New Haven-Hartford-Springfield Rail Project

Service Development Plan

High Speed Intercity Passenger Rail Program

Connecticut
Department of Transportation

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1. Introduction

This Service Development Plan (SDP) lays out the overall scope and approach for the proposed New Haven-Hartford-Springfield (NHHS) Rail Project over the next 20 years. It builds off the 2030 Vision Plan developed by Connecticut, Vermont, Massachusetts and Amtrak to dramatically transform passenger rail service in region, with up to 25 daily round-trip trains connecting communities across New England and the Northeast. That Plan has served as a catalyst for the rebirth of passenger rail in the region and for local efforts to leverage passenger rail investments to spark new economic development around stations and communities served by passenger trains.

NOTE: The body of this document has been updated as of March 2011 to reflect changes since its original completion in 2010. Some of the tables and analyses in this document and the Appendices include data that cannot easily be updated. As a result, some of the data on those tables and in the Appendices may be inconsistent with the text of the document. These inconsistencies will be resolved in future updates to this SDP.

1.1. Background – The 2030 Vision Plan

The 62-mile Amtrak-owned rail line between New Haven, Hartford and Springfield (NHHS) serves as a gateway connecting the communities of central Connecticut, southern Massachusetts and Vermont with the busy Northeast Corridor high-speed rail line. Once a robust rail corridor, service declined over decades and in the 1980s Amtrak removed one the two NHHS tracks, limiting its ability to operate more than the current six round-trip trains that operate today. Stations include New Haven, Wallingford, Meriden, Berlin, Hartford, Windsor, Windsor Locks and Springfield. Local freight trains also serve a variety of daily shippers on the line.

It has been a long-standing transportation and economic objective of Connecticut, Vermont and Massachusetts to significantly increase passenger rail service along the NHHS rail corridor and across New England as a means of providing an energy efficient, environmentally superior transportation alternative to the growing automobile congestion on the regional highway system, and to improve the quality of life, sustainability and economic vitality of the communities in this region. The three states, together with Amtrak, have developed a 2030 Vision Plan transform the NHHS rail corridor into a gateway for new passenger rail service to Central Connecticut, Massachusetts and Vermont, dramatically transforming passenger rail service in region, with up to 25 daily round-trip trains connecting communities across New England and the Northeast.

1.1.1 High-Speed Intercity Passenger Rail Funding Applications

Increasing passenger rail service to the communities along the NHHS Rail Corridor and to Vermont and Massachusetts depends directly on restoring the capacity of the NHHS rail line to accommodate additional trains. In 2009-10, Connecticut submitted two grant applications under the High-Speed Intercity Passenger Rail (HSIPR) program to the Federal Railroad

Administration (FRA) to fund the railroad infrastructure improvements required to implement the 2030 Vision Plan. The improvements include increasing the top speed to 110 mph, restoration of the second track, installation of Amtrak's Advanced Civil Speed Enforcement System (ACSES) positive train control system, drainage improvements, at-grade crossing imporvements, and high-level platforms at Amtrak intercity passenger stations. The improvements are reflected on the Final Track Configuration, Figure 1-1. These upgrades would allow a quadrupling of passenger train service north of New Haven, including expanded service to Massachusetts and Vermont, as well as new capacity for local freight service. In addition, the significant growth in ridership is expected to serve as a catalyst for new Transit-Oriented Development (TOD) around station areas, as well as provide important environmental benefits and energy savings.

Connecticut's two HSIPR grant applications requested the following funding:

- $40 million (with a $20 million state match) to restore 10.2 miles of the second track between Meriden and Newington
- $240 million (with a $260 million state match) to upgrade the remainder of the rail line between New Haven and Springfield.

In 2010, FRA awarded to Connecticut the full amount requested ($40 million) to upgrade the line between Meriden and Newington. However, FRA was able to award only $120.9 million of the $220 million requested to upgrade the remainder of the NHHS Rail Corridor. While substantial, this funding is not sufficient to complete all the planned intercity improvements. As a result, the original NHHS Rail Project has now been split into three phases to match the available funding. These include the following:

- **Phase 1 (Meriden-Newington)**, using the $40 million in federal funding already awarded and $20 million in state funding to upgrade the 10.2 miles between Meriden and Newington.
- **Phase 2 (New Haven-Hartford)**, using the $120.9 million in federal funding already awarded and a state match of $141.9 million to upgrade the infrastucture and stations between New Haven and Hartford
- **Phase 3 (Hartford-Springfield)** – this is the current application. It requests $227 million in federal funding to be matched with $97.3 million in state funds to complete the infrastructure improvements between Hartford and Springfield.

Together, the three project phases will provide the capacity to support a significant increase in intercity passenger rail service in Connecticut, Massachusetts and Vermont. The improvements are viewed by Amtrak and the three states as critical to meeting the goals of improving and sustaining the regional economic viability and improving regional livability.

Significant public outreach has taken place over nearly a decade to plan for this program. This includes outreach associated with a development of a draft Environmental Assessment undertaken for a prior analysis of new communter rail service along the NHHS rail corridor, as well as broad regional outreach associated with a draft Enviornmental Review provided in support of Connecticut's FY 2010 HSIPR application. A new environmental assessment is

currently underway, with the FRA as the lead agency and the FRA as a cooperating agency, focusing specifically on the environmental impacts along the NHHS Rail Corridor resulting from implementation of the 2030 Vision Plan.

It should be noted that FRA has awarded $52 million in ARRA Track 1A funding to Vermont to make track, roadbed and bridge improvements along the current route of the Amtrak Vermonter Service. The Commonwealth of Massachusetts has been awarded $ 70 million in Track 2 ARRA funding to make improvements to the "Knowledge Corridor" rail line along the Connecticut River between Springfield and Vermont. The full benefit of these improvements can only be realized if the entire NHHS Rail project is completed, providing the capacity for additional service to Vermont and Massachusetts.

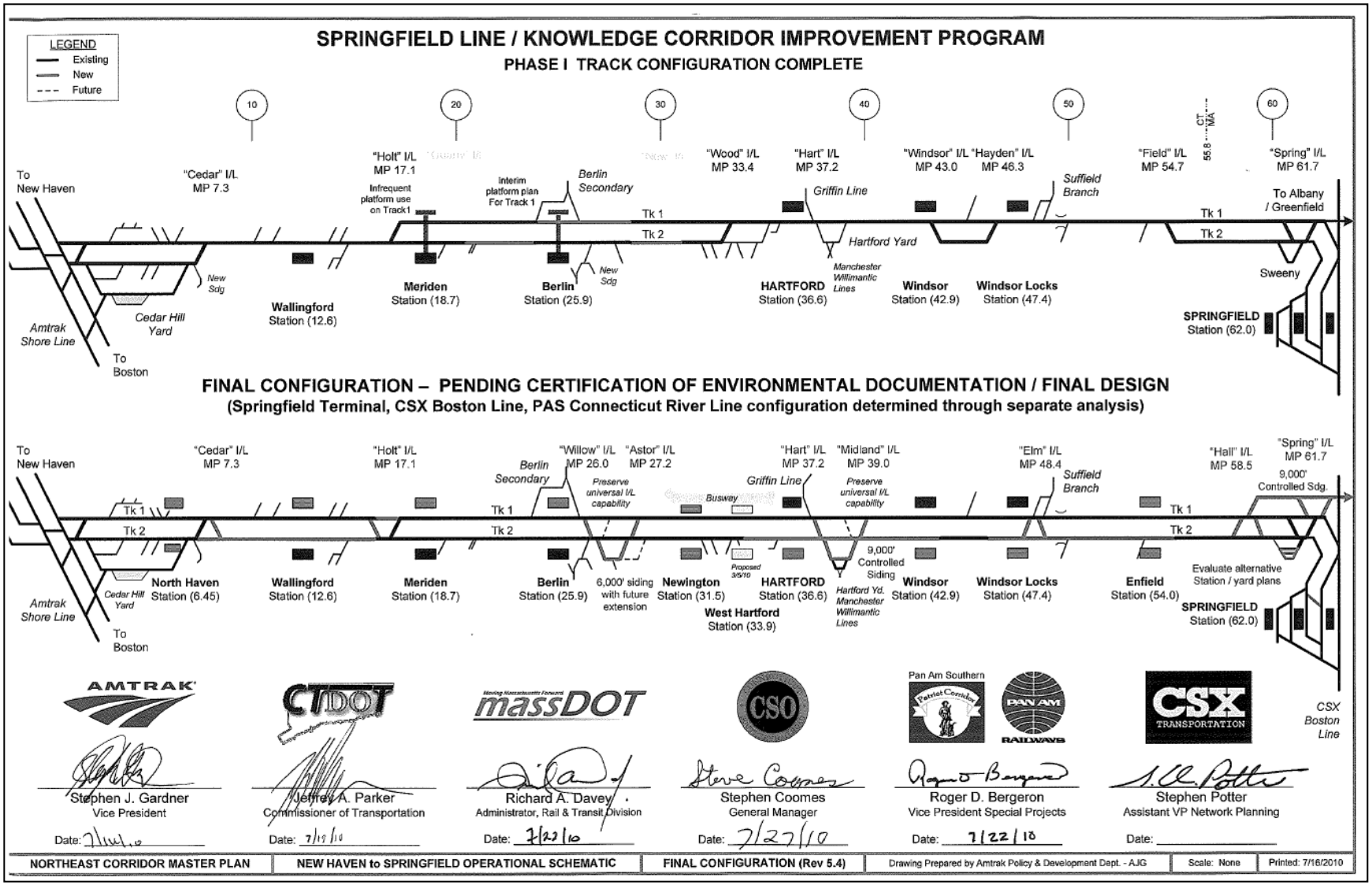


Figure 1-1 Phase 1 and Final Track Configuration

1.2. Project Description

Implementation of the initial infratsructiure improvements to accommodate the 2030 Vision Plan will cost approxmately $583 million. The improvements include the following:

- Increase track capacity through the restoration of approximately 35.7 miles of second track on existing single track sections
- Installation of approximately 5 miles of new sidings
- Installation of 12 interlockings
- Installation of signaling and control systems which meet the requirements of the Rail Safety Improvement Act of 2008
- Rehabilitation of bridges and culverts
- Improvements to 38 grade crossing warning devices to provide quad gate/median dividers
- Improvements to the following stations: Wallingford, Meriden, Berlin, Windsor, and Windsor Locks. Improvements will consist of new high-level platforms up to 500' long, overhead bridge access to the l platforms, parking capacity improvements and station amenities.
- New stations at North Haven, Newington, West Haven, and Enfield, which stations will be served by the regional trains.
- Layover/storage facilities at/near the Springfield, MA station
- Positive train control, using Amtrak's ACSES system

A description of the improvements and costs can be found in the Capital Improvement Plan Section of this Service Development Plan.

These improvements will expand travel options between the some of the largest cities in the Connecticut and Massachusetts, improve operational efficiency, increase the number of passenger trains, increase the number of stations, maintain on-time performance, and attract new riders into the system. The result will be a reduction in highway traffic congestion, reduction in carbon emissions and an improvement in air quality.

The US Department of Commerce estimates that every $1 billion dollars of new rail investment creates 20,000 jobs. Using this methodology, the total capital cost of $583 million will create 11,660 jobs. Amtrak estimates than train operations and maintenance will require approximately 110 employees on an annual basis.

In addition, Transit Oriented Development opportunities will be enhanced at each station stop along the line, creating additional jobs and economic development activity.

1.3. Related Enhancements

This project is one several projects, each with independent utility that, when integrated, will collectively advance development of a New England and national High Speed Intercity Rail system. Information on these supporting efforts is provided in the following sections.

1.3.1. Vision for New England High-Speed and Intercity Rail

The Vision for the New England High-Speed and Intercity Rail Network collectively developed by the Departments of Transportation in the six New England States provides a vision for rail in the region and a commitment to work together to coordinate efforts. The development of the rail system envisioned by this document will "… provide a foundation for economic competitiveness and promote livable communities through a network of High-Speed and Intercity Passenger Rail routes connecting every major city in New England with smaller cities and rural areas and internationally to Montreal." The plan includes the improvements to the NHHS rail corridor proposed in this SDP required to achieve the 2030 service level objectives (the 2030 Vision Plan) as a priority and recognizes the necessity for the project to provide the foundation for the larger rail network. The proposed routes included in New England's intercity rail network are shown in Figure 1-2.

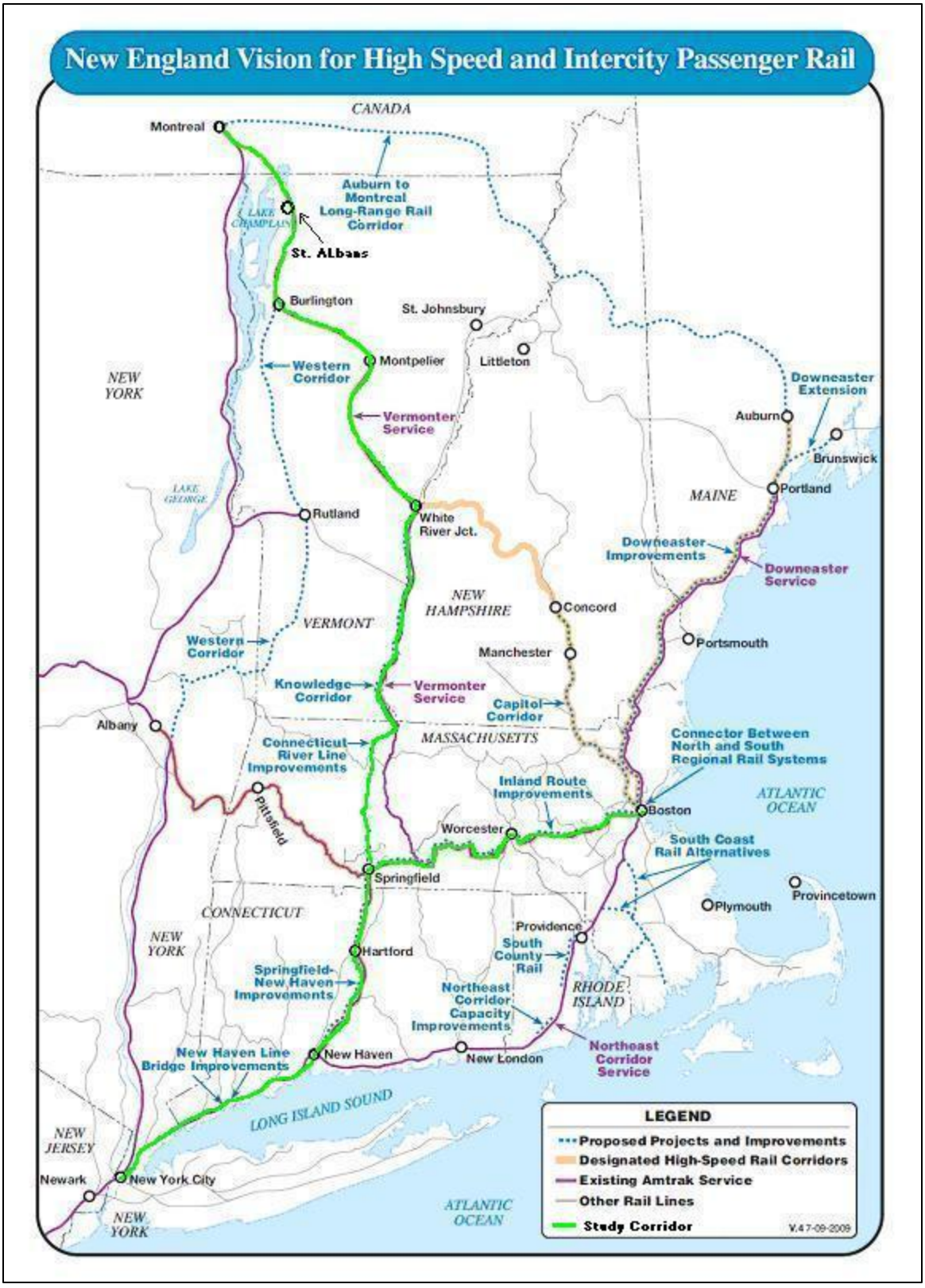


Figure 1-2 New England Vision for High Speed and Intercity Passenger Rail

1.3.2. Knowledge Corridor Improvements

The State of Massachusetts has been awarded $70 million in ARRA funding to make improvements to the "Knowledge Corridor" rail line along the Connecticut River between Springfield, MA and White River Junction, VT. The funding will be used to relocate the Amtrak intercity Passenger train, known as the Vermonter, back to its former route between Springfield and East Northfield, MA and is expected to save 25 minutes per trip and increase ridership by 23 percent.

1.3.3. Vermonter/NECR Passenger Rail Improvement Project

The State of Vermont has been awarded $52 million in ARRA funding to make track, roadbed and bridge improvements along the current route of the Amtrak Vermonter Service. These improvements will take place on the New England Central Railroad owned line and will benefit freight as well as passenger rail service.

1.3.4. Springfield to Boston Service Improvements

Planning to allow for growth in future freight rail operations and increase passenger service by five round trip trains per day has been initiated. To accommodate the additional service the following improvements are anticipated: Renovation of the station at Palmer, MA and reinstallation of approximately 25 miles of double track.

1.3.5. Program Partners

The planning and project development activities have been a cooperative and collaborative effort by the CTDOT, MassDOT, VTrans, Amtrak, and the freight railroads. All parties have participated in project related discussions in an effort to identify and resolve issues early on in the process.

1.4. Freight Railroads

Freight Railroads which operate on the NHHS Corridor include Connecticut Southern RR (CSO), CSX Transportation (CSX), Providence and Worcester RR (P&W), and Pan Am. Each of these private railroads operated on the line under an agreement with Amtrak They primarily serve industrial customers in Connecticut. To ensure growth of freight railroad operations would not be negatively impacted by the increase in passenger rail service, a 1.75% growth factor, compounded annually, was used when developing the 2020 Service Plan and related operating performance.

1.5. Project History

In 2005, at the direction of the Connecticut state legislature, CTDOT studied the feasibility of initiating a regional commuter rail service on the NHHS rail corridor. Subsequently, CTDOT completed a project-level draft Environmental Assessment evaluating the impacts of increased rail service on the NHHS rail corridor. However, in 2009 Amtrak initiated discussions with Connecticut, Vermont and Massachusetts regarding the opportunity to develop the NHHS rail corridor as a gateway for new intercity and regional service for New England. Amtrak and the three states developed a 2030 operating plan – the 2030 Vision Plan – that would include all

planned service along the NHHS rail corridor, Knowledge and Vermonter Corridors, and the Inland Route to Boston.

Currently, Amtrak operations along the NHHS rail corridor are limited to six round-trip trains per day. The 2030 Vision Plan calls for up to 25 daily round-trip trains, plus local freight rail service. Once implemented, the communities served by NHHS trains will receive some of the best passenger rail service in the nation.

In 2009-10, Connecticut applied for funding to implement the improvements necessary to accommodate the 2030 Vision Plan. Connecticut received two federal grants, but the amount remains insufficient to implement the full program. Connecticut is now seeking the remainder of the funding required to complete the NHHS Rail Project.

Upgrading the NHHS rail corridor is identified as a key component in meeting the goals of improving and sustaining regional economic viability and improving regional livability in Connecticut and the project is recognized by the Connecticut Transportation Strategy Board as an important step in implementing more robust regional Rail network.

2. Approach to the Project

2.1. Project Purpose

The purpose of the Project is to improve the existing rail infrastructure and passenger rail service and intermodal connections within the study area, promote economic growth and development, and enhance energy efficiency and environmental quality. The Project will allow 110 mph high-speed rail operations, providing a safe, convenient, and reliable alternative mode of travel. The study area's transportation network has many links and facilities that are functionally inadequate. The Northeastern United States is one of the most densely populated areas of the country and the major roadways and air traffic corridors experience chronic congestion. This has led to delays and reliability problems for all modes of transportation. Intercity trips are the most rapidly growing trip type in the study area and present the greatest opportunity to shift future riders from less efficient, more congested modes to rail.

Linking the larger cities together with high speed passenger rail will enable the study area to function as more of an integrated economic unit. It will serve key destinations within the corridor and also address growing freight operations, which are necessary for continued economic growth. The project will serve as a beneficial economic stimulus at proposed station locations. It will act as a catalyst for integrating the existing transit systems and enhancing regional economic growth and development opportunities in a way that is consistent with smart growth and long term sustainability.

The study area presents a great opportunity to link together a string of livable downtowns and neighborhoods. Many station locations already boast a vibrant mixture of land uses in compact and walkable nodes of activity that will be advanced by any enhanced service. Investment in improved intercity rail will reinforce these communities as economic, residential, and cultural

hubs of their respective areas and will lay the foundation for continued private sector investment in and around station locations.

When ridership levels are high, rail is one of the most energy efficient means of passenger transportation. Shifting ridership from automobile to rail will provide congestion relief on highways and result in a corresponding reduction in greenhouse gasses. Additionally, rail investments promote compact growth patterns, which is consistent with national, state, and local policies encouraging smart growth.

2.2. Project Need

The study area has an extensive multi-modal transportation system–highways, airports, links to intercity and commuter rail, and public transit serving all major cities and many intermediate markets. However, after significant investment over decades in all modes, the study area still faces major congestion and capacity constraints. These constraints, if not addressed, have the potential to curtail future mobility, lead to slowing economic growth. The Northeast market for intercity rail travel, of which the study area is a significant part, is estimated to reach 200 million medium distance trips of between 100 and 400 miles across all major modes – auto, air, and rail by 2025. With expected demographic growth, coupled with growing capacity constraints on the study area's highways and at major airports, Amtrak preliminary estimates are that intercity passenger rail ridership in the Northeast could double by 2030 to 28 million and quadruple by 2050 to 60 million riders depending on future network configuration options. Moreover, a substantial portion of this growth is expected in small to medium-sized markets, as well as those linking outlying areas of the region to the core urban markets between Boston and Washington.

The need for the project is based on current and projected traffic congestion and safety concerns in the Interstate corridors, resulting from a lack of an integrated rail alternative to air travel, automobile and truck usage. The Project would provide an attractive alternative mode of transportation for travel along the corridor, as well as connecting beyond to New York City, and Washington, D.C. Future programs would tie the study area to Boston and Canada. The project is part of vision that supports the transportation goals of the states in the project area. Without it, the ability of a truly integrated intercity high speed rail system in the Northeast would not be possible.

2.3. Project Rationale

Interstates 95, 91, and 89 are critical commerce corridors and primary connections for the movement of people and goods linking New Haven, Hartford, and Springfield, MA. Traffic congestion is experienced on I-95 to the south New Haven and on I-91 in pockets located primarily near New Haven and Hartford. Congestion is especially severe at the interchange of Interstate 95/91/Route 34 in New Haven. Congestion is also experienced at the I-91 Interchange with I-84 in Hartford.

Amtrak's current regional service north of New Haven, via the Springfield Line, consists of six trains each way per weekday to Springfield with one of the trains servicing Vermont. Because of the schedule and lack of frequency, this regional service cannot fully meet the needs of intercity/regional travelers and commuters.

The NHHS Vision Plan is intended to provide an attractive option for intercity/regional travelers and commuters in the Study Area that would reduce automobile usage. It would also provide a rail alternative to air traffic for business travelers and to truck traffic for the movement of goods by improving the freight schedule and reducing cost by increasing operating efficiency.

Qualitative and quantitative assessments are presented in later sections of the SDP.

2.4. Other Passenger Transportation Options in the Study Area

2.4.1. Rail Service in the Study Area

In the New Haven to Springfield segment Amtrak operates six daily intercity trains that serve eight stations between and including Springfield and New Haven. The frequency of trains is insufficient to provide a convenient commute for many intercity passengers. In addition, the current service does not provide a reliable efficient connection to Bradley International Airport in Windsor Locks.

2.4.2. Bus Service in the Study Area

- Private Bus Service along I-95 and 91 from New York City to Boston via New Haven, Hartford, and Springfield
- Connecticut Transit, Pioneer Valley Transit, and other local transit systems operate in the study area.

2.5. Evaluation of Alternatives

2.5.1. No Build Alternative

The No Build Alternative would be a continuation of existing conditions and does not meet the Purpose and Need. It is included in this document for the purpose of baseline comparison. Public transportation services would continue to be limited to the existing Amtrak intercity rail service providing minimum service and not represent a true modal choice from automobile and airline transportation. Transit options in the study area would remain poorly integrated. These limited services are not adequate to attract enough ridership to impact or affect travel options in the corridor for passengers and the traffic volume on the highways in the Study Area. Congestion in the Study Area is expected to increase along with a corresponding reduction in air quality and economic competitiveness. CTDOT's Greenhouse Gas Emission Analysis dated March 2, 2009; based on CTDOT's Travel Demand Model predicts that the No-Build greenhouse gas emissions would increase in the New Haven-Hartford-Springfield metropolitan areas about 20% by 2030.

2.5.2. Build Alternatives

2.5.2.1. Level of Rail Service Requirements in a Build Alternative

During the course of preparing earlier technical studies, it became apparent that it was not feasible to move freight operations to off-peak periods in order to reduce the amount of new railroad infrastructure required for passenger operations.. The freight railroads require

established schedules and train make-ups in order to meet their customers' delivery and pick-up requirements as well as to interface with other rail operations on connecting routes.

To provide highly marketable passenger rail service in the study area, new service should include the following features:

- Passenger Service:
  - Rail one-seat rides or cross-platform transfers from New York City to Springfield
  - Bi-directional, 30-minute peak hour service and robust mid-day service on the Springfield Line.
  - Support existing and expanded freight operations and volume.
  - To operate the improved passenger service requires infrastructure improvements as follows:
    - Implementation of a direct bus shuttle at Windsor Locks station for connecting to Bradley International Airport;
    - Modifications to existing stations on the NHHS rail line to provide high-level platforms and additional parking;
    - Improving local bus routes to provide connecting service to the stations; and,
    - Infrastructure improvements to track (ballast, ties and rail), bridges, grade crossings, warning devices, traffic signals, and other structures to support the service.

- Integration of rail freight with the proposed passenger service requires further track infrastructure improvements as follows:
  - Restoration of the second track.
  - Install layover and light maintenance track east of the Springfield Station.
  - Install passing sidings at Berlin and Hartford.

2.5.2.2. Operating Alternatives

Diesel locomotive-hauled trains are sufficient to meet the trip time and capacity requirements assumed in the 2030 Vision Plan. In the long-term, electrification provides an attractive alternative. Electrified service provides many benefits including quieter service with fewer emissions and a seamless connection from the Springfield Line to the electrified Northeast corridor which runs to Washington, DC. Service improvements would include reduced travel times, improvements in on time performance, and increase the attractiveness of rail travel.

2.5.2.3. Station Alternatives

The location for new stations to be served by the new Connecticut regional trains was considered in the 2005 Implementation Plan and the 2009 Pioneer Valley Planning Commission Final Report. Locations for stations proposed in this document are influenced by these previous reports. During the course of public involvement, prior studies were shared with the public as well as community leaders. By their very nature, station site alternatives are limited to areas

adjacent to the railroad tracks and where there is good vehicular access and where there would not be a conflict with an existing grade crossing. Public meetings have been held with the affected communities and most are in agreement with general concepts. However, final station locations could be adjusted during preparation of the NEPA documents.

Maps depicting the location of the stations within the context of the regional setting and detailed station plans are included in this application.

2.6. Methodology

2.6.1. Introduction

Sources for this SDP include technical information prepared by Amtrak for schedule, operating equipment, track configuration, and ridership. Limited field investigations took place to verify existing conditions. Also, CTDOT consulted with adjacent states, appropriate local governments, Amtrak, and freight railroad officials to assess the status of their respective plans and operations and to assemble a consensus operating and track configuration plan that would assist all stakeholders to meet their service goals.

2.6.2. The Planning Horizon

The planning horizon is geographically very broad and long term to include all of the New England states. In 2009 the New England states prepared a joint document "Vision for the New England High-Speed and Intercity Rail Network"; a bold vision for rail in the region and a commitment to work together. In May 2010 Amtrak completed the "Northeast Corridor Master Plan" which is the first in a series of planning activities towards an integrated, intermodal regional transportation system which will support future economic growth, environmental, and energy goals. This broad view was studied by CTDOT in the Service NEPA Environmental Review Document for High Speed, Intercity, and Regional Rail Service in New England (ERD 2030), distributed July 2010.

The infrastructure and service improvements on the NHHS rail corridor are integral components and initial steps in fulfilling these geographically broad and long term visions and plans. The infrastructure and service improvements described in this SPD intend to carry the project forward to the 2020-30 timeframe. This would permit rail service on the NHHS rail line to integrate well with rail improvement projects in Massachusetts and Vermont as well as setting a foundation for future programmed capacity improvements on the NHHS rail corridor.

2.6.3. Major Cross-Cutting Assumptions

There are two major assumptions included in this document. First, all improvements will be made to existing rail corridors and no new alignments are to be considered. Second, Amtrak will operate the passenger service to maximize the integration of all service on the NHHS Rail Corridor and Amtrak service on the Northeast Corridor and north to Vermont and Massachusetts.

2.6.4. Level of Public Involvement

Local stakeholders including local governments, government agencies, freight railroads, Amtrak, other businesses, and the public in general have been engaged and made aware of service and infrastructure improvements planned for the Springfield Line since 2002 when the New Haven-Hartford-Springfield Implementation Study began and continued through 2009. This engagement has been in the form of public meetings, newsletters, a web site, and meetings with local officials.

Recent public involvement for ERD 2030 included public informational meetings held in the SDP study area communities of Springfield-June 2, 2010, Hartford-June 3, 2010, and New Haven-June 9, 2010. At each of these meetings a presentation of the 2030 Vision for High Speed, Intercity, and Regional Rail Service in New England was made and public comment was encouraged. Comments made showed solid support on the part of the public for the advancement of increased rail service throughout New England. The availability of increased choices in transportation modes and improved connectivity of rail services to make intercity travel more attractive received particularly strong support.

In addition to the public informational meetings mentioned above, Connecticut held local official meetings concerning the proposed improvements.

A new Environmental Assessment (EA) is now advancing to evaluate the specific improvements planned for the NHHS rail corridor under the 2030 Vision Plan. The FRA is the lead agency for this study, with the Federal Transit Administration serving as a cooperating agency. The EA is planned for completion by the end of 2011. Additional public meetings, involvement and outreach is planned in conjunction with the EA.

A project website has been established which provides the public with project updates, notices of meetings and an opportunity to comment on the proposed projects. The address is www.nhhsrail.com.

Written public comments were received and responded to; these are included in the ERD 2030.

3. Service and Operating Plan

3.1. NHHS 2020/30 Service Plan

The proposed infrastructure improvements will increase one-way Amtrak trains from six to as many as 15 daily round-trips and add up to ten new daily round-trip regional trains to supplement Amtrak service. In addition, freight volume is assumed to increase 1.75% compounded annually while maintaining passenger trip time and meeting requirements for passenger on-time performance at 90 percent. The detailed Alternative C1 2020 Corridor Service Development Plan is included in Appendix A. The number of freight trains is not expected to increase significantly; the calculated growth is expected to result in larger freight consists. The existing freight service is included in Appendix B.

An operation simulation was performed to determine the projected performance of the future freight and passenger service as compared to the existing service. The scenarios tested for the 2020/30 build condition are labeled “2020” below and in the Appendices.

The following scenarios were evaluated:

- No-Build condition (no change in existing track configuration and existing service)
- 2020 Build condition (all double tracking except at Hartford Station and Connecticut River Bridge with proposed passenger service plan and projected growth in freight service)
- 2020 Build condition with slight modifications in the proposed service schedules (both freight and passenger) to maintain good performance parameters.

In doing so, the simulation identifies the track improvements and operational requirements for operating the 2020/30 Build track configuration with increased passenger service while meeting requirements for limiting delay and meeting on-time performance.

3.1.1. Study Area

The simulations are limited to the NHHS rail corridor between New Haven and Springfield Terminal. Figure 3-1 Study Area illustrates the Simulation Corridor and its relation to the entire New England Vision for High Speed and Intercity Passenger Rail.

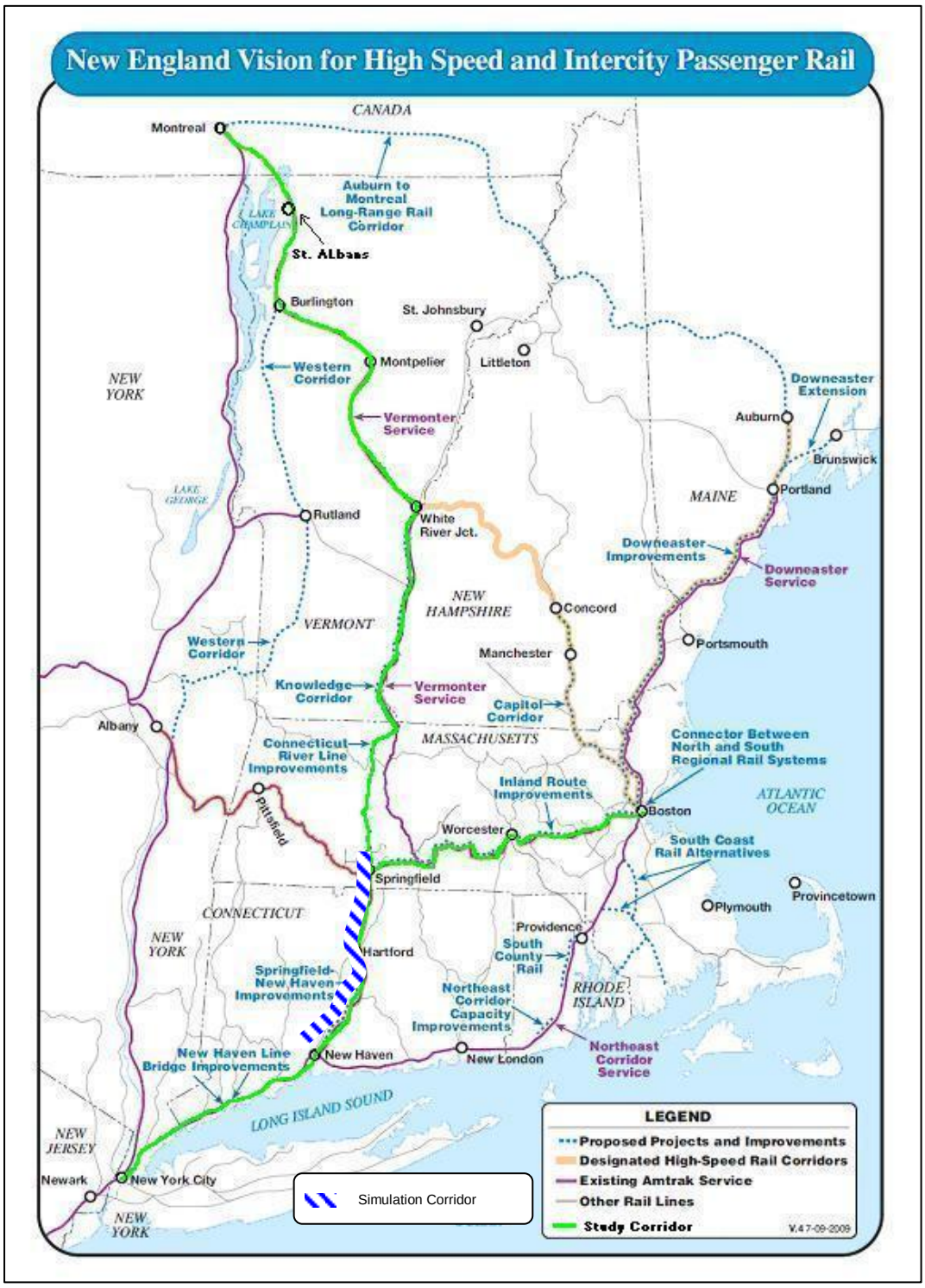


Figure 3-1 Study Area

3.1.2. Existing Train Operation

Existing train operating information was provided by the operators on the line. These were: Amtrak, Pan Am Railways, CSX Corporation, Providence and Worcester Railroad (P&W), and the Connecticut Southern Railroad (CSO). The latter four are freight railroads. Conversations with all carriers occurred in the late summer and early fall of 2008. The existing passenger schedules, for

modeling purposes, are based on Amtrak's summer 2008 schedule and include the Amtrak trains operating on the NHHS Corridor as well as all Amtrak Shore Line East and Metro North trains that operate between New Haven and Mill River. Schedules are included in Appendix B. The 2008 schedule is slightly different than the current schedule (2010); however, the differences are slight and do not affect overall modeling results. The 2010 passenger schedule is included in Appendix B for comparison.

3.1.3. Proposed Train Operation

Proposed train operations utilized in the analysis include provisions for both commuter and freight operations. The proposed C1 Service Alternative as developed by AMTRAK Policy Development Department was used to replace existing passenger service in the corridor. The C1 Service Alternative schedule is in Appendix A. In addition, the freight train services were assumed to grow by a nominal annual rate of 1.75 percent which results in a growth in train length of 23.4 % between base year 2008 and 2020. It is further assumed that there are no additional freight trains or third party service requests that may result with additional track occupancy.

3.2. Track Configuration and Operation Modeling

3.2.1. No-Build Track Configuration

The No-build track configuration for this study represents the existing conditions and is included as Appendix C-1.

3.2.2. 2020-30 Track Configuration

The proposed 2020/30 track configuration is shown in Appendix C-2. It includes restoration of the second track for the full corridor except at the Hartford Station and on the Connecticut River Bridge. This configuration includes a new third track (passing siding) north of Berlin Station MP 26.6 to MP 28.4 and in the Hartford Yard MP 37.2 to MP 38.9 .

3.2.3. Operations Simulation Software

3.2.3.1. General

Train operations were simulated using the Rail Traffic Controller (RTC) software. Essential inputs for the simulations include the existing and future freight and passenger operation, along with the existing and future track configurations; all as described above.

One of the key features of RTC is its meet-and-pass conflict resolution logic. RTC resolves "meets" or conflicts of opposing trains on the basis of priority, just as a human dispatcher would. For example, if a passenger train has a higher priority than a freight train then when a passenger train and a freight train are approaching each other on single track, the passenger train would "hold" (remain on) the mainline while the freight train would "take" (enter) a siding in order to let the passenger train pass. Also, if a train is running late, its priority increases. The opposite is true if a train is early. There are three priority values to be set in RTC: minimum, initial and maximum. The initial priority is a value assigned to a train when it goes online,

minimum and maximum are the lowest and highest boundary. RTC also offers a second layer of dispatching criteria based on train's rank. This parameter is used to handle special trains such as high speed rail; there are seven ranks available: ranks 1 to 3 designate train types as elite, while 4 to 7 as regular. RTC will strive to keep higher-ranked trains on schedule, and lower-ranked trains can be forced to take large delay in order to keep elite trains on schedule. Train priority

Table 3-1 Trains' Default Priorities and Ranks

Train Group	Train Type	Train Priority Value			Dispatch Rank
		Minimum	Initial	Maximum	
Passenger	Amtrak	6000	7000	8000	4
	NEC	6000	7000	8000	4
	SLE	6000	7000	8000	4
	Regional	6000	7000	8000	4
	REG	6000	7000	8000	4
Freight	Local	5000	6000	8000	7
	General	5000	6000	8000	7

Notes:
NEC: Northeast Corridor
SLE: Shoreline East
REG-: Intercity Regional Service

values and ranks adopted for the analysis are shown in Table 3-1.

All simulations are modeled to recognize that there is a level of randomness that occurs in train operations. The RTC software can recognize this with the application of randomization factors applied to each case. For the simulations used in this study the initial departures and dwell times were allowed to vary on a random basis within the following parameters:

Passenger Trains (including commuter service)

- Up to 2 minutes late initial departure
- Up to 15 seconds extended dwell time

Freight Trains

- Up to 15 minutes early/late initial departure
- Up to 5 minutes extended dwell time

Each simulation was run for a seven day period plus half a day for warm-up and cool down. Ten runs were performed for each case, and each run had a different random seed, i.e. trains' schedule and delays were different during each run. The results of the 10 runs were averaged and reported as the results for each particular operating case modeled.

The assumed service plans for the 2020 No-Build cases were used without modifications except for the growth in freight volume. The 2020 Build condition was modeled based on the existing freight schedules except for the growth in freight volume and by modifying the proposed C1-2020 service alternative to mitigate potential schedule conflicts as described in 3.2.5.

3.2.3.2. Train Parameters

3.2.3.2.1. Train Performance Calculator

The train performance calculator (TPC) parameter depicts the ideal run of a train. TPC runtimes assume no conflicts with other trains, all switch aligned and all green signals along the route. RTC trains were calibrated to replicate performance reported on TPC charts provided by Amtrak. Also speed restrictions on the corridor were coded according to Amtrak's TPC, which reports a maximum design speed of 110 mph with 80 mph speed limits at level crossings. Refer to Appendix D for both Amtrak and RTC generated TPC charts. The speed restrictions on the single track sections in Hartford as well as the Connecticut River Bridge are assumed to be identical to the ones currently in place.

3.2.3.2.2. PAD

According to the FRA's "Railroad Corridor Transportation Plans" guidance manual, whenever passenger schedules are produced by various TPC runs, a PAD must be added to the TPC schedule to account for a number of factors. For a double-track network the schedule pad is calculated by increasing the train runtime by a minimum of 7% to take into account the following factors:

- Human operation instead of perfect TPC operation
- Some TPC assumptions that would not prove feasible to achieve
- Extra station dwell for mail, baggage, wheelchairs, etc
- Temporary slow orders
- Low diesel power output or extra cars
- Congestion or other off-schedule trains
- Signal imposed delays
- Weather conditions
- Miscellaneous delays

3.2.3.2.3. On –Time Performance

The on-time performance (OTP) parameter represents trains' schedule adherence and is expressed as the percentage of trains arriving between their scheduled arrival time and a specific OTP Threshold Value. OTP threshold values used in the simulations are shown in Table 3-2. For passenger trains values are based on the minimum PAD (7%) for the longest passenger running time, specifically: 7 minutes PAD for a scheduled run time of 1 hour and 30 minutes. The NEC and SLE passenger trains traverse the network for approximately 15 minutes, thus the lower threshold. With respect to freight trains, considering their length/weight and consequent slower acceleration/deceleration capability, 15% of the longest service runtime train (i.e. CSO5) was used. The same reasoning applies to freight trains with short running time such as the CSX trains from Springfield yard.

Table 3-2. OTP Threshold Values

Train Type	Runtime	OTP Threshold
Passenger	90	6
NEC and SLE	15	2
CSO	420	60
CSX Springfield	30	5

3.2.4. Operating Cases Modeled

Four cases were created to simulate existing and future conditions; a brief description of each is presented below. The scenarios that build off the NHHS 2030 Vision Plan are referred to below as 2020 case scenarios (as they depict the 2020/30 level of service).

3.2.4.1. Case 1 – NO_BUILD_Existing_2008

This simulation is the Base Case and represents existing operating efficiency and delays. It is used as a basis of comparison for testing the impact of additional rail service (commuter, regional, and intercity) to the NHHS Corridor. The case models existing track configuration per the track chart in Appendix C, and existing passenger (Amtrak) and freight (CSX, Pan Am, PNW, and CSO) trains. Passenger train and freight schedules were modeled per Appendix A.

3.2.4.2. Case 2 - NO_BUILD_Future_2020_v3

This case modeled the existing track configurations and trains, but freight train length, weight, and car numbers were modified to reflect the 2020 volumes. This was a no-build simulation. The purpose of this simulation was to determine the amount of delay that the line would experience in the design year under normal growth with no improvements. It represents anticipated no-build 2020 operating efficiency and delay. It is used as a basis of comparison for testing the impact of implementing the C1 Alternative rail service to the NHHS Corridor in 2020.

3.2.4.3. Case 3 – C1_A_2020_update_v1

This case modeled the restoration of the second track along most of the project corridor and new passing sidings according to Phase II 2020 Track configuration. Train service is based on the proposed C1 Alternative and freight trains have been modified to reflect 2020/30 conditions.

3.2.4.4. Case 4 – C1_A_2020_update_OPT_v2

This case is the result of optimization of Case 3. Trains' schedule and operating plan have been modified in order to achieve same if not better performance with respect to Case 2. The following section presents the mitigation measurements implemented.

3.2.5. Operation & Infrastructure Modifications

Based on the analysis, the following modifications are suggested to improve service frequency under the Phase II 2020 Track Configuration:

- Train 490 needs to be cut back to end in Hartford instead of Springfield. This slot collides with two freight trains heading north (CS04 and PLED) and causes additional delay for REG 140

- Train 4404 needs to leave New Haven 10 minutes earlier (7:34 am) to avoid conflict with CS04

- Train 3450 needs to leave 10 minutes earlier in New Haven (9:10 am) to avoid conflict with CS01 northbound

- CS01 southbound has to use passing siding in Hartford Yard for 10 minutes to let CMTR 4403 pass

- CS01 northbound has to use passing siding in Berlin (10 minutes) to let 3450 pass

- REG 473 needs to leave 20 minutes earlier out of Springfield (12:03 pm) to avoid
- conflict with EDPL

- REG 141 needs to leave Springfield 15 minutes earlier (6:02 am) but departs Hartford as planned

- REG 494 leaving Hartford 8:04 pm arriving Springfield 5 minutes later (8:44 pm).

- Due to the structure of the service requests for freight and long distance passenger trains, one schedule conflict remains: Regional train 140 departs Hartford as planned and arrives at Springfield about 10 minutes later (10:06 am) than indicated in the proposed service plan. This train is routed from Washington to Boston and has a conflict with PLED, both heading northbound from Hartford. This conflict is independent from the track configuration and will most likely remain under a two-track configuration.

- Commuter train 4406 needs to leave New Haven 9 minutes earlier (8:52 am).

After these schedule adjustments and infrastructure modifications are made no significant schedule conflicts for the planned passenger and freight services were apparent. The proposed Track Occupancy for the various passenger services in the Springfield and New Haven stations was assumed to follow the conceptual assumptions as shown in the figures in Appendix E.

3.2.6. Results

An acceptable operating scenario is one where the on-time performance (OTP) meets the 90% minimum criteria for passenger and freight service based on FRA guidelines. Moreover, the optimization step intended to replicate the same conditions as the No Build cases. The results from these simulation runs are shown in Tables 3-3 to 3-5.

Comparing the optimized C1 2020 Alternative to the 2020 No-Build, the percent of accumulated delay time (expressed as a share of the total delay versus the total optimal run time of a train) is higher (3.3% versus 1.5% for passenger trains and 17.4% versus 14.9% for freight trains).

The average delay per 100 train miles is 4.0 minutes for passenger service (2.2 min in No-Build) and 49.9 minutes for freight services (42.4 minutes in No-Build).

Even though the optimized C1 2020 alternative case does not improve the no build conditions, OTP values are well within the required FRA thresholds of 90% despite a quadrupling of train service.

Table 3-3 Delay Percentage

Case Number	Operating Case Name	Delay Percentage		
		Passenger	Freight	Overall
1	NO_BUILD_Existing_2008	1.4	14.2	6.7
2	NO_BUILD_Future_2020_v3	1.5	14.9	7.1
3	C1_A_2020_update_v1	3.9	20.3	8.0
4	C1_A_2020_update_OPT_v2	3.3	17.4	6.8

Table 3-4 Minutes of Delay per 100 Train Miles

Case Number	Operating Case Name	Minutes of Delay per 100 Train Miles		
		Passenger	Freight	Overall
1	NO_BUILD_Existing_2008	2.0	39.5	12.1
2	NO_BUILD_Future_2020_v3	2.2	42.2	12.9
3	C1_A_2020_update_v1	4.7	58.2	11.4
4	C1_A_2020_update_OPT_v2	4.0	49.9	9.7

Table 3-5 On Time Performance

Case Number	Operating Case Name	On Time Performance		
		Passenger	Freight	Overall
1	NO_BUILD_Existing_2008	99.8%	99.4%	99.7%
2	NO_BUILD_Future_2020_v3	99.8%	99.4%	99.7%
3	C1_A_2020_update_v1	93.4%	96.6%	94.0%
4	C1_A_2020_update_OPT_v2	95.2%	96.7%	95.5%

For additional detailed information refer to train performance parameters by train in Appendix F and the String Charts in Appendix G.

3.2.7. Conclusions/Recommendations:

The proposed C1 2020 Alternative train service and the Phase II 2020 Track Configuration with single track at the Hartford Station and the Connecticut River Bridge are feasible with the revised schedule and operating plan as described herein. This operational concept can be performed within the required performance thresholds but shows slightly reduced operating performance compared to existing conditions.

The analysis of the rail operations for Phase II, Alternative C1 2020 shows that it reaches the maximum number of train movements possible for the infrastructure configuration while maintaining reasonable operational conditions. While the OTP meets the 90% requirement the passenger minutes of delay is greater by approximately 2 minutes/100 train miles or 1 minute/trip than the “No Build” case. A reduction of planned passenger services in 2020 would be required to reach equal or better average delay parameters as compared to the No Build situation. However, it is our opinion that greater service opportunities provide passengers with greater flexibility to meet the train schedules thereby reducing wait time at the stations. The

analysis also shows a conflict between AMTRAK 140 (Washington to Boston) and a freight train. This will have to be resolved based on bi-lateral agreements.

The analysis assumes utilization of the planned passing tracks (third track) in Hartford Yard and north of Berlin Station. These passing sidings provide additional operational flexibility when resolving schedule conflicts.

3.3. Equipment Plan

The number of train sets required are included in Appendix A as part of the Service Plan. The Incremental Equipment required is included in Appendix J as Section 4 of the Financial Analysis and summarized as follows:

- Diesel Locomotives - 11
- Cab Cars - 9
- Coaches - 20
- Food Service Cars - 2

Equipment Turns for passenger trains are included in Appendix A.

Consists for freight trains are included in Appendix B.

3.4. Conceptual Operating Cost Estimate

The Incremental Annual Operating Cost Estimate is included in Appendix J as Section 2 of the Financial Analysis and, based on Proposed (Reduced) fares is summarized as follows by route:

- NHV – SPG (RT 12) $24.5 Million
- Vermonter Greenfield (RT 04) $ .8 Million
- CT Regional Trains $ 34.8 Million
- NE Regional (RT 05) $ .8 Million
- Total (2020 Dollars) $60.9 Million
- Total (2010 Dollars)* $41.7 Million

*Appendix J Page 5

3.5. Project Management

Amtrak owns and operates the NHHS line and dispatches all of the freight operations of the Pan Am South, CSX, P&W, and CSO on this line. Amtrak has significant experience in building rail projects and in administering Federal funds. Amtrak has overseen major new construction and rehabilitation projects on its infrastructure with its own forces and/or the support of consultants and contractors. In carrying out the infrastructure improvements under this service development plan, Amtrak intends to augment its internal capacity with staff from CTDOT as well as experienced consultants and contractors.

A completed Project Management Plan has been developed and is provided in Section 6 of the Application. It is based on current, successful CTDOT and MassDOT practices and addresses management, budget, schedule and risk factors. Major points of the plan include:

- Based on a track record of success in completing railroad infrastructure projects.
- Use of experienced in-house staff with consultant assistance
- Create manageable contract packages (design/build wherever possible)
- Use of Project Management systems that are in place for technical, budget and schedule monitoring and control
- Safety component and references for construction and operation of the existing and planned corridor system
- Risk assessment and management to mitigate identified risks in implementation

CTDOT recognizes the size and complexity inherent in this undertaking and understands the need to adapt existing management systems to accommodate the coordination that will be necessary to design, build, and acquire all of the pieces necessary to complete the NHHS Corridor program.

3.6. Project Schedule

Preliminary engineering and NEPA environmental review began in 2010-11 and will be completed by the end of 2011/early 2012. Final design is expected to be complete by March 2013, with construction work to be completed in 2015. Revenue Operation would begin by 2016.

The Project Schedule is included in Appendix I and is based on the capital spending plan, project sequencing, and design and construction requirements.

Projects within the overall NHHS Rail Project will be sequenced to minimize existing rail traffic interferences and delays while providing the most cost effective contracting approach possible.

While current conditions have been used as the basis for this initial project sequencing, future rail traffic and economic conditions may suggest different approaches, particularly in the out years of the program.

4. Prioritized Capital Plan

4.1. NHHS Rail Project

The NHHS Rail Project includes: restoration of the second track and new sidings; upgrades and new platforms at existing Amtrak stations, addition of new stations (funded from non-HSIPR program sources), and implementation of the C1 2020 Alternative Service Plan. The investment for this work was included in the HSIPR Track 2 application submitted by Connecticut to the FRA in 2010. Because the funding request was only partially funded by the FRA, Connecticut is reapplying for additional funds to be able to complete the construction work.

4.2. Long Term Plan

The Long Term Plan includes electrification of the NHHS Corridor to allow a seamless connection to the electrified Northeast corridor and infrastructure improvements to include rehabilitation or replacement of the Connecticut River Bridge and the Hartford Viaduct to allow for additional track capacity. This track configuration is included as Figure 1-1.

4.3. Estimated Capital Cost

The overall capital cost estimate for the NHHS Rail Plan is currently estimated at $583 million in year of expenditure dollars. Appendix I includes has been updated to include the latest costs by individual project component. These include the following costs, escalated to year of expenditure and including contingency:

Track Construction	$150.7 Million
Communication/Signaling	$61.1
Structures	$79.3
Stations	$128.2
Professional Services	$60.1
Total	$479.4

Springfield Line Track 2 Application Estimated Costs

7/27/2010

Track 2 Component	Quantity	Unit	2010 Unit Cost	2010 Raw Construction Cost	Inflation Rate	Mid-point (2015) Construction Cost	Contingency	2015 Construction Cost With Contingency
Double Track Construction / Rehabilitation / Interlockings / Sidings								
New Track[1]								
MP 7.1 to MP 17.0	9.9	Trk. Mile	$1,452,000	$14,374,800	15%	$16,531,020	10%	$18,184,122
MP 35.1 to MP 37.2	2.1	Trk. Mile	$1,452,000	$3,049,200	15%	$3,506,580	10%	$3,857,238
MP 38.9 to MP 43.0	4.1	Trk. Mile	$1,452,000	$5,953,200	15%	$6,846,180	10%	$7,530,798
MP 46.3 to MP 54.7	8.4	Trk. Mile	$1,452,000	$12,196,800	15%	$14,026,320	10%	$15,428,952
New Track Total	24.5	-	-	$35,574,000	-	$40,910,100	-	$45,001,110
Sidings	5.0	Trk. Mile	$1,452,000	$7,260,000	15%	$8,349,000	10%	$9,183,900
Track Rehabilitation								
Parkville MP 31.1 to MP 35.1	4.0	Trk. Mile	$1,452,000	$5,808,000	15%	$6,679,200	10%	$7,347,120
Hartford MP 37.2 to MP 38.9	1.7	Trk. Mile	$1,452,000	$2,468,400	15%	$2,838,660	10%	$3,122,526
Rehabilitation Total	5.7	-	-	$8,276,400	-	$9,517,860	-	$10,469,646
Layover/Maintenance Area	1.0	LS	$5,000,000	$5,000,000	15%	$5,750,000	10%	$6,325,000
Interlockings	12.0	Each	$5,250,000	$63,000,000	15%	$72,450,000	10%	$79,695,000
Track Conctruction Total	-	-	-	$119,110,400	-	$136,976,960	-	$150,674,656
Communications / Signaling[1]								
Signal Improvements @ Grade Crossings								
Improvements @ New Double Track	17.0	Each	$400,000	$6,800,000	15%	$7,820,000	15%	$8,993,000
Modifications @ Existing Double Track	21.0	Each	$250,000	$5,250,000	15%	$6,037,500	15%	$6,943,125
CAB Signal System	33.6	Trk. Mile	$300,000	$10,080,000	15%	$11,592,000	10%	$12,751,200
Communications Cable	27.9	Trk. Mile	$125,000	$3,487,500	15%	$4,010,625	10%	$4,411,688
Signal Express Cable	27.9	Trk. Mile	$250,000	$6,975,000	15%	$8,021,250	10%	$8,823,375
C&S 480V Power Cable Relocation	27.9	Trk. Mile	$150,000	$4,185,000	15%	$4,812,750	10%	$5,294,025
Control Center (CETC) Changes	0.8	LS	$2,000,000	$1,600,000	15%	$1,840,000	10%	$2,024,000
Comm. & Signal Cutover and Testing	0.8	LS	$3,000,000	$2,400,000	15%	$2,760,000	10%	$3,036,000
Positive Train Control	1.0	LS	$7,000,000	$7,000,000	15%	$8,050,000	10%	$8,855,000
Communications / Signaling Total	-	-	-	$47,777,500	-	$54,944,125	-	$61,131,413
Structure Costs								
Bridge Work (excludes CT River and Hartford Viaduct)	1.0	LS	$50,000,000	$50,000,000	15%	$57,500,000	15%	$66,125,000
Culvert Replacement	1.0	LS	$10,000,000	$10,000,000	15%	$11,500,000	15%	$13,225,000
Structure Costs Total	-	-	-	$60,000,000	-	$69,000,000	-	$79,350,000
Stations[2]								
New Haven State Street	1.0	LS	$3,177,000	$3,177,000	15%	$3,653,550	10%	$4,018,905
Wallingford	1.0	LS	$20,842,000	$20,842,000	15%	$23,968,300	10%	$26,365,130
Meriden	1.0	LS	$21,875,000	$21,875,000	15%	$25,156,250	10%	$27,671,875
Berlin	1.0	LS	$16,728,000	$16,728,000	15%	$19,237,200	10%	$21,160,920
Windsor	1.0	LS	$20,317,000	$20,317,000	15%	$23,364,550	10%	$25,701,005
Windsor Locks	1.0	LS	$15,615,000	$15,615,000	15%	$17,957,250	10%	$19,752,975
Land Acquisition (station areas)	1.0	LS	$1,954,000	$1,954,000	15%	$2,247,100	15%	$2,584,165
Relocation of Redidents / Businesses (station areas)	1.0	LS	$700,000	$700,000	15%	$805,000	15%	$925,750
Stations Total	-	-	-	$101,208,000	-	$116,389,200	-	$128,180,725
Professional Services								
Preliminary Bridge Study (Hartford Viaduct and CT River)	1.0	LS	$10,000,000	$10,000,000	0%	$10,000,000	0%	$10,000,000
Preliminary Engineering	5%	LS	-	$5,060,400	0%	$5,060,400	0%	$5,060,400
Final Design	10%	LS	-	$10,120,800	0%	$10,120,800	0%	$10,120,800
Project Management for Design & Const.	5%	LS	-	$5,060,400	15%	$5,819,460	0%	$5,819,460
Construction Adin. & Management	10%	LS	-	$10,120,800	15%	$11,638,920	0%	$11,638,920
Professional Liability and other Non-Construction Insurance	2%	LS	-	$2,024,160	15%	$2,327,784	0%	$2,327,784
Legal; Permits; Review Fees by other agencies, cities, etc.	2%	LS	-	$2,024,160	15%	$2,327,784	0%	$2,327,784
Surveys, Testing, Investigation, Inspection	10%	LS	-	$10,120,800	15%	$11,638,920	0%	$11,638,920
Start up	1%	LS	-	$1,012,080	15%	$1,163,892	0%	$1,163,892
Professional Services Total	45%	-	-	$55,543,600		$60,097,960		$60,097,960
GRAND TOTAL				**$383,639,500**	-	**$437,408,245**	-	**$479,434,754**

1. Assumes Track 1a work to add second track north of Berlin is in place.
2. Assumes parking and amenity improvements at stations currently served by Amtrak, plus New Haven State Street.

Table 4-1 Track 2 Estimated Capital Cost

4.4. Post-2030 Long Term Capital Improvements

- Connecticut River Bridge: Construction of an additional track over the Connecticut River will require improvements to the Connecticut River Bridge. While these improvements are not required for the NHHS 2030 Vision Plan, increases in the level of service will require the installation of double track in this area in the future.

- Hartford Viaduct: The viaduct in downtown Hartford will require rehabilitation of the structure. As with the Connecticut River Bridge, this work is not required for implementation of the NHHS 2030 Vision Plan.

- Electrification: The long term plan for service and infrastructure improvements includes electrification from New Haven to Springfield. This will allow a seamless connection from the NHHS Corridor to the electrified Northeast corridor which runs from Washington, DC to Boston, MA. Service improvements would include reduced travel times, improvements in on time performance and increase the attractiveness of rail travel.

5. Ridership and Revenue Forecast

5.1. Travel Demand Forecasting Methodology

5.1.1. Scope of the Travel Demand Model

The forecasting model to establish ridership and revenue forecasts for the New Haven to Springfield C1 service plan is based on the Amtrak travel demand model[1]. This model is a multimodal passenger travel demand forecasting model and considers intercity passenger travel by passenger car, air, intercity bus as well as premium (Acela) and regular (Regional) rail modes. It is used to understand existing and to predict future intercity passenger travel within the Northeast of the United States. The results of the model runs are ridership and ticket revenue forecasts for future Amtrak service scenarios and pricing alternatives. The study area is shown Figure 5-1 and includes the Northeast Corridor spine (Washington, D.C. – New York – Boston) and the corridors branching from the spine serving Virginia, Harrisburg, Albany, and Springfield.

1 AMTRAK, Summary of AMTRAK Travel Demand Forecasting Models, PowerPoint Presentation, April 2010 (Appendix H is an extract from a larger presentation made to GAO in April 2010).

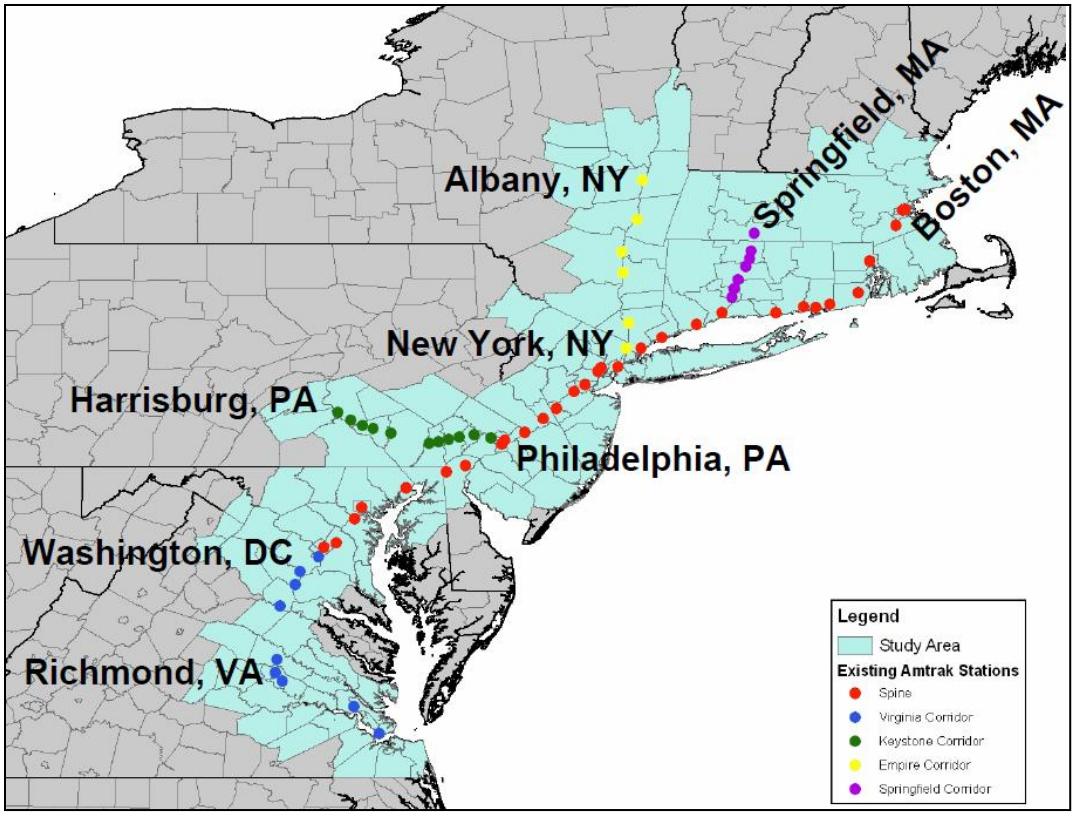


Figure 5-1 Model Study Area

The demand model is based on two major sources for measuring current travel mode choice and origin-destination (O-D) patterns:

- Passenger and vehicle counts; and
- New travel surveys

These data sources are used as data base to reflect current demand and to calibrate the demand model algorithms to properly reflect user reaction to changes in travel conditions.

5.1.2. Passenger and Vehicle Counts

The data includes Amtrak Data Warehouse data, FAA 10 percent sample data including commercial airlines and commuter /air taxi. In addition, highway traffic counts are used to determine current and historic road travel demand.

5.1.3. New Travel Survey

In order to estimate and validate travel patterns within the model, the following travel survey results were incorporated into the demand model:

- Highway origin-destination surveys;
- Telephone survey of Amtrak customers; and

- Telephone survey of random Northeast Corridor (NEC) travelers

5.1.4. Highway Origin-Destination Surveys

The travel survey program included 4,638 completed mail-back highway O-D surveys in Maryland, New Jersey, and Massachusetts. The purpose of the survey was to establish an estimate of O-D patterns of passenger car travelers within the NEC. It was also used to adjust data from the random traveler telephone survey to account for under-reporting of passenger car trips. Data collected included origin and destination of the trip, trip purpose, group size and the trip duration as well as household demographic data including household size, passenger car ownership, and income.

5.1.5. Amtrak Customer Survey

The Amtrak customer survey was performed for Acela, Regional, Virginia, Keystone, Empire and Springfield services, and totaled 5,001 completed interviews. The survey was used to establish O-D trip table by purpose for Amtrak trips within the Northeast Corridor. The sensitivity of Amtrak customers to travel time, service frequency, fares / cost, on-time performance and other characteristics was evaluated. During the questionnaire observed trip data was recorded differentiated by current Amtrak class of service (Acela first class, Acela business class, Regional business class, or Regional coach class), origin, and destination of the trip, trip purpose, and size of the group that travelled. In addition, a stated preference survey about future stated travel preferences was performed were travelers were asked about potential modes of travel (Acela, regional train, passenger car, air travel or intercity bus) in combination with varied levels of service (travel time, frequency, fare/cost and on-time performance). The answers from these stated preference surveys are being used to determine elasticities for use in the demand modeling process. The survey staff also collected data regarding the household size, passenger car ownership, and income from the interviewed person.

5.1.6. Telephone Survey of Random NEC travelers

The telephone survey of random NEC travelers covers 10,015 completed answers from motorists, air passengers, and intercity bus travelers. The survey was intended to produce origin-destination trip tables by purpose for passenger car, air, and intercity bus trips in the Northeast Corridor. The data was used to determine the random travelers' sensitivity to travel time, frequency, fare/cost and on–time performance of these modes. The observed data includes the current mode, origin and destination, trip purpose and group size. The stated preference section of the survey asked about future travel intentions regarding modes and a varied combination of levels of service parameters such as travel time, frequency, fare/cost and on-time performance. This survey also included questions about household size, car ownership, and income.

5.1.7. Summary of Travel Market Data

Based on the major data sources as described above, a person O-D trip table by mode and purpose for annual trips in the Northeast Corridor was developed. The amount of annual person

trips by mode and between pairs of metropolitan areas is shown in Figure 5-1; Figure 5-2 shows the amount of trips by purpose between pairs of metropolitan areas.

Metro Area Pair	Auto	Air	Bus	Acela	Regional	Total
Boston - New York	13,563,377	2,499,698	1,223,674	465,902	374,405	18,127,056
Boston - Philadelphia	2,382,853	541,760	98,224	14,329	42,610	3,079,776
Boston - Washington	1,632,061	2,102,639	64,256	18,914	37,969	3,855,839
New York - Philadelphia	31,715,504	45,644	1,451,467	301,768	976,337	34,490,720
New York - Baltimore	7,664,755	206,834	958,002	154,393	386,516	9,370,500
New York - Washington	13,844,102	1,427,551	756,048	510,833	1,095,630	17,634,164
Philadelphia - Baltimore	9,186,058	89,361	217,967	21,876	119,276	9,634,539
Philadelphia - Washington	8,355,977	45,884	137,539	194,101	475,046	9,208,546

Table 5-1 Summary of Travel Demand Market Data – 2006 Person Trips by Mode

Metro Area Pair	Business	Non Business	Total
Boston - New York	4,080,235	14,046,821	18,127,056
Boston - Philadelphia	533,050	2,546,726	3,079,776
Boston - Washington	1,494,585	2,361,254	3,855,839
New York - Philadelphia	9,140,351	25,350,369	34,490,720
New York - Baltimore	989,685	8,380,815	9,370,500
New York - Washington	2,580,857	15,053,307	17,634,164
Philadelphia - Baltimore	3,019,953	6,614,586	9,634,539
Philadelphia - Washington	1,805,900	7,402,646	9,208,546

Table 5-2 Summary of Travel Demand Market Data – 2006 Person Trips by Purpose

The trip tables represent a combination of the data from the Amtrak customer survey and the random traveler surveys. The Amtrak data was weighted to reflect the fiscal year 2006 Amtrak ridership on Acela, Regional, Virginia, Keystone, Empire and Springfield services. In order to reflect the total non-Amtrak intercity traveling population, the random traveler surveys were weighted to match the total travel demand. The passenger car trips with this survey had to be adjusted to compensate for under-reporting of passenger car trips in telephone recall surveys. This adjustment process was based on the trip table developed from the highway surveys.

5.1.8. Socio-Economic Data & Forecasts

The main factors influencing the travel demand forecast are population, employment, and per-capita income. This data was derived from Economy.com and projections by county as well as the U.S Census data for allocations to sub-county areas. The population estimates for 2006 and

2010 by metropolitan region are shown in Table 5-3, employment estimates for 2006 and 2010 are shown in Table 5-4, and the per-capita income is shown in Table 5-5.

Metro Area	2006 (millions)	2010 (millions)	Change 2006-2010
Washington	5.103	5.342	4.7%
Baltimore	2.904	2.985	2.8%
Wilmington	0.848	0.882	4.0%
Philadelphia	5.417	5.470	1.0%
New York including New Jersey	18.854	19.096	1.3%
New Haven	0.849	0.864	1.8%
Trenton	0.368	0.377	2.5%
Providence	1.193	1.211	1.5%
Boston	6.062	6.157	1.6%

Table 5-3 Summary of Travel Demand Market Data – Population by Metropolitan Area

Metro Area	2006 (millions)	2010 (millions)	Change 2006-2010
Washington	2.909	3.115	7.1%
Baltimore	1.412	1.488	5.4%
Wilmington	0.418	0.441	5.4%
Philadelphia	2.609	2.699	3.5%
New York including New Jersey	8.432	8.757	3.9%
New Haven	0.380	0.402	5.8%
Trenton	0.242	0.255	5.4%
Providence	0.531	0.550	3.6%
Boston	3.102	3.224	3.9%

Table 5-4 Summary of Travel Demand Market Data – Employment by Metropolitan Area

Metro Area	2006 (ths/2006$)	2010 (ths/2006$)	Change 2006-2010
Washington	52.16	56.08	7.5%
Baltimore	43.12	47.42	10.0%
Wilmington	39.89	44.84	12.4%
Philadelphia	42.51	45.18	6.3%
New York including New Jersey	48.11	52.72	9.6%
New Haven	42.25	45.68	8.1%
Trenton	50.34	54.54	8.3%
Providence	36.64	39.10	6.7%
Boston	47.12	51.15	8.6%

Table 5-5 Summary of Travel Demand Market Data – Per Capita Income by Metropolitan Area

5.1.9. Highway Mode

In order to estimate travel times on the highway network within the demand model corridor, distances, and travel times were obtained from the New York Metropolitan network for the New York area and the Oak Ridge National Laboratory Highway Network for the rest of the study area. The highway link speeds were derived from the New York Metro area speeds or assigned based on the facility types within the Oak Ridge network and adjusted in urban areas.

Travel cost was reflected as a per-mile cost which is assumed to be fully allocated at 43.5 cents per mile for business trips and an incremental cost of 18 cents per mile for non-business trips. In addition tolls incurred during the trip were allocated for passenger car trips.

5.1.10. Summary of Service Characteristics

Table5-6 represents the service characteristics between Washington D.C and New York, Table 5-7 represents the characteristics between New York and Boston, respectively. The tables are for each mode showing distance travelled, travel times, cost and frequency as well access and terminal times and distances for non-auto modes. The auto cost includes tolls and is shown for business and non-business travel purpose due to the differences in allocating the cost.

	Auto	Air	Bus	Acela Express	Regional
Line Haul					
Distance (miles)	236	214	236	226	226
Travel Time (hours)	4.4	1.2	4.8	2.8	3.4
Travel Cost *	$133/$58	$125	$37	$156	$82
Frequency (avg./day)		38	21	15	21
Access/Terminal					
Distance (miles)		15.58	5.41	5.84	5.84
Travel Time (hours)		0.41	0.23	0.25	0.25

* Auto Cost Includes Tolls and is Presented as Business / Non Business Costs

Table 5-6 Summary of Service Characteristics Washington – New York

	Auto	Air	Bus	Acela Express	Regional
Line Haul					
Distance (miles)	208	185	208	231	231
Travel Time (hours)	3.82	1.2	5	3.6	4.2
Travel Cost	$110/$44	$121	$37	$107	$68
Frequency (avg./day)		40	21	9	9
Access/Terminal					
Distance (miles)		14.64	5.22	5.65	5.65
Travel Time (hours)		0.44	0.20	0.22	0.22

* Auto Cost Includes Tolls and is Presented as Business / Non Business Costs

Table 5-7 Summary of Service Characteristics New York – Boston

5.1.11. Travel Demand Model Components

Based on the data input described in the previous paragraphs, the demand model uses as two-stage approach to estimate ridership. The first step describes the total travel market as volume of travel between two areas and includes an assessment of the existing market size and a forecast of the future market growth. The second step handles mode share calculations to split the travel volume by mode between two areas. The mode split is performed for Amtrak premium service (Acela Express by class) and regular service (Regionals/Empire/Keystone services by class), passenger car, air travel and intercity bus.

The travel demand model utilizes a nested logit model with a market segmentation into business and non-business trips. The model structure and the logit equation are shown in Figure 5-2. The independent variables determining the user reaction to changes in service are:

- Level of service;
- Travel time including in vehicle and access time;
- Departure frequency and time of departure;
- On-time performance (OTP); and
- Travel cost versus available income.

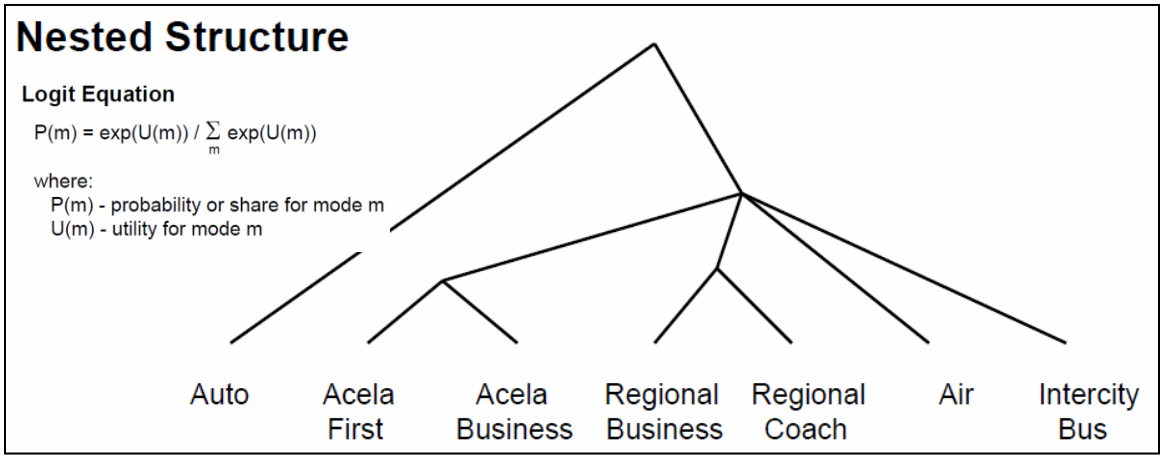


Figure 5-2 Nested Logit Model Structure

The utilities for each mode are calculated from the independent variables as described above. The weighting of these variables is based on a statistical analysis of the stated / revealed preference surveys. This analysis reflects the trade-off or substitution behavior among the available modes and sensitivity to changes in the key characteristics such as travel time, travel cost, frequency and schedule slotting, on-time performance and the need to transfer or make connections during the course of the travel. These reactions are calculated for each market segment due to the differential sensitivity by trip purpose.

The nested logit model is calibrated using existing market and service characteristics trying to match observed actual travel volume data in respect to ridership and revenue.

5.1.12. Elasticities of Demand

The key elasticities of the model calculations are shown in Table 5-8. A negative elasticity will result in a decrease of demand when the variable increases or an increase of demand when the variable decreases (e.g. cost). A positive elasticity will show an increase in demand with an increase in the variable value and a decrease in demand with a decrease in variable value. Travel time yields the highest impact on rail demand, followed by cost, on-time performance, and frequency of service.

	Acela	Regional
First Class Cost	-0.64	-
Business Class Cost	-0.65	-0.60
Coach Class Cost	-	-0.85
Travel Time	-1.40	-1.24
Frequency	0.35	0.34
OTP (@ 80%)	0.63	0.34
Impact of Transfer/Connection	-40%	-32%

- Fare elasticity of -0.65 means that a 10% *increase* in fare will result in a 6.5% *decline* in demand (ridership); after applying the increased fare yield (of +10%) this results in a net revenue *increase* of about 3.5%
- Travel Time elasticity of -1.4 means that a 10% *reduction* in travel time will result in a 14.0% *increase* in demand (ridership or revenue)
- Frequency elasticity of 0.35 means that a 10% *increase* in frequency will result in a 3.5% *increase* in demand (ridership or revenue)
- OTP elasticity of 0.63 means that a 10% *increase* in OTP, from 80% to 88%, will result in a 6.3% *increase* in demand (ridership or revenue)

Table 5-8-Key Line Haul Sensitivities (Elasticities) of Demand (Average Across all Northeast Corridor Markets)

A transfer or connection results in a reduction of rail demand of 32% for regional trains and 40% for Acela trains compared to a service without the need for changing trains. Generally the elasticities for Acela trains are higher than the ones for regional trains except for frequency which is more or less identical between the train categories. These elasticities are reflected in the annual ridership and revenue forecasts provided.

The Revenue Forecasting Methodology includes a longer planning horizon (2030) than this Service Development Plan, however, the results of the process are applied only to 2020 ridership.

5.2. Revenue Forecasts

A detailed Financial Analysis including revenue assumptions and methodology was provided by Amtrak and is included as Appendix J. This forecast is for the Springfield Line as a component of the larger “Knowledge Corridor.” Improvements to the “Knowledge Corridor” in Massachusetts and Vermont are already committed projects.

The Revenue Forecasting Methodology includes a longer planning horizon than included in this Service Development Plan. However, the results of the process are applied only to 2020/30 ridership. The forecasted annual revenue is a net increment (vs. Baseline) of $21.6 Million.

6. Assessment of Benefits

Investment in improvements on the NHHS Corridor is anticipated to create substantial transportation, economic/job creation and environmental benefits in both Connecticut and Massachusetts.

One of the most important aspects of this corridor program is the incremental increase this project provides toward the creation of a nationally integrated Intercity Passenger Rail network. The infrastructure improvements to the NHHS rail corridor will increase the level of passenger service in one of the most densely populated areas of the country, providing convenient connections to the largest cities in the region. Congestion on all interstate highways in the region has been a problem for decades. These conditions will continue to deteriorate unless safe and convenient alternatives, such as new passenger all options, are made available to travelers.

Because of these conditions it is expected that the service will attract new riders looking to avoid adverse driving conditions and reduce personal vehicle operating costs.
The NHHS Rail Project will provide intermodal connections at all station stops along the corridor. Dedicated bus service will connect the Windsor Locks station with Bradley Airport. All stations will have connections with local bus service.

Freight rail service will be improved by the additional track capacity allowing operators to better serve their customers. It is anticipated that freight operations will grow at a rate of 1.75% per year. The capital improvements plan has been developed to accommodate this growth with an increase in freight delay of only 10 minutes per 100 train miles or about 3 minutes per trip.

6.1. Benefits from Transportation Improvement

Three categories of benefits were measured for this assessment, including important benefits to riders generated as a result of the enhanced intercity service and the new commuter service. In addition to rider related benefits, however, the study measured the secondary congestion reduction benefits that include reduced highway maintenance costs, reduced emissions and environmental benefits. All benefits are measured in comparison to the No-build Alternative. The categories of benefits, due to the proposed rail investments, include the following:

- **Benefits to Riders:** These are the benefits for induced rail passengers who are projected to use the service after the improvement. This benefit is measured by the difference between the generalized cost of highway and rail travel for each origin-destination pair, accounting for travel time, vehicle operating costs, rail fare, and an amenity factor. The vehicle operating cost savings account for fuel, oil, depreciation, tire wear, and maintenance and repair. The amenity factor incorporates the increased comfort and quality of the time spent travelling by rail.

- **Economic Development Benefits:** These benefits result from enhanced rail service enhancements. With increased service levels, it is expected that there will be induced economic development in terms of jobs and population, primarily in the Central Business Districts surrounding the station areas. Induced development leads to increased ridership, which in turn results in increased user benefits, measured similarly to the benefits to “new riders,” as described above.

- **Congestion Reduction Benefits:** These benefits are due to reduced auto Vehicle Miles Traveled (VMT), based on estimates of increased passenger traffic on rail. The reduction in VMT relieves congestion for those vehicles remaining on the highway, resulting in reduced travel time (VHT). Additionally, there are emission savings produced from the reduction in auto VMT. Emissions measured include VOC, CO, CO2, NOX, SO2, and PM10. Finally, the reduction in auto VMT results in a savings of pavement maintenance costs. The reduction of accident costs, like other variable costs, is dependent on the reduction of vehicle-miles. The reduction in vehicles on the road is combined with a multiplier, which is a weighted average of fatal, injury, and property damage only (PDO) accidents.

6.2 Benefit Cost Analysis

6.2.1. Introduction

NOTE: The costs and revenues used for the analyses below have not been updated to reflect 2011 data.

To be deemed economically feasible, projects must pass one or more value benchmarks: the total benefits must exceed the total costs of the project on a present value basis. A fundamental tenet of the benefit-cost analysis approach is that only those benefits that are directly attributable to the implementation of rail service and are incremental to that service are accounted for.

In the analysis, benefits are estimated for current and future users on an incremental basis; that is, the change in welfare that consumers and, more generally, society derive from access to the improved passenger rail service as compared to the current situation. As in most transportation projects, the benefits derived from the implementation of infrastructure projects, are actually a reduction in the costs associated with transportation activities. For example, the reduction of costs due to the passenger rail service affects users differently, depending on their preferences and the way the project changes their individual transportation costs.

Generally, benefits are measured as the creation of economic value from changes in the quantity of final uses and the quality (time spent, comfort, reliability, among other factors) of the services provided to the users. The total transportation costs for riders in the Study Area include the value of the total time spent commuting, plus the expenses associated with operating the vehicles used for the commute, including parking fees, plus other externalities, such as the cost of pollution generated by the specific level and composition of traffic. The benefits are the cost reductions that may result from its implementation.

6.2.2. Principles

The following principles guide the estimation of benefits and costs:

- Only incremental benefits and costs are to be measured

- The incremental benefits of the project include the transportation cost savings for the users of the service as a result of the implementation of the transportation improvements.

- The incremental costs of project implementation include initial and recurring costs. Initial costs refer to the capital costs incurred for design and construction of a list of enhancements that will increase the maximum speed limit on the existing tracks and improve rail stations along the corridor. Recurring costs include incremental operating costs, as well as administration and marketing expenses.

  Incremental in this situation means that costs above and beyond those currently incurred are considered. Any investments or operating costs required for the operation of the existing passenger and freight service, including deferred maintenance, are not viewed as costs associated with this project.

- Benefits and costs are valued at their opportunity costs.

  - The benefits stemming from the implementation of the transportation improvement are those above and beyond the benefits that could be obtained from the best transportation alternative. For instance, the transportation costs savings for users are measured relative to the best existing alternative, the highway. The benefit is the net cost saving in transportation costs relative to the best alternative.

6.2.3. Valuation

All benefits and costs are estimated in 2010 dollars. The valuation of benefits makes use of a number of assumptions that are required to produce monetized values for all non-pecuniary benefits. The different components of time, for instance, are monetized by using a "value of time" that is assumed to be equivalent to the user's willingness to pay for time savings in transit. For the analysis, the "value of time" varies depending on trip purpose. Premiums to the value of time are also measured by incorporating comfort, reliability and other characteristics associated with the quality of the trip. Other estimates used in the monetization of benefits include, for example, the cost of operating a vehicle (e.g., maintenance, repair, and depreciation) and the cost per ton of pollution.

Annual costs and benefits are computed over a long-run planning horizon and summarized by a lifecycle cost analysis. The project is assumed to have a useful life of at least 30 years; the time horizon of the analysis. Construction costs are assumed to occur within the first seven years of implementation of the project, but operating costs are incurred throughout the project's time horizon. Similarly, benefits begin five years after the project begins and accrue during the full operation of the project.

6.2.4. The Opportunity Cost of Capital

The opportunity cost associated with the delayed consumption of benefits and the alternative uses of the capital for the implementation of the project is measured by the discount rate. All

benefits and costs are discounted to reflect the opportunity costs of committing resources to the project. Calculated real discount rates are applied to all future costs and benefits as a representation of how the public sector evaluates investments. A 7% real discount rate is used in the analysis.

6.3. Capital Improvements on the Springfield Line

Capital improvements of the Springfield Line are those that are necessary to provide the infrastructure to increase passenger service as described in this SDP while maintaining the on time performance of the freight operators.

In summary, the increases in passenger service include:

- Increased frequency of peak period service
- Increased train speed where practical
- Increased number of stations for commuter service

The improvements to support this service include:

- Reinstall double track at all single track locations except the Hartford Viaduct and the Connecticut River Bridge. Install new track, if practical, to permit clearance for electrification.
- Install new sidings at Berlin and north of Hartford.
- Install layover and light maintenance tracks east of Springfield Station.
- Construct new commuter rail stations at North Haven, Newington, West Hartford, and Enfield.
- Improve/relocate stations at New Haven State Street, Wallingford, Meriden, Berlin, Windsor, and Windsor Locks.
- Improve grade crossings including establishing quiet zones, as requested by local communities.
- Signal Improvements including positive train control.
- This Project does not include track and infrastructure improvement included in Project 1 CTDOT's Track 1A funding and NEPA work which is currently under separate evaluation.

Improvements that represent deferred maintenance and mandated signal improvements that would be required to maintain existing passenger and freight operations:

- Improve/repair all structures and culverts except the Hartford viaduct and the Connecticut River Bridge.
- Positive train control.

The estimated capital cost included in Section 4 of this SDP can be apportioned to:

- Cost of improvements to support this service including professional services
    - $ 318.9 Million Year of Expenditure
    - $277.3 Million 2010

- Cost of improvements that represent deferred maintenance and mandates including professional services
    - $ 88.3 Million Year of Expenditure
    - $76.8 Million 2010

6.4. Operating Costs on the Springfield Line

The Incremental Operating Cost Estimate is included in Section 3.4 as:

- $60.9 Million in 2020
- $41.7 Million in 2010

The Base Operation Cost Estimate is included in Appendix J as Section 2 for 2020 cost and page 5 for 2010 costs as:

- $46.3 Million in 2020
- $31.9 Million in 2010

6.5. Project Benefits

6.5.1. Ridership and Revenue

The following data is included in Appendix J:

Base Riders	490,000 Trips/year
Incremental Riders	780,600 Trips/year
Base Revenue (2010)	$17.0 Million/year
Incremental Revenue (2010)	$18.0 Million/year

6.5.2. Diversions, Travel Time Savings, and VMT Reduction

Appendix K contains analysis for diversions, travel time savings, and VMT reduction for 2030.

These savings can be estimated by prorating them based on the difference between the 2020 new riders and the 2030 new riders.

2020 New Riders: 780,600 (Appendix J)
2030 New Riders: 1,255,000 (Appendix K)
Prorated results are shown in Table 6-1.

	Appendix K Values	Prorated 2020 Values
New Riders Diverted from Auto	1,147,490	713,757
New Riders Diverted from Air	107,461	66,843
Time Savings (Million minutes)		
Existing Customers	10.25	10.25
New Riders Diverted from Auto	29.79	18.5
New Riders Diverted from Air	(13.35)	(8.30)
Total Net Savings	26.70	20.48
Auto VMT Reduction (millions)	148.94	92.65

Table 6-1 2020 Diversions, Travel Time Savings, and VMT Reduction

6.5.3. Carbon Reduction

The total carbon reduction due to the proposed service is the difference between the reduction due to VMT and the increase due to more diesel fuel consumed by locomotives.

Reduction in VMT 92.65 Million
Carbon Dioxide/Mile 424 grams/mile
Increase in locomotive fuel about 760,000 gal
($1.9 Million fuel cost @ $2.50/gallon)
Carbon Dioxide/gal 10.1 kg/gal

Light Duty Vehicle Reduction 40,000 M-T
Locomotive Increase 8,000 M-T
Net Reduction 32,000 M-T

6.5.4. Total Benefits and Costs

Total benefits and costs are the aggregation of each of the individual categories of benefits and costs. These totals are used to give an indication of the feasibility of the projects. The expected benefits exceed the costs when the benefit-cost ratio is greater than one. Net benefits begin to accrue once the benefits of the project surpass the costs in a given year.

Benefits increase in proportion to increases in the number of riders who switch to rail, as well as with the amount of savings each rider achieves on average by switching from other modes. As the savings of using the rail service increase over time, so does ridership.

For the purpose of estimating the costs and benefits, it is assumed that the construction will occur over the course of two years prior to the opening of the service along the new line, and that service will begin in the year 2016. Operating and maintenance costs occur annually, while construction costs are only incurred in the first five years. Benefits increase annually as well with an increase in ridership.

Construction costs are annualized based on a 7% discount rate and the life of the various project components. Table 6-2 calculates the Annualized cost of the project as $27,713 Million.

NOTE: This table has not been updated to reflect 2011 costs.

Item	Source Document	Base Year Dollars w/Contingency (X000)	Uniformly distribute Category 80	Lifetime	Annualization Factor (based on 7% rate)	Annualized Cost (X000)
10 Guideway & Track Elements	OMB No. 2130-0584	$200,227	$29,021	35	0.0772	$17,698
20 Stations, Stops, Terminals, Intermodal	OMB No. 2130-0584	$92,259	$13,372	70	0.0706	$7,458
30 Support Faclities: Yards, Shops, Admin. Bdgs	OMB No. 2130-0584	$ 6,000	$870	50	0.0725	$498
40 Sitework and Special Conditions	OMB No. 2130-0584	$29,794	$4,318	125	0.0700	$2,388
50 Communications and Signaling	OMB No. 2130-0584	$54,944	$7,964	30	0.0806	$5,070
60 Electric Traction	OMB No. 2130-0584	$				
70 Vehicles	OMB No. 2130-0584	$				
80 Professional Services	OMB No. 2130-0584	$ 55,544				
Cost of improvements that represent deferred maintenance and mandates	SDP Paragraph 6.3	$(76,800)		80	0.0703	$(5,399)
	Total	$361,968				$27,713

Table 6-2 Annualization of Capital Costs

Table 6-3 provides a Summary of Annualized Benefits to the riders and the region as a result of the project.

Benefit	
	Savings ($ MILLION)
Travel Time Savings - Existing and Diverted Riders	$11.95
Enhanced Amenities	$5.97
Reduced Emissions	$3.71
Reduced Highway Maintenance	$4.63
Reduced Automobile Usage	$46.33
Annual Value of Benefits	**$72.58**
Costs	
Annualized Capital Cost	$27.70
Incremental Rail Operation and Maintenance	$41.70
Annual Cost	**$69.40**

Table 6-3 Summary of Annualized Benefits and Costs

6.6. Economic Impacts on Land Usage

The NHHS Rail Project will provide economic recovery benefits to the States of Connecticut and Massachusetts. The corridor passes through New Haven and Hartford, two of the most economically distressed communities in the country. Development of new stations and increasing ridership at existing stations may provide communities with transit oriented development (TOD) opportunities. While ridership numbers alone may not generate sufficient demand to result in development, when combined with community initiatives they will serve to foster economic growth. Mixed-use residential is a proven TOD mix that enhances public transportation ridership and encourages urban living in a green setting by discouraging car use and creating dense living environments. Many communities along the line have initiated their own development plans in proximity to the stations.

There are a significant number of positive economic impacts that the development of TODs at stations on the NHHS Corridor intercity service, including, but not limited to:

- Increase the potential use of public transportation including use of trains and buses
- Reduction of overall environmental impacts due to the encouragement of less car usage and more public transportation usage. Empty-nester housing, a popular TOD component, a has limited impact on the school system locally
- Construction of a development would cost in the millions of dollars which would create substantial sales in building materials and local construction jobs.
- New development would increase the local property tax grand list.
- Reliable intercity passenger rail service will facilitate communities' ability to retain and attract businesses.

The proposed corridor improvements will have the most potential for beneficial economic impact on the cities and town where stations occur.

In general, the station locations are urban and suburban. Although the projected ridership volume is not anticipated to be great enough to support a significant increase in development at any single station based on ridership alone, there are several reasons why the new NHHS Corridor service can be economically beneficial to the communities without causing adverse impacts:

- There is underutilized land a most station locations.
- The desire for more walkable communities is a growing trend, consistent with transit, and encourages mixed-use development.
- The modest increase in traffic volume at the stations, as a result of the car-to-train modal split, does not degrade Levels of Service or is easily mitigated.
- Cities and towns already have development plans that include transit. The addition of increased transit and the land used for transit are generally consistent with community development plans and would be beneficial to the economic environment of the cities and towns.

Table 6-4 summarizes the economic environment and potential development for each station.

Table 6-4 Summary of Economic Environment and Potential Development

Station	Real Estate Market		Potential Development	Impacts on Key Properties	Constraints to Development
	Existing	Potential Changes			
New Haven Union	Low income housing, commercial, and retail	In accordance with New Haven TOD initiative	In accordance with New Haven TOD initiative	In accordance with New Haven TOD initiative	Existing highway and rail transportation facilities and limited underutilized property
New Haven State Street	Multi family residential, commercial, and retail	In accordance with New Haven development plans	In accordance with New Haven development plans	Development to multi family residential in a walkable neighborhood	Existing highway and rail transportation facilities and limited underutilized property
Meriden	Multi family residential, commercial, and retail	Town Green plan would increase commercial and residential	In accordance with Meriden development plans	In accordance with Meriden development plans and, in time, redevelopment of sites to mixed use residential	Existing Town Green plan reserves significant portion for green space. Ongoing businesses and residences are not distressed.
Berlin	Residential and commercial	Conversion of underutilized industrial to commercial and residential	Conversion of underutilized industrial to commercial and residential	Conversion of underutilized industrial to commercial and residential	Housing incentive zone requires remediation which would add cost and the station is some distance from the town center.
Hartford	Multi family residential, commercial, and retail	In accordance with Hartford development plans and COG bus transfer station	In accordance with Hartford development plans and COG bus transfer station	In accordance with Hartford development plans and COG bus transfer station	Existing highway and rail transportation facilities and the cost of developing underutilized property

Windsor	Residential, civic, and retail	Strengthen existing usage	Increase in mixed use residential as demand increases	Increase in mixed use residential as demand increases	The high cost of redeveloping well utilized property may make redevelopment impractical in the near term.
Windsor Locks	Small amount of residential, existing wastewater treatment plant, transportation facilities and the Connecticut River.	The existing water treatment plant, transportation facilities, and the Connecticut River are not likely to change.	Mixed use residential farther away from the station but it would not be easily walkable to the station.	Mixed use residential farther away from the station	The existing wastewater treatment plant, transportation facilities, the Connecticut River, very little underutilized property, and the station is some distance from the town center.

Table 6-4 Summary of Economic Environment and Potential Development (Continued)

6.7. Benefits to Environmental Justice Populations

There are a number of communities in the corridor with significant Environmental Justice populations. These communities include New Haven, Meriden, Hartford, and New Britain in Connecticut and Springfield in Massachusetts. Construction of the proposed improvements will have a positive benefit on Environmental Justice populations in two ways:

1) There will be a significant number of construction jobs created that will likely be available to Environmental Justice populations.

2) The increased frequency of service will provide Environmental Justice populations dependent on transit for their general mobility or journey to work with improved transit services.

6.8. Economic Impact Analysis: Jobs and Economic Activity Generation

Injection of capital infrastructure spending, such as for the proposed NHHS Rail Project, into the economy, whether regional or national, will lead to direct construction, and related professional services, jobs and economic activity, as well as indirect jobs supporting the suppliers of materials and equipment. In turn, these direct and indirect jobs support additional jobs within the economy (induced impacts), all of which can generate a relatively quick boost to the regional economy, contributing to economic growth. Following the initial construction/capital

investment activity, there will be ongoing operations and maintenance expenditures for the initially constructed facilities, equipment, and associated services. Operations and maintenance contracts will include the hiring of employees and purchasing of supplies and services, which can be measured in terms of economic impacts. Direct expenditures for operations and maintenance of the facilities and systems represent direct economic benefits, and give rise to multiplier effects for the estimation of the total impacts.

The following tables present the expenditure-based employment and economic activity (GDP/GRP), both direct and total, impacts pertaining to the construction (including professional services - engineering design) and operations phases associated with this Application-related corridor improvements in the Corridor study area as well as nationwide. Overall, employment impacts are estimated to amount to 4,710 direct job-years in the study area or 5,500 direct job-years nationwide over the 9-year analysis time horizon, or 8,090 total job-years in the study area and 12,590 job-years for the nation as a whole over the 9-year time horizon. The operations-related job-years in 2019 will recur in the same magnitude for each year thereafter (not presented within the tables), given the operations and maintenance expenditures are assumed to remain constant into the future (in constant dollar terms).

Table 6-5 Corridor Study Area (3-County)

Employment (Job-Years) Expenditure Category	**Time Horizon**									
	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**
Construction & Engineering										
Direct Impact	70	200	330	520	580	530	520	250	110	3,110
Total Impact	150	360	600	930	1,030	940	910	450	200	5,570
Operations & Maintenance										
Direct Impact	0	0	0	0	0	400	400	400	400	1,600
Total Impact	0	0	0	0	0	630	630	630	630	2,520
All Expenditure Categories										
Direct Impact	70	200	330	520	580	930	920	650	510	4,710
Total Impact	150	360	600	930	1,030	1,570	1,540	1,080	830	8,090

Note 1: total = direct + indirect + induced

Note 2: operations-related job-years continue past 2019 throughout the operating time horizon

Note 3: employment impacts are rounded to the nearest 10 job-years.

Table 6-6 Economic Activity (GDP/GRP, in millions of 2010 $)

Expenditure Category	**Time Horizon**									
	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**
Construction & Engineering										
Direct Impact	$5.27	$14.82	$25.01	$39.65	$44.64	$40.83	$39.77	$19.46	$8.68	$238.13
Total Impact	$11.26	$28.44	$46.77	$73.12	$81.22	$74.37	$72.11	$35.28	$15.81	$438.40
Operations & Maintenance										
Direct Impact	0	0	0	0	0	$25.68	$25.68	$25.68	$25.68	$102.70
Total Impact	0	0	0	0	0	$44.81	$44.81	$44.81	$44.81	$179.24
All Expenditure Categories										
Direct Impact	$5.27	$14.82	$$25.01	$39.65	$44.64	$66.50	$65.45	$45.13	$34.36	$340.83
Total Impact	$11.26	$28.44	$46.77	$73.12	$81.22	$119.17	$116.92	$80.09	$60.62	$617.63

Note 1: total = direct + indirect + induced

Note 2: operations-related job-years continue past 2019 throughout the operating time horizon
Note 3: employment activity impacts are rounded to the nearest $1,000.

Table 6-7 National Level

Employment (Job-Years) Expenditure Category	Time Horizon									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Construction & Engineering										
Direct Impact	70	220	370	590	680	620	600	300	130	3,580
Total Impact	220	560	930	1,460	1,620	1,490	1,440	710	320	8,750
Operations & Maintenance										
Direct Impact	0	0	0	0	0	480	480	480	480	1,920
Total Impact	0	0	0	0	0	960	960	960	960	3,840
All Expenditure Categories										
Direct Impact	70	220	370	590	680	1,100	1,080	780	610	5,500
Total Impact	220	560	960	1,460	1,620	2,450	2,400	1,670	1,280	12,590

Note 1: total = direct + indirect + induced
Note 2: operations-related job-years continue past 2019 throughout the operating time horizon
Note 3: employment impacts are rounded to the nearest 10 job-years.

Table 6-8 Economic Activity (GDP/GRP, in millions of 2010 $

Expenditure Category	Time Horizon									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Construction & Engineering										
Direct Impact	$5.29	$14.25	$23.82	$37.56	$42.08	$38.50	$37.45	$18.32	$8.19	$225.46
Total Impact	$16.86	$42.42	$69.68	$108.86	$120.85	$110.65	$107.28	$52.49	$23.53	$652.62
Operations & Maintenance										
Direct Impact	0	0	0	0	0	$24.27	$24.27	$24.27	$24.27	$97.10
Total Impact	0	0	0	0	0	$64.45	$64.45	$64.45	$64.45	$257.79
All Expenditure Categories										
Direct Impact	$5.29	$14.25	$23.82	$37.56	$42.08	$62.78	$61.72	$42.59	$32.46	$322.55
Total Impact	$16.86	$42.42	$69.68	$108.86	$120.85	$175.10	$171.73	$116.94	$87.98	$910.41

Note 1: total = direct + indirect + induced
Note 2: operations-related job-years continue past 2019 throughout the operating time horizon
Note 3: employment activity impacts are rounded to the nearest $1,000.

These impact are expenditure (on design/engineering, construction, and operations) based only, and do not include other impact types such as those related to travel efficiency savings or additional development in the Corridor that would also be expected to occur.

The counties in the Corridor are not designated as Economically Distressed Areas; therefore this aspect is not applicable to this Application subcomponent.

7. Stakeholder Agreements

Several Stakeholder (Agreements) (Agreements in Principal) which support the implementation of the NHHS Corridor Program are in place. These agreements cover operational, financial and project management issues and are attached as Appendix L.

Appendix A

Springfield Line Commuter/Knowledge Corridor Service Development Plan

Amtrak, July 2010

Appendix A

Springfield Line Commuter/Knowledge Corridor Service Development Plan

Amtrak, July 2010

SUMMARY of SERVICE CHARACTERISTICS by ALTERNATIVE
SPRINGFIELD LINE COMMUTER / KNOWLEDGE CORRIDOR SERVICE
SERVICE DEVELOPMENT PLAN

Study	Mode to Springfield			Trains Operated (M-F)			Avg. Tvl. Time: SPG -			Best Tvl. Time: SPG -			Train Miles by Service Weekdays (M-F)			Train Miles by State (M-F) Knowledge Cor.			NEC &	Equipment Sets			Overnight Layovers		
Scenario	REG	REG-S	CMTR	REG	REG-S	CMTR	NHV	NYP	GCT	NHV	NYP	GCT	REG	REG-S	CMTR	VT/NH	MA	CT	Other	REG	REG-S	CMTR	NHV	SPG	Other
CURRENT SERVICE (Excludes Lake Shore Ltd.)																									
BASE	DslPP	REG-S	-	12	-	-	1:28	3:26	n/a	1:20	3:10	n/a	1,942	496	-	382	192	764	1,100	4	3	-	1	3	4
COMMUTER SERVICE ALTERNATIVES CONNECTING AT NEW HAVEN																									
ALT-C1.2020	DslREG	REG-S	DslPP	8	16	21	1:26	3:01	3:25	1:04	2:42	3:15	4,246	992	1,136	382	340	2,384	3,268	7	4	5	5	6	7
ALT - C1	DslREG	REG-S	DslPP	10	24	21	1:23	2:57	3:22	1:04	2:42	2:56	5,996	2,260	1,136	594	1,774	2,720	4,306	10	7	5	6	5	11
ALT - C2	ICDPwr	REG-S	DslPP	10	24	21	1:23	2:55	3:21	1:04	2:36	2:56	5,996	2,260	1,136	594	1,774	2,720	4,306	10	7	5	6	5	11
COMMUTER SERVICE ALTERNATIVES OPERATING DIRECTLY THROUGH NEW HAVEN																									
ALT - T1	ICDPwr	REG-S	CMDPwr	10	17	30	1:24	2:57	3:20	1:04	2:42	3:12	5,996	1,888	3,900	594	1,806	3,056	6,328	10	6	9	6	5	11
ALT - T2	Elec	REG-S	EMU	10	17	30	1:21	2:54	3:17	1:01	2:39	2:50	5,996	1,888	3,900	594	1,806	3,056	6,328	10	6	9	6	5	11

REG	Regional Intercity service. Standard NEC equipment operating between Maine and North Carolina
REG-S	Intercity service equipment assigned to Springfield area. May differ from standard Regional Service
CMTR	Commuter Service i.e., Shore Line East service
ICDPwr	Dual-power locomotive capable of operating from overhead catenary system or using on-board diesel engines
CMDPwr	Dual-power locomotive capable of operating from 3rd rail system or using on-board diesel engines
DslPP	Industry standard diesel locomotive and coaches in push-pull service

SERVICE DEVELOPMENT PLAN - CONCEPTUAL WORKING SCHEDULES
SPRINGFIELD LINE COMMUTER / KNOWLEDGE CORRIDOR / INLAND ROUTE
Alternative C-1: 2020 Connecting Commuter and Springfield Region Intercity Service. NHV Locomotive changes for Inter-Regional Service

SOUTHBOUND with CONNECTING Springfield Line commuter service to GCT. NHV Locomotive changes on intercity through trains.

(Read Left to Right. "S" indicates station stops at intermediate points.

Miles From New York				235	234	214	191	151	388	260	221	197	173	154	144	137	129	122	118	112	108	106	101	94	88	82	76	75	66	62	58	54	52	52	47	45	44	42	41	39	36	34	33	33	31	29	27	25	24	22	19	NYP 0	G15	G14	G9	G4	GCT 0	1:26	3:01	3:25
																SPRINGFIELD	HARTFORD											NEW HAVEN	STAMFORD																																				
TRAIN Number	TERMINALS Origin	Finish	Equipment	Boston	Back Bay	Framing-ham	Worcester	Palmer	St. Albans	White River Jct.	Bellows Falls	Brattleboro	Greenfield	North Hampton	Holyoke	Ar SPG	Lv SPG	ENF	WNL	WND	Lv HFD	WHF	NEW	BER	MER	WFD	NHV	STS	Ar NHV	Conn Train	Lv NHV	MIL	STF	BRP	FLD	SPT	GRF	WTP	ENK	NOR	ROW	DAR	NTH	STM	OGW	RIV	COS	GRW	PCH	RYE	HAR	MAM	LAR	NRO	Arrive NYP	PEL	MTV	FRD	125	Arrive GCT	Run Time SPG-NHV	Run Time SPG-NYP	Run Time SPG-GCT
403	SPG	NHV	REG-S														5:10 A	S	S	S	5:48 A	S	S	S	S	S	S	S	6:40 A	1531	6:47A	S	S	S	S	S	S	S	S	S				7:48A	S	S	S	S									D	8:45 A	1:30		3:35
4401	SPG	NHV	CMTR														5:51 A	S	S	S	6:29 A	S	S	S	S	S	S	S	7:21 A	1533	7:28A	S	S	S										8:16A													D	9:06 A	1:30		3:15
141	SPG	NFK	REG-DP														6:17 A	S	S	S	6:55 A	S	S	S	S	S	S	S	7:47 A	Thru	7:58A			S										8:38A											S		9:27 A						1:30	3:10	
																													↳	1539	7:59A	S	S	S		S		S					8:50A	S	S	S	S	S	S							D	9:47 A			3:30
4403	SPG	NHV	CMTR														6:52 A	S	S	S	7:30 A	S	S	S	S	S	S	S	8:22 A	1543*	8:29A	S	S	S	S	S	S	S	S	S				9:30A	S	S	S	S									D	10:27 A	1:30		3:35
495	SPG	NHV	REG-S														7:24 A	S	S	S	8:02 A	S	S	S	S	S	S	S	8:54 A	95	9:04A													9:42A														10:29 A						1:30	3:05	
4405	SPG	NHV	CMTR														7:53 A	S	S	S	8:31 A	S	S	S	S	S	S	S	9:23 A	1549	9:30A	S	S	S		S		S						10:24A													D	11:11 A	1:30		3:18
143	BOS	NFK	REG-DP														8:46 A		S		9:19 A				S				9:53 A	Thru	10:04A			S										10:44A											S		11:33 A						1:07	2:47	
4407	SPG	NHV	CMTR														9:15 A	S	S	S	9:53 A	S	S	S	S	S	S	S	10:45 A	1555	10:57A	S	S	S		S	S	S	S	S	S	S		11:53A													D	12:40 P	1:30		3:25
493	SPG	NHV	REG-S														10:23 A	S	S	S	11:01 A	S	S	S	S	S	S	S	11:53 A	93	12:06P			S										12:46P											S		1:35 P						1:30	3:12	
																													↳	1559	11:57A	S	S	S		S	S	S	S	S	S	S	12:53P													D	1:40 P			3:17
4409	SPG	NHV	CMTR														11:20 A	S	S	S	11:58 A	S	S	S	S	S	S	S	12:50 P	1563	12:57P	S	S	S		S	S	S	S	S	S	S		1:53P													D	2:40 P	1:30		3:20
473	SPG	NHV	REG-S														12:23 P	S	S	S	1:01 P	S	S	S	S	S	S	S	1:53 P	173	2:01P													2:39P														3:26 P						1:30	3:03	
																													↳	1567	1:57P	S	S	S		S	S	S	S	S	S	S	2:53P													D	3:40 P			3:17
449	BOS	CHI	LDST	12:05P	12:12P	12:40P	1:08P	1:50P								2:10 P																																													
437	SPG	NHV	REG-S														2:17 P	S	S	S	2:55 P	S	S	S	S	S	S	S	3:47 P	137	3:59P													4:37P														5:24 P						1:30	3:07	
																													↳	1575	3:52P	S	S	S	S	S	S	S	S	S	S	S	4:53P				S									D	5:46 P			3:29
55	SAB	WAS	REG-DP						9:29A	12:04P	12:55P	1:52P	2:12P	2:26P	2:40P	2:49 P	2:54 P		S		3:27 P								3:58 P	Thru	4:09 P			S										4:49P														5:36 P						1:04	2:42	
4411	SPG	NHV	CMTR														3:52 P	S	S	S	4:30 P	S	S	S	S	S	S	S	5:22 P	1581	5:33P	S	S	S		S		S		S				6:26P				S									D	7:16 P	1:30		3:24
475	SPG	NHV	REG-S														4:21 P	S	S	S	4:59 P	S	S	S	S	S	S	S	5:51 P	175	6:01P													6:39P														7:26 P						1:30	3:05	
																													↳	1583	5:56P	S	S	S	S	S	S	S	S	S	S	S	6:57P													D	D	7:46 P			3:25
4453	HFD	NHV	CMTR																		5:28 P	S	S	S	S	S	S	S	6:20 P																																		
4415	SPG	NHV	CMTR														5:17 P	S	S	S	5:55 P	S	S	S	S	S	S	S	6:47 P	1587	6:57P	S	S	S		S	S		S	S	S	S		7:53P													D	8:40 P	1:30		3:23
147	SPG	WAS	REG-DP														5:46 P		S		6:19 P				S				6:53 P	Thru	7:04P			S										7:44P											S		8:33 P						1:07	2:47	
4457	HFD	NHV	CMTR																		6:30 P	S	S	S	S	S	S	S	7:22 P																																		
477	SPG	NHV	REG-S														6:22 P	S	S	S	7:00 P	S	S	S	S	S	S	S	7:52 P	177	8:03P													8:41P														9:28 P						1:30	3:06	
																													↳	1591	7:57P	S	S	S	S	S	S	S	S		S	S	8:53P													D	D	9:41 P			3:19
4419	SPG	NHV	CMTR														7:15 P	S	S	S	7:53 P	S	S	S	S	S	S	S	8:45 P	179	9:04P			S										9:44P											S		10:33 P						1:30	3:18	
																													↳	1595	8:57P	S	S	S		S	S	S	S	S	S	S	9:53P													D		10:40 P			3:25
497	SPG	NHV	REG-S														7:59 P	S	S	S	8:37 P	S	S	S	S	S	S	S	9:29 P	2197	9:39P													10:14P														10:58 P						1:30	2:59	
																													↳	1597	10:08P	S	S	S		S	S	S	S	S	S	S	11:04P													D		11:51 P			3:52
No. of Trains Stopping				1	1	1	1	1	1	1	1	1	1	1	1	2	20	17	20	17	22	19	19	19	21	19	19	19	22		28	16	16	22	14	5	12	15	11	15	9	11	10	28	3	3	3	5	1	1	1		5	12		2	16	16	4:48	12:21	6:49

LEGEND

Acela Express Service	
Intercity Regional Service	
Long Distance Service	
Inland Route / Knowledge Corridor Regional Service	
Hartford Commuter Service	
Metro-North New Haven Line Service	

PROPOSED JOINT TICKETING TRAINS

Acela Express Service	None
Intercity Regional Service	None except Train 141
Long Distance Service	None
Inland Route / Knowledge Corridor Regional Service	All trains between Springfield and GCT
Hartford Commuter Service	All trains
Metro-North New Haven Line Service	All trains

SCHEDULE NOTES

Intercity running times based on Amtrak-performed TPC analysis of routes with assumed 2030 infrastructure in place
Metro-North runing times and schedules from Jan 2010 New Haven Line timetable. Only connecting trains shown.
Train 1543* represents new train

SERVICE DEVELOPMENT PLAN - CONCEPTUAL WORKING SCHEDULES
SPRINGFIELD LINE COMMUTER / KNOWLEDGE CORRIDOR / INLAND ROUTE
Alternative C-1: Connecting Commuter and Springfield Region Intercity Service. NHV Locomotive changes for Inter-Regional Service

NORTHBOUND with CONNECTING Springfield Line commuter service to GCT. Locomotive changes at NHV on intercity through trains

Read Left to Right. "S" indicates station stops at intermediate points.

Miles From New York					GCT 0	G4	G9	G14	G15	NYP 0	19	22	24	25	27	29	31	33	33	34	36	39	41	42	44	45	47	52	52	54	58	62	66	19	36	58	75	76	82	88	94	101	106	108	112	118	122	129	137	144	154	173	197	221	260	378	151	191	214	234	235	#REF!	2:51	1:25
TRAIN Number	TERMINALS Origin	TERMINALS Finish	Equipment	Connecting Train No.	Leave GCT	125	FRD	MTV	PEL	Leave New York	NRO	LAR	MAM	HAR	RYE	PCH	GRW	COS	RIV	OGW	STM	NTH	DAR	ROW	NOR	ENK	WTP	GRF	SPT	FLD	BRP	STF	MIL	NRO	STM	BRP	Ar NHV	Lv NHV	STS	NHV	WFD	MER	BER	NEW	WHF	Lv HFD	WND	WNL	ENF	Ar SPG	Lv SPG	Holyoke	North Hampton	Greenfield	Brattleboro	Bellows Falls	White River Jct.	St. Albans	Palmer	Worcester	Framing-ham	Back Bay	Boston	Run Time SPG-GCT	Run Time SPG-NYP	Run Time SPG-NHV
											STAMFORD																											NEW HAVEN												SPRINGFIELD																	
4400	NHV	SPG	CMTR																																			6:00 A	S	S	S	S	S	S	S	6:55A	S	S	S	7:30 A																1:30
466	NHV	SPG	REG-S																																			6:35 A	S	S	S	S	S	S	S	7:30A	S	S	S	8:05 A																1:30
4402	NHV	SPG	CMTR																																			7:10 A	S	S	S	S	S	S	S	8:05A	S	S	S	8:40 A																1:30
4404	NHV	SPG	CMTR	1504	5:47 A	R	R										S				6:36A	S	S	S	S	S	S		S	S	S	S	S				7:38 A	7:44 A	S	S	S	S	S	S	S	8:39A	S	S	S	9:14 A																1:30
				1506	6:18 A	R	R									S		S			7:06A	S	S	S	S	S	S	S	S	S	S	S	S				8:11 A																													3:30
490	NHV	SPG	REG-S	190					6:45 A												7:22A																8:03 A	8:18 A	S	S	S	S	S	S	S	9:13A	S	S	S	9:48 A																1:30
140	WAS	BOS	REG-DP	Thru					7:20 A												7:57A																8:38 A	8:49 A				S				9:26A		S		9:56 A	10:01 A								10:19A	11:00A	11:25A	12:00P	12:05P		2:36	1:07
4406	NHV	SPG	CMTR																																			9:03 A	S	S	S	S	S	S	S	9:58A	S	S	S	10:33 A																1:30
				1512	8:00 A	R	R									S		S			8:52A	S	S		S	S	S		S	S	S	S	S				9:56 A																											3:33
470	NHV	SPG	REG-S	170					8:35 A												9:12A																9:53 A	10:03 A	S	S	S	S	S	S	S	10:58A	S	S	S	11:33 A																1:30
				1518	10:07 A	R															10:54A	S	S		S	S	S		S	S	S	S	S				11:52 A																											3:35
472	NHV	SPG	REG-S	172					10:45 A	S											11:24A																12:05 P	12:12 P	S	S	S	S	S	S	S	1:07P	S	S	S	1:42 P																1:30
56	WAS	SAB	REG-DP	Thru					11:45 A												12:22P										S						1:06 P	1:17 P								1:51P		S		2:21 P	2:41 P	2:50P	3:04P	3:24P	3:52P	4:27P	5:27P	8:07P								2:36	1:04
4408	NHV	SPG	CMTR	1526	12:07 P	R															12:54P	S	S		S	S	S		S	S	S	S	S				1:52 P	1:58 P	S	S	S	S	S	S	S	2:53P	S	S	S	3:28 P																1:30
				1530	1:07 P	R															1:54P	S	S		S	S	S		S	S	S	S	S				2:52 P																											3:26
474	NHV	SPG	REG-S	174					1:38 P												2:15P																2:56 P	3:03 P	S	S	S	S	S	S	S	3:58P	S	S	S	4:33 P																1:30
144	NFK	BOS	REG-DP	Thru					2:30 P	S											3:09P										S						3:53 P	4:04 P				S				4:41P	S	S	S	5:16 P	5:31 P								5:49P	6:30P	6:55P	7:30P	7:35P		2:46	1:12
4450	NHV	HFD	CMTR	1534	2:07 P	R															2:51P	S	S	S	S	S	S	S	S	S	S	S	S				3:59 P	4:07 P	S	S	S	S	S	S	S	5:02P																						
448	CHI	BOS	LDST																																																		5:53 P								6:11P	6:54P	7:24P	8:44P	8:51P			
4412	NHV	SPG	CMTR	1536	2:34 P	R											S				3:21P		S		S		S			S	S	S	S				4:20 P	4:30 P	S	S	S	S	S	S	S	5:25P	S	S	S	6:00 P																1:30
476	NHV	SPG	REG-S	176					3:35 P	S											4:14P										S						4:58 P	5:03 P				S				5:40P	S	S	S	6:15 P																1:12
4454	NHV	HFD	CMTR	1538	3:07 P	R															3:51P	S	S	S	S	S	S	S	S	S	S	S	S				4:59 P	5:07 P	S	S	S	S	S	S	S	6:02P																						
4416	NHV	SPG	CMTR	1540	3:34 P	R											S				4:21P		S		S		S			S	S	S	S				5:20 P	5:30 P	S	S	S	S	S	S	S	6:25P	S	S	S	7:00 P																1:30
				1542	4:09 P	R											S				4:54P				S	S	S	S	S	S	S	S	S				5:56 P																											#REF!
4418	NHV	SPG	CMTR																																			6:05 P	S	S	S	S	S	S	S	7:00P	S	S	S	7:35 P																1:30
4420	NHV	SPG	CMTR																																			6:40 P	S	S	S	S	S	S	S	7:35P	S	S	S	8:10 P																1:30
				1556	5:16 P	R															6:01P																6:56 P																											3:23
494	NHV	SPG	REG-S	94					5:40 P	S											6:19P										S						7:03 P	7:09 P	S	S	S	S	S	S	S	8:04P	S	S	S	8:39 P																1:30
				1570	6:29 P	R																									S						8:10 P																											3:21
148	WAS	SPG	REG-DP	Thru					6:49 P	S											7:28P										S						8:12 P	8:23 P		S	S	S	S	S	S	9:15P	S	S	S	9:50 P																1:27
				1576	7:14 P	R															7:58P	S	S	S	S	S	S	S	S	S	S	S	S				9:05 P																											3:31
478	NHV	SPG	REG-S	178					7:45 P	S											8:24P										S						9:08 P	9:15 P	S	S	S	S	S	S	S	10:10P	S	S	S	10:45 P																1:30
No. of Trains Stopping					14	14	3			11	6				2			6			25	9	11	5	12	10	12	5	10	12	18	12	12				25	23	18	19	19	22	19	19	19	23	19	21	19	21	4	1	1	1	1	1	1	1	3	3	3	3	3	#REF!	7:31	6:02

LEGEND

Acela Express Service	None	Intercity running times based on Amtrak-performed TPC analysis of routes with assumed 2030 infrastructure in place
Intercity Regional Service	None except Tr 148 and Tr 144 between HFD and SPG	Metro-North runing times and schedules from Jan 2010 New Haven Line timetable. Only connecting trains shown.
Long Distance Service	None	1504 runs 8 min earlier than current TT
Inland Route / Knowledge Corridor Regional Service	All trains between GCT and Springfield	1512 runs 7 min earlier than current TT
Hartford Commuter Service	All trains	176 runs 5 min earlier than 2030 Master Plan
Metro-North New Haven Line Service	All trains	148 runs 8 min later than current Master Plan

PROPOSED JOINT TICKETING TRAINS

SCHEDULE NOTES

NEC MASTER PLAN - 2020 CONCEPTUAL EQUIPMENT TURNS
SPRINGFIELD LINE COMMUTER / KNOWLEDGE CORRIDOR SERVICE

SPRINGFIELD LINE - SPRINGFIELD BASED 2020 INTERCITY EQUIPMENT TURNS

Trians Run	Trian Miles	SAB	WRJ	BOS	SPG	NHV	NYP	WAS	Overnight Layover Points	WAS	NYP	NHV	SPG	BOS	WRJ	SAB
					2	2			4 Total Sets; 16 Trains Run; 992 Train Miles; 62 Avg. Mi. / Train; 4			2	2			
4	248				1				KNOWLEDGE CORRIDOR - 2020 Service to Springfield: SPG 403 470 SPG 437 NHV 494 SPG				1			
4	248				1				SPG 495 472 475 NHV 478 SPG				1			
4	248					1			NHV 466 SPG 493 NHV 474 477 NHV			1				
4	248					1			NHV 490 SPG 473 NHV 476 497 NHV			1				
16	992				2	2			4 Total in service			2	2			

SPRINGFIELD LINE - CONNECTING COMMUTER 2020 SERVICE EQUIPMENT TURNS

Trians Run	Trian Miles	SAB	WRJ	BOS	SPG	NHV	NYP	WAS	Overnight Layover Points	WAS	NYP	NHV	SPG	BOS	WRJ	SAB
					2	3			5 Total Sets; 21 Trains Run; 1,136 Train Miles; 54 Avg. Mi. / Train; 5			3	2			
4	248				1				SPRINGFIELD LINE COMMUTER: SPG 4401 4406 SPG 4411 4418 SPG				1			
3	186				1				SPG 4403 NHV 4408 4415			1				
5	258					1			NHV 4400 4405 NHV 4450 4420 SPG				1			
4	248					1			4402 4407 NHV 4412 4419			1				
5	196					1			4404 4409 4454 4457			1				
21	1,136				2	3			5 Total in service			3	2			

SPRINGFIELD LINE / KNOWLEDGE CORRIDOR / INLAND ROUTE - 2020 INTERCITY

Trians Run	Trian Miles	NFK	SAB	WRJ	BOS	SPG	NHV	NYP	WAS	Overnight Layover Points	WAS	NYP	NHV	SPG	BOS	WRJ	SAB	NFK
		1	1			2		1	2	7 Total Sets; 8 Trains Run; 4,487 Train Miles; 561 Avg. Mi. / Train; 7	2			2			1	2
1	635					1				KNOWLEDGE CORRIDOR - Service to Greenfield and White River Jct.: SPG 141 NFK								1
1	635					1				SPG 143 NFK								1
2	920								1	140 SPG 147 WAS	1							
1	635	1								NFK 144 SPG				1				
1	460							1		181 WAS 148 SPG				1				
1	601		1							SAB 55 -Vermonter (via Conn River Line) WAS	1							
1	601								1	WAS 56 - Vermonter (via Conn River Line) SAB							1	
8	4,487	1	1			2		1	2	7 Total in service	2			2			1	2

ALT T-1, T-2

TRAIN Num	TERMINALS Origin	TERMINALS Finish	Equipm	Total Miles	Total Miles	Train Miles by State VT/NH	MA	CT	Other	Train Miles by Service REG	REG-S	CMTR	Other
Miles From New York				11784	5456	594	1806	3056	6328	5996	1888	3900	0
		Complete Route				5.0%	15.3%	25.9%	53.7%	50.9%	16.0%	33.1%	0.0%
		Knowledge Corridor				10.9%	33.1%	56.0%					
1531	SPG	GCT	CMDPwr	134	62		6	56	72			134	0
1533	SPG	GCT	CMDPwr	134	62		6	56	72			134	0
141	SPG	NFK	REG-DP	581	62		6	56	519	581			0
1543*	SPG	GCT	CMDPwr	134	62		6	56	72			134	0
3495	GFD	NHV	REG-S	98	98		42	56	0		98		0
1549	SPG	GCT	CMDPwr	134	62		6	56	72			134	0
143	BOS	NFK	REG-DP	679	160		104	56	519	679			0
1555	SPG	GCT	CMDPwr	134	62		6	56	72			134	0
3471	WRJ	WAS	REG-S	185	184	73	55	56	1		185		0
3493	GFD	NHV	REG-S	98	98		42	56	0		98		0
1563	SPG	GCT	CMDPwr	134	62		6	56	72			134	0
145	BOS	NFK	REG-DP	679	160		104	56	519	679			0
1567	SPG	GCT	CMDPwr	134	62		6	56	72			134	0
449	BOS	CHI	LDST		0								
1575	SPG	GCT	CMDPwr	134	62		6	56	72			134	0
55	SAB	WAS	REG-DP	601	303	191	56	56	298	601			0
1581	SPG	GCT	CMDPwr	134	62		6	56	72			134	0
475	SPG	NHV	REG-S	62	62		6	56	0		62		0
1583	SPG	GCT	CMDPwr	134	62		6	56	72			134	0
4453	HFD	NHV	CMTR	37	36			36	1			37	0
1587	SPG	GCT	CMDPwr	134	62		6	56	72			134	0
147	BOS	WAS	REG-DP	458	160		104	56	298	458			0
4457	HFD	NHV	CMTR	37	36			36	1			37	0
3477	BLF	NHV	REG-S	145	145	33	56	56	0		145		0
1595	SPG	GCT	CMDPwr	134	62		6	56	72			134	0
5479	BOS	NHV	REG-S	160	160		104	56	0		160		0
3497	GFD	NHV	REG-S	98	98		42	56	0		98		0
1597	SPG	GCT	CMDPwr	134	62		6	56	72			134	0
5499	BOS	SPG	REG-S	98	98		98	0	0		98		0
1599	SPG	GCT	CMDPwr	134	62		6	56	72			134	0
			Total	5892	2728	297	903	1528	3164	2998	944	1950	0
			X 2	11784	5456	594	1806	3056	6328	5996	1888	3900	0

2010 Svc

TRAIN Num	TERMINALS Origin	TERMINALS Finish	Equipm	Total Miles	Total Miles	Train Miles by State VT/NH	MA	CT	Other	Train Miles by Service REG	REG-S	CMTR	Other
Miles From New York				2438	1338	382	192	764	1100	1942	496	0	0
				Complete Route		15.7%	7.9%	31.3%	45.1%	79.7%	20.3%	0.0%	0.0%
				Knowledge Corridor		28.6%	14.3%	57.1%					
141	SPG	WAS	REG	360	108		6	102	252	360			0
495	SPG	NHV	REG-S	62	62		6	56	0		62		0
449	BOS	CHI	LDST		0								0
493	SPG	NHV	REG-S	62	62		6	56	0		62		0
55	SAB	WAS	REG-DP	611	313	191	66	56	298	611			0
475	SPG	NHV	REG-S	62	62		6	56	0		62		0
479	SPG	NHV	REG-S	62	62		6	56	0		62	0	0
			Total	1219	669	191	96	382	550	971	248	0	0
			X 2	2438	1338	382	192	764	1100	1942	496	0	0

Appendix B

Existing Service Schedules

B.1 Existing Scheduled for Freight Trains – Springfield Line

B.2 Existing Shipper Location Service for CSO and CSX

B.3 2008 Passenger Service Schedule for Modeling Purposes

B.4 2010 Schedule for Passenger Service

Appendix: B.1 Existing Schedule for Freight Trains Springfield Line

Railroad: P&W (Provided by P&W to CTDOT May-June 2008)

Symbol	Origin	Destination	Days	Direction	Cars	Weight (tons)	Length (ft)	Locomotive (number of)	Departure and Return Detail
CHFP	Cedar Hill	Fresh Pond	Tu-Fr	SB	30-75	3,900-9,750	2,000-4,700	B39-7 (2)	Departs Cedar Hill at 8:30 PM.
FPCH	Fresh Pond	Cedar Hill	We-Sa	NB	30-75	810-2,025	2,000-4,700	B39-7 (2)	Arrives Cedar Hill at 2:00 PM +/- 1 hr
CHDB	Cedar Hill	Danbury	Su-Fr	SB	30-70	3,900-9,100	2,000-4,500	B39-7 (2)	Departs Cedar Hill at 7:45 PM.
DBCH	Danbury	Cedar Hill	Mo-Sa	NB	30-70	810-1,890	2,000-4,500	B39-7 (2)	Arrives Cedar Hill at 6:30 AM.
Symbol	**Origin**	**Destination**	**Days**	**Direction**	**Cars**	**Weight (tons)**	**Length (ft)**	**Locomotive (number of)**	**Departure and Return Detail**
EDPL	Springfield	Waterbury Line	Mo-Fr	SB	60	3,500	4,500	GP40-2 (2)	Departs Springfield at 12:15 PM; run through to Waterbury
PLED	Waterbury Line	Springfield	Mo-Fr	NB	60	3,500	4,500	GP40-2 (2)	Departs Berlin at 8:15 AM; run through to Springfield.

Appendix B.1 Existing Schedule for Freight Trains Springfield Line (Continued)

Railroad: CSO (Developed by CTDOT and distributed May 13th, 2008)						
Train	**On line**	**From**	**Off Line**	**At**	**Locomotives (number of)**	**Cars**
CSO 1	5:30-6 AM	West Springfield Yard	Noon	West Springfield Yard	SD-40 (1) and B39-8 (1-2)	50-60
CSO 2	9-10 PM	Hartford Yard at Hart	3-5 AM	Hartford Yard at Hart	B39-8 (2)	20-25
CSO 3A	2-3 pm	Hartford Yard at Hart	45 min RT	Hartford Yard	B39-8 (1)	20
CSO 3B	8 AM	Hartford Yard at Hart	45 min RT	Hartford Yard	B39-8 (1)	20
CSO 4	8:30 AM	Hartford Yard at Fry	Before 2 PM	Hartford Yard	B39-8 (2-3)	50
CSO 5	7:30-8 PM	Hartford Yard at Fry	2 AM	Hartford	B39-8 (2) or GP 38 (2)	15-20
Railroad: CSX (Information provided by CSX on June 6th and July 25th, 2008)						
B748	8 PM	Cedar Hill Yard at Mill River	3 AM	Cedar Hill Yard at Cedar	B23 (1)	6-12

Appendix B.2 Existing Shipper Location Service for CSO and CSX

CSO Train Movements						
Train	**Shipper**	**Location**	**Mile Post**	**Dwell (minutes)**	**Service Frequency (weekly)**	**Notes**
CSO 1					5 trips Mo-Fr	Through train to Cedar Hill Yard and return
CSO 2					5 trips Mo-Fr	Train runs south then, turns and serves shippers going north.
	Fernwood Yard Marjam Supply Oakwood Ave.	West Hartford-Newington	33.3	20	1 day	Stop #1
	International Bridge/Standard Structural Steel	Newington	32.8	30	1 day	Stop #2
	Automated Materials	Berlin	26.0	20	1 day	Stop #3
	Inframetals	Wallingford	14.5	60	5 days	Stop #4
	Cytec	Wallingford	12.5	60	5 days	Stop #5
	Ryerson Steel	Wallingford	14.4	20	1 day	Stop #6
	WestVaco	Berlin	26.0	30-45	2-3 days	Stop #7
	Berlin Industrial Track	Berlin	26.0	45	3 days	Stop #8
	Connecticut Plywood	West Hartford	33.5	20	2 days	Stop #9
	Hartford Currant	Hartford, MP 35	36.5	20	1 day	Stop #10
	Waterbury Switch	Hartford, MP 37	37.0	20-30	5 days	Stop #11
CSO 3A	Delivery to CNZR	Hartford	35.1	20	4 trips Mo-Th	Known as the Hartford Yard Switcher, this train delivers cars to the Bloomfield Spur and return
CSO 3B	Delivery to CNZR	Hartford	35.2	20	Sunday only	

Appendix B.2 Existing Shipper Location Service for CSO and CSX

(Continued)

Train	Shipper	Location	Mile Post	Dwell (minutes)	Service Frequency (weekly)	Notes
CSO 4					6 trips Mo-Sa	Through train to W. Springfield Yard and return
CSO 5					5 trips Su-Th	
		Mac Brick / Nutmeg Builders	50.6	20	1-2 days	
		Enfield Lumber	53.7	30	3 days	
		Suffield Branch	49.1	2-3 hours	5 days	
CSX Train Movements						
B748					5 trips Mo-Fr	Loads out, empties return.
	H. Krevit	New Haven	2.7	40		Stop #1
	National Lumber	North Haven	5.8	40		Stop #2
	Connecticut Container	North Haven	5.8	40		Stop #3
	NE Graphics	North Haven	6.0	40		Stop #4
	Gallo	North Haven	6.0	40		Stop #5

APPENDIX B.3: 2008 Schedule for Passenger Trains from New Haven to Mill River

Eastbound/Northbound

	Service	Train		Days	New Haven	State St.	Mill River
Eastbound/SLE Northbound/NHHS	SLE	CD	9700	M-F	4.30		4.34
Eastbound/SLE Northbound/NHHS	SLE	CD	9702	M-F	4.55		4.59
Eastbound/SLE Northbound/NHHS	SLE	A	66	Daily	5.05		5.07
Eastbound/SLE Northbound/NHHS	SLE	CD	9704	M-F	5.30		5.34
Eastbound/SLE Northbound/NHHS	SLE	CD	9706	M-F	5.50		5.54
Eastbound/SLE Northbound/NHHS	SLE	CD	1602	M-F	6.20		6.24
Eastbound/SLE Northbound/NHHS	SLE	CD	9708	M-F	6.50		6.54
Eastbound/SLE Northbound/NHHS	SLE	A	2190	M-F	7.53		7.56
Eastbound/SLE Northbound/NHHS	SLE	CD	1606	M-F	8.20		8.24
Eastbound/SLE Northbound/NHHS	SLE	A	190	M-F	8.31		8.33
Eastbound/SLE Northbound/NHHS	NHHS	A	490	M-F	8.38	8.42	8.44
Eastbound/SLE Northbound/NHHS	SLE	CD	1610	M-F	9.06	9.09	
Eastbound/SLE Northbound/NHHS	SLE	A	2150	M-F	9.37		9.39
Eastbound/SLE Northbound/NHHS	SLE	A	170	M-F	10.10		10.12
Eastbound/SLE Northbound/NHHS	NHHS	A	470	M-F	10.35	10.39	10.41
Eastbound/SLE Northbound/NHHS	SLE	A	2154	M-F	11.37		11.39
Eastbound/SLE Northbound/NHHS	SLE	A	172	M-F	**12.44**		12.46
Eastbound/SLE Northbound/NHHS	SLE	CD	1622	M-F	**13.00**	**13.02**	**13.04**
Eastbound/SLE Northbound/NHHS	NHHS	A	56	M-F	**13.34**		13.37
Eastbound/SLE Northbound/NHHS	SLE	A	2158	M-F	**13.37**		13.39
Eastbound/SLE Northbound/NHHS	SLE	A	174	M-F	**14.42**		14.44
Eastbound/SLE Northbound/NHHS	SLE	CD	1632	M-F	**15.20**	**17.22**	**15.24**
Eastbound/SLE Northbound/NHHS	SLE	A	2162	M-F	**15.37**		15.39
Eastbound/SLE Northbound/NHHS	SLE	A	2164	M-F	**16.27**		16.29
Eastbound/SLE Northbound/NHHS	SLE	A	86	M-F	**16.28**		16.32
Eastbound/SLE Northbound/NHHS	SLE	CD	1636	M-F	**16.30**	**16.32**	**16.34**
Eastbound/SLE Northbound/NHHS	SLE	CD	1638	M-F	**17.02**	**17.04**	**17.06**
Eastbound/SLE Northbound/NHHS	NHHS	A	476	M-F	**17.15**	**17.19**	**17.21**
Eastbound/SLE Northbound/NHHS	SLE	A	2166	M-F	**17.27**		**17.29**
Eastbound/SLE Northbound/NHHS	SLE	A	176	M-F	**17.30**		**17.32**
Eastbound/SLE Northbound/NHHS	SLE	CD	1640	M-F	**17.37**	**17.39**	**17.41**
Eastbound/SLE Northbound/NHHS	SLE	CD	1644	M-F	**18.02**	**18.04**	**18.06**
Eastbound/SLE Northbound/NHHS	NHHS	A	494	M-F	**18.22**	**18.26**	**18.28**
Eastbound/SLE Northbound/NHHS	SLE	A	2168	M-F	**18.31**		**18.33**
Eastbound/SLE Northbound/NHHS	SLE	CD	1646	M-F	**18.38**	**18.40**	**18.42**
Eastbound/SLE Northbound/NHHS	SLE	CD	1656	M-F	**18.57**	**18.59**	**19.01**
Eastbound/SLE Northbound/NHHS	SLE	A	2170	M-F	**19.26**		**19.28**
Eastbound/SLE Northbound/NHHS	SLE	A	94	M-F	**19.30**		**19.33**
Eastbound/SLE Northbound/NHHS	SLE	CD	1668	M-F	**19.48**	**19.50**	**19.52**

APPENDIX B.3: 2008 Schedule for Passenger Trains from New Haven to Mill River

Eastbound/Northbound

	Service	Train		Days	New Haven	State St.	Mill River
Eastbound/SLE Northbound/NHHS	SLE	A	2172	M-F	**20.27**		**20.29**
Eastbound/SLE Northbound/NHHS	NHHS	A	148	M-F	**20.30**	**20.34**	**20.36**
Eastbound/SLE Northbound/NHHS	SLE	CD	1674	M-F	**20.50**	**20.52**	**20.54**
Eastbound/SLE Northbound/NHHS	SLE	A	178	M-F	**21.08**		**21.10**
Eastbound/SLE Northbound/NHHS	SLE	CD	1682	M-F	**22.05**	**22.07**	**22.09**
Eastbound/SLE Northbound/NHHS	SLE	A	136	F	**23.00**		**23.03**

Westbound/Southbound

	Service	Train		Days	New Haven	State St.	Mill River
Westbound/SLE Southbound/NHHS	SLE	CD	1621	M-F	6.12	6.09	6.07
Westbound/SLE Southbound/NHHS	SLE	CD	1627	M-F	6.35	6.32	6.3
Westbound/SLE Southbound/NHHS	SLE	CD	1633	M-F	7.03	7	6.58
Westbound/SLE Southbound/NHHS	NHHS	A	141	M-F	7.07	7.03	7.02
Westbound/SLE Southbound/NHHS	SLE	A	2151	M-F	7.19		7.16
Westbound/SLE Southbound/NHHS	SLE	CD	1637	M-F	7.40	7.37	7.36
Westbound/SLE Southbound/NHHS	SLE	CD	1641	M-F	8.05	8.02	8
Westbound/SLE Southbound/NHHS	SLE	A	2153	M-F	8.18		8.15
Westbound/SLE Southbound/NHHS	NHHS	A	495	M-F	8.37	8.33	8.31
Westbound/SLE Southbound/NHHS	SLE	CD	1645	M-F	8.40	8.37	8.35
Westbound/SLE Southbound/NHHS	SLE	A	95	M-F	8.42		8.39
Westbound/SLE Southbound/NHHS	SLE	A	2155	M-F	9.18		9.16
Westbound/SLE Southbound/NHHS	SLE	CD	1651	M-F	9.59	9.57	9.55
Westbound/SLE Southbound/NHHS	SLE	A	171	M-F	10.41		10.34
Westbound/SLE Southbound/NHHS	SLE	A	2159	M-F	11.18		11.14
Westbound/SLE Southbound/NHHS	SLE	A	83	F	**12.08**		12.05
Westbound/SLE Southbound/NHHS	SLE	A	93	M-Th	**12.08**		12.05
Westbound/SLE Southbound/NHHS	NHHS	A	493	M-F	**12.12**	12.08	12.06
Westbound/SLE Southbound/NHHS	SLE	A	2163	M-F	**13.18**		13.14
Westbound/SLE Southbound/NHHS	SLE	A	173	M-F	**13.38**		13.35
Westbound/SLE Southbound/NHHS	SLE	A	2165	M-F	**14.18**		14.14
Westbound/SLE Southbound/NHHS	SLE	CD	1671	M-F	**14.40**		14.29
Westbound/SLE Southbound/NHHS	SLE	A	2167	M-F	**15.18**		15.14
Westbound/SLE Southbound/NHHS	SLE	A	137	M-F	**16.08**		16.05
Westbound/SLE Southbound/NHHS	NHHS	A	55	M-F	**16.31**		16.21
Westbound/SLE Southbound/NHHS	SLE	CD	1679	M-F	**16.52**		16.47
Westbound/SLE Southbound/NHHS	SLE	A	2171	M-F	**17.18**		17.14
Westbound/SLE Southbound/NHHS	NHHS	A	475	M-F	**17.22**	17.18	17.16
Westbound/SLE Southbound/NHHS	SLE	A	175	M-F	**17.45**		17.42
Westbound/SLE Southbound/NHHS	SLE	CD	1687	M-F	**18.00**		17.54

APPENDIX B.3: 2008 Schedule for Passenger Trains from New Haven to Mill River

Westbound/Southbound

	Service	Train		Days	New Haven	State St.	Mill River
Westbound/SLE Southbound/NHHS	SLE	CD	9751	M-F	**18.30**		18.24
Westbound/SLE Southbound/NHHS	SLE	A	2173	M-F	**18.38**		18.34
Westbound/SLE Southbound/NHHS	SLE	CD	9753	M-F	**19.05**		18.59
Westbound/SLE Southbound/NHHS	SLE	A	2193	M-F	**19.23**		19.2
Westbound/SLE Southbound/NHHS	SLE	CD	9755	M-F	**19.30**		19.25
Westbound/SLE Southbound/NHHS	SLE	A	177	M-F	**20.09**		20.06
Westbound/SLE Southbound/NHHS	SLE	CD	9757	M-F	**20.26**		20.19
Westbound/SLE Southbound/NHHS	NHHS	A	479	M-F	**20.37**	20.33	20.31
Westbound/SLE Southbound/NHHS	SLE	CD	1693	M-F	**21.00**		20.49
Westbound/SLE Southbound/NHHS	SLE	A	179	M-F	**21.09**		21.07
Westbound/SLE Southbound/NHHS	SLE	CD	9759	M-F	**21.20**		21.13
Westbound/SLE Southbound/NHHS	SLE	CD	9761	M-F	**22.20**		22.14
Westbound/SLE Southbound/NHHS	SLE	A	67	Daily	24.20		24.17

APPENDIX B.3: 2008 Schedules for Passenger Trains Springfield Line

Railroad: Amtrak. Direction: Southbound. Origin: Springfield.							
Symbol	**Destination**	**Days**	**Psgr. Cars**	**Trailing Tons**	**Feet**	**Power**	**Departs Springfield**
141	Wash DC	Mo-Fr	7	350	655	1 P42DC	5:35 AM.
143	Wash DC	SaSu	7	350	655	1 P42DC	6:15 AM.
495	New Haven	Mo-Fr	2	100	230	1 P42DC	7:00 AM.
405	New Haven	SaSu	2	100	230	1 P42DC	7:20 AM.
147	Wash DC	Sa	7	350	655	1 P42DC	7:40 AM
145	Wash DC	Su	6	300	570	1 P42DC	8:40 AM.
493	New Haven	Mo-Fr	2	100	230	1 P42DC	10:20 AM.
401	New Haven	SaSu	2	100	230	1 P42DC	10:20 AM.
463	New Haven	SaSu	2	100	230	1 P42DC	12:20 PM.
475	New Haven	Mo-Fr	2	100	230	1 P42DC	3:50 PM.
467	New Haven	SaSu	2	100	230	1 P42DC	5:15 PM.
479	New Haven	Mo-Fr	2	100	230	1 P42DC	7:05 PM.
497	New Haven	Su	2	100	230	1 P42DC	7:15 PM.

Railroad: Amtrak. Direction: Southbound. Origin: St. Albans.							
Symbol	**Destination**	**Days**	**Psgr. Cars**	**Trailing Tons**	**Feet**	**Power**	**Departs Springfield**
55	Wash DC	Mo-Fr	5	250	485	1 P42DC	2:50 PM.
57	Wash DC	SaSu	5	250	485	1 P42DC	2:50 PM.

APPENDIX B.3: 2008 Schedules for Passenger Trains Springfield Line

Railroad: Amtrak. Direction: Northbound. Origin: New Haven .							
Symbol	**Destination**	**Days**	**Psgr. Cars**	**Trailing Tons**	**Feet**	**Power**	**Departs New Haven**
490	Springfield	Mo-Fr	2	100	230	1 P42DC	8:38 AM.
450	Springfield	SaSu	2	100	230	1 P42DC	9:00 AM.
470	Springfield	Mo-Fr	2	100	230	1 P42DC	10:35 AM.
460	Springfield	SaSu	2	100	230	1 P42DC	11:05 AM.
464	Springfield	SaSu	2	100	230	1 P42DC	3:00 PM.
488	Springfield	SaSu	2	100	230	1 P42DC	4:50 PM.
476	Springfield	Mo-Fr	2	100	230	1 P42DC	5:15 PM.
494	Springfield	Mo-Fr	2	100	230	1 P42DC	7:22 PM.
466	Springfield	Su	2	100	230	1 P42DC	10:04 PM.

Railroad: Amtrak. Direction: Northbound. Origin: Wash DC.							
Symbol	**Destination**	**Days**	**Psgr. Cars**	**Trailing Tons**	**Feet**	**Power**	**Departs New Haven**
54	St. Albans	SaSu	5	250	485	1 P42DC	1:34 PM.
56	St. Albans	Mo-Fr	5	250	485	1 P42DC	1:34 PM.
140	Springfield	SaSu	7	350	655	1 P42DC	6:36 PM.
148	Springfield	Mo-Fr	7	350	655	1 P42DC	8:30 PM.
146	Springfield	Sa	7	350	655	1 P42DC	10:04 PM.
136	Springfield	Fr	7	350	655	1 P42DC	11:00 PM.

B.4 2010 Schedule for Passenger Service

Southbound Boston • Providence • Springfield • Hartford • New Haven • New York • Philadelphia • Washington

Train Name	Northeast Regional	Acela Express	Northeast Regional	Acela Express	Northeast Regional	Northeast Regional	Acela Express	Northeast Regional	Northeast Regional	Acela Express	Northeast Regional	Northeast Regional	Acela Express	Northeast Regional	Northeast Regional	Northeast Regional	Acela Express	Acela Express	Northeast Regional	Acela Express	Northeast Regional
Train Number	67	2151	141	2153	143	95/495	2155	195/405	147	2251	171	145	2159	99	83/93/493	161/401	2253	2163	173	2165	163/463
Normal Days of Operation	Daily	Mo-Fr	Mo-Fr	Mo-Fr	SaSu	Mo-Fr	Mo-Fr	SaSu	Sa	Sa	Mo-Fr	Su	Mo-Fr	SaSu	Mo-Fr	SaSu	SaSu	Mo-Fr	Mo-Fr	Mo-Fr	SaSu
Will Also Operate					7/5,9/6			7/5,9/6	7/4,9/5	7/4,9/5		7/5,9/6		7/5,9/6		7/5,9/6	7/5,9/6				7/5,9/6
Will Not Operate		7/5,9/6	7/5,9/6	7/5,9/6		7/5,9/6	7/5,9/6				7/5,9/6	7/4,9/5	7/5,9/6		7/5,9/6			7/5,9/6	7/5,9/6	7/5,9/6	
On Board Service	RB🍽Q🛒	RB✪🍽Q	RB🍽Q	RB✪🍽Q	RB🍽Q	RB🍽	RB✪🍽Q	RB🍽	RB🍽Q	RB✪🍽Q	RB🍽Q	RB🍽Q	RB✪🍽Q	RB🍽	RB🍽	RB🍽Q	RB✪🍽Q	RB✪🍽Q	RB🍽Q	RB✪🍽Q	RB🍽Q
BOSTON, MA (ET) -South Station	Dp 9 25P	5 10A		6 10A		6 15A	7 15A	6 40A		8 10A	8 15A		9 15A	8 40A	9 35A	9 40A	11 10A	11 15A	11 05A	12 15P	11 40A
Boston, MA-Back Bay	R 9 30P	R 5 15A		R 6 15A		R 6 20A	R 7 20A	R 6 45A		R 8 14A	R 8 20A		R 9 20A	R 8 45A	R 9 40A	R 9 45A	R11 14A	R11 20A	R11 10A	R12 20P	R11 45A
Route 128, MA	R 9 44P	R 5 24A		R 6 24A		R 6 30A	R 7 29A	R 6 55A		R 8 23A	R 8 30A		R 9 29A	R 8 55A	R 9 50A	R 9 55A	R11 23A	R11 29A	R11 20A	R12 29P	R11 55A
Providence, RI	10 16P	5 45A		6 45A		6 55A	7 50A	7 20A		8 45A	8 54A		9 50A	9 20A	10 15A	10 20A	11 45A	11 50A	11 52A	12 51P	12 20P
Kingston, RI (Newport) 🚌 [92] [94]	10 42P					7 16A		7 41A			9 15A			9 41A	10 36A	10 41A			12 13P		12 41P
Westerly, RI	10 59P					7 30A		7 56A						10 00A	10 51A						12 59P
Mystic, CT	11 11P													10 10A	11 02A						
New London, CT (🚌 Casino)	11 25P	6 30A				7 52A		8 18A			9 50A			10 25A	11 17A	11 17A			12 47P		1 20P
Old Saybrook, CT	11 47P					8 11A		8 40A			10 11A				11 38A	11 38A			1 07P		1 40P
Springfield, MA			6 00A		6 30A	7 10A		7 30A	8 00A			9 05A			10 40A	10 40A					12 40P
Windsor Locks, CT			6 20A		6 50A	7 28A		7 48A							11 01A	10 58A					12 58P
Windsor, CT			6 25A		6 56A	7 33A		7 53A							11 07A	11 03A					1 03P
Hartford, CT			6 37A		7 08A	7 45A		8 05A	8 37A			9 40A			11 18A	11 14A					1 16P
Berlin, CT			6 51A		L 7 21A	7 58A		8 16A	8 50A			9 53A			11 30A	11 25A					1 28P
Meriden, CT			7 01A		L 7 31A	8 08A		8 26A	9 01A			10 02A			11 38A	11 34A					1 36P
Wallingford, CT			7 09A		L 7 39A	8 15A		8 33A	9 09A			10 10A			11 45A	11 42A					
New Haven, CT	Ar					8 35A		8 55A							12 03P	12 00N					2 05P
NEW HAVEN, CT	Ar 12 25A		7 28A		8 00A	8 43A		9 09A	9 30A		10 39A	10 30A		11 09A	12 08P				1 38P		2 09P
	Dp 12 45A	7 13A	7 38A	8 13A	8 11A	8 45A		9 11A	9 41A	10 18A	10 41A	10 41A	11 18A	11 11A	12 11P	12 11P	1 18P	1 18P	1 41P	2 18P	2 11P
Bridgeport, CT			7 58A		8 31A			9 31A	10 01A			11 01A		11 31A	12 31P	12 31P			2 01P		2 31P
Stamford, CT	1 31A	7 54A	8 24A		8 56A	9 28A	9 52A	9 56A	10 26A	10 57A	11 26A	11 26A	11 57A	11 56A	12 56P	12 56P	1 57P	1 57P	2 26P	2 57P	2 56P
New Rochelle, NY			8 47A		9 15A			10 15A	10 45A			11 45A		12 15P	1 15P	1 15P			2 45P		3 15P
NEW YORK, NY	Ar 2 20A	8 45A	9 20A	9 40A	9 50A	10 20A	10 45A	10 50A	11 20A	11 45A	12 16P	12 20P	12 45P	12 50P	1 50P	1 44P	2 45P	2 45P	3 16P	3 45P	3 50P
	Dp 3 00A	9 00A	9 35A	10 00A	10 05A	10 35A	11 00A	11 05A	12 05P	12 00N	12 35P	12 55P	1 00P	1 05P	2 05P	2 05P	3 00P	3 00P	3 35P	4 00P	4 05P
Newark, NJ	3 20A	9 14A	9 52A	10 14A	10 22A	10 52A	11 14A	11 22A	12 22P	12 14P	12 52P	1 12P	1 14P	1 22P	2 22P	2 22P	3 14P	3 14P	3 52P	4 14P	4 22P
Newark Liberty Intl. Airport, NJ			9 57A		10 28A				12 28P		12 58P			1 28P	2 27P	2 28P					4 27P
Metropark, NJ	3 36A		10 08A		10 40A	11 06A	11 27A	11 37A	12 40P	12 27P	1 08P		1 27P	1 40P	2 40P	2 40P	3 27P				4 39P
Trenton, NJ	4 03A		10 32A		11 03A	11 30A		12 03P	1 03P		1 32P	1 47P		2 03P	3 06P	3 03P					5 03P
PHILADELPHIA, PA -30th St. Station	Ar 4 35A		10 57A		11 30A	11 57A		12 28P	1 30P		1 59P	2 14P		2 30P	3 32P	3 30P			4 52P		5 30P
	Dp 4 40A	10 07A	11 08A	11 07A	11 33A	12 00N	12 10P	12 31P	1 33P	1 12P	2 13P	2 17P	2 10P	2 33P	3 35P	3 33P	4 12P	4 07P	4 55P	5 07P	5 33P
Wilmington, DE	5 06A	10 26A	11 31A	11 26A	11 55A	12 22P	12 29P	12 52P	1 55P	1 31P	2 36P	2 39P	2 29P	2 55P	3 56P	3 55P	4 31P	4 26P	5 17P	5 26P	5 55P
Aberdeen, MD											3 03P					4 21P					
Baltimore, MD	6 08A	11 09A	12 17P	12 09P	12 43P	1 13P	1 12P	1 40P	2 43P	2 15P	3 27P	3 25P	3 12P	3 43P	4 42P	4 45P	5 15P	5 09P	6 02P	6 11P	6 43P
BWI Thurgood Marshall Air., MD	6 19A	11 19A	12 27P	12 19P	12 53P	1 25P		1 50P	2 53P	2 24P	3 37P	3 35P		3 53P	4 52P	4 55P	5 24P	5 19P	6 12P	6 21P	6 53P
New Carrollton, MD	L 6 42A		D12 48P		D 1 14P	1 45P		2 13P	3 12P		3 56P	D 3 54P		4 12P	5 11P	D 5 19P			D 6 33P		D 7 17P
WASHINGTON, DC	Ar 6 55A	11 47A	12 59P	12 47P	1 25P	2 00P	1 47P	2 25P	3 30P	2 52P	4 12P	4 10P	3 47P	4 28P	5 25P	5 30P	5 52P	5 47P	6 44P	6 49P	7 28P

Train Name	Acela Express	Acela Express	Northeast Regional	Northeast Regional	Vermonter	Vermonter	Acela Express	Acela Express	Northeast Regional	Northeast Regional	Acela Express	Acela Express	Northeast Regional	Acela Express	Acela Express	Northeast Regional	Northeast Regional	Northeast Regional	Northeast Regional	Northeast Regional
Train Number	2255	2167	135	137	57	55	2171	2257	165/465*	175/475	2259	2173	167/467	2297	2193	139	177	179/479	169/497*	67
Normal Days of Operation	Su	Mo-Fr	SaSu	Mo-Fr	SaSu	Mo-Fr	Mo-Fr	Su	SaSu	Mo-Fr	Su	Mo-Fr	Sa	Su	Mo-Fr	Su	Mo-Fr	Mo-Fr	SaSu	Daily
Will Also Operate	7/5,9/6		7/5,9/6		7/5,9/6			7/5,9/6	7/5,9/6		7/5,9/6		7/4,9/5	7/5,9/6		7/5,9/6			7/5,9/6	
Will Not Operate	7/4,9/5	7/5,9/6		7/5,9/6		7/5,9/6	7/5,9/6	7/4,9/5		7/5,9/6	7/4,9/5	7/5,9/6		7/4,9/5	7/5,9/6	7/4,9/5	7/5,9/6	7/5,9/6		
On Board Service	RB✪🍽Q	RB✪🍽Q	RB🍽Q	RB🍽Q	RB🍽Q	RB🍽Q	RB✪🍽Q	RB✪🍽Q	RB🍽Q	RB🍽Q	RB✪🍽Q	RB✪🍽Q	RB🍽Q	RB✪🍽Q	RB✪🍽Q	RB🍽Q	RB🍽Q	RB🍽Q	RB🍽Q	RB🍽Q🛒
BOSTON, MA (ET) -South Station	Dp 1 10P	1 15P	1 45P	1 40P	From Vermont	From Vermont	3 15P	3 15P	3 05P	3 25P	4 10P	4 30P	4 45P	5 10P	5 20P	5 40P	5 35P	6 45P	6 40P	9 25P
Boston, MA-Back Bay	R 1 14P	R 1 20P	R 1 50P	R 1 45P			R 3 20P	R 3 20P	R 3 10P	R 3 30P	R 4 14P	R 4 35P	R 4 50P	R 5 15P	R 5 25P	R 5 45P	R 5 40P	R 6 50P	R 6 45P	R 9 30P
Route 128, MA	R 1 23P	R 1 29P	R 2 00P	R 1 55P			R 3 29P	R 3 30P	R 3 20P	R 3 40P	R 4 23P	R 4 44P	R 5 00P	R 5 24P	R 5 34P	R 5 55P	R 5 50P	R 7 00P	R 6 55P	R 9 44P
Providence, RI	1 44P	1 50P	2 25P	2 20P			3 50P	3 51P	3 54P	4 05P	4 44P	5 05P	5 24P	5 45P	5 55P	6 20P	6 15P	7 24P	7 20P	10 16P
Kingston, RI (Newport) 🚌 [92] [94]			2 46P	2 41P					4 17P	4 26P			5 45P			6 41P	6 36P	7 45P	7 41P	10 42P
Westerly, RI				2 56P					4 31P				6 01P			6 56P	6 51P			10 59P
Mystic, CT									4 41P								7 02P		8 04P	11 11P
New London, CT (🚌 Casino)			3 21P	3 22P					4 55P	4 59P			6 23P			7 18P	7 21P	8 18P	8 20P	11 25P
Old Saybrook, CT				3 40P					5 14P	5 17P			6 45P			7 38P	7 40P		8 40P	11 47P
Springfield, MA					2 50P	2 50P			4 10P	4 05P			5 25P					7 20P	7 40P	
Windsor Locks, CT					3 12P	3 12P			4 29P	4 23P			5 44P					7 38P	7 58P	
Windsor, CT									4 35P	4 28P			5 50P					7 43P	8 04P	
Hartford, CT					3 26P	3 32P			4 47P	4 42P			6 04P					7 56P	L 8 15P	
Berlin, CT					3 40P	3 45P			4 59P	4 54P			6 14P					8 09P	L 8 26P	
Meriden, CT					3 53P	3 56P			L 5 06P	5 04P			L 6 24P					8 18P	L 8 34P	
Wallingford, CT					4 03P	4 05P			L 5 13P	5 11P			L 6 31P					8 27P	L 8 41P	
New Haven, CT	Ar								5 31P	5 35P			7 00P					8 46P	9 00P	
NEW HAVEN, CT	Ar		4 08P	4 09P	4 30P	4 30P			5 43P	5 46P			7 14P			8 09P	8 12P	9 13P	9 08P	12 25A
	Dp 3 18P	3 18P	4 11P	4 11P	4 41P	4 41P	5 18P	5 23P	5 48P	5 48P	6 18P	6 38P	7 16P	7 18P	7 23P	8 11P	8 14P	9 15P	9 11P	12 45A
Bridgeport, CT			4 31P	4 31P	5 01P	5 01P			6 08P				7 36P			8 31P	8 34P		9 31P	
Stamford, CT	3 57P	3 57P	4 56P	4 56P	5 28P	5 28P	5 57P	6 01P	6 33P	6 30P	6 57P	7 17P	8 01P	7 57P	8 02P	8 56P	8 59P	9 57P	9 56P	1 31A
New Rochelle, NY			5 15P	5 15P					6 52P				8 20P			9 15P	9 18P		10 15P	
NEW YORK, NY	Ar 4 44P	4 45P	5 45P	6 00P	6 25P	6 41P	6 55P	6 47P	7 26P	7 45P	7 45P	8 05P	8 50P	8 45P	8 59P	9 45P	9 50P	10 45P	10 46P	2 20A
	Dp 5 00P	5 00P	6 05P	6 20P	6 55P	7 05P	7 15P	7 00P	7 55P	8 00P	8 00P	8 15P	9 05P			10 05P	10 05P		11 05P	3 00A
Newark, NJ	5 14P	5 14P	6 22P	6 37P	7 12P	7 21P	7 29P	7 14P	8 12P	8 17P	8 14P	8 29P	9 22P			10 22P	10 22P		11 22P	3 20A
Newark Liberty Intl. Airport, NJ			6 28P	6 43P					8 18P	8 23P			9 27P			10 28P				
Metropark, NJ	5 27P		6 40P	6 54P	7 30P			7 27P	8 30P	8 35P	8 27P		9 40P			10 40P	10 38P		11 37P	3 36A
Trenton, NJ			7 03P	7 16P	7 54P	7 55P			8 53P	8 58P			10 03P			11 03P	11 01P		12 01A	4 03A
PHILADELPHIA, PA -30th St. Station	Ar		7 30P	7 42P	8 22P	8 22P			9 20P	9 25P			10 30P			11 30P	11 28P		12 28A	4 35A
	Dp 6 12P	6 07P	7 33P	7 45P	8 25P	8 25P	8 22P	8 12P	9 23P	9 28P	9 12P	9 22P	10 33P			11 33P	11 30P		12 30A	4 40A
Wilmington, DE	6 31P	6 26P	7 55P	8 05P	8 46P	8 47P	8 41P	8 31P	9 45P	9 50P	9 31P	9 41P	10 55P			11 55P	11 50P		12 52A	5 06A
Aberdeen, MD			8 24P																	
Baltimore, MD	7 15P	7 09P	8 48P	8 51P	9 33P	9 35P	9 24P	9 15P	10 33P	10 38P	10 15P	10 24P	11 43P			12 43A	12 40A		1 40A	6 08A
BWI Thurgood Marshall Air., MD	7 24P	7 19P	8 58P	9 01P	9 43P	9 45P	9 34P	9 24P	10 43P	10 48P	10 24P	10 34P	11 53P			12 52A	12 50A		1 49A	6 19A
New Carrollton, MD			D 9 22P	D 9 24P	D10 04P	D10 11P			D11 07P	D11 12P			D12 17A				D 1 14A			L 6 42A
WASHINGTON, DC	7 52P	7 47P	9 35P	9 35P	10 15P	10 20P	10 05P	9 52P	11 20P	11 25P	10 52P	11 05P	12 29A			1 25A	1 25A		2 25A	6 55A

Services, Symbols and Reference Marks on other side.

* Shuttle Trains 465 and 497 operate on Sundays only.

Northbound Washington • Philadelphia • New York • New Haven •Hartford • Springfield • Providence • Boston

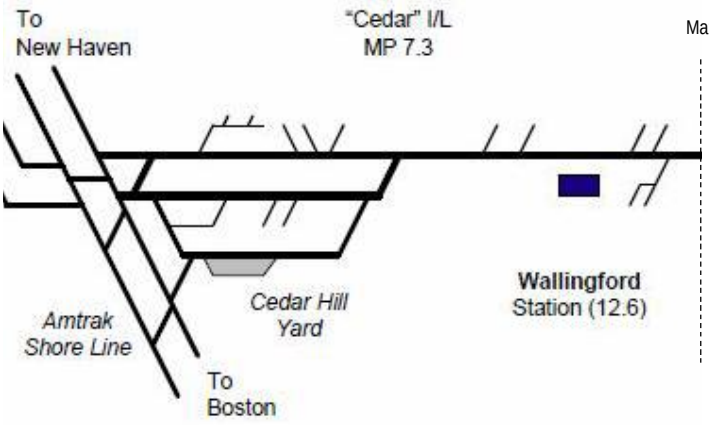
Train Name ▸		Northeast Regional	Acela Express	Northeast Regional	Northeast Regional	Acela Express	Acela Express	Northeast Regional	Northeast Regional	Northeast Regional	Acela Express	Northeast Regional	Vermonter	Vermonter	Acela Express	Acela Express	Northeast Regional	Northeast Regional	Acela Express	Northeast Regional	Northeast Regional	Acela Express
Train Number ▸		66	2190	190/490	150/450	2150	2290	170/470	160/460	162	2154	172	54	56	2158	2250	86	164/464	2160	174	82	2252
Normal Days of Operation ▸		Daily	Mo-Fr	Mo-Fr	SaSu	Mo-Fr	Sa	Mo-Fr	SaSu	SaSu	Mo-Fr	Mo-Fr	SaSu	Mo-Fr	Mo-Fr	SaSu	Mo-Fr	SaSu	Mo-Fr	Mo-Fr	Sa	Su
Will Also Operate ▸					7/5,9/6		7/4,9/5		7/5,9/6	7/5,9/6		7/5,9/6	7/5,9/6			7/5,9/6		7/5,9/6	7/5,9/6		7/4,9/5	7/5,9/6
Will Not Operate ▸			7/5,9/6	7/5,9/6		7/5,9/6		7/5,9/6			7/5,9/6	7/5,9/6		7/5,9/6	7/5,9/6		7/5,9/6		7/5,9/6	7/5,9/6		7/4,9/5
On Board Service ▸		RB🍽Q🛄	RB✪🍽Q	RB🍽Q	RB 🍽Q	RB✪🍽Q	RB✪🍽Q	RB🍽Q	RB🍽Q	RB🍽Q	RB✪🍽Q	RB🍽Q	RB🍽Q	RB🍽Q	RB✪🍽Q	RB✪🍽Q	RB🍽Q	RB🍽Q	RB✪🍽Q	RB✪🍽Q	RB🍽Q	RB🍽	RB✪🍽Q
WASHINGTON, DC qr (ET)	Dp	🛄 10 00P		3 15A	3 15A	5 00A		5 02A	5 25A	6 20A	7 00A	7 25A	7 30A	8 10A	9 00A	9 00A	8 40A	9 25A	10 00A	10 25A	10 20A	11 00A
New Carrollton, MD qr		10 10P						R 5 14A	R 5 37A	R 6 32A		R 7 37A	R 7 42A	R 8 20A			8 51A	R 9 37A		R10 37A	10 32A	
BWI Thurgood Marshall Air., MD ✈ qr		10 30P						5 30A	5 53A	6 48A	7 21A	7 53A	7 58A	8 35A	9 21A	9 21A	9 08A	9 53A	10 21A	10 53A	10 48A	11 21A
Baltimore, MD qr		🛄 10 46P		3 55A	3 55A	5 30A		5 45A	6 09A	7 04A	7 34A	8 08A	8 12A	8 50A	9 34A	9 34A	9 27A	10 10A	10 34A	11 10A	11 04A	11 34A
Aberdeen, MD qr				4 19A	4 19A					7 28A											11 28A	
Wilmington, DE qr		11 36P		4 50A	4 50A	6 11A		6 30A	6 56A	7 56A	8 16A	8 55A	8 56A	9 35A	10 16A	10 18A	10 11A	10 56A	11 16A	11 55A	11 56A	12 18P
PHILADELPHIA, PA qr -30th St. Station	Ar	🛄 11 59P		5 10A	5 11A			6 49A	7 15A	8 15A		9 15A	9 17A	9 55A			10 30A	11 15A		12 15P	12 15P	
	Dp	🛄 12 13A		5 13A	5 15A	6 30A		6 52A	7 18A	8 18A	8 35A	9 18A	9 20A	9 58A	10 35A	10 37A	10 38A	11 18A	11 35A	12 18P	12 18P	12 37P
Trenton, NJ qr		12 48A		5 45A	5 45A			7 20A	7 47A	8 47A		9 46A	9 49A	10 27A			11 09A	11 47A		12 46P	12 47P	
Metropark, NJ qr		1 15A							8 07A	9 08A		10 07A	10 10A			11 18A	11 30A	12 08P		1 07P	1 08P	1 18P
Newark Liberty Intl. Airport, NJ ✈ qr				6 16A	6 16A				8 21A			10 20A						12 21P		1 20P	1 19P	
Newark, NJ qr		1 32A		6 22A	6 22A	7 25A		7 54A	8 27A	9 23A	9 30A	10 26A	10 25A	11 02A	11 30A	11 36A	11 47A	12 27P	12 30P	1 26P	1 25P	1 36P
NEW YORK, NY qr	Ar	1 50A		6 40A	6 40A	7 42A		8 13A	8 45A	9 41A	9 47A	10 44A	10 43A	11 20A	11 46A	11 52A	12 05P	12 46P	12 46P	1 44P	1 45P	1 52P
	Dp	🛄 2 40A	6 20A	6 55A	7 00A	8 03A	8 03A	8 30A	9 00A	10 00A	10 03A	11 00A	11 30A	11 33A	12 03P	12 05P	12 30P	1 00P	1 03P	2 00P	2 00P	2 05P
New Rochelle, NY qr								8 57A	9 27A	10 27A		11 28A						1 27P		2 27P	2 27P	
Stamford, CT qr		3 30A	7 04A	7 43A	7 47A	8 46A	8 47A	9 18A	9 48A	10 48A	10 46A	11 48A	12 18P	12 18P	12 46P	12 47P	1 16P	1 48P	1 46P	2 48P	2 48P	2 46P
Bridgeport, CT qr								9 42A	10 12A	11 12A		12 12P	12 42P	12 42P				2 12P		3 12P	3 12P	
NEW HAVEN, CT qr	Ar	4 20A		8 29A	8 31A			10 06A	10 36A	11 36A		12 36P	1 06P	1 06P			2 00P	2 36P		3 36P	3 36P	
	Dp	4 40A	8 02A	8 35A	8 33A	9 30A	9 31A	10 08A	10 38A	11 38A	11 30A	12 38P			1 31P	1 31P	2 04P	2 38P	2 30P	3 38P	3 38P	3 28P
New Haven, CT qr	Dp			8 38A	8 37A			10 15A	10 43A				1 20P	1 22P				2 50P				
Wallingford, CT				8 53A	8 51A			10 28A	10 56A				1 35P	1 37P				3 03P				
Meriden, CT				9 03A	8 59A			10 35A	11 05A				1 44P	1 46P				3 12P				
Berlin, CT				9 14A	9 08A			10 44A	11 14A				1 54P	1 56P				3 24P				
Hartford, CT qr				9 27A	9 20A			10 57A	11 27A				2 08P	2 10P				3 41P				
Windsor, CT				L 9 38A	L 9 28A			L11 05A	L11 35A									L 3 49P				
Windsor Locks, CT				L 9 44A	L 9 34A			L11 11A	L11 40A				2 24P	2 26P				L 3 55P				
Springfield, MA qr				10 10A	10 00A			11 35A	12 05P				2 58P	3 00P				4 16P				
Old Saybrook, CT		5 13A		9 06A	9 05A					12 08P		1 07P					2 42P	3 08P		4 09P	4 10P	
New London, CT (🎰 Casino) qr		5 34A	L 8 44A	9 27A	9 31A			11 05A	11 26A	12 28P		1 27P					3 03P	3 30P		4 39P	4 33P	
Mystic, CT qr		5 47A		9 39A	9 44A					12 42P		1 43P						3 44P				
Westerly, RI qr		5 59A		9 49A	9 55A				11 47A			1 54P						3 54P		5 01P		
Kingston, RI 🚲 (Newport 🚌) 92 96 qr		6 17A		10 06A	10 10A			11 38A	12 02P	1 08P		2 09P					3 38P	4 11P		5 18P	5 07P	
Providence, RI qr		🛄 7 04A	L 9 22A	10 24A	10 30A	L10 51A	L11 02A	12 00N	12 20P	1 25P	L12 52P	2 28P			L 2 51P	L 2 52P	3 56P	4 29P	L 3 49P	5 38P	5 26P	L 4 58P
Route 128, MA qr		D 7 43A	D10 02A	D10 52A	D11 02A	D11 23A	D11 26A	D12 35P	D12 53P	D 2 01P	D 1 23P	D 3 00P			D 3 20P	D 3 25P	D 4 26P	D 5 01P	D 4 21P	D 6 09P	D 6 01P	D 5 23P
Boston, MA-Back Bay qr		D 7 59A	D10 03A	D11 04A	D11 13A	D11 32A	D11 36A	D12 48P	D 1 03P	D 2 11P	D 1 32P	D 3 10P			D 3 29P	D 3 36P	D 4 37P	D 5 12P	D 4 30P	D 6 19P	D 6 11P	D 5 33P
BOSTON, MA qr -South Station (ET)	Ar	🛄 8 05A	10 07A	11 09A	11 18A	11 37A	11 431A	12 54P	1 08P	2 17P	1 37P	3 15P	To Vermont	To Vermont	3 34P	3 41P	4 42P	5 17P	4 34P	6 25P	6 18P	5 38P

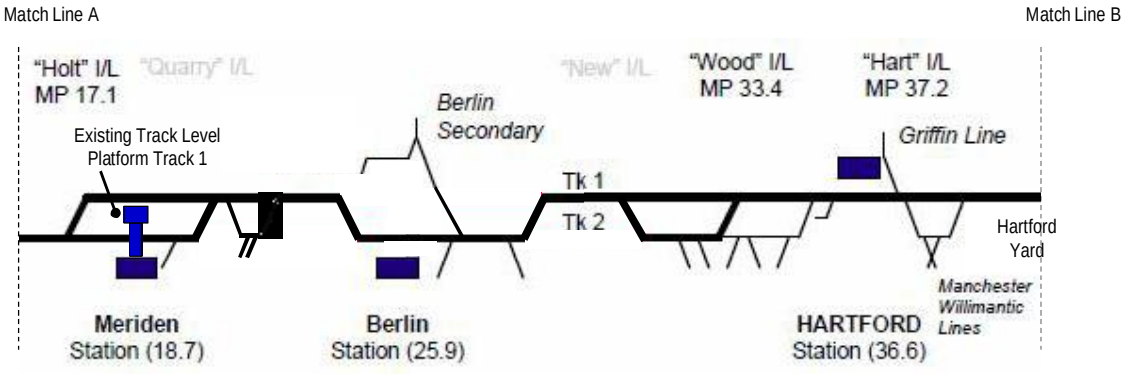
Train Name ▸		Northeast Regional	Acela Express	Northeast Regional	Northeast Regional	Acela Express	Acela Express	Northeast Regional	Acela Express	Northeast Regional	Acela Express	Acela Express	Northeast Regional	Northeast Regional	Northeast Regional	Acela Express	Acela Express	Northeast Regional	Northeast Regional	Northeast Regional	Northeast Regional	Northeast Regional
Train Number ▸		88/488	2164	176/476	140	2166	2254	194	2168	94/494	2170	2256	148	168	132/432	2172	2258	178	146	136	166	66
Normal Days of Operation ▸		SaSu	Mo-Fr	Mo-Fr	SaSu	Mo-Fr	Su	SaSu	Mo-Fr	Mo-Fr	Mo-Fr	Su	Mo-Fr	Sa	Su	Mo-Fr	Su	Mo-Fr	Sa	Fr	Su	Daily
Will Also Operate ▸		7/5,9/6			7/5,9/6		7/5,9/6	7/5,9/6				7/5,9/6		7/4,9/5	7/5,9/6		7/5,9/6		7/4,9/5		7/5,9/6	
Will Not Operate ▸			7/5,9/6	7/5,9/6		7/5,9/6	7/4,9/5		7/5,9/6	7/5,9/6	7/5,9/6	7/4,9/5	7/5,9/6		7/4,9/5	7/5,9/6	7/4,9/5	7/5,9/6			7/4,9/5	
On Board Service ▸		RB🍽	RB✪🍽Q	RB🍽Q	RB🍽Q	RB✪🍽Q	RB✪🍽Q	RB🍽	RB✪🍽Q	RB🍽	RB✪🍽Q	RB✪🍽Q	RB🍽Q	RB🍽Q	RB🍽Q	RB✪🍽Q	RB✪🍽Q	RB🍽Q	RB🍽Q	RB🍽Q	RB🍽Q	RB🍽Q🛄
WASHINGTON, DC qr (ET)	Dp	11 25A	12 00N	12 05P	12 25P	1 00P	1 00P	1 25P	2 00P	2 05P	3 00P	3 00P	3 02P	3 25P	3 25P	4 00P	4 00P	4 05P	4 25P	5 10P	5 20P	🛄 10 00P
New Carrollton, MD qr		11 37A		12 16P	R12 37P			1 37P		2 16P			R 3 13P	R 3 37P	R 3 37P			R 4 16P	R 4 37P	R 5 22P	R 5 32P	10 10P
BWI Thurgood Marshall Air., MD ✈ qr		11 53A		12 32P	12 54P		1 21P	1 53P		2 32P	3 21P	3 21P	3 31P	3 53P	3 53P		4 21P	4 32P	4 53P	5 38P	5 48P	10 30P
Baltimore, MD qr		12 09P	12 30P	12 47P	1 09P	1 30P	1 34P	2 09P	2 30P	2 47P	3 34P	3 34P	3 46P	4 09P	4 09P	4 30P	4 34P	4 47P	5 09P	5 54P	6 04P	🛄 10 46P
Aberdeen, MD qr													4 09P								6 28P	
Wilmington, DE qr		12 56P	1 11P	1 34P	1 56P	2 11P	2 18P	2 56P	3 11P	3 34P	4 16P	4 18P	4 35P	4 56P	4 56P	5 11P	5 18P	5 32P	5 56P	6 43P	6 56P	11 36P
PHILADELPHIA, PA qr -30th St. Station	Ar	1 15P		1 53P	2 15P			3 15P		3 53P			4 57P	5 15P	5 15P			5 52P	6 15P	7 04P	7 15P	🛄 11 59P
	Dp	1 18P	1 30P	1 56P	2 18P	2 30P	2 37P	3 18P	3 30P	3 56P	4 35P	4 37P	5 00P	5 18P	5 18P	5 30P	5 37P	5 55P	6 18P	7 07P	7 18P	🛄 12 13A
Trenton, NJ qr		1 47P		2 25P	2 47P			3 47P		4 25P			5 29P	5 47P	5 47P			6 23P	6 47P	7 35P	7 47P	12 48A
Metropark, NJ qr		2 08P	2 11P	2 46P	3 08P	3 11P	3 18P	4 08P	4 11P			5 18P	5 50P	6 08P	6 08P	6 11P	6 18P		7 08P	L 8 08P	8 08P	1 15A
Newark Liberty Intl. Airport, NJ ✈ qr		2 19P			3 19P			4 19P		4 54P			6 02P	6 21P	6 21P			6 55P		L 8 20P	8 21P	
Newark, NJ qr		2 25P	2 29P	3 00P	3 25P	3 29P	3 36P	4 25P	4 29P	5 00P	5 29P	5 36P	6 10P	6 27P	6 27P	6 29P	6 36P	7 01P	7 25P	L 8 24P	8 26P	1 32A
NEW YORK, NY qr	Ar	2 45P	2 45P	3 18P	3 45P	3 45P	3 52P	4 46P	4 45P	5 20P	5 45P	5 52P	6 31P	6 45P	6 45P	6 45P	6 53P	7 19P	7 46P	8 43P	8 46P	1 50A
	Dp	3 00P	3 03P	3 30P	4 30P	4 00P	4 05P	5 00P	5 00P	5 40P	6 00P	6 05P	6 43P	7 00P	7 30P	7 00P	7 05P	7 30P	8 00P	9 07P	9 00P	🛄 2 40A
New Rochelle, NY qr		3 27P		3 57P	4 57P								7 10P	7 27P	7 57P			8 15P	8 27P	9 35P	9 27P	
Stamford, CT qr		3 48P		4 18P	5 18P		4 46P	5 48P	5 46P	6 29P	6 44P	6 46P	7 30P	7 48P	8 18P	7 44P	7 46P	8 35P	8 48P	9 56P	9 48P	3 30A
Bridgeport, CT qr		4 12P		4 42P	5 42P								7 54P	8 12P	8 42P			9 05P		10 20P		
NEW HAVEN, CT qr	Ar	4 36P		5 06P	6 06P			6 33P		7 14P			8 19P	8 36P	9 06P			9 30P	9 33P	10 44P	10 33P	4 20A
	Dp	4 45P		5 08P		5 26P	5 32P	6 35P	6 30P	7 20P		7 30P		8 38P	9 08P	8 29P	8 31P	9 32P			10 35P	4 40A
New Haven, CT qr	Dp	4 50P		5 15P	6 21P					7 25P			8 30P		9 20P				9 50P	11 00P		
Wallingford, CT		5 03P		5 30P	6 43P					7 39P			8 44P		9 34P				10 04P	11 14P		
Meriden, CT		5 10P		5 38P	6 53P					7 47P			8 54P		9 44P				10 14P	11 24P		
Berlin, CT		5 21P		5 50P	7 03P					7 58P			9 06P		9 56P				10 24P	11 34P		
Hartford, CT qr		5 36P		6 05P	7 19P					8 12P			9 20P		10 10P				10 38P	11 48P		
Windsor, CT		L 5 44P		L 6 15P	L 7 28P					L 8 20P			L 9 29P		L10 19P				L10 46P	L11 56P		
Windsor Locks, CT		L 5 51P		L 6 21P	L 7 34P					L 8 25P			L 9 35P		L10 25P				L10 51P	L12 02A		
Springfield, MA qr		6 15P		6 45P	8 00P					8 50P			10 00P		10 50P				11 18P	12 30A		
Old Saybrook, CT		5 14P		5 38P				7 04P		7 53P				9 11P	9 41P			10 01P			11 04P	5 13A
New London, CT (🎰 Casino) qr		5 36P		5 57P				7 25P		8 24P				9 31P	10 02P	L 9 13P		10 21P			11 31P	5 34A
Mystic, CT qr														9 43P	10 15P			10 35P				5 47A
Westerly, RI qr				6 18P				7 45P						9 54P	10 25P			10 45P				5 59A
Kingston, RI 🚲 (Newport 🚌) 92 96 qr		6 08P		6 33P				8 01P		8 55P				10 11P	10 42P			11 02P			12 03A	6 17A
Providence, RI qr		6 29P	L 5 49P	6 57P		L 6 54P	L 6 56P	8 19P	L 7 55P	9 15P	L 8 49P	L 9 05P		10 29P	10 59P	L 9 55P	L 9 49P	11 272P			12 21A	🛄 7 04A
Route 128, MA qr		D 7 03P	D 6 19P	D 7 29P		D 7 24P	D 7 26P	D 8 51P	D 8 26P	D 9 43P	D 9 21P	D 9 42P		D11 00P	D11 31P	D10 27P	D10 23P	D11 54P			D12 48A	D 7 43A
Boston, MA-Back Bay qr		D 7 15P	D 6 28P	D 7 40P		D 7 34P	D 7 36P	D 9 01P	D 8 35P	D 9 54P	D 9 30P	D 9 56P		D11 12P	D11 42P	D10 36P	D10 35P	D12 05A			D12 58A	D 7 59A
BOSTON, MA qr -South Station (ET)	Ar	7 21P	6 33P	7 45P		7 39P	7 42P	9 07P	8 40P	9 59P	9 35P	10 02P		11 17P	11 47P	10 41P	10 41P	12 10A			1 04A	🛄 8 05A

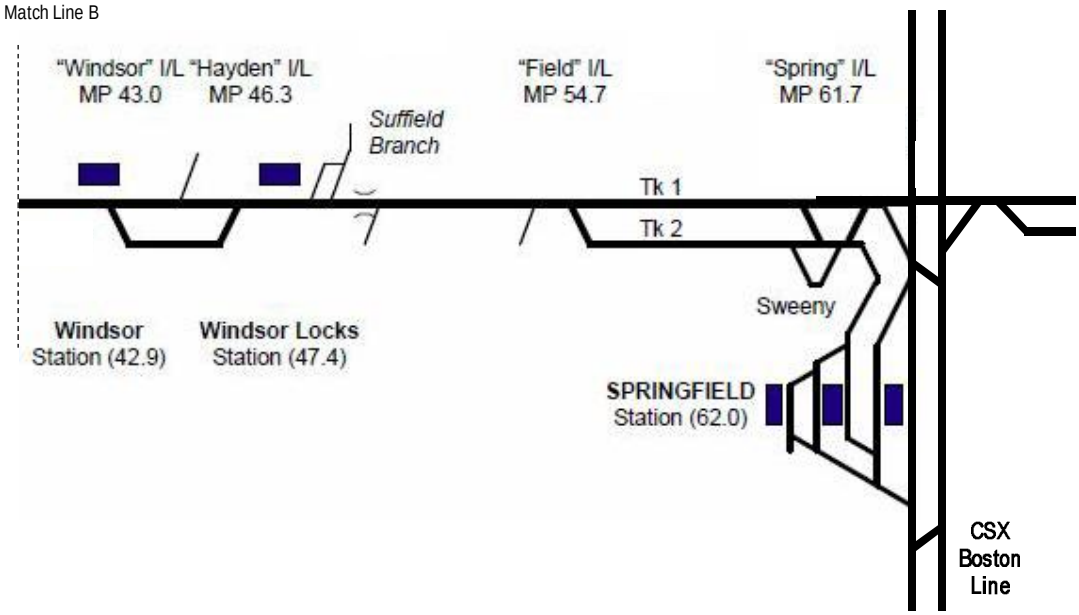
Appendix C

Track Configuration

C1 - Existing
C2 - Future/Proposed Improvements







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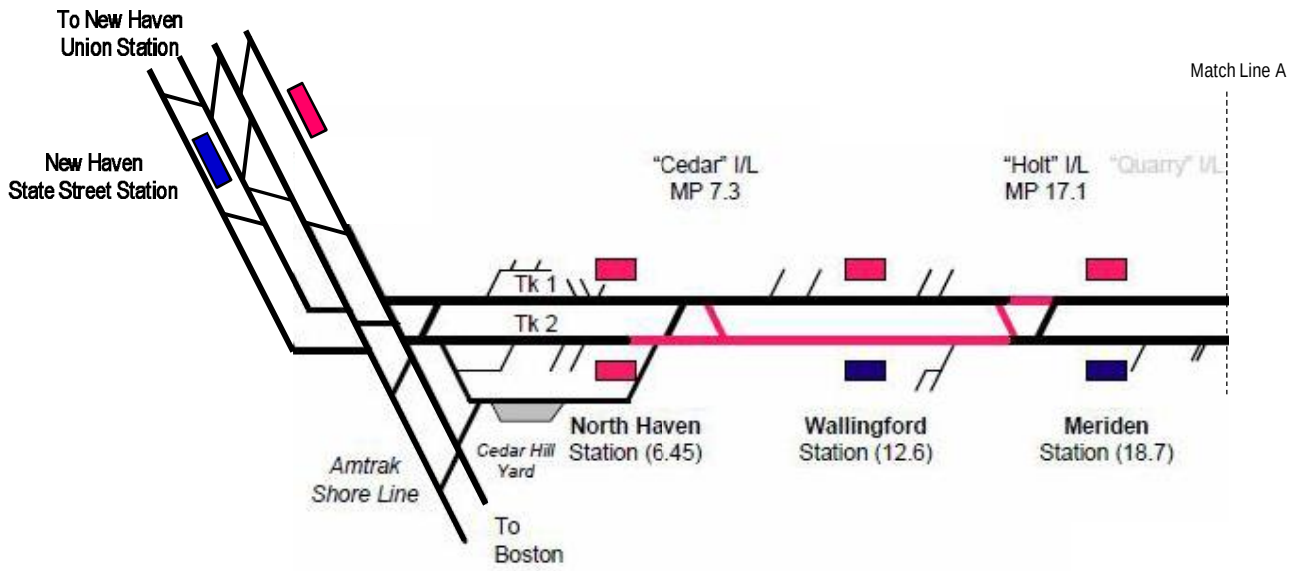
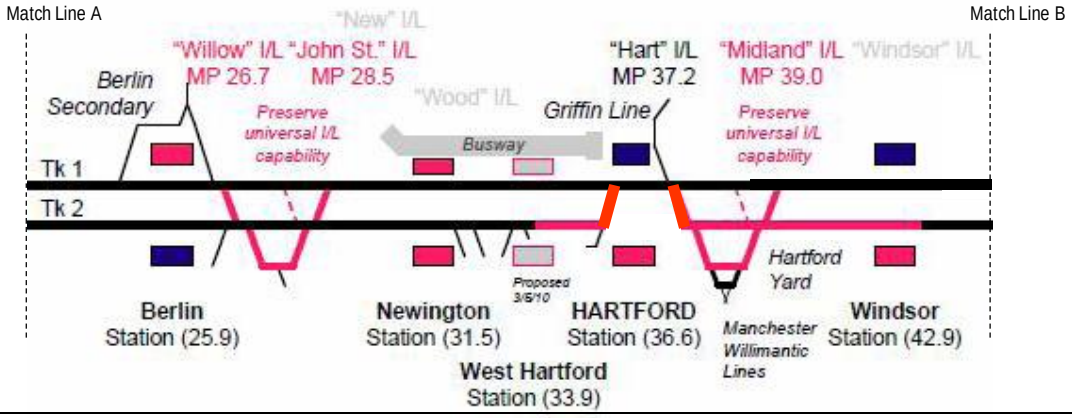
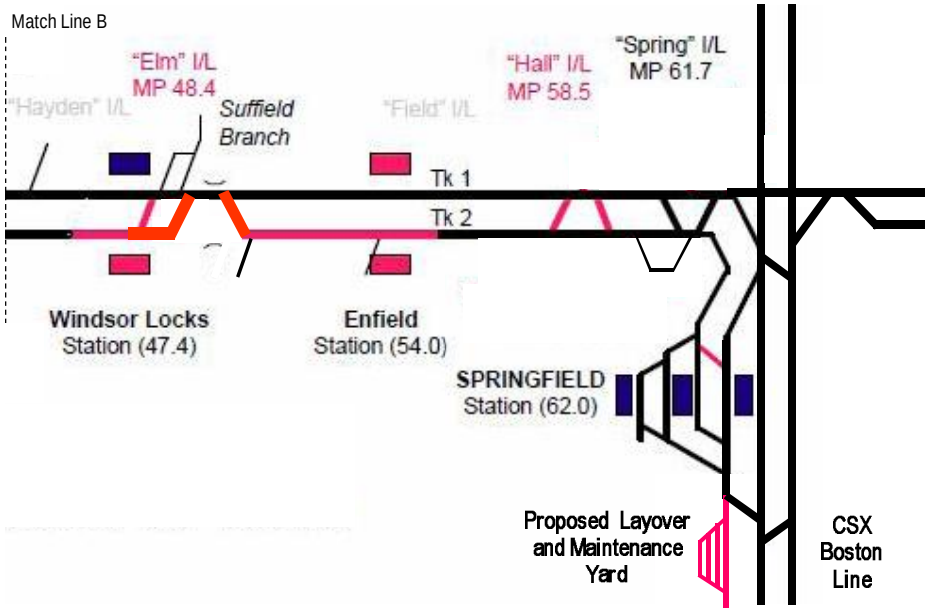
No-Build Track Configuration New Haven - Springfield







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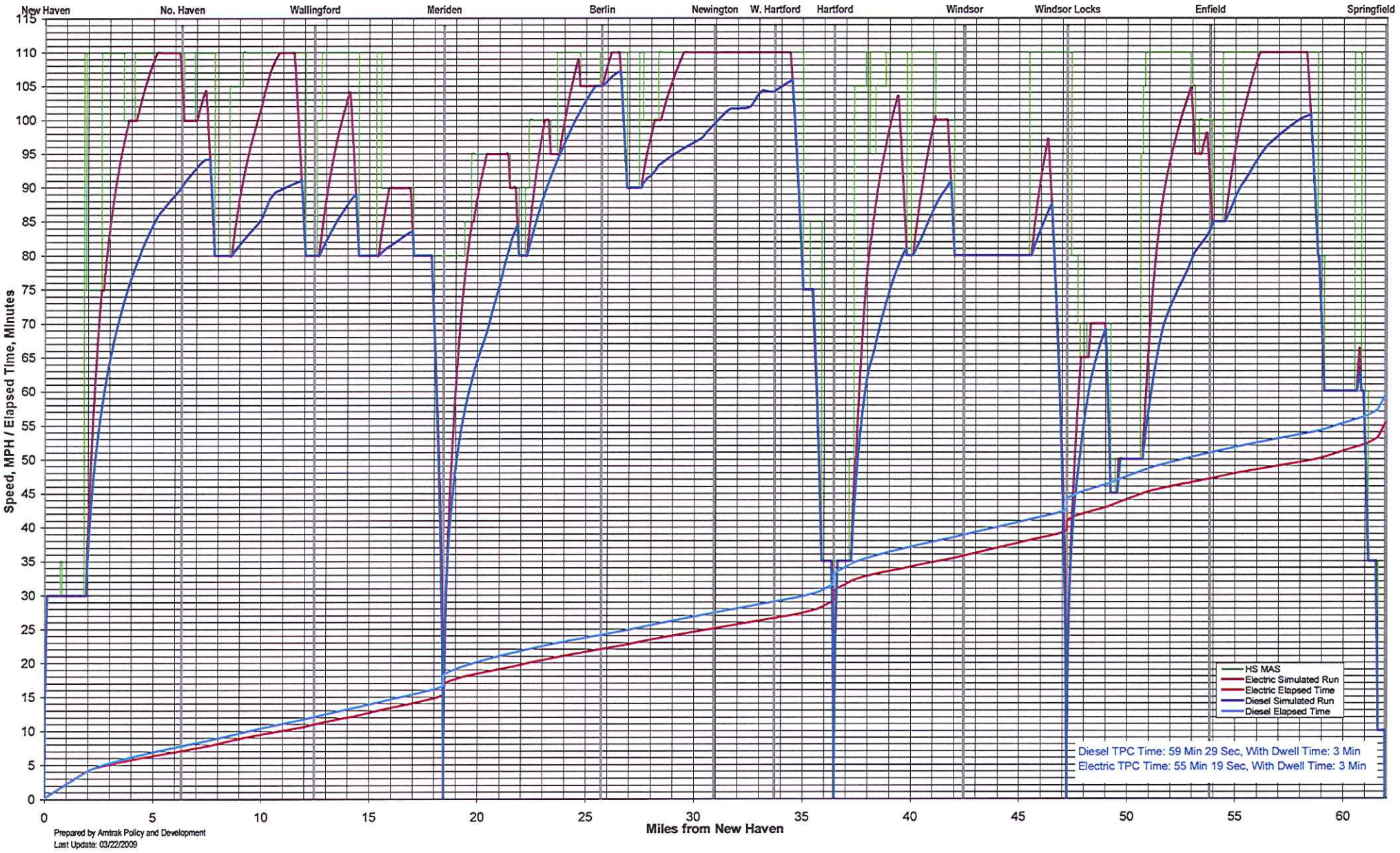
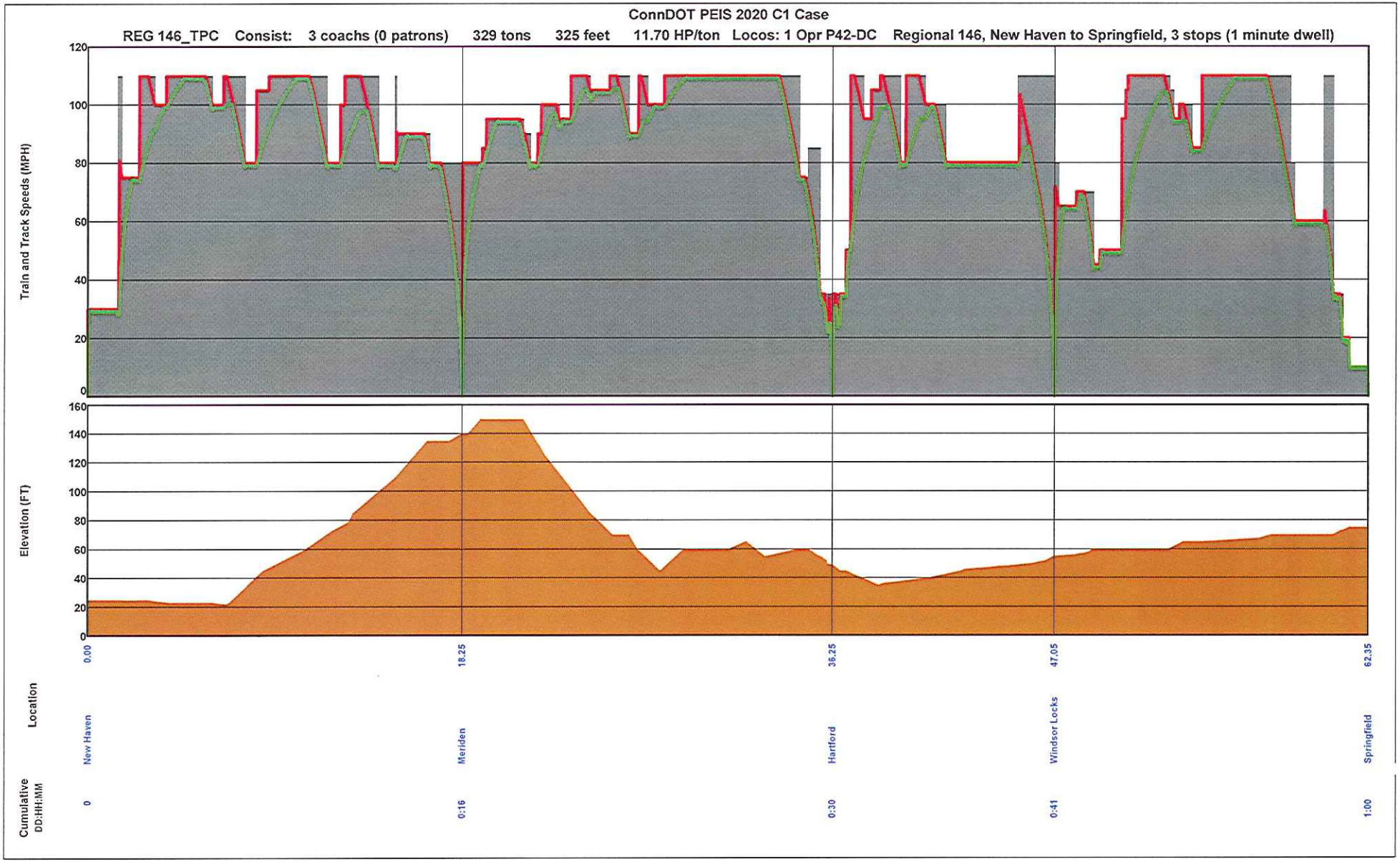
2020 Track Configuration New Haven - Springfield

Appendix D

Train Performance Charts

Expanded 80 MPH at Crossings: MAS, Speed & Elapsed Time: P42 vs. AEM7 with 3 Stops NHV-SPG

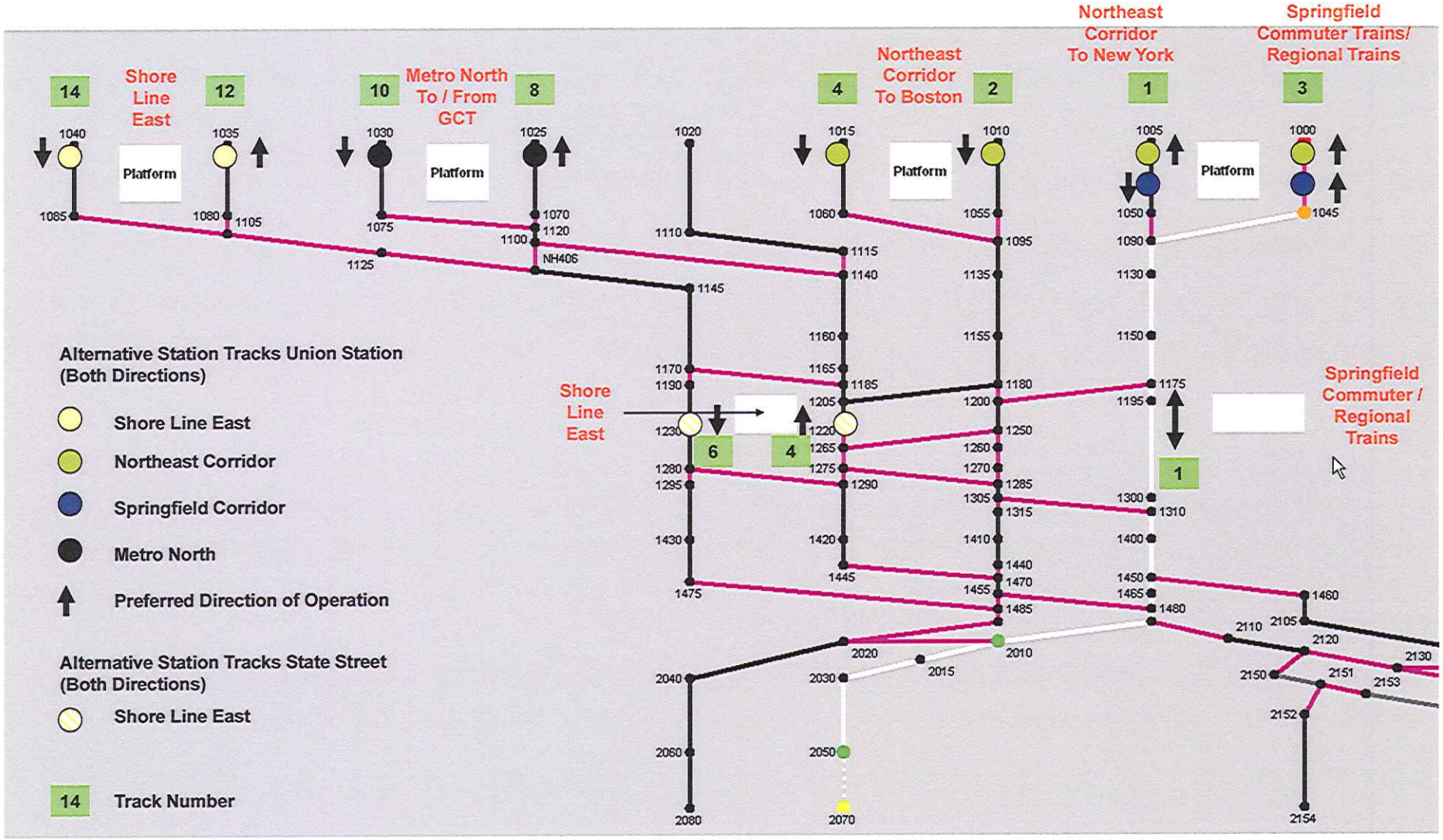




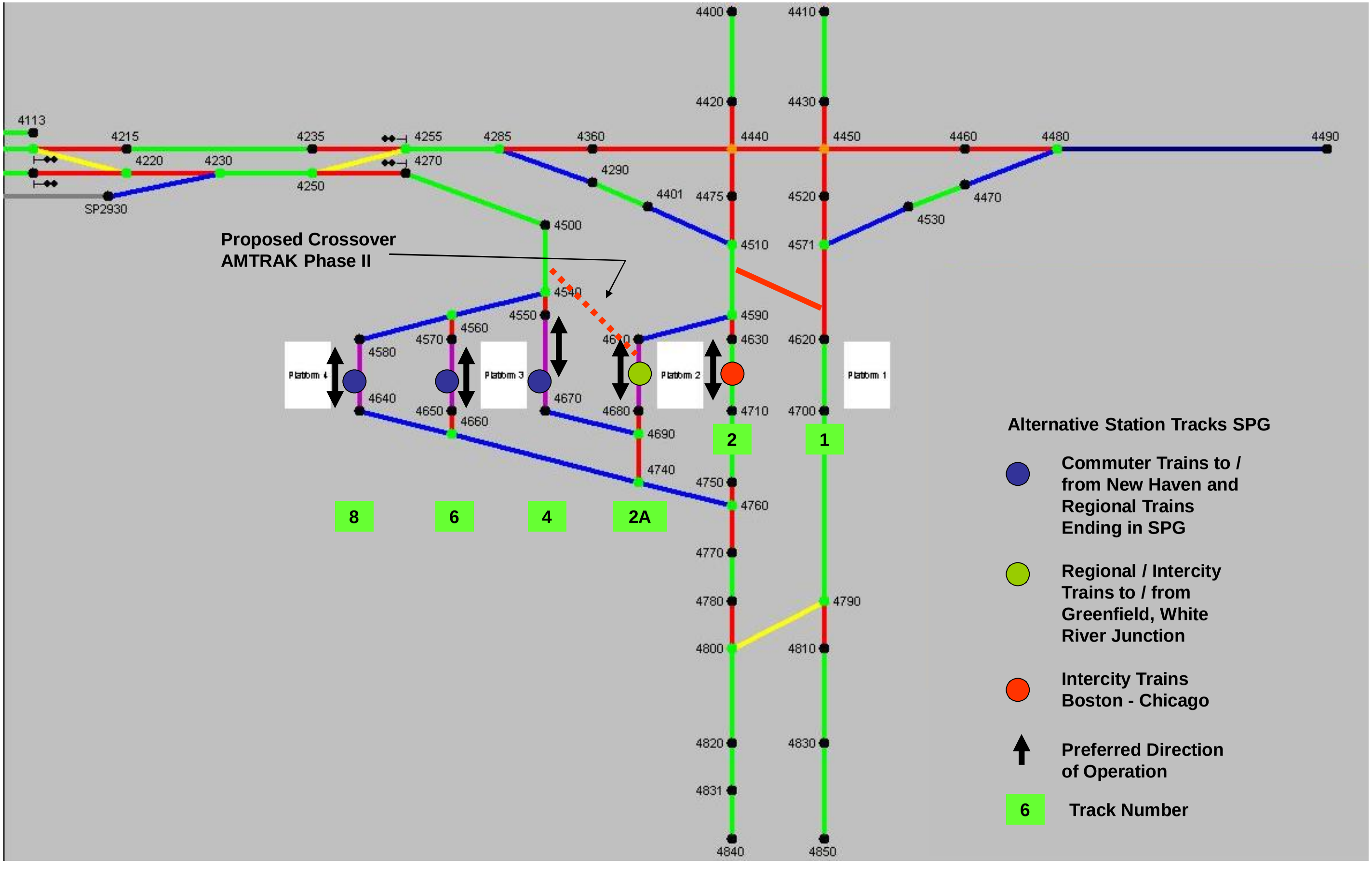
Case: C1_Alternative_TPC RTC run: 20 May 2010 15:59:33 User: Valerio Oricchio of Wilbur Smith Associates

Appendix E

Proposed Track Occupancy



Proposed 2020 C1 Track Utilization New Haven Stations

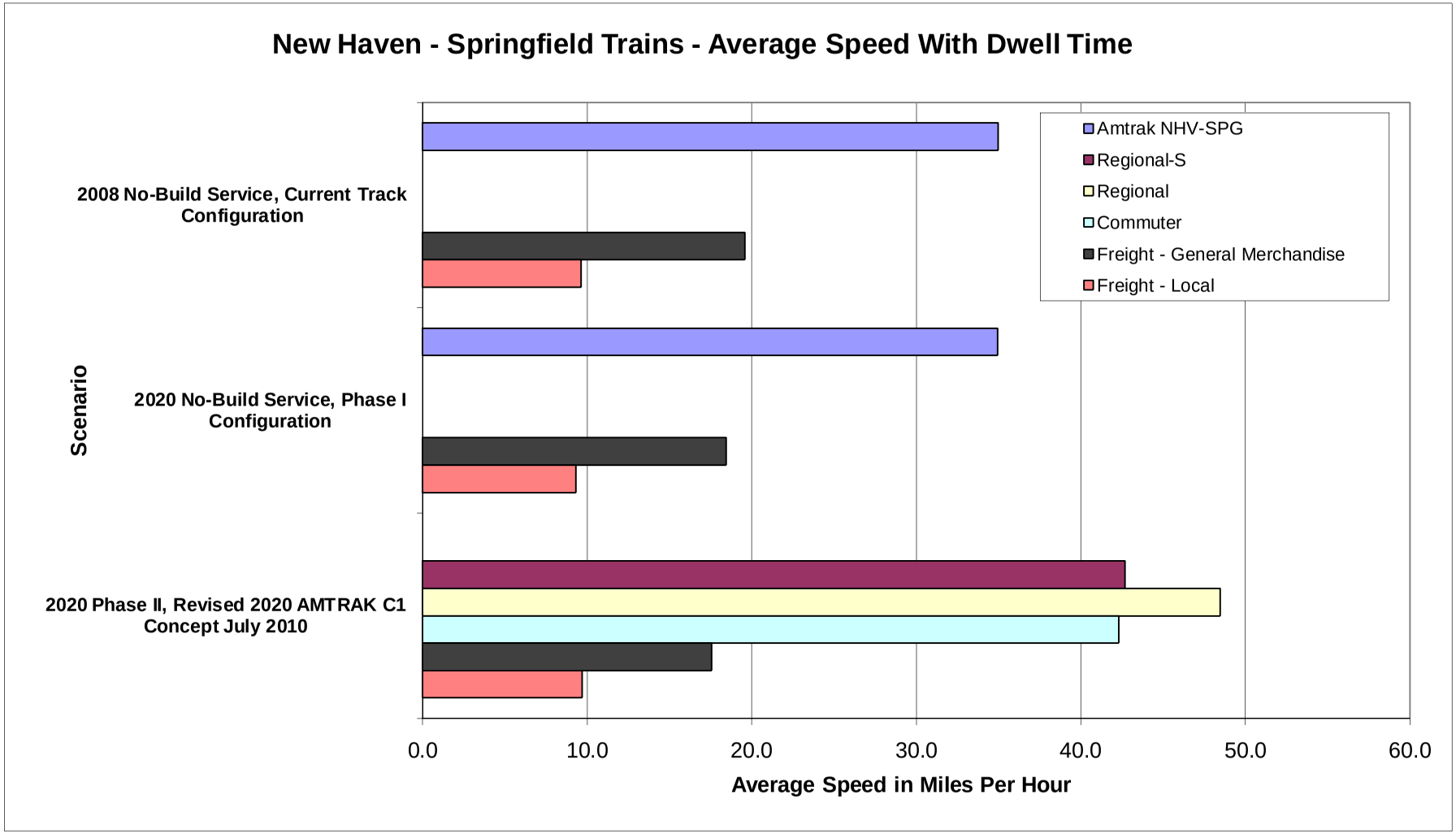


Proposed 2020 C1 Track Utilization Springfield Station

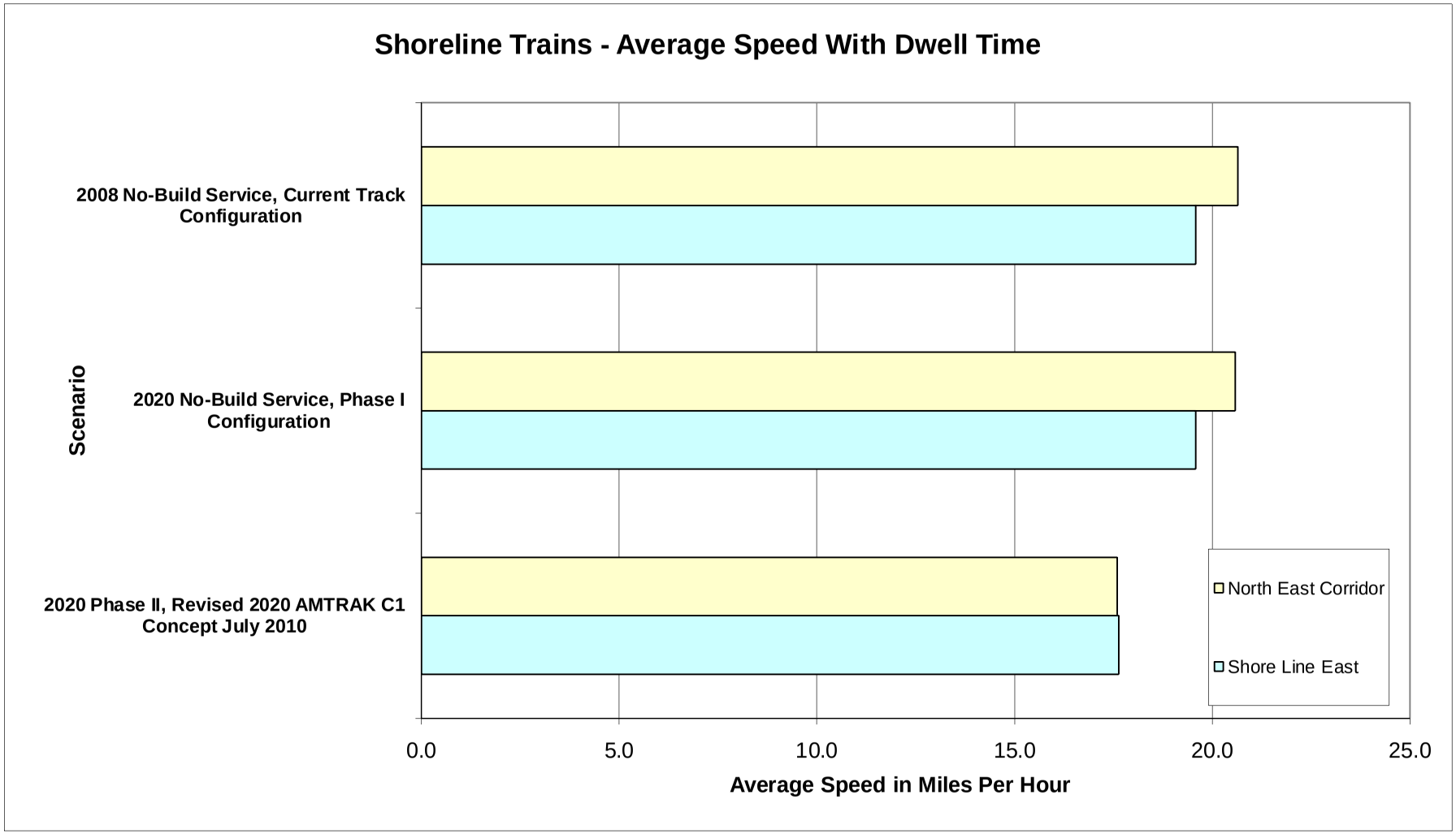
Appendix F

Train Performance Parameters by Train Group

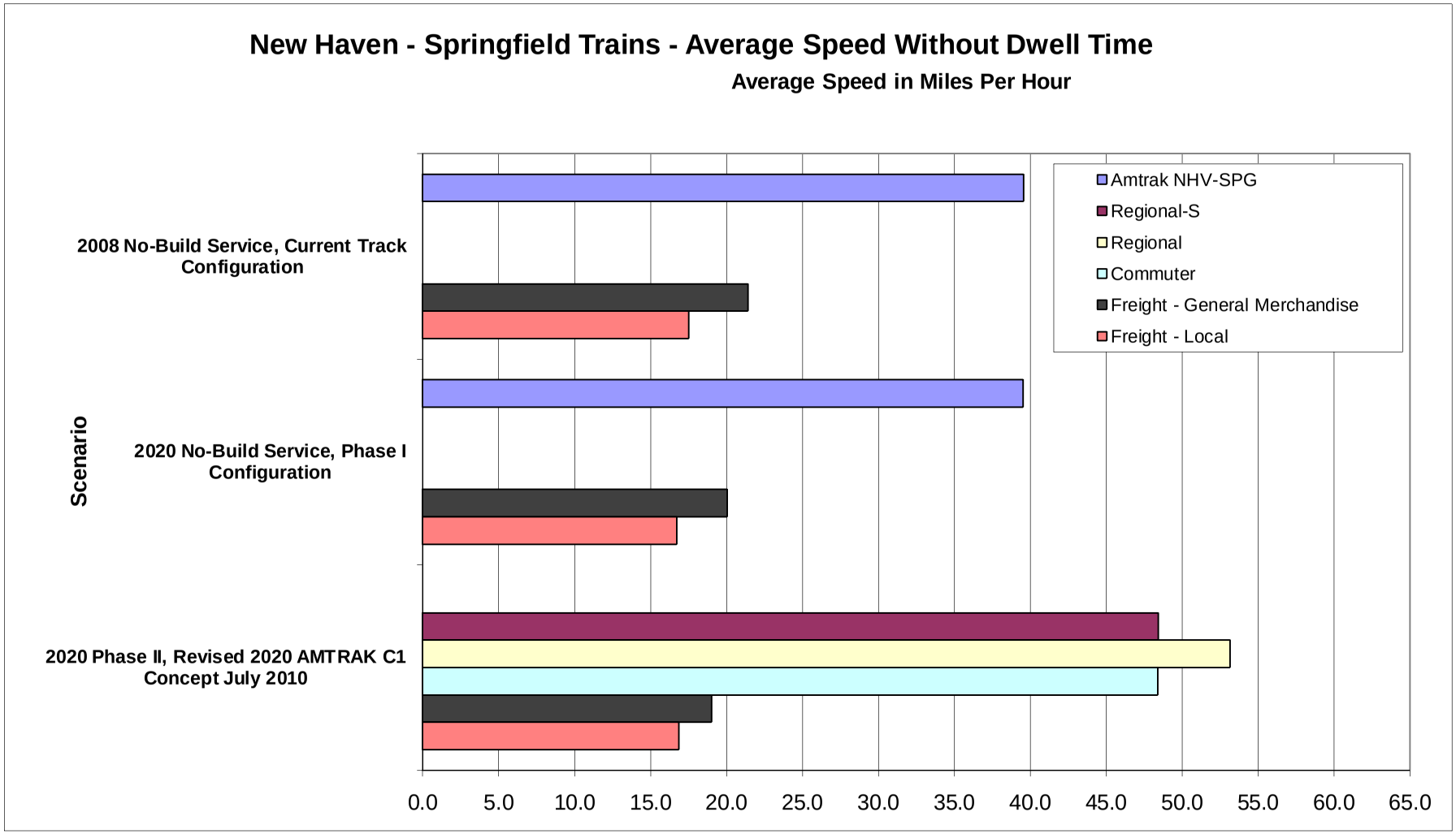
Scenario	Amtrak NHV-SPG	Regional-S	Regional	Commuter	Freight - General Merchandise	Freight - Local	North East Corridor	Shore Line East
2008 No-Build Service, Current Track Configuration	35.0	0.0	0.0	0.0	19.6	9.6	20.6	19.6
2020 No-Build Service, Phase I Configuration	35.0	0.0	0.0	0.0	18.4	9.3	20.6	19.6
2020 Phase II, Revised 2020 AMTRAK C1 Concept July 2010	0.0	42.7	48.5	42.3	17.6	9.7	17.6	17.6



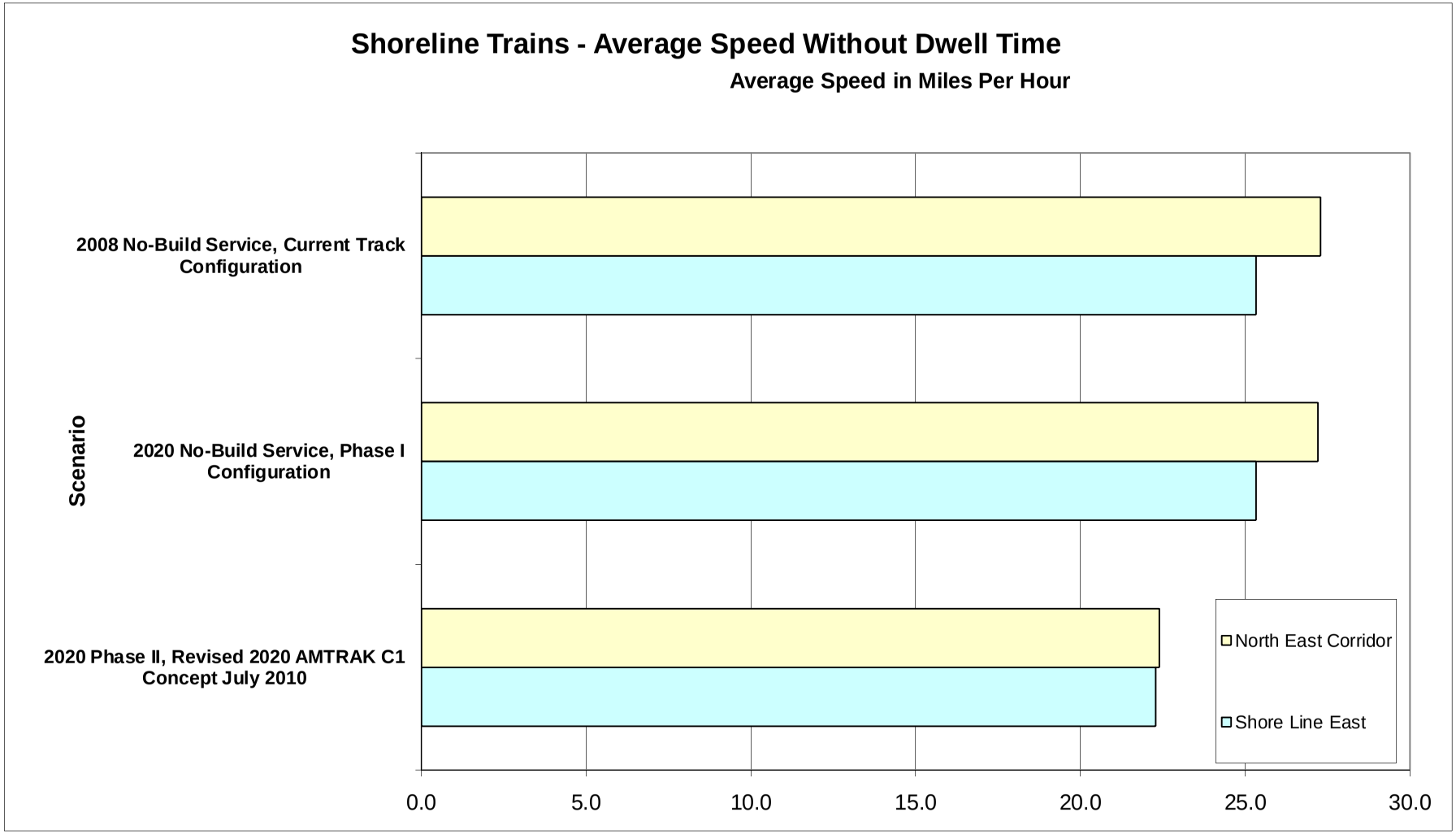
Scenario	Amtrak NHV-SPG	Regional-S	Regional	Commuter	Freight - General Merchandise	Freight - Local	North East Corridor	Shore Line East
2008 No-Build Service, Current Track Configuration	35.0	0.0	0.0	0.0	19.6	9.6	20.6	19.6
2020 No-Build Service, Phase I Configuration	35.0	0.0	0.0	0.0	18.4	9.3	20.6	19.6
2020 Phase II, Revised 2020 AMTRAK C1 Concept July 2010	0.0	42.7	48.5	42.3	17.6	9.7	17.6	17.6



Scenario	Amtrak NHV-SPG	Regional-S	Regional	Commuter	Freight - General Merchandise	Freight - Local	North East Corridor	Shore Line East
2008 No-Build Service, Current Track Configuration	39.6	0.0	0.0	0.0	21.4	17.5	27.3	25.3
2020 No-Build Service, Phase I Configuration	39.5	0.0	0.0	0.0	20.0	16.7	27.2	25.3
2020 Phase II, Revised 2020 AMTRAK C1 Concept July 2010	0.0	48.4	53.2	48.4	19.0	16.9	22.4	22.3



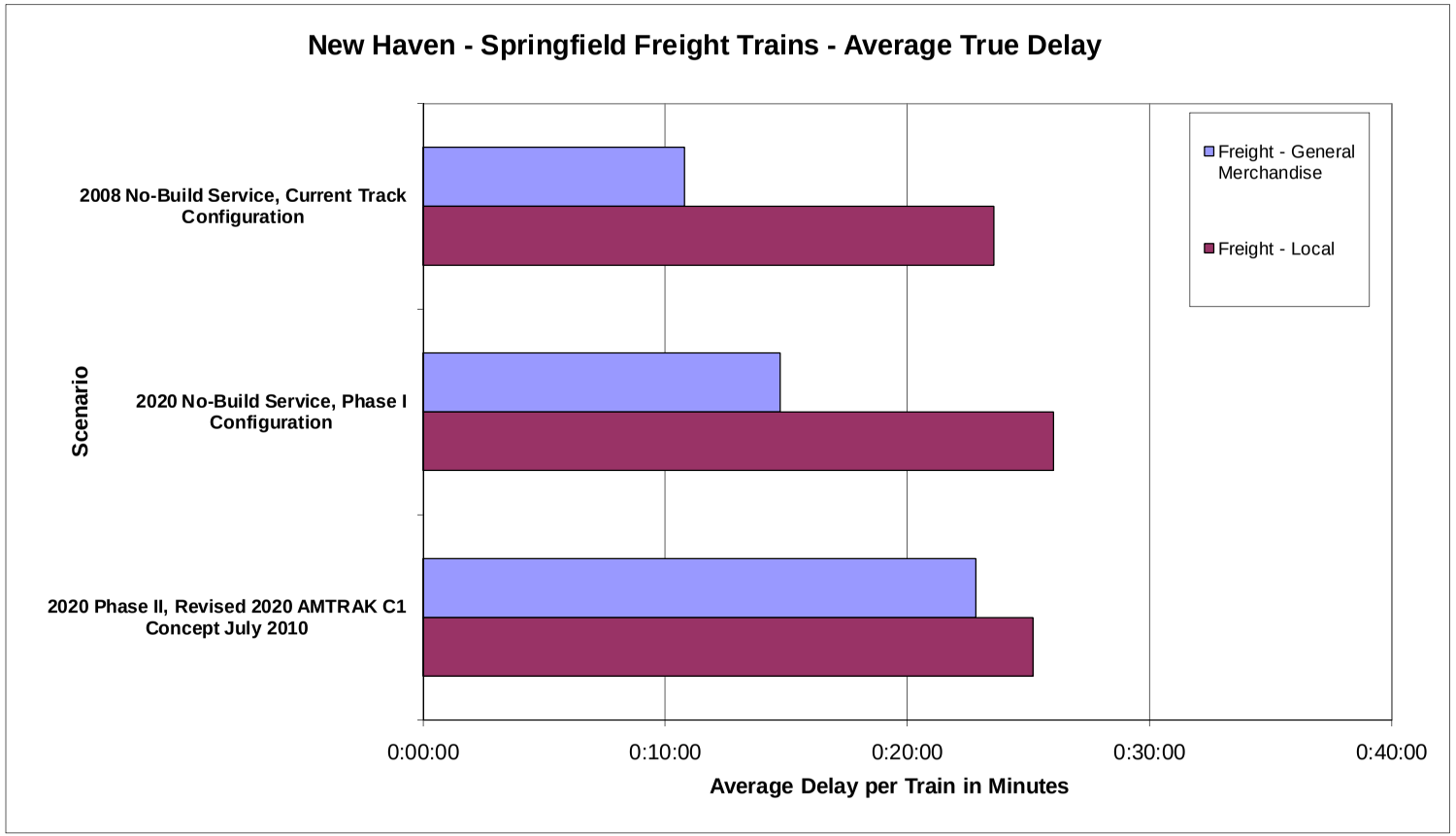
Scenario	Amtrak NHV-SPG	Regional-S	Regional	Commuter	Freight - General Merchandise	Freight - Local	North East Corridor	Shore Line East
2008 No-Build Service, Current Track Configuration	39.6	0.0	0.0	0.0	21.4	17.5	27.3	25.3
2020 No-Build Service, Phase I Configuration	39.5	0.0	0.0	0.0	20.0	16.7	27.2	25.3
2020 Phase II, Revised 2020 AMTRAK C1 Concept July 2010	0.0	48.4	53.2	48.4	19.0	16.9	22.4	22.3



Scenario	Amtrak NHV-SPG	Regional-S	Regional	Commuter	Freight - General Merchandise	Freight - Local	North East Corridor	Shore Line East
2008 No-Build Service, Current Track Configuration	0:00:45	0:00:00	0:00:00	0:00:00	0:10:48	0:23:34	0:00:07	0:00:11
2020 No-Build Service, Phase I Configuration	0:00:47	0:00:00	0:00:00	0:00:00	0:14:45	0:26:02	0:00:09	0:00:11
2020 Phase II, Revised 2020 AMTRAK C1 Concept July 2010	0:00:00	0:01:36	0:00:55	0:01:31	0:22:49	0:25:12	0:00:50	0:00:37

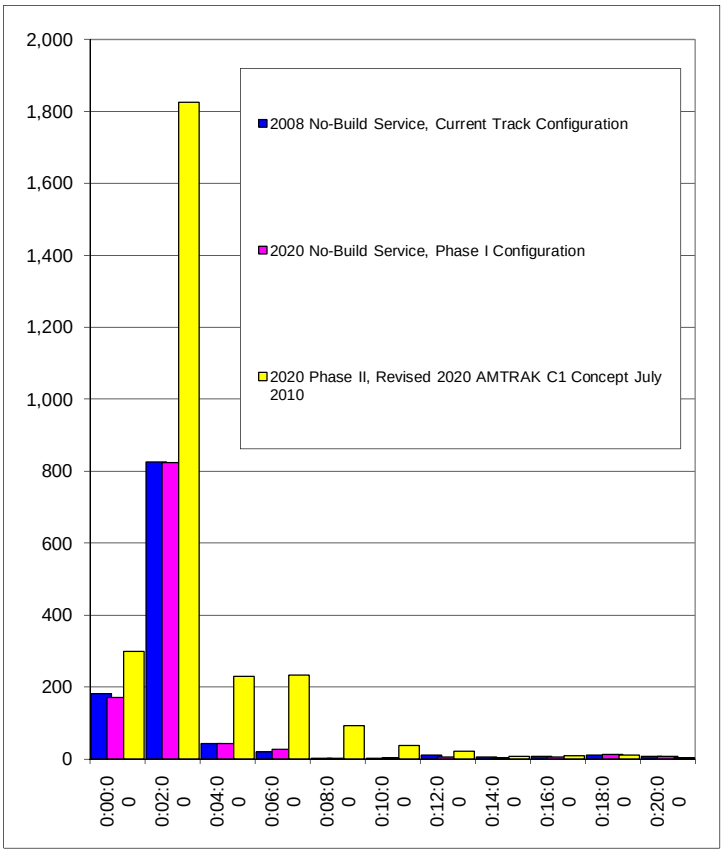
Scenario	Amtrak NHV-SPG	Regional-S	Regional	Commuter	Freight - General Merchandise	Freight - Local	North East Corridor	Shore Line East
2008 No-Build Service, Current Track Configuration	0:00:45	0:00:00	0:00:00	0:00:00	0:10:48	0:23:34	0:00:07	0:00:11
2020 No-Build Service, Phase I Configuration	0:00:47	0:00:00	0:00:00	0:00:00	0:14:45	0:26:02	0:00:09	0:00:11
2020 Phase II, Revised 2020 AMTRAK C1 Concept July 2010	0:00:00	0:01:36	0:00:55	0:01:31	0:22:49	0:25:12	0:00:50	0:00:37

Scenario	Amtrak NHV-SPG	Regional-S	Regional	Commuter	Freight - General Merchandise	Freight - Local	North East Corridor	Shore Line East
2008 No-Build Service, Current Track Configuration	0:00:45	0:00:00	0:00:00	0:00:00	0:10:48	0:23:34	0:00:07	0:00:11
2020 No-Build Service, Phase I Configuration	0:00:47	0:00:00	0:00:00	0:00:00	0:14:45	0:26:02	0:00:09	0:00:11
2020 Phase II, Revised 2020 AMTRAK C1 Concept July 2010	0:00:00	0:01:36	0:00:55	0:01:31	0:22:49	0:25:12	0:00:50	0:00:37



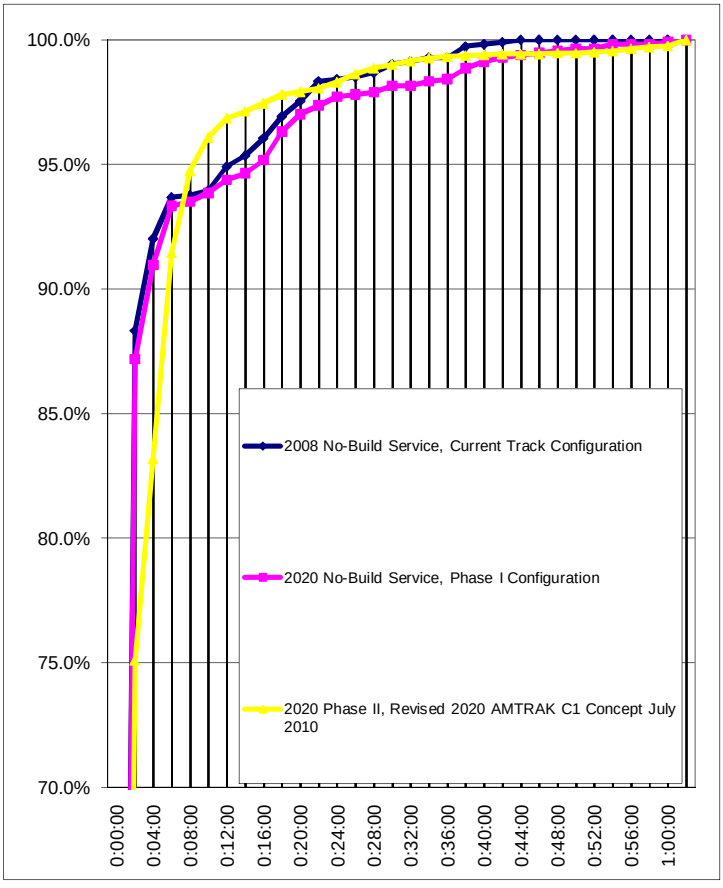
Frequency of True Delay - Passenger Trains NHV - SPG

Interval	2008 No-Build Service, Current Track Configuration	2020 No-Build Service, Phase I Configuration	2020 Phase II, Revised 2020 AMTRAK C1 Concept July 2010
0:00:00	181	171	299
0:02:00	826	823	1,826
0:04:00	42	43	229
0:06:00	19	27	234
0:08:00	1	2	93
0:10:00	2	4	38
0:12:00	11	6	22
0:14:00	5	3	8
0:16:00	8	6	9
0:18:00	10	13	10
0:20:00	7	8	3
0:22:00	9	4	4
0:24:00	1	4	7
0:26:00	1	1	9
0:28:00	2	1	7
0:30:00	4	3	4
0:32:00	1	0	4
0:34:00	2	2	3
0:36:00	0	1	2
0:38:00	5	5	1
0:40:00	1	3	1
0:42:00	1	2	1
0:44:00	1	1	0
0:46:00	0	1	0
0:48:00	0	1	1
0:50:00	0	1	0
0:52:00	0	0	1
0:54:00	0	2	1
0:56:00	0	0	3
0:58:00	0	0	2
1:00:00	0	1	1
>1:00:00	0	1	7



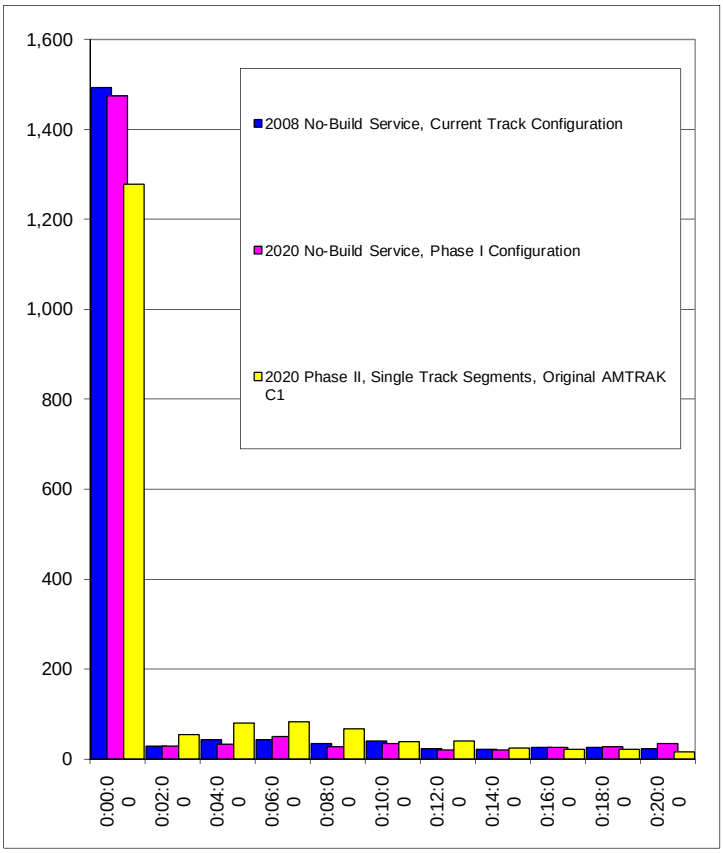
Cumulative Percent of True Delay - Passenger Trains NHV - SPG

Interval	2008 No-Build Service, Current Track Configuration	2020 No-Build Service, Phase I Configuration	2020 Phase II, Revised 2020 AMTRAK C1 Concept July 2010
0:00:00	15.9%	15.0%	10.6%
0:02:00	88.3%	87.2%	75.1%
0:04:00	92.0%	91.0%	83.2%
0:06:00	93.7%	93.3%	91.4%
0:08:00	93.8%	93.5%	94.7%
0:10:00	93.9%	93.9%	96.1%
0:12:00	94.9%	94.4%	96.9%
0:14:00	95.4%	94.6%	97.1%
0:16:00	96.1%	95.2%	97.5%
0:18:00	96.9%	96.3%	97.8%
0:20:00	97.5%	97.0%	97.9%
0:22:00	98.3%	97.4%	98.1%
0:24:00	98.4%	97.7%	98.3%
0:26:00	98.5%	97.8%	98.6%
0:28:00	98.7%	97.9%	98.9%
0:30:00	99.0%	98.2%	99.0%
0:32:00	99.1%	98.2%	99.2%
0:34:00	99.3%	98.3%	99.3%
0:36:00	99.3%	98.4%	99.3%
0:38:00	99.7%	98.9%	99.4%
0:40:00	99.8%	99.1%	99.4%
0:42:00	99.9%	99.3%	99.4%
0:44:00	100.0%	99.4%	99.4%
0:46:00	100.0%	99.5%	99.4%
0:48:00	100.0%	99.6%	99.5%
0:50:00	100.0%	99.6%	99.5%
0:52:00	100.0%	99.6%	99.5%
0:54:00	100.0%	99.8%	99.5%
0:56:00	100.0%	99.8%	99.6%
0:58:00	100.0%	99.8%	99.7%
1:00:00	100.0%	99.9%	99.8%
>1:00:00	100.0%	100.0%	100.0%



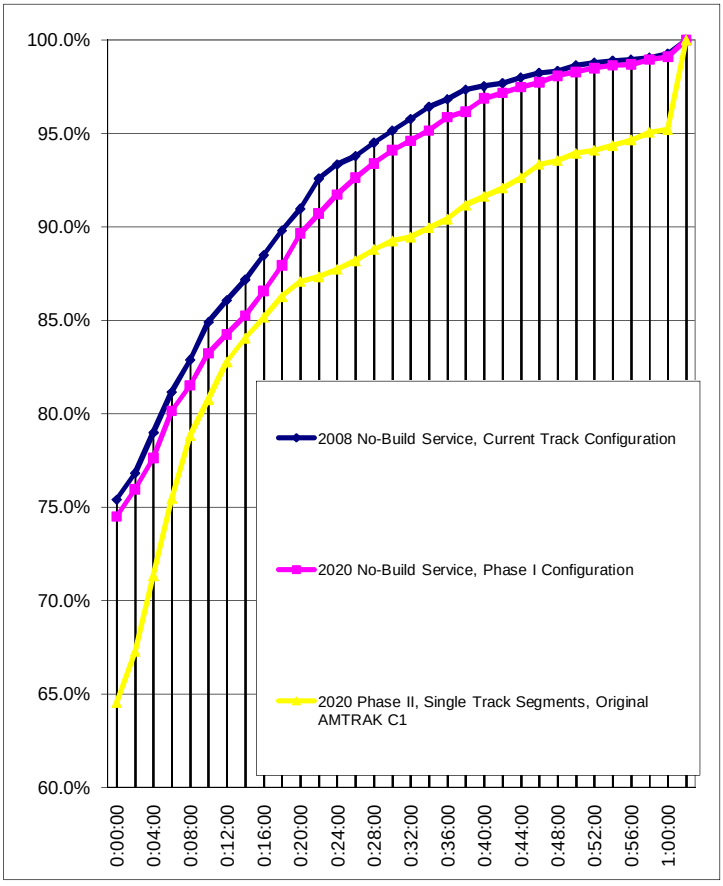
Frequency of True Delay - Freight Trains NHV - SPG

Interval	2008 No-Build Service, Current Track Configuration	2020 No-Build Service, Phase I Configuration	2020 Phase II, Single Track Segments, Original AMTRAK C1
0:00:00	1,493	1,475	1,278
0:02:00	28	29	54
0:04:00	43	33	80
0:06:00	43	50	82
0:08:00	34	27	67
0:10:00	40	34	38
0:12:00	23	20	40
0:14:00	22	20	25
0:16:00	26	26	22
0:18:00	26	27	22
0:20:00	23	34	16
0:22:00	32	21	5
0:24:00	15	20	8
0:26:00	9	18	9
0:28:00	14	15	12
0:30:00	13	14	9
0:32:00	12	10	4
0:34:00	13	11	10
0:36:00	8	14	9
0:38:00	10	6	15
0:40:00	4	14	9
0:42:00	3	6	9
0:44:00	6	6	11
0:46:00	5	5	14
0:48:00	2	7	4
0:50:00	6	4	8
0:52:00	3	4	3
0:54:00	2	3	5
0:56:00	1	1	6
0:58:00	2	5	8
1:00:00	4	3	3
>1:00:00	15	18	95



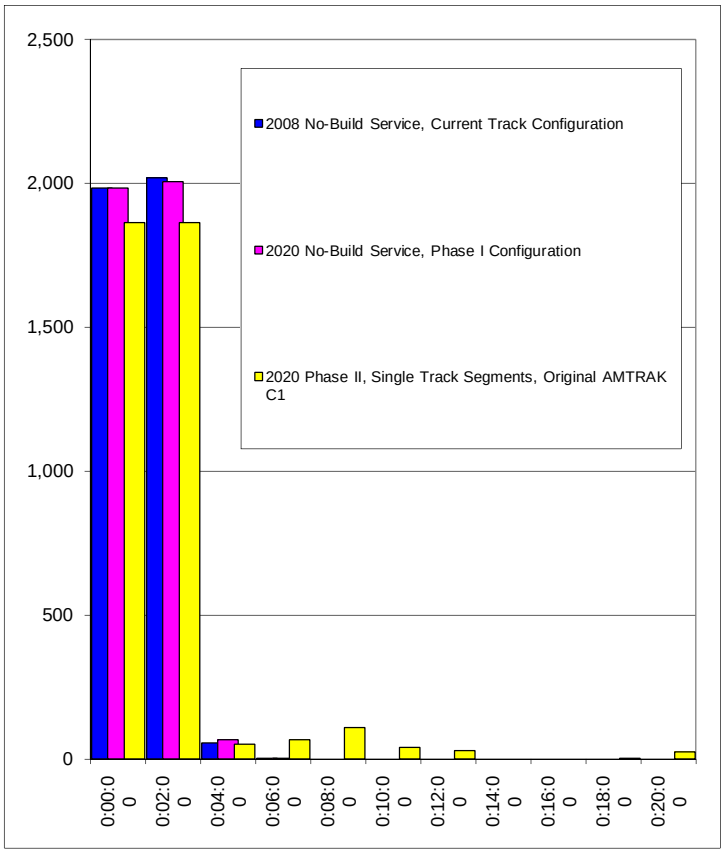
Cumulative Percent of True Delay - Freight Trains NHV - SPG

Interval	2008 No-Build Service, Current Track Configuration	2020 No-Build Service, Phase I Configuration	2020 Phase II, Single Track Segments, Original AMTRAK C1
0:00:00	75.4%	74.5%	64.5%
0:02:00	76.8%	76.0%	67.3%
0:04:00	79.0%	77.6%	71.3%
0:06:00	81.2%	80.2%	75.5%
0:08:00	82.9%	81.5%	78.8%
0:10:00	84.9%	83.2%	80.8%
0:12:00	86.1%	84.2%	82.8%
0:14:00	87.2%	85.3%	84.0%
0:16:00	88.5%	86.6%	85.2%
0:18:00	89.8%	87.9%	86.3%
0:20:00	91.0%	89.6%	87.1%
0:22:00	92.6%	90.7%	87.3%
0:24:00	93.3%	91.7%	87.7%
0:26:00	93.8%	92.6%	88.2%
0:28:00	94.5%	93.4%	88.8%
0:30:00	95.2%	94.1%	89.2%
0:32:00	95.8%	94.6%	89.4%
0:34:00	96.4%	95.2%	89.9%
0:36:00	96.8%	95.9%	90.4%
0:38:00	97.3%	96.2%	91.2%
0:40:00	97.5%	96.9%	91.6%
0:42:00	97.7%	97.2%	92.1%
0:44:00	98.0%	97.5%	92.6%
0:46:00	98.2%	97.7%	93.3%
0:48:00	98.3%	98.1%	93.5%
0:50:00	98.6%	98.3%	93.9%
0:52:00	98.8%	98.5%	94.1%
0:54:00	98.9%	98.6%	94.3%
0:56:00	98.9%	98.7%	94.6%
0:58:00	99.0%	98.9%	95.1%
1:00:00	99.2%	99.1%	95.2%
>1:00:00	100.0%	100.0%	100.0%



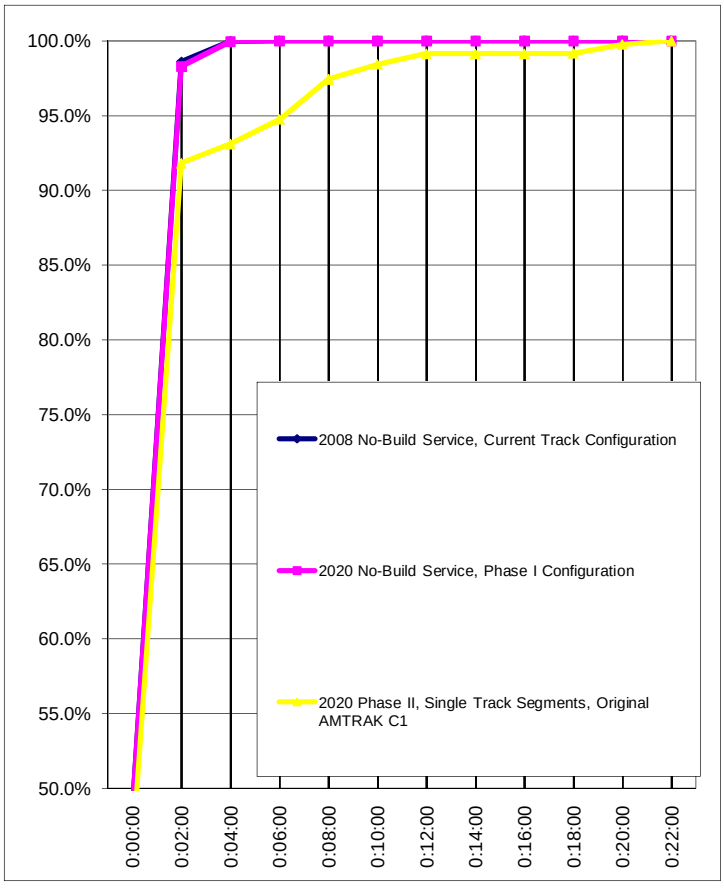
Frequency of True Delay - Passenger Trains Shoreline

Interval	2008 No-Build Service, Current Track Configuration	2020 No-Build Service, Phase I Configuration	2020 Phase II, Single Track Segments, Original AMTRAK C1
0:00:00	1,983	1,983	1,864
0:02:00	2,020	2,007	1,864
0:04:00	56	68	52
0:06:00	1	2	67
0:08:00	0	0	109
0:10:00	0	0	40
0:12:00	0	0	29
0:14:00	0	0	0
0:16:00	0	0	0
0:18:00	0	0	1
0:20:00	0	0	24
0:22:00	0	0	10
0:24:00	0	0	0
0:26:00	0	0	0
0:28:00	0	0	0
0:30:00	0	0	0
0:32:00	0	0	0
0:34:00	0	0	0
0:36:00	0	0	0
0:38:00	0	0	0
0:40:00	0	0	0
0:42:00	0	0	0
0:44:00	0	0	0
0:46:00	0	0	0
0:48:00	0	0	0
0:50:00	0	0	0
0:52:00	0	0	0
0:54:00	0	0	0
0:56:00	0	0	0
0:58:00	0	0	0
1:00:00	0	0	0
>1:00:00	0	0	0

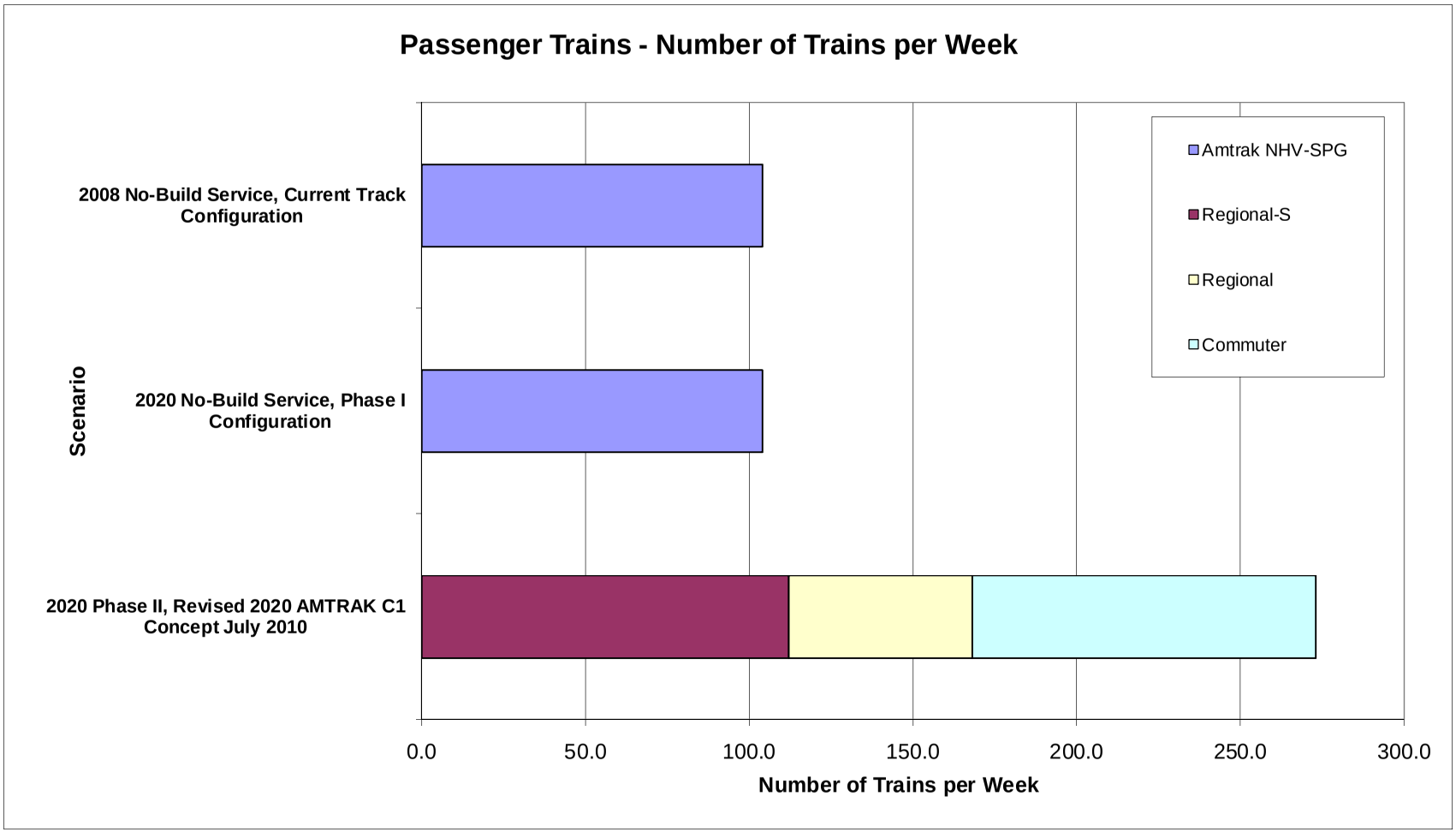


Cumulative Percent of True Delay - Passenger Trains Shoreline

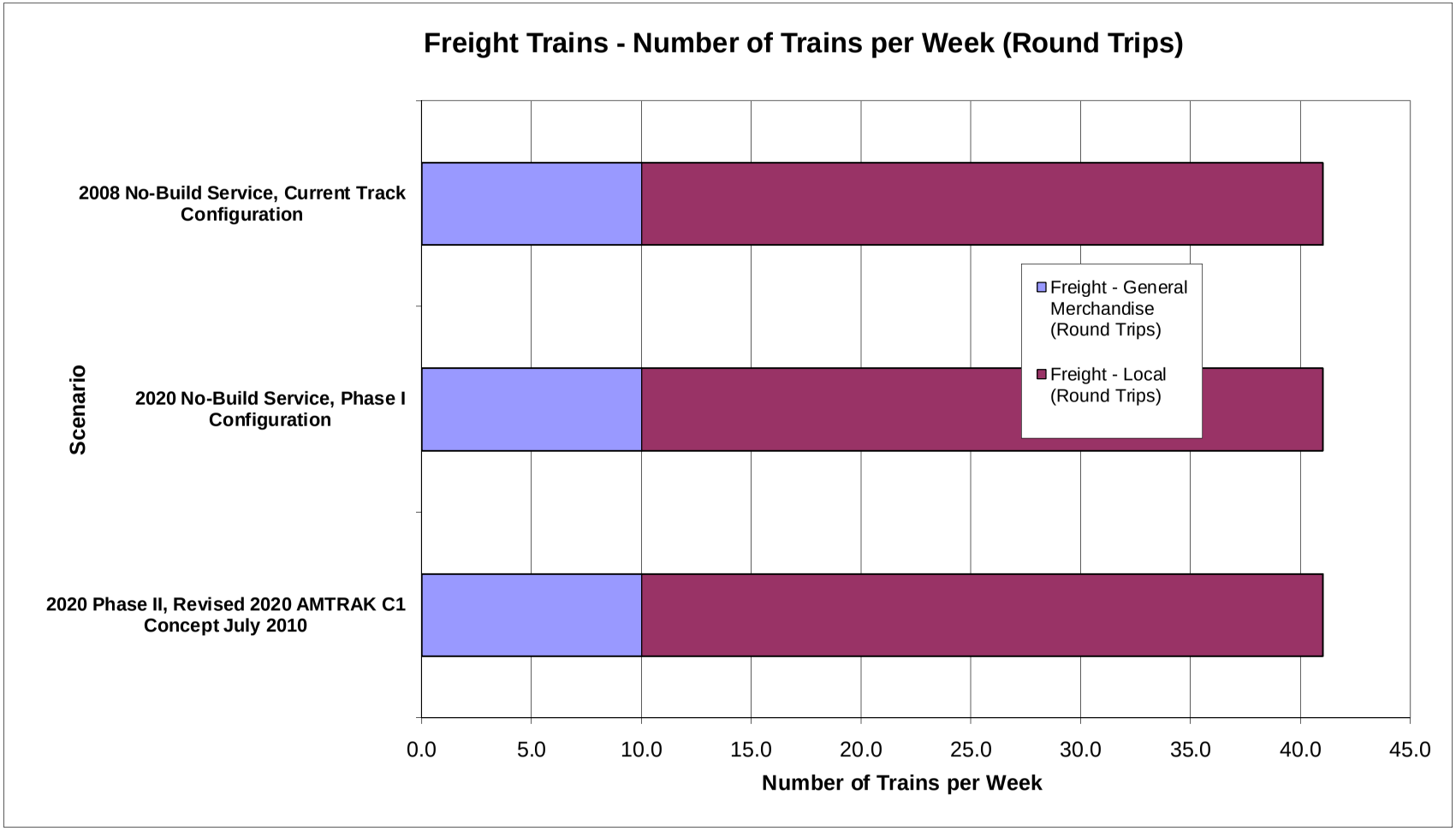
Interval	2008 No-Build Service, Current Track Configuration	2020 No-Build Service, Phase I Configuration	2020 Phase II, Single Track Segments, Original AMTRAK C1
0:00:00	48.8%	48.8%	45.9%
0:02:00	98.6%	98.3%	91.8%
0:04:00	100.0%	100.0%	93.1%
0:06:00	100.0%	100.0%	94.8%
0:08:00	100.0%	100.0%	97.4%
0:10:00	100.0%	100.0%	98.4%
0:12:00	100.0%	100.0%	99.1%
0:14:00	100.0%	100.0%	99.1%
0:16:00	100.0%	100.0%	99.1%
0:18:00	100.0%	100.0%	99.2%
0:20:00	100.0%	100.0%	99.8%
0:22:00	100.0%	100.0%	100.0%
0:24:00	100.0%	100.0%	100.0%
0:26:00	100.0%	100.0%	100.0%
0:28:00	100.0%	100.0%	100.0%
0:30:00	100.0%	100.0%	100.0%
0:32:00	100.0%	100.0%	100.0%
0:34:00	100.0%	100.0%	100.0%
0:36:00	100.0%	100.0%	100.0%
0:38:00	100.0%	100.0%	100.0%
0:40:00	100.0%	100.0%	100.0%
0:42:00	100.0%	100.0%	100.0%
0:44:00	100.0%	100.0%	100.0%
0:46:00	100.0%	100.0%	100.0%
0:48:00	100.0%	100.0%	100.0%
0:50:00	100.0%	100.0%	100.0%
0:52:00	100.0%	100.0%	100.0%
0:54:00	100.0%	100.0%	100.0%
0:56:00	100.0%	100.0%	100.0%
0:58:00	100.0%	100.0%	100.0%
1:00:00	100.0%	100.0%	100.0%
>1:00:00	100.0%	100.0%	100.0%



Scenario	Amtrak NHV-SPG	Regional-S	Regional	Commuter	Freight - General Merchandise (Round Trips)	Freight - Local (Round Trips)	North East Corridor	Shore Line East	All Trains
2008 No-Build Service, Current Track Configuration	104.0	0.0	0.0	0.0	10.0	31.0	231.0	175.0	157.0
2020 No-Build Service, Phase I Configuration	104.0	0.0	0.0	0.0	10.0	31.0	231.0	175.0	157.0
2020 Phase II, Revised 2020 AMTRAK C1 Concept July 2010	0.0	112.0	56.0	105.0	10.0	31.0	231.0	175.0	157.0



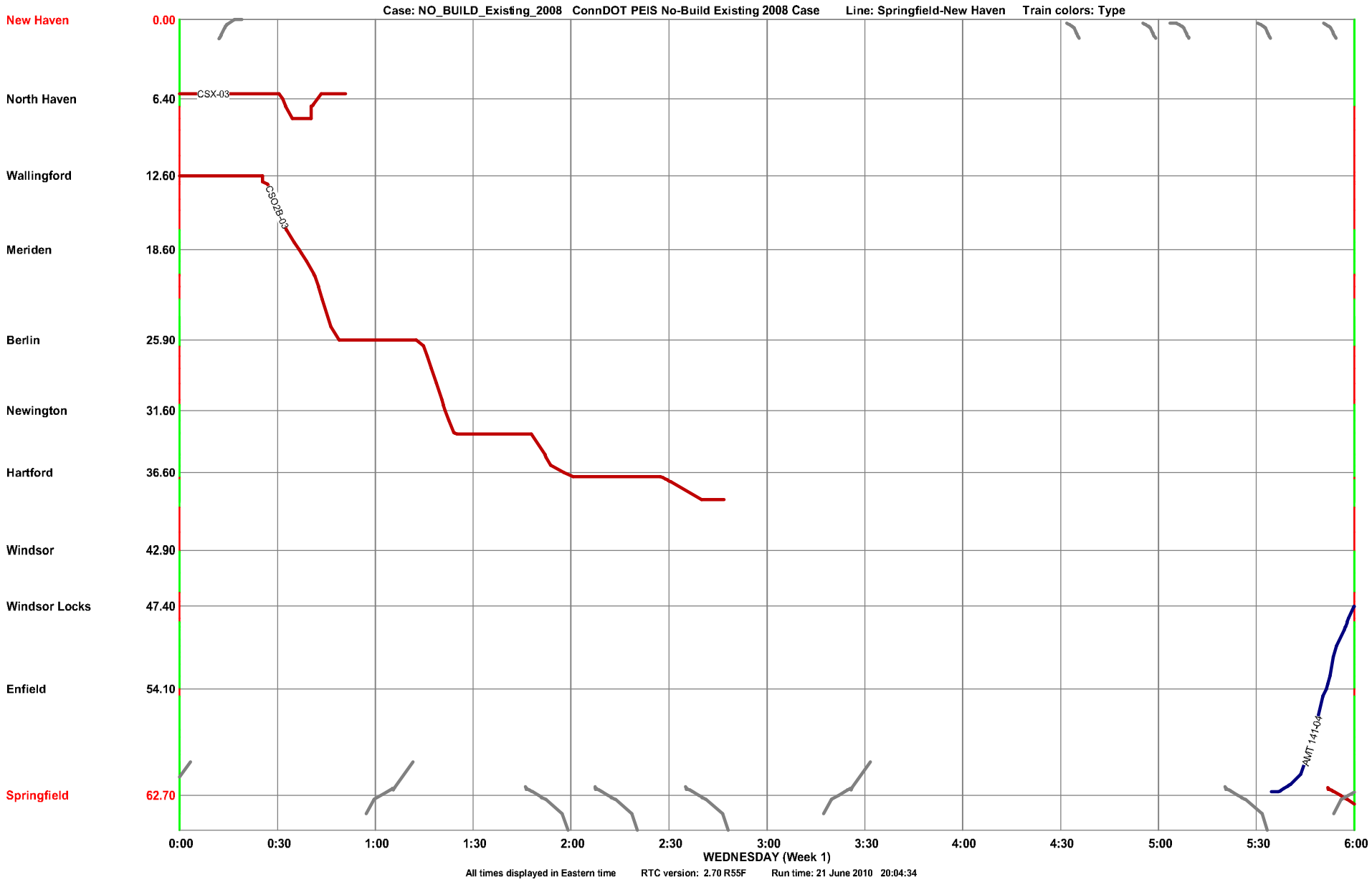
Scenario	Amtrak NHV-SPG	Regional-S	Regional	Commuter	Freight - General Merchandise (Round Trips)	Freight - Local (Round Trips)	North East Corridor	Shore Line East	All Trains
2008 No-Build Service, Current Track Configuration	104.0	0.0	0.0	0.0	10.0	31.0	231.0	175.0	157.0
2020 No-Build Service, Phase I Configuration	104.0	0.0	0.0	0.0	10.0	31.0	231.0	175.0	157.0
2020 Phase II, Revised 2020 AMTRAK C1 Concept July 2010	0.0	112.0	56.0	105.0	10.0	31.0	231.0	175.0	157.0

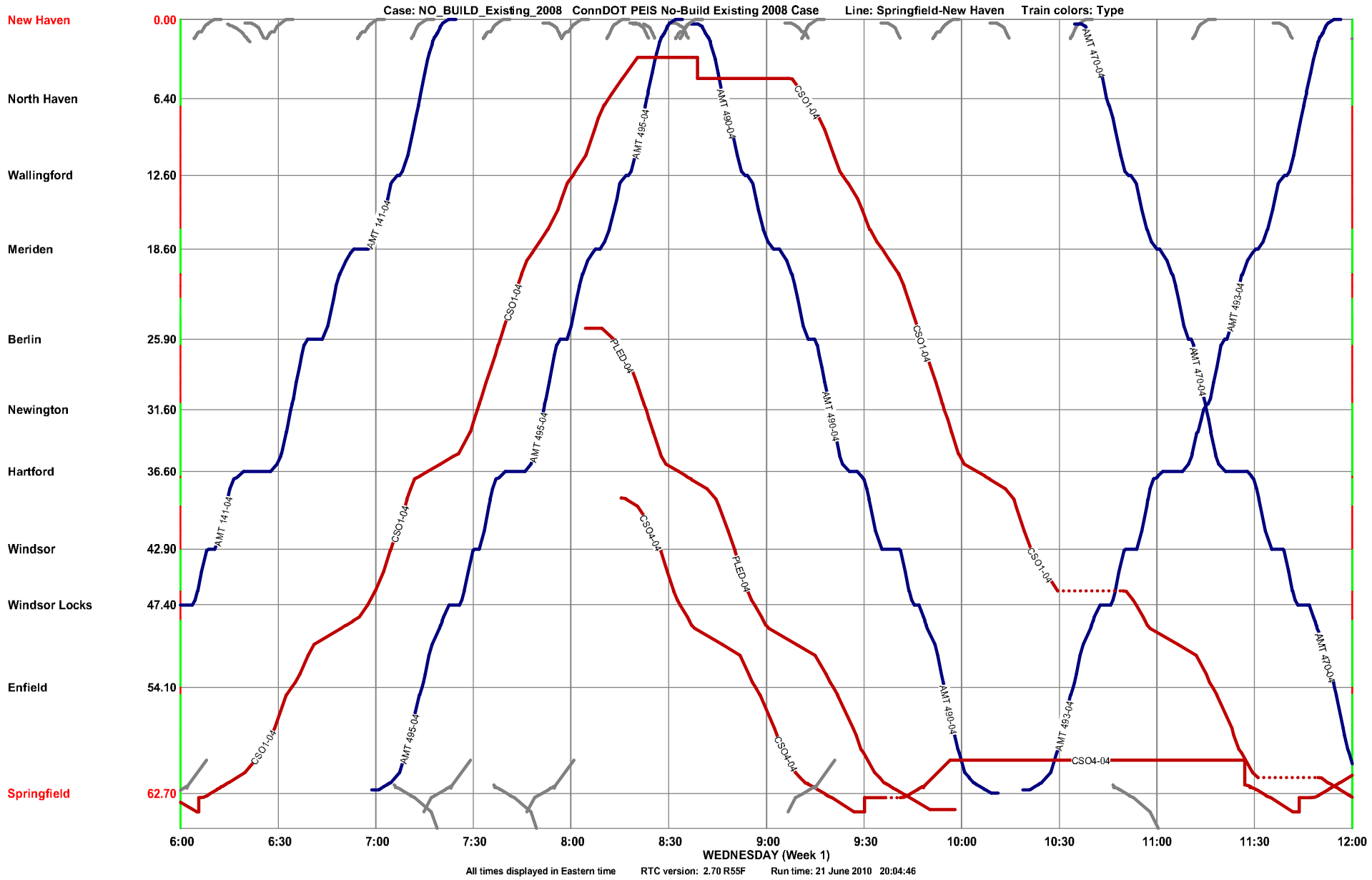


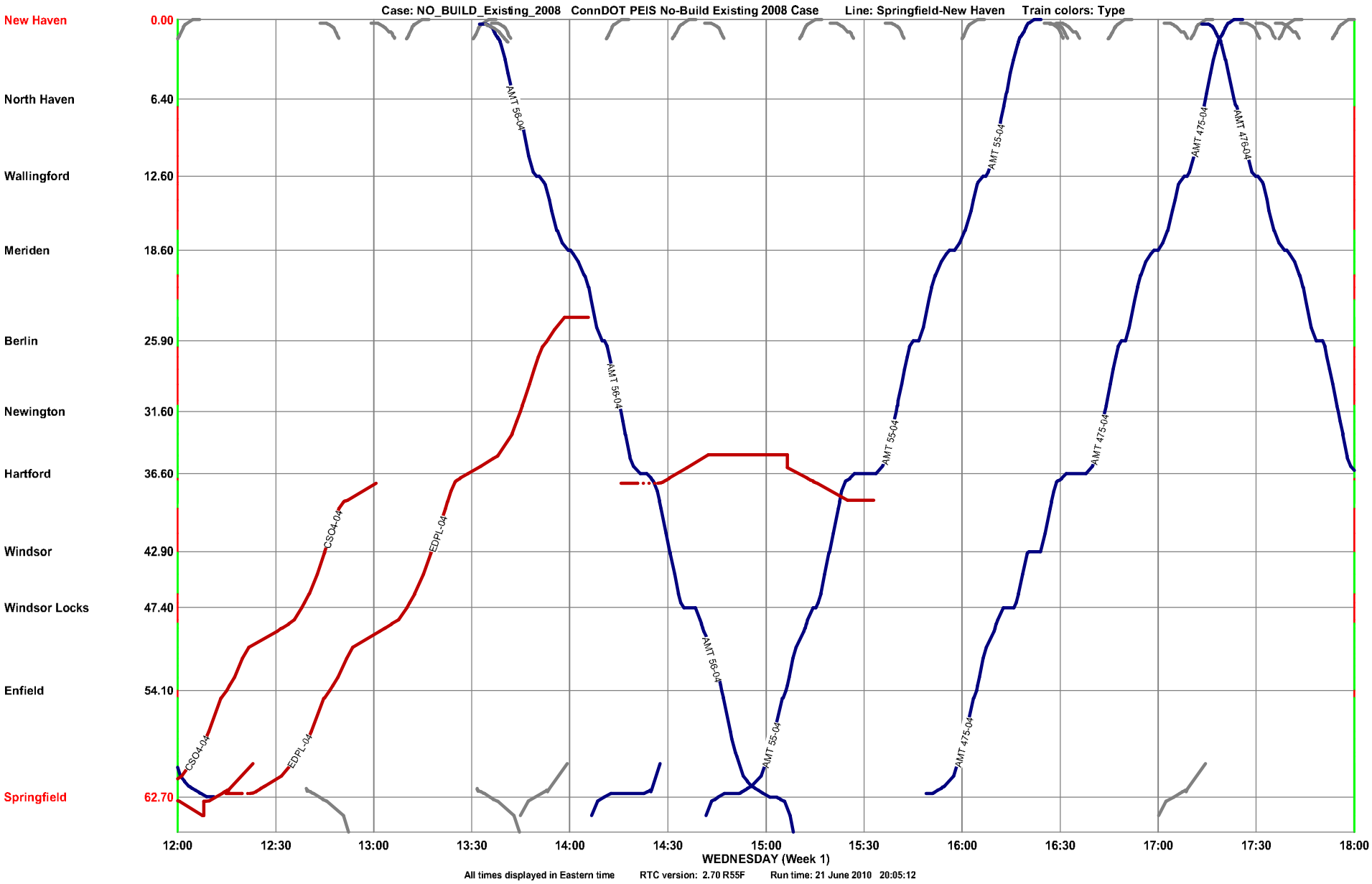
Scenario	Amtrak NHV-SPG	Regional-S	Regional	Commuter	Freight - General Merchandise (Round Trips)	Freight - Local (Round Trips)	North East Corridor	Shore Line East	All Trains
2008 No-Build Service, Current Track Configuration	104.0	0.0	0.0	0.0	10.0	31.0	231.0	175.0	157.0
2020 No-Build Service, Phase I Configuration	104.0	0.0	0.0	0.0	10.0	31.0	231.0	175.0	157.0
2020 Phase II, Revised 2020 AMTRAK C1 Concept July 2010	0.0	112.0	56.0	105.0	10.0	31.0	231.0	175.0	157.0

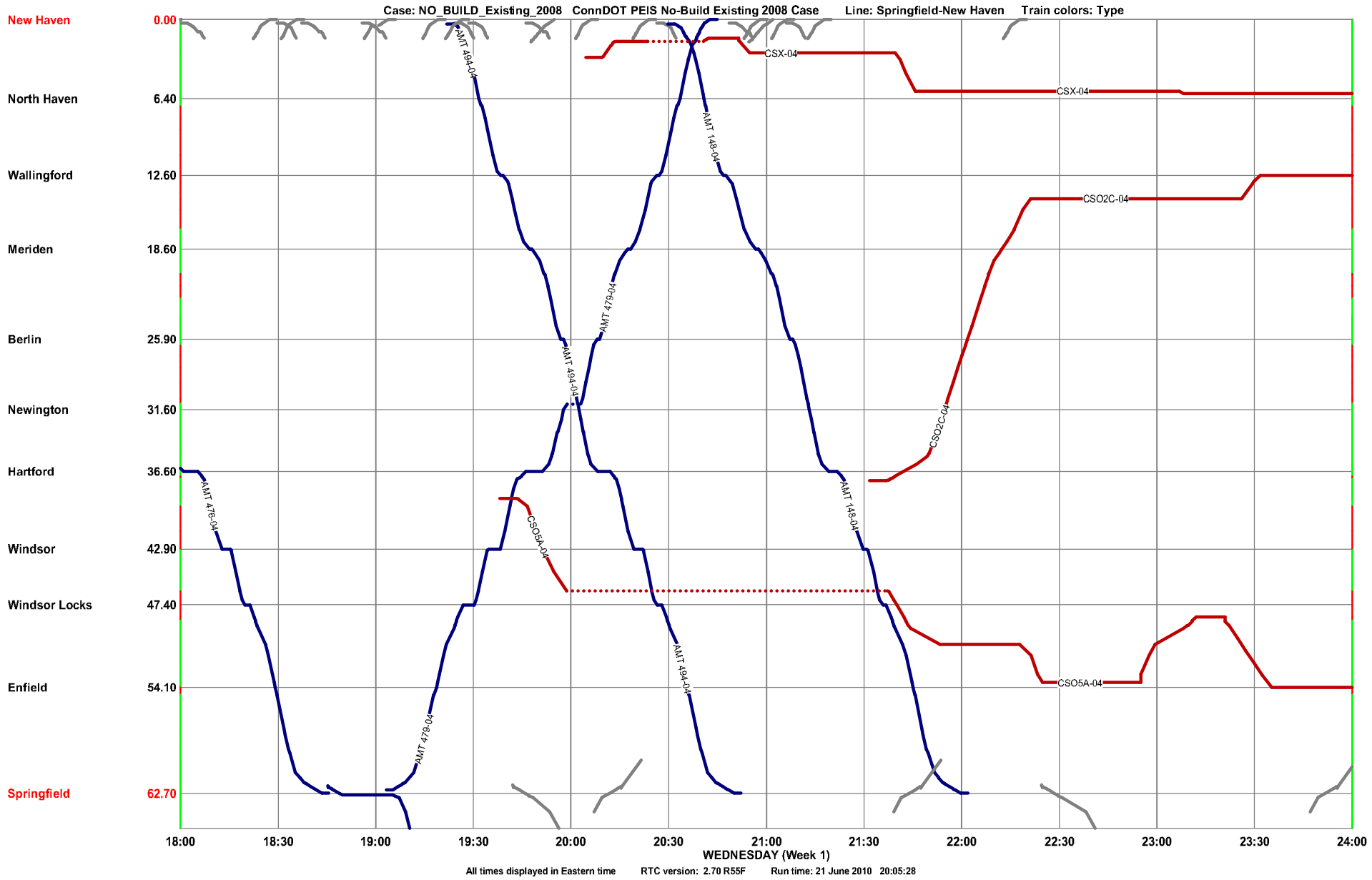
Appendix G

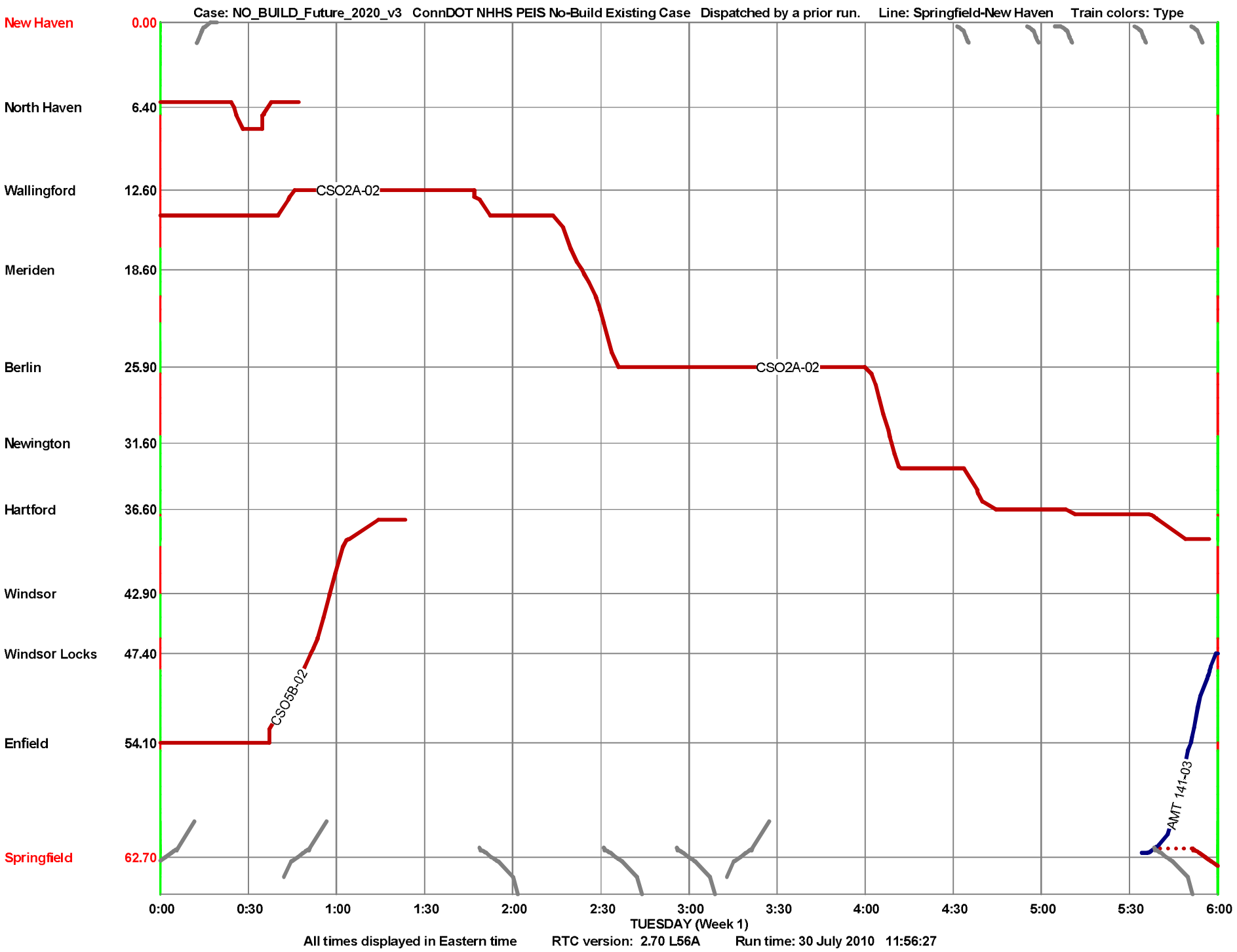
String Charts

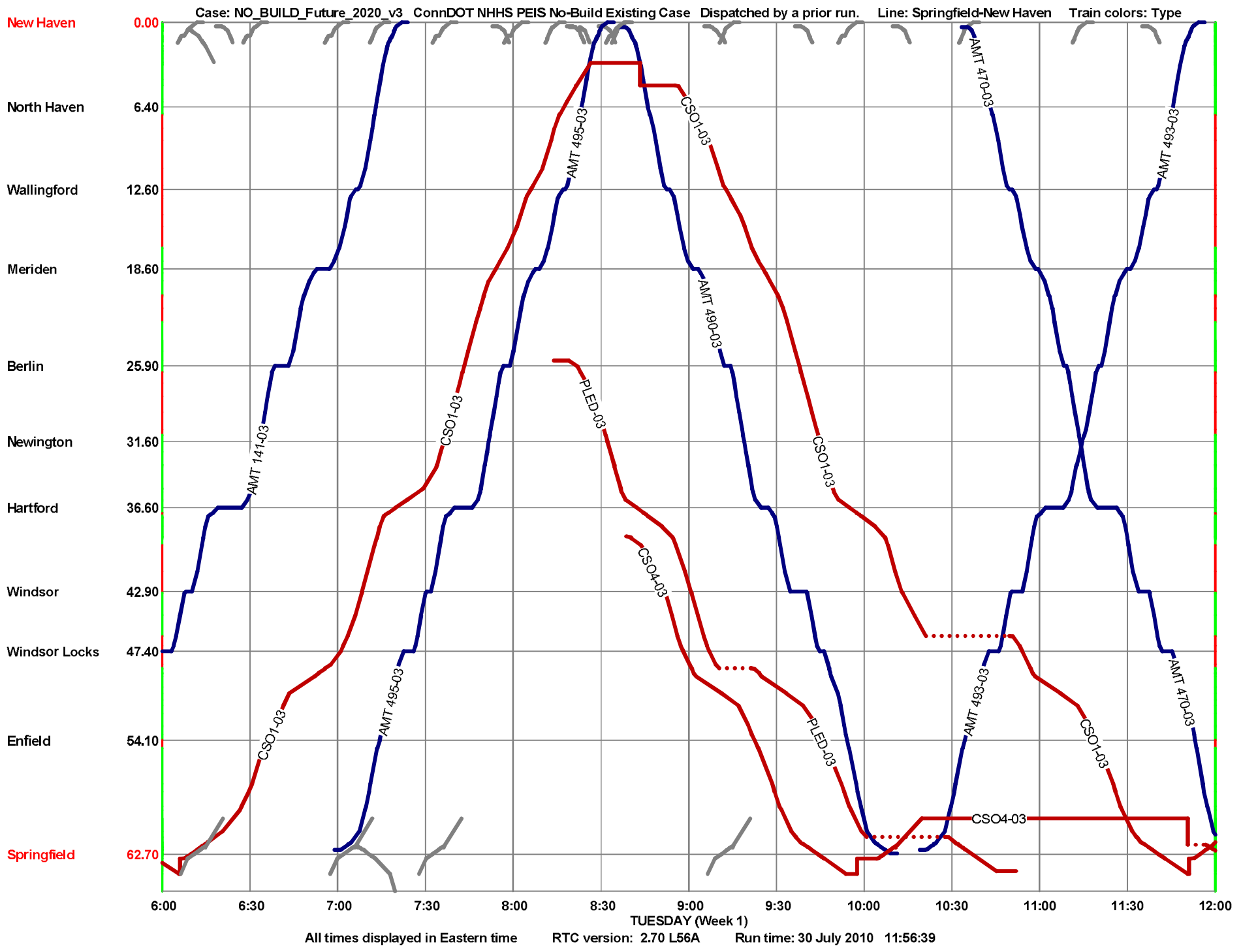

Case: NO_BUILD_Existing_2008 ConnDOT PEIS No-Build Existing 2008 Case
Line: Springfield-New Haven
Train colors: Type
New Haven 0.00
North Haven 6.40
Wallingford 12.60
Meriden 18.60
Berlin 25.90
Newington 31.60
Hartford 36.60
Windsor 42.90
Windsor Locks 47.40
Enfield 54.10
Springfield 62.70
CSX-03
CSO28-03
AMT 141-04
0:00
0:30
1:00
1:30
2:00
2:30
3:00
3:30
4:00
4:30
5:00
5:30
6:00
WEDNESDAY (Week 1)
All times displayed in Eastern time
RTC version: 2.70 R55F
Run time: 21 June 2010 20:04:34

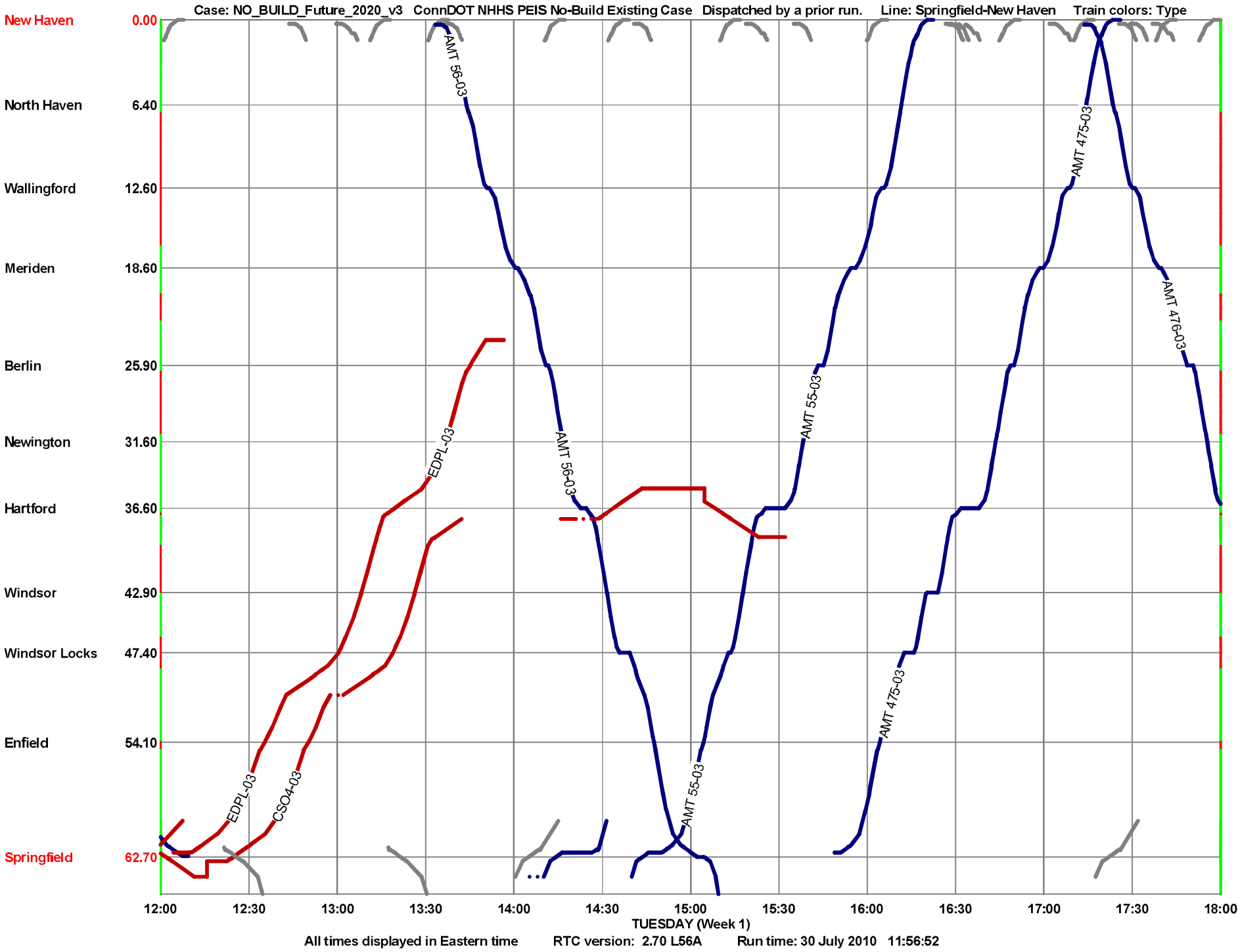

Case: NO_BUILD_Existing_2008 ConnDOT PEIS No-Build Existing 2008 Case
Line: Springfield-New Haven
Train colors: Type
New Haven 0.00
North Haven 6.40
Wallingford 12.60
Meriden 18.60
Berlin 25.90
Newington 31.60
Hartford 36.60
Windsor 42.90
Windsor Locks 47.40
Enfield 54.10
Springfield 62.70
6:00
6:30
7:00
7:30
8:00
8:30
9:00
9:30
10:00
10:30
11:00
11:30
12:00
WEDNESDAY (Week 1)
All times displayed in Eastern time
RTC version: 2.70 R55F
Run time: 21 June 2010 20:04:46


Case: NO_BUILD_Existing_2008 ConnDOT PEIS No-Build Existing 2008 Case
Line: Springfield-New Haven
Train colors: Type
New Haven 0.00
North Haven 6.40
Wallingford 12.60
Meriden 18.60
Berlin 25.90
Newington 31.60
Hartford 36.60
Windsor 42.90
Windsor Locks 47.40
Enfield 54.10
Springfield 62.70
AMT 56-04
AMT 55-04
AMT 475-04
CSO4-04
EDPL-04
12:00
12:30
13:00
13:30
14:00
14:30
15:00
15:30
16:00
16:30
17:00
17:30
18:00
WEDNESDAY (Week 1)
All times displayed in Eastern time
RTC version: 2.70 R55F
Run time: 21 June 2010 20:05:12


Case: NO_BUILD_Existing_2008 ConnDOT PEIS No-Build Existing 2008 Case
Line: Springfield-New Haven
Train colors: Type
New Haven 0.00
North Haven 6.40
Wallingford 12.60
Meriden 18.60
Berlin 25.90
Newington 31.60
Hartford 36.60
Windsor 42.90
Windsor Locks 47.40
Enfield 54.10
Springfield 62.70
AMT 494-04
CSX-04
AMT 148-04
CSO2C-04
AMT 479-04
AMT 476-04
CSO5A-04
18:00
18:30
19:00
19:30
20:00
20:30
21:00
21:30
22:00
22:30
23:00
23:30
24:00
WEDNESDAY (Week 1)
All times displayed in Eastern time
RTC version: 2.70 R55F
Run time: 21 June 2010 20:05:28


Case: NO_BUILD_Future_2020_v3 ConnDOT NHHS PEIS No-Build Existing Case Dispatched by a prior run. Line: Springfield-New Haven Train colors: Type
New Haven 0.00
North Haven 6.40
Wallingford 12.60
Meriden 18.60
Berlin 25.90
Newington 31.60
Hartford 36.60
Windsor 42.90
Windsor Locks 47.40
Enfield 54.10
Springfield 62.70
CSO2A-02
CSO2A-02
CSO5B-02
AMT 141-03
0:00 0:30 1:00 1:30 2:00 2:30 3:00 3:30 4:00 4:30 5:00 5:30 6:00
TUESDAY (Week 1)
All times displayed in Eastern time RTC version: 2.70 L56A Run time: 30 July 2010 11:56:27


Case: NO_BUILD_Future_2020_v3 ConnDOT NHHS PEIS No-Build Existing Case Dispatched by a prior run. Line: Springfield-New Haven Train colors: Type
New Haven 0.00
North Haven 6.40
Wallingford 12.60
Meriden 18.60
Berlin 25.90
Newington 31.60
Hartford 36.60
Windsor 42.90
Windsor Locks 47.40
Enfield 54.10
Springfield 62.70
AMT 141-03
CSO1-03
AMT 495-03
CSO1-03
AMT 490-03
CSO1-03
PLED-03
CSO4-03
PLED-03
AMT 470-03
AMT 493-03
CSO4-03
CSO1-03
AMT 493-03
AMT 470-03
6:00
6:30
7:00
7:30
8:00
8:30
9:00
9:30
10:00
10:30
11:00
11:30
12:00
TUESDAY (Week 1)
All times displayed in Eastern time
RTC version: 2.70 L56A
Run time: 30 July 2010 11:56:39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Newington 31.60
Hartford 36.60
Windsor 42.90
Windsor Locks 47.40
Enfield 54.10
Springfield 62.70
AMT 56-03
EDPL-03
AMT 56-03
AMT 55-03
AMT 55-03
AMT 475-03
AMT 475-03
AMT 476-03
EDPL-03
CSO4-03
12:00
12:30
13:00
13:30
14:00
14:30
15:00
15:30
16:00
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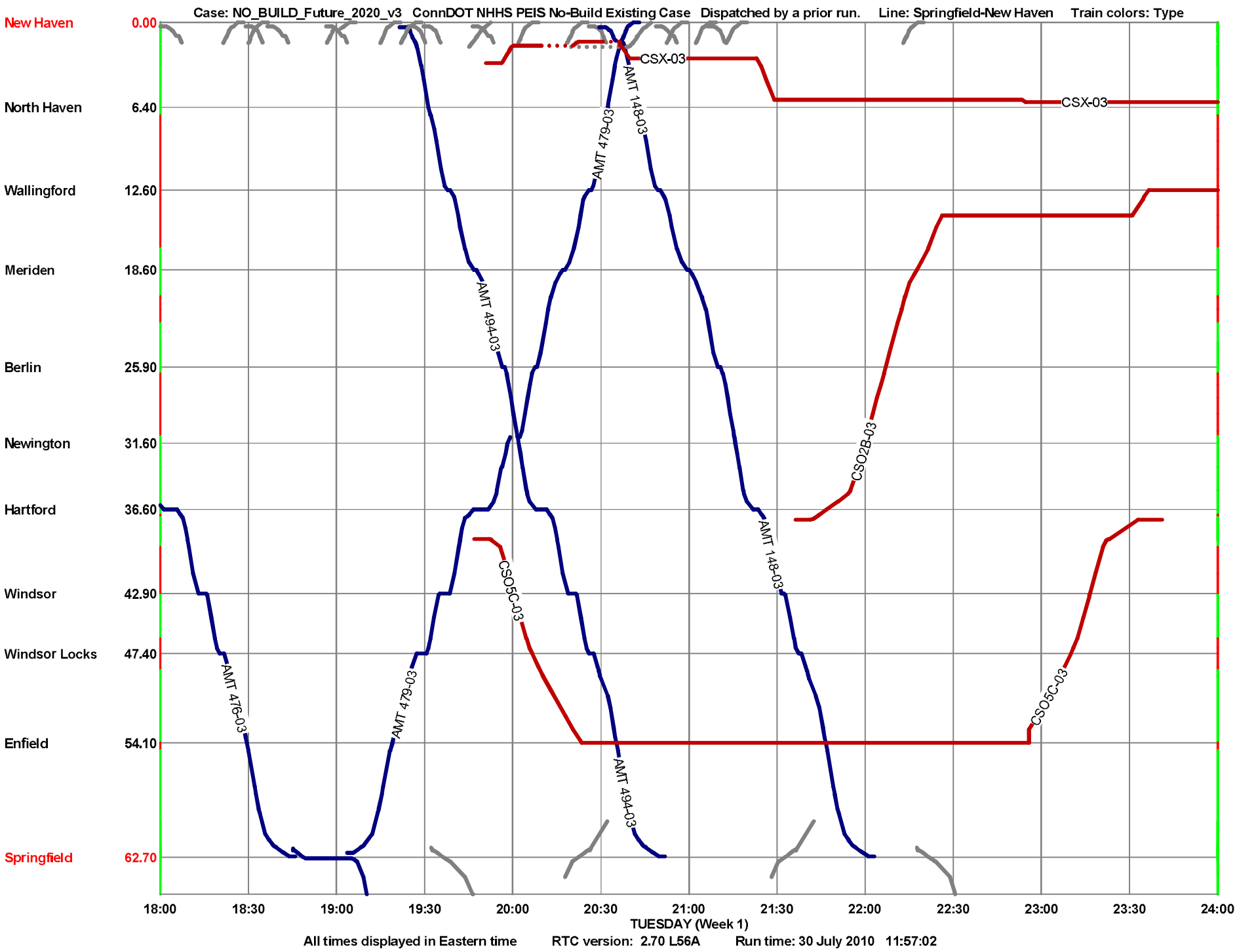
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Berlin 25.90
Newington 31.60
Hartford 36.60
Windsor 42.90
Windsor Locks 47.40
Enfield 54.10
Springfield 62.70
CSX-03
CSX-03
AMT 479-03
AMT 148-03
AMT 494-03
CSO2B-03
AMT 148-03
CSO5C-03
AMT 476-03
AMT 479-03
AMT 494-03
CSO5C-03
18:00
18:30
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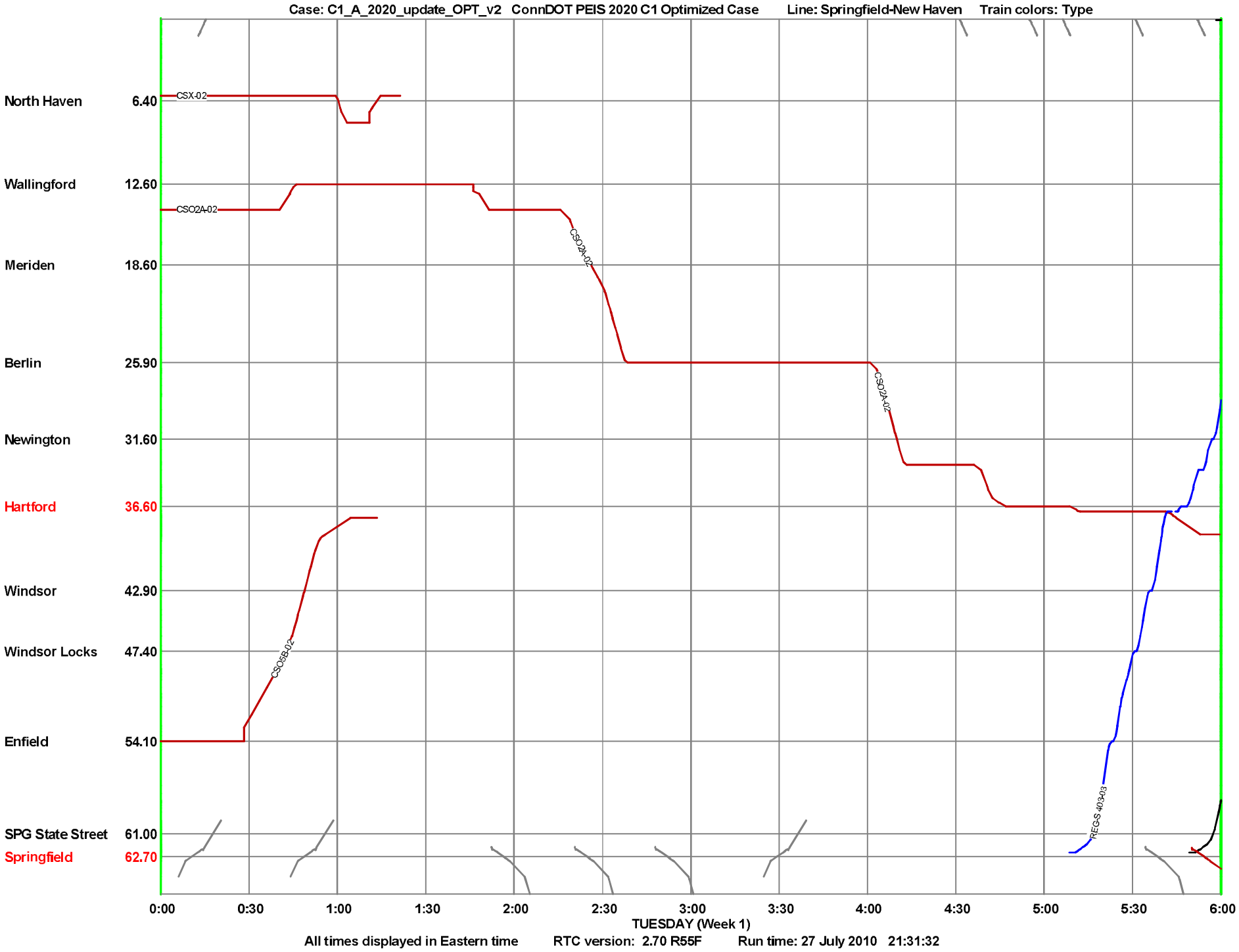
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Windsor 42.90
Windsor Locks 47.40
Enfield 54.10
SPG State Street 61.00
Springfield 62.70
CSX-02
CSO2A-02
CSO2A-02
CSO2A-02
CSO5B-02
REGS 403-03
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0:30
1:00
1:30
2:00
2:30
3:00
3:30
4:00
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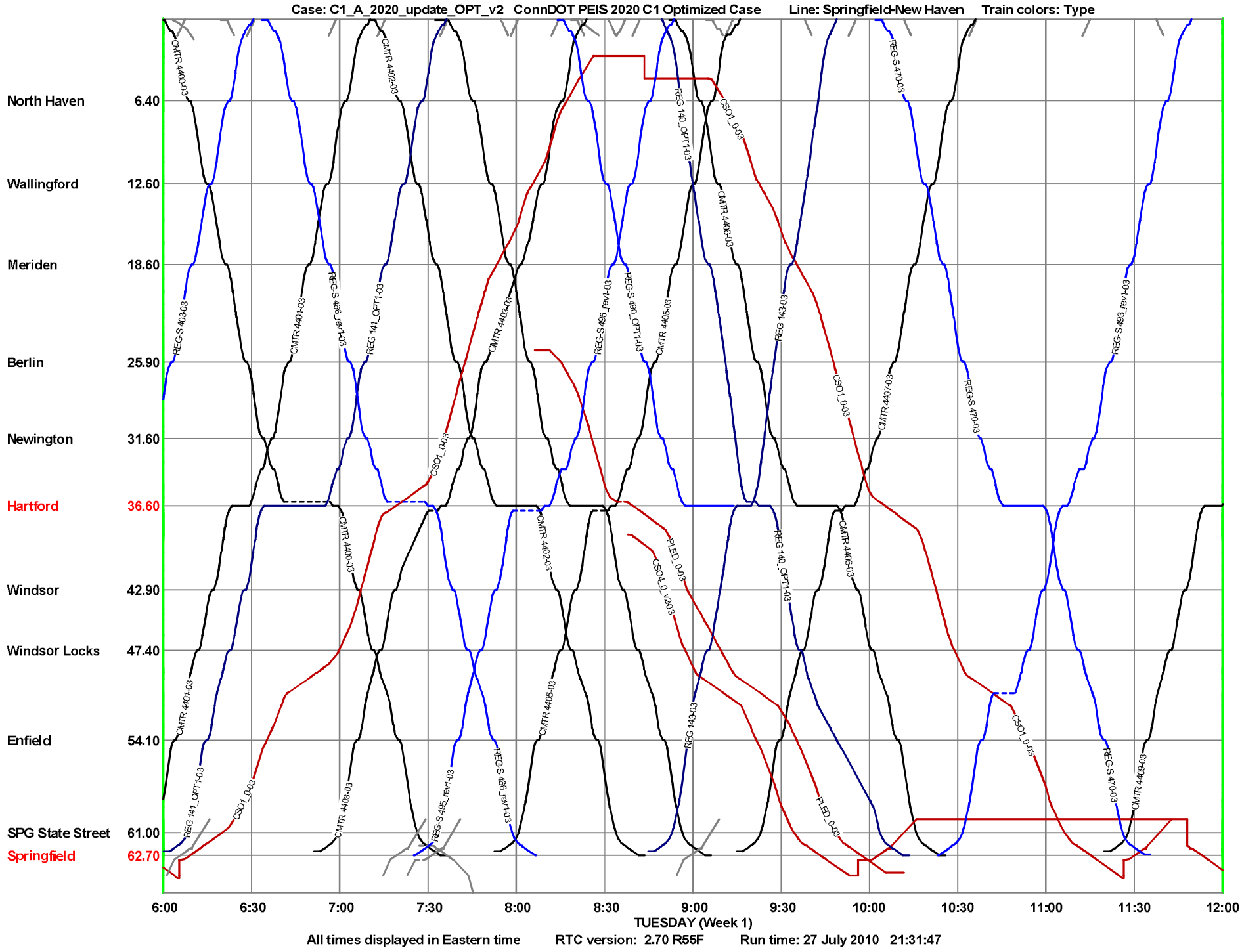
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Meriden 18.60
Berlin 25.90
Newington 31.60
Hartford 36.60
Windsor 42.90
Windsor Locks 47.40
Enfield 54.10
SPG State Street 61.00
Springfield 62.70
6:00
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7:00
7:30
8:00
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9:00
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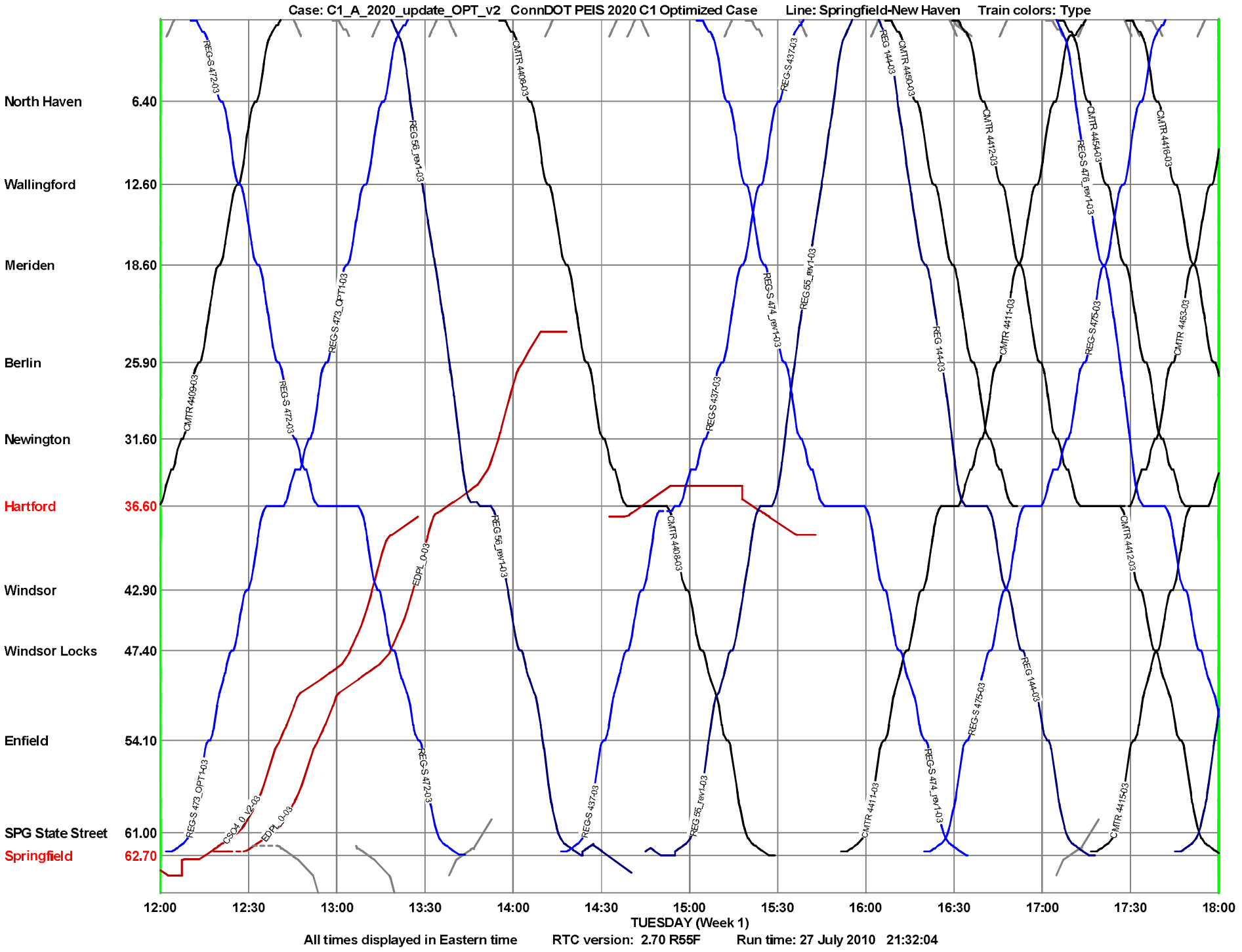
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Meriden 18.60
Berlin 25.90
Newington 31.60
Hartford 36.60
Windsor 42.90
Windsor Locks 47.40
Enfield 54.10
SPG State Street 61.00
Springfield 62.70
12:00
12:30
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13:30
14:00
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15:00
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18:00
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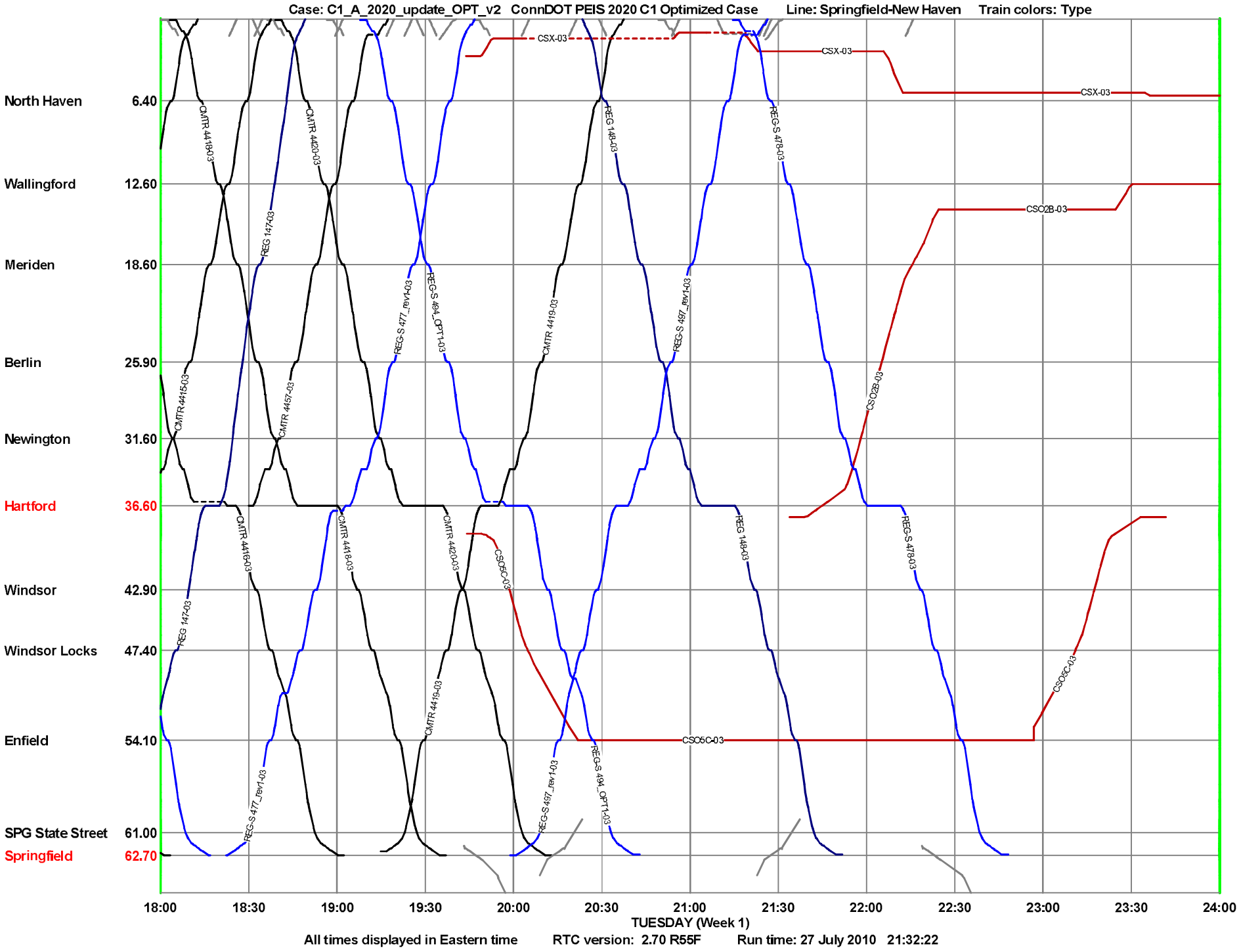
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Train colors: Type
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Wallingford 12.60
Meriden 18.60
Berlin 25.90
Newington 31.60
Hartford 36.60
Windsor 42.90
Windsor Locks 47.40
Enfield 54.10
SPG State Street 61.00
Springfield 62.70
CSX-03
CSO2B-03
CSO5C-03
CMTR 4418-03
CMTR 4420-03
CMTR 4415-03
CMTR 4457-03
CMTR 4419-03
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REG 148-03
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REG-S 494_OPT1-03
REG-S 497_rev1-03
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24:00
TUESDAY (Week 1)
All times displayed in Eastern time
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Run time: 27 July 2010 21:32:22

Appendix H

Summary of Amtrak Travel Demand Forecasting Models

Summary of Amtrak Travel Demand Forecasting Models

April 2010

Contents

Summary of New Amtrak Northeast Corridor (NEC) Travel Demand Forecasting Model

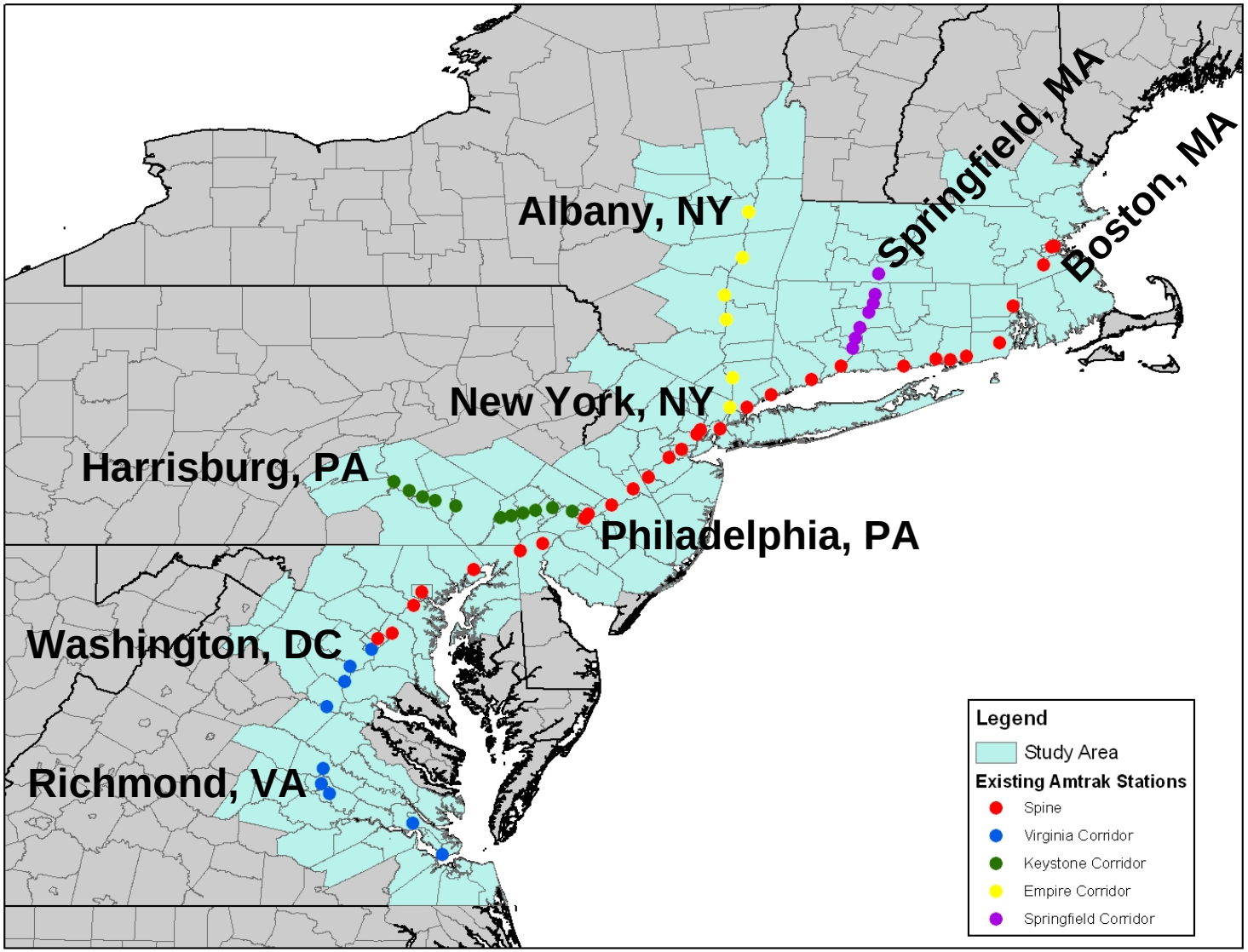
May 2007

Purpose and Scope

- **Objectives**
  - Understand existing and predict future intercity passenger travel within the Northeast
  - Develop multi-modal passenger travel demand forecasting model system tool
  - Prepare ridership and ticket revenue forecasts for future Amtrak service scenarios and pricing

- **Scope**
  - Intercity passenger travel
    - Auto, air, and intercity bus
    - Premium (Acela) and Regular (Regional) rail
  - Study area
    - NEC Spine (Washington, D.C. – New York – Boston)
    - Corridors branching from the Spine serving Virginia, Harrisburg, Albany, and Hartford/Springfield

Study Area


Albany, NY
Springfield, MA
Boston, MA
New York, NY
Harrisburg, PA
Philadelphia, PA
Washington, DC
Richmond, VA
Legend
Study Area
Existing Amtrak Stations
Spine
Virginia Corridor
Keystone Corridor
Empire Corridor
Springfield Corridor

Travel Market Data Sources

- **Passenger/Vehicle Counts**
  - Amtrak Data Warehouse
  - Air passengers
    - FAA 10 percent sample
    - Commuter data
  - Highway traffic counts

- **New Travel Surveys**
  - Highway origin-destination surveys in Maryland, New Jersey, and Massachusetts
  - Telephone survey of Amtrak customers
  - Telephone survey of random NEC travelers

Travel Survey Program

- **Highway O-D Surveys (4,638 completed mail-back surveys)**
  - I-95 in Maryland
  - New Jersey Turnpike
  - Massachusetts Turnpike

- **Telephone Survey of Amtrak Customers (5,001 completed interviews)**
  - Acela, Regional, Virginia, Keystone, Empire, and Springfield services

- **Telephone Survey of Random NEC Travelers (10,015 completed interviews)**
  - Auto, air, and intercity bus travelers

Highway Survey

- **Sample Size**
  - 4,638 completed mail-back surveys
- **Survey Purpose**
  - Develop an estimate of origin-destination trips by auto within the NEC
  - Used to adjust data from the random traveler telephone survey to account for under-reporting of auto trips
- **Observed Trip Data**
  - Origin and destination
  - Trip purpose
  - Group size
  - Trip duration
- **Household Demographic Data**
  - Household size, auto ownership, and income

Telephone Survey of Amtrak Customers

- **Sample Size**
  - 5,001 completed interviews
- **Survey Purpose**
  - Develop an origin-destination trip table by purpose for Amtrak trips within the NEC
  - Determine sensitivity of Amtrak customers to travel time, frequency, fare/cost, on-time performance, and other characteristics of NEC modes
- **Observed Trip Data**
  - Current Amtrak Class of Service (Acela First Class, Acela Business Class, Regional Business Class, or Regional Coach Class)
  - Origin and destination
  - Trip purpose
  - Group size
- **Future Stated Travel Intentions**
  - Modes (Acela, Regional, auto, air, or intercity bus)
  - Varied levels of service (travel time, frequency, fare/cost, on-time performance)
- **Household Demographic Data**
  - Household size, auto ownership, and income

Telephone Survey of Random Travelers

- **Sample Size**
  - 10,015 completed interviews
- **Survey Purpose**
  - Develop an origin-destination trip table by purpose for auto, air, and intercity bus trips within the NEC
  - Determine sensitivity of random travelers to travel time, frequency, fare/cost, and on-time performance of NEC modes
- **Observed Trip Data**
  - Current mode (auto, air, intercity bus)
  - Origin and destination
  - Trip purpose
  - Group size
- **Future Stated Travel Intentions**
  - Modes (Acela, Regional, auto, air, or intercity bus)
  - Varied levels of service (travel time, frequency, fare/cost, on-time performance)
- **Household Demographic Data**
  - Household size, auto ownership, and income

Summary of Travel Market Data

- **Developed an origin-destination person trip table by mode and purpose for annual trips in the NEC**

- **Combined the trip tables developed from the Amtrak Customer and Random Traveler surveys**
  - Amtrak Customer survey weighted to reflect total FY06 Amtrak ridership on Acela, Regional, Virginia, Keystone, Empire, and Springfield services
  - Random Traveler surveys weighted to reflect the total (non-Amtrak) intercity traveling population in the NEC

- **Random traveler survey auto trips were adjusted to account for under-reporting of auto trips in telephone recall surveys**
  - Adjustment based on the auto person trip table developed from the highway surveys

Summary of Travel Market Data: 2006 Person Trips by Mode

Metro Area Pair	Auto	Air	Bus	Acela	Regional	Total
Boston - New York	13,563,377	2,499,698	1,223,674	465,902	374,405	18,127,056
Boston - Philadelphia	2,382,853	541,760	98,224	14,329	42,610	3,079,776
Boston - Washington	1,632,061	2,102,639	64,256	18,914	37,969	3,855,839
New York - Philadelphia	31,715,504	45,644	1,451,467	301,768	976,337	34,490,720
New York - Baltimore	7,664,755	206,834	958,002	154,393	386,516	9,370,500
New York - Washington	13,844,102	1,427,551	756,048	510,833	1,095,630	17,634,164
Philadelphia - Baltimore	9,186,058	89,361	217,967	21,876	119,276	9,634,539
Philadelphia - Washington	8,355,977	45,884	137,539	194,101	475,046	9,208,546

Summary of Travel Market Data: 2006 Person Trips by Purpose

Metro Area Pair	Business	Non Business	Total
Boston - New York	4,080,235	14,046,821	18,127,056
Boston - Philadelphia	533,050	2,546,726	3,079,776
Boston - Washington	1,494,585	2,361,254	3,855,839
New York - Philadelphia	9,140,351	25,350,369	34,490,720
New York - Baltimore	989,685	8,380,815	9,370,500
New York - Washington	2,580,857	15,053,307	17,634,164
Philadelphia - Baltimore	3,019,953	6,614,586	9,634,539
Philadelphia - Washington	1,805,900	7,402,646	9,208,546

Socio-Economic Data & Forecasts

- **Measures**
  - Population
  - Employment
  - Per Capita Income

- **Sources**
  - Economy.com data and projections by county
  - U.S. Census for allocations to sub-county areas

Population by Metro Area

Metro Area	2006 (millions)	2010 (millions)	Change 2006-2010
Washington	5.103	5.342	4.7%
Baltimore	2.904	2.985	2.8%
Wilmington	0.848	0.882	4.0%
Philadelphia	5.417	5.470	1.0%
New York including New Jersey	18.854	19.096	1.3%
New Haven	0.849	0.864	1.8%
Trenton	0.368	0.377	2.5%
Providence	1.193	1.211	1.5%
Boston	6.062	6.157	1.6%

Employment by Metro Area

Metro Area	2006 (millions)	2010 (millions)	Change 2006-2010
Washington	2.909	3.115	7.1%
Baltimore	1.412	1.488	5.4%
Wilmington	0.418	0.441	5.4%
Philadelphia	2.609	2.699	3.5%
New York including New Jersey	8.432	8.757	3.9%
New Haven	0.380	0.402	5.8%
Trenton	0.242	0.255	5.4%
Providence	0.531	0.550	3.6%
Boston	3.102	3.224	3.9%

Per Capita Income by Metro Area

Metro Area	2006 (ths/2006$)	2010 (ths/2006$)	Change 2006-2010
Washington	52.16	56.08	7.5%
Baltimore	43.12	47.42	10.0%
Wilmington	39.89	44.84	12.4%
Philadelphia	42.51	45.18	6.3%
New York including New Jersey	48.11	52.72	9.6%
New Haven	42.25	45.68	8.1%
Trenton	50.34	54.54	8.3%
Providence	36.64	39.10	6.7%
Boston	47.12	51.15	8.6%

Highway (Auto) Service

- **Distance and Travel Time**
  - Highway network links
    - New York Metropolitan network for New York area
    - Oak Ridge National Laboratory Highway Network for rest of study area
  - Highway link speeds
    - Used New York Metro area speeds in New York
    - Assigned based on facility type for Oak Ridge Network
    - Adjustments made in urban areas

- **Travel Cost**
  - Operating cost per mile
    - Business – Fully allocated (43.5 cents per mile)
    - Non-Business – Incremental (18 cents per mile)
  - Tolls/Other Costs

Summary of Service Characteristics: Washington – New York

	Auto	Air	Bus	Acela Express	Regional
Line Haul					
Distance (miles)	236	214	236	226	226
Travel Time (hours)	4.4	1.2	4.8	2.8	3.4
Travel Cost *	$133/$58	$125	$37	$156	$82
Frequency (avg./day)		38	21	15	21
Access/Terminal					
Distance (miles)		15.58	5.41	5.84	5.84
Travel Time (hours)		0.41	0.23	0.25	0.25

* Auto Cost Includes Tolls and is Presented as Business / Non Business Costs

Summary of Service Characteristics: New York – Boston

	Auto	Air	Bus	Acela Express	Regional
Line Haul					
Distance (miles)	208	185	208	231	231
Travel Time (hours)	3.82	1.2	5	3.6	4.2
Travel Cost	$110/$44	$121	$37	$107	$68
Frequency (avg./day)		40	21	9	9
Access/Terminal					
Distance (miles)		14.64	5.22	5.65	5.65
Travel Time (hours)		0.44	0.20	0.22	0.22

* Auto Cost Includes Tolls and is Presented as Business / Non Business Costs

Travel Demand Model Components

- **Integrated Two-Stage Approach**

- **Total Travel Market – Total Volume of Travel Between Two Areas**
  - Existing Market Size
  - Future Market Growth

- **Mode Share – Market Share of Trips Between Two Areas Captured by Each Mode of Travel**
  - Amtrak
    - Premium Service – Acela Express (by class)
    - Regular Service – Regionals/Empire/Keystone (by class)
  - Auto
  - Air
  - Intercity Bus

Model Development Process

- **Market Segmentation**
  - Business Trips
  - Non-Business Trips
- **Model Structure/Form – Nested Logit**
- **Independent Variables**
  - Level of Service
  - Travel Time (Line Haul & Access)
  - Departure Frequency & Time Slot
  - On-Time Performance (OTP)
  - Travel Cost / Income

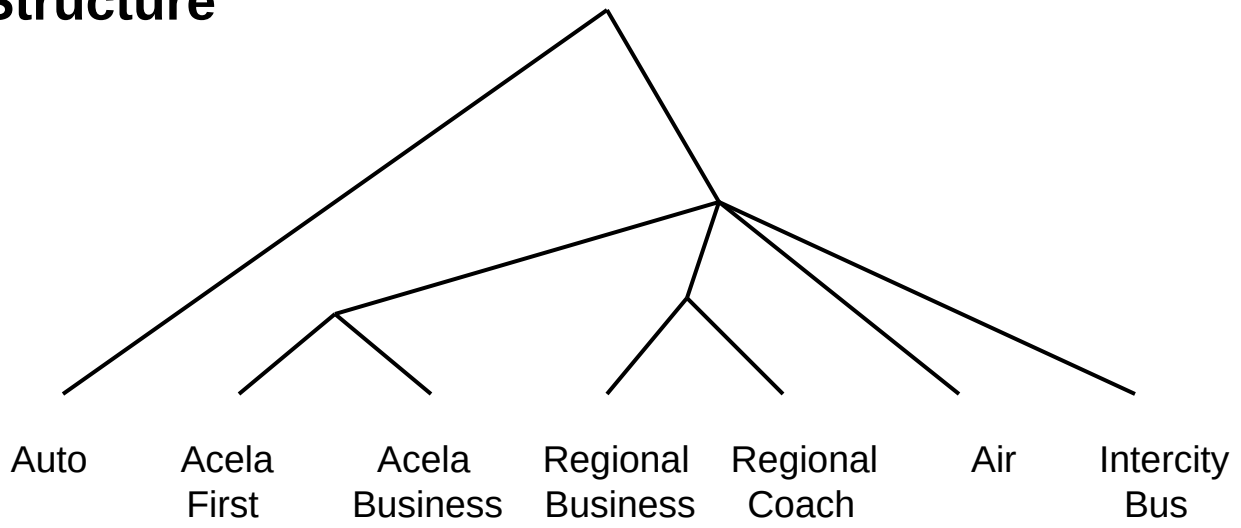
Model Structure

- **Logit Equation**

  $P(m) = \exp(U(m)) / \sum_{m} \exp(U(m))$

  where:
  P(m) - probability or share for mode m
  U(m) - utility for mode m

- **Nested Structure**



Model Development Process

- **Statistical analysis of Preference Surveys**
  - Trade-off/substitution behavior among available modes
  - Sensitivities to changes in key characteristics of modes
    - Travel time
    - Travel cost
    - Frequency / schedule slotting
    - On-Time Performance (OTP)
    - Transfers/Connections
  - Market segmentation – differential sensitivities by trip purpose

- **Application and Validation**
  - Current market and service characteristics
  - Actual travel volume data (ridership/revenue)
  - Adjust/calibrate model to match observed actuals

Key Line Haul Sensitivities (Elasticities) of Demand
(average across all NEC Markets)

	Acela	Regional
First Class Cost	-0.64	-
Business Class Cost	-0.65	-0.60
Coach Class Cost	-	-0.85
Travel Time	-1.40	-1.24
Frequency	0.35	0.34
OTP (@ 80%)	0.63	0.34
Impact of Transfer/Connection	-40%	-32%

- Fare elasticity of -0.65 means that a 10% *increase* in fare will result in a 6.5% *decline* in demand (ridership); after applying the increased fare yield (of +10%) this results in a net revenue *increase* of about 3.5%
- Travel Time elasticity of -1.4 means that a 10% *reduction* in travel time will result in a 14.0% *increase* in demand (ridership or revenue)
- Frequency elasticity of 0.35 means that a 10% *increase* in frequency will result in a 3.5% *increase* in demand (ridership or revenue)
- OTP elasticity of 0.63 means that a 10% *increase* in OTP, from 80% to 88%, will result in a 6.3% *increase* in demand (ridership or revenue)

Appendix I

Detailed Budget and Project Schedule

Detailed Capital Cost Budget

Instructions:
To assist FRA in comparing projects, this form provides a breakdown of capital cost using Standard Cost Categories (SCCs). Definitions of FRA's SCCs can be found in the "Capital Cost Info" tab of this workbook. The data you enter in this form should be drawn from budget estimates or analysis you have available for your project.

1. Enter values in the yellow cells below. You should only provide data for those costs categories associated with this project; leave others blank.

2. The light blue cells will auto-populate based on the Contingency rates entered in "General Info."

3. Explain any large discrete, identifiable and/or unique capital investments in the space provided at the bottom of this form. Where an explanation is appropriate, place an asterisk in the far right column to denote that an explanation is provided. Pleas include the reference to the Cost Category number in your explanation. Example: "10.07: Tunnel at xxxx [location], x.x miles in length, consists of one twin-tube New Austrian Tunneling Method tunnel with cross-passages located every .25 miles."

4. For purposes of this application "Base Year Dollars" are Fiscal Year (FY) 2011 Dollars.

Program Name: CT-NHHS Corridor-Intercity HSR

		Applicant Inputs								
		Unit	Quantity	Unit Cost (Thousands of Base Yr/FY 11 Dollars)	Non-Unit Based Costs	Total Allocated Cost (Thousands of Base Yr FY11 Dollars)	Allocated Contingency (Thousands of Base Yr/FY 11 Dollars)	TOTAL COST (Thousands of Base Yr/FY 11 Dollars)	Explanation Provided? (if so use *)
10	TRACK STRUCTURES & TRACK					$ 174,110,400	$ 26,116,560	$ 200,226,960	
10.01	Track structure: Viaduct	Miles				$ -	$ -	$ -	
10.02	Track structure: Major/Movable bridge				$ 50,000,000	$ 50,000,000	$ 7,500,000	$ 57,500,000	
10.03	Track structure: Undergrade Bridges					$ -	$ -	$ -	
10.04	Track structure: Culverts and drainage structures	#	1.00	$ 10,000,000		$ 10,000,000	$ 1,500,000	$ 11,500,000	
10.05	Track structure: Cut and Fill (> 4' height/depth)	Miles				$ -	$ -	$ -	
10.06	Track structure: At-grade (grading and subgrade stabilization)	Miles				$ -	$ -	$ -	
10.07	Track structure: Tunnel					$ -	$ -	$ -	
10.08	Track structure: Retaining walls and systems	Miles				$ -	$ -	$ -	
10.09	Track new construction: Conventional ballasted				$ 35,574,000	$ 35,574,000	$ 5,336,100	$ 40,910,100	
10.10	Track new construction: Non-ballasted					$ -	$ -	$ -	
10.11	Track rehabilitation: Ballast and surfacing				$ 8,276,400	$ 8,276,400	$ 1,241,460	$ 9,517,860	
10.12	Track rehabilitation: Ditching and drainage					$ -	$ -	$ -	
10.13	Track rehabilitation: Component replacement (rail, ties, etc)					$ -	$ -	$ -	
10.14	Track: Special track work (switches, turnouts, insulated joints)				$ 7,260,000	$ 7,260,000	$ 1,089,000	$ 8,349,000	
10.15	Track: Major interlockings				$ 63,000,000	$ 63,000,000	$ 9,450,000	$ 72,450,000	
10.16	Track: Switch heaters (with power and control)					$ -	$ -	$ -	
10.17	Track: Vibration and noise dampening					$ -	$ -	$ -	
10.18	Other linear structures including fencing, sound walls	Miles				$ -	$ -	$ -	
20	STATIONS, TERMINALS, INTERMODAL					$ 80,225,346	$ 12,033,802	$ 92,259,148	
20.01	Station buildings: Intercity passenger rail only					$ -	$ -	$ -	
20.02	Station buildings: Joint use (commuter rail, intercity bus)					$ -	$ -	$ -	
20.03	Platforms				$ 68,332,898	$ 68,332,898	$ 10,249,935	$ 78,582,833	
20.04	Elevators, escalators				$ 1,674,750	$ 1,674,750	$ 251,213	$ 1,925,963	
20.05	Joint commercial development					$ -	$ -	$ -	
20.06	Pedestrian / bike access and accommodation, landscaping, parking lots				$ 707,148	$ 707,148	$ 106,072	$ 813,220	
20.07	Automobile, bus, van accessways including roads				$ 9,510,550	$ 9,510,550	$ 1,426,583	$ 10,937,133	
20.08	Fare collection systems and equipment					$ -	$ -	$ -	
20.09	Station security					$ -	$ -	$ -	
30	SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS					$ 5,000,000	$ 1,000,000	$ 6,000,000	
30.01	Administration building: Office, sales, storage, revenue counting					$ -	$ -	$ -	
30.02	Light maintenance facility				$ 5,000,000	$ 5,000,000	$ 1,000,000	$ 6,000,000	
30.03	Heavy maintenance facility					$ -	$ -	$ -	
30.04	Storage or maintenance-of-way building/bases					$ -	$ -	$ -	
30.05	Yard and yard track					$ -	$ -	$ -	
40	SITEWORK, RIGHT OF WAY, LAND, EXISTING IMPROVEMENTS					$ 24,828,654	$ 4,965,731	$ 29,794,385	
40.01	Demolition, clearing, site preparation				$ 3,584,445	$ 3,584,445	$ 716,889	$ 4,301,334	
40.02	Site utilities, utility relocation				$ 1,003,838	$ 1,003,838	$ 200,768	$ 1,204,606	
40.03	Hazardous material, contaminated soil removal/mitigation, ground water treatments					$ -	$ -	$ -	
40.04	Environmental mitigation: wetlands, historic/archeology, parks					$ -	$ -	$ -	
40.05	Site structures including retaining walls, sound walls					$ -	$ -	$ -	
40.06	Temporary facilities and other indirect costs during construction				$ 13,740,371	$ 13,740,371	$ 2,748,074	$ 16,488,445	
40.07	Purchase or lease of real estate				$ 5,000,000	$ 5,000,000	$ 1,000,000	$ 6,000,000	
40.08	Highway/pedestrian overpass/grade separations					$ -	$ -	$ -	
40.09	Relocation of existing households and businesses				$ 1,500,000	$ 1,500,000	$ 300,000	$ 1,800,000	

	Unit	Quantity	Unit Cost (Thousands of Base Yr/FY 11 Dollars)	Non-Unit Based Costs	Total Allocated Cost (Thousands of Base Yr FY11 Dollars)	Allocated Contingency (Thousands of Base Yr/FY 11 Dollars)	TOTAL COST (Thousands of Base Yr/FY 11 Dollars)	Explanation Provided? (if so use *)
50 COMMUNICATIONS & SIGNALING					$ 47,777,500	$ 7,166,625	$ 54,944,125	
50.01 Wayside signaling equipment					$ -	$ -	$ -	
50.02 Signal power access and distribution				$ 4,185,000	$ 4,185,000	$ 627,750	$ 4,812,750	
50.03 On-board signaling equipment				$ 17,080,000	$ 17,080,000	$ 2,562,000	$ 19,642,000	
50.04 Traffic control and dispatching systems				$ 1,600,000	$ 1,600,000	$ 240,000	$ 1,840,000	
50.05 Communications				$ 12,862,500	$ 12,862,500	$ 1,929,375	$ 14,791,875	
50.06 Grade crossing protection				$ 12,050,000	$ 12,050,000	$ 1,807,500	$ 13,857,500	
50.07 Hazard detectors (dragging equipment, , slide, etc.)					$ -	$ -	$ -	
50.08 Station train approach warning system					$ -	$ -	$ -	
60 ELECTRIC TRACTION					$ -	$ -	$ -	
60.01 Traction power transmission: High voltage					$ -	$ -	$ -	
60.02 Traction power supply: Substations	#				$ -	$ -	$ -	
60.03 Traction power distribution: Catenary and third rail	#				$ -	$ -	$ -	
60.04 Traction power control					$ -	$ -	$ -	
Construction Subtotal (10-60)					$ 331,941,900	$ 51,282,718	$ 383,224,618	
70 VEHICLES					$ -	$ -	$ -	
70.00 Vehicle acquisition: Electric locomotive	#				$ -	$ -	$ -	
70.01 Vehicle acquisition: Non-electric locomotive	#				$ -	$ -	$ -	
70.02 Vehicle acquisition: Electric multiple unit	#				$ -	$ -	$ -	
70.03 Vehicle acquisition: Diesel multiple unit	#				$ -	$ -	$ -	
70.04 Veh acq: Loco-hauled passenger cars w/ ticketed space	#				$ -	$ -	$ -	
70.05 Veh acq: Loco-hauled passenger cars w/o ticketed space	#				$ -	$ -	$ -	
70.06 Vehicle acquisition: Maintenance of way vehicles	#				$ -	$ -	$ -	
70.07 Vehicle acquisition: Non-railroad support vehicles	#				$ -	$ -	$ -	
70.08 Vehicle refurbishment: Electric locomotive	#				$ -	$ -	$ -	
70.09 Vehicle refurbishment: Non-electric locomotive	#				$ -	$ -	$ -	
70.10 Vehicle refurbishment: Electric multiple unit	#				$ -	$ -	$ -	
70.11 Vehicle refurbishment: Diesel multiple unit	#				$ -	$ -	$ -	
70.12 Veh refurb: Passeng. loco-hauled car w/ ticketed space	#				$ -	$ -	$ -	
70.13 Veh refurb: Non-passeng loco-hauled car w/o ticketed space	#				$ -	$ -	$ -	
70.14 Vehicle refurbishment: Maintenance of way vehicles	#				$ -	$ -	$ -	
70.15 Spare parts					$ -	$ -	$ -	
80 PROFESSIONAL SERVICES					$ 55,543,600	$ -	$ 55,543,600	
80.01 Service Development Plan/Service Environmental					$ -	$ -	$ -	
80.02 Preliminary Engineering/Project Environmental				$ 15,060,400	$ 15,060,400	$ -	$ 15,060,400	
80.03 Final Design				$ 10,120,800	$ 10,120,800	$ -	$ 10,120,800	
80.04 Project management for design and construction				$ 5,060,400	$ 5,060,400	$ -	$ 5,060,400	
80.05 Construction administration & management				$ 10,120,800	$ 10,120,800	$ -	$ 10,120,800	
80.06 Professional liability and other non-construction insurance				$ 2,024,160	$ 2,024,160	$ -	$ 2,024,160	
80.07 Legal; Permits; Review Fees by other agencies, cities, etc.				$ 2,024,160	$ 2,024,160	$ -	$ 2,024,160	
80.08 Surveys, testing, investigation				$ 10,120,800	$ 10,120,800	$ -	$ 10,120,800	
80.09 Engineering inspection				$ 1,012,080	$ 1,012,080	$ -	$ 1,012,080	
80.10 Start up					$ -	$ -	$ -	
Subtotal (10-80)					$ 387,485,500	$ 51,282,718	$ 438,768,218	
90 UNALLOCATED CONTINGENCY								
Subtotal (10-90)							$ 438,768,218	
100 FINANCE CHARGES								
TOTAL CAPITAL COSTS (10-100)							$ 438,768,218	

Space provided for additional descriptions of capital costs.
See Example under "Instructions" above. Please include references to specific Cost Category numbers.

10.05 - Track Structure: Culverts and Drainage Structures - $10 Million Lump Sum Estimate

Annual Capital Cost Budget

Instructions:
This form provides a breakdown by year of the capital costs entered in the previous "Detailed Capital Cost Budget". The data you enter in this form should be drawn from budget estimates or analysis you have available for your project.

1. In the yellow cells in the "Base Year/ FY 2011 Dollars" table, enter the annual dollar figures for each cost category in thousands of Base Year/FY 2011 Dollars.

2. In the "Base Year/ FY 2011 Dollars" table, the numbers in the "Double Check Total" column will auto-populate from the "Detailed Capital Cost Budget" in the previous tab. The numbers in the "Base Yr/FY 11 Total" column will be the sum of the annual dat for each Standard Cost Categpry. If the entries in the "Double Check Total" column are not identifcal, the Base Year/FY 11 values you entered in the previous tab do not match the values entered in this tab.

3. The light blue cells in the Year of Expenditure (YOE) table will auto-populate using Inflation rates from the "General Info" tab.

Program Name:	CT-NHHS Corridor-Intercity HSR

BASE YEAR FY 2011 DOLLARS (Thousands)	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total in Base Yr /FY 11 Dollars*	Check Figures Taken from Detailed Budget‡
10 TRACK STRUCTURES & TRACK	$ -	$ 10,000,000	$ 30,000,000	$ 55,000,000	$ 68,000,000	$ 37,226,960	$ -	$ -	$ -	$ 200,226,960	$ 200,226,960
20 STATIONS, TERMINALS, INTERMODAL	$ -	$ -	$ -	$ 5,000,000	$ 25,000,000	$ 25,000,000	$ 22,000,000	$ 10,000,000	$ 5,259,148	$ 92,259,148	$ 92,259,148
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	$ -	$ -	$ -	$ 2,000,000	$ 4,000,000	$ -	$ -	$ -	$ -	$ 6,000,000	$ 6,000,000
40 SITEWORK, RIGHT OF WAY, LAND, EXISTING IMPROVEMENTS	$ 1,000,000	$ 2,000,000	$ 7,000,000	$ 7,000,000	$ 8,000,000	$ 4,794,385	$ -	$ -	$ -	$ 29,794,385	$ 29,794,385
50 COMMUNICATIONS & SIGNALING	$ -		$ 3,000,000	$ 3,000,000	$ 14,000,000	$ 12,000,000	$ 10,000,000	$ 10,000,000	$ 2,944,125	$ 54,944,125	$ 54,944,125
60 ELECTRIC TRACTION	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
70 VEHICLES	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
80 PROFESSIONAL SERVICES (applies to Cats. 10-60)	$ 5,000,000	$ 15,000,000	$ 10,000,000	$ 10,000,000	$ 5,000,000	$ 5,000,000	$ 3,000,000	$ 1,500,000	$ 1,043,600	$ 55,543,600	$ 55,543,600
90 UNALLOCATED CONTINGENCY	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
100 FINANCE CHARGES	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Program Cost (10-100)	$ 6,000,000	$ 27,000,000	$ 50,000,000	$ 82,000,000	$ 124,000,000	$ 84,021,345	$ 35,000,000	$ 21,500,000	$ 9,246,873	$ 438,768,218	$ 438,768,218

YEAR OF EXPENDITURE (YOE) DOLLARS	2011	2012	2013	2014	2015	2016	2017	2018	2019	YOE Total**
10 TRACK STRUCTURES & TRACK	$ -	$ 10,000,000	$ 30,900,000	$ 58,349,500	$ 74,305,436	$ 41,899,271	$ -	$ -	$ -	$ 215,454,207
20 STATIONS, TERMINALS, INTERMODAL	$ -	$ -	$ -	$ 5,304,500	$ 27,318,175	$ 28,137,720	$ 25,504,030	$ 11,940,523	$ 6,468,089	$ 104,673,037
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	$ -	$ -	$ -	$ 2,121,800	$ 4,370,908	$ -	$ -	$ -	$ -	$ 6,492,708
40 SITEWORK, RIGHT OF WAY, LAND, EXISTING IMPROVEMENTS	$ 1,000,000	$ 2,000,000	$ 7,210,000	$ 7,426,300	$ 8,741,816	$ 5,396,123	$ -	$ -	$ -	$ 31,774,239
50 COMMUNICATIONS & SIGNALING	$ -	$ -	$ 3,090,000	$ 3,182,700	$ 15,298,178	$ 13,506,106	$ 11,592,741	$ 11,940,523	$ 3,620,902	$ 62,231,150
60 ELECTRIC TRACTION	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
70 VEHICLES	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
80 PROFESSIONAL SERVICES (applies to Cats. 10-60)	$ 5,000,000	$ 15,000,000	$ 10,300,000	$ 10,609,000	$ 5,463,635	$ 5,627,544	$ 3,477,822	$ 1,791,078	$ 1,283,496	$ 58,552,576
90 UNALLOCATED CONTINGENCY	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
100 FINANCE CHARGES	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Program Cost (10-100)	$ 6,000,000	$ 27,000,000	$ 51,500,000	$ 86,993,800	$ 135,498,148	$ 94,566,764	$ 40,574,593	$ 25,672,124	$ 11,372,487	$ 479,177,916

* For the purpose of this application, base year dollars are considered FY 2011 dollars.
**Year-of-Expenditure(YOE) dollars are inflated Base Year dollars. Applicants must determine their own inflation rate and enter it on the "General Info" tab. Applicants should also explain their proposed inflation assumptions (and methodology, if applica
‡ As a convenience to applicants in cross-checking their figures, this column shows the "Total Costs" by category in FY 2011 dollars carried over from the "Detailed Capital Cost Budget" sheet.

If not using the FRA-provided formulas, please describe your methodology in the space provided below as well as listing any supporting documentation.

Schedule- Service Development Program

Instructions:

1. In the yellow cells below, enter the anticipated "Start Date" and "End Date" for each high level activity (e.g., Final Design, Construction, Service Ops).

2. Illustrate the anticipated timing and duration of each task item on the chart below. Shade the quarters or months for each corresponding year in which work will take place on a task. Shade all cells in the corresponding row in which activity will take place. Enter an 'X' in a cell to shade that cell.

3. Complete this process for all of the tasks, both high-level tasks (e.g., Final Design) and subtasks (e.g., Issue request for bids, make awards of FD contracts).

Service Development Program Name
CT-NHHS Corridor-Intercity HSR

	Start Date	End Date	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
			Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4	Q1Q2Q3Q4
Service Development Plan																				
Develop Service Development Plan												X								
Develop Service Selection NEPA documentation												X								
Receive environmental determination for Service Selection NEPA												X								
Submit request / receive FRA approval for Letter of Intent (if applicable)												X								
Preliminary Engineering (PE)																				
Issue requests for bids, make awards of PE contracts												X								
PE Drawings; and cost estimate, schedule, ridership forecast												X	X							
Develop Project NEPA Document												X	X							
Receive environmental determination for Project NEPA													X							
Submit request / receive FRA funding obligation for FD/Construction (if applicable)													X							
Final Design (FD)																				
Issue requests for bids, make awards of FD contracts													X							
FD Drawings; and cost estimate, schedule refinement													X	X	X	X	X			
Acquisition of real estate, relocation of households and businesses															X	X				
Conduct reviews															X					
Issue requests for bids																X				
Submit request / receive FRA approval for Construction																X				
Construction																				
Make awards of construction contracts																X	X	X	X	X
Construct infrastructure																	X	X	X	X
Finalize real estate acquisitions and relocations																	X			
Acquire and test vehicles																		X		
Service Operations - Project/Program Close Date																				
Service Operations																		X	X	X
Completion of project/program close-out, resolution of claims																				X

Appendix J

Financial Analysis

FINANCIAL IMPACT FROM PROPOSED 2020 SERVICE FOR THE KNOWLEDGE CORRIDOR; 2010 DOLLARS, 2020 DEMAND

1. 2010 Dollars, 2020 Demand

To better understand to impact of the different rates of inflation (about 2% per year for revenues and about 3.8% per year for costs) **we are reporting the financial results in 2010 dollars, while reporting the demand (riders) in 2020 numbers.**

The table below illustrates the impact of inflation.

(millions, except riders)	2020 Dollars	2010 Dollars	Percent Change
Original Fares [1]			
Base (no change in service)			
Riders [3]	490,000	490,000	0%
Revenues	$20.7	$17.0	-18%
Operating Costs	$46.3	$31.9	-31%
Net	-$25.6	-$14.9	-42%
Cost Recovery Ratio	45%	53%	18%
Cost per Train Mile	$ 99	$68	-31%
Incremental			
Riders [3]	593,900	593,900	0%
Revenues	$26.0	$21.3	-18%
Operating Costs	$60.5	$41.5	-31%
Net	-$34.5	-$20.2	-41%
Cost Recovery Ratio	43%	51%	19%
Cost per Train Mile	$73	$50	-32%
Proposed Fares [2]			
Incremental			
Riders [3]	*780,600*	780,600	0%
Revenues	$21.9	$18.0	-18%
Operating Costs	$60.9	$41.7	-32%
Net	-$39.0	-$23.8	-39%
Cost Recovery Ratio	36%	43%	19%
Cost per Train Mile	$73	$50	-32%

1) Current (2010) pricing
2) Reduced pricing
3) 2020 demand

2. Financial Summary

The tables below summarize the 2020 dollar numbers at the route level. (see page 5 for the 2010 dollar numbers at the route level)

Originally Fares

Incremental Financial Impact [1]	Base [2]	NHV – SPG (RT12)	Vermonter Greenfield (RT04)	CT Commuter Route	NE Regional (RT05)	Incremental Total
Total Riders	490,000	*157,200*	*34,500*	*346,500*	*55,700*	*593,900*
Total Revenue (mil)	$20.7	$13.0	$2.4	$7.0	$3.6	$26.0
Total Direct Costs (mil)	$46.3	$24.3	$0.8	$34.6	$0.8	$60.5
Net Impact (Rev – Dir Costs) (mil)	-$25.6	-$11.3	$1.6	-$27.6	$2.8	-$34.5
Cost Recovery (Rev/Dir Costs)	45%	53%	295%	20%	425%	43%
Cost per Train Mile	$ 99	$65	NA	$75	NA	$73

1) 2020 demand and 2020 Dollars, fully allocated
2) New Haven – Springfield (RT 12) plus Vermonter Greenfield (RT 04)

Proposed (Reduced) Fares

Incremental Financial Impact [1]	Base [2]	NHV – SPG (RT12)	Vermonter Greenfield (RT04)	CT Commuter Route	NE Regional (RT05)	Incremental Total
Total Riders	**490,000**	*236,700*	*34,500*	*431,300*	*78,100*	*780,600*
Total Revenue (mil)	$20.7	$11.2	$2.4	$5.5	$2.7	$21.9
Total Direct Costs (mil)	$46.3	$24.5	$0.8	$34.8	$0.8	$60.9
Net Impact (Rev – Dir Costs) (mil)	-$25.6	-$13.2	$1.6	-$29.3	$1.9	-$39.0
Cost Recovery (Rev/Dir Costs)	**45%**	46%	295%	16%	340%	36%
Cost per Train Mile	$ 99	$66	NA	$75	NA	$73

1) 2020 demand and 2020 Dollars, fully allocated
2) New Haven – Springfield (RT 12) plus Vermonter Greenfield (RT 04)

3. Summary of Proposed Changes

We were asked to determine the financial impact of the proposed 2020 service changes to the Knowledge Corridor (New Haven to Springfield and New Haven to Boston on the Inland Route), to the Vermonter (Springfield to St. Albans) and for a new Connecticut Commuter route (New Haven to Springfield). The table below illustrates the proposed changes in service.

Proposed Service Changes (same for both Original Fares and Proposed Fares)

	2010	2020	
	Base	Increment	Total
Springfield Route (RT 12)			
New Haven - Springfield	6	3	9
New Haven - Boston	0	2	2
Vermonter/Greenfield Route (RT 4)			
Springfield - Greenfield	0	0	0
Springfield – Bellows Falls	0	0	0
Springfield – White River Junction	0	0	0
Springfield – St. Albans	1	0	1
Connecticut Commuter Route			
New Haven - Hartford	0	2	2
New Haven - Springfield	0	9	9

We were given two separate scenarios, based on New Haven-Springfield pricing:

1. Original Fares: Current pricing (adjusted for inflation)
2. Proposed Fares: Reduced pricing (also adjusted for inflation)

4. Important Assumptions/Qualifications

- **Incremental Equipment (same for both Original Fares and Proposed Fares)**

New Haven to all but Boston		Equipment per Set			
	Sets	Locomotives	Coaches	Cab Car	Food Cars
New Haven – Springfield	2	1	1	1	0

1) Currently 3 sets; proposed would require 5 sets (from NEC Master Plan Conceptual Schedule).

New Haven-BOS Inland Route		Equipment per Set		
	Sets	Locomotives	Coaches	Food Cars
New Haven – BOS	1.5 (1)	1	7	1

1) Based on train miles. Total increase is 5 sets. New Haven-BOS takes 29% of train miles (shares with RT05).

Connecticut Commuter Route		Equipment per Set			
	Sets	Locomotives	Coaches	Cab Car	Food Cars
New Haven – Springfield	5	1	1	1	

- **Food Service**
  - New Haven – Springfield: no food service
  - New Haven – Boston (inland route): Food service same as NE Regional Route
- **Staffed Station**
  Assume no new staffed stations.

  Assume station costs at existing staffed stations increase at 75% of current station costs per passenger.
- **OBS Costs**
  Assume one District Manager for every 15 new OBS positions.
- **T&E Costs**
  Assume one Road Foreman for every 15 new OBS positions.
- **Yard**
  Assume yard costs only apply to trains operating through New Haven.
- **Mechanical Costs**
  - PM costs are allocated between the three routes by applying the current PM costs/ total unit miles for Route 12 and Route 4 to the expected total unit miles for each of the three routes.
  - Turnaround costs are calculated and allocated between the three routes by applying the current turnaround costs/ unit trips for Route 12 and Route 4 to the expected

incremental unit trips for each of the three routes, adjusted for shared turnaround costs for Base Increment trains (those trains that would operate south of New Haven)

- **Maintenance of Way**
  The estimated increase in track between New Haven and Springfield is 60%. Train miles would increase by 360%. The FRA/Volpe Avoidable Cost analysis reports that 25% of Amtrak MoW costs are avoidable. We estimate that the incremental annual operating MoW costs would be equal to 150% of the current MoW costs allocated to Route 12 (New Haven to Springfield), adjusted for 2020 dollars.
  - A 60% increase in MoW operating costs, plus
  - A 90% increase in MoW operating costs (360% x 25% = 90%),
  - 60% + 90% = 150%

  We allocated the MoW costs (between New Haven and Springfield) by train mile. We allocated 65% to Route 12, and 35% to the new Commuter route.
- **Schedule**
  None of the proposed schedules have been submitted to the host railroads for approval, so are subject to change.
- **Equipment Capital Costs**

	Additional Units Required				Cost Per Unit (millions)	Total Costs (million)
	NHV to all but BOS	NHV – BOS (Inland)	CT Commuter	total		
Diesel Locomotives	3	2	6	11	$7.0	$77
Electric Locomotives					$11.0	
Cab Cars	3		6	9	$5.0	$45
Coaches	3	11	6	20	$4.0	$80
Food Service Cars		2		2	$5.0	$10
Total						**$212**

5. Incremental Headcount (same for both Original Fares and Proposed Fares)

Incremental Headcount	NHV – SPG (RT12)	Vermonter Greenfield (RT04)	Connecticut Commuter Route	Total
OBS positions	5	0	0	5
T&E positions	30	0	35	65
Station positions	tbd	tbd	tbd	tbd
Mechanical positions	tbd	tbd	tbd	tbd

6. Financial Analysis Results 2020 Dollars, 2020 Demand

Originally Fares (Base); 2020 Dollars, 2020 Demand

Incremental Financial Impact [1]	Base [2]	NHV – SPG (RT12)	Vermonter Greenfield (RT04)	CT Commuter Route	NE Regional (RT05)	Incremental Total
Riders	**490,000**	*157,200*	*34,500*	*346,500*	*55,700*	*593,900*
Revenue (million)						
Ticket Revenue	$20.0	$12.7	$2.4	$7.0	$3.6	$25.7
Food and Beverage Revenue	0.6	0.3	0.0	0.0	0.0	0.3
Total Revenue	**$20.7**	**$13.0**	**$2.4**	**$7.0**	**$3.6**	**$26.0**
Expenses (million)						
Host Railroad	$1.5	$1.2	$0.0	$0.0	$0.0	$1.2
Fuel	2.0	1.3	0.0	1.7	0.0	3.0
Power - Electric Traction	0.0	0.0	0.0	0.0	0.0	0.0
T&E (Labor & Support)	8.2	5.3	0.1	8.9	0.0	14.3
OBS (Labor & Support)	0.6	0.9	0.0	0.0	0.0	0.9
Commissary (F&B)	0.7	0.2	0.0	0.0	0.1	0.2
Yard Ops	1.0	0.3	0.0	0.0	0.0	0.3
Operations Management	2.2	2.1	0.0	3.3	0.0	5.4
Motor Coach	0.2	0.0	0.0	0.0	0.0	0.0
Maintenance of Equipment	11.1	6.7	0.0	10.5	0.0	17.2
Stations	3.3	0.9	0.1	1.7	0.1	2.8
Amtrak Maintenance of Way	5.4	1.3	0.0	5.7	0.0	7.0
Sales and Marketing	3.4	2.0	0.5	0.9	0.5	3.9
Commissions	0.6	0.4	0.1	0.2	0.1	0.7
Insurance	0.6	0.3	0.1	0.1	0.1	0.6
Passenger Inconvenience	0.1	0.0	0.0	0.0	0.0	0.1
Police, Environmental, and Safety	1.3	1.3	0.0	1.7	0.0	3.0
General and Administrative	4.2	0.0	0.0	0.0	0.0	0.0
Sub-total Direct Operating Costs	**$46.3**	**$24.3**	**$0.8**	**$34.6**	**$0.8**	**$60.5**
Net (Rev. - Dir. Op. Costs) (mil)	**-$25.6**	**-$11.3**	**$1.6**	**-$27.6**	**$2.8**	**-$34.5**
Cost Recovery (Rev/Dir Costs)	45%	53%	295%	20%	425%	43%
Cost per Train Mile	$ 99	$65.7	NA	$75.2	NA	$73.0

Proposed Fares (Reduced); 2020 Dollars, 2020 Demand

Incremental Financial Impact [1]	Base [2]	NHV – SPG (RT12)	Vermonter Greenfield (RT04)	CT Commuter Route	NE Regional (RT05)	Incremental Total
Riders	**490,000**	*236,700*	*34,500*	*431,300*	*78,100*	*780,600*
Revenue (million)						
Ticket Revenue	$20.0	$11.0	$2.4	$5.5	$2.7	$21.6
Food and Beverage Revenue	0.6	0.2	0.0	0.0	0.0	0.3
Total Revenue	**$20.7**	**$11.2**	**$2.4**	**$5.5**	**$2.7**	**$21.9**
Expenses (million)						
Host Railroad	$1.5	$1.2	$0.0	$0.0	$0.0	$1.2
Fuel	2.0	1.3	0.0	1.7	0.0	3.0
Power - Electric Traction	0.0	0.0	0.0	0.0	0.0	0.0
T&E (Labor & Support)	8.2	5.3	0.1	8.9	0.0	14.3
OBS (Labor & Support)	0.6	0.9	0.0	0.0	0.0	0.9
Commissary (F&B)	0.7	0.2	0.0	0.0	0.1	0.3
Yard Ops	1.0	0.3	0.0	0.0	0.0	0.3
Operations Management	2.2	2.1	0.0	3.3	0.0	5.4
Motor Coach	0.2	0.0	0.0	0.0	0.0	0.0
Maintenance of Equipment	11.1	6.7	0.0	10.5	0.0	17.2
Stations	3.3	1.3	0.1	2.1	0.2	3.7
Amtrak Maintenance of Way	5.4	1.3	0.0	5.7	0.0	7.0
Sales and Marketing	3.4	1.8	0.5	0.7	0.4	3.3
Commissions	0.6	0.3	0.1	0.1	0.1	0.6
Insurance	0.6	0.4	0.1	0.2	0.1	0.7
Passenger Inconvenience	0.1	0.1	0.0	0.0	0.0	0.1
Police, Environmental, and Safety	1.3	1.3	0.0	1.7	0.0	3.0
General and Administrative	4.2	0.0	0.0	0.0	0.0	0.0
Sub-total Direct Operating Costs	**$46.3**	**$24.5**	**$0.8**	**$34.8**	**$0.8**	**$60.9**
Net (Rev. - Dir. Op. Costs) (mil)	**-$25.6**	**-$13.2**	**$1.6**	**-$29.3**	**$1.9**	**-$39.0**
Cost Recovery (Rev/Dir Costs)	45%	46%	295%	16%	340%	36%
Cost per Train Mile	$ 99	$66.2	NA	$75.7	NA	$73.4

1) 2020 demand and 2020 Dollars, fully allocated

2) New Haven – Springfield (RT 12) plus Vermonter Greenfield (RT 04)

7. Financial Analysis Results 2010 Dollars, 2020 Demand

Originally Fares (Base); 2010 Dollars, 2020 Demand

Incremental Financial Impact (1)	Base 2020 dollars	Base 2010 dollars	Change	Incremental Total 2020 Dollars	Incremental Total 2010 Dollars	Change
Riders	**490,000**	**490,000**	0%	**593,900**	**593,900**	0%
Revenue (million)						
Ticket Revenue	$20.0	$16.4	-18%	$25.7	$21.1	-18%
Food and Beverage Revenue	0.6	0.5	-17%	0.3	0.3	0%
Total Revenue	**$20.7**	**$17.0**	**-18%**	**$26.0**	**$21.3**	**-18%**
Expenses (million)						
Host Railroad	$1.5	$1.1	-27%	$1.2	$0.8	-33%
Fuel	2.0	1.3	-35%	3.0	1.9	-37%
Power - Electric Traction	0.0	0.0		0.0	0.0	
T&E (Labor & Support)	8.2	5.5	-33%	14.3	9.4	-34%
OBS (Labor & Support)	0.6	0.4	-33%	0.9	0.6	-33%
Commissary (F&B)	0.7	0.6	-14%	0.2	0.2	0%
Yard Ops	1.0	0.7	-30%	0.3	0.2	-33%
Operations Management	2.2	1.6	-27%	5.4	3.8	-30%
Motor Coach	0.2	0.2	0%	0.0	0.0	
Maintenance of Equipment	11.1	7.7	-31%	17.2	12.1	-30%
Stations	3.3	2.5	-24%	2.8	2.0	-29%
Amtrak Maintenance of Way	5.4	3.5	-35%	7.0	4.7	-33%
Sales and Marketing	3.4	2.5	-26%	3.9	2.8	-28%
Commissions	0.6	0.4	-33%	0.7	0.5	-29%
Insurance	0.6	0.4	-33%	0.6	0.5	-17%
Passenger Inconvenience	0.1	0.1	0%	0.1	0.1	0%
Police, Environmental, and Safety	1.3	0.9	-31%	3.0	2.0	-33%
General and Administrative	4.2	2.8	-33%	0.0	0.0	
Sub-total Direct Operating Costs	**$46.3**	**$31.9**	**-31%**	**$60.5**	**$41.5**	**-31%**
Net (Rev. - Dir. Op. Costs) (mil)	**-$25.6**	**-$14.9**	**-42%**	**-$34.5**	**-$20.2**	**-41%**
Cost Recovery (Rev/Dir Costs)	45%	53%	18%	43%	51%	19%
Cost per Train Mile	$ 99	$68	-31%	$73	$50	-32%

Proposed Fares (Reduced); 2010 Dollars, 2020 Demand

Incremental Financial Impact (1)	Base 2020 dollars	Base 2010 dollars	Change	Incremental Total 2020 Dollars	Incremental Total 2010 Dollars	Change
Riders	**490,000**	**490,000**	**0%**	*780,600*	**780,600**	**0%**
Revenue (million)						
Ticket Revenue	$20.0	$16.4	-18%	$21.6	$17.7	-18%
Food and Beverage Revenue	0.6	0.5	-17%	0.3	0.2	-33%
Total Revenue	**$20.7**	**$17.0**	**-18%**	**$21.9**	**$18.0**	**-18%**
Expenses (million)						
Host Railroad	$1.5	$1.1	-27%	$1.2	$0.8	-33%
Fuel	2.0	1.3	-35%	3.0	1.9	-37%
Power - Electric Traction	0.0	0.0		0.0	0.0	
T&E (Labor & Support)	8.2	5.5	-33%	14.3	9.4	-34%
OBS (Labor & Support)	0.6	0.4	-33%	0.9	0.6	-33%
Commissary (F&B)	0.7	0.6	-14%	0.3	0.2	-33%
Yard Ops	1.0	0.7	-30%	0.3	0.2	-33%
Operations Management	2.2	1.6	-27%	5.4	3.8	-30%
Motor Coach	0.2	0.2		0.0	0.0	
Maintenance of Equipment	11.1	7.7	-31%	17.2	12.1	-30%
Stations	3.3	2.5	-24%	3.7	2.6	-30%
Amtrak Maintenance of Way	5.4	3.5	-35%	7.0	4.7	-33%
Sales and Marketing	3.4	2.5	-26%	3.3	2.4	-27%
Commissions	0.6	0.4	-33%	0.6	0.4	-33%
Insurance	0.6	0.4	-33%	0.7	0.5	-29%
Passenger Inconvenience	0.1	0.1	0%	0.1	0.1	0%
Police, Environmental, and Safety	1.3	0.9	-31%	3.0	2.0	-33%
General and Administrative	4.2	2.8		0.0	0.0	
Sub-total Direct Operating Costs	**$46.3**	**$31.9**	**-31%**	**$60.9**	**$41.7**	**-32%**
Net (Rev. - Dir. Op. Costs) (mil)	**-$25.6**	**-$14.9**	**-42%**	**-$39.0**	**-$23.8**	**-39%**
Cost Recovery (Rev/Dir Costs)	45%	53%	18%	36%	43%	19%
Cost per Train Mile	$ 99	$68	-31%	$73.4	$50	-32%

1) 2020 demand but in 2010 Dollars, fully allocated

2) New Haven – Springfield (RT 12) plus Vermonter Greenfield (RT 04)

8. One Time Charges (same for both Original Fares and Proposed Fares)

One Time Charges (mil) [1]	NHV – SPG (RT12)	Vermonter Greenfield (RT04)	New CT (RT COM)	Total
Training and Qualifying	$ 1.0	$ 0.0	$ 2.0	$ 3.0
Equipment	$ 116.0	$ 0.0	$ 96.0	$ 212.0
Stations - Structure	tbd	tbd	tbd	tbd
Mechanical Facility	tbd	tbd	tbd	tbd

1) 2010 Dollars

9. Financial Analysis Methodology

- **Ticket Revenues and Ridership**
  We used a Corridor Demand Forecasting Model to forecast ridership and ticket revenue. The model uses a direct demand approach to forecast Amtrak ridership by geographic market and class of service.
- **Food and Beverage Revenues**
  We estimated food and beverage revenues and costs based on the average food and beverage revenues-per-rider and cost-per-rider on the Vermonter and Springfield Shuttle Route for the last 12 months.
- **Host Railroad Costs**
  We based host railroad costs on the current, route specific, cost per train mile.
- **Fuel Costs**
  We estimated fuel costs based on the average fuel costs per train mile for Vermonter and Springfield Shuttle Routes for the last 12 months.
- **Train Crew Costs**
  T&E and OBS labor cost estimates were based on numbers provided by Crew Management.
- **Mechanical Costs**
  Incremental mechanical costs consist of turnaround/layover costs, and PM and bad order costs. PM costs are based on expected increase in the active fleet. Turnaround costs are based on the expected increase in frequency (adjusted for Base Increment trains). The net incremental mechanical costs used in the financial analysis are the total of the expected new incremental mechanical costs less the current allocated mechanical costs.

10. Impact of Ramp-up on Revenue

Estimated demand numbers are mature; they have not been adjusted to reflect phasing or ramp-up. The Finance Department strongly encourages that the first year revenues and riders be adjusted to reflect the expected impact of the ramp up period.

Appendix K

Diversions, Travel Time Savings, and VMT Reduction

2030 Ridership Source

	Alternative C1 Base Fares	Alternative C1 Proposed Fares
Total Ridership - Baseline	546,500	546,500
New Riders Diverted from Auto	955,260	1,147,490
New Riders Diverted from Air	105,787	107,461
Total Ridership - Alternative C1*	1,607,547	1,801,451

* excludes incremental NE Regional connections (counted a 2nd time by Amtrak)

2030 Travel Time Savings (millions of minutes)

	Alternative C1 Base Fares	Alternative C1 Proposed Fares
Savings to Existing Customers	10.25	10.25
New Riders Diverted from Auto	30.30	29.79
New Riders Diverted from Air	(13.21)	(13.35)
Total Net Savings	27.34	26.70

2030 Estimated Auto VMT Reduction (from auto diversion)

	Alternative C1 Base Fares	Alternative C1 Proposed Fares
Auto VMT Reduction (millions)	134.84	148.94

** see Section 6.5.2 of this report for estimated 2020 values.

Appendix L

Stakeholder Agreements

AGREEMENT IN PRINCIPLE BETWEEN STATE OF CONNECTICUT AND NATIONAL RAILROAD PASSENGER CORPORATION IN SUPPORT OF PRIIA GRANT FOR SERVICE DEVELOPMENT PROGRAM ON AMTRAK-OWNED INFRASTRUCTURE

THIS AGREEMENT IN PRINCIPLE ("AIP") is made as of the 3 day of August 2010, by and between the National Railroad Passenger Corporation, a corporation organized under the Rail Passenger Service Act (recodified at 49 U.S.C. § 24101 et seq.) and the laws of the District of Columbia and having its principal office and place of business in Washington, DC (hereinafter referred to as "Amtrak"), and the State of Connecticut, acting by and through its Department of Transportation (hereinafter referred to as "State").

WHEREAS, the Federal Railroad Administration ("FRA") has established a grant application process to fund projects for high-speed and intercity passenger rail authorized by the Passenger Rail Investment and Improvement Act of 2008 ("PRIIA") and the FY 2010 Consolidated Appropriations Act (Title I of Division A of Pub. L. 111-117, December 16, 2009) ("FY 2010 DOT Appropriations Act"), ("FRA Grant Process"), and, on July 1, 2010, has issued interim program guidance governing the FRA Grant Process (75 Fed. Reg. 38344, et seq.) ("FRA Interim Guidance"); and

WHEREAS, the State has identified a program of projects it wishes to complete on Amtrak-owned infrastructure that will remove congestion, enhance capacity, increase track speed and/or reduce trip times for intercity passenger service operating over Amtrak-owned infrastructure ("Service Development Program" or "Program"); and

WHEREAS, the State desires to submit one or more grant applications to the FRA pursuant to the FRA Grant Process ("the Application(s)") to fund the Program; and

WHEREAS, a prerequisite for the FRA's consideration of such Application(s) is that the State reach, at a minimum, agreements in principle with the railroad that operates or will operate the benefiting high-speed or conventional speed intercity passenger rail service, and with the entity upon whose infrastructure the improvements may be performed; and

WHEREAS, the State has requested Amtrak, and Amtrak has agreed, to enter into this AIP in support of State's Application(s) pursuant to the FRA Grant Process as to the scope of the proposed Program and the realization of operating benefits the Program is intended to achieve; and

WHEREAS, the State and Amtrak are each authorized by applicable law to enter into this AIP on the terms and conditions hereinafter set forth.

NOW, THEREFORE, in consideration of the mutual covenants herein contained, the parties hereto agree as follows:

1. Proposed Service Development Program. The proposed Program will benefit, in whole or in part, intercity passenger rail service located on the Amtrak-owned Springfield Line. Completion of the Program will result in the following service ("Improved Service"):

   > Intercity passenger rail service on the Amtrak-owned Springfield Line, between New Haven and Hartford, Connecticut and Springfield, Massachusetts, and including through-service to New York, Washington, Boston, and other locations as indicated on the attached Service Schedule. As design plans advance, Amtrak and the State will develop more refined service schedules and service outcomes.

2. Commencement of Program. The parties acknowledge that the Program will be implemented pursuant to this AIP only as federal funding under the FRA Grant Process becomes available. The parties agree that Amtrak is not obligated to commence any Program element until funding for such Program element is secured by the State. Moreover, the parties agree that prior to Program implementation they will have reached agreement on specific design, construction, operations and maintenance responsibilities relating to each Program element ("Project Agreement").

3. Allocation of Responsibilities to Complete Application(s). The parties agree to cooperate to secure federal funding under the FRA Grant Process for the Program as follows:

   (a) State will take the lead in preparing the Application(s) for funds received pursuant to the FRA Grant Process and State will be identified as applicant.

   (b) Amtrak will provide or approve documentation prepared at the direction of the State by others the expected passenger benefits from the Program as well as other support documentation required for the Application(s), such as construction cost estimates and ongoing operations and maintenance cost estimates associated with the completed Program.

   (c) State will be responsible for Program design and Amtrak will be responsible for approving Program design and for Program implementation and ongoing maintenance responsibilities, conditioned upon State funding such activities.

4. Matching Funds for Program. If the parties are able to secure funds received pursuant to the FRA Grant Process for the Program, the parties agree to demonstrate their financial commitment to the Program by providing the requisite local match to the federal grant(s), in either cash or, if approved, in-kind services. The parties have agreed upon their specific contributions to the Program.

5. Cost Sharing for Program(s).

(a) Cost Overruns. Pursuant to Section 3.3 of the FRA Interim Guidance, the State agrees to absorb any cost overruns associated with the Program unless Amtrak otherwise agrees in a Project Agreement to participate in the cost sharing for cost overruns associated with a particular project.

(b) Ongoing Operations and Maintenance Costs. Since the Program will be completed on Amtrak-owned infrastructure other than the NEC Spine, the State agrees, pursuant to Section 3.3 of the FRA Interim Guidance, to cover costs associated with the operations of intercity passenger rail service benefiting from the Program in accordance with the costing methodology developed under Section 209 of PRIIA. The NEC Spine is defined as the Amtrak-owned or operated portions of the Northeast Corridor between Boston, MA and Washington, DC. Further, to the extent commuter rail service benefits from the Program, the State also agrees to pay its share of ongoing costs attributable to the Program upon completion of each project, in accordance with Amtrak's then-current pricing policies for such access as supplanted by 49 USC 24904(c) and 24905(c).

6. Program Benefits to Intercity Passenger Rail Service. Upon completion of the Program identified above, Amtrak commits to helping to achieve, to the extent that it is capable, Program benefits that are consistent with applicable FRA guidance. A Service Schedule is attached as Exhibit A.

7. Ownership of Improvements. Amtrak will own the equipment or facilities acquired, constructed and/or improved by the Program unless otherwise agreed to in a separate agreement between the parties but for which the State has not otherwise agreed to reimburse Amtrak.

8. Reimbursement of Pre-Award Costs. Pursuant to Section 3.5.5 of the FRA Interim Guidance, the State agrees that it will include in its Application(s) a request for reimbursement of pre-award costs that may be incurred by Amtrak in support of the Application(s).

9. Term and Termination. The parties agree that the purpose of this AIP is to support FY 2010 Applications. Consequently, this AIP shall automatically terminate in the event the State fails to submit an Application(s) consistent with this AIP that are necessary to fully implement the Improved Service described above. In addition, either party may terminate this AIP, on five (5) days prior written notice, for any event that it determines will materially impact completion

of the Program necessary to support, or for implementation of, the Improved Service, such events including, but not limited to, a material change affecting the planned Improved Service; FRA's failure to fully fund the Program described in the Applications; or failure of the parties to reach the agreements described above.

10. Notices. Any notice, request or other communication to either party by the other as provided for herein shall be given in writing, sent by first-class mail, return receipt requested or by overnight courier, and shall be deemed given upon actual receipt by the addressee. Notices shall be addressed as follows:

If to Amtrak:	National Railroad Passenger Corporation 30th Street Station, Box 20 Philadelphia, PA 19104 Attention: Andrew J. Galloway
If to State:	Connecticut Department of Transportation 2800 Berlin Turnpike Newington, CT 06131 Attention: James P. Redeker

State shall promptly notify Amtrak of any development, including actions by or communications from FRA, which could materially impact the Applications; funding for the Program or for their implementation; or the completion or implementation of any of the Program.

11. Governing Law. This AIP shall be governed by and construed in accordance with the laws of the District of Columbia.

12. Application Content. The parties acknowledge that due to the time constraints associated with the filing schedule for the FRA Grant Process, Amtrak has not had the opportunity to adequately review and/or validate some or all of the estimates or supplemental information presented in the State's Application(s). Such information may include, as applicable, ridership and revenue estimates, cost projections, and/or accompanying statistical information which has been independently prepared by and/or under the direction of the State. Accordingly, in those cases, Amtrak cannot at this time attest to the accuracy of such information or other anticipated service outcomes included in the State's Application(s). The parties agree to continue to work together to provide for the reasonable review of all such information, and update any and all such information as required and recognize that any commitments made by Amtrak in this Agreement based upon this not-yet-reviewed or validated information are subject to change upon further review and validation.

13. Modification. This AIP constitutes the entire agreement between the parties and supersedes any and all prior representations, understandings or agreements between the parties, whether oral or written, concerning the subject matter hereof. This AIP or any part hereof may not be changed, amended or modified, except by written agreement signed by duly authorized representatives of both parties.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their duly authorized representatives as of the day and year first hereinabove written.

NATIONAL RAILROAD PASSENGER CORPORATION

By: _____
Signature

Assistant Vice President Policy and Development-East
Title

STATE OF CONNECTICUT

By: James Rodch
Signature

Bureau Chief, Public Transportation
Title

EXHIBIT A

SERVICE SCHEDULE

SERVICE DEVELOPMENT PLAN - CONCEPTUAL WORKING SCHEDULES
SPRINGFIELD LINE COMMUTER / KNOWLEDGE CORRIDOR / INLAND ROUTE
Alternative C-1: Connecting Commuter and Springfield Region Intercity Service. NHV Locomotive changes for Inter-Regional Service

NORTHBOUND with CONNECTING Springfield Line commuter service to GCT. Locomotive changes at NHV on intercity through trains

Read Left to Right. "S" indicates station stops at intermediate points.

Miles From New York					GCT 0	54	52	51	51	NYP 0	19	22	24	25	27	29	31	33	33	34	36	39	41	42	44	45	47	52	52	54	58	62	65	19	36	65	75	78	82	88	94	101	108	112	118	122	129	137	144	154	173	192	221	260	378	151	191	214	234	235	#REF!	2:51	1:25
TRAIN Number	TERMINALS Origin	TERMINALS Finish	Equipment	Connecting Train No.	Leave GCT	125	RAD	MTV	PEL	Leave New York	NRO	LAR	MAM	HAR	RYE	POH	GRW	COS	RIV	ODW	STM	NTH	DAR	ROK	NOR	BDK	WSP	OSF	SPT	FLD	BRP	STF	HL	NRO	STM	EBR	NEW HAVEN Ar NHV	NEW HAVEN Lv NHV	STS	NAV	WFD	MER	BER	NEW	WHF	Lv HFD	WBO	WNL	BAF	SPRINGFIELD Ar SPG	SPRINGFIELD Lv SPG	Holyoke	North Hampton	Greenfield	Bellows Falls	Bellows Falls	Wells River Jct.	St Albans	Palmer	Worcester	Framingham	Back Bay	Boston	Run Time SPG-GCT	Run Time SPG-NYP	Run Time SPG-NHV
3400	NHV	SPG	CMTR																																																												
468	NHV	SPG	REG-S																																																											
3402	NHV	SPG	CMTR																																																										
3404	NHV	SPG	CMTR	1504	5:47 A	R	R									S					6:36A	S	S	S	S	S	S		S	S	S	S	S	S		7:30A	S	S	S	S	S	S	S	7:30A	S	S	S	7:30 A																																
				1506	6:16 A	R	R							S		S					7:06A	S	S	S	S	S	S		S	S	S	S	S	S		8:00A	S	S	S	S	S	S	S	8:00A	S	S	S	8:00 A																																
480	NHV	SPG	REG-S	180						6:45 A											7:22A																8:03A	8:16 A	S	S	S	S	S	S	S	9:13A	S	S	S	9:46 A																																
3410	WAS	BOS	REG-DP	7thru						7:20 A											7:57A																8:38A	8:49 A		S					9:28A	S	S	S	9:50 A	10:01 A																																
3408	NHV	SPG	CMTR	1512	6:47 A	R	R							S		S					8:02A	S	S	S	S	S	S		S	S	S	S	S	S		9:05A	9:20 A	S	S	S	S	S	S	S	9:53A	S	S	S	11:21 A																																
				1514	7:17 A	R	R														8:52A	S	S	S	S	S	S		S	S	S	S	S	S		9:55A																																									
470	NHV	SPG	REG-S	170						8:35 A											9:12A																9:53A	10:03 A	S	S	S	S	S	S	S	10:58A	S	S	S	11:33 A																																
				1649	10:07 A	R															10:54A	S	S	S	S	S	S		S	S	S	S	S	S		11:52 A																																								
472	NHV	SPG	REG-S	172						10:45 A	S										11:24A																12:05 P	12:12 P	S	S	S	S	S	S	S	1:07P	S	S	S	1:42 P																																
56	WAS	SAB	REG-DP	Thru						11:45 A											12:23P																1:08 P	1:17 P								1:51P	S			2:21 P	2:41 P		3:06P	3:24P	4:52	4:27	5:25	6:07P																																
3408	NHV	SPG	CMTR	1526	12:07 P	R															12:54P	S	S	S	S	S	S		S	S	S	S	S	S		1:52 P	1:59 P	S	S	S	S	S	S	S	2:53P	S	S	S	3:28 P																																
				1530	12:37 P	R															1:54P	S	S	S	S	S	S		S	S	S	S	S	S		2:52 P																																								
474	NHV	SPG	REG-S	174						1:05 P											2:15P																2:58 P	3:03 P	S	S	S	S	S	S	S	3:58P	S	S	S	4:33 P																																
144	NPK	BOS	REG-DP	Thru						2:30 P	S										3:09P																3:58 P	4:04 P								4:41P	S	S	S	5:16 P	5:31 P																																
3460	NHV	HFD	CMTR	1534	2:07 P	R															2:51P	S	S	S	S	S	S		S	S	S	S	S	S		3:50 P	4:07 P	S	S	S	S	S	S	S	5:02P				5:53 P																																
3440	CHI	BOS	LDST																																																													
3462	NHV	SPG	CMTR	1536	2:34 P	R										S					3:21P		S	S	S	S	S		S	S	S	S	S	S		4:20 P	4:30 P	S	S	S	S	S	S	S	5:20P	S	S	S	6:00 P																																
476	NHV	SPG	REG-S	176	3:25 P	S															4:14P																4:58 P	5:03 P			S					5:40P	S	S	S	6:15 P																																
3464	NHV	FD	CMTR	1538	3:07 P	R															3:51P	S	S	S	S	S	S		S	S	S	S	S	S		4:58 P	5:07 P	S	S	S	S	S	S	S	6:02P																																
3466	NHV	SPG	CMTR	1540	3:34 P	R											S				4:21P		S	S	S	S	S		S	S	S	S	S	S		5:20 P	5:30 P	S	S	S	S	S	S	S	6:20P	S	S	S	7:00 P																																
				1542	4:09 P	R											S				4:48P			S	S	S	S		S	S	S	S	S	S		5:58 P																																								
3468	NHV	SPG	CMTR																																																													
3470	NHV	SPG	CMTR																																																												
				1556	5:16 P	R															6:01P																6:56 P																																								
494	NHV	SPG	REG-S	94						5:40 P	S										6:19P																7:03 P	7:09 P	S	S	S	S	S	S	S	8:04P	S	S	S	8:39 P																																
				1570	6:29 P	R															7:10P																8:10 P																																								
3146	WAS	SPG	REG-DP	Thru						6:49 P	S										7:28P																8:12 P	8:23 P			S					8:55P	S	S	S	9:30 P																																
				1576	7:14 P	R															7:55P	S	S	S	S	S	S		S	S	S	S	S	S		8:51P																																								
478	NHV	SPG	REG-S	178	7:45 P	S															8:24P																9:12 P	9:15 P	S	S	S	S	S	S	S	10:10P	S	S	S	10:45 P																																
No. of Trains Stopping					14	14	5			11	6			2		6					25	9	11	5	12	10	12	5	10	17	18	12	12		25	23	18	19	19	22	16	19	16	23	19	21	19	21	4	1	1	1	1	1	1	1	3	3	3	3	3			

LEGEND

- Acela Express Service
- Intercity Regional Service
- Long Distance Service
- Inland Route / Knowledge Corridor Regional Service
- Hartford Commuter Service
- Metro-North New Haven Line Service

PROPOSED JOINT TICKETING TRAINS

- None
- None except Tr 148 and Tr 144 between HFD and SPG
- None
- All trains between GCT and Springfield
- All trains
- All trains

SCHEDULE NOTES

- Intercity running times based on Amtrak-performed TPC analysis of routes with assumed 2030 infrastructure in place
- Metro-North running times and schedules from Jan 2010 New Haven Line timetable. Only connecting trains shown.
- 1504 runs 8 min earlier than current TT
- 1512 runs 7 min earlier than current TT
- 176 runs 5 min earlier than 2030 Master Plan
- 148 runs 8 min later than current Master Plan

SERVICE DEVELOPMENT PLAN - CONCEPTUAL WORKING SCHEDULES
SPRINGFIELD LINE COMMUTER / KNOWLEDGE CORRIDOR / INLAND ROUTE
Alternative C-1: 2020 Connecting Commuter and Springfield Region Intercity Service. NHV Locomotive changes for Inter-Regional Service

SOUTHBOUND with CONNECTING Springfield Line commuter service to GCT. NHV Locomotive changes on intercity through trains.
(Read Left to Right. "S" indicates station stops at intermediate points.

TRAIN Number	TERMINALS Origin	TERMINALS Finish	Equipment	Boston	Back Bay	Framing-ham	Worcester	Palmer	St. Albans	White River Jct	Bellows Falls	Brattleboro	Greenfield	North Hampton	Holyoke
Miles From New York				235	234	214	191	151	328	260	221	197	173	154	144
403	SPG	NHV	REG-S												
4401	SPG	NHV	CMTR												
141	SPG	NFK	REG-DP												
4403	SPG	NHV	CMTR												
495	SPG	NHV	REG-S												
4405	SPG	NHV	CMTR												
143	BOS	NFK	REG-DP												
4407	SPG	NHV	CMTR												
493	SPG	NHV	REG-S												
4409	SPG	NHV	CMTR												
473	SPG	NHV	REG-6												
449	BOS	CHI	LDST	12:06P	12:12P	12:40P	1:09P	1:50P							
437	SPG	NHV	REG-8												
55	SAB	WAS	REG-DP						9:29A	12:04P	12:55P	1:52P	2:12P	2:30P	
4411	SPG	NHV	CMTR												
475	SPG	NHV	REG-6												
4453	HFD	NHV	CMTR												
4415	SPG	NHV	CMTR												
147	SPG	WAS	REG-DP												
4457	HFD	NHV	CMTR												
477	SPG	NHV	REG-S												
4419	SPG	NHV	CMTR												
497	SPG	NHV	REG-S												
No. of Trains Stopping				1	1	1	1	1	1	1	1	1	1	1	1

TRAIN Number	SPRINGFIELD Ar SPG	SPRINGFIELD Lv SPG	ENF	WNL	WND	HARTFORD Lv HFD	WHF	NEW	BER	MER	WFD	NHV	STS	NEW HAVEN Ar NHV	Conn Train	Lv NHV
Miles From New York	137		129	122	116	112	108	106	101	94	88	82	76	75		
403		6:10 A	S	S	S	5:48 A	S	S	S	S	S	S	S	6:40 A	1631	6:47A
4401		5:51 A	S	S	S	6:23 A	S	S	S	S	S	S	S	7:21 A	1633	7:28A
141		6:17 A	S	S	S	6:55 A	S	S	S	S	S	S	S	7:47 A	Thru	7:58A
														↳	1539	7:59A
4403		6:52 A	S	S	S	7:30 A	S	S	S	S	S	S	S	8:22 A	1542*	8:29A
495		7:24 A	S	S	S	8:02 A	S	S	S	S	S	S	S	8:54 A	95	9:04A
4405		7:53 A	S	S	S	8:31 A	S	S	S	S	S	S	S	9:23 A	1540	9:30A
143		8:46 A		S		9:19 A				S				9:53 A	Thru	10:04A
4407		9:15 A	S	S	S	9:53 A	S	S	S	S	S	S	S	10:45 A	1565	10:57A
493		10:23 A	S	S	S	11:01 A	S	S	S	S	S	S	S	11:53 A	93	12:05P
														↳	1559	11:57A
4409		11:20 A	S	S	S	11:58 A	S	S	S	S	S	S	S	12:50 P	1563	12:57P
473		12:23 P	S	S	S	1:01 P	S	S	S	S	S	S	S	1:53 P	173	2:04P
														↳	1567	1:57P
449	2:10 P															
437		2:17 P	S	S	S	2:55 P	S	S	S	S	S	S	S	3:47 P	137	3:55P
														↳	1575	3:52P
55	2:49 P	2:54 P		S		3:27 P								3:58 P	Thru	4:09 P
4411		3:52 P	S	S	S	4:30 P	S	S	S	S	S	S	S	5:22 P	1581	5:33P
475		4:21 P	S	S	S	4:59 P	S	S	S	S	S	S	S	5:51 P	175	6:04P
														↳	1583	5:56P
4453						5:28 P	S	S	S	S	S	S	S	6:20 P		
4415		5:17 P	S	S	S	5:55 P	S	S	S	S	S	S	S	6:47 P	1587	6:57P
147		5:46 P		S		6:19 P				S				6:53 P	Thru	7:04P
4457						6:30 P	S	S	S	S	S	S	S	7:22 P		
477		6:22 P	S	S	S	7:00 P	S	S	S	S	S	S	S	7:52 P	177	8:03P
														↳	1591	7:57P
4419		7:16 P	S	S	S	7:53 P	S	S	S	S	S	S	S	8:46 P	179	9:04P
														↳	1595	8:57P
497		7:59 P	S	S	S	8:37 P	S	S	S	S	S	S	S	9:26 P	2197	3:39P
														↳	1597	10:08P
No. of Trains Stopping	2	20	17	20	17	22	19	19	19	21	19	18	19	22		28

TRAIN Number	MIL	STF	BRP	FLD	SPT	GRF	WTP	ENK	NOR	ROW	DAR	NTH	STAMFORD STM	OGW	RIV	COS	GRW	PCH	RYE	HAR	MAM	LAR	NRO	Arrive NYP	PEL	MTV	FRD	125	Arrive GCT	Run Time SPG-NHV	Run Time SPG-NYP	Run Time SPG-GCT
Miles From New York	68	63	58	54	51	52	47	45	44	42	41	39	36	34	33	33	31	29	27	25	24	22	19	NYP 0	G15	G14	G9	G4	GCT 0	1:26	3:01	3:25
403	S	S	S	S	S	S	S	S	S				7:46A	S	S	S	S											D	8:45 A	1:30		3:35
4401	S	S	S										8:16A															D	9:06 A	1:30		3:15
141			S										8:36A										S	9:27 A						1:30	3:10	
	S	S	S	S			S		S				8:50A	S	S	S	S	S	S	S								D	9:47 A			3:30
4403	S	S	S	S	S	S	S	S	S				9:30A	S	S	S	S											D	10:27 A	1:30		3:35
495													9:42A											10:29 A						1:30	3:05	
4405	S	S	S	S			S		S				10:24A															D	11:11 A	1:30		3:18
143			S										10:44A										S	11:33 A						1:07	2:47	
4407	S	S	S	S		S	S	S	S	S	S	S	11:53A															D	12:40 P	1:30		3:25
493			S										12:46P										S	1:35 P						1:30	3:12	
	S	S	S	S		S	S	S	S	S	S	S	12:53P															D	1:40 P			3:17
4409	S	S	S	S		S	S	S	S	S	S	S	1:53P															D	2:40 P	1:30		3:20
473													2:39P											3:26 P						1:30	3:03	
	S	S	S	S		S	S	S	S	S	S	S	2:53P															D	3:40 P			3:17
449																																
437													4:37P											5:24 P						1:30	3:07	
	S	S	S	S	S	S	S	S	S	S	S	S	4:53P				S											D	5:06 P			3:29
55			S										4:49P											5:26 P						1:04	2:42	
4411	S	S	S	S			S		S		S		6:26P				S											D	7:16 P	1:30		3:24
475													6:29P											7:26 P						1:30	3:05	
	S	S	S	S	S	S	S	S	S	S	S	S	6:57P														D	D	7:46 P			3:25
4453																																
4415	S	S	S	S		S	S		S	S	S	S	7:53P															D	8:40 P	1:30		3:23
147			S										7:44P										S	8:33 P						1:07	2:47	
4457																																
477													8:41P											9:28 P						1:30	3:06	
	S	S	S	S		S	S	S	S		S	S	8:59P														D	D	9:41 P			3:19
4419			S										9:44P										S	10:33 P						1:30	3:18	
	S	S	S		S		S	S	S	S	S	S	9:53P															D	10:40 P			3:25
497													10:14P											10:58 P						1:30	2:59	
	S	S	S	S		S	S	S	S	S	S	S	11:04P															D	11:51 P			3:52
No. of Trains Stopping	16	16	22	14	5	12	15	11	15	9	11	10	28	3	3	3	5	1	1	1			5	12			2	15	16	[illegible]		

LEGEND
- Acela Express Service
- Intercity Regional Service
- Long Distance Service
- Inland Route / Knowledge Corridor Regional Service
- Hartford Commuter Service
- Metro-North New Haven Line Service

PROPOSED JOINT TICKETING TRAINS
- None
- None except Train 141
- None
- All trains between Springfield and GCT
- All trains
- All trains

SCHEDULE NOTES
Intercity running times based on Amtrak-performed TPC analysis of routes with assumed 2030 infrastructure in place
Metro-North runing times and schedules from Jan 2010 New Haven Line timetable. Only connecting trains shown.
Train 1543* represents new train

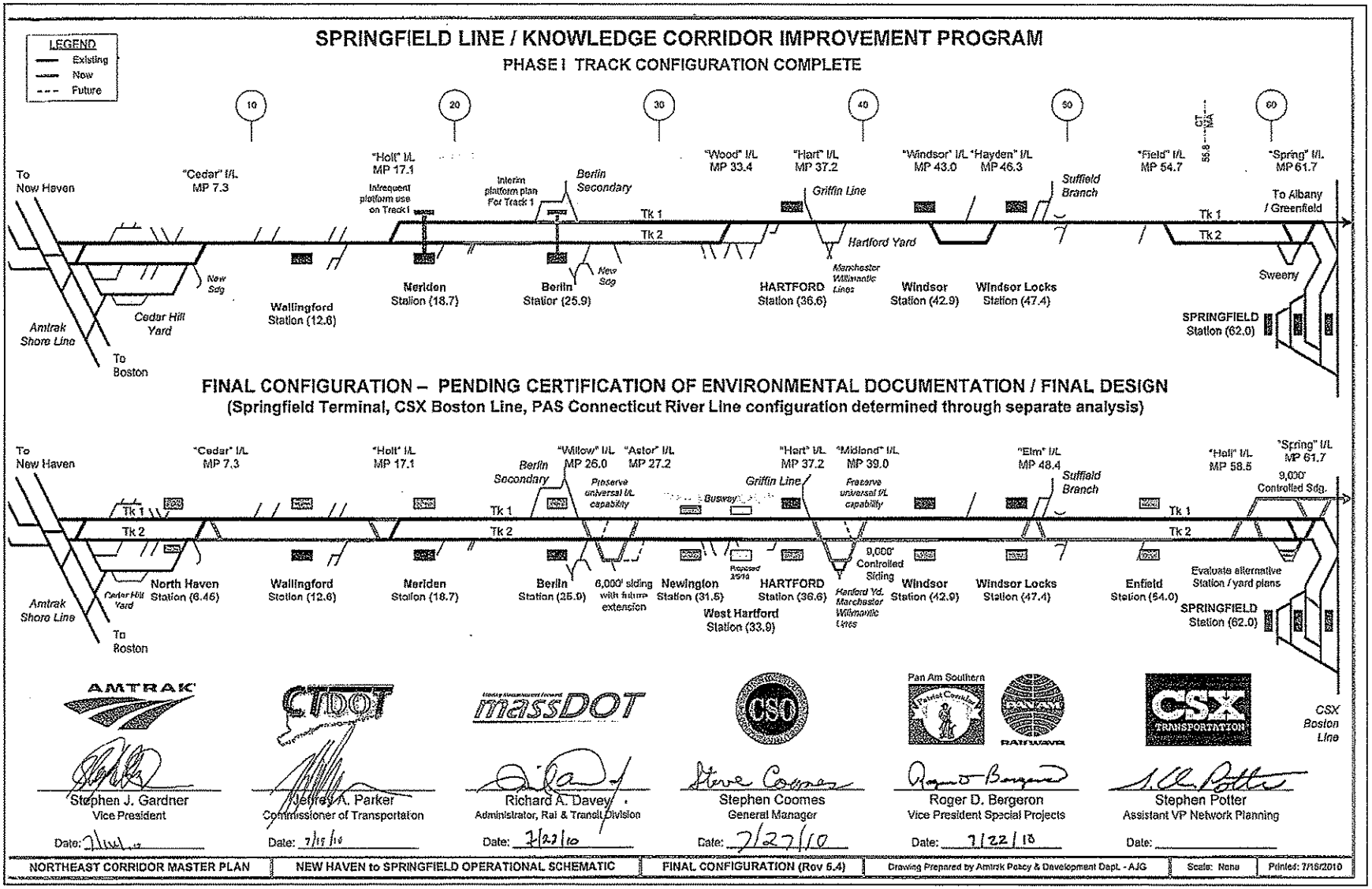


Figure 1-1 Phase 1 and Final Track Configuration

Appendix M

Ridership Projections

Station Codes

Code	Name
SAB	St. Albans, VT
ESX	Essex Jct., VT
WAB	Waterbury, VT
MPR	Montpelier, VT
RPH	Randolph, VT
WRJ	White River Jct., VT
WNM	Windsor, VT
CLA	Claremont, NH
BLF	Bellows Falls, VT
BRA	Brattleboro, VT
GFD	Greenfield, MA
NHP	Northampton, MA
HOL	Holyoke, MA
AMM	Amherst, MA
BOS	Boston (South Sta), MA
BBY	Boston (Back Bay), MA
FRA	Framingham, MA
WOR	Worcester, MA
SPG	Springfield, MA
ENF	Enfield, CT
WNL	Windsor Locks, CT
WND	Windsor, CT
HFD	Hartford, CT
BER	Berlin, CT
MDN	Meriden, CT
WFD	Wallingford, CT
NHV	New Haven, CT
BRP	Bridgeport, CT
STM	Stamford, CT
NRO	New Rochelle, NY
NYG	New York (Grand Central), NY
NYP	New York (Penn Sta), NY
NWK	Newark, NJ
EWR	Newark Airport, NJ
MET	Metropark, NJ
TRE	Trenton, NJ
CWH	Cornwells Heights, PA
PHN	North Philadelphia, PA
PHL	Philadelphia, PA
WIL	Wilmington, DE
NRK	Newark, DE
ABE	Aberdeen, MD
BAL	Baltimore, MD
BWI	BWI Airport, MD
NCR	New Carrollton, MD
WAS	Washington, DC

Forecasted 2020 Ridership By Station Pair (Connecticut Service Alternatives)

Prepared 7/27/10

Station Pair (total)	Baseline			Interim Alt C1 Base Fares			Interim Alt C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
SAB ESX	25	0	25	35	0	35	35	0	35	10	10
SAB WAB	315	0	315	355	0	355	355	0	355	39	39
SAB MPR	13	0	13	13	0	13	13	0	13	0	0
SAB RPH	63	0	63	55	0	55	55	0	55	-8	-8
SAB WRJ	76	0	76	60	0	60	60	0	60	-16	-16
SAB BLF	76	0	76	60	0	60	60	0	60	-16	-16
SAB BRA	543	0	543	379	0	379	379	0	379	-164	-164
SAB GFD	0	0	0	287	0	287	287	0	287	287	287
SAB NHP	0	0	0	345	0	345	345	0	345	345	345
SAB HOL	0	0	0	44	0	44	44	0	44	44	44
SAB AMM	50	0	50	0	0	0	0	0	0	-50	-50
SAB SPG	114	0	114	117	0	117	117	0	117	3	3
SAB HFD	189	0	189	230	0	230	230	0	230	41	41
SAB BER	76	0	76	93	0	93	93	0	93	17	17
SAB MDN	38	0	38	47	0	47	47	0	47	9	9
SAB NHV	151	0	151	189	0	189	189	0	189	37	37
SAB BRP	25	0	25	32	0	32	32	0	32	7	7
SAB STM	50	0	50	64	0	64	64	0	64	14	14
SAB NYP	669	0	669	886	0	886	886	0	886	218	218
SAB NWK	25	0	25	34	0	34	34	0	34	9	9
SAB TRE	38	0	38	51	0	51	51	0	51	13	13
SAB PHL	315	0	315	421	0	421	421	0	421	105	105
SAB WIL	38	0	38	51	0	51	51	0	51	13	13
SAB BAL	50	0	50	67	0	67	67	0	67	16	16
SAB BWI	76	0	76	101	0	101	101	0	101	25	25
SAB WAS	543	0	543	714	0	714	714	0	714	171	171
ESX WAB	114	0	114	121	0	121	121	0	121	7	7
ESX MPR	101	0	101	100	0	100	100	0	100	-1	-1
ESX RPH	76	0	76	64	0	64	64	0	64	-11	-11
ESX WRJ	492	0	492	380	0	380	380	0	380	-113	-113
ESX WNM	13	0	13	9	0	9	9	0	9	-3	-3
ESX CLA	25	0	25	19	0	19	19	0	19	-6	-6
ESX BLF	467	0	467	358	0	358	358	0	358	-109	-109
ESX BRA	1,893	0	1,893	1,280	0	1,280	1,280	0	1,280	-613	-613
ESX GFD	0	0	0	948	0	948	948	0	948	948	948
ESX NHP	0	0	0	1,156	0	1,156	1,156	0	1,156	1,156	1,156
ESX HOL	0	0	0	722	0	722	722	0	722	722	722
ESX AMM	845	0	845	0	0	0	0	0	0	-845	-845
ESX SPG	871	0	871	897	0	897	897	0	897	26	26
ESX WNL	88	0	88	107	0	107	107	0	107	18	18
ESX HFD	921	0	921	1,119	0	1,119	1,119	0	1,119	198	198
ESX BER	101	0	101	122	0	122	122	0	122	21	21
ESX MDN	214	0	214	263	0	263	263	0	263	48	48
ESX WFD	88	0	88	107	0	107	107	0	107	18	18
ESX NHV	1,325	0	1,325	1,639	0	1,639	1,639	0	1,639	314	314
ESX BRP	492	0	492	613	0	613	613	0	613	121	121
ESX STM	555	0	555	696	0	696	696	0	696	141	141
ESX NYP	6,952	0	6,952	9,122	0	9,122	9,122	0	9,122	2,170	2,170
ESX NWK	505	0	505	671	0	671	671	0	671	166	166
ESX TRE	379	0	379	497	0	497	497	0	497	119	119
ESX PHL	2,170	0	2,170	2,858	0	2,858	2,858	0	2,858	688	688
ESX WIL	290	0	290	381	0	381	381	0	381	90	90
ESX BAL	391	0	391	515	0	515	515	0	515	123	123
ESX BWI	315	0	315	413	0	413	413	0	413	97	97
ESX NCR	88	0	88	116	0	116	116	0	116	27	27
ESX WAS	2,334	0	2,334	3,052	0	3,052	3,052	0	3,052	717	717
WAB MPR	227	0	227	235	0	235	235	0	235	8	8
WAB RPH	25	0	25	23	0	23	23	0	23	-3	-3
WAB WRJ	858	0	858	697	0	697	697	0	697	-161	-161
WAB BLF	13	0	13	10	0	10	10	0	10	-3	-3
WAB BRA	782	0	782	521	0	521	521	0	521	-261	-261
WAB GFD	0	0	0	419	0	419	419	0	419	419	419
WAB NHP	0	0	0	503	0	503	503	0	503	503	503
WAB HOL	0	0	0	250	0	250	250	0	250	250	250
WAB AMM	290	0	290	0	0	0	0	0	0	-290	-290
WAB SPG	328	0	328	342	0	342	342	0	342	14	14
WAB WNL	38	0	38	46	0	46	46	0	46	8	8
WAB HFD	114	0	114	138	0	138	138	0	138	24	24
WAB BER	25	0	25	30	0	30	30	0	30	5	5

Forecasted 2020 Ridership By Station Pair (Connecticut Service Alternatives)

Prepared 7/27/10

Station Pair (total)	Baseline			Interim Alt C1 Base Fares			Interim Alt C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
WAB MDN	38	0	38	46	0	46	46	0	46	8	8
WAB WFD	25	0	25	30	0	30	30	0	30	5	5
WAB NHV	227	0	227	279	0	279	279	0	279	52	52
WAB BRP	63	0	63	78	0	78	78	0	78	15	15
WAB STM	126	0	126	157	0	157	157	0	157	31	31
WAB NYP	2,094	0	2,094	2,731	0	2,731	2,731	0	2,731	637	637
WAB NWK	88	0	88	117	0	117	117	0	117	28	28
WAB TRE	88	0	88	115	0	115	115	0	115	27	27
WAB PHL	479	0	479	625	0	625	625	0	625	145	145
WAB WIL	25	0	25	33	0	33	33	0	33	7	7
WAB BAL	189	0	189	246	0	246	246	0	246	57	57
WAB BWI	177	0	177	229	0	229	229	0	229	52	52
WAB NCR	13	0	13	16	0	16	16	0	16	4	4
WAB WAS	883	0	883	1,146	0	1,146	1,146	0	1,146	263	263
MPR RPH	13	0	13	11	0	11	11	0	11	-1	-1
MPR WRJ	63	0	63	52	0	52	52	0	52	-11	-11
MPR WNM	13	0	13	10	0	10	10	0	10	-3	-3
MPR CLA	63	0	63	49	0	49	49	0	49	-14	-14
MPR BLF	76	0	76	60	0	60	60	0	60	-16	-16
MPR BRA	315	0	315	211	0	211	211	0	211	-105	-105
MPR GFD	0	0	0	177	0	177	177	0	177	177	177
MPR NHP	0	0	0	212	0	212	212	0	212	212	212
MPR HOL	0	0	0	258	0	258	258	0	258	258	258
MPR AMM	290	0	290	0	0	0	0	0	0	-290	-290
MPR SPG	227	0	227	238	0	238	238	0	238	11	11
MPR WNL	38	0	38	46	0	46	46	0	46	8	8
MPR HFD	252	0	252	307	0	307	307	0	307	55	55
MPR BER	38	0	38	46	0	46	46	0	46	8	8
MPR MDN	13	0	13	15	0	15	15	0	15	3	3
MPR WFD	50	0	50	60	0	60	60	0	60	10	10
MPR NHV	404	0	404	495	0	495	495	0	495	91	91
MPR BRP	38	0	38	47	0	47	47	0	47	9	9
MPR STM	177	0	177	220	0	220	220	0	220	43	43
MPR NYP	3,306	0	3,306	4,298	0	4,298	4,298	0	4,298	992	992
MPR NWK	151	0	151	199	0	199	199	0	199	48	48
MPR TRE	76	0	76	98	0	98	98	0	98	22	22
MPR PHL	921	0	921	1,193	0	1,193	1,193	0	1,193	272	272
MPR WIL	164	0	164	211	0	211	211	0	211	47	47
MPR BAL	240	0	240	310	0	310	310	0	310	71	71
MPR BWI	177	0	177	228	0	228	228	0	228	51	51
MPR NCR	114	0	114	147	0	147	147	0	147	33	33
MPR WAS	883	0	883	1,141	0	1,141	1,141	0	1,141	258	258
RPH WRJ	88	0	88	77	0	77	77	0	77	-11	-11
RPH BLF	63	0	63	51	0	51	51	0	51	-13	-13
RPH BRA	126	0	126	83	0	83	83	0	83	-43	-43
RPH GFD	0	0	0	0	0	0	0	0	0	0	0
RPH SPG	63	0	63	38	0	38	38	0	38	-25	-25
RPH HFD	63	0	63	77	0	77	77	0	77	14	14
RPH MDN	13	0	13	15	0	15	15	0	15	2	2
RPH WFD	25	0	25	30	0	30	30	0	30	5	5
RPH NHV	76	0	76	91	0	91	91	0	91	15	15
RPH BRP	13	0	13	16	0	16	16	0	16	3	3
RPH STM	13	0	13	16	0	16	16	0	16	3	3
RPH NYP	543	0	543	696	0	696	696	0	696	153	153
RPH NWK	25	0	25	33	0	33	33	0	33	7	7
RPH TRE	25	0	25	32	0	32	32	0	32	7	7
RPH PHL	151	0	151	192	0	192	192	0	192	41	41
RPH WIL	76	0	76	96	0	96	96	0	96	21	21
RPH BWI	38	0	38	48	0	48	48	0	48	10	10
RPH WAS	214	0	214	272	0	272	272	0	272	58	58
WRJ WNM	50	0	50	34	0	34	34	0	34	-17	-17
WRJ BLF	13	0	13	9	0	9	9	0	9	-3	-3
WRJ BRA	202	0	202	119	0	119	119	0	119	-83	-83
WRJ GFD	0	0	0	98	0	98	98	0	98	98	98
WRJ NHP	0	0	0	123	0	123	123	0	123	123	123
WRJ HOL	0	0	0	341	0	341	341	0	341	341	341
WRJ AMM	416	0	416	0	0	0	0	0	0	-416	-416
WRJ SPG	315	0	315	189	0	189	189	0	189	-127	-127
WRJ HFD	530	0	530	644	0	644	644	0	644	114	114

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Station Pair (total)	Baseline			Interim Alt C1 Base Fares			Interim Alt C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
WRJ BER	88	0	88	107	0	107	107	0	107	19	19
WRJ MDN	139	0	139	165	0	165	165	0	165	26	26
WRJ WFD	25	0	25	30	0	30	30	0	30	5	5
WRJ NHV	757	0	757	891	0	891	891	0	891	134	134
WRJ BRP	177	0	177	213	0	213	213	0	213	36	36
WRJ STM	416	0	416	506	0	506	506	0	506	89	89
WRJ NYP	7,532	0	7,532	9,511	0	9,511	9,511	0	9,511	1,979	1,979
WRJ NWK	467	0	467	594	0	594	594	0	594	127	127
WRJ TRE	328	0	328	413	0	413	413	0	413	85	85
WRJ PHL	1,489	0	1,489	1,844	0	1,844	1,844	0	1,844	355	355
WRJ WIL	353	0	353	438	0	438	438	0	438	85	85
WRJ BAL	252	0	252	311	0	311	311	0	311	58	58
WRJ BWI	101	0	101	125	0	125	125	0	125	24	24
WRJ NCR	88	0	88	109	0	109	109	0	109	21	21
WRJ WAS	2,006	0	2,006	2,488	0	2,488	2,488	0	2,488	482	482
WNM BRA	13	0	13	7	0	7	7	0	7	-6	-6
WNM GFD	0	0	0	0	0	0	0	0	0	0	0
WNM SPG	13	0	13	13	0	13	13	0	13	0	0
WNM NHV	25	0	25	29	0	29	29	0	29	4	4
WNM BRP	25	0	25	30	0	30	30	0	30	5	5
WNM STM	38	0	38	45	0	45	45	0	45	7	7
WNM NYP	454	0	454	569	0	569	569	0	569	115	115
WNM NWK	101	0	101	128	0	128	128	0	128	27	27
WNM TRE	50	0	50	62	0	62	62	0	62	12	12
WNM PHL	76	0	76	93	0	93	93	0	93	17	17
WNM WIL	25	0	25	31	0	31	31	0	31	5	5
WNM BWI	13	0	13	15	0	15	15	0	15	3	3
WNM WAS	76	0	76	93	0	93	93	0	93	17	17
CLA BLF	76	0	76	43	0	43	43	0	43	-32	-32
CLA BRA	25	0	25	13	0	13	13	0	13	-12	-12
CLA GFD	0	0	0	0	0	0	0	0	0	0	0
CLA SPG	76	0	76	76	0	76	76	0	76	1	1
CLA WNL	13	0	13	15	0	15	15	0	15	2	2
CLA HFD	50	0	50	60	0	60	60	0	60	9	9
CLA NHV	101	0	101	117	0	117	117	0	117	16	16
CLA BRP	38	0	38	44	0	44	44	0	44	6	6
CLA STM	63	0	63	74	0	74	74	0	74	11	11
CLA NYP	946	0	946	1,178	0	1,178	1,178	0	1,178	232	232
CLA NWK	25	0	25	32	0	32	32	0	32	6	6
CLA TRE	13	0	13	15	0	15	15	0	15	3	3
CLA PHL	63	0	63	77	0	77	77	0	77	14	14
CLA WIL	63	0	63	76	0	76	76	0	76	13	13
CLA BAL	25	0	25	30	0	30	30	0	30	5	5
CLA BWI	50	0	50	61	0	61	61	0	61	10	10
CLA WAS	88	0	88	108	0	108	108	0	108	19	19
BLF BRA	38	0	38	17	0	17	17	0	17	-21	-21
BLF GFD	0	0	0	19	0	19	19	0	19	19	19
BLF NHP	0	0	0	25	0	25	25	0	25	25	25
BLF HOL	0	0	0	27	0	27	27	0	27	27	27
BLF AMM	38	0	38	0	0	0	0	0	0	-38	-38
BLF SPG	126	0	126	126	0	126	126	0	126	0	0
BLF HFD	88	0	88	101	0	101	101	0	101	13	13
BLF BER	13	0	13	14	0	14	14	0	14	2	2
BLF MDN	63	0	63	72	0	72	72	0	72	9	9
BLF WFD	25	0	25	28	0	28	28	0	28	3	3
BLF NHV	240	0	240	269	0	269	269	0	269	29	29
BLF BRP	265	0	265	297	0	297	297	0	297	32	32
BLF STM	202	0	202	231	0	231	231	0	231	29	29
BLF NYP	2,296	0	2,296	2,780	0	2,780	2,780	0	2,780	484	484
BLF NWK	126	0	126	154	0	154	154	0	154	28	28
BLF TRE	88	0	88	107	0	107	107	0	107	18	18
BLF PHL	479	0	479	568	0	568	568	0	568	88	88
BLF WIL	114	0	114	135	0	135	135	0	135	21	21
BLF BAL	189	0	189	223	0	223	223	0	223	34	34
BLF BWI	76	0	76	90	0	90	90	0	90	15	15
BLF NCR	25	0	25	30	0	30	30	0	30	5	5
BLF WAS	782	0	782	934	0	934	934	0	934	152	152
BRA GFD	0	0	0	31	0	31	31	0	31	31	31
BRA NHP	0	0	0	41	0	41	41	0	41	41	41

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Station Pair (total)	Baseline			Interim Alt C1 Base Fares			Interim Alt C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
BRA HOL	0	0	0	54	0	54	54	0	54	54	54
BRA AMM	76	0	76	0	0	0	0	0	0	-76	-76
BRA SPG	240	0	240	140	0	140	140	0	140	-100	-100
BRA WNL	38	0	38	42	0	42	42	0	42	4	4
BRA HFD	164	0	164	177	0	177	177	0	177	13	13
BRA BER	25	0	25	26	0	26	26	0	26	0	0
BRA MDN	76	0	76	43	0	43	43	0	43	-33	-33
BRA NHV	631	0	631	348	0	348	348	0	348	-283	-283
BRA BRP	177	0	177	174	0	174	174	0	174	-2	-2
BRA STM	315	0	315	306	0	306	306	0	306	-10	-10
BRA NYP	6,510	0	6,510	6,761	0	6,761	6,761	0	6,761	250	250
BRA NWK	505	0	505	528	0	528	528	0	528	23	23
BRA TRE	328	0	328	330	0	330	330	0	330	2	2
BRA PHL	934	0	934	937	0	937	937	0	937	4	4
BRA WIL	227	0	227	225	0	225	225	0	225	-2	-2
BRA BAL	315	0	315	314	0	314	314	0	314	-1	-1
BRA BWI	76	0	76	76	0	76	76	0	76	0	0
BRA NCR	88	0	88	89	0	89	89	0	89	1	1
BRA WAS	1,653	0	1,653	1,689	0	1,689	1,689	0	1,689	36	36
GFD NHP	0	0	0	34	0	34	34	0	34	34	34
GFD HOL	0	0	0	45	0	45	45	0	45	45	45
GFD SPG	0	0	0	111	0	111	111	0	111	111	111
GFD WNL	0	0	0	32	0	32	32	0	32	32	32
GFD HFD	0	0	0	139	0	139	139	0	139	139	139
GFD BER	0	0	0	0	0	0	0	0	0	0	0
GFD MDN	0	0	0	32	0	32	32	0	32	32	32
GFD NHV	0	0	0	277	0	277	277	0	277	277	277
GFD BRP	0	0	0	128	0	128	128	0	128	128	128
GFD STM	0	0	0	199	0	199	199	0	199	199	199
GFD NYP	0	0	0	3,994	0	3,994	3,994	0	3,994	3,994	3,994
GFD NWK	0	0	0	362	0	362	362	0	362	362	362
GFD TRE	0	0	0	251	0	251	251	0	251	251	251
GFD PHL	0	0	0	750	0	750	750	0	750	750	750
GFD WIL	0	0	0	185	0	185	185	0	185	185	185
GFD BAL	0	0	0	242	0	242	242	0	242	242	242
GFD BWI	0	0	0	61	0	61	61	0	61	61	61
GFD NCR	0	0	0	68	0	68	68	0	68	68	68
GFD WAS	0	0	0	1,399	0	1,399	1,399	0	1,399	1,399	1,399
NHP HOL	0	0	0	33	0	33	33	0	33	33	33
NHP SPG	0	0	0	137	0	137	137	0	137	137	137
NHP WNL	0	0	0	35	0	35	35	0	35	35	35
NHP HFD	0	0	0	153	0	153	153	0	153	153	153
NHP MDN	0	0	0	36	0	36	36	0	36	36	36
NHP NHV	0	0	0	309	0	309	309	0	309	309	309
NHP BRP	0	0	0	143	0	143	143	0	143	143	143
NHP STM	0	0	0	246	0	246	246	0	246	246	246
NHP NYP	0	0	0	5,672	0	5,672	5,672	0	5,672	5,672	5,672
NHP NWK	0	0	0	451	0	451	451	0	451	451	451
NHP TRE	0	0	0	285	0	285	285	0	285	285	285
NHP PHL	0	0	0	854	0	854	854	0	854	854	854
NHP WIL	0	0	0	211	0	211	211	0	211	211	211
NHP BAL	0	0	0	278	0	278	278	0	278	278	278
NHP BWI	0	0	0	70	0	70	70	0	70	70	70
NHP NCR	0	0	0	78	0	78	78	0	78	78	78
NHP WAS	0	0	0	1,624	0	1,624	1,624	0	1,624	1,624	1,624
HOL SPG	0	0	0	456	0	456	456	0	456	456	456
HOL WNL	0	0	0	31	0	31	31	0	31	31	31
HOL HFD	0	0	0	68	0	68	68	0	68	68	68
HOL MDN	0	0	0	39	0	39	39	0	39	39	39
HOL NHV	0	0	0	461	0	461	461	0	461	461	461
HOL BRP	0	0	0	198	0	198	198	0	198	198	198
HOL STM	0	0	0	404	0	404	404	0	404	404	404
HOL NYP	0	0	0	5,468	0	5,468	5,468	0	5,468	5,468	5,468
HOL NWK	0	0	0	522	0	522	522	0	522	522	522
HOL TRE	0	0	0	331	0	331	331	0	331	331	331
HOL PHL	0	0	0	1,550	0	1,550	1,550	0	1,550	1,550	1,550
HOL WIL	0	0	0	431	0	431	431	0	431	431	431
HOL BAL	0	0	0	200	0	200	200	0	200	200	200
HOL BWI	0	0	0	149	0	149	149	0	149	149	149

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Station Pair (total)	Baseline			Interim Alt C1 Base Fares			Interim Alt C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
HOL NCR	0	0	0	55	0	55	55	0	55	55	55
HOL WAS	0	0	0	1,497	0	1,497	1,497	0	1,497	1,497	1,497
AMM SPG	202	0	202	0	0	0	0	0	0	-202	-202
AMM WNL	25	0	25	0	0	0	0	0	0	-25	-25
AMM HFD	63	0	63	0	0	0	0	0	0	-63	-63
AMM MDN	38	0	38	0	0	0	0	0	0	-38	-38
AMM NHV	492	0	492	0	0	0	0	0	0	-492	-492
AMM BRP	214	0	214	0	0	0	0	0	0	-214	-214
AMM STM	454	0	454	0	0	0	0	0	0	-454	-454
AMM NYP	5,615	0	5,615	0	0	0	0	0	0	-5,615	-5,615
AMM NWK	530	0	530	0	0	0	0	0	0	-530	-530
AMM TRE	353	0	353	0	0	0	0	0	0	-353	-353
AMM PHL	2,082	0	2,082	0	0	0	0	0	0	-2,082	-2,082
AMM WIL	517	0	517	0	0	0	0	0	0	-517	-517
AMM BAL	214	0	214	0	0	0	0	0	0	-214	-214
AMM BWI	177	0	177	0	0	0	0	0	0	-177	-177
AMM NCR	63	0	63	0	0	0	0	0	0	-63	-63
AMM WAS	1,943	0	1,943	0	0	0	0	0	0	-1,943	-1,943
BOS FRA	0	0	0	51	0	51	51	0	51	51	51
BOS WOR	72	0	72	152	0	152	152	0	152	80	80
BOS SPG	2,838	0	2,838	5,453	0	5,453	5,453	0	5,453	2,615	2,615
BOS ENF	0	0	0	226	0	226	226	0	226	226	226
BOS WNL	0	0	0	288	0	288	288	0	288	288	288
BOS WND	0	0	0	105	0	105	105	0	105	105	105
BOS HFD	0	0	0	3,155	0	3,155	3,155	0	3,155	3,155	3,155
BOS BER	0	0	0	0	0	0	0	0	0	0	0
BOS MDN	0	0	0	1,140	0	1,140	1,140	0	1,140	1,140	1,140
BOS WFD	0	0	0	0	0	0	0	0	0	0	0
BBY FRA	12	0	12	104	0	104	104	0	104	92	92
BBY WOR	48	0	48	102	0	102	102	0	102	54	54
BBY SPG	914	0	914	1,765	0	1,765	1,765	0	1,765	851	851
BBY ENF	0	0	0	343	0	343	343	0	343	343	343
BBY WNL	0	0	0	433	0	433	433	0	433	433	433
BBY WND	0	0	0	159	0	159	159	0	159	159	159
BBY HFD	0	0	0	4,734	0	4,734	4,734	0	4,734	4,734	4,734
BBY BER	0	0	0	0	0	0	0	0	0	0	0
BBY MDN	0	0	0	1,705	0	1,705	1,705	0	1,705	1,705	1,705
BBY WFD	0	0	0	0	0	0	0	0	0	0	0
FRA SPG	241	0	241	382	0	382	382	0	382	141	141
FRA ENF	0	0	0	6	0	6	6	0	6	6	6
FRA WNL	0	0	0	7	0	7	7	0	7	7	7
FRA WND	0	0	0	7	0	7	7	0	7	7	7
FRA HFD	0	0	0	429	0	429	429	0	429	429	429
FRA BER	0	0	0	0	0	0	0	0	0	0	0
FRA MDN	0	0	0	87	0	87	87	0	87	87	87
FRA WFD	0	0	0	0	0	0	0	0	0	0	0
FRA NHV	0	0	0	3,112	0	3,112	3,112	0	3,112	3,112	3,112
FRA BRP	0	0	0	117	0	117	117	0	117	117	117
FRA STM	0	0	0	296	0	296	296	0	296	296	296
FRA NRO	0	0	0	173	0	173	173	0	173	173	173
FRA NYP	0	0	0	14,690	0	14,690	14,690	0	14,690	14,690	14,690
FRA NYG	0	0	0	0	0	0	0	0	0	0	0
FRA NWK	0	0	0	1,016	0	1,016	1,016	0	1,016	1,016	1,016
FRA EWR	0	0	0	0	0	0	0	0	0	0	0
FRA MET	0	0	0	309	0	309	309	0	309	309	309
FRA TRE	0	0	0	571	0	571	571	0	571	571	571
FRA CWH	0	0	0	258	0	258	258	0	258	258	258
FRA PHN	0	0	0	232	0	232	232	0	232	232	232
FRA PHL	0	0	0	3,311	0	3,311	3,311	0	3,311	3,311	3,311
FRA WIL	0	0	0	409	0	409	409	0	409	409	409
FRA BAL	0	0	0	263	0	263	263	0	263	263	263
FRA BWI	0	0	0	199	0	199	199	0	199	199	199
FRA NCR	0	0	0	190	0	190	190	0	190	190	190
FRA WAS	0	0	0	2,837	0	2,837	2,837	0	2,837	2,837	2,837
WOR SPG	1,058	0	1,058	1,567	0	1,567	1,567	0	1,567	509	509
WOR ENF	0	0	0	5	0	5	5	0	5	5	5
WOR WNL	0	0	0	6	0	6	6	0	6	6	6
WOR WND	0	0	0	6	0	6	6	0	6	6	6
WOR HFD	0	0	0	343	0	343	343	0	343	343	343

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Station Pair (total)	Baseline			Interim Alt C1 Base Fares			Interim Alt C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
WOR BER	0	0	0	0	0	0	0	0	0	0	0
WOR MDN	0	0	0	68	0	68	68	0	68	68	68
WOR WFD	0	0	0	0	0	0	0	0	0	0	0
WOR NHV	0	0	0	2,389	0	2,389	2,389	0	2,389	2,389	2,389
WOR BRP	0	0	0	91	0	91	91	0	91	91	91
WOR STM	0	0	0	219	0	219	219	0	219	219	219
WOR NRO	0	0	0	132	0	132	132	0	132	132	132
WOR NYP	0	0	0	10,703	0	10,703	10,703	0	10,703	10,703	10,703
WOR NYG	0	0	0	0	0	0	0	0	0	0	0
WOR NWK	0	0	0	734	0	734	734	0	734	734	734
WOR EWR	0	0	0	0	0	0	0	0	0	0	0
WOR MET	0	0	0	230	0	230	230	0	230	230	230
WOR TRE	0	0	0	409	0	409	409	0	409	409	409
WOR CWH	0	0	0	174	0	174	174	0	174	174	174
WOR PHN	0	0	0	155	0	155	155	0	155	155	155
WOR PHL	0	0	0	2,361	0	2,361	2,361	0	2,361	2,361	2,361
WOR WIL	0	0	0	291	0	291	291	0	291	291	291
WOR BAL	0	0	0	188	0	188	188	0	188	188	188
WOR BWI	0	0	0	142	0	142	142	0	142	142	142
WOR NCR	0	0	0	135	0	135	135	0	135	135	135
WOR WAS	0	0	0	2,019	0	2,019	2,019	0	2,019	2,019	2,019
SPG ENF	0	0	0	175	0	175	243	0	243	175	243
SPG WNL	108	0	108	121	0	121	168	0	168	13	59
SPG WND	96	0	96	180	0	180	249	0	249	84	153
SPG HFD	3,343	0	3,343	6,332	0	6,332	8,763	0	8,763	2,989	5,420
SPG BER	253	0	253	416	0	416	575	0	575	163	323
SPG MDN	613	0	613	1,054	0	1,054	1,458	0	1,458	441	845
SPG WFD	120	0	120	186	0	186	258	0	258	66	138
SPG NHV	18,471	0	18,471	33,654	0	33,654	46,579	0	46,579	15,184	28,108
SPG BRP	337	216	553	392	867	1,259	472	1,074	1,546	706	993
SPG STM	392	690	1,082	560	1,482	2,043	645	1,721	2,366	961	1,284
SPG NRO	265	349	613	775	447	1,222	906	527	1,432	609	819
SPG NYP	24,725	36,928	61,653	42,940	41,294	84,234	50,081	48,997	99,078	22,581	37,425
SPG NYG	0	0	0	0	65,090	65,090	0	75,320	75,320	65,090	75,320
SPG NWK	1,328	1,786	3,115	3,042	2,803	5,845	3,407	3,198	6,605	2,730	3,491
SPG EWR	167	218	385	234	388	622	251	429	680	237	295
SPG MET	405	581	986	1,150	1,085	2,235	1,286	1,240	2,526	1,249	1,540
SPG TRE	790	966	1,756	1,794	1,575	3,369	1,948	1,738	3,686	1,613	1,930
SPG CWH	0	0	0	231	0	231	252	0	252	231	252
SPG PHN	0	0	0	202	0	202	220	0	220	202	220
SPG PHL	4,824	5,734	10,558	10,456	9,488	19,944	11,381	10,451	21,832	9,386	11,274
SPG WIL	608	667	1,275	1,297	1,141	2,438	1,400	1,248	2,648	1,164	1,373
SPG BAL	393	461	854	774	770	1,544	835	832	1,667	690	813
SPG BWI	306	272	577	647	464	1,111	685	501	1,186	534	609
SPG NCR	275	266	541	599	453	1,052	633	485	1,119	511	577
SPG WAS	3,937	4,060	7,997	8,643	6,657	15,300	9,267	7,245	16,512	7,303	8,515
ENF HFD	0	0	0	149	0	149	207	0	207	149	207
ENF MDN	0	0	0	247	0	247	342	0	342	247	342
ENF WFD	0	0	0	52	0	52	72	0	72	52	72
ENF NHV	0	0	0	6,160	0	6,160	8,521	0	8,521	6,160	8,521
ENF BRP	0	0	0	23	150	173	30	195	226	173	226
ENF STM	0	0	0	24	233	257	30	289	319	257	319
ENF NRO	0	0	0	32	34	66	39	41	79	66	79
ENF NYP	0	0	0	1,521	4,140	5,661	1,755	4,884	6,639	5,661	6,639
ENF NYG	0	0	0	0	5,688	5,688	0	6,710	6,710	5,688	6,710
ENF NWK	0	0	0	69	196	266	79	229	308	266	308
ENF EWR	0	0	0	10	32	42	12	37	49	42	49
ENF MET	0	0	0	84	146	230	95	168	263	230	263
ENF TRE	0	0	0	117	294	411	128	331	459	411	459
ENF PHL	0	0	0	488	1,228	1,716	528	1,362	1,890	1,716	1,890
ENF WIL	0	0	0	68	224	292	75	249	323	292	323
ENF BAL	0	0	0	10	29	39	10	32	42	39	42
ENF BWI	0	0	0	20	59	80	22	64	86	80	86
ENF NCR	0	0	0	14	40	54	15	43	58	54	58
ENF WAS	0	0	0	364	762	1,126	384	816	1,200	1,126	1,200
WNL HFD	120	0	120	139	0	139	193	0	193	19	73
WNL MDN	216	0	216	228	0	228	315	0	315	11	98
WNL WFD	48	0	48	46	0	46	63	0	63	-2	15
WNL NHV	5,039	0	5,039	5,682	0	5,682	7,856	0	7,856	644	2,818

Forecasted 2020 Ridership By Station Pair (Connecticut Service Alternatives)

Prepared 7/27/10

Station Pair (total)	Baseline			Interim Alt C1 Base Fares			Interim Alt C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
WNL BRP	73	47	120	45	123	169	57	154	211	49	91
WNL STM	78	138	216	66	185	251	76	214	289	34	73
WNL NRO	27	33	60	45	28	73	51	31	82	13	22
WNL NYP	3,047	4,288	7,335	3,210	3,043	6,252	3,591	3,457	7,048	-1,083	-287
WNL NYG	0	0	0	0	4,768	4,768	0	5,401	5,401	4,768	5,401
WNL NWK	109	144	253	150	143	293	165	159	324	41	72
WNL EWR	14	23	36	11	26	37	12	28	40	1	4
WNL MET	72	96	168	121	113	234	133	127	260	66	92
WNL TRE	181	204	385	252	210	462	268	228	496	77	111
WNL CWH	0	0	0	33	0	33	36	0	36	33	36
WNL PHN	0	0	0	29	0	29	31	0	31	29	31
WNL PHL	779	832	1,611	1,035	872	1,907	1,103	945	2,048	296	437
WNL WIL	118	147	265	150	159	309	159	169	328	44	64
WNL BAL	17	20	36	20	21	40	20	21	42	4	6
WNL BWI	34	38	72	42	42	83	44	44	88	11	16
WNL NCR	22	26	48	29	28	57	30	29	59	8	11
WNL WAS	509	513	1,022	675	534	1,208	707	565	1,273	186	251
WND HFD	36	0	36	74	0	74	102	0	102	38	66
WND BER	12	0	12	22	0	22	30	0	30	10	18
WND MDN	313	0	313	570	0	570	789	0	789	257	476
WND WFD	914	0	914	1,565	0	1,565	2,166	0	2,166	651	1,253
WND NHV	2,080	0	2,080	4,003	0	4,003	5,541	0	5,541	1,923	3,460
WND STM	31	65	96	38	148	185	40	175	216	89	119
WND NRO	34	39	72	57	58	115	67	67	134	43	62
WND NYP	1,144	3,270	4,413	1,494	4,152	5,646	1,682	4,738	6,420	1,233	2,007
WND NYG	0	0	0	0	5,682	5,682	0	6,498	6,498	5,682	6,498
WND NWK	78	199	277	130	350	480	142	389	532	204	255
WND EWR	64	45	108	75	91	165	77	99	177	57	68
WND MET	33	51	84	53	110	164	60	124	185	79	100
WND TRE	59	170	228	95	316	411	103	340	443	182	214
WND PHL	346	508	854	580	963	1,544	611	1,065	1,676	690	822
WND WIL	49	95	144	80	186	267	86	203	288	122	144
WND BAL	21	51	72	33	98	131	36	107	142	59	70
WND BWI	16	8	24	30	17	46	30	17	47	22	23
WND NCR	15	33	48	24	66	90	25	69	94	42	46
WND WAS	351	515	866	640	981	1,621	666	1,050	1,716	755	850
HFD BER	108	0	108	181	0	181	251	0	251	73	143
HFD MDN	5,351	0	5,351	9,119	0	9,119	12,621	0	12,621	3,768	7,270
HFD WFD	2,008	0	2,008	3,181	0	3,181	4,402	0	4,402	1,173	2,394
HFD NHV	45,347	0	45,347	83,295	0	83,295	115,201	0	115,201	37,948	69,854
HFD BRP	450	272	722	394	1,236	1,630	453	1,436	1,889	909	1,168
HFD STM	1,551	2,609	4,161	2,072	5,813	7,885	2,402	6,829	9,232	3,725	5,071
HFD NRO	389	417	806	1,000	615	1,615	1,121	689	1,811	810	1,005
HFD NYP	29,331	38,767	68,099	50,832	45,922	96,754	55,597	51,084	106,680	28,655	38,582
HFD NYG	0	0	0	0	73,055	73,055	0	81,542	81,542	73,055	81,542
HFD NWK	1,994	2,575	4,570	4,483	4,286	8,769	4,896	4,737	9,633	4,200	5,064
HFD EWR	613	674	1,287	872	1,284	2,156	920	1,386	2,306	869	1,019
HFD MET	740	739	1,479	2,007	1,453	3,460	2,120	1,583	3,704	1,981	2,224
HFD TRE	1,319	1,519	2,838	2,978	2,630	5,608	3,135	2,800	5,936	2,770	3,098
HFD CWH	0	0	0	418	0	418	446	0	446	418	446
HFD PHN	0	0	0	364	0	364	386	0	386	364	386
HFD PHL	8,141	8,814	16,955	17,640	15,482	33,122	18,645	16,559	35,203	16,167	18,248
HFD WIL	1,388	1,426	2,814	2,962	2,599	5,561	3,102	2,750	5,851	2,747	3,038
HFD NRK	0	0	0	0	0	0	0	0	0	0	0
HFD ABE	26	4	30	99	0	99	103	0	103	69	73
HFD BAL	697	758	1,455	1,363	1,350	2,714	1,430	1,422	2,853	1,259	1,398
HFD BWI	425	381	806	884	696	1,580	915	728	1,642	774	837
HFD NCR	369	401	770	776	730	1,506	807	760	1,567	737	797
HFD WAS	6,251	6,399	12,650	13,458	11,195	24,653	14,054	11,781	25,834	12,002	13,184
BER MDN	216	0	216	374	0	374	518	0	518	158	301
BER WFD	84	0	84	140	0	140	194	0	194	56	110
BER NHV	10,799	0	10,799	19,784	0	19,784	27,382	0	27,382	8,985	16,583
BER BRP	15	9	24	4	45	50	5	50	55	26	31
BER STM	39	69	108	10	171	180	11	189	200	72	92
BER NRO	6	6	12	6	8	15	7	9	16	3	4
BER NYP	2,915	4,000	6,914	1,459	5,366	6,825	1,552	5,757	7,309	-89	394
BER NYG	0	0	0	0	7,805	7,805	0	8,423	8,423	7,805	8,423
BER NWK	117	148	265	75	274	350	79	288	367	85	102
BER EWR	68	65	132	80	132	212	83	141	224	79	92

Forecasted 2020 Ridership By Station Pair (Connecticut Service Alternatives)

Prepared 7/27/10

Station Pair (total)	Baseline			Interim Alt C1 Base Fares			Interim Alt C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
BER MET	98	142	241	129	265	394	137	282	419	154	179
BER TRE	143	193	337	89	373	462	92	387	479	125	142
BER PHL	958	1,123	2,080	585	2,204	2,790	609	2,301	2,910	709	830
BER WIL	212	257	469	122	521	643	127	540	668	174	199
BER ABE	21	3	24	84	0	84	87	0	87	60	63
BER BAL	152	160	313	87	319	406	90	332	421	94	109
BER BWI	69	75	144	39	155	194	40	158	198	50	54
BER NCR	92	88	180	58	181	239	60	186	246	58	66
BER WAS	1,037	1,079	2,116	666	2,109	2,776	687	2,184	2,870	659	754
MDN WFD	313	0	313	521	0	521	721	0	721	208	408
MDN NHV	27,237	0	27,237	51,761	0	51,761	71,616	0	71,616	24,524	44,379
MDN BRP	53	31	84	34	153	186	37	166	203	102	119
MDN STM	22	38	60	24	89	113	26	95	121	53	61
MDN NRO	19	17	36	43	26	70	46	28	74	34	38
MDN NYP	1,382	1,877	3,259	1,985	2,393	4,378	2,074	2,512	4,586	1,119	1,327
MDN NYG	0	0	0	0	3,683	3,683	0	3,894	3,894	3,683	3,894
MDN NWK	169	216	385	308	390	698	318	404	722	313	337
MDN EWR	65	91	156	75	186	261	78	193	272	105	115
MDN MET	41	56	96	99	110	209	102	113	215	112	119
MDN TRE	99	130	228	177	243	420	182	250	432	191	203
MDN CWH	0	0	0	33	0	33	34	0	34	33	34
MDN PHN	0	0	0	29	0	29	30	0	30	29	30
MDN PHL	561	618	1,178	973	1,173	2,146	1,001	1,212	2,213	967	1,035
MDN WIL	161	175	337	270	347	618	280	361	641	281	305
MDN BAL	138	127	265	214	247	461	217	251	468	196	203
MDN BWI	117	124	241	182	249	431	185	254	439	191	199
MDN NCR	117	99	216	199	199	398	203	205	407	182	191
MDN WAS	610	604	1,215	1,026	1,161	2,188	1,047	1,188	2,235	973	1,020
WFD NHV	14,767	0	14,767	28,035	0	28,035	38,801	0	38,801	13,268	24,034
WFD BRP	8	4	12	2	23	25	3	24	27	13	15
WFD STM	23	38	60	6	95	102	7	104	111	42	51
WFD NRO	6	6	12	7	8	15	7	9	16	3	4
WFD NYP	558	753	1,311	306	1,043	1,349	321	1,096	1,416	38	105
WFD NYG	0	0	0	0	1,503	1,503	0	1,594	1,594	1,503	1,594
WFD NWK	82	110	192	56	210	267	59	219	277	74	85
WFD EWR	48	49	96	58	100	157	59	103	162	61	66
WFD MET	16	20	36	21	39	60	22	40	62	24	26
WFD TRE	149	175	325	103	348	450	107	364	471	126	147
WFD PHL	315	250	565	225	502	726	228	516	744	161	179
WFD WIL	28	32	60	18	67	84	18	69	88	24	28
WFD BAL	46	50	96	28	102	130	28	105	133	33	37
WFD BWI	36	37	72	22	77	99	23	80	102	27	30
WFD NCR	41	43	84	27	90	117	28	93	120	33	36
WFD WAS	458	408	866	327	817	1,143	334	839	1,172	278	307
TOTAL	345,863	144,137	490,000	653,565	374,719	1,028,284	771,799	420,667	1,192,467	538,284	702,467
Northeast Regional Incremental Connections (riders that get counted a second time by Amtrak) -->										55,664	78,149
Total Reported Ridership Increment -->										593,948	780,616

Forecasted 2030 Ridership By Station Pair (Connecticut Service Alternatives)

Station Pair (total)	Baseline			Alternative C1 Base Fares			Alternative C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
SAB ESX	27	0	27	38	0	38	38	0	38	10	10
SAB WAB	341	0	341	383	0	383	383	0	383	42	42
SAB MPR	14	0	14	14	0	14	14	0	14	0	0
SAB RPH	68	0	68	59	0	59	59	0	59	-9	-9
SAB WRJ	82	0	82	65	0	65	65	0	65	-17	-17
SAB BLF	82	0	82	65	0	65	65	0	65	-17	-17
SAB BRA	586	0	586	409	0	409	409	0	409	-177	-177
SAB GFD	0	0	0	446	0	446	446	0	446	446	446
SAB NHP	0	0	0	421	0	421	421	0	421	421	421
SAB HOL	0	0	0	48	0	48	48	0	48	48	48
SAB AMM	54	0	54	0	0	0	0	0	0	-54	-54
SAB SPG	123	0	123	126	0	126	126	0	126	3	3
SAB HFD	204	0	204	248	0	248	248	0	248	44	44
SAB BER	82	0	82	100	0	100	100	0	100	18	18
SAB MDN	41	0	41	50	0	50	50	0	50	9	9
SAB NHV	163	0	163	204	0	204	204	0	204	40	40
SAB BRP	27	0	27	34	0	34	34	0	34	7	7
SAB STM	54	0	54	69	0	69	69	0	69	15	15
SAB NYP	722	0	722	957	0	957	957	0	957	235	235
SAB NWK	27	0	27	37	0	37	37	0	37	9	9
SAB TRE	41	0	41	55	0	55	55	0	55	14	14
SAB PHL	341	0	341	454	0	454	454	0	454	114	114
SAB WIL	41	0	41	55	0	55	55	0	55	14	14
SAB BAL	54	0	54	72	0	72	72	0	72	18	18
SAB BWI	82	0	82	109	0	109	109	0	109	27	27
SAB WAS	586	0	586	771	0	771	771	0	771	185	185
ESX WAB	123	0	123	130	0	130	130	0	130	8	8
ESX MPR	109	0	109	108	0	108	108	0	108	-1	-1
ESX RPH	82	0	82	70	0	70	70	0	70	-12	-12
ESX WRJ	531	0	531	410	0	410	410	0	410	-121	-121
ESX WNM	14	0	14	10	0	10	10	0	10	-3	-3
ESX CLA	27	0	27	20	0	20	20	0	20	-7	-7
ESX BLF	504	0	504	386	0	386	386	0	386	-118	-118
ESX BRA	2,043	0	2,043	1,381	0	1,381	1,381	0	1,381	-662	-662
ESX GFD	0	0	0	1,481	0	1,481	1,481	0	1,481	1,481	1,481
ESX NHP	0	0	0	1,414	0	1,414	1,414	0	1,414	1,414	1,414
ESX HOL	0	0	0	779	0	779	779	0	779	779	779
ESX AMM	913	0	913	0	0	0	0	0	0	-913	-913
ESX SPG	940	0	940	968	0	968	968	0	968	28	28
ESX WNL	95	0	95	115	0	115	115	0	115	20	20
ESX HFD	994	0	994	1,209	0	1,209	1,209	0	1,209	214	214
ESX BER	109	0	109	132	0	132	132	0	132	23	23
ESX MDN	232	0	232	283	0	283	283	0	283	52	52
ESX WFD	95	0	95	115	0	115	115	0	115	20	20
ESX NHV	1,430	0	1,430	1,770	0	1,770	1,770	0	1,770	340	340
ESX BRP	531	0	531	662	0	662	662	0	662	131	131
ESX STM	599	0	599	752	0	752	752	0	752	152	152
ESX NYP	7,506	0	7,506	9,849	0	9,849	9,849	0	9,849	2,343	2,343
ESX NWK	545	0	545	724	0	724	724	0	724	179	179
ESX TRE	409	0	409	537	0	537	537	0	537	128	128
ESX PHL	2,343	0	2,343	3,086	0	3,086	3,086	0	3,086	743	743
ESX WIL	313	0	313	411	0	411	411	0	411	98	98
ESX BAL	422	0	422	556	0	556	556	0	556	133	133
ESX BWI	341	0	341	446	0	446	446	0	446	105	105
ESX NCR	95	0	95	125	0	125	125	0	125	30	30
ESX WAS	2,520	0	2,520	3,295	0	3,295	3,295	0	3,295	775	775
WAB MPR	245	0	245	254	0	254	254	0	254	9	9
WAB RPH	27	0	27	24	0	24	24	0	24	-3	-3
WAB WRJ	926	0	926	752	0	752	752	0	752	-174	-174
WAB BLF	14	0	14	11	0	11	11	0	11	-3	-3
WAB BRA	845	0	845	563	0	563	563	0	563	-282	-282
WAB GFD	0	0	0	626	0	626	626	0	626	626	626
WAB NHP	0	0	0	616	0	616	616	0	616	616	616
WAB HOL	0	0	0	270	0	270	270	0	270	270	270
WAB AMM	313	0	313	0	0	0	0	0	0	-313	-313
WAB SPG	354	0	354	369	0	369	369	0	369	15	15
WAB WNL	41	0	41	50	0	50	50	0	50	9	9
WAB HFD	123	0	123	149	0	149	149	0	149	26	26
WAB BER	27	0	27	33	0	33	33	0	33	6	6
WAB MDN	41	0	41	50	0	50	50	0	50	9	9
WAB WFD	27	0	27	33	0	33	33	0	33	5	5
WAB NHV	245	0	245	302	0	302	302	0	302	56	56
WAB BRP	68	0	68	84	0	84	84	0	84	16	16
WAB STM	136	0	136	170	0	170	170	0	170	34	34
WAB NYP	2,261	0	2,261	2,949	0	2,949	2,949	0	2,949	688	688
WAB NWK	95	0	95	126	0	126	126	0	126	31	31
WAB TRE	95	0	95	124	0	124	124	0	124	29	29

Forecasted 2030 Ridership By Station Pair (Connecticut Service Alternatives)

Station Pair (total)	Baseline			Alternative C1 Base Fares			Alternative C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
WAB PHL	518	0	518	674	0	674	674	0	674	157	157
WAB WIL	27	0	27	35	0	35	35	0	35	8	8
WAB BAL	204	0	204	266	0	266	266	0	266	62	62
WAB BWI	191	0	191	247	0	247	247	0	247	57	57
WAB NCR	14	0	14	18	0	18	18	0	18	4	4
WAB WAS	954	0	954	1,238	0	1,238	1,238	0	1,238	284	284
MPR RPH	14	0	14	12	0	12	12	0	12	-1	-1
MPR WRJ	68	0	68	56	0	56	56	0	56	-12	-12
MPR WNM	14	0	14	11	0	11	11	0	11	-3	-3
MPR CLA	68	0	68	53	0	53	53	0	53	-15	-15
MPR BLF	82	0	82	65	0	65	65	0	65	-17	-17
MPR BRA	341	0	341	227	0	227	227	0	227	-113	-113
MPR GFD	0	0	0	253	0	253	253	0	253	253	253
MPR NHP	0	0	0	260	0	260	260	0	260	260	260
MPR HOL	0	0	0	278	0	278	278	0	278	278	278
MPR AMM	313	0	313	0	0	0	0	0	0	-313	-313
MPR SPG	245	0	245	257	0	257	257	0	257	12	12
MPR WNL	41	0	41	50	0	50	50	0	50	9	9
MPR HFD	272	0	272	331	0	331	331	0	331	59	59
MPR BER	41	0	41	49	0	49	49	0	49	8	8
MPR MDN	14	0	14	17	0	17	17	0	17	3	3
MPR WFD	54	0	54	65	0	65	65	0	65	11	11
MPR NHV	436	0	436	535	0	535	535	0	535	99	99
MPR BRP	41	0	41	50	0	50	50	0	50	10	10
MPR STM	191	0	191	237	0	237	237	0	237	46	46
MPR NYP	3,569	0	3,569	4,640	0	4,640	4,640	0	4,640	1,071	1,071
MPR NWK	163	0	163	215	0	215	215	0	215	52	52
MPR TRE	82	0	82	106	0	106	106	0	106	24	24
MPR PHL	994	0	994	1,288	0	1,288	1,288	0	1,288	294	294
MPR WIL	177	0	177	228	0	228	228	0	228	51	51
MPR BAL	259	0	259	335	0	335	335	0	335	76	76
MPR BWI	191	0	191	246	0	246	246	0	246	55	55
MPR NCR	123	0	123	159	0	159	159	0	159	36	36
MPR WAS	954	0	954	1,232	0	1,232	1,232	0	1,232	278	278
RPH WRJ	95	0	95	83	0	83	83	0	83	-12	-12
RPH BLF	68	0	68	55	0	55	55	0	55	-14	-14
RPH BRA	136	0	136	90	0	90	90	0	90	-46	-46
RPH GFD	0	0	0	101	0	101	101	0	101	101	101
RPH SPG	68	0	68	41	0	41	41	0	41	-27	-27
RPH HFD	68	0	68	83	0	83	83	0	83	15	15
RPH MDN	14	0	14	16	0	16	16	0	16	3	3
RPH WFD	27	0	27	33	0	33	33	0	33	6	6
RPH NHV	82	0	82	98	0	98	98	0	98	16	16
RPH BRP	14	0	14	17	0	17	17	0	17	3	3
RPH STM	14	0	14	17	0	17	17	0	17	3	3
RPH NYP	586	0	586	751	0	751	751	0	751	165	165
RPH NWK	27	0	27	35	0	35	35	0	35	8	8
RPH TRE	27	0	27	35	0	35	35	0	35	8	8
RPH PHL	163	0	163	208	0	208	208	0	208	44	44
RPH WIL	82	0	82	104	0	104	104	0	104	22	22
RPH BWI	41	0	41	52	0	52	52	0	52	11	11
RPH WAS	232	0	232	294	0	294	294	0	294	62	62
WRJ WNM	54	0	54	48	0	48	48	0	48	-7	-7
WRJ BLF	14	0	14	14	0	14	14	0	14	1	1
WRJ BRA	218	0	218	252	0	252	252	0	252	34	34
WRJ GFD	0	0	0	307	0	307	307	0	307	307	307
WRJ NHP	0	0	0	324	0	324	324	0	324	324	324
WRJ HOL	0	0	0	780	0	780	780	0	780	780	780
WRJ AMM	450	0	450	0	0	0	0	0	0	-450	-450
WRJ SPG	341	0	341	418	0	418	418	0	418	77	77
WRJ HFD	572	0	572	1,169	0	1,169	1,169	0	1,169	597	597
WRJ BER	95	0	95	187	0	187	187	0	187	92	92
WRJ MDN	150	0	150	281	0	281	281	0	281	132	132
WRJ WFD	27	0	27	50	0	50	50	0	50	23	23
WRJ NHV	817	0	817	1,421	0	1,421	1,421	0	1,421	603	603
WRJ BRP	191	0	191	215	44	259	215	44	259	68	68
WRJ STM	450	0	450	515	95	609	515	95	609	160	160
WRJ NYP	8,133	0	8,133	9,780	1,464	11,244	9,780	1,464	11,244	3,111	3,111
WRJ NWK	504	0	504	612	87	699	612	87	699	195	195
WRJ TRE	354	0	354	426	61	486	426	61	486	132	132
WRJ PHL	1,607	0	1,607	1,888	308	2,196	1,888	308	2,196	589	589
WRJ WIL	381	0	381	447	77	524	447	77	524	143	143
WRJ BAL	272	0	272	313	69	382	313	69	382	109	109
WRJ BWI	109	0	109	126	29	155	126	29	155	46	46
WRJ NCR	95	0	95	110	25	135	110	25	135	40	40
WRJ WAS	2,166	0	2,166	2,474	655	3,129	2,474	655	3,129	963	963
WNM BRA	14	0	14	15	0	15	15	0	15	1	1

Forecasted 2030 Ridership By Station Pair (Connecticut Service Alternatives)

Station Pair (total)	Baseline			Alternative C1 Base Fares			Alternative C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
WNM GFD	0	0	0	19	0	19	19	0	19	19	19
WNM SPG	14	0	14	30	0	30	30	0	30	17	17
WNM NHV	27	0	27	48	0	48	48	0	48	21	21
WNM BRP	27	0	27	30	7	37	30	7	37	10	10
WNM STM	41	0	41	46	9	55	46	9	55	14	14
WNM NYP	490	0	490	583	95	678	583	95	678	188	188
WNM NWK	109	0	109	132	18	150	132	18	150	41	41
WNM TRE	54	0	54	64	11	74	64	11	74	20	20
WNM PHL	82	0	82	95	15	110	95	15	110	29	29
WNM WIL	27	0	27	31	6	37	31	6	37	10	10
WNM BWI	14	0	14	15	4	19	15	4	19	6	6
WNM WAS	82	0	82	92	26	118	92	26	118	36	36
CLA BLF	82	0	82	72	0	72	72	0	72	-10	-10
CLA BRA	27	0	27	29	0	29	29	0	29	2	2
CLA GFD	0	0	0	37	0	37	37	0	37	37	37
CLA SPG	82	0	82	188	0	188	188	0	188	107	107
CLA WNL	14	0	14	31	0	31	31	0	31	18	18
CLA HFD	54	0	54	117	0	117	117	0	117	62	62
CLA NHV	109	0	109	197	0	197	197	0	197	88	88
CLA BRP	41	0	41	44	11	55	44	11	55	14	14
CLA STM	68	0	68	75	16	91	75	16	91	22	22
CLA NYP	1,022	0	1,022	1,204	206	1,409	1,204	206	1,409	388	388
CLA NWK	27	0	27	32	5	38	32	5	38	11	11
CLA TRE	14	0	14	16	3	18	16	3	18	5	5
CLA PHL	68	0	68	78	15	93	78	15	93	24	24
CLA WIL	68	0	68	77	16	92	77	16	92	24	24
CLA BAL	27	0	27	30	8	38	30	8	38	11	11
CLA BWI	54	0	54	60	16	77	60	16	77	22	22
CLA WAS	95	0	95	106	33	138	106	33	138	43	43
BLF BRA	41	0	41	50	0	50	50	0	50	9	9
BLF GFD	0	0	0	69	0	69	69	0	69	69	69
BLF NHP	0	0	0	94	0	94	94	0	94	94	94
BLF HOL	0	0	0	89	0	89	89	0	89	89	89
BLF AMM	41	0	41	0	0	0	0	0	0	-41	-41
BLF SPG	136	0	136	412	0	412	412	0	412	276	276
BLF HFD	95	0	95	256	0	256	256	0	256	161	161
BLF BER	14	0	14	35	0	35	35	0	35	21	21
BLF MDN	68	0	68	167	0	167	167	0	167	99	99
BLF WFD	27	0	27	64	0	64	64	0	64	36	36
BLF NHV	259	0	259	573	0	573	573	0	573	314	314
BLF BRP	286	0	286	276	146	422	276	146	422	136	136
BLF STM	218	0	218	219	100	319	219	100	319	101	101
BLF NYP	2,479	0	2,479	2,672	1,055	3,726	2,672	1,055	3,726	1,247	1,247
BLF NWK	136	0	136	149	54	204	149	54	204	68	68
BLF TRE	95	0	95	103	37	141	103	37	141	45	45
BLF PHL	518	0	518	549	203	752	549	203	752	235	235
BLF WIL	123	0	123	131	45	177	131	45	177	54	54
BLF BAL	204	0	204	213	89	302	213	89	302	98	98
BLF BWI	82	0	82	87	33	120	87	33	120	38	38
BLF NCR	27	0	27	28	13	41	28	13	41	14	14
BLF WAS	845	0	845	881	415	1,296	881	415	1,296	451	451
BRA GFD	0	0	0	143	0	143	143	0	143	143	143
BRA NHP	0	0	0	179	0	179	179	0	179	179	179
BRA HOL	0	0	0	204	0	204	204	0	204	204	204
BRA AMM	82	0	82	0	0	0	0	0	0	-82	-82
BRA SPG	259	0	259	489	0	489	489	0	489	230	230
BRA WNL	41	0	41	129	0	129	129	0	129	88	88
BRA HFD	177	0	177	502	0	502	502	0	502	325	325
BRA BER	27	0	27	71	0	71	71	0	71	44	44
BRA MDN	82	0	82	114	0	114	114	0	114	33	33
BRA NHV	681	0	681	844	0	844	844	0	844	162	162
BRA BRP	191	0	191	157	108	264	157	108	264	74	74
BRA STM	341	0	341	278	177	455	278	177	455	114	114
BRA NYP	7,029	0	7,029	6,275	3,387	9,663	6,275	3,387	9,663	2,633	2,633
BRA NWK	545	0	545	495	248	742	495	248	742	197	197
BRA TRE	354	0	354	309	155	464	309	155	464	110	110
BRA PHL	1,008	0	1,008	880	431	1,311	880	431	1,311	303	303
BRA WIL	245	0	245	211	103	314	211	103	314	68	68
BRA BAL	341	0	341	294	151	444	294	151	444	104	104
BRA BWI	82	0	82	71	34	105	71	34	105	23	23
BRA NCR	95	0	95	82	47	129	82	47	129	34	34
BRA WAS	1,785	0	1,785	1,555	895	2,450	1,555	895	2,450	666	666
GFD NHP	0	0	0	467	0	467	467	0	467	467	467
GFD HOL	0	0	0	477	0	477	477	0	477	477	477
GFD SPG	0	0	0	1,110	0	1,110	1,110	0	1,110	1,110	1,110
GFD WNL	0	0	0	265	0	265	265	0	265	265	265
GFD HFD	0	0	0	950	0	950	950	0	950	950	950

Forecasted 2030 Ridership By Station Pair (Connecticut Service Alternatives)

Station Pair (total)	Baseline			Alternative C1 Base Fares			Alternative C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
GFD BER	0	0	0	130	0	130	130	0	130	130	130
GFD MDN	0	0	0	205	0	205	205	0	205	205	205
GFD NHV	0	0	0	2,611	0	2,611	2,611	0	2,611	2,611	2,611
GFD BRP	0	0	0	129	268	396	129	268	396	396	396
GFD STM	0	0	0	229	446	675	229	446	675	675	675
GFD NYP	0	0	0	5,309	8,915	14,224	5,309	8,915	14,224	14,224	14,224
GFD NWK	0	0	0	419	676	1,095	419	676	1,095	1,095	1,095
GFD TRE	0	0	0	260	438	698	260	438	698	698	698
GFD PHL	0	0	0	743	1,262	2,005	743	1,262	2,005	2,005	2,005
GFD WIL	0	0	0	178	308	486	178	308	486	486	486
GFD BAL	0	0	0	249	457	707	249	457	707	707	707
GFD BWI	0	0	0	61	103	164	61	103	164	164	164
GFD NCR	0	0	0	70	139	209	70	139	209	209	209
GFD WAS	0	0	0	1,316	2,609	3,926	1,316	2,609	3,926	3,926	3,926
NHP HOL	0	0	0	379	0	379	379	0	379	379	379
NHP SPG	0	0	0	1,954	0	1,954	1,954	0	1,954	1,954	1,954
NHP WNL	0	0	0	247	0	247	247	0	247	247	247
NHP HFD	0	0	0	948	0	948	948	0	948	948	948
NHP MDN	0	0	0	351	0	351	351	0	351	351	351
NHP NHV	0	0	0	2,751	0	2,751	2,751	0	2,751	2,751	2,751
NHP BRP	0	0	0	114	272	386	114	272	386	386	386
NHP STM	0	0	0	200	440	641	200	440	641	641	641
NHP NYP	0	0	0	4,784	9,027	13,811	4,784	9,027	13,811	13,811	13,811
NHP NWK	0	0	0	383	703	1,086	383	703	1,086	1,086	1,086
NHP TRE	0	0	0	241	445	686	241	445	686	686	686
NHP PHL	0	0	0	723	1,344	2,068	723	1,344	2,068	2,068	2,068
NHP WIL	0	0	0	177	344	521	177	344	521	521	521
NHP BAL	0	0	0	230	467	698	230	467	698	698	698
NHP BWI	0	0	0	58	121	179	58	121	179	179	179
NHP NCR	0	0	0	64	136	200	64	136	200	200	200
NHP WAS	0	0	0	1,333	2,827	4,160	1,333	2,827	4,160	4,160	4,160
HOL SPG	0	0	0	2,192	0	2,192	2,192	0	2,192	2,192	2,192
HOL WNL	0	0	0	198	0	198	198	0	198	198	198
HOL HFD	0	0	0	416	0	416	416	0	416	416	416
HOL MDN	0	0	0	200	0	200	200	0	200	200	200
HOL NHV	0	0	0	2,170	0	2,170	2,170	0	2,170	2,170	2,170
HOL BRP	0	0	0	136	360	497	136	360	497	497	497
HOL STM	0	0	0	282	692	975	282	692	975	975	975
HOL NYP	0	0	0	3,983	8,256	12,239	3,983	8,256	12,239	12,239	12,239
HOL NWK	0	0	0	384	762	1,146	384	762	1,146	1,146	1,146
HOL TRE	0	0	0	243	482	726	243	482	726	726	726
HOL PHL	0	0	0	1,141	2,264	3,405	1,141	2,264	3,405	3,405	3,405
HOL WIL	0	0	0	314	651	965	314	651	965	965	965
HOL BAL	0	0	0	145	311	455	145	311	455	455	455
HOL BWI	0	0	0	107	238	345	107	238	345	345	345
HOL NCR	0	0	0	39	88	127	39	88	127	127	127
HOL WAS	0	0	0	1,072	2,391	3,463	1,072	2,391	3,463	3,463	3,463
AMM SPG	218	0	218	0	0	0	0	0	0	-218	-218
AMM WNL	27	0	27	0	0	0	0	0	0	-27	-27
AMM HFD	68	0	68	0	0	0	0	0	0	-68	-68
AMM MDN	41	0	41	0	0	0	0	0	0	-41	-41
AMM NHV	531	0	531	0	0	0	0	0	0	-531	-531
AMM BRP	232	0	232	0	0	0	0	0	0	-232	-232
AMM STM	490	0	490	0	0	0	0	0	0	-490	-490
AMM NYP	6,062	0	6,062	0	0	0	0	0	0	-6,062	-6,062
AMM NWK	572	0	572	0	0	0	0	0	0	-572	-572
AMM TRE	381	0	381	0	0	0	0	0	0	-381	-381
AMM PHL	2,248	0	2,248	0	0	0	0	0	0	-2,248	-2,248
AMM WIL	559	0	559	0	0	0	0	0	0	-559	-559
AMM BAL	232	0	232	0	0	0	0	0	0	-232	-232
AMM BWI	191	0	191	0	0	0	0	0	0	-191	-191
AMM NCR	68	0	68	0	0	0	0	0	0	-68	-68
AMM WAS	2,098	0	2,098	0	0	0	0	0	0	-2,098	-2,098
BOS FRA	0	0	0	290	0	290	290	0	290	290	290
BOS WOR	81	0	81	460	0	460	460	0	460	379	379
BOS SPG	3,188	0	3,188	15,048	0	15,048	15,048	0	15,048	11,859	11,859
BOS ENF	0	0	0	254	0	254	254	0	254	254	254
BOS WNL	0	0	0	1,786	0	1,786	1,786	0	1,786	1,786	1,786
BOS WND	0	0	0	117	0	117	117	0	117	117	117
BOS HFD	0	0	0	19,158	0	19,158	19,158	0	19,158	19,158	19,158
BOS BER	0	0	0	329	0	329	329	0	329	329	329
BOS MDN	0	0	0	6,701	0	6,701	6,701	0	6,701	6,701	6,701
BOS WFD	0	0	0	266	0	266	266	0	266	266	266
BBY FRA	14	0	14	528	0	528	528	0	528	515	515
BBY WOR	54	0	54	308	0	308	308	0	308	254	254
BBY SPG	1,027	0	1,027	4,860	0	4,860	4,860	0	4,860	3,833	3,833
BBY ENF	0	0	0	386	0	386	386	0	386	386	386

Forecasted 2030 Ridership By Station Pair (Connecticut Service Alternatives)

Station Pair (total)	Baseline			Alternative C1 Base Fares			Alternative C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
BBY WNL	0	0	0	2,701	0	2,701	2,701	0	2,701	2,701	2,701
BBY WND	0	0	0	178	0	178	178	0	178	178	178
BBY HFD	0	0	0	28,893	0	28,893	28,893	0	28,893	28,893	28,893
BBY BER	0	0	0	499	0	499	499	0	499	499	499
BBY MDN	0	0	0	10,067	0	10,067	10,067	0	10,067	10,067	10,067
BBY WFD	0	0	0	403	0	403	403	0	403	403	403
FRA SPG	270	0	270	1,034	0	1,034	1,034	0	1,034	763	763
FRA ENF	0	0	0	7	0	7	7	0	7	7	7
FRA WNL	0	0	0	46	0	46	46	0	46	46	46
FRA WND	0	0	0	8	0	8	8	0	8	8	8
FRA HFD	0	0	0	2,611	0	2,611	2,611	0	2,611	2,611	2,611
FRA BER	0	0	0	23	0	23	23	0	23	23	23
FRA MDN	0	0	0	511	0	511	511	0	511	511	511
FRA WFD	0	0	0	10	0	10	10	0	10	10	10
FRA NHV	0	0	0	17,960	0	17,960	17,960	0	17,960	17,960	17,960
FRA BRP	0	0	0	683	144	827	683	144	827	827	827
FRA STM	0	0	0	1,363	206	1,569	1,363	206	1,569	1,569	1,569
FRA NRO	0	0	0	1,088	51	1,139	1,088	51	1,139	1,139	1,139
FRA NYP	0	0	0	74,493	5,890	80,383	74,493	5,890	80,383	80,383	80,383
FRA NYG	0	0	0	0	5,219	5,219	0	5,219	5,219	5,219	5,219
FRA NWK	0	0	0	5,762	209	5,970	5,762	209	5,970	5,970	5,970
FRA EWR	0	0	0	601	0	601	601	0	601	601	601
FRA MET	0	0	0	2,426	82	2,508	2,426	82	2,508	2,508	2,508
FRA TRE	0	0	0	3,442	111	3,553	3,442	111	3,553	3,553	3,553
FRA CWH	0	0	0	290	0	290	290	0	290	290	290
FRA PHN	0	0	0	260	0	260	260	0	260	260	260
FRA PHL	0	0	0	20,641	659	21,300	20,641	659	21,300	21,300	21,300
FRA WIL	0	0	0	2,568	77	2,644	2,568	77	2,644	2,644	2,644
FRA BAL	0	0	0	1,662	42	1,704	1,662	42	1,704	1,704	1,704
FRA BWI	0	0	0	1,255	25	1,280	1,255	25	1,280	1,280	1,280
FRA NCR	0	0	0	1,193	24	1,217	1,193	24	1,217	1,217	1,217
FRA WAS	0	0	0	17,619	344	17,963	17,619	344	17,963	17,963	17,963
WOR SPG	1,189	0	1,189	4,219	0	4,219	4,219	0	4,219	3,030	3,030
WOR ENF	0	0	0	6	0	6	6	0	6	6	6
WOR WNL	0	0	0	38	0	38	38	0	38	38	38
WOR WND	0	0	0	7	0	7	7	0	7	7	7
WOR HFD	0	0	0	2,128	0	2,128	2,128	0	2,128	2,128	2,128
WOR BER	0	0	0	20	0	20	20	0	20	20	20
WOR MDN	0	0	0	406	0	406	406	0	406	406	406
WOR WFD	0	0	0	9	0	9	9	0	9	9	9
WOR NHV	0	0	0	14,016	0	14,016	14,016	0	14,016	14,016	14,016
WOR BRP	0	0	0	529	105	634	529	105	634	634	634
WOR STM	0	0	0	1,020	156	1,176	1,020	156	1,176	1,176	1,176
WOR NRO	0	0	0	818	34	852	818	34	852	852	852
WOR NYP	0	0	0	54,729	4,374	59,102	54,729	4,374	59,102	59,102	59,102
WOR NYG	0	0	0	0	3,831	3,831	0	3,831	3,831	3,831	3,831
WOR NWK	0	0	0	4,210	135	4,345	4,210	135	4,345	4,345	4,345
WOR EWR	0	0	0	421	0	421	421	0	421	421	421
WOR MET	0	0	0	1,780	53	1,834	1,780	53	1,834	1,834	1,834
WOR TRE	0	0	0	2,493	71	2,564	2,493	71	2,564	2,564	2,564
WOR CWH	0	0	0	195	0	195	195	0	195	195	195
WOR PHN	0	0	0	174	0	174	174	0	174	174	174
WOR PHL	0	0	0	14,865	418	15,283	14,865	418	15,283	15,283	15,283
WOR WIL	0	0	0	1,842	48	1,891	1,842	48	1,891	1,891	1,891
WOR BAL	0	0	0	1,181	26	1,207	1,181	26	1,207	1,207	1,207
WOR BWI	0	0	0	890	16	906	890	16	906	906	906
WOR NCR	0	0	0	845	15	860	845	15	860	860	860
WOR WAS	0	0	0	12,453	215	12,668	12,453	215	12,668	12,668	12,668
SPG ENF	0	0	0	196	0	196	272	0	272	196	272
SPG WNL	122	0	122	138	0	138	191	0	191	17	70
SPG WND	108	0	108	201	0	201	279	0	279	93	171
SPG HFD	3,756	0	3,756	7,274	0	7,274	10,068	0	10,068	3,519	6,312
SPG BER	284	0	284	469	0	469	650	0	650	186	366
SPG MDN	689	0	689	1,221	0	1,221	1,689	0	1,689	532	1,000
SPG WFD	135	0	135	210	0	210	291	0	291	75	156
SPG NHV	20,752	0	20,752	39,179	0	39,179	54,225	0	54,225	18,428	33,474
SPG BRP	378	243	621	464	1,027	1,492	558	1,273	1,831	870	1,210
SPG STM	441	775	1,216	706	1,740	2,446	813	2,019	2,832	1,230	1,616
SPG NRO	297	392	689	1,016	518	1,534	1,188	610	1,798	845	1,109
SPG NYP	27,778	41,489	69,267	60,224	48,858	109,082	70,271	57,972	128,243	39,815	58,976
SPG NYG	0	0	0	0	76,402	76,402	0	88,411	88,411	76,402	88,411
SPG NWK	1,492	2,007	3,499	4,308	3,164	7,471	4,828	3,610	8,438	3,972	4,939
SPG EWR	188	245	432	547	444	990	588	491	1,079	558	646
SPG MET	455	653	1,108	1,770	1,223	2,993	1,981	1,397	3,379	1,885	2,271
SPG TRE	887	1,085	1,972	2,525	1,773	4,298	2,743	1,956	4,700	2,325	2,727
SPG CWH	0	0	0	259	0	259	283	0	283	259	283
SPG PHN	0	0	0	227	0	227	248	0	248	227	248

Forecasted 2030 Ridership By Station Pair (Connecticut Service Alternatives)

Station Pair (total)	Baseline			Alternative C1 Base Fares			Alternative C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
SPG PHL	5,420	6,442	11,862	14,727	10,633	25,360	16,035	11,712	27,747	13,498	15,885
SPG WIL	683	749	1,432	1,827	1,277	3,104	1,973	1,396	3,369	1,672	1,937
SPG BAL	441	518	959	1,094	859	1,953	1,179	929	2,108	994	1,149
SPG BWI	343	305	648	907	517	1,424	960	558	1,518	775	870
SPG NCR	309	299	608	841	503	1,343	889	539	1,428	735	820
SPG WAS	4,423	4,561	8,984	12,185	7,379	19,564	13,069	8,031	21,100	10,580	12,116
ENF HFD	0	0	0	167	0	167	231	0	231	167	231
ENF MDN	0	0	0	277	0	277	383	0	383	277	383
ENF WFD	0	0	0	58	0	58	81	0	81	58	81
ENF NHV	0	0	0	6,897	0	6,897	9,541	0	9,541	6,897	9,541
ENF BRP	0	0	0	26	165	191	34	215	250	191	250
ENF STM	0	0	0	27	257	284	34	319	352	284	352
ENF NRO	0	0	0	38	33	70	46	39	85	70	85
ENF NYP	0	0	0	1,712	4,615	6,328	1,975	5,444	7,420	6,328	7,420
ENF NYG	0	0	0	0	6,371	6,371	0	7,516	7,516	6,371	7,516
ENF NWK	0	0	0	78	217	295	89	253	342	295	342
ENF EWR	0	0	0	11	36	47	13	42	55	47	55
ENF MET	0	0	0	94	161	255	106	185	291	255	291
ENF TRE	0	0	0	132	325	456	144	366	510	456	510
ENF PHL	0	0	0	547	1,359	1,906	592	1,507	2,099	1,906	2,099
ENF WIL	0	0	0	76	248	324	84	275	359	324	359
ENF BAL	0	0	0	11	33	43	12	35	47	43	47
ENF BWI	0	0	0	23	66	89	25	71	96	89	96
ENF NCR	0	0	0	16	44	60	17	47	65	60	65
ENF WAS	0	0	0	409	847	1,256	431	907	1,338	1,256	1,338
WNL HFD	135	0	135	159	0	159	220	0	220	24	85
WNL MDN	243	0	243	262	0	262	363	0	363	19	120
WNL WFD	54	0	54	52	0	52	71	0	71	-2	17
WNL NHV	5,661	0	5,661	6,595	0	6,595	9,116	0	9,116	934	3,455
WNL BRP	82	53	135	53	146	199	66	182	249	64	114
WNL STM	88	155	243	82	217	298	94	250	344	55	101
WNL NRO	31	37	68	59	32	92	66	36	102	24	35
WNL NYP	3,424	4,817	8,241	4,504	3,586	8,090	5,042	4,075	9,116	-151	875
WNL NYG	0	0	0	0	5,574	5,574	0	6,314	6,314	5,574	6,314
WNL NWK	122	161	284	214	160	374	235	179	414	90	130
WNL EWR	15	25	41	26	29	55	29	32	61	15	20
WNL MET	81	108	189	187	127	314	206	142	348	125	159
WNL TRE	204	229	432	355	235	591	379	255	634	158	202
WNL CWH	0	0	0	38	0	38	40	0	40	38	40
WNL PHN	0	0	0	33	0	33	35	0	35	33	35
WNL PHL	875	935	1,810	1,463	972	2,435	1,560	1,053	2,613	625	803
WNL WIL	132	165	297	213	177	390	226	188	414	93	117
WNL BAL	19	22	41	28	23	51	29	24	53	10	12
WNL BWI	38	43	81	59	46	105	62	48	111	24	30
WNL NCR	25	29	54	41	31	71	42	32	74	17	20
WNL WAS	572	576	1,148	956	588	1,544	1,002	623	1,625	395	477
WND HFD	41	0	41	82	0	82	114	0	114	42	74
WND BER	14	0	14	25	0	25	34	0	34	11	20
WND MDN	351	0	351	638	0	638	883	0	883	287	532
WND WFD	1,027	0	1,027	1,752	0	1,752	2,425	0	2,425	725	1,398
WND NHV	2,337	0	2,337	4,483	0	4,483	6,204	0	6,204	2,145	3,867
WND STM	35	73	108	43	163	205	46	193	239	97	131
WND NRO	38	43	81	68	55	123	79	65	144	42	63
WND NYP	1,285	3,673	4,958	1,682	4,629	6,311	1,894	5,282	7,177	1,353	2,218
WND NYG	0	0	0	0	6,350	6,350	0	7,262	7,262	6,350	7,262
WND NWK	88	223	311	147	387	533	160	430	590	223	280
WND EWR	71	50	122	84	102	186	87	111	198	64	77
WND MET	37	58	95	60	122	181	67	137	204	87	110
WND TRE	66	191	257	107	349	456	115	376	491	199	234
WND PHL	388	571	959	652	1,066	1,717	686	1,178	1,864	758	905
WND WIL	55	107	162	90	206	297	96	225	321	135	158
WND BAL	23	58	81	37	109	146	40	118	159	65	78
WND BWI	18	9	27	33	18	52	34	19	53	25	26
WND NCR	17	38	54	27	73	101	29	77	105	47	51
WND WAS	394	578	973	719	1,091	1,809	748	1,167	1,915	837	942
HFD BER	122	0	122	204	0	204	283	0	283	83	161
HFD MDN	6,012	0	6,012	10,509	0	10,509	14,545	0	14,545	4,497	8,533
HFD WFD	2,256	0	2,256	3,584	0	3,584	4,960	0	4,960	1,328	2,704
HFD NHV	50,947	0	50,947	96,633	0	96,633	133,637	0	133,637	45,686	82,690
HFD BRP	505	305	811	466	1,465	1,931	536	1,702	2,239	1,121	1,428
HFD STM	1,743	2,932	4,675	2,598	6,816	9,415	3,009	8,008	11,017	4,740	6,343
HFD NRO	437	468	905	1,294	713	2,007	1,450	799	2,249	1,101	1,344
HFD NYP	32,954	43,555	76,508	71,341	54,201	125,542	78,066	60,293	138,359	49,033	61,850
HFD NYG	0	0	0	0	85,291	85,291	0	95,200	95,200	85,291	95,200
HFD NWK	2,240	2,893	5,134	6,410	4,811	11,221	7,002	5,318	12,320	6,087	7,186
HFD EWR	689	757	1,446	1,917	1,461	3,379	2,025	1,578	3,603	1,933	2,158
HFD MET	831	830	1,662	3,109	1,623	4,732	3,287	1,769	5,056	3,070	3,394

Forecasted 2030 Ridership By Station Pair (Connecticut Service Alternatives)

Station Pair (total)	Baseline			Alternative C1 Base Fares			Alternative C1 Proposed Fares			Total Increments	
	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	Direct	Connect via NHV	Total	C1 vs. Base	C1 Low vs. Base
HFD TRE	1,482	1,706	3,188	4,233	2,943	7,176	4,458	3,134	7,592	3,988	4,404
HFD CWH	0	0	0	470	0	470	501	0	501	470	501
HFD PHN	0	0	0	409	0	409	434	0	434	409	434
HFD PHL	9,147	9,903	19,049	25,093	17,266	42,360	26,532	18,467	44,999	23,310	25,949
HFD WIL	1,559	1,602	3,161	4,218	2,895	7,112	4,418	3,062	7,480	3,951	4,319
HFD NRK	0	0	0	93	0	93	99	0	99	93	99
HFD ABE	29	5	34	168	23	191	175	24	199	157	165
HFD BAL	783	852	1,635	1,949	1,499	3,448	2,045	1,579	3,624	1,813	1,989
HFD BWI	478	428	905	1,252	771	2,023	1,296	806	2,102	1,118	1,197
HFD NCR	414	451	865	1,105	807	1,912	1,149	839	1,988	1,047	1,124
HFD WAS	7,023	7,190	14,213	19,183	12,340	31,523	20,036	12,986	33,022	17,310	18,809
BER MDN	243	0	243	420	0	420	581	0	581	177	338
BER WFD	95	0	95	158	0	158	218	0	218	63	123
BER NHV	12,132	0	12,132	22,245	0	22,245	30,788	0	30,788	10,113	18,656
BER BRP	17	10	27	5	50	55	5	55	60	28	33
BER STM	44	77	122	11	188	199	12	209	221	78	100
BER NRO	7	7	14	7	8	15	8	9	17	2	3
BER NYP	3,275	4,494	7,768	1,655	6,130	7,785	1,761	6,576	8,337	17	568
BER NYG	0	0	0	0	8,691	8,691	0	9,379	9,379	8,691	9,379
BER NWK	131	166	297	85	303	388	89	318	407	91	109
BER EWR	76	73	149	90	148	238	94	159	252	89	104
BER MET	111	160	270	144	292	436	153	310	463	165	193
BER TRE	161	217	378	100	412	512	104	427	530	133	152
BER PHL	1,076	1,261	2,337	659	2,433	3,092	685	2,540	3,225	754	888
BER WIL	239	288	527	138	576	713	143	597	740	187	213
BER ABE	23	4	27	94	0	94	98	0	98	67	71
BER BAL	171	180	351	98	354	452	101	368	469	101	118
BER BWI	78	85	162	44	172	216	45	176	221	54	58
BER NCR	104	99	203	65	200	266	67	207	274	63	72
BER WAS	1,165	1,212	2,378	750	2,342	3,092	773	2,424	3,197	714	819
MDN WFD	351	0	351	586	0	586	810	0	810	234	459
MDN NHV	30,601	0	30,601	59,298	0	59,298	82,040	0	82,040	28,697	51,439
MDN BRP	60	35	95	39	179	218	42	195	237	123	143
MDN STM	25	43	68	30	103	133	32	111	142	65	75
MDN NRO	21	20	41	55	30	85	59	32	91	45	50
MDN NYP	1,552	2,109	3,661	2,876	2,805	5,682	3,006	2,945	5,951	2,020	2,290
MDN NYG	0	0	0	0	4,249	4,249	0	4,493	4,493	4,249	4,493
MDN NWK	190	242	432	460	435	895	475	450	925	462	493
MDN EWR	73	103	176	177	208	385	184	216	400	209	224
MDN MET	46	62	108	156	122	277	161	126	287	169	178
MDN TRE	111	146	257	264	270	534	272	278	550	278	293
MDN CWH	0	0	0	37	0	37	39	0	39	37	39
MDN PHN	0	0	0	32	0	32	33	0	33	32	33
MDN PHL	630	694	1,324	1,455	1,301	2,755	1,497	1,344	2,841	1,431	1,517
MDN WIL	181	197	378	408	384	792	423	400	822	414	444
MDN BAL	155	142	297	322	273	595	327	277	604	298	307
MDN BWI	131	139	270	276	274	550	281	280	560	280	290
MDN NCR	132	111	243	297	219	516	303	225	528	273	285
MDN WAS	686	679	1,365	1,545	1,273	2,819	1,576	1,303	2,879	1,454	1,515
WFD NHV	16,591	0	16,591	31,489	0	31,489	43,581	0	43,581	14,898	26,991
WFD BRP	9	5	14	3	25	28	3	27	29	14	16
WFD STM	25	42	68	7	105	112	8	114	122	44	55
WFD NRO	7	6	14	8	8	16	9	9	17	3	4
WFD NYP	627	846	1,473	348	1,180	1,528	364	1,240	1,603	55	131
WFD NYG	0	0	0	0	1,668	1,668	0	1,769	1,769	1,668	1,769
WFD NWK	92	124	216	64	232	295	66	241	307	79	91
WFD EWR	54	54	108	65	112	177	66	116	182	69	74
WFD MET	18	23	41	24	42	66	25	44	68	26	28
WFD TRE	168	197	365	116	383	499	121	401	522	134	157
WFD PHL	354	281	635	253	553	806	257	569	826	171	191
WFD WIL	31	36	68	20	74	94	21	77	97	26	30
WFD BAL	52	56	108	31	113	144	32	116	148	36	40
WFD BWI	40	41	81	25	86	110	26	88	114	29	33
WFD NCR	47	48	95	30	100	130	31	103	134	36	40
WFD WAS	514	458	973	368	906	1,274	375	931	1,306	301	334
TOTAL	384,562	161,938	546,500	1,092,675	514,872	1,607,547	1,233,234	568,216	1,801,451	1,061,047	1,254,951
Northeast Regional Incremental Connections (riders that get counted a second time by Amtrak) -->										80,762	106,827
Total Reported Ridership Increment -->										1,141,808	1,361,778

Forecast Results for Interim Connecticut Service Alternative C-1

(prepared 7/20/10)

Route	Fiscal Year 2010 Base Fares Ridership	Fiscal Year 2010 Base Fares Ticket Revenue	Fiscal Year 2010 Base Fares Passenger Miles	Fiscal Year 2020 Forecasts*** Base Fares**** Ridership	Fiscal Year 2020 Forecasts*** Base Fares**** Ticket Revenue	Fiscal Year 2020 Forecasts*** Base Fares**** Passenger Miles	Fiscal Year 2020 Forecasts*** Proposed Fares***** Ridership	Fiscal Year 2020 Forecasts*** Proposed Fares***** Ticket Revenue	Fiscal Year 2020 Forecasts*** Proposed Fares***** Passenger Miles
Baseline*									
New Haven - Springfield (Route 12)	339,900	$9,721,000	30,750,000	398,400	$13,885,000	36,130,000			
Vermonter (Route 4)	81,100	$4,480,000	13,640,000	91,600	$6,163,000	15,410,000			
TOTAL	421,000	$14,201,000	44,390,000	490,000	$20,048,000	51,540,000			
Alternative C-1 Interim**									
New Haven - Springfield (3-digit trains)	474,100	$18,578,000	61,950,000	555,600	$26,538,000	72,800,000	635,100	$24,856,000	79,280,000
New Connecticut/MA (4-digit trains)******	295,700	$4,926,000	13,900,000	346,500	$7,036,000	16,330,000	431,300	$5,537,000	20,040,000
Vermonter/Greenfield (north/thru SPG only)	111,700	$6,236,000	17,840,000	126,100	$8,578,000	20,150,000	126,100	$8,578,000	20,150,000
Northeast Regional (incr. connections)	47,500	$2,497,000	9,070,000	55,700	$3,566,000	10,660,000	78,100	$2,681,000	13,500,000
TOTAL	929,000	$32,237,000	102,760,000	1,083,900	$45,718,000	119,940,000	1,270,600	$41,652,000	132,970,000
NET INCREMENT (vs. Baseline)	***508,000***	***$18,036,000***	***58,370,000***	***593,900***	***$25,670,000***	***68,400,000***	***780,600***	***$21,604,000***	***81,430,000***

These forecasts are based solely upon information available to AECOM Consult as of 7/20/10.
These forecasts are provided for the sole use of Amtrak.
They are not intended for disclosure in a financial offering statement.
Notes:

* Current Service
** Proposed new interim schedule alternative (provided by Amtrak 7/14/10)
*** FY 2020 based on Moody's Economy.com Medium Growth projections thru 2020
**** Existing pricing +2%/year matching assumed inflation
***** Proposed pricing (provided by Amtrak 6/03/10) +2%/year matching assumed inflation
****** Includes only ticket revenue and passenger-miles north of New Haven

Forecast Results for Connecticut Service Alternatives

(prepared 6/08/10)

Route	Fiscal Year 2010 Ridership	Fiscal Year 2010 Base Fares Ticket Revenue	Fiscal Year 2010 Passenger Miles	Fiscal Year 2030 Forecasts*** Base Fares**** Ridership	Base Fares**** Ticket Revenue	Base Fares**** Passenger Miles	Proposed Fares***** Ridership	Proposed Fares***** Ticket Revenue	Proposed Fares***** Passenger Miles
Baseline*									
New Haven - Springfield (Route 12)	339,900	$9,721,000	30,750,000	447,600	$19,006,000	40,700,000			
Vermonter (Route 4)	81,100	$4,480,000	13,640,000	98,900	$8,116,000	16,640,000			
TOTAL	421,000	$14,201,000	44,390,000	546,500	$27,122,000	57,340,000			
Alternative C-1**									
New Haven - Springfield (3-digit trains)	714,600	$36,056,000	123,420,000	940,900	$70,500,000	163,350,000	1,035,000	$67,943,000	171,640,000
New Connecticut/MA (4-digit trains)******	347,700	$6,748,000	19,910,000	457,800	$13,194,000	26,350,000	557,700	$11,034,000	30,780,000
Vermonter/Greenfield (north/thru SPG only)	171,300	$8,912,000	23,850,000	208,800	$16,144,000	29,090,000	208,800	$16,144,000	29,090,000
Northeast Regional (incr. connections)	61,300	$2,857,000	10,420,000	80,800	$5,587,000	13,790,000	106,800	$4,341,000	17,060,000
TOTAL	1,294,900	$54,573,000	177,600,000	1,688,300	$105,425,000	232,580,000	1,908,300	$99,462,000	248,570,000
NET INCREMENT (vs. Baseline)	***873,900***	***$40,372,000***	***133,210,000***	***1,141,800***	***$78,303,000***	***175,240,000***	***1,361,800***	***$72,340,000***	***191,230,000***
Alternative C-2**									
New Haven - Springfield (3-digit trains)	717,000	$36,203,000	123,790,000	944,100	$70,787,000	163,840,000	1,038,500	$68,205,000	172,220,000
New Connecticut/MA (4-digit trains)******	349,300	$6,752,000	19,900,000	459,900	$13,202,000	26,350,000	560,600	$11,024,000	30,800,000
Vermonter/Greenfield (north/thru SPG only)	171,500	$8,925,000	23,890,000	209,100	$16,166,000	29,140,000	209,100	$16,166,000	29,140,000
Northeast Regional (incr. connections)	63,900	$2,962,000	10,760,000	84,100	$5,791,000	14,240,000	110,600	$4,528,000	17,540,000
TOTAL	1,301,700	$54,842,000	178,340,000	1,697,200	$105,946,000	233,570,000	1,918,800	$99,923,000	249,700,000
NET INCREMENT (vs. Baseline)	***880,700***	***$40,641,000***	***133,950,000***	***1,150,700***	***$78,824,000***	***176,230,000***	***1,372,300***	***$72,801,000***	***192,360,000***
Alternative T-1**									
New Haven - Springfield (3-digit trains)	576,900	$33,972,000	116,770,000	759,600	$66,424,000	154,550,000	819,800	$64,486,000	161,270,000
New Connecticut/MA (4-digit trains)******	567,900	$10,397,000	31,230,000	747,800	$20,329,000	41,340,000	899,200	$16,953,000	48,360,000
Vermonter/Greenfield (north/thru SPG only)	171,700	$8,934,000	23,930,000	209,300	$16,183,000	29,180,000	209,300	$16,183,000	29,180,000
Northeast Regional (incr. connections)	63,100	$2,756,000	10,700,000	83,000	$5,389,000	14,160,000	109,300	$4,093,000	17,460,000
TOTAL	1,379,600	$56,059,000	182,630,000	1,799,700	$108,325,000	239,230,000	2,037,600	$101,715,000	256,270,000
NET INCREMENT (vs. Baseline)	***958,600***	***$41,858,000***	***138,240,000***	***1,253,200***	***$81,203,000***	***181,890,000***	***1,491,100***	***$74,593,000***	***198,930,000***
Alternative T-2**									
New Haven - Springfield (3-digit trains)	626,400	$36,779,000	126,550,000	824,800	$71,912,000	167,490,000	890,000	$69,799,000	174,800,000
New Connecticut/MA (4-digit trains)******	594,000	$11,088,000	33,470,000	782,200	$21,681,000	44,300,000	939,900	$18,130,000	51,750,000
Vermonter/Greenfield (north/thru SPG only)	176,800	$9,192,000	24,610,000	215,500	$16,650,000	30,010,000	215,500	$16,650,000	30,010,000
Northeast Regional (incr. connections)	73,700	$3,143,000	12,030,000	97,100	$6,145,000	15,920,000	125,200	$4,782,000	19,420,000
TOTAL	1,470,900	$60,202,000	196,660,000	1,919,600	$116,388,000	257,720,000	2,170,600	$109,361,000	275,980,000
NET INCREMENT (vs. Baseline)	***1,049,900***	***$46,001,000***	***152,270,000***	***1,373,100***	***$89,266,000***	***200,380,000***	***1,624,100***	***$82,239,000***	***218,640,000***

These forecasts are based solely upon information available to AECOM Consult as of 6/08/10.
These forecasts are provided for the sole use of Amtrak.
They are not intended for disclosure in a financial offering statement.
Notes:

* Current Service
** Proposed new schedule alternatives (provided by Amtrak 4/28/10)
*** FY 2030 based on Moody's Economy.com Medium Growth projections thru 2030
**** Existing pricing +2%/year matching assumed inflation
***** Proposed pricing (provided by Amtrak 6/03/10) +2%/year matching assumed inflation
****** Includes only ticket revenue and passenger-miles north of New Haven