



# Keystone Connected: Intercity Passenger Rail Success Factors

Pennsylvania Transportation Advisory Committee

February 21, 2019

Cover:  
Lancaster Station on Pennsylvania's Keystone Corridor  
View from the Pedestrian Bridge  
(Commonwealth Media Services)

## Acknowledgements

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The Pennsylvania Transportation Advisory Committee (TAC) was established in 1970 by Act 120 of the State Legislature, which also created the Pennsylvania Department of Transportation (PennDOT).

TAC has two primary duties. First, it "consults with and advises the State Transportation Commission and the Secretary of Transportation on behalf of all transportation modes in the Commonwealth." In fulfilling this task, TAC assists the Commission and the Secretary "in the determination of goals and the allocation of available resources among and between the alternate modes in the planning, development, and maintenance of programs, and technologies for transportation systems."

TAC's second duty is "to advise the several modes (about) the planning, programs, and goals of the Department and the State

Transportation Commission." TAC undertakes in-depth studies on important issues and serves as a liaison between PennDOT and the general public.

TAC consists of the following members: the Secretary of Transportation; the heads (or their designees) of the Department of Agriculture, Department of Education, Department of Community and Economic Development, Public Utility Commission, Department of Environmental Protection, and the Governor's Policy Office; two members of the State House of Representatives; two members of the State Senate; and 18 public members—six appointed by the Governor, six appointed by the President Pro Tempore of the Senate, and six appointed by the Speaker of the House of Representatives.

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# 1. Executive Summary

## Purpose

The State Transportation Advisory Committee (TAC) first conducted an intercity passenger rail study in 2001. TAC determined that a 2019 update was in order given the passage of nearly two decades since the topic had been studied. TAC aimed to address one fundamental question: What does it take to make intercity passenger rail feasible?

This study does not in any way aim to establish the feasibility of any corridor. That requires extensive analysis (see Appendix A).

## Scope and Methodology Overview

1. TAC reviewed the current **multimodal context** for intercity passenger rail in Pennsylvania.
2. TAC investigated, through focused **case studies**, the state and national intercity passenger rail experience since 2001—what has worked, what has been less successful, and why?
3. TAC considered other **trends and technologies** that may influence intercity passenger rail supply and demand.
4. Analyzing lessons learned through the case studies in light of trends and technologies, TAC identified **success factors** for intercity passenger rail.
5. TAC updated and augmented the **profiles** of existing and potential Pennsylvania intercity rail corridors from the 2001 study.
6. TAC made a qualitative **assessment** of those corridors against the success factors.
7. Finally, TAC made a series of **recommendations** based on the implications of the analysis.

Highlights of each section follow.



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TAC aimed to address one question: What does it take to make intercity passenger rail feasible?

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### Multimodal Context

This report provides an overview of Pennsylvania’s existing intercity passenger rail corridors, mapped on Figure ES-1.

**Figure ES-1: Pennsylvania’s Amtrak Corridors**



This report also inventories infrastructure and service for the following modes, which may compete with or complement intercity passenger rail:

- **Commuter Rail** – While commuter rail is distinct from intercity rail, the line can be blurred. For example, the Amtrak *Keystone Service* is technically intercity passenger rail but does serve many commuters.
- **Intercity Bus** – Because intercity bus service operates on existing roadways, providers can flexibly and cost-effectively serve travel markets and provide a low-cost alternative to commercial air that is competitive with intercity rail. Amtrak Thruway service coordinates intercity bus service with train schedules.
- **Commercial Air** – Travelers typically choose commercial air service for distances greater than 400-500 miles. Pennsylvania has eight primary commercial service airports.
- **Automobile Travel** – Automobiles allow cost-effective, convenient intercity transportation, with the flexibility of door-to-door service on any roadway route. Rail competes favorably with automobile travel on corridors with heavily congested roadways.

## Case Studies

This report includes case studies and highlights of other national experience:

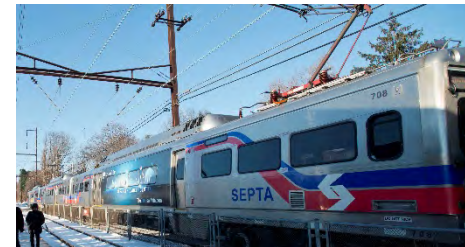
- [Pennsylvania's Keystone Corridor](#)
- [Pennsylvania's Keystone West Corridor](#)
- [Florida's Brightline/Virgin Trains USA](#)
- [Virginia's Amtrak System](#)
- [Texas Central Railway, Dallas to Houston High-Speed Rail](#)
- [Connecticut's Hartford Commuter Rail Line](#)
- [Minnesota's Northern Lights Express](#)
- [California's LOSSAN and Capitol Corridors](#)
- [North Carolina's State-Supported Passenger Rail](#)



Source: Amtrak



Source: Wikipedia



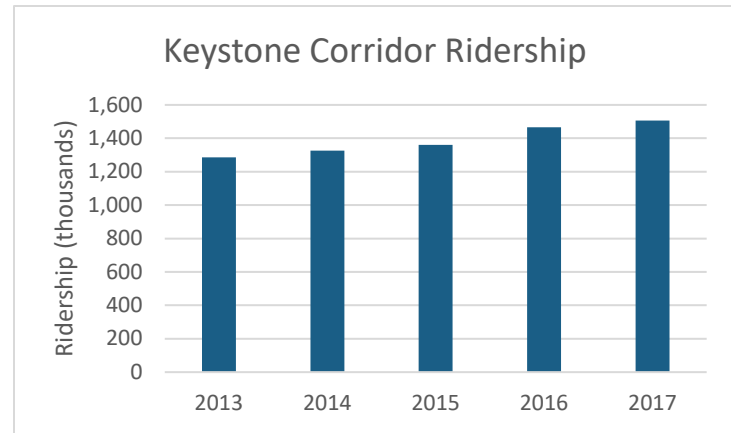
Source: Commonwealth Media Services

**Where is intercity passenger rail working well, and why?**

Intercity rail is experiencing varying degrees of success in the U.S., typically succeeding where there is sufficient population density, economic activity, and highway congestion to generate a market for such services. Several examples are listed below along with some success factors:

**Keystone Corridor – Harrisburg to Philadelphia (see p.29)**

Ridership on the Keystone Corridor has increased over the last decade as infrastructure improvements allowed for faster speeds and more frequency of service, making rail competitive with automobile travel in the congested corridor. PennDOT’s leadership and investment in the corridor have been keys to success.



**Brightline / Virgin Trains USA Florida (see p.39)**

Brightline/Virgin Trains USA is a privately-owned passenger rail system that operates along the existing Florida East Coast Railway corridor, with stations in Miami, Fort Lauderdale, and West Palm Beach. All Aboard Florida has a \$3.5 billion plan to expand the tracks to Orlando by 2022.

While much of this rail system is still developing, success to date has been due to private investment in a service market with high population/growth, rail-supportive economic development, and millions of tourists. The initial service in South Florida provides a much-needed transportation alternative due to the severe congestion of the area’s major highways.



**Amtrak Virginia (see p.43)**

Virginia has seen success with the intercity passenger rail services added over the past nine years. The Virginia Northeast Regional between Lynchburg and Roanoke is especially noteworthy—annual ridership increased nearly 30 percent between 2011 and 2018.

Legislation in 2005 dedicated a portion of the vehicle rental tax to a rail enhancement fund. Legislation in 2011 created the Intercity Passenger Rail Operating and Capital Fund, which receives 40 percent of a 0.125 percentage point increase in the general sales tax, which amounts to approximately \$55 million per year. The funds can be used for operating costs, equipment upgrades, and capital improvements.

### **Other Intercity Rail Start-Ups:**

**Texas** (see p.47): Intercity rail is advancing with the Texas Central Railway – Dallas to Houston, with private investment and high-speed service as the likely key factors for its expected success. A ridership study in 2016 projected five million passengers in 2026, increasing to 10 million by 2050.

**Connecticut** (see p.48): The 62-mile Hartford line, paralleling the I-91 corridor, links New Haven to Springfield, Massachusetts. The line opened in June 2018 and is the first commuter rail service to link Connecticut’s interior cities since 1968. Additional train frequencies and lower fares have contributed to ridership growth, which was reported at 2,000 per day by October. State bonding covered more than two-thirds of the \$768 million project cost; federal funds covered the remainder.

### **Where have intercity passenger rail improvements been more challenging, and why?**

It is noteworthy that since TAC’s last intercity passenger rail study in 2001, Pennsylvania’s experience is arguably the most insightful both for the Keystone Corridor’s success as well as the challenges and limitations for expanding intercity rail on Keystone West between Harrisburg and Pittsburgh. Keystone West service—one train per day in each direction, with steady ridership—can be considered successful. The 2017 financial performance of the *Pennsylvanian* compares favorably to the average for state-supported trains and to the *Keystone Service*. There is support among various community interests throughout the corridor for improvements and expanded service. As laudable as that is, the challenge of improving the corridor for expanded passenger service on the existing freight line is daunting.

The challenges stem from the fundamental differences between Keystone West and the Keystone Corridor, which are instructive:

**Geography and Terrain:** The Keystone West corridor spans 249 miles of mountainous terrain, resulting in indirect routing, steep grades, and relatively slow average speeds (45 mph). By contrast, the Keystone



The *Pennsylvanian* rounding Horseshoe Curve near Altoona  
Source: <https://history.amtrak.com/blogs/blog/on-board-the-pennsylvanian>

Corridor is 104 miles of much gentler topography and a relatively direct right-of-way. The average train speed is 60 mph, with maximum speeds up to 110 mph. Keystone West's terrain makes potential improvements tremendously costly, as detailed in the 2014 Keystone West High Speed Rail Study.

**Ownership:** Keystone West is owned by Norfolk Southern. It is very challenging to operate reliable passenger rail service on a busy freight corridor. The Keystone Corridor is owned by Amtrak, which provides a distinct advantage. However, joint use of corridors for moving people and goods has worked well in other states. For example, Virginia's three extensions of *Northeast Regional* service from Washington, D.C., to Roanoke, Newport News, and Norfolk use non-electrified track owned by freight railroads.

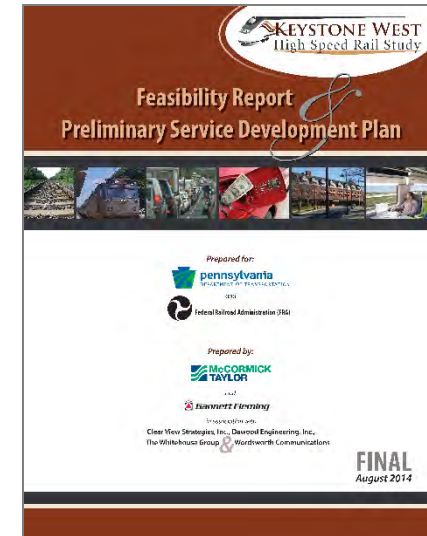
**Population:** Much of the Keystone West corridor has a relatively low population density and is less developed compared to the high densities along the Keystone Corridor. This affects both demand for service (there are more potential passengers in the eastern part of the state) and the competitiveness of passenger rail—train travel is often easier, faster, and more reliable on the Keystone Corridor than travel on the congested parallel roadways, increasing the number of travelers who choose to take the train. For travelers in Western PA with an option to drive, automobile travel between Harrisburg and Pittsburgh is faster than train travel by about two hours.

Note that statistics for the *Pennsylvanian* provide data for the entire Pittsburgh-to-New York City route, not specifically for the Keystone West portion.

## Trends and Technologies

TAC identified seven areas that should be considered in relation to intercity travel generally and intercity rail future planning specifically:

- **Population Migration to Urban Areas** – For the first time we are seeing significant changes in transportation preferences and work/live location decisions. Many transit-oriented Millennials do not want to own cars. Many from the aging Baby Boomers cohort are expected to move from suburbs to cities for a more active and walkable retirement. The combination of city population growth and lower vehicle ownership will



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Many transit-oriented Millennials do not want to own cars.

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impact the market for intercity travel alternatives to the automobile. Some cities anticipating this trend are looking for ways to have more productive land uses than the parking structures and spaces that now consume a large percentage of the urban footprint.

- **Ride-Hailing (Transportation Network Companies)** – The popularity of Uber and Lyft has implications for intercity transportation by providing first- and last-mile connections for public transportation riders by accommodating pick-up and drop-off of passengers at stations. Seamless electronic ticketing that covers all trip segments will make multimodal trip-making even more seamless and attractive from a customer perspective.
- **Connected and Automated Vehicle Technology** – Connected and automated vehicle technology may complement intercity passenger rail if travelers are provided real-time information on mode choices and convenient ticketing and transition points from automobiles.
- **Environment** – Intercity passenger rail has environmental benefits that may encourage public support and ridership.
- **Intercity Bus Revival** – With the advent of modern coaches and premiere bus service, intercity bus has renewed potential to meet intercity travel demand cost-effectively and serve as extensions of rail service. Reliance on existing highway infrastructure and the flexibility of this mode make intercity bus a promising alternative. The social stigma for intercity bus travel is steadily decreasing as Megabus and other new entrants present and market a popular low-cost travel alternative.
- **National and State Policy** – As a long-term trend, national and state transportation policy has steadily promoted a more multimodal and intermodal approach. If this trend continues and/or greater decision-making flexibility is given to state governments, it could be favorable for further supporting a wider range of intercity transportation investments. State policy over the past decade in Pennsylvania has made the Keystone Corridor’s success possible.
- **Transportation Innovations** – It is important to note that almost all of the innovation in the transportation sector for the past two decades has been related to the growing



synergy between information technology and transportation (freight and passenger). This has been seen in GPS, ITS, smart phone applications, and companies like Uber and Lyft that do not own physical assets but rather manage information. This rate and application of change is so rapid that it could significantly impact how intercity transportation is provided in the future—embracing complementary technology is key for passenger rail.

### Success Factors

The case studies and current trends and technologies point to 11 factors that Pennsylvania must consider as part of any assessment, evaluation, or planning for intercity rail in a corridor. The success factors are highlighted below and discussed beginning on page 59.

- **Infrastructure** – Availability, condition, and ownership of rail right-of-way are formidable obstacles if not adequate.
- **Capital Costs and Funding** – This encompasses the cost to build, improve, or expand services and the availability of funding sources for making such expensive investments.
- **Operating Costs and Funding** – Sometimes overlooked, but equally important, are the costs to operate and maintain services, rolling stock (trains), and infrastructure and to sustain these funding sources over time.
- **Organizational Capacity** – This is a broad success factor that recognizes that expanding intercity rail is extremely challenging organizationally and typically involves multiple organizations, including the rail operator, the state DOT, the federal government, and others. Each brings various skills and experience to the overall success of what is essentially a multi-organization collaboration.
- **Public Policy Support** – The case studies generally demonstrate support from public officials through funding and other commitments. One case study, Florida’s Brightline—primarily a private-sector intercity rail initiative—has experienced some notable opposition from public officials and the general public.
- **Partnerships** – Like organizational capacity, partnerships have been key for station development, funding, agreements on shared use of rail lines, etc.



- **Trip-Making Potential** – The existence of major trip attractors such as employers, colleges, major event venues, tourist destinations, and conference centers is essential to ridership. High concentrations of employment and population near the rail stations also correlate with high potential for ridership.
- **Local Connectivity and Access** – This includes stations, public transit connections, and other services and facilities near train stations that make the all-important first and last miles positive in attracting ridership.
- **Connectivity with Amtrak Network** – Intercity rail lines such as the *Keystone Service* that have access to (and operate on) the Amtrak network have a greater chance of attracting passengers. Access to the Northeast Corridor seems to be more important than access to other portions of the national Amtrak system.
- **Limited Competition from Other Modes** – Rail has a greater likelihood of success if the alternative modes are limiting or less attractive (e.g., on a corridor with heavy highway congestion, train travel time and convenience may be highly competitive).
- **Level of Rail Service** – Service frequency, schedules, reliability, travel time, station amenities, customer service, quiet cars, cleanliness of cars, Wi-Fi access, etc. all factor into the appeal of intercity passenger rail.

### Corridor Profiles

To evaluate city pairs for potential new or expanded intercity passenger rail, this study builds on the passenger rail corridors analyzed in TAC's 2001 *Pennsylvania Statewide Passenger Rail Needs Assessment Technical Report*. TAC evaluated all eight of the "High-Rated Corridors"<sup>1</sup> from the 2001 TAC study and two additional corridors

#### City-Pair Corridors Evaluated

##### Corridors with Existing Passenger Rail Service

- [Northeast Corridor \(Washington, DC–Philadelphia–New York City–Boston\)](#)
- [Keystone Corridor \(Harrisburg–Philadelphia\)](#)
- [Keystone West \(Pittsburgh–Harrisburg\)](#)
- [Pittsburgh–Cleveland, OH](#)

##### Corridors without Existing Passenger Rail Service

- [Lehigh Valley–New York City](#)
- [Harrisburg–New York City \(directly, not via Philadelphia\)](#)
- [Scranton–New York City](#)
- [Harrisburg–Washington D.C.](#)
- [Reading–Pottstown–Philadelphia](#)
- [Pittsburgh–Erie](#)

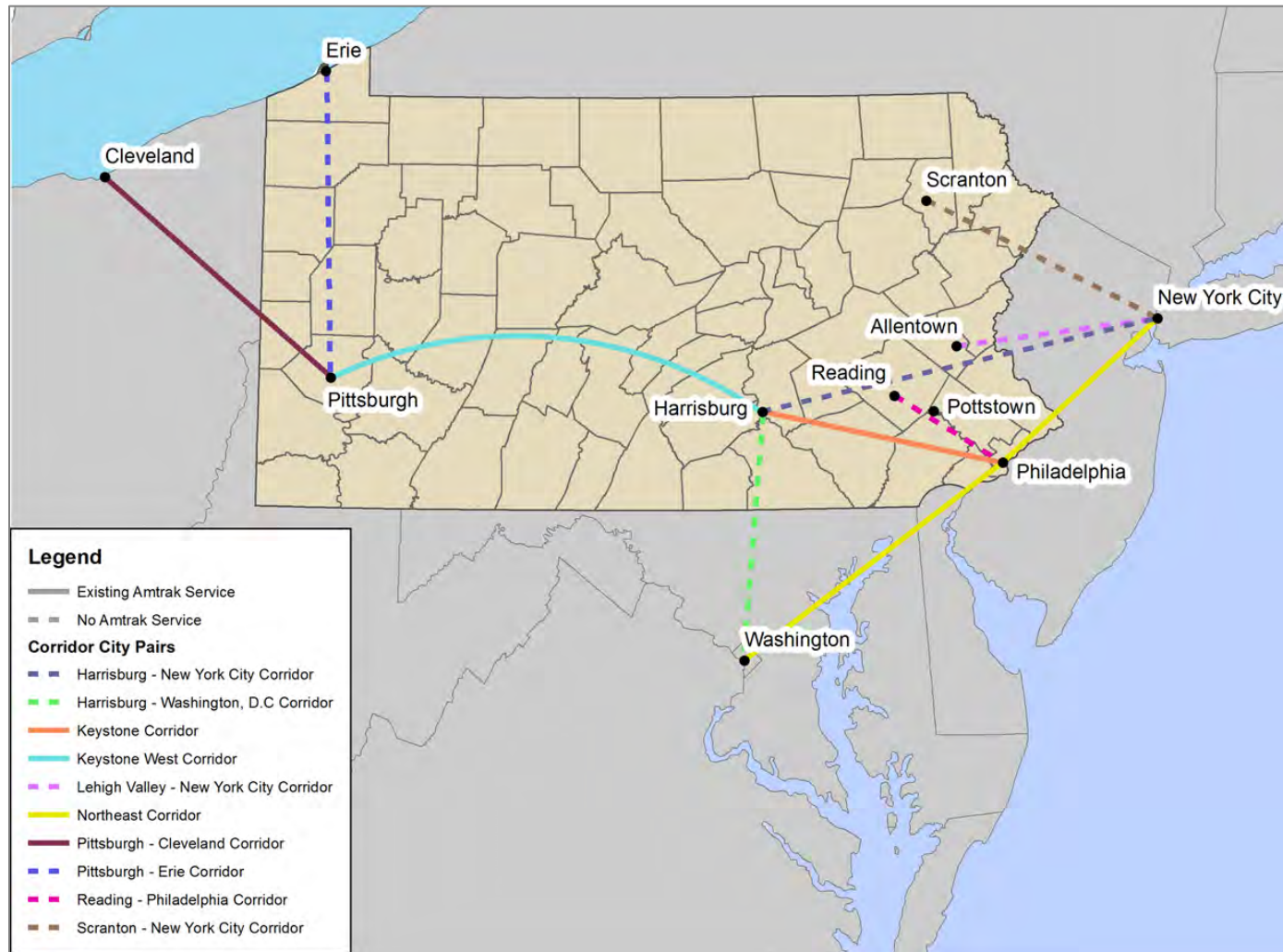
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<sup>1</sup> Pennsylvania Transportation Advisory Committee, *Pennsylvania Statewide Passenger Rail Needs Assessment Technical Report*, December 2001, p.41 (<http://www.talkpatransportation.com/assets/TAC/Pennsylvania%20Statewide%20Passenger%20Rail%20Needs%20Assessment%20-%20December%202001%20-%20Technical%20Report.pdf>)

(Reading–Pottstown–Philadelphia and Pittsburgh–Erie) suggested by current TAC members. The corridors are listed in the sidebar on the previous page with links to the profiles, and mapped in Figure ES-2.

In addition, the corridor profiles section presents [Metropolitan Planning Organization Perspectives](#), with summarized firsthand input from regional planners on issues related to passenger rail service development, gathered through a survey.

**Figure ES-2: City-Pair Corridors**



### Corridor Assessment

TAC evaluated the corridors against the five success factors that lend themselves to comparison. Table 10 on page 118 describes the basis for the corridor ratings.

**Figure ES-3: Corridor Evaluation Matrix**      **KEY: weak** □ **medium** ■ **strong** ■

Corridor	Infrastructure	Trip-Making Potential	Local Connectivity & Access	Connectivity with Amtrak Network	Limited Competition from Other Modes	Comments
Northeast Corridor	■	■	■	■	■	High-demand/speed-reliable travel option.
Keystone Corridor	■	■	■	■	■	Time and cost-competitive with driving.
Keystone West	■	■	■	■	■	Travel time not competitive with auto/bus for Harrisburg–Pittsburgh trips.
Pittsburgh to Cleveland	■	■	■	■	■	Ample existing options—rail, air, and auto.
Lehigh Valley–NYC	□	■	■	■	■	Extensive travel demand and growing congestion. Major infrastructure needs, including stations and additional river crossing. Connection with NJ Transit commuter line depends on NJ Transit connecting west to Phillipsburg, which is not imminent.
Harrisburg–NYC	□	■	■	■	□	Would substantially duplicate Amtrak <i>Keystone Service</i> and <i>Pennsylvanian</i> .
Scranton–NYC	□	■	■	■	■	Corridor has been advocated for decades—population growth and locations could be revisited to determine any significant changes.
Harrisburg–DC	□	■	■	■	■	Lack of a defined corridor and right-of-way is a major limiting factor—auto travel time is good when factored with ability to connect to local transit to avoid congestion (e.g., WMATA Metro at Shady Grove and Greenbelt).
Reading–Pottstown–Philadelphia	■	■	■	■	■	Population, growth, traffic congestion, and very limited ability to expand highway capacity speak to the need for mobility options.
Pittsburgh–Erie	■	□	■	■	□	Existing track connection is circuitous and requires agreements with two freight railroads. I-79 provides connection with ample capacity for car and bus. Lack of infrastructure.

## Recommendations

The study concludes with 11 general recommendations that are listed below and described in Section 8.

- Establish funding and financing strategies/concepts
- Use long-range transportation planning for determining intercity travel priorities
- Consider potential partnerships and coalitions
- Advocate for supportive policy
- Align economic development and transportation strategies, policies, programs, and investments
- Preserve corridors to the extent feasible
- Build upon the Keystone Corridor’s success
- Assess the market feasibility for Keystone West
- Consider targeted, in-depth intercity passenger rail feasibility studies
- Support intercity bus service development
- Dovetail technology with intercity travel

### **Are there corridors with potential for new or expanded intercity passenger rail service?**

Potential is not to be confused with readiness or feasibility. As shown on Figure ES-3, the key determinants of “potential” center around infrastructure (availability), trip-making potential, and having limited competition from other modes (e.g., traffic congestion making other modes less effective). From that perspective the Reading–Pottstown–Philadelphia corridor appears to have the most potential in comparison to the other corridors.

As a policy study, TAC emphasizes that potential does not constitute any indication that the corridor is feasible, simply that it appears to have relatively greater potential among the currently unserved corridors that were compared to the success factors. Should there be further consideration of this corridor it would require a detailed feasibility analysis with in-depth evaluations of infrastructure, costs, environmental impacts, economic benefits, and many other considerations.

## 2. Introduction

### Study Overview and Objectives

The Transportation Advisory Committee (TAC) recognizes that certain areas of the nation, particularly those with significant population growth and travel demand, have invested in new or expanded intercity passenger rail projects to provide a safe, efficient, and environmentally cleaner transportation option linking cities and regions. TAC further recognizes that connecting PA communities with intercity passenger rail service could improve mobility, support new economic opportunities, and be positive environmentally.

TAC prepared a comprehensive study of intercity rail in 2001 (*Pennsylvania Statewide Passenger Rail Needs Assessment Technical Report*). Since that study, PennDOT has made strategic investments in the Keystone Corridor between Philadelphia and Harrisburg, making a train trip cost- and time-competitive with highway travel and improving station accessibility and amenities, resulting in a dramatic increase in ridership.

In light of new technologies, changing demographics, shifting public preferences, and economic challenges, TAC reexamined intercity rail in the broader context of intercity transportation by various modes.

The objectives of this study were to:

1. Reexamine intercity rail within the broader context of intercity transportation trends by addressing a series of targeted study questions.
2. Identify those transportation, cost, economic, and other conditions and supporting factors that would be necessary to sustain new or expanded intercity passenger rail service in Pennsylvania.
3. Conduct a cursory evaluation of corridors between Pennsylvania cities and beyond Pennsylvania's borders in relation to the range of factors necessary for making intercity rail viable (as identified as part of objective #2).

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What does it take to make intercity passenger rail feasible? TAC identified 11 success factors/requirements that answer that question.

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### Scope and Methodology

This study was conducted by answering a series of questions aimed at understanding key trends related to intercity passenger rail and a range of success factors associated with its feasibility. Specifically, drawing on national experience, the ultimate and overarching question this study answers is this: What does it take to make intercity passenger rail feasible? TAC has

identified 11 success factors/requirements that answer that question.

TAC conducted research and collected data on existing intercity passenger rail service within the state to provide a snapshot of the development and operational characteristics of passenger rail transportation between cities/regions in Pennsylvania. TAC also conducted research and collected data from other states that are considering new or expanded intercity passenger rail systems. TAC developed case studies on relevant rail systems, from which to identify cross-cutting success factors for new or expanded service.

Based on these success factors, TAC evaluated city pairs for potential new or expanded intercity passenger rail service, using the eight “High-Rated Corridors” from the 2001 study and two additional corridors suggested by current TAC members. Following this analysis, TAC provided considerations for intercity passenger rail service in Pennsylvania.

### 3. Context – Inventory of Existing Intercity Transportation Mode Choices in Pennsylvania

Travelers in Pennsylvania have several mode options for trips between cities. While travelers in 2017 chose intercity passenger rail for more than 6.5 million trips that originated and/or terminated in Pennsylvania, the service competes with and in some cases complements commuter rail, intercity bus, commercial air service, and travel by automobile. This section presents an inventory of current intercity transportation facilities and services.

#### Intercity Passenger Rail

Today Amtrak provides intercity passenger rail service on five corridors in Pennsylvania, mapped in Figure 1:

- Northeast Corridor
- Keystone Corridor
- Keystone West
- Capitol Limited Corridor
- Lake Shore Limited Corridor



(Commonwealth Media Services)

Figure 1: Pennsylvania's Intercity Passenger Rail Corridors



**Northeast Corridor**

The Northeast Corridor (NEC) connects the major metropolitan areas of Washington, D.C.; Philadelphia; New York; and Boston. Each year, 17.1 million trips are made on the NEC by Amtrak customers.<sup>2</sup> In Fiscal Year (FY) 2017, the NEC generated Amtrak revenue of more than \$1.2 billion—nearly half of Amtrak’s total revenue nationwide.<sup>3</sup>

**Figure 2: Northeast Corridor**



**The Northeast Corridor – America’s Intercity Rail Engine**

Each year, more than 260 million passenger trips are made on the NEC, via Amtrak trains and the eight commuter rail lines that use the corridor. With its frequent, convenient service, the NEC provides a competitive transportation alternative to both commercial air and auto travel between the dynamic cities along the congested corridor. Amtrak’s two services on the NEC—*Northeast Regional* and *Acela*—are two of only six service lines in the Amtrak system that generate sufficient fare revenue to cover operating costs.

Other corridors benefit from the NEC’s presence and performance. For Pennsylvania, the Keystone Corridor between Harrisburg and Philadelphia connects to the NEC at Philadelphia’s 30<sup>th</sup> Street Station, where passengers can continue to New York or transfer to other trains traveling up and down the East Coast.

The initial selection of the New York and Washington, D.C., areas for the siting of new Amazon headquarters facilities underscores how important transportation access is in the decision-making process for major economic development site locations.

**Keystone Corridor**

The “Keystone Corridor,” in its original designation, is a passenger and freight railroad corridor between Pittsburgh and Philadelphia. This version of the corridor is one of 10 federally-designated high-speed rail corridors. The western segment, known as Keystone West, which connects Pittsburgh and Harrisburg, is on track and right-of-way owned by Norfolk

<sup>2</sup> Amtrak (<https://nec.amtrak.com/about-the-nec/>)

<sup>3</sup> Amtrak, *General and Legislative Annual Report & Fiscal Year 2019 Grant Request*

Southern. The eastern segment connecting Harrisburg and Philadelphia (mapped in Figure 3), is on track and right-of-way owned by Amtrak. This 104-mile eastern Keystone Corridor segment is often referred to as simply the “Keystone Corridor” because Amtrak’s *Keystone Service* operates on it. For the purposes of this report, “Keystone Corridor” refers to the segment between Harrisburg and Philadelphia.

The Keystone Corridor has become a vital transportation asset connecting passengers from Central Pennsylvania to Philadelphia and the Northeast Corridor, with 14 daily and 8

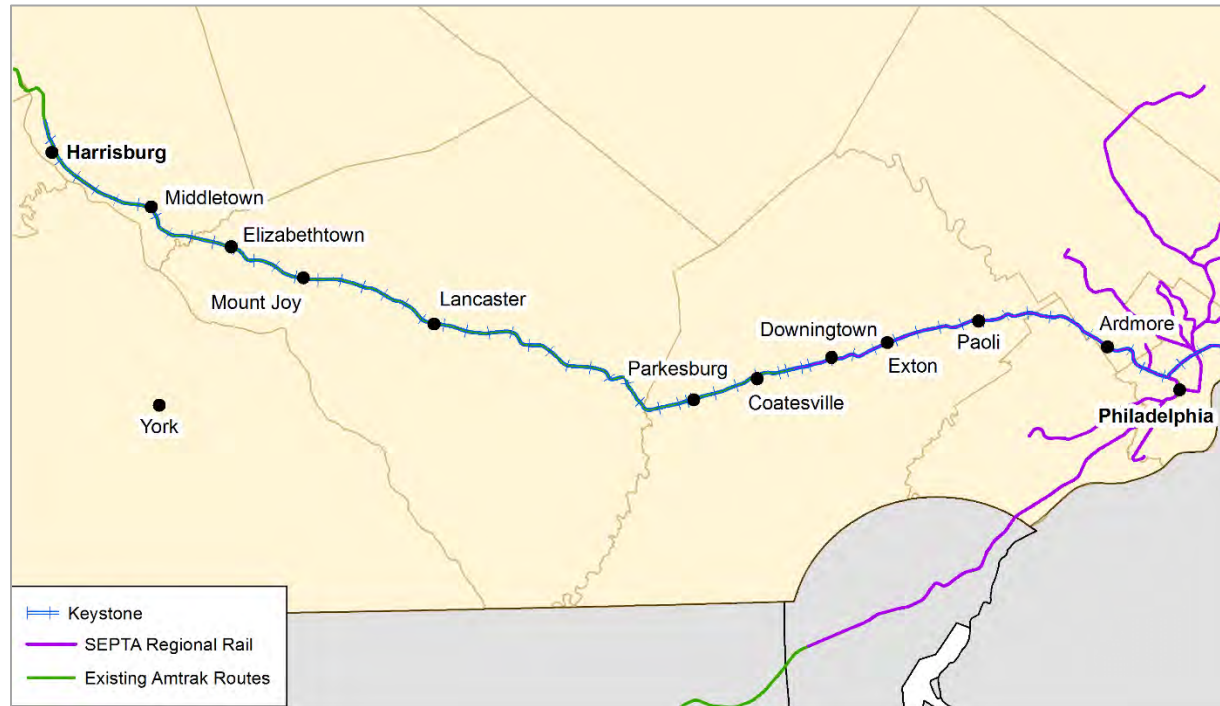
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For the purposes of this report, “Keystone Corridor” refers to the segment between Harrisburg and Philadelphia.

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weekend trips. The performance of the corridor has improved greatly with PennDOT’s strategic leadership and investments. These improvements are described in the Keystone Corridor case study in Section 4.

Figure 3: Keystone Corridor



### Keystone West

The Keystone West corridor runs between Pittsburgh and Harrisburg and carries Amtrak’s *Pennsylvanian* service, which continues to New York City. The 249-mile corridor, mapped in Figure 4, is served by one train daily in each direction, which transported more than 220,000 passengers in 2017.

The Keystone West corridor right-of-way is owned by Class I rail freight carrier Norfolk Southern. Passenger rail service is challenging for that and other reasons as described in the Keystone West case study in Section 4.

**Figure 4: Keystone West**



### Capitol Limited Corridor

Amtrak's *Capitol Limited* also serves Western PA. The Capitol Limited Corridor connects Washington, D.C., and Chicago through Pittsburgh, with a second PA stop at Connellsville (Fayette County). The corridor is served by one train daily in each direction, which carried more than 230,000 passengers in 2017.<sup>4</sup>

Figure 5: Capitol Limited Corridor



### Lake Shore Limited Corridor

Amtrak's *Lake Shore Limited* provides passenger rail service between Chicago and New York through Erie with one train daily in each direction. The *Lake Shore Limited* carried a total of 388,722 passengers in 2017, with 16,766 passengers boarding or alighting in Erie.<sup>5</sup>

Figure 6: Lakeshore Limited Corridor



<sup>4</sup> Amtrak, *General and Legislative Annual Report & Fiscal Year 2019 Grant Request*

<sup>5</sup> Amtrak (<https://www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/statefactsheets/PENNSYLVANIA17.pdf>)

## Commuter Rail

Commuter rail, as defined by the Federal Transit Administration (FTA), is “short-haul rail transportation in metropolitan and suburban areas...usually characterized by reduced fare, multiple-ride, and commutation ticket and by morning and evening peak period operations.” The FTA definition also explicitly excludes light or rapid rail transportation. However, the line between commuter and intercity passenger rail can be blurred. For example, the Amtrak *Keystone Service*, technically an intercity passenger rail service between Harrisburg and Philadelphia, does offer slightly more service in the morning and evening weekday peak periods, and serves many commuters.

Conversely, commuter rail service provided by the Southeastern Pennsylvania Transportation Authority (SEPTA) and New Jersey Transit provides intercity passenger rail connections between Philadelphia and Trenton and Atlantic City. SEPTA Regional Rail operates 13 rail lines serving more than 150 stations in the Philadelphia metropolitan area. New Jersey Transit connects Center City Philadelphia with Atlantic City, New Jersey, via its Atlantic City commuter rail line.

Light rail and rapid transit are other rail-based transit services that are distinct from commuter rail and can meet an intercity passenger rail need in some markets. In a light rail system, the railcars operate singly or in short multiple unit trains on fixed rails in a right-of-way that is not necessarily grade-separated from other traffic. Light rail vehicles are almost always electrically driven with power usually being drawn from an overhead line. The “T” in Pittsburgh, operated by the Port Authority of Allegheny County, is an example of a light rail system.

Rapid transit typically refers to a high passenger capacity electric rail system that operates in an urban area on an exclusive right-of-way that is grade-separated in tunnels or elevated railways. SEPTA’s Market/Frankford Line (The “El”) is an example of a rapid transit line. The Philadelphia metropolitan area is the only Pennsylvania region to have rapid transit. Two entities operate rapid transit lines out of Philadelphia: SEPTA and PATCO (the Port Authority Transit Corporation, owned and operated by the bi-state Delaware River Port Authority). The PATCO Speedline operates between Center City Philadelphia and Lindenwold, New Jersey.



SEPTA commuter rail train at Secane Station  
(Commonwealth Media Services)



Source: Amtrak

### Intercity Bus

Four companies provide intercity passenger bus service within and through Pennsylvania: Greyhound, Megabus, Martz Trailways, and Fullington. Because intercity bus service operates on existing roadways, providers can flexibly and cost-effectively serve travel markets and provide a low-cost alternative to commercial air that is competitive with intercity rail (some intercity bus service to rural areas is subsidized by PennDOT). Millennials and others are showing a renewed willingness to travel by bus.

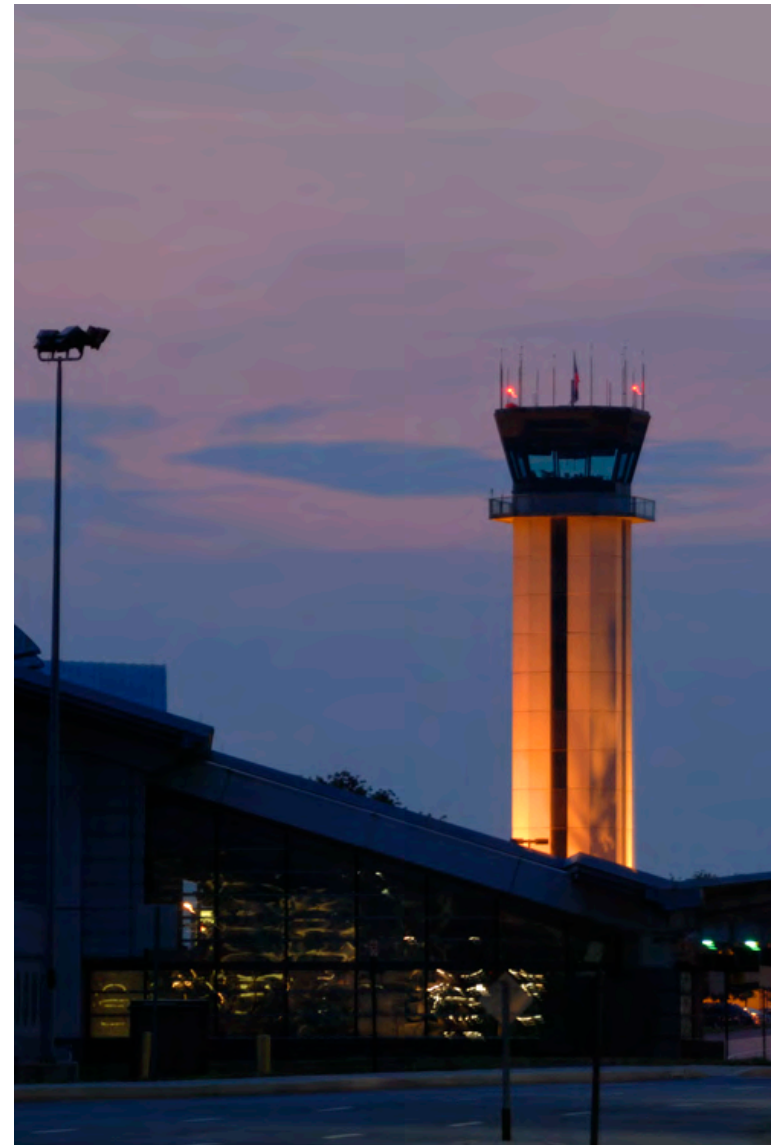
Amtrak Thruway services coordinate intercity passenger bus service with train schedules, conveniently augmenting Amtrak passenger rail service to serve a number of Pennsylvania cities that are not on an Amtrak corridor.

Table 1 lists major Pennsylvania intercity corridors and bus lines serving those corridors.

**Table 1: Pennsylvania Intercity Bus Service Inventory**

Corridor	Service	Number of Trips
<b>Baltimore/Washington–Philadelphia–New York</b>	Greyhound	<ul style="list-style-type: none"> <li>• 20 per day Philadelphia to NYC</li> <li>• 18 per day NYC to Philadelphia</li> <li>• 10 per day Washington to Philadelphia</li> <li>• 9 per day Philadelphia to Washington</li> </ul>
	Megabus	<ul style="list-style-type: none"> <li>• Up to 20 per day each direction Philadelphia–NYC</li> <li>• Up to 13 per day each direction Washington–NYC</li> </ul>
<b>Harrisburg–King of Prussia–Trenton–New York</b>	Greyhound	<ul style="list-style-type: none"> <li>• 1 per day each direction</li> </ul>
<b>Harrisburg–Philadelphia</b>	Greyhound	<ul style="list-style-type: none"> <li>• 3 per day each direction</li> </ul>
	Megabus	<ul style="list-style-type: none"> <li>• Up to 5 per day each direction</li> </ul>
<b>Allentown–New York</b>	Greyhound	<ul style="list-style-type: none"> <li>• 1 per day each direction (more with transfer in Philadelphia)</li> </ul>

Corridor	Service	Number of Trips
<b>Scranton–New York</b>	Martz Trailways	<ul style="list-style-type: none"> <li>• 19 per day (NYC to Scranton, 5 only weekends and 8 only weekdays) and 10 per day (Scranton to NYC, two operate only weekdays and one only operates Sunday)</li> </ul>
	Greyhound	<ul style="list-style-type: none"> <li>• 3 per day each direction</li> </ul>
<b>Harrisburg–York–Baltimore/Washington</b>	Greyhound	<ul style="list-style-type: none"> <li>• 2 per day each direction</li> </ul>
<b>Pittsburgh–Cleveland</b>	Greyhound	<ul style="list-style-type: none"> <li>• 5 per day each direction without transfer</li> </ul>
<b>Pittsburgh–Harrisburg</b>	Fullington	<ul style="list-style-type: none"> <li>• 1 per day each direction</li> </ul>
	Greyhound	<ul style="list-style-type: none"> <li>• 6 per day (Harrisburg to Pittsburgh) and 5 per day (Pittsburgh to Harrisburg)</li> </ul>
	Megabus	<ul style="list-style-type: none"> <li>• 1 per day each direction</li> </ul>
<b>Pittsburgh–Erie</b>	Greyhound	<ul style="list-style-type: none"> <li>• 2 per day each direction without transfer</li> </ul>



Harrisburg International Airport

## Commercial Air

Commercial air service is another intercity transportation option, typically for distances greater than 400-500 miles or connections from smaller cities to larger hubs. There are eight primary commercial service airports in Pennsylvania:

- Philadelphia International (PHL)
- Pittsburgh International (PIT)
- Harrisburg International (MDT)
- Lehigh Valley International (ABE)
- Wilkes-Barre/ Scranton International (AVP)
- Erie International (ERI)
- University Park (UNV)
- Williamsport Regional (PIT)

There are also seven non-primary airports offering limited commercial service, among them: Altoona, Bradford, DuBois, Johnstown, Lancaster, Latrobe, and Venango.

Air service (the number of flights offered and destinations served) has steadily declined over the past decade. To help maintain a minimal level of scheduled air service to the nation's more rural regions, the U.S. DOT subsidizes smaller regional airports through the Essential Air Service Program. For years the program has been a candidate for budget cuts and elimination by the federal government. If that were to happen, several smaller Pennsylvania commercial airports might not be able to continue to provide commercial air service. This possibility makes the need to consider alternatives such as premium bus service more important.

**Table 2: Sample Pennsylvania Intercity Commercial Air Service**

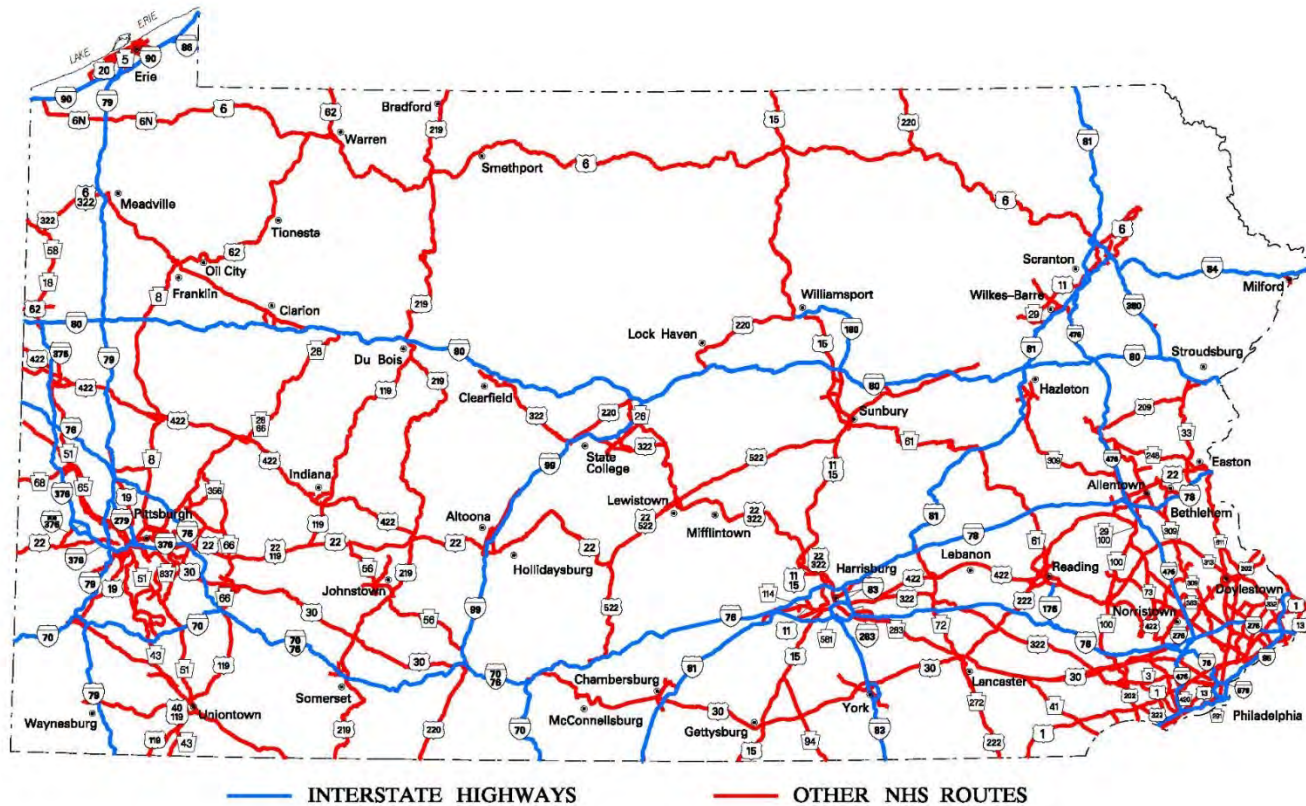
Airport	Regional Services
<b>Altoona-Blair County Airport</b>	Pittsburgh International Airport (PIT), Baltimore International Airport (BWI)
<b>Arnold Palmer Regional Airport</b>	No Regional Commercial Service
<b>Bradford Regional Airport</b>	PIT
<b>Dubois Regional Airport</b>	PIT, BWI
<b>Erie International Airport</b>	Philadelphia International Airport (PHL), O'Hare International Airport (ORD), Detroit Metropolitan Airport (DTW)
<b>Harrisburg International Airport</b>	PHL, Washington Dulles International Airport (IAD)
<b>John Murtha Johnstown-Cambria County Airport</b>	PIT, BWI
<b>Lancaster Airport</b>	PIT, BWI
<b>Lehigh Valley International Airport</b>	Newark Liberty International Airport (EWR), PHL
<b>Philadelphia International Airport</b>	BWI, Erie International Airport (ERI), Harrisburg International Airport (MDT), Lehigh Valley International Airport (ABE), John F. Kennedy International Airport (JFK), LaGuardia Airport (LGI), PIT, University Park Airport (UNV), Ronald Reagan Washington National Airport (DCA), Wilkes-Barre/Scranton International Airport (AVP), Williamsport Regional Airport (IPT)
<b>Pittsburgh International Airport</b>	Altoona-Blair County Airport (AOO), AVP, BWI, Bradford Regional Airport (BFD), Dubois Regional Airport (DUJ), Franklin County Regional Airport (N68), John F. Kennedy International Airport (JFK), John Murtha Johnstown-Cambria County Airport (JST), LGI, Lancaster Airport (LNS), Newark Liberty International Airport (EWR), PHL, DCA, Venango Regional Airport (FKL), IAD
<b>University Park Airport</b>	PHL
<b>Venango Regional Airport</b>	PIT
<b>Wilkes-Barre/Scranton International Airport</b>	PIT, PHL
<b>Williamsport Regional Airport</b>	PHL
<p>Note: The regional air service destinations listed are those within 500 miles. Travel by car or train for distances farther than 500 miles is generally not competitive with air travel.</p>	

### Automobile Travel

Intercity passenger rail also competes with automobiles, which provide cost-effective, convenient intercity transportation, with the flexibility of door-to-door service on any roadway route. Pennsylvania's 1,868 miles of interstate highway and 900 miles of non-interstate expressway—such as US 22 between

Harrisburg and Pittsburgh—provide intercity connections in the most densely populated areas of Pennsylvania. Other National Highway System routes—such as U.S. 6 across the Northern Tier—provide vital connections for the more rural areas.

Figure 7: Pennsylvania's National Highway System



Source: PennDOT

Daily vehicle miles traveled (DVMT) is an indicator of travel demand. Table 3 shows the linear miles and (DVMT) for various roadway types in Pennsylvania, and the change in DVMT from

2013 to 2017. Notable increases include an 8 percent increase in DVMT on National Highway System roadways and a 14 percent increase in DVMT on Interstate highways.

**Table 3: Linear Miles and DVMT by Roadway Type**

PA Highway Systems	Linear Miles	2013 DVMT	2017 DVMT	DVMT % Change
<b>Total System</b>	120,527	270,213,634	278,414,227	+3%
<b>Rural</b>	72,758	96,739,296	95,897,881	-1%
<b>Urban</b>	47,769	173,474,338	182,516,346	+5%
<b>Federal-Aid System</b>	28,742	225,550,120	237,496,378	+5%
<b>National Highway System</b>	7,165	142,057,916	153,914,486	+8%
<b>Interstate System</b>	1,868	63,784,230	72,425,755	+14%

## 4. Lessons Learned – State and National Experience

### Introduction

As noted previously, the study’s primary research question is: What does it take to make intercity passenger rail feasible? To make that assessment, TAC collected information on selected intercity passenger rail lines in Pennsylvania and other states.

The mix of case studies and highlights of other national experience provides a sufficient cross-section from which to identify common themes, recurring success factors, and order-of-magnitude capital and operating costs.

It became clear at the outset that Pennsylvania’s experience both with the Keystone Corridor and Keystone West would also be instructive—the former largely in terms of what has made it so successful; the latter in terms of understanding some of the challenges that the Harrisburg–Pittsburgh corridor faces.

This section presents case studies of the following corridors and rail systems and implications for Pennsylvania:

- [Pennsylvania’s Keystone Corridor](#)
- [Pennsylvania’s Keystone West Corridor](#)
- [Florida’s Brightline/Virgin Trains USA](#)
- [Virginia’s Amtrak System](#)

The following national experience is also highlighted:

- [Texas Central Railway, Dallas to Houston High-Speed Rail](#)
- [Connecticut’s Hartford Commuter Rail Line](#)
- [Minnesota’s Northern Lights Express](#)
- [California’s LOSSAN and Capitol Corridors](#)
- [North Carolina’s State-Supported Passenger Rail](#)

## Case Studies

### Keystone Corridor Case Study

#### Overview

The Keystone Corridor, which connects Harrisburg and Philadelphia, passes through the following counties: Philadelphia, Montgomery, Delaware, Chester, Lancaster, and Dauphin. In the past five years, as the corridor’s metro areas have continued to grow, and as significant investment has improved travel times and the passenger experience, ridership in the Keystone Corridor has increased by approximately 5 percent. In 2017, Amtrak carried more than 1.5 million passengers on the Keystone Corridor.

Additionally, the Keystone Corridor connects to the Northeast Corridor—Amtrak’s most well-traveled route—linking the Pennsylvania cities of Harrisburg and Lancaster to major destinations such as Washington, D.C.; New York City; and Boston.

The Keystone Corridor is served by 14 weekday and eight weekend round trips. The *Pennsylvanian* provides one daily round trip between Pittsburgh and New York City. The *Keystone Service* provides 13 weekday and seven weekend round trips between Harrisburg and New York City.

The Keystone Corridor Improvement Project (KCIP), from 2002 to 2006, restored electric service, replaced jointed rail with continuous welded rail, and installed concrete ties to accommodate train speeds up to 110 mph. This top speed is a

threshold for the Federal Railroad Administration (FRA) definition of “Emerging High Speed Rail,” sometimes also referred to as “Higher Speed Rail.” The improvements made to the Keystone Corridor allowed for more trains, higher speeds, and shorter trip times, driving success and high-quality service. Amtrak and PennDOT collaborated and shared the \$145 million cost of the improvement project. Since then, the Keystone Corridor has undergone additional improvements, including elimination of public at-grade crossings and track and interlocking improvements, with the goal of increasing top train speeds to 125 mph.

#### Operating Costs and Revenues

Both Amtrak services operating on the Keystone Corridor are classified as “state-supported service,” subject to cost and revenue allocation formulas established pursuant to Section 209 of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA). These allocation formulas determine Pennsylvania’s cost responsibilities. Generally speaking, Pennsylvania must make annual operating subsidy payments to Amtrak for the difference between costs and fare revenues. See the sidebar on the following page.

In FY 2017, fare revenues of \$43 million covered 77 percent of the *Keystone Service*’s reported \$55.5 million operating expenses, leaving a shortfall of \$12.5 million.

For the *Pennsylvanian*, fare revenues of \$11.9 million covered 70 percent of its reported \$17.1 million in operating expenses, leaving a shortfall of \$5.2 million.<sup>6</sup>

#### **PRIIA Section 209 State-Supported Service Payments**

Section 209 of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA) directed Amtrak and the states to develop a standardized methodology for allocating the operating and capital costs for routes of less than 750 miles among the states and Amtrak. The costs allocated are for the route segments within the state. For example, the costs allocated to Pennsylvania for the *Keystone Service* (which extends from Harrisburg to New York City) are for the Harrisburg to Philadelphia segment.

The sharing of fare revenue for trips with one endpoint on the Northeast Corridor (known as “through revenue”) credits the state for some of the travel on the NEC that is contributed by the state-supported leg. This recognizes the important role of the state-supported route in providing ridership and fare revenue to the NEC.

States must make support payments (subsidy payments) to Amtrak for the difference between the allocated costs of the route and the allocated revenues. The specific costs and revenues are established in confidential agreements between Amtrak and the states. The operating cost and fare revenue information presented in this report is from published Amtrak operating reports. These data may not necessarily align exactly with the Section 209 cost and revenue allocations that determine the state subsidy payments.

PennDOT’s Bureau of Public Transportation reports the Section 209 expense and revenue allocation and resulting subsidy payment for the combined *Keystone Service* and *Pennsylvanian*. For state FY 2015-16, the subsidy payment was nearly \$12.7 million, and it increased to nearly \$15 million for FY 2016-17. The entire Multimodal Transportation Fund revenue allotment for passenger rail—\$8 million per year—is directed for this subsidy payment. The balance is made up by the monies in the Public Transportation Trust Fund designated for Programs of Statewide Significance. Intercity passenger transportation (rail and bus) is one of seven designated categories of “programs of statewide significance.” Both operating assistance and capital assistance for intercity passenger transportation are allowed.

#### **Capital Projects and Funding**

The federal American Recovery and Reinvestment Act of 2009 (ARRA) was an important source of funding for the \$145 million Keystone Corridor Improvement Project (described previously in the Overview). The funding, often referred to as “federal stimulus funding,” provided approximately \$8 billion for intercity passenger rail projects nationwide, with priority for high-speed rail. PennDOT received \$58.8 million in ARRA funding through the FRA High-Speed Intercity Passenger Rail (HSIPR) Program to make high-speed rail improvements to the Keystone Corridor.

Considerable capital expenditures remain for continued improvements to the Keystone Corridor. The projects listed in Table 4 are intended to advance the goal of 125 mph operations, reduce travel time, and improve service reliability.

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<sup>6</sup> Amtrak, *Monthly Performance Report, September 2017*  
(<https://www.amtrak.com/reports-documents>)

**Table 4: Keystone Corridor Projects**

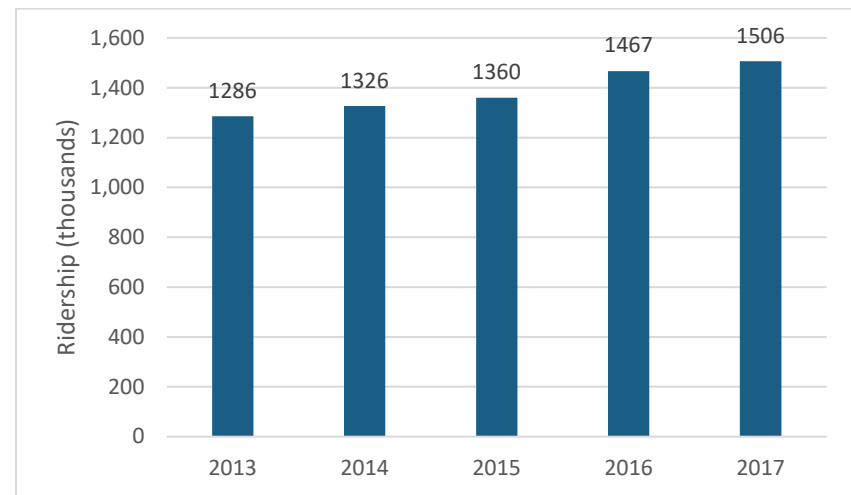
Project	FRA Funding Amount <sup>7</sup>	Total Cost	Completion
State Interlocking Final Design/ Construction	\$40,000,000	\$40,000,000	2017
Grade Crossing Elimination	\$11,437,213	\$20,000,000	2015
Interlockings Program	\$6,300,000	\$465,000,000	In progress
ABS/Centralized Control Project	\$1,119,299	Not available	Not available

In addition, major station improvements are recently completed, underway, or in design for the stations along the corridor. All stations will have high-level platforms and other facilities for compliance with ADA accessibility standards. ADA improvements have the ancillary benefit of decreasing train dwell times, as the high-level platforms allow all passengers to board more quickly. By enhancing the traveler experience through improved parking, amenities, and lighting, these station projects are key to PennDOT’s strategy for attracting new ridership. PennDOT, Amtrak, the FRA, and the FTA are providing funding for the station projects.

**Ridership**

Ridership on the Keystone Corridor has increased over the last decade. Amtrak reported 1.467 million passengers on the *Keystone Service* in 2016 and 1.506 million passengers in 2017—an increase of 7.3 percent in one year. Figure 8 shows *Keystone Service* ridership on Amtrak from 2013 to 2017. The *Keystone Service* has seen an annual average passenger growth of four percent over this period.

**Figure 8: Keystone Service Ridership**



The *Pennsylvanian* also contributes ridership along the Keystone Corridor. However, ridership data for the *Pennsylvanian* does not separately identify trips that include the Keystone Corridor segment.

Both population and employment along the corridor have increased in recent years, as detailed in the corridor profile in

<sup>7</sup>Federal Railroad Administration (<https://www.fra.dot.gov/Page/P0554>)

Section 7. As tourism, population, and employment along the Keystone Corridor continue to grow and as parallel highway routes become more congested, ridership is predicted to continue to increase.

### **Partnerships and Policy**

Although Amtrak owns the Keystone Corridor, SEPTA and Norfolk Southern operate on portions of the line. SEPTA operates the Paoli/Thorndale Regional Rail service from Philadelphia to Thorndale, while Norfolk Southern operates freight service on the Keystone Corridor. PennDOT subsidizes operations costs for the line and administers grants for capital improvements.

Recent state policy has added another means to fund passenger rail improvements in Pennsylvania. Pennsylvania Act 88 of 2012 authorized public-private partnerships (P3) for transportation projects. Station improvements and the provision of parking are examples of rail-related projects that might attract private partners. Prospective projects must be approved by a P3 review board before proceeding. To date, while there has been some interest, no P3 projects have been undertaken.

PennDOT is leading or partnering with Amtrak and/or SEPTA for improvements to all 12 stations, including reconstruction of several stations.

### **Implications for Pennsylvania**

Much of the Keystone Corridor's success stems from a successful partnership between Amtrak and PennDOT. The partnership has yielded benefits including enhancements in train speed and reliability, elimination of all public at-grade crossings on the route, signaling and switch improvements, and major station improvements. These projects were made possible

because of federal and state funding. Additionally, P3s are expected to advance various improvements. The Keystone Corridor is also growing in population and employment, with Philadelphia and Harrisburg being major tourism and employment hubs. Passenger rail competes favorably with automobile travel on this congested corridor.

Implications going forward for Pennsylvania:

1. Intercity rail feasibility hinges on there being a market demand for it.
2. Intercity rail also must be built upon existing infrastructure and service to be feasible in the near to medium term (without infrastructure and service to build upon, the prospect for intercity rail is at best long-term and at worst infeasible).
3. Service improvements in terms of both frequency and quality entail an investment of substantial resources—monetary and other.
4. Intercity rail service development represents a long-term commitment and partnership among multiple partners, including in this case Amtrak and PennDOT.
5. Fare revenues are not sufficient to cover operating costs. PennDOT must make substantial annual subsidy payments to Amtrak to support the two services that operate on the Keystone Corridor. The average state subsidy payment of nearly \$15 million in FY 2016-17 amounted to approximately \$8.50 per passenger.
6. Ancillary development and investments such as stations, parking, and lighting are key success factors.

7. Performance in the form of travel time, frequency, etc., must be competitive for better-than-automobile-traffic trip times over the long term to be sustainable.
8. The \$8 million designated in the Multimodal Transportation Fund for intercity passenger rail is fully expended on the operating subsidy for the existing state-supported Amtrak service. Resources required for additional services, or even studies or planning for additional services, must compete with numerous other needs in a very constrained state transportation fiscal environment.

These eight points represent substantial conditions / challenges. PennDOT's leadership in the Keystone's Corridor's success is nothing less than a remarkable story of teamwork, vision, persistence, and commitment (resources and other). The organizational and financial capacity to replicate the Keystone Corridor's success in other corridors is limited in comparison.

## Keystone West Case Study

### **Corridor Overview**

The Keystone West corridor spans 249 miles, connecting Pittsburgh and Harrisburg via stops in Lewistown, Huntingdon, Tyrone, Altoona, Johnstown, Latrobe, and Greensburg. The track is owned by Norfolk Southern. Amtrak's once-daily round trip *Pennsylvanian* service between Pittsburgh and New York City is the only passenger rail service on this corridor. The *Pennsylvanian* was instituted at the request of the Commonwealth in 1980 and was state-supported until 1993. In the late 1980s the *Pennsylvanian* had the best financial performance of all Amtrak's state-sponsored trains.<sup>8</sup> State support of the service resumed in 2014, pursuant to the requirements of PRIIA Section 209 (explained in the sidebar on page 30). A second daily round trip train served this corridor until 2005.<sup>9</sup> Unlike the *Keystone Service*, the *Pennsylvanian* offers a business class car and a café car.

### **Corridor Characteristics**

Because of the indirect routing, the mountainous terrain, and the interaction with freight traffic, passenger trains on Keystone West have the relatively low average speed of 45 mph, making the scheduled route time from Pittsburgh to Harrisburg 5 hours, 23 minutes. By car, the trip time from the Harrisburg Transportation Center to the Pittsburgh station is approximately 3 hours, 30 minutes, although congestion in Pittsburgh—especially at the Squirrel Hill Tunnel—often causes delays.

Greyhound offers five to six buses per day between Pittsburgh and Harrisburg. Some are direct via the Pennsylvania Turnpike, and some take a lengthy, indirect route to stop in State College, with travel times longer than the *Pennsylvanian* service. Megabus also connects Pittsburgh and Harrisburg, with a once-daily route via State College. These buses do not serve the seven other stations in the Keystone West corridor. There are no direct flights between Pittsburgh and Harrisburg.

The nine stations along the corridor range from large, staffed stations to passenger shelters. A variety of entities own stations, platforms, and parking facilities at these stops.

A 2009 Amtrak study of the feasibility of increasing the service frequency on the corridor described then-current and historical infrastructure conditions. It reported that the corridor was mostly double-tracked, with triple track over most mountainous portions. Crossovers in the double-track segments were located approximately every 10 miles. Originally, nearly the entire corridor was four-tracked. In 2008 an average of nearly 40 freight trains per day traversed the route. Current freight traffic statistics are not available, but levels can be expected to be at least as great if not higher. Rudy Husband, Norfolk Southern vice president of government relations in Pennsylvania, told the Pennsylvania House Transportation Committee that the railroad's Pittsburgh Line in western Pennsylvania "sits literally in the middle of our Premier Corridor, which connects Chicago and the New York metropolitan area." He added, "From both a

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<sup>8</sup> PennDOT, "The Pennsylvanian: An Allegheny Traveler," 1990.

<sup>9</sup> Amtrak, *PRIIA Section 224 Pennsylvania Feasibility Studies Report*, October 2009

customer service and revenue standpoint, there is not a more important rail line within Norfolk Southern’s 22-state network.”<sup>10</sup>

**Performance of the *Pennsylvanian***

The *Pennsylvanian* serves the nine stations on the Keystone West corridor as well as all of the Keystone Corridor. As such, the financial and ridership statistics for the *Pennsylvanian* do not reflect performance specific to Keystone West. The listing of top city pairs illustrates this point. Half of the top city pairs are exclusively in the Keystone Corridor, suggesting that the financial viability of the *Pennsylvanian* service is dependent on trips occurring outside of the Keystone West corridor.

**Table 5: *Pennsylvanian* Top City Pairs, 2017**  
(Pairs involving Keystone West are shaded)

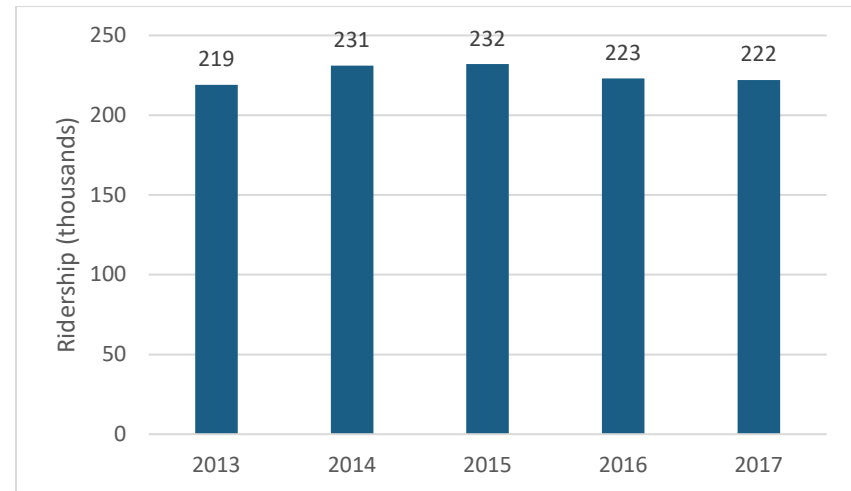
1	New York	Pittsburgh
2	Lancaster	Philadelphia
3	Philadelphia	Pittsburgh
4	Harrisburg	Philadelphia
5	Harrisburg	New York
6	Lancaster	New York
7	Harrisburg	Pittsburgh
8	Lancaster	Pittsburgh
9	Johnstown	Philadelphia
10	New York	Paoli

Source: Rail Passengers Association, 2018  
(<https://www.railpassengers.org/site/assets/files/3446/57.pdf>)

The three most active stations for the *Pennsylvanian* in 2017, in order, were Pittsburgh, Philadelphia, and New York. Together, these stations accounted for more than half of all activity on the line.

Ridership on the *Pennsylvanian* (including the Keystone Corridor segment) increased until 2015, then declined slightly in the following two years.

**Figure 9: *Pennsylvanian* Ridership**



Source: Rail Passengers Association, 2018  
(<https://www.railpassengers.org/site/assets/files/3446/57.pdf>)

The 2017 financial performance of the *Pennsylvanian* compares favorably to the average for state-supported trains and to the *Keystone Service*. The average farebox recovery ratio for all Amtrak state-supported routes is 58 percent. The average state

<sup>10</sup> The [Johnstown] Tribune-Democrat, “Vision 2018: Rail push gains speed,” February 24, 2018

payment per passenger in 2017 was nearly \$15, compared to \$5.87 for the *Pennsylvanian* and \$4.71 for the *Keystone Service*.

**Table 6: *Pennsylvanian* Financial Performance, 2017**

<b>Gross ticket revenue</b>	\$11.9 million
<b>Operating Expense</b>	\$17.1 million
<b>Farebox Recovery</b>	70%
<b>Ridership</b>	221,500
<b>Operating Expense per Passenger</b>	\$77.20
<b>Fare Revenue per Passenger</b>	\$53.72

Source: Amtrak, *Monthly Performance Report*, September 2017

On-time performance statistics reflect the challenges previously noted of sharing a relatively steep rail corridor with a high volume of freight rail traffic. For the most recent (September 2016) Host Railroad Report, the *Pennsylvanian* achieved a quarterly on-time performance of 62 percent, meaning that 62 percent of the trains reached their route endpoints within the allowed window of the scheduled arrival. The Amtrak target for non-Northeast Corridor routes is 80 percent. In contrast, the *Keystone Service* achieved an 86.6 percent on-time performance for this period, which slightly exceeded the Amtrak target for NEC routes (the Keystone Corridor is categorized as an NEC route for these purposes). The average delayed *Pennsylvanian* passenger experienced a delay of 50 minutes.<sup>11</sup>

<sup>11</sup> Amtrak, *Host Railroad Report*, September 2018

The 2017 financial performance of the *Pennsylvanian* compares favorably to the average for state-supported trains and to the *Keystone Service*.

### Service Enhancement Studies

In 2009, pursuant to a mandate under PRIIA, Amtrak studied the feasibility of adding a second frequency to the Keystone West corridor. The study forecasted that a second frequency would attract 144,400 additional riders and \$7.7 million (adjusted to 2017 dollars) in fare revenue. Incremental operating costs were estimated at \$15.6 million (adjusted to 2017 dollars), which would result in an \$8 million increase in the route’s operating loss and therefore an approximately equal increase in subsidy payment to Amtrak. Such a subsidy increase would amount to a more than 50 percent increase over the most recent reported subsidy of \$15 million.

PennDOT released the *Keystone West High-Speed Rail Feasibility Report and Preliminary Service Development Plan* in 2014. Despite the name “High Speed Rail,” the study’s detailed cost and revenue projections were for capital improvements that would achieve an approximately 30-minute reduction in the trip time between Harrisburg and Pittsburgh and permit the addition of a second round-trip train. The capital cost for “Alternative 2,” which would include some curve straightening, additional track

and sidings, signal upgrades, grade crossings, grade separations, highway relocations, new bridges, bridge rehabilitation, tunnel renovation, and station improvements, was estimated at \$9.9 billion, not including right-of-way costs.

A lower-cost \$500 million capital cost option (“Lower Cost Option A”) was developed after completion of the initial feasibility studies. This option would also add a second train but would be much more modest in track projects along the corridor. The trip time savings would be reduced by approximately two minutes compared to the alternative described above. Accordingly, the demand effects of Lower Cost Option A were reasoned by the study authors to be similar to the demand estimated for the much higher-cost alternative. The study projected a Year 2035 ridership increase of 56 percent (nearly 134,000 passengers) for Lower Cost Option A over the Year 2035 base case (no improvements) ridership.

In 2017, Pennsylvania Senate Resolution 76 and House Resolution 385 both directed the Legislative Budget and Finance Committee (LBFC) to determine the feasibility of additional train service between Harrisburg and Pittsburgh. Those studies were never undertaken due to funding issues.

In 2018, Governor Tom Wolf also announced a new review of adding service between Altoona and Pittsburgh. PennDOT’s Bureau of Public Transportation is overseeing the Altoona to Pittsburgh study and anticipates completion in Spring 2019.

### **New PennDOT Review of Potential Passenger Train Service between Altoona and Pittsburgh**

In September 2018 Governor Wolf directed PennDOT to re-examine the possibility of adding rail service in western Pennsylvania between Altoona and Pittsburgh.

PennDOT will review past studies of the Keystone West Corridor and collect updated data. The effort will include outreach to Norfolk Southern, which owns the Keystone West Corridor.

The study is expected to identify the feasibility of potential passenger rail service through analysis that includes high-level infrastructure and capital costs, as well as a travel demand market assessment and ridership estimates.

### **Implications for Pennsylvania**

The Keystone West corridor makes service and infrastructure improvements challenging for a number of reasons. The route is longer, with more difficult terrain, and the region served is considerably less populous. The existing rail line is on a busy freight corridor owned by a private freight railroad. Implications for Pennsylvania include:

1. The corridor, which serves Harrisburg, Altoona, Pittsburgh, and other points in between, may not have the population density or travel demand to warrant an expanded investment scenario. There could be other factors, however, to consider as part of that investment decision-making.
2. In contrast to the Keystone Corridor, the fact that a busy freight railroad owns the track and right-of-way poses a major hurdle to achieving the level of speed and

- frequency needed to compete with automobile travel. However, capacity could potentially be expanded through the use of existing or additional right-of-way.
3. The incidence of traffic congestion in the Keystone West corridor is less extensive and sustained than that which is experienced in the Keystone Corridor.
  4. Based on the analysis for the Keystone West High Speed Rail study, a tremendous investment would be needed to expand service on Keystone West.
  5. The travel demand characteristics may look different for trips between Pittsburgh and other western Pennsylvania stops than they do for travel between the corridor endpoints of Pittsburgh and Harrisburg. The indirect route makes rail travel a difficult sell for Harrisburg–Pittsburgh travelers, but that is not the case for the intermediate stops. Also, stops nearer Pittsburgh may have a commuting potential that is not present for Harrisburg–Pittsburgh travel. The current PennDOT study of rail service between Altoona and Pittsburgh recognizes this distinction and may discover some opportunities that were not examined through previous studies. Any future analysis of this corridor should be careful to not overly rely on the Harrisburg–Pittsburgh end points, but consider the intermediate points of service (e.g., Altoona–Pittsburgh).

## Brightline/Virgin Trains USA Florida Case Study

### **Overview**

Brightline/Virgin Trains USA is the only privately-owned and operated passenger rail system in the United States. It is owned by All Aboard Florida, a wholly owned subsidiary of Florida East Coast Industries, which in turn is owned by Fortress Investment Group LLC, a global investment management firm. Brightline operates on the existing Florida East Coast Railway corridor with stations in Miami, Fort Lauderdale, and West Palm Beach.

All Aboard Florida has a \$3.5 billion plan to expand the tracks to Orlando by 2022. It was recently declared to be the sole proposer responding to the Governor's invitation for private lease of the Interstate Highway 4 right-of-way for higher-speed passenger rail connecting Orlando to Tampa.

Brightline aims for an enhanced customer experience. There are two classes: "Select," which offers larger, more comfortable seats and complimentary food and beverages; and "Smart" which offers smaller seats and food and beverages for purchase.

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*"We believe that the economics of passenger rail service offer a highly compelling investment opportunity."*

*Brightline/Virgin Trains USA*



Interior of Brightline's Miami station

Each of the Brightline stations was designed as a unique, mixed-use space. Train waiting areas are bright, attractive, and comfortably appointed. The Miami station is elevated 50 feet above ground, with restaurants and shops underneath the tracks. A 12-story office building and residential tower is built atop the platform.

### **Ownership**

Fortress Investment Group, a private equity investor, purchased Florida East Coast Industries, parent company of Florida East Coast Railway and All Aboard Florida, in 2007. Florida East Coast Railway is a Class II regional railroad that owns a well-maintained 351-mile freight corridor from Miami to Jacksonville. In 2017, the freight railroad arm, Florida East Coast Railway, was sold to Grupo Mexico. In November 2018, it was announced

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It is not the fare revenue alone that makes Brightline financially viable—the company stands to gain from increasing the value of the property it owns at and near the stations.

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that Richard Branson’s Virgin Group is purchasing a minority stake in Brightline and forming a strategic partnership with the company, which will change its brand name to Virgin Trains USA in 2019. At the same time, Brightline disclosed plans to become a publicly-traded company.

In its filing with the SEC to go public, the company stated, “Our goal is to build railroad systems in North America that connect major metropolitan areas with significant traffic and congestion. We believe that the economics of passenger rail service offer a highly compelling investment opportunity.”<sup>12</sup> The company has already demonstrated this belief with the acquisition of rights to a designated high-speed rail route connecting Las Vegas and Southern California.

### **Financing**

The majority of construction costs, which include building tracks and stations as well as upgrading signaling, bridges, and grade crossings, are covered privately. Public loan programs provide a portion of the financing. Brightline received a Railroad Rehabilitation & Improvement Financing (RIFF) loan, which is

administered by the Federal Railroad Administration and is supported by federally authorized, tax-exempt bonds.

Private bonds sold in late 2017 for a total of \$600 million were rated BB-, a junk bond grade that reflects “an elevated vulnerability to default risk.”<sup>13</sup>

### **Costs**

Brightline is said to have invested nearly \$1.7 billion in the rail service and real estate development associated with the Miami to West Palm Beach corridor. The total Miami to Orlando project is estimated at \$4 billion.

There is speculation that it is not the fare revenue alone that makes the Brightline financially viable. The company stands to gain from increasing value of the property it owns at and near the stations. The Miami station, with its office and residential towers and retail facilities, was constructed in an underdeveloped section of the city.

### **Ridership**

The Brightline between Miami and Orlando would link two populous and economically dynamic regions, both of which are top visitor destinations. On the strength of Disney World, Universal Studios, and other theme parks, Orlando is the most visited city in the United States. Miami, with its global cachet and thriving cruise ship port, is another popular destination.

Further, the population of the communities served by Brightline conceivably supports its use (Table 7).

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<sup>12</sup>The Real Deal, “Passenger-train operator files to go public under its new name, Virgin Trains USA,” November 17, 2018

<sup>13</sup> The Palm Beach Post, “Brightline, Richard Branson’s Virgin Group to form ‘strategic partnership,’” November 16, 2018

**Table 7: Population Density of Brightline-Served Cities**

City with Brightline Station	Population per square mile
Miami	12,139
West Palm Beach	1,936
Fort Lauderdale	4,436
Orlando (future station)	2,638

Brightline stations are intentionally located with connections to other modes: public transit in Miami, and in Orlando, at a new intermodal center at the airport.

Brightline told investors it expected 1.1 million passengers and nearly \$24 million in revenue in the first full year of operation. It has not been operating at a full schedule long enough, however, to reach that ridership level. The company reported losses of slightly over \$28 million in each of the first two quarters of 2018.<sup>14</sup> In a filing with the SEC, the company said that it expects 6.6 million riders once the full Miami to Orlando route is completed. The company stated it expects Brightline fares to be approximately 25 percent less expensive than driving and approximately 30 percent less expensive than flying.<sup>15</sup>

**Partnerships, Policy, and Public Opinion**

Approvals from the State of Florida and Central Florida Expressway were required to build the rail system next to Interstate 4. The Orlando station will be located at the airport and connect to a new commuter rail line at a state-funded \$215 million transportation hub.

<sup>14</sup> *Ibid*

Brightline expects its fares to be approximately 25 percent less expensive than driving and approximately 30 percent less expensive than flying.

Residents of some communities in the path of the train are opposed to the train due to safety and noise concerns. Two counties have spent millions in legal battles with Brightline, attempting to obstruct the project by challenging the issuance of tax-exempt bonds to finance some of the project’s cost.

**Implications for Pennsylvania**

The freight railroad operating on the shared right-of-way, Florida East Coast Railway, does not run the long, heavy, slow coal and other bulk trains typical of freight railroads in Pennsylvania. The existing railroad has some of the most sophisticated signaling of any freight railroad in the U.S., allowing freight trains to travel at up to 60 miles per hour. Most of the track is currently rated for passenger speeds of up to 80 miles per hour, but further upgrades will be needed to bring the line up to the 110 miles per hour maximum speed touted in All Aboard Florida’s press release.

If it is truly the case that it is the increased development value of the property at the train station and its vicinity that contributes to the financial viability of the Brightline venture, it supports the case for seeking public–private partnerships with property

<sup>15</sup> The Real Deal, “Passenger-train operator files to go public under its new name, Virgin Trains USA,” November 17, 2018

owners and developers that reduce the public funding burden for station projects and potentially service extensions. Clearly, privately funded intercity passenger rail may represent the mode's expansion model for the foreseeable future.

However, as the Florida experience demonstrates, intercity rail feasibility is largely dependent on there being a market demand. It also demonstrates that some level of public funding, even in the forms of loans or loan guarantees, may reflect the future general model for intercity passenger rail investment. Fortress Investment Group, the investment firm that owns All Aboard Florida, has touted its interest in certain populous markets in the south and west that are known for their rapid growth and economic vitality. No Mid-Atlantic or Northeastern markets have been mentioned.

Besides the contrasting economic and demographic trends of Pennsylvania with these markets, the penetration of Amtrak in the Northeast Corridor may also be a discouraging factor for private rail development.

Brightline's implications for Pennsylvania include:

- Validation that private-sector investment in intercity rail is possible but is market-driven.
- State support can take on other forms, including loans and assistance / involvement in project development.
- Economic development and intercity rail development, especially around stations, is extremely important as are modal connections at those stations.

**Amtrak Virginia Case Study**

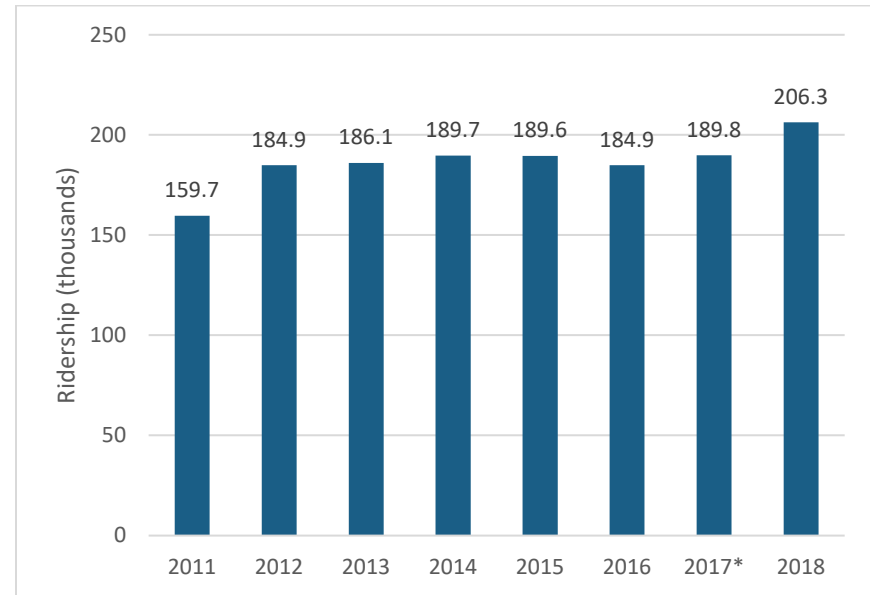
**Overview**

Virginia has seen remarkable success in adding intercity passenger rail service in the past nine years. Three services have been added, all extensions of *Northeast Regional* trains traveling the Northeast Corridor out of Washington, D.C. The trains are all Amtrak-owned and operated, running on Norfolk Southern and CSX track (similar to the *Pennsylvanian* service on Keystone West). All of the services are generating sufficient fare revenues to cover their operating costs. Key facts about the state-supported services are summarized in Table 8.

**Ridership and Financial Performance**

Compared to 2008, when one Amtrak long-distance train served the Lynchburg to D.C. route, ridership on the route was 168 percent higher after the first year of operation and nearly three times higher in 2017. The station providing the most passengers (measured in combined boardings and alightings) is Charlottesville. The Roanoke stop saw more than 54,000 passengers in its first year of rail service. With these service additions, 81 percent of Virginians now live within 25 miles of intercity passenger rail.<sup>16</sup>

**Figure 10: Virginia Northeast Regional – Lynchburg/Roanoke Ridership**



\*Service to Roanoke began in November 2017.

<sup>16</sup> Richards, Meredith Martin, Weldon Cooper Center for Public Service, “Fueling the Renaissance: Public Policy and Intercity Passenger Rail in Virginia,” May 2018

**Table 8: Virginia State-Supported Passenger Rail Facts**

	Lynchburg/Roanoke	Newport News	Norfolk	Richmond Staples Mill
<b>Population*</b>	6,416,278	7,313,054	7,313,054	6,844,333
<b>Daily Round Trips</b>	1	2	1	2
<b>Total Daily Round Trips, including Other Amtrak</b>	2 Lynchburg 1 Roanoke	2	1	6
<b>Service Added</b>	<ul style="list-style-type: none"> <li>• 2009 one additional Lynchburg</li> <li>• 2017 Roanoke extension</li> </ul>	Prior to 2009**	2012	2010
<b>Ridership</b>	206,252	332,265	152,611	158,318
<b>Ticket Revenue</b>	\$12.5 million	\$22.2 million	\$9.1 million	\$9.4 million
<b>Operating Expense</b>	\$8.8 million	\$18.7 million	\$9.1 million	\$9.4 million
<b>Net Operating Revenue</b>	\$3.7 million	\$3.5 million	0	0

\* 2010 population of the Metropolitan and Micropolitan Statistical Areas (MSA) that the Virginia portion of the corridor passes through.

Source: U.S. Census Bureau.

Northernmost MSA included is Washington, D.C. Does not include the population of the Baltimore MSA and points north on the Northeast Corridor.

\*\*One of the trains was slated for elimination in 2007, but public pressure preserved the service.

Source: Amtrak, *Monthly Performance Report*, September 2017.

### **Capital Projects and Funding**

The most recent addition to Virginia's service, the extension of one Northeast Regional train route from Lynchburg to Roanoke, was completed in 2017 with a reported investment of \$103 million, most of it state-funded. Among the improvements required to accommodate the passenger rail service were the following:

- A 10-mile second mainline
- Increasing tunnel clearances and roadway bridges on a different route segment to accommodate double-stack intermodal traffic, thereby opening up capacity for the passenger service
- Signal and switching upgrades
- Construction of a train service facility in Roanoke
- Construction of a high-level platform at the Roanoke station

State funding for passenger rail is provided for in two dedicated funds: The Rail Enhancement Fund and the Intercity Passenger Rail Operating and Capital Fund. The Rail Enhancement Fund is funded by a dedicated portion of the vehicle rental tax. Tax revenues deposited into the fund are estimated at \$21 million per year. Freight and passenger rail projects are eligible for grants under the fund. Applicants must provide a 30 percent match, and grant award decisions include a consideration of the project's cost-benefit ratio. The \$114 million in funding from the Rail Enhancement Fund was critical to the completion of the extension of Amtrak *Northeast Regional* service to Norfolk. The

fund also provided \$22 million for the extension of a *Northeast Regional* train to Lynchburg.

The Intercity Passenger Rail Operating and Capital Fund receives dedicated revenues of 0.05 percent of the state sales tax, estimated at approximately \$55 million per year. The funds can be used for operating costs, equipment upgrades, and capital improvements. The improvements can include projects that also benefit freight rail as a consequence of improvements to benefit passenger rail. Among many other uses, the fund is being used to continue to advance planning for the Washington-Richmond High Speed Rail Project, part of the federally-designated Southeast High Speed Rail Corridor from Washington, D.C., to Charlotte, North Carolina.

### **Expansion Plans and Goals**

Further enhancements are underway. In the near term, a second state-supported round trip to Lynchburg is planned. Long-term plans envision a second frequency to Roanoke, and further extensions beyond Roanoke to Christiansburg and points further west. Christiansburg and Virginia Tech are reported to be vigorously advocating for these extensions. Currently, Blacksburg (Virginia Tech) rail travelers can book an Amtrak Thruway bus connector to the Roanoke station.

Some other more aspirational goals are adding a state-supported service to the one existing Amtrak service extending from Lynchburg through Danville to Charlotte, North Carolina, and building a rail connection from Charlottesville to Richmond—a leg currently served by Amtrak Thruway bus service. However, when Norfolk Southern abandoned its line in 2003 it donated the right-of-way for a rails-to-trails project.

### Keys to Success

The service additions to date have taken advantage of their connection with Amtrak's *Northeast Regional* service on the Northeast Corridor. Virginia arranged with Amtrak to extend the route of existing *Northeast Regional* trains, thus expanding service without the expense of additional rolling stock. Station renovations and track upgrades to accommodate both passenger and freight rail have not been particularly cost-prohibitive—a stark contrast to the estimated cost of upgrading Pennsylvania's Keystone West corridor. Perhaps most importantly, by feeding ridership to Amtrak's busy and profitable Northeast Corridor, Virginia receives a share of the fare revenue that its riders generate for travel on the NEC segment.

According to the reporting of rail advocate Meredith Martin Richards in the University of Virginia Weldon Center's "The Virginia News Letter," there has been a great deal of enthusiastic public support and organized advocacy for passenger rail in Virginia. Also, and possibly largely as a result, the state's political leaders—of both parties—have been supportive. Legislation in 2005 created the Rail Enhancement Fund. Even more noteworthy was the passage of legislation in 2011 creating the Intercity Passenger Rail Operating and Capital Fund, the nation's first dedicated fund for intercity passenger rail.

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In 2011 Virginia passed the first legislation in the U.S. to establish a dedicated fund for intercity passenger rail.

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### Implications for Pennsylvania

- Virginia's experience demonstrates the importance of solid market demand for services—in their case enabling ticket revenue to cover operating costs.
- Virginia takes a long-range planning approach to intercity rail that could be considered as PennDOT and the MPOs/RPOs update the statewide Long-Range Transportation Plan.
- Virginia has dedicated and predictable funding sources that Pennsylvania might consider if it pursues additional resources in the future.
- The system benefits from strong support of public officials, reflective of the public's support.
- Virginia's success in making a freight-owned and operated corridor work well for passenger rail could provide useful insights for future analysis of Keystone West.

## Other National Experience

### Texas Central Railway, Dallas to Houston High Speed Rail

#### Overview

Texas Central Railway, a private, Texas-based company, plans to construct a high-speed passenger rail line connecting Dallas and Houston, with a stop in the Brazos Valley. The company states that the 240-mile trip will take less than 90 minutes, with trains reaching top speeds approaching 200 mph. Trains will depart every 30 minutes during peak periods.

The company has recently contracted with Spanish passenger railway operator Renfe to serve as the rail operator. It has also entered into a partnership agreement with Amtrak that provides for through ticketing, connections to Amtrak trains in Houston and Dallas, and purchases of support services from Amtrak such as training, marketing, and sales. In announcing the agreement, Amtrak Executive Vice President Stephen Garner stated, “We welcome the opportunity to partner with the private sector to expand the reach of our national network.” Amtrak has not operated passenger rail service between Dallas and Houston since 1995.

#### Ridership

A ridership study completed by L.E.K. Consulting in 2016 projected five million passengers in 2026, increasing to 10 million by 2050. Among the factors the study cited in support of these forecasts are the following:

- Travel options are limited and journey times by other modes are long and unpredictable. The study estimated that the train would save 70 minutes compared to

automobile and 50 minutes compared to air travel, when door-to-door travel times are compared.

- The underlying travel market, as measured by the population in the 66 counties along the corridor, is projected to grow 1.5 percent per year.
- The market demand for high-speed rail is also expected to grow with the projected economic growth and income levels in the market area—GDP growth of 2.6 percent per year is forecasted.

#### Ownership and Financing

Texas Central asserts the following advantages to being a privately-financed venture:

- Market discipline means that the project must demonstrate its financial viability to investors.
- The project is not limited by the political constraints of a public endeavor; it has greater scope for capital and operating decisions, including adjusting schedule, service, staffing, and ticketing.

The \$10 billion project may secure some funding through publicly-financed loan programs but will not accept federal construction grants. It also anticipates paying property taxes on its right-of-way and stations.

#### Implications for Pennsylvania

Private-sector ownership and investment could become a trend for intercity rail that Pennsylvania should continue to monitor.

## **Connecticut's Hartford Commuter Rail Line**

### **Overview**

The 62-mile Hartford line, paralleling the I-91 corridor, links New Haven to Springfield, Massachusetts. Just opened in June 2018, it is the first commuter rail service to link Connecticut's interior cities since 1968. Amtrak, which owns the track, has had two-car trains serving the corridor as a "shuttle" extension of its *Northeast Regional* service, thus linking the corridor to the busy Northeast Corridor.

### **Ridership**

The Hartford line runs four-car trains. Both Amtrak and the Hartford Line accept each other's tickets for travel on the line. Prior to the start of the Hartford commuter line in June, Amtrak transported about 725 passengers per weekday. With the combined Hartford Line and Amtrak service, trains leave about every 30 minutes during weekday peak travel times. The full route takes about 1 hour, 20 minutes. The additional train frequencies and lower fares have corresponded to a sharp increase in ridership, which was reported at 2,000 per day by October 2018.

### **Financing and Operations**

State bonding covered more than two-thirds of the \$768 million project cost; federal funds covered the remainder. The project included double-tracking, concrete ties, and station improvements.

The service is starting with equipment leased from Massachusetts. Five bidders responded to the invitation to bid

for the contract to operate the service. A joint venture of TransitAmerica Services and Alternate Concepts bid \$41.7 million for the five-year contract. Amtrak, Keolis, First Transit, and Bombardier also bid on the contract.<sup>17</sup>

### **Economic Development**

Hartford business and community advocates have great hopes for the ability of the commuter rail service, along with the enhancement of the downtown train station, to be an economic and cultural boon for the city. The train connection is one important element of a multi-pronged effort to revitalize the downtown and boost its appeal to Millennials in particular. A new bus rapid transit system is the other transportation element of this effort. The higher frequency of rail and bus service, along with the elimination of parking minimums in development proposals, is expected to create more demand around the stations.

### **Possible Service Expansion**

Massachusetts is examining the feasibility of continuing commuter service north of Springfield.

### **Implications for Pennsylvania**

The Hartford line is instructive in underscoring that commuter rail does in some cases provide valuable service between cities. Service between Trenton and Philadelphia provided by SEPTA and NJ Transit is another example of commuter rail connecting metropolitan areas. The Hartford line also highlights the high value that local interests place on the downtown development boost provided by rail service. Nationally, it has become clear

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<sup>17</sup> The CT Mirror, "DOT valued expertise over price in Hartford rail competition," July 27, 2017

that the transportation/economic development synergy is especially prominent around stations. This applies to both public transportation and intercity rail—in many cases stations serve both intercity and regional/commuter rail, such as the Ardmore and Paoli stations on the Keystone Corridor that are served by both Amtrak and SEPTA trains.

### Minnesota's Northern Lights Express (NLX)

#### **Overview**

The planned 152-mile NLX line would run four daily trips between Duluth and Minneapolis, where it would connect to the existing Amtrak network. Amtrak would operate the line on BNSF track. Operations would begin in 2021 at the earliest. The train would reach top speeds of 90 mph and average approximately 60 mph. Four round trips per day are envisioned. The project has received FRA approval, passed state environmental review requirements, and can proceed to final design and construction as soon as funding is available.

#### **Costs and Financing**

Capital costs are estimated at between \$500 and \$600 million. For the first five years of operation, projected operating costs of \$18.9 million would be partially offset by projected fare revenue of \$12 million, leaving a required operating subsidy of \$6.9 million per year. Initial year annual ridership is projected at 700,000-750,000.<sup>18</sup>

### **Implications for Pennsylvania**

- The NLX passenger service on a rail freight-owned and operated line may offer insights/best practices.
- Estimated initial fare revenue expected to cover about two-thirds of estimated operating costs—ultimately Pennsylvania and any other state must determine the expected level / combination of revenue generated through the service, subsidies, and other funding sources.

### California's LOSSAN and Capitol Corridors

#### **Overview**

The 351-mile rail LOSSAN corridor stretches from San Luis Obispo through Los Angeles to San Diego, connecting major metropolitan areas of Southern California and the Central Coast. Train operations on the line include Amtrak's Pacific Surfliner, regional commuter rail, and Union Pacific and BNSF Railway freight rail services. Each year, more than 2.8 million intercity passengers and 4.4 million commuter rail passengers (Metrolink and COASTER) travel the LOSSAN corridor. One in every nine Amtrak riders uses the corridor.<sup>19</sup>

The 170-mile Capitol Corridor connects San Jose and Sacramento. It is under the management of the Capitol Corridor Joint Powers Authority (JPA), whose membership consists of the transportation agencies in the Capitol Corridor service area. The rail service in the Capitol Corridor was initiated by the state in 1991. It was under the management of the California

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<sup>18</sup> Northern Lights Express Newsletter: March 2018 ([www.mndot.gov/nlx](http://www.mndot.gov/nlx))

<sup>19</sup> [www.keepsandiegomoving.com/Lossan-Group/lossan-intro.aspx](http://www.keepsandiegomoving.com/Lossan-Group/lossan-intro.aspx)

Department of Transportation (Caltrans) until 1999. It has always been a state-supported rail service and was therefore already well-positioned when the provisions of PRIIA of 2008 took effect, requiring state support of shorter rail lines.

**Organization and Performance**

RailPac, the Rail Passenger Association of California and Nevada, published an editorial on March 3, 2012, that provides useful lessons for passenger rail advocates by contrasting the organizational arrangements and performance of these two corridors as of 2012.<sup>20</sup> When this comparison was made, the PRIIA 2008 requirements for state support of shorter routes were only beginning to be phased in. A comparison of some of the corridors’ characteristics is summarized in Table 9.

The editorial argues that the key reason for the better on-time performance in the Capitol Corridor is the institutional arrangement for the rolling stock: JPA has a great deal of control over the quantity and fitness of the locomotives and cars on its trains. The editorial expressed the view that Amtrak was excessively focused on short-run cost minimization, to the detriment of keeping the right-sized fleet of rolling stock and maintaining it in a state of good repair. The editorial added that the JPA agreement with the host railroad included incentive payments for better on-time performance. However, a comparison to the LOSSAN corridor could not be made because the article did not include any information about the terms of Amtrak’s agreement with the host railroads on the LOSSAN

corridor. More state and regional control over intercity passenger rail was argued to yield better performance.

**Table 9: Comparing California’s Capitol and LOSSAN Corridors**

Item	Entity	
	Capitol Corridor JPA	LOSSAN
<b>Intercity Services</b>	Capitol Corridor	Pacific Surfliner
<b>Track and ROW</b>	Union Pacific	Union Pacific and BNSF
<b>Rolling Stock Ownership</b>	Capitol Corridor JPA	Amtrak
<b>Rolling Stock Maintenance</b>	Amtrak, under contract. Overseen by JPA paid staff.	Amtrak
<b>Operations</b>	Amtrak, under contract with Caltrans	Amtrak, under contract with Caltrans
<b>Management</b>	JPA, day-to-day largely done by BART (Bay Area Rapid Transit), a JPA member agency.	Amtrak
<b>Number of round trips</b>	16	11
<b>On-Time Performance in 2011</b>	95%	70-80%

<sup>20</sup> Braymer, Noel T., “Why the Capitol Corridor Works, and What is Wrong with the Pacific Surfliners,” March 3, 2012 (<http://www.railpac.org/2012/03/03/why-the-capitol-corridor-works-and-what-is-wrong-with-the-pacific-surfliners/>)

Later in the year that the editorial was published, California passed SB 1225 which authorized LOSSAN to assume administrative and oversight responsibility of the Pacific Surfliner rail service, effective 2015. Since then, LOSSAN has taken over more control in a manner like the Capitol Corridor JPA, including taking ownership of new rolling stock. The JPA model is proving beneficial by providing for coordination among the various agencies using the lines. They are better coordinating train schedules, conducting joint marketing strategies, and publicizing timetables that show riders the schedules of all the lines, as well as public transit connections.<sup>21</sup>

### **Implications for Pennsylvania**

- California's experience of providing passenger service on a rail freight-owned and operated line may offer insights/best practices.
- The concept of a multi-jurisdictional agency that spans the corridor could be a useful institutional best practice or benchmark.
- Incentive payments for supportive performance by the owning freight railroad might be a contracting innovation worthy of exploring.

### **State-Supported Passenger Rail In North Carolina**

The State of North Carolina plays a very active role in railroad transportation. Its involvement dates back to at least 1849 with its establishment of the North Carolina Railroad.

#### **North Carolina Railroad**

The North Carolina Railroad is a private corporation, chartered in 1849 for the purpose of economic development, with 100 percent of its stock owned by the State of North Carolina. The railroad owns the 317-mile corridor that connects Charlotte, through Greensboro, Durham, and Raleigh, to the Port Terminal on the Atlantic coast in Morehead City. A lease agreement with Norfolk Southern grants exclusive freight trackage rights to Norfolk Southern. Norfolk Southern is responsible for maintenance of the line and any improvements for freight operations. Amtrak trains operate on various segments of the railroad corridor. The North Carolina-managed *Piedmont* service connecting Raleigh and Charlotte is entirely along North Carolina Railroad track.

#### **NC by Train**

The North Carolina Department of Transportation's Rail Division is responsible for the state's intercity passenger rail service, NC by Train. NC by Train offers two rail services. The *Piedmont* runs three round trips daily between Raleigh and Charlotte. The *Carolinian* runs one round trip daily between Charlotte and Rocky Mount in North Carolina, with a final destination in New York City.

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<sup>21</sup> Weikel, Dan, Los Angeles Times, "Little-known agency keeps commuter rail network on track," January 27, 2015

A noteworthy feature of the North Carolina model is that the State Rail Division owns and maintains the equipment. While operated under contract with Amtrak, NC trains have their own brand identity, distinct from Amtrak.

NCDOT takes an active role in passenger rail service in other ways. It plans, finances, and markets the passenger service, oversees customer service, plans and oversees station improvement projects, and manages station staff in cooperation with Amtrak. North Carolina's sponsorship of passenger rail predates the PRIIA 2008 requirement for state support of lines less than 750 miles.

The state has recently completed the Piedmont Improvement Program, an extensive set of improvements to the corridor between Charlotte and Raleigh that will both benefit freight movement and accommodate two additional frequencies of the *Piedmont* service for a total of five daily round trips. The \$520 million program was largely federally funded.

#### **Implications for Pennsylvania**

- NC DOT's active involvement in intercity passenger rail service indicates it may be a candidate for reciprocal sharing of ideas and best practices.

## 5. Looking Ahead – Relevant Trends, Technologies, and Influences

In addition to lessons learned from intercity passenger rail projects, future intercity passenger rail expansion must be considered in relation to broader trends and emerging technologies. This section highlights several such considerations that might have direct or indirect impacts for intercity rail.

### Population Migration to Urban Areas

***Expected to increase market for intercity passenger rail.***

Nationwide over the past 30 years, population has been decreasing in rural areas while suburban and urban areas have steadily grown. About 82 percent of North Americans live in urban areas—a percentage that has increased slightly over the past three decades. Increasingly, the population has been concentrating in mid-sized and large cities. Opportunities in employment, lifestyle preferences, availability of modal transportation, and social and entertainment activities have attracted more people—particularly Millennials—to larger city centers and regional suburbs. Projections suggest this trend will continue.<sup>22</sup>

In addition, today's young adults tend to be more health conscious and far less auto-centric than previous generations, preferring walking, biking, or taking bus or rail transit over driving. The large population of aging Baby Boomers seems to be pursuing similar lifestyles with walkable communities and less reliance on the car. The economic vitality of urban regions will be strengthened by more seamless connections from door to destination via multimodal public transportation systems, including intercity passenger rail.

### Ride-Hailing (Transportation Network Companies)

***Can complement rail by providing first- and last-mile connections.***

Ride-hailing companies such as Uber and Lyft have become popular and offer first- and last-mile transportation to transit stations or airports that provide longer distance intercity travel by air, bus, or rail. The growing public popularity of transportation network companies (TNC) may indirectly encourage use of modes other than the automobile for intercity travel as the total

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<sup>22</sup> statista (<https://www.statista.com/statistics/269967/urbanization-in-the-united-states/>)

trip is seen as more convenient, seamless, and customer friendly.

Ride-hailing services have created a new business model of “Shared Mobility.” This model attracted more than 250 million users within the first five years. According to a University of California, Davis study, 24 percent of ride-hailing adopters in metropolitan areas use the service on a weekly or daily basis.

This growing trend has had significant mode shift impacts in metropolitan areas. The Cal-Davis study found that bus ridership declined by 6 percent and light rail ridership declined by 3 percent. However, the study noted that ride-hailing services act as a complementary mode for commuter rail services (rather than replacing those trips).

For intercity passenger rail, ride-hailing services provide an alternative to local bus/commuter transit connections between metropolitan stations and travel destinations. Rail tourism destinations in Pennsylvania have ride-share partnerships with local transit providers that offer discounted rates—a model that can be applied to all passenger rail stations. In addition, pilot programs with SEPTA have shown that ridesharing at commuter stations is key to alleviating parking and accessibility issues faced outside of urban centers.<sup>23</sup>

## Connected and Automated Vehicle Technology

***May complement intercity passenger rail if travelers are provided real-time information on mode choices and convenient ticketing and transition points from automobiles.***

New and emerging technologies will play a role in support of intercity transportation. Intelligent Transportation Systems (ITS) devices such as detectors and sensors are already providing real-time traveler data that can help populate applications such as Waze for better intercity route choices to avoid traffic congestion.

Connected and automated vehicles (CAV) will likely provide a nearer-term benefit by connecting vehicles to vehicles, vehicles to infrastructure, and infrastructure to infrastructure. This will enable better communication of travel conditions among all these connections for intercity travel by automobile, as well as more efficient trip chaining. Information technology is indeed the greatest driver of change in transportation. The information technology and transportation marriage continues to strengthen and, as it does, some of the “friction” associated with travel decreases, which makes the use of modes once perceived as less convenient/customer-friendly than the automobile more favorable.

CAV will also provide more seamless travel by connecting payment for multiple travel costs, such as tolls, parking fees, and e-ticketing, into one convenient payment. PennDOT is preparing

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<sup>23</sup> Southeastern Pennsylvania Transportation Authority  
(<http://www.septa.org/media/releases/2016/05-25-16a.html>)

for a fully integrated system where travelers have real-time traveler information that includes modal options. As part of the I-76 Integrated Corridor Management program, drivers will get SEPTA travel times at key decision points to afford them with a realistic opportunity to switch modes.<sup>24</sup> In addition, some form of autonomous vehicle shuttle, whether fully or partially automated, could supplement travel for the first- and last-mile connection to intercity transportation hubs.

## Environment

***Intercity passenger rail has environmental benefits, which may encourage public support and ridership.***

Vehicle traffic congestion on our highways, specifically in high-volume corridors, not only causes travel delay but also increases fuel consumption and vehicle emissions, which reduces air quality. The availability of passenger rail as an alternative to personal vehicles not only reduces roadway congestion but also supports environmental stewardship. With the current predominant rail and automobile fleets, passenger rail emits less pollutants per passenger-mile than does the personal automobile. Changing fleet composition to favor zero emission powertrain types (electric, hydrogen) could reduce this advantage in the long term. The potential scenario of growing evidence of negative impacts of climate change could provide increased motivation to personal behavioral changes along with policy and regulatory changes that favor more environmentally benign travel modes, such as passenger rail.

The use of electric-powered locomotives instead of diesel engines further enhances the emissions reduction benefits of passenger rail. The Keystone Corridor is now served by electric-powered locomotives, which also results in less time at 30<sup>th</sup> Street Station in Philadelphia for through trains to New York as the time-consuming engine switch no longer has to occur.

## Intercity Bus

***Strong potential to meet intercity travel demand cost-effectively and serve as extensions of rail service.***

Intercity bus service has been a part of the American landscape for many decades. As automobile travel became more feasible for more people, intercity bus generally became viewed as a lesser transportation alternative. Like many long-term trends this one appears to be reversing for the following reasons:

- Greater competition through entrants into the market such as MegaBus.
- Improved vehicles to the point where luxury coaches provide a high level of comfort and convenience.
- Parking costs at the city ends of trips can be avoided through intercity bus travel (as it can with other non-auto modes).
- Exposure to intercity bus through charters and tourism has contributed to a positive impression.

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<sup>24</sup> Delaware Valley Regional Planning Commission, Connections 2040 Proposed Amendment, May 2016

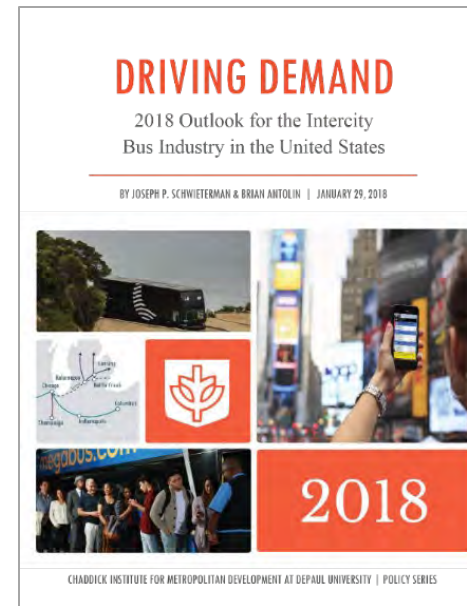
(<https://www.dvrpc.org/Connections2040/PublicComment/pdf/2016AmendmentAnalysis.pdf>)

- Convenient coordination of bus–rail journeys through Amtrak’s Thruway services.

Intercity bus offers several advantages over intercity passenger rail, including:

1. Intercity bus has a far lower cost profile than intercity rail and can provide a cost-effective travel option that does not require an extensive or, in some cases, any public subsidy.
2. Premium bus service and increased trip frequencies (which attract ridership) are achievable at a lower cost than similar upgrades for train travel.
3. Intercity bus uses the built infrastructure of the highway network, which is already the primary focus of federal, state, and local transportation investment and expenditure.
4. Because of its lower costs and use of existing infrastructure, intercity bus service is much more flexible and readily adjustable to adapt to changing circumstances.

State and local government have the opportunity to strategically consider ways to further bolster this mode in partnership with the private sector, economic developers, and others.



Intercity bus service could be the best option for intercity transportation on certain corridors, either alone or with complementary rail service that provides through ticketing and coordinated schedules.

For a more in-depth review of intercity bus trends and outlook please see [Driving Demand: 2018 Outlook for the Intercity Bus Industry in the United States](#).

## National and State Policy

### **Greater flexibility and funding for the states could help to expand intercity passenger rail.**

Federal transportation policy and investment has since the 1950s favored the automobile with the result of greater access and mobility than previously unimagined. A by-product of those decades of investment has been increasing congestion in major urban areas. As such, federal policy since the early 1990s has increasingly promoted greater emphasis on a multimodal system for moving passengers and goods and intermodal connections for both. Investments by the FTA in intercity rail have been important. Yet, FTA's investment pattern aligns entirely with the findings of this report in this way: FTA focuses its investments on intercity corridors with high populations, high market demand, significant traffic congestion, and strong public support.

Pennsylvania's policy has been to invest strategically in multimodal and intermodal transportation with a substantial growth in programs supporting transit, rail freight, and to a lesser degree aviation. The General Assembly has been supportive in several major bills of more funding for non-highway modes with the establishment of the Multimodal Transportation Fund. As a steward of the Commonwealth's limited resources, PennDOT has effectively targeted resources to intercity rail investments that will produce a return on the investment and help to ensure long-term sustainability.

The implication of national and state policy for any expansion of intercity rail comes down to this: federal and state resources

presently are not sufficient for such investments. Future policy would need to have both greater flexibility and greater funding in order to better align with expansion of intercity rail.

Comprehensive policy development might also consider new incentives for private participation and new funding and financing instruments.

## Transportation Innovations

***Technological advances could eventually make traditional rail obsolete. Leveraging complementary technology is key for the foreseeable future.***

Another prospect for transportation modernization is the effort to implement Superconducting Maglev (SCMAGLEV) technology in the Northeast Corridor. Principles of magnetic attraction would be used to whisk passengers from New York City to Washington, D.C., in only an hour, with speeds up to 374 miles per hour theoretically possible. The project could help to alleviate transportation congestion issues along the Northeast Corridor and have major economic impacts. Safety benefits could also be expected, as this proven technology has been in use in Japan for over 50 years with no reported passenger or crew injuries. The first segment of the NEC SCMAGLEV project, from Washington, D.C., to Baltimore, Maryland, is currently being evaluated as part of an environmental impact study.<sup>25</sup>

There is interest in a revolutionary hyperloop project connecting Pittsburgh, Columbus, and Chicago. The hyperloop would theoretically allow for a 48-minute total journey. This technology propels pods with passengers or freight at 700 miles per hour

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<sup>25</sup> Northeast Maglev (<https://northeastmaglev.com/>)

using magnetic force through a tube maintained at a partial vacuum. The hyperloop would be able to transport both passengers and freight. The Mid-Ohio Regional Planning Commission is conducting a \$2.5 million feasibility study.<sup>26</sup>

These rail technologies are still in the early stages of development in Pennsylvania and would require substantial financial investment to become a viable option for intercity travel. As demonstrated by the reassessment of California's MAGLEV initiative, the tremendous costs of such systems, as well as obstacles related to environmental clearances, right-of-way acquisition, and public opposition, can derail plans once seen as visionary. For the foreseeable future, continued investment in conventional bus and rail systems will be needed.

Intercity rail with its extensive capital assets is not a highly flexible mode, in comparison to intercity bus for example. The rate and pace of technology change has been great over the past two decades and will likely accelerate. It is not possible to

predict our transportation future in relation to technology. However, we know that in the past two decades transportation has been more impacted and changed by technology than all other factors combined. Uber, ITS, tolling in motion, and GPS are examples of technology impacting transportation.

This raises a sober concern regarding intercity rail for the future—will technology advances in some ways make intercity rail a high risk? In the worst case, technology could make intercity rail obsolete. Conversely, implementing complementary technology as part of a strategic approach to incremental investments could be the best scenario for enhancing intercity rail. For example, improved electronic ticketing and fare coordination between passenger rail and other modes—including ridesharing companies such as Uber and Lyft—would be an incremental enhancement using current information technology to enhance passenger rail ridership.

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<sup>26</sup> Blazina, Ed, Pittsburgh Post-Gazette, "Hyperloop proposal to link Pittsburgh–Columbus–Chicago moves to feasibility study," February 21, 2018

## 6. Success Factors – Considerations for Intercity Passenger Rail in Pennsylvania

Case studies of the intercity rail experience across the nation were conducted to address the core study question: What does it take to provide intercity passenger rail? Collectively, those case studies, other national experience, and trends point to 11 broad categories that answer that core question:

- Infrastructure
- Capital Costs and Funding
- Operating Costs and Funding
- Organizational Capacity
- Public Policy Support
- Partnerships
- Trip-Making Potential
- Local Connectivity and Access
- Connectivity with Amtrak Network
- Limited Competition from Other Modes
- Level of Rail Service

The first six of these “success factors” are supply-side considerations—required resources and capabilities to provide intercity passenger rail. The remaining five are demand-side considerations, influencing the potential ridership and fare

revenue of the rail line. Each of these “success factors” is described below along with some of the related case study findings.

### Infrastructure

The significant infrastructure requirements to support intercity passenger rail service are often a barrier to extending or expanding service. Right-of-way, track, signals, passing lanes, sidings, interlockings, and stations are costly to construct and to maintain in a state of good repair. Constructing entirely new rail lines on newly acquired right-of-way is nearly unheard of.

Relevant case study highlights:

- The Keystone Corridor already had extensive rail infrastructure in place prior to service expansion. That corridor, owned by Amtrak, provided the foundation for further improvements with PennDOT’s active leadership and involvement, resulting in travel time reduction and passenger growth.
- The Keystone Corridor benefits greatly from being owned and controlled by Amtrak, already electrified, with traffic dominated by shorter and faster-moving passenger rail cars.

- The Keystone Corridor improvements allowed for more trains, higher speeds, and shorter trip times--spurring success and high-quality service. Improvements such as the elimination of public at-grade crossings and track and interlocking upgrades have helped to move closer to the goal of increasing top speeds to 125 mph.
- The Keystone West experience to date illustrates the challenges faced in bringing passenger rail service to a corridor that is already straining at its capacity with freight traffic, on a route that has steep grades and sharp curves and is owned by a private freight railroad.
- Florida's Brightline corridor shares right-of-way and some track with a corporate sister regional freight railroad company. Compared to typical shared-use corridors in Pennsylvania, the lower volumes and type of freight traffic more readily allow for the trip frequencies, travel time reduction, and schedule reliability that help make passenger rail a success.
- Brightline operates on the existing Florida East Coast Railway corridor, with stations in Miami, Fort Lauderdale, and West Palm Beach. All Aboard Florida has a \$3.5 billion plan to expand the tracks to Orlando by 2022. It was recently declared to be the sole proposer responding to the Governor's invitation for private lease of Florida right-of-way for higher-speed passenger rail connecting Orlando to Tampa.

## Capital Costs and Funding

Railroads are an inherently capital-intensive enterprise. The infrastructure additions and equipment acquisition costs to add

or enhance passenger rail service are very costly even under the most favorable of circumstances (not to mention any land acquisition that may be required). Several state-supported systems (including Pennsylvania's Keystone Corridor) made considerable progress improving their systems in the era of ARRA (American Reinvestment and Recovery Act) stimulus grants and other legislation and programs around that time. The competitive BUILD (formerly TIGER) grant program is another federal source of capital funding.

Dollar amounts of required capital investment can only be estimated through a detailed feasibility study that considers a specific corridor's unique challenges. More precise costs would require engineering and other detailed analyses. A review of several recently completed feasibility studies suggests that an order-of-magnitude capital cost could range between \$400,000 and \$44 million per mile. The Keystone West High Speed Rail Feasibility Study concluded that \$500 million selectively invested in projects along the 249-mile corridor (\$2 million per mile) could support the addition of a second round-trip frequency.

Relevant case study highlights:

- Some states, including Pennsylvania, have dedicated or semi-dedicated funding sources for intercity passenger rail projects. Examples include the following:
  - Pennsylvania's Multimodal Transportation Fund includes \$8 million per year for passenger rail, which funds approximately half of the state's subsidy payment to Amtrak for the *Pennsylvanian* and *Keystone Service* trains.
  - Virginia has two separate dedicated funds: the Rail Enhancement Fund and the Intercity

### Passenger Rail Operating and Capital Fund ICPROC.

- The Rail Enhancement Fund, created in 2005, is available for freight and passenger rail. Revenues into the fund are estimated at approximately \$21 million per year. The 30 percent match requirement has limited the interest in the fund, and thus the reserves have been growing.
- The Intercity Passenger Rail Operating and Capital Fund, established in 2011, receives dedicated revenues of 0.05 percent of the state sales tax, estimated at roughly \$55 million per year. Virginia is the first state to establish a dedicated revenue stream specifically to support intercity passenger rail.
- o California voters approved a referendum dedicating one-fourth of the revenues from Cap and Trade auctions of greenhouse gas emissions allowances (an estimated \$500 million per year) to its ambitious high-speed rail project and some enhancements to conventional rail systems that will have connections with the high-speed rail line.
- The situation of Minnesota's Northern Lights Express (NLX) is emblematic of many railroad proposals across the country that remain stalled for lack of sufficient funding. The proposed 152-mile line, which would

provide four daily round-trips between Duluth and Minneapolis, has received its required approvals and is ready to proceed to final design and construction, as *soon as funding is available*. However, funding for the estimated \$500-\$600 million capital costs, and expected annual \$6.9 million operating subsidy, has not been established.

- The Keystone West case study demonstrates how challenging intercity rail capital improvements can be. As noted in the case study, the build alternatives from the 2014 report all have estimated costs in the billions of dollars for a modest increase in service and decrease in travel time.
- The two private passenger railroad ventures, Texas Central Railway and All Aboard Florida's Brightline (soon to be Virgin Trains), are predominantly privately financed. Low-interest, federally sponsored private activity bonds are also an important funding source for both projects. The Brightline venture also includes multi-use real estate development at the South Florida stations, which improves the project's expected payout and thereby helps to raise the needed capital.

### Operating Costs and Funding

The interest of many in establishing intercity passenger rail service often focuses on the costs to build without adequate consideration of the tremendous cost to operate and maintain intercity rail service. This factor simply recognizes that for intercity rail service to succeed, there must be adequate funding to ensure and sustain the costs of operation and maintenance.

Only six service lines in the Amtrak system operate with fare revenue covering operating costs. Two of these are Amtrak's Northeast Corridor services, The *Northeast Regional* and *Acela*. The remaining four are the Virginia state-supported services. Amtrak's services on routes less than 750 miles require the state to cover the net cost of the service after fare revenues. In light of this requirement, the ongoing viability of state-supported service all but requires that the state has a sustainable dedicated funding stream to cover required operating subsidies.

Financial operating performance statistics for the state-supported Amtrak routes for FY 2017 are displayed in Appendix B. Operating costs per seat-mile (seat-mile is a metric that does not change with usage) ranged from 13 to 43 cents. The *Keystone Service* ranks 15<sup>th</sup>-lowest on this measure, with an operating cost of 19 cents per seat-mile.

The excess of operating expense over fare revenue is an approximate indicator of the level of subsidy payment that the state needs to fund. This shortfall ranged from negative \$19.50 per passenger in Virginia, where the fare revenues more than cover operating expense, to \$120 per passenger on the *Hoosier State* in Indiana. Revenues fell short of operating expense by \$8 per passenger on the *Keystone Service* and \$24 per passenger on the *Pennsylvanian*. The *Keystone Service* ranks 7<sup>th</sup>-lowest on this metric and the *Pennsylvanian* ranks 12<sup>th</sup>-lowest.

When accounting for the length of trip by using passenger-mile, the rates and ranking change. The operating shortfall per passenger-mile ranges from negative 9 cents to 78 cents. The *Keystone Service* and the *Pennsylvanian* fall in the lower end of this range, at 10 cents per passenger-mile for both.

Relevant case study highlights:

- Pennsylvania's Multimodal Transportation Fund, financed through Pennsylvania Turnpike Commission payments, Motor Vehicle Fees, and the Oil Company Franchise Tax, supplies most of the operating subsidy payments to Amtrak for the *Keystone Service* (\$7.1 million in 2017) and the *Pennsylvanian* (\$1.3 million in 2017).
- Florida's Brightline experience is instructive as a private operator of intercity rail. In its early operation, even with a large passenger base, it is not yet covering its operating cost. Brightline expected 1.1 million passengers and nearly \$24 million in revenue in the first full year of operation. It has not been operating at a full schedule long enough to reach that ridership level. The company reported losses of slightly more than \$28 million in each of the first two quarters of 2018. In a filing with the SEC, the company said that it expects 6.6 million riders after the full Miami–Orlando route is completed.
- In FY 2017, fare revenues of \$43 million covered 77 percent of the *Keystone Service's* reported \$55.5 million operating expenses, leaving a shortfall of \$12.5 million. The instances of intercity rail being self-sustaining (fare revenue meeting all operating costs) are extremely rare, yet as the next points describe this has occurred in Virginia.
- Virginia has seen remarkable success in adding intercity passenger rail service in the past nine years. Three services have been added, all extensions of *Northeast Regional* trains traveling the Northeast Corridor out of

Washington, D.C. The trains are all Amtrak-owned and operated, running on Norfolk Southern and CSX track.

- All of the Virginia rail services are generating sufficient fare revenues to cover their operating costs. The cost and ridership characteristics of the Virginia routes benefit from the fact that they are extensions of Amtrak's *Northeast Regional* service. This connection helps to keep down the incremental cost of the service. Also, the dense and growing population of the Northeast Corridor helps to boost ridership and associated fare revenue. Finally, Virginia receives a share of the fare revenue that its riders generate for travel on the Northeast Corridor segment of their trip.

### Organizational Capacity

Organizational capacity broadly relates to organizational capabilities and resources to own, operate, and maintain the rail service. This factor does not imply that any one organization can make intercity passenger rail work. It takes the combined capacities of multiple organizations to make service successful, as discussed under Partnerships.

The Keystone Corridor provides a valuable picture of the organization capacity success factor in several ways:

- The success of the Keystone Corridor depends upon major organizations: Amtrak, the Federal Transit Administration, the Federal Railroad Administration, PennDOT, and SEPTA.
- Other organizations are part of the organizational capacity puzzle including developers, local government, and economic development organizations.

- The Keystone Corridor operator is Amtrak, a national organization with significant capabilities, experience, and resources. The operator of a prospective intercity rail line must have comparable capabilities and resources (at least at the corridor level of scale). In the case of Brightline, the private sector is paying for these skills and capabilities. A publicly funded new start intercity rail provider is a highly unlikely scenario at present.

Additional case study highlights:

- In California, the Capitol Corridor and LOSSAN Joint Powers Authorities are organizations of regional transportation agencies that have the authority and resources to oversee and manage the state-supported Amtrak services in their corridor. The Capitol Corridor Joint Powers Authority owns its own rolling stock and has paid staff overseeing maintenance services provided under contract by Amtrak.
- The North Carolina Department of Transportation's Rail Division is responsible for the state's intercity passenger rail service, NC by Train, which offers two rail services: the *Piedmont* and the *Carolinian*. The Rail Division has purchased and maintains its own rolling stock for these two services.
- The NC DOT Division takes an active role in passenger rail service in other ways. It plans, finances, and markets the passenger service, oversees customer service, plans and oversees station improvement projects, and manages station staff in cooperation with Amtrak.

- Texas Central (Dallas–Houston) indicates the following advantages of a privately-financed venture:
  - Market discipline means that the project must demonstrate its financial viability to investors.
  - The project is not limited by the political constraints of a public endeavor; it has greater scope for capital and operating decisions, including scheduling, service, and ticketing.

### Public Policy Support

Intercity passenger rail needs supportive public policy. Even the private Brightline service in Florida has elements of supportive public policy. This very broad success factor includes, but is not limited to: public support, public officials as champions, consensus among public officials and other key stakeholder leaders, political will, and also supportive legislation including that which provides funding and establishes various requirements that indirectly support intercity rail (e.g., ADA).

However, it is not the money alone that make these enterprises successful. The responsible state agencies (e.g., PennDOT's Bureaus of Public Transportation and Rail Freight, Ports, and Waterways and the Virginia Department of Rail and Public Transportation) provide essential planning, expertise, and organizational support, as discussed further under Partnerships.

Future policy changes at any level of government that might be more supportive of intercity rail are few and include the following:

- Increasing spending flexibility to allow states, in partnership with MPOs, to make funding decisions regardless of mode.
- Allowing states and MPOs to establish their own performance measures—the recent advent of federal performance measures reflects the structure of a national highway program in contrast to overall system performance regardless of mode.

Relevant case study highlights:

- The Commonwealth of Pennsylvania's leadership and resources (financial and other) in bringing and sustaining a high level of service on the Keystone Corridor demonstrates the impact of supportive public policy, particularly at the state level.
- The recent and planned extensions and enhancements to Virginia's passenger rail network are another example of strong leadership and broad public and political support for intercity passenger rail. The provision of dedicated funding was a major and important manifestation of this public and political support.
- Political support at the state level might be more likely when intercity passenger rail is a realistic transportation option for the majority of the state's residents. In Virginia, where state leaders have been strongly supportive, 81 percent of Virginians live within 25 miles of intercity passenger rail. In Pennsylvania, the corresponding population share is approximately 70 percent—a figure that includes the population in the Erie area, which is not connected by passenger rail to the rest of Pennsylvania.

- Even the private passenger rail ventures in Texas and Florida demonstrate that supportive public policy plays an important role. These projects required various approvals and are also seeking/receiving taxpayer-subsidized private activity bonds.
- The Texas and Florida experiences also show some ways in which public opposition can endanger a private rail project. The Texas Central Railway is meeting resistance from some private landholder interests. Florida's Brightline was in danger of losing critical private activity bond funds due to lawsuits filed by communities opposed to having the trains pass through.
- The 62-mile Hartford line, paralleling the I-91 corridor, links New Haven to Springfield, Massachusetts' state capital. Just opened in June 2018, it is the first commuter rail service to link Connecticut's interior cities since 1968. State bonding covered more than two-thirds of the \$768 million project cost; federal funds covered the remainder.
- State policy has changed the way passenger rail improvements may be funded in Pennsylvania. Pennsylvania Act 88 of 2012 authorized public-private partnerships (P3) for transportation projects.
- The expectation of economic developments of new passenger rail service, particularly at train stations, is a strong source of public and political support. Enthusiasm expressed in the local press over new service in Hartford, Connecticut, and Roanoke, Virginia, evidence this support.

## Partnerships

The case studies underscore that considering the great challenge of providing intercity passenger rail services, partnerships are essential—partnerships among transportation organizations at the state, national and regional levels, as well as public-private financing partnerships.

It is important to note that partnerships are not only for front-end investment but must be enduring and accountable over time to ensure that the service and the infrastructure are both in good order. Partnerships depend upon clearly understood roles and responsibilities among the partners.

Relevant case study highlights:

- Act 88 in Pennsylvania authorized public-private partnerships (P3) for transportation projects, changing the way passenger rail improvement projects may be funded. Reinvigorated train stations have increasingly been viewed as drivers of local economic development, offering opportunities for "value capture" by engaging private partners to share in the station development costs in exchange for business revenues and increased property values.
- Around the nation, a variety of partnerships exist for operating passenger rail systems. Some of these arrangements may not be suitable for Pennsylvania's corridors. Nevertheless, it can be useful to be aware of and open to the various possibilities.
- North Carolina's Piedmont, connecting Charlotte and Raleigh, operates under what is probably a unique institutional arrangement. The service is operated by

Amtrak under contract to the NCDOT's Rail Division under the branding "NC by Train." The equipment is owned and maintained by NCDOT. The train shares use of the track with Norfolk Southern. However, unlike a typical passenger rail scenario, Norfolk Southern is not the owning host railroad. Rather, it has a long-term lease with the track's owner, the North Carolina Railroad—a company that is owned by the people of North Carolina.

- The Virginia Railway Express (VRE), which provides commuter rail service in Northern Virginia, offers an interesting example of partnership options. For its first 18 years, VRE contracted with Amtrak for operations and maintenance of the commuter rail service. Starting in 2010, VRE contracted with Keolis Rail Services America, a subsidiary of a French company.
- The 170-mile Capitol Corridor, connecting San Jose and Sacramento, California, is under the management of the Capitol Corridor Joint Powers Authority (JPA), whose membership consists of the transportation agencies in the Capitol Corridor service area.
- The Capitol Corridor JPA model is proving beneficial by providing for coordination among the various agencies using the lines. The agencies are coordinating train schedules, conducting joint marketing strategies, and publicizing timetables that show riders the schedules of all the lines, as well as public transit connections.
- As of July 2015, the three California passenger rail Joint Powers Authorities contract directly with Amtrak for the state-supported routes in their jurisdictions.<sup>27</sup>

The following success factors are the major determinants of the levels of ridership (demand) that an intercity passenger rail service will achieve. The "Trip-Making Potential" success factor refers to the forces generating trips between stops in the corridor. The other success factors are the characteristics that affect the share of these trips that are made by intercity passenger rail.

### **Trip-Making Potential**

Like public transportation in urban areas, intercity rail ridership depends on dense population and economic activity in the multiple areas served. The existence of major trip attractors such as employers, colleges, major event venues, tourist destinations, and conference centers also contributes to ridership. These elements underlie the number of trips made between the stops in the corridor.

Relevant case study highlights:

- The Brightline corridor links Miami and Orlando, which are two populous and economically dynamic regions in southern Florida. Further, both are among the most popular tourist destinations in America.

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<sup>27</sup> California Department of Transportation  
(<http://www.dot.ca.gov/dmrt/rsos.html>)

- Between 2000 and 2015, the average population growth was 8.5 percent and the average employment growth was 11.7 percent for the counties that are served by the Keystone Corridor. As tourism, population, and employment along the Keystone Corridor continue to grow and as parallel highway routes become more congested, ridership is predicted to also increase. Passenger growth trends favorably with population growth in this corridor.
- Ridership on the Keystone Corridor has increased over the last decade. Amtrak reported 1.467 million passengers on the Keystone Corridor in 2016 and 1.506 million passengers in 2017—an increase of 7.3 percent in one year. Even on Saturdays and Sundays, for example, Amtrak Keystone Corridor trains have many passengers destined for recreation, culture, events, and shopping in Philadelphia and New York City.
- Many passengers board at the Virginia Amtrak station in Charlottesville, demonstrating the passenger potential associated with a major university (University of Virginia). Even with only two trains per day, Charlottesville’s 141,200 passengers in 2017 represented nearly three times the city’s population. Charlottesville accounted for two of the top five city pairs for rail travel in Virginia.
- The 351-mile rail LOSSAN (Los Angeles–San Diego) corridor stretches from San Luis Obispo, through Los Angeles, to San Diego, connecting major metropolitan areas of Southern California and the Central Coast. Train operations on the line include Amtrak’s Pacific Surfliner, regional commuter rail, and Union Pacific and BNSF

Railway freight rail services. Each year, more than 2.8 million intercity passengers and 4.4 million commuter rail passengers (Metrolink and COASTER) travel the LOSSAN corridor. One in every nine Amtrak riders uses the corridor.

- For the Texas Central Railway, Dallas to Houston High Speed Rail, a ridership study completed by L.E.K. Consulting in 2016 projected five million passengers in 2026, increasing to 10 million by 2050.
- The market demand for high-speed rail is also expected to grow with the projected economic growth in the Dallas–Houston market area, along with expected increase in income levels. GDP growth of 2.6 percent per year is forecasted.

### Local Connectivity and Access

Intercity rail does not provide door-to-door service for any user. Success is more likely in rail corridors that have stations and parking affording ready access to a robust public transit system and a walkable station area where rail patrons feel reasonably safe. For suburban or small-town stations, the availability of free or at least reasonably priced secure parking supports ridership. If a rail station is not located with good access to the traveler’s destination, the traveler may be more likely to drive directly. PennDOT has learned over time that this factor is vitally important and sometimes not sufficiently recognized. The department has likened local connectivity and access to having an adequate “front door” to access a building.

Relevant case study highlights:

- SEPTA’s regional rail operates on part of the Keystone Corridor line. The Keystone Corridor connects with SEPTA’s transit line at 30<sup>th</sup> Street Station in Philadelphia, providing travelers with an extensive transit network to access other destinations in the metro area. The Keystone Corridor stations have parking in direct proximity to the rail line. Many of the stations, particularly those in the Delaware Valley, have connecting bus, commuter rail, and regional rail services.
- “Access the Keystone” was a PennDOT initiative to evaluate and improve multimodal connections, including non-motorized modes, to the stations on the Keystone Corridor. Station-area improvements are now advanced under the “Plan the Keystone” initiative.
- Florida’s Brightline stations are located with connections to other modes: public transit in Miami, and in Orlando, at a new intermodal center at the airport.
- Brightline’s Miami station is elevated 50 feet above ground, with restaurants and shops underneath the tracks. A 12-story office building and residential tower is built atop the platform. Intercity rail station areas are often characterized by the variety and density of business activity within walking distance. This includes commercial business activity, retail, restaurants, etc.

### Connectivity with Amtrak Network

Rail service that has more linkages into the national rail network is more likely to attract passengers. It is important to note that this factor in reality does not have equal impact across the

Amtrak system. In fact, intercity rail line connectivity to the Northeast Corridor is far more impacting on travel demand than connections to other Amtrak lines.

Relevant case study highlights:

- The Brightline corridor is directly linked to the north-south Amtrak network, which connects to northern portions of Florida and other states, which enhances ridership.
- The service additions in Virginia all link to Amtrak’s Northeast Corridor, providing very good connections to Washington, Philadelphia, New York, and Boston.
- Amtrak’s greatest ridership is on the Northeast Corridor. Amtrak and state DOTs have given special attention to linkages such as the Keystone Corridor because they are feeders to the NEC.

### Limited Competition from Other Modes

The ability of rail to attract riders depends in large part on the characteristics of the alternative modes against which it competes. These alternative modes can include intercity bus, air, personal vehicle, or a combination of modes, such as driving to a transit stop and completing the journey by transit. This success factor considers the availability, cost, schedule, travel time, and reliability of these alternative modes. The other side of the competition equation is the level of rail service, which is a separate success factor, described later.

More travelers choose to take the train when the alternative transportation modes are limiting or less attractive. For example, on a corridor with heavy highway congestion, train travel time and convenience may be highly competitive. Compared to

personal automobile travel, taking the train can save on tolls and avoid the expense and challenge of finding parking. Similarly, the additional time required for airport security post-9/11 has made travel pairs such as Philadelphia–Pittsburgh less desirable by air, particularly calculating that neither airport is near its respective downtown area, for which many passengers are destined.

Relevant case study highlights:

- Taking the train on the Northeast Corridor is usually preferable to driving the heavily congested I-95, and it is time-competitive. It is also more convenient than air connections between the corridor’s cities, which are comparatively limited (at least for some city pairs) but more importantly do not provide the downtown-to-downtown access that most intercity travelers need.
- Florida’s Brightline expects its rail fares to be approximately 25 percent less expensive than driving and approximately 30 percent less expensive than flying.

### Level of Rail Service

Rail’s competitiveness with other modes depends not only on the characteristics of the other modes, but on the characteristics of the rail service. Competitiveness depends on having sufficiently frequent service that is offered at times that meet traveler needs, and that provides reliable door-to-door trip times that are reasonably competitive with the next best alternative

mode. Frequency of service, comfort, cleanliness, and amenities such as Wi-Fi, quiet cars, and food cars help to make intercity rail a more appealing travel option than competing modes.

Relevant case study highlights:

- The Keystone Corridor and the Northeast Corridor offer a high level of service, and their ridership levels are correspondingly high. Travelers on the Keystone Corridor have a choice from among 14 trains in each direction on weekdays and seven trains in each direction on weekends. Passengers can travel from Harrisburg to Philadelphia within 105 minutes.
- For many travelers in the Keystone West corridor, the *Pennsylvanian’s* once-daily (in each direction) service is insufficient to divert them from other modes. For example, the *Pennsylvanian’s* schedule makes it impossible to make a one-day business trip between Pittsburgh and Harrisburg by train.
- The ridership forecast study for the proposed Texas Central Railway linking Dallas and Houston supported its high ridership projections in large part on the service frequency and the fact that the travel times of the train compared favorably to those of auto or air travel. They estimated the trains would depart every 30 minutes in peak periods and save 70 minutes compared to automobile travel.

## 7. Corridor Profiles – Assessing City Pairs

To evaluate city pairs for potential new or expanded intercity passenger rail, this study builds on the passenger rail corridors analyzed in TAC’s 2001 *Pennsylvania Statewide Passenger Rail Needs Assessment Technical Report*. TAC evaluated all eight of the “High-Rated Corridors”<sup>28</sup> from the 2001 TAC study and two additional corridors (Reading–Pottstown–Philadelphia and Pittsburgh–Erie) suggested by current TAC members. Note that some of the corridors in this study already have passenger rail service. Existing rail corridors such as the Northeast Corridor and Keystone Corridor are included as benchmarks for potential recommendations of new or expanded passenger rail services in Pennsylvania.

The 10 corridors analyzed in this section are listed below and depicted on Figure 11 (page 72):

### Corridors with Existing Passenger Rail Service

- [Northeast Corridor \(Washington, DC–Philadelphia–New York City–Boston\)](#)
- [Keystone Corridor \(Harrisburg–Philadelphia\)](#)
- [Keystone West \(Pittsburgh–Harrisburg\)](#)
- [Pittsburgh–Cleveland, OH](#)

### Corridors without Existing Passenger Rail

- [Lehigh Valley–New York City](#)
- [Harrisburg–New York City \(directly, not via Philadelphia\)](#)
- [Scranton–New York City](#)
- [Harrisburg–Washington D.C.](#)
- [Reading–Pottstown–Philadelphia](#)
- [Pittsburgh–Erie](#)

The corridor profiles focus on the following information:

1. **City pair(s)** – Cities and population centers at the termini of each corridor as well as any intermediate cities that should be considered.
2. **Travel demand indicators** – These include demographics such as population change, employment change, and economic growth/stability within the corridor limits. MPO data such as commuting trips and major origin and destination points were also considered in this category. The U.S. Census Bureau American

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<sup>28</sup> Pennsylvania Transportation Advisory Committee, *Pennsylvania Statewide Passenger Rail Needs Assessment Technical Report*, December 2001, p.41 ([http://www.talkpatransportation.com/assets/TAC/Pennsylvania%20Statewide%](http://www.talkpatransportation.com/assets/TAC/Pennsylvania%20Statewide%20Passenger%20Rail%20Needs%20Assessment%20-%20December%202001%20-%20Technical%20Report.pdf)

[20Passenger%20Rail%20Needs%20Assessment%20-%20December%202001%20-%20Technical%20Report.pdf](#))

Communities Survey (ACS) commuting flow data was used to supplement MPO data.

3. **Major origin/destination points and traffic generators** – Major trip generators include metropolitan areas, employment centers, and major tourism attractions as identified by Visit PA, Pennsylvania’s official tourism website.
4. **Challenges/issues/opportunities** – Factors include track ownership, existing rail service, opportunities for rail extensions, and other items identified as part of the research effort. This category also includes the availability of passenger bus service and other intercity transportation modes.
5. **Travel intensity** – This measure assesses traffic trends on parallel roadway corridors. PennDOT’s historical AADT data was used to determine the percentage change in travel intensity from 2000 to 2015.
6. **Significant improvements or functional changes in corridor since 2001 study** – This includes any feasibility

studies, MPO interest, or other initiatives made to advance intercity passenger rail since 2001.

The corridor profile maps show an overview of the corridor with major metropolitan areas and other cities within the corridor limits. The maps also show existing freight, passenger, and commuter rail lines within the corridors as well as 2010 U.S. Census population data by census tract,<sup>29</sup> 2010 U.S. Census population density data, and the percentage change in average annual daily traffic (AADT) between 2000 and 2015<sup>30</sup> along some of the parallel roadway networks.

Note that there are several corridors that extend beyond Pennsylvania’s borders. Data for neighboring states was limited to census tract population data, population density, and some existing transit rail connections such as New Jersey Transit.

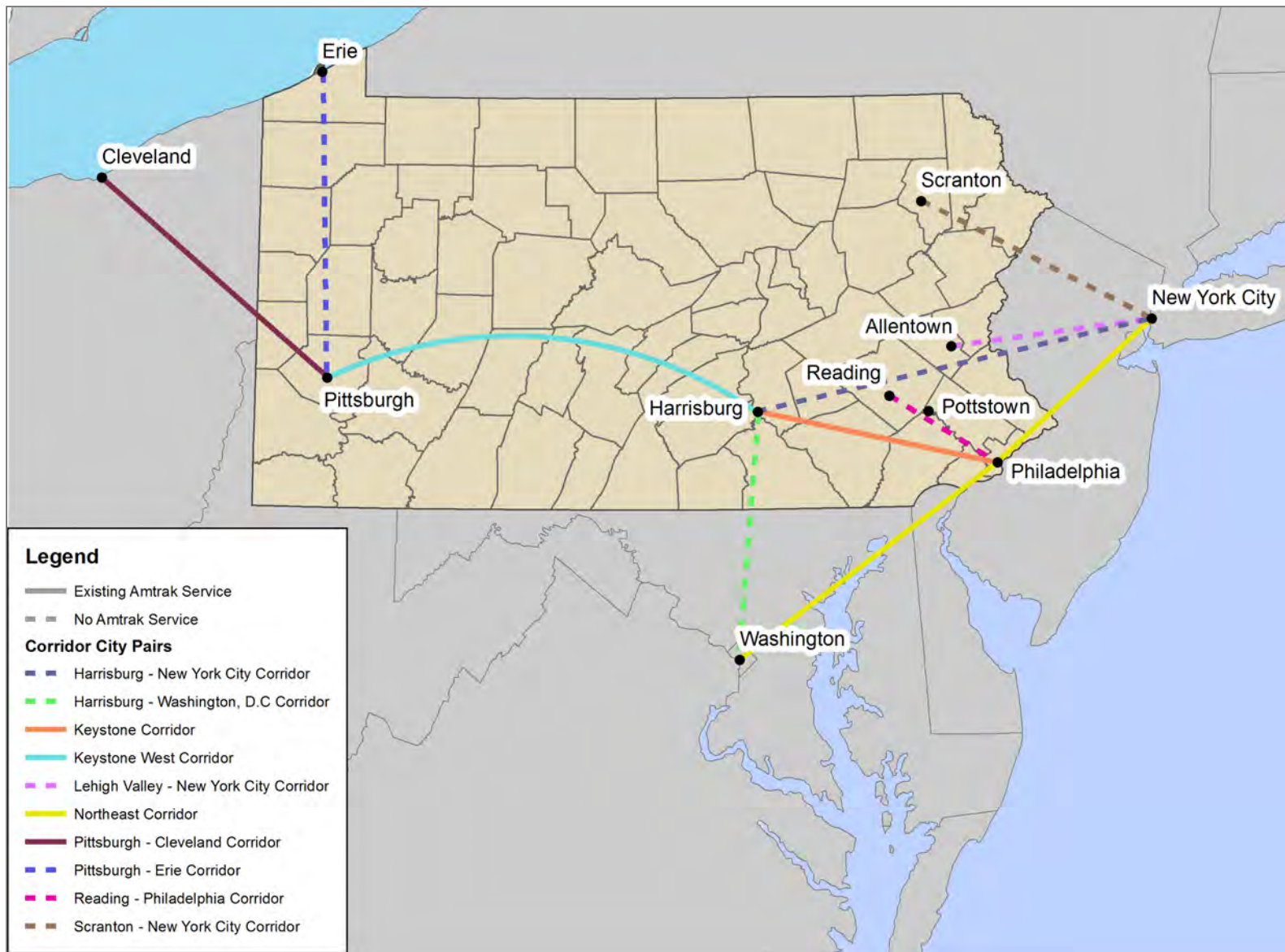
Fact sheets with more detailed ridership data by Amtrak station are available at <https://www.railpassengers.org/all-aboard/tools-info/ridership-statistics/>.

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<sup>29</sup> U.S. Census Bureau, American Fact Finder ([https://factfinder.census.gov/faces/nav/jsf/pages/community\\_facts.xhtml](https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml))

<sup>30</sup> PennDOT (<https://www.penndot.gov/ProjectAndPrograms/Planning/Maps/Pages/Traffic-Volume.aspx>)

Figure 11: City-Pair Corridors Profiled in this Section



## Northeast Corridor Profile

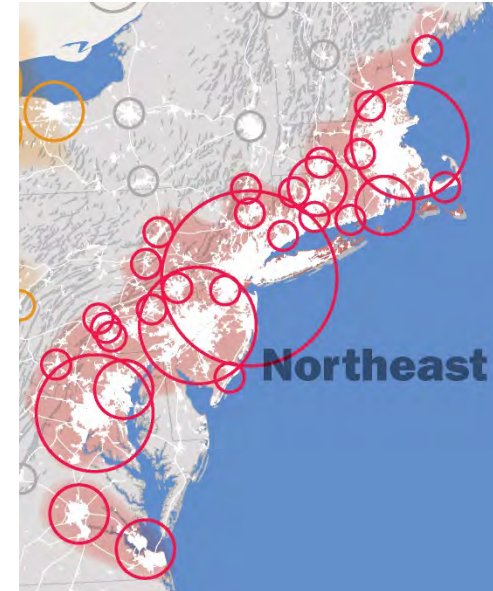
**Existing infrastructure and service:** The Northeast Corridor (NEC) connects Boston, New York City, Newark, Philadelphia, Baltimore, and Washington, D.C., running generally parallel to I-95. The rail infrastructure for a majority of the line is owned, operated, and maintained by Amtrak and is fully electrified, meaning the trains can draw uninterrupted power from an overhead electrical conductor. Certain stretches of track along the corridor are owned by the Metropolitan Transportation Authority (MTA), Connecticut DOT (CDOT), and the Massachusetts Bay Transportation Authority (MBTA). As Amtrak's most successful corridor, the NEC accounted for 49 percent of Amtrak's overall 2017 revenue. One Pennsylvania stop has been added to this corridor since 2001: Cornwells Heights in Northeast Philadelphia.

**Travel demand indicators:** According to FHWA's 2013 Interstate Brief, I-95 is the most traveled road in the U.S. with 51,041 million annual vehicle miles traveled (VMT).<sup>31</sup> The corridor serves an almost continuous metropolitan area with a total population of more than 52 million and a \$2.91 trillion economy—nearly 20 percent of the U.S. Gross Domestic Product (GDP).<sup>32</sup>

**Tourism:** In 2016, approximately \$6 billion was spent on tourism in the Philadelphia metro area alone. New York City, Washington, and Boston are also major generators of tourists and tourism spending in the corridor.

**Proposed competing projects:** The Northeast Corridor has been chosen as a potential candidate for Super-conducting Maglev (SCMaglev) trains<sup>33</sup> that would allow passengers to travel from Washington, DC, to New York City in an hour, resulting in a 1.5 hour travel time savings from Amtrak's current *Acela Express* service. The SCMaglev trains would require a significant investment in additional infrastructure. Phase 1 of the project is a pilot study of the corridor between Washington, DC, and Baltimore, MD.

Boring Company has proposed constructing a Hyperloop between Washington, D.C., and Baltimore with the vision of extending the Hyperloop to New York.<sup>34</sup> The company envisions reducing travel time from Washington to New York to less than 30 minutes.



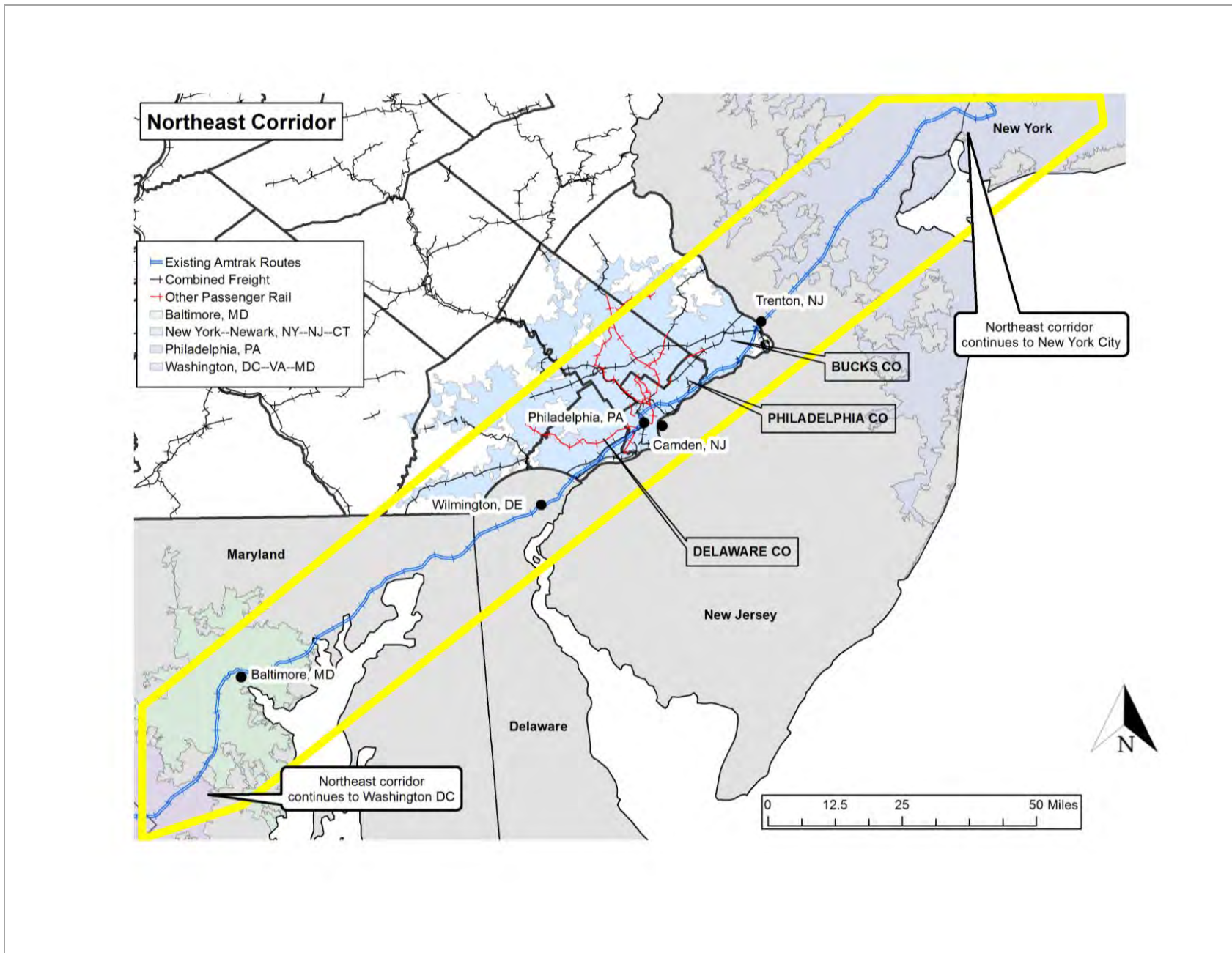
The Northeast Corridor Megaregion  
([www.america2050.org](http://www.america2050.org))

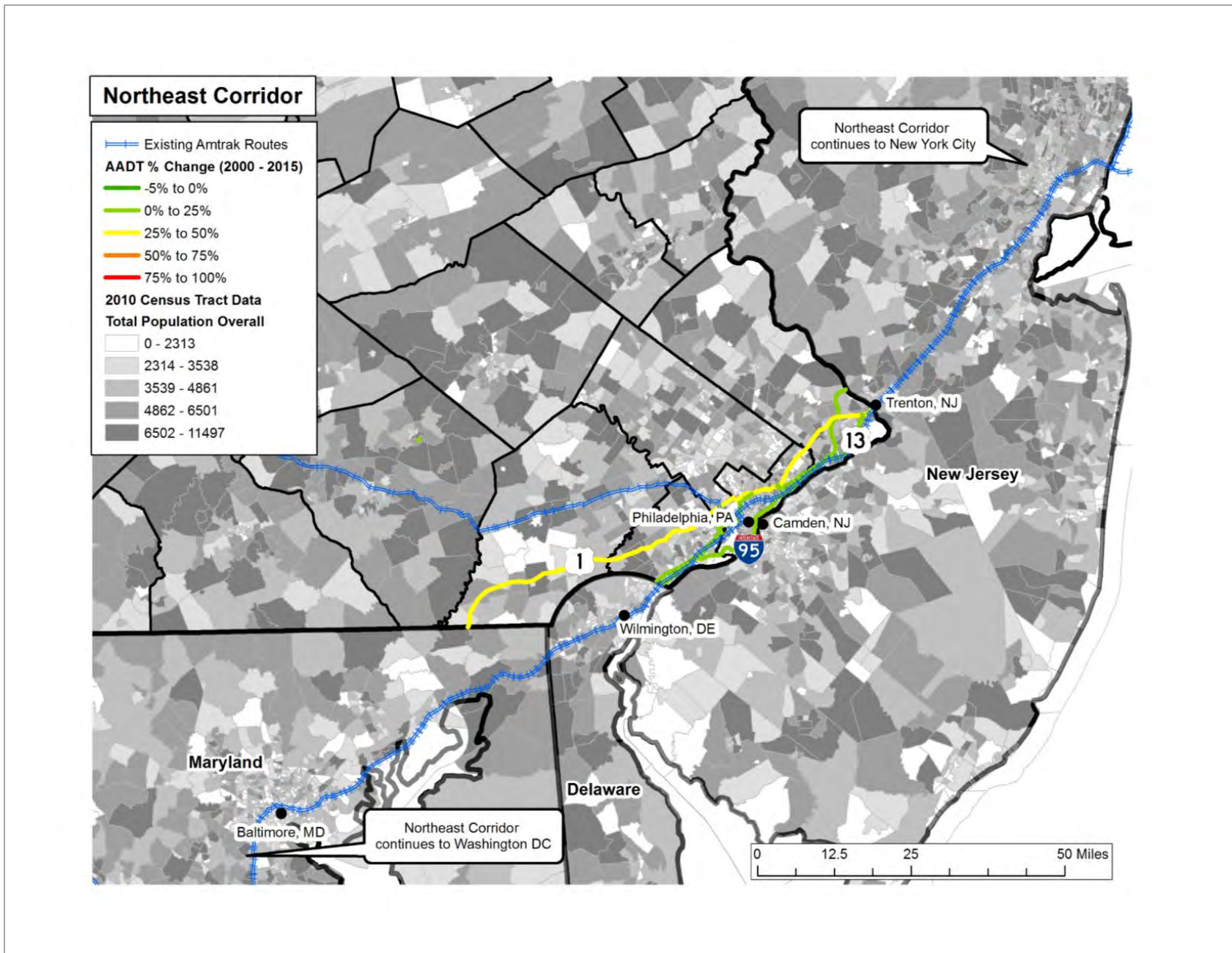
<sup>31</sup> Federal Highway Administration, "Interstate Brief," August 2013 (<https://www.fhwa.dot.gov/interstatebrief2011/>)

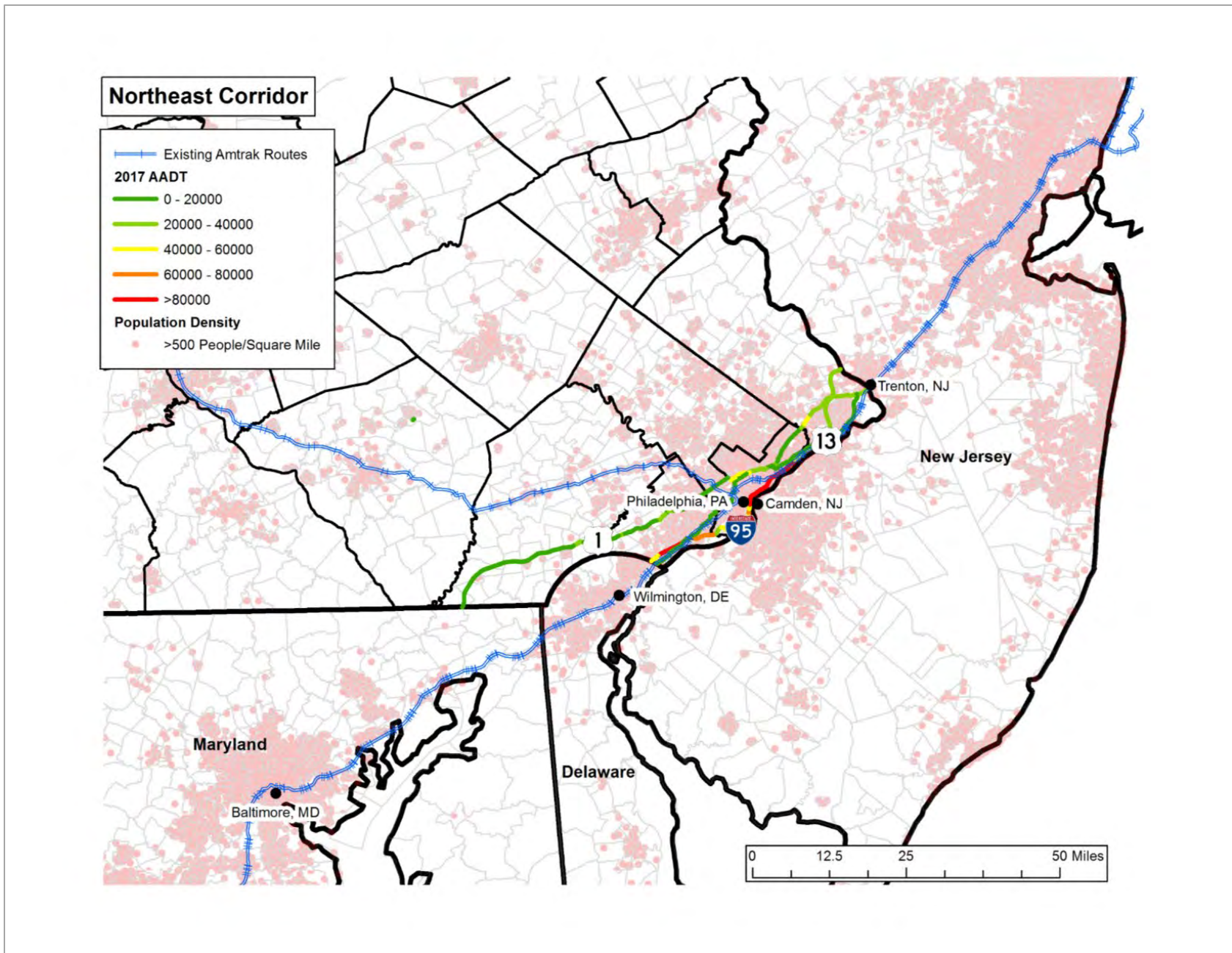
<sup>32</sup> Based on 2010 figures (<http://www.america2050.org/northeast.html>)

<sup>33</sup> Northeast Maglev (<https://northeastmaglev.com/>)

<sup>34</sup> The Boring Company (<https://www.boringcompany.com/eastcoast/>)







### Keystone Corridor Profile

**Existing infrastructure and service:** The Keystone Corridor is a fully electrified, Amtrak-owned rail line connecting Harrisburg, Lancaster, and Philadelphia. Amtrak operates six daily weekday round-trip trains on the Keystone Corridor as the *Keystone Service*. The once-daily *Pennsylvanian* travels along this corridor as part of its trip between Pittsburgh and New York City. SEPTA commuter trains also operate on the eastern reaches of this corridor. From Philadelphia’s 30th Street Station, riders have access to many destinations on Amtrak’s East Coast network, most notably Virginia and the Northeast via Amtrak’s *Northeast Regional* service and the Amtrak *Acela* high-speed, business class service between Washington and New York.

**Travel demand indicators:**

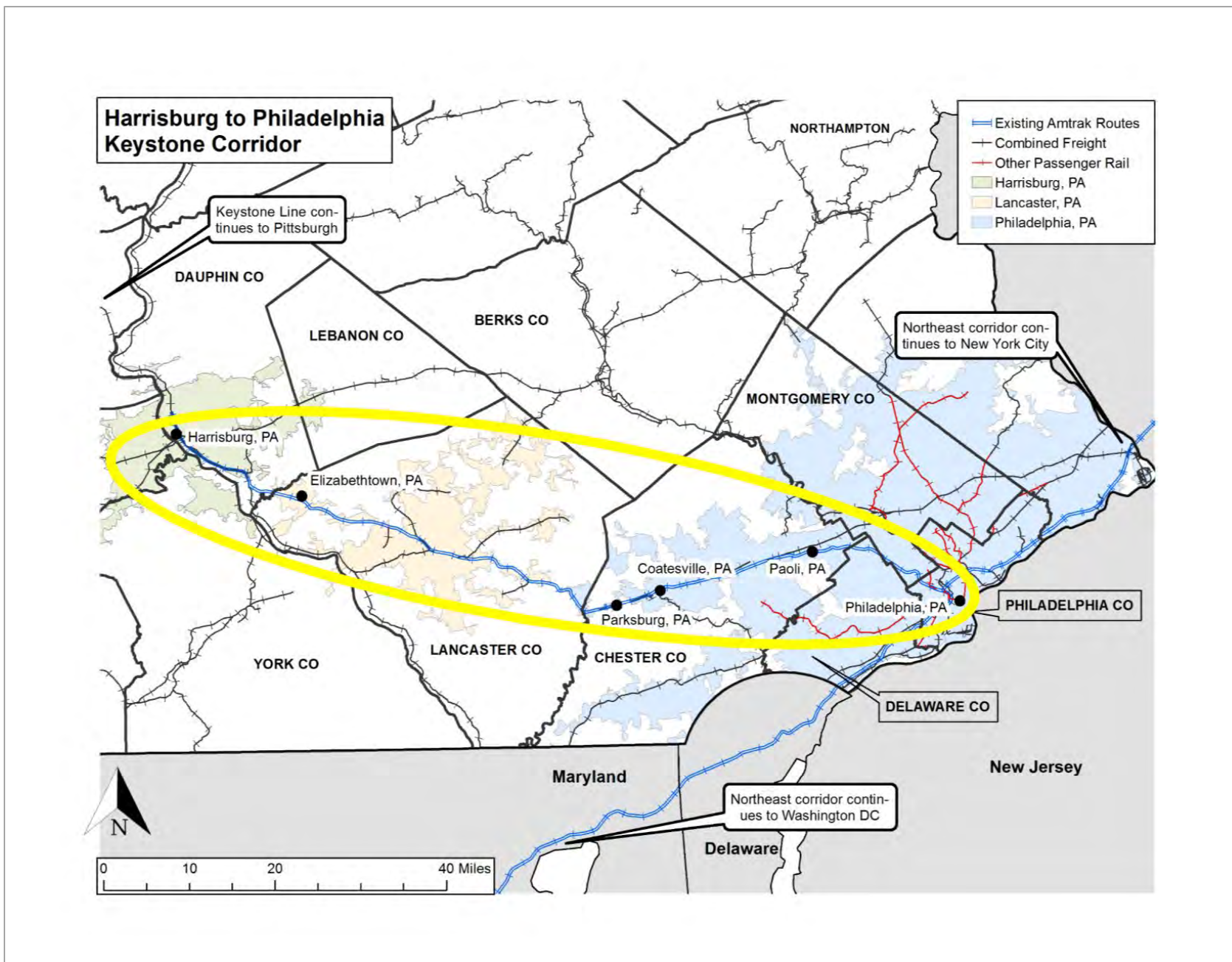
Combined population of Harrisburg, Lancaster, and Philadelphia metropolitan statistical areas, 2010	7.1 million	
Corridor Changes, 2000 to 2015		
Municipality	Population	Employment
Dauphin County	+7.7%	+7.1%
Lancaster County	+12.6%	+8.2%
Chester County	+17.6%	+13.4%
Delaware County	+2.0%	+10.1%
Montgomery County	+8.4%	+23.0%
Philadelphia County	+2.5%	+8.6%
Source: U.S. Census Bureau		

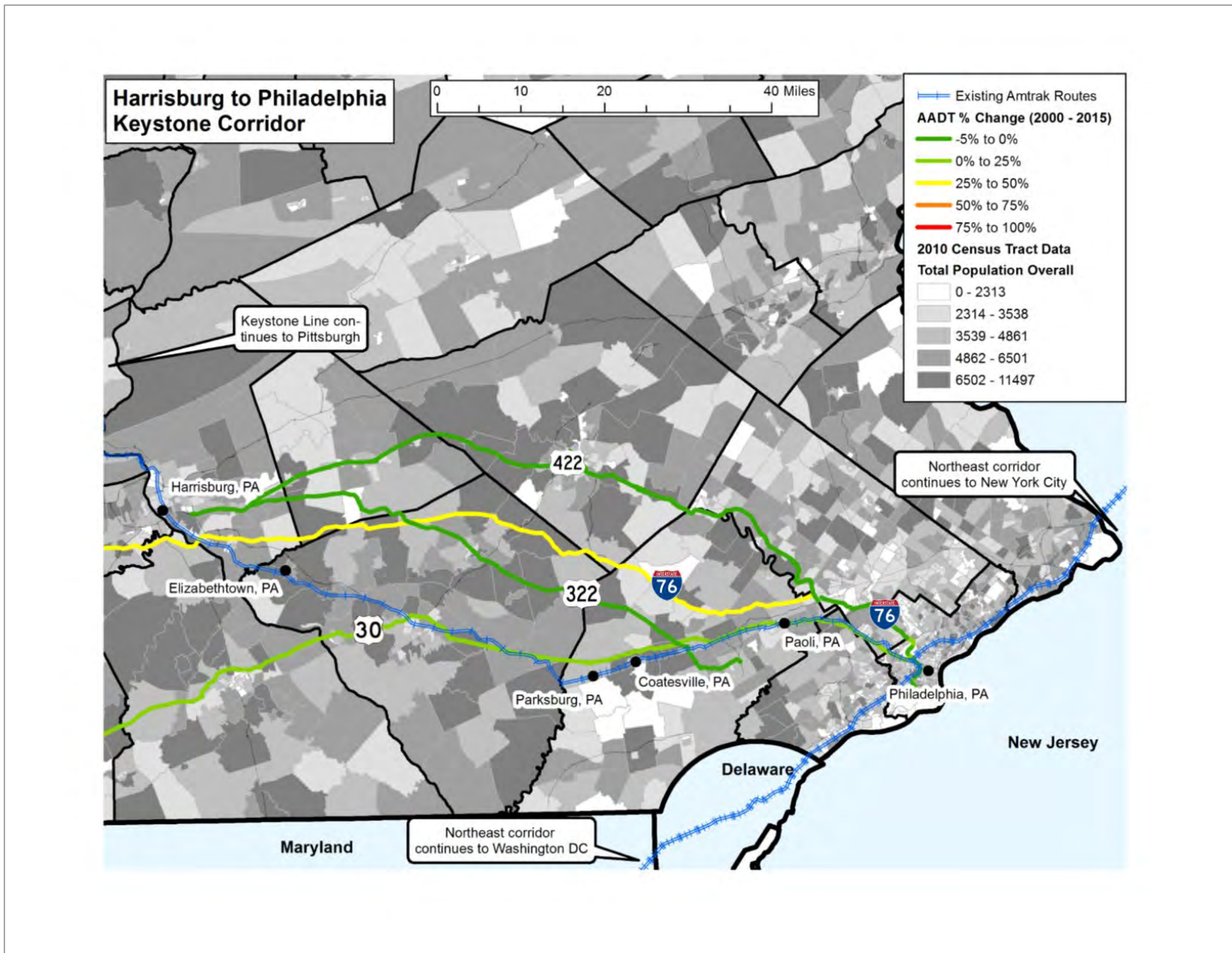
Commuting Flow		
Place of Residence (metro area)	Place of Work (metro area)	Number of Commuters
Philadelphia	Lancaster	4,088
	Harrisburg	1,257
Lancaster	Philadelphia	11,050
	Harrisburg	10,479
Harrisburg	Lancaster	3,475
	Philadelphia	815
Source: U.S. Census Bureau, 2009-2013 5-Year American Community Survey		

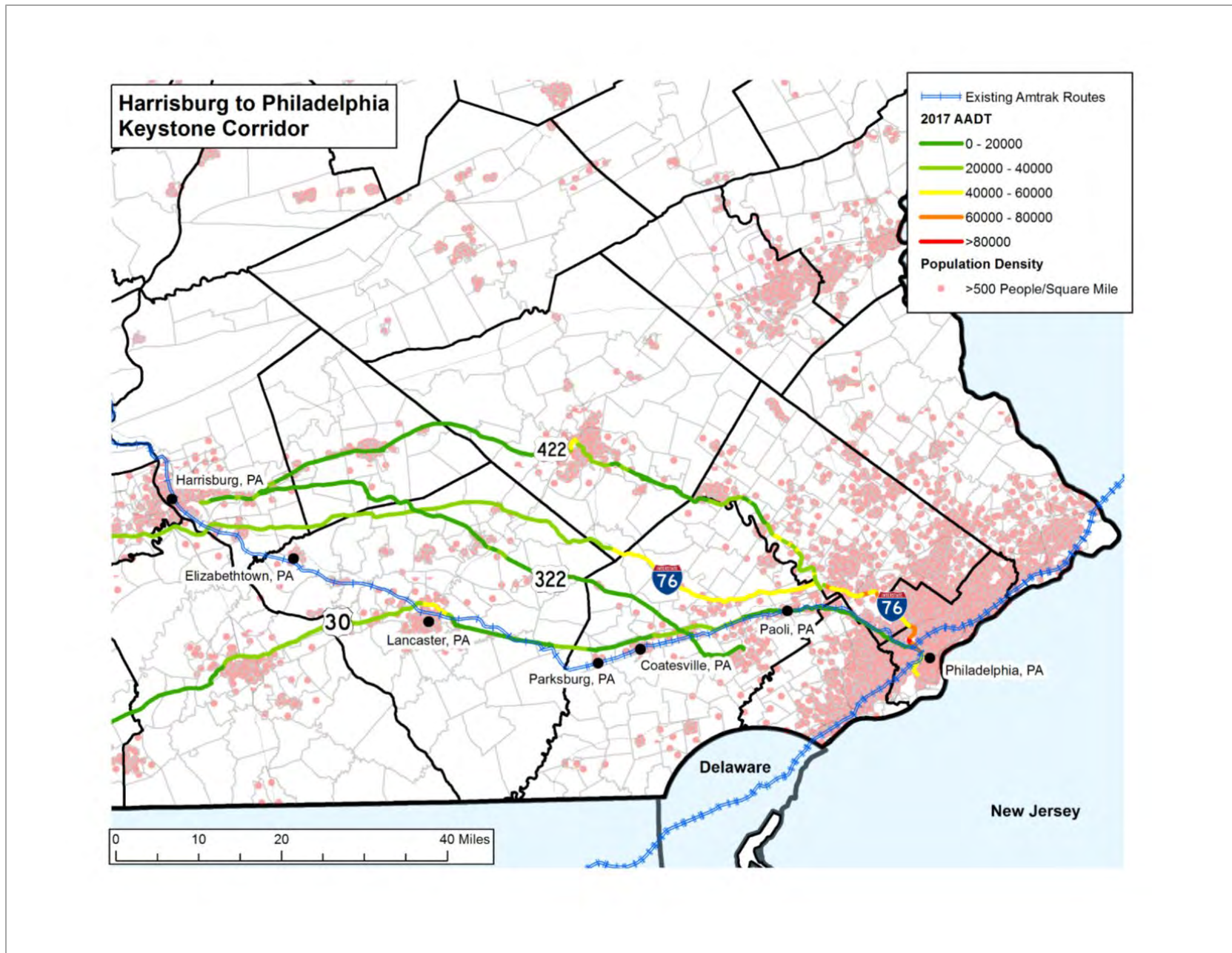
**Previous studies and projects:** With PennDOT funding assistance, Amtrak has made many improvements to this line over the years, most notably the \$145 million Keystone Corridor Improvement Project. See the [Keystone Corridor case study](#) for details on improvement projects and performance of this rail line.



Elizabethtown Station (Commonwealth Media Services)







### Keystone West Corridor Profile

**Existing infrastructure and service:** The Keystone West corridor connects Pittsburgh and Harrisburg via Johnstown, Altoona, and Huntingdon along Norfolk Southern track. The corridor is served by Amtrak’s once-daily *Pennsylvanian* service between Pittsburgh and New York City.

**Tourism:** In 2014, visitors spent \$2.36 billion in the Harrisburg and Hershey area and \$5.67 billion in Pittsburgh. In 2016, “Dutch Country Roads,” the tourism region that includes Harrisburg, attracted \$8.4 billion in tourism spending (20.1 percent of the state total), while the “Pittsburgh and Countryside” region attracted \$7.96 billion (19 percent of the state total).

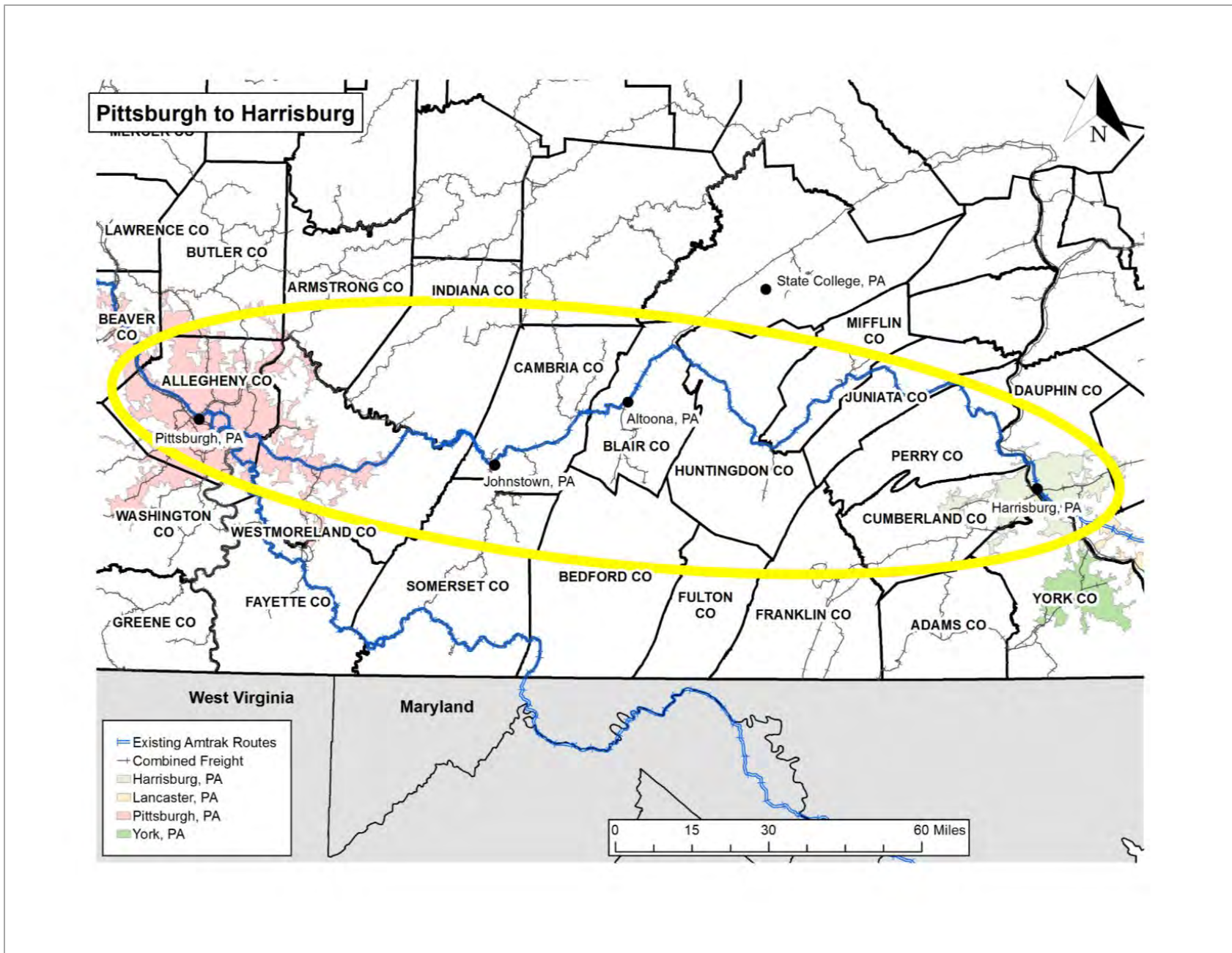
**Travel demand indicators:**

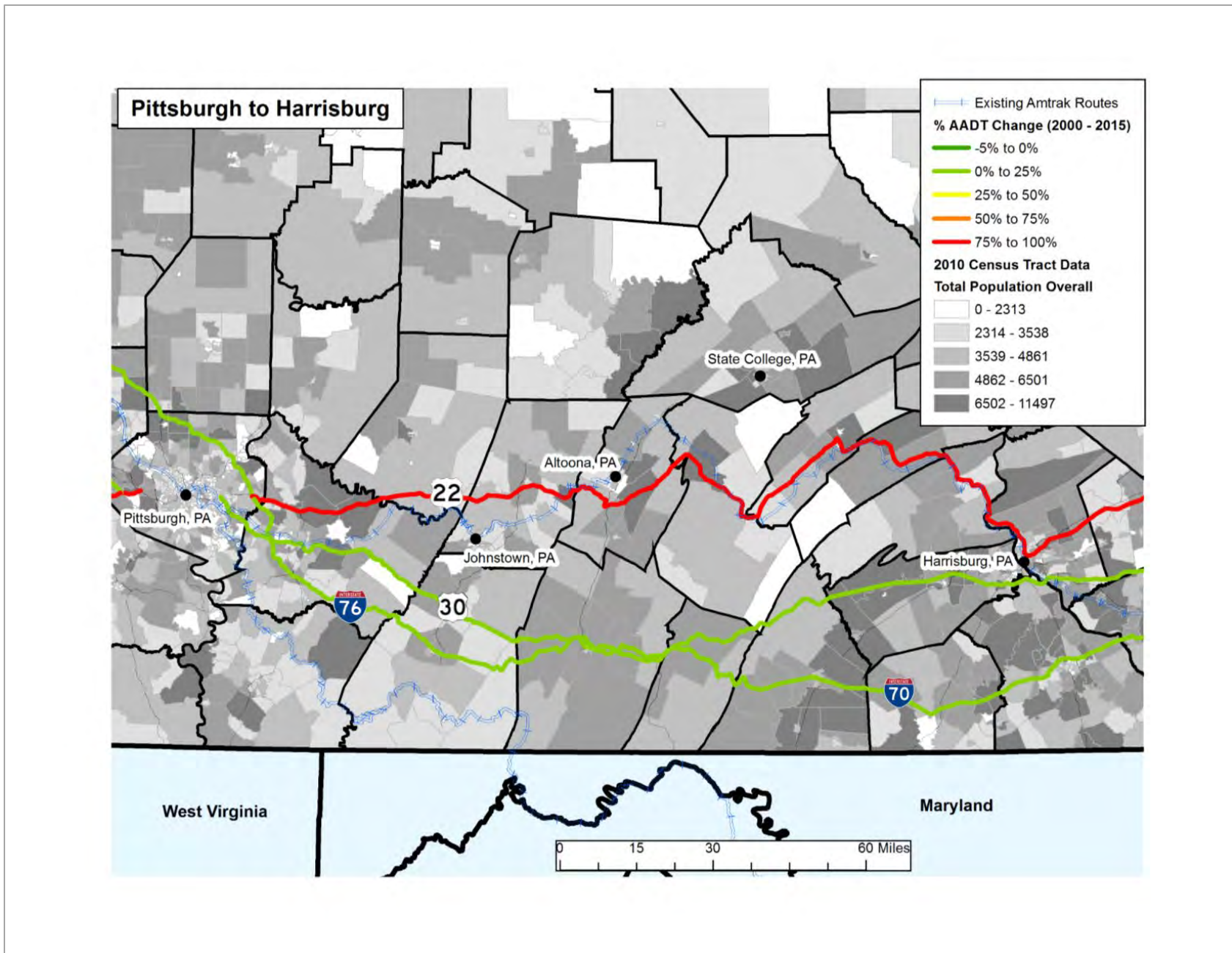
Combined population of Harrisburg and Pittsburgh metropolitan statistical areas, 2010	2.9 million	
<b>Corridor Changes, 2000 to 2015</b>		
<b>Average population</b>	+1.8%	
<b>Average employment</b>	+2.5%	
<b>Projected Changes, 2010 to 2040</b>		
<b>Municipality</b>	<b>Population</b>	<b>Employment</b>
Pittsburgh	+9.4%	+11.7%
Allegheny County	+15.2%	+28.8%
Dauphin County	+10.6%	+20.8%
Source: U.S. Census Bureau		

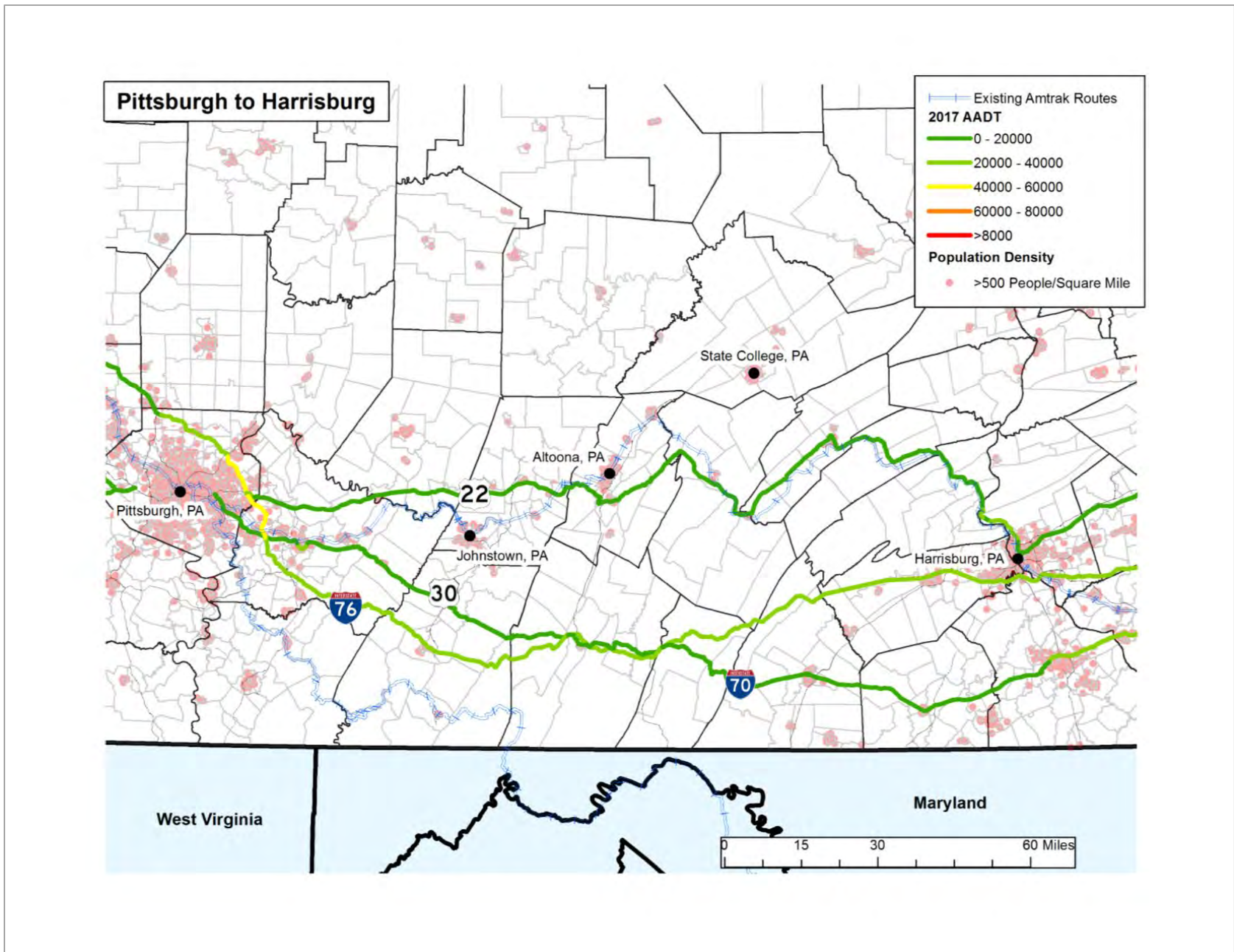
**Previous studies and current projects:** Service enhancements for this corridor have been studied several times in the past and another study was recently ordered by Governor Tom Wolf. Please see the [Keystone West case study](#) for details.



The *Pennsylvanian* rounding Horseshoe Curve near Altoona. Source: <https://history.amtrak.com/blogs/blog/on-board-the-pennsylvanian>







## Pittsburgh–Cleveland Corridor Profile

**Existing infrastructure and service:** The Pittsburgh–Cleveland corridor is served by Amtrak’s once-daily *Capitol Limited* service between Washington, D.C., and Chicago. Norfolk Southern is the host railroad. The Capitol Limited Corridor is part of Amtrak’s National Network, which is significant to Pennsylvania because National Network trains are not subject to state financial support requirements. A one-way trip between Pittsburgh and Cleveland takes approximately three hours and costs from \$20 to \$56.

### Travel demand indicators:

Combined population of Pittsburgh and Cleveland metropolitan statistical areas, 2010	4.4 million	
<b>Corridor Changes, 2000 to 2015</b>		
<b>Average population</b>	-5.2%	
<b>Average employment</b>	-1.2%	
<b>Projected Changes, 2010 to 2040</b>		
<b>Municipality</b>	<b>Population</b>	<b>Employment</b>
Pittsburgh	+9.4%	+11.7%
Allegheny County	+15.2%	+28.8%
Beaver County	+1.4%	+16.5%
Sources: <a href="https://www.spcregion.org/pdf/datalib/Forecasts/SPC%20forecast%20county%20&amp;%20region%20totals%202010-40.pdf">https://www.spcregion.org/pdf/datalib/Forecasts/SPC%20forecast%20county%20&amp;%20region%20totals%202010-40.pdf</a> U.S. Census Bureau		

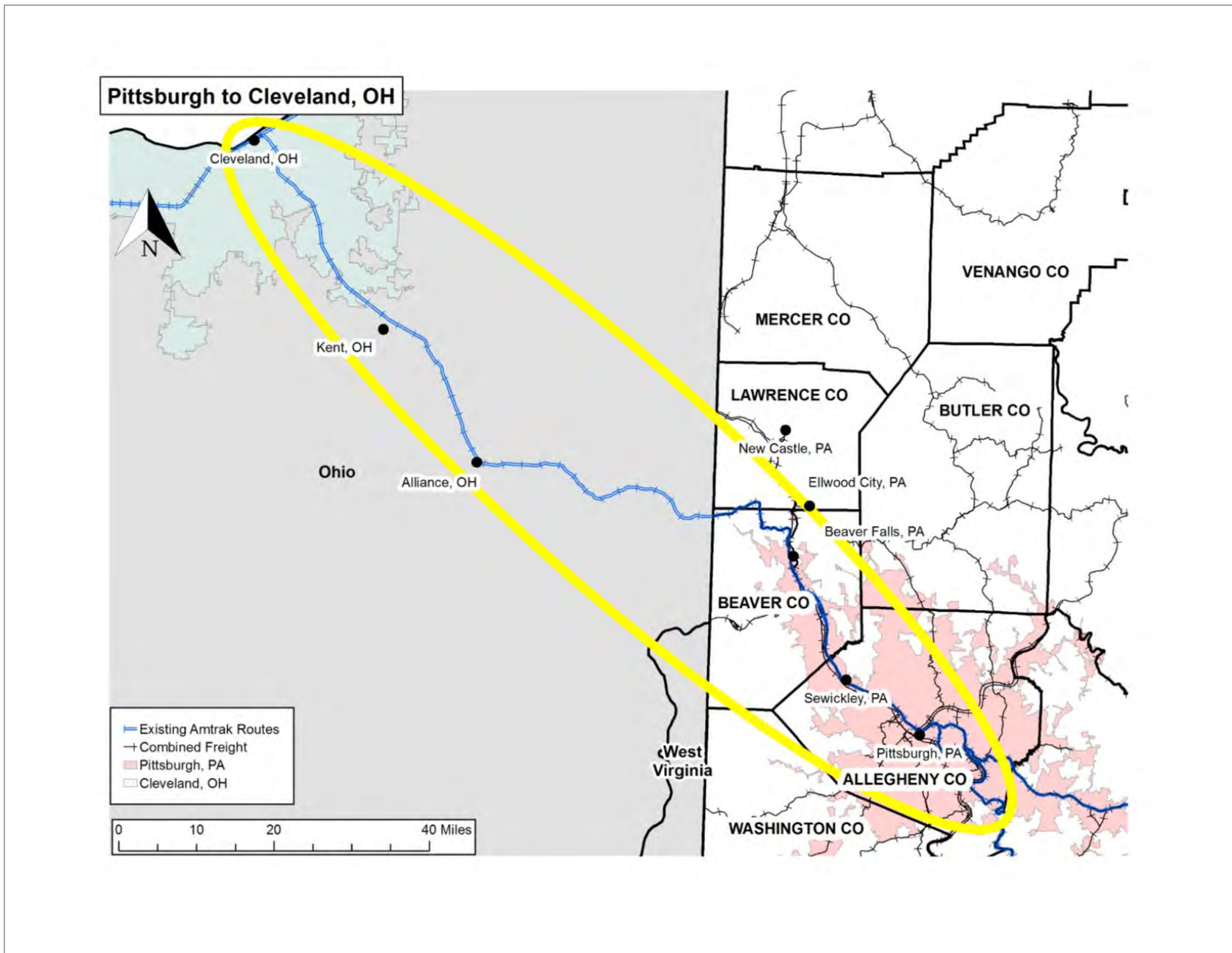
**Tourism:** According to VisitPA.com, 2016 visitor spending in the region “Pittsburgh and its Countryside” made up 19 percent of the total visitor spending in Pennsylvania, or \$7.9 billion.<sup>35</sup>

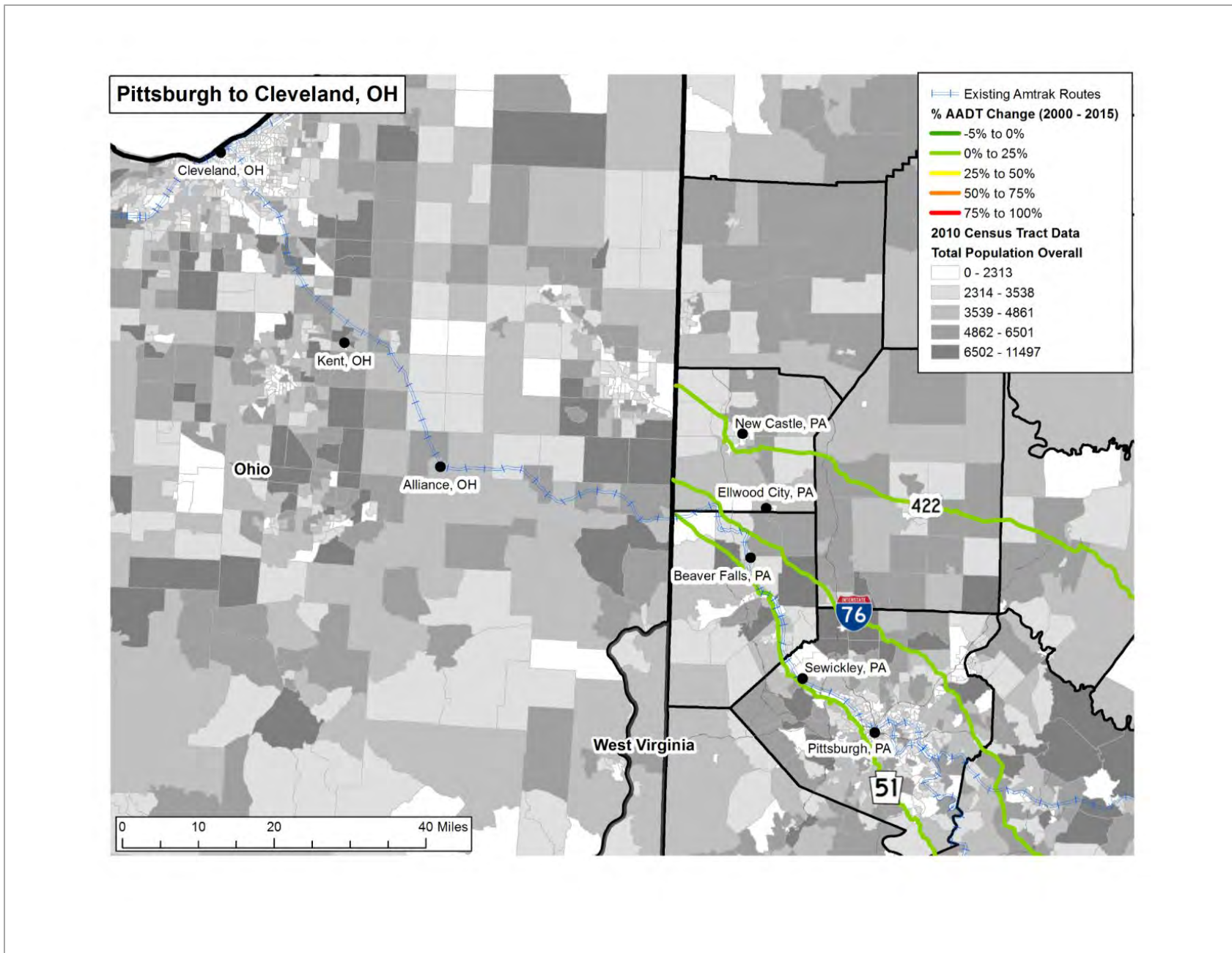
**Additional challenges:** While Amtrak has an established agreement with Norfolk Southern to use the track, there are limitations on the number of passenger rail trips per day, and freight service can delay passenger trains. According to Host Railroad Performance Report<sup>36</sup> released by Amtrak, in 2017 Norfolk Southern received a performance grade of F, causing more than 1,500 minutes of delay per 10,000 train miles for Amtrak nationwide. Amtrak’s *Capitol Limited* service had an on-time performance of 47.3 percent in 2017. On-time performance measures the percentage of trips that arrive at the route endpoints within the scheduled time.

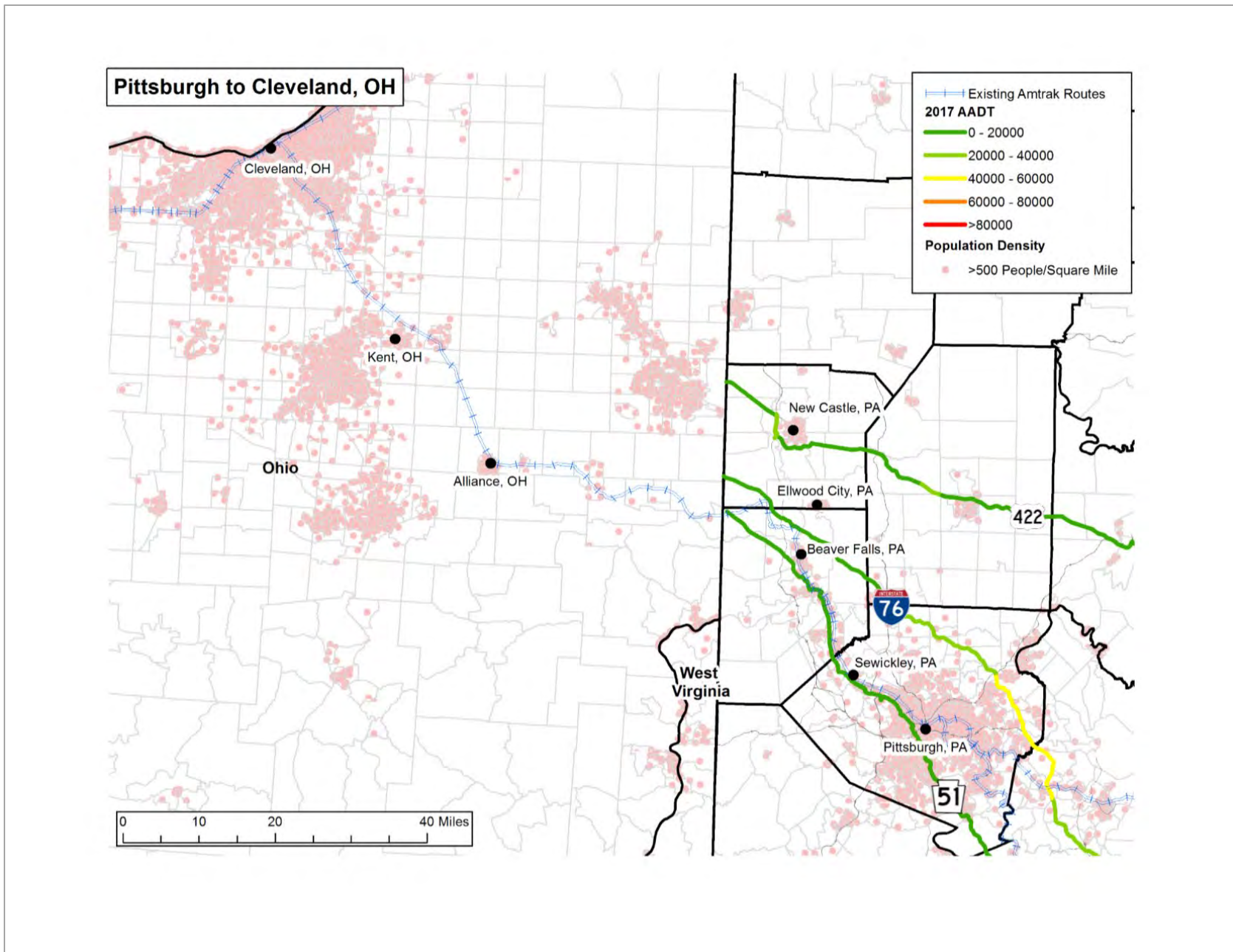
*Capitol Limited* ridership increased by 1 percent from 2016 to 2017. Increasing trip frequency between Cleveland and Pittsburgh would require additional right-of-way and infrastructure or a new route, to avoid conflicts with freight trips.

<sup>35</sup> Pennsylvania Department of Community and Economic Development, *The Economic Impact of Travel and Tourism in Pennsylvania*, 2016 ([https://visitpa.com/sites/default/master/files/PA-Visitor-Economic-Impact-2016\\_County-Data.pdf](https://visitpa.com/sites/default/master/files/PA-Visitor-Economic-Impact-2016_County-Data.pdf))

<sup>36</sup> Amtrak, *Host Railroad Report Card & FAQ* ([https://media.amtrak.com/wp-content/uploads/2018/10/Amtrak-Host-Railroad-Report-Card\\_FAQ\\_Route-Detail-2018-10-15.pdf](https://media.amtrak.com/wp-content/uploads/2018/10/Amtrak-Host-Railroad-Report-Card_FAQ_Route-Detail-2018-10-15.pdf))







## Lehigh Valley–New York City Corridor Profile

**Existing infrastructure and service:** The Lehigh Valley encompasses Allentown, Bethlehem, and Easton. Norfolk Southern owns and operates a busy freight rail line that traverses this corridor.

### Travel demand indicators:

Combined population of Allentown and NYC metropolitan statistical areas, 2010	20 million	
Corridor Changes, 2000–2015		
Average population	+7%	
Average employment	+8.1%	
Projected Change, 2010–2040		
Municipality	Population	Employment
Lehigh Valley	+35%	+37.7%
Source: U.S. Census Bureau <a href="http://lvpc.org/pdf/MOVELV%20Long%20Range%20Plan.pdf">http://lvpc.org/pdf/MOVELV%20Long%20Range%20Plan.pdf</a>		

Estimated Commuting Flow		
Place of Residence	Place of Work	Number of Commuters
Lehigh Valley (Lehigh and Northampton Counties)	New York City	2,890
Source: U.S. Census Bureau, 2009-2013 5-Year American Community Survey		

Many Lehigh Valley commuters drive to park-and-ride facilities where they board express buses that take I-78 to New York City. Many other commuters from the Lehigh Valley travel to workplaces in New Jersey along the I-78 corridor.

Given the Lehigh Valley’s proximity to major urban / employment centers in Pennsylvania, New Jersey, and New York, intercity bus has strong potential. As services and equipment continue to improve from a customer service standpoint, intercity bus market share may grow substantially over time.

**Previous studies and current projects:** The Lehigh Valley Planning Commission (LVPC) published a study<sup>37</sup> in 2010 evaluating express bus and passenger rail options between the Lehigh Valley and New Jersey Transit’s Raritan Valley Line commuter rail, which currently terminates in Gladstone/ High Bridge, New Jersey. The study evaluated extending the line from Philipsburg to the three Lehigh Valley cities. It is noteworthy that the study expressly referred to the proposed service as commuter rail, as opposed to intercity passenger rail. While the proposed service would be “intercity” in the sense of connecting two distinct metropolitan areas, its aim was very much directed at serving commuters from the Lehigh Valley to the New York metro area.

The plan proposed eight AM peak trains originating in the Lehigh Valley with service to New York and eight PM peak trains operating in the reverse direction. The projected ridership is 220 average daily weekday trips within Pennsylvania and 690 trips between the Lehigh Valley and New York City. The projected

<sup>37</sup> Lehigh Valley Planning Commission, *Central New Jersey/Raritan Valley Transit Study – Pennsylvania Component*, 2010

(<http://www.lvpc.org/pdf/centralNJ-RaritanValleyTranstStudy-PAcomponent.pdf>)

costs and revenues for the project, adjusted to 2017 dollars, are shown below. The capital costs include development of three stations, but do not include the costs of the New Jersey portion of the line extension from its existing western terminus at Gladstone to Phillipsburg on the Pennsylvania border. The study concluded that the high capital cost and relatively low farebox recovery ratio would be a challenge in the competitive environment for federal and local funding. The extension project has not moved forward since the 2010 study.

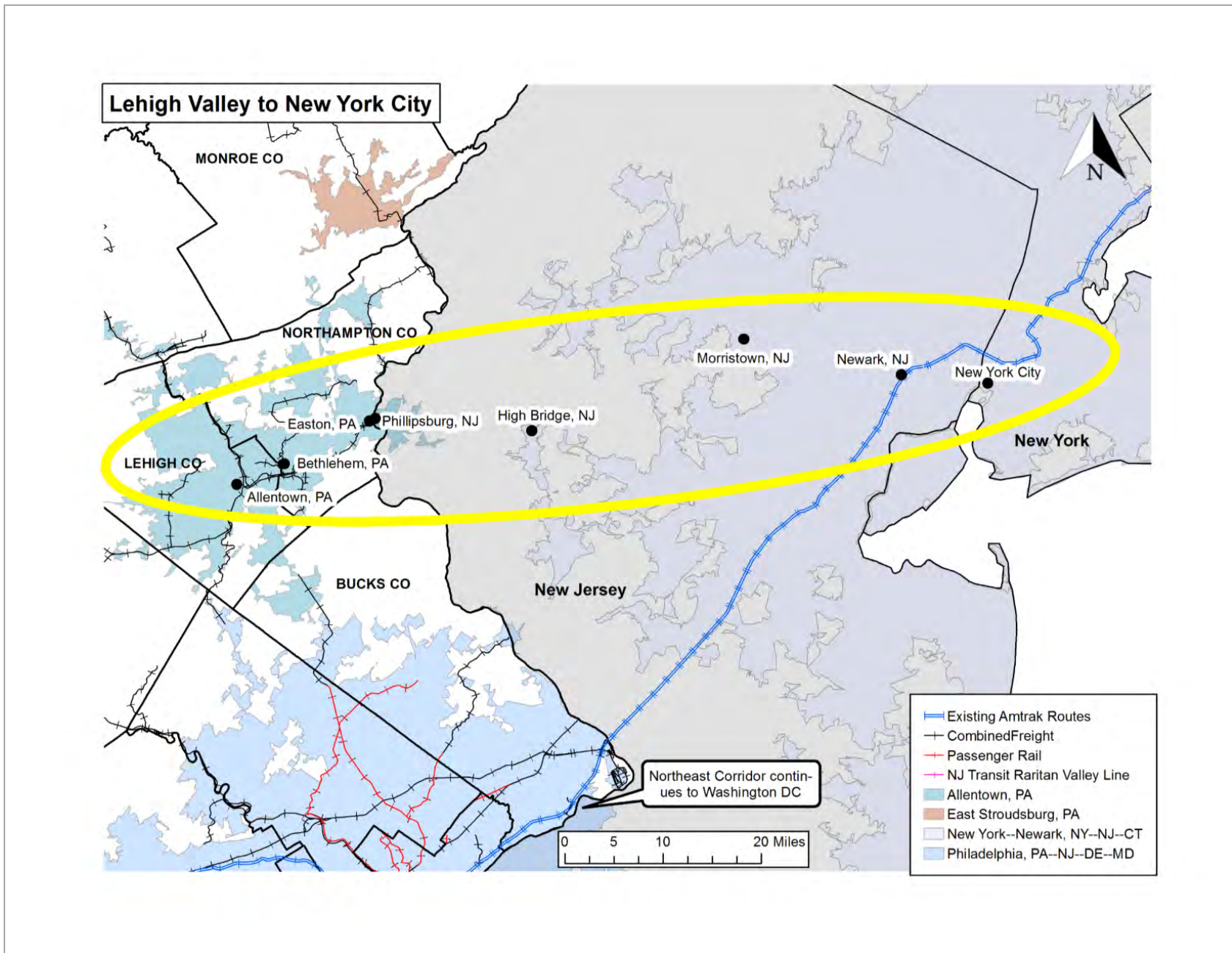
**Estimated Costs, Rail Extension from Phillipsburg, NJ to Bethlehem, Allentown, and Easton**

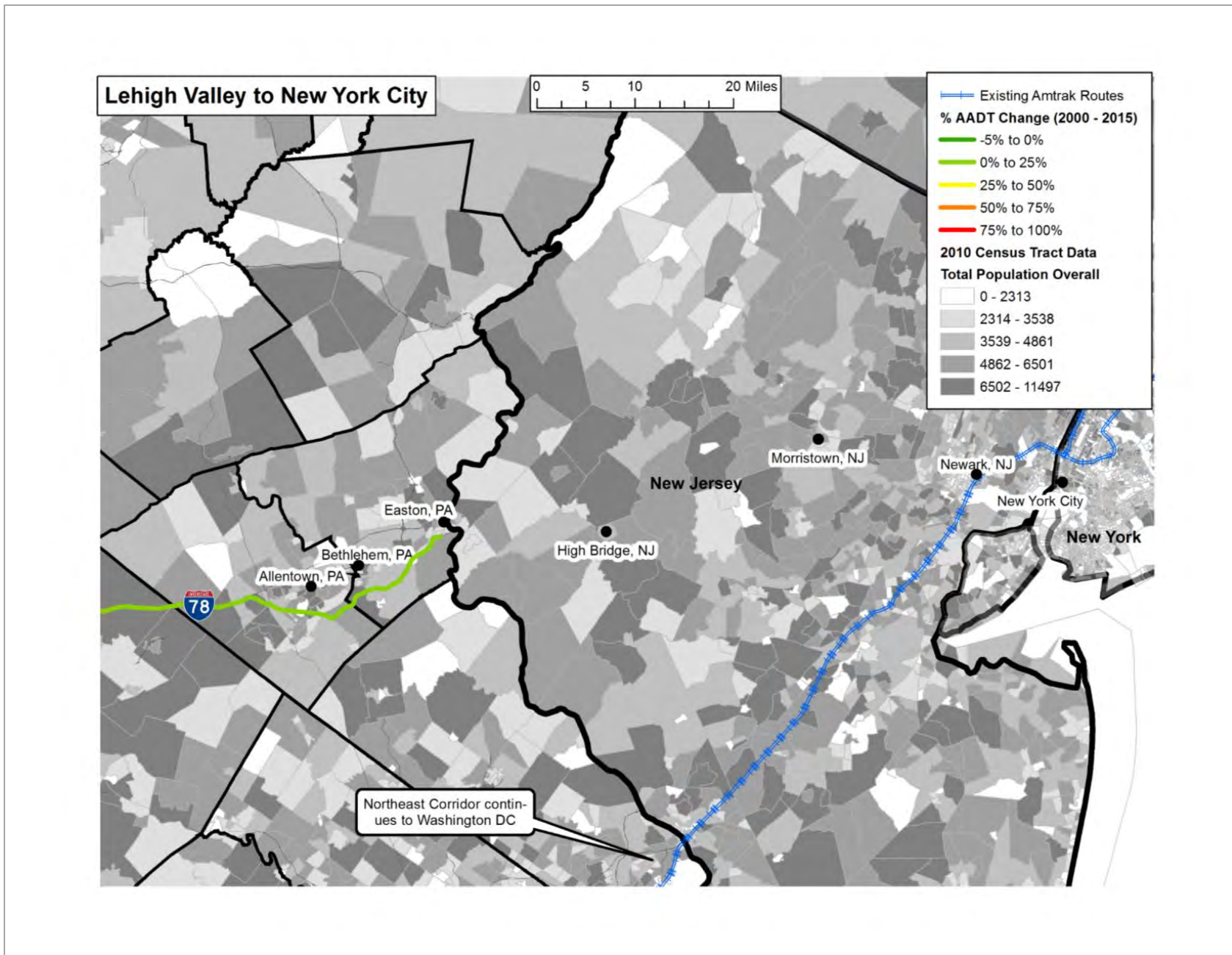
Cost Category	Cost in 2017 Dollars
Capital Costs*	\$740–810 million
Annual Operating Cost	\$16.9 million
Annual Revenue	\$3.7 million
Operating Subsidy Required	\$13.2 million
Farebox Recovery**	22%

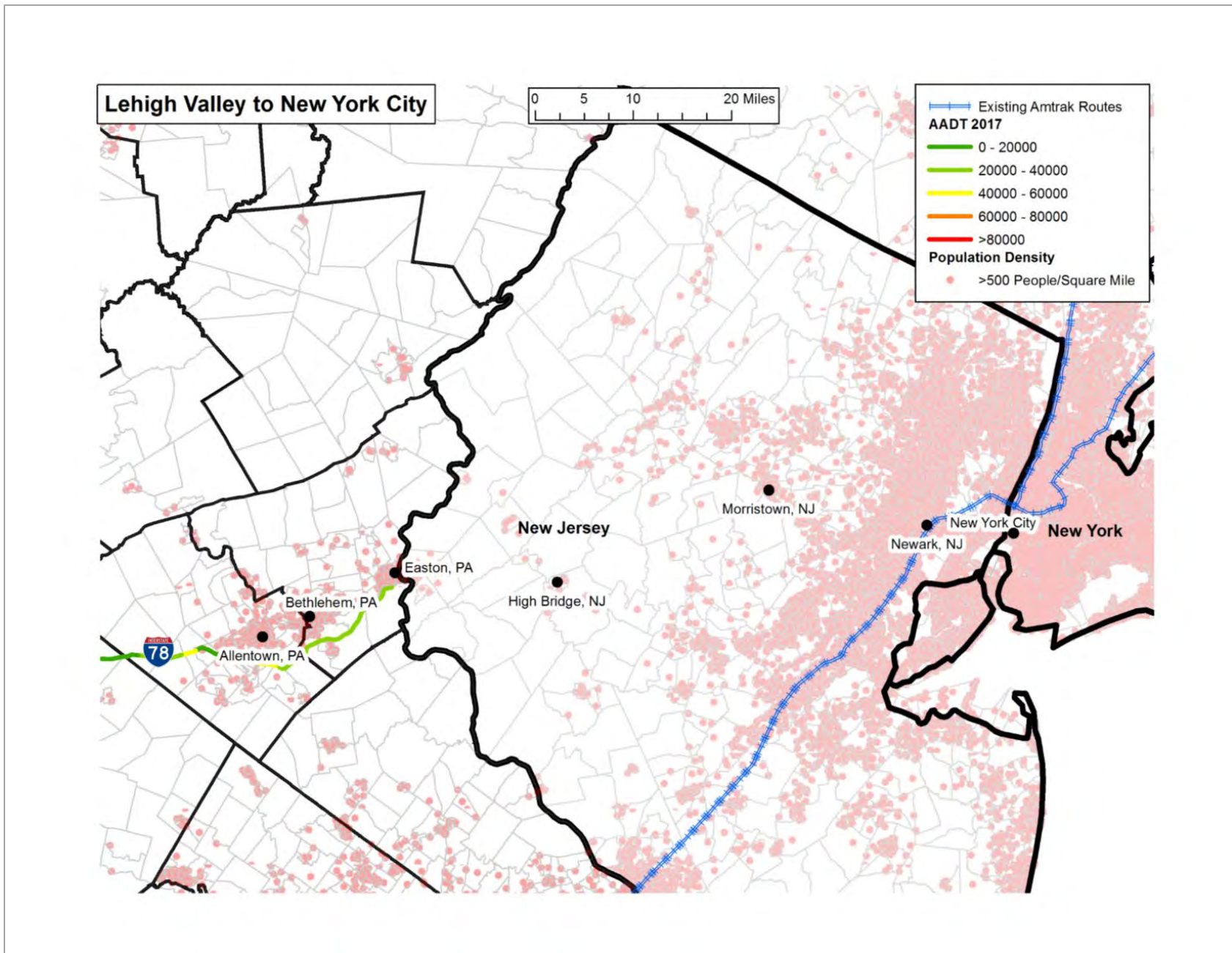
\*The study estimated capital costs for the Pennsylvania portion of the extension. Additional costs for the extension of the commuter rail line from its existing western terminus to Phillipsburg would also be required.

\*\*Percentage of operating costs covered by fare revenues.

**Additional challenges:** Provision of rail service by connecting to the NJ Transit Raritan Valley Line would require a Commonwealth of Pennsylvania agency and NJ Transit to negotiate an operating agreement that addresses shared costs, liabilities, and other issues. An even larger obstacle would be securing capacity from the host railroad, Norfolk Southern. Norfolk Southern trains cross the Delaware River on a two-track bridge. The railroad has seen increased use of this line to transfer containers received at the Port of New York/New Jersey to inland distribution facilities.







### Harrisburg–New York City Corridor Profile

**Existing infrastructure and service:** This corridor would connect Harrisburg to New York City through King of Prussia and Trenton, NJ, bypassing Philadelphia. A passenger rail connection has yet to be established in this corridor although there are some commuter and freight rail lines within the corridor limits. Harrisburg is currently connected to New York via passenger rail service through Philadelphia. While there is no rail service on the direct Harrisburg–New York City corridor, there are commercial bus operators that provide transportation between key destinations within this corridor.

**Tourism:** Popular tourist attractions in the Philadelphia area include the King of Prussia Mall and Valley Forge National Park, which attract more than 20 million and 2.1 million visitors per year, respectively.

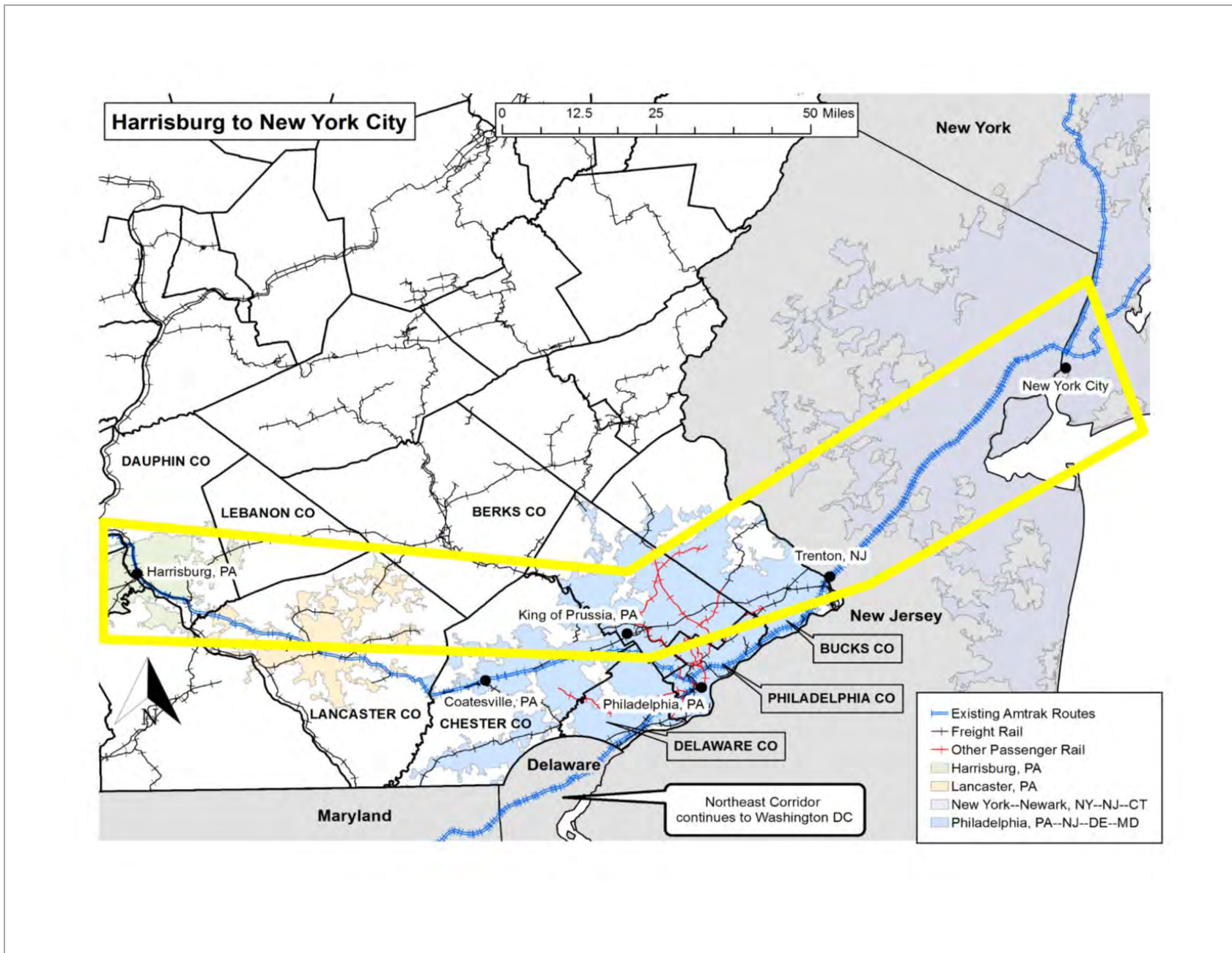
**Main highway routes:** I-78, I-76, I-276, and US Route 30

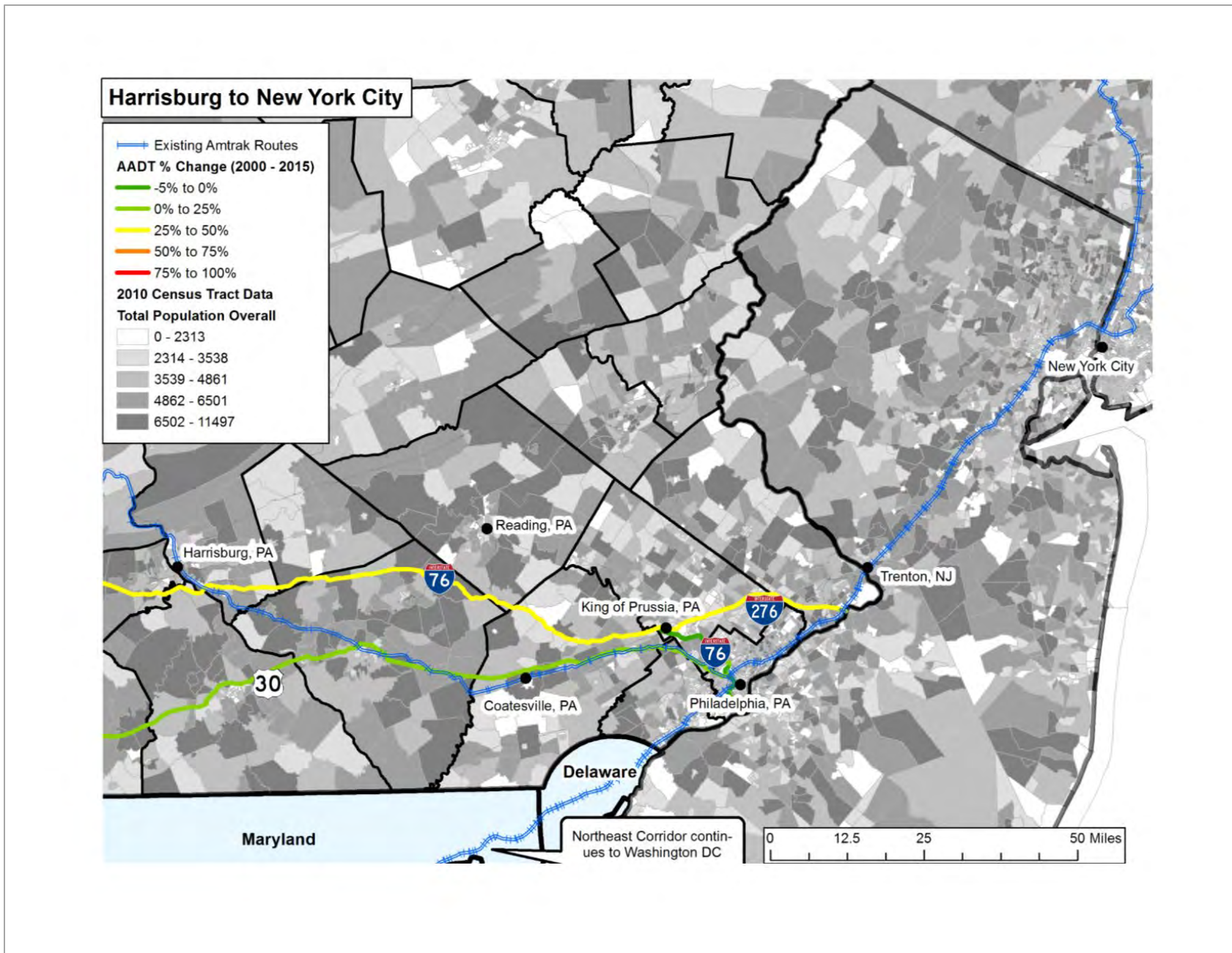
### Travel demand indicators:

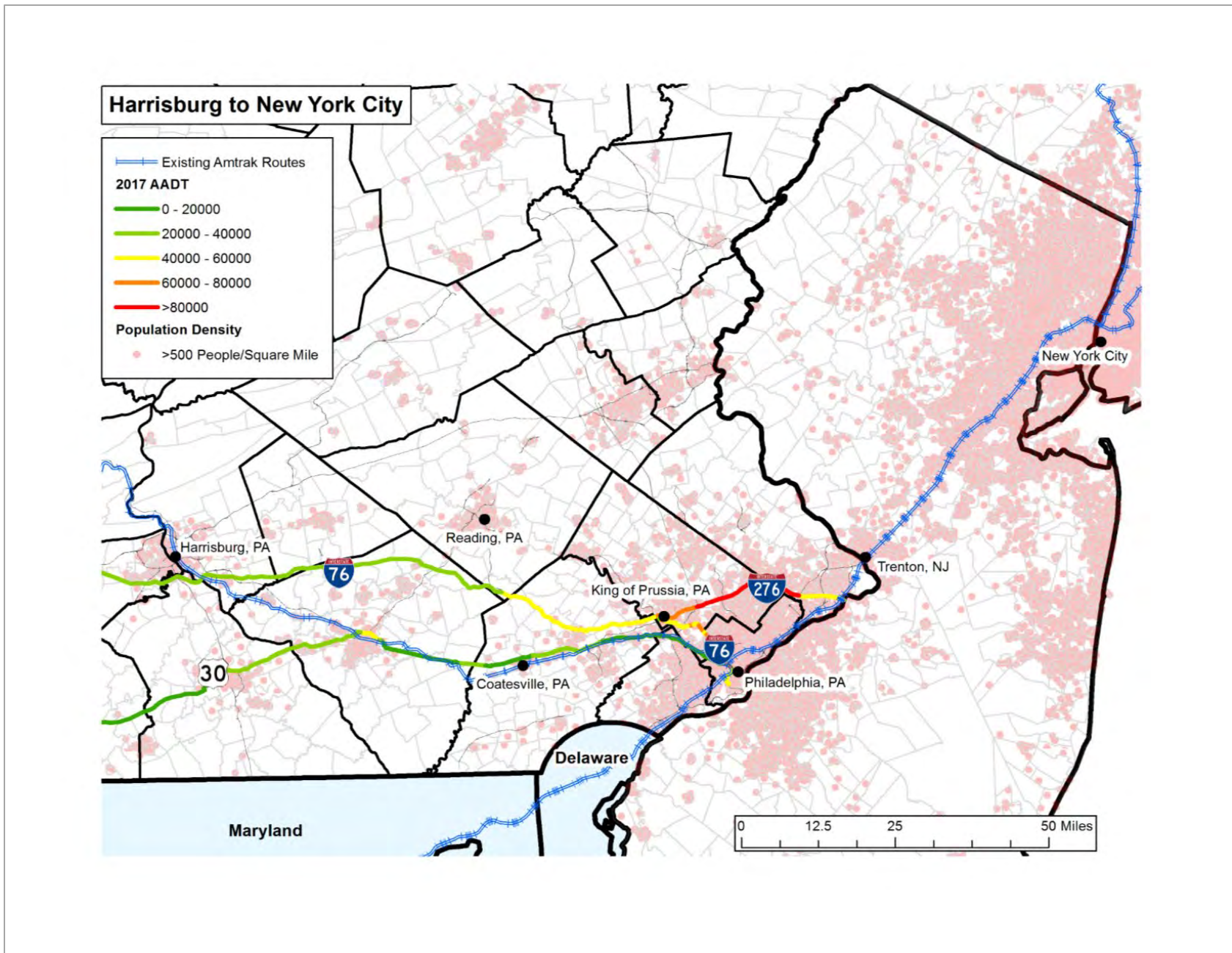
King of Prussia Changes, 2000 to 2016	
Median household income, 2000-2016	+13%
Unemployment Rate, 2014-2018	Decreased from 4.5% to 2.9%
Source: <a href="https://issuu.com/kingofprussiadistrict/docs/single_page_spreads_for_web?e=16656026/59376002">https://issuu.com/kingofprussiadistrict/docs/single_page_spreads_for_web?e=16656026/59376002</a>	

**Previous studies and current projects:** SEPTA released a Draft Environmental Impact Statement (DEIS) in October 2017<sup>38</sup> to extend the Norristown High Speed Line into King of Prussia. The project would provide a one-seat ride to King of Prussia from either the 69<sup>th</sup> Street Transportation Center or the Norristown Transportation Center. Such a commuter rail expansion could act as an extension of the intercity passenger rail corridors that service Philadelphia (Keystone and Northeast Corridors).

<sup>38</sup> Southeastern Pennsylvania Transportation Authority, *King of Prussia Rail Draft Environmental Impact Statement*, 2017  
<http://www.kingofprussiarail.com/DEIS/deis/DEIS%20and%20Appendices.pdf>







### Scranton–New York City Corridor Profile

**Existing infrastructure and service:** This corridor connects parts of Northeastern Pennsylvania, including Scranton and East Stroudsburg, with the New York City metro area. The nearest existing passenger rail service to New York is the New Jersey Transit commuter rail line from Port Jervis and Hackettstown. While both of these rail connections are more than 60 miles from Scranton, there are many bus services between key destinations within this corridor.

**Tourism:** In 2016, visitors spent more than \$3.5 billion in the Pocono Mountains region and more than \$2.1 billion in the Upstate PA region.<sup>39</sup>

**Travel demand indicators:**

Corridor Changes, 2000 to 2015	
Average population	+8%
Average employment	+10%
Source: U.S. Census Bureau	

**Previous studies and current projects:** There has been discussion about restoring a retired rail service within this corridor known as the Lackawanna Cutoff, which would provide service from Scranton to Hoboken, NJ.<sup>40</sup> From Hoboken, riders

<sup>39</sup> Pennsylvania Department of Community and Economic Development, *The Economic Impact of Travel and Tourism in Pennsylvania*, 2016 ([https://visitpa.com/sites/default/master/files/PA-Visitor-Economic-Impact-2016\\_County-Data.pdf](https://visitpa.com/sites/default/master/files/PA-Visitor-Economic-Impact-2016_County-Data.pdf))

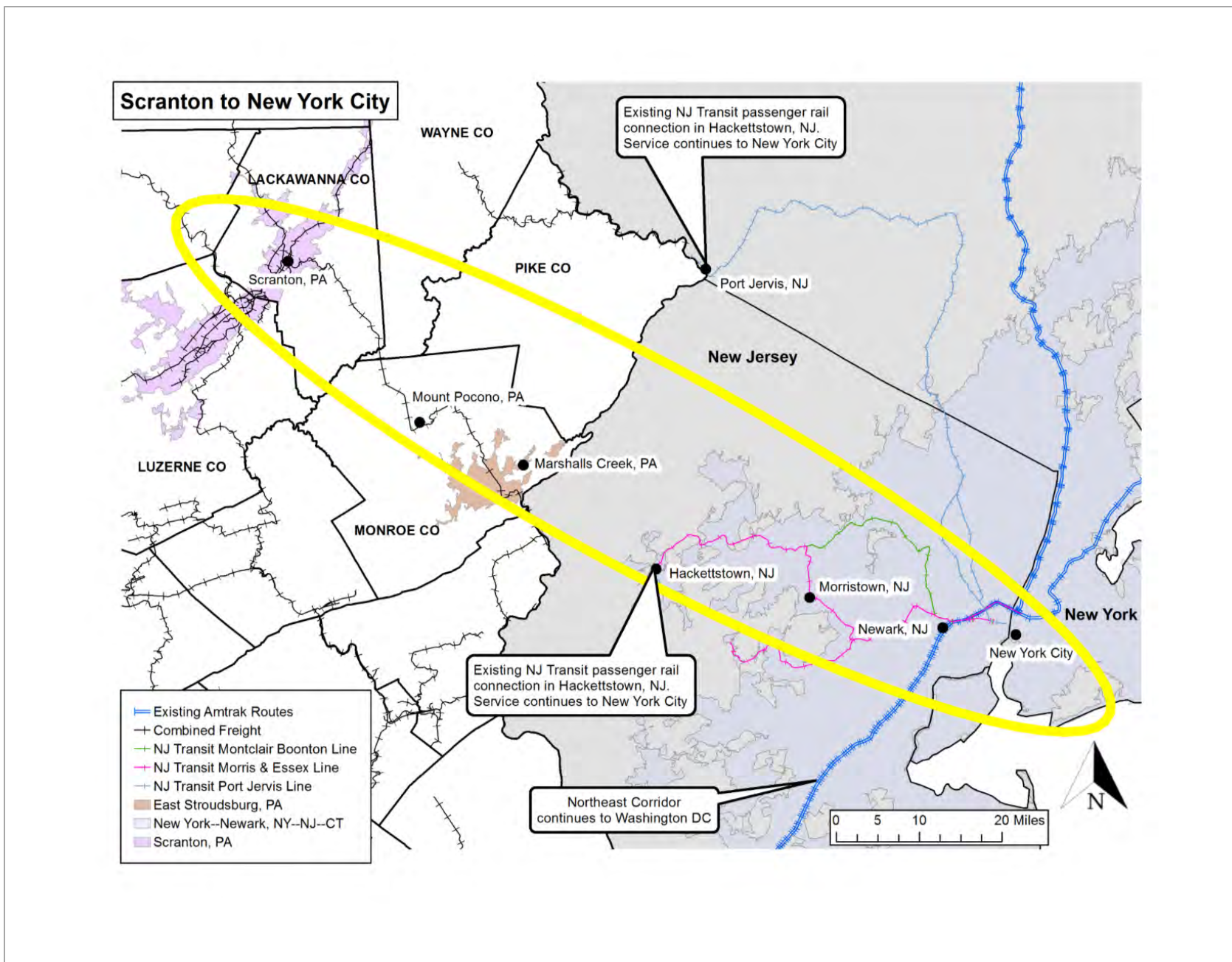
could transfer to existing NJ Transit lines with services to New York Penn Station. Currently, only the first phase of this New Jersey project is fully funded—a connection between Port Morris Yard to a new passenger station at Andover, NJ.<sup>41</sup> It is expected that the following phases will focus on expanding the rail to Scranton, which would serve areas such as Blairstown in New Jersey and Tobyhanna, Pocono Mountain, East Stroudsburg, and the Delaware Water Gap in Pennsylvania.

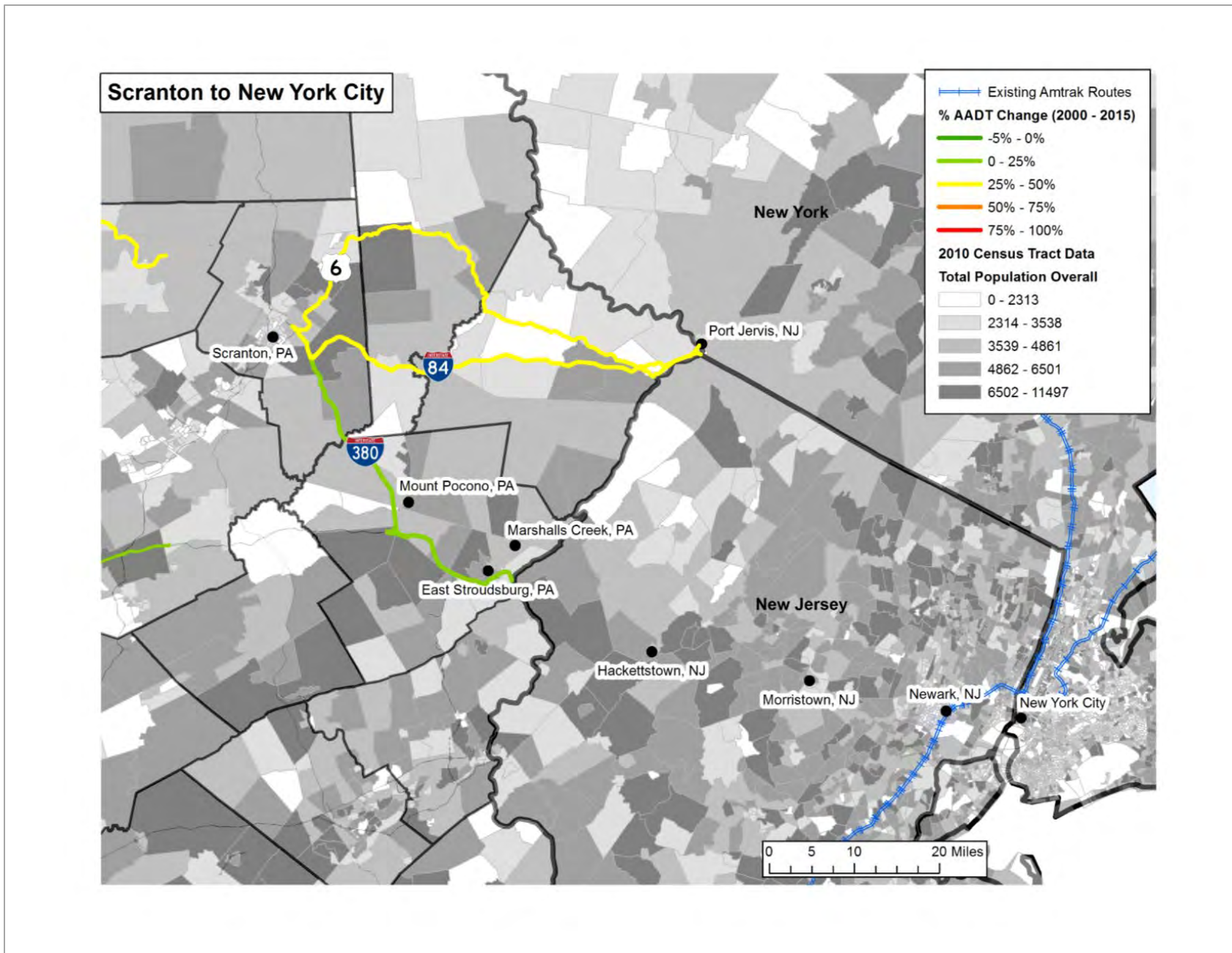


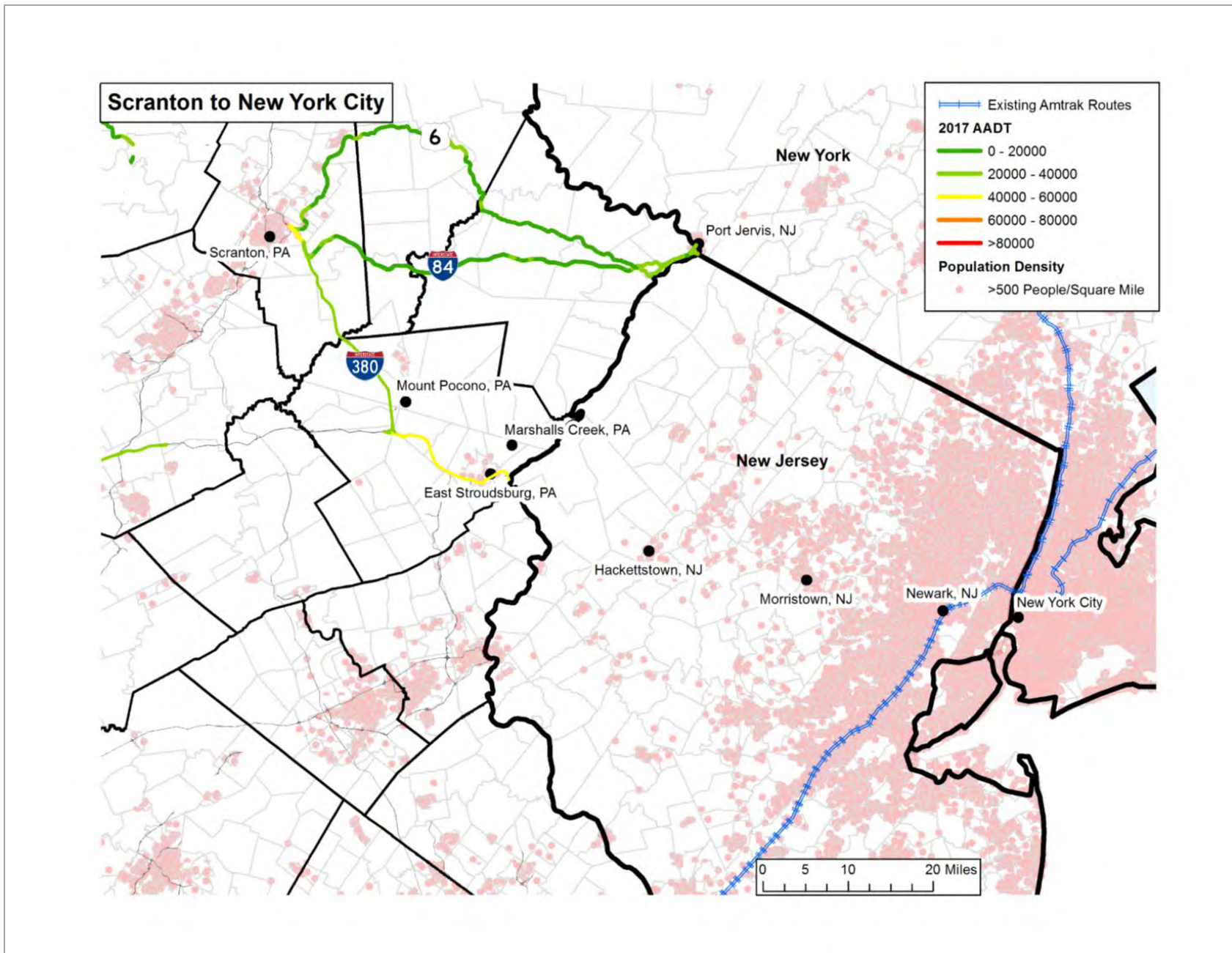
Statue of Liberty and Manhattan (National Park Service)

<sup>40</sup> New Jersey Transit, *New Jersey – Pennsylvania Lackawanna Cut-Off Passenger Rail Service Restoration Project Environmental Assessment*, June 2008 (<https://www.njtransit.com/pdf/LackawannaEAJune2008.pdf>)

<sup>41</sup> New Jersey Transit ([https://www.njtransit.com/tm/tm\\_servlet.srv?hdnPageAction=CapProjectDetailsTo&CapitalProjectId=82](https://www.njtransit.com/tm/tm_servlet.srv?hdnPageAction=CapProjectDetailsTo&CapitalProjectId=82))







### Harrisburg–Washington, D.C., Corridor Profile

**Existing infrastructure and service:** This corridor encompasses Harrisburg, York, and Washington, D.C. Although there is no existing passenger rail service in the corridor, Greyhound provides two daily round trips between Harrisburg and Washington.

**Tourism:** In 2015, 10 million people visited the Harrisburg/Hershey region, generating visitor spending of \$2.4 billion.<sup>42</sup>

**Travel demand indicators:**

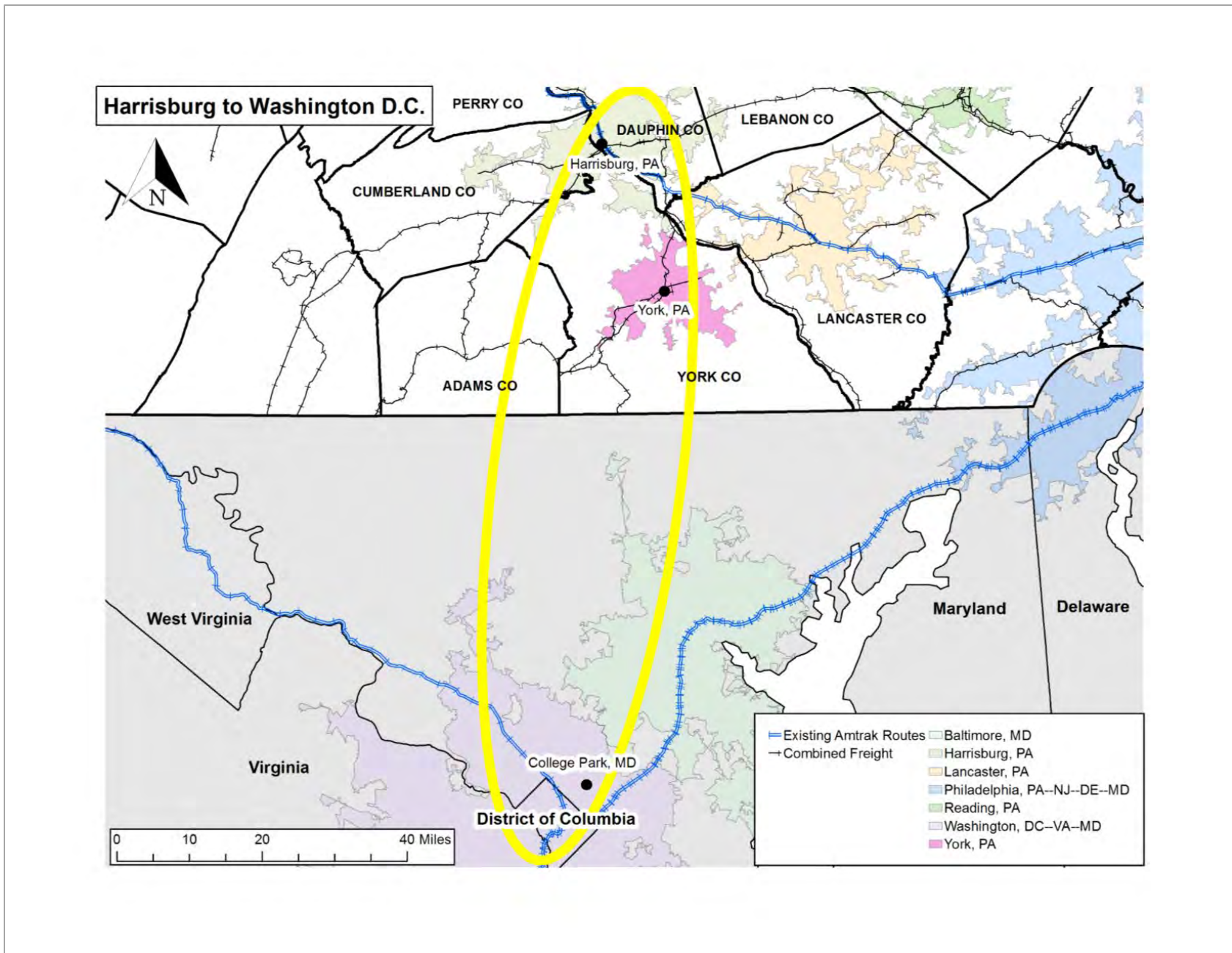
Combined population of Harrisburg, York, and D.C. metropolitan statistical areas, 2010	7 million	
<b>Corridor Changes, 2000 to 2015</b>		
<b>Average population</b>	+9.4%	
<b>Average employment</b>	+10.9%	
<b>Projected Changes, 2010 to 2040</b>		
<b>Municipality</b>	<b>Population</b>	<b>Employment</b>
Dauphin County	+10.7%	+20.8%
Source: Harrisburg Transportation Study <a href="https://static1.squarespace.com/static/56dc3f9cb654f9876576bab7/t/5748a89122482ec4b426a114/1464379539334/RTP2040Ch2Demo-graphics.pdf">https://static1.squarespace.com/static/56dc3f9cb654f9876576bab7/t/5748a89122482ec4b426a114/1464379539334/RTP2040Ch2Demo-graphics.pdf</a> U.S. Census Bureau		

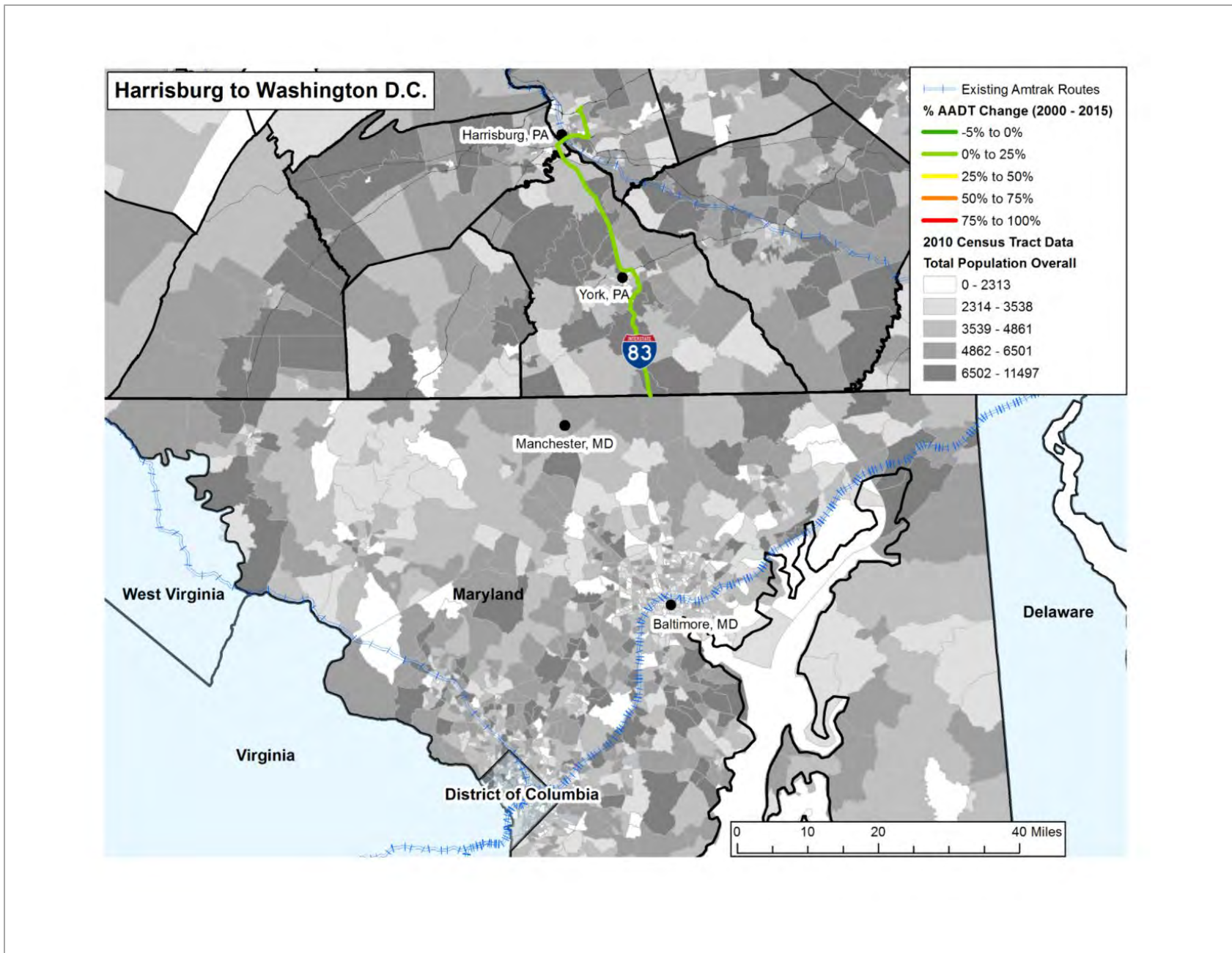


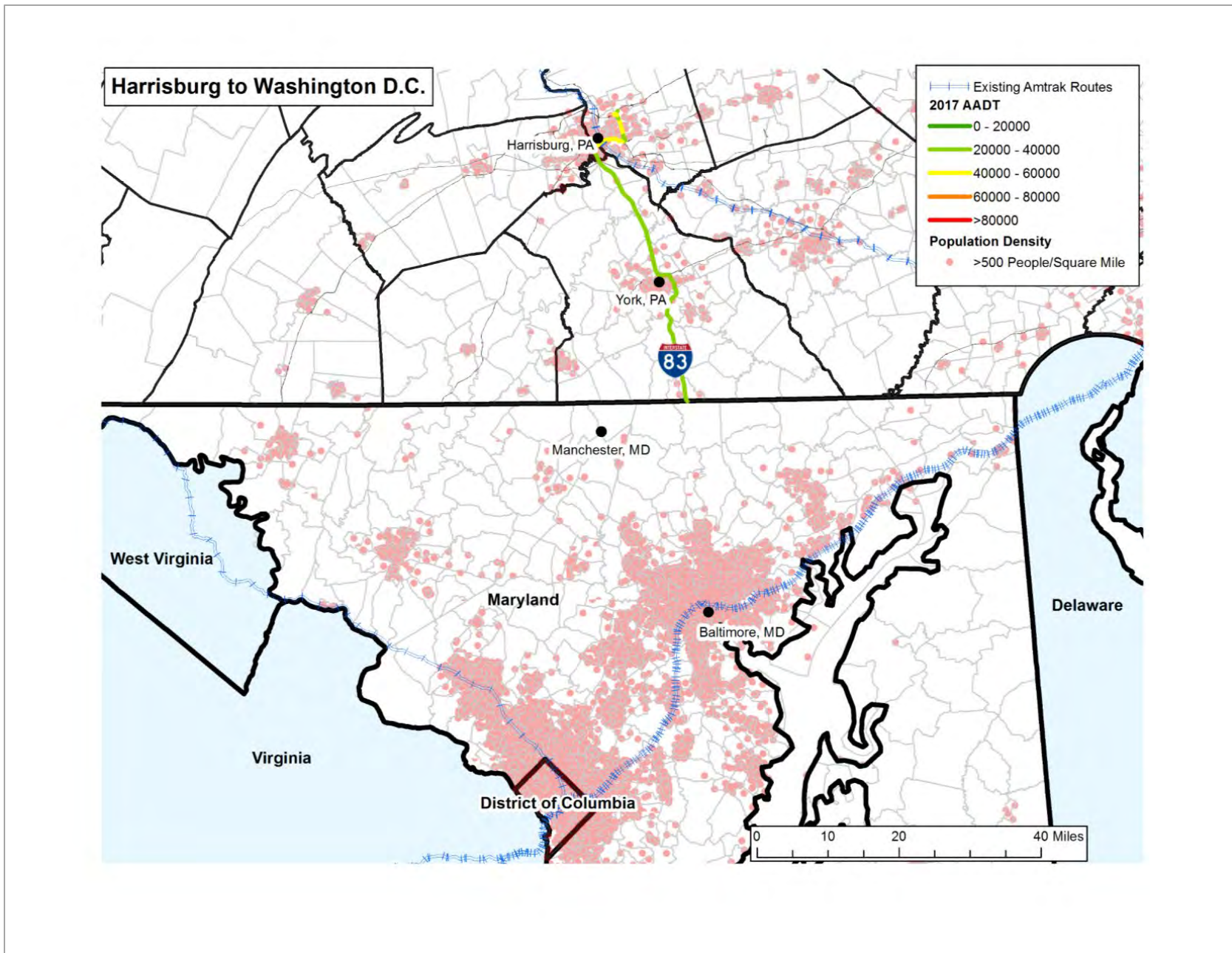
U.S. Capitol (courtesy Architect of the Capitol)

Commuting Flow		
Place of Residence	Place of Work	Number of Commuters
Harrisburg metro area	Washington, D.C. metro area	740
Source: U.S. Census Bureau, 2009-2013 5-Year American Community Survey		
Total Trips per Year		
Origin	Destination	Number of Trips
Cumberland, Dauphin, or Perry County, PA	Maryland	33,000
Source: HATS Regional Transit Coordination Study, 2011		

<sup>42</sup> Visit Hershey & Harrisburg, <https://www.visithersheyharrisburg.org/about/tourism-statistics/>







### Reading–Pottstown–Philadelphia Corridor Profile

**Existing infrastructure and service:** This corridor connects Reading and Philadelphia through cities including Pottstown, Phoenixville, and King of Prussia. Currently there is no passenger rail service between Reading and Philadelphia. There are commuter rail lines within the corridor, but only extending as far as Norristown, PA.

**Tourism:** In 2016, visitors spent \$857 million in Berks County, \$1.36 billion in Montgomery County, and \$6.07 billion in Philadelphia County.

**Travel demand indicators:**

Combined population of Reading and Philadelphia metropolitan statistical areas, 2010	6.4 million	
<b>Corridor Changes, 2000 to 2015</b>		
<b>Average population</b>	+7.2%	
<b>Average employment</b>	-5.0%	
<b>Travel intensity on US 422</b>	+10.9%	
<b>Projected Changes, 2010 to 2040</b>		
<b>Municipality</b>	<b>Population</b>	<b>Employment</b>
Philadelphia County	+6.9%	+6.8%
Montgomery County	+12.1%	+11.7%
Berks County	+10.8%	Not available
Sources: <a href="https://www.dvrpc.org/Reports/13042.pdf">https://www.dvrpc.org/Reports/13042.pdf</a> <a href="http://www.co.berks.pa.us/Dept/Planning/Documents/Transportation/LongRangeTransportationPlan_2016/Full_Document_2018_ReducedSize.pdf">http://www.co.berks.pa.us/Dept/Planning/Documents/Transportation/LongRangeTransportationPlan_2016/Full_Document_2018_ReducedSize.pdf</a> U.S. Census Bureau		



Independence Hall, Philadelphia (National Park Service)

Commuting Flow between Counties		
County of Residence	Place of Work	Number of Commuters
Berks	Chester	7,499
	Montgomery	14,822
	Philadelphia	1,039
Chester	Berks	2,545
	Montgomery	29,813
	Philadelphia	12,577
Montgomery	Berks	4,313
	Chester	25,083
	Philadelphia	59,910
Philadelphia	Berks	195
	Chester	7,479
	Montgomery	59,146
Total commuting into Philadelphia County from Berks, Chester, or Montgomery		73,526
Source: U.S. Census Bureau, 2009-2013 5-Year American Community Survey		

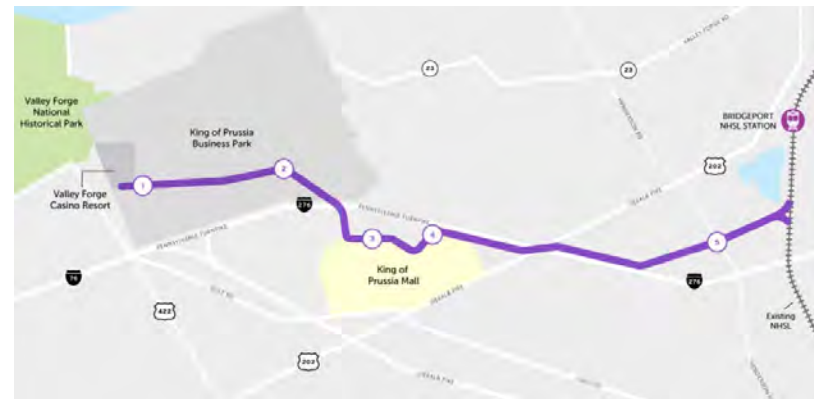
**Previous studies and current projects:** In the early 2000s, DVRPC partnered with SEPTA to study the viability of a proposed 62-mile rail transit system called the Schuylkill Valley Metro. It would connect Philadelphia with Reading via SEPTA rail lines and two Norfolk Southern freight lines.<sup>43</sup> However, in 2005 the cost of the project was determined to be too high to pursue.

In 2009, Montgomery County released a study called *R6 Norristown Line Service Extension* to determine the feasibility of restoring passenger rail service between communities along US Route 422. Funding was to come from tolling US 422; however, in 2011, this funding option was removed from consideration after negative public feedback, thus eliminating potential funding for the proposed rail extension.

In 2012, SEPTA began working on the King of Prussia rail extension that will connect King of Prussia to the Norristown High Speed Line, as depicted on Figure 12. The project is in early development and is expected to be completed as early as 2023.

In 2018, Chester County released a study to evaluate the viability of bringing back a commuter rail within this corridor. The proposed line would connect Philadelphia to King of Prussia and Phoenixville. The study identifies a preliminary cost estimate of about \$15 million in capital costs and \$2.7 million in annual operations and maintenance costs.<sup>44</sup>

**Figure 12: SEPTA Extension to King of Prussia**

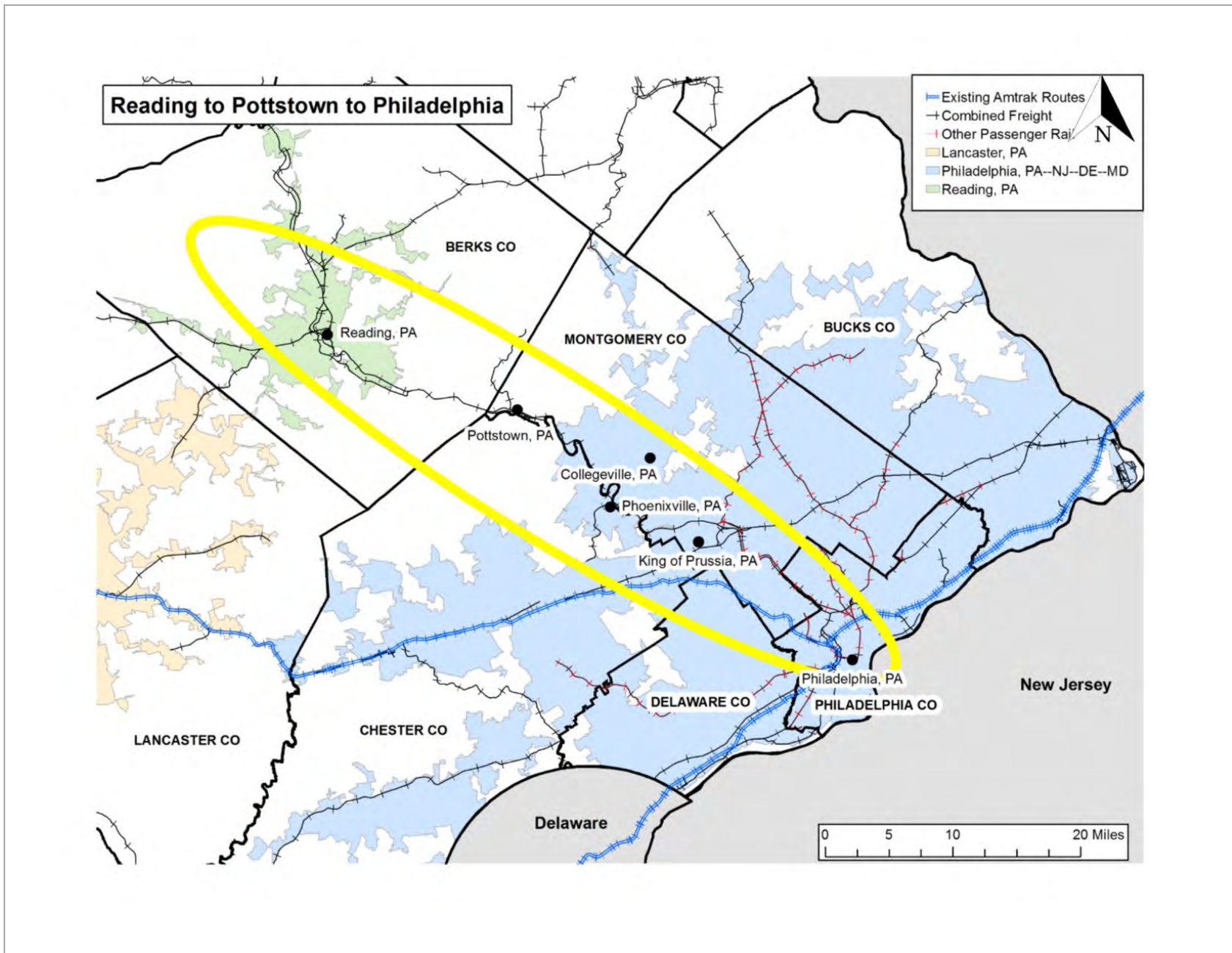


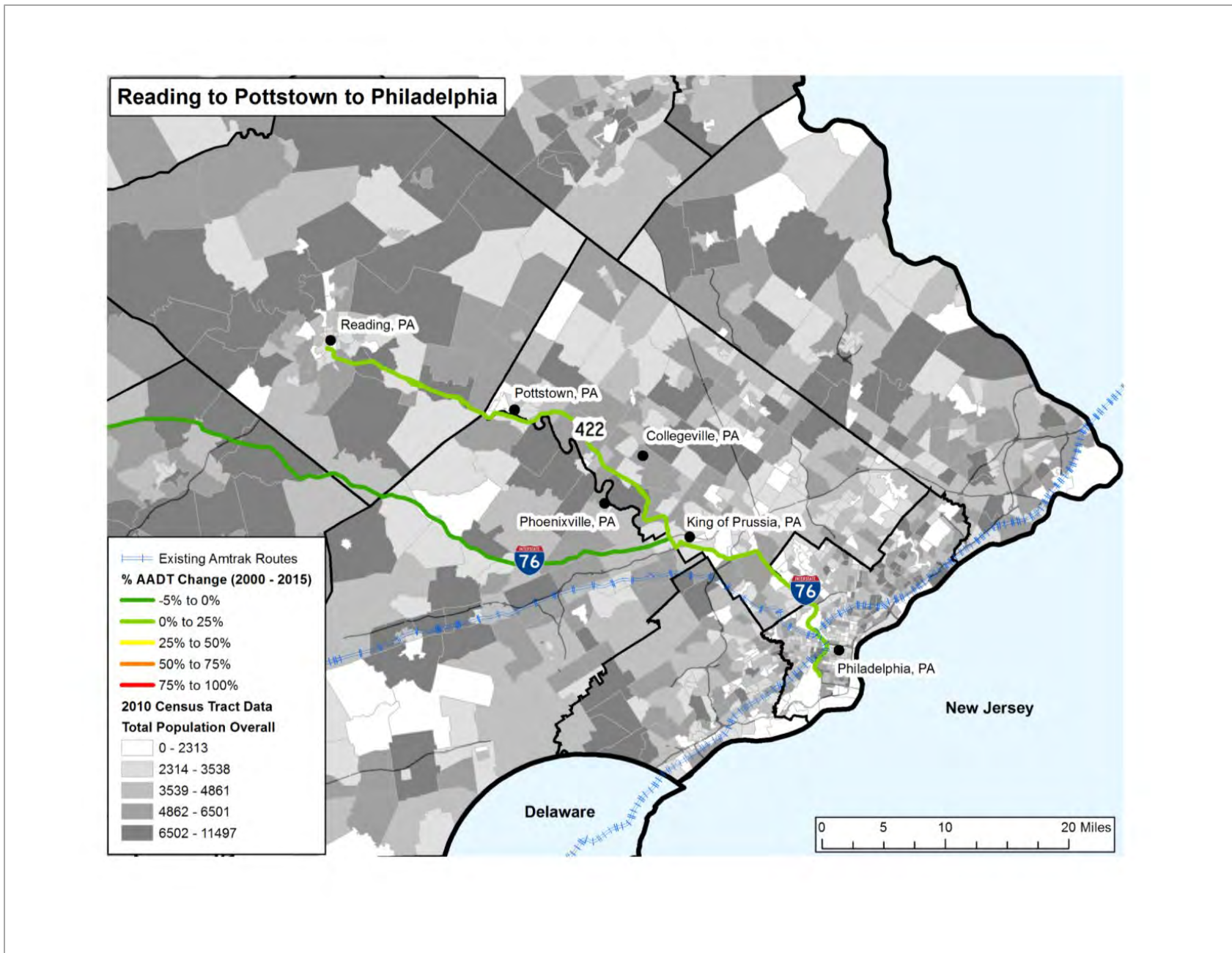
Source: <http://koprailcoalition.com/#main>

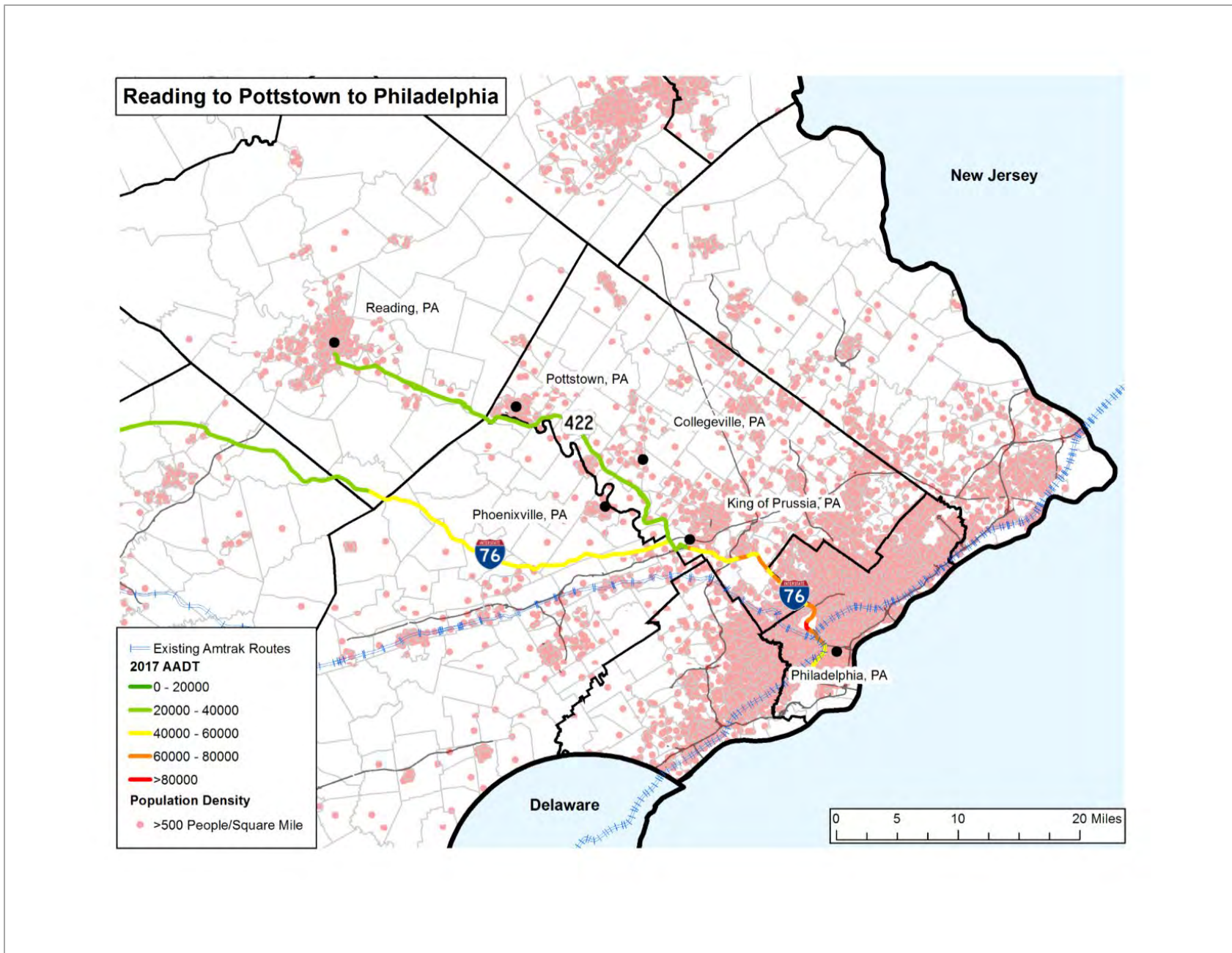
<sup>43</sup> Southeastern Pennsylvania Transportation Authority and Berks Area Reading Transportation Authority, *Schuylkill Valley Metro Task Force Summary Report*, November 2007

(<http://www.dot.state.pa.us/public/bureaus/PublicTransportation/GeneralInformation/SVM%20Report.pdf>)

<sup>44</sup> [http://planphilly.com/uploads/media\\_items/phoenixville-passenger-rail-demonstration-project.original.pdf](http://planphilly.com/uploads/media_items/phoenixville-passenger-rail-demonstration-project.original.pdf)







### Pittsburgh–Erie Corridor Profile

**Existing infrastructure and service:** There is currently no passenger rail in this corridor but there are various freight rail systems that connect the two cities. The condition and feasibility of utilizing this infrastructure has never been evaluated; however, the non-profit All Aboard Erie is sponsoring a feasibility study for high-speed passenger rail service between Erie and Pittsburgh.<sup>45</sup>

**Major trip generators:** The corridor includes attractions such as Lake Erie, Pittsburgh, vineyards, and historic sites. In 2016, visitors spent \$1.67 billion in the Great Lakes region and \$7.9 billion in the “Pittsburgh and Countryside” region.

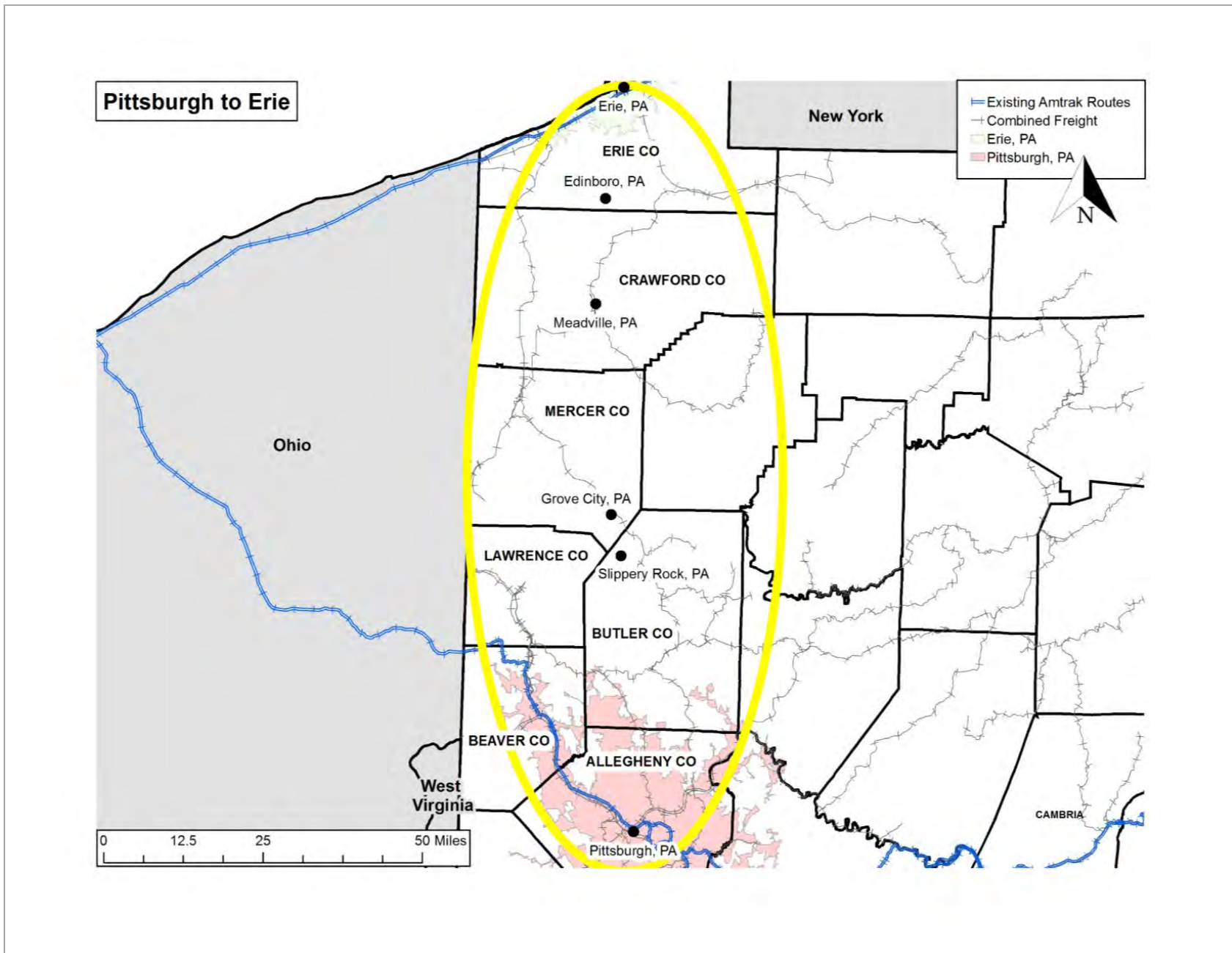


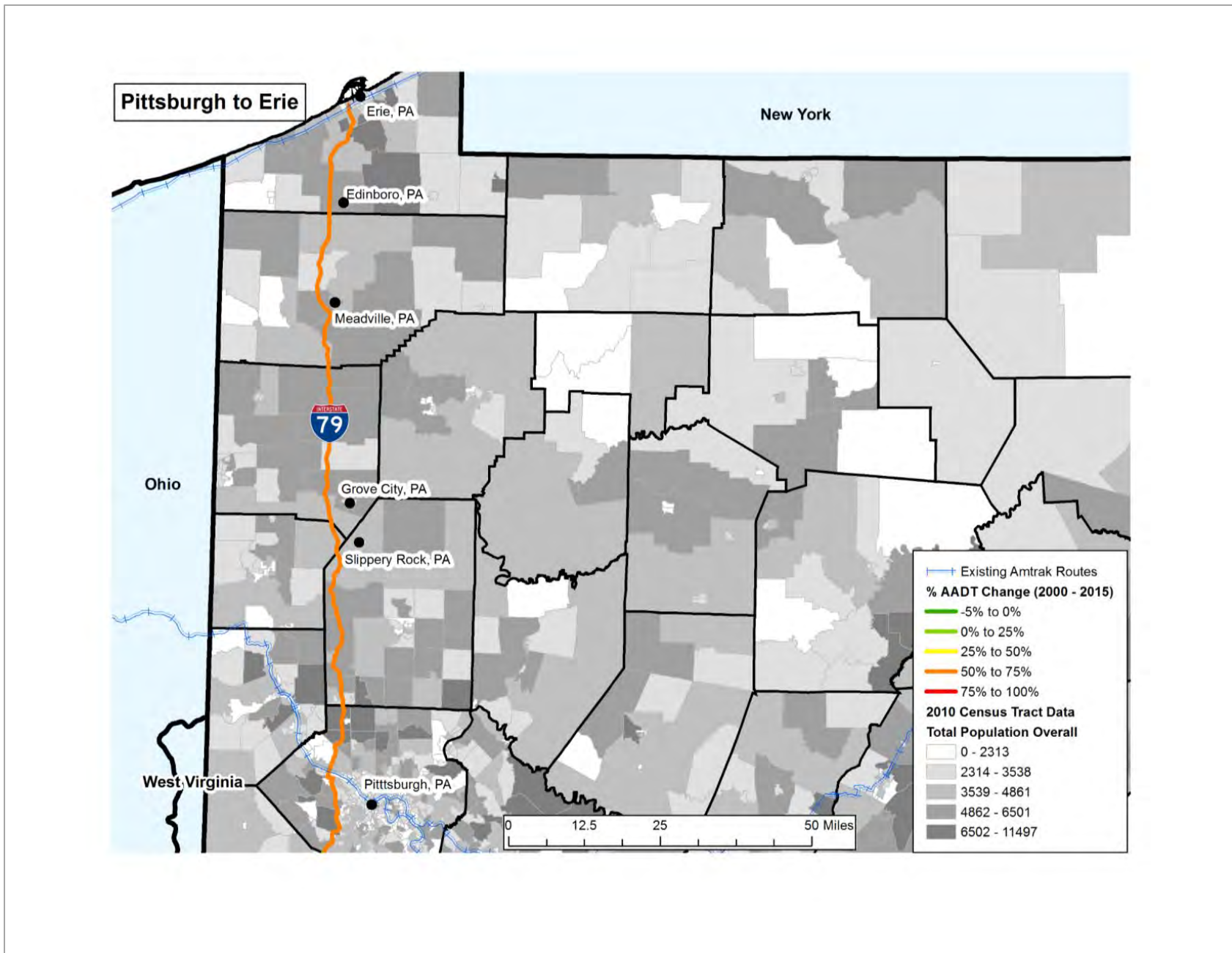
U.S.S. Brig Niagara, Erie Maritime Museum  
source: [www.flagshipniagara.org](http://www.flagshipniagara.org)

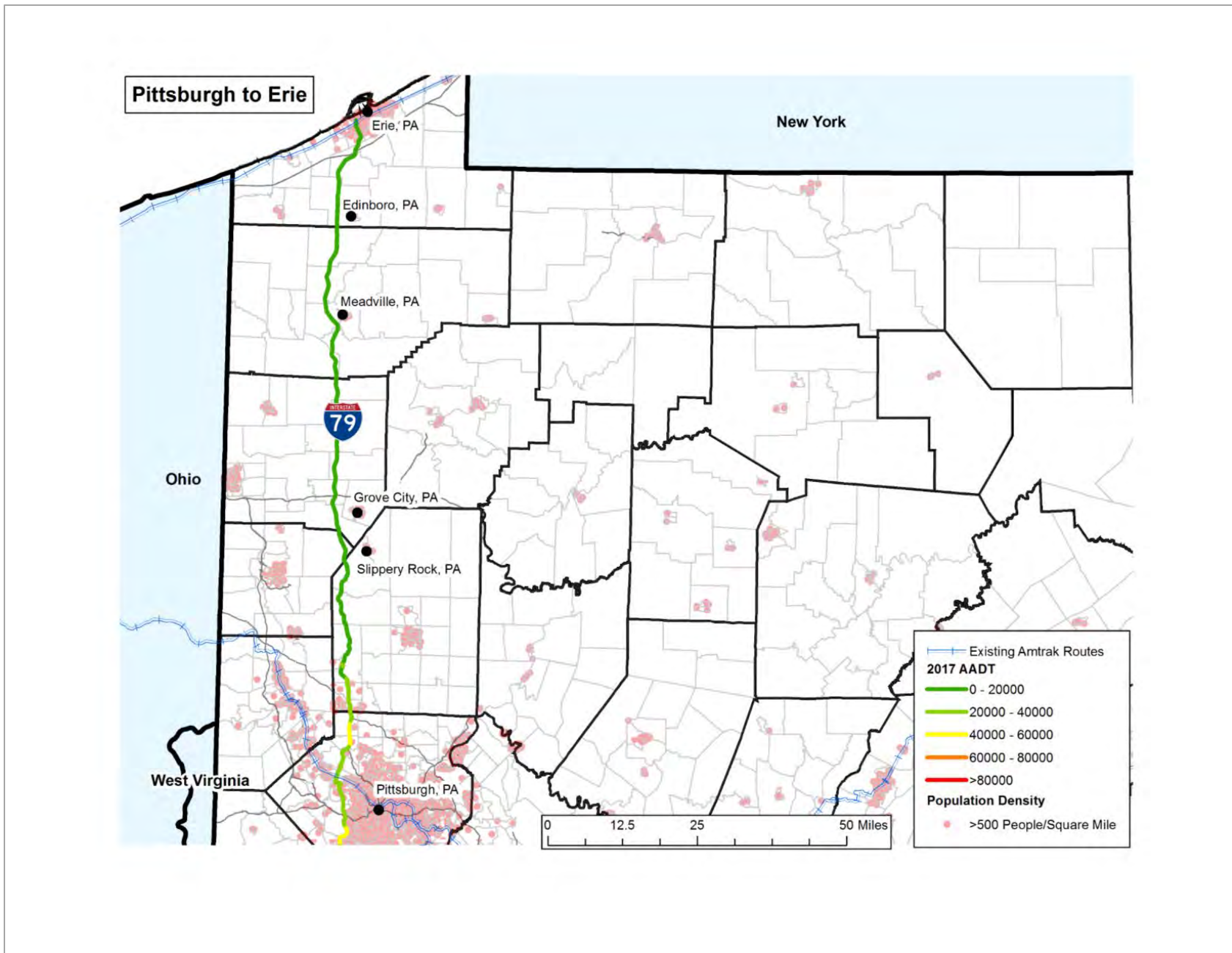
**Travel demand indicators:**

Combined population of Pittsburgh and Erie metropolitan statistical areas, 2010	2.6 million	
<b>Corridor Changes between 2000 to 2015</b>		
<b>Average population</b>	-2.5%	
<b>Average employment</b>	-0.8%	
<b>Travel intensity on I-79</b>	+53.7%	
<b>Projected Changes, 2010 to 2040</b>		
<b>Municipality</b>	<b>Population</b>	<b>Employment</b>
Erie County	+3.4%	11.9%
Crawford County	+0.6%	Not available
Pittsburgh	+9.4%	+11.7%
Allegheny County	+15.2%	+28.8%
Beaver County	+1.4%	+16.5%
Sources: <a href="https://www.eriecountypa.gov/media/518943/2017-03-30_erie_lrtp_reportappendicespackage_pdf.pdf">https://www.eriecountypa.gov/media/518943/2017-03-30_erie_lrtp_reportappendicespackage_pdf.pdf</a>		
<a href="http://www.northwestpa.org/wp-content/uploads/2015/07/FINAL-Northwest-LRTP-7-6-2015-p1.pdf">http://www.northwestpa.org/wp-content/uploads/2015/07/FINAL-Northwest-LRTP-7-6-2015-p1.pdf</a>		
Southwestern Pennsylvania Commission		
U.S. Census Bureau		

<sup>45</sup> All Aboard Erie ([http://allaboarderie.com/?page\\_id=17](http://allaboarderie.com/?page_id=17))







## Metropolitan Planning Organization Perspectives

Across the state, many intercity corridors currently have passenger rail service or have ongoing efforts toward acquiring passenger rail service. TAC surveyed Pennsylvania Metropolitan Planning Organizations (MPO) to inquire about the local and regional discussions about passenger rail service along their respective corridors. The following questions were provided for their response:

1. Do you have any active plans or initiatives for advancing intercity passenger rail service along this corridor? If yes, please specify.
2. Have you pursued passenger rail service within this corridor in the past? If so, what was the outcome?
3. Is there a demonstrable demand for intercity passenger rail within this corridor and what collaboration between MPOs is occurring in relation to its advancement?
4. What are the region's assets or key attractions that should be considered in relation to generating demand for intercity rail? Any key areas to avoid?
5. What criteria and conditions would be essential to demonstrate the viability of intercity passenger rail in your region?
6. What other perspectives do you have related to intercity travel in general (i.e., vehicle, air, and bus) within this corridor?
7. Are elected officials considering intercity rail and if so to what extent and how has that been evidenced?
8. What are transportation issues within your region that may enhance the need for improved intercity travel regardless of the mode—e.g., intercity bus?

Summaries of MPO remarks follow.

### Lehigh Valley Region (Lehigh Valley Transportation Study)

Rail studies have been performed evaluating intercity rail connections between the Lehigh Valley in the 1990s and in 2010. In 2010, the Central New Jersey Raritan Valley Transit Study evaluated rail service from the Lehigh Valley through western New Jersey and into Newark, NJ. The study found steep capital investments and annual operating costs requiring significant subsidies. It was concluded that rail service was not viable at that time.

Currently, private bus companies take passengers from the area to employment, transportation hubs, and/or entertainment centers in New Jersey, Newark Airport, JFK Airport, and Penn Station, NYC. These private bus companies do not receive public funds and employ hundreds of Lehigh Valleyians/Pennsylvanians.

The region is decentralized and largely suburban and does not have singular or even two or three distinct commuter or non-work vehicle movements. Currently, bus transit is viewed as more flexible and adaptable to meeting the growing changes in the Lehigh Valley region. The Lehigh Valley Transportation Study adopted goals and policies in the *MOVELV: Long Range Transportation Plan* that encourage private-sector transportation providers.

### Reading Region (Reading Area Transportation Study)

The Reading–Pottstown–Philadelphia corridor had passenger rail service in the early 1980s. Since then there has been discussion of restoring the passenger rail connection, including the robust Schuylkill Valley Metro study coordinated with SEPTA and DVRPC. There has also been the *R6 Extension Study*, and the *Route 422 Plus Corridor Study* was the latest effort to restore rail but it did not go anywhere due to the high cost and lack of support to toll Route 422 to fund the project.

Recently there has been a renewed emphasis on intercity passenger rail from the Reading Chamber of Commerce. There is reverse commuting potential and any rail service should link to Drexel University, which is opening a medical school in Wyomissing, and EnerSys Batteries, which has its corporate headquarters in Reading and is looking to attract employees from Philadelphia. Much of the demand is coming from Reading and the urban area but there is less demand to and from the middle stations such as eastern Pottstown, which are less densely populated.

Considering restoring rail service to revitalize the area and make it attractive to redevelopment is important, but sufficient and sustained demand must be shown. Additionally, it is important to secure federal, state, and local funding. Obtaining right-of-way or an agreement from Norfolk Southern may be the biggest hurdle. The cost of running passenger rail on the freight line is currently unknown.

Other than passenger vehicles, there are few transportation links. There is a transit gap to Phoenixville.

There is no scheduled air service in or out of Berks County. Public transit includes South Central Transit Authority, which

serves the Reading and Lancaster corridor. Currently there is no connection from Reading to SEPTA service. BARTA serves the City of Reading and surrounding area. The region has limited highway access and congestion occurs along its four- to five-mile length. Bus rapid transit may be useful in certain areas.

### Pittsburgh Region (Southwestern Pennsylvania Commission)

Discussion and studies for a hyperloop passenger rail connection between Pittsburgh and Columbus are progressing. Mid-Ohio Regional Planning Commission (MORPC) is taking the lead on this effort and SPC provides data when it is requested. The work will comprise a feasibility study when complete and MORPC has done fundraising for the study. There is a second study going on between Pittsburgh and Cleveland. This project is not as far along as the Pittsburgh to Columbus hyperloop project. There are no definite plans for each of the projects yet, but SPC plans to continue to cooperate.

The SPC and its board have been involved in the Pittsburgh to Harrisburg corridor with efforts to enhance service along the Keystone West corridor. Additional service to Pittsburgh would greatly enhance the intercity connection from Pittsburgh to Harrisburg and is important to the Pittsburgh region. The Pittsburgh Downtown Partnership (PDP) is also looking to increase service to downtown Pittsburgh to make trips easier for commuters and visitors.

### Scranton Region (Lackawanna/Luzerne Transportation Study)

Residents of the Scranton to New York City corridor have been actively working toward revitalizing passenger rail. There are a number of elected officials interested in restarting passenger rail—Congressman Cartwright, Senator Casey, and State Senator Blake. Surveying along the corridor has begun and Lackawanna County has sought funding for preliminary engineering and environmental work. Meetings with our New Jersey counterparts are expected to begin in early 2019. There are a number of regional assets that attract visitors, such as the National Historic Site in Scranton, the Delaware Water Gap, Kalahari Water Park, and a proposed Ripley’s Aquarium.

Reverse commuting demand has been identified. With the congestion along I-80 it would be helpful to have dedicated right-of-way to move people around. Currently there is bus service and a newly started bus route from Stroudsburg into New York City. Additionally, the Visitors Bureau of Monroe County is involved and there may be potential for public–private partnerships.

### Erie Region (Erie Area Transportation Study)

Currently, there are no plans to extend passenger rail to Pittsburgh. Erie has passenger rail access via Amtrak that runs east and west between New York City and Chicago. It would be beneficial to increase train frequency as currently there is one train daily, and it is inconvenient—the westbound train arrives in Erie at 2:00 a.m. There is bus service to Pittsburgh as well as Cleveland and Buffalo. Erie is looking to increase tourism and commerce. Erie also has a Great Lakes Port. Demand and congestion would need to increase to justify building new rail infrastructure to Pittsburgh. Right now this is not a viable option for the area.

### Preliminary Evaluation of Corridors

Section 6 described 11 factors that support successful implementation and operation of intercity passenger rail service. This section presents an assessment of the Pennsylvania travel corridors included in this study against five of those factors, which lend themselves to comparison. Of the remaining factors, five are generic to Pennsylvania as a whole. The sixth, level of rail service (i.e., schedule, frequency, travel time, amenities) is

not included as an evaluation factor because level of service is purposely not specified for any corridor. The study is aiming toward prospects for future rail service, not the status quo.

Table 10 describes the rating system used on Table 11, the corridor evaluation matrix.

**Table 10: Basis for Corridor Ratings**

Success Factor/Requirement	Basis for Rating		
	weak <input type="checkbox"/>	medium <input type="checkbox"/>	strong <input type="checkbox"/>
<b>Infrastructure</b>	Track and right-of-way connections are incomplete.	There is existing right-of-way and track connecting the endpoints of the corridor, but it is owned by one or more freight railroads.	The rail line is owned by Amtrak and extensive passenger rail infrastructure is already in place.
<b>Trip-Making Potential</b>	<p><u>None</u> of the following apply:</p> <ul style="list-style-type: none"> <li>• There is a substantial and growing population in the corridor.</li> <li>• There are multiple major trip attractions such as colleges, major convention centers, major event venues, tourist destinations, and major business centers.</li> <li>• There is a substantial commuter flow between the corridor endpoints.</li> </ul>	<p>At least <u>one</u> of the following applies:</p> <ul style="list-style-type: none"> <li>• There is a substantial and growing population in the corridor and there are multiple major trip generators.</li> <li>• There is a substantial commuter flow between the corridor endpoints.</li> </ul>	<p><u>All</u> of the following apply:</p> <ul style="list-style-type: none"> <li>• There is a substantial and growing population in the corridor.</li> <li>• There are multiple major trip attractions such as colleges, major convention centers, major event venues, tourist destinations, and major business centers.</li> <li>• There is a substantial commuter flow between the corridor endpoints.</li> </ul>

Success Factor/Requirement	Basis for Rating		
	weak <input type="checkbox"/>	medium <input type="checkbox"/>	strong <input checked="" type="checkbox"/>
<b>Local Connectivity and Access (public transit, stations/land use, and parking)</b>	Reasonably good transit connections exist at only one endpoint. Limited land availability for stations and parking.	Some transit connecting services as well as parking and general land availability/use for stations.	Endpoint stations and major intermediate stations provide good connections to local transit. Supportive land use.
<b>Connectivity with Amtrak Network</b>	No “low” score for this factor.	One endpoint connects to Amtrak’s rail network.	Both endpoints connect to Amtrak’s rail network.
<b>Limited Competition from Other Modes</b>	Travel options exist in ample supply and convenience to obviate the present need for passenger train travel between the cities in the corridor.	<p><u>One</u> of the following applies:</p> <ul style="list-style-type: none"> <li>Automobile travel is affected by recurring congestion that substantially increases trip times, and frequent non-recurring congestion that decreases trip time reliability (and drivers cannot readily access effective alternative modes of transportation at a point before the typical congested portion of the automobile trip (e.g., park-and-ride at a public transit stop).</li> <li>Other modes such as bus and air are less convenient and cost-effective than rail.</li> </ul>	<p><u>Both</u> of the following apply:</p> <ul style="list-style-type: none"> <li>Automobile travel is affected by recurring congestion that substantially increases trip times, and frequent non-recurring congestion that decreases trip time reliability (and drivers cannot readily access effective alternative modes of transportation at a point before the typical congested portion of the automobile trip (e.g., park-and-ride at a public transit stop).</li> <li>Other modes such as bus and air are less convenient and cost-effective than rail.</li> </ul>

**Table 11: Corridor Evaluation Matrix**

KEY: weak  medium  strong

Corridor	Infrastructure	Trip-Making Potential	Local Connectivity & Access	Connectivity with Amtrak Network	Limited Competition from Other Modes	Comments
Northeast Corridor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	High-demand/speed-reliable travel option.
Keystone Corridor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Time and cost-competitive with driving.
Keystone West	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Travel time not competitive with auto/bus for Harrisburg–Pittsburgh trips. Some bus routes, however, are lengthy/time-consuming.
Pittsburgh–Cleveland	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ample existing options—rail, air, and auto.
Lehigh Valley–NYC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Extensive travel demand and growing congestion. Major infrastructure needs, including stations and additional river crossing. Connection with NJ Transit commuter line depends on NJ Transit connecting west to Phillipsburg, which is not imminent.
Harrisburg–NYC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Would substantially duplicate Amtrak <i>Keystone Service</i> and <i>Pennsylvanian</i> .
Scranton–NYC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Corridor has been advocated for decades—population growth and locations could be revisited to determine any significant changes.
Harrisburg–DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lack of a defined corridor and right-of-way is a major limiting factor—auto travel time is good when factored with ability to connect to local transit to avoid congestion (e.g., WMATA Metro at Shady Grove and Greenbelt).
Reading–Pottstown–Philadelphia	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Population, growth, traffic congestion, and very limited ability to expand highway capacity speak to the need for mobility options.
Pittsburgh–Erie	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Existing track connection is circuitous and requires agreements with two freight railroads. I-79 provides connection with ample capacity for car and bus. Lack of infrastructure.

The qualitative assessment alone does not point to any new corridor that is unarguably “ready” for intercity rail. Considering the monumental requirements to make such service feasible, that should be no surprise. However, the corridors in highly populated areas, namely the Reading–Pottstown–Philadelphia corridor, may have long-term potential for intercity rail.

The value of this study is that it should start a discussion of Pennsylvania’s future with respect to intercity travel. The next section offers 11 recommendations that start that discussion among stakeholder organizations, planners, and decision-makers.

## 8. Recommendations – Where Do We Go from Here?

The subject of intercity rail merited an update as it had been 17 years since TAC last examined the topic. Much has changed over that period, including PennDOT’s success and leadership in developing the Keystone Corridor. That signature initiative is emblematic of PennDOT’s transformation from a highway department into a multimodal agency.

Some things have not changed, namely the monumental challenges involved in establishing and providing intercity rail service. Public policy nationally has been centered on highway and bridge infrastructure since the 1950s, representing an historic investment for improving mobility and access, but one that structurally limits intercity rail as a growth mode.

Pennsylvania policy has been more innovative and forward-looking with respect to multimodal strategy. Nationally, the case studies show other innovations such as private financing, related

land and economic development, and public-sector support through loans.

The focus of this study was on addressing what it takes to make intercity passenger rail feasible—not on developing recommendations. Through the course of the study, however, TAC attained various insights and perspectives that are reflected by the recommendations that follow. Each is listed below with some initial considerations aimed at starting the future dialogue among decision-makers and key stakeholders.

### **Establish Funding and Financing Strategies/Concepts**

If any state is to position, plan, and prepare for the possibility of intercity rail service expansion, funding and finance must be at the core of that work. This too would need to involve many public and private stakeholders working together to determine the funding requirements and financing strategies and tools. Potentially this could be done, at least in part, as a component of the LRTP recommendation, following. Clearly, the common thread among intercity rail expansion in recent years has been the combination of private and public funding. Pennsylvania should continue to monitor trends with private sector financing / provision of intercity transportation—including rail and bus. The advent and popularity of MegaBus is one more indicator that there is space for the private sector to provide transportation

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The focus of this study was on addressing what it takes to make intercity passenger rail feasible—not on developing recommendations.

services once deemed to be either monopolies or state-subsidized.

### **Use Long-Range Transportation Planning for Determining Intercity Travel Priorities**

PennDOT should consider focusing the next statewide long-range transportation planning (LRTP) process with its 25-year horizon to address intercity travel needs. This should have a multistate component (at least Pennsylvania's adjoining states) to support proper planning for intercity travel. Intercity travel could be a planning theme developed in collaboration with other state agencies (e.g., DCED), representatives of each mode, regional planning partners, and transportation service providers, including Amtrak.

The essential planning would be around transportation needs over the 25-year planning horizon and whether and how intercity rail fits over that period. The LRTP in turn would help to guide investments for the ensuing decades. Should the LRTP consider intercity travel and intercity rail, TAC recommends that the associated economics and benefit–cost be evaluated in sufficient depth to determine whether such long-range investment scenarios are worth the pursuit in specific corridors. Scenario planning is taking hold for some states and MPOs. Consideration should be given to an intercity travel enhancement scenario.

Historically transportation planning has been good at considering costs. The real challenge for this long-range planning would be to evaluate intercity transportation in terms of both benefits (economic, safety, mobility, access, etc.) and investments. The case studies show that intercity rail is as much about economic development as it is transportation.

PennDOT Connects implementation, in fact, is pointing to the opportunity for using long-range transportation planning—state and regional—as the means to better identify long-term investments with the active involvement of communities, agencies, and other stakeholders at the state and local levels. That good business practice can be extended to multiple regions, levels of government, and a broader range of impacted stakeholders (as well as potential investors).

### **Consider Potential Partnerships and Coalitions**

If Pennsylvania ever has additional intercity rail it will be due in part to having strong and new coalitions (including multi-state coalitions). There will also be the need for a wider range of partnerships. The Keystone Corridor experience has been especially instructive in this regard. That success would not be possible without the partnership among PennDOT, Amtrak, SEPTA, local communities, developers, and others. Many of the corridors examined in this study have a commuter travel component that lends them to applying lessons for partnerships from the Keystone Corridor experience. Intercity rail simply does not happen without a plethora of partnerships and collaborations.

### **Advocate for Supportive Policy**

The nation has long lacked a transportation policy. Funding bills are reauthorized programmatically every few years without any substantive new vision or policy priorities. Over the span of several decades in which there have been dynamic changes in technology, energy, and economics, the national transportation policy has changed little in comparison to such trends. It has

become more of a national transportation program that is adjusted from time to time.

The budgetary and legislative processes have tended to thwart any real vision such as that which brought about the Interstate Highway System in the middle of the 20<sup>th</sup> century. There is no present indication that this stasis will change.

Ironically, as regards intercity rail, greater flexibility over spending could be a positive for Pennsylvania based on its national leadership for this mode. Pennsylvania interests will need to advocate for federal policy changes if there is a consensus that more investment and flexibility are needed. On a smaller scale Pennsylvania interests could advocate for targeted research into intercity transportation innovation, policy changes, etc. Pennsylvania can continue to leverage supportive state policy (e.g., PennDOT Connects with its focus on better communities, quality of life, leveraging funds, etc.).

It is important to note that TAC's recommendations do not pit intercity rail against highways and bridges. In fact, one of the greatest barriers to intercity rail investment is the tremendous unmet investment need for highways and bridges.

## Align Economic Development and Transportation Strategies, Policies, Programs, and Investments

Obviously economic development decisions are primarily driven and made by the private sector. Public policy and programs, however, are often a catalyst and important component for private investment. Pennsylvania's economic and transportation strategies are being more closely tied together as evidenced by

PennDOT's recent rail freight planning activity. In a similar way Pennsylvania's longer game plan for economic development should consider the intercity travel dimensions that would help to attract and retain business and a talented workforce.

The Amazon HQ2 experience, for example, has been instructive in that it demonstrates two items relevant to this study:

- Transportation is a crucial factor in location decision-making. The initial selection of locations in the New York and Washington metro areas has a lot

to do with access locally and inter-city. It is no coincidence that both locations are on Amtrak's Northeast Corridor.

- States, regions, and cities must be ready for these kinds of mega-investment opportunities when they occur. Most economic development opportunities will not have the scale and long lead times of Amazon HQ2. The public sector with its stakeholders and partners needs to be

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TAC's recommendations do not pit intercity rail against highways and bridges.

In fact, one of the greatest barriers to intercity rail investment is the tremendous unmet investment need for highways and bridges.

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ready and positioned so that mobility and access are strengths, not liabilities. Pennsylvania’s 20<sup>th</sup> century legacy as the Keystone State continues with the Keystone Corridor and perhaps other future opportunities that leverage the state’s outstanding location advantages. Perhaps by the year 2101 the 21<sup>st</sup> century legacy will be “Keystone Connected.”

There is no way to know when such big private-sector investments will happen, but the principle that transportation must be aligned with economic strategy stands. These location decisions are first a function of the proper labor force. Many of the workers are Millennials who have also demonstrated a first-of-its-kind generational preference for non-automobile travel. The other large cohort, Baby Boomers, are retiring and will also be looking for other travel options in the near future.

The PennDOT Connects initiative emphasizes the importance of coordination among state and local agencies. That is particularly so in relation to strengthening the connection between transportation and state and regional (multistate) economic development.

### **Preserve Corridors to the Extent Feasible**

In those corridors for which expanded or new intercity rail might have potential, there should be intentional consideration of the varied land requirements. This might include both land and rail banking—corridor preservation, land designated for stations,

parking, etc. Intercity rail does not happen without the necessary right-of-way. That land and the associated cost is a far more vexing challenge than it was in the days of the Pennsylvania Railroad in the 19<sup>th</sup> and early 20<sup>th</sup> centuries when land was abundant, even in the Delaware Valley. It might be interesting to ask the various private investors in intercity rail in Florida and elsewhere to evaluate Pennsylvania’s potential and the land development components that might attract private investors. Such targeted market research could conceivably be done informally and/or through a Request for Information (RFI).

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PennDOT has developed passenger rail capacities and in-depth expertise that at one point in time would have been unimaginable.

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### **Build Upon the Keystone Corridor’s Success**

PennDOT continues to improve the Keystone Corridor in partnership with Amtrak. The lessons learned through the Keystone Corridor success (discussed in the case study) should be drawn upon to foster any feasible replication. PennDOT, since the 2001 TAC intercity rail study, has developed

passenger rail capacities and in-depth expertise that at one point in time would have been unimaginable. This includes all facets related to stations, infrastructure, policy, partnerships, and maintenance/ operations.

### **Assess the Market Feasibility for Keystone West**

Keystone West presents many challenges to expanding passenger rail service. By now taking a different look at this corridor, focusing on commuting flows in the Altoona–Pittsburgh segment, PennDOT has an opportunity to gauge, as a first step,

whether there is broad market feasibility for additional passenger rail service.

### **Consider Targeted, In-Depth Intercity Passenger Rail Feasibility Studies**

The feasibility of the Reading–Pottstown–Philadelphia corridor should be considered in new ways with new perspectives, including taking advantage of the learning that has occurred through the Keystone Corridor and Keystone West experience.

- The Reading–Pottstown–Philadelphia corridor has a large and growing population with population density throughout the corridor that might be able to support strong demand at station points.
- It has extensive traffic congestion and established commuting patterns between the two cities.
- With the concentration of economic activity there could be potential for private sector investment—if not in the rail service, then in stations and surrounding business ventures.
- There is rail infrastructure that can be used to develop this rail line and services.

TAC recommends that consideration be given to conducting an in-depth feasibility assessment of this corridor, and possibly others, with active involvement of key stakeholders—state, regional, national, and private sector.

Pennsylvania has an opportunity to approach intercity rail feasibility through some logical progressive phases:

1. Use the Altoona–Pittsburgh study as an opportunity to consider a similar review for other corridors.

2. Conduct detailed demand estimates as a first step for any other corridor deemed to have potential, such as Reading–Pottstown–Philadelphia.
3. If demand is demonstrated, ensuing evaluations would include cost and revenue studies.

A template or protocol should be established for conducting consistent, rigorous feasibility studies. See Appendix A for more detailed feasibility study guidance.

### **Support Intercity Bus Service Development**

State and local governments have the opportunity to strategically consider ways to further bolster this mode in partnership with the private sector, economic developers, and others. This could be done in various ways with the key stakeholders. One idea would be to organize a 2020 Intercity Transportation Summit that would include all intercity modes and the various organizations with a stake in improved intercity travel—both from the public and private sectors. The range of stakeholders is extensive. For example, Pennsylvania’s many universities benefit from enhanced alternatives to personal vehicles for intercity travel. Supporting intercity bus development could be especially opportune where it complements intercity rail and air travel.

### **Dovetail Technology with Intercity Travel**

Until recently, transportation technology had not changed dramatically. Now we see on the horizon the likelihood of connected and automated vehicles in our lifetimes. Depending on its deployment timing, CAV will influence transportation markedly and directly. Planners and policy analysts also need to

consider how technology will indirectly impact travel in the future as it too may impact the demand for intercity travel. Technology has been more dynamic than transportation and will continue to be. It must be a core factor for future feasibility assessments.

As discussed in Chapter 5 it is possible that rapid changes in transportation technology, along with factors such as increased use of telepresence technologies that depress travel demand, could pass by the asset-heavy intercity rail mode in various ways. However, and more likely, a strategic approach for

targeted investment in intercity rail should dovetail with technology applications incorporated in tandem.

America will remain a mobile nation and one that values mobility. Transportation, being a capital-intensive sector, requires long lead times for change management, strategic planning, and investment-making. TAC's study has demonstrated that while the launch or expansion of intercity rail is a major initiative at great cost, it is possible. "Possible," however, will not translate to "open to passengers" without the success factors discussed herein coming together.

## 10. Appendix A – Feasibility Study Resources

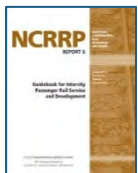
This document is an intercity passenger rail policy study. Nothing in the report is to be construed in any way to infer that corridor potential at any level of subjective assessment is the same as feasibility. Feasibility can only be determined through in-depth analyses of a specific corridor.

That raises the question as to what a subsequent corridor feasibility evaluation should address.

TAC recognizes that there is great demand on existing transportation financial resources. As such, it is recommended that any future intercity rail feasibility study be as definitive as possible, ideally providing a basis for decision-making. Studies that do not support definitive decision-making are to be approached with caution, unless they represent a logical phase of progressively more detailed evaluations.

The Transportation Research Board of The National Academies of Sciences, Engineering, and Medicine (TRB) conducted a webinar related to this subject in April 2017, which can be accessed via the link below.

<http://www.trb.org/main/blurbs/175788.aspx>



The webinar covered a related guidebook, *NCRRP Report 6: Guidebook for Intercity Rail Passenger Service and Development*.<sup>46</sup> TAC recommends that any intercity passenger rail feasibility studies be carried out consistent with the guidance and

resources provided in this document. PennDOT should consider establishing it as either a standard for any feasibility assessments, or as strongly encouraged guidance. TAC especially emphasizes the importance of:

- Ridership forecasts
- Economic and environmental impacts
- Capital costs estimation and the identification of potential funding and financing sources, including local funding
- Operating cost estimation and the identification of potential sources, including local financing
- Partnerships and institutional arrangements
- Right-of-way assessments

Each of the main chapters of the guidebook covers a vital component related to feasibility and planning. The chapters are listed below.

- Chapter 1 – Introduction
- Chapter 2 – Visioning: Intercity Passenger Rail Program Establishment
- Chapter 3 – Planning: Project Feasibility/Service Development
- Chapter 4 – Planning: Environmental Requirements

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<sup>46</sup> <http://www.trb.org/Publications/Blurbs/174443.aspx>

- Chapter 5 – Design and Construction
- Chapter 6 – Operations and Maintenance: Service Planning
- Chapter 7 – Operations and Maintenance: Ongoing Service Management

Chapters 3, 5, and 6 are particularly useful for scoping a feasibility study and any early considerations of cost estimation such as up to a preliminary engineering level.

The document also includes numerous links to other resources on topics such as funding and finance, legal issues, institutional arrangements, and right-of-way. The Resource Matrix in the Annex at the back of the document provides a comprehensive treatment of the various elements of feasibility and any phases beyond feasibility. The matrix is an invaluable source of information related to the many facets of intercity rail assessment, planning, and development.

## 11. Appendix B – Financial Operating Performance Statistics for State-Supported Amtrak Routes

**Table B-1: Financial Operating Performance Statistics for State-Supported Amtrak Routes, FY 2017**

<b>Amtrak Service</b> (in order of farebox recovery ratio)	<b>Expense</b> (\$ millions)	<b>Fare Revenue</b> (\$ millions)	<b>Operating Shortfall/(profit)</b> (\$ millions)	<b>Farebox Recovery Ratio</b>	<b>Ridership</b> (thousands)	<b>Shortfall/Passenger</b>	<b>Passenger-Miles</b> (millions)	<b>Cost/Passenger-Mile</b>	<b>Revenue/Passenger-Mile</b>	<b>Shortfall/Passenger-Mile</b>	<b>Seat-Miles</b> (millions)	<b>Cost/Seat-mile</b>	<b>Passenger-Mile/Seat-Mile</b>	<b>Shortfall-seat-mile</b>
<b>Washington-Lynchburg/Roanoke</b>	\$8.8	\$12.5	\$(3.7)	142%	190	\$(19.47)	41.1	\$0.21	\$0.30	\$(0.09)	61.2	\$0.14	67%	\$(0.06)
<b>Washington-Newport News</b>	18.7	22.2	(3.5)	119%	331	(10.57)	72.5	0.26	0.31	(0.05)	113.2	0.17	64%	(0.03)
<b>Washington - Norfolk</b>	9.1	9.1	0	100%	155	-	29.0	0.31	0.31	-	70.9	0.13	41%	-
<b>Washington - Richmond</b>	9.4	9.4	0	100%	175	-	26.4	0.36	0.36	-	66.6	0.14	40%	-
<b>Carolinian</b>	18.4	17.8	0.6	97%	279	2.15	78.7	0.23	0.23	0.01	120.8	0.15	65%	0.00
<b>Hiawatha</b>	23.3	18.6	4.7	80%	829	5.67	66.6	0.35	0.28	0.07	175.3	0.13	38%	0.03
<b>Empire Service</b>	64.9	50.3	14.6	78%	1,159	12.60	139.0	0.47	0.36	0.11	372.6	0.17	37%	0.04
<b>Keystone Service</b>	55.5	43.0	12.5	77%	1,506	8.30	130.5	0.43	0.33	0.10	299	0.19	44%	0.04
<b>Pennsylvanian</b>	17.1	11.9	5.2	70%	221	23.53	52.1	0.33	0.23	0.10	80.6	0.21	65%	0.06
<b>Maple Leaf</b>	32.7	21.8	10.9	67%	353	30.88	105.3	0.31	0.21	0.10	226.1	0.14	47%	0.05
<b>Vermont</b>	10.3	6.4	3.9	62%	96	40.63	24.8	0.42	0.26	0.16	51.1	0.20	49%	0.08
<b>Pacific Surfliner</b>	126.9	76.9	50.0	61%	2,990	16.72	259.2	0.49	0.30	0.19	788.2	0.16	33%	0.06
<b>Wolverines</b>	34.0	20.4	13.6	60%	459	29.63	97.0	0.35	0.21	0.14	182.5	0.19	53%	0.07
<b>Piedmont</b>	5.8	3.2	2.6	55%	148	17.57	16.2	0.36	0.20	0.16	33.1	0.18	49%	0.08
<b>The Downeaster</b>	17.3	9.0	8.3	52%	526	15.78	41.8	0.41	0.22	0.20	134.1	0.13	31%	0.06
<b>Cascades</b>	65.1	32.5	32.6	50%	810	40.25	120.5	0.54	0.27	0.27	203.0	0.32	59%	0.16
<b>Blue Water</b>	13.7	6.6	7.1	48%	186	38.17	36.4	0.38	0.18	0.20	83.5	0.16	44%	0.09
<b>Ethan Allen Express</b>	5.9	2.8	3.1	47%	50	62.00	9.4	0.63	0.30	0.33	23.9	0.25	39%	0.13
<b>Chicago-St. Louis</b>	34.4	15.4	19.0	45%	590	32.20	106.9	0.32	0.14	0.18	240.3	0.14	44%	0.08
<b>Adirondack</b>	14.5	6.4	8.1	44%	116	69.83	34.0	0.43	0.19	0.24	48.9	0.30	70%	0.17
<b>Pere Marquette</b>	7.3	3.2	4.1	44%	93	44.09	14.0	0.52	0.23	0.29	27.0	0.27	52%	0.15
<b>Capitol</b>	73.1	31.3	41.8	43%	1,607	26.01	108.6	0.67	0.29	0.38	368.3	0.20	29%	0.11

Amtrak Service (in order of farebox recovery ratio)	Expense (\$ millions)	Fare Revenue (\$ millions)	Operating Shortfall/(profit) (\$ millions)	Farebox Recovery Ratio	Ridership (thousands)	Shortfall/Passenger	Passenger-Miles (millions)	Cost/Passenger-Mile	Revenue/Passenger-Mile	Shortfall/Passenger-Mile	Seat-Miles (millions)	Cost/Seat-mile	Passenger-Mile/Seat-Mile	Shortfall-seat-mile
<b>New Haven - Springfield</b>	22.0	9.3	12.7	42%	245	51.84	21.1	1.04	0.44	0.60	51.5	0.43	41%	0.25
<b>Illini</b>	17.9	7.2	10.7	40%	251	42.63	45.1	0.40	0.16	0.24	116.0	0.15	39%	0.09
<b>San Joaquins</b>	97.0	35.6	61.4	37%	1,210	50.74	155.2	0.63	0.23	0.40	456.1	0.21	34%	0.13
<b>Kansas City-St. Louis</b>	14.8	5.4	9.4	36%	174	54.02	32.2	0.46	0.17	0.29	76.9	0.19	42%	0.12
<b>Illinois Zephyr</b>	16.3	5.3	11.0	33%	204	53.92	33.4	0.49	0.16	0.33	85.1	0.19	39%	0.13
<b>Heartland Flyer</b>	7.5	1.8	5.7	24%	71	80.28	12.5	0.60	0.14	0.46	25.8	0.29	48%	0.22
<b>Hoosier State</b>	4.6	1.0	3.6	22%	30	120.00	4.6	1.00	0.22	0.78	13.2	0.35	35%	0.27
<b>Total State-Supported Services</b>	<b>846.3</b>	<b>496.3</b>	<b>350</b>	<b>59%</b>	<b>15,054</b>	<b>23.25</b>	<b>1,914.1</b>	<b>0.44</b>	<b>0.26</b>	<b>0.18</b>	<b>4,594.8</b>	<b>0.18</b>	<b>42%</b>	<b>0.08</b>

Source: Amtrak, *General and Legislative Annual Report and Fiscal Year 2019 Grant Request*