Northeast Corridor Capital Investment Plan

Fiscal Years 2017-2021

April 2016

Congress established the Northeast Corridor Commission (the Commission) to develop coordinated strategies for improving the Northeast's core rail network in recognition of the inherent challenges of planning, financing, and implementing major infrastructure improvements that cross multiple jurisdictions. The expectation is that by coming together to take collective responsibility for the NEC, these disparate stakeholders will achieve a level of success that far exceeds the potential reach of any individual organization.

The Commission is governed by a board comprised of one member from each of the NEC states (Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, and Maryland) and the District of Columbia; four members from Amtrak; and five members from the U.S. Department of Transportation (DOT). The Commission also includes non-voting representatives from four freight railroads, states with connecting corridors and several commuter operators in the Region.

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Letter from the Chair

The Northeast Corridor (NEC) is a vital asset for businesses, workers, residents, and visitors in the Northeast and beyond. Its eight commuter rail operators deliver hundreds of thousands of workers to some of the most productive economic centers in the country each day. Amtrak carries more intercity passengers within the Northeast than all airlines combined. The demand for NEC rail services is growing year after year, reflecting an increasing preference for rail service and urban living.

As these trends accelerate, the NEC is playing an increasingly critical role in the economy. This poses a strategic vulnerability for the region and the nation as the infrastructure is failing to keep pace with the demands we place on it. A loss of NEC services would shift rail travelers to the busy highway and aviation networks. A one-day outage alone could cost the economy $100 million in lost productivity and additional congestion. Such an outage would sever the Delmarva Peninsula and ports in Providence, Davisville, New London, and New Haven from the national freight network. Manufacturers in states like North Dakota, Kansas, and Indiana would lose their connection to global markets via the Port of Baltimore. These scenarios are real. Connecticut and New York suffered an estimated $60 million loss when a power supply failure in 2013 limited rail access to job centers on the New Haven Line.

These facts underscore the mission critical importance of the NEC: supporting interstate commerce. Nobody has greater responsibility to protect and promote interstate commerce than the federal government. Furthermore, as mortgage holder for the vast majority of its infrastructure, the federal government has a decades-old obligation to restore the NEC to a state of good repair.

The states and Amtrak, recognizing an urgent but largely unfunded need, have pledged funding to reduce the state-of-good-repair backlog. Amtrak, in partnership with the State of Maryland and New Jersey Transit, respectively, has progressed the planning for the eventual replacement of the 142-year-old Baltimore & Potomac Tunnels, the 110-year-old Susquehanna River Bridge, and the 106-year-old Hudson River Tunnel. The State of Connecticut has programmed more than $2 billion for the NEC over the next five years to replace major capital assets like the 119-year-old Norwalk Bridge. And last year, the States of New York and New Jersey pledged support for funding their shares of the proposed $20 billion Gateway Program.

Despite the more recent collective efforts of the states and Amtrak, we are left with a railroad that faces, at minimum, a $28 billion state-of-good-repair backlog of assets ranging from railroad ties to movable bridges that are beyond their useful life. Though operational — for the time being — these assets reduce reliability and increase maintenance costs. Eliminating this backlog would take decades of sustained investment on top of the capital funding already committed by NEC passenger railroads.

Fortunately, Congress and NEC stakeholders have been engaging in a productive, multi-year dialogue to begin working on this problem. Congress created the Northeast Corridor Commission (the Commission) in the Passenger Rail Investment and Improvement Act of 2008 (PRIIA), charging it with developing a formula for fully allocating the costs of operating and maintaining the railroad based on relative use by agency. In 2015, the Commission delivered to Congress the NEC Commuter and Intercity Rail Cost Allocation Policy (the Policy), including both a formula for fully allocating over $1 billion in annual operating and baseline capital (not backlog) costs as well as a variety of policy recommendations to increase cross-agency collaboration, transparency, and accountability. Congress then passed the Fixing America's Surface Transportation (FAST) Act in 2015 which memorialized many of the Policy's recommendations in law.

The Commission is pleased to continue this constructive dialogue by quickly delivering on a key requirement of the FAST Act, the development of an NEC Capital Investment Plan (the Plan). The Plan documents the investment needs of the NEC and provides a roadmap for the policy and funding priorities to get the job done. The Commission now looks to Congress to use other provisions of the FAST Act, such as the Federal-State Partnership for State-of-Good-Repair Program, to tackle the backlog needs which are not funded through the Policy.

Given the magnitude of unmet needs at all agencies operating on the NEC and limited available funding, reaching consensus on regional priorities covering eight states was a daunting challenge. Each state develops its own transportation priorities considering local factors and funding sources, and the condition and criticality of infrastructure. For nearly all passenger railroads on the Corridor, the NEC represents only a portion of their overall system, and agency priorities are developed within their own broader systems.

Nevertheless, through the development of this Plan, stakeholders did agree on the broad priority to apply new resources toward the elimination of the state-of-good-repair backlog described on pages 12 and 13 of this document. In addition, this Plan highlights the highest priority projects within segments of the Corridor, as illustrated on page 19, based on project readiness and a set of strategic goals outlined on pages 10 and 11. We hope the results of our collective effort will serve as an informative resource for Congress as we work together to initiate an era of reinvestment in America's most important passenger railroad.

James Redeker
Commissioner, Connecticut Department of Transportation
Chair, Northeast Corridor Commission

Executive Summary

The Northeast Corridor (NEC) Capital Investment Plan (the Plan) is the product of a cross-agency effort to identify and integrate the infrastructure investments required over the next five years to reverse decades of deterioration and build a foundation for growth on the nation's most important passenger railroad. Overall funding proposed over five years would support as many as 360,000 jobs, including direct jobs rebuilding the NEC and manufacturing components in as many as 22 states, and indirect jobs supported by those earnings.

Service disruptions on the NEC caused by infrastructure failures, rail traffic congestion, and other factors already cost the economy $500 million per year in lost productivity. Without higher levels of capital investment, those losses are likely to grow. A loss of all NEC services for just one day would cost the economy an estimated $100 million.

Goals

The Plan has four strategic goals: **Strengthen Safety and Security** by meeting or exceeding all relevant standards and regulations; **Modernize our Infrastructure** by kicking off a decades-long effort to restore a state of good repair; **Prepare for our Future** by building to accommodate ridership growth and withstand future challenges; and **Grow our Economy** by retaining and attracting businesses, workers, and residents with more livable communities.

Challenges

The Plan identifies $23.8 billion in funding required over the next five years for infrastructure investments to advance these goals. The primary challenge is that only an estimated $5.3 billion in funding is available. Historic reliance on the vagaries of the annual appropriations process is another challenge, especially for the development and delivery of major multi-year projects. Implementing agencies typically cannot solicit construction bids for major projects until funds are in hand or linked to a reliable funding source. Unpredictable funding also presents a challenge for workforce development when it is unclear if positions will be available for skilled workers after multi-year training programs.

Opportunities

In 2015, the Northeast Corridor Commission (the Commission) adopted the NEC Commuter and Intercity Rail Cost Allocation Policy (the Policy). Through this agreement, the railroads that use the NEC will invest approximately $500 million annually in capital work. According to current estimates, this dependable funding stream would be sufficient to sustain existing NEC infrastructure, if not for the $28 billion backlog of state-of-good-repair investment needs.

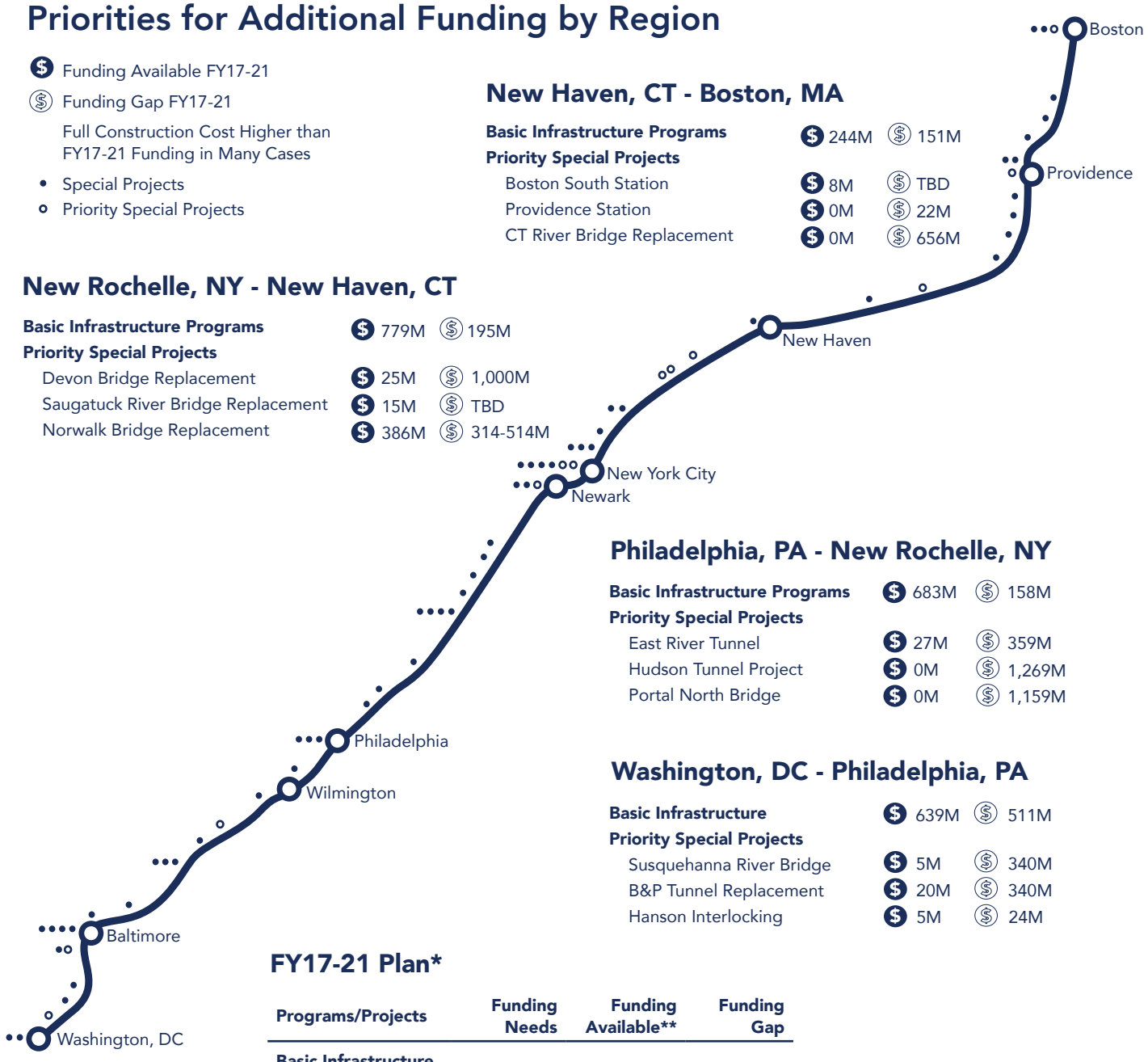
Also in 2015, Congress passed the Fixing America's Surface Transportation (FAST) Act which memorialized many recommendations from the Policy in law, including authorization of a Federal-State Partnership for State-of-Good-Repair Program. While authorized levels are far below the amount required to eliminate the state-of-good-repair backlog and maintain existing service in the long term, NEC stakeholders have agreed on broad priorities for applying additional funds should they be made available. Funding the programs authorized in the FAST Act would be an important first step.

Priorities for Additional Funding by Region

- Funding Available FY17-21
- Funding Gap FY17-21

  Full Construction Cost Higher than FY17-21 Funding in Many Cases

- Special Projects
- Priority Special Projects



New Haven, CT - Boston, MA

Basic Infrastructure Programs	244M	151M
Priority Special Projects		
Boston South Station	8M	TBD
Providence Station	0M	22M
CT River Bridge Replacement	0M	656M

New Rochelle, NY - New Haven, CT

Basic Infrastructure Programs	779M	195M
Priority Special Projects		
Devon Bridge Replacement	25M	1,000M
Saugatuck River Bridge Replacement	15M	TBD
Norwalk Bridge Replacement	386M	314-514M

Philadelphia, PA - New Rochelle, NY

Basic Infrastructure Programs	683M	158M
Priority Special Projects		
East River Tunnel	27M	359M
Hudson Tunnel Project	0M	1,269M
Portal North Bridge	0M	1,159M

Washington, DC - Philadelphia, PA

Basic Infrastructure	639M	511M
Priority Special Projects		
Susquehanna River Bridge	5M	340M
B&P Tunnel Replacement	20M	340M
Hanson Interlocking	5M	24M

FY17-21 Plan*

Programs/Projects	Funding Needs	Funding Available**	Funding Gap
Basic Infrastructure Programs	$5,286M	$2,860M	$2,426M
Special Projects	$18,494M	$2,430M	$16,064M
Total	**$23,780M**	**$5,290M**	**$18,490M**

*Includes Washington - Boston and Connecting Corridors to Springfield, MA; Albany, NY; and Harrisburg, PA.
**Assumptions explained in Appendix I.

Overview

What is the Northeast Corridor Capital Investment Plan?

The Northeast Corridor (NEC) Capital Investment Plan (the Plan) is a joint effort among eight states, the District of Columbia, the federal Department of Transportation (U.S. DOT), Amtrak, and commuter rail agencies to identify and integrate the infrastructure investments required over the next five years to reverse decades of deterioration and modernize this shared national asset for future economic growth. Development of the Plan incorporated constraints related to workforce, resource, and track space availability. The Plan is not constrained by funding availability.

In 2015, the Northeast Corridor Commission (the Commission) adopted the NEC Commuter and Intercity Rail Cost Allocation Policy (the Policy), an historic agreement that establishes a new collaborative framework to guide planning and investment, and to ensure increased transparency and accountability for operations and performance on the NEC. Through this agreement, the railroads that use the NEC are committing approximately $1 billion annually to NEC operating and capital costs. The Policy does not, however, fully fund the NEC's state-of-good-repair backlog.

Recently, the Fixing America's Surface Transportation (FAST) Act took many recommendations in the Policy and memorialized them in law, including new programs to address state-of-good-repair needs. The funding needs are vast for even the modest goals of maintaining the NEC as is and operating the current level of service. In fact, even if the FAST Act programs were fully funded and directed to the NEC, investment levels would continue to fall far short of what is necessary to eliminate the $28 billion state-of-good-repair backlog in a reasonable timeframe, much less prepare the NEC for tomorrow's needs.

Nevertheless, any additional dollar is an opportunity to make progress. The Plan lays out broad priorities for where additional funding might go if made available based on where needs are most critical over the next five years.

What is at Stake?

The NEC supports over 710,000 trips each day on eight commuter railroads and over 40,000 trips on Amtrak's various intercity services. Four freight railroads share portions of the NEC, providing some communities (Delmarva Peninsula) and ports (New Haven, New London, Davisville, and Providence) their only access to the national freight rail network.

The 457-mile main line railroad still includes many bridges and tunnels that date back to the period between the Civil War and the New Deal. Service disruptions caused by infrastructure failures, rail traffic congestion, and other factors already cost the economy $500 million per year in lost productivity. Without higher levels of capital investment, those losses are likely to grow. A loss of all NEC services for just one day would cost the economy an estimated $100 million.

Map files: National Transportation Atlas Database.

Massachusetts Bay Transportation Authority

Connecticut Commuter Rail

SEPTA

VRE

AMTRAK

MTA Long Island Rail Road

MTA Metro-North Railroad

MARC

NJTRANSIT The Way To Go.

Implementing the Plan: Goals

The Plan, if fully funded, would begin work on key projects that address four strategic goals. Larger projects would take more than five years to complete. Overall funding proposed over five years would support as many as 360,000 direct and indirect jobs, from equipment operators on the NEC to suppliers in as many as 22 states.*

Strengthen Safety and Security

The Plan would provide for maintenance of existing assets and installation of new assets to meet or exceed all relevant standards and regulations. Remaining investments in Positive Train Control (PTC) are funded, but additional funding could go toward other customer-focused safety measures.

- **A $46 million investment in Massachusetts** would ensure that all pedestrian walkways, platforms, and ramps are ADA-compliant at various stations, supporting nearly 1,000 jobs.
- **A $145 million investment in New York** would improve commuter safety and convenience by upgrading lighting, HVAC equipment, and addressing vertical access and egress issues at Penn Station, supporting over 2,000 jobs.

Modernize our Infrastructure

The Plan would accelerate the renewal of aging assets. Additional funding would set the NEC on a course to restore most basic infrastructure to a state of good repair within the next 15 years and to replace the 100-plus-year-old bridges and tunnels that threaten to sever existing NEC service.

- **A $1.2 billion investment in New Jersey** would build a new Portal North Bridge across the Hackensack River to eliminate delays caused by bridge openings for marine traffic, supporting 19,000 jobs.
- **A $370 million investment in New York** would construct a new Pelham Bay Bridge across the Hutchinson River, prone to mechanical failures when it opens for maritime traffic, supporting over 6,000 jobs.
- **A $850 million investment in Maryland** would replace the Susquehanna River Bridge with a high-level, fixed structure capable of accommodating commuter, intercity, and freight services, supporting over 13,000 jobs.

*Estimates of jobs supported by investments based on methodology provided by American Public Transportation Association: https://www.apta.com/resources/reportsandpublications/Documents/Economic-Impact-Public-Transportation-Investment-APTA.pdf

Boston South Station

Penn Station New York

Washington Union Station

Prepare for our Future

The Plan would build new assets to accommodate anticipated growth in travel demand and to make our infrastructure more resilient in the face of unforeseen events with additional funding.

- **A $350 million investment in Washington, DC** would double capacity at the Ivy City rail yards shared by Amtrak, MARC, and VRE in order to accommodate growth in train service, supporting over 5,000 jobs.
- **A $250 million investment in Connecticut** would complete double tracking of the New Haven-Hartford-Springfield corridor, allowing for service every 30 minutes in each direction and providing relief from growing traffic congestion on the regional highway network, while supporting 4,000 jobs.

Grow our Economy

The Plan would apply additional funding to spark economic development with station projects that make communities throughout the region more livable to retain and attract new employers and residents.

- **A $32 million investment in Rhode Island** would revitalize Providence Station with repairs to the existing station building and improvements to intermodal connections for travelers, supporting 500 jobs over five years.
- **A $70 million investment in Pennsylvania** would rehabilitate Philadelphia's 30th Street Station and prepare it for additional transit-oriented development, supporting 1,000 jobs over five years.
- **A $19 million investment in Delaware** would rebuild Claymont Station, bringing it into ADA compliance while relocating it near a former industrial site targeted for redevelopment as a major industrial/commercial campus. The station project would support approximately 300 jobs over five years.

Spotlight on State-of-Good-Repair Backlog

Infrastructure assets have a useful life after which they should be replaced. Depending on the type of asset, a useful life span can vary from a few years to many decades. In many cases, infrastructure assets can continue to be operated safely beyond their useful life, though they become more expensive to maintain and more vulnerable to failures that cause service disruptions. The same principle applies to a home hot water heater or car transmission system. The NEC will be in a state of good repair when all assets are within their useful lives.

Basic Infrastructure Backlog
$11 Billion

+

Major Backlog Projects
$17 Billion

=

State-of-Good-Repair Backlog Elimination Needs Over 20+ Years

$28 Billion

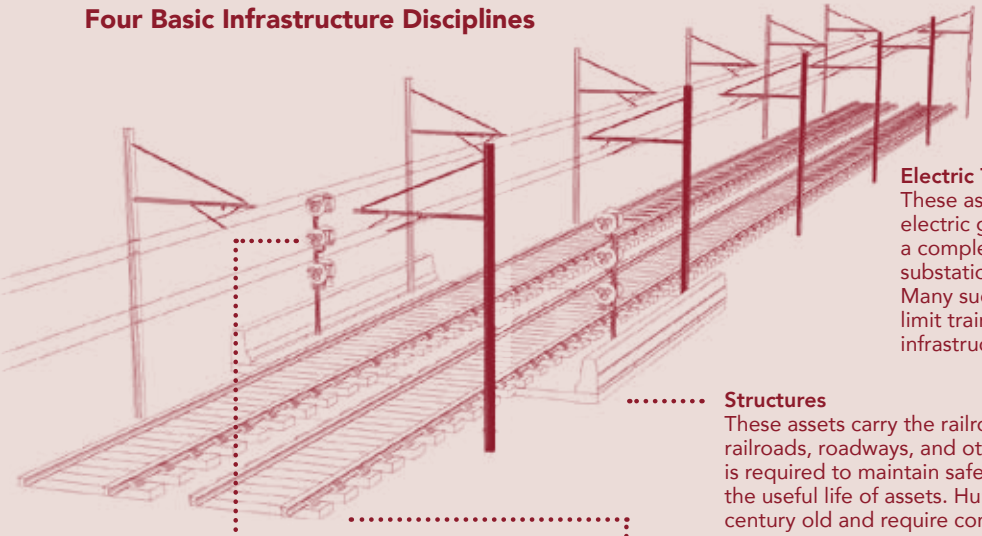
On Top of $500 Million Annual Capital Costs Covered by Cost Allocation Policy*

*See Appendix I for more information.

Basic Infrastructure Backlog

Scheduled replacement of basic infrastructure assets is needed to provide reliable and safe service on the NEC. Work ranges from the smoothing of tracks and ballast to remove imperfections to the replacement of power distribution systems with new assets that are able to withstand inclement weather. Components that are not replaced within their useful lives require more maintenance and are significantly more prone to failure, causing delays for passengers. Replacement components often utilize newer technology that improves cost efficiency, resiliency, and/or service quality.

Four Basic Infrastructure Disciplines



Electric Traction
These assets draw power from the regional electric grid and distribute it to trains through a complex system of frequency converters, substation facilities, and overhead catenary lines. Many such assets that date back to the 1930s limit train speeds and are the frequent source of infrastructure failures that cause service disruptions.

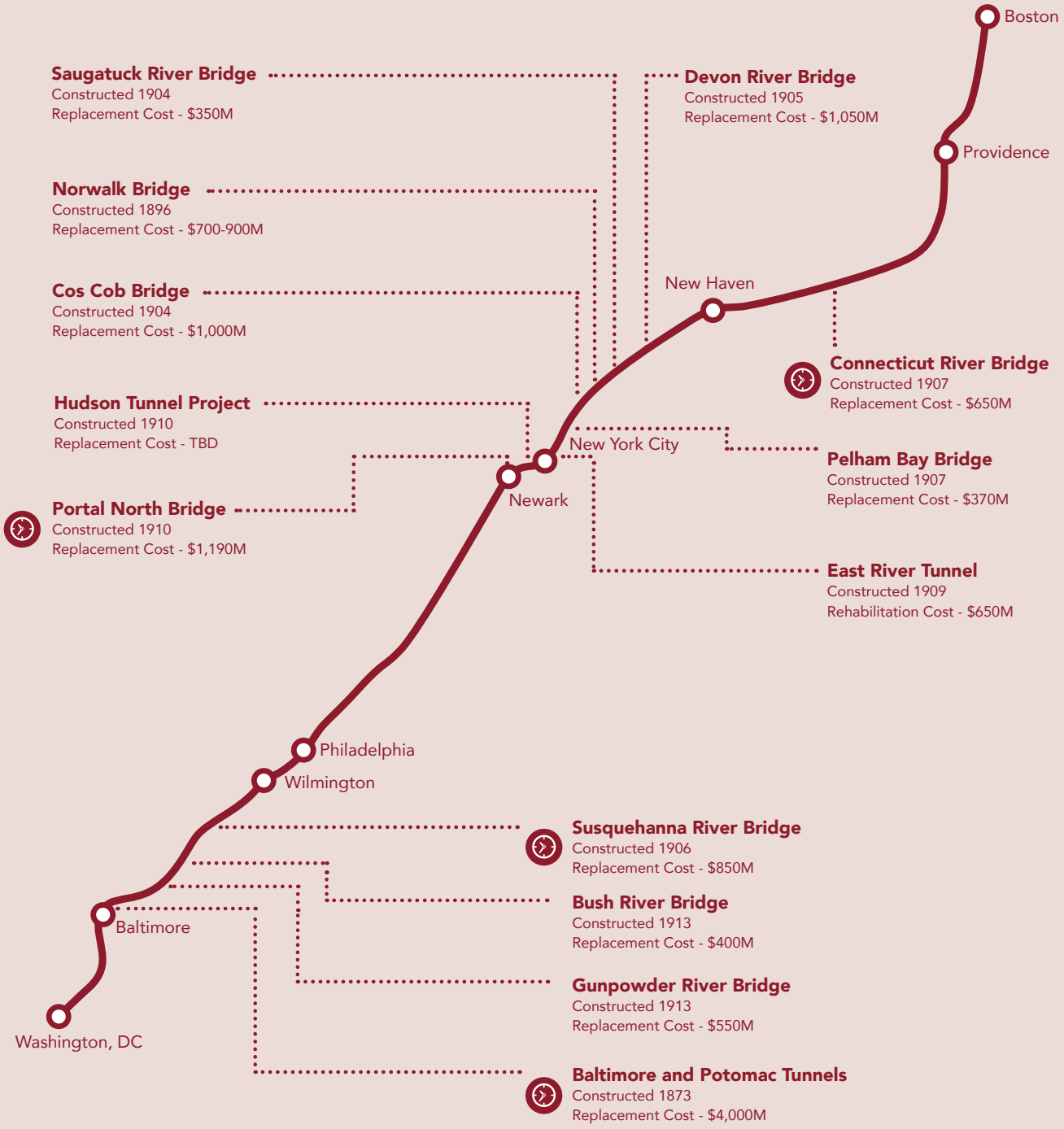
Structures
These assets carry the railroad over rivers, streams, other railroads, roadways, and other obstacles. Regular maintenance is required to maintain safe operating conditions and extend the useful life of assets. Hundreds of such assets are now over a century old and require complete replacement.

Communications and Signals
These assets control the movement of trains along tracks and between tracks at interlockings. The signal network on the NEC is among the most outdated of all assets as communications technology has rapidly developed in the last decades. Many replacement parts for the current system are not available.

Track
These assets physically support the movement of trains, including rail, concrete or wood ties, a trackbed of crushed stone, and sublayers designed to ensure proper drainage to prevent shifting of the railroad. Regular maintenance of such infrastructure is required to maintain safe operating conditions, extend the useful life of assets, and promote comfortable ride quality.

Major Backlog Projects

As major bridges and tunnels on the NEC age beyond their useful life, replacement or rehabilitation projects become part of the state-of-good-repair backlog. These investments are required to sustain current service levels because failure of the existing assets would sever service on the NEC. Construction funding for some projects is especially critical since previous preliminary engineering and environmental review work must be redone if construction does not commence in a prescribed timeframe.



Implementing the Plan: Challenges

Funding Availability

The most significant obstacle to implementing the Plan is funding availability. The Policy adopted by the Commission in 2015 established consistent and transparent methods for rail operators to share approximately $500 million in annual baseline capital expenses, enough to cover ongoing asset replacement needs if the NEC were in a state of good repair according to current estimates. However, the Policy does not fund the $28 billion state-of-good-repair backlog or address other long-term needs.

Project Development and Delivery

Reliance on annual appropriations does not facilitate the development and delivery of major projects which take many years for planning, design, environmental review, permitting, and construction. They need long-term, stable funding sources. In particular, major projects need predictable funding sources to enter contracts with the private sector. Implementing agencies typically cannot solicit construction bids until funds are in hand or committed.

One-time special federal grants through the American Recovery and Reinvestment Act (ARRA) and the High-Speed Intercity Passenger Rail (HSIPR) program also present a challenge. Several NEC projects benefitted from design and environmental review funding but require much more significant funding for construction. If construction does not begin within three years of completion of the environmental review, it must be redone at additional taxpayer expense.

Workforce Development

The uncertainty of relying on annual appropriations also has a negative impact on workforce development. The required training for some skilled trades takes several years, and funding uncertainty makes it difficult to invest in training programs when it is unclear if resources will be available to employ trainees at the end of their program.

Service Continuity

With NEC infrastructure already operating at capacity at key chokepoints, finding sufficient windows to replace existing assets is a challenge. Agencies must determine how to sequence work in a way that minimizes the impact on the 750,000 daily commuter and intercity trips on the Corridor. Because of this challenge, many maintenance windows are overnight or during weekends when labor costs are at their highest. In some cases, capital investment in new assets can add capacity or increase operational flexibility to mitigate disruptions during the replacement of existing assets.

Northeast Corridor Capital Investment Plan, FY17-21: $23.8B

Programs/Projects	FY17-21 Plan	Funding Available	Funding Gap
Basic Infrastructure	**$5,286M**	**$2,860M**	**$2,426M**
Track	$1,717M	$1,017M	$700M
Electric Traction	$348M	$245M	$103M
Structures and Stations	$1,971M	$882M	$1,089M
Communication and Signals	$544M	$292M	$252M
Multi-discipline/ System	$706M	$424M	$282M
Special Projects	**$18,494M**	**$2,430M**	**$16,064M**
Major Backlog	$3,419M	$498M	$2,922M
Service Preservation & Improvement	$6,722M	$1,933M	$4,789M
Gateway Program*	$8,353M	$0	$8,353M
Total	**$23,780M**	**$5,290M**	**$18,490M**

Source	FY17-21 Plan**
Funding Available	**$5,290M**
Baseline Capital Contributions***	$2,365M
Special Federal Grants	$923M
State/Local Funds	$2,003M
Funding Gap	**$18,490M**
Total	**$23,780M**

*FY17-21 costs for Gateway Program (Project #42), Portal North Bridge (Project #41) and Hudson Tunnel Project (Project #44). See Appendix B.

**Assumptions explained in Appendix I.

***Funds generated by the Cost Allocation Policy.

Spotlight on Service Continuity: Norwalk Bridge

Connecticut will replace the Norwalk Bridge, built in 1896, with a combination of federal and state funds. Construction will require an extended continuous outage of two tracks where normally four are operational. This change in track availability could cause schedule changes, decreased reliability, or even service reductions. Connecticut has identified two additional capital projects in the vicinity of Norwalk Bridge, including a new interlocking and an upgraded train yard, that could facilitate the operational flexibility required to preserve existing service during construction. However, Connecticut has not yet identified all the funding required to implement these investments to ensure service continuity.

Implementing the Plan: Opportunities

The FAST Act: Strong Foundation for Progress

The FAST Act represents a significant step forward for the NEC. It marked the first time that intercity passenger rail was addressed in a multi-year authorization alongside other surface transportation programs. It requires profits from NEC intercity ticket revenues to be reinvested in NEC infrastructure rather than used to support train services elsewhere in the nation. In addition, the FAST Act codified many recommendations included in the Commission's Policy aimed at increasing collaboration, transparency, and accountability for all NEC stakeholders. Among the requirements are:

- **NEC Capital Investment Plan** — this document — to outline a collaborative infrastructure improvement strategy.
- **Annual reports** on the implementation of capital programs and train performance to hold agencies accountable and improve coordination across agencies on capital project delivery and train operations.
- **Asset management plans** to strengthen corridor-wide understanding of capital needs and inform prioritization.

The FAST Act also authorized several new grant programs that could begin to address capital funding needs:

- **Amtrak Northeast Corridor Account** could provide up to $2.6 billion over five years in grants for eligible projects on the Northeast Corridor.
- **Federal-State Partnership for State-of-Good-Repair Program** could provide up to $1 billion over five years in competitive grants for projects that replace, rehabilitate, or repair major infrastructure assets.
- **Consolidated Rail Infrastructure and Safety Improvements Program** could provide up to $1.1 billion over five years in competitive grants for projects that enhance passenger and freight rail safety, reliability and efficiency.

These programs are only authorized and must be appropriated on an annual basis. However, as this Plan makes clear, even if Congress were to appropriate all programs at the maximum authorized level for each of the next five years and direct all those funds to the NEC, investment levels would still fall far below baseline capital needs to preserve existing service and unlock capacity chokepoints. Though much work remains to be done to address funding gaps, these programs are an important first step.

Additional Investment Creates Additional Jobs

The NEC can absorb higher levels of investment than have historically been available. The State of Connecticut has invested far higher sums per track mile than Amtrak has had available over the past decade, all while running service on some of its busiest operating segments. In addition, many major bridges and tunnels could be constructed by contracted workforces adjacent to the existing NEC with minimal service impacts. If fully funded, the Plan has the opportunity to support as many as 360,000 direct and indirect jobs in the railroad industry, ranging from equipment operators on the Corridor to manufacturers and materials suppliers in as many as 22 states.

Spotlight on State-of-Good-Repair Investments

Basic Infrastructure Programs tackle the least visible but some of the most important state-of-good-repair needs. **The $350 million Catenary Replacement Program in Connecticut** is an example. Given the scarcity of funding, electric traction investments on the NEC have tended toward spot replacement of particular components (short stretches of catenary wire, individual catenary poles, etc.) where the likelihood of failure is highest. The Connecticut DOT, on the other hand, will complete a systematic overhaul to replace outdated 1930s technology with an entirely new fixed-tension catenary system by 2017. Though the up front capital commitment has been sizable, this new system will save riders and taxpayers in the long run by reducing delays and ongoing maintenance costs. Though this program is funded, additional funding for the NEC would allow stakeholders to take on more impactful basic infrastructure backlog elimination investments of this nature.

Special Projects are also required for advancing a state of good repair. **The $850 million Susquehanna River Bridge Replacement Project in Maryland** is an example. Dating back to 1906, this bridge restricts speed 30 miles per hour slower than adjacent track and is required to open for maritime traffic. Each time, a crew of over 30 workers is required to essentially deconstruct and reconstruct the movable span. This expensive operation can cause hours of delay. Fortunately, the state of Maryland is leading an HSIPR-funded design and environmental review process for a new fixed bridge, high enough for boats to pass underneath. However, no funding for construction has been identified. When environmental review ends in 2017, a three-year clock will start within which construction must begin, or the environmental approval will expire. Additional funding for the NEC would allow stakeholders to take action on major backlog projects.

Plan Prioritizes State-of-Good-Repair Investments

The Commission has initiated a preliminary process for prioritizing unfunded capital needs. If Congress were to provide additional funding for the NEC, the Commission's highest priority would be investments to reduce the state-of-good-repair backlog described on pages 12 and 13. The most important justification for these investments is that they are required to sustain existing service levels. Secondary benefits of these investments could include improved reliability, cost efficiency, and/or service quality. As noted on page 8, delays on today's NEC already cost the economy at least $500 million annually. If service were to deteriorate to the point of complete shutdown, it could cost the economy up to $100 million every day.

Given the magnitude of capital needs and the numerous operators on the NEC, reaching consensus on a prioritized list of state-of-good-repair investments is challenging. Exactly which programs and projects would be prioritized would depend on the level of funding made available. However, stakeholders in each subregion did convene to prioritize funding needs by subregion. For Basic Infrastructure Programs, all investments address state of good repair, and the collective priority is simply to eliminate the funding gap that has caused our backlog to grow year after year. For Special Projects, priorities reflect readiness to advance over the next five years and the strategic goals on pages 10 and 11.

Programs and Projects

Northeast Corridor Five-Year Capital Plan, FY17-21: $23.8B

Basic Infrastructure Programs: $5.3B

Normalized Replacement and Maintenance
- Track
- Structures and Stations
- Electric Traction
- Communications & Signals

Basic Infrastructure Backlog
- Track
- Structures and Stations
- Electric Traction
- Communications & Signals

Special Projects: $18.5B

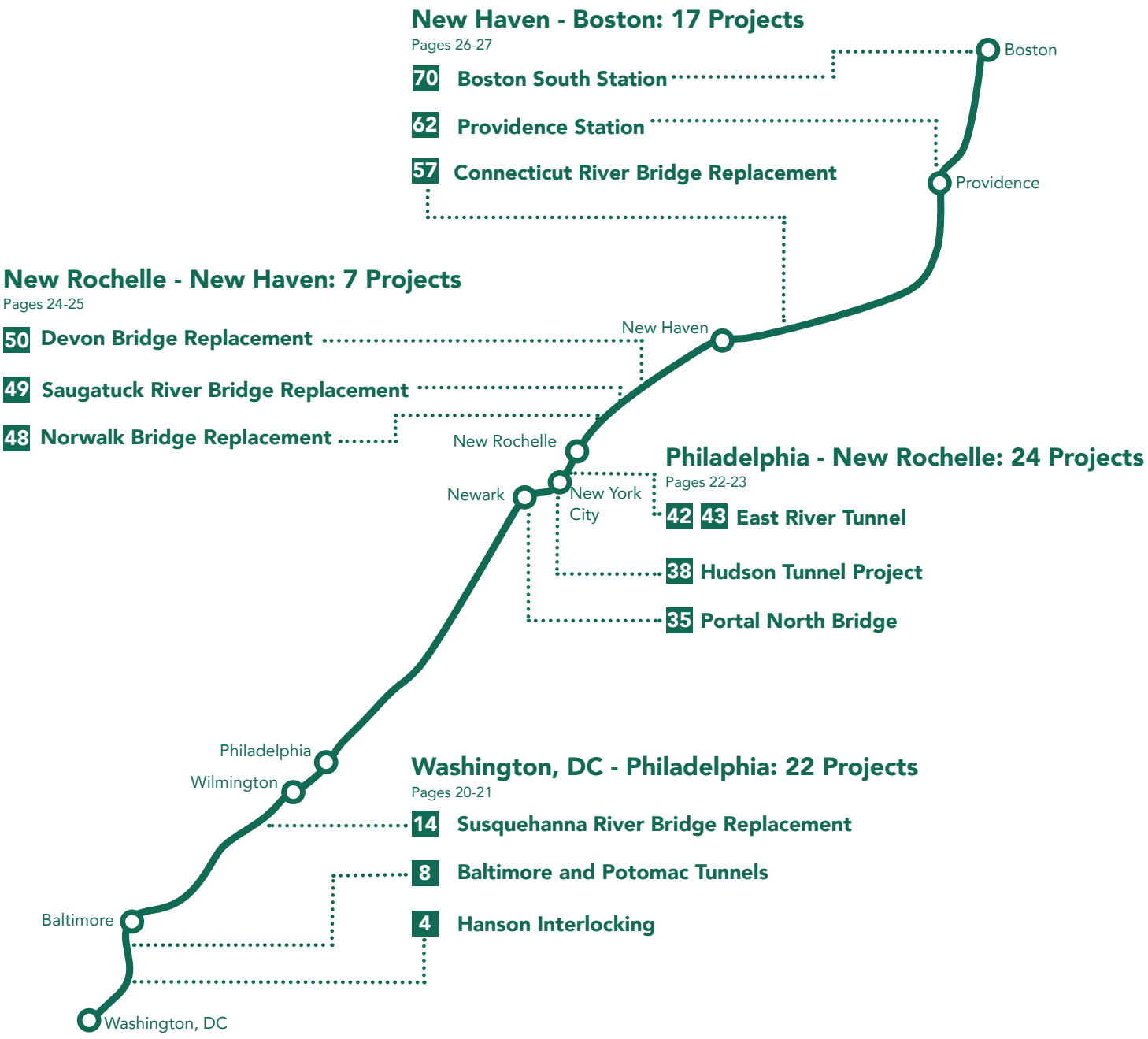
Major Backlog Projects
- Major Tunnels
- Major Bridges

Service Preservation and Improvement Projects
- Safety
- Efficiency
- Reliability
- Resiliency
- Capacity
- Amenities

Basic Infrastructure Programs
Priority: Eliminate Funding Gap

	FY17-21 Plan	Funding Available	Funding Gap
Track	$1,717M	$1,017M	**$700M**
Electric Traction	$348M	$245M	**$103M**
Structures and Stations	$1,971M	$882M	**$1,089M**
Communications and Signals	$544M	$292M	**$252M**
Multi-discipline / Systemwide	$706M	$424M	**$282M**
Total	$5,286M	$2,860M	**$2,426M**

Special Projects
Priorities: Top Three Projects by Region



Washington, DC to Philadelphia, PA

The 130 miles of the NEC between Washington, DC and Philadelphia, PA is owned by Amtrak and supports commuter service operated the Maryland Area Regional Commuter (MARC), Virginia Railway Express (VRE), and the Southeastern Pennsylvania Transportation Authority (SEPTA). There is also substantial freight activity with CSX and Norfolk Southern.

The segment has numerous 100-plus-year-old large movable bridges and Civil War-era tunnels. Replacement projects are undergoing preliminary engineering and environmental review, though construction funding is unavailable. The segment also has significant ride quality issues related to unstable ground conditions along the Chesapeake Bay. The continued deployment of a Track Laying System (TLS) between FY17-21 would rehabilitate track infrastructure and improve the customer experience.

315 daily trains

54,000 daily passengers

Basic Infrastructure Programs: $1.1 Billion

	FY17-21 Plan	Funding Available	Funding Gap	Notable Projects
Track	$688M	$399M	$289M	Deployment of Track Laying System ($191M) to replace concrete ties and renewal of 13 interlockings/turnouts in PA, MD, and DE ($154M). Planned work will help maintain reliable performance and reduce speed restrictions, train delays and maintenance costs.
Electric Traction	$56M	$15M	$41M	Replacement of all catenary and hardware in sections of the Baltimore subdivision ($3.2M) and the Safe Harbor Frequency Converter ($6.9M). Program will improve reliability, and reduce delays and maintenance costs.
Structures and Stations	$356M	$194M	$162M	Repair or replacement of culverts, bridge timbers, fencing, and undergrade bridges; replacement of Wilmington Maintenance of Way repair shop ($91M).
Communications and Signals	$50M	$31M	$19M	Replacement of all signal equipment at North Penn and South Penn Interlockings ($11.5M) and upgrade of electronic switch controls at Hook Interlocking ($5M).

Special Projects: $2.3 Billion

Philadelphia, PA
20 21 22
19
PA
MD
18
Wilmington, DE
17
DE
MD
16
15
14
13
12
11
Baltimore, MD
7 8 9 10
5 6
4
3
MD
DC
Washington, DC
1 2

14 Susquehanna River Bridge Replacement

The 110-year-old Susquehanna River Bridge is both a deteriorating asset and a bottleneck that restricts the NEC down to two tracks. A modern, high-level fixed bridge would reduce operations and maintenance costs, allow for increased capacity, and may enable freight trains to cross the river during daytime hours to reach the Port of Baltimore. Environmental review for this project is underway and may expire if funding is not identified for construction.

Total Construction Cost - $850M
FY17-21 Available Funding - $5M
FY17-21 Funding Required - $340M

8 Baltimore & Potomac Tunnels

Passing underneath a large portion of Baltimore, the B&P Tunnels were constructed in 1873. They have tight curves and are in poor condition, requiring trains to reduce speeds to 30 mph going through the tunnel. Continual deterioration of the tunnels mandates constant monitoring and imposes significant maintenance costs, while safety concerns threaten to shut down the tunnels indefinitely. Maryland DOT and Amtrak, along with Norfolk Southern and CSX, are leading the design process and beginning preliminary engineering for replacement tunnels. This project would allow for increased train speeds, greater capacity, and safer train operations on this heavily utilized portion of the NEC. However, if construction dollars are not made available for the replacement tunnels, the environmental approvals for this project may expire.

Total Construction Cost - $4,000M
FY17-21 Available Funding - $20M
FY17-21 Funding Required - $340M

4 Hanson Interlocking

Currently trains passing through New Carrollton Station just outside of Washington, DC are required to utilize the outdated Carroll Interlocking whose layout creates conflicts between MARC and Amtrak trains. By constructing Hanson Interlocking, trains would be able to move fluidly between three separate tracks and therefore significantly reduce conflicts. Construction of Hanson Interlocking would also advance a state of good repair by allowing for the retirement of aging Carroll Interlocking.

Total Construction Cost - $30M
FY17-21 Available Funding - $5M
FY17-21 Funding Required - $24M

Philadelphia, PA to New Rochelle, NY

Amtrak owns the 80 miles of the NEC between Philadelphia, PA and New Rochelle, NY, which is one of the busiest and most densely traveled sections of railroad in the United States. In addition to intercity trains operated by Amtrak, SEPTA, NJ TRANSIT, Long Island Rail Road (LIRR), and Metro-North Railroad (MNR) operate commuter service. Conrail Shared Assets Operations, CSX, and the Providence & Worcester Railroad conduct freight operations. Penn Station New York is the busiest passenger rail station in North America in terms of both passengers and train volumes.

Many of the critical tunnels and bridges that move hundreds of thousands of daily commuters were damaged by Superstorm Sandy, accelerating the already deteriorating conditions of these aging structures. Much of this section of the NEC is operating at capacity. Investments like the Gateway Program between New Jersey and New York, elements of which are described on page 23, would integrate the rehabilitation of existing assets with additional capacity to meet future needs.

980 daily trains

465,000 daily passengers

Basic Infrastructure Programs: $840 Million

	FY17-21 Plan	Funding Available	Funding Gap	Notable Projects
Track	$343M	$299M	$44M	Replacement of wood turnouts at Penn Station and Sunnyside ($6-7M per year) and interlocking renewals, including removal of old ballast and track, restoration of proper drainage and installation of new track panels ($103.5M).
Electric Traction	$139M	$122M	$17M	Replacement of three substations on New York's Hell Gate Line ($35M) and the relocation of the Kearny substation, including feasibility study and design ($35M).
Structures and Stations	$330M	$236M	$94M	Reconstruction of undergrade bridges ($30M), station upgrades ($25M), and renewal of two escalators annually at Penn Station New York ($4M).
Communications and Signals	$28M	$26M	$3M	Design and replacement of components at Q Interlocking in Queens, NY ($4.8M). Program will reduce delays, improve reliability and capacity and reduce maintenance costs.

Special Projects: $11.8 Billion

New Rochelle, NY
45 46 47
42 43
New York City
39 40 41
36 37 38
NY
NJ
35
Newark, NJ
33 34
32
31
30
28 29
27
26
25
Trenton, NJ
NJ
PA
23 24
Philadelphia, PA

43 42 East River Tunnel

The East River Tunnel consists of four tubes that connect Manhattan to Long Island and are used for Amtrak and LIRR services. The tubes, constructed in 1909, require significant upgrades and rehabilitation in order to achieve a state of good repair. Planned maintenance for FY17-21 will replace certain assets that are beyond their useful lives, however, the tubes require a much more intensive rehabilitation and overhaul. A full rehabilitation of the track and drainage systems requires the removal and replacement of track and ballast, installation of new welded rail, and the removal and replacement of third rail for the entire length of all four tubes.

Total Construction Cost - $650M
FY17-21 Available Funding - $27M
FY17-21 Funding Required - $360M

38 Hudson Tunnel Project

Every weekday, almost 200,000 passengers use the Hudson River Tunnel to travel between New Jersey and Manhattan. These two tubes were built in 1910 and, although operational and safe, were inundated and significantly damaged by Superstorm Sandy and continue to deteriorate due to deposits of corrosive minerals. Plans to repair the original structures first call for the construction of a new two-track tunnel that would increase operational flexibility and reliability, while also enabling the original tunnel to be rehabilitated without major service disruptions. With an initial $15.2 million in funding available in FY16, preliminary engineering and environmental review are underway with the FRA as the lead agency and NJ TRANSIT as the NEPA manager.

Total Construction Cost - TBD
FY17-21 Available Funding - $0M
FY17-21 Funding Required - $1,269M

35 Portal North Bridge

This century-old, swing-span bridge over the Hackensack River carries approximately 450 trains daily between Newark, NJ and Penn Station New York. The aging components of this bridge often malfunction when opening to let maritime traffic pass and the bridge gets stuck in the open position, creating major delays for this section of the NEC. Amtrak and NJ TRANSIT have completed final design and environmental review to replace the existing bridge with a new high-level, fixed-span bridge that would eliminate future malfunctions. In 2015, New Jersey was awarded a $16M TIGER Grant to complete early action construction items. Full construction of the new structure can proceed as soon as funding can be secured.

Total Construction Cost - $1,190M
FY17-21 Available Funding - $0M
FY17-21 Funding Required - $1,159M

New Rochelle, NY to New Haven, CT

The New York Metropolitan Transportation Authority (MTA) and the State of Connecticut own their respective portions of the 56-mile-long segment between New Rochelle, NY and New Haven, CT. MNR's New Haven Line is the busiest single commuter rail line in the country. Shore Line East (SLE) operates limited commuter service along with Amtrak's intercity services. CSX and the Providence & Worcester Railroad operate freight service.

Investments for the New Haven Line include final installation of PTC and completion of the Catenary Replacement Program to improve safety and reliability. The New Haven Line has over 100 bridges spanning inlets and roads as well as five major movable bridges designed to accommodate maritime traffic, four of which are over 100 years old and require replacement. Construction funding is currently only available for one of these bridges.

287 daily trains

111,000 daily passengers

Basic Infrastructure Programs: $973 Million

	FY17-21 Plan	Funding Available	Funding Gap	Notable Projects
Track	$239M	$118M	$121M	Annual replacement of yard switches, interlockings and track surfaces. Repairs and improvements to track drainage to protect investments in ties and switches.
Electric Traction	$94M	$80M	$14M	Completion of final phases of a multiple-year $350M investment to replace the overhead catenary system on the New Haven Line in CT. The fully modernized catenary system will reduce maintenance costs and improve reliability for Amtrak and Metro-North riders.
Structures and Stations	$403M	$356M	$48M	Replacement of three bridges in Greenwich and Stamford and major repairs or replacements of five additional undergrade bridges ($293M).
Communications and Signals	$237M	$225M	$12M	Replacement of outdated copper communication systems with fiber optics and replacement of the current cab-signal system.

Special Projects: $2.5 Billion

New Haven, CT
51 52 53
50
Bridgeport, CT
49
48
Stamford, CT
47
CT
NY
New Rochelle, NY

50 Devon Bridge Replacement

This movable bridge, constructed in 1905, carries four New Haven Line tracks over the Housatonic River. While short-term repairs have lengthened the useful life of this asset, the long term replacement of this bridge is required. The Connecticut DOT has $50M in programmed funds to complete initial designs of the replacement structure, but construction dollars are not available.

Total Construction Cost - $1,050M
FY17-21 Available Funding - $25M
FY17-21 Funding Required - $1,000M

49 Saugatuck River Bridge Replacement

The Saugatuck River Bridge was constructed in 1904 and carries the four New Haven Line tracks on a set of parallel bascule spans. These movable bridges have had periodic interim repairs conducted but require regular maintenance to ensure their continued use, a cost which is increasing with time as more electrical and mechanical components become obsolete. Connecticut DOT has $15M of programmed funds to advance the design of a replacement bridge, however the bridge replacement will require additional funds for construction.

Total Construction Cost - $350M
FY17-21 Available Funding - $15M
FY17-21 Funding Required - TBD

48 Norwalk Bridge Replacement

This movable bridge constructed in 1896 has been identified by Connecticut DOT as its first priority for replacement. As all four tracks of the New Haven Line lie on this bridge's single span, failure of this asset would sever service on the NEC for an indefinite amount of time. Connecticut has committed to replace this asset with a combination of federal and state funds, including a $465M grant from the FTA. Construction will require an extended continuous outage of two tracks where normally four are operational. This change in track availability could cause changes in schedule, decreases in reliability, or even reductions in service. Connecticut has identified two additional capital projects in the vicinity of Norwalk River Bridge, including a new interlocking and an upgraded train yard, that could facilitate the operational flexibility required to preserve existing service during construction. However, Connecticut has not yet identified the funding required to implement these investments to ensure service continuity.

Total Construction Cost - $700-900M
FY17-21 Available Funding - $386M
FY17-21 Funding Required - $314 -514M

New Haven, CT to Boston, MA

This 158-mile segment of the NEC is owned by Amtrak and the State of Massachusetts. Operators here include SLE, Massachusetts Bay Transportation Authority (MBTA), and Amtrak along with freight services from CSX and the Providence & Worcester Railroad.

Though this portion of the NEC received significant investment in the 1990s associated with the introduction of Acela service, the capital needs on this segment still outstrip available funding. Many of the bridges between New Haven and Boston are over 100 years old and require investment. The Connecticut River Bridge, which opens 3,000 times per year for marine traffic and halts rail service when it malfunctions, requires replacement. The NEC also suffers capacity constraints in the vicinity of Boston South Station which requires additional tracks and platforms to accommodate growth forecasts.

315 daily trains

86,000 daily passengers

Basic Infrastructure Programs: $396 Million

	FY17-21 Plan	Funding Available	Funding Gap	Notable Projects
Track	$252M	$160M	$92M	Turnout renewals at Southampton Yard and Tower 1, Branford, Transfer, and Shore Line Junction Interlockings and replacement of concrete ties ($25M per year). Rebuilding of all turnouts in Davisville, MA Interlocking ($3.1M).
Electric Traction	$8M	$5M	$3M	Replacement of circuit breakers in Sharon, MA ($1.3M). Program will improve reliability, reduce train delays and maintenance costs, and avoid delays to state highway projects by relocating catenary equipment.
Structures and Stations	$121M	$70M	$51M	Replacement of the Shaw's Cove, CT moveable bridge components ($11M), structural upgrades to moveable bridges ($17.5M) and upgrades at Branford and Guilford stations ($20M).
Communications and Signals	$15M	$9M	$6M	Upgrades to battery back-up banks at five interlockings ($8M) and upgrades to electronic controllers at three interlockings in CT, RI, and MA ($1M).

Special Projects: $1.0 Billion

Boston, MA
68 69 70
67
66
MA
RI
65
63 64
Providence, RI
61 62
60
59
RI
CT
58
New London, CT
57
56
55
54
New Haven, CT

70 Boston South Station

This station is the busiest in MBTA commuter system and Amtrak's fourth-busiest station on the NEC. South Station is currently operating at capacity and accommodating future growth would be limited without significant investment. Expansion is needed to accommodate additional platforms, tracks, and customer facilities. Massachusetts DOT is currently conducting pre-engineering and environmental analysis while developing a vision for the station, partially funded by an HSIPR grant.

Total Construction Cost - TBD
FY17-21 Available Funding - $8M
FY17-21 Funding Required - TBD

62 Providence Station

Serving the capital of Rhode Island, Providence Station needs significant updates to both its exterior and interior spaces to better serve passenger demand. When the train station was moved to its present location in 1986, connections to other intermodal travel options were severed. Rhode Island DOT plans to reconnect the station with other bus and transit lines through the long-term development of a transit hub. Other upgrades at Providence Station would provide better connections to nearby retail centers and expand passenger areas, along with increasing parking availability. Preliminary engineering and environmental review is underway, but additional funding is required for construction.

Total Construction Cost - $32M
FY17-21 Available Funding - $0M
FY17-21 Funding Required - $22M

57 Connecticut River Bridge Replacement

Completed in 1907, the Connecticut River Bridge is one of the oldest assets on the NEC between New Haven and Boston. The frequent opening and closing of the bridge – over 3,000 times per year – puts high demands on its aging components, increasing maintenance costs and reducing reliability for both railway and marine traffic. Many key elements of the bridge have reached the end of their design life and require extensive maintenance to remain in operable condition. The new bridge would improve reliability and offer higher speeds for Amtrak and SLE trains. Environmental review for this project is underway and may expire if funding is not identified for construction.

Total Construction Cost - $658M
FY17-21 Available Funding - $0M
FY17-21 Funding Required - $656M

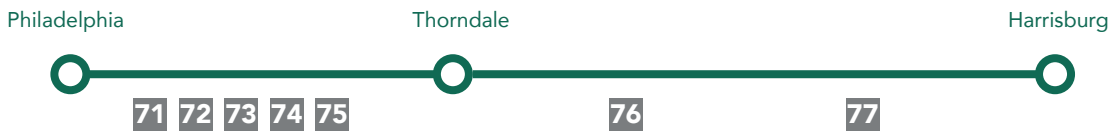
Connecting Corridors

	FY17-21 Plan	Funding Available	Funding Gap	Notable Projects
Harrisburg Line	$503M	$386M	$117M	Renewal and reconfiguration of State, Paoli, and Zoo Interlockings, including ballast and track replacement, drainage improvements and new track panels.
Albany Line	$1,055M	$0.4M	$1,055M	Replacement of electrical and mechanical assets on the Spuyten Duyvil moveable bridge ($52M). Replacement of Metro-North's Harmon Shop electric repair facility ($484M).
Springfield Line	$389M	$94M	$295M	Major program to add a second track between New Haven and Hartford, overhaul the signal and communications system, rehabilitate or replace many bridges and culverts, and improve stations at Wallingford, Meriden, Berlin, and Hartford.

Harrisburg Line: Philadelphia, PA to Harrisburg, PA

Connecting the state's largest city with the state capital, the Harrisburg Line extends 104 miles across Pennsylvania and is owned by Amtrak. Both Amtrak and SEPTA operate passenger service on this corridor for 26,000 daily riders. Despite large investments by the Commonwealth of Pennsylvania and Amtrak in 2006, additional work is needed to bring this corridor to a state of good repair.

During FY17-21, agencies plan to upgrade and improve existing stations at Ardmore, Villanova, Paoli, Exton, Mount Joy, Coatesville, Middletown, as well as the Frazer Shop and Yard Complex. Agencies will continue work on renewing and reconfiguring State, Paoli, and Zoo Interlockings. These investments would help to expand capacity, modernize passenger amenities, and rehabilitate deteriorating assets.



Albany Line: New York, NY to Albany, NY

The 160-mile corridor connecting Albany to New York City is partially owned by Amtrak, Metro-North and CSX. With nearly 30,000 daily riders commuting on this line, the Albany/Hudson Line is a valuable alternative to reach New York City and the state capital instead of using congested highways.

Obsolete track and signal systems along this corridor result in numerous chokepoints which limit capacity and speed. Both diesel and electric-powered trains operate on the Albany Line, and planned investments by Metro-North at the Harmon Shop and Yard Complex would ensure that both types of engines and rail cars can be maintained properly. Additional funding is required for planning and construction of the complex, which would enable the streamlined inspection and maintenance of a wide variety of rolling stock.

*See Harmon Shop and Yard Upgrade in Appendix G

Springfield Line: New Haven, CT to Springfield, MA

The 60-mile corridor that connects New Haven, CT to Springfield, MA is owned by Amtrak, currently the sole operator of passenger rail. Freight service is operated by CSX, Connecticut Southern, and Pan Am Southern. The New Haven-Hartford-Springfield (NHHS) Rail Program is a multi-year investment to rebuild and upgrade infrastructure along this corridor, including the installation of a second track that will permit commuter service. CT*rail* is scheduled to begin operating its Hartford Line in early 2018.

In addition to the second track between New Haven and Hartford, the initial NHHS Program will upgrade Wallingford, Meriden, Berlin, and Hartford stations, overhaul the signal and communications system, and rehabilitate or replace many bridges and culverts. Additional funding for future phases would restore a full double track railroad capable of operating 25 trains per day between New Haven and Springfield.

Appendix A: Washington, DC to Philadelphia, PA

BASIC INFRASTRUCTURE PROGRAMS

COMMUNICATIONS AND SIGNALS - Program provides for the replacement of infrastructure components, such as cabling, equipment shelters, signals and switches must be continually replaced. Specific projects include replacement of all signal equipment at South and North Penn Interlockings ($11.5m total) and upgrade of electronic switch controls at Hook Interlocking ($5m). Program will help avoid operational delays, capacity reductions, and unplanned service disruptions.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	2.3	3	3.2	5.9	8.4	10.4	30.8
Funding Gap		3.3	3.8	4.8	4.7	2.8	19.5

ELECTRIC TRACTION - Program provides for the replacement of infrastructure components and includes sectionalized catenary hardware renewal, substation upgrades, and new transformer installation. Specific projects include replacement of all catenary and hardware (wire, insulators, rods, clips, etc.) in portions of the Baltimore subdivision ($3.2m), and the Safe Harbor Frequency Converter ($6.9m). Program will improve reliability, and reduce delays and maintenance costs.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	18.8	3.5	1.8	2.8	3.6	3.6	15.3
Funding Gap		13.5	7.8	8	7.1	4.2	40.6

STATIONS AND STRUCTURES - Program provides for the replacement of infrastructure components and includes culvert upgrades, bridge timber replacement, installation of right-of-way fencing, retaining wall upgrades, improvements to lighting and stations, as well as structural upgrades and/or replacement of undergrade bridges. Specific projects include 30th Street Station facade restoration ($66m) and replacement of Wilmington MoW repair shop ($91m).

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	17.8	36.9	45.4	49.1	35.5	27	193.8
Funding Gap		40.2	54.3	40.4	20	7.4	162.2

TRACK - Program provides for the replacement of infrastructure components and includes undercutting, spot tie replacement, joint elimination, worn curve rail replacement, track fastener elimination, ballast cleaning, and turnout/interlocking renewals and reconfigurations. Significant aspects of the program include Track Laying System (TLS) deployment to replace defective concrete ties ($191m) , renewal of 13 interlockings/turnouts in PA, MD, and DE ($154m). Program will help maintain reliable performance and reduce speed restrictions, train delays, and maintenance costs.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	115.1	62.9	60.9	83.2	90.8	101.2	399
Funding Gap		68.5	73	68.5	51.1	27.6	288.6

SPECIAL PROJECTS

1. Washington Union Station 2nd Century Plan

This project would build on 2012 Washington Union Terminal Master Plan, which outlined a vision to redevelop the station and its air rights to address capacity constraints and aging infrastructure. The project would triple rail passenger capacity and double train capacity by modernizing and expanding station facilities and rail infrastructure. It would integrate three million square feet of transit-oriented development over the existing rail yard. Near-term funding would advance a package of near-term investments that can be advanced in parallel with the preparation of an Environmental Impact Statement for the long-term improvements. Additional funding is required for design and construction of improvements.

($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Funding Available	19.9	0	0	0	0	0	0
Funding Gap		49.1	43.3	56.1	57.9	58.2	264.6

Coordinating Agency - Amtrak

Full Construction Cost - $7,000 Million

Current Phase - Planning

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
2. Ivy City Traffic Upgrades This project would develop and implement a master plan to meet service and store needs for MARC, Amtrak, and VRE trains so they can support anticipated increases in commuter and intercity demand. Plan would evaluate whether property acquisition is needed. Current storage and maintenance facilities are approaching capacity. Additional funding is required for design and construction of improvements.	Funding Available	6.1	0	0	0	0	0	0
	Funding Gap		10	25	150	150	10	345
	Coordinating Agency - Amtrak **Full Construction Cost** - TBD **Current Phase** - PE/NEPA							
3. Maryland Section Reliability Improvements This project would upgrade 30 miles of existing Track 1 in MD and make associated signal system and track upgrades for higher speed operations on the Washington-to-Baltimore section of the NEC. This section of the NEC operates at or near capacity and is not able to reliably absorb increases in service without additional infrastructure. This project would reduce congestion-related delays and provide new overtake capacity between different classes of service. Additional funding is required for design and construction of improvements.	Funding Available	3.2	0	0	0	0	0	0
	Funding Gap		9.7	13.3	22.6	15.8	10.3	71.7
	Coordinating Agency - Amtrak **Full Construction Cost** - $82 Million **Current Phase** - PE/NEPA							
4. Hanson Interlocking* This project would improve operational flexibility at New Carrollton station and reduce delays for Amtrak and MARC service. A new interlocking would allow universal moves and reduce conflicts that occur when trains must pass other trains stopped at New Carrollton. Construction of Hanson Interlocking would also advance a state of good repair by allowing for the retirement of aging Carroll Interlocking.	Funding Available	.8	5.3	0	0	0	0	5.3
	Funding Gap		8	8	8	0	0	24
	Coordinating Agency - Maryland DOT **Full Construction Cost** - $30 Million **Current Phase** - Final Design							
5. BWI Thurgood Marshall Airport Station Interim Improvements* This project will complete renovation of the existing BWI Thurgood Marshall Airport Station building to provide improved customer service, accessibility, and security. The project involves interior station improvements including new ADA-compliant restrooms; updated interior finishes and lighting; exterior station improvements to windows, the roof, and canopies; and a new pedestrian connector bridge between the north garage to the existing pedestrian bridge over the tracks.	Funding Available	.4	.5	3	4	0	0	7.5
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Maryland DOT **Full Construction Cost** - $7 Million **Current Phase** - Final Design							

*Funding figures reflect programmed or proposed dollars to be spent over multiple years.
Elsewhere, dollars reflect anticipated or proposed annual expenditures.

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
6. BWI Thurgood Marshall Airport Station Improvements and 4th Track Project*	Funding Available	0	0	0	0	0	0	0
This investment would allow for the construction of a fourth track on the NEC between the Odenton MARC Station and Halethorpe MARC Station. Additional improvements include the full reconstruction of the station to permit boarding of trains from all four tracks.	Funding Gap		12	7	65	180	180	444
	Coordinating Agency - Maryland DOT **Full Construction Cost** - $544 Million **Current Phase** - Final Design							
7. MARC Station Improvements - West Baltimore Station*	Funding Available	.2	.3	.8	2.2	0	0	3.4
This project would reconstruct the West Baltimore MARC Station to add high-level platforms and bring the station into ADA compliance. Depending on the preferred alternative for the B&P Tunnel replacement (project 8), the West Baltimore Station project may be incorporated into the overall B&P Tunnel project. The funding levels assume the West Baltimore MARC Station project remains a stand-alone project. Design is underway, but additional funding is required for construction.	Funding Gap		0	0	.3	.6	73	73.9
	Coordinating Agency - Maryland DOT **Full Construction Cost** - $83 Million **Current Phase** - Planning							
8. Baltimore and Potomac Tunnels	Funding Available	20	20	0	0	0	0	20
This project would replace the B&P Tunnels, which were built in 1873 and are a key chokepoint since the right-of-way is reduced from four to two tracks and the tunnels' tight curvature and poor condition require trains to reduce speeds to 30 mph. Tunnels are in need of constant monitoring and maintenance at high cost. Preliminary engineering and environmental review is funded by HSIPR. Additional funding is required for final design and construction.	Funding Gap		0	30	30	30	250	340
	Coordinating Agency - Maryland DOT **Full Construction Cost** - $4,000 Million **Current Phase** - PE/NEPA							
9. Baltimore Penn Station Master Plan	Funding Available	0	0	0	0	0	0	0
Master Plan would provide a comprehensive and integrated approach for Baltimore Penn Station to advance key near-term state-of-good-repair projects while establishing a development framework to leverage under utilized assets and accommodate future growth and redevelopment, potentially through a public private partnership. The century-old facility is challenged by aging infrastructure and increasing demand for rail ridership and multimodal connectivity. Baltimore Penn Station is Amtrak's 8th busiest station serving nearly one million riders and an additional two million commuter passengers each year. Additional funding is required for design and construction of improvements.	Funding Gap		6.7	8.7	11.2	14.5	16.2	57.4
	Coordinating Agency - Amtrak **Full Construction Cost** - TBD **Current Phase** - Planning							

*Funding figures reflect programmed or proposed dollars to be spent over multiple years.
Elsewhere, dollars reflect anticipated or proposed annual expenditures.

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
10. MARC Station Improvements - Bayview Station* This project would build a new MARC station with two high-level platforms at Bayview Medical Center in Baltimore, as well as associated track, signal, and catenary infrastructure investments between Bay and Point Interlockings. Additional funding is required for design and construction of improvements.	Funding Available	0	0	0	0	0	0	0
	Funding Gap		0	.3	.5	1.1	85.5	87.4
	Coordinating Agency - Maryland DOT **Full Construction Cost** - $79 Million **Current Phase** - PE/NEPA							
11. MARC Storage Improvements - Martins Airport* This project would construct additional storage tracks and related infrastructure at the Martin State Airport Facility. MARC trains lack adequate storage along the Penn Line and often are required to run empty trains between Perryville and Baltimore, MD, using up track capacity and increasing operating costs. Additional funding is required for construction.	Funding Available	.5	.2	4.7	4.3	0	0	9.1
	Funding Gap		0	0	5.3	0	0	5.3
	Coordinating Agency - Maryland DOT **Full Construction Cost** - $15 Million **Current Phase** - Design							
12. Gunpowder River Bridge Replacement This project would replace the existing century-old Gunpowder River Bridge in MD, used by MARC, Amtrak, and Norfolk Southern freight trains. Options include a higher-capacity four-track bridge that would increase service potential for all users. Potential for a separate freight track will also be examined as part of the planning. The poor condition of the bridge has led to more intensive maintenance and increased costs. Additional funding is required for design and construction of improvements.	Funding Available	0	0	0	0	0	0	0
	Funding Gap		1	3	5	5	10	24
	Coordinating Agency - Amtrak **Full Construction Cost** - $550 Million **Current Phase** - PE/NEPA							
13. Bush River Bridge Replacement This project would replace the century-old, half-mile long Bush River Bridge with a new bridge that provides additional capacity for intercity, commuter, and freight operations. Options to increase clearance for maritime traffic would be explored as a design option. Opening the current bridge in a manual exercise that requires over twenty employees due to antiqued components. While rare, failures can be highly disruptive. Additional funding is required for design and construction of improvements.	Funding Available	0	0	0	0	0	0	0
	Funding Gap		1	3	5	5	10	24
	Coordinating Agency - Amtrak **Full Construction Cost** - $400 Million **Current Phase** - PE/NEPA							

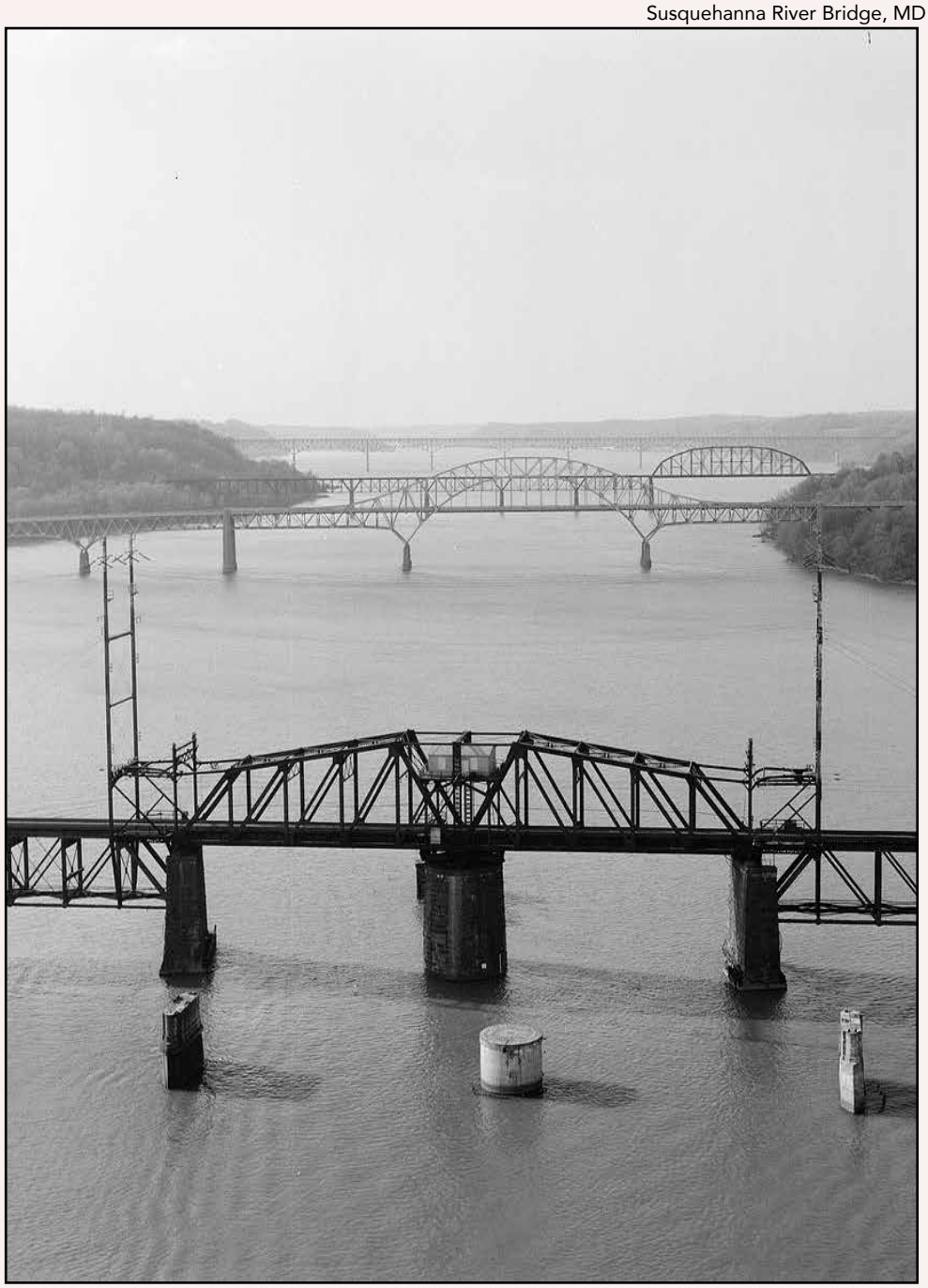
*Funding figures reflect programmed or proposed dollars to be spent over multiple years. Elsewhere, dollars reflect anticipated or proposed annual expenditures.

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
14. Susquehanna River Bridge Replacement This project would replace the movable Susquehanna River Bridge with a modern high-level, fixed structure. The current bridge constricts the NEC to two tracks and requires trains to reduce speeds for almost a mile due to the poor condition of the bridge. The project would benefit commuter and intercity rail as well as Norfolk Southern, which uses the segment to access the Port of Baltimore. Using a $22M HSIPR grant, preliminary engineering and environmental review are underway. Additional funding is required for final design and construction.	Funding Available	5	5	0	0	0	0	5
	Funding Gap		0	5	10	75	250	340
	Coordinating Agency - Maryland DOT **Full Construction Cost** - $850 Million **Current Phase** - PE/NEPA							
15. MARC Storage Improvements - Northeast Maintenance Facility* This project would construct a new MARC maintenance facility north of Baltimore in Cecil County, MD. The new facility would support existing and expanded MARC Penn Line operations by consolidating maintenance and layover functions to a MARC-controlled facility. Preliminary design and environmental review is underway. Additional funding is required for final design and construction.	Funding Available	.2	7.6	0	0	0	0	7.6
	Funding Gap		2	4	51	40	266	363
	Coordinating Agency - Maryland DOT **Full Construction Cost** - $370 Million **Current Phase** - PE/NEPA							
16. Chesapeake Connector The Chesapeake Connector project envisions a new 2.5-mile long, 2-track high-speed section (primarily viaduct above grade) adjacent to the existing NEC between Perryville and Charlestown, MD, bypassing a speed restrictive curve. It includes a flyover at the north end of the viaduct section to provide grade separation between high-speed intercity passenger rail operations and a growing volume of daily freight trains. It would also facilitate a future extension of MARC commuter service to Newark. Investments would improve operational flexibility for all users. Additional funding is required for design and construction of improvements.	Funding Available	0	0	0	0	0	0	0
	Funding Gap		0	0	0	0	0	TBD
	Coordinating Agency - Amtrak **Full Construction Cost** - TBD **Current Phase** - PE/NEPA							
17. Newark (DE) Regional Transportation Center This project will construct an updated Regional Transportation Center in Newark, DE that will increase capacity and support additional SEPTA service between Newark and Wilmington, DE. The project includes construction of a new station house, a new platform, a new freight track connection, and a new pedestrian bridge so passengers are not forced to cross an active track. The project will make the station ADA-compliant, eliminate conflicts with freight operations, and permit expansion of regional and commuter service. This project is funded by a combination of federal, state, and local sources.	Funding Available	4.1	11.9	15.9	0	0	0	27.8
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Delaware DOT **Full Construction Cost** - $32 Million **Current Phase** - PE/NEPA							

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
18. Delaware Third Track Program This project will increase capacity for intercity and commuter service between Wilmington and Newark, DE by eliminating current two-track bottlenecks and installing a third track throughout most of the state. This joint Amtrak/Delaware DOT project is funded by a combination of federal and state sources.	Funding Available	20	24.9	11.6	0	0	0	36.5
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Delaware DOT **Full Construction Cost** - $51 Million **Current Phase** - Construction							
19. Delaware DOT Station Improvements - Claymont Station This project would expand and modernize the Clayton, DE station, including bringing the station into compliance with ADA. The station layout and facilities have not be modernized and require investment to return to a state of good repair. The project would also include a conceptual design to relocate the station to better serve a large industrial site adjacent to the existing station that is targeted for redevelopment. Additional funding is required for design and construction of improvements.	Funding Available	0	1	0	0	0	0	1
	Funding Gap		.8	.8	1	5	10	17.6
	Coordinating Agency - Delaware DOT **Full Construction Cost** - $32 Million **Current Phase** - Planning							
20. Philadelphia 30th Street Master Plan This project is a multi-year initiative including immediate and long-term improvement in passenger and rail facilities and up to 10 million square feet of transit-oriented development over existing rail yards. Immediate work would include design and construction to bring 30th Street Station to a state of good repair and enhance passenger facilities to alleviate congestion and accommodate future growth. Work would build off the 30th Street Master Plan, a partnership between Brandywine Realty Trust, Drexel University, Pennsylvania DOT and SEPTA, to be finalized in June 2016. Additional funding is required for design and construction.	Funding Available	0	0	0	0	0	0	0
	Funding Gap		4.5	5.8	11.7	25.9	22.2	70.1
	Coordinating Agency - Amtrak **Full Construction Cost** - TBD **Current Phase** - Planning							

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
21. 30th Street West Catenary Replacement This project will replace and modernize the SEPTA overhead catenary system from 30th Street Station westbound to K and Zoo Interlockings, an area that includes SEPTA's Powelton Yard. Work also includes repairs to aging catenary support structures, foundations, retaining walls, tunnels, and site drainage. The project will rehabilitate assets beyond their useful life and improve system reliability.	Funding Available	0.8	1	1.1	18.2	21.7	21.7	63.7
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - SEPTA **Full Construction Cost** - $77 Million **Current Phase** - PE/NEPA							
22. 30th Street to Arsenal Signals and ROW Improvements This project will improve SEPTA's Arsenal Interlocking (near University City Station), which serves the Airport, Media/ Elwyn, and Wilmington Regional Rail lines. The project will retire the existing Walnut Interlocking and incorporate its functionality into a rebuilt and reconfigured Arsenal Interlocking. The project, which includes installation of new track, catenary, and signal systems will rehabilitate assets beyond their useful life while improving system reliability.	Funding Available	2.8	15.4	13.6	0	0	0	29
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - SEPTA **Full Construction Cost** - $31.8 Million **Current Phase** - Final Design							

Susquehanna River Bridge, MD



Appendix B: Philadelphia, PA to New Rochelle, NY

BASIC INFRASTRUCTURE PROGRAMS

COMMUNICATIONS AND SIGNALS - Program provides for the replacement of infrastructure components such as cabling, equipment shelters, signals, switches, and switch heaters. Specific projects include design and replacement of World War II-era components at Q Interlocking in Queens, NY ($4.8m). Program will reduce delays, improve reliability and capacity, and reduce maintenance costs.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	35.4	2.5	3.5	3.5	7.5	8.5	25.5
Funding Gap		.5	.5	.9	.9	0	2.8

ELECTRIC TRACTION - Program will provide for the replacement of infrastructure components and includes sectionalized catenary hardware renewal, substation upgrades, and new transformer installations. Specific projects include the multi-year design / replacement of the three substations that provide power to the Hell Gate Line ($35m) and relocation of the Kearny substation, including feasibility study / conceptual design to determine the best location for the substation considering resiliency needs, permitting, environmental concerns, and real estate / land use issues ($35m).

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	58.4	15.6	25	27.8	26.7	26.8	121.9
Funding Gap		3.5	3.7	6.9	3.2	0	17.3

STATIONS AND STRUCTURES - Program will provide for the replacement of infrastructure components and includes culvert upgrades, bridge timber replacement, installation of right-of-way fencing, retaining wall upgrades, and lighting and roofing replacements. Specific projects include repair or replacement of substructures and superstructures ($30m); upgrades to stations ($25m); upgrades for Dock moveable bridge in Newark, NJ ($25m); replacement of an existing undergrade bridge in Morrisville, PA ($21 m); and renewal of two escalators per year at Penn Station, NY ($4m).

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	79.2	37.1	41.5	35.4	30.1	33.3	177.9
Funding Gap		8.3	6.2	8.8	3.6	0	26.8

TRACK - Program provides for the replacement of infrastructure components and includes undercutting, spot tie replacement, joint elimination, worn curve rail replacement, track fastener elimination, ballast cleaning, and turnout/interlocking renewals and reconfigurations. Specific projects include the Penn Station Zero Defects Program that provides for the replacement of wood turnouts at Penn Station and Sunnyside (5-8 turnouts per year at $6 -$7m per year) and interlocking renewals, including removal of old ballast and track, restoration of proper drainage, and installation of new track panels ($103.5m). Program will help maintain reliable performance and reduce speed restrictions, train delays, and maintenance costs.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	77.2	43.5	54.4	68.9	72.5	59.9	299.2
Funding Gap		9.7	8.1	17.1	8.7	0	43.5

NJ TRANSIT STATIONS - Program is designed to address a variety of issues relating to capacity constraints, passenger amenities, ADA compliance and others. These improvements will significantly increase the ability of these stations to meet current and future demand with state of the art facilities and technology.

EDISON -

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL
Available Funding	0	.2	0	0	0	0	0
Funding Gap		0	0	6.9	0	0	6.9

ELIZABETH -

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL
Available Funding	14.4	10	15	15.6	0	0	40.5
Funding Gap		0	0	0	0	0	0

METUCHEN -

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL
Available Funding	0	0	0	0	0	0	0
Funding Gap		0	0	4.7	0	0	4.7

NEW BRUNSWICK -

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL
Available Funding	4	0	0	0	0	0	0
Funding Gap		5	5	0	0	0	10

NEWARK PENN STATION -

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL
Available Funding	0	8.2	7.7	0	0	0	15.9
Funding Gap		0	0	15.1	15	15	45.1

NORTH ELIZABETH -

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL
Available Funding	0	2	0	0	0	0	2
Funding Gap		0	0	0	0	0	0

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
23. Levittown Station Improvements This project will rebuild Levittown Station on SEPTA's Trenton Regional Rail Line to bring the station to a state of good repair and make the station fully ADA compliant. Work includes station improvements, construction of high-level platforms, elevators, a pedestrian overpass, improved intermodal service connections and parking expansion.	Funding Available	3.6	8	7.6	7.6	0	0	23.2
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - SEPTA **Full Construction Cost** - $36 Million **Current Phase** - Construction							
24. West Barracks Yard This project would build a storage yard, the West Barracks Yard, north of Trenton Station in NJ for SEPTA equipment, which is currently stored on platform tracks. The new yard would increase storage capacity, reduce operating costs, ensure trains are stored outside of flood prone areas, and open track and platform space for SEPTA, NJ TRANSIT and Amtrak. Additional funding is required for design and construction.	Funding Available	.3	0	0	0	0	0	0
	Funding Gap		14	20	0	0	0	34
	Coordinating Agency - SEPTA **Full Construction Cost** - $34.3 Million **Current Phase** - Planning							
25. Princeton Junction Station This project will involve the installation of a tactile edge panel at each of the three platforms where passengers load onto trains bound for Trenton and Newark as well as for the local Dinky Track. Interim repairs to the platforms will also be undertaken as needed.	Funding Available	0	1	0	0	0	0	1
	Funding Required		0	0	0	0	0	0
	Coordinating Agency - NJ TRANSIT **Full Construction Cost** - $1 Million **Current Phase** - Construction							
26. New Jersey HSR Improvement Program This program will upgrade electric power systems, signal systems, tracks, and overhead catenary wire along a 23-mile section of track between Trenton and New Brunswick, NJ to support faster, more reliable, and more frequent service for NJ TRANSIT and Amtrak. Modernized infrastructure will allow Acela services to reach 160 mph, their highest speed on the NEC. This project is funded for construction, with $450m in funding from the federal government in addition to local funding.	Funding Available	106.6	12.9	0	0	0	0	12.9
	Funding Gap		6	15.4	3.8	12.5	0	37.6
	Coordinating Agency - Amtrak **Full Construction Cost** - $487.6 Million **Current Phase** - Construction							

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
27. North Brunswick Station This project would construct a new station with two separate center island platforms able to support the operation of 12-car trains. A new station building would also be constructed and would contain improved security devices and passenger information systems to encourage a better passenger experience. This new station is being advanced to address growing ridership on NJT services in this portion of the NEC which cannot be accommodated at existing stations.	Funding Available	0	0	0	0	0	0	0
	Funding Gap		10	15	20	25	30	100
	Coordinating Agency - NJ TRANSIT **Full Construction Cost** - $100 Million **Current Phase** - Construction							
28. NJT Middle Zone Improvements: Adams Substation This project would design and construct a new substation in Adams, NJ. Project would address the need for additional transformation capacity to properly operate electric trains in this area, given increased train traffic and plans for a new NJ TRANSIT station in New Brunswick. The project is needed to provide sufficient levels of traction power to both Amtrak and NJ TRANSIT trains. Additional funding is required for design and construction of improvements.	Funding Available	0	0	0	0	0	0	0
	Funding Gap		1	5	10	10	10	36
	Coordinating Agency - Amtrak **Full Construction Cost** - $36 Million **Current Phase** - PE/NEPA							
29. Mid-Line Loop This project would construct a new above-grade connection between existing and planned storage facilities and the NY- bound local track of the NEC. The crossover would eliminate at-grade movements that create conflicts between commuter and intercity trains. It would increase capacity for all users, improve reliability for NJ TRANSIT services, and help enable the goal of 160 mph speeds on Acela, as well as support future express service patterns planned by NJ TRANSIT. Preliminary engineering is currently underway. Additional funding is required for final design and construction.	Funding Available	0	5.4	0	0	0	0	5.4
	Funding Gap		15	30	70	93	0	208
	Coordinating Agency - NJ TRANSIT **Full Construction Cost** - $350 Million **Current Phase** - Planning							
30. Jersey Avenue Station This project would include the reconstruction of the existing station with new Eastbound and Westbound platforms along completely rebuilt station. These improvements will be complimented by the addition of a new commuter parking lot that will be connected to the station via a pedestrian overpass. This project is being coordinated with the construction of NJ TRANSIT's Delco Lead Project.	Funding Available	0	2	3	0	0	0	5
	Funding Gap		0	5	7	15	16	43
	Coordinating Agency - NJ TRANSIT **Full Construction Cost** - $48 Million **Current Phase** - PE/NEPA							

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
31. County Yard This project would expand the existing County Storage Yard from its current footprint to include an unused part of an adjacent rail freight yard. The Yard supports the interrelated investments described for the NJHISPR (project 26) and the Mid-Line Loop (project 29), and is a key resiliency project designed in response to Superstorm Sandy. The Delco Lead project (project 32), with County Yard improvements, will provide safe storage capacity for up to 444 rail cars in the event of flooding at other locations. The project will also support future service expansion by providing additional train storage.	Funding Available	0	7	0	0	0	0	7
	Funding Gap		0	13	20	40	45	118
	Coordinating Agency - NJ TRANSIT **Full Construction Cost** - $125 Million **Current Phase** - PE/NEPA							
32. Delco Lead Safe Haven Facility Project Project will construct a safe haven storage facility on the NEC south of the New Brunswick station to protect rail rolling stock against damage resulting from a storm surge. A service and inspection facility that is part of the project will facilitate the rapid return of equipment to service following a storm event. Project is supported by FTA Emergency Relief Program funds.	Funding Available	189.7	0	0	0	0	0	0
	Funding Required		10	15	20	11.3	0	56.3
	Coordinating Agency - NJ TRANSIT **Full Construction Cost** - $246 Million **Current Phase-** Planning							
33. NJ TRANSITGRID This project will create a microgrid power generation and distribution system as a backup to the regional power network, allowing transit systems to function during storms or other times when the centralized power grid is compromised. NJ TRANSITGRID will incorporate renewable energy, distribution generation, and other technologies to provide resilient power to key NJ TRANSIT stations, maintenance facilities, bus garages, and other buildings. The project will also provide resilient electric traction power to NJ TRANSIT trains on critical corridors, including portions of the NEC, to continue to operate even when the traditional power grid fails.	Funding Available	15.3	0	0	0	0	0	0
	Funding Gap		70	90.1	113	134	155	562.1
	Coordinating Agency - NJ TRANSIT **Full Construction Cost** - $580 Million **Current Phase** - Planning							
34 Hunter Flyover This project would construct a flyover to eliminate at-grade crossings and reduce conflicts, increasing capacity for NJ TRANSIT and Amtrak and enabling NJ TRANSIT to improve Raritan Valley Line service. Currently, eastbound (Newark-bound) Raritan Valley Line trains must travel along the westbound local track or cross the NEC at grade to reach the eastbound local track. Additional funding is required for construction.	Funding Available	5	0	0	0	0	0	0
	Funding Gap		35.7	25.7	71.4	71.4	0	204.2
	Coordinating Agency - NJ TRANSIT **Full Construction Cost** - $209 Million **Current Phase** - Planning							

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
35. Portal North Bridge This project is part of the Gateway Program (project 36) but carved out separately for the purposes of the NEC Capital Investment Plan. This project would replace the century-old Portal Bridge. Amtrak and NJ TRANSIT have completed final design and environmental review to replace the existing swing-span bridge over the Hackensack River with a new fixed-span bridge. The recently completed design process involved a preliminary design phase for which costs of $31m were shared between NJ TRANSIT and Amtrak. Final design was funded by a Federal Railroad Administration grant of $38.5m. The two-track replacement bridge, known as Portal North Bridge, is estimated to cost approximately $1,190 million and would proceed with the cooperation of NJ TRANSIT and Amtrak as soon as funding can be secured.	Funding Available	32.2	0	0	0	0	0	0
	Funding Gap		347	378.1	286.3	114.4	33.4	1,159.2
	Coordinating Agency - Amtrak **Full Construction Cost** - $1,190 Million **Current Phase** - Construction							
36. Gateway Program (Investments Beyond Projects 35 and 38) The Gateway Program would create four mainline tracks between Newark, NJ and New York, NY, the most severe bottleneck on the NEC. This program includes several major projects that are carved out for the purposes of the NEC Capital Investment Plan, including the Hudson Tunnel Project (project 38), a new Portal North Bridge (project 35), and improvements in and around Penn Station New York. The investments listed here account for the rest of the Program which would include upgrades to and modernization of existing infrastructure, such as the electrical system that supplies power to the roughly 450 weekday trains using this track segment, and elements of expanding the railroad to four tracks. The program is in early stages of development and construction cost estimates are not yet complete. Amtrak has directed more than $300m to the Gateway Program since 2012, including approximately $74m for planning and pre-construction, and $235m in FTA Emergency Relief funds for Hudson Yards concrete casing. Additional funding is required for design and construction of improvements.	Funding Available	63.4	0	0	0	0	0	0
	Funding Gap		355	1,295	1,384	1,493	1,395	5,924
	Coordinating Agency - Amtrak **Full Construction Cost** - TBD **Current Phase** - Planning							
37. River-To-River Rail Resiliency (R4) Projects This program will protect the East River Tunnels and the West Side Yard against flood hazards to ensure connectivity at New York Penn Station for Amtrak, LIRR, and NJ TRANSIT. The program consists of multiple elements, including West Side Yard perimeter protection and drainage improvements, hardening the Queens Portals of the East River Tunnels, resiliency improvements within the East River Tunnels, including the installation of permanent emergency generators, and waterproofing of the entrances and manhole/conduit points of entry to two ventilation facilities.	Funding Available	1.6	21.3	21.3	21.3	21.3	21.3	106.4
	Funding Gap	0	0	0	0	0	0	0
	Coordinating Agency - MTA Long Island Rail Road **Full Construction Cost** - $108 Million **Current Phase** - Planning							

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
38. Hudson Tunnel Project This project is part of the Gateway Program (project 36) but carved out separately for the purposes of the NEC Capital Investment Plan. This project includes design and construction of a new two-track tunnel to enable the future rehabilitation and modernization of the existing two-track tunnel which was inundated with corrosive salt water during Superstorm Sandy and will continue to deteriorate without comprehensive rehabilitation. Taking one track out of service at a time without the new tunnel would reduce total capacity for Amtrak and NJ TRANSIT, impacting 200,000 passengers on 450 trains each weekday. With an initial $15.2 million in funding available in FY16, preliminary engineering and environmental review are underway with the FRA as the lead agency and NJ TRANSIT as the NEPA manager. Additional funding is required to complete design and begin construction.	Funding Available	15.2	0	0	0	0	0	0
	Funding Gap		55	14.3	26	206.9	967.7	1,269.9
	Coordinating Agency - Amtrak **Full Construction Cost** - TBD **Current Phase** - PE/NEPA							
39. Moynihan Station The Port Authority and NY and NJ (PANYNJ) and the Moynihan Station Development Corporation (MSDC) are partners with Amtrak in redeveloping the James A. Farley historic post office building into a new intermodal transportation facility. Moynihan Station, will relieve congestion and overcrowding at Penn Station New York. TIGER and HSIPR are partially funding Phase I of the station redevelopment, which focuses on below-grade transportation investments. Additional funding is required for design and construction of Phase II improvements including a new train hall	Funding Available	9	0	0	0	0	0	0
	Funding Gap		40.8	51	13.1	0	0	105
	Coordinating Agency - Amtrak **Full Construction Cost** - TBD **Current Phase** - PE/NEPA							
40. Penn Station New York - NJ TRANSIT Projects This project will make much needed improvements to Penn Station New York. Investments are targeted at improving safety and ameliorating congested pedestrian flows on stairways and passages leading to and from the train platforms below. Among the projects being advanced are: extending the existing Central Concourse to allow for more vertical access to existing train platforms, improving the existing Hilton corridor so it better connects between vertical access points to platforms, improving signage and wayfinding given the often confusing passageways found within the Station to facilitate the safe and efficient movement of passengers and visitors. While come funding is programmed for this work, additional funding is needed to make all the necessary improvements.	Funding Available	0	5	5	0	0	0	10
	Funding Gap		0	15	20	30	0	65
	Coordinating Agency - NJ TRANSIT **Full Construction Cost** - $75 Million **Current Phase** - Planning							

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
41. Penn Station New York - State of Good Repair This project would repair and improve assets at Penn Station New York. Work would include replacing elevators and escalators, upgrading customer service facilities, installing new HVAC equipment, improving lighting, and rehabilitating platforms. Elevators and escalators assets have reached the end of their useful life, stairways are in poor condition, and rehabilitation or upgrades are needed to HVAC, platforms, and lighting. Some funding for these improvements is pending approval of the MTA Capital Program. Additional funding is required for other improvements.	Funding Available	1.5	7.7	4.8	0	0	0	12.5
	Funding Gap	1	13.9	13.9	13.9	13.9	13.9	69.5
	Coordinating Agency - MTA Long Island Rail Road **Full Construction Cost** - $85.3 Million **Current Phase** - Final Design							
42. East River Runnel - Right of Way Infrastructure Improvements This project would include several initiatives in the East River Tunnels, including a Stray Current Study, communications antenna replacement in lines 3 and 4, total track replacement in lines 3 and 4, and substation replacement. Work would evaluate and mitigate stray current in the tubes, improve radio system infrastructure in the tunnels and on the platforms at Penn Station New York used by Amtrak and LIRR, and install a new fully operational AC-DC Traction Power Substation to replace a substation that is beyond its useful life. The project would improve reliability and reduce delays and maintenance costs by replacing and/or upgrading existing equipment. Some funding for these improvements is pending approval of the MTA Capital Program. Additional funding is required for other improvements.	Funding Available	8.4	14.3	13	0	0	0	27.3
	Funding Gap	9.7	4.9	4.9	0	0	0	9.8
	Coordinating Agency - MTA Long Island Rail Road **Full Construction Cost** - $91.3 Million **Current Phase** - Final Design							
43. East River Tunnel Rehabilitation This project would rehabilitate all four East River tunnels from MP 0.2 (Penn Station) to approximately MP 2.7 (East Portal) at a planned cost of $80 million per year. Each tunnel is approximately 13,000 feet in length. To rehabilitate the track and drainage systems will require removal and replacement of track and ballast, new welded rail installed, new impedance bonds installed, new I joints installed, drainage system cleaning with new covers installed, the removal and replacement of third rail for the entire length of all four East River Tunnels.	Funding Available	0	0	0	0	0	0	0
	Funding Gap		15	25	70	140	100	350
	Coordinating Agency - Amtrak **Full Construction Cost** - $650 Million **Current Phase** - Planning							

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
44. Harold Interlocking This project will construct new conflict-free train routes through Harold Interlocking, the busiest switch point on the NEC. Located in Queens, NY, this interlocking sorts Amtrak, LIRR, and NJ TRANSIT trains as they travel north and east of Penn Station or access Sunnyside Yard for service and storage. The project, which utilizes HSIPR funds, will greatly improve reliability, on-time performance, and travel time for all rail services.	Funding Available	121.5	63.5	13.9	69.4	94.5	70.5	311.9
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - MTA Capital Construction **Full Construction Cost** - $612.5 Million **Current Phase** - Construction							
45. Penn Station Access* Penn Station Access (PSA) is an MTA project that will open a new Metro-North Railroad link directly into Penn Station, New York, providing critical system resiliency and redundancy to protect Metro-North customers in the event of service disruptions to Grand Central Terminal. The new New Haven Line link to Manhattan's West Side will also result in greater mobility, access, connectivity, and travel time savings and help address capacity issues at GCT. As part of the project, four new Metro-North Stations will be built in the Bronx – near Co-op City, Morris Park, Parkchester/Van Nest and Hunts Point, introducing direct rail service connections for the area's residents to employment centers in West Midtown Manhattan and locations to the east along the NHL. Similarly, easier access will be provided to employment centers in the East Bronx. In addition to the four stations, the project includes upgrading the power and signal systems along the Hell Gate Line; adding new interlockings and tracks, and modifying existing ones and curves on a portion of the line; replacing existing over the street railroad bridges as necessary; and upgrading the Bronx River Bridge.	Funding Available	0	0	0	0	0	0	0
	Funding Gap	0	40	416	239	0	0	695
	Coordinating Agency - MTA Metro-North **Full Construction Cost** - $695 Million **Current Phase** - Planning							
46. Pelham Bay Bridge Replacement This project would replace the century-old movable Pelham Bay Bridge with a new high-level fixed bridge with clearance for marine traffic. The two-track bridge, which creates a bottleneck by constricting traffic to 45 mph, opens frequently for marine traffic and occasionally fails to properly close, creating a block for Amtrak service. Additional funding is required for design and construction of improvements.	Funding Available	.7	0	0	0	0	0	0
	Funding Gap		3	5	5	25	100	138
	Coordinating Agency - Amtrak **Full Construction Cost** - $368 Million **Current Phase** - PE/NEPA							

*Funding figures reflect programmed or proposed dollars to be spent over multiple years.
Elsewhere, dollars reflect anticipated or proposed annual expenditures.

Appendix C: New Rochelle, NY to New Haven, CT

BASIC INFRASTRUCTURE PROGRAMS - CONNECTICUT DOT*

COMMUNICATIONS AND SIGNALS - Project will replace the current cab-signal system with a modern technology-advanced, upgradeable system that will increase train velocity and frequency. Project includes installation of two fiber optic, aerial cables to accommodate current and future communication and signaling equipment as well a new cab-signal system to enhance interoperability with Positive Train Control. The current wayside signal block spacing was formulated on freight train speeds and braking distances, and the 1975-vintage communications and signal system was not configured towards passenger rail service. Final design for the CT portion of the project is underway, and design for the NY portion of the line is complete.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	85	84	18	25	29.4	68.7	225.2
Funding Gap		0	0	0	0	0	0

ELECTRIC TRACTION - Program replaces six substations supplying electric traction power in CT to the New Haven Line segment of the NEC. The existing substations are obsolete and not capable of supplying reliable electric traction power. Failure of these substations causes major disruption of service for Amtrak and Metro-North trains, and their replacement will ensure reliability and additional capacity for service increases to address growing demand.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	84	10	15	15	0	0	40
Funding Gap		0	0	0	0	0	0

STATIONS AND STRUCTURES - Program repairs aging infrastructure in CT along the New Haven Line segment of the NEC. Work includes culvert replacement; interim repairs to the moveable bridges at Cos Cob, Devon, and Saugatuck; repairs to maintenance facilities; steel, abutment and foundation repairs to fixed undergrade bridges; and the timber replacement program. Repairs will promote proper functioning and extend the useful life of these structures until they can be replaced. Program prevents slow orders and outages and is critical to providing safe and reliable service.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	28	10	11	12	15	15	63
Funding Gap		0	10	10	0	0	20

TRACK - Program provides for cyclical replacement of ties, switches, and interlockings to prevent a backlog of maintenance that would significantly increase the likelihood of an accident due to track failure. Continual repair and improvement to track drainage ensures that investments in ties and switches last their full useful life.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	42	12.2	15	38	28	25	118.3
Funding Gap		50	30	0	0	25	105

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NEW HAVEN LINE CATENARY REPLACEMENT PROGRAM - Program will complete the final phases of a multiple-year $350m investment that began in the 1990s to replace the overhead catenary system on the New Haven Line in CT. Some of the system is over 80 years old and, under high heat, can sag and occasionally get caught in moving trains, causing expensive damage, track outages, and major delays. The fully modernized catenary system will reduce maintenance costs and improve reliability for Amtrak and Metro-North riders.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	120	40	0	0	0	0	40
Funding Gap		0	0	0	0	0	0

NEW HAVEN LINE BRIDGE REPLACEMENT PROGRAM - Program will replace three bridges in Greenwich and Stamford and include major repairs or replacements at the Sound Beach, Tomac Road, East Avenue, Osborne Avenue, and Maple Lane Bridges. The New Haven Line includes over 100 fixed, undergrade bridges that carry trains over roads and waterways. The majority of these bridges are over a century old and routine inspections indicate they are in critical need of major repair or replacement to prevent a failure that would result in a major service disruption for Amtrak and Metro-North.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	0	30	143.2	119.6	0	0	292.8
Funding Gap		0	0	0	0	0	0

*Funding figures reflect programmed or proposed dollars to be spent over multiple years.
Elsewhere, dollars reflect anticipated or proposed annual expenditures.

BASIC INFRASTRUCTURE PROGRAMS - MTA METRO-NORTH*

COMMUNICATIONS AND SIGNALS - Program would address communications and signal (C&S) infrastructure to support train operations along the MTA-owned portion of the New Haven Line used by Amtrak and Metro-North. Work would include installation of Positive Train Control and cyclical programs to replace C&S equipment. Program would prolong the life of the overall infrastructure and ensure safety and reliability. Funding for the program is pending approval of the MTA Capital Program.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	0	0	0	0	0	0	0
Funding Gap	0	7.1	4.3	0.5	0	0.1	12

ELECTRIC TRACTION -Program would address electric traction infrastructure to support train operations along the MTA-owned portion of the New Haven Line. Work would include construction of some elements and design of other elements, with construction advancing in future years. The program would address (through design efforts and/or construction) substations, catenary infrastructure transmission towers, traction power towers, substation equipment, circuit breakers, and equipment needed to return power to the electrical grid harnessed from regenerative braking systems that reduce overall power consumption and lower long run energy costs for all users of the infrastructure. Funding for the program is pending approval of the MTA Capital Program.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	0	0	0	0	0	0	0
Funding Gap	1.5	1.7	4.5	0.2	7.5	0	14

STATIONS AND STRUCTURES - Program would address rehabilitation/replacement of structures to support train operations along the MTA-owned portion of the New Haven Line. This segment includes 20 undergrade and 24 overhead bridges, many of which are over 100 years old, well beyond their life expectancy, and in need of repair to avoid impacting safety and reliability, imposing of slow orders, or, potentially, closing of service. This program would include design for the replacement or rehabilitation of several bridges in the segment, or repairs to the bridges to extend the life, as well as inspections and surveys. Funding for the program is pending approval of the MTA Capital Program.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	0	0	0	0	0	0	0
Funding Gap	0.2	3.2	5.1	3.1	3.9	2.2	17.7

TRACK - Program would address replacement of track infrastructure components to support train operations along the MTA-owned portion of the New Haven Line. The track infrastructure work would include the cyclical replacement of ties, rail, mainline turnouts, and insulated joints, as well as rail grinding, ballast cleaning, rail joint welding, cyclical surfacing, and track work equipment. Work would prolong the life of the overall track infrastructure, minimizing track outages and slow orders. Funding for the program is pending approval of the MTA Capital Program.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	0	0	0	0	0	0	0
Funding Gap	0.04	4.9	2.7	3.1	3.5	1.8	16

NEW HAVEN LINE - STATIONS SOLE BENEFIT - Program would update stations along the New Haven Line with state of the art technology, primarily to enhance the customer experience. Notable investments are the installation of customer information technology that provides real time performance information and installation of a new fare payment system to allow for a single card or smartphone to be used for the entire MTA network.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	0	0	0	0	0	0	0
Funding Gap	0	3.2	2.1	0.1	0	4.4	9.8

*Funding figures reflect programmed or proposed dollars to be spent over multiple years.
Elsewhere, dollars reflect anticipated or proposed annual expenditures.

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
47. Cos Cob Bridge Replacement* This project includes interim repairs to the functionally obsolete 112-year-old Cost Cob Bridge, the busiest movable bridge on the New Haven Line. The project includes replacing the miter rails and deck timber as well initial work on the design for the full replacement of the structure. The existing bridge requires constant maintenance due to aging components and years of deferred maintenance. Additional funding is required for design and construction of a replacement bridge.	Funding Available	15	16.5	30	0	0	0	46.5
	Funding Gap		0	0	0	50	0	50
	Coordinating Agency - Connecticut DOT **Full Construction Cost** - $1,000 Million **Current Phase** - Planning							
48. Norwalk Bridge Replacement* This project will replace the functionally obsolete 120-year-old Norwalk River Bridge, which has experienced increasing deterioration of electrical and mechanical components. Failure of key components has resulted in periodic serious service disruptions for Amtrak and Metro-North services, and the bridge is vulnerable to additional damage from a storm surge. CTDOT has committed to replace this asset with a combination of federal and state funds. Construction will require an extended continuous outage of two tracks where normally four are operational. This change in track availability could cause changes in schedule, decreases in reliability, or even reductions in service. Connecticut has identified two additional capital projects in the vicinity of Norwalk River Bridge, including a new interlocking and an upgraded train yard, that could facilitate the operational flexibility required to preserve existing service during construction. However, Connecticut has not yet identified all the funding required to implement these investments to ensure service continuity.	Funding Available	262	139	87	80	80	0	386
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Connecticut DOT **Full Construction Cost** - $700-900 Million **Current Phase** - Final Design							
49. Saugatuck River Bridge Replacement* This project includes interim repairs on the functionally obsolete 112-year-old Saugatuck River Bridge, which carries four New Haven Line tracks and is used by Amtrak and Metro-North. Age and deferred maintenance have caused deterioration affecting electrical and mechanical components. Additional funding is required for design and construction of a replacement bridge.	Funding Available	0	15	0	0	0	0	15
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Connecticut DOT **Full Construction Cost** - $350 Million **Current Phase** - Planning							

*Funding figures reflect programmed or proposed dollars to be spent over multiple years.
Elsewhere, dollars reflect anticipated or proposed annual expenditures.

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
50. Devon Bridge Replacement* This project includes interim repairs to the functionally obsolete 111-year-old Devon Bridge and $50m to complete design for a replacement bridge. The bridge, which carries four New Haven Line tracks over the Housatonic River, has experienced serious deterioration, and CTDOT has identified it as the next most critical movable bridge for replacement after the Norwalk River Bridge. Additional funding is required for design and construction of a replacement bridge.	Funding Available	25	25	0	0	0	0	25
	Funding Gap		0	0	0	0	1,000	1,000
	Coordinating Agency - Connecticut DOT **Full Construction Cost** - $1,000 Million **Current Phase** - PE/NEPA							
51. New Haven Line Station Improvements* This program will upgrade and repair the Stamford, Bridgeport, and Noroton Heights Stations to ensure continued safe operation and improve the passenger experience. Work will increase canopy and windscreen coverage, provide additional pedestrian paths, repair and replace platform sections that are failing due to their age, and ensure ADA compliance. The program also includes a parking garage and pedestrian bridge for New Haven Station, the new Barnum Station in Bridgeport, and the installation of real time audio and video systems at all mainline stations.	Funding Available	10	105	80	50	85	0	320
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Connecticut DOT **Full Construction Cost** - TBD **Current Phase** - Design/Construction							
52. New Haven Line Network Infrastructure Upgrades* This project will upgrade the communications network infrastructure along the New Haven Line segment of the NEC by installing fiber optic communication cable and equipment to support closed circuit television safety cameras at vulnerable passenger stations and bridges. This system will also be capable of supporting passenger information displays and other amenities at stations. The project will improve passenger safety and security as well as the resiliency of the overall system.	Funding Available	30	25	35	10	0	0	70
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Connecticut DOT **Full Construction Cost** - $100 Million **Current Phase** - Construction							
53. New Haven Yard Master Complex Improvements* This project is a multi-year initiative that receives funding on an annual basis to store and maintain the rail fleet and spare parts. CT received $9m in FTA Emergency Relief funds to install a backup feeder as an alternative power source at New Haven Yard. Additional funding would design and construct other modernization elements, including new facilities to improve efficiency and allow for growth.	Funding Available	87	60	48	60	75	75	318
	Funding Gap		0	100	100	100	0	300
	Coordinating Agency - Connecticut DOT **Full Construction Cost** - TBD **Current Phase** - Planning/Construction							

*Funding figures reflect programmed or proposed dollars to be spent over multiple years.
Elsewhere, dollars reflect anticipated or proposed annual expenditures.

Appendix D: New Haven, CT to Boston, MA

BASIC INFRASTRUCTURE PROGRAMS

COMMUNICATIONS AND SIGNALS - Program provides for the replacement of infrastructure components, such as cabling, equipment shelters, signals, and switches. Specific projects include upgrades to battery back-up banks at five interlockings in New England to improve resiliency in the event of a power outage ($8) and upgrades to electronic controllers at three interlockings in CT, RI, and MA ($1m). Program also includes upgrades to communications equipment houses across the division. Program will help avoid operational delays, capacity reductions, and unplanned service disruptions.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	3.7	1.6	2.1	2.9	.9	1.3	8.9
Funding Gap		.64	1.9	2.2	.5	.3	5.7

ELECTRIC TRACTION -Program will provide for the replacement of infrastructure components and includes substation renewals, bridge icicle mitigation, and the installation of circuit breakers to upgrade defective or antiquated circuit switchers. Specific projects include the installation of upgraded circuit breakers in Sharon, MA ($1.3m). Program will improve reliability, reduce train delays and maintenance costs, and avoid delays to state highway projects by relocating catenary equipment.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	1	.9	.8	.9	1.1	1.2	5.2
Funding Gap		.8	.8	.7	.6	.3	3.3

STATIONS AND STRUCTURES - Program will provide for the replacement of infrastructure components and includes culverts upgrades, bridge timber replacement, installation of right-of-way fencing, retaining wall upgrades, lighting and roofing replacements, and maintenance and replacement of bridge-related components. Specific projects include replacement of the Shaw's Cove, CT moveable bridge wood fender system with a composite fender system ($11m); structural upgrades to moveable bridges ($17.5m); upgrades, replacements and construction at stations ($20m); support for CTDOT construction of a new platform and overpass at Branford station; and platform extensions at Guilford Station. Program will help avoid speed restrictions, delays, and increases to maintenance costs.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	16.8	16.1	17.7	14.8	12.6	9.	70.2
Funding Gap		13.7	16.6	10.9	6.7	2.5	50.6

TRACK - Program will provide for the replacement of infrastructure components and includes spot undercutting, spot tie replacement, joint elimination, worn curve rail replacement, track fastener elimination, and ballast cleaning. Specific projects include turnout renewals at Southampton Yard and Tower 1, Branford, Transfer, and Shore Line Junction Interlockings; replacement of concrete ties that are failing or at risk of failure ($25m per year); and rebuilding of all turnouts in Davisville, MA Interlocking ($3.1m). Program will help maintain reliable performance and reduce speed restrictions, train delays, and maintenance costs.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	23.4	17.9	16.4	34.6	40.4	50.8	160.2
Funding Gap		15.3	15.5	25.6	21.4	14.1	92

SPECIAL PROJECTS

54. Clinton Interlocking

Interlocking investments in Clinton, CT would include the installation of turn-outs, rail, ties, sub-grade, ballast, overhead catenary, signal transformers, signals cables, signal bridges, switch heaters, switch machines, switch houses, instrument houses, and interlocking lighting. The project would increase operational flexibility for Shore Line East and Amtrak. Preliminary design is complete. Additional funding is required for final design and construction.

($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Funding Available	0	0	0	0	0	0	0
Funding Gap		1	15	15.5	0	0	31.4

Coordinating Agency - Amtrak

Full Construction Cost - $31.4 Million

Current Phase - Final Design

*Funding figures reflect programmed or proposed dollars to be spent over multiple years.
Elsewhere, dollars reflect anticipated or proposed annual expenditures.

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
55. Shore Line East Station Improvements*	Funding Available	18.8	0	15	17	0	0	32
This project will complete an over 10-year long initiative to expand and improve stations served by Shore Line East. Most stations had a single low-level platform, forcing trains to switch tracks to serve stations, resulting in reduced capacity. This phase includes constructing high-level platforms, improving waiting areas, and expanding parking at Clinton, Madison, and New Haven State Street. Expanded parking at Guilford and a feasibility study of a new station in Niantic are also included. The project will reduce delays, improve the passenger experience, and expand capacity for future service.	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Connecticut DOT **Full Construction Cost** - TBD **Current Phase** - Construction							
56. Shore Line East Track and Catenary Improvements*	Funding Available	0	20	0	0	0	0	20
This project will install electric catenary along key stretches of track in Old Saybrook, Guilford, and New London. The project will enable the transition of Shore Line East from diesel-powered trains to electric powered equipment and allow for future service expansion.	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Connecticut DOT **Full Construction Cost** - TBD **Current Phase** - Construction							
57. Connecticut River Bridge Replacement	Funding Available	2	0	0	0	0	0	0
This project would replace the century-old Connecticut River Bridge. The frequent opening and closing of the bridge – over 3,000 times per year – puts high demands on its aging components, increasing maintenance costs and reducing reliability for both railway and marine traffic. Many key elements of the bridge have reached the end of their design life and require extensive maintenance to remain in operable condition. The new bridge would improve reliability and offer higher speeds for Amtrak and Shore Line East trains. Preliminary design and environmental review will be completed in FY17. Additional funding is required for construction of the new bridge.	Funding Gap		6	250	250	150	0	656
	Coordinating Agency - Amtrak **Full Construction Cost** - $656 Million **Current Phase** - PE/NEPA							
58. New England Interlocking Improvements	Funding Available	0	0	0	0	0	0	0
This project would install new interlockings in Mystic, CT ($31.4m) and Hebronville, MA ($14.4m). Construction would include the installation of turn-outs, rail, ties, sub-grade, ballast, overhead catenary, signal transformers, signals cables, signal bridges, switch heater, switch machines, switch houses, instrument houses, and interlocking lighting. These new interlockings would provide operating flexibility, improve reliability, and allow for future maintenance outages. Additional funding is required for design and construction of improvements.	Funding Gap		0	1	16	22.2	4.8	43.9
	Coordinating Agency - Amtrak **Full Construction Cost** - $43.9 Million **Current Phase** - Final Design							

*Funding figures reflect programmed or proposed dollars to be spent over multiple years.
Elsewhere, dollars reflect anticipated or proposed annual expenditures.

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
59. Kingston Track and Platform Capacity Improvements This project will build a high-speed passing siding and high-level platforms at Kingston Station. The project also includes the construction of a new interlocking (Liberty) west of Kingston. Funding is available to complete the environmental analysis, prepare the final design, and construct an additional 1.5 miles of an electrified third track on a heavily used portion of the NEC. The project will improve ADA access at the station, increase capacity, and reduce travel time.	Funding Available	14.5	26.5	0	0	0	0	26.5
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Rhode Island DOT **Full Construction Cost** - $41 Million **Current Phase** - Construction							
60. Quonset Maintenance Layover Facility This project would build a combined passenger/freight maintenance and layover facility, which would include a 6-8 track yard, engine house, inspection pit, and other related facilities. Additional funding is required for design and construction.	Funding Available	0	0	0	0	0	0	0
	Funding Gap		.5	2	10	7.5	0	20
	Coordinating Agency - Rhode Island DOT **Full Construction Cost** - $20 Million **Current Phase** - Planning							
61. RIDOT Station Improvements - Warwick/T.F. Green Airport Station This project would expand Warwick/T.F. Green Airport Station and provide for additional track and platform capacity to allow for increased MBTA and Amtrak service. Phase 1 included the construction of a station house and a single high-level platform to support the introduction of MBTA commuter rail services to the Airport and communities south of Providence. Additional funding is required for design and construction of station expansion.	Funding Available	0	0	0	0	0	0	0
	Funding Gap		2	3	15	10	10	40
	Coordinating Agency - Rhode Island DOT **Full Construction Cost** - $40 Million **Current Phase** - Planning							
62. Providence Station This project would develop short- and long-term improvements to the interior and exterior of Providence Station. Funding is available for preliminary engineering and environmental review of short-term improvements. Long-term actions could build connections to adjacent retail centers, enhance bus/intermodal connections, increase parking, and expand the station. Additional funding is required for construction.	Funding Available	9.8	0	0	0	0	0	0
	Funding Gap		2	5	5	10	0	22
	Coordinating Agency - Rhode Island DOT **Full Construction Cost** - $31.8 Million **Current Phase** - Planning							

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
63. MBTA Layover Facilities - Pawtucket Layover Facility This project will implement improvements to the existing Pawtucket Layover Facility, where the MBTA stores and services some trains for the Providence/Stoughton Line. Enhancements will allow MBTA to perform fueling and some light equipment maintenance in Pawtucket, relieving pressure on other MBTA facilities. Phase 1, completed in 2013, included a 700 ft. inspection pit. In this phase, RIDOT and MBTA will construct fueling and sanding facilities.	Funding Available	2.8	1.9	0	0	0	0	4.7
	Funding Gap		1	10	5	0	0	16
	Coordinating Agency - Rhode Island DOT **Full Construction Cost** - $20.7 Million **Current Phase** - Final Design							
64. RIDOT Station Improvements - Pawtucket/Central Falls Station This project would build a new commuter rail station in Pawtucket, RI. Funding is available for site assessment and evaluation, conceptual design, preliminary engineering, environmental review, transit-oriented development assessment, and public outreach. The project would improve access to commuter rail service, provide relief to overcrowded stations in Providence and South Attleboro, attract new riders, and improve access to jobs in Boston and Providence. Additional funding is required for final design and construction.	Funding Available	.5	0	0	0	0	0	0
	Funding Gap		1	2	12	15	10	40
	Coordinating Agency - Rhode Island DOT **Full Construction Cost** - $40.5 Million **Current Phase** - PE/NEPA							
65. MBTA Station Improvements - South Attleboro Station This project would improve South Attleboro Station, including rehabilitation of stairways, pedestrian walkways, establishment of a new bus stop for RIPTA, accessible parking improvements, pedestrian crossings, and mini-high platforms. Emergency repairs currently are underway, but permanent improvements are needed. Preliminary engineering and environmental review are underway. Additional funding is required for final design and construction.	Funding Available	0	.1	.2	0	0	0	.3
	Funding Gap		4	0	0	0	0	4
	Coordinating Agency - Massachusetts DOT **Full Construction Cost** - TBD **Current Phase** - Planning							
66. MBTA Station Improvements - Mansfield Station This project would make improvements to heavily-used Mansfield Station which currently is not fully accessible. The project includes pedestrian ramps and stairways to make platforms accessible for inbound and outbound passengers, replacement of existing mini-high platforms which are in poor condition with ADA-compliant mini-high platforms, platform repaving, new tactile strips along both platforms, new lighting, guard rails, bollards, signage, curb cuts, and improvements in parking lots for better accessibility. Funding for final design is in place. Additional funding is required for construction.	Funding Available	0	2.4	0	0	0	0	2.4
	Funding Gap		8	0	0	0	0	8
	Coordinating Agency - Massachusetts DOT **Full Construction Cost** - $10.4 Million **Current Phase** - Final Design							

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
67. Route 128 Station Improvements This project would make improvements to Route 128 Station, used by Amtrak and MBTA. Work would replace the interior elevators and escalators, which have reached the end of their useful life, make other upgrades to lighting and rest rooms, and replace the roof system. Preliminary engineering and environmental review are underway. Additional funding is required for final design and construction.	Funding Available	0	0	0	0	0	0	0
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Massachusetts DOT **Full Construction Cost** - $11 Million **Current Phase** - PE/NEPA							
68. MBTA Station Improvements - Ruggles Street Station This project will construct a new platform and make other improvements at Ruggles Station to enable all inbound and outbound MBTA trains to serve the station and to increase system capacity along this segment of the NEC. The project will improve accessibility by upgrading the existing elevators and adding one new elevator in the lower busway, and make interior and exterior repairs to bring the station to code. A TIGER grant partially funds this project, which is part of a larger initiative to modernize the Ruggles Station.	Funding Available	0	6	12	12	0	0	30
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Massachusetts DOT **Full Construction Cost** - TBD **Current Phase** - Construction							
69. Next Generation High Speed Fleet Infrastructure - Southampton St. Yard Upgrade This project would allow for the reconfiguration of tracks at the S&I building in order to allow for the storage of additional trains. In addition, the HST Health Hub will be upgraded to allow for diagnostic information to be processed more quickly, thus shortening the amount of time necessary for regular maintenance operations.	Funding Available	0	0	0	0	0	0	0
	Funding Gap		.5	2	2	0	0	4.5
	Coordinating Agency - Amtrak **Full Construction Cost** - $4.5 Million **Current Phase** - Planning							
70. Boston South Station This project would expand Boston South Station for future growth. The terminal is currently operating at capacity, in terms of train movements and passengers, creating a significant bottleneck and a major obstacle to service expansion. State funding and a HSIPR grant are funding preliminary engineering and environmental review. Additional funding is required for final design and construction.	Funding Available	12.5	8	0	0	0	0	8
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Massachusetts DOT **Full Construction Cost** - TBD **Current Phase** - PE/NEPA							

Appendix E: System Wide Support Programs

PROGRAMS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
MTA Metro-North System Wide Support These programs provide the support and management of capital investments to ensure scope development, asset management planning, as well as work elements which facilitate project delivery, such as system-wide environmental remediation and lead/asbestos abatement, protective liability coverage, independent engineering oversight services, value engineering services, scope analysis and security assessments.	Funded	0	0	0	0	0	0	0
	Unfunded	20.6	13.0	18.3	10.6	13.6	20.6	76.2
	Coordinating Agency - MTA Metro-North							
Amtrak Multi-Discipline/System Amtrak's systemwide basic infrastructure program includes projects that benefit the entire NEC and lack the geographic specificity to categorize them within a single subregion. These projects are necessary to maintain the overall rail network. Specific projects include the Washington to New York system undercutting program ($25-$29m per year), the purchase of track roadway equipment ($18m per year), and the purchase of maintenance equipment such as tie inserters, tie handlers, anchor applicators, rail heaters, a fan car, and a diesel-electric crane. Systemwide projects of this type benefit the NEC as a whole and are essential to maintain reliable performance, avoid speed restrictions, reduce delays, and avoid increases in maintenance costs.	Funded	32.9	70	72.8	79.8	94.6	106.8	424
	Unfunded		51.9	53	46.9	36.1	18.4	206.3
	Coordinating Agency - Amtrak							
Next Generation High Speed Fleet Infrastructure - Ride Quality Investment This investment would allow for Amtrak to begin to establish reference surfacing on the portions of the NEC owned by Amtrak. This process would result in a higher quality track geometry, thus increasing ride quality and passenger comfort.	Funded	0	0	0	0	0	0	0
	Unfunded		52	4.3	4.2	2.2	2.2	64.8
	Coordinating Agency - Amtrak							
Next Generation High Speed Fleet Investment - Safety Mitigation This investment would for the operation of Amtrak's Acela Express, a trainset that is classified as Tier III in the Federal Railroad Administration's High-Speed Passenger Rail Safety Strategy (HSPRSS). Following a detailed investigation by Amtrak, limited investments in alteration of right of way and high speed tracks would allow for the safe operation of this train at its maximum speed of 160mph. Such operations require relief from regulation limitations currently in place under FRA.	Funded	0	0	0	0	0	0	0
	Unfunded		.9	30	30	29.1	0	90
	Coordinating Agency - Amtrak							

Appendix F: Philadelphia, PA to Harrisburg, PA

BASIC INFRASTRUCTURE PROGRAMS

COMMUNICATIONS AND SIGNALS - Program provides for the replacement of infrastructure components, such as cabling, equipment shelters, signals, and switches. Program will help avoid operational delays, capacity reductions, and unplanned service disruptions.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	.2	.19	.09	.11	.13	.16	.7
Funding Gap		.21	.11	.09	.07	.04	.5

ELECTRIC TRACTION - Program will provide for the replacement of infrastructure components and includes sectionalized catenary hardware renewal, substation upgrades, and new transformer installations. Much electric traction infrastructure dates from the 1930s and the catenary hardware is close to 100 years old. Program will maintain reliable performance and prevent train delays.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	5.3	7.7	7.3	3.4	2.1	1.3	22
Funding Gap		6.6	7.2	2.1	.6	.1	16.6

STATIONS AND STRUCTURES - Program provides for the replacement of infrastructure components and includes upgrades of culverts, bridge timber replacement, installation of right-of-way fencing, retaining wall upgrades, and lighting and roofing replacements. Program will reduce the need for speed restrictions, train delays, and maintenance costs that rise when aging assets are not replaced.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	.3	12.6	1.9	2.1	2.4	2.6	21.7
Funding Gap		13.7	2.3	1.7	1.4	.7	19.9

TRACK - Program provides for the replacement of components and includes undercutting, spot tie replacement, joint elimination, worn curve rail replacement, track fastener elimination, ballast cleaning and turnout/interlocking renewals and reconfigurations. Specific projects include renewal and reconfiguration of State, Paoli, and Zoo Interlockings, where work also includes ballast and track replacement, drainage improvements, and new track panels. Program will help maintain reliable performance and reduce speed restrictions.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	3.2	5.2	13.8	11.1	6.4	3.7	40.3
Funding Gap		5.7	16.5	9.1	3.6	1.1	36

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
71. Ardmore Station Improvements This project will make several improvements to Ardmore Station on SEPTA's Paoli/Thorndale Regional Rail Line and Amtrak's Keystone Corridor to make the station fully ADA compliant. Improvements are being advanced in phases. Phase I of this project includes a new station building, high-level platforms, modifications to the existing pedestrian tunnel, new canopies and passenger shelters, and site and circulation improvements. Additional funding is required for construction of a parking garage.	Funding Available	0	11.5	13.2	4.4	0	0	29.1
	Funding Gap		0	0	10.4	10.1	5.5	26
	Coordinating Agency - SEPTA **Full Construction Cost** - $62 Million **Current Phase** - Construction							
72. Villanova Station Improvements This project will modernize Villanova Station on SEPTA's Paoli/Thorndale Regional Rail Line. Work includes high-level platforms with canopies, a new pedestrian underpass with ramps and stairs, station building exterior improvements, parking lot modifications, stormwater management, and new signage, lighting, passenger amenities, and landscaping. The improvements will make the station fully ADA accessible. The project will be advanced in phases. Phase I activities will improve station accessibility, through the construction of a new pedestrian tunnel with access ramps and stairs, and modify the parking lot to improve stormwater management. Phase II will build high-level platforms, canopies, and an improved station building.	Funding Available	1.6	6	6.3	5.6	4.7	3.7	26.3
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - SEPTA **Full Construction Cost** - $30.6 Million **Current Phase** - Construction							

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
73. Paoli Station Improvements This project will reconstruct Paoli Intermodal Station on SEPTA's Paoli/Thorndale Regional Rail Line and Amtrak's Keystone Corridor. Phase I will make the existing station ADA accessible and include a pedestrian overpass with elevators connecting to parking lots and a new high-level center platform. Reconfiguration of the outbound parking areas are part of the project, as are pedestrian linkages. Phase I construction includes an intermodal station complex with an additional high-level platform on the outbound side, waiting area and passenger amenities, enhanced bus facilities, and a parking garage. Phase II would advance in future years.	Funding Available	2.6	12	12	12	0	0	36
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - SEPTA **Full Construction Cost** - $48 Million **Current Phase** - Construction							
74. Frazer Rail Shop and Yard Upgrade This project will accommodate the increased fleet size resulting from SEPTA's procurement of multi-level cars for the Regional Rail System to accommodate growing ridership. The project includes significant renovations and expansion of the 35-year-old shop and yard facilities, as well as a new washer, employee facilities, and improvements at the site to create space for additional yard tracks.	Funding Available	4.8	21.9	34.6	31.2	14	0	101.7
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - SEPTA **Full Construction Cost** - $106.5 Million **Current Phase** - Final Design							
75. Exton Station Improvements This project will implement overall station improvements to Exton Station on SEPTA's Paoli/Thorndale Regional Rail Line and Amtrak's Keystone Corridor and will provide full-length high-level boarding. Work includes construction of high-level boarding platforms, ramps and stairs, a new station building, new canopies, and shelters. The project will bring the station to a state of good repair and make the station ADA compliant.	Funding Available	3.5	8.7	6.9	0	0	0	15.6
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - SEPTA **Full Construction Cost** - $23.4 Million **Current Phase** - Construction							
76. Harrisburg Line Interlocking Improvements PennDOT proposes to fully replace multiple interlockings on the Harrisburg Line, to advance a state-of-good-repair and to support future passenger rail expansion for both SEPTA and Amtrak. In FY16, PennDOT completed preliminary engineering and NEPA work on the following interlockings: Bailey, Potts, Paoli, Wynnfield, Villa, Nova, and Zoo, funded in part by an HSIPR grant. Additional funding is required for construction, which will not begin until after FY21, according to PennDOT's estimated schedule	Funding Available	0	0	0	0	0	0	0
	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Pennsylvania DOT **Full Construction Cost** - $267.5 Million **Current Phase** - Final Design							
77. Harrisburg Line Station Improvements The Commonwealth of Pennsylvania, in partnership with SEPTA and Amtrak, has embarked on an investment program that will eventually modernize virtually the all of the Amtrak stations along the Harrisburg Line, including shared Amtrak-SEPTA stations. For FY17-21, PennDOT will lead construction of three new stations at Middletown, Mount Joy and Coatesville. All of the new stations will provide ADA access with high level boarding platforms, improved/expanded parking, and incorporated multimodal connections. In addition, it is the intent that these projects will lead to community and economic development.	Funding Available	0	36	30	23	3	0	92
	Funding Gap		0	9	9	0	0	18
	Coordinating Agency - Pennsylvania DOT **Full Construction Cost** -$110 Million **Current Phase** - Construction							

Appendix G: Albany/Hudson Line

BASIC INFRASTRUCTURE PROGRAMS - AMTRAK

COMMUNICATIONS AND SIGNALS - Program provides for the replacement of infrastructure components such as cabling, equipment shelters, signals and switches. Program will help avoid operational delays, capacity reductions, and unplanned service disruptions.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	.3	.3	.1	0	0	0	.4
Funding Gap		12.7	12.7	12.7	12.7	12.7	63.8

STATIONS AND STRUCTURES - Program provides for the replacement of infrastructure components and includes upgrades of culverts, bridge timber replacement, installation of right-of-way fencing, retaining wall upgrades, and lighting and roofing replacements. Specific projects include replacement of electrical and mechanical assets on the Spuyten Duyvil moveable bridge damaged in Superstorm Sandy ($41M) and replacing the wooden fender system on the east side of the bridge to steel ($11M). Program will reduce speed restrictions, train delays, and maintenance costs that rise when aging assets are not replaced.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	3	0	0	0	0	0	0
Funding Gap		15.1	37.5	30.5	5.5	4.8	93.5

TRACK - Program provides for the replacement of infrastructure components and includes spot undercutting, spot tie replacement, joint elimination, worn curve rail replacement, track fastener elimination, and ballast cleaning. Program will help maintain reliable performance, reduce speed restrictions, and avoid maintenance costs that occur with under investment.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	5.5	0	0	0	0	0	0
Funding Gap		8.6	12.4	10.4	11	11	53.5

BASIC INFRASTRUCTURE PROGRAMS - MTA METRO-NORTH*

COMMUNICATIONS AND SIGNALS - This program will focus investment on the installation of Positive Train Control along with state of the art fiber optics to provide the most reliable communication on this corridor. Such investments will help lengthen the useful life of such assets and progress a state of good repair. Funding for the program is pending approval of the MTA Capital Program.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	0	0	0	0	0	0	0
Funding Gap	0	72.8	20.4	2.7	20	32.3	148.3

STATIONS AND STRUCTURES - This program is aimed at improving the over 110 undergrade and 90 overhead bridges on the Hudson Line, many of which are over 100 years old and severely deteriorating. As these assets continue to age, delays resulting from minor failures will continue to degrade service reliability unless these assets are either replaced or rehabilitated. Funding for the program is pending approval of the MTA Capital Program.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	0	0	0	0	0	0	0
Funding Gap	2.3	18.8	26.4	20.3	9.2	10.4	85.1

TRACK - This program will fund the programmatic replacement of track infrastructure used by both Metro-North and Amtrak trains in order to provide a safe and comfortable experience for customers. Other activities to be conducted include rail grinding, ballast cleaning, resurfacing and other track work to minimize outages and increase reliability. Funding for the program is pending approval of the MTA Capital Program.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	0	0	0	0	0	0	0
Funding Gap	27.8	20.1	18.4	19.3	0	8.3	66

STATIONS - SOLE BENEFIT This program is designed to enhance passenger's experience for Metro-North riders through the installation of real-time train arrival and departure screens as well as upgrades for the elevator and escalators. Other investments include the upgrading of the fare payment system to allow for a single smart card or phone to be used to travel the entire MTA system. Funding for the program is pending approval of the MTA Capital Program.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	0	0	0	0	0	0	0
Funding Gap	2.1	13	21.3	.5	0	15.3	50.1

ET - SOLE BENEFIT - Program will provide for continual investments in traction power in order to support current service levels as well as projected growth. Specific investments in this category are to include the phasing out of antiquated power components with state of the art equipment as well as the installation of third rail insulators, brackets, snow melters and other components aimed at increasing reliability and capacity. Funding for the program is pending approval of the MTA Capital Program.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	0	0	0	0	0	0	0
Funding Gap	7.7	2.8	8.6	.1	.1	0	11.5

HARMON SHOP AND YARD UPGRADES - This project would replace Metro-North's Harmon Shop electric repair facility to complete a multi-year shop replacement program. This project consists of modernizing a hundred-year-old shop and yard complex to support an expanded fleet of electric and diesel hauled rail cars. Funding for these improvements is pending approval of the MTA Capital Program.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	0	0	0	0	0	0	0
Funding Gap	0	2	385.6	46	10	40	483.6

*Funding figures reflect programmed or proposed dollars to be spent over multiple years.
Elsewhere, dollars reflect anticipated or proposed annual expenditures.

Appendix H: Springfield Line Projects

BASIC INFRASTRUCTURE PROGRAMS

COMMUNICATIONS AND SIGNALS - Springfield Line communications signal systems are largely being rebuilt as part of the New Haven-Hartford-Springfield rail program. See Project Number 78 and 79.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	0	0	0	0	0	0	0
Funding Gap		0	0	0	0	0	0

STATIONS AND STRUCTURES - Program will provide for the replacement of infrastructure components and includes culvert upgrades, bridge timber replacement, and undergrade bridge upgrades. Specific projects include replacement of bridge timbers at Asylum Street in Hartford and the upgrade of three culverts in Connecticut.

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	0	1.4	.8	.9	1.1	0	4.3
Funding Gap		1.1	.6	.5	.4	0	2.7

TRACK - Springfield Line track is largely being rebuilt as part of the New Haven-Hartford-Springfield rail program. See Project Number 78 and 79. .

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
Available Funding	1.3	0	0	0	0	0	1.3
Funding Gap		0	0	0	0	0	0

SPECIAL PROJECTS

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
78. New Haven - Hartford - Springfield Rail Program, Phase 1-3A*	Funding Available	155	0	0	0	0	0	0
The New Haven-Hartford-Springfield Rail Program is being progressed in phases to rebuild and upgrade infrastructure. The New Haven-Hartford-Springfield corridor is underserved by rail, leading to increased congestion and poor access to jobs, which hinders economic growth. The first phases, funded for construction, include adding a second track between New Haven and Hartford, overhauling the signal and communications system, rehabilitating or replacing many bridges and culverts, and improving stations at Wallingford, Meriden, Berlin, and Hartford. These investments will improve reliability and allow for increased service.	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Connecticut DOT **Full Construction Cost** - TBD **Current Phase** - Construction							
79. New Haven - Hartford - Springfield Rail Program, Phase 3B-5*	Funding Available	0	0	0	0	0	0	0
The New Haven-Hartford-Springfield Rail Program is being progressed in phases to rebuild and upgrade infrastructure. The final phases, which are not funded, would restore a full double track railroad with a goal of providing 25 trains per day at 30 minute headways.	Funding Gap		0	0	110.3	140	0	250.3
	Coordinating Agency - Connecticut DOT **Full Construction Cost** - TBD **Current Phase** - Planning							

*Funding figures reflect programmed or proposed dollars to be spent over multiple years.
Elsewhere, dollars reflect anticipated or proposed annual expenditures.

SPECIAL PROJECTS	($M)	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL FY17-21
80. Hartford Line Commuter Station Improvements*	Funding Available	10.6	0	30	30	30	0	90
This project will add new stations along the New Haven-Hartford-Springfield corridor at North Haven, Newington, West Hartford, and Enfield. An additional platform at State Street Station in New Haven is entering construction allowing riders on the new Hartford Line to more easily walk to downtown New Haven. The project will attract new riders by providing new transportation options.	Funding Gap		0	0	0	0	0	0
	Coordinating Agency - Connecticut DOT **Full Construction Cost** - TBD **Current Phase** - Construction							
81. Springfield Maintenance and Storage Facility	Funding Available	0	0	0	0	0	0	0
This project would construct a new maintenance and storage facility in Springfield, MA on a site partially owned by Massachusetts DOT. The new facility would increase capacity and reliability for the New Haven-Hartford-Springfield Line by allowing trains to be maintained at an additional site. Preliminary engineering and environmental review are underway. Additional funding is required for final design and construction.	Funding Gap		3	6	6	2	0	17
	Coordinating Agency - Massachusetts DOT **Full Construction Cost** - TBD **Current Phase** - Planning							
82. Springfield Union Station Improvements	Funding Available	3	0	0	0	0	0	0
This project would entail a large-scale renovation and expansion of rail and bus facilities at Springfield Union Station. Phase 1 would include restoration of the station building, reactivation of the tunnel connecting the terminal and rail platforms, new vertical circulation from the tunnel to station platforms, construction of a parking garage, and construction of a 24-bay bus terminal. Additional funding is required to complete final design and construction of all project elements.	Funding Gap		7	7	7	3.5	0	24.5
	Coordinating Agency - Massachusetts DOT **Full Construction Cost** - $78 Million **Current Phase** - Planning							

*Funding figures reflect programmed or proposed dollars to be spent over multiple years.
Elsewhere, dollars reflect anticipated or proposed annual expenditures.

Appendix I: Funding and State of Good Repair Assumptions

Funding Available in FY17-21
While the majority of the work identified in the FY17-21 Capital Investment Plan is not yet funded, there is approximately $5,700M of funding available from different sources:

- **Baseline Capital Contributions (BCCs)**: The NEC Commuter and Intercity Rail Cost Allocation Policy (the Policy) established methods for sharing approximately $500 million in annual baseline capital expenses among operators on the NEC. The Policy assigned a capital charge to each operator based on factors that reflect asset replacement costs and relative use. To date, the Commission has adopted BCC obligations for FY16, and is in the process of updating obligations for subsequent years. The Policy also established a phase-in cash outlay of BCCs, with FY16-18 calculated at 80% of the obligation and FY19 and beyond calculated at the full obligation.

The BCC funding levels for the FY17-21 Plan were based on the FY16 approved obligations and were estimated according to the prescribed phase-in. BCCs are only used toward funding basic infrastructure programs unless variances are approved by the Commission.

- **Special Federal Grants**: Funding in the FY17-21 Plan that comes from one-time, special federal grants. These grants include the American Recovery and Reinvestment Act (ARRA), High-Speed Intercity Passenger Rail (HSIPR) program, US DOT Transportation Investment Generating Economic Recovery (TIGER) grants, and the FTA Emergency Relief Program.

- **State/Local Funds**: Non-BCC funding from state or commuter agencies. These may include agency capital budgets, bond revenues, funding from FTA/FHWA formula programs, other local funds, or a combination of any of these sources.

Funding information was provided by individual agencies and Amtrak. Where applicable, figures have been marked if they are represented as programmed dollars (which may be spent over the course of the project and multiple years) instead of yearly expenditure dollars.

State-of-Good-Repair Backlog Assumptions
The total backlog figure on the NEC includes the basic infrastructure backlog and major backlog projects. The table below breaks down elements of these backlog categories by geography:

Figures in $M			
	Basic Infrastructure Backlog	Major Backlog Projects	Total Backlog
Amtrak Main Line	7,500	13,300	20,800
New Haven Line	1,600	3,200	4,800
Connecting Corridors	2,000	100	2,100
	11,100	16,600	**27,700**

The basic infrastructure backlog information for the Amtrak Main Line and Connecting Corridors was developed from the Amtrak 2013 State-of-Good-Repair Assessment. A similar methodology was used to estimate the basic infrastructure backlog information for the New Haven Line, based on estimated asset condition, annual maintenance costs per track mile, and asset replacement costs.

The major backlog projects are based on agency-provided updates for individual projects, consistent with the FY17-21 Plan.

Credits

Appendix J: FAST Act Legislation

On December 4, 2015, the Fixing America's Surface Transportation (FAST) Act was signed into law. The Act established new planning requirements for the Northeast Corridor. This Capital Investment Plan is the first submission as required by the law. The Commission will continue to refine the planning process moving forward to comply with the stipulations described below.

SEC. 11306. NORTHEAST CORRIDOR PLANNING.

(a) AMENDMENT.—Chapter 249 of title 49, United States Code, is amended—

(1) by redesignating section 24904 as section 24903; and

(2) by inserting after section 24903, as so redesignated, the following:

"§ 24904. Northeast Corridor planning

"(a) NORTHEAST CORRIDOR CAPITAL INVESTMENT PLAN.—

"(1) REQUIREMENT.—Not later than May 1 of each year, the Northeast Corridor Commission established under section 24905 (referred to in this section as the 'Commission') shall—

"(A) develop a capital investment plan for the Northeast Corridor; and

"(B) submit the capital investment plan to the Secretary of Transportation and the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives.

"(2) CONTENTS.—The capital investment plan shall—

"(A) reflect coordination and network optimization across the entire Northeast Corridor;

"(B) integrate the individual capital and service plans developed by each operator using the methods described in the cost allocation policy developed under section 24905(c);

"(C) cover a period of 5 fiscal years, beginning with the first fiscal year after the date on which the plan is completed;

"(D) notwithstanding section 24902(b), identify, prioritize, and phase the implementation of projects and programs to achieve the service outcomes identified in the Northeast Corridor service development plan and the asset condition needs identified in the Northeast Corridor asset management plans, once available, and consider—

"(i) the benefits and costs of capital investments in the plan;

"(ii) project and program readiness;

"(iii) the operational impacts; and

"(iv) Federal and non-Federal funding availability;

"(E) categorize capital projects and programs as primarily associated with—

"(i) normalized capital replacement and basic infrastructure renewals;

"(ii) replacement or rehabilitation of major Northeast Corridor infrastructure assets, including tunnels, bridges, stations, and other assets;

"(iii) statutory, regulatory, or other legal mandates;

"(iv) improvements to support service enhancements or growth; or

"(v) strategic initiatives that will improve overall operational performance or lower costs;

"(F) identify capital projects and programs that are associated with more than 1 category described in subparagraph (E);

"(G) describe the anticipated outcomes of each project or program, including an assessment of—

"(i) the potential effect on passenger accessibility, operations, safety, reliability, and resiliency;

"(ii) the ability of infrastructure owners and operators to meet regulatory requirements if the project or program is not funded; and

"(iii) the benefits and costs; and

"(H) include a financial plan.

"(3) FINANCIAL PLAN.—The financial plan under paragraph (2)(H) shall—

"(A) identify funding sources and financing methods;

"(B) identify the expected allocated shares of costs pursuant to the cost allocation policy developed under section 24905(c);

"(C) identify the projects and programs that the Commission expects will receive Federal financial assistance; and

"(D) identify the eligible entity or entities that the Commission expects will receive the Federal financial assistance described under subparagraph (C) and implement each capital project.

Front Cover: Downtown Providence, RI
Back Cover: Penn Station Baltimore, MD

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