



# PA On Track

PA'S LONG RANGE TRANSPORTATION &  
COMPREHENSIVE FREIGHT MOVEMENT PLAN

## LONG RANGE TRANSPORTATION PLAN





*"By failing to prepare,  
you are preparing to fail."*

-- Benjamin Franklin

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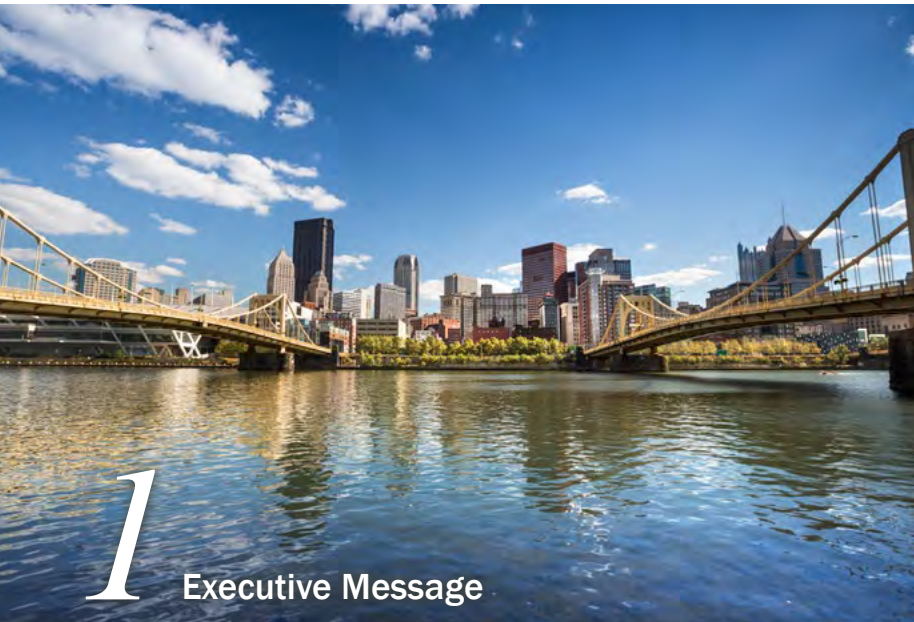
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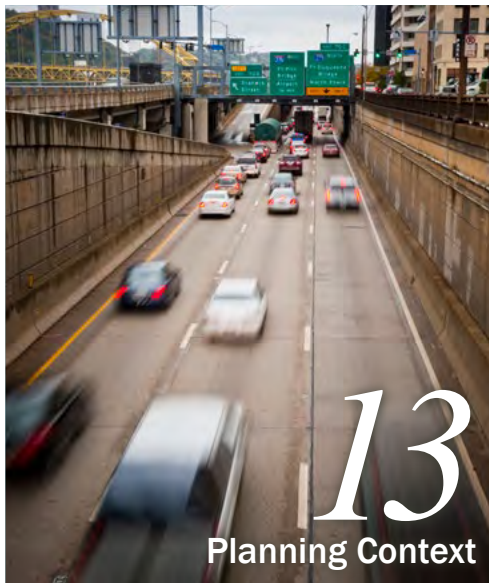
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## Executive Message

Pennsylvania recently adopted a new funding plan that will invest billions of dollars into our transportation system – and this critical investment is already creating new jobs and spurring economic development across the state. To guide that investment, Pennsylvania requires a long range transportation plan and a comprehensive freight movement plan that are innovative, performance-based, and that establish the best transportation priorities to move our economy forward and address the needs of our citizenry as we meet the opportunities of the future.

These plans, known collectively as PA On Track, have been developed with the cooperation from dozens of state, regional and local transportation agencies, the perspectives of Keystone State businesses large and small, and received input from all regions of the state. PA On Track sets goal areas that include system preservation, safety, personal and freight mobility, and stewardship. PA On Track challenges us to move in a bold direction over the next 25 years and focuses on project prioritization, projects, and system performance.

Today, Pennsylvania is served by a robust but aging transportation system. A growing economy demands we modernize and innovate this system – to make it safer for all users, increase the use of technology to capture the benefits offered by autonomous and connected vehicles, increase transit and biking opportunities, and move freight on our roads and through our ports more efficiently. We need to accomplish this while preserving our system in a state of good repair.

Please take the time to read PA On Track and learn more about how we are working to improve our transportation system for all of its users. Please let me know your thoughts at [RA-PennDOTLRTP@pa.gov](mailto:RA-PennDOTLRTP@pa.gov).

Sincerely,

Leslie S. Richards

Secretary of Transportation

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# Overview

## PURPOSE OF 'PA ON TRACK'

"PA On Track" is the name for Pennsylvania's most recent update of its multimodal long range transportation plan and the state's first comprehensive freight movement plan. The multimodal long range transportation plan, presented in this document, seeks to preserve and improve accessibility and connectivity for all transportation modes. The comprehensive freight movement plan further defines how to efficiently move freight, while fostering the state's economy and generating future growth. The Pennsylvania Department of Transportation (PennDOT) led the development of PA On Track in partnership with the many entities that influence transportation planning in Pennsylvania, as well as members of the general public.



The PA On Track planning effort occurred in the wake of two major legislative events. First, in July 2012 the Moving Ahead for Progress in the 21st Century Act (MAP-21) was enacted to reauthorize federal funding for highways and transit. MAP-21 essentially kept federal funding for Pennsylvania's transportation program constant with prior levels. MAP-21 also included requirements for states to develop performance-based plans. Despite the fact that the federal guidance and the final rules were not fully available at the time of PA On Track's development and release, PA On Track

incorporated performance-based planning to enable PennDOT to more efficiently track system performance over time. Second, at the state level, Act 89 was enacted in 2013. The Act is Pennsylvania's first major transportation funding legislation in over 15 years and provides for increased and growing long-term revenue to address the transportation funding gap identified and defined by the prior independent studies of the State Transportation Advisory Committee and Transportation Funding Advisory Commission.

Just as these previous studies have highlighted Pennsylvania's funding deficit, PA On Track offers bold direction and innovation as the state moves deeper into the Act 89 era. The three overarching themes associated with PA On Track include **prioritization**, **projects**, and **system performance**.



**Project Prioritization.** A new project prioritization process framework was developed as part of the PA On Track planning process. The process includes evaluation measures based on the plan's goals and objectives along with a scoring method that incorporates both qualitative and quantitative data. The process allows PennDOT to prioritize regional and statewide significant projects, assign a score based on a proposed project's technical merit, as well as its projected economic impact. The tool also enables PennDOT to more objectively evaluate the merits of candidate projects, regardless of mode (e.g., highway versus rail freight, etc.).



**Projects.** PA On Track breaks from the approaches of prior state plans in that it advances a set of prioritized projects. PennDOT collaborated with its various partners statewide during the development of the 2015 Twelve Year Program to prioritize critical interstate highway system investments needed to meet the long range objectives of the multimodal Long Range Transportation Plan. (Appendix A)

**System Performance.** PennDOT has incorporated performance-based planning into PA On Track. The United States Department of Transportation (USDOT) is currently working with states and planning organizations to transition toward and implement a performance-based approach to carrying out the long range transportation plan. USDOT will finalize the MAP-21 rules and requirements in 2015. In 2016, therefore, PennDOT will collaborate with its Metropolitan Planning Organizations (MPOs) to further develop the strategic direction by identifying MAP-21 performance measure targets.

## HISTORY OF TRANSPORTATION PLANNING IN PENNSYLVANIA

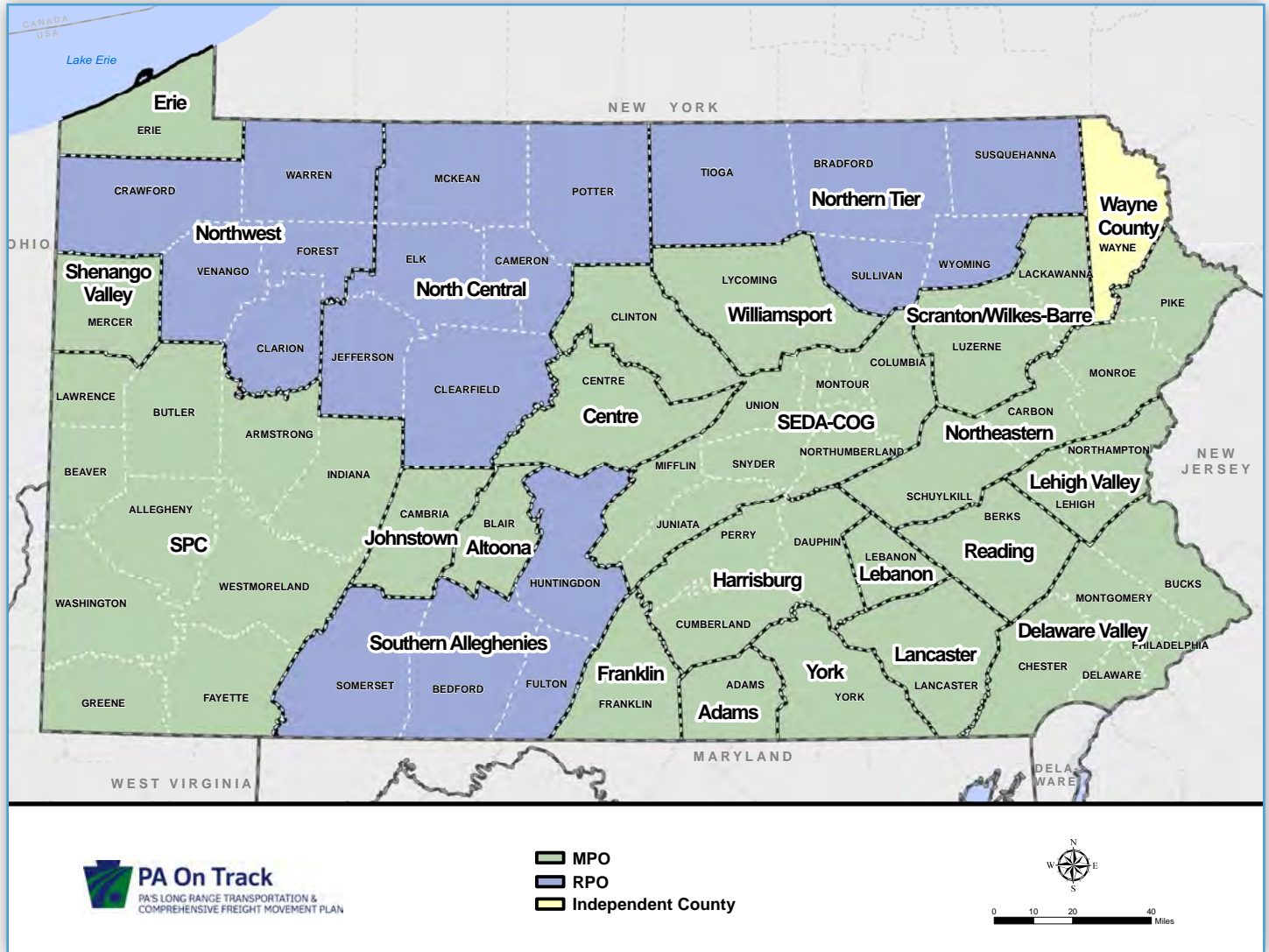
PA On Track is the latest in a series of long range transportation plans that PennDOT has administered since the mid-1990s. PennDOT's Policy Plan of 1995 was Pennsylvania's first long range intermodal transportation plan and touted as "a starting point for developing a transportation agenda for the 21st Century." It was followed by *PennPlan*, which PennDOT unveiled in January 2000. *PennPlan* introduced a corridors-based approach to transportation planning, and organized the state into 28 corridors of statewide significance in order to analyze significant trends, issues and opportunities for future consideration in regional and statewide transportation planning and programming. It added focus to the state's transportation planning process and was emulated by several planning partners.

In more recent years, PennDOT has been guided by the direction of the PA Mobility Plan, adopted in 2007, which provided guidance for Pennsylvania's transportation investments through 2030. The Mobility Plan advanced several plan breakthroughs. For example, the Mobility Plan defined an illustrative Core PA Transportation System, a concept proposed as a planning tool to improve the performance of Pennsylvania's multimodal transportation system. The PA Mobility Plan also included the development of new analytical tools such as a statewide travel demand model and freight model. PennDOT designed these tools to evaluate infrastructure projects and policy options that span regions, and estimate the impacts on the transportation system by simulating traffic patterns.

PA On Track advances the planning tools introduced by the PA Mobility Plan to address Pennsylvania's most current transportation challenges. The Core PA Transportation System, for example, was a precursor to PA On Track's project prioritization framework and PennDOT revised the travel demand model to include updated network information and a more robust zonal structure that will yield greater accuracy in estimating future travel demand. Together, these advances provide PennDOT with the tools needed to develop future programs with even more analytical rigor than was previously possible.

Pennsylvania's Metropolitan Planning Organizations (MPOs) and Rural Planning Organizations (RPOs) also develop long range transportation plans (**Figure 1**). MPOs were established by the Federal-Aid Highway Act of 1973 and their boundaries are defined by U.S. Census Bureau urbanized areas. RPOs were created following the 1991 passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) which required states to establish a transportation planning process to serve areas beyond urbanized boundaries. Planning partners play a significant role in transportation planning in Pennsylvania by collaborating with PennDOT to advance and support planning for the state's transportation system. PennDOT works closely with the planning partners in developing its long range transportation plan and recognizes that each partner has unique regional transportation issues to address.

**Figure 1: Pennsylvania's Planning Partners, MPO and RPO Regions**

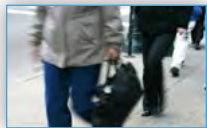


Source: PennDOT Center for Program Development and Management, 2015

Note: The Delaware Valley MPO also includes Burlington, Camden, Gloucester, and Mercer Counties in New Jersey

## DOCUMENT NAVIGATOR

The multimodal long range transportation plan is organized into the following major sections:



### Outreach Summary

This section discusses the approach that PennDOT used to develop PA On Track including stakeholder involvement and outreach to the general public.



### Planning Context

This section outlines trends in socio-economic factors such as changes in population and age composition, employment and occupation type, and land use patterns that will impact future multimodal transportation demand.



### Multimodal Investment Needs

This section qualitatively presents the needs by mode—roadway, bridge, appurtenances, public transportation, freight rail, passenger rail, bicycle and pedestrian, aviation, and ports and waterways—for the planning horizon through year 2040.



**Strategic Direction**

This section presents the vision, goals, and performance measures of PA On Track and outlines recommendations and implementation steps for attaining the plan’s directions.



**Transportation Revenues and Funding**

This section discusses the importance of Act 89 to Pennsylvania transportation and the need for greater federal funding. Act 89 generates an additional \$2.3 billion annually by Fiscal Year 2017-18. A more robust multi-year federal surface transportation reauthorization is needed to supplement recent increases in available state funding.



**Findings**

This section presents PA On Track’s findings, including Pennsylvania’s transportation challenges and the changing nature of transportation needs through the planning horizon year 2040.

Both the long range transportation plan and comprehensive freight movement plan are available at [www.paontrack.com](http://www.paontrack.com).



# Outreach Summary

## STAKEHOLDER INVOLVEMENT

Engaging stakeholders in the development of PA On Track was a PennDOT priority. To reach a wide range of stakeholders, PennDOT used outreach methods such as the internet ([www.paontrack.com](http://www.paontrack.com)) and interactive webinars that brought together statewide stakeholders. Webinar participants included local planning partners, local officials, private sector businesses, PennDOT central office and district office staff, modal operators, and representatives from adjacent states. The webinars solicited participant feedback and input on PA On Track via polling questions and open question and answer segments. Stakeholders also were able to provide input by submitting comments at [www.paontrack.com](http://www.paontrack.com) and PennDOT posted summaries and dispositions of all website comments received. In addition, PennDOT leveraged several of the Commonwealth's transportation planning and policy bodies to communicate progress and build momentum for plan implementation:

- County Planning Directors Association
- PennDOT Planning Partners
- Department of Community and Economic Development (DCED)
- Department of Conservation and Natural Resources (DCNR)
- Local Development Districts (LDD)
- Pedalcycle and Pedestrian Advisory Committee (PPAC)
- Rail Freight Advisory Committee (RFAC)
- Transportation Advisory Committee (TAC)

## PUBLIC OUTREACH

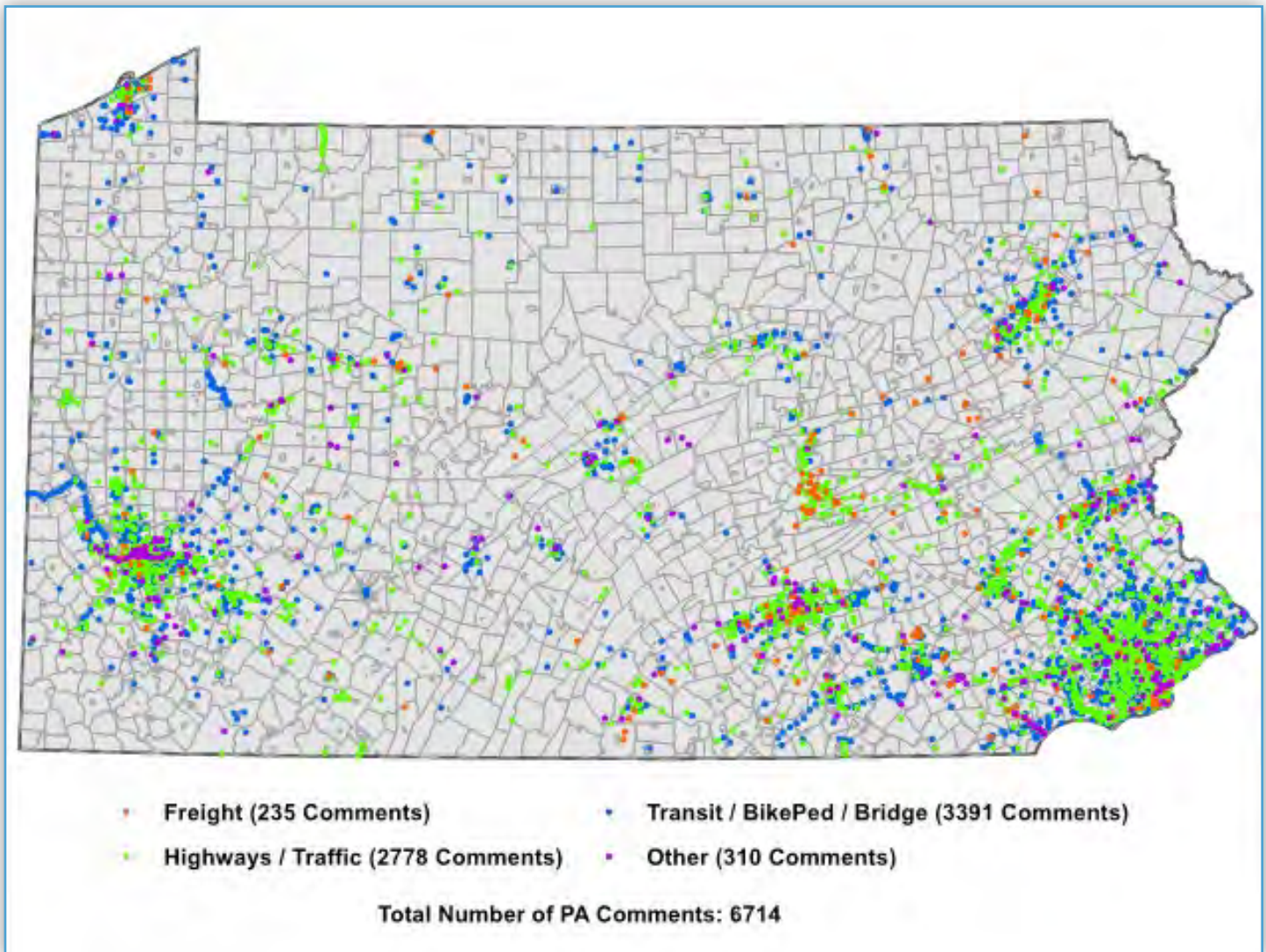
In addition to its efforts to engage stakeholders, PennDOT also provided specific opportunities for public engagement. Chief of these involved the use of MetroQuest, an online platform whose software enabled the public to learn about the planning process and provide feedback using a series of interactive screens. The online platform included the following five elements:

- Background on statewide long range transportation and freight plans;
- Program areas for user ranking;
- Investment scenarios for review and evaluation;

- Interactive map to receive comments related to specific locations; and
- General comment screen with links to the project website.

The online platform attracted nearly 3,700 website visits and over 2,500 visitors provided data and information. Through the interactive map exercise, the public provided comments on nearly 7,000 locations, which were saved to a database and shared with the respective planning partner. **Figure 2** illustrates the spatial distribution of the comments received, as well as the nature of the comment, i.e., freight-related, transit, etc.

**Figure 2: Location of Project Concerns Identified by the Public**



**Program Priorities**

The MetroQuest online platform generated over 500 comments on program priorities. These comments will be used by PennDOT and its partners (MPOs/RPOs) in future plans and programs. While not exhaustive, the following provides a high-level overview of public comments received, by priority area:



**Aviation**

Respondents noted the value of this service in connecting the state's rural areas to the national network. Maintaining essential air service is a concern at several of the state's airports, as is improving capacity at Philadelphia International.



### **Bicycle and Pedestrian Facilities**

Respondents commented that transportation planning needs to focus on the movement of people over vehicles. Improved bicycle and pedestrian connections to other modes, particularly public transit centers, and to community centers are desired in order to increase mobility options. Investments in these modes improve health and wellness, and can help address congestion and mobility.



### **Bridge Conditions**

Respondents noted that bridge maintenance must be addressed and sustained. One cannot travel anywhere in Pennsylvania without crossing a bridge. As one respondent stated, “Being number one in structurally deficient bridges is not a ranking Pennsylvania should have.”



### **Economic Development**

According to respondents, transportation improvements to support new development could be funded using public-private partnerships or value capture and similar approaches where possible.



### **Highway Safety**

Respondents noted that safety needs to remain PennDOT’s top priority. A multi-prong strategy is needed, including education and enforcement to address behavioral concerns such as distracted and aggressive driving, as well as to address the unique issues associated with new drivers and mature drivers. Low-cost improvements, such as signing and roadway markings should be done in addition to improvements in roadway design. It is also important to maintain infrastructure and safety through commercial motor vehicle safety and weight inspections.



### **Land Use and Planning**

The public noted the disconnect that exists in how land use and transportation decisions are made within the state. PennDOT needs to prioritize transportation improvements in areas where investments in other infrastructure have already been made. As one commenter noted: “Transportation decisions need to be made in harmony with local land-use policy...or rather, local land-use policy needs to be adjusted to better serve regional transportation plans.”



### **New Roads or Widening**

According to respondents, adding capacity should be done strategically, recognizing the competing demands for resources. Interest in specific major projects was noted, including extending I-83 north into New York (via US 15), addressing the missing link at US 220 near Lock Haven, the Laurel Valley Improvement Project, and the widening of US 322 in Delaware County. Other projects that were highlighted, such as the Central Susquehanna Valley Thruway, and the US 322 Potters Mills Gap project, have already been programmed.



### **Operational Improvements**

Respondents’ feedback included a desire for additional technology investment in roadway improvements such as adaptive traffic signals, ramp metering and operational improvements through travel time display on message boards. PennDOT was also urged to collaborate with online traffic information providers to provide improved detour and travel time information.



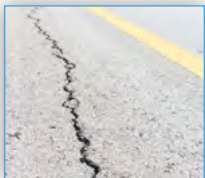
### **Passenger Rail**

According to respondents, rising energy costs make investment in this mode a vital part of our future planning strategy. The state has good service available in its southeastern region, but very little elsewhere. New station stops were noted in Paradise in Lancaster County, as well as new service desired from the Greater Scranton area and Lehigh Valley region to New York/New Jersey. Many noted the need for increased, more convenient service from Pittsburgh to points west and that the *Pennsylvanian* did not offer enough frequency of service.



**Public Transportation**

According to respondents, this is a vital mode of transportation for many Pennsylvanians, contributing to the accessibility and vitality of our urban spaces. A desire for improvements to this mode of transportation was noted, including greater frequency of service, extending routes into suburban areas, use of technology to improve the customer experience, and improving connections to other modes such as bicycle and pedestrian facilities and passenger rail service.



**Pavement Condition**

Respondents noted that this aspect of our transportation system directly impacts the most important priority – that of safety. Potholes and crumbling pavement degrades highway safety and are concerns to roadway users, including motorists and bicyclists alike. The needed durability of pavements was also raised as a concern, as was proper winter roadway maintenance.



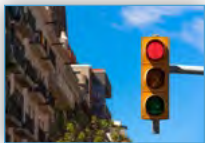
**Ports and Waterways**

Respondents noted that the state’s ports and waterways are important transportation assets that can give shippers and receivers cost-effective options while alleviating demand on the highway network.



**Rail Freight**

Pennsylvania is a national leader in recognizing the importance of a high quality rail freight network. According to respondents, the state should continue to make investments in private infrastructure where public benefits can be clearly demonstrated. More freight on rail also has the side benefit of improving the surface life of the highway network and its safety. The value of shortline railroads in connecting shippers and receivers to the national rail freight network was also emphasized.



**Technology/Energy Efficiency**

Respondents commented that the timing of traffic signals is important to improve efficiency and reduce congestion. Using technology to ease traffic flow would improve efficiency and address aggressive driving.

**Alternative Investment Scenarios – A Planning Exercise**

PennDOT executed a planning exercise consisting of four planning, or investment scenarios. The purpose of the exercise was to examine resource allocation across a variety of project types, and assess how the system would respond (e.g., pavement quality ratings, number of substandard bridges, etc.) based upon changes in resource allocations among the project types. A “preferred scenario” was not chosen.

PennDOT solicited feedback on the scenario descriptions shown in **Figure 3**. Over 2,300 respondents provided a range of comments on the planning scenarios. Responses included comments both favorable and unfavorable to the presented scenarios. Highlights from each scenario are provided in **Table 1**.



**Figure 3: Alternative Investment Scenario Definitions**



**Preservation**

Ensure that all existing modes of transportation are maintained and preserved at a high level of reliability and performance. This includes, but is not limited to, highway resurfacing, bridge maintenance/rehabilitation and the purchase of replacement transit buses.



**Expand the Modes**

Focus investments on maintaining and expanding the transit, rail and non-motorized systems, linking cities and communities. Investments could include new transit service, high-speed rail lines, and bicycle and pedestrian paths across the state.



**Technology Enhancements**

Integrate state-of-the-art technology and Intelligent Transportation Systems (ITS) to improve the operations of the transportation network. Investments could include the integration of connected and autonomous vehicles technology, traffic cameras, and other highway, transit, and passenger rail technology.



**Serve the Economic Drivers**

Emphasize improvements to multimodal strategic assets and services to ensure reliable access to the state's economic generators. This would include additional roadway capacity and last mile connections to support critical highway, rail, water, and airport facilities.

**Table 1: Public Comments on Alternative Investment Scenarios**

Planning Scenario	Illustrative Comments	
	Public Comments Received Favorable to the Scenario	Public Comments Received Unfavorable to the Scenario
Preservation	Population change has stabilized, we should focus on improving existing infrastructure	Our current transportation system, even at peak performance, still does not serve all users adequately
Expand the Modes	<p>The most vital transportation issue facing our state</p> <p>Pennsylvania must move forward on diversifying safe and accessible transportation options</p> <p>Helps us move toward an environmentally sustainable system</p> <p>Represents forward thinking and good investments</p>	<p>Our highways and bridges cannot afford to receive less emphasis. Most consumer goods travel by truck</p> <p>Less attention or funding toward pavement condition would be disastrous in our cold weather climate</p>
Technology Enhancements	<p>Technology can improve system efficiency</p> <p>Helps us do more with less and improve user satisfaction</p>	<p>Too invasive; loss of privacy</p> <p>In time the state's vehicle fleet will be "smart" enough that reliance on ITS infrastructure will not be needed</p>
Serve the Economic Drivers	<p>Represents a more balanced plan</p> <p>Would improve our state's economy</p>	<p>"Serving the economic drivers" could naturally benefit Pennsylvania as a whole, but could have negative traffic impacts for the area immediately surrounding the economic generator</p>

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# Planning Context

Demand for transportation services is primarily driven by socio-economic factors such as population growth and age composition, employment growth and occupation type, and land use patterns. Trends in these factors are summarized below as they provide the foundation for estimates of travel demand. In addition, trends in freight movement and vehicle miles traveled also are discussed.

## POPULATION TRENDS

### Historic and Projected Population Growth

With over 12.7 million people, Pennsylvania is the 6th most populous state in the nation. Pennsylvania, however, is a “slow growth” state and decennial population growth rates have been lower than national averages dating back to the 1920s. The state has not experienced double digit growth rates since that decade and while there have been brief periods of more moderate growth (such as immediately following World War II) the overall trend has been one of slow growth. To underscore this, up until 1950, Pennsylvania was the second-most populous state in the nation. By the 2000 Census, however, it ranked sixth (behind California, Texas, Florida, New York, and Illinois), a position it maintains today.

Although growth rates have been declining, Pennsylvania has experienced overall population growth, adding 421,000 persons since the 2000 Census. More recent estimates from the U.S. Census Bureau indicate that, since the 2010 Census, the state has grown by an additional 72,000 persons to a July 2013 estimate of 12.77 million.

**Table 2** provides more detailed information comparing Pennsylvania’s historic population growth with that of the nation, overall.

**Table 2: History of Population Growth in Pennsylvania and the United States, 1970-2010**

Census Year	Total Population		Percent Increase Over Previous Period		Numeric Increase over Previous Period (000s)	
	PA	US	PA	US	PA	US
1970	11,794,000	203,302,000	4%	13%	482	23,979
1980	11,864,000	226,546,000	1%	11%	70	23,244
1990	11,882,000	248,710,000	0%	10%	18	22,164
2000	12,281,000	281,422,000	3%	13%	399	32,712
2010	12,702,000	308,746,000	3%	10%	421	27,054

Source: U.S. Census Bureau



**Figure 4** depicts growth rates by decade in Pennsylvania and the nation for each decade since 1960.

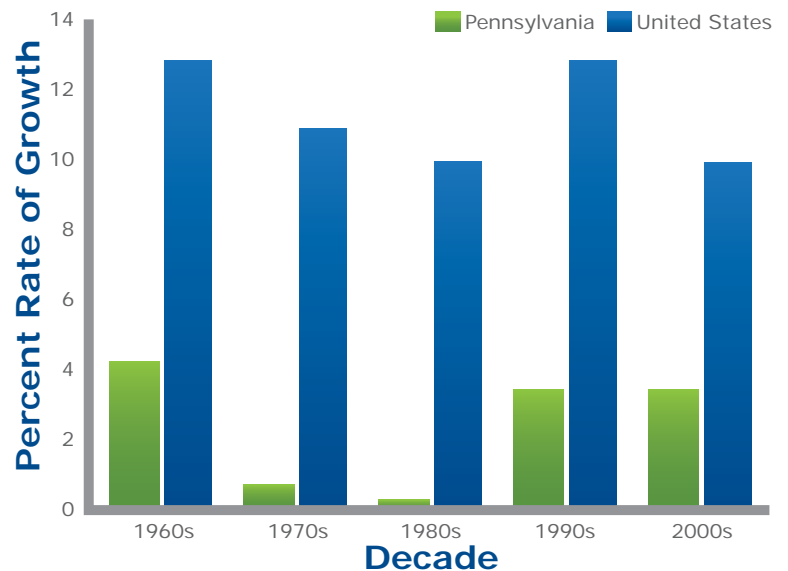
Pennsylvania’s overall population is expected to continue to experience slow to moderate growth and by 2040 will reach 14 million.<sup>1</sup>

**Regional Population Shift**

Recent (2014) estimates from the U.S. Census Bureau indicate that Pennsylvania’s population has grown by over half a million since the 2000 Decennial Census, when 12.28 million Pennsylvanians were counted. Much of this growth has occurred within the suburban Philadelphia counties of Chester and Montgomery, while the City of Philadelphia continues its reversal of a decades-long trend of population decline. (Pennsylvania’s largest city has grown by nearly 3 percent since the turn of the century, and at the 2010 Census registered its first 10-year population gain since 1950.) Other large counties within the Northeast Mega-region, such as Berks, Lancaster, Lehigh, and York counties have all added significant numbers of population since 2000. Much of the state’s population growth occurred in the eastern and southern regions, with in-migration from the urban centers of New York, Baltimore, and Washington. The growth in these counties has offset the population declines that continue to occur in much of the state’s western half, which has experienced significant declines in manufacturing employment, along with a rise in generally lower-paying service and retail jobs. This has contributed to lackluster economic growth, spurring outmigration of young adults and working age adults. In terms of rates of increase, the most significant gains have occurred in Forest, Monroe, and Pike counties.<sup>2</sup>

**Figure 5** shows the changes that have occurred in total population between 2000 and 2014. It shows “two Pennsylvanias”: the counties within the central and eastern regions (which have collectively grown by over 645,000, or 7.7 percent since 2000), and the counties in the state’s western half (which have collectively declined by nearly 140,000, or 3.5 percent over the same period).

**Figure 4: National and State Decennial Growth Rates, 1960s-2000s**

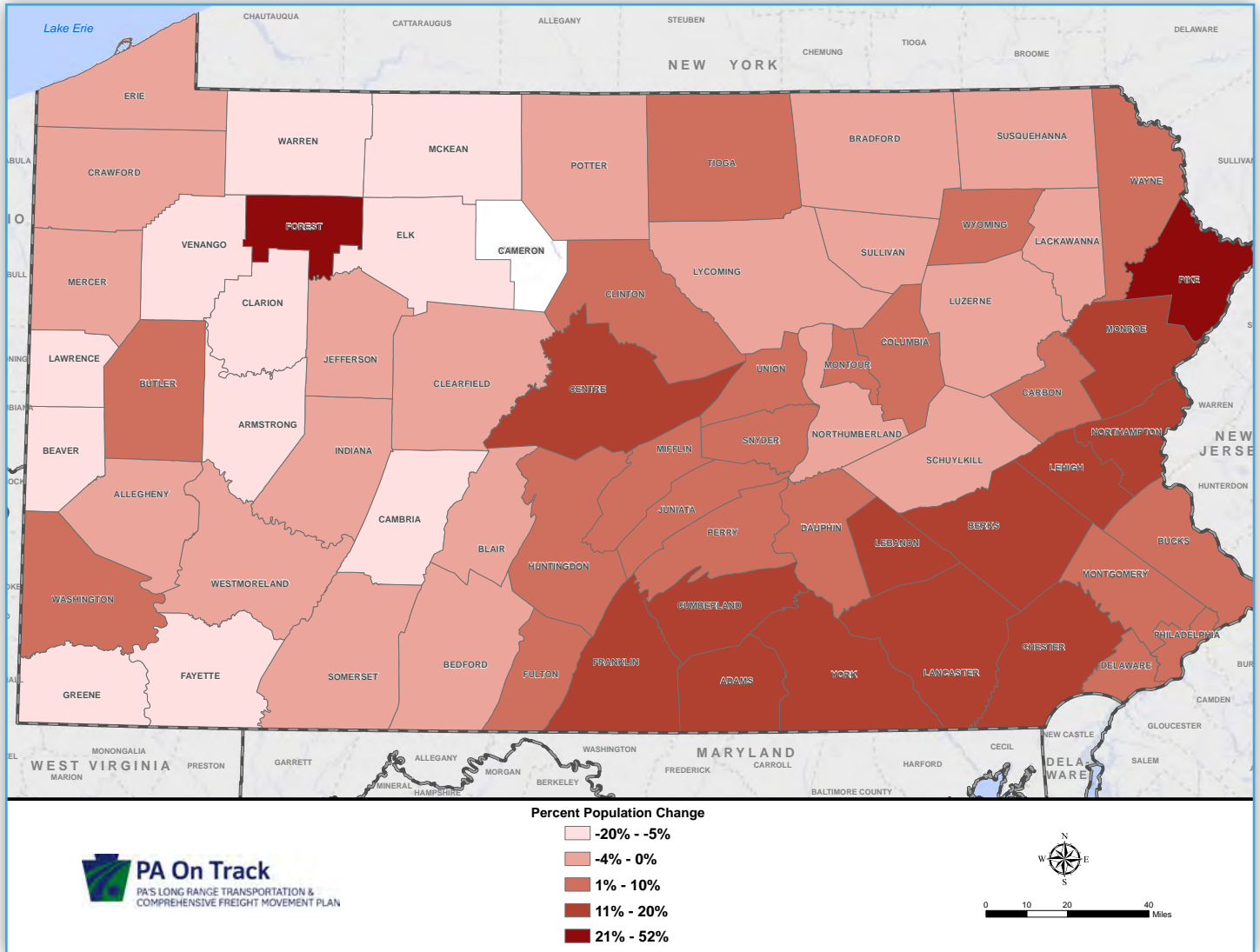


Source: U.S. Census Bureau

<sup>1</sup>Woods and Poole Economics, Inc.

<sup>2</sup>In the case of Forest County (a county of only 5,000 persons), the large population rate increases were due largely to the 2004 opening of a new state prison.

**Figure 5: Pennsylvania Change in Population by County, 2000-14**



Source: U.S. Census Bureau

### Decentralizing Population

At a municipal level, the state's population continues to decentralize, with the most densely developed urban centers (i.e., cities and boroughs) losing population to surrounding townships. Many of the urban centers reached their maximum population during the 1930s and 1940s, particularly in western Pennsylvania and in the state's anthracite belt. For example, the City of Pittsburgh and the City of Johnstown have each lost over half of their respective total populations since the 1950s. This decentralization of population (and employment) has been an ongoing trend.

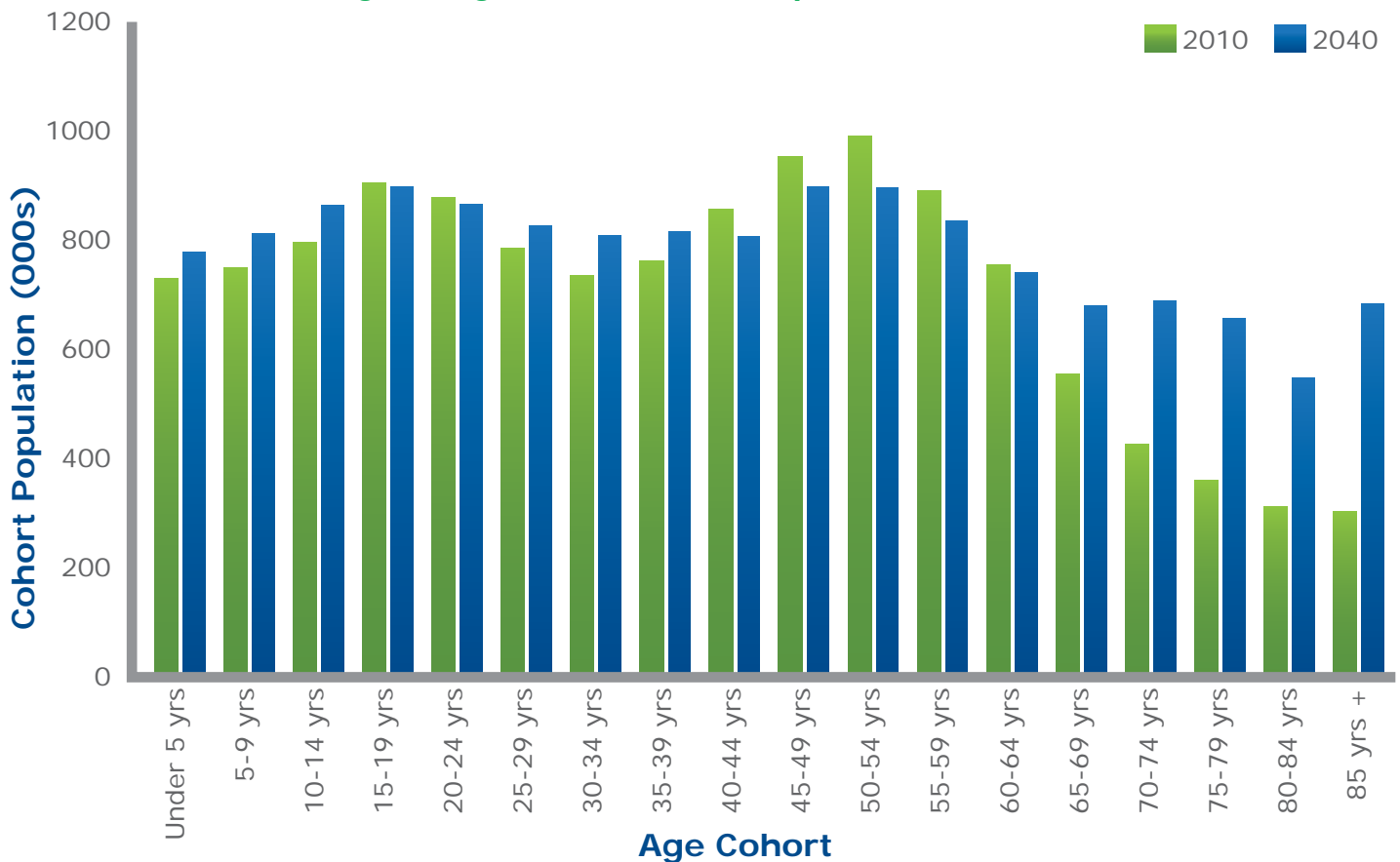
Pennsylvania has the nation's largest number of people living in rural counties. According to the Center for Rural Pennsylvania, a rural county has a population density below the state average, and 48 of Pennsylvania's 67 counties are considered rural. Rural counties contain a total population of 3.4 million or 27 percent of the state's population. The rural population rate nationally is similar, at 26 percent. Despite the state's rural character, Pennsylvania has 14 Metropolitan Statistical Areas (core urban area of 50,000 or more population) and 21 Micropolitan Statistical Areas (core city or town with a population of between 10,000 and 49,999). Micropolitan Statistical Areas are still significant employment centers in Pennsylvania and, collectively, their population is growing faster than that of the Metropolitan Statistical Areas.

### Aging Population

2010 Census data also show that, for the first time, Pennsylvania’s median age is now above 40, at 40.3 years, one of the highest median ages in the nation. Pennsylvania also ranks fourth among all states with 16 percent of its population older than age 65.<sup>3</sup> In some Pennsylvania counties, the share of mature population is as high as one in five. The state also recently passed a demographic milestone, with over 2 million of its residents now older than age 65. By 2040, the state’s share of population age 65 and older is expected to increase from 16 percent today to over 23 percent, or 3.3 million persons (**Figure 6**). This demographic group is typically more dependent on bicycling, walking, and public transportation. The combination of a large mature and a large rural population makes the delivery of certain transportation services in many areas of the state, such as public transportation, more challenging.

In 2010, the first of the baby boomer generation began turning 65. The state is at the very front end of a growing demographic tidal wave, as those born during the period 1945 to 1964 begin to retire. While age 65 is an accepted marker for more significant physiological changes affecting vision, hearing, reaction time, and other functions critical to driving ability, for some people the decline can begin at an earlier age. For purposes of planning for future public transportation services, highway design, signing, road markings and related highway and traffic engineering issues (including pedestrian safety), PA On Track considers the significant increase in the proportion of the state’s population that is 55 and older and the changing needs and characteristics of transportation users in coming years. Most of the investments made to meet senior transportation users will benefit younger users as well. There are currently nearly 1.5 million licensed drivers aged 65 and older in the state, comprising 17 percent of Pennsylvania’s driving population. As shown in Figure 6, given the increases in longevity, through 2040 no age group will grow more significantly than that of those aged 65+ while the 85+ population is expected to more than double.

**Figure 6: Age Distribution of Pennsylvanians, 2010, 2040**



Source: Woods & Poole Economics, Inc

<sup>3</sup>The Center for Rural Pennsylvania

## EMPLOYMENT AND COMMUTING PATTERN TRENDS

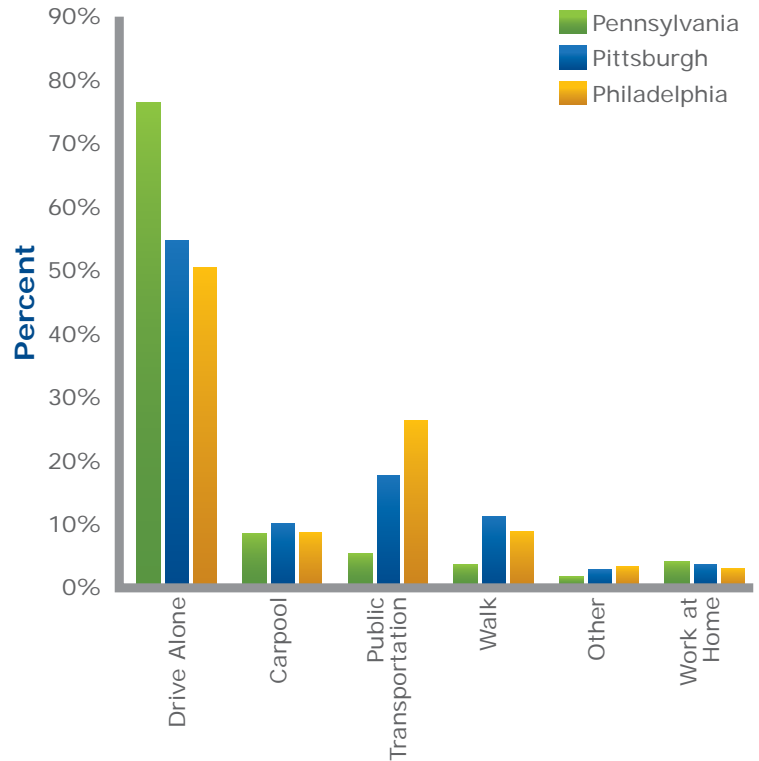
Today, total employment in Pennsylvania is approximately 5.85 million. According to the U.S. Census Bureau, the average travel time to work is 26 minutes for Pennsylvania workers, 76 percent of whom drive alone to work. The remaining 24 percent of workers carpool, use public transit, walk, bicycle, telecommute, or use another means of transportation. Pennsylvania currently ranks 9th in the nation in the share of its workers who use public transportation as a means of journey to work, and 11th in the share who walk to work. The share of Pennsylvania workers who carpool to work has now dropped below 10 percent, ranking 40th in the U.S. Journey to work trips nationally constitute approximately 16 percent of all travel, a rate that is attributable to significant growth in other activities (e.g., freight movement, family/personal business, etc.) rather than diminished work travel.

**Figure 7** depicts mode of journey to work for Pennsylvania workers, compared to workers specifically from Pittsburgh and Philadelphia. The figure contrasts the reliance on public transportation and pedestrian travel in the state’s urban areas compared to the rest of Pennsylvania.

Travel time to work has increased for all workers nationally. In Pennsylvania, the rate of change has been greater than that of the nation as a whole. As shown in **Figure 8**, the most recent American Community Survey shows that Pennsylvania workers have, on average, longer commute times than their counterparts nationally. Those who drive alone to work average 25.1 minute commute times, those who carpool average 28.1 minutes per commute, and those who use public transportation average 45 minutes.

In Pennsylvania, the average distance from home to work is approximately 12 miles. While almost 75 percent of the state’s workers are employed within their county of residence, nearly 25 percent leave their county of residence for employment, underscoring transportation’s importance in linking workers with jobs.<sup>4</sup> Travel times to work have increased since 1990 (**Figure 8**). Employment locations themselves have shifted from downtown, urban settings, to suburban and exurban areas. This phenomenon has further supported the decentralization of our urban centers and has contributed to what has been referred to as “extreme” commutes, or those longer than 60 minutes. These development patterns typically create new, suburb-to-suburb commuting patterns that are difficult for providers of public transportation to serve effectively.

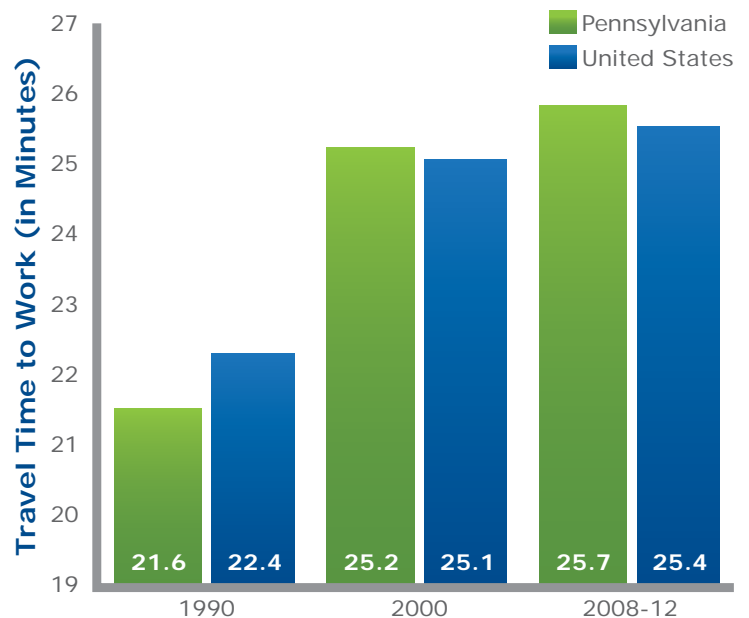
**Figure 7: Mode of Commuting to Work, Pennsylvania, Pittsburgh, and Philadelphia, 2009-13**



**Mode of Transportation to Work**

Source: American Community Survey, 2009-13

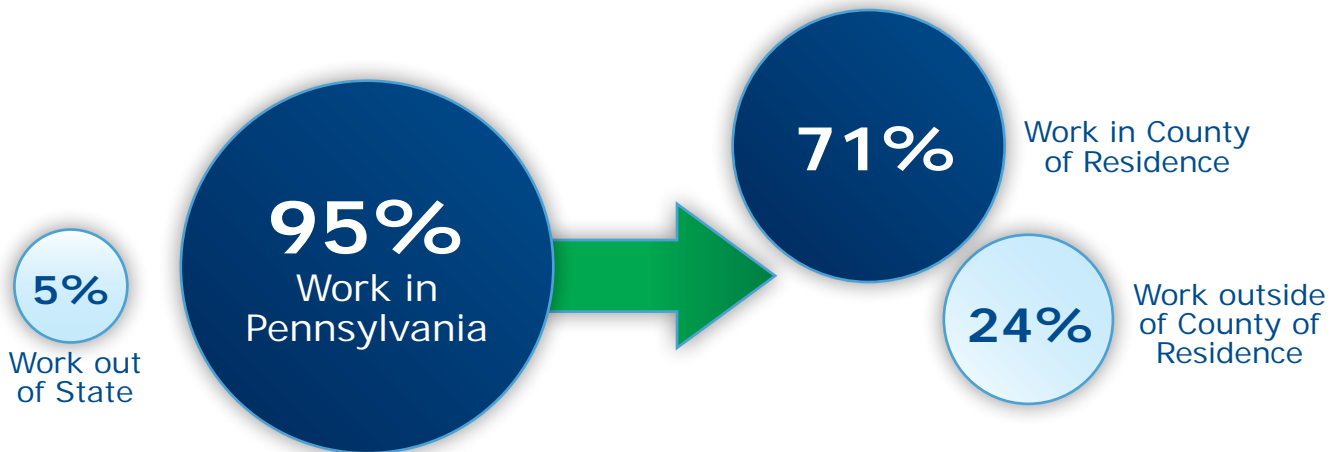
**Figure 8: Travel Time to Work, Pennsylvania and the Nation, 1990, 2000, 2008-12**



Source: U.S. Census; American Community Survey, 2008-12

<sup>4</sup>U.S. Census Bureau, 2011 American Community Survey

**Figure 9: Pennsylvanians' Work Location, 2008-12**



Source: U.S. Census Bureau, 2009-13 American Community Survey

As shown in **Figure 10**, household access to a vehicle has increased since the 2000 Census. The most recent data from the American Community Survey indicated that approximately 95 percent of all Pennsylvania households now have access to a vehicle. Improved engineering of cars and light trucks in recent years has led to vehicles that last longer, making more serviceable units available to lower income populations.

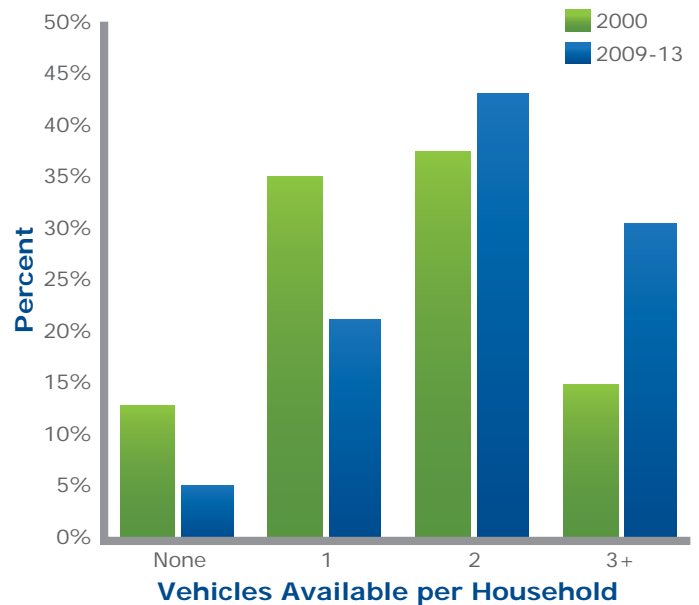
**LAND USE TRENDS AND ISSUES**

Since 1968, Pennsylvania’s municipalities have had the authority to regulate and manage their land use. Pennsylvania has 2,561 units of local government, or one unit for every 4,792 persons (**Figure 11**). Only Illinois and Minnesota have more general purpose government entities. According to the Governor’s Center for Local Government Services, 80 percent of Pennsylvania’s municipalities govern fewer than 5,000 people, while 60 percent govern fewer than 2,500. This fragmentation of land use management in Pennsylvania presents a significant challenge to the efficient maintenance and operation of the state’s transportation system.

The management of land use has significant implications for transportation planning as described below.

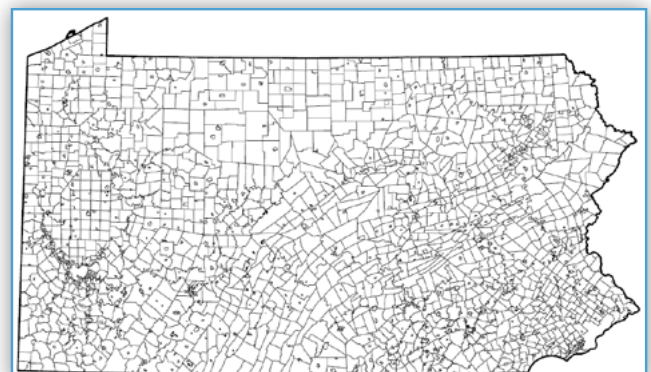
- Comprehensive Planning and Land Use Ordinances** — The absence of local-level land use plans and ordinances in many municipalities reduces the ability to ensure that development reflects local priorities and preserves the capacity and viability of existing and future transportation infrastructure. As of 2010, approximately 66 percent of municipalities had an adopted comprehensive plan, 63 percent had an adopted zoning ordinance, and 61 percent had an adopted subdivision ordinance. As required by state law, every county has an adopted comprehensive plan.

**Figure 10: Pennsylvania Vehicles Available per Household, 2000, 2013**



Source: U.S. Census; American Community Survey, 2009-13

**Figure 11: Pennsylvania has 2,561 Units of Local Government**





- **Management Tools** — The enabling legislation for managing land use in Pennsylvania offers many tools and techniques for municipal officials; however, the requirements can be onerous and the tools, therefore, are not used to their full extent.
- **Inefficient Development Patterns** — A lack of comprehensive planning and land use management ordinances can result in inefficient development patterns that are not conducive to transportation safety and mobility.
- **Cumulative Impacts** — Developments of regional significance may be approved without analysis of the cumulative impacts on the transportation network across municipal boundaries. This is especially a concern as subsequent developments may be approved individually without considering the cumulative total impact of all developments in the area.

## FREIGHT TRENDS AND IMPACTS

Pennsylvania is truly the “Keystone State” with regard to freight movement within the northeastern United States. In 2011, Pennsylvania’s multimodal transportation system moved nearly 1.2 billion tons of goods valued at over \$1.6 trillion. The 1.2 billion tons and \$1.6 trillion in freight that moved within Pennsylvania in 2011 represents approximately 7 percent of the tons and 9 percent of the value of all goods moved in the U.S. By 2040 Pennsylvania’s freight volume is projected to exceed 2 billion tons with a value of \$3.7 trillion. **Table 3** summarizes total freight traffic by mode in Pennsylvania and includes all movements (e.g., into, out of, within, and through).

In addition to increases in overall freight, the *composition* of the state’s freight is also expected to change through 2040. **Table 4** depicts the top commodities moving through Pennsylvania in 2011 and 2040.

It is worthwhile to consider freight trends because it impacts the economy, demographics, infrastructure, the environment, and technology.

**Table 3: Pennsylvania Total Freight Traffic by Mode (2011 and 2040)**

Mode	2011 Tons (Millions)		2040 Tons (Millions)		Mode	2011 Value (Billions)		2040 Value (Billions)	
	Total	%	Total	%		Total	%	Total	%
Truck	867.7	75.8%	1,495.9	79.9%	Truck	\$1,334.8	81.5%	\$3,173.6	85.6%
Rail	209.0	18.2%	294.3	15.7%	Rail	\$249.9	15.3%	\$443.0	12.0%
Water	65.8	5.7%	78.5	4.2%	Water	\$26.1	1.6%	\$25.2	0.7%
Air	0.2	0.0%	0.4	0.0%	Air	\$25.5	1.6%	\$62.8	1.7%
Other	2.8	0.2%	3.1	0.2%	Other	\$1.6	0.1%	\$1.8	0.0%
<b>Total</b>	<b>1,145.5</b>	<b>100.0%</b>	<b>1,872.2</b>	<b>100.0%</b>	<b>Total</b>	<b>\$1,637.9</b>	<b>100.0%</b>	<b>\$3,706.4</b>	<b>100.0%</b>

Source: CDM Smith Analysis of PA Transearch Data, 2011

**Table 4: Top Commodities Being Moved (2011 and 2040)**

Commodity	2011 Tons (Millions)	Commodity	2040 Tons (Millions)
Petroleum Refining Products	108.5	Broken Stone or Riprap	171.3
Broken Stone or Riprap	106.9	Bituminous Coal	94.8
Bituminous Coal	102.3	Petroleum Refining Products	91.0
Gravel or Sand	28.2	Gravel or Sand	47.2
Misc. Industrial Organic Chemicals	26.4	Misc. Industrial Organic Chemicals	38.4
Primary Iron or Steel Products	23.5	Misc. Waste or Scrap	36.7
Asphalt Paving Blocks	22.7	Primary Iron or Steel Products	34.8
Grain	19.2	Concrete Products	30.3
Dairy Farm Products	17.7	Grain	28.1
Liquefied Gases, Coal or Petroleum	17.1	Paper Waste or Scrap	27.2

Source: CDM Smith Analysis of PA Transearch Data, 2011



## Economic

A number of existing and projected economic trends have the potential to impact freight movement in Pennsylvania. One example is the shift of manufacturing back to North America. After the 1980s, a time when manufacturing dominated the U.S. economy, manufacturing growth began to move from the U.S. to emerging developing countries such as China. By 2005, 68 percent of the United States' GDP was service-oriented. Due to multiple factors, including a rise in labor costs in these developing countries, manufacturing is shifting back to the Americas (U.S., Canada, Mexico, South America, and Central America)—a phenomenon often referred to as “near-shoring” or “re-shoring.” Just as the supply chains and freight flows shifted with off-shoring, the supply chains and freight flows will also adjust with the re-emergence of manufacturing in the Americas. In addition, as the economy rebounds and manufacturing returns, volumes of traffic of all modes along international routes and roadways providing access to manufacturing facilities will increase. As businesses continue to source and sell products and materials globally, shippers and carriers will seek the most cost-efficient methods to move goods.

Trends related to the top export and production sectors in the U.S. will also impact Pennsylvania freight movement. For example, food production is one of the ten fastest growing U.S. export sectors and Pennsylvania currently has 2,300 food processing companies employing over 66,800 workers. The U.S. Energy Information Agency predicted that the U.S. would be the largest producer of petroleum products and natural gas in the world. According to the Pennsylvania Department of Community and Economic Development, the presence of the Marcellus Shale formation in Pennsylvania (which is projected to eventually produce 17.5 billion cubic feet of natural gas per day in the future) will impact various aspects of freight movement in the state. In addition, crude oil extracted from the Bakken formations in North Dakota and the prairie provinces of Canada is shipped via rail lines through the U.S. to East Coast ports, including refineries in Philadelphia. Also, a proposed new multi-billion dollar petrochemical plant (also known as the ethane “cracker plant”) in Beaver County will create even more high-wage jobs in the industry, bolster the region's manufacturing industry, and induce needed investments in rail, inland waterway, and highway and bridge infrastructure.

The Panama Canal is undergoing a \$5.25 billion expansion to accommodate more and larger ships. Currently expected to be completed in 2016, the expansion will have an impact on demand for U.S. ports, rail service, and highways. Pennsylvania will experience transportation impacts as ships on Panama Canal routes are replaced with larger vessels over time. Out of state ports, such as those in New York/New Jersey, Baltimore, and Virginia, are also currently used by Pennsylvania businesses and industries and will experience increases in shipments, which will result in additional truck

and rail traffic impacting Pennsylvania. In sum, rail and water infrastructure serving the Panama Canal trade routes will need to be monitored to determine if shippers and carriers will shift their supply chains to take advantage of this improved international routing option.

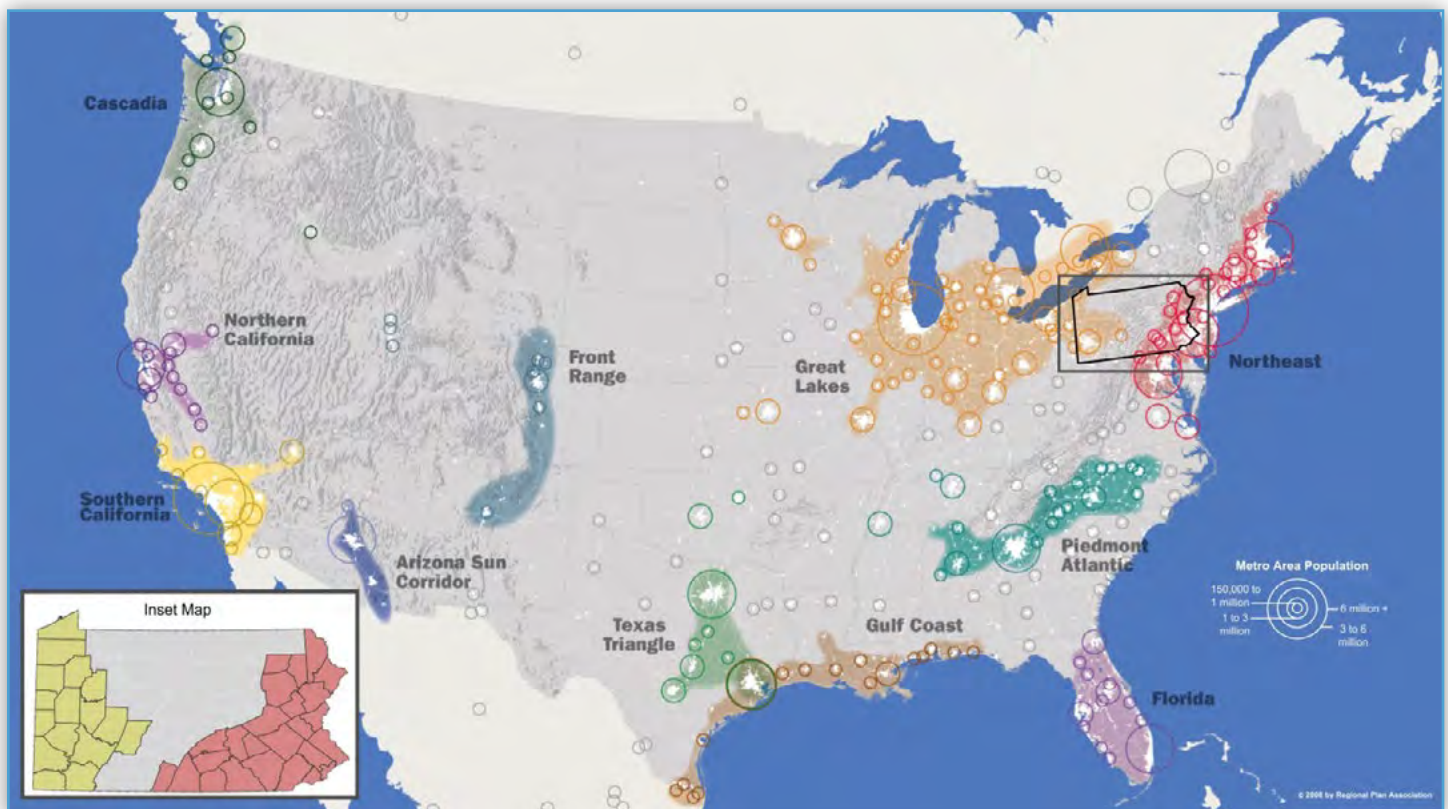
Pennsylvania's position on the Great Lakes provides strategic access to the world's largest inland waterway system. The connecting waterways of the Great Lakes has been an important trade route for more than three centuries, connecting Pennsylvania with shippers and receivers in the Midwest and Canada. Principal cargoes shipped on the Great Lakes-St. Lawrence Seaway are iron ore and coal. The former is shipped from Minnesota and Michigan's Upper Peninsula and eastern Canada into western Pennsylvania, while the latter is often backhaul cargo to utilities and factories in the upper Great Lakes states and Canada.

Other economic trends that may have a broad impact on freight movement include: fuel price volatility, fuel options (including natural gas), impacts on modal productivity (related to work hour restrictions and other regulations), as well as the potential outcomes of FHWA's Comprehensive Truck Size and Weight Study.

### Demographic

Demographers have identified 11 mega-regions across the U.S. These mega-regions account for only 30 percent of the nation's geographical area but account for 77 percent of both population and employment, 81 percent of gross regional product, and 92 percent of Fortune 500 Companies' revenue (all 2008). Pennsylvania is one of only two states (Missouri being the other) that is part of two of these mega-regions. The Great Lakes mega-region consists of 13 metropolitan centers in nine states. The Northeast mega-region (also called "Megalopolis" by demographers) consists of six metropolitan centers in nine states and reaches from southern Maine to Richmond, Virginia. Mega-regions in the U.S. have been identified by the Regional Plan Association in its "America 2050: A Prospectus." The regions are illustrated in **Figure 12**.

**Figure 12: U.S. Mega-Regions**



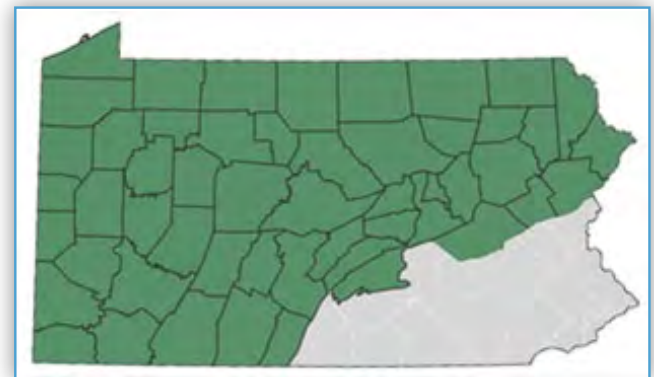
Source: Regional Plan Association



With shifts in population to mega-regions, Pennsylvania will experience increases in freight flows as goods move within and between these areas. With these large mega-regions consisting of similar agglomerations of related economic activity, transportation links, and cultural relationships, they represent important frameworks for planning for the challenges inherent in a global economy. Moreover, nearly all of Pennsylvania's MPO regions are located within one of the defined megaregions, and can be important actors within a mega-regional framework, given their ongoing role in planning for transportation, land use, infrastructure, and the environment.

**Figure 13: Pennsylvania's Appalachian Counties**

Another large region of particular concern in Pennsylvania includes that of Appalachia (**Figure 13**). This region stretches from northern Mississippi to upstate New York, and includes 52 of Pennsylvania's 67 counties. The Appalachian region is characterized by rugged topography and is typically more isolated from the national transportation network. This fact was recognized by Congress with the formation of the Appalachian Regional Commission (ARC) in 1965, which offers funding for economic development projects within the region. This has led to the identification of and funding for the Appalachian Development Highway System (ADHS), and funds for an Access Road program to better link businesses, communities, and residents to the ADHS and to other key parts of the Appalachian region's transportation network.



Source: ARC

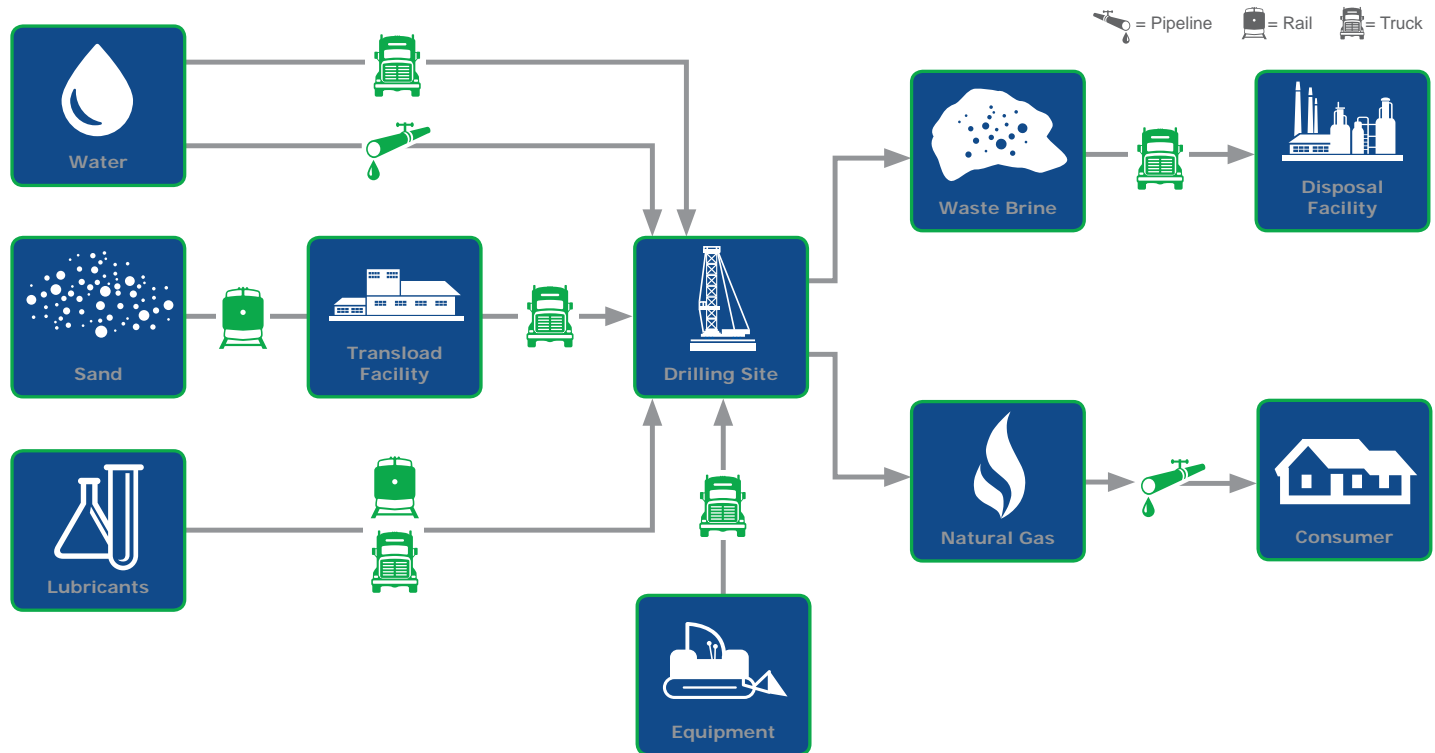
## Infrastructure

Pennsylvania has numerous weight-restricted bridges in need of repair. PennDOT has started to address these issues with new funding and pilot programs, such as the Accelerated Bridge Program and newer initiatives such as the Rapid Bridge Replacement project. Pennsylvania struggles with pavement damage and problems associated with small bridges and culverts. The state's climate and geology also presents a harsh environment for bridges, with more salt, moisture, and freeze/thaw cycles. Pennsylvania is also experiencing growth in over-size and over-weight (OS/OW) cargo volume, due in part to the increase in energy related industries such as wind turbines and oil and gas extraction as well as agricultural equipment. In addition, it is possible that the findings from FHWA's Truck Size and Weight Study may increase pressure to adopt higher weight and longer combination vehicles standards. The result of heavier loads has the potential to increase the impact to Pennsylvania's infrastructure along the routes used. The lack of a fully developed pipeline network in the state has also forced shippers to rely more on motor carriers and freight rail.

PennDOT's 5-year goal is to reduce the miles of roadway with a poor International Roughness Index (IRI) rating to 1.5 percent of Interstate highways and 5 percent of non-Interstate National Highway System (NHS) highways, and to maintain current IRI conditions on the remainder of the highway network. The IRI is a measure of highway roughness, with lower numbers indicating smoother pavements. PennDOT also measures roadway performance through an Overall Pavement Index (OPI), which takes both roughness and pavement distress into account. The OPI index includes IRI ratings as well as other information collected through PennDOT's pavements programs to result in a more comprehensive index for comparison purposes.

As freight volumes and highway congestion continue to grow, shippers and carriers will expand their use of alternative supply chain strategies such as transloading. This will result in an increased demand for rail intermodal facilities and new warehousing, and is illustrated in the **Figure 14**, which documents the role of a transloading facility in the natural gas supply chain.

Figure 14: Natural Gas Supply Chain



Source: CDM Smith, Inc.

Typically, the infrastructure issues of Class I railroads vary significantly from those of Class II and Class III railroads. Class I railroad needs are related to direct capital investments to line capacity needs, such as siding capacity and improved signal technology, clearance restrictions on intermodal corridors (double stacking), and intermodal and classification facilities.

Class II and III railroad needs in Pennsylvania include:

- **Track (286k-compatible) and bridge rehabilitation** – track and bridges need to be upgraded in order to accommodate 286,000-pound rail cars.
- **Access to Marcellus and Utica Shale extraction locations, and the construction or expansion of terminal or yard facilities** – this is an issue with the emergence of the natural gas industry. (Moreover, since pipeline development is not keeping pace with resource extraction, there is a higher demand on both highway and rail to provide access and connection to energy related facilities.)
- **New or improved rail access** – many types of energy producers, including coal, oil, gas and wind have expressed interest and need for new or improved rail access.
- **Reactivation of service/rail lines** – this may conflict with residential or commercial land uses that have developed over time.
- **Sidings and rail service to major employers** – many employers in Pennsylvania could not remain viable without a rail option.

In addition to roadway and trucking related infrastructure, Pennsylvania is also connected to three U.S. water transportation systems, the Great Lakes (Marine Highway M-71/77, M-75), inland waterways (the Ohio River system Marine Highway M-70), and the East Coast Ocean systems (Marine Highway, M-95). A channel dredging project is currently underway in the Delaware River which will deepen it to 45 feet from its entrance at Delaware Bay to the Benjamin Franklin Bridge. This project will be completed in 2017 and will enable larger ships to transit the channel and is estimated to yield \$13 million in net annual economic benefits. The deepening will also create opportunities for further upgrades at Philadelphia area ports.



The state's locks and dams, constructed more than 50 years ago, are in varying states of repair. The Port of Pittsburgh Commission reports that of the three sets of locks and dams on the Ohio River, two are in very poor condition. Of the six sets on the Monongahela River, two are in poor condition. Of the eight sets on the Allegheny River, one is in very poor condition. The lock and dam systems are critical to the movement of waterborne freight, and to the health of the transportation system overall. A typical barge tow can carry the same load as 16 rail cars or 70 trucks, making their ongoing operation a vital part of Pennsylvania's transportation system. The U.S. Army Corps of Engineers is responsible for keeping the network of locks and dams operational.

Pennsylvania's commercial service airports are an integral part of a massive logistics and distribution system that provide efficient coordination between wings and wheels. Goods are commonly shipped by truck to and from airports to local sorting centers throughout the state. Once sorted locally, a fleet of express vehicles perform final delivery services to businesses and residences. The express vehicles also perform initial pick-up services from drop boxes, business, and residences to the local sorting centers.

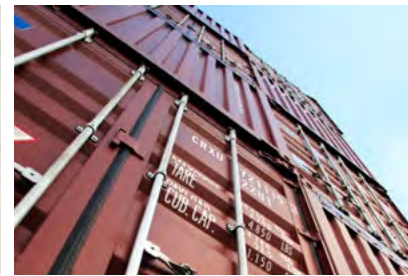
Movement of goods by air freight occurs at Pennsylvania's commercial service airports. Service is provided by air cargo airlines that use passenger type airplanes specifically configured to carry air freight for scheduled service. Some smaller commercial service airports are served by air cargo airlines that use small feeder aircraft for scheduled air freight service. Air freight service is also provided by scheduled passenger airlines, with freight carried as belly cargo in the baggage compartments of passenger airplanes. The amount and size of air freight carried by scheduled airlines is dictated by the type of passenger airplanes used. Regional jet and commuter airplanes have substantially less capacity to carry air freight than larger passenger airplanes.

A connecting hub for passengers, Philadelphia International is also a domestic and international hub for air freight where goods arriving from one airport are unloaded, sorted, and loaded on another airplane bound for the final destination. Pittsburgh, Harrisburg, and Lehigh Valley International Airports are used by air freight companies as local air freight hubs where goods are transferred between large passenger airplanes and small feeder aircraft.

### Environmental

The main environmental impact associated with freight movement is air quality. As of the summer of 2014, Pennsylvania had nearly 20 counties in non-attainment status for critical pollutants (although it should be noted that all counties currently in nonattainment for one or more NAAQS<sup>5</sup> are all projected to be in attainment within a few years). Freight transport equipment is one contributor to air pollution. Efficient operations (including idling limits) and congestion reduction

<sup>5</sup>National Ambient Air Quality Standards



are important factors to improve air quality. Land use controls can be one way to reduce congestion and improve air quality by reducing sprawl and slowing the growth in truck vehicle miles traveled. Pennsylvania's growing natural gas industry offers a potential fuel source with lower emissions per vehicle miles traveled which can also improve air quality.

The Public and Private Partnerships for Transportation Act, which authorized public-private partnerships (P3) in Pennsylvania, has resulted in a project that would involve the Commonwealth working with a private partner in developing compressed natural gas (CNG) fueling stations at public transit agencies statewide, that would also provide public access to its facilities. PennDOT would receive a portion of the fuel sales revenue, with the money being returned to transit agencies to assist with future capital projects.

Another environmental impact associated with freight movement is the accidental release of materials. The transport of hazardous materials presents risks such as toxicity, flammability, reactivity, and corrosiveness. Rollover and derailment are the principal causes of failure. In addition to causing deaths and injuries, accidental releases of hazardous materials may contaminate soils, surface waters, and groundwater, which can threaten both the human and the natural environments.

## Technology

Three trends related to technology that have the potential to impact freight movement in Pennsylvania include the increase in e-commerce, handheld technology, and connected and autonomous vehicles.

In order to meet demand for next day delivery, it is anticipated that more warehouses and distribution centers will be needed to allow goods to be closer to customers. This could potentially shift freight traffic to lower functional class roadways and reduce the pressure on longer-distance next day air cargo. The impacts of e-commerce may also increase traffic on local networks and potentially reduce growth in larger truck traffic serving traditional retail establishments.

With the increased use of hand-held devices, there is a rise in expectations from the public, elected officials, truck drivers, shippers, and carriers for greater customer service. Many expect detailed information related to congestion, construction, crashes, vehicle access, and even truck parking availability to be available to them in real time.

There is an increased interest in connected and autonomous vehicles with a number of studies currently underway in various states. PennDOT commissioned Carnegie Mellon University to assess the implications of connected and autonomous vehicles on the management and operation of the state's surface transportation system. The study advises PennDOT to consider this technology in new investment decisions to avoid interference with vehicle to infrastructure (V2I) deployment. As technology advances, real time data will be able to be transmitted between vehicles, roadside units and traffic management centers.

## TRAVEL DEMAND

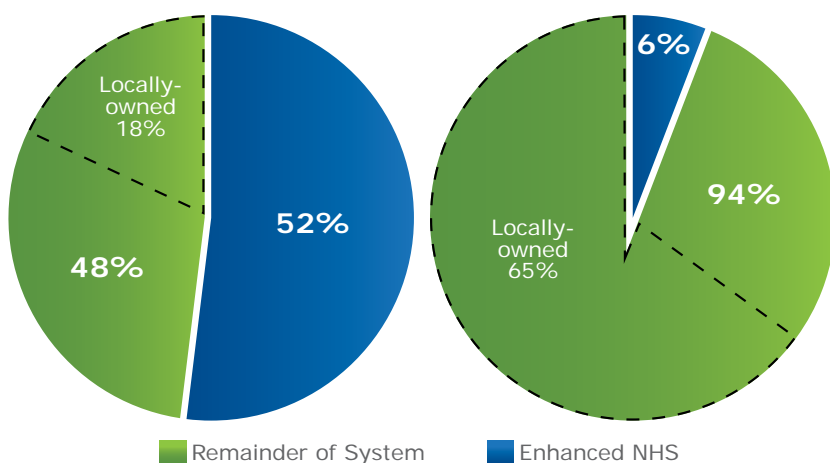
Pennsylvania's roadway network supports approximately 270 million miles of travel on a daily basis. In recent years, overall travel demand within Pennsylvania has been declining, due to several factors. One includes a growing share of mature population, which tends to drive less. Another factor has been the national recession, which began in December 2007 and continued to June 2009. Its effects are still being reflected in the softening demand for vehicular travel, overall, as shown in **Figure 15**. In the five-year period ending 2013, overall daily vehicle miles of travel (or DVMT) has declined by nearly 8 percent.

Pennsylvania's interstates accommodate the most vehicular travel, accounting for nearly a quarter of all miles traveled, followed by "Other Principal Arterials." Together, (along with "Other Freeway") these roadways comprise the Enhanced National Highway System (NHS) network, and accommodate nearly 143 million vehicle miles of travel, or 52 percent of all demand for travel within Pennsylvania. The mileage of this network comprises only 6 percent of the state's entire roadway network, further underscoring the importance of these strategic networks in supporting the state's mobility needs.

**Figure 16** illustrates the percent of travel and percent of mileage on the "Enhanced NHS" system and the remaining system for the year 2012. The figure also graphically shows the extent of miles and travel on the system owned by local (municipal) government within Pennsylvania.

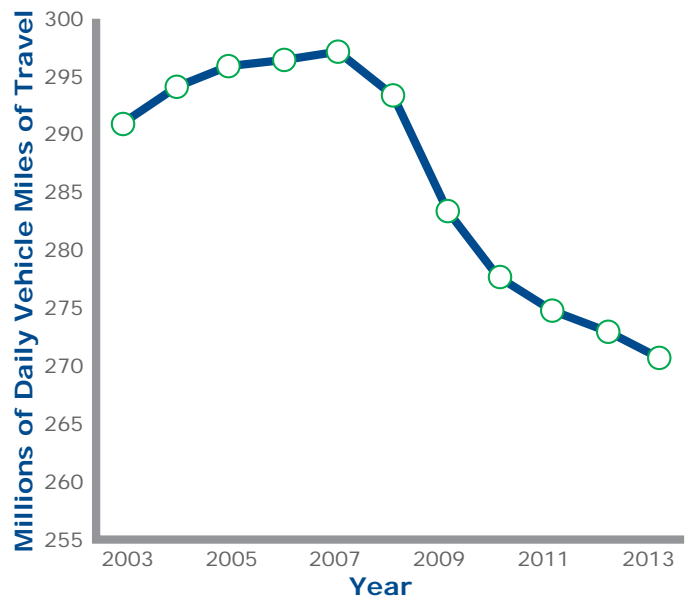
The passage of the federal surface transportation act of MAP-21 in 2012 introduced several changes to statewide transportation planning as it related to the structure of funding programs. One element of the new law created the National Highway Performance Program (or NHPP) through the consolidation of several programs. As a result of this change, highway and bridge facilities that are not on the National Highway System (or approximately two-thirds of the state's share of the Federal-aid system), are not eligible, and instead must be funded through the Surface Transportation Program (STP) program, which by default must now fund a greater variety of project types, with no proportionate increase in funding.

**Figure 16: Travel (left) and Mileage (right) on the "Enhanced NHS" and Remaining System (2012)**



Source: PennDOT Bureau of Planning and Research

**Figure 15: Daily Vehicle Miles of Travel, 2003-13**



Source: PennDOT Bureau of Planning and Research

The role of locally-owned roadways should not be understated, as these roadways accommodate over 47 million vehicle miles of travel on a daily basis, or 18 percent of the overall state total. These roadways are also often commonly part of the "first and last mile" for shippers and carriers, and thus an important component in facilitating the movement of freight. The importance of local roadways has been identified by FHWA as an area for improved awareness, and PennDOT has completed much work in recent years with its partners in obtaining more information regarding the extent of this network. This importance was recognized and validated by an increased investment in the local system as part of Act 89.





## Multimodal Investment Needs

PA On Track presents needed investments in Pennsylvania's transportation system, as shown in **Table 5**, through the planning horizon year of 2040. The following sections outline the investment needs in each of the major transportation modes of Pennsylvania's transportation system.

### ROADWAYS AND BRIDGES

Pennsylvania ranks fifth in the nation in the size of its state-owned highway network with 41,166 linear miles of roadway and more than 25,000 bridges. Approximately half of the Commonwealth's transportation budget is dedicated to these assets.

#### Roadways and Appurtenances

The International Roughness Index (IRI) is a measure of highway roughness, with lower numbers indicating smoother pavements. In 2014, Pennsylvania's 1,868-mile network of interstate highways carried 25 percent of all the state's vehicular traffic on only 1.6 percent of the state's total roadway network. As a unit, interstate highways recorded the lowest (best) IRI ratings, successively followed by lower-order roadways, such as National Highway System (NHS) and non-NHS roadways. Based on IRI values, the interstates can be classified as being in "excellent" condition, while the other roadway networks are rated as "good."

However, approximately 6,800 roadway miles are rated as being in "poor" condition. The majority of Pennsylvania's pavement structure have exceeded its design life and there are significant reconstruction and rehabilitation needs. A comprehensive asset management system would include the right mix of pavement preservation and reconstruction projects. The result is that subsequent preservation treatments would be more effective and last longer. PennDOT is working on an asset management plan, which is expected to improve pavement conditions over time.

**Table 5: Summary of Pennsylvania’s Transportation Infrastructure and Services**



**Roadways**

- 39,787 linear miles of state-owned roadway
- 77,988 linear miles of locally-owned roadway



**Bridges**

- 25,000 state-owned bridges greater than 8 feet in length
- 6,400 locally-owned bridges greater than 20 feet in length
- 4,300 locally-owned bridges between 8 and 20 feet in length<sup>6</sup>



**Appurtenances**

- 14,000+ traffic signals (all but a few of these are locally-owned)
- 5,531 culverts
- 12 roadway tunnels
- Numerous retaining walls, signs, guiderails, intelligent transportation systems



**Public Transportation**

- 36 urban and fixed-route systems
- 58 shared-ride/demand response operators



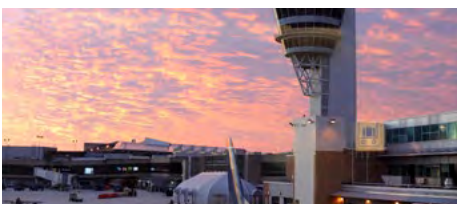
**Passenger Rail**

- 120 Amtrak trains daily
- 13 SEPTA commuter rail lines serving 154 stations



**Freight Rail**

- Over 5,095 miles of track
- 4 Class I freight railroads
- 2 Class II freight railroads
- 34 Class III (Short Line) railroads
- 26 switching or terminal railroads



**Aviation**

- 7 major airports
- 134 public use airports



**Ports and Waterways**

- 3 major ports (Philadelphia, Pittsburgh, Erie)



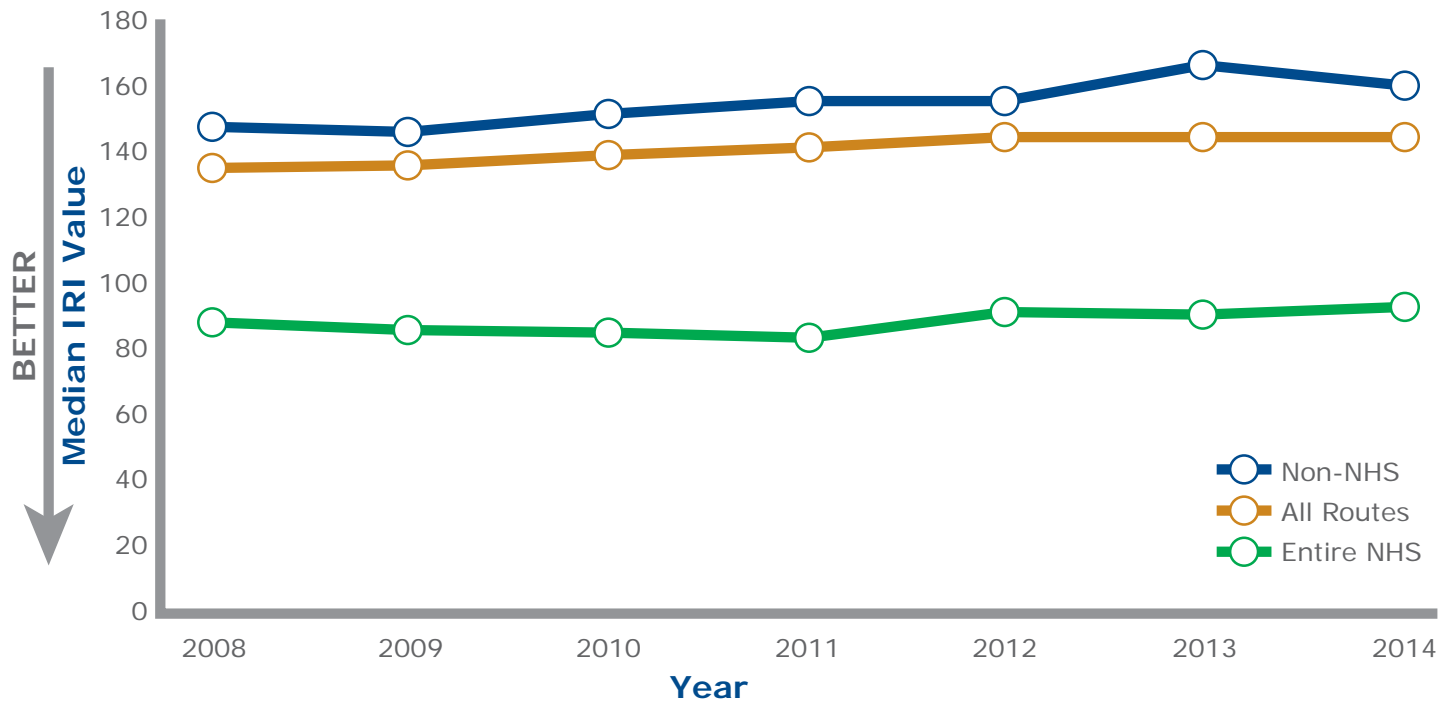
**Bicycle and Pedestrian**

- All roads except interstates and expressways are available to pedestrians and bicyclists
- 2,300+ mile BicyclePA network
- 3,700+ miles of designated bicycle trails
- Sidewalk systems

<sup>6</sup>TAC Study, Financial Needs of Counties and Municipalities for Highways and Bridges (2011)

**Figure 17** shows changes in IRI values across the state’s Business Plan Networks. PennDOT’s 5-year goal is to reduce the number of roadway miles rated as “poor” to 1.5 percent on interstate highways, and 5 percent of non-Interstate NHS highways, and to maintain current pavement conditions on the remainder of the highway roadway.

**Figure 17: Pennsylvania Statewide Median IRI values, by Business Plan Network, 2008-14**



Source: PennDOT Highway Administration

**Figure 18** depicts the number of segment miles by median pavement condition, and it shows the progress PennDOT has made in addressing poor pavement conditions on the state’s most critical highways.

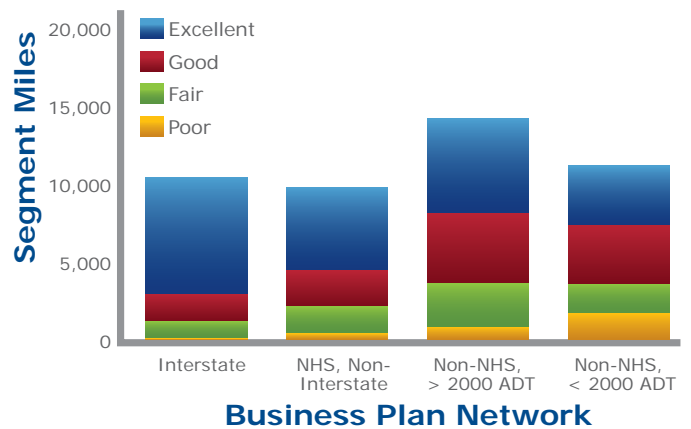
Additionally, there are large numbers of roadway appurtenances which require periodic maintenance and replacement. These include over 5,500 culverts, 12 roadway tunnels, and numerous retaining walls, signs, guiderails, and a wide range of Intelligent Transportation System (ITS) devices.

**Bridges**

Pennsylvania’s bridges serve as a crucial link in the state’s transportation system. Pennsylvania’s size, topography, and expansive roadway system have resulted in the need for a large bridge inventory – the third-largest number of bridges in the U.S. Pennsylvania’s bridges also represent one of PennDOT’s largest capital investments. The investment to construct over 25,000 state owned bridges would cost approximately \$30-\$40 billion in today’s dollars. Maintaining the state’s bridge assets protects this investment and ensures that bridges are safe for the efficient movement of people and goods.

Faced with an aging infrastructure and limited resources, Pennsylvania experienced a steady increase in its number of structurally deficient (SD) bridges. In fact, compared to

**Figure 18: Segment Miles by Business Plan Network with IRI Ratings**



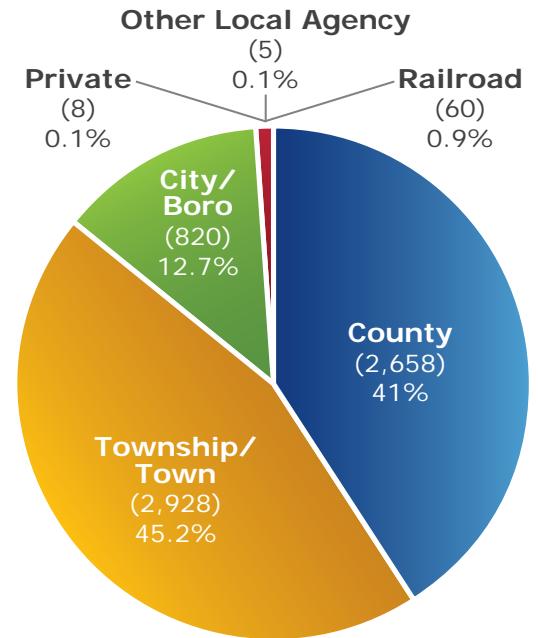
Source: PennDOT Highway Administration

other state DOTs, PennDOT has the highest number of SD bridges in the country. PennDOT saw the number of SD bridges climb to an all-time high of 6,034 in 2008, representing 24 percent of its state-owned bridges. Today, 15.8 percent of the state-owned bridges are classified structurally deficient and 17 percent are rated functionally obsolete. A structurally deficient bridge typically requires significant rehabilitation or replacement to address the deterioration of one or more of its elements.

Another important measure to evaluate bridge conditions is evaluating the percentage of structurally deficient deck area, which factors in the size of bridges. By focusing on all sizes of bridges, including large bridges (over 500 feet in length), PennDOT has significantly reduced the percentage of structurally deficient deck area. Today, the state-owned share of structurally deficient deck area is 10.2 percent.

In addition to the state system, there are more than 6,400 bridges with a length greater than 20 feet and **Figure 19** shows that the majority of the non-state-owned bridges are owned by other entities, mostly townships, counties, and cities/boroughs. While most counties do not own roads, counties own 41 percent of local bridges.<sup>7</sup> Today, nearly 2,200 (35 percent) of these non-state-owned bridges are considered SD, and nearly 1,900 (14 percent) are posted or closed.

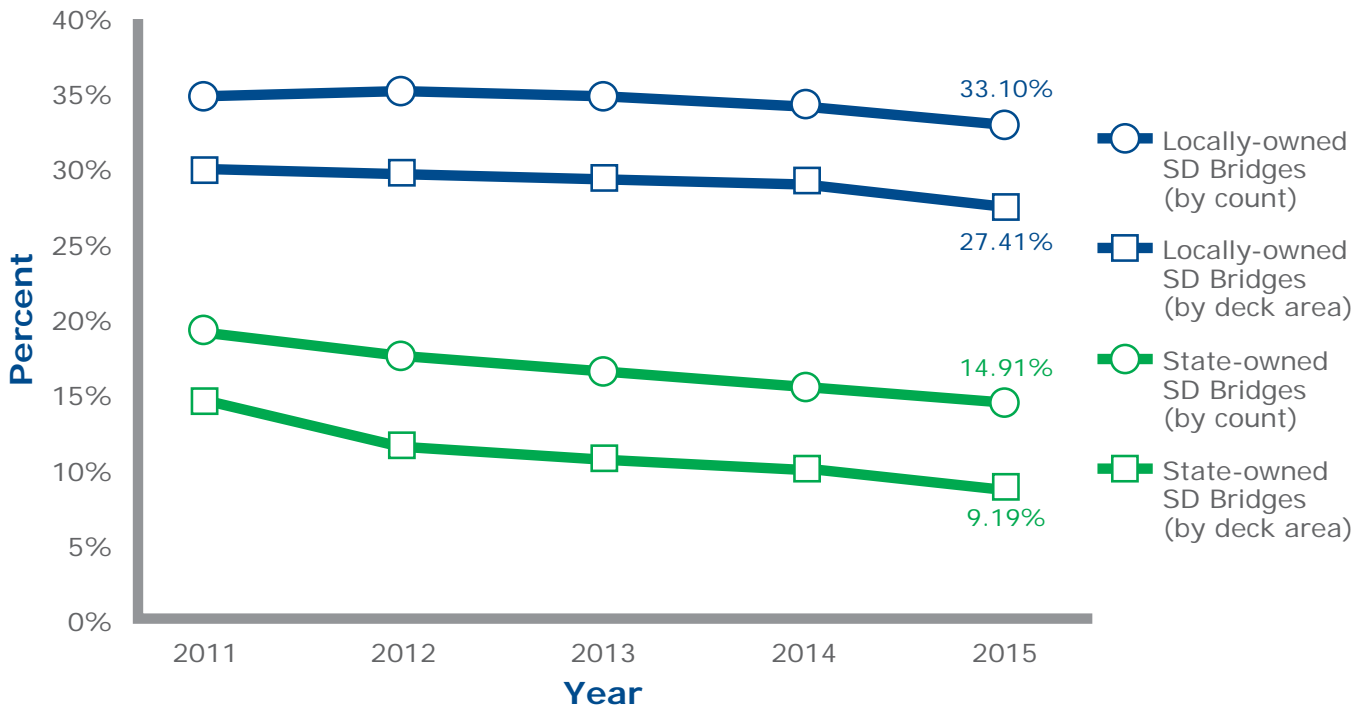
**Figure 19: Local Bridge Count (greater than 20 feet), by Owner, 2014**



Source: PennDOT Bridge Management Systems, December 2014

**Figure 20** shows that state and local bridge conditions over the last four years, by both number and deck area, have improved.

**Figure 20: Pennsylvania State- and Locally-owned Bridges, Percent SD by Count and by Deck Area, 2011-14**



Source: PennDOT Bridge Management Systems, December 2014

<sup>7</sup>Only five counties do not own any bridges: Centre, Erie, Juniata, Potter, and Warren



## PUBLIC TRANSPORTATION

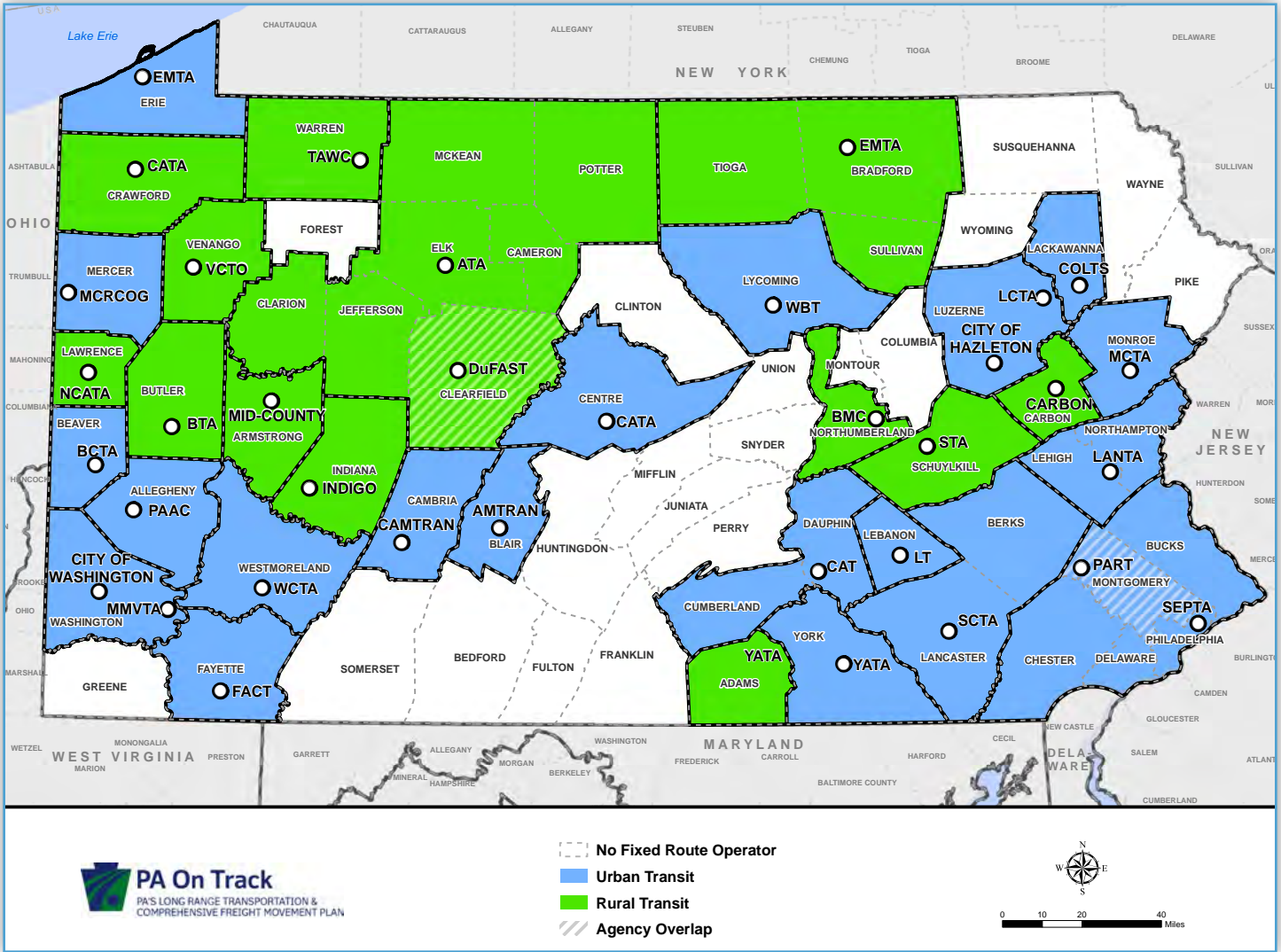
Public transportation service is available in all of Pennsylvania's 67 counties. The Commonwealth recognizes the important role public transportation provides in our urban and rural communities and it has provided significant investments to support continued services and operations. In fact, in fiscal year 2010, the American Association of State Highway Officials (AASHTO) reported that Pennsylvania provided the fourth-highest level of state funding support for public transportation in the nation. With the passage of Act 89 in 2013, Pennsylvania reaffirmed its commitment to public transportation by increasing funding and stabilizing dedicated revenue sources well into the future.

Public transportation is divided into three clearly defined services: fixed route, shared-ride demand responsive, and intercity bus transportation. These modes have unique operating characteristics, program goals, customer expectations, and funding sources.

Fixed route transportation is defined as any service that follows a set schedule with a designated route, stops, or time points. Fixed route service varies significantly throughout the state, from large 40-foot urban transit buses with five minute headways in major metropolitan centers, to small body-on-chassis vehicles with more than one hour headways. Regardless of the service, fixed route transportation is critical to moving people for employment, medical appointments, shopping, and recreation. It is also important for the movement of passengers to and from stations and airports that serve intercity passenger transportation. **Figure 21** shows the locations of the state's urban and rural transit systems.

The state's transit operators provided nearly 429 million trips during the fiscal year ending 2014. Total ridership on the state's urban and rural systems has remained steady over the past several years. SEPTA and PAAC (Southeastern Pennsylvania Transportation Authority and Port Authority of Allegheny County, respectively) are the state's two largest transit operators, and their collective ridership totals dwarf that of the rest of the state, as depicted in **Figure 22**.

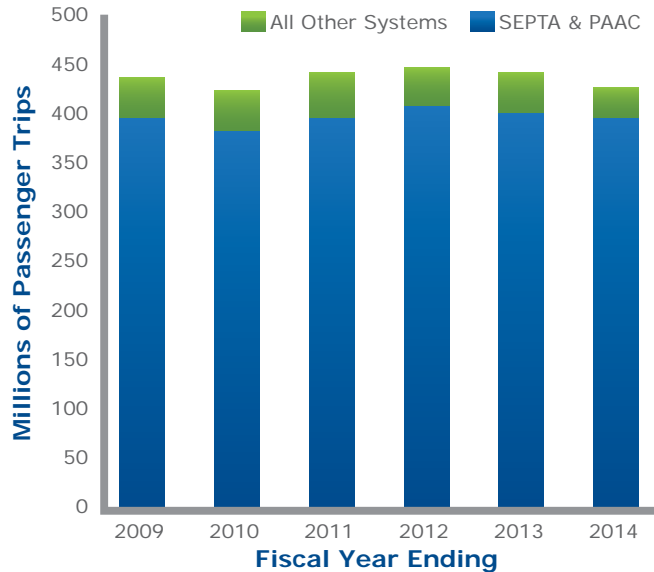
Figure 21: Pennsylvania Transit Systems



Pennsylvania has one of the most comprehensive shared-ride demand response programs in the nation. Shared-ride transportation is door-to-door or curb-to-curb transportation on a reservation basis. While there are no limits on trip purpose, frequency, or quantity, there are limits on the delivery of service. With a foundation of substantial state funding from the Pennsylvania lottery, shared-ride demand response transportation is available in all 67 Pennsylvania counties.

The shared-ride program is funded through multiple sources, predominantly through the PennDOT-administered senior citizen lottery program and Persons with Disabilities (PwD) programs. Additionally, in most counties shared-ride transit provides Medical Assistance Transportation Program (MATP) administered by the Department of Human Services. Finally, some counties use the welfare-to-work program funding to provide shared-ride service, and all service is open to the general public under the published fare schedules. Shared-

Figure 22: Total Fixed-route, Unlinked Passenger Trips (Urban and Rural Systems), 2009-14



Source: PennDOT Bureau of Public Transportation



ride transportation agencies provided over 6.9 million trips in FY 2012-13. Of these trips, nearly 60 percent were 65+ senior lottery trips, 5 percent were PwD trips, and the remaining 35 percent consisted of MATP, general public, welfare to work, and non-public other trips.

PennDOT is currently making an effort to address para-transit issues for PwD and Senior Shared Ride programs. These include providers' ability to cross county lines and to provide services during non-traditional business hours (i.e., evenings, weekends, holidays). With this, a significant number of seniors and persons with disabilities would have expanded employment and volunteer opportunities, along with greater access to health care and other community living opportunities.

**Figure 23** provides more information on trends in shared-ride trips in Pennsylvania.

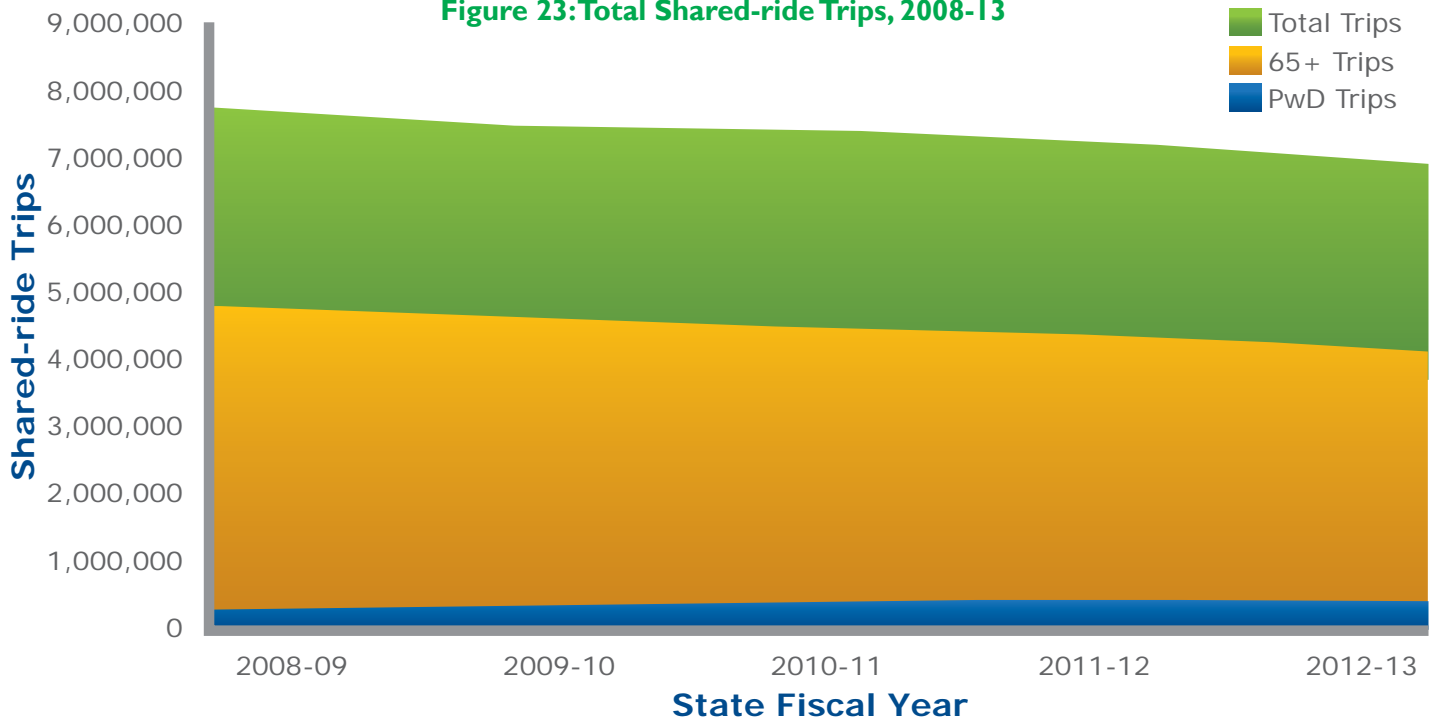
Intercity bus transportation is contracted by PennDOT through private bus companies to provide scheduled, fixed route service along essential regional and statewide corridors, which cannot be financially supported solely from ridership revenue. PennDOT contracted with five private intercity bus operators to provide more than 25,000 one-way trips in FY 2012-13. **Figure 24** shows the five-year ridership trend, while **Figure 25** identifies the statewide location and distribution of the subsidized intercity bus transportation. It should be noted that there are other private, unsubsidized intercity bus services that exist throughout the state. In addition, there are other public transit agencies that provide intercity bus service throughout Pennsylvania.



### Carpooling & Vanpooling

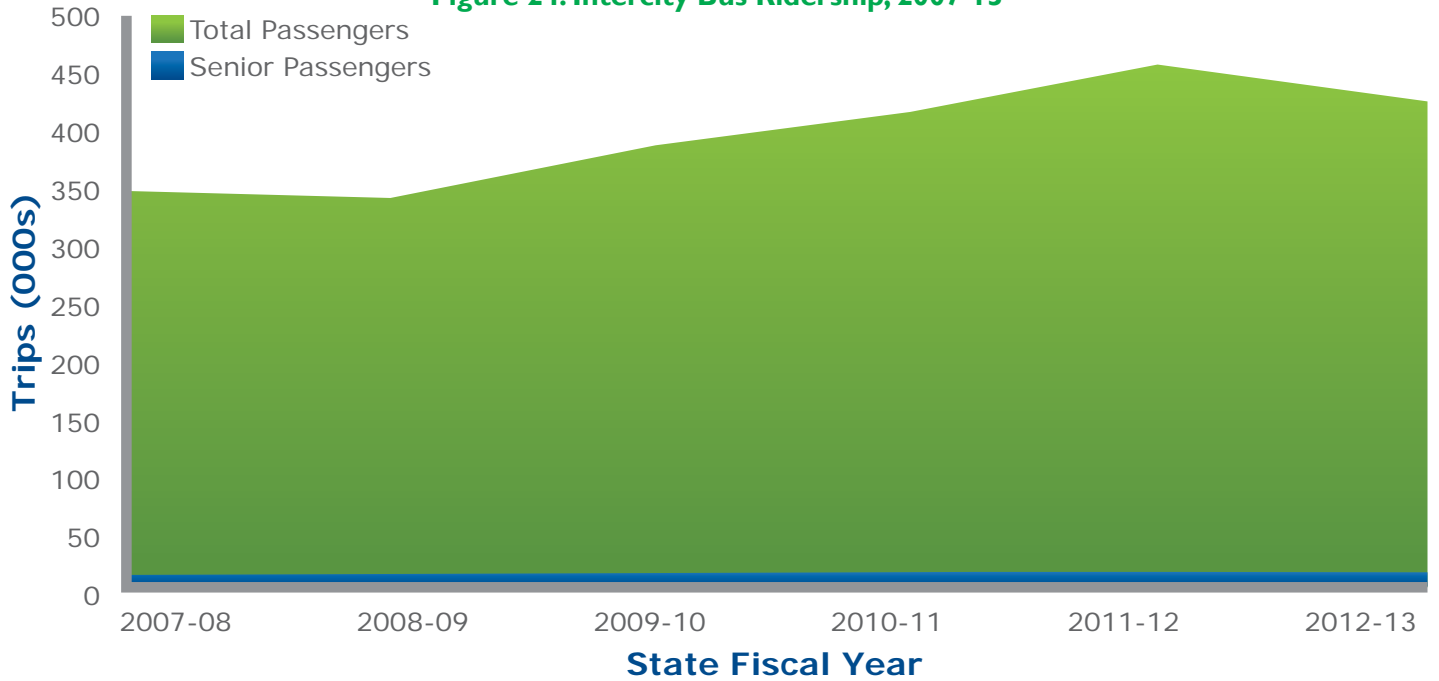
Carpooling and vanpooling are important components of the state's transportation system. According to ACS, nearly 9 percent of Pennsylvania's resident workers carpool to their work destination. A few operators such as CATA in State College offer commuter service programs that incorporate ridesharing, vanpooling, and park and ride programs.

**Figure 23: Total Shared-ride Trips, 2008-13**



Source: PennDOT Bureau of Public Transportation

**Figure 24: Intercity Bus Ridership, 2007-13**



**Figure 25: Pennsylvania Intercity Bus Transportation (Subsidized Routes)**







## PASSENGER RAIL

Intercity passenger rail service in Pennsylvania is provided by Amtrak, also known as the National Railroad Passenger Corporation. Additional commuter passenger rail service in Pennsylvania is provided by the Southeastern Pennsylvania Transportation Authority (SEPTA) and New Jersey Transit (NJTransit).

### Amtrak

Amtrak requires states to fund its operating and capital costs directly associated with Amtrak's passenger rail service (costs that are over and above fare box revenue). As a result, Pennsylvania provides approximately \$15.5 million annually to fund Amtrak operating costs. The Amtrak long-distance and corridor trains serving Pennsylvania include the following:

- **Capitol Limited** – Connects Washington, D.C. to Chicago via Pittsburgh and Cleveland with two Pennsylvania stops: Connellsville and Pittsburgh. The entire route is 780 miles, including a 195-mile segment that traverses Pennsylvania. There is daily one train each direction and in 2013 ridership totaled 139,322.
- **Keystone** – Connects Harrisburg to Philadelphia with stops in between at: Middletown, Elizabethtown, Mt. Joy, Lancaster, Parkesburg, Coatesville, Downingtown, Exton, Paoli, and Ardmore. The corridor is 104 miles long and many trains continue to New York City which is an additional 91 miles. The *Keystone* is Amtrak's fourth-busiest service in the nation and in 2013, ridership totaled 1,923,276. The service features 13 trains each direction on weekdays, and seven trains on weekends.
- **Lake Shore Limited** – Connects Chicago with New York City and Boston with one train each direction daily, with one stop in Pennsylvania: Erie. The entire route is 959 miles in length from Chicago to New York City, including 45 miles across Pennsylvania's panhandle. In 2013, ridership totaled 18,108.
- **Pennsylvanian** – Connects Pittsburgh and central Pennsylvania communities to Harrisburg, Philadelphia, and New York City, with one train scheduled each direction, daily. Intermediary stops include: Greensburg, Latrobe, Johnstown, Tyrone, Huntingdon, and Lewistown. The entire route is 444 miles long, including the 353-mile segment between Philadelphia and Pittsburgh. In 2013, ridership totaled 87,044.
- **Northeast Corridor** – Connects Washington, DC to Boston via Baltimore, Wilmington, Philadelphia, Trenton, New York City, Stamford, New Haven, Providence, and intermediate points. Within Pennsylvania, Amtrak shares the *Northeast Corridor* with SEPTA, NJTransit, and CSX Transportation. In 2013, ridership totaled 4,129,308. *Northeast Regional* and *Acela Express* trains serving Pennsylvania have multiple departures daily, as depicted in **Table 6**.

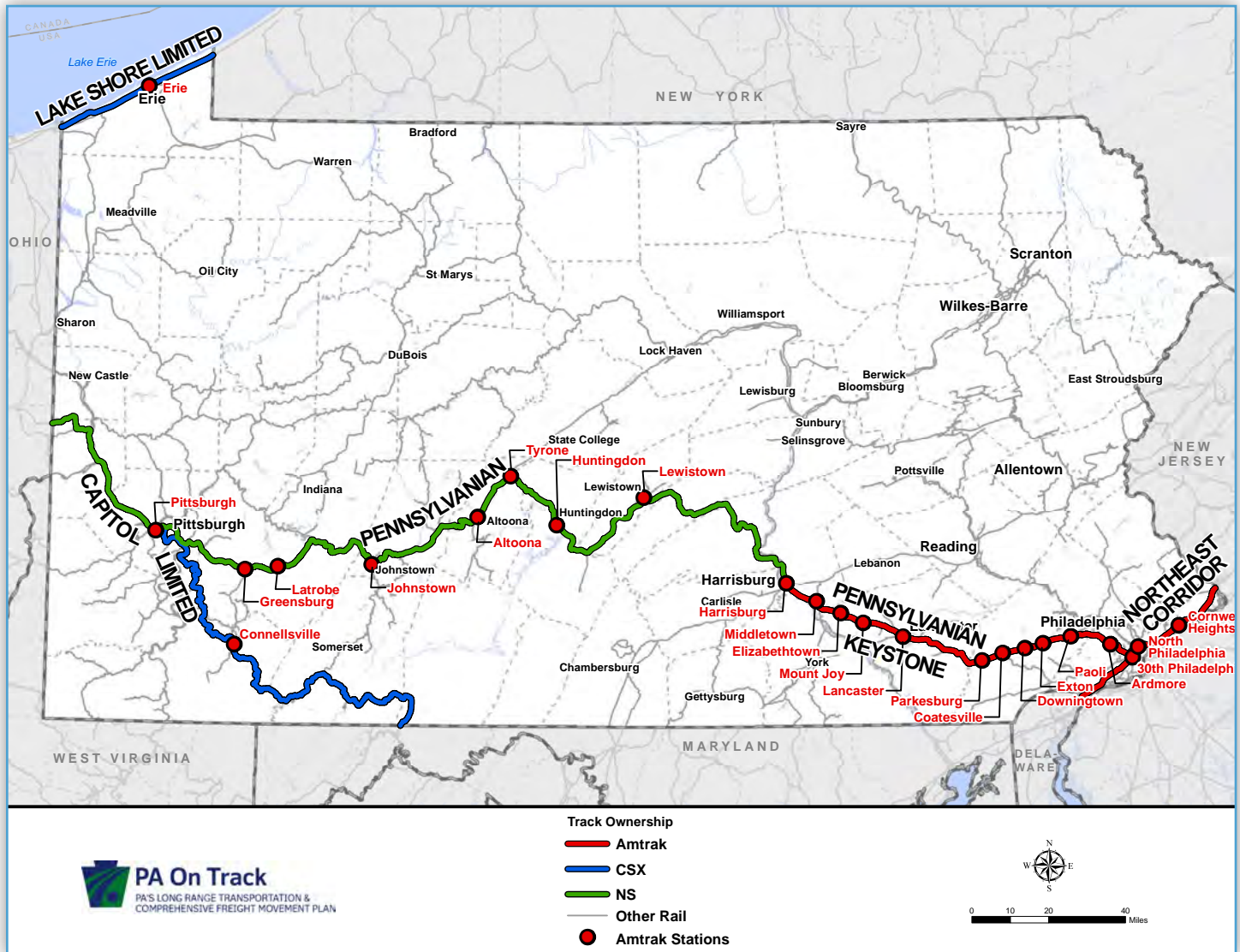
**Table 6: NEC Service Departures by Day**

	Southbound	Northbound
Monday	38	37
Tuesday	38	37
Wednesday	38	37
Thursday	38	37
Friday	39	39
Saturday	24	23
Sunday	29	27

Source: Amtrak

**Figure 26** illustrates the Amtrak passenger service routes in Pennsylvania. Amtrak trains operate on tracks owned by three different entities, including Amtrak itself, Norfolk Southern, and CSX. Amtrak pays for the capital costs of maintaining its own track, and pays fees to freight railroads to use their tracks.

Figure 26: Amtrak Routes in Pennsylvania



### Southeastern Pennsylvania Transportation Authority and New Jersey Transit

SEPTA provides service to most of the five-county southeastern Pennsylvania region and it operates 13 commuter rail lines that serve 154 stations. SEPTA also operates trains to Newark, Delaware; Trenton, New Jersey; and West Trenton, New Jersey. In 2013, SEPTA set a ridership record with 36 million trips. NJTransit serves the greater Philadelphia region with its Atlantic City regional rail line. The Atlantic City Line handles an average of 3,450 average weekday trips, 3,300 Saturday trips, and 2,950 Sunday trips.

### RAIL FREIGHT

Pennsylvania’s rail freight system is comprised of 5,095 miles of track operated by more than 60 railroads (four Class I railroads, two Class II railroads, 34 Class III railroads, and 26 switching or terminal railroads).

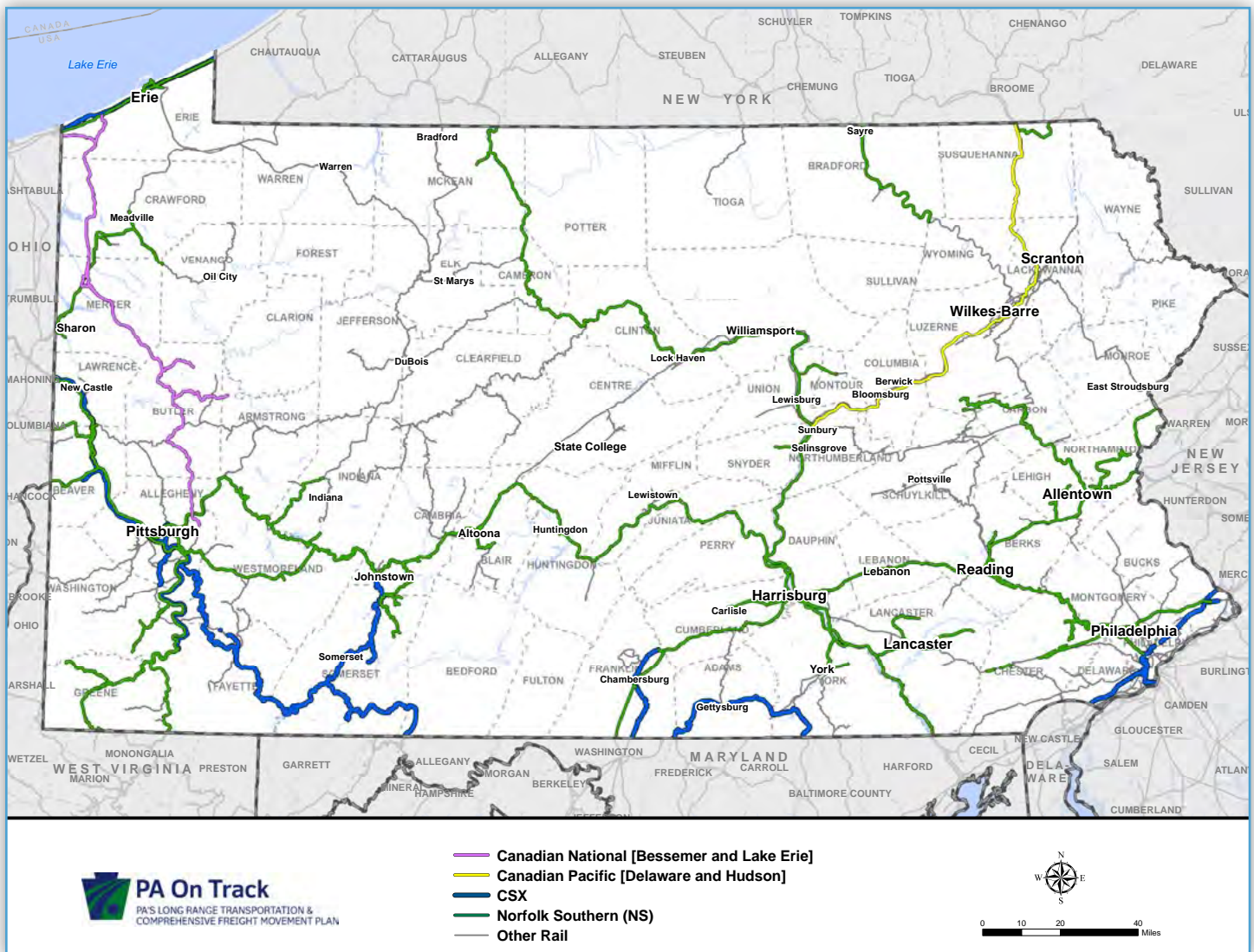
Pennsylvania is a national leader among states in a number of categories regarding freight rail. Based on 2011 statistics, Pennsylvania ranked first among states in the number of railroads, fifth in railroad mileage, and between seventh and tenth in the amount of tons and carloads originating and terminating within the state. Pennsylvania also ranked eighth in total railroad employment (6,977) and rail wages (\$483.2 million).

Freight railroads are defined annually by the Surface Transportation Board and are currently classified as follows:

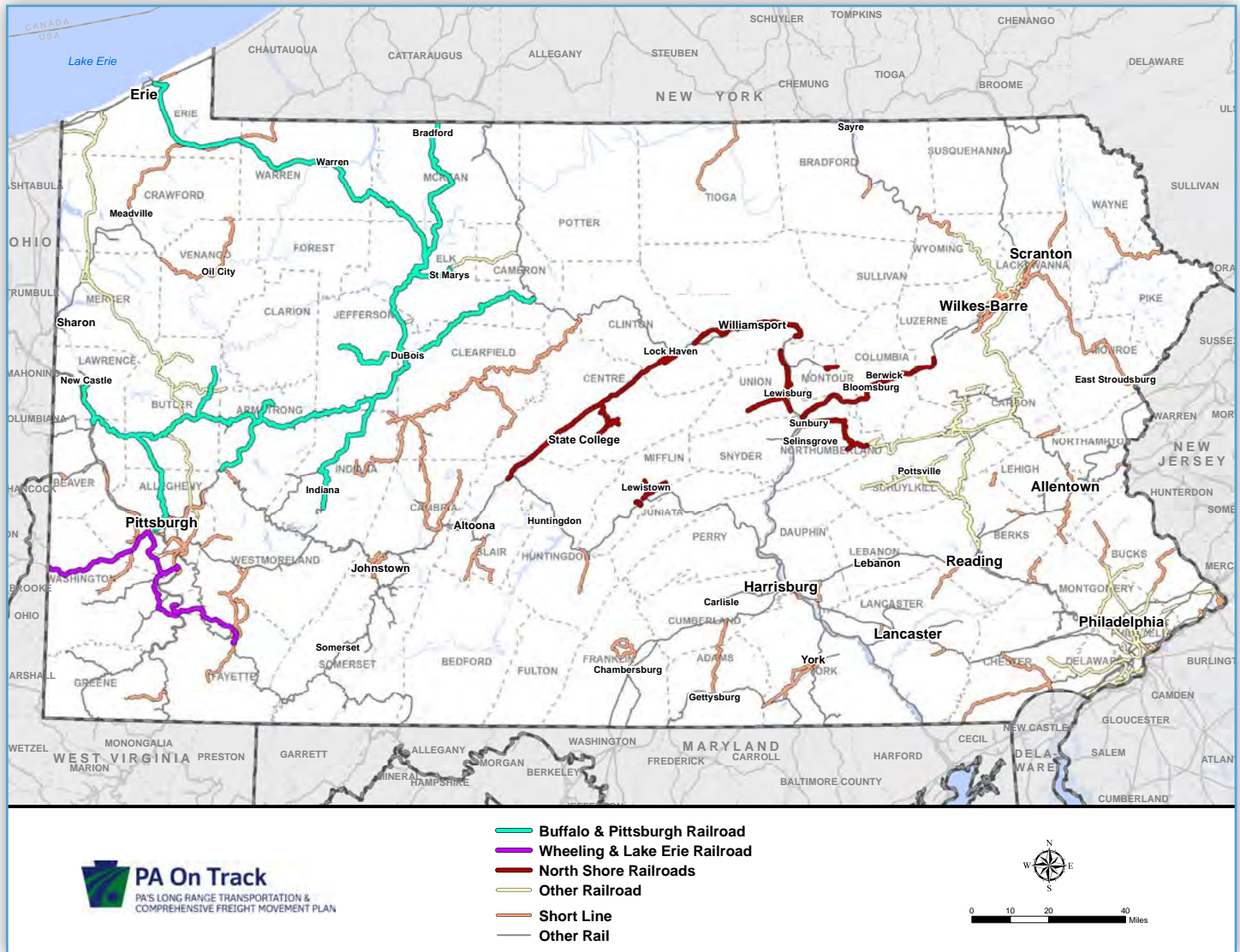
- Class I Railroads are defined by the Federal Surface Transportation Board (STB) based on the value of annual carrier operating revenue. The required minimum revenue is adjusted annually. Class I railroads primarily operate long-haul service over high-density intercity traffic lanes.
- Class II or Regional railroads are defined by STB as having annual revenue between the limits set for Class I and Class III railroads.
- Class III or Short Line railroads have annual revenue less than a threshold established annually by STB.

Figure 27 depicts the geographic extent of Pennsylvania’s Class I railroad network, while Figure 28 shows the Class II and Class III railroad networks.

**Figure 27: Pennsylvania Class I Railroads**



**Figure 28: Pennsylvania Class II and Class III Railroads**



**PORTS AND WATERWAYS**

The location and development of major cities and industry in Pennsylvania can be directly tied to the locations of the major waterways in the state and access to them. It is not a coincidence that three of Pennsylvania’s four largest cities are located directly on major navigable water bodies.

Pennsylvania’s geographic position makes it the only state in the nation that has three types of ports: Deepwater Port (Delaware River Ports), Inland Waterway (Pittsburgh), and Great Lakes (Erie).

**Delaware River Ports**

Delaware River Ports, comprises the marine facilities on the Pennsylvania side of the Delaware River and on the Schuylkill River, from the Delaware state line north to Fairless Hills, Pennsylvania (Port of Bucks). This includes facilities in Bucks, Delaware, and Philadelphia Counties. The Philadelphia Regional Port Authority owns a portion of the terminals within Philadelphia County, with the balance of the terminals owned and operated by the private sector. The Delaware River Channel had been historically maintained at 40 feet. With the advent of larger vessels, this available draft has precluded some ocean carriers from using the Delaware River Ports. The channel is currently being deepened to 45 feet to allow greater access for larger vessels.



The completion of the the Delaware River channel deepening, together with the ability to expand terminal facilities is expected to create opportunities for new services and markets, allowing the Delaware River Ports to maintain or increase growth relative to the industry. Developments in the production and logistics of petroleum products related to shale oil and gas are expected to spur development of new markets and modernization of facilities, suggesting cargo volumes will increase in the near term well beyond what is indicated in the forecast. The state is also seeing an increase in the shipping of crude oil from North Dakota's Bakken Shale play across Pennsylvania to refineries on the East Coast.

### Port of Pittsburgh

The Pittsburgh Port Commission defines the Pittsburgh Port District as an area encompassing twelve counties, including Allegheny, Armstrong, Beaver, Blair, Butler, Clarion, Fayette, Greene, Indiana, Lawrence, Washington, and Westmoreland Counties. It includes the three major rivers in southwestern Pennsylvania: the Allegheny, the Monongahela, and the Ohio. Together, these rivers encompass essentially all 200 miles of commercially navigable waterways in southwestern Pennsylvania.

Based on information developed by the US Army Corps of Engineers (USACE) and provided by the Port of Pittsburgh Commission, there are over 200 facilities on the river system that have, or had river access or wharf or dock structures.<sup>8</sup> The terminals themselves consist of dry bulk (minerals), dry bulk (coal), cement, petroleum products, chemicals, general cargo, metals, miscellaneous equipment, marine service providers, and shipbuilding and repair facilities. Generally, facilities serve barge traffic for cargo handling. Many of these facilities support marine operations such as towing services or by providing mooring locations, but do not have a specific cargo purpose.

Barge traffic to the Port of Pittsburgh region is made possible by a series of locks located along various reaches of the river. Seventeen of these locks are located in the Pittsburgh Port District. Of these 17 locks, most have exceeded their useful life and/or are failing. This critical waterways infrastructure must be maintained in order to enable continued use of the Port of Pittsburgh facilities.

### Port of Erie

The Port of Erie is located on the southeast shore of Lake Erie in a natural bay formed and sheltered by Presque Isle. Erie's harbor entrance channel is 29 feet deep. This is deeper than the draft available through the St. Lawrence Seaway and Lake St. Clair and is not considered a limiting factor for either Great Lakes or international trade. Entrance to the bay is through the Presque Isle Channel, which is a jetty protected structure. The port is served by CSX Transportation.

The port currently supports two industries, Donjon Shipbuilding and Repair and Erie Sand and Gravel Co. Erie Sand and Gravel is the only cargo facility and is configured as a dry-bulk operation (sand and gravel). The terminal also houses one of the largest cranes on the Great Lakes and can accommodate project cargo. Other marine uses within the bay are generally recreational.

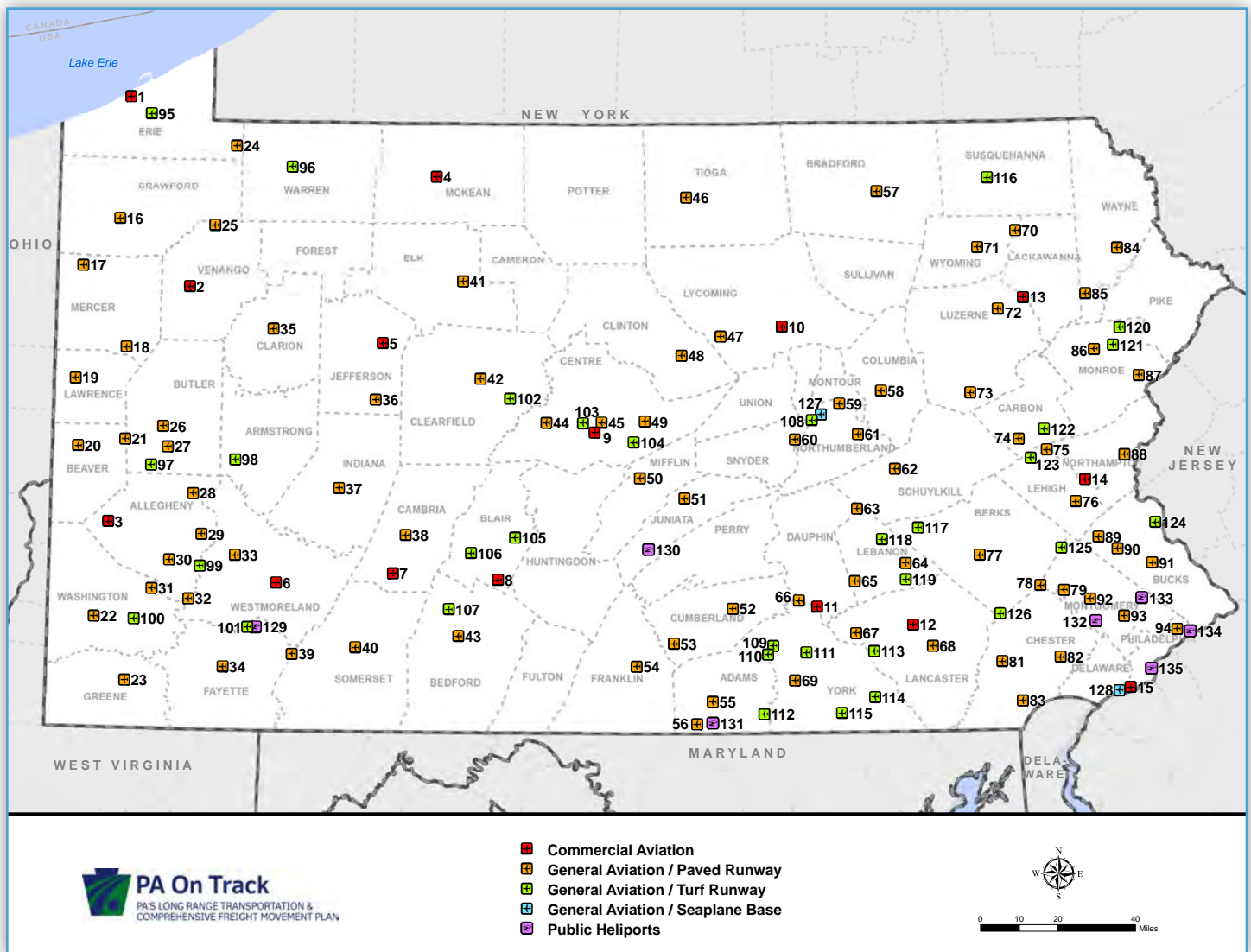
<sup>8</sup>Dock List, Port Series No. 60, U.S. Army Corps of Engineers Institute for Water resources, 2004

## AVIATION

Pennsylvania's aviation system is comprised of public-use aviation facilities that support the movement of people and goods by air. As shown in **Figure 29** and **Table 7**, there are over 130 public-use aviation facilities in Pennsylvania, which accommodate close to 5,000 based aircraft and handle over 2 million general aviation aircraft takeoffs and landings.

Existing facilities require maintenance and preservation such as pavement rehabilitation, building refurbishing, and utility and equipment replacement, as well as upgrades to runway length and width, runway approach and departure area clearing, building area size and setback, and aircraft navigation equipment siting.

**Figure 29: Pennsylvania Public Use Airports**



**Table 7: Commercial and General Aviation Airports**

Commercial Aviation					
1	Erie International	6	Arnold Palmer Regional	11	Harrisburg International
2	Venango Regional	7	John Murtha Johnstown-Cambria County	12	Lancaster
3	Pittsburgh International	8	Altoona-Blair County	13	Wilkes-Barre/Scranton International
4	Bradford Regional	9	University Park	14	Lehigh Valley International
5	DuBois Regional	10	Williamsport Regional	15	Philadelphia International

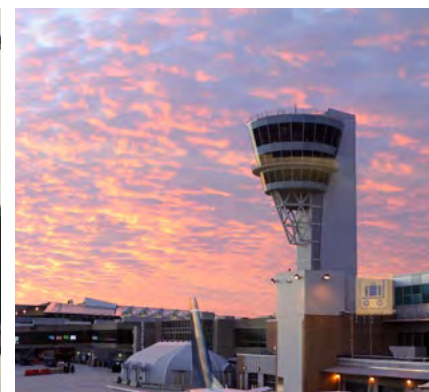
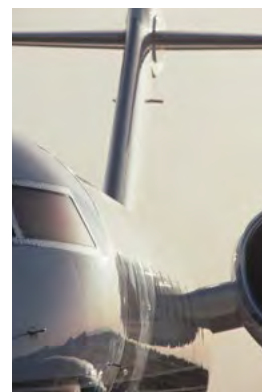
**Table 7: Commercial and General Aviation Airports (continued)**

General Aviation / Paved Runway					
16	Port Meadville	42	Clearfield Lawrence	68	Smoketown
17	Greenville Municipal	43	Bedford County	69	York
18	Grove City Regional	44	Mid State	70	Seamans Field
19	New Castle Municipal	45	Bellefonte	71	Sky Haven
20	Beaver County	46	Wellsboro Johnston	72	Wilkes-Barre/Wyoming Valley
21	Zelienople Municipal	47	Jersey Shore	73	Hazleton Regional
22	Washington County	48	William T. Piper Memorial	74	Jake Arner Memorial
23	Greene County	49	Penn's Cave	75	Slatington
24	Corry Lawrence	50	Mifflin County	76	Queen City
25	Titusville	51	Mifflintown	77	Reading Regional
26	Butler Farm Show	52	Carlisle	78	Pottstown Municipal
27	Butler County	53	Shippensburg	79	Heritage Field
28	Rock	54	Franklin County Regional	81	Chester County-G.O. Carlson
29	Pittsburgh-Monroeville	55	Gettysburg Regional	82	Brandywine
30	Allegheny County	56	Mid Atlantic Soaring Center	83	New Garden Flying Field
31	Finleyville	57	Bradford County	84	Cherry Ridge
32	Rostraver	58	Bloomsburg Municipal	85	Spring Hill
33	Greensburg Jeannette Regional	59	Danville	86	Pocono Mountains Municipal
34	Joseph A. Hardy Connellsville	60	Penn Valley	87	Stroudsburg-Pocono
35	Clarion County	61	Northumberland County	88	Braden
36	Punxsutawney	62	Schuylkill County-Joe Zerbey	89	Quakertown
37	Indiana County/Jimmy Stewart	63	Bendigo	90	Penndridge
38	Ebensburg	64	Deck	91	Doylestown
39	Seven Springs	65	Reigle	92	Perkiomen Valley
40	Somerset County	66	Capital City	93	Wings Field
41	St. Marys Municipal	67	Donegal Springs	94	Northeast Philadelphia

General Aviation / Turf Runway					
95	Thermal G Ranch Gliderport	106	Blue Knob Valley	117	Grimes
96	Brokenstraw	107	Ickes Ultralight	118	Farmers Pride
97	Lakehill	108	Sunbury	119	Keller Brothers
98	McVile	109	Kampel	120	Flying Dollar
99	Inter County	110	Bermudian Valley	121	Rocky Hill Ultralight
100	Bandel	111	Lazy B Ranch	122	Beltzville
101	Mt. Pleasant-Scottdale	112	Hanover	123	Flying M Aerodrome
102	Albert	113	McGinness Field	124	Van Sant
103	Ridge Soaring Gliderport	114	Baublitz	125	Butter Valley Golf Port
104	Centre Airport	115	Shoestring Aviation	126	Morgantown
105	Cove Valley	116	Husky Haven		

General Aviation / Seaplane Base					
127	Sunbury Seaplane Base		128	Philadelphia Seaplane Base	

Public Heliports					
129	WPHS		133	Horsham Valley Airways	
130	Stottle Memorial		134	Total RF	
131	Southern Adams County		135	Penn's Landing	
132	Valley Forge Bicentennial				



### Commercial Service Airports

Currently there are 15 commercial airports in the state that provide service to passengers on scheduled passenger airlines. All of Pennsylvania’s major metropolitan areas and regional population centers are served by commercial service airports. Seven of these commercial service airports predominately serve regional population centers and only have one airline that provides service to one connecting hub via smaller commuter type propeller airplanes. Six of these seven airports receive subsidized air service under the Essential Air Service program administered by the USDOT which has enabled the provision of scheduled airline service to isolated communities across the country since 1978. Recent program reforms, however, will make it difficult for low activity airports to continue air service. As a result, the number of commercial service airports in Pennsylvania may decrease in the future. Airports that no longer have scheduled air service will become general aviation airports.

Philadelphia International is Pennsylvania’s largest airport, with nearly 15 million enplanements and its most critical issues include increasing runway length and landside capacity, as well as remaining a major airline hub. **Table 8** provides more information on Pennsylvania’s commercial service airports and related activity.

### General Aviation Airports

General aviation airports accommodate all operations other than scheduled passenger airlines and air freight companies. Unlike the commercial service airports, which are all publicly-owned,<sup>9</sup> general aviation facilities can be either public or privately-owned. Ownership dictates eligibility for governmental airport improvement funding, especially federal funding. Fifty-two of Pennsylvania’s general aviation airports are publicly-owned.

**Table 8: Commercial Service Airport Activity**

Airport	2012 Enplanements	2012 Commercial Aircraft Operations
Altoona-Blair County Airport	4,101	5,246
Arnold Palmer Regional-Westmoreland Co.	31,500	4,863
Bradford Regional Airport	2,962	4,162
DuBois Regional Airport	5,728	6,226
Erie International Airport Tom Ridge Field	127,184	7,962
Harrisburg International Airport	655,294	40,281
John Murtha Johnstown-Cambria County Airport	7,956	3,498
Lancaster Airport	7,575	4,781
Lehigh Valley International Airport	428,332	22,205
Philadelphia International Airport	14,883,180	433,127
Pittsburgh International Airport	4,160,024	119,595
University Park Airport	144,054	13,228
Venango Regional Airport	2,219	2,507
Wilkes-Barre/Scranton International Airport	228,367	16,356
Williamsport Regional Airport	24,508	4,230
Other	2,317	N/A
<b>Total</b>	<b>20,715,301</b>	<b>688,267</b>

Source: PennDOT Bureau of Aviation

<sup>9</sup>An exception includes University Park Airport, which is owned by Penn State University.





There are many issues facing these facilities, including pending changes in navigation systems, changes in FAA consideration of approach hazards that have led to the restriction or closure of approaches at a large number of GA airports, and ongoing efforts to protect general aviation through the institution of hazard zoning ordinances<sup>10</sup> in adjoining municipalities. Additionally, stakeholders have noted the issues of aging demographics (among pilots and service providers), high cost barriers to entering aviation, and the role of general aviation in supporting economic development, education, and tourism as concerns to the industry.

### Special-Use Facilities

Special-use facilities, such as heliports, glider ports, ultra-light aircraft airfields and seaplane bases, accommodate specific segments of aviation operations. These facilities generally provide for local and regional demand and can include maintenance and fueling services, hangars, and flight instruction.

## BICYCLE AND PEDESTRIAN

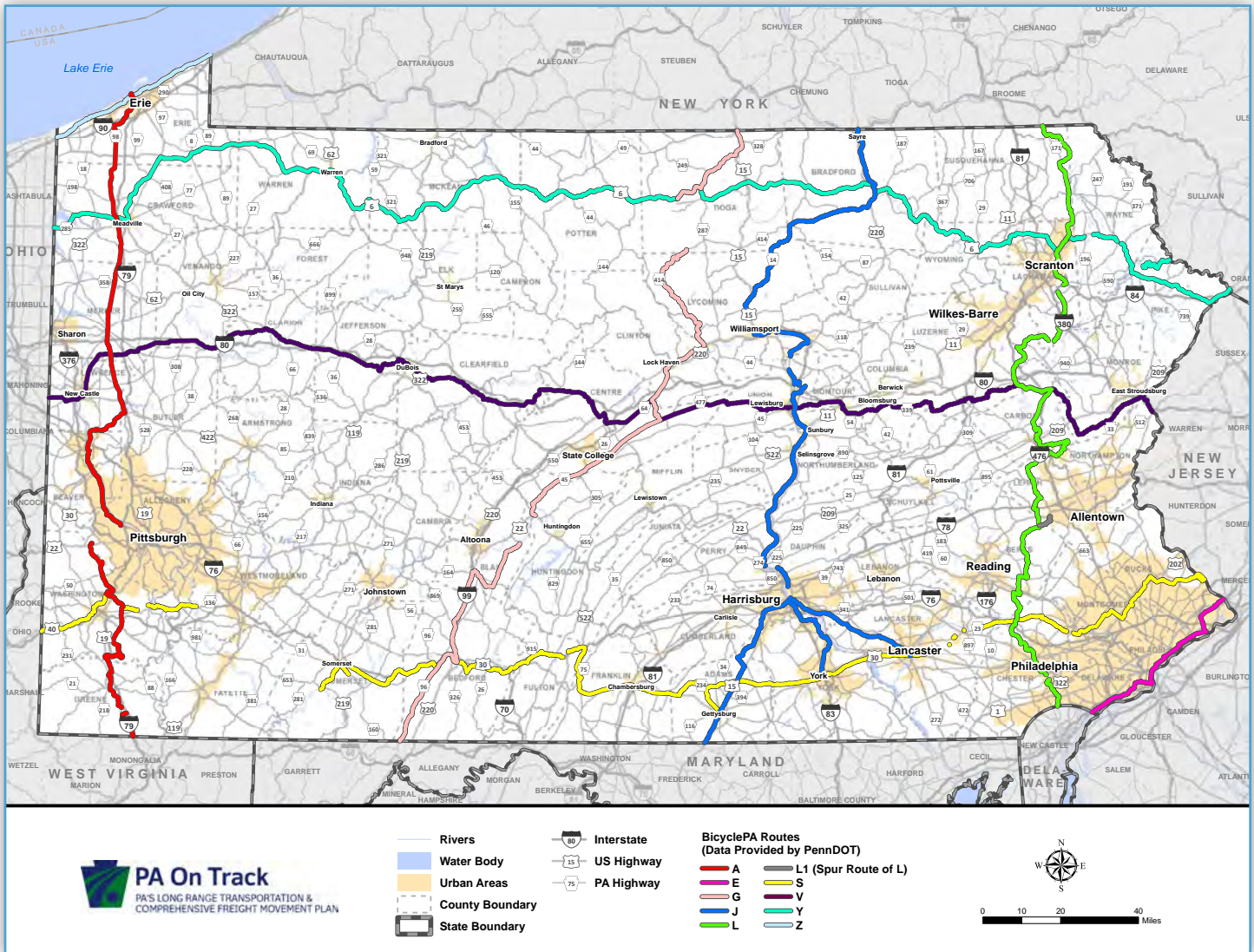
Bicycle and pedestrian facilities represent critical infrastructure for both accessibility and mobility. In addition, these facilities provide important “quality of life” elements to the state’s transportation system, connecting people to their neighbors and their community, all while promoting health and wellness. While not all Pennsylvanians are truck drivers, transit users, airline pilots, or longshoremen, everyone is a pedestrian. Regardless of the mode used, all trips begin and end as a pedestrian. Walking and bicycling also currently constitute 4.3 percent of all the state’s journey to work trips, representing nearly a quarter of a million Pennsylvania workers.

Typically, bicycle and pedestrian projects offer high value for low cost, but their benefits extend beyond their dollar value. In addition to promoting greater mobility and health, proper planning for these modes can improve overall system safety, improve the built environment, and enhance connectivity between modes. Connectivity between bicycle and pedestrian facilities and other origins/destinations such as public transportation stations, schools, community and residential centers, can make walking and bicycling a more appealing choice.

Planning for these modes in Pennsylvania is largely accomplished at the local, municipal level, although PennDOT has provided leadership for these modes at the state level since it produced its first statewide bicycle and pedestrian master plan in 1996. State-level initiatives, such the inventory of cross-state bicycle routes known as BicyclePA , shown in **Figure 30**, and various publications and training materials for local planners and officials, have advanced bicycle and pedestrian transportation in the state. In recent years, the State administered the Pennsylvania Community Transportation Initiative (PCTI) and federal Safe Routes to School program, both of which directed investments toward bicycle and pedestrian, streetscape, and trail connection improvements.

<sup>10</sup>Current compliance with Act 164 Airport Hazard Zoning remains steady statewide, at 45 percent.

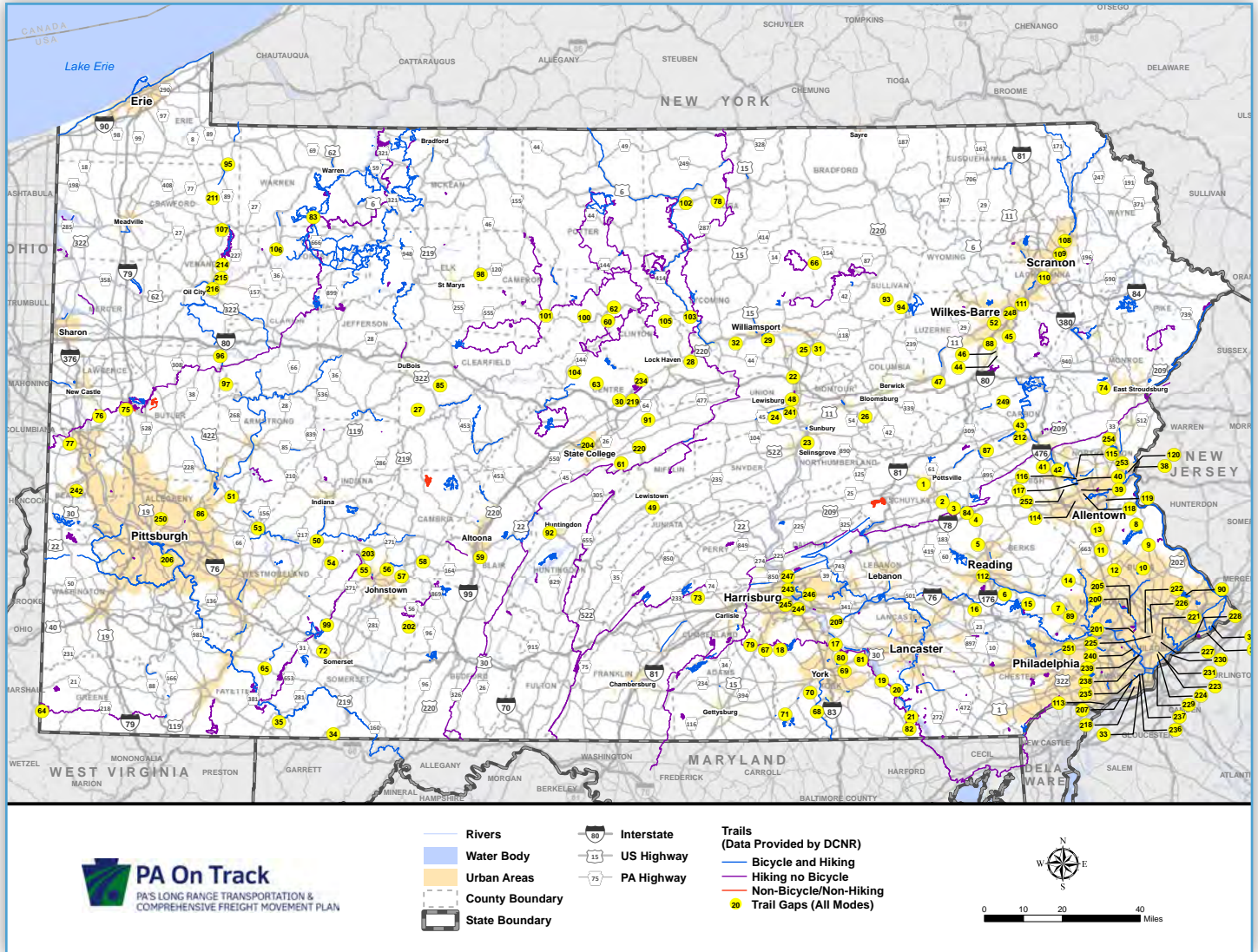
Figure 30: BicyclePA Routes



PennDOT and other state agencies currently administer the federal Transportation Alternatives Program and the state Multimodal Transportation Fund, which also direct investments to bicycle and pedestrian, streetscape, and trail connection improvements. Funds are available on a competitive basis at the large MPO and state levels. PennDOT continues to investigate ways of better integrating bicycle and pedestrian needs in highway and bridge projects.

PennDOT also routinely coordinates efforts with the state Department of Conservation and Natural Resources (DCNR). DCNR continued its planning work with the development of the 2014-19 Statewide Comprehensive Outdoor Recreation Plan (SCORP). As part of this effort, DCNR mapped the state’s regional trail system, and identified over 100 gaps in need of closing, as shown in **Figure 31**. There are over 3,700 miles of designated bicycle trails in the state. Other key considerations from the plan’s development include the need for Pennsylvania’s planners and engineers to be aware of the public’s high regard toward the development and maintenance of trails for walking and bicycling, with specific emphasis on linking communities with natural areas and outdoor recreation resources.

Figure 31: DCNR Trails and Trail Gaps



Source: Pennsylvania DCNR

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# Transportation Revenues

## REVENUES

Pennsylvania's transportation funding comes from a variety of sources including federal funds, federal and state fuel taxes, motor vehicle and driving-related licenses and fees, Pennsylvania Turnpike tolls, sales taxes, lottery proceeds, and other general revenues of the Commonwealth. Of note, fuel taxes, a primary source of transportation revenue in Pennsylvania and elsewhere, have traditionally been levied as a fixed amount per gallon sold (as opposed to a percent of the sales price). As a result, as construction costs for transportation infrastructure have naturally inflated over time, the purchasing power of fuel tax revenue has declined.

Federal funding – a major source of Pennsylvania's transportation revenue – has been flat in recent years, as the state's federal aid total has increased by an average annual rate of only 2 percent over the past decade. MAP-21 largely maintained the funding levels of its predecessor legislation, and Pennsylvania received \$3.18 billion for the Federal-Aid Highway Program under MAP-21. Both the Highway Account and the Mass Transit Account of the federal Highway Trust Fund (HTF), our nation's infrastructure funding source, has been teetering on the edge of insolvency for the last few years because the federal gas tax that funds the HTF cannot keep pace with the new CAFE standards (improvements in vehicle fuel efficiency, including hybrid vehicles) and people are driving less.

## ACT 89 OF 2013

Act 89 of 2013 addresses the declining purchasing power of Pennsylvania's fuel tax revenue. By eliminating Pennsylvania's flat tax on gasoline and diesel fuel retail sales and removing the wholesale fuel tax's inflationary cap, the legislation takes a step toward maintaining the purchasing power of fuel tax revenue over time.

New revenue from the legislation began to be generated in April 2014 and will reach full collections of an estimated \$2.3 billion annually in FY2018.



### Act 89 of 2013

- Invests in Pennsylvania's future by
  - increasing public safety
  - driving commerce
  - creating 50,000 new jobs and preserving 12,000 jobs
  - improving funding reliability
- Improves or rebuilds thousands of bridges and over 10,000 road miles
- Keeps Pennsylvania economically competitive with neighboring states
- Avoids public transportation service cuts and meets needs of dependent populations



Conservatively, the new revenues are projected to generate \$53 billion in total through 2040.

Act 89 brings much-needed additional investment to Pennsylvania’s transportation system. The annual additional investment will benefit a full range of transportation improvements as depicted in **Table 9**.

As Pennsylvania looks to the future via PA On Track, overcoming historical under-investment in transportation

infrastructure remains a key challenge. It is estimated that over the planning horizon of PA On Track, \$151 billion in total transportation revenues will be available for transportation investment. This revenue estimate includes new revenues that will be generated as a result of Act 89. This extensive state transportation funding legislation stabilizes the state Motor License Fund and brings much-needed additional investment to Pennsylvania’s multimodal transportation system.

Pennsylvania’s transportation investment needs include the cost of operating and maintaining the existing transportation system as well as the costs of adding new capacity through the expansion of services and infrastructure to meet the demand for travel. These costs span all transportation modes—roadways, bridges, public transportation, passenger rail, bicycle and pedestrian, freight rail, aviation, and ports. The costs cover all governmental transportation facilities but not privately owned and operated infrastructure.

**Table 9: Act 89’s Estimated Additional Annual Investment**

Funding Categories	Estimated Annual Investment (as of FY2018)
State Roads & Bridges	\$1.3 billion
Public Transportation	\$495 million
Local Roads & Bridges	\$237 million
Multimodal	\$144 million
Pennsylvania Turnpike Expansion	\$86 million
Dirt, Gravel, & Low Volume Roads	\$30 million
<b>Total Estimated Additional Annual Investment</b>	<b>\$2.3 billion</b>

*Source: PennDOT Press Office*



## Findings

In planning for the future of Pennsylvania's transportation system, PennDOT is challenged by a variety of trends and issues – many of which are beyond the agency's control. A few of the more significant trends and issues affecting transportation are as follows:

### Funding challenges

- **Uncertainty about the future of the federal Highway Trust Fund remains.** While proposals have been put forth to strengthen federal transportation funding, the most likely scenario is for future federal transportation funding for Pennsylvania to remain constant.
- **Changes in funding program eligibility.** MAP-21's National Highway Performance Program (NHPP) introduced a 30 percent decline in funding for local roadways. The development of the Enhanced National Highway System (NHS) and the NHPP under MAP-21 put local and county roads and bridges at a disadvantage in the federal distribution of transportation funding. Only road projects that are on the Enhanced National Highway System are eligible for this funding stream and just 5 percent of county and local government roads on the federal-aid system qualify. County and other local roads on the federal-aid system (but not on the NHS) must compete for a share of Surface Transportation Program (STP) dollars. The FAST Act however makes NHPP dollars eligible to be expended on non-NHS highway bridges that are on a federal-aid eligible highway.
- **Reduced growth rate of revenue streams.** Increasing fuel efficiency standards and declining vehicle miles traveled will continue to impact the growth rate of liquid fuels revenues despite the steps recent legislation took to address declining purchasing power.



### Transportation investment needs are driven by a variety of demographic and land use trends

- **Total population.** Pennsylvania is the nation's sixth most populous state, with 12.7 million people who require transportation services. By 2040, that number is expected to climb to over 14 million.
- **Aging population.** By 2040, as many as one in four Pennsylvanians will be over the age of 65. Pennsylvania's 85+ population is projected to double by 2040 requiring additional public transportation services and safety modifications (e.g., improved signing, reflectivity, etc.) to transportation infrastructure to meet their mobility needs.
- **Millennial population.** This group (those presently between the ages of 18 and 30) typically has lower rates of vehicle ownership, is driving fewer miles, and exhibits a higher use of public transportation and bicycling. These trends could have a significant impact on future travel patterns, particularly in urban areas where millennials constitute a larger share of the population.

- **Changes in land use patterns.** Despite Pennsylvania's slow rate of population growth, the state's population continues to shift from older, more established urban areas to outlying suburban areas, which introduces new demands for transportation infrastructure and services. This shift has caused increases in traffic congestion and freight bottlenecks in these areas. Moreover, DCED data from 2010 indicate that as many as one-third of the state's municipalities do not have any form of land use management or basic plans to guide decision-making, such as zoning ordinances or comprehensive plans. Absent any major state initiative, this condition is expected to persist.



### Transportation investment needs are also driven by significant modal trends

- **Highways.** The state's highway network in 2012 supported nearly 273 million vehicle miles of travel daily – a decline of 5 percent from a decade ago. Through the plan's 30-year analysis period, the majority of needs (74.5 percent) are projected to be on non-interstate roadways. In addition, a vast majority of the needs are projected for preservation (37.6 percent) and reconstruction activities (39.7 percent), while just 10.1 percent of the needs are projected for capacity activities. Capacity estimates were based on constraining the expansion needs to an extremely high extent.
- **Highway safety concerns.** Pennsylvania has experienced a downward trend in highway fatalities over the past 10 years. However, the overall number of statewide fatalities still exceeds the national average. In addition, safety focus areas have not met established goals for mature drivers and motorcyclists (fatal motorcycle crashes have actually increased). While fatality rates for urban conditions are lower than the state and national averages, rural conditions exceed these thresholds. This indicates a clear need to continue dedicating time and funding for the constant monitoring of current crash trends and implementation of policies and programs to strive for the ultimate goal of "zero fatalities".
- **Bridges.** PennDOT continues to make progress in addressing its inventory of structurally deficient (SD) bridges. The state's share of SD bridges (state-owned and greater than 8 feet in length) is now 15.8 percent by number and 10.2 percent by deck area. On the local network (greater than 20 feet in length), the rates are 35 and 30 percent, respectively. Life cycle analysis indicates that a large number of bridges will need to be reconstructed in 2020 and thereafter. Continued investment in the state's bridges is, therefore, critical.
- **Motor Carrier.** Freight tonnage moved by truck is expected to increase by 72 percent from 867.7 million tons in 2011 to 1.49 billion tons in 2040. Based on 2013 conditions, FHWA has identified Pennsylvania's top highway interchange bottlenecks as:
  - I-76 and I-676 in Philadelphia;
  - I-76 and I-476 in Montgomery County;
  - I-70 and I-79 in Washington County; and
  - I-83 and I-81 in Dauphin County.
- **Public Transportation.** Collectively, the state's urban and rural transit providers provided nearly 429 million fixed-route trips for the fiscal year ending 2014. Both the under 18 and over 65 populations are heavier than average users of public transportation, and these two groups combined currently account for 38 percent of Pennsylvania residents.
- **Rail Freight.** Freight tonnage moved by rail is expected to increase by 41 percent from 209 million tons in 2011 to 294 million tons in 2040.





- **Passenger Rail.** Passenger rail ridership on the *Keystone* service, Amtrak's fourth busiest, has doubled since 2000 and now carries 1.4 million passengers annually. Philadelphia's 30th Street Station is the third-busiest station in the national Amtrak system. Moreover, ridership on the *Pennsylvanian* has grown from 218,000 in 2013 to 230,700 in 2014...an increase of nearly 6 percent.
- **Aviation.** All of the state's major metropolitan areas and regional population centers are served by Commercial Service Airports. These airports currently handle over 20 million enplaned air passengers, close to 700,000 commercial takeoffs and landings, and approximately 1 billion pounds (loaded) in air freight volume. Low activity airports are in danger of losing subsidized air service under the Federal Essential Air Service program. With discontinued air service, these may become General Aviation airports.
- **Water Ports.** Until recently, the Delaware River channel had been maintained at a depth of 40 feet. A program to deepen the navigation channel from its entrance at Delaware Bay up to the Benjamin Franklin Bridge is currently underway. Approximately 60 percent of the channel has been deepened to 45 feet, and the remainder of the deepening is scheduled to be completed by 2017. The Port of Pittsburgh is served by 17 locks and dams that were built over 50 years ago, 10 of which are in poor or very poor condition.
- **Bicycle and Pedestrian.** By 2040, the state's share of its 65+ population is expected to increase from 16 percent today to over 23 percent. In addition, 22 percent of Pennsylvania residents are under the age of 18. Both the under age 18 and over age 65 populations are typically more dependent on bicycling and walking forms of transportation. In addition, nearly a quarter of a million Pennsylvania workers (226,000) relied on pedestrian travel for their journey to work during the American Community Survey period 2009-13 (compared to 230,000 in 2000).



### Transportation investment needs are driven by technology and industry trends

- **Increasing role of technology.** Advances in technology play a key role in shaping transportation systems, which in turn help to shape our lives, landscapes, and culture. Technology that impacts transportation can include innovations such as solar pavement, mobile phone apps for ridesharing and real time public transportation schedules and refillable public transportation fare cards. Transponders and infrastructure for electronic tolling and congestion-based road pricing will likely have a significant impact on financing. Other innovations include self-parking cars, new revenue collection techniques such as those related to Vehicle miles traveled, and information systems such as PA511 which provide traffic conditions, weather alerts, and travel delays. Technology advances have also made transportation planning more accessible and efficient for public participation.
- **Role of connected and autonomous vehicles.** Connected and autonomous vehicles have the potential to revolutionize transportation and land use as the automobile did a century ago. While the timing of when connected and autonomous technology will be fully incorporated into all motor vehicles is subject to debate, PennDOT is actively planning for a future involving these vehicles, which will affect surface transportation in a number of areas. Topics to be considered include investments in design and infrastructure (message signs, radio advisories, lane capacity, lane widths and medians, and traffic signals, for example); communication devices for safety and mobility such as stop sign/red light violations, queue warnings and speed harmonization; transmission of real time data on parking availability, congestion, and weather conditions between vehicles, roadside units, and traffic management centers; workforce training and preparation; and changes to driver licensing requirements.
- **Changes in journey to work.** Most Pennsylvania households (95 percent) now have access to a vehicle. Reliance on the private automobile continues: nearly 86 percent of households use this mode for journey to work. With fewer than 10 percent of households participating in carpools, Pennsylvania ranks 40th in the nation in this metric. Commute times continue to grow longer, and now average over 26 minutes, compared to 22 minutes 20 years ago. More workers are also taking advantage of alternative work schedules, and the opportunity to work at home.



- **Changes in consumer base.** Today 95 percent of the world's consumers and 80 percent of the world's purchasing power are outside of the United States, creating new opportunities for Pennsylvania businesses and increasing demand for freight transportation services as more companies ship products to a growing array of destinations.

### Transportation investment needs are driven by many factors that influence economic competitiveness

- **Companies today depend more than ever on an integrated, agile, and efficient freight network.** The transportation system must connect them to customers in a growing number of markets around the world. Reliability, speed to market, and transportation costs impact their ability to compete. Eleven of the top 26 site selection criteria cited by companies planning to expand or relocate involve transportation; highway accessibility consistently ranks first or second.
- **Global trade will continue to play a significant role in the state's economy.** Demand for U.S. goods is projected to increase for key Pennsylvania industry sectors. The state's coal-producing regions accounted for 42 percent of U.S. mining exports in 2011, and this is expected to grow 64 percent by 2020. Although U.S. demand for coal is decreasing, Pennsylvania's coal is in growing demand in Asian countries, particularly China. Oil and gas exports—largely from Philadelphia refineries—increased 2,605 percent between 2008 and 2013. Nearly 90 percent of Pennsylvania exports in 2011 were from firms with fewer than 500 employees, and one quarter of export companies were located in rural counties.
- **Pennsylvania is a major player in energy production due to the Marcellus and Utica shale formations.** In 2010 the industry supported 140,000 jobs and by 2020 shale gas development could add 570,000 jobs in the state. However, shale gas development, which relies on hydraulic fracturing, seriously impacts roads, bridges, and rail lines in the primarily rural counties where most of this activity occurs due to the large number of trucks required to haul heavy equipment, water, and fracking sand. Additionally, more than half of all applications to the Federal Energy Regulatory Commission for new pipelines over the past year were as a result of Marcellus shale gas drilling activity.
- **Manufacturing remains a major contributor to the state's economy.** Pennsylvania is the sixth largest manufacturing state, and manufacturing accounts for over 12 percent of gross state product. Manufacturing jobs have increased every year since 2010, spurred by low-cost, abundant energy as a result of the state's shale gas production. A major contributor to the state's economy has been the development of alternative energy (shale gas and related development). Central Pennsylvania also leads the world in powdered metals manufacturing. Advanced technologies, including nanotechnology and additive processes such as 3D printing are revolutionizing the state's manufacturing sector.
- **Demand for Pennsylvania agricultural and manufactured food products is increasing.** Several major food producers recently invested in the state, joining a large number of well-known brands. Food product exports topped \$1.7 billion in 2011, and the local food movement is also a boon for Pennsylvania growers.
- **The state is a global leader in life sciences.** It ranks fourth in U.S. life sciences patents for new drugs and vaccines, diagnostic tools, and medical devices and was fourth in research funding from the National Institutes of Health in 2012.
- **Transportation is a growing employment sector in the state, but workers are in short supply.** Trucking jobs are expected to increase by 24 percent by 2020, and rail jobs by ten percent. But the state already has a shortage of truck drivers, and a third of U.S. railroad employees were eligible for retirement in 2013. Training will be needed to ensure new workers can meet job requirements and maintain the required licenses.



Combined, these trends and issues call for an implementation plan that addresses the critical challenges that lie ahead. PennDOT has developed strategies to address these challenges, in alignment with the four goal areas. These are discussed in greater detail in the following section.





## Strategic Direction

PA On Track is a performance-based plan that establishes a strategic direction for Pennsylvania's future multimodal and intermodal transportation system. The Plan's strategic direction is based on the diverse priorities of the system's users. To develop the strategic direction of PA On Track, PennDOT conducted a series of interactive workshops, technical meetings, and webinars with a broad array of stakeholders to identify, discuss, and refine Pennsylvania's most critical transportation priorities. PennDOT also considered previously developed plans<sup>11</sup> and PennDOT policies to ensure consistency in strategic direction.

The USDOT is currently working with states and planning organizations to transition toward and implement a performance-based approach to carrying out the Federal Highway Program, required under MAP-21, which will support prioritization of needs and alignment of resources for optimizing system performance in a collaborative manner. In the coming year, USDOT is expected to establish performance measures and state DOT and MPO requirements for establishing performance targets and reporting progress toward them for key focus areas, as set forth in MAP-21. USDOT plans to establish the new MAP-21 requirements for a performance and outcome-based program in 2015. In 2016, therefore, PennDOT will work with its planning partners to further develop the strategic direction of PA On Track to identify performance measure targets in a manner that will support MAP-21.

### Pennsylvania's Transportation Vision

PA On Track's vision for the future of transportation in Pennsylvania is to:

*Deliver a quality transportation system to support the economy and lifestyles of current and future Pennsylvanians.*

#### MAP-21 National Goal Areas

- **Safety** - To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- **Infrastructure Condition** - To maintain the highway infrastructure asset system in a state of good repair.
- **Congestion Reduction** - To achieve a significant reduction in congestion on the National Highway System.
- **System Reliability** - To improve the efficiency of the surface transportation system.
- **Freight Movement and Economic Vitality** - To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- **Reduced Project Delivery Delays** - To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion by eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.
- **Environmental Sustainability** - To enhance the performance of the transportation system while protecting and enhancing the natural environment.

<sup>11</sup>A bibliography of "previously developed plans considered" appears in the tech memo on the plan's goals and objectives.



## GOALS, OBJECTIVES, PERFORMANCE MEASURES

PA On Track is centered on four goal areas—system preservation, safety, personal and freight mobility, and stewardship—that support the achievement of Pennsylvania’s transportation vision and guide PennDOT in addressing transportation priorities.

A strategic framework of objectives and measures of performance serves to bring the goals and vision to fruition.



PA On Track’s Four Goal Areas Support the Transportation Vision

**PA On Track’s Strategic Framework**

**Goals and Objectives** direct transportation investments and translate the strategic vision into something that can be measured and tracked.

**Performance measures** monitor and communicate progress towards goals, evaluate investment scenarios, comply with national performance requirements, and track implementation over time.

## SYSTEM PRESERVATION

Preserve transportation assets using sound asset management practices within the limitations of available resources

### Overview

PennDOT, through its various management systems and federal and regional partners has enormous amounts of data available on the assets that it owns and maintains. What is not clearly known is the magnitude and condition of *locally*-owned transportation infrastructure. Gains have been made in this area in recent years, but more work remains to be done.

Asset management has gained greater prominence in recent years – the shortage of funding makes it a critical business practice. It entails a strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on engineering and economic analysis based upon quality information. MAP-21 advanced the practice of asset management even further, even as it becomes more accepted and understood.

### Objectives

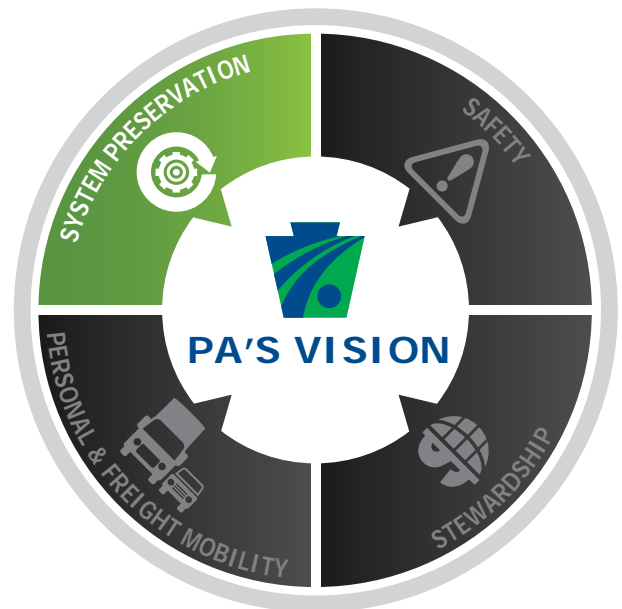
- Optimize pavement conditions
- Reduce the number of structurally deficient bridges
- Encourage state-of-good repair initiatives for all modes
- Limit the number of load-restricted bridges

### Performance Measures

- Percent of pavements in excellent, good, fair, and poor condition (International Roughness Index (IRI))
- Pavement structure index (Overall Pavement Index (OPI))
- Percent of structurally deficient bridges by deck area (MAP-21 measure)
- Number of load-restricted bridges

### Strategies

- Develop an inventory and condition information of all state- and locally-owned transportation system assets
- Implement enterprise asset management for programming and decision-making
- Prioritize state-of-good repair approaches that preserve transportation system assets
- Implement a Capital Inventory and Planning Tool to store, maintain, edit, and report on transit's capital assets



## SAFETY

### Improve statewide safety for all modes and all users

#### Overview

In 2014, there were over 121,000 reportable crashes in Pennsylvania, which claimed the lives of nearly 1,200 people and injured nearly 80,000 more. The estimated economic loss due to traffic crashes was \$14 billion, or approximately \$1,100 for every Pennsylvanian. It should be noted that this figure far exceeds PennDOT's annual budget. While much of this cost is borne through insurance, there is also a public cost. On average, 14 crashes were reported every hour, and 1 out of every 44 Pennsylvanians was involved in a reportable traffic crash. The number of total crashes, while unacceptably high, nevertheless represented the lowest statewide total recorded since the early 1950s.

While progress has been made in improving safety, these numbers underscore the need to take additional strides in addressing safety across the system, and maintain safety as a primary focus of the state's transportation planning. PennDOT is working with safety stakeholders to establish a "Toward Zero Deaths" initiative in the state, agreeing that even one death is unacceptable. Recent advances in safety, including the implementation of countermeasures such as centerline and edgeline rumble strips, and Yield to Pedestrian channelizing devices, have been complemented by such policy changes as the Graduated Driver Licensing Program, and Act 3 of 2012, which requires motorists to provide a 4-foot buffer for bicyclists. Pennsylvania's anti-texting while driving law, which went into effect in March 2012, gave law enforcement officials more heft in addressing distracted driving. PennDOT will also be adding resources for the enforcement of safety and infrastructure protection activities (such as commercial motor vehicle weight enforcement). Other supporting efforts, such as municipal adoption of Airport Hazard Zoning (Act 164), and rail-related efforts associated with "Operation Lifesaver," have improved safety across the system.

#### Objectives

- Reduce statewide transportation system fatalities
- Reduce serious injury crashes statewide
- Invest in cost-beneficial approaches and technologies that enhance the safety of the transportation system
- Improve public understanding of high-risk traveling behaviors
- Reduce crashes, injuries, and fatalities in work zone areas
- Promote, develop, and sustain multijurisdictional traffic incident management programs to achieve enhanced responder safety and safe and quick traffic incident clearance

#### Performance Measures

- Number of fatalities and serious injuries (MAP-21 measure)<sup>12</sup>
- Rates of crashes with fatalities and serious injuries per vehicle miles traveled (MAP-21 measure)
- Number of fatalities and serious injuries in work zones
- Number of rail-crossing fatalities, serious injuries, and incidents



PennDOT's Rapid Bridge Replacement program is replacing up to 650 deteriorated bridges under a single contract. The public-private partnership approach coupled with the economies of scale will lower life cycle costs and free up dollars for other projects.

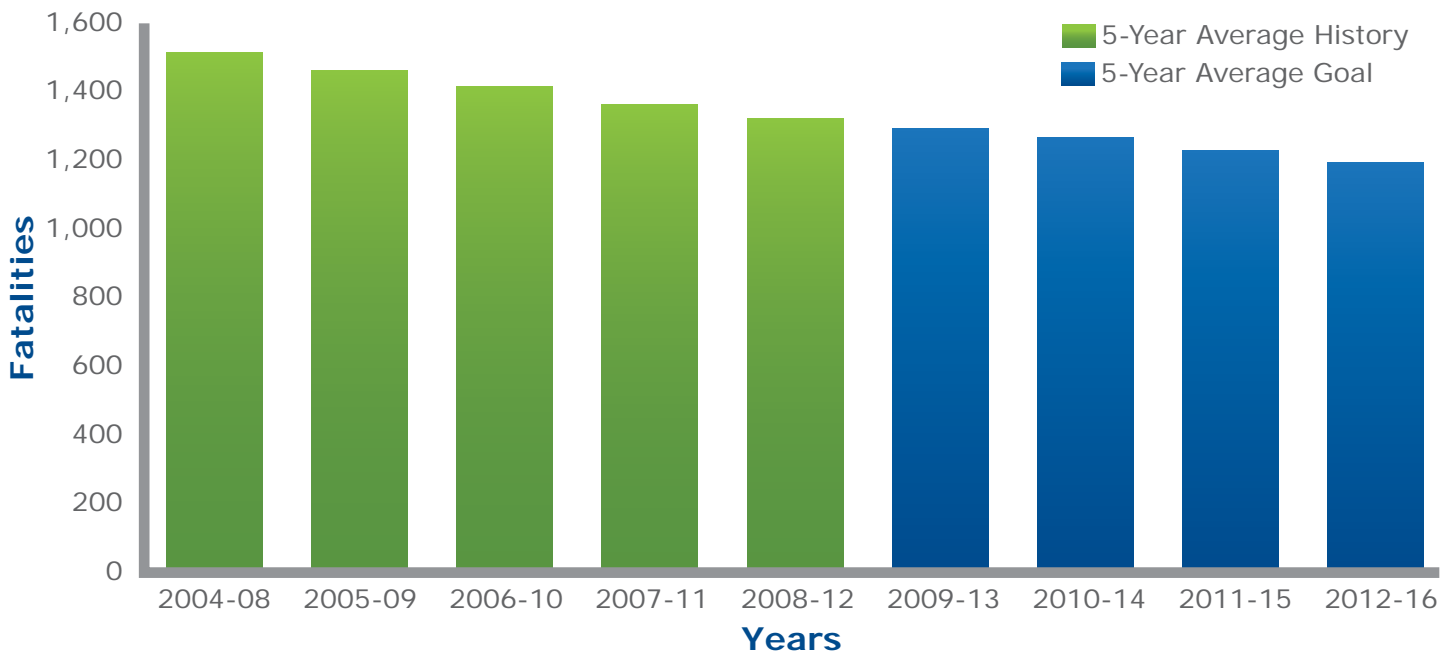
*Source: PennDOT Office of Policy and Public Private Partnerships*

**Strategies**

- Implement the Strategic Highway Safety Plan
- Emphasize the Highway Safety Manual in all design processes
- Address safety issues during earlier phases of project planning
- Partner to expand driver improvement programs for seniors and younger drivers
- Emphasize safety for pedestrians and bicyclists through design modifications, education, and aggressive coordination with enforcement
- Ensure highway design accommodates transit and freight
- Support efforts by the General Assembly to enact tougher laws that address distracted driving
- Address the transport of hazardous materials in business plans, long range transportation plans, and county local hazard mitigation plans

PennDOT has set an aggressive goal of cutting the number of fatalities and injuries by half over the next two decades.

**Figure 32: Historical Fatalities and Future Goals**



Source: FY2014 Pennsylvania Highway Safety Plan

<sup>12</sup>The PennDOT Traffic Operations Section is currently working on an overall Traffic Operations Metrics program which includes working with the various congestion-related business areas. Part of that effort will include working to develop and apply performance metrics for traffic incident management, but currently there are no means to systematically document and measure incident timelines and secondary crashes using existing PennDOT systems and incident reporting processes. However, the department is planning to include metrics on “limited access rear-end crashes” which would provide similar information. Ongoing PennDOT initiatives such as the Corridor Modernization program and the Statewide Transportation Operations Data Warehouse project are initiatives to aid in the establishment, monitoring, and/or measurement of TIM performance measures once fully deployed.



## PERSONAL AND FREIGHT MOBILITY

Expand and improve system mobility and integrate modal connections

### Overview

The state's transportation system will be called upon over time to facilitate the movement of an ever greater share of people and goods. Pennsylvania cannot effectively be “the Keystone State” if its transportation system cannot sustain the existing and future demands that will be placed upon it. PennDOT has many initiatives in place to maintain and improve system mobility. One such initiative is PennDOT's Corridor Modernization program, which is a planning for Transportation Systems Management and Operations (TSM&O) effort to optimize the performance of existing infrastructure by implementing systems, services, and projects that preserve capacity and improve the security, safety, and reliability of the state's transportation system. Additionally, Corridor Modernization will further integrate operations data, performance metrics, and processes into the project planning and programming process.

PA On Track (and new tools related to the long range plan, such as the project prioritization process) was developed in alignment with PennDOT's ongoing work on Corridor Modernization for seamless implementation. The strategies being advanced by PA On Track serve to reinforce the work that PennDOT has initiated not only on Corridor Modernization, but also on other efforts such as “Plan the Keystone,” for passenger rail services, and regional consolidation studies for public transportation. The plan also offers strategies for PennDOT to acquire a better understanding of bicycle and pedestrian infrastructure, and the need to advocate for funding for the state's ports.

### Objectives

- Provide multimodal infrastructure and technology advancements to eliminate bottlenecks and improve system efficiency and trip predictability
- Increase access to jobs, labor, and transportation choices in urban, suburban, and rural communities
- Support communities through appropriate and equitable transportation modal options and investments
- Improve first and last mile intermodal access and connections
- Improve bridge under-clearances and intersection geometry

### Performance Measures

- Annual hours of truck/auto delays (cost of delays)
- Annual transit ridership (e.g., fixed route, shared ride service, etc.)
- Percent/number of freight bottlenecks eliminated





Pennsylvania is recognized nationally for recent efforts to modernize traffic signals and reduce congestion by implementing new technologies. **In Pennsylvania, delay and fuel costs due to traffic signal-related congestion are estimated at \$120 to \$160 million annually**

*Source: 2013 Pennsylvania Transportation Performance Report*

## Strategies

- Optimize multimodal infrastructure through improved operations
- Incorporate a project prioritization tool into statewide planning and programming as a validation process
- Identify the Multimodal Economic Competitiveness Network in collaboration with Pennsylvania's MPOs and RPOs
- Prioritize and enhance intermodal connections ("first and last mile")
- Implement station improvements and interlocking projects on the Keystone Corridor
- Integrate freight mobility and truck parking accommodation needs into the Corridor Modernization program.
- Work with local and state partners to support sustainable community-based shared-ride services
- Develop a systematic approach for calculating bicycle and pedestrian needs statewide
- Partner with private sector freight carriers to investigate strategies for improving modal efficiency
- Advocate for additional funding for the state's ports, locks and dams
- Inventory substandard bridge underclearances for rail

## STEWARDSHIP

Increase efficiency through modernization of assets and streamlining of processes

### Overview

Strategies related to stewardship reflect not only PennDOT's desire to minimize transportation's footprint on the environment, but also in how effectively PennDOT maximizes its use of financial resources in constructing, operating and maintaining the state's transportation infrastructure. In recent years, there have been major cultural shifts within the state's program and project development processes through Smart Transportation and Linking Planning and NEPA. In recent years, PennDOT has advanced initiatives to modernize and optimize the way the agency works while looking for ways to cut costs and realign available resources. Additionally, the State Transportation Innovation Council (STIC) has fostered collaboration in which new ideas and innovations can be evaluated and implemented more quickly.

### Objectives

- Ensure a high standard of quality and maximize effectiveness of agency and user investments
- Enhance the performance of the transportation system while protecting the state's natural, cultural, and historic resources
- Encourage the development and use of innovative technologies
- Support transportation investments that reflect the diversity of Pennsylvanians and their needs
- Support coordination of land use and transportation planning
- Support economic development
- Support technical assistance/training courses offered to municipalities
- Support clean air initiatives
- Promote initiatives aimed at improving system operations and energy efficiency

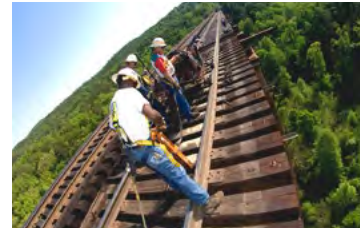
### Performance Measures

- Annual savings through PennDOT modernization
- Timely delivery of approved local projects
- Timely delivery of highway occupancy permits (issued for occupancy of highway right-of-way, opening the surface of the highway, placing a facility or structure, or opening an access to the highway) (**Figure 33**)
- Number of municipal officials trained through the Local Technical Assistance Program (LTAP) on the coordination of land use and transportation planning



### Pennsylvania's State Transportation Innovation Council (STIC)

The STIC consists of a cross-section of various stakeholders, state and federal agencies, local governments, research organizations, and industry partners that work together to forge an environment of innovation, imagination, and ingenuity to pursue specific initiatives and their rapid implementation to deliver a modern and high-quality transportation system to the citizens of Pennsylvania.



Over \$100 million in total savings were realized in 2014 due to modernization initiatives which update and optimize PennDOT policies and procedures, shorten project delivery, and improve customer service while seeking to cut costs and realign resources.

Source: 2015 Pennsylvania Transportation Performance Report

**Strategies**

- Assess weather-related vulnerability in statewide and regional planning
- Continue and accelerate implementation of the “Linking Planning and NEPA Process” to advance project delivery
- Continue sponsoring course offerings on critical land use topics that protect the state’s investments in the transportation system
- Raise awareness of freight’s value to the economy and its impacts on the state’s transportation infrastructure
- Encourage the regional consolidation of transit agencies where efficiencies can be demonstrated
- Use public-private partnerships to expand the available pool of capital and tap into private innovation and approaches
- Investigate opportunities to incorporate technology and Intelligent Transportation Systems across Pennsylvania
- Coordinate with local/county governments on traffic signal management operation and maintenance agreements
- Support the use of alternative fuels and related equipment and facilities
- Continue to plan for the advent of autonomous/connected vehicles

**Figure 33: Reduced Highway Occupancy Permit Application Review Time**



■ 2011 ■ 2014

Source: PennDOT Bureau of Maintenance and Operations

## IMPLEMENTATION STEPS

PA On Track identifies the state’s strategic direction for transportation through a series of goals, objectives, and strategies. Specific actions, however, will be identified and carried out through subordinate plans and planning efforts, such as PennDOT’s business plans, regional LRTPs, county comprehensive plans, and modal plans.

PA On Track is intended to serve as a guidebook for PennDOT as it collaborates with its transportation partners at the state, federal, regional, and local levels. As such, PennDOT will continue to work with its partners in advancing the Plan’s directions, even as it informs the ongoing planning work within its engineering districts and planning partners across the state.

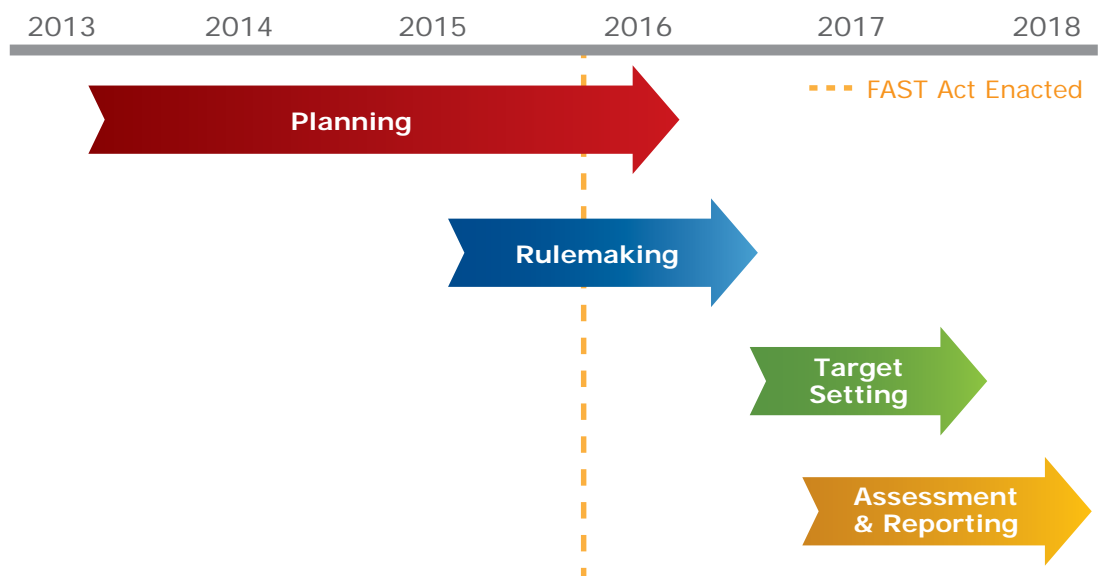
Over the near-term,

PennDOT will be distributing copies of the long range plan to raise awareness of the strategic directions identified, and to help ensure consistency between state and sub-state plans. This will help ensure that all transportation-related efforts being undertaken by the state are consistent with PA On Track. Other ancillary products created as part of the planning process, such as the updated state travel demand model, Commodity Information Management System (CIMS) tool, and project prioritization process, will also be unveiled and shared with partners. Results of the PA On Track plan’s public participation process also lend themselves to regional and county-specific planning efforts. These will also be shared at the MPO/RPO level to help inform and add value to regional transportation planning efforts.

At the Federal level, FHWA and FTA are expected to establish performance measures and state DOT and MPO requirements for establishing and reporting on specific annual targets. For safety, infrastructure condition, and system performance, freight movement and air quality, FHWA will publish three separate Notices of Proposed Rulemakings in the Federal Register with proposed performance measures and state DOT and MPO requirements for establishing and reporting specific annual targets.

The first of these notices was published in March 2014. Following the opportunity to comment on each proposed rule, revisions will be made as appropriate. Via final rules published in the Federal Register, FHWA and FTA will establish the new MAP-21 requirements for performance measurement simultaneously in 2015. In 2016, therefore, PennDOT will work with its planning partners to further develop the strategic direction of PA On Track to identify performance measure targets in a manner that will support MAP-21 (**Figure 34**).

**Figure 34: Implementation Schedule**



The CIMS Tool
As one of the byproducts of this plan, a Commodity Information Management System (CIMS) tool has been developed for use by PennDOT and its partners. The tool takes the Transearch freight data and puts it into a GIS-based, user-friendly interface for improved freight analysis and planning applications.

## APPENDIX A: PROJECTS

Projects on the Transportation Improvement Program and the Twelve Year Program are identified on the PennDOT Transportation Improvement Program webpage.

Route	Title	Improvement	Period	Total (\$000s)
<b>Allegheny County</b>				
79	I-79 Neville Island Br	IM Program	Fourth	97,703
376	Pkwy East Corridor Transp	Safety Improvement	Fourth	81,173
<b>Berks County</b>				
78	Lenhartsville Br Rehab	Bridge Restoration	Fourth	41,608
<b>Central Office</b>				
	Interstate Contingency	Reserve Line Item	Fourth	424,323
	Interstate Contingency	Reserve Line Item	Fifth	1,258,676
	Interstate Contingency	Reserve Line Item	Sixth	2,334,866
<b>Clinton County</b>				
80	I-80 Roadway Restoration	Highway Recon	Fourth	15,657
<b>Cumberland County</b>				
81	I-81 Carlisle West	Highway Restoration	Fourth	13,742
<b>Dauphin County</b>				
83	Eisenhower Int.	Highway Recon	Fourth	100,000
83	Eisenhower Int.	Highway Recon	Fifth	20,000
83	I-83 East Shore Sect 3	Highway Recon	Fourth	200,000
83	I-83 East Shore Sect 3	Highway Recon	Fifth	100,000
<b>Delaware County</b>				
95	I95/US322 Interchng Imprv	IM Program	Fourth	212,339
<b>Lackawanna County</b>				
81	Moosic-Scranton I4R N & S	IM Program	Fourth	86,130
81	Moosic-Scranton I4R N & S	IM Program	Fifth	100,000
<b>Luzerne County</b>				
81	I-81 Bridges Dorrance	Bridge Rpl	Fourth	35,479
8005	SR 8005 ov Interstate 80	Bridge Rpl	Fourth	8,937
<b>Monroe County</b>				
80	I-80 Recnstruction-Monroe	Highway Restoration	Fourth	180,000
80	I-80 Recnstruction-Monroe	Highway Restoration	Fifth	180,000
80	I-80 Recnstruction-Monroe	Highway Restoration	Sixth	145,000
<b>Philadelphia County</b>				
95	I-95: Race - Shackamaxon	Highway Recon	Fourth	137,000
8017	I-95:O/H Brs, Rmps, Adams	Highway Recon	Fourth	52,810
95	I-95: Betsy Ross Mainline	Bridge Replacement	Fourth	168,000
95	I-95: Betsy Ross Mainline	Bridge Replacement	Fifth	14,568
95	I-95: Allegheny Ave Inter	Highway Recon	Fourth	27,667
95	I-95S: Ann St-FrankfordCr	IM Program	Fourth	70,677
95	I-95S: Ann St-FrankfordCr	IM Program	Fifth	100,000

Source: PennDOT Center for Program Development and Management

## APPENDIX B: GLOSSARY OF ACRONYMS

**ACS** – American Community Survey

**AMTRAN** – Altoona Metro Transit

**ATA** – Area Transportation Authority of North Central PA

**BARTA** – Berks Area Regional Transportation Authority

**BCTA** – Beaver County Transit Authority

**BTA** – Butler Transit Authority

**CAMTRAN** – Cambria County Transit Authority

**CAT** – Capital Area Transit

**CATA** – Centre Area Transportation Authority

**CATA** – Crawford Area Transportation Authority

**COLT/LT** – Lebanon County Transit Authority

**COLTS** – County of Lackawanna Transit System

**DCED** – Department of Community and Economic Development

**DuFAST** – DuBois, Falls Creek, Sandy Township Joint Transportation Authority

**DVMT** – Daily Vehicle Miles of Travel

**EMTA** – Endless Mountains Transportation Authority

**EMTA** – Erie Metropolitan Transit Authority

**FACT** – Fayette Area Coordinated Transportation

**FHWA** – Federal Highway Administration

**FTA** – Federal Transit Administration

**HPT** – Hazleton Public Transit

**IndiGO** – Indiana County Transit Authority

**ITS** – Intelligent Transportation System

**LANTA** – Lehigh and Northampton Transportation Authority

**LCTA** – Luzerne County Transportation Authority

**MAP-21** – Moving Ahead for Progress in the 21st Century, the federal surface transportation authorization signed into law in July 2012 and expiring September 2014.

**MCRCOG** – Mercer County Regional Council of Governments

**MCTA** – Monroe County Transportation Authority

**MEC Network** – The Multimodal Economic Competitiveness Network, a proposed network of the state's most strategic transportation facilities comprising part of the framework for a project prioritization process.

**MMVTA** – Mid Mon Valley Transit Authority

**MPO** – Metropolitan Planning Organization

**NAAQS** – National Ambient Air Quality Standards

**NCATA** – New Castle Area Transit Authority

**NEPA** – The National Environmental Policy Act

**NHPP** – National Highway Planning Program

**NHS** – National Highway System

**eNHS** – Enhanced National Highway System

**PAAC** – Port Authority of Allegheny County

**PART** – Pottstown Area Rapid Transit

**PennDOT** – The Pennsylvania Department of Transportation

**PPP** – Public private partnerships

**RPO** – Rural Planning Organization

**RVT** – River Valley Transit

**SCTA** – South Central Transit Authority

**SEPTA** – Southeastern Pennsylvania Transportation Authority

**STIC** – State Transportation Innovation Council

**STS** – Schuylkill Transportation System

**VCTO** – Venango County Transportation Office

**WCTA** – Westmoreland County Transit Authority

**YATA** – York Adams County Transportation Authority





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