DELAWARE VALLEY
dvrpc
REGIONAL
PLANNING COMMISSION

# CONNECTIONS 2045

Plan for Greater Philadelphia

## AMENDMENT

JULY 2020


## The Delaware Valley Regional Planning Commission

is the federally designated Metropolitan Planning Organization for a diverse nine-county region in two states: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey.

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

**DVRPC's vision** for the Greater Philadelphia Region is a prosperous, innovative, equitable, resilient, and sustainable region that increases mobility choices by investing in a safe and modern transportation system; that protects and preserves our natural resources while creating healthy communities; and that fosters greater opportunities for all.

**DVRPC's mission** is to achieve this vision by convening the widest array of partners to inform and facilitate data-driven decision-making. We are engaged across the region, and strive to be leaders and innovators, exploring new ideas and creating best practices.

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# T.O.C.



*Cover photo source: NASA/GSFC/LaRC/JPL, MISR Team.*

## FIGURES



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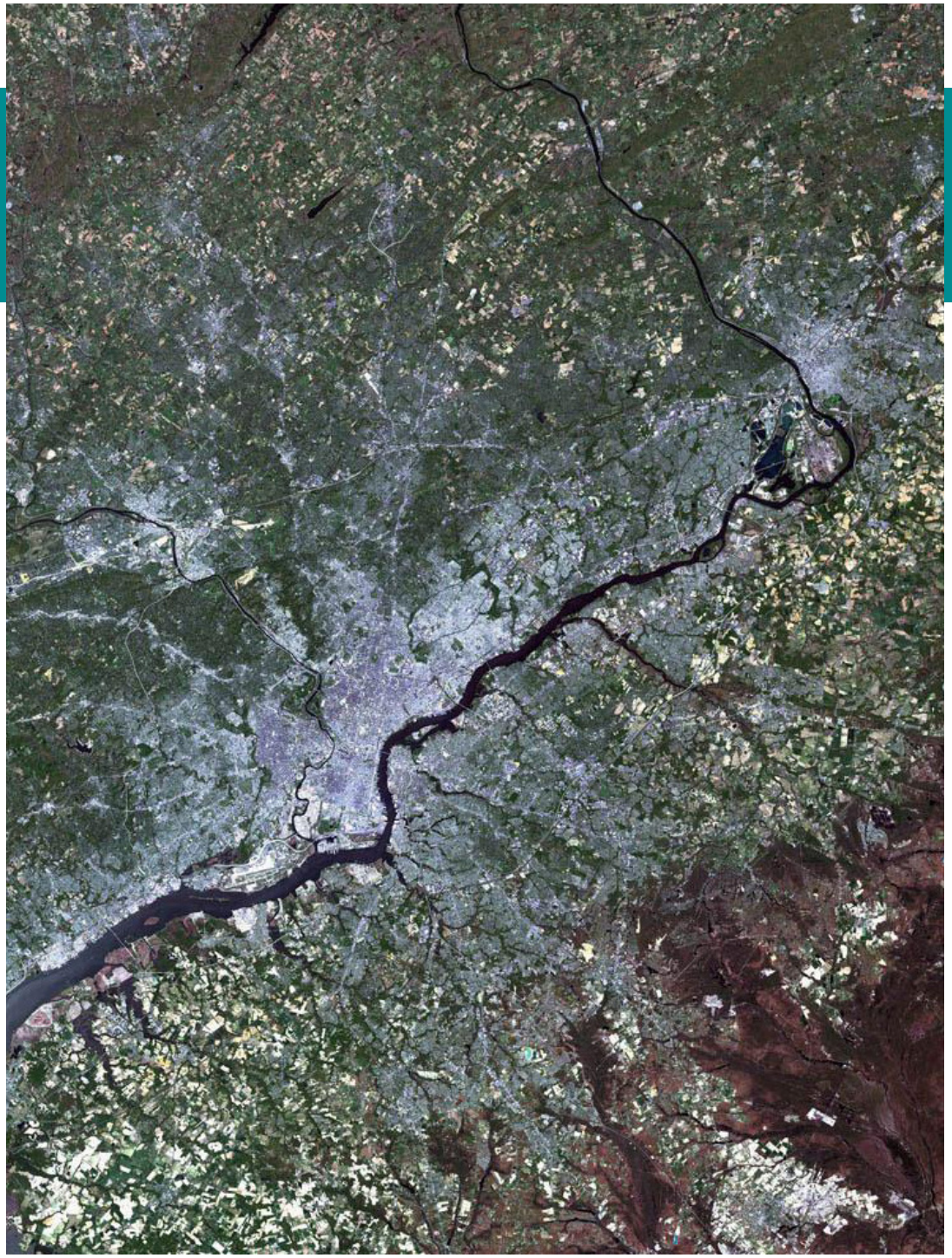


*Source: USGS Landsat Project.*

# 1. INTRODUCTION

*As the federally-designated Metropolitan Planning Organization (MPO) for the nine-county Greater Philadelphia region, the Delaware Valley Regional Planning Commission (DVRPC) is responsible for prioritizing transportation investments for funding with federal and state dollars through a Long-Range Plan (Plan) and Transportation Improvement Program (TIP).* A key function of the region's Long-Range Plan, *Connections 2045* Plan for Greater Philadelphia, is to outline a vision and strategy for how the region will invest in transportation infrastructure through 2045. Since identified needs are greater than anticipated funding, the financial plan prioritizes projects for funding by developing forecasts of reasonably anticipated revenue, allocating the revenue to categories of projects based on need and policy, and evaluating and selecting specific regionally significant projects for funding in the Plan.

This document amends the *Connections 2045* Plan to account for major changes to the Pennsylvania Department of Transportation's (PennDOT) Interstate Management Program (IMP). This Amendment also reports on new Transportation Performance Management (TPM) requirements set forth in federal transportation legislation—Moving Ahead for Progress in the 21st Century Act (MAP-21) and subsequent Fixing America's Surface Transportation (FAST) Act. In addition, this Amendment makes a few revisions to the Major Regional Project list in New Jersey. This Amendment was realeased for public comment while much of the nation and the world was shut down due to the COVID-19

**FIGURE 1: DVRPC NINE-COUNTY REGION**


*Source: DVRPC, 2017.*

coronavirus pandemic. While the long-term impacts of this virus remain uncertain, vehicle miles traveled (VMT) and transit ridership have seen a major decline. This amendment does not address the pandemic. The forthcoming *Connections 2050* Plan update, currently under development will have the opportunity to more fully consider the pandemic's implications.

Chapter 2 of this Amendment details the requirements that MAP-21 and the FAST Act set for State DOTs, transit operators, and MPOs to establish and use a performance-based approach to transportation decision-making. This includes tracking performance measures, setting data-driven targets for each measure, and selecting projects to help meet those targets.[1] The FAST Act also requires that the TIP include a description of its anticipated effect toward achieving the established performance targets, linking investment priorities to those performance targets. Any plan adopted or undergoing a major amendment more than two years after adoption of the final rule for any TPM requires a listing of how the financial plan will help to meet its target(s). The regulations required by FHWA are related to seven national goals:

- Safety
- Infrastructure Preservation
- Congestion Reduction
- System Reliability
- Freight Movement and Economic Vitality
- Environmental Sustainability
- Reduced Project Delivery Delays

1 For more information about the development and implementation of FHWA's Transportation Performance Management (TPM) policy and rulemaking, see www.fhwa.dot.gov/tpm. For the TPM implementation timeline for all performance measures, see www.fhwa.dot.gov/tpm/rule/timeline.pdf.

Transit operators are responsible for developing a transit asset management (TAM) plan that monitors system condition, sets performance targets, and prioritizes investments to achieve state-of-good-repair targets. Transit operators must submit system condition data annually and identify performance targets for the following year to the National Transit Database (NTD). Operators must also submit a narrative each year that describes any change in condition of the system from the previous year and progress made toward meeting the performance targets.

**Any plan adopted or undergoing a major amendment more than two years after adoption of the final rule for any TPM requires a listing of how the financial plan will help to meet its target(s).**

Chapter 3 of this Amendment updates the region's Long-Range Financial Plan, to account for higher funding levels in the IMP and lower funding levels for the region's formula funding. The IMP is a part of Pennsylvania's Statewide Transportation Improvement Program (STIP). It was created to proactively address the maintenance and reconstruction of the state's aging Interstate infrastructure. Additional funding for the IMP was generated by reducing allocations to the various regions throughout the commonwealth. These funds are allocated statewide to specific projects on the Interstate network. PennDOT's Project Management Committee (PMC) acts as the approval body for the IMP,

just like the DVRPC Board acts as the approval body for the regional TIP and Long-Range Plan.

The IMP was established in 2005 with $370 million in annual funding and has since remained at that level. The base $370 million of set-aside funding is currently supplemented from the Secretary of Transportation's discretionary funds to reach a level of approximately $500 million per year. From FY2021 to FY2024 an average of $712 million per year will be available statewide, utilizing the federal National Highway Performance Program Funds that represent the funding available relative to total interstate lane miles and bridges, plus the appropriate state match. The FY2021 TIP has 32 IMP projects in the DVRPC region, totaling over $859 million, which are included in the IMP over the four years from FY2021 to FY2024. Those highway projects (I-95 in the City of Philadelphia, I-76 in Montgomery County, and the I-95/322 Interchange in Delaware County) are listed in a separate IMP section of the TIP document.

Funding for the IMP has not been keeping up with the identified annual $1.2 billion needed to maintain the Commonwealth's interstates. Federal performance measures, as well as the statewide Transportation Asset Management Program (TAMP) required by FHWA will require an increase in IMP funding over time. The IMP will be increased by $150 million in FY2021, plus an additional $50 million for the following six years to reach a total of $1 billion per year by FY2027 (year seven of the current

program). This is not new money, it is generated by reducing funding for each regional TIP throughout the Commonwealth, which will impact the maintenance and improvement of non-Interstate facilities.

The Long-Range Plan maintains separate financial plans for the Pennsylvania and New Jersey portions of the DVRPC region. Due to the changes in the IMP funding, this amendment focuses on revising roadway projects in the Pennsylvania subregion, although there are some changes to the project set in New Jersey. Table 1 identifies the projects revised from the *Connections 2045* Plan adopted in October 2017. Maintaining fiscal constraint required moving all or part of six Major Regional Projects outside the FY2021 TIP's 12-year program. Those projects are US 1 in Bucks County; US 30-Coatesville-Downingtown Bypass in Chester County; US 1 at PA 352 and PA 452 in Delaware County; I-76 and Belmont interchange, and the Second Collegeville Bridge Crossing in Montgomery County; and I-95

**TABLE 1: REVISED MAJOR REGIONAL PROJECTS SUMMARY**

| FACILITY | COUNTY | SCOPE | CHANGE |
|---|---|---|---|
| US 1 | Bucks | Reconstruct from I-276 (PA Turnpike) to NJ state line; widen from PA Turnpike to PA 413; Interchange improvements | Cost increase and pushed construction timing back |
| PA 663 from Portzer Road to Hickory Drive | Bucks | Widen to 4 lanes between Portzer Road and Hickory Drive, including turn lanes; and construct 8' wide bike/pedestrian pathway | Added new project |
| Bristol Road Extension | Bucks | Extend roadway from US 202 to Park Avenue | Cost increase |
| US 30-Coatesville-Downingtown Bypass | Chester | Reconstruct from PA 10 to the Exton Bypass; interchange improvements at Airport Road and PA 113; part-time shoulder use or flex lanes from PA 82 to US 202 | Revised scope, cost increase, and pushed construction timing back |
| Orvis Road | Chester | New connector road parallel to US 202 from Stetson School driveway to West Pleasant Grove Road | Added new project |
| Ashburn Road Extension | Chester | 0.34-mile extension to Township Line Road | Added new project |
| West Chester Pike (PA 3) | Delaware | Widen with additional through travel lane from College Avenue to Ellis Avenue | Added new project |
| US 1 at PA 352 and 452 | Delaware | Reconstruction of PA 352 cloverleaf interchange, Media Bypass/ Baltimore Pike interchange, and PA 452 intersection; and eliminate lane drops | Cost increase and pushed construction timing back |

*continued on next page...*

| FACILITY | COUNTY | SCOPE | CHANGE |
|---|---|---|---|
| I-95/US 322/Highland Avenue Interchange | Delaware | Realign I-95 and add new movements at interchange to US 322, Bethel Road, and Highland Avenue | Cost decrease and moved into TIP |
| I-476 Active Traffic Management | Delaware | Part-time shoulder use and other operational strategies from PA 3 to I-95; and on southbound I-95 from I-476 to US 322 | Revised scope, cost increase, and moved into TIP |
| I-95 Delaware County Active Traffic Management | Delaware | Part-time shoulder use and other operational strategies southbound from Stewart Avenue to I-476 and northbound from US 322 East to Stewart Avenue | Revised scope |
| I-95 Sound Walls | Delaware | Installation of sound walls in Chester City | Cost decrease |
| Belmont Avenue at I-76 Interchange | Montgomery | Widen Belmont Avenue to provide additional lanes, intersection improvements and streetscape improvements; modify I-76 and railroad overpasses | Cost increase and pushed construction timing back |
| Spring House Road | Montgomery | Widen for additional through lane from Norristown Road to Sumneytown Pike | Added new project |
| Philmont Avenue/Tomlinson Road/Pine Road | Montgomery | Intersection improvements | Cost increase and moved into TIP |
| Horsham Road | Montgomery | Widen to two through lanes in each direction from Limekiln Pike to Davis Grove. Widen Limekiln Pike to two through lanes at intersection with Horsham Road | Added new project |
| District 6 Traffic Management Center | Montgomery | New Regional Traffic Management Center at PennDOT District 6 Headquarters | Moved into TIP |
| Second Collegeville Bridge Crossing | Montgomery | Provide additional bridge over the Perkiomen Creek between Ridge Pike and Germantown Pike to connect with PA 29 | Moved into unfunded vision |
| I-276/PA 611 Willow Grove Interchange | Montgomery | Interchange modernization | Updated project cost estimate |
| I-276/I-76 Valley Forge Interchange | Montgomery | Interchange modernization | Updated project cost estimate |
| I-276 and Virginia Drive Interchange | Montgomery | Add full movements | Updated project cost estimate |
| I-276 and Henderson Road | Montgomery | New interchange | Updated project cost estimate |

*continued on next page...*

| FACILITY | COUNTY | SCOPE | CHANGE |
|---|---|---|---|
| I-276 and PA 63/Welsh Road | Montgomery | New interchange | Updated project cost estimate |
| I-76 Integrated Corridor Management | Montgomery | ATM, multimodal improvements and coordination, and safety analysis from PA Turnpike to US 1; part-time shoulder use from US 202/US 422 to I-476/Conshohocken, and I-476/Conshohocken to Belmont Avenue/Green Lane | Cost increase |
| Henderson Road and South Gulph Road | Montgomery | Widen Henderson Road from South Gulph Road to Shoemaker Road; Widen South Gulph Road from Crooked Lane to I-76/Gulph Mills interchange | Cost decrease |
| PA 63 at Welsh Road | Montgomery | Bridge replacements and minor widening for turn lanes between Blair Mill Road and Twining Road | Reclassify from System Expansion to Operational Improvement, and cost increase |
| Penn's Landing Cap and Civic Space | Philadelphia | Cap over I-95 and Columbus Boulevard between Walnut and Chestnut Streets creating an 8-acre civic space; extension of the South Street Bridge to the waterfront; and construction of a two-mile on-road section of the Delaware River Trail from Spring Garden Street to Washington Avenue in Center City, Philadelphia | Cost increase |
| Schuylkill River Swing Bridge | Philadelphia | Provide a bicycle and pedestrian connection across the Schuylkill River between the Kingsessing and Grays Ferry neighborhoods of Philadelphia | Cost increase |
| I-95 Philadelphia North | Philadelphia | Reconstruct from Race Street to State Road; Interchange improvements at Vine, Girard, Allegheny, Betsy Ross Bridge, Bridge, and Cottman interchanges | Cost increase and pushed construction timing back |
| 37th Street Extension | Philadelphia | One-block connector for vehicles with a pedestrian-friendly streetscape between Market Street and Filbert Street | Added new project |
| Market Street over Schuylkill River | Philadelphia | Rehabilitate Market Street Bridge over Schuylkill River and CSX rail tracks | Added new MRP |
| I-295/NJ 38 (Missing Moves) | Burlington | Add Missing Movements to Interchange at NJ 38 | Cost increase and moved from TIP to unfunded vision |
| I-295/NJ 42 (Missing Moves) | Camden/ Gloucester | Add Missing Movements to Interchange at I-76/NJ 42 | Cost increase |
| US 1 from Alexander Road to Mapleton Road | Mercer | Widen from 6 to 8 lanes from the Dinky Bridge to Scudders Mill Road; intersection improvements at Washington Road and Harrison Street | Regional cost increase per cost sharing agreement with NJTPA |

*Source: DVRPC, 2020.*

reconstruction in north Philadelphia. Several other Major Regional Projects have advanced into the TIP since the Plan was adopted. These include the 1-95/US 322/Highland Avenue interchange and I-476 active traffic management in Delaware County, and the District 6 PennDOT traffic management center and Philmont Avenue/Tomlinson Road/ Pine Road in Montgomery County. The amendment also accounts for a series of minor system expansion projects that have emerged from PennDOT's Multimodal Fund and various project cost increases and decreases that have occurred since the Plan was initially adopted. Table 1 also includes projects with a significant cost change.

Three Major Regional Projects were impacted in the New Jersey portion of the region, due to cost increases in the New Jersey TIP since the *Connections 2045* Plan was adopted. The I-295/NJ 38 (Missing Moves) project was removed from both the Plan and the TIP due to funding concerns, and is now listed in the unfunded vision list. The I-295/NJ 42 (Missing Moves) project saw a cost increase. Finally, a new cost sharing agreement with the North Jersey Transportation Planning Authority, the 13-county MPO for northern New Jersey, shifted more of the US 1 project in Mercer and Middlesex counties onto the DVRPC TIP, but did not change the overall project cost.

## PUBLIC COMMENT

A public comment period was held from May 26, 2020 to June 29, 2020 to accept input on the draft Long-Range Plan Amendment. The draft document was made available online. DVRPC's offices and public libraries were closed during this period due to various state and local stay-at-home orders as a result of the COVID-19 pandemic. DVRPC's Office of Communications & Engagement conducted a survey of its library partners to gather recommendations for how DVRPC could bridge the "digital divide" and asked that they use their online platforms to promote the public comment period. The comment period was advertised by legal notice in area newspapers, on the DVRPC web page, and via email to over 12,000 recipients on DVRPC's distribution list. DVRPC also emailed the document to its list of tribal governments.

As part of the comment period, two online public information sessions were held on June 17 at 2 PM and 7 PM, via webinar and a call-in function. Comments were able to be submitted at the June 17 meetings, by mail, email, fax, or online form. Three comments on the draft Amendment were received during this period. Those comments were presented to the DVRPC Board at its July 2020 meeting, and all comments and responses are available at www.dvrpc.org/longrangeplan.

Source: DVRPC.

Source: Paul Reitano Photography.


Source: Shoshana Akins, DVRPC.

# 2. TRANSPORTATION PERFORMANCE MANAGEMENT

**DVRPC's long-range planning process has long been rooted in Performance-Based Planning and Programming (PBPP).** Even though the *Connections 2045* Long-Range Plan was adopted before the final TPM planning requirements went into effect, it incorporates the tenets of TPM. The Plan was developed using indicators to gauge progress toward regional goals, scenarios to consider alternative futures, and investments that were selected using project evaluation criteria that are based on regional and long-range plan goals, including asset management, safety, and system reliability.

The intent of PBPP is to ensure targeted investment of federal transportation funds by increasing accountability and transparency and providing for better investment decisions that focus on key outcomes. A series of rulemakings established a set of performance measures for State DOTs and MPOs to use as required by MAP–21 and the FAST Act.[2] The first rule (PM1) considers roadway safety measures, the second (PM2) focuses on infrastructure condition, while the third (PM3) looks at system performance—including congestion reduction, system reliability, freight movement and economic vitality, and environmental sustainability. There are multiple performance measures established within these groupings. Table 2 summarizes these measures, the area in which they are being reported for, the facilities that are included, and the update frequency.

State Departments of Transportation are required to establish targets for each performance measure and report progress toward the target. MPOs, such as DVRPC, must either support the state DOT targets or may establish their own regional targets. As a bi-state MPO, DVRPC must plan and program projects to contribute toward separate sets of targets—one set for each State in which the planning area boundary extends. DVRPC has agreed to support the respective PennDOT and NJDOT PM1, PM2, and PM3 targets. Written procedures were developed between the state DOTs and MPOs regarding the coordination of TPM activities.

The regulations required by the Federal Transit Administration (FTA) have established a strategic and systematic process of operating, maintaining, and improving transit capital assets effectively through their lifecycle. The performance management requirements are a

2 For more information about the development and implementation of Transportation Performance Management (TPM) policy and rulemaking, see www.fhwa.dot.gov/tpm for roadways and www.transit.dot.gov/performance-based-planning for Transit. For the TPM implementation timeline for all performance measures, see www.fhwa.dot.gov/tpm/rule/timeline.pdf for Highway and www.transit.dot.gov/regulations-and-guidance/transportation-planning/timeframes-performance-based-planning for Transit.

minimum standard for transit operators and involve measuring and monitoring Transit Assets and Transit Safety.

Transit agency operators are required to establish targets for each performance measure and report progress toward the target. Table 3 summarizes the FTA performance measures. MPOs must either support the transit agency targets or may establish their own regional targets. DVRPC has agreed to support the respective SEPTA, New Jersey Transit, and DRPA/PATCO targets for transit assets. Transit safety performance measures will be set for the first time in calendar year 2020.

## TABLE 2. FHWA PERFORMANCE MEASURES SUMMARY

| GOAL AREA | PERFORMANCE MEASURE | GEOGRAPHY | NETWORK | REPORTING FREQUENCY |
|---|---|---|---|---|
| PM1 Roadway Safety | Number of Fatalities | Statewide or Regional | All Roads | Annual |
| | Fatality Rate (per 100 million VMT) | | | |
| | Number of Serious Injuries | | | |
| | Serious Injury Rate (per 100 million VMT) | | | |
| | Number of Non-Motorized Fatalities and Serious Injuries | | | |
| PM2 Infrastructure Condition | Good Pavement Lane Miles | Statewide or Regional | Interstates & NHS | 2-Year Interim Target, 4-Year Target |
| | Poor Pavement Lane Miles | | | |
| | Good Bridge Deck Area | | NHS | |
| | Poor Bridge Deck Area | | | |
| PM3 System Performance | Person-Miles Traveled with Reliable Travel Times (%) | Statewide or Regional | Interstates & NHS | 2-Year Interim Target, 4-Year Target |
| | Truck Travel Time Reliability Index | | Interstates | |
| | Percentage non-SOV Travel | Philadelphia (PA-NJ-DE-MD); and New York (NY-CT-NJ) Urbanized Areas | All Urbanized Area Commuters (via ACS) | |
| | Peak Hour Excessive Delay (PHED) per Capita | | All NHS roads within Urbanized Areas, AM & PM Peak Periods | |
| | CMAQ Emissions Reductions | Regional and Statewide | CMAQ Projects | |

*Source: DVRPC adapted from FHWA. 2020.*

## TABLE 3. FTA PERFORMANCE MEASURES SUMMARY

| GOAL AREA | PERFORMANCE MEASURE | GEOGRAPHY | NETWORK/ASSETS | REPORTING FREQUENCY |
|---|---|---|---|---|
| Transit Assets | Rolling Stock | Entire Transit Agency Service Area | Revenue Vehicles | Annual |
| | Equipment | | Non-Revenue Vehicles | |
| | Facilities | | Passenger and Administrative/ Maintenance Facilities | |
| | Infrastructure | | Rail Track | |
| Transit Safety | Fatalities | Entire Transit Agency Service Area | Entire Transit Agency Service Area NHS | Annual |
| | Injuries | | | |
| | Safety Events | | | |
| | System Reliability | | | |

*Source: DVRPC adapted from FTA, 2020.*

## ROADWAY SAFETY (PM1)

On March 27, 2016, the FHWA Highway Safety Improvement Program and Safety Performance Management Measures Rule (Safety PM Rule or PM1) was finalized and published in the Federal Register. The federal safety performance measures are based on consecutive five-year rolling averages for:

- Number of Fatalities
- Rate of Fatalities per 100 million vehicle miles traveled (VMT)
- Number of Serious Injuries
- Rate of Serious Injuries per 100 million VMT
- Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries (combined)

Starting in calendar year 2018, State DOTs and MPOs are required to set annual targets for these five safety performance measures. State DOTs are required to submit an annual safety report to FHWA that includes baseline values, targets, and progress toward meeting the targets.

### ROADWAY SAFETY TARGETS

Both PennDOT and NJDOT adopted their goals to support the national vision for highway safety–Toward Zero Deaths: A National Strategy on Highway Safety. Safety targets were established after careful consideration of previous trends, recently constructed projects, and the current socioeconomic environment. Using a five-year rolling average and projected numbers in the target calculation, as required, can result in a higher target number than baseline number in the short-term if the recent historic data has been trending upward. Due to these uncertainties, many states took a cautious approach to setting targets, with the understanding that reaching zero fatalities on all public roads will require time and significant effort. DVRPC supported both PennDOT and NJDOT state targets to align regional efforts with state goals.

Table 4 details PennDOT's and NJDOT's statewide safety targets for calendar year (CY) 2020. PennDOT published its most recent *Strategic*

**TABLE 4. 2016-2020 STATEWIDE SAFETY TARGETS**

| STATE | PERFORMANCE MEASURE | FIVE-YEAR ROLLING AVERAGE | |
|---|---|---|---|
| | | BASELINE (2014–2018) | TARGET (2016–2020) |
| PA | Number of Fatalities | 1,182 | 1,171.9 |
| | Fatality Rate | 1.169 | 1.148 |
| | Number of Serious Injuries | 3,839.6 | 4,400.3 |
| | Serious Injury Rate | 3.797 | 4.309 |
| | Number of Non-Motorized Fatalities and Serious Injuries | 679 | 781.7 |
| NJ | Number of Fatalities | 581.6 | 582.8 |
| | Fatality Rate | 0.759 | 0.744 |
| | Number of Serious Injuries | 1,110.8 | 1,167.9 |
| | Serious Injury Rate | 1.449 | 1.489 |
| | Number of Non-Motorized Fatalities and Serious Injuries | 392.7 | 407.9 |

*Sources: PennDOT and NJDOT, 2020.*

*Highway Safety Plan* (SHSP) in early 2017. The goals outlined in PennDOT's 2017 SHSP were used to help define targets for the Safety PM Rule.

PennDOT's 2017 SHSP set a goal of reducing fatalities and serious injuries on PennDOT roadways by 2 percent per year. However, this reduction may not be readily apparent in the table because of the specific calculation required for the baseline and target numbers. Using a five-year average and projected numbers in the target calculation, as required, can result in a higher target number than baseline number. For example, the higher target number for the serious injury calculation is a direct result of Pennsylvania changing the definition of a serious injury to include many injuries not previously counted as serious. This increased the 2016 and subsequent years' serious injury number significantly. The five-year average baseline calculation uses this higher 2016 number once (for one year) as part of calculating the average. For the target calculation, even while projecting a 2 percent reduction in 2017 and 2018, the calculation uses higher numbers for three of the five years in calculating the average (due to the definition change), resulting in a higher target than baseline number. The same principle applies to the baseline and target calculations of the non-motorized fatalities and serious injuries.

The 2015 NJDOT SHSP is data driven, sets long-term goals, and is a coordinated statewide plan that identifies the most significant infrastructure and behavioral safety issues on New Jersey's public roads.[3] It identifies 16 key safety emphasis areas, including lane departure, drowsy and distracted driving, aggressive driving, intersections, pedestrians and bicyclists, and mature drivers; and supporting strategies that are likely to have the largest impact on improving safety on public roadways. The SHSP also guides the allocation of safety funding and resources to reduce highway fatalities and serious injuries on New Jersey's public roadways.

The SHSP sets a statewide goal to reduce serious injuries and fatalities by 2.5 percent annually. Various agencies, including FHWA, NJDOT, New Jersey Division of Highway Traffic Safety (NJDHTS), and the MPOs, recognize that reaching zero fatalities will require time and significant effort by many different partner agencies. Therefore, annual targets must be data driven, realistic, and achievable. Targets are important for agencies to make interim progress toward the long-term goal of Toward Zero Deaths in the SHSP. The goal of setting data-driven, realistic, and achievable performance targets each year will help agencies better utilize their safety resources in ways that can result in the greatest reduction in fatalities and serious injuries over time. NJDOT is developing a new SHSP, which is scheduled for completion in the summer of 2020.

NJDOT and the MPOs in New Jersey adopted targets legislated as part of the previous MAP-21 federal transportation authorization, which has involved a great deal of coordination and analysis among these agencies. These agencies aim to reduce the number of fatalities, serious injuries, and non-motorized fatalities in New Jersey.

*3 The NJDOT SHSP is available at www.state.nj.us/transportation/about/safety/sshsp.shtm.*

## COORDINATION ON SAFETY TARGETS

The 2017 Pennsylvania SHSP was developed in conjunction with over 45 stakeholders including federal, state, and local agencies, and private-sector organizations, and Pennsylvania's MPOs and Rural Planning Organizations (RPOs), coordinating together to address the four E's of the safety discipline (Engineering, Enforcement, Education, and Emergency Response).

The NJDOT SHSP was developed in collaboration with the NJDHTS and New Jersey's three MPOs to focus on activities that will be most effective in reducing fatalities and serious injuries. To strengthen communication and coordination efforts, various technical safety experts and planning staff from the MPOs and NJDOT meet regularly to discuss Highway Safety Improvement Program (HSIP) project advancement and performance measure targets and goals.

## PROGRESS TOWARD SAFETY TARGETS

Safety is the highest ranked criterion in DVPRC's TIP-LRP Project Benefit Criteria, accounting for 27 percent of the investment recommendation. Each project is evaluated based on implementation of FHWA-proven safety countermeasures or other safety strategies with specific crash reduction factors; whether it is located in State DOT or county-identified high-crash locations and crashes in communities of concern; or if it is a safety-critical transit projects that helps meet the safety performance measures identified by a Public Transportation Agency Safety Plan (PTASP). This focus on safety is intended to gear all transportation investments toward achieving greater safety outcomes, beyond safety specific programming through HSIP. *Connections 2045* aims to invest 11.75 percent of total roadway revenues in Pennsylvania to safety and operational improvements, and 12.0 percent in New Jersey. In both states, the bulk of the Plan's reasonably anticipated roadway funds will be spent on roadway system preservation projects (80.5 percent in Pennsylvania and 78.5 percent in New Jersey), which will also have safety benefits.

**Safety is the highest ranked criterion in DVPRC's TIP-LRP Project Benefit Criteria, accounting for 27 percent of the investment recommendation.**

### SIGNIFICANT PROGRESS DETERMINATION

Beginning in calendar year 2020, FHWA will determine whether a state has met or made significant progress toward its safety performance targets. A state is considered to have met or made significant progress when at least four out of the five safety performance targets are met or the actual outcome for the safety performance target is better than baseline performance.

For the 2014-2018 reporting period, New Jersey met or made significant progress on four of the five performance measures (Number and Rate of Fatalities, and Number and Rate of Serious Injuries). Pennsylvania only met or made significant progress on two of the five performance measures (Number and Rate of Fatalities). The penalty for not meeting targets or making significant progress:

- A State DOT must submit an HSIP Implementation Plan; and.
- Use obligation authority equal to the HSIP apportionment for the prior year, only for highway safety projects.

## INFRASTRUCTURE (PAVEMENT AND BRIDGE) ASSETS (PM2)

The FHWA final rule for the National Performance Management Measures; Assessing Pavement Condition for the National Highway Performance Program (NHPP) and Bridge Condition for the NHPP was published in the Federal Register (82FR5886) on January 18, 2017 and became effective on February 17, 2017. It established performance measures for all State DOTs to use to carry out the National Highway Performance Program (NHPP) and to assess the condition of pavements on the Interstate System, pavements on the National Highway System (NHS) (excluding the Interstate System), and bridges carrying the NHS which include on- and off-ramps connected to the NHS. The NHPP is a core Federal-aid highway program that provides support for the condition and performance of the NHS and the construction of new facilities on the NHS. The NHPP also ensures that investments of Federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets as established in a State's Transportation Asset Management Plan (TAMP) for the NHS. The Infrastructure Performance Management Measure rule requires the State DOT to report and manage performance of the NHS, regardless of ownership or maintenance responsibility, for the full extent of the Interstate and Non-Interstate NHS. This final rule establishes regulations for the new performance aspects of the NHPP that address measures, targets, and reporting.

Road pavements are classified as one of three types: concrete, bituminous (also known as asphalt), and jointed concrete—which is a series of contiguous concrete slabs joined together. Pavement condition is measured by up to three distress components: International Roughness Index (IRI), cracking, and either rutting or faulting.

- IRI quantifies how rough the pavement is by measuring the longitudinal profile of a traveled wheel track and generating a standardized roughness value in inches per mile.
- Cracking measures the percentage of bituminous and concrete pavement surface that is cracked.
- Rutting measures the depth of ruts (surface depression) in bituminous pavement in inches.
- Faulting quantifies the misalignment between concrete slabs as the difference in elevation across transverse concrete pavement joints in inches.

Roughness affects travel speeds, safety, comfort, and transportation costs. Cracking, rutting, and faulting are surface indicators of underlying structural deterioration. The use of these measures varies with different pavement types, see Table 5. All three pavement types consider IRI and cracking. Bituminous pavements additionally consider rutting, while jointed concrete also utilizes faulting. These metrics are then translated to good, fair, or poor condition scores per FHWA criteria and then broken out into separate values for the Interstate and Non-Interstate NHS. A pavement is considered to be in good condition if it meets or exceeds all the values for the applicable measures for good condition. A pavement is in poor condition if it exceeds any two of the applicable thresholds for poor condition.

Prior to the TPM requirements, all PennDOT pavement data was collected for one-half-mile roadway segments. Federal rulemaking 23 U.S.C.119 requires that all distress component information be collected for one-tenth-mile increments. PennDOT and its partners have adjusted their pavement data collection to meet FHWA standards. One-tenth-mile increment data collection began in 2017 for cracking, rutting, and

## TABLE 5. COMPUTING PAVEMENT CONDITION

| PAVEMENT TYPE | MEASURE | GOOD* | FAIR | POOR** |
|---|---|---|---|---|
| B, C, J | IRI (inches/ mile)*** | <95 | 95-170 | >170 |
| B, C, J | Cracking (%) | <5% | Concrete: 5%-10%<br>Jointed: 5%-15%<br>Bituminous: 5%-20% | >10%<br>>15%<br>>20% |
| B | Rutting (inches) | <0.20 | 0.20-0.40 | >0.40 |
| J | Faulting (inches) | <0.10 | 0.10-0.15 | >0.15 |

*Notes:*
*B = Bituminous pavement.*
*C = Continuous concrete.*
*J = Jointed Concrete.*
**A section of pavement is in good condition if all applicable measures meet the standard for good.*
***A section of pavement is considered to be in poor condition if any two of the applicable measures are greater than the standard for poor.*
****For roads with posted speed limit under 40 mph, pavement surface rating (PSR), has a value between 0.0 and 5.0, can substitute for IRI. Good pavement condition is a PSR ≥ 4.0 and poor pavement condition is a PSR ≤ 2.0.*
*Source: DVRPC adapted from FHWA, 2020.*

faulting and will be used for future submissions of the TAMP. No more than 5 percent of each state's Interstate System can have missing, invalid, or unresolved data.

The FHWA final rulemaking for PM2 also established performance measures for all mainline Interstate Highway System and Non-Interstate NHS bridges regardless of ownership or maintenance responsibility. This includes bridge on-ramps connecting to the NHS and NHS bridges that span a state border. FHWA's performance measures aim to assess bridge condition by deriving the percentage of NHS bridges rated in good and poor condition by total deck area on the NHS. Separate bridge structure condition ratings are collected for deck, superstructure, and substructure components during regular inspections using the National Bridge Inventory (NBI) Standards. Culvert structures have only one condition rating: the culvert rating.

Each component is given a rating that ranges between 9 and 0 on the FHWA condition scale. A rating of 7 or higher is considered to be in good condition. A rating of 4 or lower is considered to be in poor condition. A structure's overall condition rating is determined by the lowest value for its deck, superstructure, substructure, or culvert rating. If any of the components of a structure qualify as poor, the structure is deemed poor; while all the components must have a good rating for the structure to be deemed in good repair. Poor condition does not mean the bridge is unsafe to use. Both PennDOT and NJDOT will take necessary action to restrict heavy-weight vehicles or close a bridge in order to ensure safety. Bridge condition performance measures are calculated by summing the deck area of bridges in "good" and "poor" condition and dividing by the total deck area of all NHS bridges.

## PAVEMENT PERFORMANCE TARGETS

Initial state two-year and four-year targets—the desired state-of-good repair (SGR)—were due May 20, 2018. PennDOT's pavement condition targets, see Table 6, are consistent with its asset management objectives of maintaining the system at the desired SGR, managing to lowest lifecycle costs (LLCC), and achieving national and state transportation goals. LLCC is a tool to determine the best option by considering all transportation agency expenditures and user costs throughout the life of an alternative, not just the initial investment. On October 25, 2018, the DVRPC Board agreed to support both PennDOT

and NJDOT's statewide Pavement Infrastructure Performance targets and their efforts at achieving those targets.

NJDOT developed pavement targets by using its pavement management system and internal measures, metrics, and budget information to predict future performance. A correlation analysis was developed and then applied to the state highway system performance, which showed a gradually declining trend on both the Interstate and Non-Interstate NHS pavements at current funding levels. NJDOT also sent a survey to all NHS owners requesting past and future expenditures on NHS routes and qualitative information regarding future funding and pavement performance to help validate results of the correlation analysis.

Federal standards under Section 490.315 require that no more than 5 percent of NHS pavement be in poor condition. Both NJDOT's and PennDOT's two-year and four-year targets anticipate a worsening of conditions. However, NJDOT's poor condition target of 2.5 percent is well below the maximum of 5 percent; while PennDOT aims to meet the federal standard. Both are currently well below this threshold. If this threshold is not met, restrictions are placed on the State DOT's NHPP and Surface Transportation Program (STP) funds. FHWA has not

**TABLE 6. STATE PAVEMENT INFRASTRUCTURE PERFORMANCE TARGETS**

| STATE | PAVEMENT INFRASTRUCTURE | CONDITION | BASELINE (2017) | 2-YEAR TARGET (2019 | 4-YEAR TARGET (2021) |
|---|---|---|---|---|---|
| PA | Interstate Lane Miles | Good | 67.2% | N/A | 60.0% |
| | | Poor | 0.4% | N/A | 2.0% |
| | Non-Interstate NHS Lane Miles | Good | 36.8% | 35.0% | 33.0% |
| | | Poor | 2.3% | 4.0% | 5.0% |
| NJ | Interstate Lane Miles | Good | 61.25% | N/A | 50.0% |
| | | Poor | 1.01% | N/A | 2.5% |
| | Non-Interstate NHS Lane Miles | Good | 32.45% | 25.0% | 25.0% |
| | | Poor | 2.38% | 2.5% | 2.5% |

*Note: TWO-year targets (FY2019) for the Interstate are not required for the first performance period (hence "n/a").*
*Source: PennDOT and NJDOT.*

established a minimum condition for NHS Non-Interstate roadways, but requires the State DOTs and MPOs to establish performance targets.

## BRIDGE PERFORMANCE TARGETS

On October 25, 2018, the DVRPC Board agreed to support both PennDOT and NJDOT's statewide Bridge Infrastructure Performance targets and their efforts toward achieving those targets. 23 CRF 490.411(a) requires that no more than 10 percent of a state's total NHS bridges by deck area be in poor condition. Both PennDOT's and NJDOT's baseline bridge condition and two-year and four-year statewide targets are below this threshold, as shown in Table 7. PennDOT's bridge condition targets are consistent with its asset management objectives of maintaining the system at the desired SGR, managing to LLCC, and achieving national and state transportation goals.

### TABLE 7. STATE NHS BRIDGE INFRASTRUCTURE PERFORMANCE TARGETS

| BRIDGE INFRASTRUCTURE | CONDITION | BASELINE (2017) | 2-YEAR TARGET (2019) | 4-YEAR TARGET (2021) |
|---|---|---|---|---|
| Pennsylvania NHS Bridge Deck Area | Good | 25.6% | 25.8% | 26.0% |
| | Poor | 5.5% | 5.6% | 6.0% |
| New Jersey NHS Bridge Deck Area | Good | 20.7% | 19.4% | 18.6% |
| | Poor | 6.5% | 6.5% | 6.5% |

*Source: PennDOT and NJDOT, 2020.*

NJDOT established the state-maintained National Bridge Inspection Standards (NBIS) Bridge targets based on available National Bridge Inventory (NBI) data, current project delivery process, project pipeline capacity, and current practices adopted by NJDOT, including available financial information, lifecycle planning strategies, and capital investment strategies. Then, NBI historical data from CY2012 to CY2018 was analyzed to develop trends on the NHS bridge conditions. Targets were adjusted to incorporate data on other owners' NHS bridges, federally owned NBIS bridges, and border NBIS bridges reported by neighboring states. NJDOT assumed that bridges owned by others will remain stable. NJDOT is collecting more information in order to implement AASHTOWare's Bridge Management software as their main data analysis tool to develop better targets for the population of NHS bridges rated as good and poor.

NJDOT owns and maintains just 52 percent of NHS bridge deck area in New Jersey. Transportation authorities and commissions own and maintain 38 percent; while the remaining 10 percent is owned and maintained by counties, municipalities, NJ TRANSIT, various other agencies, and private owners. NJDOT projects a gradual decrease of bridges in good condition. The poor condition targets are flat because the New Jersey Turnpike Authority is responsible for two-thirds of the remaining NHS bridges in poor condition, and they have recently completed a major upgrade to their system and increased funding for bridge maintenance. Additionally, there was a recent increase of funding, from $25 million to $44+ million per year, for county bridge owners for local aid projects, where the distribution formula favors poor condition bridges.

## COORDINATION ON PAVEMENT AND BRIDGE PERFORMANCE TARGETS

NJDOT held a series of stakeholder meetings and workshops that included the assessment and analyses of the state NHS network pavement and bridges, as well as the State Highway System pavement and bridges; and discussions related to performance measures, targets and target setting approach, SGR objectives, issues, and challenges. Since a significant amount of the NHS in the state is owned by other jurisdictions, stakeholders included these non-NJDOT NHS owners. The MPOs in New Jersey assisted NJDOT with the collection and dissemination of data to the non-NJDOT NHS owners. The MPOs also agreed to use the infrastructure targets that NJDOT established and adopt the statewide federal TPM infrastructure targets.

DVRPC has participated in PennDOT's TAMP steering committee and worked with PennDOT to develop the Pennsylvania Department of Transportation MAP-21 and FAST Act Performance Management Road Map to provide PennDOT's Planning Partners with a resource on the performance measure requirements and calculations.

## PROGRESS TOWARD PAVEMENT AND BRIDGE PERFORMANCE TARGETS

Roadway and bridge maintenance are a major focus for both State DOT's and DVRPC. *Connections 2045* follows a fix-it-first philosophy that emphasizes transportation system preservation needs and funding, which in turn informs the fiscally-constrained list of projects included in both the Plan and TIP.

Roadway maintenance is a major focus area of NJDOT's Capital Investment Strategy. According to NJDOT's Statewide Capital Investment Strategy FY2013–2022, more than $260 million (approximately 8 percent) of the annual investments go toward road assets. The New Jersey Transportation Trust Fund (TTF) provides $400 million annually to all local governments in New Jersey for the funding of road, bridge, and other transportation projects.

In the Pennsylvania subregion, the Plan identified $42.6 billion needed for pavement and bridge preservation projects from FY2018 to FY2045. Of this total need, $1.97 billion is programmed in the four-year Draft FY2021 TIP for system preservation, under the regional TIP, which does not include the majority of the I-95 reconstruction, because it is listed on the Statewide Interstate Management Program. Per Table 20 in this Amended Plan, system preservation receives the most funding of all highway project types. Of the entire $26.0 billion year-of-expenditure (Y-O-E) in reasonably anticipated roadway revenues identified in the Amended Plan, 50 percent, or $13.0 billion, is allocated to bridge preservation. The second highest allocation is for pavement preservation, 30.5 percent, or $7.9 billion. Table 21 in this Amended Plan lists all major regional system preservation projects needed to maintain the existing system. At the time that the Draft FY2021 TIP was released for Public Comment, 26.9 percent or almost $529.1 million out of $1.97 billion total in the first-four years of all projects in the Draft DVRPC Regional Highway Program were bridge preservation projects, which was the highest percentage of all TIP project categories. 16.8 percent or $331.7 million was programmed for roadway rehabilitation, reconstruction, and restoration over the first four years of the TIP.

Facility and asset condition is the second highest weighted criterion in DVPRC's TIP-LRP Project Benefit Criteria, accounting for 22 percent of the investment recommendation. Projects score by bringing a facility

or asset into a SGR, extending its useful life, or providing reduced operating/maintenance costs. A focus on fix-it-first has helped to reduce the Pennsylvania subregion's state-maintained poor condition bridges from 22 percent of all deck area in 2007 to just 9 percent in 2018.

## SYSTEM (NHS, FREIGHT, CMAQ) PERFORMANCE (PM3)

The FHWA final rule for the National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program was published in the Federal Register (82 FR 5970) on January 18, 2017, and became effective on May 20, 2017. The measures in this third and final rule assess: the performance of the Interstate and Non-Interstate NHS for the purpose of carrying out the NHPP; freight movement on the Interstate System; and traffic congestion and on-road mobile source emissions for the purpose of carrying out the Congestion Mitigation and Air Quality Improvement (CMAQ) Program. These system performance measures are collectively referred to as PM3 measures. System Performance management measures are divided into three categories: Travel Time Reliability (NHS and Freight), CMAQ Congestion, and CMAQ Emissions Reduction.

State two-year and four-year targets were due May 20, 2018. On October 25, 2018, the DVRPC Board agreed to support the PennDOT and NJDOT statewide NHS Travel Time Reliability and Freight System Performance targets and the respective state DOT efforts at achieving those targets shown in Tables 8 and 9. The DVRPC Board agreed to support the CMAQ Congestion targets on May 24, 2018 and the CMAQ Emissions Reduction targets on September 27, 2018, which are shown in Tables 10 through 12, respectively.

### TRAVEL TIME RELIABILITY (TTR) TARGETS

Reliability refers to the variability of travel times on road segments experienced by travelers. The more variability in travel time then the less reliable the trip. Irregularly occurring events such as crashes, disabled vehicles, special events, bad weather, and short-term construction can affect travel time reliability. Traffic congestion occurs when the amount of traffic far exceeds the physical capacity of the system, generally measured by the number of travel lanes on the roadway, the number of intersections, access points, and numerous other factors. Reliability is used in reference to the level of consistency in the transportation service provided by a roadway. For example, a roadway can be heavily congested, but if the amount and time of day when congestion occurs on it is consistent, it is considered reliable. The US DOT established performance measures pertaining to reliability because empirical evidence exists to suggest that the traveling public values reliability more than straight travel times.[4]

**The US DOT established performance measures pertaining to reliability because empirical evidence exists to suggest that the traveling public values reliability more than straight travel times.**

The first major performance area under system performance is Travel Time Reliability (TTR). The measures for TTR are the percent of person-

4 *See Traffic Congestion and Reliability: Linking Solutions to Problems, which is available on the FHWA website at ops.fhwa.dot.gov/congestion_report_04/chapter2.htm.*

miles traveled (PMT) on the Interstate system with reliable travel times, and the percent of PMT on the Non-Interstate NHS with reliable travel times. Travel times in this measure are derived from the National Performance Management Data Set (NPMRDS v2), based on archived probe-based traffic data, and traffic volumes are from the Highway Performance Monitoring System (HPMS). The measures are calculated using the University of Maryland's Center for Advanced Transportation Technology (CATT) Lab Regional Integrated Transportation Information System (RITIS) Probe Data Analytics (PDA) software platform, and generated by roadway segment using the Level of TTR metric, defined as the ratio of the longer travel time (80th percentile) to a "normal" travel time (50th percentile). Any value equal or less than 1.50 is considered reliable. The percent of person-miles traveled that are reliable for the region is the ratio of the reliable segments TTR multiplied by segment traffic volumes to all segments TTR multiplied by traffic volumes.

In Pennsylvania, the MPOs collaboratively decided to keep the future two-year and four-year TTR Targets for Interstate and Non-Interstate the same as the 2017 baseline values due to potential tool enhancements, limited historic information, and the need for additional research to understand the variances and factors influencing each of the performance measures, see Table 8. In New Jersey, the consensus was to have the required targets represent maintenance of current values for each TTR measure, given traffic growth and near-term projects and programs.

Moving forward, as more yearly NPMRDS v2 data is available, future trends may be more evident and can then be used to revise and adjust targets. The state DOTs will track the measures over the next two years. States are permitted to adjust their four-year targets at the midterm of the performance period, representing data through 2019 in a report due to FHWA by October 1, 2020. The state DOTs will coordinate any updates to the performance measures with the Planning Partners.

### TABLE 8. STATE TRAVEL TIME RELIABILITY TARGET

| STATE | NHS SYSTEM | BASELINE (2017) | 2-YEAR TARGET (2019) | 4-YEAR TARGET (2021) |
|---|---|---|---|---|
| PA | Person-Miles Traveled on Interstate with Reliable Travel Times (%) | 89.8% | 89.8% | 89.8% |
| | Person-Miles Traveled on Non-Interstate NHS with Reliable Travel Times (%) | 87.4% | N/A | 87.4% |
| NJ | Person-Miles Traveled on Interstate with Reliable Travel Times (%) | 82.0% | 82.0% | 82.0% |
| | Person-Miles Traveled on Non-Interstate NHS with Reliable Travel Times (%) | 84.1% | N/A | 84.1% |

*Source: PennDOT and NJDOT, 2020.*

## FREIGHT/TRUCK TRAVEL TIME RELIABILITY TARGETS

The national system performance measure for freight is the Truck Travel Time Reliability (TTTR) Index and is required for interstate highways on the NHS only. Like TTR, this measure is derived from the NPMRDS v2 data and calculated using the University of Maryland CATT Lab RITIS PDA software platform. It is expressed as an index based on a percent reliability threshold that determines whether a segment is reliable or not. TTTR is the ratio between the "congested" (95th percentile) and "average" (50th percentile) truck travel times. This metric is averaged for all Interstate road segments in the state, weighted by distance, resulting in the TTTR Index for the state.

State two-year and four-year targets were due May 20, 2018, and have been reported to FHWA in the 2017 baseline report that was due October 2018. As with the TTR performance measures, PennDOT and the MPOs have collaboratively decided to keep the future two-year and four-year TTTR Targets for Interstate the same as the 2017 baseline values, see Table 9. In New Jersey, freight performance targets on the NHS Interstate system represent a slight worsening in both the two-year and four-year targets compared to the 2017 baseline due to anticipated increase in traffic, both overall and trucks specifically, and near-term projects and programs in the DVRPC FY2020 TIP for New Jersey.

Future revisions and modifications to the PDA tool may impact the reported performance measures and established targets, so the state DOTs will track the measures over the next two years. States are permitted to adjust their four-year targets at the midterm of the performance period, representing data through 2019 in a report due to FHWA by October 1, 2020. State DOTs will coordinate any updates to the performance measures with their planning partners.

### TABLE 9. STATE FREIGHT PERFORMANCE TARGETS ON THE NHS INTERSTATE HIGHWAY SYSTEM

| FREIGHT | BASELINE (2017) | 2-YEAR TARGET (2019) | 4-YEAR TARGET (2021) |
|---|---|---|---|
| Pennsylvania Truck Travel Time Reliability | 1.34% | 1.34% | 1.34% |
| New Jersey Truck Travel Time Reliability | 1.81% | 1.90% | 1.95% |

*Source: PennDOT and NJDOT, 2020.*

## COORDINATION ON TRAVEL TIME RELIABILITY (TTR) AND FREIGHT/TRUCK TTR TARGETS

In New Jersey, the NJDOT Complete Team met several times to discuss and agree on the underlying data, calculation tools and methods, baseline results, and target-setting approaches. NJDOT's *Statewide Freight Plan*, published in 2017, identifies improving reliability and efficiency as one of its goals. This plan provides a well-defined blueprint for NJDOT investment, identifying discrete projects that immediately address critical freight system improvements. It also includes a fiscally constrained freight investment plan that identifies and prioritizes freight-related transportation projects. The Truck TTR Index was one of four factors that were used for project prioritization. In addition to the *Statewide Freight Plan* cited above, NJDOT continues to spearhead various initiatives with the specific intent of improving infrastructure conditions for goods movement in New Jersey. These include:

- Freight Management System to advance freight-specific concerns into NJDOT's capital programming process;
- Freight Performance Measures; and
- Truck Monitoring Program.

DVRPC is an active participant in NJDOT's Freight Advisory Committee and the I-95 Corridor Coalition and served on the stakeholder group for the development of the 2017 NJDOT *Statewide Freight Plan*. The I-95 Corridor Coalition provides a forum for state, local, and regional transportation agencies and organizations from Maine to Florida to work together to improve transportation mobility, safety, efficiency, and system performance. Coalition members facilitate more efficient network operations through regional incident management planning, coordination, communication, and improved information management across jurisdictions and modes. DVRPC and the other two MPOs in New Jersey are also involved in the Metropolitan Area Planning Forum of the Greater New York Metropolitan Transportation Management Area, which identified regional freight initiatives as one of the key items to work on.

To satisfy coordination requirements [23CFR490.105(e)(2)], PennDOT has coordinated with its Planning Partners in the development of the measures and selection of targets to ensure consistency, to the maximum extent practicable. Coordination efforts have included a workshop with PennDOT, FHWA-Pennsylvania, and MPO staff from DVRPC, York Area Metropolitan Planning Organization (YAMPO in York County, PA), and the Southwestern Pennsylvania Commission (SPC, the Pittsburgh area MPO); overview of performance measures at the annual Planning Partners Conference; status updates during monthly Planning Partners conference calls; a webinar to review targets with Planning Partners; four TPM conferences held at various locations around the commonwealth, including one in Philadelphia; and the development of a Road Map, which is a resource for TPM requirements and performance measure calculations.

## PROGRESS TOWARD TRAVEL TIME RELIABILITY (TTR) AND FREIGHT/TRUCK TTR TARGETS

DVRPC is committed to improving reliability on roadways within its region, as well as working with its county, city, and transit partners, NJDOT, and PennDOT to develop projects that improve TTR and help meet state targets. The Congestion Management Process (CMP) is a key part of DVRPC's commitment to improving travel time reliability. DVRPC facilitates a CMP Planning Advisory Committee that is part of a systematic and ongoing process to determine where traffic congestion exists, identify causes, prioritize congested locations according to congestion and other CMP objective measures, and to help develop strategies to reduce. The goals of the Long-Range Plan provide guidelines for developing CMP objectives. These objectives include:

1. minimize growth in recurring congestion and improve reliability of the transportation system;
2. provide transit where it is most needed for accessibility;
3. maintain the existing core transportation network;
4. Improve safety and reduce non-recurring congestion by reducing crashes;
5. maintain movement of goods by truck;
6. Maintain transportation preparedness for major events, especially ones that call for interregional movements far beyond normal and serve routine needs; and,
7. Ensure that all transportation investments support DVRPC Long-Range Plan principles.

PM3 performance measures are mapped by roadway segment where data is available, and used to inform the CMP process.[5] Reliability, as measured by the Planning Time Index (PTI), is a key component of the Congestion and Reliability criterion in DVRPC's TIP-LRP Benefit Criteria. Projects score based on location in a CMP congested corridor, implementing a CMP strategy appropriate for that corridor, or being located on a road with a high PTI; or transit facility with a low on-time performance. This criterion accounts for 13 percent of the project-level investment decision recommendation.

DVRPC includes freight as a primary planning factor through its Long-Range Plan, TIP development, and the development of technical studies. Truck counts are a component of the Multimodal Use criterion in DVRPC's TIP-LRP Benefit Criteria. Projects score based on the total number of person trips (driver trips + passenger trips + transit trips + bike trips + pedestrian trips, each multiplied by the project's length and divided by average trip distance) and daily trucks using the facility or asset, and overall benefit to multimodal trip making. This criterion accounts for 9 percent of the project-level investment decision recommendation. Table 6 in Chapter 2 of the FY2021 Pennsylvania TIP and Table 3 of the FY2020 New Jersey TIP shows a sampling of projects that support freight mobility and TTR as part of promoting goods movement and economic development.

One of DVRPC's goals is to serve the region's freight stakeholders and maintain the Philadelphia-Camden-Trenton region as an international freight center. At the forefront of DVRPC's freight planning program is the Delaware Valley Goods Movement Task Force (DVGMTF), a broad-based freight advisory committee that provides a forum for the private- and public-sector freight community to include its unique perspectives on regional plans and specific projects.

## CMAQ CONGESTION TARGETS

The Congestion Mitigation and Air Quality Program (CMAQ) is a federal program that funds projects that reduce congestion and improve air quality. The CMAQ Congestion and Emissions Reduction Targets are specifically intended to reduce congestion, directly related to attributes of CMAQ funded projects, and unlike other federally required performance measures described in this chapter, specifically apply to Urbanized Areas with a population over one million in an air quality nonattainment or maintenance area. The majority of the DVRPC region is part of the Philadelphia PA-NJ-DE-MD Urbanized Area with a population of almost 5.54 million, per the U.S. Census American Community Survey (ACS) 2018 five-year estimate. Portions of Mercer County are also in the New York (NY-CT-NJ) Urbanized Area. Both urbanized areas are part of multiple air quality nonattainment and maintenance areas.

CMAQ Congestion has two measures:

- Annual Hours of Peak Hour Excessive Delay (PHED) per Capita on the NHS. The PHED measure is derived from the NPMRDS v2 travel time data, traffic volumes and vehicle mix (cars, buses, and trucks) from HPMS, and vehicle occupancies and time-of-day travel distributions from national survey data and established estimation formulas. The population used to normalize the annual hours was acquired from the U.S. Census ACS 2016 five-year estimates. The measure indicates traffic delay experienced by travelers throughout an entire year on roadways, specifically during peak periods. The morning peak is

*5 More information about the CMP can be found on the DVRPC website at www.dvrpc.org/CongestionManagement/.*

defined as weekdays from 6 a.m. to 10 a.m., and partner agencies agreed on the afternoon peak period from 3 p.m. to 7 p.m., rather than 4 p.m. to 8 p.m. time period. Excessive delay means the extra amount of time spent in congested conditions defined by speed thresholds that are lower than a normal delay. The speed threshold is 20 miles per hour, or 60 percent of the posted speed limit travel time, whichever is greater. The "excessive" part of the PHED name indicates that some level of congestion is recognized as not possible or desirable to eliminate and thus not counted. For example, some congestion can accompany economic activity in thriving places. The "per capita" implies that the total delay is shared by all residences. Some trips can be avoided or shifted to non-vehicular modes out of the peak period, which would reduce the measure. This measure sums up the delay experienced by travelers throughout an entire year on NHS roads, specifically during peak periods. The actual rule containing all the details is found in 23 CFR 490.707(a).

- Percent Non-Single Occupancy Vehicle (non-SOV) travel: Percent non-SOV travel may include travel via carpool, van, public transportation, commuter rail, walking, or bicycling as well as telecommuting. The actual rule containing all the details is found in 23 CFR 490.707(b).

For the PHED per capita measure, only a four-year target is required at this time, while both two- and four-year targets are required for the percent non-SOV measure. The CMAQ congestion performance targets are shown in Table 10.

DVRPC and the planning partners will track the annual PHED and non-SOV travel measures and revisit the estimated established four-year targets at the mid-term period.

## TABLE 10. CMAQ CONGESTION MEASURES TARGETS

| DVRPC URBANIZED AREAS | CMAQ CONGESTION MEASURES | BASELINE | 2-YEAR TARGET | 4-YEAR TARGET |
|---|---|---|---|---|
| Philadelphia PA-NJ-DE-MD Urbanized Area | Non-SOV Travel | 27.9% | 28.0% | 28.1% |
| | PHED per Capita | 16.8 Hours/Capita | N/A | 17.2 Hours/Capita |
| New York- Newark NY-NJ-CT | Non-SOV Travel | 51.6% | 51.6% | 51.7% |
| | PHED per Capita | 20.0 Hours/Capita | N/A | 22.0 Hours/Capita |

*Notes:*
*1. Baseline for non-SOV Travel is based on the 2012–2016 American Community Survey (ACS).*
*2. PHED per Capita Four-Year Target assumes a growth of +0.6% per year.*
*3. See also DVRPC's CMAQ Performance Plan for 2018–2021 (Publication #TM19003)*
*Source: DVRPC, 2020.*

## COORDINATION ON THE CMAQ CONGESTION TARGET

Pursuant to MAP-21 and the FAST Act, and the ensuing requirements of 23 CFR Part 490, the National Performance Management Measures Final Rule, all State DOTs and MPOs that contain, within their respective boundaries, any portion of the NHS network within the Urbanized Area with a population over one million must establish a single unified target for the two CMAQ congestion measures. Each MPO and DOT within an urbanized area must coordinate, discuss, and establish a target for both the PHED and percent non-SOV travel measures. The DVRPC region covers much of the Philadelphia PA-NJ-DE-MD urbanized area. In addition, DVRPC collaborated with the North Jersey Transportation Planning Authority (NJTPA), the New York Metropolitan Transportation Council, NJDOT, the New York State Department of Transportation and others to adopt a common congestion measure baseline and targets for the New York-Newark NY-NJ-CT UZA, which includes portions of Mercer County, NJ.

**Since DVRPC serves a Transportation Management Area (TMA) with a population greater than one million that includes a nonattainment or maintenance area, the Commission is required to develop a CMAQ Performance Plan.**

DVRPC staff held a series of meetings to collaborate with multiple agencies in developing and agreeing on a single realistic target for each of the two measures for the Philadelphia PA-NJ-DE-MD Urbanized Area. In addition to DVRPC, agency representation included PennDOT, NJDOT, Delaware Department of Transportation, Maryland Department of Transportation, FHWA, NJTPA, South Jersey Transportation Planning Organization, Wilmington Area Planning Council, Lehigh Valley Planning Commission, Reading Area Transportation Study, and Lancaster County Transportation Coordinating Committee MPOs.

The agencies developed and agreed on a common congestion measure baseline and targets for the Philadelphia Urbanized Area. On May 24, 2018, the DVRPC Board agreed to support CMAQ congestion performance measure targets for PHED per capita and percent non-SOV travel for the Philadelphia and New York urbanized areas. Since DVRPC serves a Transportation Management Area (TMA) with a population greater than one million that includes a nonattainment or maintenance area, the Commission is required to develop a CMAQ Performance Plan. The CMAQ Performance Plan must describe how the MPO plans to meet the targets, detail progress toward achieving the targets, and include a description of projects identified for funding that will contribute to achieving targets. The first DVRPC CMAQ Performance Plan was developed for 2018–2021 to support the implementation of the CMAQ Congestion measures, and is required to be updated biennially through the performance period.[6] The DVRPC Board approved the submission of the DVRPC plan to PennDOT and NJDOT for submission to FHWA on September 27, 2018.

*6 DVRPC's Congestion Mitigation and Air Quality Baseline Report and Performance Plan (2018-2021) can be accessed at https://www.dvrpc.org/Products/TM19003*

## TABLE 11: PENNSYLVANIA CMAQ ON-ROAD EMISSIONS REDUCTION TARGETS (IN DAILY KILOGRAMS)

| CMAQ EMISSION REDUCTION | DVRPC PA SUBREGION | | PENNSYLVANIA STATEWIDE | |
|---|---|---|---|---|
| | 2-YEAR TARGET (2018–2019) | 4-YEAR TARGET 2020–2021) | 2-YEAR TARGET (2018–2019) | 4-YEAR TARGET 2020–2021) |
| VOC | 37.61 | 69.31 | 109.46 | 201.73 |
| NOx | 23.42 | 42.5 | 337.70 | 612.82 |
| $PM_{2.5}$ | 1.08 | 2.06 | 10.76 | 20.49 |
| CO | 282.74 | 565.47 | 567.70 | 1,135.40 |

*Source: DVRPC, 2020.*

## TABLE 12: NEW JERSEY CMAQ ON-ROAD EMISSIONS REDUCTION TARGETS (IN DAILY KILOGRAMS)

| CMAQ EMISSION REDUCTION | DVRPC NJ SUBREGION | | NEW JERSEY STATEWIDE | |
|---|---|---|---|---|
| | 2-YEAR TARGET (2018–2019) | 4-YEAR TARGET 2020–2021) | 2-YEAR TARGET (2018–2019) | 4-YEAR TARGET 2020–2021) |
| VOC | 1.45 | 2.864 | 17.682 | 36.324 |
| NOx | 7.453 | 14.861 | 114.401 | 231.850 |
| $PM_{2.5}$ | 2.627 | 5.253 | 4.29 | 8.52 |
| CO | N/A | N/A | 31.927 | 63.010 |

*Source: DVRPC, 2020.*

## CMAQ EMISSIONS REDUCTION TARGETS

DVRPC coordinated efforts with PennDOT, NJDOT, and other MPOs in both states to develop cumulative on-road mobile source emissions two-year and four-year reduction targets as kilograms per day. MPO regional targets in Tables 11 and 12 were used to develop the respective state DOT statewide on-road mobile emissions reduction targets displayed in Tables 11 and 12. DVRPC's CMAQ Performance Plan for 2018–2021 (Publication # TM19003) describes the process in developing the regional targets.

On September 27, 2018, the DVRPC Board agreed to support PennDOT's and NJDOT's statewide CMAQ Emission Reduction targets, adopt the MPO regional targets, and approve DVRPC to submit the CMAQ Baseline Report and Performance Plan for 2018-2021 (Publication #TM19003) to PennDOT for submission to FHWA.

## COORDINATION ON CMAQ EMISSIONS REDUCTION TARGETS

DVRPC has coordinated emissions reduction target setting with both PennDOT and NJDOT to establish emissions reduction targets from CMAQ funded projects in the relevant portions of the DVRPC planning areas. Each state has developed state-level emissions reduction targets that account for emissions reductions at the MPO level.

## PROGRESS TOWARD CMAQ CONGESTION AND EMISSIONS REDUCTION TARGETS

Table 9 in DVRPC's CMAQ Performance Plan for 2018-2021 (Publication # TM19003) identifies all TIP projects that will help the MPO and State meet two- and four-year targets for traffic congestion and on-road mobile source emissions. DVRPC will continue to promote and develop projects and programs with air quality benefits to its counties and

planning partners. DVRPC's CMP facilitates a CMP Planning Advisory Committee and generates a list of the topmost congested roadway facilities and ten bottleneck locations for State, County and Local Roadways. The Environment criterion in DVRPC's TIP-LRP Benefit Criteria accounts for 7 percent of the project-level investment decision recommendation. Projects score in this criterion by delivering high air quality benefits (per FHWA guidance) or incorporating environmentally friendly design principles.

In Pennsylvania, there are several continuing statewide programs that utilize CMAQ funding to reduce emissions as well as congestion. These include the Air Quality Partnership (MPMS #17928), retrofit for bike lanes and shoulders (MPMS #63406), signal retiming programing and Philadelphia signal retiming program (MPMS #s 84457 and 96223), Mobility Alternative Program and Share-a-Ride Program (MPMS #110429), Commuter Services (MPMS #110460), and Transportation Management Associations (MPMS #111424).

In New Jersey they include the active traffic management system (DB #13303), bicycle and pedestrian facilities/accommodations (DB #X185), intelligent traffic signal systems (DC #15343), transportation demand management program support (DB #X43), ozone action program (DB #D0407), rail rolling stock procurement (DB #T112), and the small/special services program (DB #T120). Congestion relief is also one of the focus areas in NJDOT's Capital Investment Strategy (CIS). Per the Statewide FY2013–FY2022 CIS, nearly $480 million (about 15 percent), of annual capital investments goes toward congestion relief projects.

## TRANSIT ASSET MANAGEMENT (TAM) RULE

Transit asset management (TAM) is the strategic and systematic practice to optimize transit capital asset procurement, operation, inspection, maintenance, rehabilitation, and replacement to manage lifecycle performance, risk, and cost in order to provide safe, cost-effective, and reliable public transportation. TAM places value and understanding on the negative impacts of deferring maintenance, and the positive outcomes of optimizing investment decisions that improve state-of-good repair (SGR). TAM also relates to many of the goals and the vision set in the *Connections 2045* Plan: reducing resource use, pollution, and waste; improving efficiency of existing systems and processes; establishing transit as a key transportation option; and supporting livable communities. Successfully implementing TAM requires: using resources more efficiently to reduce an agency's environmental footprint; managing waste responsibly; building and supporting healthy places; and becoming more resilient to prepare for climate change.[7]

The TAM Final Rule 49 USC 625 became effective Oct. 1, 2016. The TAM rule develops a framework for transit agencies to monitor and manage public transportation assets, increase reliability and performance, and establish performance measures. TAM requirements differ between Tier 1 and Tier 2 transit agencies. Tier 1 transit agencies receive federal transit grant funds, either directly or indirectly through a state, and own, operate, or manage either 101 or more revenue vehicles during regular peak service hours, regardless of mode; or operate one or more fixed-rail transit routes. Tier 2 transit agencies are subrecipients of Section 5311 Rural Area Formula Program funds; or own, operate, or manage 100 or fewer vehicles during regular peak hour services; or are a part of any American Indian tribe. Tier 1 transit agencies are required to develop TAM plans and submit their performance measures and targets to the National Transit Database. Tier 2 transit agencies may develop their own TAM plan or participate in a group TAM plan.

There are three Tier 1 agencies and one Tier 2 agency providing public transit service and subject to this FTA TAM performance management rule in the DVRPC region. The Tier 1 agencies are SEPTA, NJ TRANSIT, and DRPA/PATCO. The Tier 2 agency is Pottstown Area Rapid Transit (PART). In Pennsylvania, PennDOT has developed a group Transit Asset Management Plan and set of performance measure targets for the Tier 2 agencies statewide.

The TAM Plan monitors system condition, sets performance targets, and prioritizes investments to achieve state-of-good-repair targets. It must include the following nine elements in order to ensure assets are in a SGR:

- Inventory of Capital Assets;
- Condition Assessment;
- Decision Support Tools;
- Investment Prioritization;
- TAM and SGR Policy;
- Implementation Strategy;
- List of Key Annual Activities;
- Identification of Resources; and
- Evaluation Plan.

7 *Parsons Brinkerhoff, Asset Management Guide: Focusing on the Management of our Transit Investments (Washington, DC: Federal Transit Administration, 2012) www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/57411/ftareportno0098.pdf*

MAP-21 requires that any asset that a transit agency intends to use federal SGR grant funds to repair, rehabilitate, or replace must be listed in the TAM plan (USC Title 49, Section 5337). Funding for the SGR Program was reauthorized in the FAST Act at approximately $2.5 billion for fiscal years 2016–2020, a significant increase over MAP-21's authorized funding levels. Eligible projects include TAM plan development and implementation, and capital projects to maintain a system in a SGR. Projects eligible for funding under the SGR Formula Program must be identified within the investment prioritization of a transit provider's TAM plan. SEPTA, NJ TRANSIT, and DRPA/PATCO submitted their respective TAM Plans to FTA on October 1, 2018. DRPA/PATCO's TAM Plan includes a blueprint to identify, describe, and improve asset management practices, with the vision to maintain the agency's assets in a SGR. The plan also identifies their programs and projects aimed at helping to achieve their TAM targets.

SEPTA's TAM Plan will develop the data and support investment decisions needed to achieve goals such as rebuilding the system and resource management. The Authority continues to prioritize the replacement and renewal of infrastructure and vehicles; however, SGR projects require a careful balance between operational impacts and other strategic initiatives.

NJ TRANSIT has prepared an Enterprise Asset Management Program TAM Plan that sets forth its blueprint to identify, describe, and improve asset management practices, with the vision to maintain the agency's assets in a SGR. The plan presents a summary inventory of assets, describes the current condition of the assets, sets near-term targets for the required performance measures, and explains how NJ TRANSIT managers develop and present requests for operating/maintenance budgets and capital asset replacements. The plan also identifies NJ TRANSIT programs and projects aimed at helping to achieve their TAM targets.

The FTA performance measures are:

- **Rolling stock:** The percentage of revenue vehicles (by type) that meet or exceed their useful life benchmark (ULB);[8]
- **Equipment:** The percentage of non-revenue service vehicles (by type) that meet or exceed their ULB;[8]
- **Facilities:** The percentage of facilities (by group) that are rated less than 3.0 on the Transit Economic Requirements Model (TERM) scale. Under the TERM scale, an asset in need of immediate repair or replacement is scored as one (1), whereas a new asset with no visible defects is scored as five (5); and
- **Infrastructure:** The percentage of track segments (by mode) that have performance restrictions

As part of their annual data submission to the National Transit Database (NTD), transit operators must include system condition, performance targets for the following year, and a narrative that describes any change in system condition over the previous year and progress made toward meeting the performance targets.

*8 ULB is the measure agencies will use to track the performance of revenue vehicles (rolling stock) and service vehicles (equipment) to set their performance measure targets. ULB means either the expected lifecycle of a capital asset or the acceptable period of use in service determined by FTA. Each vehicle type's ULB estimates how many years that vehicle can be in service and still be in a SGR. The ULB considers how long it is cost effective to operate an asset before ongoing maintenance costs outweigh replacement costs.*

## TRANSIT ASSET MANAGEMENT (TAM) TARGETS

Beginning in January 2018, DVRPC annually has taken formal action to adopt the same set of targets as SEPTA, NJ TRANSIT, and DRPA/PATCO. Both SEPTA and NJ TRANSIT are sizable agencies that operate and maintain a large fleet of buses, railroad cars, locomotives, and light rail vehicles (LRVs) in the DVRPC region. To ensure these assets are in a SGR, SEPTA and NJ TRANSIT have budgeted funds to permit regular ongoing replacement of equipment as it approaches the end of its useful life.

**Beginning in January 2018, DVRPC annually has taken formal action to adopt the same set of targets as SEPTA, NJ TRANSIT and DRPA/PATCO.**

### MEASURE 1: PERCENTAGE OF REVENUE VEHICLES THAT HAVE MET OR EXCEEDED THEIR USEFUL LIFE BENCHMARK

The transit agencies' provide ULBs for their respective fleets. A number of planned procurements will allow SEPTA to reduce the average age of the rail vehicle fleet in future reporting years. SEPTA will replace the light rail and vintage trolley fleets as part of the Regional Rail Car, Locomotive, and Trolley Acquisition program, which is programmed in FY2024 and beyond of the DVRPC regional TIP. All rail cars and buses are included in SEPTA's vehicle overhaul (VOH) program in the TIP.

SEPTA met the established targets for 2019 for all fleets except for the bus fleet, which had a target of 10 percent, and an actual 2019 measure of 12.4 percent. SEPTA has recently completed the procurement of 525 hybrid buses. Some older buses are being kept on property until the replacement buses have been accepted; once these buses are retired in late 2020, the average age of all bus subfleets will be below the ULBs. SEPTA put a new fleet of 30 electric buses into service. The electric bus fleet project included the installation of new infrastructure, including charging stations, at Southern Depot. SEPTA completed a major procurement of locomotives in FY2019, which allowed the Authority to retire eight 30-year-old locomotives. The new locomotives will increase the reliability of the commuter rail service.

NJ TRANSIT owns and maintains a fleet of 200 locomotives, 160 self-propelled cars, and 953 locomotive-hauled cars to serve the state of New Jersey. In addition, the agency maintains and operates 15 diesel locomotives and 65 single-level passenger cars owned by the Metro-North Railroad that are configured to operate with NJ TRANSIT's fleet. All locomotives and loco-hauled cars are operated in push-pull service. NJ TRANSIT's commuter rail ULB for locomotives, passenger cars, and self-propelled passenger cars is 30 years, which is lower than FTA's ULB of 39 years. In the DVRPC New Jersey region, the heavy commuter rail lines include the Northeast Corridor from the City of Trenton to Hamilton Township, Princeton Junction, and to New York City's Penn Station; and the Atlantic City line between Philadelphia's 30th Street Station and Atlantic City, New Jersey.

The RiverLINE has 20 diesel-powered LRVs that were built in 2003 and are maintained by Bombardier at the 36th Street facility in the City of Camden. NJ TRANSIT has established 31 years as the ULB for LRVs, which is the FTA default value.

NJ TRANSIT owns a fleet of over 3,000 buses consisting of two types: (1) over-the-road for longer-haul commuting services and (2) transit. The active bus fleet in daily service is considered to be in a SGR. NJ TRANSIT has set ULB for transit buses—articulated buses, transit buses, and suburban buses—at 12 years for those in transit service; and 14 years for over-the-road for commuter service buses.

DRPA/PATCO's rolling stock includes all revenue vehicles. The ULB of a self-propelled heavy-rail car is 39 years. The DRPA/PATCO had 75 Budd rail cars from 1969 (50 years old) and 45 Vickers cars from 1980 (39 years old). PATCO completed a car overhaul project in April 2019, with a 25-year ULB for the rehabilitated vehicles.

### TABLE 13. 2019 TRANSIT ASSET MANAGEMENT MEASURE— PERCENTAGE OF REVENUE VEHICLES THAT HAVE MET OR EXCEEDED THEIR USEFUL LIFE BENCHMARK

| NTD CATEGORY | AGENCY | USEFUL LIFE BENCHMARK | FY2019 TARGET | FY2019 ACTUAL | FY2020 TARGET |
|---|---|---|---|---|---|
| Articulated Bus | SEPTA | 14 | 0% | 0% | 0% |
| Bus | SEPTA | 14 (12 for Electric) | 10% | 12.4% | 10% |
| Heavy-Rail Passenger Car | SEPTA | 40 | 0% | 0% | 0% |
| Commuter Rail Locomotive | SEPTA | 30 | 50% | 0% | 0% |
| Commuter Rail Passenger Coach | SEPTA | 39 | 0% | 0% | 0% |
| Commuter Rail Self-Propelled Passenger Vehicle | SEPTA | 39 | 66% | 66% | 66% |
| Cutaway Car | SEPTA | 10 | 0% | 0% | 0% |
| Light Rail Vehicle | SEPTA | 31 | 100% | 100% | 100% |

*continued on next page...*

| NTD CATEGORY | AGENCY | USEFUL LIFE BENCHMARK | FY2019 TARGET | FY2019 ACTUAL | FY2020 TARGET |
|---|---|---|---|---|---|
| Trolley Bus | SEPTA | 18 | 0% | 0% | 0% |
| Vintage Trolley/Streetcar | SEPTA | 58 | 100% | 100% | 100% |
| Heavy-Rail Passenger Vehicle | DRPA/PATCO | 25 | 0% | 0% | 0% |
| Articulated Bus | NJ TRANSIT | 12 | 100% | 100% | 20% |
| Automobile | NJ TRANSIT | 5 | 28.9% | 28.9% | 0% |
| Over-the-Road Bus | NJ TRANSIT | 14 | 45% | 52.0% | 46.4% |
| Bus | NJ TRANSIT | 12 | 0% | 0.16% | 0% |
| Cutaway Car | NJ TRANSIT | 5 | 13.2% | 11.7% | 1.5% |
| Light Rail Vehicle | NJ TRANSIT | 31 | 0% | 0% | 0% |
| Minivan | NJ TRANSIT | 8 | 4.35% | 2.13% | 4.35% |
| Commuter Rail Locomotive | NJ TRANSIT | 30 | 6.41% | 7.55% | 6.37% |
| Commuter Rail Passenger Coach | NJ TRANSIT | 30 | 18.3% | 17.9% | 17.9% |
| Commuter Rail Self-Propelled Passenger Car | NJ TRANSIT | 30 | 100% | 100% | 100% |
| Van | NJ TRANSIT | 8 | 1.53% | 2.74% | 1.53% |

*Sources: SEPTA, NJDOT, and DRPA/PATCO, 2020.*

### MEASURE 2: AVERAGE AGE OF NON-REVENUE FLEET

The agencies maintain a diverse portfolio of support vehicles, including fleets of police cars, utility vans, and rail maintenance vehicles. The performance targets are developed by comparing the age of the vehicles to their useful life benchmark (ULB).

SEPTA utility vehicles support transit and railroad operations, and include the following types of equipment:

- Utility vehicles for transit and paratransit supervisors and SEPTA police officers.
- Utility vehicles for inspection, maintenance, and construction of infrastructure. These vehicles include trucks, cranes, high rail vehicles, and maintenance-of-way equipment.
- Transporter vehicles used in garages and shops, including revenue trucks, forklifts for material handling, pick-up trucks for material movement between depots and shops, and for snow removal.
- Service vehicles used for vehicle maintenance including wreckers, tow tractors, man lifts, and pick-up trucks.
- Miscellaneous equipment such as generators, compressors, trailers, floor scrubbers, and welding units.

A number of recent procurements have allowed SEPTA to reduce the average age of the automobile and van fleets. While many of the other vehicles are beyond their useful life benchmarks, SEPTA maintains the non-revenue fleet as a part of the vehicle overhaul program. In FY2019, SEPTA was able to outperform its targets for non-revenue automobiles, trucks and other rubber-tired vehicles, and steel-wheel vehicles.

NJ TRANSIT's non-revenue service vehicle inventory includes ordinary automobiles and locomotives that also include police cruisers and specialized track machinery (light duty trucks, heavy duty trucks, and rubber tire construction equipment and trailers). The current work train locomotive fleet includes five MP-20 locomotives and four GP-40 locomotives. The fleet of work train freight cars totals 81 cars. Of these 81 cars, 68 of them are able to be interchanged with freight railroads.

**TABLE 14. 2019 TRANSIT ASSET MANAGEMENT MEASURE—PERCENT OF SUPPORT VEHICLES THAT HAVE MET OR EXCEEDED THEIR USEFUL LIFE BENCHMARK**

| NTD CATEGORY | AGENCY | FY2019 TARGET | FY2019 ACTUAL | FY2020 TARGET |
|---|---|---|---|---|
| Automobiles | SEPTA | 75% | 43% | 50% |
| Trucks and Other Rubber-Tired Vehicles | SEPTA | 40% | 20% | 25% |
| Steel-Wheel Vehicles | SEPTA | 60% | 51% | 55% |
| All Support Vehicles | DRPA/PATCO | 24% | 22% | 28% |
| Automobiles | NJ TRANSIT | 39% | 58.2% | 52.8% |
| Trucks and Other Rubber-Tired Vehicles | NJ TRANSIT | 47% | 50.4% | 50.6% |
| Steel-Wheel Vehicles | NJ TRANSIT | 25% | 23.6% | 24.1% |

*Sources: SEPTA, NJ TRANSIT, and DRPA-PATCO, 2020.*

There are also 80 steel-wheel maintenance-of-way equipment pieces and 158 construction equipment pieces that include trailers and backhoes, loaders, or similar, not driven on highways. There are 68 automobiles for management and supervisory use, 275 light trucks for maintenance, and 106 heavy duty trucks. The bus non-revenue vehicle inventory consists of 58 automobiles for management and supervisory use, 75 light trucks for service calls, and 34 trucks to retrieve buses back to the maintenance garage. NJ TRANSIT also has a fleet of corporate non-revenue service vehicles (police, technology, maintenance, and administration); and Information Systems equipment, such as radio towers, radio repeater equipment, ticket vending machines, and a drone.

In 2019, DRPA/PATCO estimated that 24 percent of non-revenue service vehicles will be over their ULB. Most of the non-revenue service vehicles over their ULB pertain to maintenance, such as trailers or loaders.

### MEASURE 3. AVERAGE CONDITION OF FACILITIES

The FTA requires transit agencies to evaluate all facilities on the Transit Economic Requirements Model (TERM) scale, where a rating of 5.0 is new and 1.0 is unusable. Assets below a rating of 3.0 are not in a SGR. Facilities are evaluated every four years.

SEPTA maintains over 300 passenger facilities and 28 maintenance facilities. Many of these facilities were built in the late 1890s and the early 1900s, and are in fair condition. The major factors that impact the selection of facility investment projects include ridership, operational efficiencies, and ADA compliance. While some station projects include the complete reconstruction of the facility, the majority of station projects consist of both the renovation of existing facilities as well as the addition of features. These features include the construction of high-level platforms, ADA-compliant ramps and pedestrian crossings, replacements of roofs and major building systems, installation of efficient lighting, and the addition of parking spaces.

SEPTA has set a target of no more than 5 percent of its passenger and administrative and maintenance facilities with a TERM rating below 3.0. In FY2019, just 2 percent of passenger facilities and no administrative or maintenance facilities were below this condition rating. Both NJ TRANSIT and DRPA/PATCO have set targets of no passenger,

**TABLE 15. 2019 TRANSIT ASSET MANAGEMENT MEASURE–AVERAGE CONDITION OF FACILITIES**

| NTD CATEGORY | AGENCY | % < 3 ON THE TERM SCALE | | |
|---|---|---|---|---|
| | | FY2019 TARGET | FY2019 ACTUAL | FY2020 TARGET |
| Passenger Facilities | SEPTA | 5% | 2% | 5% |
| Administrative/ Maintenance Facilities | SEPTA | 5% | 0% | 5% |
| Passenger Facilities | DRPA/PATCO | 0% | 7.7% | 0% |
| Administrative/ Maintenance Facilities | DRPA/PATCO | 0% | 0% | 0% |
| Passenger Facilities | NJ TRANSIT | 0% | 0% | 0% |
| Administrative/ Maintenance Facilities | NJ TRANSIT | 0% | 0% | 0% |

*Sources: SEPTA, NJ TRANSIT, and DRPA/PATCO, 2020.*

administrative, or maintenance facilities of below a 3.0 rating on the TERM scale. While NJ TRANSIT met these targets in 2019, DRPA/PATCO failed to meet the target of 0 percent, as one station was given a rating of 2.95. Repairs for this station are being addressed in 2020.

### MEASURE 4: PERCENTAGE OF TRACK SEGMENTS WITH PERFORMANCE RESTRICTIONS

This number is to be calculated once a month and averaged at the end of the year. Performance targets are based on infrastructure condition and speed restriction reports and include provisions for planned maintenance work throughout the year. Projects that impact track (either through slow zone or track outages) are considered.

SEPTA's asset management group reviewed the weekly speed restriction reports and made note of the reasons that the restriction was implemented. The majority of SEPTA track speed restrictions are put in place because SEPTA is performing preventative maintenance, such as tie and surfacing or replacement of the overhead contact wires on the Regional Railroad. Other work to bring the right-of-way to a SGR included tie and surfacing on the Main Line, trolley track renewal on the suburban light rail system, and substation maintenance. None of SEPTA's bridges have a speed or a load restriction.

SEPTA evaluated the scope of planned maintenance work when establishing the performance targets for 2020. In 2019, SEPTA set a target of no more than 10 percent of commuter rail and track in outage or under slow zone restrictions, and managed to come in well below this target with just 3.5 percent and 1.3 percent, respectively, of track in these conditions. For 2020, SEPTA has again set this target at no more than 10 percent of commuter and heavy rail track with outage or under slow zone restrictions. Streetcar rail track had a target in 2019 of no more than 5 percent of track with outage or slow zone restrictions, which it has maintained for 2020. Actual 2019 performance was just 1.8 percent of streetcar track operating in these conditions.

For 2019, DRPA/PATCO set a target of 1.44 percent, or 1,080 feet, of track outages and/or slow zone restrictions due to scheduled

**TABLE 16. 2019 TRANSIT ASSET MANAGEMENT MEASURE—PERCENT OF TRACK SEGMENTS WITH PERFORMANCE RESTRICTIONS BY MODE**

| NTD MODE | AGENCY | FY2019 TARGET | FY2019 ACTUAL | FY2020 TARGET |
|---|---|---|---|---|
| Commuter Rail | SEPTA | 10% | 3.5% | 10% |
| Heavy Rail | SEPTA | 10% | 1.8% | 10% |
| Streetcar Rail | SEPTA | 5% | 1.3% | 5% |
| Heavy Rail | DRPA/PATCO | 1.44% | 0.2% | 0.8% |
| Commuter Rail | NJ TRANSIT | 1% | N/A | 1% |
| Light Rail | NJ TRANSIT | 4.1% | N/A | 4.1% |
| Hybrid Rail | NJ TRANSIT | 0.4% | N/A | 0.4% |

*Sources: SEPTA, NJ TRANSIT, and DRPA/PATCO, 2020.*

capital projects, such as the Ben Franklin Bridge Bike Ramp, PATCO Interlocking Rehabilitation, PATCO Elevator Installation, Fourth Street Garage Cathodic Protection, and PATCO Track Resurfacing, in addition to routine maintenance and inspections and resurfacing and maintenance projects. Actual performance over the year was only 0.2 percent of track outages and/or slow zones. For FY2020, DRPA/PATCO is increasing capital investment in projects that will decrease track segments with performance restrictions, hence the lower target (0.8 percent) for FY2020.

## COORDINATION ON TRANSIT ASSET MANAGEMENT TARGET SETTING

DVRPC has worked with SEPTA, NJ TRANSIT, DRPA/PATCO, the Pennsylvania and New Jersey Departments of Transportation, and other MPOs to develop a set of written procedures that outline the coordination process for Transit Asset Management.

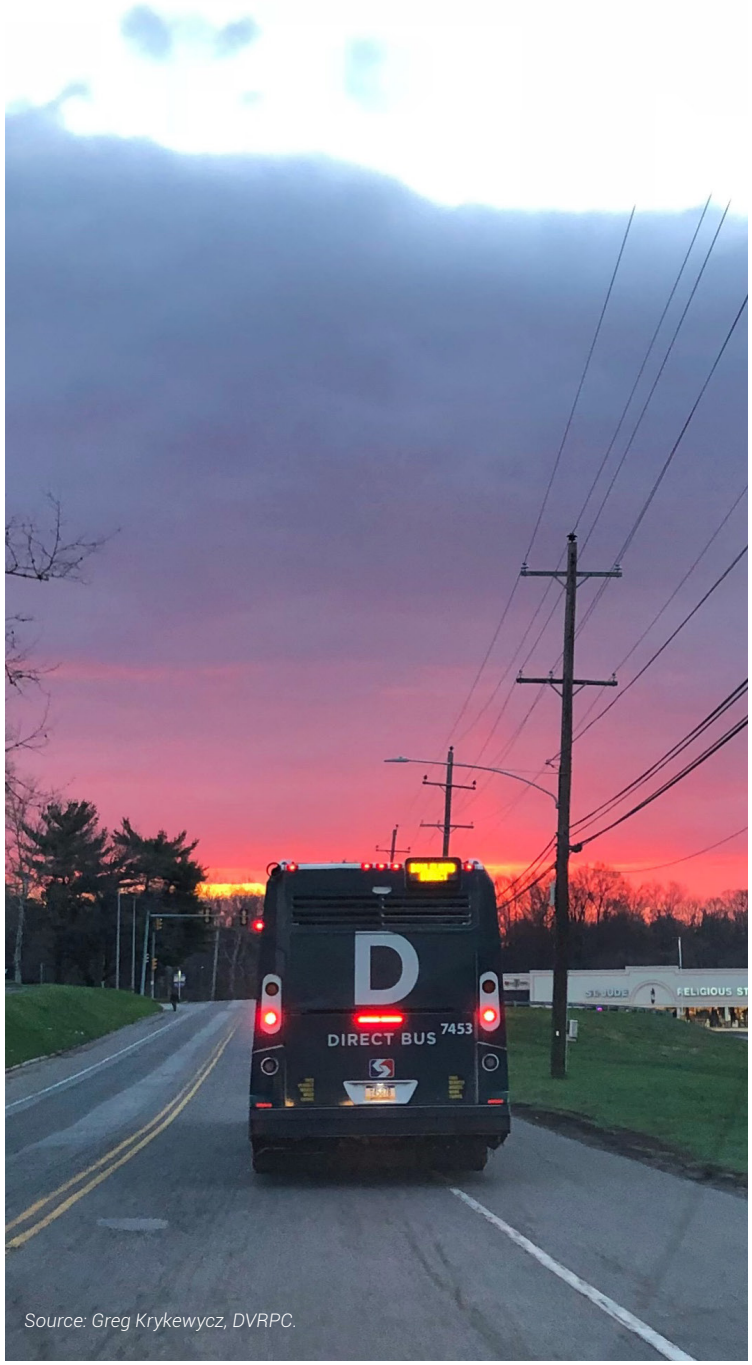
## PROGRESS TOWARD TRANSIT ASSET MANAGEMENT TARGETS

The Transit Asset Transportation Performance Management rule requires MPOs to describe how the region's TIP and Long-Range Plan will help to achieve the Transit Asset Management targets. The DVRPC FY2021 PA TIP was developed to ensure progress toward target achievement. The following steps have been taken by the transit operators to ensure that projects selected for TIP funding help to achieve the Transit Asset Management targets. Overall, SEPTA has programmed almost 87 percent of their FY2021 TIP funding for preservation and maintenance of their system.

DVRPC's Long-Range Plan prioritizes the preservation and maintenance of the existing transportation infrastructure. This includes maintaining the transit system in a SGR and operating it in a safe and secure manner by replacing buses, railcars, and locomotives as they age, as well as attending to rail bridges, track, signal systems, stations, and other infrastructure. Facility and Asset Condition is the second highest ranked criterion in DVPRC's TIP-LRP Project Benefit Criteria, accounting for 22 percent of the investment recommendation.

NJ TRANSIT's State Capital Program calls for continued investment in the state's transit infrastructure to maintain a SGR and provide reliable transit service. An emphasis on better preparing NJ TRANSIT to withstand, and recover from, future extreme weather events through building a more resilient system remains a key focus of the Capital Program, which invests in railroad bridge rehabilitation, track replacement, signal upgrades, repairs to overhead power lines and electric substations, improvements to rail stations, and bus shelter upgrades.

DRPA/PATCO has adopted the TAM policy to support and complement their Five-Year Strategic Plan "Roadmap to World-Class Stewardship: 2018–2022," Five-Year Capital Program, and the Annual Budget Process in order to realize the agency's vision as a "World-Class Stewardship" organization. Further, the operator will continue to utilize biennial inspections (that serve as the basis of the agency's budget program), an integrated budget and strategic plan process, and solutions derived from the asset management to continuously evaluate and update the asset management plan.




Source: Greg Krykewycz, DVRPC.

***To meet the targets for Measure 1: Percentage of Revenue Vehicles that Have Met or Exceeded their Useful Life Benchmark.***

As part of each long-range plan update, SEPTA, NJ TRANSIT, DRPA/PATCO, and DVRPC collaborate on a full needs assessment to estimate what it would cost to bring all revenue vehicles into a SGR within 10 years and maintain a SGR throughout the life of the Plan. This assessment estimated that $12.9 billion (Y-O-E, including non-revenue vehicles) in Pennsylvania and $4.9 billion in New Jersey will be needed to achieve and maintain a SGR for the region's transit vehicles. The Plan allocates 45.8 percent of reasonably available transit revenue to transit vehicles in Pennsylvania and 34.3 percent in New Jersey.

SEPTA's fleet management plan has been designed to maintain the bus and paratransit fleets at an age below the established ULB and provide the appropriate level of vehicle overhaul (VOH) program for all fleets; however, SEPTA recognizes that additional investment is needed in the rail fleets, maintenance facilities, and infrastructure to bring them up to current vehicle standards. SEPTA's Capital Budget identifies several fleet procurements that will effectively decrease the age of the light rail and commuter rail fleets, which are beyond their ULBs. The Silverliner IV fleet, which was purchased between 1973 and 1976, is scheduled to be replaced with new cars. This procurement is programmed for FY2025 through 2031. SEPTA is also working on a "Trolley Modernization" program, which includes an evaluation of the light rail and vintage trolley fleets, along with associated infrastructure and maintenance facility upgrades. Preliminary cross disciplinary studies are underway to develop vehicle specifications, determine infrastructure needs, and evaluate operational and service impacts. The VOH program lets SEPTA perform daily inspections, routine

maintenance, and preventative maintenance on a regular basis for all revenue vehicles. The VOH program replaces vehicle components at the end of their useful life while extending the useful life of the fleet itself. Buses are overhauled once per service life; rail vehicles are overhauled every five years. SEPTA spent $77 Million on VOH in FY2019 and has budgeted $83 Million in FY2020. The VOH program is particularly important for the light rail and commuter rail fleets, where most vehicles have aged beyond their ULB.

NJ Transit intends to replace its entire self-propelled passenger car fleet with new multilevel vehicles by 2023.

***To meet targets that were set for Measure 2: Percentage of Support Vehicles that Have Met or Exceeded their Useful Life Benchmark.***

As part of each long-range plan update, SEPTA, NJ TRANSIT, DRPA/PATCO, and DVRPC collaborate on a full needs assessment to estimate what it would cost to bring all non-revenue vehicles into a SGR within 10 years and maintain a SGR throughout the life of the Plan. This assessment estimated that $157.5 million (Y-O-E) in Pennsylvania will be needed to achieve and maintain a SGR for the region's non-revenue vehicles. The Plan allocates 45.8 percent of reasonably available transit revenue to revenue and non-revenue transit vehicles in Pennsylvania and 34.3 percent in New Jersey.

In order to have adequate and reliable utility vehicles, SEPTA has developed a program to periodically renew this fleet on a vehicle-by-vehicle basis contingent upon the vehicle's age, condition, and usage within the Authority.

*Source: Joe Flood, DVRPC.*

***To meet the targets of Measure 3: Average Condition of Facilities.***

As part of each long-range plan update, SEPTA, NJ TRANSIT, DRPA/PATCO, and DVRPC collaborate on a full needs assessment to estimate what it would cost to bring all station, maintenance, and administrative facilities into a SGR within 10 years and maintain a SGR throughout the life of the Plan. This assessment estimated that $3.8 billion (Y-O-E) in Pennsylvania and $0.6 billion (Y-O-E) in New Jersey will be needed to achieve and maintain a SGR for the region's station infrastructure. The Plan allocates 10.9 percent of reasonably available transit revenue to station infrastructure in Pennsylvania and 3.0 percent in New Jersey.

SEPTA's 2020–2032 Capital Budget includes provisions of $478 million for maintenance and passenger facilities. Representative projects include Ardmore Transportation Center, Conshohocken Station, 5th Street Station, and 30th Street Station. SEPTA continues to design improvements for City Hall Station, and has started to design improvements for Fairmont Station, which were both rated in poor condition. Construction for these stations is scheduled to begin in 2020 and 2024, respectively.

NJ TRANSIT takes a geographic approach (north, central, and south regions) to the condition of all facilities over a three-year period: north in FY2018, central in FY2019, and south in FY2020. For 2020, it is estimated that no passenger station facilities and parking lots, and no administration and maintenance facilities will have a performance rating of less than 3 on the TERM scale, after having met that target in FY2019.

***To meet the targets for Measure 4: Percentage of Track Segments with Performance Restrictions (by Mode).***

As part of each long-range plan update, SEPTA, NJ TRANSIT, DRPA/PATCO, and DVRPC collaborate on a full needs assessment to estimate the cost to bring all rail infrastructure into a SGR within 10 years and maintain a SGR throughout the life of the Plan. This assessment estimated that $9.1 billion (Y-O-E) in Pennsylvania and $1.0 billion (Y-O-E) in New Jersey will be needed to achieve and maintain a SGR for the region's rail infrastructure. The Plan allocates 14 percent of reasonably available transit revenue to rail infrastructure in Pennsylvania and 7.5 percent in New Jersey.

SEPTA will continue the cyclical replacement of railroad tie timbers and overhead contact wire, even though these projects will cause performance restrictions. In the case of a condition that requires a speed restriction, SEPTA deploys crews to fix the issue as soon as possible. SEPTA's Resiliency Program is performing several projects that will harden the infrastructure against extreme weather events, such as stabilization slopes; installation of new pumps; flood mitigation; and emergency power for the signal system.

NJ TRANSIT is undertaking significant new investments in a series of hardening projects, in order to prepare for possible future extreme weather events and security threats; and to ensure capital assets can continue to operate at full performance in order to provide safe, reliable, convenient, and cost-effective services. These projects include new rail vehicle storage, upgraded power systems, maintenance facilities, emergency control centers, security improvements and signal and communications systems resilience upgrades.

## TRANSIT SAFETY RULE

The Public Transportation Agency Safety Plan (PTASP) regulation, at 49 C.F.R. Part 673, requires covered public transportation providers and state DOTs to establish safety performance targets (SPTs) to address the safety performance measures identified in the National Public Transportation Safety Plan (49 C.F.R. § 673.11(a)(3)). Transit agencies and states must identify SPTs by mode for each of the following categories:

- Fatalities: Total number of fatalities reported to the NTD and rate per total vehicle revenue miles (VRM) by mode.
- Injuries: Total number of injuries reported to the NTD and rate per total VRM by mode.
- Safety Events: Total number of safety events reported to the NTD and rate per total VRM by mode.
- System Reliability: Mean distance between major mechanical failures by mode.

Transit agencies are required to set their initial safety performance targets by July 20, 2020. 49 C.F.R. § 673.15(b) requires, to the maximum extent practicable, a state or transit agency to coordinate with states and MPOs in the selection of State and MPO safety performance targets; and in accordance with 49 U.S.C. 5303(h)(2)(B) and 5304(d)(2)(B), states and transit agencies must make their SPTs available to states and MPOs to aid in the planning process. MPOs are required to set performance targets for each performance measure, per 23 C.F.R. § 450.306; and these must be established 180 days after the transit agency establishes their performance targets.

Source: Stokes Creative Group, INC.



Source: SEPTA.

# 3. AMENDED TRANSPORTATION INVESTMENTS

A key role of the Plan is to outline a vision and strategy for how the region will invest in transportation infrastructure over a long-term period of several decades. This section lays out a vision for maintaining and improving the transportation system to achieve the future potential for Greater Philadelphia. The vision for the future is to achieve and maintain a state-of-good repair (SGR) for all existing transportation infrastructure, integrating modes and improving the safety and efficiency of the network—through design, markets, and technology—while making it more connected and multimodal. To achieve this vision, we will need to make the choices that support it through the investments identified in the long-range financial plan.

This chapter amends and replaces the Chapter 4 Transportation Investments section in the *Connections 2045* Plan, which outlines how Greater Philadelphia will make capital investments in transportation infrastructure to help achieve the Plan's vision. It reflects changes to the IMP in Pennsylvania and changes to Major Regional Project scope, cost, timing, and inclusion in the fiscally constrained financial plan.

DVRPC worked with PennDOT, NJDOT, SEPTA, NJ TRANSIT, DRPA/PATCO, county and municipal government partners, and other regional stakeholders to determine what investments need to be made over the life of the Plan. A Long-Range Plan Working Group, composed of members from DVRPC's Regional Technical Committee, was highly involved in this financial plan amendment.

The financial plan consists of five steps:

- assessing transportation infrastructure needs;
- forecasting revenue;
- allocating forecasted revenue to project types;
- evaluating and selecting Major Regional Projects; and
- identifying options to close the funding gap.

At the heart of this exercise is an in-depth needs assessment that utilizes asset management (AM) systems. AM collects detailed data and monitors the various components of the network to identify and optimize maintenance and replacement needs for existing infrastructure. The needs assessment identifies what is required to bring the existing roadway and transit systems to a SGR. This is the first step in creating the Vision Plan for transportation infrastructure. In addition to the needs assessment, the Vision Plan identifies operational improvements and

system expansion projects that are necessary for the region to continue to grow and prosper in the future. The financial plan then prioritizes projects for funding by developing forecasts of reasonably anticipated revenue, allocating the revenue to project categories based on need and policy, and evaluating and selecting specific major regionally significant projects for funding in the Plan. Since we cannot afford all of the identified needs, *Connections 2045* outlines a list of unfunded projects (Vision Plan), and a separate list of fiscally constrained projects (Funded Plan) that the region can achieve over the life of the Plan. This Amendment revises the revenue forecast as a result of changes to increase funding to PennDOTs IMP, while decreasing the formula funding made available to each region in the commonwealth. It also updates the list of Major Regional Projects included in the plan, as well as their scope, cost, and timing where relevant changes have occurred since the *Connections 2045* Plan was initially adopted in October 2017. All text that is bolded in tables 21 to 26 indicate a change to the Major Regional Project as part of this amendment.

The financial plan covers the years from FY2018 to FY2045. There are four separate financial plans contained within this document: one roadway and one transit, for each of the Pennsylvania and New Jersey subregions. Each plan contains four funding periods that align with both the FY2017 Pennsylvania and FY2018 New Jersey TIPs. In Pennsylvania, the first funding period will comprise years two to six of the FY2017 TIP, the TIP that was in place when *Connections 2045* was originally adopted. The second period will round out the statewide 12-year plan. In New Jersey, the first funding period matches up with the first four years of the FY2018 New Jersey TIP, the TIP in place when *Connections 2045* was originally adopted. The second funding period corresponds with the remainder of the 10-year plan.

**TABLE 17. CONNECTIONS 2045 FUNDING PERIODS**

| FUNDING PERIOD | PENNSYLVANIA | NEW JERSEY |
|---|---|---|
| 1 | 2018–2022 | 2018–2021 |
| 2 | 2023–2028 | 2022–2027 |
| 3 | 2029–2035 | 2028–2035 |
| 4 | 2036–2045 | 2036–2045 |

*Source: DVRPC, 2017.*

Federal regulations require that MPOs, such as DVPRC, develop a regional long-range transportation plan with a fiscally constrained financial plan covering a minimum 20-year planning horizon. Fiscal constraint means that total transportation expenditures identified in a long-range plan must not exceed the total revenues reasonably expected to be available for the region over the life of the Plan, and over each individual funding period in the Plan. All revenues and project funding categories' needs are presented in Y-O-E dollars, which account for the impact of inflation over time. *Connections 2045* forecasts a 3 percent annual inflation rate over the life of the Plan.

The TIP is a short-term implementation program of capital improvements that are drawn from, and consistent with, the DVRPC Long-Range Plan. The TIP is multimodal in nature and includes bridge, roadway, bicycle, pedestrian, freight, operational, and public transit station, vehicle, equipment, and SGR projects of all sizes and scopes. Required by federal law to cover a four-year time period, the TIP represents the transportation improvement funding priorities of the region and lists all projects that intend to use federal funds, along with

state-funded capital projects. Anticipated costs and schedules by phase are indicated for every project in the TIP. Project phases may include preliminary engineering, final design, ROW acquisition, utility clearance, and construction for roadway-funded projects and purchase, capital, operating, or debt service phases for public transit projects. The list of projects in the TIP must be financially constrained to the amount of funds that are reasonably expected to be available.

## ASSESSING FUTURE NEEDS

The Vision Plan determined the projects that are necessary to achieve the goals outlined in *Connections 2045*. The *Connections 2045* financial plan analysis uses asset management systems data developed by PennDOT, NJDOT, SEPTA, NJ TRANSIT, and DRPA/PATCO. DVRPC strives to be more proactive in identifying asset management needs and continues to improve its efforts in quantifying system preservation needs over the life of a long-range plan. This Amendment did not undertake a full update of the Vision Plan; however, costs associated with it have changed due to revised cost estimates at the Major Regional Project level. Detailed documentation on the Vision Plan and the needs assessment is found in Appendix C of the *Connections 2045* Administrative Plan (Publication #17039). The Plan is based on the best available data and methodology, and DVRPC will continue to partner and work with the DOTs and transit agencies to improve this analysis in the future. Roadway, bike and pedestrian, and transit investments are grouped into the following categories:

**Roadway System Preservation** maintains existing roadway pavement and bridge infrastructure. Needs estimates for these categories were developed using the federally required Pavement Management System and Bridge Management System databases, which track the condition of each roadway lane mile and bridge. DVRPC used historic data from these management systems to estimate future rates of decline. This estimate also includes what DVRPC forecasts as the needs for county and local roadways and bridges eligible for federal aid.

**Roadway Operational Improvements** use physical changes or technology to improve the efficiency of the existing system. Physical improvements include roundabouts, new turn lanes, and roadway realignment to improve the functionality and safety of the roadway system. Technological improvements include the use of ITS, incident management programs, traffic signal upgrades, and connected vehicle and infrastructure technologies. ITS and incident management programs have capital funding components but also have substantial maintenance (e.g., hardware and software) and operations (e.g., personnel) costs associated with them. The region's 2017 TSMO Plan is the basis for the needs assessment for this category.

**Bike and Pedestrian** needs are reflected in the region's desire to build more bikeable and walkable communities and to develop more space-efficient transportation options. On-road needs are based on increasing existing sidewalk locations by 50 percent and tripling the number of bike lanes in the region. Off-road needs are based on constructing all unbuilt, multiuse trails in The Circuit regional trail network, along with some other multiuse trails that are not a part of The Circuit.

**Roadway System Expansion** projects add capacity to the roadway system by widening or extending existing facilities, or building new roads or interchanges. These projects have a significant impact on regional travel, and most projects in this category are listed in the Plan as Major Regional Projects. Minor new capacity projects are widenings of generally less than three lane miles in length on minor arterial, collector, or local roads. The need for Major Regional

Projects was based on existing Long-Range Plan projects, a review of recent transportation and corridor studies, and a call for projects from planning partners. All roadway system expansion projects are required to be consistent with the region's CMP and are evaluated to be consistent with land use, environmental, economic development, environmental justice, and transportation goals.

**Roadway Other** includes needs for miscellaneous items, such as parking facilities, drainage, environmental mitigation, Transportation Management Associations (TMAs), engineering, regional and local planning, and debt service. These needs are forecasted using projects and costs that are included in the current TIPs for Pennsylvania and New Jersey.

## TABLE 18: TOTAL TRANSPORTATION VISION PLAN (2018–2045, IN BILLIONS OF Y-O-E $)

| MODE | PROJECT CATEGORY | PENNSYLVANIA | NEW JERSEY |
|---|---|---|---|
| Roadway | System Preservation | | |
| | - Pavement Preservation | $ 19.1 B | $ 7.8 B |
| | - Bridge Preservation | $ 23.7 B | $ 3.5 B |
| | Operational Improvements | $ 8.6 B | $ 4.0 B |
| | Bicycle and Pedestrian | $ 3.5 B | $ 1.5 B |
| | System Expansion | $ 1.9 B | $ 0.8 B |
| | Other | $ 0.6 B | $ 0.7 B |
| **Roadway Subtotal** | | **$ 57.4 B** | **$ 18.2 B** |
| Transit | System Preservation | | |
| | - Rail Infrastructure | $ 9.1 B | $ 1.0 B |
| | - Vehicles | $ 12.9 B | $ 4.9 B |
| | - Station Enhancements | $ 3.8 B | $ 0.6 B |
| | Operational Improvements | $ 4.5 B | $ 0.6 B |
| | System Expansion | $ 8.7 B | $ 3.8 B |
| | Other | $ 4.7 B | $ 1.3 B |
| **Transit Subtotal** | | **$ 43.7 B** | **$ 12.0 B** |
| **Region Total** | | **$ 101.2 B** | **$ 30.2 B** |

*Figures may not add up due to rounding. | Source: DVRPC, 2020.*

**Transit System Preservation** represents needs for existing rail infrastructure, vehicle fleets, and stations. Regular vehicle track, catenary, power substations, signals, vehicle overhaul and replacement, station renovations, and ADA accessibility needs were used to develop the need for each of these three categories using asset management data.

**Transit Operational Improvements** reflect the need to improve the functionality of the existing system. Types of projects include real-time information systems, signal preemption, fare modernization, and double tracking and sidings to improve service frequency. The estimated needs were developed by DVRPC working with regional transit agencies

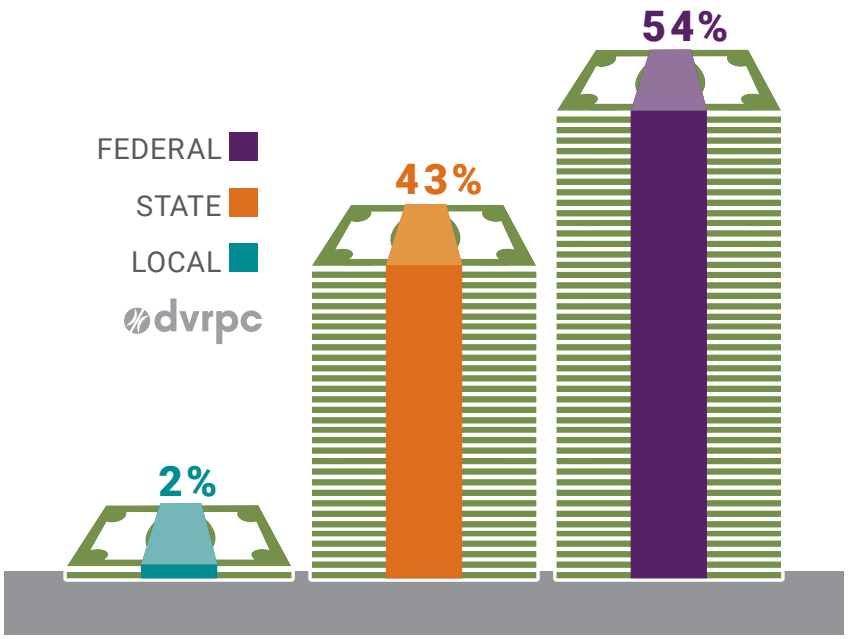
**Transit System Expansion** identifies new transit facilities, routes, and lines that the region would like to pursue. Need for this category is based on a short list of projects developed by the Long-Range Plan Working Group and includes projects listed in the Plan and recent transit expansion project studies conducted by DVRPC and other entities.

**Transit Other** includes safety, security, coordinated human services, trackage fees paid by regional transit agencies to Amtrak, federal operating funds, and debt service. Need for this category is estimated by remaining debt obligation payments and accounting for outlays over the life of the Plan based on current and projected future expenditures.

Regionally, the Vision Plan identified approximately $131 billion in transportation improvements, predominantly to preserve and maintain our existing system. These needs represent the region's desired investments, or the Vision Plan.

The infrastructure in the Pennsylvania subregion is generally older and more expansive, and this is reflected in the total estimated need for the subregion. In Pennsylvania, there is an estimated $57.4 billion in roadway need, and more than $43.7 billion in transit need, over the life of the Plan. Total roadway need for the New Jersey subregion is estimated to be just over $18.2 billion, and total transit need for the New Jersey subregion over the life of *Connections 2045* is estimated to be $12.0 billion. These figures are in Y-O-E dollars to account for the impact of inflation over time.

**FIGURE 2: REGIONAL FUNDING BY SOURCE**




*Figures may not add up due to rounding. | Source: DVRPC, 2020.*

## PROJECTING FUTURE REVENUES

The primary reason for this Long-Range Plan amendment is that more federal funding is being directed to the Interstate Management Program (IMP) by PennDOT than in the past. The IMP was created by PennDOT to proactively address the maintenance and reconstruction of the state's aging Interstate infrastructure. Whereas the IMP has received $370 million in annual funding available since 2005, an average of $712 million per year will be available statewide in FY2021 through FY2024. The DVRPC region has over $859 million in IMP projects over the four years from FY2021 to FY2024. While this shift doesn't make a significant difference in the total anticipated funds to the region, it does affect the amount of Non-Interstate projects that can be funded at the discretion of DVRPC and its stakeholders.

The regional funding projection shown in Table 19 accounts for one-time additional funds to the region, beyond the federal and state formula funds plus their local match funds, and ongoing competitive grant programs that the region can reasonably anticipate receiving in additional non-formula funds. These competitive grant programs include Multimodal Funds administered by PennDOT and the Department of Community and Economic Development, and the Green Light Go program. One-off additional funds include the New Starts program and the EB-5 Immigrant Investor Visa program, which provides foreign nationals who invest money in the United States with a means of obtaining a Visa or "green card." In January 2016, SEPTA entered into a loan agreement with the Delaware Valley Regional Center that provided up to $300 million to partially fund several projects: the rehabilitation of City Hall/15th Street Station; restoration of service from Elwyn to Wawa; acquisition of Regional Rail, Locomotive, and Trolley vehicles; substation and power improvements; and expansion of the Frazer yard. EB-5 funds were also used to help finance the I-95 and Pennsylvania Turnpike Interchange. Since the adoption of *Connections 2045*, the amount of EB-5 funding available to SEPTA has increased to $600 million.

### TABLE 19: FUNDING BY SOURCE AND MODE (2018–2045, IN BILLIONS OF Y-O-E $)

| STATE | MODE | FEDERAL | STATE | LOCAL | TOTAL |
|---|---|---|---|---|---|
| Pennsylvania | Highway | $ 16.8 B | $ 8.6 B | $ 0.6 B | $ 26.0 B |
| | Transit | $ 9.6 B | $ 10.3 B | $ 0.6 B | $ 20.5 B |
| | **Subtotal** | **$ 26.4 B** | **$ 18.9 B** | **$ 1.2 B** | **$ 46.5 B** |
| New Jersey | Highway | $ 7.6 B | $ 6.1 B | $ 0.0 B | $ 13.6 B |
| | Transit | $ 3.2 B | $ 3.7 B | $ 0.2 B | $ 7.0 B |
| | **Subtotal** | **$ 10.8 B** | **$ 9.8 B** | **$ 0.2 B** | **$ 19.9 B** |
| **Region Total** | | **$ 37.2 B** | **$ 28.7 B** | **$ 1.4 B** | **$ 67.1 B** |

*Source: DVRPC, 2017.*

The Coronavirus Aid, Relief, and Economic Security (CARES) Act, signed into law in March 2020, allocates additional dollars to transit agencies via the FTA. This funding is slated for operating expenses and to make up for revenue shortfalls, though, and is not expected to appear in the capital budgets of any of the region's transit agencies.

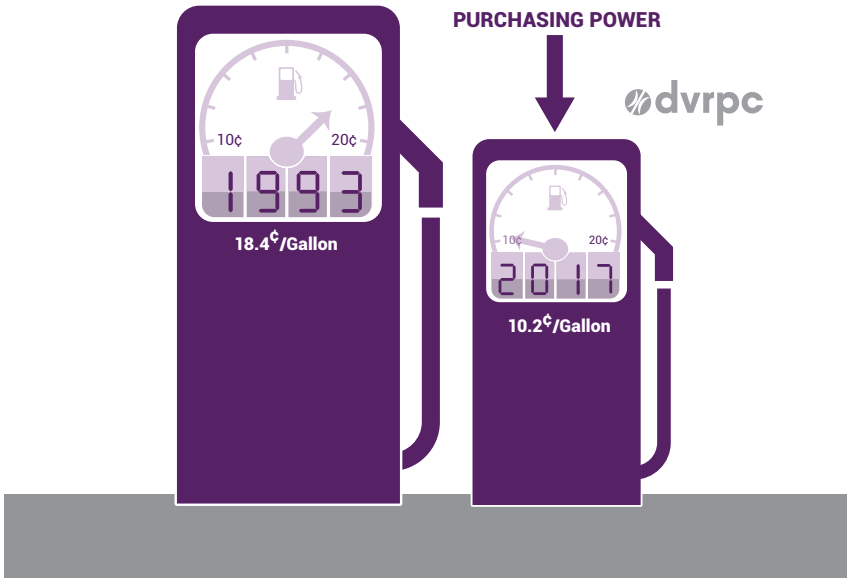
With the shifting of these funding sources, DVRPC took the additional step of updating its revenue estimates using the current Pennsylvania and New Jersey TIPs. DVRPC identified all federal, state, and local revenue sources that the region can reasonably expect to receive through the year 2045. Revenue estimates are for capital project expenditures. Preparation of this financial plan revenue estimate included a review of historical data and trends. All planning principles and financial assumptions in identifying federal and state financial resources and investment needs are developed with and reviewed by federal, state, and transit partners. The Plan anticipates $67.1 billion Y-O-E dollars in total federal, state, and local funding from 2018 to 2045. This figure includes add-on funds such as BUILD grants, New or Small Starts grants, and automated red-light enforcement (ARLE) revenues, which have always been included in the Long-Range Plan revenue forecast. Accounting for known one-time additional funds in the Plan's revenue forecast accounts for nearly all the $1.8 billion increase in funding between the 2017 Adopted Plan's $65.3 billion (Y-O-E) forecast, which didn't include these one-time additional funds, over the same period.

## FEDERAL FUNDING

Federal funding includes the federal Highway and Transit Trust Funds, which are primarily funded through gas tax receipts and are the region's largest funding source, accounting for approximately 55 percent of forecasted revenue. But more fuel-efficient and alternative-fuel vehicles and a slight decrease in total driving since the economic recession of 2008 have meant flat gas tax revenue collection. The federal gas tax of 18.4 cents per gallon has not been increased since 1993. Inflation since the last gas tax increase has eaten away 45 percent of its purchasing power.

The FAST Act transfers $52 billion from the General Fund to the Highway Trust Fund and $18 billion to the Transit Trust Fund to keep both solvent through the year 2020. Since 2008, the Highway and

### FIGURE 3: THE EFFECT OF INFLATION ON THE FEDERAL GAS TAX




*Source: Producer Price Index, Construction Materials Index, 1993–2017.*

Transit Trust Fund accounts have required $143 billion in general fund infusions to meet authorized funding levels. Recent analysis by the Congressional Budget Office (CBO) indicates long-term federal funding concerns in its May 2019 projections for the Highway Trust Fund accounts. Although the CBO reflects relatively flat transportation expenditures (outlays) out to 2029, the Highway Trust Fund would need an infusion of $92 billion to maintain this level of spending; while the Transit Trust Fund would require an infusion of $42 billion. 2019 also saw PennDOT increase federal and state funding in the amount of $712 million per year (FY2021–2024) on average from the National Highway Performance Program funds into the Interstate Management Program (IMP) in an effort to prioritize and prescribe funding for high-level facilities throughout the commonwealth. Greater Philadelphia, which has 32 projects funded by the IMP, has fared comparatively well in this movement of funds, but the region is left with less flexibility in deciding which projects can receive federal dollars.

Federal relief packages related to COVID-19 could have a dramatic impact on funding in the coming years. Major transportation funds from this, as well as funds from the next federal transportation bill will be accounted for in the forthcoming *Connections 2050* Long-Range Plan. For now, *Connections 2045* assumes federal funding will remain flat through the year 2032. After that time, it assumes a growth rate of 3 percent per year compounded annually from 2033 to 2045, based on an eventual need to shift to a new paradigm for federal transportation funding.

## STATE FUNDING

State funding is the second largest source of funding for transportation projects. The states contribute 43 percent of total regional funding (Pennsylvania contributes 21.8 percent and New Jersey 20.8 percent of total anticipated funding) in the Amended *Connections 2045* Plan.

Pennsylvania's Act 89 of 2013 generates billions in additional transportation revenue each year. It rescinded the state retail tax of 12 cents per gallon on gasoline and diesel fuels; removed the $1.25 cap on the wholesale gas tax over a five-year period; and increased fees on vehicle registrations, driver's licenses, traffic violations, and permits. This Act is advancing many transportation projects throughout the commonwealth.

In 2016, New Jersey also passed legislation to increase state transportation funding through its Transportation Trust Fund (TTF). The combined Motor Fuels/Petroleum Products Gross Receipts Tax rate at the consumer level increased from 14.5 to 37.1 cents per gallon. Thanks to the Public Question 2 Amendment Referendum, voted on in November 2016, these receipts are constitutionally dedicated to the TTF. Passage of Question 2 also enables the state to authorize up to $12 billion in bonds to fund transportation projects. This legislation increased annual spending on New Jersey's road, bridge, and rail infrastructure by $400 million annually. It also doubled transportation aid for municipalities and counties, provided funds for light rail expansion projects in both North and South Jersey, and to upgrade New Jersey's freight rail infrastructure.

Per financial guidance from PennDOT and NJDOT, *Connections 2045* assumes flat funding in both states through the life of the Plan.

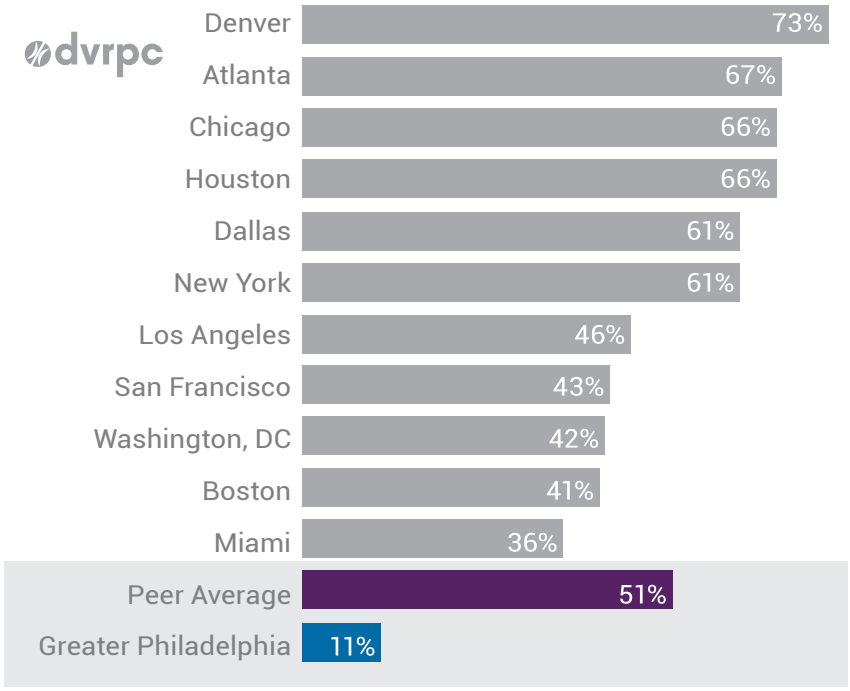
## LOCAL FUNDING

Local funding is the source of 2.1 percent of the reasonably anticipated funds documented in the Amended *Connections 2045* Plan, though local jurisdictions do pay to build and maintain local facilities that are not included here. Local transportation funding generally comprises revenues derived within the jurisdiction, such as a dedicated sales tax or dedicated bonds. Due to its flexibility, local funding is critical to making multimodal investments and improvements to transportation networks. Many regions around the country contribute a significant amount in local funding toward transportation projects. The Greater Philadelphia region provides comparatively very little transportation funding from local sources. For example, from 2006–2015, Greater Philadelphia generated just 11 percent of transit capital expenditures locally, while 11 peer regions (the other nine largest in the United States, plus San Francisco and Denver) have, on average, generated 51 percent of their transit capital funds locally; see Figure 4.[9] If federal funding decreases in the future, regions with a strong dedicated local source of transportation funding will be more competitive by better maintaining their network and promoting economic growth.

Pennsylvania Act 89 increased state funding allocations to local projects in Pennsylvania by 60 percent, about $220 million per year. It provided state funds for better timing of local traffic signals; increased the prevailing wage law threshold to projects costing more than $100,000; allowed for local match savings by participating in PennDOT's bridge bundling program; and waived local match requirements for some transit capital investment projects. Higher levels of investment in state projects are likely to increase the need for local match funds. To offset this need, Act 89 allows counties to place a $5 annual surcharge on vehicle registration fees. Delaware County passed this fee in February 2020, so all five southeast Pennsylvania counties have now enacted this county vehicle registration surcharge to help fund local transportation infrastructure repairs.

New Jersey does not grant authority to raise transportation revenues at the regional or local level. Limited or no local funding options in the

### FIGURE 4: PERCENTAGE OF TRANSIT CAPITAL FUNDING FROM LOCAL SOURCES, 10-YEAR AVERAGE (2006–2015)




*Source: National Transit Database, 2006–2015.*

*9 This figure uses National Transit Database (NTD) definitions for state and local funding sources. Whereas Act 44 Pennsylvania Turnpike payments into the Motor License Fund are considered state funding in the Plan in Figure 1 and TIP, NTD defines it as local funding. Similar discrepancies apply in New Jersey, where Turnpike and Port Authority funds that were planned for the Access to the Region's Core project were instead transferred into the Transportation Trust Fund. No changes have been made to the NTD definitions for consistent comparison across regions; however, this creates a difference between the local funding projection in the Plan and what is shown in Figure 4.*

region mean that local matches for state-maintained facilities must largely come from municipal or county general funds. Not only do transportation projects have to compete with many other municipal budget needs, but state-maintained facilities also have to compete with all the locally maintained roads and bridges that municipalities and counties manage. These local facilities are often in worse condition than state roads and bridges.

## AUTHORITY AND OTHER FUNDING

There are several transportation authorities in the region, such as the Pennsylvania Turnpike Commission (PTC), New Jersey Turnpike Authority (NJTA), Delaware River Joint Toll Bridge Commission (DRJTBC), South Jersey Transportation Authority (SJTA), and Delaware River Port Authority (DRPA), which generate their own revenues, generally via tolling. Revenue generated by these authorities is not included as a funding source in the Plan.

## THE FUNDING GAP

In the Pennsylvania subregion, there is a total estimated funding gap of about $31.5 billion for roadway projects over the life of the Plan. Only about 45 percent of the total roadway vision can be funded. There is a total transit funding deficit of $23.2 billion over the life of the Plan. Only about 47 percent of the total identified transit vision can be funded.

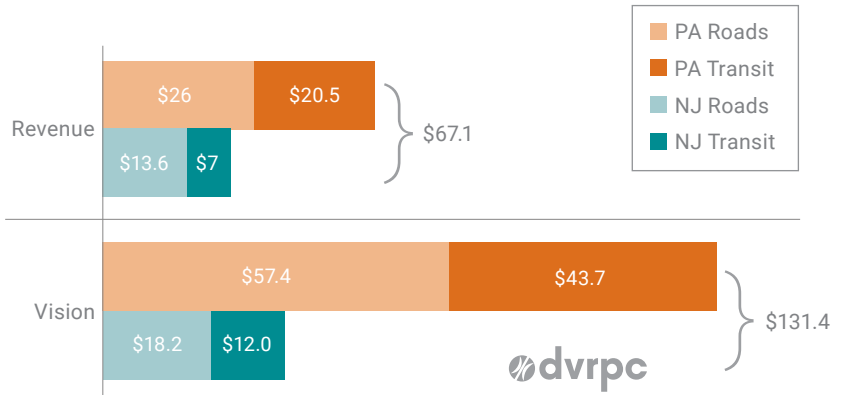
In the New Jersey subregion, there is a roadway funding deficit of $4.6 billion over the life of the Plan. About 75 percent of the total vision can be funded. On the transit side, there is a total funding deficit of about $5 billion over the life of the Plan, with the ability to fund approximately 58 percent of the projects identified in the transit vision.

## ALLOCATING REVENUES TO PROJECT TYPES

Funding is allocated to each of the roadway and transit funding categories based on comparative need, as well as meeting regional goals. Long-range plan policy prioritizes preservation and maintenance needs, followed by operational improvements, then system expansion projects. Following the lead of the U.S., Pennsylvania, and New Jersey DOTs as well as SEPTA and NJ TRANSIT, this "fix-it-first" policy allocates more funding to preserving and maintaining existing roadway and transit networks. The goal is to achieve and maintain a SGR for existing transportation infrastructure.

*Connections 2045* revised the roadway funding allocation to reflect a changing transportation vision and needs. In Pennsylvania, the cap on roadway system expansion was reduced from 5 percent to 4 percent of available roadway funds. This 1 percent was reallocated to Pavement Preservation, Operational Improvements, and the Roadway Other categories. It will help the region to better prepare for the needs

### FIGURE 5: REGIONAL TRANSPORTATION VISION COMPARED TO AVAILABLE FUNDING (IN BILLIONS OF Y-O-E $)




*Source: DVRPC, 2020.*

of connected vehicles (CVs) and highly automated vehicles (HAVs)—which will require better pavement conditions, line striping, and vehicle-to-infrastructure communications—as well as climate change and increased precipitation, which will require more investment in stormwater infrastructure and wetlands mitigation (in the 'Roadway Other' category).

Table 20 identifies the target allocations and resulting revenue for each funding category. Funding within each category is allocated to both Major Regional Projects, which are listed in the Plan, and to smaller scale projects as they are programmed in the TIP. The Plan also sets aside funding for smaller-scale projects that will be identified in the current and future TIPs.

## TABLE 20: FUNDING ALLOCATION TO PROJECT CATEGORIES

| MODE | PROJECT CATEGORY | PENNSYLVANIA | | NEW JERSEY | |
|---|---|---|---|---|---|
| | | TARGET ALLOCATION | ALLOCATED REVENUE | TARGET ALLOCATION | ALLOCATED REVENUE |
| Roadway | **System Preservation** | | | | |
| | - Pavement Preservation | 30.5% | $ 7.9 B | 48.5% | $ 6.6 B |
| | - Bridge Preservation | 50.0% | $ 13.0 B | 25.0% | $ 3.4 B |
| | **Operational Improvements** | 11.75% | $ 3.1 B | 15.25% | $ 2.1 B |
| | **Bicycle and Pedestrian** | 1.5% | $ 0.4 B | 2.0% | $ 0.3 B |
| | **System Expansion** | 4.0% | $ 1.0 B | 4.0% | $ 0.5 B |
| | **Other** | 2.25% | $ 0.6 B | 5.25% | $ 0.7 B |
| **Roadway Subtotal** | | **100.0%** | **$ 26.0 B** | **100.0%** | **$ 13.6 B** |
| Transit | **System Preservation** | | | | |
| | - Rail Infrastructure | 14.0% | $ 2.9 B | 7.5% | $ 0.5 B |
| | - Vehicles | 45.8% | $ 9.4 B | 34.3% | $ 2.4 B |
| | - Station Enhancements | 10.9% | $ 2.2 B | 3.0% | $ 0.2 B |
| | **Operational Improvements** | 3.5% | $ 0.7 B | 2.0% | $ 0.1 B |
| | **System Expansion** | 3.6% | $ 0.7 B | 35.7% | $ 2.5 B |
| | **Other** | 22.2% | $ 4.5 B | 17.5% | $ 1.2 B |
| **Transit Subtotal** | | **100.0%** | **$ 20.5 B** | **100.0%** | **$ 7.0 B** |
| **Region Total** | | **100.0%** | **$ 46.5 B** | **100.0%** | **$ 19.9 B** |

*Revenues in billions of Y-O-E $. Figures may not add up due to rounding. | Source: DVRPC, 2020.*

Together, roadway maintenance and preservation categories (pavement reconstruction and bridge replacement) account for 80.5 percent of total roadway expenditures in Pennsylvania and 73.5 percent in New Jersey. In Pennsylvania, the transit preservation and maintenance categories (rail infrastructure, vehicles, and station enhancements) account for over 70 percent of transit expenditures; in New Jersey, they account for nearly 45 percent of transit expenditures. A higher percentage was allocated in Pennsylvania because it has a much larger and older system.

Even if all anticipated Plan revenues were directed toward preserving and maintaining the roadway and transit systems, there would not be enough money to address the identified need. Furthermore, the region would not have funding for any other critical types of improvements to address congestion, safety, or mobility. With system preservation needs on the rise, only 4 percent of expected revenue was allocated for roadway system expansion projects in Pennsylvania and New Jersey, primarily for eliminating choke points in the system and for improving connections between facilities. A larger percentage of funding is reserved for operational improvements, which tend to have a higher return on congestion reduction than system expansion projects, per dollar spent. SGR needs are a higher priority than system expansion for transit. In New Jersey, 35.7 percent of funding is dedicated to transit system expansion.

## MAJOR REGIONAL PROJECT EVALUATION AND SELECTION

With available funding constrained, it is imperative to select projects judiciously, based on quantitative assessment. Investments in the system need to support the core principles of *Connections 2045*: Sustain the Environment; Develop Livable Communities; Expand the Economy; Advance Equity and Foster Diversity; and Create an Integrated, Multimodal Transportation Network. Investments also need to focus on modernizing the region's aging transportation network while working toward other key goals, such as: improving safety, reducing congestion, increasing mobility options for people and goods, incorporating technology, seamlessly connecting different modes, and identifying additional funding. As projects move from the Plan into the TIP, capital programming should be based on sound long-range strategic planning considerations, life-cycle investment analyses, and network performance and condition data (actual and projected). Careful tradeoff analysis must be done in order to ensure that the region gets the best possible return on its transportation investments

**Major Regional Projects** are large-scale projects that will have a significant impact on regional travel. Almost all system expansion projects are Major Regional Projects, as are large-scale reconstruction projects on the region's freeways. Major Operational Improvement initiatives, such as SEPTA's fare modernization project, are also listed in the Plan. For the sake of brevity, smaller-scale projects that were identified in the needs assessment are not listed in the Plan. Only minor system expansion projects are included in this Amendment, other smaller scale projects will be drawn down from current and future TIPs. The various funding categories in the Plan serve as placeholders for funding other smaller projects. Major Regional Projects are defined as:

**System Expansion:**

- **Roads:** Addition of new through lanes by widening, extending, or building new limited-access freeways of any length; creating a new interchange or adding missing movements between freeways (Highway Performance Monitoring System [HPMS] functional classes 1 or 2) and arterials (HPMS functional classes 3 or 4); or widening, extending, or building new principal arterials (HPMS functional classes 3 or 4) for more than three lane miles.

- **Transit:** New stations on existing lines (including station parking needs), extension of existing lines, or new rail and bus rapid transit (BRT) routes.

**Operational Improvement and System Preservation:**

- **Roads:** Projects that improve or reconstruct NHS facilities, or facilities with more than 25,000 vehicles per day, have more than 25,000 square feet of bridge deck area, cover more than 20 lane miles, or cost more than $20 million.

- **Transit:** Projects that improve or make major repairs to existing rail lines at a cost greater than $20 million; make major improvements to stations (generally aimed at rehabbing/upgrading the full facility; but can include major ADA initiatives to bring a station into compliance or roof replacements greater than 50,000 square feet) with more than 5,000 daily boardings or alightings, or cost greater than $20 million; make procurements that replace five or more vehicles in existing rail fleets; double track or add sidings to existing passenger rail lines; or upgrade a traditional bus route with bus rapid transit service.

Major Regional Project costs are typically broken out over several funding periods and categories, as their scope can involve reconstruction, replacement or rehabilitation, operational or safety improvements, and/or system expansion components.

## PROJECT EVALUATION

The DVRPC Board adopted a revised set of TIP-LRP project benefit criteria on July 25, 2019, based on the revised vision and goals set in the *Connections 2045* Plan and FHWA and FTA transportation performance measures (TPM). This new set of criteria aligns the TIP and Plan evaluation process, and is guided by a universal, multimodal performance-based approach. FHWA requires a project evaluation process to guide selecting projects for the Long-Range Plan. The criteria were updated with New Jersey and Pennsylvania members of a working subcommittee of the DVRPC Regional Technical Committee (RTC) and were designed to align directly with the multimodal goals of the LRP, as well as reflect the increasingly multimodal nature of projects in the LRP.

The evaluation process establishes universal criteria that can evaluate a variety of modes (roadway, transit, bike, pedestrian, freight) and project types, and can be used in the New Jersey and Pennsylvania counties in the DVRPC region. Figure 6 shows the 7 Criteria and 12 Subcriteria with their associated weights used in evaluating individual transportation projects. This analysis is one of many considerations that go into determining which projects are ultimately advanced into the LRP. More details are available at: www.dvrpc.org/LongRangePlanAndTIP/.

For system expansion projects, DVRPC and its planning partners developed a prescreening and evaluation process to assess whether they meet key objectives of the Plan. The first pre-screening criterion is whether a proposed system expansion project invests in areas that are currently developed or have been identified as areas appropriate for development over the life of the Plan on the Land Use Vision map (Figure 21 of the Administrative Plan, Publication #17039). The second prescreening criterion is consistency with the region's CMP. Consistency is determined by whether the subcorridor(s) in which a potential roadway expansion project is located has been identified in the CMP as appropriate for adding capacity. If a project fails the prescreening process, it is not considered for inclusion in either the Vision or Funded Plan. Expansion projects that pass this prescreening go through the full TIP-LRP Project Benefit Evaluation.[10] This evaluation considers:

- Safety – projects that implement FHWA-proven safety countermeasures or other safety strategies with specific crash reduction factors, address department of transportation (DOT)-identified high-crash locations and crashes in communities of concern; or implement safety-critical transit projects or are identified by a Public Transportation Agency Safety Plan (PTASP).

- Facility/Asset Condition and Maintenance – projects that bring a facility or asset into a SGR, extending the useful life of a facility or asset, or providing reduced operating/maintenance costs.

- Reliability and Congestion – projects that are located in a CMP congested corridor, implement a CMP strategy appropriate for that corridor, or are on a road with a high Planning Time Index (PTI); or a transit facility with a low on-time performance.

- Centers and the Economy – projects that are located within a quarter-mile of a Planning or Freight Center, or within a high, medium-high, or medium transit score area, or provide a connection between two or more Centers; are located in a municipality that meets U.S. Economic Development Administration funding eligibility requirements (per capita income or unemployment); located within a half-mile of a major regional visitor attraction; or are part of a major-county-identified economic development project.

- Multimodal Use – projects that impact the greatest number of total person trips (driver trips + passenger trips + transit trips + bike trips + pedestrian trips) and daily trucks using the facility or asset, and overall benefit to multimodal trip making.

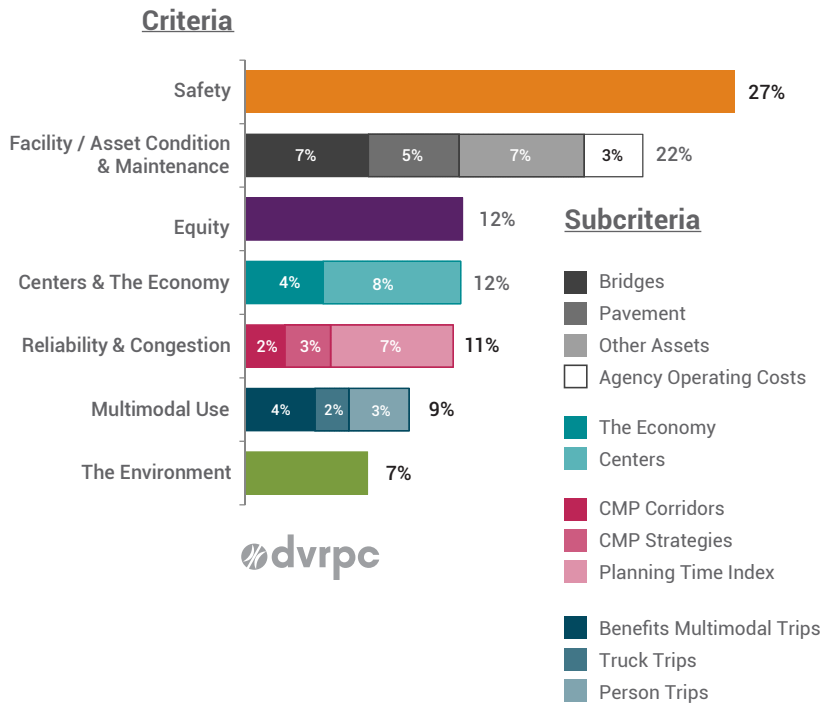
- Equity – projects located in census tracts with high Indicators of Potential Disadvantage (IPD), including consideration of population within the tract; no score for projects that increase vehicle speeds above 30 miles per hour (mph) or traffic volumes in tracts with above-average or well-above-average IPD scores.

- The Environment – projects that deliver high air quality benefits (per FHWA guidance) or incorporate environmentally friendly design principles.

Projects selected for inclusion in the Plan are part of the fiscally constrained Funded Plan, meaning there is reasonably anticipated revenue available to fund them during the life of the Plan. Those that

*10For more information on the TIP-LRP Project Benefit Evaluation Criteria, visit www.dvrpc.org/LongRangePlanAndTIP/pdf/4690_Designed_Final_TIP-LRP_Benefit_Evaluation_Criteria.pdf*

## FIGURE 6: PROJECT EVALUATION CRITERIA/SUBCRITERIA AND WEIGHTING




*Source: DVRPC, 2020.*

cannot be funded during the Plan's time horizon are included in an aspirational Vision Plan, which represents the projects the region would like to invest in during the Plan's time horizon but will likely be unable to do so as a result of current funding limitations.

### Air Quality Conformity

The U.S. EPA has established health-based standards for six criteria air pollutants, referred to as the National Ambient Air Quality Standards (NAAQS). Air quality in the region does not meet the standard for ground-level ozone and previously has not met the standards for fine particulate matter ($PM_{2.5}$). The Clean Air Act requires DVRPC to demonstrate that the transportation projects contained in the TIPs and Plan do not make the region's air quality worse, or impede the region's progress toward meeting the NAAQS. The process of this demonstration is referred to as transportation conformity.

DVRPC demonstrates transportation conformity by using a travel demand model to estimate the motor vehicle emissions from all of the regionally significant, nonexempt projects in the TIPs and Plan and comparing those emissions against budgets or limits established by the states. This process is conducted in close coordination with an interagency consultation group, composed of state and federal regulatory environmental and transportation agencies. DVRPC has successfully demonstrated the transportation conformity of the Amended *Connections 2045* Plan and the Pennsylvania and New Jersey TIPs in accordance with the corresponding State Implementation Plans and Clean Air Act requirements. More details are available at: www.dvrpc.org/AirQuality/Conformity/.

## THE VISION PLAN

The Vision Plan includes all of the identified improvements that are needed to attain the region's transportation goals outlined in the Long-Range Plan. It includes the system preservation needs assessment, along with desired investments in operational improvements, system expansion, and bike and pedestrian projects needed to achieve the Plan's vision. Since the Plan considers a 28-year horizon, there is a focus on Major Regional Projects. However, the financial plan considers all sizes and types of projects that are critical to achieving our transportation goals. Major Regional Projects that are not included in the Funded Plan are listed as unfunded aspirational projects in the Vision Plan.

## THE FUNDED PLAN

The Funded Plan is the list of fiscally constrained projects that can be paid for with the reasonably anticipated revenue through 2045. The Long-Range Plan Working Group identified the projects that are ultimately included in the Funded Plan. The Working Group reviewed the TIP-LRP project benefit evaluation criteria and used them and other relevant considerations to guide and inform project selection.

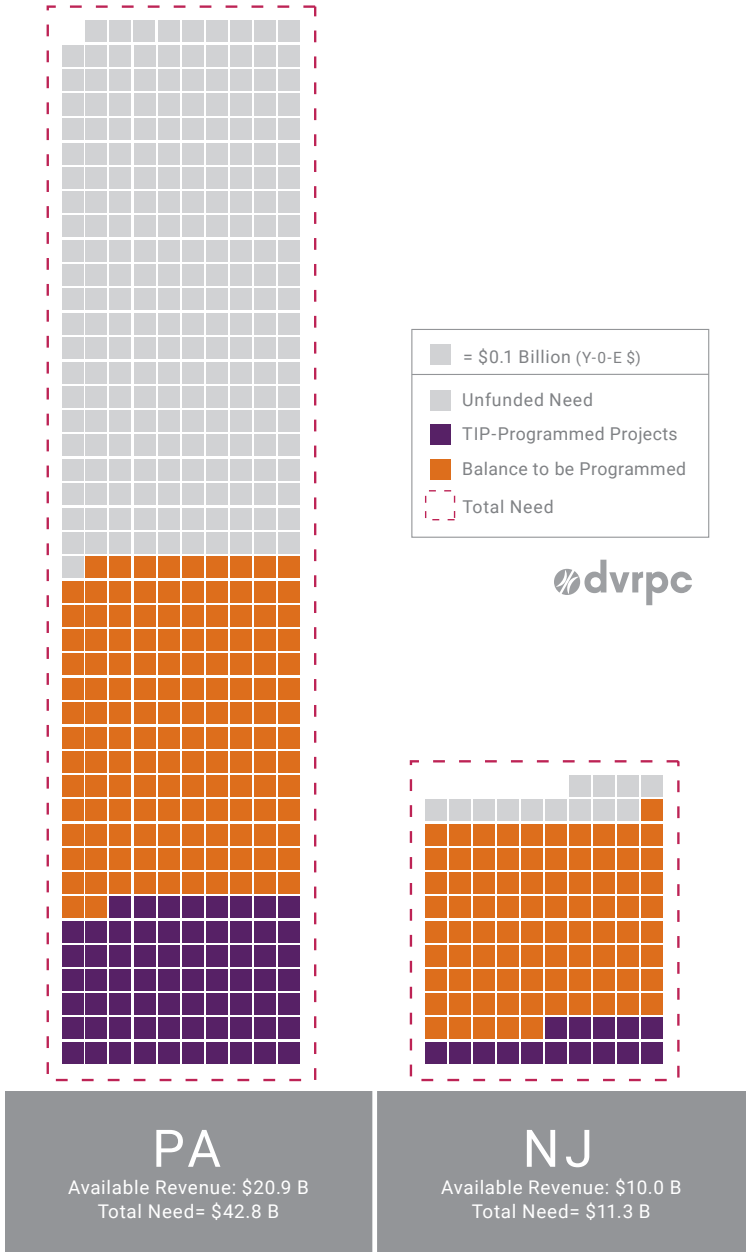
The Major Regional Projects that the region intends to fund over the life of the Plan are indicated in the following roadway and transit system preservation, operational improvements, and system expansion tables, plus one for bike and pedestrian, another for new or revised minor roadway expansion projects being added or revised as part of this Amendment; and a table for externally funded Major Regional Projects, which do not anticipate using federal or state transportation funds. Each project is identified by facility, project scope and location, and completion date based on the end of the funding period by which the project is expected to be complete. Project costs are given in Y-O-E dollars for funded projects, and in current-year dollars for the unfunded projects that are part of the Vision Plan. Project costs listed are only those that will be incurred during the life of the Plan (FY2018 to FY2045); projects may have incurred costs prior to FY2018 that aren't included here. Fields that have been updated from the Board-Adopted Connections 2045 Plan are indicated in bolded text. A detailed, interactive webmap of the amended Major Regional Projects can be found at www.dvrpc.org/webmaps/MRP2045_Amendments. This can be compared with the project status and funding in the Board-adopted financial plan at www.dvrpc.org/webmaps/MRP2045/#map.

## MAJOR REGIONAL ROADWAY PRESERVATION PROJECTS

The major regional roadway preservation projects identified in the Plan illustrate the scope and the scale of the effort needed to maintain the existing system. Identifying the timing and scope of reconstruction projects is difficult as minor repairs can extend facility lifespans, but may cost more over time than appropriately repairing and replacing as needed. In addition, any given facility can decline more quickly—or slowly—than predicted. Some of the projects identified will be completed, drawing from the balance of unallocated system preservation funds, but some of them will not be able to advance as a result of funding constraints. Figure 7 illustrates the programmed and available funding for roadway preservation projects as compared with the total need in each state's subregion.

Table 21 identifies Major Regional Roadway Preservation projects that are currently funded in the TIP, with a list of illustrative projects and their costs as a sample of major regional reconstruction projects that need to be advanced over the life of *Connections 2045*. Projects in **bold** in this table reflect a change in a project's funding status, scope, timing, or cost from the Board-adopted *Connections 2045* Plan. Market Street over Schuylkill River is new to this Amendment, as it is funded in the Pennsylvania TIP and meets the definition of a Major Regional Project. Only about 49 percent of the Pennsylvania subregion's roadway preservation needs and 88 percent of the New Jersey subregion's roadway preservation needs are met in the Plan. Projects listed as TBD are identified as needs during the life of the Plan, but are not currently funded in the TIP. Since aging curves on individual facilities are hard to predict, this is intentionally left open in order to give the DOT flexibility in terms of future project programming.

## FIGURE 7: ROADWAY SYSTEM PRESERVATION TIP PROGRAMMED PROJECTS, ALLOCATED REVENUE, AND TOTAL NEED (2018–2045)




*Source: DVRPC, 2020.*

### Innovations In Project Delivery

Better transportation project delivery methods can increase worksite safety, reduce congestion from construction, and lower the cost of transportation projects. FHWA's *Everyday Counts* campaign highlights the economic and quality-of-life benefits from maintaining and reconstructing transportation facilities while minimizing impacts on the traveling public. Some examples of the techniques that are being used in the region and around the country to do this include:

- **INVEST** is an FWHA tool that provides information and techniques to help agencies integrate sustainability best practices into their projects and programs.
- **Accelerated bridge construction** uses geosynthetic materials to quickly and cheaply construct abutments and roadway approaches, and prefabricated bridges that are built off-site, or nearby, and can be slid into place and paved, and allow the road to reopen within 48 to 72 hours.
- **AASHTOWare** is bridge and pavement management software that can more accurately design facility requirements for given traffic and weather conditions.
- **Cold-in-place recycling** is a no-heat paving solution. Two to five inches of the current road surface are pulverized down to a specific aggregate size, mixed with a rejuvenating asphalt emulsion, and then reused to pave that same road, saving labor, material, and transportation costs.
- **Warm-mix paving** asphalt's heating requirements are 30 to 120 degrees Fahrenheit less than traditional asphalt, reducing fuel consumption and emissions. Secondary benefits include allowing and prolonging the construction period in cold climates, extending material handling time, and reducing fumes.
- **Waste and recycled materials**, such as rubber tires, coal ash, fly ash, foundry sand, slag, asphalt shingles, construction and demolition materials, and silica fume, have been added to pavement mixtures to reduce cost and improve performance.
- **Precast concrete paving** involves panels being precast offsite, where they can be subject to higher quality-control standards, and installed during low-volume periods—such as overnight or weekends. They can reduce one of the major causes of road delay: construction.

## TABLE 21: ILLUSTRATIVE LIST OF MAJOR REGIONAL ROADWAY PRESERVATION PROJECTS

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | LRP PROJECTS FUNDED IN TIP *MILLIONS OF Y-O-E $* | ILLUSTRATIVE PROJECT COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|
| PA 309 Sellersville Bypass | Resurface from Church Road to Tollgate Road | Bucks | 2018–2028 | $ 56.6 | |
| I-95 | Rehabilitate bridges over Neshaminy Creek | Bucks | TBD | | $ 36.0 |
| US 1 Lincoln Highway | Rehabilitate bridge over Delaware Canal and Conrail | Bucks | TBD | | $ 16.5 |
| PA 332 Newtown Bypass | Reconstruct bridge over SEPTA | Bucks | TBD | | $ 10.0 |
| Butler Pike | Reconstruct bridge over PA 611 Bypass | Bucks | TBD | | $ 27.0 |
| Old Lincoln Highway | Reconstruct bridge over Conrail | Bucks | TBD | | $ 26.0 |
| Newportville-Falls Road | Rehabilitate bridge over Conrail | Bucks | TBD | | $ 11.0 |
| Darby Road Extension | Replace North Valley Road Bridge; realign to connect new bridge with Darby Boulevard | Chester | **2018–2028** | **$ 20.8** | |
| Baltimore Pike | Replace bridge over Brandywine Creek | Chester | TBD | | $ 26.0 |
| US 202 Section 200 | Reconstruct Section 200 (from Matlack Street north to US 30); intersection improvements at PA 100 Bypass | Chester | TBD | | **$ 125.0** |
| Swedesford Road | Replace bridge over County Line Expressway | Chester | TBD | | $ 24.0 |
| Black Rock Road | Rehabilitate bridge over Schuylkill River | Chester | TBD | | $12.0 |
| US 1 | Reconstruct from Schoolhouse Road to Maryland state line | Chester | **2018–2035** | **$ 279.9** | |
| US 422 | Reconstruct from Sanatoga Interchange to just east of Stowe Interchange and west of Schuylkill River bridge; realign from Porter to Park Road; improve acceleration lane for westbound on-ramp from Sanatoga Interchange; reconstruct bridge over Schuylkill River and provide Schuylkill River Trail crossing | Chester, Montgomery | 2018–2028 | **$ 314.4** | |
| I-476 | Reconstruct throughout Delaware County | Delaware | TBD | | $ 700.0 |
| Media Bypass | Replace bridge over Crum Creek and Crum Creek Road | Delaware | TBD | | $ 25.0 |
| PA 291 | Replace bridge over Little Crum Creek and Conrail | Delaware | TBD | | $ 29.0 |
| I-95 | Reconstruct throughout Delaware County | Delaware | TBD | | $ 725.0 |
| I-476 | Reconstruct bridges over Balligomingo Road | Montgomery | TBD | | $ 80.0 |

*continued on next page...*

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | LRP PROJECTS FUNDED IN TIP *MILLIONS OF Y-O-E $* | ILLUSTRATIVE PROJECT COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|
| US 422 Pottstown Expressway | Replace bridges over Perkiomen Creek | Montgomery | TBD | | $ 67.5 |
| Belmont Avenue | Rehabilitate bridge over Schuylkill River | Montgomery | TBD | | $ 33.0 |
| Church Road/Schoolhouse Road/Water Street | Reconstruct roadway to provide for truck traffic bypass | Montgomery | TBD | | $ 25.0 |
| Langely Avenue | Reconstruct, realign, and new streetscaping from 26th Street to Broad Street | Philadelphia | 2018–2022 | **$ 3.6** | |
| US 1 Roosevelt Boulevard | Reconstruct bridge over Wayne Junction | Philadelphia | 2018–2028 | **$ 52.6** | |
| Passyunk Avenue | Rehabilitate bridge over Schuylkill River | Philadelphia | TBD | | $ 65.0 |
| Henry Avenue | Replace bridge over Lincoln Drive | Philadelphia | TBD | | $ 95.0 |
| I-95 Girard Point Bridge | Rehabilitate bridge over Schuylkill River | Philadelphia | TBD | | $ 30.0 |
| I-95 South Philadelphia | Reconstruct from I-676 to Broad Street | Philadelphia | TBD | | $ 3,000.0 |
| I-76 | Rehabilitate throughout Philadelphia | Philadelphia | TBD | | $ 400.0 |
| Henry Avenue | Replace bridge over Wissahickon Creek | Philadelphia | TBD | | $ 46.0 |
| **Market Street over Schuylkill** | **Rehabilitate bridges over Schuylkill River and CSX** | **Philadelphia** | **2018–2028** | **$ 122.6** | |
| NJ 70 | Reconstruct from NJ 38 to Cropwell Road | Burlington, Camden | 2018–2027 | **$ 161.5** | |
| I-676 | Reconstruct from County Route 537 to US 30 | Camden | TBD | | $ 26.0 |
| I-76 | Reconstruct from I-676 to I-295 | Camden | TBD | | $ 47.0 |
| US 30 | Reconstruct bridge over Cooper River | Camden | TBD | | $ 27.0 |
| NJ 73 | Reconstruct bridge over US 130 | Camden | TBD | | $ 22.5 |
| I-295 | Reconstruct bridges over Big River Creek | Gloucester | TBD | | $ 35.0 |
| US 322 | Reconstruct bridge over Main Street | Gloucester | TBD | | $ 43.0 |
| **US 130 and US 47** | **Reconstruct bridges over Big Timber Creek** | **Gloucester** | **2018–2027** | **$ 26.7** | |
| US 1 | Rehabilitate bridge over D&R Canal | Mercer | TBD | | $ 22.0 |
| Clarksville Road (CR 638) | Replace Clarksville Road bridge over NE Corridor rail line, adding bike and pedestrian facilities | Mercer | TBD | | $ 27.5 |
| NJ 133 | Reconstruct bridges over NJ Turnpike | Mercer | TBD | | $ 36.0 |

*Source: DVRPC, 2020.*

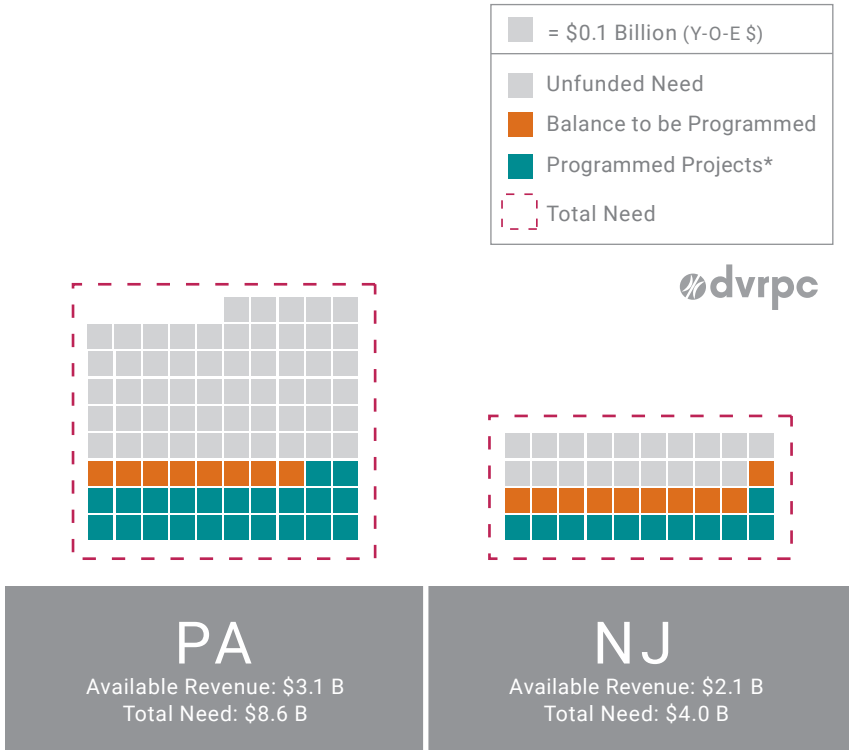
I-95 is a clear example of the difficult task of addressing the rebuilding of our infrastructure in a fiscally constrained environment. The focus right now is on reconstructing the portion between Cottman Avenue and Race Street in Philadelphia. Starting in the 2030s, the next section of reconstruction will be in Center City and South Philadelphia between I-676 and Broad Street. Much of this segment in South Philadelphia is a viaduct bridge structure. Then, reconstruction will need to advance from Broad Street all the way to the Delaware state line. This Plan amendment comes in response to PennDOT shifting additional funds to the IMP, which will help to meet the funding challenge for these critical regional projects, along with other Interstate repair needs around the commonwealth.

Roadway reconstruction projects often include improvements for bicycle and pedestrian facilities, and funding constraints on those projects can affect several modes—not just automobiles.

## MAJOR REGIONAL ROADWAY OPERATIONAL IMPROVEMENT PROJECTS

Operational improvements increase the efficiency of the existing transportation system. In many cases, these projects make interchange improvements that will improve the flow of traffic and help to remove traffic from local streets. Examples of this type of project are the I-95 and I-476, and the I-476 and I-76 interchange improvements, along with US 1 interchange improvements at PA 352 and PA 452 in Delaware County. Other types of operational improvement projects include the intersection improvement at US 202 and PA 926: the result of "right-sizing" what was a widening and grade-separated interchange project into an affordable, short-term project that can improve safety and reduce congestion more immediately. Figure 8 illustrates the programmed and available

**FIGURE 8: ROADWAY OPERATIONAL IMPROVEMENT PROGRAMMED PROJECTS, ALLOCATED REVENUE, AND TOTAL NEED (2018–2045)**




*Includes projects programmed in the TIP and funded Major Regional Projects in the Long-Range Plan

*Source: DVRPC, 2020.*

funding for roadway operations projects as compared with the total need in each state's subregion. Any major regional system preservation project that has operational improvement components is listed here. Table 22 identifies all Major Regional Roadway Operational Improvement projects in the Plan, and highlights anything that has changed in terms of inclusion in the funded plan, scope, timing or cost in **bolded** text.

Major Regional Roadway Operational Improvement Projects do not only focus on physical changes to the roadway system. DVRPC and its

## TABLE 22: MAJOR REGIONAL ROADWAY OPERATIONAL IMPROVEMENT PROJECTS

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST *MILLIONS OF Y-O-E $* | ILLUSTRATIVE PROJECT COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|
| US 202 at PA 926 | Intersection improvements | Chester | 2018–2022 | **$ 4.4** | |
| US 422 Corridor ITS | ITS improvements along US 422, Ridge Pike, PA 23, and PA 724 | Chester, Montgomery | Unfunded | | $ 50.0 |
| US 1 at PA 352 and PA 452 | Reconstruction of PA 352 cloverleaf interchange, Media Bypass/ Baltimore Pike interchange, and PA 452 intersection; eliminate lane drops | Delaware | **2018–2035** | **$ 295.6** | |
| I-95 and I-476 Interchange | One new lane in each direction on I-95 through interchange; addition of lane on ramp from SB I-476 to SB I-95 | Delaware | 2029–2035 | $ 195.0 | |
| US 202 (Section 500) Markley Street | Reconstruct from Main Street to Johnson Highway; widen to add center turn lane between Marshall Street and Johnson Highway | Montgomery | **2018–2035** | **$ 44.8** | |
| Ridge Pike | Reconstruct four-lane road from Butler Pike to I-276 PA Turnpike; widen to add center turn lane; reconstruct two bridges over Norfolk-Southern rail tracks | Montgomery | **2018–2028** | $ 25.7 | |
| I-476 and I-76 | Ramp modifications | Montgomery | 2029–2045 | $ 18.0 | |
| I-76 and PA 23 Matsonford Road | Interchange modification | Montgomery | 2029–2045 | $ 18.0 | |
| US 422 at Sanatoga Interchange | Ramp modifications | Montgomery | 2029–2045 | $ 16.0 | |
| US 422 | Reconstruct from Berks County line to Schuylkill River Bridge; reconfigure "S" curve in West Pottsgrove; realign Stowe Interchange | Montgomery | 2018–2022 | $ 41.5 | |
| I-276 at PA 611 Willow Grove | Interchange modification | Montgomery | 2029–2045 | **$ 63.1** | |
| US 202 Dekalb Street | Convert from one-way traffic flow to two-way, and full reconstruction of road in Norristown | Montgomery | Unfunded | | $ 15.0 |
| PA 100 at PA 73 | Modify interchange into a single-point urban-style interchange | Montgomery | Unfunded | | $ 70.0 |
| PA 611 – Easton Road | Corridor, signals, and intersection improvements between Blair Mill Road and County Line Road | Montgomery | 2029–2045 | $ 73.0 | |
| PA 611 ITS | Eastern Montgomery County ITS improvements and multimodal upgrades from Cheltenham Avenue to County Line Road | Montgomery | 2029–2045 | $ 36.0 | |

*continued on next page...*

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST *MILLIONS OF Y-O-E $* | ILLUSTRATIVE PROJECT COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|
| Sumneytown Pike | Corridor and intersection improvement from PA 63 to PA 363 | Montgomery | 2029–2045 | $ 36.0 | |
| District 6 Traffic-Management Center | New regional traffic management center to be constructed in PennDOT District 6 headquarters building | Montgomery | **2018–2028** | **$ 90.3** | |
| Philmont Avenue/ Tomlinson Road/ Pine Road | Intersection improvements | Montgomery | **2023–2035** | **$ 11.9** | |
| PA 63 at Welsh Road | Bridge replacements and minor widening for turn lanes between Blair Mill Rd. and Twining Rd. | Montgomery | **2023–2035** | **$ 27.5** | |
| I-95 Philadelphia Sector A North | Reconstruct from Race Street to Cottman Avenue; interchange improvements at Vine, Girard, Allegheny, Betsy Ross Bridge, Bridge, and Cottman Interchanges | Philadelphia | **2018–2035** | **$ 2,750.0** | |
| Roosevelt Boulevard | Reconstruct and improve safety from Broad Street to Bensalem Township | Philadelphia | Unfunded | | $ 1,500.0 |
| Eakins Oval | Reconfiguration of circulation paths and patterns around Eakins Oval and Benjamin Franklin Parkway | Philadelphia | 2029–2045 | $ 45.0 | |
| 30th Street Station Vehicle Circulation | Improvements from 30th Street District Plan, including repurposing Little Market Street; improvements to Market Street, Arch Street, and 30th Street; realignment of JFK Boulevard; I-76 ramp reconfigurations | Philadelphia | 2029–2045 | $ 75.0 | |
| Vision Zero in Philadelphia | Improve road safety with engineering enhancements | Philadelphia | 2029–2035 | $ 80.0 | $ 50.0 |
| US 130 Corridor Improvements | Redesign five intersections spanning 12.76 miles from Bridgeboro Rd. to Rising Sun Rd. | Burlington | 2028–2045 | $ 445.0 | |
| NJ 70 | Operational and safety improvements from NJ 38 to NJ 73; intersection improvements at Kingston Road and Covered Bridge Road | Burlington, Camden | 2028–2045 | $ 305.0 | |
| NJ 29 | Convert to an urban boulevard from US 1 to Sullivan Way | Mercer | Unfunded | | $ 220.0 |
| Princeton-Hightstown Road Improvements | Widening, reconstruction, and signal upgrades from Wallace-Cranbury Road to Clarksville Road | Mercer | 2018–2021 | **$ 15.1** | |
| I-195 ATM | Dynamic speed limit, dynamic lane assignment, and queue warning between NJ Turnpike and I-295 | Mercer | 2028–2035 | $ 25.0 | |

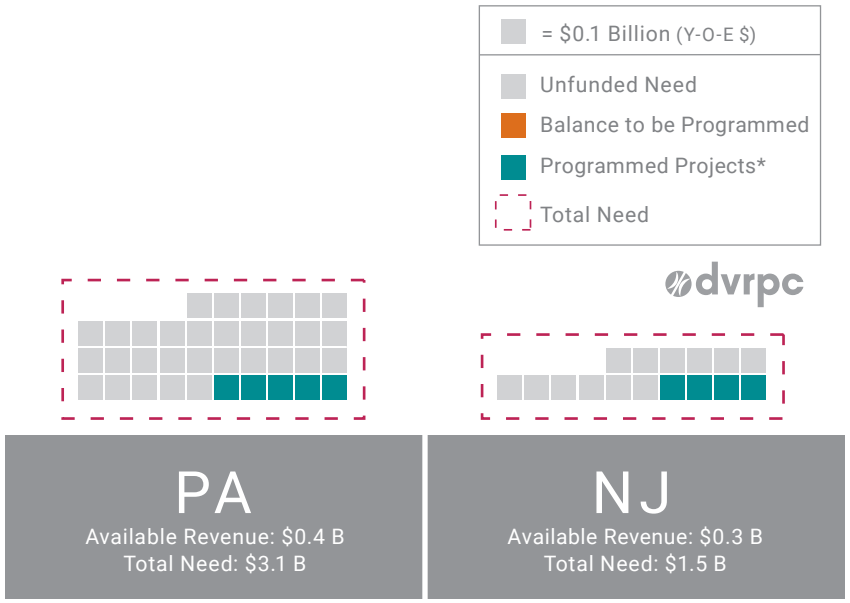
*Source: DVRPC, 2020.*

planning partners developed a TSMO Plan that details specific ITS, DSRC, Active Traffic Management (ATM), and signal improvement projects. ATM blends technology and increased management to enhance roadway throughput using techniques, such as variable speed limits, queue detection, dynamic lane assignments, junction control, adaptive ramp metering, and continuous monitoring systems. The biggest changes in the amendment include pushing back a portion of the I-95 reconstruction project in North Philadelphia to the third funding period, and moving the PennDOT District 6 regional traffic management center into the first two funding periods. Only about 36 percent of the Pennsylvania subregion's and 53 percent of the New Jersey subregion's operational improvements can be funded in the Plan.

## MAJOR REGIONAL BIKE AND PEDESTRIAN PROJECTS

Bike and pedestrian improvements in *Connections 2045* include on-road improvements and completing The Circuit, a 815-mile regional trail network. About 340 miles of this system are complete, and about 75 miles are anticipated to be constructed over the next five years. Completing the remaining 400 miles of the system will require approximately $600 million to $1 billion over the life of the Plan. Table 23 identifies all Major Regional Bike and Pedestrian projects in the Plan, and highlights anything that has changed in terms of inclusion in the funded plan, scope, timing, or cost in **bolded** text. Now fully funded with near-term construction timing in this Amended Plan, a partnership between the City of Philadelphia, the Commonwealth of Pennsylvania, and the William Penn Foundation will cap over I-95 in Old City, Philadelphia, helping to better connect Penn's Landing with Center City. Only about 13 percent of the Pennsylvania subregion's and 20 percent of the New Jersey subregion's bicycle and pedestrian improvements can be funded. Figure 9 illustrates the programmed and available funding for roadway bike and pedestrian projects as compared with the total need in each state's subregion. Some of these needs will be built as part of larger roadway preservation, operational improvement, and system expansion projects. Projects may also be constructed using competitive grant funding; or get completed by local governments outside the federal process, such as the Upper Bucks Rail Trail.

### FIGURE 9: BIKE AND PEDESTRIAN PROGRAMMED PROJECTS, ALLOCATED REVENUE, AND TOTAL NEED (2018–2045)




*Includes projects programmed in the TIP and funded Major Regional Projects in the Long-Range Plan

*Source: DVRPC, 2020.*

## TABLE 23: MAJOR REGIONAL BIKE AND PEDESTRIAN PROJECTS

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | LOCAL, PRIVATE, AND OTHER FUNDED *MILLIONS OF Y-O-E $* | STATE AND FEDERAL FUNDED COST *MILLIONS OF Y-O-E $* | UNFUNDED COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|---|
| The Circuit in Pennsylvania | **Complete 249 miles of the Circuit regional trail network** | Pennsylvania Subregion | 2018–2045 | | **$ 168.6** | **$ 392.2** |
| The Circuit in New Jersey | **Complete 151 miles of the Circuit regional trail network** | New Jersey Subregion | 2018–2045 | | **$ 51.8** | **$ 223.9** |
| Penn's Landing Cap and Civic Space | Cap over I-95 and Columbus Boulevard between Walnut and Chestnut Streets creating an 8-acre civic space; extension of the South Street Bridge to the waterfront; and construction of a two-mile on-road section of the Delaware River Trail from Spring Garden Street to Washington Avenue in Center City, Philadelphia | Philadelphia | **2018–2028** | **$ 105.0** | **$ 146.0** | |
| Vine Street Expressway | New cap over I-676 around 10th Street | Philadelphia | Unfunded | | | $ 35.0 |
| Schuylkill River Swing Bridge | As part of the Circuit Trail network, provide a bicycle and pedestrian connection between the Kingsessing and Grays Ferry neighborhoods of Philadelphia across the Schuylkill River | Philadelphia | 2018–2022 | | **$ 17.7** | |
| 30th Street Station Bike/Pedestrian Bridge Connections | Construction of two new bike/ped bridges over the Schuylkill River as part of the 30th Street Station District Plan | Philadelphia | Unfunded | | | $ 225.0 |
| Schuylkill Promenade and Boardwalk | Construct new promenade and boardwalk on the west bank of the Schuylkill River between Market Street and Arch Street | Philadelphia | Unfunded | | | $ 40.0 |

*Source: DVRPC, 2020.*

## MAJOR REGIONAL ROADWAY SYSTEM EXPANSION PROJECTS

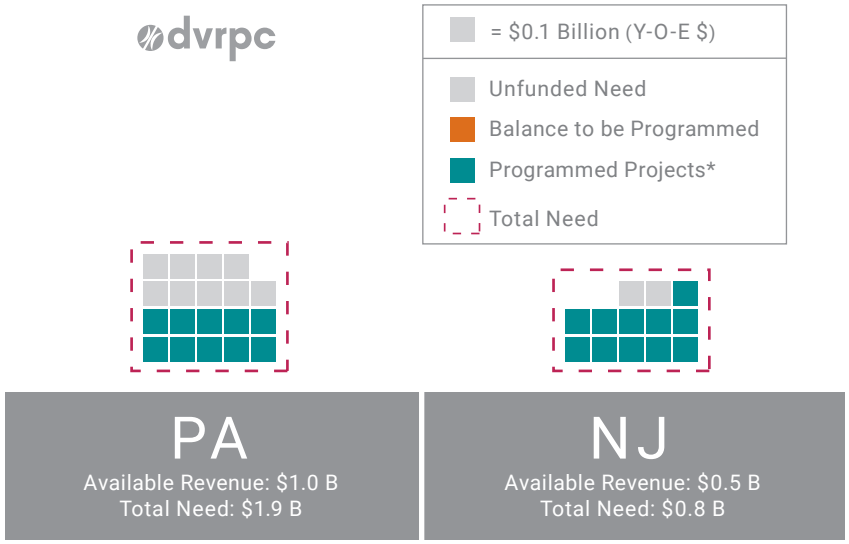
Due to overwhelming needs in system preservation and increasing needs for operational improvements, new roadway capacity funding is capped at 4 percent of total anticipated roadway revenue. Table 24 lists all the system expansion projects in the vision and identifies which ones can be funded within this cap, and highlights anything that has changed in terms of inclusion in the funded plan, scope, timing, or cost in **bolded** text.

Although limited in scope, the system expansion investments included in the Plan support its land use, environmental, and economic development goals. Any major regional system preservation or operational improvement project that increases system capacity is listed here. The US 1 reconstruction in Bucks County is one example of an expansion project that is also helping to rebuild the system. Costs for such projects are accounted for within the system preservation, operational improvements, and system expansion categories.

A number of the major regional roadway system expansion projects improve operations by eliminating bottlenecks or bridging gaps. The Adams Avenue Connector, for example, provides a connection between I-95 and the Betsy Ross Bridge. Similarly, the I-295 and I-76/NJ 42 Direct Connect and I-295/NJ 42 (Missing Moves) projects complete this critical interchange and improve the functionality and safety of the system; while better facilitating goods movement. The latter has a cost increase in the Amended Plan. Other system expansion projects improve the region's economic competitiveness. The North Delaware Avenue and Lafayette Street extensions provide access to planned residential and recreational facilities in key regional centers.

System expansion projects also go through right-sizing to ensure the improvement is cost affordable. US 1 in Mercer County was originally programmed as a set of grade-separated intersections. However, the project will now consist of minor widening in one section, along with improvements at several other key intersections, in an effort to improve safety and reduce congestion, and a new cost sharing agreement with the North Jersey Transportation Planning Authority increases the cost within the Greater Philadelphia region, but doesn't change the total project cost as it also extends into Middlesex County, NJ. The US 30 Coatesville-Downingtown Bypass project scope has been revised from new through lanes to part-time shoulder use or flex lanes in the Amended Plan.

### FIGURE 10: ROADWAY SYSTEM EXPANSION PROGRAMMED PROJECTS, ALLOCATED REVENUE, AND TOTAL NEED (2018–2045)




*Includes projects programmed in the TIP and funded Major Regional Projects in the Long-Range Plan

*Source: DVRPC, 2020.*

## TABLE 24: MAJOR REGIONAL ROADWAY SYSTEM EXPANSION PROJECTS

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | SYSTEM EXPANSION COST *MILLIONS OF Y-O-E $* | TOTAL FUNDED COST *MILLIONS OF Y-O-E $* | UNFUNDED COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|---|
| US 1 | Reconstruct from I-276 (PA Turnpike) to NJ state line; widen from PA Turnpike to PA 413; interchange improvements | Bucks | **2018–2035** | **$ 110.3** | **$ 479.7** | |
| I-95 at Street Road (PA 132) | Replace bridge over I-95 and Amtrak Northeast Corridor with wider structure; provide turning lanes on bridge; widen I-95; improve connection to US Route 13 | Bucks | Unfunded | | | $ 162.0 |
| John Fries Highway (PA 663) | Widen and reconstruct from PA 309 to PA Turnpike | Bucks | Unfunded | | | $ 27.0 |
| County Line Road | Widen and reconstruct from Doylestown Road to PA 611 | Bucks, Montgomery | **2018–2022** | **$ 7.9** | **$ 18.0** | |
| PA 309 Connector Road | Construct new road from Allentown Road to County Line Road; improve PA 309 Interchange | Bucks, Montgomery | **2018–2035** | **$ 87.0** | **$ 115.9** | |
| I-95 Bucks/ Philadelphia Active Traffic Management | Part-time shoulder use and other operational strategies from Woodhaven Road to Academy Road | Bucks, Philadelphia | Unfunded | | | $ 22.0 |
| US 30 Coatesville-Downingtown Bypass | **Reconstruct from Exton Bypass to PA 10; complete interchanges at PA 113 and Airport Road; part-time shoulder use or flex lanes from Exton Bypass to Reeceville Road** | Chester | **2018–2035** | **$ 233.6** | **$ 1,248.2** | |
| US 202 (Section 100) | Widen from West Chester to Delaware state line from four to six lanes; grade separated interchanges at US 1 and at PA 926 | Chester, Delaware | Unfunded | | | $ 350.0 |
| US 322 | Widen and reconstruct from US 1 to I-95 | Delaware | **2018–2035** | **$ 112.6** | **$ 288.2** | |
| I-95/US 322/ Highland Avenue Interchange | Realign I-95 and add new movements at interchange to US 322, Bethel Road, and Highland Avenue | Delaware | **2018–2028** | **$ 18.2** | **$ 121.3** | |
| I-476 Active Traffic Management | Part-time shoulder use and other operational strategies from PA 3 to I-95 | Delaware | **2018–2028** | **$ 35.6** | **$ 71.2** | |

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| FACILITY | PROJECT SCOPE | LOCATION | TIMING | SYSTEM EXPANSION COST *MILLIONS OF Y-O-E $* | TOTAL FUNDED COST *MILLIONS OF Y-O-E $* | UNFUNDED COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|---|
| I-95 Delaware County Active Traffic Management | **Part-time shoulder use and other operational strategies southbound from Stewart Avenue to I-476 and northbound from US 322 East to Stewart Avenue** | Delaware | Unfunded | | | $ 23.0 |
| Lafayette Street | Extend roadway from Barbadoes Street to Diamond Avenue | Montgomery | 2018–2022 | $ 12.0 | $ 24.1 | |
| US 202 (Section 600) | Widen and reconstruct from Johnson Highway to PA 309 | Montgomery | **2018–2035** | **$ 75.8** | **$ 148.6** | |
| US 422 Bridge and PA 23 Interchange | Bridge replacement and new bridge over Schuylkill River—existing bridge is five lanes, new bridge will have six lanes; intersection/ interchange improvements at US 422 and PA 23 Interchange | Montgomery | 2018–2022 | **$ 8.8** | **$ 17.7** | |
| I-76 Integrated Corridor Management | ATM, multimodal improvements and coordination, and safety analysis from PA Turnpike to US 1; part-time shoulder use from US 202/US 422 to I-476/Conshohocken, and I-476/Conshohocken to Belmont Avenue/ Green Lane | Montgomery | 2018–2028 | **$ 130.6** | **$ 261.2** | |
| US 422 Mainline Widening | Reconstruct and widen from four to six lanes from US 202 to PA 363 | Chester, Montgomery | 2029–2045 | **$ 31.6** | **$ 63.3** | |
| I-276/I-76 Valley Forge Interchange | Ramp modifications | Montgomery | Unfunded | | | **$ 44.2** |
| I-276 and Virginia Drive | Add full movements | Montgomery | Unfunded | | | **$ 29.1** |
| I-276 and Henderson Road | New interchange | Montgomery | Unfunded | | | **$ 34.5** |
| I-276 and PA 63 Welsh Road | New interchange | Montgomery | Unfunded | | | **$ 58.0** |
| I-276 Fort Washington Interchange | Ramp modifications | Montgomery | Unfunded | | | **$ 5.0** |

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| FACILITY | PROJECT SCOPE | LOCATION | TIMING | SYSTEM EXPANSION COST *MILLIONS OF Y-O-E $* | TOTAL FUNDED COST *MILLIONS OF Y-O-E $* | UNFUNDED COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|---|
| US 202 Dannehower Bridge and Lafayette Street Interchange | Reconstruct Dannehower Bridge and add new half-diamond interchange at Lafayette Street | Montgomery | Unfunded | | | $ 58.0 |
| US 422 Active Traffic Management | Part-time shoulder use and other operational strategies from US 202 to PA 29 | Chester, Montgomery | Unfunded | | | $ 18.0 |
| North Delaware Avenue | Extend roadway from Orthodox Street to Buckius Street | Philadelphia | 2018–2022 | $ 6.6 | $ 6.6 | |
| Adams Avenue Connector | Extend roadway to new ramps at I-95 and Aramingo Avenue | Philadelphia | 2018–2022 | $ 13.7 | $ 13.7 | |
| I-76 Philadelphia Active Traffic Management | Part-time shoulder use and other operational strategies from US 1 to I-676 | Philadelphia | Unfunded | | | $ 48.0 |
| I-295 at NJ 38 | Add missing movements at interchange | Burlington | **Unfunded** | | | **$ 200.9** |
| NJ 73 at Church Road and Fellowship Road | Convert intersections into grade-separated interchanges | Burlington | 2018–2027 | **$ 44.0** | **$ 88.0** | |
| I-295 Direct Connect | Direct connection of I-295 through interchange at I-76/NJ 42 | Camden | 2018–2027 | **$ 150.3** | **$ 320.6** | |
| I-295/NJ 38 (Missing Moves) | Add Missing Movements to interchange at I-76/NJ 42 | Camden, Gloucester | 2018–2021 | **$ 121.0** | **$ 2,428.0** | |
| US 322 | Widen from US 130 to NJ Turnpike | Gloucester | 2028–2045 | $ 45.5 | $ 91.0 | |
| US 322 Rowan University Bypass | Bypass around US 322 and NJ 55 Interchange; intersection improvements at US 322 and Joseph Bowe Boulevard; corridor improvements in campus/downtown area between Lehigh Road and Yale Road | Gloucester | Unfunded | | | $ 36.0 |
| US 1 Alexander Road to Mapleton Road | Widen from six to eight lanes from Dinky Bridge to Scudders Mill Road; intersection improvements at Washington Road and Harrison Street | Mercer | 2018–2027 | **$ 36.0** | **$ 36.0** | |
| Vaughn Drive Connector | Extend Vaughn Drive to Princeton Hightstown Road (CR 571) | Mercer | 2028–2045 | $ 57.0 | $ 57.0 | |

*Source: DVRPC, 2020.*

Improved movements and new exits along the Pennsylvania Turnpike are proposed to give better access to a number of key regional business centers. Although not funded in the Plan, these projects could support the redevelopment of these areas and make the Turnpike more of a regional beltway. They have the potential to become a public-private partnership between PennDOT, the Pennsylvania Turnpike, and property developers. Completing the missing movements at I-295/NJ 38 (Missing Moves) was removed from the funded plan in this Amendment in order to maintain fiscal constraint. Figure 10 illustrates the programmed and available funding for roadway system expansion projects as compared with the total need in each state's subregion. Only about 53 percent of the Pennsylvania subregion's and 63 percent of the New Jersey subregion's roadway system expansion projects can be funded.

## MINOR REGIONAL ROADWAY SYSTEM EXPANSION AND ROADWAY OTHER PROJECTS

Minor Roadway System Expansion projects generally expand lower volume roads for less than three lane miles. This category includes funding for minor network expansion projects in the current TIP, projects identified in previous long-range plans, and new ones identified by counties during the 2045 Plan development. Many of the projects listed in Table 25 are new, as a result of additional funding to the region from the Pennsylvania Multimodal Fund, and their subsequent inclusion in the TIP. Local funds identified in Table 25 are in addition to the state and federal funds, and these should be added together to account for the project's total cost. This table lists a selection of minor system expansion projects in the vision and identifies which ones can be funded within the cap, and highlights anything that has changed in terms of inclusion in the funded plan, scope, timing, or cost in **bolded** text.

The Roadway Other category is a collection of miscellaneous roadway needs, including parking facilities, drainage, environmental mitigation, Transportation Management Associations (TMAs), engineering, regional and local planning, and debt service. Table 26 lists two major regional roadway other projects. Sound walls in Chester City will help to reduce noise pollution and improve livability in one of the region's core cities, it has an updated cost estimate from the Board-adopted Plan. It highlights one change in cost in **bolded** text.

## TABLE 25: MINOR REGIONAL ROADWAY SYSTEM EXPANSION PROJECTS

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | SYSTEM EXPANSION COST *MILLIONS OF Y-O-E $* | TOTAL FUNDED COST *MILLIONS OF Y-O-E $* | UNFUNDED COST *MILLIONS OF 2017 $* | LOCAL COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|---|---|
| **PA 663 from Portzer Road to Hickory Lane** | **Widen to 4 lanes between Portzer Road and Hickory Drive, including turn lanes; and construct 8' wide bike/pedestrian pathway** | **Bucks** | **2018–2028** | **$ 1.5** | **$ 1.5** | | **$ 0.6** |
| Bristol Road Extension | Extend roadway from US 202 to Park Avenue | Bucks | 2018–2022 | **$ 24.9** | **$ 24.9** | | |
| US 1 Baltimore Pike | Selective widening from two lanes in each direction to three lanes in each direction and relocate the School House Road intersection. Add left turn lanes on US 1 at School House Road and install new traffic signals | Bucks | 2018-2022 | **$ 4.0** | **$ 8.0** | | |
| **Orvis Road** | **New connector road parallel to US 202 from Stetson School driveway to West Pleasant Grove Road** | **Chester** | **2018–2028** | **$ 1.0** | **$ 1.0** | | **$ 1.4** |
| **Ashburn Road Extension** | **0.34-mile extension to Township Line Road** | **Chester** | **2018–2028** | **$ 1.3** | **$ 1.3** | | **$ 5.7** |
| **West Chester Pike (PA 3)** | **Widen with additional through lane from College Avenue to Ellis Avenue** | **Delaware** | **2018–2028** | **$ 4.0** | **$ 4.0** | | |
| US 202 and US 1 Loop Road | Complete southwestern loop road | Delaware | 2018–2022 | **$ 5.9** | **$ 5.9** | | |
| Belmont Avenue at I-76 Interchange | Widen Belmont Avenue to provide additional lanes, intersection improvements and streetscape improvements; modify I-76 and railroad overpasses | Montgomery | 2018–2035 | **$ 37.8** | **$ 75.73** | | |
| **Spring House Roadway** | **Widen for additional through lane from Norristown Road to Sumneytown Pike** | **Montgomery** | **2018–2028** | **$ 0.9** | **$ 0.9** | | **$ 3.1** |
| **Horsham Road** | **Widen to two through lanes in each direction from Limekiln Pike to Davis Grove. Widen Limekiln Pike to two through lanes at intersection with Horsham Road** | **Montgomery** | **2018–2028** | **$ 3.9** | **$ 3.9** | | **$ 4.0** |

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| FACILITY | PROJECT SCOPE | LOCATION | TIMING | SYSTEM EXPANSION COST *MILLIONS OF Y-O-E $* | TOTAL FUNDED COST *MILLIONS OF Y-O-E $* | UNFUNDED COST *MILLIONS OF 2017 $* | LOCAL COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|---|---|
| Second Collegeville Bridge Crossing | Provide additional bridge over the Perkiomen Creek between Ridge Pike and Germantown Pike to connect with PA 29 | Montgomery | **Unfunded** | | | **$ 57.7** | |
| PA 23 and Trout Creek Road Bridge | Replace weight restricted bridge on a new alignment; realign roadway between Moore Road and Vandenberg Road providing two westbound lanes and one eastbound lane | Montgomery | 2018–2028 | **$ 5.4** | **$ 21.4** | | |
| Ridge Pike | Reconstruct from Butler Pike to Philadelphia city line; widen from 3 to 4 lanes from Church Lane to Philadelphia | Montgomery | **2018–2028** | **$ 8.9** | **$ 35.5** | | |
| Henderson Road and South Gulph Road | Widen Henderson Road from South Gulph Road to Shoemaker; Widen South Gulph Road from Crooked Lane to I-76 Gulph Mills intersection | Montgomery | 2023–2035 | **$ 10.6** | **$ 21.3** | | |
| **37th Street Extension** | **One-block connector for vehicles with a pedestrian friendly streetscape between Market Street and Filbert Street** | **Philadelphia** | **2018–2028** | **$ 2.0** | **$ 2.0** | | **$ 0.7** |
| Route 73 and CR 544 (Evesham Road/Marlton Parkway) | Widen from NJ 70 to Evesham Road/Ardsley Drive; add left turn lanes at Both Brick Road and Evesham Road/Marlton Parkway intersections with Dual Left Addition; add Roundabout at Marlton Parkway | Burlington | 2018–2027 | **$ 10.6** | **$ 21.2** | | |

*Source: DVRPC, 2020.*

## TABLE 26: ROADWAY OTHER MAJOR REGIONAL PROJECTS

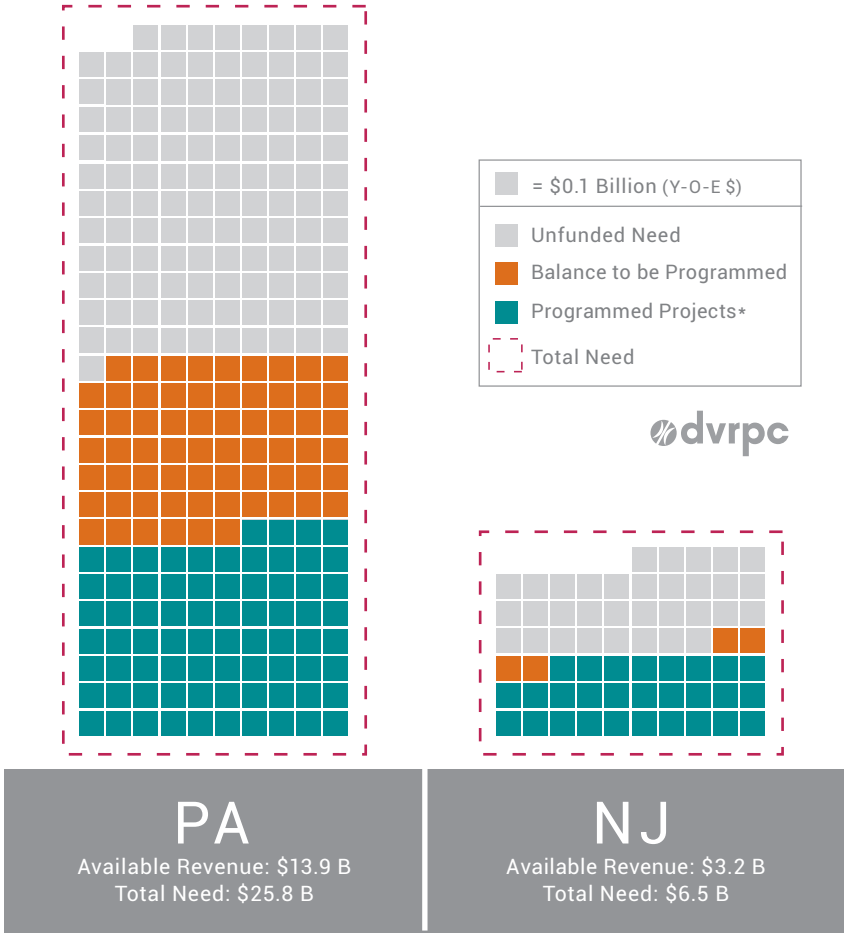
| FACILITY | PROJECT SCOPE | LOCATION | TIMING | TOTAL FUNDED COST *MILLIONS OF Y-O-E $* | UNFUNDED COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|
| I-95 | Sound walls in Chester City | Delaware | 2018–2028 | **$ 16.8** | |
| Delaware River Ferry | Year-round service between Philadelphia and City of Camden | Camden, Philadelphia | Unfunded | | TBD |

*Source: DVRPC, 2020.*

## MAJOR REGIONAL TRANSIT SYSTEM PRESERVATION PROJECTS

Major Regional Transit System Preservation projects (vehicles, stations, and rail infrastructure) will occur on the Atlantic City Rail Line, along with a number of key SEPTA bridges and power substations, which are critical to the long-term viability of the regional rail system. A major renovation of City Hall Station is underway, and significant Regional Rail station upgrades are in the works at Villanova, Paoli, Exton, Ardmore, Levittown, and Fern Rock. Major transit rail bridge rehabilitations are planned for the Chestnut Hill East and West, and Norristown High Speed lines, along with the mainline track between Suburban Station and 30th Street Station. Critical trolley and Regional Rail vehicle replacements will occur over the life of the Plan. Fleets will have expanded seating capacity through the purchase of multilevel regional rail vehicles and larger trolleys, helping to reduce system overcrowding. Trolley modernization aims to make service faster and more reliable, meet ADA-accessibility requirements, and positively transform the streetscape in the neighborhoods where they operate. Figure 11 illustrates the programmed and available funding for transit preservation projects as compared with the total need in each state's subregion. About 54 percent of the Pennsylvania subregion and 50 percent of the New Jersey subregion's transit system preservation improvements can be funded.

## FIGURE 11: TRANSIT SYSTEM PRESERVATION PROGRAMMED PROJECTS, ALLOCATED REVENUE, AND TOTAL NEED (2018–2045)




*Includes projects programed in the TIP and funded Major Regional Projects in the Long-Range Plan

*Source: DVRPC, 2017.*

## TABLE 27: MAJOR REGIONAL TRANSIT SYSTEM PRESERVATION PROJECTS

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST *MILLIONS OF Y-O-E $* | UNFUNDED COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|
| Trenton Line | Levittown Station reconstruction | Bucks | 2018–2022 | $ 36.0 | |
| Woodbourne Substation | New substation on West Trenton Line | Bucks | 2018–2022 | $ 23.5 | |
| Paoli-Thorndale Line | Devon Station renovation | Chester | 2023–2035 | $ 20.0 | |
| Frazer Shop and Yard | Rail shop and yard upgrade | Chester | 2018–2022 | $ 119.1 | |
| Paoli-Thorndale Line | Paoli Intermodal Center (phases 1 and 2) | Chester | 2018–2028 | $ 81.9 | |
| Paoli-Thorndale Line | Exton Station improvements | Chester | 2018–2035 | $ 62.9 | |
| Paoli-Thorndale Line | Villanova Station rehabilitation | Delaware | 2018–2035 | $ 32.2 | |
| Media-Elwyn Line | Secane Station renovation | Delaware | 2018–2035 | $ 24.2 | |
| Wilmington-Newark Line | Marcus Hook Station renovation | Delaware | 2023–2035 | $ 22.5 | |
| Norristown High Speed Line | Tie replacement and continuous welded rail | Delaware, Montgomery | 2018–2028 | $ 26.0 | |
| Routes 101 & 102 | Positive Train Control | Delaware | 2018–2022 | $ 75.0 | |
| 69th Street Transportation Center | Construct parking structure; Transportation Center enhancements | Delaware | 2018–2028 | $ 31.0 | |
| Market-Frankford Line | Replace existing heavy-rail vehicle fleet | Delaware, Philadelphia | 2029–2045 | $ 1,100.0 | |
| Trolleys | Street track improvements | Delaware, Philadelphia | 2023–2035 | $ 27.3 | |
| Norristown High Speed Line | Replace heavy-rail vehicles | Delaware, Montgomery | 2036–2045 | $ 130.0 | |
| West Trenton Line | Philmont Station parking | Montgomery | 2018–2022 | $ 25.0 | |

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| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST *MILLIONS OF Y-O-E $* | UNFUNDED COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|
| Norristown High Speed Line | Rehabilitate Bridgeport Viaduct over Schuylkill River and Bridge 0.15 over 69th Street yard tracks | Delaware, Montgomery | 2018–2028 | $ 50.5 | |
| West Trenton Line | Noble Station renovation, parking garage, and storage track | Montgomery | 2018–2028 | $ 53.0 | |
| Paoli-Thorndale Line | Ardmore Transportation Center (phases 1 and 2) | Montgomery | 2018–2035 | $ 46.3 | |
| Regional Rail Mainline | Jenkintown-Wyncote Station renovation | Montgomery | 2018–2028 | $ 25.3 | |
| Wayne Junction Station | Static Frequency Converter (SFC) #1-4 | Philadelphia | 2018–2022 | $ 60.0 | |
| Regional Rail | Catenary replacement from 30th Street Station to K and Zoo interlockings | Philadelphia | 2018–2022 | $ 77.0 | |
| Regional Rail | Signals, catenary, and right-of-way improvements from 30th Street to Phil interlocking | Philadelphia | 2018–2022 | $ 41.8 | |
| Buses and Trolleys | Computer Aided Radio Dispatch signal and communication system upgrades and replacements | Philadelphia | 2018–2022 | $ 32.5 | |
| Market-Frankford Line | 30th Street Station improvements | Philadelphia | 2018–2022 | $ 11.0 | |
| Market-Frankford Line | 40th Street Station renovation | Philadelphia | 2018–2022 | $ 10.9 | |
| Market-Frankford Line | Arrott Transportation Center (Margaret-Orthodox Station) renovation | Philadelphia | 2018–2022 | $ 39.9 | |
| Market-Frankford Line | 11th Street Station renovation | Philadelphia | 2018–2022 | $ 9.5 | |
| Broad Street Line | Erie Station renovation | Philadelphia | 2018–2028 | $ 9.0 | |
| Wissahickon Transportation Center | Improvements | Philadelphia | 2018–2022 | $ 13.3 | |
| City Hall and 15th Street Stations | Renovation | Philadelphia | 2018–2028 | $ 146.5 | |
| Regional Rail and Broad Street Line | Station ventilation improvements at Suburban and AT&T stations | Philadelphia | 2018–2028 | $ 20.0 | |
| Center City Concourse Improvements | Renovation | Philadelphia | 2018–2035 | $ 59.7 | |
| Regional Rail Mainline | Rehabilitate bridges from 30th Street to Suburban Station | Philadelphia | 2018–2035 | $ 58.0 | |

*continued on next page...*

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST *MILLIONS OF Y-O-E $* | UNFUNDED COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|
| Wayne Junction Shop | Shop improvement/expansion | Philadelphia | 2018–2035 | $ 150.0 | |
| Midvale Bus Garage | Facility and security enhancements | Philadelphia | 2018–2035 | $ 26.7 | |
| Broad Street Line | Replace existing heavy-rail vehicle fleet | Philadelphia | 2029–2045 | $ 625.0 | |
| Chestnut Hill East Line | Rehabilitate five bridges | Philadelphia | 2023–2035 | $ 39.0 | |
| Chestnut Hill West Line | Rehabilitate seven bridges | Philadelphia | 2023–2035 | $ 45.5 | |
| Fern Rock Station | Transportation Center and parking enhancements | Philadelphia | 2023–2035 | $ 77.5 | |
| Regional Rail Vehicles | Replace Silverliner IV fleet | Pennsylvania Subregion | 2023–2029 | $ 1,100.0 | |
| SEPTA Multilevel Push-Pull Cars | Procure 45 new ADA-accessible push-pull cars to replace existing fleet | Pennsylvania Subregion | 2018–2022 | $ 174.3 | |
| Regional Rail Locomotives | Procure (15) electric locomotives | Pennsylvania Subregion | 2018–2022 | $ 154.5 | |
| Trolley Modernization | Replace existing trolley fleet with ADA-compliant trolleys to expand capacity and provide faster, more reliable service | Delaware, Philadelphia | 2018–2045 | $ 713.3 | |
| Atlantic City Line Vehicles | Procure five locomotives and 20 commuter rail vehicles | Camden, Philadelphia | 2028–2045 | $ 215.0 | |
| River Line | Procure 20 light rail vehicles | Camden, Burlington, Mercer | 2036–2045 | $ 130.0 | |
| PATCO | Procure 120 heavy-rail vehicles | Camden, Philadelphia | 2036–2045 | $ 100.0 | |
| Atlantic City Line Stations | Rehabilitate Cherry Hill, Lindenwold, and Atco stations | Camden | 2036–2045 | $ 65.0 | |
| Walter Rand Transportation Center | Station enhancements | Camden | 2028–2035 | $ 50.0 | |
| NJ TRANSIT NE Corridor | Replace 42 commuter rail vehicles for routine fleet replacement | Mercer | 2028–2045 | $ 390.0 | |

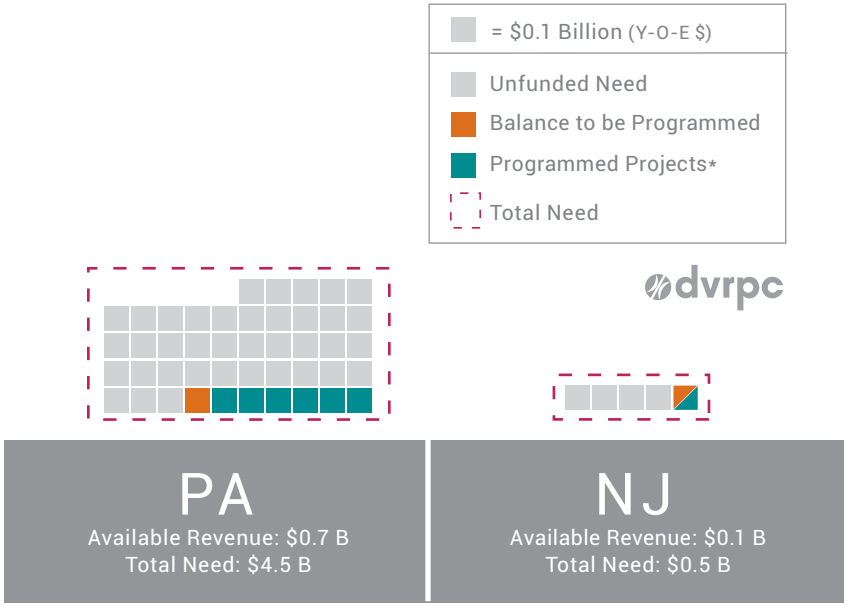
** Project cost includes federal funding portion only; DRPA-PATCO funds make up the balance.*

*Source: DVRPC, 2017.*

## MAJOR REGIONAL TRANSIT OPERATIONAL IMPROVEMENT PROJECTS

Operational improvements include new sidings, additional vehicles to expand the fleet, and other projects that allow for increased service frequency. Table 28 highlights the Major Regional Transit Operational projects. Projects, such as the Norristown Line third track, will enable service and safety improvements. New frequent express bus service along the Roosevelt Boulevard corridor in Philadelphia with amenities like high-quality stations and a unique brand will serve multiple travel markets. Funding for these Enhanced Bus services may partially or fully come from the region's roadway revenues such as the Congestion Mitigation and Air Quality fund (CMAQ). NJ TRANSIT will fully implement positive train control on all of its rail routes. Finally, completion of the SEPTA Key project will give the region one of the most flexible payment systems in the country. Figure 12 illustrates the programmed and available funding for transit operational improvement projects as compared with the total need in each state's subregion. Only about 15 percent of the Pennsylvania subregion's and 20 percent of New Jersey subregion's transit operational improvements can be funded.

## FIGURE 12: TRANSIT OPERATIONAL IMPROVEMENT PROGRAMMED PROJECTS, ALLOCATED REVENUE, AND TOTAL NEED (2018–2045)




*Includes projects programed in the TIP and funded Major Regional Projects in the Long-Range Plan

*Source: DVRPC, 2017.*

## TABLE 28: MAJOR REGIONAL TRANSIT OPERATIONAL IMPROVEMENT PROJECTS

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST *MILLIONS OF Y-O-E $* | UNFUNDED COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|
| Regional Rail System: Core Capacity Improvements | Interlockings, sidings, flyovers, and freight separation projects to increase service frequency on Regional Rail lines | Bucks, Delaware, Montgomery, Philadelphia | Unfunded | | $ 850.0 |
| Roosevelt Boulevard Direct Bus Phase I | Station infrastructure and passenger amenities to allow direct bus service along Roosevelt Boulevard between Neshaminy Mall and Frankford Transportation Center | Bucks, Philadelphia | 2018–2021 | $ 4.0 | |
| West Chester Pike Enhanced Bus Service | Signal prioritization and transit amenities from West Chester Transportation Center to 69th Street Transportation Center | Chester, Delaware | Unfunded | | $ 8.0 |
| Media Trolley Line Second Track | Double tracking from east of Pine Ridge Station to Woodland Avenue | Delaware | Unfunded | | $ 19.0 |
| Trolley Modernization | Communications, signals, power supplies, subway station and in street stops, track and bridge improvements, fare payment and trolley maintenance upgrades | Delaware, Philadelphia | 2018–2045 | $ 440.0 | |
| Norristown Regional Rail Line | Third track at Norristown Station | Montgomery | 2023–2035 | $ 34.5 | |
| Market-Frankford Line Capacity Enhancements | Lengthened station platforms, 80 supplemental rail cars, reconfigured railcar seating, power system improvements, and ADA accessibility improvements | Delaware, Philadelphia | Unfunded | | $ 870.0 |
| Roosevelt Boulevard Direct Bus Phase II | Station infrastructure and passenger amenities to allow direct bus service along Roosevelt Boulevard between Frankford Transportation Center and Wissahickon Transportation Center | Philadelphia | Unfunded | | $ 6.0 |
| SEPTA Key | Updated system-wide fare collection system | Pennsylvania subregion | 2018–2022 | $ 130.3 | |
| Real-Time Information/Audio Visual Public Address System | New passenger information at rail and transit stations | Pennsylvania subregion | 2018–2022 | $ 34.7 | |

*continued on next page...*

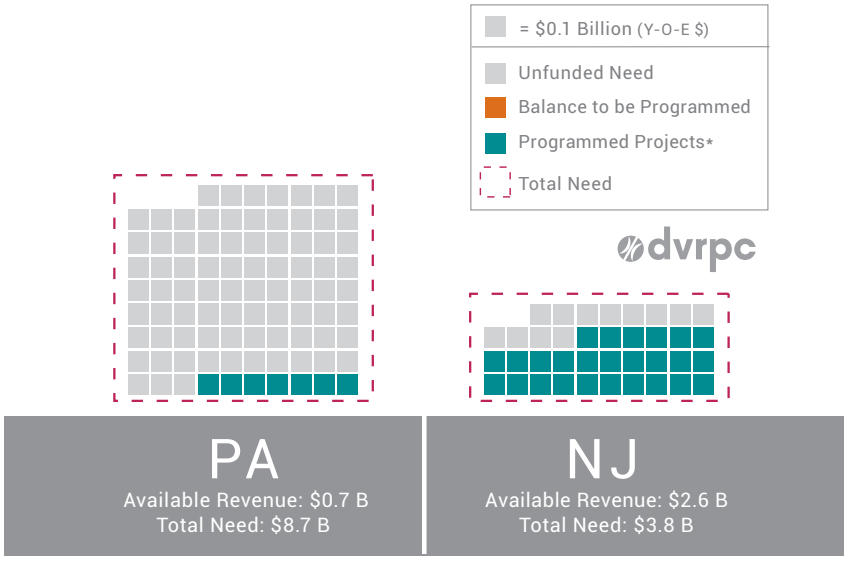
| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST *MILLIONS OF Y-O-E $* | UNFUNDED COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|
| Improved Transit Service to Philadelphia International Airport | Infrastructure improvements to increase Airport Line service frequency, as well as enhancement of other transit modes that serve PHL | Delaware, Philadelphia | Unfunded | | $ 75.0 |
| NJ TRANSIT Positive Train Control | Installation of positive train control on all active NJ TRANSIT rail lines | Camden, Mercer, Burlington | 2018–2021 | $ 21.6 | |
| Atlantic City Line Frequency Improvements | Siding and station improvements; new commuter rail vehicles | Camden, Philadelphia | Unfunded | | $ 105.0 |

*Source: DVRPC, 2017.*

## MAJOR REGIONAL TRANSIT SYSTEM EXPANSION PROJECTS

The Media-Elwyn Line extension to Wawa is funded in the TIP's 12-year program and will be completed by 2023. It is being financed with the help of EB-5 program funds. The Norristown High Speed Line Spur to King of Prussia is funded in the Plan and will open in the later years of the Plan. PATCO's Franklin Square Station will also be reopened. In New Jersey, the South Jersey BRT will run along NJ 42 and NJ 55 in Gloucester County into Center City, Philadelphia. The Glassboro-Camden Line will be constructed in the later years of the Plan. Table 29 lists all Major Regional Transit System Expansion projects in both the funded plan and unfunded vision. Figure 13 illustrates the programmed and available funding for transit system expansion projects as compared with the total need in each state's subregion. Only about 8 percent of the Pennsylvania subregion's and 68 percent of the New Jersey subregion's transit system expansion improvements can be funded.

## FIGURE 13: TRANSIT SYSTEM EXPANSION PROGRAMMED PROJECTS, ALLOCATED REVENUE, AND TOTAL NEED (2018–2045)




*Source: DVRPC, 2017.*

## TABLE 29: MAJOR REGIONAL TRANSIT SYSTEM EXPANSION PROJECTS

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST *MILLIONS OF Y-O-E $* | | UNFUNDED COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|---|
| | | | | STATE AND LOCAL | FEDERAL NEW STARTS/SMALL STARTS | |
| Bethlehem Branch Passenger Rail Extension | Extend service from Lansdale to Perkasie | Bucks, Montgomery | Unfunded | | | $ 282.0 |
| Atglen Regional Rail Extension | Extend Paoli-Thorndale Line to Atglen | Chester | Unfunded | | | $ 15.5 |
| West Chester Rail Service restoration | Extend Media/Elwyn/Wawa Line to West Chester Borough | Chester, Delaware | Unfunded | | | $ 126.0 |
| Pottstown Rail Extension | Extend Norristown Line to Pottstown | Chester, Montgomery | Unfunded | | | $ 419.0 |
| Media-Elwyn Line Rail Extension | Extend Media-Elwyn Line to Wawa | Delaware | 2018–2022 | $ 150.6 | | |
| Norristown High Speed Line King of Prussia Expansion | Rail Line Extension from Hughes Park to King of Prussia | Montgomery | 2023–2035 | $ 550.0 | $ 550.0 | |
| New West Market Market-Frankford Line Station | New Station on Market-Frankford Line | Philadelphia | Unfunded | | | $ 345.0 |
| Roosevelt Boulevard Surface Transit Line | New surface transit line along Roosevelt Boulevard | Bucks, Philadelphia | Unfunded | | | $ 500.0 |
| Delaware Avenue Transit Service | New transit service within Philadelphia | Philadelphia | Unfunded | | | $ 920.0 |
| Broad Street Transit Extension | Transit Extension to Navy Yard | Philadelphia | Unfunded | | | $ 1,250.0 |
| Franklin Square Station | Reopen station on the PATCO Line in Philadelphia | Philadelphia | 2018–2027 | $ 5.2 | $ 20.8 | |

*continued on next page...*

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | FUNDED COST *MILLIONS OF Y-O-E $* | | UNFUNDED COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|---|---|
| | | | | STATE AND LOCAL | FEDERAL NEW STARTS/SMALL STARTS | |
| South Jersey BRT | New BRT from Avondale Park-and-Ride and Delsea Drive to Center City, Philadelphia | Camden, Philadelphia | 2028-2045 | $ 90.0 | | |
| Glassboro-Camden Line | Construct new transit line from Camden to Gloucester County | Camden, Gloucester | 2028–2035 | $ 2,430.0 | $ 700.0 | |
| US 1 BRT | Express bus network serving the US 1 corridor and providing access from Somerset County on US 206, Monmouth County on CR 571, Burlington County on I-295, and Bucks County on I-95 | Mercer, Bucks | Unfunded | | | $ 150.0 |
| West Trenton Line | Re-establish passenger service on the West Trenton Line to Newark and Secaucus (from West Trenton Station to Bridgewater); relocate West Trenton Station to Parkway Avenue TOD | Mercer | Unfunded | | | $ 150.0 |

*Source: DVRPC, 2017.*

## EXTERNALLY FUNDED PROJECTS

In addition to those projects receiving federal and state transportation dollars, *Connections 2045* includes a list of non-federal- and non-state-funded projects. These projects are generally funded through toll revenues, but some have other sources. The New Jersey Turnpike has recently completed its Exits 6 to 9 widening project. The new I-95 and Pennsylvania Turnpike Interchange addresses some of the missing movements between these two critical facilities. The Pennsylvania Turnpike is the subject of two widening feasibility studies. The first study is for the section between Mid-County and Bensalem (mileposts 50 to 59); the second is for the area around the Delaware River Crossing. The extension of Lafayette Street in Norristown in conjunction with the Lafayette Street/Ridge Avenue Interchange will provide direct access from the Pennsylvania Turnpike to Norristown: one of the region's Town Centers.

## TABLE 30: EXTERNALLY FUNDED MAJOR REGIONAL PROJECTS

| FACILITY | PROJECT SCOPE | LOCATION | TIMING | COST *MILLIONS OF 2017 $* |
|---|---|---|---|---|
| I-95 at PA Turnpike | New partial interchange at I-276; widen Pennsylvania Turnpike from US 1 to New Jersey; widen I-95 from PA 413 to Pennsylvania Turnpike | Bucks | 2018–2022 | $ 140.0 |
| I-95 at Scudder Falls Bridge | Widen I-95 from PA 332 to the Delaware River Bridge; replace and widen the Delaware River Bridge; reconfigure I-95 interchanges at Taylorsville Road and NJ 29; repave I-95 from PA 332 to CR 579 (Bear Tavern Road) | Bucks, Mercer | 2018–2022 | $ 512.0 |
| PA Turnpike | All electronic tolling | Bucks, Chester, Montgomery | 2018–2028 | $ 257.0 |
| NEC Future | Includes capacity improvements throughout corridor; new right-of-way and station to directly serve PHL airport; new hub station at Baldwin/Chester, and other improvements to support higher speeds and increased levels of service. | Bucks, Delaware, Philadelphia, Mercer | Unfunded | TBD |
| I-476 PA Turnpike NE Extension | Reconstruct and widen to six lanes from Lansdale to Quakertown | Bucks, Montgomery | 2018–2028 | $ 450.0 |
| I-76 PA Turnpike | Reconstruct and widen from Morgantown, Berks County to Valley Forge | Chester, Montgomery | 2018–2035 | $ 500.0 |
| I-276 and Lafayette Street/ Ridge Avenue | New interchange | Montgomery | 2023–2028 | $ 66.4 |
| 30th Street-Mantua-Philadelphia Zoo Connector | New fixed-guideway shuttle service connecting 30th Street Station; new 30th Street District development; the Mantua neighborhood; and the Philadelphia Zoo | Philadelphia | Unfunded | TBD |
| Atlantic City Expressway | Construction of a third lane in the westbound direction from milepost 31 to milepost 44 | Camden | 2018–2027 | $ 150.0 |
| Atlantic City Expressway | Implement all electronic tolling throughout entire facility | Camden, Gloucester | 2018–2021 | $ 50.0 |

*Source: DVRPC, 2017.*

### Port and Rail Freight Improvements

Strategic improvements to the region's world-class port and rail freight networks will streamline operations, strengthen Greater Philadelphia's ability to compete with other regions, complement highway and highway connector improvements, and enhance the industry's ability to be a good neighbor. Many of these projects will be identified through statewide freight plans and result from public-private partnerships (P3s) and from revenue sources outside of DVRPC's traditional funding purview. INFRA (formerly FASTLANE) grants are just one example of these outside funding sources that assist nationally and regionally significant freight and highway projects that align with the FHWA program goals.

The Commonwealth of Pennsylvania recently completed a $300 million Capital Investment Program, which targets the Packer Avenue Marine Terminal complex and the Tioga Marine Terminal in Philadelphia. These improvements doubled container capacity at the facilities, provided increased capacity for non-containerized cargoes, and brought a substantial increase in automobile-handling capacity. In New Jersey, a project of similar consequence was recently realized with the opening of the South Jersey Port Corporation's new Paulsboro Marine Terminal. Dramatic advances have also occurred with regional rail freight facilities, such as the modernization of the Delair Bridge, the region's most important freigt railroad link between New Jersey and Pennsylvania. Rail freight projects included providing double stack clearance on CSX's Philadelphia Subdivision Line traversing Philadelphia and Delaware County, expanding Norfolk Southern service to the Southport Auto Terminal, and removing bottlenecks and creating additional capacity for freight trains serving the Delaware County industrial waterfront.

### Philadelphia International Airport

Airport capital improvements are primarily funded with fees paid by commercial airlines. PHL is planning a number of major improvements and renovations in the coming years that will significantly enhance and facilitate the traveling experience. A new air traffic control tower and a new arrivals building for terminals B and C will be constructed. Travelers will have access to new restaurants and retail offerings and be able to order food directly to their seats as they wait at gates. Also, the airport's fuel pumping and storage system will be modernized; many roofs, elevators, escalators, and HVAC units will be replaced; and aircraft de-icing equipment and airfield snow removal equipment will be purchased.

## CLOSING THE FUNDING GAP

DVRPC's transportation infrastructure needs assessment found a minimum regional funding gap of approximately $64 billion between the Vision Plan and the Funded Plan over the life of *Connections 2045*. Failure to maintain and improve the transportation network reduces the region's economic competitiveness, and makes it less attractive for business investment; degrades the environment with increased congestion; increases vehicular damage due to poor road conditions; and increases vehicular crashes due to less-safe travel conditions.

The majority of the funding that the region currently uses to build, maintain, and repair its road and transit infrastructure currently comes from the federal and state governments. The region does not have the power to control the level of federal or state funding that it receives. Given the large set of needs that will remain unmet at current funding levels, the region should continue to explore ways to close its funding gap. This can be through project right-sizing, better program

management, innovative project delivery, and raising additional revenues with a focus on local funding options or P3s. It is likely that a combination of several funding mechanisms, with help from all levels of government, is needed to fully fund the region's identified needs. The region's local funding contribution is low compared to other large metropolitan areas. This restricts Greater Philadelphia's ability to fulfill the Vision Plan and puts the region at a competitive disadvantage when compared to its peers across the nation and around the world.

The Plan continues the dialogue and consensus building around the search for optimal funding solutions. The gas tax that is used to fund road and transit projects at the federal and state levels is quickly becoming obsolete due to increased use of electric vehicles that do not pay into it, more fuel-efficient vehicles that pay less per mile driven, and flat VMT growth rates. The major decline in VMT and transit ridership due to the COVID-19 stay-at-home orders will have a significant impact on transportation revenues. There is a need to have a serious discussion about what sort of tax or fee should replace the gas tax. This is also an opportunity to think about how the design of markets and pricing the system can help to further the goals of the Plan while creating a more equitable, safe, and efficient transportation network. Funding will become an even more significant issue if federal transportation dollars do not grow to keep up with future needs, or even with inflation.

## PROJECT RIGHT-SIZING

Right-sizing and seeking efficiencies throughout the transportation network works to resolve transportation problems with solutions that are context sensitive, affordable, supported by the surrounding communities, and implementable in a reasonable timeframe. Right-sizing means the DOT will consider reduced-scale alternatives like TSMO before developing alternatives, such as new or widened roadways. If safety, and not congestion, is the problem, then the DOT will consider focused solutions that can improve safety without increasing capacity. That said, safety must be considered in all projects.

## LOCAL FUNDING OPTIONS

Additional funding is needed if the region wants to realize the transportation vision set forth in this Plan. New funds will most likely need to be generated at all levels, including locally. To do this, the region needs to find ways to translate recent growth into improvements in the transportation system. Ideally, any new local transportation funding sources should be easy to implement, stable and sustainable over time, equitable both for system users and over geographic areas, should further the goals and policies of the Plan, and not yield unintended negative economic impacts. In addition, the region can use financing to help advance large-scale projects using tools, such as bonds, Transportation Infrastructure Finance and Innovation Act (TIFIA) loans, the EB-5 program, state infrastructure banks, and P3s. See Appendix B of the *Connections 2045* Administrative Plan (Publication #17039) for more information on these financing tools.

Poor infrastructure conditions and the failure to improve transportation system performance puts the region at an economic disadvantage compared to our peer competitor regions, both in the United States and around the world. The goal has been to find ways to use the region's economic growth as a means to enhance the transportation network. DVRPC has reviewed more than two dozen different taxes or fees that could potentially fund the region's transportation system. *Connections 2045* maintains the focus on direct user fees, which are widely considered to be the fairest way to pay for system improvements. These

## TABLE 31: REGIONAL USER FEES SUMMARY

| FUNDING OPTION | DESCRIPTION | PROPOSED RATE | % INCREASE | ANNUAL REVENUE *(2017 MM $)* | | LONG-TERM ANNUAL CHANGE | | LONG-TERM IMPLICATIONS |
|---|---|---|---|---|---|---|---|---|
| | | | | PA SUB-REGION | NJ SUB-REGION | VMT (MM) | TRANSIT RIDERSHIP (MM) | |
| Access Fees | Charge on nonresidential taxable property located within a quarter-mile of transit stations | $0.25 per square foot | Varies | $ 40.0 | $ 5.0 | 0.0 | 0.0 | Could lead to slight shift away from transit-oriented locations; alternatively could finance new transit routes, increasing transit-accessible locations and ridership |
| Carbon Tax | Tax placed on carbon emissions | $30 per $MTCO_2E$ | 2.3% to cost of driving per mile | $ 480.0 | $ 210.0 | 280.0 | + 0.8 | Likely to increase use of alternative-fuel or energy-efficient vehicles, and may encourage alternative modes of transportation |
| Congestion Pricing | (a) Cordon toll around Center City; (b) Peak-hour congestion pricing on region's highways | (a) $5 per vehicle entering cordon area; (b) $0.20 per peak hour vehicle mile driven | (a) ~25% per Center City vehicle trip; (b) ~37% per peak-period highway trip | (a) $65.0<br>(b) $260.0 | (a) $0.0<br>(b) $140.0 | (a) – 180.0<br>(b) – 270.0 | (a) + 3.6<br>(b) + 5.6 | (a) May have negative impacts on Center City, but this area of the region has the most transportation options;<br>(b) Option with most congestion reduction; high administration costs |
| Fuel Sales Tax | Applies a sales tax to the purchase price of gasoline, not including liquid fuels taxes | 2% of the retail gasoline price | 2% increase to fuel cost | $ 40.0 | $ 25.0 | – 40.0 | – 0.1 | Likely to increase use of alternative-fuel or energy-efficient vehicles, and may encourage use of alternative modes |

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| FUNDING OPTION | DESCRIPTION | PROPOSED RATE | % INCREASE | ANNUAL REVENUE *(2017 MM $)* | | LONG-TERM ANNUAL CHANGE | | LONG-TERM IMPLICATIONS |
|---|---|---|---|---|---|---|---|---|
| | | | | PA SUB-REGION | NJ SUB-REGION | VMT (MM) | TRANSIT RIDERSHIP (MM) | |
| Mileage-Based User Fees | A fee on each vehicle mile driven, assessed at inspection and/or registration | $0.01 per mile | 1.9% compared to cost per mile driven | $ 220.0 | $ 140.0 | – 660.0 | + 2.9 | Largest decline in VMT; may encourage more compact development patterns |
| Regional Toll Surcharge | a) Add surcharge to 12 regional turnpike exits;<br>(b) add surcharge to nine bridges over the Delaware River | (a) $1.00 per trip;<br>(b) $1.00 per crossing | 20–100% | (a) $ 95.0<br>(b) $ 45.0 | (a) $ 20.0<br>(b) $ 45.0 | (a) – 190.0<br>(b) – 90.0 | (a) + 0.6<br>(b) + 2.0 | Many trips lack transportation alternatives; may benefit goods movement through reduced congestion |
| Sales Tax | Levied as a percentage of the purchase price for goods, products, and services | Increase 0.5% | 13%–17% | $ 250.0 | $ 100.0 | – 8.0 | 0.0 | Little impact on transportation system use and development patterns |
| Toll Existing Highways | Assessed as a user fee on designated limited access roads and bridges | $0.10 per mile | ~19% per highway trip | $ 400.0 | $ 280.0 | – 290.0 | + 0.7 | May shift traffic onto local roads; high administration costs; may encourage TOD |
| Transit Fare Increases | Cost per transit trip or monthly/weekly pass | 3.0% | 3% fare increase | $ 9.0 | $ 1.0 | + 16.0 | – 5.6 | May reduce transit ridership and increase congestion |
| Vehicle Registration Fee | Annual assessment on vehicle ownership | $10 per vehicle per year | 0.2% to annual vehicle ownership cost | $ 20.0 | $ 10.0 | 2.4 | 0.0 | Very little impact on transportation system use and development patterns |

*Source: DVRPC, 2017.*


Source: PennDOT.

fees are related to the use of the transportation system and can include mileage-based user fees (MBUF), tolling, gas taxes, or transit fares, among others, see Table 31 (or Appendix E of the *Connections 2045* Administrative Plan, Publication #17039) for more detailed information. It is not likely that any single option could fill the funding gap on its own. DVRPC has not identified any of the options as a preferred alternative. Rather, the hope is to encourage discussion and develop consensus on the optimal funding mechanisms to help the region achieve its transportation goals. The implications of HAVs and other emerging technologies must also be a part of this conversation. The transition to HAVs is likely to be far more transformative than changing revenue sources, and may further necessitate new funding methods. In addition, HAVs may decrease other government funds derived from parking, traffic enforcement, vehicle registration, and similar sources.

None of the fees listed in Table 31 are easily implementable. State-enabling legislation is required for anything besides transit fares. Adding tolls to Interstate highways would require federal government approval and is not allowed under current federal regulations. It is likely much easier to increase an existing fee, than it is to create a new payment system. The way in which we charge for the use of the transportation network can potentially help realize some of the Plan's goals while also building agglomeration economies needed to make the region more economically competitive. New charges should support denser, centers-based development patterns and encourage more development in areas served by transit, along with pedestrian and bike facilities. This can reduce pressure to grow in the less-developed areas of the region. Careful market design can help to make the transportation network more efficient, while reducing energy use and lowering congestion.

## INVESTING IN THE VISION

The transportation investments outlined in *Connections 2045* and this Amendment are aimed at improving mobility choices by Creating An Integrated, Multimodal Transportation Network that is well-maintained, provides accessibility, reduces congestion and auto-dependence, incorporates new services and technologies, and moves the region toward zero roadway deaths. These investments will also further the regional goals related to the other core principles of the plan: Sustain the Environment, Develop Livable Communities, Expand the Economy, and Advance Equity and Foster Diversity. Rebuilding, maintaining, and updating existing transportation infrastructure—while incorporating more transit, bicycle, and pedestrian options—remains a top priority for the region.

These types of investments will help to focus growth and development in centers, make transportation more space efficient, and lower demand for new roadway facilities. Building less infrastructure can reduce future maintenance needs. Placing development near existing transit routes will help increase ridership. It will improve the operating cost recovery of our transit system, making it more self-sufficient, and will allow for more capital funding for system improvements. Another top priority is the use of technology to increase the flow of information, find new efficiencies, increase safety, and generally improve the operations of the existing transportation system. Given future uncertainty with regard to a changing climate and advances in technology, a multimodal network offers flexibility to respond to shifts in demand. In addition, the COVID-19 crisis has led to a major decline in demand for most transportation infrastructure as a result of shelter-in-place orders, while greatly increasing demand for bicycle and pedestrian space for exercise and recreation—highlighting the need for flexible facilities. Uncertainty surrounding the future of transportation post-COVID-19 will again call for adaptable options, the use of technology to better manage systems and risks, and dense urban areas to lead the rebound through innovation and the building of stronger, more resilient communities and economies. These issues and needs will be more fully addressed in the *Connections 2050* Long-Range Plan, currently under development.

While the Funded Plan serves as an initial down payment for achieving the vision outlined in *Connections 2045*, there is still much work to be done. The region will need to continue to monitor technological advances and determine how transportation infrastructure will need to be adapted to successfully apply them. The network also needs a new way of funding that can both support the goals and policies set within the Plan while also addressing the funding needed to make the vision a reality. Implementing the Plan is an ongoing process that requires data sharing and coordination, multimunicipal planning, regional cooperation, and government efficiency. The region will need to be flexible and adaptable to potentially fast-moving future changes, while not losing sight of the greater vision of where we collectively want the Greater Philadelphia region to be in 2045.

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# *CONNECTIONS 2045*
## Long-Range Plan Amendment

**Publication Number**: 20016
**Date Published:** July 2020

**Geographic Area Covered:**
The nine- county DVRPC region, which covers the counties of Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer counties in New Jersey.

**Key Words:**
Long-Range Plan, Greater Philadelphia, financial plan, transportation needs, vision, funding gap, funding options, multimodal, major regional projects, MPO, implementation, transportation, transportation performance management, performance targets, amendment, Performance-based Planning and Programming, performance measures, roadway safety, pavement condition, bridge condition, CMAQ, congestion, emissions, freight, asset management, transit asset condition, transit safety.

**Abstract:**
This document amends the Connections 2045 Plan for Greater Philadelphia to reflect shifts in federal and state funding to the Pennsylvania portion of the DVRPC region and incorporate federal Transportation Performance Management (TPM) requirements. The amended financial plan addresses the new revenue projections, updates the cost, timing, and scope of major regional projects in the Long-Range Plan. TPM requires MPOs, DOTs, and Transit Agencies to track indicators and set performance targets for transportation safety, infrastructure and asset conditions, and system performance. The Plan must also include a discussion of how it will help to meet the TPM targets.

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