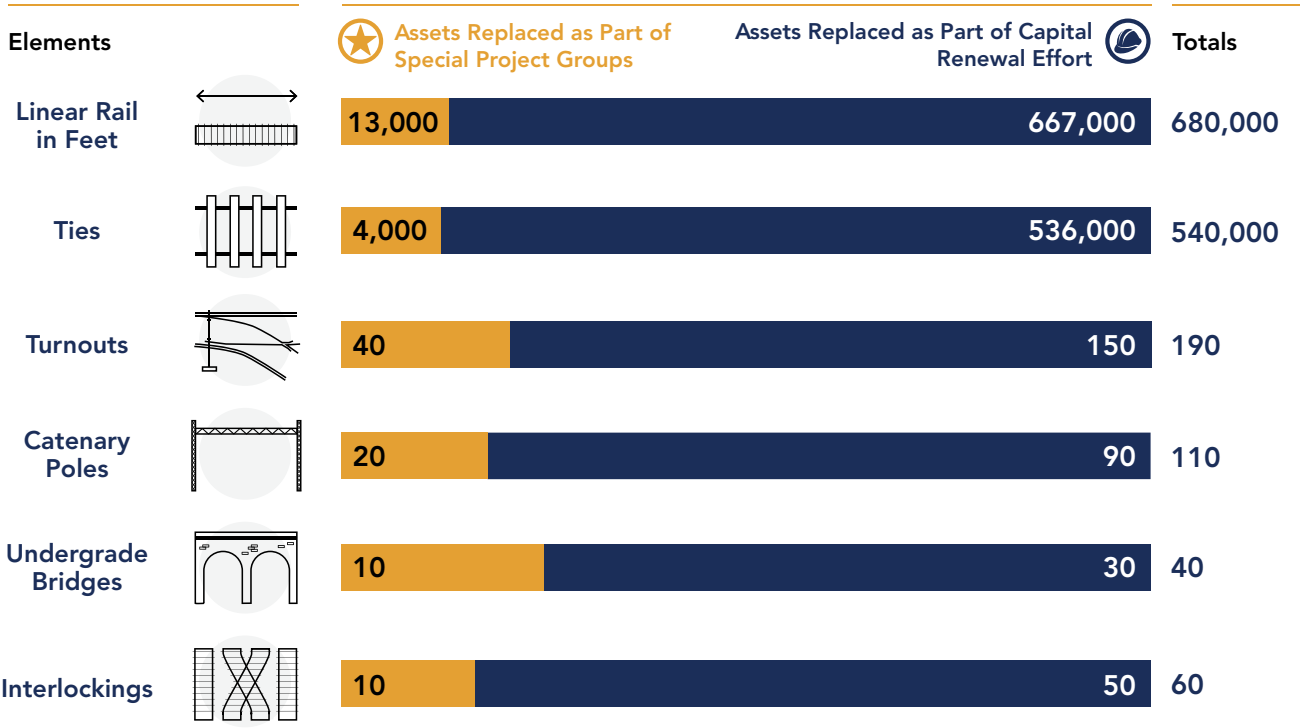


Figure notes:
1. Number in center of circle represents total assets
2. Numbers rounded

Source: C35 Analysis, 2021

Figure 4-3: NE Estimated Assets Replaced in Special Project Groups and Capital Renewal Programs



Source: C35 Analysis, 2021

Schedule of Investments

The C35 plan sequenced 15 special project groups and 36 capital renewal programs in NE (26 on the NEC mainline, ten on the Hartford Line), and evaluated temporary construction-related service adjustments and permanent service benefits. Special projects and capital renewal, such as the Massachusetts Third Track (Readville to Canton) and Canton Junction Station Improvements, were analyzed collectively and sequenced to maximize productivity of track outages, minimize service disruption, and create overall project delivery efficiencies in NE. The C35 plan does require some peak-period service reductions for MBTA, CT*rail*, and Amtrak to allow for necessary track outages longer than a midday, overnight, or weekend period.

The roadmap for future project delivery provides an initial schedule timeline for efficient construction of special projects and capital renewal over the 15-year period.

Figure 4-4: NE Estimated Initial Timeline Capital Renewal and Special Project Groups

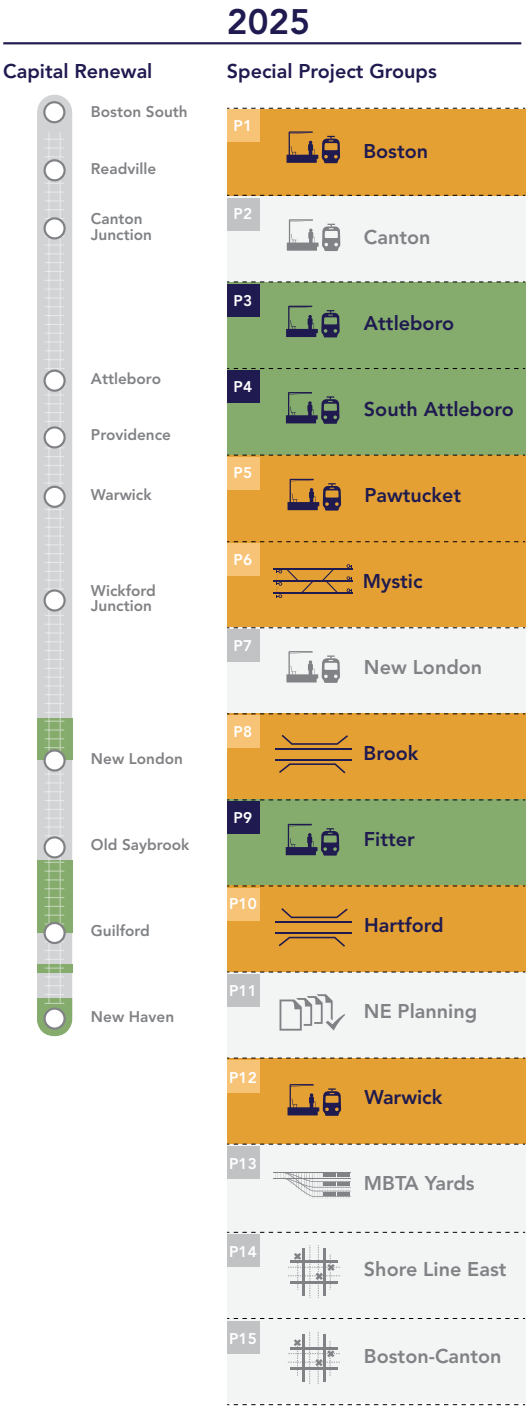


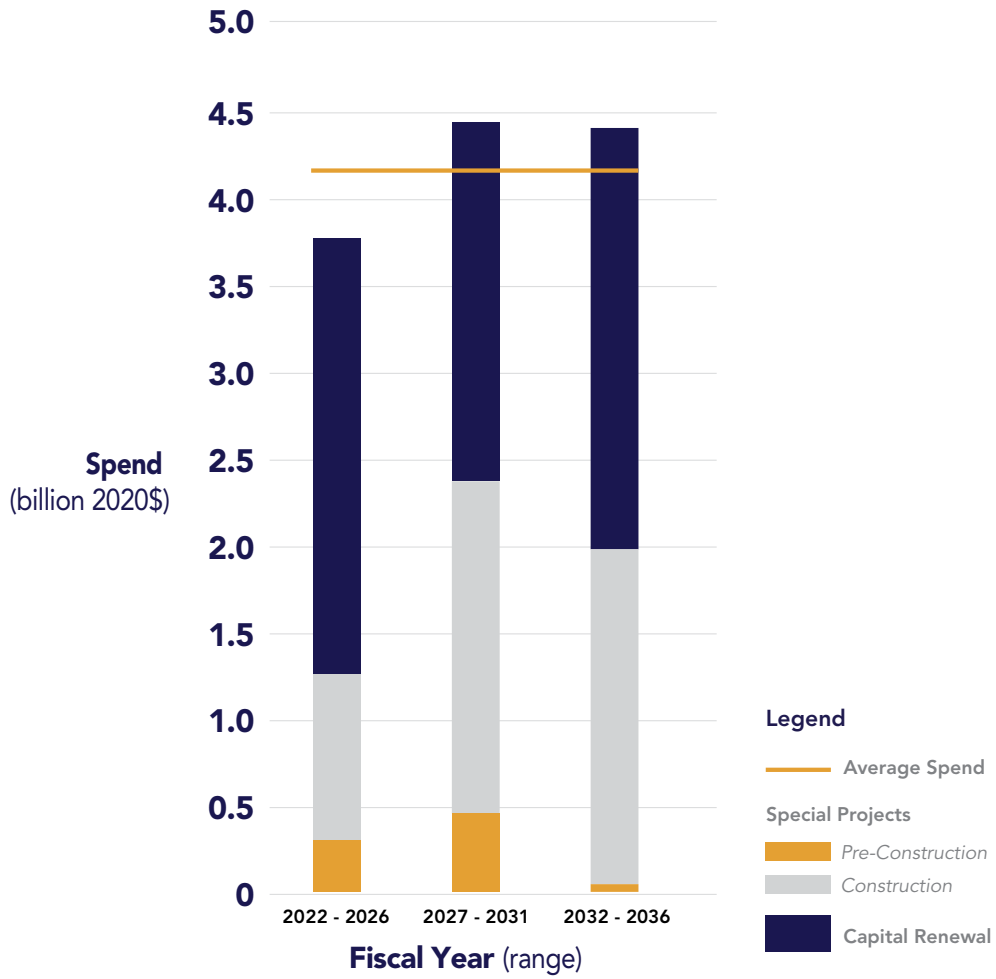
Figure note: Initial analysis results to be updated in C37

Source: C35 Analysis, 2021


Capital Renewal
Complete
Not Complete
Special Project Groups
P1 Complete
P1 Ongoing
P1 Not Started
2030
Capital Renewal
Special Project Groups
Boston South
Readville
Canton Junction
Attleboro
Providence
Warwick
Wickford Junction
New London
Old Saybrook
Guilford
New Haven
P1 Boston
P2 Canton
P3 Attleboro
P4 South Attleboro
P5 Pawtucket
P6 Mystic
P7 New London
P8 Brook
P9 Fitter
P10 Hartford
P11 NE Planning
P12 Warwick
P13 MBTA Yards
P14 Shore Line East
P15 Boston-Canton
2035
Capital Renewal
Special Project Groups
Boston South
Readville
Canton Junction
Attleboro
Providence
Warwick
Wickford Junction
New London
Old Saybrook
Guilford
New Haven
P1 Boston
P2 Canton
P3 Attleboro
P4 South Attleboro
P5 Pawtucket
P6 Mystic
P7 New London
P8 Brook
P9 Fitter
P10 Hartford
P11 NE Planning
P12 Warwick
P13 MBTA Yards
P14 Shore Line East
P15 Boston-Canton

If the C35 project delivery sequence is followed, investment in this territory will be as much as $12.5 billion total over 15 years.

Figure 4-5: NE Estimated Total Capital Costs – 5-Year Increments



Source: C35 Analysis, 2021

Improve Mobility and Connections

Reliable Service

In FY 2019 MBTA trains were delayed over 2,100 hours and 11 percent trains were late.[31] Significant upgrades will be made at the Tower 1 Interlocking, which is the point where trains are distributed among the platforms at Boston's South Station. During peak periods, a five-minute shutdown in service at Tower 1 Interlocking can generate residual delays impacting thousands of train passengers.[32] This project will replace the existing signal system at Tower 1 Interlocking and increase track maximum allowable speeds to 15mph (from 10mph), thereby improving on-time performance.

CT*rail* trains were delayed over 300 hours and 9 percent of trains were late in FY2019.[33] C35 investments will improve SLE service reliability through grade crossing elimination and mitigation of other known sources of delay. The New England Grade Crossing Elimination Program will remove four of the eleven remaining highway-rail at-grade crossings on the NEC.

Adding track capacity, such as completing a second track on the Hartford Line between New Haven, CT and Springfield, MA and a third track between Readville and Canton, MA, will address some of the largest sources of train delay in the territory. Adding parallel tracks allows trains to pass one another when serving a station or when a train is disabled so they do not impede corridor operations. An example of this is the recently-completed Kingston Third Track project, a partnership between Amtrak and RIDOT using federal American Reinvestment and Recovery Act (ARRA) funds, that allows the Amtrak Acela to bypass Northeast Regional service.

Figure 4-6: NE Estimated Delay Relief Improvements

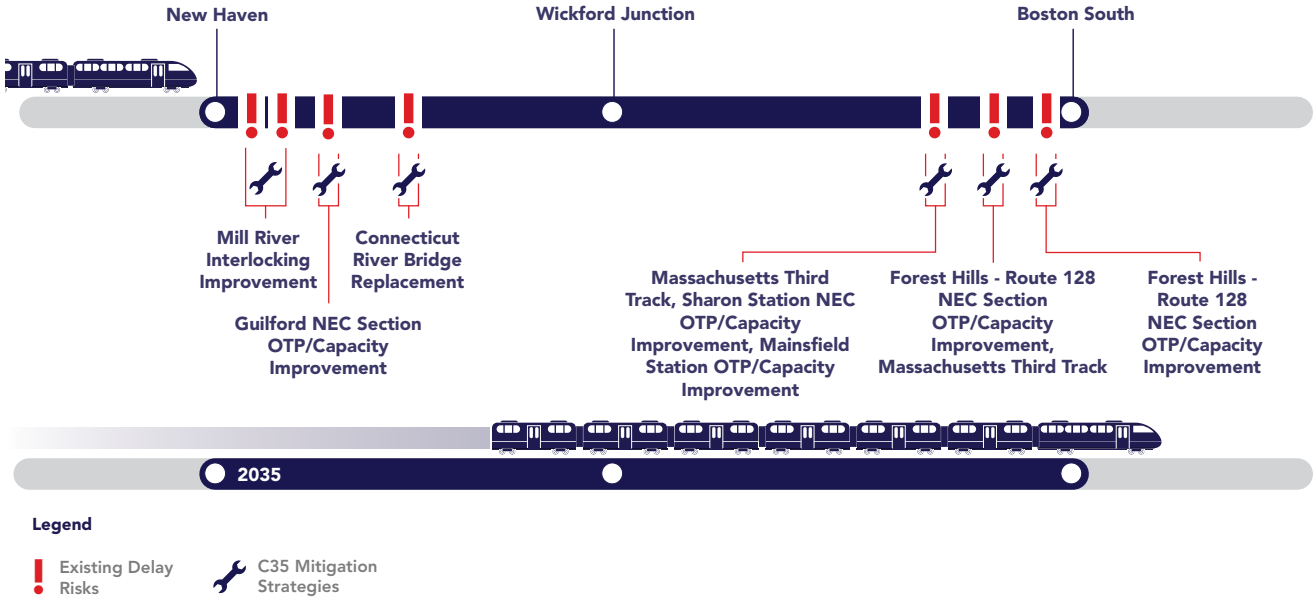


Figure note: Connecting corridors not included

Source: C35 Analysis, 2021

New Services

The C35 operating plan includes MBTA service to new Pawtucket/ Central Falls station. Additional track and platform capacity at Warwick/T.F. Green Airport Station will enable the introduction of new Amtrak Northeast Regional service.

Upgrades to the Hartford Line and SLE will allow for the introduction of new express commuter rail services. A new super express service will run between Hartford, CT and New York City, while another new express train will run between New London, CT and New York City. Both services will offer a direct, one-seat ride service, making all stops on the Hartford Line and SLE before running express between New Haven, CT and New York City.

C35 will enhance full South Coast Rail service between Boston and southeastern Massachusetts, restoring rail service to Taunton, Fall River, and New Bedford, the only major cities within 50 miles of Boston not served by passenger rail. While initial service will operate via Middleborough and the existing Old Colony Line, full South Coast Rail service, to be implemented by 2035, depends on using the NEC between Canton Junction, Route 128, and Boston.

Figure 4-7: NE 2035 Estimated Daily Revenue Round Trips

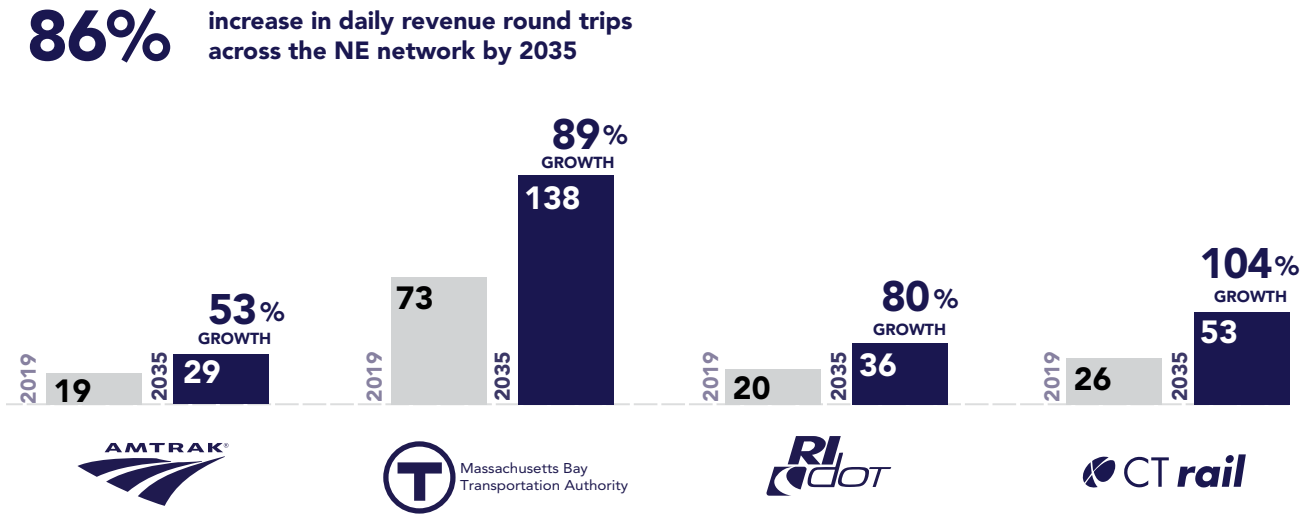


Figure Note: MBTA includes RIDOT, and RIDOT includes MBTA

Source: C35 Analysis, 2021

Frequent Service

C35 special projects and capital renewal enable more frequent service across NE. The average time between trains for MBTA passengers traveling from Boston will be reduced from 16 to 9 minutes in the morning peak period (averaged for all NEC stations). There are also improvements to the average time between trains for MBTA passengers in the off-peak periods. The CT*rail* SLE and Hartford Line rail services will more than double in the morning peak period, and see a doubling of off-peak service. Overall, commuter and intercity service will grow by 86 percent.

Figure 4-8: NE Estimated AM Reverse-Peak Maximum Time Between Trains Averaged Across All NEC Stations (minutes)

Figure note: Actual times will vary by destination.

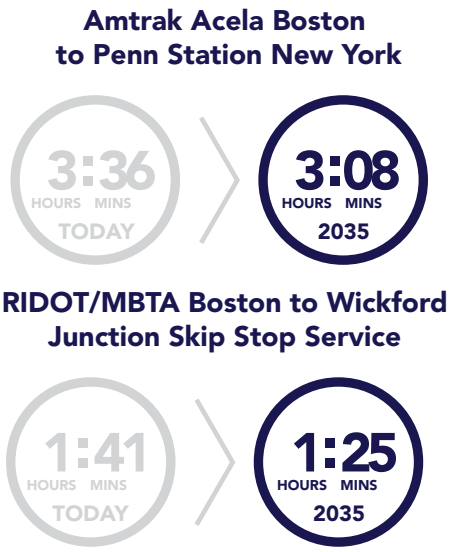
Source: C35 Analysis, 2021

Faster Service

C35 improvements, including special projects like the Boston South Station Tower 1 Interlocking, the Attleboro Area On-Time Performance/Capacity Improvement (Part 1), curve speed improvements, and additional electrified track and conversion to electric trains will reduce existing skip-stop MBTA commuter rail travel times between Boston, MA and Providence, RI by 11 minutes and between Boston, MA and Wickford Junction, RI by 16 minutes.

Faster CT*rail* SLE commuter rail service will save passengers five minutes of travel time between New London and New Haven. The Connecticut River bridge replacement, the elimination of grade crossings, and interlocking improvements will contribute to reducing Amtrak Acela travel time from Boston, MA to New Haven, CT by six minutes and from Boston, MA to New York City by 28 minutes (estimated 13 percent less than current travel time).

Figure 4-9: NE Estimated Travel Time Improvements



Source: C35 Analysis, 2021

CT*rail* Hartford Line train at Hartford Union Station (CT)

Station Improvements

The new Pawtucket/Central Falls Station will provide Rhode Island's densest urban communities between Providence and Attleboro access to commuter rail service. This station will relieve overcrowded stations in Providence and South Attleboro (recently closed due to failing infrastructure), while attracting new riders from adjacent residential redevelopment areas with improved access to jobs, educational opportunities, and medical care in Boston and Providence. The new station will include a hub for local bus service and a new park-and-ride.

Connecticut station improvements will improve ADA passenger access, station capacity, and on-time performance for trains operating on CT*rail's* SLE. Upgrades at Providence, Attleboro, South Attleboro, and Canton Junction MBTA stations will also provide improved ADA accessibility and a better customer experience for passengers.

The South Station Expansion project will improve service reliability and enable growth in Amtrak intercity and commuter rail service through updates to rail infrastructure and related layover capacity. It will also enhance the customer experience with more circulation space for passengers at South Station, promote increased development in a key area of Boston, and enable the improvement of public space outside the station.

Rendering of South Station Expansion (MA)

Create Economic Opportunity

Quality rail connections are a key part of an overall transit network that supports the economic health of metropolitan areas and connects them to the regional economy. MBTA generates significant economic benefits valued at $11.4 billion per year by reducing travel times, travel costs, crashes, and harmful emissions. The MBTA's annual budget is approximately $2 billion dollars per year, meaning that the economic benefits provided by the MBTA are over 5 times greater than its costs.[34] Intercity rail connections are important as well, enabling increased access to talent markets and capital. Improving rail connections in the NE territory will provide an opportunity to attract additional investment and support continued economic growth.

Job Creation

C35 investment will generate over 110,000 total new jobs (direct construction-related, indirect [non-construction], and induced) in NE over the 15-year plan, an average of 7,300 jobs per year. These jobs will in turn generate over $6.8 billion in earnings throughout the territory over the 15-year period.

Delivering the C35 plan will require an estimated average of 1,200 specialized railroad construction jobs each year, well in excess of current staffing levels. Workforce development initiatives are necessary to make sure opportunity is afforded to residents within the NE territory to fill the skilled workforce needs of the C35 plan.

Equity and Access

The NEC serves diverse populations in NE. While C35 will improve rail for higher income Acela riders with speedier intercity service, an estimated 80 percent of riders in NE use MBTA and CT*rail* services which create access to economic opportunity for a variety of high, medium, and lower income communities.

A new infill commuter rail station and bus hub in Pawtucket, RI will transform the surrounding communities, providing access to jobs, educational opportunities, and medical providers along the corridor and spurring new local development. The new station will serve a historically disadvantaged community.[35] Figures from 2017 indicate that 15 percent of the MBTA's commuter rail ridership is from minority groups, a number that could grow with increased access to new markets like Pawtucket, where 75 percent of residents living within ¼-mile of the new station are from minority groups and

45 percent are low-income. Within three miles of the station, 40 percent of residents are from minority groups and 23 percent are low-income.[36]

The C35 plan includes infrastructure improvements to support converting the MBTA's Providence Line from diesel to higher-performance electric trains, reducing emissions and supporting improved air quality for local residents within a ¼ mile of the corridor, almost 50 percent of whom are from minority groups and nearly 25 percent of whom are from lower income groups.[37] These investments also benefit Amtrak and MBTA riders when waiting for trains in station areas.

The skyline in Hartford (CT)

Hartford's Economy and C35 Investment

Hartford faces opportunities and challenges as its insurance industry evolves. Top-tier transportation connections are critical to diversifying the Hartford economy and growing its emerging technology and advanced manufacturing industries. Increasing economic opportunity in the city of Hartford is especially important, given that the city's poverty rate of 31 percent is four times the rate of the adjacent communities.[38]

City officials believe that the Hartford Line is integral to attracting the next generation of talent by fostering a transit-oriented community that appeals to younger workers while also providing a much lower cost of living compared with larger cities. A survey of nine downtown developments found that this approach has already paid dividends as 50 percent of residents are under 30, and most them are new to Hartford.[39] C35 improvements increasing the service levels of both commuter rail and Amtrak through the NE territory, particularly through the double-tracking of the Hartford Line will help to attract the talent that is key to retaining and growing the insurance, technology, and advanced manufacturing industries.

Combat Climate Change

Reduced Carbon Footprint

C35 improvements support many of the environmental goals identified by entities in the NE territory. In 2014, Rhode Island passed the Resilient Rhode Island Act. The act set specific GHG emission reduction targets below 1990 levels of 10 percent by 2020; 45 percent by 2035; and 80 percent by 2050. It also established the Executive Climate Change Coordination Council to develop strategies, programs, and actions to meet the GHG reduction targets.[40]

The Commonwealth of Massachusetts recently enacted legislation that codifies into law the Baker-Polito Administration's commitment to achieve Net Zero emissions in 2050 and furthers the Commonwealth's nation leading efforts to combat climate change and protect vulnerable communities. The legislation updates the GHG emissions limits in the Global Warming Solutions Act of 2008, committing the Commonwealth to Net-Zero emissions by 2050 and interim targets of 50 percent reduction by 2030 and no less than 75 percent reduction by 2040.[41] The Act set legally enforceable goals of reducing GHG emissions. Additionally, the Commonwealth Executive Office of Energy and Environmental Affairs prepared the Climate Change Adaptation Report that establishes strategic and long-term solutions for addressing climate change. This report identifies the vulnerability of the transportation network and outlines the importance of maintaining, replacing, and protecting transportation infrastructure to minimize flooding risks or other damage that may occur from climate-related events. It also discusses the importance of reducing vehicle miles traveled (VMT) to lower GHG.

The C35 improvements support electrification of all MBTA Providence Line service and could minimize pollutants and improve air quality for Amtrak and MBTA employees and passengers.

The platform at Back Bay Station (MA)

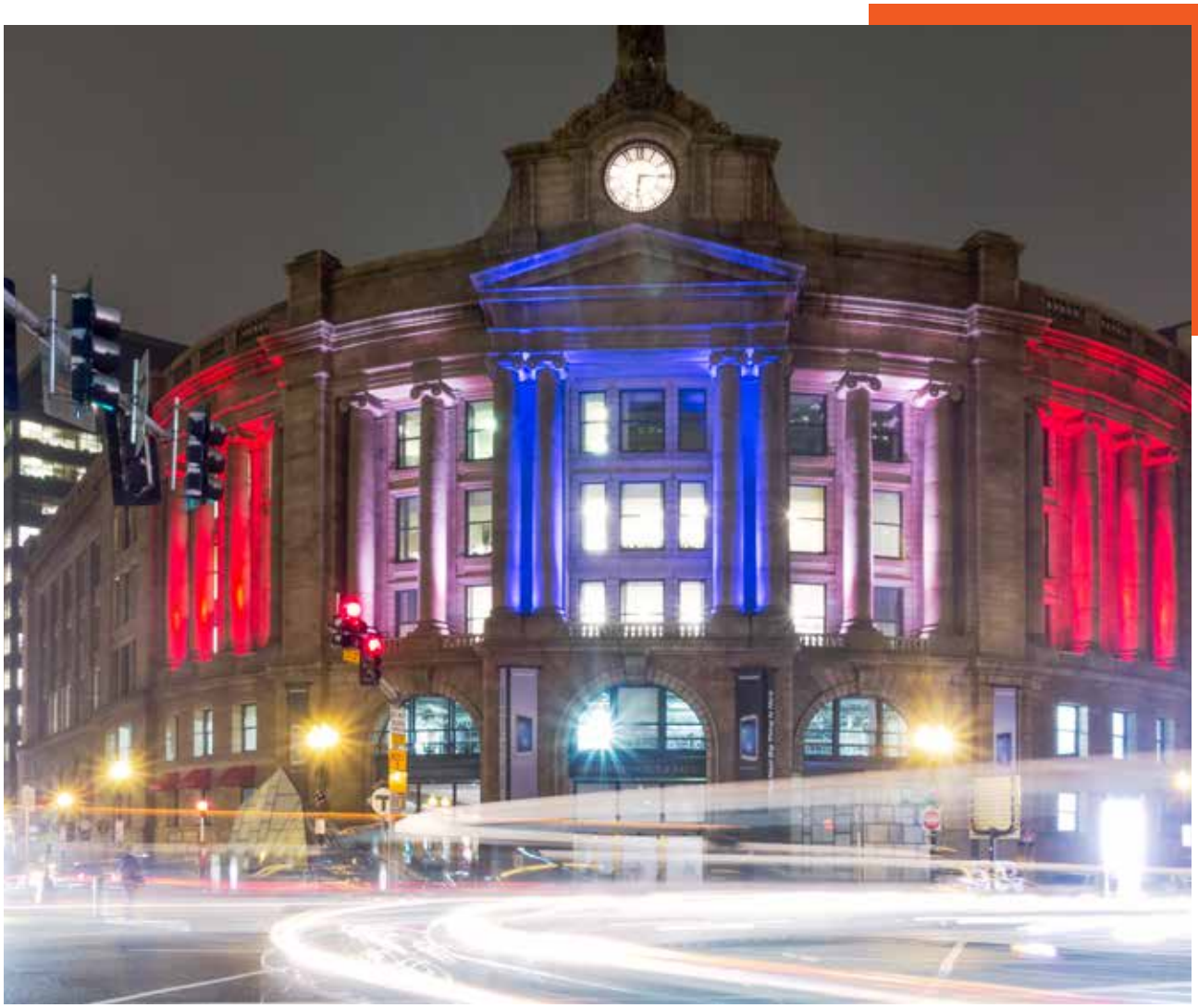
Resilient Infrastructure

As the NEC continues north out of Connecticut, the NE territory generally has lower risks of inundation from sea level rise and storm surge flooding over the other territories, based on analysis conducted for NEC FUTURE.[42] However, the NE territory is subject to inundation risks in Middlesex and New London Counties in Connecticut, and risk associated with flooding are particularly of concern in Hampden County, MA. Infrastructure improvements in this territory could reduce risks of inundation of rail assets. An example of a special project that will address flooding and extreme weather events (storms, heat stress, etc.) is the Boston South Station Tower 1 Interlocking. This project will make Tower 1 Interlocking more resilient to the effects of climate change by addressing known drainage and settlement issues, upgrading the existing signaling system, and providing additional redundancy to protect against potential failures.

Support Desirable Cities and Communities

Station Area Development

Station areas in the NE territory are experiencing significant development. The South Station project will add almost 2 million square feet of mixed-use space (once all phases of redevelopment are complete).[43] WSDevelopment is planning on adding 7.6 million square feet of mixed-use space in Boston's Seaport District, specifically in Seaport Square. This investment is in addition to over a million square feet of commercial and residential space added to the area since the early 2000s.[44]



Boston South Station lit up at night (MA)

Today, commuters traveling to Boston or Providence from the Pawtucket/Central Falls area lack access to direct public transportation connections. Local commuters must travel to the Attleboro or South Attleboro Stations to catch an MBTA commuter rail train. In addition to attracting an estimated 520 daily boardings, the new Pawtucket/Central Falls Station will also generate significant transit-oriented development. In particular, this station will create direct transit access to a two-million-square-foot historic mill complex that Pawtucket and Central Falls have been working to redevelop. Additional changes to the transportation landscape, including the bus hub component of the new Pawtucket/Central Falls Station as well as the creation of a Transit Emphasis Corridor with dedicated bus and bike lanes, will facilitate easy connections between the train station and the surrounding communities via public and active transportation.[45]

Rendering of completed Pawtucket/Central Falls Transit Center (RI)

Innovation Districts

Boston's Seaport District was branded as the "Boston Innovation District' in 2010 by former Mayor Thomas Menino, at a time when the area was largely parking lots. Located near Boston's South Station, the 1,000-acre Seaport District has today matured into the vision established by Mayor Menino - a hub for technology, life sciences, and creative industry firms. By 2013, more than 200 companies and 4,000 jobs had located in the District.[46] Today, the Seaport District has not only become a hub for start-ups but has also attracted relocations of a broad range of established companies including Alexion Pharmaceuticals, General Electric, and MassMutual, among others.[47] Amazon has announced that it will bring 3,000 new jobs to the Seaport District by 2024.[48]

Local transit connections via South Station are important for employee access to the Seaport District, as well as access to nearby Cambridge and its higher education institutions and bioscience and technology companies. Rick Dimino, President and CEO of A Better City, views transit connectivity both within the Boston region and intercity connectivity (particularly to access New York capital and talent markets) as critical components of the growth of the life sciences and technology sectors in the Boston metropolitan area.[49]

The City of Providence and its surrounding communities have transitioned from a manufacturing-based economy 30 years ago, to one that has diversified into technology, higher education, and the creative industries. The commuter and intercity rail links to Boston, MA, and NEC access to New York City, provides access to talent and capital that allows technology and bioscience companies to locate and grow in Providence.[50] Charlie Kroll, founder of Providence-based technology company Andera, noted that during his time as founder and CEO the lack of fast and affordable rail service between Boston and Providence inhibited the company's ability to attract talent. Better connections between Providence and other cities along the NEC can facilitate the mobility of talent in the region.[51]

Providence is investing heavily in its downtown area and its Innovation & Design District, developing 26 acres of land once occupied by an Interstate highway and investing in public transit, cycling and walking facilities connecting to Providence Station. The redevelopment will add new commercial and retail space and urban realm improvements. It has already attracted a variety of tenants in the education, health, and technology sector because of its proximity to Providence Station and connections to health and science hubs along the NEC. Several new residential complexes and hotels have been developed or are under development as well, providing residents and visitors alike with direct access to Amtrak and MBTA service.[53]

Innovation District Park in Providence, RI

"Having the NEC connect Providence to New York and Boston is a competitive advantage when attracting, young talented workers. The ability to move up and down the East Coast with ease is wonderful for business and for cultural exchange between cities."[52]

—Aidan Petrie, Co-founder and Chief Innovation Officer, Emeritus for Ximedica, a medical device company located in Providence, Rhode Island